HIRLAM
Where are we now?

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EWGLAM meeting, Belgrade, 05/10/2015

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
- ✓ Preparing for a new programme (2016-2020)

  external review, updated strategy, new MoU, new management group

Data assimilation and use of observations

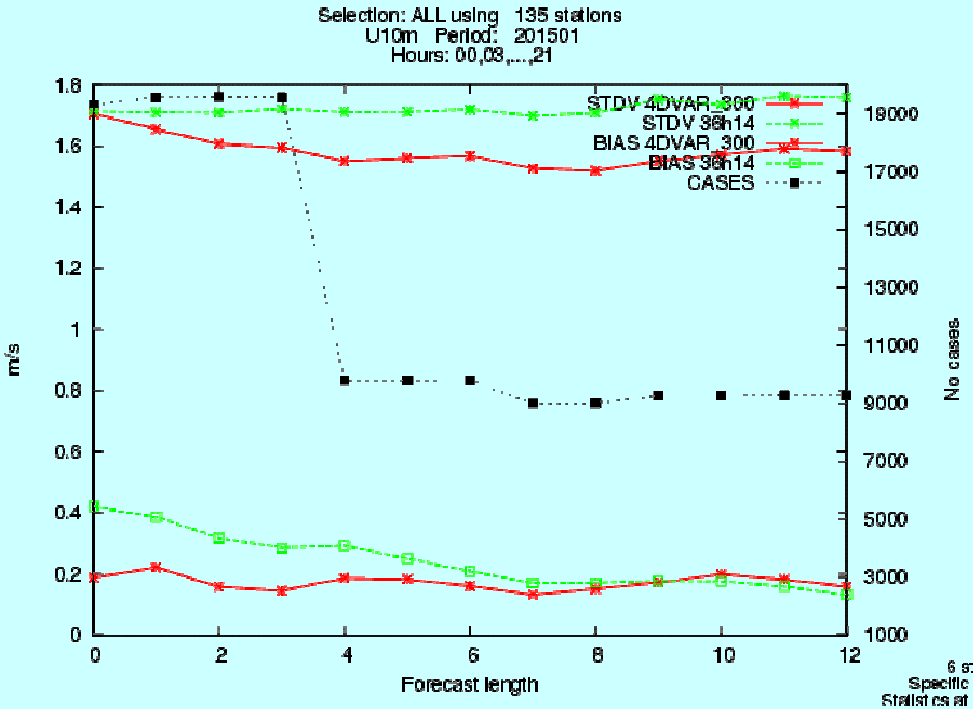
- ✓ Presently used: 3D-Var; conventional + AMSU-A/B
  Optional: radar, GNSS ZTD, Mode-S, IASI, AMV, scatterometer, …
  Several of these being introduced operationally in NMS's.
  Radar: Inhomogeneous quality over Europe (esp. winds), more stringent QC and more intelligent thinning/superobbing needed; taken up with OPERA

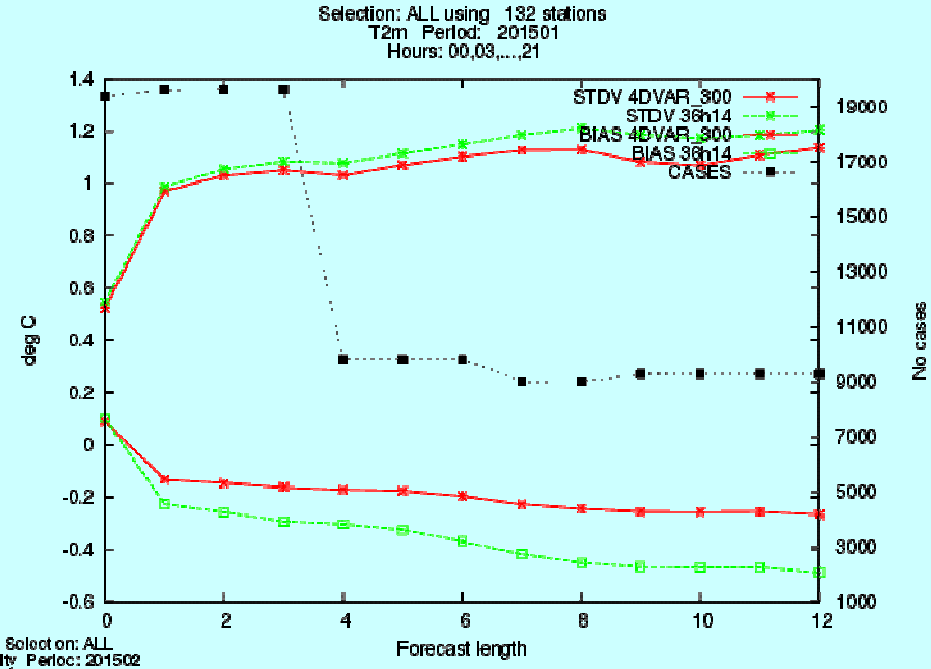
- ✓ Towards more advanced DA algorithms
  - Experiments with 3D-Var 1h cycling, EDA-derived fine-scale structure functions, studies of balance assumptions
  - Impact studies extending to 4D-Var
  - LETKF: first experiments/tuning, looking good

