

Zentralanstalt für Meteorologie und Geodynamik



**OPERATIONAL SETUP in AUSTRIA AND RECENT
DEVELOPMENTS**

*Florian Meier, Xin Yan, Stefan Schneider,
Christoph Wittmann, Yong Wang*

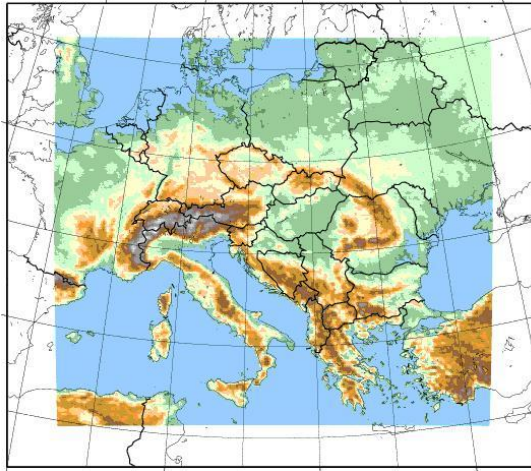
Operational system at ZAMG: ALARO 5km + CANARI

- Model since March 2011: ALARO 4.8km L60 (cy35t1) coupled with ECMWF-IFS (6h-lagged), 4x per day +72h (standard ISBA no SURFEX), DFI, driven by simple Scripts (no SMS/mini-SMS)
- ASSIM soil: CANARI (cy36t1) with no vertical correlation function, SST-from IFS (2xblendsur), OROLIM=2900, ORODIF=950., REF_A_H2=REF_A_T2=60km, REF_S_H2=0.2, REF_S_T2=3.0, LCORRF=T;
- Atmosphere: from IFS **downscaled** blendsur with soil (no 3D-Var, no blending)
- OBS: SYNOP+TAWES; OPLACE obstype 1+ZAMG-database
- NO-5km B-Matrix
- Verification: ZAMG routines (Scripts+Fortran+GNU PLOT) for standard scores RMSE, MAE, BIAS for T2m, RH2m, MSLP, ff10m, ffx10m, dd10m, upper-air against radio soundings, precipitation: SAL, FAR, POD, ETS, gerrity skillscore



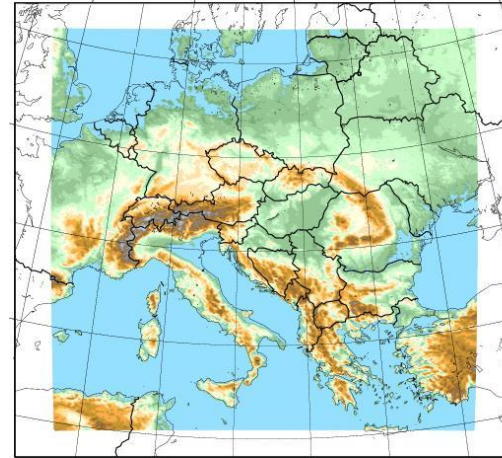
Operational domain (old 9.6km vs 5km)

ALADIN-AUSTRIA Domain & Topography



Old ALADIN-Austria 9.6km

ALADIN-AUSTRIA 5km Domain & Topography



ALARO-Austria 4.9km

odynamik

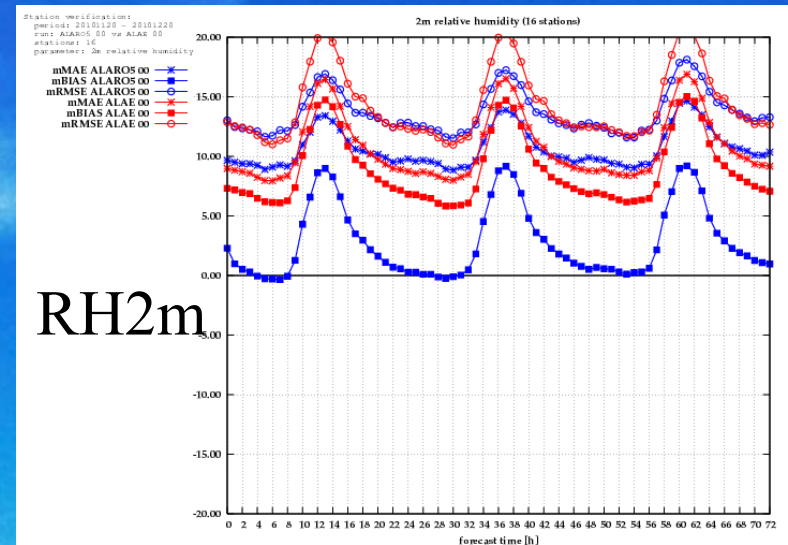
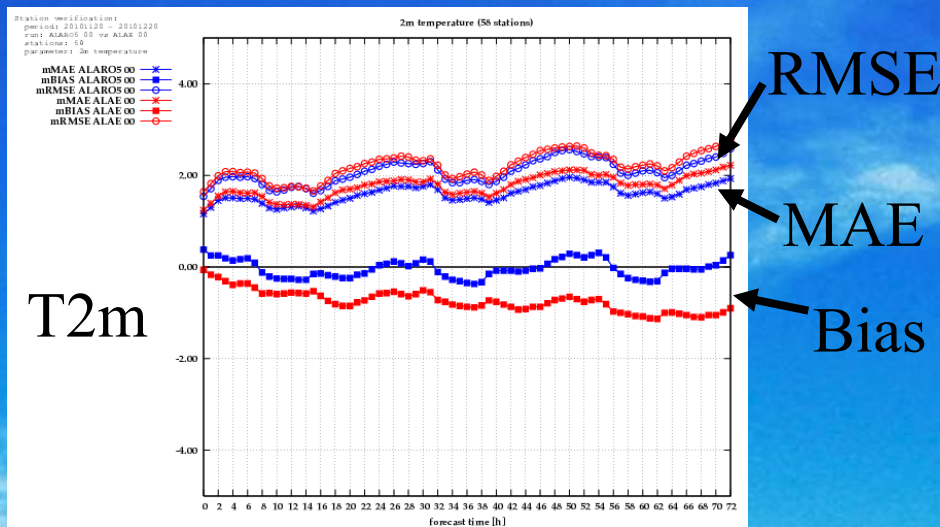


old 9.6km model is still running unchanged
(no assim, Arpège-coupling) will be switched off probably soon
Switch to cy36t1 in 4.8km model and transfer to new SGI-HPC planned
for this summer, cy36t1 001 ALARO 4.8km (modified physics) was
tested in an e-suite version

Effect of CANARI soil assimilation in ALARO4.8km:

ALARO5+CANARI

ALADIN-Europe without CANARI 



20th november 2010-20th december 2010

ALADIN-LAEF running at ECMWF archived in MARS

- At the moment 18km L37 version operational, coupled with IFS-EPS, 00 and 12 UTC +60h + ALADIN-Europe deterministic 6,5km version coupled with IFS all running at ECMWF without any own DA
- CANARI soil with perturbed obs implemented by M. Bellus (SK) will become operational with new 11km ensemble version probably till end 2012. Perturbation after BATOR+CANARI-QC on ODB level
- observations from OPLACE

namik



Experimental setups – future developments

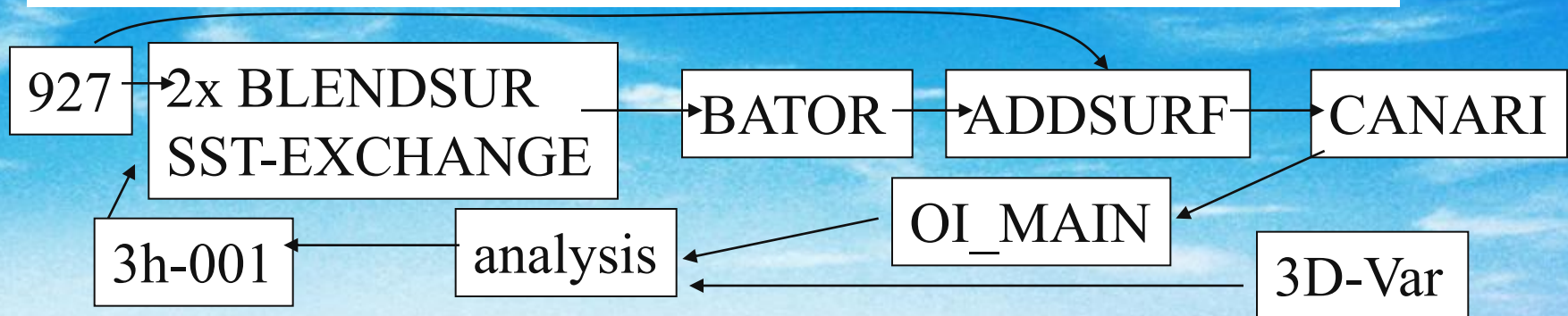
- ALADIN-9,6km ASSIM was switched off at 30th November 2011 - no further development planned
- AROME-Austria 2,5km 60L (->upgrade to 90L planned): running with 3D-VAR+CANARI-OI_MAIN, 3h-assimilation cycle +-1,5h assimilation window; 8x daily up to +30h should become operational till end of next year, test period 15th May-15th July 2011, all components cy36t1 export except for oi_main (cy36t1_op2 from Météo France) because export version does not work in OI-MAIN! Only short cutoff cycle CANARI->3DVAR->001->CANARI->3DVAR->001 for 00 and 12 UTC +30h else +3h, SURFEX 3L+town scheme, no FLAKE, climate files from ECOCLIMAP I (standard), no DFI so far! B-Matrix: Ensemble method using 4 members of 11km-ALADIN LAEF -> change in diff-calculation for specific humidity GP instead of spectral in AROME!

