

Application and verification of ECMWF products 2012

National Meteorological Administration

1. Summary of major highlights

The objective verification of all deterministic models forecasts in use have been continued on all time ranges as previous years. All MOS verification results and deterministic models verification results are presented on the specialised web-site. <http://neptun.meteoromania.ro> (access restricted upon request)

In **2011**, some important steps were performed:

- verification of extremes temperatures from MOS_MIXTE model: - statistical MOS model using MOS_ECMWF and MOS_ARPEGE
- up-date of all MOS_ECMWF and MOS_ARPEGE models
- up-date of PseudoPP statistical models for extremes temperatures forecasts up to 15 days and up to 32 days. The disseminating formats are: maps, regional graphs, and stations graphs.

2. Use and application of products

2.1 Post-processing of model output

2.1.1 Statistical adaptation

The MOS statistical models have been in operational use since 2004. No changes in basic models since that time. The models provide twice on a day, local forecasts up to 10 days, to 163 meteorological stations for the following main parameters: 2m temperatures, extreme temperatures, 10m wind speed and direction, total cloudiness(3 classes) and total precipitation. The results are plotted in map forms and displayed on the web site. A special selection is made for the end users in text format and also for the forecasters.

In 2008, the PseudoPP statistical model developed in cooperation with Meteo France, was implemented. The parameters are: 6h 2m spot temperatures and extremes temperatures, up to 15 days and up to 32 days. The disseminating formats are: maps, regional graphs, and stations graphs.

In 2010, a MOS_MIXTE model was developed, using MOS_ECMWF RUN 12 UTC and MOS_ARPEGE RUN 00, for extreme temperatures.

No additional statistical models in 2011.

2.1.2 Physical adaptation

2.1.3 Derived fields

2.2 Use of products

The ECMWF products continued to form the basis of short and medium range forecasts, for public, customers and state authorities, and within the national warning system. A large number of new graphical products, generated through METVIEW and Magics are available on a dedicated Intranet site.

The meteorological fields from deterministic model ECMWF, received via RMDCN, are plotted, in operational mode, using Magics package and are made available for the Forecasting Department in real time.

The following figures are some examples from this operational system:

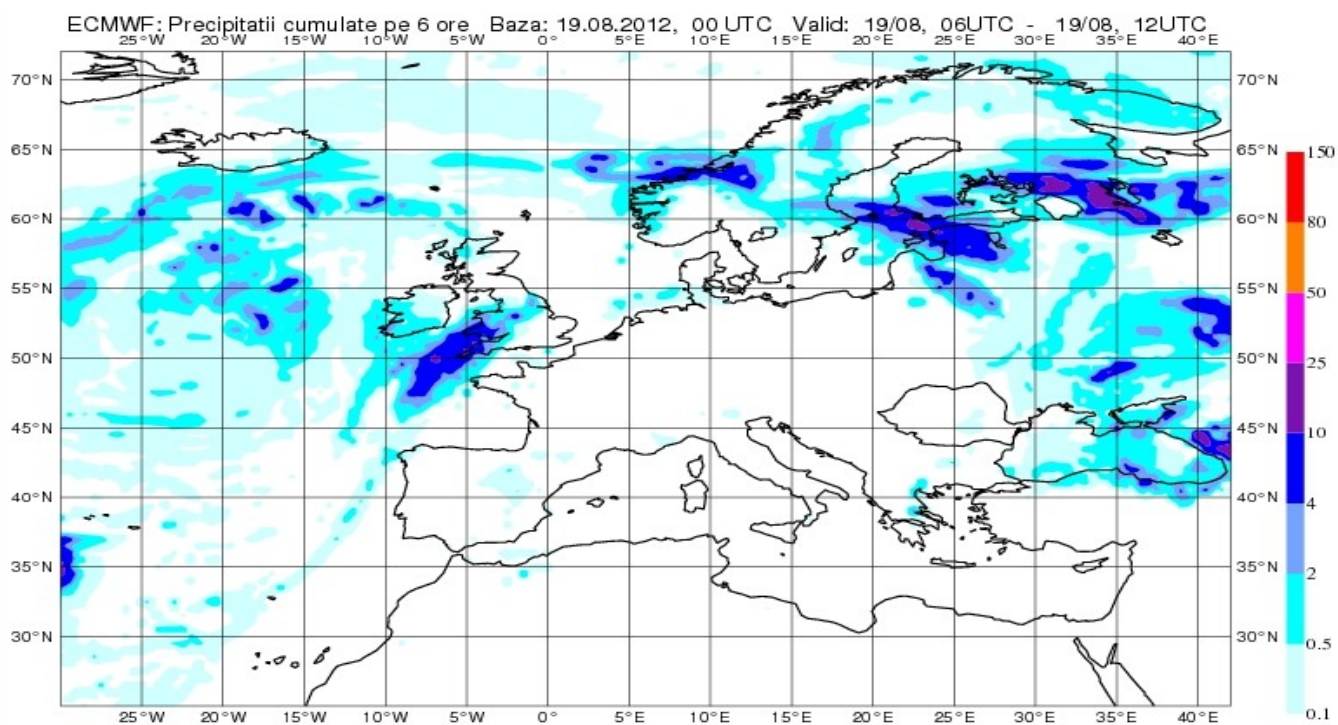


Figure 1. The cumulated precipitation in 6 hours
 Base:19.08.2012, 00 UTC
 Valid: 19.08.2012, 06 UTC – 19.08.2012, 12 UTC

