DACAAR

Scientific Investigation Report in Afghanistan

Water Resources Potential, Quality Problems, Challenges and Solutions in Afghanistan

July, 2013




Provided by

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An

Evaluation of the Past and Present Situation of Water Resources and Consequences on the Basis of Previous Water Resource Investigation and Present National Groundwater Monitoring Wells Network Data Management, Mapping, Visualization and Assessment

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Foreword

Quantitative and qualitative standings of groundwater resources as well as surface water resources in Afghanistan were Investigated. The qualitative investigation was based on data from national Groundwater Monitoring Wells (GMWs) network and production wells and the qualitative investigation was onthe base of physical, chemical and bacteriological analysis of water samples data from national GMWs network and drinking water points (hand pumped wells, production wells, dug wells, stream, springs and karezes). The results show that the groundwater water table has been progressively declining over time and the water quality have deteriorated due to lowering of water table, poor land use, poor waste management and protection. The main impact of these events include; 1) Most of the springs, karezes and shallow wells have dried up; 2) decreased annual precipitation; 3) increased deterioration of water quality; 4) increased water logging and salination; 5) declining of water levels in excess of recharge trend; 7) increased evpo-transpiration and; 6) Marshes dried up in several areas of the river basins, leaving salt crust on the surface.

The above impacts have resulted in the replacement of surface water by groundwater resources to support socio-economic development and environmental security. This however, is basically not possible because of low thickness and productivity of the aquifers. We have done very little to tackle water quality deterioration and serious lowering of the groundwater level due to fragmented institutional arrangements and poor formulation of effective water policies, strategies and regulation for integrated water resources management, development, protection, conservation and sustainability

This report presents water resources qualitative and quantitative problems (early warning signals) which may support policy and decision makers to apply effective policies, strategic plans and regulations for sustainable development, management, development and protection of water resources.

There is also increasing demand due to population growth, agricultural needs, industrialization and socio-economic improvement. There are urgent needs to find solutions rather than waiting for further deteriorations.

Key words: **Natural Groundwater Resources Depletion; Water Quality Deterioration**; **over draft and socio-economic and environmental security concern**.

Acknowledgments

I would like to thank DACAAR personnel for the support, constructive suggestion, and valuable recommendations and for analyzing of water samples groups. The kindness and cooperation of all of our staffs and co-helpers is greatly appreciated.
I would not be able to finish thisscientific report without continual support of the following staffs:

- Gerry Garvey director of DACAAR and Shah Wali program head of DACAAR facilitated suitable environment for provision of this report.
- Leendert Vijselaar, Coordinitor WASH Closter Co-Lead of DACAAR hard work for revising and correction of this report
- Ahmad Jawid, WASH Hydrogeologist, recorded and managed water quality and quantity data and provided charts, graphs and tables.
- Shir Habib, Laboratory Supervisor supervised physical and chemical analysis of water samples
- Bashir Ahmad, Abdul Hadi, Shakar Khan, Abdul Ahmad, Nasratullah and Qudratullah lab technician were analyzed bacteriological, physical and chemical of water samples.
- Shir Ahmad, field supervisor for GMWs data collection in central, east and south of Afghanistan.
- Sayed Masood, field supervisor for GMWs data collection in west of Afghanistan.
- Assadullah, field supervisor for GMWs data collection in north, north west and north east of Afghanistan

We would like thank from Professor M. Naim Eqrar Dean of Geoscience Faculty of Kabul University and Dr. Mohamad Abrahim Najaf Profesor of Geology and Mine of Kabul Polythechnic University for his useful comments, recommendations and editing of this report.
We also would like to thank from Leendert Vijselaar, WASH Closter Co-Lead Coordinitor of DACAAR for recommendation and revising of this report

Comment on scientific-research report "Water resources potential, quantity problems, challenges and solutions in Afghanistan"

I read through this report, and I found, it is very important and comprehensive research in over the country in regards groundwater recourses, however three decade ware and conflict caused insecure situation and created many problems in all sectors, especially for field research of water resources. In general it is admirable and valuable. In this report, the previous and current situation of the water resource evaluated based on the historical data and recent groundwater monitoring wells network data.

It is clear and obvious that due to frequent drought the water resources of each country is being affecting and in this situation, most of the country can in a good manor in regard water problems and its other negative affect through applying effective and efficient policies and strategies for water resources development and protection from contamination and depletion.

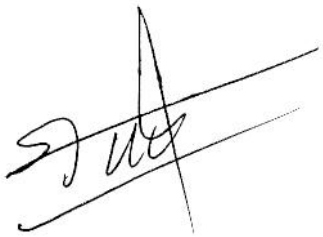
However, the content and results of this report shows that in our country there seems lake of efficient and effective policies for water resources management due to prolonging wars and conflicts. Currently, the situation is relatively ready for making appropriate water resources management policies, but the water recourses has impacted due unworkable and poor key water sector institutional organization and this issue caused the following main negative impacts:

1. The majority of springs, Karizes and shallow wells dried up.
2. Yearly rains fall decreased.
3. Increase water quality deterioration.
4. Decrease groundwater recharge by rivers.
5. Increased evaporation
6. Marshes dried up in the several areas of rivers basin. conductors

According to above mentioned problem, I hope the result of this report to be warning signal for the water resources management key sectors and it is urgent needed to make effective and efficient policies, strategies and regulation for water resources management, development and protection. The most important points, the water sectors should coordinate and cooperate for the implementation of the policies, strategies and regulation.
The most data used for the evaluation of this report provided by DACAAR and these data contain: 1) the water table and physical parameters (electrical conductivity, pH and temperature) were collected from groundwater monitoring wells network (2003-2011); 2) the water quality (physical, chemical and bacteriological) parameters tested in the DACAAR water quality analysis laboratory (2004-December); and 3) the water table and physical parameters (23870 measurement) were provided from DACAAR water points (tube wells, dug well and spring).

We realized from above issues that the report is prepared by Engineer M Hassan Saffi with his hard work and long time effort and with giving clear results and achievements, however, it is to be a step for doing further effective works and bringing this to attention of officials to take necessary action for water resources monitoring and other field research improvement and management.
I am as commenter appreciate this important and valuable report that provided by Engineer Mohammad Hassan. I recommend to published this report. I also request from related government officials to respect such qualifies and patriot engineers and encourage him for his effective and valuable effort.

Sincerely,
Dr. Mohammad Ibrahim Najaf
Professor of Geology and Mines
Faculty of Kabul Polytechnic University



Comments on report of Water resources potential, quality problems, challenges and solutions in Afghanistan

Lessons can be learned from the past; from time to time it is useful for practitioners to look back over the historical development of their sciences, basically we have been from long term time a gap of practitioners in all over the country, because of upheaval war for more than three decades.

Still we stay in gap of well arranged and standard hydrogeological data and many scattered hydrogeological data which are available with water line, ministries and private sectors, it has to be collected analyzed and scientifically interpreted with good background of hydrogeological knowledge and modern techniques and tools.

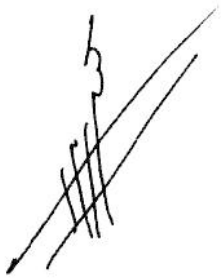
The qualitative investigation of this report was based on data from National Groundwater Monitoring Wells (GMWs) network , production wells and the qualitative investigation was on based of physical, chemical and bacteriological analysis of water samples data from National GMWs network and drinking water points (hand pump wells, production wells, dug wells, stream, springs and karezes).

This scientific report prepared with recent hydrogeological data and compared with historical exisisting data, well analysed and interpreted with modern tools and pointed out all challenge and critical most existed problems in the field of quality and quantity of groundwater issues in Afghanistan.

The Water resources potential, quality problems, challenges and solutions in Afghanistan report, has been written and prepared with ongoing support of DACAAR by Eng.M.Hassan Saffi one of the most practitioner and familiar hydrogeologist with hydrogeology of Afghanistan and who has collected the hydrogeological data according the national and international standards and well arranged good data base of hydrogeology in the country.

Anyone who needs groundwater data in all over the country he must knocks the door of DACAAR and ring up Eng. Hassan Saffi, I am fully appreciate this great jobs which he has done and this is the assignment for future generation to improve and continuously follow up and well developed the groundwater sector to find out safe potable drinking water for our next generation.
Finally the author comes with Solution and policy relevant option to solve the potential, quality and quantity problems of groundwater in Afghanistan, publishing or launching this report on web will be one of the positive step for the next one.

Wish him all success
M.Naim Eqrar Hydrogeologist
Professor of Geosciences faculty
University of Kabul



List of Abbreviation

Cm	Centimeter
DANIDA	Danish Development Aid
dS/m	Deci-Siemens/meter
ETP	Evapo-transpiration
DACAAR	Danish Committee for Aid to Afghan Refugees
DW	Dug Well
EC	Electrical Conductivity or Salinity
FAO	Food and Agriculture Organization.
gr/l	Gram per liter
MCM	Million cubic meters
M	Meter
Mm	Millimeters
m^3	Cubic meters
mmhos/cm (mS/cm)=	millimohos/cm at 25 Degree Celsius
µS/cm	Micro-Siemence Per Centimeter
µ	Micro
µg/l	Micrograms per liter
GMWs	Groundwater Monitoring Wells
meq/L or meq/l	mille equivalents per liter
mg/l or mg/L	Milligram per liter
MRRD	Ministry of Rural Rehabilitation and Development
NRVA	National Risk and Vulnerability Assessment
RNE	Royal Norwegian Embassy
SAR	Sodium Adsorption Ratio
Ppm	Part per millions
Ppb	Part per billions
TW	Tube Well
TDS	Total Dissolved Solid (mg/l or gr/l)
TD	Total Depth
USGS	United States Geological Survey
USDA	United States Development Aid
UNICEF	United Nations Children Fund
Vs	Versus
WTWG	Water Technical Working Group
WP	Water Point
WD	Well Diameter
WSP	Water and Sanitation Programme
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
WSG	Water and Sanitation Group

Technical Terms

Anthropogenic Pollution	Man Made Pollution
Aquifer	A geologic formation or stratum containing water in its voids or pores that may be extracted economically and used as a source of water supply
Aquiclude	A geologic formation so impervious that for all practical purposes it completely obstructs the flow of groundwater (although it may itself be saturated with water).
Aquitard	A geologic formation of rather impervious and semi-confined nature which transmits water at a very slow rate compared to an aquifer.
Artificial recharge	Artificial recharge is an aquifer recharge and recovery by directing surface water into pits, trenches, boreholes and infiltration basins.
Contaminant	Any substance that when added to water (or another substance) makes it impure and unfit for consumption or use
Effluent	Streams receiving water from groundwater aquifers by base flow are termed effluent or gaining streams
Evaporation	The conversion of a liquid (water) into a vapor (a gaseous state) usually through the application of heat energy during the hydrologic cycle; the opposite of condensation
Evapo-transpiration	The loss of water from the soil through both evaporation and transpiration from plants
Ground water	It is water held within the interconnected openings of saturated rock beneath the land surface
Groundwater Discharge	Groundwater discharges include, evaporation, transpiration and groundwater flow to the surface as drainage, springs, karezes and pumping for irrigation and water supply
Groundwater Level	Indicates the position where the atmospheric pressure and hydraulic head are at equilibrium (balance) in the aquifer
Groundwater Recharge	Groundwater recharge is defined as the downward flow of water recharging the water level forming an addition to the groundwater reservoir.
Groundwater Level Fluctuation	Any event that produces a change in pressure on ground water level causing the groundwater level to vary. Differences between supply and withdrawal of groundwater cause level to fluctuate.
Groundwater Movement	The movement of groundwater in an aquifer. The movement of ground water through an aquifer is extremely slow, generally in the order of centimeters per day or meters per year
Intermittent Stream	Flows only after a rain and is fed totally by surface water.
Infiltration	The process whereby water enters the soil and moves downward toward the water table
Influent	Streams losing water to groundwater are called influent or losing streams.
Integrated Water Resources Management (IWRM):	Integrated Water Resources Management is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resulting economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.
National Primary Drinking Water Regulations(NPDWRs) or Primary Standards	Primary standards are legally enforceable standards that apply to all public water systems. Primary Standards protect public health by limiting the “Maximum Contaminant Levels” (MCLs) of contaminants in drinking water
Non Point Source Pollution (NPS):	Non-Point Source Pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources.
Quality Control (QC):	Quality control monitors compliance with standards and tells us that something has gone wrong after it had happened.
Quality Assurance (QA):	Quality assurance tries to stop that something is going wrong
Run-off	Precipitation that flows over land to surface streams, rivers, lakes and under the ground surface.
Specific Capacity	Well Yield Per Unit of Drawdown.

Secondary Standards or National Secondary Drinking Water Regulations (NSDWRs)	These standards were established more for cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odour or colour) in drinking water
"Safe"	No health risk is incurred by drinking the water; the concentrations of contaminants in the water are below acceptable levels as defined by regulation.
Spring	Abrupt intersection of the ground by the groundwater table. Unlike swamps, the point of intersection is usually followed by a steep slope causing the water to flow by gravity
Strategy	An action, procedure, program or technique that carries out general plan policy.
Specific Yield	Portion of water in storage in the ground that will drain under the influence of gravity.
Storage Coefficient (S):	The volume of water that an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head.
Sustainability	Sustainability encompasses the beneficial use of groundwater to support the present and future generations, while simultaneously ensuring that unacceptable consequences do not result from such use.
Percolation	Vertical and lateral movement of water through the soil by gravity.
Strategy	An action, procedure, program or technique that carries out general plan policy.
Permeability (K)	The fluid-transmitting characteristic of geologic media in quantitative terms
Hydraulic Conductivity (K)	The water- transmitting characteristic of geologic media in quantitative terms.
Precipitation	The part of the hydrologic cycle when water falls, in a liquid or solid state, from the atmosphere to earth (rain, snow and sleet).
Policy	A specific statement that guides decision making or a commitment of the national/local legislation body to a particular course of action.
pH	Which is defined as the negative decimal logarithm hydrogen ion activity(H^+). The pH value is indicated where the water is acid or alkaline. Neutral water pH=7. If the pH of water is less than 7 is acidic and more than 7 is alkaline
Transpiration	The process by which water absorbed by plants (usually through the roots) is evaporated into the atmosphere from the plant surface (principally from leaves)
Undesired Result	An undesired result is commonly interpreted to mean a progressive lowering of groundwater table, leading eventually to depletion of supply (recharge).
Water safety plan	The water safety plan is provision of safe drinking without contamination of source water.
Water table	The surface separating the vadose zone from the saturated zone
Watershed	It is the area of land that catches rain and snow and drains or seeps into a marsh, stream, river, lake or groundwater.
Water Quality	water quality is the physical, chemical and biological characteristics of water in relationship to a set of standards
Water Logging	Changing saturated zone to unsaturated zone.

Conversion Formula

meq/l= 10*EC in milimohos per centimeter(mmhos/cmor mS/cm)
TDS (mg/l) = 640*EC in mS/cm, if EC< 5 mS/cm
TDS(mg/l) = 800*EC in mS/cm, if EC >5 mS/cm
1000 mmhos/cm(µS/cm) = 1 mmho/cm (mS/cm) = 1 dS/m
mmhose/cm = 1000 micro-siemence per centimetre (µS/cm)
dS/m = deci-Siemen/metre(equivalent to 1 mmho/cm)
milligram per litre ≃ parts per million (ppm).
meq/l = milliequivalent per litre (mg/l ÷ equivalent weight = me/l); in SI units, 1 me/l= 1 millimol/litre
1 µg/l = 1000 mg /l=pbm
1 mg/l = 1 ppmin water chemistry= litre of water weighs 1,000,000 mg

1. Introduction

Most of Afghan's depend on groundwater as their primary source of domestic/drinking water. Afghanistan has encountered a scarcity of surface water due to the unequal and timely distribution of precipitation, poor integrated water resources management, and low water storage infrastructure and fragment institutional arrangement. The country is covered by five river basins which have potential water. The perennial rivers either flow marginally or extremely polluted. Most of small rivers/streams are intermittent and only run for 3-4 months during rainy period. Therefore, the groundwater is a strategic storage andit is plying the lead role for various purposes (domestic/drinking, irrigation, industries and environmental security).

The logic from a human development prospective is clear to improve access to safe drinking water and sanitation would reduce health incidents and would allow people to make productive use of their time, the study and improve their livelihood.

The national coverage access to safe drinking water is about 27%, which only around 20% of the rural inhabitants have access to safe drinking water andthe rest depend on unsafe drinking water. About 5% of total population has access to the sanitation. Afghans poorest nation in the world, the access to the safe drinking water and sanitation is one of the lowest coverage in the world. Poor coverage safe drinking water and sanitation have caused to the high mortality and morbidity rate in the country.

In Afghanistan, the quantitative and qualitative concerns have indicated by the national groundwater monitoring wells network. The quantitative concerns has continuing lowered groundwater table, water logging, depletion of groundwater natural storage and the qualitative concern has progressively deteriorated the parameters of salinity, water hardness, fecal coliform bacteria, nitrate, nitrite, arsenic, sulfate, fluoride and boron concentrations, which potentially can become a real threat for the health of Afghan's inhabitants, agricultural activities and environmental security. Afghan's inhabitants have frequently been affected by contaminated water-born related diseases and children are the most vulnerable

As Afghan's population continues to grow up, there is increasing pressure to further exploit groundwater for various purposes. This trend will cause further negative consequences on the qualitative and quantitative of groundwater that will challenge our socio-economic development and environmental security as well as well being. This vulnerability of the aquifers may not be reversible and the inhabitants of Afghanistan will face a severe shortage of drinking water and most probably increased water contamination in future.

Current institutional arrangements and management tools may not meet the emerging need. It is urgently required to prevent all processes and activities that cause degradation of water quality and depletion of natural water storage.

2. Overview Objectives, Indicators, Concerns and Challenges

2.1 Indicator

The main water supply and sanitation management indicators are as follow:

a) The national coverage access to safe drinking water is 27%, which only around 20% of the rural population have access to safe drinking water (NRVA 2007-2008). This is very low coverage level in the world.
b) The estimate indicates that 191 out of 1000 children die before they reach their fifth birth day, out which 44 are caused by unsafe water and poor sanitation (Ministry of public health 2006).
c) No clear and scientific image of groundwater potential (availability), supply and demand
d) No water safety plan(QCand QA)
e) High density of well per unit area without regard to spacing norms and number of households constructed. Standard well mains to supply safe drinking for 25 households (8 people per household).
f) Limited technical options for water using, development and storage.
g) No practical alternative for water sources investigation and development.
h) Cross contamination in wells due to poor well site selection and construction.
i) There is usually a lack of technical capacity in the national and local level in term of effective operation and maintenance of the water supply system.
j) The capacity to access spare parts might also be lacking due to distance to markets were such products are available
k) According to the safe drinking water in the rural areas is a challenge for millions of rural inhabitants around the country.
l) Poor access to safe drinking water, inadequate sanitation, and poor hygiene cause a water-related diseases which potentially has affected healthof people inthe country.
m) Poor skilled and poor equipped water private sector.

2.2 Objective

The main objectives of this report include:

a) Describe current characteristics and conditions of water resource.
b) Identify the source of water supply.
c) Identify sources of contamination (artificial/man made and natural contaminations).
d) Identify type of contamination.
e) Identify seasonal/periodic variation of contamination.
f) Identify seasonal/long term water table variation or continuing lowering water table.
g) Determine what has caused changes in water table and water quality.
h) Determine effective policies, regulations and management action to protect or restore groundwater resources.
i) Specify undesired results which are threatening security and sustainability of groundwater.

2.3 Main Concern

The main concerns are:

a) Low coverage of water supply and sanitation.
b) No clear and scientific image of water resources potential, supply and demand.
c) Lack of coordination among various water supply stakeholders (practical knowledge, sharing experiences, lessons learning, dissemination and exchange information).
d) Poor groundwater quality and quantity monitoring system.
e) Limited technical options for water using, development and storage.
f) Poor groundwater data collection, database and data information system.
g) Lack of action research.
h) No practical alternative for water sources investigation and development.
i) Large cities without central sewerage and waste water treatment systems.
j) Poor encouragement of public participation for household sanitation and hygiene practices.
k) No practical responses regarding groundwater quality and quantity degradation.
l) Fragmented institutional arrangements.
m) Poor formulation of effective water policies, strategies and enforcement of water legislation.

2.4 Challenges facing water resources

The main challenges facing water resources are:

a) Lack of understanding integrated approach for water resources management, development, protection, conservation and sustainability.
b) Response required regarding insufficient groundwater storage and very high degree of population growth.
c) Growing competing demand and supply gap.
d) Increasing environment concern.
e) Climate change, variability of precipitation, and severe events like drought and flooding.
f) Response required regarding over-abstraction and degradation of water quality and quantity.
g) Past emphasis on water supply development than water resources availability
h) Setting of primary and secondary National Drinking Water Standard
i) Poor water safety plan
j) Improvement of policies, strategies, legislation and action for sustainable ground water use and development reform
k) Low level of stakeholder participation
l) Low level of awareness
m) Centralized database and data information system
n) Encourage research to determineavailability of alternative water sources.
o) Centralized or systematic sewerage system is needed for big cities.

2.5 Main factors of groundwater contamination

The main factors affecting groundwater quality are:

a) Poor efforts for water quality monitoring, management and protection system.
b) Poor land use resulting in contamination of ground water as well as surface water.
c) Poor legislation and regulation for groundwater quantity and quality protection.
d) Insufficient waste treatment and disposal management.
e) Permeable characteristic of overlying layers (overlying cover) of aquifers.

f) Poor sanitation and hygiene practices.
g) Lowering of groundwater level caused deterioration of groundwater quality
h) Cross contamination in wells due to poor well site selection and construction.
i) Lack of awareness about important of water quality.
j) Sharp urbanization without sewerage system and poor solid waste management.

2.6 Data/information collection

Required data are mainly collected from:

a) DACAAR national GMWs network groundwater table and physical parameters (electrical conductivity, pH and temperature) time series measurement data and which were monitored by DACAAR (March 2003 - December 2011).
b) DACAAR national GMWs network time series water quality (physical, bacteriological and chemical) data which were analyzed by DACAAR water quality laboratory (2004- December 2011).
c) Analyzed water quality (physical, bacteriological and chemical) data from drinking water points which were analyzed by DACAAR water quality laboratory (2003-2011).
d) Shallow drilled wells equipped with hand pump drilled by DACAAR (1996-2011).
e) Measured water level and physical parameters (electrical conductivity, pH and temperature) of 23,870 hand pump installed wells by DACAAR hand pump inspection team.
f) Productions wells water quality and pumping test data which were drilled and constructed for pumped piped water supply scheme and solar water supply system.
g) Historical water quality and quantity data from Ministry of Water and Power and Ministry of Mine and Industry.

2.7 Major impacts

a) Reduced groundwater recharge due to low precipitation, deforestation and poor land use.
b) Water level impacts in the certain river basins due to over pumping.
c) Drying up of shallow wells, spring and karezes.
d) Affected water quality in the urban and rural areas.

3. Methodology

From March 2004 - December 2011 DACAAR constructed, modified, installed and monitored 205 GMWs network in 19 provinces (within the river basins) of Afghanistan. An overview of the National GMWs network is indicated in figure 27. Location and depth of each monitoring well is presented in Annex 5 (separate from main document). The well locations were geo-referenced by GPS (Global Position System, see figure 1) for establishing a groundwater monitoring wells database that can be assessed through GIS maps.

Figure 1 GPS (Global Positing System

The water level and physical parameters like Electrical conductivity, temperature, ORP andpH were measured on site on a monthly basis using pH/conductivity meter and water level indicator, SEBA and Diver/data logger devices (Figure 2).

Figure 2 Water Table and Physical parameters measurement devices

Divers or data loggers (Figure 2) are reliable instruments for automatic measurement and registration of the ground water level, salinity and temperature over a long time period. The Divers are installed in tube wells and after a while data are up-loaded to a Diver Mate (hardware provided by manufacturer), then downloaded from the Diver Mate to a PC (software provided).

The SEBA (Fig.2) water level recorder is a floater operated measuring instrument. The recorder is driven by clockwork using a small electrical motor and batteries. The SEBA water level recorder is a precise measuring instrument requiring careful placing and handling to guarantee long operation.

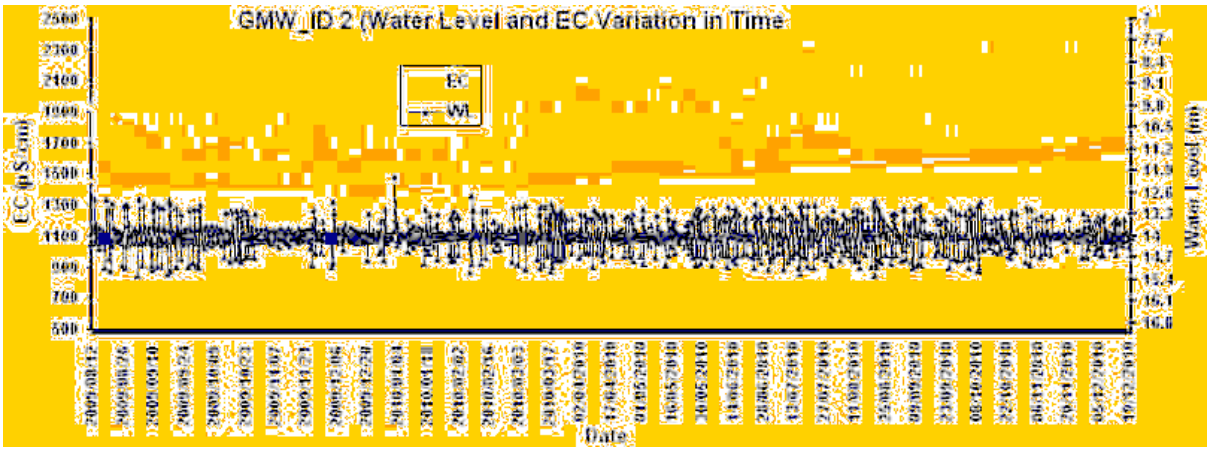


Figure 3 Water level and salinity (EC) variation in time graph

The bacteriological properties of the groundwater monitoring wells were determined on site using a micro bacteriological field test kit (Figure 4).

Figure 4 Bacteriological analysis equipment and other components required

The chemical properties (parameters) of the groundwater monitoring wells were determined every six months using a Photometer 8000 (Figure 5).

Figure 5 Chemical analysis measurement devices

The water quality and quantity data (from GMWs, DACAAR'sprojects and private sector projects) were recorded in the AquaChem and HydroGeo Analyst database (International acceptable and widely used software's for integrated water resources quality and quantity data management)for data management, evaluation, and visualization, mapping and reporting (Figures 6 and 7).

The AquaChem database (Figure 6) was used for integrated water quality data (physical and chemical parameters) recording, management, analysis, graphic evaluation and interpretation, mapping and reporting.

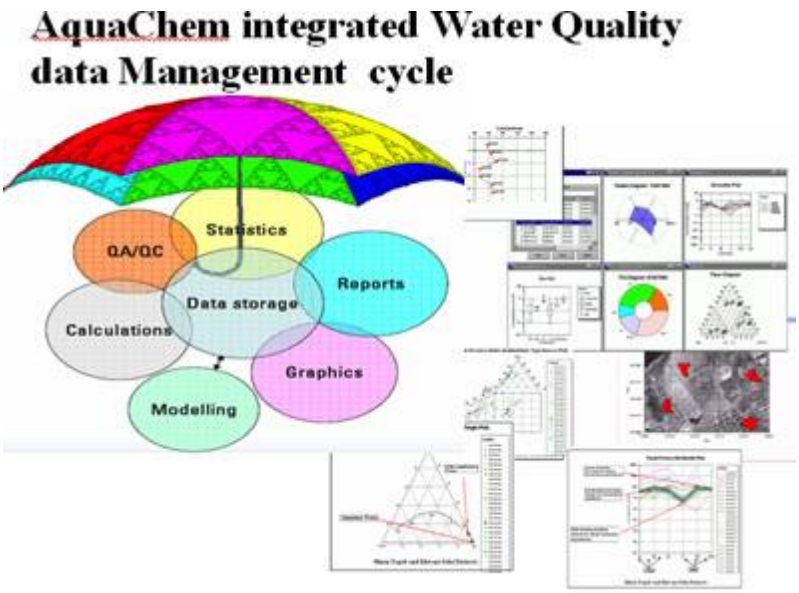


Figure 6AquaChem or integrated water quality data management

The HydroGeo Analyst (Fig. 7) package software was used for integrated water quantity data management, graphic evaluation, making 2D and 3D section, mapping and reporting.

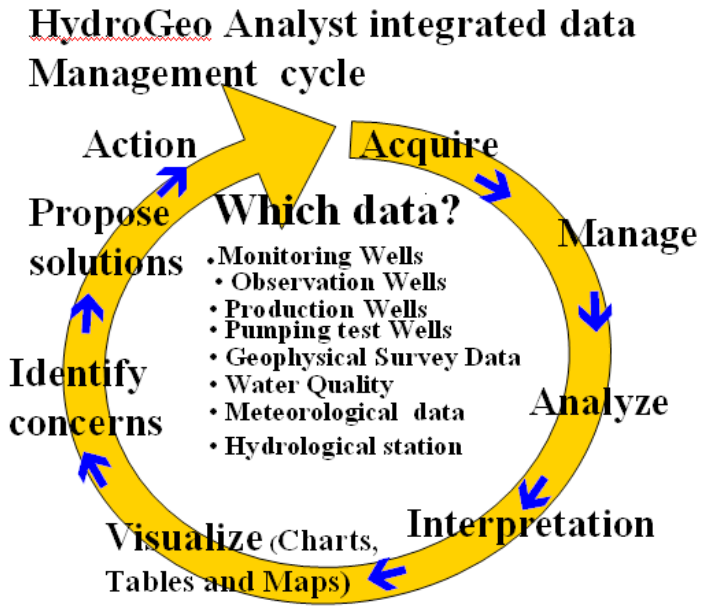


Figure 7HydroGeo Analyst integrated data management

4. Physical setting of Afghanistan

4.1 General information

Afghanistan is located in Central Asia between 29°35 -38° 40' latitude and 60°31'-74°55'of longitude. It is bounded by Turkmenistan, Uzbekistan and Tajikistan in the North;China to the Northeast; Pakistan to the East and South, and Iran to the West. Itis convenient to divide Afghanistan into four major geographic zones:

- The northern plains.
- The central mountains.
- The eastern and south-eastern mountains and
- The southern and western lowlands.

80% of Afghanistan is mountain or desert, the forest cover only 1.3 million hectares or about 2% of total land. Total irrigated area (arable agriculture) is 8 million hectare (12% of total land) which is 3.8 million hectare of cultivated land, 2.6 million hectares is irrigated and 1.2 million hectares is rain fed, 90% of irrigated land is traditional, 1,44 hectare has sufficient water, 15% of irrigated land gets water from Karees (Qanats), springs and shallow wells (Arhads). 60-70% of Karezes dried out and 85% of shallow wells dried out (FAO 1996). The annual volume of water used for

irrigation is estimated to be 20 BCM which is 99% of all water used. Total groundwater extraction estimated to be 3BCM, groundwater used from tube wells less than 0.5 %.

4.2 Climate

The Afghanistan climate is continental with temperature ranging from 40 °C in summer to -20 °C in the winter. Annual evapo-transpiration (ETP) rates are relatively low (9,000-1, 2000 mm) in the Hindu Kush due to long and severe winter. They vary between 1,200 mm and 1,400 mm in the northern plain and reach values up to 1,800 mm in the southern and south-western plains. However, summer ETP rates are higher every where, showing a daily peak of 5-8 mm in June-August.

Afghan biophysical environment is characterized rainfall variability and relatively high frequency of drought and land used economy. It is an arid to semi arid country receiving erratic rainfall over the year. Rainfall, which varies from a low 50 mm in Zaranj to 1,170 mm in the south Salang occurs mostly in winter months and particularly in the February-April period. In higher elevation, precipitation falls in the form of snow that is critical for rivers flow and irrigation in summer. From June to October, Afghanistan receives hardly any precipitation. These rainfall patterns result in high dependency on snow melts for irrigation and other purposes. Figure 8 illustrates rainfall pattern for Afghanistan.

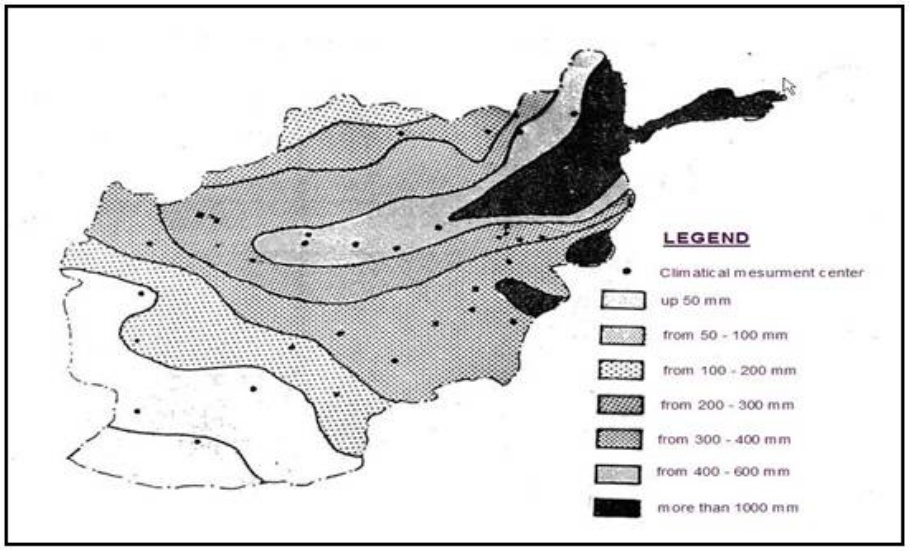


Figure 8 Average annual rainfall pattern for Afghanistan

The recent average annual rainfall indicated that the rainfall considerably decreased (figure 9).

Figure 9 Average annual rainfall pattern for Afghanistan (World Trade Press, 2007)

Figure 10 shows the per cent of normal rainfall measured by USD.

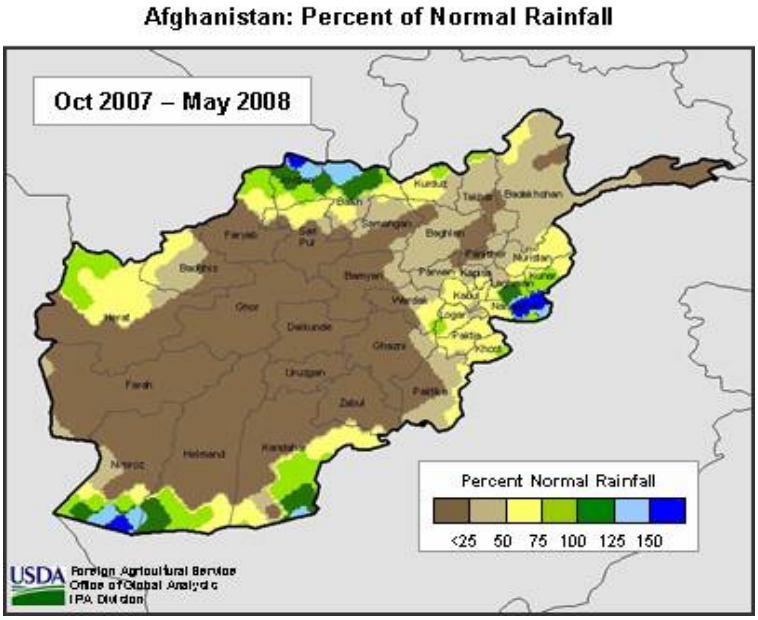


Figure 10Per cent of normal Rainfall, USDA 2007-2008

4.3 Yearly average precipitation from rainfall and snow melt

The food agricultural organization (FAO, 1996) indicated that in average year precipitation from snow melt is in the range of 150,000 million cubic meters (MCM) and from rainfall about 30,000 MCM. Total precipitation for the country is in the range of 180,000 MCM.

In the past, there were 140 stations for river gauging and or rainfall measurement. These stations were destroyed due to prolonging civil war in Afghanistan.

4.4 Water Resources of Afghanistan

4.4.1 Surface water

4.4.1.1 General information

Although Afghanistan is located in half deserted atmosphere, it is still rich in water resources mainly due to the series of high mountains such as Wakhan, Hindokush and Baba covered by snow. The high mountains ranges are considered as the water tower of Afghanistan and neighbouringcountries. In most high mountain areas annual precipitation is substantially higher than in the surrounding low lands. The snows that fall in the cold season and covers snow fields and glaciers from which it is slowly melting during warmer period to provide large volumes of fresh water to rivers/ streams, springs and aquifer intensively fractured and karstified limestone.

4.4.1.2 Major river basins of Afghanistan

Afghanistan, based on the hydrological and geomorphologic systems, the country can be divided into five main river basins: 1) Amu Darya (North-eastern basin); 2) Helmand; 3) Hari Rod-Murghab(Western river basin); 4) Kabul/ Indus(Eastern river basin) and; 5) Northern, as well as five non-drainage areas.

The largest of these basins is the Helmand river basin, covering 43% of the national territory. The other four basins area is smaller size and cover 10-14 % of the country. In addition to these river basins, there are four non-drainage areas (Namaksar, Registan-iSedi, Registan and Dasht-iShortepa). The boundaries of the five river basins and non-drainage areas of Afghanistan are indicated in figure 11.

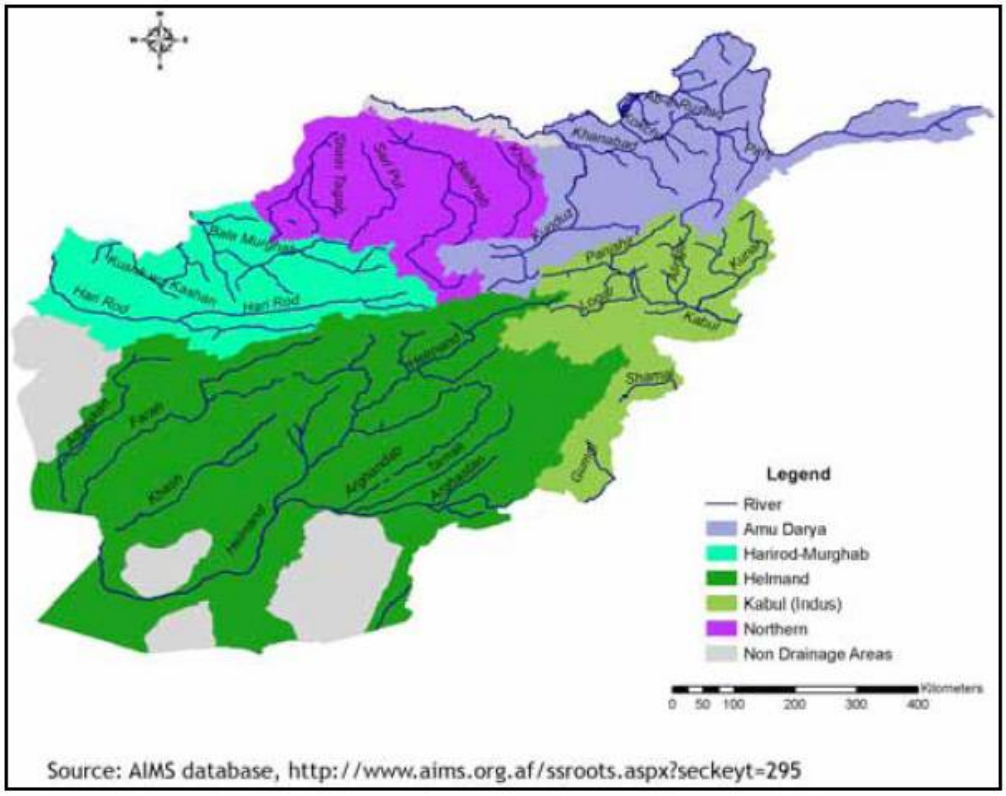


Figure 11Water sheds (AIMS database)

4.4.1.3 Surface water potential

Afghanistan has 57 billion cubic meters (BCM) potential surface water resources which is illustrated in figure 12. More than 47 % of surface water of Afghanistan (27 BCM) flow out of country. The 57% of the total river flow in Afghanistan originated from the Amu Darya river basin. The Kabul and Hilmand river basins contribute, respectively to 28% and 11% of the total water flow. The Harirod-Murghaband Northern river basins have small contributions of, respectively 2% and 4%. Most of river basins, however, are shared with Afghanistan's neighbouring countries with exception of the Northern river basin. Therefore, the use of water from river basins taking their source in Afghanistan has a regional dimension and political issues.

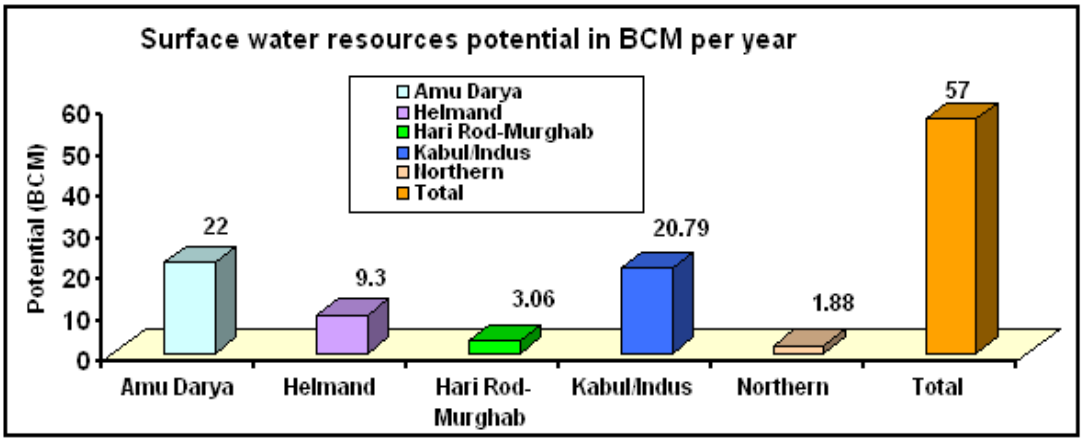


Figure 12 Surface water resources potential in river basins (Faver and Kamal, 2004)

The catchment areas of the river basins and non- drainage area is illustrated in figure 13.

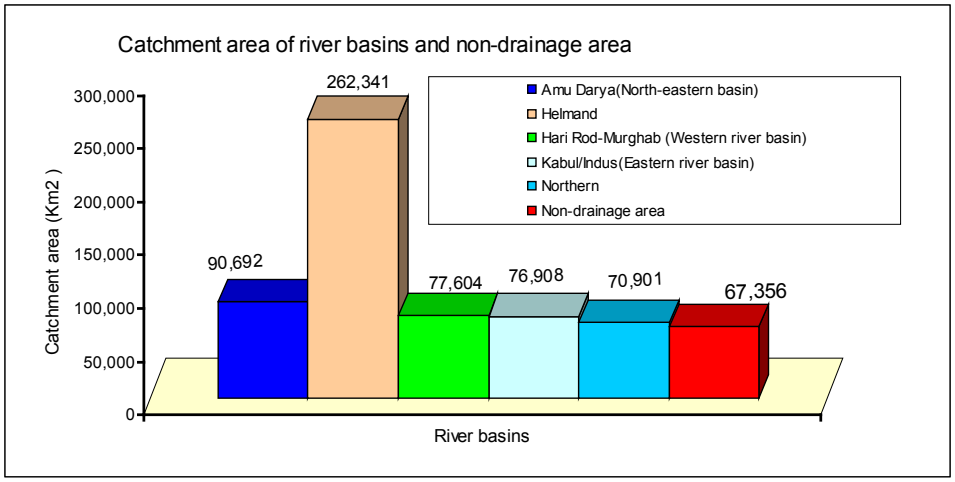


Figure 13 Catchment areas of the river basins and non-drainage areas of Afghanistan

4.4.1.4 Watersheds of river basins

The river basins of country are divided into 41 watersheds. These watersheds are the basic scientific units, which are used for proper planning and management. Figure 14 shows the watersheds of Afghanistan.

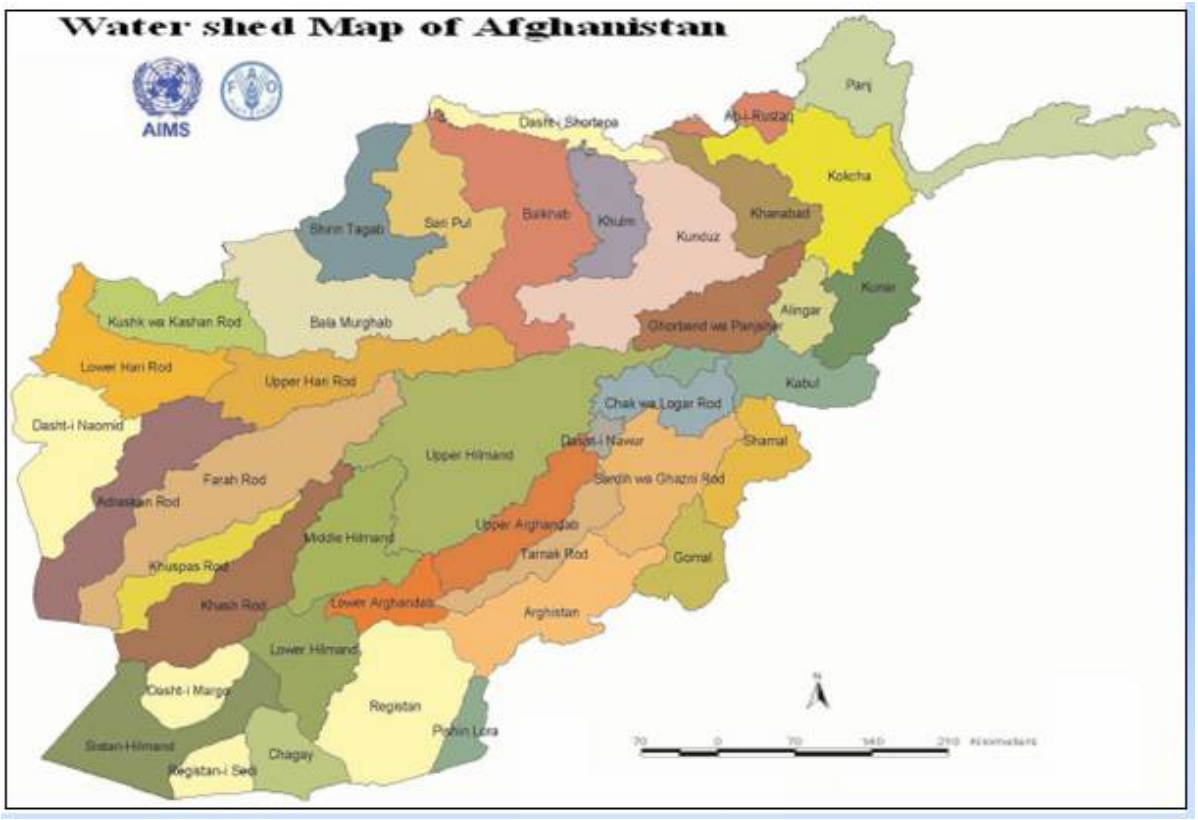


Figure 14 Watersheds of river basins in Afghanistan

The largest of these river basins is the Helmand basin, covering 43% of the nation territory. The other 4 basins cover 57 % of the country.

The main watersheds (water resources potential)of river basins are illustrated in Figures15, 16, 17, 18 and19.

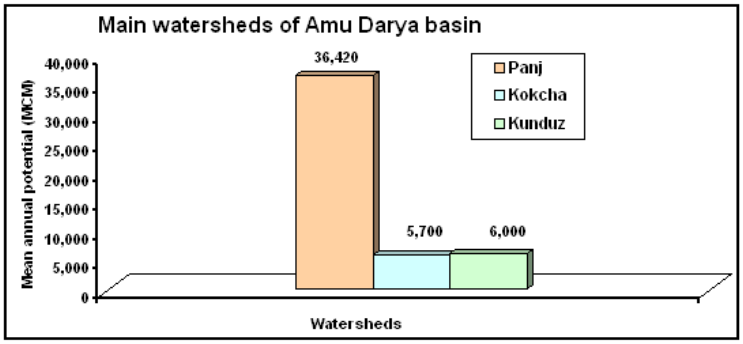


Figure 15 The Main watersheds of the Amu Darya Basin

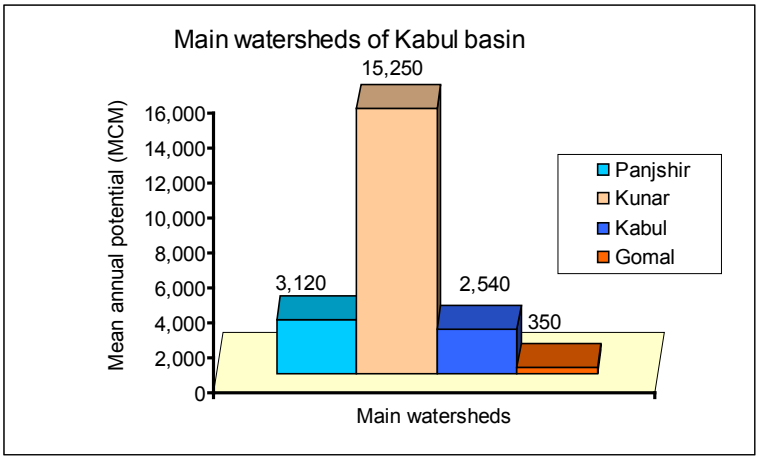


Figure 16 The main watersheds of the Kabul Basin

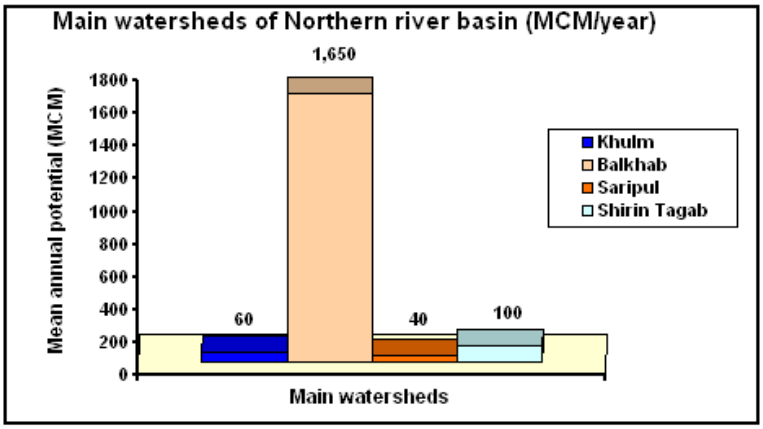


Figure 17 Main watersheds of northern river basin

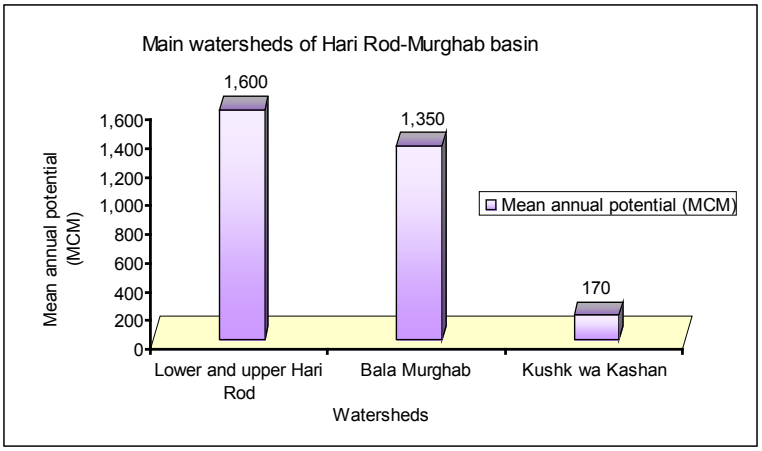


Figure 18 The main watershed of Hari Rod-Murghab basin

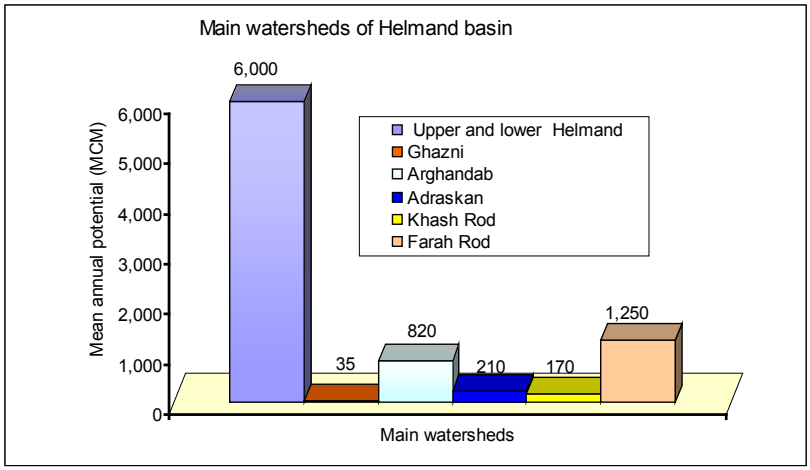


Figure 19 The main watersheds of Helmand Basin

4.4.2 Groundwater

4.4.2.1 Natural groundwater systems

Groundwater in Afghanistan is present in different sort of rock of different ages, from pre-Cambrian metamorphic basement to Quaternary sediments. In Afghanistan the natural groundwater systems is characterized by fives hydro geologic units: 1) crystalline rocks; 2) Triassic – lower Cretaceous pressure thermal water; 3) upper Cretaceous-Paleogene (Cr-Pg) fracture- Karstic aquifers 4) Neogene (Pliocene and Miocene) aquifer-aquitard system; and 5) Quaternary aquifers. The natural groundwater systems or hydro geological basins of Afghanistan studied in detail in the report on "Groundwater resources at risk in Afghanistan" (Web site: www.dacaar.org /Google). Figure 20 illustrates the natural groundwater systems model in Afghanistan.

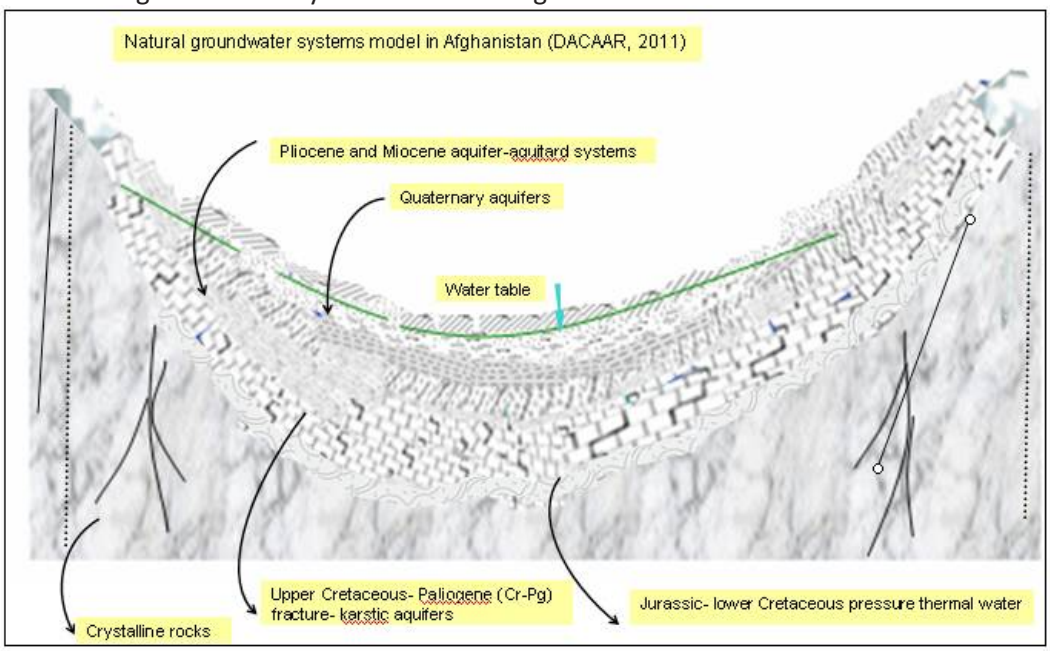


Figure 20Natural groundwater systems model in Afghanistan

The crystalline rocks are pre-Cambrian metamorphic fracture aquitard basement. Secondary fracture permeability in these rocks resulting from faulting and weathering could make these rocks potentially important water bearing systems. In the absence of primary fracture, the crystalline rocks act as a barrier to the groundwater flow. The crystalline rocks are dominantly composed of hard rocks of pre-Cambrian age, dominated by sedimentary and metamorphic rocks with the exposure of igneous rocks (granites and grano-diorites). The rocks are faulted, fractured folded and deformed. In the crystalline formations the groundwater movement occurs along faults, joints and fractures between layers of different hydraulic behaviours. In some cases the groundwater moves from high land (central and eastern and southeastern mountains ranges) to the low land (north plain and southern and western low land) through along the fracture, fault and weathering and contact zones. The natural groundwater system links to the hydro geological condition and hydraulic properties. Most of the drainage system are structurally controlled which enters by infiltration into faults, joints, and fractures of crystalline formation. The groundwater is discharging as springs to the surface along

the streams and narrow valleys with various hydraulic properties.

Upper Cretaceous-Paleogene (Cr-Pg) fracture- karstic aquifers are largely spread in south, south-western, central, north and north eastern of Afghanistan. This aquifer is the main aquifer in Afghanistan. The fracture-karstic aquifers are developed within carbonate (limestone, dolomite, dolomites limestone, marl and marble) rocks which are having different age.

The natural groundwater aquifers consist of fault, contact zones and karstic development fractures, channel and cavities with various thickness and hydraulic properties. Groundwater flow is controlled by the characteristics of aquifer and discharging as springs on the surface at the foothills of mountains (at the slopes of low elevations).

The karst springs from fracture-karstic aquifers play great role for irrigation of agricultural activities and supplying drinking water. The discharges of springs vary in the range from 2 l/s (in Ghormach District of Badghise province) to 3,332 l/s (up Stream of Balkh river in Sholgara district). The quality of water quite fit for drinking and irrigation.

The karstic spring with different discharge are emerging from various karst development aquifer seem to be best sources for water supply and irrigation. These sources therefore, are to be given the highest priority in the water supply programming and planning in the north part of country where the shallow and deep groundwater highly mineralized. The fractured-karst aquifers are the main aquifers in Afghanistan for social- economic development and environment security, therefore, these aquifers need detail research.

Neogene (Pliocene and Miocene) aquifers and aquifer-aquitard system underlain by an aquiclud (Bed rock), which mainly consist of clay, silt, sand and gravel sandstones, siltstone and conglomerate. These alternate aquifer systems are mainly wide speared in east, south, south-western, central, west, and west- northern, north and north-eastern of Afghanistan with various thickness and hydraulic properties.
Pliocene and Miocene sediments alternate aquifer systems have relatively good possibilities regarding water quality and quantity in the east, south, snout-western Afghanistan, however in the south-western, west, west- northern and north and north-eastern lowland of Afghanistan, these aquifer-aquitard systems are characterized as successively bedded of sandstones, siltstone, conglomerate and clay with occurrence of gypsum and salt, which contain salty and brackish groundwater.
The Quaternary aquifers are widespread in the east, south, west, north and the central of Afghanistanalong the river valleys and foot hills of mountains, which are composed of alluvial deposits (silt clay, sand, gravel, pebbles, cobles, conglomerate and breccias).

The figures 21 and 22 show the natural groundwater systems in the Jurassic-recent sectionsof tectonic units inthe north Afghanistan platform.

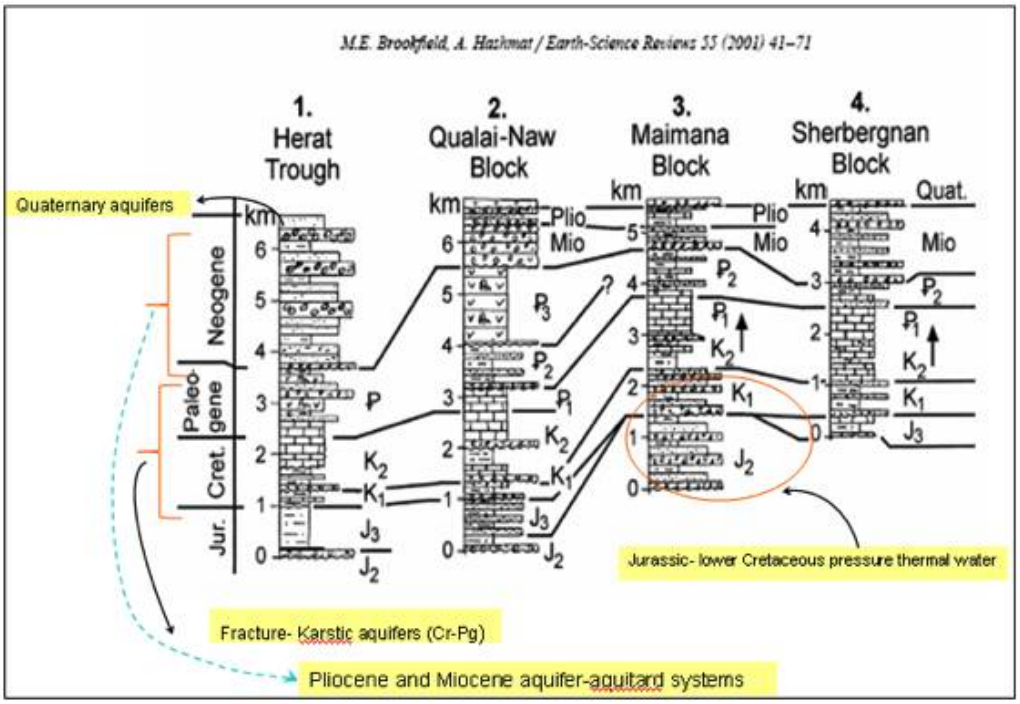


Figure 21Natural groundwater systems (Bends 1964, Baratash 1970, Wolfart 1980)

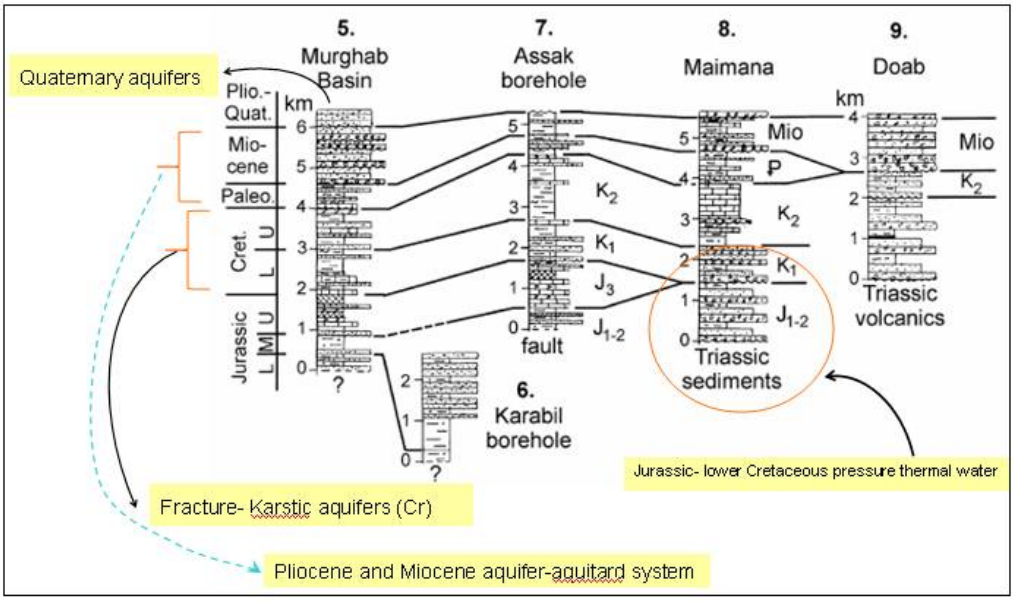


Figure 22 Groundwater in northern Afghanistan (Bends 1964, Baratash 1970, Wolfart 1980)

4.4.2.2 Groundwater average annual recharge and usage

According to FAO estimation of 1996, the average annual recharge for aquifers was 14.9 BCM, however this values decreased to 10.8 BCM (Wincent W. Uhl, 2003). 2.8 BCM water from these aquifers used for various purposes.Figure 23 illustrates the estimation of groundwater average annual recharge and usage within the five river basins of Afghanistan.

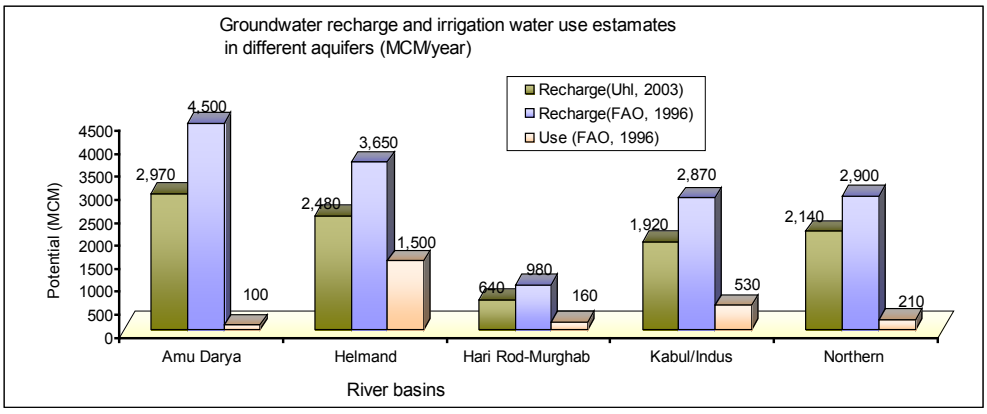


Figure 23Estimates of groundwater recharge in aquifers (FAO, 1999 and Wincent, 2003)

It is not clear, however, how much of this potential resources can be accessed without affecting the socio- economic development and ecosystems. For example, how much of the groundwater potential can be extracted without leading to an excessive decline in groundwater level and recharge to a stage of water pumping from aquifers.
The data from GMWs network shows that the use of groundwater is higher than the recharge of groundwater due to progressively lowering of water table within the river basins of Afghanistan.

The extended period of drought that started from 1998 to 2002, associated with dry year in 2004, largely affected the availability of groundwater. Therefore, the drought, over exploitation without any scientific consideration, low precipitation, high evaporation and poor management have caused todecline groundwater table, consequences dried up most of karezes, and shallow wells as well as springs in the most part of Afghanistan. There are not currently agricultural activities in country where karezes, shallow wells and springs dried out, in case replacing this traditional or hand irrigation and rural water supply system with the groundwater pumping system, which is basically not possible because of high cost and the low productivity of wells.

Recently deeper confined and unconfined aquifers are being developed for domestic, irrigation, industries and other purposes using modern well-drilling techniques. Water for various purposes usage is not potential to be future developed. There is a need to better understand potential groundwater as well as to develop policies, strategies and regulation aimed at sustaining current use and meeting future demand.

4.4.3 Water resources potential

Annual renewable water resources of Afghanistan are estimated at 75 billion cubic meters which is 57 BCM from surface water and 18 BCM from groundwater. Figure 24 shows the surface and groundwater potential in Afghanistan.

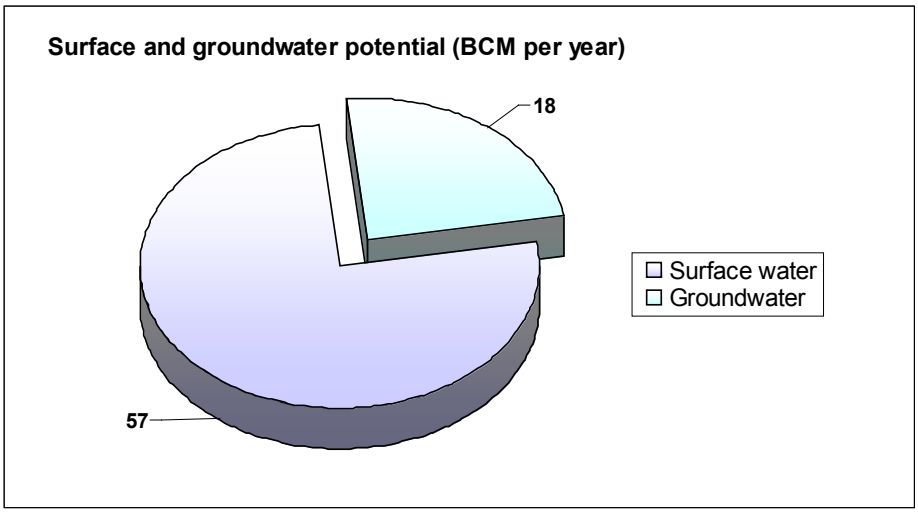


Figure 24Surface and groundwater potential in Afghanistan

The annual volume of water resources used for irrigation is estimated to be about 20 BCM which is 99% of all water used. Total ground water extraction amount is estimated to be 3 BCM. About 15% of total water volume used annually originated from alluvial groundwater aquifers and almost 85% from rivers and streams.

4.4.4 Water resources potential and present and future using balance

Total groundwater extraction estimated about 3 BCM. Approximately 15 per cent of the total water volume used annually originates from groundwater and almost 85 per cent from rivers and streams. Groundwater used from deep wells counts for less than 0.5 per cent.
Figure 25 shows the estimation of average annual water resources (surface and groundwater) potential, present and future usage and balance within the fives river basins of Afghanistan.

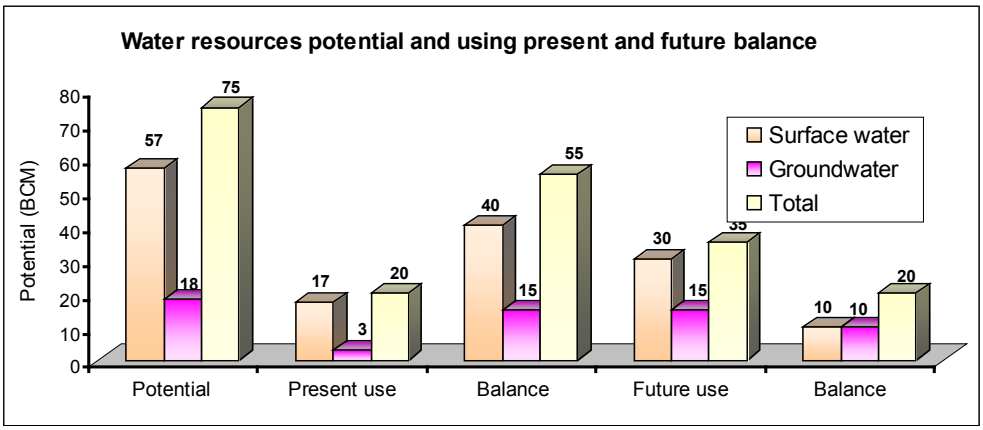


Figure 25 Water resources (FAO, 1999 and Wincent, 2003)

4.4.5 Annual per capita water resources availability

The Afghan's annual per capita water availability is approximately 2,775 cubic meters per year, which compares positively with other countries of the region, for example, in Iran, less than 1,400 cubic meters per capita per year and, in Pakistan below 1,200 cubic meters per capita per year. If the countries have less than 1,700 cubic meters per capita per year which are water stressed. The countries are having less than 1,000 cubic meters per capita per year water which are water scarce. The world water poverty line is 1,000 cubic meters per capita per year.

4.4.5.1 Is Afghanistan a water rich or water scarce country?

Afghanistan is a water-rich country according to nationwide indicators and currently has sufficient water resources to support socio-economic development and environmental needs.

4.4.5.2 What is the cause of water scarcity in Afghanistan?

Fragment institutional arrangement and poor formulation of effective policies, strategies and regulation of integrated water resource management (monitoring system, centralized/server database and data information system), using (more than 57% of surface water flow out of country, more than 40% of water loses during irrigation), development (without scientific quantification of water resources potential, supplies and demand) storage (construction of water storage infrastructure like, dame, water storage reservoirs, recharge wells for aquifers storage and recovery and rain water harvesting) and protection are the main causes of a water scarce in the country.

4.4.5.3 Is Afghanistan the water stressed or water scarcity country?

According to the Falkenmark indicator (table1), 1,700 cubic meters per capita per year of water are required to satisfy the water demand of a given population for domestic, food production, industrial, energy and environmental needs, however availability of water in Afghanistan is 2,775 cubic meters per capita per year(figure 26).Countries have more than 1,700 cubic meters per capita per year water which are not water stress and if the countries have less than 1,700 cubic meters per capita per year water which are water stressed. The world water poverty line is 1,000 cubic meters per capita per year and the countries have less than 500 cubic meters per capita per years which are absolute scarcity.

Table 1 Definition of the Falkenmark water scarcity indicator

Falkenmark water stress indicator	500 m^3/capita/year	1,000 m^3/capita/year	1,700 m^3/capita/year
	Absolute water scarcity	Water scarcity	Water stress	No water stress

Source: Adapted from Rijsberman (2005).

Parts of Afghanistan are physically water scarce, but most people who lack secure access to water are deprived because of inadequate water storage infrastructure and poor management rather than insufficient resource.
Figure 26 illustrates that Afghanistan can not be included water scarce because the country is more than 60 per cent above the water stress indicator.

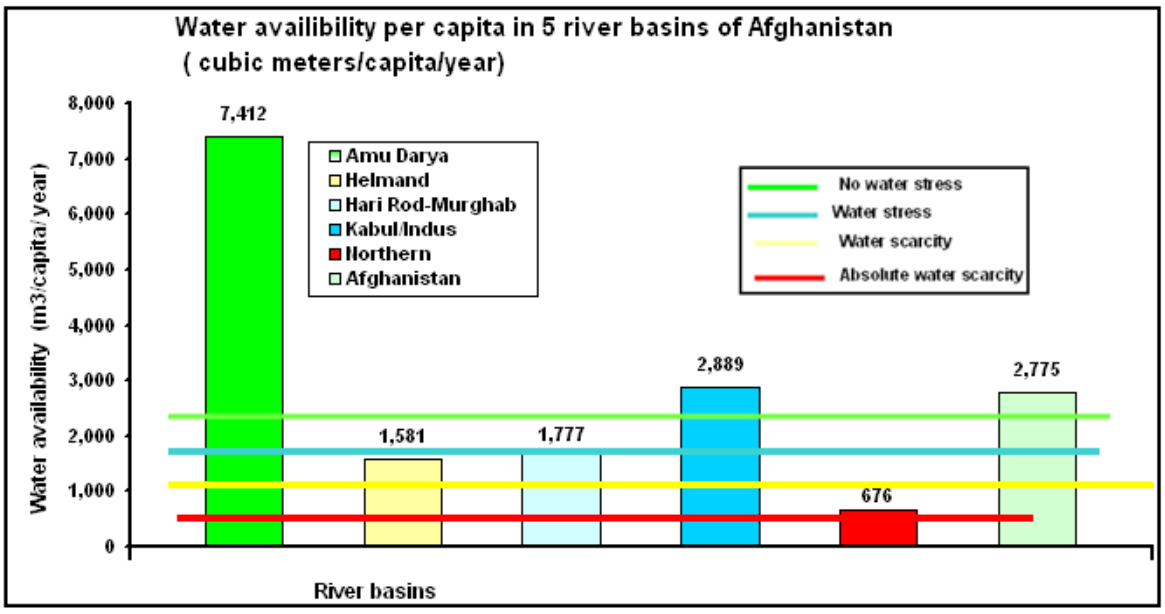


Figure 26 Water availability (m3/capita/year) in five river basins (Favre & Kamal, 2004)

Figure 26 indicates that the Amu Darya and Kabul river basins both possess largely sufficient water resources. Only northern river basin is close to the absolute scarcity and it is facing shortages in water. This is partly because of unequal and timely distribution of precipitation and coupled with a lack of water storage capacity.

4.4.6 Water resources consumption trend in Afghanistan

Presently the major water consumption in Afghanistan is agricultural sector, with more than 21.9 BCM. 19.1 BCM (87%) of this amount is from surface water resources and 2.8 BCM (15%) from groundwaterwhich is 1.21 BCM from karezes, 0.98 BCM from springs and 0.7 BCM from deep wells.Groundwater extraction is estimate to about 2.8 BCM which 99%

used for agriculture. (FAO, 2003)

4.4.6.1 What is the real picture of water resources consumption?

There is no clear scientific quantification of water resources of Afghanistan due tolack of metrological and hydrological measurement stations, monitoring system, central database,data information system and management tools. The hydro-meteorological data were lost or not collected during last 30 year, the ministry of energy and water is planed to establish 174 hydrometric stations (Human development report, Afghanistan/ 2011, Chapter 2). Therefore, the most estimation (quantification) of water resources availability, usage and recharge are based on the assumption. There is urgent need to quantify water resources for sustainable socio-economic development and environmental security.

4.4.7 Why does the traditional irrigation and water supply systems fail?

More than 15% of Afghanistan's irrigated land gets water from traditional groundwater systems such as karezes(Qanats), spring and shallow wells (Arhads)

According to an estimate all traditional groundwater irrigation and domestic water supply systems have reduced or dried up. About 60-70% of the karezes are not in use and 85% of shallow wells are dried out (FAO, 2003). Recently, these values increased to 95% due to frequently drought, over-pumping and low recharge. The population dependent on these systems has suffered badly due to failure or reduction in discharges of these systems.

The main reasons of traditional irrigation and water supply system failure are:

- Poor management.
- Continuing drought.
- Degradation of natural vegetation with shallow and deep rotted crops and pastures as a result decreasing groundwater recharge and lowering water table.
- Widespread drilling of TW have led lowering of water table and causing many karezes and large diameter shallow wells as will as springs to dry up.
- Uprooting of root system
- Drilling of TW in the vicinity of karezes.

The drying–up of sustainable traditional groundwater extraction methods(karezes, large diameter shallow wells and spring) has considered early and alarming sign.

However, the Karezes has maintained and rehabilitated in neighbouring Iran and Pakistan (Baluchestan). In Iran the Government has spent $48 millions to rehabilitee more than 7,800 Karezes over five years (Human development report, Afghanistan/ 2011, Chapter 2)

5. NationalGMWs network data assessment

5.1 Background

In Afghanistan was lake of groundwater resources qualitative and quantitative information due to poor data collection, storage and management. Therefore, from March 2005 to December 2012 DACAAR, with the financial support of USGS, DANIDA and Royal Norwegian Embassy(RNE) selected, constructed and modified 205GMWs network in 19 provinces of Afghanistan for seasonal and long term groundwater (qualitative and quantitative)monitoring. The GMWs cover approximately 80 percent of the main river basins of Afghanistan. The depth of these wells ranges between 12-65 m, and most are drilled in the Quaternary formation.

The groundwater level and physical parameters like electrical conductivity, temperature and pH of each GMW was measured either manuallyon a monthly basis or by divers/data loggers. All the measured field data from the GMWs network was corrected, revised, processed then recorded in the national groundwater monitoring database (WSG_WL) for storage, management, evaluation, visualization, mapping and reporting.

The water quality (physical, chemical and bacteriological) of the GMWs was sampled and analyzed every sixth months. All the water quality data (more than 34 elements) from the GMWs was corrected revised, processed and ions balanced and then, recorded in the integrated water quality data management database (AquaChem) for data analysis, management, graphic evaluation, and visualization, mapping and reporting.

An overview of the national GMWs network is presented in figure 27, 28, 29, 30 and 31. Location and depth of each monitoring well is presented in Annex 5.

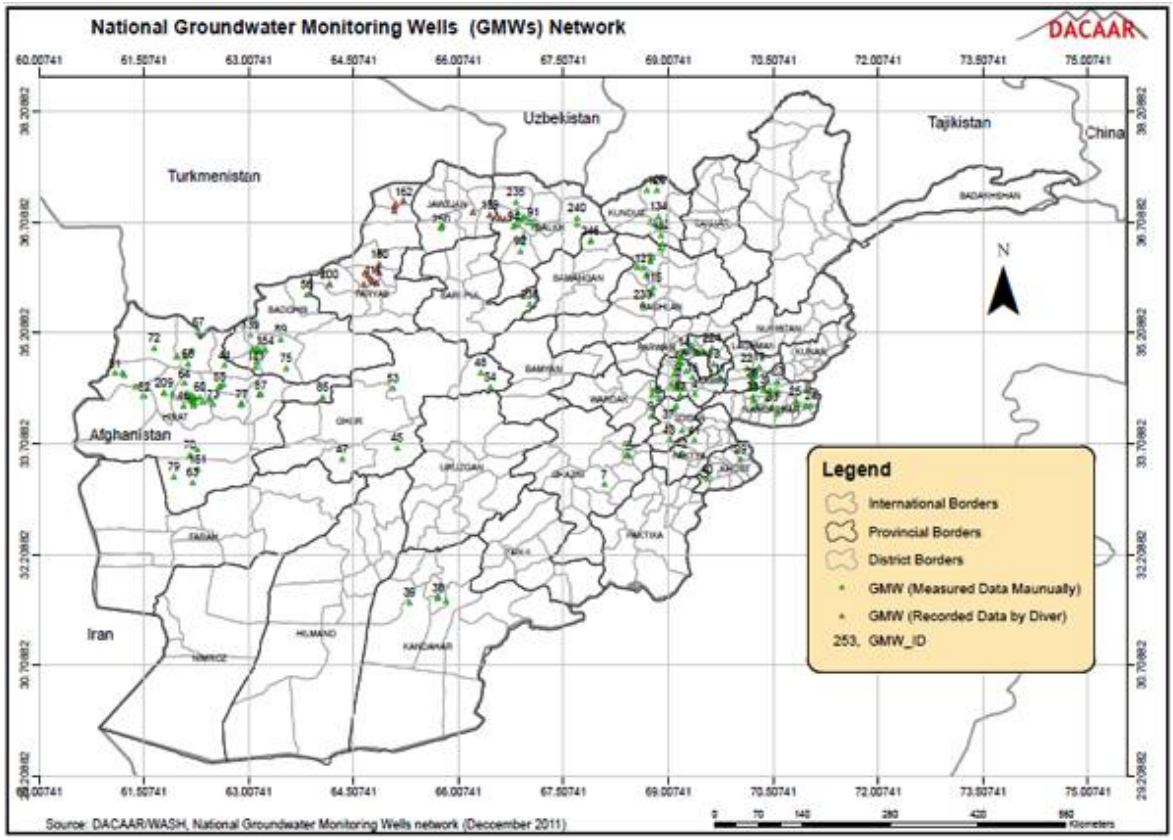


Figure 27GMW's network locations in Afghanistan

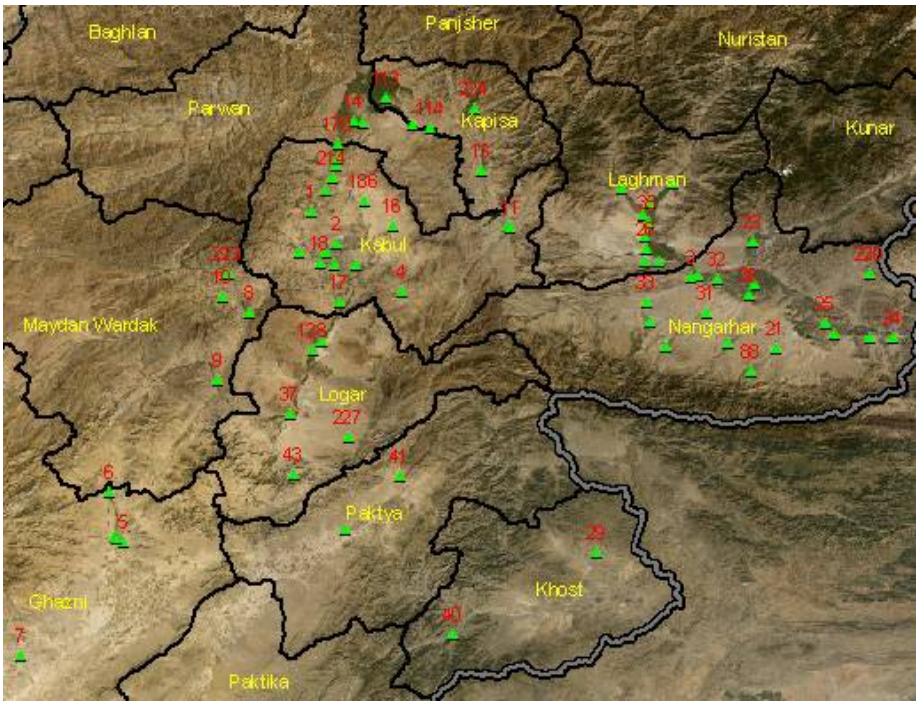


Figure 28 Network of GMW's near Kabul Province

Figure 27 a: GMWs network location in MaydanWardak, Kabul, Logar, Pakttya, Khost, Nangrahar, Laghman, Kapisa and Parwan provinces

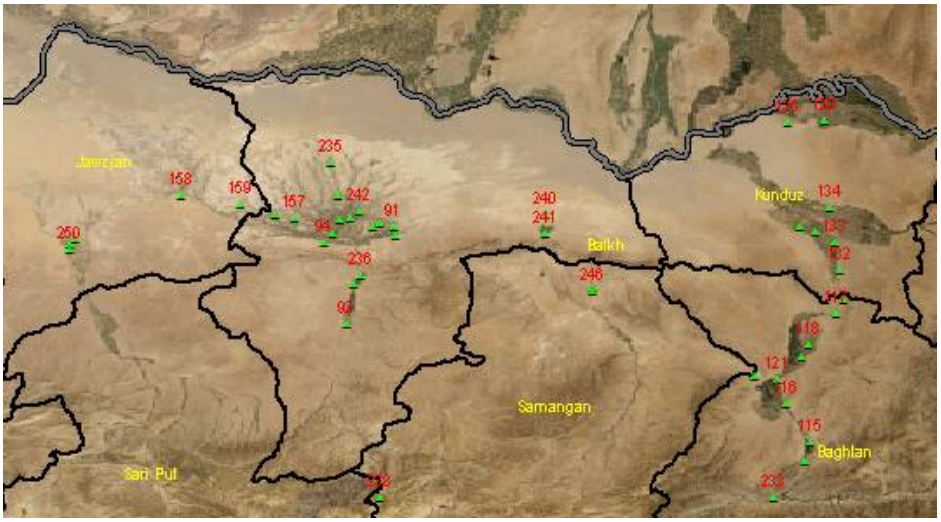


Figure 29GMW's network around Samagan

Figure 27 b: GMWs network locations in the Samangan, Baghlan, Kunduz, Balkh and Jawzjan province.

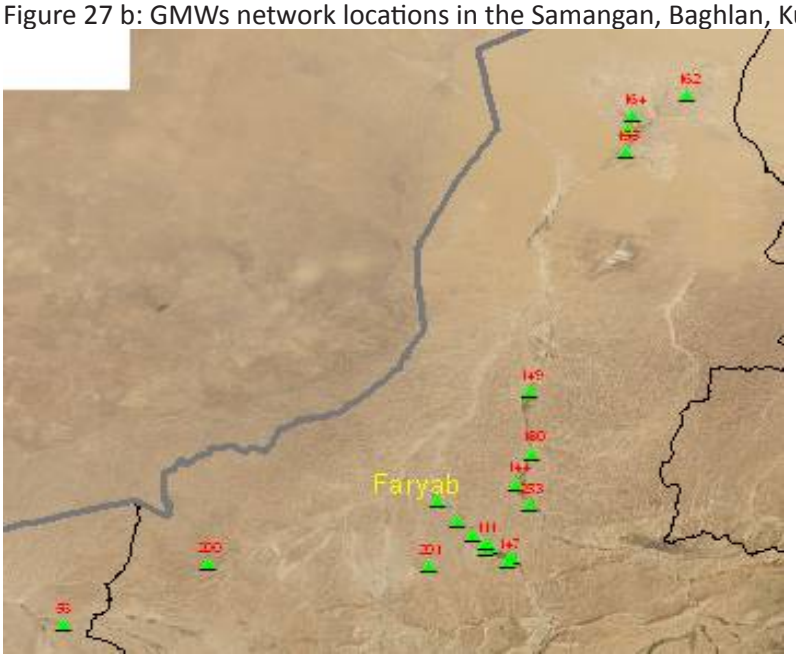


Figure 30GMW's in Faryab Province

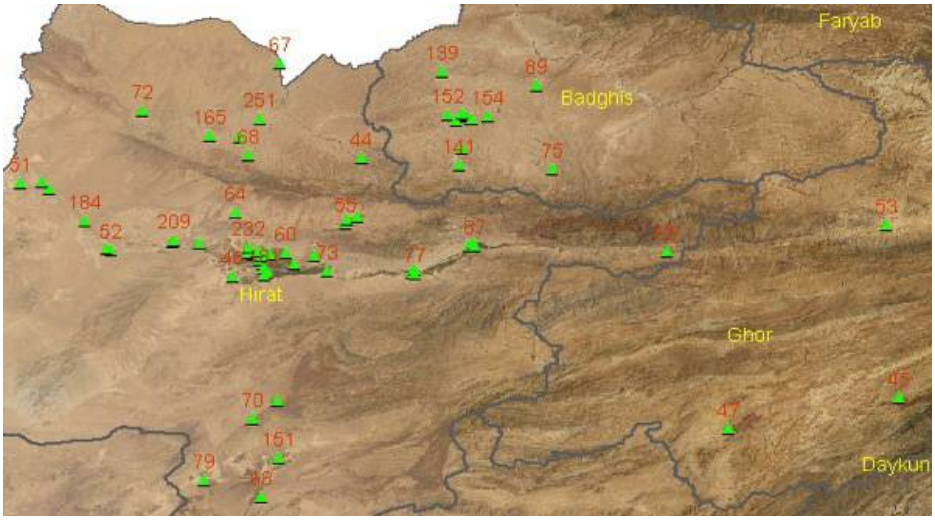


Figure 31GMW's network in and around Herat

Finding vulnerable areas from the integrated water qualitative and quantitative data management, evaluation and mapping is significant for innovation and improvement of relevant water resources policies, strategies and regulations in Afghanistan.

Reports were provided according to the GMWs network water qualitative and quantitative data analysis, management,

assessments and mapping. Presentations were made to the Water Technical Working Group (WTWG), Water and Sanitation Group (WSG), World Water Day and National Workshop on Water Quality Monitoring in Afghanistan held by UNICEF and MRRD from 19-20 December 2010 for raising awareness and sharing information with water sector stakeholders in Afghanistan.

5.2. National GMWs networktime series data assessment

The national GMWs network water quantity and quality time series data assessment is divided:

1. GMWs network time series water table and salinity variation data graphic assessment.
2. GMWs network time series water quality dataassessment

5.2.1 GMWs water table and salinity variation

The GMWs network time series water table and salinity variation data were assessed into the following fourcategories:

1) TheGMWs are located in the up gradient of narrow valleys, foot hills and along the small intermittent streams. There the aquifers consist of recent by Quaternary (Q_{IV}) alluvial sediments (sand, gravel, clay, clay and sand cobble), underling impervious pre-Paleogene (Pg) or pre-Cambrian formation. This aquifer is very sensitive and vulnerable against contamination and over-pumping. In rainy period (January-May) the depth of groundwater level raised when the groundwater receiving an amount of water from precipitation or run off and, in the dry season (April- November) the water level declined due to low precipitation and evapo-transpiration and over-pumping. Average annual groundwater recharge is lower than groundwater withdrawal (GMW_ID 5, 7,10, 13, 14, 21, 28, 32, 34, 36, 38, 39, 40, 41, 51, 56, 68, 77, 87, 117, 118, 127, 131, 143, 147, 175 and 189).The water level variation in time graphs show that in average the water level fluctuated at the rate of 1.05- 3.5 m/ year, and also the salinity variation in time graphs also varies due to fluctuation of groundwater. The influence trend was continuing lowering of water table and depletion of natural storage (annex 8)

2) The GMWs are located in the semi-desert, intermountain areas, and relatively far from rivers/streams. The aquifers consist of late to recent Quaternary (Q_{I-IV}) sediments which are consist of gravel, sand, sand clay, loams and loess with various thickness, hydraulic properties and water quality. Seasonal pattern of fluctuation of groundwater level mainly affected by rainfall and snow melting. The water table variation in time graphs show that the highest levels of groundwater occurred during April-May and the lowest level of groundwater occurred in the dry seasons when the areas rarely received precipitation (June-October). Yearly fluctuation amplitude of groundwater level was between 1.5 -2.16 meters. There is also the water level continuously declined due to low recharge, high evapo-transpiration and over extraction(GMW_ID 2, 9, 16, 18, 21, 26, 30, 34, 44, 63, 70, 72, 73, 79, 89, 91, 94, 112, 115, 120, 121, 124, 126, 151, 154, 162, 170, 182 and 188). The water level variation in time graphs show that in average the water level fluctuated at the rate of 1.5 -2.16 m/year, and the salinity variation in time graphs also vary due to fluctuation of groundwater. The influence trend was continuing lowering of water table and depletion of natural storage (Annex 8)

3) The GMWs are located along the perennial rivers/streams irrigated canals/ditches that the groundwater is considerably recharged via infiltration from irrigation channels and ditches. The water level fluctuation related to the flowing of irrigated channel (canals and ditches) and rivers/streams (GMW_ID 17, 22, 29, 37, 52, 60, 64, 67,92, 115, 123, 125, 130, 135, 146, 147, 149, 150, 155,156, 159, 165, 181, 187, 206, 211, 216, 217, 218, 248 and 249). The water table fluctuated during a year, but there is not considered progressively lowering of the water table. The water level variation in time graphs show that in average the water level fluctuated at the rate of 1.7 -7.10m/year. The salinity variation in time graphs also varies due to fluctuation of groundwater (Annex 8).

4) The GMW_ID 113 (Mahmod Raqi center of Kapisa province), GMW_ID 122 (Dosti villsge, Doshi district of Baghlan province) and GMW_ID 119 (Sangi surakh village, Doshi district of Baghlan province)GMW_ID 116 (ZamanKhil village, Pul-e Khumri center of Baghlan province)and GMW_ID 92 (center of Sholgara, Balkh province) are located along the perennial river courses which are not recharge from river and irrigation channels. The water table variation in time graphs show that the highest (maximum) levels of groundwater occurred during September and the lowest (minimum) levels of groundwater occurred during April. Yearly fluctuation amplitude of groundwater level was between 3-7 meters (Annex 8).

The above, (1) and(2) are attributed to the long term dropping water level (the time variation in groundwater level for long term) and the(3) and (4) are attributed to the seasonal groundwater level fluctuation and

5.2.1 Groundwater table lowering model and early warning signal

Historical groundwater level and water quality data in Afghanistan were reviewed and compared with the data collected recently. The results show the main following impacts:

1) Declined of groundwater level in excess of recharge trend.
2) Increased water logging (changed saturated zone to the unsaturated zone) and salinization.
3) Depleted natural storage with time/ΔS/t (change in aquifer natural storage with time).
4) Deteriorated water quality due lowering water, poor sanitation, poor waste management and poor land use.
5) Dried wet land.
6) Imbalanced stream and aquifer interaction (effluent and influent).
7) Marshes dried up in several areas of the country, leaving salt crust at the surface.

The above impacts on the groundwater table occurred in the following two steps:

1) The groundwater table dropped due low recharge and over-pumping and also imbalanced stream and aquifer interaction. As a result the discharge of springs and karezes decreased. A new equilibrium of water level reached due digging of karezes and shallow wells.
2) A new equilibrium of water level was no stable and water table continuously declined due to low recharge and over- pumping. As results, the most of sprigs karezes and shallow wells dried up. This trend mad other equilibrium of water level, in case replaced the karezes and shallow wells by deep tube wells.

There are not currently agricultural activities in the country where karezes, springs and shallow wells dried out, in case replaced this traditional or hand irrigation and rural water supply system by tube wells, which is basically not possible because of high running cost and the low productivity of wells. This trend has affected socio-economic and environmental sustainability and also caused displacement of inhabitants.

As country population continues to grow up, there is increasing pressure to exploit more groundwater for various purposes, which this trend will cause further negative consequences on the groundwater quality and quantity. The over-exploitation of groundwater will challenge our socio-economic development and environmental security. This vulnerability of the aquifer may not be reversible and the country will face a severe shortage of drinking water in near upcoming.

Current fragment institutional arrangements and management tools, poor formulation of policies and strategies and ineffective regulation may not meet the emerging need. It is urgently required to apply effective policies, strategies for sustainable groundwater management, using, development, protection and conservation.

Figure 32 illustrates groundwater table lowering conceptual model and early warning signal which is urgent needed to protect groundwater from further degradation.

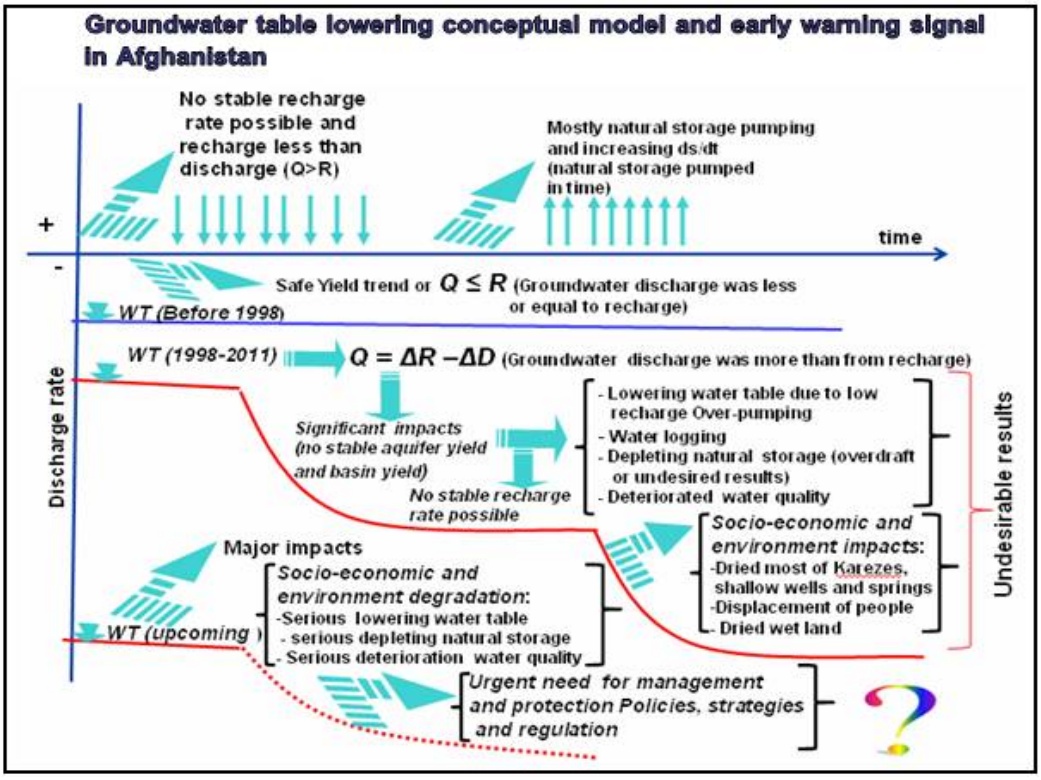


Figure 32 Groundwater lowering model and early warning signals

5.3 GMWs water quality data

The declining groundwater level has created a large hydraulic gradient in the aquifer (cone of depression), which has resulted in increased infiltration of pollutants. This trend has progressively deteriorated the groundwater quality.

5.3.1 Major groundwater quality deterioration indicators.

By the water quality data mapping and graphic assessment shows that the groundwater quality has progressively deteriorated due to natural hydro chemical process and man mad activities.

Themajor water quality deterioration indicators include:

1) Salinity contamination (occurred naturally and artificially)
2) Nitrate and nitrite contamination
3) Sodium and chloride contamination
4) Fluoride contamination
5) Boron contamination
6) Arsenic contamination
7) Chromium contamination
8) Fecal coliform bacteria contamination.

The above contaminations potentially can become a real threat for the health of Afghan's inhabitants and agricultural activities. Afghan's inhabitants are frequently been affected by contaminated water-born related diseases.

5.3.1.1Definition of salinity

Salinity is the dissolved minerals or salt content of a body of water. Minerals dissolved in water have a positive or negative charge and electrical conductivity (EC) is a measure of this charge (and therefore is a measure of the dissolved mineral content). Major components of EC are calcium, magnesium, sodium, potassium, bicarbonate, carbonate, chloride and sulfate. EC measured in micro Siemens (mS/cm) or micro mhos (µS/cm), however 1,000 µS/cm is equal to 700 mg/L.

5.3.1.2 WHO guideline for electrical conductivity

The UAEPA standard for electrical conductivity is 750µS/cm (TDS = 500 mg/l) , but due to the acute water shortage in Afghanistan the electrical conductivity values up to 3000 µS/cm are tolerated for human consumption(WSG 2004).

5.3.1.3 Salinity contamination in the groundwater in Afghanistan

The distribution of EC in the groundwater of Afghanistan (according to the testing of 23,800 water points) ranges from 322 µS/cm (centre of Farah province) and 52,100 µS/cm (Ateh khan Khawaja (3), ShirinTagab district of Faryab province) with clear increases from recharge zones(up gradient) to the discharge zones(down gradient). EC values is generally less than 700 µS/cm along up gradient hydraulic boundaries through the river basins, there are no considered the anthropogenic contamination and a salinity mineralized natural is predominately concentration of bicarbonate in the groundwater. Along flow paths under less populated areas, these values gradually increase to 1200 µS/cm, suggesting natural processes of chemical weathering and low anthropogenic impact on major ions chemistry. Along the down gradient hydraulic boundaries of river basins of major urban land use, however, the EC concentration progressively increased. The measuring water samples from down gradient of water points are elevated in sodium, magnesium, chloride and sulfate concentrations. The hydro chemical mixing processes like evaporation condition, dissolution and precipitation of gypsum and halite mineral and anthropogenic sources(urban areas) impact major ions chemistry. Groundwater within urban areas is more vulnerable to anthropogenic influence than other parts of the river basins.The GMW_ID 122, 119, 115, 116, 118 and 117 indicated EC/salinity variation from upgrading to down gradient in Baghlan province (annex 8)

The water points with high values according to the spatial distribution of EC were recognized in the west, west-northern, north and north- eastern of the country where the shallow and deep groundwater is naturally highly mineralized. These areas are having safe drinking water problem. Figure 33 illustrates the EC/salinity spatial distribution levels in the groundwater within the river basins Afghanistan.

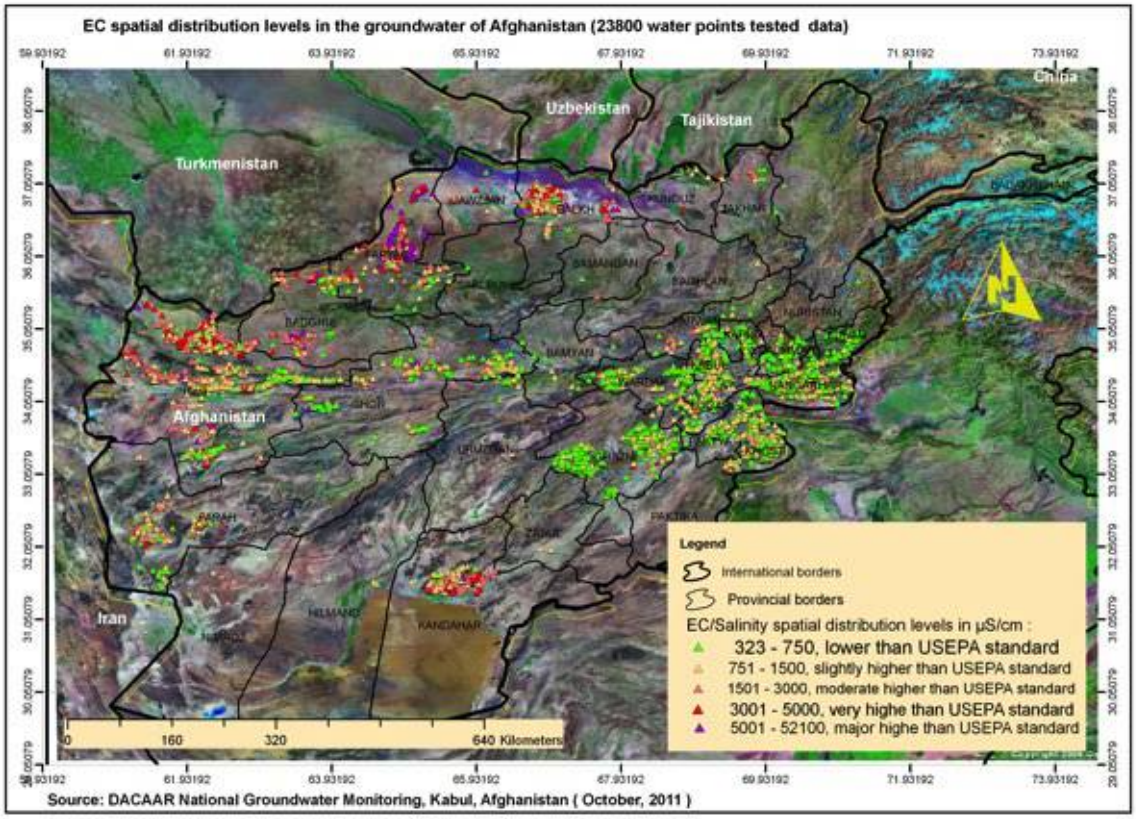


Figure 33 Electrical conductivity/salinity distribution

The percentage is 29.60% (figure 34) (23,800 tested water samples) of water samples from drinking water points show that EC concentration values higher than 1500 µS/cm.

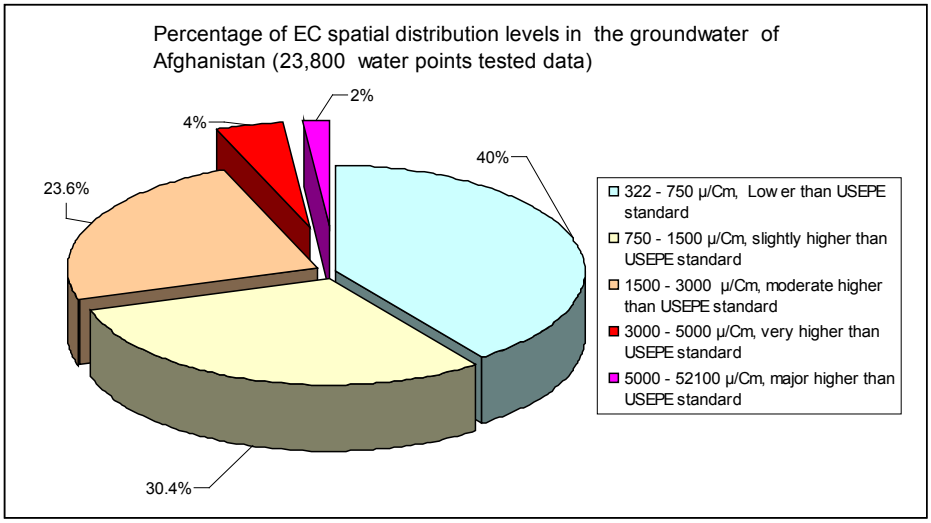


Figure 34 Percentage of EC distribution (DACAAR, October 2011)

The most of water samples with high electrical conductivity observed in the west, west-northern north and north-eastern of the country. These areas have complex hydro geological conditions. The shallow and deep aquifers contain either saline/brackish groundwater or fresh and saline groundwater, therefore the development of groundwater for drinking and irrigation purposes without proper hydro geological knowledge wastes the time and money. There are many tube wells were drilled which most of them have saline water and they are not suitable for water supply and irrigation. The people of these areas have confronted with safe drinking water problems since money years, therefore, there are needed to perform detail research of water resources for finding of alternative solution.

5.3.1.4 Correlation of electrical conductivity against some elements

The figures 35, 36, 37, 38, 39, 40 and 41 indicate correlation between EC against sodium, chloride, sulfate, bicarbonate, magnesium and calcium (Scatter plot). The points are clustered very densewith respect correlation between EC special distribution against sodium, chloride, sulfate, bicarbonate, magnesium and calcium concentrations, this trend indicates that the salinity (EC) mineralized “nature” is predominately concentrations of bicarbonate in the groundwater(up

gradient areas) and the quality of water is excellent. The hydro chemical processes like weathering of carbonate rocks and dissolution impact major ions chemistry.The points are scattered from unity (down gradient areas) with respect correlation between EC special distribution against sodium, chloride, sulfate, bicarbonate, magnesium and calcium concentrations, this trend indicates that the groundwater is medium and highly mineralized (polluted). The mineralization major components are predominant concentrations of magnesium, sodium, sulfate and chloride in the groundwater. The hydro chemical processes like evaporation condition, dissolution and precipitation of gypsum and halite minerals and anthropogenic sources impact major ions chemistry.

Figure 35 EC versus Na

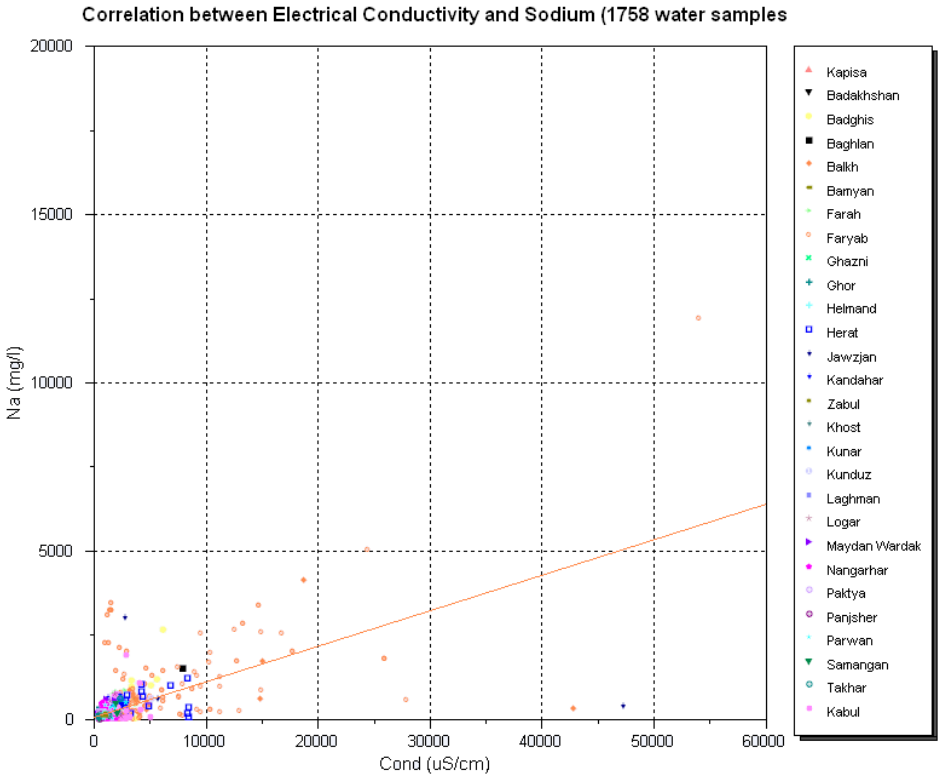


Figure 36 EC versus Na

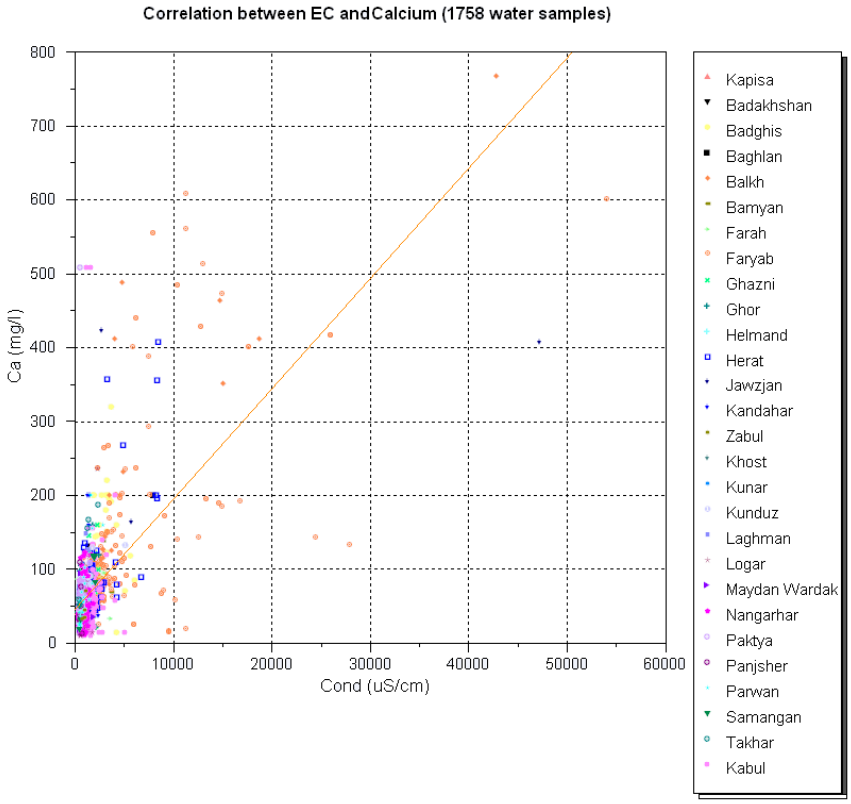


Figure 37 EC versus Ca

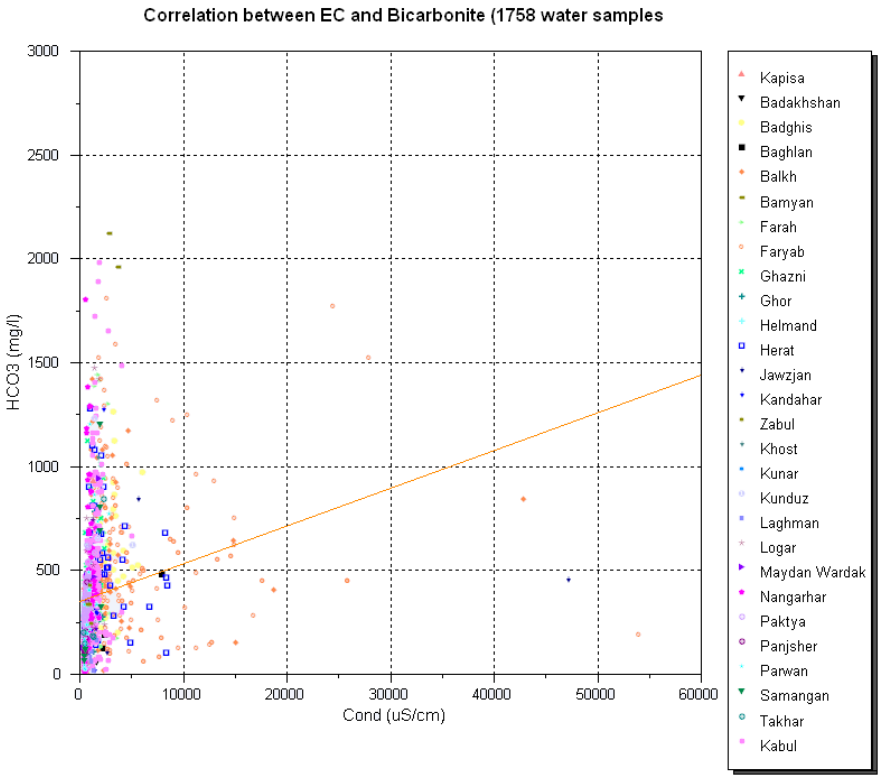


Figure 38 EC versus HCO3

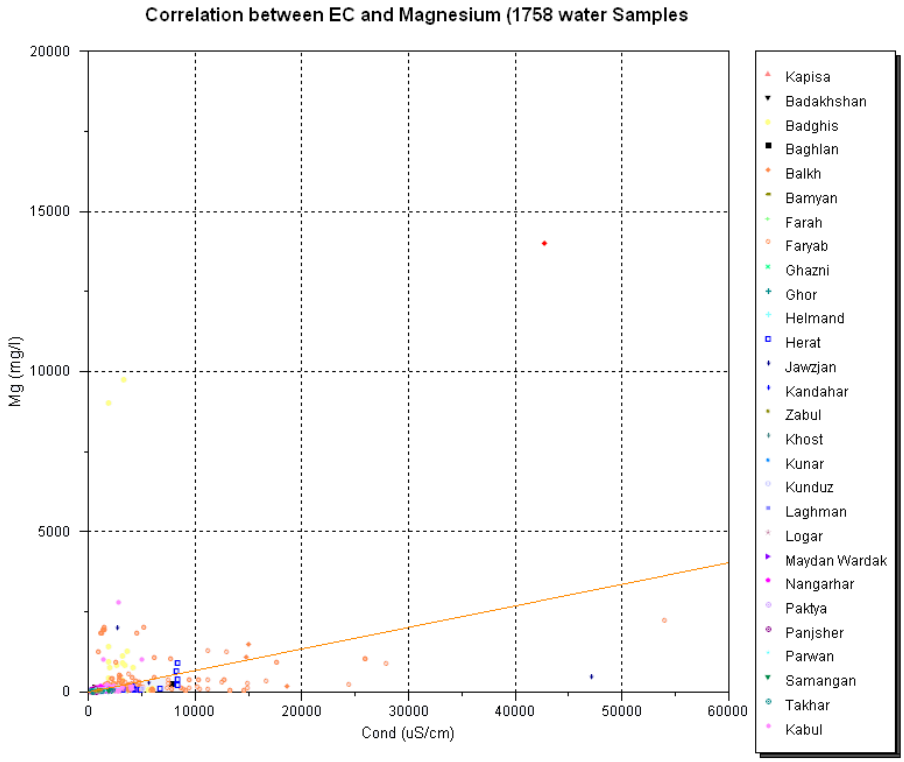


Figure 39 EC versus Mg

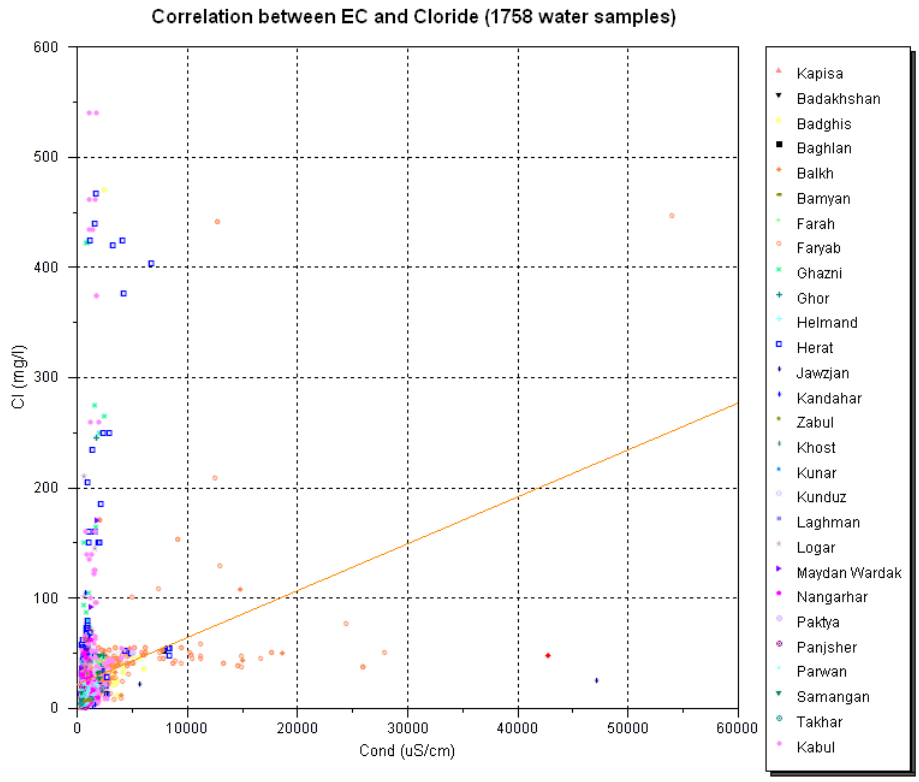


Figure 40 EC versus Cl

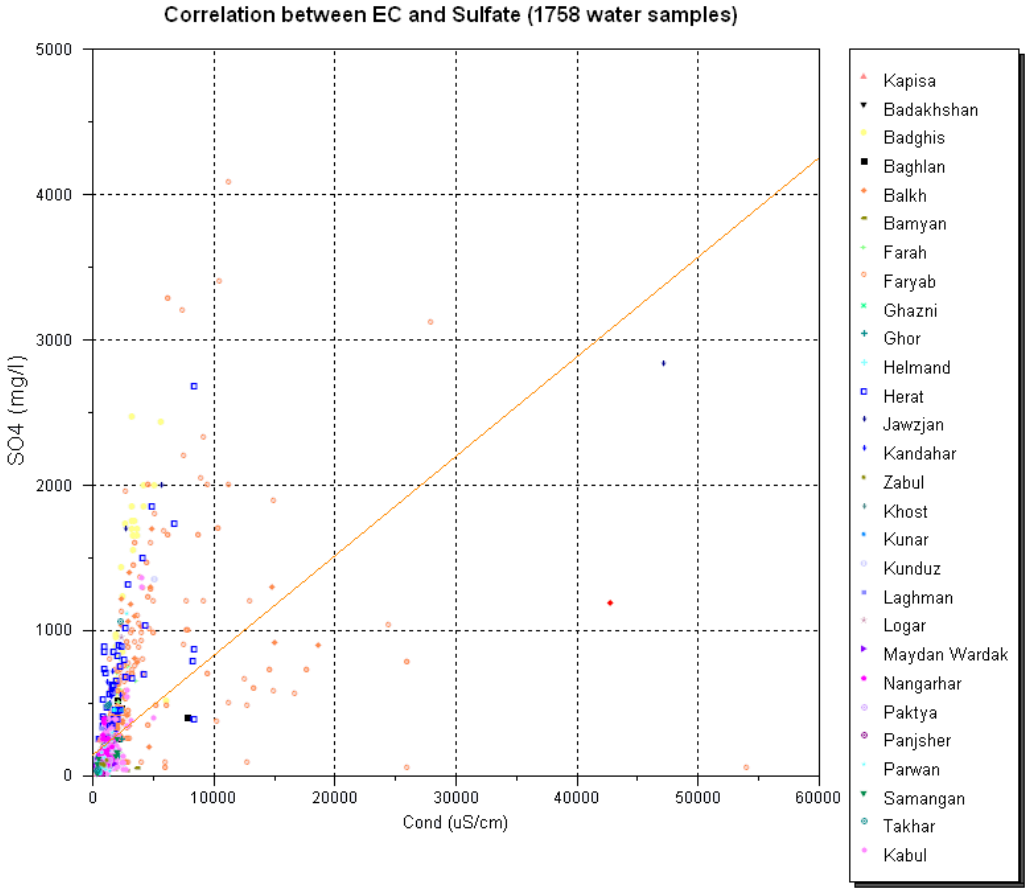


Figure 41 EC versus SO4

5.3.2 Major ions chemistry of groundwater in Afghanistan

The piper diagram plot (figure 42) illustrates hydro- chemical facies (water types) of groundwater within the hydraulic boundaries of river basins. The cat ion triangle (anions field) shows that the calcium concentrations is dominant from

magnesium in the upper and middle parts of the hydraulic boundaries of river basins, however, the magnesium and sodium concentration are dominant from calcium in the down gradient of the hydraulic boundaries river basins. The anions triangle shows that the bicarbonate concentration is dominant from chloride and sulfate in the upper and middle parts of the hydraulic boundaries river basins, however,the sulfate and chloride concentration are dominant than bicarbonate in the down gradient of the hydraulic boundaries river basins.

In the up gradient (recharge areas) of river basins, the groundwater type is Ca-HCO_3 and the natural hydro chemical processes like weathering and dissolution of rocks (mostly carbonate rock) with interaction of water impacts ions chemistry of groundwater. In the middle parts of river basins the groundwater types is mostly Ca-Mg-CO_3 and Ca-HCO_3 with considerable increase in sodium and sulfate concentrations and the natural hydro chemical processes like dissolution/precipitation and anthropogenic sources impact ions chemistry of groundwater. In the down gradient of hydraulic boundaries of river basins the groundwater is mixed with increased concentrations of sodium, sulfate and chloride and the water types are Mg-SO_4,Na-Mg-CO_3, Na-Mg-SO_4-Cl, Na-$SO_4$and Na-Mg-Ca-HCO_3-CO_3-SO_4.The natural hydro chemical processes like dissolution/precipitation, evaporative condition and anthropogenic sources impact ions chemistry of groundwater.

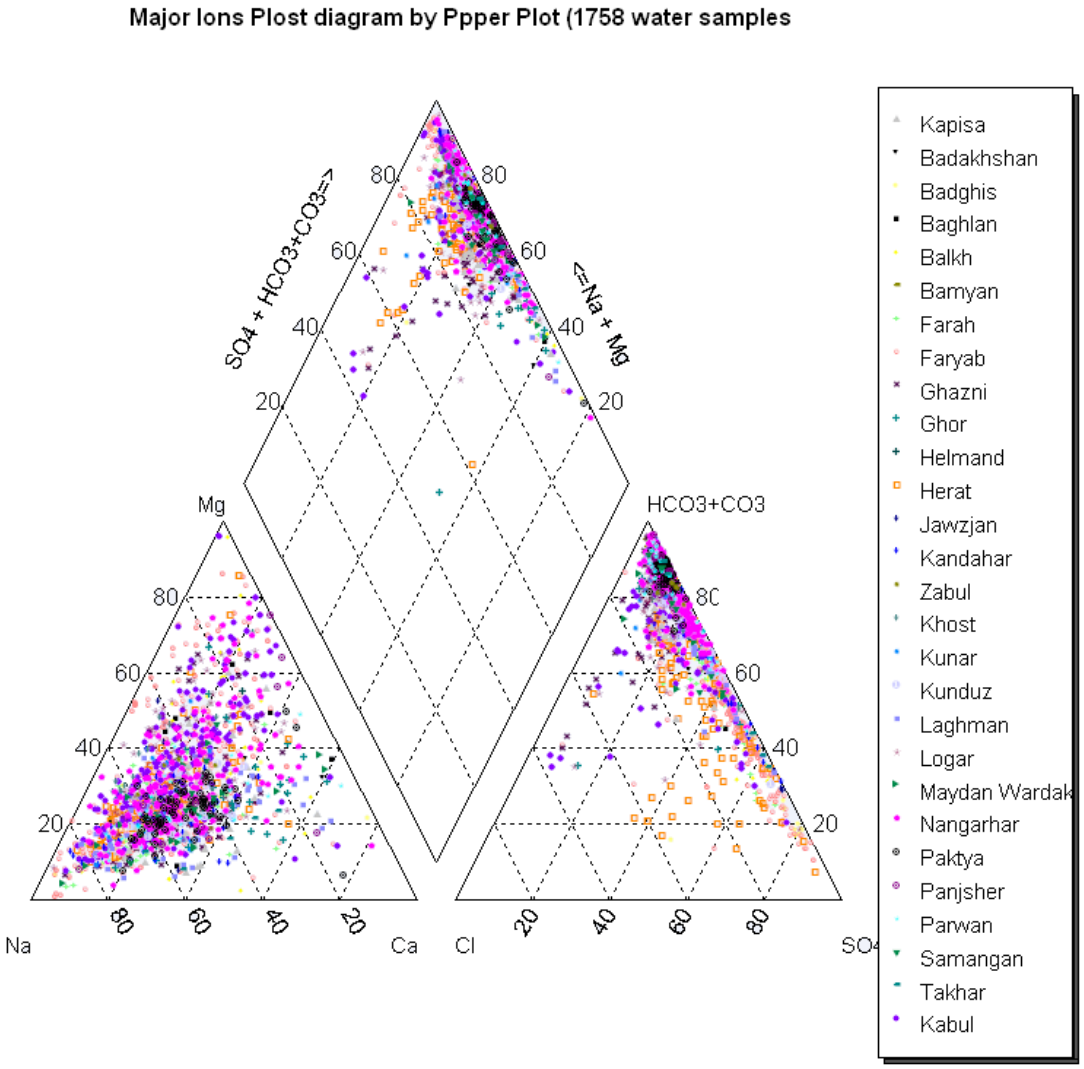


Figure 42 Piper diagram groundwater (DACAAR, March 2012)

Plot of water samples from GMWs and water points illustrate correlation of EC against major ions and pH (Figure 43). 98.5% of water samples indicated basic environment that provided favourable conditions for weathering and dissolution of carbonate and silicate rocks in the up gradient hydraulic boundaries of river basins.Values of EC are gradually increase from up gradient to down gradient hydraulic boundaries of river basin. The major ions plot shows that the groundwater has been evolved to yield mixed from mixing between Ca-HCO_3recharge water (fresh or natural water type) and pre-existing groundwater of the Mg-$SO_4$and Mg-Cltypes (polluted groundwater). These water types undergo further geochemical evolution through water- rock infractions to reach a final stage of evolution represented by the Na-Cl water type.

In the up gradient hydraulic boundaries of river basins, the natural hydro chemical processes like weathering and

dissolution of carbonate minerals with water-rock interaction may impact the geochemistry of groundwater, however in the down gradient of hydraulic boundaries of river basins (specially north plain and west low land), the natural hydro chemical processes like evaporative conditions, dissolution and precipitation(predominately gypsum and halite minerals) and anthropogenic sourcemay impact the geochemistry of groundwater.

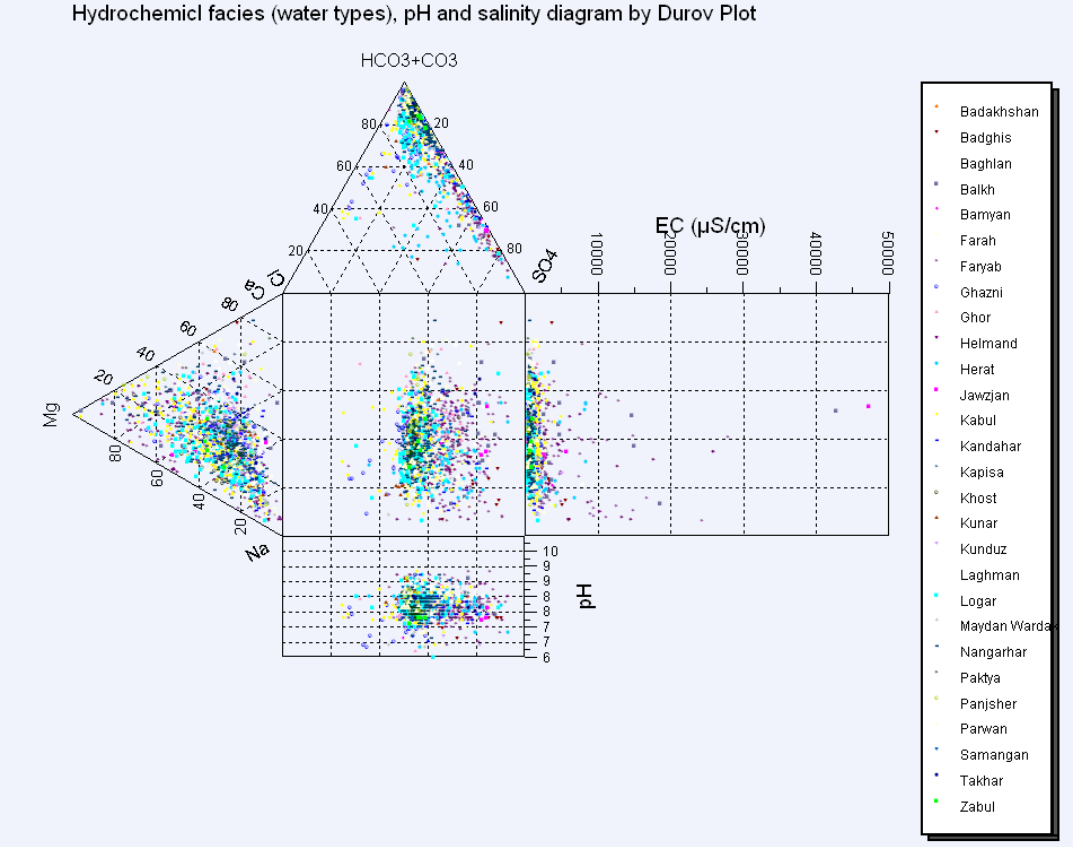


Figure 43 Hydro chemical distribution in groundwater

5.3.3 pH distribution in the groundwater of Afghanistan

5.3.3.1 Definition of pH

pH is defined as the negative decimal logarithm hydrogen ion activity (H^+). The pH value is indicated where the water is acid or basic. Neutral water has a pH of 7. If the pH of water is less than 7 it is acidic and if more than 7 it is basic. It is a very important parameter for numerous hydro-chemical reactions and assessing the usability of water in a technical system.

5.3.3.2 pH hydro chemical processes

The hydro chemical processes are dependent on pH:

1. Carbonates equilibrium.
2. The solubility of numerous minerals (calcium, magnesium, iron, manganese and aluminium minerals)
3. Surface charge of numerous minerals and thus their adsorption capacity.

5.3.3.3 pH Contaminant level limit

The WHO limit for pH is 6.5 – 8.5 (WHO, 2003).

5.3.3.4 pH spatial distribution levels in the groundwater of Afghanistan

The pH distribution levels in the groundwater of Afghanistan varies and the range from 6.31 (Nawe Fati village, Lal Wa Sarijangal district of Ghor province) to 8.94 (KutubK hil village, Qarghayo district of Laghman province). Major of water samples from water points indicated basic environment and which are higher than 7. The Figure 44 illustrates the spatial distribution levels of pH in the groundwater of Afghanistan.

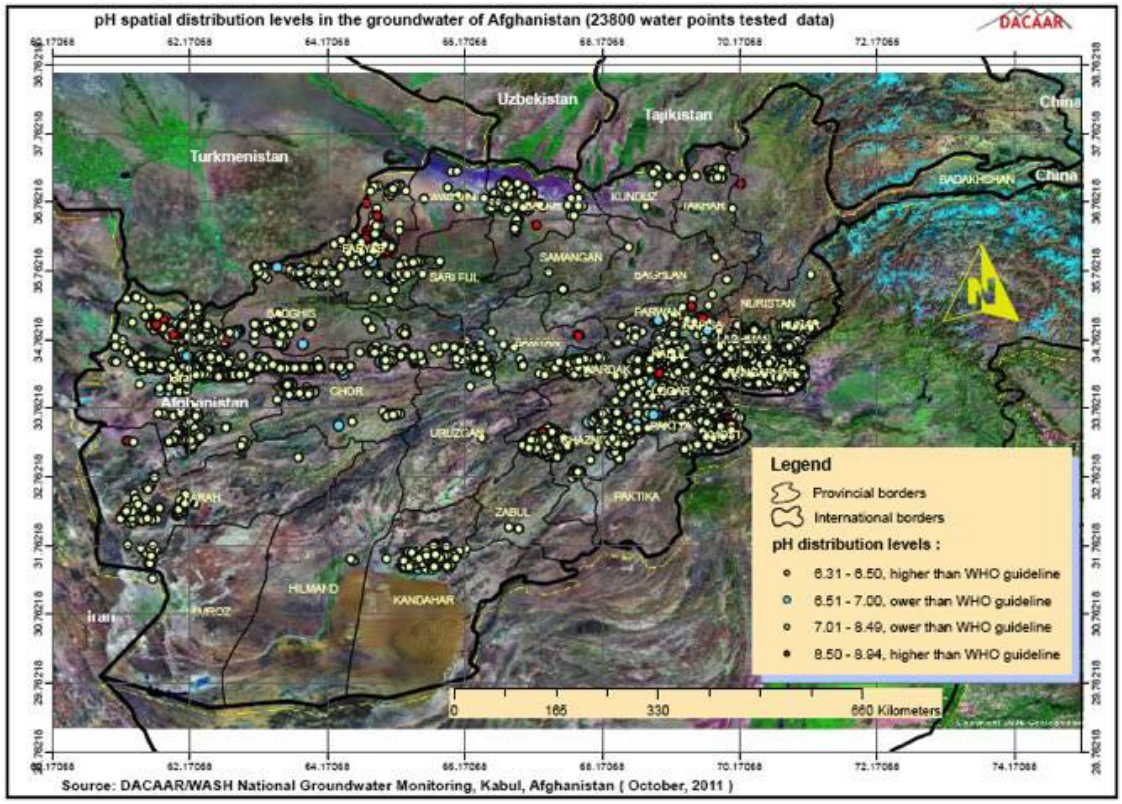


Figure 44 pH spatial distribution in groundwater

The 2.01% (23,800 water samples) of water samples from drinking water points shows that the pH concentration values are higher than the WHO limit. The 98.5% water samples indicated basic environment and only 1.96 % of water samples are higher than WHO guideline. The 1.5% water samples indicated acid environment and only 0.05% of water samples are higher than WHO guideline (Figure 45).

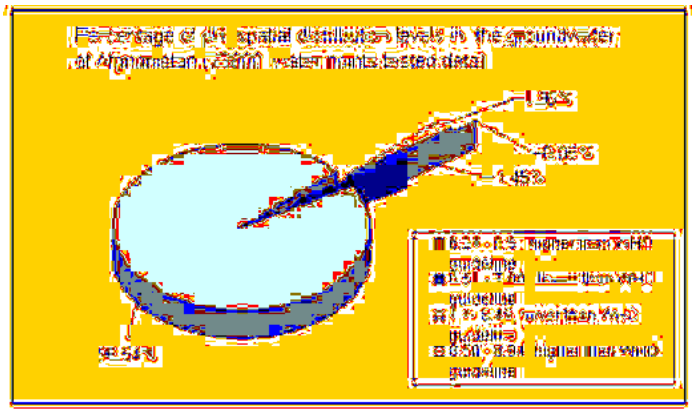


Figure 45 Percentage of ph distribution in the groundwater

5.3.4 Nitrogen contamination in the groundwater of Afghanistan

5.3.4.1 Nitrogen species (nitrate, nitrite and ammonium)

The nitrogen species (nitrate, nitrite and ammonium) are very important for the assessment of drinking water hygiene. The distribution of nitrogen species is also a good indicator of the reduction environment of the groundwater. Nitrate reveals oxidation condition, but ammonium reveals reduction condition, however nitrite is shown reduction at the first of nitrate oxidation condition.

5.3.4.2 Nitrate

5.3.4.2.1 Sources of nitrate

The nitrate is sourced from animal waste, septic systems, wastewater, flooded sewers, polluted storm water run-off, fertilizers, agricultural run-off, and decaying plants.

5.3.4.2.2 Nitrate Maximum Contaminant Levels (MCLs)

The U.S. Environmental Protection Agency (EPA) maximum contaminant levels for nitrates is 10 milligrams per liter

(as NO_3 –N mg/l), however the WHO guideline for nitrate is 50 mg /l NO_3(2004).

5.3.4.2.3 Nitrate and potential health effects

Nitrate can cause health problems for infants, especially those six months of age and younger. Nitrate interferes with their blood's ability to transport oxygen. This causes an oxygen deficiency, which results in a dangerous condition called *methemoglobinemia*, or "blue baby syndrome". The most common indication of nitrate toxin is bluish skin colouring, especially around the eyes and mouth. Infants six months of age and younger and pregnant and nursing women should avoid consumption of water high in nitrate. Toxic effects occur when bacteria in the infant's stomach convert nitrate to more toxic nitrate. Some scientific studies suggest a linkage between high nitrate level in drinking water with birth defects and certain types of cancer.

According to the US Environmental Protection Agency (EPA) long-term exposure to water with high nitrate levels can cause diuresis (excessive discharge of urine), increased starchy deposits, and haemorrhaging (flow of blood) of the spleen. People with heart or lung disease, reduced gastric acidity, may be more vulnerable to the toxic effects of nitrate than others.

5.3.4.2.4 Nitrate content water treatment systems

Reverse osmosis, ion exchange and distillation are types of water treatment systems that can remove nitrate. Carbon adsorption filters, mechanical filters of various types, and standard water softeners do not remove nitrate from water.

5.3.4.2.4.1 Reverse osmosis

Pressure is applied to water to force it through a semi-permeable membrane, filtering out most impurities. According to manufacturers' literature, 85-95% of nitrate can be removed. Actual removal rates may vary, depending on the initial quality of the water, the system pressure and water temperature.

5.3.4.2.4.2 Ion exchange

Special anion exchange resins are used that exchange chloride ions for nitrate and sulphate ions in the water as it passes through the resin. Since most anion exchange resins have a higher selectivity for sulphate than nitrate, the level of sulphate in the water is an important factor in the efficiency of an ion exchange system for removing nitrates. Disposable mixed-bed deionizers are an ion-exchange process where virtually all the dissolved ions in the water can be removed. This type of system uses both anion and cat ion exchange resins.

5.3.4.2.4.3 Distillation

The process involves boiling the water, collecting and condensing the steam via a metal coil and removes nearly 100% of the nitrate.

5.3.4.2.5 Sources of nitrate in the groundwater of Afghanistan

The sources of nitrate in the groundwater of Afghanistan are: 1) sewage drainage; 2) leakage from septic tanks; 3) pit latrines; 4) nitrogen based fertilizer and 5) irrigation influences.

The nitrate spatial distribution levels in the groundwater of Afghanistan varies and the range from 0.01 (Qalai Mirzad village, Shindand district of Herat province) to 96 (Taimani centre of Kabul province). The water samples from water points indicated that the nitrate concentrations in the up gradient (recharge areas) is lower than 3 mg/l, however, this values gradually elevated in the down gradient. The nitrite concentrations levels in urban areas are much higher than rural areas. The figure 46 shows spatial distribution levels in the groundwater of Afghanistan.

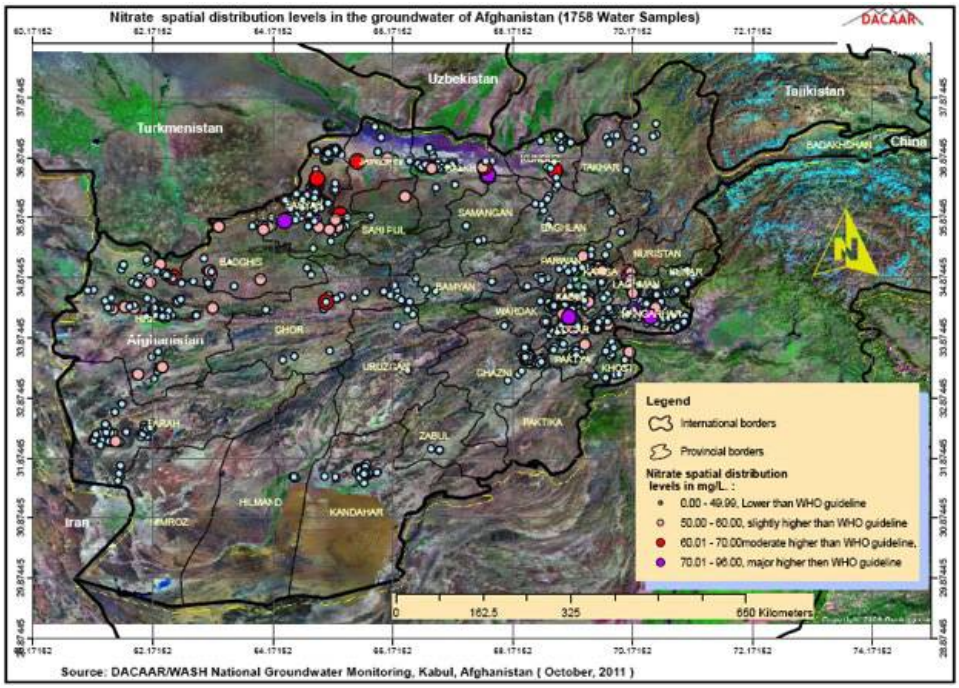


Figure 46 Nitrate spatial distribution in groundwater

8.6% tested water samples from water points contaminated with nitrate and they are over WHO guideline of 50 mg/l NO_3 and most of them from the urban areas(Figure 47).

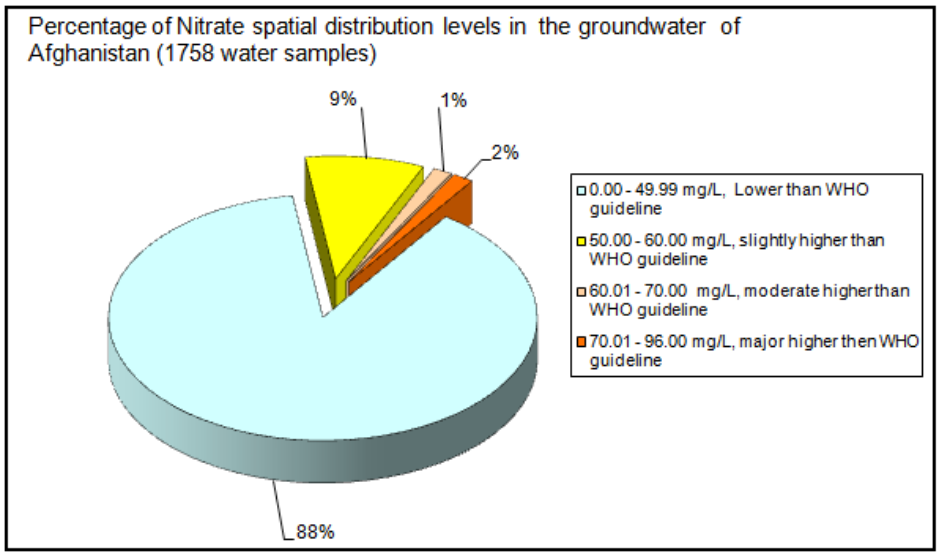


Figure 47 Percentage of nitrate distribution in groundwater

Nitrate is a significant drinking water hygiene parameter because concentrations above the WHO limit of 50 mg/l can lead to the formation of toxic nitrosumines via nitrite. This represents a considerable risk particularly to small children. Nitrate is reduced by bacteria in the stomach to nitrite which can irreversibly displace the oxygen bound to red blood cells in small children and infants. The children therefore suffer from a lack of oxygen and can even suffocate in extreme cause "blue baby disease".

5.3.4.3 Nitrite

5.3.4.3.1 Maximum Contaminant Levels (MCLs)

The United State Environmental Protection Agency (USEPA) maximum contaminant level for nitrite is 3 mg/l NO2 and the WHO guideline for nitrite is also3 mg/l NO2.

5.3.4.3.2 Nitrite concentration levels in the groundwater of Afghanistan

The figure 48 shows the special distribution levels of nitrite in the groundwater of Afghanistan. In the urban areas the concentrations of nitrite are higher than the rural areas. The pit latrines, leakage septic tanks, sewerages are the main causes of nitrite concentration in the groundwater of urban areas. The figure 48 shows spatial distribution levels in the groundwater of Afghanistan.

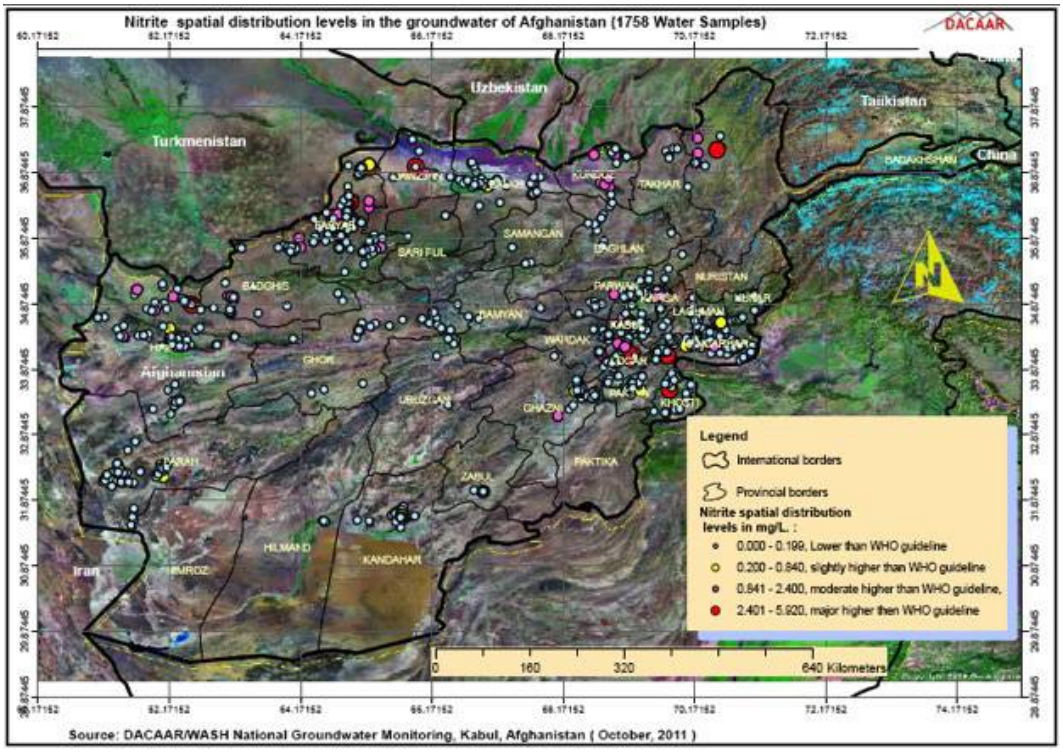


Figure 48 Nitrite spatial distribution in groundwater

2.1% of water samples were taken from water points had nitrite levels above WHO guideline limit of 1 mg/l NO2. Most of water samples with high nitrite contamination are from urban areas of Afghanistan. Figure 49 illustrates the percentage of nitrite distribution levels in the groundwater of Afghanistan

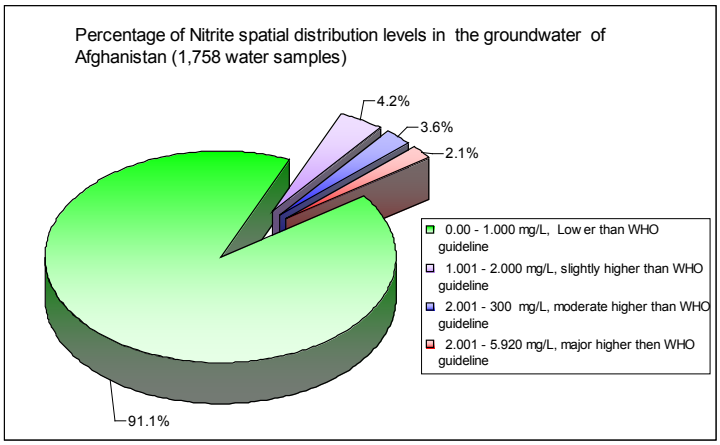


Figure 49 Percentage of Nitrite concentration in the groundwater

5.3.5 Sulfate contamination in the groundwater

5.3.5.1 What is sulfate?

Sulphate is a chemical commonly found in air, soil and water. Since it is soluble (easily dissolved) in water, sulphate is found at high concentrations in many aquifers and in surface water. Compostion of fossil fuels releases large quantities of sulphur to the atmosphere. Sulphur in the atmosphere is oxidized to sulphate and eventually deposited with precipitation or through dry deposition. Because sulphate occurs as a dissolved ion, it is mobile in ground water.

5.3.5.2 What are sources of sulphate in ground water?

Sulphur occurs in a variety of oxidation states that affect its behavior in the environment. Sulfate is an oxidized form of sulfur. There are many potential sources of sulfate including barite (BaSO4) epsomite (MgSO4.7H2O), and gypsum (CaSO4.2H2O) minerals. Gypsum is an important source in many aquifers having high concentrations of sulfate. Reduced forms of sulfur are oxidized to sulfate in the presence of oxygen. This process often occurs when sulfide minerals are mined. In the past century, atmospheric fallout has become an important source of sulfate to soils and, eventually, to ground water. Other sources of sulfur include decomposition of organic matter (which is about 0.1 percent sulfur), fertilizers and natural sources, such as volcanoes. Since sulfate is mobile in soil, inputs to soil will impact shallow

ground water.

5.3.5.3 Maximum Contaminant Levels (MCLs).

The U.S. Environmental Protection Agency (EPA) and WHO maximum contaminant levels for sulfate is 250 mg/L.

5.3.5.4 How can sulfate be removed from drinking water?

Three types of treatment system remove sulfate from drinking water:

- Reverse osmosis.
- Distillation and
- Ion exchange

Deionization (demineralization) carbon filters, water softeners and sediment filters can not remove sulfate. Water softeners exclusively change magnesium or calcium into sodium sulfate, which is more laxative

5.3.5.5 Sulfate potential health effect

Sulfate occurs negatively in groundwater combined with calcium, magnesium and sodium as sulfate salt. Sulfate content excess of 250 mg/l may give water a bitter taste and have laxative effect on human health. Sulfate concentration above 250 mg/l can cause diarrhea and can lead to dehydration and is special concern for infants. Sulfur oxidizing bacteria pose no known human health.

Animals are also sensitive to high levels of sulfate. Using of high levels sulfate content water by animals may cause sever chronic diarrhea and some cases death. High sulfate levels may also be corrosive characteristic for materials.

The hydrogen sulfide gas may occur naturally in water near oil and gas or bacteria contamination. Bacteria, which attack and reduce sulfates, form hydrogen sulfide gas (H2S)

5.3.5.6 Sulfate spatial distribution levels in the groundwater of Afghanistan

Sulfate concentration values in the water samples from GMWs and water points varies trough out Afghanistan in the range from 12 mg/l (Tanfeer village, Dih Yak district of Ghazni province)to 9,000 mg/l (Ali Abad village, NahriShahi district of Bakkh province). The weathering and dissolution of gypsum and anhydrite minerals during their long residence time is responsible for high sulfate concentration in the groundwater of west-northern, north and north eastern Afghanistan. There are considered gypsum and anhydrite minerals where the sulfate concentration is higher. The figure 50 shows the sulfate spatial distribution levels in the groundwater of Afghanistan.

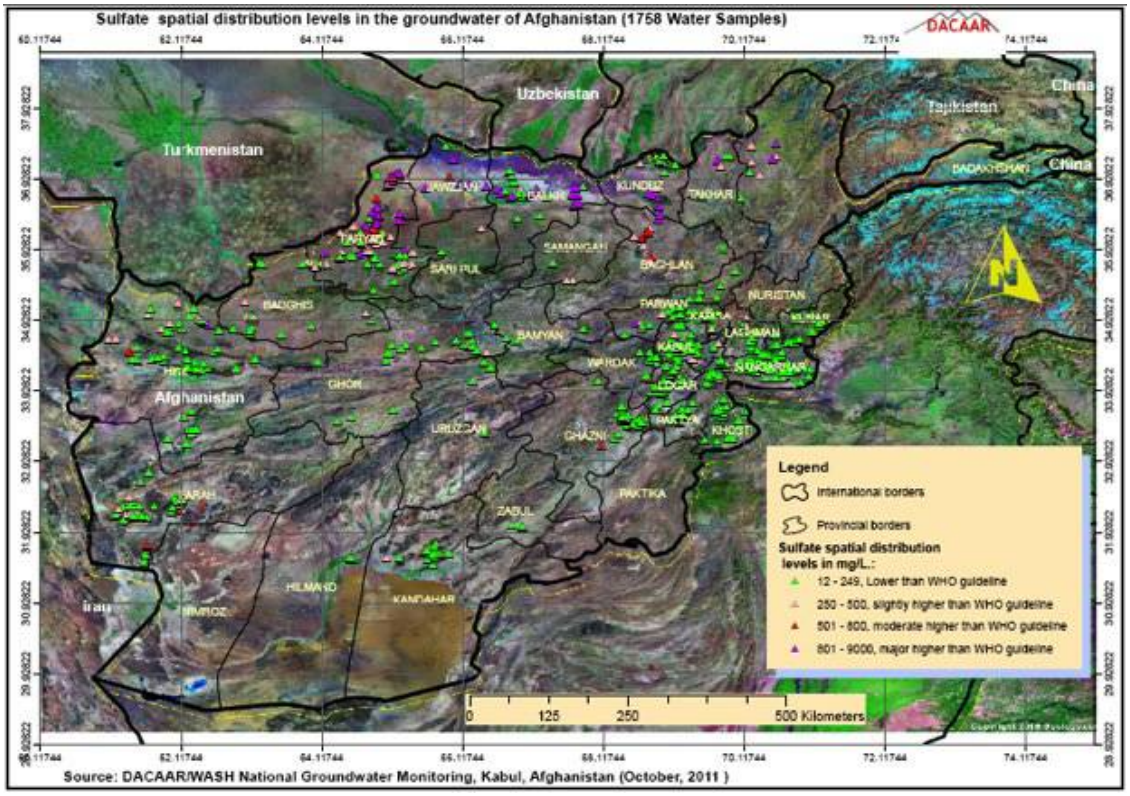


Figure 50 Sulfate distribution in groundwater

The 32% (1,758 water samples) of water samples from drinking water points show that the sulfate concentration values are higher than the WHO limit of 250 mg/l. The most of water samples with high sulfate concentration values observed in the west, west-northern, north and north-eastern of the country. These areas have faced shortage of safe drinking water for many years. Figure 51 shows the percentage of sulfate distribution level in the groundwater.

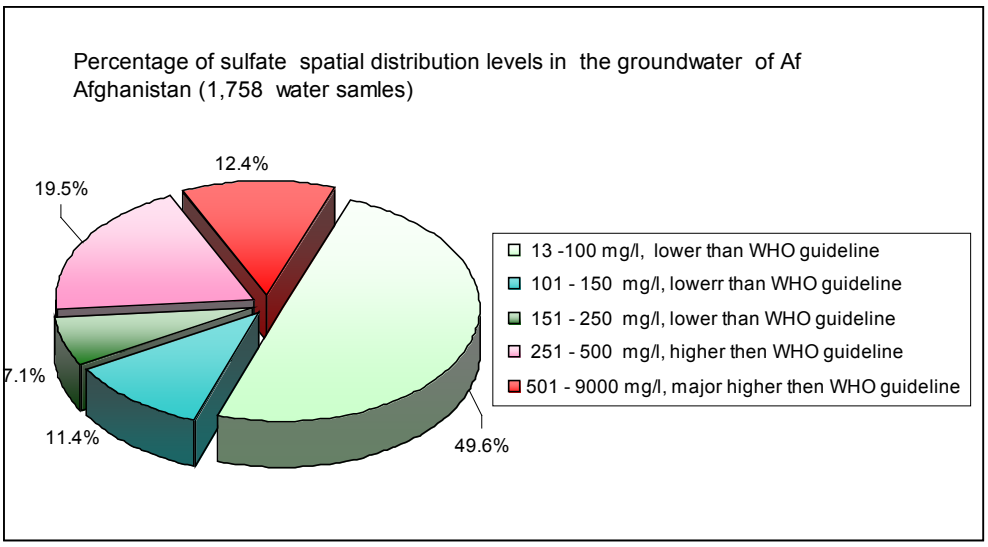


Figure 51 Percentage of sulphate distribution level in groundwater

The areas where are considered high concentrations of sulfate in the groundwater, which is attributed weathering and dissolution of gypsum and anhydrite minerals with interaction of aquifer water.
In the areas where are considered high sulfate concentration in the groundwater, there are considered a significant bacteria contamination in the deeper part of aquifers. A bacterium which attack and reduce sulfates in aquifers (aerobic and anaerobic zones) and forms hydrogen sulfide gas. The hydrogen sulfide is toxic for human health.

It is notable the groundwater with the high concentration of sulfate in groundwater is potentially affected the health of people, but the inhabitants of areas are using due to shortage of drinking water. There are observed high sulfate content water diseases (dehydration or loss of body fluid, diarrhea and malnutrition) and mortality of children.

The graphic evaluation of GMWs water samples by Pie diagram (located along main road of Masar-i-Sharif-Sheberghan) indicated high concentration of magnesium and sulphate (figure 52)

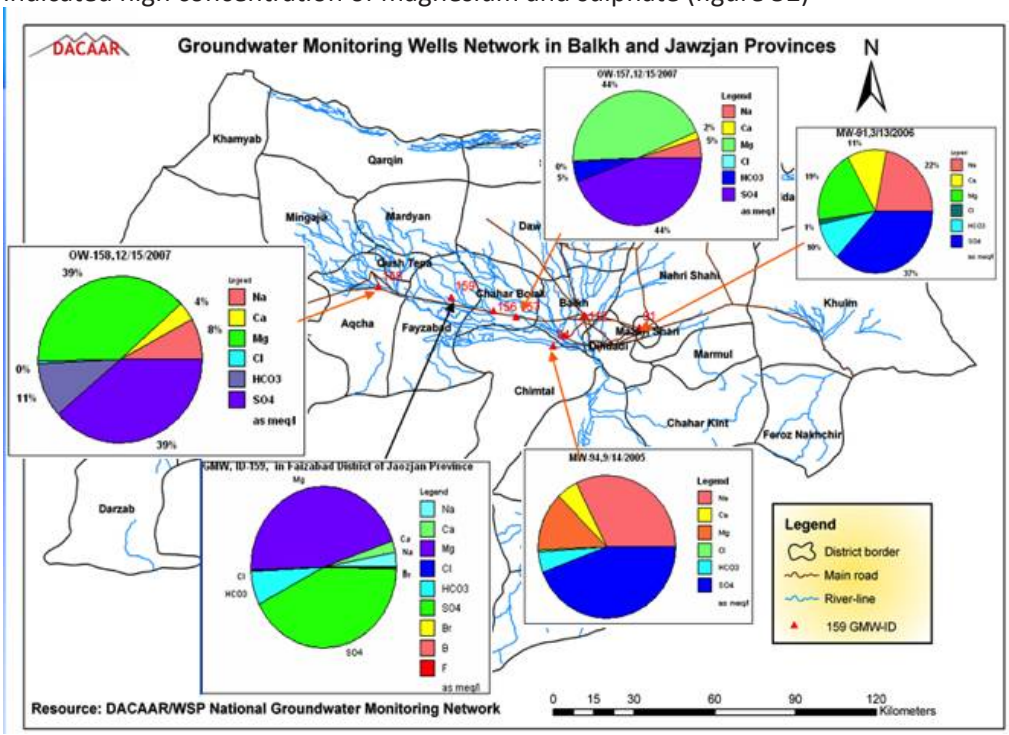


Figure 52 Percentage of Sulphate and magnesium concentrate

5.3.5.7 Correlation between sulfate against calcium, magnesium

The figure 53, 54, 55 and 56 indicate correlation between sulfate against magnesium and calcium (Scatter plot). The points are clustered very dense (up gradient) with respect correlation between sulfate special distribution against magnesium and calcium concentrations. These points indicate that the sulfate concentration against magnesium and calcium concentrations are lower and this is the first stage of weathering and dissolution of gypsum minerals. The hydro

chemical processes like weathering and dissolution of gypsum minerals impact the geochemistry of groundwater. The points are scattered from unity (down gradient areas) with respect correlation between sulfate special distribution against magnesium and calcium concentrations. These points indicate the sulfate concentrations against magnesium and calcium concentrations are very high. The main hydro chemical processes like evaporative condition, dissolution and precipitation of gypsum minerals and anthropogenic sources impact major ions chemistry.

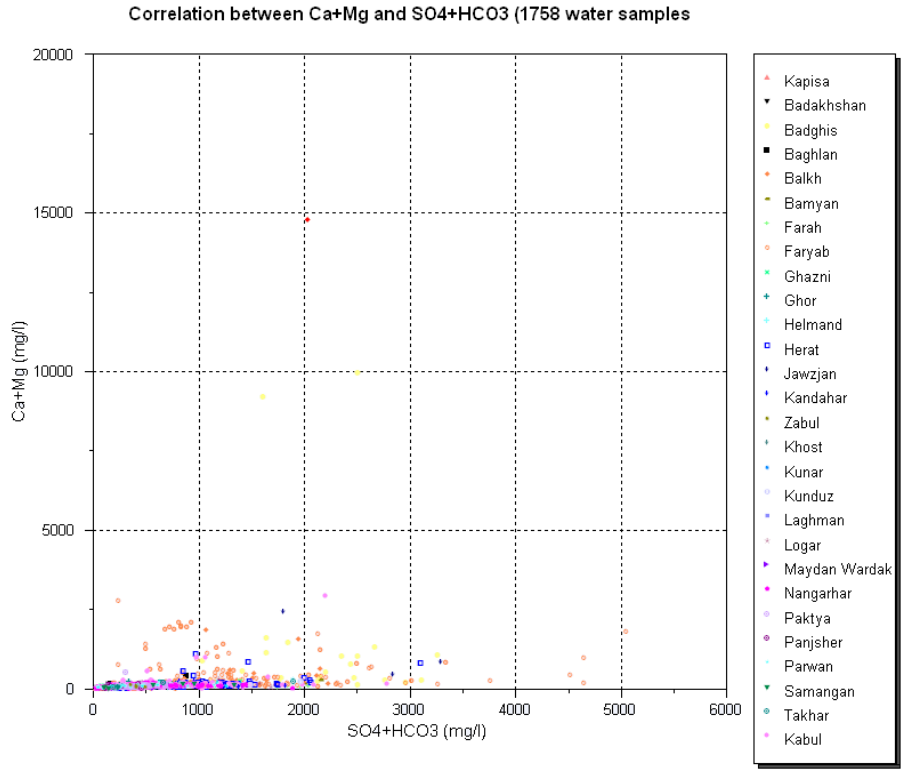


Figure 53 SO4 versus Ca + Mg

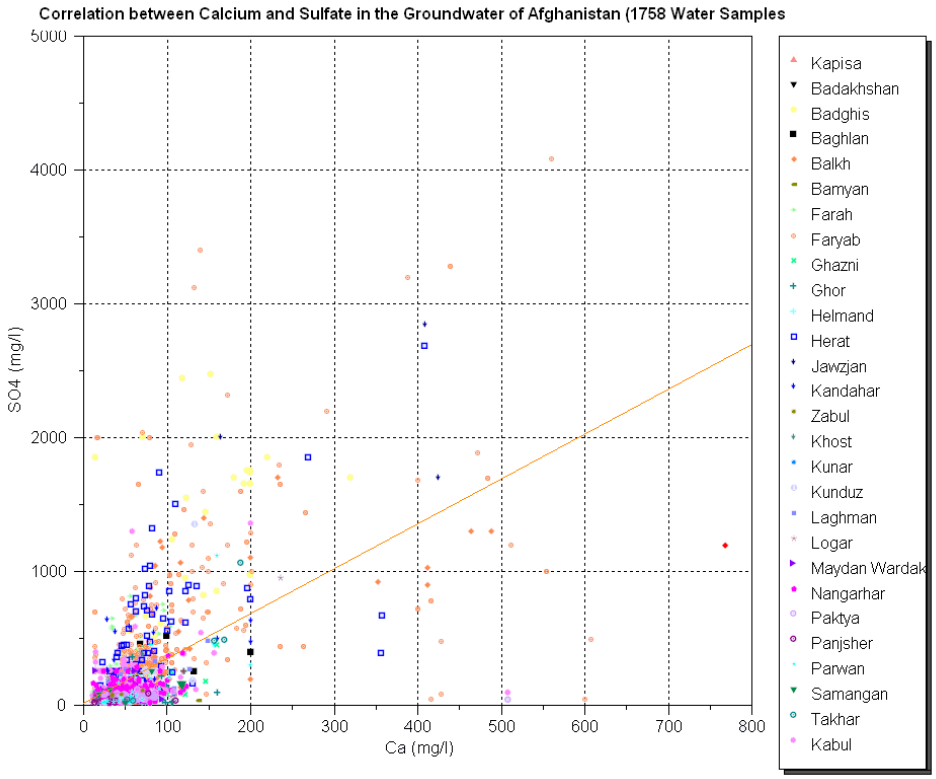


Figure 54 SO4 versus Ca

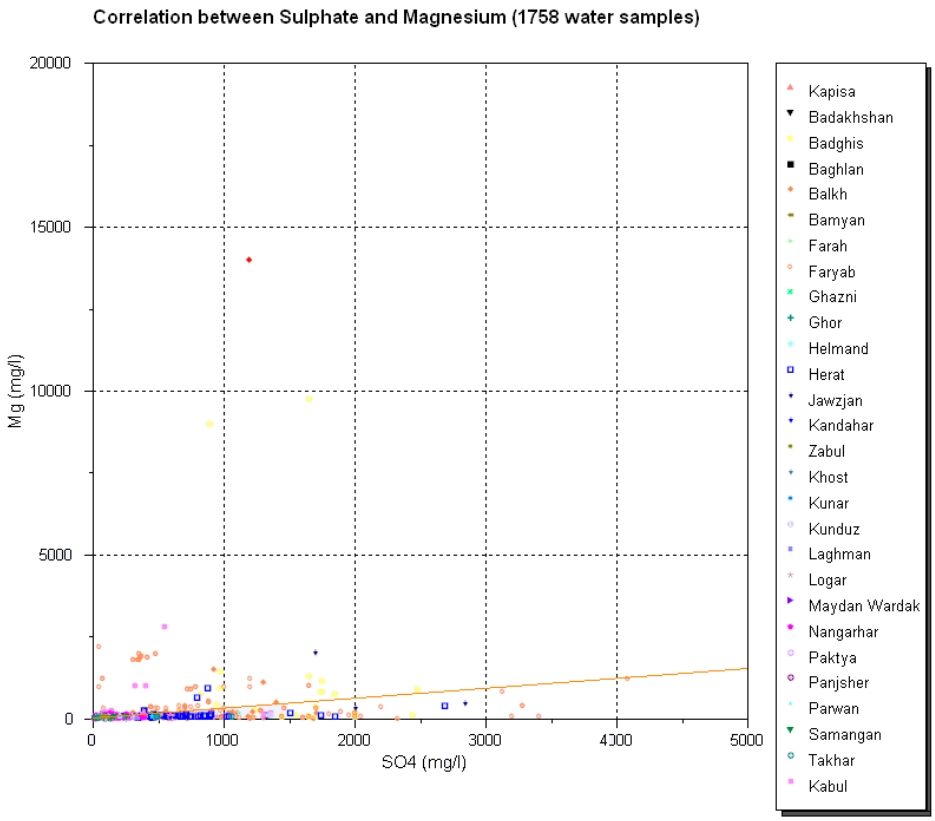


Figure 55 SO4 versus Mg

5.3.6 Sodium and Chloride

Sodium and chloride ions are important components of most groundwater, because the mineral of sodium chloride (halite) is very soluble and both of the ions very mobile. Sodium and chloride ions are enriched in the residual solution during evaporation. At the same time the distribution of sodium is limited by ion exchange, chloride is a practically uncreative conservative tracer.

