HIRLAM operations at KNMI

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This poster describes the operational setup of HIRLAM and HARMONIE at KNMI, the Netherlands.

1. Introduction

HIRLAM is used extensively at KNMI as the basis for meteorological products. Its output is also used by a variety of external customers.

2. Technical Setup

The HIRLAM setup at KNMI consists of a single, deterministic, cycle. Its technical parameters are:

- A 816 x 650 horizontal grid with a resolution of 0.1 x 0.1 degree.
- 60 layers in the vertical, as defined by the Reference System.
- A 4 minute time step.
- A 3 hour analysis cycle, using 3DVAR.
- Fresh boundaries every 6 hours, with a 3 hour boundary interval.

HIRLAM is run on a 104 processor SGI Altix computer with 208 Gbyte of main memory. The processors are 1.5 Ghz Itanium 2's. The usage is: `nprocx=11, nprocy=9, nproc_hgs=1`.

3. Deviation from the Reference System

3.1 Large Scale Mixing

Our setup of large scale mixing by ECMWF upper air model fields is somewhat different from the Reference System. At KNMI, the 00 UTC fields from the Boundary Condition run at ECMWF arrive around 06 UTC (and mutatis mutandis for the 06, 12 and 18 UTC runs). To be able to use the 00 UTC analysis in our mixing strategy for the HIRLAM 06 UTC cycle, we perform the mixing step at 07 UTC by a special run, then at 07:35 the HIRLAM 03 UTC cycle is run, with the outcome of the special run as first guess. Subsequently, at 08:05 UTC the HIRLAM 06 UTC cycle is run.

Taking the arrival times of the ECMWF runs into account, it is paramount for us to run the mixing cycle using its own schedule, independent of the main run.

After switching to HIRLAM 7.2, we will use the scheduling as described on the wiki page for that version ("Launch of a single cycle job").

3.2 Dynamics and Physical Parametrisations

The physical / computational differences with respect to the Reference 7.0 System are:

1. Higher horizontal diffusion coefficients to mitigate the resonances over Greenland.
2. Corrections for soil ice treatment (impact of melting on temperatures).
3. Computation of Convective Available Potential Energy as output parameter in `POSTPP.f`.
4. Computation of type of precipitation (rain, snow, freezing rain, ...) in `POSTPP.f`. The method is based on work by Ruud Ivens, published in the Proceedings of the Symposium on Mesoscale Analysis & Forecasting, Vancouver, Canada, 17-19 august 1987.

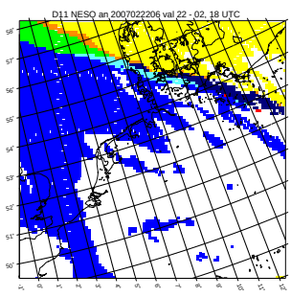

Figure A. *Example of type-of-precipitation chart*

Blue: Rain; Yellow: Snow; Green & Orange: Wet Snow (sleet); Light Blue & Dark Blue: Frozen Rain; Red: Freezing Rain.

As all items are corrected or standard in version 7.2, we do not expect to deviate from the Reference System when we switch to that version.

3.3 Verification

KNMI uses the Reference verification package, but in a delayed mode (however, using the same observations), run on a different hardware platform.

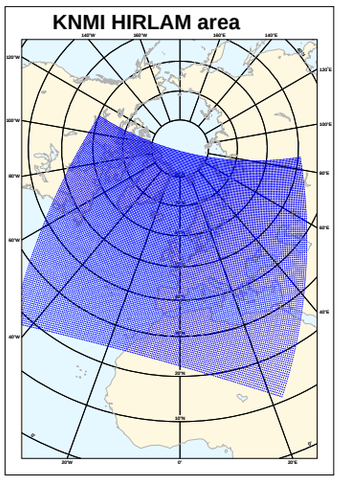

Figure B. *The HIRLAM computational domain*

4. HARMONIE

Since the beginning of July, 2007, we perform a daily (00 UTC) run with HARMONIE cycle 31h1. The initial condition and (hourly) boundaries are provided by the HIRLAM 00 UTC run.

- A 300 x 300 horizontal grid with a resolution of 2.5 km.
- 40 layers in the vertical.
- The centre is at 51.967 degree North, 4.9 degree East, the location of Cabauw.
- The time step is 60 seconds.

5. Future

We plan to switch to HIRLAM version 7.2 as soon as possible.

For HARMONIE, we would like to go to cycle 33h0 and introduce SURFEX cycling. We are also in the process of setting up verification, using the monitor package.

There are no plans to change hardware platforms before 2010.

References

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