



## **Effects of Ignoring or Imposing Long-Range Dependence on the Uncertainty of Return Level Estimates**

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River run-off is frequently assumed to be governed by underlying long-range dependent (LRD) processes. This assumption has a significant influence on the uncertainty of return level estimates: LRD leads to less information in the sample, i.e. the river run-off record, and thus to larger confidence intervals.

We compare confidence limits for a 100-year return level estimate obtained from river run-off records. These estimates are calculated using annual maxima and the general extreme value distribution (GEV). Confidence intervals are obtained under the assumption of an uncorrelated, a short-range dependent (SRD) and a LRD underlying process. For the latter assumption, we find a 10%-20% increase (relative to the return-level estimate) of the 95% upper confidence limit compared to the assumption of an uncorrelated or SRD process. This is a dimension worth considering for practical applications.

The confidence limits under the assumption of dependent processes are derived using a bootstrap approach involving linear stochastic processes and a resampling procedure.