namik



CANARI+OI-MAIN

- CANARI+OI-MAIN with vertical correlation function activated (new switch **LCORRV=T** introduced):
OROLIM=3800m, ORODIF=1650m, REF_A_H2=REF_A_T2=55k m, LCORRF=T, REF_S_H2=0.1, REF_S_T2=1.6, **REF_AP_H2=REF_AP_T2=0.05** (default)
- Data: SYNOP+TAWES OPLACE+ZAMG-database additional obs from ZAMG-database tested but not regularly used (uncertainty about quality) hydrological, environmental, METAR-stations
- CANARI does 2m analysis (LAEICS=F) afterwards OI-MAIN does transfer to soil variables TG1/2, WG1/2 dealing with LFI-file (modified CANARI routine CACSTS) the lowest soil level is cycling freely not modified by OI-MAIN
- Compared to standard ISBA, ADDSURF-binary has to run before CANARI to initialise not used ISBA-soil fields inside CANARI
- EKF+ASCAT soil moisture tests planned



3D-Var OBS

Observation type	Assimilated fields	Source
HYDRO/METAR	RH2m,T2m, Φ ,U10m,V10m	ZAMG
SYNOP+TAWES	RH2m,T2m, Φ ,U10m,V10m	ZAMG +OPLACE
SHIP	RH2m,T2m, Φ ,U10m,V10m	ZAMG +OPLACE
AMDAR	U,V,T	ZAMG +OPLACE
GEOWIND	U,V	OPLACE
Radio Soundings	U,V,T,Q, Φ	ZAMG +OPLACE
PILOT/ PROFILER	U,V	ZAMG/ OPLACE+ZAMG
ASCAT Ozeanwinde	U10m,V10m (25km resolution)	ZAMG/EUMETSAT
NOAA 16/18/19+ MetOp-A AMSU-A, AMSU- B,HIRS	AMSU-A: CH5-13; AMSU-B: CH3-5; HIRS: CH12 (land); HIRS: CH4-7,11,12,14-15 (sea);	OPLACE
MSG-SEVIRI	Radiances CH2,3	OPLACE
RADAR	Reflectivity/humidity	Austrocontrol
IASI/SSMIS/GPS	Radiances/ZTD	ZAMG/TU-Vienna

used

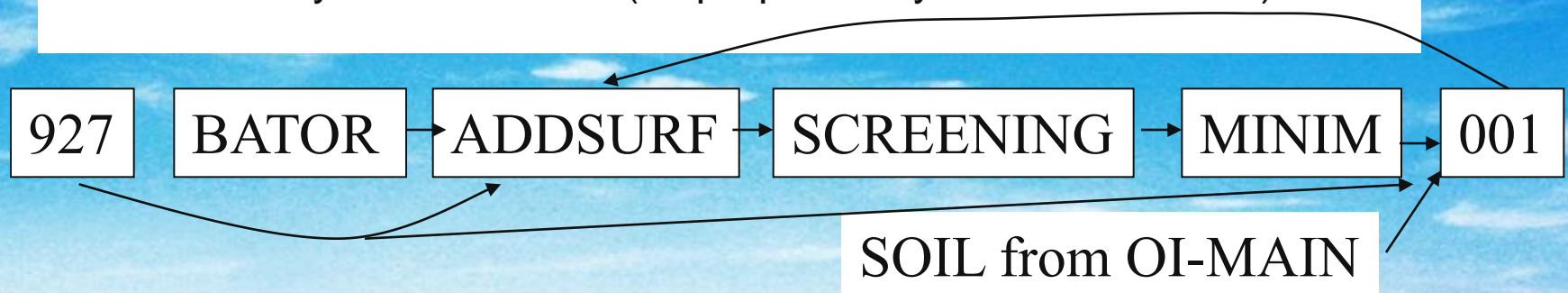
technically
tested

planned

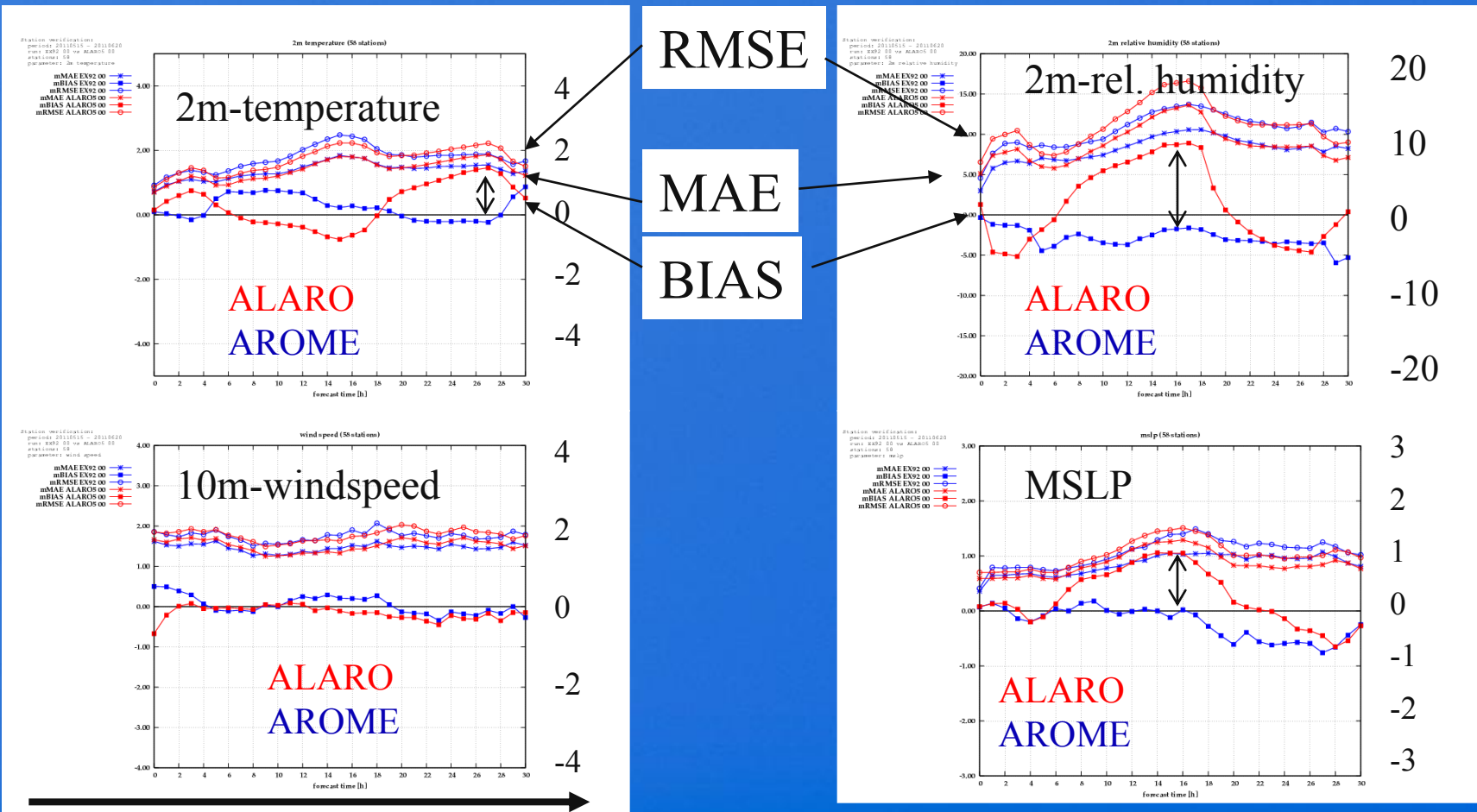


3D-Var AROME

- Most observations taken as for 9.6km ALADIN-Assim
- 10m wind also over land used (as MF)
- VARBC for SAT warm started with VARBC.merge files from MF-AROME (cougar) one file per assim step (8 files)
- B-Matrix from LAEF instead of Arpège ensemble
- AROME also needs additional ADDSURF before SCREENING
- Blending of hydrometeors after minimization (as before)
- Thinning distances changed compared to 9.6km: as MF namelist
- No DFI so far -> IDFI would be nice
- Plan: Hourly assimilation as MF? FGAT?
- Tuning and OSE necessary - tests possibly when new HPC available
- Emissivity from AMSU-A (as proposed by ALENA last time)



