Regional Cooperation for
Limited Area Modeling in Central Europe

LACE
nwp central europe

ALARO experience in Slovenia

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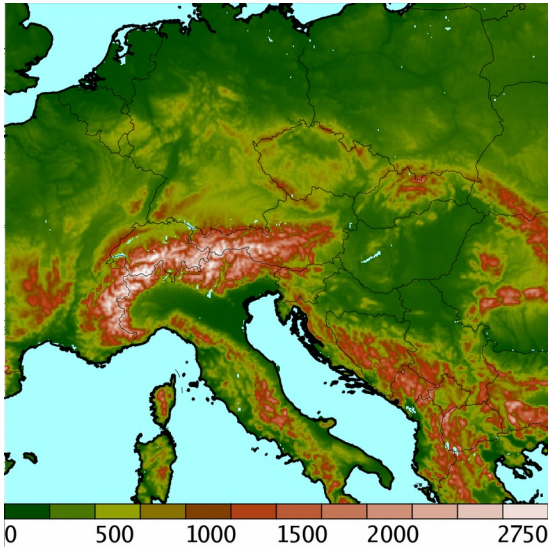
DHMZ SHMÚ ARSO METEO Slovenia OMSZ ZAMG ROMANIA ANM

OUTLINE

- Operational application
- SURFEX off-line
- Plans

Operational suite

- CY40T1, ALARO-1vB,
- 4.4 km horizontal grid spacing, 421x421 points, 87 model levels,
- 180 s time-step
- aosruc04ec
  - 00, 06, 12, 18 +72 h, 03, 09, 15, 21 +36 h,
  - coupling at every 3 hours, LBC from ECMWF time lagged coupling
- aos04ar
  - analysis from aosruc04ec
  - 00, 06, 12 +72 h, 18 +60 h
  - coupling at every 3 hours, LBC from ARPEGE
- Assimilation cycle:
  - 3-hourly 3D-Var assimilation cycle (RUC),
  - B-matrix sampled from downscaled ECMWF ensemble members,
  - CANARI surface analysis using surface observations (T and RH at 2 m),
  - coupling frequency 1 hour,
  - space consistent coupling, no digital filter initialization,
  - observations: OPLACE data and local observations (SYNOP, Mode-S MRAR).



Operational suite - updates

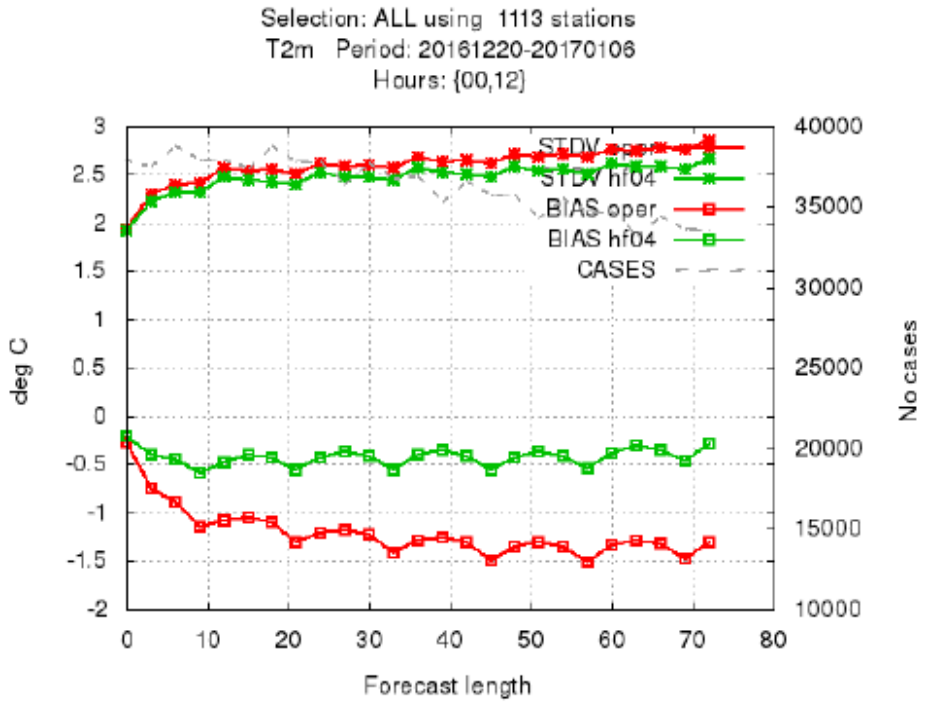
July 2017

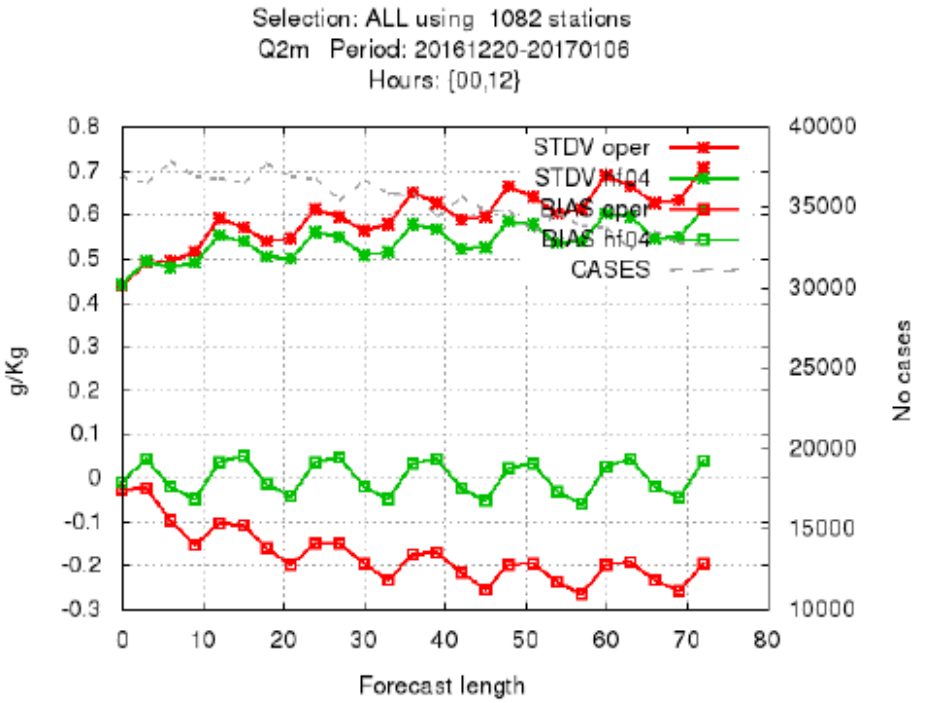
- cy38 → cy40
- ALARO-0 → ALARO-1vB
- Novelties in DA (satellite observations)

