

Workshop on Predictability, dynamics and applications research using the TIGGE and S2S ensembles



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Early warning products for severe weather events derived from operational medium-range ensemble forecasts

Accurate predictions of severe weather events are important for the society, economy, and environment in regions affected by such events. In the present study, the ensemble-based early warning products for severe weather events routinely available at the TIGGE museum (http://gpvjma.ccs.hpcc.jp/TIGGE/tigge_extreme_prob.html), are introduced. The early warning products are based on operational medium-range ensemble forecasts from four of the leading global numerical weather centres: the European Centre for Medium-Range Weather Forecasts (ECMWF), the Japan Meteorological Agency (JMA), the UK Meteorological Office (UKMO), and the National Centers for Environmental Prediction (NCEP) in USA. The forecast probability of the occurrence of severe weather events, including heavy rainfall, strong surface winds, and high/low surface temperatures, is defined based on each model's climatological probabilistic density function. The construction of a grand ensemble by combining four single-centre ensembles can improve the probabilistic skills of forecasts of severe events, up to a lead time of +360 h. The improvements in forecast skills are more pronounced for severe surface temperature and precipitation. The grand ensemble provides more reliable forecasts than single-centre ensembles, particularly with respect to strong wind speeds and severe temperature, aiding the advance detection of severe weather events to help mitigate the associated catastrophic damage, especially in developing countries.

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