5.3.6.1 WHO guideline for sodium and chloride

The WHO guideline for sodium is 200 mg/l and for chloride is 250 mg/l.

5.3.6.2 Sodium and chloride potential health effect

A high content of sodium in drinking water injurious to health (increases blood pressure) and water with chloride concentration is greater than 250 mg/l has saline taste. High concentrations can cause considerable damage to the body's fluid balance. One of the negative effects of highly saline water is also the corrosion of metal and destroys concrete elements.

5.3.6.3 Sodium spatial distribution levels in the groundwater of Afghanistan

Sodium concentration values in the water samples from the water points varies trough out Afghanistan, in the range from 8 mg/l (ZamanKhil Payeen village,Unaba district of Panjsher province) to 11,932 mg/l (Chel Quduq village, ShirinTagab district of Faryab province). The dissolution of halite minerals during their long residence time are responsibly for high sodium concentration in the groundwater of west-northern, north and north-eastern Afghanistan. The figure 56 shows the sodium spatial distribution levels in the groundwater of Afghanistan.

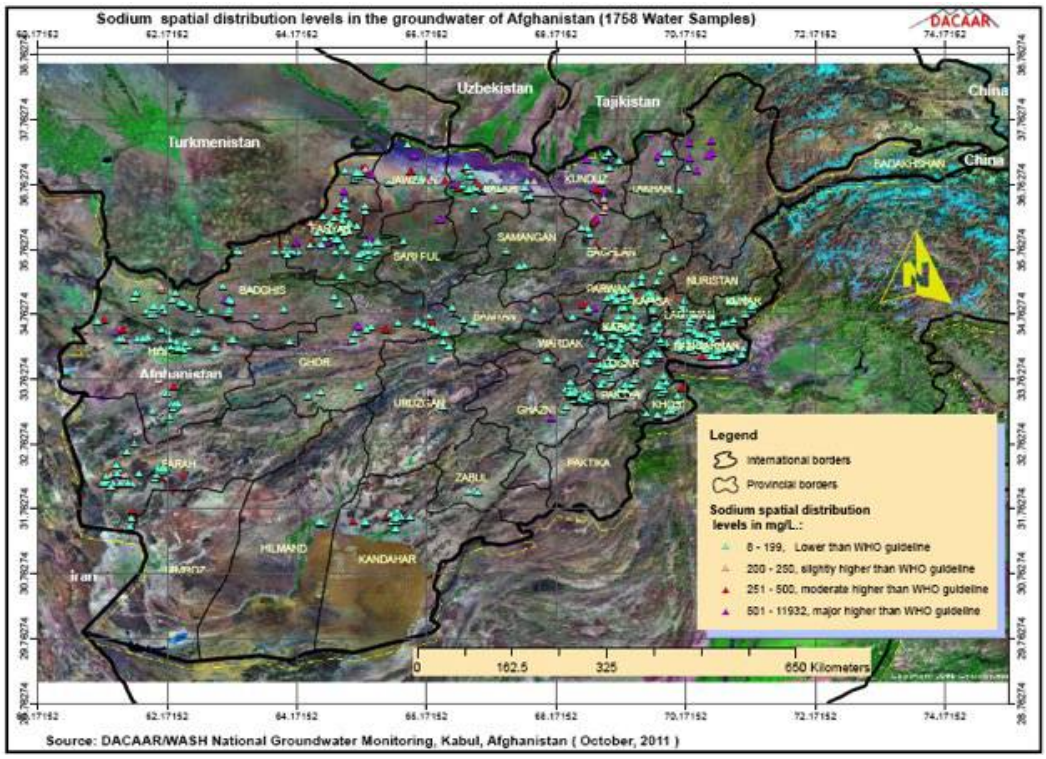


Figure 56 Sodium distribution in groundwater

The 27% (1,758 water samples) of water samples from drinking water points show that the sodium concentrations value are higher than the WHO limit of 200 mg/l (Figure 57). The most of water samples with high sulphate concentrations value observed in the west, west-northern, north and north-eastern of the country.

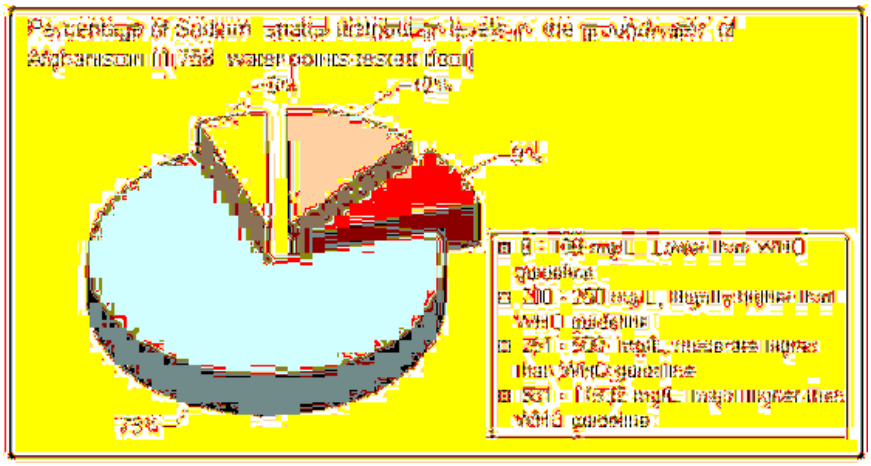


Figure 57 Percentage distribution of sodium in groundwater

5.3.6.4 Chloride spatial distribution levels in groundwater of Afghanistan

Chloride concentrations value in the water samples from the water points and groundwater monitoring wells varies trough out Afghanistan, in the range from 4 mg/l (Tunfer village, Dih Yak district of Ghazni province) to 540 mg/l (Darah Bum village, Qadis district of Badghis province). The dissolution of halite minerals and evaporation during their long residence time are responsible for high chloride concentrations in the groundwater of Afghanistan. The chloride spatial distribution levels in the drinking water points and groundwater monitoring wells is shown in figure 58 and figure 59 show the distribution as percentage.

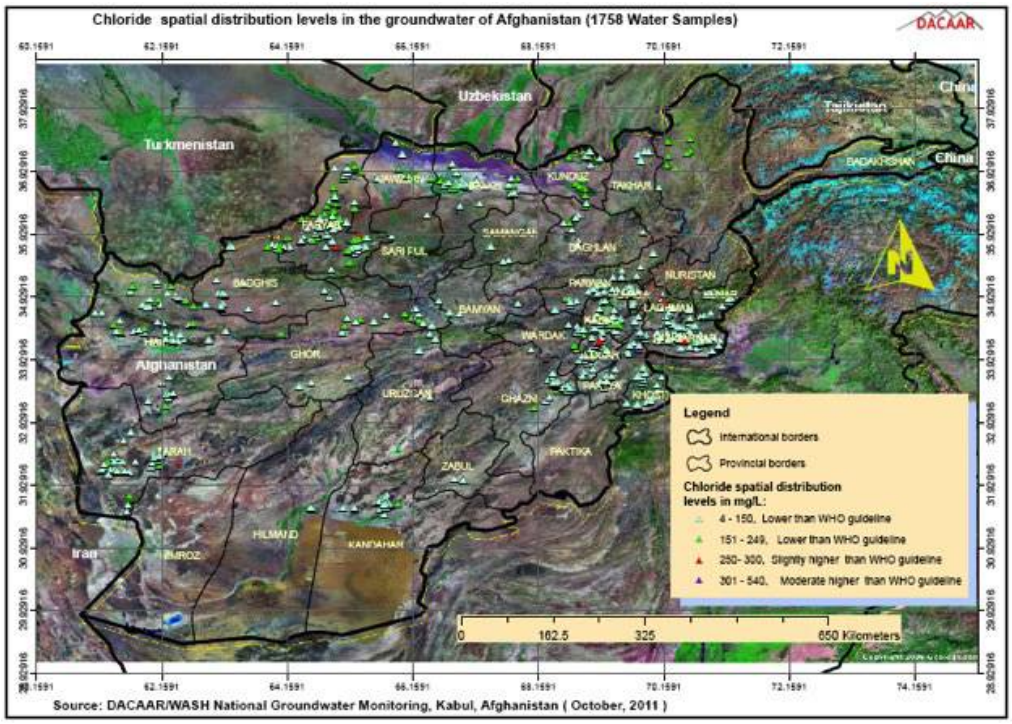


Figure 58 Chloride distribution in groundwater

The 2% (1758 water samples) of water samples from drinking water points and GMWs show that the chloride concentrations value are higher than the WHO limit of 250 mg/l. Most of water samples with high chloride concentrations value are observed in the west, west-northern, north and north-eastern of the country.

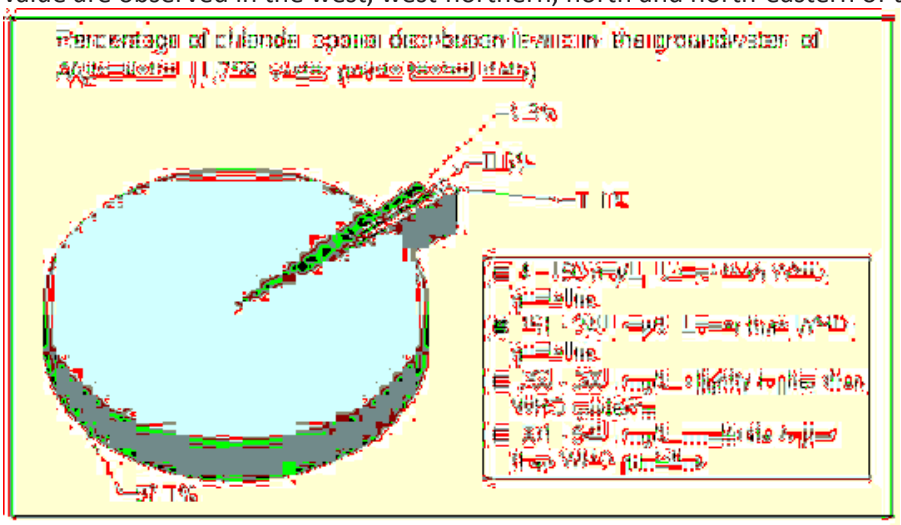


Figure 59 Percentage of chloride distribution in groundwater

5.3.6.5 Correlation between sodium and chloride concentration in the groundwater

Figure 60 shows correlation between sodium and chloride concentrations in the groundwater of Afghanistan. The points are clustered densely with respect sodium versus chloride concentrations. These points are considered along the upper and middle parts of hydraulic boundaries of river basins and the sodium versus chloride concentrations is lower. The natural hydro chemical processes like weathering and dissolution of rock (sodium rich feldspar or albite) with interaction of water and low values of anthropogenic sources impact the geochemistry of groundwater. The concentrations values of sodium versus chloride are low and the water is fresh. This trend is the first stage of sodium bearing minerals dissolution to the groundwater. The points get away from unity (scatters points) with respect of sodium versus chloride concentrations are considered in the down gradient of hydraulic boundaries of river basins(west, north-western, north and north-eastern of Afghanistan). The natural processes like evaporative condition, precipitation and dissolution of halite mineral and anthropogenic sources are responsible for high concentration of sodium and chloride concentration in the groundwater.

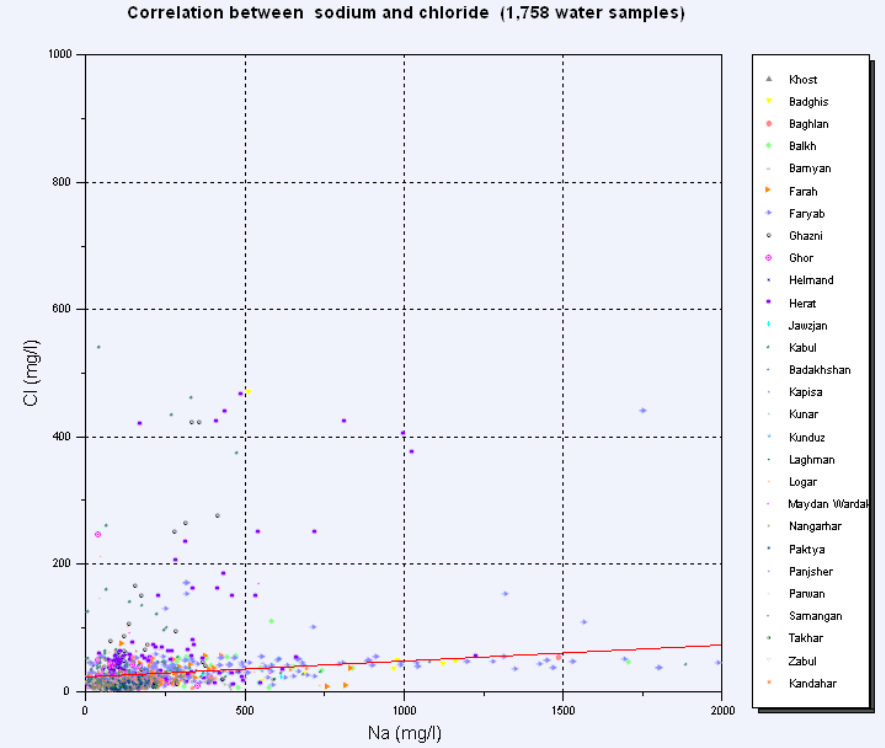


Figure 60 Correlation between sodium and chloride

5.3.7 Fluoride

5.3.7.1 Environmental occurrence

Fluorides are organic and inorganic compounds containing the fluorine element. Only inorganic fluorides are the focus of this study, particularly those which are most present in the environment. The fluoride concentrations in drinking water has beneficial and the detrimental effects on human health. Low concentrations of fluoride in drinking water are hygienically desirable and high concentration of fluoride in the water effects on human health and growth of plant.

5.3.7.2 Effect of Fluoride on health

The low concentrations of fluoride in drinking water are hygienically desirable and the high concentrations of fluoride in drinking water causes dental, skeletal, crippling skeletal fluoros is and *affect Brain and Arthritis.*

5.3.7.3 WHO guideline for Fluoride

The WHO permissible limit of fluoride in drinking water is 1.5 mg/l, however bureau of Indian standards (BIS, 1990) has suggested the permissible limit of fluoride in drinking water to be 1mg/l.

5.3.7.4 Sources of Fluoride.

a) Granite (igneous rock) with pegmatite layer, gneiss and schist (metamorphic rocks) rocks are the major geological formation for fluoride concentration in groundwater. The minerals composition of granite is composed of quartz, feldspar and fluorite, whereas gneiss and schist are composed of quartz, k-feldspar hornblende, biotite and fluorite. The fluoride-bearings minerals with interaction of water provide a significant fluoride in groundwater.
b) Granite and gneiss rocks are highly weathered which facilitate to release of fluoride from minerals into groundwater.
c) Fluoride is commonly associated with volcanic activity and famarolic gases.
d) Thermal waters with high pH, are also rich in fluoride (Edmunds and Smedley1996)
e) Agriculture and granite rock polishing industries are the main source of fluoride concentration in groundwater
f) Due to dust, industrial production of phosphate fertilizers, coal ash from the burning of coal and volcanic activities, fluorides are widely distributed in the atmosphere

5.3.7.5 Fluoride distribution levels in the groundwater of Afghanistan

The chemical analysis of water samples from the water points and GMWs show that the fluoride distribution levels varies and the range from 0.01 mg/l (center of Ghazni province) to 79.20 mg/l(Dawlatabad district of Faryab province). The fluoride spatial distribution levels in the drinking water points and GMWs is shown in figure 61.

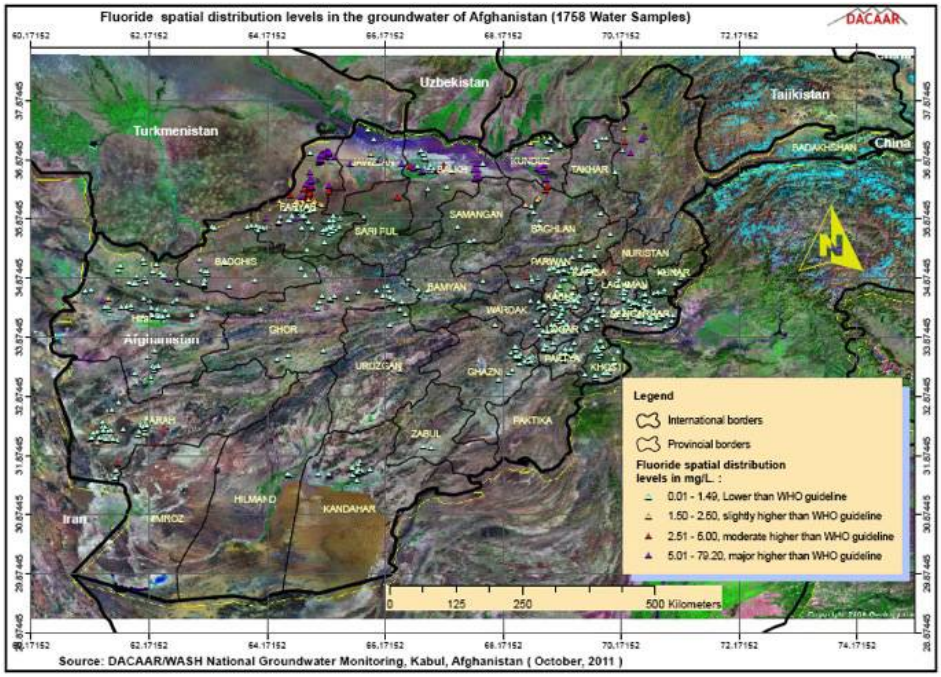


Figure 61 Floride distribution in groundwate

15.9% of analyzed water samples (1,758 water samples) from the drinking water points (hand pumped wells, springs, rivers) and GMWs indicated the presence of significant fluoride concentration and which are exceeded the WHO limit of 1.5 mg/l. The water samples indicated high concentrations of fluoride which are from the west, west-northern, north and north-eastern of Afghanistan. The figure 62 shows the percentage of fluoride distribution levels in the groundwater of Afghanistan.

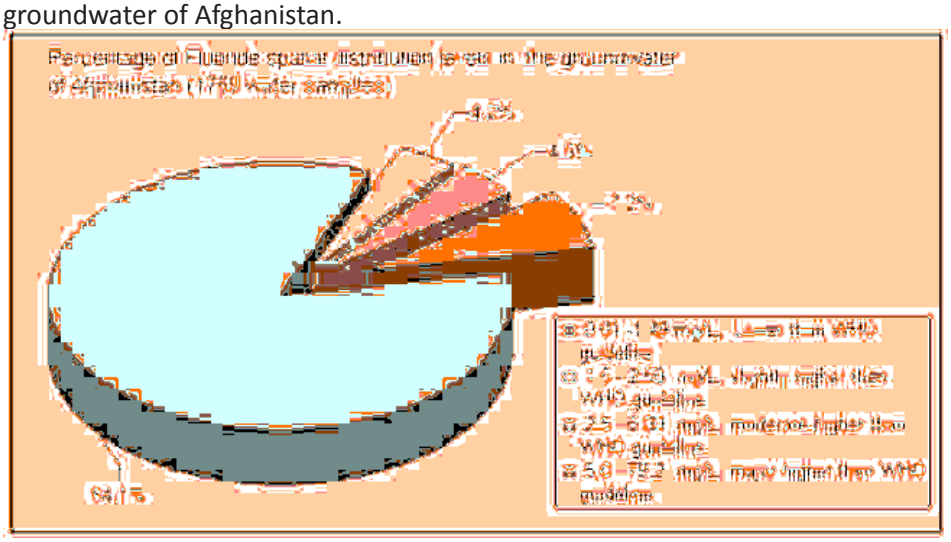


Figure 62 Percentage of Fluoride concentration in groundwater

The GMWs network (GMW_ID, 91, 94, 112, 156, 157, 158 and 159)are located along the main road between Mazar-i-Sharif (centre of Balkh province) to Aqcha district of Jawzjan province indicated that the fluoride concentrations are very higher than the WHO limit of 1.5 mg/l. The fluoride and boron concentrations increased from the upper parts to the deeper parts of groundwater. The figure 63 shows the percentage of fluoride distribution levels in the groundwater of Afghanistan.

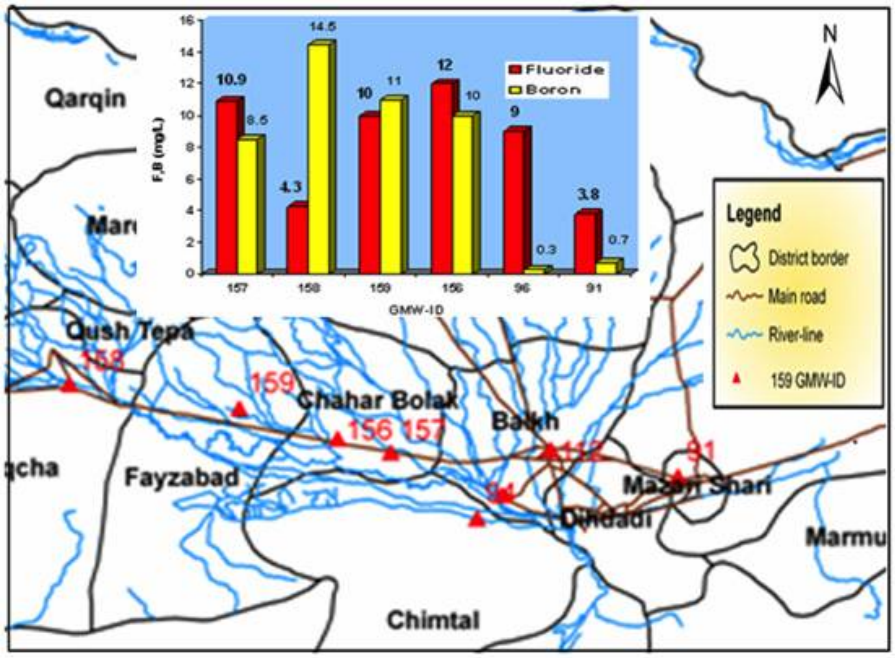


Figure 63 Boron and fluoride concentration levels

5.3.7.6 Correlation between fluoride against calcium, salinity, bicarbonate and pH

The Fig. 64 shows fluoride versus calcium concentrations in the groundwater of Afghanistan. The points are clustered very densely with respect fluoride versus calcium concentrations. This trend indicates the fluoride versus calcium concentrations is low, it is the first stage of fluoride bearing minerals from igneous (granite) and metamorphic (gneiss and shiest) rocks weathering and dissolution with interaction of water. The points are scattered from the unity with respect fluoride versus calcium concentrations. This trend indicates the fluoride versus calcium concentrations is higher. The hydro chemical processes like evaporative condition, cations exchange (calcium for sodium occurs), ion exchange (precipitation of calcite) impacts hydrochemistry of groundwater.

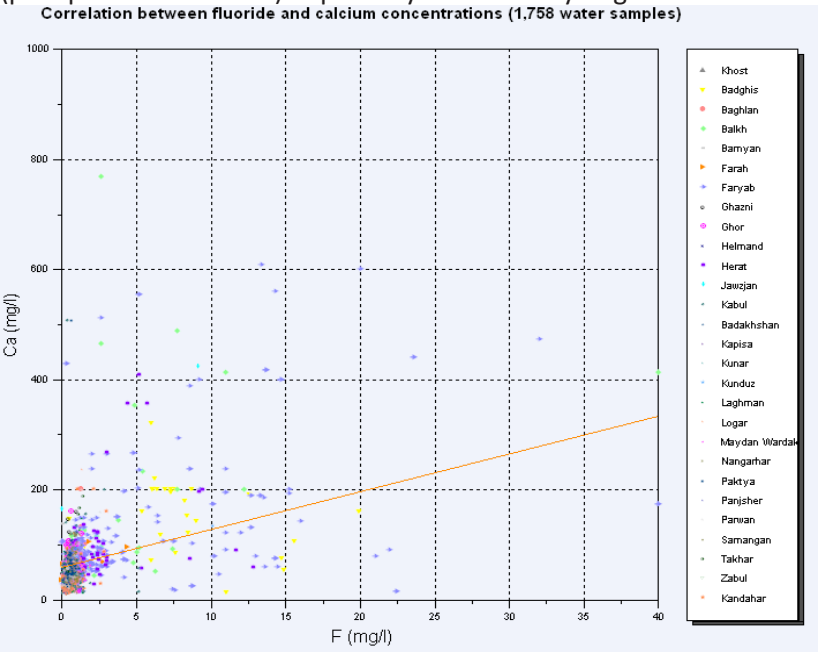


Figure 64 Correlation between fluoride and calcium

Figure 65 shows correlation between fluoride and EC concentrations in the groundwater. The points clustered very densely with respect fluoride versus EC spatial distribution, this trend indicates the fluoride concentrations versus EC spatial distributions is lower and this is the first stage of weathering and dissolution of fluoride bearing minerals and carbonate rock with interaction of water. The points scattered from unity with respect fluoride concentrations versus EC spatial distributions, this trend indicates the fluoride concentrations versus EC spatial distributions is high. In generally, the areas with high fluoride concentration in groundwater overlap the areas with high EC. In the recharge areas, the content of EC in groundwater is low, however which is progressively increased in the discharge areas.

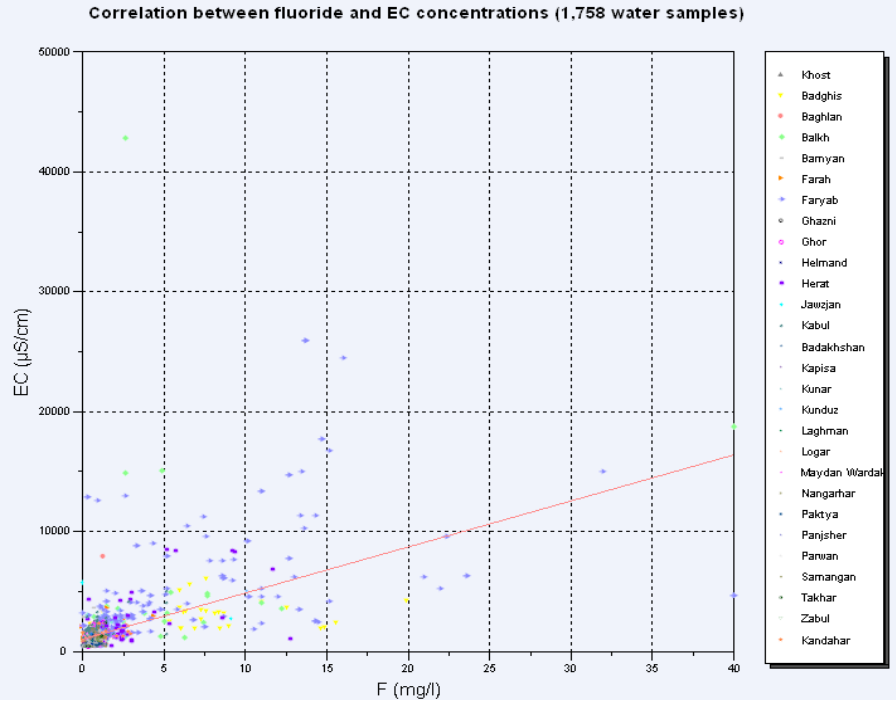


Figure 65 Correlation between fluoride and EC Concentration

Figure 66 shows the correlation between fluoride and bicarbonate in the groundwater of Afghanistan. The points are clustered very dense (up gradient of river basins) with respect fluoride versus bicarbonate concentrations. This trend indicates the fluoride versus bicarbonate concentrations are low in the groundwater and it is the first stage of weathering and dissolution fluoride bearing minerals and carbonate rocks with interaction of water. The hydro chemical processes like weathering and dissolution of fluoride bearing minerals and carbonate rocks with interaction of water impacts the hydro chemistry in the groundwater. The point scattered from unity with respect fluoride versus bicarbonate concentrations. High bicarbonate concentrations in the groundwater with respect fluoride versus bicarbonate may result from depletion calcium ion due to cat ion exchange (Walraevens, 1990). As a result of depletion of calcium ion may increase to fluoride concentration in ground water. This trend is applicable to the areas where the fluoride concentration is very high, however the calcium is low (west, north- west and north-east of Afghanistan)

The high fluoride concentration in the groundwater with respect fluoride versus bicarbonate concentrations may results from precipitation and evaporative sources due to its long resident time.

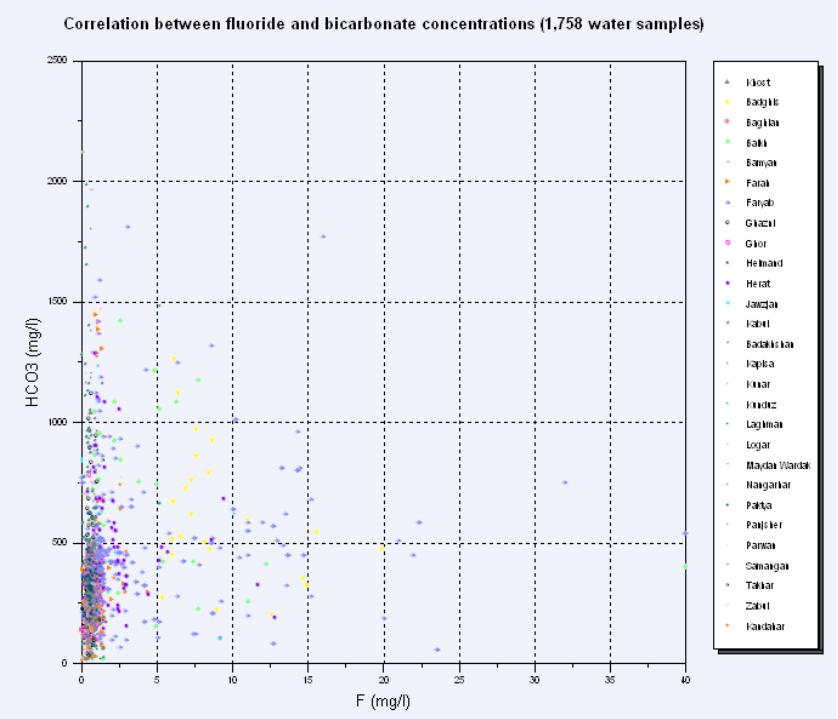


Figure 66 Correlation between fluoride and bicarbonate

5.3.8 Boron contamination in the groundwater

5.3.8.1 Environmental occurrence

Boron is an element that is present in our environment. It is often found in rock and soil, and slowly released into water. Plants use boron that is obtained from soil. Some boron also gets into the environment from manufacturing of chemical products or pesticides. Much of the boron found in groundwater and drinking water is naturally occurring, but some of it comes from the production of consumer and agricultural products.

5.3.8.2 Boron effect on health and plant growth

High boron content in drinking water affects the testes and sperm of males, and causes birth defects in the offspring of pregnant females. Some research has suggested that small amounts of boron in drinking water may actually offer a beneficial effect for certain conditions, such as arthritis. High boron concentrations in water are also expected to have a negative impact on plant growth.

5.3.8.3 WHO guideline for boron

The WHO maximum contaminants level for boron is 0.5 mg/l B or 2 mg/l BO_2.

5.3.8.4 Sources of boron in the groundwater of Afghanistan

Boron can be derived from various sources: 1) residual solutions of evaporating surface water; 2) anthropogenic pollution and detergent from sewage; 3) weathering of boron-bearing minerals (biotite and amphibolites); and 4) agricultural fertilizer**.**

5.3.8.5 Boron contamination in the groundwater of Afghanistan

The chemical analysis of water samples from the water points and GMWs show that the boron distribution levels ranges from 0.001 mg/l (in central, east and south Afghanistan) to 25 mg/l (Khulm district of Balkh province). The figure 67 shows the boron spatial distribution levels in the in the groundwater of Afghanistan.

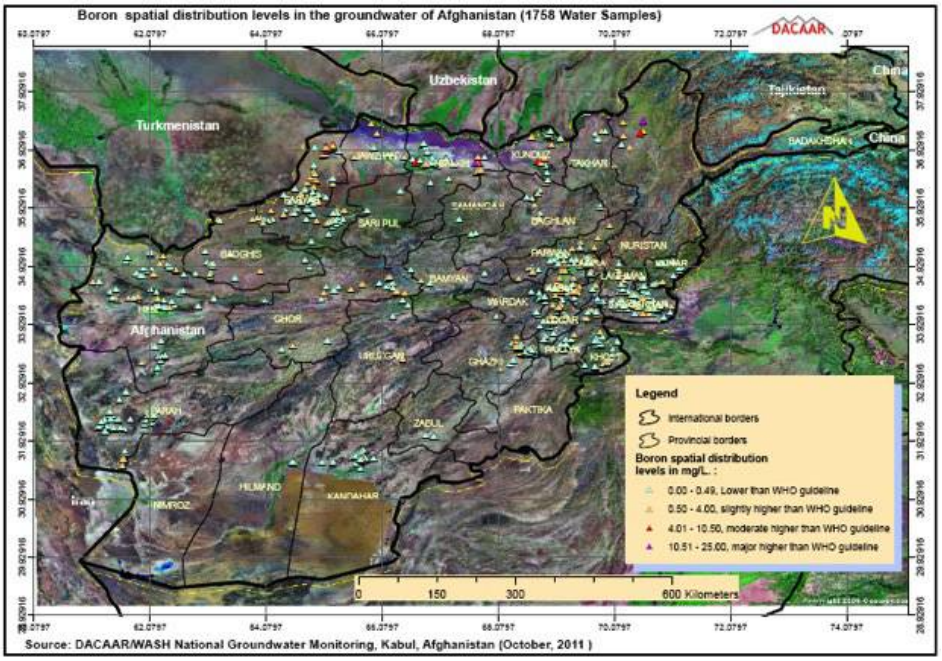


Figure 67 Boron distribution in groundwater

42 % of analyzed water samples (1,758 water samples) data from the drinking water points (hand pumped wells, springs and rivers) and groundwater monitoring wells indicated the presence of significant boron concentration and which are exceeded the WHO limit of 0.5 mg/l.(figure 68).

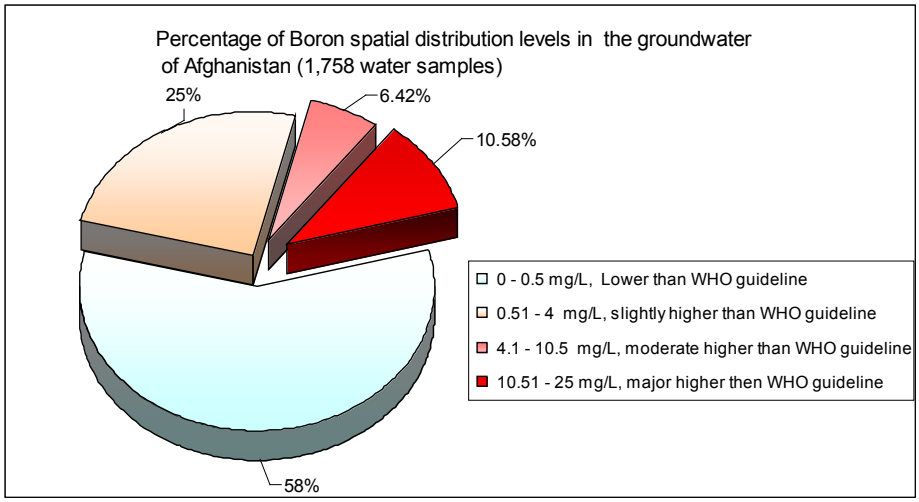


Figure 68 Percentage of boron distribution levels

The most areas are located in the central, west, west-northern, north and north-east of Afghanistan the groundwater contain high boron concentration. This most probably came from due to either evaporative condition or its high residence time in the aquifers system, thereby having longer contact time for dissolution of fluoride bearing minerals present. The high boron concentration in the groundwater of urban areas specially in Kabul city can be influenced from various sources:1) residual solutions of evaporating surface water; 2) anthropogenic pollution and detergent from sewage; 3) weathering of boron-bearing minerals (biotite and amphibolites); and 4) agricultural fertilizer**.**
The time series water samples analyzed data from GMWs (the west, west-northern, north and north-eastern of Afghanistan) indicated that the boron concentrations values fluctuated in time, but the boron concentrations values have not progressively increase with time (Annex 8)

5.3.9 Arsenic contamination in the groundwater of Afghanistan

5.3.9.1 What is Arsenic?

Arsenic is a naturally occurring element. It is commonly classed as a metal (one of the so-called heavy metals), but it has some non-metal characteristics. Arsenic is chemically similar to phosphorus, one of the essential components of life processes.
Arsenic commonly moves around in the environment as an anion (negatively charged ion), in combination with oxygen. Arsenic is one of the most common potentially toxic trace metals and it is toxic to humans and animals.
5.3.9.2 what is the geochemistry of Arsenic?
Chemically, arsenic is always present as compounds with oxygen, chlorine,sulphur, carbon and hydrogen on one hand and with lead, gold, copper and iron on the other. Organic arsenic is generally fewer toxins than inorganic arsenic.

Geochemistry of arsenic is controlled by many factors including:

1) Red-ox potential
2) Adsorption/ desorption
3) Precipitation/dissolution
4) Source
5) pH
6) Arsenic speciation
7) Presence and concentration of competing ions
8) Biological transformation

5.3.9.3 Arsenic species
The significant Arsenic species are:

1) As (III) -H3AsO3 ,H2AsO3, HAsO3 (Arsenate)
2) As (V)-H3AsO4 ,HAsO4, AsO4 (Arsenite)

As V (Arsenite) more effectively removed than As III (Arsenate) by most treatment technologies. Surface waters - predominantly As (V). Ground waters – usually found as As (III), however, it can As (V) or a combination of As (III) and As (V).

5.3.9.4 Arsenic sources

1) Arsenic occurs in surface and groundwater and an air

2) Processes that release arsenic in to the environmental include
   - Volcanic activities
   - Erosion of rocks
   - Forest fires
   - Human activities

5.3.9.5 WHO guideline for Arsenic

The WHO guideline for arsenic is 0.01mg/L or 10 ppb (part per billion) or microgram/litre, USA Maximum Contamination Level for Arsenic is 0.01mg/L and Canada MCL for Arsenic is 0.025mg/.

5.3.9.6 Arsenic health effect

The health problems of high Arsenic content drinking water are:

1) Causes cancers-bladder, lungs, skin,kidneys, nasal passages, liver and prostate
2) Effects nervous system as well as heart and blood vessels
3) Birth defects and reproductive problem

5.3.9.7 Technology for removal of Arsenic

The ion exchange, activated alumina, reverse osmosis, modified coag/filtration, modified lime softening and oxidation/filtration technologies can remove Arsenic contamination from water. Table 2 shows the best available technology for removal of Arsenic.

Table 2 Best available technology for removal of Arsenic

Technology	Max. Removal(%)
Ion ixchange	95
Activated alumina	90
Reverse osmosis	>95
Modified coag/filtration	95
Modified lime softening	80
Electrodialysis reversal	85
Oxidation/filtration	80

5.3.9.8 Arsenic contamination in the ground water of Afghanistan

The analyzed data from water points and groundwater monitoring wells show that the arsenic contamination identified in the Logar, Ghazni, Hirat, Pangshir, Laghman, Farah and Faryab provinces where are considered the arsenic bearing minerals. The figure 69 shows the arsenic spatial distribution levels in the groundwater of Afghanistan.

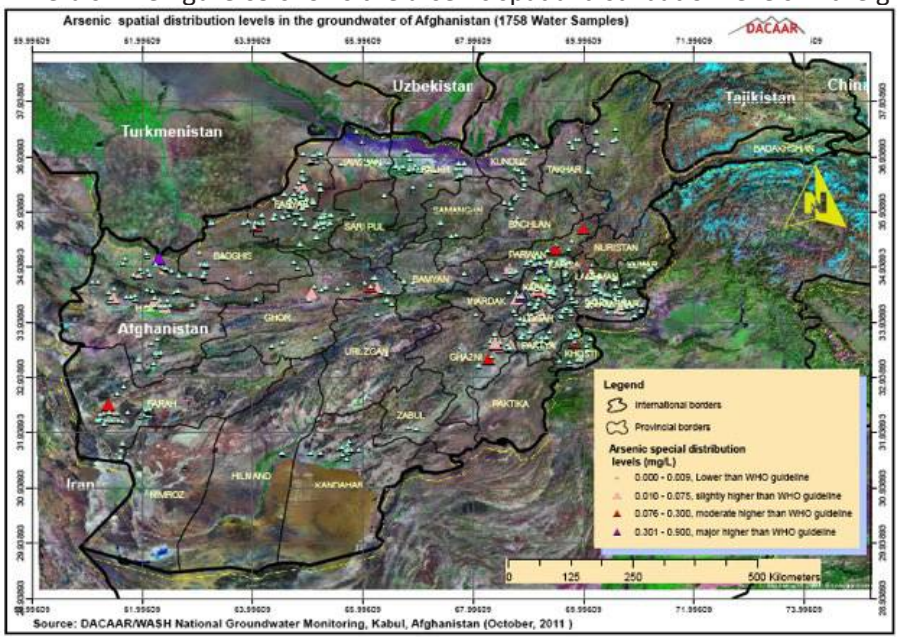


Figure 69 Arsenic distribution

In the areas where are considered excessive arsenic concentration, there are existing arsenic bearing minerals (figure 70). There are need detail research regarding arsenic contamination and other heavy (trace) elements.

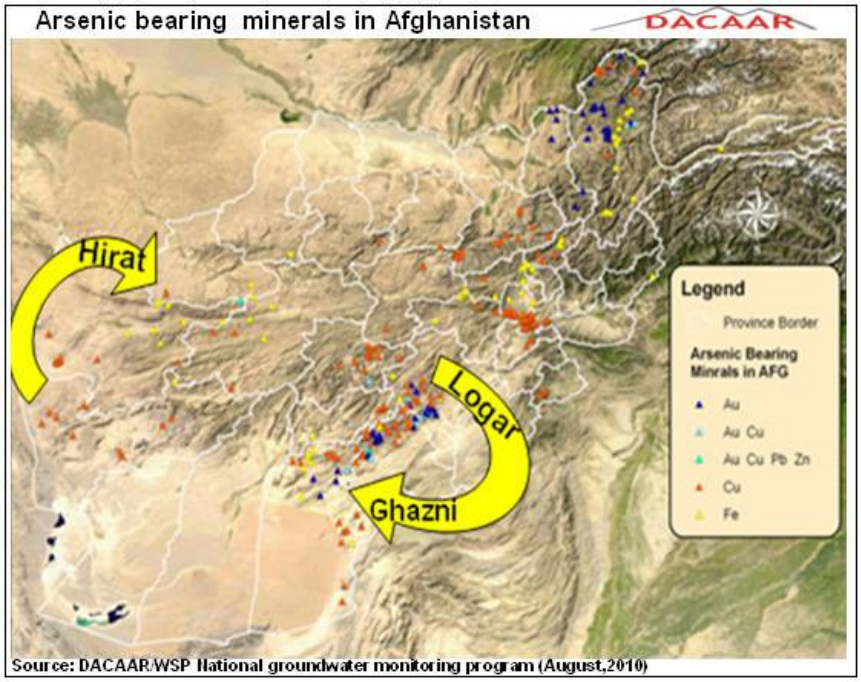


Figure 70 Arsenic bearing minerals

Since 2003-2004, DACAAR with financial support of UNCIF carried out detail investigation regarding Arsenic contamination in Ghazni, Logar, Kabul and Heart provinces and have collected data from GMWs since(2005 -2011). The results of investigation and monitoring are as follows:

5.3.9.9.1 Arsenic contamination in Ghazni province

In 2003-211, DACAAR tested 347 water samples from water points using Digital Arsenator instrument in Ghazni (center), Khwaja Umari, Jaghato and Rashidan districts of Ghazni province. The analyzed data show that the most of water samples from water points are exceeded the limit of 0.01mg/l. Figure71 illustrates the arsenic special distribution level in the groundwater of urban and rural areas of Ghazni province.

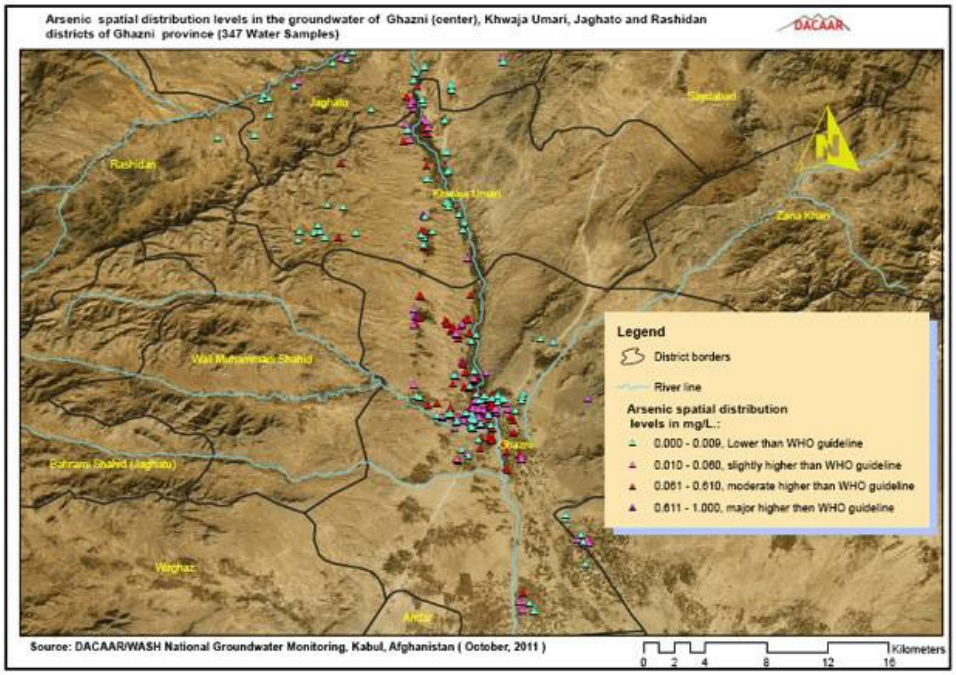


Figure 71 Arsenic contamination in Ghazni

The figure72 illustrates the special distribution levels of arsenic contamination in the groundwater of Ghazni province centre.

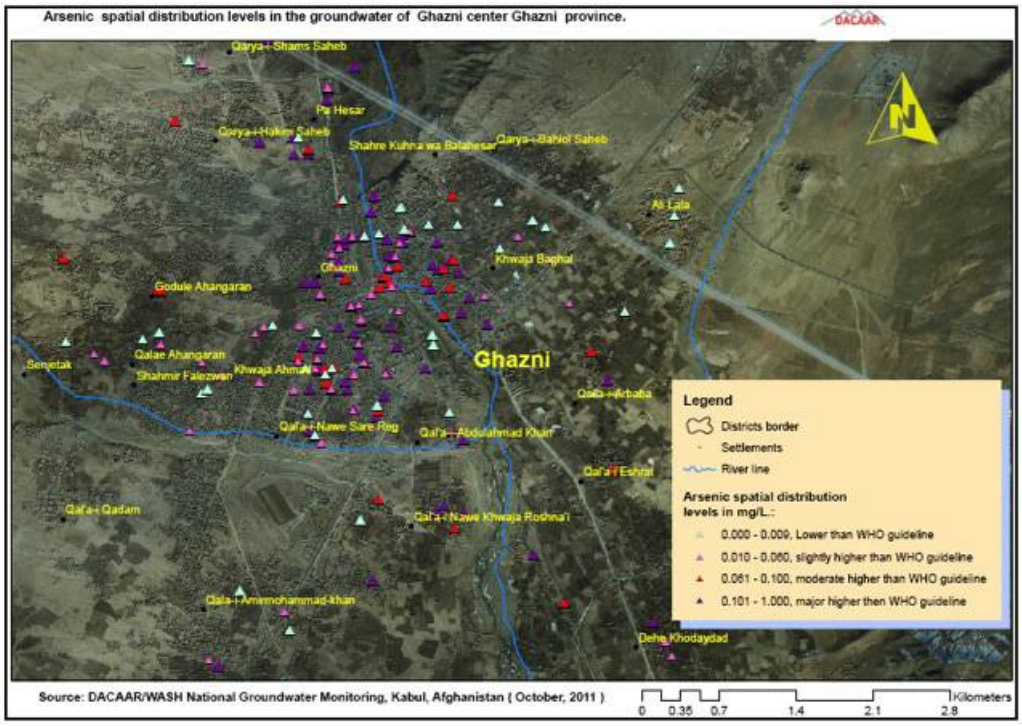


Figure 72 Arsenic in Ghazni Centre

58 % of tested water samples (348 water samples) data from the drinking water points and GMWs indicated the presence of significant arsenic concentrations and which are exceeded the WHO guideline of 0.01 mg/L As (figure 73).

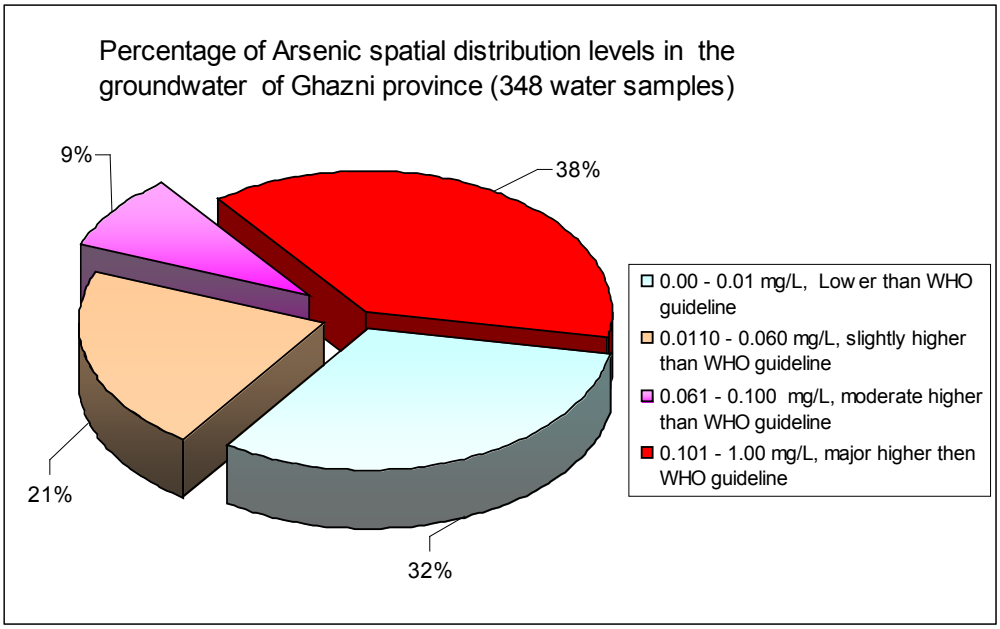


Figure 73 Percentage of Arsenic distribution Ghazni Center

The time series water samples analyzed data from GMWs_ID 5,6, 7 and 189 (located in the, Khwaja Umari and centre of Ghazni province) indicated that the arsenic concentrations values fluctuated in time (Annex 8) and most probably controlled by natural hydro chemical process like red-ox potential, adsorption/adsorptions and dissolution of arsenic bering minerals. The Arsenic bearing minerals considered in the west of Ghazni centre (Figure 74).

5.3.9.9.2 Arsenic contamination Logar and Kabul provinces

The analyzed water samples from the water points of Khak-i- Jabar district of Kabul province show that the arsenic concentrations are zero, however the most of analyzed water samples from the water points of Logar province indicated that the Arsenic concentrations are exceeded the WHO guideline of 0.01 mg/L As.The Arsenic spatial distribution levels in the groundwater (water points) of Logar and Ghazni provinces is shown in figure75.

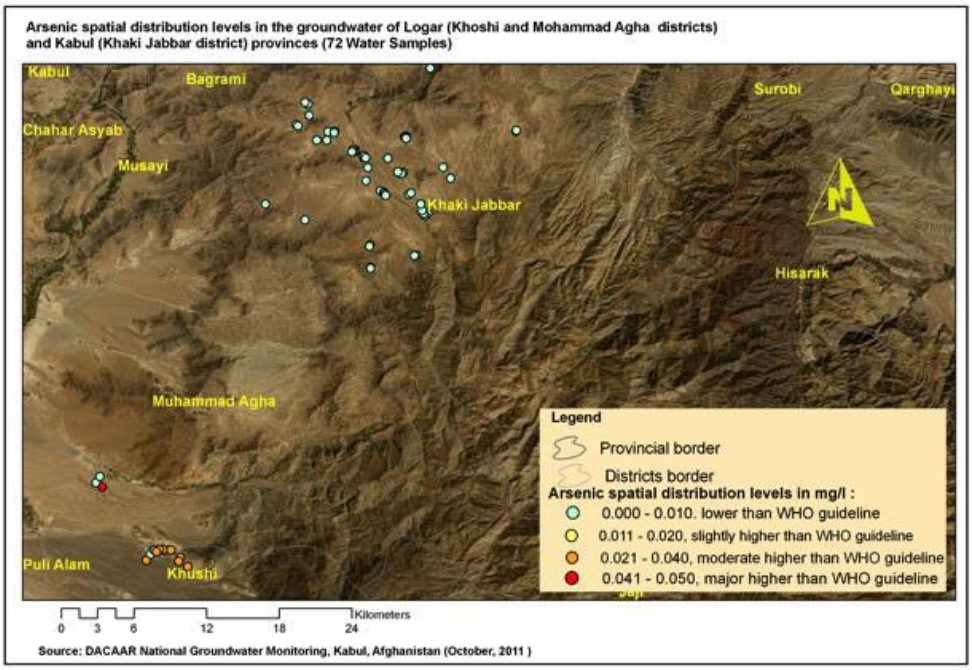


Figure 74 Arsenic spatial distribution in Logar

19 % of tested water samples (72 water samples) from the water points of logar and Kabul provinces are exceeded the WHO guideline of 0.01 mg/L As (figure 75). All water samples from water points from Logar province are exceeded the WHO guideline of 0.01 mg/L As and all tested water samples from Kabul province (Khak-i- Jabar district) water points are zero.

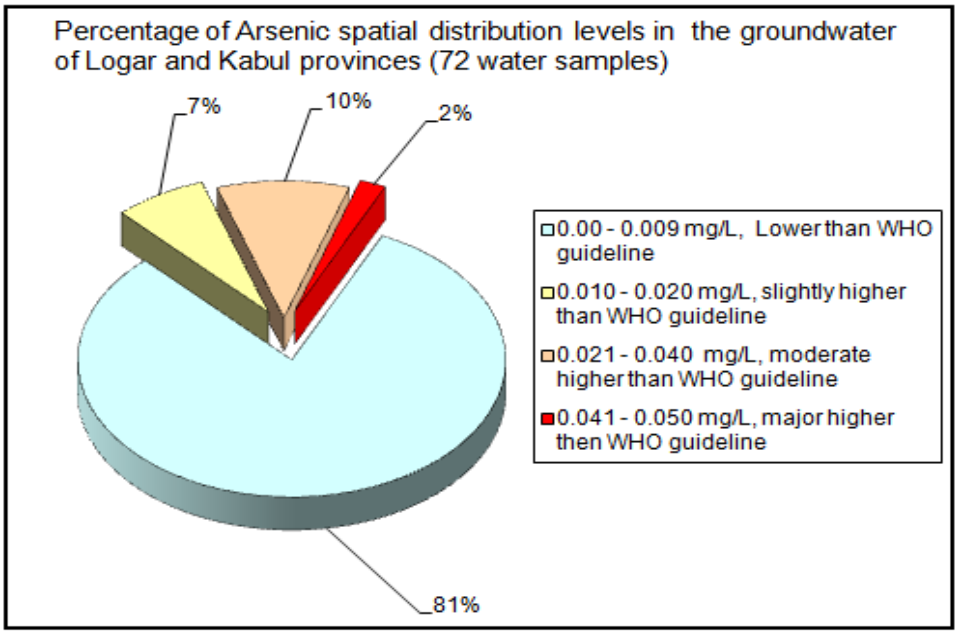


Figure 75 Percentage of Arsenic in Logar and Kabul

The time series water samples analyzed data from GMWs_ID 142 (located in the Mohammad Agha districts of Logar province) indicated that the Arsenic concentrations values fluctuated in time (Annex 8) and the Arsenic contaminationmost is probably originated from the copper mine of Ainak. The exploitation and chemical process of copper alloys (mixtures of metals), is a significant concerns for the wells field which are located in the Logar River course due to discharge of waste water to the Logar River in the future. Therefore, there is needed to regulate the discharge of wastewater from chemical process of copper alloys (mixtures of metals), before exploitation.

The distribution levels of Arsenic concentration, groundwater and surface water flow direction and location of Ainak copper mine indicated in figure76.

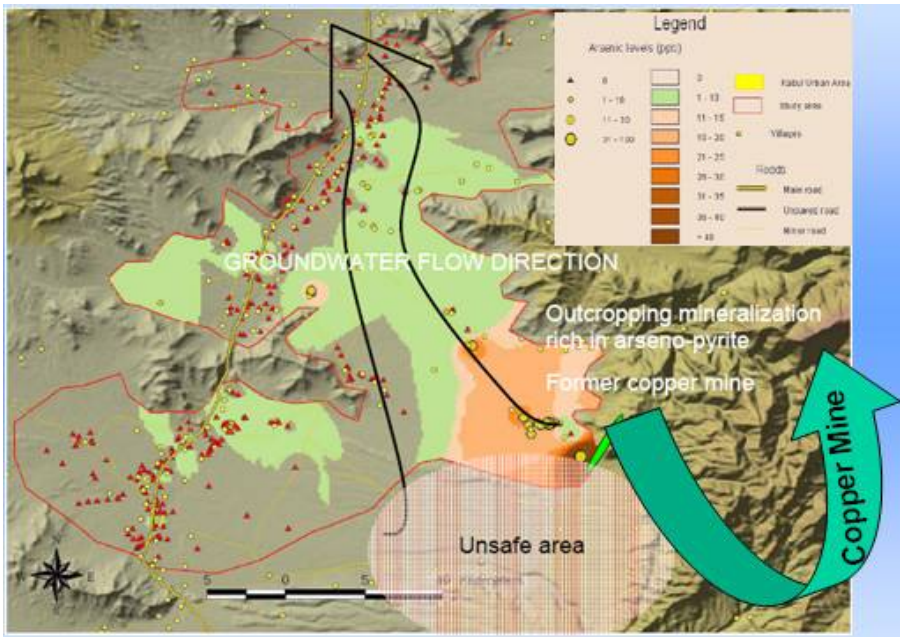


Figure 76 Arsenic concentration levels near Ainak copper mine

5.3.9.9.3 Arsenic contamination in the groundwater of Herat provinces

Arsenic concentration values in the water samples from the water points of heart province vary in the range from 0.0 mg/l to 0.05 mg/l. The Arsenic spatial distribution levels in the drinking water points are shown in figure77.

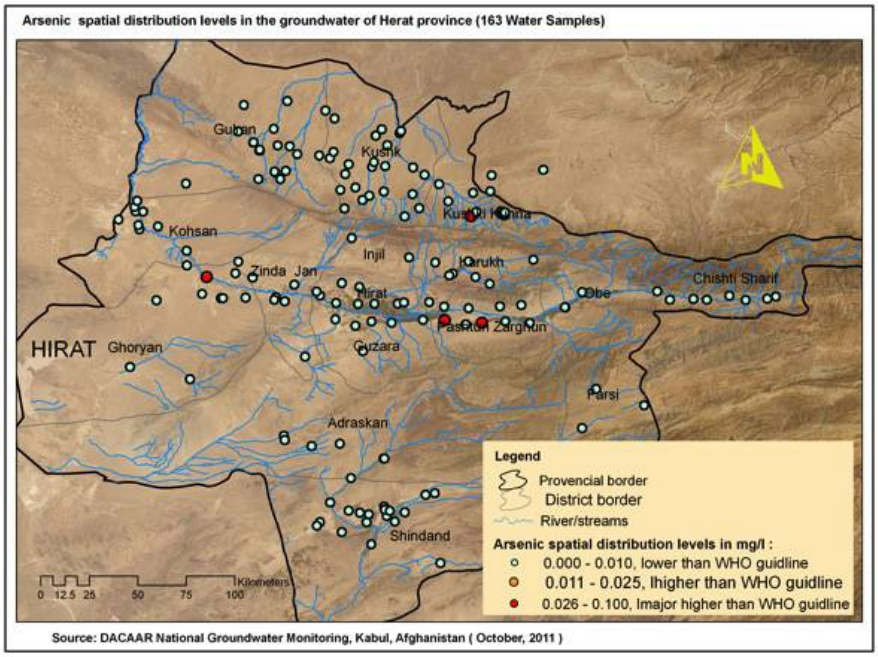


Figure 77 Arsenic contamination in Herat Province

5% of tested water samples (163 water samples) data from the drinking water points in Heart province are exceeded the WHO guideline of 0.01 mg/L As(figure 78).

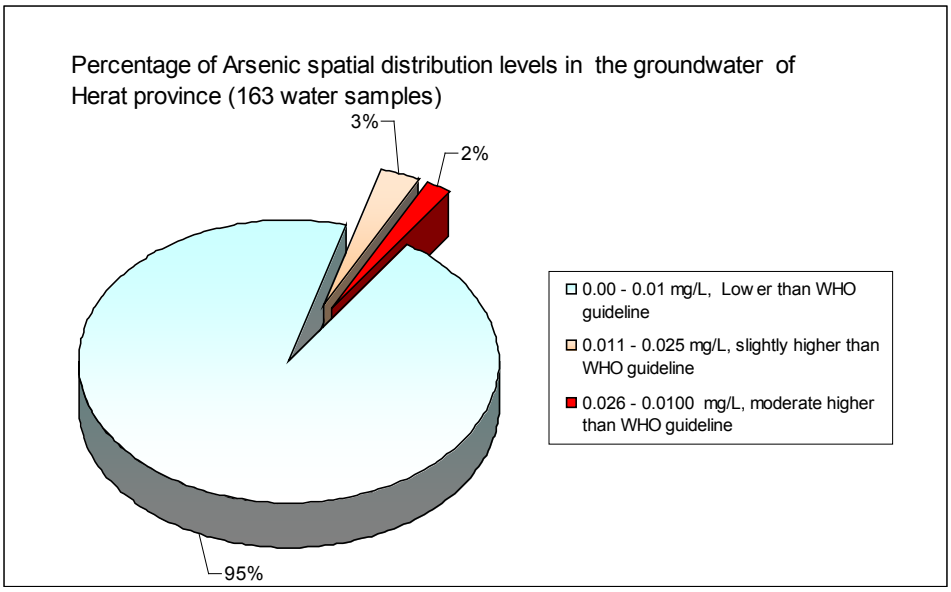


Figure 78 Percentage of Arsenic in Herat province

5.3.10 Chromium contamination in the groundwater of Afghanistan

Chromium is a naturally occurring element found in rocks, animals, plants, soil, and in volcanic dust and gases. Chromium is present in the environment in several different forms. The most common forms are chromium(0), trivalent [or chromium(III)], and hexavalent [or chromium(VI)]. Chromium (III) occurs naturally in the environment and is an essential nutrient required by the human body to promote the action of insulin in body tissues so that sugar, protein, and fat can be used by the body. Chromium (VI) and chromium (0) are generally produced by industrial processes. No known taste or odour is associated with chromium compounds. The metal chromium, which is the chromium (0) form, is a steel-grey solid with a high melting point. It is used mainly for making steel and other alloys. The naturally occurring mineral chromate in the chromium(III) form is used as brick lining for high-temperature industrial furnaces, for making metals and alloys (mixtures of metals), and chemical compounds.

5.3.10.1 What are chromium health effects?

Chromium (III) is a nutritionally essential element in humans and is often added to vitamins as a dietary supplement. Chromium (III) has relatively low toxicity and would be a concern in drinking water only at very high levels of contamination, unlike Chromium (VI) and chromium (0), which are more toxic and pose potential health risks to people. Some people who use water containing chromium well in excess of the maximum contaminant level (MCL) over many years could experience allergic dermatitis.

5.3.10.2 Chromium Maximum Contaminant Levels (MCLs)

The U.S. Environmental Protection Agency (EPA) maximum contaminant levels for chromium is 0.01 mg/l, however the WHO guideline for Chromium is 0.05 mg /l.

5.3.10.3 Chromium contamination in the groundwater of Afghanistan

The chemical analysis of water samples from the water points and groundwater monitoring wells show that the Chromium distribution levels ranges from 0.00 mg/l to 0.08 mg/l. The Chromium spatial distribution levels in the drinking water points and groundwater monitoring wells is shown in figure79 and figure 80 shows the percentage distribution.

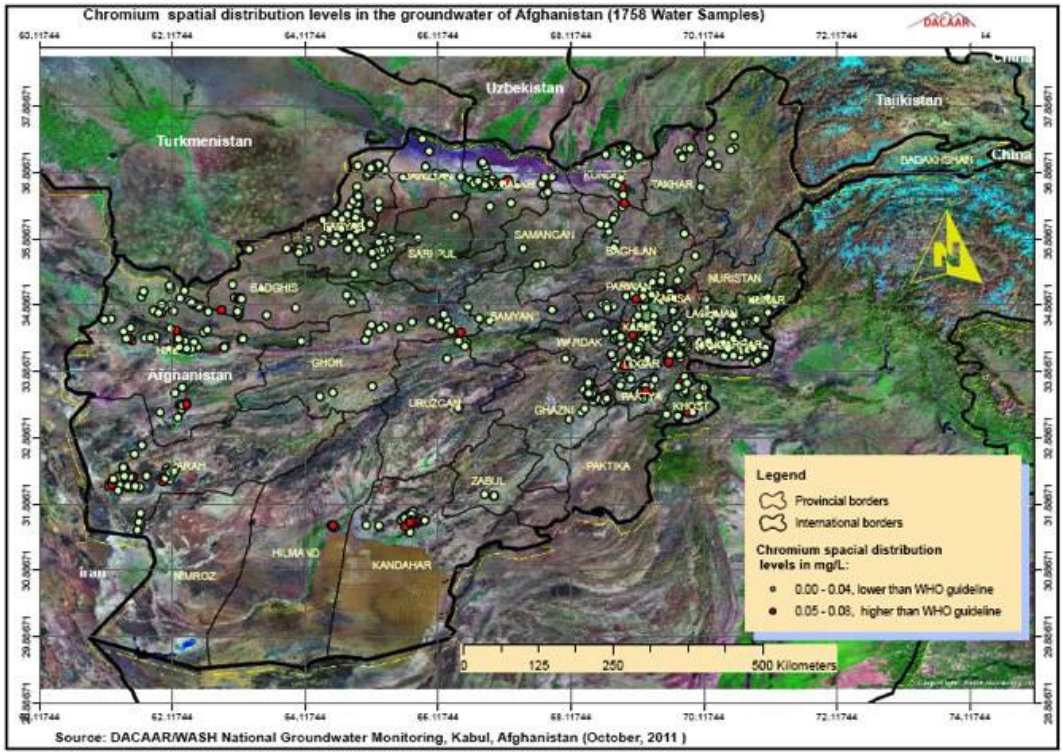


Figure 79 Chromium distribution in groundwater

The 7.11% (1758 water samples) from water points and GMWs indicated that the chromium concentration values are higher than the WHO limit of 0.05 mg/l.

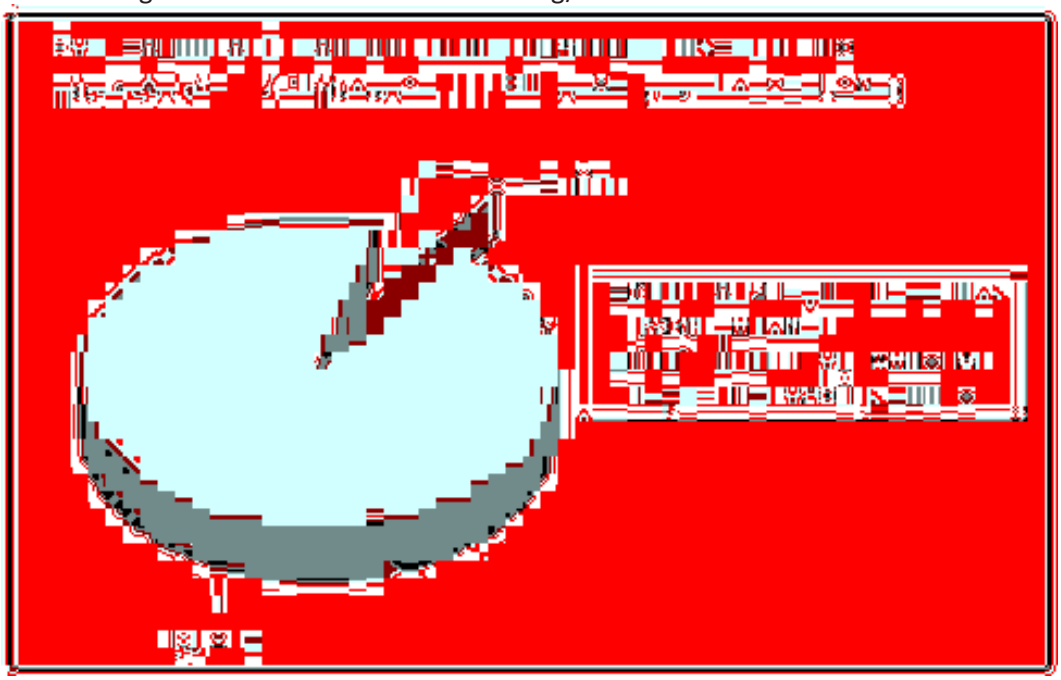


Figure 80 Percentage of Chromium in groundwater

6. Bacteria contamination in the groundwater

6.1 General information

Bacterial growth is increase in cell numbers. Growth of bacteria depends on temperature, pH, osmotic pressure, oxygen, and nutrients. The occurrence of fecal indicators (figure 81) in a drinking water supply is an indication of the potential presence of microbial pathogens that may pose a threat to public health.

6.2 Common Indicator of Bacteria

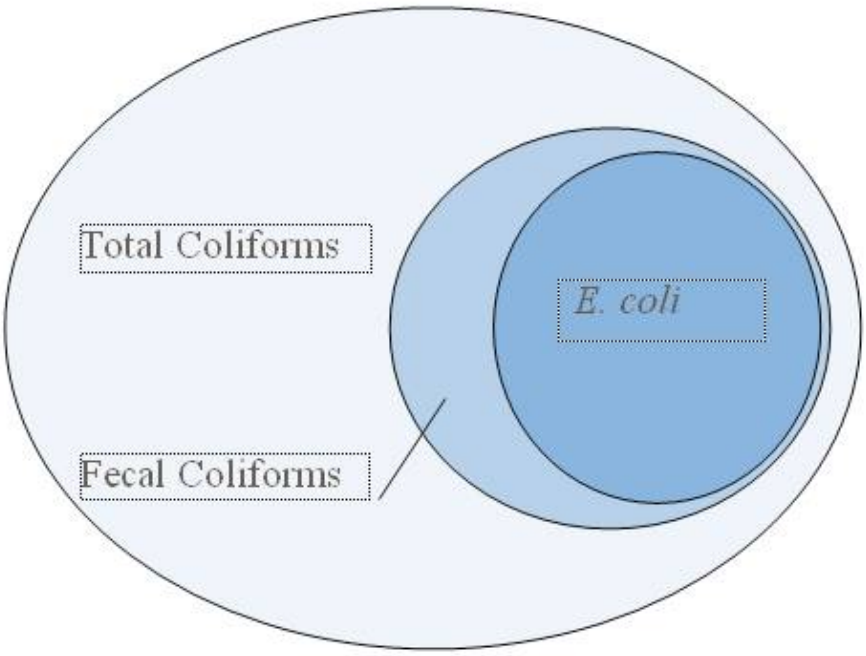


Figure 81 Illustration of total, E. coli and fecal coliform bacteria

6.2.1 Total coliforms bacteria

1) Rod-shaped, gram negative bacteria
2) Ferment lactose at 35°C
3) Found in intestinal tracts of cold and warm-blooded animals
4) Group members: *Escherichia, Klebsiella, Enterobacter, Serratia, Citrobactera, Edwardsiella*

Total Coliforms bacteria are a large group of usually harmless bacteria that are naturally present in soil and vegetation, and also in the intestinal tract of warm-blooded animals. Although total coliforms normally do not produce illness, their presence in drinking water is used as an indicator that other potentially harmful bacteria may be present. Since total coliforms and fecal coliforms often coexist, the presence of total coliform in drinking water is a warning to check for possible sources of contamination

6.2.2 Fecal coliforms bacteria

1) Subset of Total coliform group
2) Present in sewage and indicate possibility of human pathogens
3) Distinguished from Total coliform by ability to ferment lactose at 44.5°C
4) Group members: *E. coli* and *Klebsiella* (not always fecal often associated with paper, textile & pulp waste)

6.2.3 E. coli bacteria

1) *Escherichia coli* is a specific species within the Fecal coliform group
2) Specific to intestines of mammals and other warm blooded animals
3) Only specific strains are pathogenic
4) According to EPA, is the best indicator of health risks from water contact recreation

Coliform bacteria are generally not harmful, and presence in drinking water is usually a result of a problem with a treatment system. Presence of fecal coli form and E. coli bacteria indicates that the water may be contaminated with human or animal wastes. E. coli can be more pathogenic (disease-causing microorganisms from decaying vegetation, human and animal wastes) in immune compromised individuals. E. coli Coliform bacteria may not cause disease, but can be indicators of pathogenic organisms that cause diseases. The latter could cause intestinal infections, dysentery, hepatitis, typhoid fever, cholera and other illnesses. However, these illnesses are not limited to disease-causing organisms in drinking water. E. Coli is a coliform bacterium of fecal origin whose presence indicates that the water may be contaminated with human or animal wastes. These wastes come from septic systems, sewage, feedlots and pastures, or from wildlife, domestic animals and pets.

6.3 Limits of faecal coliform bacteria

The WHO acceptable limits is <1 coliform bacterium/100 mL (absent or < 1 colony/100 ml)

6.4 Faecal coliform bacteria contamination in drinking water points

The factors providing suitable conditions for distribution of bacteria to the drinking water points are:

1) Cover soil contamination by human waste and solid disposal load.
2) High permeability of overlying aquifer layers which have a good water filtration capacity and retaining of the microbiological contamination from the countless drainage pits.
3) Improper land use facilitating bacteria contamination.
4) Very low coverage of housing sanitation and hygiene practices.
5) Poor construction of wells that caused to promote, facilitate bacteria contamination to the ground water
6) No waste treatment and poor disposal management.

The most analyzed water samples from water points and GMWs indicated that the faecal coli form bacteria contamination are exceeded the WHO limit. Figure 82 illustrates the special distribution level of faecal coli form bacteria contamination in drinking water points and GMWs in the urban and rural areas of Afghanistan.

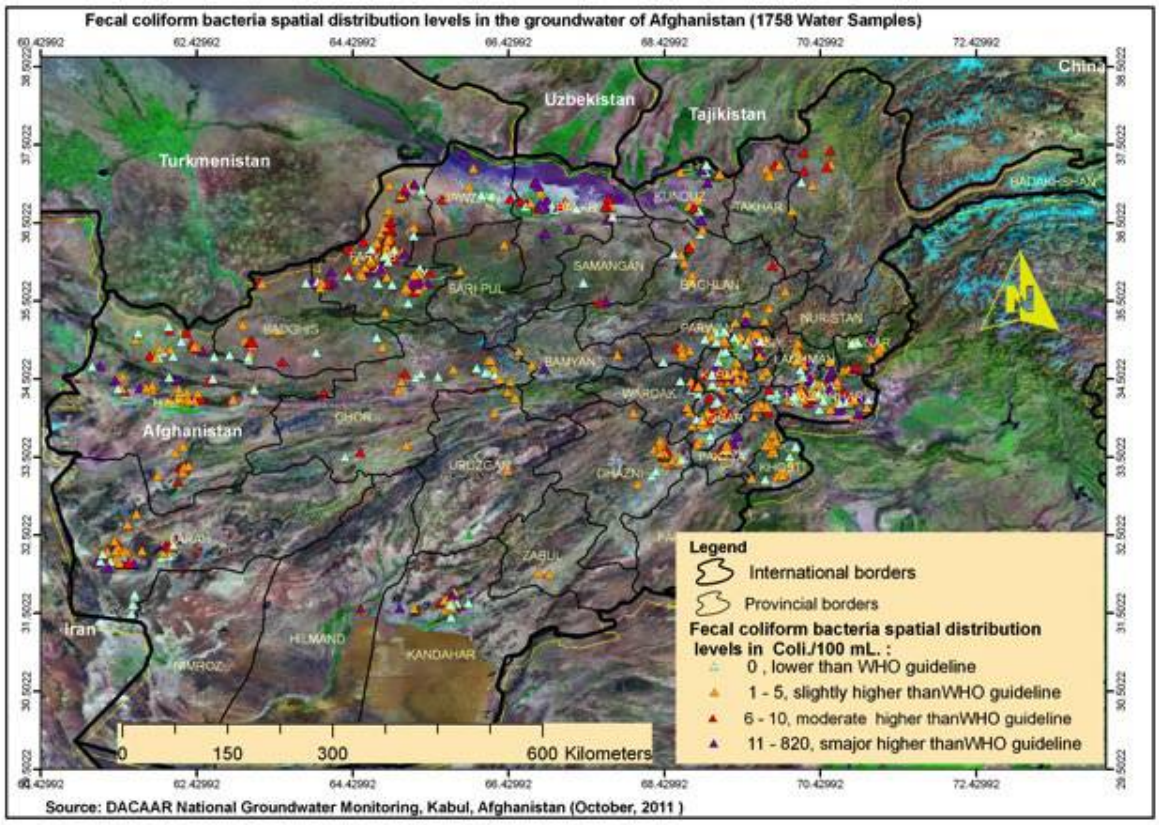


Figure 82 Faecal coliform as found

The distribution of high level faecal coli form bacteria contamination in drinking water points and GMWs is an indicator of potential presence of microbial pathogens including bacteria, viruses, protozoa and helminthes which may cause diarrhoea, dysentery, hepatitis, typhoid fever and potentially threat the health of our people.

The estimate indicated that 191 out of 1000 children died before they reach their fifth birthday out which 44 are caused by unsafe water and poor sanitation (Ministry of public Health, 2006).

This study shows that the effect of microbial pathogens relevant diseases may be very serious as we think due to wide distribution of faecal coli form bacteria concentration in groundwater that is using for drinking.

The faecal coli form bacteria contamination level in the urban areas is significantly higher than the rural areas. The countless drainage, improper waste storage, lack of information on hazardous sites or activities for site selection improper well construction, poor land use, improper waste disposal management, poor sanitation and poor housing sanitation hygiene practices are responsible for high bacteria contamination both in the urban and rural areas.

60 % of tested water samples (1,758 water samples) from the water point sand GMWs network are exceeded the WHO guideline of 0 Coli /100 mL (figure 83).

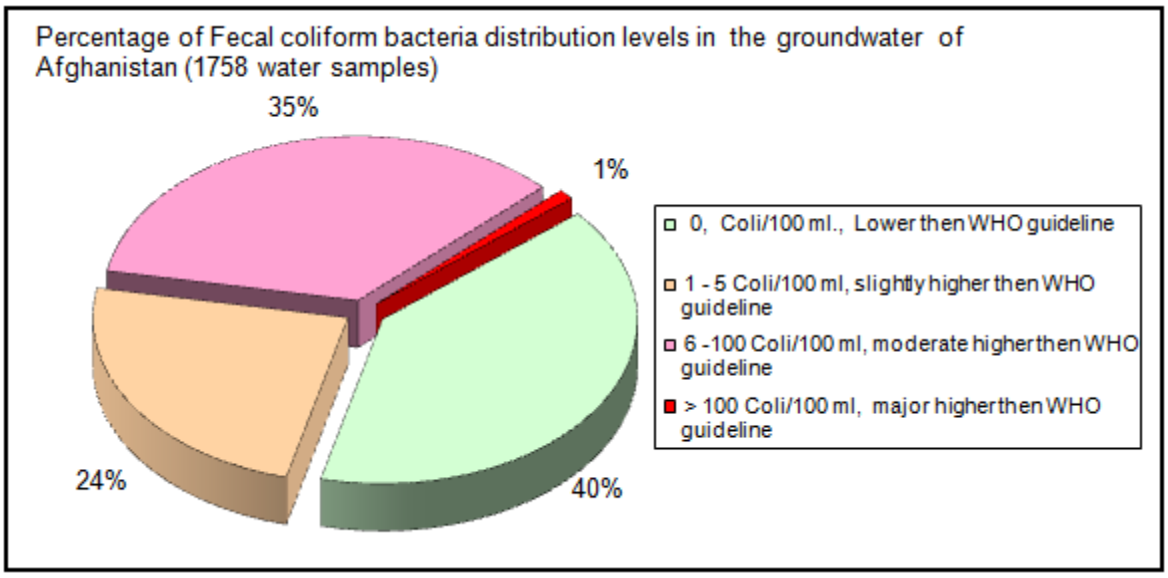


Figure 83 Percentage of fecal coliform bacteria contamination

7. Suitability of water quality for irrigation agriculture

Water quality for suitability of irrigation agriculture are complex, generally occur in the four categories:

a) Salinity (Electrical conductivity) hazard
b) Permeability or sodium hazard(SAR)
c) Toxicity or specific ions toxicity
d) Miscellaneous
e) pH - acid or basic

7.1 Salinity (Electrical conductivity) hazard

A salinity problem related to water quality occurs if the total quantity of salt in the irrigation water is high enough that salts accumulate in the crop root zone to the extend that yields are affected. If excessive quantities of soluble salts accumulate in the root zone, the crop has extra difficulty in extracting enough water from the salty soil solution. This reduced water uptake by the plant can result in slow or reduced growth and may also be shown by symptoms similar in appearance to those of drought such as early wilting. Some plants exhibit a bluish-green color and heavier deposits of wax on the leaves. These affects of salinity may vary with the growth stage and in some cases may go entirely unnoticed due to due to a uniform reduction in yield or growth across an entire field. This mechanism of water uptake has been studied extensively an it now appears the plant takes most of its water from and responds more critically to salinity in the upper part of the root zone than to the salinity level in its lower depths when using normal irrigation practices (Bernstein and Francois 1973). Thus, managing this critical upper root zone may be as important as providing adequate leaching to prevent salt accumulation in the total root zone.

7.1.1 Guideline for assessment of salinity hazard of irrigation

Table 3 Guidelines for assessment of salinity hazard of irrigation water

Potential problem	Limitation/degree of problem on use		
	non	Slight-moderate	sever
EC (dS/m)	<0.75	0.75-3.00	> 3
TDS (mg/L)	<400	450 - 2000	> 3

Source: Guidelines of for irrigation water quality for irrigation (FAO, 1985)

7.1.2 Irrigation water salinity tolerance for different crops

Irrigation water salinity tolerance for different crops and their reduction of yield potential against increasing salinity is shown table 4 (Irrigation water salinity tolerance for different crops (Adapted from Ayers and Westcot, 1976).

Table 4 Irrigation water salinity tolerance for different crops

Crop	Yield potential/ Salinity of water (EC) in dS/m			
	100%	90%	75%	50%
Field crops				
Barley	5.0	6.7	8.7	12.0
Bean	0.7	1.0	1.5	2.4
Broad bean	1.1	1.8	2.0	4.5
Corn	1.1	1.7	2.5	3.9
Cotton	5.1	6.4	8.4	12.0
Cowpea	0.9	1.3	2.1	3.2
Flax	1.1	1.7	2.5	3.9
Groundnut	2.1	2.4	2.7	3.3
Rice	2.0	2.6	3.4	4.8
Safflower	3.5	4.1	5.0	6.6
Sesbania	1.5	2.5	3.9	6.3
Sorghum	2.7	3.4	4.8	7.2
Soybean	3.3	3.7	4.2	5.0
Sugar beet	4.7	5.8	7.5	10.0
Wheat	4.0	4.9	6.4	8.7
Vegetable crops				
Bean	0.7	1.0	1.5	2.4
Beat	2.7	3.4	4.5	6.4
Broccoli	1.9	2.6	3.7	5.5
Cabbage	1.2	1.9	2.9	4.6
Cantaloupe	1.5	2.4	3.8	6.1
Carrot	0.7	1.1	1.9	3.1
Cucumber	1.7	2.2	2.9	4.2
Lettuce	0.9	1.4	2.1	3.4
Onion	0.8	1.2	1.8	2.9
Pepper	1.0	1.5	2.2	3.4
Potato	1.1	1.7	2.5	3.9
Radish	0.8	1.3	2.1	3.4
Spinach	1.3	2.2	3.5	5.7
Sweet corn	1.1	1.7	2.5	3.9
Sweet potato	1.0	1.6	2.5	4.0
Tomato	1.7	2.3	3.4	5.0
Forage crops				
Alfalfa	1.3	2.2	3.6	5.9
Barley hay	4.0	4.9	6.3	8.7
Bermuda grass	4.6	5.7	7.2	9.8
Clover	1.0	2.1	3.9	6.8
Corn	1.2	2.1	3.9	6.8
Harding grass	3.1	3.9	5.3	7.4
Orchard grass	1.0	2.1	3.7	6.4
Perennial rye	3.7	4.6	5.9	8.1
Sudan grass	1.9	3.4	5.7	9.6
Tall fescue	2.6	3.9	5.7	8.9
Tall wheat grass	5.0	6.6	9.0	13.0
Trefoil big	1.5	1.9	2.4	3.3
Trefoil small	3.3	4.0	5.0	6.7
Wheat grass	4.0	6.0	7.4	9.8

Fruit crops				
Almond	1.0	1.4	1.9	2.7
Apple, pear	1.0	1.6	2.2	3.2
Apricot	1.1	1.3	1.8	2.5
Avocado	0.9	1.2	1.7	2.4
Date palm	2.7	4.5	7.3	12.0
Fig, olive, pomegranate	1.8	2.6	3.7	5.6
Grape	1.0	1.7	2.7	4.5
Grapefruit	1.2	1.6	2.2	3.3
Lemon	1.1	1.6	2.2	3.2
Orange	1.1	1.6	2.2	3.2
Peach	1.1	1.4	1.9	2.7
Plum	1.0	1.4	1.9	2.8
Strawberry	0.7	0.9	1.2	1.7
Walnut	1.1	1.6	2.2	3.2

7.1.3 Groundwater salinity hazards in Afghanistan

The most of analyzed water samples from north, northeast, northwest, west, southwest and south of Afghanistan are indicated slight- moderate salinity hazard for irrigation and caused to reduce the yield of crops. The most of analyzed water samples from the central, east and east south part of Afghanistan are not having salinity hazard for irrigation (figure 84).

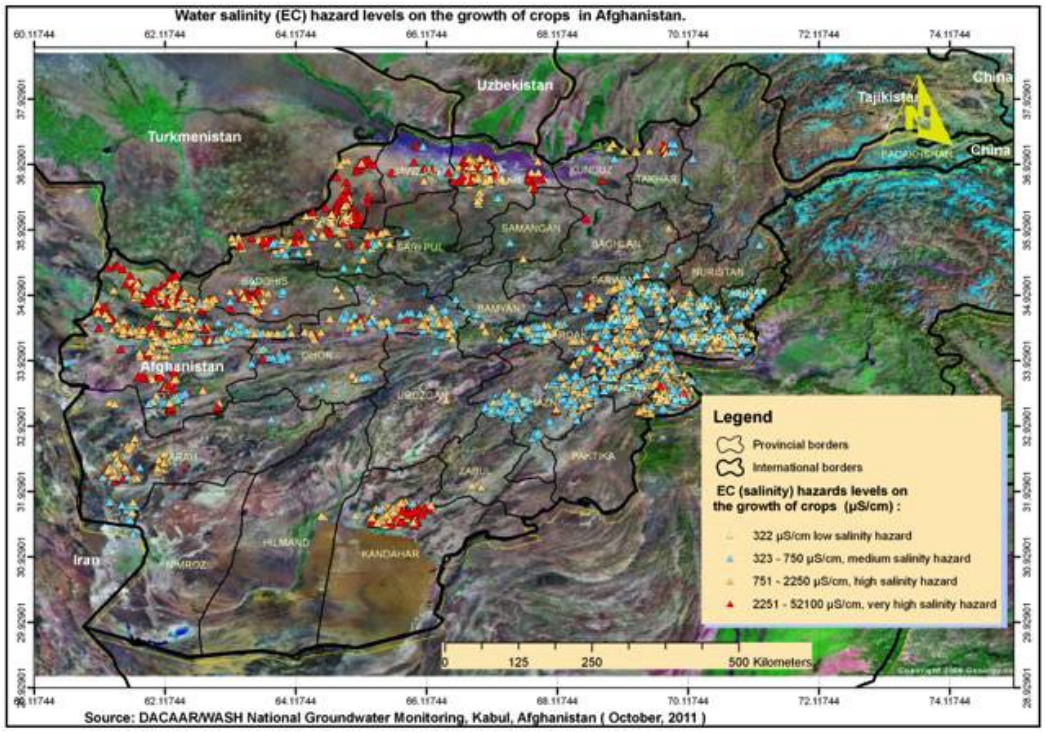


Figure 84 Salinity and sodium hazard levels

The Figure 85 shows that the 59.1% of measured salinity data are classified a slight - moderate and sever hazard salinity for irrigation.

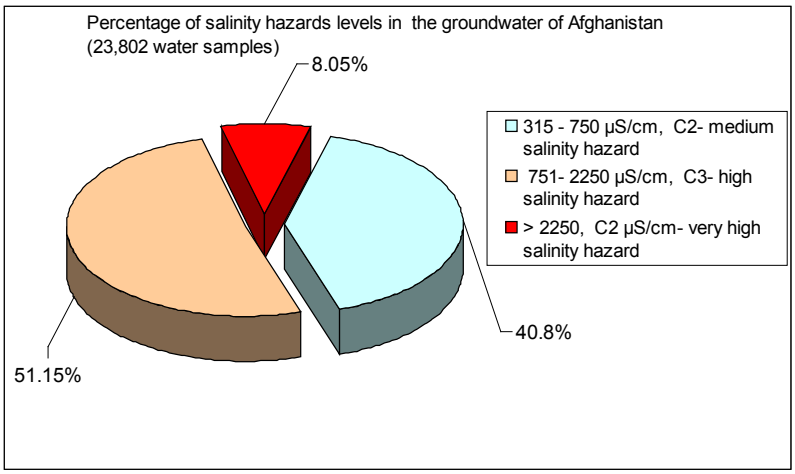


Figure 85 Salinity hazard levels in percentage

7.2 Soil related Irrigation Problems

7.2.1 Infiltration/Permeability Problems

Although plant growth is primarily limited by the salinity (EC_w) level of the irrigation water, the application of water with a sodium imbalance can further reduce yield under certain soil texture conditions. Reductions in water infiltration can occur when irrigation water contains high sodium relative to the calcium and magnesium contents. This condition, termed "sodicity," results from excessive soil accumulation of sodium. Sodic water is not the same as saline water. Sodicity causes swelling and dispersion of soil clays, surface crusting and pore plugging. This degraded soil structure condition in turn obstructs infiltration and may increase runoff. Sodicity causes a decrease in the downward movement of water into and through the soil, and actively growing plants roots may not get adequate water, despite pooling of water on the soil surface after irrigation.

The most common measure to assess sodium hazard (sodicity) in water and soil is called the Sodium Adsorption Ratio (SAR). The SAR defines sodicity in terms of the relative concentration of sodium (Na) compared to the sum of calcium (Ca) and magnesium (Mg) ions in a sample. The SAR assesses the potential for infiltration problems due to a sodium imbalance in irrigation.

The sodium adsorption ratio (SAR) is an important measure of the tendency of irrigation water to cause structural damage to soil. SAR is defined as:

$$SAR = \frac{Na}{\sqrt{(Ca + Mg)/2}}$$

Where concentration of Na, Ca and Mg are given in mill equivalents per litre (Meq /l). Table 1 outlines the levels at which SAR indicates a hazard to soil structure.

7.2.2 Classification of SAR hazard to soil structure

The SAR hazard according to the soil structure and degree of problem for irrigation is divided into four classes (table 5).

Table 5 Classification of SAR hazard to soil structure

SAR classes	SAR hazard scale	Hazard
S1 low sodium water	< 10	Safe to irrigation with no structural deterioration but, may affect salt sensitive plants depending on EC or TDS.
S2 medium sodium water	10- 18	Hazards on fine textured soils with a high caption exchange capacity. OK on coarse textured soils with good drainage.
S3 high sodium water	18- 26	Hazard on most soils. Need to manage with amendments and drainage leaching.
S4 very high sodium water	>26	Not suitable for irrigation.

7.2.3 Salinity hazard calcification for irrigation

The affect of salinity is calcified as follow:

1) C1 – Excellent or low salinity water (<250 µS/cm), can be used for irrigation with most crops on most soils with little likelihood that soil salinity will develop. Some leaching is required, but this occurs under normal irrigation practices except in soils of slow and very slow permeability.

2) C2 – Good or medium salinity water(250-750 µS/cm), can be used if a moderate amount of leaching occurs. In most cases plants with moderate salt tolerance can be grown without special practices for salinity control.

3) C3 –Permissible or high salinity water (750-2250 µS/cm), cannot be used on soils with moderately slow to very slow permeability. Even with adequate permeability, special management for salinity control may be required and plants with good salt tolerance should be selected.

4) C4 – Unsuitable or very high salinity water (>2250 µS/cm) is not suitable for irrigation under ordinary conditions, but may be used occasionally under very special circumstances. The soils must have rapid permeability, drainage must be adequate, irrigation water must be applied in excess to provide considerable leaching, and very salt tolerant crops should be selected.

7.2.4 Guideline sodium and salinity hazard of irrigation water

The potential soil and permeability/ infiltration problems created from application of irrigation water with high sodium cannot be adequately assessed on the basis of the SAR alone. This is because the swelling potential of low EC water is greater than high EC water at the same sodium content (table). Therefore, a more accurate evaluation of infiltration/permeability hazards requires using the EC together with the SAR. The guideline for assessment of sodium and salinity hazard to soil structure is indicated in the table 6.

Table 6 Guideline assessment sodium hazard

Salinity and permeability problem (evaluate using EC and SAR)	Limitation/degree of problem on use		
	Non	Slight-moderate	Sever
SAR	EC (dS/m)		
0 - 3	> 0.7	0.7 – 0.2	< 0.2
3 - 6	> 1.2	1.2 – 0.3	< 0.3
6 - 12	> 1.9	1.9 – 0.5	< 0.5
12 - 20	> 2.9	2.9 – 1.3	< 1.3
20 - 40	> 5	5 – 2.9	<2.9

Source: Guidelines of for irrigation water quality for irrigation (FAO, 1985)

7.2.5 Sodium versus salinity hazard assessment with Wilcox diagram

Groundwater samples fall under C1S1 and C2S1 which are suitable for irrigation (no problem for irrigation). The water samples were grouped under C3S1, S2C2 and S2S3which are slight-moderate problem for irrigation. The water samples clustered under the C4S2, C2S2, C3S4 and C4S4 which are slight-moderate problem for irrigation(figure 86).

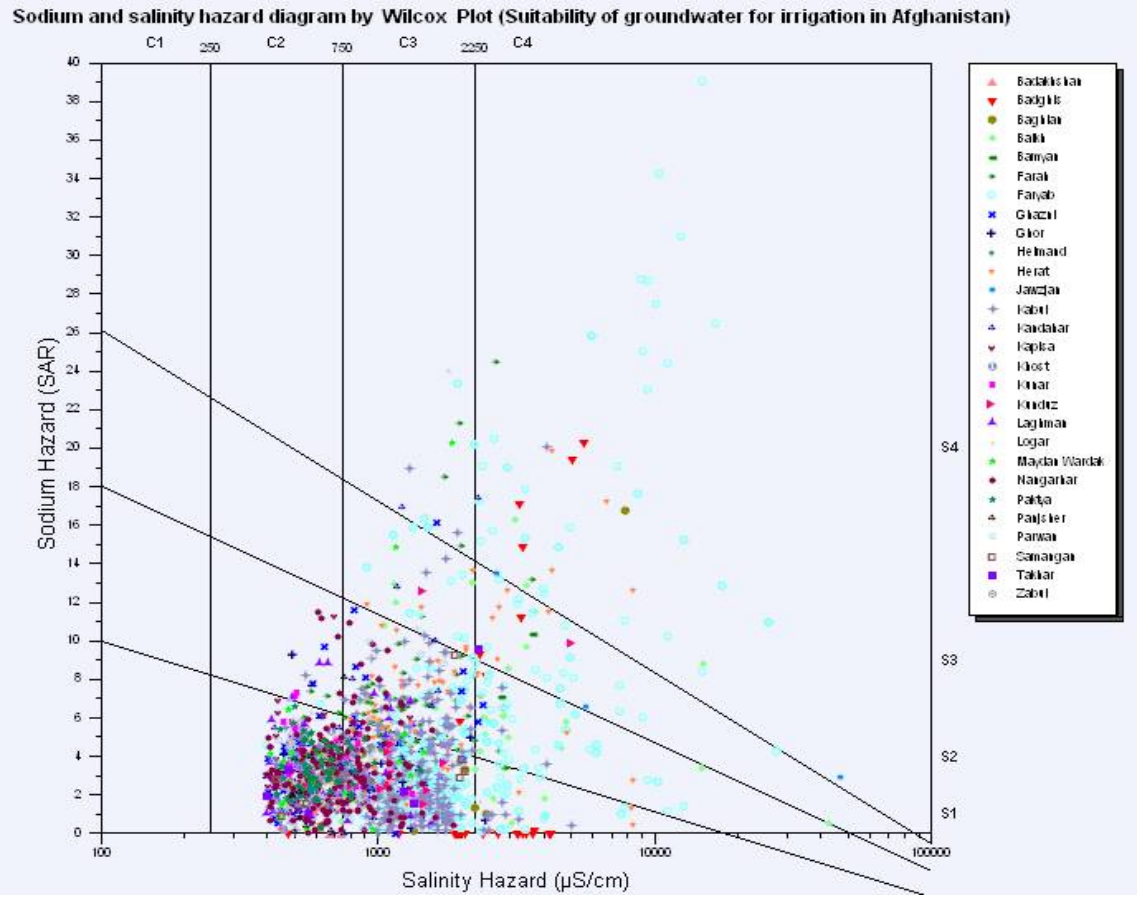


Figure 86 Sodium and salinity hazard diagram spread

7.3 Specific ion toxicity

7.3.1 Guideline for assessment specific ion toxicity of irrigation water

Specific ion toxicity affects sensitive crops and occurs when certain constituents in the water are taken by the crop and accumulate in amount that result in a reduced yield. This is usually related to one or more specific ion in the water like sodium, boron, chloride and trace elements. The Specific ion toxicity potential problem of irrigation assesses according to table 7.

Table 7 Guideline for assessment of specific ion toxicity of irrigation water

Specific ion toxicity (affects sensitive crops)	Limitation/degree of problem on use		
	Non	Slight-moderate	sever
Sodium or SAR(surface irrigation)	< 3	3 - 9	> 9
Boron (mg/L)	< 0.7	0.7 - 3	> 3
Chloride (meq/L)	< 4	4 - 10	> 10

Source: Guidelines of for irrigation water quality for irrigation (FAO, 1985)

7.3.2 Sodium or sodium ion toxicity hazard assessment

Sodium ion toxicity affect according to the degree of problem on sensitive crops during irrigation is classified:

- If the SAR <3, there is no potential problem for irrigation
- If the SAR range between 3 - 9, there is slight -moderate- problem for irrigation
- If the SAR >9, there is severe problem for irrigation

7.3.2.1 Sodium hazard levels potential problem for irrigation.

Most of analyzed water samples from the central, east and south-eastern of Afghanistan are indicated none and slight-moderate sodium hazard(sodium ion toxicity on crops) for irrigation agriculture however, the most of analyzed water samples from the north, north-eastern, north-western and west of Afghanistan are classified as slight- moderate and severe sodium hazard for irrigation agriculture. The figure 87 indicates the sodium (SAR) hazard levels for irrigation in the groundwater of Afghanistan.

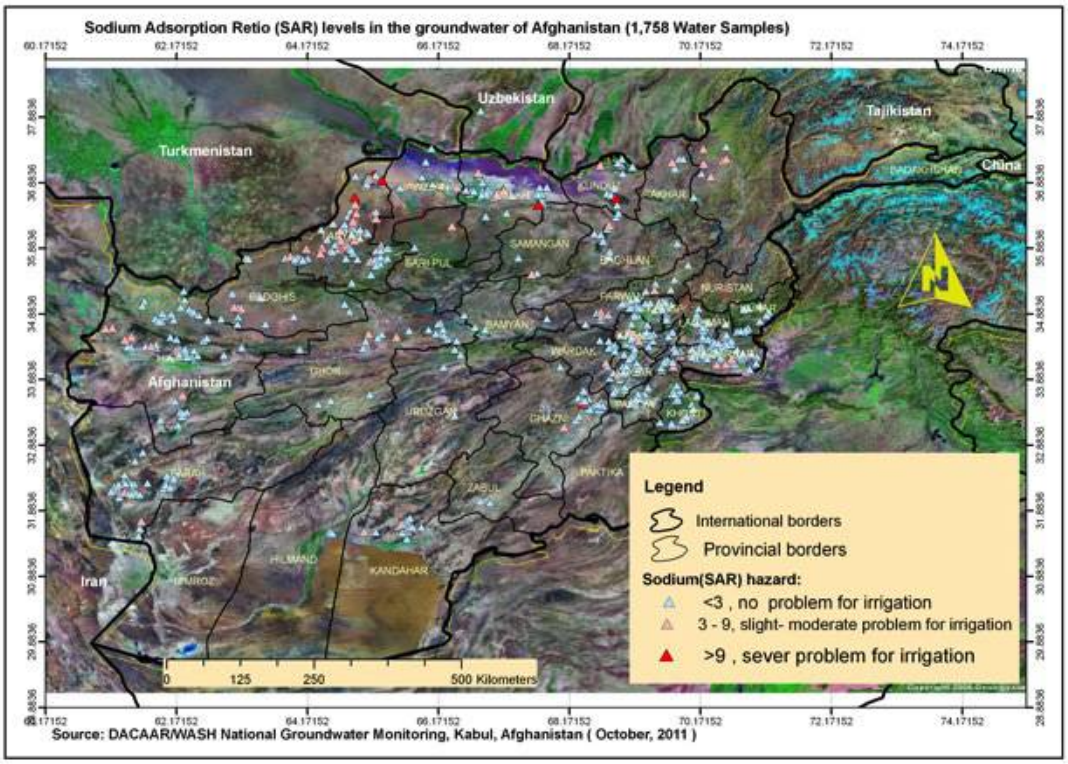


Figure 87 Sodium hazard level in groundwater

The figure 88 shows that the 54.8% of analyzed water samples indicated none sodium hazard, 39.15% of water samples indicated slight-moderate sodium hazard and 6.05 of water samples indicated sever sodium hazard for irrigation.

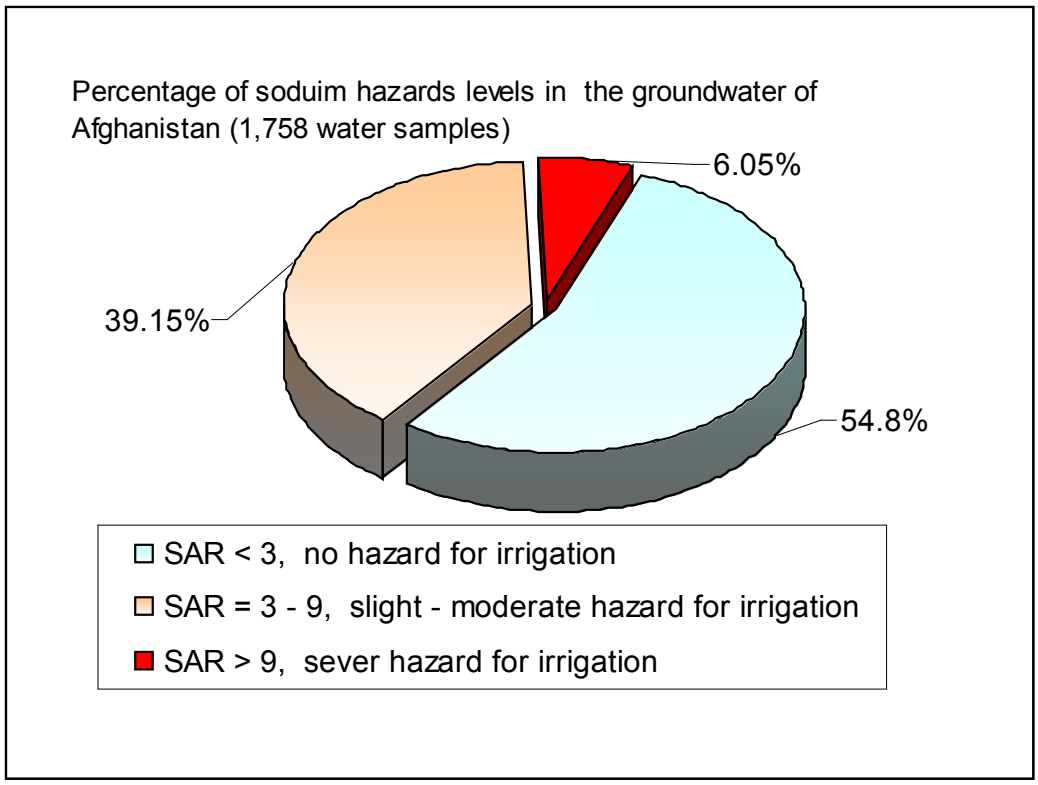


Figure 88 SAR hazards levels in percentage

7.3.3 Boron ion toxicity on sensitive crops

7.3.3.1 Boron ion toxicity and boron tolerance plants

Boron is another importance element in irrigation water. It is an essential micronutrient to plants, but it can become toxic at very low concentrations. Sensitive plants, such as nuts, deciduous fruits, and grapes experience toxic effects when the boron concentration in the soil reaches 1mg/l. Even the most tolerant plants, such as asparagus and alfalfa are affected once the soil boron concentration is 4 ppm. Boron toxicity symptoms are similar to those of sodium, with

the burning effect beginning at the edges of older leaves. Woody perennial plants are generally most sensitive to Boron. Boron tolerance plans classified in the table 8.

Table 8 Boron tolerant plants

Tolerance	Boron in irrigation Water (mg/l)	Agriculture crop
Very sensitive	< 0,5	Blackberry
Sensitive	0.5-1.0	Peach, cherry, plum, grape, onions, garlic, sweet, potato, wheat, barley,sunflower, mungbeam, sesame, lupine, strawberry
Moderately sensitive	1.0-2.0	Red pepper, peach, carrot, radish,
Moderate tolerant	2.0-4.0	Lettuce, celery, turnip, oat, corn, tobacco,mustard, clover, squash, muskmelon
Tolerant	>4	Sorghum, tomato, alfalfa, purple vetch, parsley, red beet, sugar beet, Asparagus

Source: Recommendations for Boron concentrations in British, Columbia and Canada (http://wlapwww.gov.bc.ca/wat/wq/BCguidlines/boron.html)

7.3.3.2 Boron concentration in relation to plant tolerance

Irrigation water based of boron concentration in relation to plant tolerance is classified in the table 9.

Table 9 Boron concentration in relation to plant tolerance

Classification	Sensitive plant	Semi-tolerant plant	tolerant plant
Boron concentrations (ppm)			
Good	< 0.3	< 0.6	< 1.0
Fair	0.4 – 0.6	0.7 – 1.3	1.1 – 2
Poor	0.7 – 1.0	1.4 – 2.0	2.1 – 3.0
Poor	1.1 – 1.3	2.1 – 2.5	3.1 – 3.8
Unsuitable	> 1.3	> 2.5	> 3.8

Source: http//www.osueextra.com

7.3.3.3 Boron distribution levels and potential irrigation problem.

The most water samples from the water points of north, northeast, northwest, west and south of Afghanistan indicate that the boron concentration values are classified boron moderate tolerant and tolerant for agriculture crops during irrigation, however the most of water samples from the water points of central, east and northeast of Afghanistan indicate that the boron concentration values are classified boron sensitive and moderately sensitive for agriculture crops during irrigation(figure 89).

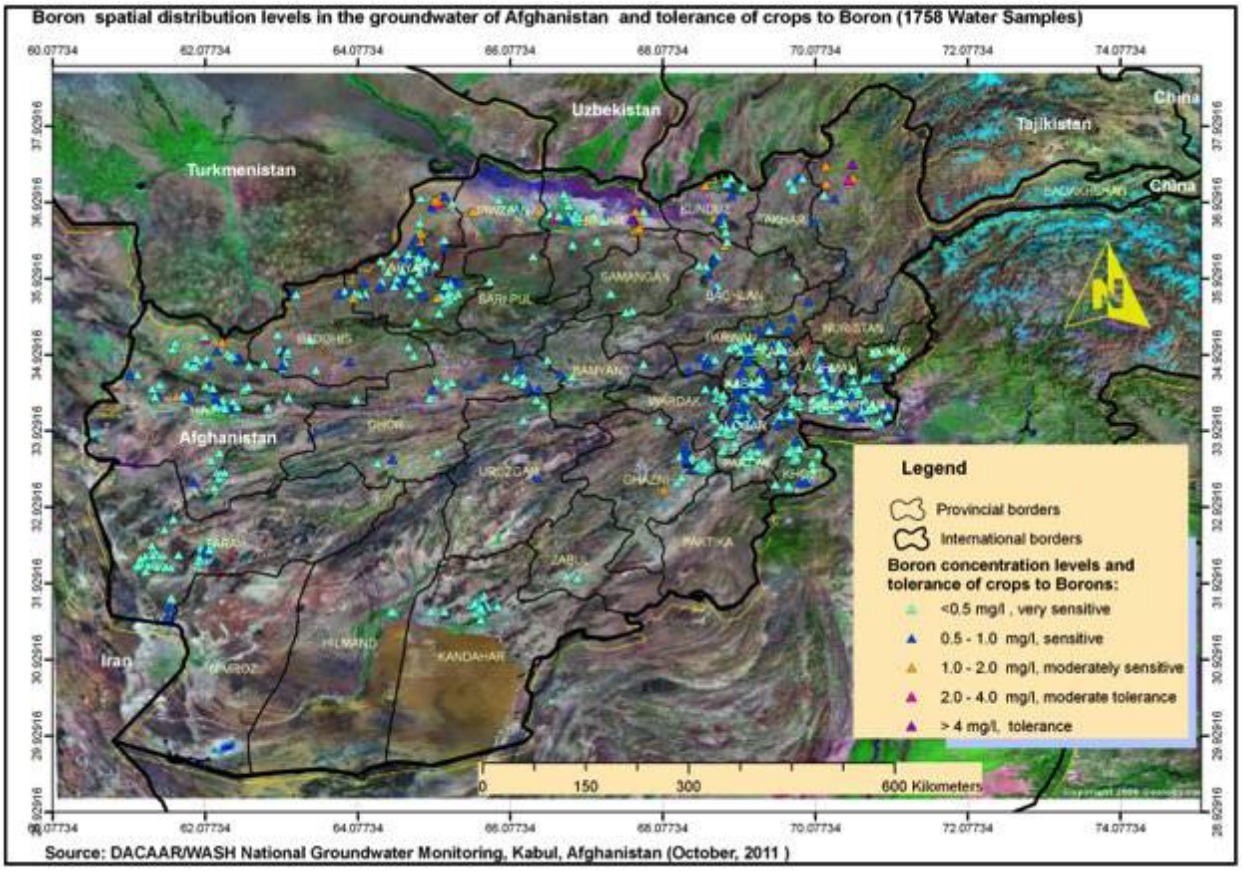


Figure 89 Boron distribution

13,4% of water samples from the water points indicate that the boron concentration values are classified boron moderate tolerant and tolerant for agriculture crops, however 86% of water samples from the water points indicate that the boron concentration values are classified boron very sensitive, sensitive and moderately sensitive for agriculture crops during irrigation (figure 90).

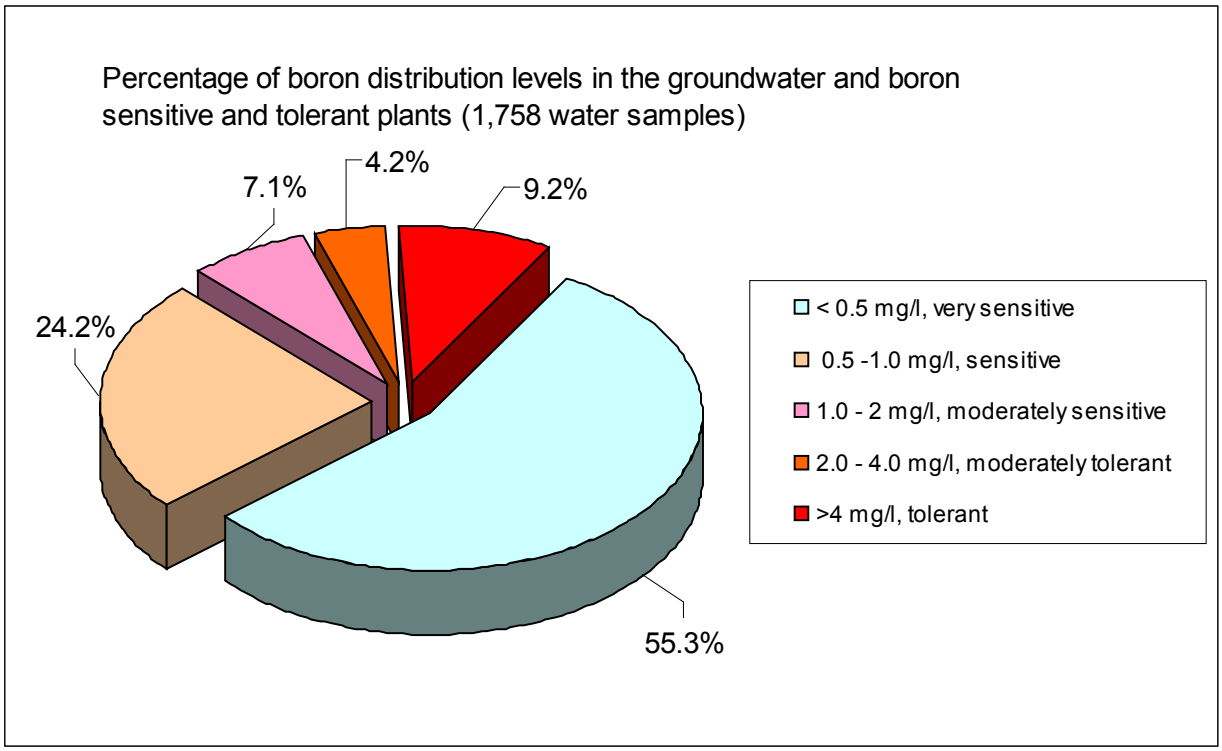


Figure 90 Boron distribution in percentage and sensitivity of plants

7.3.4 Chloride

7.3.4.1 What is chloride ion toxicity?

The most common toxicity is from chloride in the irrigation water. Chloride is not adsorbed or held back by soils, therefore it moves readily with the soil-water, is taken up by the crop, moves in the transpiration stream, and accumulates in the leaves. If the chloride concentration in the leaves exceeds the tolerance of the crop, injury symptoms develop such as leaf burn or drying of leaf tissue. Normally, plant injury occurs first at the leaf tips (which is common for chloride toxicity), and progresses from the tip back along the edges as severity increases. Excessive necrosis (dead tissue) is often accompanied by early leaf drop or defoliation. With sensitive crops, these symptoms occur when leaves accumulate from 0.3 to 1.0 percent chloride on a dry weight basis, but sensitivity varies among these crops. Many tree crops, for example, begin to show injury above 0.3 percent chloride (dry weight).

Chemical analysis of plant tissue is commonly used to confirm chloride toxicity. The part of the plant generally used for analysis varies with the crop, depending upon which of the available interpretative values is being followed. Leaf blades are most often used, but the petioles of some crops (grapes) are sometimes used rather than leaves. For irrigated areas, the chloride uptake depends not only on the water quality but also on the soil chloride, controlled by the amount of leaching that has taken place and the ability of the crop to exclude chloride. Crop tolerances to chloride are not nearly so well documented as crop tolerances to salinity. Table 14 gives the known tolerances of several crops to chloride in the saturation extract or in the applied water. These values may need to be changed where local experience indicates that different levels cause damage. For example, tobacco, although tolerant to chloride, acquires progressively more undesirable burning characteristics of the leaf as well as reduced storage life if chloride levels in irrigation water increase above a few milli-equivalents per liter. This greatly affects its market value.

7.3.4.2 Chloride classification of irrigation water

Chloride concentrations levels in irrigation water are classified according to the effect of crops Table 10.

Table 10 Chloride classification of irrigation water

Chloride (ppm)	Effect on Crops
Below 70	Generally safe for all plants.
70-140	Sensitive plants show injury.
141-350	Moderately tolerant plants show injury.
Above 350	Can cause severe problems.

Source: Mass (1990) Crop Salt Tolerance. ***Agricultural Salinity Assessment and Management Manual***. K.K. Tanji (ed.). ASCE, New York. pp 262-304.

7.3.4.3 Chloride tolerance of agricultural crops

The chloride tolerance of agricultural crops is shown in the table 11 according the levels of chloride concentration of water.

Table 11 Chloride tolerance of agricultural crops (Adapted form Tanji, 1990)

Elements(symbol)	Maximum chloride without loss in yield (mol/cubic meter)	Maximum chloride without loss in yield (mg/l)
Strawberry	10	350
Bean	10	350
Onion	10	350
Carrot	10	350
Radish	10	350
Lettuce	10	350
Turnip	10	350
Rice	30	1050
Pepper	15	525
Clover, strawberry	15	525

Elements(symbol)	Maximum chloride without loss in yield (mol/cubic meter)	Maximum chloride without loss in yield (mg/l)
Clover, red	15	525
Corn	15	525
Flax	15	525
Potato	15	525
Sweet potato	15	525
Broad bean	15	525
Cabbage	15	525
Foxtail, meadow	15	525
Celery	15	525
Clover, Berseem	15	525
Orchard grass	15	525
Sugarcane	15	525
Trefoil, big	20	700
Lovegras	20	700
Spinach	20	700
Alfalfa	20	700
Sesbania	20	700
Cucumber	25	875
Tomato	25	875
Broccoli	25	875
Squash	30	1050
Vetch, common	30	1050
Wheat	60	2100
Beet	40	1400
Fescue	40	1400
Squash	45	1575
Cowpea	50	1750
Barley	80	2800
Sorghum	70	2450
Cotton	75	2625

7.3.3.4 Chloride distribution levels and potential irrigation problem.

The most water samples from the GMWs and water points indicated that the chloride concentration values are not potential problem for irrigation. The most of water samples from Kunduz, Balkh Jowzjan and Faryab province indicated slight-moderate and sever problem for irrigation figure 91.

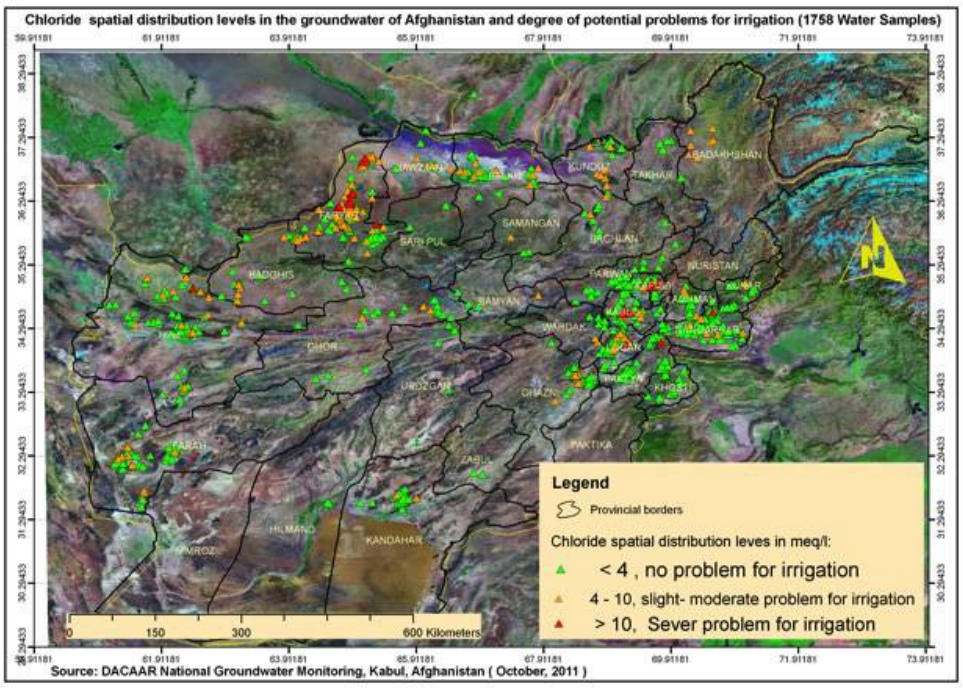


Figure 91 Chloride distribution in groundwater

8.8% of water samples from the GMWs and water points indicate that the chloride concentration values indicated slight-moderate and sever problem for irrigation (figure 92).

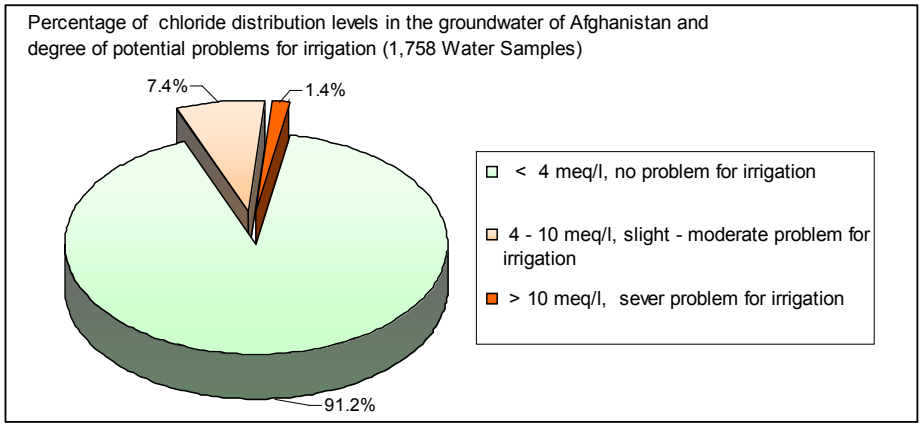


Figure 92 Chloride distribution in groundwater and potential problem levels

8. Conclusion

8.1 The main groundwater concerns

(Early warning signal/policy relevant options) are:

8.1.1 Groundwater qualitative concerns

a) Salinity contamination
b) Nitrate contamination
c) Sodium and chloride contamination
d) Boron contamination
e) Fluoride contamination
f) Arsenic contamination
g) Chromium contamination
h) Hardness
i) Fecal Coliform bacteria

8.1.2 Groundwaterquantitative concerns;

a) Continuing lowering groundwater table
b) Depletion of groundwater natural storage(no steady state water balance or negative change in natural storage)

c) Continuing water logging (changing saturation zones to unsaturated zones)
d) Exceeded discharge trend and deteriorating water quality
e) Imbalanced streams/river and aquifer interaction (effluent and influent)
f) Most of kareze, large diameters wells and springs dried up

8.2 Main water supply and sanitation management indicator

8.2.1 WASH coverage and water related diseases

a) National coverage to access safe drinking water is 27%, which only around 20% of the rural population have access to safe drinking water (NRVA 2007-2008)
b) National coverage access to housing sanitation and hygienic practices are lower coverage in the world
c) 44 children out of 1000 die before they reach their fifth birth day due to very poor access to safe drinking water, housing sanitation and hygiene facilities (Ministry of public health 2006)

8.2.2 Main influence trend in the water sectors;

a) No clear and scientific image of water resources potential (availability), supply and demand(how much water is available? how much water is used? What is our current and future demand?)
b) No clear vision for immediate and future water resources protection
c) Progressively increasing imbalance between availability and supply
d) High density of well per unit area without regard to spacing norms, number of households constructed and technical consideration. Standard well mains to supply safe drinking for 25 households (8 people per household).
e) Limited technical option for water using, development and storage
f) No practical alternative for water sources research and development.
g) Cross contamination in wells due to poor well site selection and construction.
h) Lack of effective operation and maintenance of the water supply system.
i) The capacity to access spare parts may also be lacking and nonstandard.
j) Provision of safe drinking water in the rural areas is a challenge for millions of rural inhabitants around the country.
k) Poor skilled and poor equipped private water sectors for doing quality work
l) Insufficient of raising the awareness about water conservation

8.2 Major deficiencies

8.3.1 Knowledge and capacity building

a) Poor investment in the building of hydrological and hydro geological expertise
b) Lack of water sector professionals
c) Poor water resources integration, coordination, data collection, information sharing and dissemination
d) Poor alternative water sources research, assessment and consultancy
e) Lack of water resources monitoring, management, development, protection and sustainability.

8.3.2 Poor integrated water resources management;

1) Water resources monitoring system (qualitative and quantitative point of views)
2) Database and data information system
3) National water quality standard (primary and secondary) and national water resources regulation act (both surface and groundwater)
4) Water safety plan (quality control and quality assurance)
5) Policy relevant research and alternative solution
6) Water resources management, development, protection and sustainability
7) Environmental security

8.3.3 Poor initiate technical or conservation measure

a) Groundwater recharge by surface water during peak flowing for aquifer recharge and recovery
b) Rain water harvesting
c) Construction of water storage infrastructure (dame, reservoirs, trench and injunction wells)
d) Installation of desalination plan where the areas have saline water

8.3.4 Poor supporting measure in regard

a) Low awareness level of the inhabitants on the importance of water (qualitative and quantities)
b) Encourage public participation
c) No stress on public awareness campaigns

8.3.5 Poor integrated water resources management instruments

a) Fragment institutional arrangement
b) Poor creation of enabling environment for effective policies and strategies for water resources monitoring, management, development, protection and sustainability.
c) Poor formulation of enforcement legislation

9. Solution and policy relevant option

The main solution and policy relevant options are:

9.1 Management initiative and improvement

a) National water resources monitoring system (qualitative and quantitative)
b) Develop and enhance stream gage meteorological networks to estimates a water availability
c) Develop a snow/glacier hydrology information system
d) Database and data information system
e) Initiate management where problems are evident regardless of data limitations.
f) National water quality standard (primary and secondary) or national water resources regulation act (both surface and groundwater)
g) Water safety plan (quality control and quality assurance)
h) Availability of financial resources.
i) Encouragement of stakeholders participation
j) Mitigate imbalance between availability and supply
k) Water resources management, development, protection and sustainability.
l) Define water resources potential (availability), supply and demand.
m) Define sustainability of water resources for socio-economic development and environmental security.

9.2 Enabling environment

a) Establish coordination organization within water sector and moving towards an enabling environment to make policies, strategies and legislation for integrated water resources management.
b) Reform in within the current institutional framework to implement the policies, strategies and legislation
c) Setting up the management tools (data management, evaluation, mapping and visualization) which can help to make policy relevant better decision(required by the institutions to do their job)

9.3 Initiate technical or conservation measure

a) Groundwater recharge by surface water during peak flowing for aquifer recharge and recovery (directing surface water into pits, trench, ,boreholes and infiltration basin)
b) Rain water harvesting
c) Construction of infiltration ponds
d) Construction of water storage infrastructure (cheek dams, trenches and capturing water by making storage reservoir)
e) Installation of desalination plan where the areas have saline water
f) Raising awareness on efficient water usage
g) Construct standards water wells (improper or nonstandard water well construction promote, facilitate contamination to the groundwater)
h) Promotion of water uses from the non-conventional water resources (rainwater harvesting, waste water treatment)
i) Formulate regulation forwell drilling and groundwater abstraction

9.4 Building Capacity

1. Investment in building of hydrogeological expertise
2. Increase the number of water sector professionals
3. Increase investment in water resources management, monitoring infrastructure and research

9.5 Knowledge building

a) Initiate practically oriented scientific surface and groundwater studies that focus on groundwater and surface water interaction, availability, recharge characteristic, quality, sustainability and management alternative.
b) Policy relevant research and alternative solution
c) Water resource data management, assessment, mapping and evaluation and visualization for future water resources management, development, protection and sustainability.
d) Technology transfer, research development must take place to transfer this knowledge on to the practical field level of restoring and re-establishing old practices
e) Stress on public awareness campaign, role of women, and the community participation towards preserving groundwater from pollution and depletion.
f) Initiate management where problems are evident regardless of data limitations.
g) Initiate practically oriented scientific surface and groundwater studies that focus on groundwater and surface water interaction, availability, recharge characteristic, quality, sustainabilityand management alternative
h) Develop an aquifer classification system and address vulnerable aquifer from contamination

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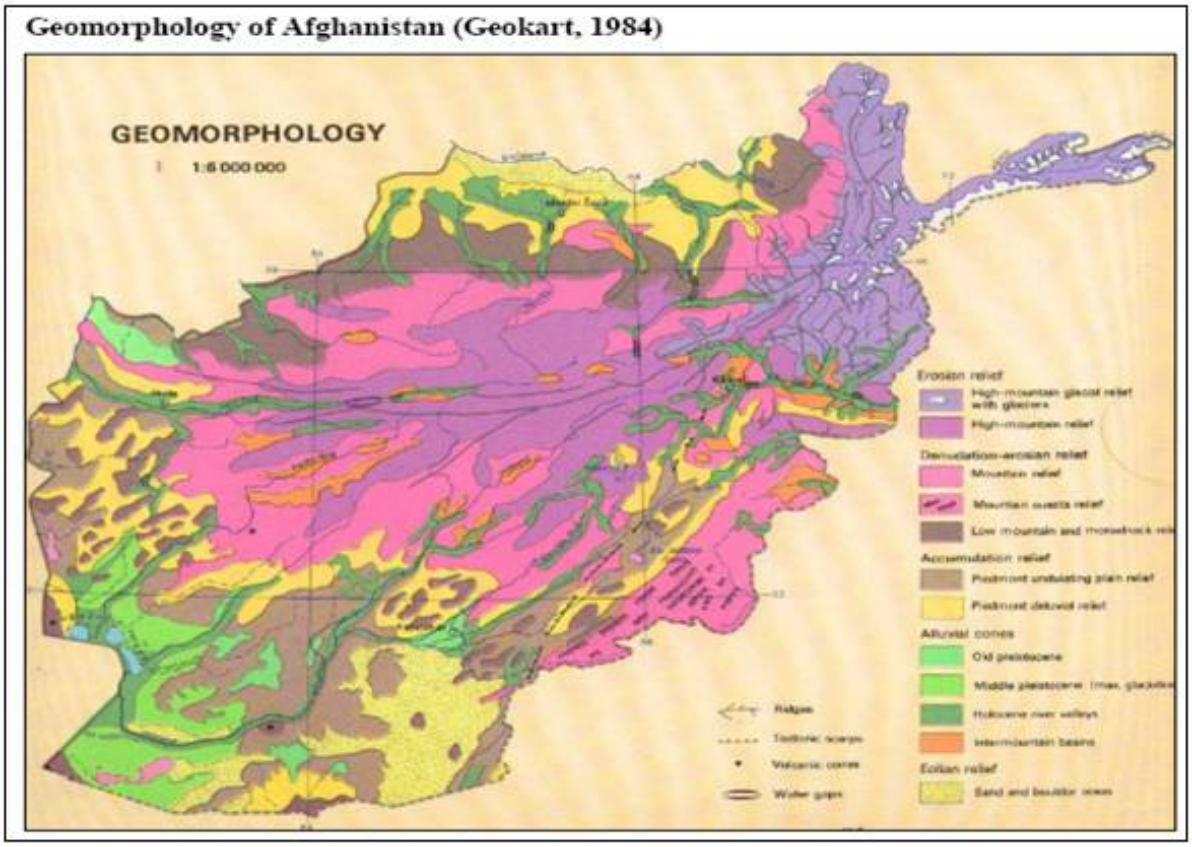
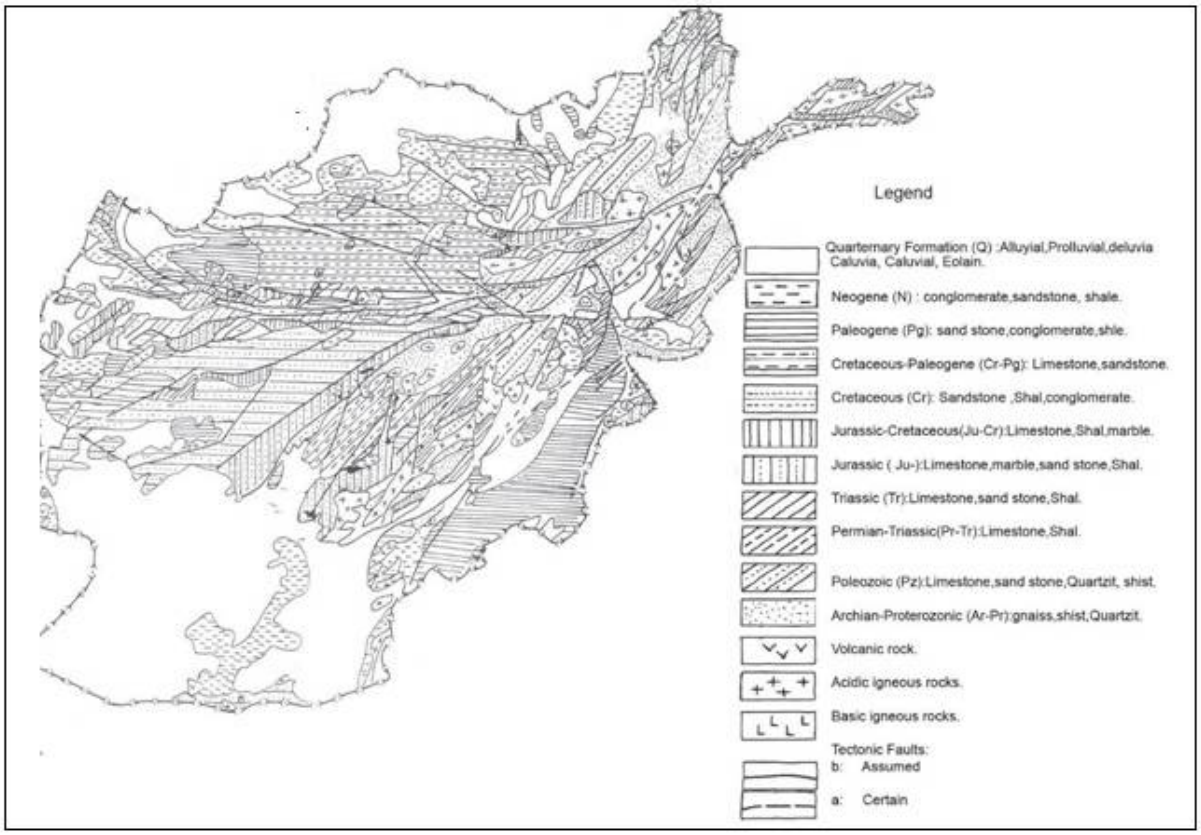
Annex 1 Geomorphology of Afghanistan

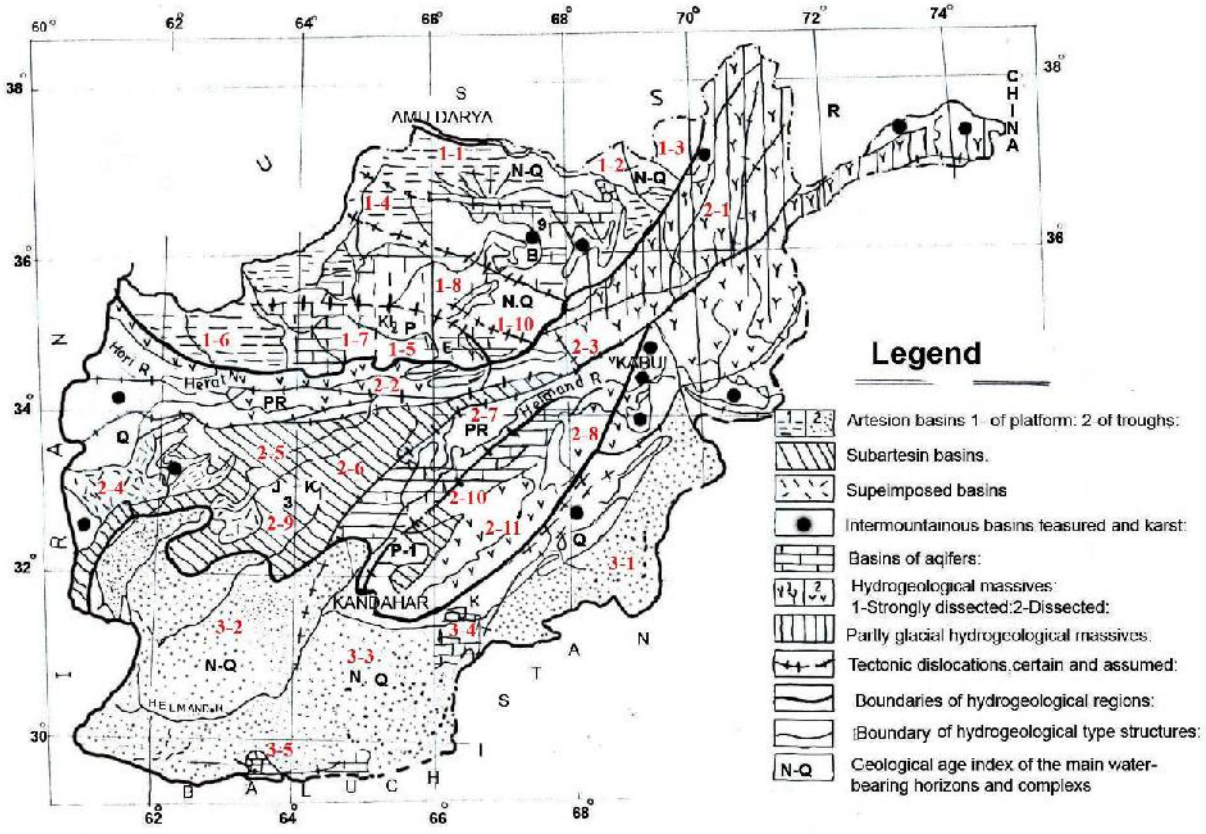


Annex 2 Geological map of Afghanistan

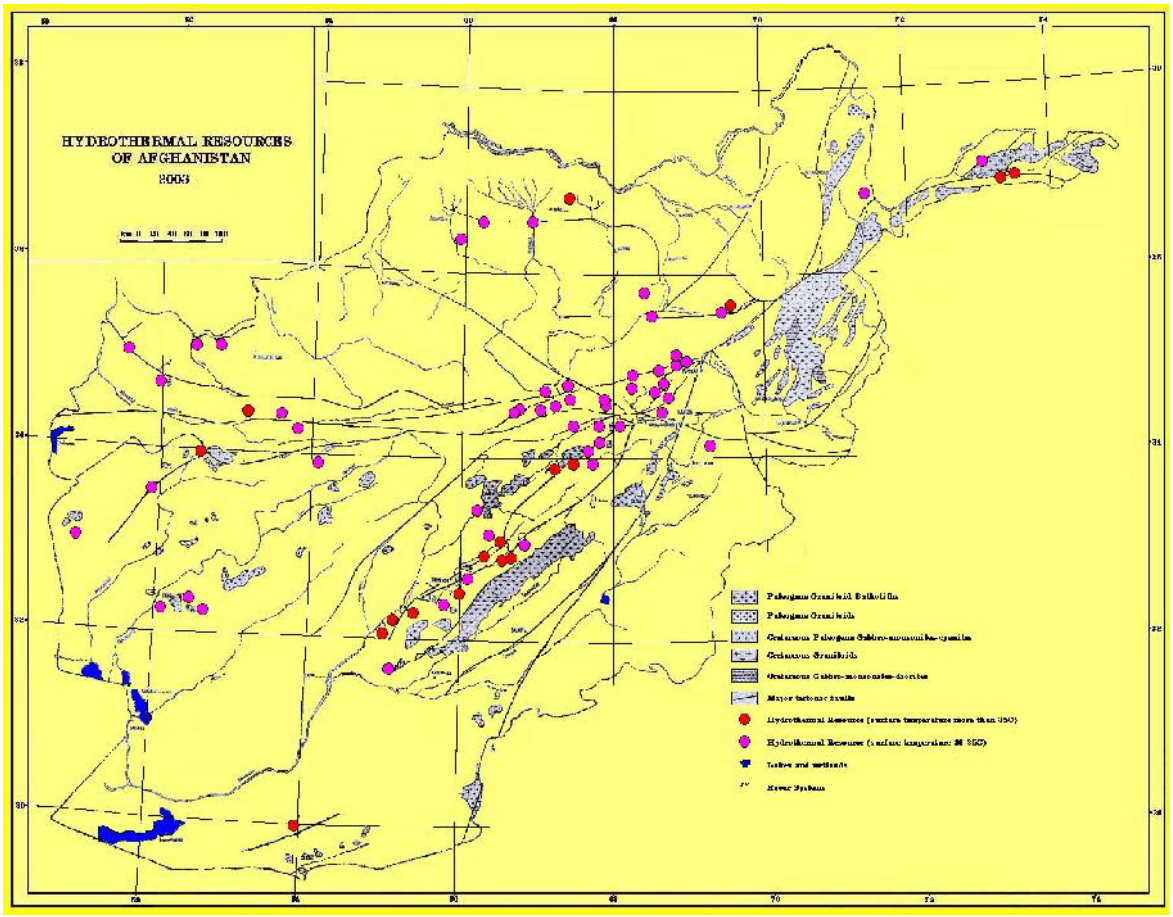


Geological Map of Afghanistan (W.A. Slawin, 1984)

Annex 3 Hydro-geological Basins of Afghanistan



Annex 4 Geothermal water of Afghanistan.



Source: Center on international cooperation/ (February 2004)

Annex 5 Location and initial information of national GMWs network in Afghanistan

GWM ID	Province	District	Village	LON	LAT	Water point type	Well depth (m)	Initial Water Level(m)	Well diameter (inch)
152	Badghis	Ab Kamari	Arbab Abdul Hamid	63.05374	34.99268	TW	37	7.93	4
56	Badghis	Ghormach	Ab I Garmak	63.83602	35.73567	TW	22	8.83	4
139	Badghis	Moquor	Zir Tangi	63.02522	35.19443	DW	18	17.69	35.5
154	Badghis	Moquor	Sanjitak	63.23637	34.98492	TW	26	5.12	4
75	Badghis	Qadis	Moqama	63.53416	34.73255	TW	29	8.65	4
89	Badghis	Qadis	Darah Bom	63.46245	35.12768	TW		5.45	4
150	Badghis	Qala-e Naw	Laman Zadshay	63.11654	34.83383	TW	30	8.43	4
141	Badghis	Qala-e Naw	Laman	63.10345	34.75230	TW	25	10.38	4
174	Badghis	Qala-e Naw	Qarghayto	63.15876	34.97461	TW	35	10.94	4
140	Badghis	Qala-e Naw	First Area	63.12362	34.98465	TW	35	13.76	4
166	Badghis	Qala-e Naw	Airport	63.12270	34.99134	DW	35	16.11	35.5
202	Badghis	Qala-e Naw	Tagab Ismail	63.09411	34.96266	TW	35	17.85	4
203	Badghis	Qala-e Naw	Bagh Dashty	63.16270	34.97381	TW	60	22.93	4
252	Badghis	Qala-e Naw	Haji Abad	63.12115	35.00038	TW	50	34.32	4
120	Baghlan	Baghlani Jadid	Gelawgir	68.92041	36.41742	TW	62	18.97	4
123	Baghlan	Baghlani Jadid	Baghlan Hospital	68.75075	36.18349	TW	32	12.96	6
117	Baghlan	Baghlani Jadid	Gerdab	68.89073	36.36446	TW	42	9.3	4
118	Baghlan	Baghlani Jadid	Pashaiha	68.78039	36.23768	TW	28	18.78	4
233	Baghlan	Doshi	Center of Doshi District	68.63688	35.60478	DW	6.4	4.60	36.4
119	Baghlan	Doshi	Sangisurakh	68.76635	35.75794	DW	23	14.65	35.5
122	Baghlan	Doshi	Dosti	68.76635	35.75794	DW	23	17.94	35.5
115	Baghlan	Doshi	Calagi	68.78835	35.83504	TW	32	14.33	4
116	Baghlan	Pul-e Khumri	Zaman khil	68.68722	35.99419	TW	27	17.70	4
124	Baghlan	Pul-e Khumri	Khwaja Alwan	68.55503	36.10606	TW	35	29.65	4
121	Baghlan	Pul-e Khumri	Poza Eshan Qul	68.65024	36.09195	DE	15.8	15.23	4
93	Balkh	Balkh	Samar Qandyan	66.83037	36.69177	DW	26.2	5.55	35.5
234	Balkh	Balkh	Buryabaf	66.85375	36.84728	TW	21.9	14.70	4
112	Balkh	Balkh	Center	66.89885	36.75699	DW	10	20.75	35.5
243	Balkh	Balkh	Charbagh-e Gulshan	66.85640	36.75123	TW	31.2	23.72	4
242	Balkh	Balkh	Shpola (Deh Bebe)	66.93548	36.78506	TW	25	27.02	4

GWM ID	Province	District	Village	LON	LAT	Water point type	Well depth (m)	Initial Water Level(m)	Well diameter (inch)
156	Balkh	Char Bolak	Baday Balkhi School	66.59397	36.77278	TW	52	10.50	4
157	Balkh	Char Bolak	Abo Shakor Balkhi School	66.67047	36.75317	TW	52	25.50	4
94	Balkh	Chimtal	Palo	66.79360	36.65803	DW	42	39.38	35.5
235	Balkh	Dawlatabad	Dawlatabad (Kochai by Taka)	66.82387	36.98364	TW	30.5	40.00	4
238	Balkh	Dehdadi	Sharif Abad	67.02297	35.60478	TW		8.80	4
239	Balkh	Dehdadi	Chalgazi	66.99299	36.71695	TW	35	11.45	4
241	Balkh	Khulm	Masjed Burhan (Tashqurghan)	67.70155	36.69357	TW	56	10.90	4
240	Balkh	Khulm	Deh Heshan	67.69870	36.76805	TW	55	18.90	6
91	Balkh	Mazar-e-sharif	Baba Yadgar	67.08112	36.71851	TW	65	6.75	4
245	Balkh	Nahr-e Shahi	Nasaji	67.08484	36.68357	TW	36.7	16.50	4
244	Balkh	Nahr-e Shahi	Takhta Pul	67.02088	36.73551	TW	31	19.50	4
92	Balkh	Sholgara	Qadim	66.88485	36.31964	TW	41	6.53	4
237	Balkh	Sholgara	Alqajar	66.91463	36.48776	TW	38	7.60	4
236	Balkh	Sholgara	Badam Qala	66.94277	36.51996	TW	30.3	22.85	4
200	Faryab	Almar	Chaghatak High School	64.15876	35.88084	TW	80	60.00	4
162	Faryab	Khan-e Charbagh	Khan-e Charbagh School	65.22091	37.00222	TW	45	38.02	4
144	Faryab	Khwaja Sabz Posh	Deh Now School	64.84024	36.07253	TW	55	26.37	4
180	Faryab	Khwaja Sabz Posh	Qara Shikhi Boy School	64.87395	36.14588	TW	50	30.06	4
253	Faryab	Khwaja Sabz Posh	Kata Qishlaq School	64.87137	36.02252	TW	60	35.00	4
188	Faryab	Maimana	Chaghatak midal School	64.74659	35.95216	TW	63	11.06	4
179	Faryab	Maimana	Kariz Qala School	64.71217	35.98633	TW	50	17.74	4
148	Faryab	Maimana	Water Management Department	64.77408	35.91743	TW	52.5	29.00	4
111	Faryab	Maimana	Center	64.77626	35.93039	DW	10.5	7.73	35.5
146	Faryab	Pashtun Kot	Khwaja Musa School	64.66569	36.03494	TW	49.5	9.06	4
254	Faryab	Pashtun Kot	Baloch Payeen	64.83057	35.89709	TW	59.5	13.90	4
201	Faryab	Pashtun Kot	Arab Aqsay High School	64.64918	35.87706	TW	78	14.02	4
147	Faryab	Pashtun Kot	Jamshidi School	64.82450	35.88859	TW	50.5	15.41	4
187	Faryab	Pashtun Kot	Deh Azizan Midal School	64.78183	35.91862	TW	63	15.87	4
155	Faryab	Qaramqul	Qaramqul High School	65.08395	36.86487	TW	53	31.95	4

GWM ID	Province	District	Village	LON	LAT	Water point type	Well depth (m)	Initial Water Level(m)	Well diameter (inch)
163	Faryab	Qurghan	Qurghan School	65.09017	36.91920	TW	50	15.00	4
164	Faryab	Qurghan	Abo- Yosof Andkhoye Primary School	65.09908	36.95268	TW	50	24.26	4
149	Faryab	Shirin Taqab	Fiz Abad Shamsudin School	64.87269	36.29333	TW	51	26.74	4
5	Ghazni	Ghazni	Arbaba	68.43911	33.54383	TW	60	41.77	4
189	Ghazni	Ghazni	Deh Meskin Masjed Eid Gaha	68.41223	33.56161	DW	26.8		35.5
171	Ghazni	Ghazni	Qarabagh Bus Station	68.41882	33.55265	DW	25		35.5
6	Ghazni	Jaghatu	Qala-I-naw	68.39050	33.71292	TW	23.3	13.3	4
7	Ghazni	Qara Bagh	Walikay	68.09195	33.16115	TW	56	5.99	4
53	Ghor	Chaghcharan	Ahangaran	65.06780	34.47120	TW	46	19.6	4
48	Ghor	Lal Wa Sarjangal	Kara	66.31619	34.67457	DW	8.6	7.12	35.5
54	Ghor	Lal Wa Sarjangal	Espideyual	66.45639	34.47528	DW	8	7.17	35.5
45	Ghor	Pasaband	Astarghana	65.12406	33.65857	DW	81.2	7.13	35.5
47	Ghor	Taiwara	Shahr Sokhta	64.34017	33.50787	DW	9.9	7.66	35.5
198	Herat	Herat	Ten Area	62.18818	34.33616	TW	30	7.98	4
197	Herat	Herat	Nine Area	62.17828	34.34866	TW	28	15.83	4
55	Herat	Karukh	Agha Sahib	62.58609	34.47787	DW		9.61	35.5
205	Herat	Karukh	Badghis Road	62.58968	34.49749	TW	54	23.75	4
204	Herat	Karukh	Qala-e Sharbat	62.64115	34.51348	DE	28	26.58	6
125	Herat	Karukh	Robate Saliman	62.44276	34.32581	DW	35	33.84	35.5
199	Herat	Kohsan	Qala-e Mushi	61.22171	34.64518	TW	42	8.84	4
175	Herat	Kohsan	Haji Alishir	61.19207	34.67484	TW	42	12.05	4
51	Herat	Kohsan	Kamisary	61.09056	34.66615	TW	29.8	14.00	4
44	Herat	Kushk-e Kohna	Shulyji	62.65620	34.78552	DW	11.3	11.65	35.5
251	Herat	Kushk-e Naw	Yaka Dokan	62.19063	34.97406	DW	15	5.61	35.2
67	Herat	Kushk-e Naw	Toraghundi	62.28473	35.23199	TW	31.7	6.63	4
208	Herat	Kushk-e Naw	Haft Ulya	62.09665	34.88386	DE	25	13.63	6
68	Herat	Kushk-e Naw	Rabat Sangi	62.13460	34.79738	TW		16.07	4
206	Herat	Obeh	Muslim Abad	63.14864	34.37229	DE	45	42.65	4
127	Herat	Obeh	Hawashanasi	63.16942	34.38273	DW	46.5	42.76	35.5
87	Herat	Obeh	Center	63.17507	34.37196	DW		14.99	35.5

GWM ID	Province	District	Village	LON	LAT	Water point type	Well depth (m)	Initial Water Level(m)	Well diameter (inch)
126	Herat	Pashtun Zarghun	Marwa1	62.89116	34.24895	DW	21.7	14.58	35.5
207	Herat	Pashtun Zarghun	Turan Abad	62.90090	34.25907	TW	97	33.81	4
73	Herat	Pashtun Zarghun	Salimi	62.49703	34.25212	TW		8.65	4
77	Herat	Pashtun Zarghun	Marwa 2	62.90203	34.24429	DW	13.2	12.26	35.5
151	Herat	Shindand	Mughulan	62.27296	33.37397	TW	30	11.03	4
79	Herat	Shindand	Qalai Pain	61.93130	33.26911	TW		8.45	4
63	Herat	Shindand	Samizai	62.19654	33.18905	TW		7.98	4
183	Herat	Zenda Jan	Deh Surkh	61.91280	34.38832	TW	33	8.12	4
167	Herat	Zenda Jan	Tahied	61.78894	34.39420	DE	20	13.60	6
209	Herat	Zenda Jan	Tawhed	61.79555	34.40127	TW	85	17.16	4
182	Herat	Adraskan	Adraskan School	62.26706	33.64366	TW	35	7.71	4
70	Herat	Adraskan	Zulm Abad	62.15838	33.55578	TW	20.4	10.78	4
85	Herat	Chesht-e Sharif	Sargaz	64.05972	34.34393	DW	12.4	11.32	35.5
190	Herat	Enjil	(Jagharah) Yahya Khan	62.20037	34.28966	TW	28	3.16	4
194	Herat	Enjil	(Kabul iha) Qalwar	62.15604	34.33506	TW	30	3.28	4
195	Herat	Enjil	Zaman Abad	62.23848	34.33257	TW	45	3.70	4
168	Herat	Enjil	Pustay No 1 DACAAR OFFICE	62.21533	34.33501	TW	90	4.73	4
60	Herat	Enjil	Kahdistan	62.30587	34.34260	TW		5.83	4
64	Herat	Enjil	Gandaw Parwana	62.08145	34.53142	TW	43	6.64	4
192	Herat	Enjil	Qafaslan	62.19362	34.30951	TW	35	7.53	4
191	Herat	Enjil	Karti Sufla	62.19875	34.32457	TW	35	9.98	4
230	Herat	Enjil	Shadi Jan	62.35039	34.28554	TW	34	10.83	4
231	Herat	Enjil	Qaybatan	62.13463	34.34198	TW	90	13.07	4
232	Herat	Enjil	Jabrail	62.13958	34.36834	TW	105	22.64	4
52	Herat	Ghurian	Center	61.50554	34.35254	TW	27.5	7.96	4
184	Herat	Ghurian	Shahbas	61.38504	34.48943	TW	60	8.61	4
210	Herat	Ghurian	Faghdan	61.48573	34.35955	TW	75	17.46	4
46	Herat	Gozara	Tezan	62.06575	34.22767	TW		4.46	4
193	Herat	Gozara	Urdo Bagh	62.21325	34.26608	TW	30	7.84	4
196	Herat	Gozara	Qawashan	62.22144	34.25041	TW	45	13.85	4
181	Herat	Gozara	Rawza Bagh	62.21219	34.23463	TW	45	17.38	4

GWM ID	Province	District	Village	LON	LAT	Water point type	Well depth (m)	Initial Water Level(m)	Well diameter (inch)
165	Herat	Gulran	Qashawury	61.95979	34.89442	DW	33	12.71	35.5
72	Herat	Gulran	Kariz I Kar	61.65043	35.01271	TW	40.2	26.88	4
158	Jawzjan	Aqcha	Qara Boyean School	66.21061	36.85057	TW	53	23.22	4
159	Jawzjan	Faizabad	Nasir Shaid School	66.45372	36.81622	TW	46	23.50	4
248	Jawzjan	Shaberghan	Masjed Qeranchi	65.77058	36.66923	TW	30.7	17.17	4
249	Jawzjan	Shaberghan	Center (Khir Khana Area)	65.75411	36.65196	TW	34	20.04	4
250	Jawzjan	Shaberghan	Marghab	65.75377	36.62891	TW	31.5	23.40	4
12	Kabul	Bagrami	Gul buta	69.22864	34.47863	TW	40.5	13.92	4
17	Kabul	Char Asiab	Chaman	69.17281	34.35407	TW	26	5.75	4
16	Kabul	Deh Sabz	Kata khel	69.35124	34.60985	TW	44.5	15.20	4
2	Kabul	Kabul	Kabul - DACAAR office	69.16004	34.55275	TW	14.6	5.72	4
106	Kabul	Kabul	Kabul University Engineering Faculty	69.12299	34.51930	TW		21.39	4
18	Kabul	Kabul	Char Qala	69.10533	34.48651	DE	30	37.30	4
105	Kabul	Kabul	Aqa Alis Sham	69.15499	34.48169	TW		5.7	4
214	Kabul	Kalakan	Masjed Atafaq	69.14922	34.77303	TW	34	21.91	4
4	Kabul	Khak-e Jabar	Khurd kabul	69.38399	34.38887	TW	52	13.93	4
15	Kabul	Mir Bacha Kot	Shekhan	69.12266	34.72940	TW	32	16.63	4
229	Kabul	Paghman	Qala-e Abdul Ali	69.03374	34.51889	DE	28	5.48	4
213	Kabul	Qara Bagh	Bagharak	69.16372	34.81847	TW	35	16.94	4
143	Kabul	Qara Bagh	Qur Quol	69.16652	34.84225	TW	21	20.55	4
170	Kabul	Qara Bagh	Masjed Omar Farooq	69.16601	34.88995	DW	25	25.26	35.5
185	Kabul	Sarobi	Gundi kaly	69.74276	34.60920	DW	30	12.01	35.5
11	Kabul	Sarobi	Naway Qala	69.74756	34.60645	DE	20	14.15	4
1	Kabul	Shakar Dara	Qala-e-Murad Biek	69.07902	34.65884	TW	23	3.96	4
101	Kandahar	Kandahar		65.82175	31.58345	TW		11.65	4
103	Kandahar	Kandahar		65.70087	31.61665	DW		23	35.5
38	Kandahar	Kandahar	Loya Wialah	65.71470	31.63269	TW	41	38.23	4
39	Kandahar	Panjwai	House I Madad	65.30230	31.56131	TW	46	28.87	4
113	Kapisa	Mahmud-e Raqi	Dehbab Ali Bazar	69.33126	35.04328	DW	21.6	2.50	35.5
211	Kapisa	Mahmud-e Raqi	Shokhy	69.42187	34.95353	DW	4.5	7.54	35.5
114	Kapisa	Mahmud-e Raqi	Qalae Jabar	69.47720	34.94423	DW	10.8	19.02	35.5

GWM ID	Province	District	Village	LON	LAT	Water point type	Well depth (m)	Initial Water Level(m)	Well diameter (inch)
224	Kapisa	Nijrab	Poor Klay35.00919	69.62898	35.00919	DW	8.7	10.35	35.5
13	Kapisa	Tagab	Firoz khel	69.65385	34.79947	TW	40	24.50	4
29	Khost	Bak	Kotkay (Pasachagan)	70.04154	33.50895	TW	65	29.65	4
40	Khost	Speyra	Zanda taga	69.55567	33.23370	TW	41	35.71	4
132	Kunduz	Aliabad	Hazara (Mohammad Husain)	68.90517	36.54100	TW	35	25.2	4
130	Kunduz	Char Dara	Duwandi (Tajakan)	68.80779	36.69709	TW	25	3.39	4
131	Kunduz	Char Dara	Aq Saray	68.74655	36.72267	TW	30	7.84	4
135	Kunduz	Imam Sahib	Qara Kuterma	68.69389	37.15000	DW	25	4.61	35.5
129	Kunduz	Imam Sahib	Kanam (Beshkapa)	68.84108	37.15388	TW	25	6.05	4
133	Kunduz	Kunduz	Ortabulq Qaraqashlaq (Haji Naim)	68.88548	36.65820	TW	31.5	12.85	4
134	Kunduz	Kunduz	Al Chin	68.86592	36.79553	DW	9.4	8.68	35.5
19	Laghman	Alingar	Qalatak(2)	70.30272	34.75413	TW	18.5	7.99	4
22	Laghman	Alishing	Shama Ram	70.12511	34.73947	TW	12.4	5.35	4
218	Laghman	Mehtarlam	Dor Kand (Asmat)	70.19842	34.64566	TW	36	1.95	4
219	Laghman	Mehtarlam	Pahlawan Baba	70.22495	34.68685	TW	20	2.90	4
35	Laghman	Mehtarlam	Qaleh Akhund	70.21899	34.62350	TW	21	3.75	4
217	Laghman	Qarghayi	Kand Hassan Khan	70.20275	34.57478	TW	28	5.28	4
216	Laghman	Qarghayi	Zangora Abdul Rashid	70.25169	34.49382	TW	35	6.65	4
215	Laghman	Qarghayi	Aziz Khan Kas	70.20771	34.49072	TW	29	16.00	4
26	Laghman	Qarghayi	Farman khel	70.21006	34.53532	TW	45.8	16.72	4
142	Logar	Muhammad Agha	Kotakay	69.11441	34.21964	TW	53	7.04	4
128	Logar	Muhammad Agha	Surkh Abad	69.08307	34.19126	TW	13.5	12.27	4
227	Logar	Pol-e Alam	Masjed Khwaja Painda Khan Wali	69.20198	33.89422	TW	14	6.30	4
43	Logar	Pol-e Alam	Jawzar	69.01970	33.77194	TW	18.4	11.35	4
37	Logar	Pol-e Alam	Oni sayedan	69.00556	33.97439	TW	19	12.85	4
25	Nangarhar	Bati Kot	Ambar khana	70.81845	34.28256	TW	30	4.55	4
36	Nangarhar	Behsud	Sammar khel	70.55787	34.37573	TW	12.8	5.55	4
220	Nangarhar	Behsud	Malang Jan (Chamyary)	70.96996	34.44817	DW	19.5	15.20	35.5
31	Nangarhar	Chaparhar	Terelay	70.41271	34.31956	TW	34.8	15.60	4
32	Nangarhar	Jalalabad	Jalalabad	70.45117	34.43425	TW	14	11.05	4

GWM ID	Province	District	Village	LON	LAT	Water point type	Well depth (m)	Initial Water Level(m)	Well diameter (inch)
20	Nangarhar	Kama	Qaleh yeAkhund	70.57511	34.41641	TW	16.9	2.36	4
27	Nangarhar	Khogiani	Babaker khel	70.22153	34.29006	TW	53	5.09	4
88	Nangarhar	Kot	Pursha Khail	70.56300	34.12067	TW	23	7.93	4
21	Nangarhar	Kot	Jabeh	70.64901	34.20007	TW	41	13.40	4
23	Nangarhar	Kuz Konar	Qalagay (Malakzai)	70.57033	34.55982	TW	15.5	12.06	4
24	Nangarhar	Lalpur	Lal pur	71.04402	34.23229	TW	21.1	2.89	4
221	Nangarhar	Mohmand Dara	Gerdi Ghous (Masjed Jamy)	70.96996	34.23387	TW	17.3	5.45	4
222	Nangarhar	Mohmand Dara	27 Wyala	70.84839	34.24655	TW	25	8.06	4
34	Nangarhar	Pachir Wa Agam	Sabre Ulya	70.27873	34.20602	DE	41.6	13.82	4
30	Nangarhar	Rodat	Mazina	70.48627	34.21450	DE	38.5	18.50	4
28	Nangarhar	Surkh Rod	Sawz Abad	70.38820	34.44563	TW	19.6	10.94	4
3	Nangarhar	Surkh Rod	Musli khel	70.36052	34.43802	DE	17.4	14.30	4
33	Nangarhar	Surkh Rod	Fateh Abad	70.21406	34.35188	TW	42	16.25	4
42	Paktya	Gardez	Khataba	69.19266	33.58677	TW	63	42.39	4
41	Paktya	Sayyid Karam	Nora khel	69.37737	33.76376	DW	29.5	24.17	35.5
186	Parwan	Bagram	Bagram city	69.25758	34.69792	DW	14	7.88	35.5
212	Parwan	Bagram	Shaka	69.25027	34.95955	TW	30	13.82	4
14	Parwan	Bagram	Shahie ya	69.22398	34.96389	TW	34.5	24.55	4
247	Samangan	Hazrat-e Sultan	Gadi	67.89185	36.46904	TW	17.5	3.60	4
246	Samangan	Hazrat-e Sultan	Center of District	67.89364	36.45701	TW	35	6.45	4
8	Wardak	Maidan Shahr	Shahabudin	68.86778	34.32021	DW	10	9.75	35.5
223	Wardak	Maidan Shahr	Kochi Ha	68.79218	34.44884	TW		11.65	4
10	Wardak	Nirkh	Deh hayat	68.77547	34.36844	DE	42	14.73	4
9	Wardak	Sayyidabad	Shikh abdul	68.76060	34.08726	DE	25	18.65	4

Annex 6 Concern elements of groundwater in Afghanistan

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Badghis	Abkarmi	04/03/07	04/03/05	64.89363	36.66533	6120	7.1	36	520	7.60	5.02	0.006	0.35	2648	0.01	0.000	1
Nangarhar	Acheen	02/03/09	03/04/09	69.10127	34.21398	413	8.7	13	87	0.40	9.80	0.000	0.15	19	0.01	0.000	5
Nangarhar	Acheen	15/05/11	17/05/11	70.69047	34.19235	555	7.7	7	27	0.24	2.52	0.000	0.14	56	0.02	0.000	0
Nangarhar	Acheen	27/09/10	29/09/10	70.70758	34.12545	730	7.6	17	165	1.08	4.40	0.001	0.11	159	0.04	0.000	10
Nangarhar	Acheen	29/09/07	29/09/07	69.60758	34.94229	928	7.4	8	122	0.90	3.50	0.010	0.10	138	0.00	0.003	156
Nangarhar	Acheen	27/09/10	29/09/10	70.70925	34.19981	730	7.6	16	160	1.03	4.26	0.003	0.10	168	0.03	0.000	60
Nangarhar	Acheen	27/09/10	29/09/10	70.69047	34.19235	729	7.6	8	160	1.22	4.18	0.007	0.10	161	0.04	0.000	3
Nangarhar	Acheen	27/09/10	29/09/10	70.68217	34.16347	865	7.6	13	160	0.90	4.36	0.004	0.09	144	0.03	0.000	30
Herat	Adraskan	25/08/08	25/08/08	69.17966	34.58288	722	8.0	9	101	0.60	2.78	0.002	0.35	63	0.00	0.000	5
Herat	Adraskan	27/04/11	28/04/11	62.26706	33.64366	918	7.5	13	170	0.90	5.20	0.002		407	0.02	0.000	1
Kunduz	Aliabad	09/02/08	09/03/08	63.10806	34.73251	1098	7.5	8	253	0.70	3.28	0.000	0.10	111	0.00	0.000	1
Laghman	Alingar	07/03/11	10/03/11	70.30272	34.75413	411	7.2	12	32	0.48	3.54	0.004	0.65	120	0.01	0.000	0
Laghman	Alingar	24/12/09	28/12/09	62.12969	32.40967	415	7.3	7	48	1.45	0.58	0.005	0.35	134	0.02	0.000	1
Laghman	Alishing	13/07/09	14/07/09	68.41850	33.55661	582	7.9	7	75	0.20	1.02	0.006	0.40	23	0.01	0.000	6
Laghman	Alishing	01/08/09	01/08/09	64.34017	33.50787	554	6.8	9	77	0.10	0.28	0.008	0.25	110	0.00	0.000	0
Laghman	Alishing	14/07/08	14/07/08	69.17966	34.58288	652	7.8	13	87	0.70	3.36	0.004	0.25	16	0.01	0.000	2
Laghman	Alishing	19/03/09	19/03/09	62.22152	34.25056	562	7.5	7	77	0.40	2.86	0.003	0.20	38	0.01	0.000	1
Laghman	Alishing	26/03/09	26/03/09	62.33626	34.22721	557	7.2	7	58	0.40	2.68	0.007	0.20	25	0.00	0.000	3
Laghman	Alishing	19/03/09	19/03/09	62.90203	34.24429	401	8.0	7	87	0.40	3.68	0.002	0.15	29	0.00	0.000	3
Laghman	Alishing	26/03/09	26/03/09	62.06575	34.22767	495	7.5	7	87	0.40	3.52	0.002	0.15	22	0.00	0.000	2
Laghman	Alishing	04/05/08	04/06/08	69.17068	34.58370	1590	7.4	18	128	0.70	3.72	1.110	0.15	22	0.00	0.000	2
Laghman	Alishing	07/03/11	10/03/11	70.12511	34.73947	425	7.4	7	23	0.14	3.32	0.004		33	0.02	0.000	2
Faryab	Almar	25/01/11	27/01/11	64.64918	35.87706	5140	7.8	40	1800	5.15	1.00	0.175	0.70	632	0.01	0.000	200
Faryab	Almar	25/01/11	27/01/11	64.15876	35.88084	4720	7.8	30	1700	5.10	9.98	2.000	0.64	582	0.01	0.000	200
Faryab	Almar	31/05/10	06/06/10	64.53031	35.85520	1430	7.9	15	190	1.32	1.82	0.000	0.51	171	0.01	0.000	2
Faryab	Almar	03/06/10	06/06/10	64.55704	35.83260	1682	7.9	32	218	0.80	5.54	0.004		123	0.01	0.000	2
Farah	Anar Dara	29/05/10	29/05/10	61.66096	32.77402	532	7.9	7	56	0.58	4.52	0.001		103	0.00	0.000	2
Farah	Anar Dara	29/05/10	29/05/10	61.54379	32.64103	757	7.9	8	142	1.03	3.22	0.001		131	0.01	0.000	2
Faryab	Andkhoy	10/07/07	10/07/07	62.28473	35.23199	2420	7.2	11	252	0.90	16.00	0.008	13.00	222	0.00	0.000	7
Faryab	Andkhoy	15/01/05	15/01/05	65.07899	36.95350	24400	6.4	76	1035	16.00	57.00	0.046	10.00	5037	0.00	0.000	7
Faryab	Andkhoy	16/01/05	16/01/05	65.09900	36.95238	17660	7.4	50	720	14.70	4.80	1.160	6.00	2029	0.00	0.005	0
Faryab	Andkhoy	16/01/05	16/01/05	65.09900	36.95238	17660	7.4	50	720	14.70	4.80	1.160	6.00	2029	0.00	0.005	3
Faryab	Andkhoy	27/02/05	28/02/05	66.67047	36.75317	7450	7.0	108	3200	8.60	88.00	0.010	5.50	1565	0.00	0.000	7
Faryab	Andkhoy	27/02/05	28/02/05	66.67047	36.75317	6200	7.8	50	1650	8.60	5.00	1.970	4.50	670	0.00	0.000	7
Faryab	Andkhoy	01/03/05	01/03/05	68.74655	36.72267	6200	7.8	50	1650	8.60	5.00	1.970	4.50	670	0.00	0.000	3

