

## ***Interactive comment on “Probability distributions for explaining hydrological losses in South Australian catchments” by S. H. P. W. Gamage et al.***

### **Anonymous Referee #2**

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Dear Authors,

In the manuscript, the fitting of parametric and non-parametric probability functions to the hydrological losses of four selected catchments in South Australia were investigated, in order to improve design flood applications and operation of large water infrastructure. The Authors presented that the two-parameter Gamma distribution was the most suited for the initial losses and a non-parametric approach, which was developed in past studies, described successfully both the initial and continuing losses. However, the applicability and usefulness of the presented approach for major floods prediction in gauged and ungauged catchments are questionable in my point of view.

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First of all, it is not clear to me what is new in the manuscript regarding to the past studies on this issue. The Authors should make clear the scientific frontiers dealing in the manuscript.

Why is estimating hydrological losses distribution better than using directly the streamflow distribution, which is standard in Hydrologic Statistics (e.g. Stedinger, Vogel and Foufoula-Georgiou, 1992), to estimate the major flood flows?

In order to evaluate the applicability of the presented approach, the Authors must still apply it to a set of independent catchments, adopting some regionalisation techniques. Also, the Authors must test whether the presented approach performs better than that using the streamflow distribution.

Some minor “technical corrections”:

1. There is a lot of basic statistics, such as the explanation of bias and MSE, in the text. They can be summarized.
2. Fig. 1 has a very poor quality.
3. Fig. 5 shows strange values for the x-line (MSE).
4.  $\Delta t$  instead of  $t$  in Eqs (2) and (3).
5. Lebanon (2010), Hill et al. (1996) and Waugh (1990) are not included in References.
6. In References, L.14 p. 4614 seems strange to me.

References

Stedinger, J.R., R.M. Vogel and E. Foufoula-Georgiou: Frequency Analysis of Extreme Events, Chapter 18, Handbook of Hydrology, McGraw-Hill Book Company, David R. Maidment, Editor-in-Chief, 1993.

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