

Hydrol. Earth Syst. Sci. Discuss., author comment AC3  
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## Reply on RC2

Abubakar Haruna et al.

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Author comment on "Signature and sensitivity-based comparison of conceptual and process oriented models, GR4H, MARINE and SMASH, on French Mediterranean flash floods" by Abubakar Haruna et al., Hydrol. Earth Syst. Sci. Discuss.,  
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Thank you for reviewing our work and for the constructive comments that will help us revise and improve this article. Some elements of answer to your main questions are provided here:

- A better presentation of details of each model will clarify the reading, for example with respect to the models' resolutions - that is on the order of rainfall forcing grid resolution.
- Regarding simulated states and the comparison with those of SIM model, as answered to reviewer 1. This choice is motivated by the fact that SIM is a well validated surface model with a rich description of soil atmosphere processes, applied on a wide spatio-temporal domain which ensures good data availability. Note that SIM runs at relatively fine time steps but we only used daily quantities for sake of simplicity. Moreover, SIM1 is traditionally used to initialize MARINE, hence the choice is made to use SIM2 as benchmark, whose parameterization is more complex (ex. more soil levels, which is not usable for MARINE initialization). Note that using satellite moisture data is a work on its own, already studied with MARINE in Eeckman (2020), and is left for further work. These points will be clarified and better discussed.
- Studying the relation between hydrograph shape and model performance is an interesting topic, this could be used to refine the analysis based on presented results.

We will be happy to revise our paper following your helpful comments and also to provide a detailed response letter.