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Andkhoy	06/11/04	06/11/04	65.22241	37.01193	10340	7.3	48	1700	62.00	2.30	1.270	4.50	314	0.00	0.000	0
Faryab	Andkhoy	06/11/04	06/11/04	65.22241	37.01193	10340	7.3	48	1700	62.00	2.30	1.270	4.50	314	0.00	0.000	3
Faryab	Andkhoy	24/02/05	25/02/05	66.45372	36.81622	5890	8.8	50	1680	9.20	1.44	0.020	4.00	333	0.00	0.000	7
Faryab	Andkhoy	27/01/05	27/01/05	65.09017	36.91920	14900	7.9	36	576	13.50	7.48	0.013	3.00	2619	0.00	0.000	7
Faryab	Andkhoy	10/01/05	10/01/05	65.20544	36.99041	4590	7.6	46	340	40.00	13.20	0.015	1.20	1533	0.00	0.000	0
Faryab	Andkhoy	11/10/05	11/01/05	70.33223	36.98192	4590	7.6	46	340	40.00	13.20	0.015	1.20	1533	0.00	0.000	3
Faryab	Andkhoy	18/04/05	19/04/05	64.85771	36.25606	1529	6.5	34	460	2.60	80.80	0.003	1.05	156	0.00	0.000	7
Faryab	Andkhoy	28/06/05	28/06/05	64.98191	36.16701	4790	8.0	48	1600	2.00	0.32	1.165	1.00	601	0.00	0.000	7
Faryab	Andkhoy	07/03/05	07/03/05	68.90517	36.54100	3870	8.2	44	1360	6.40	0.04	0.016	0.35	225	0.00	0.004	13
Faryab	Andkhoy	24/02/05	25/02/05	65.04779	36.82892	7550	8.4	50	2640	9.30	4.08	0.026	0.10	663	0.00	0.003	8
Faryab	Andkhoy	22/01/05	22/01/05	65.09017	36.91920	11270	7.4	46	496	13.40	0.90	0.001	0.10	1281	0.00	0.002	1
Faryab	Andkhoy	15/01/05	15/01/05	65.09908	36.95268	4090	7.9	24	2100	15.20	57.00	0.043	0.10	695	0.03	0.000	1
Faryab	Andkhoy	20/04/10	25/04/10	64.90644	36.98840	820	8.0	25	195	0.87	1.72	0.000	0.01	83	0.01	0.000	2
Jawzjan	Aqcha	25/02/05	26/02/05	66.45372	36.81622	2720	7.2	13	1700	9.10	5.60	0.030	3.00	2997	0.01	0.000	7
Kandahar	Arghandab	27/11/10	30/11/10	65.55942	31.64616	1674	7.4	4	720	2.85	9.88	0.007	0.20	333	0.00	0.000	9
Kandahar	Arghandab	27/11/10	30/11/10	65.60293	31.68037	1579	7.4	14	540	1.25	10.20	0.003	0.19	271	0.00	0.000	17
Kandahar	Arghandab	27/11/10	30/11/10	65.71595	31.72474	894	7.3	11	190	0.99	5.18	0.004	0.10	113	0.00	0.000	172
Kandahar	Arghandab	27/11/10	30/11/10	65.67725	31.66724	1417	7.1	4	495	2.95	8.86	0.004	0.02	183	0.00	0.000	33
Kandahar	Arghandab	27/11/10	29/11/10	65.63974	31.70530	1235	7.4	21	470	2.12	3.92	0.005	0.01	220	0.02	0.000	34
Kandahar	Arghandab	16/12/10	21/12/10	65.60601	31.67710	673	8.0	52	86	0.61	6.22	0.005	0.00	149	0.02	0.000	1
Kandahar	Arghandab	27/11/10	29/11/10	65.61596	31.67204	689	7.3	6	63	0.63	5.48	0.003	0.00	118	0.03	0.000	1
Kandahar	Arghandab	27/11/10	29/11/10	65.69072	31.73285	1451	7.2	16	630	1.02	6.96	0.001	0.00	242	0.03	0.000	137
Kandahar	Arghandab	16/12/10	20/12/10	65.73862	31.77652	814	7.0	17	140	1.03	6.88	0.004	0.00	234	0.00	0.000	1
Kandahar	Arghandab	27/11/10	29/11/10	65.64716	31.68214	826	7.3	18	180	1.04	7.02	0.003	0.00	191	0.02	0.000	5
Kandahar	Arghandab	27/11/10	29/11/10	65.60871	31.68015	1178	7.7	20	340	1.40	52.90	0.003	0.00	407	0.02	0.000	9
Badakhshan	Argo	09/02/08	09/03/08	69.12266	34.72940	675	7.6	4	253	0.70	3.36	0.003	0.50		0.00	0.000	0
Badakhshan	Argo	05/09/07	06/09/07	63.13545	34.99016	917	8.0	6	253	0.90	3.04	0.004	0.35	101	0.00	0.000	7
Badakhshan	Argo	21/09/07	25/09/07	63.15807	34.97451	747	8.4	6	253	0.90	5.56	0.010	0.35		0.00	0.000	7
Samangan	Aybak		12/12/05	64.84867	36.04663	2070	7.6	48	253	1.30	2.00	0.001	0.65	150	0.00	0.000	3
Samangan	Aybak	29/10/10	01/11/10	67.59872	35.49188	1917	7.3	31	138	0.63	7.36	0.003	0.01	438	0.05	0.000	7
Logar	Azra	03/07/10	04/07/10	69.57000	34.05000	1355	7.6	12	138	0.78	20.20	0.105	0.77	142	0.02	0.002	3
Logar	Azra	03/07/10	04/07/10	68.92253	33.96286	1298	7.6	14	134	0.88	53.60	0.100	0.52	206	0.00	0.000	3
Logar	Azra	01/02/11	01/03/11	69.67500	34.18200	491	7.5	22	24	0.14	0.86	0.001	0.51	112	0.02	0.000	1
Logar	Azra	03/07/10	05/07/10	69.57500	34.05944	1335	7.6	13	126	0.83	56.00	0.520	0.51	127	0.00	0.003	0
Logar	Azra	03/07/10	04/07/10	68.85190	33.98245	1307	7.7	14	128	0.98	51.20	0.510	0.51	143	0.01	0.003	12
Logar	Azra	03/07/10	04/07/10	69.57444	34.05682	1304	7.7	17	124	1.00	60.22	0.097	0.51	209	0.00	0.000	10

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Logar	Azra	13/12/10	20/12/10	68.42308	33.55173	482	7.7	6	46	0.44	3.76	0.004	0.01	165	0.00	0.000	1
Logar	Azra	13/12/10	19/12/10	68.38153	33.51088	1813	7.9	9	270	1.02	53.00	0.009	0.01	737	0.01	0.008	0
Logar	Azra	01/02/11	01/03/11	69.63200	34.14300	499	7.8	23	27	0.26	4.56	0.003	0.01	131	0.04	0.000	1
Logar	Azra	01/02/11	01/03/11	69.63000	34.18000	490	7.6	19	26	0.20	3.62	0.001	0.01	130	0.04	0.000	1
Logar	Azra	01/02/11	01/03/11	69.75500	34.14500	494	7.6	26	25	0.20	3.74	0.002	0.01	15	0.02	0.000	1
Logar	Azra	01/02/11	01/03/11	69.61100	34.14000	494	7.6	25	24	0.25	2.96	0.001	0.01	12	0.02	0.000	1
Logar	Azra	01/02/11	01/03/11	70.21069	34.64067	489	7.9	13	25	0.37	2.92	0.001	0.01	118	0.04	0.000	1
Logar	Azra	13/12/10	20/12/10	68.37500	33.55944	944	7.9	12	205	0.67	4.00	0.007	0.00	287	0.04	0.000	1
Logar	Azra	13/12/10	20/12/10	68.48743	33.42743	1112	7.6	24	400	0.76	4.48	0.003	0.00	283	0.00	0.000	1
Baghlan	Baghlani Jadid	12/05/06	12/05/06	64.73265	35.99879	7922	7.7	52	396	1.30	1.96	0.004	0.80	1488	0.00	0.000	1
Baghlan	Baghlani Jadid	11/12/07	11/12/07	69.17072	34.85583	883	7.6	7	91	0.80	5.50	0.002	0.10	145	0.00	0.000	0
Baghlan	Baghlani Jadid	04/07/07	05/07/07	65.28080	35.65455	874	7.5	6	92	0.90	6.74	0.009	0.10	101	0.01	0.000	1
Baghlan	Baghlani Jadid	22/08/06	22/08/06	65.81187	35.89686	696	8.2	7	74	1.10	1.84	0.003	0.10	185	0.00	0.000	1
Parwan	Bagram	25/02/09	26/02/09	62.20660	34.37539	890	7.5	7	69	0.40	2.60	0.013	1.90	9	0.00	0.000	1
Parwan	Bagram	19/01/10	20/01/10	69.22683	34.95631	936	7.6	13	66	0.30	1.58	0.006	0.51	435	0.01	0.000	1
Parwan	Bagram	04/06/10	07/06/10	69.26990	34.97656	826	8.1	14	62	0.53	4.62	0.016	0.30	159	0.04	0.000	2
Parwan	Bagram	15/05/11	16/05/11	69.22950	34.98050	439	7.6	11	23	0.72	2.40	0.004	0.04	143	0.00	0.000	1
Parwan	Bagram	22/05/11	30/05/11	69.22479	34.97650	548	7.8	5	19	0.38	4.80	0.001	0.04	56	0.02	0.000	2
Parwan	Bagram	15/01/11	16/01/11	69.25202	34.96904	677	8.3	22	40	0.76	5.54	0.000	0.01	71	0.01	0.000	200
Parwan	Bagram	22/03/11	23/03/11	69.22398	34.96389	1040	7.2	20	45	1.02	4.82	0.006	0.51	109	0.02	0.000	0
Kabul	Bagrami	22/08/08	22/08/08	69.15298	34.53941	1018	8.1	18	89	0.60	2.50	1.176	1.20	20	0.00	0.000	0
Kabul	Bagrami	02/09/08	02/09/08	65.53144	34.53794	993	8.8	19	86	0.60	2.20	0.001	1.10	403	0.00	0.000	0
Kabul	Bagrami	30/05/10	31/05/10	69.28854	34.49562	1098	7.8	13	69	0.40	8.80	0.009	0.51	75	0.02	0.000	12
Kabul	Bagrami	30/05/10	31/05/10	69.28170	34.49649	847	8.1	20	116	0.56	5.24	0.007	0.51	129	0.02	0.000	
Kabul	Bagrami	26/08/08	26/08/08	69.17163	34.56086	973	7.9	6	85	0.60	2.46	0.003	0.10	88	0.01	0.000	0
Kabul	Bagrami	07/12/10	15/12/10	69.44357	34.47079	822	7.6	9	52	0.70	3.90	0.001	0.01	87	0.00	0.000	0
Kabul	Bagrami	07/12/10	15/12/10	69.44472	34.47527	1040	7.9	15	26	0.78	4.92	0.004	0.01	87	0.01	0.000	0
Kabul	Bagrami	07/12/10	15/12/10	69.22864	34.47863	990	7.8	12	35	0.77	4.14	0.004	0.01	94	0.07	0.000	0
Kabul	Bagrami	07/12/10	15/12/10	69.25453	34.55744	1180	7.6	16	18	0.95	5.56	0.012	0.01	45	0.00	0.000	0
Kabul	Bagrami	09/01/11	12/01/11	69.30712	34.49546	1502	8.2	29	295	0.79	5.64	0.009	0.13	291	0.04	0.000	0
Kabul	Bagrami	09/01/11	12/01/11	69.27875	34.49494	1012	7.8	22	140	0.64	5.64	0.001	0.12	212	0.05	0.000	1
Kabul	Bagrami	09/01/11	12/01/11	69.27219	34.49488	1455	7.7	30	300	0.66	5.74	0.003	0.12	253	0.04	0.000	1
Kabul	Bagrami	09/01/11	12/01/11	69.27452	34.49500	1443	7.8	31	205	0.72	5.18	0.003	0.12	226	0.04	0.000	1
Kabul	Bagrami	28/03/11	30/03/11	69.22864	34.47863	881	7.7	17	64	0.42	2.74	0.003		284	0.05	0.000	1
Khost	Bak	15/07/09	16/07/09	68.43529	33.55402	457	7.6	13	75	0.20	2.52	0.000	0.20	8	0.00	0.000	1
Balkh	Balkh	05/09/07	05/09/07	63.12270	34.99134	1541	7.2	14	253	0.90	9.76	0.006	0.35	79	0.01	0.001	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Balkh	Balkh	14/03/06	15/03/06	64.66540	36.03402	1153	7.3	8	88	1.30	3.42	0.002	0.35	33	0.00	0.000	5
Balkh	Balkh	18/10/10	23/10/10	67.16434	36.77373	3480	7.7	32	2000	12.20	10.70	0.004	0.20	743	0.05	0.000	15
Balkh	Balkh	17/04/10	25/04/10	66.84601	36.89186	941	7.8	19	132	0.58	2.74	0.002	0.01	109	0.01	0.000	2
Balkh	Balkh	20/04/10	25/04/10	66.84588	36.89174	957	7.9	23	136	0.85	3.30	0.003	0.01	159	0.00	0.000	2
Balkh	Balkh	31/01/10	01/02/10	67.16343	36.77356	4620	8.0	50	195	7.70	15.98	0.082	0.01	292	0.01	0.000	14
Balkh	Balkh	04/05/10	04/05/10	66.93158	36.78511	1472	7.5	25	270	0.09	2.78	0.041		312	0.00	0.000	12
Balkh	Balkh	03/05/10	03/05/10	66.84297	36.68277	748	7.6	5	84	0.62	1.28	0.004		29	0.00	0.000	3
Balkh	Balkh	19/10/10	19/10/10	66.90308	36.68633	1192	7.8	23	128	0.70	4.94	0.002		194	0.04	0.000	1
Balkh	Balkh	03/04/10	03/04/10	66.89043	36.69253	1072	7.6	16	185	0.78	2.20	0.004		140	0.00	0.000	12
Balkh	Balkh	20/10/10	20/10/10	66.89831	36.68781	1062	7.4	6	138	0.92	3.24	0.012		310	0.01	0.000	0
Balkh	Balkh	29/04/10	29/04/10	66.84044	36.74899	1060	7.6	12	165	0.93	0.70	0.027		57	0.00	0.000	26
Balkh	Balkh	03/04/10	03/04/10	66.91201	36.76631	1624	7.3	23	230	0.93	4.38	0.008		329	0.00	0.000	12
Balkh	Balkh	07/05/10	07/05/10	66.89816	36.37219	1255	7.5	13	230	0.95	3.26	0.004		97	0.00	0.000	13
Balkh	Balkh	27/04/10	27/04/10	66.90471	36.71681	1345	7.4	15	198	0.98	4.70	0.006		56	0.00	0.000	120
Balkh	Balkh	06/05/10	06/05/10	66.82005	37.97690	1148	7.4	8	140	1.04	1.00	0.011		100	0.01	0.000	14
Balkh	Balkh	28/04/10	28/04/10	66.83335	36.69791	873	7.2	6	104	1.44	1.82	0.004		79	0.00	0.000	2
Balkh	Balkh	07/05/10	07/05/10	66.84601	36.89186	2470	7.8	40	380	1.80	0.06	0.000		203	0.00	0.000	7
Balkh	Balkh	03/05/10	03/05/10	66.77995	37.03467	2200	7.5	36	420	2.20	2.44	0.035		547	0.01	0.000	200
Bamyan	Bamyan	15/04/10	18/04/10	67.82811	34.81546	3680	6.6	44	55	0.67	7.44	0.000	0.64	557	0.00	0.000	0
Bamyan	Bamyan	09/10/10	11/10/10	67.82810	36.81432	1826	7.4	42	42	0.20	2.38	0.008	0.11	247	0.01	0.000	20
Bamyan	Bamyan	18/10/10	25/10/10	68.36374	33.54459	744	7.5	16	61	0.92	5.20	0.002	0.09	129	0.00	0.000	2
Bamyan	Bamyan	18/10/10	25/10/10	68.36384	33.54559	694	7.6	18	24	0.90	5.82	0.003	0.06	134	0.00	0.000	0
Bamyan	Bamyan	08/10/10	11/10/10	68.42138	33.54001	1026	8.0	27	50	0.51	7.52	0.390	0.04	167	0.01	0.000	40
Bamyan	Bamyan	18/10/10	25/10/10	68.36321	33.54432	545	7.2	8	23	0.42	8.96	0.290	0.04	98	0.01	0.000	0
Bamyan	Bamyan	15/04/10	18/04/10	67.82799	34.81215	576	8.5	4	44	0.41	2.82	0.010	0.02	43	0.03	0.000	5
Bamyan	Bamyan	15/04/10	16/04/10	67.82812	34.81211	508	7.9	7	40	0.27	5.92	0.017	0.01	122	0.01	0.000	1
Bamyan	Bamyan	15/04/10	18/04/10	67.82824	34.81254	2830	7.4	42	36	0.10	1.76	0.001	0.01	485	0.00	0.000	0
Logar	Baraki Barak	10/10/07	10/11/07	62.52471	34.87761	1063	7.5	6	136	0.80	0.08	0.007	1.35	85	0.00	0.000	2
Logar	Baraki Barak	08/08/10	10/08/10	68.85190	33.98245	684	7.8	9	45	0.40	4.34	0.007	0.80	99	0.01	0.000	1
Logar	Baraki Barak	08/08/10	10/08/10	69.00366	33.96304	1122	7.4	10	84	0.48	7.52	0.014	0.80	119	0.01	0.000	5
Logar	Baraki Barak	31/08/08	31/08/08	69.16496	34.53860	722	8.1	7	87	0.60	2.20	0.007	0.80	50	0.02	0.000	3
Logar	Baraki Barak	08/08/10	10/08/10	68.92944	33.96722	499	8.0	13	37	0.58	5.54	0.007	0.64	88	0.00	0.000	6
Logar	Baraki Barak	01/03/11	03/03/11	68.88244	33.96705	485	7.8	13	83	0.76	5.06	0.010	0.38	135	0.02	0.000	0
Logar	Baraki Barak	07/01/09	07/01/09	68.87602	34.40800	543	8.2	25	87	0.50	0.48	0.001	0.30	57	0.03	0.000	3
Logar	Baraki Barak	01/02/11	03/02/11	68.92944	33.96722	578	7.4	16	35	0.31	3.16	0.004	0.18	85	0.00	0.000	0
Logar	Baraki Barak	01/02/11	03/02/11	68.85190	33.98245	556	7.5	7	22	0.50	2.48	0.001	0.17	83	0.02	0.000	2

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Logar	Baraki Barak	01/02/11	03/02/11	68.84593	33.98648	483	7.0	17	38	0.24	1.82	0.002	0.15	57	0.03	0.000	0
Logar	Baraki Barak	01/02/11	03/02/11	68.92253	33.96286	575	7.4	13	29	0.46	2.61	0.002	0.15	89	0.03	0.000	0
Logar	Baraki Barak	01/02/11	03/02/11	68.91853	33.96756	483	7.0	18	36	0.61	2.82	0.001	0.15	28	0.07	0.000	2
Logar	Baraki Barak	01/02/11	03/02/11	68.97797	33.94155	548	7.5	15	20	0.22	2.54	0.001	0.14	74	0.02	0.000	2
Logar	Baraki Barak	01/02/11	03/02/11	69.00366	33.96304	581	7.6	101	39	0.23	2.44	0.001	0.14	132	0.02	0.000	2
Logar	Baraki Barak	01/02/11	03/02/11	68.90121	33.91905	477	7.7	29	36	0.33	2.60	0.002	0.14	43	0.03	0.000	2
Logar	Baraki Barak	01/02/11	03/02/11	68.92819	33.96672	474	7.0	25	58	0.22	2.28	0.001	0.12	40	0.01	0.000	2
Logar	Baraki Barak	19/01/11	20/01/11	68.94260	33.88940	575	7.5	10	44	0.55	1.42	0.005	0.12	97	0.02	0.000	0
Logar	Baraki Barak	12/01/11	20/01/11	68.93539	33.96816	574	7.5	28	43	0.55	1.26	0.005	0.12	163	0.01	0.000	2
Logar	Baraki Barak	01/02/11	03/02/11	68.78965	33.90919	576	7.4	13	27	0.43	2.60	0.001	0.09	88	0.04	0.000	2
Logar	Baraki Barak	01/12/10	05/12/10	68.91853	33.96756	557	7.1	13	23	0.40	4.14	0.002	0.02	126	0.04	0.000	4
Logar	Baraki Barak	01/03/11	03/03/11	68.95925	33.90608	517	7.8	12	85	0.64	5.34	0.008	0.01	154	0.03	0.000	2
Logar	Baraki Barak	01/03/11	03/03/11	68.93959	33.88497	498	7.8	7	84	0.67	4.46	0.003	0.01	131	0.04	0.000	2
Logar	Baraki Barak	01/03/11	03/03/11	68.93532	33.92978	483	7.9	17	82	0.70	3.84	0.005	0.01	161	0.03	0.000	5
Logar	Baraki Barak	01/03/11	03/03/11	68.85056	33.98056	482	7.9	26	83	0.70	3.62	0.003	0.01	134	0.03	0.000	0
Logar	Baraki Barak	01/12/10	05/12/10	68.84593	33.98648	651	7.4	15	59	0.31	5.50	0.000	0.00	167	0.04	0.000	1
Logar	Baraki Barak	01/12/10	05/12/10	68.92819	33.96672	592	7.2	5	23	0.32	6.66	0.002	0.00	136	0.05	0.000	1
Logar	Baraki Barak	01/12/10	05/12/10	68.92253	33.96286	1407	7.5	30	104	1.29	18.00	0.003	0.00	530	0.03	0.000	0
Nangarhar	Bati Kot	09/05/11	11/05/11	70.73394	34.25916	400	7.9	9	19	0.67	1.80	0.001	1.80	81	0.00	0.001	12
Nangarhar	Bati Kot	04/02/08	04/02/08	63.10345	34.75230	798	8.0	11	136	0.70	0.48	0.003	0.30	53	0.01	0.000	0
Nangarhar	Bati Kot	11/01/07	11/01/07	65.29333	35.85350	1222	8.0	32	144	1.10	6.00	0.000	0.10	40	0.00	0.000	2
Nangarhar	Bati Kot	09/05/11	11/05/11	70.82334	34.27734	416	7.8	8	18	0.51	1.62	0.005	0.02	49	0.01	0.000	9
Nangarhar	Bati Kot	23/04/11	24/04/11	70.73231	34.34290	845	7.6	5	69	0.75	5.26	0.039	0.02	230	0.02	0.000	8
Nangarhar	Bati Kot	09/05/11	11/05/11	70.82157	34.27693	414	7.7	9	20	0.44	1.02	0.001	0.01	39	0.01	0.000	6
Nangarhar	Bati Kot	12/03/11	15/03/11	70.81845	34.28256	784	7.4	17	128	0.89	2.48	0.001		217	0.03	0.000	2
Panjsher	Bazarak	10/04/10	11/04/10	69.98600	35.63000	508	7.8	10	50	0.42	10.20	0.001	0.80	12	0.02	0.099	1
Nangarhar	Behsud	16/04/08	16/04/08	69.17122	34.58430	1221	7.8	13	150	0.70	0.40	0.002	0.75	23	0.01	0.000	6
Nangarhar	Behsud	04/02/10	04/02/10	70.51686	34.38956	612	7.8	5	50	0.28	2.74	0.024	0.60	151	0.02	0.000	1
Nangarhar	Behsud	10/08/06	11/08/06	64.77625	35.91978	1277	7.9	62	253	1.20	8.80	0.010	0.60	158	0.02	0.000	2
Nangarhar	Behsud	03/09/10	01/10/10	70.57399	34.51756	662	8.1	8	44	0.54	4.88	0.030	0.40	115	0.02	0.000	45
Nangarhar	Behsud	12/03/11	17/03/11	70.55787	34.37573	1079	7.6	19	120	0.76	2.74	0.003	0.40	280	0.02	0.000	0
Nangarhar	Behsud	11/04/10	11/04/10	70.64661	34.47655	479	7.8	10	62	0.52	1.18	0.002		68	0.00	0.000	1
Nangarhar	Behsud	11/05/10	11/05/10	70.50121	34.39230	930	8.0	8	195	0.77	6.06	0.063		189	0.00	0.000	1
Faryab	Belcharagh	26/03/05	27/03/05	68.89073	36.36446	3822	7.9	40	1040	4.00	10.60	0.000	2.00	248	0.00	0.000	0
Faryab	Belcharagh	17/05/06	17/05/06	64.76657	35.93228	1409	7.3	14	253	1.20	0.44	0.001	0.90	88	0.00	0.000	15
Faryab	Belcharagh	12/01/07	12/01/07	68.78835	35.83504	1880	7.3	26	720	1.10	0.64	0.004	0.35	383	0.02	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Belcharagh	23/05/07	31/05/07	65.20563	35.70809	1167	7.4	11	255	1.00	1.52	0.014	0.10	108	0.02	0.000	3
Faryab	Belcharagh	25/03/07	25/03/07	64.87317	35.81506	1623	7.3	10	75	1.10	1.50	0.010	0.10	22	0.00	0.000	4
Faryab	Belcharagh	19/08/06	19/08/06	64.76291	35.90353	1519	7.6	16	570	1.10	3.24	1.157	0.10	428	0.01	0.000	8
Faryab	Belcharagh	16/03/05	16/03/05	65.21891	36.44378	3422	7.5	27	910	5.80	5.70	1.300	0.10	17	0.02	0.000	2
Ghor	Chaghcharan	10/07/08	11/07/08	69.17966	34.58288	2190	7.7	38	134	0.70	8.62	0.013	6.00	171	0.00	0.000	7
Ghor	Chaghcharan	12/05/07	13/05/07	64.10765	35.72410	1318	7.5	14	150	1.00	16.40	0.000	1.90	179	0.00	0.000	6
Ghor	Chaghcharan	08/07/07	08/07/07	65.11430	35.64846	1421	7.4	6	360	0.90	1.00	0.020	0.75	94	0.00	0.000	1
Ghor	Chaghcharan	09/05/06	09/05/06	64.68587	36.01197	2470	7.6	48	253	1.30	57.00	0.010	0.60	38	0.00	0.000	1
Ghor	Chaghcharan	11/01/07	11/01/07	65.23592	35.84122	970	8.4	7	104	1.10	57.00	0.010	0.45	29	0.00	0.000	2
Ghor	Chaghcharan	10/11/05	10/12/05	64.85422	36.05966	1244	8.1	12	253	1.30	54.00	0.000	0.45	97	0.00	0.000	2
Ghor	Chaghcharan	09/02/08	09/03/08	69.35118	34.60979	615	8.1	9	98	0.70	13.60	0.000	0.25	51	0.00	0.000	2
Ghor	Chaghcharan	02/08/08	02/08/08	69.17966	34.58288	588	8.1	5	69	0.60	13.20	0.000	0.15	36	0.00	0.000	3
Ghor	Chaghcharan	06/12/10	08/12/10	66.24751	34.64854	1450	7.0	14	90	0.51	20.24	0.015	0.04	257	0.02	0.000	3
Ghor	Chaghcharan	27/01/10	31/01/10	65.24751	34.52374	463	8.0	9	39	0.11	1.94	0.005	0.03	116	0.02	0.000	1
Ghor	Chaghcharan	21/01/10	25/11/10	66.02243	34.64441	739	7.5	21	23	0.48	5.52	0.000	0.03	86	0.00	0.000	1
Ghor	Chaghcharan	21/11/10	25/11/10	66.89000	34.64556	722	7.3	17	29	0.43	8.06	0.002	0.02	131	0.00	0.000	80
Ghor	Chaghcharan	29/11/10	02/12/10	66.02484	34.64652	753	7.4	40	34	0.39	13.80	0.010	0.01	146	0.03	0.000	0
Ghor	Chaghcharan	27/01/10	28/01/10	65.02243	34.36324	432	8.2	9	33	0.37	1.26	0.008	0.01	110	0.01	0.000	1
Ghor	Chaghcharan	27/01/10	28/01/10	65.06218	34.47190	705	7.7	5	81	0.59	4.46	0.005	0.01	107	0.03	0.000	0
Ghor	Chaghcharan	29/11/10	02/12/10	66.02451	34.64421	744	7.3	42	34	0.38	11.10	0.009	0.00	75	0.02	0.000	0
Kabul	Chahar Asyab	24/09/07	24/09/07	63.10744	34.97594	452	8.1	4	87	0.90	3.56	0.000	2.00	75	0.00	0.000	0
Kabul	Chahar Asyab	07/10/07	07/10/07	62.39568	34.92844	877	7.3	140	92	0.80	57.00	1.100	1.70	140	0.00	0.000	0
Kabul	Chahar Asyab	07/10/07	07/10/07	62.39808	34.92648	1313	7.3	140	92	0.80	12.40	1.100	1.70	140	0.00	0.000	7
Kabul	Chahar Asyab	27/03/11	03/04/11	69.17281	34.35407	463	8.3	10	45	1.30	8.22	0.002		177	0.02	0.000	7
Balkh	Chahar Bolak	17/03/05	17/03/05	64.88331	36.41798	15000	8.0	44	920	4.90	2.56	0.010	8.50	1704	0.00	0.000	7
Balkh	Chahar Bolak	10/01/05	10/01/05	65.20544	36.99041	18680	7.8	50	900	40.00	0.16	0.030	8.00	4120	0.00	0.000	7
Balkh	Chahar Bolak	04/10/10	05/10/10	68.39745	33.60517	865	7.7	8	170	0.78	2.98	0.007	0.27	188	0.04	0.000	0
Balkh	Chahar Bolak	01/05/10	01/05/10	66.72065	36.75559	1056	7.6	17	160	1.20	2.12	0.040		180	0.01	0.000	1
Balkh	Chahar Bolak	25/05/11	26/05/11	66.59397	36.77278	14780	7.6	108	4800	2.60	3.00	0.003		585	0.01	0.000	7
Kunduz	Chahar Dara	26/11/08	27/11/08	69.12299	34.51930	1040	7.2	7	253	0.50	3.20	0.002	1.20	98	0.00	0.000	5
Kunduz	Chahar Dara	13/06/07	14/06/07	65.13651	35.68911	1275	7.2	5	253	1.00	16.60	0.004	0.40	98	0.00	0.000	1
Balkh	Chahar Kint	05/05/10	05/05/10	67.21478	36.42340	565	8.6	10	22	0.34	1.22	0.007		32	0.01	0.000	32
Parwan	Chaharikar	09/08/10	10/08/10	69.19900	35.01200	496	7.7	13	20	0.17	8.14	0.001	0.70	56	0.00	0.004	1
Parwan	Chaharikar	28/06/10	24/06/10	68.41903	34.72668	599	8.5	4	27	0.31	3.22	0.001	0.70	57	0.00	0.000	0
Parwan	Chaharikar	23/06/10	24/06/10	69.12800	34.97500	575	8.1	5	17	0.47	2.28	0.002	0.70	62	0.00	0.000	0
Parwan	Chaharikar	07/11/10	08/11/10	69.09700	34.97700	459	7.6	16	18	0.04	1.42	0.001	0.00	26	0.05	0.000	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Maydan Wardak	Chaki Wardak	18/08/05	18/08/05	64.87910	36.14230	1875	6.4	170	83	1.60	0.00	0.000	3.20	544	0.00	0.025	2
Maydan Wardak	Chaki Wardak	17/03/09	17/03/09	69.15481	34.22761	461	7.6	9	98	0.40	0.28	1.750	0.30	110	0.02	0.000	3
Maydan Wardak	Chaki Wardak	05/10/07	05/11/07	70.11707	34.88418	590	7.5	5	98	0.80	4.42	1.510	0.30	78	0.01	0.000	5
Maydan Wardak	Chaki Wardak	24/03/09	24/03/09	69.11665	34.22987	585	7.5	5	98	0.40	2.06	0.005	0.25	88	0.01	0.000	2
Paktya	Chamkani	16/06/10	16/06/10	69.82702	33.80409	664	7.5	7	72	0.59	6.22	0.007	0.51	106	0.02	0.000	2
Paktya	Chamkani	06/06/10	08/10/10	69.81438	33.80468	560	7.9	5	78	0.69	2.44	0.036	0.09	116	0.00	0.000	1
Paktya	Chamkani	26/10/10	31/10/10	69.82294	33.78488	1434	7.3	22	106	0.68	15.20	0.005	0.02	167	0.02	0.000	0
Paktya	Chamkani	26/10/10	01/11/10	69.81245	33.79012	665	7.4	11	91	0.26	0.33	0.005	0.01	119	0.02	0.000	1
Paktya	Chamkani	26/10/10	01/11/10	69.76298	33.71252	451	7.5	17	79	0.56	0.34	0.012	0.01	107	0.06	0.000	1
Nangarhar	Chaparhar	09/03/08	09/04/08	69.17132	34.58435	1893	7.7	10	253	0.70	1.28	0.004	0.35	21	0.03	0.000	5
Nangarhar	Chaparhar	12/01/07	12/04/07	64.03560	35.74230	850	7.9	33	100	1.10	7.60	0.000	0.20	52	0.01	0.000	5
Nangarhar	Chaparhar	05/04/11	07/04/11	70.31983	34.25231	1106	7.5	23	97	1.09	31.00	0.002	0.12	130	0.01	0.000	1
Nangarhar	Chaparhar	05/04/11	07/04/11	70.36668	34.28217	1298	8.0	29	97	1.13	9.78	0.000	0.12	168	0.00	0.000	1
Nangarhar	Chaparhar	14/05/11	19/05/11	70.32609	34.25829	864	7.4	4	47	0.50	3.36	0.047	0.01	134	0.00	0.000	3
Nangarhar	Chaparhar	14/05/11	19/05/11	70.39320	34.28680	1159	7.5	7	185	1.30	10.90	0.004	0.01	88	0.00	0.000	7
Nangarhar	Chaparhar	23/03/11	24/03/11	70.33912	34.25866	510	7.7	13	34	0.58	3.76	0.000	0.00	74	0.00	0.000	30
Nangarhar	Chaparhar	23/03/11	24/03/11	70.35075	34.28231	502	8.0	18	19	1.23	3.78	0.002	0.00	34	0.00	0.000	1
Nangarhar	Chaparhar	14/04/10	14/04/10	70.41110	34.34749	657	8.3	4	116	0.93	0.64	0.005		143	0.00	0.000	2
Nangarhar	Chaparhar	10/04/11	12/04/11	70.41271	34.31956	843	7.6	16	190	0.95	6.76	0.005		198	0.04	0.000	1
Balkh	Chimtal	04/02/05	05/02/05	66.08395	36.86487	4010	7.2	12	1025	11.00	3.26	0.009	0.10	152	0.02	0.000	8
Herat	Chishti Sharif	09/02/08	09/03/08	61.09056	34.66615	986	7.8	7	253	0.70	7.12	0.001	0.90	153	0.00	0.000	0
Panjsher	Dara	01/05/10	02/05/10	69.47100	35.24700	766	8.6	4	18	0.14	1.92	0.001	0.01	146	0.02	0.000	1
Samangan	Dara-i- Sufi Bala	08/01/11	11/01/11	67.39599	35.73730	430	8.3	14	19	0.59	6.10	0.001	0.01	98	0.04	0.000	0
Badakhshan	Darayim	29/08/08	29/08/08	69.16229	34.54517	549	8.2	6	122	0.60	0.84	0.004	0.40	120	0.00	0.000	7
Ghor	Dawlat Yar	27/01/10	31/01/10	65.72600	34.63000	552	7.9	7	19	0.31	3.82	0.008	0.79	133	0.02	0.000	1
Ghor	Dawlat Yar	09/05/11	15/05/11	68.53194	33.46556	745	7.3	9	30	0.44	10.70	0.004	0.04	119	0.01	0.000	6
Balkh	Dawlatabad	05/05/10	05/05/10	66.78422	37.03991	1316	7.6	9	155	1.02	1.76	0.023		77	0.00	0.000	13
Balkh	Dawlatabad	18/10/10	19/10/10	66.81525	36.98761	1620	7.5	34	195	1.16	8.38	0.017		263	0.01	0.000	0
Balkh	Dawlatabad	02/05/10	02/05/10	66.76918	37.02141	1087	7.6	17	110	1.23	1.30	0.004		306	0.01	0.000	19
Faryab	Dawlatabad	10/06/06	10/06/22	70.56751	37.43682	27900	7.3	50	3120	79.20	0.60	0.000	20.00	605	0.00	0.000	7
Faryab	Dawlatabad	23/01/05	23/01/05	65.10069	36.92699	25900	7.9	36	780	13.70	57.00	2.000	2.50	1801	0.00	0.000	7
Faryab	Dawlatabad	27/01/05	27/01/05	65.09547	36.92559	25900	7.9	36	48	13.70	57.00	2.000	2.50	1801	0.00	0.000	3
Faryab	Dawlatabad	23/01/05	23/01/05	65.09547	36.92559	25900	7.9	36	780	13.70	57.00	2.000	2.50	1801	0.00	0.000	3
Faryab	Dawlatabad	23/08/05	24/08/05	65.09676	36.11281	2520	8.4	38	83	1.50	0.86	0.040	1.15	100	0.00	0.000	3
Faryab	Dawlatabad	23/08/05	24/08/05	64.86400	36.12130	2520	8.4	38	253	1.50	0.86	0.040	1.15	100	0.01	0.000	5
Faryab	Dawlatabad	27/11/05	27/11/05	64.85755	36.06753	2100	7.5	24	400	1.30	3.04	0.002	0.75	90	0.00	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Dawlatabad	23/08/05	24/08/05	64.86400	36.12130	1182	7.7	19	252	1.50	1.42	0.005	0.75	196	0.00	0.000	17
Faryab	Dawlatabad	12/12/05	12/12/05	64.85998	36.04498	1597	7.7	16	270	1.30	1.20	0.002	0.35	104	0.00	0.000	122
Faryab	Dawlatabad	22/03/05	22/03/05	64.86552	36.29934	2660	7.4	34	1950	3.10	8.56	1.320	0.35	1348	0.00	0.000	5
Faryab	Dawlatabad	28/03/05	29/03/05	64.86814	36.29973	4001	7.8	40	980	3.30	7.70	0.003	0.35	685	0.01	0.000	1
Faryab	Dawlatabad	25/02/05	25/03/05	64.89002	36.36932	4000	7.7	8	920	4.10	4.28	0.003	0.35	589	0.01	0.000	5
Faryab	Dawlatabad	31/03/05	31/03/05	64.88933	36.28982	4000	8.7	44	83	2.90	0.08	1.110	0.30	36	0.00	0.000	3
Faryab	Dawlatabad	14/11/05	14/11/05	64.66339	36.06780	1365	7.9	14	270	1.30	2.72	0.003	0.20	118	0.00	0.000	7
Faryab	Dawlatabad	29/10/06	29/10/06	64.82773	35.88652	2340	7.5	22	440	1.10	2.64	0.006	0.10	721	0.00	0.000	5
Faryab	Dawlatabad	25/03/07	25/03/07	64.37107	35.81163	2610	8.6	22	540	1.10	1.08	0.020	0.10	652	0.00	0.000	5
Faryab	Dawlatabad	11/10/05	11/10/05	64.85766	36.08278	2201	7.8	42	622	1.40	6.28	0.003	0.10	454	0.01	0.000	1
Faryab	Dawlatabad	15/05/06	15/05/06	64.59346	35.93746	1436	7.7	16	280	1.20	4.74	0.002	0.05	141	0.00	0.000	4
Nangarhar	Deh Bala	12/05/11	16/05/11	70.80738	34.25543	1207	7.4	7	75	0.38	4.08	0.011	0.18	131	0.01	0.000	12
Nangarhar	Deh Bala	14/05/11	18/05/11	70.82691	34.23666	568	7.8	4	34	0.59	1.96	0.014	0.02	110	0.04	0.012	2
Nangarhar	Deh Bala	16/04/11	21/04/11	70.80080	34.19289	490	6.7	14	42	0.30	2.38	0.007	0.01	51	0.02	0.000	3
Nangarhar	Deh Bala	14/05/11	19/05/11	70.81461	34.24671	732	7.7	4	71	0.54	4.78	0.022	0.01	105	0.01	0.000	6
Nangarhar	Deh Bala	14/05/11	19/05/11	70.78924	34.24287	696	7.2	7	61	0.62	4.48	0.010	0.01	158	0.01	0.000	9
Nangarhar	Deh Bala	22/01/10	25/01/10	70.86800	34.01300	797	7.7	20	50	0.64	2.54	0.008	0.01	503	0.02	0.000	2
Nangarhar	Deh Bala	16/04/11	20/04/11	70.80348	34.19647	588	7.0	9	28	0.67	7.18	0.001	0.01	41	0.00	0.000	5
Nangarhar	Deh Bala	22/01/11	25/01/11	70.42205	34.11579	630	7.7	7	35	0.65	2.08	0.005	0.01	454	0.04	0.000	0
Nangarhar	Deh Bala	14/05/11	19/05/11	70.83989	34.21444	704	7.3	4	42	0.51	2.08	0.008	0.01	100	0.00	0.000	120
Nangarhar	Deh Bala	27/02/11	03/03/11	70.80280	34.23430	428	7.8	24	41	0.44	4.20	0.003	0.01	72	0.03	0.000	50
Nangarhar	Deh Bala	21/05/11	31/05/11	70.80015	34.24271	893	7.3	5	39	0.78	8.88	0.200	0.01	125	0.00	0.000	5
Nangarhar	Deh Bala	27/02/11	03/03/11	70.80839	34.24986	418	7.5	30	37	0.34	4.76	0.008	0.01	83	0.02	0.000	120
Nangarhar	Deh Bala	27/02/11	03/03/11	70.79744	34.19209	1108	7.5	12	85	0.82	10.40	0.015	0.01	107	0.00	0.000	2
Nangarhar	Deh Bala	21/05/11	31/05/11	70.92021	34.05567	660	7.4	4	28	0.52	4.80	0.008	0.01	42	0.00	0.000	250
Kabul	Dih Sabz	30/03/10	01/04/10	69.25697	34.57611	483	8.0	7	71	0.82	4.00	0.005	0.79	99	0.04	0.000	1
Kabul	Dih Sabz	04/03/09	03/04/09	70.48627	34.21450	520	7.7	7	87	0.40	1.72	0.008	0.10	126	0.00	0.000	1
Kabul	Dih Sabz	29/03/11	07/04/11	69.35124	34.60985	519	8.2	22	52	0.26	6.32	0.004		166	0.04	0.000	1
Ghazni	Dih Yak	26/12/09	30/12/09	68.65094	33.42915	428	7.9	5	30	0.16	1.16	0.002	0.70	92	0.02	0.000	2
Ghazni	Dih Yak	26/12/09	30/12/09	68.61730	33.42222	545	7.2	6	37	0.58	1.72	0.003	0.51	98	0.01	0.000	8
Ghazni	Dih Yak	30/05/11	31/05/11	68.53832	33.46517	582	7.8	4	24	1.01	3.72	0.005	0.13	98	0.00	0.000	2
Ghazni	Dih Yak	07/02/11	13/02/11	68.51111	33.46056	530	8.0	10	75	0.97	3.52	0.013	0.12	127	0.04	0.000	0
Ghazni	Dih Yak	07/02/11	13/02/11	68.61528	33.42521	525	8.0	16	12	0.27	7.92	0.005	0.05	138	0.03	0.000	1
Ghazni	Dih Yak	07/02/11	13/02/11	68.60724	33.42910	636	7.8	12	58	0.42	9.78	0.009	0.04	157	0.04	0.000	0
Ghazni	Dih Yak	09/02/11	13/02/11	68.65329	33.47614	428	8.0	5	31	0.76	9.22	0.001	0.04	32	0.04	0.000	0
Ghazni	Dih Yak	07/02/11	13/02/11	68.52194	33.46305	529	8.0	13	25	0.40	3.78	0.004	0.04	132	0.02	0.000	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Ghazni	Dih Yak	07/02/11	13/02/11	68.62228	33.52207	453	8.0	15	33	0.69	8.76	0.001	0.04	38	0.05	0.000	2
Ghazni	Dih Yak	09/02/11	13/02/11	68.63537	33.51388	550	8.0	18	32	0.40	3.32	0.002	0.03	74	0.04	0.000	0
Ghazni	Dih Yak	09/02/11	13/02/11	68.61206	33.43722	521	8.0	8	47	0.78	9.92	0.001	0.03	44	0.04	0.000	2
Ghazni	Dih Yak	09/02/11	13/02/11	68.53889	33.46889	526	8.0	6	26	0.37	2.30	0.002	0.02	102	0.04	0.000	2
Ghazni	Dih Yak	07/02/11	13/02/11	68.64952	33.42677	550	8.0	18	23	0.53	4.82	0.001	0.02	74	0.05	0.000	0
Ghazni	Dih Yak	30/05/11	01/06/11	68.59430	33.49780	575	7.8	14	20	0.76	5.40	0.008	0.02	84	0.00	0.000	0
Ghazni	Dih Yak	23/10/10	27/10/10	68.61698	33.42256	1450	7.4	32	180	0.44	10.50	0.007	0.02	108	0.02	0.000	100
Ghazni	Dih Yak	30/05/11	01/06/11	68.53750	33.46861	557	7.9	6	22	0.61	6.82	0.005	0.02	70	0.02	0.000	1
Ghazni	Dih Yak	30/05/11	31/05/11	68.62974	33.52262	586	7.8	4	22	0.67	3.26	0.013	0.01	117	0.05	0.000	0
Ghazni	Dih Yak	30/05/11	31/05/11	68.63379	33.52711	437	7.7	5	25	0.74	9.44	0.072	0.01	57	0.01	0.000	0
Ghazni	Dih Yak	30/05/11	31/05/11	68.65019	33.47145	510	7.9	4	27	0.82	5.46	0.028	0.01	46	0.01	0.000	0
Ghazni	Dih Yak	30/05/11	01/06/11	68.58167	33.49833	540	7.8	9	19	0.61	4.60	0.003	0.01	76	0.01	0.000	0
Ghazni	Dih Yak	30/05/11	31/05/11	68.32332	33.32537	405	7.9	4	23	0.71	6.64	0.008	0.01	63	0.00	0.000	0
Ghazni	Dih Yak	30/05/11	01/06/11	68.68541	33.48253	575	7.7	12	21	0.71	2.75	0.012	0.01	77	0.01	0.000	0
Ghazni	Dih Yak	30/05/11	31/05/11	68.62179	33.49998	580	7.8	4	19	0.86	2.74	0.013	0.01	136	0.00	0.000	2
Balkh	Dihdadi	14/07/08	14/07/08	69.17966	34.58288	2870	7.3	26	1060	0.70	2.20	0.000	0.90	258	0.00	0.000	5
Balkh	Dihdadi	04/03/05	04/03/05	67.73712	36.60716	2370	7.5	36	1220	7.40	4.84	0.004	0.55	319	0.00	0.000	1
Balkh	Dihdadi	23/10/10	23/10/10	66.95215	36.68061	957	7.6	19	190	0.68	3.22	0.004		155	0.04	0.000	0
Balkh	Dihdadi	22/10/10	22/10/10	66.98804	36.72481	1080	7.5	17	245	0.89	4.92	0.003		254	0.05	0.000	0
Balkh	Dihdadi	04/05/10	04/05/10	67.30790	36.68178	1045	7.7	7	155	1.16	3.64	0.000		91	0.00	0.000	0
Balkh	Dihdadi	24/10/10	24/10/10	67.02252	36.67654	1165	7.4	13	150	2.60	6.40	0.520		544	0.02	0.000	0
Baghlan	Doshi	25/09/05	25/09/05	68.55503	36.10606	2490	7.7	23	460	1.50	17.00	0.035	0.20	60	0.00	0.000	0
Baghlan	Doshi	04/05/08	04/05/08	69.17068	34.58370	650	7.7	10	89	0.70	3.08	0.004	0.10	50	0.01	0.000	0
Baghlan	Doshi	10/05/06	10/05/06	64.89090	36.01012	1360	7.5	12	253	1.30	10.06	0.004	0.10	9	0.01	0.000	0
Ghor	Du Layna	27/01/10	31/01/10	66.25112	34.07576	668	7.8	5	90	0.49	3.08	0.003	0.01	178	0.01	0.000	1
Nangarhar	Dur Baba	06/12/10	09/12/10	71.03093	34.14113	694	7.6	12	17	0.40	8.83	0.014	0.04	145	0.01	0.000	1
Nangarhar	Dur Baba	06/12/10	09/12/10	70.55746	34.72546	631	7.6	16	59	0.44	9.32	0.004	0.02	178	0.01	0.000	1
Nangarhar	Dur Baba	06/12/10	12/12/10	71.02576	34.13584	605	7.8	9	31	0.30	8.42	0.004	0.00	145	0.01	0.000	0
Nangarhar	Dur Baba	06/12/10	12/12/10	70.92920	34.03683	614	7.8	10	30	0.30	4.62	0.001	0.00	94	0.00	0.000	1
Badakhshan	Faizabad	21/08/10	26/08/10	68.41671	33.53922	662	7.7	11	140	0.67	3.46	0.001	0.80	104	0.00	0.000	57
Badakhshan	Faizabad	24/08/10	26/08/10	68.40910	33.51951	644	7.8	11	147	0.58	5.60	0.001	0.71	104	0.01	0.000	25
Badakhshan	Faizabad	03/08/10	04/08/10	68.41744	33.54002	1683	7.7	34	90	0.63	11.80	0.006	0.53	80	0.01	0.000	14
Badakhshan	Faizabad	03/08/10	03/08/10	68.43833	33.50936	1683	7.7	34	90	0.63	11.80	0.006	0.53	80	0.01	0.000	14
Badakhshan	Faizabad	03/08/09	03/10/09	62.28565	33.34629	494	7.1	13	98	1.45	2.60	0.000	0.30	69	0.00	0.005	7
Badakhshan	Faizabad	01/12/10	06/12/10	68.41444	33.54555	619	7.6	18	81	0.53	5.28	0.005	0.00	12	0.01	0.000	1
Farah	Farah Center	07/11/07	07/11/07	62.51290	34.87920	2250	7.5	23	810	0.80	2.54	0.001	1.65	189	0.00	0.000	0

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Farah	Farah Center	09/01/08	09/01/08	69.65385	34.79947	827	7.5	6	122	0.80	3.72	0.001	1.00	103	0.00	0.000	2
Farah	Farah Center	05/04/05	05/04/05	64.87666	36.27431	2140	7.3	12	510	2.80	4.58	0.001	1.00	254	0.00	0.000	3
Farah	Farah Center	04/02/10	07/02/10	62.12348	32.38670	977	7.2	5	146	1.45	1.96	0.001	0.85	146	0.00	0.000	14
Farah	Farah Center	13/05/06	13/05/06	64.80625	35.99224	1235	7.2	11	255	1.30	1.10	0.002	0.75	145	0.00	0.000	0
Farah	Farah Center	05/05/10	05/05/10	62.12340	32.38945	1258	7.6	18	245	0.80	4.50	0.003	0.70	202	0.01	0.000	2
Farah	Farah Center	24/10/05	24/10/05	64.85173	36.07941	1505	7.3	21	340	1.40	2.42	0.002	0.70	237	0.00	0.000	0
Farah	Farah Center	17/03/05	17/03/05	64.93188	36.41479	2900	7.6	36	750	4.40	2.94	0.002	0.50	206	0.00	0.000	7
Farah	Farah Center	23/08/07	24/08/07	69.33126	35.04328	750	7.4	5	96	0.90	1.60	0.003	0.45	80	0.00	0.000	7
Farah	Farah Center	28/05/10	28/05/10	62.10143	32.38283	1231	7.5	16	250	1.10	4.16	0.077	0.40	281	0.00	0.000	2
Farah	Farah Center	28/09/10	30/09/10	62.13688	32.37661	1601	7.8	29	280	1.40	3.70	0.115	0.38	23	0.02	0.000	0
Farah	Farah Center	01/07/07	01/07/07	64.04942	35.67697	917	7.3	74	144	0.90	2.40	0.002	0.35	116	0.00	0.000	0
Farah	Farah Center	24/05/10	24/05/10	62.11066	32.36003	1131	7.6	11	250	1.04	2.92	0.002	0.08	188	0.00	0.000	2
Farah	Farah Center	06/10/10	24/10/10	61.97955	32.22460	1108	7.5	15	200	0.08	3.00	0.002	0.08	169	0.06	0.000	0
Farah	Farah Center	30/10/10	02/11/10	62.00822	32.28357	980	8.0	21	200	0.81	8.70	0.035	0.05	244	0.03	0.000	1
Farah	Farah Center	05/10/10	07/10/10	62.15225	32.40027	1037	7.5	22	212	0.75	5.00	0.003	0.02	182	0.00	0.000	1
Farah	Farah Center	30/10/10	02/11/10	62.07195	32.33778	1592	8.5	14	180	0.98	8.52	0.089	0.02	222	0.05	0.000	30
Farah	Farah Center	12/12/10	20/12/10	61.52673	32.29171	1333	7.5	27	300	0.80	5.26	0.004	0.01	281	0.00	0.000	0
Farah	Farah Center	09/11/10	11/11/10	62.10667	32.33972	913	7.4	18	160	0.90	4.78	0.001	0.01	187	0.05	0.000	283
Farah	Farah Center	14/12/10	20/12/10	62.12348	32.38670	1030	7.7	18	230	1.03	6.00	0.000	0.01	219	0.02	0.000	1
Farah	Farah Center	01/11/10	07/11/10	62.08243	32.37031	1307	7.2	21	295	1.11	4.18	0.014	0.01	185	0.02	0.000	132
Farah	Farah Center	01/11/10	07/11/10	62.17289	32.45412	1515	7.3	21	400	1.24	3.88	0.020	0.01	226	0.02	0.000	250
Farah	Farah Center	30/10/10	02/11/10	62.13420	32.40740	1026	7.4	16	185	1.27	3.68	0.016	0.01	232	0.01	0.000	10
Farah	Farah Center	06/11/10	11/11/10	62.10139	32.32513	1160	7.6	18	410	0.95	4.98	0.009	0.01	303	0.02	0.000	291
Farah	Farah Center	05/10/10	08/10/10	62.12186	32.36115	1375	7.7	21	320	1.14	6.72	0.001	0.01	289	0.00	0.000	1
Farah	Farah Center	05/05/10	05/05/10	62.09114	32.38540	1243	7.7	14	235	0.88	5.30	0.002	0.01	174	0.02	0.000	6
Farah	Farah Center	05/10/10	10/10/10	62.03750	32.37444	1265	7.7	15	240	1.84	7.34	0.008	0.01	113	0.02	0.000	140
Farah	Farah Center	03/10/10	07/10/10	62.02972	32.42139	1161	7.5	25	224	0.68	4.42	0.005	0.01	174	0.02	0.000	2
Farah	Farah Center	05/10/10	10/10/10	62.00865	32.27750	1238	7.8	13	260	0.79	6.98	0.002	0.01	183	0.02	0.000	1
Farah	Farah Center	07/11/10	11/11/10	62.11444	32.33889	1250	7.5	17	200	0.17	4.96	0.005	0.00	197	0.04	0.000	290
Farah	Farah Center	14/12/10	20/12/10	61.55672	32.15492	825	7.5	8	140	0.71	4.12	0.004	0.00	216	0.00	0.000	0
Farah	Farah Center	14/12/10	20/12/10	62.13310	32.40640	773	7.7	16	136	0.77	6.22	0.004	0.00	200	0.01	0.000	2
Farah	Farah Center	23/01/10	23/01/10	62.12186	32.36115	2010	8.0	54	575	0.02	4.82	0.009		377	0.01	0.086	0
Farah	Farah Center	24/01/10	24/01/10	62.00865	32.27750	864	7.6	5	146	0.43	2.08	0.003		120	0.00	0.000	1
Farah	Farah Center	25/01/10	25/01/10	62.11750	32.38547	1203	7.7	50	260	0.73	2.84	0.001		212	0.02	0.000	0
Farah	Farah Center	25/05/10	25/05/10	62.13014	32.38186	1066	7.7	9	260	0.93	4.52	0.001		204	0.00	0.000	2
Farah	Farah Center	21/01/10	21/01/10	62.13738	32.37734	2000	7.7	19	710	1.26	2.12	0.008		349	0.01	0.000	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Farah	Farah Center	28/05/10	28/05/10	62.07938	32.23819	2370	7.6	32	590	1.50	5.16	0.440		391	0.01	0.000	0
Jawzjan	Fayzabad	10/01/05	10/01/05	66.65372	36.71622	47220	7.6	25	2840	55.60	9.32	0.020	6.00	366	0.01	0.000	0
Paktya	Gardiz	29/06/11	30/06/11	69.26613	33.62409	506	7.9	17	64	0.58	5.28	0.028	0.51	188	0.04	0.000	0
Paktya	Gardiz	19/03/09	19/03/09	62.89118	34.24895	510	7.7	8	77	0.40	2.16	0.001	0.35	124	0.02	0.000	0
Paktya	Gardiz	22/03/11	28/03/11	69.29833	33.65972	695	7.5	12	55	0.54	8.26	0.013	0.12	138	0.01	0.000	1
Paktya	Gardiz	16/05/11	25/05/01	69.21857	33.59821	555	7.5	4	44	0.66	6.82	0.006	0.04	102	0.00	0.000	8
Paktya	Gardiz	16/05/11	22/05/11	69.20284	33.59104	709	7.4	5	64	0.66	3.18	0.004	0.04	109	0.01	0.000	2
Paktya	Gardiz	16/05/11	22/05/11	69.23370	33.59730	722	7.4	4	54	0.87	7.16	0.009	0.04	164	0.01	0.000	1
Paktya	Gardiz	30/04/11	16/05/11	69.14896	33.54509	593	7.4	11	40	0.42	2.40	0.001	0.03	103	0.02	0.000	4
Paktya	Gardiz	16/05/11	23/05/11	69.26530	33.63405	808	7.3	5	82	0.53	4.42	0.005	0.03	91	0.00	0.000	6
Paktya	Gardiz	16/05/11	23/05/11	69.22721	33.66186	810	7.3	5	77	0.56	3.20	0.001	0.03	81	0.00	0.000	1
Paktya	Gardiz	16/05/11	24/05/11	69.23359	33.59680	535	7.6	5	42	0.61	3.98	0.000	0.03	77	0.00	0.000	3
Paktya	Gardiz	16/05/11	24/05/11	69.24136	33.60115	624	7.4	4	80	1.00	0.96	0.050	0.03	87	0.00	0.000	1
Paktya	Gardiz	06/02/11	08/02/11	69.22005	33.59775	502	8.0	19	58	0.52	0.90	0.000	0.03	166	0.00	0.000	0
Paktya	Gardiz	16/05/11	23/05/11	69.21818	33.60111	737	7.3	4	67	0.57	3.40	0.001	0.03	111	0.00	0.000	3
Paktya	Gardiz	30/04/11	16/05/11	69.18793	33.63127	671	7.6	6	63	0.63	3.60	0.014	0.03	114	0.01	0.000	200
Paktya	Gardiz	16/05/11	22/05/11	69.29694	33.64305	571	7.6	4	42	0.74	9.46	0.005	0.03	86	0.01	0.000	1
Paktya	Gardiz	22/11/10	24/11/10	69.23679	33.58770	620	7.5	9	58	0.84	3.64	0.014	0.03	12	0.05	0.000	1
Paktya	Gardiz	16/05/11	22/05/11	69.22166	33.66722	695	7.4	4	62	0.65	4.10	0.003	0.03	124	0.01	0.000	2
Paktya	Gardiz	22/11/10	24/11/10	69.23200	33.66243	634	7.1	15	55	0.70	6.22	0.005	0.03	12	0.02	0.000	1
Paktya	Gardiz	16/05/11	22/05/11	69.19213	33.58084	676	7.6	5	45	0.77	0.44	0.004	0.03	127	0.00	0.000	4
Paktya	Gardiz	16/05/11	25/05/11	69.22807	33.61646	548	7.5	4	46	0.62	9.04	0.001	0.03	115	0.01	0.000	0
Paktya	Gardiz	16/05/11	25/05/01	69.22858	33.59985	572	7.2	4	46	0.66	9.64	0.004	0.03	97	0.00	0.000	5
Paktya	Gardiz	16/05/11	24/05/11	69.23926	33.65645	523	7.6	4	42	0.71	2.58	0.000	0.03	94	0.00	0.000	1
Paktya	Gardiz	30/04/11	15/05/11	69.34152	33.55616	605	7.7	13	47	0.99	11.90	0.310	0.02	157	0.01	0.000	60
Paktya	Gardiz	22/03/11	28/03/11	69.29694	33.64305	450	7.6	13	26	0.43	3.80	0.058	0.02	176	0.02	0.000	1
Paktya	Gardiz	16/05/11	23/05/11	69.22757	33.59963	525	7.3	15	46	0.59	1.55	0.001	0.02	69	0.00	0.000	1
Paktya	Gardiz	10/06/10	10/06/10	69.21680	33.56531	500	7.9	13	51	0.12	4.00	0.008	0.02	118	0.01	0.000	0
Paktya	Gardiz	30/04/11	15/05/11	69.18712	33.58207	673	7.4	20	50	0.44	5.76	0.002	0.02	88	0.04	0.000	200
Paktya	Gardiz	16/05/11	23/05/11	69.14054	33.58258	491	7.4	4	35	0.60	2.04	0.007	0.02	60	0.02	0.000	8
Paktya	Gardiz	22/11/10	24/11/10	69.21370	33.57266	809	7.4	11	61	0.61	5.30	0.088	0.02	172	0.01	0.000	1
Paktya	Gardiz	30/04/11	15/05/11	69.28648	33.62160	655	7.6	13	63	0.63	7.76	0.003	0.01	125	0.02	0.000	
Paktya	Gardiz	30/04/11	16/05/11	69.22329	33.59777	977	7.8	9	65	0.66	7.10	0.003	0.01	133	0.01	0.000	10
Paktya	Gardiz	22/03/11	28/03/11	69.20642	33.58179	617	7.7	13	31	0.39	6.70	0.125	0.01	53	0.03	0.000	0
Paktya	Gardiz	24/05/11	30/05/11	69.24078	33.59823	600	7.5	4	57	1.00	4.40	0.001	0.01	68	0.00	0.000	2
Paktya	Gardiz	22/03/11	28/03/11	69.21807	33.57707	530	8.0	15	35	0.33	5.98	0.004	0.01	83	0.01	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Paktya	Gardiz	22/03/11	28/03/11	69.31054	33.61359	460	7.8	11	37	0.29	5.06	0.005	0.01	93	0.02	0.000	0
Paktya	Gardiz	22/05/11	30/05/11	69.32183	33.66959	479	7.6	4	33	0.55	9.20	0.001	0.01	66	0.00	0.000	20
Paktya	Gardiz	16/05/11	25/05/01	69.22732	33.57319	532	7.6	4	63	0.64	1.26	0.008	0.01	93	0.00	0.000	2
Paktya	Gardiz	16/05/11	24/05/11	69.12092	33.56800	633	7.4	5	53	1.18	3.30	0.001	0.01	141	0.00	0.000	1
Paktya	Gardiz	02/01/11	01/04/11	69.22261	33.60239	651	7.9	16	58	0.18	3.96	0.004	0.01	183	0.02	0.000	1
Paktya	Gardiz	02/01/11	01/04/11	69.26539	33.61025	669	8.0	9	56	0.57	4.78	0.004	0.01	185	0.04	0.000	1
Paktya	Gardiz	01/04/11	01/05/11	69.21560	33.67562	833	7.4	16	72	0.46	6.64	0.004	0.00	138	0.01	0.000	2
Paktya	Gardiz	01/02/11	01/04/11	69.17652	33.51240	630	8.0	6	57	0.31	3.48	0.006	0.00	140	0.02	0.000	0
Paktya	Gardiz	01/04/11	01/06/11	69.25228	33.64207	774	7.5	11	71	0.37	4.42	0.004	0.00	150	0.02	0.000	0
Paktya	Gardiz	01/04/11	01/05/11	69.23643	33.60225	817	7.5	12	72	0.46	6.08	0.010	0.00	108	0.01	0.000	0
Paktya	Gardiz	01/04/11	01/05/11	69.23266	33.66292	704	7.6	15	61	0.43	5.41	0.004	0.00	185	0.01	0.000	2
Paktya	Gardiz	01/04/11	01/05/11	69.15778	33.58750	684	7.5	14	59	0.46	4.84	0.003	0.00	147	0.04	0.000	0
Paktya	Gardiz	22/03/11	28/03/11	69.22597	33.59832	433	7.8	13	19	0.34	2.20	0.017	0.00	56	0.08	0.000	0
Paktya	Gardiz	16/05/11	22/05/11	69.19417	33.58028	790	7.4	4	75	0.68	4.94	0.009	0.00	194	0.00	0.000	2
Paktya	Gardiz	01/02/11	01/04/11	69.16083	33.55009	544	7.8	13	47	0.73	4.34	0.004	0.00	175	0.04	0.000	1
Paktya	Gardiz	01/02/11	01/04/11	69.22012	33.66254	551	7.6	17	49	0.78	4.42	0.002	0.00	182	0.05	0.000	1
Paktya	Gardiz	23/03/11	30/03/11	69.19266	33.58677	553	8.0	15	41	0.24	7.02	0.001		135	0.04	0.000	0
Nangarhar	Ghani Khil	02/02/11	06/02/11	70.85984	34.23477	659	7.5	8	71	0.84	5.84	0.060	0.05	24	0.03	0.000	2
Nangarhar	Ghani Khil	02/02/11	06/02/11	70.82068	34.23388	612	7.6	10	58	0.28	5.68	0.011	0.04	88	0.04	0.000	0
Nangarhar	Ghani Khil	02/02/10	06/02/10	70.85316	34.22062	567	7.7	12	90	0.69	5.00	0.003	0.02	79	0.03	0.000	2
Nangarhar	Ghani Khil	02/02/11	06/02/11	70.77177	34.20644	560	7.7	4	90	0.69	4.74	0.002	0.02	26	0.04	0.000	0
Nangarhar	Ghani Khil	06/12/10	12/12/10	70.63513	34.42243	693	7.7	15	175	0.83	7.76	0.002	0.01	140	0.02	0.000	1
Nangarhar	Ghani Khil	27/11/10	28/11/10	70.56496	34.41212	624	7.9	16	134	0.66	5.92	0.002	0.01	141	0.01	0.000	1
Nangarhar	Ghani Khil	06/12/10	12/12/10	70.64819	34.41556	591	7.6	12	104	0.55	4.88	0.000	0.00	137	0.01	0.000	1
Nangarhar	Ghani Khil	06/12/10	13/12/10	70.64171	34.41964	548	7.8	10	90	0.63	8.76	0.001	0.00	111	0.00	0.000	1
Ghazni	Ghazni	04/04/08	04/05/08	69.17068	34.58370	2040	6.4	250	67	0.70	18.40	0.010	2.90	280	0.02	0.200	0
Ghazni	Ghazni	28/08/08	28/08/08	69.29482	34.54606	920	7.4	422	87	0.60	57.00	0.000	2.30	334	0.03	0.025	0
Ghazni	Ghazni	28/08/08	28/08/08	69.16748	34.54639	1340	6.7	8	98	0.60	48.00	0.020	2.00	213	0.04	0.100	0
Ghazni	Ghazni	19/06/07	19/06/07	64.05149	35.68269	1029	6.5	105	98	1.00	19.60	0.010	2.00	137	0.00	0.100	7
Ghazni	Ghazni	06/10/07	10/10/07	62.40588	34.92288	2440	6.7	265	78	0.80	57.00	1.140	1.85	313	0.04	0.050	0
Ghazni	Ghazni	05/09/07	05/09/07	69.58969	35.00518	1644	6.3	275	69	0.90	13.20	0.010	1.50	416	0.01	0.300	7
Ghazni	Ghazni	01/04/09	01/04/09	69.11441	34.21964	948	7.3	79	87	0.40	56.00	0.010	1.05	77	0.02	0.000	0
Ghazni	Ghazni	12/07/10	12/07/10	68.46972	33.56167	623	7.6	8	30	0.37	6.22	0.003	0.90	104	0.00	0.022	
Ghazni	Ghazni	25/03/09	25/03/09	62.40886	34.22968	1075	7.5	62	87	0.40	12.80	1.260	0.90	104	0.02	0.025	7
Ghazni	Ghazni	13/07/08	13/07/08	69.17966	34.58288	1220	7.8	9	98	0.70	4.56	0.000	0.90	93	0.00	0.019	5
Ghazni	Ghazni	07/07/10	08/07/10	68.42777	33.52934	1450	7.6	21	81	0.89	53.40	0.005	0.90	35	0.00	0.111	5

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Ghazni	Ghazni	12/12/07	12/12/07	61.93325	34.82397	922	7.6	63	87	0.80	53.00	0.010	0.85	123	0.02	0.100	0
Ghazni	Ghazni	26/09/10	27/09/10	68.42667	33.54456	901	6.7	19	41	0.36	5.54	0.000	0.80	76	0.03	0.039	200
Ghazni	Ghazni	23/08/10	24/08/10	68.42859	33.53663	559	7.3	6	43	0.42	5.04	0.001	0.80	68	0.00	0.027	3
Ghazni	Ghazni	12/07/10	14/07/10	68.45625	33.57476	785	8.7	8	67	0.43	7.28	0.001	0.80	87	0.00	0.000	5
Ghazni	Ghazni	07/07/10	07/07/10	68.42703	33.54669	775	8.2	6	64	0.46	55.18	0.003	0.80	69	0.00	0.000	1
Ghazni	Ghazni	12/07/10	14/07/10	68.40406	33.59389	678	8.0	8	60	0.48	3.92	0.001	0.80	140	0.00	0.000	5
Ghazni	Ghazni	31/08/10	02/09/10	68.38425	33.55458	1170	7.4	16	42	0.48	13.60	0.062	0.80		0.00	0.024	2
Ghazni	Ghazni	25/11/08	25/11/08	69.20580	34.52229	1110	7.3	66	87	0.50	53.00	0.010	0.80	187	0.02	0.100	0
Ghazni	Ghazni	23/08/10	24/08/10	68.41278	33.53333	475	7.7	5	18	0.55	5.02	0.002	0.80	57	0.02	0.012	0
Ghazni	Ghazni	26/09/10	28/09/10	68.42258	33.54919	824	7.0	18	45	0.64	8.10	0.006	0.80	431	0.02	0.085	200
Ghazni	Ghazni	07/07/10	08/07/10	68.45011	33.43456	921	7.9	50	39	0.65	13.10	0.000	0.80	95	0.00	0.008	1
Ghazni	Ghazni	04/11/07	04/11/07	70.11679	34.89347	645	7.2	150	69	0.80	80.00	0.000	0.80	177	0.02	0.200	0
Ghazni	Ghazni	31/08/08	31/08/08	69.16541	34.53822	799	7.7	43	87	0.60	10.40	0.000	0.75	98	0.02	0.000	0
Ghazni	Ghazni	14/07/08	14/07/08	69.17966	34.58288	919	7.5	55	87	0.70	16.00	0.010	0.75	96	0.02	0.200	0
Ghazni	Ghazni	15/07/08	15/07/08	69.17966	34.58288	1195	7.5	73	87	0.70	57.00	0.010	0.75	195	0.02	0.010	0
Ghazni	Ghazni	01/10/07	10/11/07	62.52134	34.87826	1686	7.3	165	253	0.80	67.00	0.010	0.75	156	0.03	0.000	0
Ghazni	Ghazni	22/07/09	23/07/09	68.42611	33.55098	990	7.4	59	87	0.20	51.00	0.010	0.70	98	0.01	0.000	7
Ghazni	Ghazni	12/07/10	14/07/10	68.42695	33.53121	859	7.8	13	35	0.40	5.90	0.003	0.70	218	0.04	0.008	
Ghazni	Ghazni	12/07/10	14/07/10	68.66842	33.54241	661	6.9	13	39	0.42	0.44	0.000	0.70	112	0.00	0.016	12
Ghazni	Ghazni	31/08/08	31/08/08	69.16541	34.53822	921	7.3	43	87	0.60	58.00	0.010	0.70	104	0.02	0.010	0
Ghazni	Ghazni	26/08/08	26/08/08	66.13477	34.58123	815	7.5	54	87	0.60	12.80	0.000	0.70	117	0.03	0.200	7
Ghazni	Ghazni	03/04/09	03/05/09	69.24517	34.08895	1160	7.8	47	87	0.30	15.20	0.010	0.65	123	0.03	0.010	0
Ghazni	Ghazni	23/03/09	22/03/09	62.39567	34.23229	957	7.4	53	75	0.40	57.00	0.020	0.65	111	0.02	0.025	0
Ghazni	Ghazni	07/07/10	07/07/10	68.41839	33.55318	564	8.2	6	32	0.12	4.78	0.001	0.60	73	0.02	0.000	3
Ghazni	Ghazni	23/02/10	23/02/10	68.44610	33.43431	623	7.7	17	31	0.19	1.78	0.002	0.60	191	0.03	0.007	2
Ghazni	Ghazni	07/07/10	07/07/10	68.42943	33.54715	447	8.0	4	24	0.31	20.20	0.003	0.60	91	0.01	0.029	1
Ghazni	Ghazni	23/08/10	24/08/10	68.38748	33.64227	597	7.8	8	32	0.31	5.68	0.001	0.60	72	0.00	0.006	6
Ghazni	Ghazni	23/08/10	24/08/10	68.42864	33.53048	519	7.7	8	39	0.38	6.16	0.001	0.60	89	0.01	0.019	4
Ghazni	Ghazni	23/08/10	24/08/10	68.42650	33.55061	477	7.7	6	32	0.40	5.26	0.001	0.60	74	0.00	0.008	0
Ghazni	Ghazni	07/07/10	08/07/10	68.41119	33.54905	670	7.3	9	33	0.44	6.72	0.002	0.60	108	0.01	0.016	0
Ghazni	Ghazni	07/07/10	07/07/10	68.42598	33.55072	642	7.9	5	66	0.48	10.30	0.002	0.60	66	0.01	0.011	3
Ghazni	Ghazni	23/08/10	25/08/10	68.43627	33.51375	493	7.2	4	19	0.49	4.62	0.007	0.60	99	0.02	0.013	2
Ghazni	Ghazni	04/11/08	04/11/08	69.18219	34.53643	845	7.6	422	87	0.50	19.20	0.010	0.60	357	0.02	0.010	0
Ghazni	Ghazni	23/08/10	23/08/10	68.46410	33.58715	880	7.4	20	27	0.56	48.00	0.000	0.60	111	0.00	0.007	7
Ghazni	Ghazni	08/03/08	22/08/08	69.15365	34.53907	739	7.5	5	87	0.60	14.00	0.001	0.60	78	0.01	0.000	0
Ghazni	Ghazni	23/08/10	24/08/10	68.41164	33.54112	409	7.5	15	32	0.60	6.86	0.001	0.60	59	0.01	0.013	3

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Ghazni	Ghazni	07/07/10	08/07/10	68.41760	33.54067	460	7.6	5	24	0.74	4.96	0.005	0.60	104	0.00	0.037	1
Ghazni	Ghazni	26/09/10	27/09/10	68.43156	33.55224	824	7.4	17	35	0.63	5.54	0.009	0.57	221	0.05	0.037	137
Ghazni	Ghazni	26/09/10	28/09/10	68.41850	33.55661	650	7.7	94	28	0.29	6.86	0.007	0.57	283	0.01	0.034	17
Ghazni	Ghazni	06/04/09	07/04/09	68.72258	34.14507	812	7.7	87	87	0.30	51.00	1.150	0.55	123	0.04	0.000	0
Ghazni	Ghazni	25/11/08	25/11/08	69.20580	34.52229	550	7.9	41	58	0.50	53.00	0.010	0.55	83	0.03	0.010	0
Ghazni	Ghazni	19/12/10	20/12/10	68.41584	33.52645	1116	6.9	16	45	0.52	11.30	0.003	0.51	182	0.00	0.026	1
Ghazni	Ghazni	03/02/09	03/03/09	62.22587	34.34260	816	7.7	47	87	0.40	16.40	0.010	0.50	77	0.03	0.010	0
Ghazni	Ghazni	27/11/08	28/11/08	69.13673	34.50066	487	7.9	36	58	0.50	56.00	0.000	0.45	76	0.02	0.100	0
Ghazni	Ghazni	27/08/08	27/08/08	66.25745	34.55538	465	7.8	33	58	0.60	48.00	0.000	0.45	118	0.01	0.050	0
Ghazni	Ghazni	26/08/08	26/08/08	65.31247	34.57368	535	7.7	38	75	0.60	16.40	0.000	0.45	58	0.03	0.000	0
Ghazni	Ghazni	26/09/10	28/09/10	68.45608	33.57672	2050	7.5	40	110	0.50	53.00	0.025	0.45	375	0.02	0.000	31
Ghazni	Ghazni	26/09/10	27/09/10	68.42805	33.54667	821	7.4	15	46	0.52	4.58	0.005	0.42	227	0.01	0.014	200
Ghazni	Ghazni	29/07/09	29/07/09	68.42864	33.52248	595	7.9	27	87	0.10	14.80	0.010	0.40	38	0.02	0.000	0
Ghazni	Ghazni	02/04/09	02/05/09	69.24361	34.08955	400	8.0	24	58	0.30	56.00	0.010	0.40	88	0.04	0.100	0
Ghazni	Ghazni	17/03/09	17/03/09	70.22153	34.29006	444	8.0	27	75	0.40	57.00	0.010	0.40	86	0.03	0.010	0
Ghazni	Ghazni	23/08/10	25/08/10	68.38251	33.55578	494	7.5	5	23	0.42	4.46	0.002	0.40	102	0.01	0.005	3
Ghazni	Ghazni	07/07/10	08/07/10	68.42947	33.54916	2050	7.5	34	118	0.99	51.98	0.003	0.40	177	0.01	0.100	0
Ghazni	Ghazni	26/09/10	27/09/10	68.44841	33.50123	1145	6.9	18	46	0.59	12.30	0.015	0.38	76	0.02	0.024	5
Ghazni	Ghazni	26/09/10	28/09/10	68.41485	33.54465	468	8.0	13	27	0.41	6.22	0.006	0.35	135	0.04	0.033	377
Ghazni	Ghazni	27/08/08	27/08/08	69.16004	34.55275	443	7.6	18	87	0.60	16.00	0.003	0.30	22	0.00	0.021	1
Ghazni	Ghazni	26/09/10	28/09/10	68.41833	33.55324	592	7.4	15	18	0.50	4.30	0.001	0.30	287	0.01	0.009	3
Ghazni	Ghazni	29/07/09	29/07/09	68.41836	33.52584	498	8.5	25	75	0.10	10.40	0.000	0.25	36	0.04	0.000	0
Ghazni	Ghazni	27/02/09	28/02/09	68.77547	34.36844	407	7.9	14	58	0.40	14.80	0.010	0.25	124	0.01	0.025	0
Ghazni	Ghazni	26/09/10	28/09/10	68.41061	33.57588	590	7.6	17	39	0.38	5.84	0.001	0.21	118	0.00	0.040	79
Ghazni	Ghazni	26/09/10	28/09/10	68.47015	33.46625	2330	7.5	46	450	0.96	12.90	0.002	0.20	370	0.02	0.005	5
Ghazni	Ghazni	12/07/10	14/07/10	68.30556	33.60611	466	7.8	17	23	0.30	3.56	0.004	0.09	101	0.00	0.005	4
Ghazni	Ghazni	26/09/10	28/09/10	68.42264	33.54951	565	7.8	7	24	0.41	5.18	0.013	0.06	81	0.02	0.030	19
Ghazni	Ghazni	23/08/10	25/08/10	68.42115	33.52505	622	6.8	6	18	0.54	5.06	0.006	0.05	116	0.00	0.012	2
Ghazni	Ghazni	07/07/10	08/07/10	68.42409	33.55395	735	7.8	38	34	0.56	14.70	0.001	0.01	103	0.00	0.022	0
Ghazni	Ghazni	23/08/10	25/08/10	68.41744	33.54002	508	7.2	5	20	0.64	5.02	0.005	0.01	120	0.02	0.006	2
Ghazni	Ghazni	23/08/10	23/08/10	68.42547	33.54963	457	7.7	19	19	0.01	6.00	0.001	0.01	75	0.00	0.021	0
Ghazni	Ghazni	07/07/10	07/07/10	68.41801	33.54594	1185	7.4	16	45	0.40	55.38	0.001	0.01	81	0.00	0.030	2
Ghazni	Ghazni	07/07/10	08/07/10	68.26780	33.26430	557	8.1	4	32	0.53	42.00	0.003	0.01	89	0.01	0.111	0
Ghazni	Ghazni	07/07/10	08/07/10	68.41917	33.54583	516	8.5	4	39	0.82	5.88	0.009	0.01	86	0.01	0.100	1
Ghazni	Ghazni	23/08/10	24/08/10	68.41836	33.52584	525	8.0	9	32	0.22	4.92	0.001	0.00	87	0.00	0.004	2
Ghazni	Ghazni	26/03/11	30/03/11	68.41223	33.56161	497	7.9	25	50	0.85	11.70	1.200		139	0.04	0.000	3

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Badghis	Ghormach	09/02/08	09/02/08	63.10704	34.74753	828	8.1	5	89	0.70	1.04	0.006	0.20	104	0.00	0.000	5
Herat	Ghoryan	12/05/07	12/05/07	64.76230	35.72949	1334	7.9	13	252	1.00	0.18	0.002	0.60	99	0.00	0.000	7
Herat	Ghoryan	12/08/06	12/06/06	64.76349	35.92288	2000	7.4	17	390	1.20	2.96	0.004	0.35	225	0.00	0.000	1
Herat	Ghoryan	04/05/11	05/05/11	61.48573	34.53955	1455	7.4	28	142	1.51	4.38	0.002		459	0.01	0.000	1
Herat	Ghoryan	03/05/11	07/05/11	61.38504	34.48943	2220	7.7	34	750	5.30	6.42	0.013		617	0.01	0.000	47
Herat	Gulran	22/03/05	22/03/05	64.86552	36.29934	4870	6.8	50	1850	3.00	57.00	0.010	2.20	368	0.00	0.000	6
Herat	Gulran	04/06/05	04/06/05	64.86475	36.24729	1675	7.6	467	622	2.50	54.00	1.150	1.10	486	0.00	0.000	0
Herat	Gulran	04/04/05	04/04/05	64.85881	36.27930	1373	8.2	235	560	2.80	77.00	1.200	1.00	314	0.00	0.000	0
Herat	Gulran	13/06/05	14/06/05	64.69937	36.21174	1220	8.0	424	475	2.40	8.40	1.790	0.95	409	0.00	0.000	0
Herat	Gulran	25/06/05	05/06/05	64.69937	36.21174	1570	7.6	440	620	2.40	57.00	0.010	0.85	435	0.00	0.000	0
Herat	Gulran	05/06/05	05/06/05	64.69937	36.21174	1010	7.9	73	850	2.40	4.00	0.000	0.75	340	0.00	0.000	0
Herat	Gulran	21/09/05	21/09/05	64.85405	36.10637	967	7.8	79	890	1.50	7.20	0.000	0.70	336	0.00	0.000	0
Herat	Gulran	07/05/05	07/05/05	64.74518	36.24967	984	7.7	65	740	2.50	4.80	0.000	0.70	322	0.00	0.000	0
Herat	Gulran	29/03/05	22/03/05	64.89108	36.29241	800	7.8	47	340	3.00	11.60	0.030	0.65	196	0.00	0.000	0
Herat	Gulran	04/06/05	04/06/05	64.86475	36.24729	862	7.9	73	405	2.40	9.20	0.010	0.60	214	0.00	0.000	0
Herat	Gulran	28/12/05	28/12/05	64.97520	36.03858	933	8.1	205	390	1.30	7.20	0.020	0.55	281	0.00	0.000	0
Herat	Gulran	31/03/05	31/03/05	64.89108	36.29241	876	7.8	68	522	3.00	9.20	0.000	0.55	240	0.00	0.000	0
Herat	Gulran	11/03/07	11/03/07	64.36957	35.81755	464	8.0	62	253	1.10	15.60	0.000	0.40	107	0.00	0.000	0
Herat	Gulran	31/07/05	31/07/05	64.96008	36.15363	415	7.9	58	112	1.80	17.20	0.010	0.40	44	0.00	0.000	0
Herat	Gulran	12/12/07	12/12/07	61.99971	34.85245	453	8.4	31	71	0.80	10.00	0.000	0.30	82	0.00	0.000	0
Herat	Gulran	06/04/09	07/04/09	68.72790	34.14204	2610	7.6	21	800	0.30	11.90	0.010	0.10	490	0.01	0.000	8
Khost	Gurbuz	20/12/10	22/12/10	69.96940	33.31270	687	8.0	22	69	0.54	6.94	0.004	0.90	191	0.04	0.000	1
Khost	Gurbuz	21/12/10	22/12/10	69.87965	33.25757	639	8.1	8	65	0.44	4.74	0.009	0.70	118	0.05	0.000	1
Khost	Gurbuz	28/05/11	30/05/11	69.91496	33.28279	524	8.3	4	27	0.64	3.82	0.470	0.03	120	0.01	0.000	1
Khost	Gurbuz	28/05/11	30/05/11	69.89886	33.28885	650	8.2	8	64	0.58	3.98	0.012	0.02	131	0.01	0.000	1
Khost	Gurbuz	28/05/11	30/05/11	69.91078	33.28490	505	8.3	4	18	0.68	3.78	0.030	0.02	138	0.01	0.000	1
Khost	Gurbuz	20/12/10	22/12/10	69.96795	33.31368	484	8.0	15	40	0.41	4.48	0.007	0.01	159	0.06	0.000	1
Khost	Gurbuz	20/12/10	22/12/10	69.89884	33.26623	443	8.3	19	42	0.26	3.36	0.105	0.01	131	0.04	0.000	1
Faryab	Gurziwan	24/02/09	25/02/09	70.55787	34.37573	817	7.4	9	69	0.40	0.86	0.002	4.40	73	0.00	0.000	7
Faryab	Gurziwan	05/09/07	06/09/07	63.12648	34.98695	1219	7.4	12	253	0.90	2.88	0.007	1.30	154	0.00	0.000	7
Faryab	Gurziwan	17/12/06	20/12/06	64.84858	35.86388	1425	7.6	13	253	1.10	1.84	0.009	0.75	103	0.00	0.000	7
Faryab	Gurziwan	02/02/09	02/02/09	69.38399	34.38887	1052	7.2	10	79	0.50	1.60	0.001	0.55	104	0.00	0.000	7
Faryab	Gurziwan	26/09/07	26/09/07	69.60708	34.95229	1473	7.3	17	253	0.90	3.86	0.002	0.50	148	0.00	0.000	7
Faryab	Gurziwan	28/08/08	28/08/08	69.29482	34.54606	514	7.6	13	87	0.60	1.10	0.003	0.45	81	0.00	0.000	7
Faryab	Gurziwan	15/04/08	15/04/08	69.17122	34.58430	1240	7.6	11	253	0.70	0.90	1.215	0.45	124	0.00	0.000	7
Faryab	Gurziwan	27/08/08	27/08/08	69.29020	34.54826	973	7.5	7	134	0.60	2.12	0.003	0.40	146	0.00	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Gurziwan	31/07/08	31/07/08	69.17966	34.58288	1119	7.4	7	253	0.70	1.24	0.049	0.40	136	0.00	0.000	7
Faryab	Gurziwan	01/11/08	01/11/08	69.15652	34.53664	1684	7.4	6	106	0.50	4.10	0.003	0.35	154	0.00	0.000	7
Faryab	Gurziwan	27/09/05	27/09/05	64.85213	36.10487	2170	7.7	26	750	1.40	1.46	0.001	0.35	177	0.03	0.000	3
Faryab	Gurziwan	02/06/09	02/07/09	68.41061	33.57588	1648	7.5	9	280	0.20	5.26	0.007	0.30	277	0.00	0.000	19
Faryab	Gurziwan	26/08/08	26/08/08	69.17966	34.58288	922	7.5	7	69	0.60	6.00	0.007	0.30	2275	0.00	0.000	5
Faryab	Gurziwan	26/08/08	26/08/08	65.10820	34.58174	922	7.5	7	69	0.60	6.00	0.007	0.30	2275	0.00	0.000	7
Faryab	Gurziwan	22/11/08	12/01/08	61.95049	34.77051	953	7.6	8	253	0.80	0.38	0.009	0.30	148	0.02	0.000	3
Faryab	Gurziwan	17/03/09	17/03/09	69.15436	34.29604	591	7.6	13	87	0.40	1.02	0.001	0.25	113	0.00	0.000	1
Faryab	Gurziwan	29/11/08	22/11/08	62.58609	34.47787	932	7.4	7	87	0.50	1.92	0.013	0.25	121	0.00	0.000	7
Faryab	Gurziwan	03/11/08	03/11/08	69.18283	34.53651	1023	7.4	8	90	0.50	1.26	0.002	0.25	116	0.00	0.000	7
Faryab	Gurziwan	28/11/08	29/11/08	69.12778	34.47911	922	7.4	9	98	0.50	1.30	0.003	0.25	96	0.00	0.000	7
Faryab	Gurziwan	17/05/07	17/05/07	65.22441	35.71486	1436	7.4	9	800	1.00	1.24	0.029	0.25	457	0.00	0.000	7
Faryab	Gurziwan	15/07/09	16/07/09	62.15838	33.55578	588	7.9	8	87	0.20	0.84	0.004	0.10	36	0.04	0.000	5
Faryab	Gurziwan	07/10/08	07/10/08	69.18366	34.53753	895	7.4	8	68	0.50	1.22	0.002	0.10	75	0.02	0.000	3
Faryab	Gurziwan	07/10/07	10/10/07	62.40489	34.92244	1033	7.4	6	70	0.80	0.14	0.003	0.10	16	0.00	0.000	4
Herat	Guzara	27/04/11	28/04/11	62.22144	34.25091	911	7.0	20	114	0.62	6.82	0.004	0.53	142	0.01	0.000	5
Herat	Guzara	29/09/04	29/09/04	70.19078	37.02657	635	8.4	52	132	1.00	9.20	0.000	0.45	141	0.00	0.000	0
Herat	Guzara	03/04/09	03/04/09	70.48627	34.21450	682	8.3	54	132	0.40	12.40	0.000	0.40	118	0.00	0.000	0
Herat	Guzara	13/06/08	13/06/08	69.17068	34.58370	544	8.3	55	104	0.70	76.00	0.000	0.40	93	0.00	0.000	0
Herat	Guzara	11/07/07	12/07/07	61.68532	35.09085	629	8.3	40	124	0.90	5.20	1.010	0.40	126	0.00	0.000	0
Herat	Guzara	07/10/07	07/10/07	63.15457	34.94059	638	8.1	45	128	0.80	6.60	1.180	0.35	108	0.00	0.000	0
Herat	Guzara	09/01/08	09/01/08	62.65620	34.78552	670	8.0	47	84	0.80	12.00	0.000	0.35	87	0.00	0.000	0
Herat	Guzara	12/12/07	12/12/07	63.11626	34.83382	610	8.3	49	125	0.80	7.20	0.010	0.35	108	0.00	0.000	0
Herat	Guzara	28/06/07	01/07/07	65.10337	35.66516	848	7.8	5	136	0.90	2.36	0.002	0.30	166	0.01	0.000	5
Herat	Guzara	11/10/04	11/10/04	70.19078	37.02657	618	8.7	48	118	1.00	8.40	0.000	0.30	101	0.00	0.000	0
Herat	Guzara	25/05/07	31/05/07	64.10093	35.70556	627	8.2	36	128	1.00	12.40	0.000	0.04	107	0.00	0.000	0
Herat	Guzara	28/04/11	28/04/11	62.21219	34.23463	583	7.6	13	74	0.37	2.64	0.002		149	0.03	0.000	3
Herat	Guzara	09/05/11	09/05/11	62.06575	34.22767	824	7.6	13	155	1.19	4.96	0.004		181	0.05	0.000	0
Herat	Guzara	28/04/11	29/04/11	62.21325	34.26608	868	7.5	7	126	1.31	5.52	0.002		152	0.01	0.000	1
Samangan	Hazrati Sultan	30/06/10	30/06/10	67.59827	35.49165	2010	7.0	32	160	0.99	3.70	0.002	0.70	203	0.01	0.000	
Samangan	Hazrati Sultan	30/06/10	30/06/10	67.59125	35.49185	1995	7.0	27	160	1.00	3.54	0.003	0.70	152	0.00	0.000	2
Nangarhar	Hesarak	13/12/10	19/12/10	69.79233	34.29073	410	7.7	15	30	0.92	7.04	0.002	0.03	133	0.01	0.000	0
Nangarhar	Hesarak	13/12/10	19/12/10	69.86312	34.25251	961	7.4	4	155	0.70	4.82	0.007	0.02	457	0.00	0.000	0
Nangarhar	Hesarak	13/12/10	19/12/10	69.78733	34.29511	615	7.6	11	31	0.33	2.26	0.007	0.02	438	0.02	0.001	0
Nangarhar	Hesarak	06/06/11	08/06/11	69.83497	34.29583	759	7.1	4	148	0.94	2.02	0.004	0.01	66	0.00	0.000	0
Nangarhar	Hesarak	13/12/10	19/12/10	69.81655	34.29924	1078	7.3	14	165	0.72	5.24	0.002	0.01	334	0.01	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Nangarhar	Hesarak	06/06/11	08/06/11	69.79737	34.32003	561	7.4	4	24	0.56	3.96	0.001	0.01	66	0.01	0.000	0
Kunduz	Imam Sahib	24/02/05	25/02/05	66.21061	36.85057	5063	6.4	50	1350	10.10	9.48	0.016	1.50	609	0.00	0.000	0
Kunduz	Imam Sahib	01/08/08	02/08/08	69.17966	34.58288	1488	6.7	20	253	0.60	1.20	0.004	0.80	69	0.00	0.000	1
Kunduz	Imam Sahib	25/01/10	01/03/10	68.97237	37.24638	1470	7.7	30	258	1.09	0.56	0.009	0.61	555	0.00	0.000	1
Kunduz	Imam Sahib	22/12/09	29/12/09	69.13643	37.12547	1128	7.7	21	160	1.00	2.72	0.007	0.01	116	0.00	0.000	1
Herat	Enjil	07/12/08	07/12/08	70.39565	34.44407	735	7.9	8	116	0.50	3.34	0.005	0.35	80	0.00	0.000	1
Herat	Enjil	05/11/07	05/11/07	62.43973	34.89128	1795	7.1	18	290	0.80	3.48	0.000	0.35	169	0.00	0.000	6
Herat	Enjil	11/05/07	11/05/07	64.07841	35.73349	1733	7.8	14	390	1.00	5.32	0.009	0.30	154	0.03	0.003	6
Herat	Enjil	07/04/11	10/04/11	62.19167	34.34318	899	7.3	11	130	0.94	6.22	0.009	0.21	196	0.00	0.000	1
Herat	Enjil	24/05/11	29/05/11	62.31082	34.29257	853	7.4	10	109	0.84	5.80	0.008	0.20	183	0.01	0.000	0
Herat	Enjil	24/05/11	29/05/11	62.20472	34.31861	1560	7.7	15	220	1.44	60.00	0.002	0.14	131	0.00	0.000	2
Herat	Enjil	28/04/11	30/04/11	62.15604	34.33506	1232	7.3	20	306	0.81	3.18	0.001		369	0.05	0.000	0
Herat	Enjil	28/04/11	30/04/11	62.17828	34.34866	1338	7.2	18	200	0.83	8.18	0.001		251	0.06	0.000	1
Herat	Enjil	30/04/11	20/05/11	62.30587	34.34260	760	7.7	24	160	0.84	4.82	0.004		173	0.02	0.000	1
Herat	Enjil	28/04/11	29/04/11	62.20037	34.28966	907	7.4	14	160	0.85	3.16	0.000		105	0.02	0.000	1
Herat	Enjil	28/04/11	29/04/11	62.19362	34.30951	1039	7.3	16	185	0.93	3.16	0.005		495	0.02	0.000	1
Herat	Enjil	28/04/11	29/04/11	62.19875	34.32457	1175	7.3	10	190	1.02	4.56	0.001		463	0.01	0.000	1
Parwan	Jabalussaraj	17/10/10	19/10/10	69.21300	35.11100	490	7.7	15	30	0.51	4.88	0.005	0.03	99	0.02	0.000	0
Parwan	Jabalussaraj	11/01/11	16/01/11	69.18580	35.11032	544	7.9	6	32	0.09	2.90	0.001	0.00	100	0.05	0.000	0
Parwan	Jabalussaraj	11/01/11	16/01/11	69.11011	35.09196	421	8.1	13	19	0.24	2.94	0.005	0.00	102	0.02	0.004	0
Ghazni	Jaghatu	27/08/08	27/08/08	69.16004	34.55275	615	8.1	8	87	0.60	11.20	0.001	0.30	51	0.00	0.058	1
Khost	Jaji Maidan	13/10/10	15/10/10	70.11642	33.63793	1787	7.4	25	130	0.65	52.00	0.015	0.18	300	0.02	0.000	0
Nangarhar	Jalalabad	29/11/08	22/11/08	66.45659	34.47528	886	8.0	7	284	0.50	4.52	0.004	1.60	110	0.07	0.000	5
Nangarhar	Jalalabad	04/11/08	04/11/08	69.18219	34.53643	759	8.1	5	74	0.50	5.18	0.001	1.10	59	0.00	0.000	1
Nangarhar	Jalalabad	25/09/08	25/08/08	69.17966	34.58288	744	8.3	6	68	0.60	3.14	0.000	1.00	64	0.00	0.000	3
Nangarhar	Jalalabad	24/05/10	26/05/10	70.43639	34.44278	499	8.1	18	33	0.40	0.66	0.001	0.71	82	0.01	0.000	11
Nangarhar	Jalalabad	16/12/09	29/12/09	70.43817	34.42768	900	7.9	16	63	0.28	11.90	0.004	0.70	101	0.00	0.000	200
Nangarhar	Jalalabad	24/05/10	26/05/10	70.45583	34.43000	490	8.2	12	33	0.28	5.40	0.002	0.60	71	0.00	0.000	1
Nangarhar	Jalalabad	12/01/07	12/01/07	65.22229	35.84032	897	8.3	46	94	1.10	51.00	0.000	0.40	10	0.00	0.000	3
Nangarhar	Jalalabad	28/08/08	28/08/08	69.04783	34.54771	1232	7.2	17	93	0.60	1.16	0.004	0.30	28	0.04	0.000	0
Nangarhar	Jalalabad	11/04/10	13/04/10	70.45540	34.41905	527	8.0	12	54	0.33	8.62	0.001	0.01	34	0.04	0.007	
Nangarhar	Jalalabad	26/12/09	29/12/09	70.46302	34.41630	711	7.7	8	102	0.36	5.06	0.004	0.00	119	0.00	0.000	1
Nangarhar	Jalalabad	28/12/09	29/12/09	70.46386	34.43030	553	8.0	9	55	0.38	2.62	0.004	0.00	77	0.03	0.000	5
Nangarhar	Jalalabad	10/04/11	17/04/11	70.45117	34.43425	905	7.7	9	88	1.05	6.04	0.004		121	0.01	0.000	1
Maydan Wardak	Jalrez	19/04/11	21/04/11	68.63696	34.48268	599	8.0	18	19	0.46	2.26	0.065	0.13	92	0.02	0.000	0
Kabul	Kabul	16/03/05	16/03/05	64.89540	36.41983	1432	7.7	52	1080	5.20	57.00	0.009	4.00	60	0.00	0.010	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Kabul	Kabul	17/03/05	17/03/05	64.89642	36.41815	5020	7.7	52	1080	5.20	1.40	0.009	4.00	60	0.00	0.010	10
Kabul	Kabul	11/07/07	11/07/07	62.29916	35.09854	2600	8.5	40	136	0.90	53.00	0.002	3.50	36	0.00	0.690	10
Kabul	Kabul	01/07/07	01/07/07	64.02007	35.67613	2890	7.2	36	340	0.90	52.00	0.009	3.00	36	0.00	0.000	1
Kabul	Kabul	28/06/07	01/07/07	65.12313	35.67239	1154	7.2	36	340	0.90	51.00	0.009	3.00	36	0.03	0.000	1
Kabul	Kabul	03/02/09	03/03/09	61.50554	34.35254	1260	7.7	100	62	0.40	57.00	0.001	2.50	255	0.00	0.000	10
Kabul	Kabul	21/09/07	25/09/07	69.57609	34.97569	3220	7.4	44	380	0.90	18.00	0.043	2.50	45	0.00	0.000	4
Kabul	Kabul	25/09/07	25/09/07	69.57612	34.97575	1143	7.4	44	380	0.90	53.00	0.043	2.50	45	0.01	0.000	4
Kabul	Kabul	06/02/09	07/02/09	61.70448	34.38683	1543	7.5	12	93	0.40	53.00	0.014	2.00	109	0.02	0.000	11
Kabul	Kabul	23/02/09	24/02/09	70.55786	34.37573	1650	7.4	17	80	0.40	57.00	0.016	1.90	8	0.00	0.000	12
Kabul	Kabul	17/05/07	17/05/07	64.09393	35.71630	1625	7.3	160	80	1.00	16.50	0.040	1.90	66	0.00	0.000	0
Kabul	Kabul	16/05/07	16/05/07	64.93912	35.71714	766	7.3	160	80	1.00	52.00	0.040	1.90	66	0.01	0.000	0
Kabul	Kabul	25/11/08	25/11/08	69.17427	34.52999	916	7.6	5	98	0.50	3.40	0.001	1.85	36	0.00	0.000	1
Kabul	Kabul	25/11/08	25/11/08	69.17427	34.52999	1321	7.6	5	98	0.50	8.40	0.001	1.85	36	0.04	0.000	0
Kabul	Kabul	05/11/07	05/12/07	62.51654	34.86818	1631	7.1	17	120	0.80	3.90	0.003	1.85	173	0.00	0.000	1
Kabul	Kabul	11/11/07	11/11/07	62.53134	34.87701	788	7.1	17	120	0.80	57.00	0.003	1.85	173	0.06	0.000	0
Kabul	Kabul	18/01/09	01/01/09	70.45117	34.43425	1503	7.5	19	95	0.50	11.50	0.018	1.80	128	0.00	0.000	2
Kabul	Kabul	16/12/08	16/12/08	70.45117	34.43425	1766	7.5	19	95	0.50	52.00	0.018	1.80	128	0.04	0.000	2
Kabul	Kabul	01/09/08	01/09/08	69.17285	34.53796	1656	7.5	19	104	0.60	52.00	1.158	1.80	54	0.00	0.000	12
Kabul	Kabul	26/09/07	26/09/07	69.58908	34.95738	1234	7.2	260	92	0.90	57.00	0.010	1.80	64	0.00	0.000	0
Kabul	Kabul	26/09/07	26/09/07	69.63468	34.95609	2000	7.2	260	92	0.90	51.00	0.010	1.80	64	0.00	0.000	7
Kabul	Kabul	22/06/09	22/06/09	68.41578	33.61509	1473	7.0	5	99	0.20	2.80	0.013	1.70	69	0.00	0.000	5
Kabul	Kabul	22/06/09	22/06/09	68.38748	33.64227	1544	7.0	5	99	0.20	57.00	0.013	1.70	69	0.02	0.000	3
Kabul	Kabul	18/03/09	18/03/09	69.14228	34.27359	1865	7.0	17	70	0.40	10.00	0.020	1.70	42	0.00	0.000	14
Kabul	Kabul	18/03/09	18/03/09	70.81845	34.28256	1433	7.0	17	70	0.40	52.00	0.020	1.70	42	0.03	0.000	14
Kabul	Kabul	03/07/09	03/09/07	69.72718	35.02289	1755	8.2	374	264	0.90	1.60	0.000	1.65	473	0.00	0.000	6
Kabul	Kabul	27/08/07	27/08/07	69.60818	35.02948	1765	8.2	374	264	0.90	57.00	0.000	1.65	473	0.02	0.000	0
Kabul	Kabul	26/11/08	27/11/08	69.14466	34.50222	1543	7.5	12	76	0.50	57.00	0.007	1.60	84	0.03	0.000	8
Kabul	Kabul	21/10/08	21/10/08	69.18504	34.53673	1757	7.6	14	112	0.50	5.50	1.116	1.60	235	0.00	0.000	5
Kabul	Kabul	21/10/08	21/10/08	69.18093	34.53677	1877	7.6	14	112	0.50	55.00	1.116	1.60	235	0.03	0.000	0
Kabul	Kabul	01/12/08	01/12/08	70.38820	34.44563	1567	7.2	122	96	0.50	57.00	1.150	1.55	225	0.00	0.000	0
Kabul	Kabul	01/12/08	01/12/08	70.38820	34.44563	1511	7.2	122	96	0.50	58.00	1.150	1.55	225	0.01	0.000	0
Kabul	Kabul	25/08/08	25/08/08	69.17966	34.58288	1425	7.1	15	102	0.60	3.40	0.011	1.50	163	0.00	0.000	2
Kabul	Kabul	25/08/08	25/08/08	69.17966	34.58288	1877	7.1	15	102	0.60	14.00	0.011	1.50	163	0.04	0.000	2
Kabul	Kabul	01/08/08	02/08/08	69.17966	34.58288	1543	7.3	20	85	0.70	17.70	3.000	1.50	208	0.00	0.000	2
Kabul	Kabul	01/08/08	02/08/08	69.17966	34.58288	1877	7.3	20	85	0.70	17.70	0.002	1.50	208	0.00	0.000	2
Kabul	Kabul	29/08/07	08/09/07	69.59740	34.98680	1822	7.5	13	118	0.90	51.00	0.008	1.50	33	0.00	0.000	7

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Kabul	Kabul	05/09/07	06/09/07	63.12642	34.98680	1433	7.5	13	118	0.90	55.00	0.008	1.50	33	0.00	0.000	0
Kabul	Kabul	05/04/09	06/04/09	69.06038	34.15520	1699	7.6	96	69	0.30	80.00	1.450	1.45	246	0.00	0.000	0
Kabul	Kabul	05/04/09	06/04/09	69.18491	34.15395	1800	7.6	96	57	0.30	80.00	1.450	1.45	246	0.01	0.000	0
Kabul	Kabul	28/08/08	28/08/08	69.28644	34.54718	1117	7.3	12	69	0.60	2.70	0.030	1.40	114	0.00	0.000	245
Kabul	Kabul	28/08/08	28/08/08	69.04783	34.54771	1655	7.3	12	69	0.60	55.00	0.030	1.40	114	0.02	0.000	245
Kabul	Kabul	23/07/09	26/07/09	68.42750	33.54913	1818	7.7	18	87	0.20	1.40	0.014	1.38	89	0.00	0.000	5
Kabul	Kabul	22/07/09	26/07/09	68.42258	33.54919	1543	7.7	18	87	0.20	52.00	0.014	1.38	89	0.03	0.000	2
Kabul	Kabul	03/03/08	03/05/08	69.17068	34.58370	1800	7.4	14	106	0.70	5.30	1.155	1.35	227	0.00	0.000	5
Kabul	Kabul	18/04/08	18/04/08	69.17068	34.58370	1765	7.4	14	106	0.70	53.00	1.155	1.35	227	0.02	0.000	0
Kabul	Kabul	19/07/09	20/07/09	68.41888	33.55265	1071	7.5	11	80	0.20	96.00	0.002	1.30	72	0.00	0.000	7
Kabul	Kabul	21/07/09	21/07/09	68.42772	33.55139	1432	7.5	11	80	0.20	96.00	0.002	1.30	72	0.00	0.000	0
Kabul	Kabul	07/11/08	07/11/08	69.14262	34.53518	1085	7.3	540	98	0.50	12.70	0.000	1.30	43	0.00	0.000	6
Kabul	Kabul	07/11/08	07/11/08	69.14262	34.53518	1765	7.3	540	98	0.50	51.00	0.000	1.30	43	0.02	0.000	0
Kabul	Kabul	09/01/08	09/01/08	63.09409	34.78638	933	8.2	9	94	0.80	10.00	0.000	1.30	21	0.00	0.000	0
Kabul	Kabul	09/01/08	09/01/08	62.13460	34.79738	1765	7.5	9	94	0.80	52.00	0.000	1.30	21	0.01	0.000	0
Kabul	Kabul	01/04/09	01/04/09	70.47627	34.22450	1655	7.4	125	69	0.40	78.00	1.380	1.20	8	0.00	0.000	0
Kabul	Kabul	01/04/09	01/04/09	69.11441	34.21964	1543	7.4	125	69	0.40	78.00	1.380	1.20	8	0.01	0.000	0
Kabul	Kabul	22/11/08	01/12/08	65.06780	34.47120	1699	7.5	19	97	0.50	68.00	1.154	1.20	84	0.00	0.000	14
Kabul	Kabul	19/09/07	20/09/07	63.12206	34.98222	2833	8.0	44	590	0.90	57.00	0.009	1.20	250	0.00	0.000	3
Kabul	Kabul	18/03/09	18/03/09	69.14665	34.26750	938	8.1	7	61	0.40	2.90	1.520	1.10	117	0.00	0.000	7
Kabul	Kabul	18/03/09	18/03/09	69.00569	34.26968	1322	8.1	7	61	0.40	53.00	1.520	1.10	117	0.03	0.000	7
Kabul	Kabul	09/05/07	09/05/07	63.83602	35.73562	1714	7.4	46	94	1.00	14.30	0.002	1.10	45	0.00	0.000	0
Kabul	Kabul	11/09/09	11/10/09	61.93130	33.26911	520	7.9	9	87	1.45	53.00	0.002	1.10	39	0.00	0.000	3
Kabul	Kabul	26/08/08	26/08/08	70.57033	34.55982	1113	7.4	462	98	0.60	52.00	1.110	1.05	332	0.00	0.000	0
Kabul	Kabul	26/08/08	26/08/08	69.17163	34.56086	1654	7.4	462	98	0.60	52.00	1.110	1.05	332	0.01	0.000	65
Kabul	Kabul	21/01/07	22/01/07	64.86603	35.82238	1250	7.7	12	75	1.10	77.00	0.001	1.05	96	0.00	0.000	7
Kabul	Kabul	21/01/07	22/01/07	64.37140	35.82286	1543	7.7	12	75	1.10	77.00	0.001	1.05	96	0.00	0.000	0
Kabul	Kabul	07/04/09	08/04/09	70.66671	34.10802	1451	7.4	20	97	0.30	11.20	0.024	1.00	93	0.00	0.000	11
Kabul	Kabul	07/04/09	08/04/09	69.14189	34.11540	1433	7.4	20	97	0.30	53.00	0.024	1.00	93	0.05	0.000	11
Kabul	Kabul	21/10/08	21/10/08	69.18093	34.53677	1482	7.6	16	126	0.50	1.10	0.015	1.00	97	0.00	0.000	1
Kabul	Kabul	13/10/08	13/10/08	69.16746	34.53696	1655	7.6	16	126	0.50	18.00	0.015	1.00	97	0.06	0.000	0
Kabul	Kabul	26/08/08	26/08/08	69.17966	34.58288	1529	7.5	16	148	0.60	4.60	0.015	1.00	148	0.00	0.000	4
Kabul	Kabul	26/08/08	26/08/08	69.17966	34.58288	1430	7.5	16	148	0.60	4.60	0.015	1.00	148	0.04	0.000	0
Kabul	Kabul	03/02/09	03/03/09	70.21406	34.35188	999	7.6	59	69	0.40	76.00	1.190	0.90	63	0.00	0.000	7
Kabul	Kabul	02/03/09	03/03/09	70.21406	34.35188	1543	7.6	59	69	0.40	76.00	1.190	0.90	63	0.00	0.000	0
Kabul	Kabul	28/11/08	29/11/08	69.04822	34.48274	1239	7.7	14	96	0.50	1.80	0.005	0.90	88	0.00	0.000	5

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Kabul	Kabul	27/11/08	29/11/08	69.04822	34.48274	1455	7.7	14	96	0.50	53.00	0.005	0.90	88	0.03	0.000	0
Kabul	Kabul	29/08/08	29/08/08	69.17130	34.54381	813	7.4	65	87	0.60	13.20	0.000	0.85	97	0.00	0.000	0
Kabul	Kabul	29/08/08	29/08/08	69.17130	34.54381	1655	7.4	65	87	0.60	53.00	0.000	0.85	97	0.01	0.000	0
Kabul	Kabul	09/02/08	09/02/08	70.12511	34.73947	915	7.8	9	87	0.70	6.10	1.174	0.85	63	0.00	0.000	0
Kabul	Kabul	09/02/08	09/02/08	70.11123	34.74553	1543	7.8	9	87	0.70	57.00	1.174	0.85	63	0.01	0.000	45
Kabul	Kabul	09/02/08	09/03/08	70.21989	34.62350	1268	7.5	13	83	0.70	2.40	1.250	0.85	104	0.00	0.000	21
Kabul	Kabul	09/02/08	09/03/08	69.07902	34.65884	1432	7.5	13	83	0.70	57.00	1.250	0.85	104	0.02	0.000	21
Kabul	Kabul	26/01/10	27/01/10	69.16919	34.53915	1213	7.4	22	70	0.40	3.64	0.020	0.80	362	0.01	0.000	0
Kabul	Kabul	09/08/10	12/08/10	69.45826	34.57344	999	7.8	9	59	0.48	13.40	0.005	0.80	85	0.00	0.000	5
Kabul	Kabul	28/11/08	28/11/08	69.14461	34.50198	874	7.8	8	57	0.50	3.80	0.003	0.80	70	0.00	0.000	6
Kabul	Kabul	27/11/08	28/11/08	69.14461	34.50198	1543	7.8	8	57	0.50	63.00	0.003	0.80	70	0.01	0.000	0
Kabul	Kabul	22/08/08	22/08/08	69.15812	34.53961	1106	8.0	11	101	0.60	12.00	0.007	0.80	102	0.00	0.002	4
Kabul	Kabul	06/03/10	09/03/10	69.23693	34.54510	1121	7.7	23	128	0.62	7.74	0.018	0.80	190	0.01	0.000	1
Kabul	Kabul	15/07/08	15/07/08	69.17966	34.58288	1142	7.9	11	114	0.70	59.00	1.160	0.80	86	0.00	0.002	6
Kabul	Kabul	06/12/09	07/12/09	69.18472	34.53773	1848	7.4	36	100	0.55	9.38	0.285	0.79	327	0.02	0.000	3
Kabul	Kabul	04/04/10	05/04/10	69.12605	34.54765	1787	7.5	27	158	0.66	55.80	0.042	0.79	70	0.02	0.000	1
Kabul	Kabul	07/04/09	08/04/09	70.56300	34.12067	1681	7.2	16	116	0.30	12.10	0.004	0.75	70	0.00	0.000	2
Kabul	Kabul	07/04/09	08/04/09	69.12421	34.12915	1543	7.2	16	116	0.30	52.00	0.004	0.75	70	0.02	0.000	2
Kabul	Kabul	02/03/09	02/03/09	65.02243	34.36324	1575	7.2	20	122	0.40	5.20	0.007	0.75	199	0.00	0.000	4
Kabul	Kabul	02/03/09	02/03/09	61.86545	34.36635	1755	7.2	20	122	0.40	52.00	0.007	0.75	199	0.01	0.000	4
Kabul	Kabul	01/01/09	01/01/09	70.45117	34.43425	1243	7.7	14	94	0.50	5.10	0.014	0.75	49	0.00	0.000	1
Kabul	Kabul	02/01/09	02/01/09	69.05212	34.43416	1233	7.7	14	94	0.50	5.10	0.014	0.75	49	0.07	0.000	0
Kabul	Kabul	13/07/08	13/07/08	69.17966	34.58288	1101	8.0	12	108	0.70	12.00	0.008	0.75	58	0.00	0.000	7
Kabul	Kabul	03/12/09	07/12/09	69.45140	34.53652	2820	7.4	42	544	0.30	0.54	0.008	0.71	1888	0.02	0.000	15
Kabul	Kabul	05/03/10	05/03/10	69.15825	34.55729	948	7.7	12	58	0.37	12.40	0.015	0.71	102	0.03	0.000	2
Kabul	Kabul	07/12/09	08/12/09	69.46650	34.58188	593	7.9	10	75	0.23	4.58	0.002	0.70	175	0.00	0.000	20
Kabul	Kabul	05/09/10	05/09/10	69.41944	34.54611	483	7.4	11	30	0.30	2.62	0.006	0.70	66	0.00	0.000	1
Kabul	Kabul	26/05/10	26/05/10	69.18695	34.53218	1411	7.9	19	146	0.45	7.26	0.120	0.70	141	0.01	0.000	1
Kabul	Kabul	05/03/10	05/03/10	69.15065	34.58620	617	8.0	16	104	0.46	6.80	0.001	0.70	104	0.00	0.000	1
Kabul	Kabul	15/04/10	16/04/10	69.15354	34.51021	599	8.0	16	83	0.56	4.42	0.020	0.70	103	0.01	0.000	1
Kabul	Kabul	28/08/08	28/08/08	69.29583	34.54648	958	8.2	9	57	0.60	6.70	0.001	0.70	222	0.00	0.000	1
Kabul	Kabul	28/08/08	28/08/08	69.28644	34.54718	1544	8.2	9	57	0.60	57.00	0.001	0.70	222	0.07	0.000	0
Kabul	Kabul	06/10/08	15/06/08	69.17068	34.58370	1168	7.7	434	57	0.70	53.00	0.000	0.70	269	0.00	0.000	5
Kabul	Kabul	06/09/08	16/06/08	69.17068	34.58370	1432	7.7	434	57	0.70	53.00	0.000	0.70	269	0.02	0.000	23
Kabul	Kabul	12/08/06	12/08/06	64.78854	35.91851	673	8.0	63	104	1.20	54.00	0.000	0.70	63	0.00	0.000	0
Kabul	Kabul	12/08/06	12/08/06	64.77625	35.91973	1655	8.0	63	104	1.20	54.00	0.000	0.70	63	0.01	0.000	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Kabul	Kabul	01/05/09	01/05/09	69.22900	34.09264	907	8.1	9	69	0.30	3.20	0.003	0.65	164	0.00	0.000	0
Kabul	Kabul	01/05/09	01/05/09	70.66671	34.10802	1543	8.1	9	69	0.30	52.00	0.003	0.65	164	0.01	0.000	0
Kabul	Kabul	12/10/08	12/10/08	69.16746	34.53696	1450	7.4	21	148	0.50	17.90	0.038	0.65	15	0.00	0.000	6
Kabul	Kabul	08/10/08	08/10/08	69.18494	34.53737	1121	7.4	21	148	0.50	52.00	0.038	0.65	15	0.02	0.000	0
Kabul	Kabul	21/09/08	21/09/08	69.16599	34.53757	1096	7.9	12	69	0.60	3.40	1.175	0.65	91	0.00	0.000	5
Kabul	Kabul	21/09/08	21/09/08	69.16599	34.53757	1096	7.9	12	69	0.60	3.40	1.175	0.65	91	0.00	0.000	5
Kabul	Kabul	02/09/08	02/09/08	69.18615	34.53758	1675	7.9	12	69	0.60	52.00	1.175	0.65	91	0.02	0.000	45
Kabul	Kabul	07/09/08	07/09/08	69.16599	34.53757	1432	7.9	12	69	0.60	57.00	1.175	0.65	91	0.02	0.000	13
Kabul	Kabul	12/12/07	12/12/07	69.16652	34.84225	1719	7.5	20	106	0.80	2.90	0.019	0.65	54	0.00	0.000	0
Kabul	Kabul	12/12/07	12/12/07	63.96906	34.84330	1765	7.5	20	106	0.80	53.00	0.019	0.65	54	0.01	0.000	0
Kabul	Kabul	08/03/10	09/03/10	69.16836	34.53281	640	7.7	8	37	0.42	3.18	0.003	0.64	74	0.01	0.000	1
Kabul	Kabul	17/01/10	17/01/10	69.18379	34.53465	1679	7.5	19	160	0.49	1.76	0.450	0.64	391	0.00	0.000	2
Kabul	Kabul	04/04/10	05/04/10	69.14828	34.59004	553	8.0	5	86	0.60	6.36	0.002	0.64	96	0.04	0.000	0
Kabul	Kabul	06/12/09	07/12/09	69.18694	34.53810	1909	7.1	36	155	0.59	13.70	0.028	0.61	291	0.02	0.000	7
Kabul	Kabul	21/07/09	28/07/09	68.41778	33.54071	922	8.1	7	69	0.10	3.80	0.021	0.60	200	0.00	0.000	4
Kabul	Kabul	21/07/09	28/07/09	68.41164	33.54112	1543	8.1	7	69	0.10	57.00	0.021	0.60	200	0.01	0.000	4
Kabul	Kabul	16/05/10	17/05/10	69.13706	34.49010	1066	7.7	9	73	0.39	7.30	0.006	0.60	50	0.00	0.000	2
Kabul	Kabul	18/03/09	18/03/09	70.81845	34.28256	882	7.3	14	75	0.40	2.70	0.016	0.60	85	0.00	0.000	1
Kabul	Kabul	18/03/09	18/03/09	69.14974	34.28320	1154	7.3	14	75	0.40	54.00	0.016	0.60	85	0.01	0.000	1
Kabul	Kabul	06/10/08	06/10/08	69.18366	34.53753	1410	7.1	11	84	0.50	4.60	0.008	0.60	153	0.00	0.000	8
Kabul	Kabul	03/10/08	03/10/08	69.18366	34.53753	1432	7.1	11	84	0.50	57.00	0.008	0.60	153	0.04	0.000	8
Kabul	Kabul	26/08/08	26/08/08	69.17966	34.58288	1406	8.3	20	253	0.60	0.90	0.001	0.60	188	0.00	0.000	31
Kabul	Kabul	26/08/08	26/08/08	69.17966	34.58288	1654	8.3	20	253	0.60	0.90	0.001	0.60	188	0.03	0.000	31
Kabul	Kabul	04/04/08	04/04/08	69.17186	34.58608	507	7.4	52	74	0.70	9.20	0.002	0.60	8	0.00	0.000	6
Kabul	Kabul	12/02/08	12/03/08	69.17186	34.58608	1765	7.4	52	74	0.70	57.00	0.002	0.60	8	0.02	0.000	0
Kabul	Kabul	04/07/10	05/07/10	69.19850	34.54796	2160	7.6	32	280	0.92	13.70	0.450	0.60	348	0.01	0.002	
Kabul	Kabul	28/09/10	30/09/10	69.18283	34.53651	1261	7.3	23	70	0.29	8.66	0.004	0.56	440	0.02	0.000	0
Kabul	Kabul	23/07/09	26/07/09	68.42264	33.54951	841	7.9	7	69	0.20	2.80	1.155	0.55	129	0.00	0.000	7
Kabul	Kabul	23/07/09	26/07/09	68.41641	33.54955	1543	7.9	7	69	0.20	57.00	1.155	0.55	129	0.02	0.000	12
Kabul	Kabul	22/01/09	22/01/09	68.85828	34.40357	880	7.9	11	69	0.50	5.60	0.021	0.55	62	0.00	0.000	6
Kabul	Kabul	18/01/08	18/01/09	68.86067	34.40387	1432	7.9	11	69	0.50	55.00	0.021	0.55	62	0.02	0.000	0
Kabul	Kabul	27/08/08	27/08/08	69.25453	34.55744	953	7.7	10	98	0.60	5.70	1.155	0.55	94	0.00	0.000	5
Kabul	Kabul	27/08/08	27/08/08	69.25453	34.55744	1433	7.7	10	98	0.60	57.00	1.155	0.55	94	0.03	0.000	12
Kabul	Kabul	05/11/07	05/12/07	69.21990	34.85826	1535	7.3	16	106	0.80	19.20	0.035	0.55	19	0.00	0.000	0
Kabul	Kabul	05/11/07	05/12/07	69.21990	34.85826	1122	7.3	16	106	0.80	19.20	0.035	0.55	19	0.01	0.000	0
Kabul	Kabul	01/03/05	02/03/05	65.71470	31.63269	421	6.8	13	48	1.45	0.10	0.001	0.55	38	0.00	0.000	4

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Kabul	Kabul	28/02/05	05/02/29	62.10139	32.32513	1342	6.8	13	48	1.45	16.00	0.001	0.55	38	0.03	0.000	2
Kabul	Kabul	05/03/10	05/03/10	69.12615	34.54722	855	7.8	18	76	0.51	11.00	0.013	0.53	66	0.04	0.000	0
Kabul	Kabul	30/05/10	31/05/10	69.13333	34.51481	769	8.1	10	46	0.58	6.28	0.007	0.53	93	0.02	0.000	15
Kabul	Kabul	11/08/10	15/08/10	69.42766	34.54904	1257	7.8	20	86	0.44	10.50	0.015	0.52	199	0.00	0.000	10
Kabul	Kabul	05/09/10	05/09/10	69.42651	34.55055	1231	7.9	18	126	0.77	4.96	0.003	0.52	160	0.00	0.000	0
Kabul	Kabul	04/04/10	05/04/10	69.14134	34.58631	1048	7.9	17	300	1.06	7.82	0.002	0.52	113	0.04	0.012	0
Kabul	Kabul	26/01/10	27/01/10	69.16496	34.53860	1573	7.5	28	86	0.05	8.60	0.005	0.51	370	0.01	0.000	1
Kabul	Kabul	09/08/10	11/08/10	69.40854	34.51220	488	8.3	4	32	0.22	1.42	0.023	0.51	64	0.03	0.000	550
Kabul	Kabul	16/05/10	17/05/10	69.13791	34.49004	1138	7.6	10	80	0.40	7.86	0.013	0.51	59	0.00	0.000	5
Kabul	Kabul	09/08/10	12/08/10	69.40927	34.56554	454	8.3	12	38	0.40	4.52	0.001	0.51	85	0.01	0.000	2
Kabul	Kabul	02/03/10	07/02/10	69.29267	34.54614	1270	8.3	46	128	0.43	7.80	0.002	0.51	151	0.02	0.000	17
Kabul	Kabul	31/08/10	02/09/10	69.36880	34.49186	1802	7.7	38	120	0.98	14.30	0.033	0.51	45	0.01	0.000	3
Kabul	Kabul	02/08/09	02/08/09	62.32946	33.39952	658	8.3	32	87	0.10	16.80	1.250	0.50	140	0.00	0.000	5
Kabul	Kabul	02/07/09	02/08/09	62.32688	33.39943	1121	8.3	32	87	0.10	16.80	1.250	0.50	140	0.02	0.000	1
Kabul	Kabul	03/05/09	03/06/09	68.37788	33.71475	1188	7.0	4	74	0.30	1.00	0.038	0.50	34	0.00	0.000	5
Kabul	Kabul	03/06/09	03/06/09	69.37737	33.76376	1643	7.0	4	74	0.30	57.00	0.038	0.50	34	0.02	0.000	11
Kabul	Kabul	06/02/09	07/02/09	70.32585	34.38452	1165	7.5	12	93	0.40	7.50	0.014	0.50	109	0.00	0.000	5
Kabul	Kabul	27/11/08	28/11/08	69.13822	34.50176	865	7.7	45	87	0.50	53.00	1.760	0.50	243	0.00	0.000	2
Kabul	Kabul	27/11/08	28/11/08	69.13822	34.50176	765	7.7	45	87	0.50	53.00	1.760	0.50	243	0.06	0.000	2
Kabul	Kabul	11/08/07	11/08/07	69.64378	35.07109	1899	8.0	4	120	0.90	12.00	0.002	0.50	67	0.06	0.000	4
Kabul	Kabul	22/08/07	23/08/07	69.57368	35.06069	561	8.0	9	120	0.90	2.50	0.002	0.50	67	0.00	0.000	3
Kabul	Kabul	16/09/07	16/09/07	62.23637	34.98492	2520	7.3	22	85	0.90	12.50	1.196	0.50	11	0.00	0.000	0
Kabul	Kabul	16/09/07	16/09/07	63.12284	34.98673	987	7.3	22	85	0.90	51.00	1.196	0.50	11	0.05	0.000	8
Kabul	Kabul	03/02/10	02/07/10	62.09746	32.38223	2800	6.4	8	48	1.45	0.30	0.003	0.50	36	0.00	0.000	3
Kabul	Kabul	01/02/10	02/07/10	62.09114	32.38540	1432	6.4	8	48	1.45	18.00	0.003	0.50	36	0.04	0.000	2
Kabul	Kabul	28/02/05	05/02/29	62.07609	32.36226	1045	7.9	8	75	1.45	8.90	0.009	0.50	31	0.00	0.000	6
Kabul	Kabul	28/02/05	05/02/29	62.13688	32.37661	1788	7.9	8	75	1.45	57.00	0.009	0.50	31	0.01	0.000	0
Kabul	Kabul	22/09/10	23/09/10	69.40417	34.56278	1280	7.3	5	88	0.59	7.58	0.029	0.49	340	0.05	0.000	0
Kabul	Kabul	27/11/08	28/11/08	69.14466	34.50222	1280	7.5	12	76	0.50	8.60	0.007	0.45	84	0.00	0.000	8
Kabul	Kabul	28/11/08	28/11/08	69.10533	34.48651	1487	7.6	17	120	0.50	2.40	0.025	0.45	86	0.00	0.000	1
Kabul	Kabul	28/11/08	28/11/08	69.13673	34.50066	1754	7.6	17	120	0.50	51.00	0.025	0.45	86	0.05	0.000	0
Kabul	Kabul	28/11/08	29/11/08	69.17068	34.48370	1451	7.6	16	118	0.50	5.10	0.019	0.40	159	0.00	0.000	1
Kabul	Kabul	28/11/08	29/11/08	69.17068	34.48370	1754	7.6	16	118	0.50	15.00	0.019	0.40	159	0.05	0.000	0
Kabul	Kabul	09/08/10	11/08/10	69.43315	34.55223	596	8.1	8	68	0.70	8.44	0.000	0.40	89	0.00	0.000	255
Kabul	Kabul	12/08/07	12/09/07	69.66398	34.98678	2422	7.5	20	86	0.90	59.00	1.470	0.40	9	0.00	0.000	0
Kabul	Kabul	16/09/07	16/09/07	69.59739	34.98678	1099	7.5	20	86	0.90	59.00	1.470	0.40	9	0.04	0.000	12
Kabul	Kabul	16/05/10	17/05/10	69.13769	34.49000	2040	7.5	20	205	0.92	52.80	0.130	0.40	235	0.02	0.016	

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Kabul	Kabul	22/07/09	26/07/09	68.40229	33.54491	620	8.0	11	58	0.20	2.20	1.160	0.35	144	0.00	0.000	4
Kabul	Kabul	27/07/09	27/07/09	68.41485	33.54465	1122	8.0	11	58	0.20	2.20	1.160	0.35	144	0.04	0.000	0
Kabul	Kabul	19/03/09	19/03/09	62.49703	34.25212	814	7.9	8	57	0.40	2.80	0.008	0.35	128	0.00	0.000	6
Kabul	Kabul	18/03/09	18/03/09	69.14009	34.26162	1786	7.9	8	57	0.40	51.00	0.008	0.35	128	0.02	0.000	0
Kabul	Kabul	17/04/08	17/04/08	69.17068	34.58370	1755	7.9	36	138	0.70	58.40	0.007	0.35	179	0.00	0.000	5
Kabul	Kabul	26/12/07	26/12/07	61.85244	34.80816	1240	7.8	15	94	0.80	1.40	0.010	0.35	131	0.00	0.000	1
Kabul	Kabul	16/12/07	16/12/07	62.85451	34.80951	1677	7.8	15	94	0.80	12.00	0.010	0.35	131	0.05	0.000	0
Kabul	Kabul	15/05/07	15/05/07	65.26080	35.72226	1492	7.8	23	253	1.00	52.00	0.021	0.35	61	0.00	0.000	12
Kabul	Kabul	15/05/07	15/05/07	64.09997	35.72184	1402	7.8	23	253	1.00	51.00	0.021	0.35	61	0.00	0.000	9
Kabul	Kabul	26/02/05	27/02/05	65.22230	31.56131	2500	6.8	8	48	1.45	1.40	0.004	0.35	20	0.00	0.000	4
Kabul	Kabul	09/08/10	12/08/10	69.42115	34.52505	805	8.0	8	72	0.61	4.02	0.005	0.33	127	0.02	0.000	1
Kabul	Kabul	24/03/09	24/03/09	62.29325	34.22250	1008	7.8	10	69	0.40	4.10	1.220	0.30	77	0.00	0.000	5
Kabul	Kabul	23/03/09	23/03/09	62.36607	34.22250	1432	7.8	10	69	0.40	57.00	1.220	0.30	77	0.01	0.000	56
Kabul	Kabul	27/02/09	27/02/09	63.17507	34.37196	677	7.9	18	75	0.40	54.00	0.000	0.30	36	0.00	0.000	0
Kabul	Kabul	26/02/09	27/02/09	69.77518	34.36846	446	7.9	18	58	0.40	12.40	0.000	0.30	36	0.00	0.000	10
Kabul	Kabul	07/01/09	07/01/09	69.15020	34.41024	558	7.7	9	87	0.50	0.60	0.014	0.30	102	0.00	0.000	0
Kabul	Kabul	07/01/09	07/01/09	70.57511	34.41641	1143	7.7	9	87	0.50	15.00	0.014	0.30	102	0.07	0.000	0
Kabul	Kabul	09/05/07	09/05/07	65.39550	35.73566	782	7.7	6	253	1.00	2.20	1.420	0.25	131	0.00	0.000	22
Kabul	Kabul	08/05/07	08/05/07	64.18013	35.73566	1988	7.7	6	253	1.00	43.00	1.420	0.25	131	0.02	0.000	22
Kabul	Kabul	19/10/10	20/10/10	69.18195	34.55903	1806	7.3	32	110	0.63	45.00	0.280	0.20	289	0.01	0.000	8
Kabul	Kabul	22/11/10	24/11/10	69.11612	34.54866	1510	7.8	19	200	1.03	3.82	0.009	0.20	311	0.01	0.000	1
Kabul	Kabul	17/08/06	17/08/06	64.79852	35.91206	1166	7.4	6	116	1.10	1.88	0.005	0.20	121	0.00	0.006	1
Kabul	Kabul	18/08/05	18/08/05	64.87910	36.14230	1355	8.3	34	390	1.60	4.90	1.500	0.20	19	0.00	0.000	5
Kabul	Kabul	11/08/05	11/08/05	64.87906	36.14232	1854	8.3	34	390	1.60	57.00	1.500	0.20	19	0.03	0.000	11
Kabul	Kabul	22/11/10	24/11/10	69.41722	34.54833	4070	7.8	46	1300	5.20	5.48	0.002	0.20	1084	0.04	0.000	0
Kabul	Kabul	27/08/08	27/08/08	69.12320	34.55330	892	7.4	5	80	0.60	4.92	0.004	0.10	76	0.01	0.000	5
Kabul	Kabul	13/06/10	13/06/10	69.12299	34.51930	1186	7.6	19	84	0.59	53.10	0.002	0.05	135	0.01	0.000	0
Kabul	Kabul	19/12/10	20/12/10	69.29020	34.54826	2190	7.9	31	185	0.59	51.96	0.003	0.02	255	0.01	0.000	1
Kabul	Kabul	08/12/09	08/12/09	69.43150	34.53945	460	7.1	11	34	0.04	1.40	0.001	0.02	117	0.03	0.000	1
Kabul	Kabul	09/08/10	12/08/10	69.42667	34.55806	454	8.2	18	33	0.26	4.84	0.005	0.02	92	0.01	0.000	3
Kabul	Kabul	16/05/10	17/05/10	69.13852	34.49026	1187	7.6	12	84	0.36	6.90	0.003	0.02	82	0.00	0.000	33
Kabul	Kabul	09/03/10	10/03/10	69.17485	34.53796	1482	7.9	30	83	0.47	10.50	0.006	0.02	474	0.01	0.000	0
Kabul	Kabul	13/06/10	14/06/10	69.13489	34.48625	1189	7.9	23	106	1.06	10.90	0.002	0.02	200	0.01	0.000	12
Kabul	Kabul	15/04/10	16/04/10	69.20269	34.53346	640	8.0	11	42	0.30	1.34	0.015	0.01	133	0.00	0.000	2
Kabul	Kabul	05/03/10	05/03/10	69.16225	34.55545	1106	7.7	16	68	0.32	11.60	0.001	0.01	137	0.00	0.000	1
Kabul	Kabul	20/12/09	21/12/09	69.41612	34.54866	841	7.8	6	65	0.38	2.74	0.008	0.01	156	0.02	0.000	1
Kabul	Kabul	13/04/10	13/04/10	69.20910	34.53823	1301	7.6	32	100	0.44	51.80	0.032	0.01	265	0.00	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Kabul	Kabul	05/02/10	05/02/10	69.11966	34.53413	798	8.2	12	42	0.63	6.74	0.900	0.01	168	0.00	0.000	0
Kabul	Kabul	04/04/10	05/04/10	69.14536	34.58658	753	8.0	11	142	0.64	4.44	0.000	0.01	89	0.04	0.000	1
Kabul	Kabul	07/03/10	09/03/10	69.68780	34.53585	562	7.8	8	29	0.83	7.94	0.025	0.01	117	0.02	0.000	1
Kabul	Kabul	31/12/09	31/12/09	69.15557	34.48304	1023	8.1	24	155	0.91	5.12	0.032	0.01	231	0.01	0.000	0
Kabul	Kabul	07/12/10	15/12/10	69.12778	34.47911	1600	7.9	32	330	0.10	3.64	0.004	0.00	196	0.01	0.000	0
Kabul	Kabul	11/05/10	11/05/10	69.18695	34.53218	695	7.9	8	61	0.34	2.74	0.008	0.00	161	0.01	0.000	7
Kabul	Kabul	18/12/10	21/12/10	69.20571	34.52301	1304	7.7	29	77	0.56	9.04	0.024	0.00	344	0.01	0.000	1
Kabul	Kabul	07/12/10	17/12/10	69.41134	34.56281	712	7.6	29	100	0.58	4.16	0.001	0.00	139	0.00	0.000	1
Kabul	Kabul	15/08/10	15/08/10	69.44148	34.50555	542	8.0	4	26	0.30	8.30	0.001	0.80	190	0.00	0.000	5
Kabul	Kabul	15/07/10	18/07/10	69.42947	34.54916	1211	7.6	15	83	0.62	9.68	0.110	0.60	170	0.03	0.000	5
Kabul	Kabul	28/07/10	29/07/10	69.44273	34.47117	1373	7.8	52	104	0.62	55.60	0.001	0.60	47	0.00	0.000	3
Kabul	Kabul	23/08/10	24/08/10	69.18695	34.53218	1248	8.3	21	135	0.75	2.78	0.002	0.52	76	0.01	0.003	5
Kabul	Kabul	29/08/10	29/08/10	69.42333	34.54879	999	7.6	14	69	0.38	60.60	0.004	0.51	232	0.00	0.000	50
Kabul	Kabul	01/02/11	01/02/11	69.16366	34.54542	2160	7.2	36	60	1.06	51.00	0.004	0.51	282	0.01	0.000	1
Kabul	Kabul	19/01/11	23/01/11	69.19126	34.52631	1957	7.5	30	110	0.37	10.10	0.006	0.12	739	0.03	0.000	0
Kabul	Kabul	23/01/11	24/01/11	69.23774	34.54590	671	7.6	11	26	0.32	3.56	0.013	0.12	118	0.00	0.000	0
Kabul	Kabul	26/01/11	27/01/11	69.27588	34.54897	1400	7.9	24	140	1.95	4.12	0.013	0.12	149	0.02	0.005	2
Kabul	Kabul	19/01/11	23/01/11	69.18849	34.52593	1500	7.6	28	77	0.26	9.54	0.045	0.12	616	0.01	0.000	0
Kabul	Kabul	23/01/11	24/01/11	69.19253	34.53539	673	7.6	14	24	0.60	3.76	0.012	0.12	153	0.01	0.000	0
Kabul	Kabul	28/12/2010	30/12/2010	69.22923	34.53331	1310	7.8	19	260	1.41	7.36	0.004	0.12	594	0.00	0.000	0
Kabul	Kabul	26/01/11	27/01/11	69.17896	34.52930	1094	7.7	135	70	0.51	8.00	0.008	0.11	179	0.02	0.000	2
Kabul	Kabul	26/01/11	27/01/11	69.16475	34.53554	995	7.7	15	59	0.47	8.76	0.018	0.10	125	0.01	0.000	0
Kabul	Kabul	07/12/10	08/12/10	69.16412	34.53422	1541	7.5	30	90	0.28	14.10	0.008	0.06	434	0.01	0.000	0
Kabul	Kabul	16/06/10	16/06/10	69.16198	34.58178	4100	7.7	54	1360	2.88	6.26	0.002	0.05	288	0.01	0.000	3
Kabul	Kabul	18/10/10	19/10/10	69.17090	34.58427	847	7.6	24	44	0.33	5.14	0.022	0.04	121	0.01	0.000	1
Kabul	Kabul	11/10/10	12/10/10	69.46059	34.58079	613	7.8	7	85	0.53	3.30	0.007	0.04	136	0.04	0.000	1
Kabul	Kabul	16/06/10	16/06/10	69.16418	34.53550	1400	7.7	21	88	0.63	6.14	0.014	0.03	118	0.01	0.000	
Kabul	Kabul	19/01/11	23/01/11	69.19144	34.52830	1779	7.6	26	92	0.41	7.40	0.028	0.01	683	0.03	0.000	0
Kabul	Kabul	30/11/10	02/12/10	69.20580	34.52309	1811	7.4	46	112	0.43	15.60	0.050	0.01	227	0.03	0.000	2
Kabul	Kabul	04/10/10	04/10/10	69.16411	34.54244	541	8.1	13	54	0.37	3.20	0.008	0.01	115	0.05	0.000	0
Kabul	Kabul	30/03/11	07/04/11	69.10533	34.48651	905	7.5	17	67	0.17	4.30	0.001		142	0.02	0.000	1
Kabul	Kabul	30/03/11	07/04/11	69.12299	34.51930	1113	7.5	25	93	0.83	8.48	0.006		176	0.02	0.000	0
Nangarhar	Kama	12/05/10	12/05/10	70.35923	34.24594	590	7.8	4	74	0.37	2.44	0.004	0.56	154	0.00	0.000	1
Nangarhar	Kama	23/07/09	27/03/09	69.11719	34.22691	674	7.5	8	65	0.40	0.60	0.003	0.35	75	0.02	0.000	1
Nangarhar	Kama	12/04/10	12/04/10	70.55124	34.44105	412	8.0	6	58	0.61	1.06	0.005		127	0.02	0.000	1
Nangarhar	Kama	09/04/11	17/04/11	70.57511	34.41641	660	7.5	6	85	0.64	2.82	0.004		174	0.00	0.000	1

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Kandahar	Kandahar	09/03/08	09/04/08	69.17132	34.58435	748	7.8	9	253	0.70	8.34	0.002	0.15	111	0.00	0.000	6
Kandahar	Kandahar	24/01/11	25/01/11	65.70761	31.61966	636	7.3	9	102	0.92	3.74	0.010	0.12	181	0.04	0.000	1
Kandahar	Kandahar	21/05/11	26/05/11	65.71057	31.61746	763	7.6	5	128	1.14	3.98	0.002	0.06	45	0.00	0.000	1
Kandahar	Kandahar	21/05/11	26/05/11	65.73082	31.63698	854	7.9	5	116	0.90	1.58	0.001	0.06	126	0.00	0.000	1
Kandahar	Kandahar	21/05/11	26/05/11	65.71394	31.64424	968	8.0	22	118	1.17	3.18	0.230	0.06	93	0.01	0.000	1
Kandahar	Kandahar	27/12/09	29/12/09	65.79556	31.61162	2340	8.0	34	550	1.03	3.14	0.060	0.05	692	0.03	0.000	11
Kandahar	Kandahar	07/05/11	12/05/11	65.70792	31.63529	615	8.0	4	63	0.71	2.16	0.004	0.05	87	0.01	0.000	2
Kandahar	Kandahar	04/04/11	04/04/11	65.69605	31.60844	810	7.9	14	114	0.52	5.98	0.008	0.03	135	0.04	0.000	0
Kandahar	Kandahar	02/04/11	03/04/11	65.68004	31.62460	696	7.9	14	110	0.32	5.70	0.004	0.03	90	0.03	0.000	0
Kandahar	Kandahar	16/03/11	22/03/11	65.67490	31.58481	1633	7.8	22	590	1.41	6.88	0.003	0.03	393	0.04	0.000	1
Kandahar	Kandahar	02/04/11	03/04/11	65.73800	31.64425	737	8.0	13	95	0.46	6.64	0.014	0.02	152	0.05	0.000	2
Kandahar	Kandahar	02/04/11	04/04/11	65.70709	31.56254	675	8.0	15	91	0.43	7.28	0.004	0.02	155	0.05	0.000	0
Kandahar	Kandahar	02/04/11	04/04/11	65.62574	31.55166	674	8.0	18	89	0.49	6.32	0.005	0.02	156	0.05	0.000	0
Kandahar	Kandahar	02/04/11	03/04/11	65.69440	31.45883	674	8.0	16	90	0.56	7.58	0.003	0.02	150	0.04	0.000	0
Kandahar	Kandahar	04/04/11	04/04/11	65.74601	31.61842	675	7.9	5	85	0.43	5.52	0.001	0.02	107	0.05	0.000	2
Kandahar	Kandahar	26/10/10	28/10/10	65.91704	31.63588	769	7.4	105	65	0.64	8.72	0.004	0.02		0.04	0.000	0
Kandahar	Kandahar	26/02/11	28/02/11	65.69895	31.61884	1238	7.2	32	640	2.55	4.96	0.285	0.02	645	0.04	0.000	2
Kandahar	Kandahar	06/04/11	10/04/11	65.71788	31.57712	790	7.5	13	90	1.15	6.46	0.002	0.02	144	0.01	0.000	1
Kandahar	Kandahar	16/01/11	18/01/11	65.71404	31.62090	429	8.3	13	46	0.68	7.24	0.080	0.01	152	0.04	0.000	2
Kandahar	Kandahar	16/01/11	18/01/11	65.91704	31.63588	581	8.7	12	84	0.75	6.52	0.090	0.01	194	0.05	0.000	0
Kandahar	Kandahar	04/05/11	10/05/11	65.71696	31.64344	786	7.6	12	50	0.01	1.54	0.003	0.01	125	0.01	0.000	12
Kandahar	Kandahar	26/10/10	28/10/10	65.62405	31.54793	698	7.5	8	60	0.61	6.18	0.004	0.01	145	0.05	0.000	2
Kandahar	Kandahar	26/10/10	28/10/10	65.69344	31.61207	696	7.2	13	56	0.66	7.44	0.002	0.01		0.06	0.000	0
Kandahar	Kandahar	14/04/11	18/04/11	65.72677	31.62385	1500	6.5	4	43	0.05	1.40	0.000	0.00	80	0.04	0.000	0
Kandahar	Kandahar	04/04/11	04/04/11	65.77494	31.62974	850	7.8	6	150	0.53	7.04	0.002		103	0.05	0.000	0
Herat	Karukh	30/04/11	02/05/11	62.58609	34.47787	1800	7.1	32	250	0.93	51.20	0.005	0.51	234	0.05	0.000	0
Herat	Karukh	27/08/08	27/08/08	69.29020	34.54826	955	7.5	5	253	0.60	1.12	0.001	0.30	142	0.00	0.000	1
Herat	Karukh	22/11/08	12/01/08	61.95034	34.76906	1720	7.4	12	850	0.70	16.10	0.000	0.10	387	0.00	0.000	1
Herat	Karukh	30/04/11	02/05/11	62.64115	34.51348	533	7.7	44	66	0.31	6.64	0.004		104	0.01	0.000	0
Herat	Karukh	30/04/11	30/04/11	62.17828	34.49749	640	7.6	28	142	0.77	3.26	0.610		156	0.05	0.000	200
Herat	Karukh	30/04/11	02/05/11	62.44276	34.32581	912	7.6	15	160	0.79	2.98	0.003		147	0.01	0.000	0
Kabul	Khak I Jabbar	26/09/07	26/09/07	69.22398	34.96389	888	7.6	13	150	0.90	4.36	0.001	0.35	122	0.01	0.900	5
Kabul	Khak I Jabbar	04/04/08	04/05/08	69.17068	34.58370	698	7.8	41	102	0.70	54.00	0.000	0.30	132	0.00	0.000	6
Kabul	Khak I Jabbar	04/04/08	04/05/08	69.17068	34.58370	766	7.8	41	102	0.70	53.00	0.000	0.30	132	0.01	0.000	0
Kabul	Khak I Jabbar	29/03/11	03/04/11	69.38399	34.38887	805	8.2	17	96	0.97	12.20	0.004		176	0.05	0.000	10
Faryab	Khani Chahar Bagh	08/01/05	08/01/05	65.21447	36.99203	4500	7.7	52	1460	11.00	51.00	1.117	2.55	424	0.00	0.000	3

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Khani Chahar Bagh	04/01/05	04/01/05	65.22091	37.00222	4500	7.7	52	1460	12.00	51.00	1.117	2.55	424	0.00	0.000	0
Faryab	Khani Chahar Bagh	10/01/05	10/01/05	65.16219	36.99045	4800	7.5	52	1280	44.00	51.00	0.030	2.55	466	0.00	0.000	0
Faryab	Khani Chahar Bagh	10/10/05	10/01/05	65.16219	36.99045	4800	7.5	52	1280	44.00	51.00	0.030	2.55	466	0.00	0.000	3
Faryab	Khani Chahar Bagh	13/01/05	31/01/05	65.08032	36.91496	7670	7.4	52	2200	12.70	7.80	1.160	1.80	157	0.00	0.012	6
Faryab	Khani Chahar Bagh	31/01/05	31/01/05	65.08032	36.91496	7670	7.4	52	2200	12.70	7.80	1.160	1.80	157	0.00	0.012	3
Faryab	Khani Chahar Bagh	11/01/05	11/01/05	65.21907	36.96560	6200	8.0	54	3280	23.60	3.03	0.009	1.50	552	0.00	0.000	10
Faryab	Khani Chahar Bagh	11/10/05	11/01/05	65.11962	36.96402	6200	8.0	54	3280	23.60	3.03	0.009	1.50	552	0.00	0.000	3
Faryab	Khani Chahar Bagh	01/10/09	01/10/09	62.26257	33.35330	4070	7.8	48	1440	1.45	4.70	0.010	0.90	92	0.00	0.000	0
Faryab	Khani Chahar Bagh	03/08/09	03/10/09	62.25480	33.34745	4070	7.8	48	1440	1.45	4.70	0.010	0.90	92	0.00	0.000	3
Faryab	Khani Chahar Bagh	26/03/05	27/03/05	65.21885	36.34382	3250	7.6	44	1220	3.70	2.80	1.150	0.80	109	0.00	0.000	0
Faryab	Khani Chahar Bagh	26/03/05	27/03/05	64.89626	36.32240	3250	7.6	44	1220	3.70	2.80	0.050	0.80	109	0.00	0.000	3
Faryab	Khani Chahar Bagh	31/03/05	31/03/05	64.88933	36.28982	2800	7.9	44	910	2.80	4.00	0.020	0.70	15	0.00	0.000	0
Faryab	Khani Chahar Bagh	01/04/05	01/04/05	64.88803	36.28669	2800	7.9	44	910	2.80	4.00	0.020	0.70	15	0.00	0.000	3
Faryab	Khani Chahar Bagh	25/05/11	28/05/11	65.22091	37.00222	11240	6.8	57	4080	14.30	7.66	0.285	0.70	219	0.00	0.000	40
Faryab	Khani Chahar Bagh	22/03/05	22/03/05	64.87269	36.29333	2950	7.7	36	880	3.00	8.80	0.010	0.60	276	0.00	0.000	0
Faryab	Khani Chahar Bagh	22/03/05	22/03/05	64.87269	36.29333	2950	7.7	36	880	3.00	8.80	0.010	0.60	276	0.00	0.000	3
Faryab	Khani Chahar Bagh	03/03/05	04/03/05	67.70137	36.55800	2560	7.8	46	750	6.80	4.60	0.008	0.35	1197	0.00	0.000	6
Faryab	Khani Chahar Bagh	03/03/05	04/03/05	67.70137	36.55800	2560	7.8	46	750	6.80	4.60	0.008	0.35	1197	0.00	0.000	3
Logar	Kharwar	08/06/11	09/06/11	68.85645	33.67114	745	7.3	6	44	0.74	6.22	0.002	0.11	67	0.01	0.000	1
Logar	Kharwar	07/12/10	08/12/10	68.87558	33.72751	842	7.4	21	79	0.42	5.78	0.040	0.10	155	0.01	0.000	1
Logar	Kharwar	01/05/11	10/05/11	68.84500	33.68278	915	7.4	20	215	1.39	1.68	0.021	0.01	179	0.01	0.000	50
Kunar	Khas Kunar	06/12/10	13/12/10	70.90409	34.66900	434	8.0	16	23	0.25	9.92	0.003	0.88	103	0.00	0.000	7
Kunar	Khas Kunar	06/12/10	13/12/10	70.83668	34.61006	572	7.9	14	67	0.54	8.70	0.004	0.52	126	0.02	0.000	1
Kunar	Khas Kunar	11/05/11	13/05/11	71.07436	35.00898	511	7.8	42	27	0.34	1.76	0.000	0.01	167	0.02	0.000	10
Kunar	Khas Kunar	11/05/11	13/05/11	71.08658	35.01026	459	7.7	38	34	0.49	2.36	0.001	0.01	151	0.01	0.000	35

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Kunar	Khas Kunar	06/12/10	13/12/10	70.88563	34.63866	480	8.5	17	39	0.22	8.34	0.004	0.00	158	0.00	0.000	1
Kunar	Khas Kunar	06/12/10	13/12/10	70.86735	34.63727	837	7.9	24	78	0.54	3.40	0.023	0.00	110	0.01	0.000	73
Panjsher	Khenj	14/04/10	18/04/10	69.48700	35.34300	498	8.1	4	31	0.17	2.48	0.004	0.80	54	0.02	0.003	1
Nangarhar	Khiwa	09/08/10	10/08/10	70.57910	34.59151	947	8.0	9	122	0.91	4.36	0.012	0.90	55	0.00	0.000	255
Nangarhar	Khiwa	01/08/10	01/08/10	70.57704	34.58870	1111	8.2	8	200	1.36	18.00	0.830	0.79	126	0.00	0.000	36
Nangarhar	Khiwa	15/08/10	16/08/10	70.55267	34.57459	819	7.8	4	89	0.82	3.64	0.024	0.64	91	0.01	0.000	0
Nangarhar	Khiwa	09/08/10	10/08/10	70.55507	34.57071	973	8.0	8	142	0.81	3.70	0.003	0.51	57	0.00	0.000	260
Nangarhar	Khiwa	18/10/10	20/10/10	70.58104	34.58921	742	7.2	24	69	0.44	3.80	0.013	0.03	136	0.01	0.000	5
Nangarhar	Khiwa	18/10/10	20/10/10	70.52658	34.56614	542	7.6	16	52	0.44	6.38	0.013	0.02	145	0.01	0.000	0
Nangarhar	Khiwa	01/08/10	01/08/10	70.57589	34.59035	671	7.8	4	92	0.50	3.88	0.240	0.02	50	0.01	0.000	43
Nangarhar	Khiwa	31/10/10	01/11/10	70.55521	34.53531	731	7.3	12	64	0.60	5.28	0.009	0.01	316	0.03	0.000	7
Nangarhar	Khiwa	31/10/10	01/11/10	70.53844	34.53532	726	7.3	14	68	0.58	2.88	0.009	0.01	392	0.04	0.000	1
Nangarhar	Khiwa	31/10/10	01/11/10	70.57730	34.57210	871	7.3	15	126	1.02	3.00	0.001	0.01	377	0.05	0.003	4
Nangarhar	Khiwa	13/04/10	13/04/10	70.57203	34.58572	824	7.9	9	155	1.00	5.56	0.008		198	0.01	0.000	1
Nangarhar	Khogayani	16/12/08	16/12/08	70.36052	34.43802	666	7.8	11	100	0.50	1.06	0.002	0.80	25	0.02	0.000	0
Nangarhar	Khogayani	05/06/10	07/06/10	70.26139	34.26028	545	8.2	7	32	0.45	5.38	0.019	0.79	116	0.02	0.000	91
Nangarhar	Khogayani	06/12/10	09/12/10	70.21017	34.26838	482	7.6	19	26	0.30	5.80	0.003	0.23	105	0.01	0.000	1
Nangarhar	Khogayani	23/09/07	23/09/07	63.11030	34.97966	664	7.7	13	95	0.90	5.30	0.008	0.20	62	0.00	0.000	3
Nangarhar	Khogayani	16/12/10	09/12/10	70.16600	34.20801	529	7.6	30	19	0.46	13.20	0.002	0.04	118	0.01	0.000	0
Nangarhar	Khogayani	06/12/10	09/12/10	70.04913	34.35073	848	7.6	26	52	0.59	8.00	0.029	0.03	112	0.01	0.000	11
Nangarhar	Khogayani	19/02/11	22/02/11	70.18301	34.22446	817	7.8	12	33	0.17	3.18	0.004	0.01	164	0.00	0.000	2
Nangarhar	Khogayani	06/06/11	08/06/11	70.10042	34.28644	555	7.5	4	30	0.40	2.34	0.002	0.01	61	0.01	0.000	0
Nangarhar	Khogayani	06/06/11	08/06/11	70.15572	34.24215	468	7.2	4	80	0.78	3.60	0.007	0.01	88	0.01	0.000	0
Nangarhar	Khogayani	09/04/11	12/04/11	70.22153	34.29006	689	7.8	15	122	0.86	4.88	0.001		178	0.04	0.000	1
Khost	Khost	08/07/10	09/07/10	69.95181	33.27037	781	7.7	6	84	0.69	5.50	0.001	0.71	93	0.00	0.000	2
Balkh	Khulam	26/06/05	26/06/05	64.67047	36.17294	3480	7.8	38	810	2.20	0.27	1.830	25.00	654	0.00	0.000	3
Balkh	Khulam	03/07/09	03/11/09	68.09195	33.16115	3710	7.8	40	780	1.45	0.00	2.300	2.50	588	0.00	0.000	3
Balkh	Khulam	16/03/05	16/03/05	64.92923	36.42378	4870	7.4	52	1700	5.40	0.20	5.920	1.50	445	0.00	0.000	3
Balkh	Khulam	02/03/05	03/03/05	68.80779	36.69709	4810	7.4	54	2000	7.70	0.14	2.300	1.50	470	0.00	0.000	7
Balkh	Khulam	11/05/06	11/05/06	64.68660	36.00979	2980	7.4	40	340	1.30	0.00	1.300	0.60	396	0.00	0.000	3
Balkh	Khulam	18/08/05	18/08/05	64.86582	36.13481	2860	7.3	42	420	1.50	0.00	5.120	0.50	270	0.00	0.000	3
Balkh	Khulam	18/08/05	18/08/05	65.07097	36.13655	2860	7.3	42	420	1.50	5.12	0.001	0.50	270	0.04	0.000	2
Balkh	Khulam	04/04/09	04/05/09	68.76067	34.08730	2980	7.5	44	680	0.30	0.37	1.500	0.45	286	0.00	0.000	3
Balkh	Khulam	21/06/05	21/06/05	64.68611	36.19557	2640	7.4	40	550	2.30	0.03	3.840	0.40	137	0.00	0.000	3
Balkh	Khulam	22/06/09	07/01/09	68.87445	34.40731	1402	7.3	22	252	0.50	0.00	1.300	0.30	75	0.00	0.001	3
Balkh	Khulam	04/04/09	04/05/09	69.23336	34.08338	1774	7.9	13	140	0.30	0.24	2.680	0.25	37	0.00	0.000	3

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Balkh	Khulm	31/05/11	05/06/11	67.39652	35.73452	2480	7.6	52	360	5.00	1.92	0.002	0.11	316	0.00	0.000	0
Faryab	Khwaja Sabz Posh	22/01/05	22/01/05	65.17838	36.93344	2510	7.8	32	440	14.30	0.46	1.230	8.00	293	0.00	0.000	0
Faryab	Khwaja Sabz Posh	22/01/05	22/01/05	65.17838	36.93344	2510	7.8	32	440	14.30	0.46	1.230	8.00	293	0.00	0.000	0
Faryab	Khwaja Sabz Posh	22/01/05	22/01/05	65.10069	36.92699	2510	7.8	32	440	14.30	0.46	1.230	8.00	293	0.02	0.000	0
Faryab	Khwaja Sabz Posh	14/09/05	14/09/05	64.84572	36.10773	5010	7.8	100	1650	1.50	5.34	0.009	3.50	714	0.00	0.000	7
Faryab	Khwaja Sabz Posh	22/07/05	22/07/05	64.93157	36.15664	2020	7.5	29	322	1.80	3.68	0.013	3.50	192	0.00	0.000	6
Faryab	Khwaja Sabz Posh	16/06/05	16/06/05	64.86400	36.20352	3290	7.6	42	700	2.30	5.26	0.005	3.00	216	0.00	0.000	1
Faryab	Khwaja Sabz Posh	04/03/05	04/03/05	66.79360	36.65803	2010	7.2	25	710	7.50	0.88	0.000	3.00	167	0.00	0.000	1
Faryab	Khwaja Sabz Posh	04/03/05	04/03/05	66.79360	36.65803	2010	7.2	25	710	7.50	0.88	0.000	3.00	167	0.00	0.000	1
Faryab	Khwaja Sabz Posh	01/08/07	01/08/07	69.65229	35.08959	2210	7.3	15	650	0.90	0.92	0.008	2.50	390	0.00	0.000	7
Faryab	Khwaja Sabz Posh	14/12/05	14/12/05	64.84865	36.04337	1372	7.2	18	255	1.30	1.02	0.000	2.40	154	0.00	0.000	2
Faryab	Khwaja Sabz Posh	14/12/05	14/12/05	64.85559	36.04106	1372	7.2	18	255	1.30	1.02	0.000	2.40	154	0.00	0.000	7
Faryab	Khwaja Sabz Posh	24/10/05	24/10/05	64.84037	36.08114	1681	7.4	20	270	1.40	3.90	0.004	1.50	149	0.00	0.000	7
Faryab	Khwaja Sabz Posh	18/05/06	18/05/06	64.77762	35.92854	1870	7.5	16	440	1.20	4.64	0.002	1.00	140	0.00	0.000	15
Faryab	Khwaja Sabz Posh	18/03/06	19/03/06	64.67029	36.02277	1510	7.9	16	58	1.30	1.28	0.004	0.90	129	0.00	0.000	5
Faryab	Khwaja Sabz Posh	24/03/05	25/03/05	64.78998	36.37610	2660	8.2	40	83	4.20	2.42	0.011	0.80	273	0.00	0.008	3
Faryab	Khwaja Sabz Posh	24/03/05	25/03/05	64.78998	36.37659	2660	8.2	40	83	4.20	2.42	0.011	0.80	273	0.00	0.008	3
Faryab	Khwaja Sabz Posh	25/02/05	26/02/05	68.86592	36.79553	2880	7.4	40	252	8.70	0.00	1.100	0.80	102	0.00	0.000	1
Faryab	Khwaja Sabz Posh	12/05/06	12/05/06	68.68722	35.99419	1509	7.6	15	260	1.30	1.58	0.003	0.75	135	0.00	0.000	4
Faryab	Khwaja Sabz Posh	13/05/06	13/05/06	64.81625	35.99365	1509	7.6	15	260	1.30	1.58	0.003	0.75	135	0.00	0.000	7
Faryab	Khwaja Sabz Posh	14/05/05	14/05/06	64.73227	35.96491	1387	7.5	13	255	1.20	1.44	0.001	0.70	136	0.00	0.000	3
Faryab	Khwaja Sabz Posh	14/05/06	14/05/06	64.73227	35.96491	1387	7.5	13	255	1.20	1.44	0.001	0.70	136	0.00	0.000	7

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Faryab	Khwaja Sabz Posh	13/06/05	14/06/05	64.96935	36.21174	2422	7.7	23	675	2.30	6.00	0.013	0.70	256	0.00	0.000	7
Faryab	Khwaja Sabz Posh	19/08/06	19/08/06	64.76291	35.90353	2060	7.2	23	320	1.10	1.08	0.004	0.65	232	0.00	0.000	22
Faryab	Khwaja Sabz Posh	23/08/05	24/08/05	65.09676	36.11281	2270	7.8	25	720	1.50	2.26	0.005	0.60	227	0.00	0.000	95
Faryab	Khwaja Sabz Posh	25/06/05	25/06/05	64.77049	36.17609	2022	7.6	21	622	2.30	6.28	0.020	0.60	324	0.00	0.000	6
Faryab	Khwaja Sabz Posh	17/05/06	17/05/06	64.77440	35.92225	481	7.9	8	95	1.20	2.38	1.130	0.55	155	0.00	0.000	7
Faryab	Khwaja Sabz Posh	02/05/09	02/06/09	69.20972	34.04400	12780	7.3	440	83	0.30	77.00	3.700	0.50	1751	0.00	0.000	3
Faryab	Khwaja Sabz Posh	04/04/09	04/05/09	69.76063	34.08727	12780	7.3	440	480	0.30	54.00	3.700	0.50	1751	0.00	0.000	7
Faryab	Khwaja Sabz Posh	22/11/08	12/01/08	70.08273	34.76348	1522	7.3	13	252	0.70	0.64	0.008	0.50	195	0.00	0.000	1
Faryab	Khwaja Sabz Posh	15/05/06	15/05/06	64.77521	35.93623	1620	7.2	16	260	1.20	2.08	0.001	0.50	114	0.00	0.000	3
Faryab	Khwaja Sabz Posh	16/05/06	16/05/06	64.77521	35.93623	1620	7.2	16	260	1.20	2.08	0.001	0.50	114	0.00	0.000	7
Faryab	Khwaja Sabz Posh	14/11/05	14/11/05	64.85755	36.06753	1620	7.5	16	270	1.30	2.20	0.007	0.50	50	0.00	0.000	3
Faryab	Khwaja Sabz Posh	13/08/06	13/08/06	64.79699	35.91831	1495	7.4	15	440	1.20	2.60	0.009	0.45	169	0.00	0.000	6
Faryab	Khwaja Sabz Posh	10/08/06	11/08/06	64.77625	35.91973	1684	7.5	22	320	1.20	4.98	0.001	0.45	90	0.00	0.000	5
Faryab	Khwaja Sabz Posh	14/05/06	14/05/06	64.71228	35.98653	1512	7.6	17	380	1.20	2.40	0.004	0.40	163	0.00	0.000	2
Faryab	Khwaja Sabz Posh	14/08/06	14/08/06	64.77408	35.91743	1655	7.6	22	322	1.20	5.40	0.002	0.40	137	0.00	0.000	5
Faryab	Khwaja Sabz Posh	14/11/05	14/11/05	64.66339	36.06780	1822	7.6	18	400	1.30	3.46	0.015	0.40	142	0.00	0.000	2
Faryab	Khwaja Sabz Posh	18/08/06	18/08/06	64.78460	35.91064	3650	7.8	44	790	1.10	5.34	0.006	0.35	515	0.00	0.000	0
Faryab	Khwaja Sabz Posh	21/05/06	21/05/06	64.73795	35.92570	3422	7.5	44	750	1.20	6.22	0.004	0.35	808	0.00	0.000	8
Faryab	Khwaja Sabz Posh	24/03/05	24/03/05	64.93383	36.39977	2660	8.2	40	83	4.20	2.42	0.011	0.35	273	0.00	0.000	8
Faryab	Khwaja Sabz Posh	26/08/08	26/08/08	66.18020	34.57056	1380	7.8	13	255	0.60	2.62	0.003	0.30	169	0.00	0.000	0
Faryab	Khwaja Sabz Posh	06/09/08	16/06/08	69.17068	34.58370	1554	7.5	17	360	0.70	4.24	0.002	0.30	126	0.00	0.000	7
Faryab	Khwaja Sabz Posh	09/04/08	09/04/08	69.18466	34.58554	1570	7.4	18	360	0.70	3.31	0.001	0.30	151	0.00	0.000	2

