DATA ASSIMILATION STATUS CROATIA

Antonio Stanešić, Tomislav Kovačić, Kristian Horvath and Stjepan Ivatek-Šahdan

Introduction

- Computer & domain & assimilation setup
- New from last WD
- Future plans

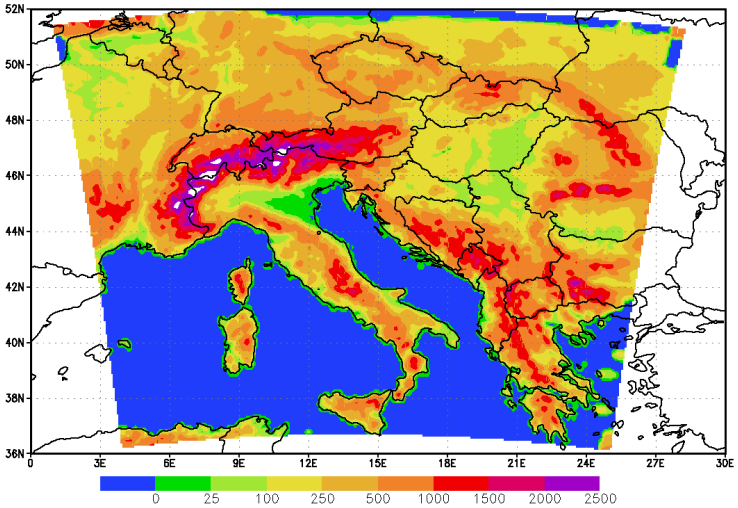
Computer

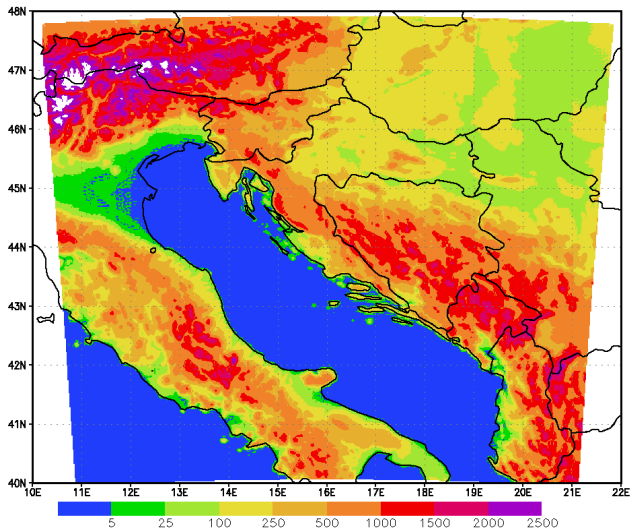
STORAGE

COMPUTER

- SGI Altix LSB-3700 BX2 Server with 56 Intel Itanium2 1.6GHz/6MB (year 2006)
- 112 GB standard system memory
- 2x146 GB/10Krpm SCSI disk drive, 3 Tb scratch disk
- Storage: 32Tb online data + tapes
- OS SUSE Linux Enterprise Server 9 for IPF with SGI Package
- Compilers: Intel Fortran version 9.0.031 & C++ version 9.1.053
- Queuing system (PBS Pro version PBSPro_11.1.0.111761)

Model setup





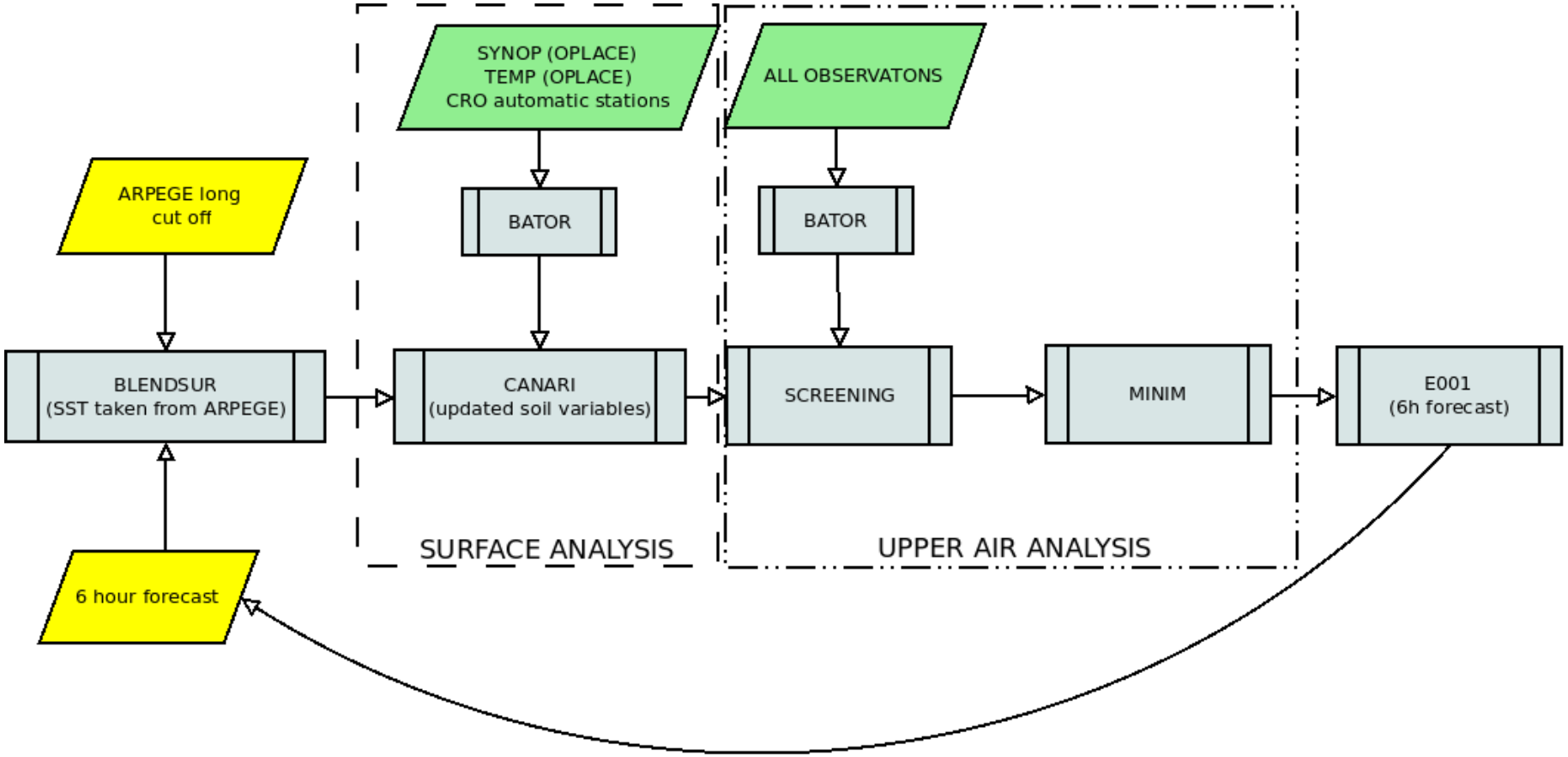
ALADIN HR domain

- 8 km horizontal resolution
- 37 levels, 229x205 (240x216) grid points
- 32T3: ALARO0-3MT, old radiation scheme, DFI
- 72 hours forecast, 1-3 hourly output

ALADIN HR22 domain

- 2 km horizontal resolution: 439x439 (450x450) grid points
- hourly 2 km dynamical adaptation up to 72 hrs @ 15 levels for 10 m wind forecast, model version AL29T2-mxl
- 24 hrs **2 km full NH** model run @ 37 levels, started from 00UTC 6h forecast, model version AL36T1, ALARO0 set-up (operational since July 2011.)

Assimilation cycle



- Cy35t1: CANARI, BATOR, screening, minimization
- Cy32t3: e001, e927
- Observations: OPLACE, Slovenian and Croatian automatic stations

Development from last WD

- Assimilation setup – **operational from November 2011**
  - Cycling: 4 times per day; LBC: long cut off ARPEGE files; before production last 3 cycles are re-run to have as much as possible data used
  - Production: twice per day at 00 and 12 UTC, 72h forecast; LBC: short cut off ARPEGE files
  - Observations used: SYNOP, TEMP, AIREP, GEOWIND, satellite radiances (NOAA, MSG)

  - B matrix: SNMC method, ~100 days, no tuning
  - B matrix - computed also with ensemble method for same period as SNMC and for seasons

B matrix

B matrix-calculation periods

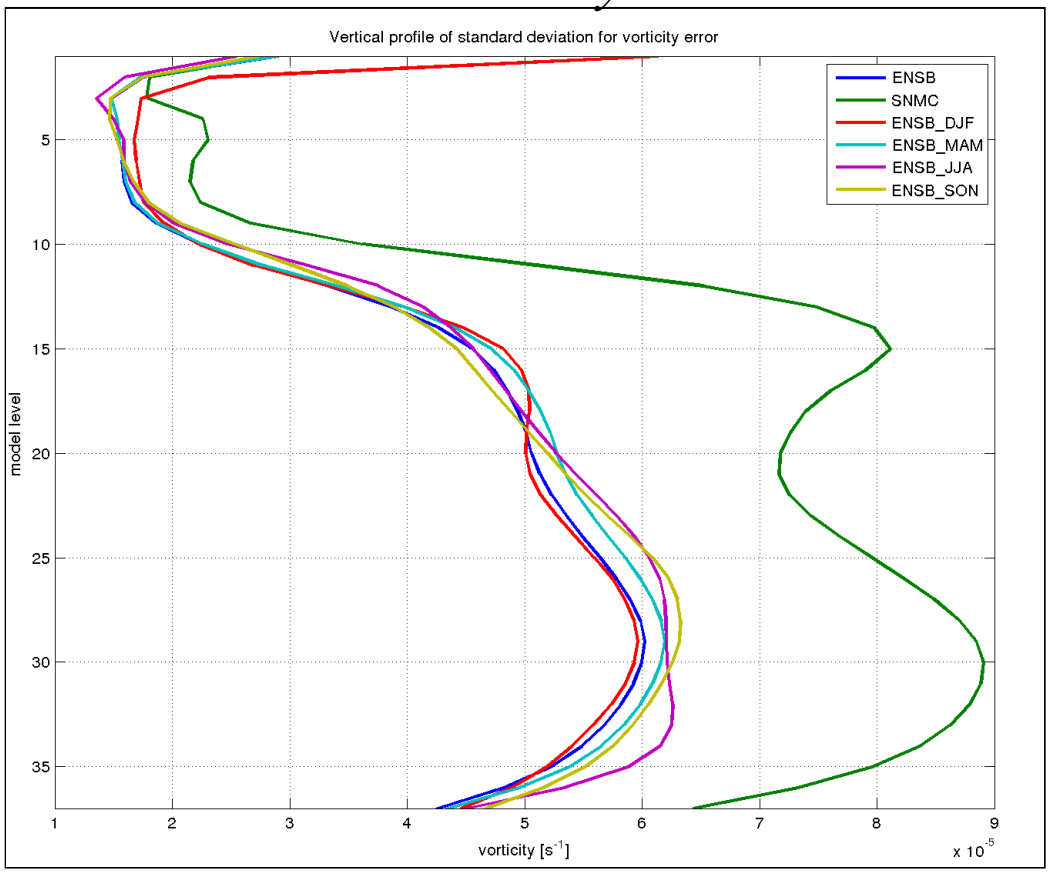
- ENSB (15 Feb – 25 May 2008)
- Seasonal ENSB (2008: MAM, JJA, SON, 2008/09: DJF)
- SNMC (15 Feb – 25 May 2008)

