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ALADIN activities in Romania

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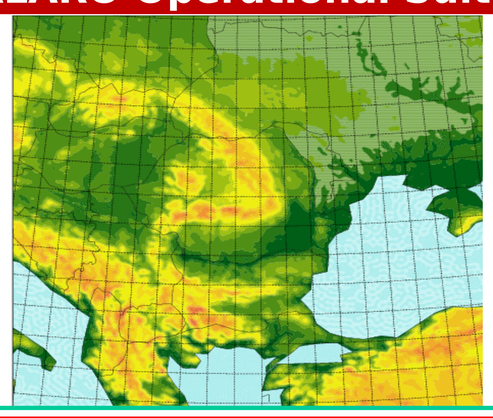
ALARO Operational Suite



Characteristics

- cy40t1 – **ALARO-0 baseline**;
- semi-implicit semi-Lagrangian 2TL, Δt=240 s;
- Δx=6.5 km, 240 x 240 points, 60 vertical levels, linear grid, Lambert projection;
- LBC from ARPEGE (3h frequency), DFI Initialization;
- 4 runs /day 00, 06, 12, 18 UTC - no DA;
- forecast range: 78/54/66/54 hours;
- physical parameterizations : ALARO-0 including developments concerning thermodynamics adjustment, microphysics, moist deep convection.

Downstream applications

Atmospheric input from ALARO for:
- hydrological model
- wave model

Post-processing

FULLPOS in line – geographical grid (0.06° x 0.085°)

Visualization

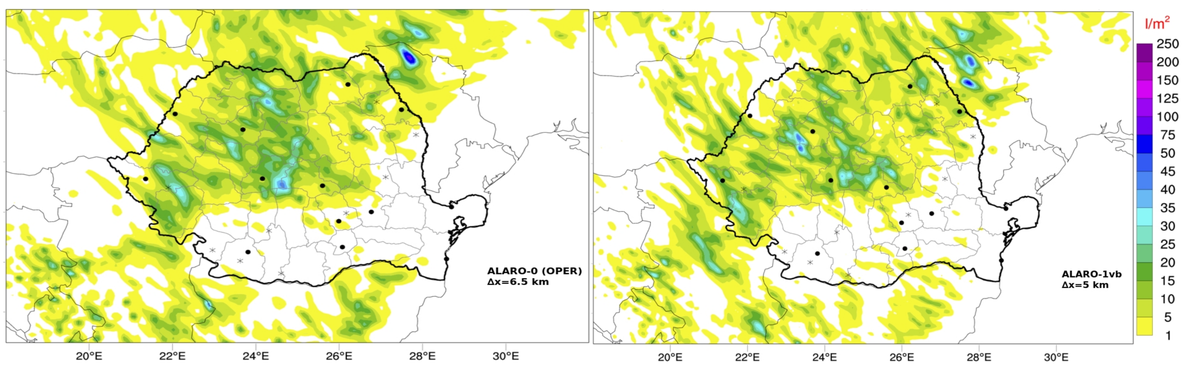
- Graphics based on package developed within NMA and RC-LACE, based on grib_api, perl and NCL-NCAR

