



Parsimony in hydrological flash flood modeling

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A parsimonious, conceptual, spatially distributed hydrological model was used to capture the flash flood processes in a highly non-linear with pronounced dynamics watershed. The model consists of routines that represent snow by a degree-day method, soil water and evaporation, groundwater by three linear reservoir equations, and channel routing by a triangular weighting function. Following the calibration with the dominant process concept, the model was able to simulate the discharge using rainfall, temperature and estimates of potential evaporation. The model was applied to the 18 September of 2007 flood that occurred in Northwest Slovenia and caused human casualties and severe damage to infrastructure and buildings. The spatial resolution was set to 1 square km, while all simulations were conducted in a 15 minute time step. Three high flow periods were selected in order to calibrate the parameters of the model and evaluate its efficiency. The obtained Nash-Sutcliffe values varied between 0.82 and 0.96 on the calibration periods for all sub-basins. The calibrated model was then applied to the flash flood event of September 18th, delivering satisfactory results with Nash-Sutcliffe estimation ranging between 0.47 and 0.90. The internal basin dynamics of the most affected area in Zelezniki was successfully tested at specific cross-section locations by comparing simulated peak discharges with the ones evaluated by the slope-conveyance method during a detailed intensive post event field campaign.