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ALADIN/SHMU - operational computer and model

Computer power (HPC)

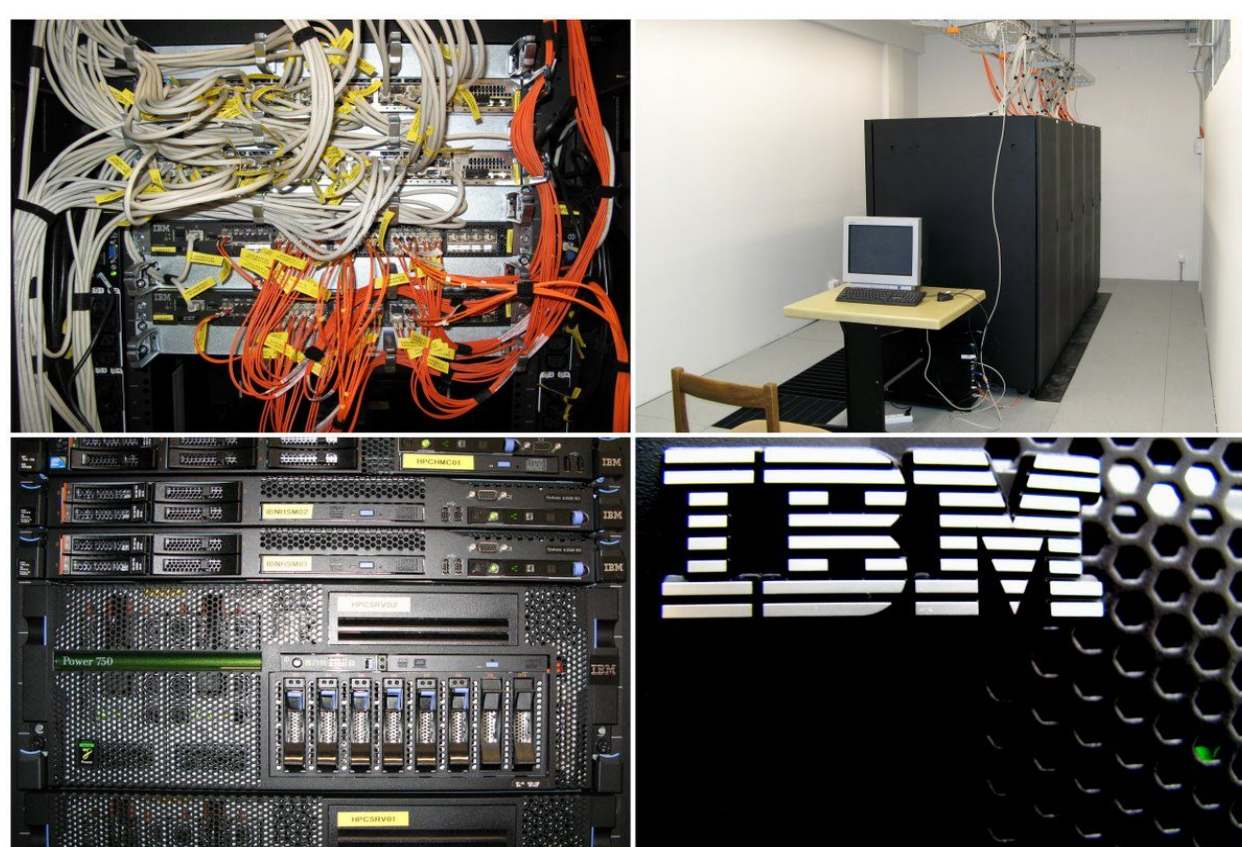
10 nodes of IBM Power 755:
4x Power7 8core CPUs (3.6 GHz),
256 GB RAM
(total: 320 CPUs, 2.5 TB RAM)

