LACE
nwp central europe

Recent Developments within LACE DA

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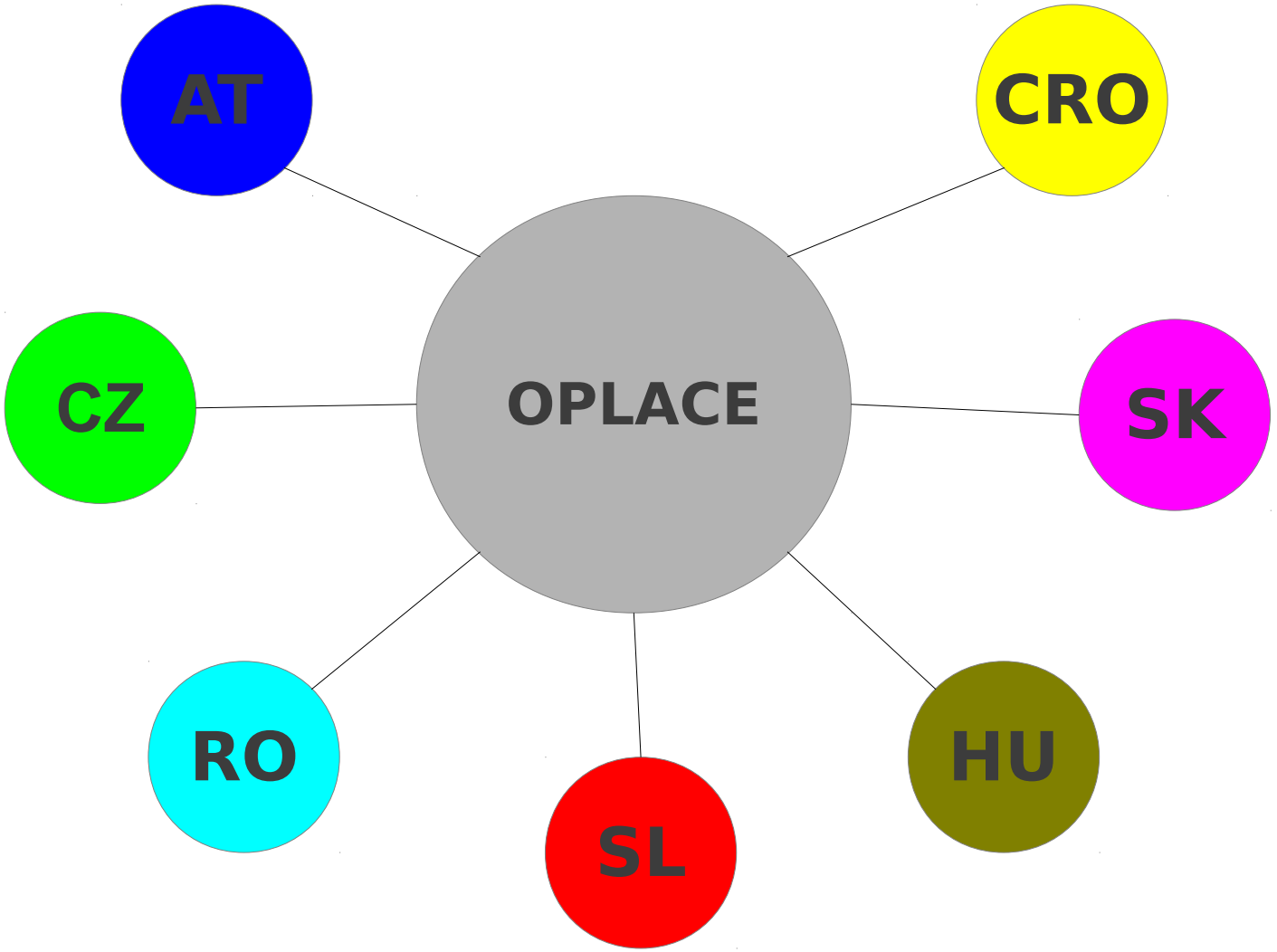
DHMZ SHMÚ OMSZ ZAMG ROMANIA ANM

Outline

- OPLACE
- DA activities at LACE centers
- RADAR data assimilation
- Mode-S observations
- Tuning of background error statistics
- RUC experiments
- Future

