

Interactive comment on “A Retrospective Streamflow Ensemble Forecast for an Extreme Hydrologic Event: a Case Study of Hurricane Irene and on the Hudson River basin” by F. Saleh et al.

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Dear Referee,

Thank you very much for your valuable comments and suggestions that will greatly improve the quality of this manuscript. Indeed, your suggestions will provide a better insight to this paper.

We agree with your comments regarding the concept of obtaining a higher confidence in the river discharge forecast as one approaches the event in question but we would like to reiterate the fact that using ensemble members instead of one deterministic forecast have advantages in terms of better representing the envelope uncertainty,

particularly in an extreme hydrologic event such as the one presented in this work. Furthermore, while the general idea is that hydrologic uncertainty is reduced with lead time, we have not found studies that quantitatively characterize this aspect using the GEFS retrospective data and in the event of an extreme flood event such as Hurricane Irene.

We also agree with you that using a hydrodynamic model will have advantages in terms of simulating the water levels but from our perspective the simulation of hydrological streamflow remains the main driver because HEC-RAS or any other hydrodynamic model would require flow boundary conditions produced by a hydrological (rainfall-runoff) model to solve the Saint-Venant equations. If the flow inputs produced by the hydrological model are not accurate then the simulated inundations or water surface elevations will be impacted regardless of the level of complexity within the modeling framework. Furthermore, hydrodynamic modeling would require detailed representation of river cross sections geometry that is not available at regional scale. In this context, a number of techniques such as pre-defined rating curves (water levels vs. discharge) are operationally used to convert the streamflow to water levels at specific locations, this is also the technique we are currently using in our operational framework.

We will make sure that these issues are appropriately addressed in the discussion part of the paper to satisfy your comments and suggestions.

Respectfully, Firas Saleh

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