Management servers

2x IBM Power 750: 1x Power7
6core CPU (3.6 GHz), 64 GB RAM

Software and file system

AIX 6 SE OS, IBM Load Leveler
queueing system, 40 TB GPFS



NWP model

ALADIN CY36T1

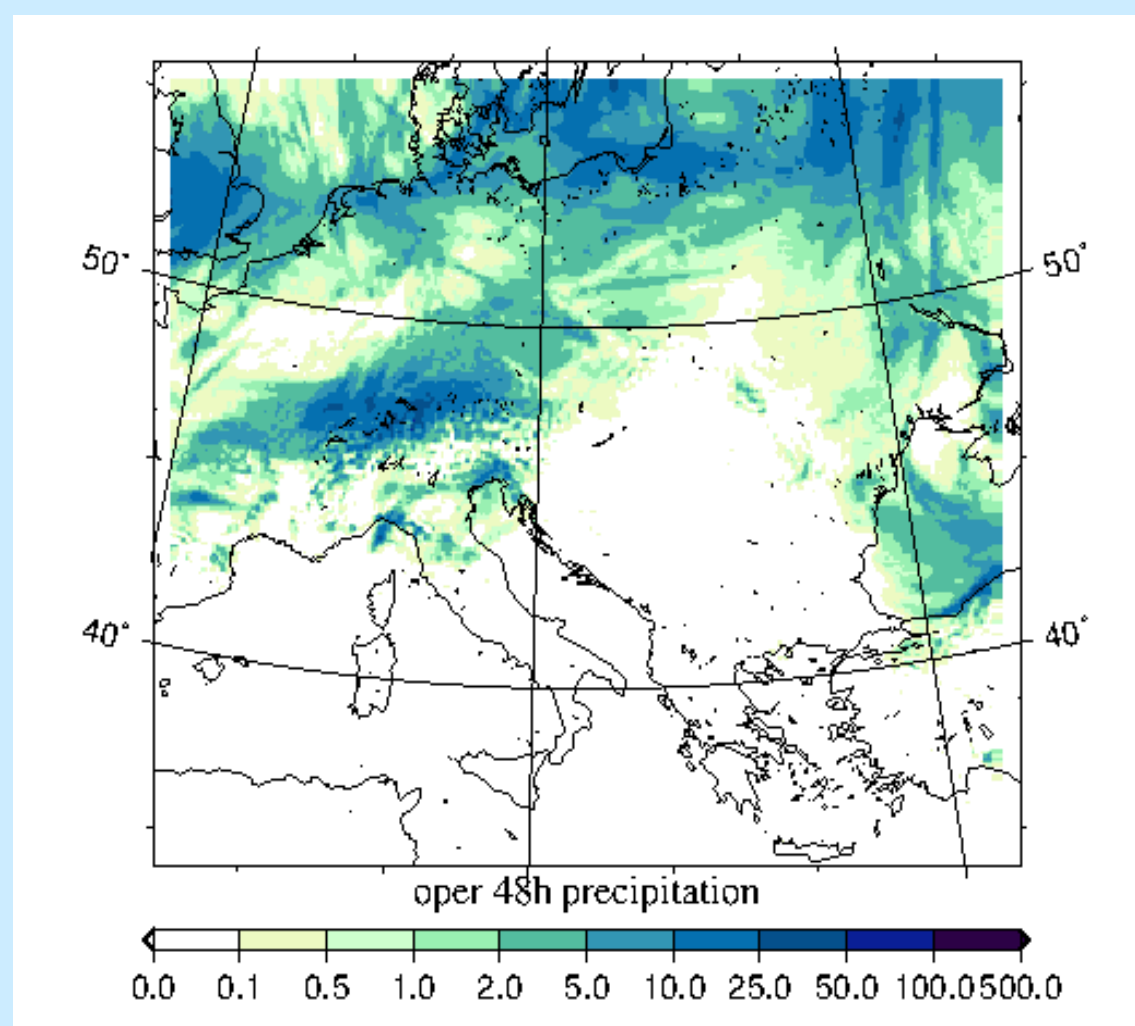
- ALARO+3MT & SLHD
- envelope orography
- assimilation cycle:
- CANARI surface analysis
- upper-air spectral blending by DFI

Domain size and resolution

2882 x 2594 km (320 x 288 points)
[2.19 ; 33.99 SW] [39.06 ; 55.63 NE]
dx=9.0 km, vlev=37, tstep=400s

Suite characteristics

forecast length +72h (3 days)
4 runs/day (00, 06, 12, 18 UTC)
ARPEGE coupling with 3h frequency



