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Impact of a statistical bias correction on the projected simulated hydrological changes obtained from three GCMs and two hydrology models

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Future climate model scenarios depend crucially on their adequate representation of the hydrological cycle. Within the European project "Water and Global Change" (WATCH) special care is taken to couple state-of-the-art climate model output to a suite of hydrological models. This coupling is expected to lead to a better assessment of changes in the hydrological cycle. However, due to the systematic model errors of climate models, their output is often not directly applicable as input for hydrological models. Thus, the methodology of a statistical bias correction has been developed, which can be used for correcting climate model output to produce internally consistent fields that have the same statistical intensity distribution as the observations. As observations, global re-analysed daily data of precipitation and temperature are used that are obtained in the WATCH project.

We will apply the bias correction to global climate model data of precipitation and temperature from the GCMs ECHAM5/MPIOM, CNRM-CM3 and LMDZ-4, and intercompare the bias corrected data to the original GCM data and the observations. Then, the orginal and the bias corrected GCM data will be used to force two global hydrology models: (1) the hydrological model of the Max Planck Institute for Meteorology (MPI-HM) consisting of the Simplified Land surface (SL) scheme and the Hydrological Discharge (HD) model, and (2) the dynamic vegetation model LPJmL operated by the Potsdam Institute for Climate Impact Research. The impact of the bias correction on the projected simulated hydrological changes will be analysed, and the resulting behaviour of the two hydrology models will be compared.