



Teaching modern Bayesian flood frequency analysis using the R software nsRFA library

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If I conclude from a statistical analysis of 50 years of records, that the 100-year peak discharge value of a given river at a given location is equal to 123.654 m³/s, any sensible hydrologist should consider me as a huge liar. It is obviously impossible to be as accurate based on such a limited sample. This example is on purpose extreme, but most courses on statistical hydrology remain focused on estimation and optimization methods, ignoring estimation uncertainties related to sampling variability or at best considering these uncertainties as a by-product computed at the very end of the statistical inference procedure.

Several pieces of software are now available to conduct modern Bayesian flood frequency analyses relatively straightforwardly. They can be used in operational studies as well as in teaching to go deeper in the understanding of the statistical inference process, reveal the generally limited information content of the available data sets and illustrate the usefulness of historical information or regional flood frequency analysis methods.

The presentation aims at sharing the experience of several years of teaching flood frequency analysis at the Ecole Nationale des Ponts et Chaussées in Paris, based on the freely available R software library nsRFA and more precisely on the BayesianMCMC command developed by the author and its colleagues.