B matrix

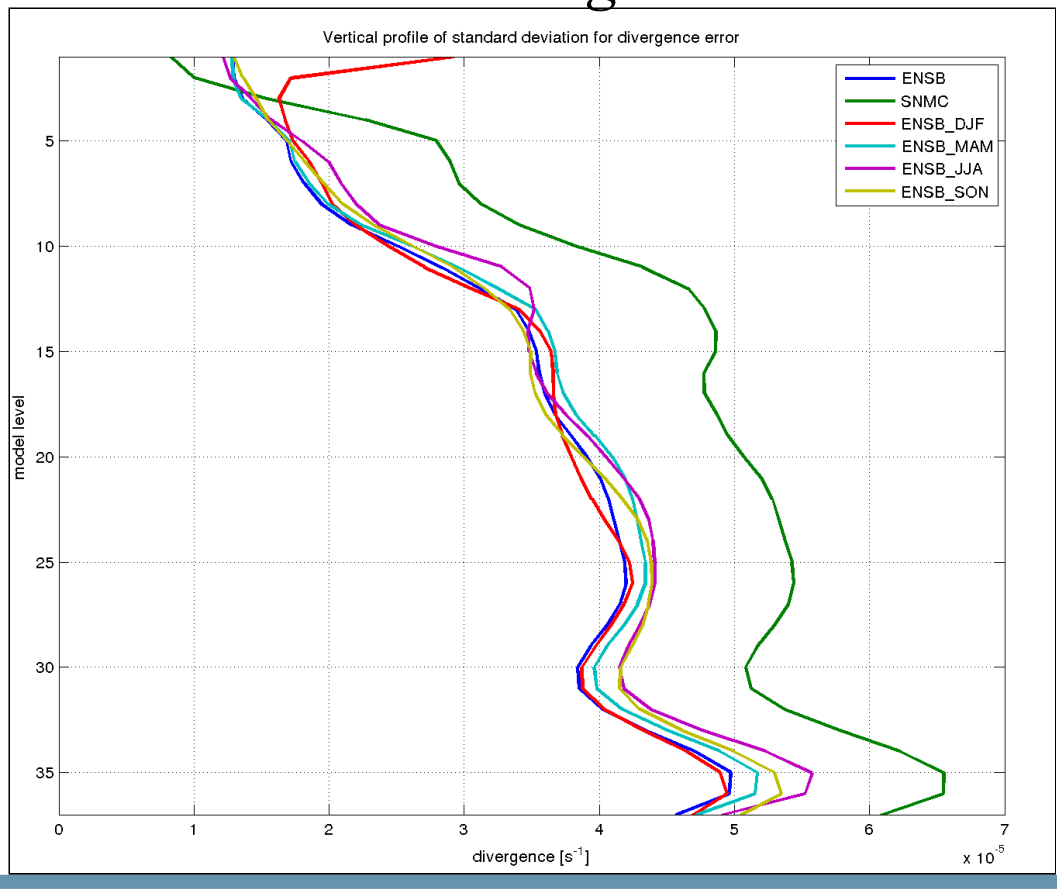
Standard deviations of vorticity and divergence errors

- Smaller magnitude for ENSB with similar shapes in the troposphere
- Small seasonal variability

vorticity



divergence

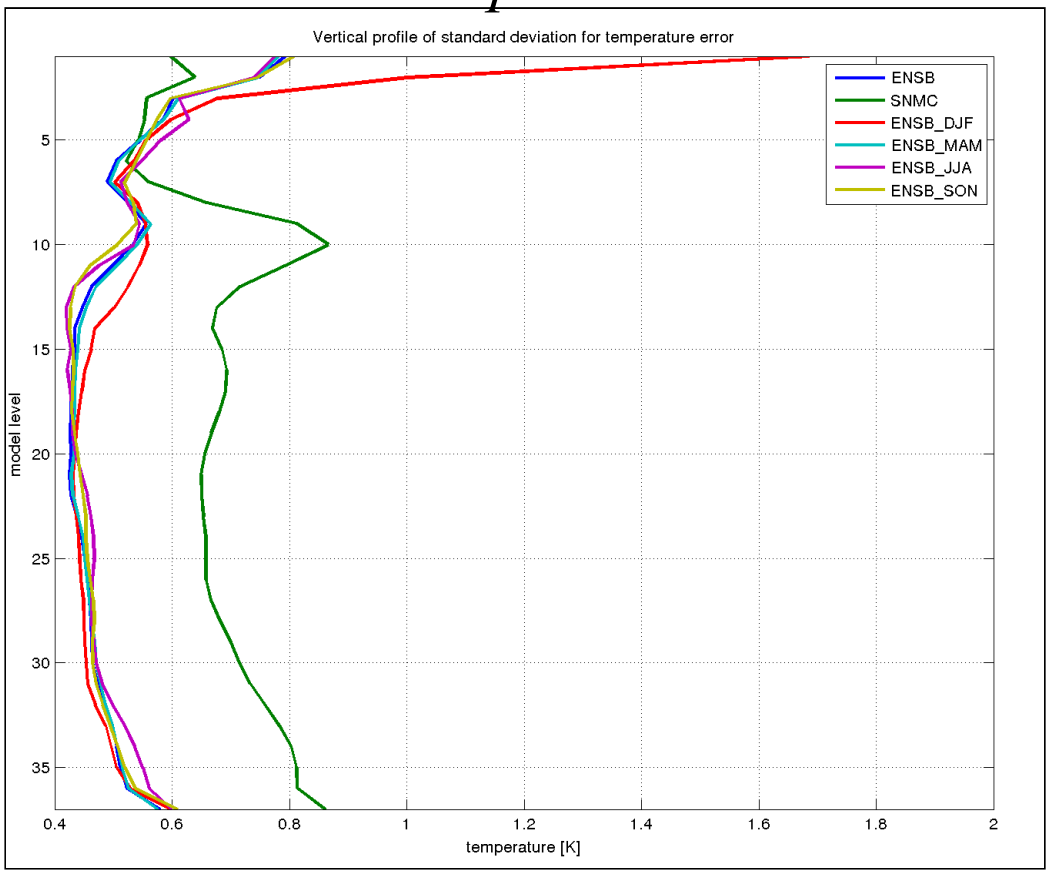


B matrix

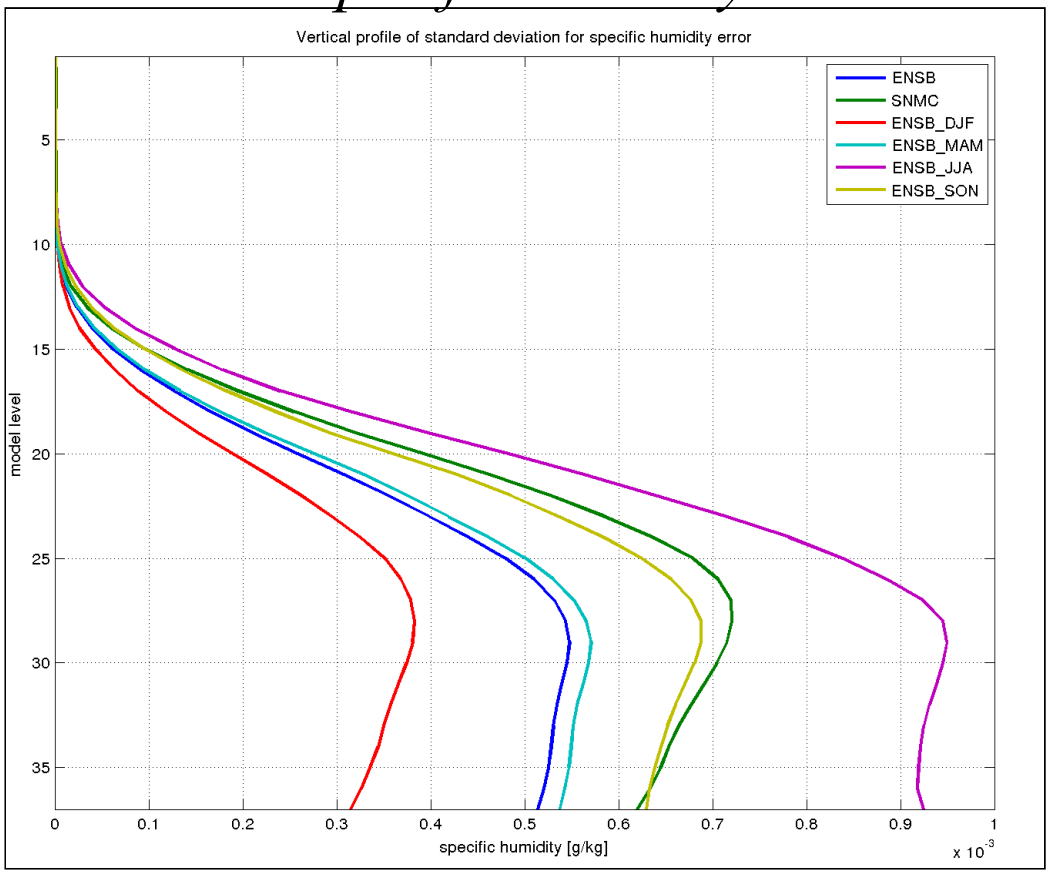
Standard deviations of temperature, ps and specific humidity

