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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.

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We thank Dr. Schaake for his comments and suggestions that were helpful to further improve our manuscript. Answers to the comments follow:

General comments: "The authors also explore the reliability of the probabilistic hydrologic forecasts using rank histograms and reliability diagrams. But the results have little clear meaning because the sample size of independent information to support this was totally inadequate to be conclusive."

In order to establish the significance of the results, we have evaluated the 90% confi-

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dence interval for the data located in the 50% of the reliability diagram (Fig.8). Then, only if the drawn value in Figure 8 lies below this confidence interval could we infer that underdispersion is present. This confidence interval is (Shaefer et al. 2007):

$X/n-Z\sqrt{(pQ/n)}<P<X/n+Z\sqrt{(pQ/n)}$ (1)

Where X is the random variable, n is the length of the random variable series, p is the proportion of elements classified as "success" (here 50%). Then the sample distribution of X/n is approximately normally distributed with mean p and a standard deviation equal to the square root of pQ/n.

In this study n=17, thus 30%< P <70% is the 90% confidence interval for the 50% of the forecasted probability that is observed. Consequently, only drawn values below 30% could be interpreted as underdispersed.

The table I shows the value of the observed relative frequency at the selected 50% confidence interval for all sites at time steps of 24h 48h and 72h.

As the table I shows, the sites Chaudière T63 and T106 are the only one that have observed relative frequencies above the established 30% threshold (at time step of 72h). This statistical analysis thus confirms the conclusion made in the paper, based on a 17-day database, that the hydrological ensemble predictions are underdispersed.

"In this study the authors did not attempt to pre-process or downscale the GEM forecast casts. They simply used the raw GEM forecasts." As the EC's operational deterministic uses a 33 km grid, each 100 km ensemble member was linearly interpolated to the same 33 km resolution. This is specified in the text (P 4895, L13-16).

Specific comments: "Units should be shown in the vertical axes in Figure 2." In this figure, the streamflow values have been standardized by the historical average value, so the graphic is presented in a dimensionless way (P 4897, L11-13).

Reference: Shaefer S. J., Theodore L.: Probability and Statistics applications for environmental Science. CRC Press, Tylor & Francis Group, Boca Raton, FL, 367 pp,

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2007.

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	Site	24h	48h	72h
a)	Chaudière T6	5.9	5.9	29.4
b)	ChaudièreT7	0	0	29.4
c)	Chaudière T63	17.7	23.5	35.3
d)	Chaudière T106	0	11.8	35.3
e)	Châteauguay T7	0	5.9	5.9
f)	Châteauguay T56	0	11.8	11.8
g)	Du Nord T33	0	23.5	29.4
h)	Kénogami T15	5.9	11.8	23.5
i)	Kénogami T173	0	11.8	23.5
j)	Kénogami T323	0	5.9	11.8
k)	Du Lièvre T34	0	6.3	18.8
l)	Du Lièvre T50	6.3	6.3	18.8

Fig. 1. Table I. Observed relative frequency for the 50% forecast probability for 24h, 48h, and 72h (only the latter where drawn in Figure 8)

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