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Khwaja Sabz Posh	14/01/07	16/01/07	64.86603	35.82238	1241	8.5	9	255	1.10	2.12	0.016	0.30	124	0.01	0.000	20
Faryab	Khwaja Sabz Posh	13/08/06	13/08/06	64.77408	35.91743	1237	7.7	16	260	1.20	1.98	0.001	0.30	86	0.00	0.000	7
Faryab	Khwaja Sabz Posh	14/08/06	14/08/06	64.77408	35.91743	1422	7.6	18	253	1.20	5.70	0.001	0.30	101	0.00	0.000	11
Faryab	Khwaja Sabz Posh	12/05/06	12/05/06	64.77422	35.99886	1347	7.4	13	296	1.30	2.64	0.001	0.30	148	0.00	0.000	4
Faryab	Khwaja Sabz Posh	18/05/06	19/05/06	64.77954	35.92853	1275	7.3	13	252	1.20	2.22	0.007	0.25	108	0.00	0.000	3
Faryab	Khwaja Sabz Posh	23/08/05	24/08/05	65.09676	36.11281	1285	7.5	12	253	1.50	2.86	0.001	0.25	74	0.00	0.000	26
Faryab	Khwaja Sabz Posh	19/07/09	20/07/09	68.41833	33.55324	1216	7.7	11	48	0.20	3.38	0.003	0.20	151	0.00	0.000	7
Faryab	Khwaja Sabz Posh	02/02/09	02/02/09	61.78894	34.39420	800	8.7	11	83	0.50	1.22	0.013	0.20	32	0.00	0.000	3
Faryab	Khwaja Sabz Posh	07/01/09	07/01/09	68.86560	34.40553	800	8.7	11	150	0.50	1.22	0.013	0.20	32	0.01	0.000	5
Faryab	Khwaja Sabz Posh	05/09/06	05/09/06	64.82450	35.88859	1094	7.7	13	134	1.10	2.20	0.030	0.20	90	0.00	0.000	8
Faryab	Khwaja Sabz Posh	15/07/06	16/08/06	64.78392	35.91341	1191	7.5	14	280	1.10	1.90	0.007	0.20	72	0.00	0.000	22
Faryab	Khwaja Sabz Posh	27/11/05	27/11/05	64.66920	36.06519	1857	7.5	15	310	1.30	5.60	0.003	0.20	68	0.00	0.000	7
Faryab	Khwaja Sabz Posh	18/04/06	20/04/06	64.47458	36.02216	1510	7.9	16	58	1.30	1.28	0.004	0.20	129	0.00	0.000	3
Faryab	Khwaja Sabz Posh	20/04/06	20/04/06	64.67029	36.02277	1510	7.9	16	58	1.30	1.28	0.004	0.20	129	0.00	0.000	3
Faryab	Khwaja Sabz Posh	03/08/05	04/08/05	64.88157	36.14429	1226	7.4	10	288	1.60	2.18	0.001	0.20	168	0.00	0.000	16
Faryab	Khwaja Sabz Posh	27/03/05	24/03/05	64.93383	36.39977	2660	8.2	40	83	4.20	2.42	0.011	0.20	273	0.00	0.000	8
Faryab	Khwaja Sabz Posh	20/05/07	20/05/07	63.98873	35.71387	1440	7.6	19	260	1.00	2.22	0.002	0.15	80	0.00	0.000	41
Faryab	Khwaja Sabz Posh	27/08/07	27/08/07	64.74400	35.03570	1517	7.5	16	290	0.90	4.14	0.002	0.10	169	0.01	0.000	0
Faryab	Khwaja Sabz Posh	29/08/06	29/08/06	64.82450	35.88859	1228	8.6	10	270	1.10	2.48	0.014	0.10	147	0.01	0.000	15
Faryab	Khwaja Sabz Posh	11/04/07	11/04/07	65.28516	35.75345	1259	8.5	15	265	1.10	1.90	0.016	0.10	122	0.02	0.000	18
Faryab	Khwaja Sabz Posh	31/07/05	31/07/05	64.96008	36.15363	2590	7.5	46	640	1.70	3.54	1.360	0.10	336	0.01	0.000	6
Faryab	Khwaja Sabz Posh	05/08/05	29/08/05	65.09676	36.11281	1441	7.6	15	270	1.50	3.92	0.004	0.02	116	0.00	0.000	38

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Ghazni	Khwaja Umari	02/04/09	03/04/09	69.12813	34.21901	905	7.6	59	87	0.40	18.40	0.000	1.00	129	0.02	0.000	0
Ghazni	Khwaja Umari	26/03/11	30/03/11	68.39050	33.71292	610	7.8	14	41	0.86	13.30	0.002	0.70	133	0.03	0.032	5
Ghazni	Khwaja Umari	03/02/09	03/03/09	62.21533	34.33501	670	7.4	36	75	0.40	4.20	0.000	0.60	122	0.02	0.100	0
Ghazni	Khwaja Umari	12/07/10	13/07/10	68.40192	33.68718	1295	7.3	11	17	0.62	6.38	0.000	0.60	217	0.00	0.093	2
Ghazni	Khwaja Umari	12/07/10	14/07/10	68.39146	33.68362	1463	7.7	23	79	0.51	7.30	0.005	0.51	81	0.00	0.005	4
Ghazni	Khwaja Umari	12/07/10	14/07/10	68.39307	33.65025	525	8.3	8	24	0.55	4.12	0.001	0.51	39	0.00	0.003	2
Ghazni	Khwaja Umari	12/07/10	13/07/10	68.41988	33.53963	443	7.9	5	19	0.99	6.60	0.000	0.51	97	0.00	0.002	0
Ghazni	Khwaja Umari	16/12/07	16/12/07	70.10620	34.81777	526	7.8	31	75	0.80	4.40	0.000	0.40	131	0.03	0.018	0
Ghazni	Khwaja Umari	26/08/08	26/08/08	69.17966	34.58288	438	7.5	9	87	0.60	17.80	0.002	0.30	24	0.02	0.025	0
Ghazni	Khwaja Umari	04/04/09	04/05/09	69.23878	34.08834	525	7.9	18	48	0.30	52.00	0.010	0.25	57	0.04	0.010	0
Ghazni	Khwaja Umari	12/07/10	13/07/10	68.38834	33.56190	1099	7.6	11	49	0.54	4.42	0.000	0.00	289	0.00	0.003	1
Badakhshan	Kishim	10/05/10	10/05/10	70.07055	36.66325	544	8.1	6	23	0.21	6.00	0.001	0.70	106	0.04	0.007	5
Kapisa	Kohistan	22/07/09	28/07/09	68.42859	33.53663	497	7.7	36	87	0.10	1.70	0.002	0.30	92	0.02	0.000	4
Herat	Kohsan	29/10/06	29/10/06	65.42094	35.87924	1272	7.9	13	320	1.10	1.98	0.010	0.60	63	0.00	0.000	7
Herat	Kohsan	07/08/07	07/08/07	61.68372	35.08680	1236	7.8	12	253	0.90	1.38	0.002	0.30	146	0.00	0.000	5
Herat	Kohsan	15/12/09	16/12/09	61.19198	34.67366	1574	7.9	29	360	0.92	1.58	0.007	0.01	333	0.00	0.000	33
Herat	Kohsan	03/05/11	04/05/11	61.09056	34.66615	1165	7.8	14	210	1.40	1.76	0.001		318	0.01	0.000	1
Herat	Koshk	05/09/10	07/09/10	62.51733	34.86124	8270	7.9	54	2680	9.40	9.10	3.001	0.79	177	0.02	0.000	97
Herat	Koshk	07/09/10	07/09/10	62.51500	34.86800	8370	8.0	48	2340	9.20	7.56	0.100	0.70	69	0.00	0.000	27
Herat	Koshk	24/10/10	25/10/10	62.51416	34.86583	8430	7.7	54	2680	5.15	4.68	0.002	0.13	332	0.01	0.000	0
Herat	Koshki Kohna	31/03/05	31/03/05	64.88933	36.28982	4260	7.9	376	1750	2.90	57.00	1.140	2.00	1024	0.00	0.000	0
Herat	Koshki Kohna	04/02/05	04/02/05	65.06960	36.91009	6770	7.9	404	1740	11.70	54.00	0.030	1.65	999	0.00	0.000	0
Herat	Koshki Kohna	01/03/05	02/03/05	67.08112	36.71851	2750	7.6	13	1020	8.60	7.74	0.000	1.40	549	0.00	0.000	0
Herat	Koshki Kohna	21/09/05	21/09/05	64.85405	36.10637	2100	7.7	150	822	1.50	45.00	0.030	1.20	532	0.00	0.000	0
Herat	Koshki Kohna	21/06/05	21/06/05	64.68611	36.19557	4160	7.9	424	1500	2.30	18.00	0.020	1.10	811	0.00	0.000	0
Herat	Koshki Kohna	20/05/06	20/05/06	65.29499	35.92577	2360	8.0	250	890	1.20	62.00	0.010	0.95	542	0.00	0.000	0
Herat	Koshki Kohna	28/06/05	28/06/05	64.67047	36.17294	1092	8.2	160	710	2.10	12.80	0.010	0.90	337	0.00	0.000	0
Herat	Koshki Kohna	04/04/05	04/04/05	64.85380	36.28160	2950	8.4	250	1320	2.80	57.00	0.020	0.85	719	0.00	0.000	0
Herat	Koshki Kohna	08/05/06	20/05/06	64.78220	35.92628	800	8.0	44	150	1.20	19.20	1.480	0.70	152	0.00	0.000	0
Herat	Koshki Kohna	28/06/05	28/06/05	64.87984	36.16861	1892	7.7	150	650	2.10	8.00	0.010	0.70	461	0.00	0.000	0
Herat	Koshki Kohna	04/06/05	04/06/05	64.86443	36.21885	1655	8.0	160	570	2.40	12.00	0.010	0.70	412	0.00	0.000	0
Herat	Koshki Kohna	25/06/05	25/06/05	64.77049	36.17609	2150	7.6	185	900	2.20	10.00	1.150	0.55	431	0.00	0.000	0
Herat	Koshki Kohna	29/10/06	29/10/06	65.39224	35.88116	1135	7.9	69	340	1.10	9.60	0.000	0.50	222	0.00	0.000	0
Herat	Koshki Kohna	14/03/06	14/03/06	64.66540	36.03402	972	8.3	50	253	1.30	18.80	0.000	0.50	184	0.00	0.000	0
Herat	Koshki Kohna	09/05/07	09/06/07	64.01973	35.69991	871	8.5	48	253	1.00	9.20	0.000	0.40	141	0.00	0.000	0
Herat	Koshki Kohna	01/05/11	02/05/11	62.09665	34.88386	859	7.3	52	160	1.23	7.52	0.000		199	0.00	0.000	1

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Herat	Koshki Naw	17/03/05	17/03/05	64.89779	36.40950	3240	7.9	420	670	4.40	76.00	0.020	1.75	169	0.00	0.000	7
Herat	Koshki Naw	23/03/09	23/03/09	71.04402	34.23229	4290	7.5	52	1040	0.40	8.34	0.013	0.30	661	0.01	0.000	6
Herat	Koshki Naw	12/01/05	12/01/05	65.11826	36.95625	2740	7.5	28	680	2.00	19.10	0.003	0.30	422	0.01	0.000	0
Nangarhar	Kot	23/05/06	23/05/06	64.77517	35.92443	949	7.6	9	134	1.20	1.16	0.006	0.45	127	0.02	0.000	0
Nangarhar	Kot	01/10/05	10/11/05	64.84024	36.07253	1249	7.5	5	253	1.40	3.24	0.003	0.45	49	0.00	0.000	1
Nangarhar	Kot	31/08/08	31/08/08	69.17285	34.53796	1125	7.4	8	122	0.60	0.36	0.004	0.20	72	0.02	0.000	0
Nangarhar	Kot	22/06/06	22/08/06	64.83156	35.89203	940	7.9	7	87	1.10	6.00	0.000	0.10	53	0.00	0.000	5
Nangarhar	Kot	04/02/10	04/02/10	70.64233	34.20830	884	7.9	6	136	0.85	1.44	0.002		178	0.04	0.000	1
Nangarhar	Kot	12/03/11	16/03/11	70.56300	34.12067	1090	7.3	16	148	0.89	5.20	0.006		395	0.04	0.000	14
Nangarhar	Kot	12/03/11	16/03/11	70.64901	34.20007	1017	7.4	16	165	1.02	3.90	0.003		386	0.02	0.000	6
Kunduz	Kunduz	13/01/09	14/01/09	68.85936	34.40497	815	7.8	15	84	0.50	1.46	0.005	0.90	86	0.00	0.000	7
Kunduz	Kunduz	20/08/10	24/08/10	68.98800	37.02200	559	8.1	11	45	0.67	2.92	0.080	0.80	76	0.01	0.000	12
Kunduz	Kunduz	19/09/07	20/09/07	63.11454	34.98445	1537	7.6	22	58	0.90	3.28	1.169	0.20	94	0.00	0.000	0
Kunduz	Kunduz	13/04/11	14/04/11	68.91444	37.18119	1757	7.7	34	185	1.22	2.44	0.016	0.03	192	0.01	0.000	15
Kunduz	Kunduz	16/03/11	22/03/11	68.97237	37.24638	1134	7.5	28	100	0.56	1.98	0.001	0.03	150	0.04	0.000	0
Kunduz	Kunduz	13/04/11	14/04/11	68.91460	37.18479	1136	7.9	27	124	0.71	2.60	0.006	0.02	190	0.00	0.000	150
Kunduz	Kunduz	13/04/11	14/04/11	69.12846	37.13385	1100	7.9	14	118	0.95	4.42	0.002	0.02	170	0.00	0.000	8
Kunduz	Kunduz	21/04/11	24/04/11	69.14230	37.13764	1132	7.3	7	122	0.75	3.20	0.003	0.02	135	0.00	0.000	2
Kunduz	Kunduz	27/03/11	28/03/11	69.13643	37.12547	543	8.3	15	44	1.35	5.88	0.005	0.00	133	0.01	0.000	0
Nangarhar	Kuz kunar	07/12/08	13/07/08	69.17966	34.58288	670	7.4	7	72	0.70	1.48	0.004	0.40	142	0.00	0.000	5
Nangarhar	Kuz Kunar	09/04/11	17/04/11	70.57033	34.55982	645	7.5	11	87	1.34	2.62	0.034		168	0.01	0.000	4
Kunar	Kuze Kunar	09/08/09	09/10/09	62.25557	33.31583	488	8.2	7	58	1.45	6.72	0.011	0.10	59	0.00	0.000	2
Nangarhar	Lal Por	19/01/10	19/01/10	71.04758	34.24116	408	7.8	8	22	0.47	3.12	0.006	0.80	147	0.02	0.000	0
Nangarhar	Lal Por	01/08/09	01/08/09	70.04154	33.50895	561	8.2	7	87	0.10	0.60	0.004	0.30	81	0.03	0.000	0
Nangarhar	Lal Por	22/03/11	30/03/11	71.03978	34.23821	932	7.6	17	390	1.22	5.08	0.002	0.03	229	0.04	0.000	1
Nangarhar	Lal Por	05/06/10	05/06/10	70.95907	34.27462	820	7.9	14	66	0.48	4.06	0.012	0.02	227	0.01	0.000	52
Nangarhar	Lal Por	12/03/11	16/03/11	70.04402	34.23229	545	7.8	13	41	0.53	1.92	0.225		136	0.02	0.000	5
Ghor	Lal Wa Sarijangal	27/01/10	28/01/10	66.31434	34.50542	793	7.5	4	96	0.46	4.08	0.003	0.61	91	0.01	0.000	1
Ghor	Lal Wa Sarijangal	29/08/08	29/08/08	69.16229	34.54517	1777	7.9	245	94	0.60	0.84	0.005	0.60	37	0.00	0.000	6
Ghor	Lal Wa Sarijangal	27/01/10	31/01/10	66.73455	34.68321	595	7.6	7	19	0.42	12.90	0.024	0.53	69	0.04	0.000	2
Ghor	Lal Wa Sarijangal	27/01/10	31/01/10	66.20459	34.74533	1828	7.6	23	128	0.69	7.96	0.008	0.51	43	0.04	0.000	1
Ghor	Lal Wa Sarijangal	11/11/08	11/11/08	69.14262	34.53518	497	8.0	8	75	0.50	18.40	0.020	0.40	351	0.00	0.000	245
Ghor	Lal Wa Sarijangal	05/10/07	05/10/07	63.15457	34.94059	1719	7.9	17	253	0.80	53.00	0.001	0.30	70	0.00	0.000	2

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Ghor	Lal Wa Sarijangal	10/10/05	10/10/05	64.85291	36.08737	1068	7.8	9	69	1.40	9.00	0.025	0.30	29	0.00	0.000	2
Ghor	Lal Wa Sarijangal	12/12/07	12/12/07	63.11628	34.83378	925	6.2	7	57	0.80	52.00	0.000	0.25	96	0.00	0.000	1
Ghor	Lal Wa Sarijangal	11/11/08	11/11/08	69.17051	34.53334	578	8.0	6	58	0.50	0.58	0.000	0.15	22	0.00	0.000	21
Ghor	Lal Wa Sarijangal	09/01/08	09/01/08	69.65386	34.79948	622	7.9	8	253	0.80	14.80	0.010	0.10	65	0.00	0.000	3
Ghor	Lal Wa Sarijangal	27/01/10	31/01/10	66.13422	34.58456	1037	7.7	4	215	0.76	2.98	0.002	0.05	166	0.02	0.000	1
Ghor	Lal Wa Sarijangal	27/01/10	31/01/10	66.13477	34.58123	575	7.5	4	34	0.39	5.70	0.003	0.01	114	0.01	0.000	1
Ghor	Lal Wa Sarijangal	27/01/10	28/01/10	66.56695	34.86806	477	7.7	5	16	0.28	3.44	0.004	0.00	52	0.01	0.000	1
Ghor	Lal Wa Sarijangal	28/11/10	02/12/10	66.13411	34.58319	802	7.3	36	30	0.34	17.00	0.008	0.00	82	0.02	0.000	0
Farah	Lash Wa Juwayn	25/05/10	25/05/10	61.61347	31.61366	768	7.9	8	146	0.90	2.56	0.001	0.80	175	0.01	0.000	
Farah	Lash Wa Juwayn	26/05/10	26/05/10	61.59326	31.49737	609	7.8	6	84	0.72	2.46	0.002	0.51	115	0.01	0.000	0
Farah	Lash Wa Juwayn	31/01/11	31/01/11	61.63694	31.74806	2750	7.8	48	530	2.65	1.68	0.007	0.03	277	0.00	0.000	0
Farah	Lash Wa Juwayn	11/01/11	13/01/11	61.63917	31.72305	1925	7.6	40	330	1.17	4.58	0.013	0.02	330	0.01	0.000	0
Helmand	Lashkargah	23/06/10	24/06/10	64.50800	31.56500	1383	7.6	18	130	0.74	13.00	0.002	0.43	46	0.01	0.000	2
Helmand	Lashkargah	29/11/10	25/12/10	64.52800	31.54200	1202	7.7	20	222	0.95	7.12	0.006	0.01	211	0.04	0.000	1
Helmand	Lashkargah	29/11/10	05/12/10	64.52900	31.56200	1012	8.1	29	188	0.64	7.74	0.002	0.01		0.05	0.000	23
Helmand	Lashkargah	29/11/10	05/12/10	64.56000	31.54300	1027	8.1	22	184	0.71	5.66	0.004	0.00	163	0.03	0.000	1
Helmand	Lashkargah	29/11/10	25/12/10	64.55460	31.54130	1114	7.6	25	202	0.88	11.10	0.007	0.00	216	0.04	0.000	1
Kapisa	Mahmudi Raqi	02/05/09	02/05/09	69.23745	34.08923	613	7.4	9	87	0.30	1.50	0.007	0.35	64	0.01	0.000	4
Kapisa	Mahmudi Raqi	04/02/08	04/02/08	70.11431	34.75081	897	7.5	5	102	0.70	2.32	0.001	0.35	71	0.00	0.000	1
Kapisa	Mahmudi Raqi	21/07/08	21/07/08	69.17966	34.58288	551	7.2	6	87	0.70	5.56	0.002	0.35	23	0.00	0.000	5
Kapisa	Mahmudi Raqi	22/03/11	23/03/11	69.47720	34.94428	649	7.5	16	66	0.42	3.36	0.002		143	0.01	0.000	0
Kapisa	Mahmudi Raqi	22/03/11	23/03/11	69.33126	35.04328	515	7.1	17	27	0.44	4.40	0.004		47	0.01	0.000	0
Kunar	Marawara	31/05/11	02/06/11	71.18111	34.90361	482	8.0	7	27	0.68	2.60	0.003	0.01	129	0.01	0.000	1
Kunar	Marawara	31/05/11	02/06/11	71.18027	34.89056	482	7.9	9	28	0.81	2.84	0.001	0.01	120	0.01	0.000	1
Kunar	Marawara	31/05/11	02/06/11	71.18417	34.90750	483	8.0	8	26	0.86	2.60	0.004	0.01	129	0.02	0.000	1
Kunar	Marawara	31/05/11	02/06/11	71.18667	34.89139	483	7.9	11	28	0.91	1.86	0.005	0.01	134	0.01	0.000	1
Kunar	Marawara	31/05/11	02/06/11	71.22361	34.91306	483	7.9	6	27	1.08	3.50	0.005	0.01	123	0.00	0.000	1
Kunar	Marawara	25/03/10	28/03/10	71.18408	34.85229	513	8.0	9	54	0.27	6.62	0.004		123	0.04	0.000	2
Kunar	Marawara	12/04/10	13/04/10	71.18230	34.85875	715	8.3	9	101	0.67	3.72	0.004		165	0.01	0.000	1
Kandahar	Marouf	01/04/10	04/04/10	65.03726	31.56931	1024	7.4	9	264	0.92	4.00	0.008	0.02	271	0.02	0.000	200
Maydan Wardak	Maydan Shahr	05/04/09	05/05/09	69.25658	34.08229	1485	6.3	7	122	0.30	1.52	0.023	1.75	167	0.02	0.000	5

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Maydan Wardak	Maydan Shahr	22/11/08	22/11/08	69.12778	34.47911	820	8.2	10	87	0.50	3.70	0.003	1.10	68	0.00	0.000	7
Maydan Wardak	Maydan Shahr	04/07/05	04/07/05	64.97217	36.16386	1329	6.9	92	253	1.90	13.00	0.000	1.10	137	0.01	0.000	7
Maydan Wardak	Maydan Shahr	22/07/09	24/07/09	68.42650	33.55061	446	7.6	8	75	0.20	11.00	0.018	0.90	25	0.00	0.000	6
Maydan Wardak	Maydan Shahr	29/10/06	29/10/06	64.82450	35.88859	411	7.8	13	66	1.10	2.16	1.940	0.90	115	0.02	0.000	2
Maydan Wardak	Maydan Shahr	17/05/06	17/05/06	64.78976	35.92948	481	7.9	8	95	1.20	2.38	1.130	0.55	153	0.01	0.000	2
Maydan Wardak	Maydan Shahr	29/08/08	29/08/08	69.16222	34.54317	466	7.9	7	75	0.60	2.00	0.000	0.30	47	0.03	0.000	5
Maydan Wardak	Maydan Shahr	11/05/07	11/05/07	64.76230	35.72949	600	7.7	13	69	1.00	1.40	1.450	0.30	120	0.02	0.000	4
Maydan Wardak	Maydan Shahr	22/07/09	24/07/09	68.42841	33.55026	555	7.8	5	75	0.20	19.70	0.016	0.27	8	0.01	0.000	7
Maydan Wardak	Maydan Shahr	22/07/09	24/07/09	68.42547	33.54963	455	7.6	9	70	0.20	3.14	0.008	0.25	44	0.02	0.000	3
Maydan Wardak	Maydan Shahr	13/11/08	13/11/08	69.17051	34.53334	451	7.6	7	65	0.50	3.02	0.008	0.25	105	0.02	0.000	5
Maydan Wardak	Maydan Shahr	31/01/09	31/01/09	68.85828	34.40357	470	7.3	9	87	0.50	2.42	1.130	0.15	83	0.03	0.000	4
Maydan Wardak	Maydan Shahr	10/01/11	11/01/11	68.77451	34.47225	665	7.5	9	44	0.51	9.76	0.012	0.12	154	0.04	0.000	1
Maydan Wardak	Maydan Shahr	11/01/11	13/01/11	68.86778	34.32021	491	7.7	36	25	0.64	10.90	0.004	0.12	167	0.04	0.000	0
Maydan Wardak	Maydan Shahr	07/11/07	07/12/07	69.17072	34.85583	480	7.7	7	102	0.80	3.56	0.029	0.10	89	0.02	0.000	3
Faryab	Maymana	12/05/07	12/05/07	64.08575	35.72514	1411	7.1	12	252	1.00	0.28	0.006	4.00	142	0.00	0.000	1
Faryab	Maymana	28/06/07	01/07/07	64.04942	35.67697	12560	7.5	208	656	0.90	10.32	1.115	3.50	2690	0.00	0.001	255
Faryab	Maymana	19/05/06	19/05/06	64.73328	35.92788	1648	7.4	14	270	1.20	2.16	0.001	0.95	152	0.00	0.000	2
Faryab	Maymana	19/05/06	20/05/06	64.77960	35.92770	1648	7.4	14	270	1.20	2.16	0.001	0.95	152	0.00	0.000	7
Faryab	Maymana	17/06/08	17/06/08	69.17068	34.58370	1047	7.4	9	253	0.70	0.52	0.005	0.85	118	0.00	0.000	24
Faryab	Maymana	19/06/08	19/06/08	69.17068	34.58370	1047	7.4	9	253	0.70	0.52	0.005	0.85	118	0.00	0.000	24
Faryab	Maymana	28/07/08	28/07/08	69.17966	34.58288	1295	7.4	6	75	0.70	1.70	0.008	0.65	36	0.00	0.000	1
Faryab	Maymana	31/07/08	31/07/08	69.17966	34.58288	1295	7.4	6	75	0.70	1.70	0.008	0.65	36	0.00	0.000	1
Faryab	Maymana	31/07/08	31/07/08	69.17966	34.58288	1295	7.4	6	75	0.70	1.70	0.008	0.65	36	0.02	0.000	1
Faryab	Maymana	20/06/07	20/06/07	64.01731	35.68080	1192	7.3	9	253	0.90	3.14	0.002	0.60	133	0.00	0.000	1
Faryab	Maymana	20/06/07	20/06/07	64.01578	35.67856	1192	7.3	9	253	0.90	3.14	0.002	0.60	133	0.00	0.000	1
Faryab	Maymana	28/12/07	31/12/07	61.83344	34.80395	1297	7.9	13	260	0.80	1.52	0.003	0.40	122	0.00	0.000	7
Faryab	Maymana	03/04/09	04/04/09	70.64901	34.20007	2981	7.7	12	253	0.40	3.40	0.010	0.35	167	0.02	0.000	1
Faryab	Maymana	26/11/08	27/11/08	69.20580	34.52229	1247	7.2	5	252	0.50	0.62	0.002	0.35	174	0.00	0.000	7
Faryab	Maymana	08/01/07	08/01/07	64.85340	35.85480	585	7.5	12	253	1.10	5.70	0.001	0.35	61	0.00	0.000	20
Faryab	Maymana	22/06/09	07/01/09	68.87310	34.40704	866	7.6	9	150	0.50	2.40	0.002	0.30	127	0.00	0.000	4
Faryab	Maymana	27/08/08	27/08/08	69.12320	34.55330	1180	7.6	11	252	0.60	5.10	0.003	0.30	120	0.02	0.000	5
Faryab	Maymana	29/08/08	29/08/08	69.16411	34.54244	1467	7.6	15	255	0.60	2.20	0.000	0.30	340	0.01	0.000	5
Faryab	Maymana	04/05/08	04/06/08	69.17068	34.58370	2222	7.3	40	87	0.70	3.08	0.003	0.30	23	0.00	0.000	57
Faryab	Maymana	10/10/07	11/10/07	62.43182	34.91374	1566	7.4	21	280	0.80	2.86	0.010	0.30	171	0.03	0.000	8
Faryab	Maymana	04/06/05	04/06/05	68.78039	36.23768	1488	7.7	22	350	2.40	19.60	0.002	0.30	3467	0.00	0.000	5
Faryab	Maymana	04/06/05	04/06/05	64.86443	36.21885	1488	7.7	22	350	2.40	19.60	0.002	0.30	3467	0.00	0.000	3

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Maymana	22/10/07	11/06/07	65.17339	35.69741	1376	7.3	7	132	1.00	4.88	0.003	0.25	60	0.00	0.000	18
Faryab	Maymana	28/06/05	28/06/05	64.38166	36.16683	1169	7.5	37	328	2.00	2.28	0.001	0.25	218	0.00	0.000	7
Faryab	Maymana	28/11/08	12/01/08	61.89194	34.77287	1253	7.1	8	253	0.80	0.42	0.004	0.20	161	0.00	0.000	3
Faryab	Maymana	11/06/07	11/06/07	65.16035	35.69246	1149	7.5	23	310	1.00	19.60	0.002	0.20	3111	0.00	0.000	6
Faryab	Maymana	11/06/07	11/06/07	65.13651	35.68911	1149	7.5	23	310	1.00	19.60	0.002	0.20	3111	0.00	0.000	3
Faryab	Maymana	08/03/05	08/04/05	64.87666	36.27431	1314	7.5	26	350	2.70	19.60	0.002	0.20	2289	0.00	0.000	1
Faryab	Maymana	12/04/05	13/04/05	64.86451	36.27321	1314	7.5	26	350	2.70	19.60	0.002	0.20	2289	0.00	0.000	3
Faryab	Maymana	31/10/07	31/10/07	61.95974	34.89442	1188	7.3	8	253	0.80	4.70	0.010	0.15	58	0.00	0.000	4
Faryab	Maymana	10/07/07	10/07/07	67.59827	35.49165	1468	7.2	11	255	0.90	3.76	0.008	0.15	91	0.00	0.000	7
Faryab	Maymana	27/03/05	28/03/05	66.38485	36.22964	1538	7.9	27	410	3.40	51.00	0.004	0.15	3268	0.00	0.000	1
Faryab	Maymana	27/03/05	28/03/05	66.37837	36.22666	1538	7.9	27	410	3.40	51.00	0.004	0.15	3268	0.00	0.000	3
Faryab	Maymana	04/04/09	04/05/09	69.04620	34.08619	1024	7.5	10	253	0.30	2.62	0.004	0.10	154	0.00	0.000	7
Faryab	Maymana	02/04/09	02/05/09	69.24636	34.08998	1320	7.5	15	255	0.30	2.48	0.003	0.10	134	0.02	0.000	5
Faryab	Maymana	06/04/09	07/04/09	69.19963	34.13414	880	8.0	20	253	0.30	2.92	0.005	0.10	122	0.00	0.000	3
Faryab	Maymana	17/03/09	17/03/09	68.86778	34.32021	1166	7.8	10	253	0.40	1.44	0.001	0.10	167	0.00	0.000	2
Faryab	Maymana	17/03/09	17/03/09	69.86778	34.32023	1398	7.5	11	252	0.40	0.88	0.003	0.10	134	0.00	0.000	0
Faryab	Maymana	03/04/09	04/04/09	70.64901	34.20007	1222	7.8	36	253	0.40	0.19	0.003	0.10	150	0.01	0.000	5
Faryab	Maymana	25/11/08	25/11/08	69.20580	34.52229	1147	7.6	12	252	0.50	5.42	0.002	0.10	124	0.01	0.000	1
Faryab	Maymana	31/10/07	31/10/07	62.43664	34.91231	1188	7.3	8	253	0.80	4.70	0.001	0.10	58	0.00	0.000	5
Faryab	Maymana	08/08/07	08/08/07	69.60209	35.08069	897	8.8	7	253	0.90	2.88	0.049	0.10	46	0.00	0.000	5
Faryab	Maymana	10/06/07	10/07/07	67.68044	35.50692	1557	7.2	17	322	0.90	1.18	0.014	0.10	140	0.00	0.000	14
Faryab	Maymana	08/07/07	08/07/07	65.22210	35.61808	1557	7.2	17	322	0.90	1.18	0.014	0.10	140	0.00	0.000	8
Faryab	Maymana	12/05/07	13/05/07	64.10765	35.72410	863	8.4	5	253	1.00	0.38	0.006	0.10	148	0.00	0.000	15
Faryab	Maymana	15/05/07	15/05/07	64.10631	35.72247	1255	7.9	12	255	1.00	1.92	0.030	0.10	85	0.00	0.000	1
Faryab	Maymana	03/05/05	03/05/05	64.86452	36.25432	1355	7.5	23	370	2.60	51.00	0.003	0.10	3269	0.00	0.000	3
Faryab	Maymana	23/04/05	23/04/05	64.86235	36.25495	1355	7.5	23	370	2.60	52.00	0.003	0.10	3269	0.00	0.000	7
Laghman	Mehterlam	25/01/11	25/01/11	70.19494	34.64763	1070	7.8	21	97	0.95	1.12	0.008	1.12	219	0.01	0.000	0
Laghman	Mehterlam	15/05/10	16/05/10	70.20260	34.68018	1073	8.0	4	480	1.30	12.10	0.004	0.80	150	0.00	0.000	1
Laghman	Mehterlam	28/09/10	29/09/10	70.22689	34.66815	599	7.8	10	81	0.42	4.56	0.014	0.70	133	0.01	0.000	150
Laghman	Mehterlam	24/02/10	24/02/10	70.18269	34.61573	619	8.2	13	150	0.64	8.24	0.007	0.60	267	0.00	0.000	2
Laghman	Mehterlam	26/12/09	29/12/09	70.21890	34.67949	452	7.3	5	23	0.21	1.96	0.003	0.53	39	0.00	0.000	1
Laghman	Mehterlam	02/07/09	02/08/09	62.32238	33.38506	495	7.5	7	75	0.10	2.36	0.000	0.40	217	0.00	0.000	1
Laghman	Mehterlam	15/05/10	15/05/10	70.18182	34.61372	1118	8.3	11	230	1.05	9.84	0.001	0.32	174	0.00	0.000	1
Laghman	Mehterlam	05/04/11	07/04/11	70.24129	34.66231	1105	7.4	22	96	1.25	52.64	0.002	0.12	242	0.00	0.000	1
Laghman	Mehterlam	27/09/10	30/09/10	70.17898	34.61709	788	7.4	5	37	0.18	55.90	0.003	0.06	23	0.02	0.000	0
Laghman	Mehterlam	21/05/11	31/05/11	70.28088	34.74658	529	8.0	6	48	0.96	8.28	0.009	0.03	109	0.00	0.000	20

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Laghman	Mehterlam	26/09/10	30/09/10	70.17805	34.61748	979	7.8	8	270	0.48	52.90	0.000	0.01	226	0.04	0.000	0
Laghman	Mehterlam	28/10/10	31/10/10	70.24441	34.67221	504	7.8	13	19	0.32	1.16	0.001	0.01	130	0.04	0.000	20
Laghman	Mehterlam	07/03/11	10/03/11	70.21899	34.62350	459	7.4	15	21	0.47	4.64	0.001		126	0.01	0.000	0
Laghman	Mehterlam	16/05/10	17/05/10	70.20130	34.67725	784	8.1	6	330	0.96	6.90	0.007		170	0.04	0.000	
Laghman	Mehterlam	16/05/10	17/05/10	70.14466	34.96745	1316	8.0	13	270	1.20	52.00	0.035		43	0.04	0.000	2
Kabul	Mir Bacha Kot	26/07/09	27/06/09	65.12406	33.65857	625	7.6	6	77	0.30	1.40	0.002	0.15	146	0.01	0.000	1
Logar	Mohammad Agha	21/03/09	21/03/09	62.36592	34.23331	1101	8.0	45	66	0.40	12.40	0.040	14.50	149	0.01	0.000	5
Logar	Mohammad Agha	18/12/05	18/12/05	64.85621	36.04055	2350	7.6	15	950	1.30	12.40	0.000	2.50	108	0.03	0.025	0
Logar	Mohammad Agha	22/08/08	22/08/08	69.15349	34.53907	710	8.0	64	94	0.60	53.00	0.010	1.45	233	0.02	0.000	5
Logar	Mohammad Agha	28/08/08	28/08/08	69.29583	34.54648	680	8.0	49	69	0.60	8.40	0.000	1.15	152	0.01	0.000	7
Logar	Mohammad Agha	04/04/09	05/04/09	70.64901	34.20007	950	8.0	42	155	0.40	50.00	0.000	0.95	70	0.04	0.010	5
Logar	Mohammad Agha	22/06/09	07/01/09	68.87174	34.40750	822	8.0	8	58	0.50	1.60	0.010	0.95	90	0.01	0.450	7
Logar	Mohammad Agha	04/05/08	04/06/08	69.17068	34.58370	904	7.9	8	62	0.70	4.00	0.002	0.95	66	0.01	0.000	5
Logar	Mohammad Agha	02/05/09	02/05/09	69.25062	34.08938	882	8.0	32	87	0.30	4.80	0.000	0.90	111	0.00	0.000	5
Logar	Mohammad Agha	28/08/08	28/08/08	69.16748	34.54639	798	7.7	52	98	0.60	0.80	0.010	0.90	41	0.02	0.010	5
Logar	Mohammad Agha	02/09/08	02/09/08	69.18615	34.53758	980	8.0	9	64	0.60	80.00	0.009	0.85	32	0.02	0.025	5
Logar	Mohammad Agha	12/12/07	12/12/07	70.14741	34.85067	1564	7.7	145	252	0.80	52.00	0.004	0.85	42	0.01	0.000	5
Logar	Mohammad Agha	02/05/09	02/06/09	69.04231	33.99503	650	7.7	62	87	0.30	8.40	0.010	0.80	91	0.05	0.025	5
Logar	Mohammad Agha	29/11/08	22/11/08	65.06218	34.47190	961	7.9	61	106	0.50	6.46	0.002	0.80	74	0.02	0.010	5
Logar	Mohammad Agha	28/11/08	28/11/08	69.14461	34.50198	947	8.0	62	69	0.50	8.00	0.000	0.80	159	0.02	0.000	0
Logar	Mohammad Agha	10/12/05	01/12/05	64.66920	36.06519	1220	8.1	72	255	1.30	57.00	0.004	0.80	105	0.02	0.000	0
Logar	Mohammad Agha	27/11/08	28/11/08	69.14461	34.50198	621	8.0	8	98	0.50	6.80	0.001	0.75	69	0.02	0.000	2
Logar	Mohammad Agha	26/11/08	27/11/08	66.32239	34.50836	1208	7.8	22	116	0.50	10.50	0.008	0.75	140	0.02	0.000	0
Logar	Mohammad Agha	22/08/08	22/08/08	69.15365	34.53907	733	7.8	4	69	0.60	11.20	0.002	0.75	105	0.02	0.000	5

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Logar	Mohammad Agha	09/05/07	09/06/07	65.16034	35.70102	1325	8.0	4	268	1.00	18.80	0.007	0.75	113	0.06	0.075	3
Logar	Mohammad Agha	02/06/09	02/07/09	68.38834	33.56190	880	8.0	16	87	0.20	56.00	0.000	0.70	67	0.01	0.025	7
Logar	Mohammad Agha	02/06/09	02/07/09	68.41244	33.56946	1185	8.0	44	67	0.20	11.60	0.000	0.70	92	0.01	0.000	3
Logar	Mohammad Agha	07/10/08	07/10/08	69.18383	34.53751	817	7.7	50	69	0.50	11.60	1.190	0.70	54	0.02	0.000	3
Logar	Mohammad Agha	07/10/08	07/10/08	69.18383	34.53751	850	8.0	45	64	0.50	62.00	0.000	0.65	78	0.02	0.038	5
Logar	Mohammad Agha	01/08/09	01/08/09	68.43738	33.51249	724	8.4	8	87	0.10	52.00	0.000	0.60	57	0.05	0.000	7
Logar	Mohammad Agha	02/04/09	02/05/09	69.24220	34.08978	870	8.0	8	69	0.30	10.80	0.004	0.55	87	0.02	0.000	5
Logar	Mohammad Agha	03/05/09	03/06/09	68.94521	33.96494	640	8.0	27	98	0.30	10.80	0.000	0.55	69	0.03	0.000	0
Logar	Mohammad Agha	08/02/09	08/02/09	61.47589	34.38067	795	8.0	37	87	0.40	16.80	1.200	0.55	51	0.07	0.010	2
Logar	Mohammad Agha	03/05/09	03/06/09	68.95906	33.94918	465	8.0	37	75	0.30	54.00	0.000	0.50	87	0.02	0.000	2
Logar	Mohammad Agha	02/01/09	02/01/09	69.05212	34.43416	873	8.2	7	76	0.50	0.06	0.002	0.50	106	0.00	0.000	3
Logar	Mohammad Agha	31/08/08	31/08/08	69.16496	34.53860	631	6.0	5	98	0.60	17.20	0.000	0.50	53	0.04	0.038	0
Logar	Mohammad Agha	03/07/09	03/09/09	62.27296	33.37397	620	8.0	211	75	0.10	7.60	0.001	0.35	48	0.05	0.000	5
Logar	Mohammad Agha	02/07/09	02/08/09	62.33247	33.38896	498	8.6	13	98	0.10	53.00	0.000	0.20	26	0.05	0.000	3
Logar	Mohammad Agha	09/08/09	09/10/09	62.25657	33.31502	451	8.5	7	48	1.45	0.56	0.005	0.20	38	0.02	0.000	4
Logar	Mohammad Agha	02/06/09	03/06/09	68.39050	33.71292	579	7.6	7	75	0.30	2.02	0.000	0.10	53	0.00	0.000	1
Logar	Mohammad Agha	08/02/11	10/02/11	69.12634	34.24154	480	8.0	5	39	0.12	2.60	0.013	0.03	55	0.05	0.000	2
Logar	Mohammad Agha	30/03/11	06/04/11	69.11441	34.21964	525	8.3	15	39	0.22	1.84	0.002	0.80	146	0.02	0.000	1
Logar	Mohammad Agha	02/04/11	06/04/11	69.08307	34.19126	1292	7.9	20	135	0.63	2.24	0.004		208	0.04	0.000	1
Nangarhar	Muhmand Dara	03/02/10	03/02/10	70.88022	34.22684	538	8.0	12	56	0.48	0.72	0.000	0.60	153	0.02	0.008	1
Badghis	Muqur	16/03/05	16/03/05	64.83451	36.45726	3690	7.3	12	1700	6.00	0.94	0.004	0.55	8	0.00	0.000	5
Balkh	Nahri Shahi	09/04/10	09/04/10	67.16434	36.77373	2410	7.7	50	1040	2.46	53.30	0.001	0.70	380	0.02	0.004	2
Balkh	Nahri Shahi	25/10/10	25/10/10	67.06661	36.71268	1066	8.0	4	280	6.30	3.82	0.007	0.12	478	0.02	0.000	0
Balkh	Nahri Shahi	18/05/10	20/05/10	67.17011	36.76440	42800	8.6	48	9000	2.60	3.04	0.009		321	0.01	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Balkh	Nahri Shahi	18/05/10	20/05/10	67.17011	36.76440	3080	7.9	27	1400	3.80	2.32	0.002		64	0.07	0.000	2
Balkh	Nahri Shahi	26/10/10	26/10/10	67.06406	36.71264	1162	8.1	5	190	4.80	2.04	0.003		575	0.04	0.000	1
Balkh	Nahri Shahi	26/10/10	27/10/10	67.17011	36.76440	3160	8.1	36	1180	5.20	3.64	0.004		837	0.05	0.000	1
Kapisa	Nijrab	10/11/08	10/11/08	69.14262	34.53518	540	7.8	38	98	0.50	9.60	0.010	0.95	106	0.02	0.000	5
Kapisa	Nijrab	14/03/10	17/03/10	69.51249	35.02200	522	8.2	5	34	0.23	10.60	0.006	0.79	102	0.06	0.000	1
Kapisa	Nijrab	14/03/10	17/03/10	69.62965	35.06321	440	8.6	4	32	0.32	4.94	0.005	0.79	95	0.05	0.000	1
Kapisa	Nijrab	14/03/10	17/03/10	69.61240	35.03342	541	8.0	4	21	0.22	4.06	0.003	0.70	112	0.05	0.000	1
Kapisa	Nijrab	14/03/10	17/03/10	69.61631	35.01325	540	7.9	6	24	0.28	5.00	0.006	0.64	93	0.04	0.000	1
Kapisa	Nijrab	08/03/10	11/03/10	69.52220	35.03365	433	8.7	5	43	0.41	2.74	0.009	0.61	90	0.02	0.000	2
Kapisa	Nijrab	14/03/10	17/03/10	69.56654	35.00324	559	7.9	4	39	0.28	9.72	0.006	0.60	88	0.04	0.000	1
Kapisa	Nijrab	07/03/10	09/03/10	69.72718	35.02289	433	8.0	11	16	0.35	2.82	0.000	0.60	119	0.06	0.000	1
Kapisa	Nijrab	28/03/09	22/03/09	62.38157	34.23321	563	7.8	4	98	0.40	9.20	0.004	0.55	93	0.03	0.000	5
Kapisa	Nijrab	23/09/08	23/09/08	69.16599	34.53757	581	7.8	39	98	0.60	10.00	0.040	0.55	25	0.02	0.000	5
Kapisa	Nijrab	10/03/10	11/03/10	69.59220	35.01316	700	7.6	15	57	0.26	5.76	0.001	0.51	258	0.01	0.000	1
Kapisa	Nijrab	28/02/09	03/01/09	61.86537	34.41668	528	7.8	37	69	0.50	6.80	0.000	0.50	104	0.04	0.000	5
Kapisa	Nijrab	17/03/09	17/03/09	70.41271	34.31956	563	7.1	5	98	0.40	7.60	0.004	0.45	86	0.03	0.000	7
Kapisa	Nijrab	03/02/09	03/03/09	66.42225	34.34357	480	7.8	8	87	0.40	8.80	0.004	0.45	34	0.02	0.000	5
Kapisa	Nijrab	03/02/09	03/03/09	64.05973	34.34393	498	7.7	34	98	0.40	9.20	0.000	0.45	87	0.02	0.000	7
Kapisa	Nijrab	08/02/09	08/02/09	63.16942	34.38273	549	7.8	40	98	0.40	5.20	0.020	0.45	91	0.02	0.000	5
Kapisa	Nijrab	29/11/08	22/11/08	69.22864	34.47863	497	7.8	39	87	0.50	7.60	0.010	0.45	70	0.02	0.000	5
Kapisa	Nijrab	19/09/07	19/09/07	63.13320	34.98456	498	7.8	44	87	0.90	8.00	0.000	0.45	110	0.04	0.000	5
Kapisa	Nijrab	26/07/09	27/07/09	68.43911	33.54383	401	8.0	7	58	0.20	6.80	0.002	0.25	77	0.02	0.010	5
Kapisa	Nijrab	22/06/09	22/06/09	68.40476	33.59512	540	7.2	7	48	0.20	7.60	0.003	0.25	68	0.02	0.000	5
Kapisa	Nijrab	01/11/09	01/11/09	62.19654	33.18905	569	7.9	38	58	1.45	5.60	0.010	0.25	134	0.02	0.000	7
Kapisa	Nijrab	01/06/09	01/06/09	69.20972	34.04400	555	7.9	7	58	0.30	7.60	0.003	0.20	88	0.02	0.000	5
Kapisa	Nijrab	04/04/09	04/05/09	69.23194	34.08838	567	7.9	27	58	0.30	4.40	0.000	0.20	59	0.01	0.000	5
Kapisa	Nijrab	04/04/09	07/04/09	68.72676	34.14418	551	7.9	38	58	0.30	8.40	0.010	0.20	71	0.02	0.000	5
Kapisa	Nijrab	24/01/11	25/01/11	69.64026	35.06925	1102	7.6	20	66	0.55	2.34	0.006	0.12	138	0.00	0.000	0
Kapisa	Nijrab	05/04/11	07/04/11	69.64012	35.06741	763	8.0	20	57	0.23	4.50	0.002	0.03	121	0.01	0.000	1
Kapisa	Nijrab	01/11/10	03/11/10	69.60425	35.02314	838	7.8	18	82	0.33	4.50	0.360	0.01	123	0.01	0.000	1
Kapisa	Nijrab	01/03/10	01/03/10	69.59740	34.98680	595	8.0	10	23	0.22	1.88	0.008	0.01	91	0.02	0.000	0
Kapisa	Nijrab	14/03/10	17/03/10	69.62245	35.05352	545	7.8	6	39	0.31	4.10	0.004	0.01	93	0.04	0.000	1
Kapisa	Nijrab	10/03/10	11/03/10	69.53452	35.01376	438	7.5	10	43	0.37	2.34	0.001	0.01	111	0.06	0.000	1
Kapisa	Nijrab	10/03/10	11/03/10	69.60209	35.08069	655	7.1	4	21	0.43	1.06	0.001	0.01	108	0.02	0.000	0
Kapisa	Nijrab	11/03/10	12/03/10	69.54632	35.07363	435	7.8	12	43	0.45	3.28	0.041	0.01	113	0.05	0.000	1
Kapisa	Nijrab	08/11/10	08/11/10	69.40745	35.05324	1314	7.8	25	140	0.49	6.34	0.004	0.01	288	0.04	0.000	2
Kapisa	Nijrab	28/02/11	03/03/11	69.64026	35.06825	1306	7.8	36	94	0.53	14.00	0.005	0.01	116	0.00	0.000	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Kapisa	Nijrab	01/03/10	01/03/10	69.57368	34.06069	766	8.2	4	32	0.04	1.74	0.006	0.00	99	0.06	0.000	20
Kapisa	Nijrab	14/03/10	17/03/10	69.57357	35.01364	541	7.8	4	39	0.16	10.50	0.005	0.00	103	0.06	0.000	1
Kapisa	Nijrab	07/03/10	09/03/10	69.58908	34.95738	608	7.7	13	36	0.32	8.36	0.015	0.00	78	0.03	0.000	1
Maydan Wardak	Nirkh	01/06/09	01/06/09	69.26206	34.07050	970	7.5	9	87	0.30	17.30	0.006	0.78	10	0.01	0.000	7
Maydan Wardak	Nirkh	18/03/09	18/03/09	70.22153	34.29006	761	6.8	6	48	0.40	11.00	0.005	0.35	80	0.00	0.000	5
Maydan Wardak	Nirkh	11/01/11	13/01/11	68.77547	34.36844	622	6.9	18	33	0.26	9.54	0.008	0.12	155	0.03	0.000	0
Kunar	Nurgal	12/05/11	16/05/11	71.08296	34.77380	1337	7.5	14	87	0.82	6.58	0.115	0.14	90	0.00	0.000	5
Kunar	Nurgal	09/01/11	11/01/11	70.79476	34.62880	864	7.4	19	90	0.79	6.48	0.040	0.13	192	0.01	0.000	9
Kunar	Nurgal	09/01/11	11/01/11	70.73271	34.61147	853	7.5	23	85	0.91	6.74	0.051	0.13	170	0.01	0.000	4
Kunar	Nurgal	22/12/10	23/12/10	70.79154	34.62900	778	7.4	25	64	0.67	1.98	0.007	0.00	151	0.01	0.000	1
Herat	Obe	07/05/11	09/05/11	63.14864	34.37229	701	7.5	11	101	0.81	7.28	0.001	0.60	114	0.03	0.000	0
Herat	Obe	04/04/09	05/04/09	69.08227	34.19126	615	7.6	6	57	0.40	12.50	0.002	0.20	17	0.01	0.000	0
Herat	Obe	14/07/08	14/07/08	69.17966	34.58288	598	7.8	33	67	0.70	0.94	0.003	0.15	54	0.00	0.000	5
Nangarhar	Pachier Agam	23/03/09	23/03/09	62.40659	34.22261	645	7.9	12	77	0.40	2.50	0.003	0.55	50	0.03	0.000	5
Nangarhar	Pachier Agam	03/08/08	04/08/08	69.17966	34.58288	742	7.9	26	69	0.60	7.20	0.000	0.15	8	0.01	0.000	0
Nangarhar	Pachier Agam	09/04/11	12/04/11	70.27873	34.20602	620	7.7	15	82	0.65	4.38	0.007		203	0.04	0.000	3
Kabul	Paghman	09/08/10	15/08/10	69.06982	34.53278	445	8.5	6	43	0.10	5.40	0.035	0.51	29	0.01	0.000	820
Kabul	Paghman	12/01/11	16/01/11	68.94815	34.56294	560	8.6	15	34	0.67	3.74	0.009	0.00	102	0.07	0.000	7
Kandahar	Panjwai	03/06/09	03/08/09	62.22914	33.38336	737	7.7	9	114	0.10	3.18	0.005	0.20	147	0.00	0.000	6
Panjsher	Paryan	22/05/10	31/05/10	69.47145	35.24222	500	8.0	4	17	0.20	3.20	0.001	0.80	46	0.03	0.003	2
Ghor	Pasaband	19/03/09	19/03/09	69.12906	34.24142	641	7.7	28	48	0.40	0.74	0.001	1.30	122	0.00	0.000	1
Faryab	Pashtun Kot	03/06/09	03/08/09	62.22741	33.38235	2100	7.3	21	380	0.10	3.72	0.006	7.50	247	0.00	0.000	1
Faryab	Pashtun Kot	01/09/09	01/09/09	62.27296	33.37397	2100	7.3	21	380	0.10	3.72	0.006	7.50	247	0.01	0.000	1
Faryab	Pashtun Kot	07/08/07	07/08/07	61.68169	35.08688	2100	7.3	21	380	0.90	3.72	0.006	7.50	247	0.00	0.000	1
Faryab	Pashtun Kot	18/08/05	18/08/05	64.98739	36.13883	3250	7.3	27	720	1.50	1.38	0.009	4.50	505	0.00	0.000	16
Faryab	Pashtun Kot	24/02/05	25/02/05	66.21061	36.85057	9122	7.7	152	2320	10.10	2.78	1.175	3.50	1317	0.00	0.000	1
Faryab	Pashtun Kot	24/02/05	25/02/05	65.08565	36.85433	9122	7.7	152	2320	10.10	2.78	0.015	3.50	317	0.00	0.000	5
Faryab	Pashtun Kot	14/11/05	14/11/05	64.66339	36.06780	2940	7.5	32	410	1.30	1.22	0.008	3.00	288	0.00	0.000	7
Faryab	Pashtun Kot	26/02/05	27/02/05	66.59397	36.77278	6000	8.7	48	83	8.70	1.68	0.023	1.35	891	0.00	0.000	0
Faryab	Pashtun Kot	25/02/05	26/02/05	66.59397	36.77278	6000	8.7	48	48	8.70	1.68	0.023	1.35	891	0.00	0.000	0
Faryab	Pashtun Kot	26/02/05	27/02/05	66.89885	36.75699	6000	8.7	48	48	8.70	1.68	0.023	1.35	891	0.00	0.000	7
Faryab	Pashtun Kot	12/02/08	12/03/08	69.74756	34.60649	1439	7.3	9	252	0.70	0.84	0.004	0.75	177	0.00	0.000	2
Faryab	Pashtun Kot	03/05/07	03/05/07	63.23630	35.73710	1708	7.4	22	60	1.10	3.08	0.000	0.55	71	0.00	0.000	6
Faryab	Pashtun Kot	19/04/07	19/04/07	65.22229	35.73954	1708	7.4	22	60	1.10	3.08	0.000	0.55	71	0.00	0.000	10
Faryab	Pashtun Kot	07/04/07	07/05/07	63.23630	35.73710	1708	7.4	22	60	1.10	3.08	0.000	0.55	71	0.02	0.000	10
Faryab	Pashtun Kot	15/12/06	16/12/06	64.84858	35.86388	2050	7.4	34	310	1.10	0.58	0.003	0.50	186	0.00	0.000	4
Faryab	Pashtun Kot	29/03/05	22/03/05	64.87269	36.29333	1522	7.9	28	360	3.00	51.00	0.002	0.50	3260	0.00	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Pashtun Kot	29/03/05	22/03/05	64.87226	36.29295	1522	7.9	28	360	3.00	19.80	0.002	0.50	3260	0.00	0.000	3
Faryab	Pashtun Kot	29/06/05	29/06/05	64.66478	36.16670	1816	7.6	27	390	1.90	0.86	0.002	0.45	84	0.00	0.000	2
Faryab	Pashtun Kot	28/06/05	28/06/05	64.98152	36.16682	1816	7.6	27	390	1.90	0.86	0.002	0.45	84	0.00	0.000	5
Faryab	Pashtun Kot	22/06/05	22/06/05	64.66478	36.16670	1816	7.6	27	390	1.90	0.86	0.002	0.45	84	0.00	0.000	7
Faryab	Pashtun Kot	19/10/05	19/10/05	64.83825	36.08242	2370	7.4	22	560	1.40	0.96	0.003	0.40	12	0.00	0.000	3
Faryab	Pashtun Kot	19/10/05	19/10/05	64.84037	36.08114	2370	7.4	22	560	1.40	0.96	0.003	0.40	12	0.00	0.000	3
Faryab	Pashtun Kot	02/02/09	02/02/09	69.38399	34.38887	1319	7.6	12	253	0.50	3.10	0.000	0.35	131	0.01	0.000	5
Faryab	Pashtun Kot	23/08/07	24/08/07	69.33126	35.04323	1837	7.0	14	350	0.90	3.72	0.004	0.35	129	0.00	0.000	8
Faryab	Pashtun Kot	04/06/07	04/06/07	65.33160	35.70447	1920	7.1	19	420	1.00	2.16	0.001	0.35	125	0.00	0.000	1
Faryab	Pashtun Kot	19/08/06	19/08/06	64.81074	35.90278	1478	7.3	17	265	1.10	3.50	0.002	0.35	68	0.00	0.000	5
Faryab	Pashtun Kot	01/07/05	01/07/05	64.66478	36.16670	2520	7.2	27	540	1.90	2.56	0.002	0.35	419	0.01	0.000	5
Faryab	Pashtun Kot	05/11/07	05/11/07	69.16601	34.88995	1362	7.1	11	252	0.80	0.16	0.003	0.30	155	0.00	0.000	7
Faryab	Pashtun Kot	26/03/05	27/03/05	65.21885	36.34382	3720	7.3	38	1100	3.70	55.00	0.000	0.30	563	0.00	0.000	1
Faryab	Pashtun Kot	01/02/09	01/02/09	68.86571	34.39657	521	8.5	9	83	0.50	2.48	0.005	0.25	66	0.00	0.000	1
Faryab	Pashtun Kot	02/02/09	02/02/09	68.81571	34.39557	521	8.5	9	83	0.50	2.48	0.005	0.25	66	0.00	0.000	7
Faryab	Pashtun Kot	03/08/08	04/08/08	69.17966	34.58288	1191	7.2	5	252	0.60	2.76	0.009	0.25	44	0.00	0.000	5
Faryab	Pashtun Kot	10/08/08	10/08/08	69.17966	34.58288	1191	7.2	5	253	0.60	2.76	0.009	0.25	44	0.00	0.000	7
Faryab	Pashtun Kot	01/08/05	01/08/05	64.87438	36.14597	1578	7.6	16	310	1.60	0.76	0.004	0.25	85	0.00	0.000	7
Faryab	Pashtun Kot	02/08/05	02/08/05	64.88021	36.14433	1578	7.6	16	310	1.60	0.76	0.004	0.25	85	0.00	0.000	7
Faryab	Pashtun Kot	28/06/05	28/06/05	64.97274	36.16938	2450	8.0	36	83	2.10	2.86	0.010	0.25	312	0.00	0.000	3
Faryab	Pashtun Kot	28/06/05	28/06/05	64.98191	36.16701	1956	7.0	13	252	2.10	2.54	1.135	0.20	360	0.00	0.000	8
Faryab	Pashtun Kot	29/10/06	29/10/06	64.82450	35.88859	1066	8.2	12	83	1.10	1.16	0.008	0.15	61	0.00	0.000	3
Faryab	Pashtun Kot	21/06/05	21/06/05	64.68611	36.19557	2922	7.8	42	83	2.30	3.54	0.005	0.15	350	0.00	0.000	3
Faryab	Pashtun Kot	07/10/08	07/10/08	69.18494	34.53737	1220	7.6	14	150	0.50	5.16	0.005	0.10	147	0.01	0.000	1
Faryab	Pashtun Kot	16/05/07	16/05/07	64.09640	35.71990	843	8.5	8	253	1.00	1.12	0.006	0.10	158	0.00	0.000	20
Faryab	Pashtun Kot	03/12/10	07/12/10	64.67693	36.16200	1574	7.6	30	310	1.03	3.86	0.008	0.08	400	0.01	0.000	1
Faryab	Pashtun Kot	03/12/10	07/12/10	64.83156	35.89211	1715	7.0	32	370	1.01	4.54	0.004	0.07	276	0.02	0.000	0
Faryab	Pashtun Kot	03/12/10	07/12/10	64.84858	35.86355	1553	7.1	15	320	0.94	5.92	0.002	0.06	313	0.00	0.000	1
Herat	Pashtun Zarghun	13/07/09	14/07/09	68.42348	33.55578	729	7.4	8	73	0.20	1.68	0.002	0.90	60	0.00	0.000	1
Herat	Pashtun Zarghun	05/04/09	05/05/09	68.98750	34.08220	598	7.3	7	62	0.30	1.36	0.001	0.90	49	0.01	0.000	1
Herat	Pashtun Zarghun	06/10/08	15/06/08	69.17068	34.58370	635	6.3	9	61	0.70	8.00	0.000	0.20	47	0.00	0.000	10
Herat	Pashtun Zarghun	08/05/11	08/05/11	62.90090	34.25907	542	7.9	9	90	0.71	2.50	0.001		89	0.01	0.000	1
Logar	Puli Alam	09/04/08	09/04/08	69.18466	34.58554	1368	8.0	70	71	0.70	9.60	0.000	1.40	195	0.02	0.000	5
Logar	Puli Alam	03/11/08	03/11/08	69.18283	34.53651	982	7.8	54	72	0.50	7.20	0.000	0.95	204	0.02	0.000	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Logar	Puli Alam	09/01/08	09/01/08	69.65387	34.79948	1195	7.8	6	136	0.80	3.60	0.006	0.95	153	0.00	0.000	5
Logar	Puli Alam	03/05/09	03/06/09	68.39050	33.71292	766	7.6	4	87	0.30	4.64	0.000	0.65	66	0.00	0.000	1
Logar	Puli Alam	24/05/10	25/05/10	69.58743	34.02743	515	7.5	8	35	0.17	4.28	0.126	0.51	9	0.05	0.000	2
Logar	Puli Alam	08/03/09	08/03/09	62.44276	34.32581	523	7.5	7	48	0.40	8.88	0.000	0.40	59	0.00	0.000	5
Logar	Puli Alam	01/07/09	01/07/09	68.45657	33.58965	544	7.2	9	75	0.20	0.48	0.003	0.35	100	0.02	0.000	4
Logar	Puli Alam	23/03/11	30/03/11	69.01970	33.77194	502	7.7	15	32	0.41	7.02	0.003		148	0.05	0.000	0
Logar	Puli Alam	02/04/11	06/04/11	69.00556	33.97439	484	8.5	20	20	0.43	2.62	0.003		155	0.03	0.000	1
Baghlan	Puli Khumri	10/10/05	10/10/05	64.85291	36.08737	2260	7.9	28	252	1.40	5.92	0.008	0.55	56	0.00	0.000	3
Baghlan	Puli Khumri	26/08/08	26/08/08	69.17966	34.58288	566	8.0	6	65	0.60	2.04	0.006	0.35	81	0.01	0.000	5
Baghlan	Puli Khumri	11/05/07	11/05/07	64.76230	35.72949	1134	7.3	7	132	1.00	3.38	0.001	0.35	35	0.00	0.000	0
Baghlan	Puli Khumri	21/09/05	21/09/05	64.84880	36.10630	2080	7.7	22	520	1.50	13.60	0.009	0.10	192	0.02	0.000	0
Badghis	Qadis	10/08/06	11/08/06	64.76349	35.92288	1320	6.6	6	253	1.20	8.00	0.020	0.65	52	0.00	0.000	1
Badghis	Qadis	16/03/05	16/03/05	64.92001	36.42118	2500	7.1	470	850	5.40	1.00	0.000	0.15	513	0.00	0.000	1
Farah	Qala-e Kah	04/11/10	11/11/10	61.40194	32.40889	1200	7.6	9	210	1.26	2.06	0.018	0.52	239	0.04	0.000	43
Farah	Qala-e Kah	16/10/10	25/10/10	61.52945	32.29528	1277	7.7	6	235	0.86	4.86	0.045	0.09	228	0.07	0.000	1
Farah	Qala-e Kah	20/10/10	25/10/10	61.31610	32.17510	1452	7.7	34	590	1.01	6.98	0.100	0.07	406	0.06	0.000	3
Farah	Qala-e Kah	30/10/10	01/11/10	61.17880	32.18040	1930	8.0	29	440	1.18	4.20	0.033	0.05	308	0.04	0.000	1
Farah	Qala-e Kah	04/10/10	10/10/10	61.38164	32.43560	1393	8.1	22	250	1.24	3.62	0.004	0.05	180	0.02	0.300	2
Farah	Qala-e Kah	30/10/10	02/11/10	61.38639	32.35528	1300	8.0	24	255	0.97	2.02	0.024	0.05	238	0.03	0.000	1
Farah	Qala-e Kah	04/10/10	07/10/10	61.16840	32.15220	732	8.2	22	165	0.77	4.10	0.005	0.04	199	0.01	0.000	200
Farah	Qala-e Kah	09/10/10	10/10/10	61.23730	32.24900	1151	8.0	20	272	1.12	3.30	0.004	0.03	211	0.01	0.000	1
Farah	Qala-e Kah	30/10/10	01/11/10	61.41861	32.35583	1540	7.8	27	260	0.95	8.12	0.020	0.02	255	0.04	0.000	2
Farah	Qala-e Kah	21/10/10	24/10/10	61.19920	32.17350	1016	7.6	15	200	1.02	1.20	0.061	0.02	186	0.05	0.000	0
Farah	Qala-e Kah	09/12/10	14/12/10	61.32670	32.17110	899	8.0	21	195	0.93	3.48	0.004	0.02	232	0.01	0.000	1
Farah	Qala-e Kah	30/10/10	02/11/10	61.30990	32.17610	2000	8.0	36	325	1.10	1.48	0.004	0.02	298	0.06	0.000	35
Farah	Qala-e Kah	04/10/10	07/10/10	61.42056	32.36278	820	8.1	15	180	0.85	2.40	0.002	0.01	181	0.05	0.016	1
Farah	Qala-e Kah	30/10/10	02/11/10	61.17830	32.19440	960	8.0	23	205	0.78	4.40	0.040	0.01	257	0.02	0.000	40
Farah	Qala-e Kah	07/12/10	14/12/10	61.48195	32.29389	1022	7.8	29	240	0.94	6.00	0.002	0.01	211	0.01	0.000	1
Farah	Qala-e Kah	14/12/10	19/12/10	61.38499	32.35720	963	7.9	34	220	0.95	3.78	0.008	0.01	220	0.02	0.000	1
Farah	Qala-e Kah	01/11/10	07/11/10	61.27600	32.24420	1383	7.5	22	370	1.13	3.62	0.035	0.01	315	0.02	0.000	82
Farah	Qala-e Kah	30/10/10	02/11/10	61.40639	32.40500	914	7.9	26	195	1.29	3.12	0.014	0.01	243	0.06	0.000	4
Farah	Qala-e Kah	03/10/10	07/11/10	61.22980	32.21130	1820	7.3	28	405	1.29	3.98	0.525	0.01	188	0.03	0.000	7
Farah	Qala-e Kah	04/10/10	10/10/10	61.31070	32.17870	1765	7.5	26	337	1.20	4.68	0.008	0.01	216	0.04	0.000	0
Farah	Qala-e Kah	04/10/10	10/10/10	61.23700	32.24990	3620	8.1	54	650	1.51	12.24	0.040	0.01	428	0.03	0.000	4
Farah	Qala-e Kah	02/10/10	11/10/10	61.32630	32.16820	1568	7.9	24	395	1.17	3.92	0.059	0.01	194	0.03	0.000	0
Farah	Qala-e Kah	20/10/10	24/10/10	61.29279	32.28751	948	7.8	11	185	0.93	0.08	0.005	0.01	214	0.03	0.000	5

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Farah	Qala-e Kah	09/11/10	11/11/10	61.27520	32.24700	1252	7.3	16	270	1.00	4.02	0.003	0.01	285	0.02	0.000	113
Farah	Qala-e Kah	07/11/10	11/11/10	61.21230	32.20820	1200	7.8	23	250	1.11	7.12	0.004	0.01	331	0.02	0.000	47
Farah	Qala-e Kah	04/10/10	11/10/10	61.39645	32.30135	1958	6.4	42	160	1.37	1.30	0.006	0.01	172	0.02	0.000	120
Farah	Qala-e Kah	04/10/10	10/10/10	61.22960	32.26150	1246	7.7	20	250	1.01	4.84	0.001	0.01	148	0.04	0.000	0
Farah	Qala-e Kah	04/10/10	10/10/10	61.22960	32.26050	1158	8.0	14	225	1.99	3.02	0.007	0.01	164	0.05	0.000	200
Farah	Qala-e Kah	09/12/10	14/12/10	61.26417	32.24306	925	8.0	19	200	0.79	3.16	0.014	0.00	216	0.00	0.000	1
Farah	Qala-e Kah	07/12/10	14/12/10	61.38528	32.35750	1068	7.9	25	232	0.90	3.72	0.007	0.00	211	0.01	0.000	1
Farah	Qala-e Kah	04/12/10	17/12/10	61.38571	32.35842	895	7.8	23	200	0.91	4.74	0.007	0.00	205	0.01	0.000	12
Farah	Qala-e Kah	06/12/10	17/12/10	61.38544	32.35699	915	7.8	26	200	0.91	4.38	0.005	0.00	229	0.02	0.000	32
Farah	Qala-e Kah	30/11/10	14/12/10	61.17640	32.17920	971	7.8	16	202	0.92	6.46	0.007	0.00	208	0.02	0.000	1
Farah	Qala-e Kah	17/01/10	17/01/10	61.39645	32.30135	1062	8.0	17	205	0.94	1.48	0.001		167	0.01	0.000	1
Farah	Qala-e Kah	19/01/10	19/01/10	61.38164	32.43560	1424	8.0	44	310	0.96	1.50	0.008		207	0.01	0.000	1
Farah	Qala-e Kah	19/01/10	19/01/10	61.29279	32.28751	963	8.0	46	200	1.00	2.06	0.004		201	0.02	0.000	1
Badghis	Qala-I Naw	01/03/05	02/03/05	67.67394	36.71312	3250	7.5	28	2475	8.40	53.00	0.006	16.00		0.00	0.000	7
Badghis	Qala-I Naw	04/02/05	04/02/05	65.11276	36.91022	3660	7.4	25	1650	12.60	3.92	0.035	8.50		0.00	0.000	64
Badghis	Qala-I Naw	12/10/05	12/01/05	65.11826	36.95625	4250	7.1	36	2000	19.90	6.40	0.029	5.00		0.00	0.000	5
Badghis	Qala-I Naw	01/03/05	02/03/05	67.08112	36.71851	1933	7.7	7	950	8.50	7.80	0.000	4.00		0.00	0.000	7
Badghis	Qala-I Naw	16/01/05	16/01/05	65.12765	36.95228	1978	7.5	5	660	14.70	4.72	0.003	4.00		0.00	0.000	0
Badghis	Qala-I Naw	04/03/05	04/03/05	67.76390	36.56352	2750	7.4	25	1740	7.30	62.70	0.004	3.50		0.00	0.000	3
Badghis	Qala-I Naw	26/02/05	26/02/05	65.58590	36.80680	3220	7.5	28	1750	8.70	66.00	0.004	3.50		0.00	0.000	6
Badghis	Qala-I Naw	25/02/05	26/02/05	67.72225	36.81353	2090	7.5	8	822	9.00	2.56	0.006	3.50		0.00	0.000	7
Badghis	Qala-I Naw	15/01/05	15/01/05	65.07899	36.95350	2440	7.4	9	1240	15.60	4.64	0.010	3.50		0.00	0.000	0
Badghis	Qala-I Naw	14/03/05	14/03/05	64.91174	36.51174	1922	7.5	13	970	6.10	65.50	0.001	3.00		0.00	0.000	7
Badghis	Qala-I Naw	10/03/05	10/03/05	64.91516	36.52572	1943	7.5	13	970	6.10	65.50	0.001	3.00		0.00	0.000	7
Badghis	Qala-I Naw	03/03/05	04/03/05	67.71547	36.56227	1917	7.9	14	890	6.90	54.00	0.003	3.00		0.00	0.000	15
Badghis	Qala-I Naw	04/03/05	04/03/05	67.76913	36.58820	3450	7.2	22	1750	7.30	76.00	0.009	2.50		0.00	0.000	0
Badghis	Qala-I Naw	16/01/05	16/01/05	65.09908	36.95268	1996	7.4	9	560	14.90	6.88	0.004	2.50		0.00	0.000	7
Badghis	Qala-I Naw	02/03/05	03/03/05	67.70149	36.70979	3220	7.7	22	1700	8.20	67.60	1.370	1.50		0.00	0.003	10
Badghis	Qala-I Naw	04/07/05	04/03/05	66.82237	36.69170	3360	7.4	32	1650	7.60	55.00	0.012	1.00		0.00	0.000	17
Badghis	Qala-I Naw	15/03/05	15/03/05	64.83451	36.45726	5100	7.3	48	2000	6.00	3.80	0.001	0.90	981	0.01	0.000	5
Badghis	Qala-I Naw	25/11/08	25/11/08	65.24212	34.52418	478	8.0	13	87	0.50	6.80	0.004	0.45		0.00	0.000	0
Badghis	Qala-I Naw	04/02/05	04/02/05	66.08395	36.86487	4190	7.1	32	1850	11.00	54.00	2.400	0.40		0.00	0.000	0
Badghis	Qala-I Naw	16/10/05	16/10/05	64.83825	36.08242	2000	7.3	10	610	1.40	10.10	0.002	0.35	292	0.01	0.000	0
Badghis	Qala-I Naw	23/09/08	23/09/08	69.18366	34.53753	2350	7.3	15	1440	0.50	3.54	0.033	0.30	555	0.00	0.000	5
Badghis	Qala-I Naw	11/10/05	11/10/05	64.85766	36.08278	1202	8.0	14	322	1.40	2.64	0.008	0.30		0.00	0.000	0
Badghis	Qala-I Naw	14/10/10	15/10/10	63.10806	34.73251	3300	7.8	42	1850	6.20	8.56	1.590	0.20	1124	0.01	0.000	12

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Badghis	Qala-I Naw	14/10/10	15/10/10	63.15807	34.97451	3360	7.8	34	1650	6.40	8.58	1.420	0.18	970	0.01	0.000	0
Badghis	Qala-I Naw	10/05/06	10/05/06	64.89090	36.01012	3310	7.3	27	1550	1.30	3.64	0.000	0.10	690	0.00	0.000	1
Badghis	Qala-I Naw	03/03/05	04/03/05	64.89941	36.55693	5620	7.6	46	2440	6.60	3.00	0.004	0.10	1161	0.01	0.000	5
Zabul	Qalat	11/05/11	17/05/11	66.95834	32.00806	1122	7.3	7	112	1.04	12.10	0.016	0.06	92	0.00	0.000	1
Zabul	Qalat	11/05/11	18/05/11	66.95417	32.00750	957	7.1	31	70	0.95	1.92	0.840	0.06	166	0.03	0.000	0
Zabul	Qalat	11/05/11	17/05/11	66.81333	32.03056	952	7.3	7	76	0.99	9.34	0.007	0.06	111	0.01	0.000	1
Zabul	Qalat	11/05/11	18/05/11	66.95917	32.00694	775	7.3	6	76	0.55	1.06	0.880	0.04	110	0.01	0.000	0
Ghazni	Qarabagh	03/05/09	03/06/09	68.40192	33.68718	586	7.2	26	87	0.30	2.60	0.000	0.50	103	0.00	0.050	1
Kabul	Qarabagh	03/05/09	03/06/09	69.00556	33.97439	444	7.4	12	48	0.30	11.00	0.002	0.10	49	0.01	0.000	6
Kabul	Qarabagh	03/05/09	03/06/09	69.01970	33.77197	700	7.7	21	48	0.30	6.00	0.013	0.10	75	0.00	0.000	0
Faryab	Qaram Qul	11/06/04	11/06/04	68.96389	37.15000	5220	7.8	54	480	11.00	5.80	1.171	1.65	1315	0.00	0.001	0
Faryab	Qaram Qul	20/11/04	20/11/04	65.17634	37.00555	6100	7.5	48	480	13.00	19.50	0.045	1.65	1451	0.00	0.000	0
Faryab	Qaram Qul	20/08/05	20/08/05	64.86582	36.13481	1697	7.5	16	270	1.50	0.82	0.010	0.60	183	0.00	0.003	1
Faryab	Qaram Qul	20/08/05	20/08/05	64.86582	36.13481	1697	7.5	16	270	1.50	0.82	0.010	0.60	183	0.00	0.003	1
Faryab	Qaram Qul	23/08/05	24/08/05	64.86582	36.13481	1697	7.5	16	270	1.50	0.82	0.010	0.60	183	0.03	0.003	1
Faryab	Qaramqul	25/05/11	29/05/11	65.08300	36.86487	1594	7.5	18	400	4.20	0.58	0.003		160	0.01	0.000	20
Laghman	Qarghayi	29/08/10	29/08/10	70.31007	34.49338	1333	8.3	42	180	1.29	32.00	0.089	0.80	166	0.01	0.000	40
Laghman	Qarghayi	07/06/10	07/06/10	70.20139	34.50555	550	8.3	17	96	0.56	10.02	0.004	0.79	138	0.02	0.000	2
Laghman	Qarghayi	07/06/10	07/06/10	70.21422	34.53854	540	8.3	9	95	0.83	9.44	0.005	0.51	121	0.03	0.000	2
Laghman	Qarghayi	04/05/08	04/06/08	69.17068	34.58370	666	8.3	4	106	0.70	6.46	0.001	0.50	222	0.00	0.000	1
Laghman	Qarghayi	29/09/10	30/09/10	70.29805	34.49434	588	8.4	10	28	0.27	3.12	0.004	0.40	60	0.00	0.000	11
Laghman	Qarghayi	31/01/09	31/01/09	68.86267	34.40357	590	7.3	5	75	0.50	5.56	0.007	0.40	55	0.00	0.000	3
Laghman	Qarghayi	29/08/10	29/08/10	70.30909	34.49224	693	8.2	13	86	0.62	4.48	0.035	0.02	114	0.00	0.000	9
Laghman	Qarghayi	02/02/10	02/02/10	70.29003	34.49659	758	7.8	12	45	0.30	5.24	0.004		74	0.02	0.000	1
Laghman	Qarghayi	07/03/11	10/03/11	70.21006	34.53532	639	8.3	15	18	0.79	6.86	0.002		38	0.01	0.000	0
Faryab	Qaram Qul	03/01/05	03/01/05	65.17634	37.00555	6100	7.5	48	480	21.00	19.50	0.045	1.65	1451	0.00	0.000	3
Faryab	Qaram Qul	21/09/04	21/09/04	70.19078	37.02657	5220	7.8	54	480	22.00	5.80	1.171	1.65	1315	0.00	0.001	3
Jawzjan	Qarqin	11/07/10	13/07/10	66.06500	37.40800	486	8.3	4	104	0.72	2.42	0.000	0.79	91	0.01	0.000	109
Faryab	Qaysar	22/11/08	12/01/08	70.22272	34.75413	908	7.9	10	253	0.70	3.30	0.008	24.00	152	0.00	0.000	1
Faryab	Qaysar	04/02/08	04/02/08	63.10349	34.75236	908	7.9	10	253	0.70	3.30	0.008	24.00	152	0.00	0.000	7
Faryab	Qaysar	25/09/05	25/09/05	64.85213	36.10487	1225	8.0	13	370	1.50	3.70	0.003	2.10	178	0.00	0.000	2
Faryab	Qaysar	18/08/06	18/08/06	64.80207	35.90695	2090	7.4	16	410	1.10	0.82	0.048	1.90	253	0.00	0.000	3
Faryab	Qaysar	18/08/06	18/08/06	64.81492	35.90832	2090	7.4	16	410	1.10	0.82	0.048	1.90	253	0.00	0.000	5
Faryab	Qaysar	18/08/06	18/08/06	64.80343	35.90678	2090	7.4	16	410	1.10	0.82	0.048	1.90	253	0.00	0.000	7
Faryab	Qaysar	14/05/07	14/05/07	63.27292	35.72355	2710	7.3	17	520	1.00	0.58	0.001	0.90	151	0.00	0.000	2
Faryab	Qaysar	31/08/08	31/08/08	69.15349	34.53907	422	8.2	4	66	0.60	1.40	0.005	0.70	112	0.00	0.000	3

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Qaysar	04/07/05	04/07/05	64.97217	36.16386	1196	7.5	8	253	1.90	9.00	0.005	0.60	115	0.00	0.000	7
Faryab	Qaysar	05/04/09	06/04/09	69.09508	34.18005	687	7.9	9	118	0.30	3.90	0.001	0.45	49	0.00	0.000	5
Faryab	Qaysar	05/04/09	06/04/09	69.06160	34.15611	687	7.9	9	118	0.30	3.90	0.001	0.45	49	0.00	0.000	7
Faryab	Qaysar	18/06/07	19/06/07	64.02226	35.68645	1570	7.4	10	253	1.00	5.30	0.007	0.45	71	0.00	0.000	3
Faryab	Qaysar	07/11/08	07/12/08	70.36052	34.43802	675	7.8	5	106	0.50	0.78	0.004	0.35	149	0.02	0.000	2
Faryab	Qaysar	06/12/08	06/12/08	70.39565	34.44407	622	8.1	7	57	0.50	1.58	0.001	0.35	167	0.02	0.000	2
Faryab	Qaysar	04/02/08	04/03/08	63.53416	34.73255	647	7.9	13	58	0.70	3.06	0.020	0.35	100	0.00	0.000	7
Faryab	Qaysar	04/02/08	04/03/08	66.17151	34.73655	647	7.9	13	58	0.70	3.06	0.002	0.35	100	0.00	0.000	5
Faryab	Qaysar	16/06/08	16/06/08	69.17068	34.58370	1286	7.8	14	280	0.70	1.82	0.003	0.35	177	0.02	0.000	2
Faryab	Qaysar	25/05/07	31/05/07	65.19748	35.70617	1165	7.1	5	253	1.00	0.32	0.003	0.35	211	0.01	0.000	3
Faryab	Qaysar	21/09/05	21/09/05	64.84880	36.10630	2810	7.3	24	670	1.50	2.74	0.002	0.35	190	0.01	0.000	2
Faryab	Qaysar	04/07/05	04/07/05	64.88388	36.16273	1490	7.7	26	322	1.80	9.10	0.006	0.35	183	0.00	0.000	1
Faryab	Qaysar	04/07/05	04/07/05	64.67693	36.16330	1490	7.7	26	322	1.80	9.10	0.006	0.35	183	0.00	0.000	5
Faryab	Qaysar	11/10/05	11/01/05	65.92692	36.96867	2890	7.2	32	700	2.00	1.16	0.002	0.35	276	0.01	0.000	5
Faryab	Qaysar	16/06/05	16/06/05	64.87226	36.20353	2900	7.3	22	770	2.30	1.24	0.001	0.35	14	0.00	0.000	4
Faryab	Qaysar	29/03/05	22/03/05	64.87269	36.29333	2750	7.2	32	670	3.00	1.94	0.004	0.35	224	0.00	0.000	4
Faryab	Qaysar	17/08/06	17/08/06	64.78392	35.91341	1611	7.4	9	255	1.10	0.16	0.005	0.30	153	0.01	0.000	2
Faryab	Qaysar	29/10/06	29/10/06	64.83410	35.88718	3760	7.4	44	880	1.10	3.42	0.002	0.30	490	0.01	0.000	5
Faryab	Qaysar	28/06/05	28/06/05	64.98152	36.16682	1190	7.8	11	320	2.00	6.32	0.026	0.30	199	0.00	0.000	2
Faryab	Qaysar	27/09/05	27/09/05	64.86250	36.10270	1387	7.4	9	360	1.40	4.28	0.002	0.25	181	0.00	0.000	7
Faryab	Qaysar	10/10/05	10/11/05	64.84024	36.07253	1403	7.3	9	288	1.40	2.00	0.008	0.22	122	0.00	0.000	10
Faryab	Qaysar	11/11/07	11/11/07	62.51369	34.86834	750	7.8	5	120	0.80	7.80	0.006	0.20	98	0.00	0.000	7
Faryab	Qaysar	04/12/05	13/04/05	64.56905	36.26516	1962	7.3	38	253	2.60	12.40	0.006	0.20	96	0.00	0.000	6
Faryab	Qaysar	18/04/05	19/04/05	64.85771	36.25606	1962	7.3	38	253	2.60	12.40	0.006	0.20	96	0.00	0.000	7
Faryab	Qaysar	01/10/05	01/10/05	64.85394	36.09641	1211	7.5	21	255	1.40	8.80	0.002	0.15	43	0.00	0.000	7
Faryab	Qaysar	01/10/05	01/10/05	64.86250	36.10270	1211	7.5	21	255	1.40	8.80	0.002	0.15	43	0.00	0.000	0
Faryab	Qaysar	22/07/09	27/07/09	68.41737	33.54131	456	7.8	8	77	0.10	0.98	0.001	0.10	124	0.02	0.000	2
Faryab	Qaysar	19/07/09	20/07/09	68.42632	33.55270	470	7.9	7	87	0.20	0.50	0.003	0.10	151	0.02	0.000	5
Faryab	Qaysar	07/05/09	10/05/09	68.03549	34.07801	471	8.0	7	87	0.30	0.78	0.001	0.10	152	0.00	0.000	1
Faryab	Qaysar	29/08/08	29/08/08	69.16944	34.54408	400	8.0	6	98	0.60	0.72	0.001	0.10	121	0.01	0.000	1
Faryab	Qaysar	22/08/08	22/08/08	69.16411	34.54244	1315	7.6	13	255	0.60	0.50	0.001	0.10	199	0.00	0.000	3
Faryab	Qaysar	05/09/07	05/09/07	61.65043	35.01271	1255	7.6	8	252	0.90	3.22	0.007	0.10	178	0.01	0.000	3
Faryab	Qaysar	22/08/06	22/08/06	64.80563	35.89732	1943	7.6	10	253	1.10	0.04	0.035	0.10	197	0.00	0.000	2
Faryab	Qaysar	04/06/05	04/06/05	64.86137	36.24535	2722	7.7	23	580	2.40	1.50	0.012	0.10	152	0.03	0.000	1
Faryab	Qaysar	06/04/05	06/04/05	64.87666	36.27431	2940	7.2	36	660	2.70	2.76	0.002	0.10	208	0.00	0.000	5
Faryab	Qurghan	04/02/05	05/02/05	66.08395	36.86487	13322	6.9	40	600	11.00	13.60	1.130	9.00	2865	0.00	0.000	0
Faryab	Qurghan	08/02/05	08/02/05	65.08516	36.86377	13322	6.9	40	600	11.00	13.60	1.130	9.00	2865	0.00	0.000	0
Faryab	Qurghan	11/10/04	11/01/04	70.51748	37.22425	14900	7.7	46	1890	32.00	3.00	4.600	9.00	884	0.00	0.005	7

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Qurghan	27/03/05	27/03/05	64.89626	36.32240	4960	7.5	40	980	3.60	3.14	1.255	7.50	453	0.00	0.000	0
Faryab	Qurghan	27/03/05	28/03/05	64.88485	36.31964	4960	7.5	40	980	3.60	3.14	1.255	7.50	453	0.00	0.000	0
Faryab	Qurghan	02/02/05	02/02/05	65.11276	36.91022	14640	7.3	38	720	12.70	4.22	1.640	7.00	3407	0.00	0.000	0
Faryab	Qurghan	02/02/05	02/02/05	65.11217	36.91280	14640	7.3	38	720	12.70	4.22	1.640	7.00	3407	0.00	0.000	0
Faryab	Qurghan	11/01/05	11/01/05	65.92692	36.96867	9500	7.3	54	700	22.40	0.17	3.030	3.15	2567	0.00	0.000	7
Faryab	Qurghan	11/10/05	11/01/05	65.21907	36.96560	9500	7.3	54	700	22.40	0.17	3.030	3.15	244	0.00	0.000	3
Faryab	Qurghan	11/06/04	11/06/04	68.64108	37.15388	2950	7.6	52	440	2.00	2.40	1.170	2.50	2016	0.00	0.000	3
Faryab	Qurghan	15/01/04	15/01/04	70.22404	37.17394	2950	7.6	52	440	3.00	2.40	1.170	2.50	2016	0.00	0.000	7
Faryab	Qurghan	04/04/09	22/12/99	70.21970	37.40419	2260	7.8	52	440	2.00	3.60	1.150	2.00	2149	0.00	0.000	7
Faryab	Qurghan	22/07/09	27/07/00	70.56838	37.25222	2260	7.8	52	440	11.00	3.60	1.150	2.00	2149	0.00	0.000	3
Faryab	Qurghan	25/05/11	27/05/11	65.09908	36.95268	3100	7.2	38	975	0.02	0.80	0.011	0.65	496	0.00	0.000	9
Faryab	Qurghan	25/05/11	26/05/11	65.09017	36.91920	12950	7.4	128	3710	2.60	0.88	0.460	0.60	253	0.01	0.000	55
Nangarhar	Rodat	20/05/07	20/05/07	64.12566	35.71059	876	7.8	6	61	1.00	2.32	0.002	0.70	111	0.00	0.000	102
Nangarhar	Rodat	06/04/09	07/04/09	69.73290	34.14717	712	7.8	8	69	0.30	0.54	1.170	0.35	126	0.02	0.000	0
Nangarhar	Rodat	28/11/08	12/01/08	61.91171	34.76931	720	7.9	13	116	0.80	8.00	0.000	0.10	69	0.00	0.000	1
Nangarhar	Rodat	13/03/11	17/03/11	70.48627	34.21450	980	7.4	15	70	0.62	2.92	0.015		80	0.01	0.000	1
Panjsher	Rukha	14/04/10	18/04/10	69.77700	35.41400	524	8.2	4	17	0.18	3.14	0.007	0.61	64	0.00	0.002	1
Panjsher	Rukha	03/04/11	04/04/11	69.82755	33.56365	505	8.0	19	30	0.52	2.30	0.000	0.03	124	0.06	0.110	0
Panjsher	Rukha	14/07/10	15/07/10	69.47654	35.24741	525	8.1	13	34	0.54	2.08	0.001	0.02	33	0.00	0.107	18
Panjsher	Rukha	23/01/11	25/01/11	69.77630	33.65776	581	7.8	12	29	0.57	2.34	0.007	0.00	126	0.05	0.000	0
Takhar	Rustaq	06/01/10	06/01/10	69.85073	37.24631	476	7.9	5	43	0.39	5.58	0.002	0.51	95	0.03	0.000	9
Takhar	Rustaq	07/01/10	07/01/10	69.91224	37.24534	401	8.0	4	32	0.20	3.42	0.005		63	0.02	0.000	1
Takhar	Rustaq	07/01/10	07/01/10	69.78475	37.13510	1247	7.5	8	480	1.11	2.90	0.011		119	0.02	0.000	1
Takhar	Rustaq	06/01/10	06/01/10	69.78742	37.10200	1352	7.6	8	490	1.22	2.02	0.003		89	0.03	0.000	1
Takhar	Rustaq	07/01/10	07/01/10	69.73930	37.20147	2330	7.6	18	1060	1.45	2.48	0.005		588	0.02	0.000	2
Samangan	Ruyi Du Ab	02/03/09	02/03/09	69.17281	34.35407	550	8.5	7	120	0.40	1.46	0.002	0.10	49	0.00	0.000	2
Samangan	Ruyi Du Ab	11/09/09	11/10/09	69.55567	33.23370	450	8.1	7	83	1.45	0.22	0.001	0.10	25	0.00	0.000	3
Ghor	Saghar	27/01/10	28/01/10	66.42064	33.33241	806	7.7	6	58	0.27	2.10	0.002	0.71	97	0.01	0.000	1
Kunar	Sarkani	30/03/11	31/03/11	70.87977	34.96906	509	7.6	22	24	0.44	2.08	0.000	0.01	169	0.06	0.000	1
Kunar	Sarkani	30/03/11	30/03/11	70.90985	34.97824	495	8.6	17	26	0.50	2.48	0.003	0.01	150	0.01	0.000	0
Kunar	Sarkani	03/03/11	06/03/11	70.83295	34.96380	506	7.9	27	23	0.07	2.10	0.003	0.01	128	0.01	0.000	2
Kunar	Sarkani	03/03/11	06/03/11	70.84768	34.95289	505	7.9	19	23	0.15	1.90	0.001	0.01	122	0.01	0.000	0
Maydan Wardak	Saydabad	07/10/07	07/10/07	63.14075	34.93963	1246	7.3	20	128	0.80	3.30	0.001	1.60	191	0.04	0.000	5
Maydan Wardak	Saydabad	12/01/07	12/04/07	63.98531	35.75131	1200	7.7	17	253	1.10	6.90	0.002	0.84	79	0.05	0.001	0
Maydan Wardak	Saydabad	11/01/11	13/01/11	68.76060	34.87260	1174	7.5	27	155	0.86	7.60	0.002	0.13	581	0.02	0.000	2
Paktya	Sayed Karam	03/04/09	04/04/09	70.27873	34.20602	545	7.5	7	87	0.40	0.98	0.001	0.25	166	0.02	0.000	0
Paktya	Sayed Karam	23/03/11	30/03/11	69.37737	33.76376	550	7.8	13	41	0.42	5.86	0.004		175	0.06	0.000	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Ghor	Shahrak	27/01/10	31/01/10	66.51339	34.26398	1096	7.4	25	150	0.72	7.26	0.005	0.00	156	0.03	0.000	1
Kabul	Shakardara	03/04/09	04/04/09	70.27873	34.20602	578	7.5	17	48	0.40	9.00	0.004	0.10	89	0.01	0.000	6
Farah	Shib Koh	27/05/10	27/05/10	61.39645	32.30135	1244	8.0	15	310	1.18	2.66	0.003	0.60	227	0.00	0.003	2
Farah	Shib Koh	28/05/10	28/05/10	61.38164	32.43560	1232	8.1	15	290	1.21	1.90	0.001	0.51	194	0.00	0.004	2
Farah	Shib Koh	25/02/11	01/03/11	61.44671	32.14480	2250	7.6	36	165	1.42	6.98	0.008	0.03	220	0.06	0.000	3
Farah	Shib Koh	30/04/11	04/05/11	61.55956	32.15152	442	7.7	10	48	0.72	55.20	0.001	0.02	46	0.01	0.000	6
Farah	Shib Koh	25/02/11	01/03/11	61.44397	32.14317	1358	7.8	40	195	1.40	3.90	0.002	0.02	214	0.02	0.000	0
Farah	Shib Koh	12/04/11	17/04/11	61.73167	32.30743	558	7.5	8	101	0.46	3.70	0.022	0.01	107	0.04	0.000	5
Farah	Shib Koh	12/04/11	17/04/11	61.44383	32.15442	475	7.6	19	80	0.42	3.06	0.050	0.01	83	0.04	0.000	1
Farah	Shib Koh	30/04/11	04/05/11	61.55672	32.15492	410	7.7	6	34	0.54	4.38	0.002	0.01	52	0.00	0.000	200
Farah	Shib Koh	17/05/11	18/05/11	61.63250	32.14111	582	7.4	8	23	0.97	3.74	0.000	0.01	49	0.00	0.000	20
Farah	Shib Koh	17/05/11	18/05/11	61.30210	32.08990	588	7.4	7	20	1.49	5.20	0.000	0.01	38	0.01	0.000	25
Farah	Shib Koh	25/02/11	28/02/11	61.37684	32.16376	1761	7.7	6	410	0.98	5.76	0.013	0.01	760	0.02	0.000	2
Farah	Shib Koh	25/02/11	01/03/11	61.44801	32.14791	1981	7.8	52	200	1.49	4.26	0.000	0.01	146	0.00	0.000	0
Farah	Shib Koh	25/02/11	28/02/11	61.61365	32.13517	1980	8.0	7	630	1.17	4.00	0.003	0.01	818	0.01	0.000	2
Farah	Shib Koh	10/12/10	20/12/10	61.39645	32.30135	2700	7.8	34	670	1.39	9.26	0.004	0.00	835	0.03	0.000	2
Farah	Shib Koh	06/03/11	10/03/11	61.61591	32.13388	698	8.0	14	106	0.50	4.66	0.008		124	0.00	0.000	2
Farah	Shib Koh	06/03/11	13/03/11	61.61724	32.13531	542	8.0	18	74	0.66	5.94	0.005		186	0.04	0.000	2
Farah	Shib Koh	06/03/11	13/03/11	61.44793	32.14399	658	7.7	18	112	0.74	7.48	0.005		211	0.03	0.000	0
Farah	Shib Koh	06/03/11	14/03/11	61.48439	32.13365	916	7.8	23	160	0.81	5.30	0.004		185	0.01	0.000	6
Farah	Shib Koh	06/03/11	14/03/11	61.61338	32.13181	574	7.5	19	77	0.85	5.12	0.002		214	0.02	0.000	0
Jawzjan	Shibirghan	17/12/10	21/12/10	65.98100	37.20600	5680	7.3	22	2000	0.02	3.70	0.011	1.89	614	0.01	0.000	1
Herat	Shindand	04/06/07	04/06/07	65.21774	35.70478	1800	6.8	17	450	1.00	1.84	0.003	0.60	250	0.00	0.000	1
Herat	Shindand	09/05/07	09/05/07	64.18013	35.73566	926	8.3	62	120	1.00	8.40	0.010	0.55	260	0.00	0.000	0
Herat	Shindand	14/08/06	14/08/06	64.77408	35.91743	961	7.9	63	138	1.20	10.80	0.030	0.55	272	0.00	0.000	0
Herat	Shindand	27/09/07	27/09/07	69.47720	34.94423	984	8.0	75	144	0.90	55.00	0.010	0.50	145	0.00	0.000	0
Herat	Shindand	10/07/07	10/07/07	65.14601	35.48153	935	8.1	56	140	0.90	10.80	0.010	0.45	138	0.00	0.000	0
Herat	Shindand	22/11/08	12/01/08	61.94973	34.77296	514	8.1	27	87	0.80	3.80	1.180	0.40	76	0.00	0.000	0
Herat	Shindand	05/04/09	05/05/09	69.05276	34.07915	578	8.2	8	69	0.30	1.82	0.002	0.35	78	0.01	0.000	6
Herat	Shindand	26/08/08	26/08/08	69.17966	34.58288	594	8.2	42	68	0.60	9.20	0.020	0.35	92	0.00	0.000	0
Herat	Shindand	03/07/07	04/07/07	65.13945	35.66415	771	8.0	48	110	0.90	12.40	0.020	0.35	140	0.00	0.000	0
Herat	Shindand	06/11/08	06/11/08	70.21006	34.53532	488	8.4	32	65	0.50	9.60	0.030	0.30	90	0.00	0.000	0
Herat	Shindand	08/03/08	22/08/08	69.15298	34.53941	492	8.6	34	64	0.60	13.00	1.160	0.30	86	0.00	0.000	0
Herat	Shindand	04/05/08	04/05/08	69.17068	34.58370	562	8.3	29	69	0.70	13.00	1.150	0.30	79	0.00	0.000	0
Herat	Shindand	02/11/08	02/11/08	69.15652	34.53664	694	8.1	9	100	0.50	0.88	0.010	0.25	88	0.00	0.000	0
Herat	Shindand	13/01/05	31/01/05	65.09132	36.91851	1043	8.0	150	48	12.80	0.01	1.100	0.08	227	0.00	0.000	5
Herat	Shindand	27/04/11	28/04/11	62.27269	33.37397	593	7.6	6	70	0.60	2.50	0.002		37	0.02	0.000	2

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Nangarhar	Shinwar	15/05/11	18/05/11	70.79900	34.19178	1574	7.4	24	195	0.84	2.50	0.005	0.16	249	0.04	0.000	0
Nangarhar	Shinwar	15/05/11	17/05/11	70.78324	34.21065	429	8.0	6	28	0.18	0.18	0.000	0.14	68	0.01	0.000	2
Nangarhar	Shinwar	30/04/11	15/05/11	70.81741	34.22812	1450	7.1	13	104	0.98	10.20	0.047	0.13	57	0.02	0.000	7
Nangarhar	Shinwar	16/01/11	20/01/11	70.81527	34.24583	442	7.2	30	27	0.50	4.72	0.007	0.12	105	0.04	0.000	2
Nangarhar	Shinwar	16/01/11	20/01/11	70.83269	34.21511	434	7.3	20	27	0.57	3.40	0.003	0.12	87	0.02	0.000	2
Nangarhar	Shinwar	17/01/11	20/01/11	70.82771	34.24179	440	7.4	17	28	0.67	3.30	0.005	0.12	104	0.04	0.000	2
Nangarhar	Shinwar	25/01/11	27/01/11	70.82213	34.18667	1065	7.8	22	70	0.95	1.44	0.009	0.12	200	0.01	0.000	0
Nangarhar	Shinwar	30/04/11	15/05/11	70.78651	34.22070	1617	7.2	12	116	0.86	7.46	0.041	0.11	49	0.00	0.000	2
Nangarhar	Shinwar	30/04/11	15/05/11	70.79913	34.25305	1453	7.1	16	104	1.05	5.10	0.035	0.10	122	0.02	0.000	10
Nangarhar	Shinwar	17/01/11	20/01/11	70.84559	34.22277	411	7.4	17	29	0.49	2.92	0.001	0.02	98	0.02	0.000	2
Nangarhar	Shinwar	22/01/11	25/01/11	70.81874	34.23992	857	7.6	16	185	0.74	2.48	0.004	0.01	183	0.05	0.000	0
Nangarhar	Shinwar	17/01/11	20/01/11	70.83927	34.22884	419	7.5	20	28	0.60	3.56	0.002	0.01	109	0.04	0.000	2
Nangarhar	Shinwar	28/02/11	06/03/11	70.81538	34.19117	512	8.0	20	19	1.16	5.00	0.003	0.01	138	0.02	0.000	0
Nangarhar	Shinwar	29/05/11	31/05/11	70.80755	34.23991	483	8.3	4	15	0.46	3.92	0.002	0.01	90	0.00	0.000	0
Nangarhar	Shinwar	16/03/11	17/03/11	70.79886	34.22624	770	7.4	17	56	0.57	7.10	0.025	0.00	123	0.03	0.000	1
Nangarhar	Shinwar	16/03/11	17/03/11	70.81522	34.19833	801	7.6	18	70	0.67	8.14	0.047	0.00	117	0.02	0.000	0
Nangarhar	Shinwar	29/05/11	31/05/11	70.80707	34.19162	486	8.2	4	24	0.53	2.60	0.004	0.00	92	0.00	0.000	0
Nangarhar	Shinwar	27/11/10	28/11/10	70.83970	34.23488	594	7.8	14	118	0.80	6.02	0.003	0.00	167	0.01	0.000	0
Nangarhar	Shinwar	29/03/11	31/03/11	70.78923	34.24078	567	8.0	23	23	0.31	2.98	0.008		121	0.06	0.000	5
Parwan	Shinwari	11/04/11	12/04/11	69.03556	35.04416	1040	6.4	16	210	1.22	2.60	0.012	0.25	81	0.02	0.000	1
Parwan	Shinwari	06/10/10	07/10/10	69.82215	35.95812	970	7.5	5	200	0.84	4.12	0.019	0.20	197	0.02	0.000	10
Parwan	Shinwari	05/02/11	07/02/11	68.95118	35.01617	768	7.7	11	65	0.40	3.32	0.003	0.20	133	0.03	0.000	2
Parwan	Shinwari	06/10/10	07/10/10	68.95118	35.01617	1600	7.3	13	300	1.37	7.00	0.890	0.11	16	0.02	0.000	0
Parwan	Shinwari	02/11/10	04/11/10	69.03556	35.04416	1433	6.6	12	37	0.33	4.86	0.002	0.09	334	0.01	0.000	1
Parwan	Shinwari	02/11/10	04/11/10	68.98725	35.03792	921	6.8	17	124	1.42	3.42	0.032	0.01	183	0.00	0.000	1
Faryab	Shirin Tagab	12/01/05	12/01/05	65.11962	36.96402	54000	8.3	446	48	20.00	54.00	1.300	12.50	11932	0.00	0.000	3
Faryab	Shirin Tagab	02/03/05	03/03/05	67.74361	36.70880	7500	7.8	44	2200	7.80	53.00	0.000	5.50	681	0.05	0.000	1
Faryab	Shirin Tagab	22/05/06	22/05/06	64.73795	35.92570	2760	8.4	36	320	1.20	2.74	0.002	0.65	260	0.00	0.000	6
Faryab	Shirin Tagab	24/12/09	28/12/09	62.13310	32.40640	2760	8.4	36	83	1.45	2.74	0.002	0.65	260	0.00	0.000	3
Faryab	Shirin Tagab	07/03/07	07/04/07	68.76635	35.75940	1810	7.3	17	340	1.10	1.40	0.000	0.60	114	0.00	0.001	5
Faryab	Shirin Tagab	11/04/07	11/04/07	68.76635	35.75794	1810	7.3	17	340	1.10	1.40	0.000	0.60	114	0.01	0.001	5
Faryab	Shirin Tagab	20/12/05	20/12/05	64.97520	36.03858	2070	7.3	23	450	1.30	3.14	0.006	0.60	102	0.00	0.000	1
Faryab	Shirin Tagab	28/12/05	28/12/05	64.97520	36.03858	2070	7.3	23	450	1.30	3.14	0.006	0.60	102	0.00	0.000	7
Faryab	Shirin Tagab	21/06/05	22/06/05	68.75075	36.18349	2022	7.6	21	622	2.30	6.28	0.002	0.60	324	0.00	0.000	0
Faryab	Shirin Tagab	21/06/05	22/06/05	68.75075	36.18349	2022	7.6	21	622	2.30	6.28	0.002	0.60	324	0.00	0.000	6
Faryab	Shirin Tagab	22/02/05	23/02/05	65.06152	36.86208	1810	7.3	17	340	10.50	1.40	0.000	0.60	114	0.00	0.000	5
Faryab	Shirin Tagab	14/08/06	14/08/06	64.76691	35.91725	2020	7.3	27	410	1.10	3.42	0.007	0.45	19	0.00	0.000	0

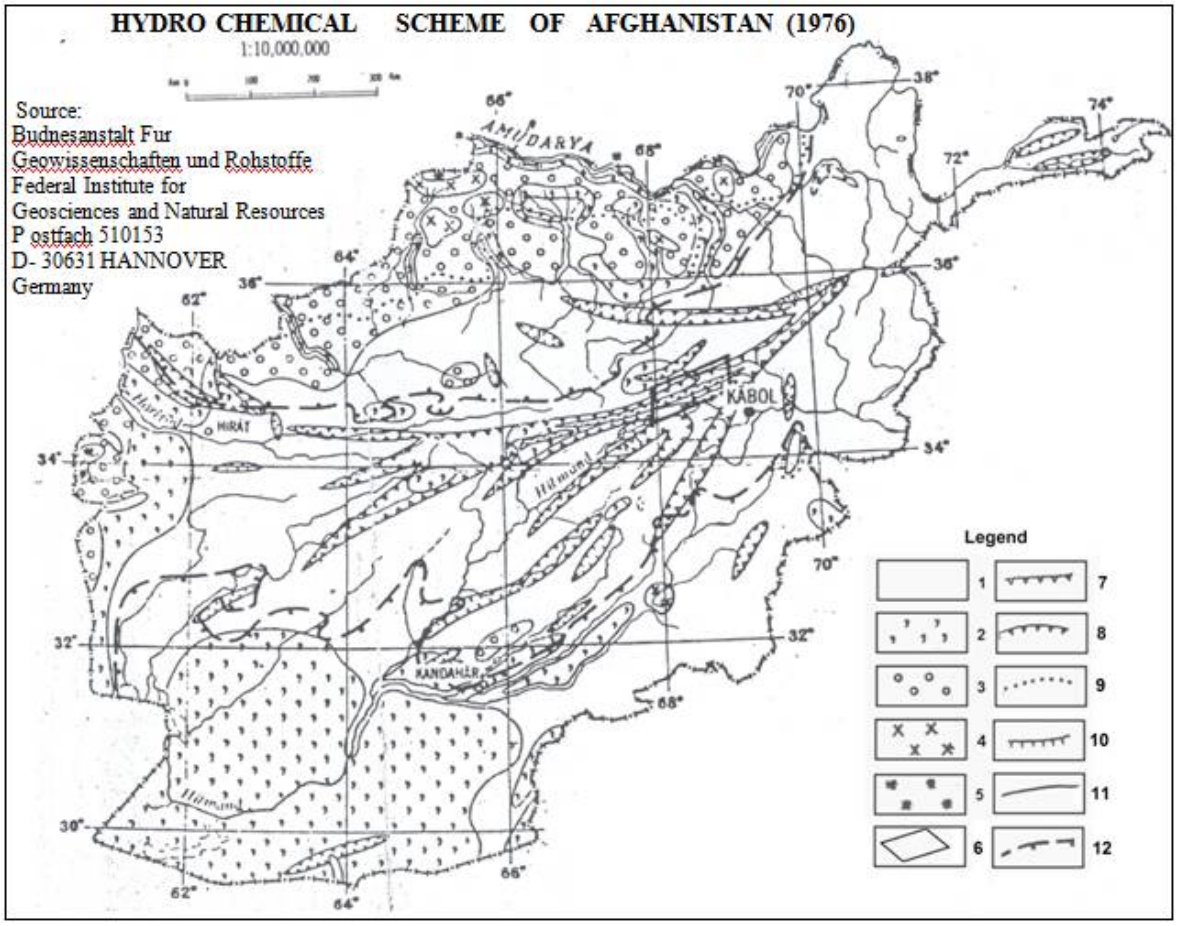
Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Shirin Tagab	16/08/06	16/08/06	64.79164	35.91670	2020	7.3	27	410	1.10	3.42	0.007	0.45	19	0.00	0.000	34
Faryab	Shirin Tagab	14/11/05	14/11/05	64.84024	36.07253	1901	7.4	23	420	1.30	6.66	0.002	0.45	108	0.00	0.000	6
Faryab	Shirin Tagab	14/11/05	14/11/05	64.83963	36.07103	1901	7.4	23	420	1.30	6.66	0.002	0.45	108	0.00	0.000	7
Faryab	Shirin Tagab	06/03/06	08/03/06	64.66569	36.03494	1950	7.3	36	310	1.30	5.41	0.003	0.40	1468	0.00	0.000	0
Faryab	Shirin Tagab	14/03/06	14/03/06	64.66569	36.03494	1950	7.3	36	310	1.30	5.41	0.003	0.40	1468	0.00	0.000	40
Faryab	Shirin Tagab	11/07/07	11/07/07	63.02522	35.19443	1776	7.6	20	252	0.90	1.92	0.000	0.35	191	0.00	0.000	5
Faryab	Shirin Tagab	23/05/07	31/05/07	65.19523	35.70666	1967	7.3	27	350	1.00	3.64	1.192	0.35	451	0.00	0.000	8
Faryab	Shirin Tagab	02/06/07	02/06/07	64.10258	35.70556	2360	7.1	29	460	1.00	5.92	0.022	0.35	670	0.00	0.000	11
Faryab	Shirin Tagab	11/03/07	11/03/07	64.36792	35.82078	2050	7.4	20	350	1.10	3.92	0.018	0.35	572	0.00	0.000	2
Faryab	Shirin Tagab	16/08/06	16/08/06	64.79164	35.91670	2020	7.3	27	410	1.10	3.42	0.007	0.35	19	0.00	0.000	8
Faryab	Shirin Tagab	18/08/05	18/08/05	65.07095	36.13655	3210	7.4	40	700	1.50	6.48	0.041	0.35	585	0.00	0.000	4
Faryab	Shirin Tagab	28/03/05	29/03/05	64.86814	36.29973	8722	8.4	40	1650	3.30	5.00	1.220	0.35	901	0.00	0.000	15
Faryab	Shirin Tagab	17/03/05	17/03/05	64.88331	36.41798	7880	7.9	44	1000	5.20	51.00	1.875	0.35	1040	0.01	0.000	5
Faryab	Shirin Tagab	28/03/07	29/03/07	63.91044	35.76228	2500	7.3	29	422	1.10	3.28	0.020	0.30	485	0.00	0.000	11
Faryab	Shirin Tagab	11/02/07	11/02/07	64.36932	35.82266	2060	7.4	170	580	1.10	2.82	0.007	0.30	315	0.00	0.000	5
Faryab	Shirin Tagab	11/02/07	11/02/07	64.36976	35.82194	2060	7.4	170	580	1.10	2.82	0.007	0.30	315	0.00	0.000	22
Faryab	Shirin Tagab	05/03/07	05/03/07	64.36881	35.82184	2060	7.4	170	580	1.10	2.80	0.007	0.30	315	0.00	0.000	5
Faryab	Shirin Tagab	22/04/06	22/04/06	64.69387	36.01512	2000	7.9	25	400	1.30	3.10	0.002	0.30	58	0.00	0.000	1
Faryab	Shirin Tagab	23/04/06	23/04/06	64.88399	36.01299	2000	7.9	25	400	1.30	3.10	0.002	0.30	58	0.00	0.000	15
Faryab	Shirin Tagab	18/01/06	18/01/06	64.66569	36.03494	1967	7.3	54	360	1.30	4.52	0.009	0.30	51	0.00	0.000	1
Faryab	Shirin Tagab	29/01/06	26/01/06	64.66569	36.03494	1967	7.3	54	360	1.30	4.52	0.009	0.30	51	0.00	0.000	42
Faryab	Shirin Tagab	10/10/05	05/11/05	64.84024	36.07253	2090	7.4	27	470	1.40	6.70	0.004	0.30	148	0.00	0.040	18
Faryab	Shirin Tagab	31/10/05	31/10/05	64.84054	36.07281	2090	7.4	27	470	1.40	6.70	0.004	0.30	148	0.00	0.000	1
Faryab	Shirin Tagab	23/03/05	23/03/05	64.93383	36.39977	4600	7.9	40	1220	4.20	51.00	0.004	0.30	420	0.02	0.000	6
Faryab	Shirin Tagab	13/07/05	13/07/05	64.88464	36.16140	1478	7.6	18	280	1.80	2.50	0.008	0.25	76	0.00	0.000	5
Faryab	Shirin Tagab	05/07/05	05/07/05	64.88591	36.16246	1478	7.6	18	280	1.80	2.50	0.008	0.25	76	0.00	0.000	25
Faryab	Shirin Tagab	22/10/05	22/10/05	64.84220	36.07437	1726	7.4	17	322	1.40	3.78	0.003	0.20	53	0.00	0.000	5
Faryab	Shirin Tagab	22/10/05	22/10/05	64.85173	36.07941	1726	7.4	17	322	1.40	3.78	0.003	0.20	53	0.00	0.000	5
Faryab	Shirin Tagab	22/10/05	22/10/05	64.84220	36.07437	1726	7.4	17	322	1.40	3.78	0.003	0.20	53	0.00	0.000	6
Faryab	Shirin Tagab	20/03/05	20/03/05	64.89700	36.40563	8962	8.3	42	2040	4.30	12.40	1.430	0.20	1428	0.06	0.000	10
Faryab	Shirin Tagab	02/03/05	03/03/05	66.82237	36.69177	9522	7.2	40	2000	7.60	57.00	1.186	0.20	990	0.01	0.000	0
Faryab	Shirin Tagab	27/01/05	27/01/05	65.31734	36.92251	10200	7.5	50	372	13.60	16.50	0.042	0.20	1695	0.02	0.000	0
Faryab	Shirin Tagab	15/01/05	15/01/05	65.09908	36.95268	16710	7.1	44	560	15.20	51.60	0.013	0.20	2576	0.01	0.000	5
Faryab	Shirin Tagab	01/06/09	01/07/09	69.19266	33.58677	1120	7.6	9	253	0.20	4.24	0.002	0.10	105	0.00	0.000	6
Faryab	Shirin Tagab	05/09/07	05/09/07	63.05374	34.99268	1850	7.5	20	320	0.90	1.42	0.003	0.10	627	0.00	0.000	5
Faryab	Shirin Tagab	11/07/07	11/07/07	63.46245	35.12768	1876	7.6	20	280	0.90	2.47	0.004	0.10	154	0.02	0.000	1
Faryab	Shirin Tagab	16/08/06	16/08/06	64.80491	35.91610	2050	7.1	19	322	1.10	5.38	0.003	0.10	266	0.00	0.000	1

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodi-um (mg/L)	Chro-mium (mg/L)	Arse-nic (mg/L)	Faecal Coliforms (Col/100 ml)
Faryab	Shirin Tagab	20/08/06	20/08/06	64.39223	35.90013	2122	7.4	21	360	1.10	4.82	0.020	0.10	381	0.00	0.000	7
Faryab	Shirin Tagab	19/05/06	19/05/06	64.77766	35.92829	2741	7.3	34	522	1.20	3.92	1.170	0.10	576	0.00	0.000	2
Faryab	Shirin Tagab	23/04/06	23/04/06	64.88399	36.01299	2000	7.9	25	400	1.30	3.10	0.002	0.10	58	0.00	0.000	5
Faryab	Shirin Tagab	11/05/06	11/05/06	64.68660	36.00979	2080	7.2	27	400	1.30	2.24	0.016	0.10	511	0.00	0.000	1
Faryab	Shirin Tagab	03/10/09	03/11/09	62.09697	32.42097	2860	7.6	20	252	1.45	2.70	1.175	0.10	296	0.00	0.000	0
Faryab	Shirin Tagab	21/06/05	21/06/05	64.87337	36.18727	2022	7.6	21	622	2.30	6.28	0.002	0.10	324	0.00	0.000	5
Faryab	Shirin Tagab	28/03/05	29/03/05	64.86814	36.29973	8722	8.4	40	1650	3.30	5.00	1.220	0.10	901	0.00	0.000	6
Faryab	Shirin Tagab	17/03/05	17/03/05	68.92041	36.41742	3400	7.8	7	1440	4.80	18.60	0.004	0.10	247	0.06	0.000	1
Faryab	Shirin Tagab	05/03/05	05/03/05	67.69769	36.54695	10400	7.6	44	3400	6.40	6.70	1.190	0.10	1988	0.02	0.000	7
Faryab	Shirin Tagab	04/02/05	04/03/05	68.88033	36.65700	11210	7.2	44	2000	7.40	67.20	1.800	0.10	990	0.07	0.000	0
Faryab	Shirin Tagab	23/02/05	24/02/05	65.06152	36.86208	4520	8.4	38	2000	10.20	57.00	0.005	0.10	1044	0.00	0.000	5
Faryab	Shirin Tagab	23/02/05	24/02/05	65.08565	36.85433	4520	8.4	38	2000	10.20	57.00	0.005	0.10	1044	0.01	0.000	6
Faryab	Shirin Tagab	31/01/05	31/01/05	65.09132	36.91851	3422	7.8	54	1600	13.30	15.20	0.004	0.10	913	0.00	0.000	1
Faryab	Shirin Tagab	22/01/05	22/01/05	65.09017	36.91920	3422	7.8	54	1600	13.30	15.20	0.004	0.10	913	0.00	0.000	1
Faryab	Shirin Tagab	16/01/05	16/01/05	65.12765	36.95228	2410	8.4	42	1120	14.50	10.80	1.370	0.10	797	0.00	0.000	0
Faryab	Shirin Tagab	10/10/05	10/10/05	68.65024	36.09195	1550	6.6	48	590	1.40	2.90	0.002	0.01	74	0.00	0.000	5
Faryab	Shirin Tagab	03/10/05	03/10/05	64.85394	36.09641	1550	7.6	48	590	1.40	2.90	0.002	0.01	74	0.00	0.000	7
Faryab	Shirin Tagab	04/02/10	07/02/10	64.97274	36.16938	4600	7.9	40	1220	4.20	51.98	0.004		420	0.02	0.000	2
Faryab	Shirin Tagab	03/02/10	07/02/10	64.38166	36.16683	3400	7.8	46	1440	4.80	52.60	0.004		247	0.06	0.000	2
Faryab	Shirin Tagab	01/02/10	07/02/10	64.74518	36.24967	7880	7.9	44	1000	5.15	20.00	0.875		127	0.01	0.000	2
Balkh	Sholgara	10/01/07	11/10/07	64.81854	34.91940	749	7.5	5	67	0.80	2.18	0.001	0.10	87	0.00	0.000	1
Balkh	Shortepa	11/07/10	13/07/10	68.38425	33.55458	2250	8.3	40	280	1.45	3.90	0.005	0.61	124	0.02	0.000	1
Khost	Spira	26/09/07	26/09/07	62.37008	34.95296	1176	7.6	9	380	0.90	8.40	0.000	0.25	93	0.00	0.000	10
Nangarhar	Surkh Rod	22/08/08	22/08/08	69.15812	34.53961	801	7.7	12	114	0.60	0.96	0.001	0.90	80	0.03	0.000	1
Nangarhar	Surkh Rod	13/05/10	14/05/10	70.17612	34.35330	665	7.9	9	146	0.83	4.18	0.007	0.53	133	0.00	0.000	1
Nangarhar	Surkh Rod	13/05/10	14/05/10	70.11471	34.22026	639	7.9	4	138	0.74	2.25	0.002	0.51	120	0.00	0.000	0
Nangarhar	Surkh Rod	17/03/09	17/03/09	70.41271	34.31956	627	7.8	10	104	0.40	0.74	0.001	0.45	19	0.03	0.000	0
Nangarhar	Surkh Rod	26/08/08	26/08/08	69.24641	34.56550	567	8.1	13	94	0.60	1.64	0.014	0.45		0.04	0.000	3
Nangarhar	Surkh Rod	03/01/09	03/02/09	69.38399	34.38887	857	7.5	16	253	0.40	1.72	0.004	0.40	55	0.02	0.000	0
Nangarhar	Surkh Rod	16/09/07	16/09/07	63.12362	34.98465	617	7.4	50	68	0.90	18.80	0.000	0.30	62	0.01	0.000	2
Nangarhar	Surkh Rod	19/09/07	19/09/07	63.12362	34.98465	617	7.4	50	68	0.90	18.80	0.000	0.30	62	0.01	0.000	2
Nangarhar	Surkh Rod	19/08/06	19/08/06	64.80343	35.90678	1103	7.8	28	126	1.10	4.80	0.020	0.30	31	0.01	0.000	0
Nangarhar	Surkh Rod	12/05/07	13/05/07	63.27292	35.72355	779	8.4	7	99	1.00	53.00	0.000	0.25	66	0.01	0.000	5
Nangarhar	Surkh Rod	30/05/11	31/05/11	70.18388	34.34172	1224	7.9	27	185	0.98	3.28	0.002	0.22	289	0.01	0.000	17
Nangarhar	Surkh Rod	30/05/11	31/05/11	70.18197	34.33919	1220	7.9	14	185	0.87	3.72	0.002	0.21	277	0.01	0.000	21
Nangarhar	Surkh Rod	30/05/11	31/05/11	70.18777	34.34545	1228	7.9	23	185	0.96	3.40	0.007	0.20	291	0.01	0.000	33
Nangarhar	Surkh Rod	30/05/11	31/05/11	70.19087	34.35209	890	7.8	13	52	0.40	5.08	0.001	0.16	252	0.00	0.000	5

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Nangarhar	Surkh Rod	30/05/11	31/05/11	70.18406	34.33815	798	7.9	16	44	0.46	3.88	0.005	0.16	192	0.00	0.000	10
Nangarhar	Surkh Rod	10/07/07	10/07/07	64.85038	35.35981	613	7.9	7	104	0.90	6.84	0.001	0.15	101	0.01	0.000	5
Nangarhar	Surkh Rod	05/10/10	06/10/10	70.10556	34.21064	747	7.6	5	136	0.84	3.60	0.079	0.04	186	0.04	0.000	70
Nangarhar	Surkh Rod	29/03/11	30/03/11	70.39194	34.45195	694	7.0	15	98	0.68	1.46	0.015	0.03	200	0.04	0.000	12
Nangarhar	Surkh Rod	19/04/11	01/05/11	70.19061	34.34600	670	7.4	4	94	0.68	2.22	0.001	0.03	28	0.00	0.000	2
Nangarhar	Surkh Rod	22/02/11	23/02/11	70.35888	34.46974	688	6.6	4	100	0.70	0.34	0.015	0.03	142	0.03	0.000	2
Nangarhar	Surkh Rod	19/04/11	01/05/11	70.40612	34.44166	593	7.5	4	95	0.87	2.64	0.009	0.03	8	0.00	0.000	3
Nangarhar	Surkh Rod	15/05/11	17/05/11	70.18618	34.34173	692	7.5	4	114	0.74	6.86	0.004	0.01	135	0.02	0.000	0
Nangarhar	Surkh Rod	25/04/11	26/04/11	70.36141	34.46579	680	7.3	6	108	1.04	1.34	0.000	0.01	68	0.00	0.000	2
Nangarhar	Surkh Rod	05/04/10	05/04/10	70.10866	34.20793	848	7.9	12	100	0.71	2.66	0.003	0.01	144	0.01	0.000	10
Nangarhar	Surkh Rod	05/02/10	06/02/10	70.18184	34.39491	553	7.8	9	101	0.42	2.04	0.007		151	0.01	0.000	1
Nangarhar	Surkh Rod	15/04/10	15/04/10	70.21654	34.24703	554	8.1	5	87	0.55	2.00	0.002		69	0.00	0.000	1
Nangarhar	Surkh Rod	15/04/10	15/04/10	70.22088	34.24749	560	8.2	6	91	0.55	3.48	0.007		105	0.01	0.000	1
Nangarhar	Surkh Rod	10/04/11	12/04/11	70.21406	34.35188	635	7.5	4	144	0.80	3.24	0.005		52	0.03	0.000	6
Nangarhar	Surkh Rod	10/04/11	12/04/11	70.36052	34.41641	972	7.3	4	365	0.92	2.74	0.003		164	0.04	0.000	2
Nangarhar	Surkh Rod	12/03/11	15/03/11	70.38820	34.44563	780	7.3	17	126	0.95	2.10	0.004		182	0.04	0.000	39
Parwan	Surkhi Parsa	23/09/10	24/09/10	68.65890	34.79933	1782	7.2	21	450	1.09	2.84	0.054	0.80	316	0.00	0.000	3
Parwan	Surkhi Parsa	23/09/10	24/09/10	68.58424	34.89914	2830	7.0	34	1120	2.60	1.82	0.006	0.80	489	0.01	0.000	7
Parwan	Surkhi Parsa	08/06/10	28/06/10	68.66163	34.83754	432	8.1	4	99	0.49	1.76	0.001	0.70	35	0.01	0.000	2
Parwan	Surkhi Parsa	28/06/10	29/06/10	68.66278	34.85175	748	8.5	4	165	0.90	1.58	0.003	0.70	119	0.03	0.000	2
Parwan	Surkhi Parsa	23/09/10	24/09/10	68.65294	34.90876	1733	7.2	23	450	1.04	2.20	0.044	0.35	406	0.00	0.024	4
Kabul	Surobi	22/07/09	22/07/09	68.40852	33.51810	545	8.0	5	48	0.10	5.44	0.004	0.90	96	0.00	0.000	7
Kabul	Surobi	22/06/09	22/06/09	68.41395	33.60045	554	8.1	8	58	0.20	4.16	0.004	0.80	97	0.00	0.000	7
Kabul	Surobi	15/05/06	15/05/06	64.74176	35.94362	1027	8.1	17	253	1.20	4.82	0.004	0.45	176	0.04	0.000	5
Kabul	Surobi	24/02/10	24/02/10	69.08424	34.61781	551	8.2	8	43	0.41	4.80	0.002	0.01	165	0.02	0.000	
Kabul	Surobi	07/03/11	10/03/11	69.00000	34.00000	739	7.6	22	49	0.44	2.98	0.004		125	0.01	0.000	0
Kapisa	Tagab	01/03/10	01/03/10	69.36730	34.71918	675	8.0	4	63	1.50	6.04	0.008	0.80	151	0.02	0.000	1
Kapisa	Tagab	08/03/10	09/03/10	69.67514	34.81856	569	8.0	12	97	0.52	2.14	0.002	0.79	107	0.00	0.000	1
Kapisa	Tagab	08/03/10	09/03/10	69.66120	34.85060	575	8.1	17	21	0.29	2.70	0.002	0.61	80	0.02	0.000	70
Kapisa	Tagab	22/05/06	22/05/06	64.76905	35.92502	743	7.7	6	253	1.20	4.06	0.001	0.35	95	0.01	0.000	1
Kapisa	Tagab	17/05/06	17/05/06	64.77717	35.92257	722	8.1	5	253	1.20	4.06	0.001	0.20	47	0.00	0.000	7
Kapisa	Tagab	13/08/06	13/08/06	64.79699	35.91831	644	7.8	34	253	1.20	6.80	0.000	0.20	185	0.01	0.000	4
Kapisa	Tagab	06/03/11	07/03/11	69.66768	34.79070	948	7.6	7	185	0.66	6.63	0.003	0.01	174	0.06	0.000	2
Kapisa	Tagab	22/03/11	23/03/11	69.65385	34.79947	742	7.7	14	182	1.09	2.80	0.005		109	0.01	0.000	1
Khost	Tani	20/12/10	22/12/10	69.72600	33.21500	475	8.0	11	48	0.63	6.38	0.004	0.01	135	0.04	0.000	0
Khost	Tani	20/12/10	22/12/10	69.73835	33.21240	551	8.1	6	30	0.46	4.86	0.004	0.01	168	0.05	0.000	0

Province	District	Sample Date	Analysis Date	Longitude	Latitude	EC (µS/cm)	pH	Chloride (mg/L)	Sulphate (mg/L)	Fluoride (mg/L)	Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)	Boron (mg/L)	Sodium (mg/L)	Chromium (mg/L)	Arsenic (mg/L)	Faecal Coliforms (Col/100 ml)
Khost	Tani	20/12/10	22/12/10	69.73900	33.18300	530	8.1	13	17	0.42	7.54	0.002	0.00	199	0.02	0.000	1
Khost	Tani	20/12/10	22/12/10	69.73715	33.21361	528	8.1	21	24	0.50	5.26	0.000	0.00	175	0.04	0.000	0
Badakhshan	Tashkan	13/07/09	13/07/09	68.41589	33.56035	565	7.1	8	87	0.20	1.74	0.002	0.45	27	0.00	0.000	0
Ghor	Taywara	27/01/10	28/01/10	64.53190	33.56492	593	7.6	6	30	0.43	1.72	0.007	0.79	132	0.01	0.000	7
Ghor	Taywara	01/07/09	01/07/09	68.46410	33.58715	1326	7.9	7	83	0.20	3.14	0.002	0.15	10	0.00	0.000	6
Khost	Terezayi	28/05/11	30/05/11	70.05194	33.42694	533	8.2	5	29	0.63	2.56	0.040	0.13	93	0.03	0.000	1
Khost	Terezayi	21/11/10	22/11/10	70.06961	33.43605	758	7.6	13	98	0.86	3.78	0.000	0.01	192	0.00	0.000	1
Panjsher	Unaba	10/04/10	11/04/10	69.34300	35.23300	680	7.5	18	86	0.30	52.00	0.001	0.70	8	0.04	0.001	1
Panjsher	Unaba	10/04/10	11/04/10	69.72100	35.25700	560	7.5	14	67	0.10	14.70	0.000	0.51	15	0.02	0.000	1
Badakhshan	Yaftal Bala	22/02/09	23/02/09	61.42276	34.37938	455	7.9	5	58	0.40	0.56	0.002	0.10	13	0.00	0.000	0
Badakhshan	Yaftal Payen	25/11/08	25/11/08	62.08145	34.53142	566	8.0	5	98	0.50	2.78	0.007	0.30	95	0.00	0.000	0
Badakhshan	Yaftal Payen	04/04/09	05/04/09	69.09386	34.18837	595	7.9	9	98	0.40	0.90	0.000	0.25	78	0.00	0.000	0
Herat	Zanda Jan	16/03/05	16/03/05	64.90160	36.42938	8350	7.8	54	388	5.70	6.66	0.010	3.00	1227	0.00	0.000	0
Herat	Zanda Jan	26/06/05	26/06/05	64.67047	36.17294	1388	8.0	9	87	2.20	1.46	0.010	1.10	76	0.00	0.000	0
Herat	Zanda Jan	21/07/09	27/07/09	68.43911	33.54383	1620	7.8	48	340	0.20	0.62	0.008	0.80	265	0.00	0.000	7
Herat	Zanda Jan	17/06/07	17/06/07	65.14400	35.68777	1139	7.4	7	253	1.00	0.90	0.001	0.40	192	0.00	0.000	7
Herat	Zanda Jan	23/05/07	23/05/07	63.99582	35.70967	2322	7.3	21	450	1.00	4.10	0.002	0.30	396	0.00	0.000	6
Herat	Zanda Jan	03/05/11	04/05/11	61.79555	34.40127	1410	7.9	26	155	1.51	1.74	0.001		322	0.03	0.000	17
Herat	Zanda Jan	04/05/11	09/05/11	61.78894	34.39420	2090	7.3	30	440	2.52	6.50	0.001		481	0.03	0.000	10
Paktya	Zurmat	05/06/11	09/06/11	69.79278	33.55754	573	7.4	4	44	0.04	0.59	3.640	0.34	104	0.00	0.000	1
Paktya	Zurmat	05/06/11	09/06/11	69.73077	33.65506	544	7.4	4	41	0.62	4.56	0.002	0.04	122	0.00	0.000	1
Paktya	Zurmat	05/06/11	09/06/11	69.72732	33.65451	594	7.3	4	47	0.49	3.02	0.000	0.03	91	0.00	0.000	1
Paktya	Zurmat	05/06/11	08/06/11	69.81382	33.67022	583	7.4	4	48	0.48	4.60	0.008	0.03	104	0.00	0.000	1
Paktya	Zurmat	05/06/11	09/06/11	69.77414	33.65896	571	7.3	4	45	0.53	2.96	0.002	0.03	94	0.00	0.000	1
Paktya	Zurmat	05/06/11	08/06/11	69.82671	33.59735	575	7.4	5	45	0.77	4.30	0.004	0.03	98	0.00	0.000	1
Paktya	Zurmat	05/06/11	08/06/11	69.74996	33.65726	586	7.4	4	56	0.93	4.50	0.036	0.03	109	0.00	0.000	1
Paktya	Zurmat	05/06/11	09/06/11	69.73498	33.66372	575	7.3	4	42	0.94	3.90	0.000	0.03	120	0.00	0.000	1
Paktya	Zurmat	05/06/11	08/06/11	69.86496	33.70806	579	7.4	4	45	0.54	2.44	0.000	0.02	84	0.00	0.000	1
Paktya	Zurmat	05/06/11	08/06/11	69.73497	33.66370	565	7.5	16	43	0.70	4.20	0.002	0.02	133	0.00	0.000	1
Paktya	Zurmat	02/01/11	01/04/11	69.20086	33.47734	907	7.8	17	116	0.45	2.76	0.015	0.01	200	0.01	0.000	1
Paktya	Zurmat	01/02/11	01/04/11	69.27274	33.65305	580	7.8	12	52	0.69	3.62	0.004	0.01	193	0.01	0.000	60
Paktya	Zurmat	01/02/11	01/04/11	69.16285	33.50930	580	7.8	17	48	0.35	4.16	0.003	0.00	170	0.01	0.000	2
Paktya	Zurmat	02/01/11	04/02/11	69.10016	33.51293	575	7.8	24	47	0.52	3.08	0.008	0.00	180	0.02	0.000	1
Paktya	Zurmat	01/02/11	01/05/11	69.12442	33.55378	583	7.8	10	48	0.55	0.06	0.002	0.00	159	0.01	0.000	0

Annex 7 Hydro chemical scheme of Afghanistan



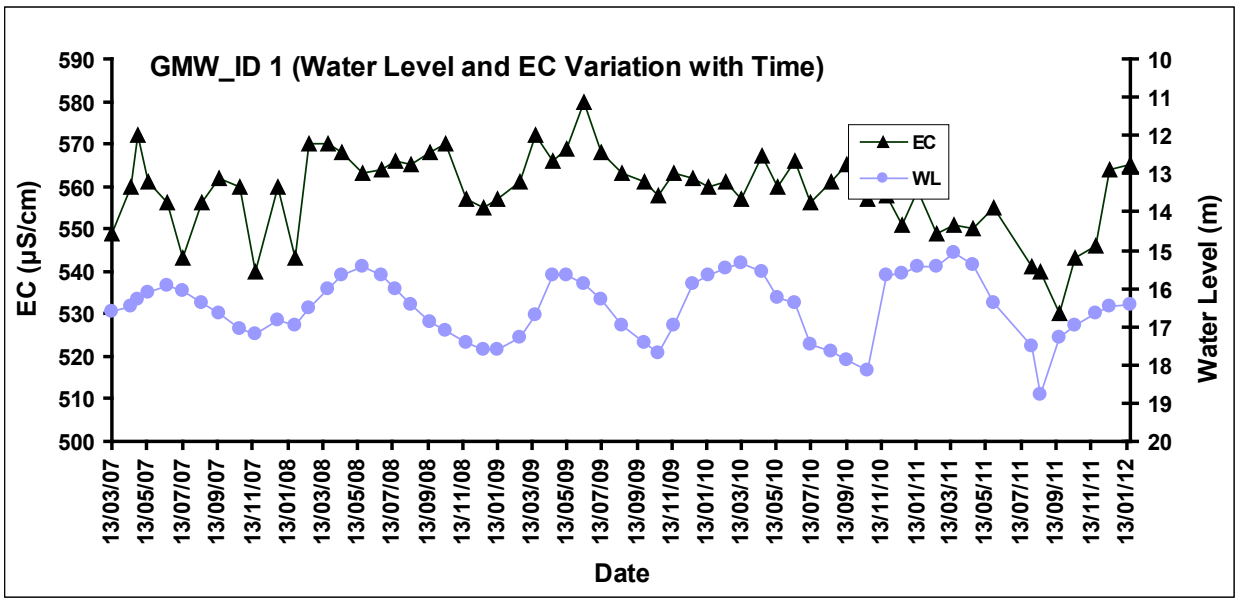
Chemical composition and mineral contend of the uppermost water bearing complexes and / or aquifers

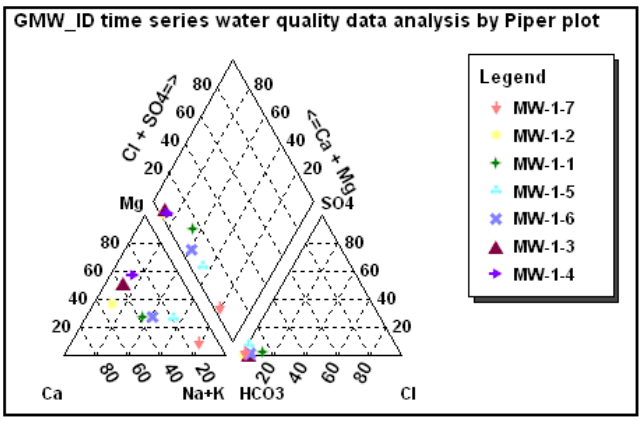
1. *Mono carbonated* magnesium- calcium- sodium sulphate of mixed cation composition; mono carbonated calcium – sulphate of mixed cation composition mineral content is up to1 g/l.
2. Chloride- sulphate -sodium of mixed cation composition, sulphate- mono carbonated -sodium of mixed cation composition, sulphate- chloride sodium of mixed cation composition predominant mineral content is from 1g/l to 3 g/l.
3. Chloride sulphate – sodium, chloride- calcium , of mixed cation composition, mono carbonated -chloride – sodium, sulphate- sodium, mono carbonated sodic, predominant mineral content is from 3 g/l to 10 g/l.
4. Chloride sulphate- sodium, sodic, chloride- sodic, sulphate- sodium, predominant mineral content is 10g/l to 30 g/l
5. Chloride sodic, mineral content is over 35g/l.
6. District of rare – metal industrial water.
7. Cold carbonated water
8. Thermal carbonated water
9. Sulphureted water, cold and thermal
10. Thermal siliceous water
11. Districts with different chemical composition ground water
12. Boundaries between artesian districts and hydro geological folded regions

Annex 8 GMWs network

Kabul

Kabul GMW_ID 1





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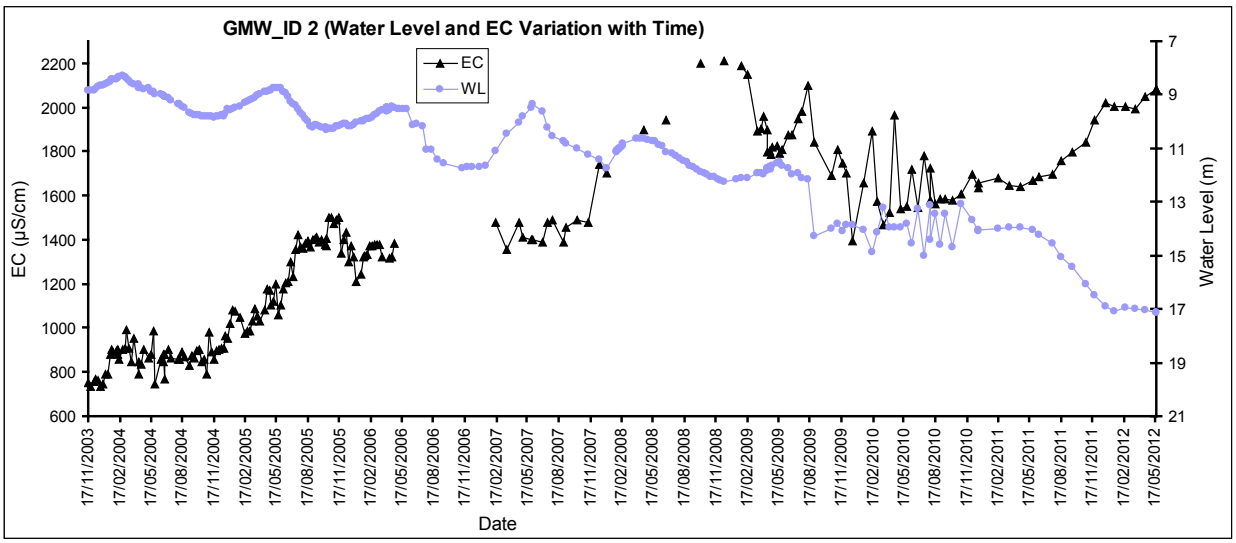

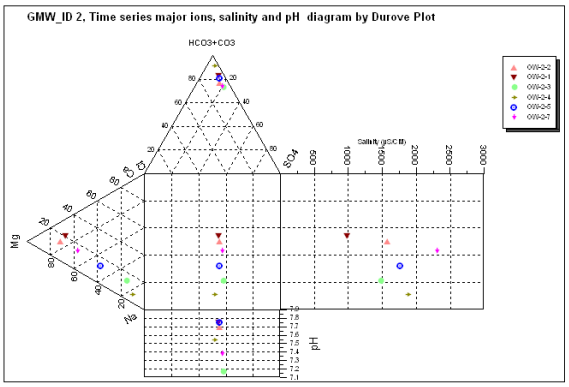

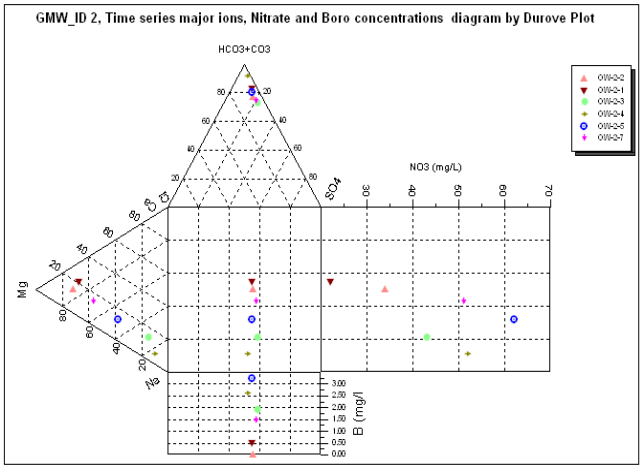

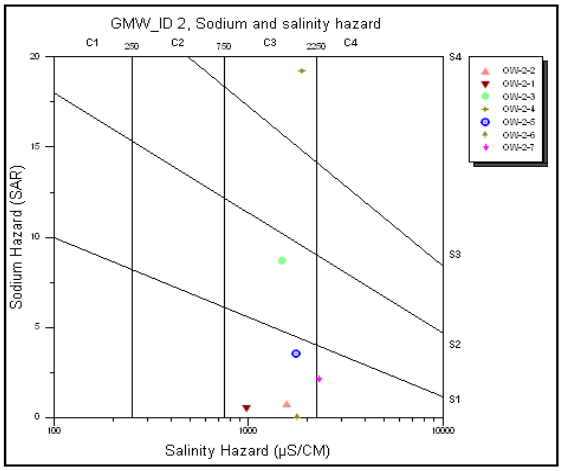

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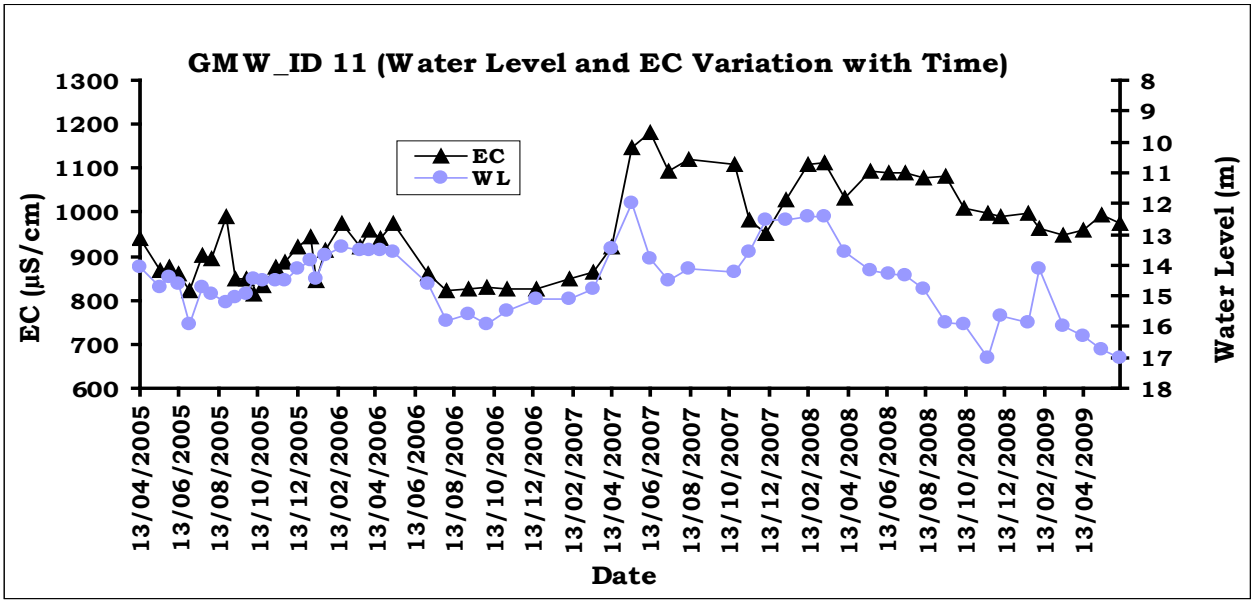

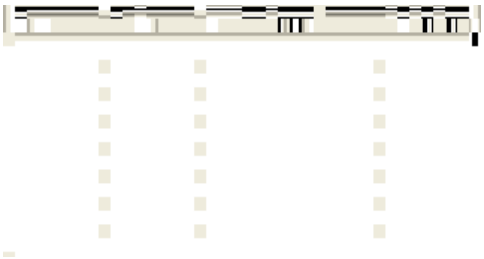

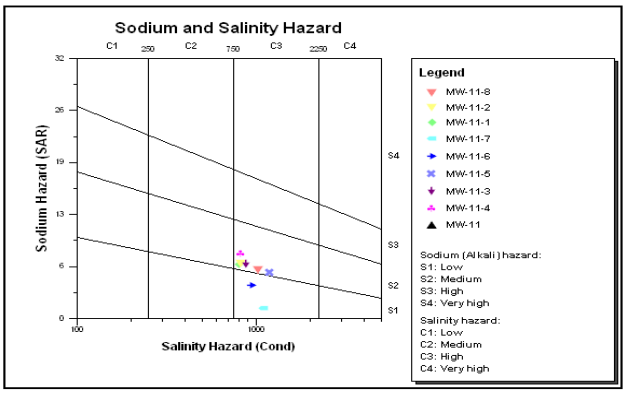

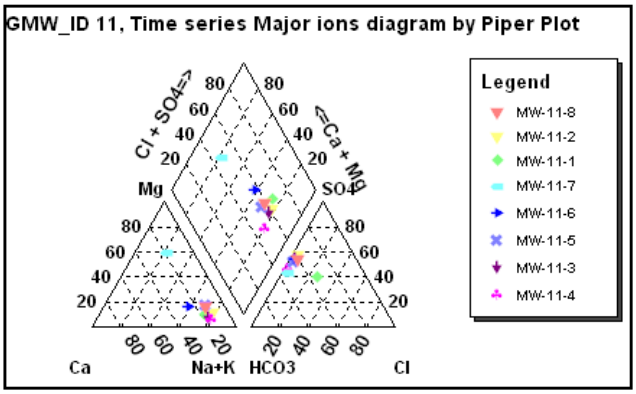

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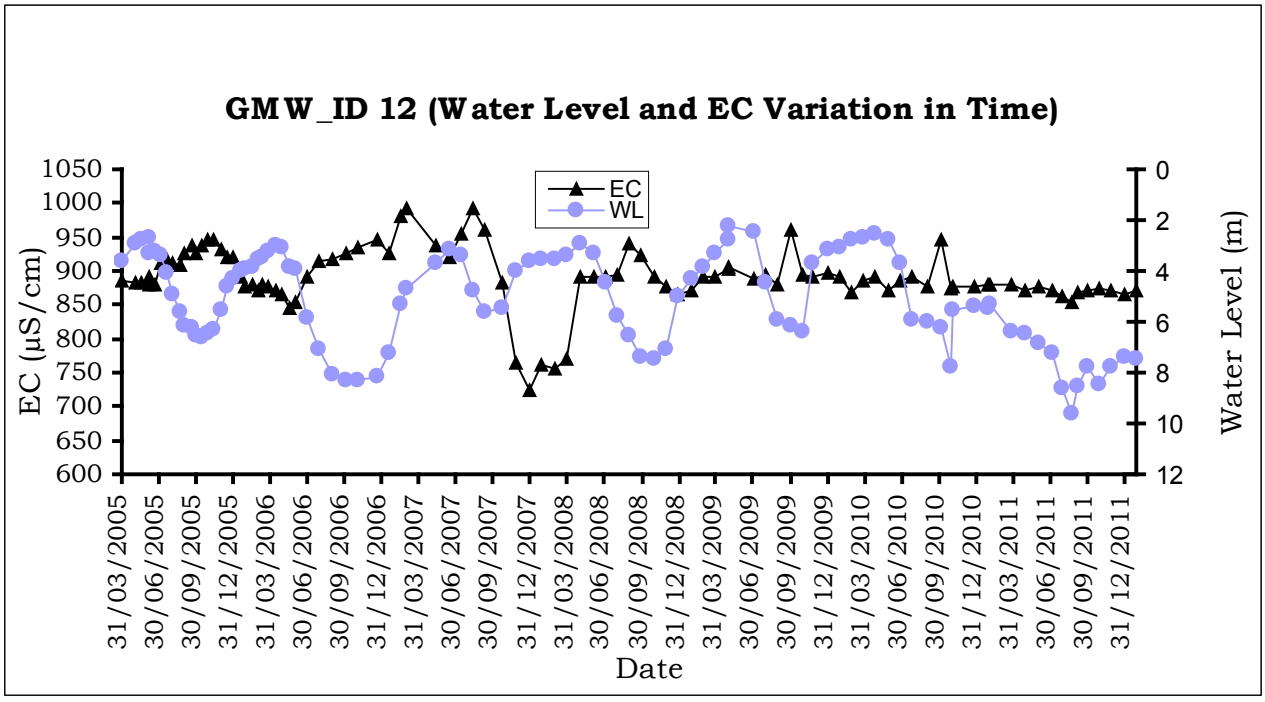

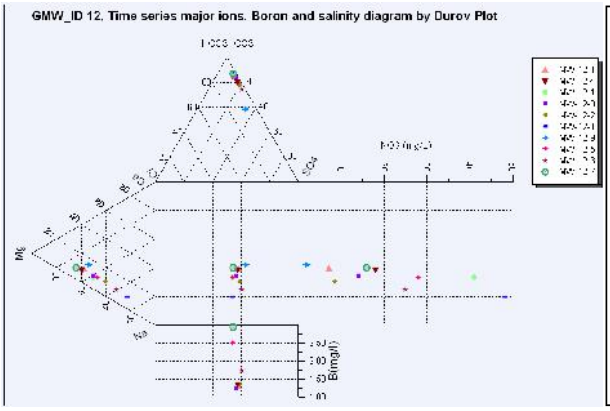

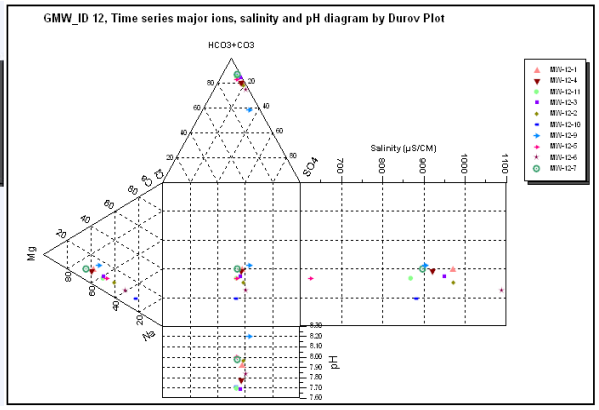

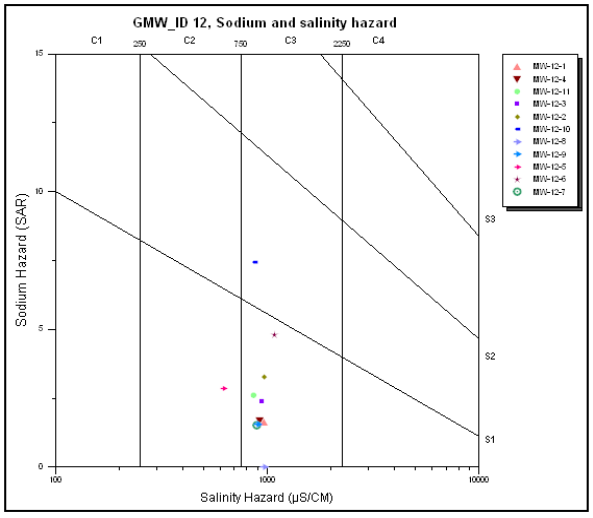

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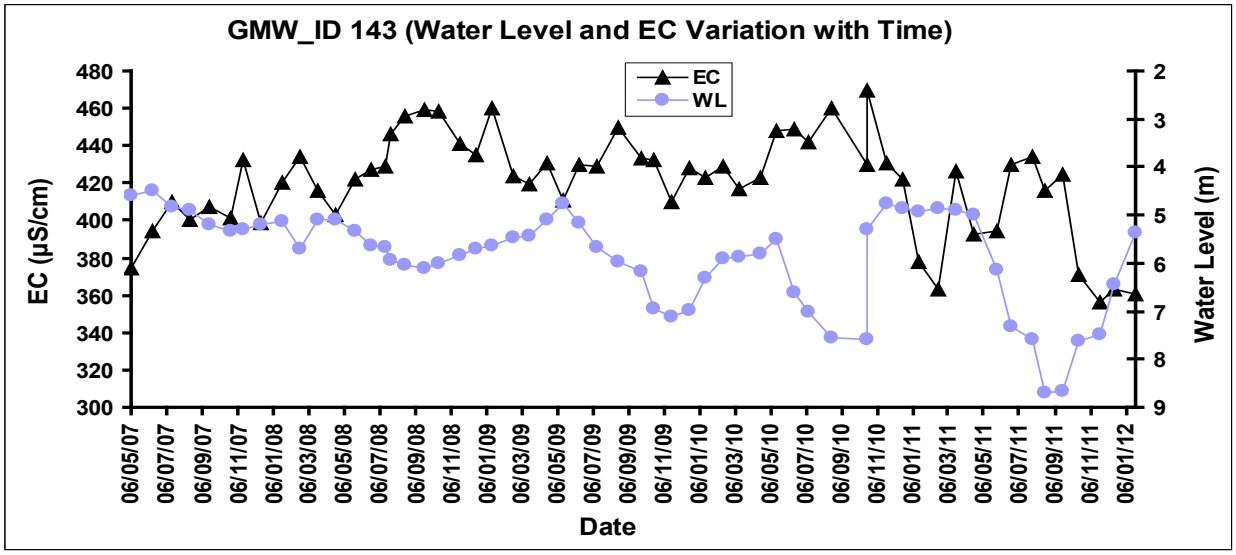

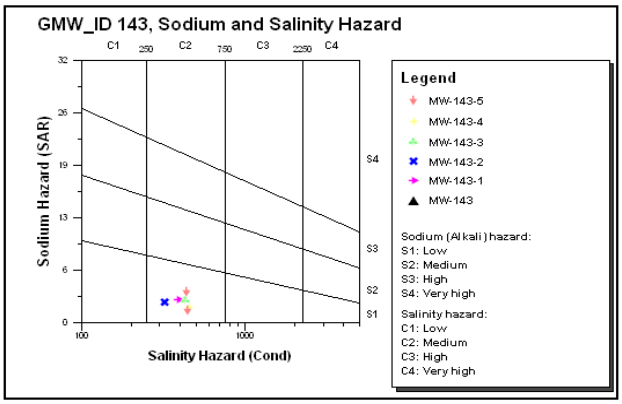

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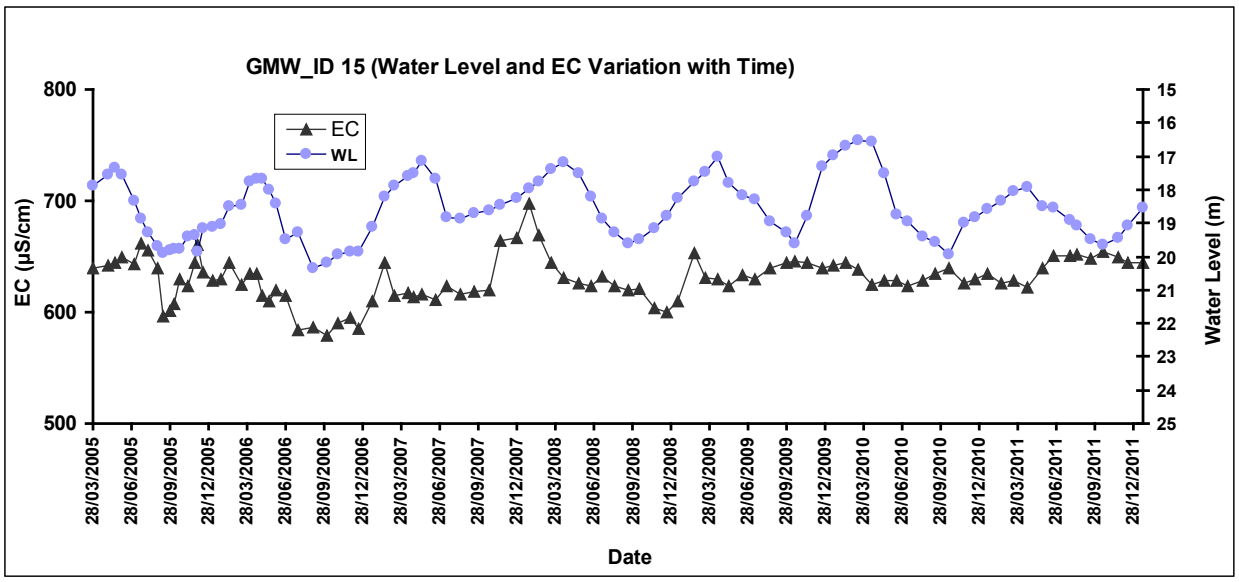

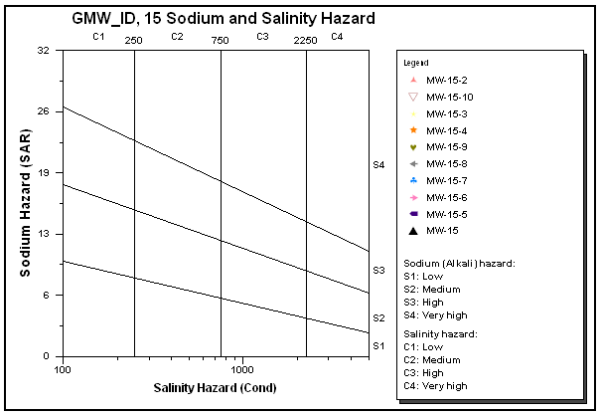

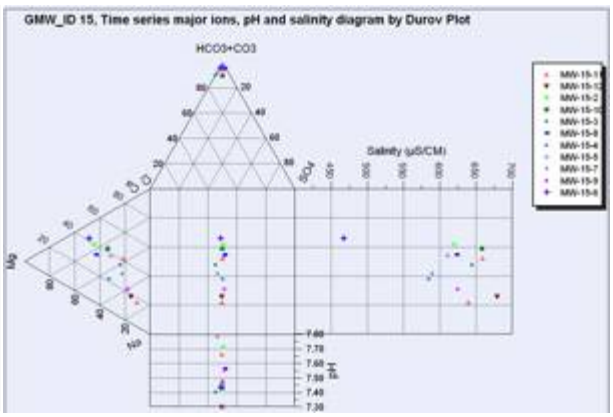

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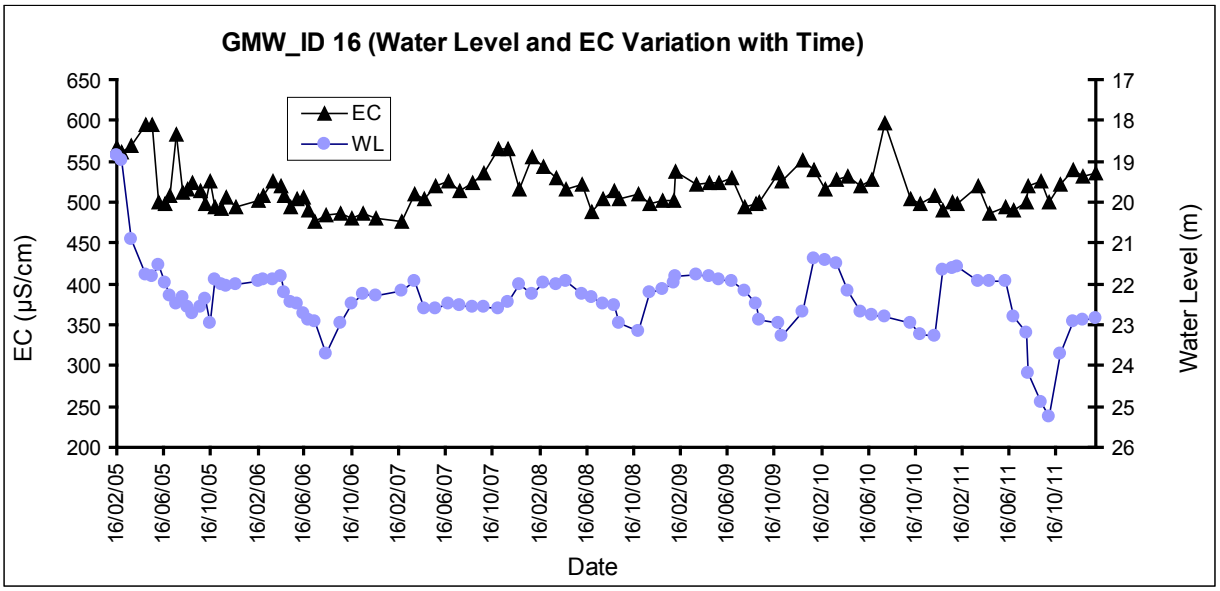

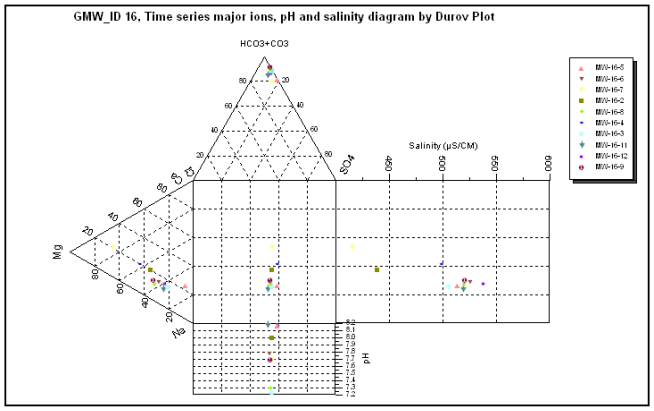

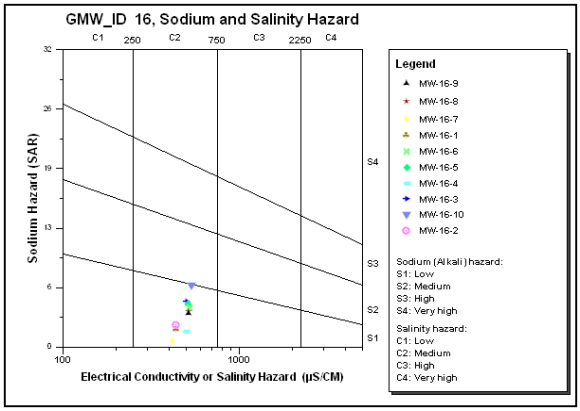

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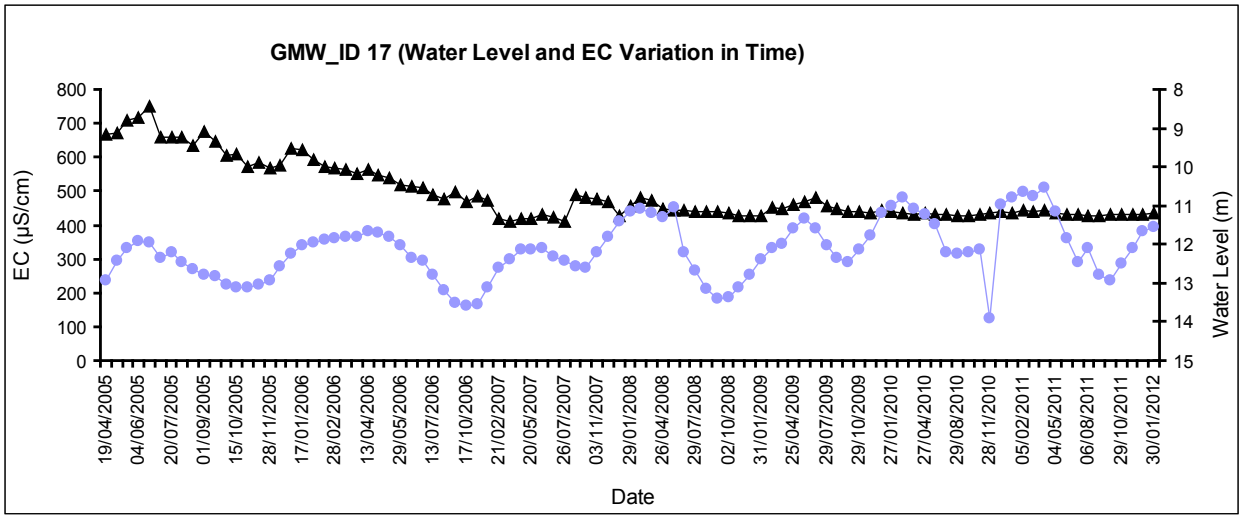

