Titel: Modeling waiting times of clustered extreme events

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For many applications in the field of extreme value theory, both the frequency of the occurrence as well as the return times of extreme events are of great interest. Such as in climate research in the study of extreme midlatitude cyclones.

Traditionally, a Poisson process is assumed as model for the occurrence of extreme events, so that the waiting times between two successive exceedances are i.i.d. exponentially distributed. If the observations are realizations of a strictly stationary process with existing extremal index, Ferro and Segers (2003) showed that extreme events cluster and the waiting times between them are approximately distributed as a mixture of an exponential distribution and a Dirac measure in zero. Hees, Nayak and Straka (2021) proposed another model for clustered extreme events based on a fractional Poisson process, leading to Mittag-Leffler distributed inter-exceedance times.

In this talk, we will introduce a generalized model that includes exponentially, mixed and Mittag-Leffler distributed waiting times as special cases. We suggest the minimum distance method based on the Cramér-von Mises distance for estimation of the model parameters and illustrate the nice properties of a suitable modification of this approach.

References

[1] Ferro, C.A.T. & Segers, J. (2003). Inference for clusters of extreme values. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, *65*, 545-556.

[2] Hees, K., Nayak, S. & Straka, P. (2021). Statistical inference for inter-arrival times of extreme events in bursty time series. *Computational Statistics & Data Analysis*, *155*, 107096.