**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "Comparative assessment of predictions in ungauged basins – Part 2: Flood and low flow studies" *by* J. L. Salinas et al.

Anonymous Referee #3

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General comments (P = Page; L = line):

This paper aims to assess the performance of methods that predict low flows and flood runoff in ungauged catchments. The methodology is based on a meta-analysis of the main published papers in the literature (14 for low flow predictions and 20 for flood predictions involving more than 3000 catchments in each case) using some specific criteria functions well-adapted for both low flows and floods. The results discuss the predictions of hydrological extremes in different climates, the performance of regionalization methods, the impact of data availability on performance and the dependence of runoff prediction performance on climate and catchment characteristics. The paper is well-structured, clear and I enjoyed reading it. The paper presents a very important synthesis of already published papers. My main comments concern the lack of justifi-

cation of the choice of the criteria used for the comparison, an analysis of the original data obtained from the papers reviewed from the literature, the impact on the results of uncertainty on data (especially high and low discharges), and some secondary comments.

Specific comments:

1. The choice of the criteria functions: i) For low flow studies, the paper uses the coefficient of determination R^2, the absolute normalized error ANE, etc. Ii) For flood studies, the paper uses the RMSNE, the 100 year flood quantile, etc. As for the companion paper (Part 1), the title of the paper deals with "flood and low flow studies". However, various criteria functions can be used to make this analysis. It will be important to justify the choice of the criteria retained among other criteria, and discuss whether or not similar (or different) results will be obtained if other criteria functions were chosen.

2. Data analysis: A very important data based was analyzed in this paper. However, it is not clear how the criteria values were identified in Table 1 (performance R^2) and Table 3 (RMSNE). It will be pedagogic to explain on one study case (one line from Table 1 and one line from Table 3), how the criteria values were extracted from literature and then used in this study; eventually a short explanation can be added in an appendix. This explanation will be helpful to discuss the significance and the uncertainty on the values considered of the criteria functions. What can we learn from the original paper, and from the median, minimum and maximum values of the criteria functions? Do the authors of the original paper use other criteria functions? This explanation will be helpful to discuss the significance and the uncertainty on the value considered of the criteria functions.

3. Uncertainty on data: The measurement of discharge during low flows and floods are made with high uncertainties. The discussion needs to address also how the uncertainty on data can impact results and the classification obtained (on all Figures and the synthesis of Table 4).

4. Please also indicate the number of points used for each class of figures 2 to 7. For example, this information is given for Figure 3 right (P 424, L 25-29) but is not given for the other applications. Please also discuss the extreme values on all Figures; what can we learn from these extreme cases : high vs low values of performance criteria?

Other comments:

P 422, L 13: Please define CV.

Table 1: i) The variables q7,10, qmon,5, q95, q96, q97, etc. are defined only in the legend of Table 1. These criteria must be defined in the main text because they are used later in the discussion (see for example P423, L10). Ii) It is not clear what represent the various values of the performance R^2 in Table 1: one, two or three values, range of variation? The same remark can be formulated for the RMSNE in Table 3.

Table 3: same remarks as for Table 1: i) Define q100 in the main text; ii) what is the significance of the various values of RMSNE : one, two or more values, range of variation?