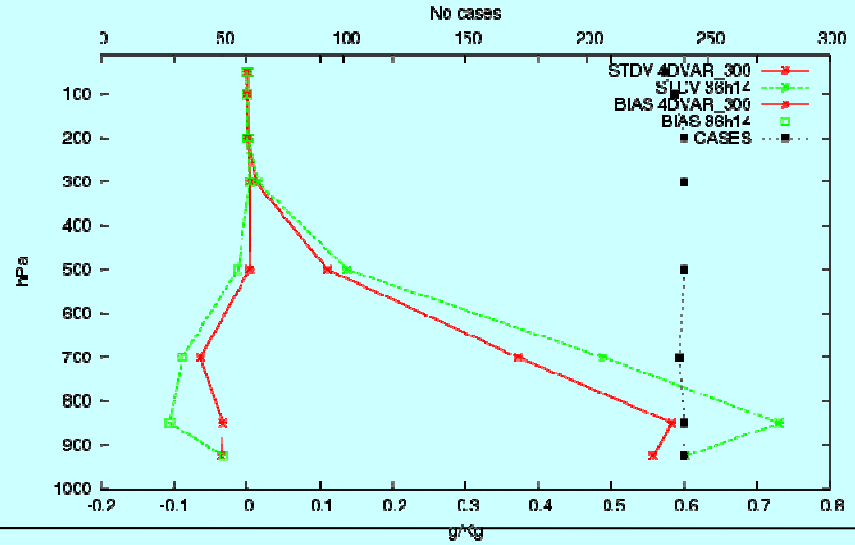
- ✓ Hybrid 3D-Var/field alignment: in preparation for operational use at AEMET.

- ✓ Interactions Eumetsat:
  - 2014: Eumetset sollicited requirements for sat data from nowcasting/SRNWP
  - Discussions on potential of new missions
  - 2015: Eumetsat Conference dedicated session, white paper