LACE DA



SYNOP & SHIP	Z,T,RH,U,V
AMDAR	U,V,T
TEMP	U,V,T,Q
Wind Profiler	U,V
MSG3/AMV	U,V
AMSU-A	Tb
AMSU-B	Tb
MHS	Tb
HIRS	Tb
MSG3/SEVIRI	Tb
IASI	Tb

OPLACE

- BUFR and ASCII SYNOP reports
- LANDSAF albedo, snow and ASCAT soil moisture is going to added soon
- Switch to Meteosat-10
- METOP-B IASI implementation

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CRO

DA activities at LACE centers

- Austria(AT)
    - AROME DA: IASI from Metop-A and Metop-B(test phase); Windprofiler technical validation; RADAR assimilation; new B matrix calculation for AROME 90L
- Czech Republic(CZ)
    - Optimal Blending and 3DVAR configuration; diagnosing and tuning observation and background error standard deviations
- Romania(RO)
    - Surface Assimilation tests with newer model cycle

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DA activities at LACE centers

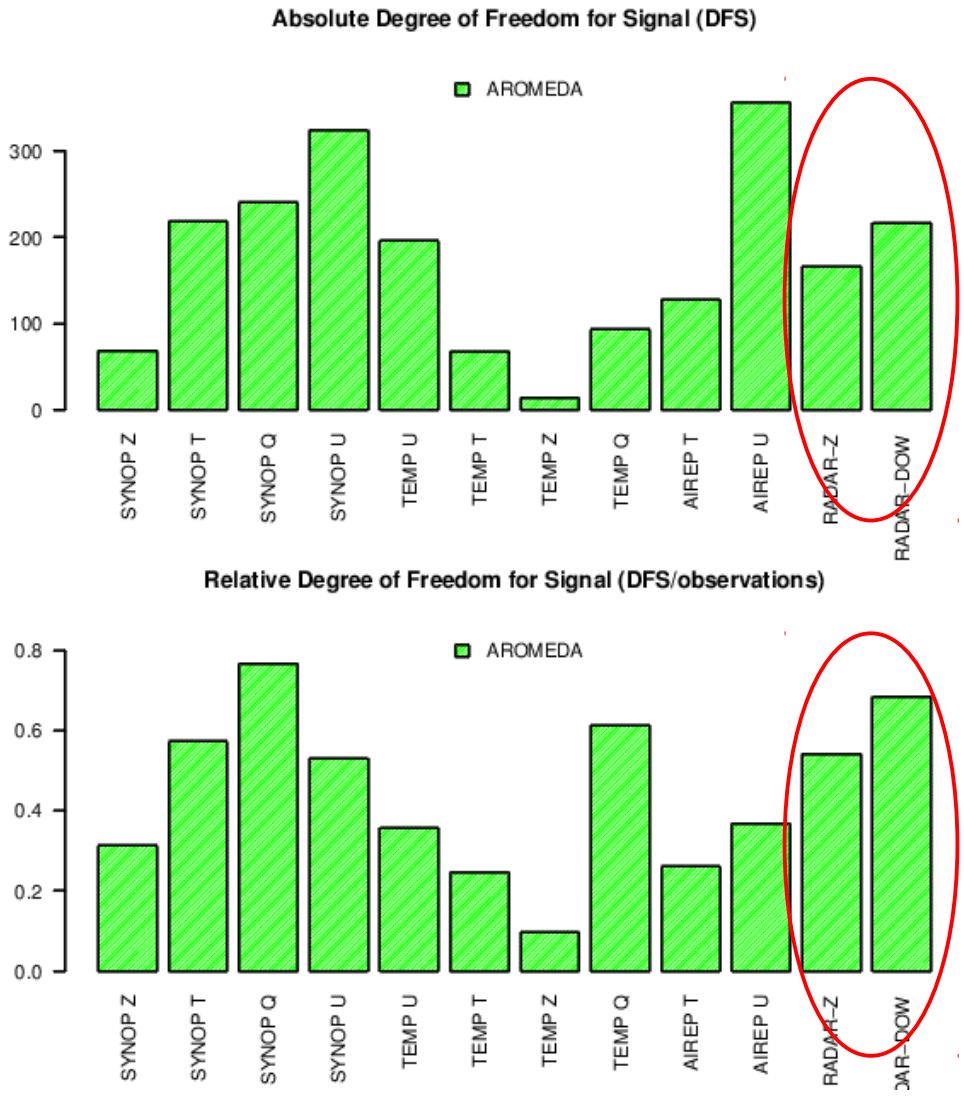
- Slovenia(SL)
  - Tune DA to avoid too much snow during winter; assimilation of Mode-S observations
- Hungary(HU)
  - Newer cycle (cy36t1) for AROME and ALARO DA; operational AROME 3DVAR; AMV and RADAR assimilation in AROME 3DVAR
- Slovakia(SK)
  - Also surface assimilation studies with newer model cycle (cy38t1)
- Croatia(CRO)
  - Focusing on RADAR DA activities

