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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Flash-flood forecasting in two Spanish Mediterranean catchments: a comparison of distinct hydrometeorological ensemble prediction strategies" *by* Beatrice Vincendon and Arnau Amengual

Anonymous Referee #2

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The present manuscript describes a comparison of different HEPSs on two Spanish catchments on two flash floods events. The HEPSs are based on two meteorological models configurations and two hydrological models, and are assessed with a set of numerical tools.

While the topic is of interest for the journal, the manuscript is far from what can be published in it in my opinion. Indeed, it suffers from presentational flaws, lack of adequate reference to past works, lack of background on this research topic, lack of deep analysis, lack of innovative methods or results, poor English, many technical issues. I

strongly agree with reviewer 1 and I think that the paper should be rejected.

Moreover, the manuscript type does not correspond to a "cutting-edge case studies report" as I understand it. It does not "broaden the knowledge base in hydrology" and data or models are not shared (as far as I know).

Please find below my major and minor remarks. Please note that due to the high number of technical mistakes, and because many parts of the manuscript should be rewritten, I did not list all of these technical mistakes. I believe that most of these minor technical mistakes should have been dealt with by authors before submission

Major remarks

- The English is sometimes deficient; many mistakes are present in the manuscript. Correction by a native speaker should be made

- The introduction provides profusion of references from the two authors (although it is not always used for highlighting the challenges or methodologies, as said by reviewer 1). However, very few is given about initiative such as HEPEX (that is the HEPS working group initiative, that may be of interest I think). Comparisons of forecasts from different strategies are not new and some of them should be acknowledged. Some works from the first authors lab compared short-range hydrological ensemble forecasts using two EPSs with a relatively well-defined framework (Thirel et al., 2008) or two hydrological models (Randrianasolo et al., 2010): why not referring to that? It does use ISBA and ECMWF EPS for instance!

- P. 9, L. 23: those are rather variables or inputs than parameters. In my opinion, it is not a good idea to use a complex fully-distributed physically-based model, supposed to better represent the processes leading to flash floods, if you put in it constant values for very physical inputs that have an impact on the rainfall-runoff relationship. Also, we have no idea about the constant values that were chosen.

- The scores used in the manuscript should be properly defined and use literature

references either in the methodology section or in an Appendix. Due to the many approximation present in the manuscript, it may help clarifying what is really assessed

- Section 4.1 title and implied goal is misleading in my opinion: the authors are not assessing or discussing the hydrological models uncertainty (there is no hydrological model calibration / validation or sensitivity analyses in the manuscript). They are showing what the impact of the two hydrological models is on the flood simulation. That is very different.

- Figure 3 is unclear: do we have here both references and all gauges mixed?

- Figure 4 is not about predictive uncertainty

- P. 11, L. 6-9: I am a bit puzzled by these sentences. Of course if you do not calibrate your physically-based model, you can expect poorer results... But that is your choice! You cannot blame anyone for this! Even so-called physically-based models are full of approximations that make them to some degrees conceptual models (see Hrachowitz and Clark, 2017). And in the same time, of course conceptual models do not give good performances if they are not calibrated... They are made for being used after calibration!

- Section 4.2.3: from such a section title, one expects more than just comparing forecasts issued at two different dates before the event. We need a longer archive for this kind of impact study. Conclusions are likely to be just opposite on many other events.

- L. 21: do you mean you randomly selected n member out of 50 once each time, or did you randomly do that many times to account for the sampling effect (i.e. the âĂŤnonâĂŤselection of (a) specific member(s) can have a large impact on the scores)?

- Section 4.2.4: I am a bit puzzled by this section: if you use models as complex as ISBA, why would you discard some forecasts? You can easily miss useful information about extremes of the forecasts! Moreover, as all members are equi-probable, you modify the pdf of the forecasts by selecting some members, which is not correct

Minor remarks

- No space before colons

- P. 2, L. 6: near what?

- L. 7: what is IOPS?

- L. 8-9: a sentence usually contains a subject, a verb, and if necessary a complement

- L. 15: what is a level of HEPS?

