Sensitivity of hydrological response of Lake Chad basin (Africa) to satellite rainfall and GCM atmospheric data

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Abstract As part of the hydrological modelling of the Lake Chad basin (LCB), monthly grids of precipitation and potential evapotranspiration (PET) have been updated using satellite derived estimates and re-analysis datasets. These data sets are then evaluated using the modified THMB model. The precipitation satellite products GPCP and TRMM are compared with observed rainfall and with the CRU grids: it appears that satellite rainfall products tend to underestimate the precipitation in mountainous areas and to overestimate it in central LCB. Five rainfall scenarios, calculated by concatenation and by correlation between CRU data and satellite data, were compared using the THMB model. While concatenating data, the satellite data were kept during the common period. The rainfall from GPCP, TRMM and their average yield gives better results than the simulation forced by CRU rainfall on the sub-basin of LCB. The PET is calculated with a Hargreaves model, radiative model, using solar radiation and air temperature extracted from climate simulations of NCEP/NCAR.

Key words hydrological models; Lake Chad basin; pair wise comparison; satellite rainfall products