



Highlights of recent and planned HIRLAM activities

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ASM/Workshop 2011

20110405

Deliverables of HIRLAM-B

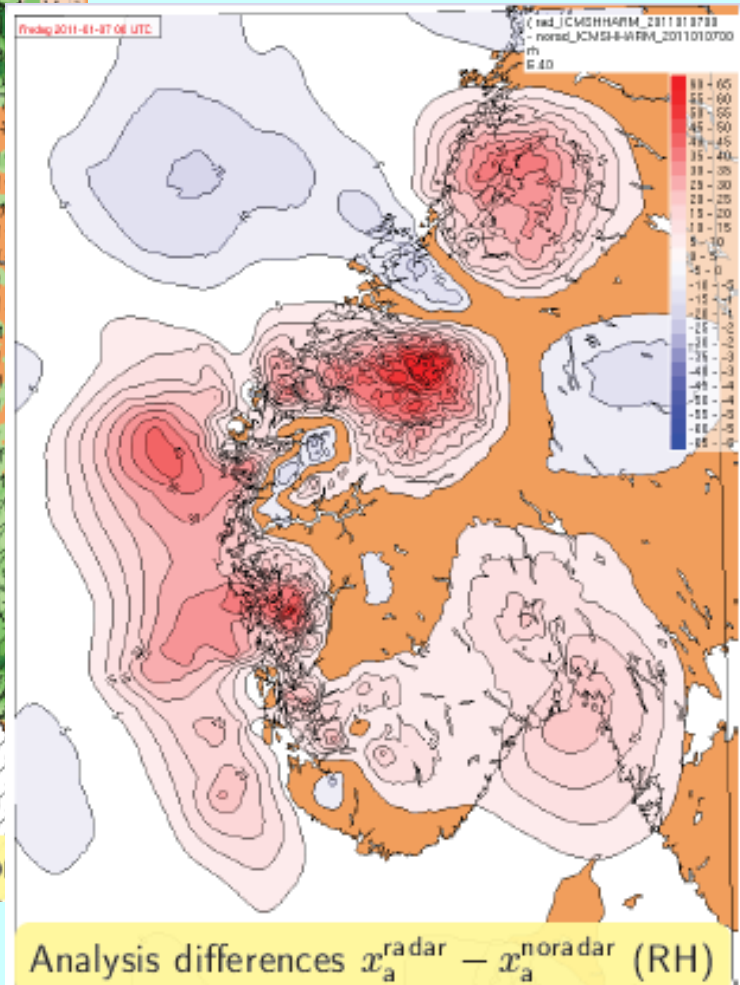
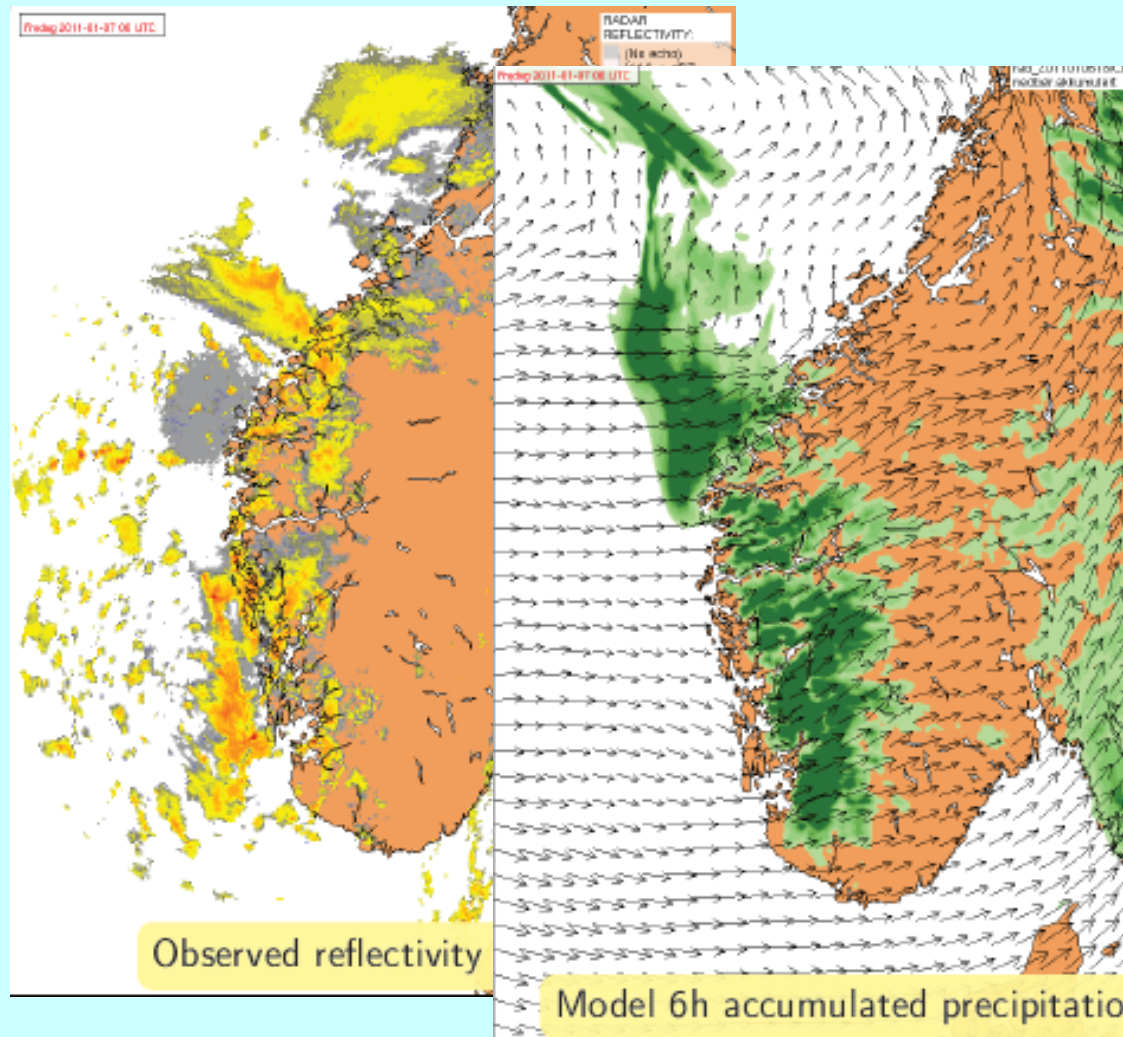
- ✓ Optimization of Harmonie system at 2-5km resolution scales and preparation for use at 0.5-3km
- ✓ Preparation of GLAMEPS for operational use and further improvement for very short range and high-impact weather
Develop convection-permitting EPS system based on Harmonie
- ✓ Replace HIRLAM by Harmonie in all its applications
- ✓ Stronger emphasis on meteorological performance: demonstrable and objectively quantifiable high quality
- ✓ Operational cooperation activities
- ✓ Continue gradual integration with ALADIN