4D-Var experiments



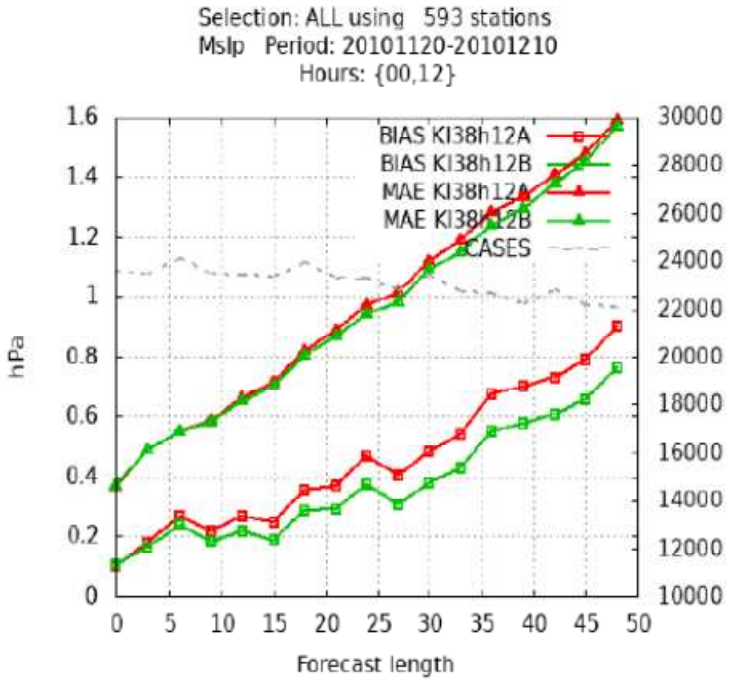


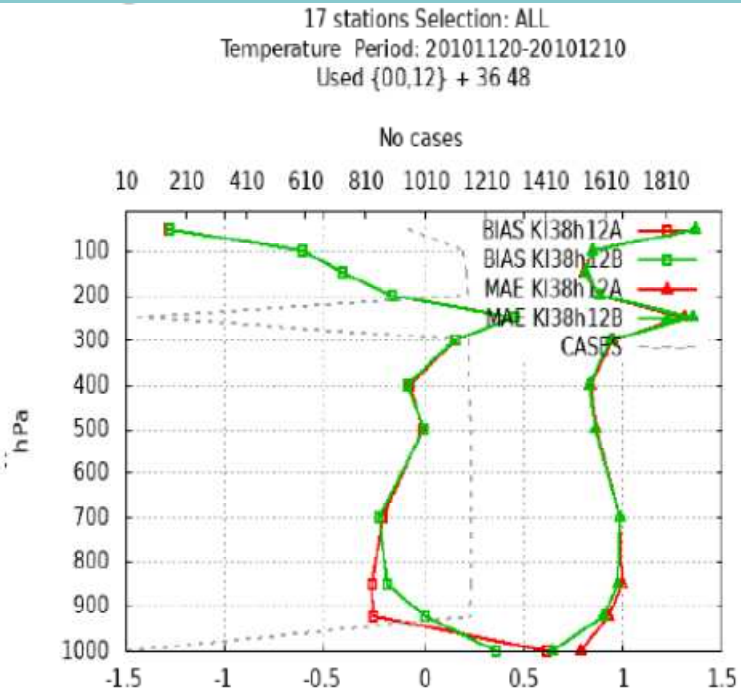


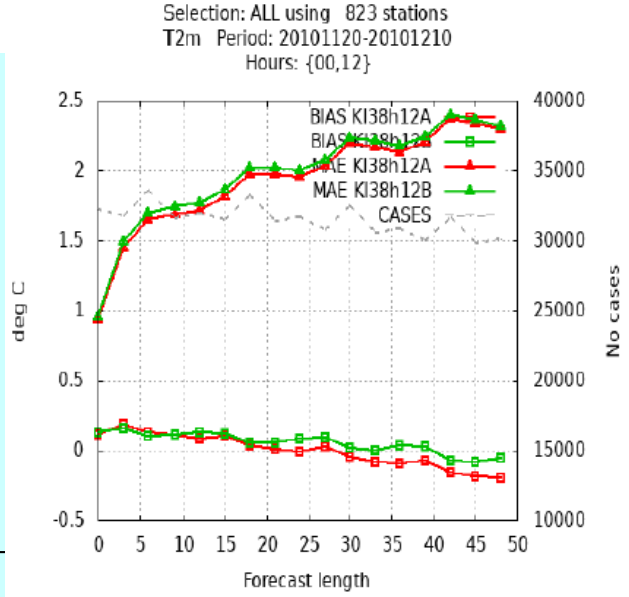
Forecast model

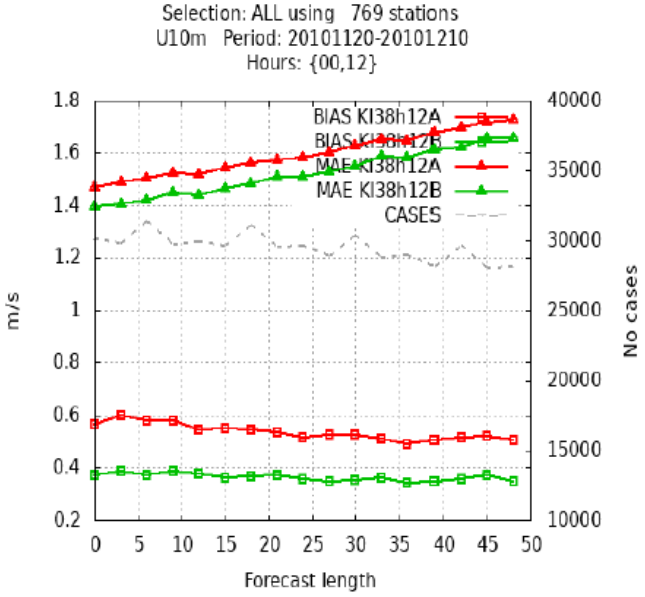
- ✓ Dynamics: experimentation with upper boundary nesting, cubic grid
- ✓ Studies to improve cloud behaviour
  - microphysics and turbulence experiments; new HARATU turbulence scheme with stronger top entrainment very promising
  - new treatment of autoconversion to reduce overforecasting of low clouds/fog: see DMI poster
  - more consistent treatment of radiation/clouds/aerosol: study of radiation, cloud optical properties and direct aerosol effects, for climatological and observed aerosol; parametrizations for indirect aerosol effects being implemented
- ✓ Surface:
  - New modules for snow+vegetation, sea ice, lakes in combination with surface DA, old/new soil schemes.
  - Experimentaton with 1-, 2-way coupling with ocean waves
- ✓ Harmonie as tool for regional climate modelling

