



HIRLAM-A status and plans

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EWGLAM meeting Madrid, 20081006

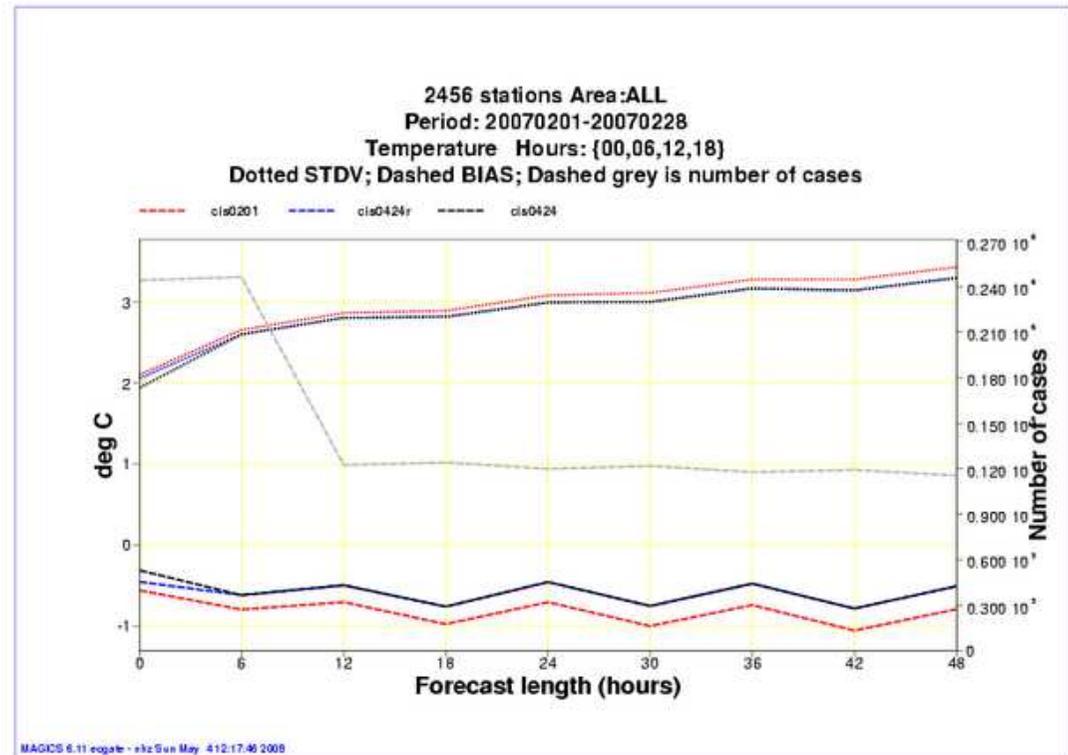
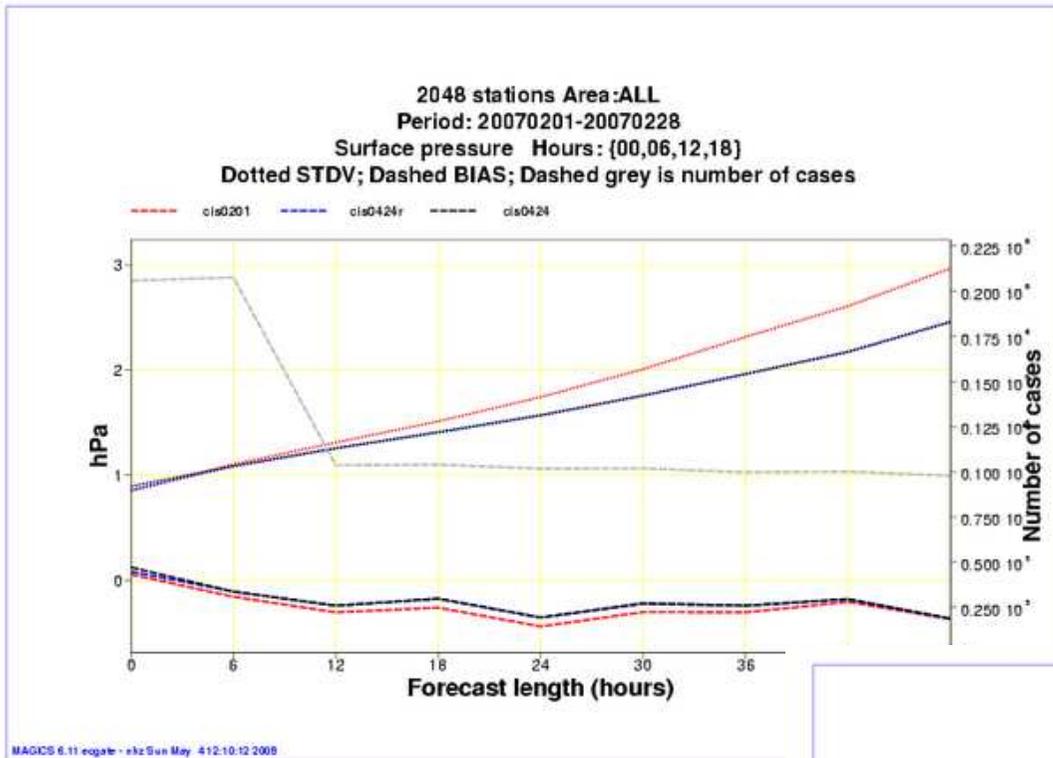
HIRLAM organization

