



Evaluation of the REW model on the Donga catchment (Benin) for the representation of several hydrological processes

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Within the AMMA (African Monsoon Multidisciplinary Analysis) project, the Donga catchment (586km²) in Benin has been subject to a dense instrumentation in order to better understand the physical processes and better simulate them at the catchment scale. A strategy of observation has been undertaken since 1998, on various compartments of the hydrological cycle like: surface runoff, water level in domestic wells, soil moisture on typical vegetation stands, etc. This catchment is found appropriate to test the REW concept model, REW-v4.0, describing the main local processes at the sub-watershed scale. The goal of this study is to evaluate the model ability to reproduce the discharge at the outlet, at intermediary stations, and also to reproduce the watertable dynamics and the vadose zone dynamics at the sub-catchment scale. Soils were characterised with the help of Beerkan infiltration measures and a pedology map. The soil parameterisation was found to be a crucial problem as no quantitative data were available below the soil surface. The soils parameters needed to be adjusted in order to take into account the decrease in soil porosity with depth. This adjustment allows the reproduction of a 3 months delay between the first rainfalls and the first observed discharges in the river bed. Thus, the model simulates quite well discharge at the outlet and at some intermediary stations as soon as the drainage area is above 100 km². On every REW, the model was found to simulate much deeper water table surface even if the annual dynamics representation was improved by soil porosity adjustment.