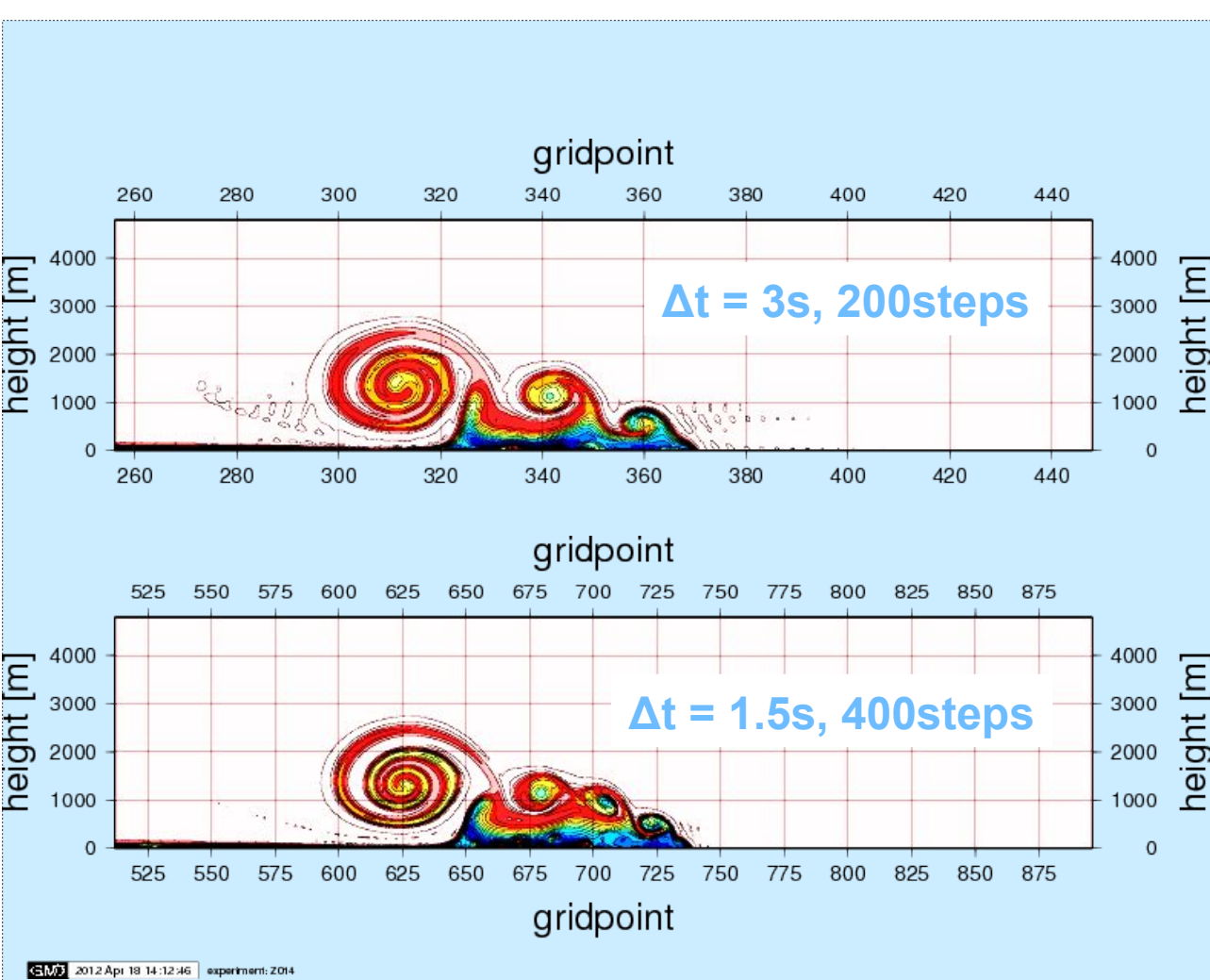
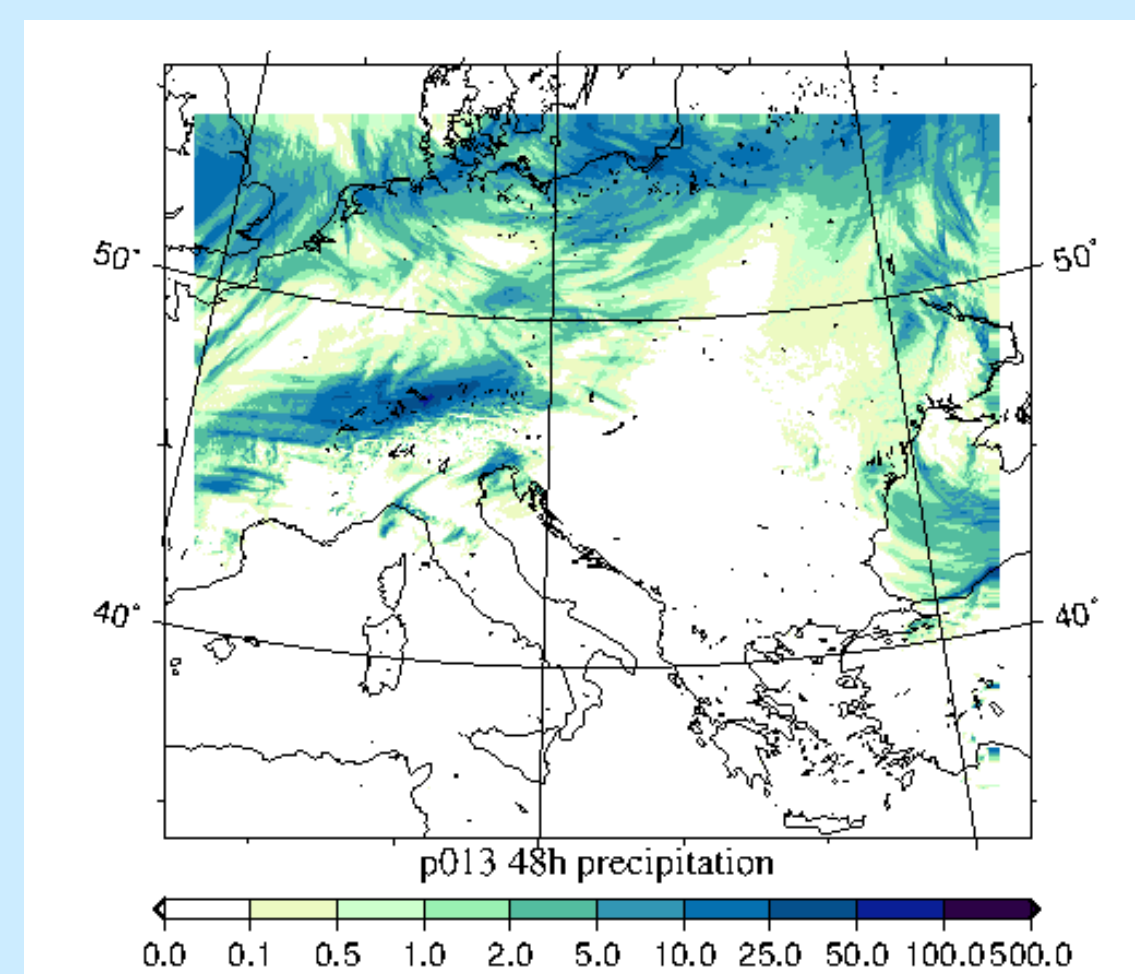
New model configuration in tests