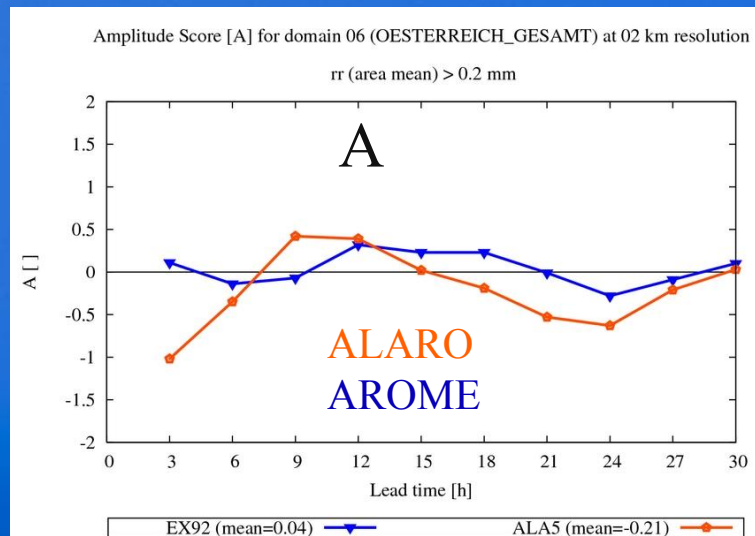
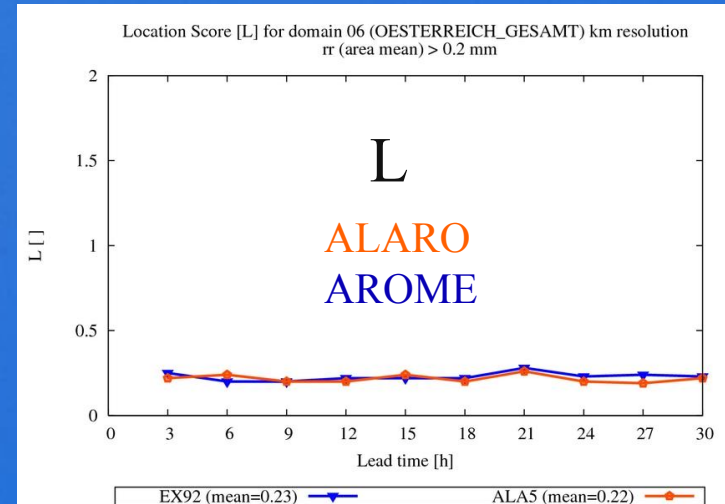
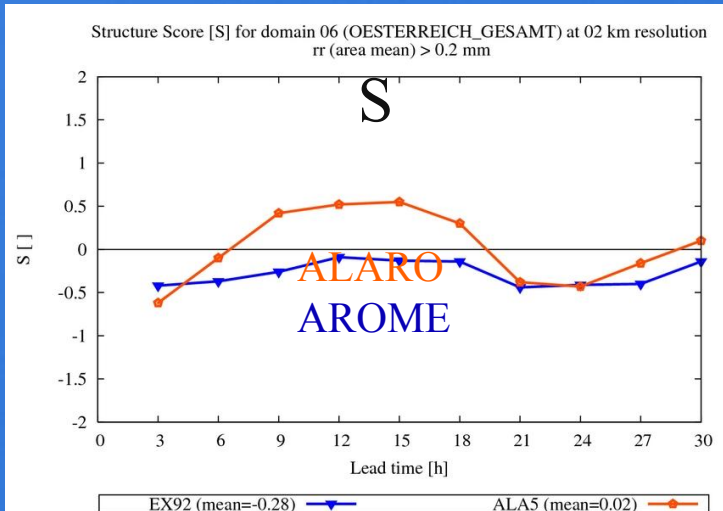
Verification 15 may -20 june 2011 against 58 Austrian stations



leadtime



precipitation– SAL (Wernli et al. 2008)



SAL-score
for whole Austria
threshold: 0.2mm

Perfect score:

S=0

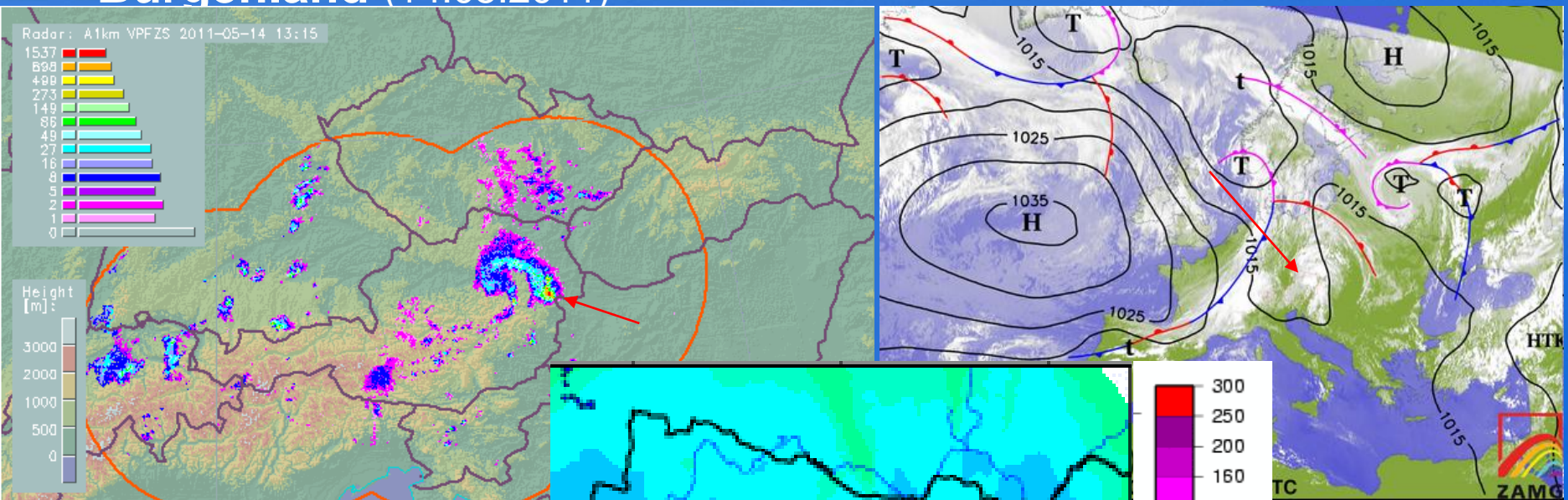
A=0

L=0



Case study1: Thunderstorm, hail, tornado in Burgenland (14.05.2011)

(Präsentation)
21.06.2012 Folie 12



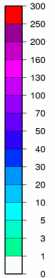
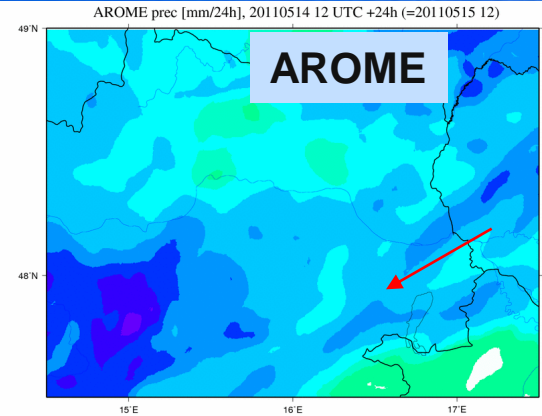
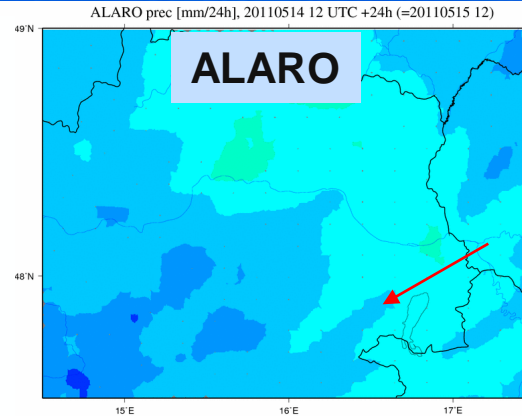
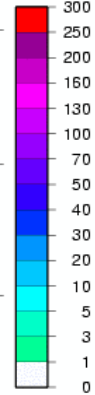
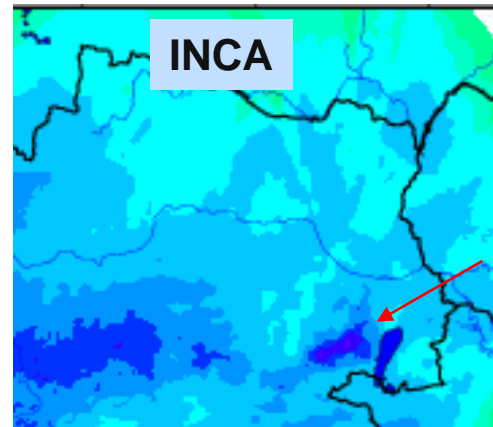
RADAR at strongest intensity

