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Hydrology and Earth System Sciences Discussions

Interactive comment on "An evaluation of the canadian global meteorological ensemble prediction system for short-term hydrological forecasting" *by* J. A. Velázquez et al.

Anonymous Referee #1

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General comments

This paper evaluates the use of the Canadian global meteorological ensemble prediction system for hydrological forecasting up to 3 days. The study applies on a 17 days storm event and at 12 locations in 5 watersheds in Quebec (Canada). The verification method comprises the MAE, the mean CRPS, the rank histograms and an index of flatness of these histograms, and the reliability diagrams. The short verification period includes severe conditions (at least for two watersheds).

This evaluation is based on a single event. Since the two papers cited on P 4894,

a number of studies have been published on the evaluation of H-EPS both for single events (e.g. Dietrich et al. 2008, Jaun et al., 2008) and for extensive hindcasts (e.g. Thirel et al., 2008, Jaun et al., 2009, Renner et al, 2009). These and other papers use a variety of verification methods. The introduction could be strengthened regarding literature (see also Cloke and Pappenberger, 2009) and argue for the choice of a single storm despite that a longer period might be available, and for the choice of the verification scores and diagrams.

Not much is said about the precipitation forecast performances (except about the flatness ratio of the rank histograms). The results are presented to answer to two questions about the "added value" and the reliability of the H-EPS. The difference between MAE and mean CRPS is obvious; however the conclusion about the reliability that there is no need for post-processing is not supported neither with Fig 6 nor Fig 7. Therefore the "added value" for dam management should be better argued.

Specific comments

P 4894, L 25 – 26: Global Environmental Multiscale model (GEM)

P 4897, L 20 – 27: "based on climate observations and CEHQ state variables"; do you mean "based on climate observations in order to estimate the initial conditions of the Hydrotel model state variables? It is not clear from this paragraph how the initial conditions on the 12 October and following days are obtained.

P 4898, L 6 – 17: this paragraph should be improved. Why "routine" comparison? L 9 –10: do you refer to the reliability that is introduced later? L 12: what are the needs in this particular study? L 13 – 17: In such a verification study, how could hedging occur?

P 4899, L 4 – 10: In the equation (2), an expectation operator is missing. How is the Monte Carlo approximation implemented, and why not to compute CRPS for an ensemble system like in Hersbach (2000)?

P 4899, L 11 – 16: "certain time": it is understood only at Section 3 that the average is

made over the 17 values corresponding to a given lead time and outlet.

P 4901, L 1 – 10: you mean you select 10 members out of 20 for a given forecast and forecast day, rank them together with the observed streamflow and repeat 200 times. “Quasi equiprobable” is being tested actually.

P 4902, L 17: the sentence could be rephrased (“moments”).

P 4903, L 26 – P 4904, L 2: the authors are true that uncertainty in the initial conditions of the hydrological model should be taken into account but the flatness of the histograms of the ensemble precipitation forecasts is not sufficient to exclude their role in the lack of reliability of the streamflow forecasts. More information about the verification of the precipitation is needed.

References

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