Multivariate Extremes and Related Processes

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Abstract. *The aim of spatial analysis is to quantitatively describe the behavior of environmental phenomena such as precipitation levels, wind speed or daily temperatures. A number of generic approaches to spatial modeling have been developed [1], but these are not necessarily ideal for handling extremal aspects given their focus on mean process levels. The areal modelling of the extremes of a natural process observed at points in space is important in environmental statistics; for example, understanding extremal spatial rainfall is crucial in flood protection. In light of recent concerns over climate change, the use of robust mathematical and statistical methods for such analyses has grown in importance. Multivariate extreme value models and the class of maxstable processes [2] have a similar asymptotic motivation to the univariate Generalized Extreme Value (GEV) distribution , but providing a general approach to modeling extreme processes incorporating temporal or spatial dependence. Statistical methods for max-stable processes and data analyses of practical problems are discussed by [3]. This work illustrates methods to the statistical modelling of spatial extremes and gives examples of their use by means of a real extremal data analysis of Switzerland precipitation levels.*

Keywords. *Extremes; Maxstable processes.*

References

[1] Cressie, N. A. C. (1993). *Statistics for Spatial Data*. Wiley, New York.

[2] de Haan, L and Ferreria A. (2006). *Extreme Value Theory An Introduction*. Springer, USA.

[3] Padoan, S. A., Ribatet, M and Sisson, S. A. (2009). Likelihood-Based Inference for Max-Stable Processes. *Journal of the American Statistical Association*, **105**, 263-277.