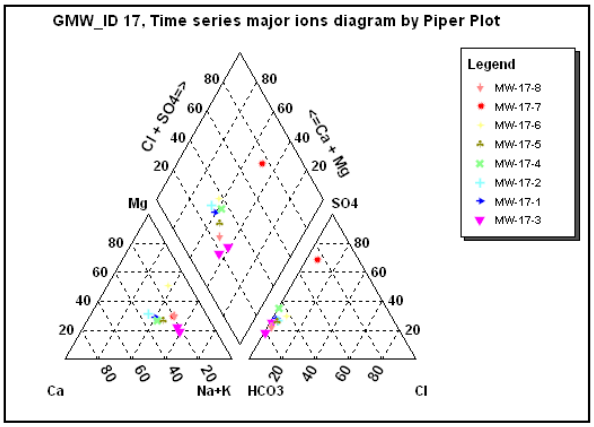

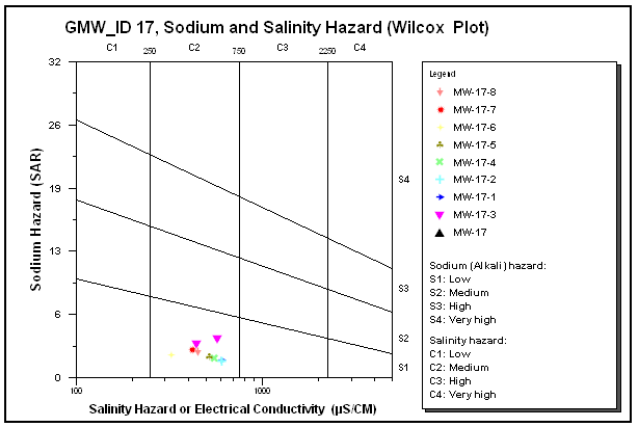

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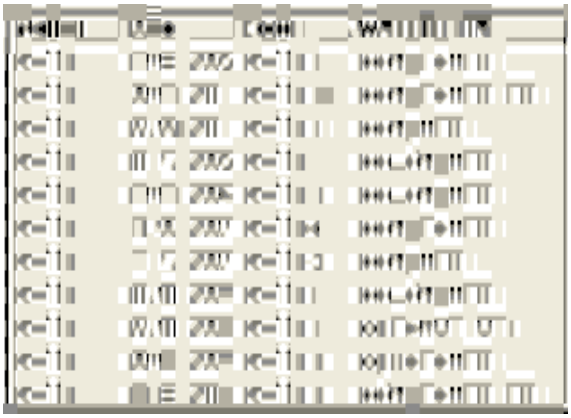

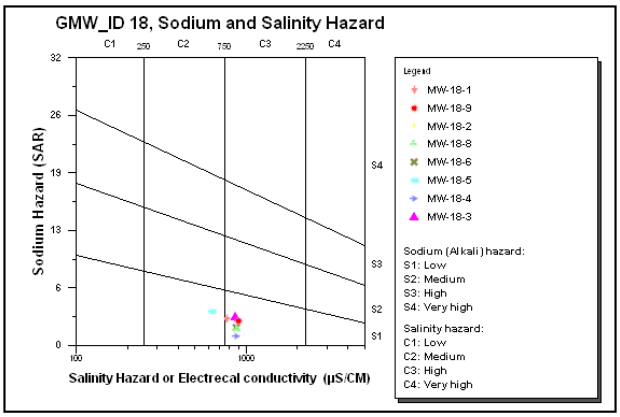

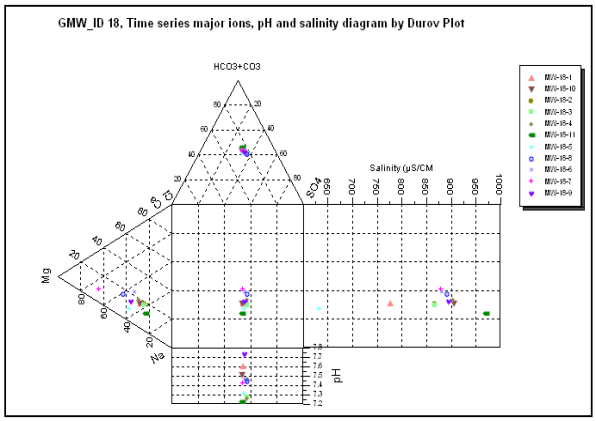

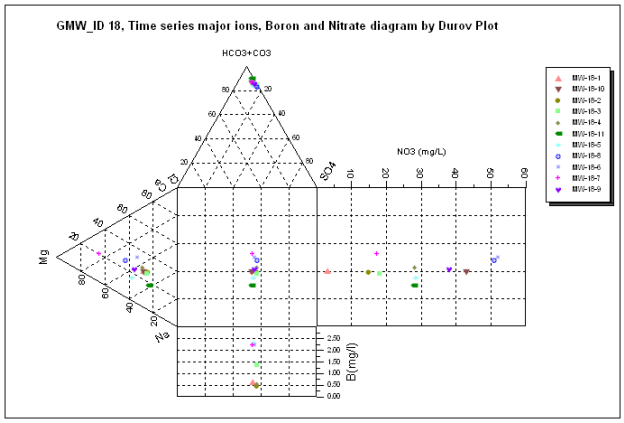

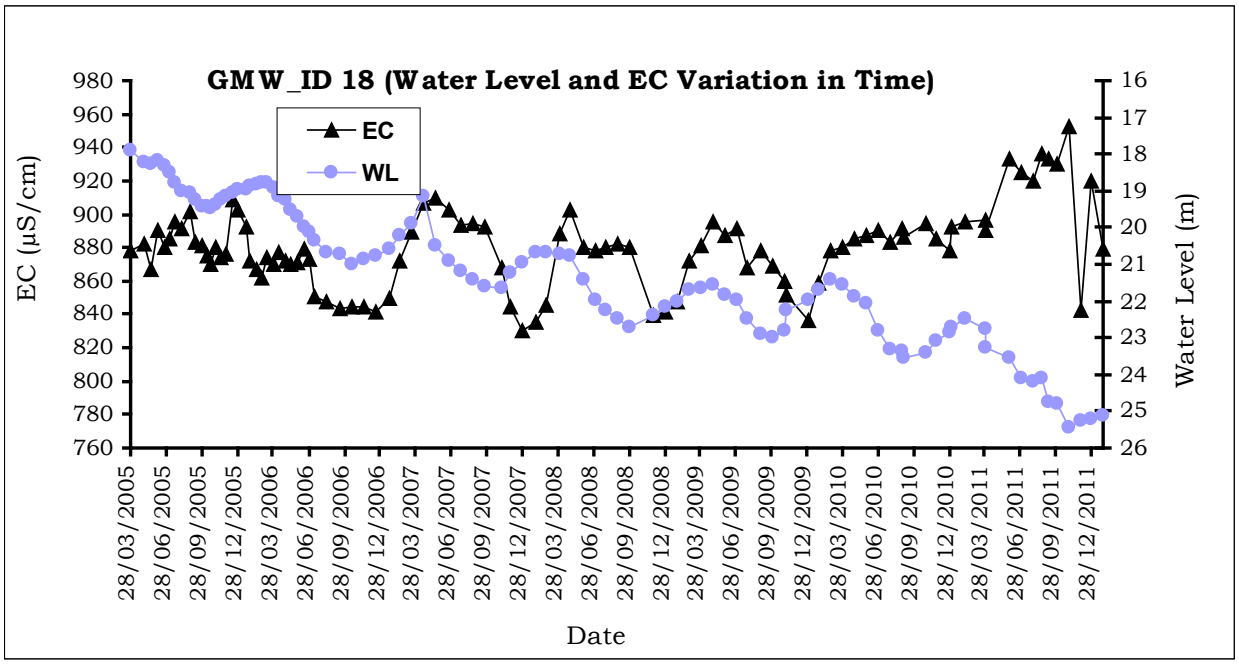

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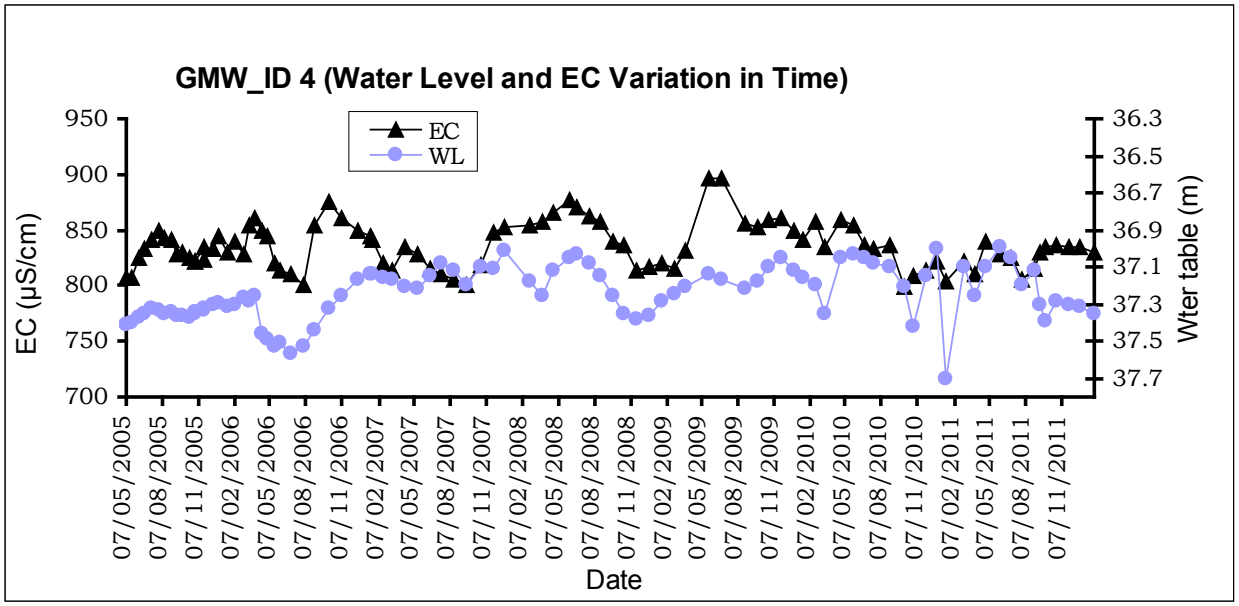

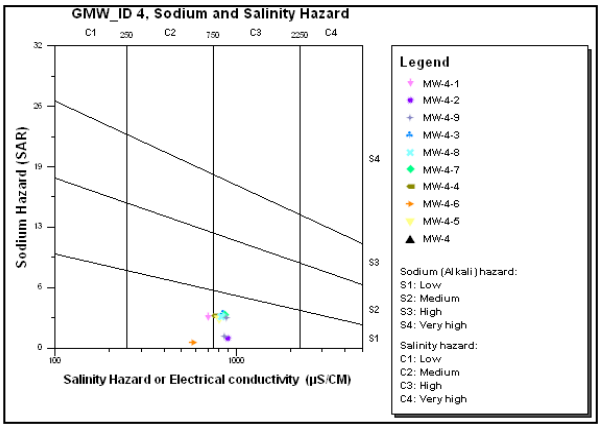

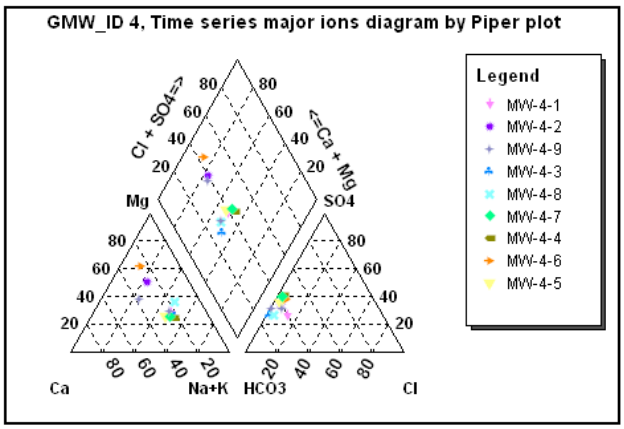

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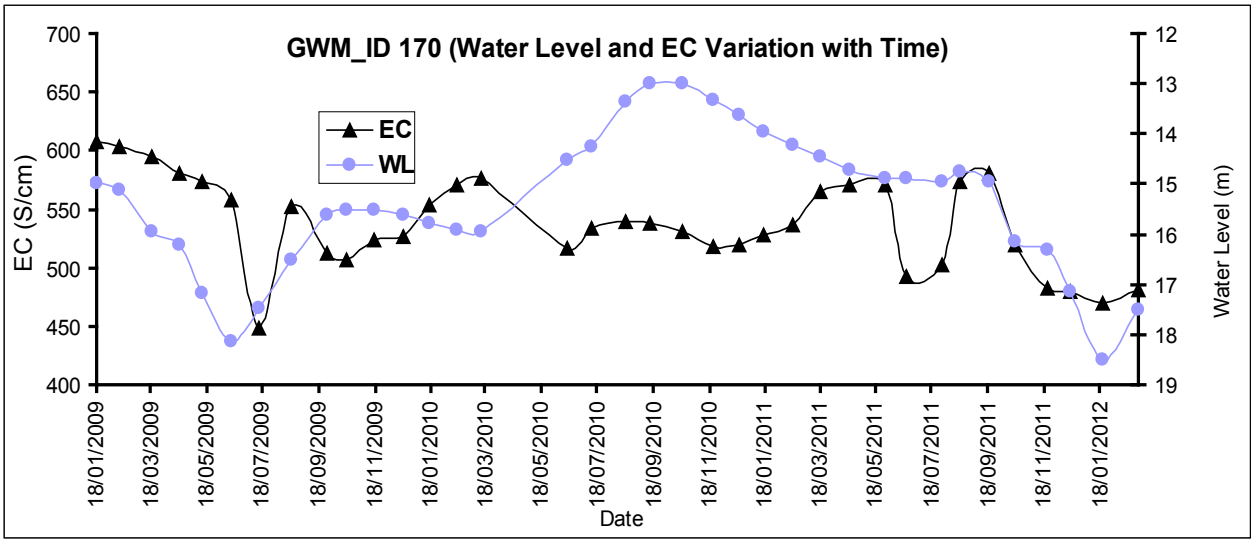

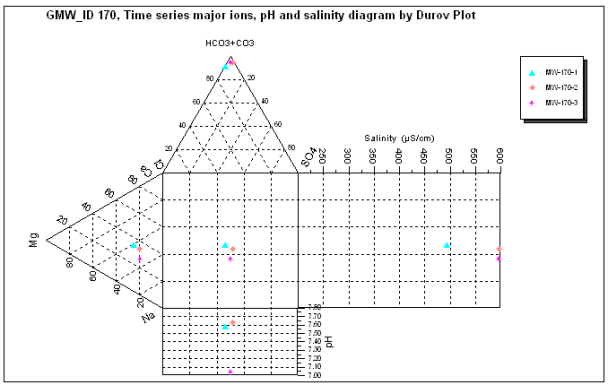

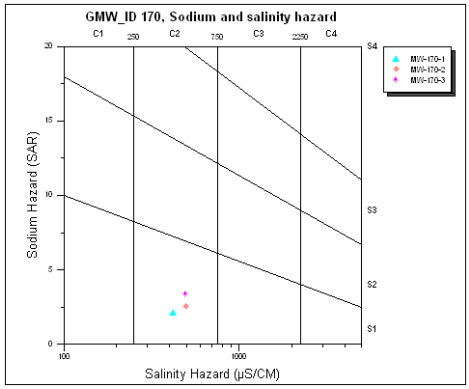

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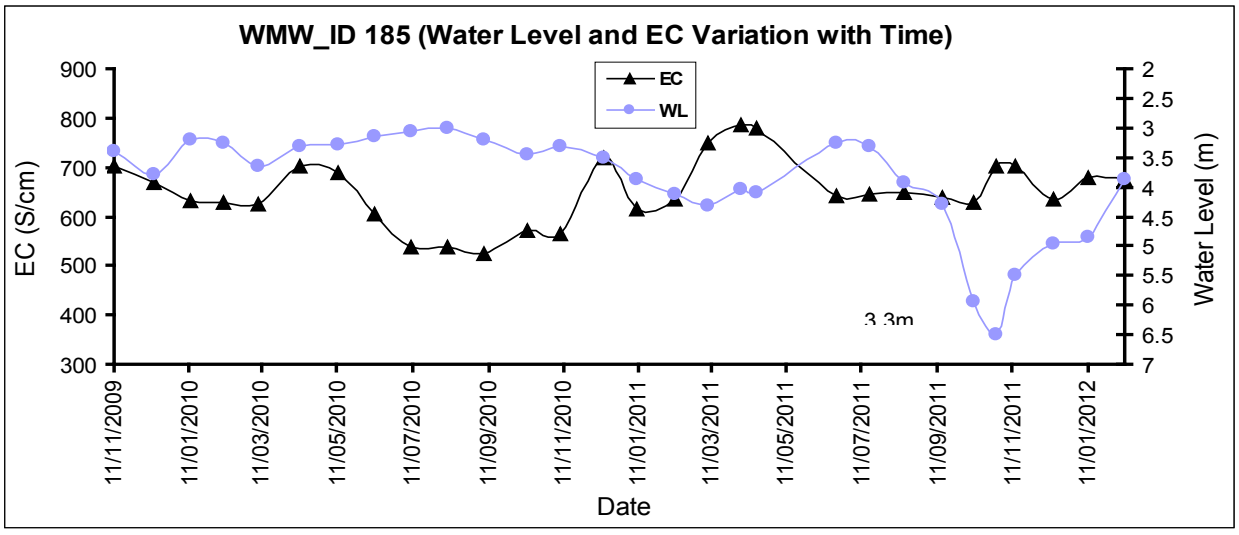

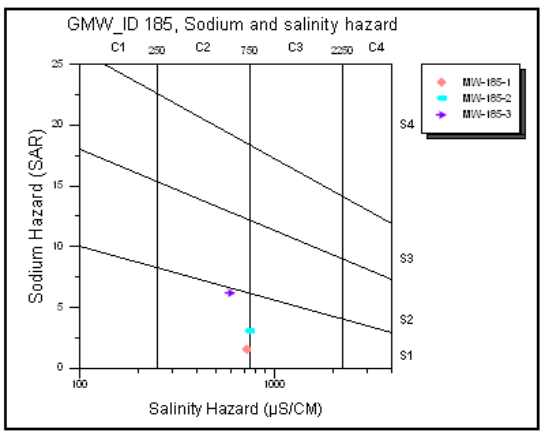

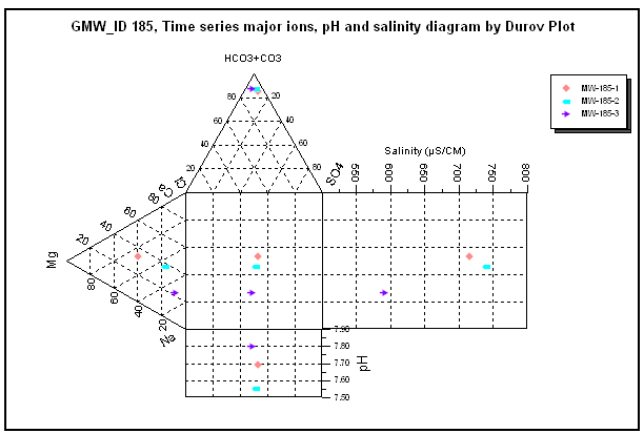

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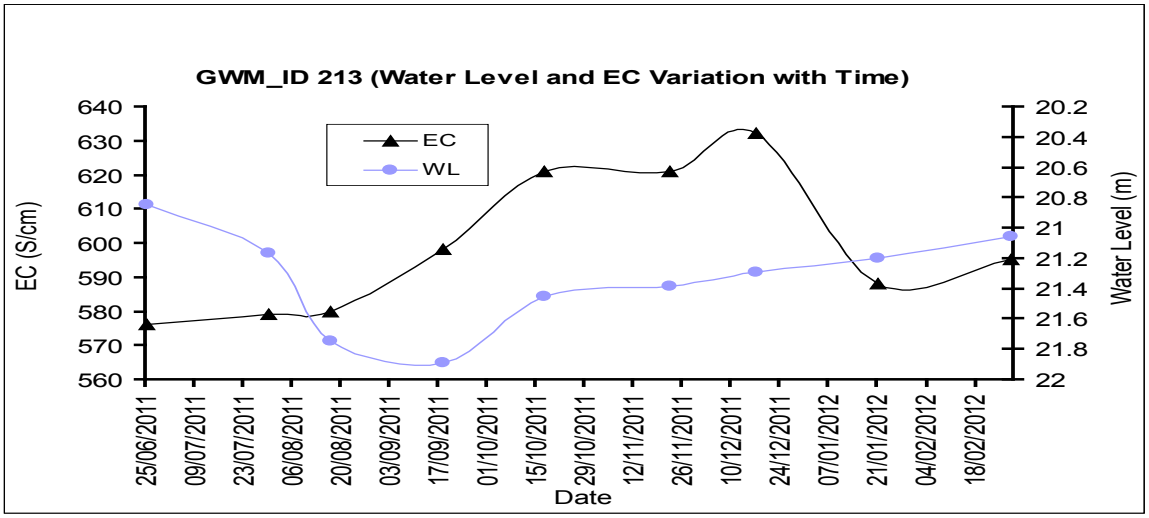

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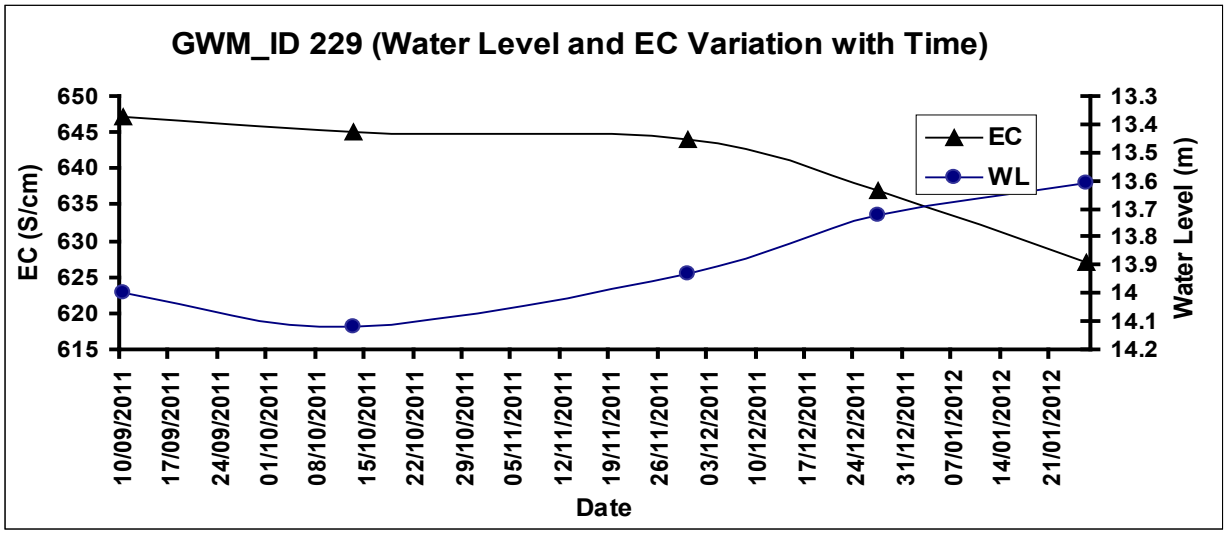
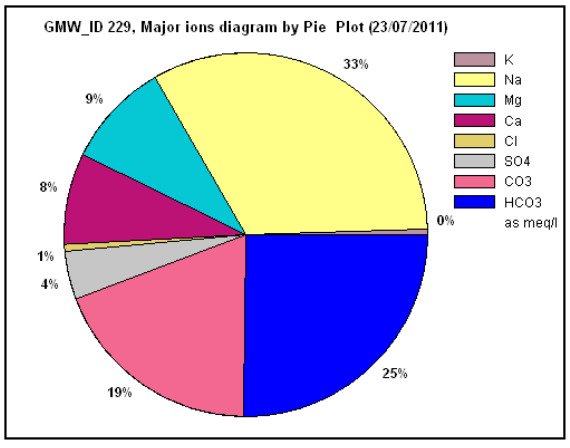
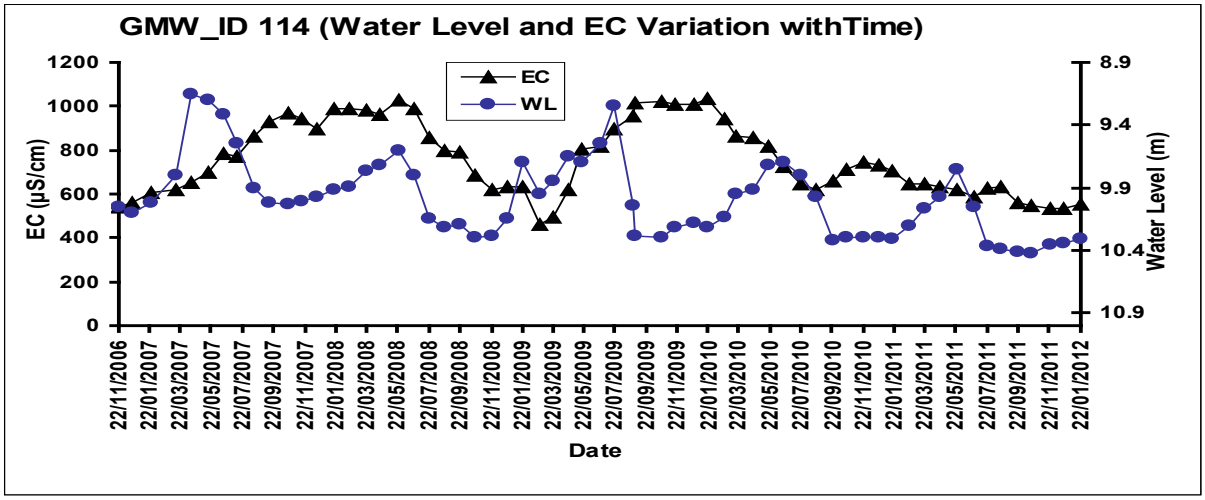
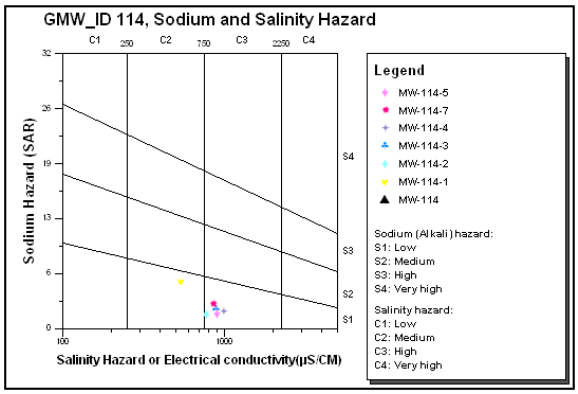


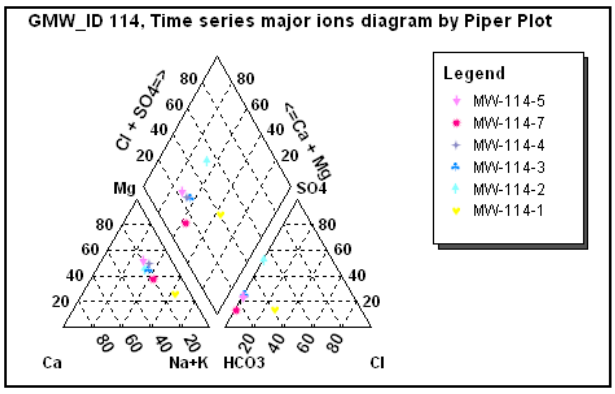


Kapisa

Kapisa GMW_ID 114







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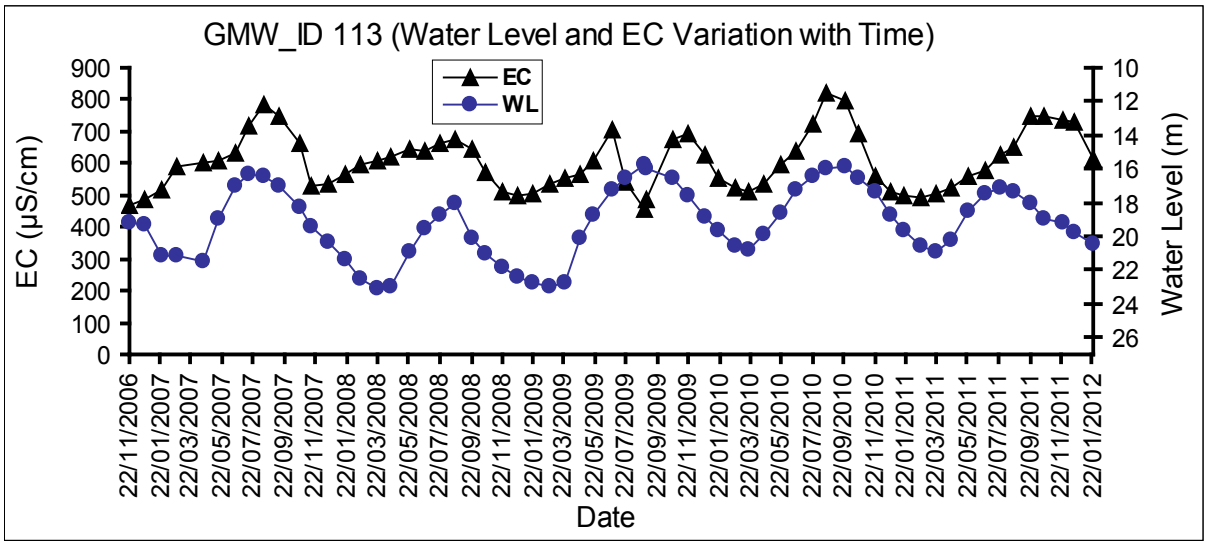

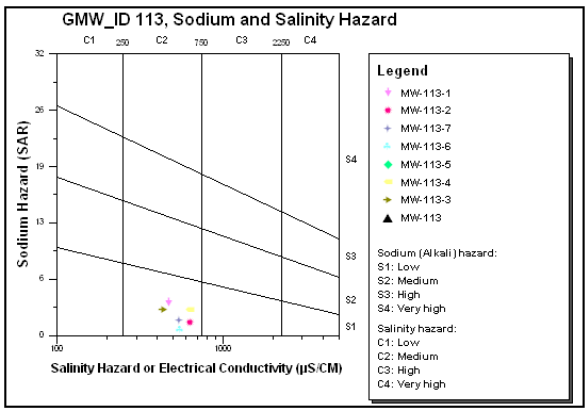

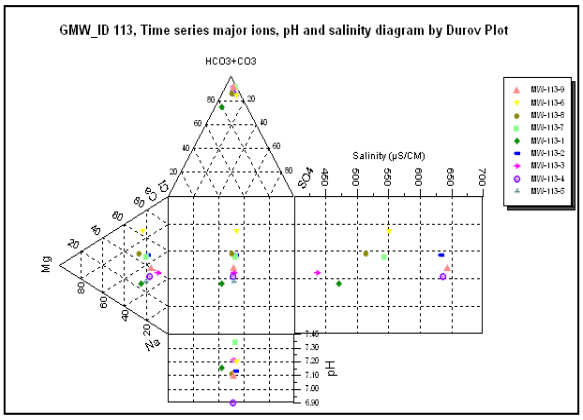

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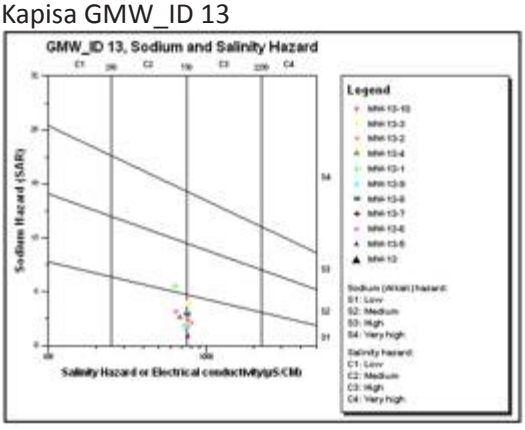

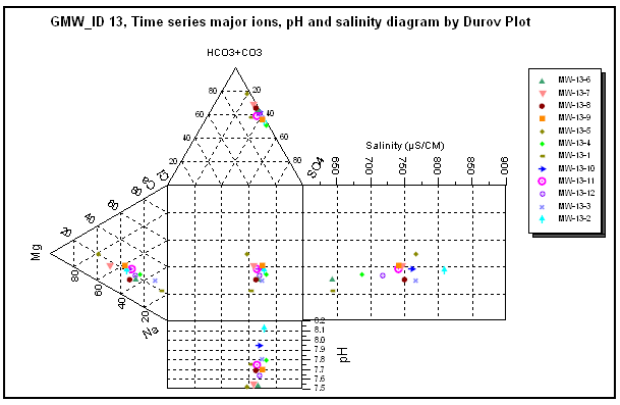

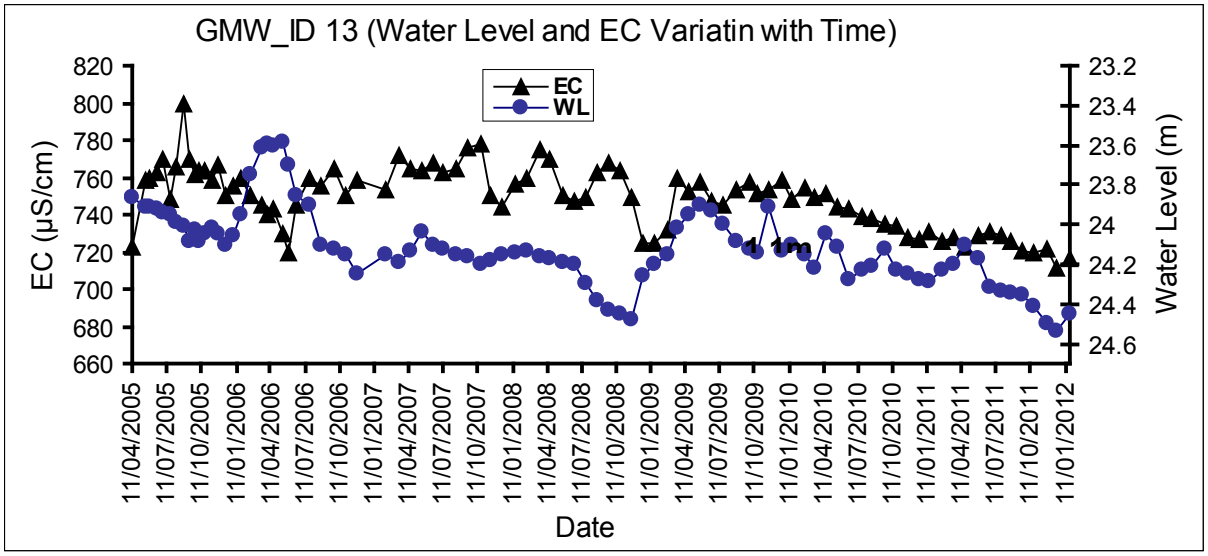

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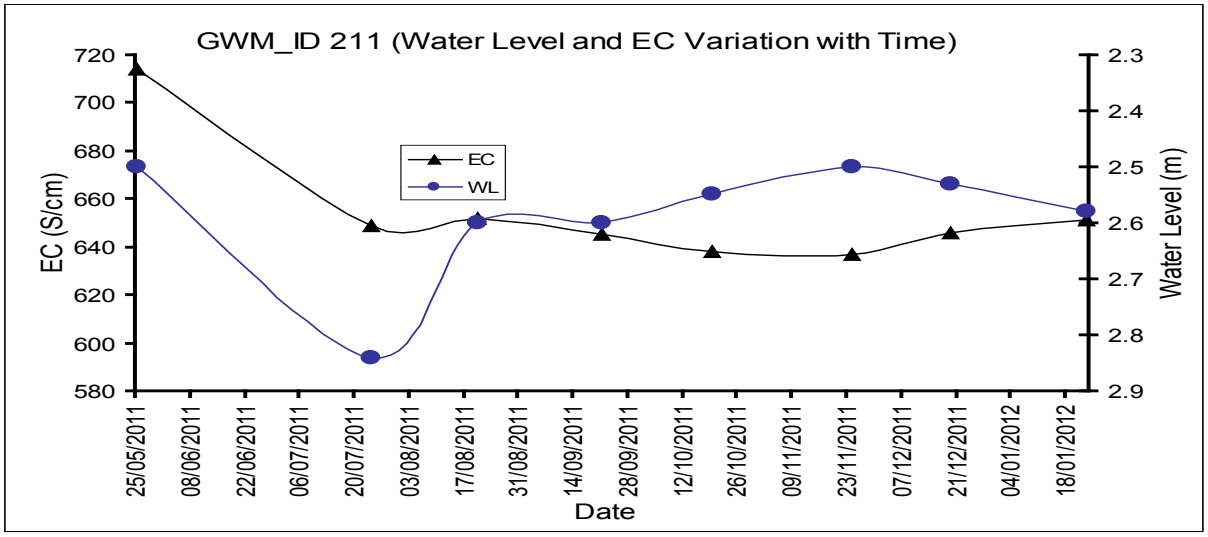

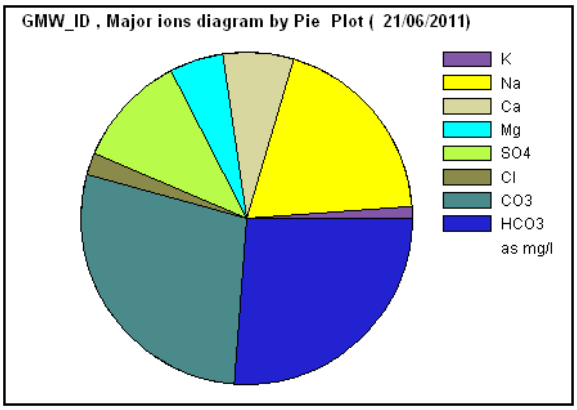

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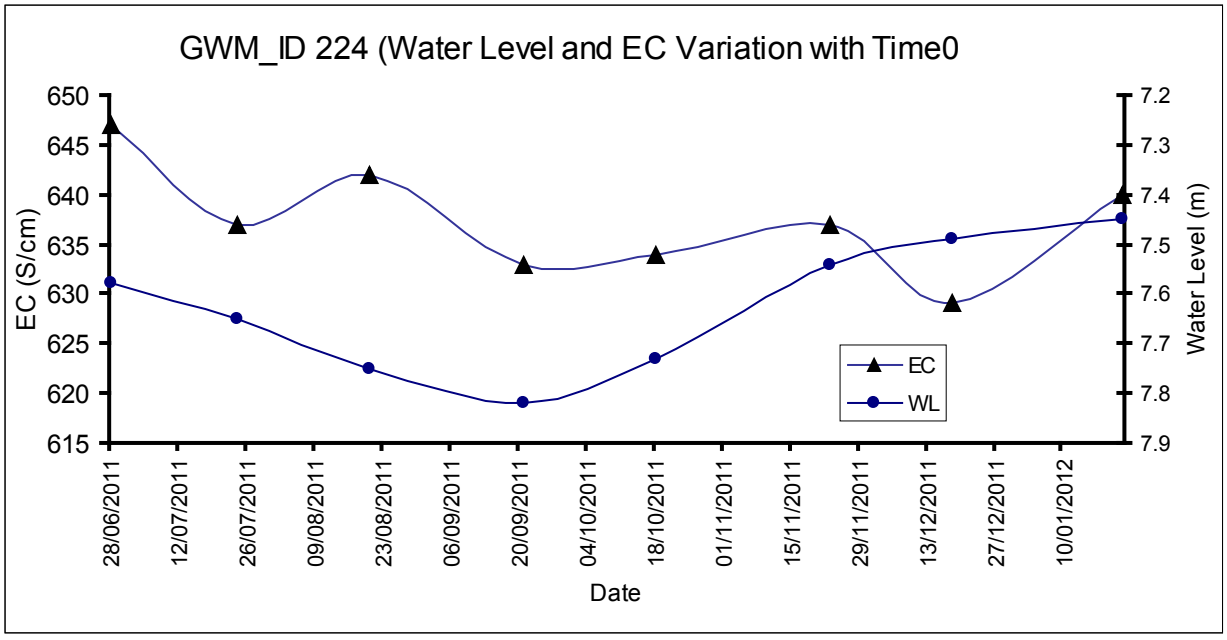
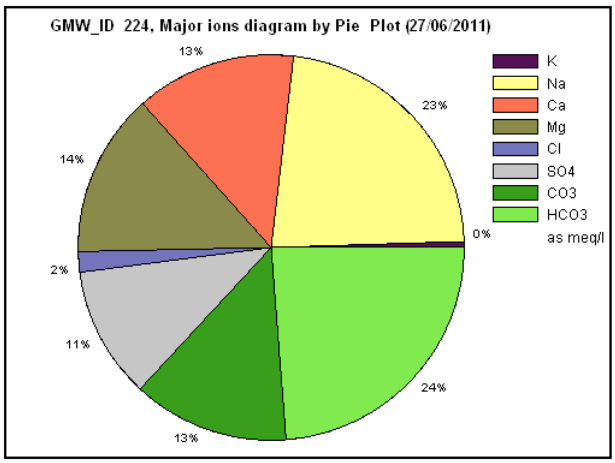
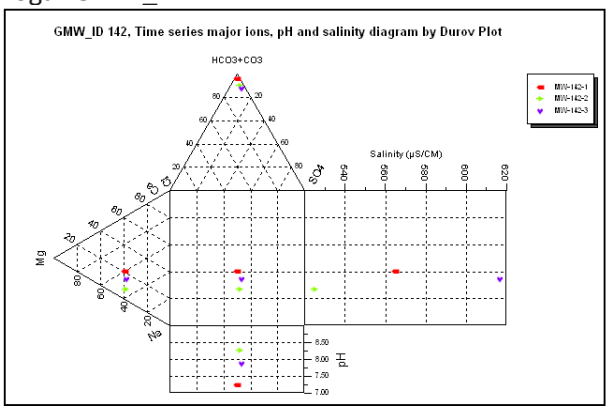
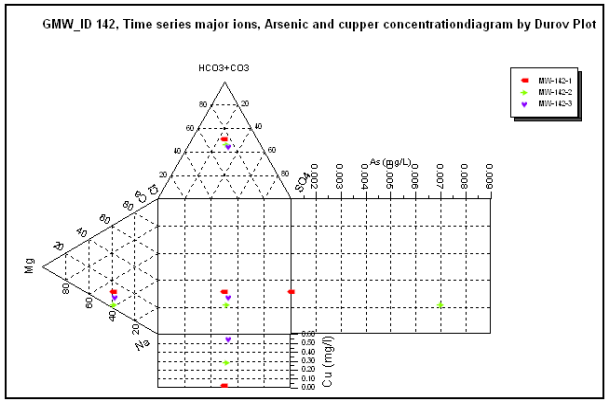
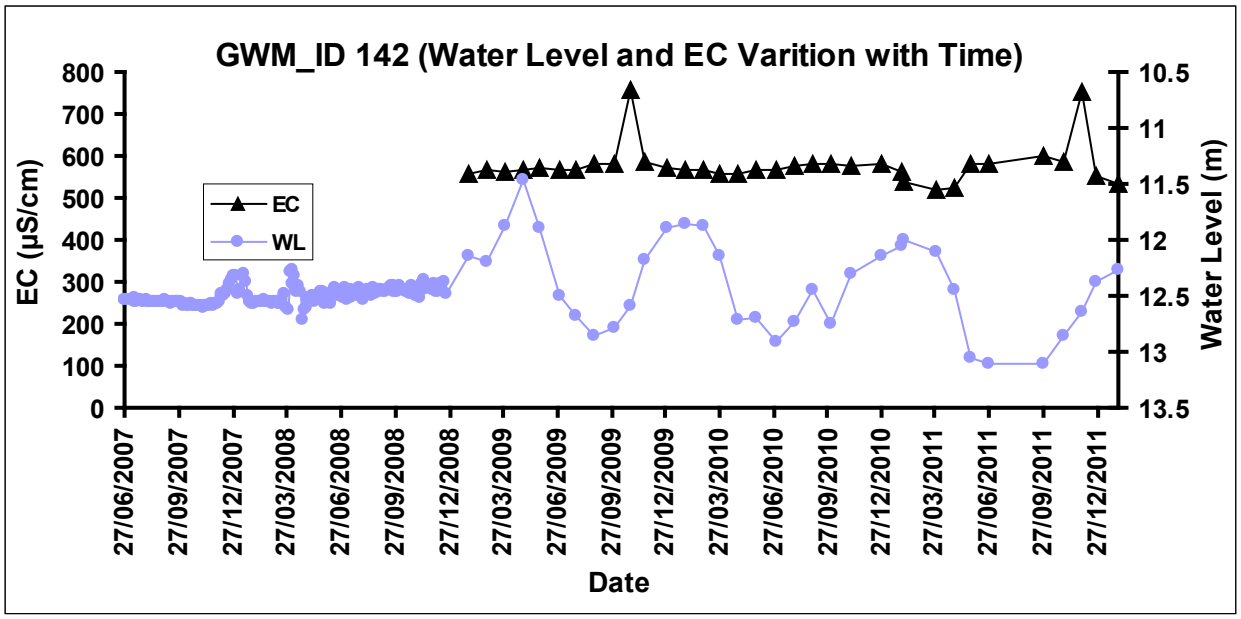




Logar GMW_ID 142

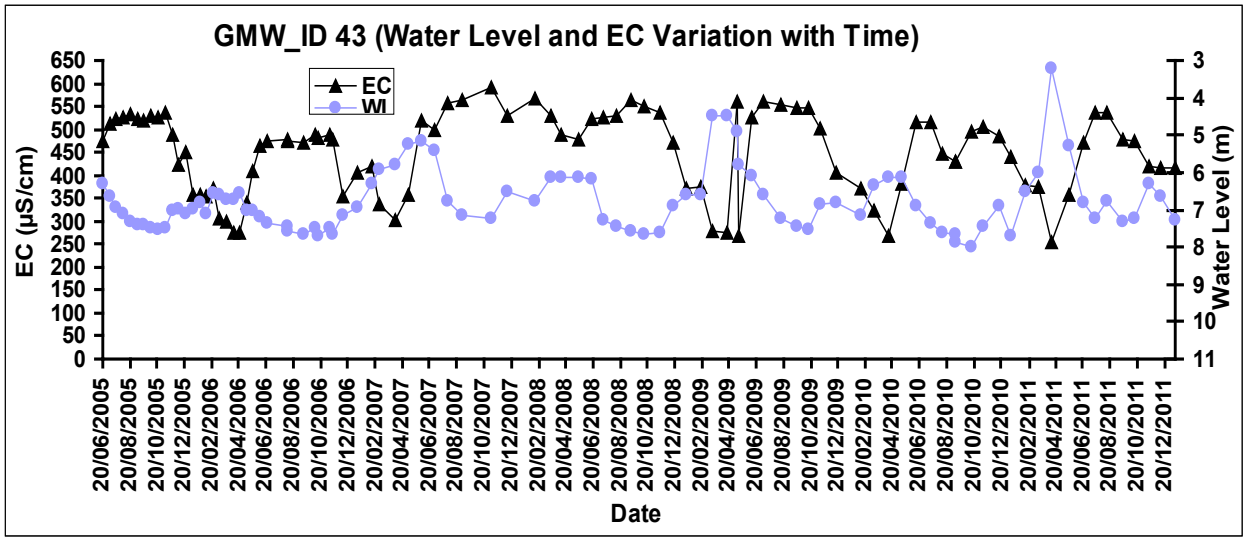


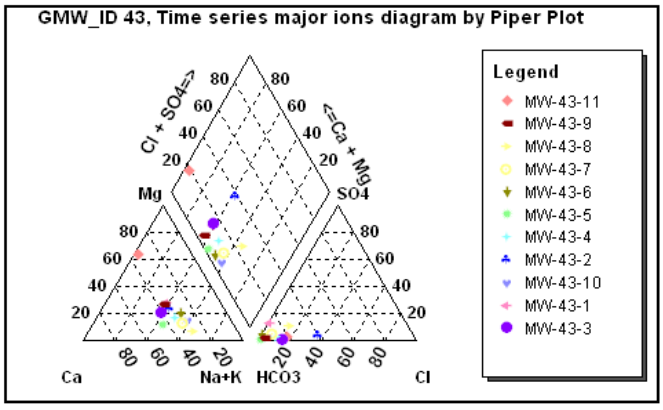


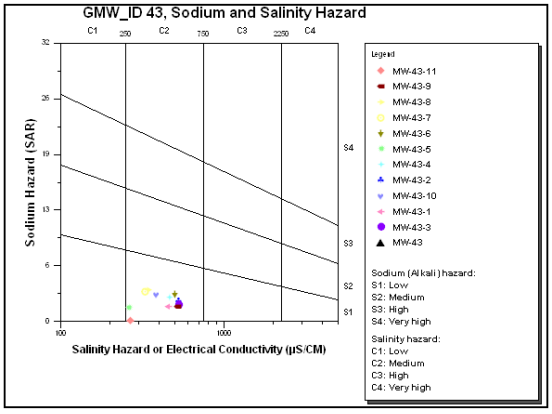


Logar

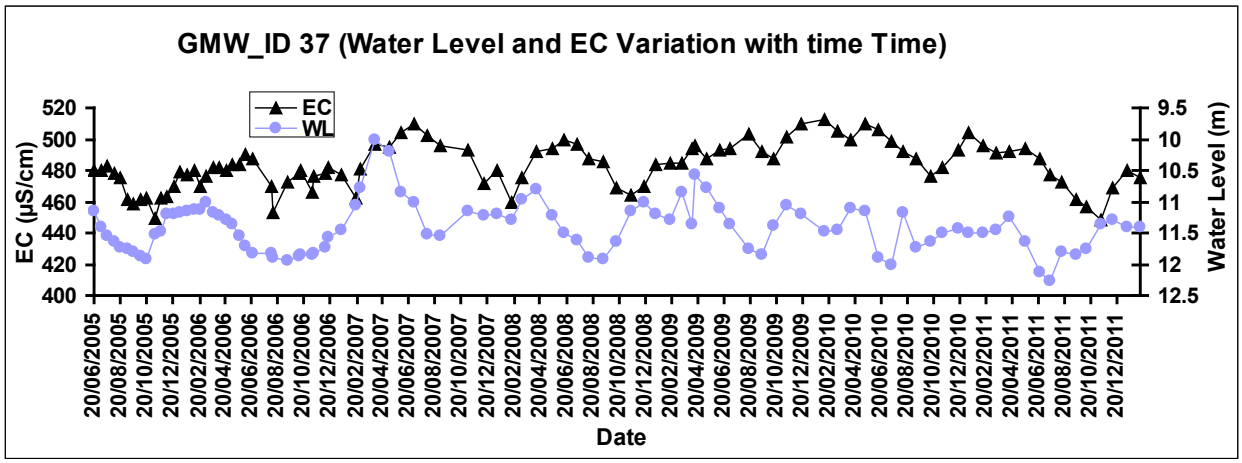
Logar GMW_ID 43



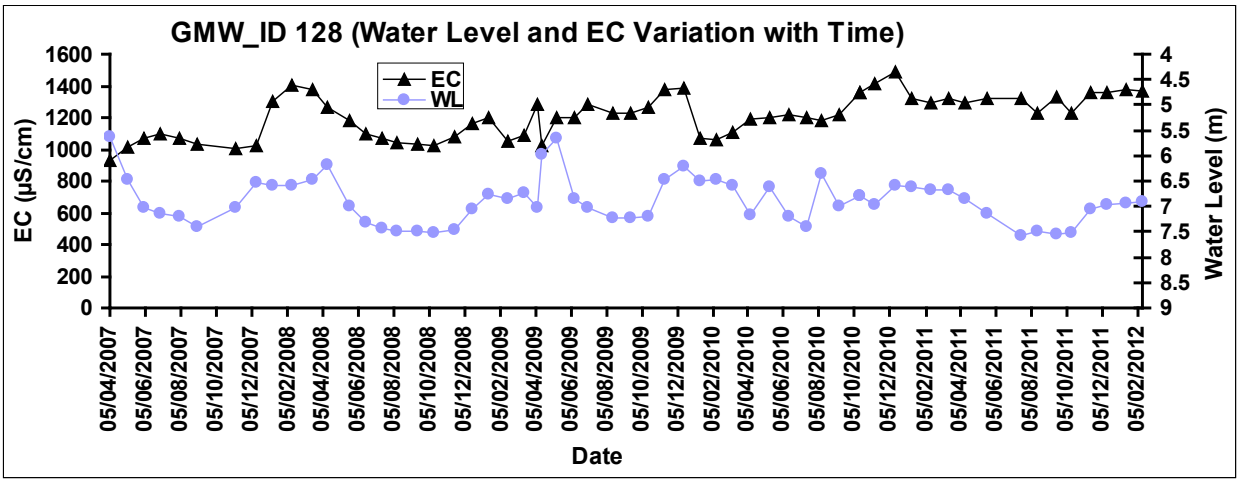


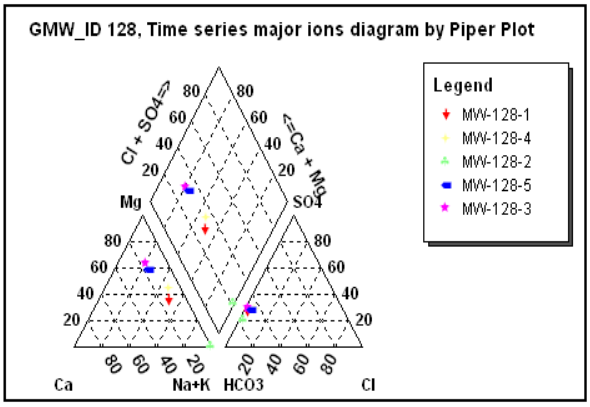


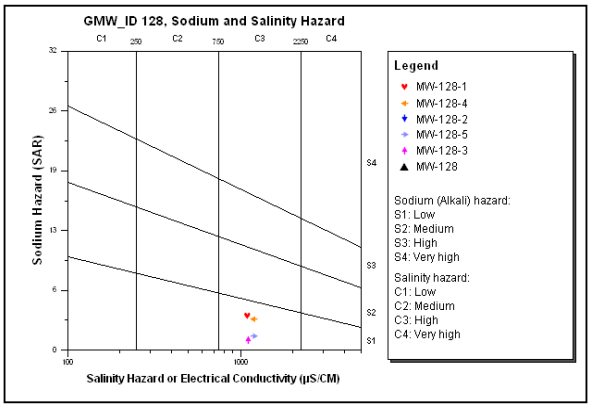
Logar GMW_ID 37

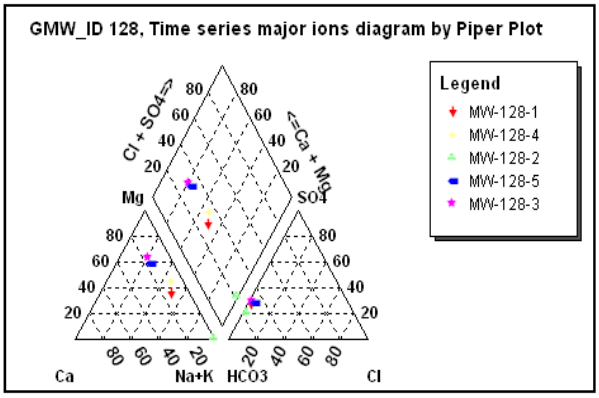


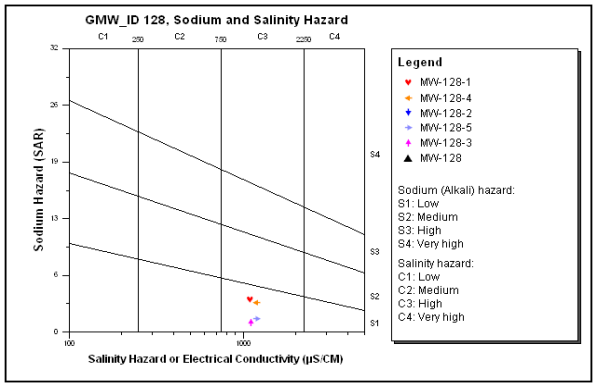
Logar GMW_ID 128



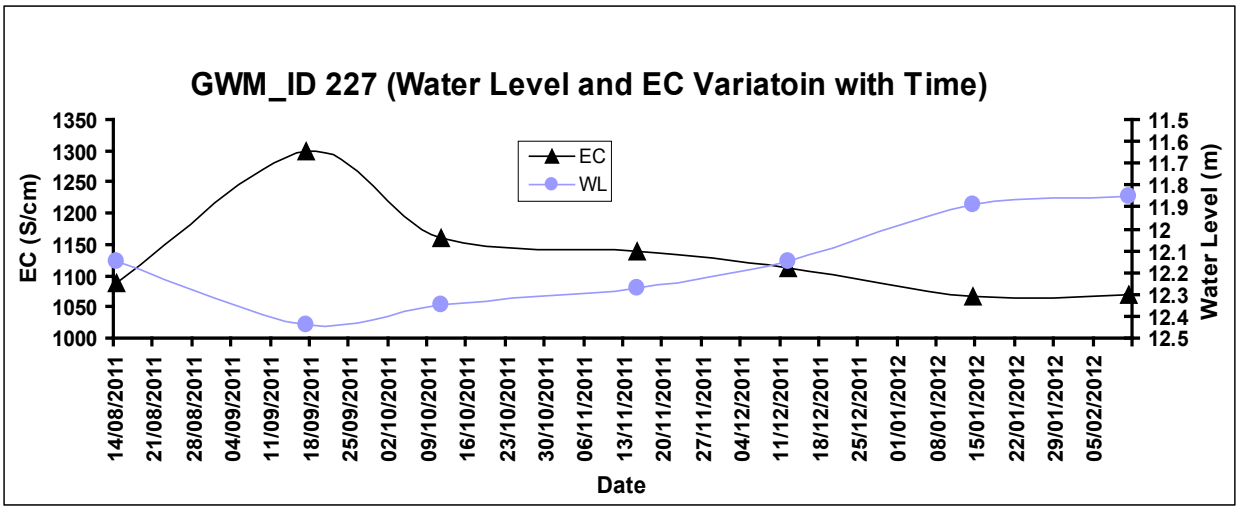






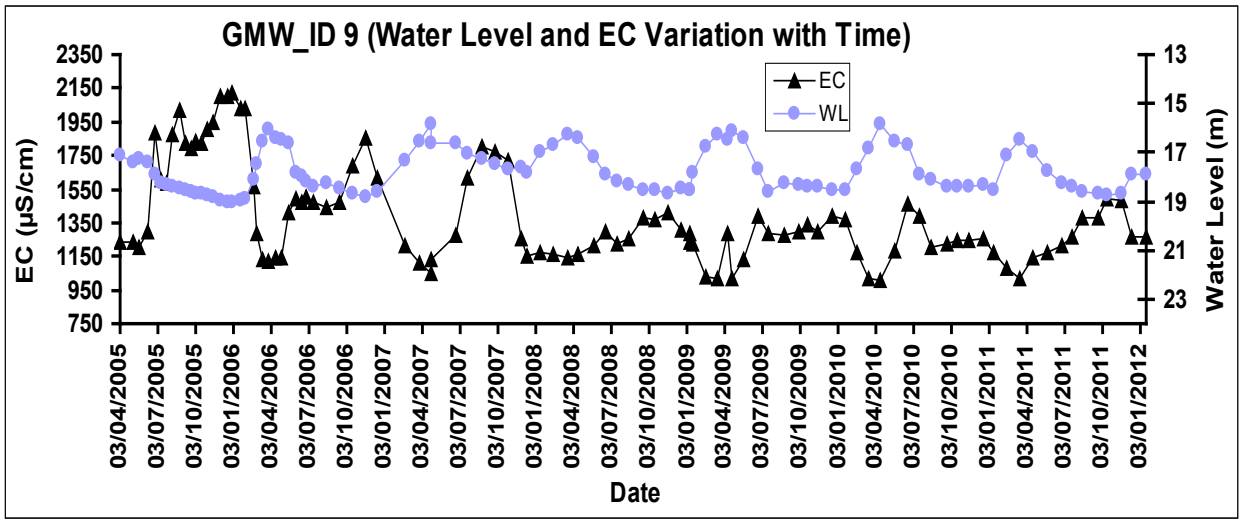


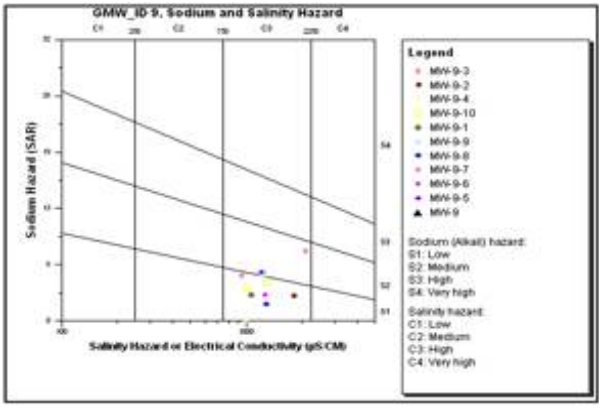
Logar GMW_ID 37

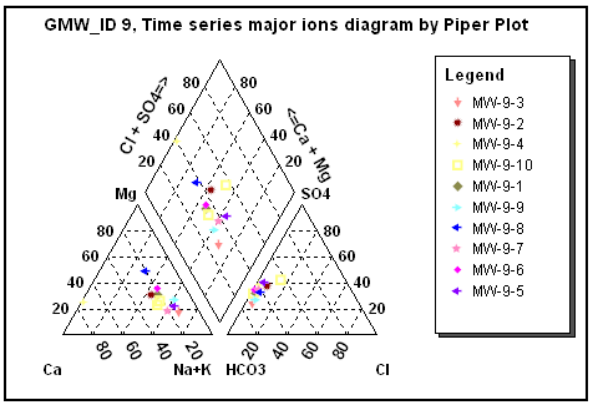


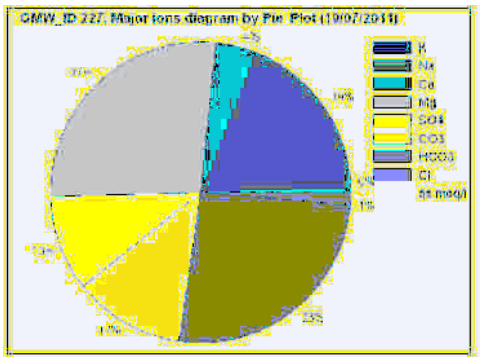
Wardak

Wardak GMW_ID 9

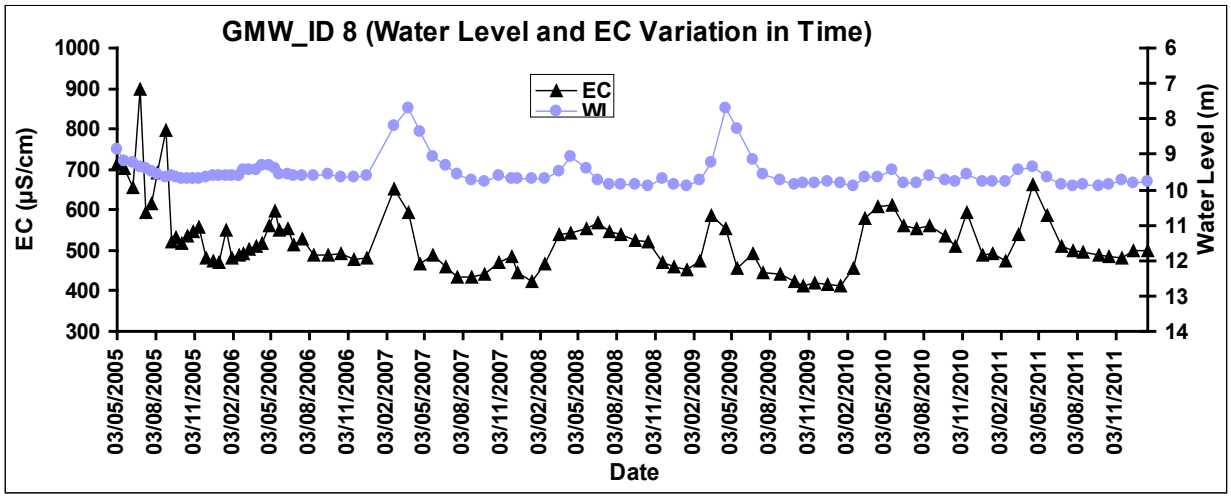


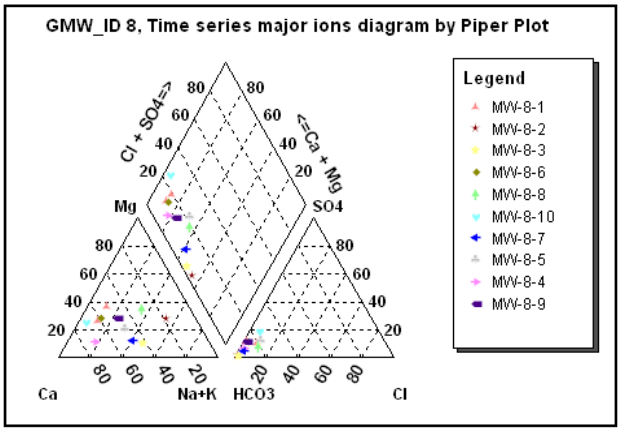


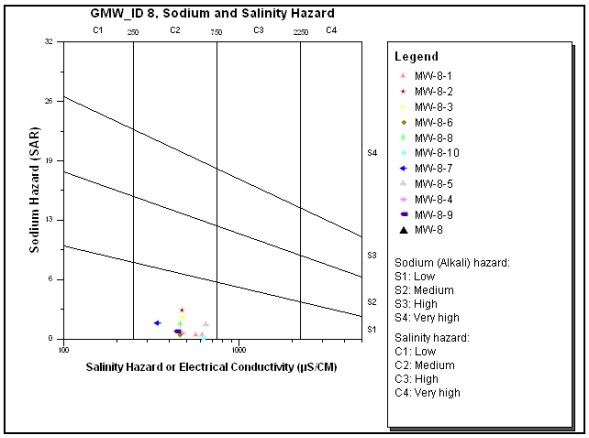




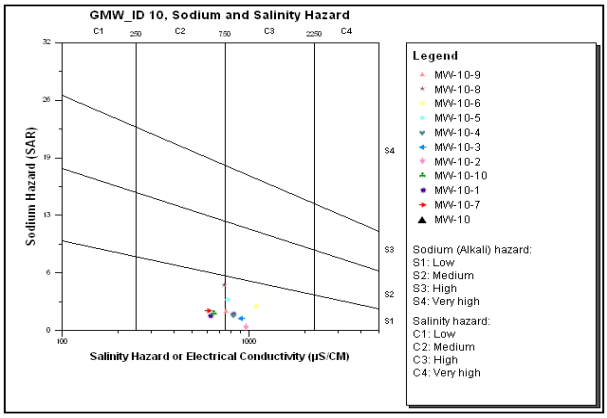
Wardak GMW_ID 8

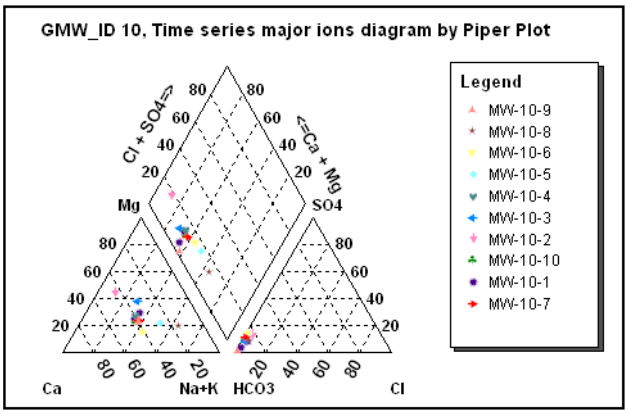


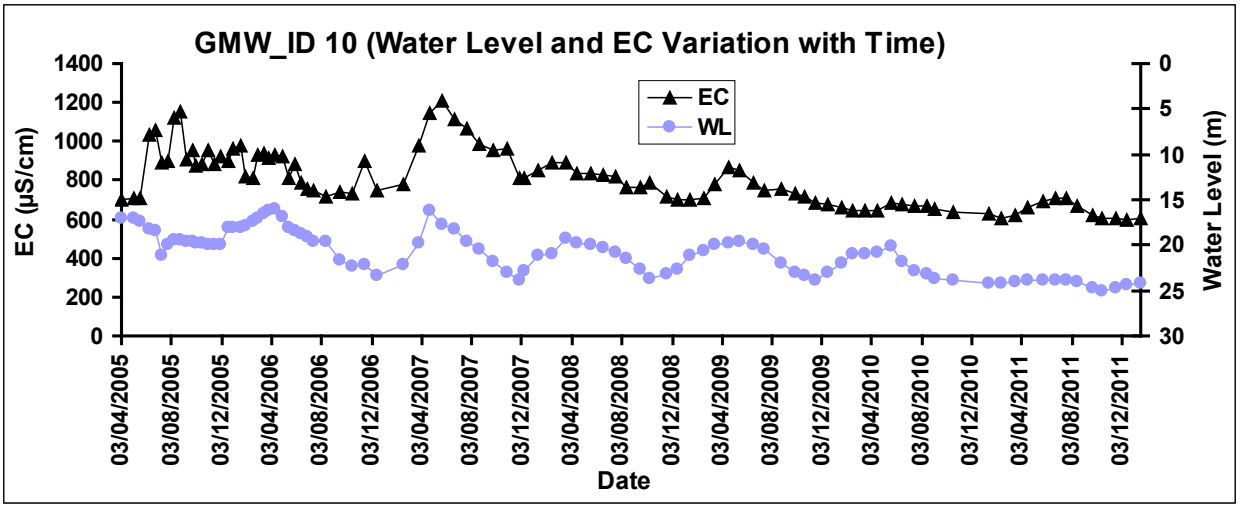




Wardak GMW_ID 10

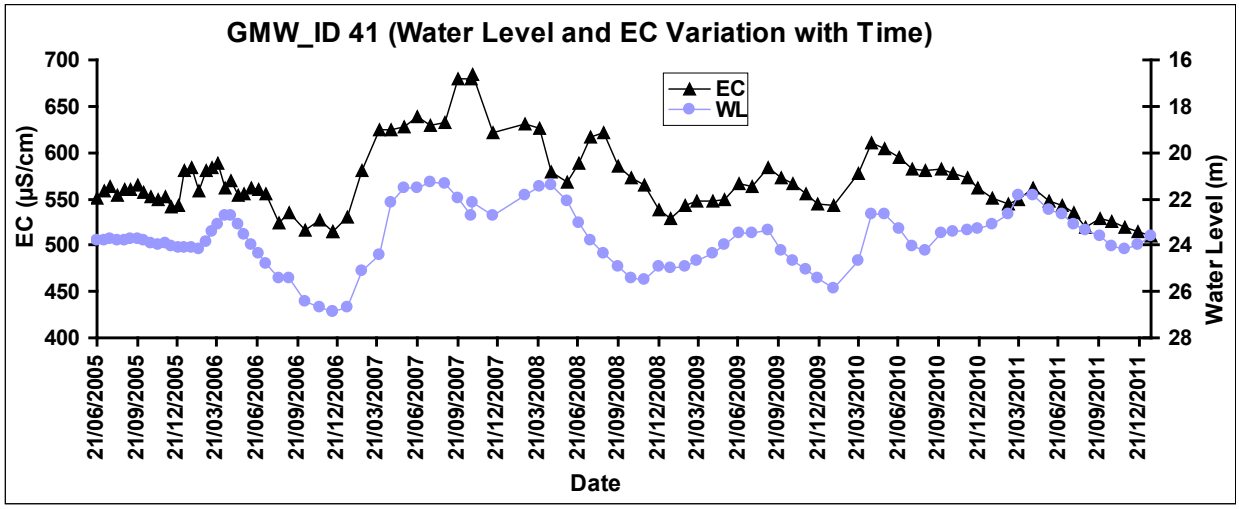


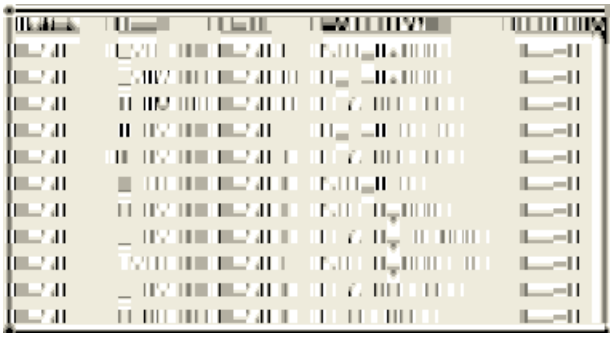


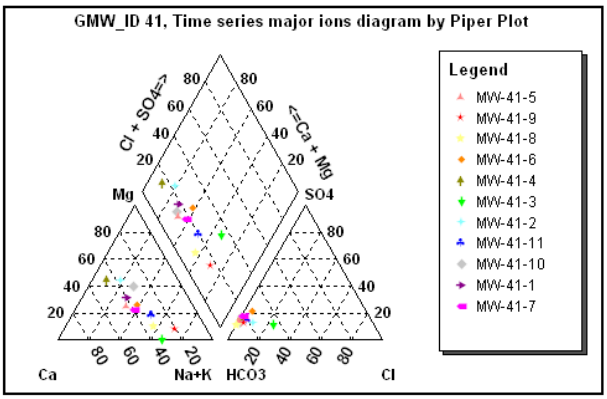


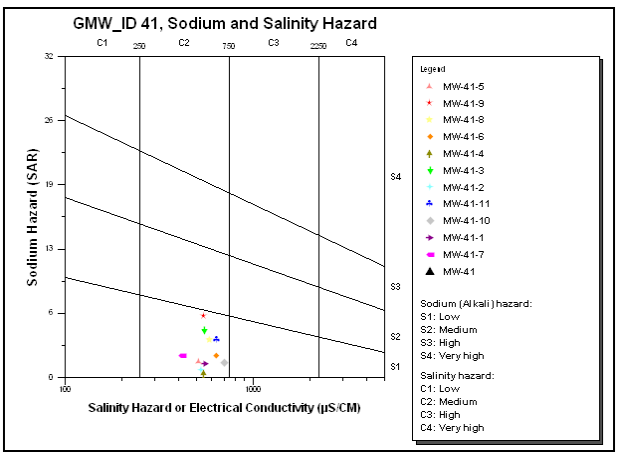
Paktya

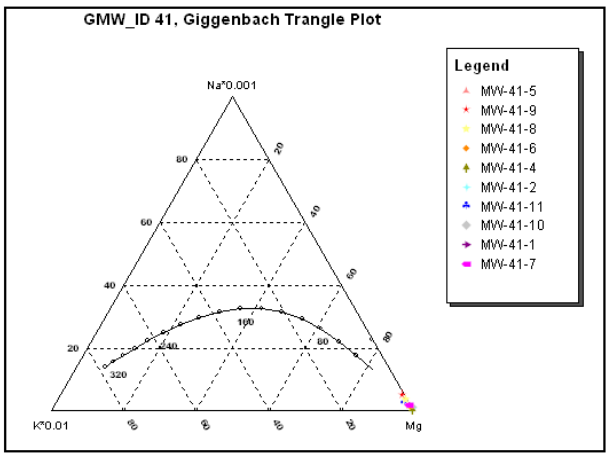
Paktya GMW_ID 41



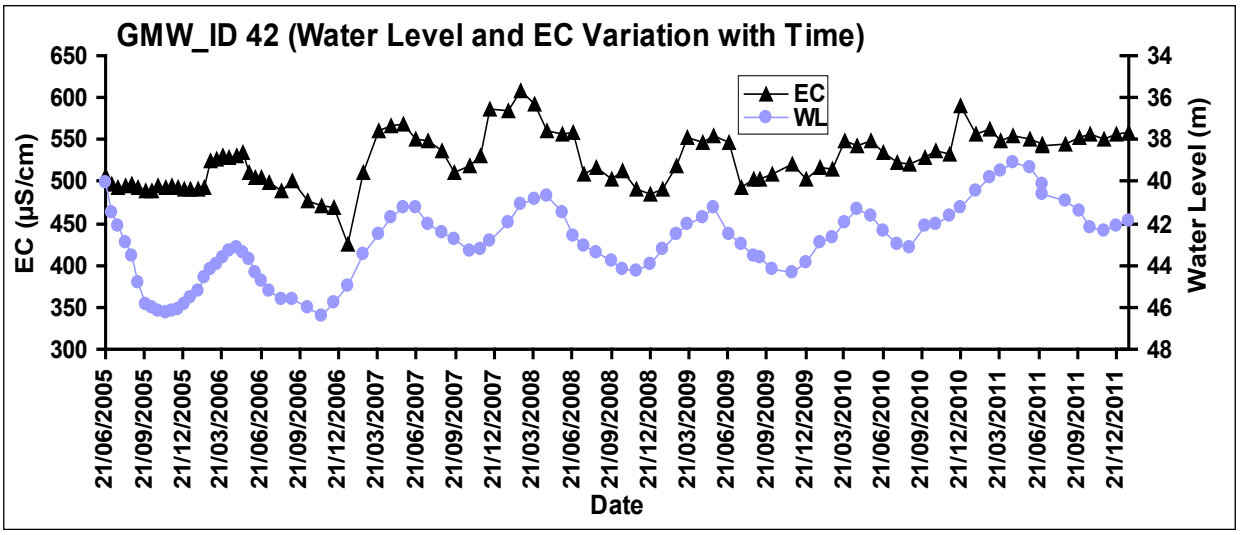


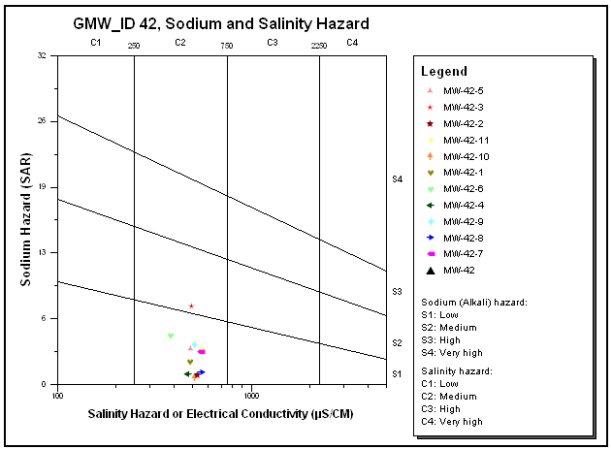


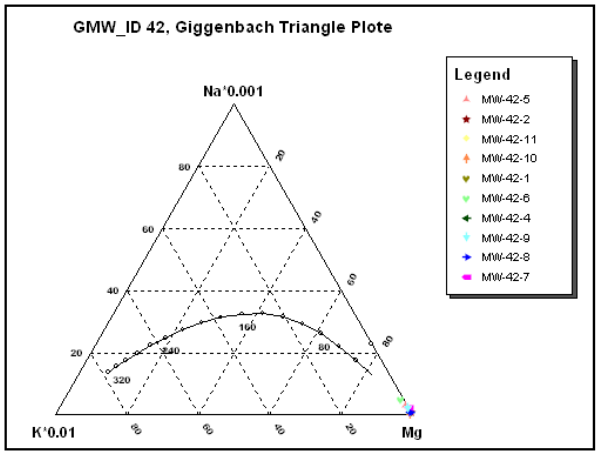




Paktya GMW_ID 42

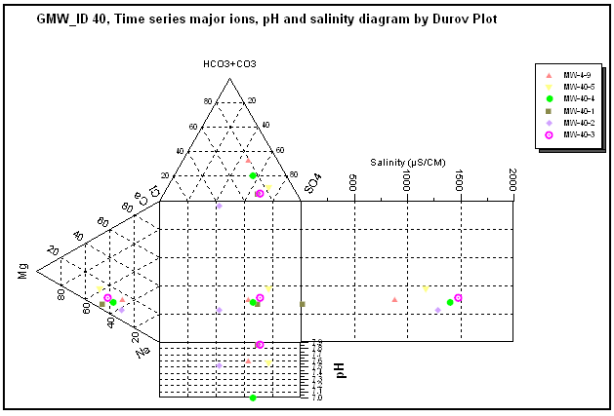


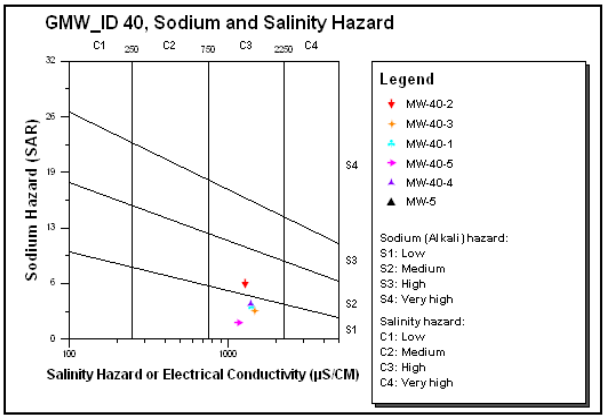


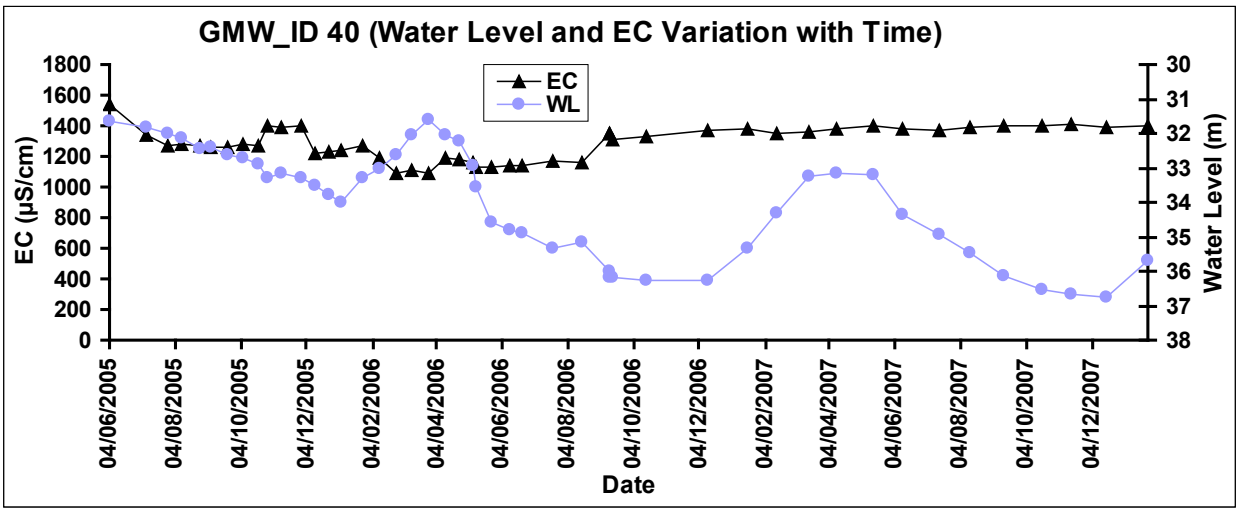


Khost

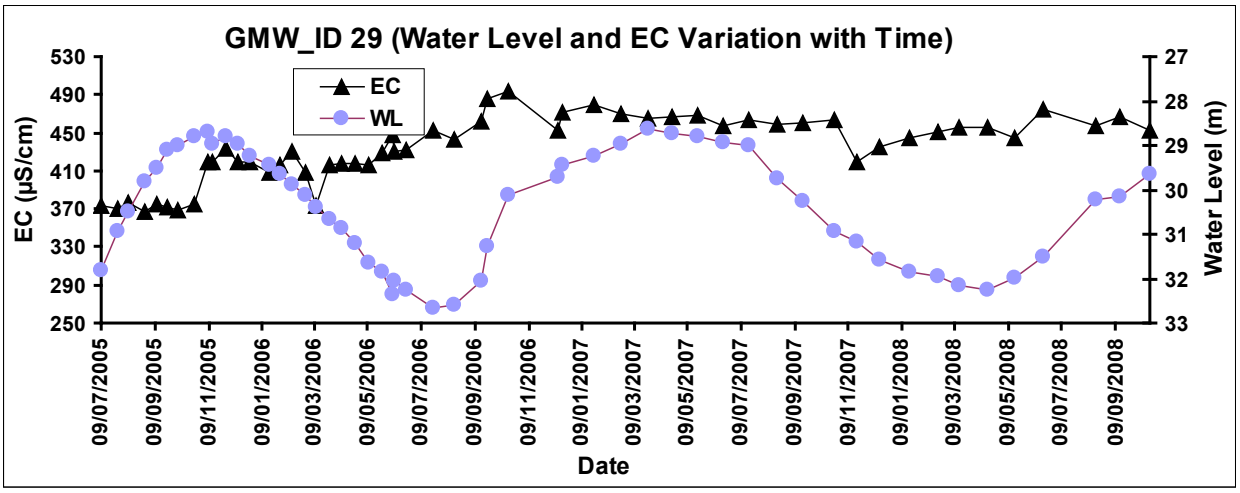
Khost GMW_ID 40

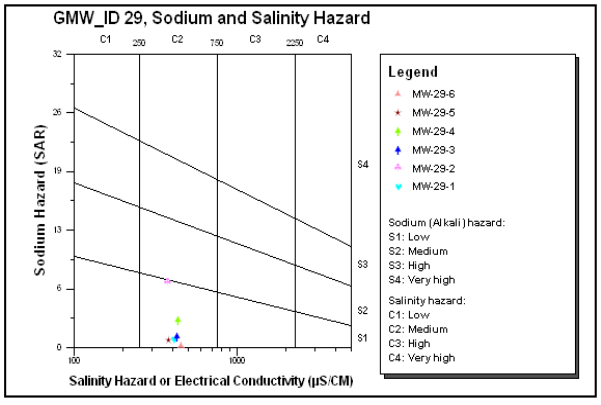


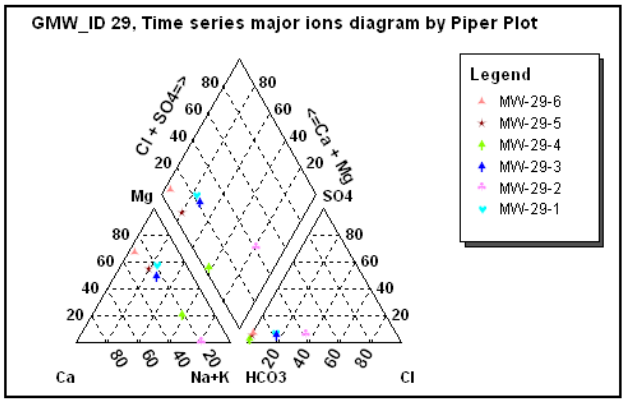




Khost GMW_ID 29

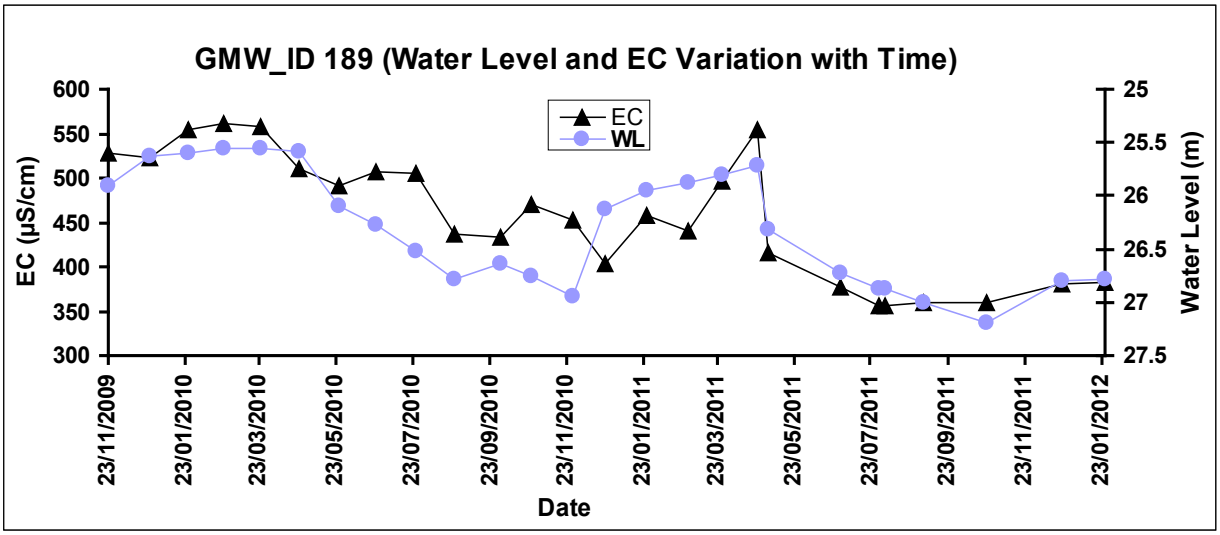


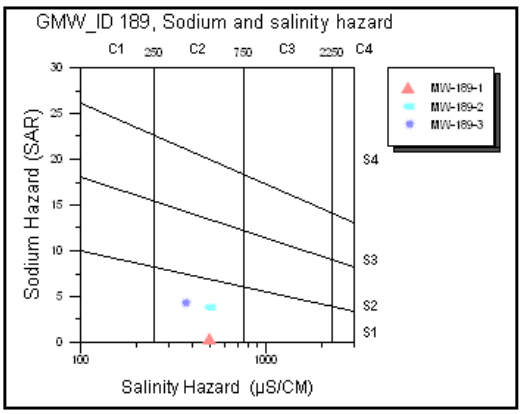


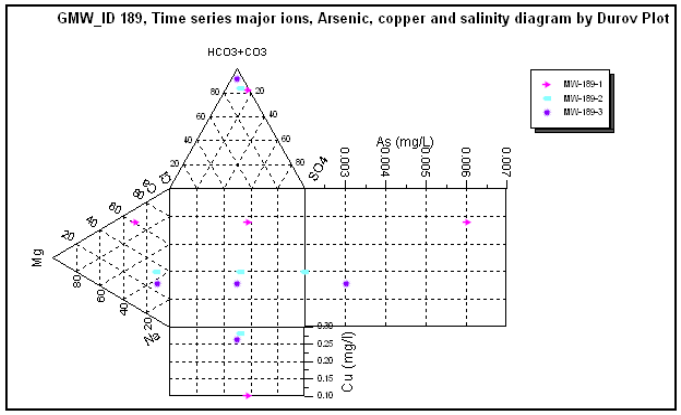


Ghazni

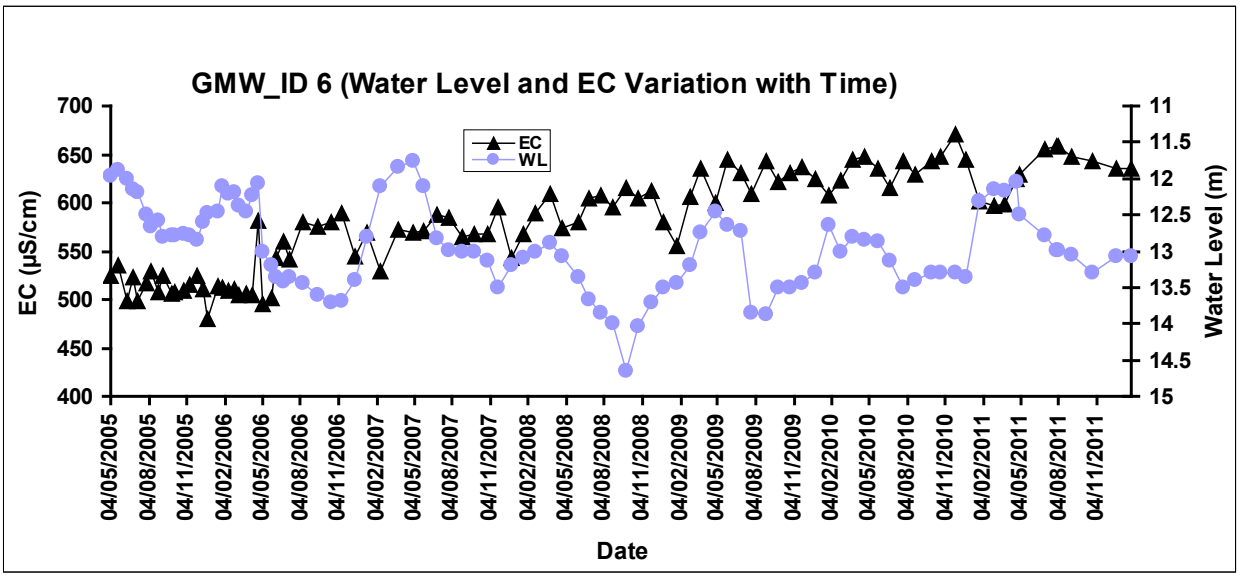
Ghazni GMW_ID 189

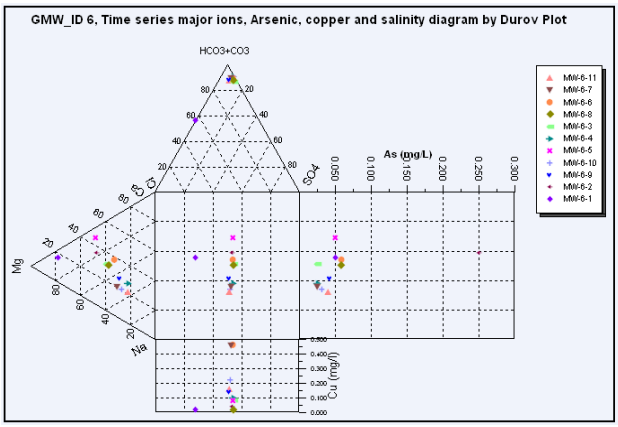


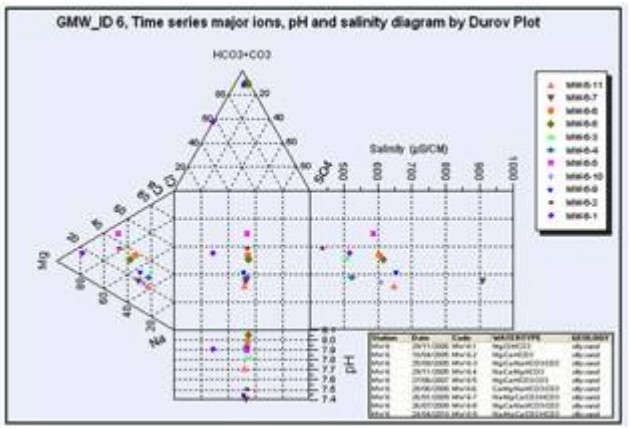


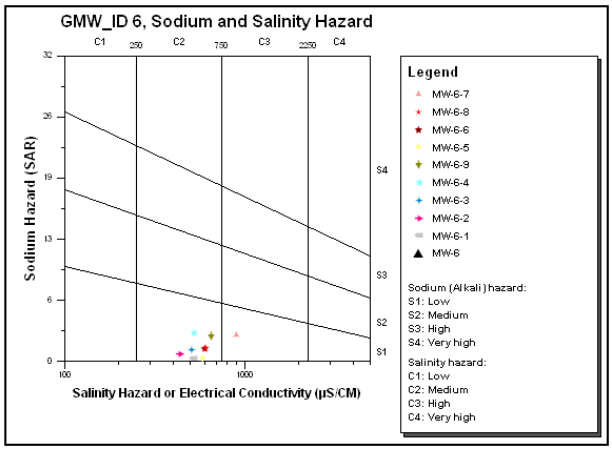


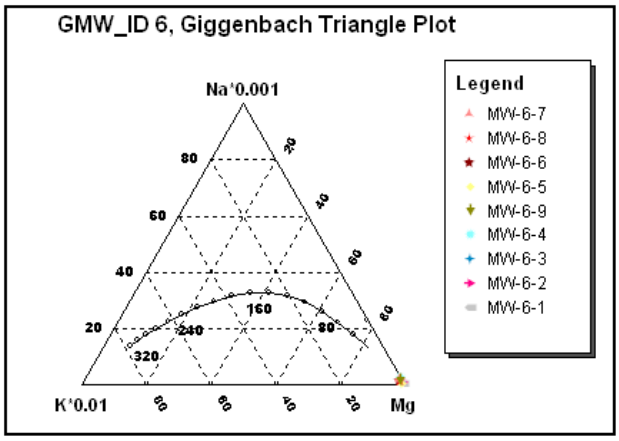
Ghazni GMW_ID 6



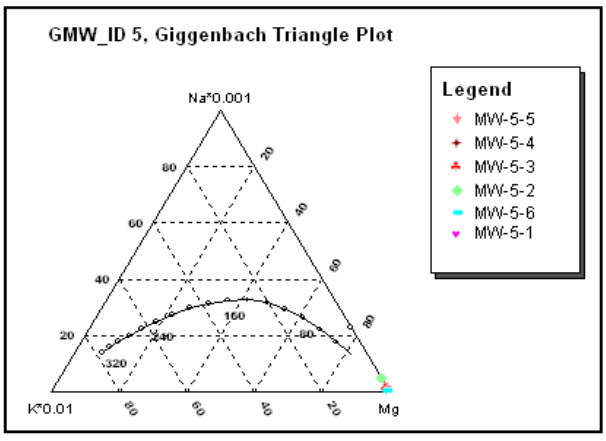

GMW_ID 6, Time series major ions, Arsenic, copper and salinity diagram by Durov Plot
HCO3+CO3
As (mg/L)
Cu (mg/L)
Mg
Na

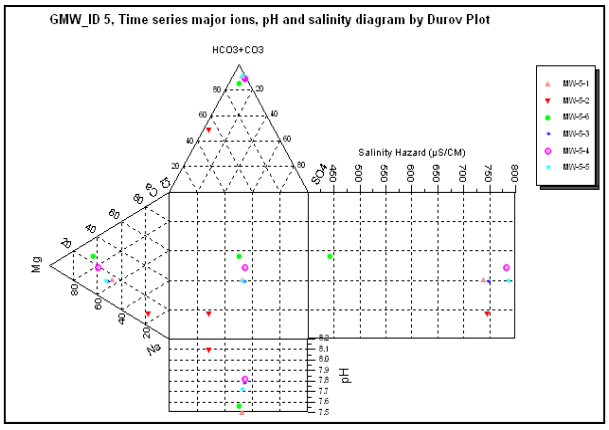

GMW_ID 6, Time series major ions, pH and salinity diagram by Durov Plot
HCO3+CO3
Salinity (µS/CM)
pH
Mg
Na

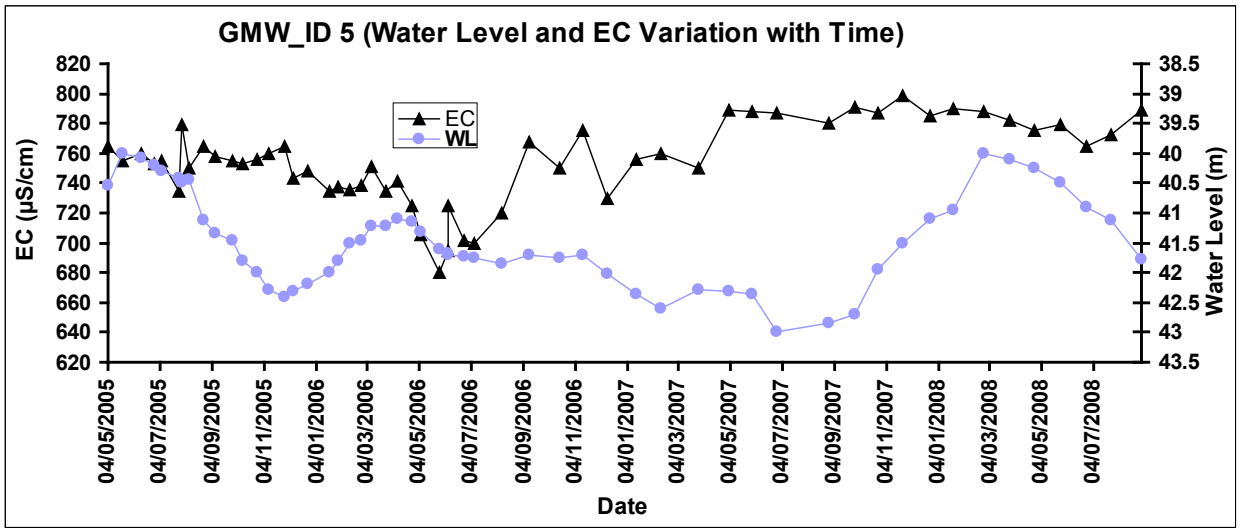

GMW_ID 6, Sodium and Salinity Hazard
Sodium Hazard (SAR)
Salinity Hazard or Electrical Conductivity (µS/CM)
Legend
MW-6-7
MW-6-8
MW-6-6
MW-6-5
MW-6-9
MW-6-4
MW-6-3
MW-6-2
MW-6-1
MW-6
Sodium (Alkali) hazard:
S1: Low
S2: Medium
S3: High
S4: Very high
Salinity hazard:
C1: Low
C2: Medium
C3: High
C4: Very high


GMW_ID 6, Giggenbach Triangle Plot
Na*0.001
K*0.01
Mg
Legend
MW-6-7
MW-6-8
MW-6-6
MW-6-5
MW-6-9
MW-6-4
MW-6-3
MW-6-2
MW-6-1

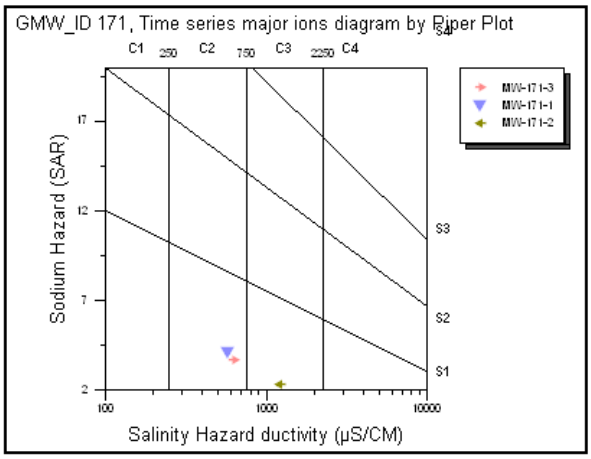
GMW_ID 5

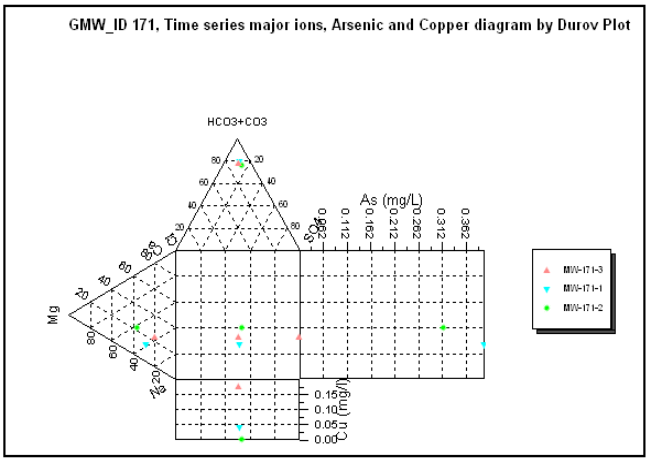

GMW_ID 5, Giggenbach Triangle Plot
Na*0.001
K*0.01
Mg
Legend
MW-5-5
MW-5-4
MW-5-3
MW-5-2
MW-5-6
MW-5-1


GMW_ID 5, Time series major ions, pH and salinity diagram by Durov Plot
HCO3+CO3
Salinity Hazard (µS/CM)
pH
Mg
Na

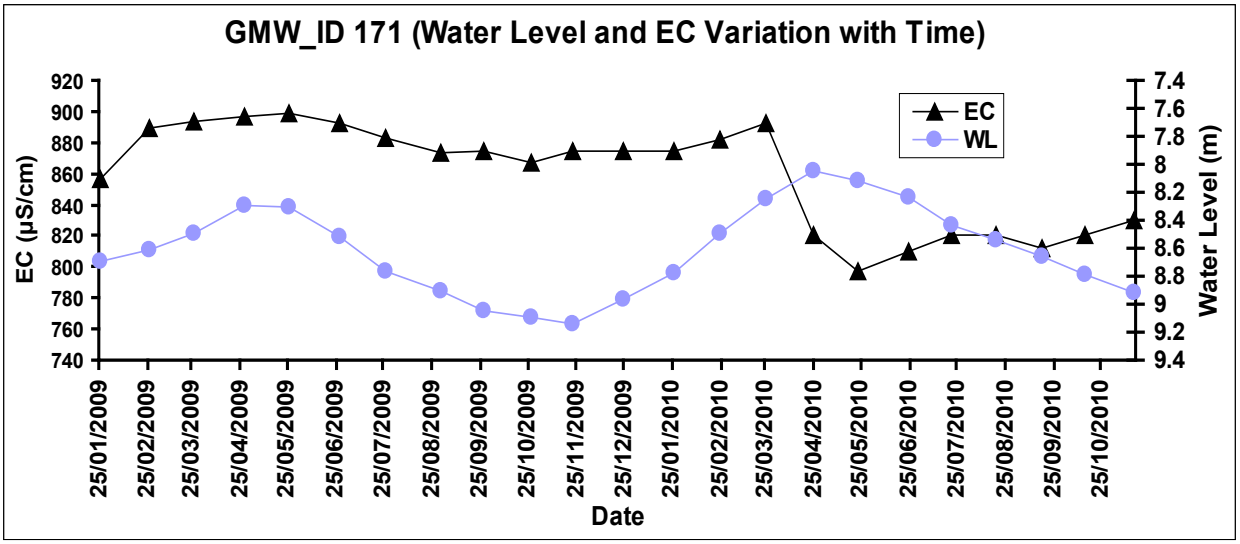

GMW_ID 5 (Water Level and EC Variation with Time)
EC (µS/cm)
Water Level (m)
EC
WL
Date
04/05/2005
04/07/2005
04/09/2005
04/11/2005
04/01/2006
04/03/2006
04/05/2006
04/07/2006
04/09/2006
04/11/2006
04/01/2007
04/03/2007
04/05/2007
04/07/2007
04/09/2007
04/11/2007
04/01/2008
04/03/2008
04/05/2008
04/07/2008

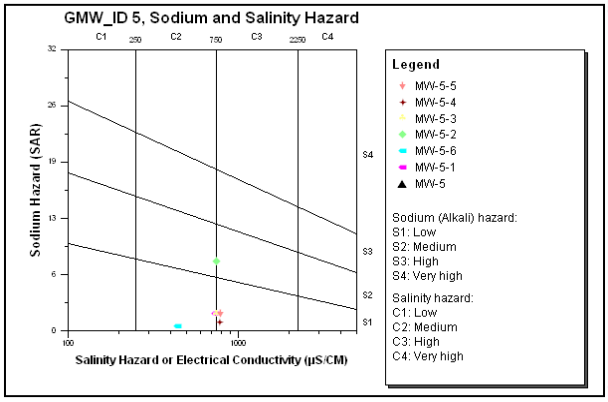
Ghazni GMW_ID 171

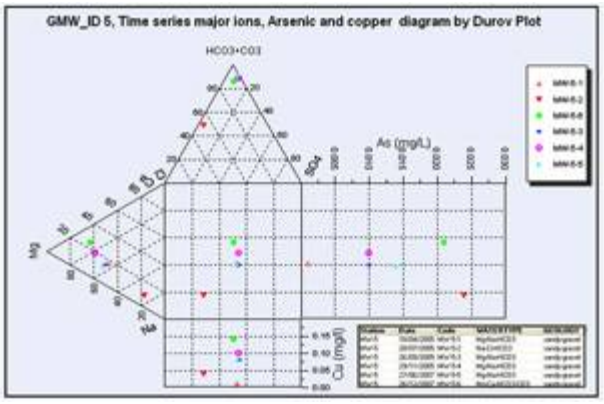


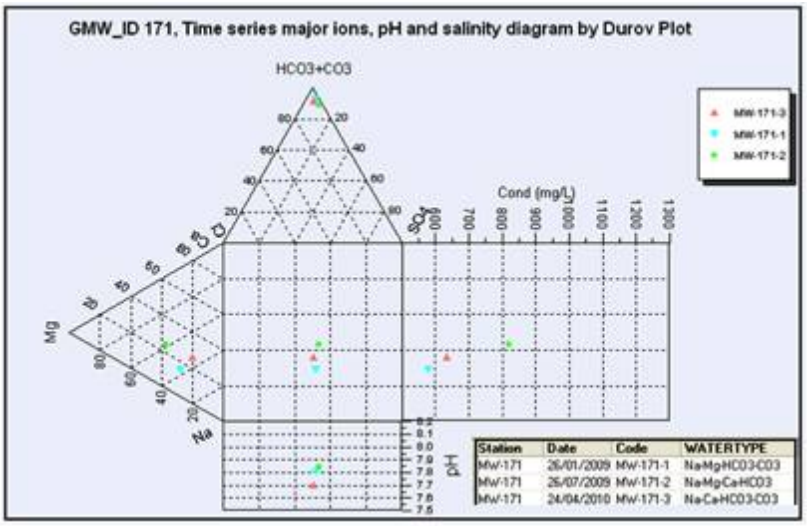


GMW_ID 171

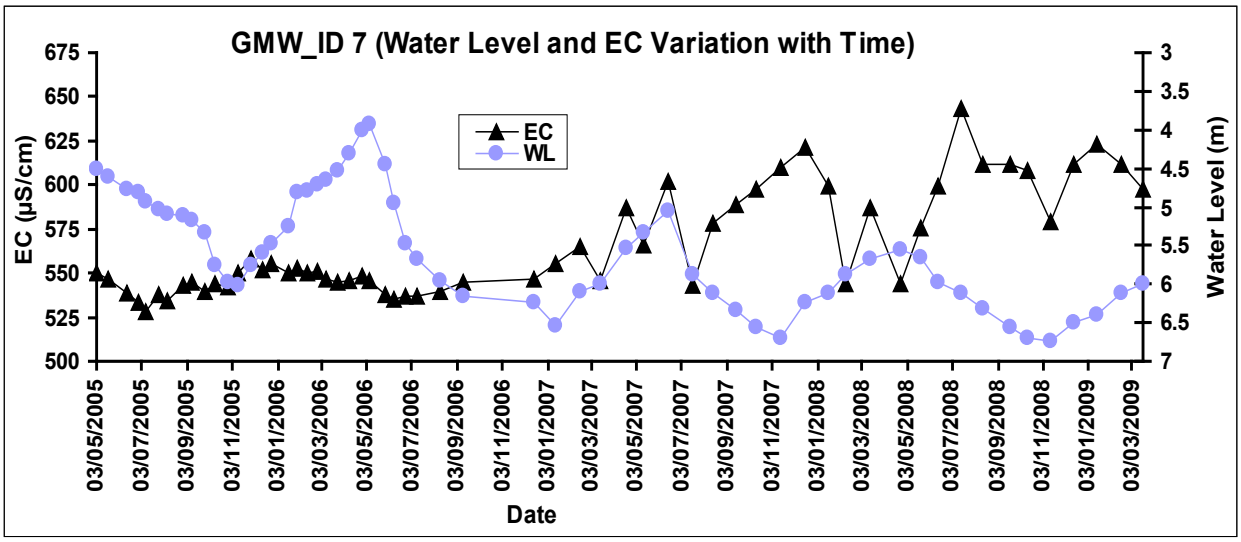


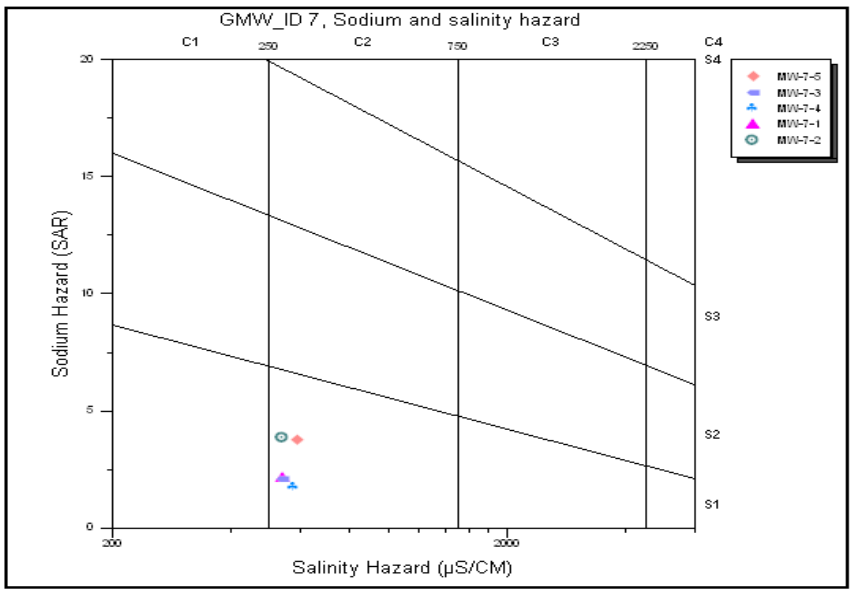


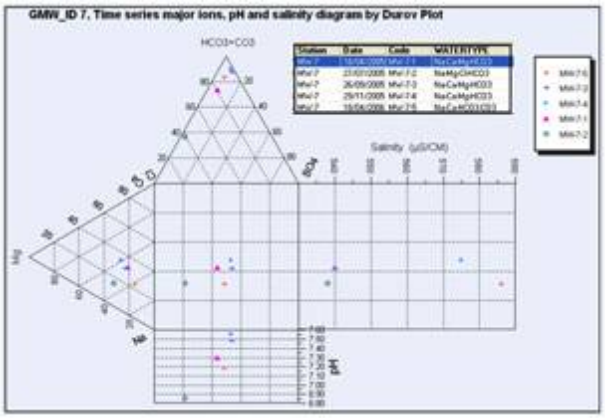


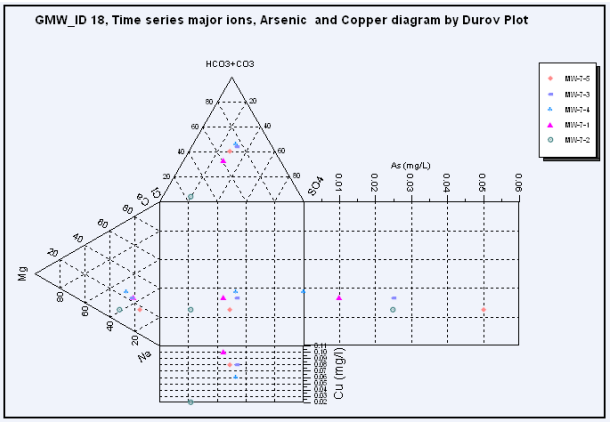


Ghazni GMW_ID 7









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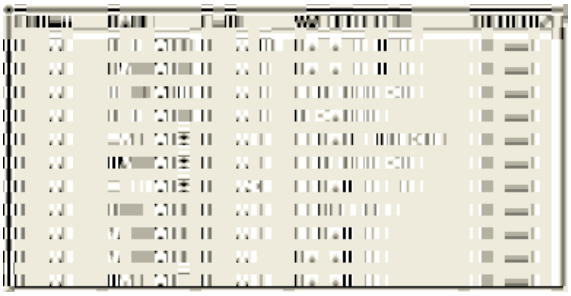

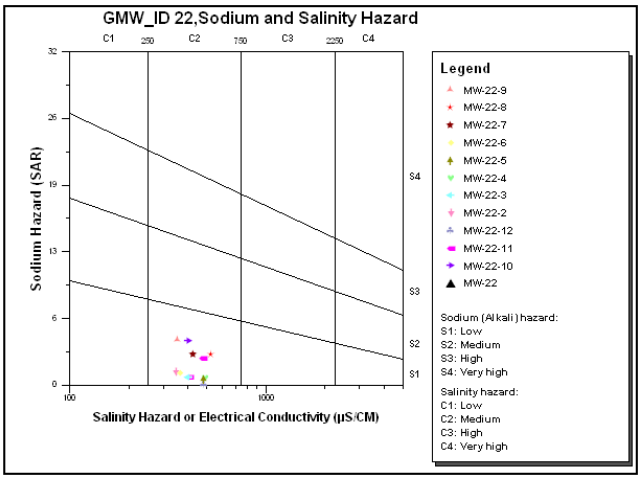

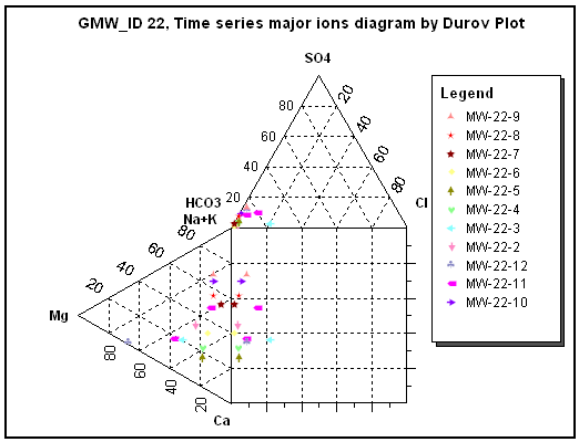

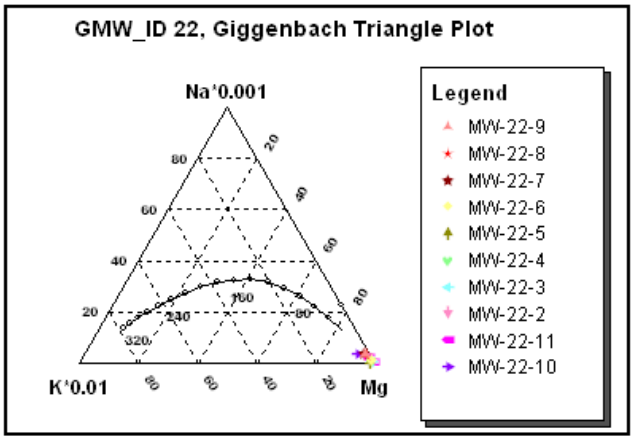

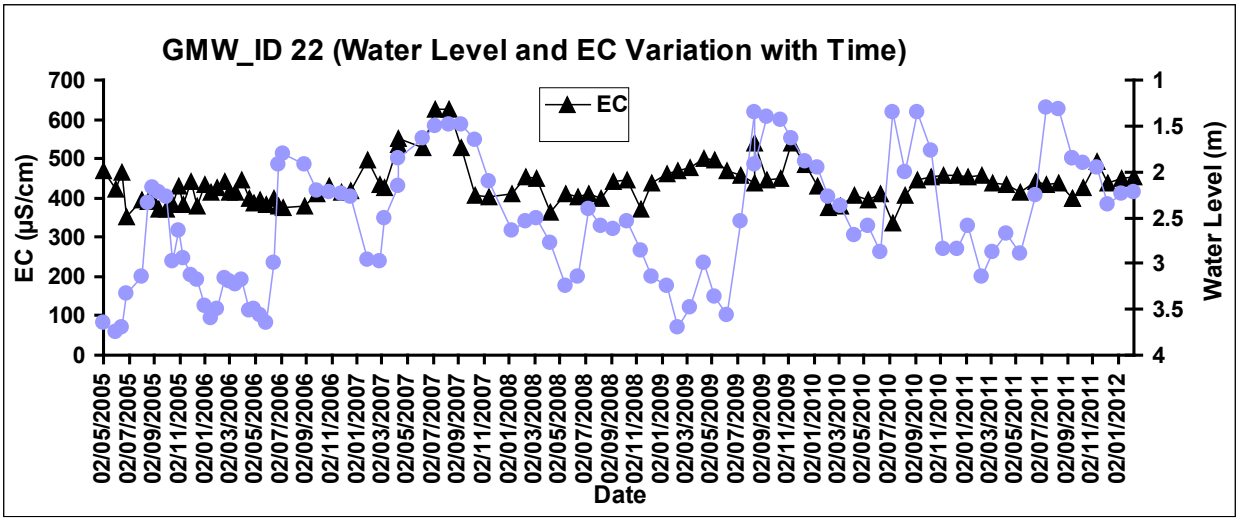

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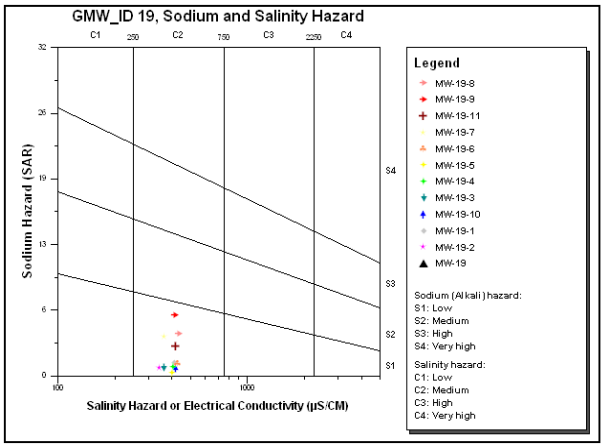

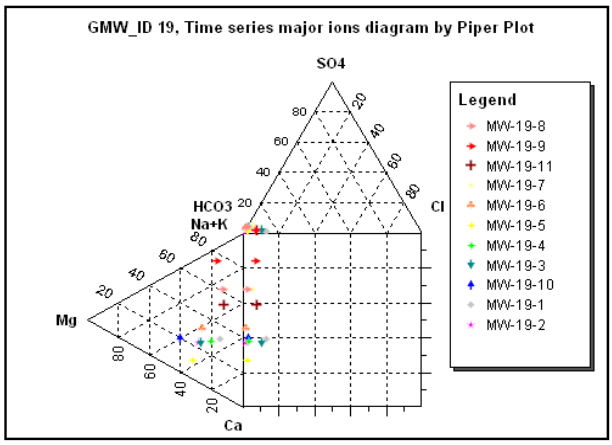

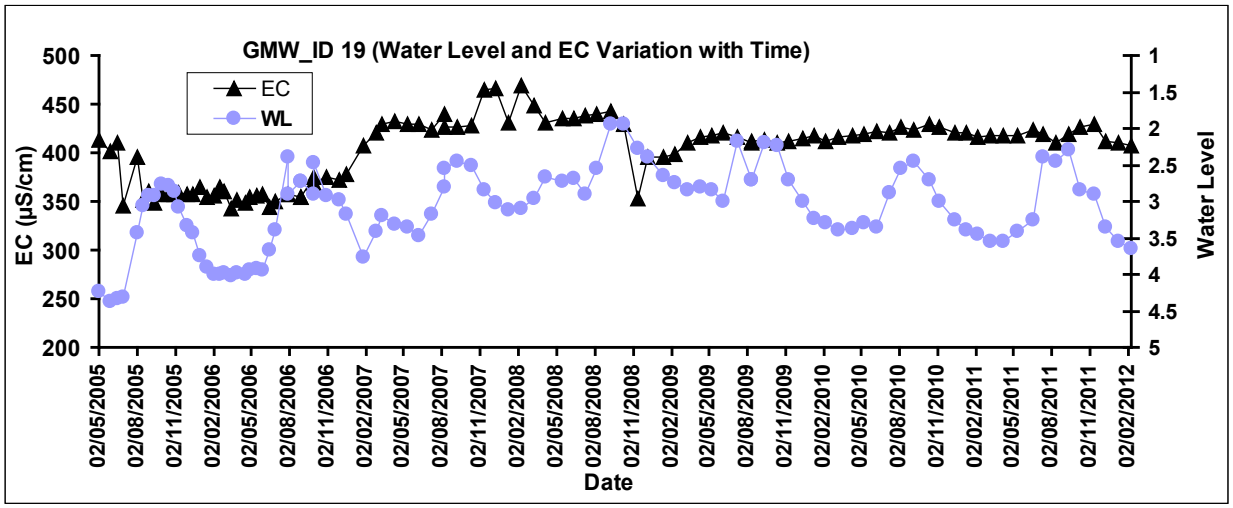

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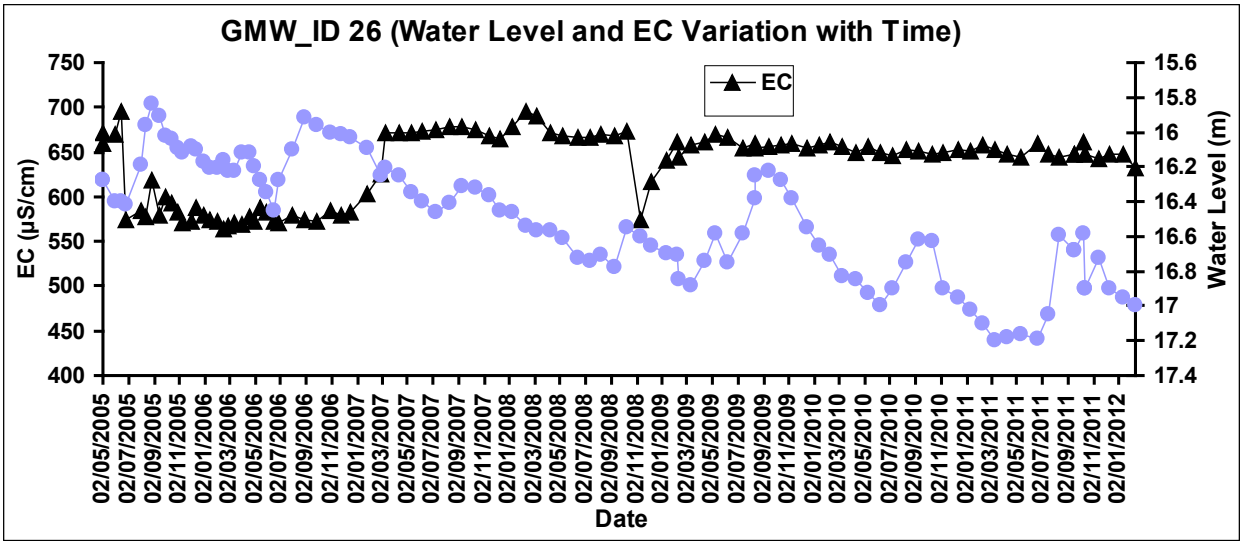

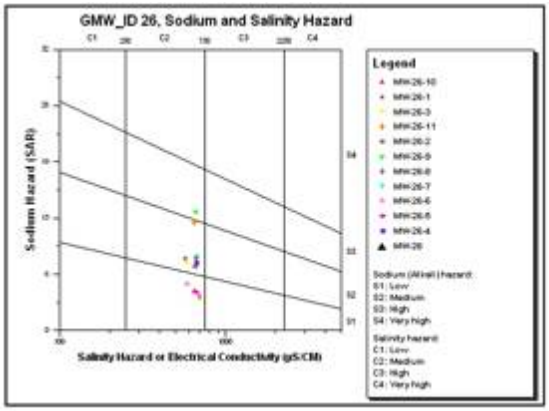

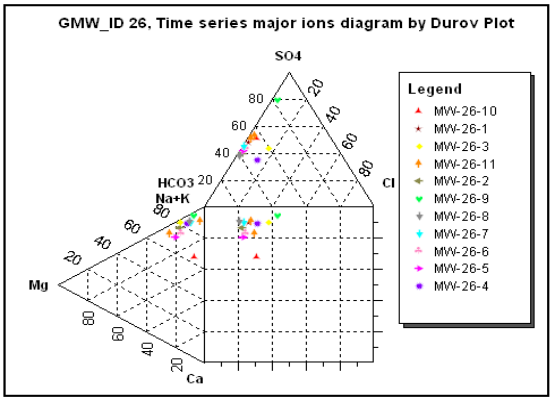

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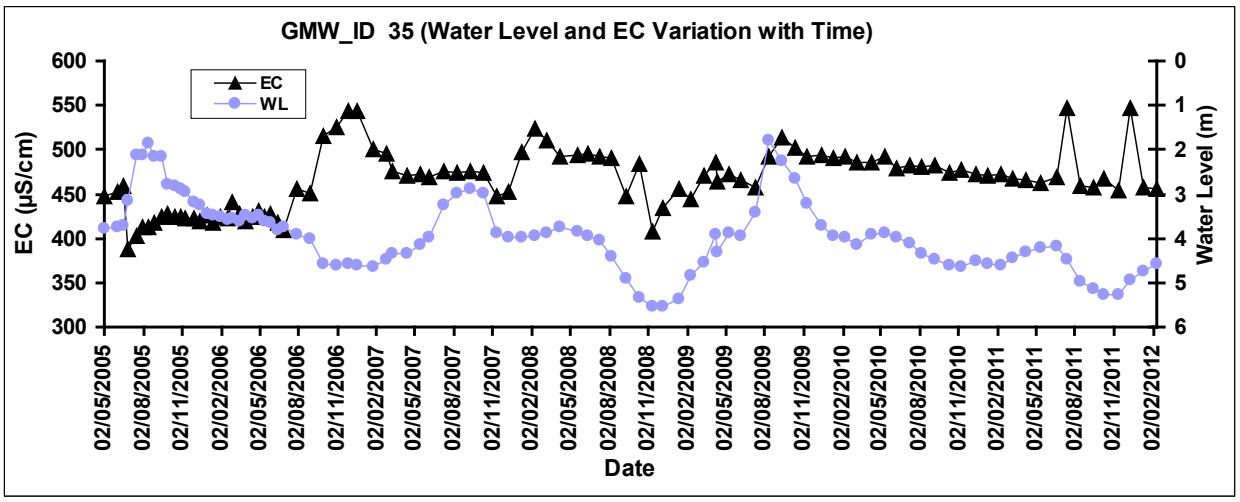

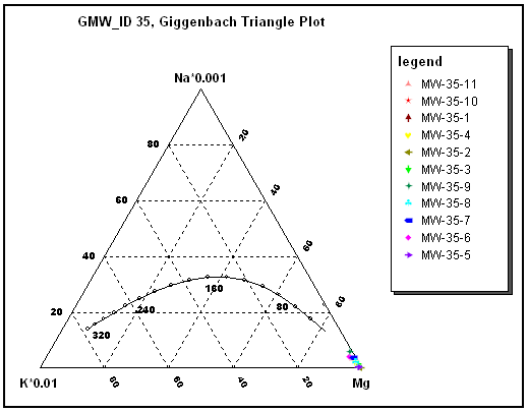

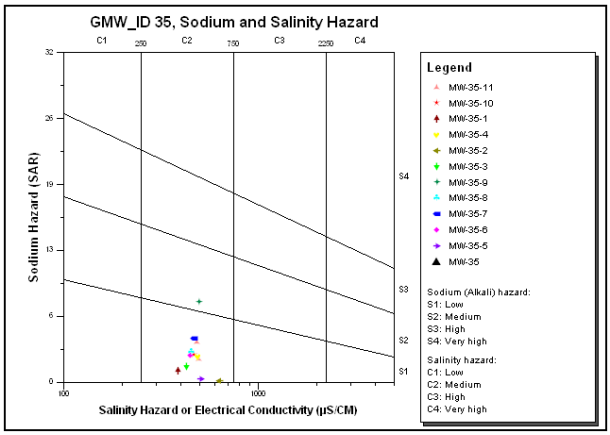

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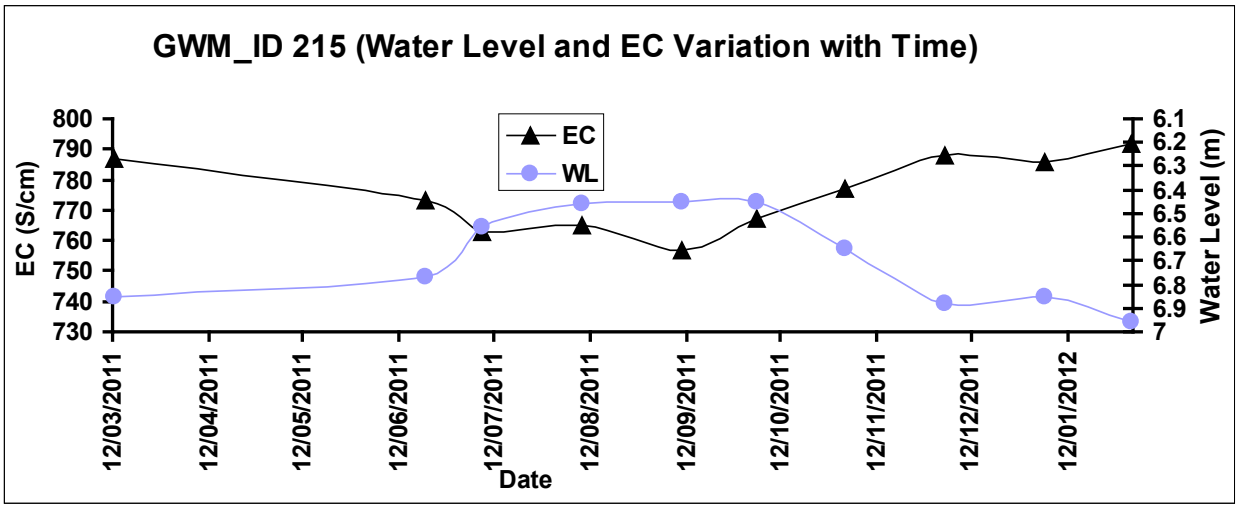

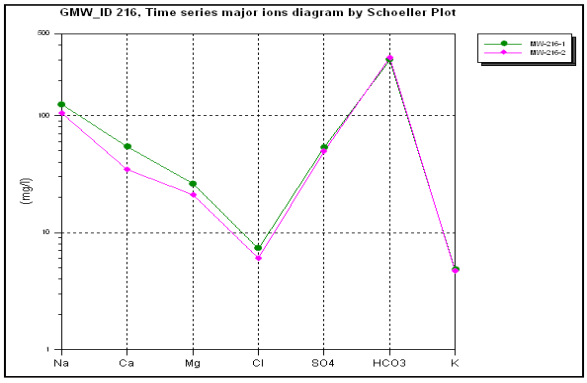

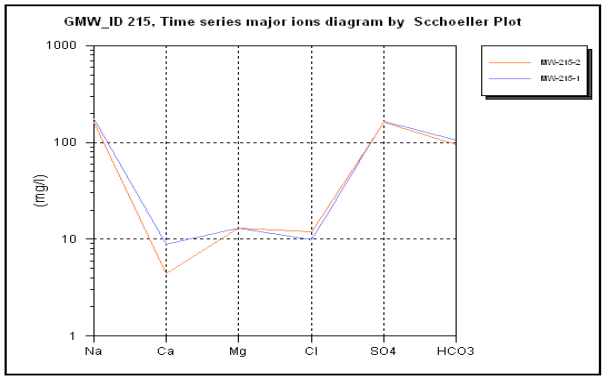

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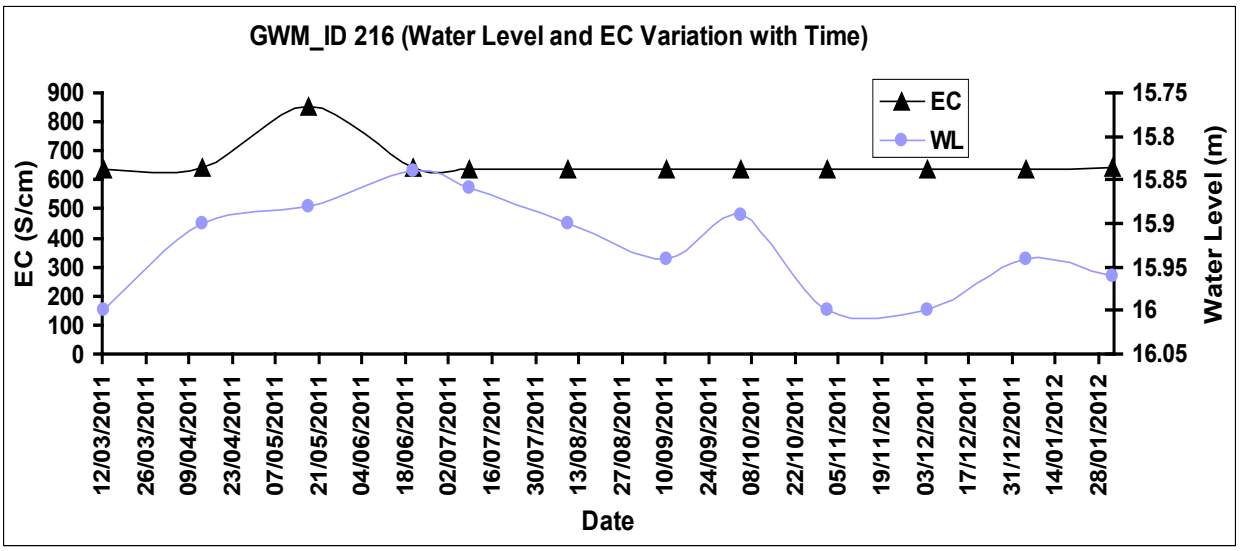

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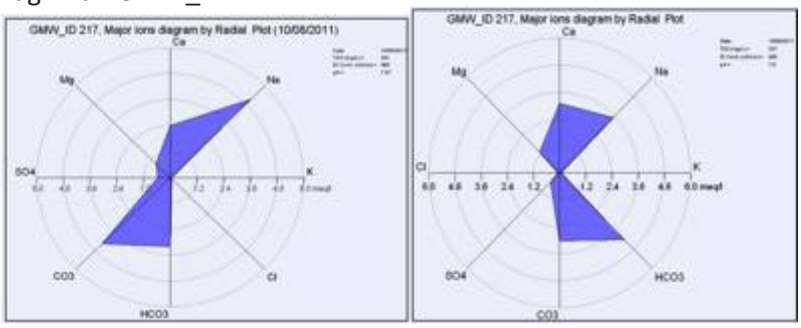

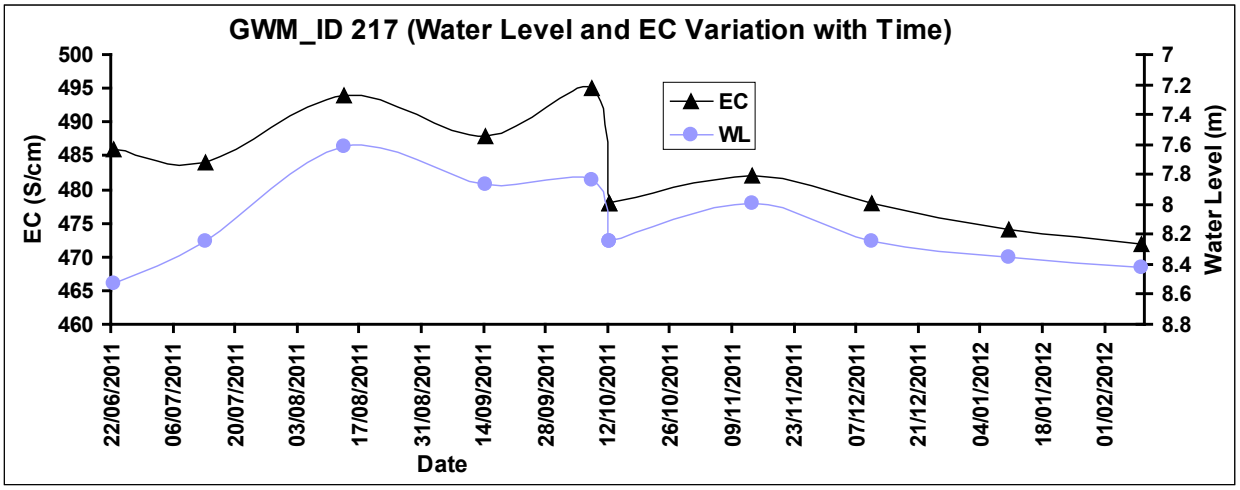

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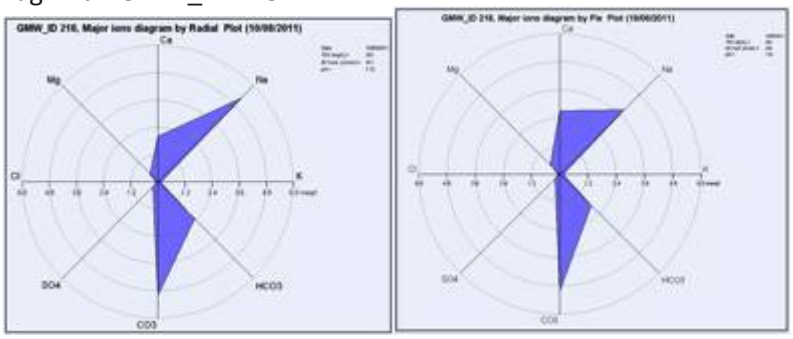

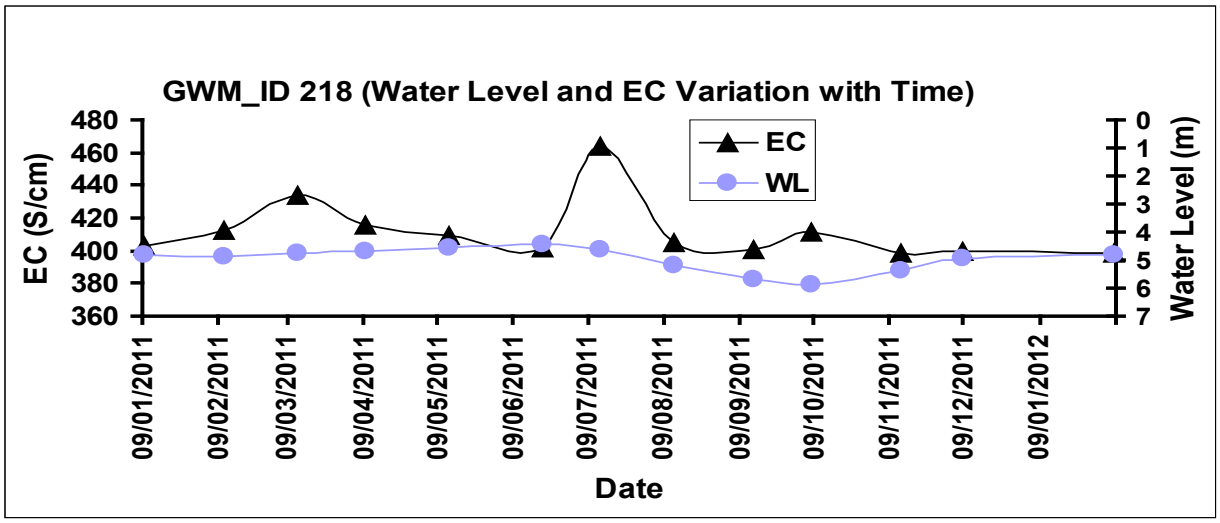

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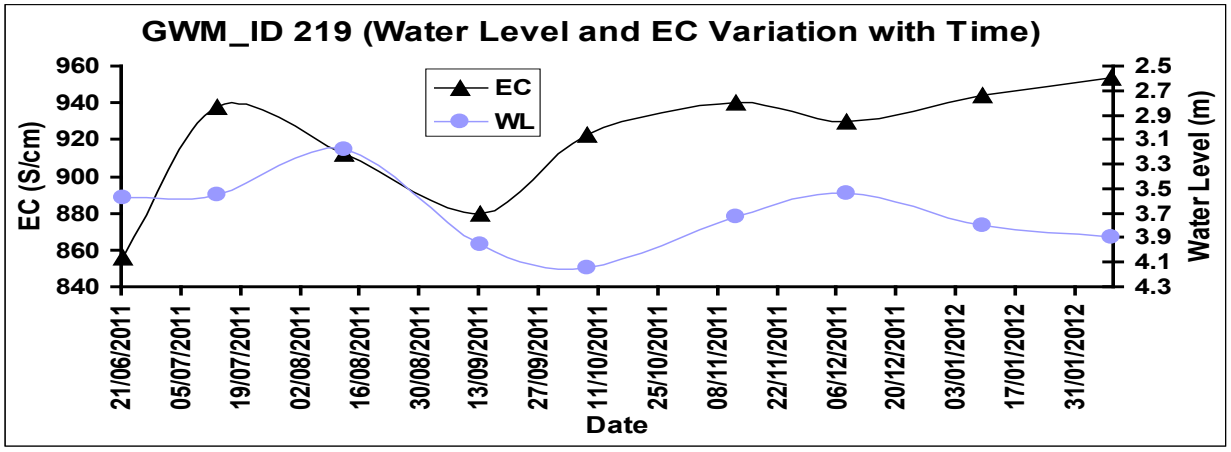

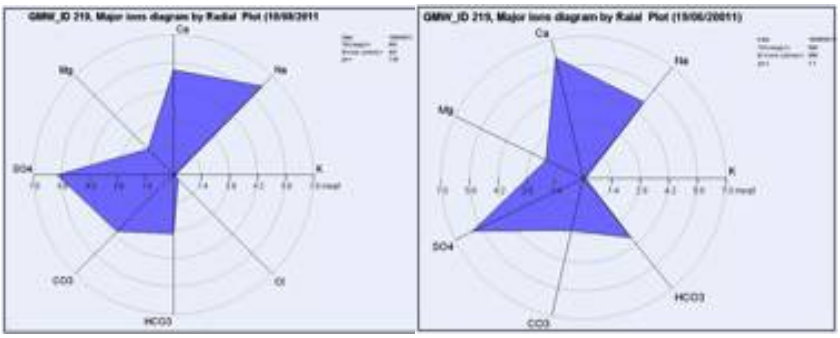

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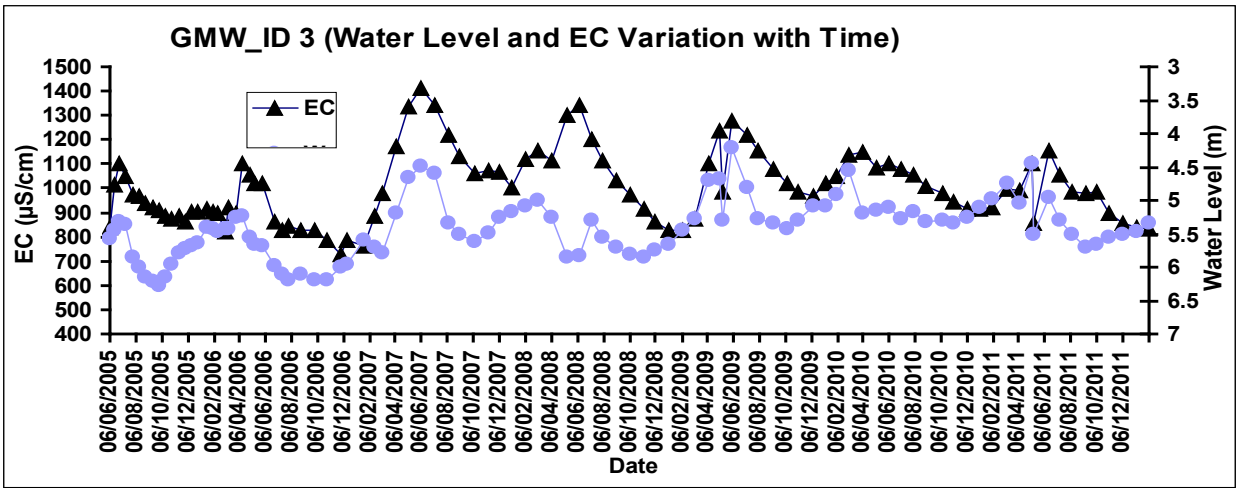

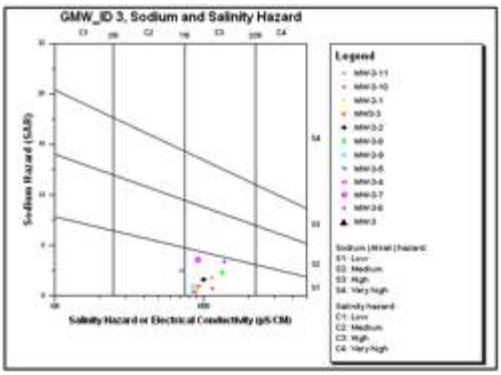

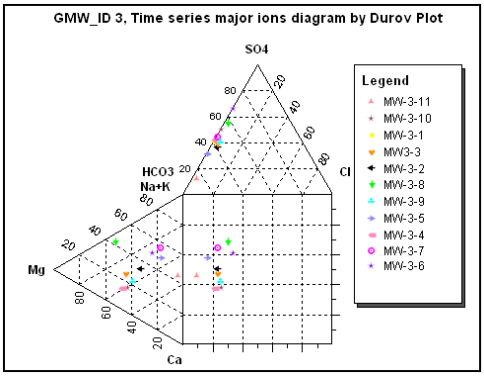

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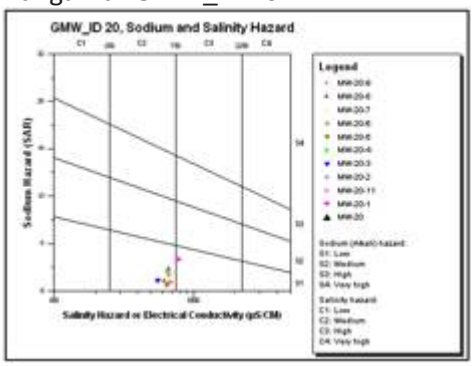

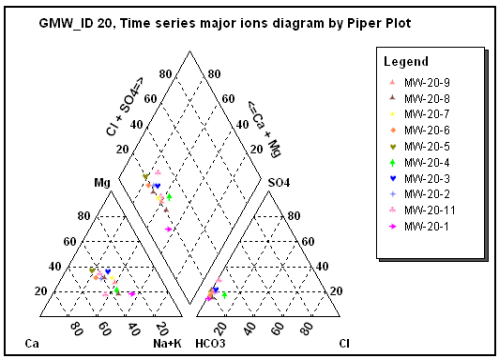

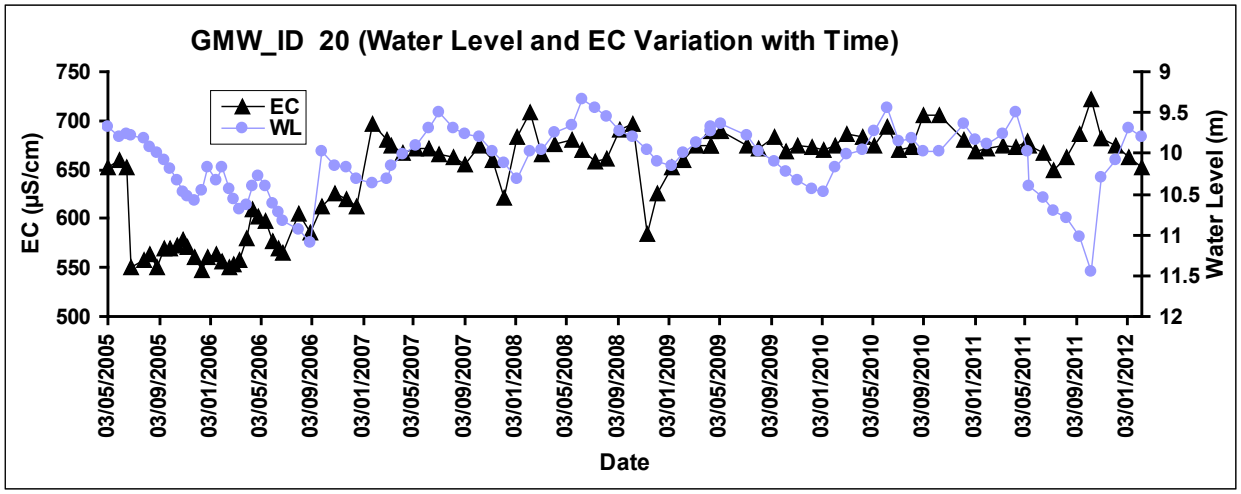

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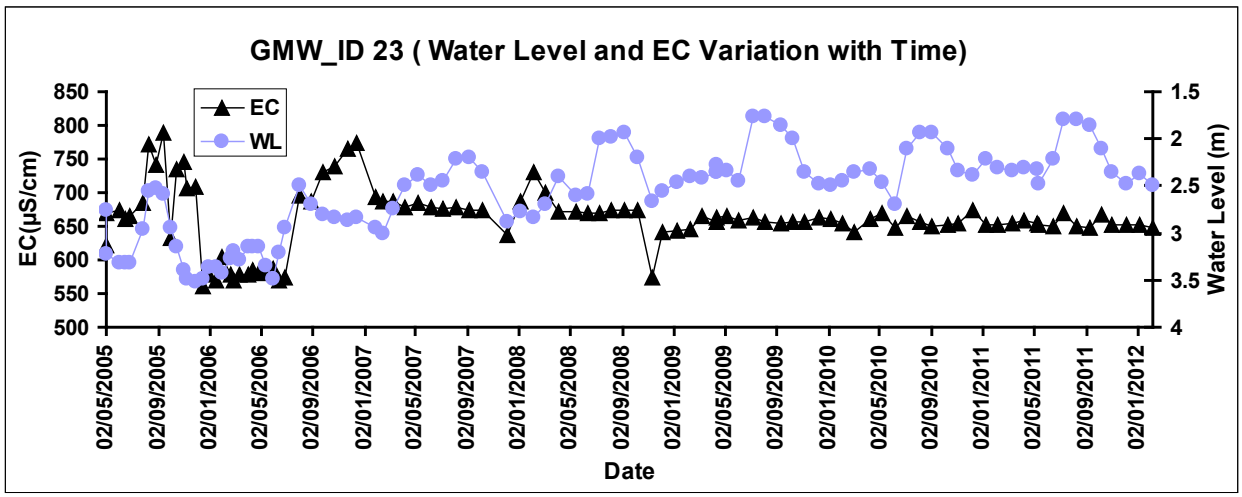

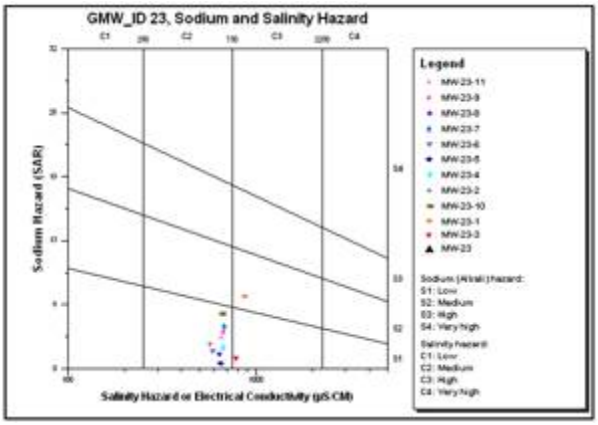

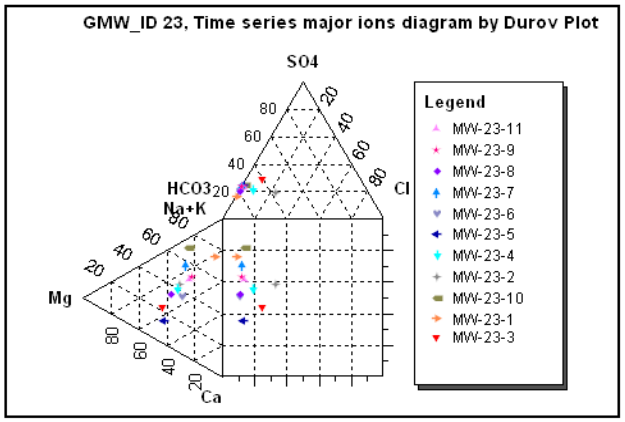

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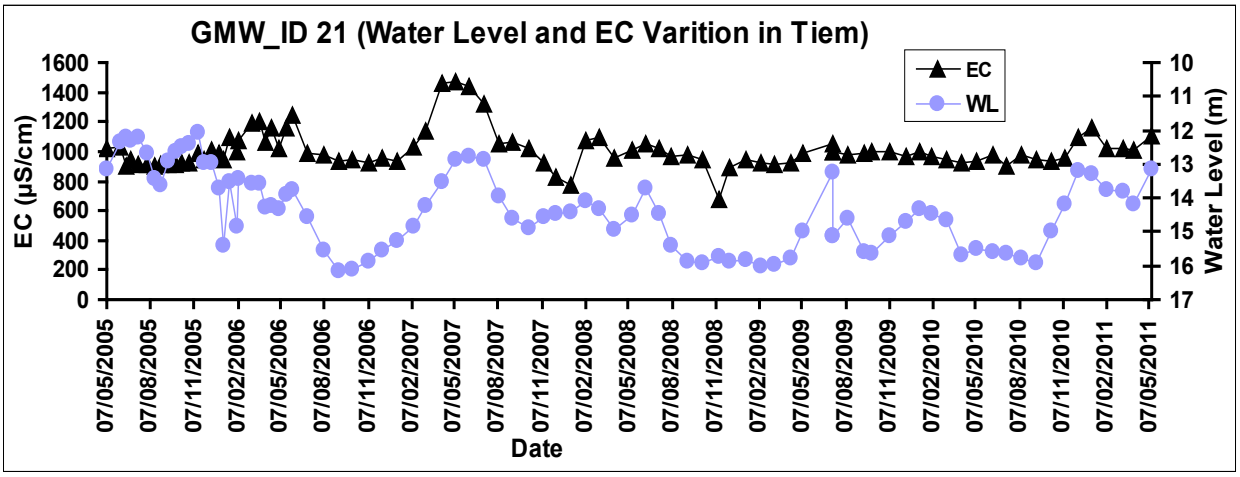

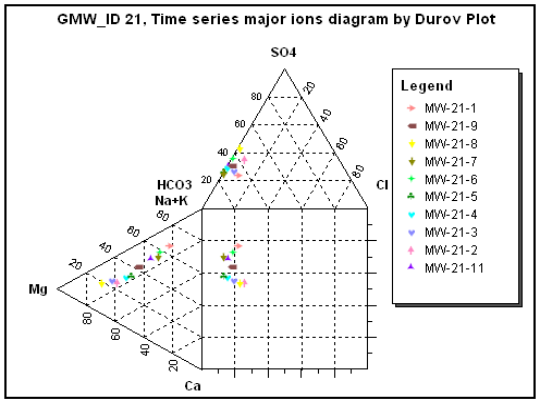

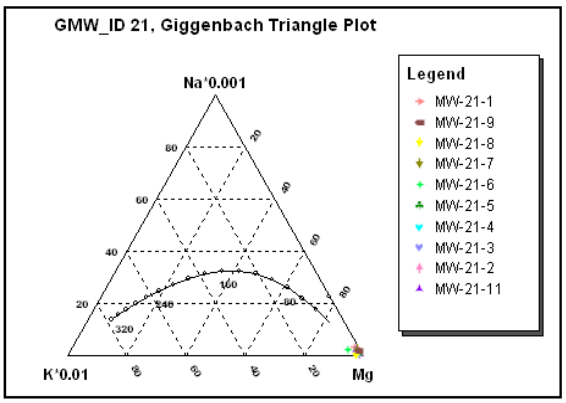

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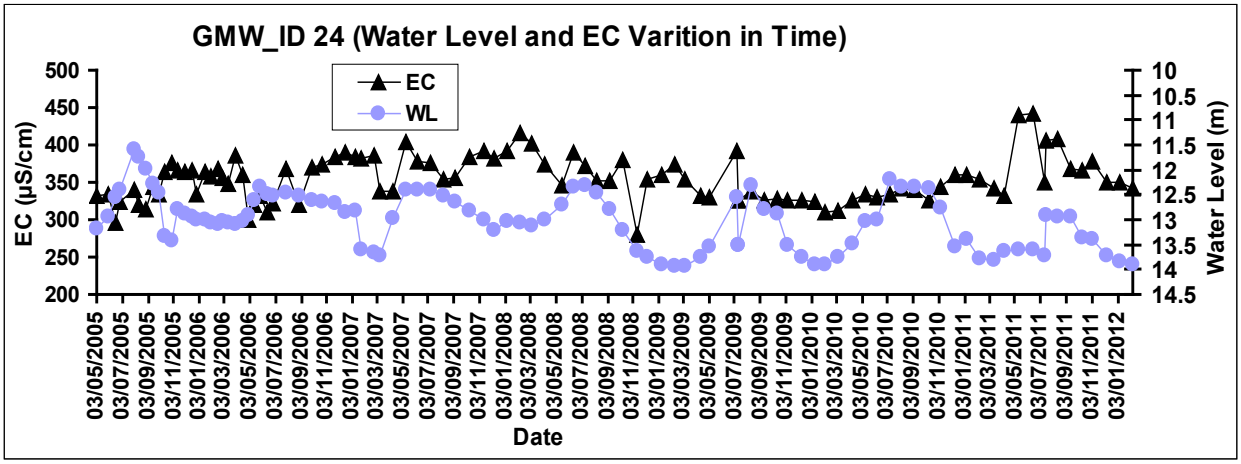

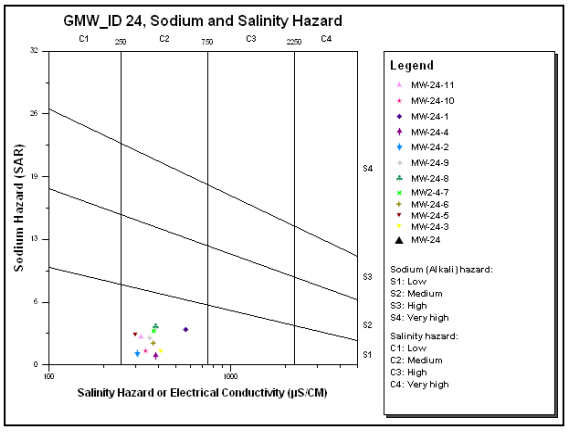

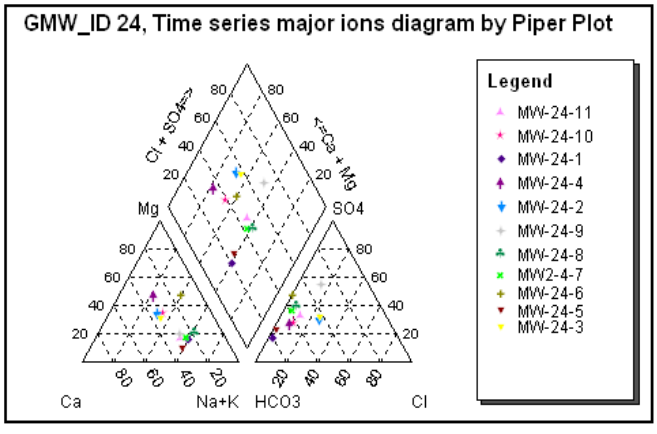

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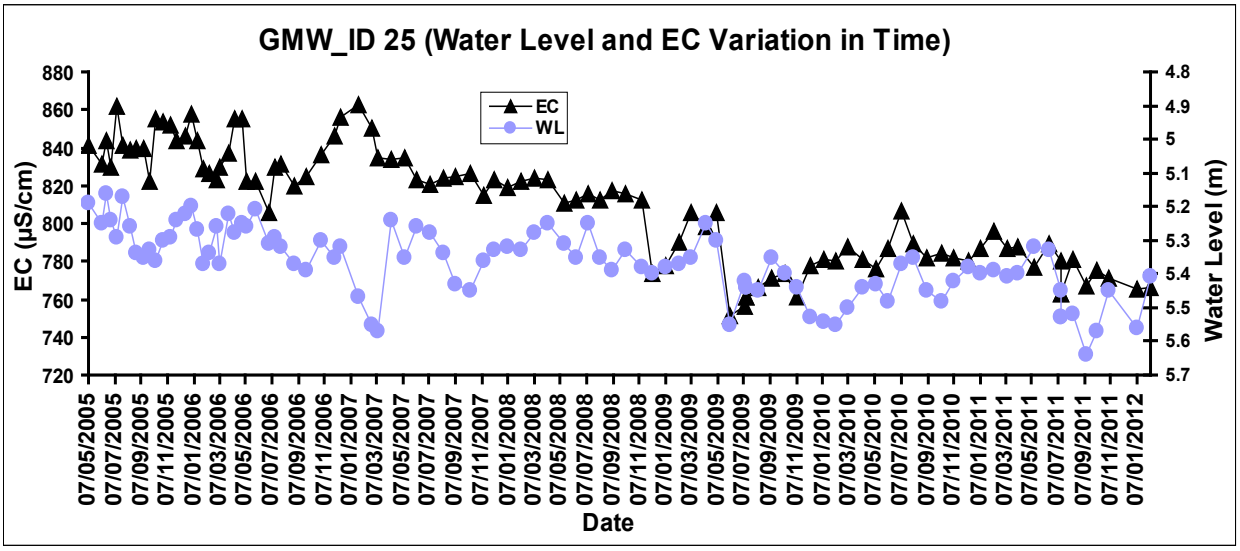

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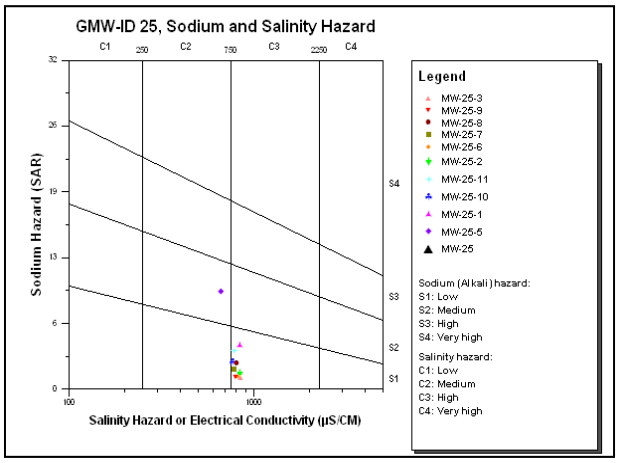

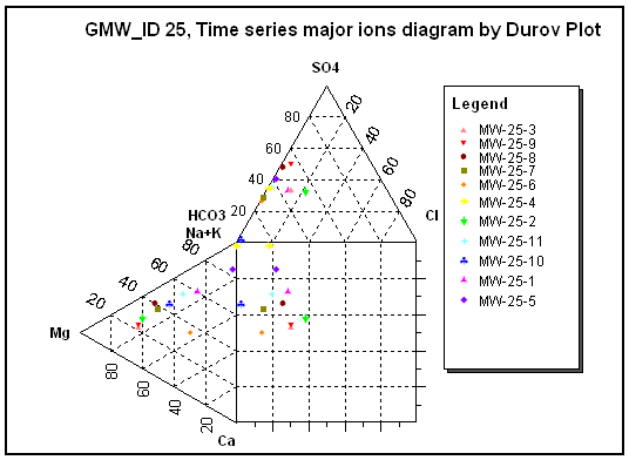

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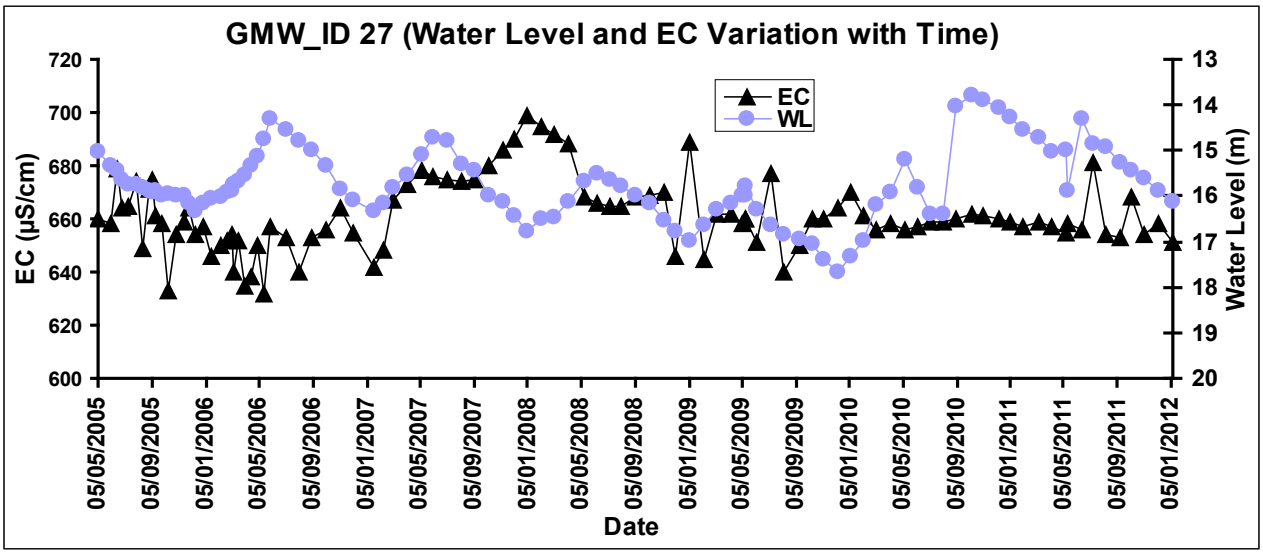

