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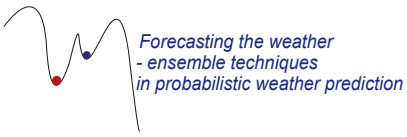


# The development of a UK windiness index: First applications to wind energy and insurance

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The contribution of windstorm losses to overall insured loss in the UK is very significant, not just as a result of major autumn and winter windstorms, but through smaller, less severe wind damage events, which can affect the UK at any time of the year. The prevalence of wind damage can be attributed to the UK wind regime which, more positively, provides significant opportunities for the growing UK wind power industry. A 31 year (1980-2010) observational database has been developed in order to identify UK wind regime trends, based on 41 surface stations throughout the UK, including both hourly mean and gust wind speeds.

Recently published results by Vautard et al. (2010) suggest that there has been a 'stilling' of the observed atmosphere over the last 30 years across the Northern Hemisphere, providing an opportunity to compare these continental scale observations with those specifically derived from our database from the UK in its geographical location exposed to the North Atlantic . Results will be presented demonstrating the climatology and trends of exceedences of specific wind speed thresholds, including those of particular interest to the insurance industry. Results reveal an overall slowing of the wind over the last three decades, particularly in the winter season, with peaks in the early 1980's and early 1990's, especially for stronger winds. The most recent year, 2010, is the lowest of all 31 years for exceedence frequencies of many of the moderate and high windspeed thresholds; 2009 and 2010 are the only years where the mean hourly wind speed did not breach the 25 $ms^{-1}$ at any of the 41 sites.

Implications of the intra- and inter-annual variations in the UK wind regime for the wind power industry have also been explored. For each of the observation sites, an imaginary 3.6MW wind turbine was considered for the duration of the recorded observations, with the 10m winds extrapolated to the typical hub height of 100m. The results show a significant annual variability, not just for individual sites, but for the overall network average, highlighting the potential limitations of relying on a single year of on-site measurements for wind farm viability assessments.