

Application and verification of ECMWF products 2015

AEMET. Spain

1. Summary of major highlights

2. Use and application of products

We use deterministic model, HRES, ensemble (ENS) and monthly forecasts, to generate graphic and text products for forecasters of short, medium range and monthly forecasts, and for automatic products.

We use deterministic model, ensemble (ENS) and monthly forecasts to generate different kind of products. Units for defence support use EcCharts outputs directly from the ECMWF Web.

2.1 Post-processing of ECMWF model output

Describe the different ways in which you post-process ECMWF forecasts, in the following categories:

2.1.1 Statistical adaptation

- 2m temperature: The high resolution ECMWF model (both 12 and 00 UTC run) 2T grids are statistically interpreted up to 10 days to generate 1km grids. The method uses both bias correction ('exponential decay correction' based on observed temperatures from the automated Spanish network) and altitude correction (from a 1km altitude grid) and is applied to 'peninsular Spain' and 'Canary Islands' areas.

2.1.2 Physical adaptation

- 5 km grid: We adapt the original resolution of ECMWF fields (HR and ENS) to a 5 km "standard" resolution in our Digital Forecast Database (BDDP), used for automatic products. In this BDDP we use forecasts from several models; ECMWF High Resolution Model is generally used from H+48 ahead and the Ensemble Model is used from H+0.
- 2m temperature for mountain points: We adapt the temperatures values contained in our Digital Forecast Database to the real altitude of the point, by an altitudinal interpolation taking into account a local vertical gradient of temperature.

2.1.3 Derived fields

- Every day for 00 and 12 runs, we generate 6 objective clusters in two specific areas, day by day up to D+15 and then, the forecaster on duty, decides a subjective re-clustering, day by day, from D+2 until D+4, only for Iberian Peninsula and Balearic Islands Area.
- Also, we elaborate probability maps for cloudiness, rainfall, snow, CAPE, wind, wind gusts, temperature and temperature variations.
- We obtained other derived fields for several specific uses (turbulence indices, 0°C wet bulb temperature altitude, etc...)

2.2 Use of ECMWF products

- Obtaining maps of for forecasters of short, medium range and monthly forecasts, and for our web site.
- EFI and SOT maps from ENS are used as an early warning or possible extreme events in medium range forecasts. It is used in conjunction with clusters and probability maps for different thresholds and variables.
- As an input for AEMET Digital Forecast Database (BDDP), with other NWP models.
- Automatic products (from BDDP) in text and pictogram formats for AEMET web site, including deterministic and probabilistic information.
- The ECMWF model data is also used as input in the Graphical Forecast Editor (GFE). GFE is a tool designed to create, edit and manage a Digital Forecast Databases (DFD or BDDP). Forecasters

interactively will prepare and manipulate this DFD using several NWP models as guidance. This system is currently being tested. So far the ECMWF HRES and ENS model data is chosen as the default guidance. The data being used is mostly surface parameters and ENS probabilities of precipitation for several thresholds.

3. Verification of products

3.1 Objective verification

3.1.1 Direct ECMWF model output (both HRES and ENS)

3.1.2 ECMWF model output compared to other NWP models

3.1.3 Post-processed products

3.1.4 End products delivered to users

3.2 Subjective verification

3.2.1 Subjective scores (including evaluation of confidence indices when available)

Since the new IFS cycle (41r1) that has been implemented last May, and from the daily technical discussions during the daily videoconference between units of our National Forecasting System, we can conclude that in this summer the HRES model failed, more than it used to do, to position correctly the maximum of convective precipitation in the short range. Each model output place the maximum of convective rainfall in different position. The impact on the issue of proper extreme weather warnings sometimes has been quite high. We think that it could be related to the outbreaks of subtropical air masses, especially in the south and east of Spain.

Moreover some effects in some coastal areas has been observed: in some specific inland locations close to the beach, the forecast temperature is sometimes cooler than the observed one. That could be due to the new land-sea mask.

3.2.2 Case studies

The snowfall that never was (18th January 2015): all the outputs of ECMWF model forecast a great snowfall over the Iberian Peninsula during the precedent days, even the output of 18th January at 00 Z).But it has been snowing a little bit, and it rained quite hard but not over forecasted geographical areas.

4. References to relevant publications