RADAR data assimilation

- Common collection of RADAR data from LACE countries are started.
- 5 from 7 members are able to provide now MF BUFR
- 3 LACE countries have been already investigating DA of local RADAR data with AROME and ALARO

RADAR data assimilation

- DFS to estimate the impact of RADAR observations on analysis
- AROME 3DVAR DA with Conventional and RADAR observations (2012040712, 2012041206)
- RADAR observations (Refl, DOW) have large Relative DFS values (figure below)



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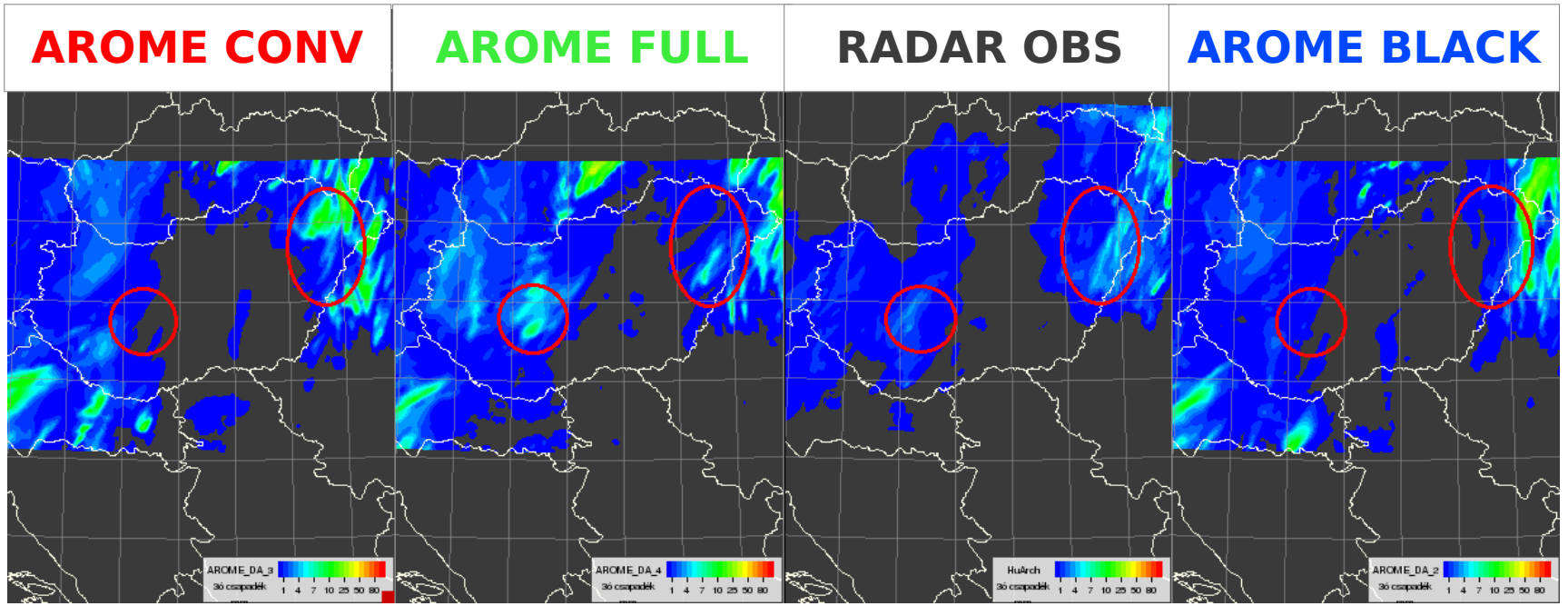
RADAR data assimilation