- Full members: Dk, Est, Fi, Ic, Ir, NI, No, Sp, Sw, (Fr)
 - Latvian, Lithuanian met services acceding members (Jan 2008)
- Management Group: Programme manager, 5 PL's for System and Applications (Yang), DA/UO (Gustafsson), Ph (Tijm), Dyn (Hortal), Prob Forecasting (Iversen). New scientific secretary: Tilly Driesenaar
- Staff: ~80 researchers, ~25 fte, 6fte core group
- Reference System: basis for developments; RCR at FMI
- Cooperation with ALADIN/LACE:
 - Mesoscale: HARMONIE
 - LAM EPS: GLAMEPS
 - Joint scientific planning; common ASM/workshop; “mirrored” organizational structure

Data assimilation highlights

- HARMONIE:
 - Data assimilation script system/observation monitoring set up; experimentation with 3D-VAR, full cycling, extension zone
 - Start made with development of basic 4D-VAR system
 - Surface: implementation of OI/CANARI; start with joint development of EKF for soil assimilation
- HIRLAM:
 - 4D-VAR as default assimilation scheme , several enhancements under development
- Comprehensive observation impact studies:
 - Synoptic scale Atlantic/Arctic:
 - AMSU-A over land/sea ice, AMSU-B, GEO/MODIS AMV, scatterometer, OSI SAF SST/sea ice
 - positive impact in winter, less clear in summer
 - Synoptic scale convection-related data: SEVIRI, GPS, radar radial winds, RH2m. In preparation.
 - 2009:
 - extend “convection” CIS to HARMONIE
 - Participation in EUCOS regional impact study

Impact of additional sat obs over N.Atl.: winter month



Forecast model developments

HARMONIE:

- Dynamics:
 - VFE
 - Nesting experiments
 - phys-dyn at different time step/resolution
 - Improve mass-conservation properties of SL interpolators
- Physics:
 - EDMF turbulence-shallow convection scheme
 - Deep convection behaviour
 - Treatment of orography
- Surface:
 - NetFAM Lake modelling workshop, Zelenogorsk, Sep 2008: starting point for lake DA development
- common HIRLAM/HARMONIE monitoring/verification system

Forecast model developments

HIRLAM:

- Upgrade/recoding KF/RK scheme
- Improvement to treatment of stable BL
- Surface:
 - Snow/forest scheme tuning wrt UA physics
 - Snow on ice parametrization
 - Lake model validation
- One- and two-way coupling with chemistry
- Plans 2009:
 - Explore coupling with ocean
 - Explore HARMONIE/HIRLAM climate branch

Surface bias maps Fig: 2008;Spain_Portugal;Cloud cover;All Exp;Bias;03;DMI_FMI_SMHI_ECMWF - Mozilla Firefox

Surface verification Fig: Freq dist.;2008;EWGLAM;All Parameter;03;DMI_FMI_SMHI_ECMWF - Mozilla Firefox

Vertical profiles Fig: 2008;EWGLAM;All Parameter;DMI_FMI_SMHI_ECMWF;03 - Mozilla Firefox

../ Intercomp
 Prof_Temp

Vertical profiles

- Parameter
- Temperature
 - Wind speed
 - Wind direction
 - Geopotential
 - Relative humidity
 - Specific humidity