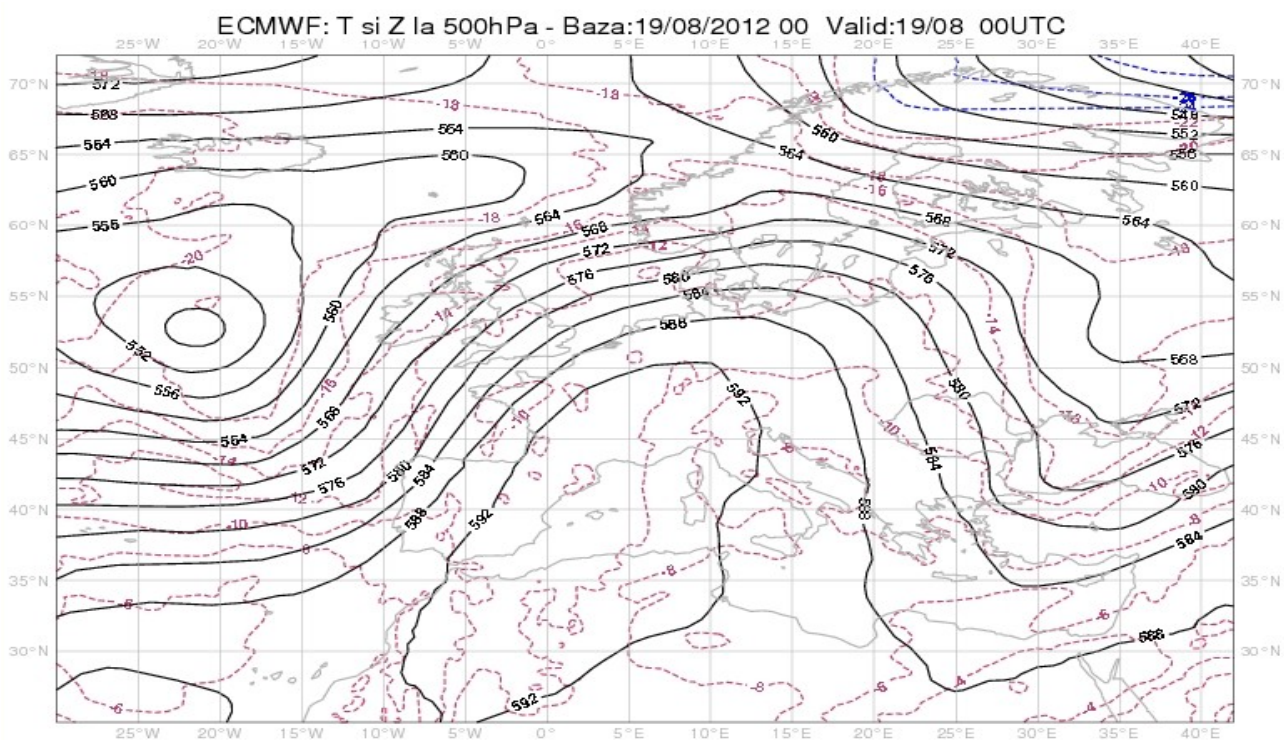


Figure 2. The temperature and geopotential at 500 hPa
 Base:19.08.2012, 00 UTC
 Valid: 19.08.2012, 00 UTC

