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HYDROLOGICAL CATCHMENT MODELS: PROCESS REPRESENTATION, DATA AVAILABILITY AND APPLICABILITY FOR WATER MANAGEMENT — CASE STUDY FOR BENIN

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ABSTRACT: Different model concepts are applied at different scales to simulate local to regional water fluxes of the tropical Ouémé watershed in central Benin (West Africa). They contain different levels of hydrological process knowledge (process-based vs. conceptual, distributed vs. lumped) and require different quality and resolution of data. Process-based models are rather applied at local scale to analyse the sensitivity of processes on changing properties and boundary conditions including management activities. These models cannot be applied in tropical Africa to assess the management effects at regional scale due to data constraints. Therefore the dominance of distinct processes needs to be translated into parameters of a conceptual, regional-scale model. This conceptual model is applied successfully to calculate regional, long-term water balances. Concerning a model application as part of watershed management with regard to water availability, the two model types introduced complement one another: at the local scale, the physically-based model estimates the management effects on a physical basis considering the most important properties and processes. For regional management applications, the lumped, conceptual model has the advantage of being simpler, transparent and easier to adapt. It can therefore also be used by non-scientists.