Ongoing

- cy43t1bf10 export
  - with “convective” pack
  - visibility

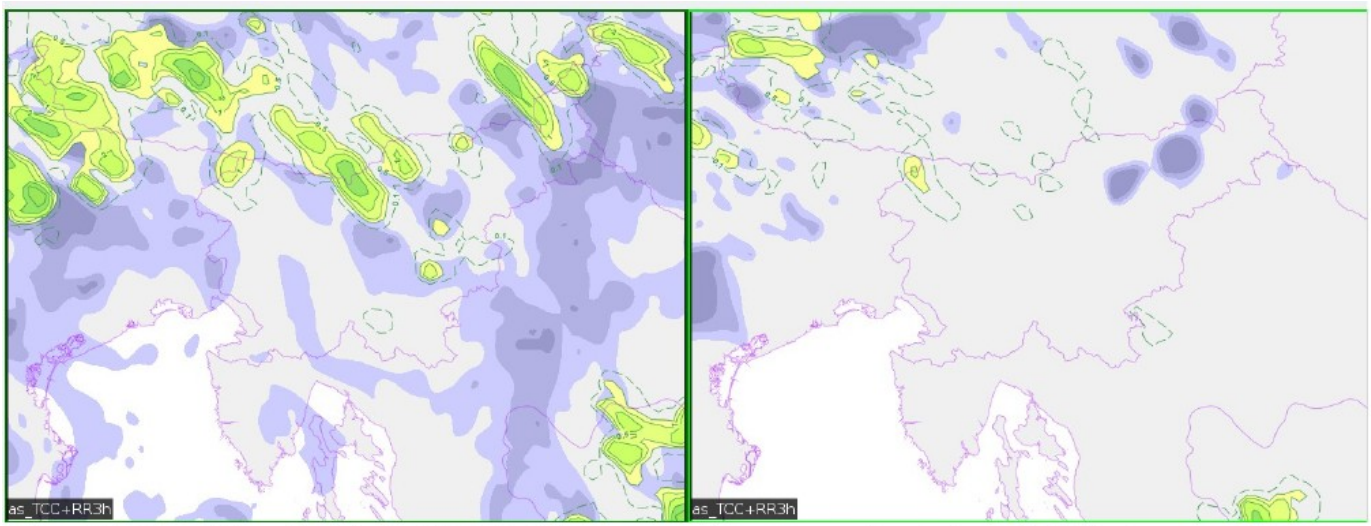
ALARO-0 vs ALARO-v1B



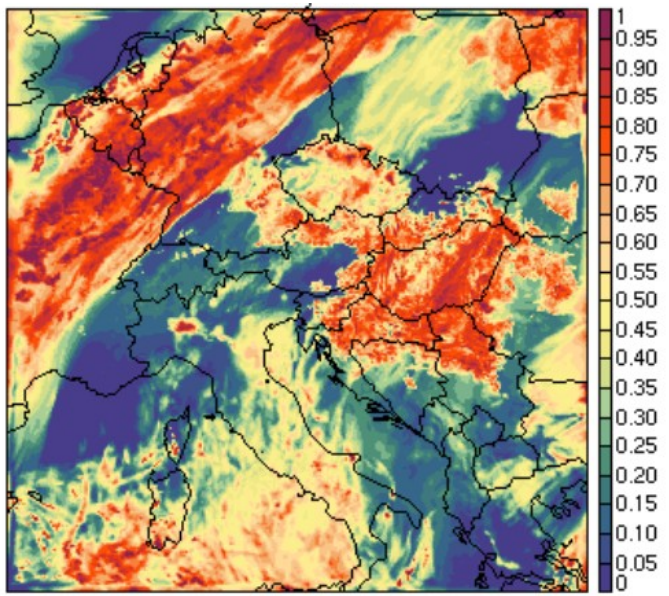


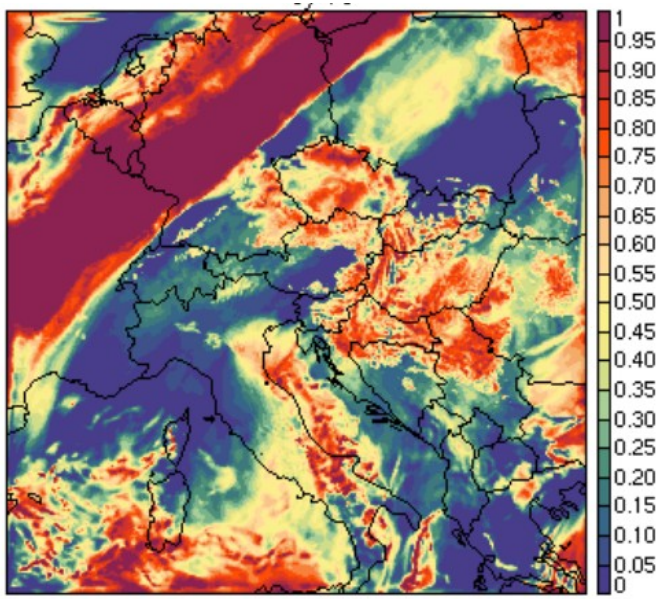
- Major improvements of surface scores, small upper-air impact

ALARO-0 vs ALARO-v1B



Improvements in convection, cloudiness, ...