Recent results and plans: HARMONIE data assimilation

- Radar assimilation
 - Ingest of radar reflectivity and wind data for radars from 6 countries
 - Assimilation impact experiments started
 - Quality control
- Rapid update cycling experimentation
- More advanced assimilation algorithms
 - 4D-VAR
 - Start setup ETKF for Harmonie
 - New ideas...

Radar assimilation: first results

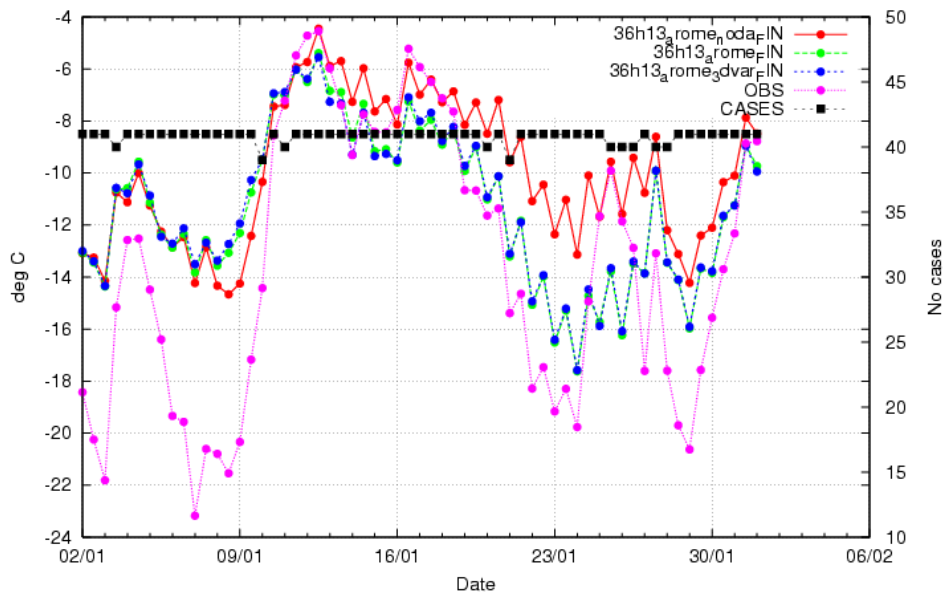


Recent results and plans: HARMONIE forecast model

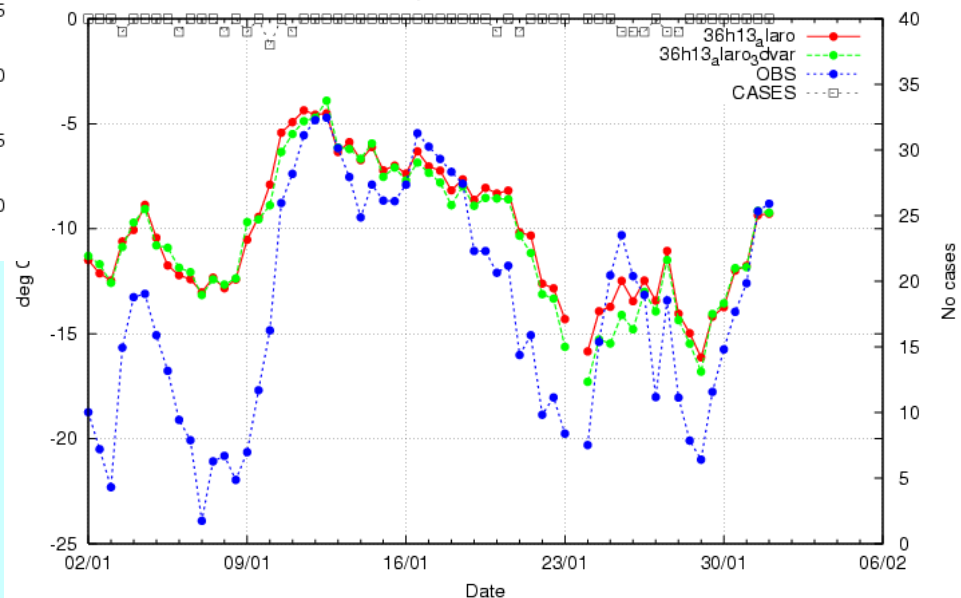
- Cy36h1.3: first complete, meteorologically validated version
Many configurations tested. Main outcomes:
 - Harmonie/AROME and ALARO comparable to HIRLAM at 3km and 5km resolution
 - Clear benefit of surface DA wrt downscaling. 3D-VAR improves initial fit but this disappears too quickly, further tuning needed
 - AROME and ALARO deficiency in handling of cold Nordic winter temperatures; surface wind bias reduced after reformulations of canopy drag
 - ALADIN 4D-VAR scores comparable to 3D-VAR
- Surface model developments: Multiple Energy Balance
- Nesting and LBC experiments
- “Group of 4”: longer-term view on dynamics developments, also in the light of HPC evolution

Stable winter conditions temperature problem

Area: Finland 41 stations
Temperature
At 00,12 + 24 Window: 12h



Area: Finland 40 stations
Temperature
At 00,12 + 24 Window: 12h



Recent results and plans: Probabilistic forecasting

GLAMEPS:

- Experiments: 11km ensemble better than new ECMWF EPS
- Adapt GLAMEPS-v1 to run as TCF-2 facility (6,18h)
- Real-time verification, calibration and product generation points of attention
- Develop and test GLAMEPS-v2

Towards a convection-permitting HarmonEPS:

- Based on Harmonie (2.5km/4km)
- Initial setup: downscaling within 16km ECMWF, multi-physics
- Later: assimilation mode, ETKF, SU/UA perturbations

System work and plans

Harmonie:

- Preparations for Cy37
- Setup of Harmonie climate branch
- Definition of Harmonie Reference System/RCR

GLAMEPS and HarmonEPS:

- Preparations for GLAMEPS TCF-2
- Setup of Harmonie-based ensemble

HIRLAM:

- HIRLAM 7.3 release + problem-solving
- Preparations for HIRLAM 7.4 release
- New ENVIRO-HIRLAM branch

Operational cooperation

New area, start with:

- Centralized/regional production: GLAMEPS; HarmonEPS?
- Observation preprocessing: first focus on radar, surface obs
- Benchmarking and pre-operational testing
- Monitoring / quality assessment of (pre-)operational HIRLAM/Harmonie suites
- Helpdesk / monitoring team

Longer: greater harmonization of operational suites