- Smaller standard deviations for ENSB
- Large seasonal variability for specific humidity

temperature



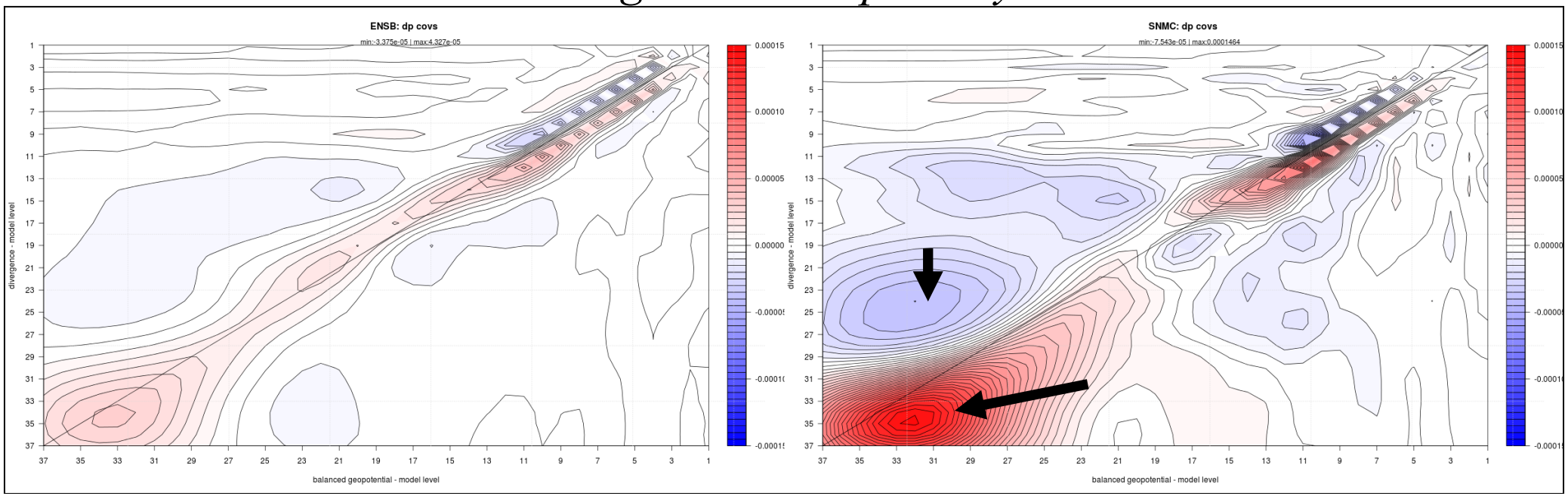
specific humidity



B matrix

Divergence – balanced geopotential

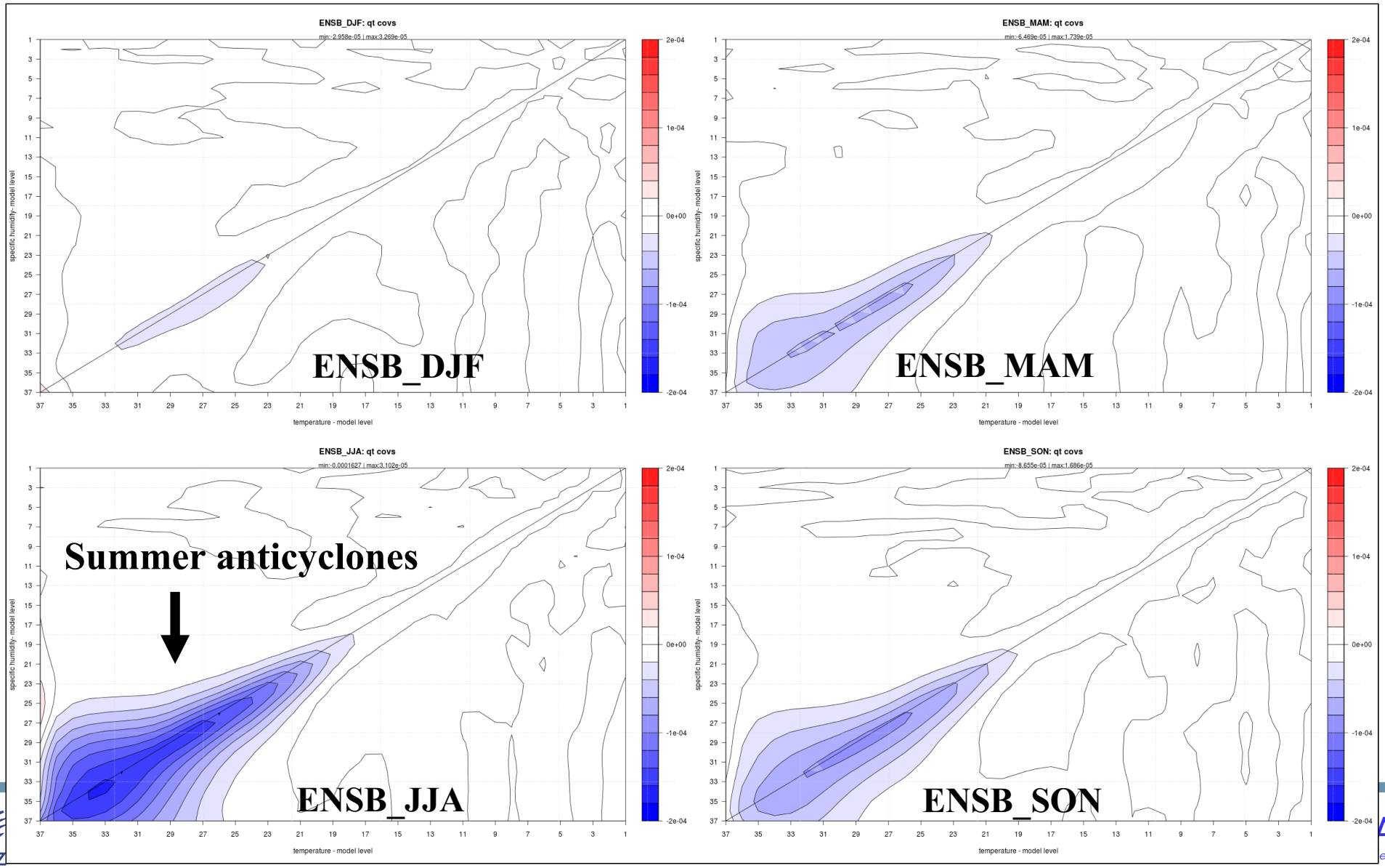
Upper-level divergence in deep cyclones,
convergence in deep anticyclones



ENSB **SNMC**

B matrix

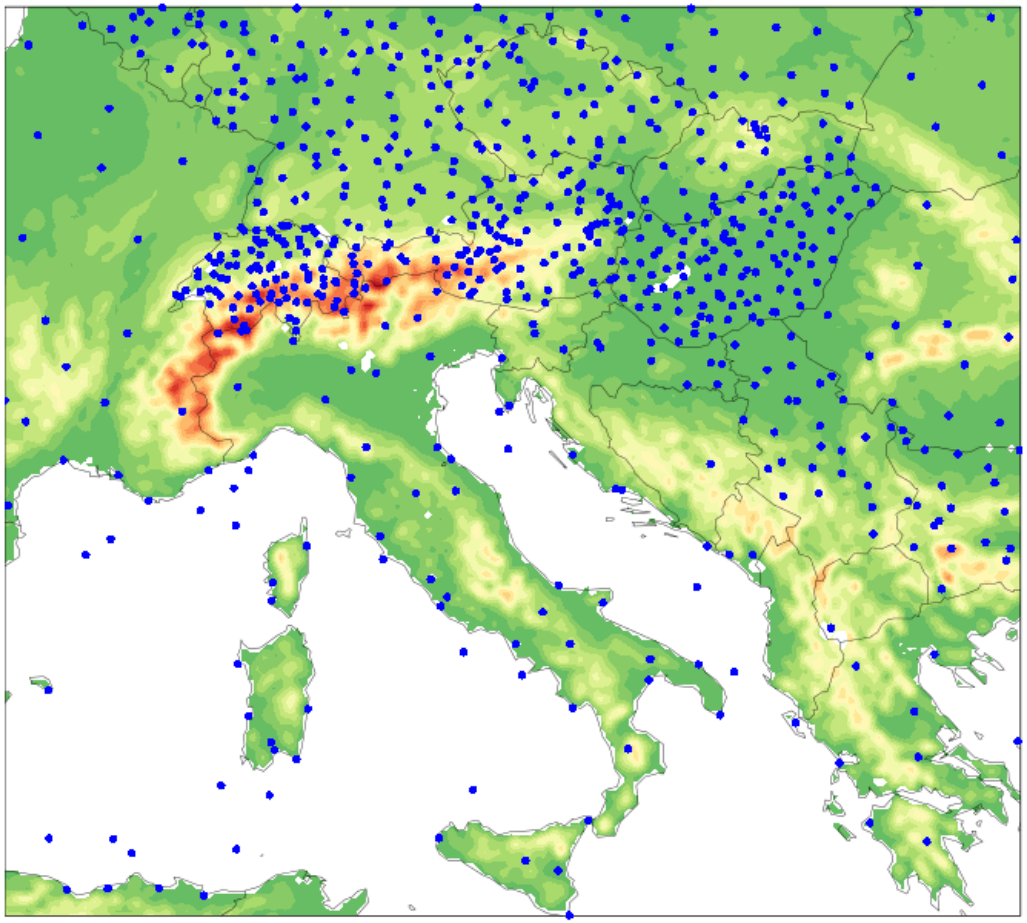
Spec. humidity – balanced geo.



