



Relative impact of topography and soil characteristics on the modelling of hydrological patterns in the Upper Ouémé catchment (North Benin)

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Topography is often a dominant control on hydrological, geomorphological and biological processes within a catchment. Topographic indexes calculated from parameters such as the upslope drained area and the local slope are generally used as measures of hydrological similarity between different locations, thus as indirect measures of the spatial variability of these processes. Soil characteristics such as the hydraulic transmissivity can also be taken into account, as proposed by Beven (1997), but they are commonly neglected because of the general lacking of any information about their spatial pattern. Now, a bias in modelling and predicting hydrological features (notably, the soil water content) can be induced by this approximation, especially where or when the ranges of soil properties vary more significantly than the altitude range, as in the considered catchment: the Upper Ouémé basin (15 000 km², 230-620 m a.s.l.), in Northern Benin. In the framework of the African Monsoon Multidisciplinary Analyses (AMMA) program, a field campaign has been achieved for characterising the hydraulic properties of upper soils and their spatial variability over the whole catchment, according to land use and pedology. Different simulations have been performed, with or without taking into account the transmissivity map, by using TopAMMA, a model based on topographic indexes as TOPMODEL and adapted to the Sudanian region (Le Lay et al., 2008). We will show how the transmissivity pattern impacts the discharge simulations, as well as the simulation of the spatial extent of saturated areas and the changes in catchment wetness over time and space.