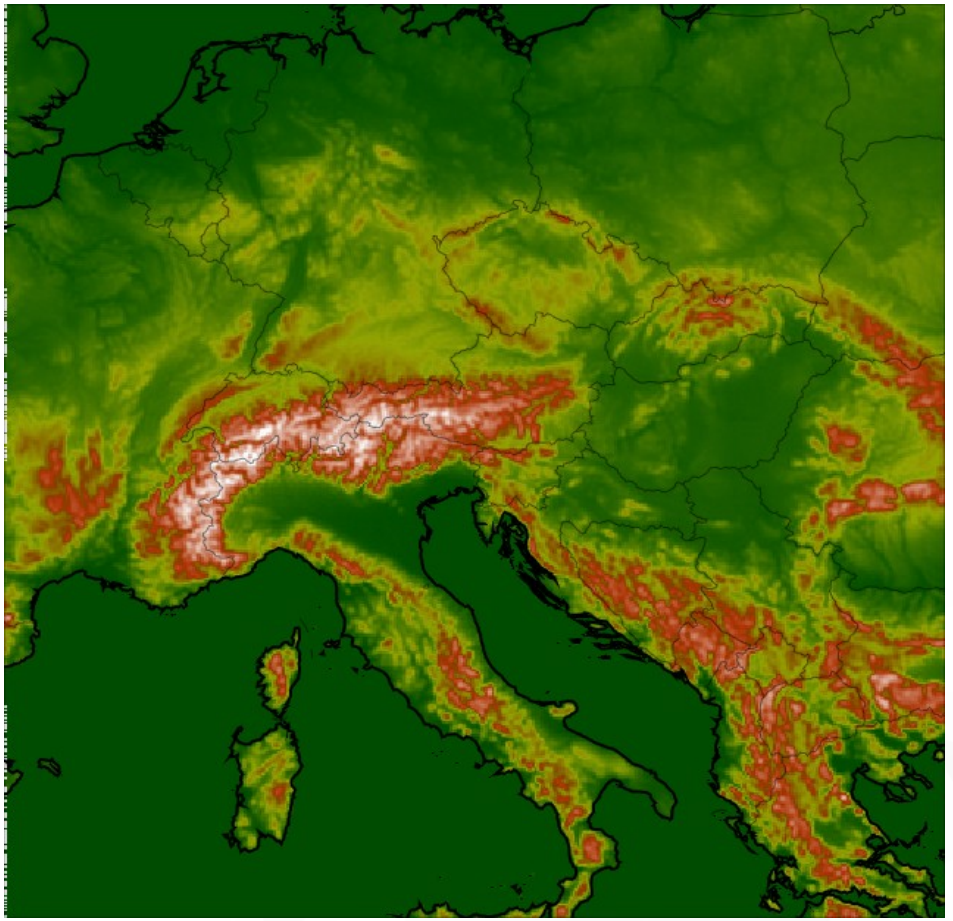
# Data assimilation in Slovenia 2016

# Contents

- Operational status
- New B-matrix
- Assimilation of local GPS stations
- Sea-atmosphere coupling (tests with assim. cycle)

# Operational status

- ALARO-0 cy38t1
- 4.4 km, 87 levels
- 3h CANARI + 3D-Var
- ECMWF LBC+SST, lagged in production (6h)
- 8 runs per day (72/36h)
- Observations: conventional, satellite, Mode-S MRAR

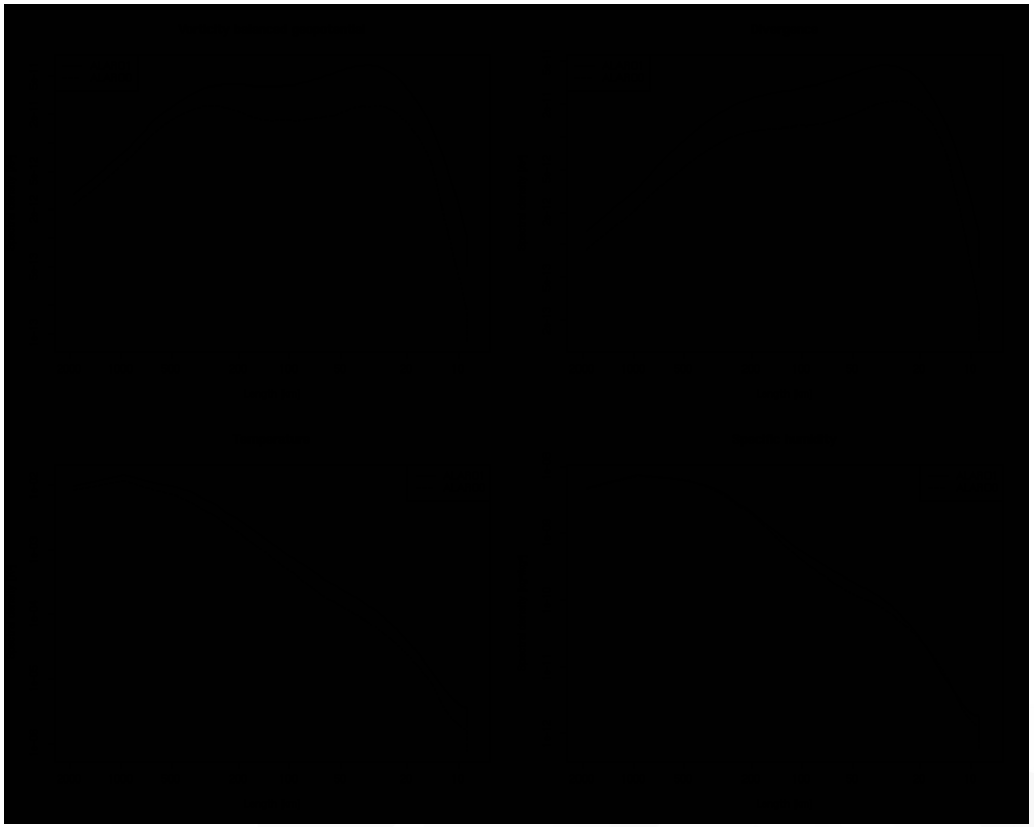


# New B-matrix computation


- Motivation: ALARO-1vA physics (Toucans, ACRANEB2)
- Period is March 2016 (712 samples)
- ECMWF EDA downscaled members (computed at ECMWF)

