

NWP activities in Romania

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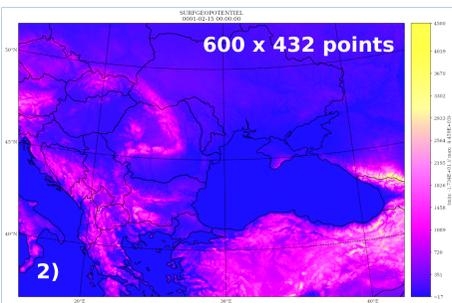
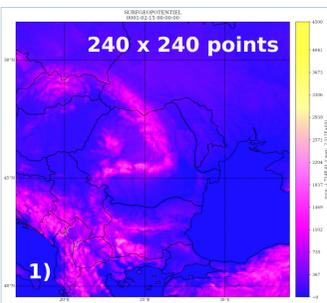
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<http://www.meteoromania.ro>

Operational configurations

1) ALARO 6.5: ALARO-0 baseline,
 $\Delta x=6.5$ km, L60, $\Delta t=240$ s

2) ALARO 4: ALARO1 vB,
 $\Delta x=4$ km, L60, $\Delta t=180$ s



- cy43t2bf11
- semi-implicit semi-Lagrangian 2TL
- 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: 78/54/78/54 hours
- **2 parallel configurations**
- **Post-processing**
FULLPOS in line - geographical grid

Downstream applications

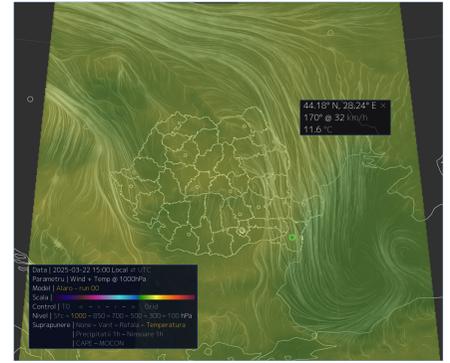
Input for hydrological model

Visualization

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

Input for IBL visualisation system and other products for the internal webpage →

Statistical Adaptation Verification



Recent activities in the group

• Migration of the operational activity on new computer nodes

During the past months, significant effort was dedicated to the migration of the NWP related activity on the new computer nodes. After trying standard local compilation, several problems were encountered. The solution we came to was porting of the ALARO model based on container environment, using *apptainer* facilities. The operational procedures were then modified accordingly.

- 2 operational ALARO configurations

- preoperational ALARO 4km with surface DA system (CANARI):

- cy43bf11
- $\Delta x=4$ km, $\Delta t=180$ s
- 60 vertical levels, 600 x 432 points
- 4 runs/day: 00, 06, 12, 18 UTC
- 30 hours forecast range

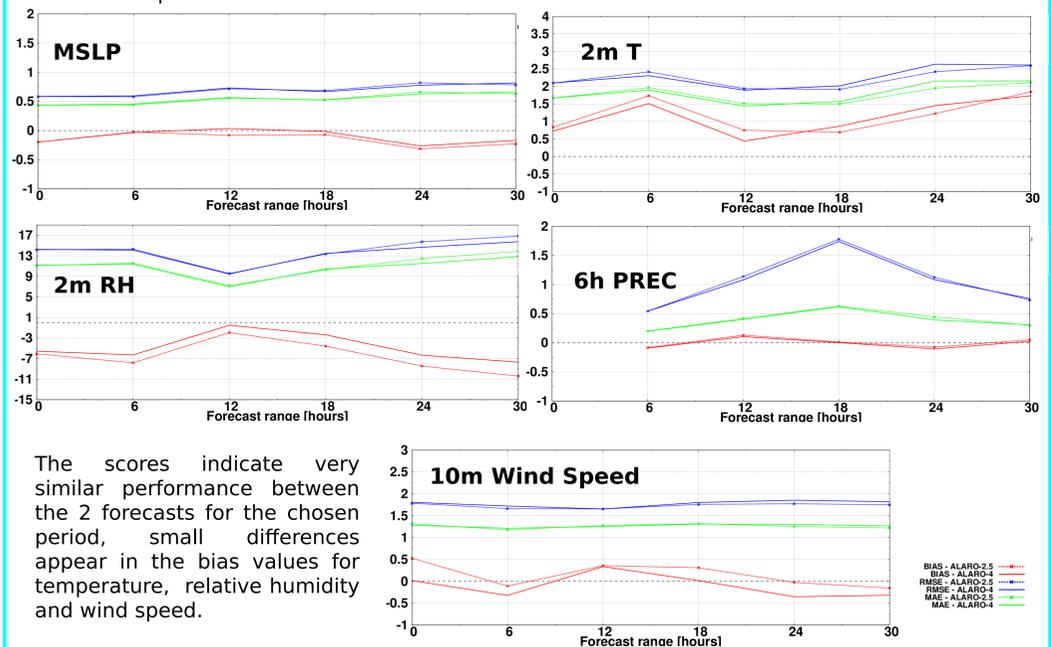
- adaptation for the new platform of the operational procedures for the dissemination of ECMWF products for specific customers and graphical representation for internal webpage + upgrade for the visualization of some products

- preoperational suite for ALARO at 2.5 km horizontal resolution:

