Hydrology and Earth System Sciences Discussions

Interactive Comment

Interactive comment on "Using the MESH modelling system for hydrological ensemble forecasting of the Laurentian Great Lakes at the regional scale" *by* A. Pietroniro et al.

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Received and published: 19 October 2006

The manuscript describes the MESH modelling system and its application to the simulation and ensemble forecasting of the Laurentian Great lakes at the regional scale. The MESH system allows for couplings of different models to generate operational forecasts of streamflow, snow water equivalent and lake level. The work is of significant scientific interest and the manuscript is carefully written. Therefore, its publication on this journal is recommended.

The title of the manuscript suggests that the paper emphasizes the methodology and

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results of the forecasts, but detailed description of the system, the great lake basin and the atmospheric forcing took too much space and it could distract the readers from the main focus. I suggest that these materials be condensed and some details omited. On the other hand, some key points of the system is missing. For example, it is not clearly stated whether the SWAT model and the hydrological model are coupled in 1 way or 2 way mode, although they are said to be "tightly integrated" (p2478 line 7 from bottom). Although "atmosphereic forcing" from models is described in length in section 4, "meterological forcing was derived from observed synoptic stations with in the basin" in streamflow simulation (section 6.2) without discussion. Discussion about the stream flow simulation and forecast results seems too brief. For instance, fig. 8 is only mentioned once in the text without comments. While the general agreement between simulation and observation can be noted, the large discranpancy in streamflow for a number of periods at some stations should be addressed. In Fig.9, everybody agrees that "the general patterns and seasonalities of the lake levels for all five Great Lakes are well simulated (P2943, line 1)", the almost exact match for Lake Erie and the substantial under-estimation in the simulations at Lakes Superior and Ontario should be mentioned even if they can not be explained at this stage. The caption for Fig.10 is too simple for a reader to understand the plottings. In addition, each panel of the figure can be reformatted to focus on the period and range of water level so the difference among ensemble members and that between forecast and observation acn be clearly displayed. The conclusion section of the manuscript seems out of the topic, without summarizing the success and/or weakness of the seytem, and approaches to improve the simulation and forecasts. This is partialy due to insufficient discussions of the results in section 6 and, partly to the deviation of emphasize from "forecast using the MESH system" to MESH itself.

In addition to the minor modifications suggested and type errors pointed out by other readers, please also note the folowing:

1) p2488, line 17, the meaning of "densities" is not clear to me.

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2) p2489, line 10, "An more" is "A more", right?

3) p2494, line 9, Should "The could" be "they could"?

4) p2496, line 9, Figs. 12c and 12d dn not exist. Do you mean 13 c and d? 5) p2493, line 21, observed flows? or observed lake levels?

6) p2493, line 23, "simulated"? to be more precise, it is "predicted" or "forecast", to be consistent to the terminology used in this paper. The "deterministic" run is closer to a "simulation".

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 2473, 2006.

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