B matrix

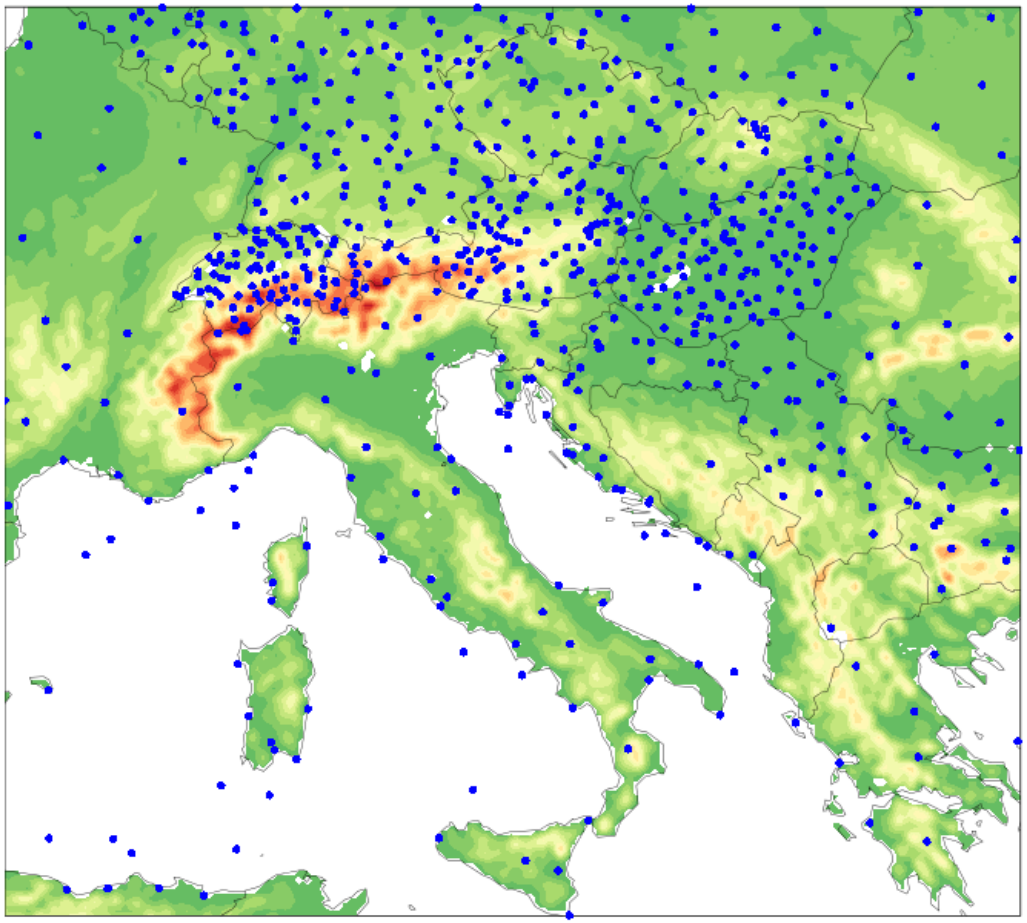
- Ensemble B-matrix generally shows smaller standard deviations and covariances than standard NMC.
- Considerate seasonal dependence exists with respect to humidity-related standard deviations and balances.
- 3D-Var data assimilation could be improved by using seasonal B-matrices – further tests needed