- Assimilation of Austrian RADAR data was tested in AROME 3DVAR. Preliminary results are under evaluation.
- From 3 Hungarian RADAR stations, observations (REFL,DOW) were assimilated in AROME 3DVAR RUC (AROME FULL) and compared with operational AROME CONV. Also low elevations of RADAR reflectivity was blacklisting in AROME BLACK to avoid overestimation of PBL humidity.
- RADAR observations can provide positive impact on forecast (Picture for +3h precipitation).



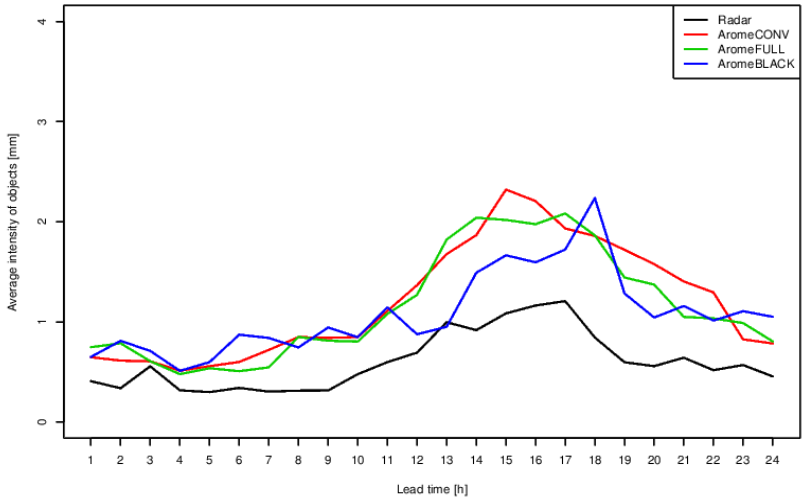
RADAR data assimilation

AT

- *RADAR feature-based verification* for Hungarian Study

- Average intensity of the objects → better with blacklisting low elevation RADAR obs

- Domain average precipitation → better with full RADAR obs.



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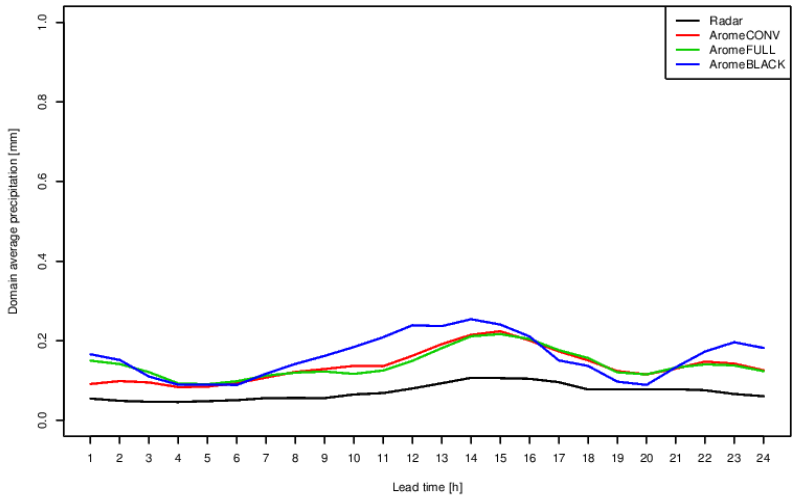