ALADIN CY36T1

newest ALARO-0 tuning & SLHD

Domain size and resolution

2640 x 2227 km (800x675 points)
dx=3.3km, vlev=62, tstep= 180s

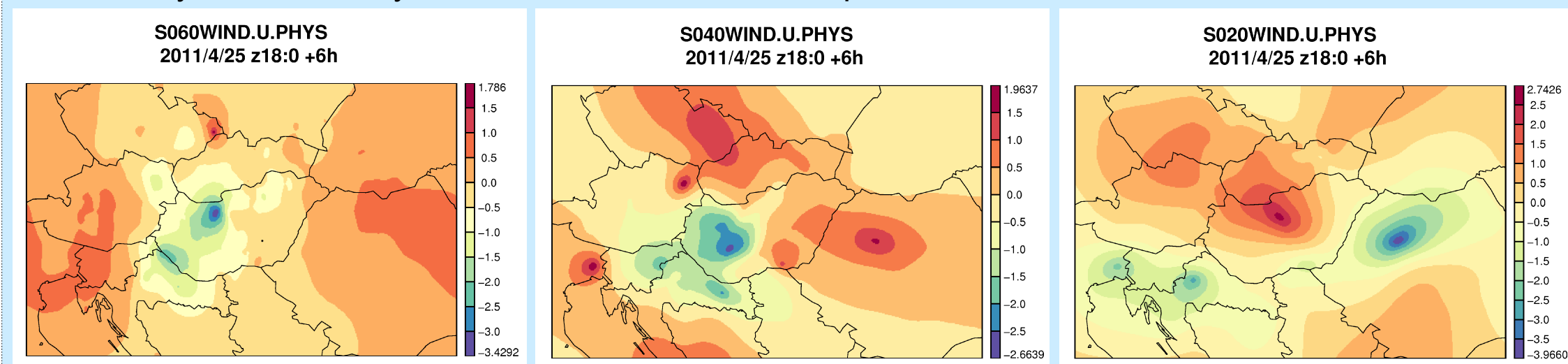


The development of VFE scheme for NH dynamical core with pressure base hybrid vertical coordinate (continuation)