More surface stations



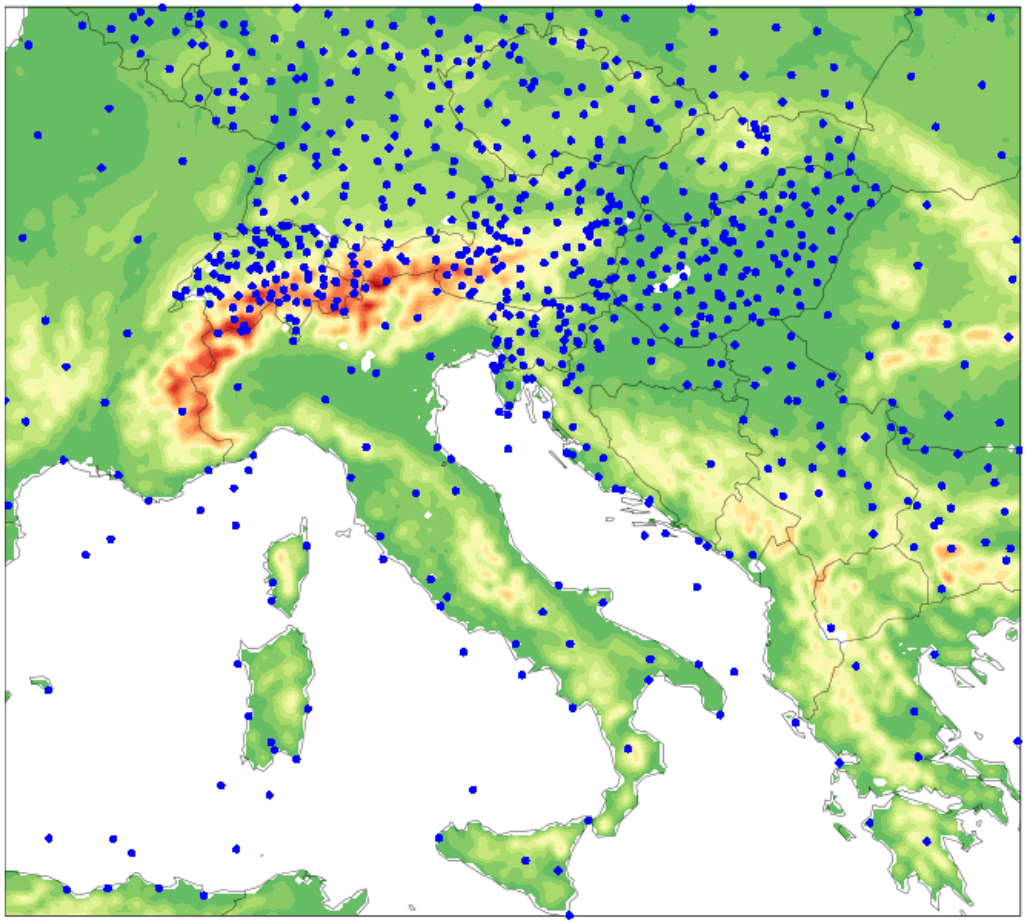
- LACE

More surface stations



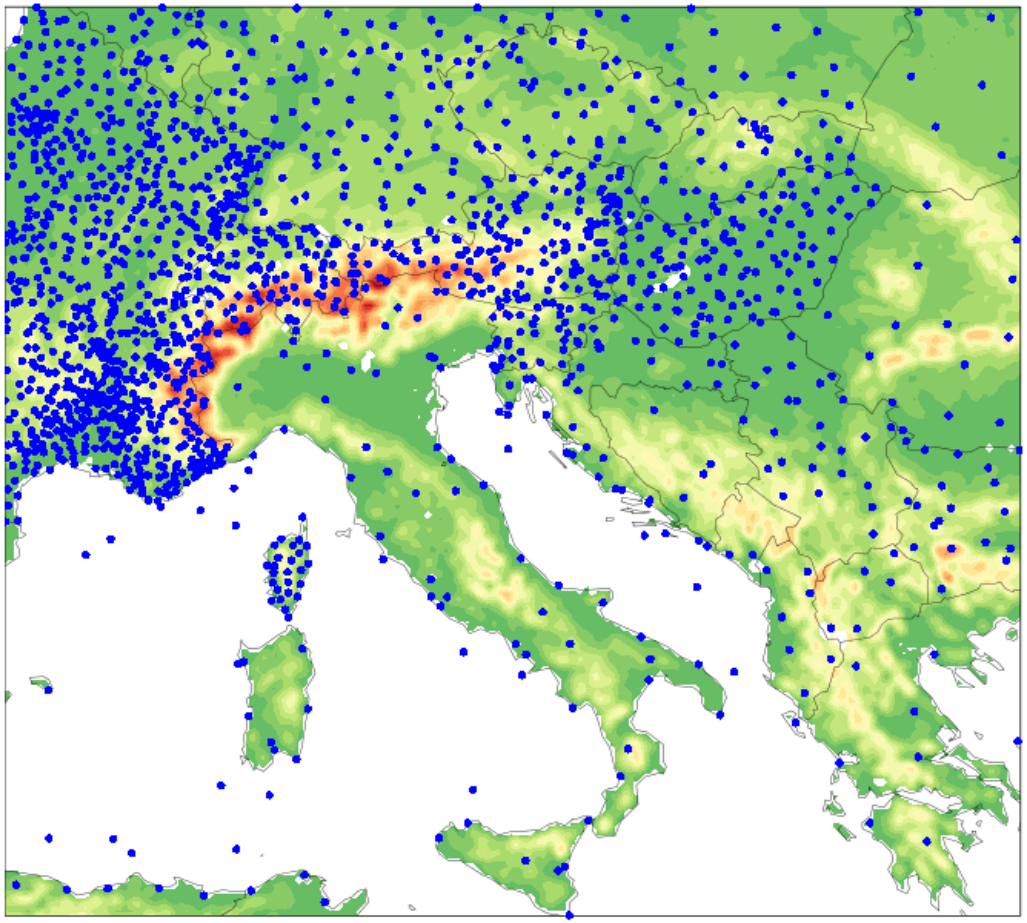
- LACE
- CRO ATM

More surface stations



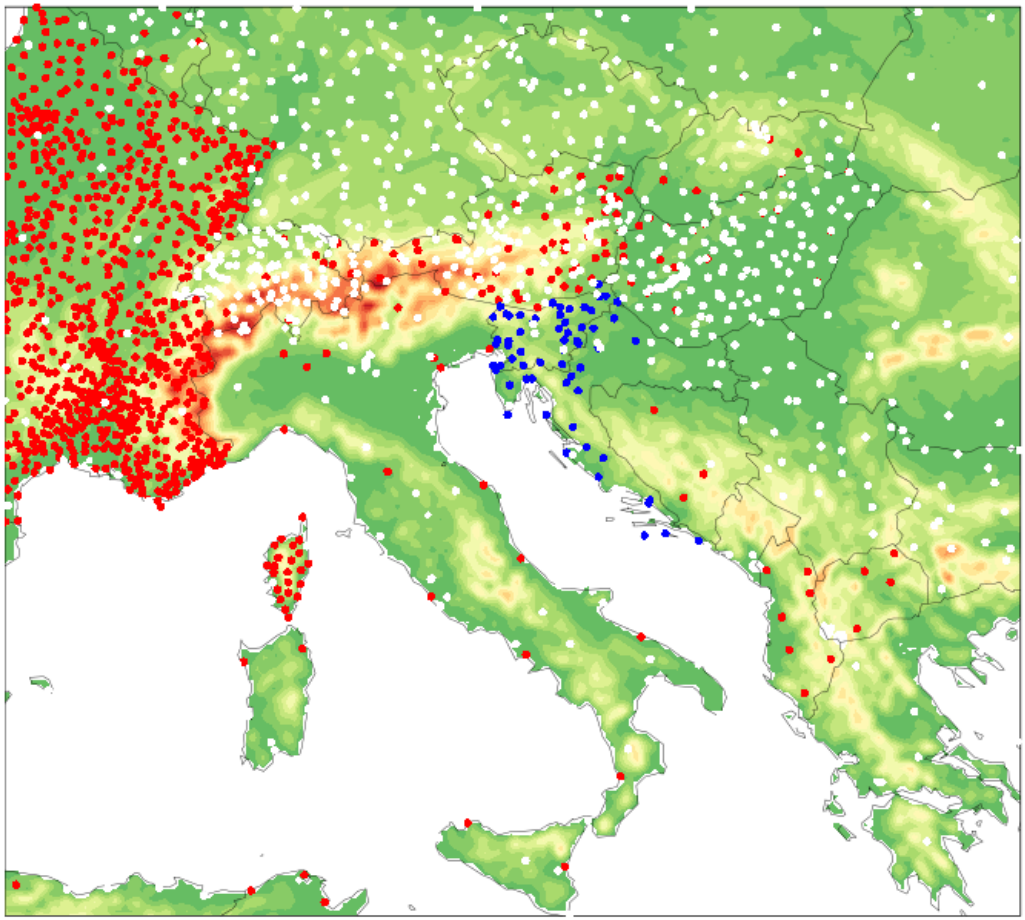
- LACE
- CRO ATM
- SLO ATM

More surface stations



- LACE
- CRO ATM
- SLO ATM
- FR

More surface stations



- LACE
- CRO ATM
- SLO ATM
- FR

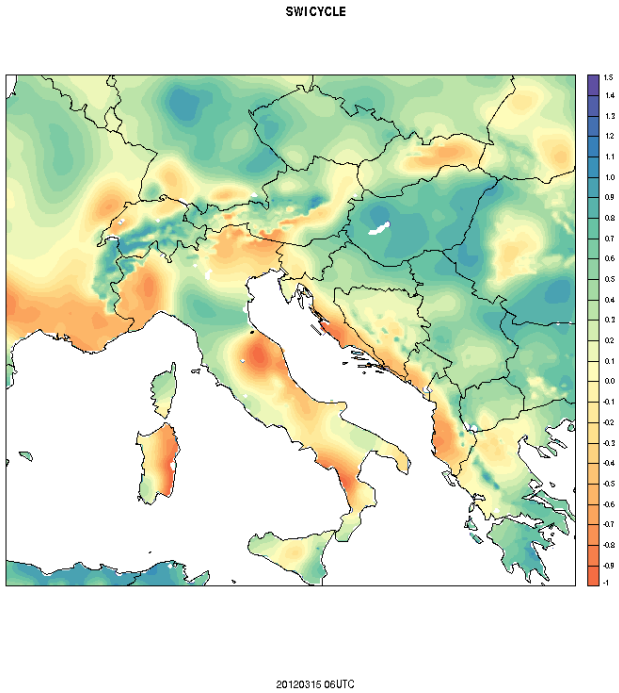
More surface stations

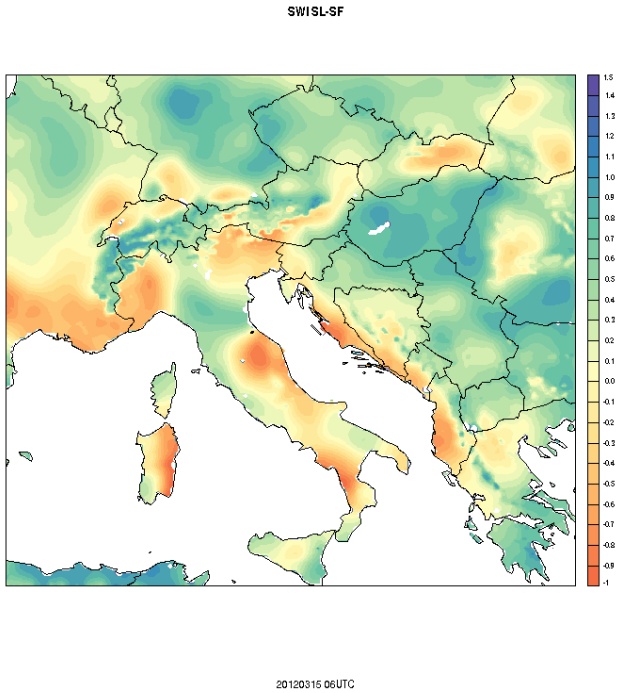
- CYCLE – operational assimilation setup
- SL – new settings for CANARI and added Slovenian automatic station
- SF – new settings for CANARI and added Slovenian automatic stations and Observations from Meteo France (RADOME)
- Warm-up period: 15-31 March 2012.
- Verification period: 01-30 April 2012.