CRO

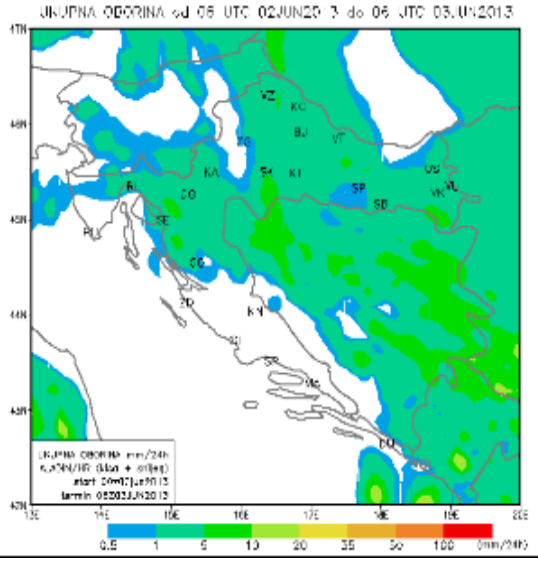
AROME CONV
AROME RADAR FULL
AROME RADAR BLACKLISTING

10/16 EWGLAM meeting

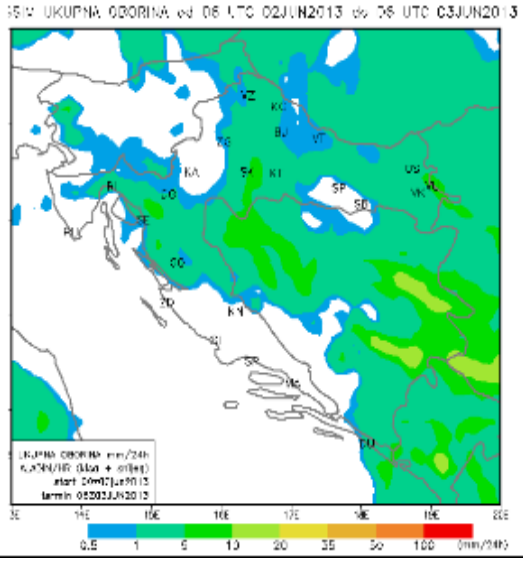
RADAR data assimilation

- Case study with ALARO DA for 1 RADAR station in Croatia
- First results are under evaluation.

