

Forecasting of Extreme Weather Events

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The forecasting of extreme weather events is of great interest to the Centre's Member States, Co-operating States and the world meteorological community in general. Zillman (1999) recently gave a comprehensive summary of extreme weather events, which play an important role in the operational practice of NMHSs around the world. These events exist on all time and space scales from tornadoes, flash floods to major storms and extended heatwaves and droughts. Forecasts and warning of these events according to national practices are required at all ranges from nowcasting to the seasonal prediction. However, the availability of appropriate, useful and reliable forecast guidance from NWP systems has been limited in the past, but with the recent and future developments in high resolution deterministic and stochastic NWP systems there appears to be a good basis for further progress also in the area of extreme weather event prediction. In its 10 year strategic plan, which was adopted by Council in 1999, the Centre was given as one of its targets, the "provision of good forecasts of severe weather towards day 4 or day 5 ahead - this requires the development of a suitable performance evaluation relating to severe weather".

Also, the WMO recently addressed the issue of extreme weather event forecasting and the 1998 session of the Commission for Basic Systems first attempts have been made to develop forecast procedures based on a cascading process for providing guidance from ensemble prediction systems and high resolution single/multiple model output. The Centre will contribute to these developments. The definition of extreme events, the validation procedures and the evaluation of the skill of the forecasting system in predicting such events, will need to be developed in close liaison with the users.

These issues were further addressed during a panel discussion. Representatives from national meteorological services in the Member States stressed the importance of successful extreme weather event forecasting for the state funding of the NMHSs. However, it was noted that, since extreme events are rare events, it will be difficult to produce consistent records of forecast skill for these events. Several speakers noted the importance of minimising the false alarm rate in the system. In this respect, the probabilistic approach to forecasting in particular in the medium-range may be used with preference. The usefulness of the probabilistic forecast products needs to be explored with the end users and will depend on the application. The cost/loss analysis and evaluation of the forecast products was seen as particularly useful in this respect.

It was noted that the current ECMWF forecasting system (high resolution deterministic model and EPS) will not meet directly all the requirements of the Member States for their extreme weather event warnings. The capability of the current system to predict events on space and time scales it can handle, should first be explored. Such events should be defined and then traced in Europe but also elsewhere thus widening the data sampling.

The development of the forecasting system in view of extreme weather prediction was briefly addressed. Higher model resolution is an obvious development but in particular the targeted EPS was mentioned as a promising step forward also for severe weather event forecasting.

References:

Zillman, J., The national meteorological service, WMO Bulletin Vol. 48 No. 2, April 1999