We cooperate with HIRLAM (Juan Simmaro from Spain) and we investigated the role of level distribution on semi-implicit time stepping stability. The first idealized tests were performed. The presented results are from known gravity current test of Straka, 1995.

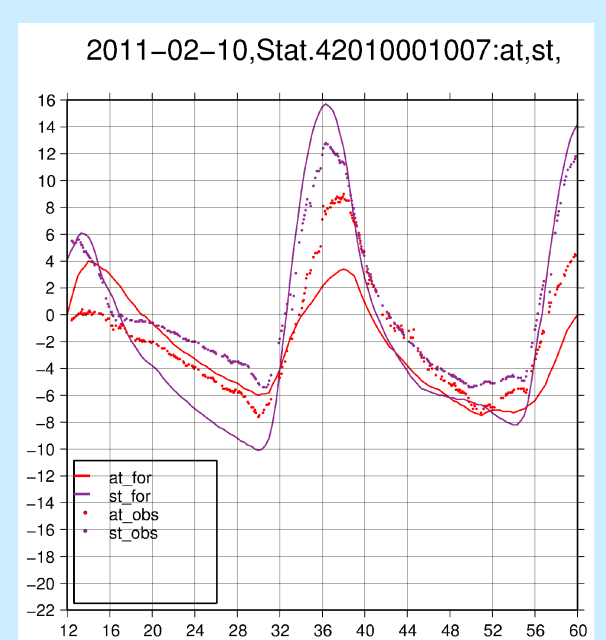
Radar assimilation in AROME

Technical development for 3D-VAR assimilation of radial Doppler winds (using 3 HU radars). Preliminary results - analysis increments of U wind component for 3 model levels are shown.



Installation and testing of METRo

The Canadian road forecast system METRo (Model of the Environment and Temperature of Roads) has been tested during the winters 2010/2011 and 2011/2012. The input parameters are data from RWIS (road weather information system); and screen level temperature and wind speed, precipitation, surface pressure and downward solar and infrared fluxes from ALADIN model. METRo is running operationally at SHMI since January 2011. The evolution of forecasted 2m air and surface temperature (at_for, st_for) and observed values (at_obs, st_obs) for randomly selected day and station is shown.

