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Parameterization of SURFEX-TOPMODEL river velocity based on instant discharge dependency

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SURFEX-TOPMODEL distributed physical model is used to analyze and forecast stream flow discharges including flash floods occurring in a Mediterranean river basin in Bulgaria. River velocity is one of the parameters that need to be calibrated in order to achieve acceptable representation of peak floods but in the same time to produce a smooth hydrograph during the low flow periods. The coupled model showed great sensibility to the parameter but when focusing to reproduce high peaks low discharge hydrograph presented unrealistic small peaks too. The dependency between the measured instant discharge and mean section velocity was established for the Bulgarian hydrometric stations on rivers using 20 years of direct discharge-velocity measures of the National Institute of Meteorology and Hydrology of Bulgaria. The relationship is used to avoid the calibration of the velocity parameter for the measured cross-sections. It was coded within the model thus permitting dynamical adjustment of the velocity with respect to the computed instant discharge in the river section. We present the results of river flow simulations with the modified parameterization compared to those with the original model for the hydrological year 2014-2015.

Keywords: SURFEX-TOP, river speed parameter