

Meteorologisk institutt met.no

Poster presentation

EWGLAM/SRNWP, 4/10 2010, Dag Bjørge



Production chain for turbulence modelling at met.no



imra. Sandnessjøen.00 høyde_if (+6) 2010-09-15 06 UTC imra. Sandnessjøen.00 turbulens_if (+6) 2010-09-15 06 UTC imra. Sandnessjøen.00 vind if (+6) 2010-09-15 06 UTC



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ECMWF



UM 1km







Simra







<complex-block>

End product for pilots on web

HIRLAM models at met.no



HIRLAM is currently run in 4 different model configurations at met.no, 3 deterministic models and one ensemble prediction system. The ensemble system (LAMEPS) is described in more detail in the box on the bottom right. Below are some facts about the deterministic models together with a figure showing their geographical extent:

H12 (0.108°=12km, 864x698x60 gridpoints, Δ t=300s) 3DVAR-FGAT analysis, ECMWF boundaries, runs 00/06/12/18 UTC to +66h.

H08 (0.072°=8km, 344x555x60 gridpoints, Δ t=200s) 3DVAR-FGAT analysis, ECMWF boundaries, runs 00/06/12/18 UTC to +66h.

H04 (0.036°=4km, 300x500x60 gridpoints, Δ t=100s) Surface analysis, otherwise initial condition and boundaries from H08. Runs 00/06/12 /18UTC to +66h.

All the models are based on HIRLAM version 7.1.4, with some local modifications.





Experimental mesoscale runs with HARMONIE

Since August 2008 an experimental HARMONIE model, HM04, has been running in routine operation. The model covers almost the same area as H04 (see figure above), but not exactly since the projection is rotated Lambert instead of rotated lat./lon. The resolution is 4km, 289x489 gridpoints horizontally and 40 levels in the vertical with the boundaries coming from the operation H08 model. It is based on HARMONIE version 36h1.1, and runs with non-hydrostatic dynamics, ALARO physics and the externalized surface module SURFEX. A surface analysis is performed in SURFEX with an Optimal Interpolation algorithm for a 3 layer ISBA scheme. Extensive tests have been performed with 3D-Var, different surface options and finer resolution with the AROME physics for intended future operational use.

The figure to the left shows an example of a +9h forecast of total cloud cover and 3-hourly precipitation rates (14.09.2010 00UTC) from the model.



NORLAMEPS

NORLAMEPS, The Norwegian ensemble prediction system

Consists of two components: Targeted EPS = TEPS and Limited Area Model (HIRLAM) EPS = LAMEPS NORLAMEPS=Combination of TEPS & LAMEPS: A simple "multi" model, multi initial condition ensemble. 42 ensemble members [2 times (20+control)]



Met Office Unified Model (UM) at met.no



Operational use of the non-hydrostatic UM at Norwegian Meteorological Institute is regulated through a partnership based upon a collaboration agreement with the UK Met Office. The agreement includes an operational and research license, and an agreed program of research and development work.

met.no runs UM on 4km and 1km resolution. UM4 is nested into Hirlam8, UM1 is nested into UM4.





The Simra turbulence model, nested in UM 1km

with a horizontal grid spacing of 200-300m and 40 levels between the surface and 4000m; iteratively solves anelastic equations for 3 wind components, potential temperature, pressure, turbulent kinetic energy and turbulent dissipation once each hour during the forecast. Picture shows plane with broken landing gear, figure shows inflight path and turbulence index as forecasted in the inflight "cone"; both at Sandnessjøen airfield 15/9-2010.

UM1 as input to air quality modelling

Figures show UM1 10 meter wind trajectories of stagnant air last winter in Bergen, picture shows the inversion problem.





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