



## **Spatial Hierarchical Bayesian Analysis of the Historical Extreme Streamflow**

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Analysis of the climate change impact on extreme hydro-climatic events is crucial for future hydrologic/hydraulic designs and water resources decision making. The purpose of this study is to investigate the changes of the extreme value distribution parameters with respect to time to reflect upon the impact of climate change. We develop a statistical model using the observed streamflow data of the Columbia River Basin in USA to estimate the changes of high flows as a function of time as well as other variables. Generalized Pareto Distribution (GPD) is used to model the upper 95% flows during December through March for 31 gauge stations. In the process layer of the model the covariates including time, latitude, longitude, elevation and basin area are considered to assess the sensitivity of the model to each variable. Markov Chain Monte Carlo (MCMC) method is used to estimate the parameters. The Spatial Hierarchical Bayesian technique models the GPD parameters spatially and borrows strength from other locations by pooling data together, while providing an explicit estimation of the uncertainties in all stages of modeling.