

Application and Verification of ECMWF Products 2021

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1. Summary of major highlights

The ECMWF products are used intensively in everyday work at LHMS. ECMWF model output data are integrated in forecaster's workstation and is considered the main data source for medium and long-term weather forecasts. For short-range forecasts we use HARMONIE-AROME model. This local limited area Lithuania tailored NWP model uses boundary conditions from ECMWF.

2. Use and application of products

2.1 Direct Use of ECMWF Products

LHMS use a medium-range high-resolution (HRES) and ensemble (ENS) forecasts on a daily bases. The choice of products depends on the situation. Especially we pay attention to the situation on AT500 hPa, how atmosphere behaved in the past and how it changed in recent time, TA and divergence field. If we expect sharp change in temperature, wind or precipitation, we use EFI products. For short range forecast the vertical cross section or atmospheric profile products are useful. Sometimes we compare vertical profile forecast and sounding data to be sure they are trusty.

ECMWF data is transferred to LHMS and integrated to forecaster's workstations – Visual Weather (IBL) and Messir (Corobor). In addition, sometimes ecCharts are used by forecaster's for basic overview of synoptic situation and as a backup source of information in case forecaster's workstation fails to work. Also, ecCharts are used for probability products and EFI.

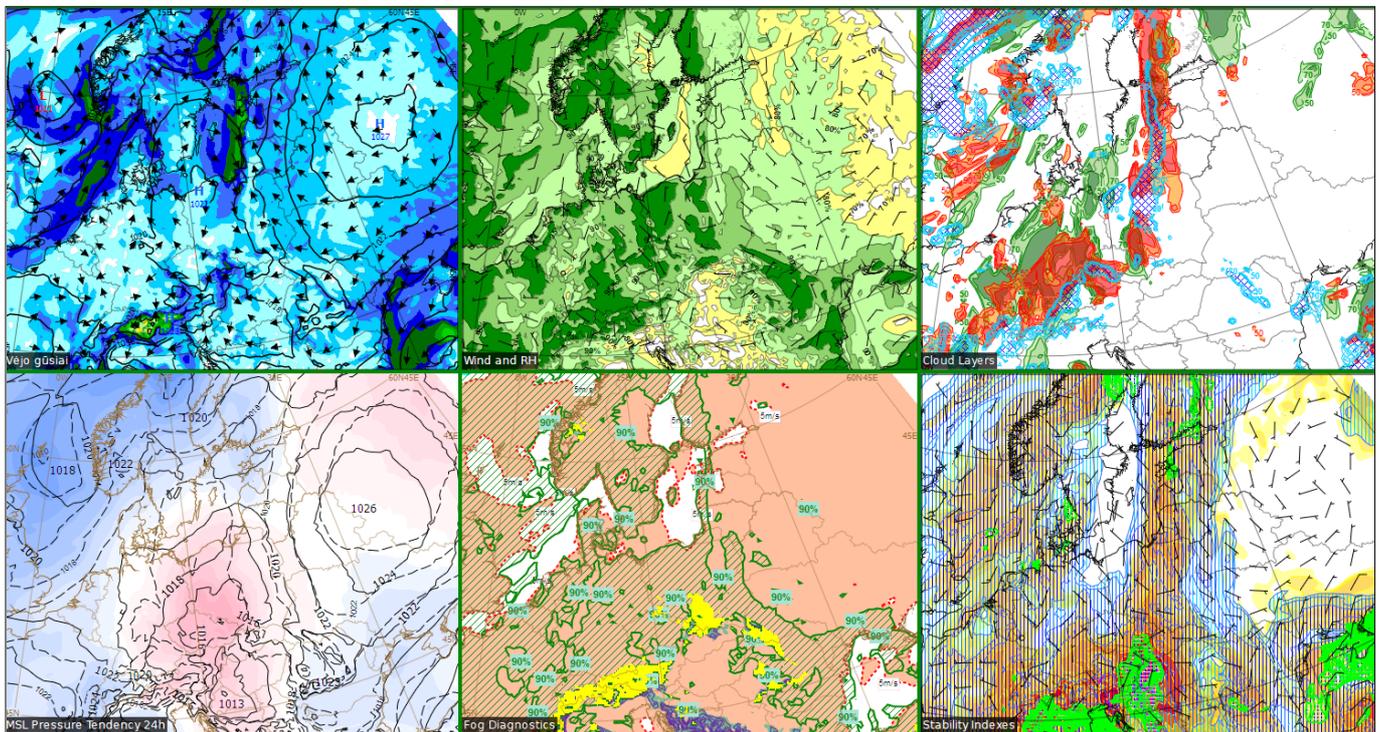


Fig. 1 Example of ECMWF HRES data visualization for operational forecasting with forecaster's workstation.

At this time (2021) we would particularly welcome comments on this recent ECMWF initiative:

- “Open Charts” usually are not used operationally while we have visualization at forecaster's workstation.

2.2 Other uses of ECMWF output

2.2.1 Post-processing

2.2.2 Derived fields

2.2.3 Modelling

LHMS has local limited area NWP model – HARMONIE-AROME.

Boundary conditions: ECMWF IFS

Horizontal resolution: 2.5 km

Vertical resolution: 65 levels

Observations and data assimilation: 3DVAR + CANARI, convective boundary, air sounding, AIREP data

Forecast: + 54 hours every 3 hours

Product delivery: 8 times per day

Horizontal resolution: 850 m

Forecast: +30 hours

3. Verification of ECMWF products

LHMS doesn't have verification tool at this time and thus can do only subjective verification.

3.1 Objective verification

3.1.1 Direct ECMWF model output (both HRES and ENS), and other NWP models

3.1.2 Post-processed products and end products delivered to users

3.1.3 Monthly and Seasonal forecasts

3.2 Subjective verification

3.2.1 Subjective scores

3.2.2 Case studies

Severe weather events/non-events are of particular interest. Include an 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.

17 severe weather phenomena have been registered in Lithuania in 2020. All situations have been analysed and the quality of models' forecasts evaluated. ECMWF model showed better results comparing with others.

More detailed information:

- Wind gusts 12-03-2020 – ECMWF good forecast 216 h in advance;
- Frost 07-05-2020 – 144 h in advance;
- Frost 12-15-05-2020 – 132 h;
- Severe thunderstorms including very heavy precipitation and large hail 07-09-06-2020 – 180 h (the forecast was very unstable and has been changed a few times later);
- Heat wave 17-20-06-2020 –144 h;
- Heavy rain 23-06-2020 – 108 h;
- Heat wave 24-28-06-2020 – 168 h;
- Severe thunderstorm including very heavy rain 30-06-2020 –168 h;
- Heat wave 17-20-07-2020 –132 h;
- Heat wave 07-10-08-2020 – 168 h;
- Heat wave 15-17-08-2020 –156 h (but forecast before 120 h was wrong).

4. Requests for additional output

5. References to relevant publications