Hydrology and Earth System Sciences Discussions

Interactive comment on "A flood episode in Northern Italy: multi-model and single-model mesoscale meteorological ensembles for hydrological predictions" *by* S. Davolio et al.

Anonymous Referee #2

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A flood episode in Northern Italy: multi-model and single-model mesoscale meteorological ensembles for hydrological predictions.

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Journal: Hydrol. Earth. Syst. Sc.. Discuss.

General comments

This manuscript deals with an interesting subject: the use of mesoscale meteorological ensembles for preparing ensemble hydrological forecasts (EHF). To my knowledge,

EHF is far from being largely implemented in operational flood forecasting agencies and one of the reasons is that technological investments needed for implementation are large compared to current performances of EHF (under-dispersion, bias, . . .). Scientific papers that present solutions to increase EHF performances are, in this sense, mostly welcomed.

In my perspective, this paper presents a very interesting set of meteorological modelling tools and a very rich modelling environment. Unfortunately, the analysis of a single flood episode and of a unique watershed does not allow for extracting pertinent and useful knowledge from this rich environment. In my view, the manuscript illustrates that the models are functioning and that results have such or such anecdotic characteristics but there is no solid scientific conclusion that can emerge from a one-site/one-event methodology. That limits greatly the interest for the manuscript.

A few sentences may better illustrate this point of view. P13416, L25 : " . . . multi-model ensemble provides more informative probabilistic predictions . . . since it characterized by a larger spread . . .". This can be true only if this spread is well calibrated and is associated with the right probability. How can we tell if only a single event is analysed? How can we do probabilistic forecast and at the same time not analyse the result in a probabilistic framework using probabilistic scores on several events and watersheds (CRPS, ROC, . . .) ? P13427 L10 : "If such a diversity is representative of . . ." : that is exactly the kind of question the paper should try to answer otherwise it is just general opinion not formal science. P13428. "the possible occurrence of high discharge peaks is forecast four or five days ahead (. . .)" How many times it is forecasted but finally did not occurred in other cases ? How can we discriminated which model performs the best if only a case leading to a flood is analysed ? What happens when some models forecast large floods but no hydrological reaction in observed at the end? Which model is the best in this very important practical situation?

Having in mind this major problem in the experimental methodology, my decision is to accept the paper only if major revisions are done. The addition of at least a few

events on at least 2 to 3 watersheds seems the only way to produce useful scientific knowledge using this rich modelling environment and must be included in a revised version. A complete rewriting of the discussion/conclusion has to be done based on coming new simulations.

Specific comments

P13417 L6 to L14 : Sentence too long. Please change the text. P13420 L16 : "The poor man's model" is a familiar and wide-spread expression but not pertinent in a scientific paper. Please change the text accordingly. P13426 L18: What does "in excess" mean in this sentence? P13428 L12: Atypical reference for a well-know interpolation technique. P13432 L5 : What is a "best representative member" ?