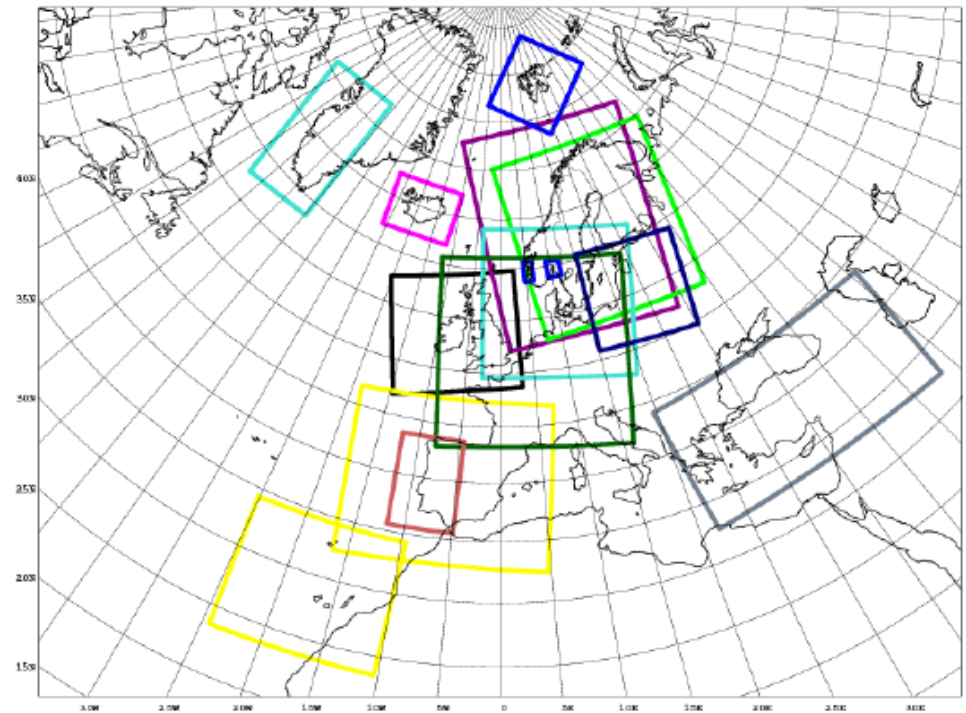# HIRLAM
Highlights of the past year

Jeanette Onvlee

EWGLAM meeting, 29/9/2014

Organizational aspects

✓ Members: unchanged since last year (Dk, Es, Fi, Fr (coop), Ic, Ir, Li, Nl, No, Sp, Sw)

✓ No changes in project leaders:
Ulf Andrae, Jelena Bojarova,
Inger-Lise Frogner, Mariano Hortal, Laura Rontu, Xiaohua Yang

Use of observations

✓ Presently used: conventional + AMSU-A/B
Optional: radar, GNSS ZTD, Mode-S, IASI, AMV, scatterometer
Tuning to optimize impact

✓ Radar reflectivity and radial winds:
- all Hirlam members with radar technically able to assimilate; DMI: up to 40 radars from 10 countries
- NRT radar exchange via Odyssey/SMHI
- radar QC still issue

✓ VarBC for AMSU, IASI, aircraft observations, GNSS

✓ Cloud initialization with MSG data: to be implemented / integrated into VAR

✓ Rapid update cycling setups for nowcasting
- hourly, 15m

Upper air data assimilation algorithms

Presently used: 3D-VAR (RUC)

- structure functions derived with EDA
- spinup studies

4D-VAR: under testing with conventional data, radar, Mode-S and (soon) GNSS

Towards 4DEnVar: Combining traditional 3/4D VAR with ensemble techniques within IFS/OOPS code refactoring

Additional:

