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## Extreme near-coastal hurricane winds

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The rarity of severe coastal hurricanes implies that empirical estimates of return periods will be unreliable. Here we demonstrate a data modelling approach for estimating return periods. The approach provides a systematic framework for including uncertainty in the modelling process. The distribution of maximum hurricane-force winds near landfall is assumed to follow a 2 parameter generalized Pareto distribution (GPD). The threshold wind speed value is fixed at 64 kt. The model uses measurement error on the wind speed estimates. The likelihood function is the product of the generalized Pareto probability for each wind speed estimate. Gibbs sampling is used to integrate the prior over the likelihood to obtain the posterior distributions for the parameters. Convergence of the model occurs in less than 4000 iterations. Sampling the model parameters provides a distribution for the maximum wind speeds given the occurrence of a coastal hurricane. Results show the 1000-year expected hurricane wind speed near the coast is 145 kt with a 10% chance that it exceeds 150 kt. In general, the posterior probability that the shape parameter of the extreme value distribution is greater than or equal to zero is less than 2.2%, indicating that the maximum wind speed is bounded.