

Interactive comment on “Inclusion of potential vorticity uncertainties into a hydrometeorological forecasting chain: application to a medium size basin of Mediterranean Spain” by A. Amengual et al.

Anonymous Referee #1

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This manuscript describes the methodology employed in studying the viability of HEC-HMS runoff forecasts driven by a quantitative precipitation forecasts (QPF) in the case of 4 events causing intense precipitation in Catalonia, Spain. Forecasting this type of event is essential to set off the warning mechanisms that minimize the social risks associated to these natural hazards.

Validating QPFs is not an easy task, but the dense network of rain-gauges installed in the study zone greatly contributed to it. The authors explain correctly the details of the techniques used in the rain-gauge driven runoff simulations (as a validation tool)

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and the flow forecasted in the one-way coupling between both models (meteor. -MM5- and hydrol. HEC-HMS) in the deterministic control simulation as well as in the EPS. There is a very interesting thinking based on the experience of the researchers on the limitations of the use of deterministic NWP for spatial and temporal forecasting of convective precipitation.

In order to generate the ensemble of perturbed runs, the invertibility principle of Ertel potential vorticity was applied. The PV inversion technique scheme used is a powerful tool that enables us to modify the upper-level synoptic structures in the initial and boundary conditions of the simulations to select (in this case) a group of realistic perturbations in the EPS. This technique for generating perturbed runs is applicable mainly to those cases where large-scale dynamic forcing is the dominating factor in the development of the precipitation, as the authors recognise.

However, the methodology is appropriate for the aims of the research. The text is clear in the theoretical tenets and in explaining the conclusions drawn from the numerical experiments.

The authors have considerable experience in using the mesoscale model MM5 and the simulations have been adequately designed. The only suggestion I have is that the authors should apply this study onto a larger sample to be able to use the results from an operative perspective. For the time being the results are merely tentative, although they do follow the right track.

From my point of view, the conclusions are well supported. I believe this is a good contribution and deserves publication in Hydrol. Earth Syst. Sci.

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