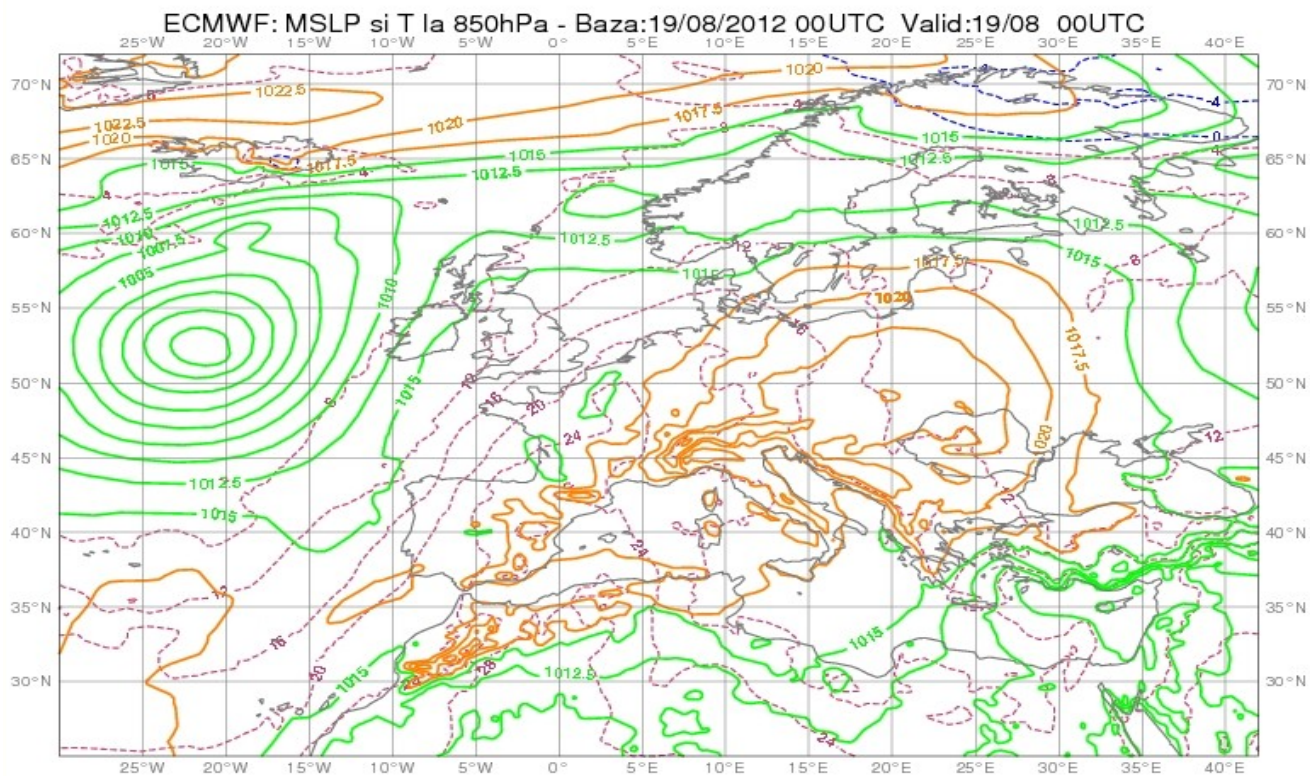


Figure 3. MSLP and temperature at 850 hPa
Base:19.08.2012, 00 UTC
Valid: 19.08.2012, 00 UTC

