

Interactive comment on “Characterization of physically based hydrologic model behaviour with temporal sensitivity analysis for flash floods in Mediterranean catchments” by P. A. Garambois et al.

L Brocca

luca.brocca@irpi.cnr.it

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Short comment on initial soil moisture conditions

I have read the paper with interest and I believe that the variance decomposition procedure proposed by the authors can be a valuable tool for better understanding the behaviour and the reliability of rainfall-runoff models. Anyhow, I have been more interested from the rainfall-runoff modelling approach employed in the paper for flash flood prediction, and for that I decided to submit this short comment. Specifically, the use of

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a continuous soil moisture model (SIM) for the initialization of the soil moisture conditions of an event-based rainfall-runoff model (MARINE) represents, in my opinion, an appropriate model structure for its application simplicity and parsimonious parameterization (see for instance *Brocca et al., 2011*). However, even though I am aware that it does not represent the main topic of the paper, the role of initial soil moisture conditions on runoff simulations and also with respect to the sensitivity analysis should be better addressed.

Firstly, it is not clear the linkage between the simulated soil moisture from the SIM model and the initial conditions to be used within the MARINE model. Which layer depth is used from the SIM model? Does the SIM soil moisture data directly inserted into the MARINE model without any rescaling/corrections? It would be really interesting if SIM soil moisture data were directly inserted into the MARINE model without the need of modifications.

Secondly, as in the paper a good set of flash flood events is analyzed (usually flash flood studies consider only a single event); it would be highly interesting to analyze the role of initial soil moisture conditions for runoff simulations in the context of flash floods. In fact, from scientific literature, it is not clear if soil moisture plays a significant role for runoff simulations during flash flood events (as it occurs for floods, especially in Mediterranean catchments). The sensitivity analysis proposed in the paper could also shed light on this aspect. Looking at Table 3, it seems that initial conditions are very similar for the validation flood events. Which are the results if soil moisture conditions are assumed as constant for all flood events?

Reference

Brocca, L., Melone, F., Moramarco, T. (2011). Distributed rainfall-runoff modelling for flood frequency estimation and flood forecasting. *Hydrological Processes*, 25 (18), 2801-2813, doi:10.1002/hyp.8042.