- Cloud initialisation with MSG
- field alignment/image warping to correct for displacement errors
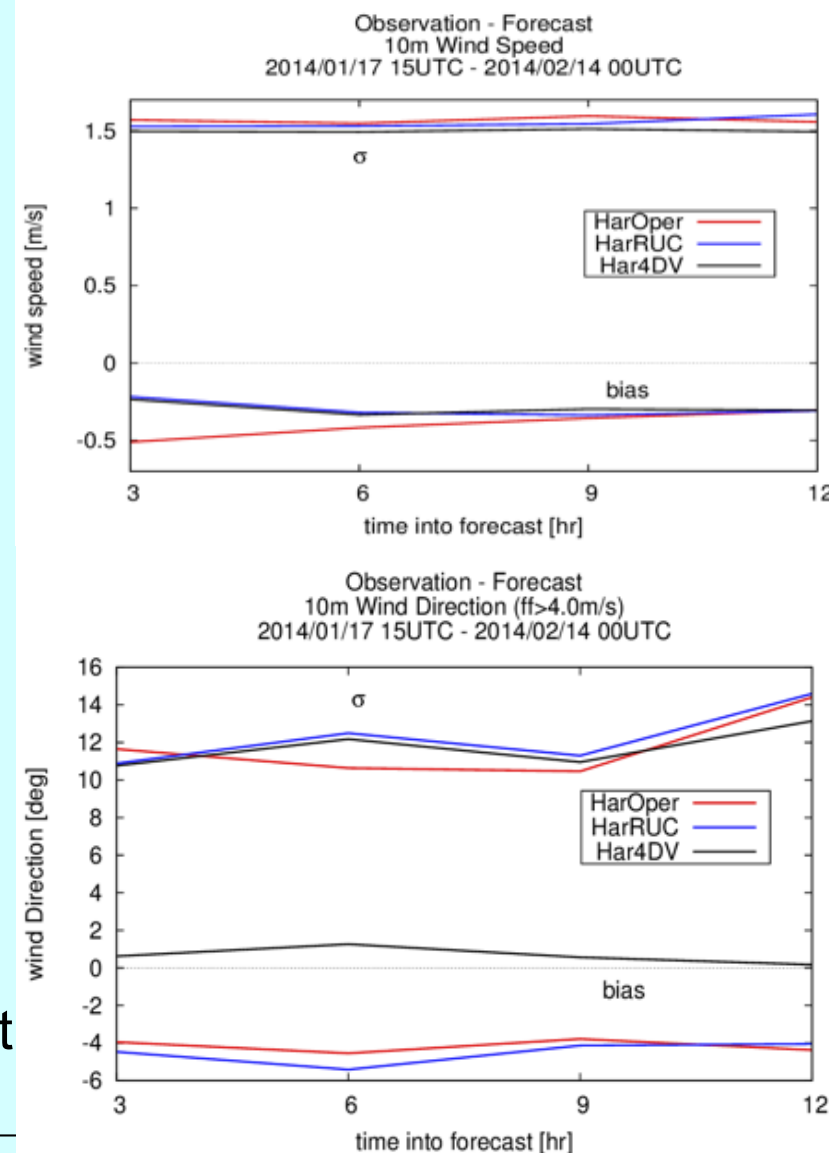
Upper air physics

✓ Studies to improve cloud behaviour
   - ice / mixed-phase cloud microphysics
   - fog over sea: alternative entrainment formulation

✓ Studies to assess/improve stable BL behaviour:
         - Energy Flux Budget (EFB) scheme
         - GABLS4

✓ More consistent treatment of radiation/clouds/aerosol
   - alternative radiation schemes/parametrizations
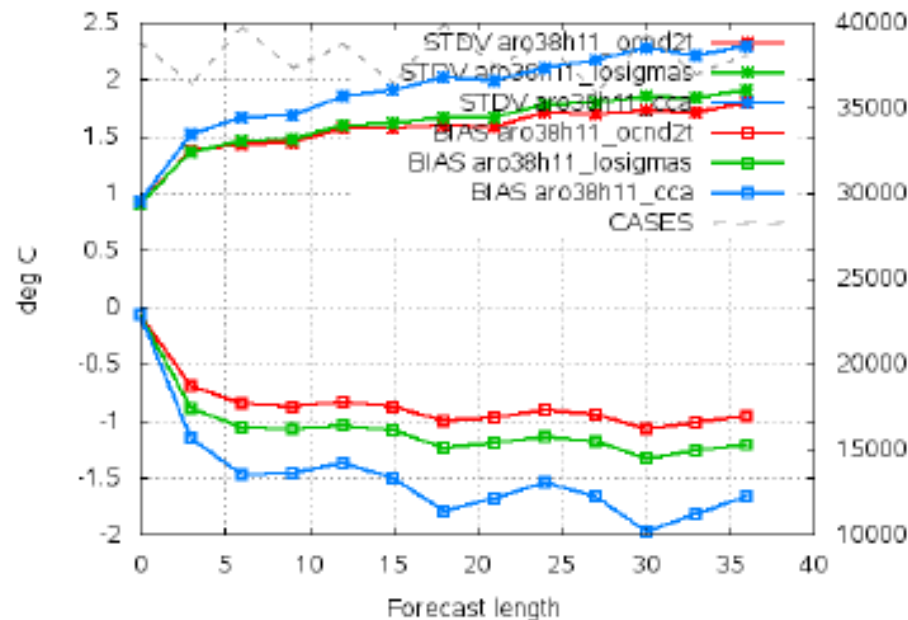   - direct/indirect aerosol effect