HARATU turbulence scheme



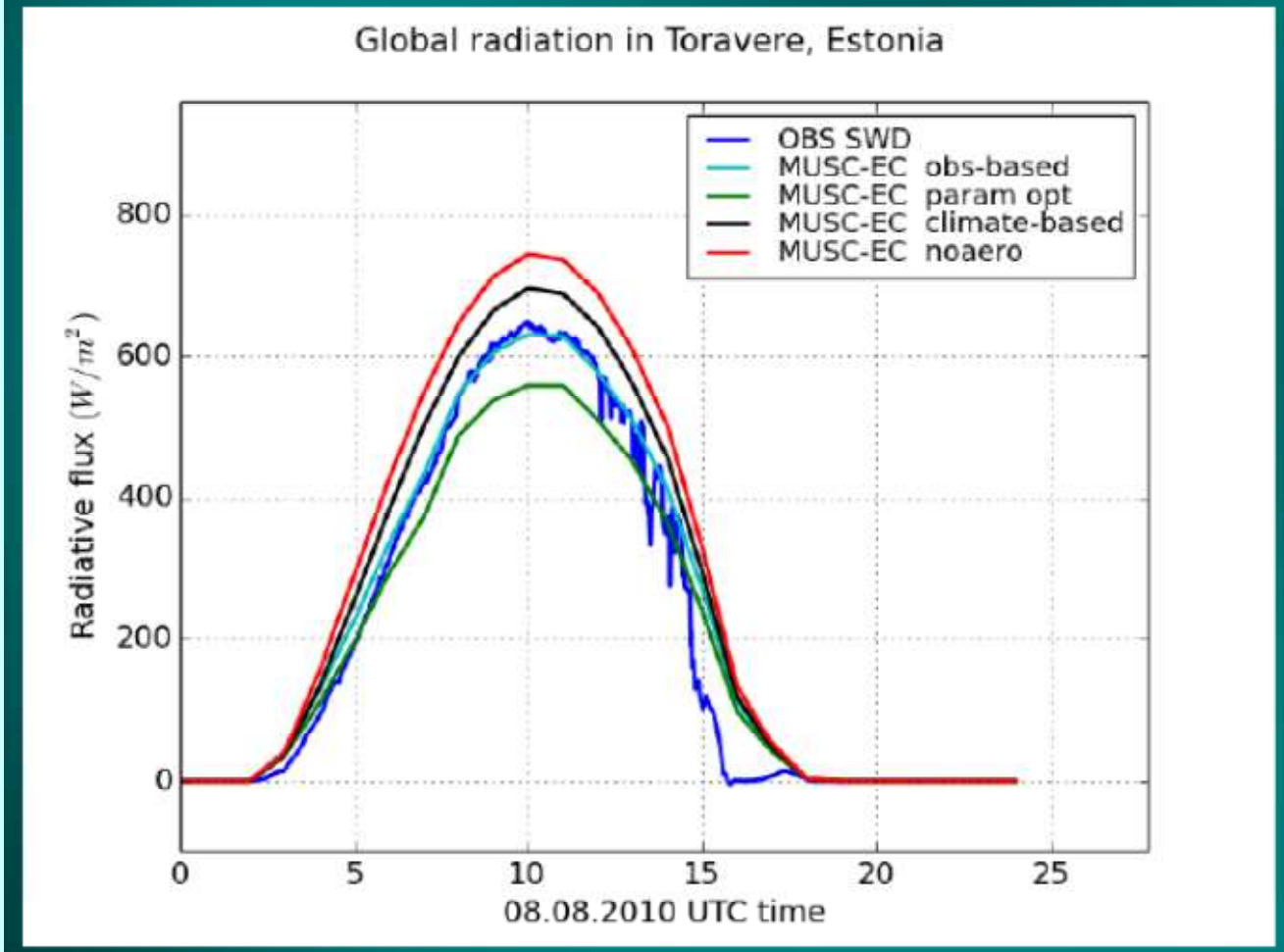






Aerosol direct effect experiments

MUSC **IFS** global radiation v.s. BSRN observations



optical properties and AOD 550nm based on observations

parametrized optical properties, observed AOD 550nm land aerosol

parametrized optical properties, climatological AOD 550nm

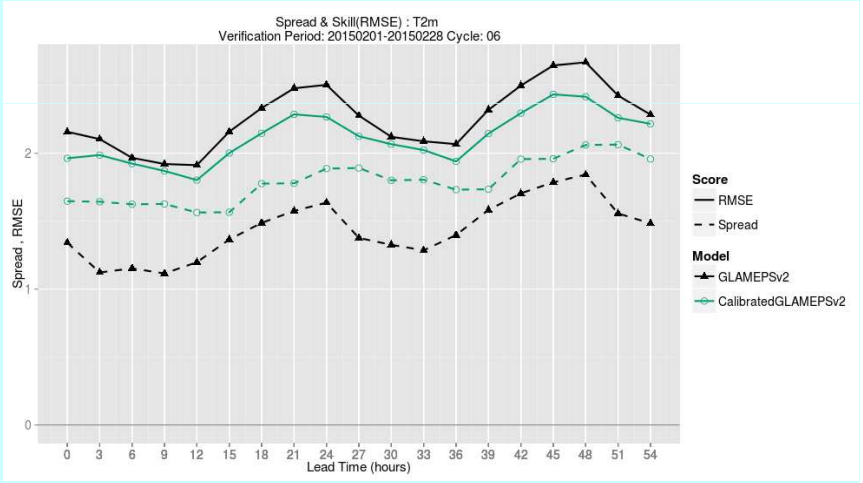
No aerosol

Probabilistic forecasting

Operational:

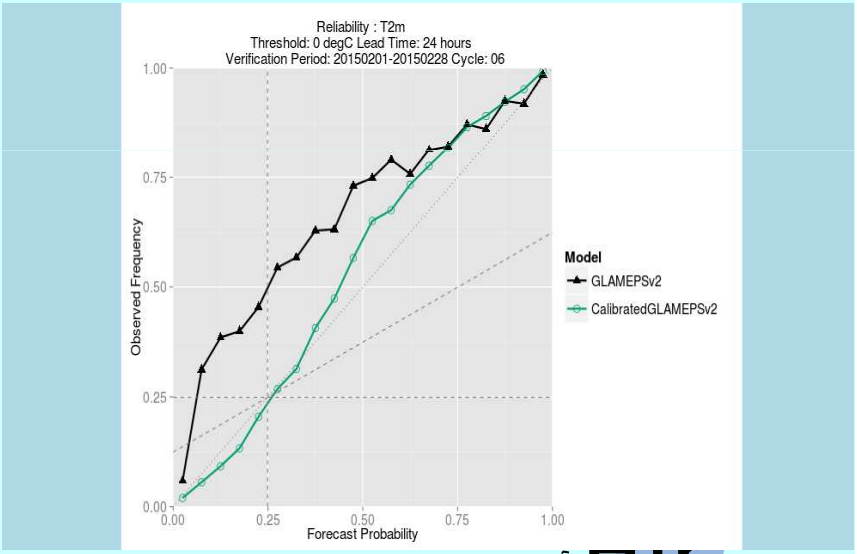
- Introduction spatially varying calibration of T2m, u10
- E-suite for GLAMEPS-v3:

  hor. resolution 8 -> 5km, several new perturbation types (obs perturbations, CAPE, hor. diffusion, physics parameters)



Convection-permitting (HarmonEPS):

- Testing different LBC approaches
- LETKF, EDA-based obs perturbations
- Cloud initialization with/without stochastic humidity
- Study surface perturbations
- Preparations for operational introduction Arctic HarmonEPS



Spatially varying calibration