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# Sensitivity of water availability in Central Asia with respect to various climate datasets in particular the input parameter precipitation

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Climate models indicate a significant future global change in precipitation. This applies both in terms of variability and quantity. Major impacts on the terrestrial water cycle are expected. The aim of this paper is to show the uncertainties which are induced by the input variable precipitation on the water cycle and to highlight these impacts in the results of global hydrological models. Central Asia was selected as study area, because arid and semi-arid areas with low average annual rainfall show a high sensitivity to changes of precipitation. Also Central Asia is a sparse data region. For the presented study the global integrated, hydrological model WaterGAP 3 (Water -Global Assessment and Prognosis) was used to simulate the terrestrial water cycle. The spatial resolution of the WaterGAP model is 5 arc minutes.

As input various global and regional climate datasets are available for the study region. In the first step the reference time series 1971-2000 is used to describe the precipitation in Central Asia. The global TS dataset of the Climate Research Unit (CRU) is used as reference to be compared with the same time series of the regional Aphrodite′s Water Resources Project dataset as well as the global forcing data of the European Union sixth framework programme project WATer and global CHange (WATCH) and the Full Data Reanalysis record of the Global Precipitation Climatology Centre (GPCC). In addition the forecast record of the European Centre for Medium-range Weather Forecasts (ECMWF) is also used, which is in contrast to the other datasets, because it is not based on observed values, but includes modeled values from forecast models. The regional Aphrodite dataset provides daily values for Asia in a spatial resolution of 15 arc minutes. The spatial resolution of the global records is 30 arc minutes and will be remapped to the model resolution of 5 arc minutes.

The effect of differences in precipitation datasets on the hydrology is examined. Building on that changes in the water balance and temporal induced changes indicated by seasonal differences are compared. Also the influence of precipitation on water availability is discussed. The choice of the climate dataset is an important source of uncertainty in respect of the regional water availability in Central Asia. In particular differences are indicated between the observed data and the weather forecast ECMWF dataset. At this the ECMWF data overvalues the water availability obviously compared to the reference dataset.