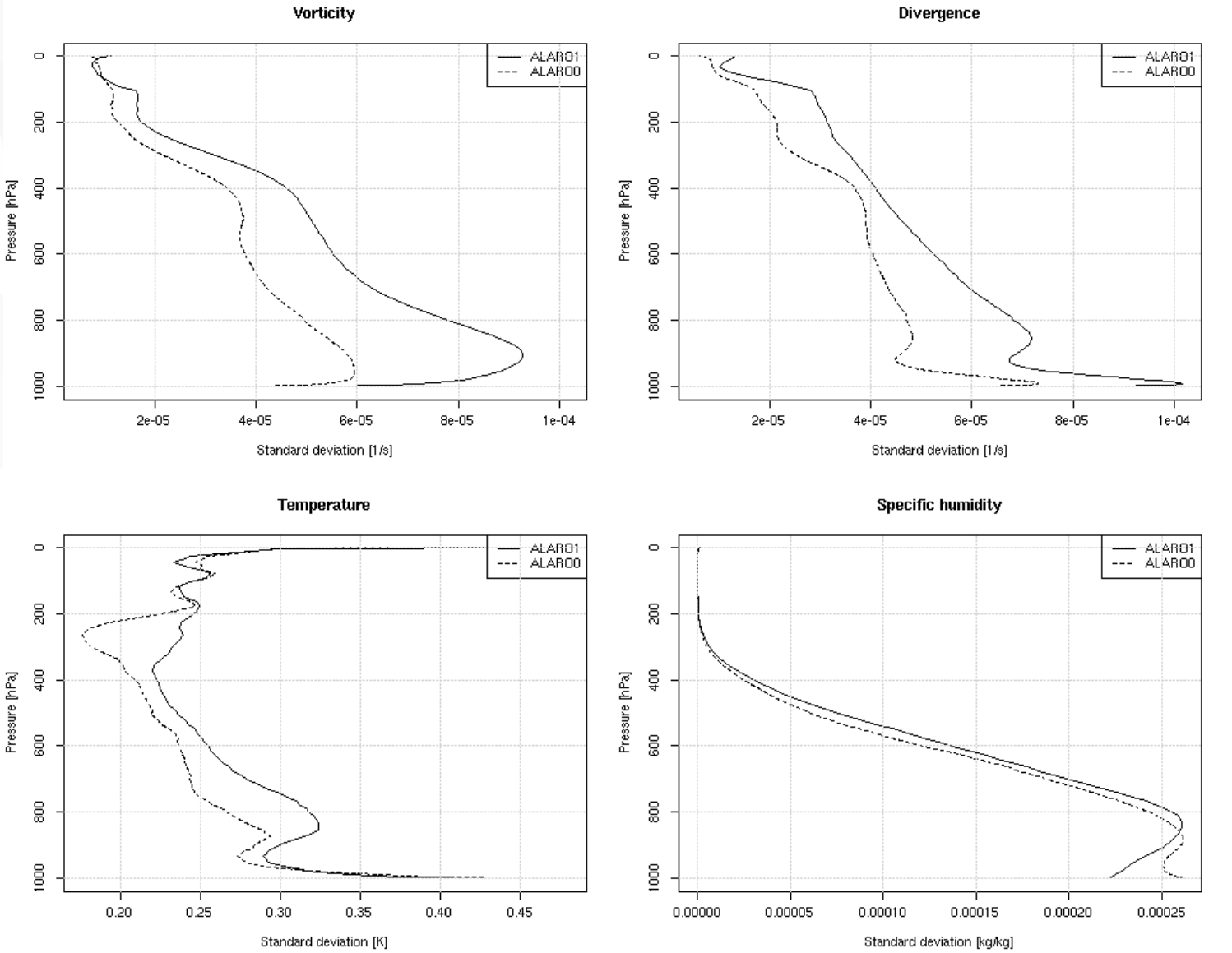
# Horizontal auto covariances

Level 87/87 (surface)

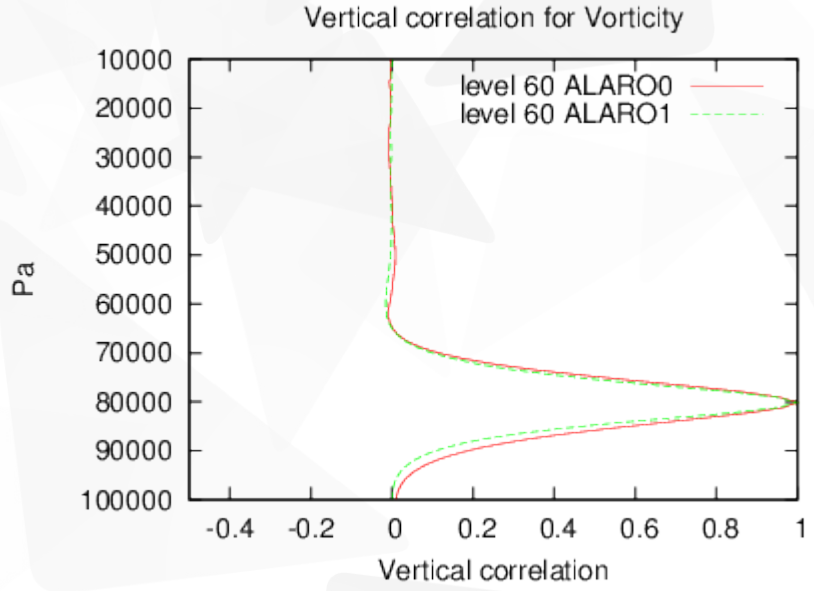


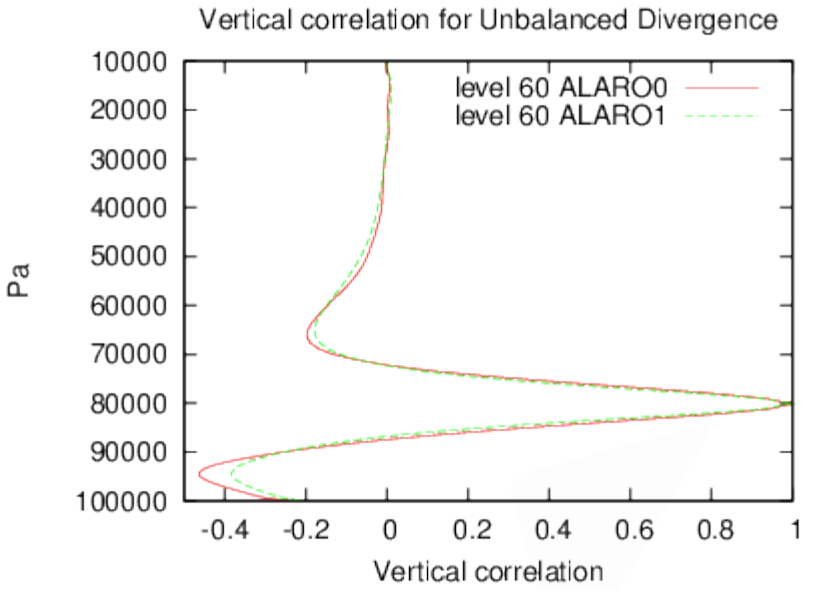
Level 60/87 (810 hPa)

