EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-474, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

Probabilistic prediction of severe weather using new products based on generalized extreme value theory

F. Prates and Roberto Buizza

ECMWF, Meteorological Operations Department, Reading, United Kingdom (fernando.prates@ecmwf.int, +44-118-9869 450)

One of ECMWF's main goals is to improve its capability to provide early warnings of severe weather to its users, in particular to its Members Sates and Co-operating States. Forecasters have access to both probabilistic forecasts generated by the Ensemble Prediction System (EPS) and single forecasts generated by the high resolution model. In this work, the concept of the return period of a rare event is used to generate a new type of probabilistic product from the EPS. This new approach can lead to a better understanding of the intensity and rarity of the predicted severe weather, especially when the EPS forecast distribution falls outside the range of the model climate distribution. Attention is focused on temperature. First, annual maxima of the daily maximum temperature are extracted from EPS re-forecasts of past years and used as an input to the generalized extreme value family of distributions. This allows return levels to be estimated for return periods longer than the length of the model climate. Probabilities can be then generated from the EPS forecast for these exceptional values. Objective verification measures are applied to assess the quality of these forecasts. In the first part of the talk, the theoretical framework used in the present study will be described. Then a few severe cases of heat waves that affected Europe in the recent years will be presented to illustrate the potential usefulness of return period probabilities to the forecasters. Finally, average diagnostics will be presented, and the potential value for weather-risk management of this new type of forecasts will be discussed.