- P. 2, L. 4: no accent in Mediterranean

- L. 6: usually figures do not need to be cited in introductions, more especially in the first paragraph

- L. 16: “basins” is missing after Llobregat?

- L. 17: capital letter to River after the river name (check whole document)

- L. 25-26: I feel that the sequencing of words is erroneous in this sentence

- P. 3, L. 20: Centre, not Center

- L. 27: two words are misspelled

- L. 28: why talking about section 4.2 specifically? Isn’t it section 4?

- P. 4, L. 10: data ARE

- L. 16: occurred is misspelled

- L. 17: I think that citations must have an alphabetical or chronological ordering

- L. 18 and 21: the date format must not differ

- L. 33: altitude instead of height?

- P. 5, L. 4: stream-flow had a different writing in the manuscript up to now

- L. 22: the writing of “mm” must not differ, especially in the same line!

- L. 27: has instead of have

- P. 6, L. 14 and 28: the time format must not differ

- L. 23 and 24: these citations must be written with the following format: name et al. (year). Check whole document

- L. 28-29: months need capital letters in English

- P. 7, L. 3: rainfall should be singular

- L. 13-14: space or no space before mm? PDFs is misspelled

- L. 33: typo in applying

- P. 9, L. 26 and 31: space or no space between 00 and UTC?

- P. 10, L. 3: listed

- L. 24: the full name is Nash-Sutcliffe efficiency

- P. 11, L. 3: “Thus”: what is the logical link with the previous sentence?

- P. 12, L. 4: succeed is misspelled

- L. 9: overestimateS

- L. 11: missing space before parenthesis

- L. 15: remove final point before parenthesis

- L. 16: reaches

- P. 13, L. 8: Table 3 is cited before Table 2!

- L. 15-21: most of it should belong to a methodology section

- L. 19: comparison is misspelled

- L. 22: no s to confirm

- L. 26: usually the sigma / RMSE ratio should be close to 1 over long time series. How true is it over single events? Please document!

- P. 14, L. 2: using BS instead of BSS here. You previously used RPSS! Moreover, you use all these scores as metrics, nothing else: no attempt is made to reflect on the impact of the statistical properties of the forecasts, this is very disappointing.

- L. 3: presented is misspelled

- L. 12: I would write “the later the simulations start”

- L. 13: “closely lead-times”: is that grammatically correct?

- L. 21: Performance is misspelled, “is” should be place after the subject of the sentence.

- L. 24: for your information, works have been done to mathematically correct the impact of the number of members on some of the scores you use

- P. 15, L. 5: modelling had 2 “l” up to now in the manuscript

- L. 6: is it HEPSs? I think that “is” should be “are” here.

- L. 9: allows

- L. 11: “clearly” should be before “improves”

- L. 20: you have to choose between lead times and lead-times!

- L. 23-24: check there are two typos

- L. 25 “do”, not “does”

- L. 27: what is a statistical study?

- L. 28: “responsible”?

- Figure 2: the stream gauges are very difficult to locate in these maps. The area value uses a different format than in P. 3, L. 32

- Figure 7-8: add “Rainfall” to the y-axis label. “Pluvios” is not correct in Fig. 8.

- Figure 11-12: these figures have panels of different sizes, and the x-axis label somehow sometimes appears incompletely

- Fig.13: in the caption, why are you talking about a reference? What is it used for?

- Fig. 15: please specify the unit of RPSS and sigma / RMSE. Rainfall is misspelled

- Table 2: please specify the unit of RPSS and sigma / RMSE

References:

Hrachowitz, M. and Clark, M. P.: HESS Opinions: The complementary merits of competing modelling philosophies in hydrology, Hydrol. Earth Syst. Sci., 21, 3953-3973, https://doi.org/10.5194/hess-21-3953-2017, 2017.

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Thirel, G., Rousset-Regimbeau, F., Martin, E., Habets, F. On the impact of short-range meteorological forecasts for ensemble stream flow predictions (2008) Journal of Hydrometeorology, 9 (6), pp. 1301-1317.

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