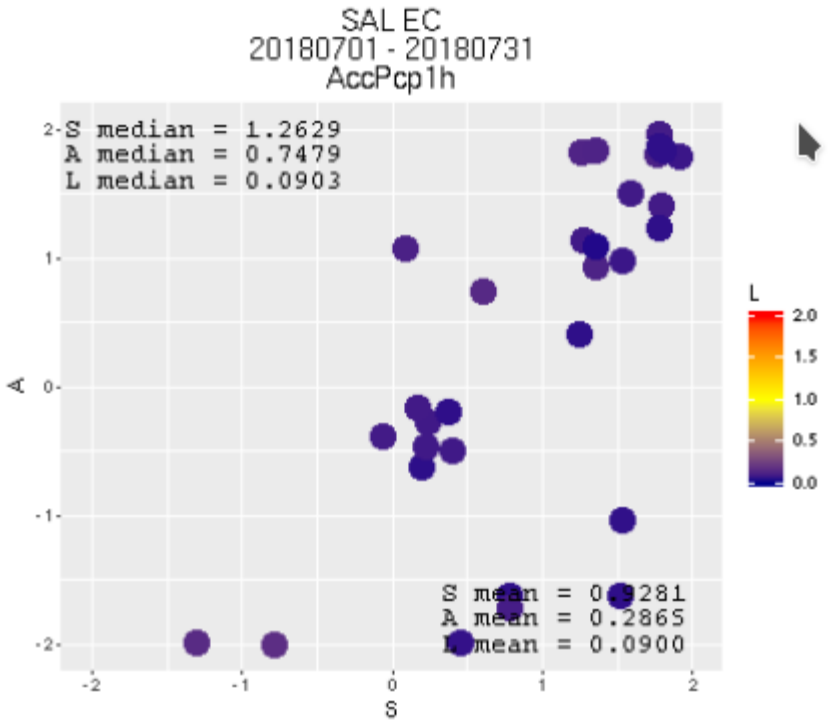


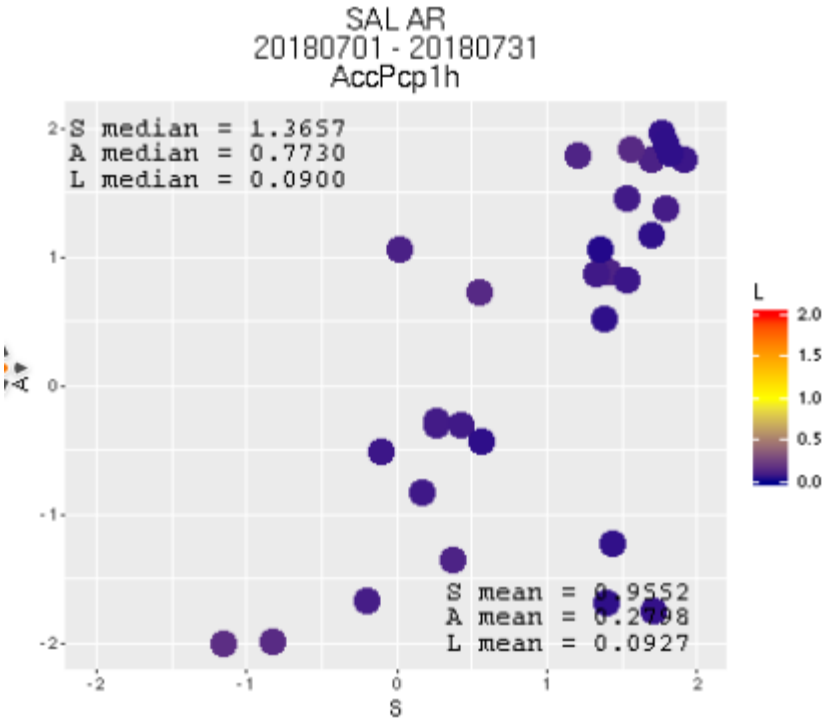
Operational suite

Why is aos04ar useful?

- as second opinion in the forecaster's process
- time of products availability is important
- aosruc04ec RR+2:15, lagged LBC
  IFS RR-6h, lower resolution
- aos04ar RR+3:30|4:30, LBC based on the
  ARPEGE RR,
- verification scores very similar, can differ for 2 and 3 day
- in some cases very useful

