Discussion of "The importance of context in extreme value analysis with application to extreme temperatures in the USA and Greenland" by D. Clarkson, E. Eastoe, and A. Leeson

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We congratulate the authors for a fresh, thought-provocative perspective on applied modeling of extremes. While we may not fully agree with some philosophical details on the approaches taken, we absolutely concur with the rising need for going beyond standard EVT models. In particular, we have been advocating with others (e.g., Lugrin et al., 2016; Hanson et al., 2017; de Carvalho et al., 2022, in press; Padoan and Rizzelli, 2022, in press) the need for semi- and non-parametric Bayesian approaches in extremes—and this paper indirectly provides another case for it. Many nonparametric Bayesian approaches are an extension of standard parametric methods in the sense that they are centered a priori around a parametric model, $\{G_{0,\theta} : \theta \in \Theta \subseteq \mathbb{R}^q\}$, but assign positive mass to a variety of alternatives. Clearly, nonparametric Bayesian EVT modeling is not as straightforward as simply centring a Dirichlet process (DP) on a GEV or a POT—as it is well-known that the tails of the DP are exponentially lighter than those of the baseline (Ghosal and Van der Vaart, 2015, §4.2.3). Recent developments in Palacios Ramírez et al. (2022) suggest however that this issue can be mitigated by resorting, for example, to Stable Law processes—and obviously related infinite mixture models may be handy for situations such as those covered in §4.

On a different note, we particularly appreciate the random effect approach in §2.2. Still, one wonders about why not using EGPD (Extended Generalized Pareto Distribution)-based methods (e.g., Papastathopoulos and Tawn, 2013; Naveau et al., 2016; de Carvalho et al., 2022, in press) that would model the full set of observations rather than the exceedances alone, and would mitigate the need for threshold selection? Indeed, in §4 all the data are used to learn about the targets of interest but not in §3.

Finally, we conclude with a comment on nonstationary multivariate extreme-valued models (e.g., de Carvalho, 2016; Castro et al., 2018; Mhalla et al., 2019; Escobar-Bach et al., 2018)—that index the angular measure with a covariate, H_x—or another related functional. It would seem natural to devise random effects versions for the latter context.

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