Status of Harmonie plans / developments: A HIRLAM view

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ALADIN General Assembly meeting,
20101214

- Some relevant HIRLAM organizational developments

- Scientific developments

- Cooperation aspects

HIRLAM organizational developments

- MoU HIRLAM-B (2011-2015) signed 8 December, updated strategy 2011-2020 adopted

- Full membership LHMS

- New management group:
  - Magnus Lindskog (Data assimilation and use of observations)
  - Mariano Hortal (Dynamics)
  - Laura Rontu (Physics)
  - Trond Iversen (Probabilistic forecasting)
  - Ulf Andrae (System)
 - Xiaohua Yang (Quality assessment and operational cooperation)

Road towards Harmonie operationalization

- Main priority: prepare Harmonie release suited for operational needs of members => extensive validation, verification, optimization for Harmonie/AROME and Harmonie/ALARO (Cy36)

- Data assimilation:
  - Cy36h thoroughly validated (surface DA, ens ass structure functions)
  - Work ongoing on ingest/QC local radar data for 5-6 countries.
  - 2011: start comprehensive obs impact studies with complete assimilation system incl radar data.

- Forecast model:
  - Real-time model inter-comparisons: good performance AROME, esp for severe weather cases. Large model domain desirable
  - Experiments to define optimal nesting strategy ongoing until end 2010

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High Resolution Limited Area Model

Road towards Harmonie operationalization (2)

- Verification Cy36 at 2.5, 4-5km resolution: Meteorological performance Harmonie/AROME and Harmonie/ALARO as good as or better than HIRLAM.

- Some problems with over-active weakly forced convection remaining.

- Plenty of speedup optimization issues remaining (I/O handling)

- Cy36h1.3 (meteor./techn. quality-controlled release) expected mid-December

- HIRLAM final version v7.4 (incl res increase, lake model, ASCAT): mid December first alpha-release.