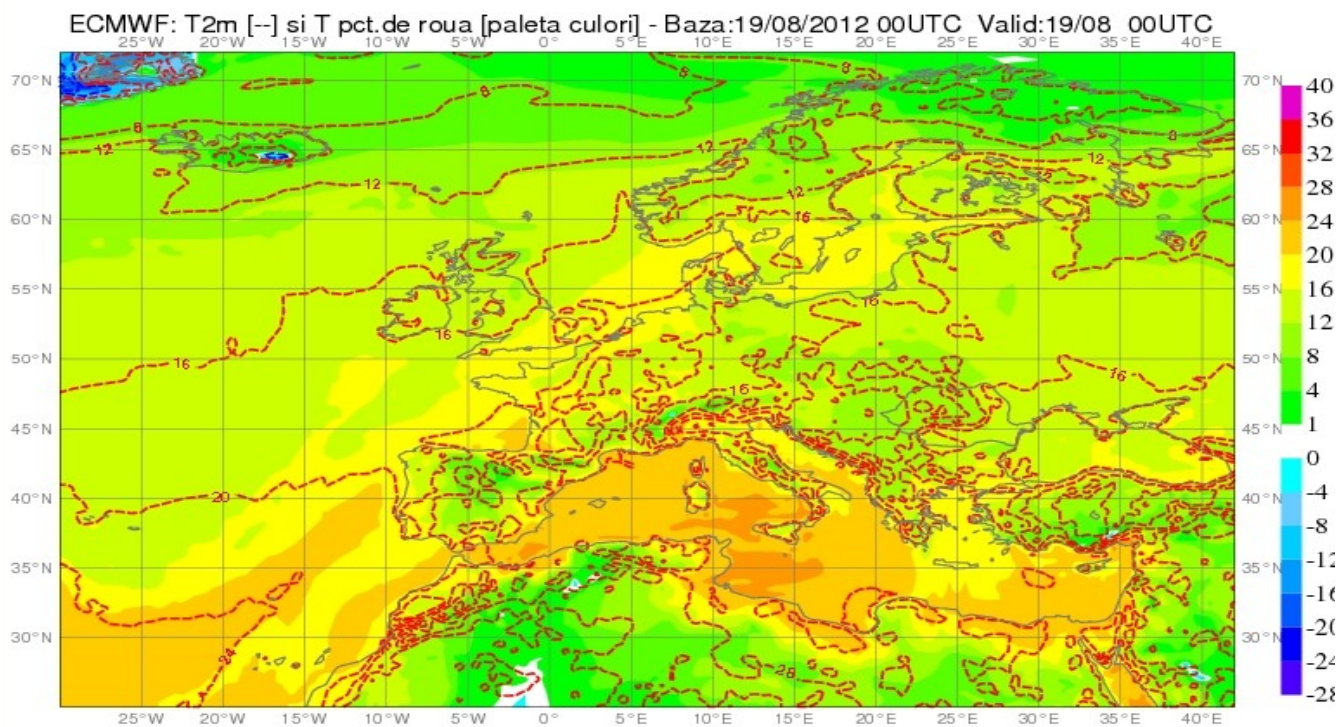


Figure 4. Temperature at 2m and dew point
Base:19.08.2012, 00 UTC
Valid: 19.08.2012, 00 UTC

On the other hand, a few parameters from numerical models are plotted using “*nci-ncar*” and displayed on the web site in such a way to be easily compared. Examples in Fig. 1.

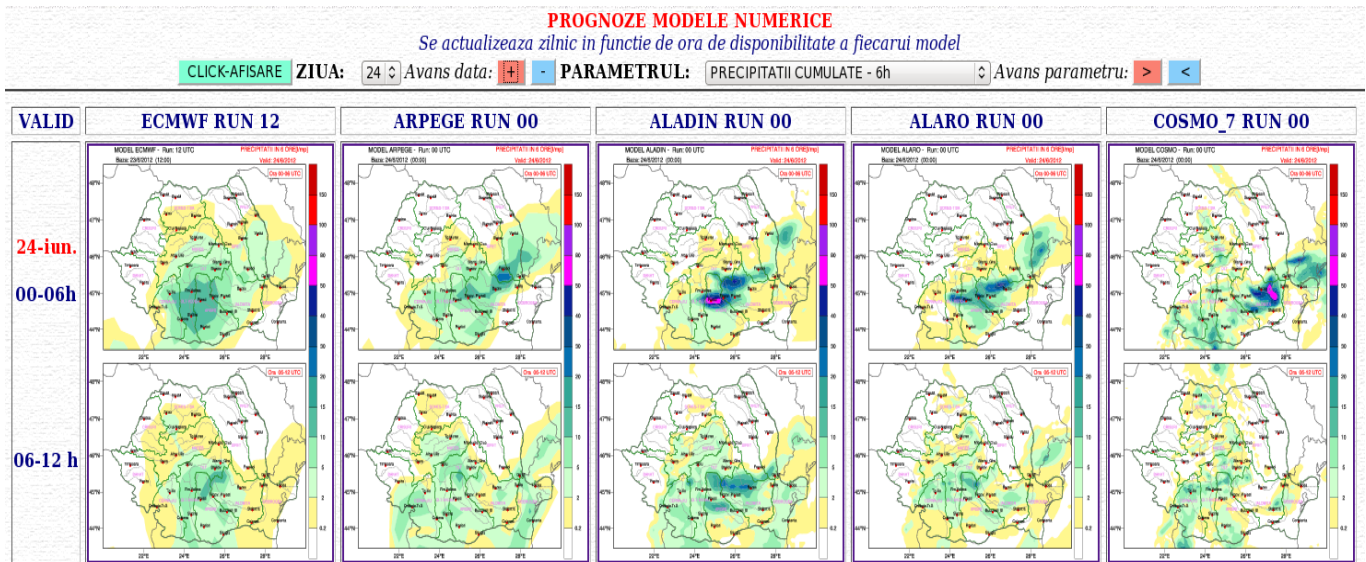


Fig. 1. Example of 6h total precipitation. Forecasts with different time lags from various models

3. Verification of products

3.1 Objective verification

3.1.1 Direct ECMWF model output (both deterministic and EPS)

The objective verification has been continued in 2011, using the **VERMOD** - an unitary system for objective verification of all models used operationally by the National Meteorological Administration (NMA): ECMWF, ARPEGE, ALADIN, ALARO COSMO_RO. A wide range of statistical verification measures are computed daily and monthly. The results are disseminated via dedicated *statistical and verification* web-site. The results are averaged over different selections of stations.

In 2011, a new procedure was developed in order to perform verification of MOS_MIXTE model. The results, monthly averages, are shows in Fig. 2. and Fig. 3.

