

Application and verification of ECMWF products 2013

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1. Summary of major highlights

Medium and long term weather forecasts at LHMS are based on ECMWF models output. Boundary conditions from ECMWF are used for local limited area NWP model – Lithuania tailored HIRLAM and HARMONIE-AROME.

2. Use and application of products

2.1 Post-processing of model output

2.1.1 *Statistical adaptation*

2.1.2 *Physical adaptation*

Boundary conditions from ECMWF deterministic suite (via optional BC project) are used in:
Hirlam HL7; 0.071 degree resolution, +54 hours forecast.
Hirlam HL4; 0.036 degree resolution; +54 hours forecast.
Harmonie-Arome 2.5 km resolution +24 hours forecast.

Boundary delivery: 4 times daily, 00, 06, 12 and 18 UTC data.

2.1.3 *Derived fields*

2.2 Use of products

There is no significant changes in usage of deterministic and EPS forecasts products

3. Verification of products

3.1 Objective verification

3.1.1 *Direct ECMWF model output (both deterministic and EPS)*

A system for verification of the ECMWF products has not been implemented.

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)*

3.2.2 *Synoptic studies*

Use of ECMWF products in operational duties, in particular use in severe weather situations

Year 2012 in Lithuania was rich with extreme weather events (23). In all cases ECMWF predicted situation favourable for those events in advance 72–240 h. In few cases the situation (mean sea level pressure and temperature fields as well as upper level geopotential fields) were predicted well in advance 5–6 days, wrong in advance 3–4 days and in advance 1–2 days model return to the previous scenario and predict situation favourable for extreme weather events.

The situation favourable for cold weather intrusion ($T_{\min} -30$) on the 2nd – 5th of February was predicted in advance 198 h., for extreme high temperature ($T_{\max} 30$ and more) on 5th – 7th and on 27th – 29th of July in advance 108–180 h. Well in advance was predicted situation favourable for ground frosts on the 5th and 14th of May.

The situation favourable for a heavy rain (>50 mm in ≤ 12 h) on the Northern part of Lithuania on the 23rd of May was well predicted by ECMWF model, but missed by local LAM models.

The situation favourable for a heavy rain locally in the Eastern part of Lithuania on the 5th of July, in the Northern part of Lithuania on the 7th of July and in the Southeastern corner of Lithuania on the 9th of July was predicted in advance 132–144 h.

The situation favourable for convective storms (thunderstorms, squalls, hail or heavy rain) on the 25th of June, on the 1st, 10th and 29th of July and on the 6th of August was predicted in advance 96–168 h. Situation favourable for a heavy convection on the 22nd of August was predicted well in advance 180 h, unfortunately the forecast became wrong in advance 156 h.

Situation favourable for tornado in the Northern part of Lithuania on the 7th of September was predicted in advance 132 h.

4. References to relevant publications