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NWP activities in Romania

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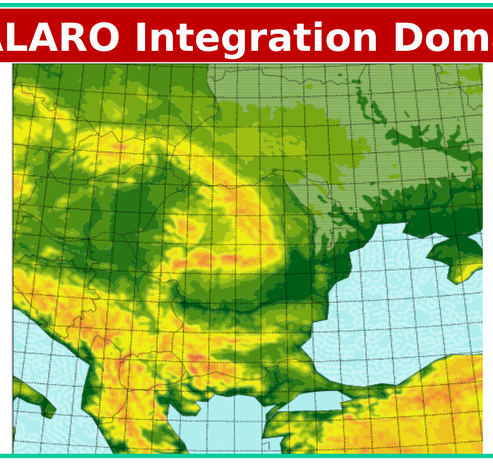
ALARO Integration Domain



Operational setup:

- **cy43t1 – ALARO-0**
- 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

Post-processing

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

Visualization

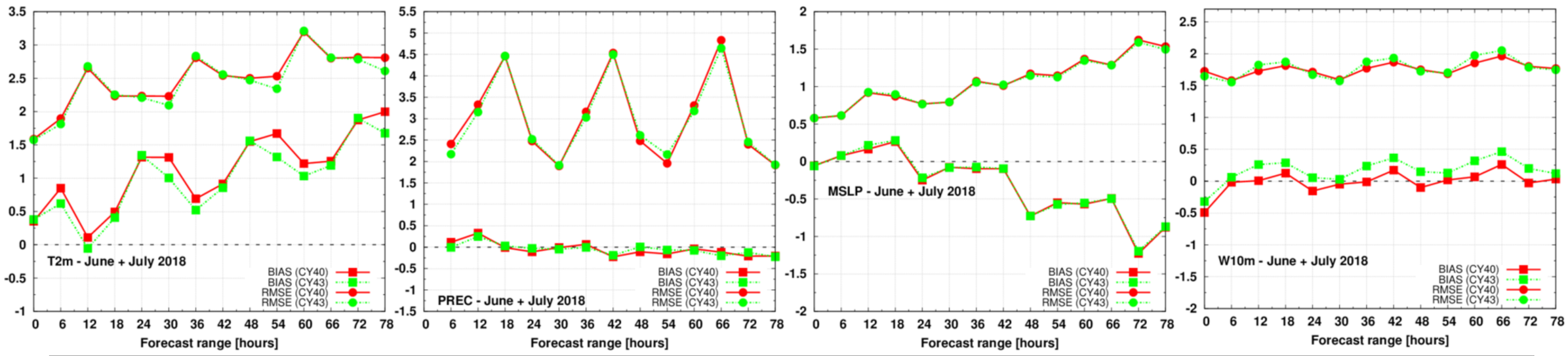
Graphics based on package developed within NMA and RC-LACE, based on grib_api, perl and NCL-NCAR

Statistical Adaptation Verification

Forecast validation: cy40 ↔ cy43

- validation of cy40 and cy43 was performed for a two month period: June and July 2018
- scores were computed for: 2 m temperature, 6 h accumulated precipitation, mean sea level pressure, 10 m wind speed
- verification was done for a forecast length up to 78-hour lead time from the 00 UTC run
- observation data from 157 synoptic stations in Romania

- the 2-month period was chosen due to its synoptic events
- over the summer season of 2018, a particularly large number of thunderstorms occurred mostly in western and central parts of Europe, causing severe wind gusts, large hail, excessive precipitation and a considerable number of flash floods

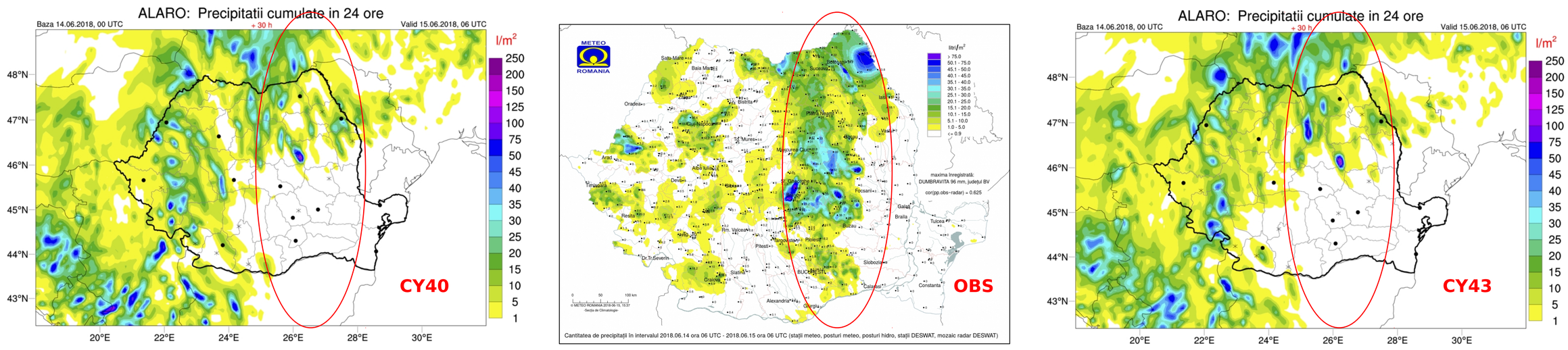


- generally, the scores (BIAS and RMSE) are similar between the two model versions, with small differences for 10 m wind speed

Subjective verification for two cases: 14th of June 2018 and 27th of June 2018
- 24 hours cumulated precipitation -

14th of June 2018 - an example of missed precipitation forecast

- *synoptic context:* a mid-level vortex developed in the Mediterranean Sea moving to the East and an intense polar jet which affects the northern part of Europe
- both versions completely missed the areas with large amounts of precipitation in the eastern half and the metropolitan area of Bucharest (in red)
- in the western part of the country, cy43 seems to reduce the precipitation amount compared to cy40



27th of June 2018 – an example of the additional improvement of the precipitation forecast for cy43

- *synoptic context:* a large cyclonic vortex at mid to upper troposphere centered over the Mediterranean Sea and an extensive high pressure system at the lower troposphere in the Northern part of Europe
- the overall precipitation pattern is well captured by both cycle versions
- in the eastern part of the country, the cy43 version produces rainfall amounts closer to that shown in the observations
- the amount of precipitation in the Danube Delta (in red) is underestimated by both model versions
- the highest precipitation amount recorded (in black) is missed by both versions