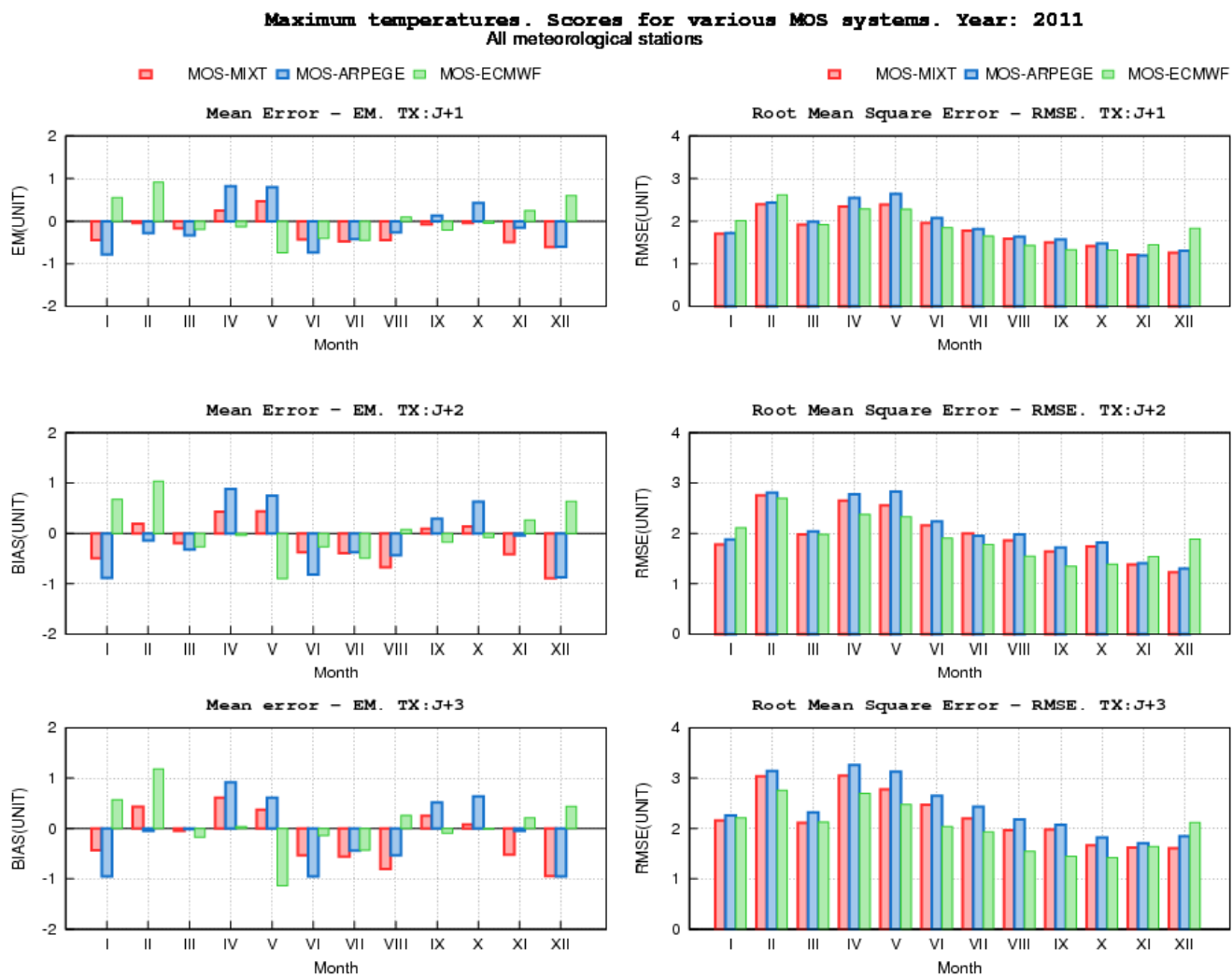


Fig. 2. Scores for maximum temperatures forecasts. MOS_MIXTE compared with MOS_ARPEGE and MOS_ECMWF.