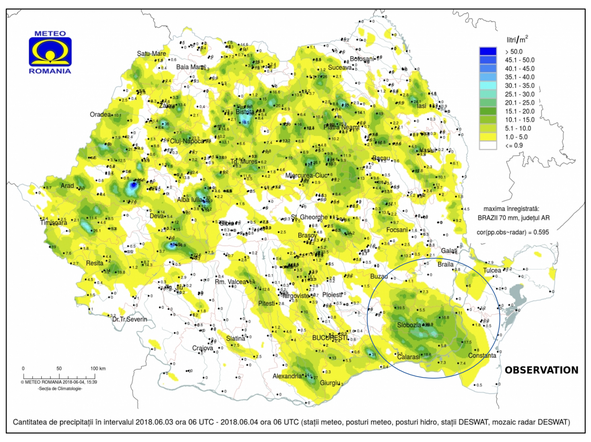
Statistical Adaptation Verification

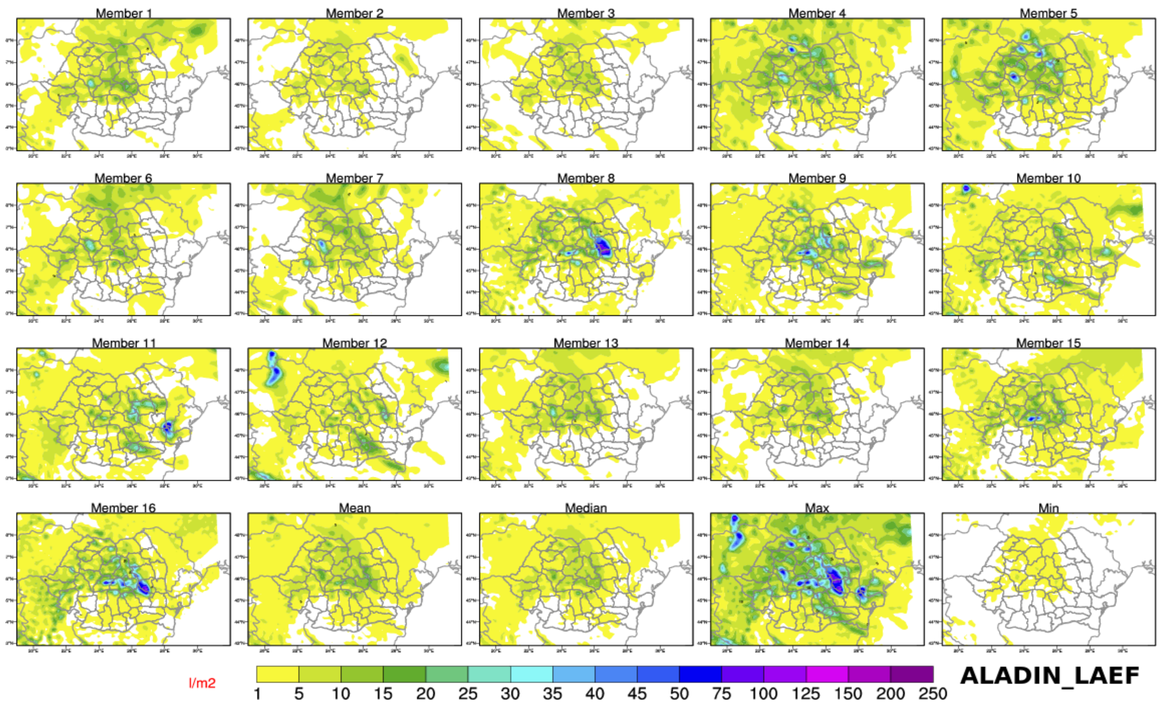
Case study: 3th of June 2018

- mesoscale convective system developed due to the intrusion of cold air masses from the North
- **24-hour cumulated precipitation: 03.06.2018, 06 UTC – 04.06.2018, 06 UTC**

- ALARO-OPER and ALARO-1vb failed to simulate the precipitation amount in the SE region; still the operational version completely missed the area

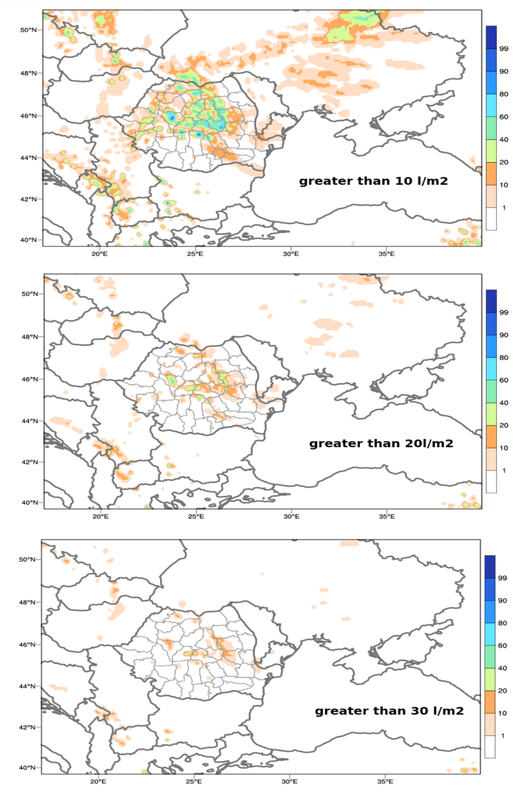






- the probabilistic approach: 10 out of the 16 members simulated the precipitation area from the SE region; members 9 and 10 are the most skillful and predicts more than 10 mm of rain at the specified location