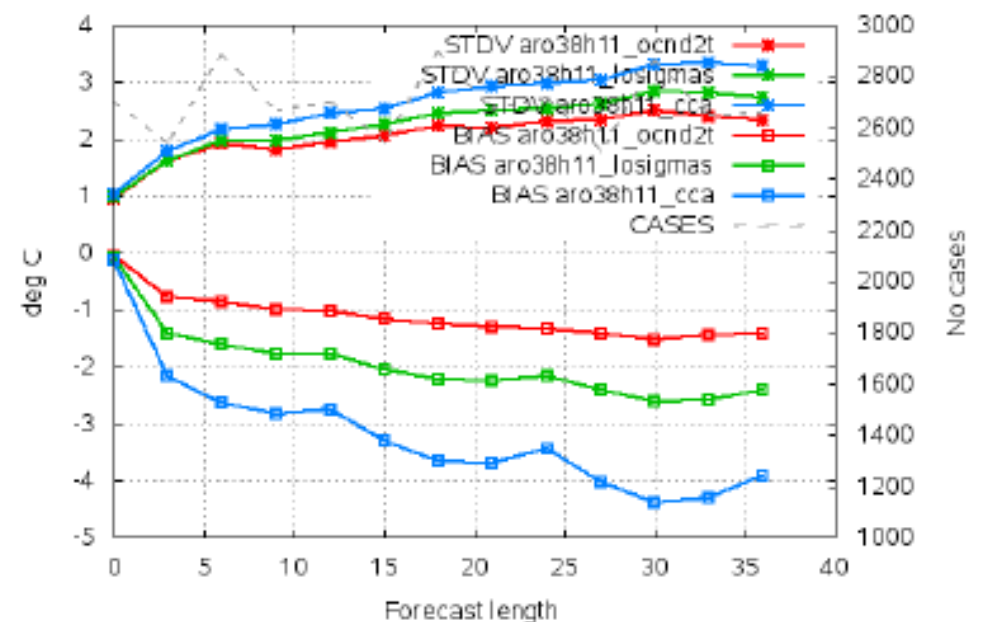# Cloud microphysics changes alleviating winter temperature problem