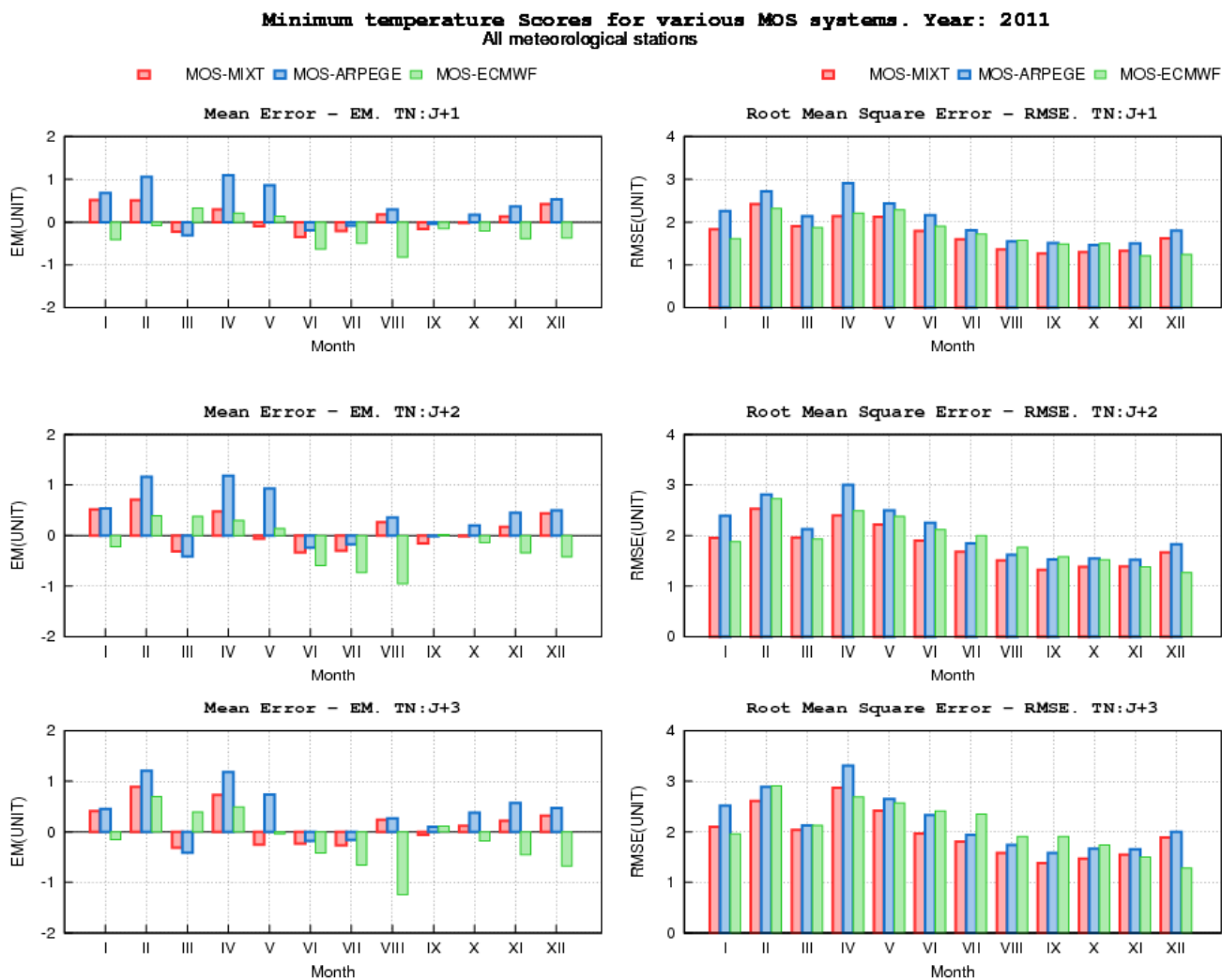


Fig. 3. Scores for minimum temperatures forecasts. MOS_MIXTE compared with MOS_ARPEGE and MOS_ECMWF.

3.1.2 ECMWF model output compared to other NWP models

Comparison of performance of ECMWF model to other NWP models used by NMA is performed daily and monthly, for the most important surface weather parameters: 2m temperature, 10m wind speed, total cloudiness, mslp pressure and 24 h total amount of precipitation. Graphs of the main verification scores are available on the web-site and also an overview of the performances of the models for all year. Examples of graphs are presented in Fig. 4.