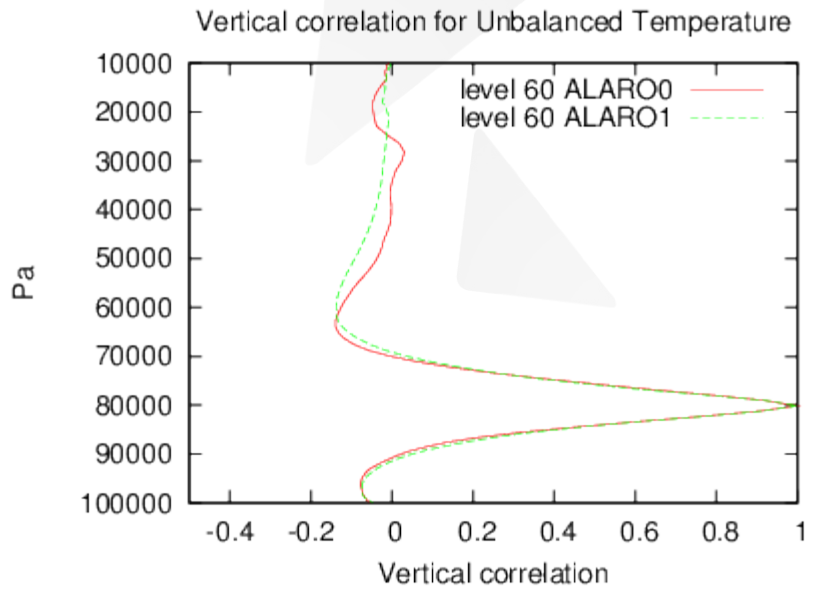
# Standard deviation profiles

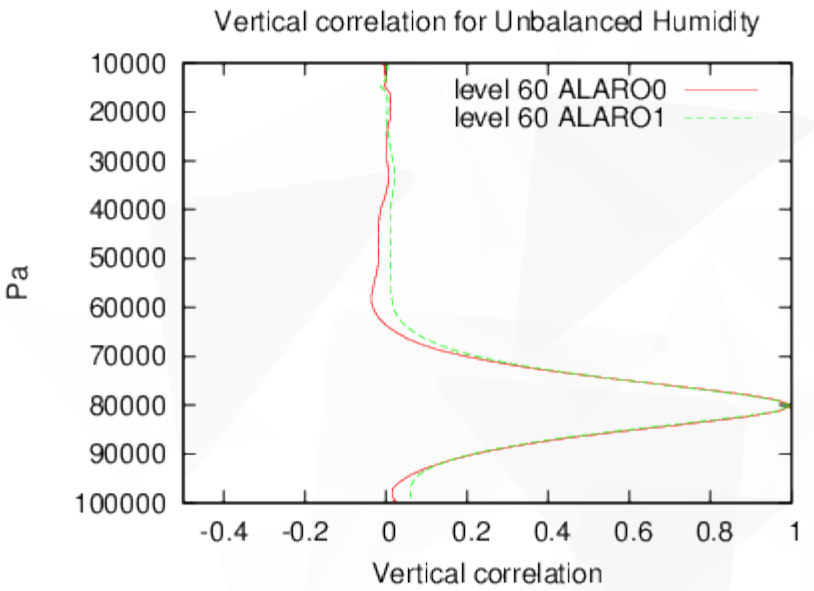


# Vertical auto covariances

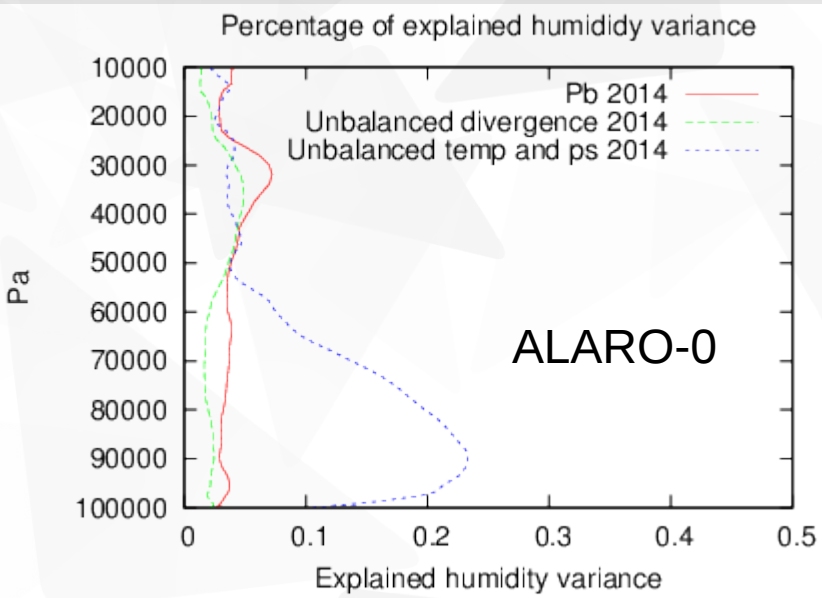


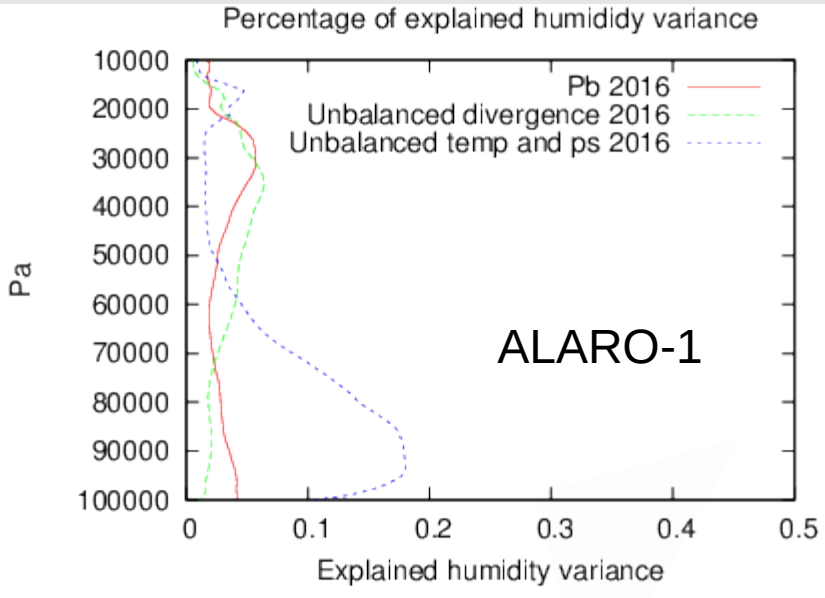



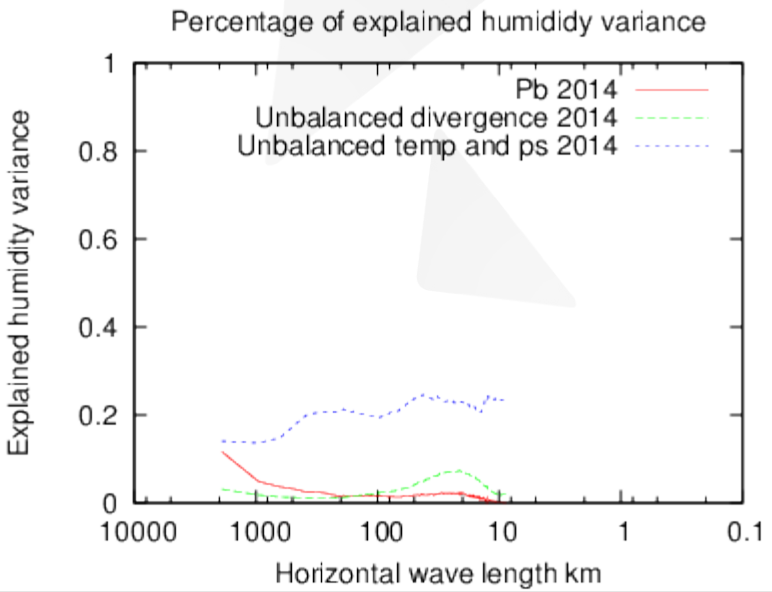



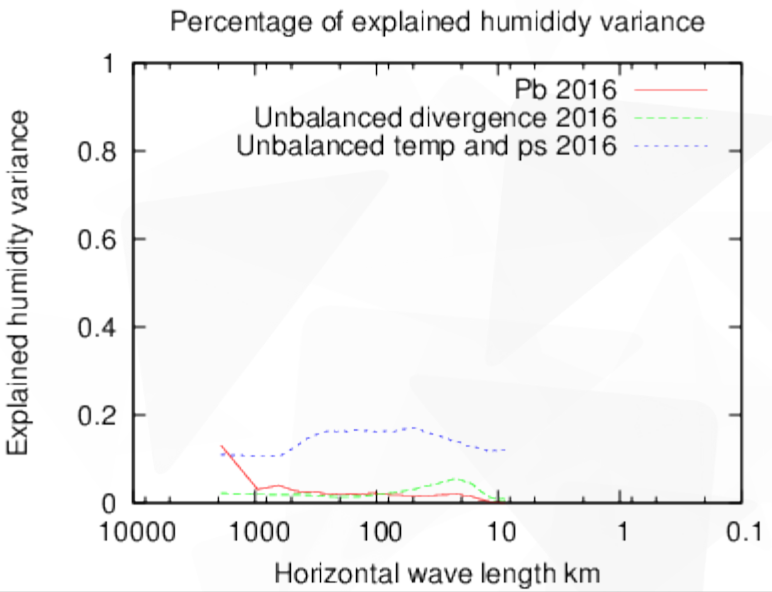



# Changes in multivariate humidity covs.



# Summary for B matrix

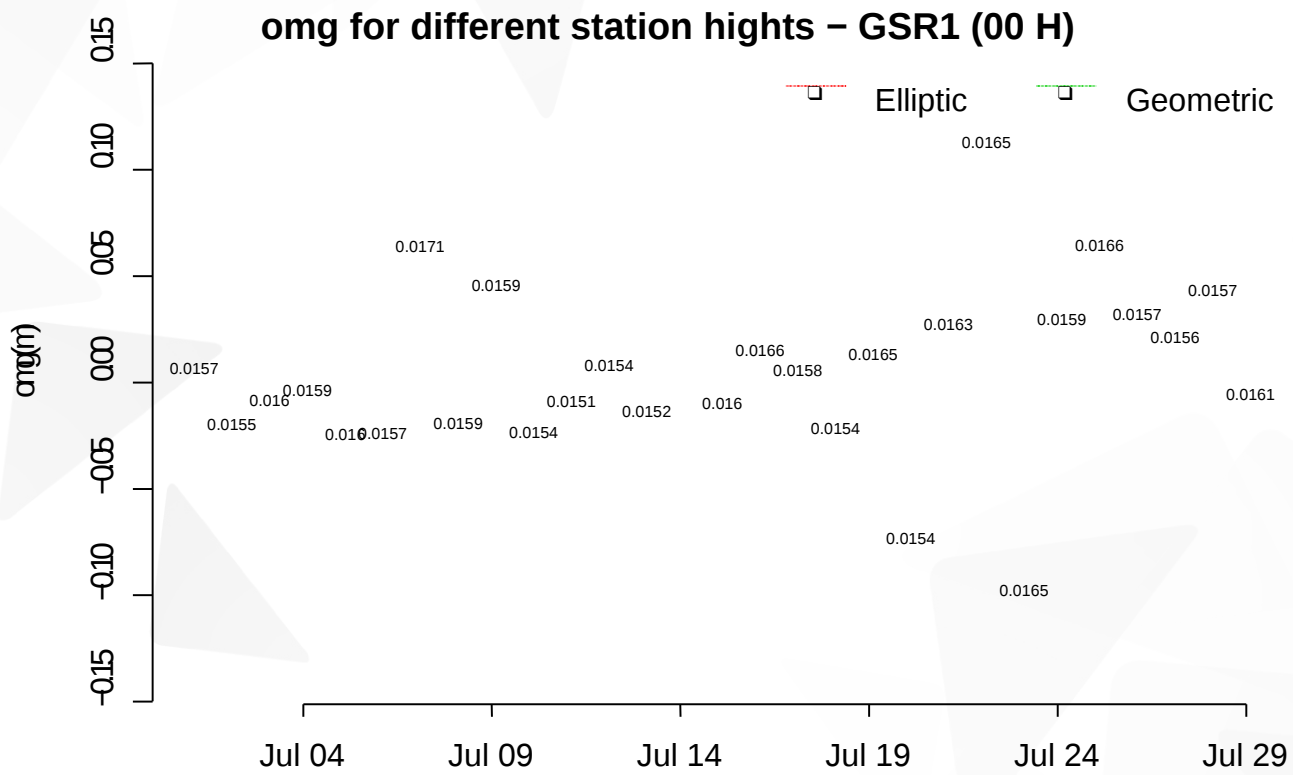
- Changes/differences in standard deviations
  - Wind forecast error increase