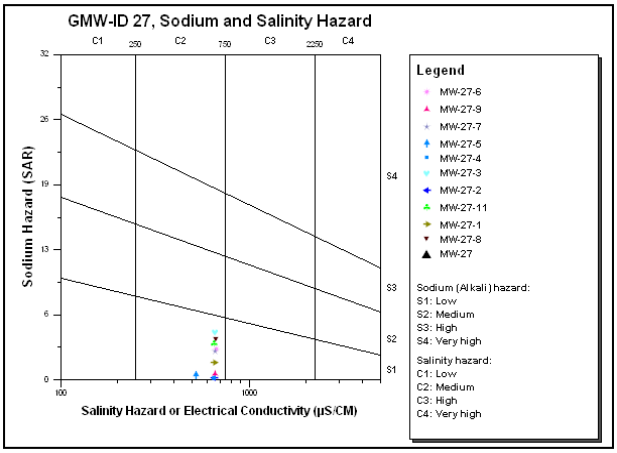

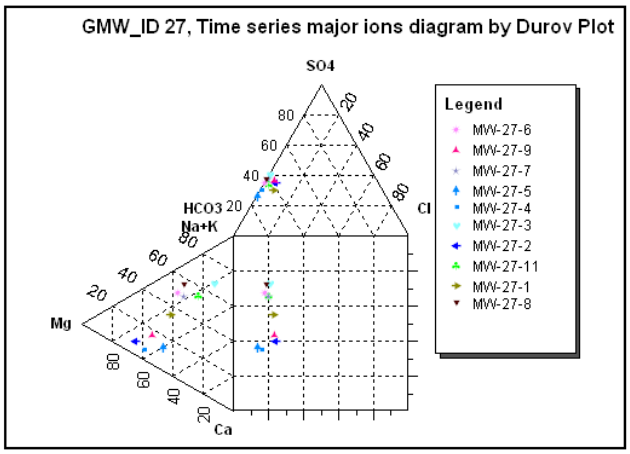

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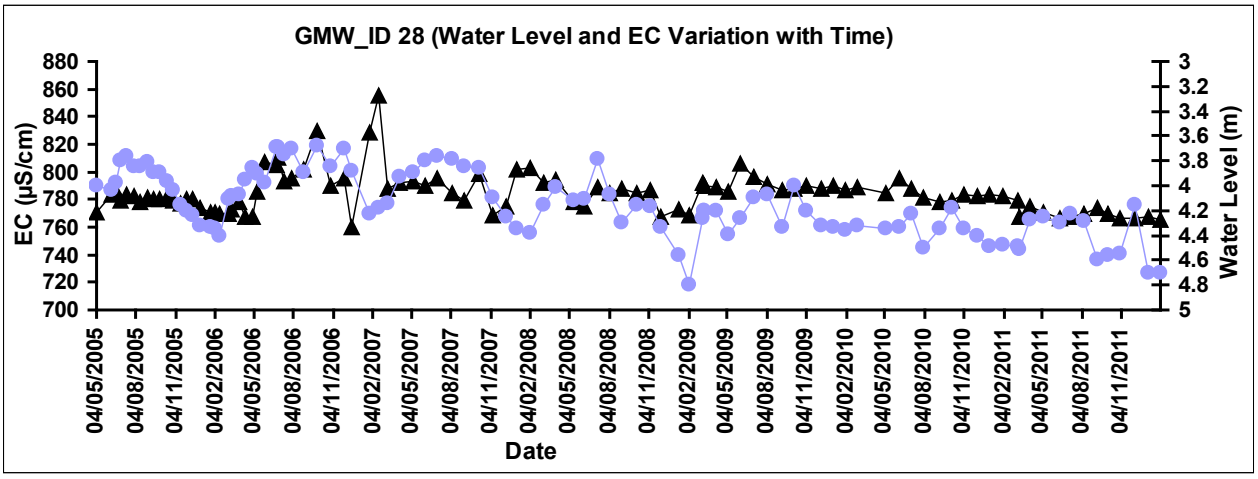

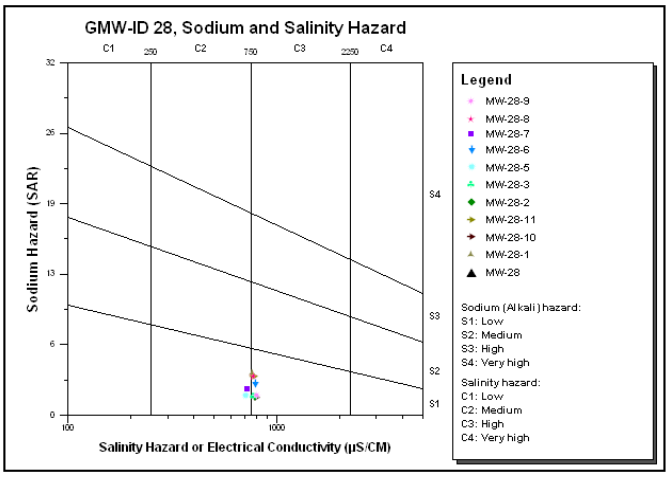

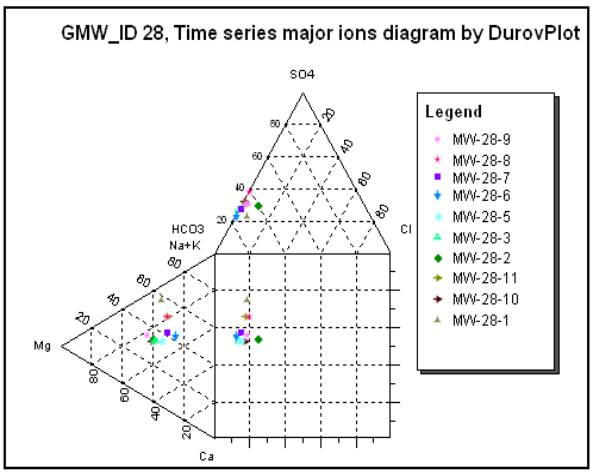

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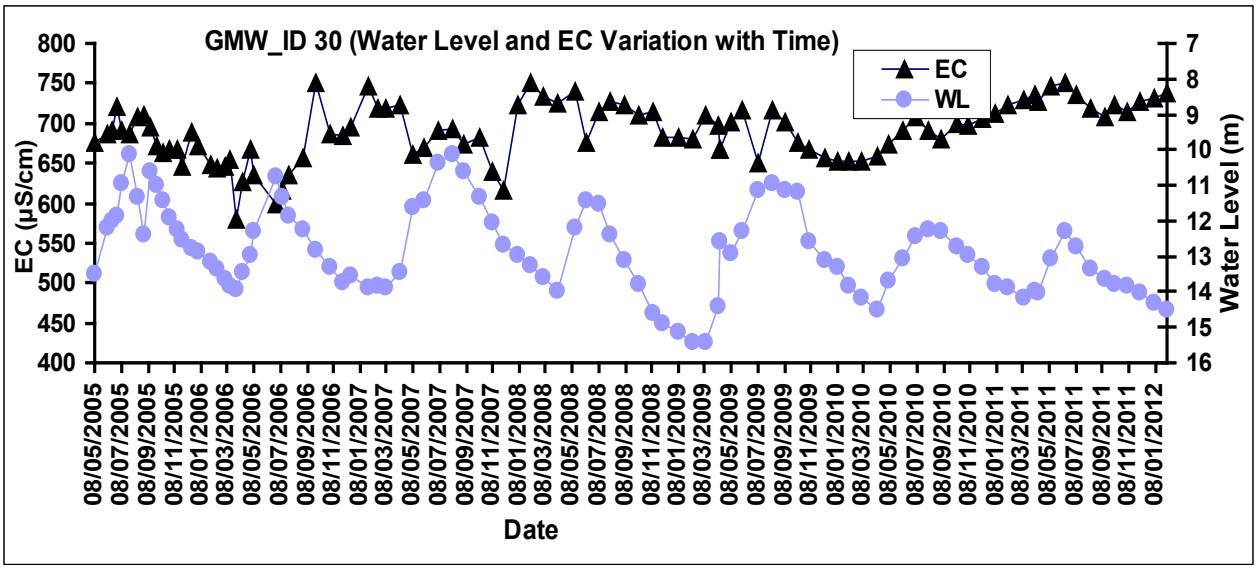

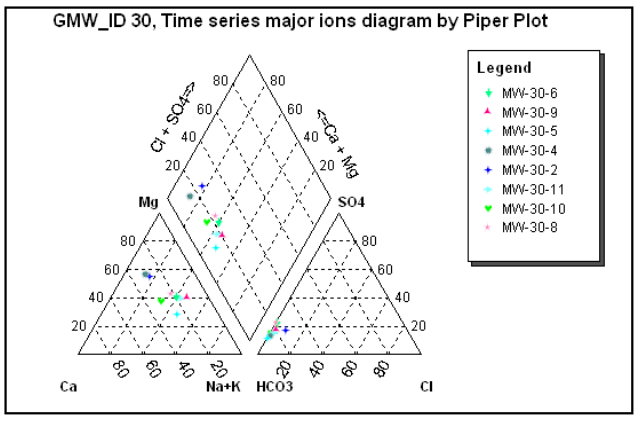

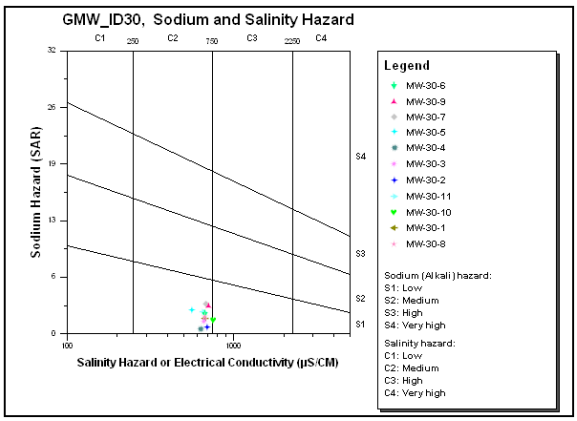

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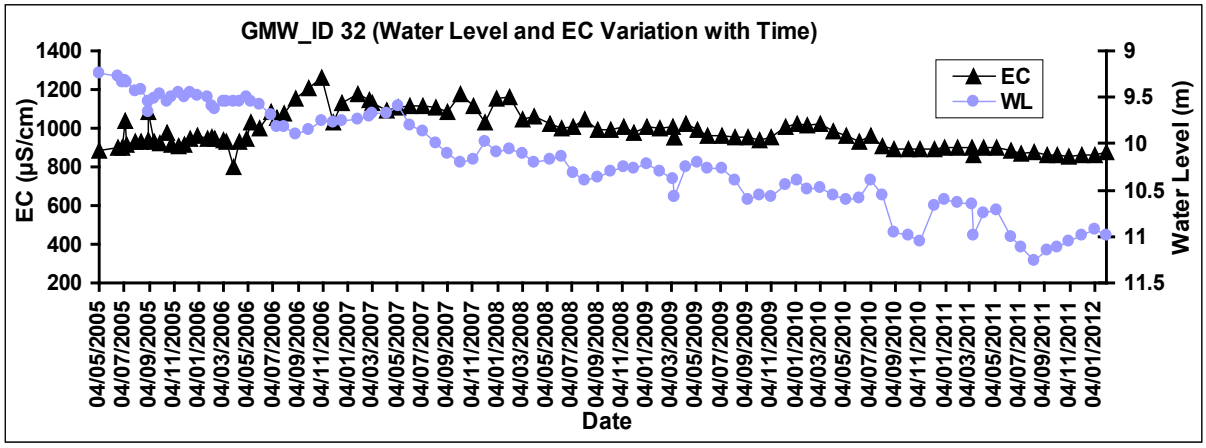

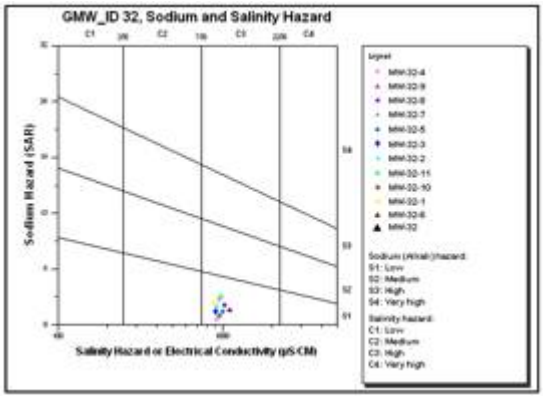

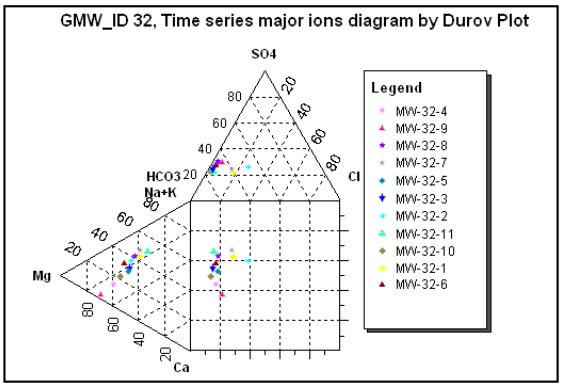

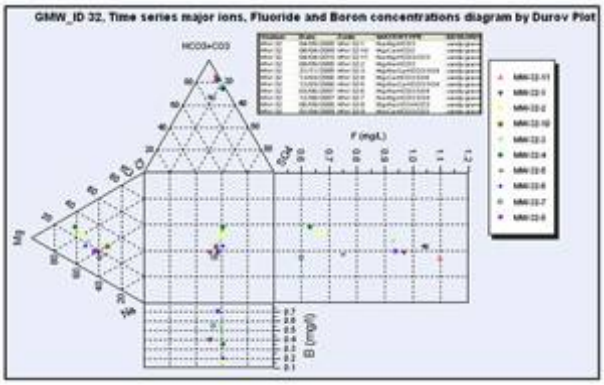

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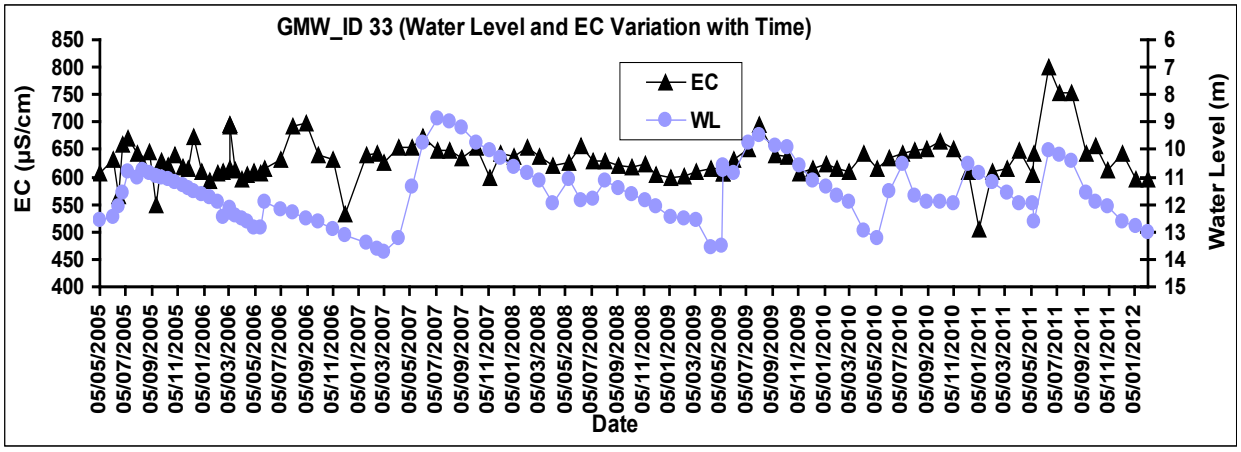
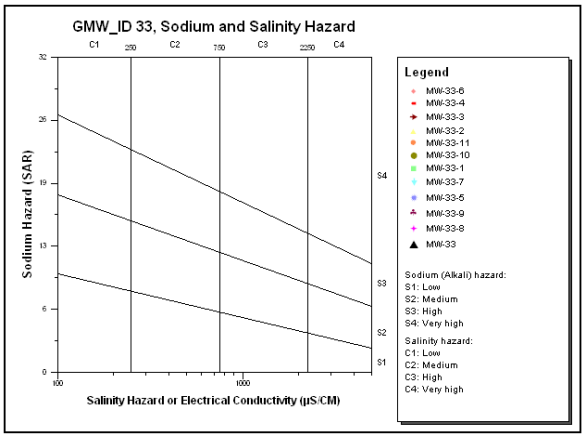
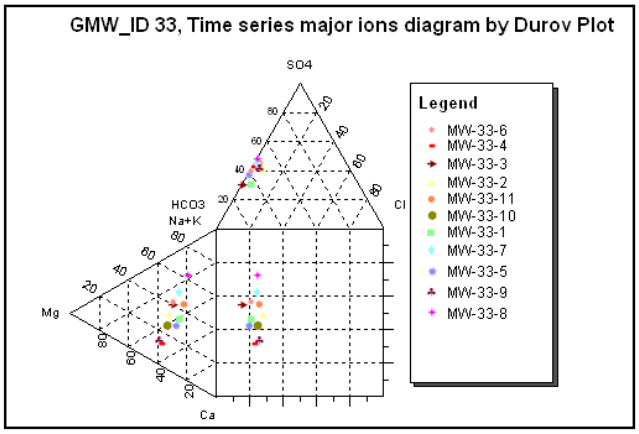
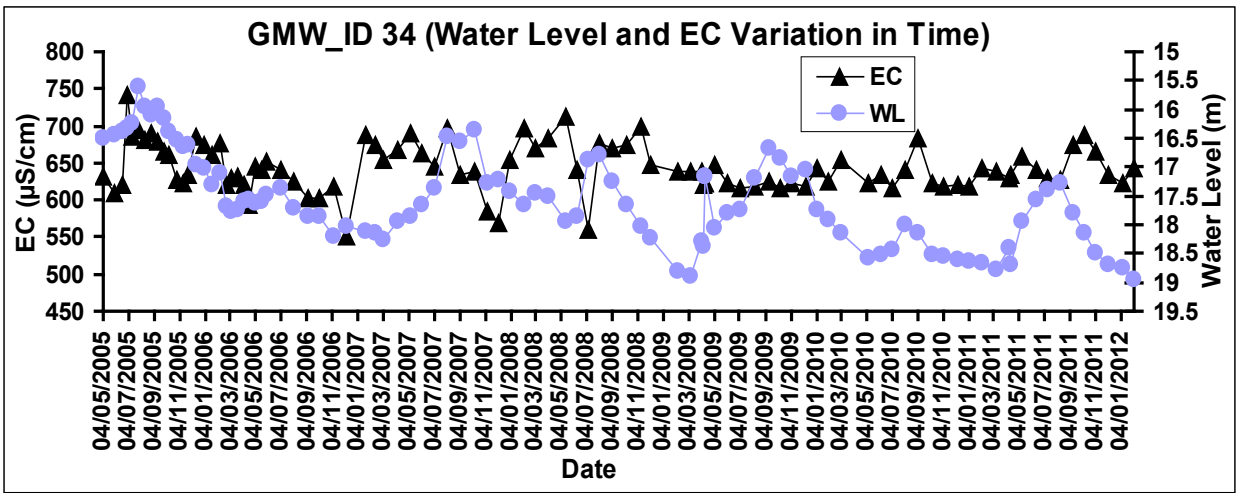
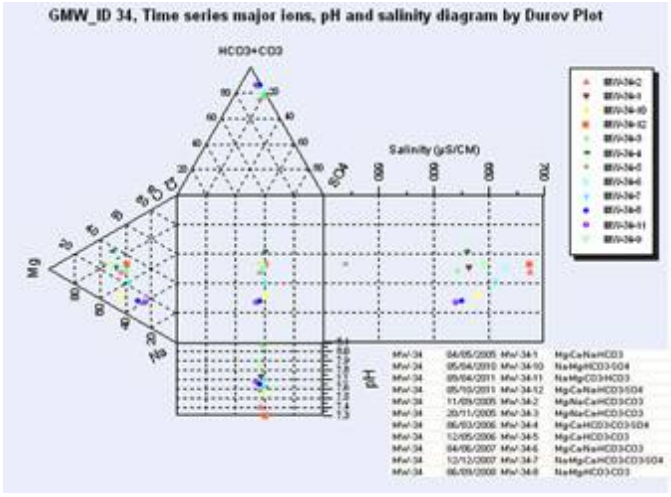


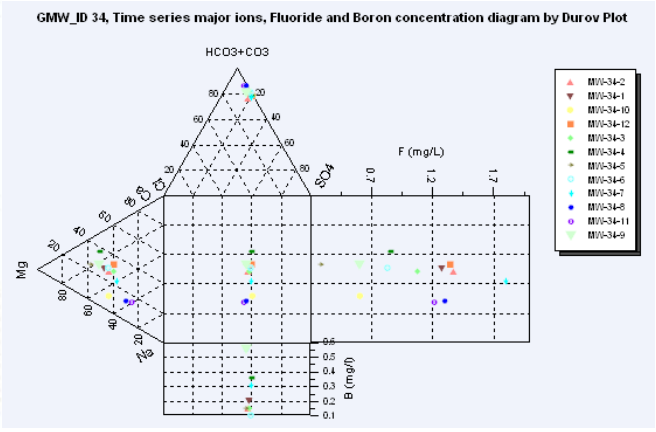


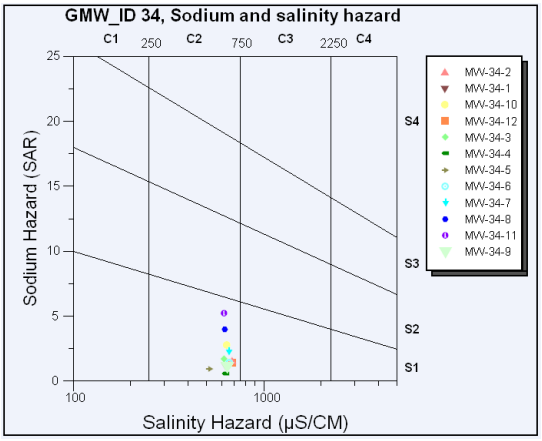


Nangarhar GMW_ID 34









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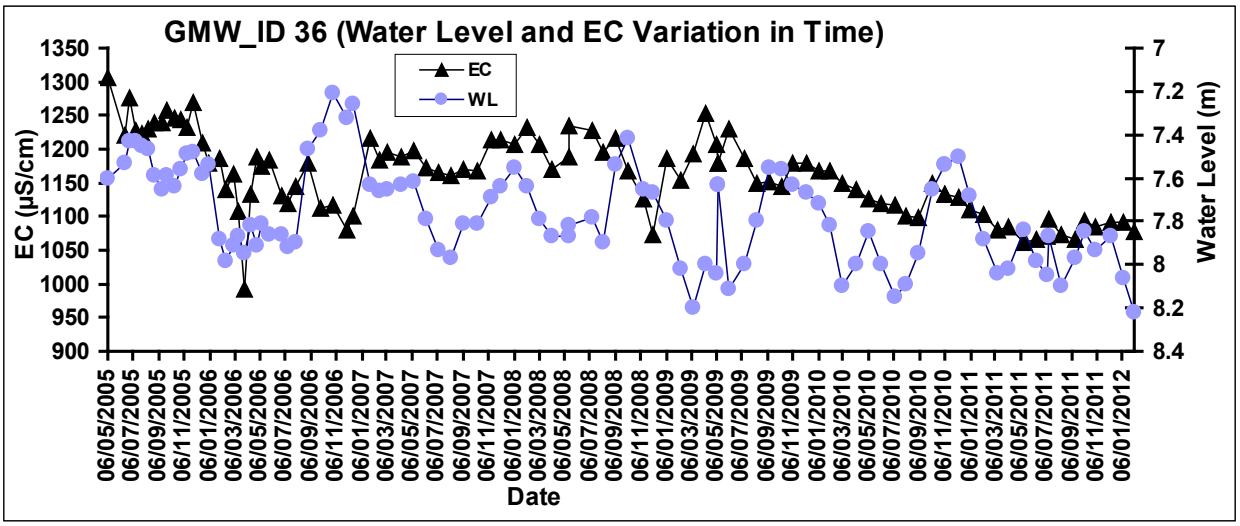
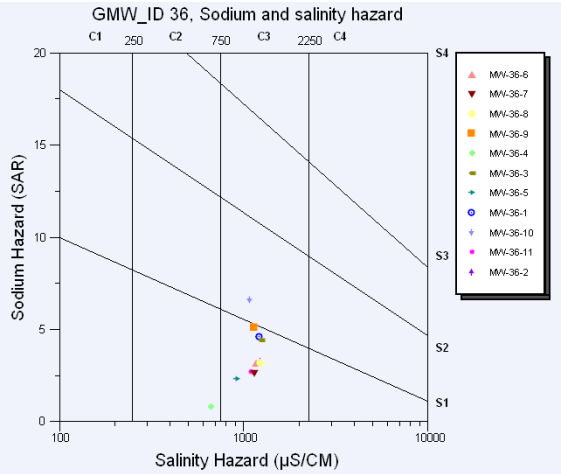
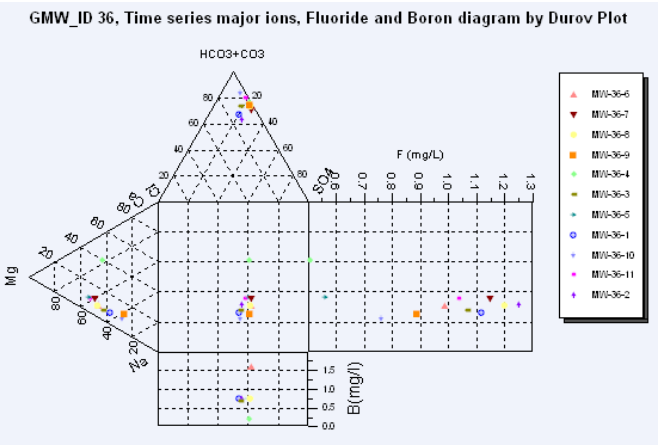
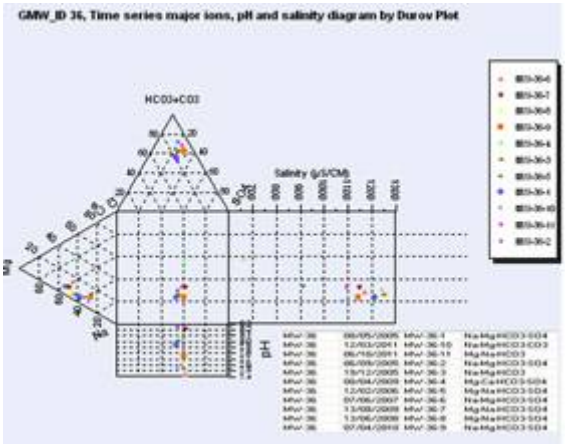
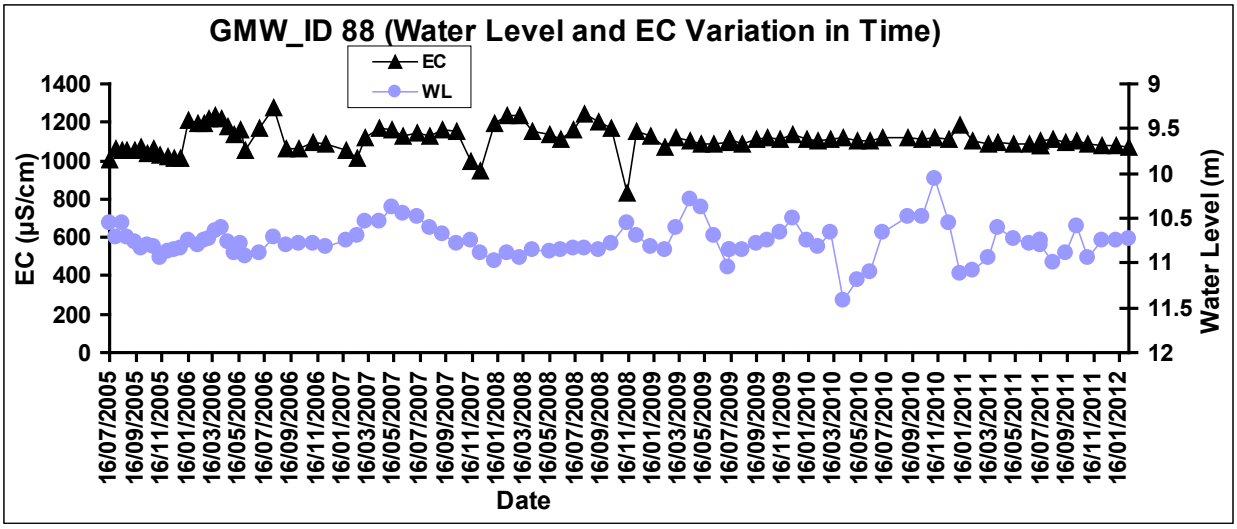


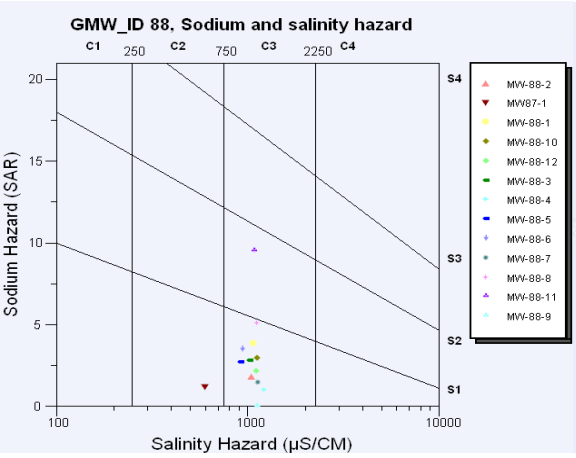


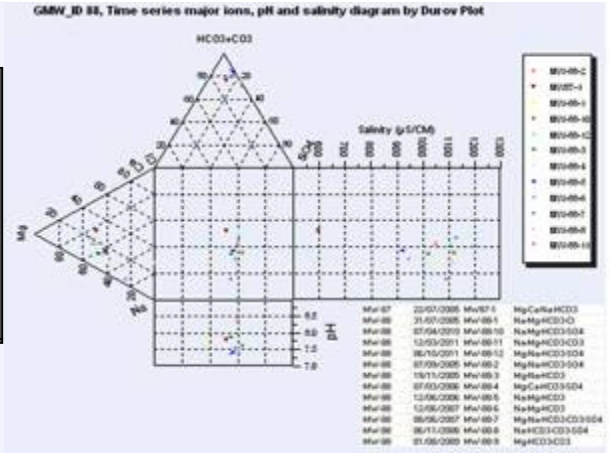




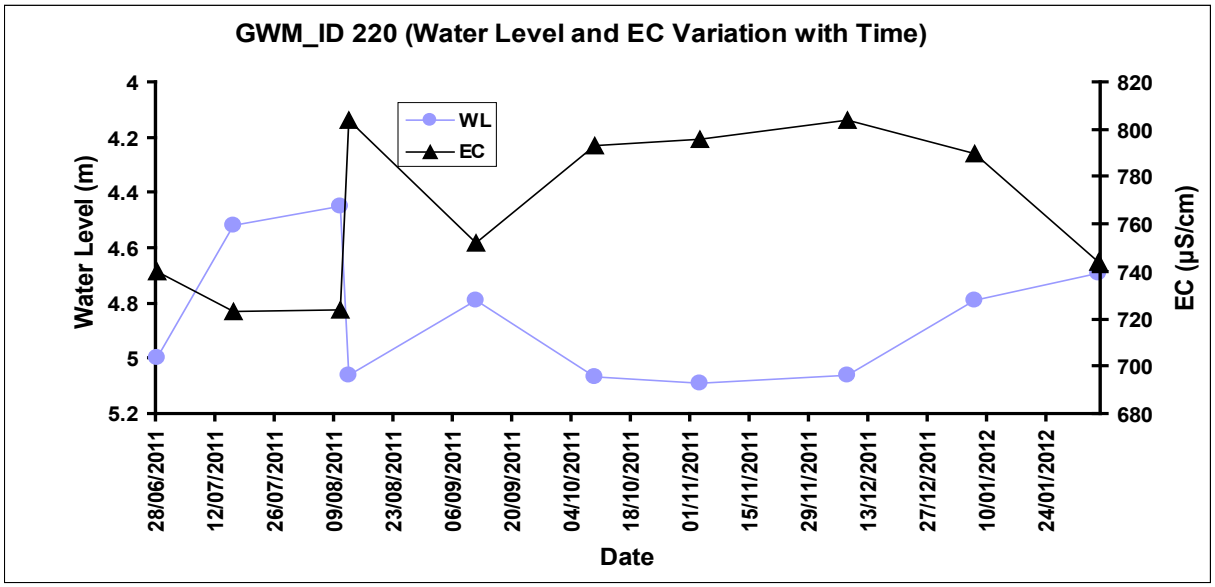
Nangarhar GMW_ID 88

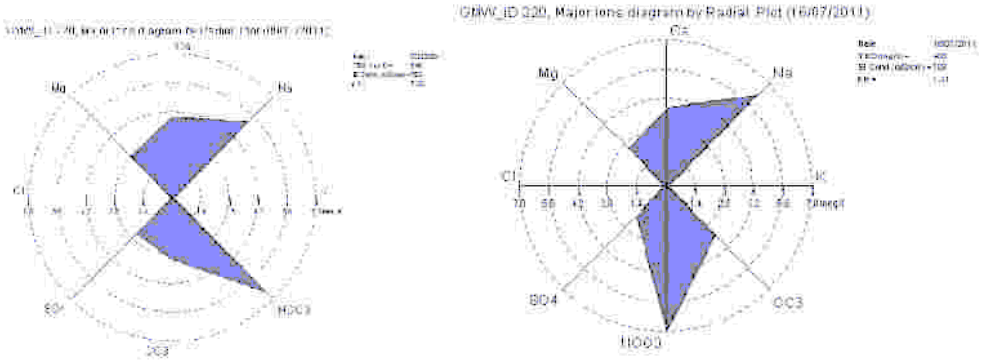




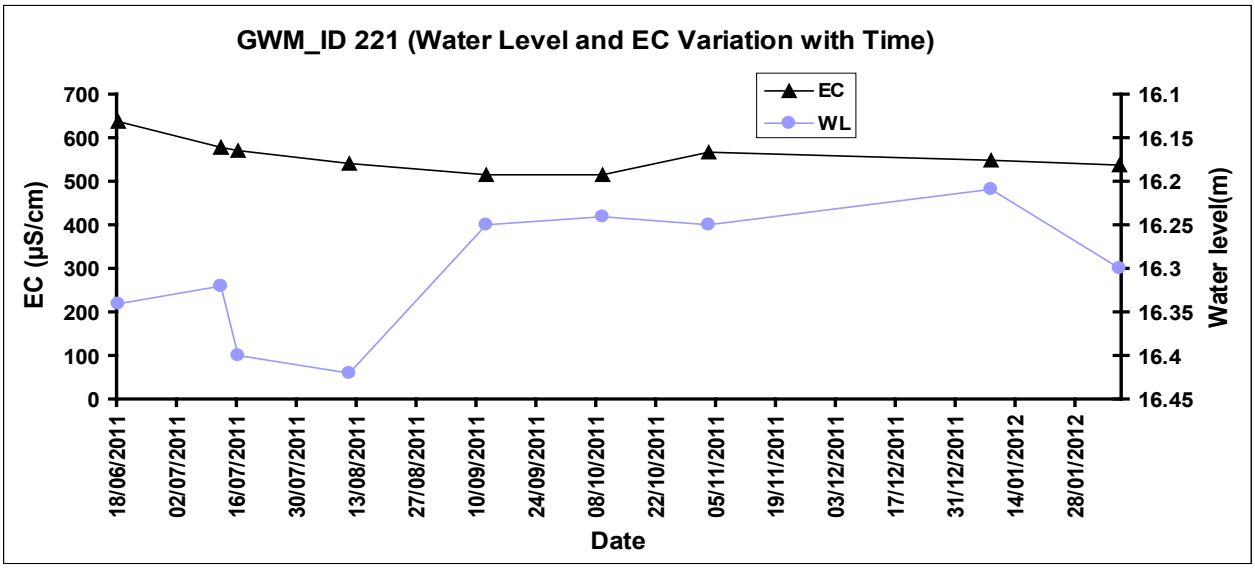


Nangarhar GMW_ID 220





Nangarhar GMW_ID 221

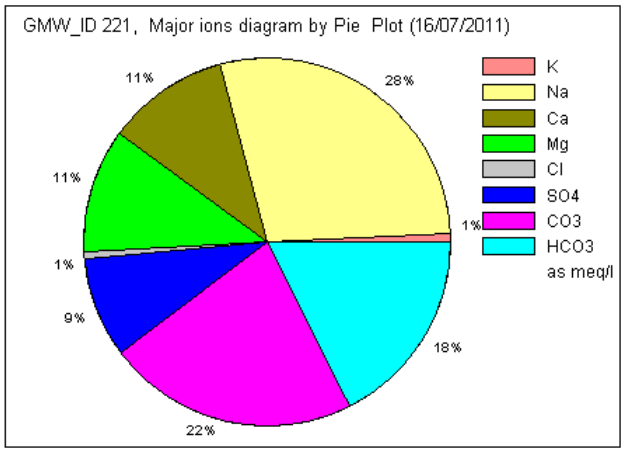


Watertype	Na-Ca-CO3-HCO3	
Temperature (°C)	24.8	
pH	7.75	
Conductivity	516	uS/cm
Sum of Anions	8.588534	meq/L
Sum of Cations	8.596629	meq/L
Balance	4.710335E-02	%

Comparison to Seawater

Ratios

	mg/l
Ca/Mg	2.25
Ca/SO4	0.5217391
Na/Cl	11.71429
Cl/Br	61.76471

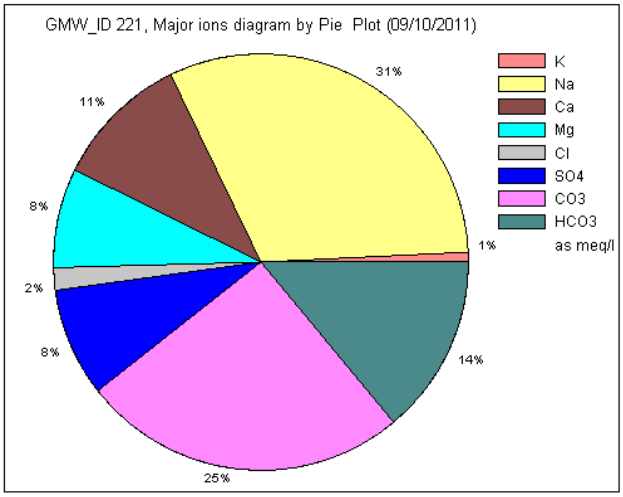


Watertype	Na-Mg-Ca-CO3-HCO3	
Temperature (°C)	23.7	
pH	7.8	
Conductivity	560	uS/cm
Sum of Anions	9.743671	meq/L
Sum of Cations	9.976525	meq/L
Balance	1.180789	%

Comparison to Seawater

Ratios

	mg/l
Ca/Mg	1.630769
Ca/SO4	0.5109434
Na/Cl	29.76744
Cl/Br	28.66667

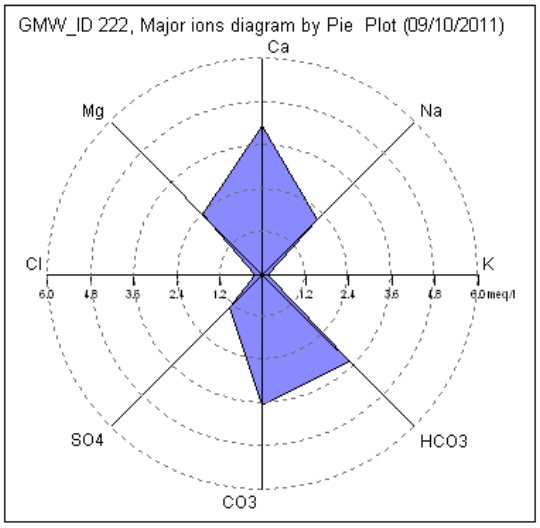


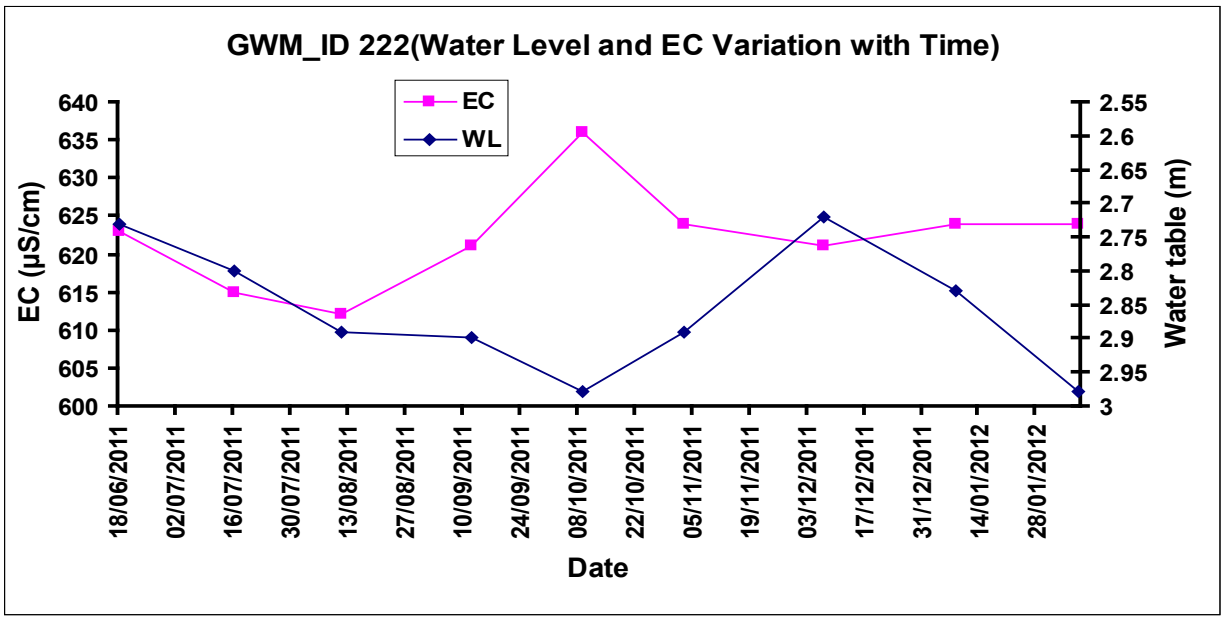
Nangarhar GMW_ID 222

Watertype	Ca-Mg-Na-CO3-HCO3	
Temperature (°C)	23.1	
pH	7.51	
Conductivity	636	uS/cm
Sum of Anions	8.77203	meq/L
Sum of Cations	8.817644	meq/L
Balance	0.259324	%

Comparison to Seawater

Ratios	mg/l
Ca/Mg	2.841379
Ca/SO4	1.329032
Na/Cl	6.329114
Cl/Br	23.93939

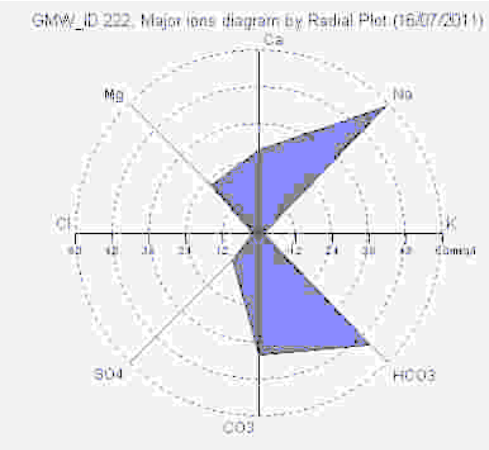




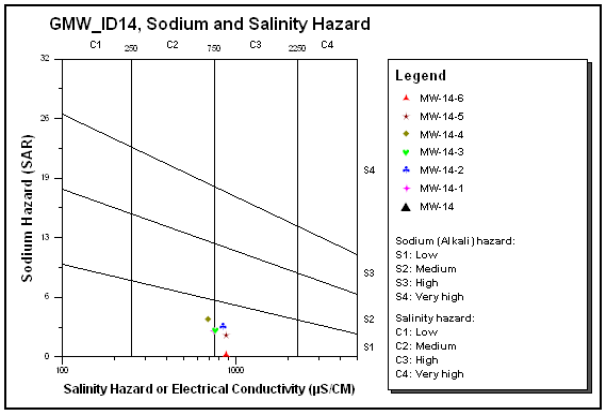
Watertype	Na-Ca-Mg-HCO3-CO3	
Temperature (°C)	23.7	
pH	7.5	
Conductivity	609	uS/cm
Sum of Anions	10.75656	meq/L
Sum of Cations	10.99961	meq/L
Balance	1.117149	%

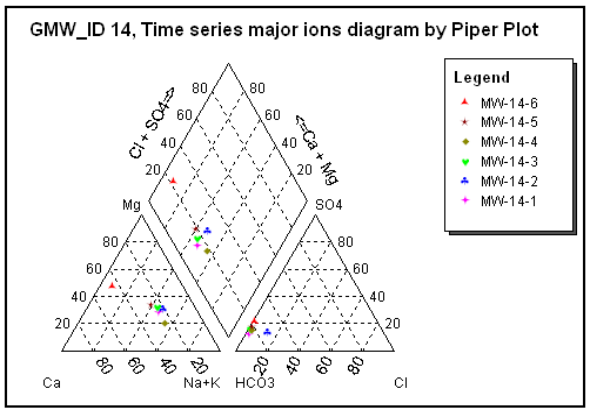
Comparison to Seawater

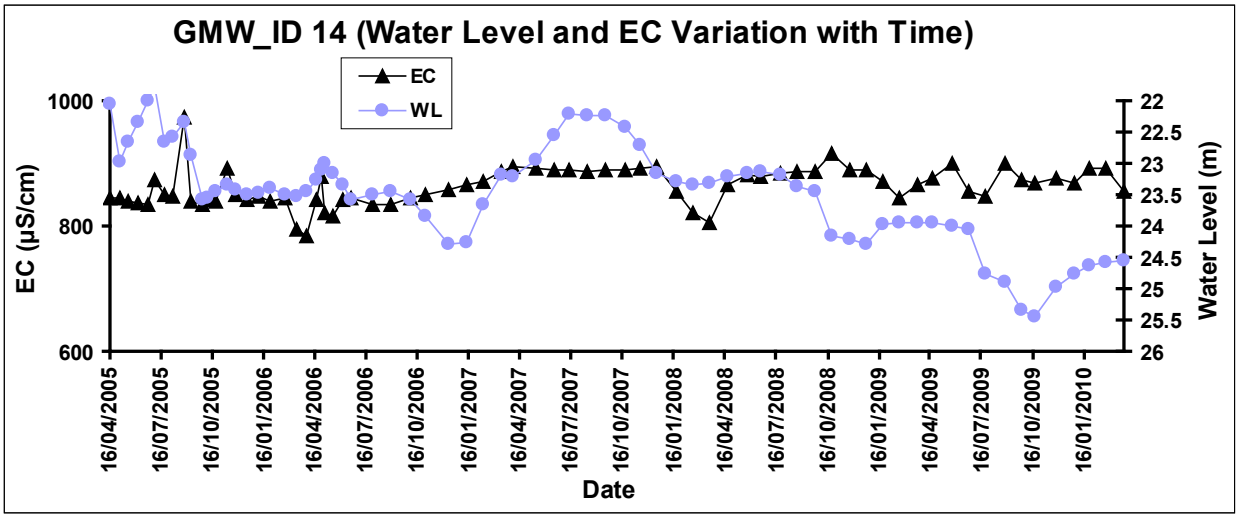
Ratios	mg/l
Ca/Mg	2.02963
Ca/SO4	0.9133333
Na/Cl	17.76316
Cl/Br	5.9375



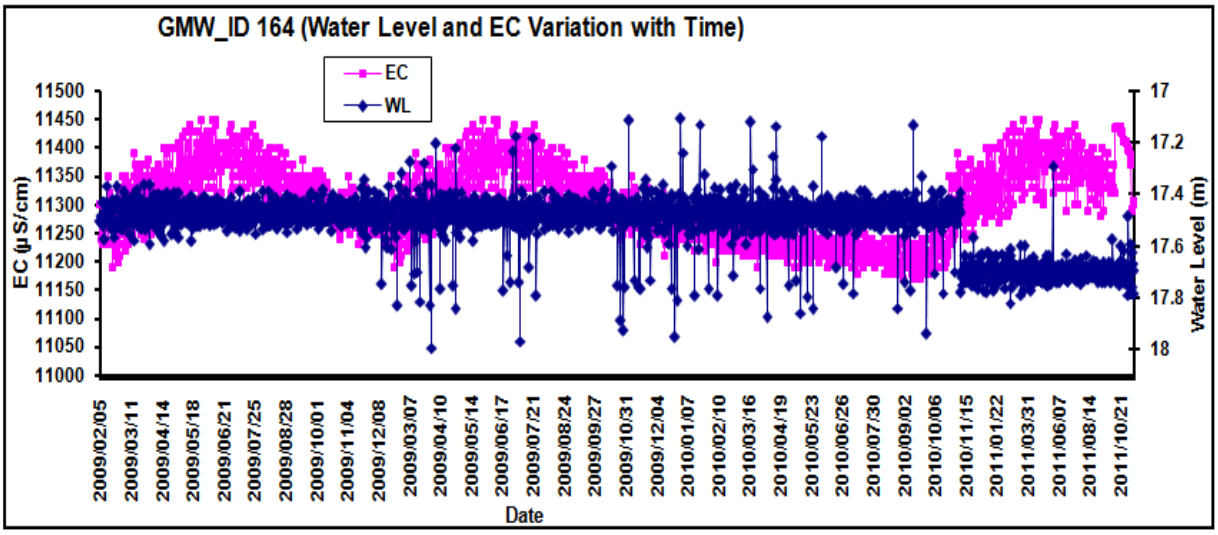
Parwan
Parwan GMW_ID 14

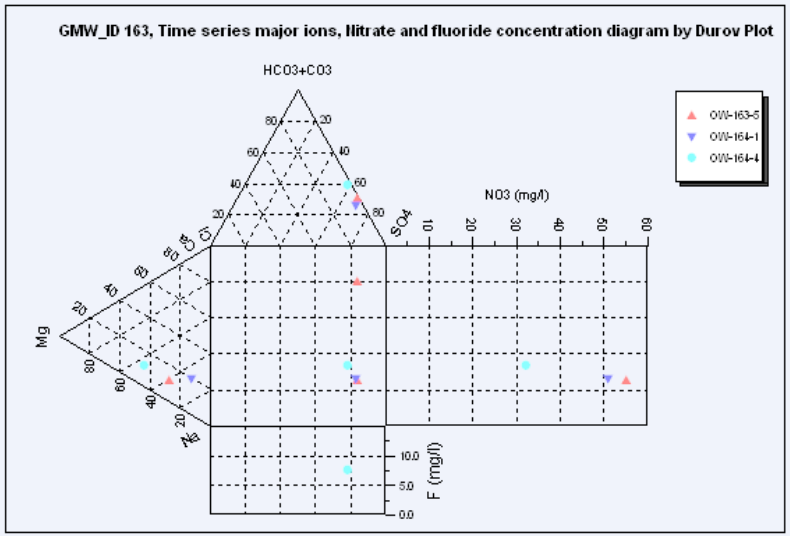


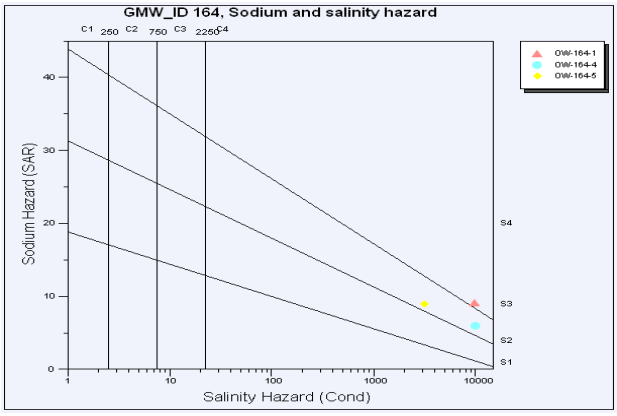


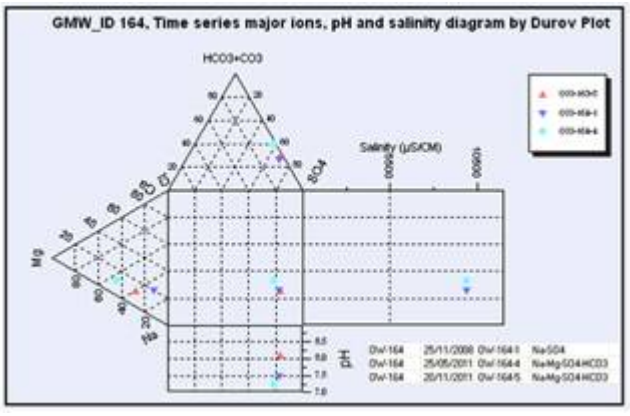


Faryab
Faryab GMW_ID 164

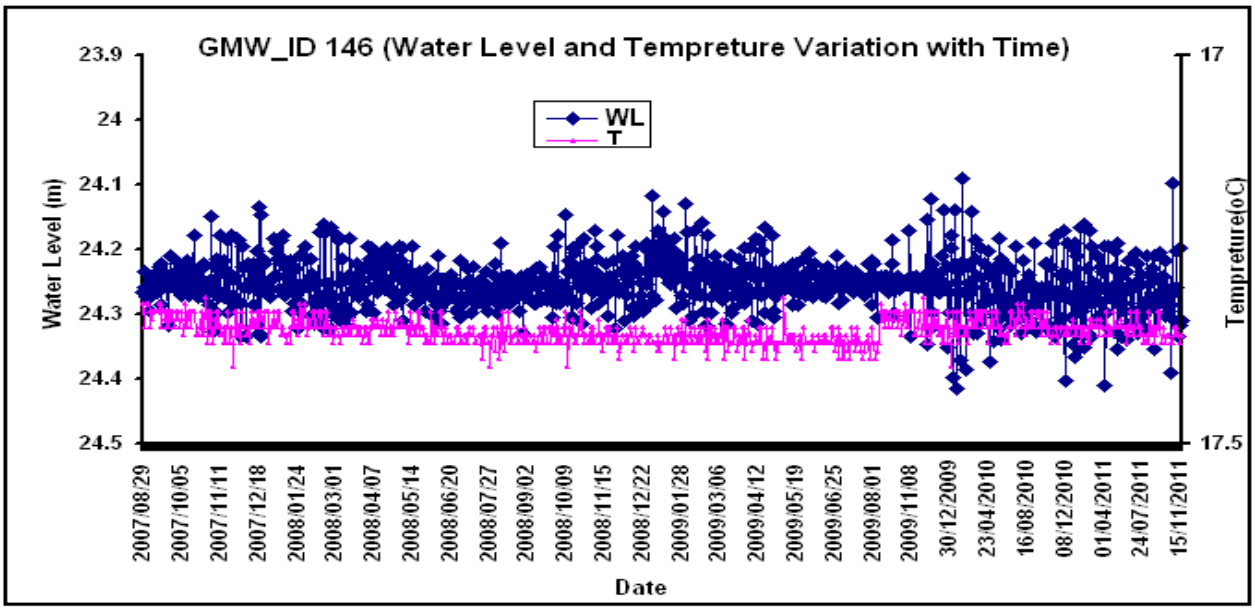


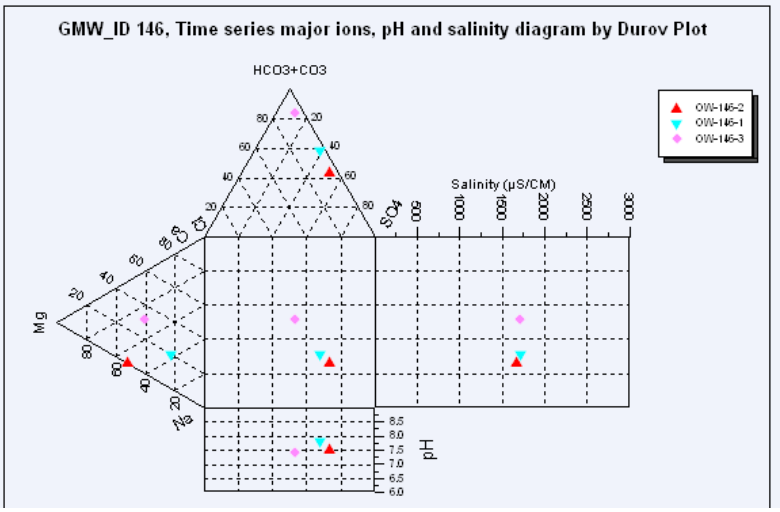


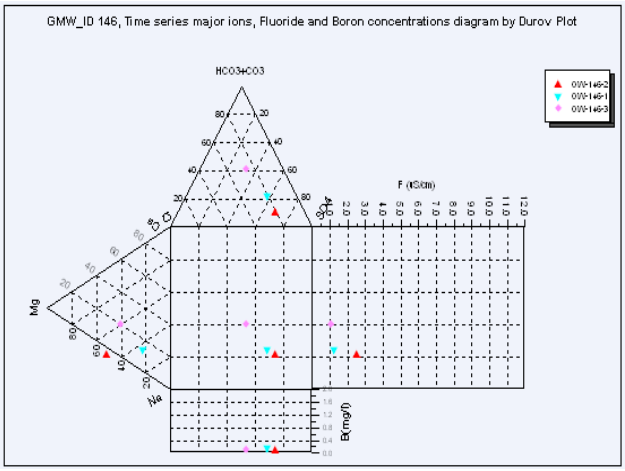


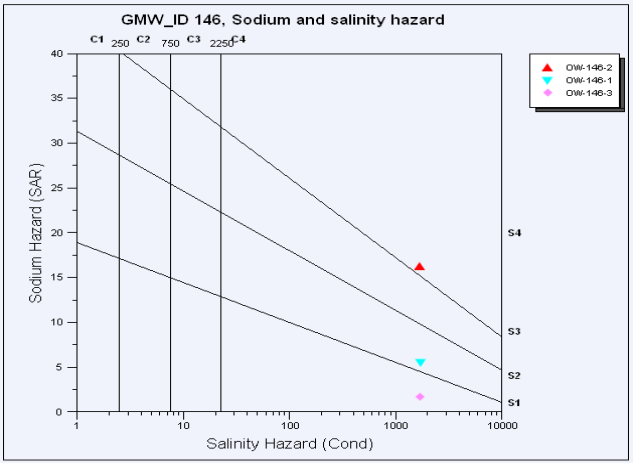


Faryab GMW_ID 14

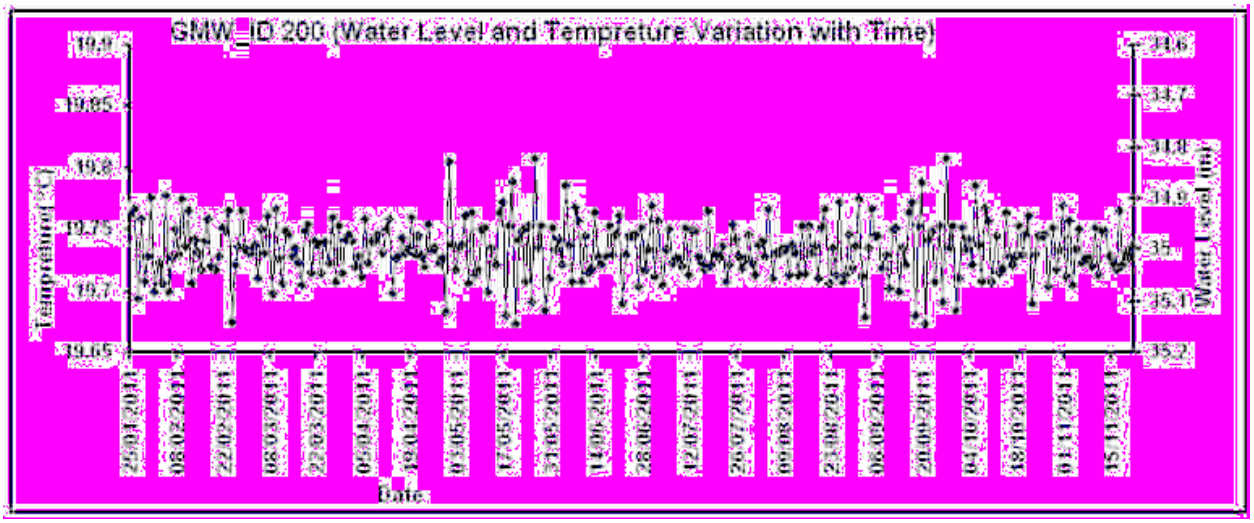




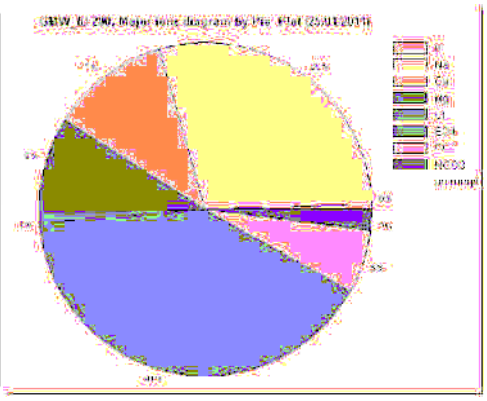




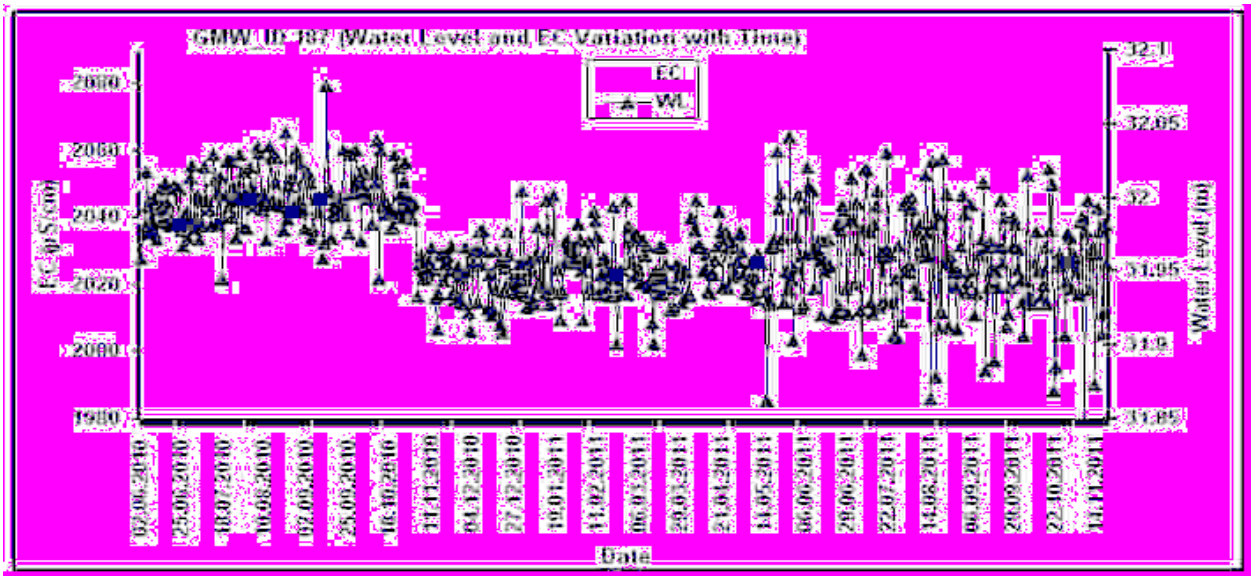
Faryab GMW_ID 200



Watertype	Na-Ca-SO4	
Temperature (°C)	12	
pH	7.8	
Conductivity	4720	uS/cm
Sum of Anions	43.82135	meq/L
Sum of Cations	44.08643	meq/L
Balance	0.3015471	%
Comparison to Seawater Ratios		
	mg/l	
Ca/Mg	2.02	
Ca/SO4	0.1188235	
Na/Cl	19.72881	
Cl/Br	46.8254	

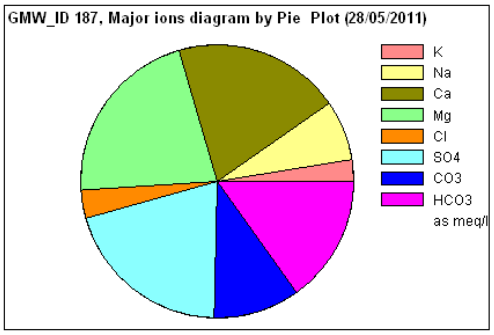


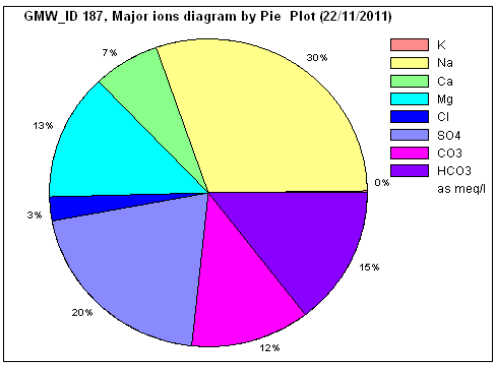
Faryab GMW_ID 187



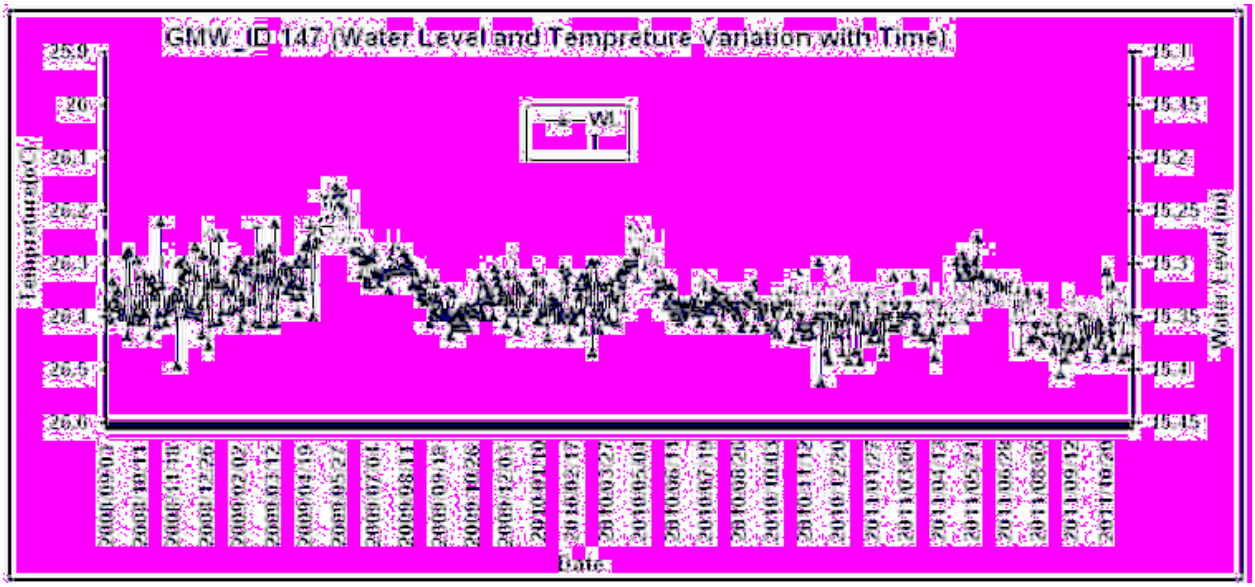
Watertype	Mg-Ca-SO4-HCO3-CO3	
Temperature (°C)	26.5	
pH	7.1	
Conductivity	2270	uS/cm
Sum of Anions	19.35435	meq/L
Sum of Cations	19.94803	meq/L
Balance	1.510558	%
Comparison to Seawater Ratios		
	mg/l	
Ca/Mg	1.521569	
Ca/SO4	0.408421	
Na/Cl	1.391304	
Cl/Br	77.9661	

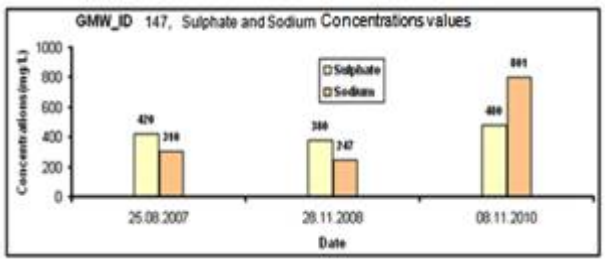
Watertype	Na-Mg-SO4-HCO3-CO3	
Temperature (°C)	16	
pH	7.52	
Conductivity	2360	uS/cm
Sum of Anions	24.79107	meq/L
Sum of Cations	25.01412	meq/L
Balance	0.447847	%
Comparison to Seawater Ratios		
	mg/l	
Ca/Mg	0.845	
Ca/SO4	0.1393814	
Na/Cl	7.795455	
Cl/Br	65.67164	

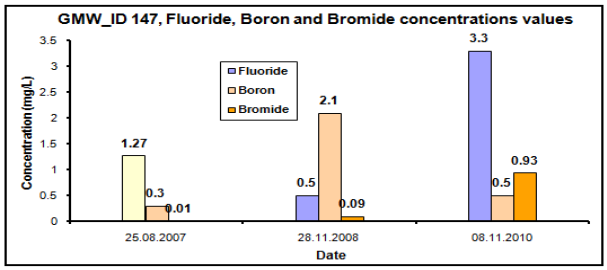


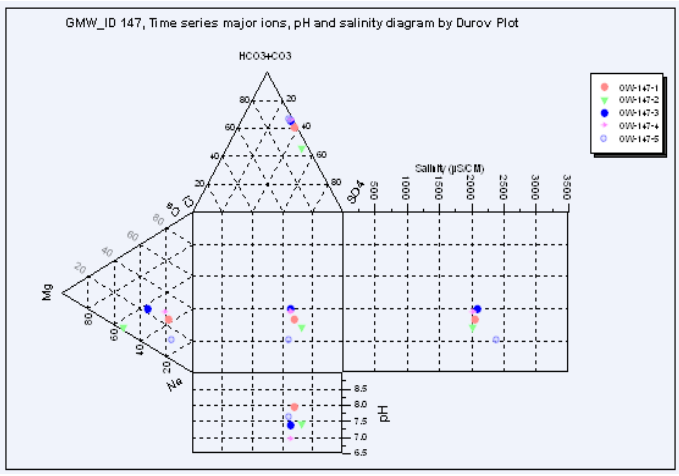


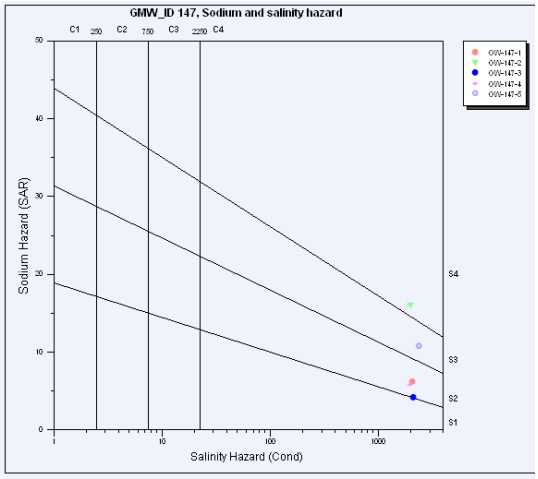
Faryab GMW_ID 147



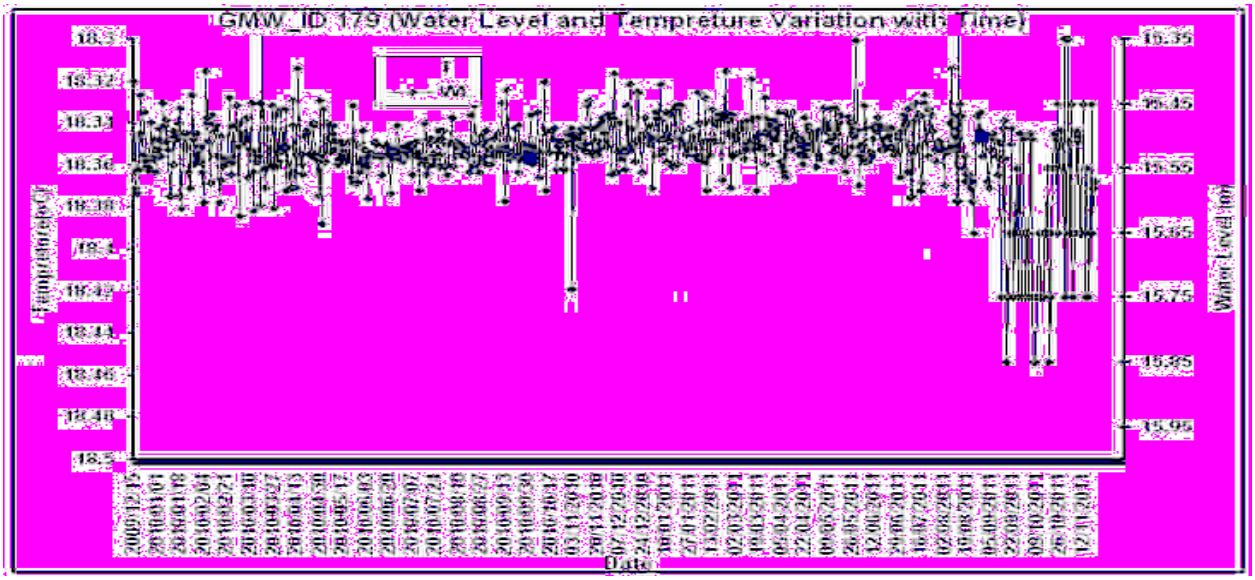






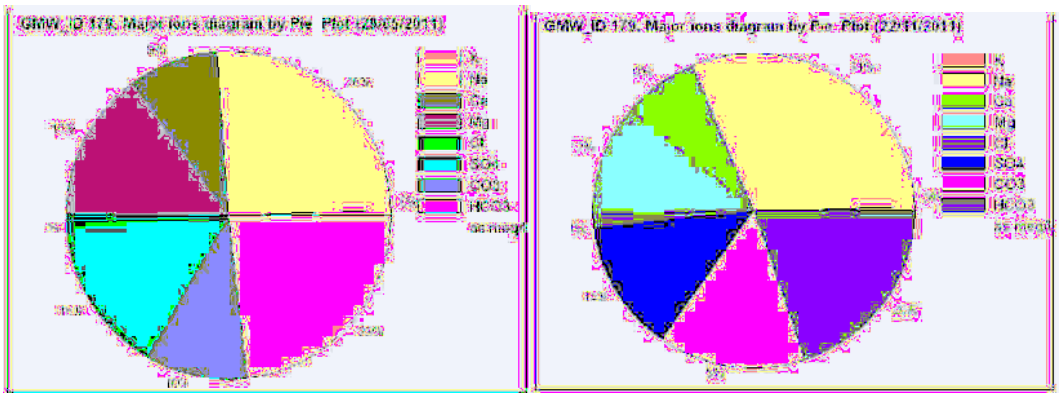


Faryab GMW_ID 179

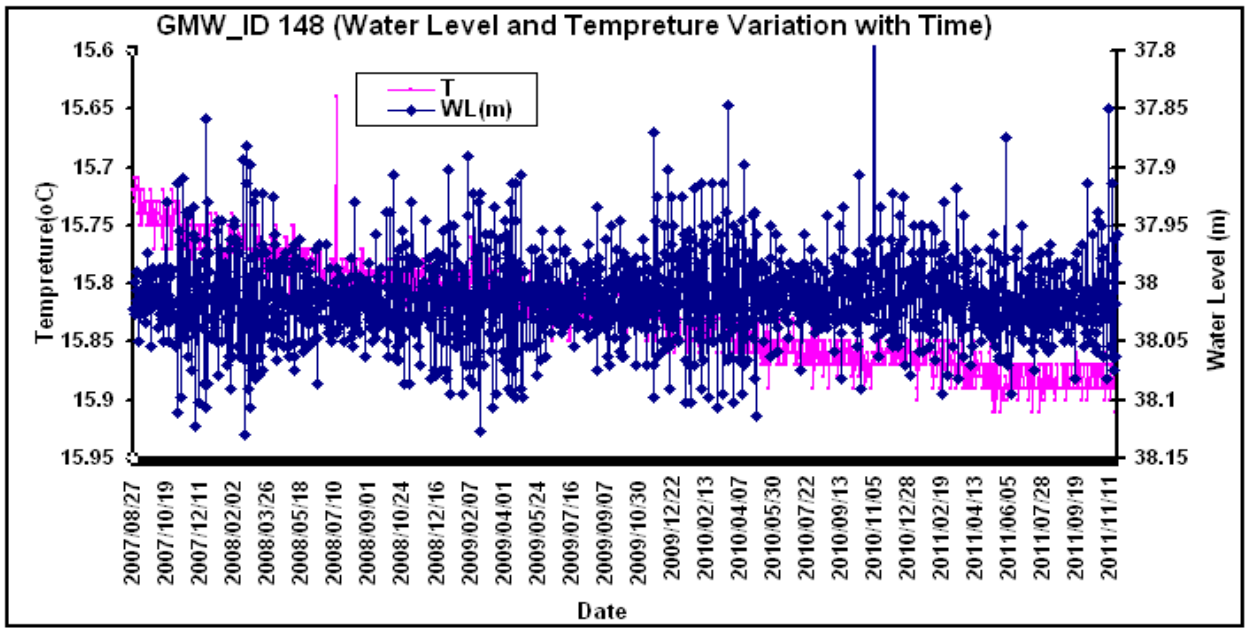


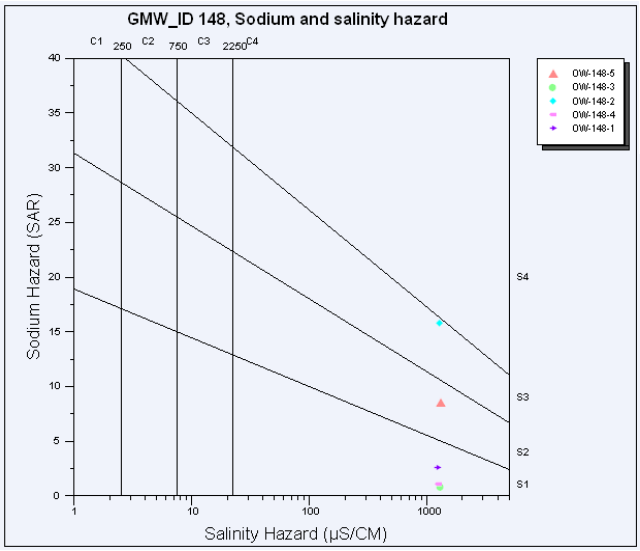
Watertype	Na-Mg-HCO3-SO4-CO3	
Temperature (°C)	27.5	
pH	7.5	
Conductivity	1233	uS/cm
Sum of Anions	18.224	meq/L
Sum of Cations	18.05995	meq/L
Balance	-0.4521312	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.9969231	
Ca/SO4	0.2417911	
Na/Cl	11.51351	
Cl/Br	88.09524	

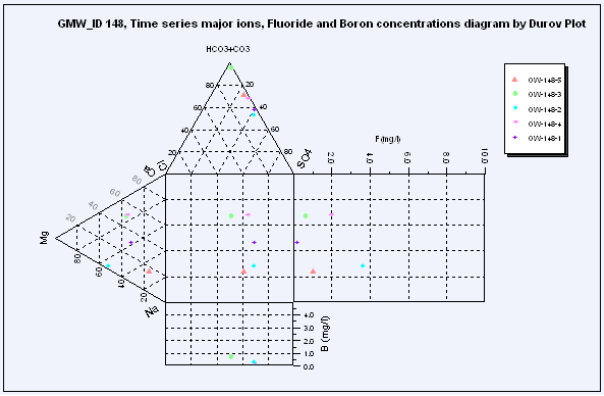
Watertype	Na-Mg-HCO3-CO3-SO4	
Temperature (°C)	15.9	
pH	7.64	
Conductivity	1380	uS/cm
Sum of Anions	21.43507	meq/L
Sum of Cations	21.63019	meq/L
Balance	0.4530796	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.1	
Ca/SO4	0.2357143	
Na/Cl	15.2	
Cl/Br	18.18182	

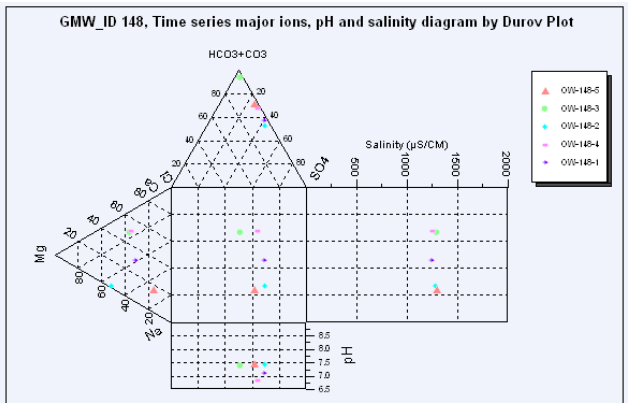


Faryab GMW_ID 148

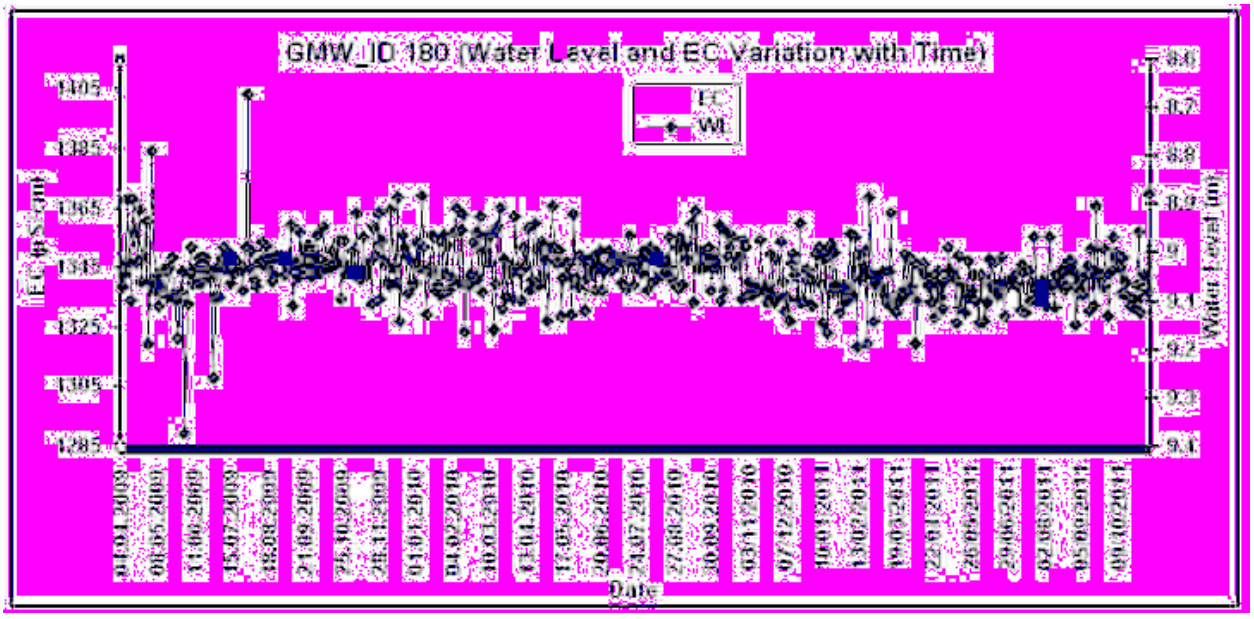




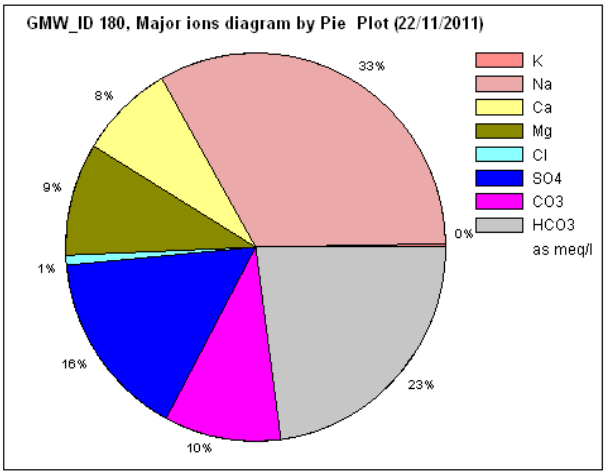




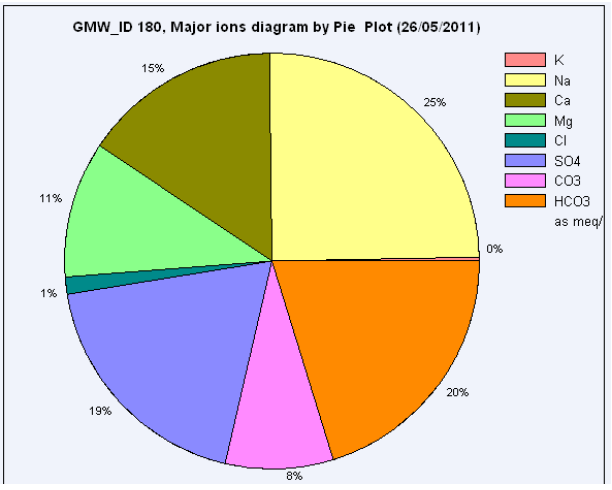
Faryab GMW_ID 180



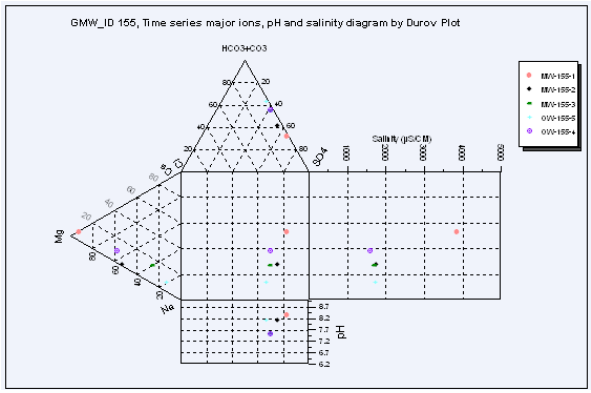
Watertype	Na-Ca-Mg-HCO3-SO4	
Temperature (°C)	29.1	
pH	7.02	
Conductivity	1556	uS/cm
Sum of Anions	17.5483	meq/L
Sum of Cations	18.29577	meq/L
Balance	2.085351	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	2.4	
Ca/SO4	0.3428572	
Na/Cl	12	
Cl/Br	44.73684	

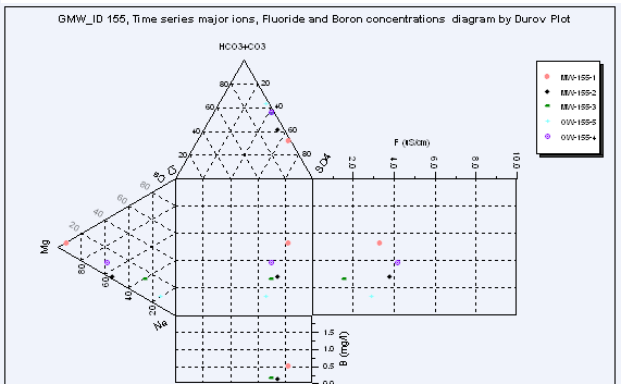


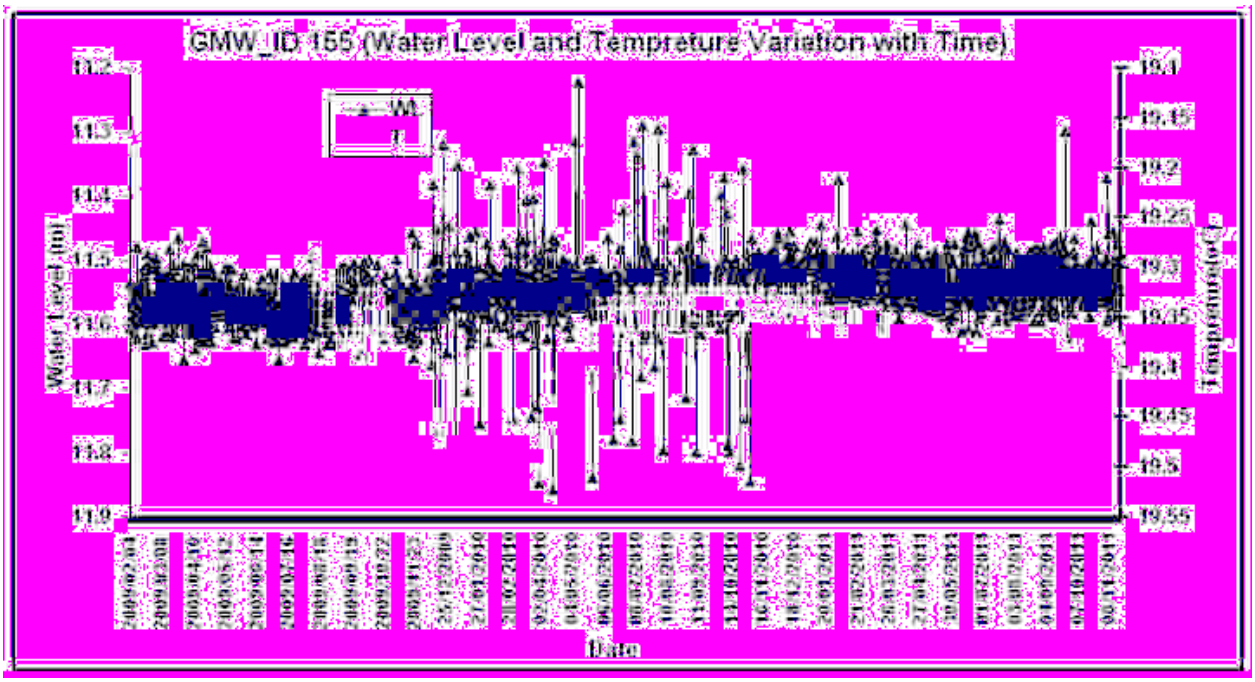
Watertype	Na-HCO3-SO4	
Temperature (°C)	15.8	
pH	7.5	
Conductivity	1505	uS/cm
Sum of Anions	21.74133	meq/L
Sum of Cations	22.20333	meq/L
Balance	1.051305	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.408	
Ca/SO4	0.2133333	
Na/Cl	26.48	
Cl/Br	17.85714	

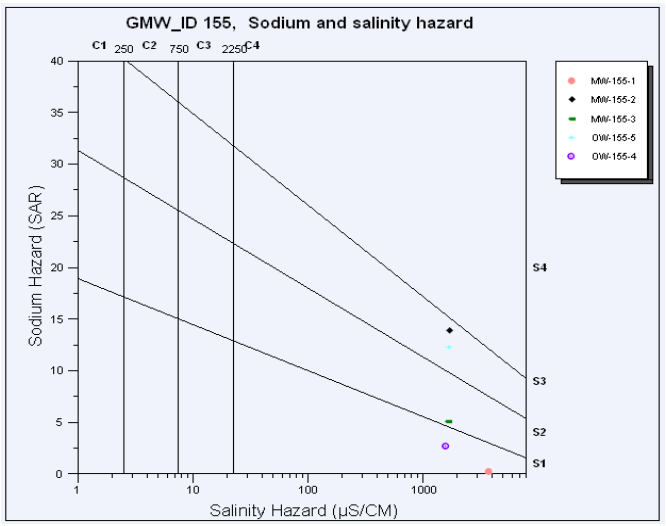


Faryab GMW_ID 155

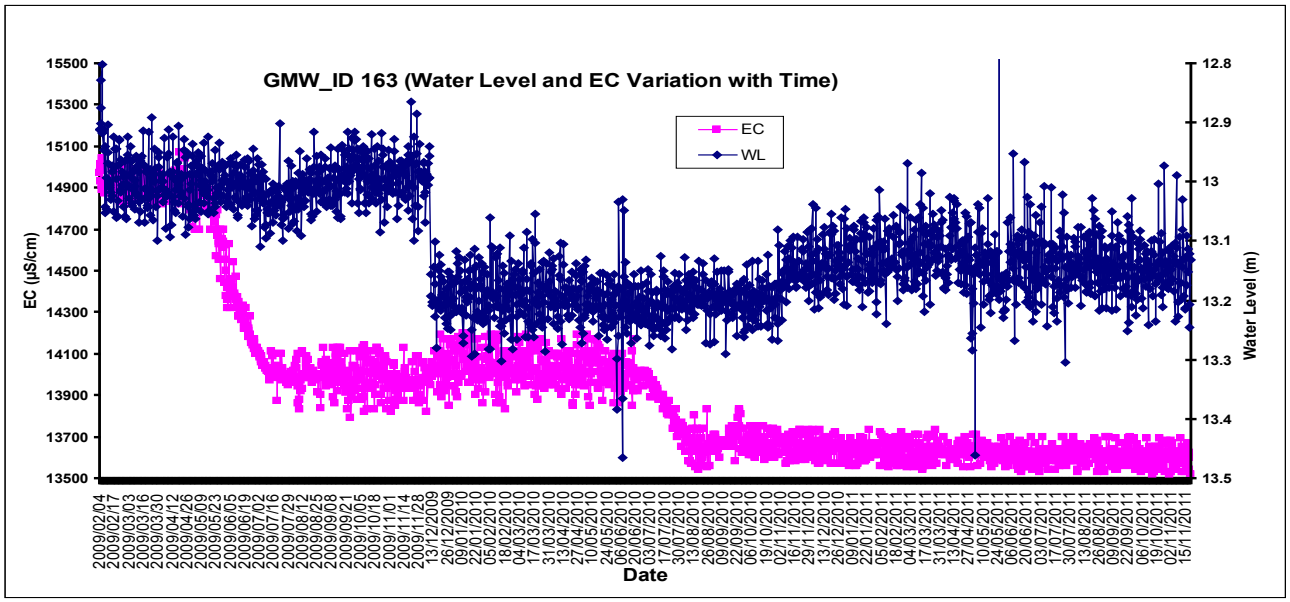


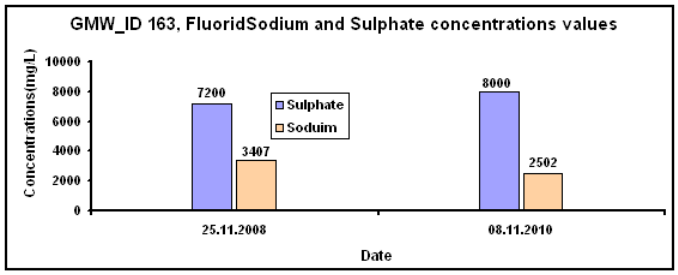


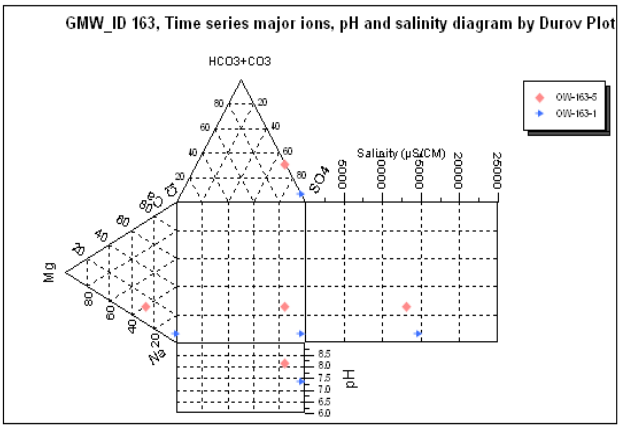


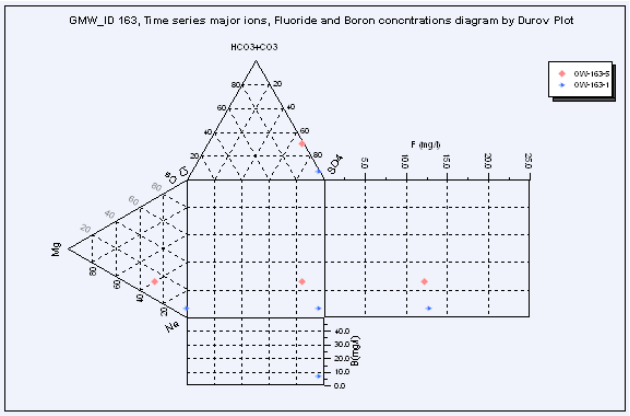


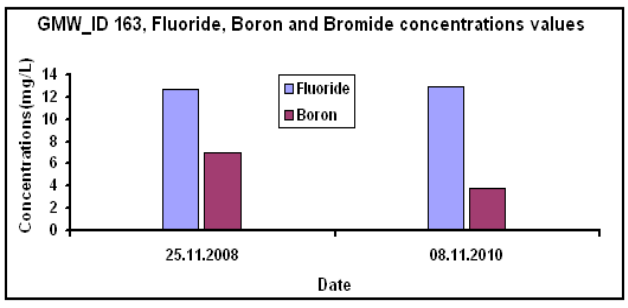
Faryab GMW_ID 163

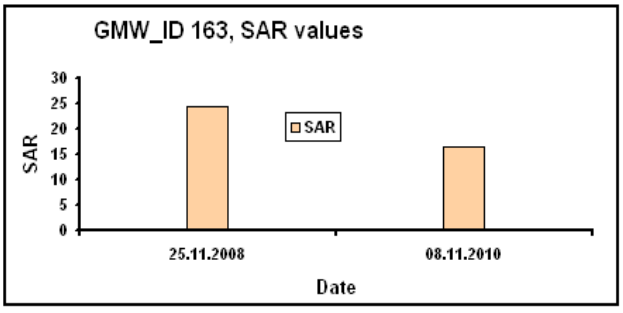












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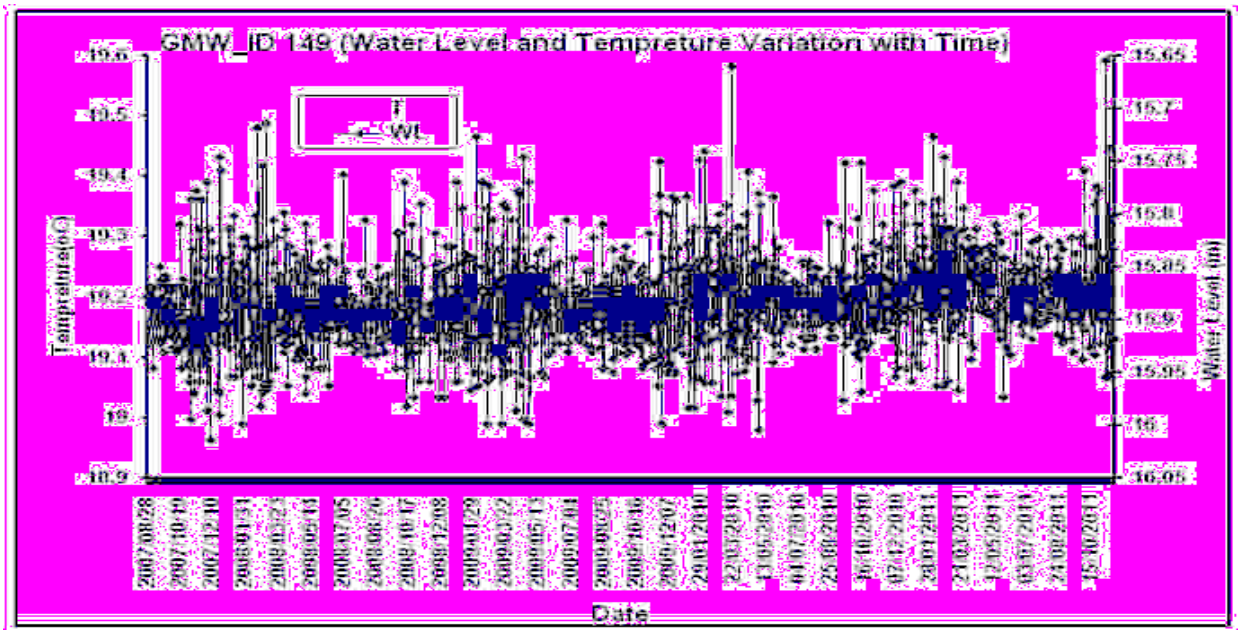

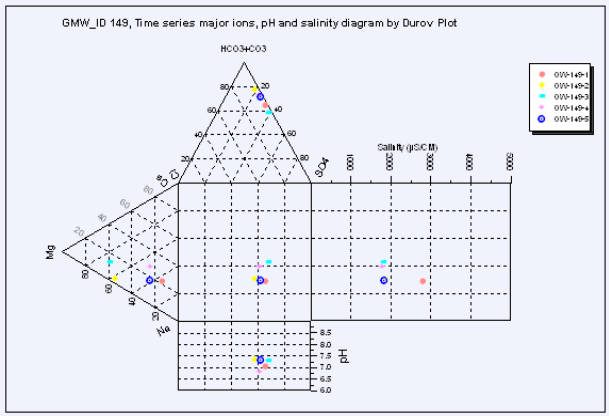

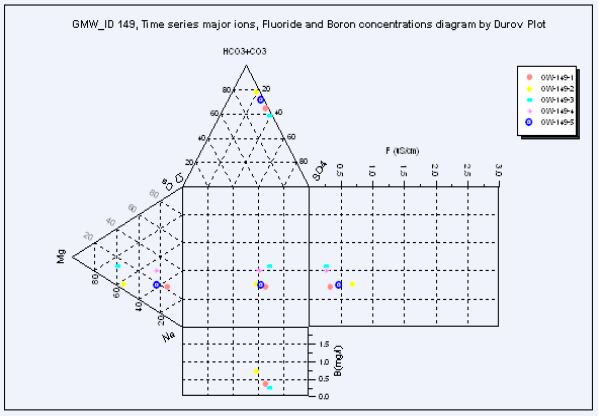

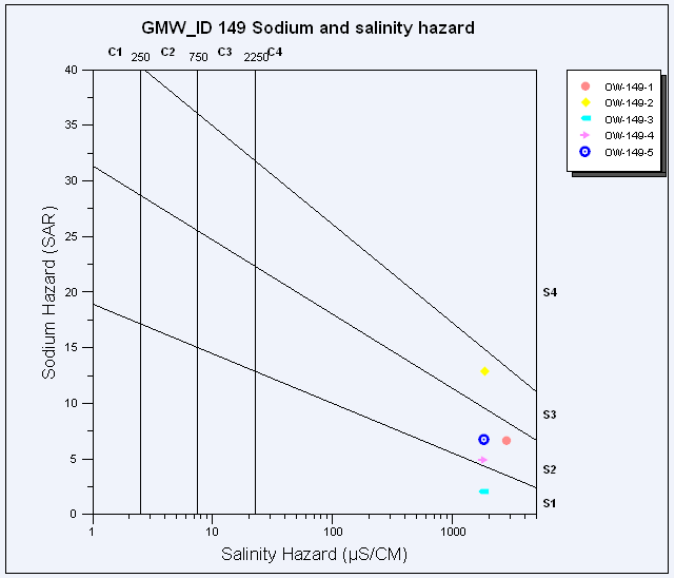

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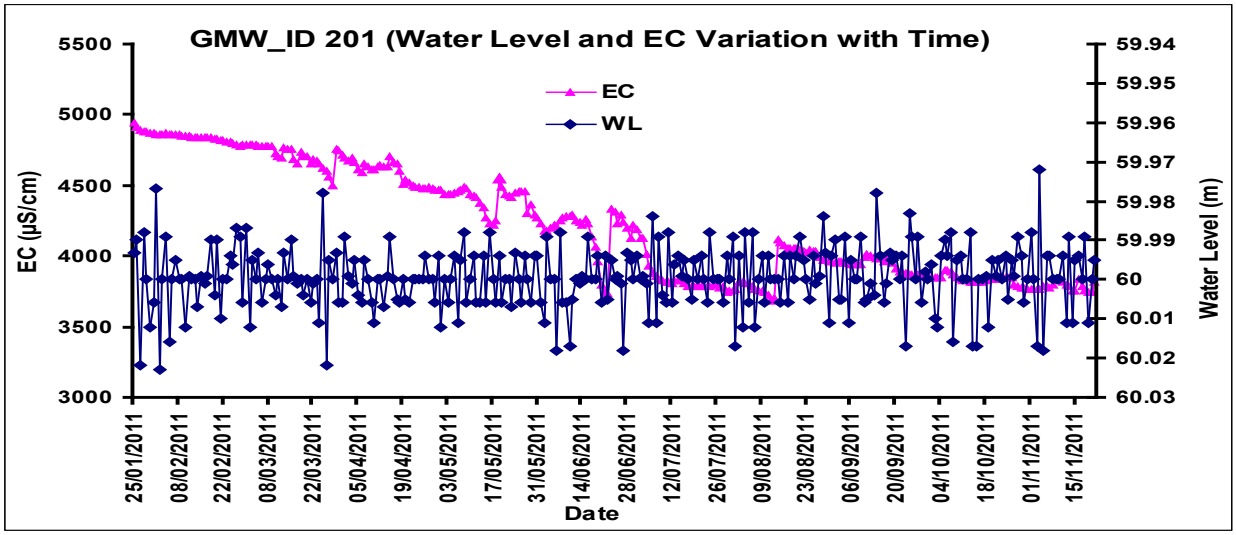
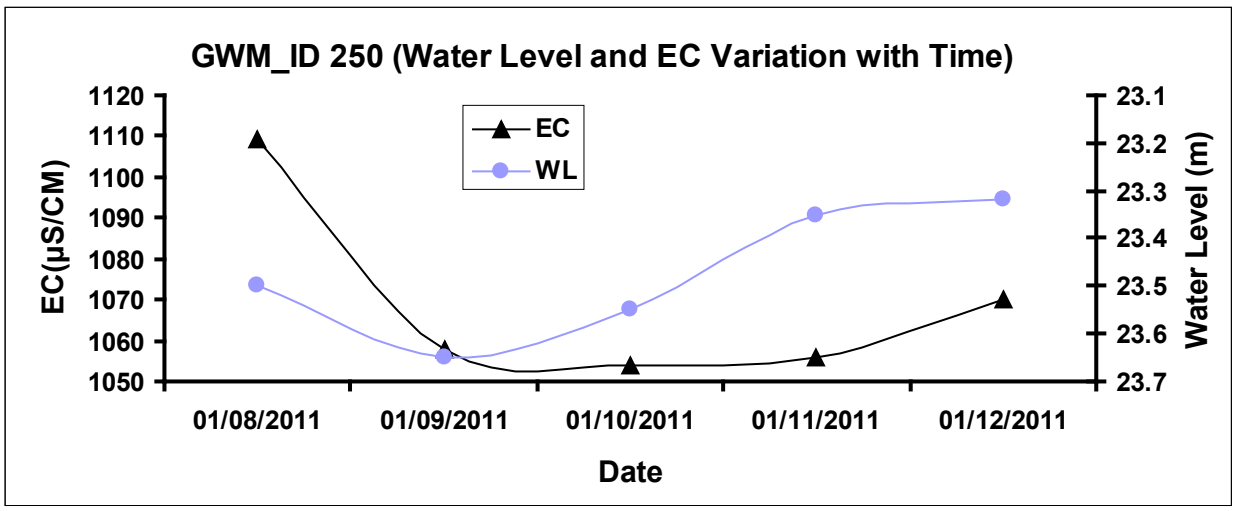
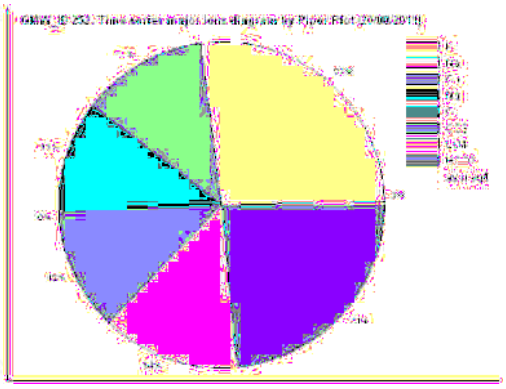


Jawzjan

Jawzjan GMW_ID 25



Watertype	Na-Ca-Mg-HCO3-SO4-CO3	
Temperature (°C)	21.2	
pH	7.19	
Conductivity	1160	uS/cm
Sum of Anions	16.3636	meq/L
Sum of Cations	16.65944	meq/L
Balance	0.8958631	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.872727	
Ca/SO4	0.3832558	
Na/Cl	201	
Cl/Br	1.266823	



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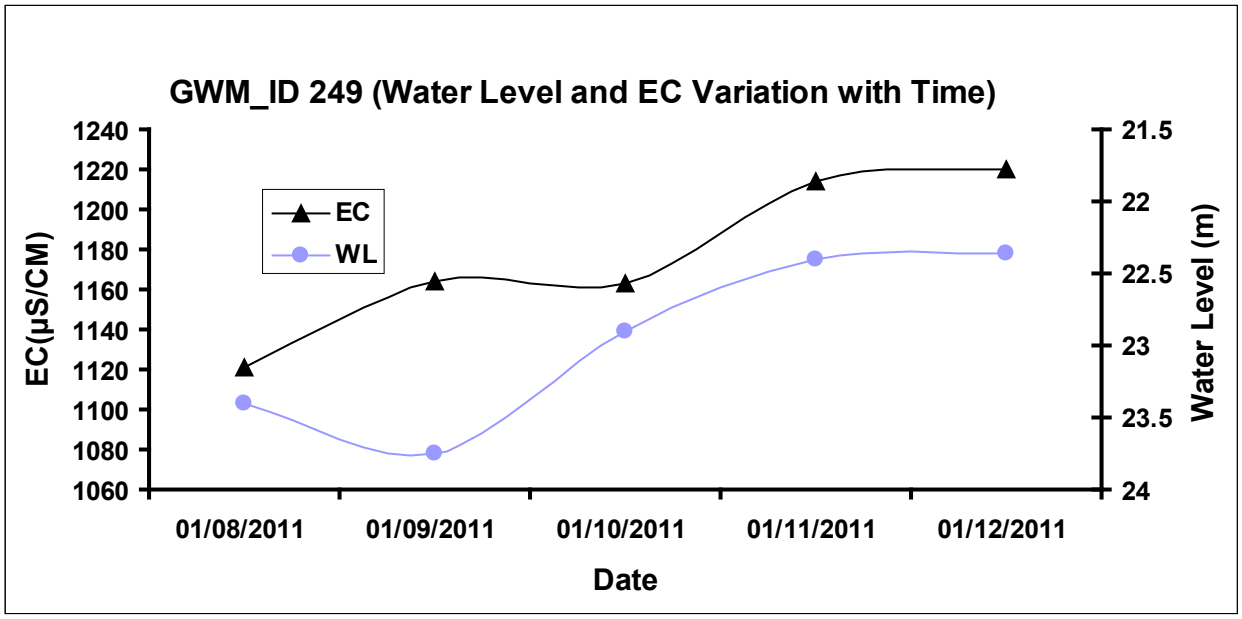
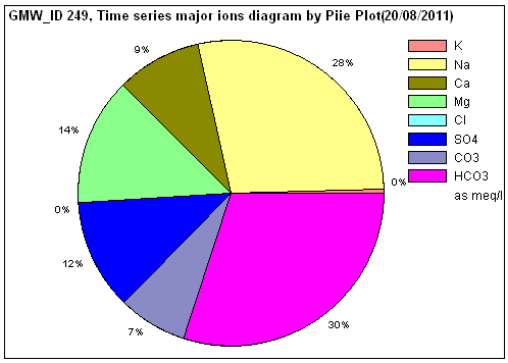


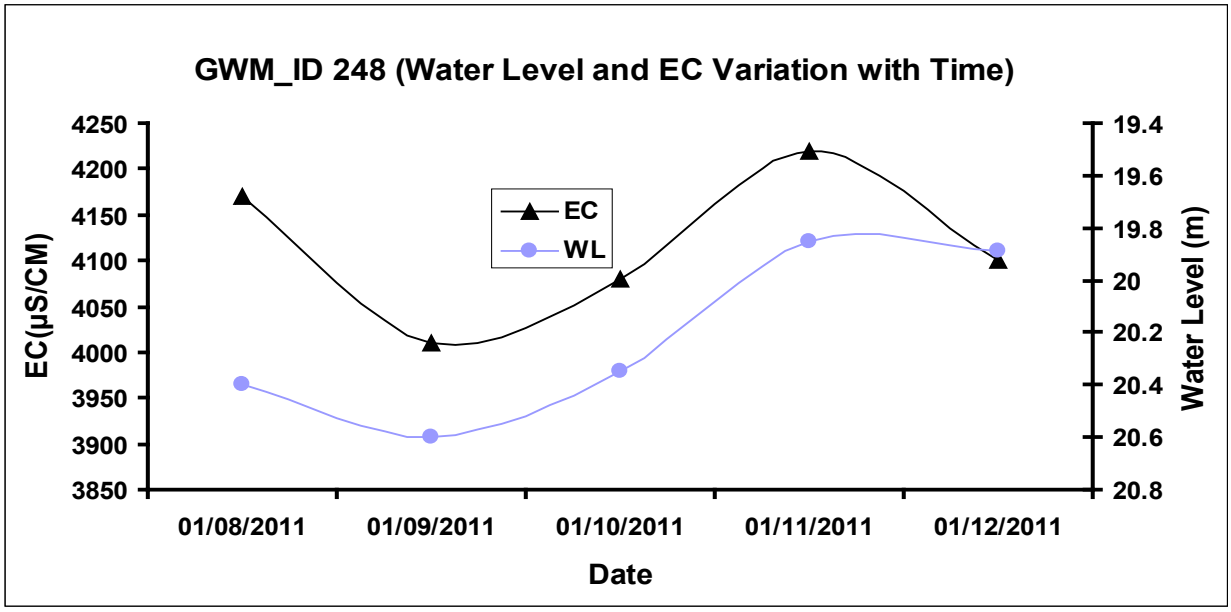
Watertype	Na-Mg-HCO3-SO4	
Temperature (°C)	32.5	
pH	7.28	
Conductivity	1218	uS/cm
Sum of Anions	18.41968	meq/L
Sum of Cations	18.69076	meq/L
Balance	0.7304529	%

Comparison to Seawater

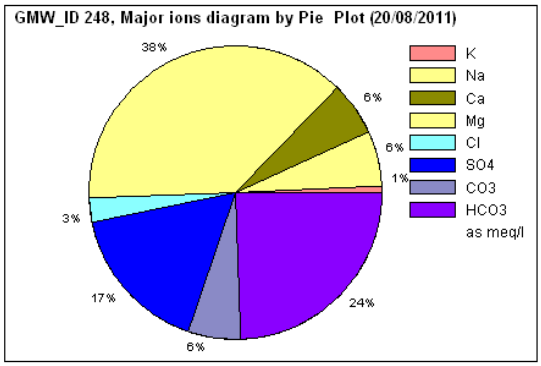
Ratios	mg/l
Ca/Mg	1.1
Ca/SO4	0.3219512
Na/Cl	2360
Cl/Br	0.1098901



Jawzjan GMW_ID 248



Watertype	Mg-HCO3-SO4	
Temperature (°C)	20.4	
pH	7.14	
Conductivity	4460	uS/cm
Sum of Anions	31.84206	meq/L
Sum of Cations	31.9725	meq/L
Balance	0.2043984	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.2593103	
Ca/SO4	0.1504	
Na/Cl	1.466667	
Cl/Br	1200	



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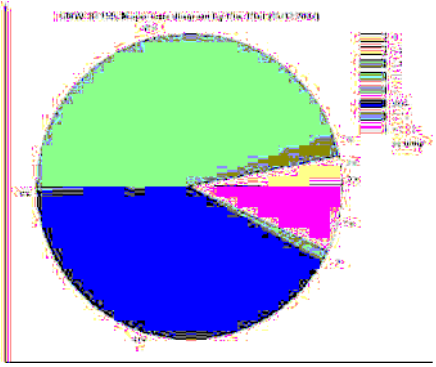
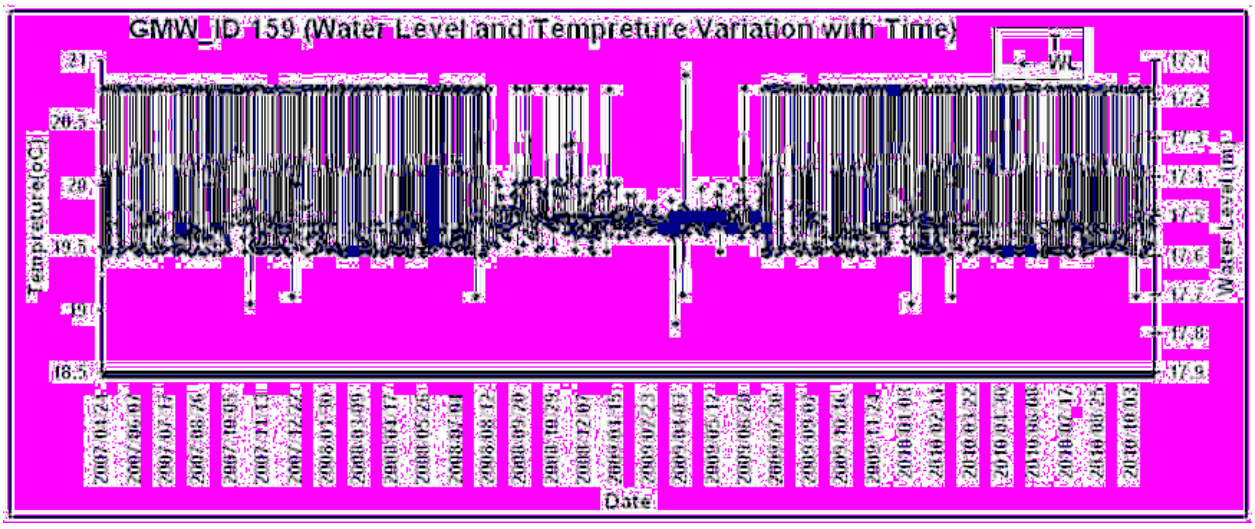
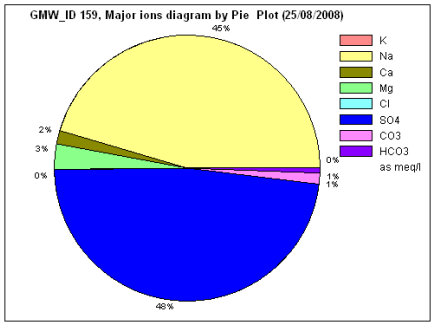
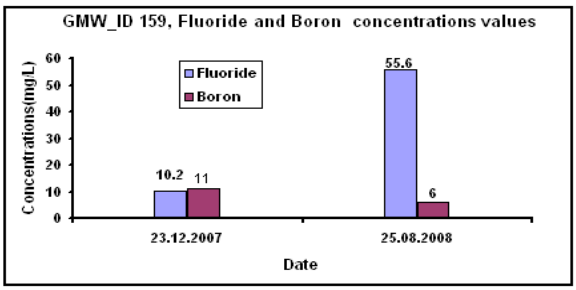
Watertype	Mg-SO4	
Temperature (°C)	14.5	
pH	7.54	
Conductivity	48300	uS/cm
Sum of Anions	208.7115	meq/L
Sum of Cations	208.2025	meq/L
Balance	-0.1220992	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	8.533333E-02	
Ca/SO4	2.327273E-02	
Na/Cl	6.595238	
Cl/Br		

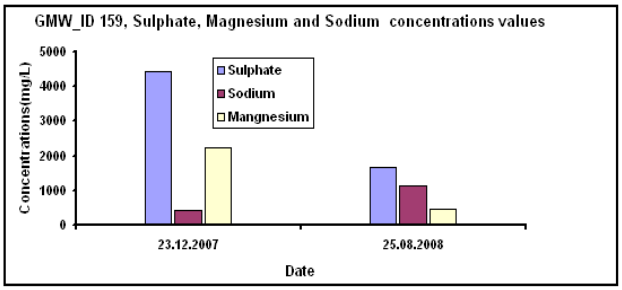




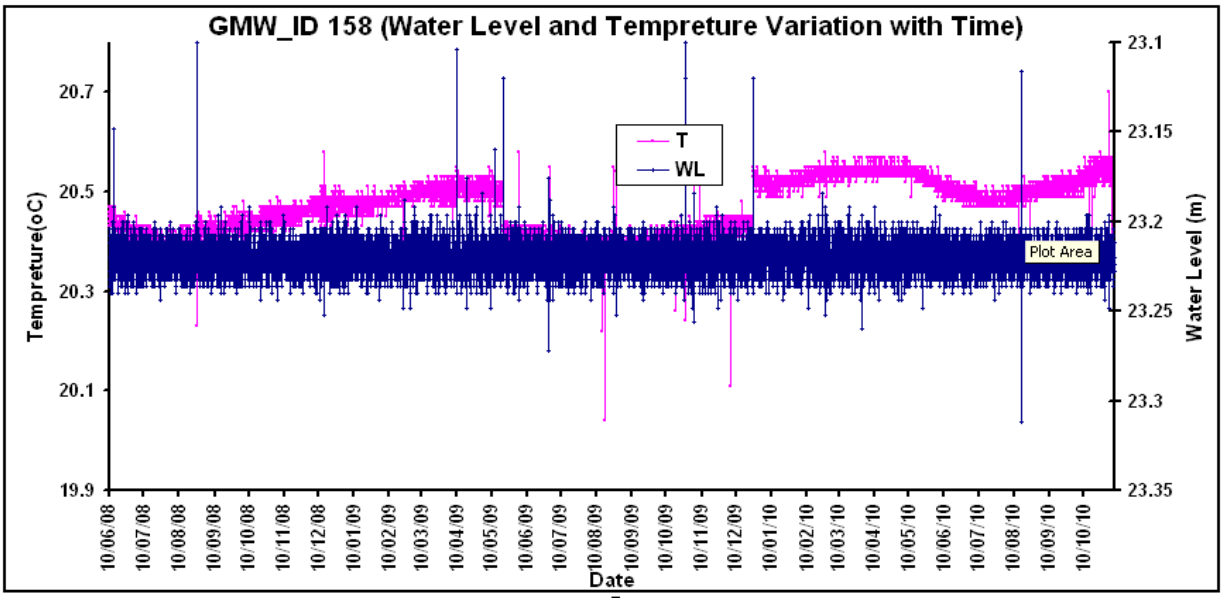
Watertype	Na-SO4	
Temperature (°C)	24	
pH	7.56	
Conductivity	47300	uS/cm
Sum of Anions	620.0504	meq/L
Sum of Cations	620.3422	meq/L
Balance	2.353046E-02	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.8869565	
Ca/SO4	0.0143662	
Na/Cl	515.6	
Cl/Br	41.66666	

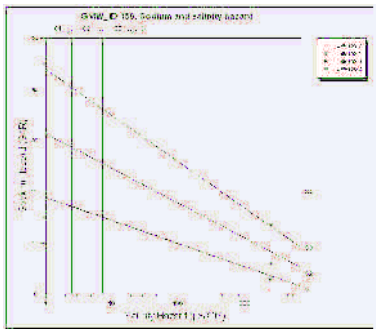


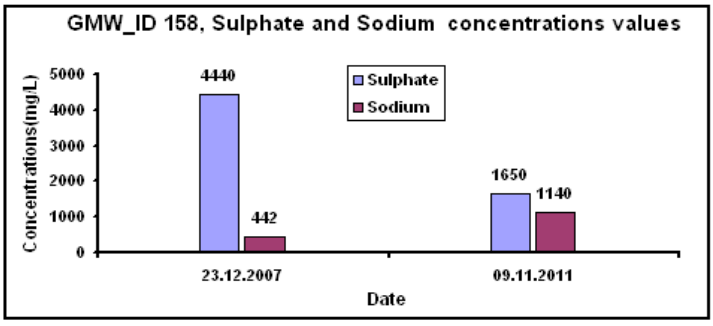


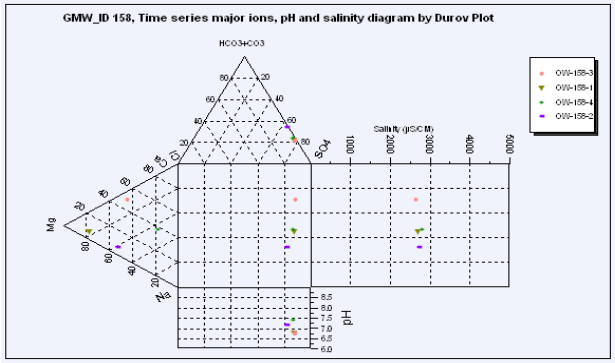


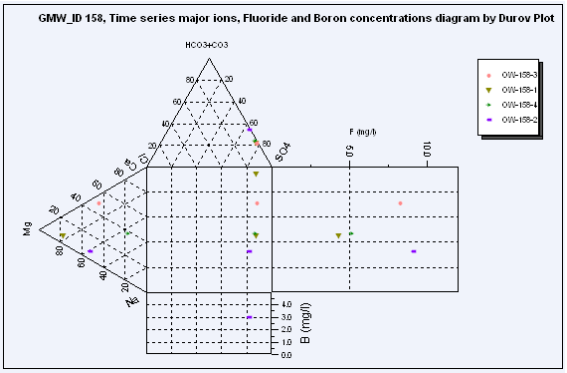
Jawzjan GMW_ID 158











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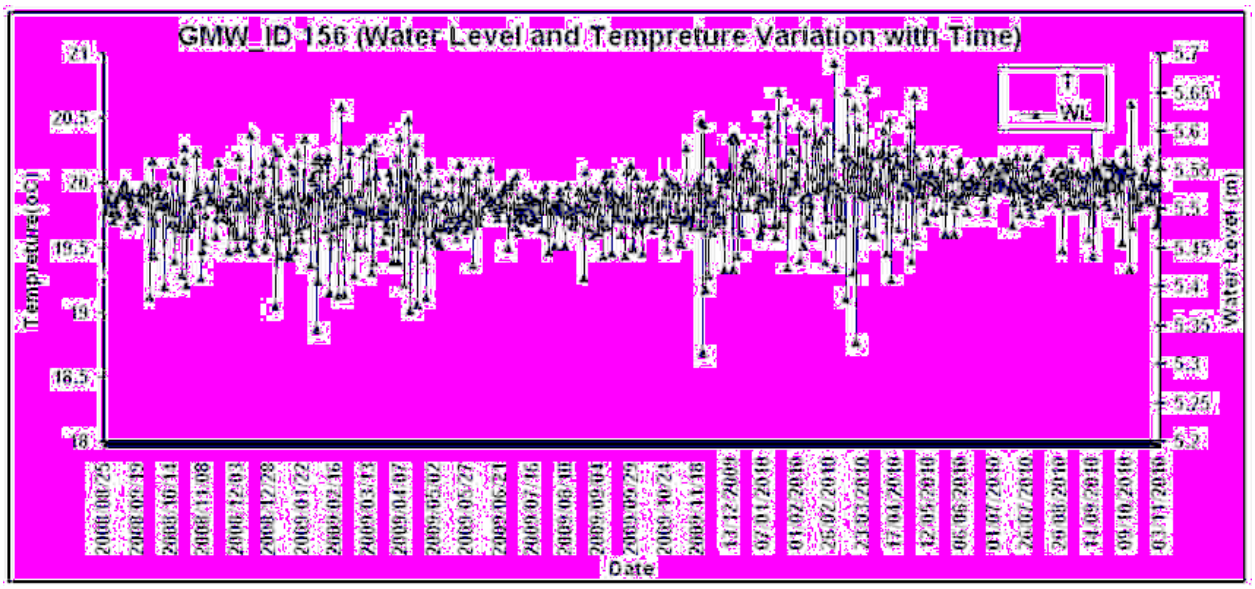
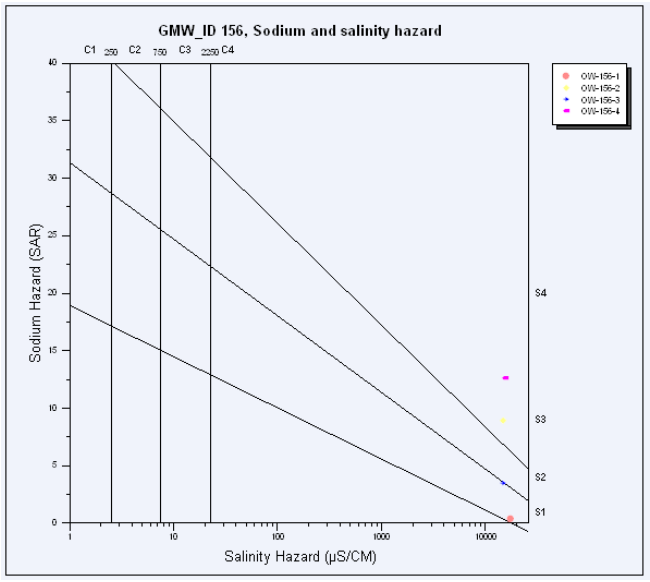
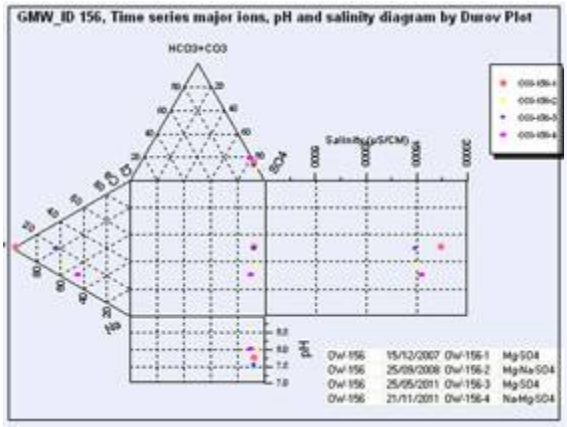
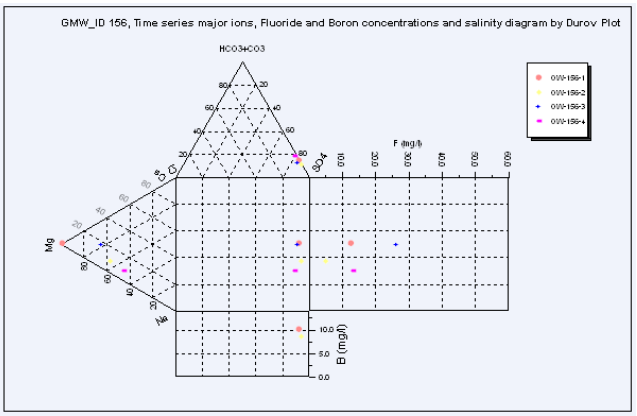
Balkh GMW_ID 156









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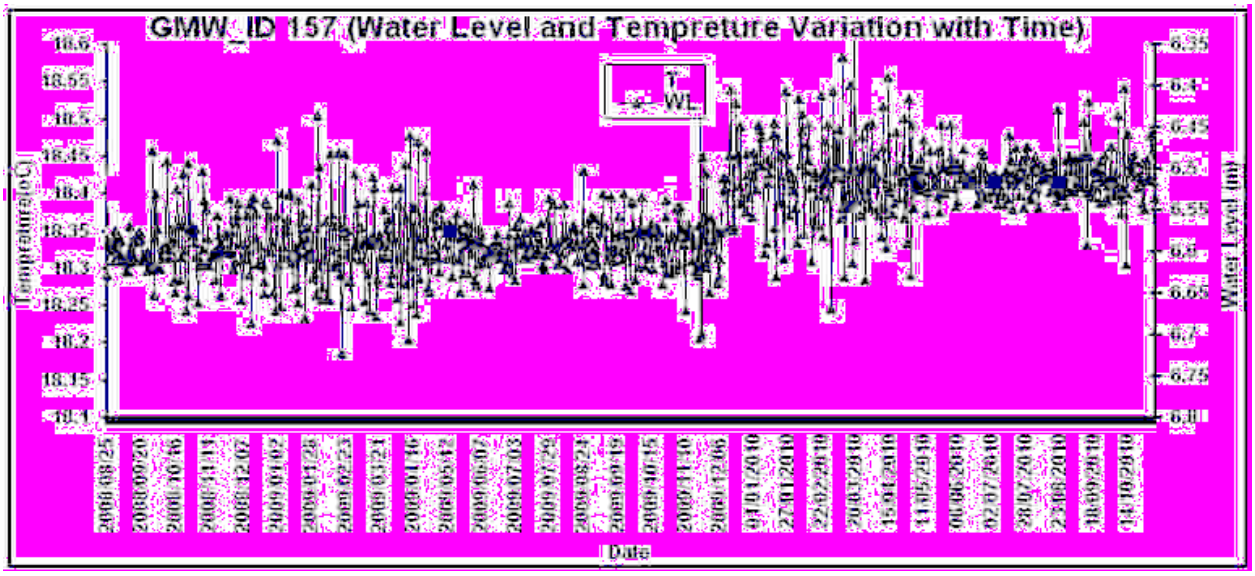

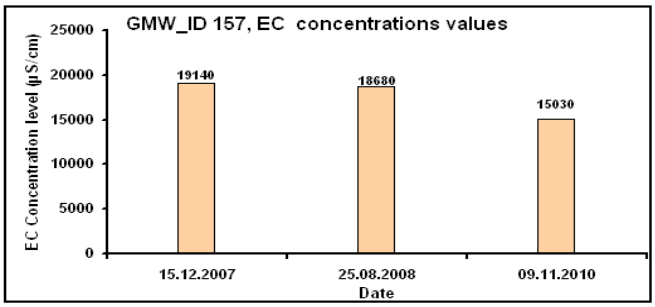

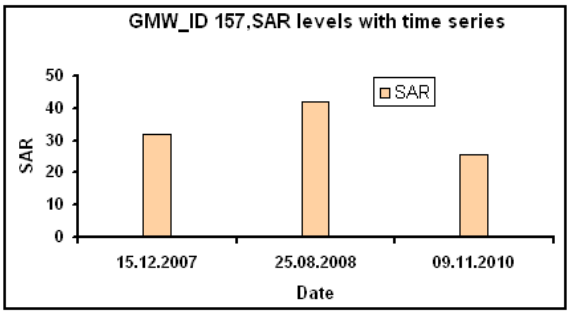

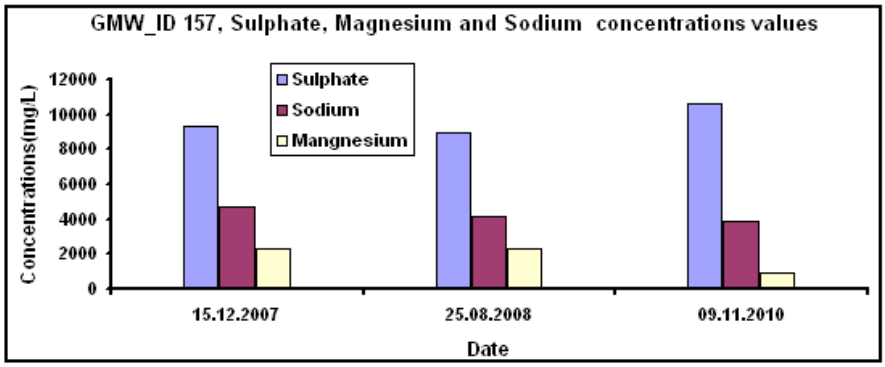

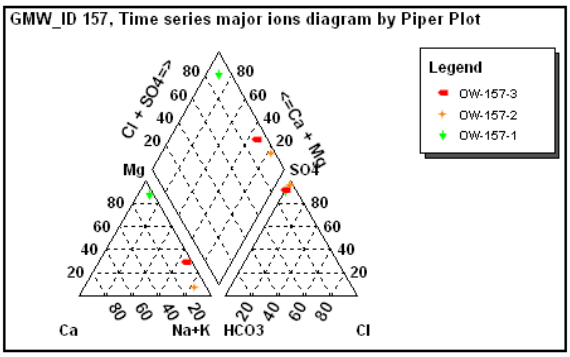

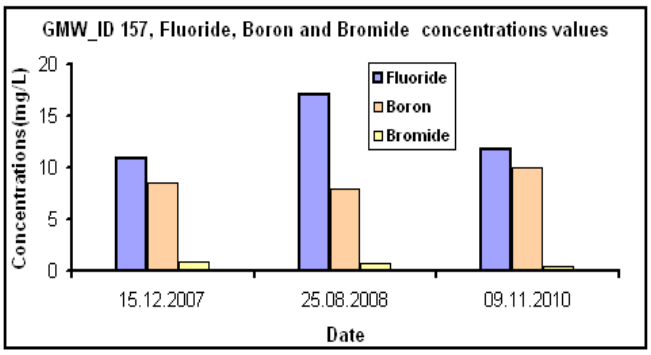

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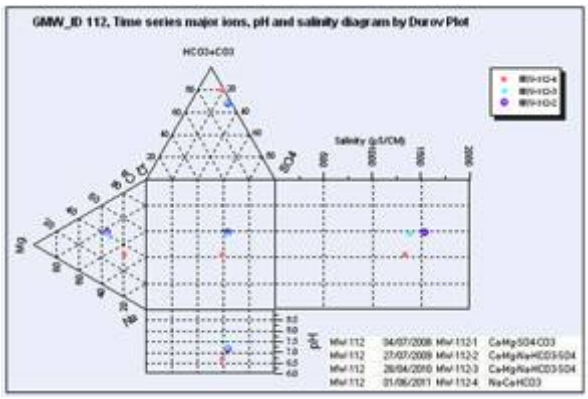

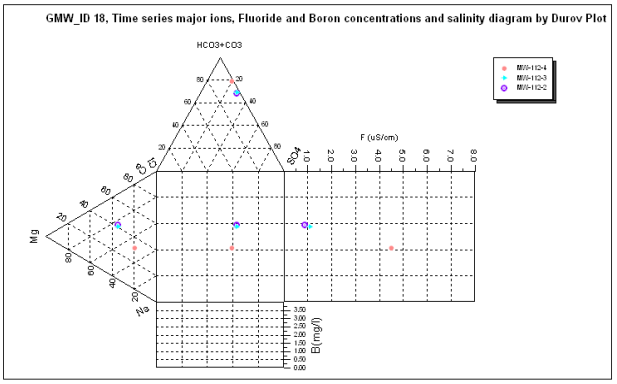

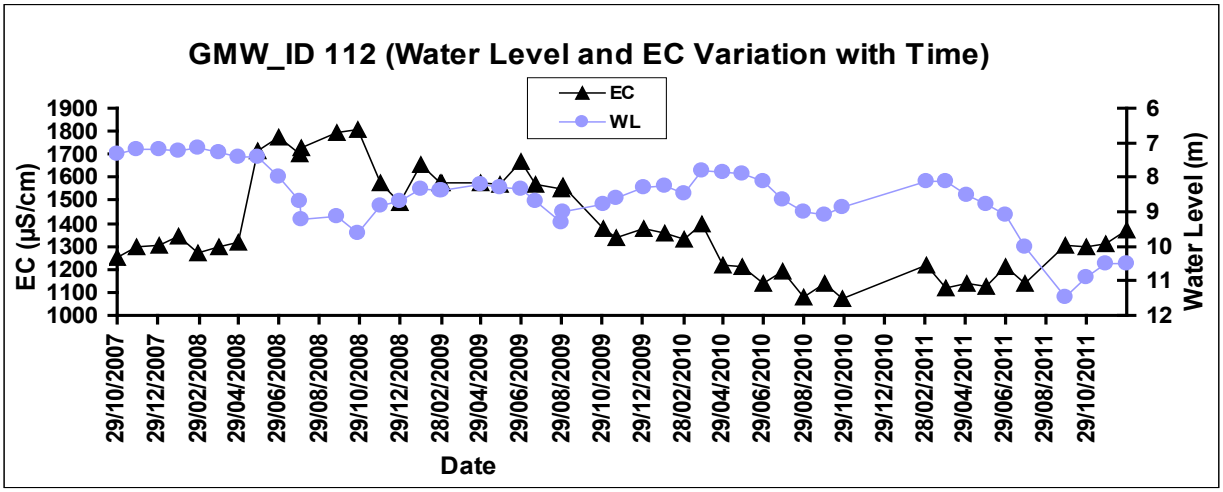

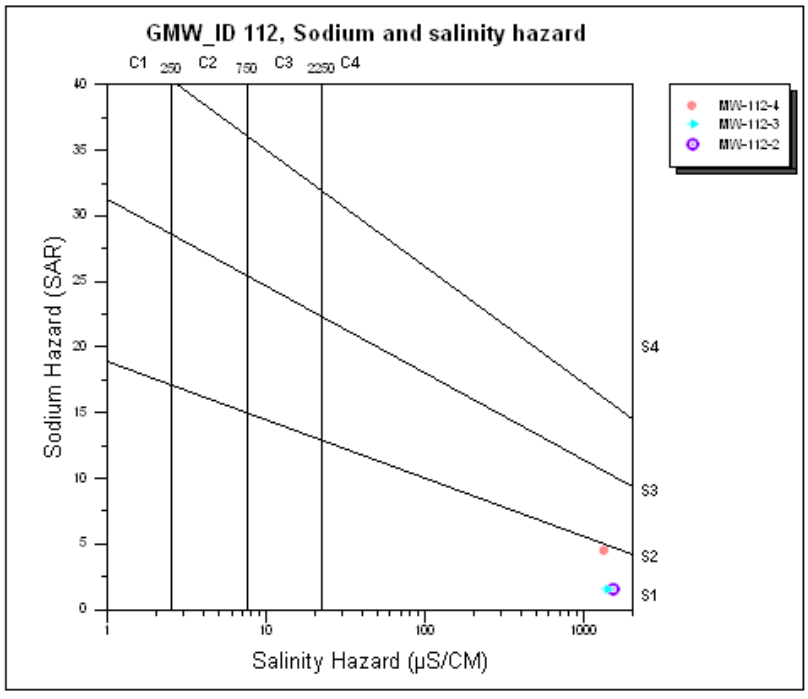

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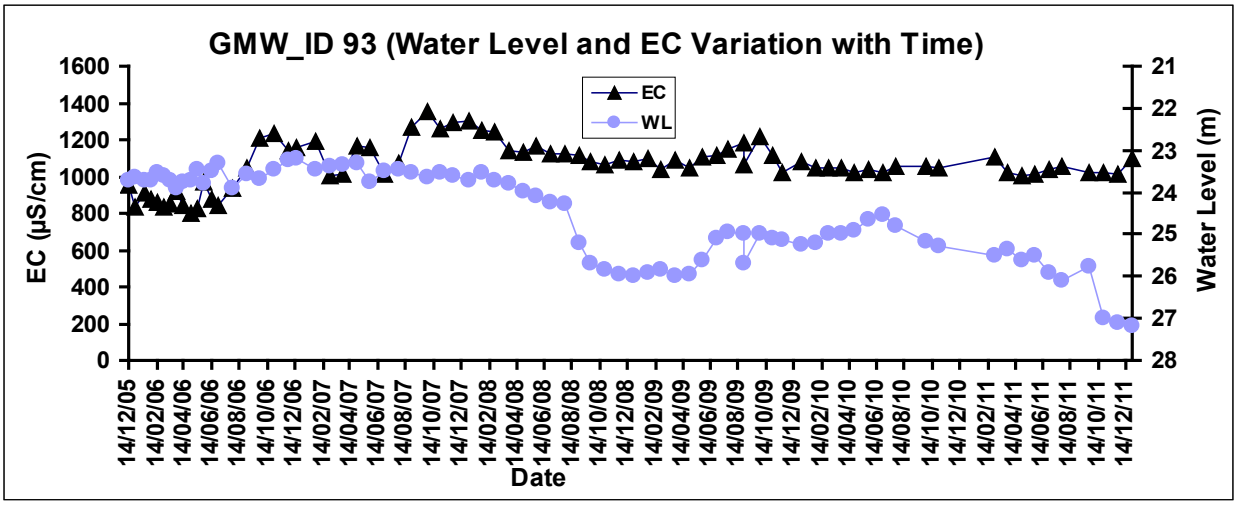

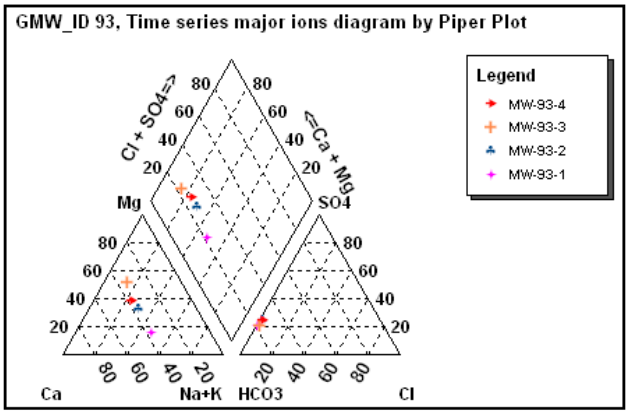

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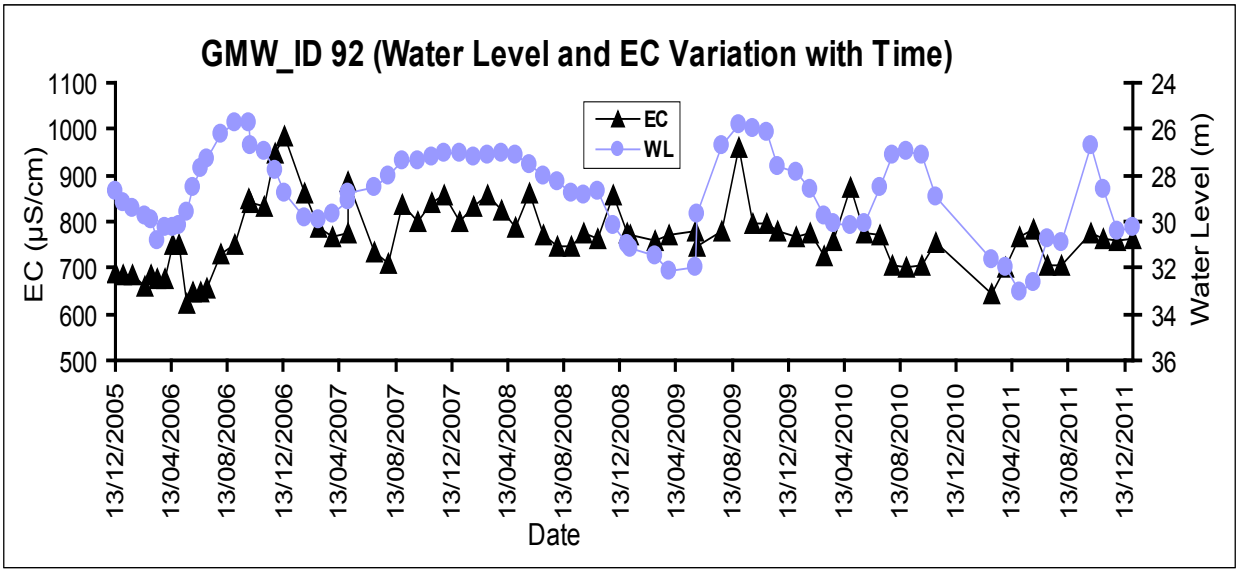

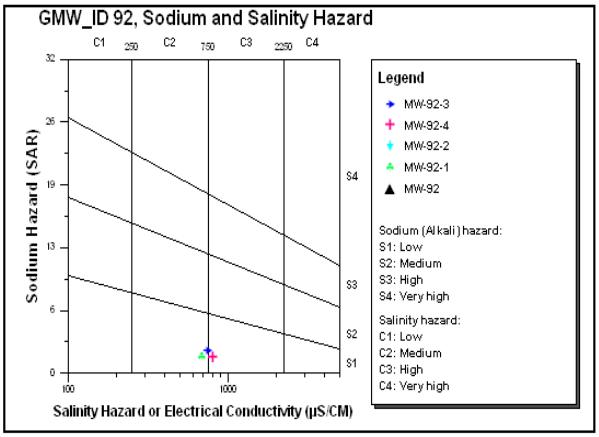

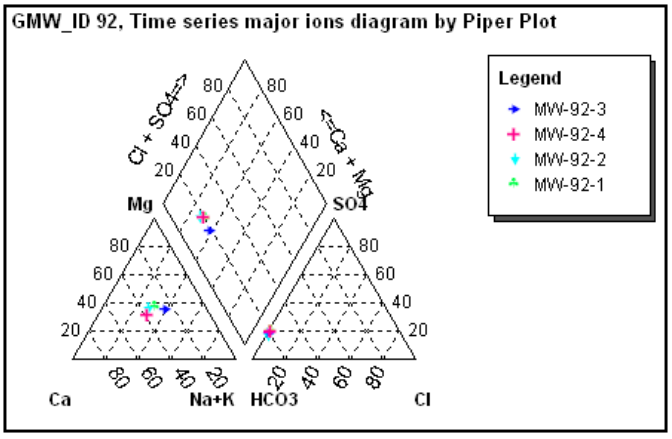

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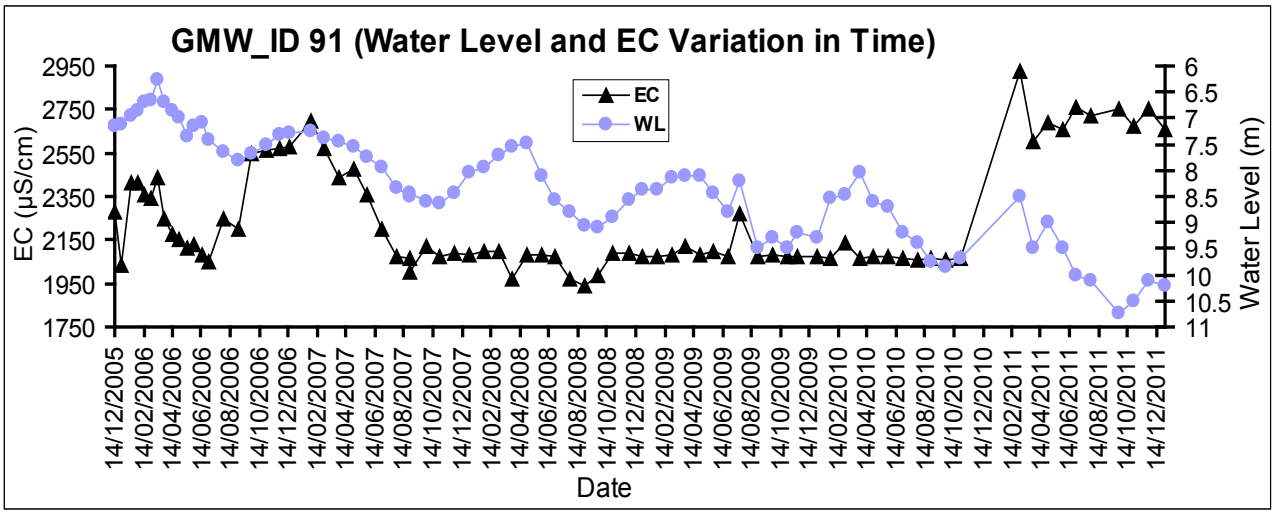
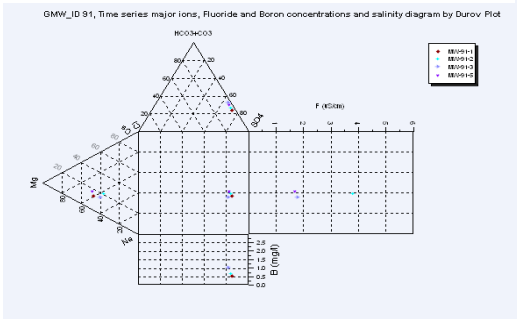
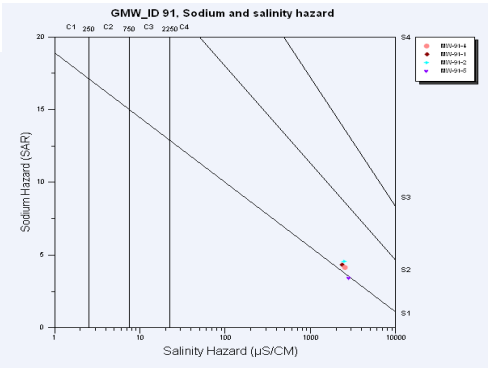
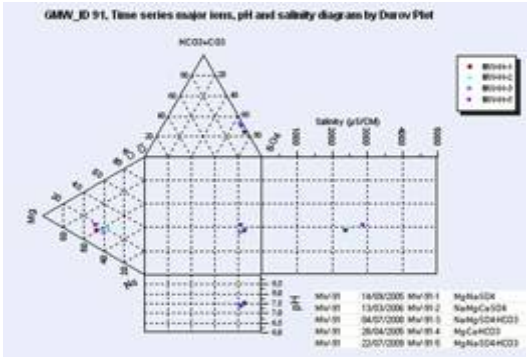
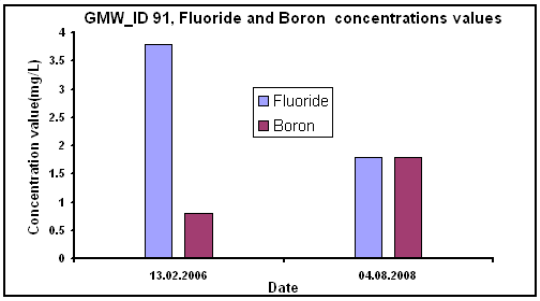


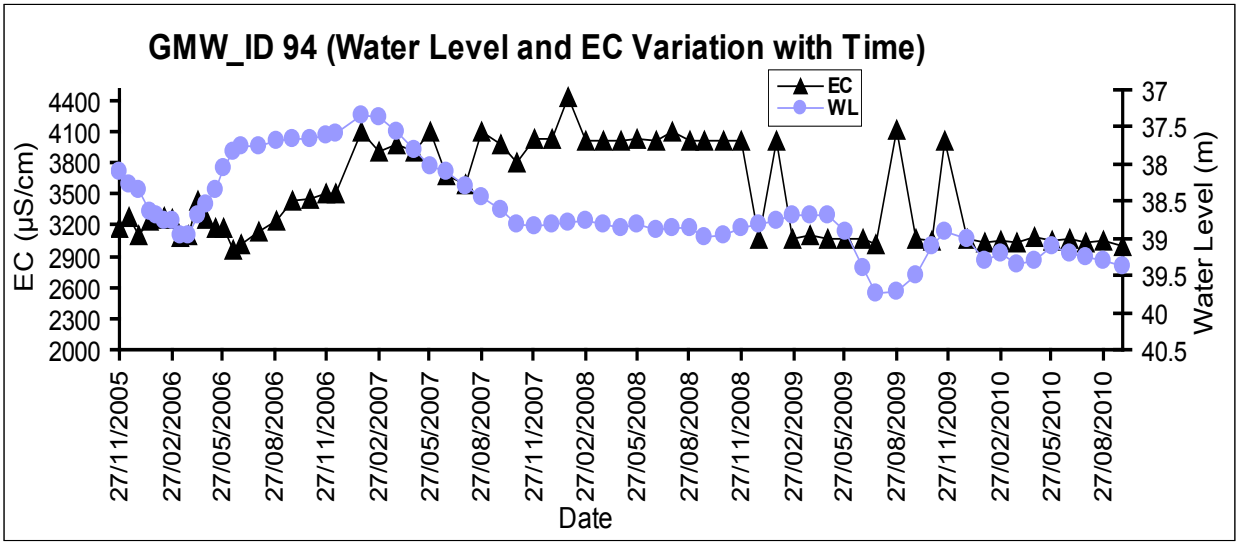


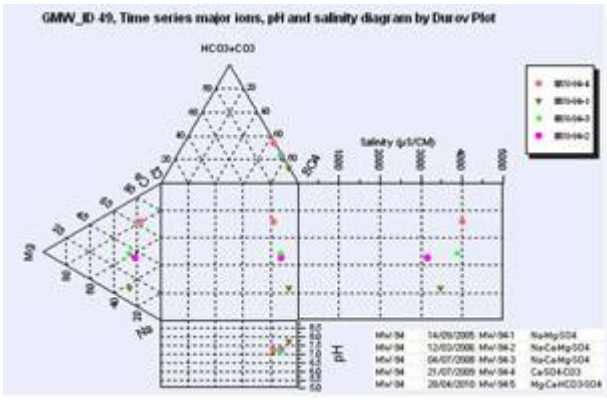


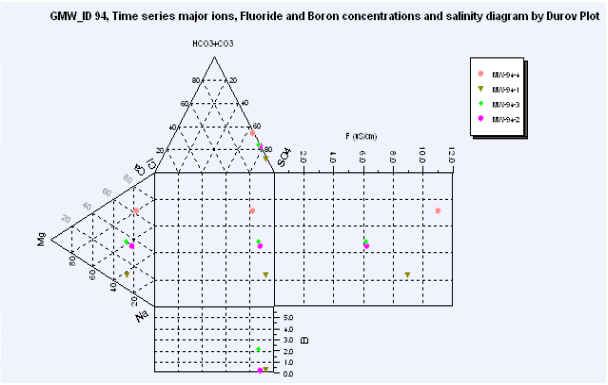


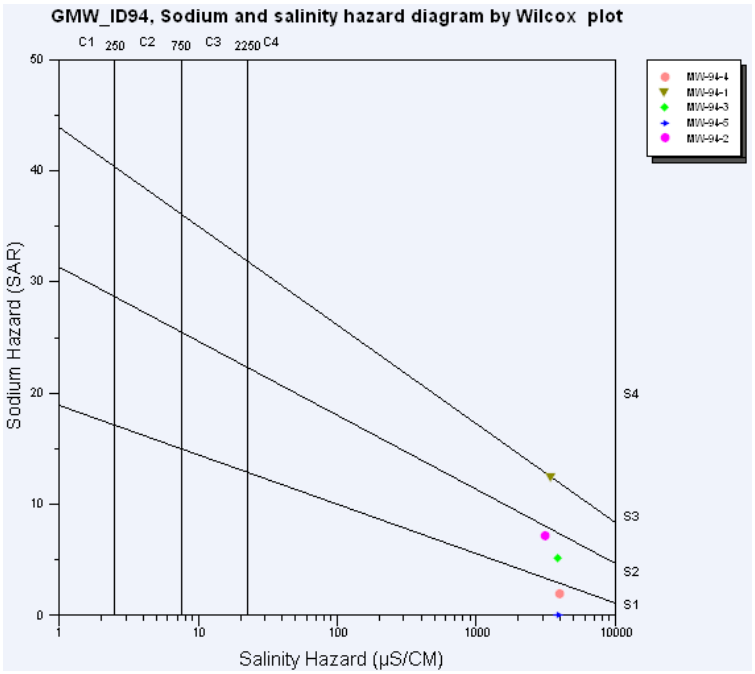


Balkh GMW_ID 94



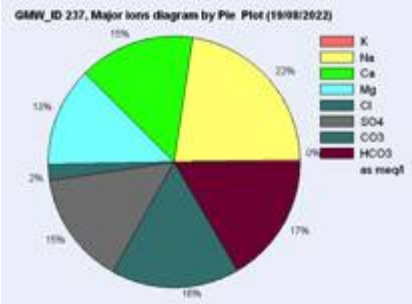


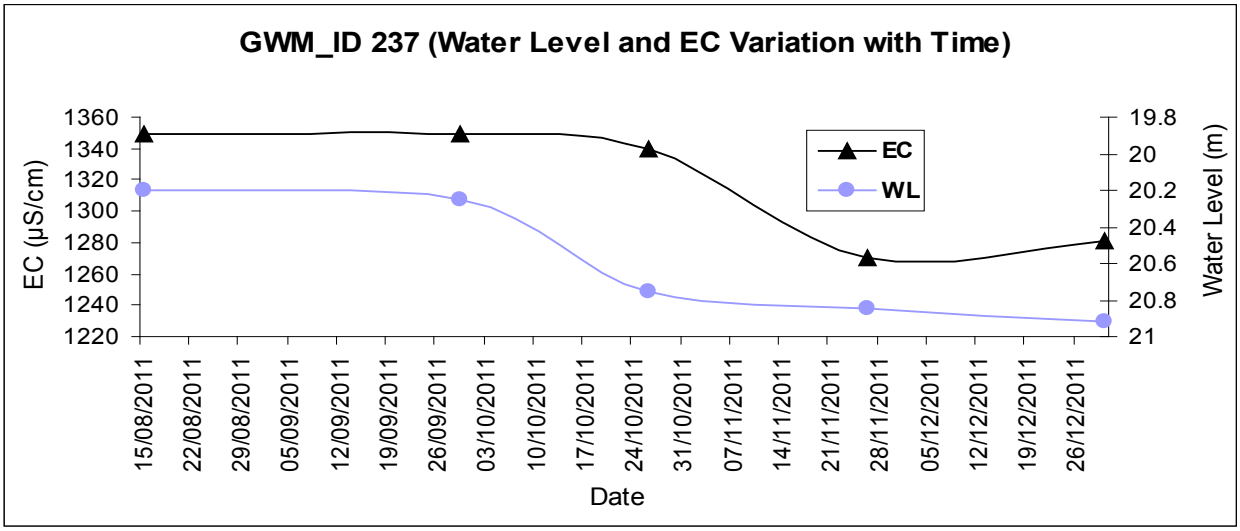




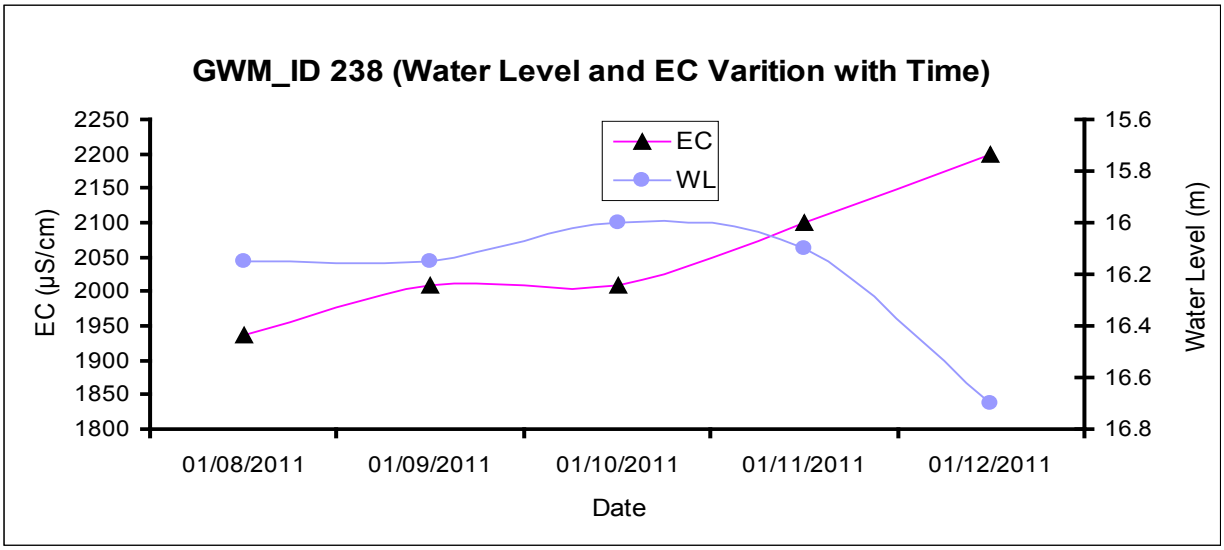
Balkh GMW_ID 237

Watertype	Na-Ca-Mg-HCO3-CO3-SO4	
Temperature (°C)	25.1	
pH	7.08	
Conductivity	1420	uS/cm
Sum of Anions	19.34755	meq/L
Sum of Cations	19.40283	meq/L
Balance	0.1426633	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.913333	
Ca/SO4	0.4251852	
Na/Cl	7.071429	
Cl/Br	4.827586	

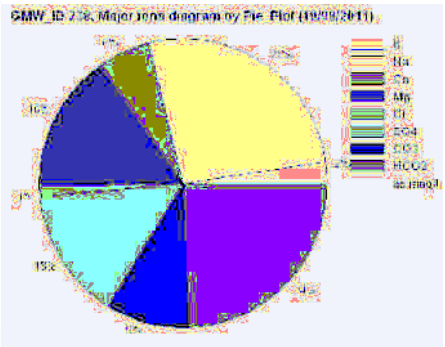




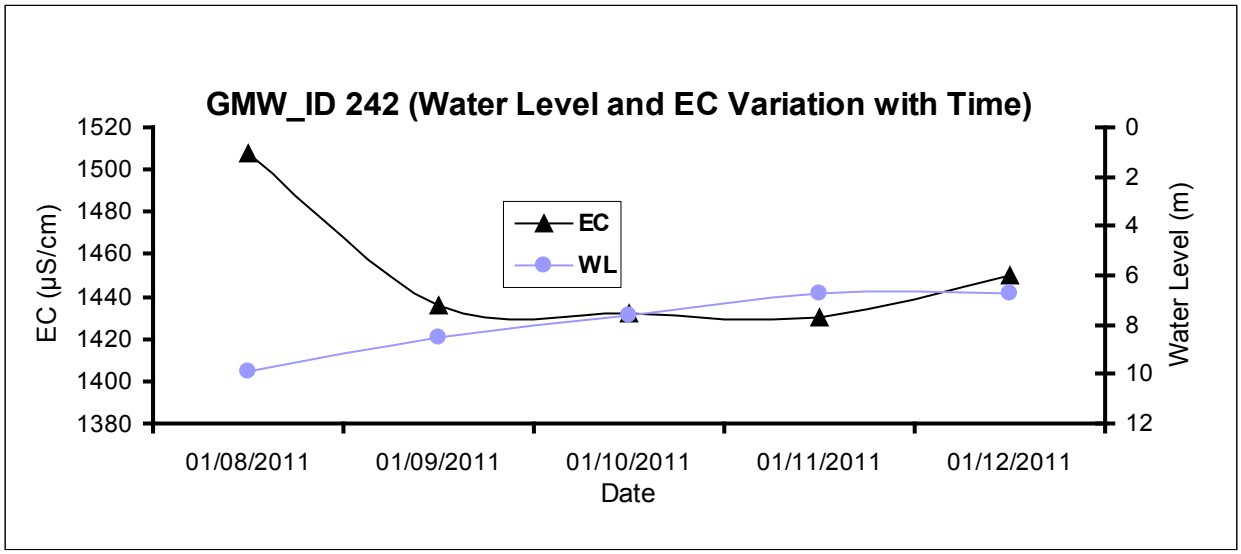
Balkh GMW_ID 238

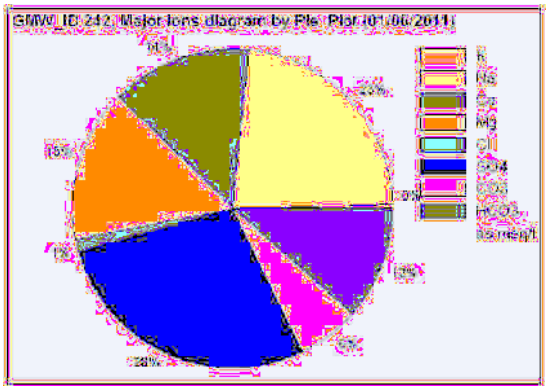


Watertype	Na-Mg-HCO3-SO4	
Temperature (°C)	16	
pH	7.24	
Conductivity	1550	uS/cm
Sum of Anions	21.25886	meq/L
Sum of Cations	21.3743	meq/L
Balance	0.2707761	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.635	
Ca/SO4	0.1693333	
Na/Cl	14.33333	
Cl/Br	43.90244	



