

Operational Activities in Met Éireann

Ray Mc Grath

Only minor modifications have been made to the operational system over the past 12 months. The system is still largely based on HIRLAM version 4.3 but the analysis (OI) has been upgraded to version 4.9.1. The following is a summary of our system.

1 Analysis

- Observations
SYNOP, SHIP, AMDAR, ACARS, AIREP, SATOB, TEMP/TEMPSHIP, PILOT, SATEM
- Dependent variables
u, v, Φ , q
- 24 vertical levels
- Data Assimilation
OI with a 3-hour cycle. The cycles are refreshed when updated boundary files become available from ECMWF.

2 Forecast

- Semi-Lagrangian advection
- Horizontal grid
218 x 144 grid points on a $0.297^\circ \times 0.297^\circ$ horizontal Arakawa C-grid, rotated with the south pole at 30° longitude, -30° latitude.
- Vertical grid
24 levels
- Initialization
Implicit normal mode scheme (2 iterations initializing 4 vertical modes).
- Integration scheme
A two time level, 3D semi-Lagrangian semi-implicit scheme is used. Time step: 7.5 minutes.
- Lateral boundary treatment
Davies-Kållberg relaxation scheme with a cosine-dependent relaxation function applied over a boundary zone of 10 lines. ECMWF boundary fields are used.

- Filtering

Fourth order implicit horizontal diffusion. A time filter is applied to the non-linear terms.

- Physical Parameterizations

Sundqvist condensation scheme; Savijärvi radiation scheme.

3 Verification

Verification against observations (EWGLAM stations) of temperature, wind and geopotential at standard levels and msl pressure, 2m temperature and 10m winds.

4 Nested model

Same as main model but the horizontal grid is 98 x 97 points (0.15° x 0.15°). The nested system has a 1-hour assimilation cycle and uses forecast fields from the main operational model for boundaries. It uses a time step of 225 seconds in the integration scheme. A digital filter initialization scheme is used.

5 Operating schedule

- Main model: 0-48 hour forecast 4 times per day (00, 06, 12 and 18 UTC).
- Nested system: 0-3 hour forecasts every hour.

6 Hardware

SGI Power Challenge Server with 6 x R10000 (194 MHz) cpus, 512MB memory.

7 Future plans

Met Éireann has acquired an IBM RS/6000 SP (Winterhawk – II: 10 nodes, 36 x Power3 cpus, 2GB per node) as a replacement for the SGI Power Challenge. Our plans for a new operational system include the following.

- Move to 3D-VAR. OI system will not port efficiently to the IBM.
- Move to 4.9/5.x version of HIRLAM.
- Retain existing forecast area but increase resolution to ~15km in the horizontal, 31 vertical levels. Explore options for higher resolution nested system.