Operational suite





SAL verification 1h precipitation July 2018

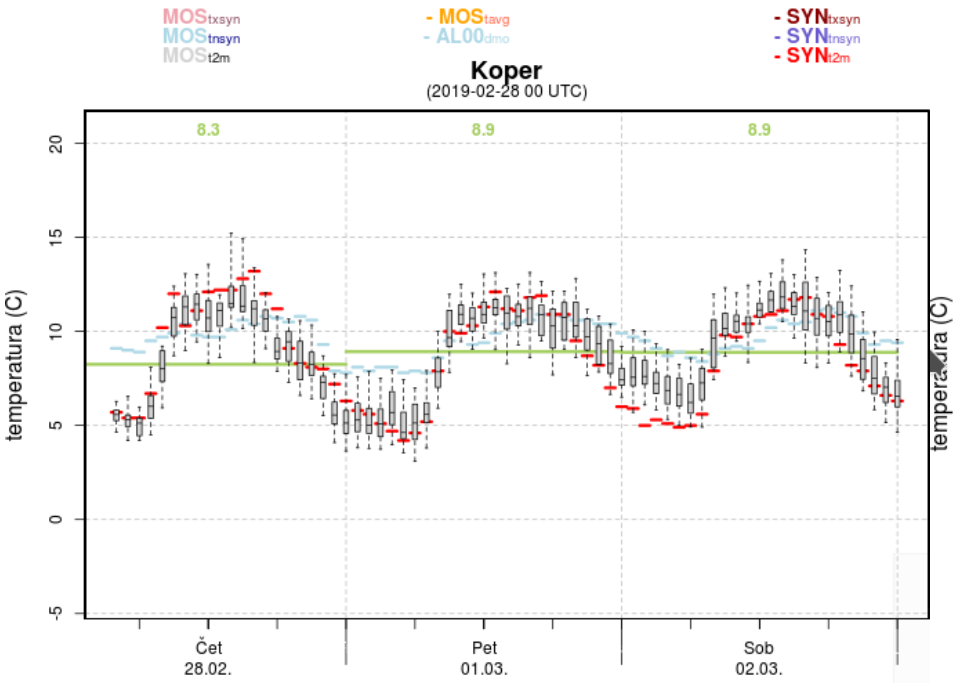
aosruc04ec aos04ar

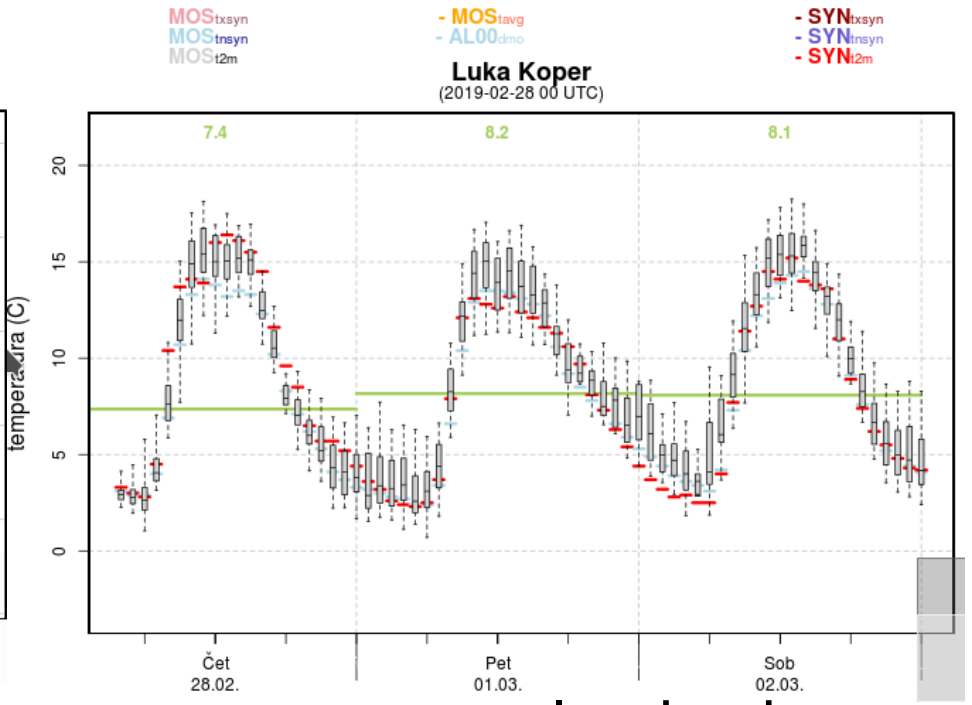
Hind forecasts

- ALARO-1vB, cy40t2, (as current oper)
- 5 years 2013-2018
- assimilation run: analysis every 3 hours
- production: 00run+72h
- archive: ICMSH files +24h, selected fields +72h on smaller area

MOS

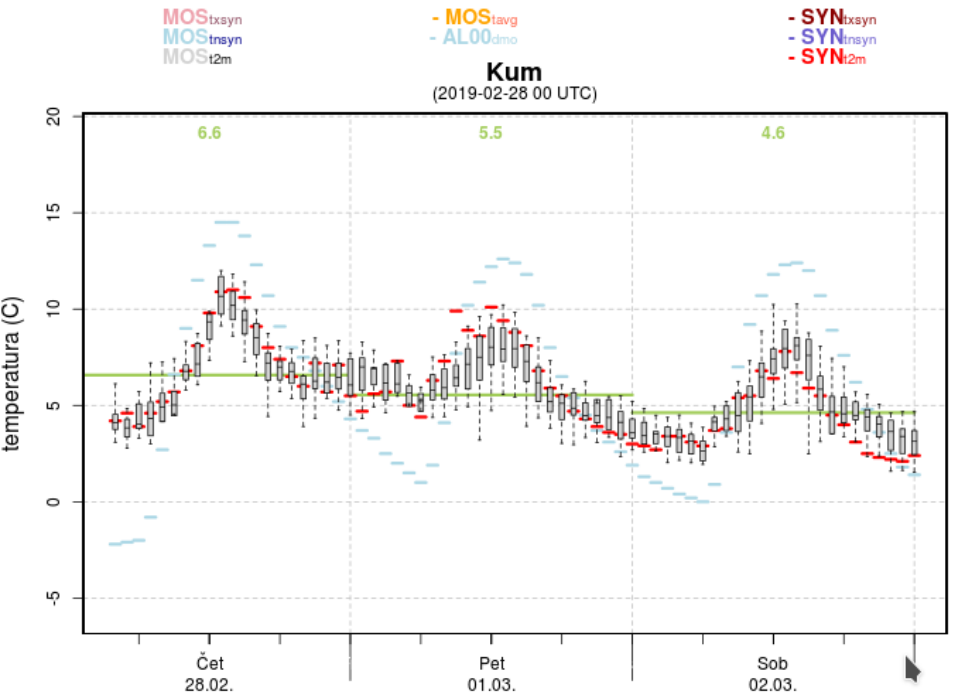
- quantil regression, 2m temperature, ~100 stations