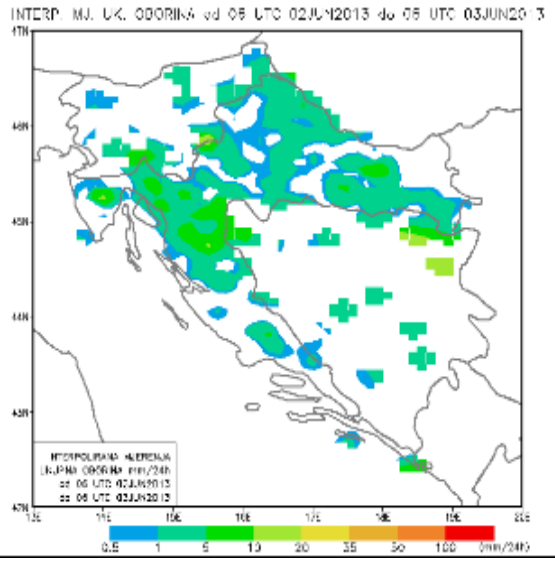
Oper



Radar assim



Rain gauges



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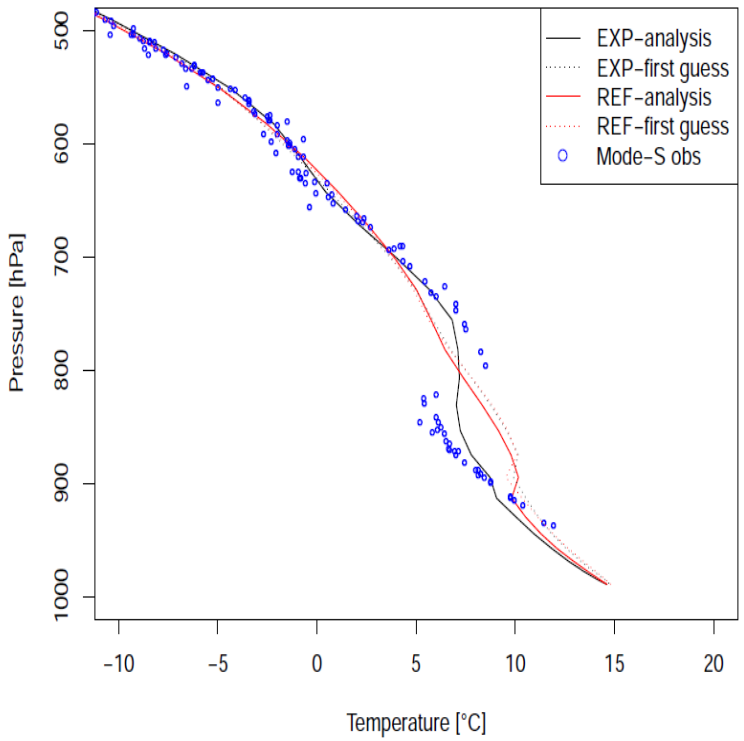
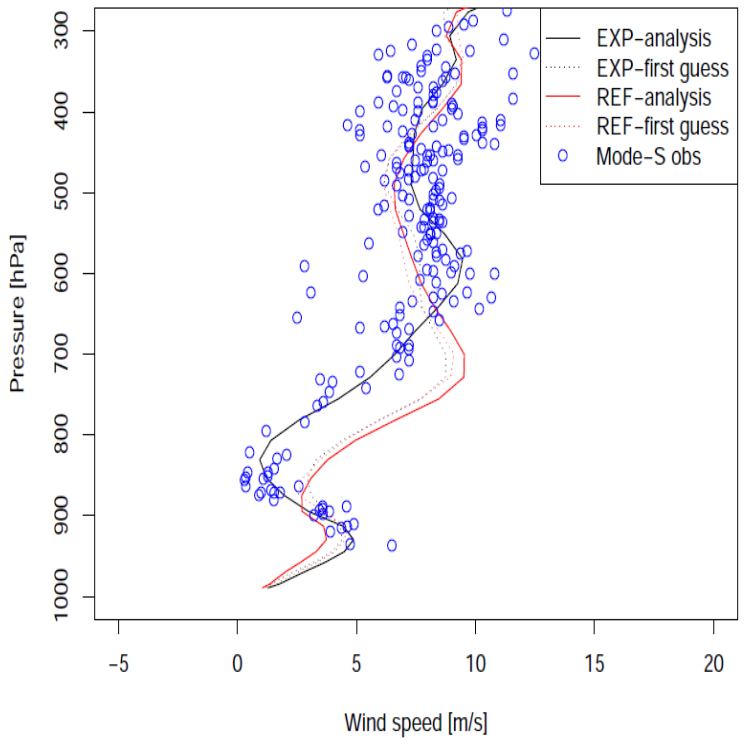
Assimilation of Mode-S observations

- A comparison with radiosonde and AMDAR data showed a good quality of Mode-S MRAR aircraft observations.
- Pre-processing procedure was considered to smooth too dense raw Mode-S and to still preserve good resolution.



