**Hydrology and
Earth System
Sciences
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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.

P. A. Garambois et al.

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We first wish to thank Luca Brocca for this comment and his agreement on the importance of the data base and of the subject that this paper addresses.

As stated in the paper, a continuous hydrometeorological model (SIM) is used for the initialization of the soil moisture condition of the event based rainfall runoff model (MARINE). We should precise that the root zone soil moisture from SIM (Hu_2 index cf. (Marchandise and Viel, 2009)) is directly used into MARINE model. Hu_2 index is cal-

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culated as follows:

$$Hu_2 = \frac{wg_2}{wg_{sat2}} \tag{1}$$

Where wg_2 is the volumetric water content of the root zone and wg_{sat2} is the saturated volumetric water content of the root zone. Hu_2 index (%) at the beginning of each event is applied to each cell within catchment discretization.

A study has already been made with MARINE model and initial soil moisture conditions assumed constant (Roux et al., 2011). It has been shown that initial soil moisture condition has to be set for each event for a robust calibration. Indeed, results show that initial soil moisture can be significantly different for flood events occurred at different time of the year. Following this study, it has been chosen to use Hu_2 index as soil moisture initialization for the MARINE model.

We agree that soil moisture initialization in the case of flash floods is still a significant research issue. But an accurate estimation of distributed soil moisture remains difficult at the catchment scale as already stated in the literature (Albergel et al., 2012; Brocca et al., 2012). Moreover, soil structure and altered layer representation is still an open question at the catchment scale, especially for rapid flows modeling and soil thickness involved.

Let us remark that in MARINE model, cell's maximal storage capacity is defined by cell's porosity and thickness, and then soil water content is initialized. The calibration parameter C_Z can be applied to modify the potential for infiltration of a catchment at the beginning of an event. Resulting from this formulation, the sensitivity of model response to initial soil water content is part of the sensitivity of model response to C_Z. It is concluded in the paper that soil moisture measurements and smaller scale water balance modeling would strengthen soil saturation dynamics modeling and increase simulation realism for catchment flood responses.

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Marchandise, A. and Viel, C., 2009. Utilisation des indices d'humidité de la chaîne Safran-Isba-Modcou de Météo-France pour la vigilance et la prévision opérationnelle des crues - Using the Météo-France Safran-Isba-Modcou data for operational flood warning and forecasting. La Houille Blanche(6), 35-41.

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