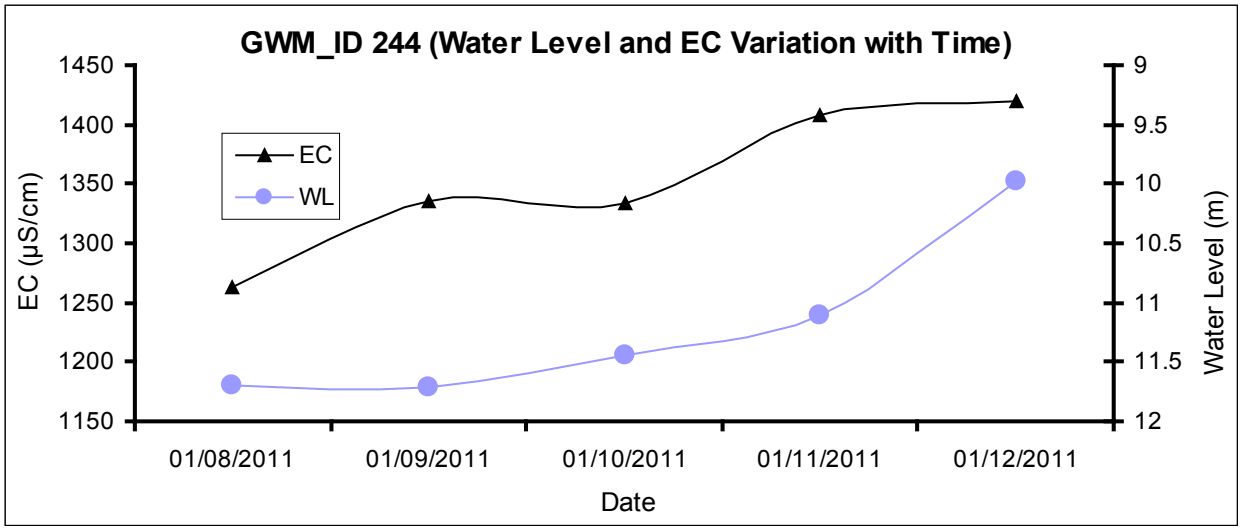
Balkh GMW_ID 242



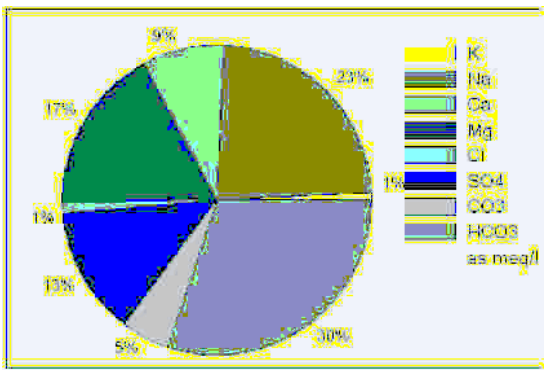


Watertype	Na-Mg-Ca-SO4-HCO3	
Temperature (°C)	23.5	
pH	6.94	
Conductivity	1240	uS/cm
Sum of Anions	33.029	meq/L
Sum of Cations	36.91296	meq/L
Balance	5.553109	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.539462	
Ca/SO4	0.2150538	
Na/Cl	11.4375	

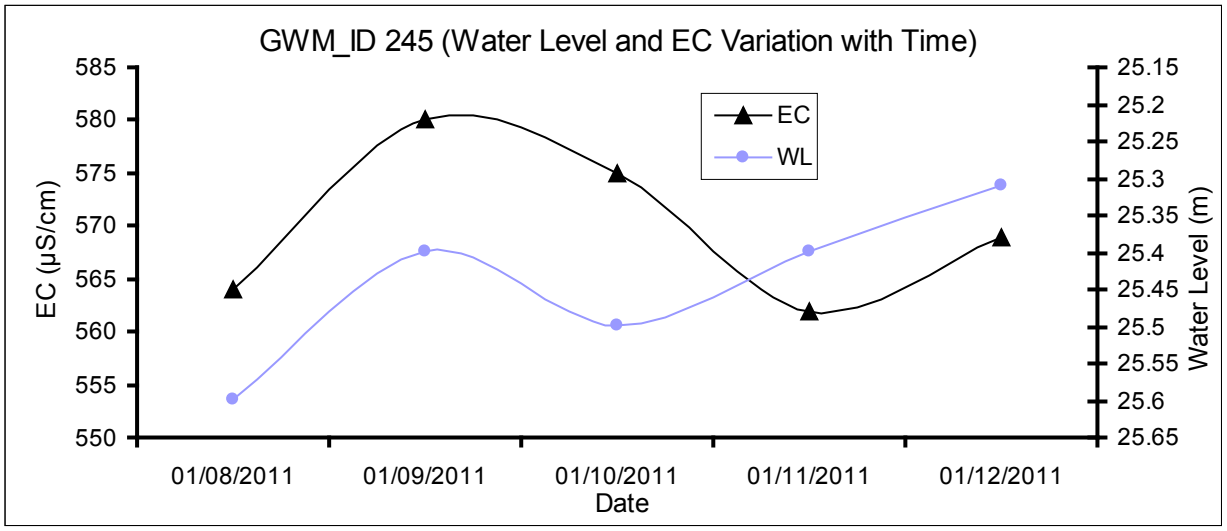
Balkh GMW_ID 244



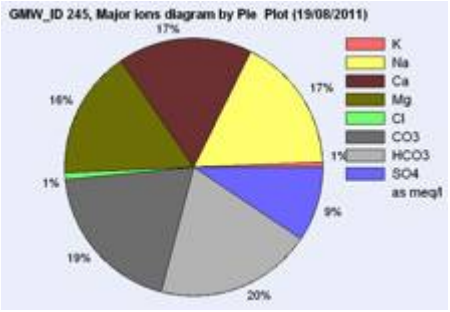
Watertype	Na-Mg-HCO3-SO4		
Temperature (°C)	23.2		
pH	7.27		
Conductivity	1366	uS/cm	
Sum of Anions	20.13091	meq/L	
Sum of Cations	20.22336	meq/L	
Balance	0.229094	%	
Comparison to Seawater			
Ratios			
	mg/l	mmol/l	
Ca/Mg	0.8141176	0.4937155	
Ca/SO4	0.2661538	0.637526	
Na/Cl	14	21.58951	
Cl/Br	43.05556	97.03946	



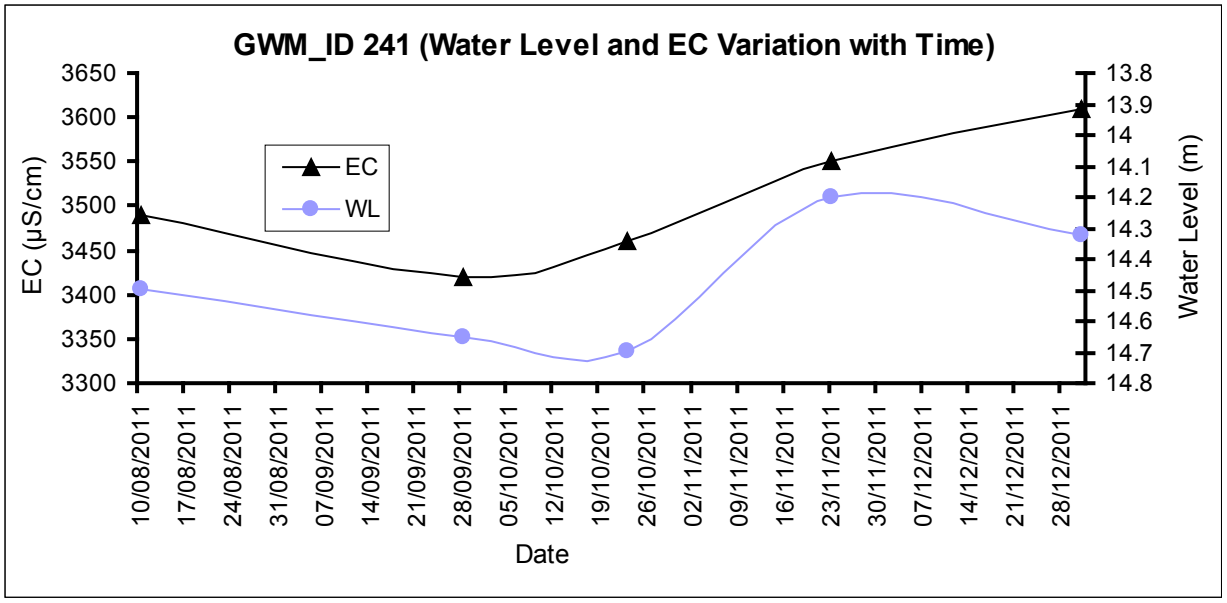
Balkh GMW_ID 245



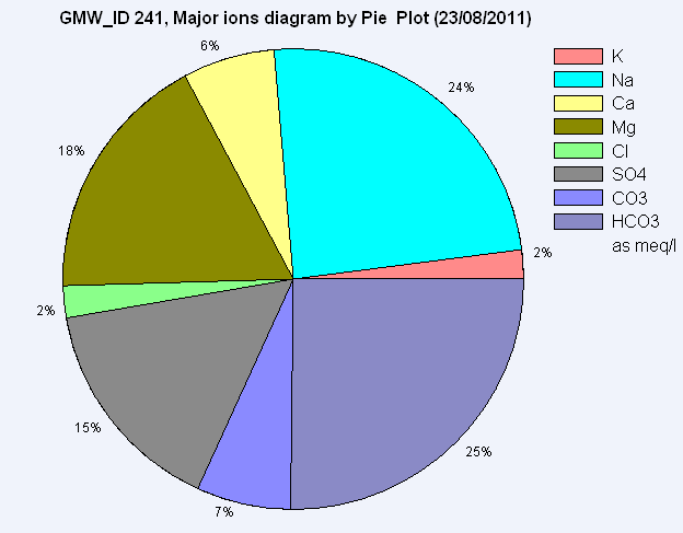
Watertype	Na-Ca-Mg-HCO3-CO3	
Temperature (°C)	23.1	
pH	7.5	
Conductivity	586	uS/cm
Sum of Anions	6.916116	meq/L
Sum of Cations	6.981444	meq/L
Balance	0.4700656	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.718519	
Ca/SO4	0.7483871	
Na/Cl	13.17073	
Cl/Br	11.08108	



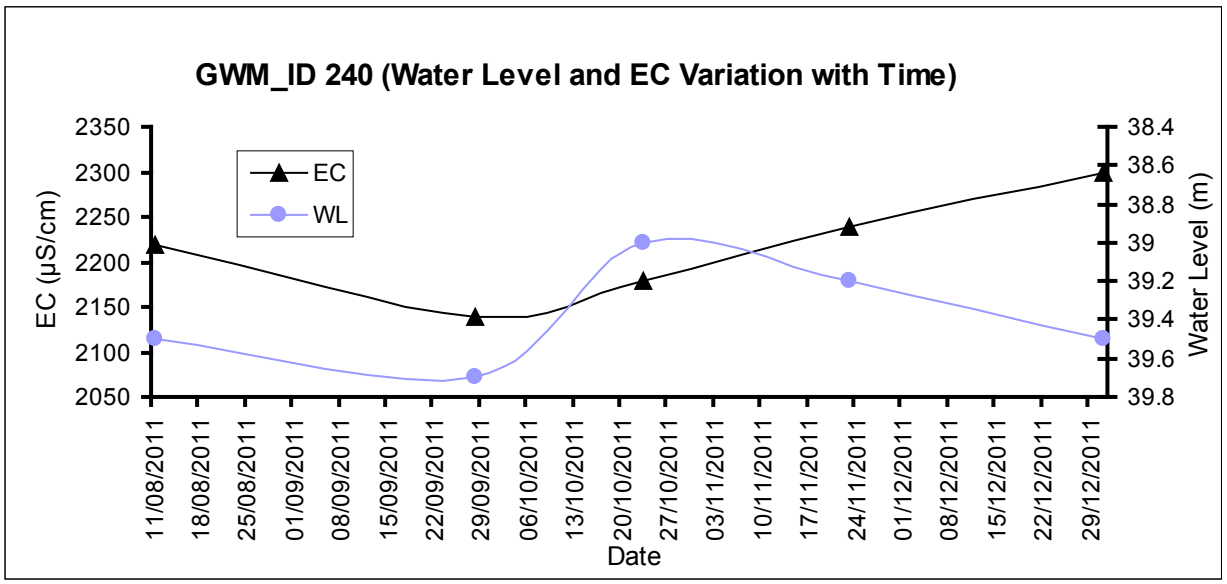
Balkh GMW_ID 241



Watertype	Na-Mg-HCO3-SO4	
Temperature (°C)	23.8	
pH	7.16	
Conductivity	3600	uS/cm
Sum of Anions	30.52779	meq/L
Sum of Cations	30.62734	meq/L
Balance	0.1627956	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.6030769	
Ca/SO4	0.1742222	
Na/Cl	7.041667	
Cl/Br	685.7143	

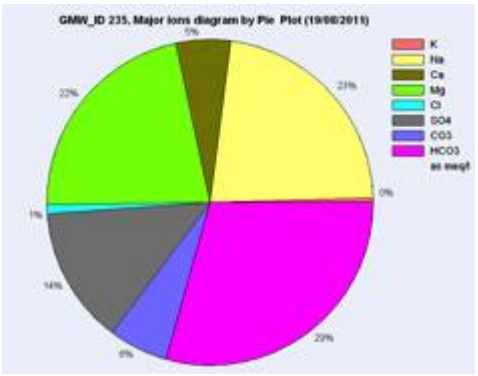


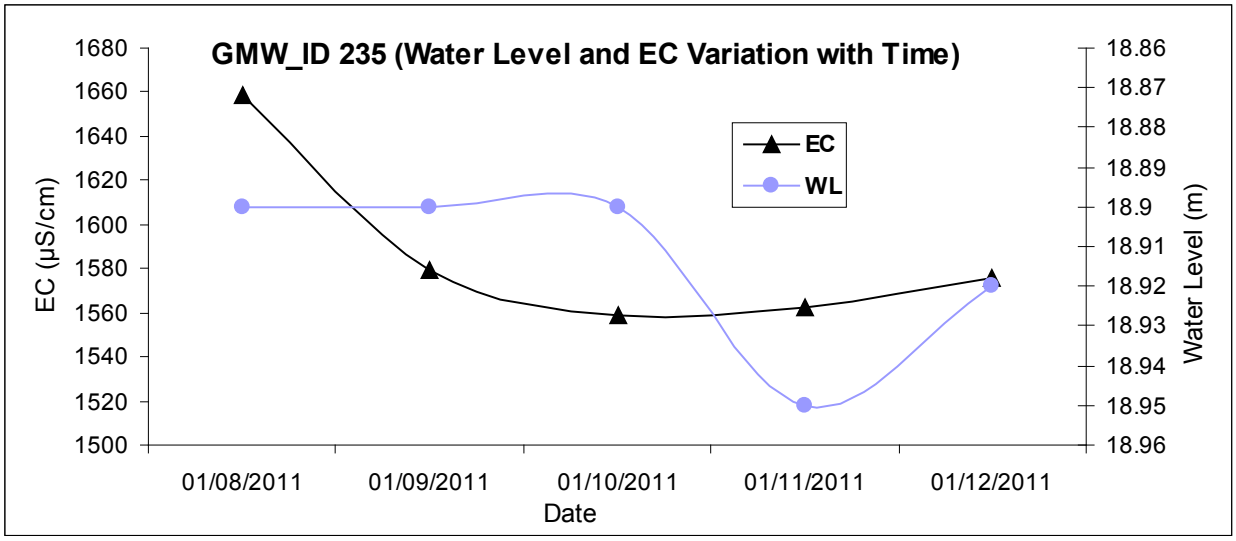
Balkh GMW_ID 240



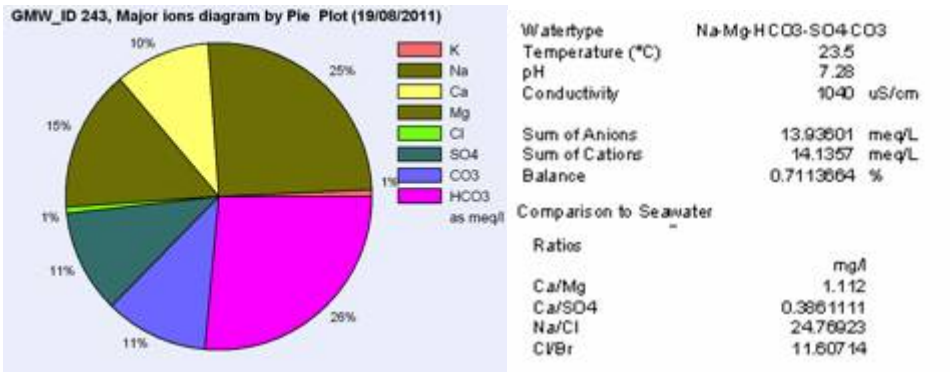
Balkh GMW_ID 235

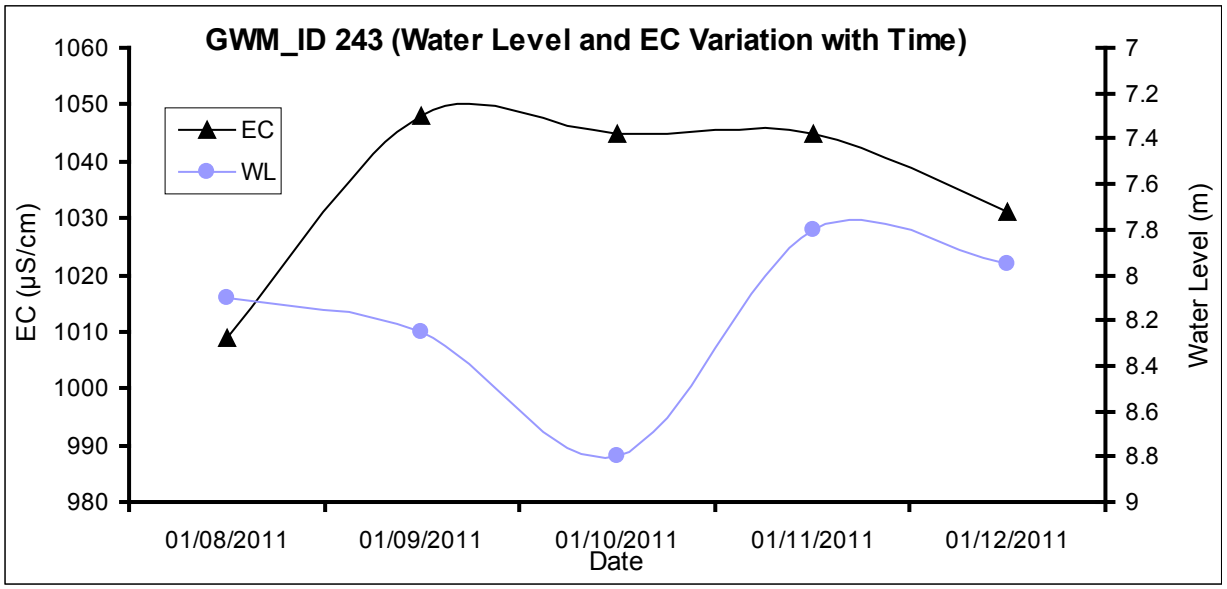
Watertype	Na-Mg-HCO3-SO4	
Temperature (°C)	22.8	
pH	7.24	
Conductivity	1697	uS/cm
Sum of Anions	22.62916	meq/L
Sum of Cations	22.7343	meq/L
Balance	0.2317824	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.41	
Ca/SO4	0.1662162	
Na/Cl	16.13793	
Cl/Br	39.18919	





Balkh GMW_ID 243





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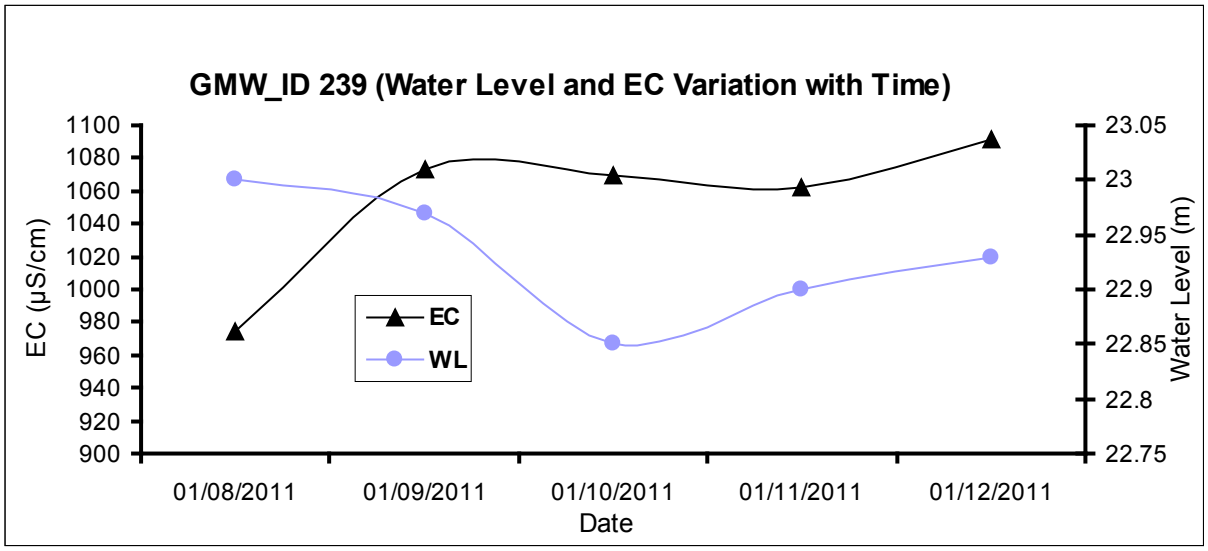
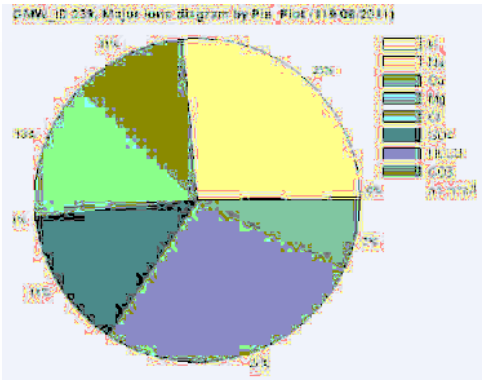
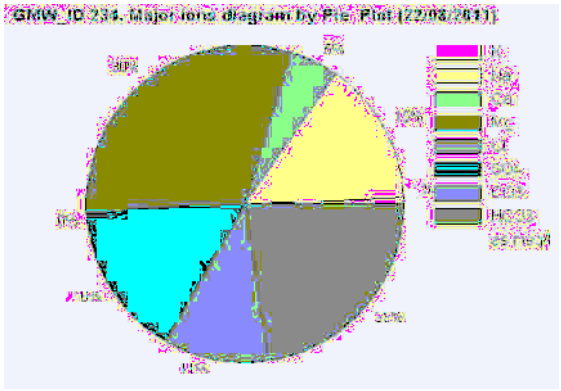


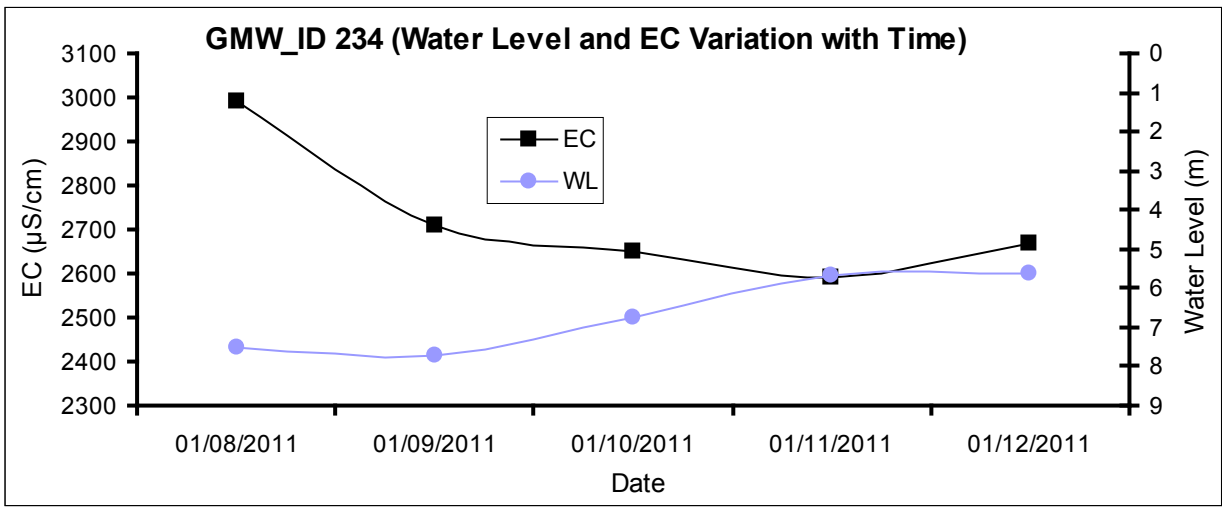
Watertype	Na-Mg-Ca-HCO3-SO4	
Temperature (°C)	21	
pH	7.23	
Conductivity	1060	uS/cm
Sum of Anions	14.57591	meq/L
Sum of Cations	14.98248	meq/L
Balance	1.375463	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.412766	
Ca/SO4	0.332	
Na/Cl	22.85714	
Cl/Br	38.5	



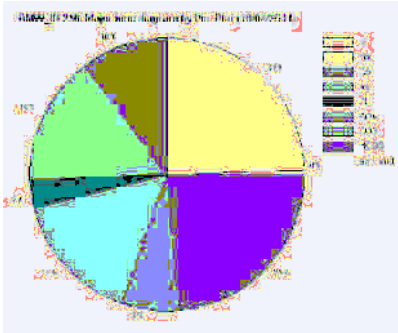
Balkh GMW_ID 234

Watertype	Mg-Na-HCO3-SO4-CO3	
Temperature (°C)	21	
pH	7.34	
Conductivity	2740	uS/cm
Sum of Anions	26.62909	meq/L
Sum of Cations	26.84643	meq/L
Balance	0.4064262	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.2769231	
Ca/SO4	0.135	
Na/Cl	44.5	
Cl/Br	2.702703	





Balkh GMW_ID 236

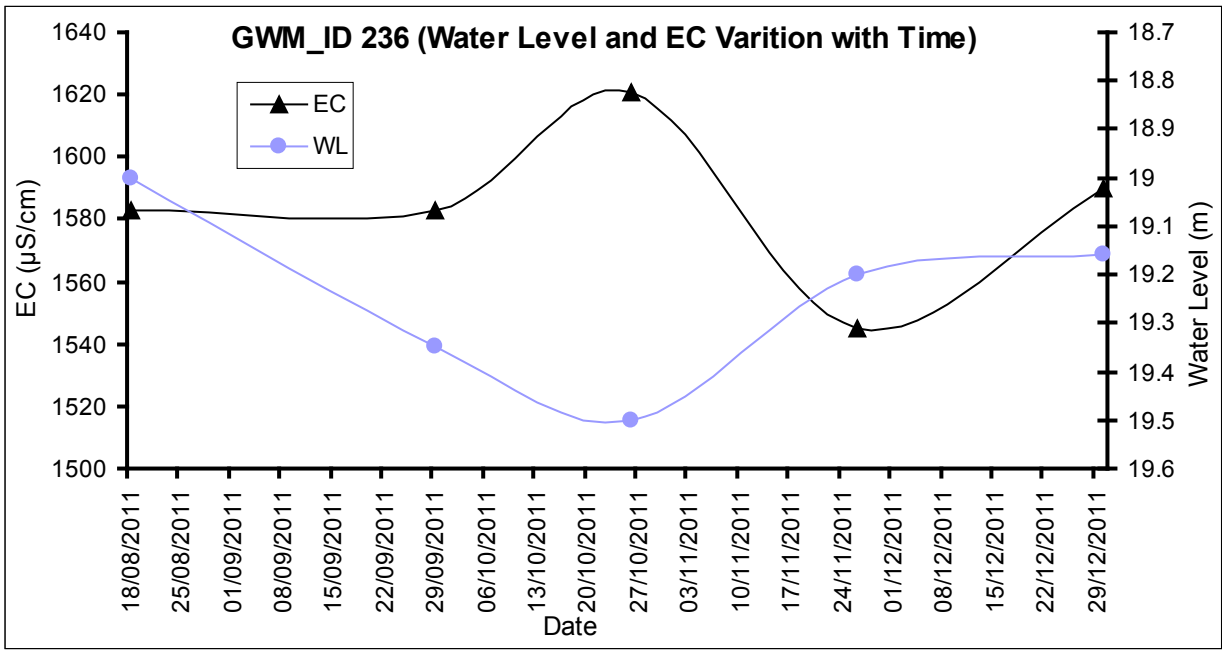


Watertype	Na-Mg-Ca-HCO3-SO4	
Temperature (°C)	23.4	
pH	7.31	
Conductivity	1558	uS/cm
Sum of Anions	14.76379	meq/L
Sum of Cations	14.82985	meq/L
Balance	0.2232303	%

Comparison to Seawater

Ratios

	mg/l
Ca/Mg	1.083636
Ca/SO4	0.2709091
Na/Cl	4.714286



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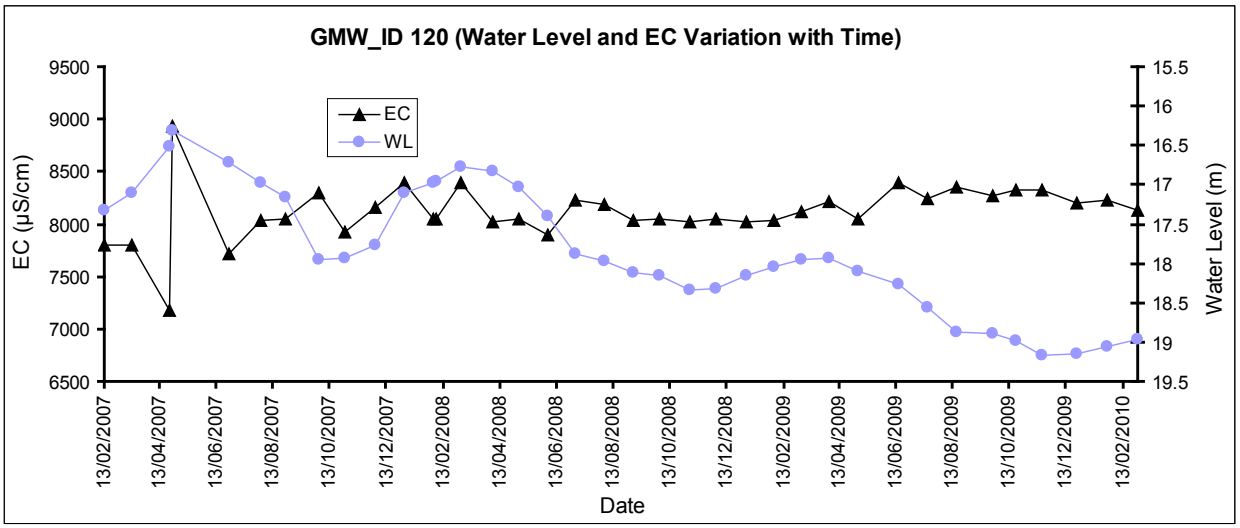
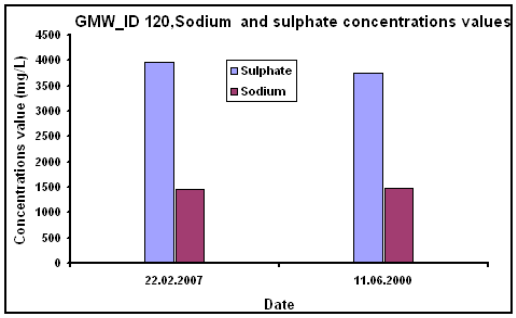
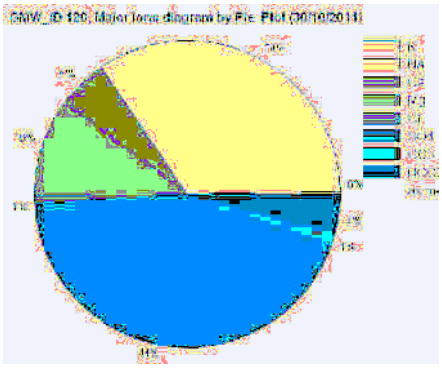
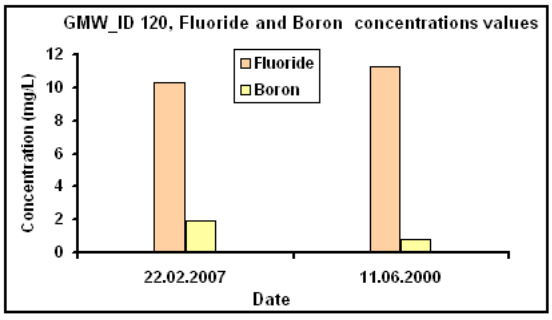
Baghlan GMW_ID 120



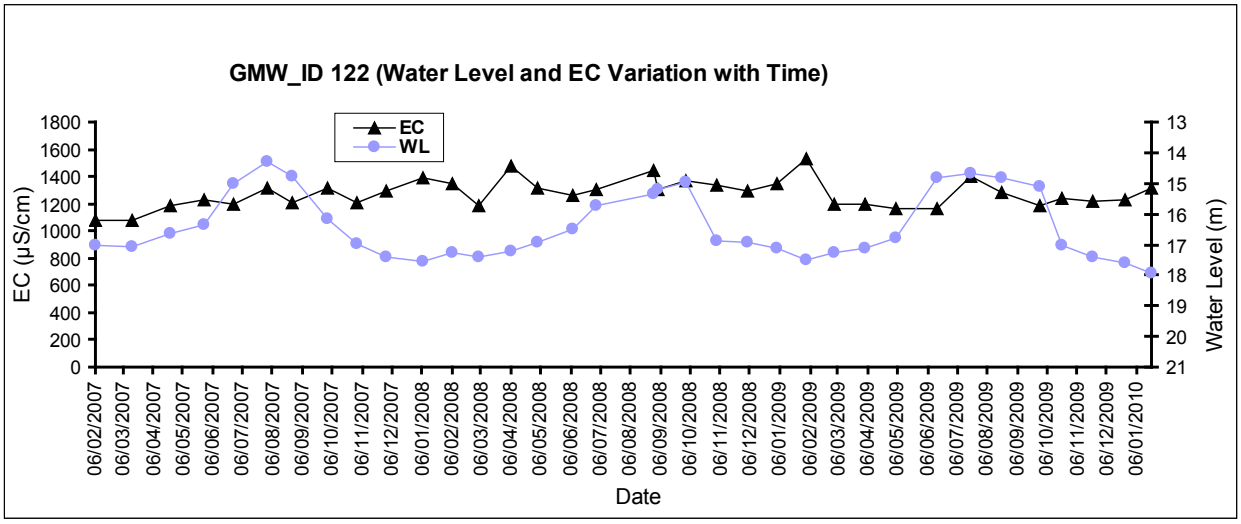


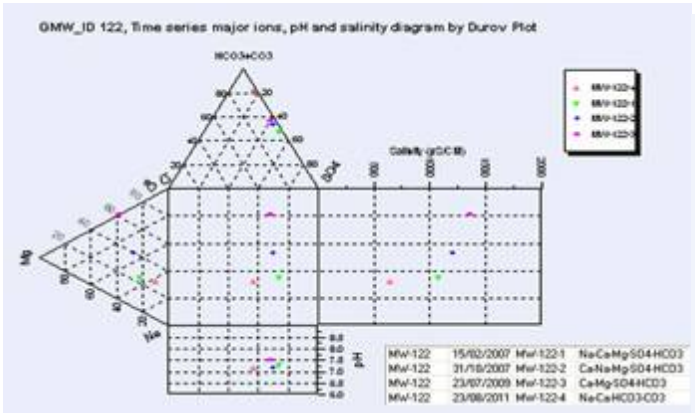
Watertype	Na-Mg-SO4	
Temperature (°C)	22.2	
pH	7.71	
Conductivity	7930	uS/cm
Sum of Anions	94.33777	meq/L
Sum of Cations	94.99921	meq/L
Balance	0.3493483	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.8333333	
Ca/SO4	5.050505E-02	
Na/Cl	28.61539	
Cl/Br		

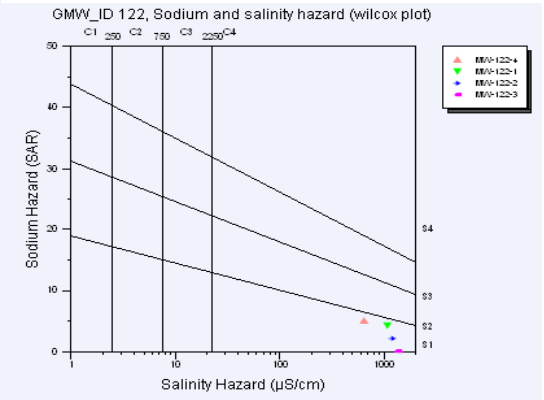




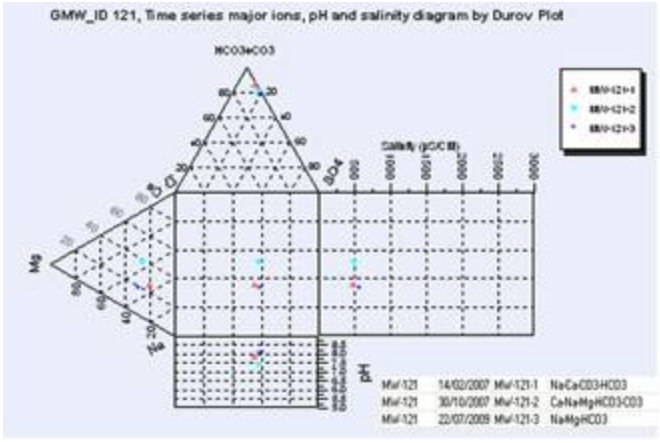
Baghlan GMW_ID 122

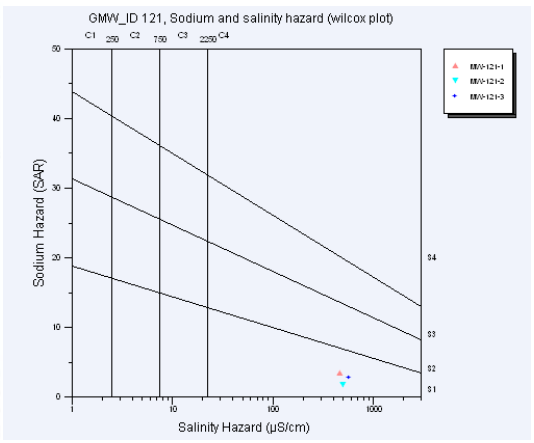


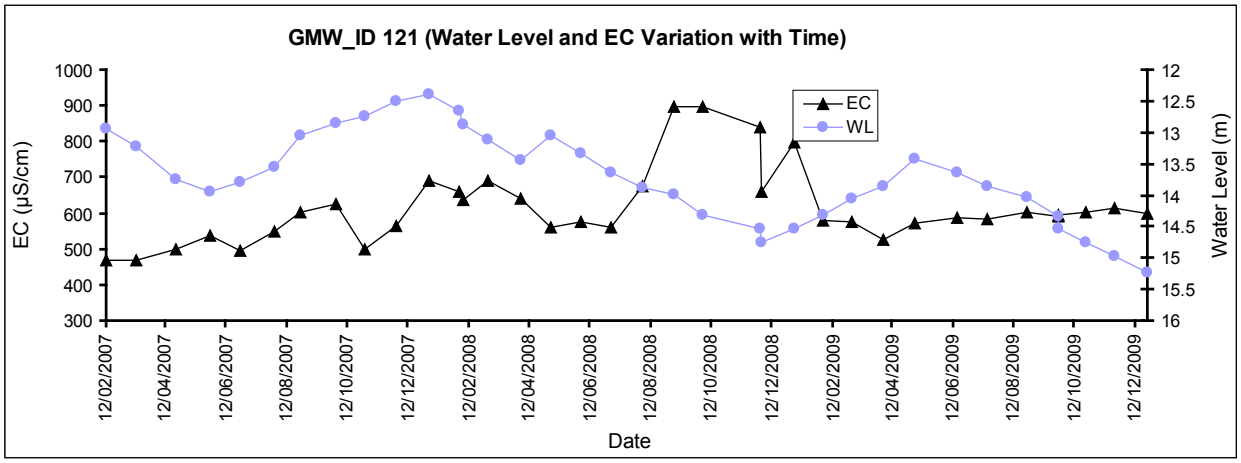




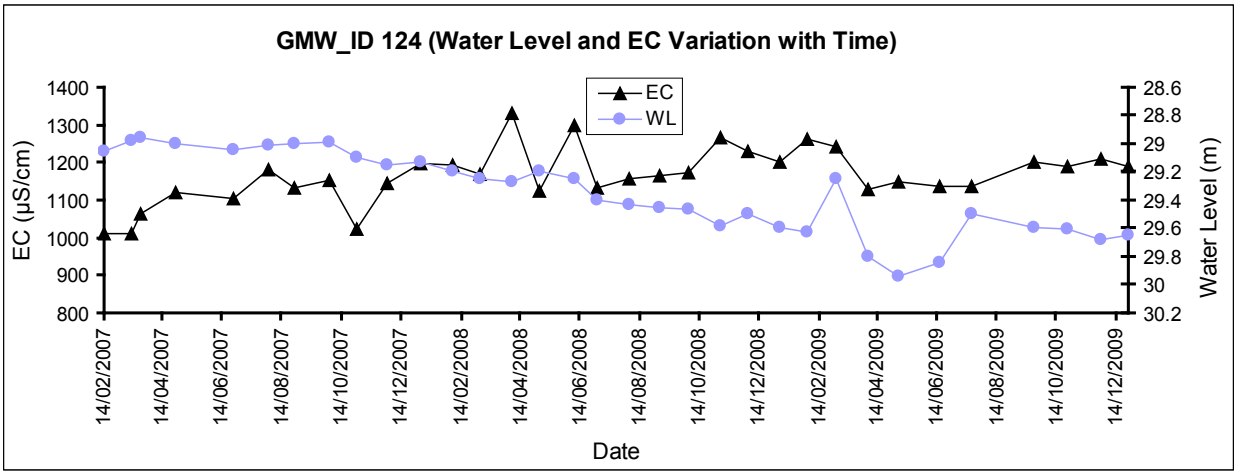
Baghlan GMW_ID 121

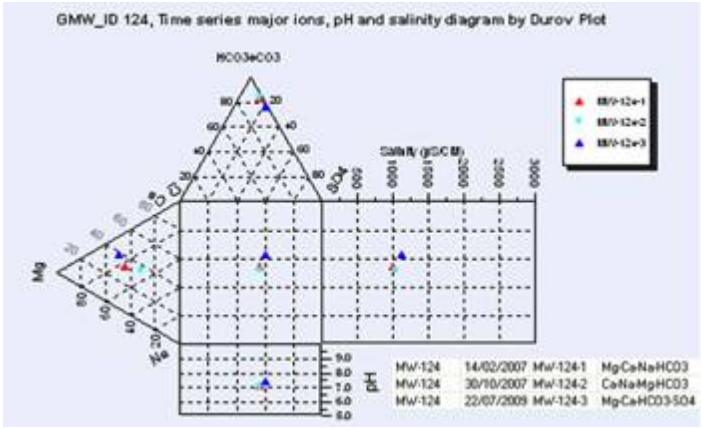


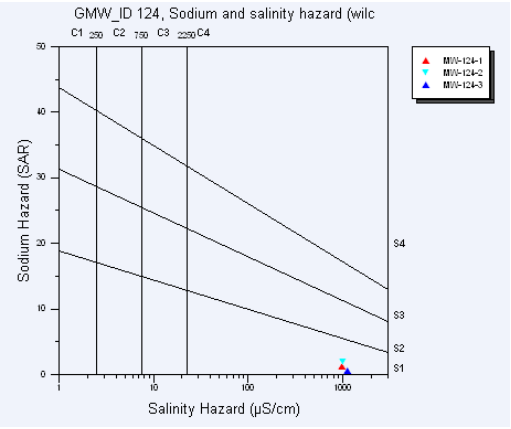




Baghlan GMW_ID 124







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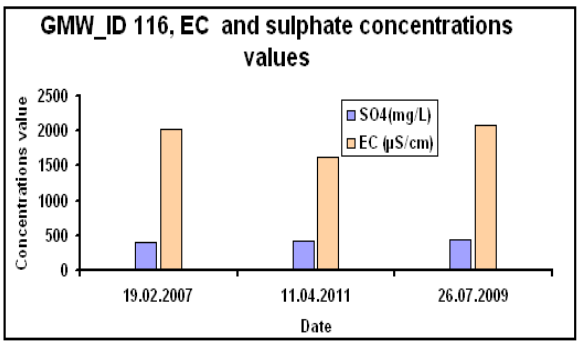
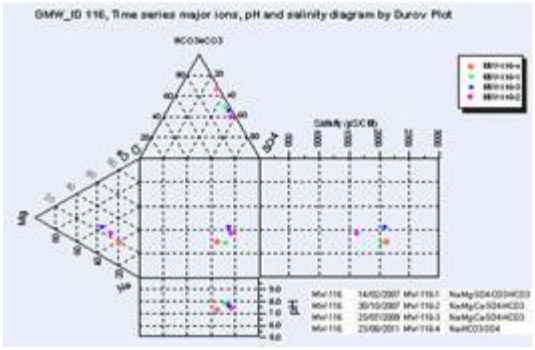
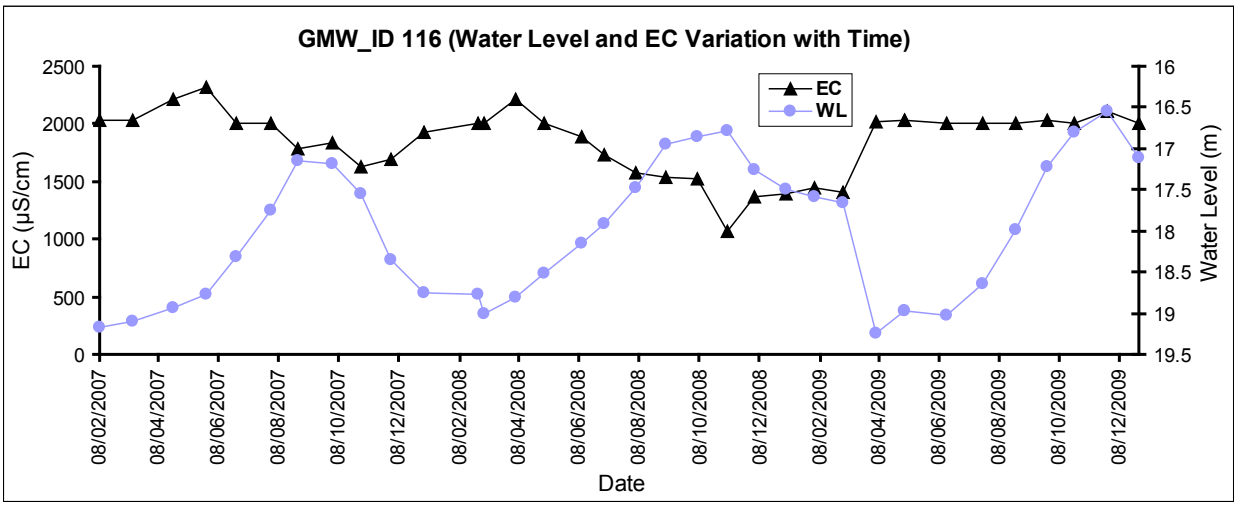
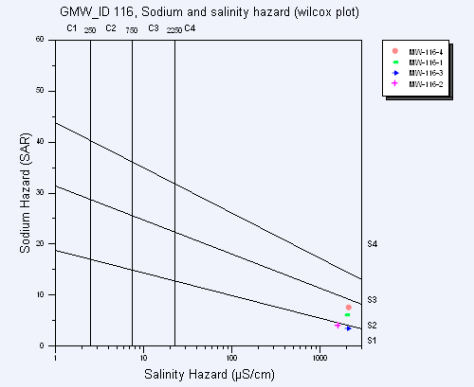
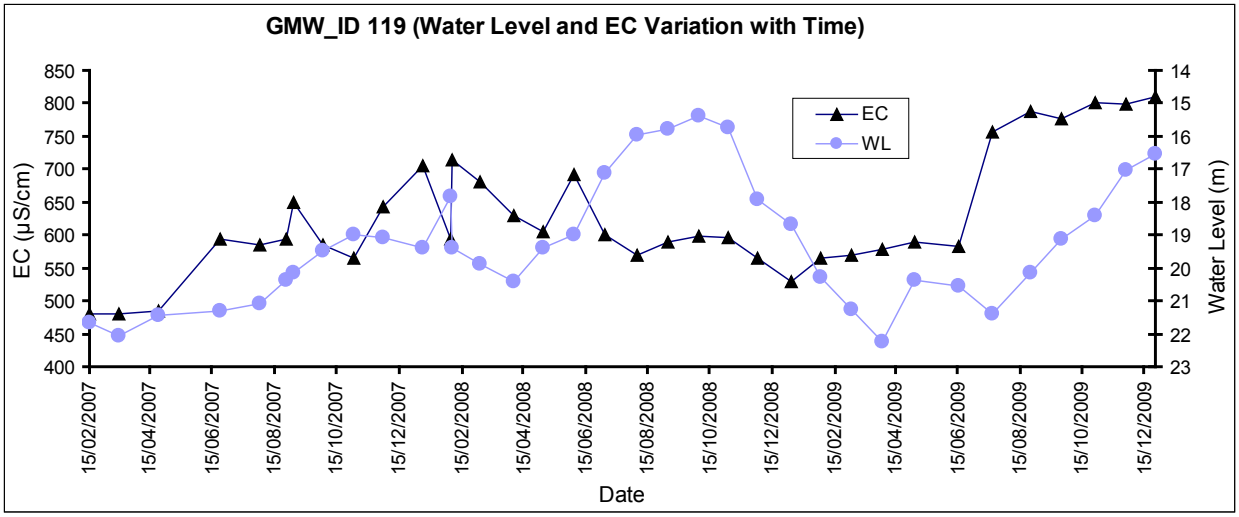


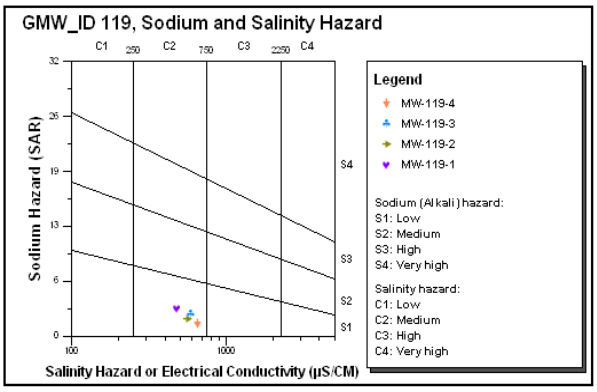


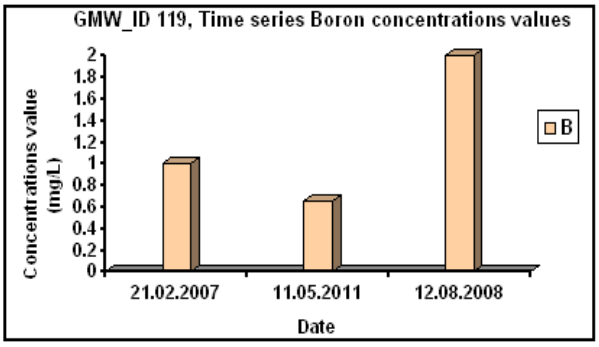


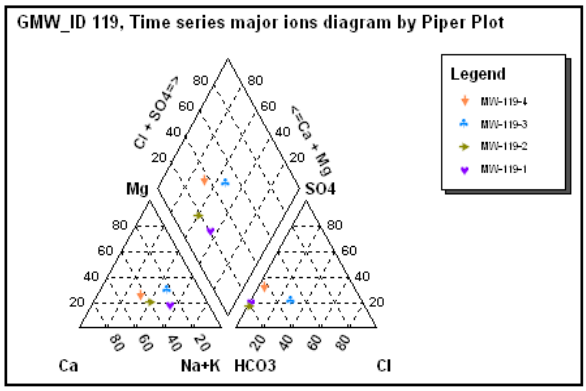


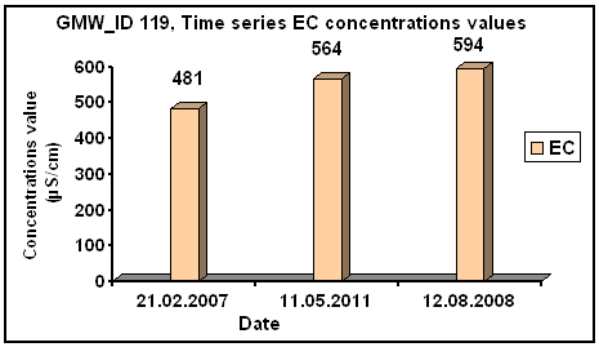
Baghlan GMW_ID 119



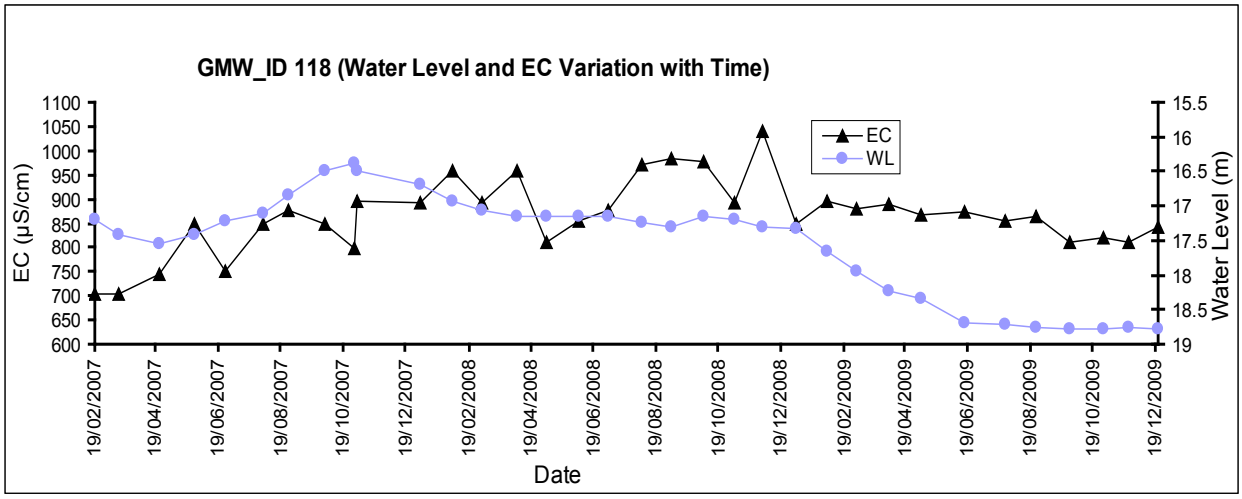


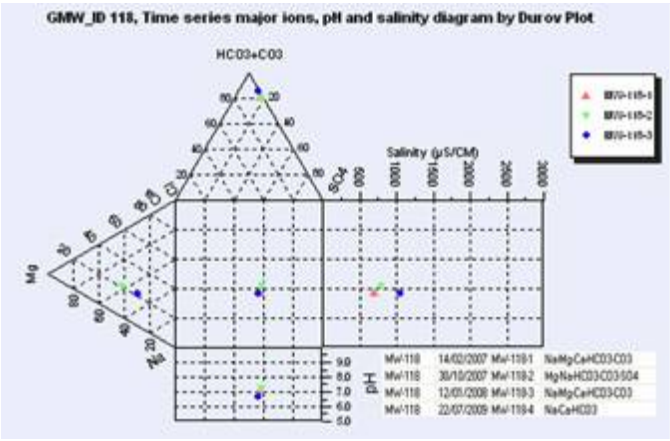


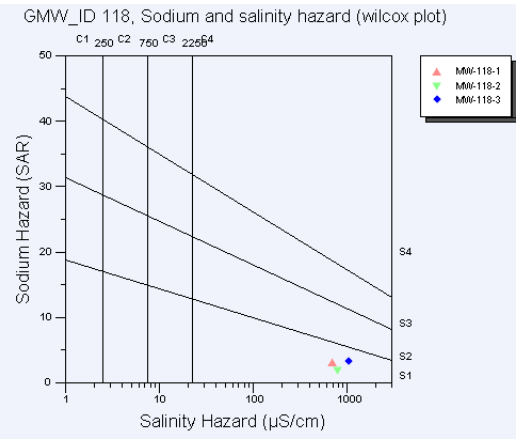




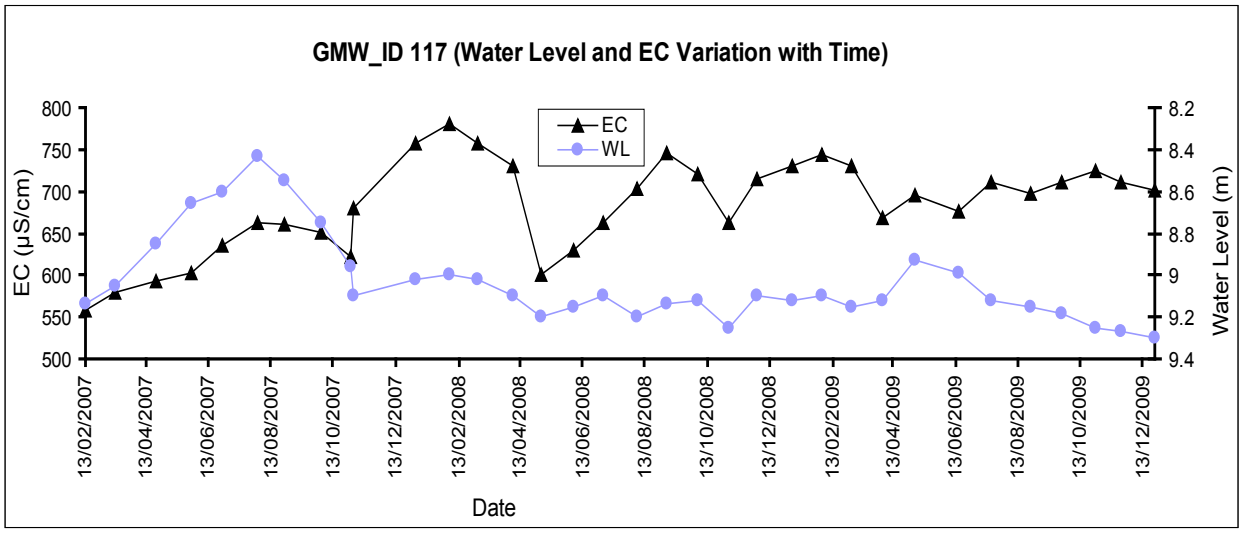
Baghlan GMW_ID 118

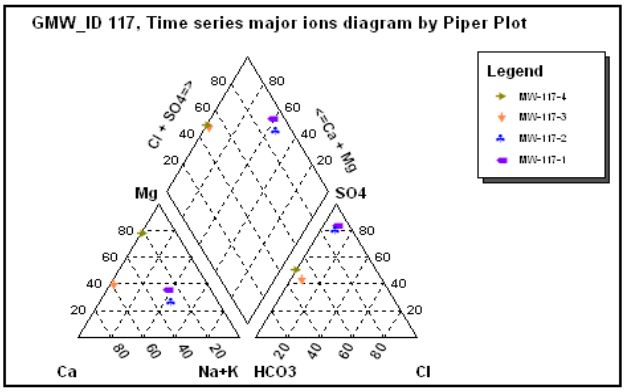


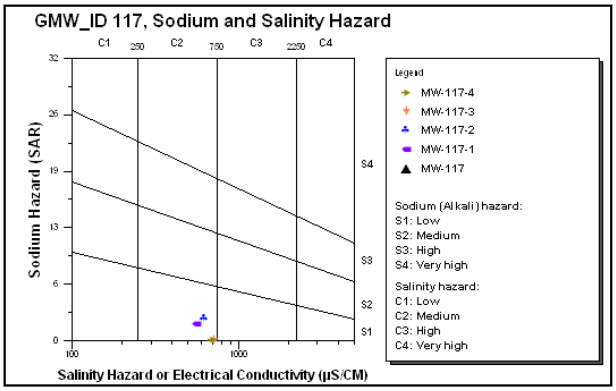


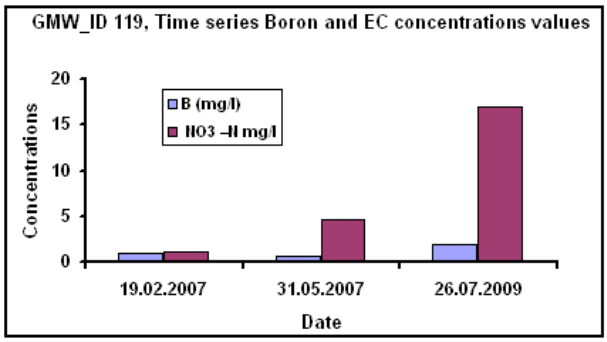


Baghlan GMW_ID 117

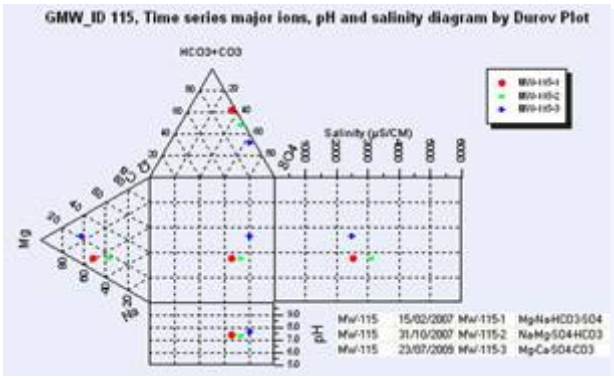


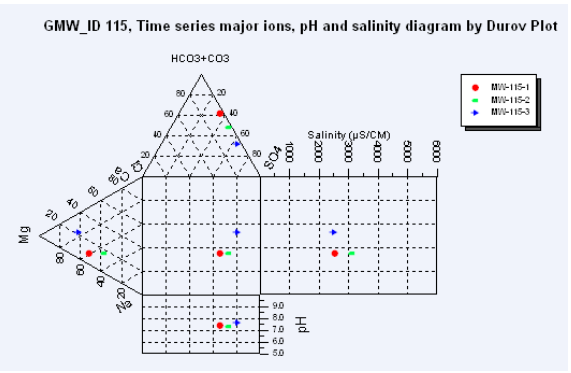


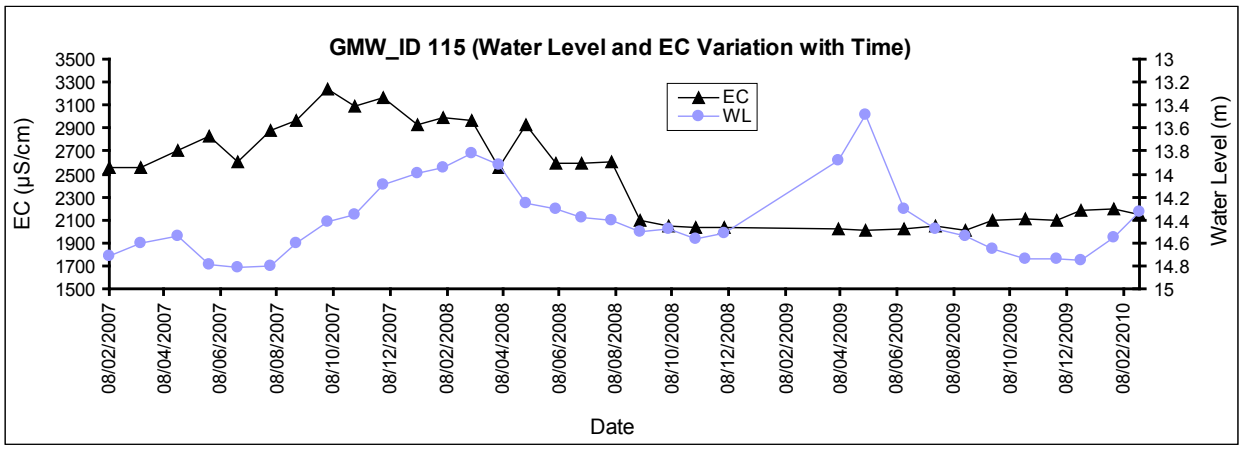


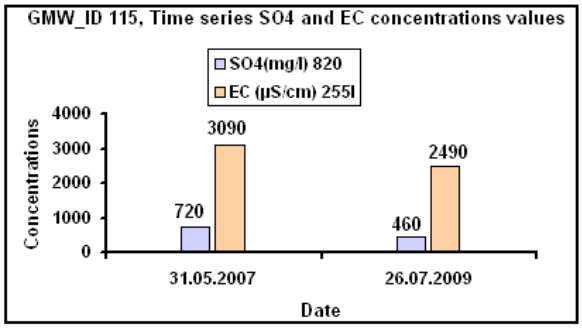


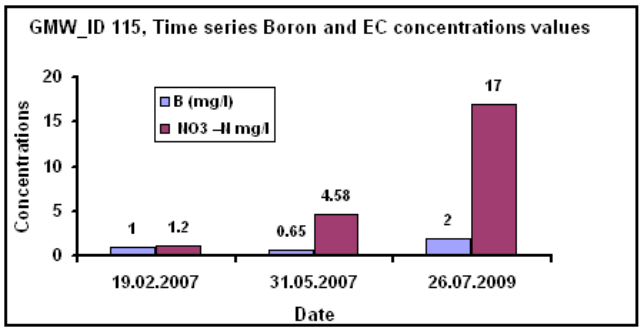
Baghlan GMW_ID 115



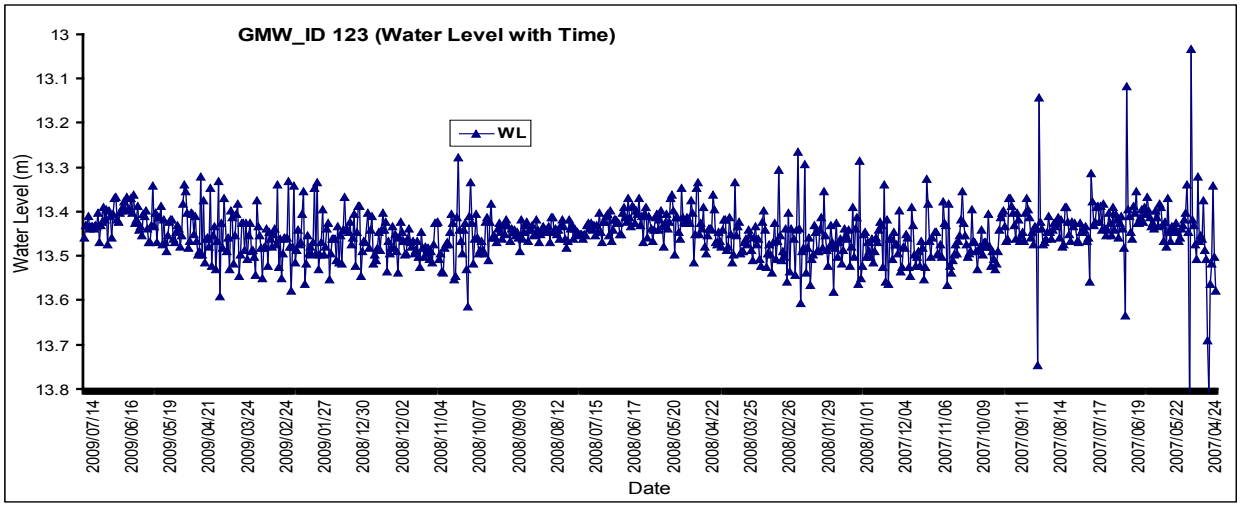


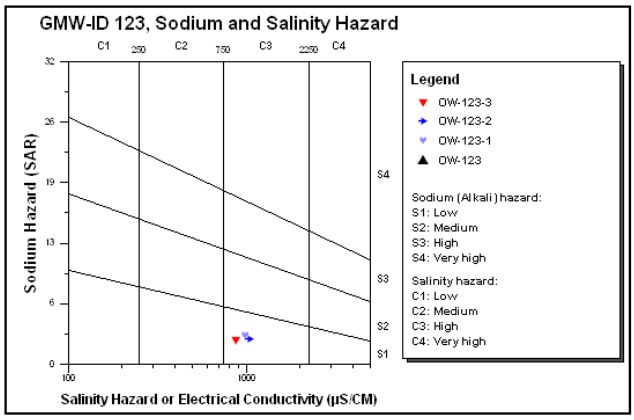


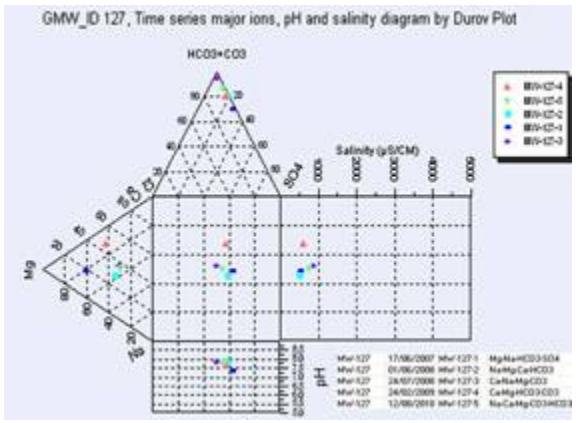




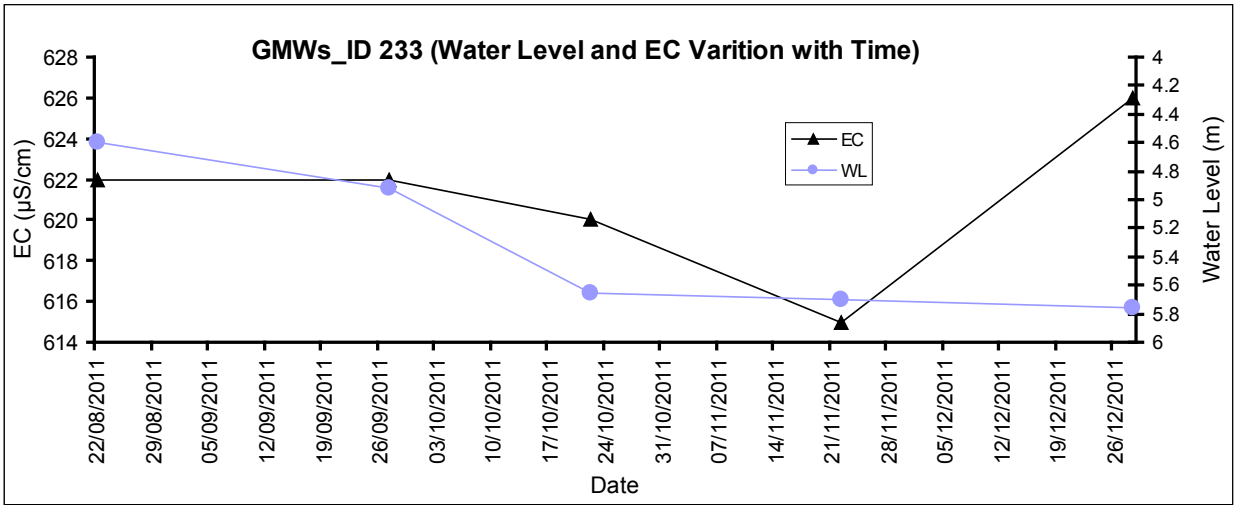
Baghlan GMW_ID 123

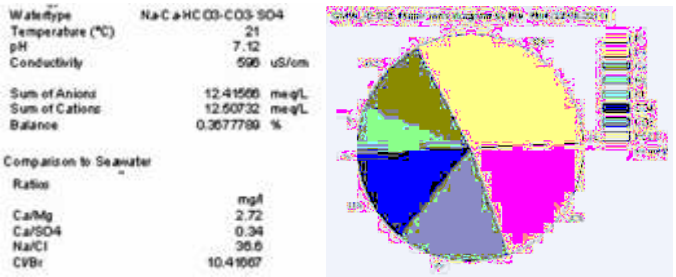




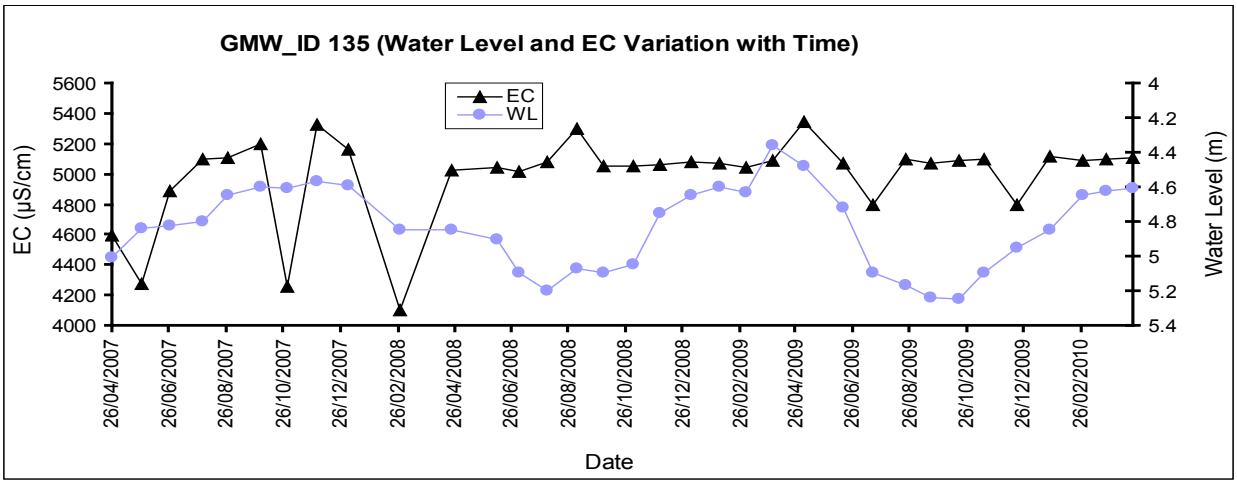


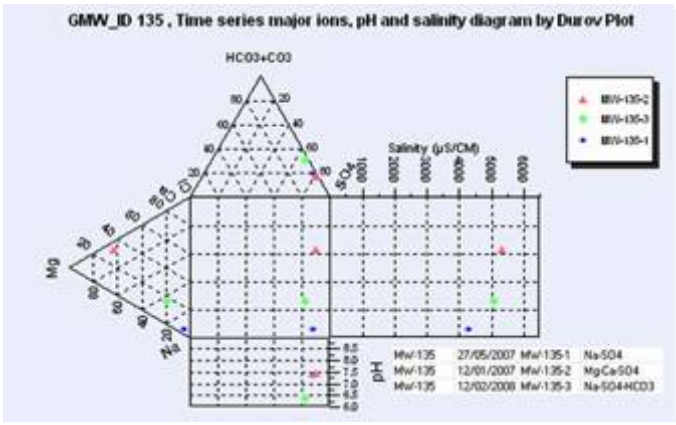
Baghlan GMW_ID 233

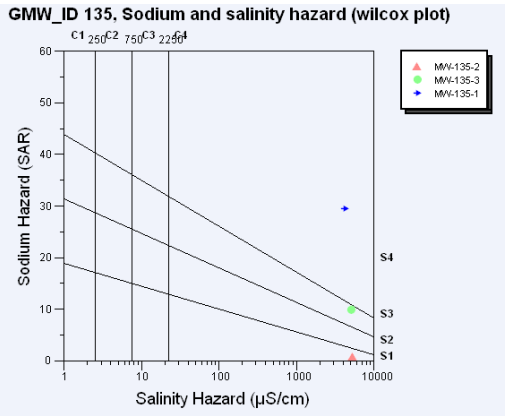


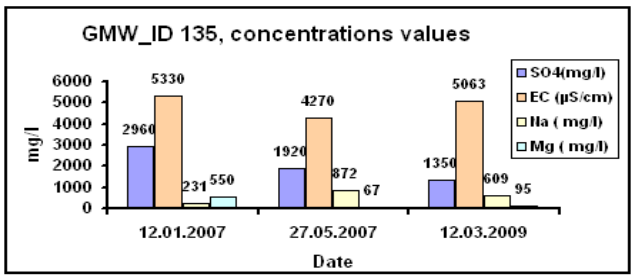


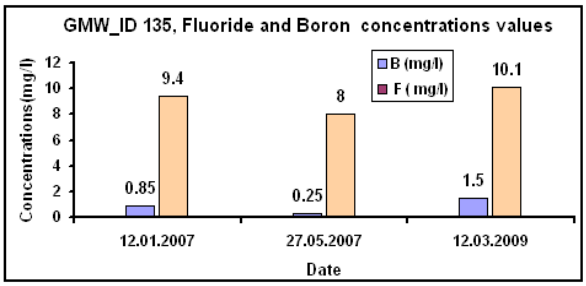
Kunduz
GMW_ID 135



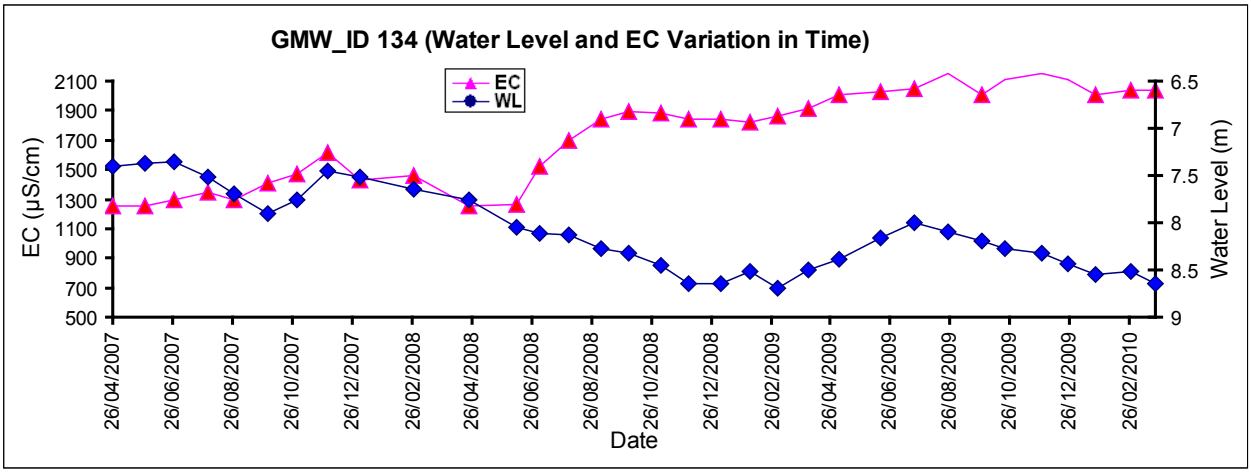


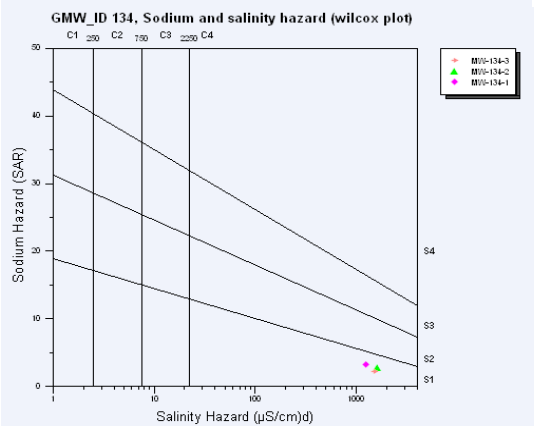


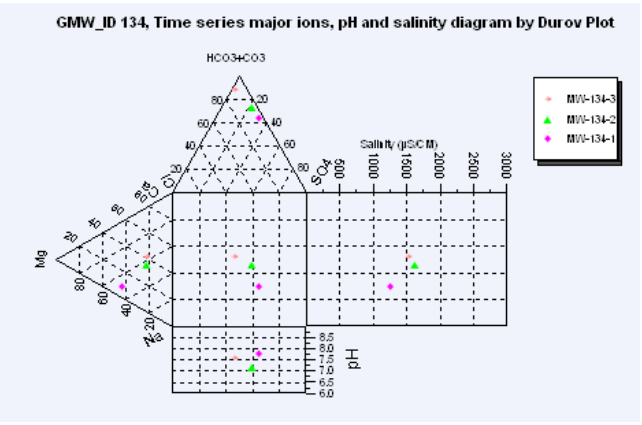


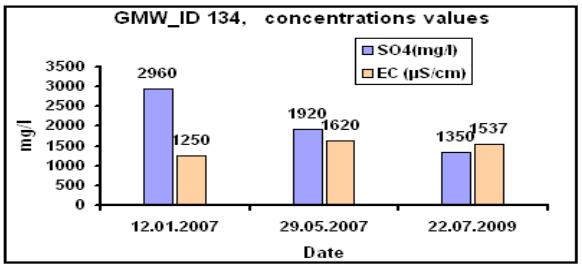


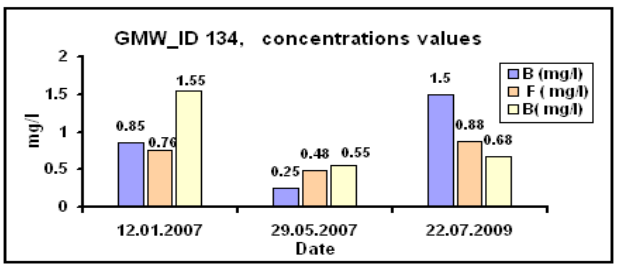
GMW_ID 134


GMW_ID 134 (Water Level and EC Variation in Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

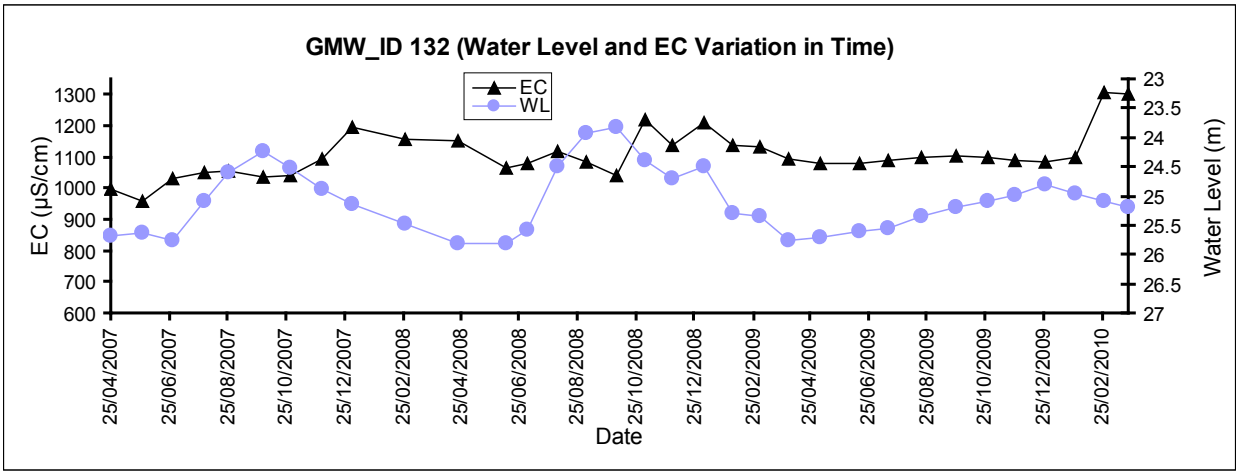

GMW_ID 134, Sodium and salinity hazard (wilcox plot)
Sodium Hazard (SAR)
Salinity Hazard (µS/cm)d)

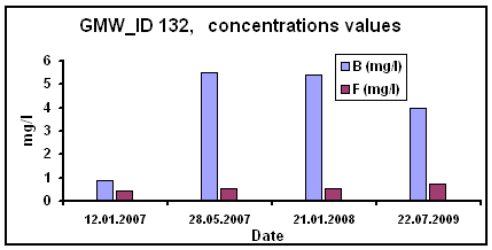

GMW_ID 134, Time series major ions, pH and salinity diagram by Durov Plot
HCO3+CO3
Salinity (µS/CM)
pH


GMW_ID 134, concentrations values
SO4(mg/l)
EC (µS/cm)
mg/l
2960
1250
1920
1620
1350
1537
12.01.2007
29.05.2007
22.07.2009
Date

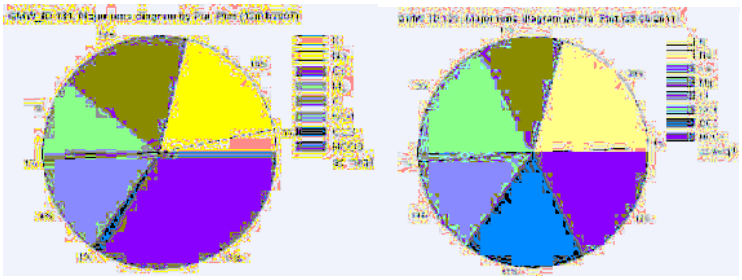

GMW_ID 134, concentrations values
B (mg/l)
F (mg/l)
B(mg/l)
mg/l
0.85
0.76
1.55
0.25
0.48
0.55
1.5
0.88
0.68
12.01.2007
29.05.2007
22.07.2009
Date

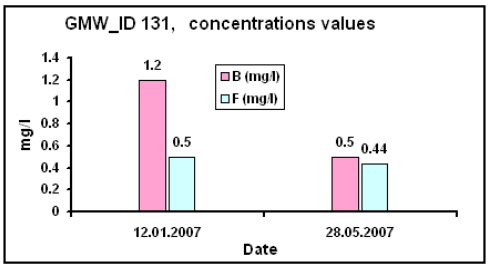
GMW_ID 132

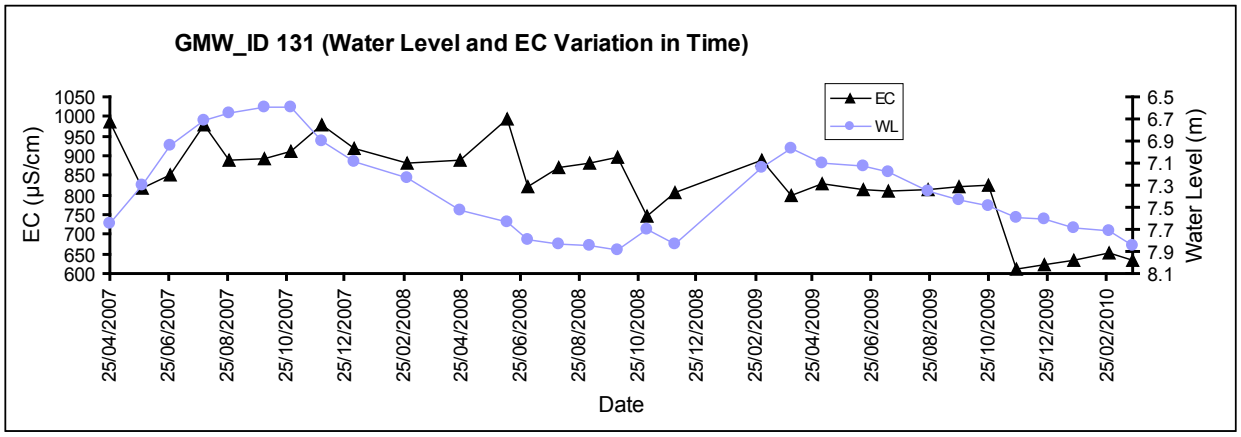




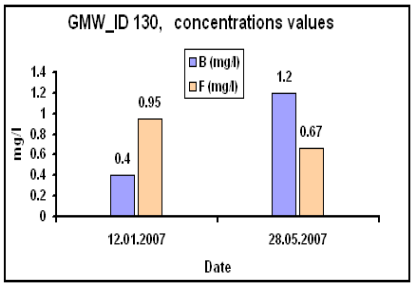
GMW_ID 131

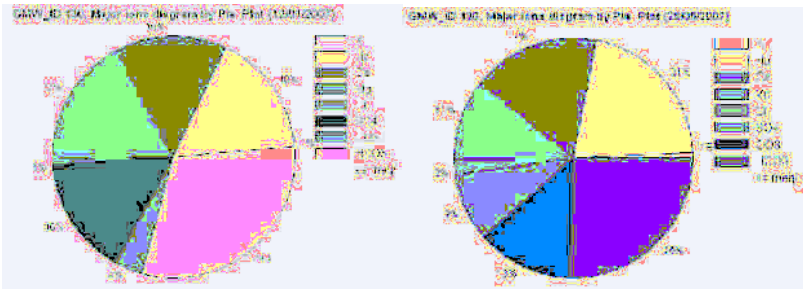


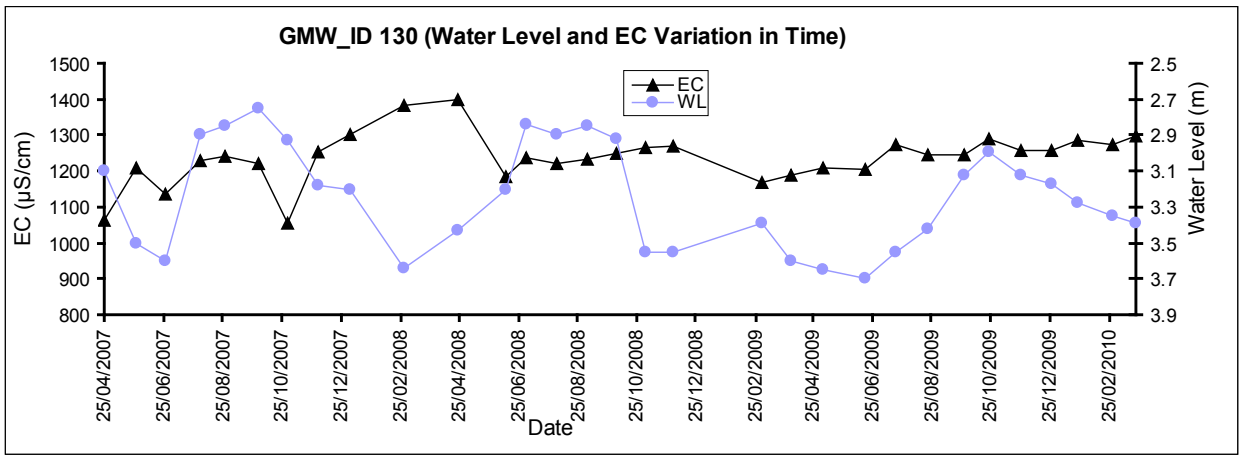




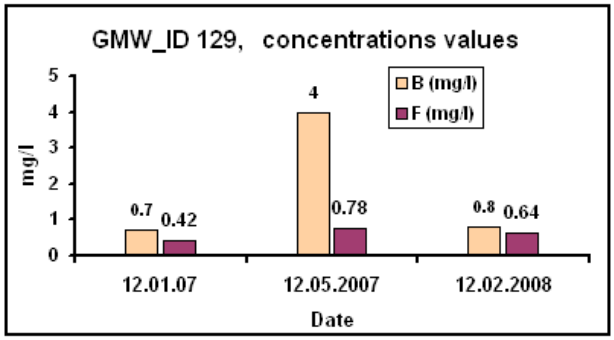
Kunduz GMW_ID 130

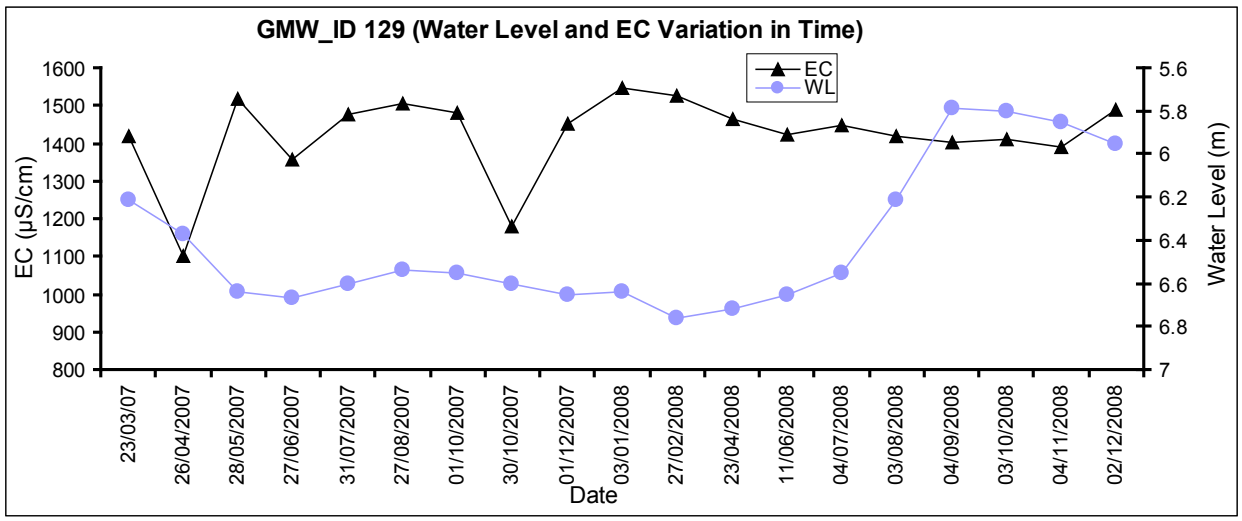


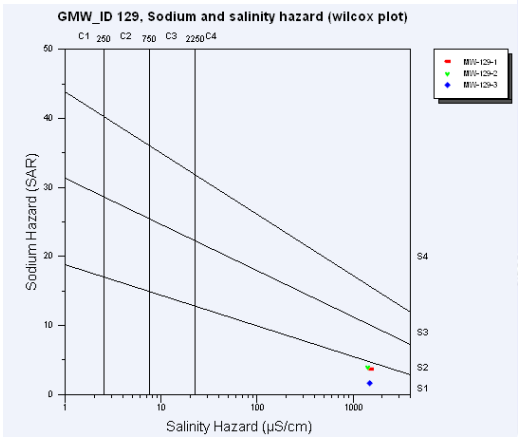


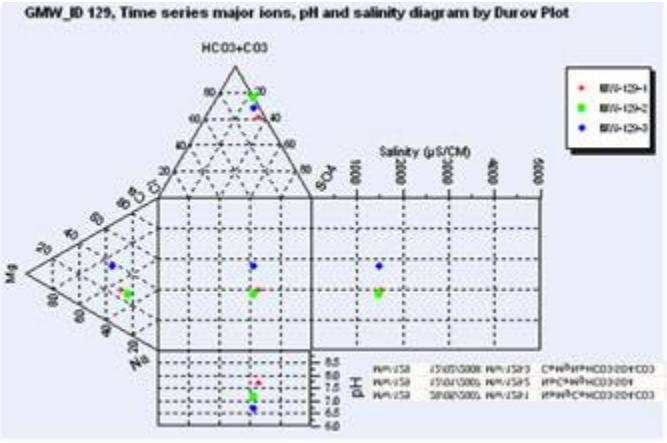


Kunduz GMW_ID 129

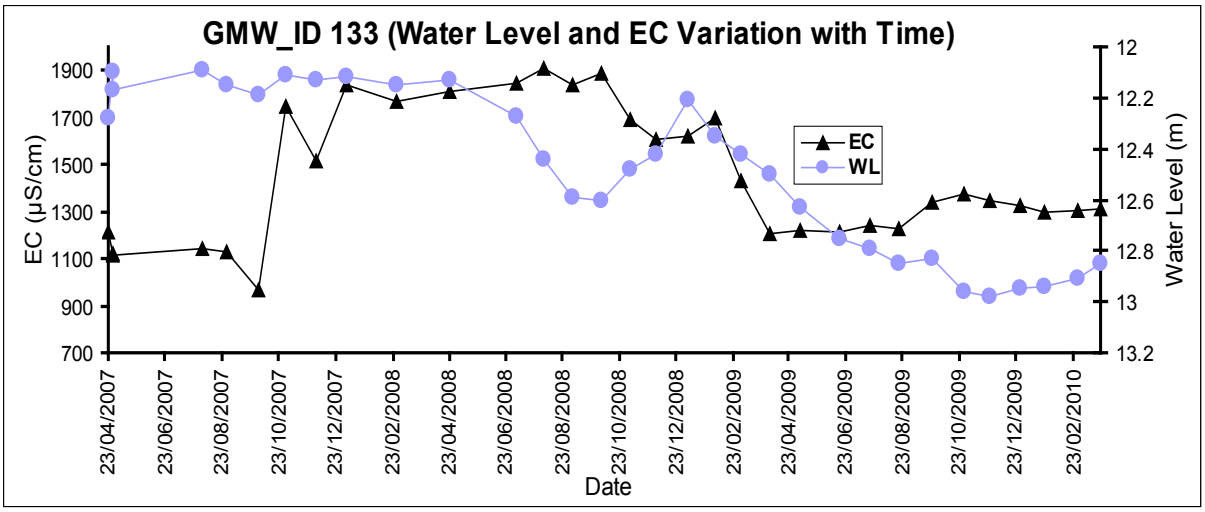


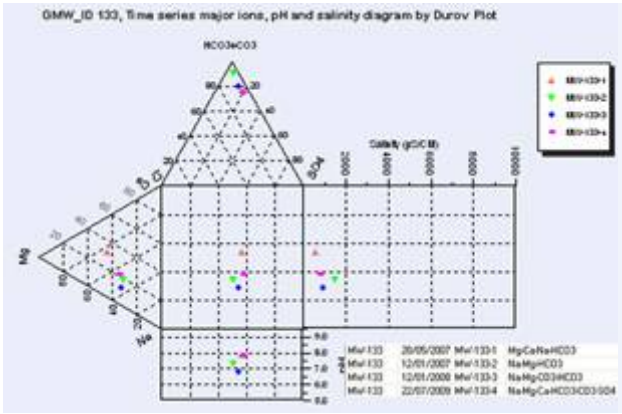


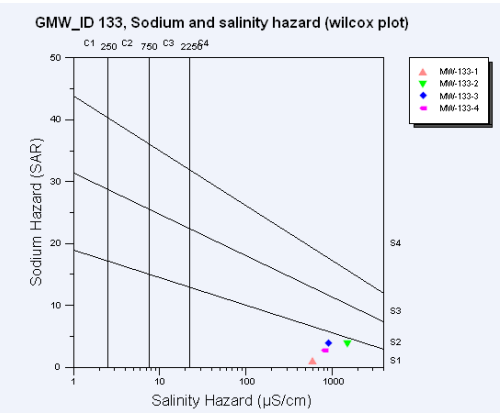

GMW_ID 129, Sodium and salinity hazard (wilcox plot)
Sodium Hazard (SAR)
Salinity Hazard (µS/cm)
S1
S2
S3
S4

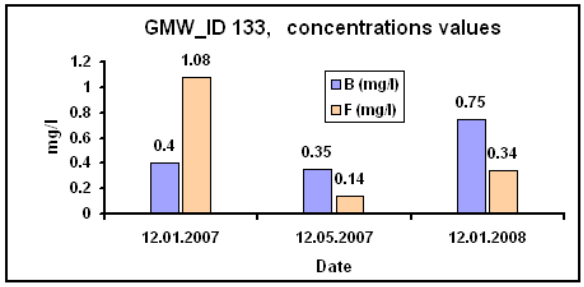

GMW_ID 129, Time series major ions, pH and salinity diagram by Durov Plot
HCO3+CO3
Salinity (µS/CM)
pH

GMW_ID 133

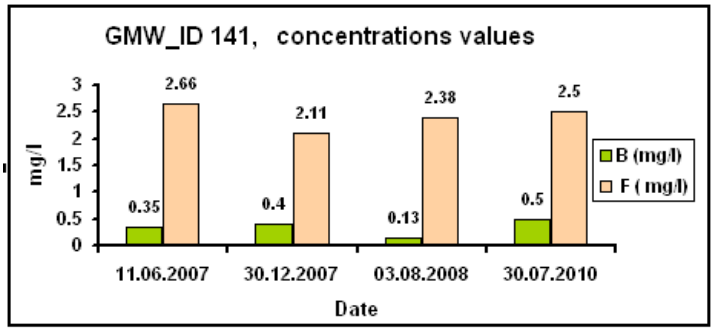

GMW_ID 133 (Water Level and EC Variation with Time)
EC (µS/cm)
Water Level (m)
EC
WL
Date

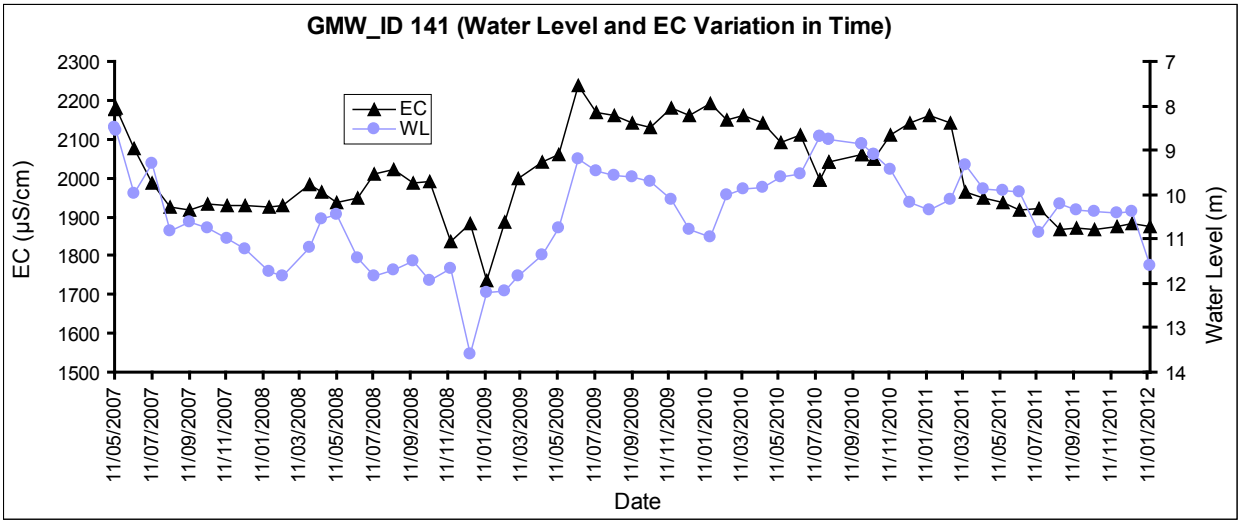

GMW_ID 133, Time series major ions, pH and salinity diagram by Durov Plot

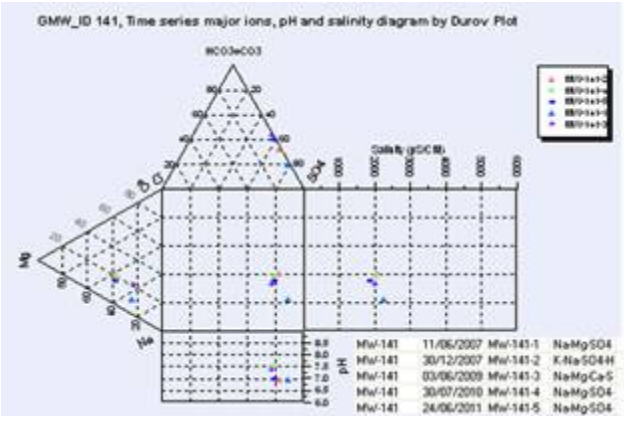

GMW_ID 133, Sodium and salinity hazard (wilcox plot)
Sodium Hazard (SAR)
Salinity Hazard (µS/cm)
S1
S2
S3
S4

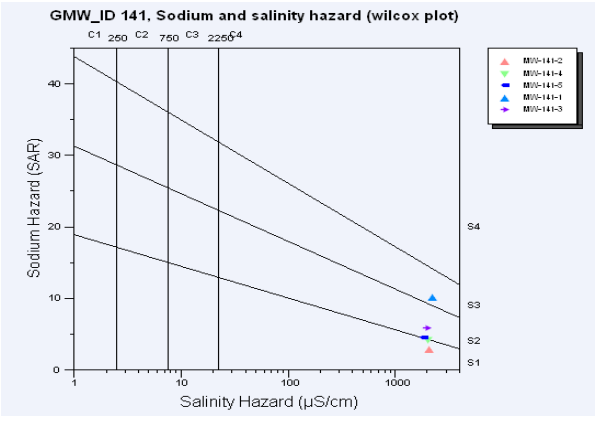

GMW_ID 133, concentrations values
mg/l
B (mg/l)
F (mg/l)
0.4
1.08
0.35
0.14
0.75
0.34
12.01.2007
12.05.2007
12.01.2008
Date

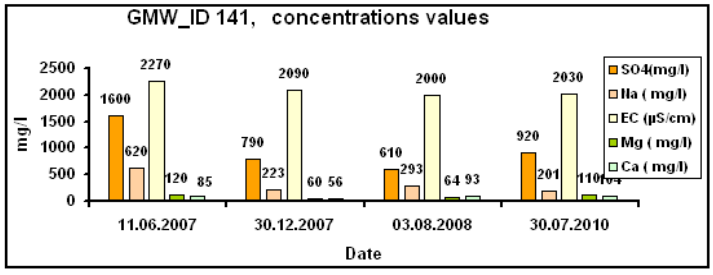
Badghis
GMW_ID 141



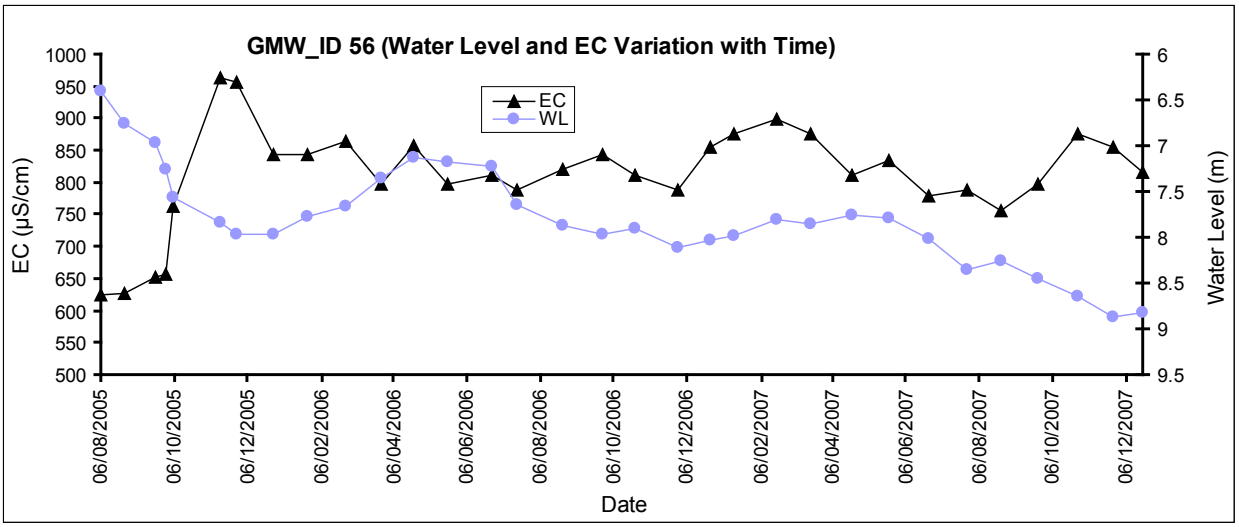


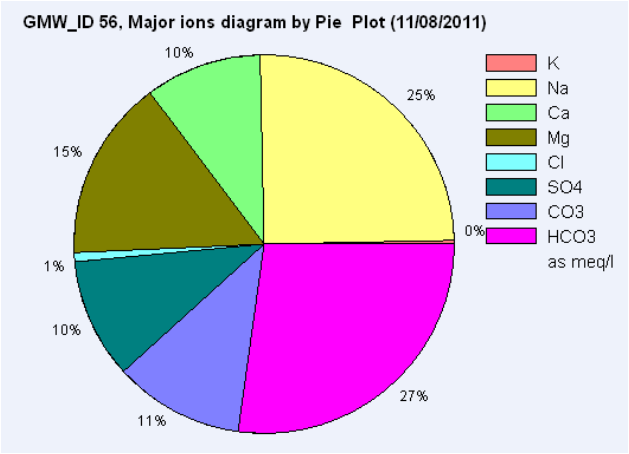






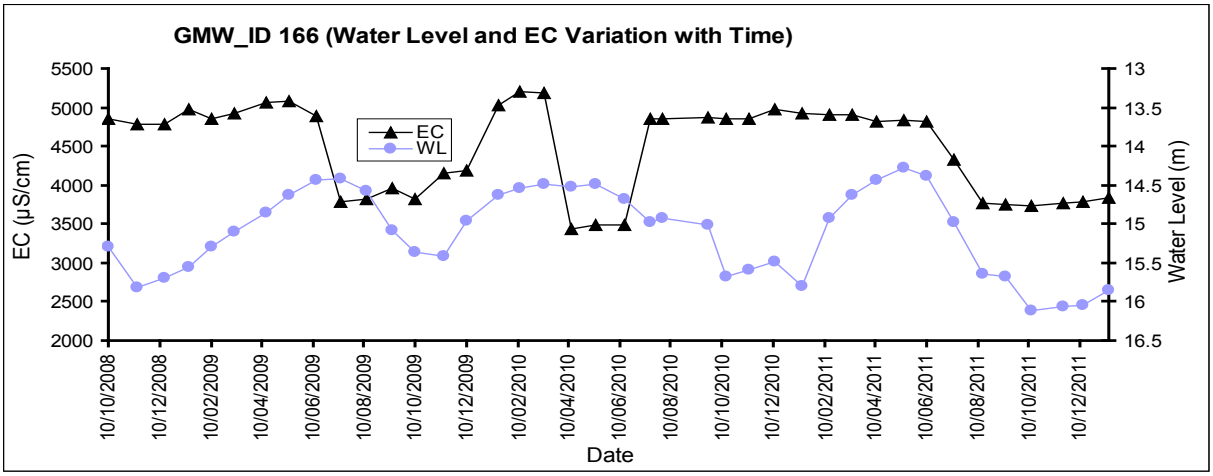
GMW_ID 56

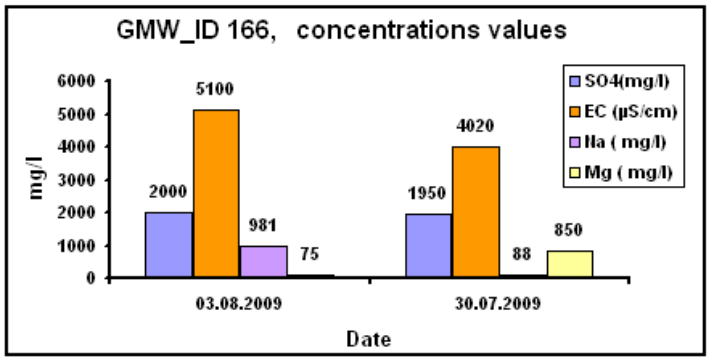


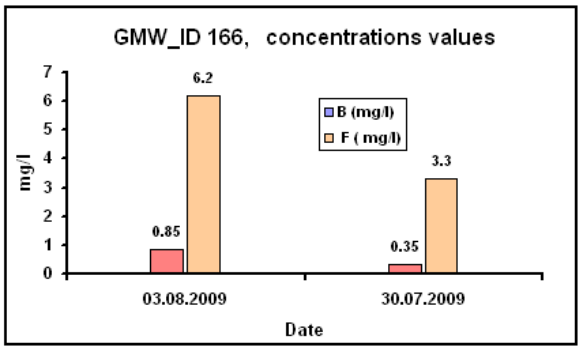


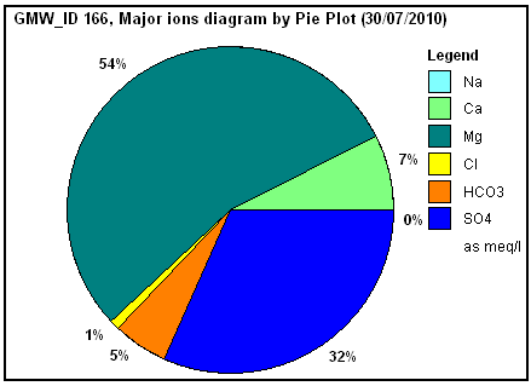
Watertype	Na-Mg-HCO3-CO3-SO4	
Temperature (°C)	19	
pH	8.13	
Conductivity	828	uS/cm
Sum of Anions	8.985768	meq/L
Sum of Cations	9.193686	meq/L
Balance	1.143699	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.058824	
Ca/SO4	0.4044944	
Na/Cl	20.8	
Cl/Br		

GMW_ID 166

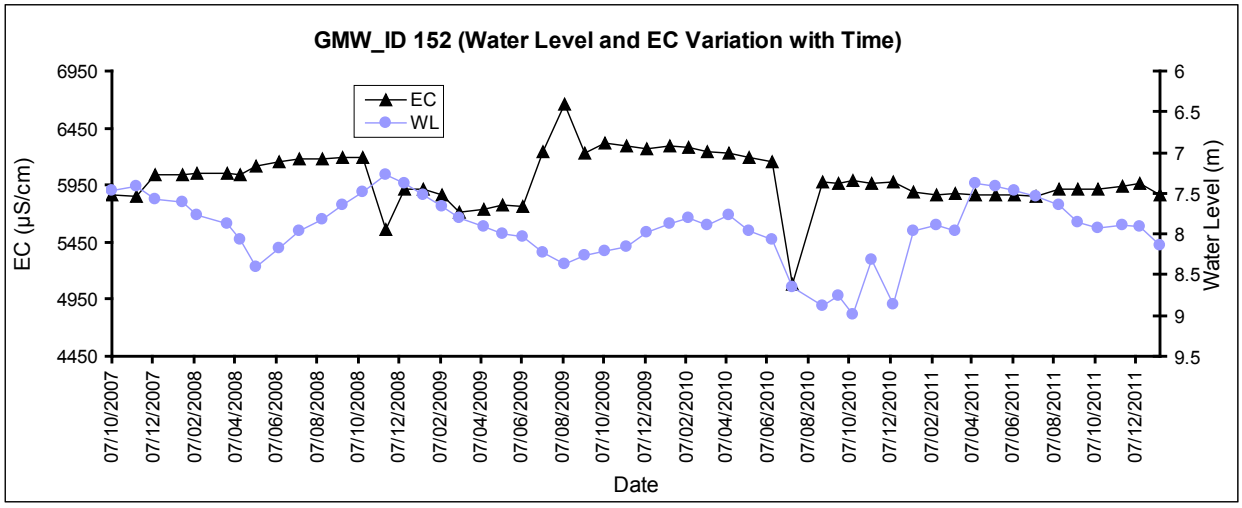


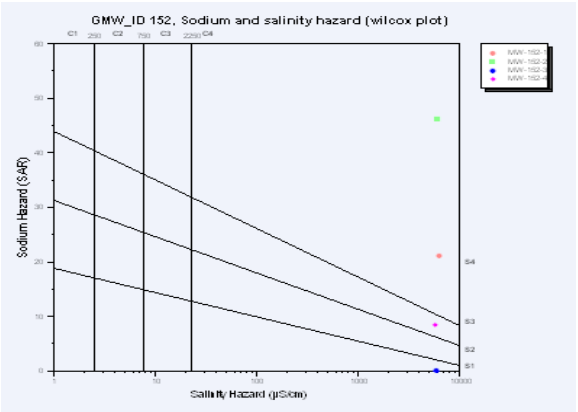

GMW_ID 166, concentrations values
mg/l
6000
5000
4000
3000
2000
1000
0
5100
2000
981
75
4020
1950
88
850
SO4(mg/l)
EC (µS/cm)
Na (mg/l)
Mg (mg/l)
03.08.2009
30.07.2009
Date

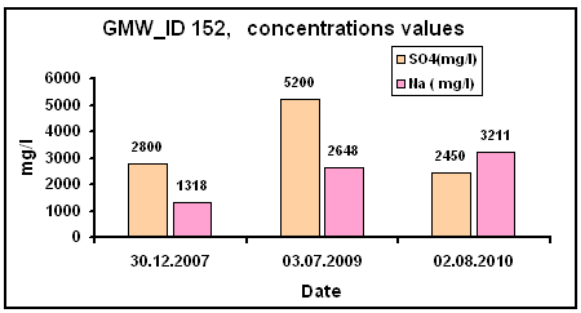

GMW_ID 166, concentrations values
mg/l
7
6
5
4
3
2
1
0
6.2
0.85
3.3
0.35
B (mg/l)
F (mg/l)
03.08.2009
30.07.2009
Date

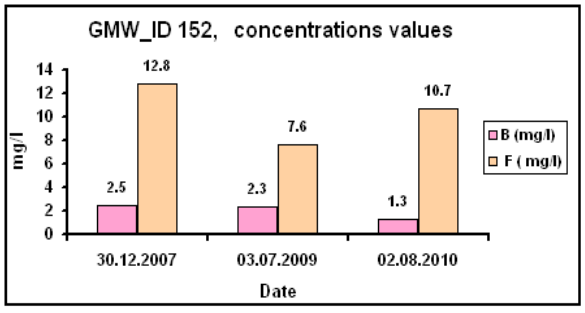

GMW_ID 166, Major ions diagram by Pie Plot (30/07/2010)
54%
7%
0%
1%
5%
32%
Legend
Na
Ca
Mg
Cl
HCO3
SO4
as meq/l

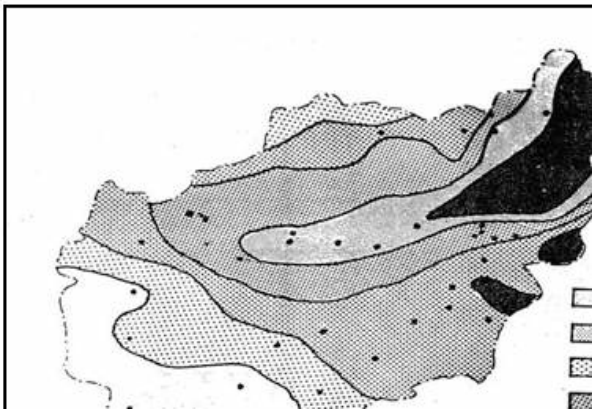
GMW_ID 152


GMW_ID 152 (Water Level and EC Variation with Time)
EC (µS/cm)
6950
6450
5950
5450
4950
4450
Water Level (m)
6
6.5
7
7.5
8
8.5
9
9.5
EC
WL
07/10/2007
07/12/2007
07/02/2008
07/04/2008
07/06/2008
07/08/2008
07/10/2008
07/12/2008
07/02/2009
07/04/2009
07/06/2009
07/08/2009
07/10/2009
07/12/2009
07/02/2010
07/04/2010
07/06/2010
07/08/2010
07/10/2010
07/12/2010
07/02/2011
07/04/2011
07/06/2011
07/08/2011
07/10/2011
07/12/2011
Date

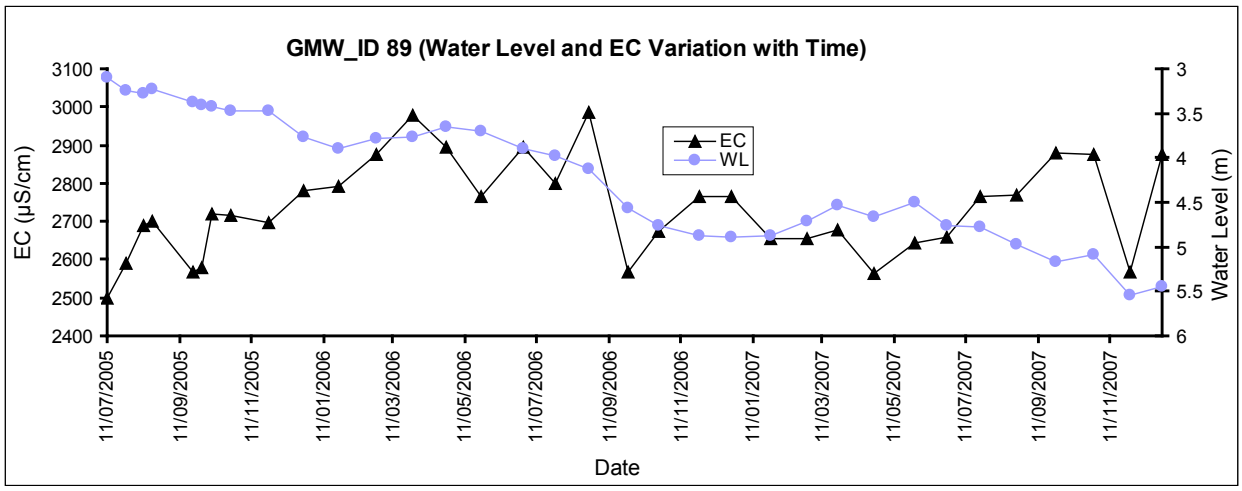

GMW_ID 152, Sodium and salinity hazard (wilcox plot)
Sodium Hazard (SAR)
Salinity Hazard (µS/cm)

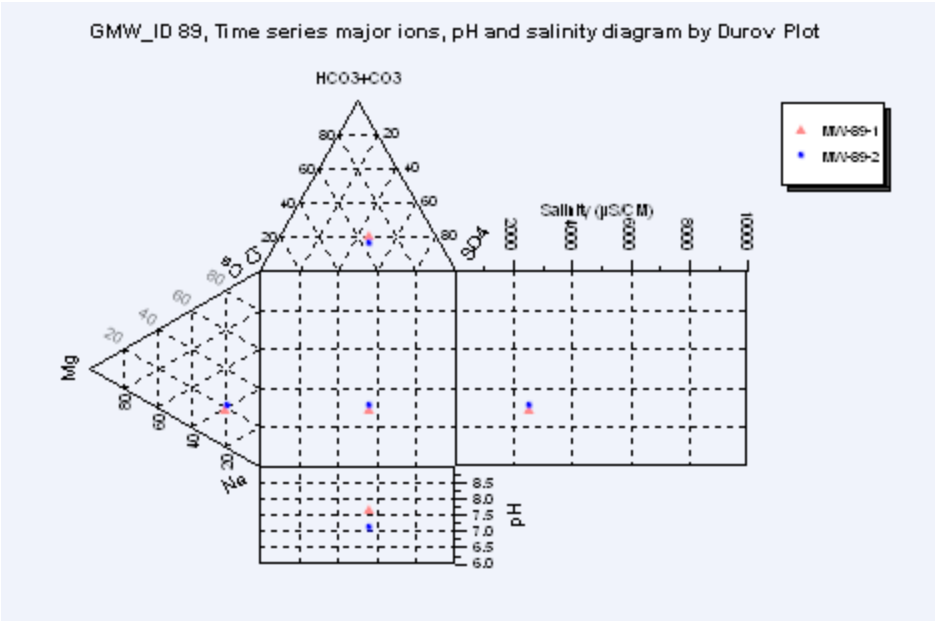

GMW_ID 152, concentrations values
mg/l
6000
5000
4000
3000
2000
1000
0
2800
1318
5200
2648
2450
3211
SO4(mg/l)
Na (mg/l)
30.12.2007
03.07.2009
02.08.2010
Date

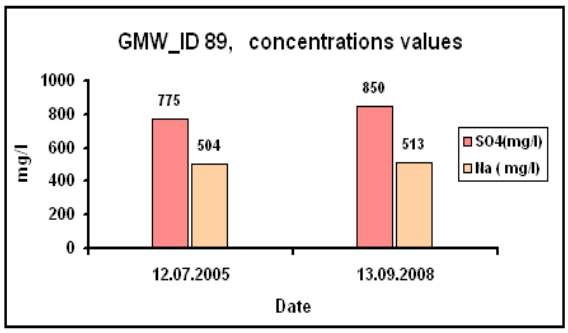

GMW_ID 152, concentrations values
mg/l
14
12
10
8
6
4
2
0
12.8
2.5
7.6
2.3
10.7
1.3
B (mg/l)
F (mg/l)
30.12.2007
03.07.2009
02.08.2010
Date

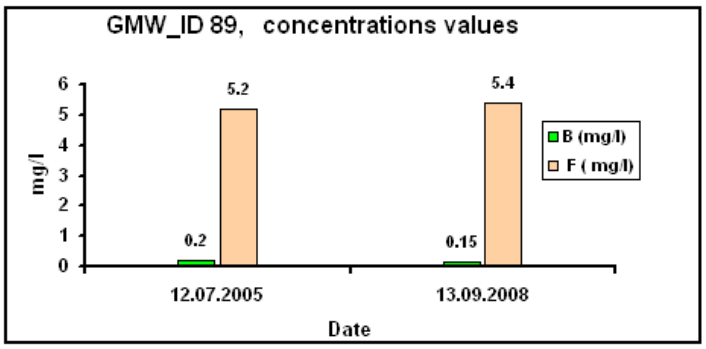


GMW_ID 89

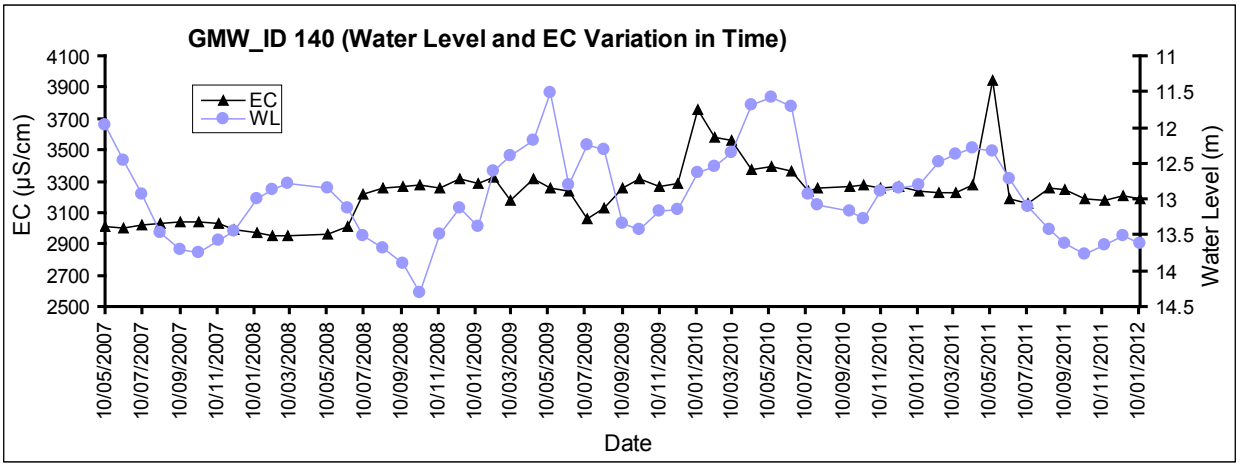

GMW_ID 89 (Water Level and EC Variation with Time)
EC (µS/cm)
3100
3000
2900
2800
2700
2600
2500
2400
EC
WL
Water Level (m)
3
3.5
4
4.5
5
5.5
6
11/07/2005
11/09/2005
11/11/2005
11/01/2006
11/03/2006
11/05/2006
11/07/2006
11/09/2006
11/11/2006
11/01/2007
11/03/2007
11/05/2007
11/07/2007
11/09/2007
11/11/2007
Date

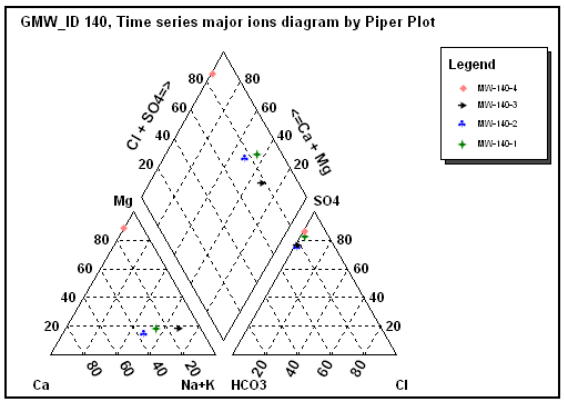

GMW_ID 89, Time series major ions, pH and salinity diagram by Durov Plot
HCO3+CO3
Salinity (µS/cm)
Mg
Na
pH
MW-89-1
MW-89-2

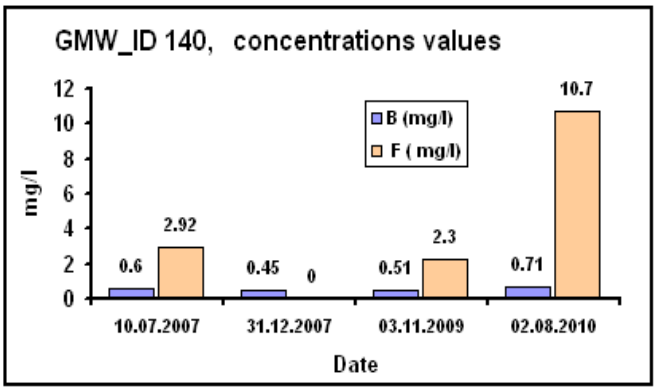

GMW_ID 89, concentrations values
mg/l
1000
800
600
400
200
0
775
504
850
513
SO4(mg/l)
Na (mg/l)
12.07.2005
13.09.2008
Date

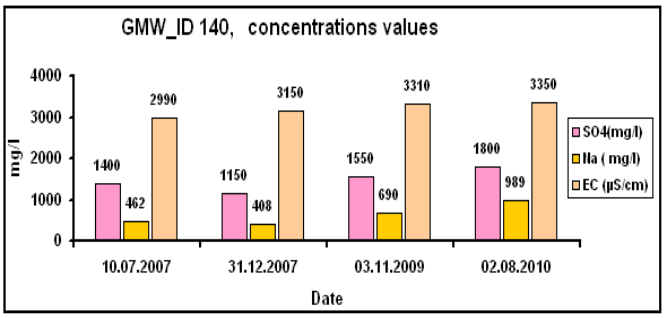

GMW_ID 89, concentrations values
mg/l
6
5
4
3
2
1
0
0.2
5.2
0.15
5.4
B (mg/l)
F (mg/l)
12.07.2005
13.09.2008
Date

GMW_ID 140

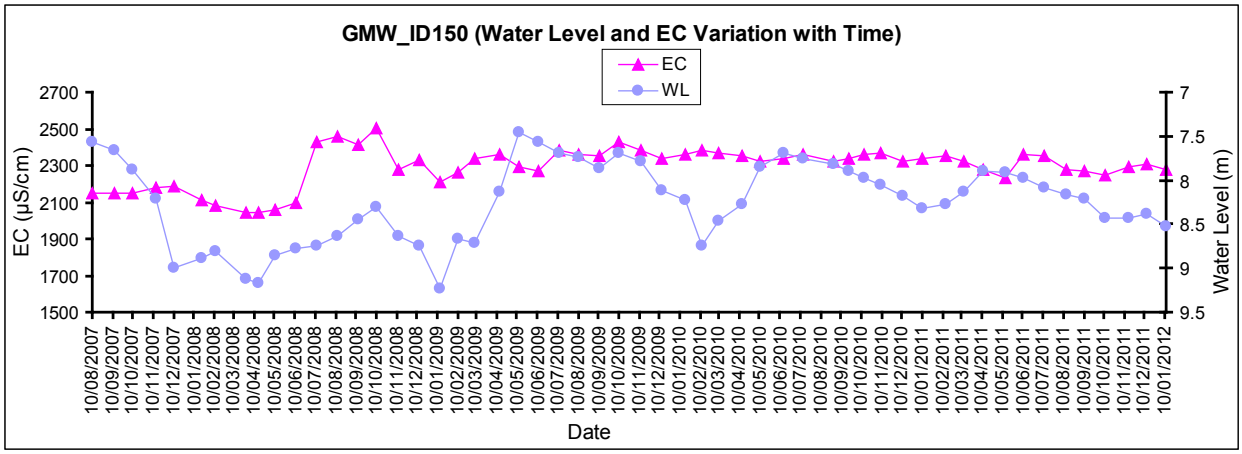

GMW_ID 140 (Water Level and EC Variation in Time)
EC (µS/cm)
4100
3900
3700
3500
3300
3100
2900
2700
2500
EC
WL
Water Level (m)
11
11.5
12
12.5
13
13.5
14
14.5
10/05/2007
10/07/2007
10/09/2007
10/11/2007
10/01/2008
10/03/2008
10/05/2008
10/07/2008
10/09/2008
10/11/2008
10/01/2009
10/03/2009
10/05/2009
10/07/2009
10/09/2009
10/11/2009
10/01/2010
10/03/2010
10/05/2010
10/07/2010
10/09/2010
10/11/2010
10/01/2011
10/03/2011
10/05/2011
10/07/2011
10/09/2011
10/11/2011
10/01/2012
Date

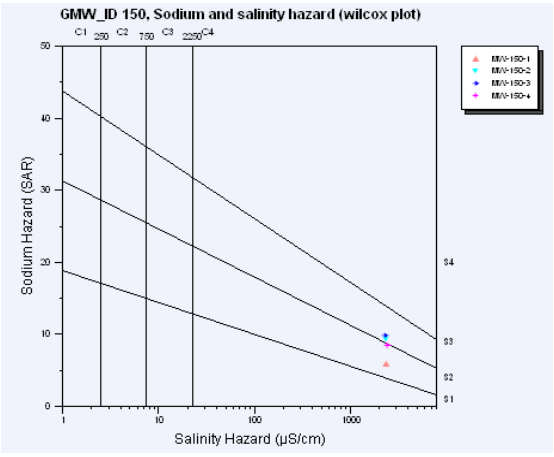

GMW_ID 140, Time series major ions diagram by Piper Plot
Legend
MW-140-4
MW-140-3
MW-140-2
MW-140-1
Cl + SO4=>
<=Ca + Mg
Mg
SO4
Ca
Na+K
HCO3
Cl

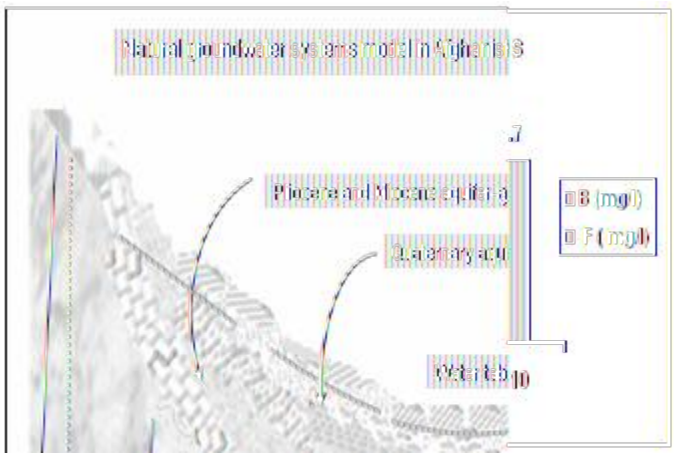

GMW_ID 140, concentrations values
mg/l
12
10
8
6
4
2
0
0.6
2.92
0.45
0
0.51
2.3
0.71
10.7
B (mg/l)
F (mg/l)
10.07.2007
31.12.2007
03.11.2009
02.08.2010
Date

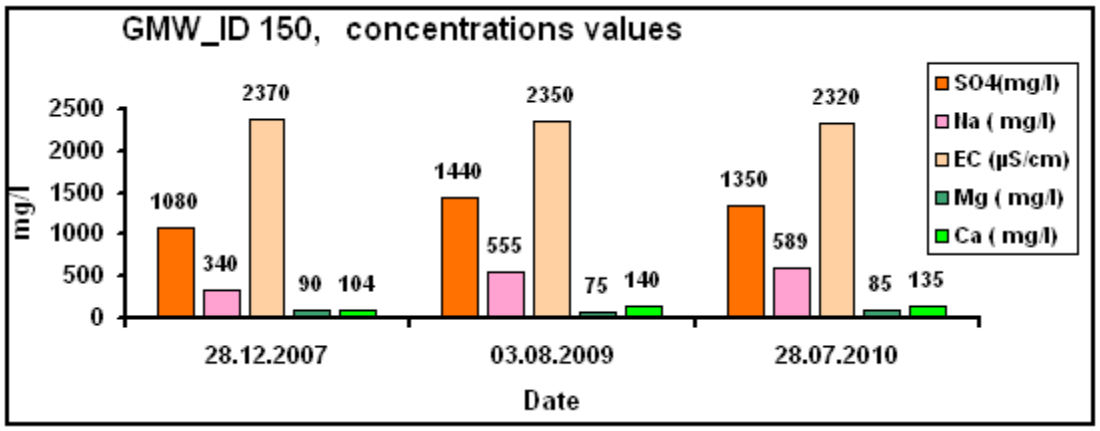

GMW_ID 140, concentrations values
mg/l
4000
3000
2000
1000
0
1400
462
2990
1150
408
3150
1550
690
3310
1800
989
3350
SO4(mg/l)
Na (mg/l)
EC (µS/cm)
10.07.2007
31.12.2007
03.11.2009
02.08.2010
Date

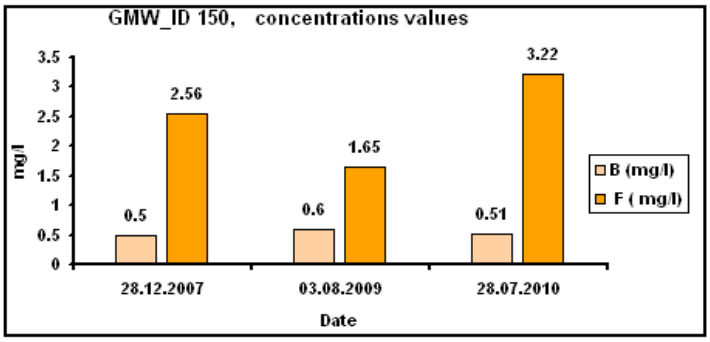
GMW_ID 150


GMW_ID150 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

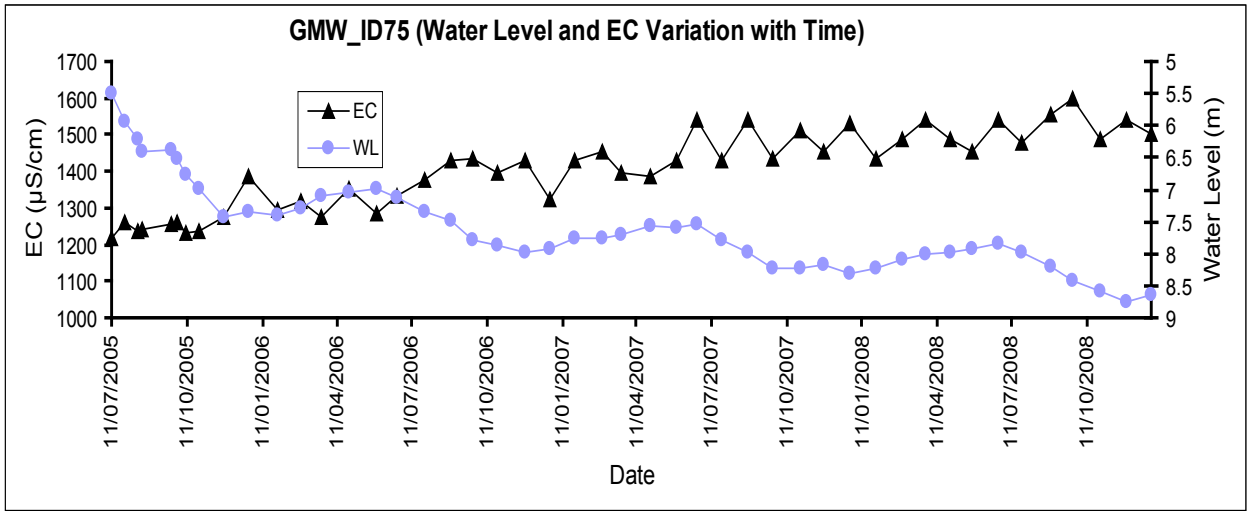

GMW_ID 150, Sodium and salinity hazard (wilcox plot)
Sodium Hazard (SAR)
Salinity Hazard (µS/cm)

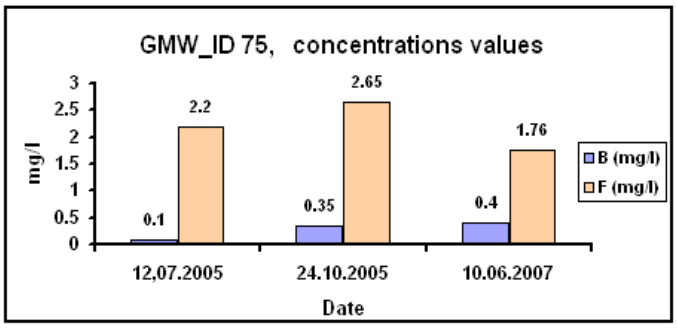

B (mg/l)
F (mg/l)

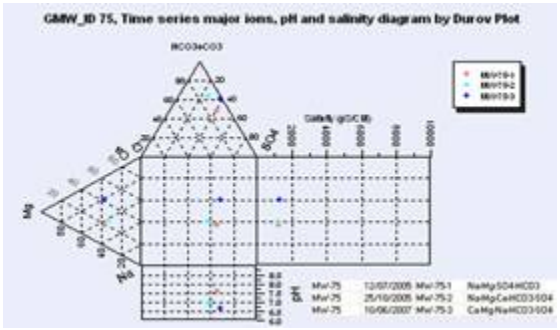

GMW_ID 150, concentrations values
SO4(mg/l)
Na (mg/l)
EC (µS/cm)
Mg (mg/l)
Ca (mg/l)
mg/l
1080
340
2370
90
104
1440
555
2350
75
140
1350
589
2320
85
135
28.12.2007
03.08.2009
28.07.2010
Date


GMW_ID 150, concentrations values
B (mg/l)
F (mg/l)
mg/l
0.5
2.56
0.6
1.65
0.51
3.22
28.12.2007
03.08.2009
28.07.2010
Date

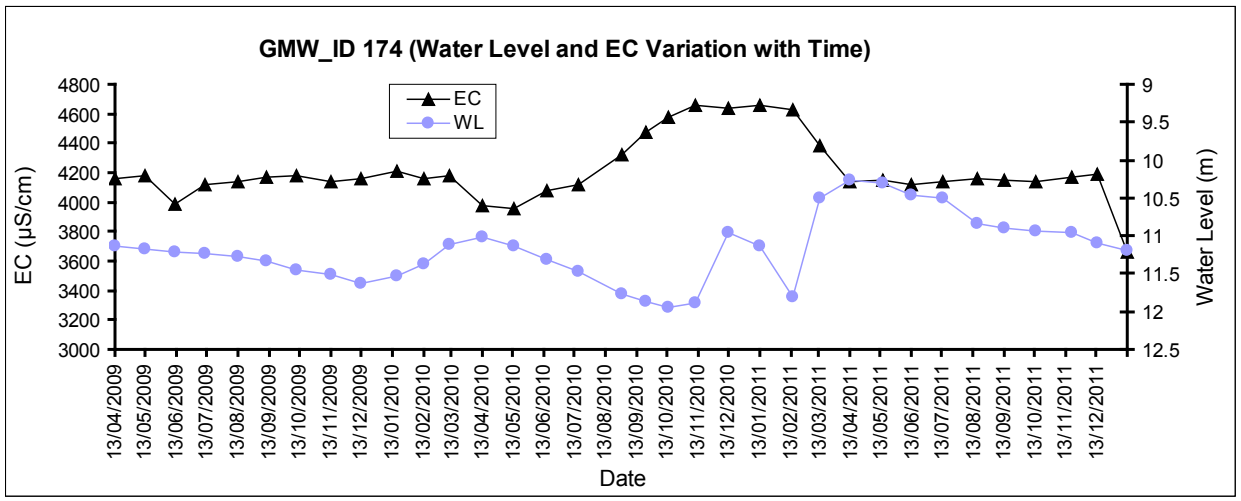
GMW_ID 75

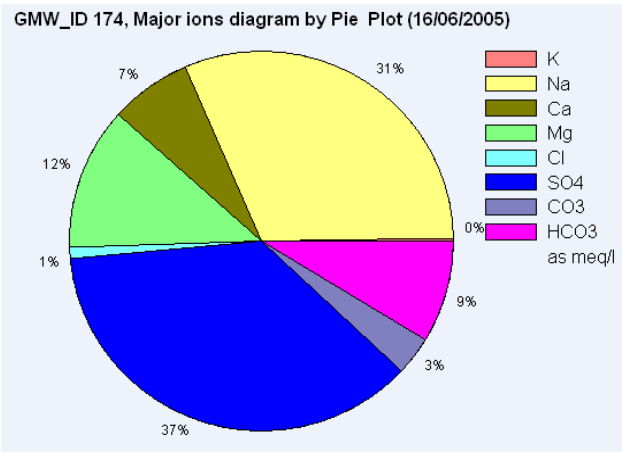






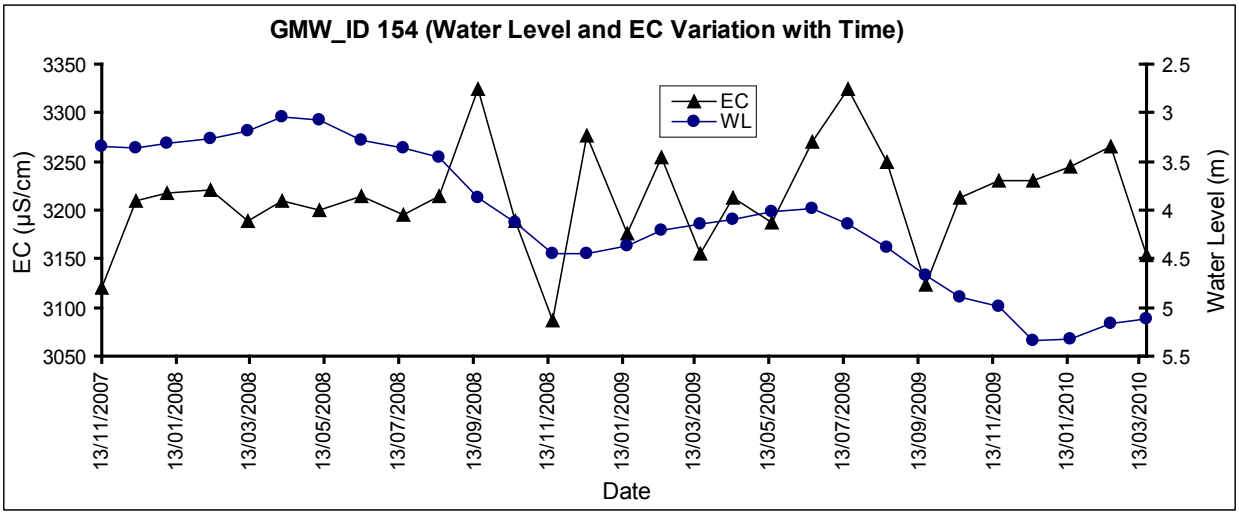
GMW_ID 174

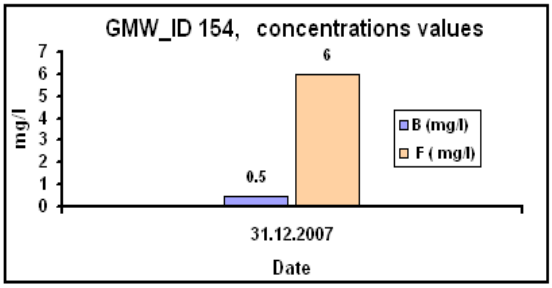


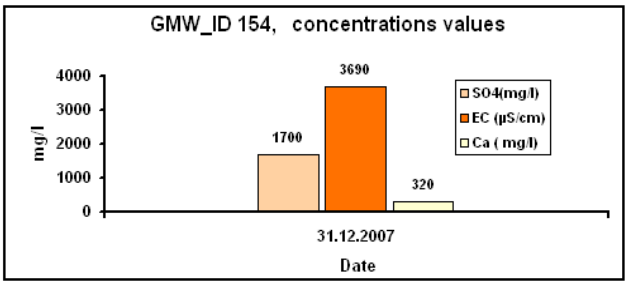


Station	MW-174	
Watertype	Na-Mg-SO4	
Temperature (°C)	21.9	
pH	6.66	
Conductivity	4050	uS/cm
Sum of Anions	51.15018	meq/L
Sum of Cations	51.39229	meq/L
Balance	0.236112	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.9333333	
Ca/SO4	7.865169E-02	
Na/Cl	21.47059	
CVBr	106.25	

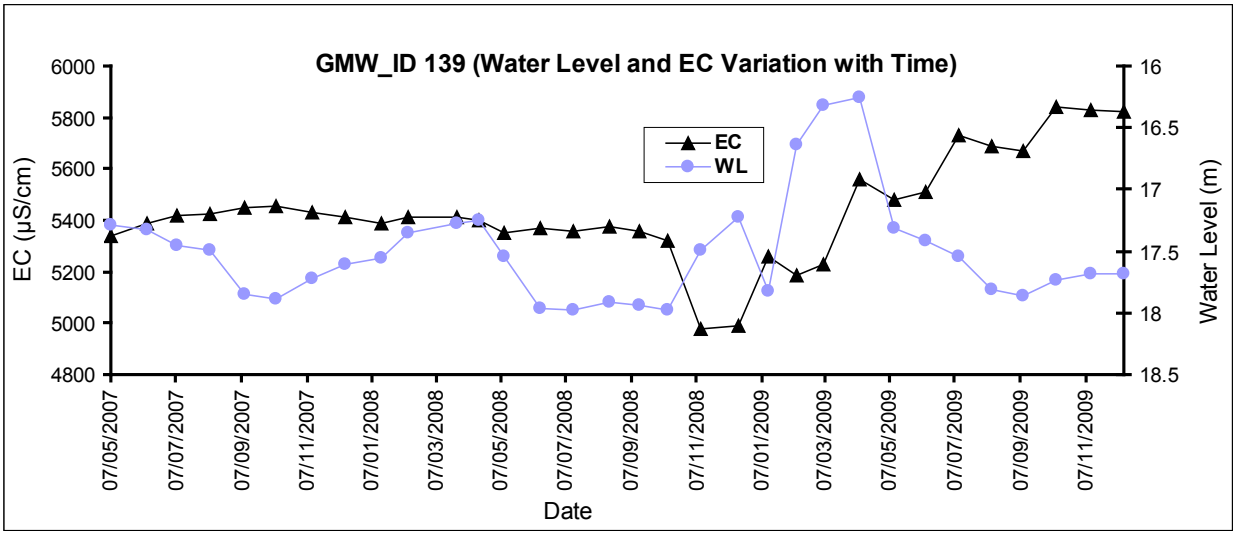
GMW_ID 154

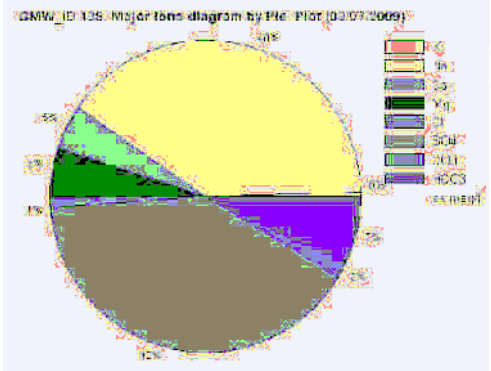




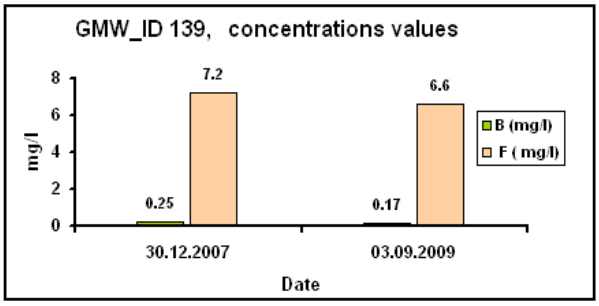


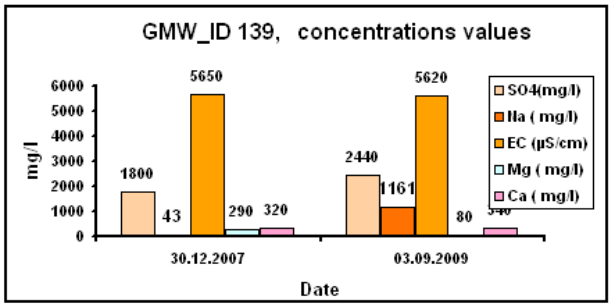
GMW_ID 139



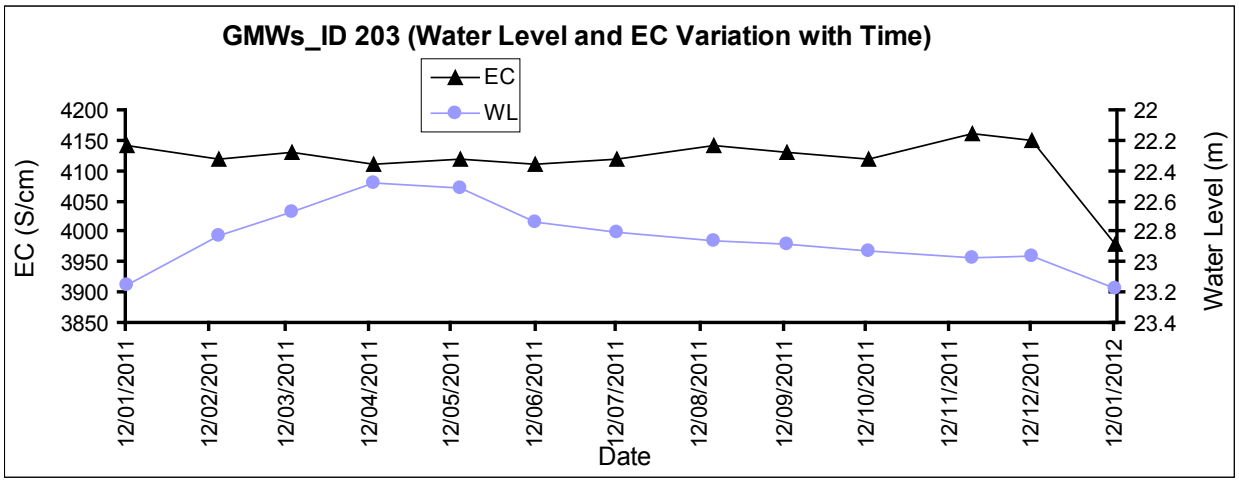


Station	MW-139	
Watertype	Na-SO4	
Temperature (°C)	16.6	
pH	7.61	
Conductivity	5620	uS/cm
Sum of Anions	63.54731	meq/L
Sum of Cations	63.59539	meq/L
Balance	3.781912E-02	%
Comparison to Seawater Ratios		
	mg/l	
Ca/Mg	1.4775	
Ca/SO4	4.844262E-02	
Na/Cl	25.23913	
Cl/Br	353.8462	

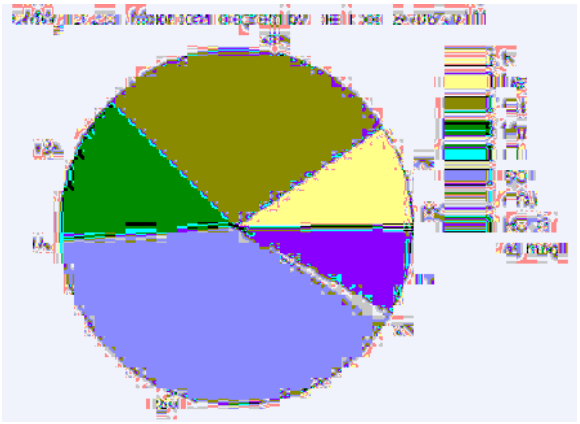




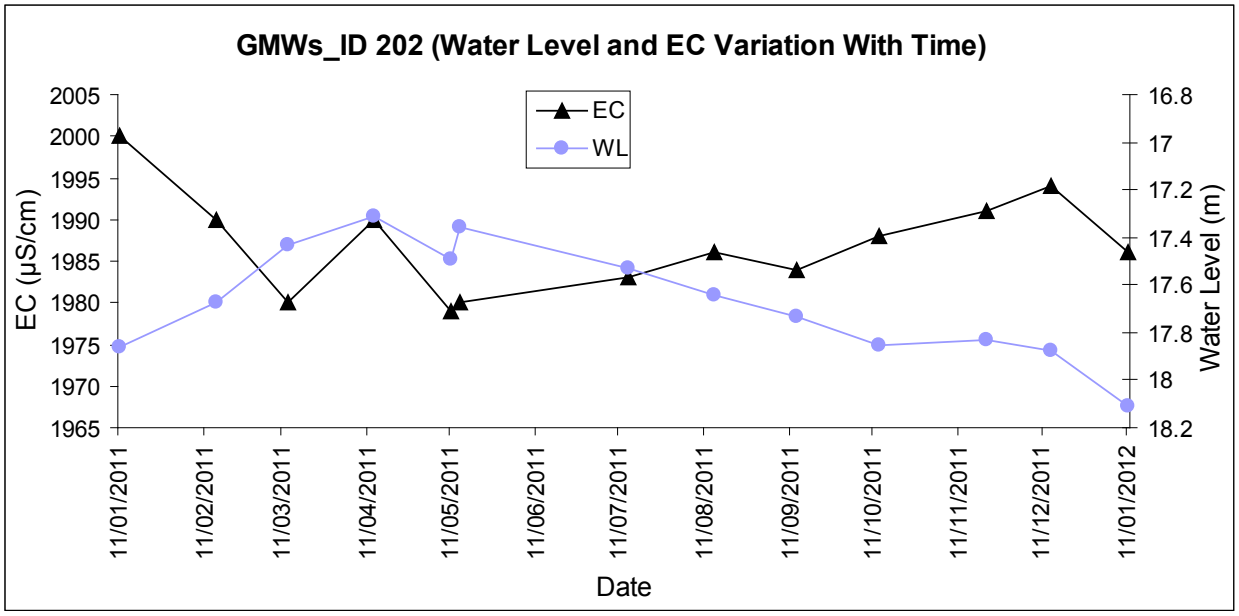
GMW_ID 203

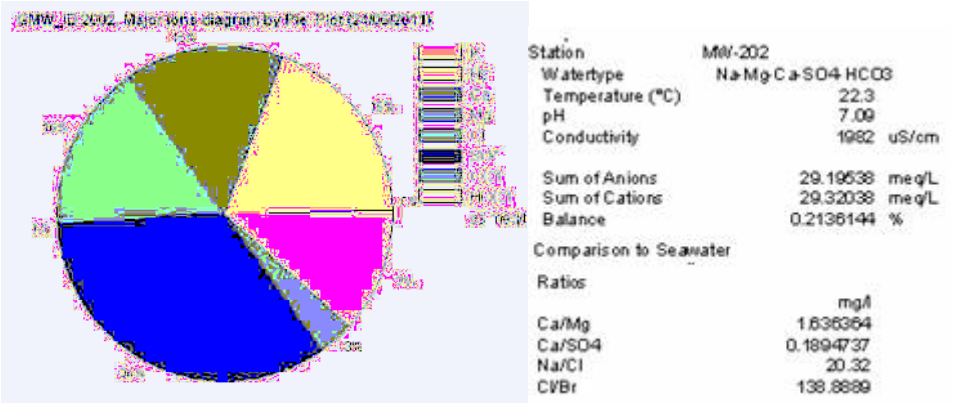


Station	MW-203	
Watertype	Ca-Mg-SO4	
Temperature (°C)	22.5	
pH	6.73	
Conductivity	4000	uS/cm
Sum of Anions	51.83231	meq/L
Sum of Cations	51.88822	meq/L
Balance	5.390274E-02	%
Comparison to Seawater Ratios		
	mg/l	
Ca/Mg	3.625	
Ca/SO4	0.2989691	
Na/Cl	6.8125	
Cl/Br	200	

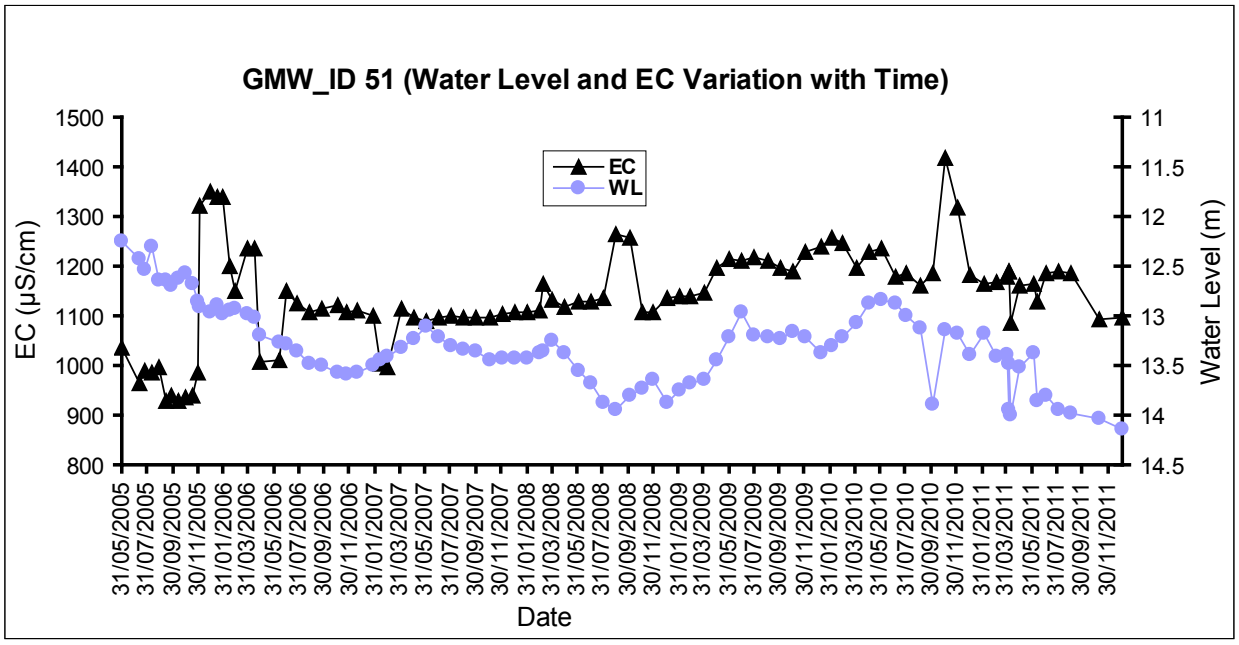


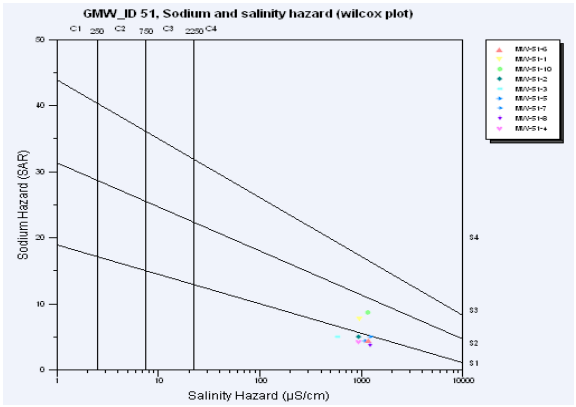
GMW_ID 202

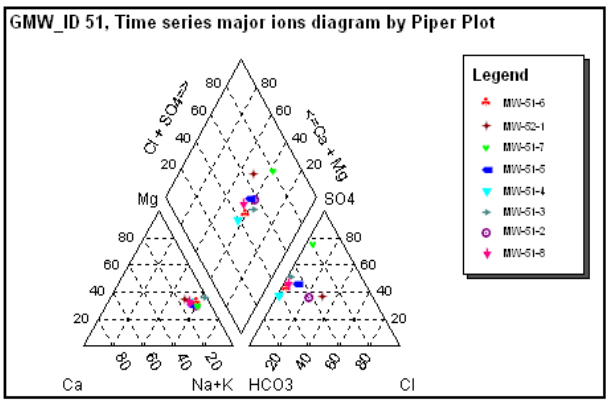

GMWs_ID 202 (Water Level and EC Variation With Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date
2005
2000
1995
1990
1985
1980
1975
1970
1965
16.8
17
17.2
17.4
17.6
17.8
18
18.2
11/01/2011
11/02/2011
11/03/2011
11/04/2011
11/05/2011
11/06/2011
11/07/2011
11/08/2011
11/09/2011
11/10/2011
11/11/2011
11/12/2011
11/01/2012


Station MW-202
Watertype Na-Mg-Ca-SO4-HCO3
Temperature (°C) 22.3
pH 7.09
Conductivity 1982 uS/cm
Sum of Anions 29.19538 meq/L
Sum of Cations 29.32038 meq/L
Balance 0.2136144 %
Comparison to Seawater
Ratios
mg/l
Ca/Mg 1.636364
Ca/SO4 0.1894737
Na/Cl 20.32
Cl/Br 138.8889

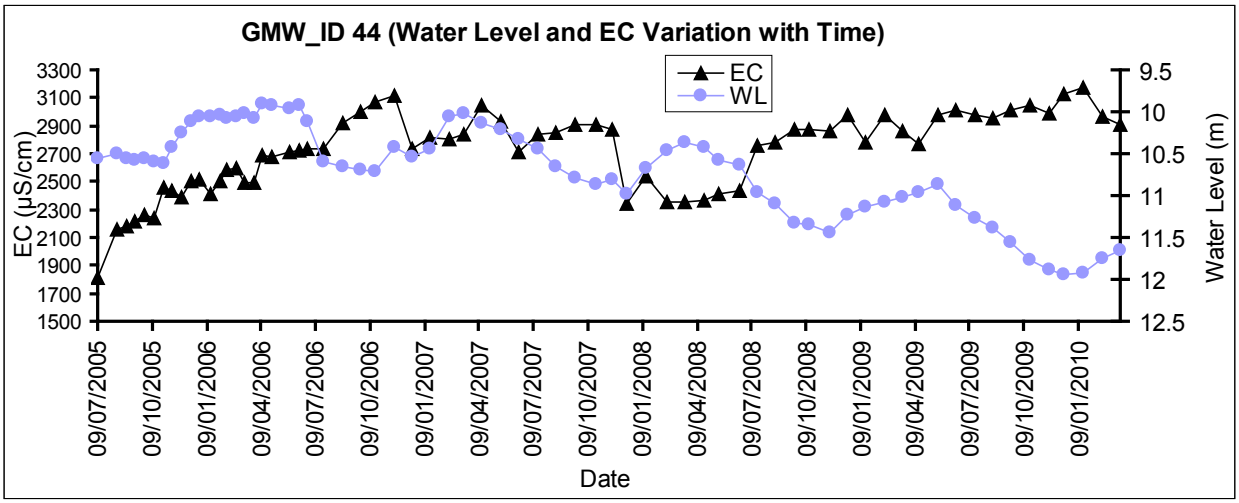
Herat
GMW_ID 51

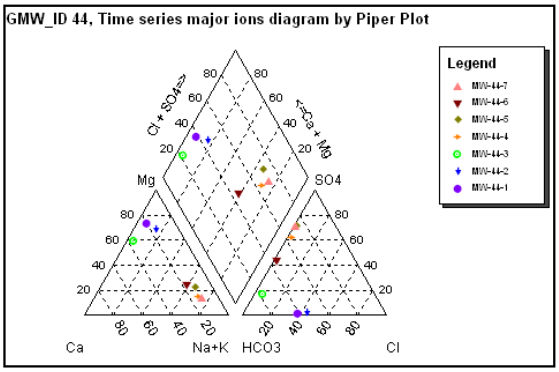


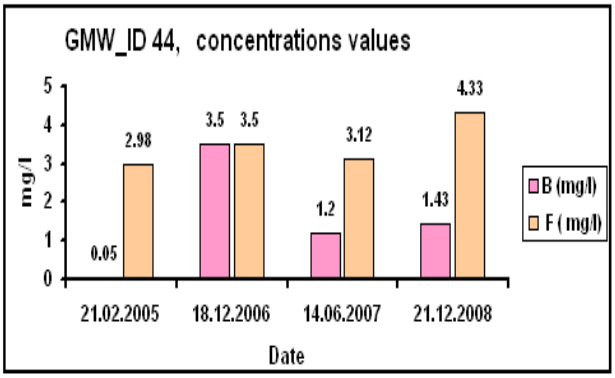




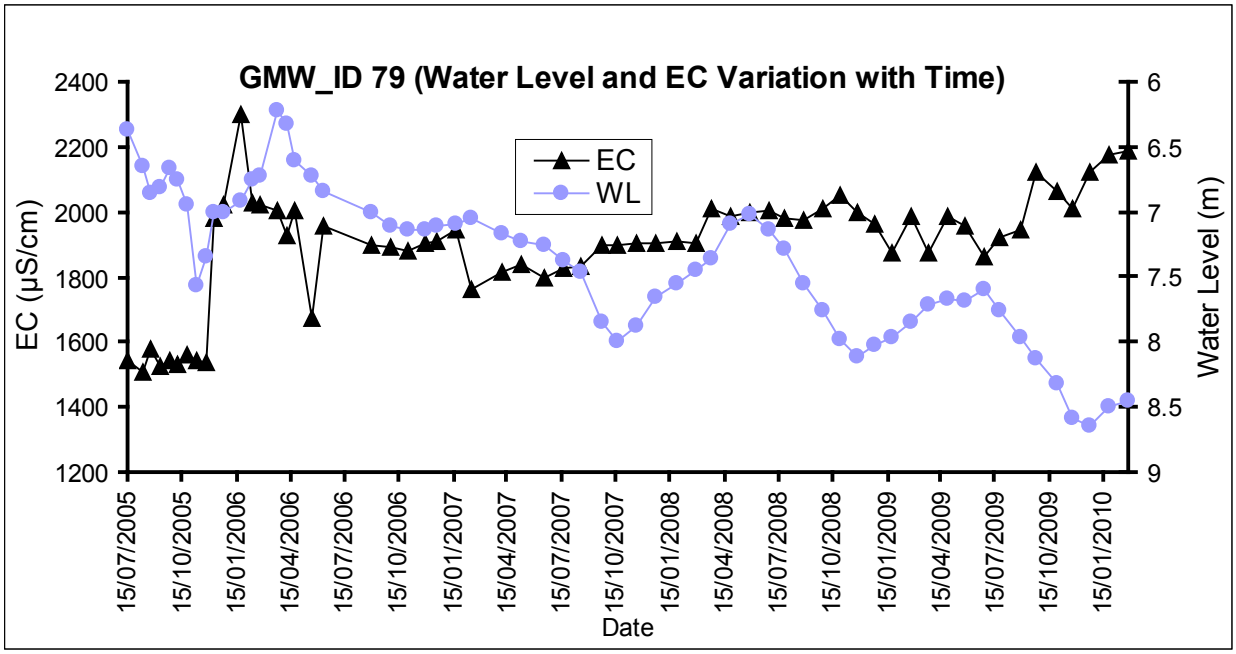
GMW_ID 44

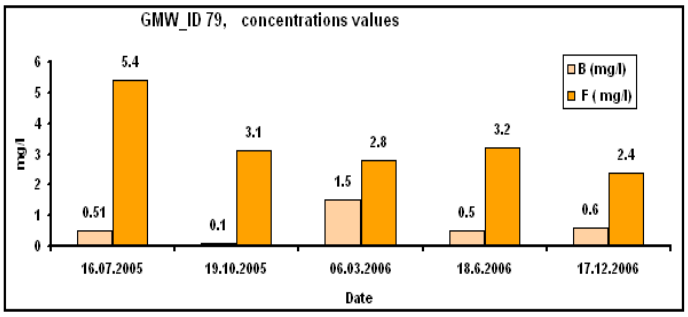


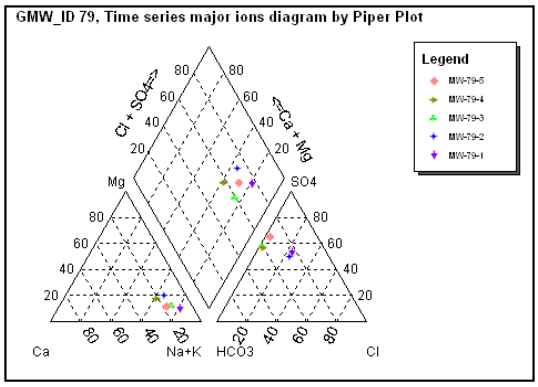

GMW_ID 44, Time series major ions diagram by Piper Plot
Legend
Cl + SO4
Ca + Mg
Mg
SO4
Ca
Na+K
HCO3
Cl