- Comparison
- FMI_ECMWF
 - DMR_ECMWF
 - DMI_FMI_ECMWF
 - DMI_FMI_SNHI_ECMWF

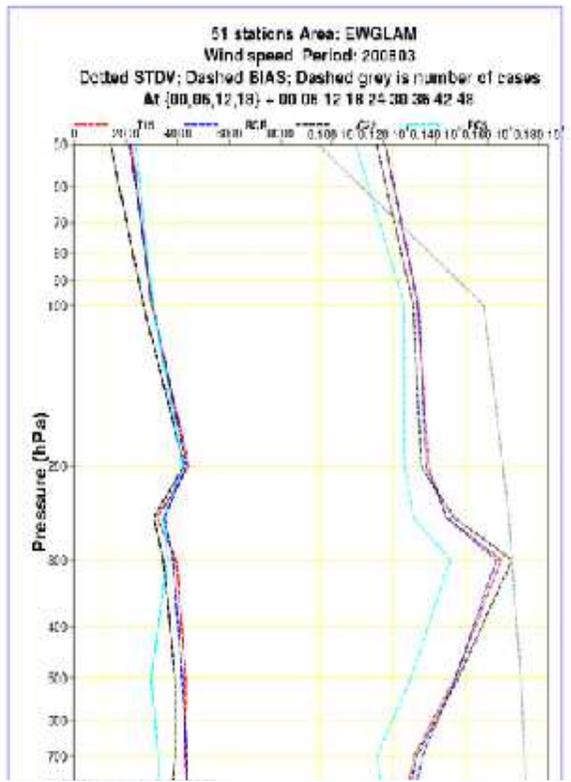
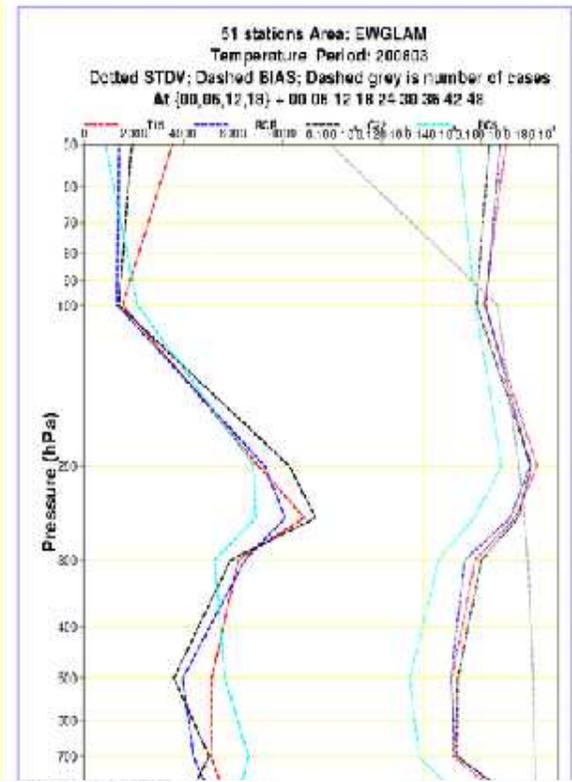
Resize

Send

Statistics
 Quality control

Year: 2008 Area: EWGLAM Month: 03 All Save Clear

2008 EWGLAM 03 2008;EWGLAM;Specific humidity;DMI_FMI_SMHI_ECMWF



Coupling with atmospheric chemistry

One-way:

- Make HIRLAM output better suited as input to ACT models (postprocessing, vert resolution in BL, ...)
- Dynamics: improve mass-conserving properties:
 - more accurate interpolators in SL scheme
 - mass conserving SL scheme of Kaas et al.

Two way:

- ENVIRO-HIRLAM coupled system being installed as HIRLAM chemistry branch at DMI

Yet to be done:

- include aerosols in microphysics
- include desired physics options where necessary (e.g. radiation scheme)
- Start study of chemistry-cloud feedbacks

GLAMEPS

- First longer historical experiments/calibration with GLAMEPS at ECMWF
- Configuration experiments ongoing
- EPS generation techniques:
 - HIRLAM (forcing, Hessian) SV: code to be included in Ref system. CAPE energy norm
 - Multiphysics, physics parameter perturbation, stochastic physics
 - ETKF: experimentation to start
- 2009: setup and testing of distributed production system

Overview operational model suites

	hor res.	Vert.levs	version
Dk:	0.15	40	7.1
	0.05	40	6.3+
Est:	0.10	40	6.1+
Fi:	0.15	60	7.2
	0.08	40	6.2.1
Ir:	0.15	60	7.0
	0.07	60	7.0
NI:	0.10	60	7.0
No:	0.10	40	6.4.2
	0.036	60	6.4.2
Sp:	0.16	40	7.1
	0.05	40	6.1.2
Sw:	0.20	40	6.3.5+
	0.10	60	6.3.5+
	0.05	60	6.3.5+
Lith:	0.10	40	7.1

HIRLAM Reference system changes

Present version: HIRLAM 7.2. Release of version 7.3 planned end 2008.

Features new in 7.2:

- 4D-VAR as default assimilation scheme
- RTTOV-8/ATOVS upgrade
- KF-RK as default condensation/convection scheme
- Bug fixes

Features new in 7.3:

- Assimilation packages for AMSU-A (new satellites, over land/sea ice), AMSU-B, AMV GEO/MODIS, scatterometer, OSI SAF sea ice/SST
- Default assimilation of most of these data
- Multiple outer loops and various other enhancements of 4D-VAR (incl SV code for GLAMEPS)
- RK/CAM3 condensation scheme
- New snow and surface scheme
- Improved openMP parallelization
- Extended postprocessing package, incl “chemistry-relevant” parameters