  - Temperature and humidity decreases in low-levels and increases elsewhere
- Somewhat sharper vertical correlations
- Less coupling between humidity and temperature in ALARO-1

# Assimilation of local GPS network

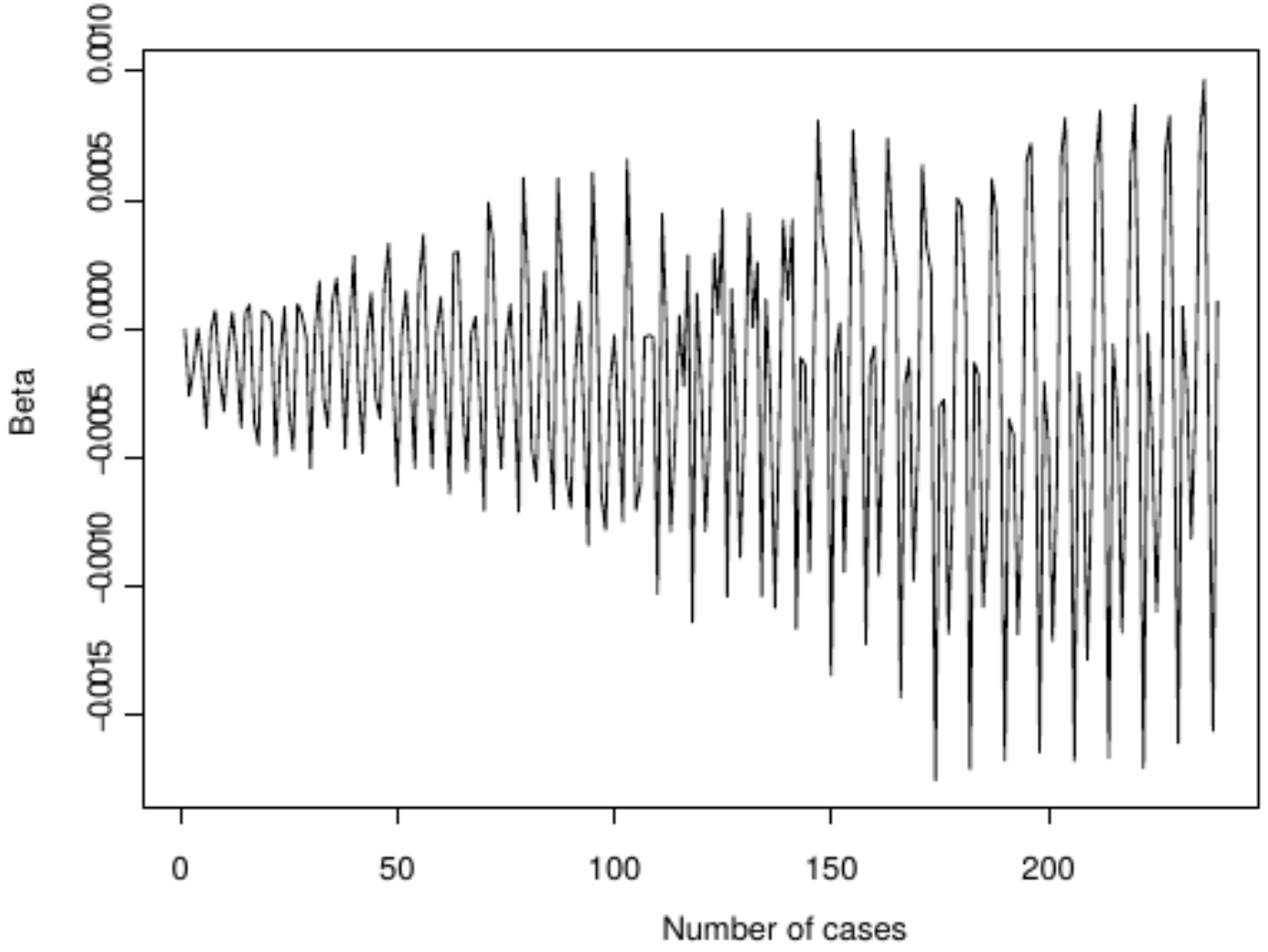
- Impact E-GVAP and SIGNAL networks were studied previously using white list approach and static and variational bias correction – positive impact detected
- This year the individual impact of SIGNAL stations were tested
  - VarBC method
  - No satellites

