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Model based distributed water balance monitoring of the White Volta catchment in West Africa through coupled meteorological- hydrological simulations

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Fully distributed hydrological simulations for the quantification of the spatial and temporal changes of water balance variables require meteorological input data in a sufficient spatial and temporal resolution. In regions with weak infrastructure these data are often not available. To overcome this often encountered limitation, we applied a meteorological model providing the required meteorological data like precipitation and surface temperature, humidity, wind speed and radiation. This combination results in a one way coupled atmospheric-hydrological model system.

Within the framework of the GLOWA-Volta project we investigated to what extent the meteorological model MM5 is able to provide the required meteorological fields with sufficient accuracy for driving the distributed hydrological model WaSiM-ETH. Both models had to be adapted separately to the specific sub-humid till semi-arid environment in West Africa. The study focuses on the White Volta catchment (100,000 km^2). Results of hydrological simulations driven by a) meteorological measurement data and b) the output of the meteorological model MM5 will be shown and the potential and limitations of the coupled models system discussed.

Beside of missing meteorological driving data, also gridded information on land surface properties usually is difficult to obtain, albeit it is an essential input for distributed hydrological models (albedo, LAI, etc.). This information is usually taken from tables depending on land use. Satellite remote sensing provides worldwide spatially detailed information on land surface properties which is especially for large and difficult ac-

cessible regions a very important source of information. The differences between a) satellite derived land surface data and b) tabular data driven hydrological model results will be shown.