INCA-precipitation:
12 UTC +24h
mm/24h

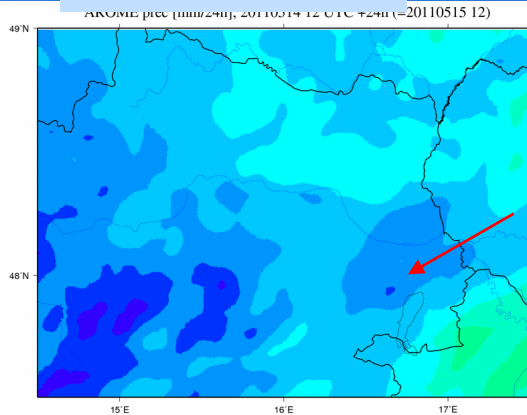


14th may 2011 12 UTC +24h precipitation

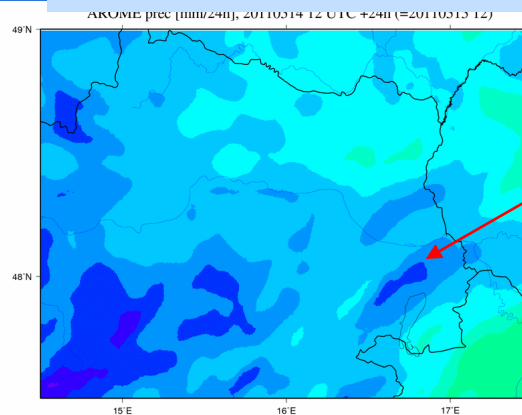
(Präsentation)
21.06.2012 Folie 13



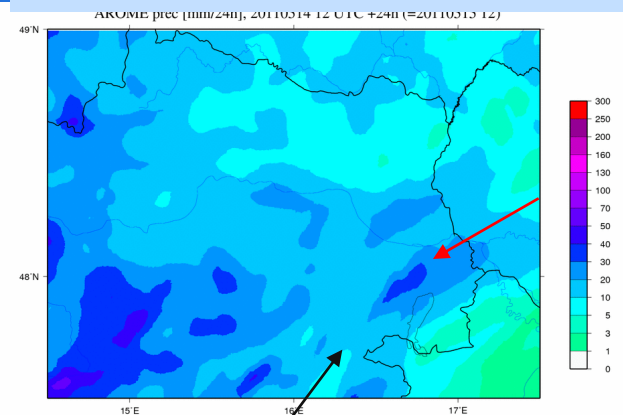
AROME-ASSIM



AROME-ASSIM+PILOT

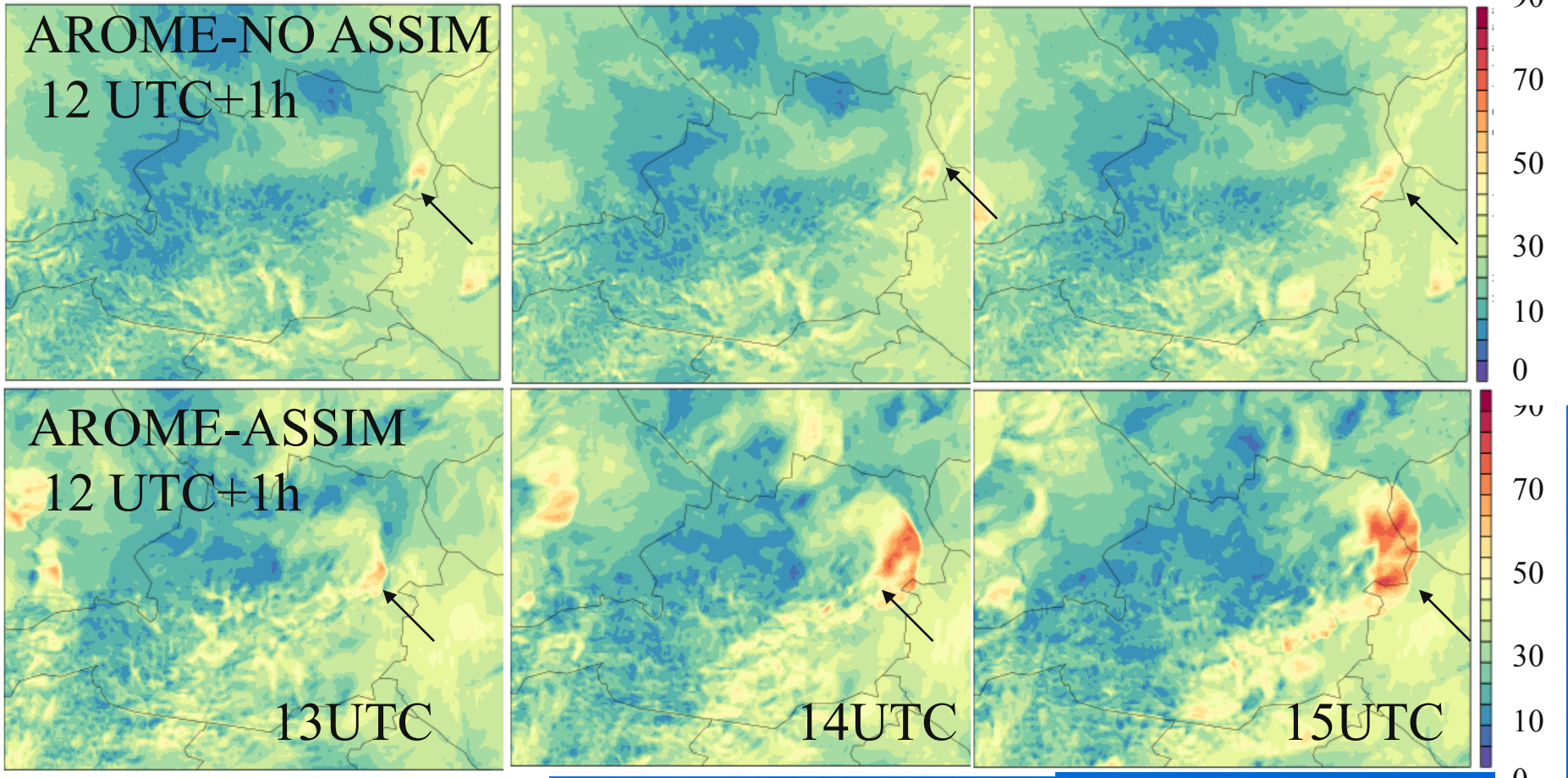


AROME-ASSIM+PILOT+ AUTOC.