# Elliptic vs. geometric height issue

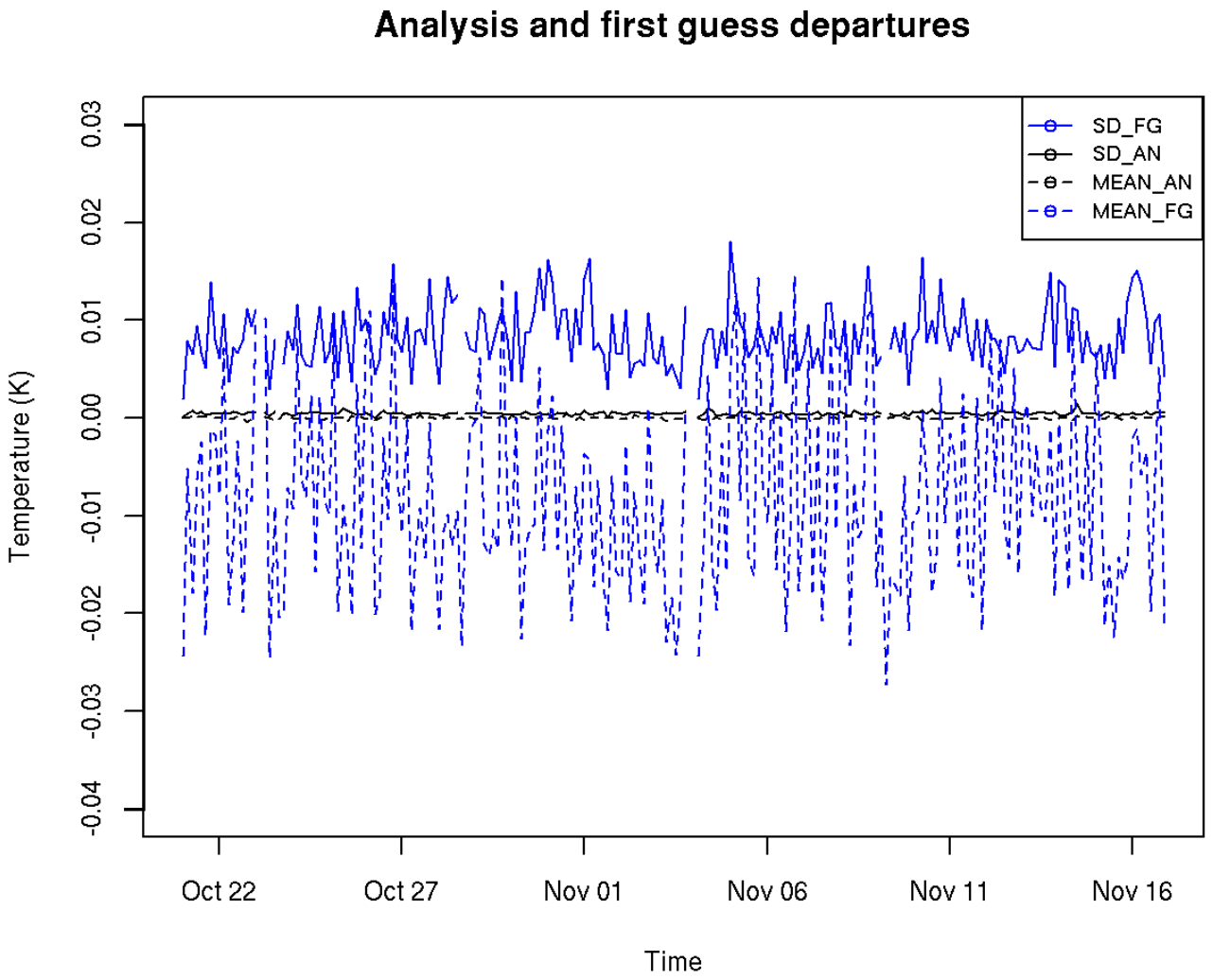
- Difference of ~ 50 m due to elliptic heights in data



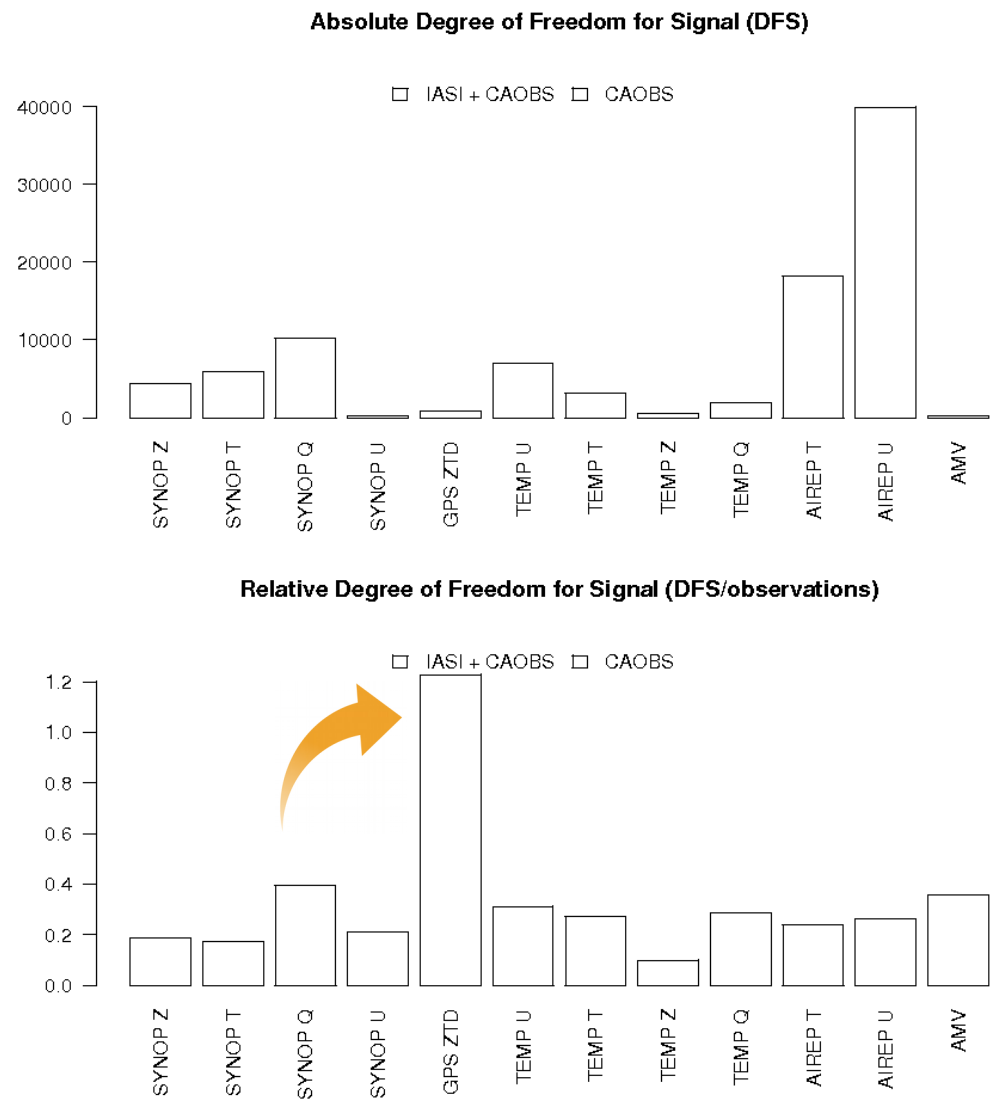
# Beta (pred_1) evolution for all network times