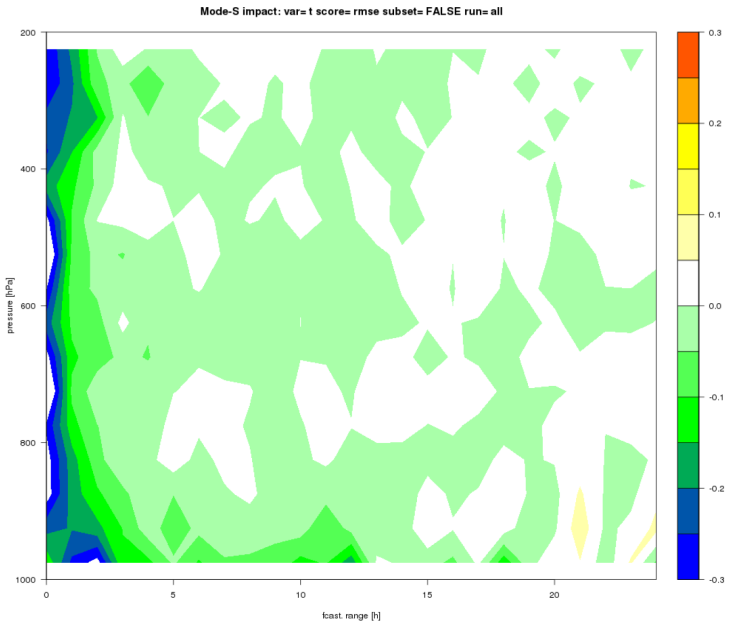


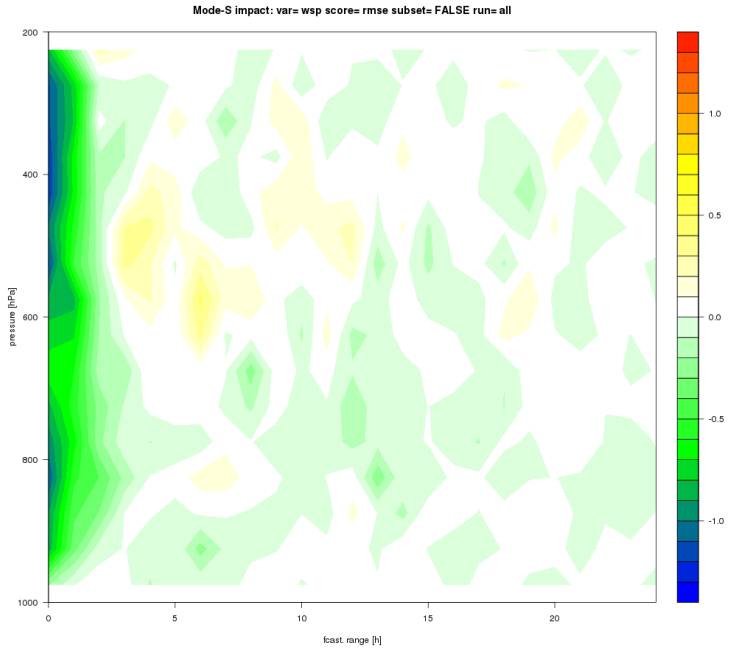
SL

Assimilation of Mode-S observations

- In local Slovenian ALARO DA system the impact of Mode-S data was investigated for a late summer, early autumn period.
- Positive impact can be observed in forecasts especially at the short ranges.

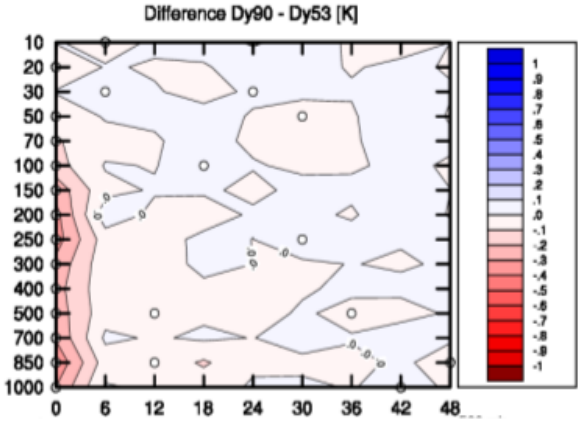
SL



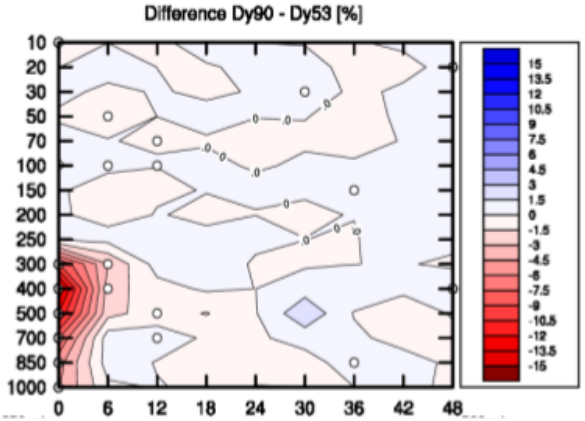


Tuning of background error statistics

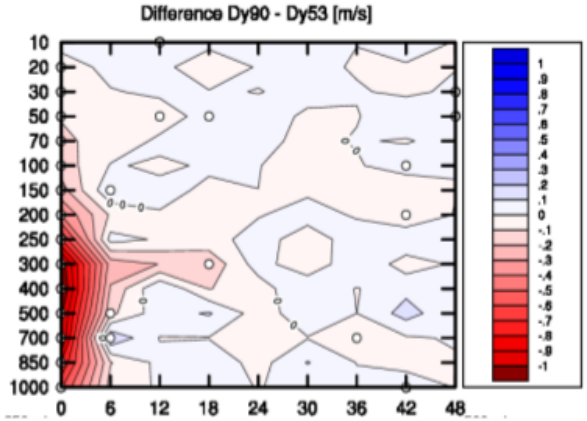
- Calculations of ensemble based background error statistics were carried out and tuning of observation and background errors was studied with Desroziers's method.
- Aim was to outperform the operational blending and set-up optimal 3DVAR (even for further studies with more obs.)



