Geophysical Research Abstracts
Vol. 15, EGU2013-6108, 2013
EGU General Assembly 2013

Predictive performance of flood frequency analysis approaches: a national comparison based on an extensive French dataset.

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An abundance of methods have been developed over the years to implement flood frequency analysis (FFA). This poster describes a data-based framework aiming at comparing the predictive performance of FFA implementations, and shows the results of its application to an extensive dataset of French gauging stations.

The comparison framework is based on the following general principles: (i) emphasis is put on the predictive ability of competing FFA implementations, rather than their sole descriptive ability measured by some goodness-of-fit criterion; (ii) predictive ability is quantified by means of reliability indices, describing the consistency between validation data (not used for calibration) and FFA predictions; (iii) stability is also quantified, i.e. the ability of a FFA implementation to yield similar estimates when calibration data change; (iv) the necessity to subject uncertainty estimates to the same scrutiny as point-estimates is recognized, and a practical approach based on the use of the predictive distribution is proposed for this purpose.

This framework is then applied to a case study involving more than one thousand gauging stations in France, where several FA implementations are compared. These implementations correspond to the local, regional and local-regional estimation of Gumbel and Generalized Extreme Value (GEV) distributions. In addition, a "derived distribution" approach based on a rainfall simulator coupled with a rainfall-runoff model is also considered. Results suggest that the local-regional estimation of a GEV distribution and the derived distribution approach are the two most reliable implementations in terms of predictive performance. Moreover, the results also illustrate the feasibility of a data-based comparison of FFA implementations : reliability and stability indices are able to reveal marked difference between FFA implementations, and using the predictive distribution enables an indirect assessment of the reliability of uncertainty estimates.