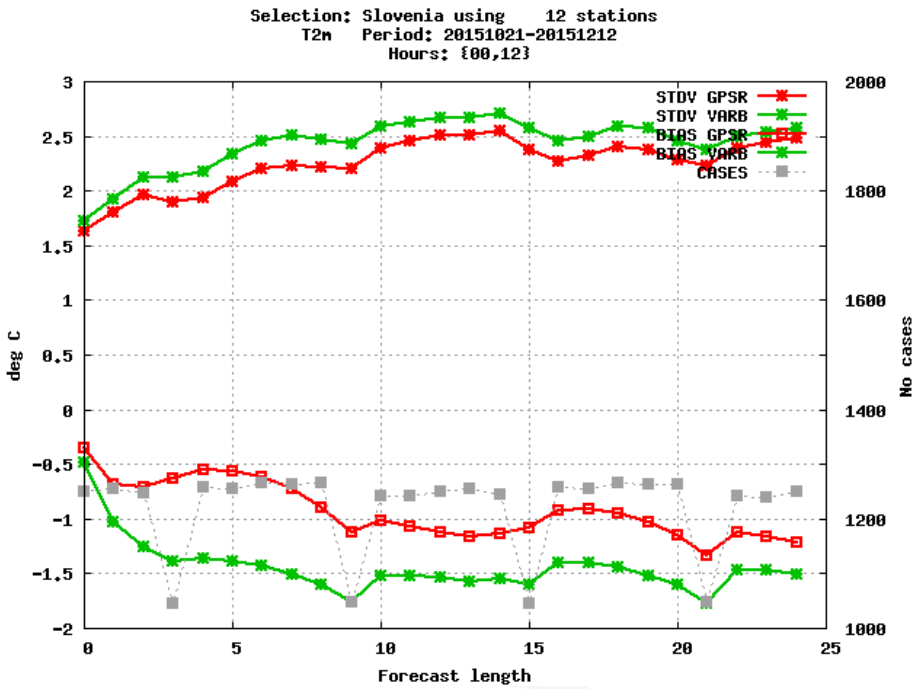
# Departures

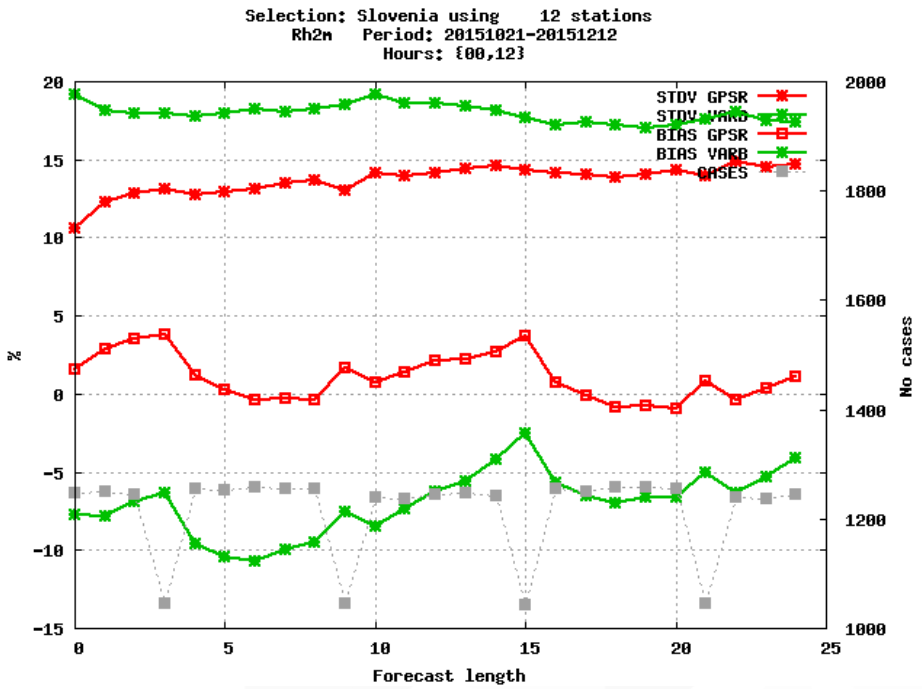

Analysis and first guess departures
SD_FG
SD_AN
MEAN_AN
MEAN_FG
Temperature (K)
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
Oct 22
Oct 27
Nov 01
Nov 06
Nov 11
Nov 16
Time

