Application and verification of ECMWF products 2018

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1.   Summary of major highlights

ECMWF products are the main source of forecasting tools for the operational work, as for the short and medium range forecasts, so for the forecasting of severe weather and weather warnings. The amount of forecasting products used in the operational work is growing continuously. Also the way there are exploring is changing, because we are more use to used them and we learn them deeply. Most frequently used products are: ten days deterministic forecasts, also ENS Meteograms, from the Ensemble Prediction System - EFI, monthly forecasts etc.
We found very useful the occasion that in the past years experts from ECMWF's visit our HMS and one forecaster from our HMS had participate to the training course: Use and interpretation of ECMWF products. We found out these face to face working meetings invaluable useful, despite there is a lot of training materials on the web-site of ECMWF. These two events allowed us another way of interpreting and looking at the ECMWF products. Also we found out some products and aspects of using products that were not known to us before.

2.   Use and application of products

ECMWF products are used in the everyday operational work for preparing short-range forecasts, which are designed for different users, such as governmental institution, public, media etc.
Medium-range forecast is also mainly based on ECMWF products from deterministic model as well as ENS products. In the process of preparing forecasts for severe weather conditions and warnings backbone is ECMWF and forecasting products as EFI, probabilities etc.
Monthly forecast of ECMWF is often using for the monthly outlook of the weather. ECMWF seasonal forecast is also more frequently used as a tool for preparing of the seasonal outlooks.

ECMWF forecast products are exploring mostly with tokens. We find out that all the improvements made to the diversity and access of forecasting charts and other materials on the web page are excellent. Also the new Forecast User Guide that we are still exploring.

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

2.1.2 Physical adaptation

In our HMS we are running twice a day WRF-NMM v.3.9.1, non-hydrostatic limited-area model, with boundary conditions from ECMWF.

2.1.3 Derived fields

Include post-processing of ENS output e.g. clustering, probabilities

2.2   ECMWF products

2.2.1 Use of Products

The most exploited way of using ECMWF products is using of ECCharts and ENS Meteograms. There are already prepared and saved combinations of meteorological parameters on the dashboard of the duty forecaster and depending on the synoptic situation we are looking in the appropriate parameters.

For severe weather conditions we are looking at EFI (together with synoptic situation), but also we are using ENS cumulative distribution function CDF, especially for the precipitation and temperature. We are always waiting for the ENS Meteograms (09:40 and 21:40 local time) to see the probabilities of the forecasted parameters. The precipitation-type make our decision more efficient, especially in the winter and transitional weather seasons.

2.2.2 Product requests

We found that the presentation of the surface pressure charts in ECCharts is not very explicit, maybe some improvement for this parameter will be good.

For the CAPE parameter, maybe it is good to have possibility for visualization from higher minimum limit (from 500 J/kg) to highlight the regions with more chances for severe weather.

3. Verification of products

Include medium-rangeHRES and ENS, monthly, seasonal forecasts. ECMWF does extensive verification of its products in the free atmosphere. However, verification of surface parameters is in general limited to using synoptic observations. More detailed verification of weather parameters by national Services is particularly valuable.

3.1 Objective verification

Describe verification activities and show related scores.

3.1.1 Direct ECMWF model output (both HRES and ENS)

Focus on local weather parameters verified for locations thatare of interest to your service

3.1.2 ECMWF model output compared to other NWP models

Comparethe performance of ECMWF modelswith other NWP models used by your service

3.1.3 Post-processed products

e.g. Kalman-filtered products, calibrated ENS probabilities, etc.

3.1.4 End products delivered to users

3.2 Subjective verification

3.2.1 Departures in the 2m temperature, especially for some sites and for the minimum temperature. The convective precipitations are still not perfect.

3.2.2 Case studies

Severe weather events/non-events are of particular interest. Includean evaluation of the behaviour of the model(s). Reference to major forecast errors, even if they are not in a "severe weather" category, are also very welcome.

4. Feedback on ECMWF "forecast user" initiatives

We invite comments on how useful you find the information provided on ECMWF's "Forecast User Portal", see: (https://software.ecmwf.int/wiki/display/FCST/Forecast+User+Home), and on any changes you would like to see. A new web-based "Forecast User Guide" will be added soon (due May 2018) and we would particularly welcome initial comments on that.

5. References to relevant publications

(Copies of relevant internal papers may be attached)

Smith, W. and **C. Jones**, 2005: Whatever the name of the article is. *Mon. Wea. Rev.*, **20**, 134–148

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