

Hydrological Modelling in the Gera catchment -- Multiscale Investigations in a Mesoscale Catchment

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Abstract: The Gera catchment is located in the Thuringian state of eastern Germany near the city of Erfurt (capital). The contributing area is approximately 844 km² with the dominate land use being forest in the south-west portion and increasing agriculture use toward the north east. The Gera is representative of many of the catchments in Thuringia and has serious water quality issues, mostly nitrate due to agricultural activities, throughout most of the year. Some of the challenges faced by hydrologists studying the Gera include; snow driven issues in the south-west, karst problems in the middle, “negative” water balance in the south, and strong surface-groundwater interactions throughout the entire catchment. Researchers from the Friedrich-Schiller-University, Desert Research Institute, and the U.S. Geological Survey have begun a collaborative effort to build and evaluate a detailed, physically-based hydrologic model to simulate the important hydrologic processes in the Gera to better understand the water quality efforts and provide land managers and decision makers with tools to improve water quality in the future. This paper presents the initial results from this effort and provides special emphasis on model and parameter uncertainty and the importance of an interdisciplinary research approach to better understand the hydro-geomorphic process dynamics controlling the runoff generation in complex catchments.