

# An Objective Bayesian approach for threshold estimation in the Peaks Over the Threshold model.

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## Abstract

The Generalized Pareto distribution (GPD) is often used to model exceedances over high thresholds. One of the main difficulty with this modeling approach is the choice of the threshold  $u$  because GPD parameter estimators are usually not robust with respect to  $u$ . In this paper we propose to model all data, extremes and non-extremes, using a mixture model that combines a sampling model for data below  $u$ , and the GPD for the exceedances over  $u$ . In contrast to the usual estimation techniques for  $u$ , in this setup we account for uncertainty on all GPD parameters, including  $u$ , via their posterior distributions. In order to infer on exceedances we use default priors for all parameters. From Monte Carlo simulations it seems that posterior credible intervals also have frequentist coverage. We further illustrate the approach on real data sets where we compare a parametric approach for non-extreme with the semiparametric one here proposed.

*Key words:* Extreme values, Generalized Pareto distribution, Jeffreys'

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