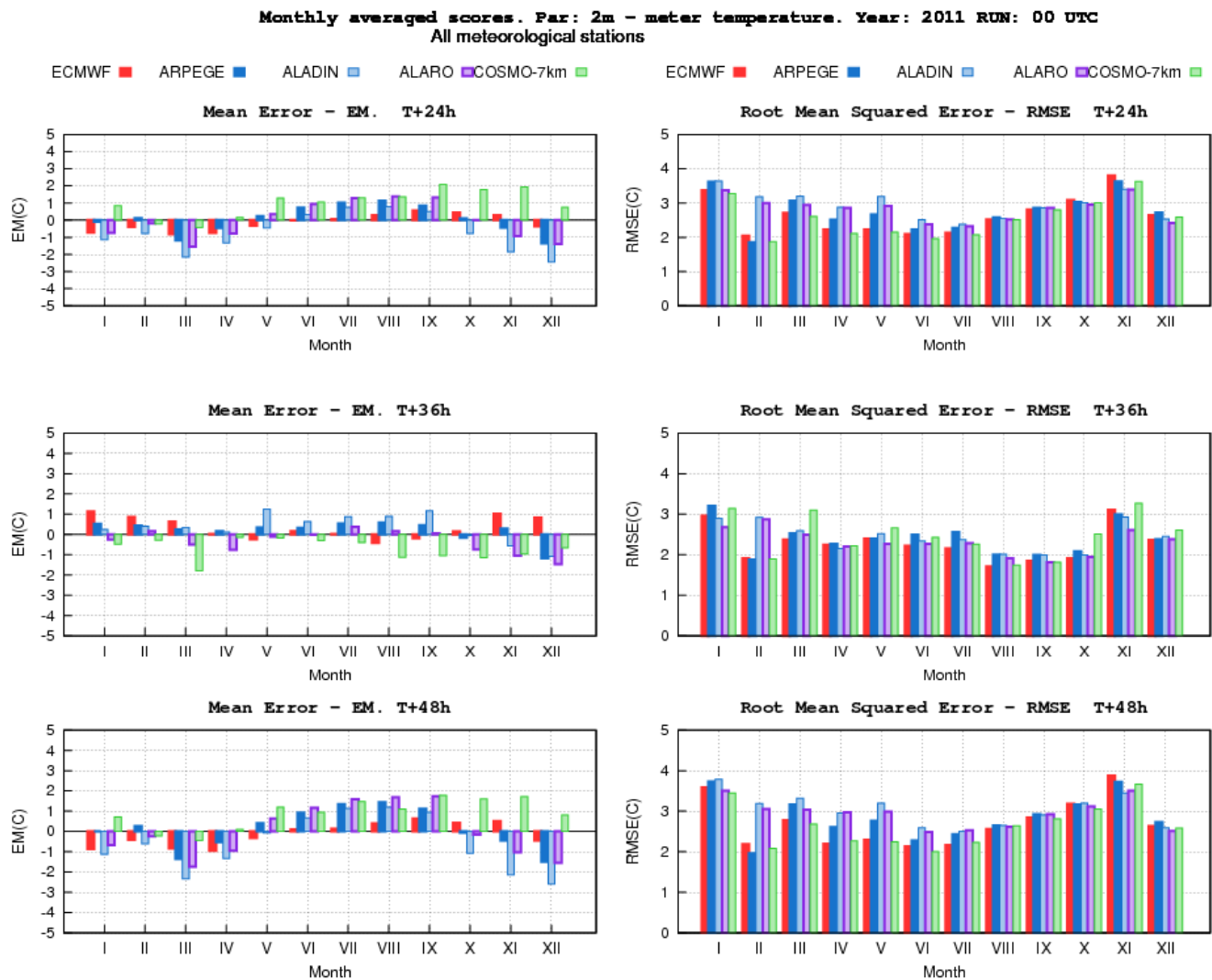


Fig 4. 2m Temperature. Mean monthly BIAS and RMSE scores distribution using all meteorological stations.

Year – 2011

3.1.3 Post-processed products

All MOS forecasts have been verified every month since 2004, and the results have been displayed on the web site. A comparison between MOS and meteorologist forecasts, for extreme temperatures, total cloudiness and precipitation (Yes/No) is performed daily and monthly.

