

HIRLAM 4.9 Evaluation

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Background

The 4.9.0 version of HIRLAM was released at the end of June 2000, making the semi-Lagrangian scheme the default in the reference system. Compared with version 4.8 the meteorological impact was expected to be small although some previous tests had indicated that the permitted longer time steps might lead to enhanced noise, associated with the CBR turbulence scheme, at high resolution.

Verification

To test the new version an experiment (named "E49") was set up on the ECMWF Fujitsu. Initially, the intention was to use the archived output from the DMR run (based on version 4.7.4) for comparison but this had to be revised when it was discovered that a bug associated with the decoding of SYNOP snow depths had contaminated the DMR scores (a defective orography field had also affected the DMR boundary fields). Initial runs with E49 also revealed several bugs (see the HeXnet for details). Eventually, after many false starts, the bugs were corrected in both versions and two independent runs were made using identical observation files, boundary strategy files and boundary fields. Because of differences in the default value for the parameter NPBPTS (0 for DMR but 2 for E49) the DMR grid was extended by 2 points all around for the E49 run. All observations in the extra area for E49 were excluded to make a clean comparison with DMR. Default run time parameters were otherwise used (*i.e.* 31 vertical levels, 0.5 degree rotated grid). For E49 (semi-Lagrangian) the time step was 450 seconds. For DMR (Eulerian) a value of 240 seconds was used. The test runs covered the period 06 UTC 6 May to 12 UTC 23 May 2000 (3-hour assimilation cycle).

Results

Fields were verified against observations using the standard HIRLAM package. In addition, forecast fields were compared against analysis fields to highlight any regional differences in forecast quality.

In general the scores for both runs are very similar. Figure 1, for example, shows the mean error (ME) and root-mean-square error (RMSE) for mean sea-level pressure as a function of forecast lead time using the EWGLAM station list for verification (due to a quirk of the Fujitsu operating system the 48-hour scores were not produced). Figure 2 shows the equivalent plot for the 500 hPa geopotential field. Other plots are available on the HeXnet.

