Thibaud, Emeric; **Aalto, Juha**; **Cooley, Daniel S.**; **Davison, Anthony C.**; **Heikkinen, Juha**
Bayesian inference for the Brown-Resnick process, with an application to extreme low temperatures. (English) Zbl 1454.62462
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Summary: The Brown-Resnick max-stable process has proven to be well suited for modeling extremes of complex environmental processes, but in many applications its likelihood function is intractable and inference must be based on a composite likelihood, thereby preventing the use of classical Bayesian techniques. In this paper we exploit a case in which the full likelihood of a Brown-Resnick process can be calculated, using componentwise maxima and their partitions in terms of individual events, and we propose two new approaches to inference. The first estimates the partitions using declustering, while the second uses random partitions in a Markov chain Monte Carlo algorithm. We use these approaches to construct a Bayesian hierarchical model for extreme low temperatures in northern Fennoscandia.

MSC:

62P12	Applications of statistics to environmental and related topics	Cited in **12** Documents
60G52	Stable stochastic processes	
62F15	Bayesian inference	
62G32	Statistics of extreme values; tail inference	
86A08	Climate science and climate modeling	

Keywords:

global warming; likelihood-based inference; max-stable process; nonstationary extremes; partition; space-time declustering

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