# Degrees of freedom for signal



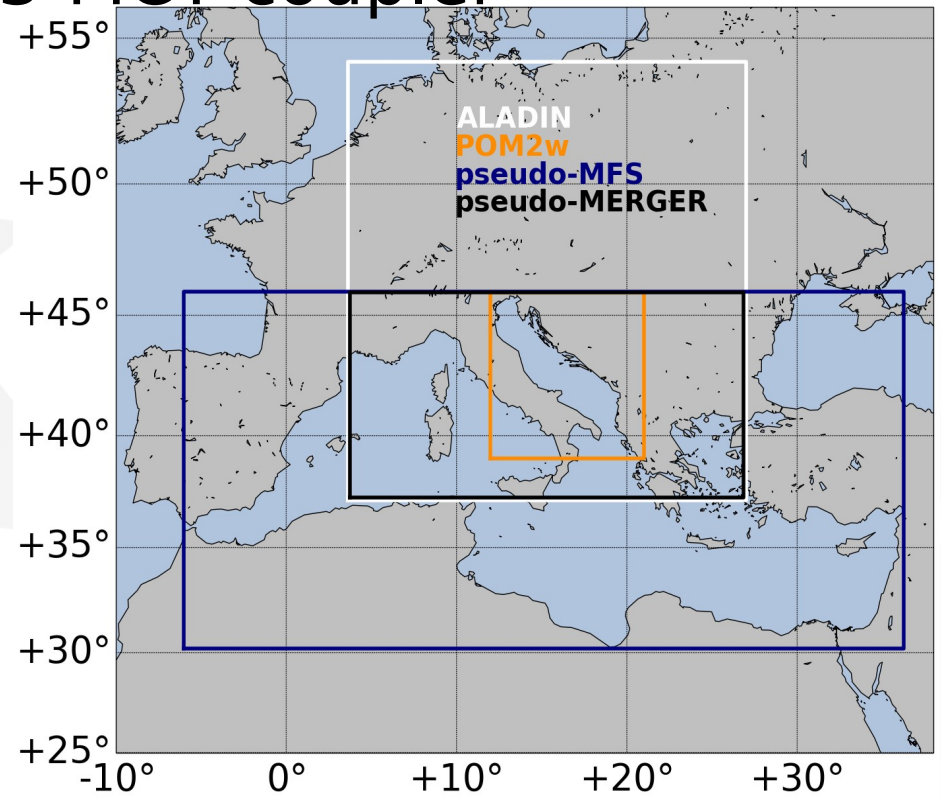
# Impact on scores



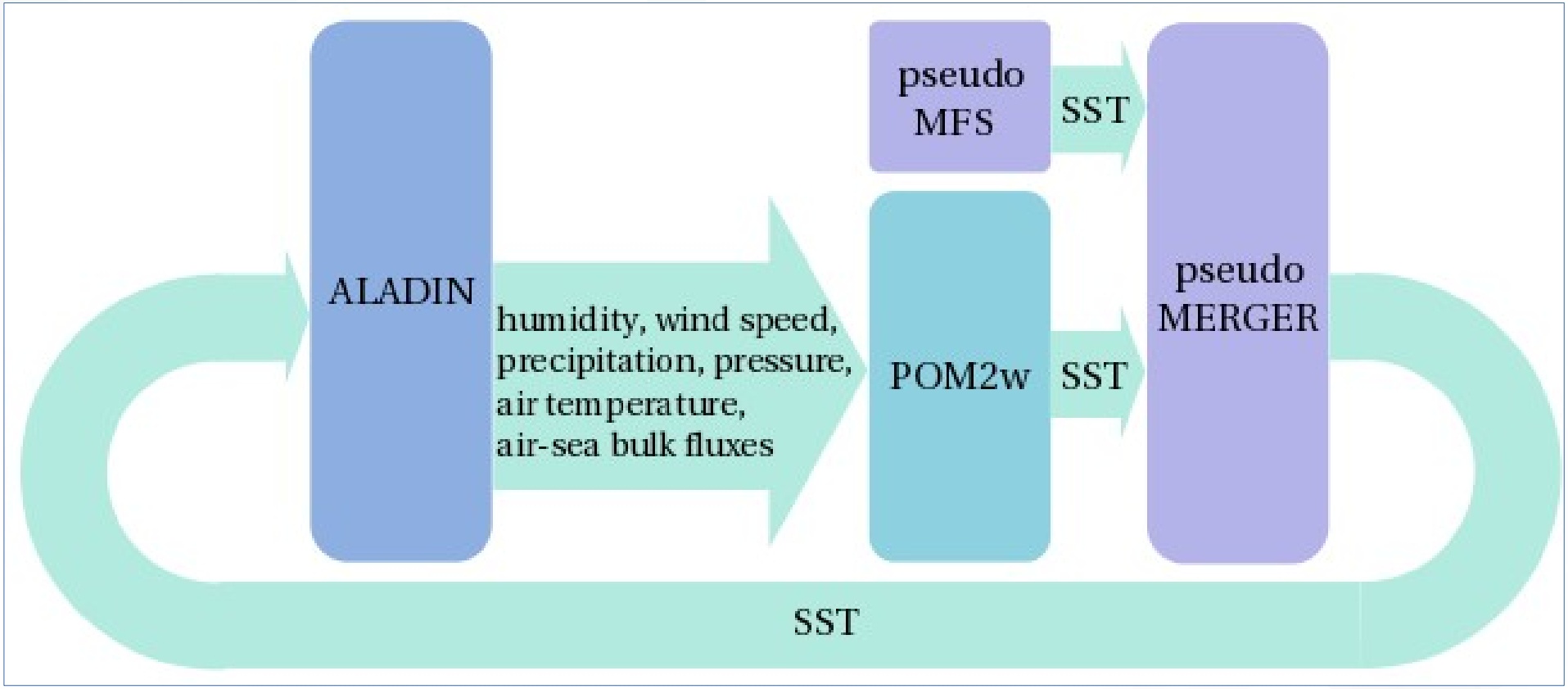
# 2-way atmosphere ocean couplings

- ALADIN is two-way coupled with POM over Adriatic region and uses MFS elsewhere (instead of ECMWF-OSTIA)
- Using OASIS3-MCT coupler