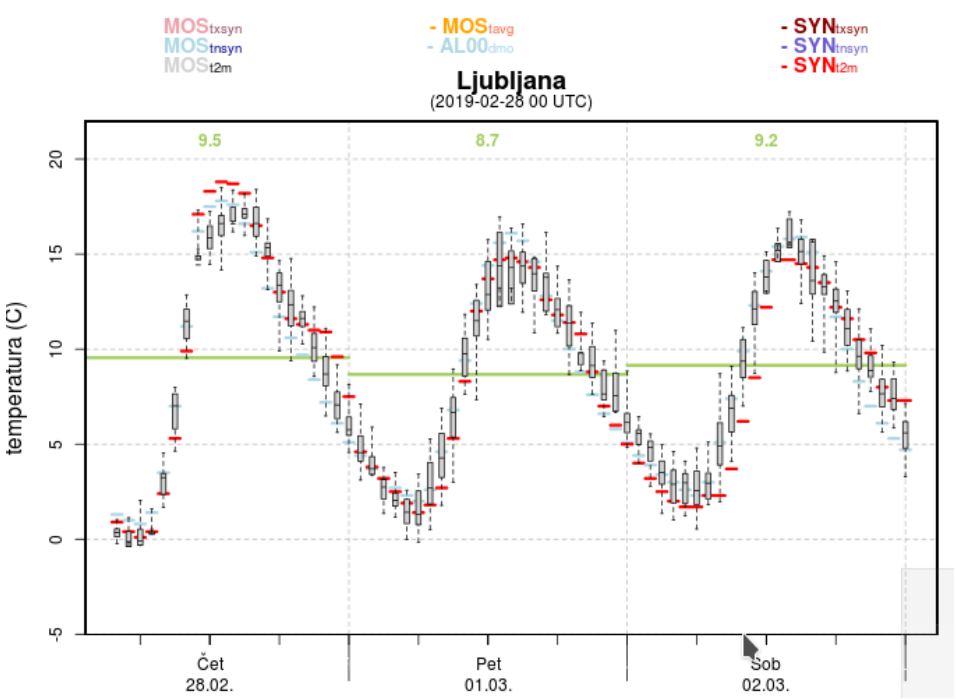




sea point coast land point

MOS





mountain

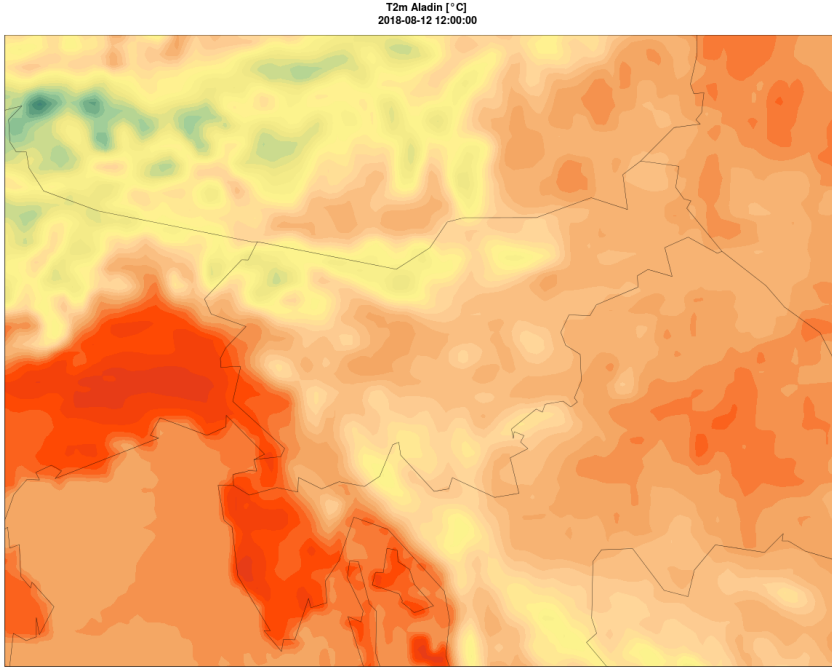
city

SURFEX off-line

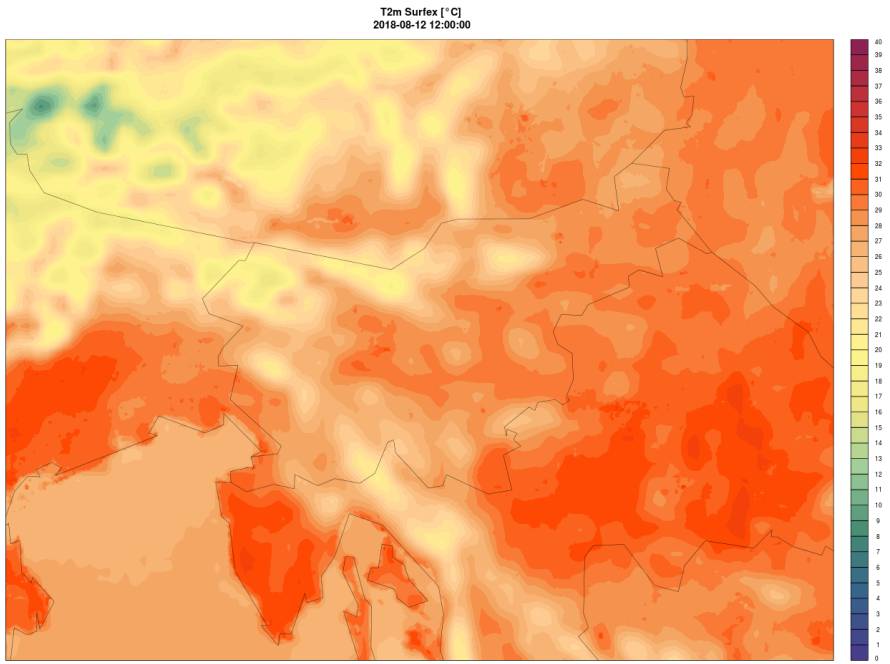
- down-scaling of T2m with SURFEX
- CROCUS snow model
  operational suite
  - analysis for last 24h hours, input from INCA
  - forecast for next 3 days, input from ALADIN