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High Resolution Limited Area Model
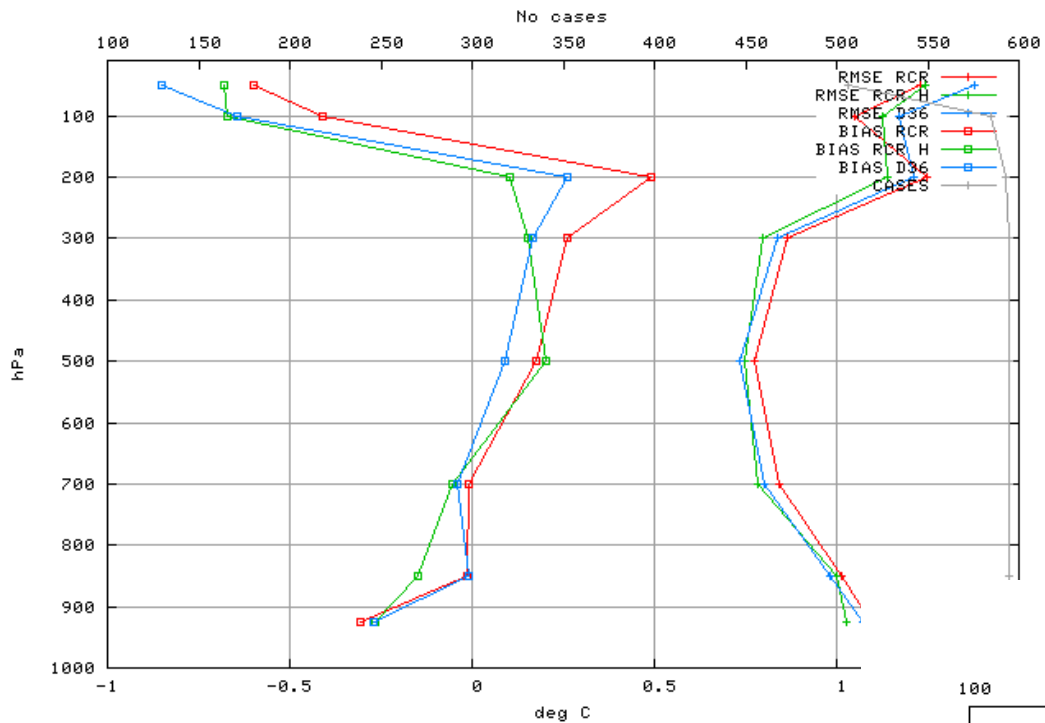
Harmonie/AROME-2.5km (blue)
vs Harmonie/ALARO-4km (green
) vs HIRLAM-RCR (red)
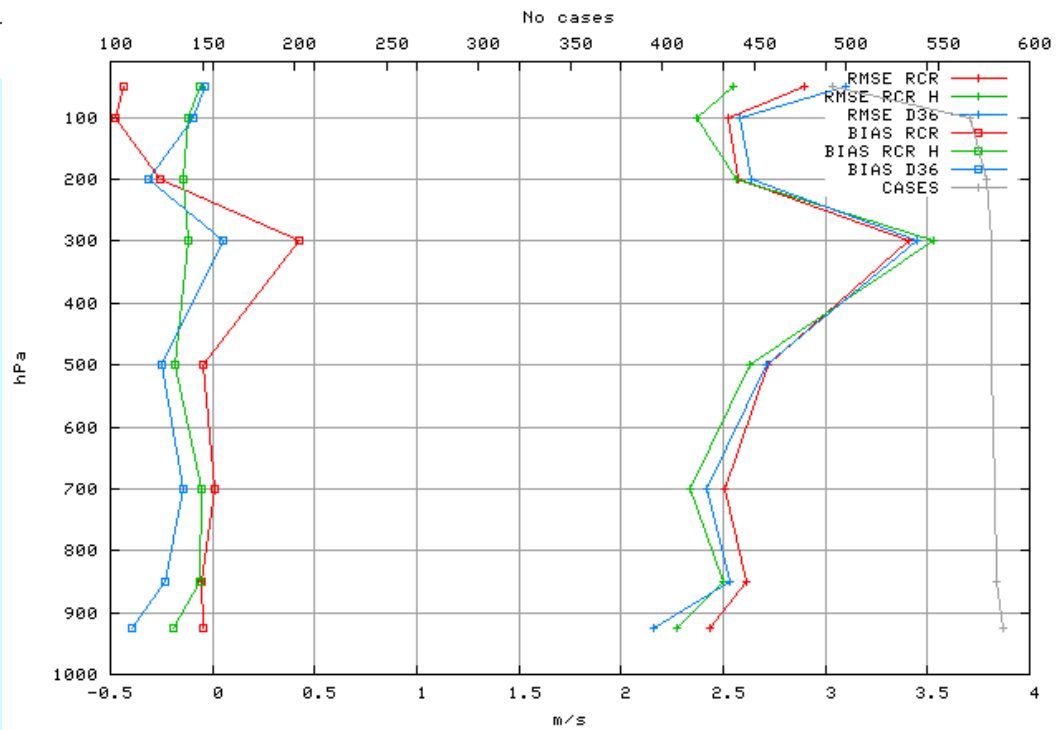
Area: ALL using 699 stations
Period: 20101003-20101031
Temperature Hours: (00,06,12,18)

STDV RCR
STDV RCR H
STDV D36
BIAS RCR
BIAS RCR H
BIAS D36
CASES
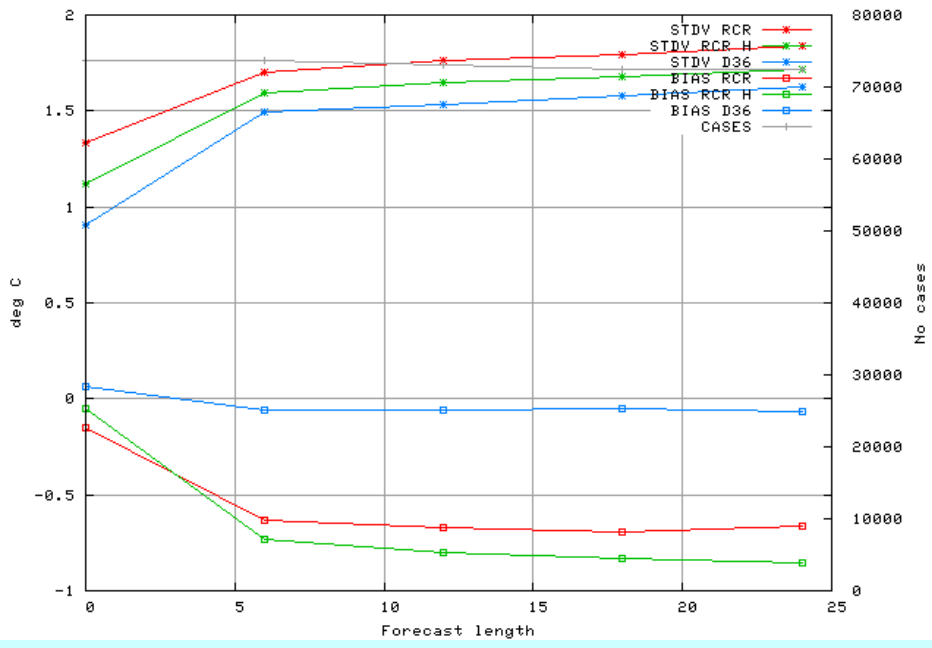
Area: ALL using 691 stations
Period: 20101003-20101031
Wind speed Hours: (00,06,12,18)

