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## A Bayesian hierarchical model for wind gust prediction

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A postprocessing method for ensemble wind gust forecasts given by a mesoscale limited area numerical weather prediction (NWP) model is presented, which is based on extreme value theory. A process layer for the parameters of a generalized extreme value distribution (GEV) is introduced using a Bayesian hierarchical model (BHM). Incorporating the information of the COMSO-DE forecasts, the process parameters model the spatial response surfaces of the GEV parameters as Gaussian random fields.

The spatial BHM provides area wide forecasts of wind gusts in terms of a conditional GEV. It models the marginal distribution of the spatial gust process and provides not only forecasts of the conditional GEV at locations without observations, but also uncertainty information about the estimates.

A disadvantages of BHM model is that it assumes conditional independent observations. In order to incorporate the dependence between gusts at neighboring locations as well as the spatial random fields of observed and forecasted maximal wind gusts, we propose to model them jointly by a bivariate Brown-Resnick process.