SURFEX off-line

- down-scaling of T2m with SURFEX



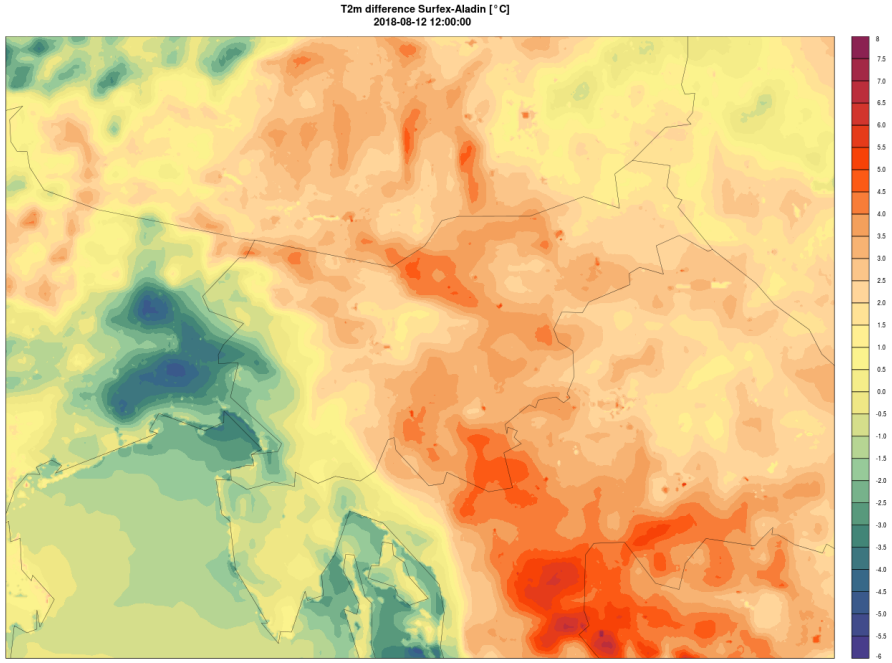
aladin



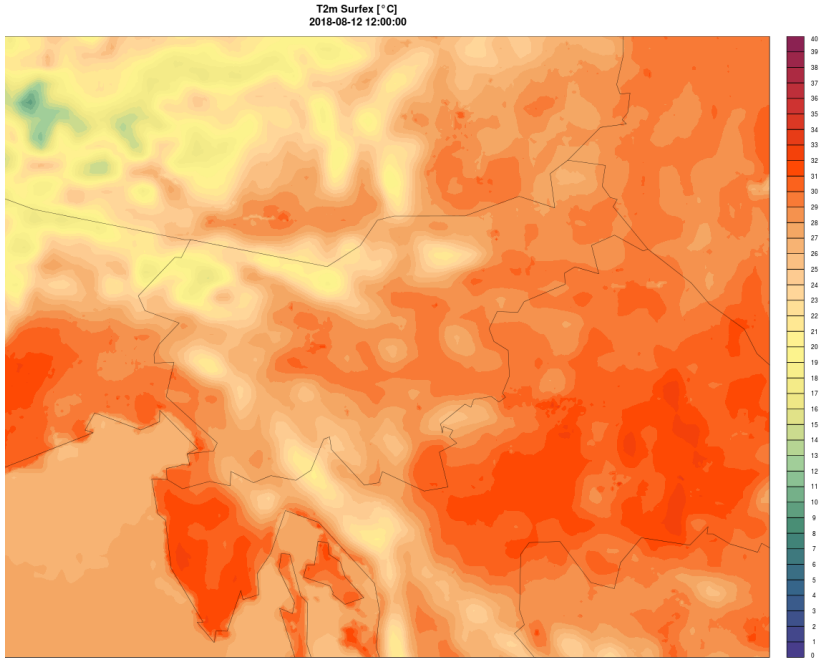
surfex

SURFEX off-line

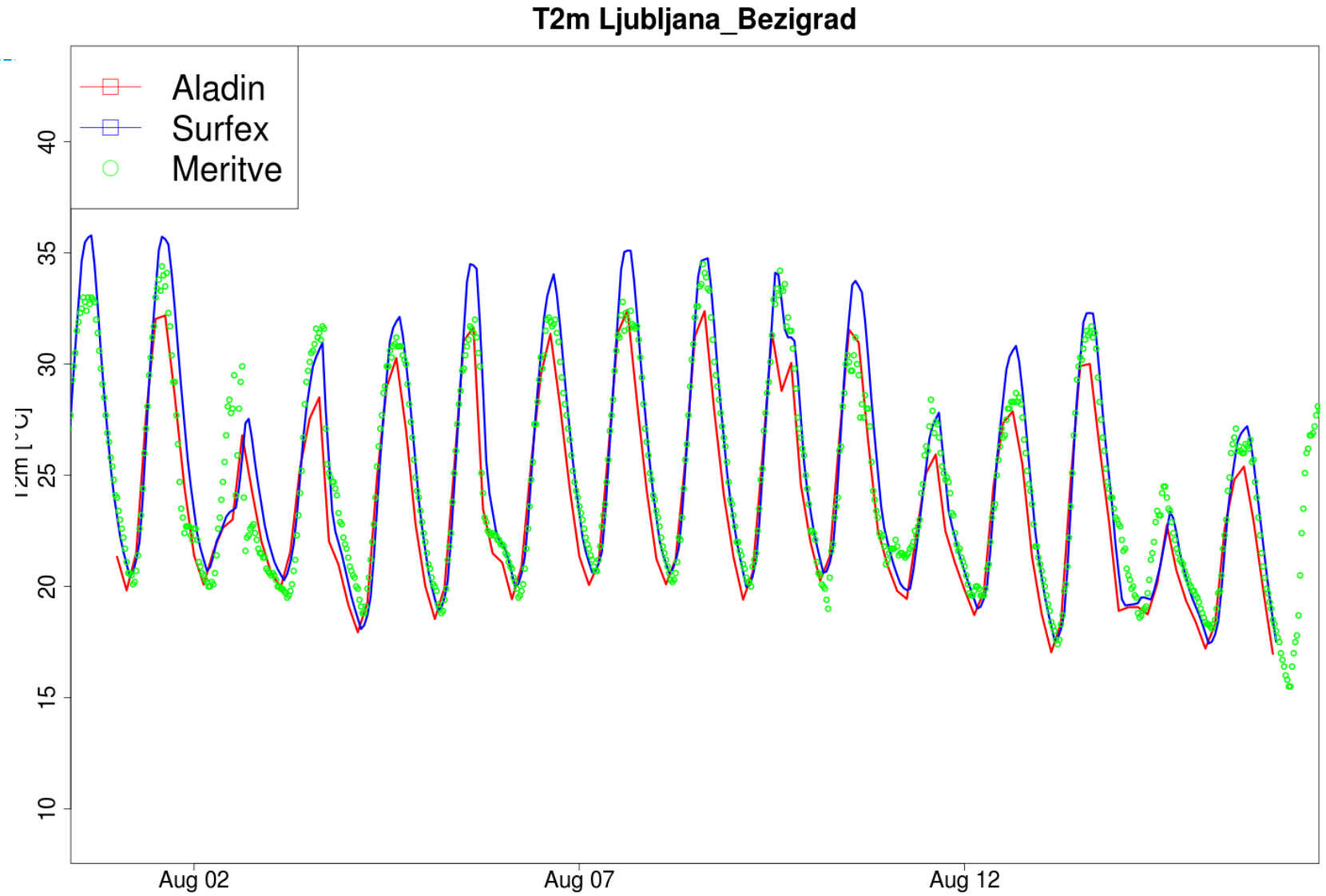
- down-scaling of T2m with SURFEX

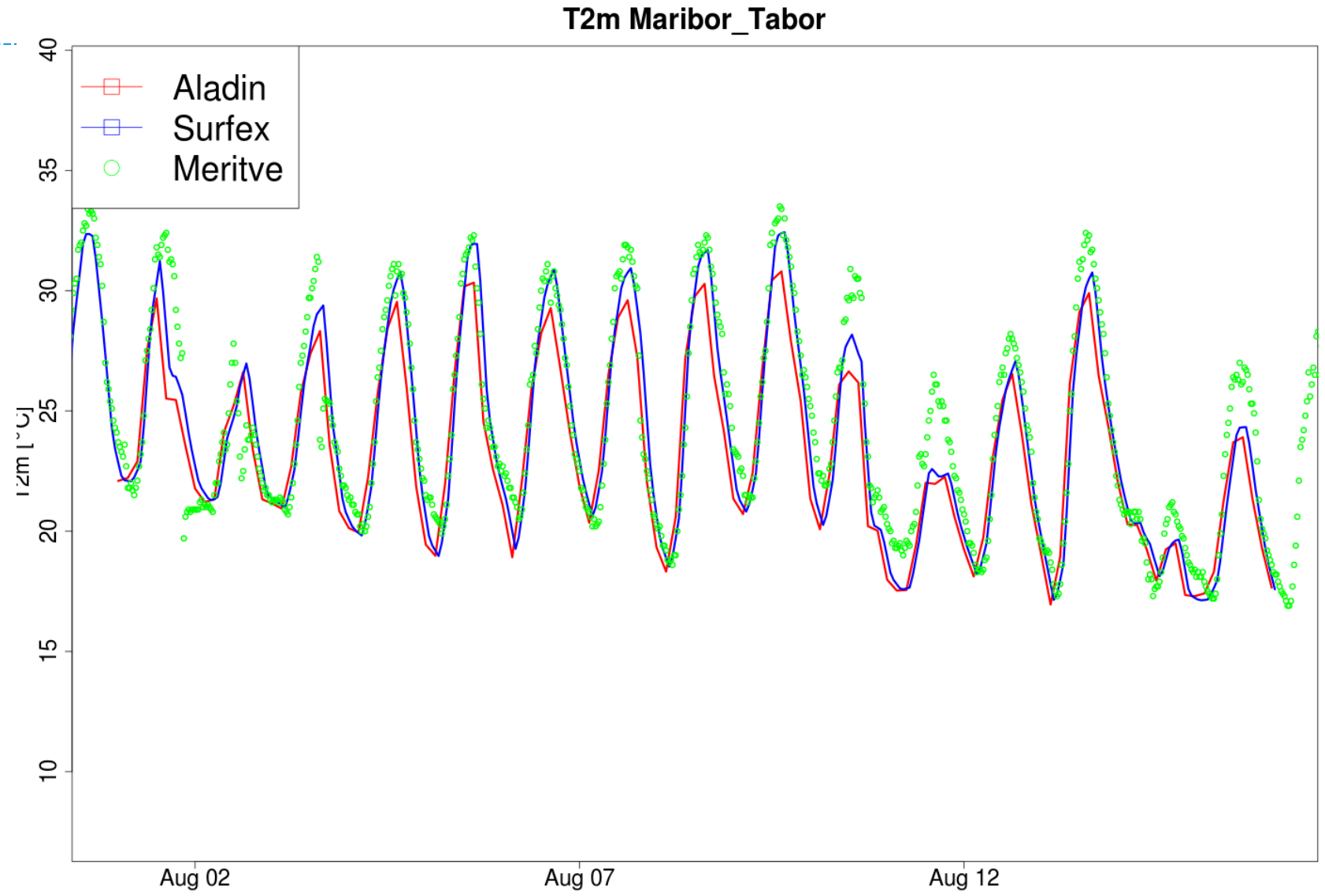


difference

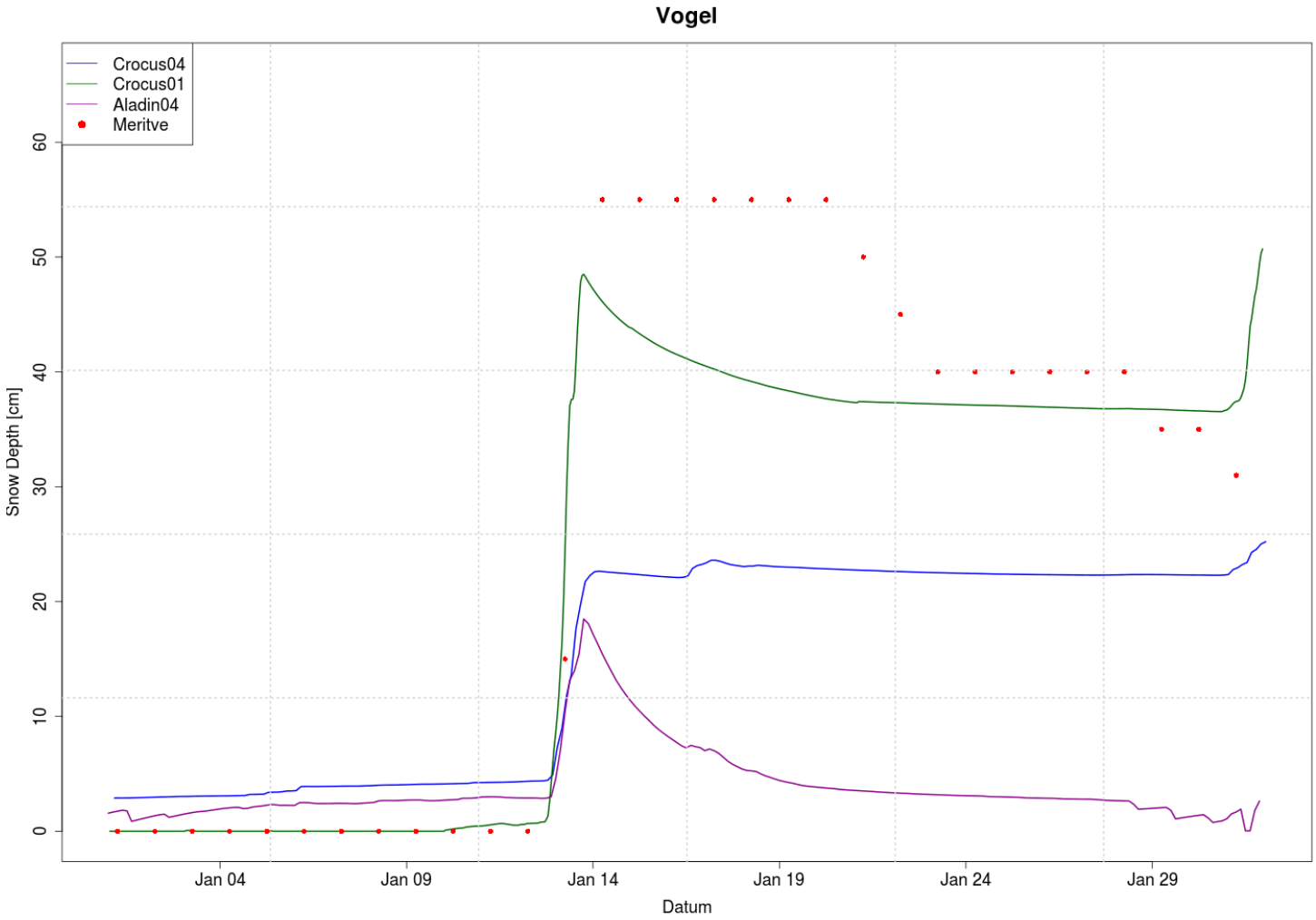


surfex

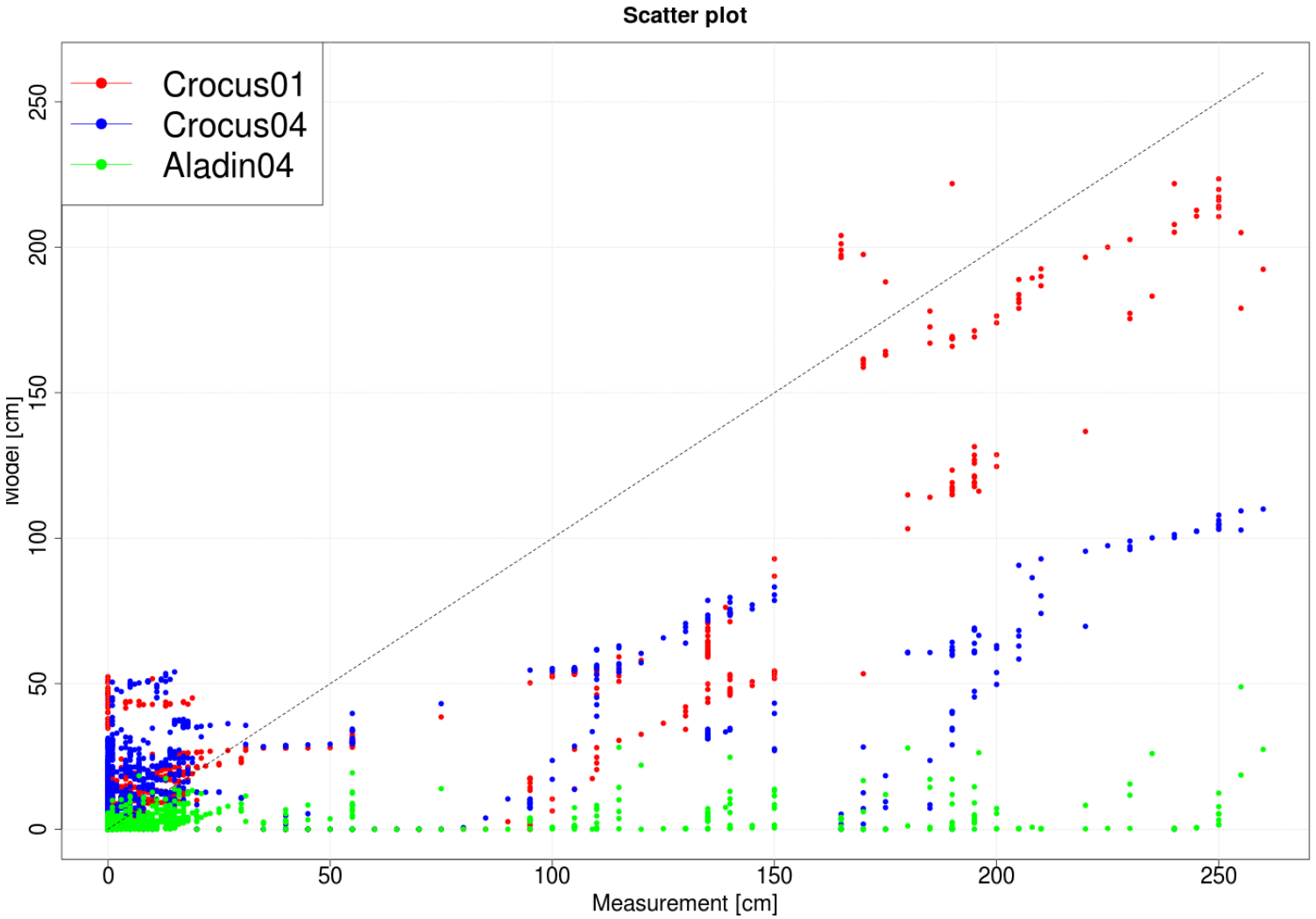

T2m Ljubljana_Bezigrad
Aladin
Surfex
Meritve
T2m [°C]
10
15
20
25
30
35
40
Aug 02
Aug 07
Aug 12