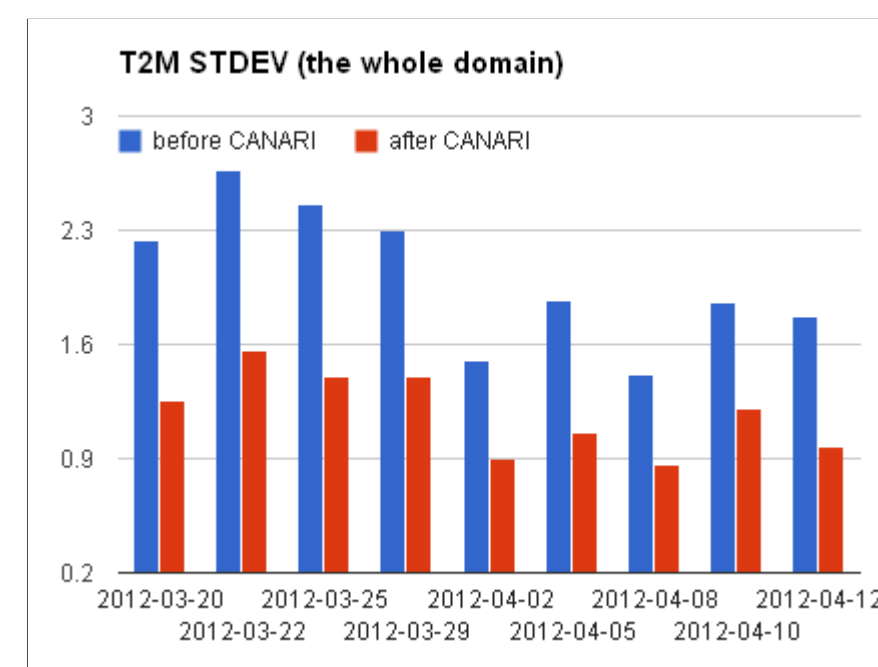
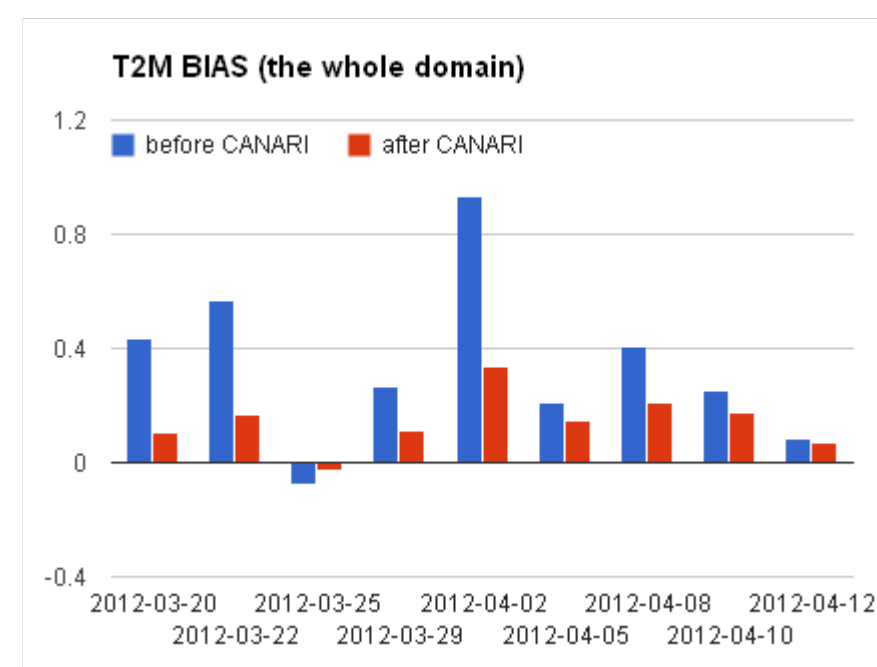


CANARI surface assimilation (2012-04-03 operational)

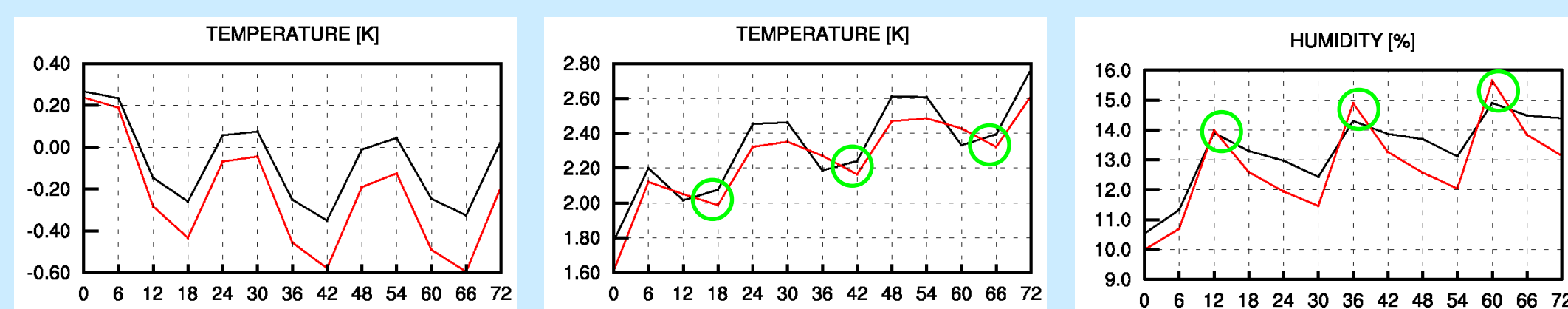
The surface data assimilation using CANARI has been tested in ALADIN/SHMU system. 2m temperature and 2m relative humidity are analyzed using 2m temperature and 2m relative humidity measurements from SYNOP (combination of OPLACE and local SYNOP database). The surface analysis is applied on 6h guess (ALADIN forecast coupled with long cut-off ARPEGE LBCs). CANARI step is preceded by a copy of SST (sea surface temperature) field from ARPEGE analysis into the INIT file. After surface analysis there is blending by DFI applied on upper-air fields. No further initialization is used prior the forecast (nor in the assimilation cycling nor in the production forecast).

