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Hydrology and Earth System Sciences Discussions

Interactive comment on " Simplifying a hydrological ensemble prediction system with a backward greedy selection of members – Part 2: Generalization in time and space" *by* D. Brochero et al.

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In the companion paper (part 1) of this article, a method describing a selection of a reduced set of members from an 800 members set (combining the 50-member ECMWF EPS and 16 hydrological models) was introduced. It proved to improve statistical scores. The method was implemented and validated for the 9th day of prediction.

Here the extension of this selection to other lead-times and similar basins is studied. This work is indeed necessary to justify the use of the method described in Part 1.

This paper (and its companion) belongs to the Special Issue: "Latest advances and developments in data assimilation for operational hydrologic forecasting and water resources management". I think it should be removed from this special issue, since the articles is not about data assimilation.

The publication of this paper is dependent on how will be addressed the possible methodological issued raised during the review process of Part 1.

General Comments:

- The presentation of the scores used in this article (section 3) is very similar to the section 2 of the part 1 of this study (companion paper). This is not necessary; the authors could reduce this section to a few lines, referring to Part 1.

- As detailed in the specific comments, some other elements (one figure, one table and the section 2) are not necessary because already given in Part 1 or would be more useful in Part 1. It will reduce the size of this article. Maybe it would thus be worth adding some complementary study?

Specific Comments:

- Abstract, line 7: please clarify already in the abstract what is a 94% simplification (i.e. that it concerns the number of members)

- Page 2786 lines 16-17: please add "EPS" in "of the European Center for Medium-range Weather Forecasts (ECMWF) EPS". Moreover the correct spelling is "Centre", not "Center".

- Section 1, last paragraph: the goal of this article does not appear clearly to me.

- The Velazquez et al. (2010) reference used in this article is not enough. Consider replacing this EGU abstract reference with the Velazquez et al. (2011) paper published

in Advances in Geosciences, which is much more complete.

- Page 2788 end of 1st paragraph: the authors state that “it is important to note that some models. . .”. Why is it important? Could you explain? This statement is not used in the rest of the article for any further interpretation of the results, whereas it should be if you keep this sentence.

- Section 2: please add this reference for SAFRAN: Analysis of Near Surface Atmospheric Variables: Validation of the SAFRAN analysis over France, P. Quintana-Seguí, P. Le Moigne, Y. Durand, E. Martin, F. Habets, M. Baillon, C. Canellas, L. Franchisteguy, S. Morel, Journal of Applied Meteorology and Climatology, 47, 92-107, 2008. <doi:10.1175/2007JAMC1636.1>. If the 50 year reanalysis has been used, please add: Vidal, J.-P.; Martin, E.; Franchistéguy, L.; Baillon, M. & Soubeyroux, J.-M. A 50-year high-resolution atmospheric reanalysis over France with the Safran system. International Journal of Climatology, 2010, 30, 1627-1644

- Page 2798 line 10: the 50% is the minimum gain and 87% is the maximum gain

- Table 1 is already given in the companion paper; I don’t think it is necessary to give it in Part 2.

- Table 4: could you explain the huge difference we observe for FTH 4 for four basins of cluster 2? The score is much better than for the other FTHs, which is surprising.

- Fig. 1: please draw the area of the basins. Are some of these basins included in other ones used in this study?

- Please consider putting Figure 2 in the Part 1 companion paper instead of Part 2.

- Fig. 5: it is difficult to see anything on the time series plots of CRPS and IGNS, please consider improving them. The first two lines of the legend do not correspond with the description of this figure that is given page 2799 lines 24-25.

- Fig. 6: The legend should be: “Hydrological models participation. (a) (b) (c) (d) (e)

Distribution in the five regions (clusters) presented at the Fig. 4. (f) Model performance evaluated as the mean rank. “

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