

## **Climate change in Central Asia – preliminary results from the CAWA Project**

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Central Asia highly depends on water for irrigation and hydropower generation. It has an observed warming rate above the global average, and in the future, climate change may be an important factor affecting natural water availability. The presentation will give an overview on preliminary results of scientific investigations on regional climate change in Central Asia and its effects on river runoff. In particular, the talk will focus on the following topics:

### *1) Regional climate modeling*

For the first time, a regional climate model with a spatial resolution of 0.5° and further refined to 0.18° has been set up for Central Asia which was used to simulate climate change in Central Asia up to the year 2100. Under the assumptions of the IPCC SRES-A1B scenario for future green house gas emissions, the REMO model simulations suggest an increase in winter temperature of 1 to 1.5 °C. Average winter precipitation is expected to increase by 50 to 70 mm in the mountain areas.

Dynamical downscaling using the regional climate model REMO provides a more robust alternative to make an informed guess about the possible consequences of a climate change scenario than statistical downscaling techniques widely used in Central Asian countries. Besides a sound physical basis, it accounts for topographic effects on temperature and precipitation, which are of particular importance for Central Asian region.

### *2) Changes in glacier covered areas in the Naryn basin*

Based on two SPOT-scenes from 2006 and a series of Landsat ETM scenes, a 2006 glacier inventory for the Big Naryn basin was created. Glaciers covered an area of approximately 489 km<sup>2</sup> in 2006, showing a retreat of 20 % compared to the mid 20th century, when a total of 615 km<sup>2</sup> was listed in the “Catalogue of Glaciers” from USSR. The retreat is especially pronounced for smaller glaciers, e.g. Dzhetim and Naryntau ranges.

### *3) Expected changes in river runoff in the Karadarya catchment*

To assess the potential impacts of climate change on future river runoff, the process based, semi-distributed hydrological model WASA has been set up for the Karadarya catchment in south-east Kyrgyzstan. Output from the regional climate model REMO has been used as input data to the hydrological model.

Preliminary results show, that river runoff is expected to increase in spring and autumn and decrease in summer by 10 to 20 % respectively. This is due to earlier snow melt in the flow formation zone and increased precipitation in autumn.