EMS Annual Meeting Abstracts
Vol. 14, EMS2017-813, 2017

A Challenge for Wind Gust Forecasting with Convection-Permitting Models

Ken Mylne and Nigel Roberts
Met Office, Weather Science, Exeter, United Kingdom (ken.mylne@metoffice.gov.uk)

Many National Meteorological Services are moving towards basing Severe Weather Warning services on a risk-based approach taking account of impacts, which requires increasing localised detail of the weather elements likely to generate high impacts. In the case of wind warnings, high impacts are normally generated by severe gusts rather than the mean wind speed. Global models and the older regional models with grid lengths of order 10km or more have long used a parameterization of shear-driven turbulence to estimate wind gusts alongside the standard 10m windspeed output, and this works well for standard strong-wind scenarios. However many services are now introducing convection-permitting models and ensembles using models with horizontal grid-lengths of order 1-2km. These models offer far more local detail which in general is very valuable in issuing improved warnings and driving estimates of local impact, but does significantly raise expectations of increased accuracy. The problem is that because these models resolve some convective overturning on the grid-scale, and therefore provide some representation of convectively driven gusts within the windspeed outputs, use of the standard gust parameter over-estimates the gusts in convective situations by adding the shear-driven element on top of the convective gust. Since many strong wind situations can include convection, it is difficult to separate the two effects in interpreting model outputs, especially in automated forecast production.
The purpose of this poster is to set out a challenge with the aim of stimulating research into how best to derive a unified approach to gust estimation from convection-permitting NWP models. This may be either a model solution or a post-processing one. Some ideas for post-processing gusts using a neighbourhood processing technique will be included to stimulate further discussion.