EWGLAM 2014, 20140929

Dynamics, very fine resolution modelling

- Progress with VFE

- Improvements of (dry) mass conservation

- Experiments with vertical relaxation vs predictor-corrector

- Experimentation at 0.5-1km resolution

- Assessment of high-resolution orography and physiographic data

6 stations Selection: EWGLAM
Temperature Period: 20140201-20140211
Statistics at 12 UTC Used 00,12 + 12 24 36 48
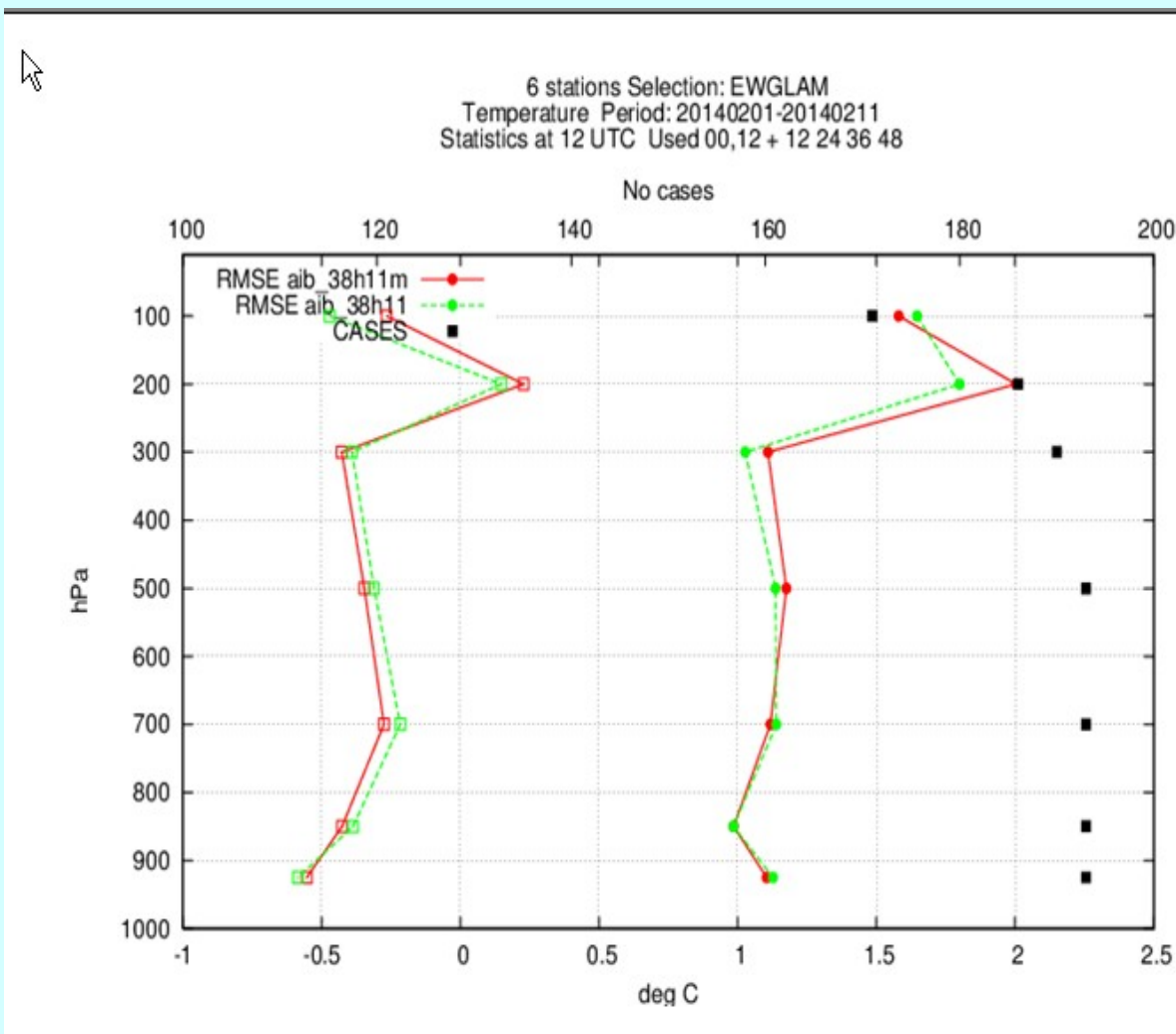
Surface

✓ Preparations for Surfex V8
   - MEB snow scheme
   - Flake model and lake depth/climate database
   - simple sea ice model, HIGHTSI