STDV RCR
STDV RCR H
STDV D36
BIAS RCR
BIAS RCR H
BIAS D36
CASES
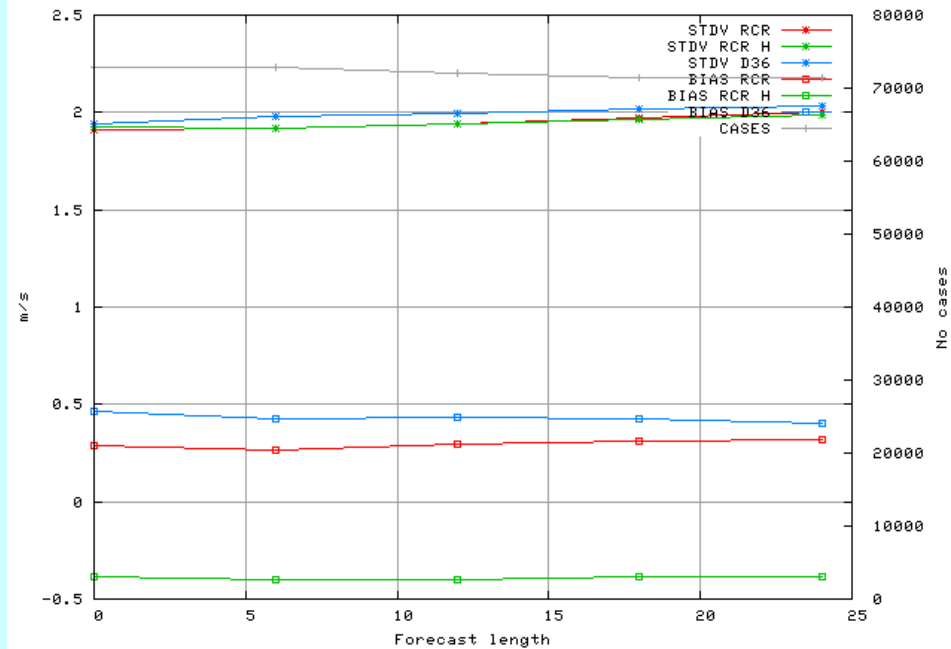
Performance issues/priorities

- Harmonie/AROME computationally considerably more expensive than HIRLAM

- Large domains essential for model quality

- Performance and scalability bottlenecks in some parts of the code; tested up to $O(10^3$ cores)

- Future challenge: Swift developments in both hardware (towards $O(10^5)$ core architectures, multi-core chips, GPGPU's) and numerics (new solvers and schemes)

Scarce staff resources: coordination, exchange needed!

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Status GLAMEPS-v1

- GLAMEPS-v1 running NRT since March 2010.
- Decision to use new ECMWF EPS rather than EUROTEPS as component
- Agreement with ECMWF on adaptations needed to achieve TCF-2 status at ECMWF. Expected to be ready end January 2011.
- Verification/comparison vs new ECMWF EPS underway.
- Proposal: After reporting/ positive recommendation GLAMEPS team on verification outcome, make decision by email correspondence to declare GLAMEPS-v1 operational. Give Council/Assembly chairs mandate to request TCF-2 status at ECMWF.
- Proposed operational configuration and required resources:
  - 52 members, 13 each from ECMWF EPS, HIRLAM-K, HIRLAM-S, ALADEPS. Resolution LAM EPS: ~10.5km. Lead time: +54h. Run 2x/day, at 06, 18h.
  - 13 MSBU/year

- Experimentation with 4-5km res. HIRLAM ensembles. Start with ~2km res Harmonie-based enseble setup early 2011.

Cooperation aspects

- Common work plan:
  - First step achieved, but process still needs improvements

- Next steps:
  - Identification / setup task forces (which?)
  - Get strategies in line
  - More common reporting?