Some results of the half year parallel suite (01/08/2011-30/01/2012) are presented. Generally positive impact has been found in the analyses and subsequent forecasts, mainly in terms of the scores of temperature and relative humidity. However, there is a problem with the forecast scores during day time in summer that has to be further investigated.

CANARI surface assimilation became operational on 03/04/2012 00 UTC (for assimilation) and 06 UTC (for production).



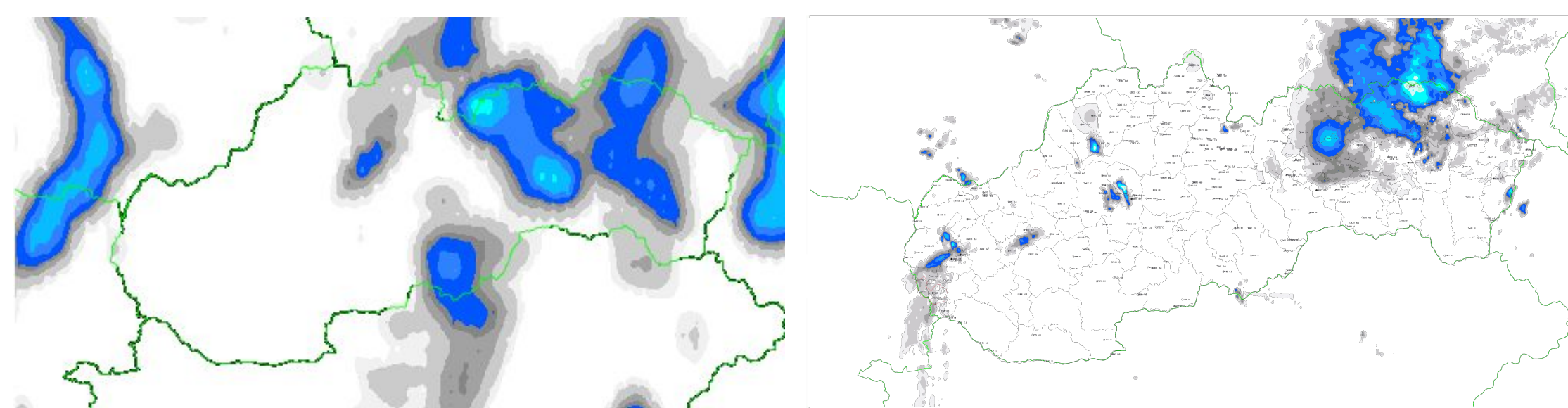
BIAS (left) and STDEV (right) of 2m temperature of the guess (blue) and of the CANARI analysis (red) computed over whole domain for few randomly selected days.



BIAS of 2m temperature forecast (left), RMSE of 2m temperature forecast (middle) and RMSE of 2m relative humidity forecasts (right), all for 00UTC runs, period 01/08/2011-30/01/2012. Operational run black solid line, CANARI red solid line. To be noticed & investigated: the cold BIAS of CANARI-based runs and problem of diurnal cycle/noon time in RMSE (green circles).

ALADIN simulated reflectivity

Comparisom of 24 hours forecast SIM_REFLECTI lev.27 from ALADIN (left) for 2012-06-22_12 vs INCA SK analyse (right) in 2km.



INCA-CE
Nowcasting for Central Europe

CENTRAL EUROPE
COOPERATING FOR SUCCESS

EUROPEAN UNION
EUROPEAN REGIONAL
DEVELOPMENT FUND

INCA SK (501x301km)

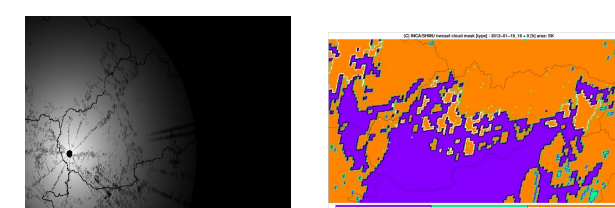
- operational, runs hourly up to +12h
- uses 2mT, 2mRH, 10m wind => computes T, Td, q, U, V, snow line, zero isotherm
- outputs on SHMU web page

INCA2 SK (501x301km)

