HIRLAM Operational Activities in Met Éireann

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The following is a brief summary of the main changes in the operational HIRLAM system over the past year

- Move to IBM RS/6000 SP
- Version upgrade: 4.3 → 5.0.1
- Analysis: OI → 3D-Var
- Increased horizontal/vertical resolution:
  33 km → 15km; 24 → 31 levels
- Use of "frame" boundaries

Currently, we are in the process of upgrading the HIRLAM version and finalising a nested system.

1 Data Assimilation

- 3D-Var with 3-hour cycle
- Conventional obs (SATEM but NO TOVS)
- Creation of "feedback" files every cycle (used for data monitoring via local Intranet and Metview/Magics visualisation system)

2 Forecast Model

HIRLAM version 5.0.1:

- Rotated grid (nlon x nlat x nlev =438 x 284 x 31).
- DFI initialisation.
- Two time-level three-dimensional semi-Lagrangian semi-implicit scheme (Δt=225 secs).
- Physics: CBR turbulence scheme; Sundqvist/STRACO condensation scheme; Savijärvi radiation scheme

- Forecasts out to 48-hours at 00, 06, 12 and 18 UTC.

3 Lateral Boundary Treatment

ECMWF “frame” fields on 0.3° x 0.3° rotated grid. Frames are updated 4 times per day.

4 Operational Usage

- General Forecasting
- Input for WAM wave model (10-metre winds)
- Input for road-ice prediction model (2-metre temperatures, 10-metre winds, cloud, precipitation)

5 Nested System

Currently, Met Éireann runs a nested HIRLAM system (based on version 4.3 with OI for data assimilation) with a 1 hour cycle. The system, primarily aimed at 'nowcasting' applications, produces forecasts out to 3 hours each hour, using a very short cut-off window for observation processing (with later re-analysis for late arriving data). A replacement system, capable of supporting forecasts out to ~18 hours is now being evaluated.

The performance of the new nested system has been tested, using different model resolutions and assimilation cycle intervals, in situations where the main operational system performed poorly. Initial results have been slightly disappointing: the forecast guidance is not materially improved by the nested system in the cases examined. Testing is continuing.

6 Plans for 2002

It is planned to upgrade to version 5.1.4 to avail of the improved surface analysis (ISBA) and to reduce errors in the low-level temperature and humidity forecast fields. Postprocessing and verification systems will be extended.