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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Uncertainty analysis of hydrological return period estimation, taking the upper Yangtze River as an example" *by* Hemin Sun et al.

Anonymous Referee #1

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This paper addresses the uncertainty in estimating return periods by considering different data sampling approaches, distribution assumptions and parameter estimation methods. It showed that different approaches could lead to very different results, and the optimal approach varies across gauging stations. The work is technically sound and the manuscript is clearly organized. The results are of practical importance.

Major comments: 1) The study somewhat lacks an in-depth discussion. The results are case-dependent and do not have a general implication. One reason is that it considered only two gauging stations, and they are in the similar climate and watershed conditions. They do differ in the flow variation trend, the uncertainty results reflect the difference. However, the author didn't go further to reveal de underlying physical or

mathematical reasons for the difference. Thus, no general conclusion can be drawn from the comparison. I improve the scientific significance of this work, I suggest the authors either analyze more stations in different watershed and climate conditions, or provide a theoretical analysis of the difference between the two stations. 2) The introduction to the sampling methods in Section 2.2 is two succinct. With the limited information, readers may not be able to understand how the extreme series are actually produced through POT and DPOT. Missing such critical information makes it hard for readers to understand the work.

Minor comments: 1) Acronyms are not consistent in the text and figures. Some examples are: MLE vs. ML; P III vs. P3; LN vs. LN2; Gam vs. GAM; GUM vs. GUM... 2) Section 3.3 was poorly written. It pours a lot of numbers here, but provides few insights. This section could be condensed into a couple of tables or figures, following by a paragraph os summary. 3) Please check the units, many of them do not have correct superscripts. 4) The introduction should articulate the research objectives.

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