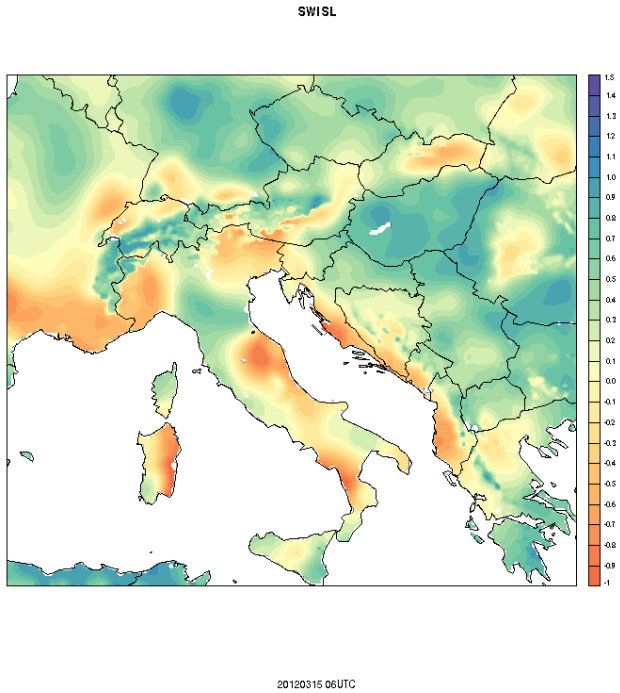
More surface stations

SWI at 20120315 06UTC

CYCLE	SF	SL



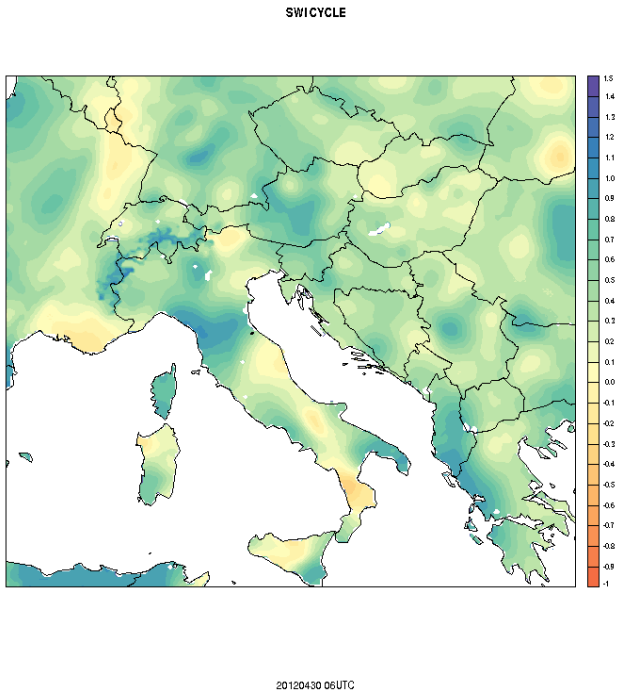


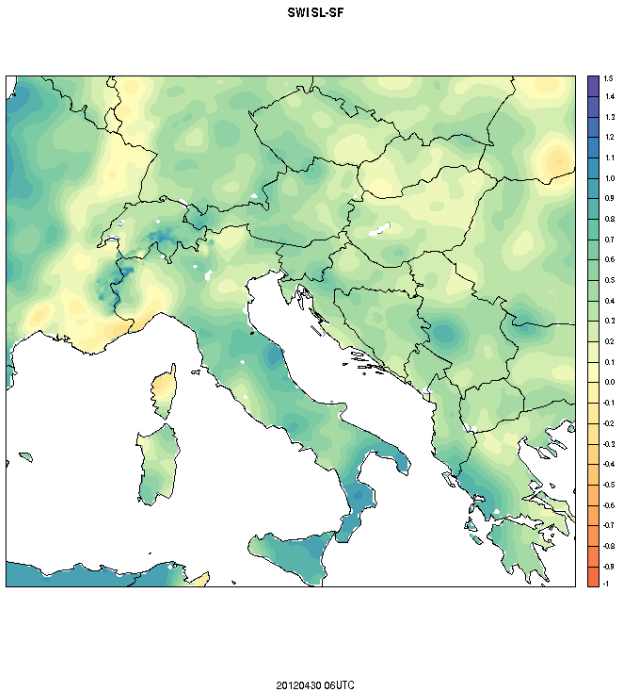


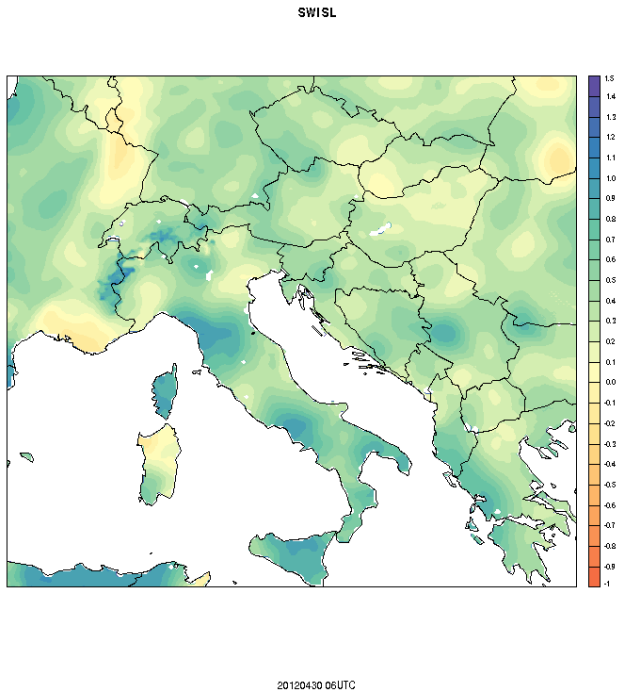
More surface stations

SWI at 20120430 06UTC

CYCLE	SF	SL

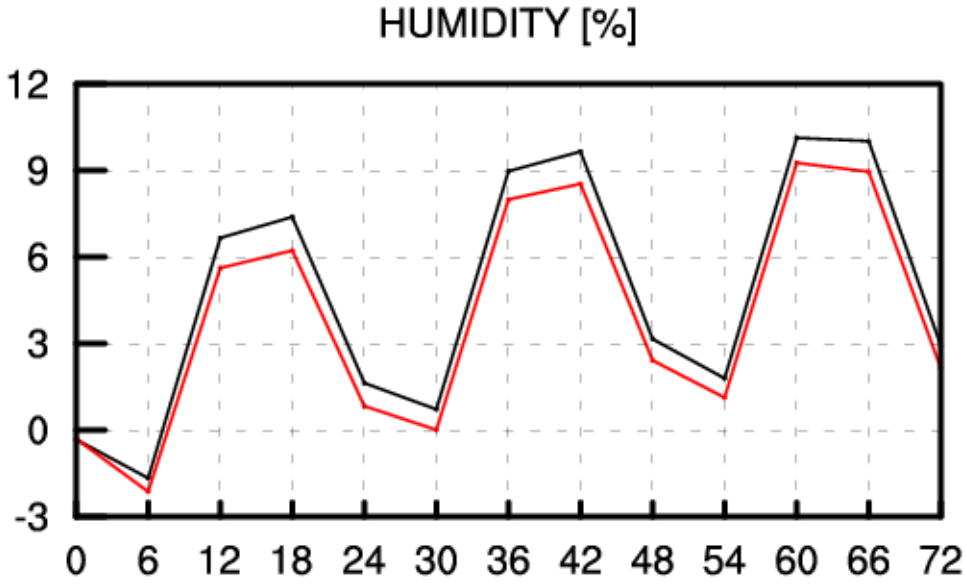


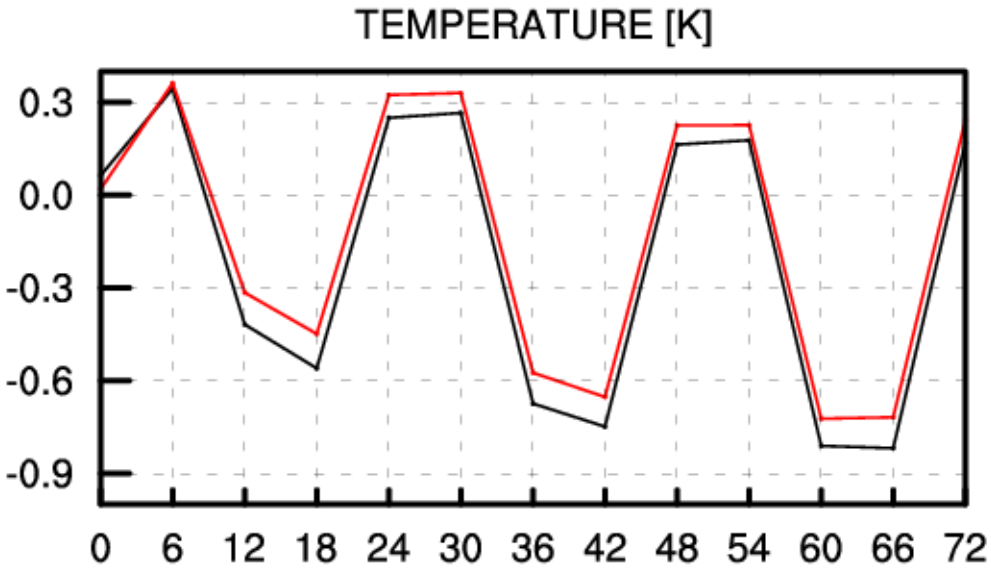




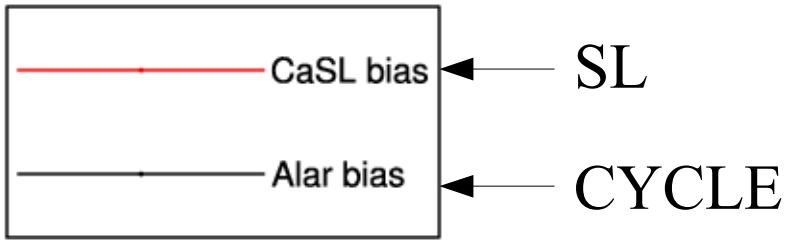
More surface stations

BIAS



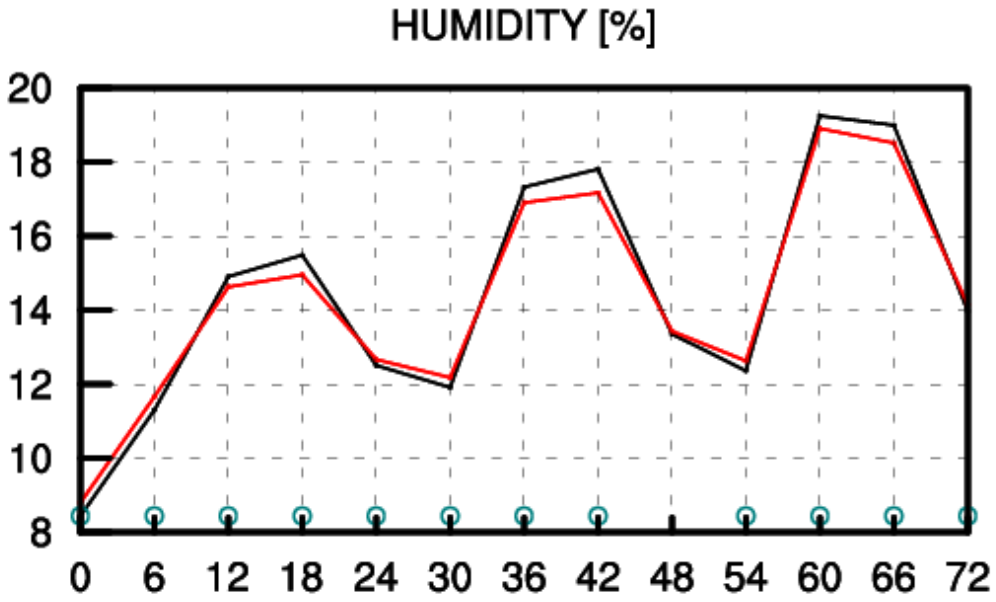


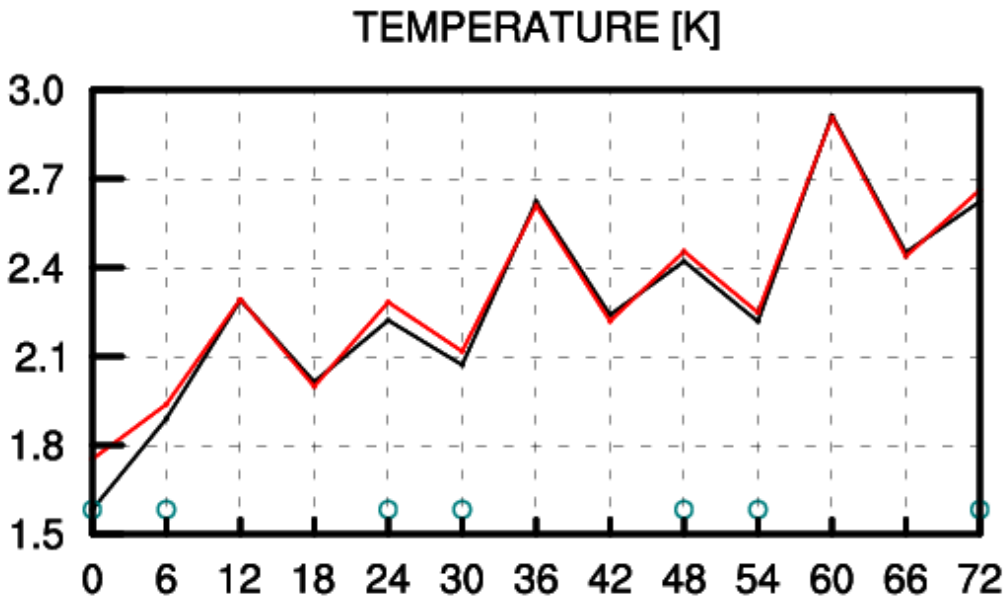
Period: 20120401...20120430
Network: 0UTC
SURFACE



