EMS Annual Meeting Abstracts
Vol. 15, EMS2018-125, 2018

Multi-model Ensemble Forecasting of Exceptional Winter Weather

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

The end of February and first days of March 2018 saw the most severe outbreak of cold winter weather in the UK for several years, as well as over much of western Europe, compounded by Storm Emma which came from the south and generated exceptional blizzards and freezing rain in the south of the country. This series of events presented a major challenge to forecast systems and operational meteorologists alike. The cold outbreak had been well predicted in advance, firstly from long-range predictions of a Sudden Stratospheric Warming increasing the risk of blocking, and then two weeks ahead from the Decider system. Decider clusters ECMWF and other global ensembles according to weather regimes, and identified very high probabilities of cold easterly flows up to two weeks ahead. In fact the real cold air came a few days later than first anticipated but by the end of the week before it was very clear that a major winter outbreak was coming. Forecasting throughout the week exploited a combination of ECMWF and Met Office models, and a few others including NCEP, to provide multi-model ensemble guidance at all time ranges.
The event also provided useful test data for new UK forecast systems which rarely encounter severe snow events. As part of the development of the new IMPROVER post-processing system (Evans, 2018) a new snow diagnostic technique is under development which combines neighbourhood ensemble precipitation probabilities with a detailed orographic diagnostic of snow penetration level. The Met Office was also at the time running a real-time demonstration of a new hourly-cycling set-up for the 2.2km MOGREPS-UK convection-permitting ensemble. The event provided an ideal testbed for both these systems.
Key to successful forecasting under such extreme conditions was a strong interaction between Science teams and operational meteorologists to analyse model guidance and provide new diagnostics, resulting in exceptionally good guidance and warnings throughout the week, including an unprecedented simultaneous two Red warnings in different parts of the UK.

Evans, G. (2018): Creating a probabilistic, multi-model post-processing system at the Met Office, submitted to EMS Annual Meeting, Budapest, 3-7 Sep, 2018.