km/h

1h gusts on 15.4.2012

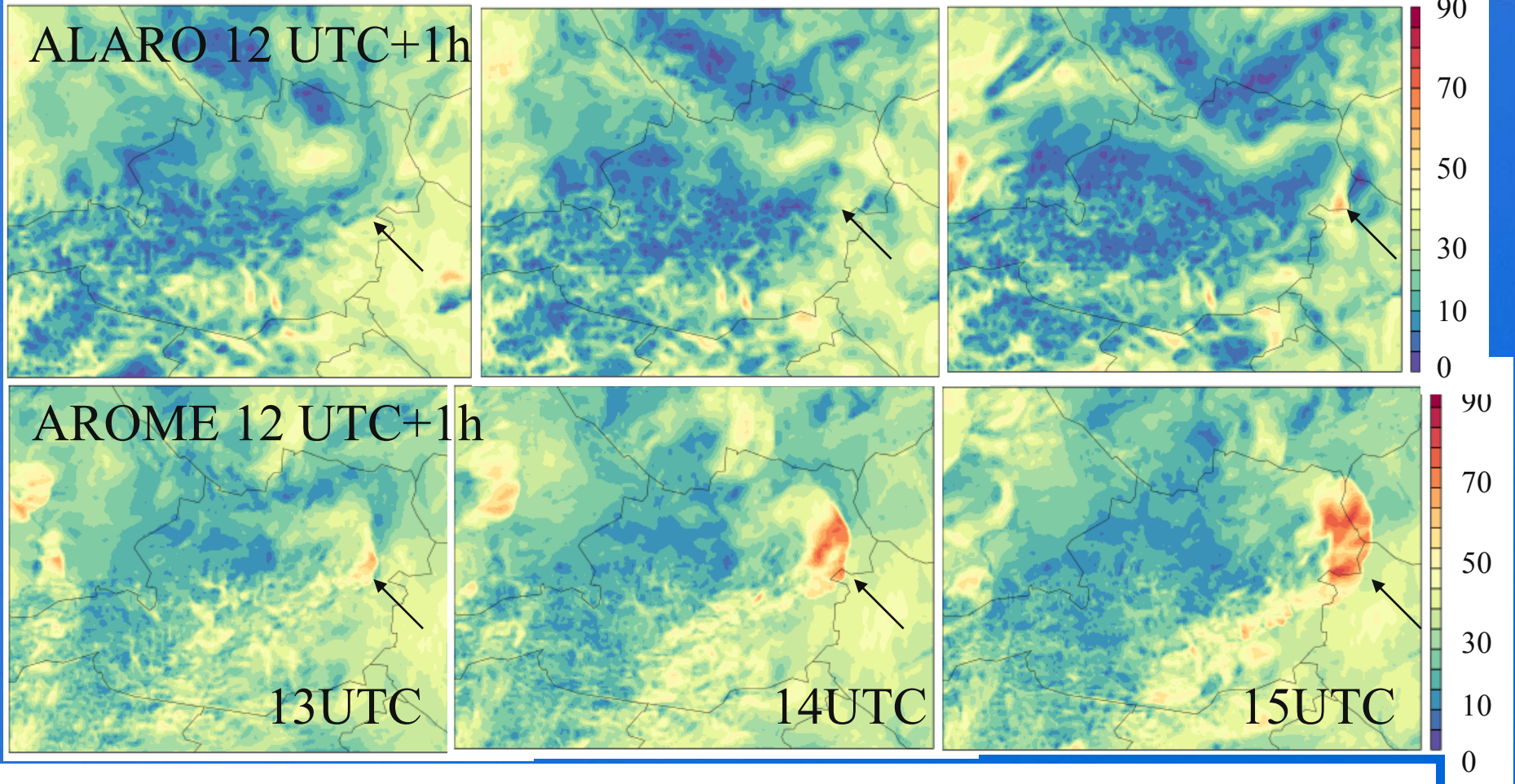


OBS: Eisenstadt: 111,6km/h, Neusiedl 79,2 km/h, Vienna 57,6 km/h



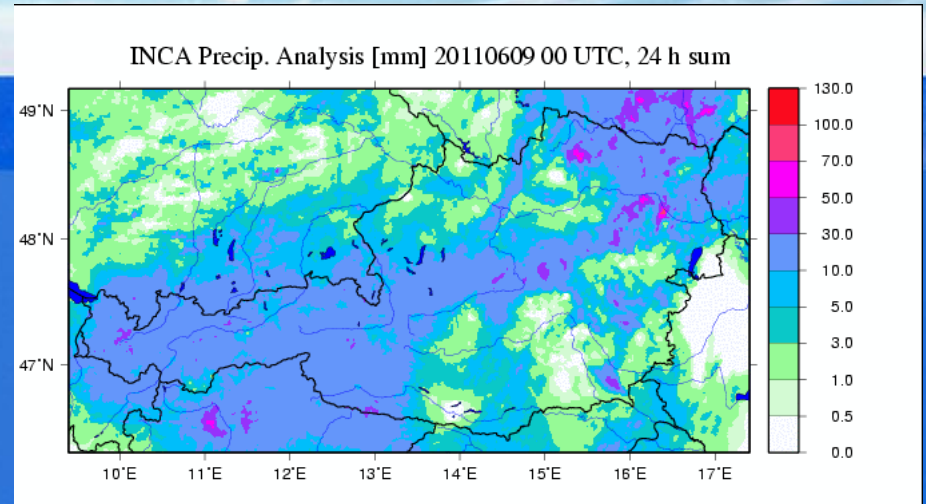
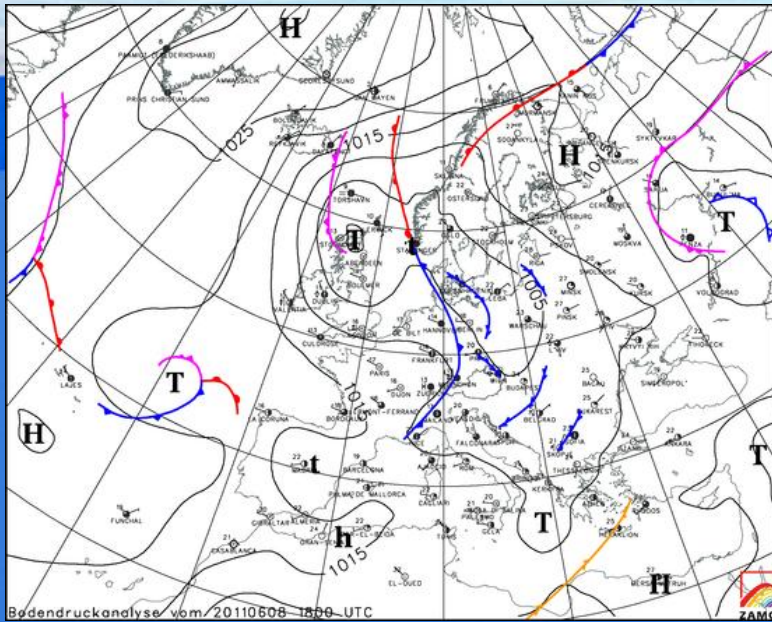
km/h

1h gusts on 15.4.2012

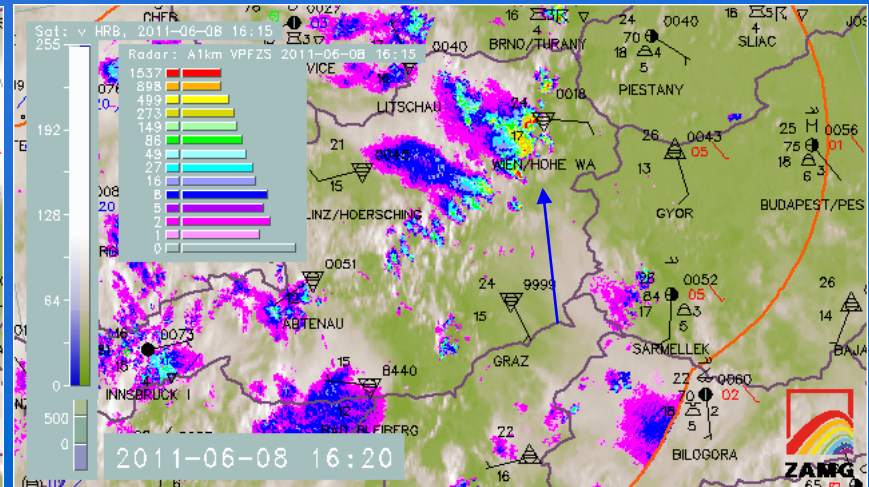
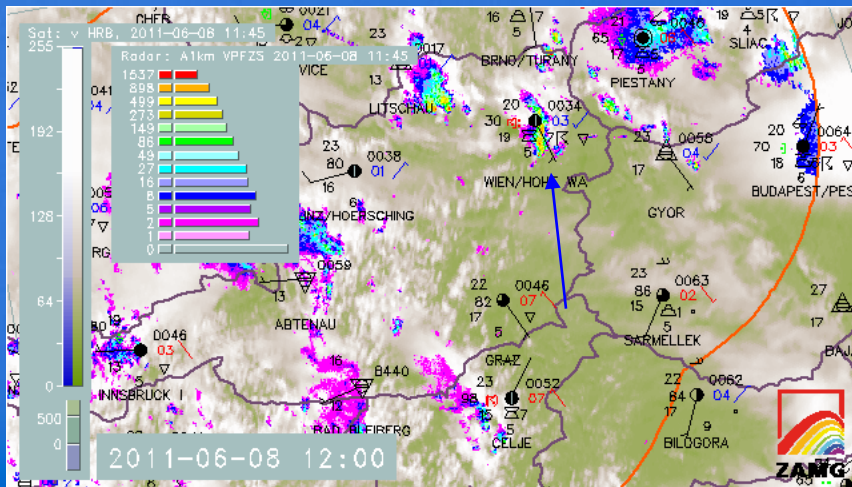


OBS: Eisenstadt: 111,6km/h, Neusiedl 79,2 km/h, Vienna 57,6 km/h

Case study2: 8th June 2011 – Thunderstorms over Vienna



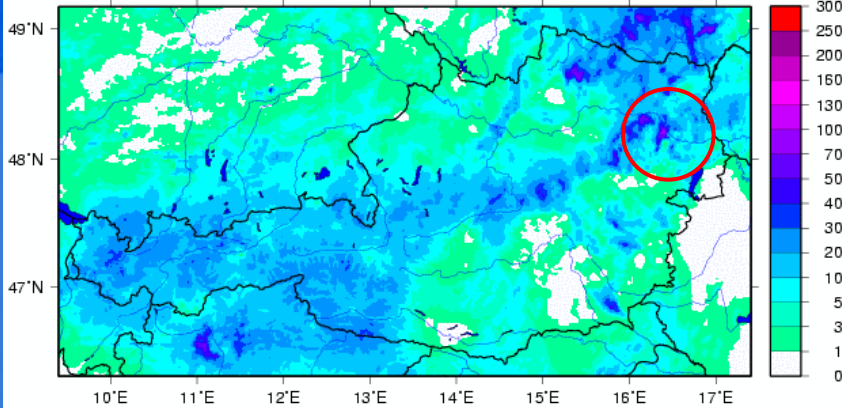
82mm/12h in downtown Vienna
44mm/30min 11.30-12.00 UTC



Case study2: 8th June 2011 – Thunderstorms over Vienna

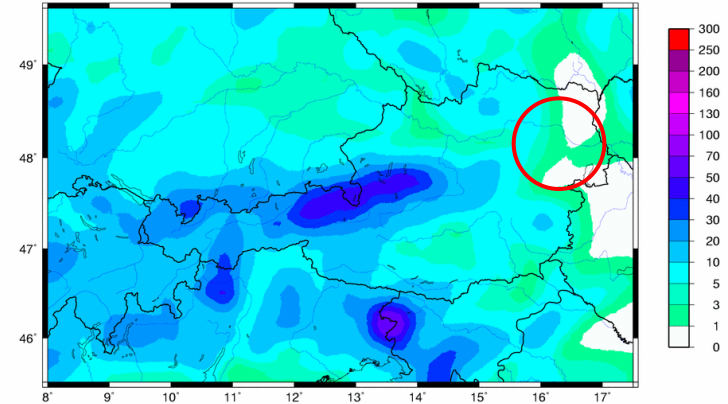
Precip. 00 UTC +24h

INCA Precip. Analysis [mm] 20110609 00 UTC, 24 h sum



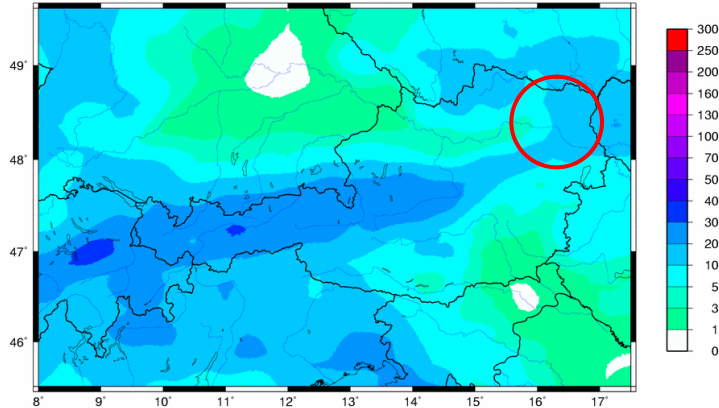
INCA-ANALYSIS as reference

ALADIN-AUSTRIA prec [mm/24h], 20110608 00 UTC + 24 h (= 20110609 00)