✓ Snow
   - testing of 1-, 3-layer snow schemes
   - assimilation of in-situ, satellite snow observations
   - COST action
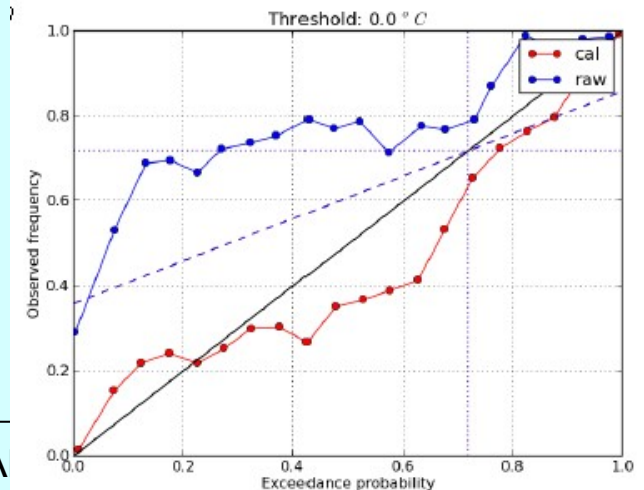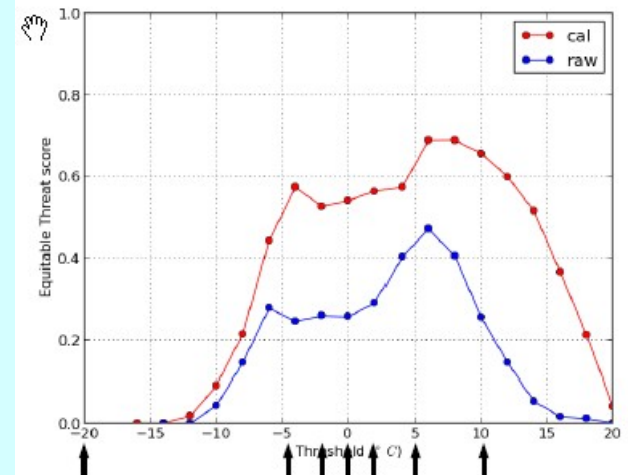
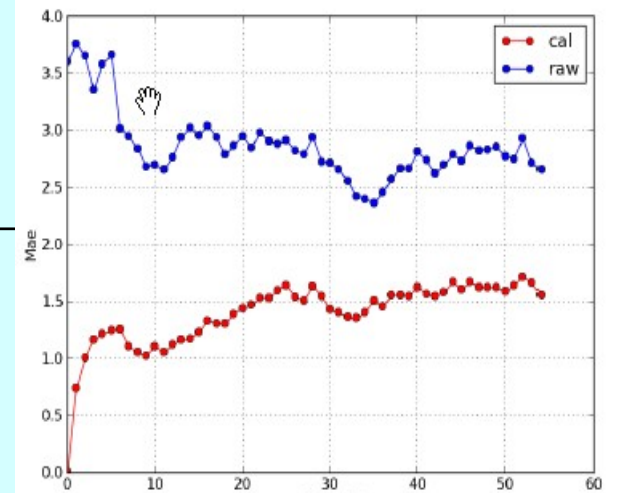✓ Lake and lake ice data assimilation

Probabilistic forecasting

Operational:

25 September: Introduction GLAMEPS-v2

4x/day, Hi+Al, 11>8km, more output products, calibration of near-surface parameters (soon)

Convection-permitting (HarmonEPS):
- Nesting exp's in EC EPS
- SPPT, CA physics perturbations
- Perturbations in surface, upper air obs, LBC, SLAF

System aspects

- ✓ Introduction of Regular Cycling Run (RCR) of Reference Harmonie system: Cy 38 run operationally at DMI, MetCoop; rotating responsibility per cycle

- ✓ Convergence with Aladin on system/validation tools and way of working

- ✓ Chemistry community: chemistry in Harmonie with offline coupling. Ambitions to develop in-line coupled system on basis of Enviro-Hirlam experience
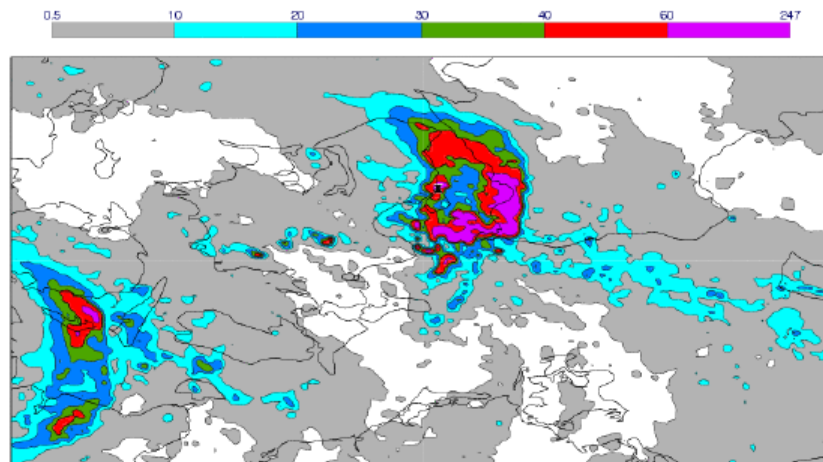
Severe weather performance

Malmö 31st of August 2014

The plot below show the 12-hour accumulated rainfall between 00UTC and 12UTC on the 31 August. Accumulated rainfall from radar

HARMONE-AROME 2.5km from MetCoOp