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Development of a UK Extreme Wind Climatology

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Windstorms cause 75-80% of the insurance loss from natural hazards in Europe. Despite this impact detailed historical information is lacking on the incidence of high and damaging winds by location across the UK and western Europe. Such information is necessary to accurately assess the risk of extreme winds by location. We report progress on the development of a state-of-the-art UK extreme wind climatology. The climatology will provide gust speed exceedance probabilities and return periods by location and on a uniform 100 m grid. We are planning this information to be based on, and available for, different climatology periods extending back 100 years. The climatology design allows ease of extension to European countries.

The presentation will describe, with examples, the datasets, new tools and information that are underpinning the creation of the UK wind and gust climatologies. These include the:

1. Use of untapped 10-min wind and continuous 3-sec gust observation data in the NERC Met Office Integrated Data Archive System (MIDAS).

2. Development of an automated scheme for computing effective upstream surface roughness at any location based on upstream land use and weighted by normalised wind direction.

3. Development of physical models giving the speed-up and speed-down of 10-min windspeed and peak 3-sec gust at any location due to upstream surface roughness and, separately, due to upstream surface topography. Local speed-ups and speed-downs in 10-min windspeed can reach 30% due to upstream roughness and 100% due to upstream topography.

4. Development of a catalogue of UK major storm events 1900-2010.