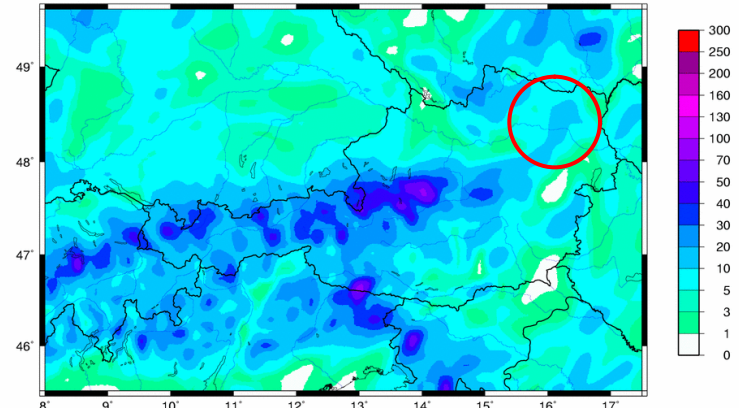
ALADIN_AUSTRIA9.6

ECMWF-T1279 prec [mm/24h], 20110608 00 UTC + 24 h (= 20110609 00)



ECMWF-IFS

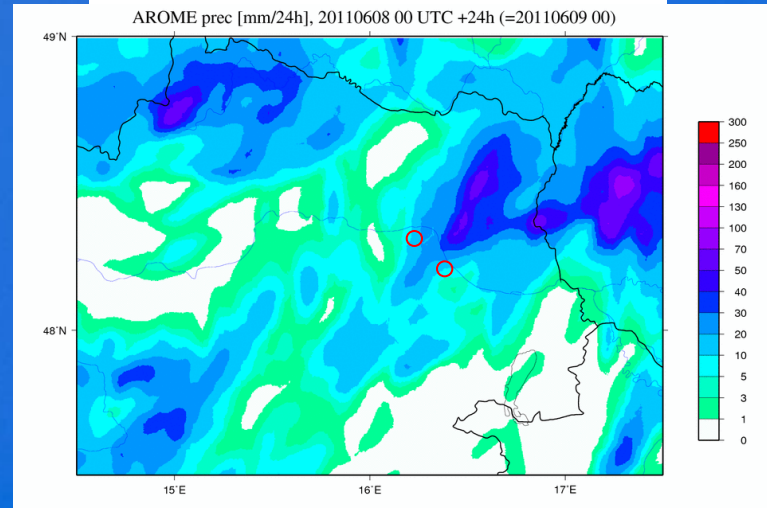
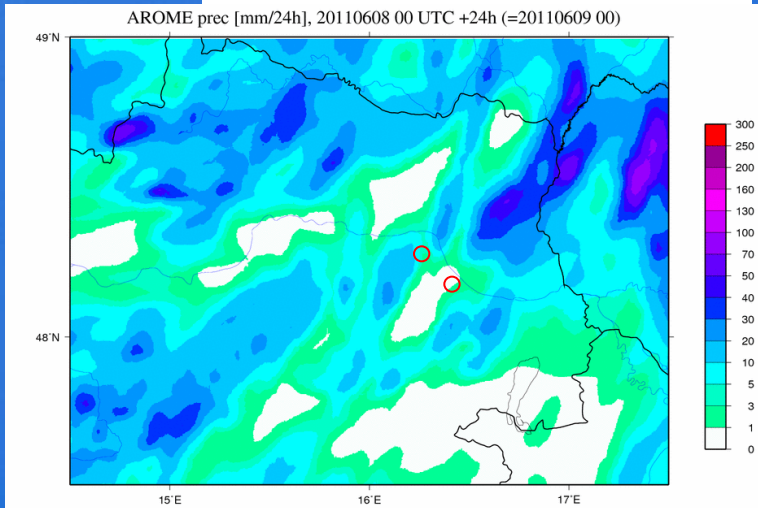
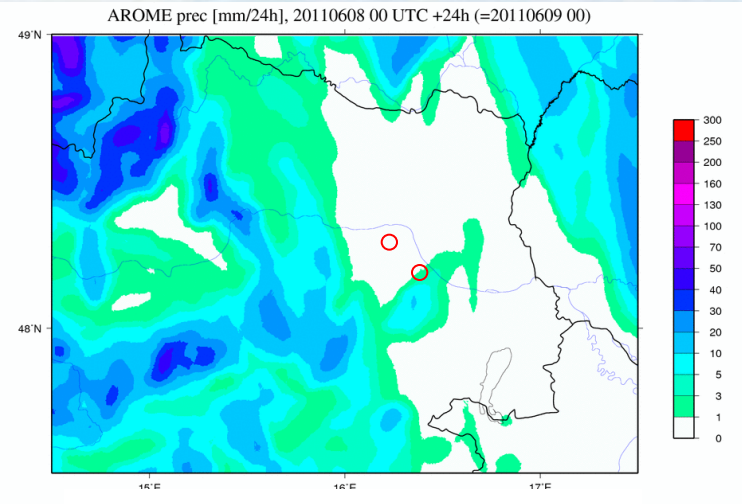
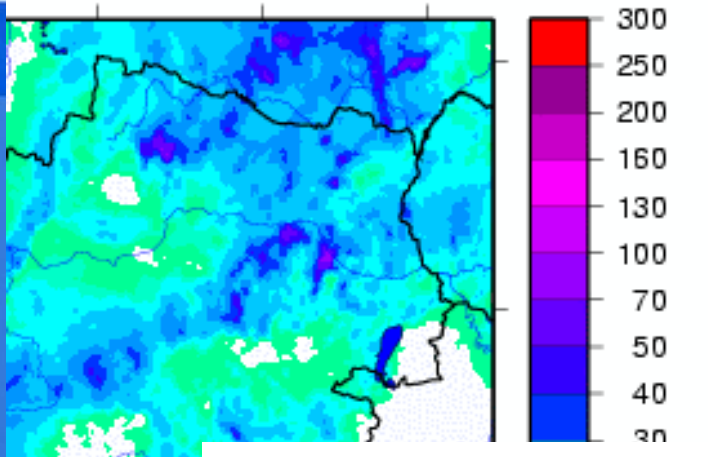
ALARO5-AUSTRIA prec [mm/24h], 20110608 00 UTC + 24 h (= 20110609 00)



