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Distributed hydrological models: comparison between TOPKAPI, a physically based model and TETIS, a conceptually based model

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The present work aims to carry out a comparison between two distributed hydrological models, the TOPKAPI (Ciarapica and Todini, 1998; Todini and Ciarapica, 2001) and TETIS (Vélez, J. J.; Vélez J. I. and Francés, F, 2002) models, obtaining the hydrological solution computed on the basis of the same storm events. The first model is physically based and the second one is conceptually based.

The analysis was performed on the 21,4 km2 Goodwin Creek watershed, located in Panola County, Mississippi. This watershed extensively monitored by the Agricultural Research Service (ARS) National Sediment Laboratory (NSL) has been chosen because it offers a complete database compiling precipitation (16 rain gauges), runoff (6 discharge stations) and GIS data. Three storm events were chosen to evaluate the performance of the two models: the first one was chosen to calibrate the models, and the other two to validate them. Both models performed a satisfactory hydrological response both in calibration and validation events.

While for the TOPKAPI model it wasn't a real calibration, due to its really good performance with parameters modal values derived of watershed characteristics, for the TETIS model it has been necessary to perform a previous automatic calibration. This calibration was carried out using the data provided by the observed hydrograph, in order to adjust the model´s 9 correction factors.

Keywords: TETIS, TOPKAPI, distributed models, hydrological response, ungauged basins.