

I appreciate the authors' efforts in revising the manuscript, particularly their acknowledgment of the limitations of their proposed method for practical applications and their alignment with the National Academies of Sciences, Engineering, and Medicine (NASEM, 2024) recommendation to use an Extreme Value Theory (EVT)-based approach. However, the study's primary contribution lies more in its critical evaluation of PMP methodologies rather than in the statistical model itself. While previous studies have highlighted the flaws in the WMO-recommended PMP estimation methods, this study uniquely examines the limitations of physically based moisture maximization through a statistical framework before ultimately recommending an EVT-based approach.

That said, I still have few concerns regarding the robustness of the conclusions, primarily due to the limitations of the EVT analysis and the inadequate discussion of sampling uncertainty.

Concerns:

- The challenge of estimating very long return periods (e.g., 10,000 years) using only 75 years of data remains unresolved. Such extreme quantile estimates require substantial extrapolation, which increases uncertainty. Moreover, the stability of estimation may be sensitive to the threshold selection in the Peaks-Over-Threshold (POT) method. I suggest going over (NASEM, 2024) report about sampling uncertainty. The authors should explicitly discuss these uncertainties in the EVT approach to prevent misinterpretation by end-users. Otherwise, there is a risk of conveying an overconfident message about the reliability of these estimates.
- The authors acknowledge that identifiability issues affect the reliability of PMP estimates, yet the discussion remains largely theoretical. The manuscript would benefit from a practical demonstration in section 6.3 of how alternative constraints—such as regularized maximum likelihood estimation or Bayesian priors—influence PMP estimates. If these methods were tested but found ineffective, the authors should clearly articulate why. This would strengthen the argument against using Pearson Type I for PMP estimation.