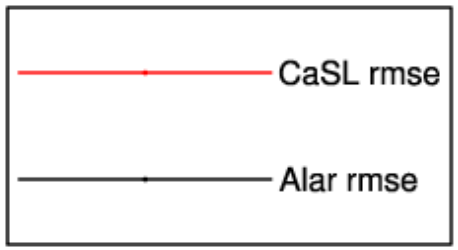
More surface stations

RMSE





Period: 20120401...20120430
Network: 0UTC
SURFACE

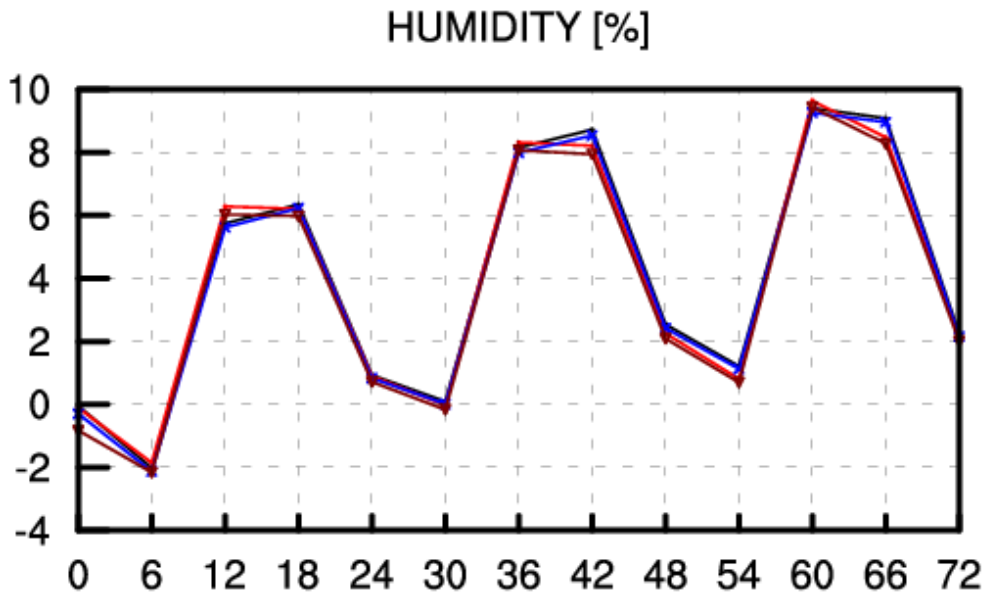


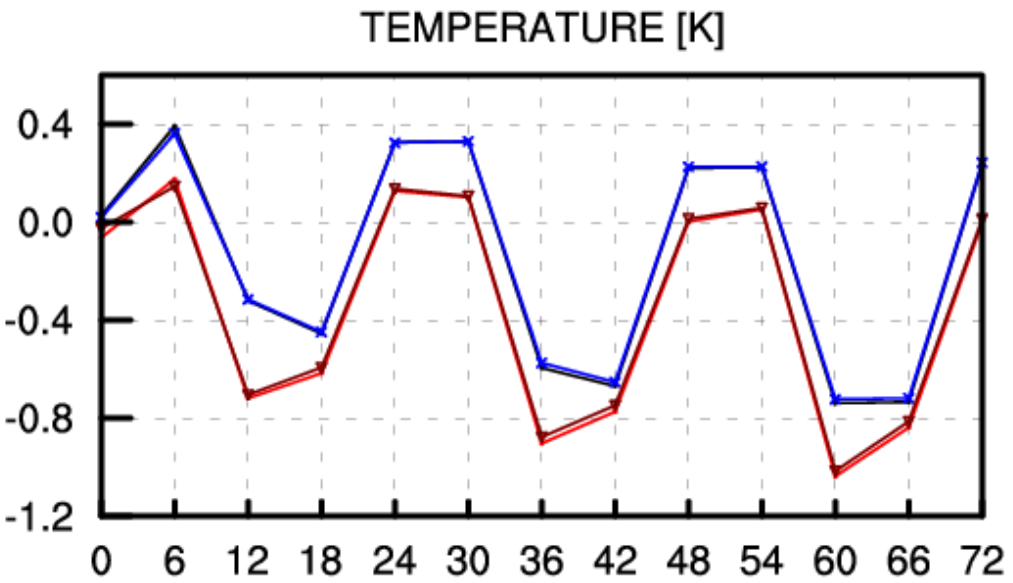
← SL

← CYCLE

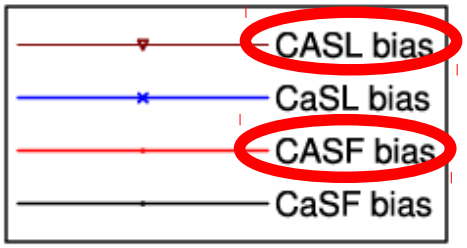
More surface stations

BIAS





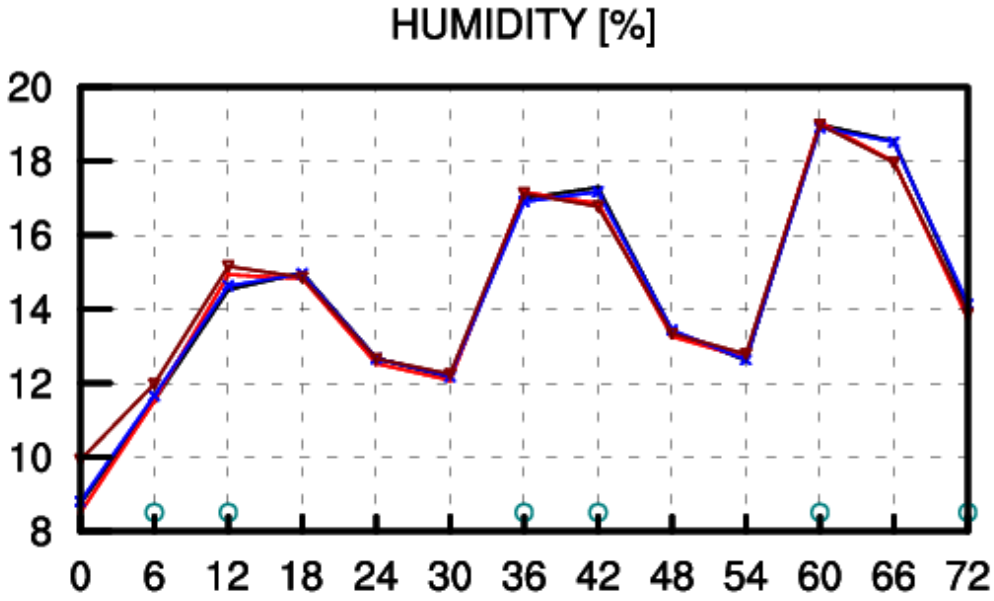
Period: 20120401...20120430
Network: 0UTC
SURFACE

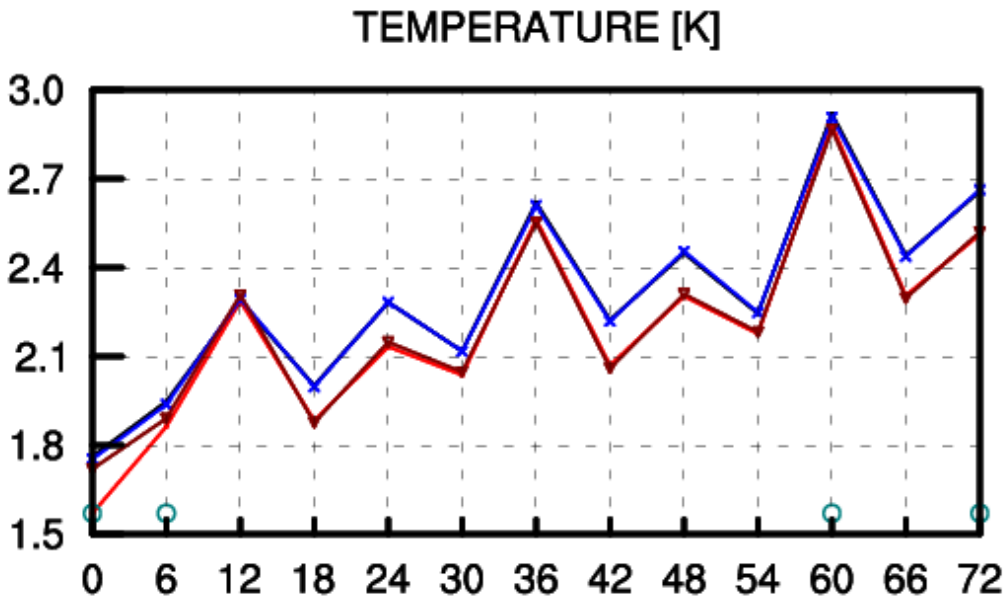


OPLACE+additional obs

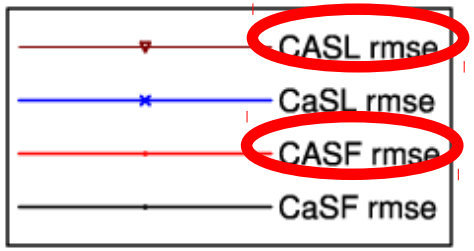
More surface stations

RMSE





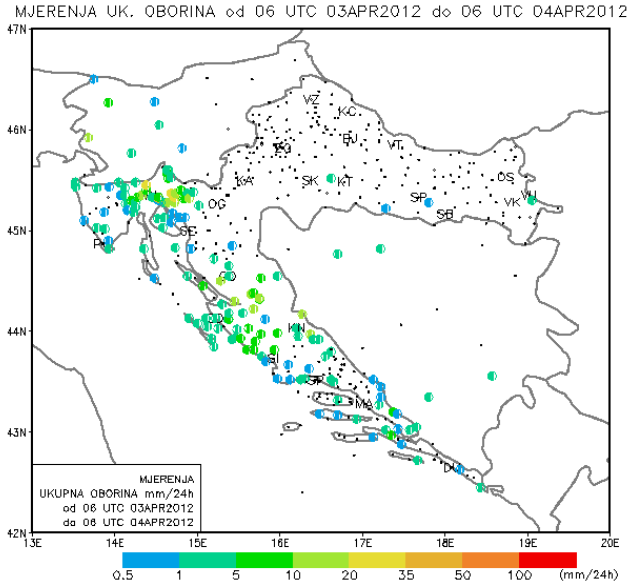
Period: 20120401...20120430
Network: 0UTC
SURFACE