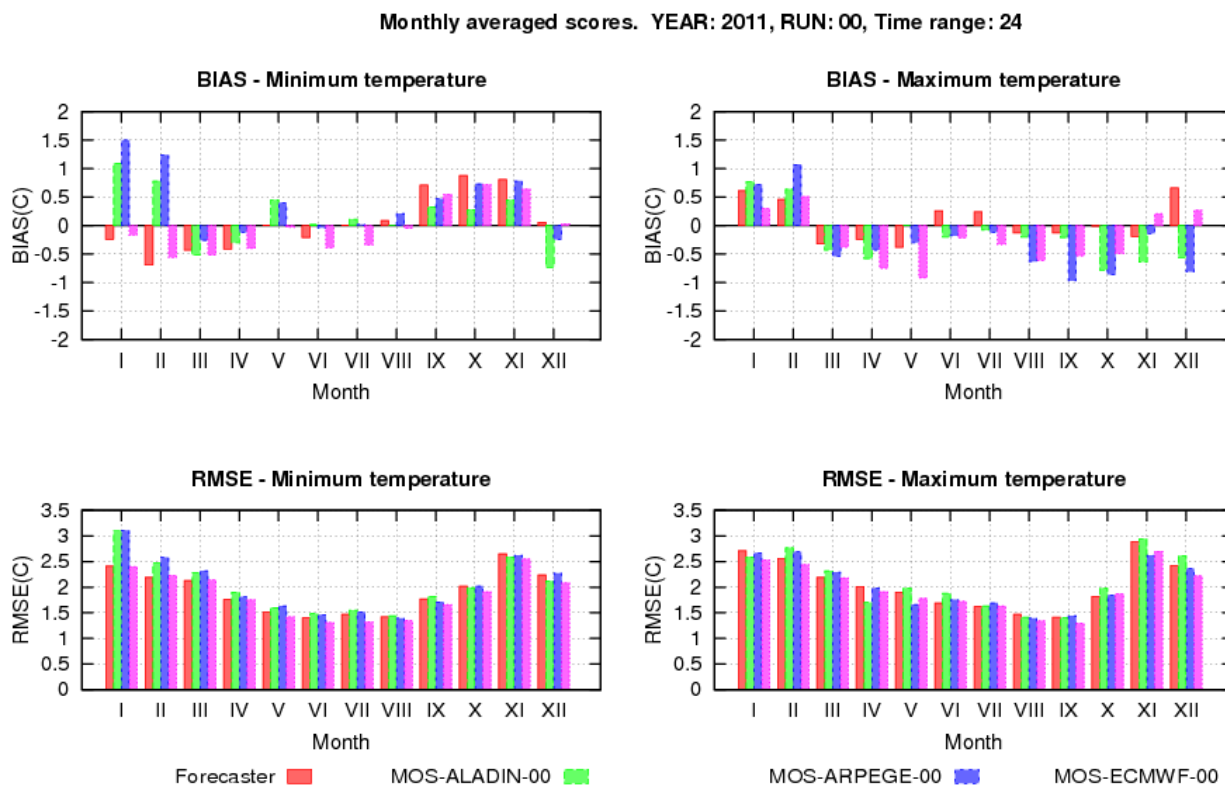


Fig. 5. Monthly averaged scores for 2011 - MOS_ECMWF, MOS_ALADIN and MOS_ARPEGE and Forecaster forecasts – minimum and maximum temperature.

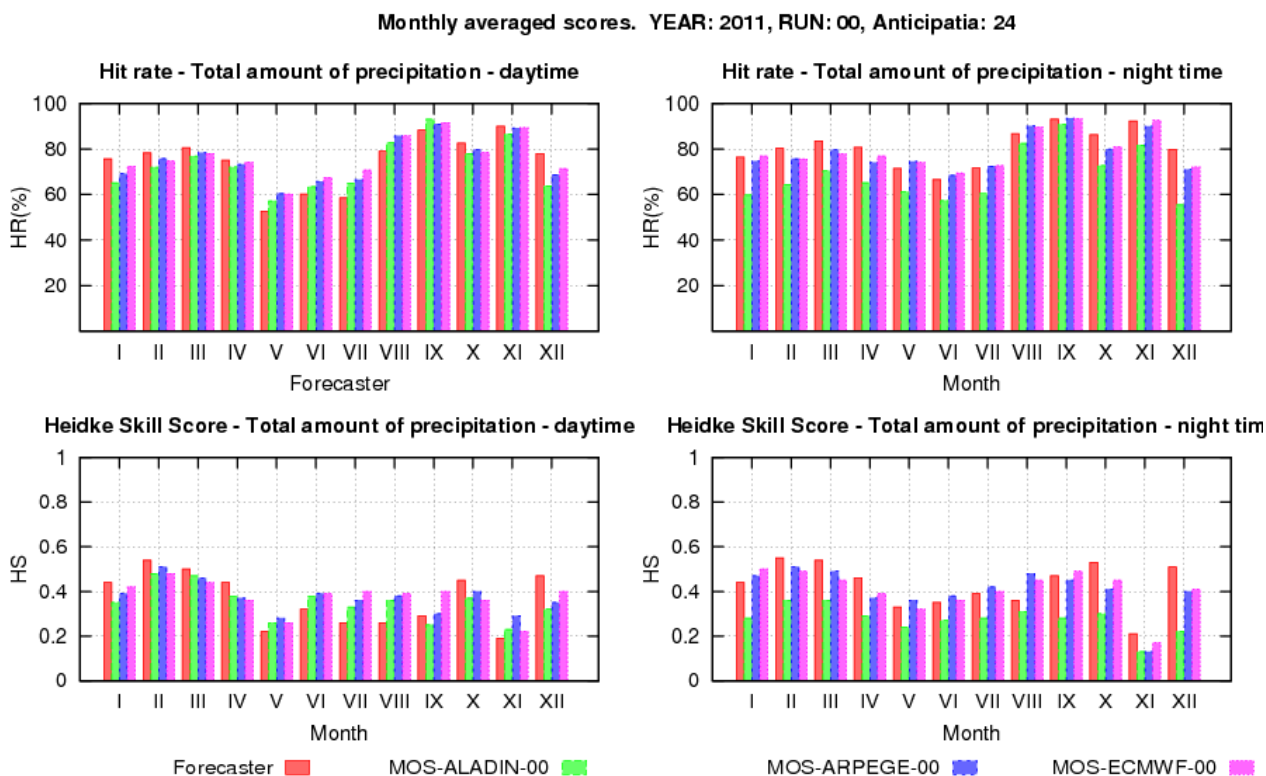


Fig. 6. Monthly averaged scores for 2011 - MOS_ECMWF, MOS_ALADIN and MOS_ARPEGE and Forecaster forecasts – (Yes/No) precipitation.

3.1.4 End products delivered to users

3.2 Subjective verification

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

3.2.2 Synoptic studie

4. References to relevant publications