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Edouard Simon, Béatrice Vincendon, Véronique Ducrocq

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Ensemble-based flash-flood modelling : Taking into account hydrodynamic parameters and initial soil moisture uncertainties

Edouard Simon, Béatrice Vincendon, Véronique Ducrocq

CNRM, UMR 3589 (Météo France, CNRS), 42 av. G. Coriolis, 31057 Toulouse cedex, France

Abstract

Intense precipitation events in the Mediterranean often lead to devastating flash floods (FF). FF modelling is affected by several kinds of uncertainties and Hydrological Ensemble Prediction Systems (HEPS) are designed to take those uncertainties into account. The major source of uncertainty comes from rainfall forcing and convective-scale meteorological ensemble prediction systems can manage it for forecasting purpose. But other sources are related to the hydrological modelling part of the HEPS. This study focuses on the uncertainties arising from the hydrological model parameters and initial soil moisture with aim to design an ensemble-based version of an hydrological model dedicated to Mediterranean fast responding rivers simulations, the ISBA-TOP coupled system. The first step consists in identifying the parameters that have the strongest influence on FF simulations by assuming perfect precipitation. A sensitivity study is carried out first using a synthetic framework and then for several real events and several catchments. Perturbation methods varying the most sensitive parameters as well as initial soil moisture allow designing an ensemble-based version of ISBA-TOP. The first results of this system on some real events are presented. The direct perspective of this work will be to drive this ensemble-based version with the members of a convective-scale meteoro-

*simon.edouard@meteo.fr

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