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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Bayesian Network Model for Flood Forecasting Based on Atmospheric Ensemble Forecasts" *by* Leila Goodarzi et al.

Anonymous Referee #2

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The manuscript proposes the utilization of a Bayesian Network Model for flood forecasting. The model utilizes the outcome from atmospheric ensemble forecasts and the results are compared against an Artificial Neural Network methodology. Considering the results, the better performance of the first approach is highlighted. There are some major drawbacks that should be mentioned. Beginning with the part of the Atmospheric modeling and the simulations performed for the analysis, it is not quite clear but the fine domain used in the model configuration might be too close to the eastern parts of the basin. The fine domain should be depicted at the same figure with the study area (Figure 1). A more important issue is the lack of important information regarding the simulations such as the spin up time, the length of each simulation etc. A table including these characteristics for the 14 cases would be useful. Apart from that,

the whole analysis is performed in order to optimize the flood forecasting skill based on atmospheric modeling and post processing. However the model is not running in a forecast mode. The initial conditions are the FNL (page 9) data from NCEP, which are a post process product. The fact that the simulations are in a hindcast mode is something that should be mentioned clearly within the manuscript. Towards this direction it would be quite interesting to also employ a model running with the NCEP forecast analysis. Additionally, it would be interesting to run the model with different forecasting horizons in order to test its performance in periods with higher uncertainties. Finally the creation of an ensemble with the implementation of different cumulus schemes is something needed to be supported better, especially considering that some of them are already known to perform better than the rest. Considering the hydrological analysis, models in general are tested for larger periods, employing a range of hydrological events with different characteristics. In the proposed manuscript only 14 flood cases were implemented resulting in good results. However there is the danger of bias by taking into consideration such a small number of test cases. In any case, the meteorological characteristics for these cases should be analyzed and the cases should be divided into categories. Finally, despite the fact that such events are rare, maybe the authors should also consider taking into account smaller-impact events or maybe employing as initial conditions a dataset covering larger periods.

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