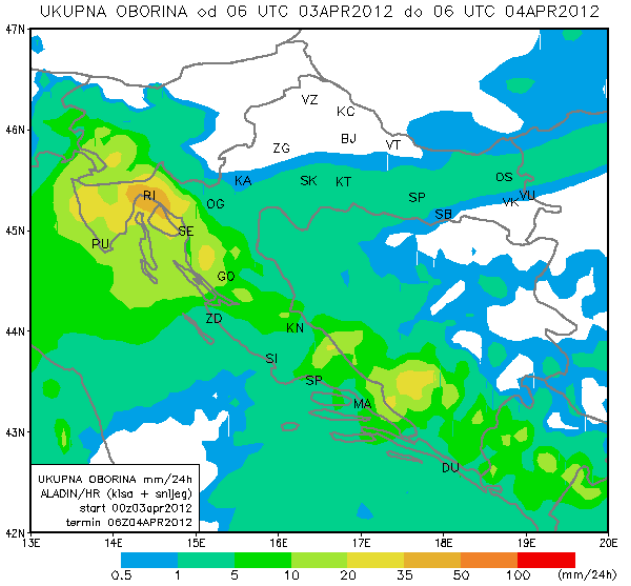


OPLACE+additional obs

More surface stations

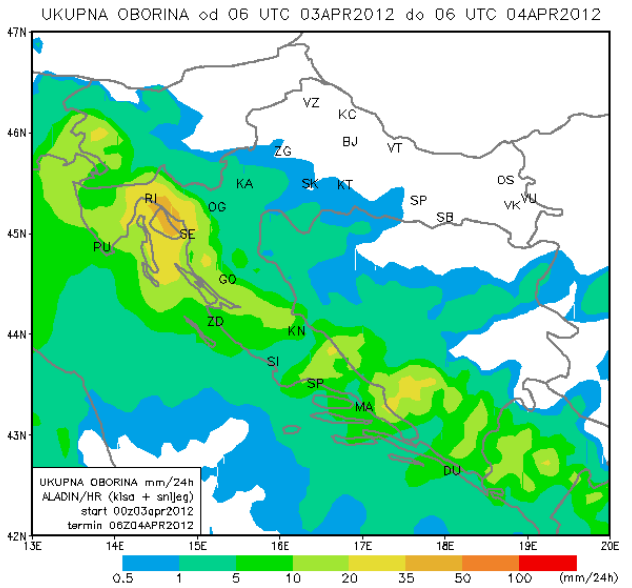
Rain gauge

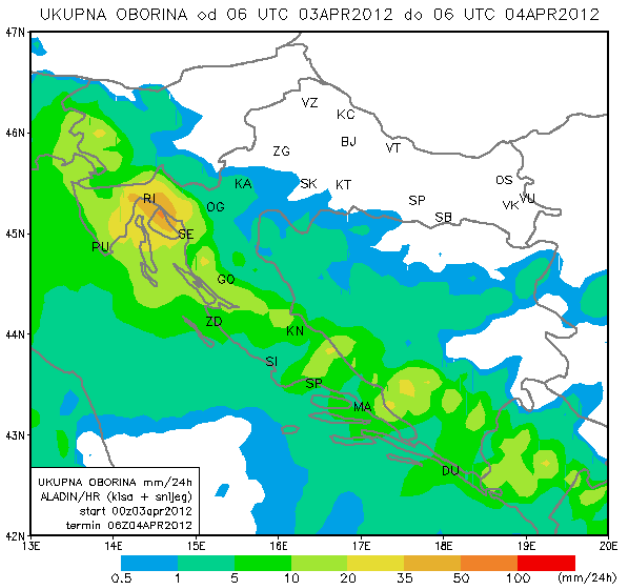




CYCLE

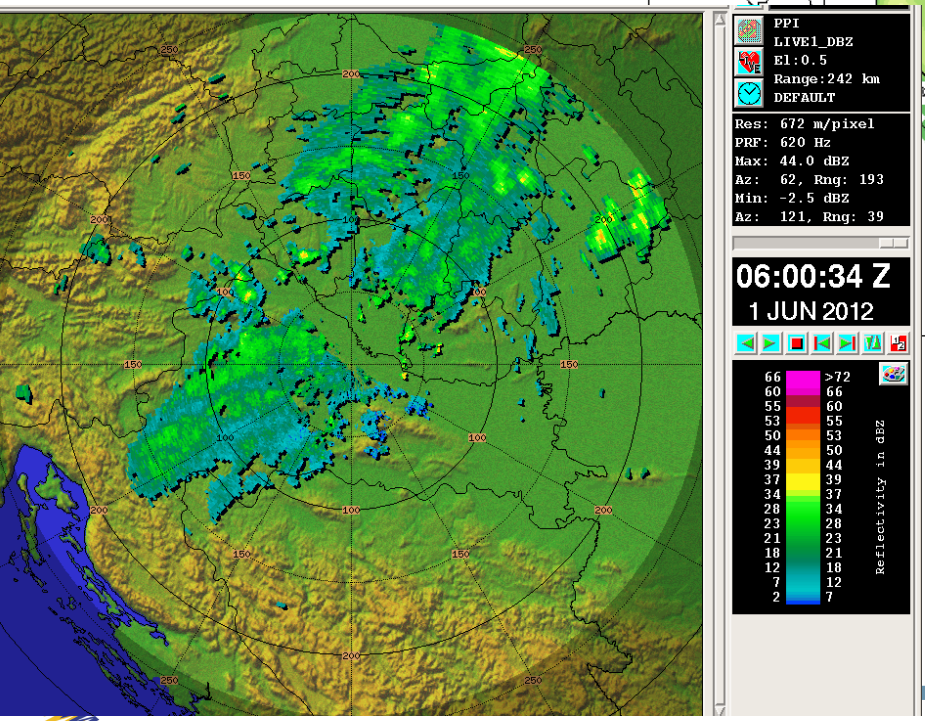
SL

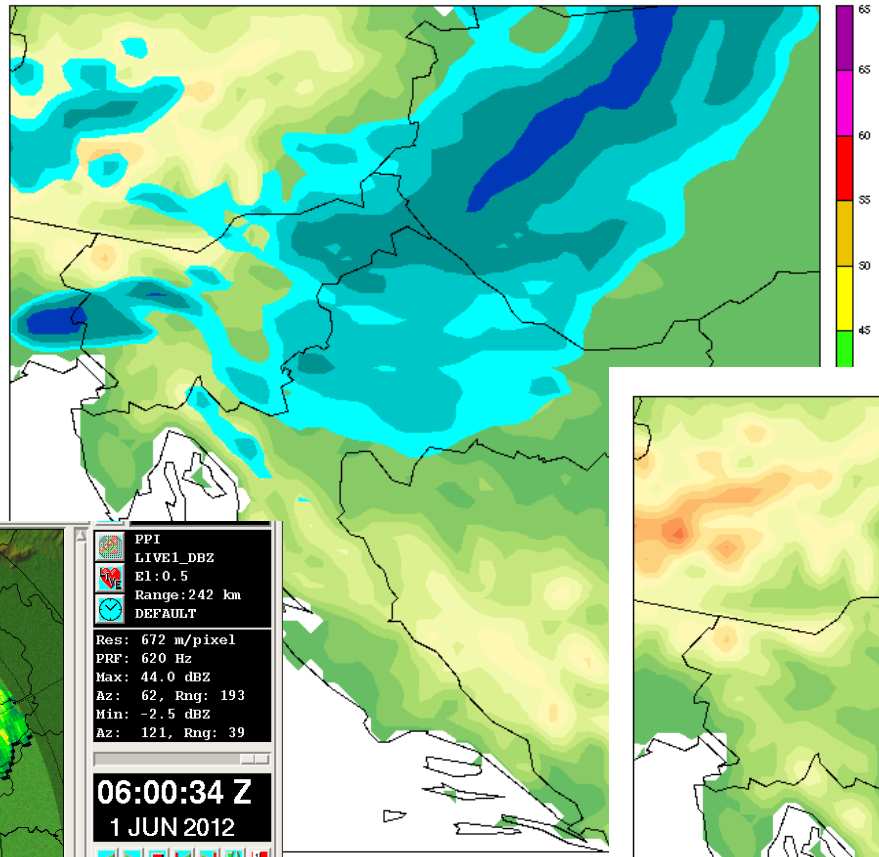


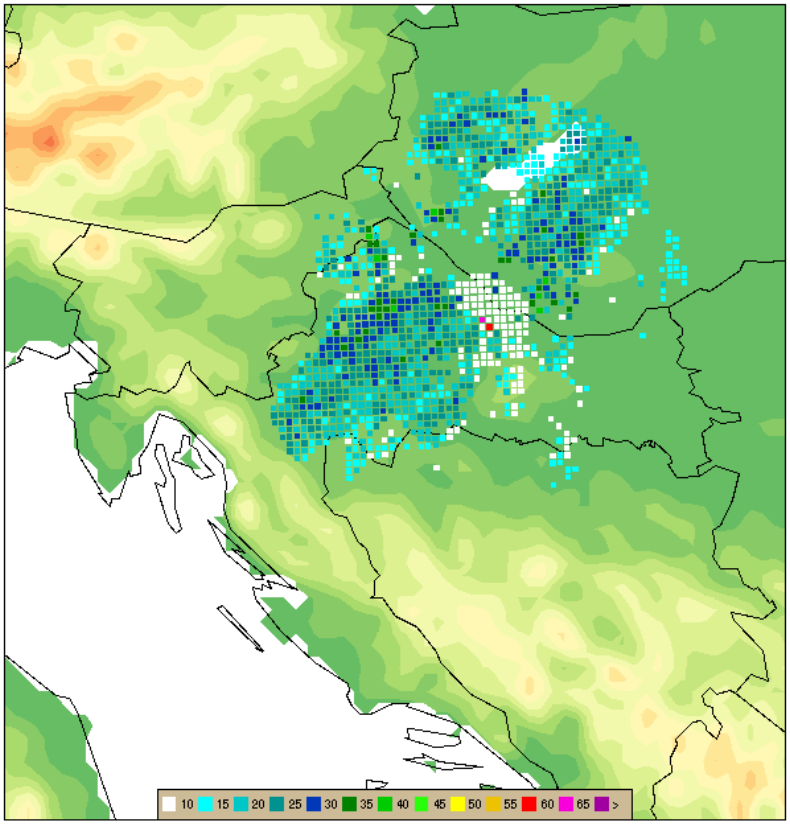


SF

Radar data assimilation







Future Plans

- Test coupling to IFS
- Go to cy38
- Test ensemble B matrix (seasonal)
- Tuning of B matrix
- Radar data assimilation
- Test surfex
- Assimilation at 2km