- cy43bf11
- $\Delta x=2.5$ km, $\Delta t=90$ s
- 60 vertical levels, 640 x 640 points
- 1 run/day: 00 UTC
- 30 hours forecast range

• Verification results for preoperational ALARO 2.5 km

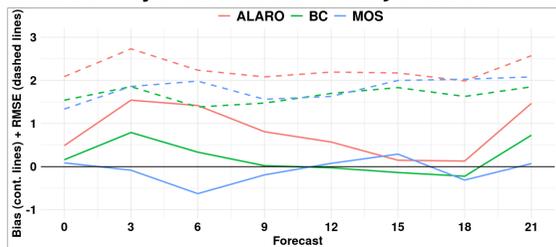
Verification scores were computed for the period: 25.08.2025 - 14.09.2025, the 00 UTC run for: mean sea level pressure, 2m temperature, 2m relative humidity, 6h cumulated precipitations, 10m wind speed.



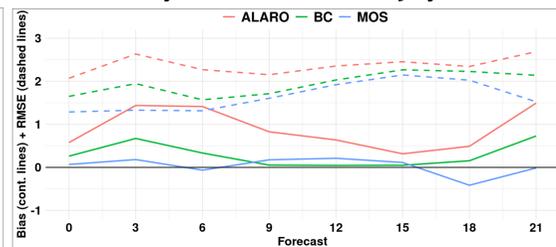
Bias-correction for the temperature forecast

• Previous results regarding the performance of the 2 m temperature forecast of the operational ALARO model showed an overestimation pattern of the real values, especially in the southern part of the country. A bias-correction method was applied for the temperature forecast of ALARO 4km in order to find some improvement of this behaviour. The forecast obtained through this method is compared to the ALARO forecast and another statistical post-processing method that is currently applied operationally - MOS (Model Output Statistics). Both statistical approaches determine some improvement in the bias scores. The corrected forecast (BC) shows promising results. An advantage of this method compared with the MOS technique is that smaller size of the training data set is required (46 days compared to 3 years - for several predictors).

Monthly bias for all stations - June 2025



Monthly bias for all stations - July 2025



• The verification scores were computed for the summer months of 2025.

• Observed temperatures from 166 meteorological stations are used.

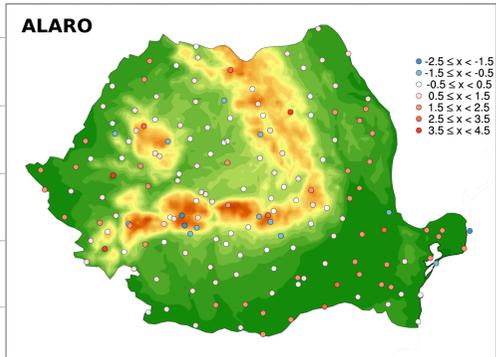
• Monthly scores show that the BC forecast reduces the bias and RMSE compared to ALARO.

• In the monthly bias for each station plotted over orography, it can be seen that for most stations the ALARO raw forecast leads to overestimation of the real values for many stations in the southern and eastern part of the country.

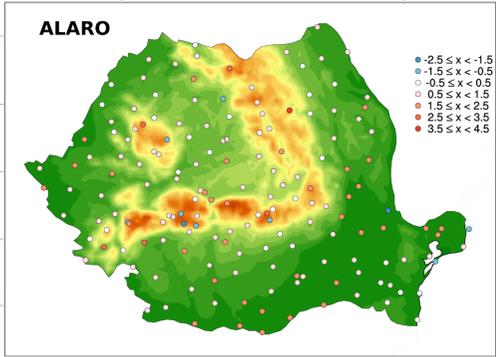
• For the same stations, this pattern is reduced when the corrected forecast is considered. For some stations in lower altitude (South-East), BC leads to a slight underestimation, especially for July.

• For some mountain stations where the forecast of the ALARO model underestimates the real temperature, the BC forecast is more realistic (June) or slightly overestimates the values (July).

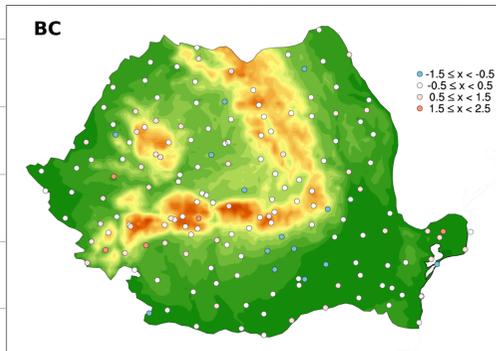
Monthly bias for each station - June 2025



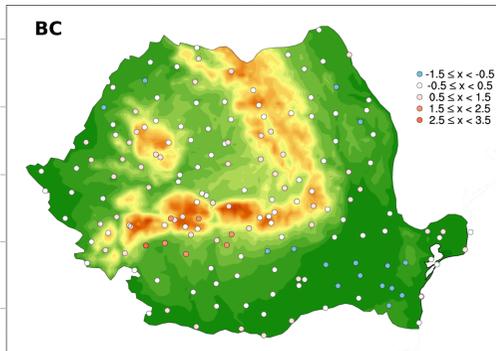
Monthly bias for each station - July 2025



BC



BC



Daily bias for July 2025 for some stations