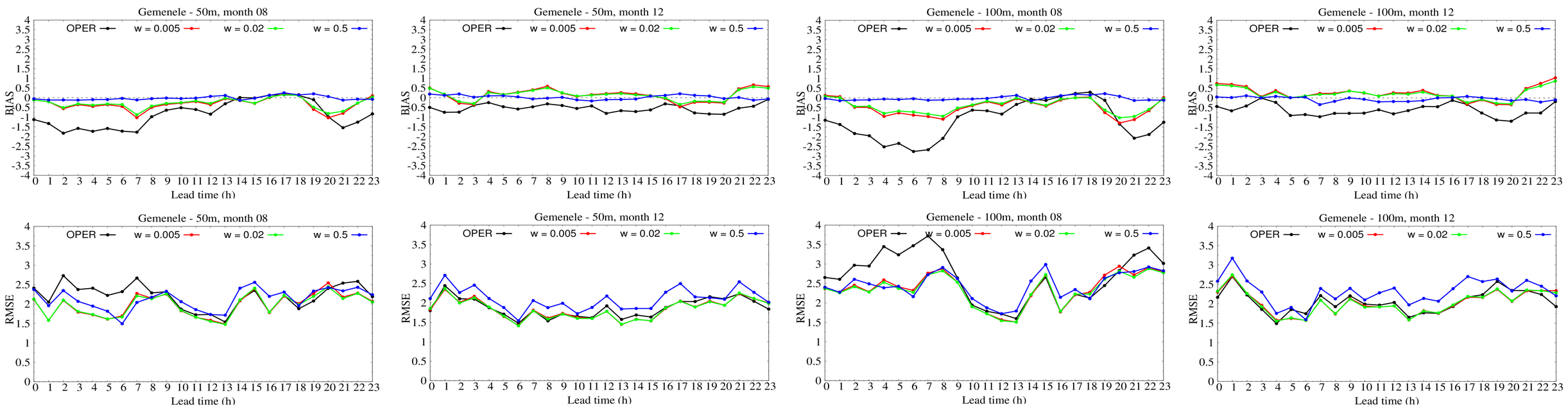
- the behaviour of the ALADIN-LAEF system is also investigated considering the probability forecast of the event "24-hour cumulated precipitation exceeding 10 mm, 20 mm and 30 mm; the probability of occurrence of the event in the SE region is predicted in the areas where the precipitations were observed



Bias correction for wind speed forecast

- a bias correction method (Cui et al, 2012) was applied to wind speed forecast
- weights used in the method are: 0.005, 0.02, 0.5
- ALARO simulated data + wind speed measured at tower located in a wind farm in SE Romania
- period: March - December 2015, hourly data, 00 run, up to 24 forecast range
- 2 height levels 50 and 100 m

- monthly scores (bias and RMSE) shown for August and December
- slightly larger bias is observed at 100 m for the raw forecast
- similar performance for the corrected forecast for both 50 and 100 m
- the post-processed forecasts lead to decrease in bias
- there are no significant differences regarding RMSE



Reference: Cui, B., Z. Toth, Y. Zhu, and D. Hou, 2012: Bias Correction for Global Ensemble Forecast. Wea. Forecasting, 27, 396–410.

Comparison of ALARO-0 (OPER) and ALARO1-vb during the 2018 convective season

- standard statistical scores (BIAS and RMSE) were computed for the surface parameters: 6h precipitation (RR06), 2m relative humidity (RH2m), 2m temperature (T2m)
- the forecast frequency is 6-hour and the verification length is up to 30-hour lead times, 00 UTC

ALARO1-vb:
- some improvements for RR06 and RH2m for the first day
- concerning the T2m, for the first 6 hours, there is slight difference in BIAS between the two versions
- in terms of RMSE, the two versions have the same pattern