



Natural water availability scenarios for the Guanting basin

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Water resources are heavily managed in Northern China. The Guanting basin is the catchment area of the Guanting reservoir, which is located about 70 km northwest of Beijing. The basin covers roughly 43 500 km² and has an elevation range of 438–2449 m a.m.s.l. Precipitation events concentrate in summer while the rest of the year is dry.

Water scarcity and quality problems sparked the idea of a joint research project lead by the Potsdam Institute and the Hebei Institute for Water Resources. The core of our investigations is a model chain providing scenario data from climate to management and water quality projections for decision making.

The adequate simulation of quasi-natural runoffs by the eco-hydrological model SWIM using climate scenarios is a key task for further analyses. Output data are used for water management and water quality modelling.

SWIM, a derivate of SWAT, is spatially semi-distributed. The model domain is split into sub-basins according to the river network. These are further discretised into so-called hydrotopes defined by land use, soil profile, and wetland property. The hydrotopes make up the primary simulation units for vertical fluxes and processes. Their runoff contributions are accumulated to the sub-basins' discharges which are then routed and accumulated through the sub-basin structure simulating river runoff.

Scenario projections driven by the stochastic climate model STAR show further decreases in water availability for the Guanting region. This result is presented besides current research directions like the simulation of agricultural yields with respect to irrigation.