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Ensemble-based first-guess warnings in support of the risk-based UK National Severe Weather Warning Service

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Severe weather warnings are increasingly becoming more risk-based as forecasters issue warnings based on where weather is most likely to have a disruptive impact on society. Risk is a combination of likelihood and impact, and this is reflected in the National Severe Weather Warning Service (NSWWS) weather impact matrix. Ensembles provide an ideal tool for deriving likelihood, whereby probabilistic first-guess warnings of severe weather can be generated using pre-defined impact-based criteria. Ensemble prediction system first guess warnings (EPS-W) is an ensemble based first-guess support tool for severe weather, developed to support Met Office forecasters in issuing risk-based severe weather warnings. EPS-W post-processes ensemble data into a format which mimics the NSWWS weather impact matrix and warning colour states. Ensemble members from both the Met Office Global and Regional Ensemble Prediction System (MOGREPS) and the European Centre for Medium-Range Weather Forecasts (ECMWF) are used, providing guidance from just a few hours ahead up to six days. The post-processing takes advantage of three versions of MOGREPS, including a new 2.2km resolution convection-permitting ensemble over the UK (known as MOGREPS-UK), as well as courser resolution regional and global versions (known as MOGREPS-R and MOGREPS-G respectively). EPS-W uses low, medium and high impact thresholds for each variable (severe gales, heavy rain and heavy snow). These thresholds vary by county, taking account of varying levels of impact of severe weather for different parts of the UK. Examples of how this tool can be used to support the risk-based NSWWS are presented, along with some latest ensemble severe weather forecast verification results.