



FROM LOCAL HYDROLOGICAL PROCESS ANALYSIS TO REGIONAL HYDROLOGICAL MODEL APPLICATION IN BENIN: CONCEPT, RESULTS AND PERSPECTIVES

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ABSTRACT: This paper presents the concept, first results and perspectives of the hydrological subproject of the IMPETUS-Benin project which is part of the GLOWA program funded by the German ministry of education and research. In addition to the research concept, first results on field hydrology, pedology, hydrogeology and hydrological modelling are presented, focusing on the understanding of the actual hydrological processes. For analysing the processes a 30 km² catchment acting as a super test site was chosen which is assumed to be representative for the entire catchment of about 15,000 km². First results of the field investigations show that infiltration, runoff generation and soil erosion strongly depend on land cover and land use which again influence the soil properties significantly. A conceptual hydrogeological model has been developed summarising the process knowledge on runoff generation and subsurface hydrological processes. This concept model shows a dominance of fast runoff components (surface runoff and interflow), a groundwater recharge along preferential flow paths, temporary interaction between surface and groundwater and separate groundwater systems on different scales (shallow, temporary groundwater on local scale and permanent, deep groundwater on regional scale). The findings of intensive measurement campaigns on soil hydrology, groundwater dynamics and soil erosion have been integrated into different, scale-dependent hydrological modelling concepts applied at different scales in the target region (upper Ouémé catchment in Benin, about 15,000 km²). The models have been applied and successfully validated. They will be used for integrated scenario analyses in the forthcoming project phase to assess the impacts of global change on the regional water cycle and on typical problem complexes such as food security in West African countries.