T2m Maribor_Tabor
Aladin
Surfex
Meritve
T2m [°C]
10
15
20
25
30
35
40
Aug 02
Aug 07
Aug 12

SURFEX – CROCUS model



SURFEX – CROCUS model



Products for users

Diagnostic fields

- convective pack adopted to CY43T2
- density of lightning
  - instantaneous field ok
  - cumulative field (not yet for alaro)
- visibility developed in Meteo-France (AROME, ARPEGE), tested with ALARO (PS stay)

- www production
- INCA
- Hydrological models
- CROCUS
- CAMX
- Ocean model NEMO
- special users (electro, road, forest,...)

Weaknesses

- Wind gusts tuning for NW and SW wind
- 2m temperature above surface covered by snow
- Low clouds, fog
- Temperature inversions

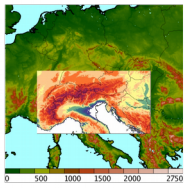
- Simulated radar reflectivity – very useful

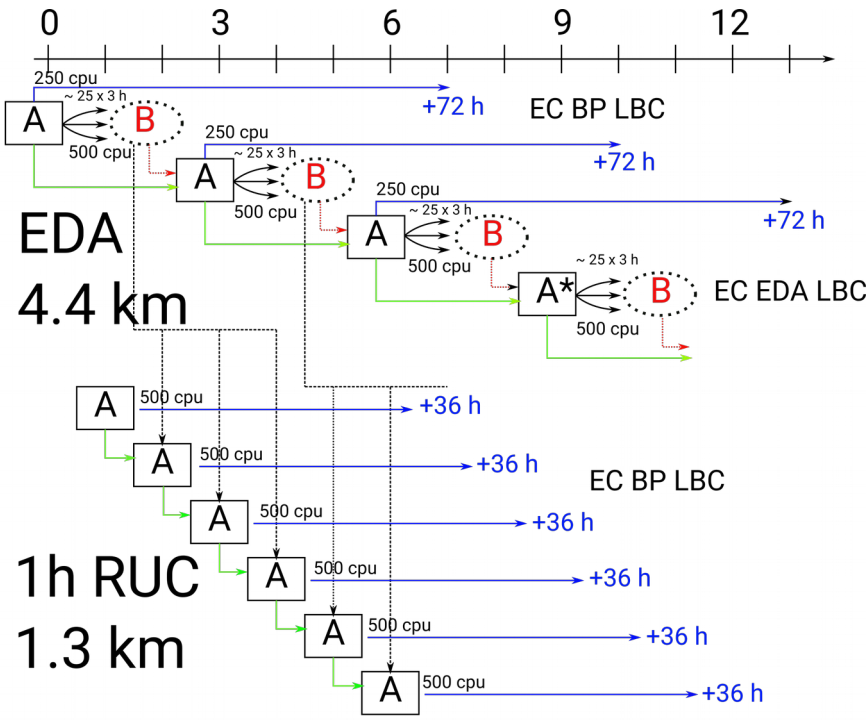
Plans

Keep 4.4 km model
(*flow dependent B)*

New 1,3 km +36 every 3h

RUC every 1 hour
(local data, radar, ...)





Domain size

Challanges
NH-dynamics, physics, SURFEX,
quality of physiography fields