

# ***Interactive comment on “Classification of heterogeneous precipitation fields for the assessment and possible improvement of lumped neural network models for streamflow forecasts”*** **by N. Lauzon et al.**

**A. Montanari (Editor)**

alberto.montanari@unibo.it

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The study described in the paper is interesting and relevant to hydrological applications. However, the comprehension of the proposed technique is limited by the explanation which I believe it is not fully clear.

In many parts of the paper the authors make reference to figures which do not provide the expected information. This problem was noted by both referees. I believe that the explanation of the classification method provided at page 205, lines from 9 to 25, and page 206, lines from 1 to 14, is difficult to follow. I believe a more detailed explanation is needed, with reference to an actual scheme of the neural network.

In the introduction, page 202, line 9, I cannot understand what the authors mean by stating that lumped models are inexpensive. Do the authors mean that they are computationally inexpensive? If yes, this is a needless replication of what is stated later in the same line (low computing requirements).

Again in the introduction, page 204, lines 19 and 20, I do not understand what the authors mean by stating that "the watershed must be selected so that the forecasting uncertainties are mainly due to precipitation". Does this mean that the neural network that is used here, if fed with perfect rainfall, would produce an output (forecast) affected by negligible uncertainty? I do not believe that this would be the case.

I believe a proper reference should be given to additional previous work. For instance, Toth et al. (2000) proved that the use of a spatially uniform rainfall field, accurately estimated through a dense network of raingauges, does not deteriorate the performances of a spatially distributed forecasting model. Brath et al. (2002) also used neural network techniques coupled with conceptual rainfall-runoff models to forecast future river flows. Are these citations worth including in the paper?

I believe this paper might be a good contribution to HESS. I would like to invite the authors to revise the text accordingly to the indications given by the referees.

#### References

Brath, A., Montanari, A. and Toth, E., Neural networks and non-parametric methods for improving realtime flood forecasting through conceptual hydrological models, *Hydrology and Earth System Sciences*, 6(4), 627-640, 2002.

Toth, E., Brath, A. and Montanari, A., Comparison of short-term rainfall prediction models for real-time flood forecasting, *Journal of Hydrology*, Vol. 239, 132-147, 2000.

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