



Characterisation of extreme wind speeds in a new high resolution reanalysis dataset for Ireland

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Windstorms pose a significant risk to life and property through extreme wind speeds and waves. They can cost billions in insurance losses and have a negative impact on the activities of the forestry and offshore energy sectors. Detailed knowledge of the location, intensity and frequency of these storms can help with planning and mitigating for their detrimental effects. In particular, there is a need for high resolution information that allows for a better understanding of the spatial variability of extreme winds.

MÉRA is a new 35-year very high resolution (2.5 km horizontal grid) regional climate reanalysis for Ireland carried out by the Irish Meteorological service (Met Éireann). It spans the period 1980-2015 and was generated using the ALADIN-HIRLAM numerical weather prediction system. Climate reanalyses are an important source of information for monitoring climate and for the validation and calibration of numerical weather prediction (NWP) models but also have vast uses outside of meteorology and climatology. Because they are carried out using a fixed version of a forecast model and a data assimilation system which utilises historical observations, they produce parameters that are physically consistent and often not routinely observed. Thus, climate reanalyses have the potential to extend the knowledge gained from current observation networks.

Selected historical windstorms from the MÉRA dataset, such as hurricane Charlie in 1986 and storm Darwin in 2014 have been analysed in the present study. In particular, 10 m level wind speeds have been verified against observations from the Irish synoptic station network to evaluate the performance of the modelled data in characterising extreme winds. A statistical analysis of extreme values has been performed and is also presented here. 850 hPa level wind speeds have been compared against radiosonde measurements from Valentia observatory. In addition, minimum values of mean sea level pressure have also been validated and used to trace the storm tracks.