

Applications in extreme value analysis and current work

Orla Murphy
McMaster University

Abstract

The focus of this talk will be on temporal dependence of univariate extremes followed by clustering of time series based on extremal behavior. Temporal dependence in a univariate time series can cause a clustering effect for extremes, i.e., extreme observations do not necessarily occur in isolation. Extreme value theory can be extended to certain stationary series but does not account for this form of dependence. We propose a model for the sum of extreme clusters called the Random Scale Model. We use a Bayesian approach with this model to make inference on the return period of the 2011 Richelieu River flood. Multivariate dependence of extreme observations is challenging due to the complexity of multivariate extreme distributions in high dimensional space. Dimension reduction is particularly important in this setting as the curse of dimensionality is worse due to the lack of extreme observations. We propose a new method for clustering time series based on pairwise extremal behavior. This method is used for a cluster analysis on rainfall data from 23 stations around Québec. The conclusion of this talk will contain potential extensions of these works as well as a summary of my current research.