- C&C++, code optimization, refactorization, parallelization
- possibility of big domains
- I/O directly read: ALADIN (grb), radar & NWCSAF (hdf5)

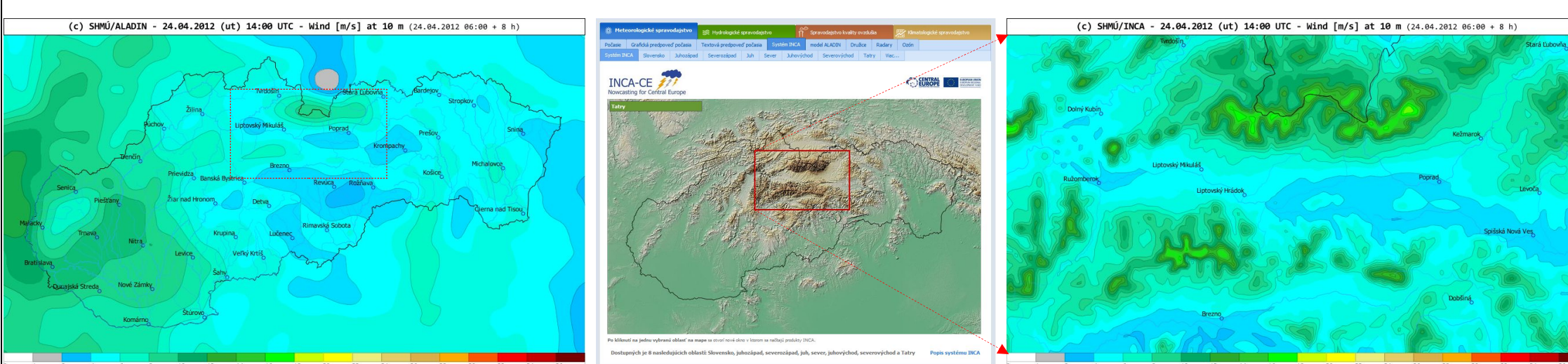
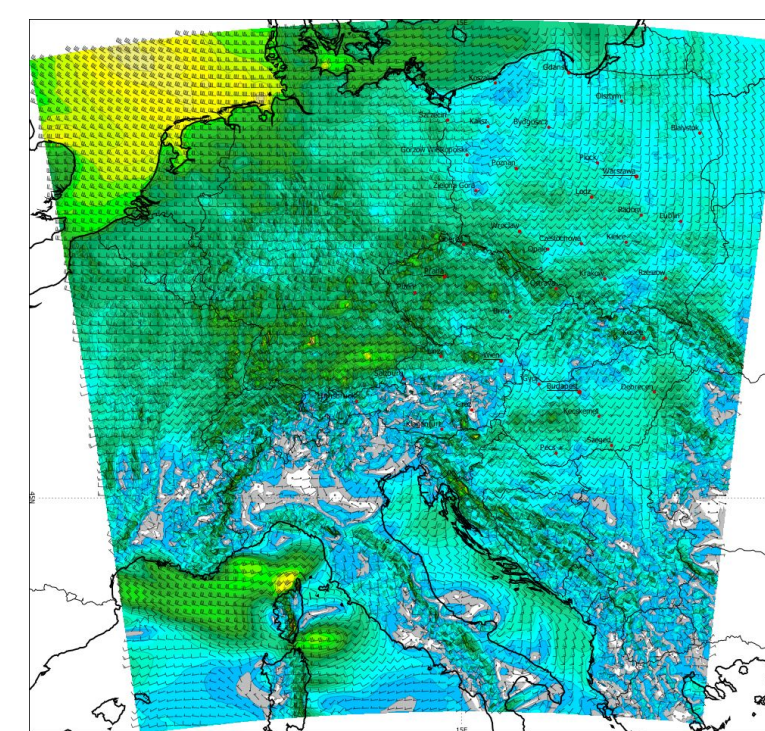
new INCA2 precipitation module (cooper. L. Meri - ODM)

- based on variational method
- quality indexes
- 3D single radar input
- usage NWCSAF products
- independent timestep (now: 5min)



INCA2 CE (1671 x 1766km)

- runs hourly up to +12h (testing mode, subject of further validation)
- for presentation of results on common webportal
- www.inca-ce.eu



ALADIN +8h forecast of wind speed (left) and INCA +8h nowcast zoomed over Tatras region (right); taken from SHMI web interface (middle).