



Modelling the clustering of extreme river flows for hydrological risk assessment

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Floods due to extreme river flows have huge impacts in terms of damaged properties and insurance costs. The duration of floods can vary a lot from river to river; the clustering in time of extreme flows affects the estimation of risk measures such as return levels, which can be used by decision makers to design water defences. The peaks over threshold method is now widely used in the context of clustered time series, but can lead to biased estimates of related risk measures. We propose a Bayesian semi-parametric approach to get proper estimates of risk measures and account for uncertainty of these estimates based on the Heffernan–Tawn conditional tail model. We assess the performance of our method on simulated data and apply it to flow series.

Keywords: Asymptotic dependence; conditional tail; Dirichlet process mixtures; flood risk.