Status of Harmonie plans / developments: A HIRLAM view

Jeanette Onvlee
ALADIN General Assembly meeting, 20101214
• Some relevant HIRLAM organizational developments

• Scientific developments

• Cooperation aspects
HIRLAM organizational developments


• 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
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

Harmonie/AROME-2.5km (blue) vs Harmonie/ALARO-4km (green) vs HIRLAM-RCR (red)
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 $O(10^3 \text{ cores})$
- Future challenge: Swift developments in both hardware (towards $O(10^5 \text{ cores})$ core architectures, multi-core chips, GPGPU’s) and numerics (new solvers and schemes)

Scarce staff resources: coordination, exchange needed!
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 ensemble 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?