ALARO4.8km



Case study2: 8th June 2011 – Thunderstorms over Vienna

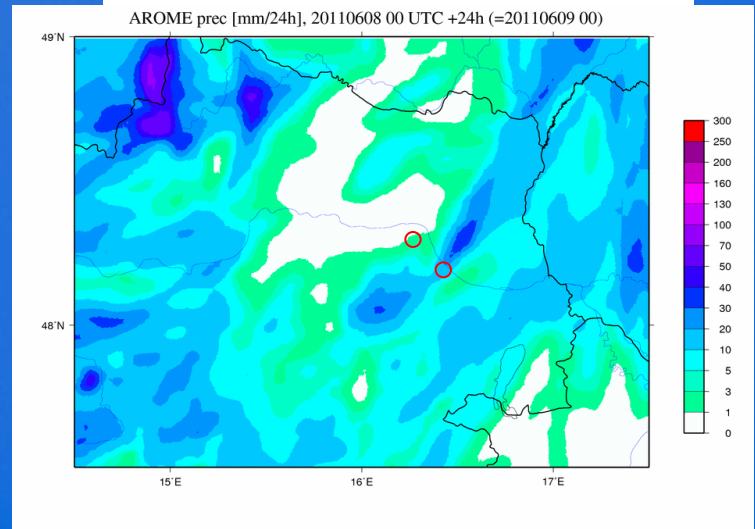
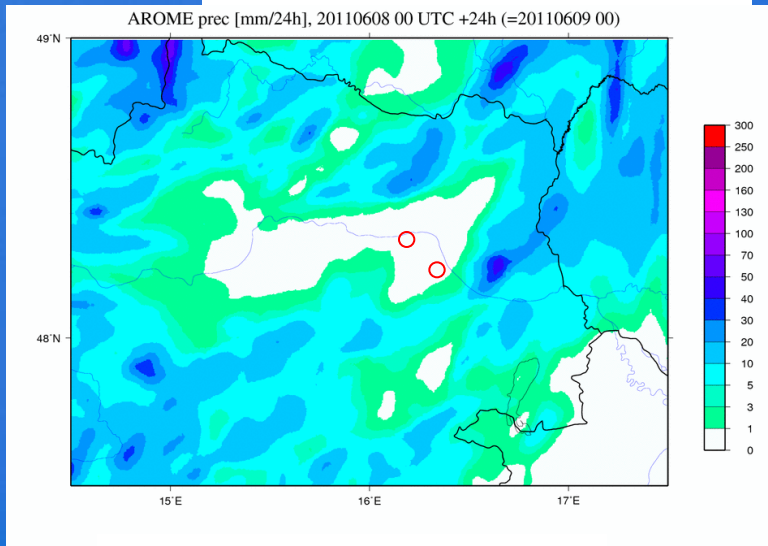
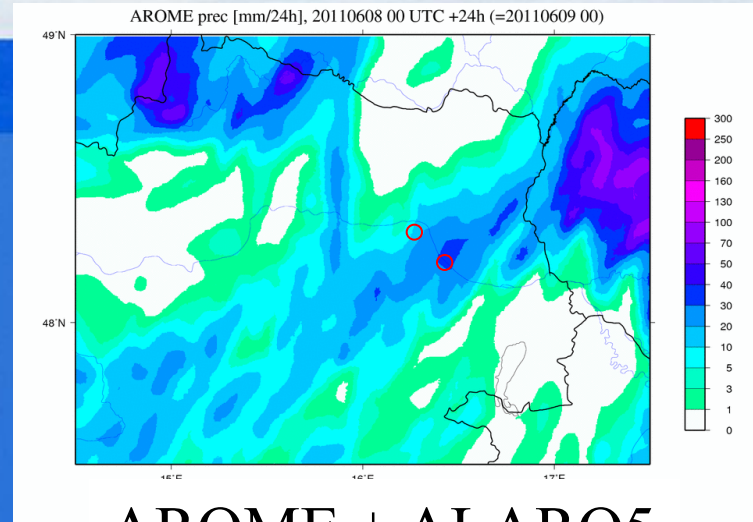
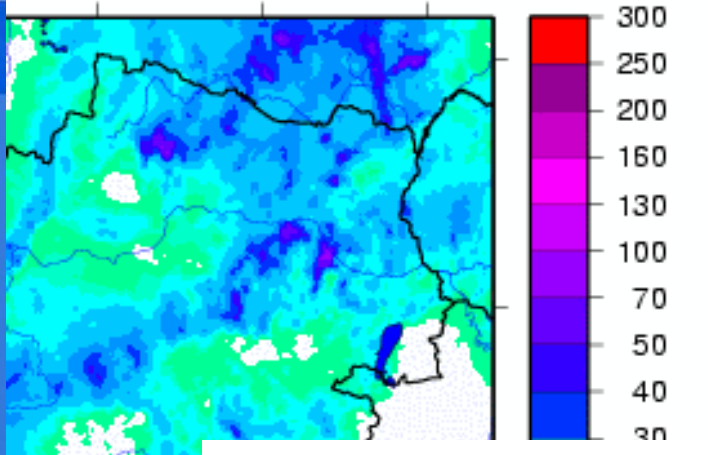