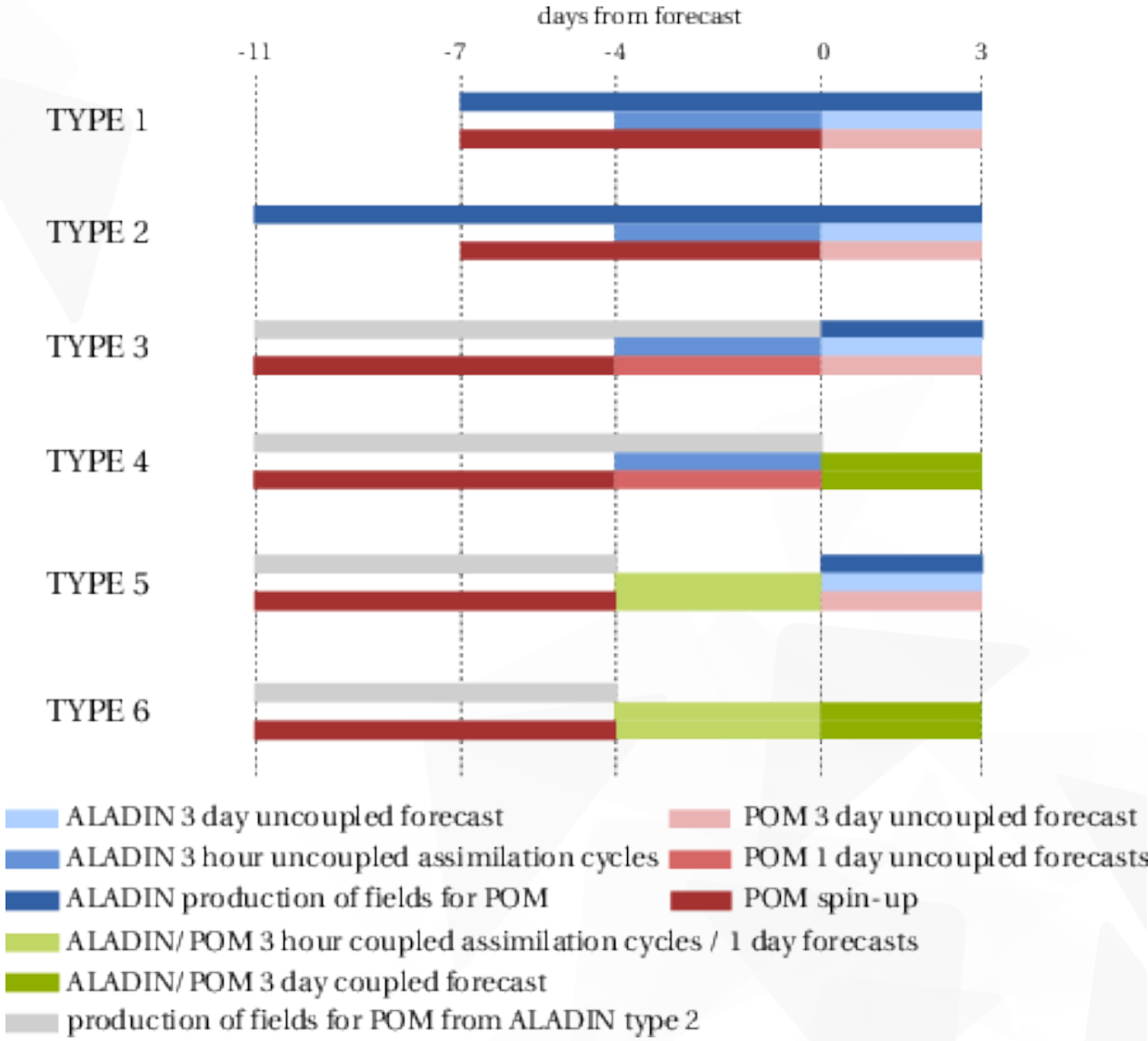
# 2-way atmosphere ocean couplings

- Afield exchange every time step
- Needed interpolations performed by OASIS

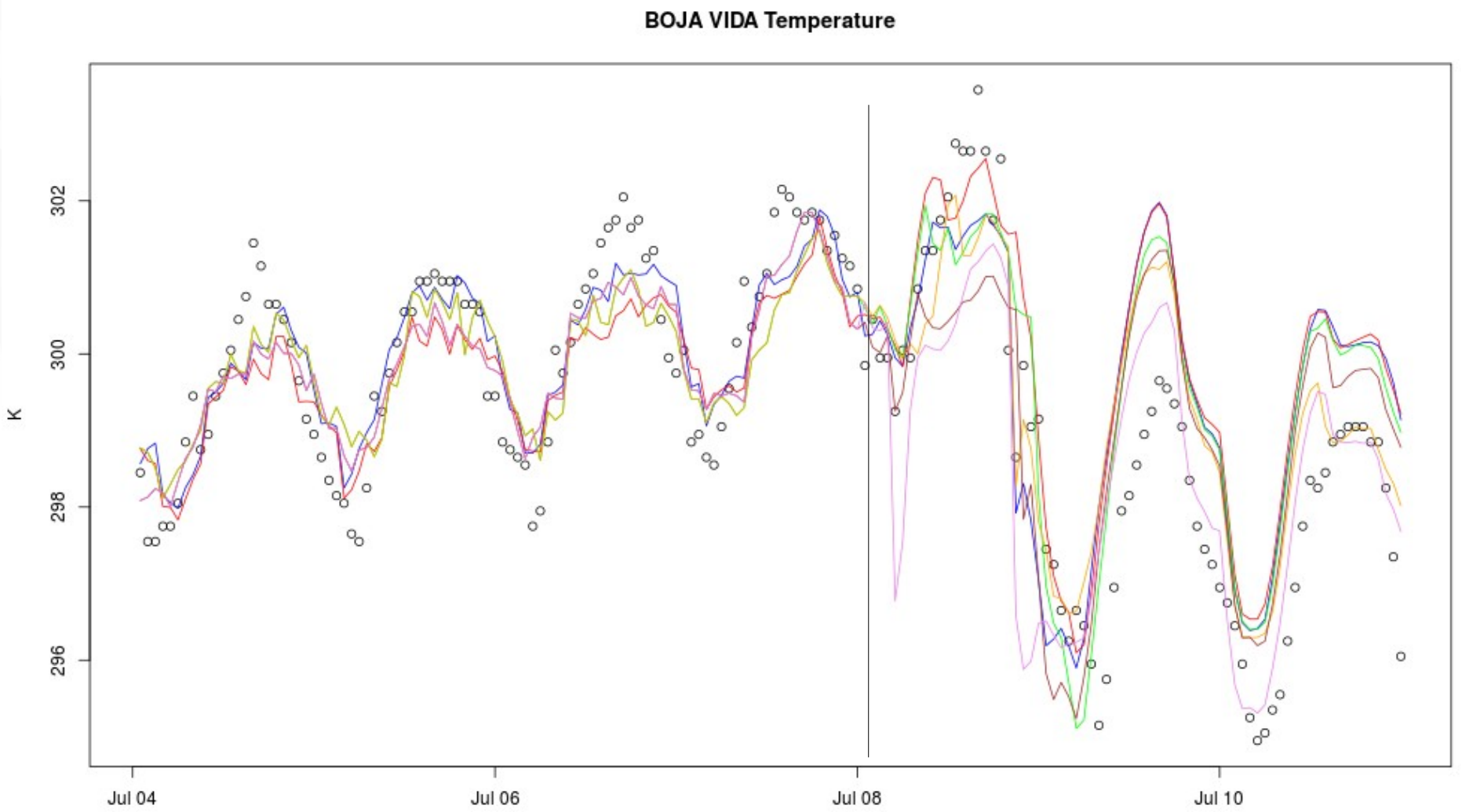


# 2-way case evaluations

- Setup: 3 hourly assimilation cycles for several days + 72h forecast
- Questions:
  - Impact of several SST products
  - Importance of coupling in assimilation cycle



# Results – influence on temperature over sea

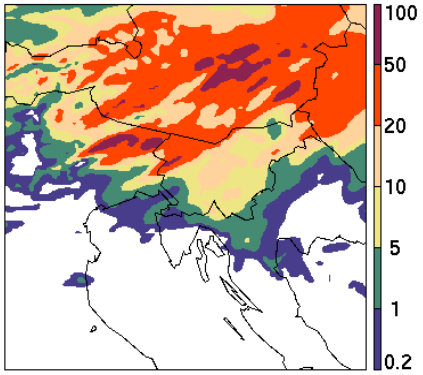


# Results – influence on inland convection

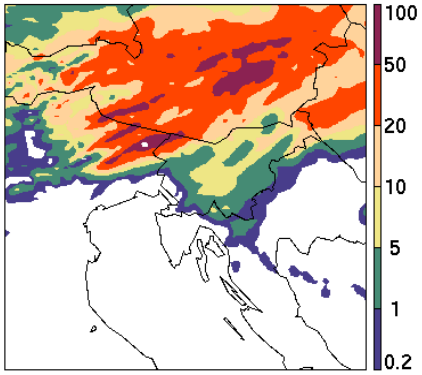
**operational**

**different SST**

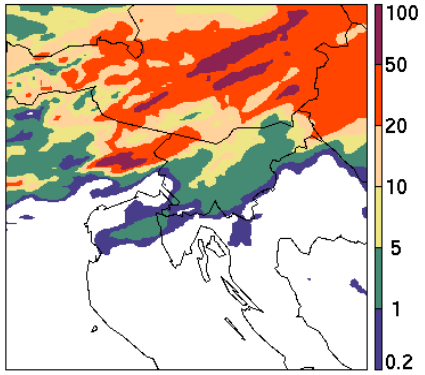
**type 1**



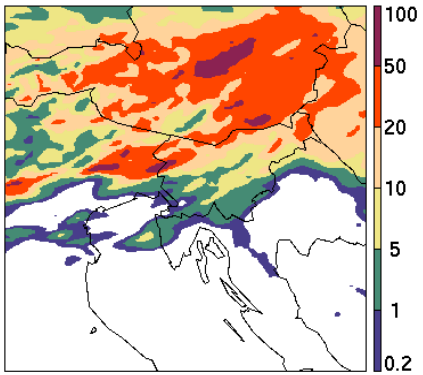

**type 2**



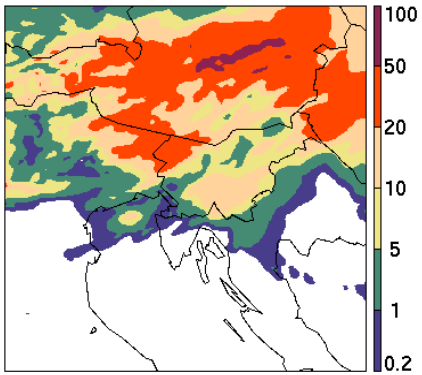

**type 3**



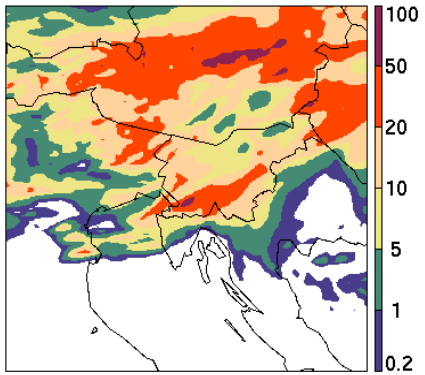

**type 4**




**type 5**




**type 6**




**assim - without coupling**
**prod - with coupling**

**assim - with coupling**
**prod - without coupling**

**assim - with coupling**
**prod - with coupling**