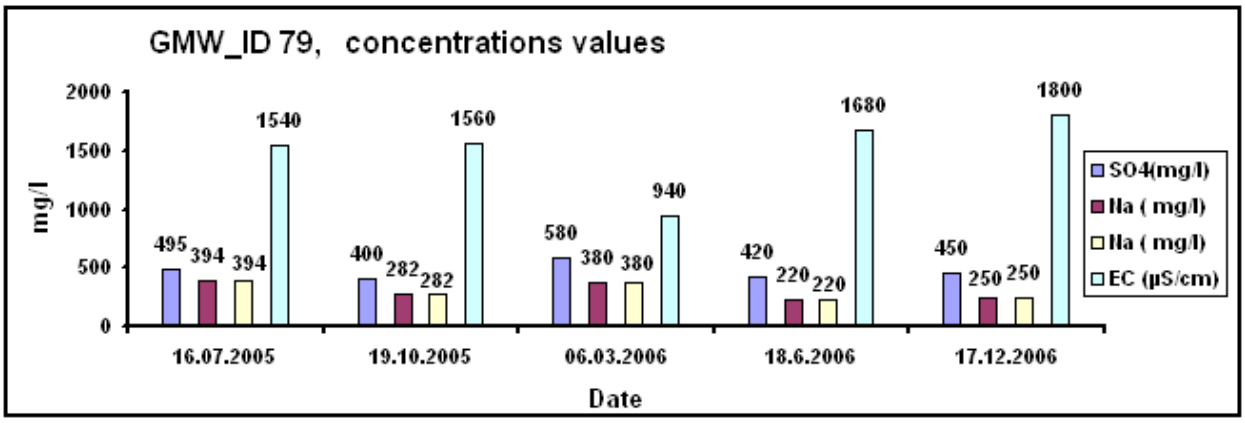

GMW_ID 44, concentrations values
mg/l
2.98
3.5
3.5
0.05
1.2
3.12
1.43
4.33
B (mg/l)
F (mg/l)
21.02.2005
18.12.2006
14.06.2007
21.12.2008
Date

GMW_ID 79

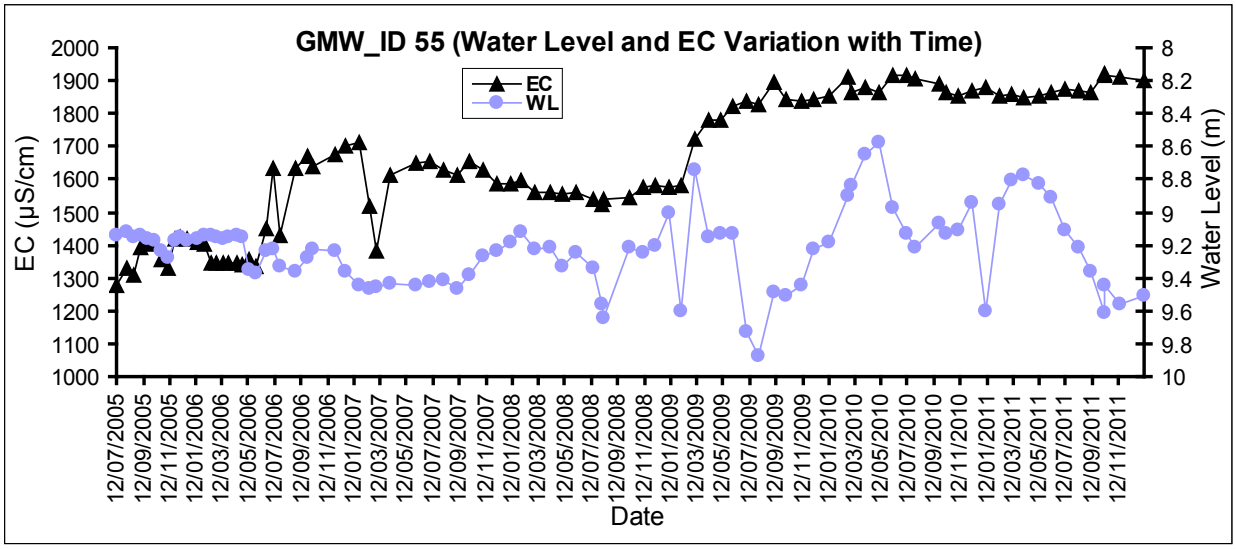

GMW_ID 79 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

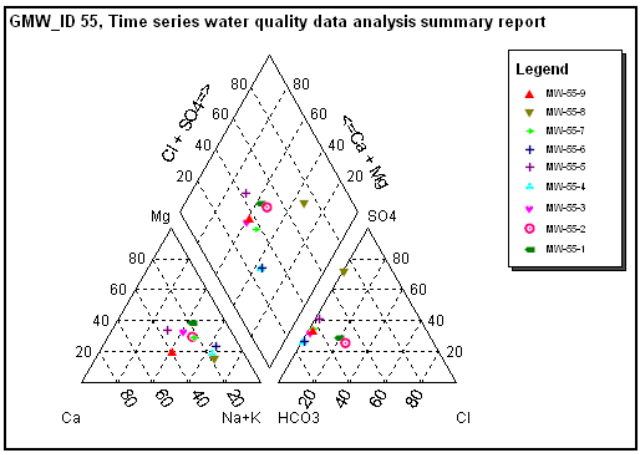

GMW_ID 79, concentrations values
mg/l
5.4
0.51
3.1
0.1
2.8
1.5
3.2
0.5
2.4
0.6
B (mg/l)
F (mg/l)
16.07.2005
19.10.2005
06.03.2006
18.6.2006
17.12.2006
Date

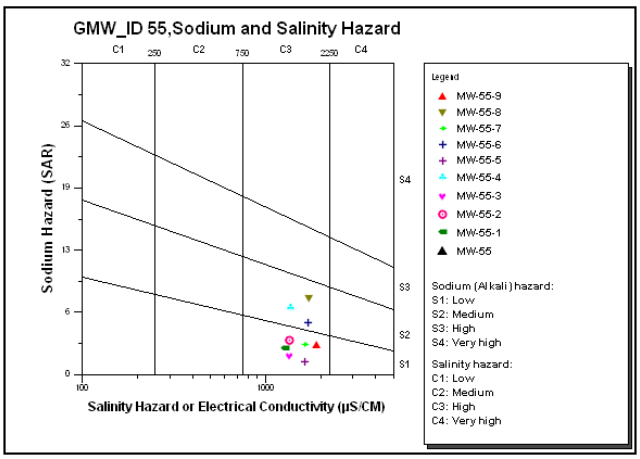

GMW_ID 79, Time series major ions diagram by Piper Plot
Legend
Cl + SO4
Ca + Mg
Mg
SO4
Ca
Na+K
HCO3
Cl

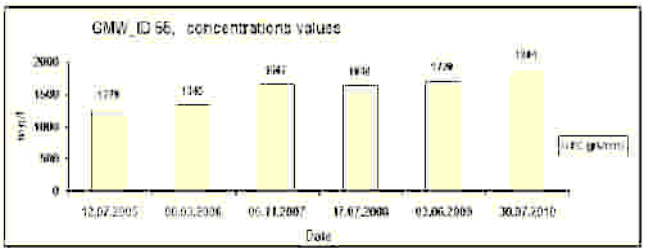

GMW_ID 79, concentrations values
mg/l
495
394
394
1540
400
282
282
1560
580
380
380
940
420
220
220
1680
450
250
250
1800
SO4(mg/l)
Na (mg/l)
Na (mg/l)
EC (µS/cm)
16.07.2005
19.10.2005
06.03.2006
18.6.2006
17.12.2006
Date

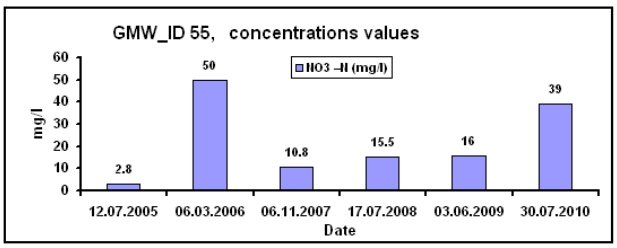
GMW_ID 55

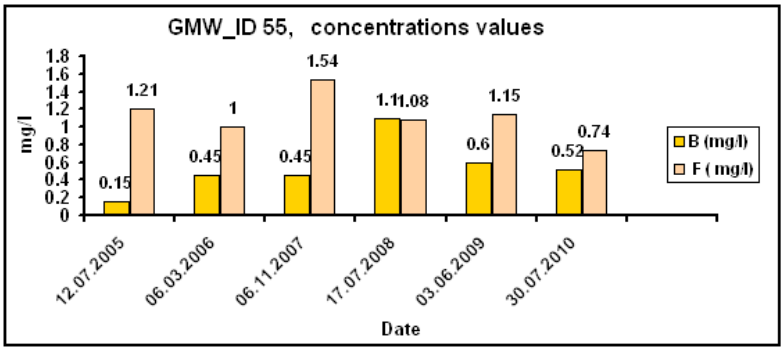

GMW_ID 55 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date


GMW_ID 55, Time series water quality data analysis summary report
Legend
Mg
SO4
Ca
Na+K
HCO3
Cl

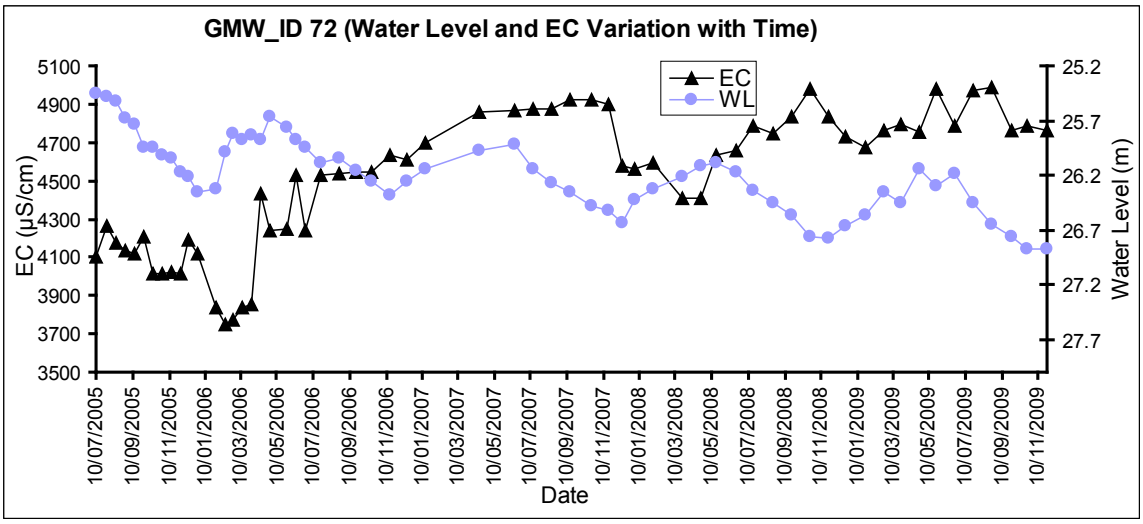

GMW_ID 55,Sodium and Salinity Hazard
Sodium Hazard (SAR)
Salinity Hazard or Electrical Conductivity (µS/CM)
Sodium (Alkali) hazard:
S1: Low
S2: Medium
S3: High
S4: Very high
Salinity hazard:
C1: Low
C2: Medium
C3: High
C4: Very high

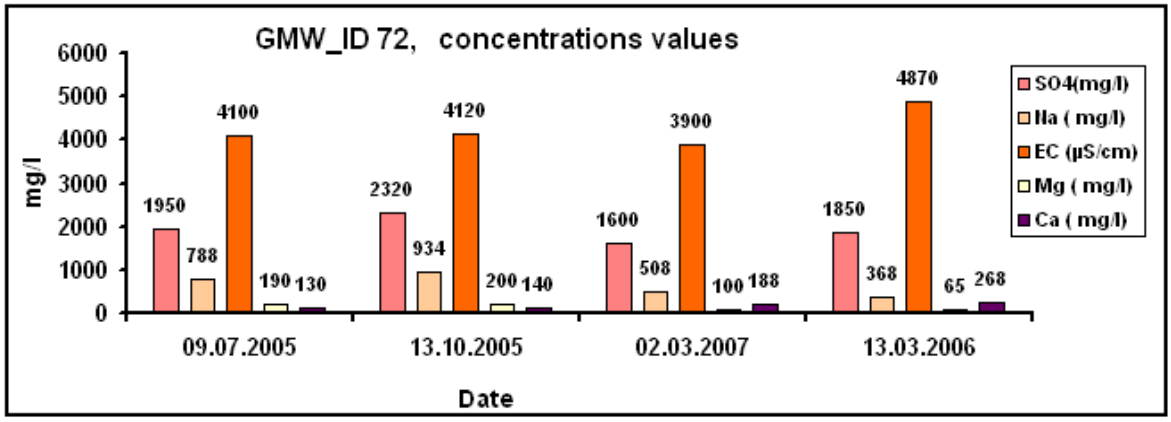

GMW_ID 55, concentrations values
Date

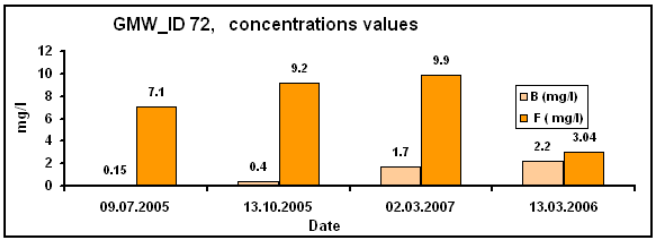

GMW_ID 55, concentrations values
NO3 -N (mg/l)
mg/l
2.8
50
10.8
15.5
16
39
12.07.2005
06.03.2006
06.11.2007
17.07.2008
03.06.2009
30.07.2010
Date


GMW_ID 55, concentrations values
mg/l
0.15
1.21
0.45
1
0.45
1.54
1.11.08
0.6
1.15
0.52
0.74
B (mg/l)
F (mg/l)
12.07.2005
06.03.2006
06.11.2007
17.07.2008
03.06.2009
30.07.2010
Date

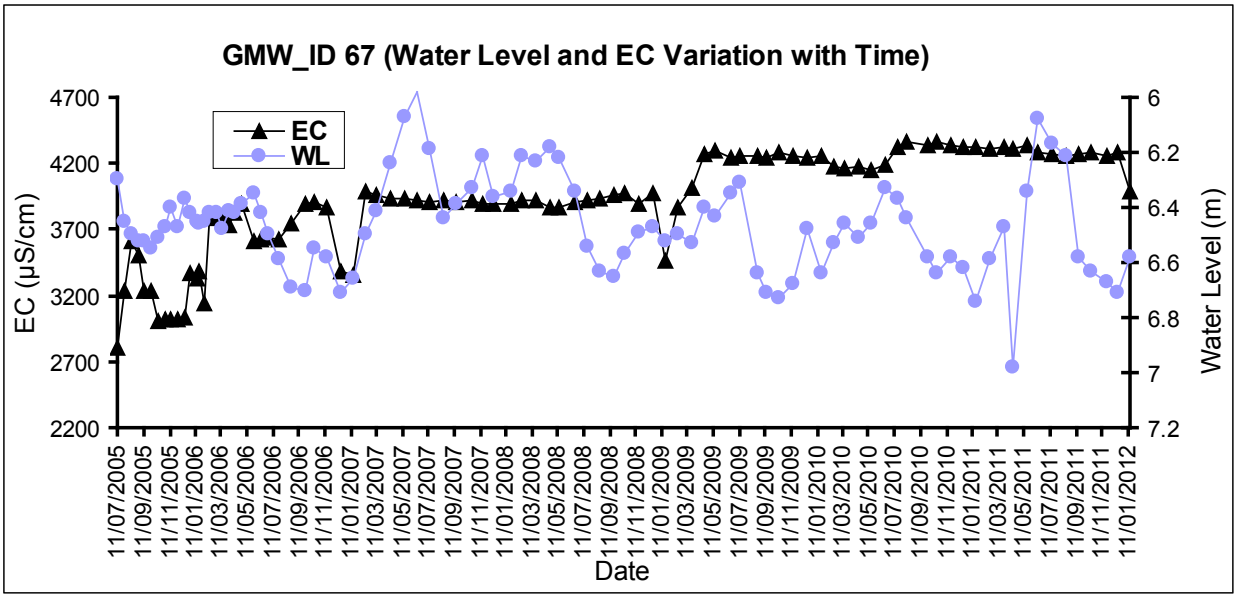
GMW_ID 72

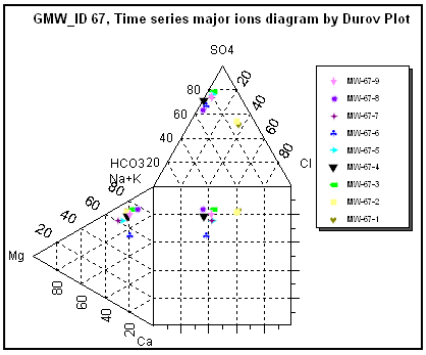

GMW_ID 72 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

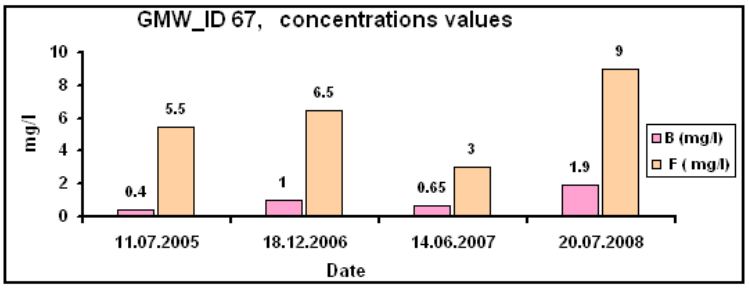

GMW_ID 72, concentrations values
SO4(mg/l)
Na (mg/l)
EC (µS/cm)
Mg (mg/l)
Ca (mg/l)
mg/l
1950
788
4100
190
130
2320
934
4120
200
140
1600
508
3900
100
188
1850
368
4870
65
268
09.07.2005
13.10.2005
02.03.2007
13.03.2006
Date

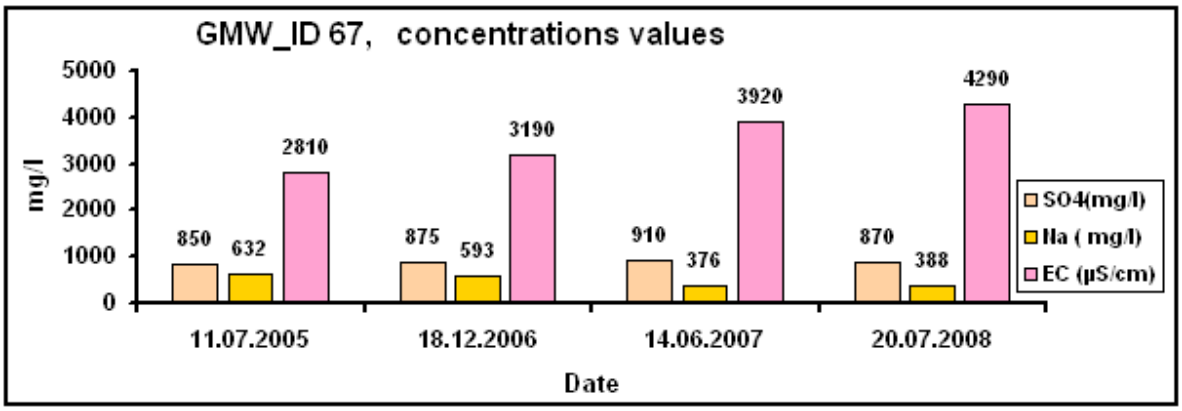

GMW_ID 72, concentrations values
B (mg/l)
F (mg/l)
mg/l
0.15
7.1
0.4
9.2
1.7
9.9
2.2
3.04
09.07.2005
13.10.2005
02.03.2007
13.03.2006
Date

GMW_ID 67

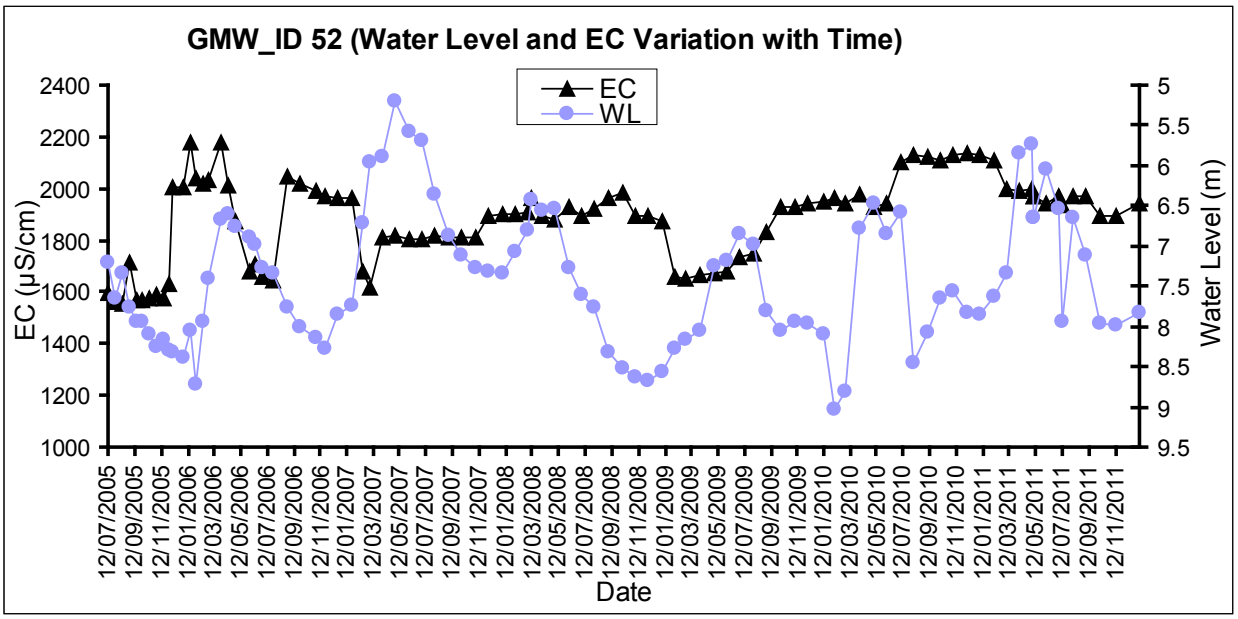

GMW_ID 67 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

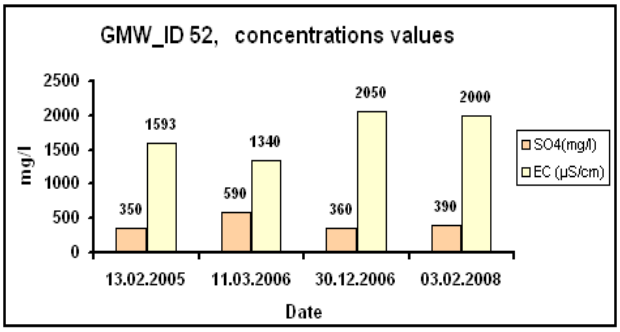

GMW_ID 67, Time series major ions diagram by Durov Plot
SO4
HCO3
Na+K
Cl
Mg
Ca

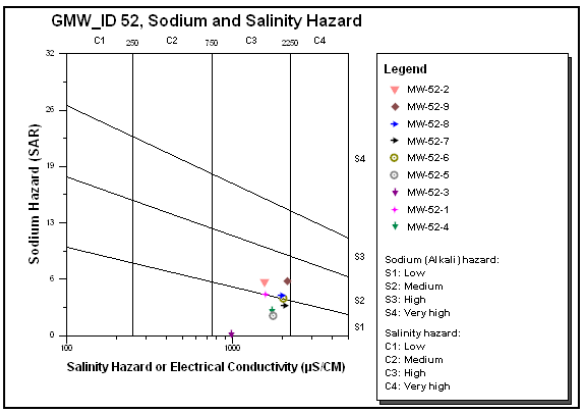

GMW_ID 67, concentrations values
mg/l
B (mg/l)
F (mg/l)
0.4
5.5
1
6.5
0.65
3
1.9
9
11.07.2005
18.12.2006
14.06.2007
20.07.2008
Date

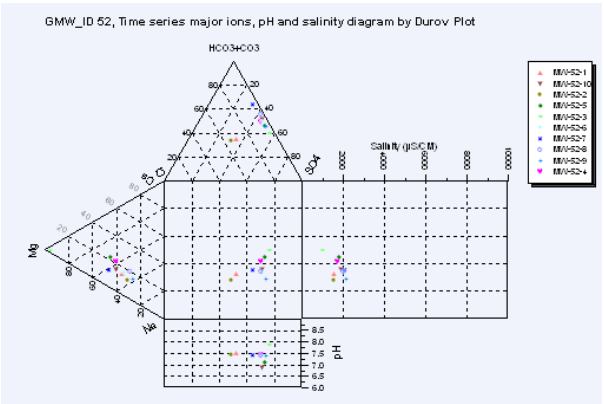

GMW_ID 67, concentrations values
mg/l
SO4(mg/l)
Ha (mg/l)
EC (µS/cm)
850
632
2810
875
593
3190
910
376
3920
870
388
4290
11.07.2005
18.12.2006
14.06.2007
20.07.2008
Date

GMW_ID 52

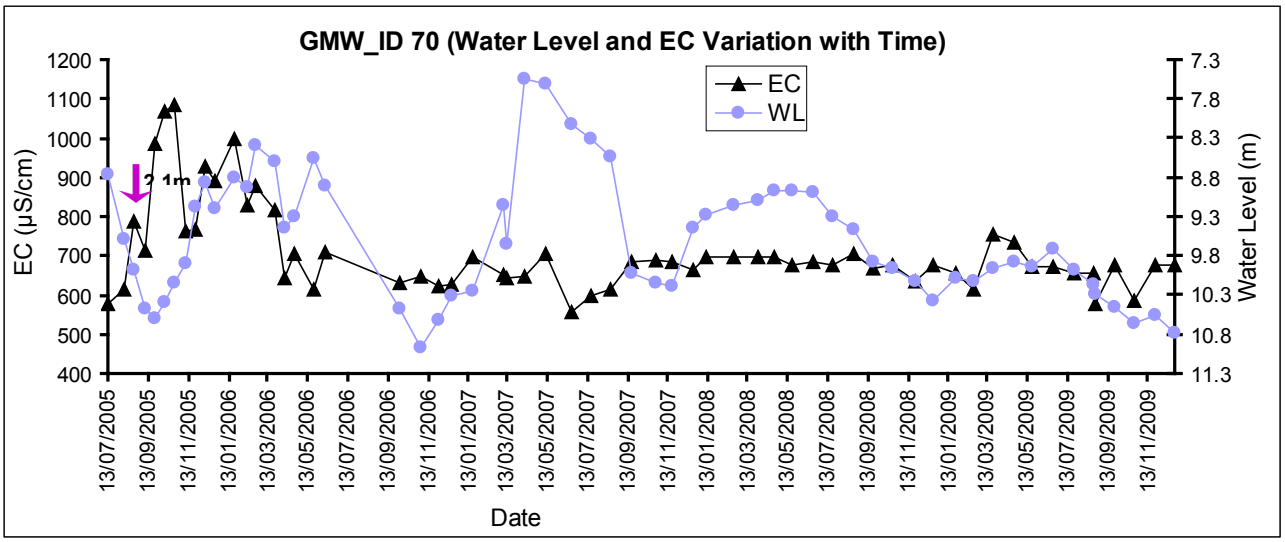

GMW_ID 52 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

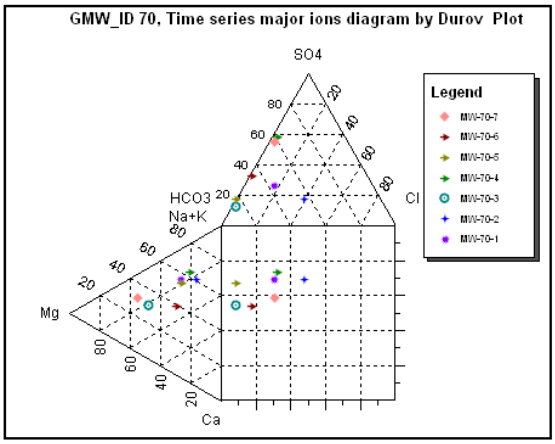

GMW_ID 52, concentrations values
mg/l
SO4(mg/l)
EC (µS/cm)
350
1593
590
1340
360
2050
390
2000
13.02.2005
11.03.2006
30.12.2006
03.02.2008
Date

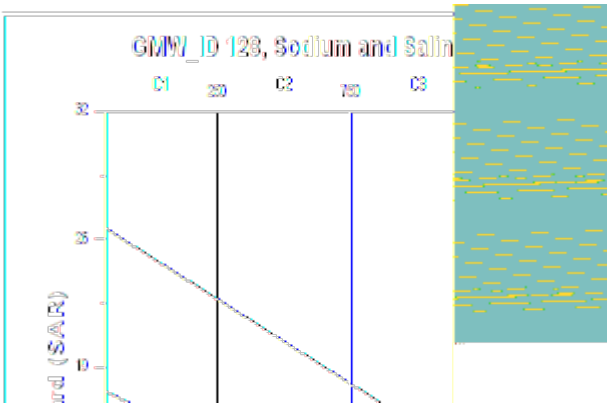

GMW_ID 52, Sodium and Salinity Hazard
Sodium Hazard (SAR)
Salinity Hazard or Electrical Conductivity (µS/CM)
Legend
MW-52-2
MW-52-9
MW-52-8
MW-52-7
MW-52-6
MW-52-5
MW-52-3
MW-52-1
MW-52-4
Sodium (Alkali) hazard:
S1: Low
S2: Medium
S3: High
S4: Very high
Salinity hazard:
C1: Low
C2: Medium
C3: High
C4: Very high

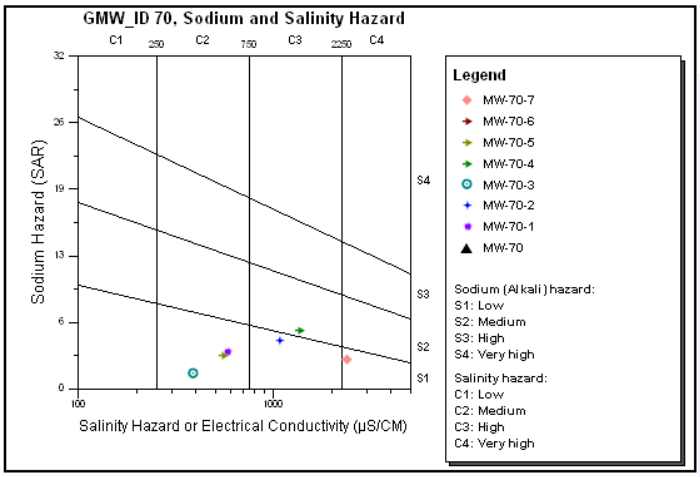

GMW_ID 52, Time series major ions, pH and salinity diagram by Durov Plot

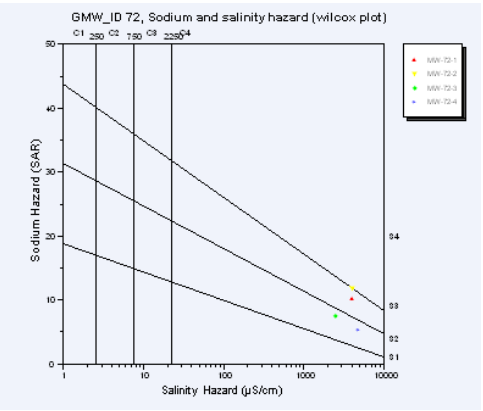
GMW_ID 70


GMW_ID 70 (Water Level and EC Variation with Time)
EC
WL
2.1m
EC (µS/cm)
Water Level (m)
Date
1200
1100
1000
900
800
700
600
500
400
7.3
7.8
8.3
8.8
9.3
9.8
10.3
10.8
11.3
13/07/2005
13/09/2005
13/11/2005
13/01/2006
13/03/2006
13/05/2006
13/07/2006
13/09/2006
13/11/2006
13/01/2007
13/03/2007
13/05/2007
13/07/2007
13/09/2007
13/11/2007
13/01/2008
13/03/2008
13/05/2008
13/07/2008
13/09/2008
13/11/2008
13/01/2009
13/03/2009
13/05/2009
13/07/2009
13/09/2009
13/11/2009

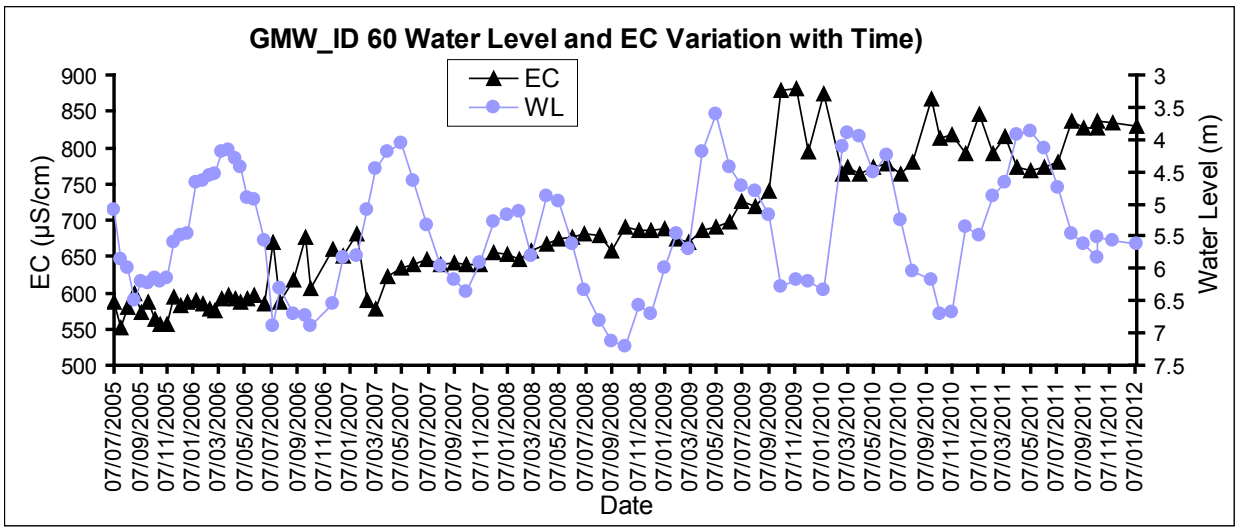

GMW_ID 70, Time series major ions diagram by Durov Plot
SO4
HCO3
Na+K
Cl
Mg
Ca
Legend
MW-70-7
MW-70-6
MW-70-5
MW-70-4
MW-70-3
MW-70-2
MW-70-1

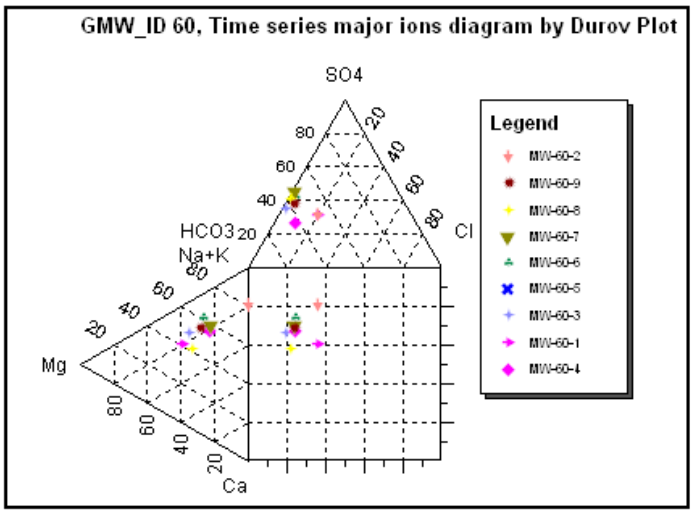

GMW_ID 128, Sodium and Salin
C1
C2
C3
250
750
SAR

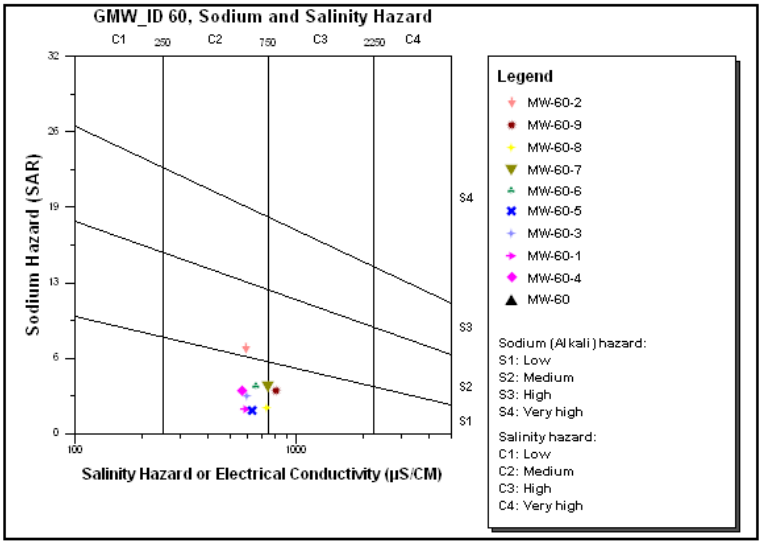

GMW_ID 70, Sodium and Salinity Hazard
C1
250
C2
750
C3
2250
C4
Sodium Hazard (SAR)
Salinity Hazard or Electrical Conductivity (µS/CM)
S4
S3
S2
S1
Legend
MW-70-7
MW-70-6
MW-70-5
MW-70-4
MW-70-3
MW-70-2
MW-70-1
MW-70
Sodium (Alkali) hazard:
S1: Low
S2: Medium
S3: High
S4: Very high
Salinity hazard:
C1: Low
C2: Medium
C3: High
C4: Very high


GMW_ID 72, Sodium and salinity hazard (wilcox plot)
Sodium Hazard (SAR)
Salinity Hazard (µS/cm)

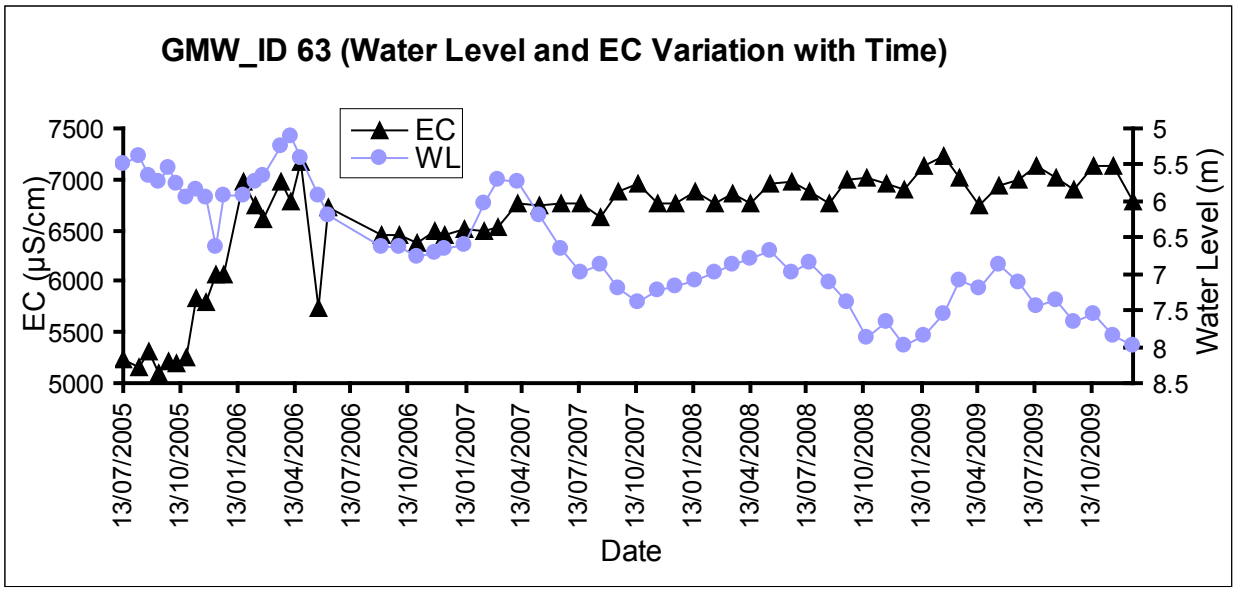
GMW_ID 60

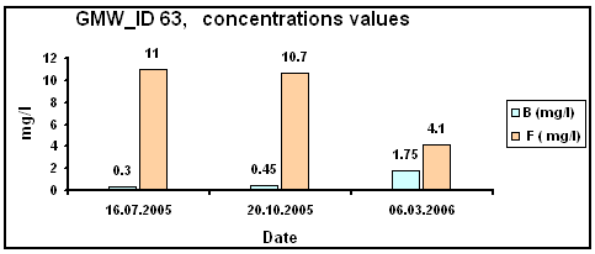

GMW_ID 60 Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

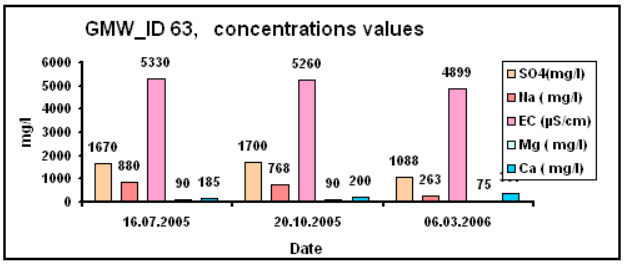

GMW_ID 60, Time series major ions diagram by Durov Plot
SO4
HCO3
Na+K
Mg
Ca
Cl
Legend
MW-60-2
MW-60-9
MW-60-8
MW-60-7
MW-60-6
MW-60-5
MW-60-3
MW-60-1
MW-60-4

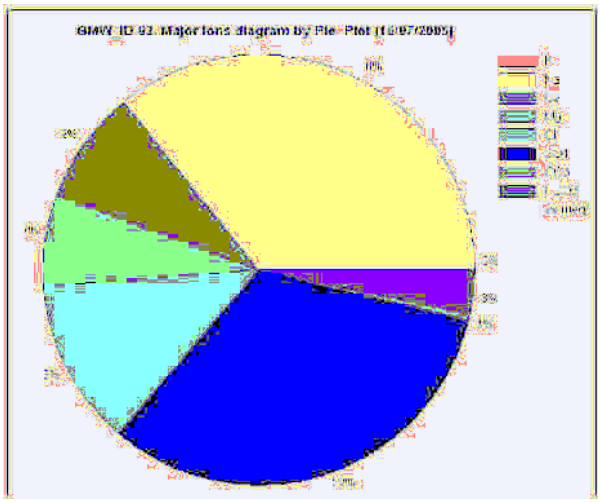

GMW_ID 60, Sodium and Salinity Hazard
C1
C2
C3
C4
S1
S2
S3
S4
Sodium Hazard (SAR)
Salinity Hazard or Electrical Conductivity (µS/CM)
Legend
MW-60-2
MW-60-9
MW-60-8
MW-60-7
MW-60-6
MW-60-5
MW-60-3
MW-60-1
MW-60-4
MW-60
Sodium (Alkali) hazard:
S1: Low
S2: Medium
S3: High
S4: Very high
Salinity hazard:
C1: Low
C2: Medium
C3: High
C4: Very high

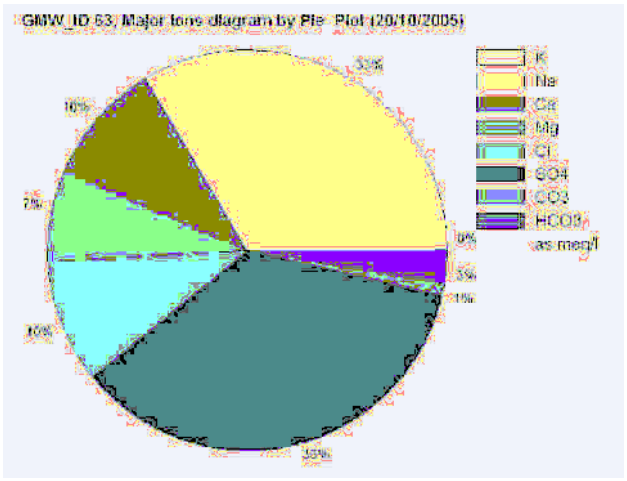
GMW_ID 63


GMW_ID 63 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

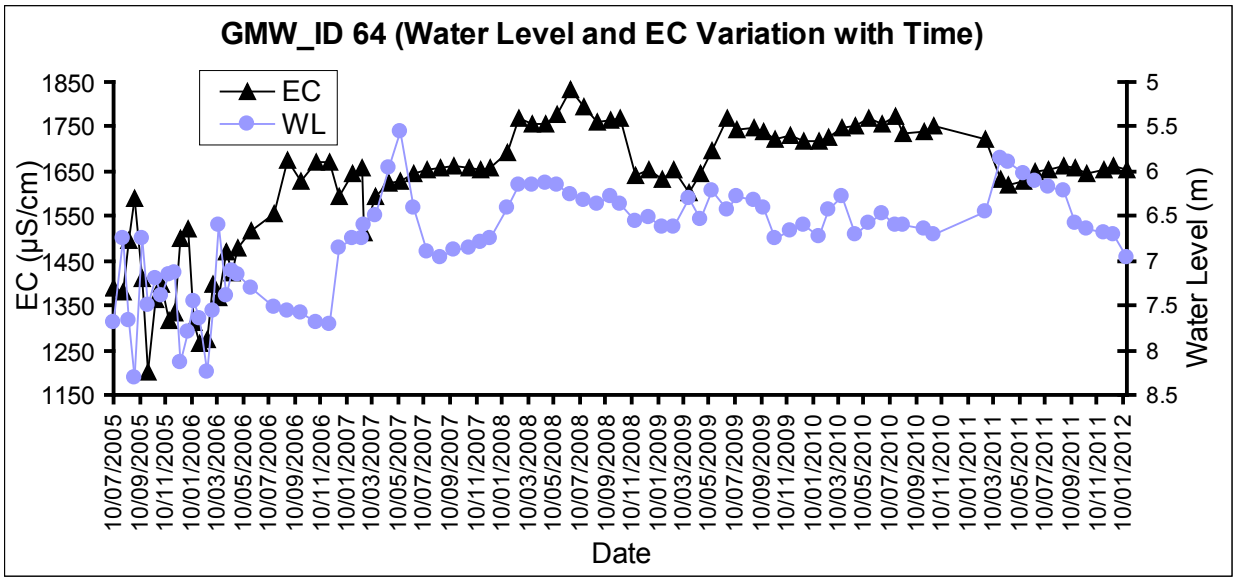

GMW_ID 63, concentrations values
mg/l
B (mg/l)
F (mg/l)
16.07.2005
20.10.2005
06.03.2006
Date

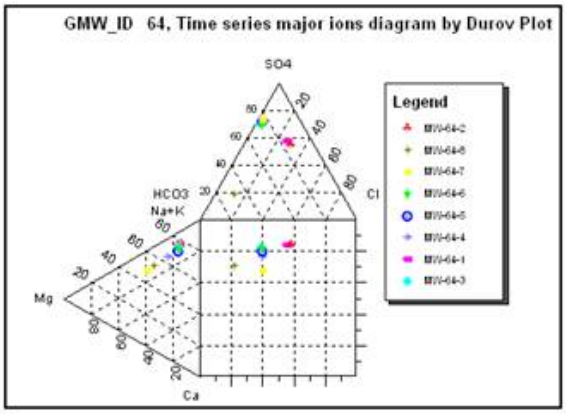

GMW_ID 63, concentrations values
mg/l
SO4(mg/l)
Na (mg/l)
EC (µS/cm)
Mg (mg/l)
Ca (mg/l)
16.07.2005
20.10.2005
06.03.2006
Date

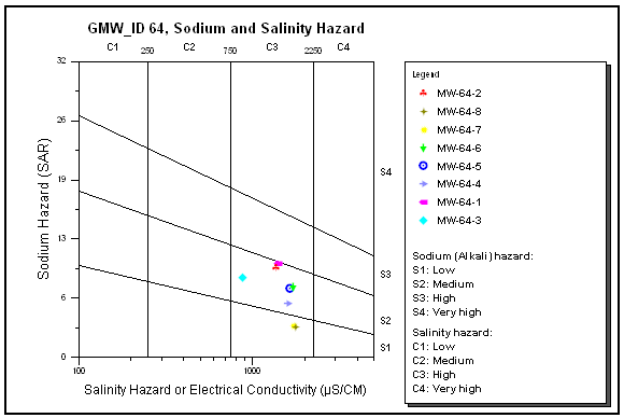



GMW_ID 63, Major ions diagram by Pie Plot (20/10/2005)
as meq/l

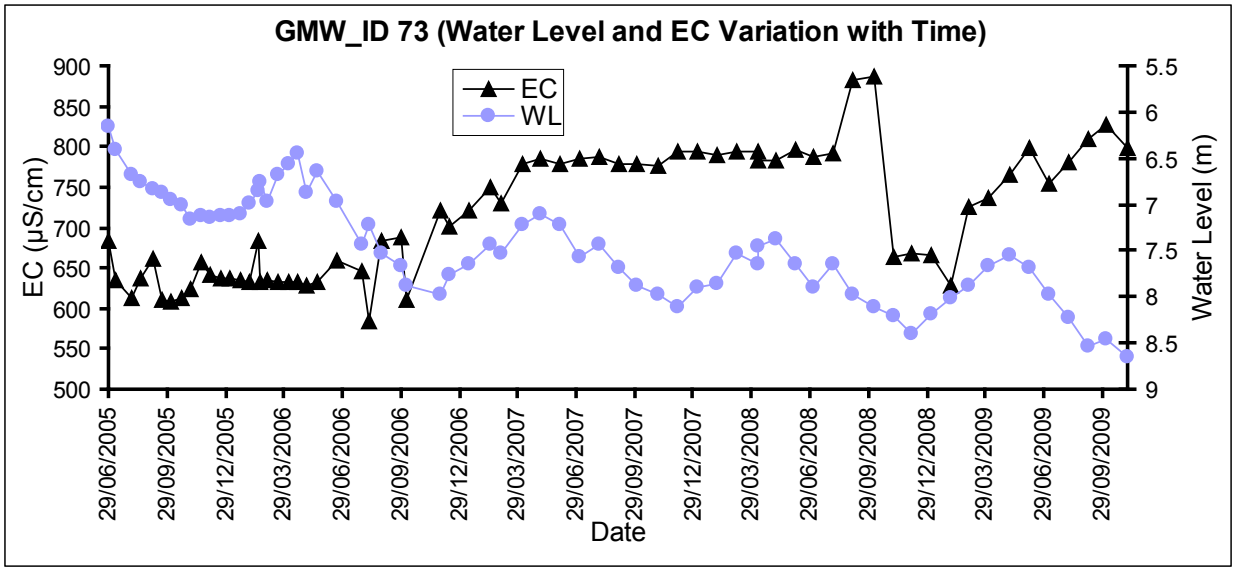
GMW_ID 64

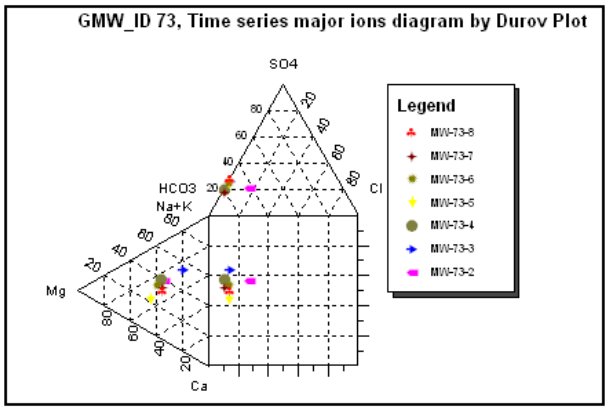

GMW_ID 64 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date

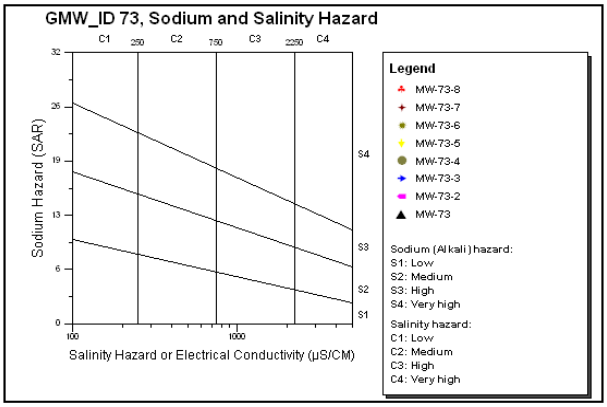

GMW_ID 64, Time series major ions diagram by Durov Plot
SO4
HCO3
Na+K
Cl
Mg
Ca
Legend


GMW_ID 64, Sodium and Salinity Hazard
Sodium Hazard (SAR)
Salinity Hazard or Electrical Conductivity (µS/CM)
Legend
MW-64-2
MW-64-8
MW-64-7
MW-64-6
MW-64-5
MW-64-4
MW-64-1
MW-64-3
Sodium (Alkali) hazard:
S1: Low
S2: Medium
S3: High
S4: Very high
Salinity hazard:
C1: Low
C2: Medium
C3: High
C4: Very high

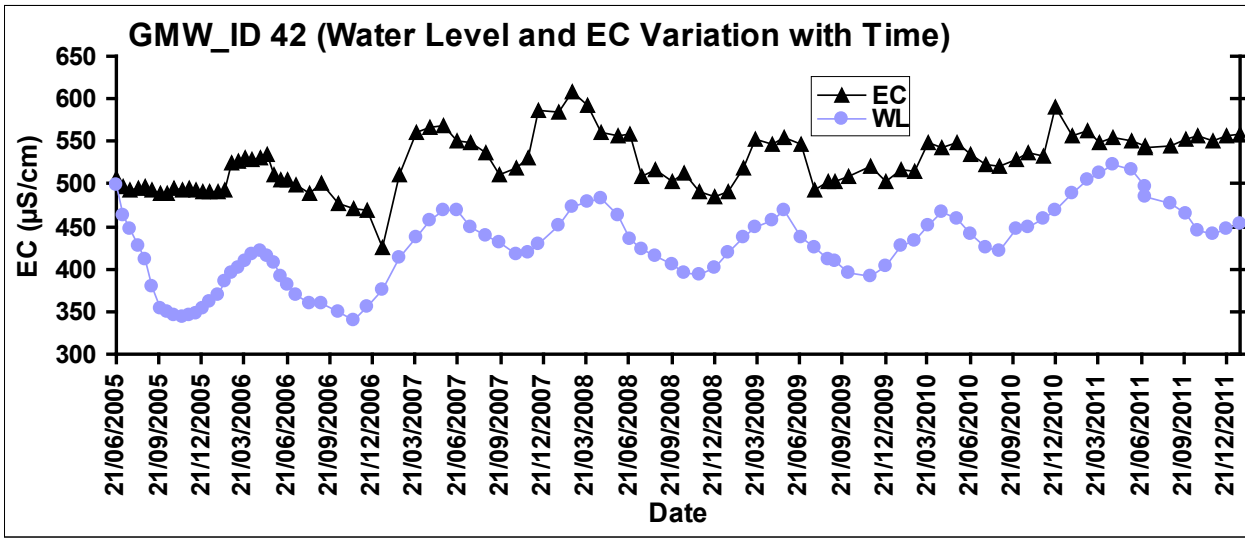
GMW_ID 73

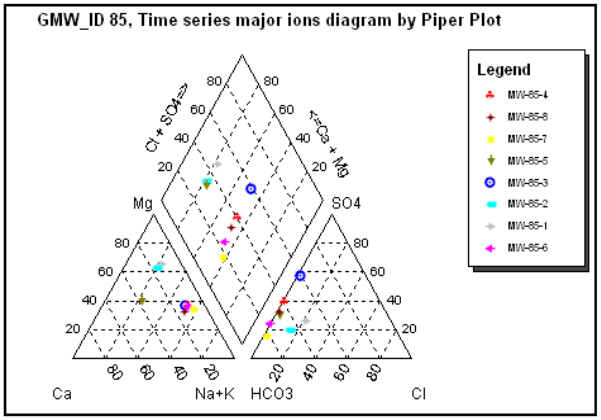


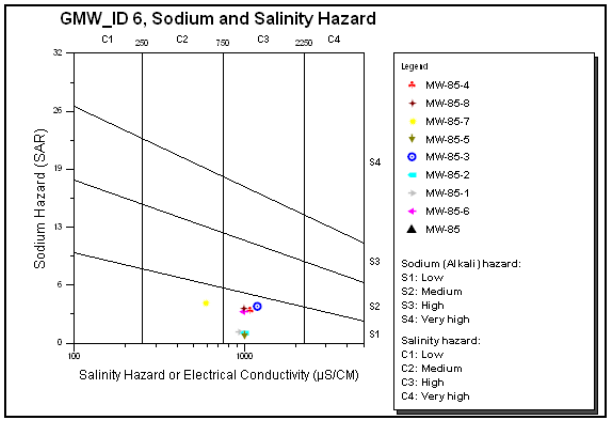




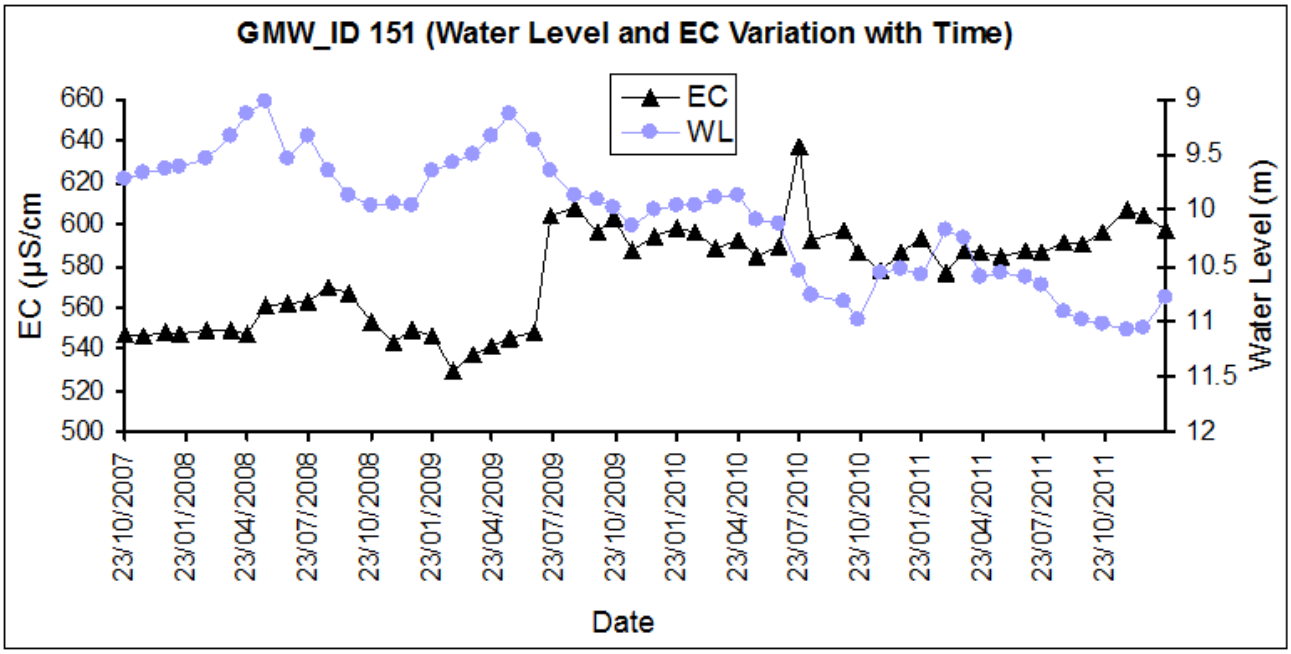
GMW_ID 85

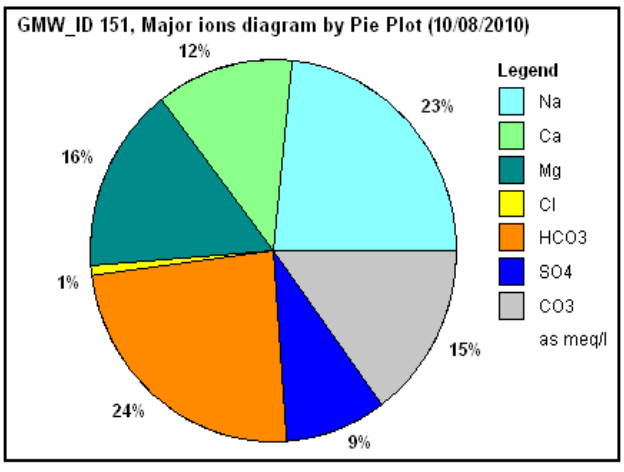


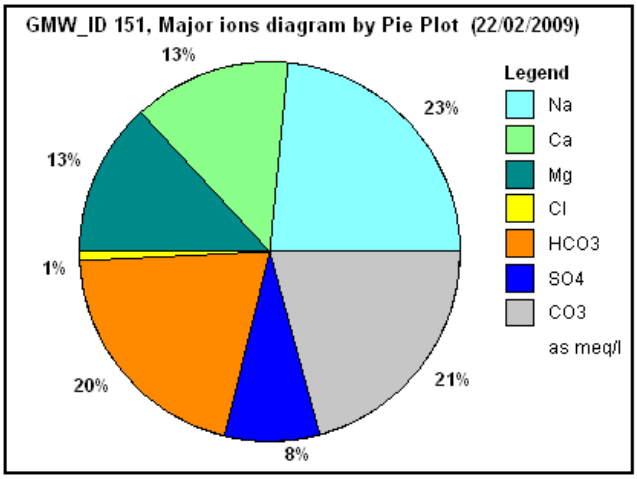

GMW_ID 85, Time series major ions diagram by Piper Plot
Legend
MW-85-4
MW-85-8
MW-85-7
MW-85-5
MW-85-3
MW-85-2
MW-85-1
MW-85-6
Ca
Na+K
HCO3
Cl
Mg
SO4

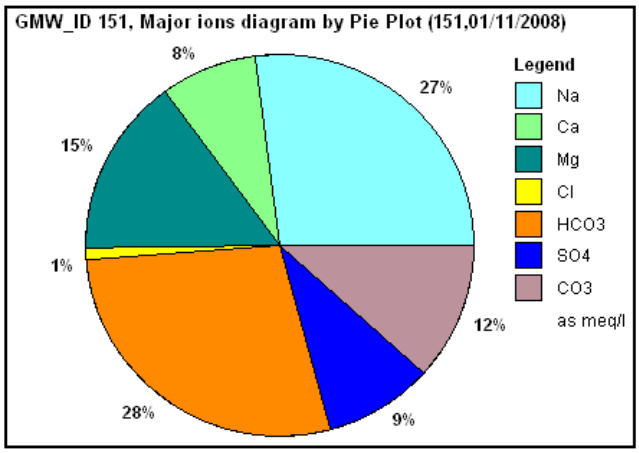

GMW_ID 6, Sodium and Salinity Hazard
Sodium Hazard (SAR)
Salinity Hazard or Electrical Conductivity (µS/CM)
Legend
MW-85-4
MW-85-8
MW-85-7
MW-85-5
MW-85-3
MW-85-2
MW-85-1
MW-85-6
MW-85
Sodium (Alkali) hazard:
S1: Low
S2: Medium
S3: High
S4: Very high
Salinity hazard:
C1: Low
C2: Medium
C3: High
C4: Very high

GMW_ID 151

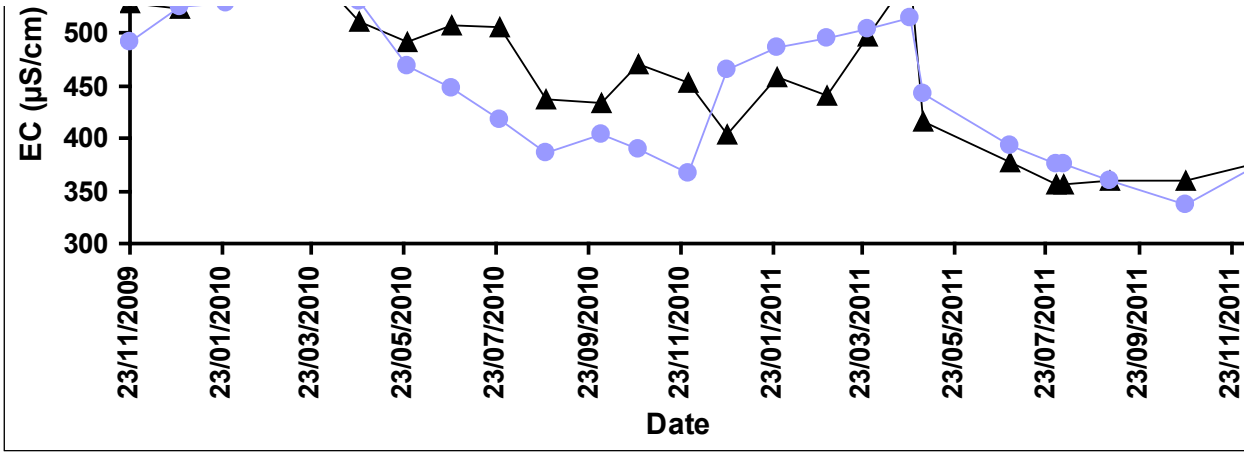

GMW_ID 151 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm
Water Level (m)
Date

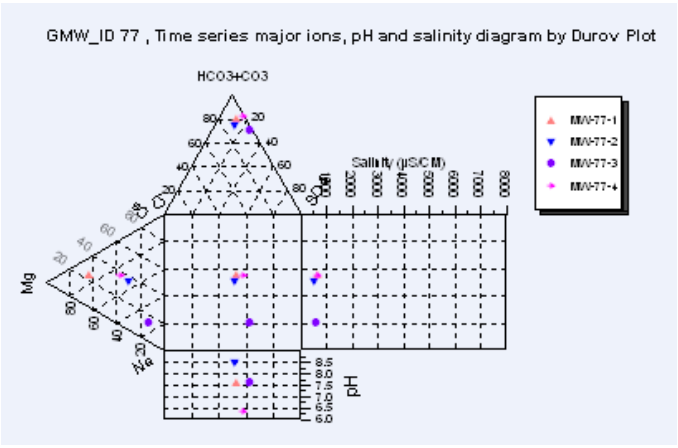

GMW_ID 151, Major ions diagram by Pie Plot (10/08/2010)
Legend
Na
Ca
Mg
Cl
HCO3
SO4
CO3
as meq/l
12%
23%
16%
1%
15%
24%
9%

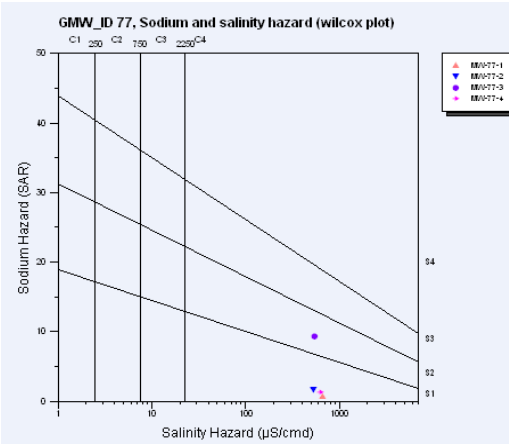

GMW_ID 151, Major ions diagram by Pie Plot (22/02/2009)
Legend
Na
Ca
Mg
Cl
HCO3
SO4
CO3
as meq/l
13%
23%
13%
1%
20%
21%
8%


GMW_ID 151, Major ions diagram by Pie Plot (151,01/11/2008)
Legend
Na
Ca
Mg
Cl
HCO3
SO4
CO3
as meq/l
27%
8%
15%
1%
28%
9%
12%

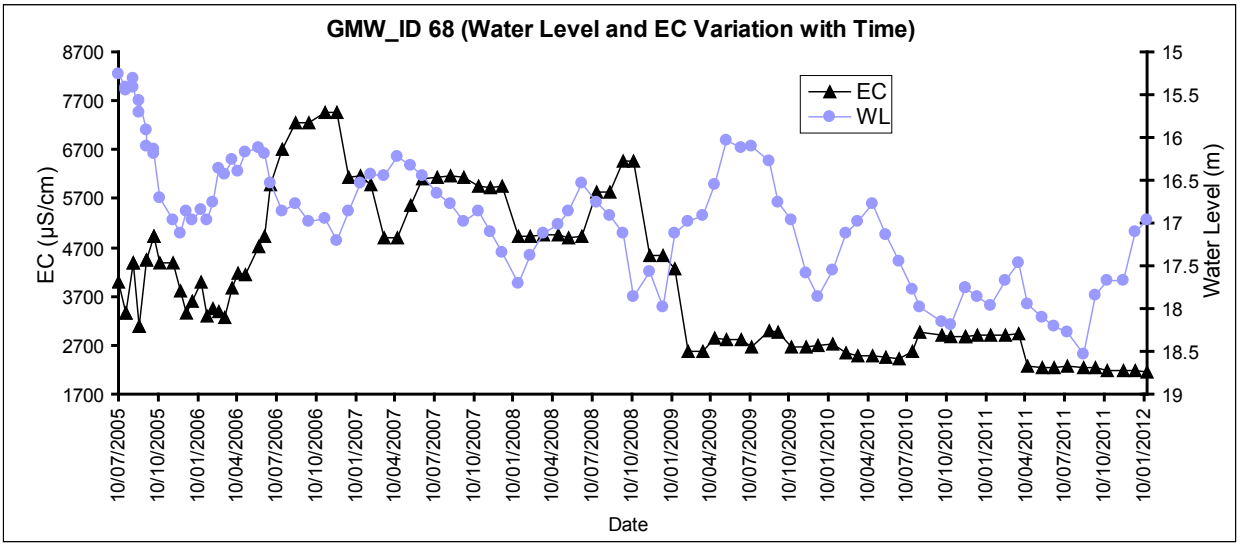
GMW_ID 77

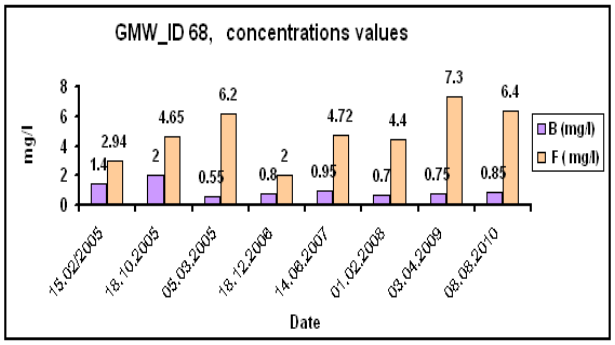

EC (µS/cm)
500
450
400
350
300
23/11/2009
23/01/2010
23/03/2010
23/05/2010
23/07/2010
23/09/2010
23/11/2010
23/01/2011
23/03/2011
23/05/2011
23/07/2011
23/09/2011
23/11/2011
Date

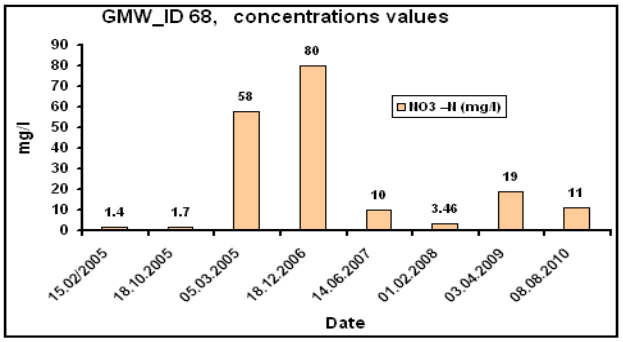

GMW_ID 77 , Time series major ions, pH and salinity diagram by Durov Plot
HCO3+CO3
Salinity (µS/CM)
pH
MW-77-1
MW-77-2
MW-77-3
MW-77-4

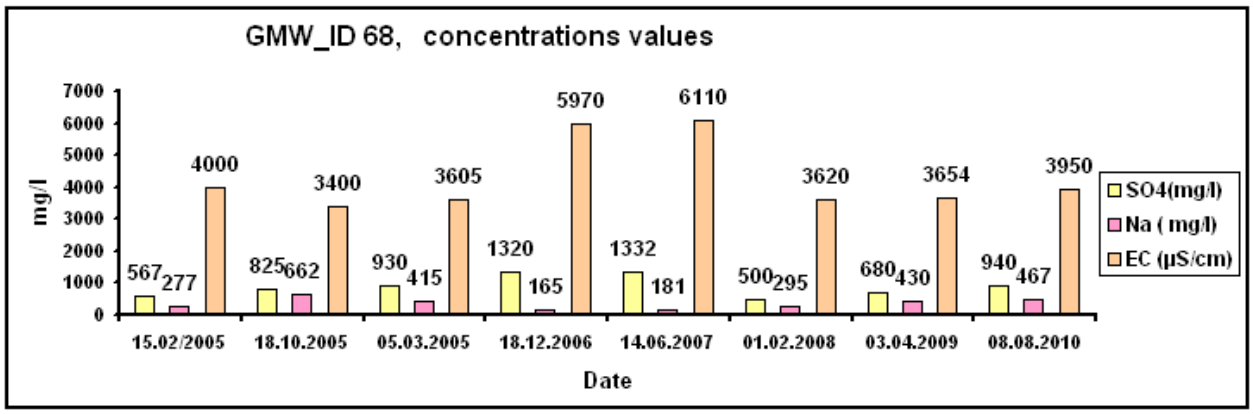

GMW_ID 77, Sodium and salinity hazard (wilcox plot)
Sodium Hazard (SAR)
Salinity Hazard (µS/cmd)
C1
C2
C3
C4
S1
S2
S3
S4

GMW_ID 68

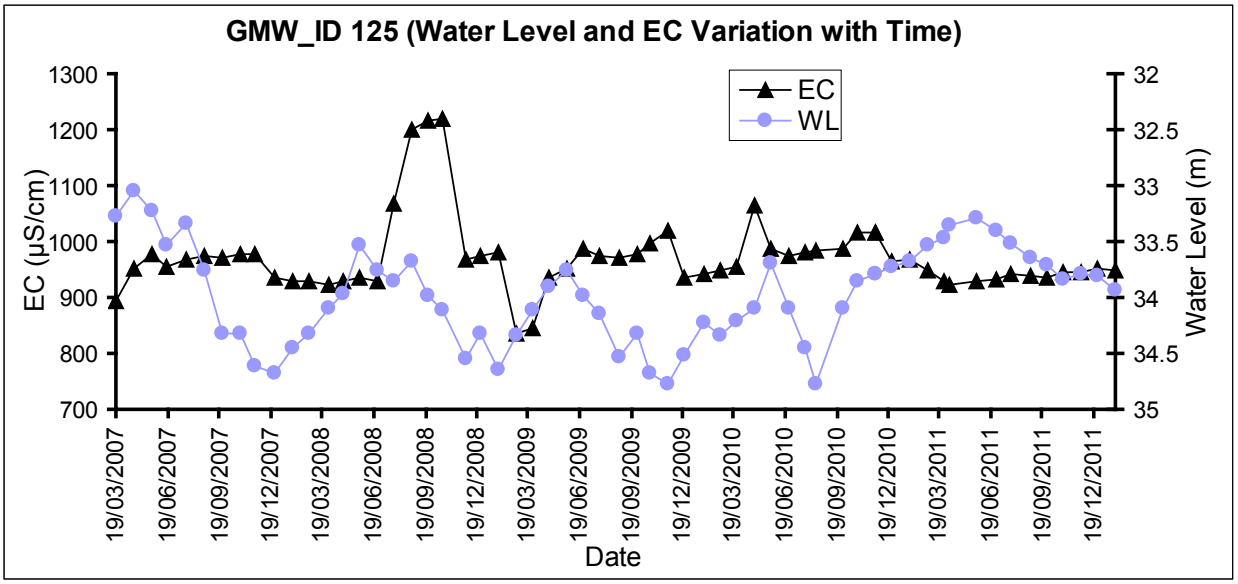

GMW_ID 68 (Water Level and EC Variation with Time)
EC (µS/cm)
Water Level (m)
EC
WL
Date

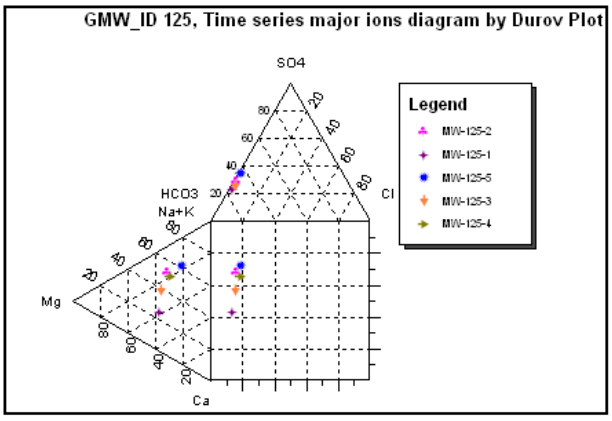

GMW_ID 68, concentrations values
mg/l
B (mg/l)
F (mg/l)
Date

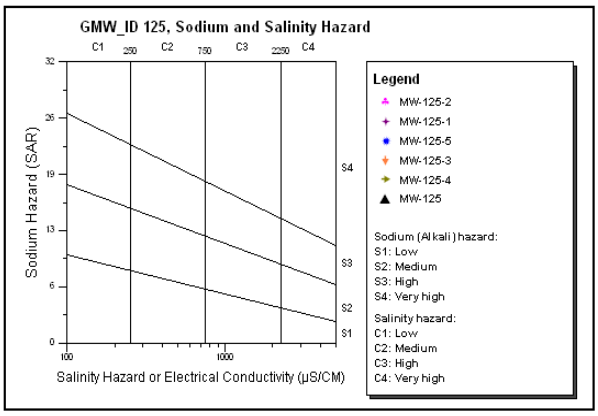

GMW_ID 68, concentrations values
mg/l
NO3 –N (mg/l)
Date


GMW_ID 68, concentrations values
mg/l
SO4(mg/l)
Na (mg/l)
EC (µS/cm)
Date

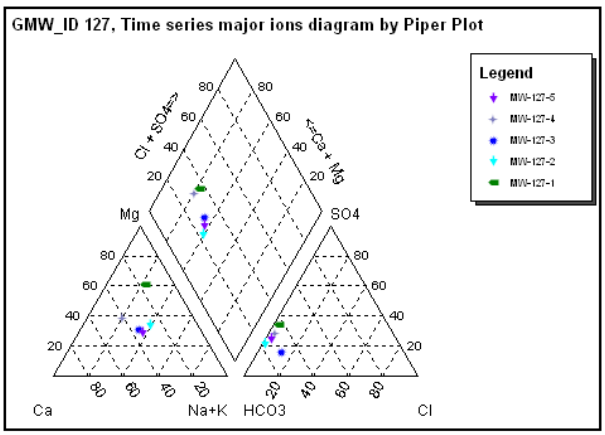
GMW_ID 125

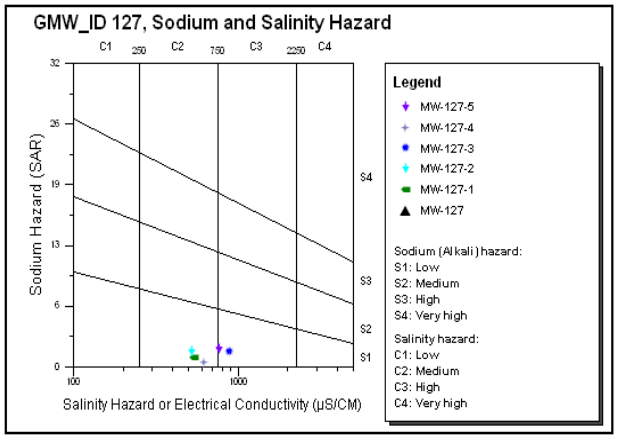




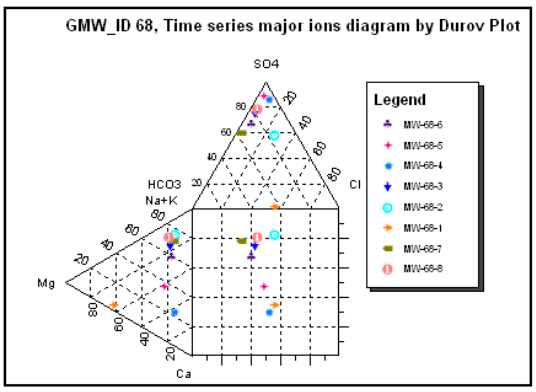


GMW_ID 127

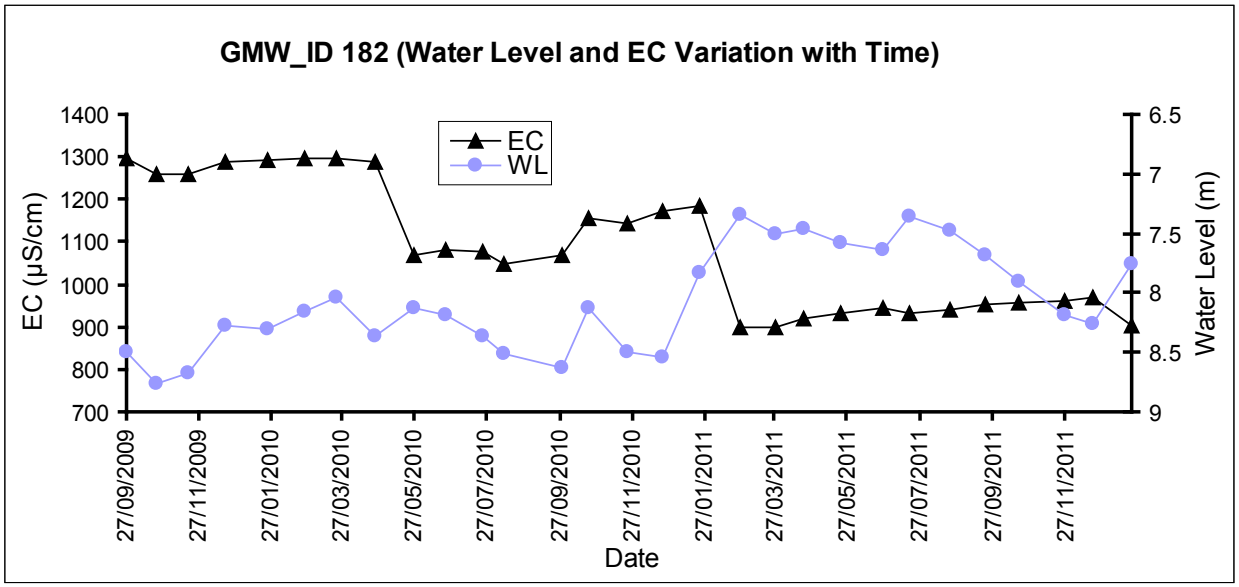




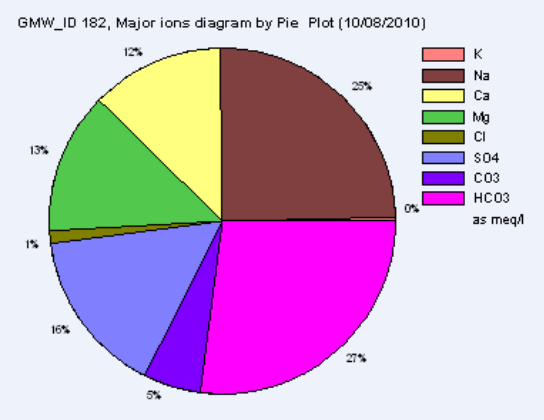
GMW_ID 68



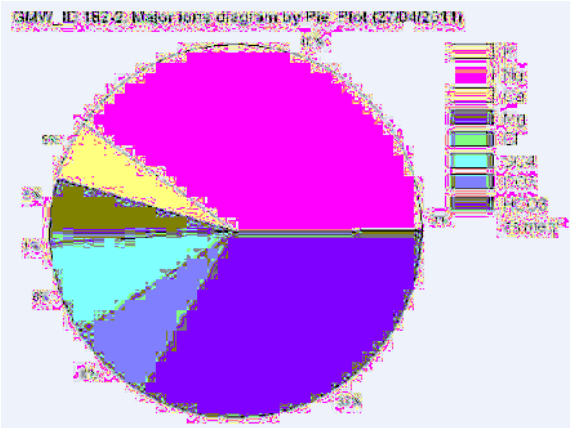
GMW_ID 182



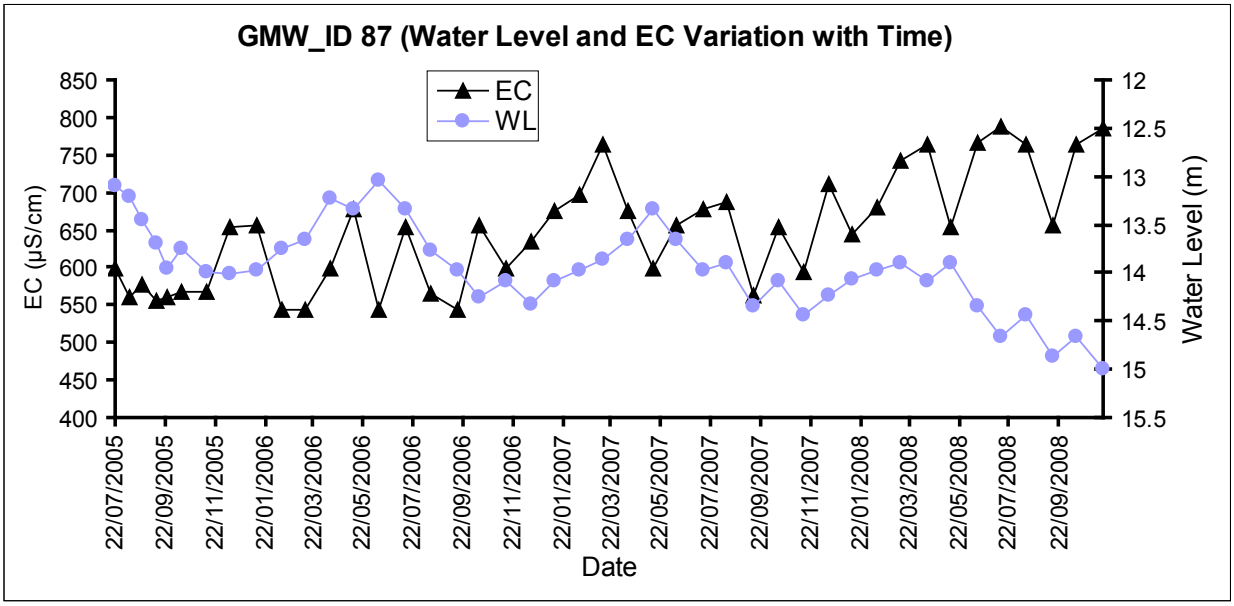
Station	MW-182	
Watertype	Na-Mg-Ca-HCO3-SO4	
Temperature (°C)	38.1	
pH	7.69	
Conductivity	592	uS/cm
Sum of Anions	12.31946	meq/L
Sum of Cations	12.66205	meq/L
Balance	1.371407	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.55	
Ca/SO4	0.3351351	
Na/Cl	13.52381	
Cl/Br	55.26316	



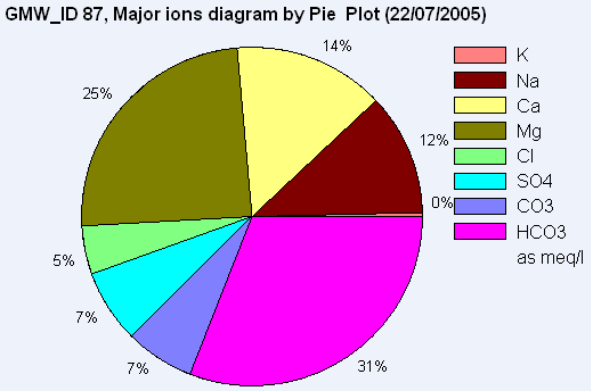
Watertype	Na-HCO3	
Temperature (°C)	22.6	
pH	7.53	
Conductivity	918	uS/cm
Sum of Anions	22.11227	meq/L
Sum of Cations	22.20902	meq/L
Balance	0.2182929	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	1.753846	
Ca/SO4	0.2682353	
Na/Cl	32.66	
Cl/Br	39.0625	



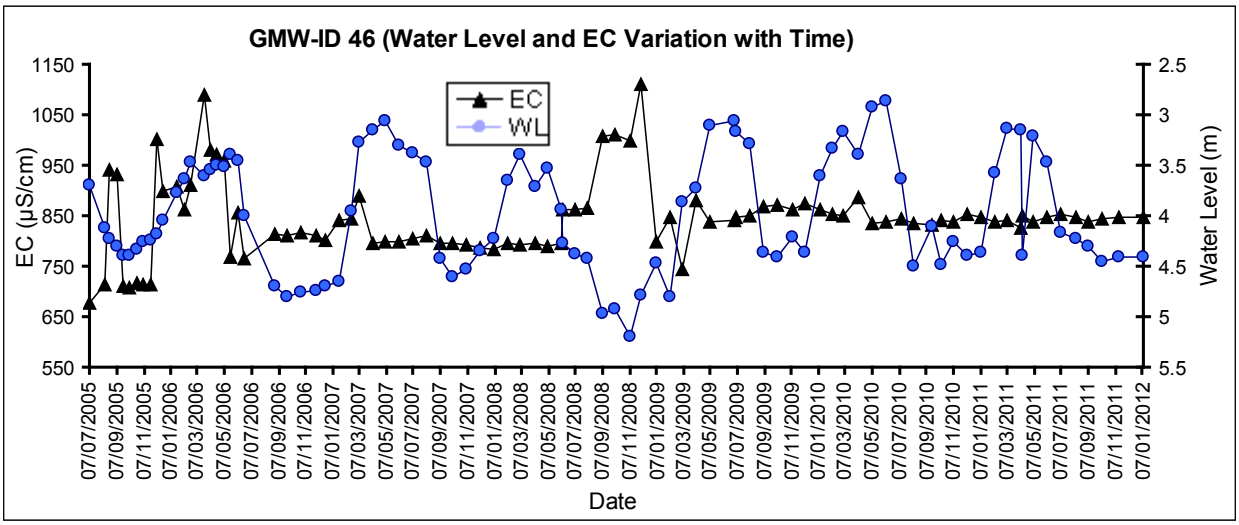
GMW_ID 87

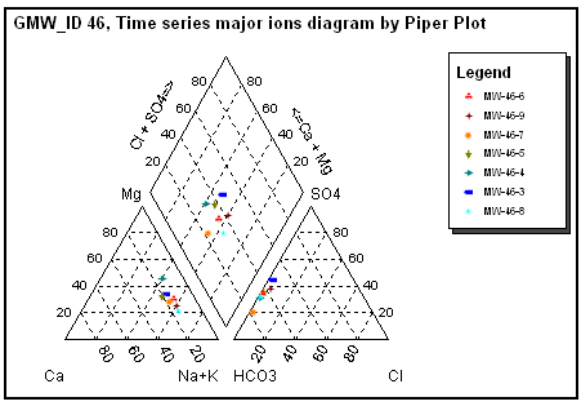


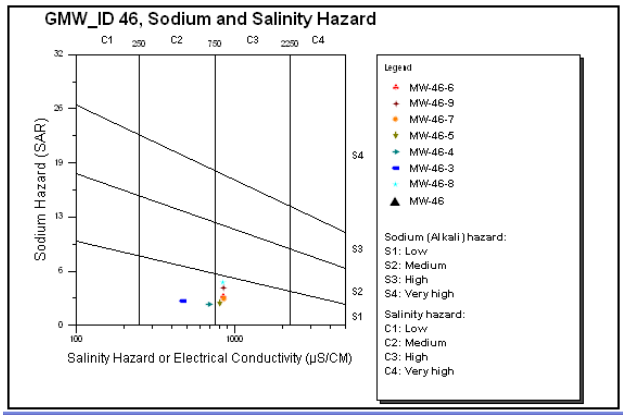
Station	MW-87	
Watertype	Mg-Ca-Na-HCO3	
Temperature (°C)	21.7	
pH	7.8	
Conductivity	598	uS/cm
Sum of Anions	9.95184	meq/L
Sum of Cations	10.26349	meq/L
Balance	1.541658	%
Comparison to Seawater		
Ratios		
	mg/l	
Ca/Mg	0.9666666	
Ca/SO4	0.8656716	
Na/Cl	1.636364	
Cl/Br		



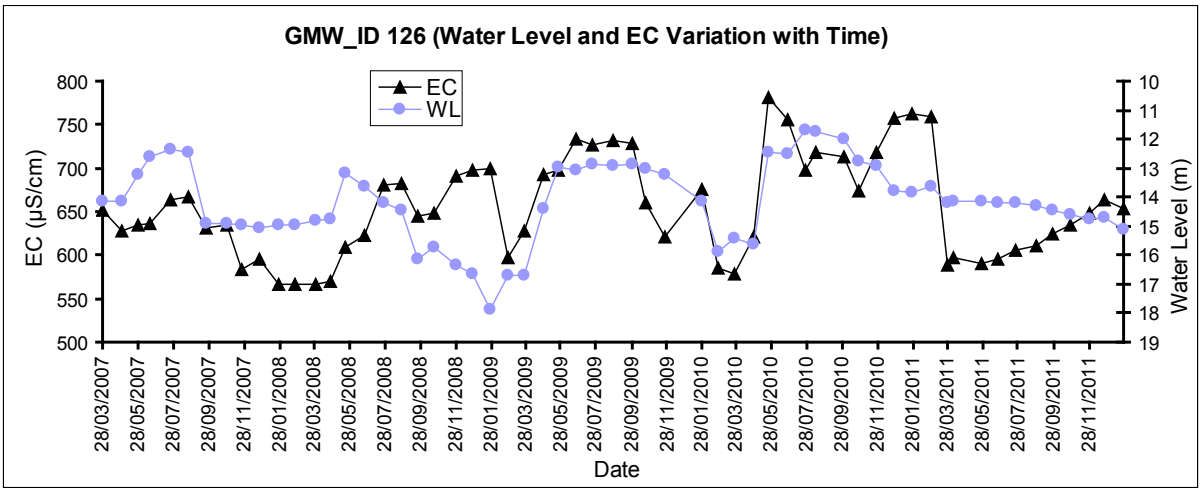
GMW_ID 46

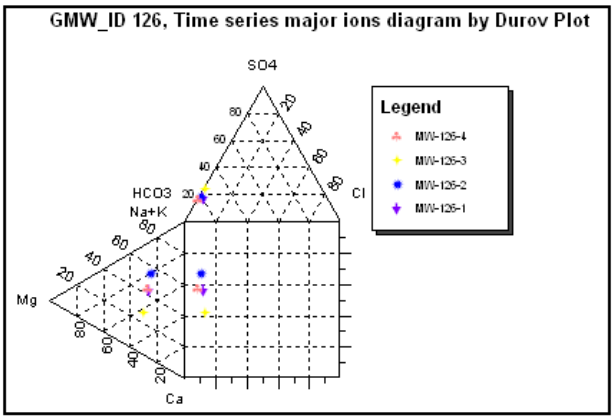


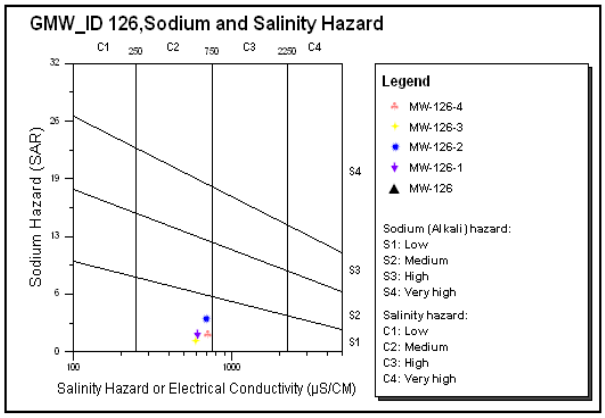




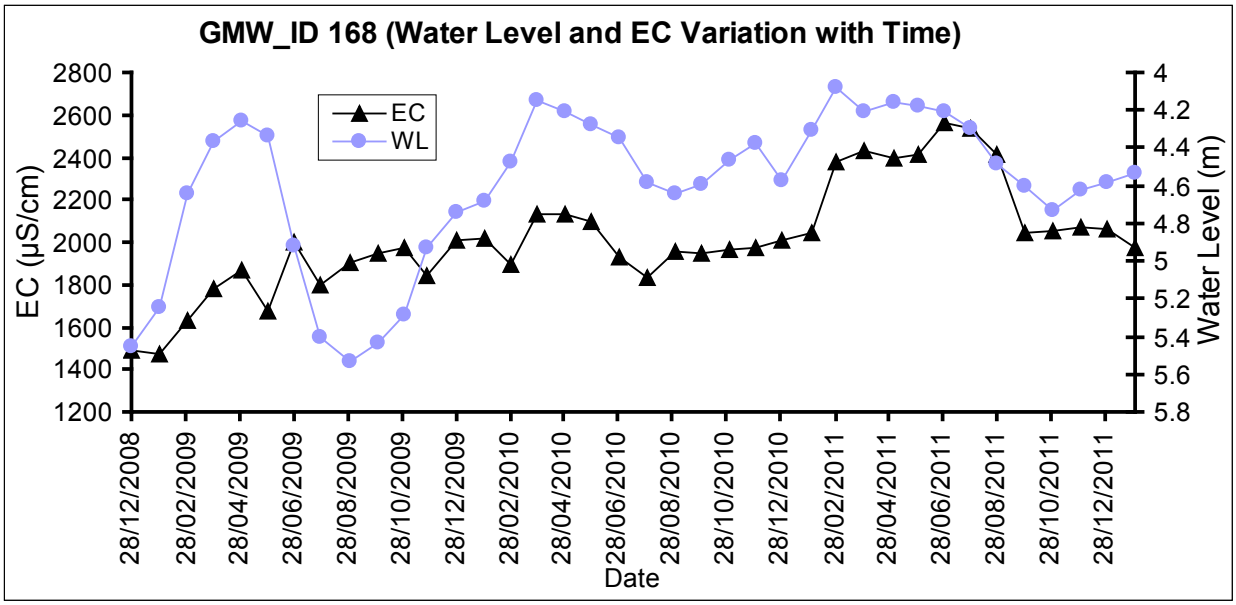
GMW_ID 126

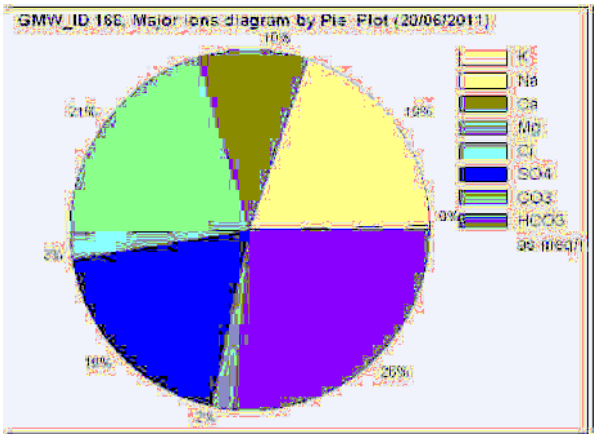


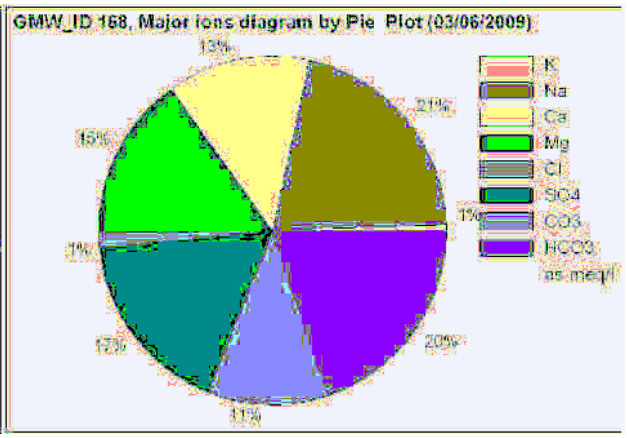




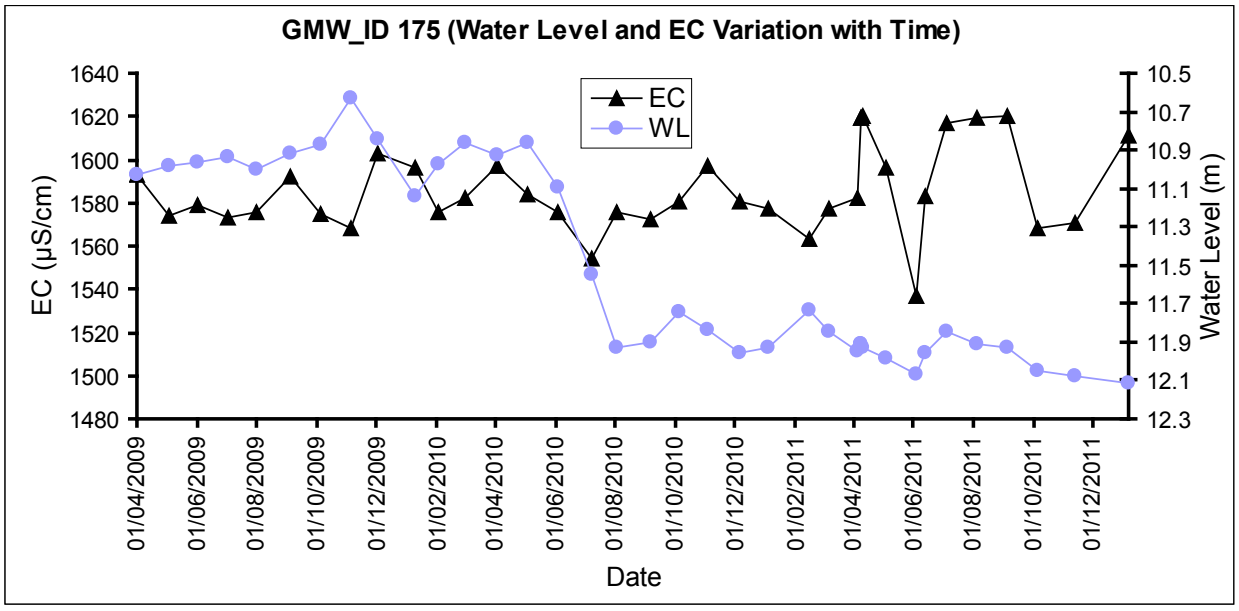
GMW_ID 168

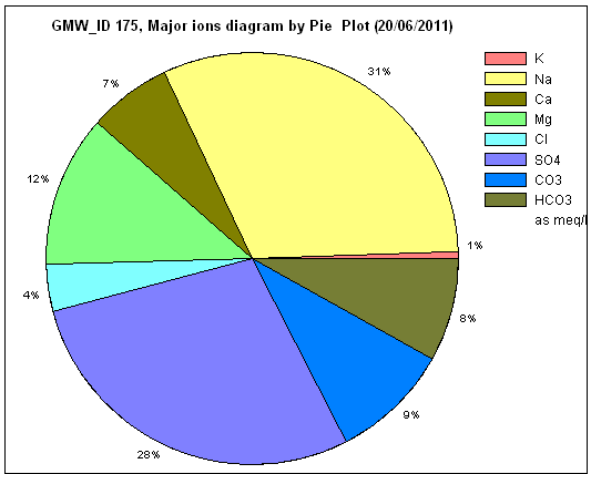


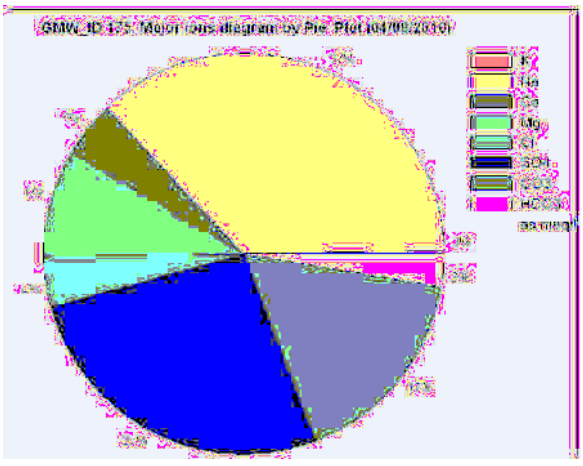

GMW_ID 168, Major ions diagram by Pie Plot (20/06/2011)
K
Na
Ca
Mg
Cl
SO4
CO3
HCO3
as meq/l


GMW_ID 168, Major ions diagram by Pie Plot (03/06/2009)
K
Na
Ca
Mg
Cl
SO4
CO3
HCO3
as meq/l

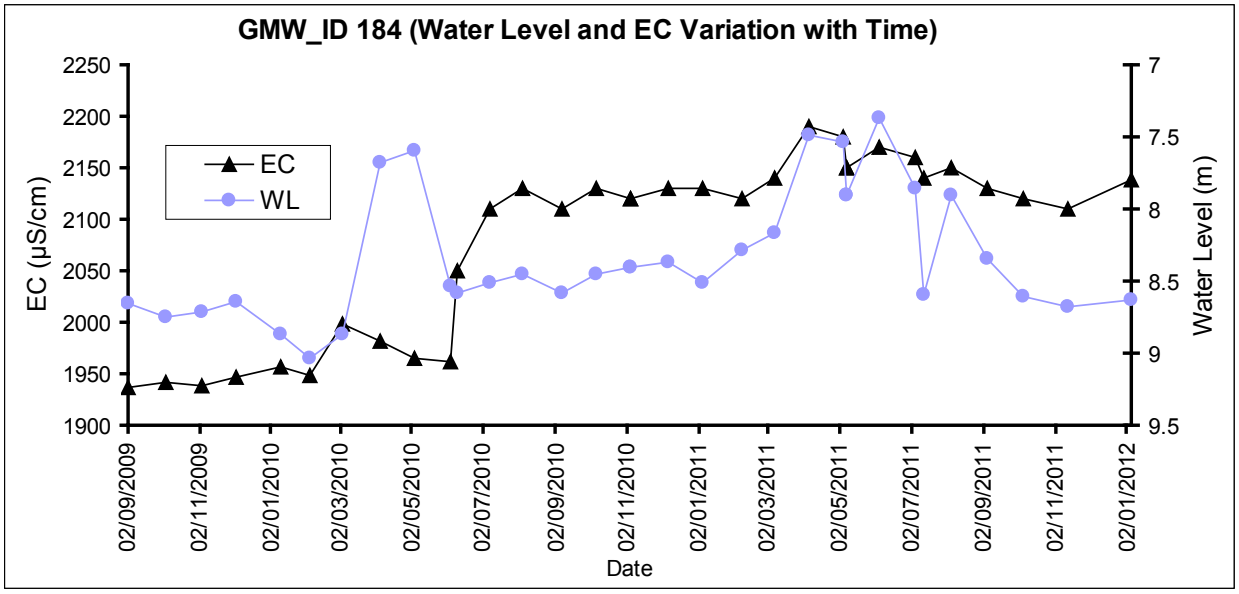
GMW_ID 175

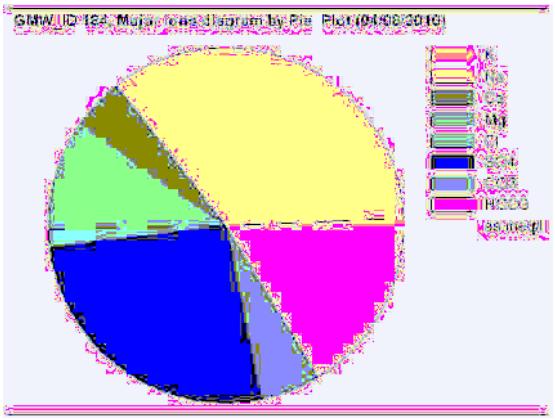

GMW_ID 175 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date
1640
1620
1600
1580
1560
1540
1520
1500
1480
10.5
10.7
10.9
11.1
11.3
11.5
11.7
11.9
12.1
12.3
01/04/2009
01/06/2009
01/08/2009
01/10/2009
01/12/2009
01/02/2010
01/04/2010
01/06/2010
01/08/2010
01/10/2010
01/12/2010
01/02/2011
01/04/2011
01/06/2011
01/08/2011
01/10/2011
01/12/2011


GMW_ID 175, Major ions diagram by Pie Plot (20/06/2011)
K
Na
Ca
Mg
Cl
SO4
CO3
HCO3
as meq/l
31%
7%
12%
4%
1%
8%
9%
28%

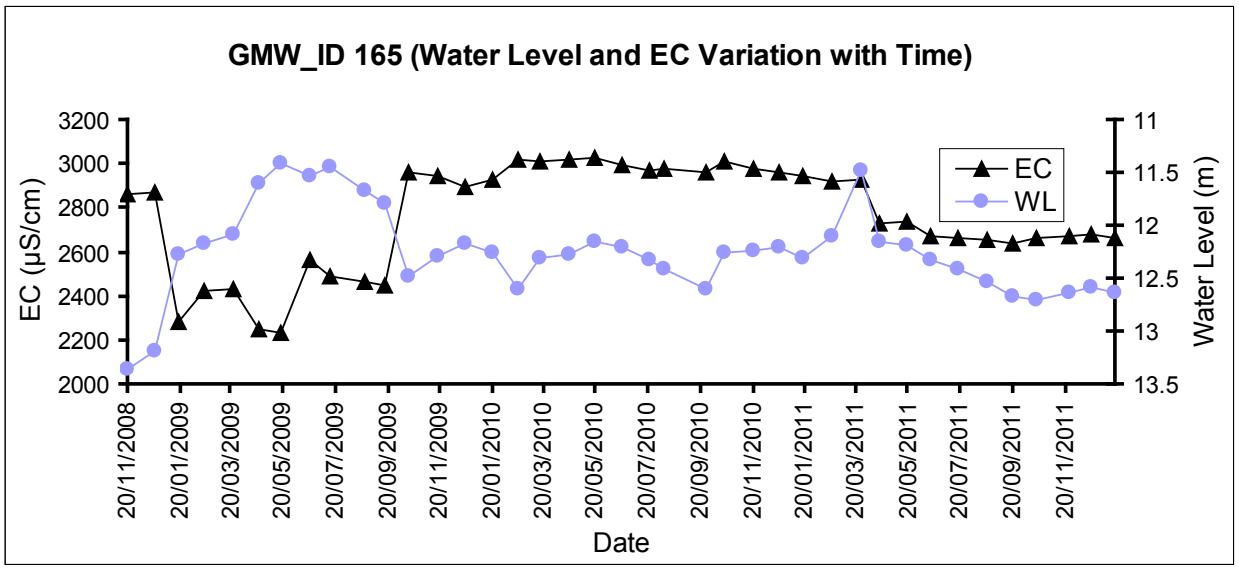


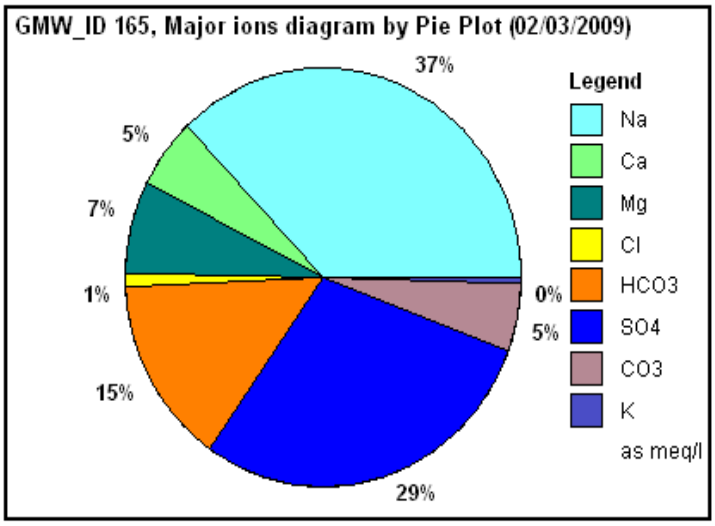
GMW_ID 184

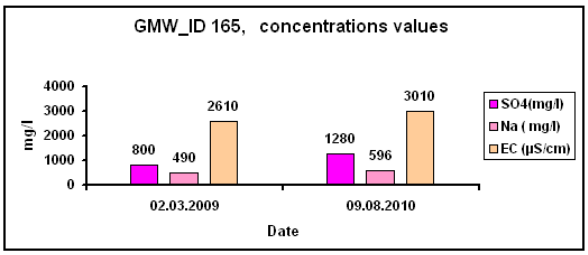


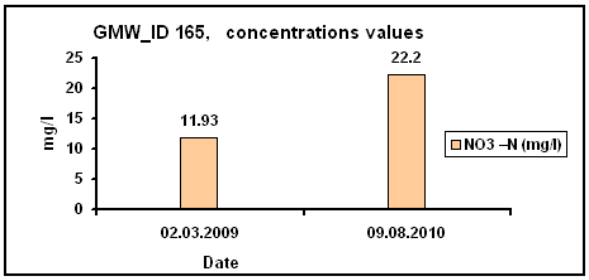


GMW_ID 165

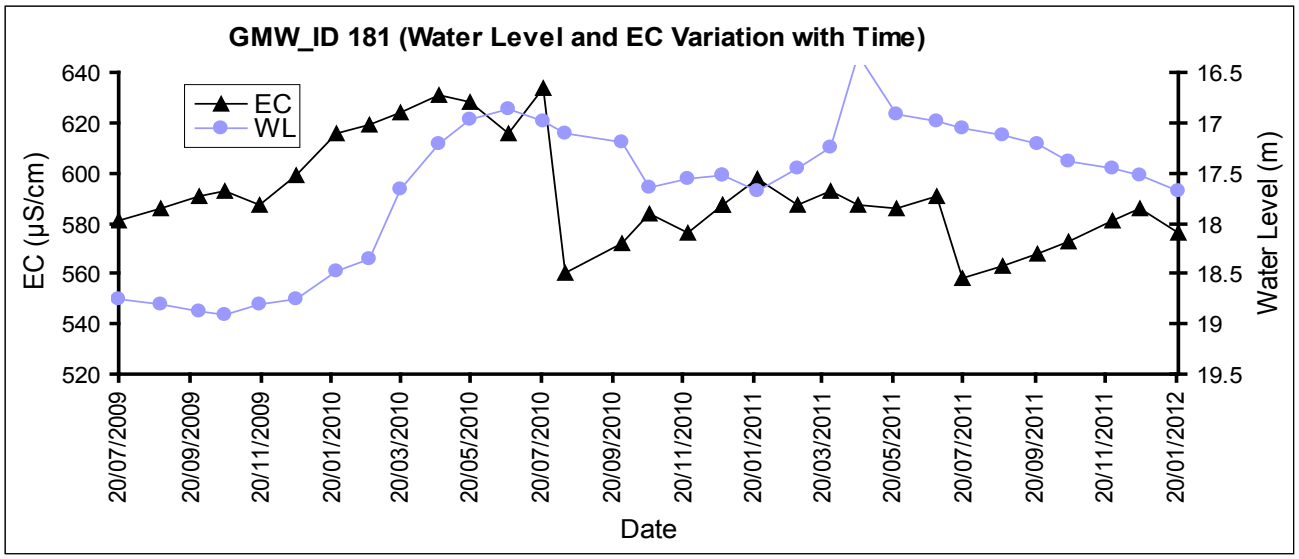


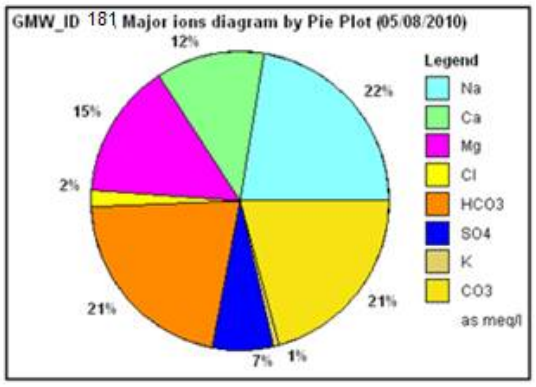

GMW_ID 165, Major ions diagram by Pie Plot (02/03/2009)
37%
5%
7%
1%
15%
29%
0%
5%
Legend
Na
Ca
Mg
Cl
HCO3
SO4
CO3
K
as meq/l


GMW_ID 165, concentrations values
mg/l
4000
3000
2000
1000
0
800
490
2610
1280
596
3010
02.03.2009
09.08.2010
Date
SO4(mg/l)
Na (mg/l)
EC (µS/cm)

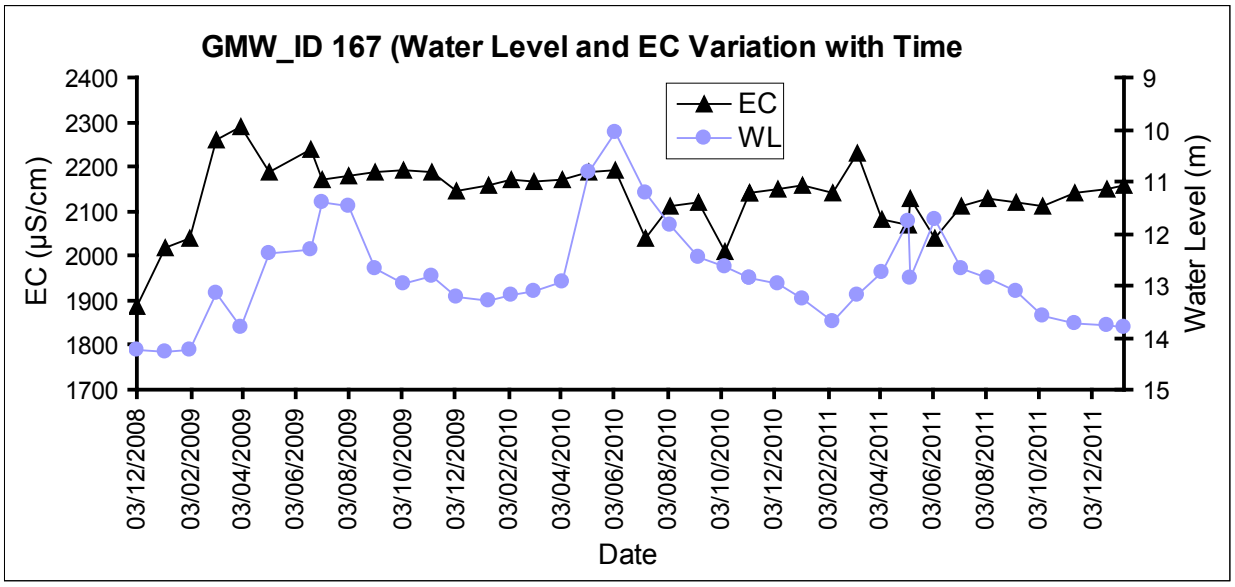

GMW_ID 165, concentrations values
mg/l
25
20
15
10
5
0
11.93
22.2
02.03.2009
09.08.2010
Date
NO3 –N (mg/l)

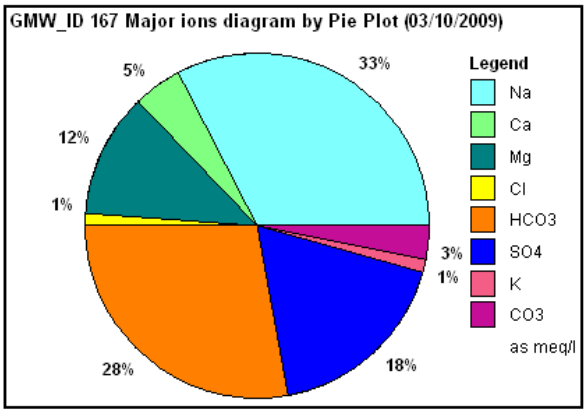
GMW_ID 181

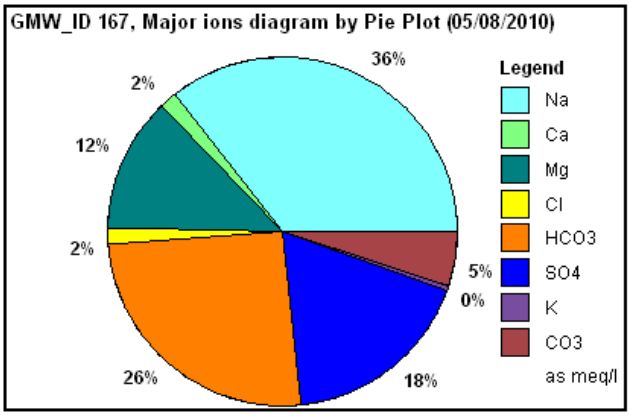

GMW_ID 181 (Water Level and EC Variation with Time)
EC (µS/cm)
640
620
600
580
560
540
520
Water Level (m)
16.5
17
17.5
18
18.5
19
19.5
EC
WL
20/07/2009
20/09/2009
20/11/2009
20/01/2010
20/03/2010
20/05/2010
20/07/2010
20/09/2010
20/11/2010
20/01/2011
20/03/2011
20/05/2011
20/07/2011
20/09/2011
20/11/2011
20/01/2012
Date


GMW_ID 181 Major ions diagram by Pie Plot (05/08/2010)
12%
22%
15%
2%
21%
21%
7%
1%
Legend
Na
Ca
Mg
Cl
HCO3
SO4
K
CO3
as meq/l

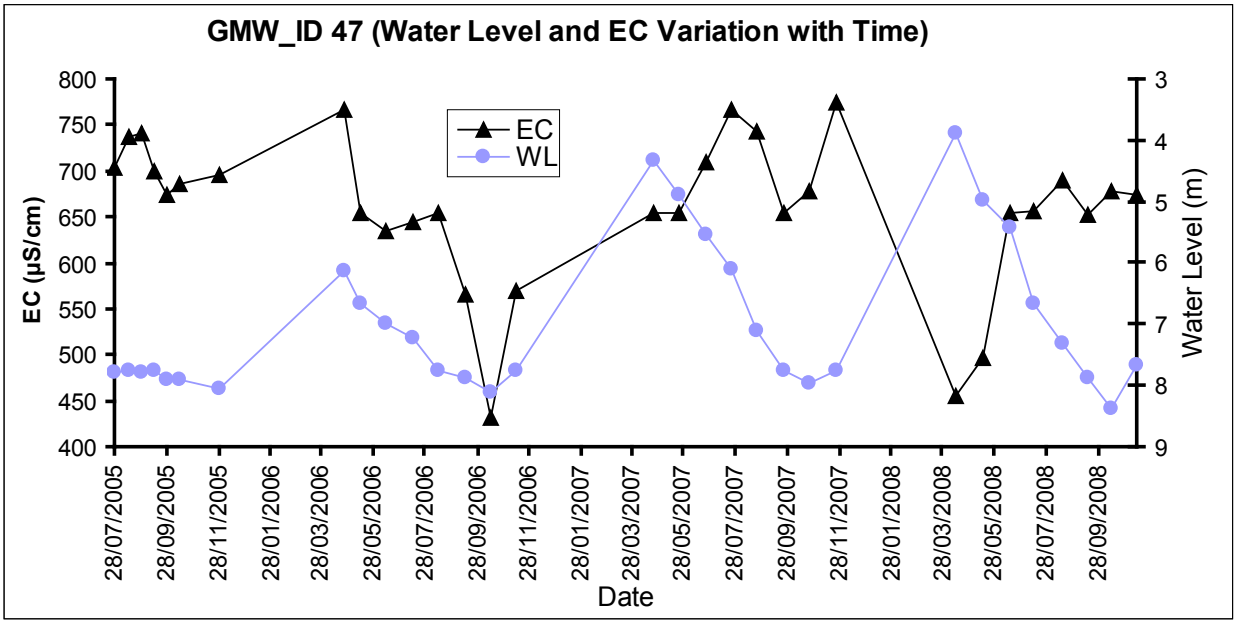
GMW_ID 167

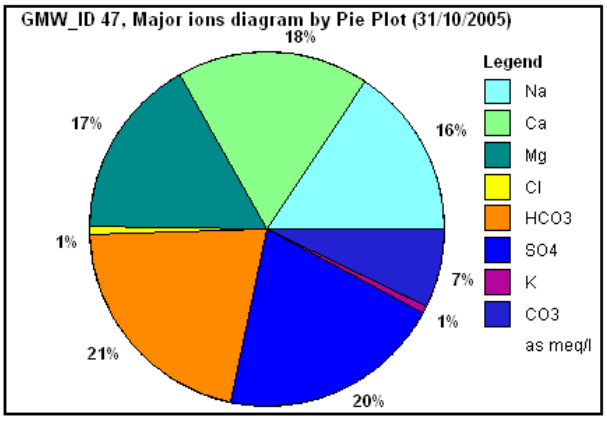


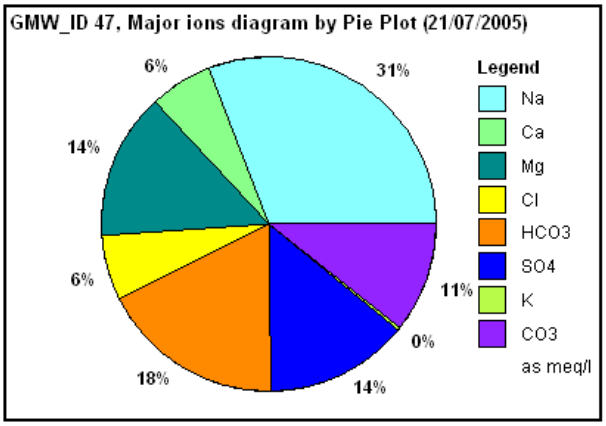




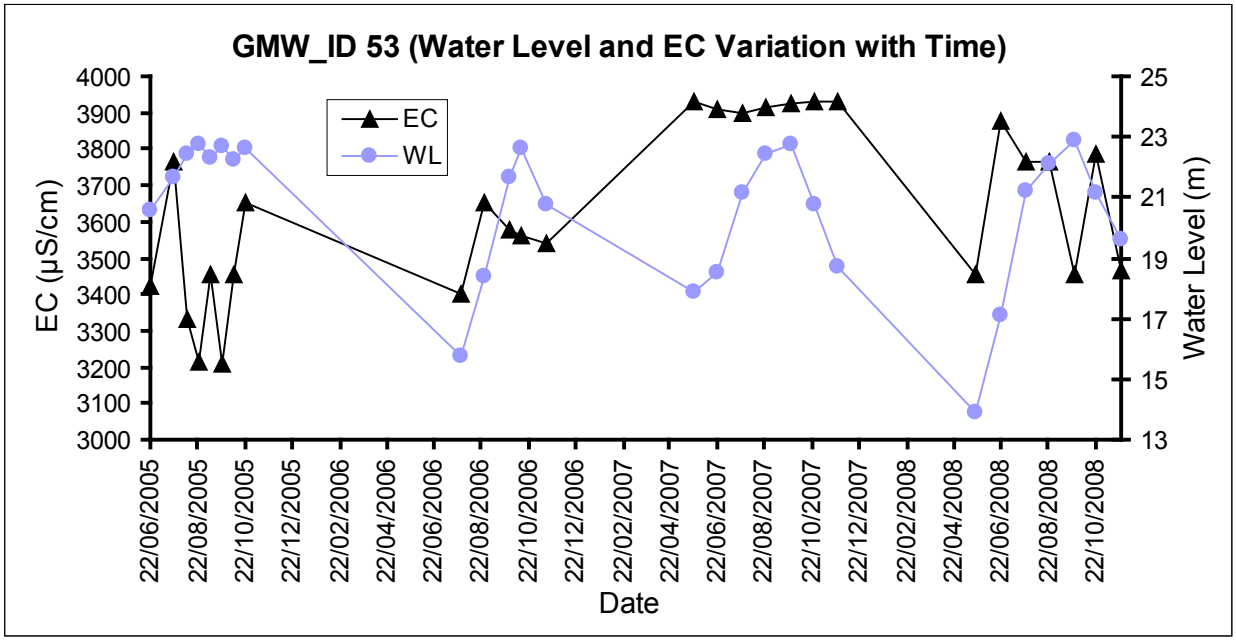
Ghor
GMW_ID 47

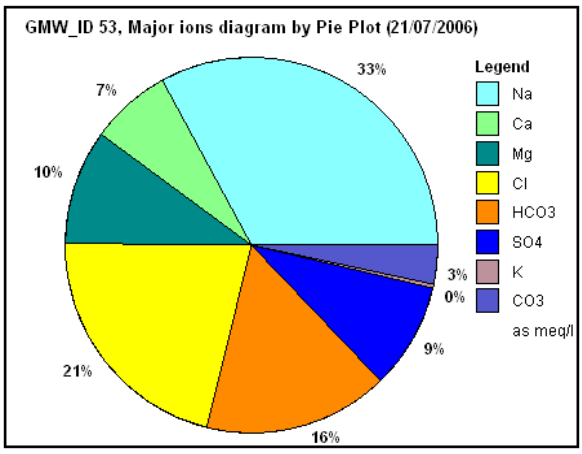


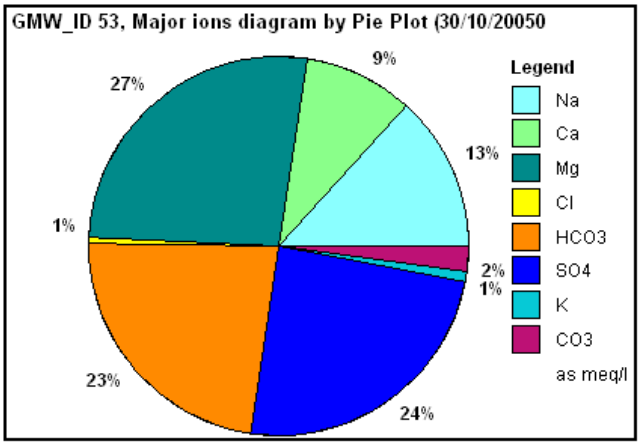

GMW_ID 47, Major ions diagram by Pie Plot (31/10/2005)
18%
17%
16%
1%
7%
1%
21%
20%
Legend
Na
Ca
Mg
Cl
HCO3
SO4
K
CO3
as meq/l


GMW_ID 47, Major ions diagram by Pie Plot (21/07/2005)
6%
31%
14%
6%
11%
0%
18%
14%
Legend
Na
Ca
Mg
Cl
HCO3
SO4
K
CO3
as meq/l

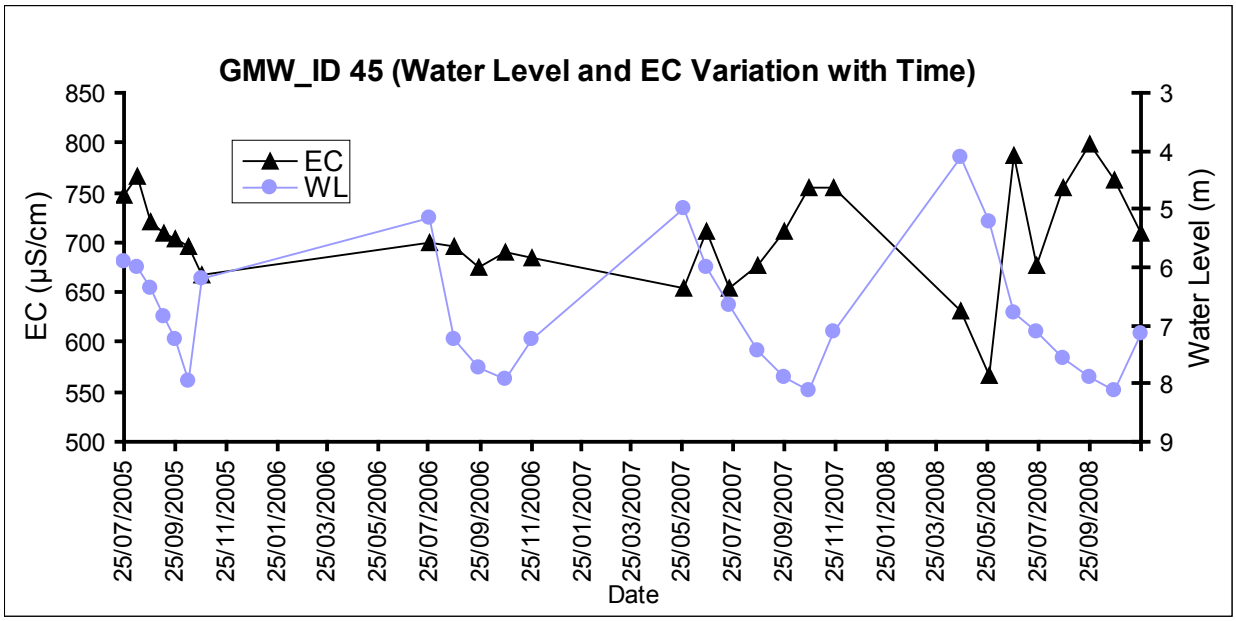
GMW_ID 53

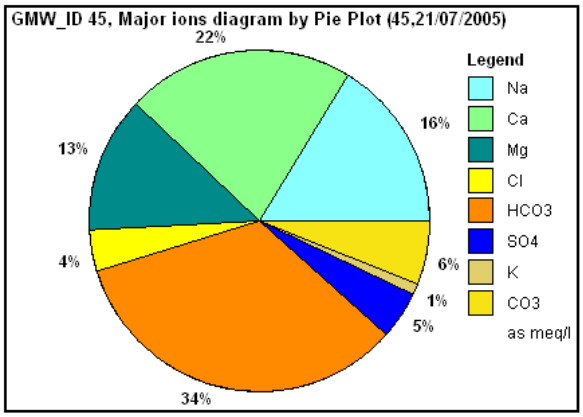

GMW_ID 53 (Water Level and EC Variation with Time)
EC (µS/cm)
Water Level (m)
EC
WL
4000
3900
3800
3700
3600
3500
3400
3300
3200
3100
3000
25
23
21
19
17
15
13
22/06/2005
22/08/2005
22/10/2005
22/12/2005
22/02/2006
22/04/2006
22/06/2006
22/08/2006
22/10/2006
22/12/2006
22/02/2007
22/04/2007
22/06/2007
22/08/2007
22/10/2007
22/12/2007
22/02/2008
22/04/2008
22/06/2008
22/08/2008
22/10/2008
Date

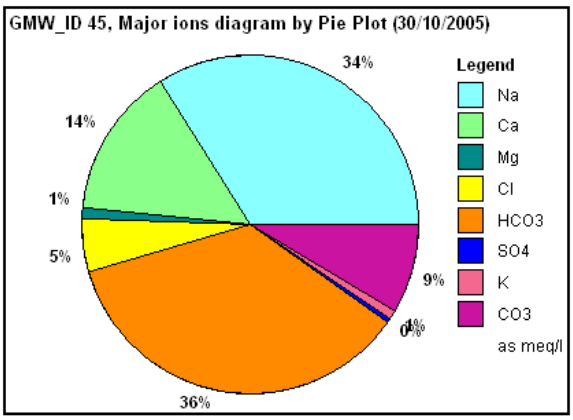

GMW_ID 53, Major ions diagram by Pie Plot (21/07/2006)
33%
7%
10%
3%
0%
9%
21%
16%
Legend
Na
Ca
Mg
Cl
HCO3
SO4
K
CO3
as meq/l


GMW_ID 53, Major ions diagram by Pie Plot (30/10/20050
9%
27%
13%
1%
2%
1%
23%
24%
Legend
Na
Ca
Mg
Cl
HCO3
SO4
K
CO3
as meq/l

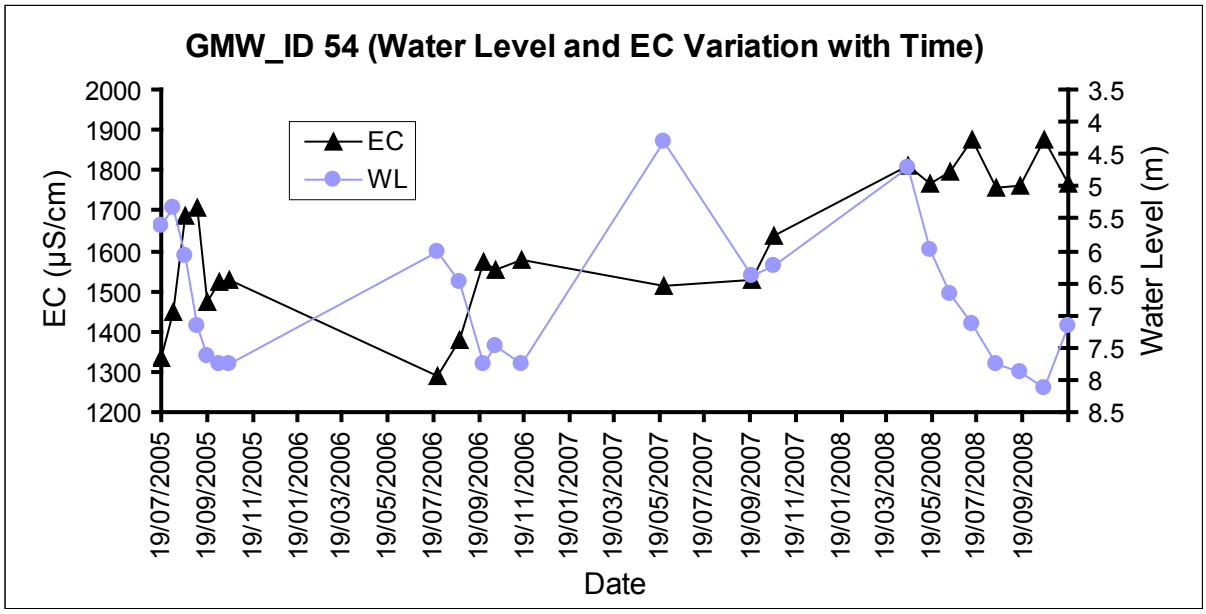
GMW_ID 45

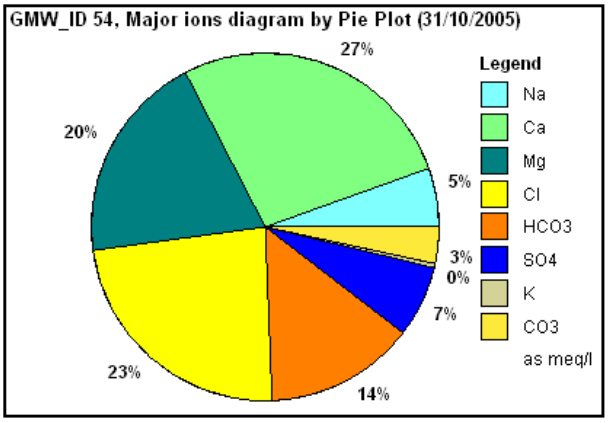

GMW_ID 45 (Water Level and EC Variation with Time)
EC
WL
EC (µS/cm)
Water Level (m)
Date
850
800
750
700
650
600
550
500
3
4
5
6
7
8
9
25/07/2005
25/09/2005
25/11/2005
25/01/2006
25/03/2006
25/05/2006
25/07/2006
25/09/2006
25/11/2006
25/01/2007
25/03/2007
25/05/2007
25/07/2007
25/09/2007
25/11/2007
25/01/2008
25/03/2008
25/05/2008
25/07/2008
25/09/2008

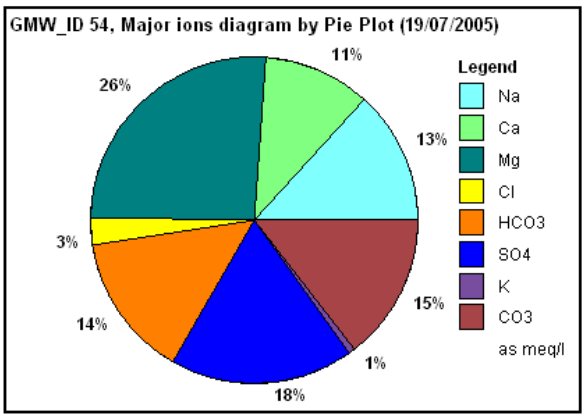

GMW_ID 45, Major ions diagram by Pie Plot (45,21/07/2005)
Legend
Na
Ca
Mg
Cl
HCO3
SO4
K
CO3
as meq/l
22%
16%
13%
6%
4%
1%
5%
34%


GMW_ID 45, Major ions diagram by Pie Plot (30/10/2005)
Legend
Na
Ca
Mg
Cl
HCO3
SO4
K
CO3
as meq/l
34%
14%
1%
5%
9%
0%
36%

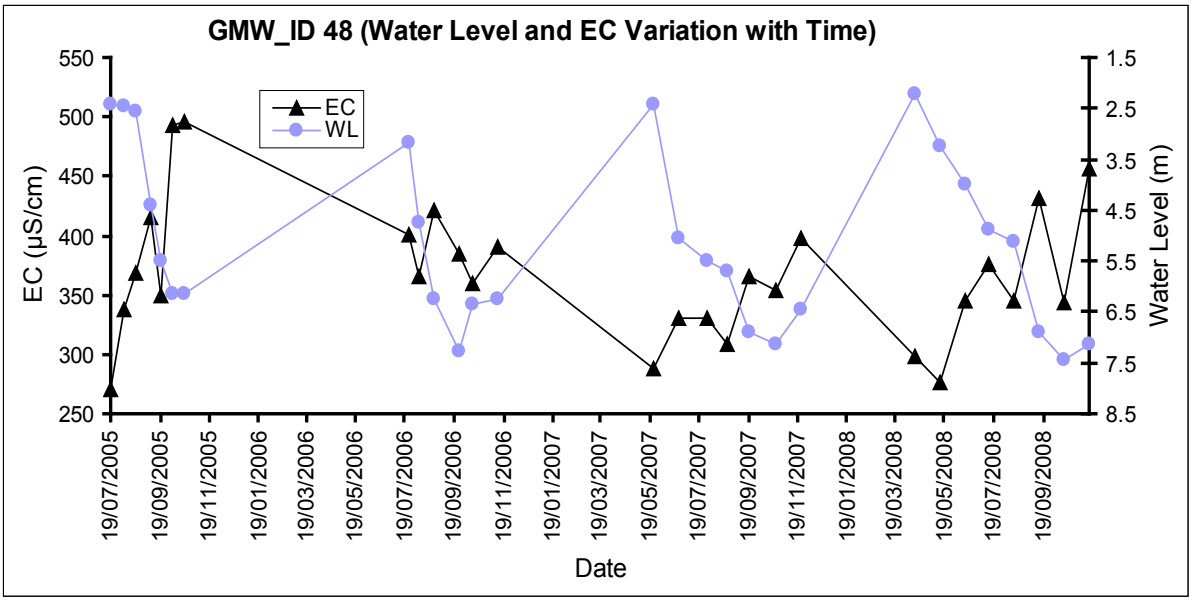
GMW_ID 54



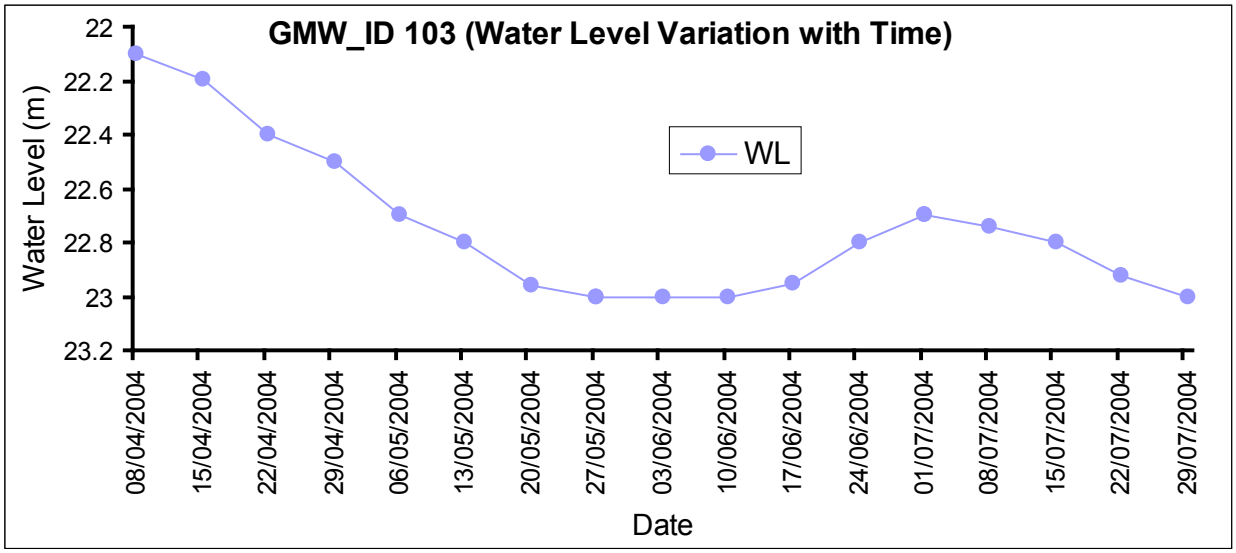




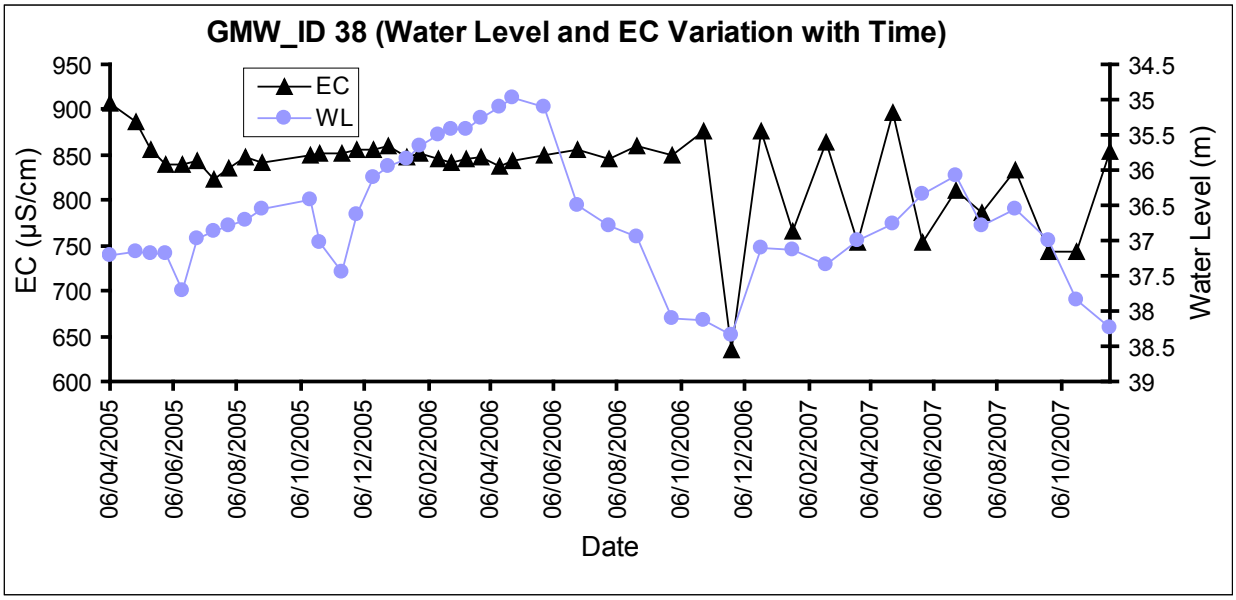
GMW_ID 48

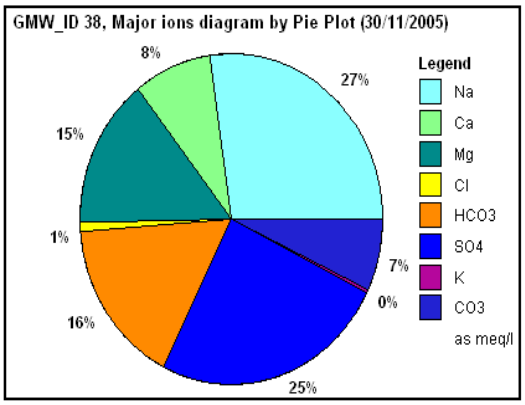


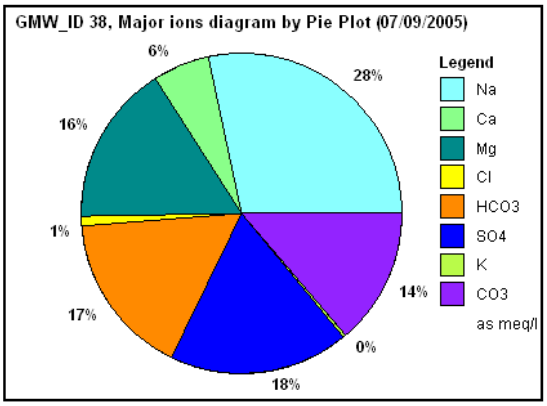
Kandahar
GMW_ID 103



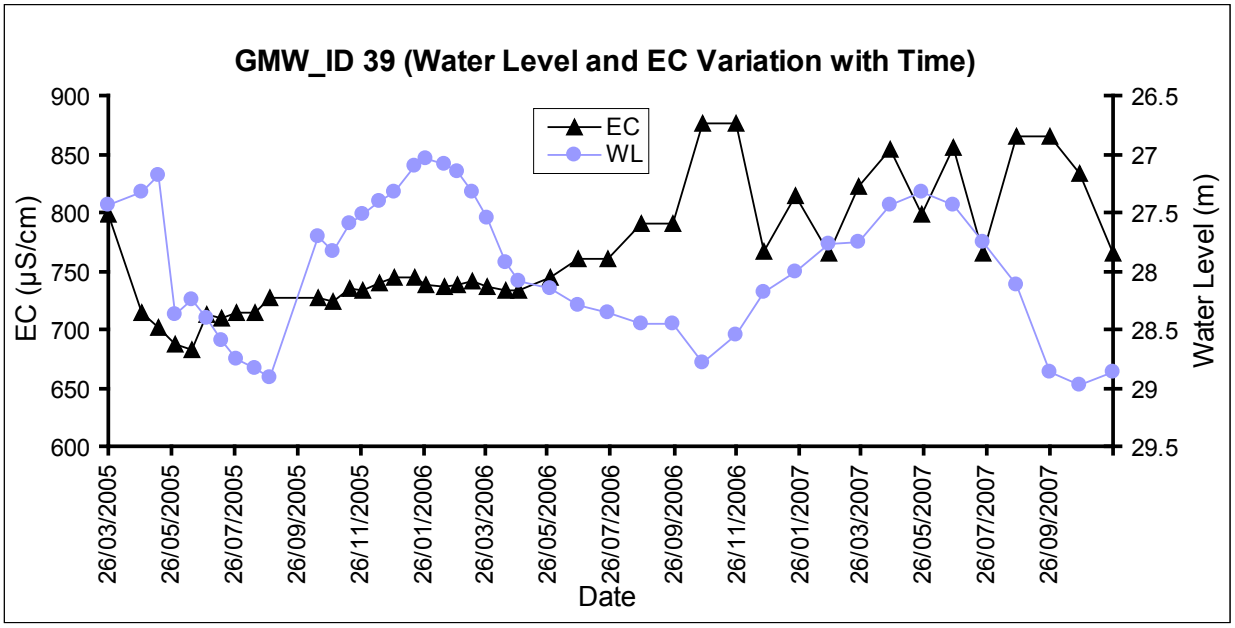
GMW_ID 38

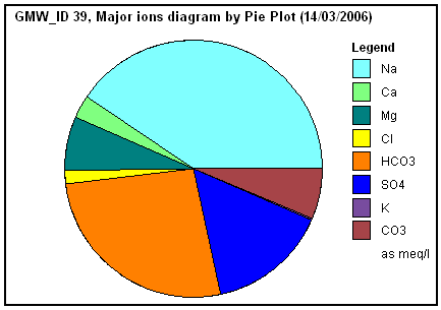


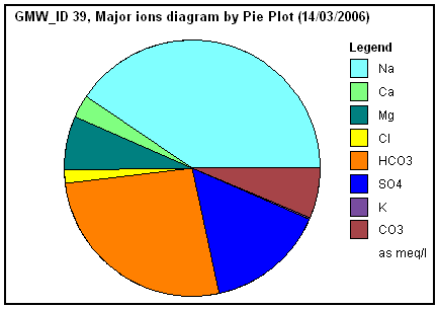


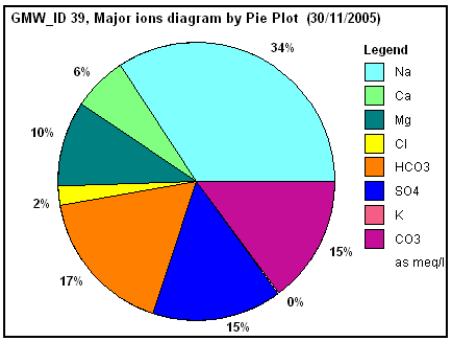


GMW_ID 39

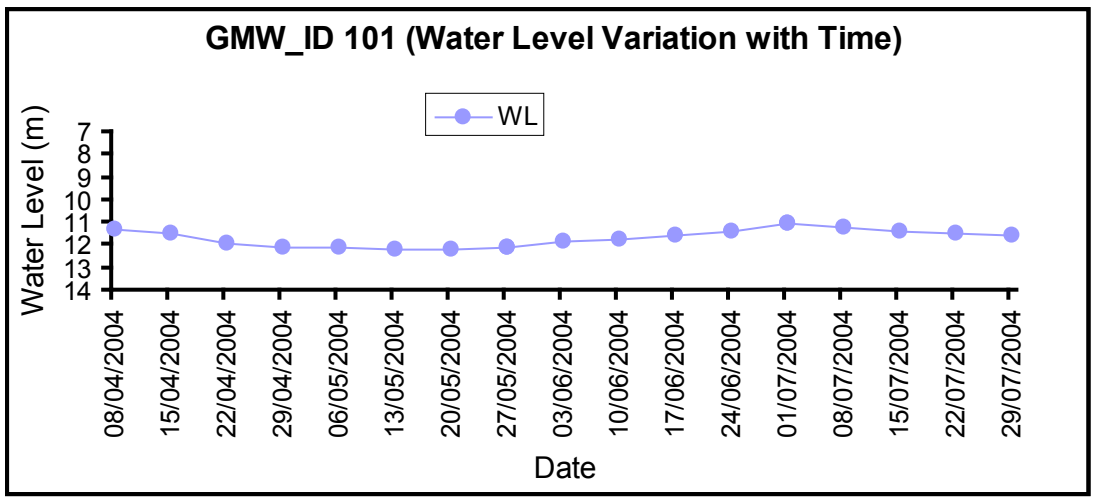




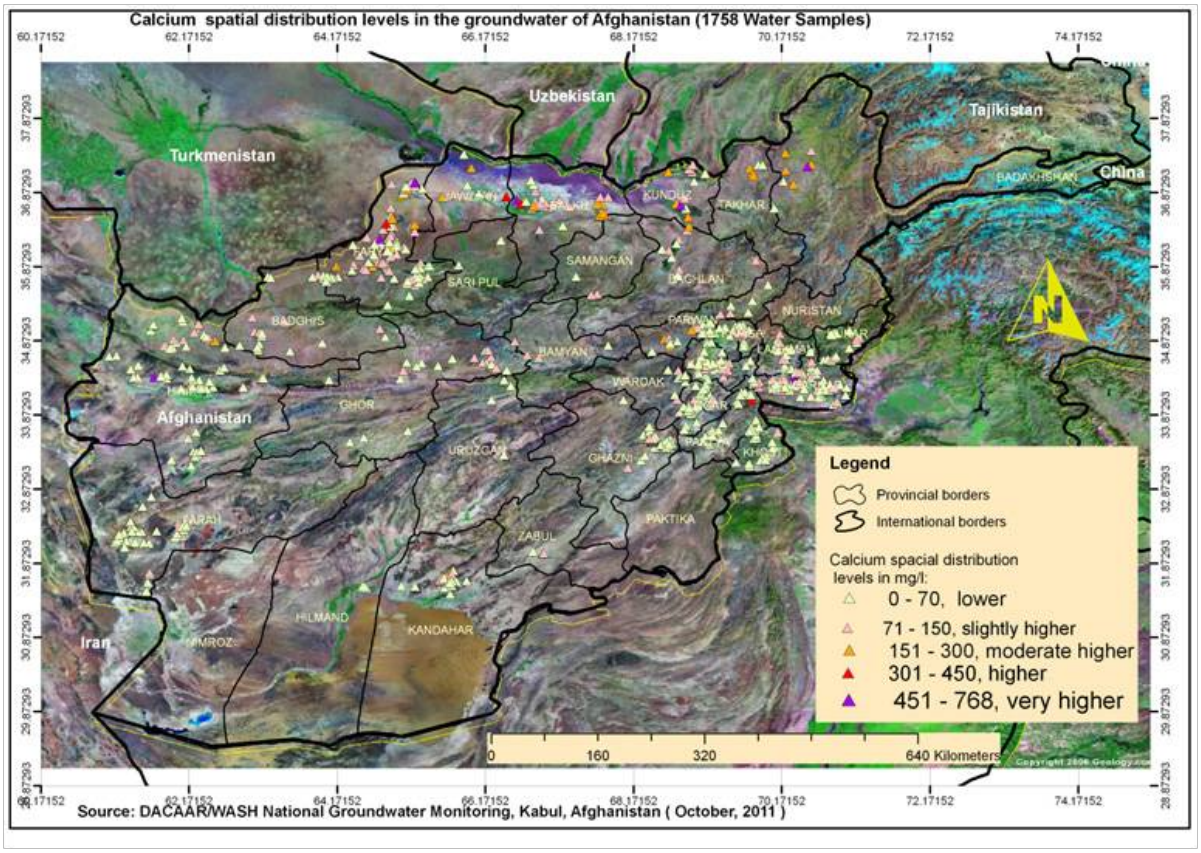


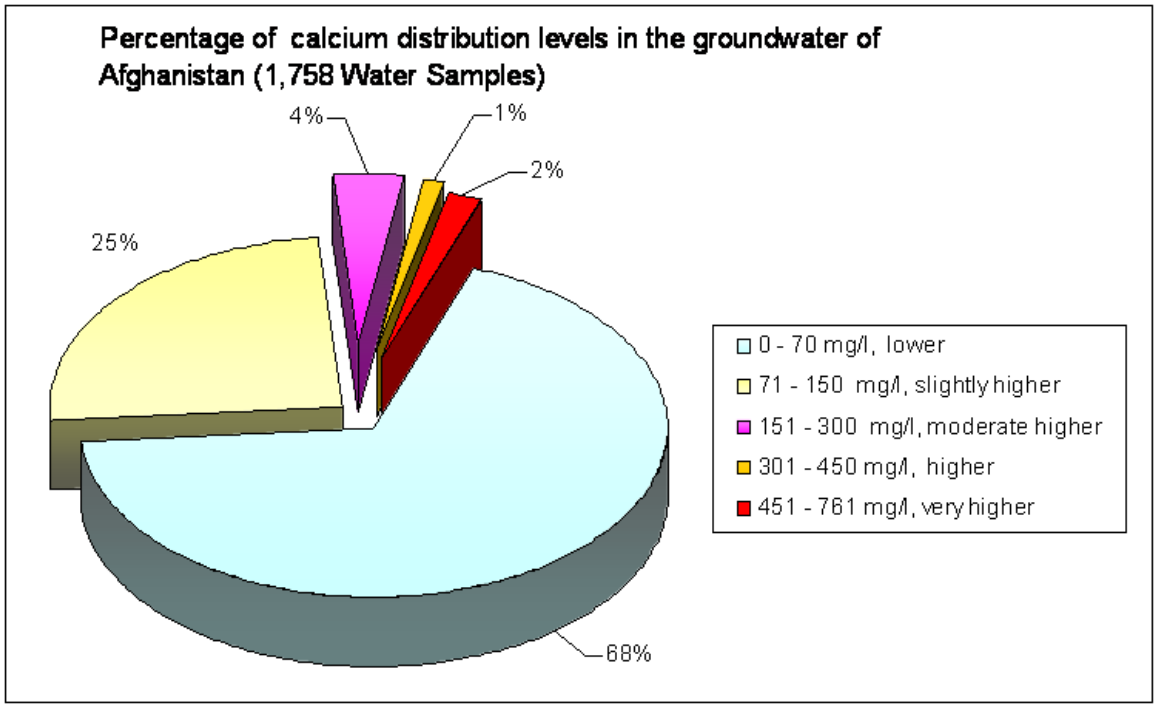


GMW_ID 101

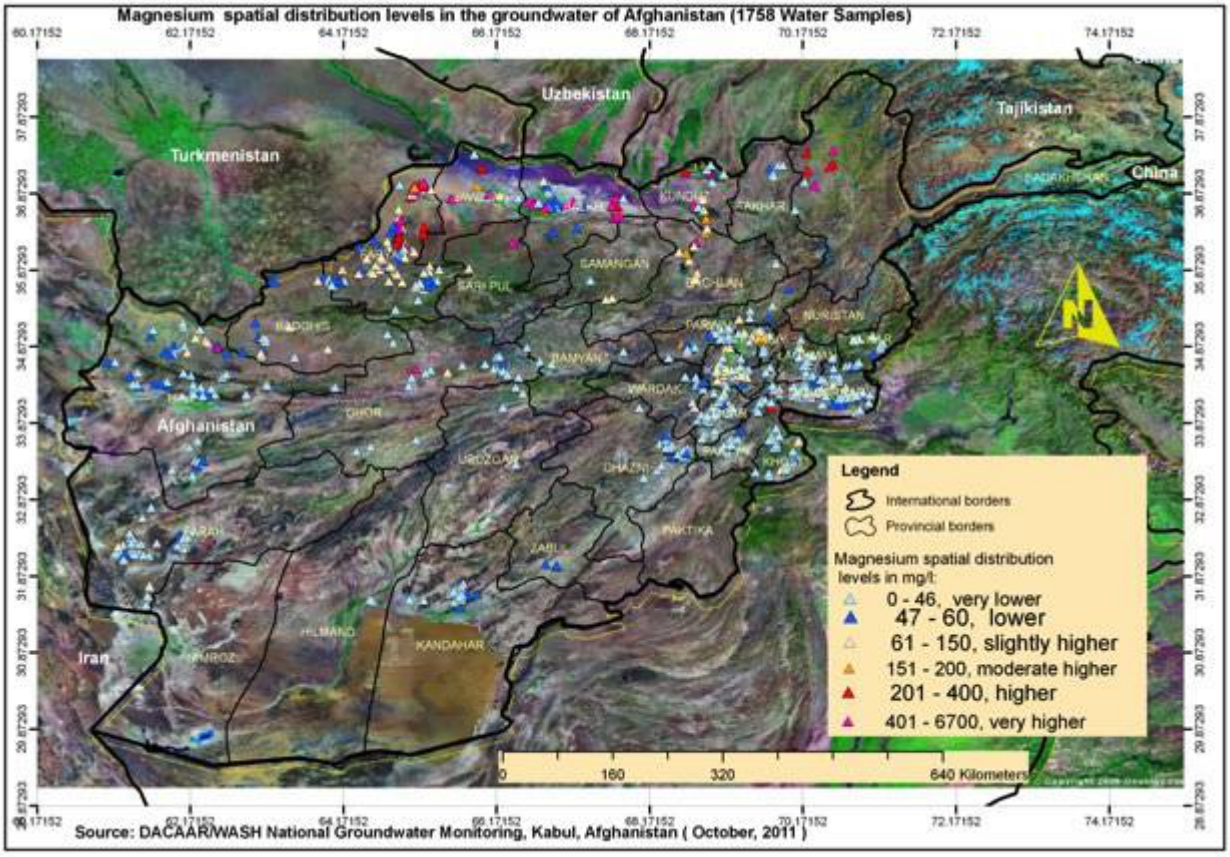


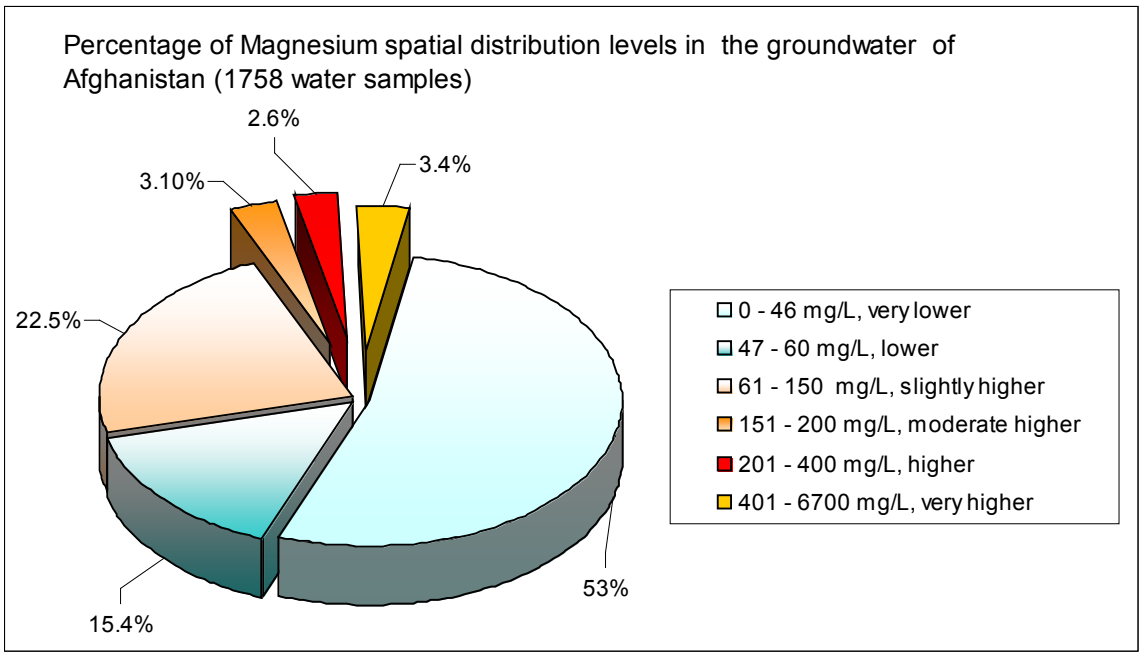
Annex 9 Calcium Spatial Distribution Levels





Annex 10 Magnesium Spatial Distribution Levels





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