T [K]



RH [%]



$wind$ [m/s]

Rapid-Update Experiments

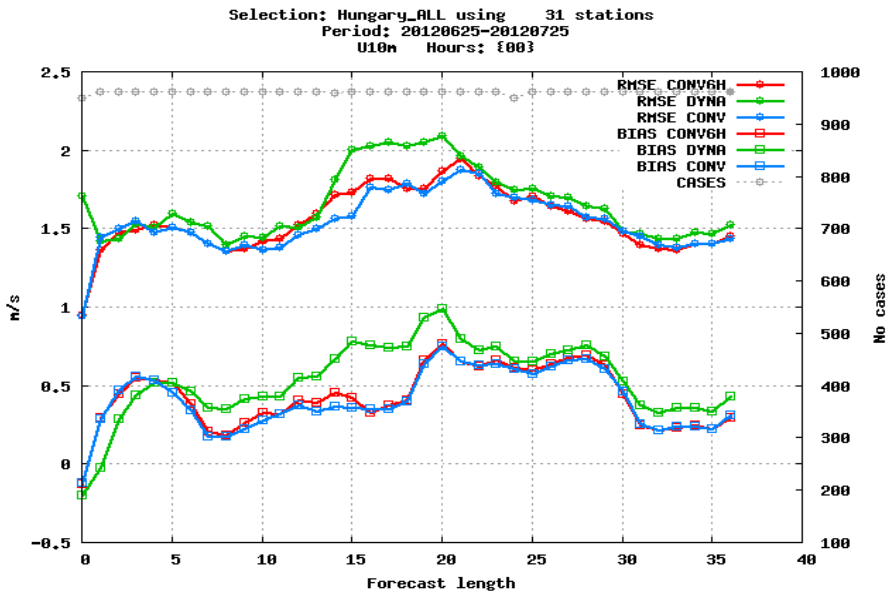
- 3h RUC approach is applied and tested with AROME and ALARO in LACE

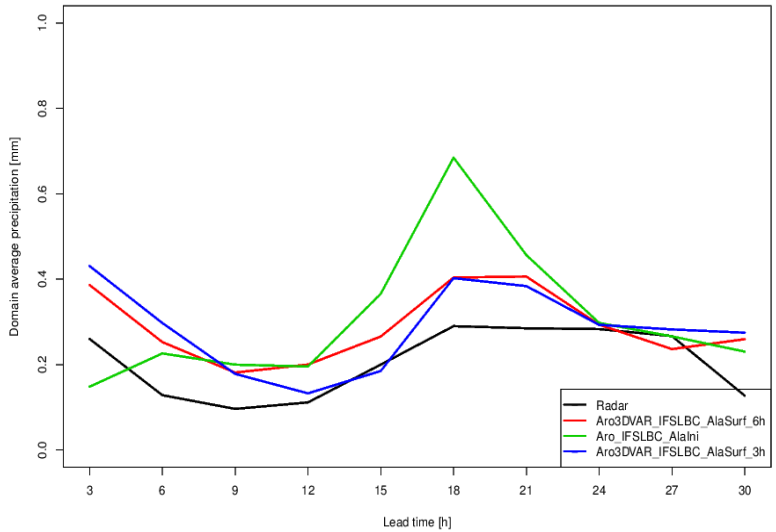
- AROME RUC is operational in Hungary and ALARO RUC was tested in Slovenia for Mode-S assimilation study.

AROME DA 6h - Red
AROME DYNA – Green
AROME DA - Blue

SL

HU





Priorities in the plan

- RADAR assimilation: How to make quality control within LACE?, Assimilation study with full LACE RADAR data samples
- GPS assimilation
- Focusing spatially varying background error statistics in AROME and ALARO 3DVAR systems
- Surface assimilation based on EKF

Thank you for your attention!
Thank you for all LACE DA colleagues!