AROME+ECMWF

AROME+ECMWF+ALARO5-soil



Case study2: 8th June 2011 – Thunderstorms over Vienna

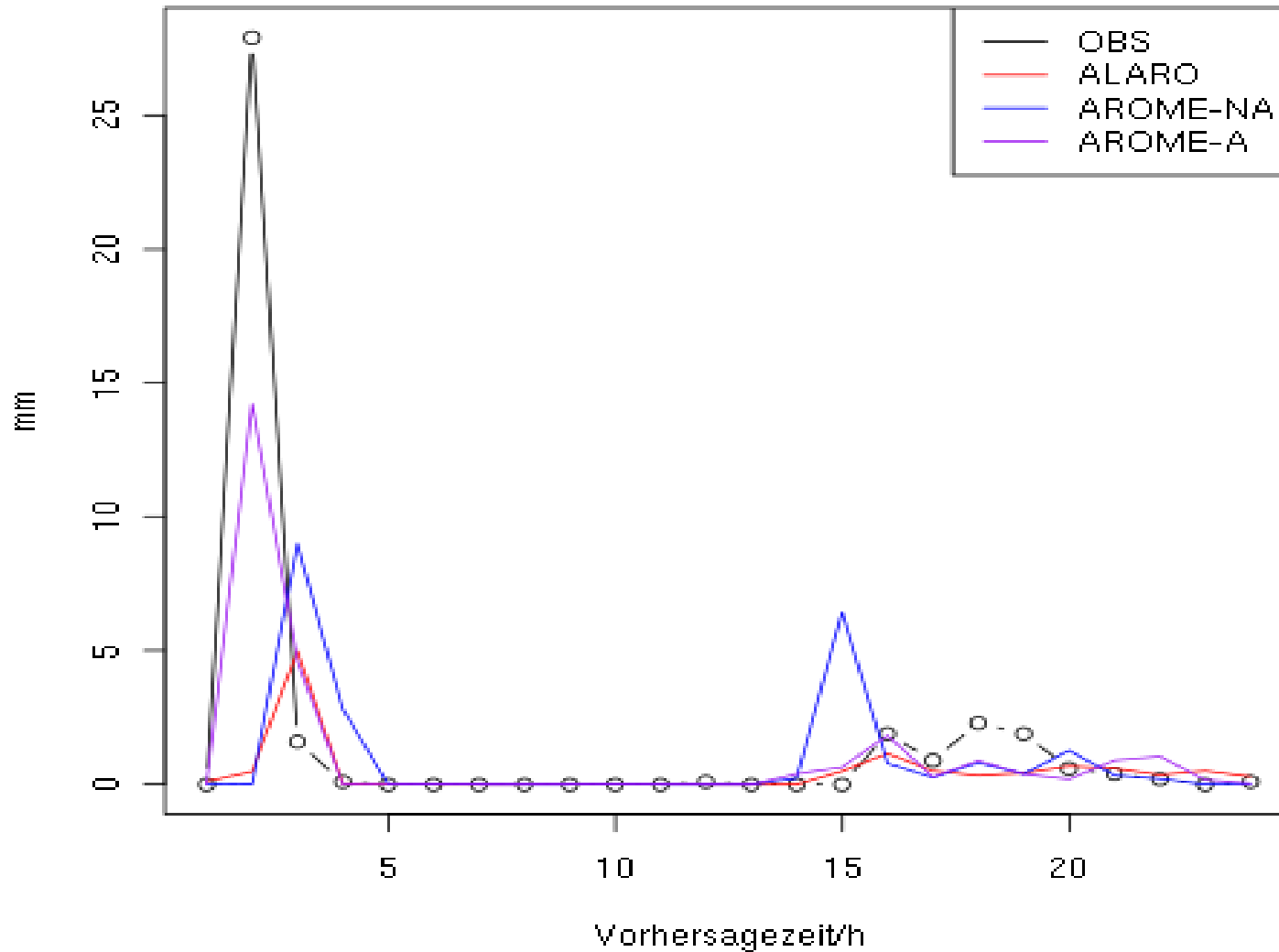


AROME+ASSIM

AROME+ASSIM+10m wind ASSIM

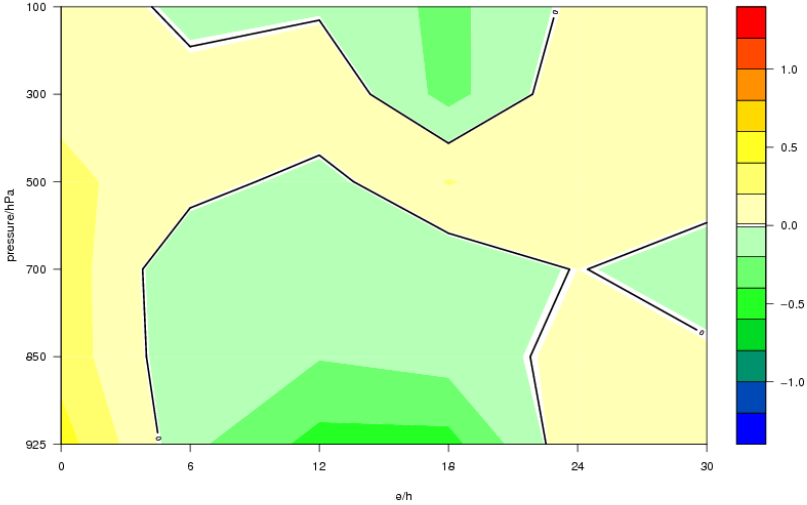
precipitation in Eisenstadt

Niederschlag in Eisenstadt 14.5.2011 12UTC+24h

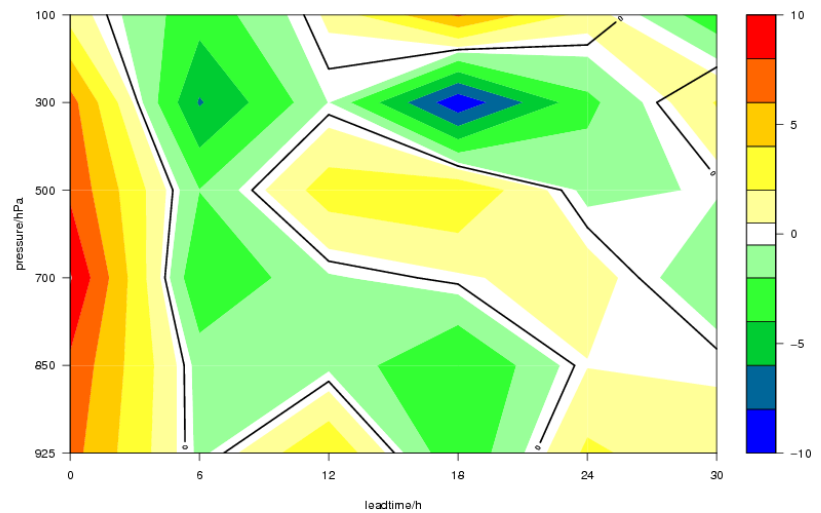


ALARO4.8km – AROME ASSIM vs radiosoundings

RMSE of TEMP; ALA5-EX92

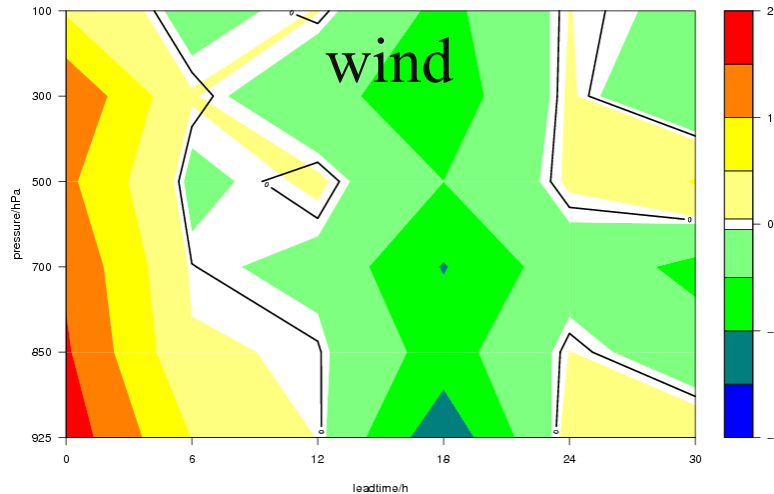


RMSE of HUMI; ALA5-EX92



temperature

wind



rel. humidity

AROME better

ALARO better

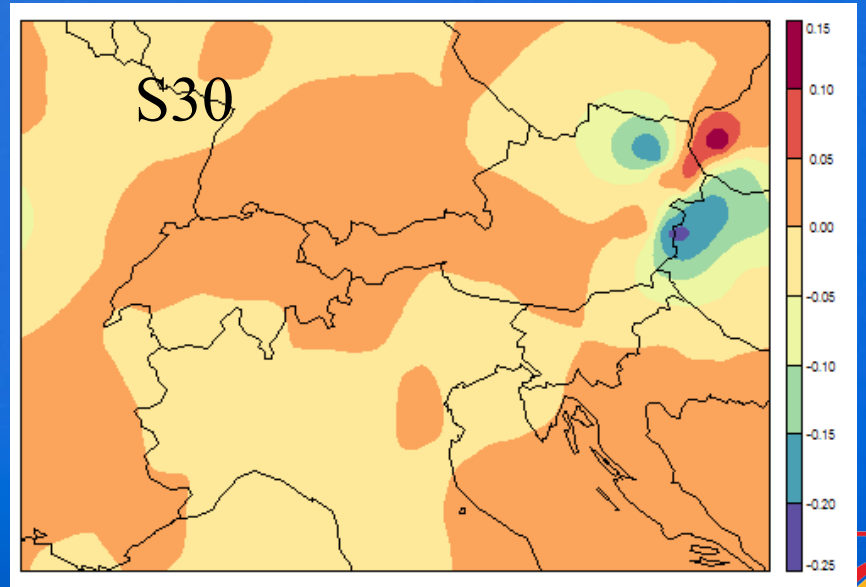
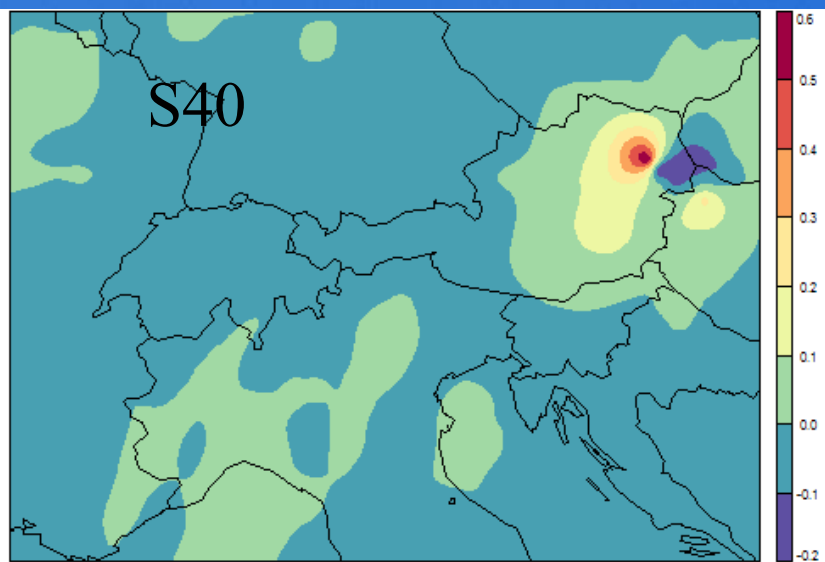
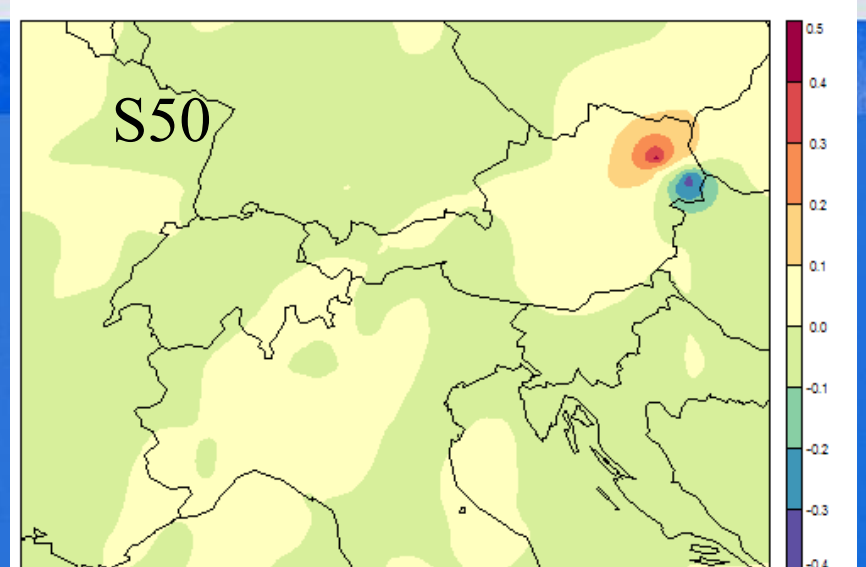
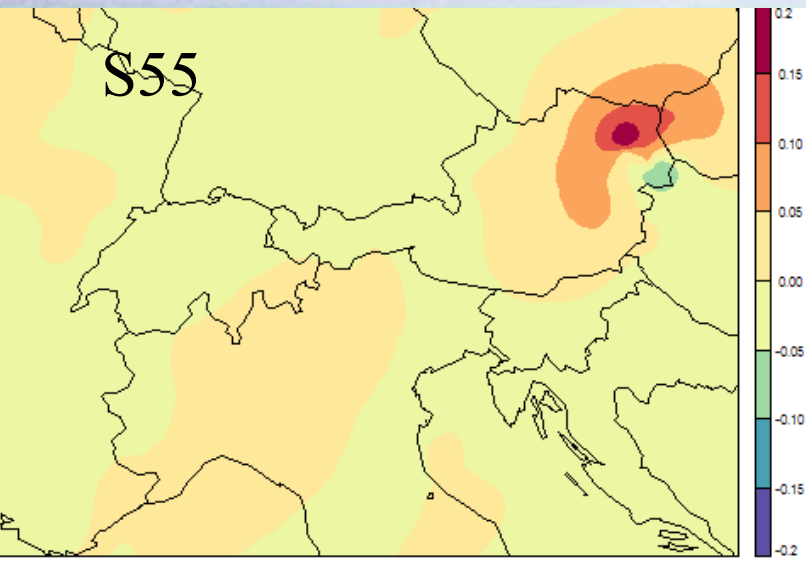


Radar assimilation

- Using Conrad to convert the local radar data to MF bufr format.
- Technically running and increments obtained.
 - bator_decodbufr.F90 used the meteo france cy36t1 exported version , with just one modification:
sensibilite = -112
constante = -112+30
- Increment Example from 2011120515UTC run



Increment temperature



Increment S50 Radar