HIRLAM VERIFICATION OF MSL PRESSURE: STATION LIST - EWG

LEVEL: Surface

DATA: 06 UTC 6 MAY - 12 UTC 24 MAY 2000

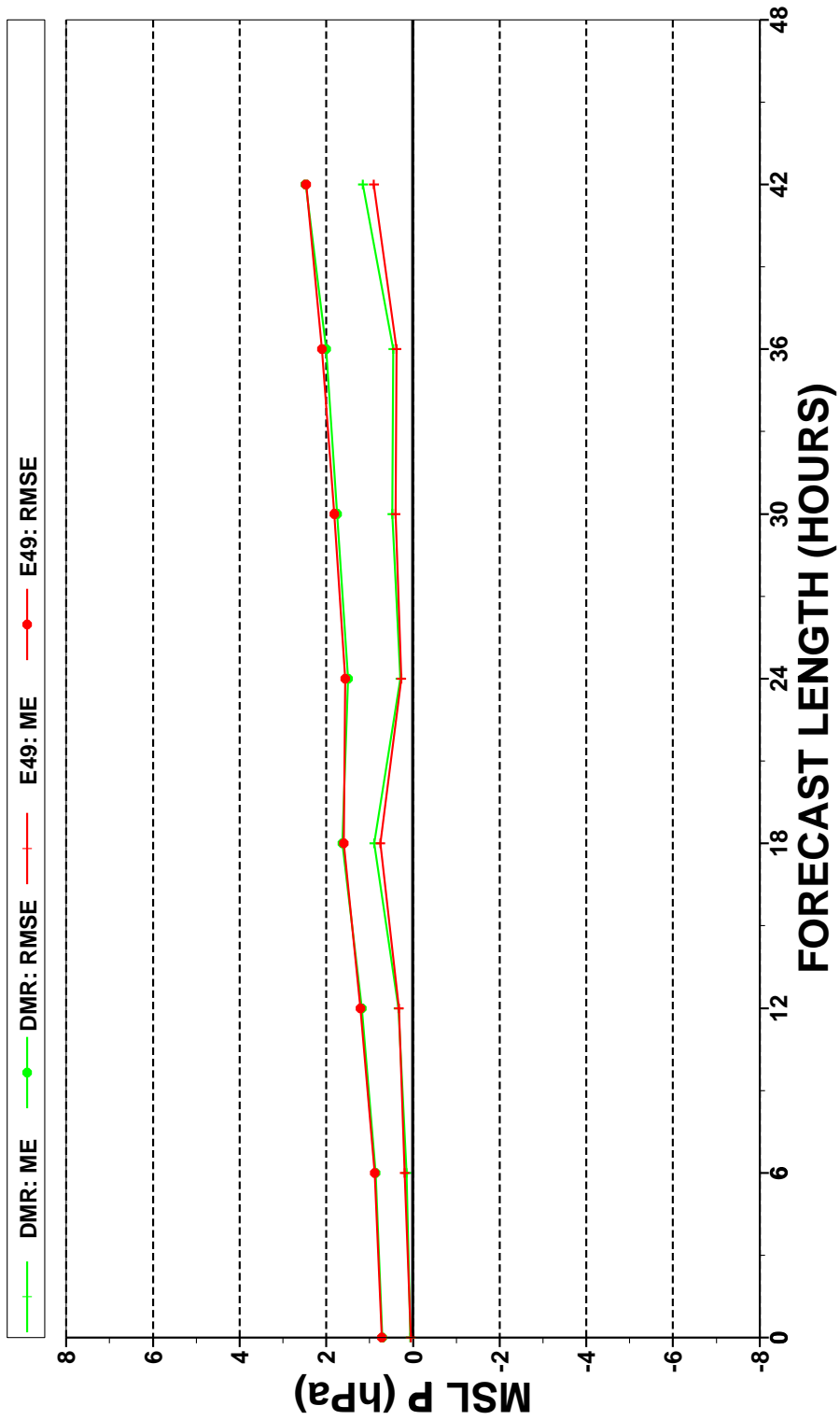


Figure 1 Verification of mean sea-level pressure.

HIRLAM VERIFICATION OF GEOPOTENTIAL: STATION LIST - EWG

LEVEL: 500hPa

DATA: 06 UTC 6 MAY - 00 UTC 25 MAY 2000

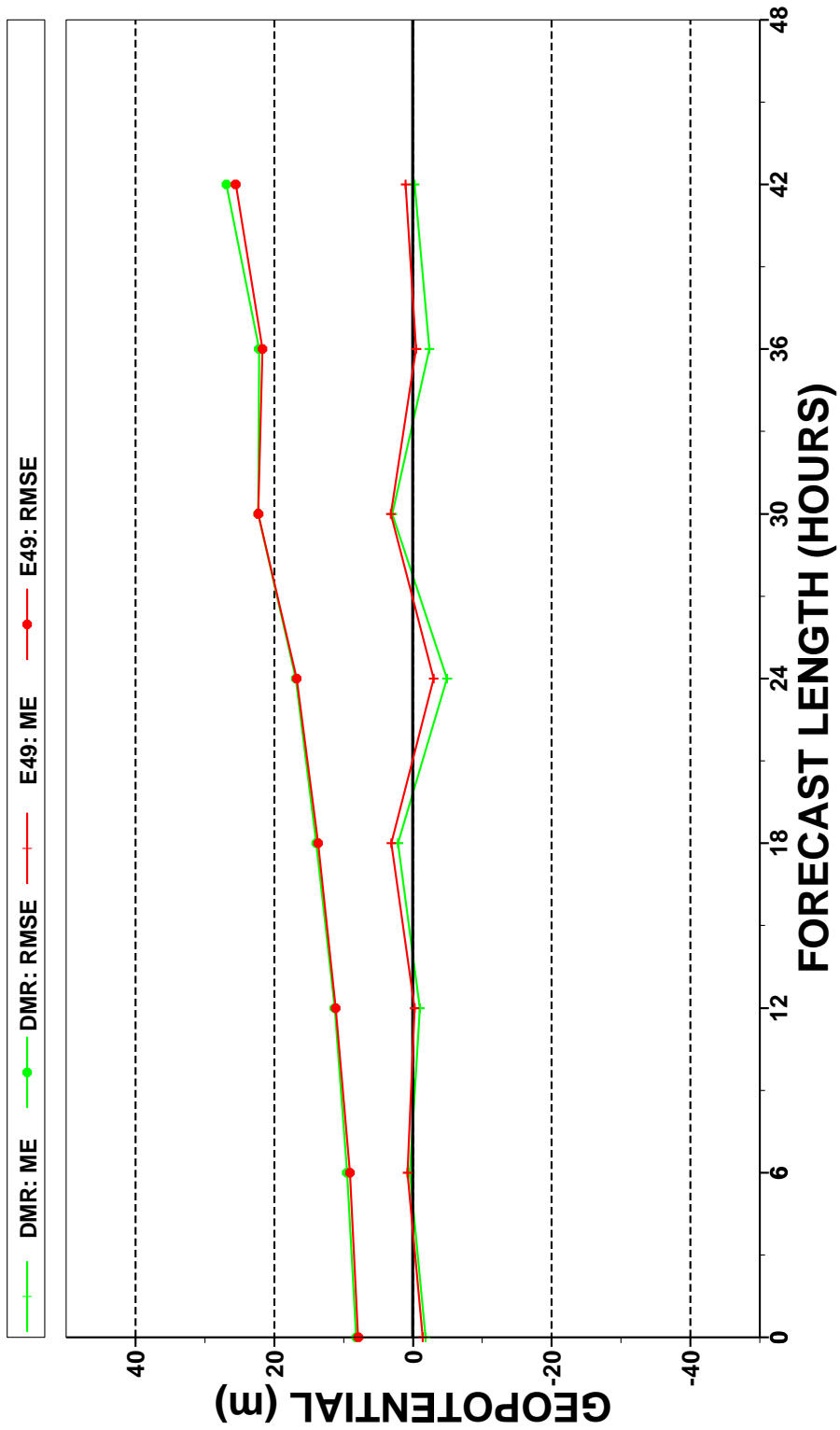


Figure 2 Verification of 500 hPa geopotential.