Meteo Romania

35th EWGLAM&20th SRNWP Meetings - Antalya, 30th September to 3rd October, 2013

LAM ACTIVITIES IN ROMANIA

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ALADIN/ALARO applications

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LACE nwp central europe

COSMO applications

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ALADIN/ALARO Operational Suite

ALARO model: cy36t1-op.1

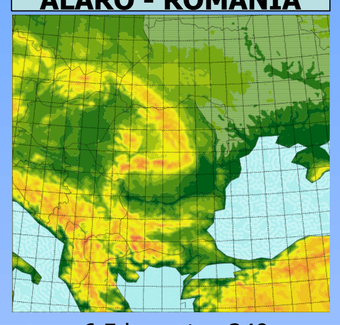
➢ Characteristics

- ❑ semi-implicit semi-Lagrangian two-time-level scheme
- ❑ projection: Lambert Projection - linear grid
- ❑ **physical parametrizations** : standard ALARO-0 set up
  - prognostic variables for water species
  - pseudo – prognostic TKE scheme
  - radiation: NER for thermal band
  - surface ISBA scheme
  - 3MT frame for moist processes
- ❑ **LBC** from ARPEGE, 3h frequency;
- ❑ 49 vertical levels.
- ❑ 4 runs/day, no data assimilation;

➢ Post-processing and visualization

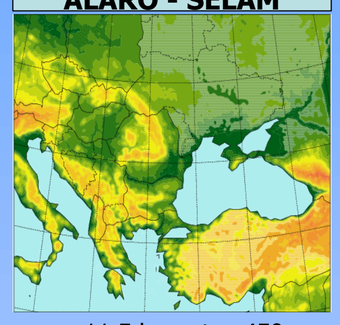
- ❑ inline FPOS on a geographical regular grid (0.1 x0.125) and offline – model grid;
- ❑ in model grid, hourly up to 54h, every 3 hrs afterwards; grib format;
- ❑ graphics based on Magics for ALARO intranet web site;
- ❑ specialized forecasts for different customers.

ALARO - ROMANIA



Δx = 6.5 km, Δt = 240 s
240 x 240 grid points

ALARO - SELAM



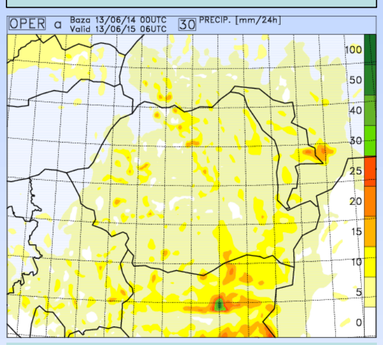
Δx = 11.5 km, Δt = 450 s
240 x 192 grid points
Input for marine applications

FUTURE OPERATIONAL CONFIGURATION

ALARO-0 baseline: including last developments from 2012 , concerning thermodynamics adjustment (dependency of critical relative humidity on the model resolution for Xu - Randall adjustment), microphysics (sedimentation of cloud water and ice) moist deep convection (modulation of the entrainment rate by the vertical integral of relative humidity, adaptive detrainment, mixed type of closure)

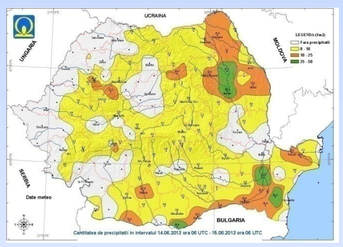
Case of 14 June 2013

ALARO - OPER

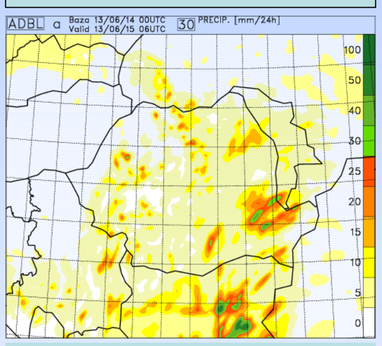


Δx = 6.5 km, Δt = 240 s, L49

Observed precipitation



ALARO – 0 baseline



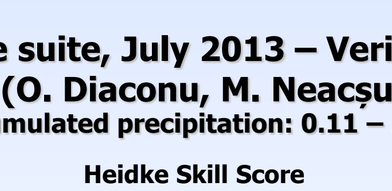
Δx = 6.5 km, Δt = 240 s
L60, vertical finite element

Double suite, July 2013 – Verification (O. Diaconu, M. Neacșu)

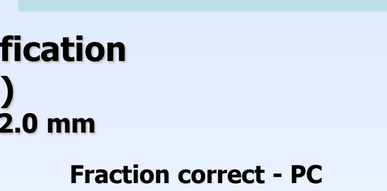
24h cumulated precipitation: 0.11 – 2.0 mm

Equitable Threat Score (perfect=1)

Heidke Skill Score (perfect=1)



Fraction correct - PC (perfect=1)

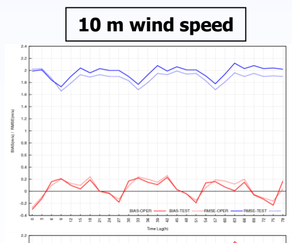


Globally better forecast

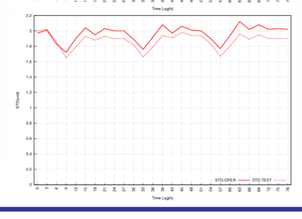
- the fraction of correct forecasted events is higher for <u>all precipitation classes</u>
- the very light [0.1 – 2 mm/12/24h] unrealistic precipitation is reduced
- the more intense precipitation [10.1 – 200 mm/12h] scores are better for the first day (06 -18 UTC)

10 m wind speed

Bias and RMSE

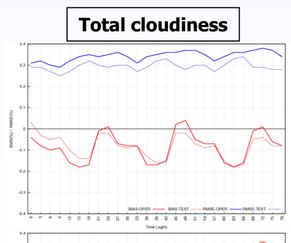


Standard deviation

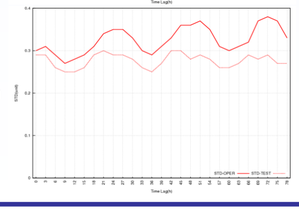


Total cloudiness

Bias and RMSE



Standard deviation



COSMO-RO Operational Suite

COSMO-Ro7

- ➢ Δx= 7km ; 201 x 177 grid points, 40 levels, Δt=40s;
- ➢ IC & LBC: GME 00, every 3h;
- ➢ Nudging data Assimilation for SYNOP, TEMP, PILOT (netcdf format);
- ➢ Forecast range: 78h (00 and 12 UTC) and 48h (06 and 18 UTC) ;
- ➢ Operational suite for 4 runs/day

COSMO-Ro2.8

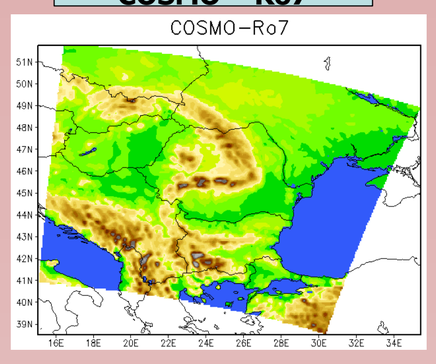
- ➢ Δx= 2.8km ; 361 x 291 grid points, 50 levels, Δt=25s;
- ➢ IC & LBC: COSMO-Ro7, every hour;
- ➢ Nudging data Assimilation for SYNOP, TEMP, PILOT (netcdf format) and radar data (grib1 format);
- ➢ Forecast range: 30h;
- ➢ Operational suite for 4 runs/day

Physical parameterizations:

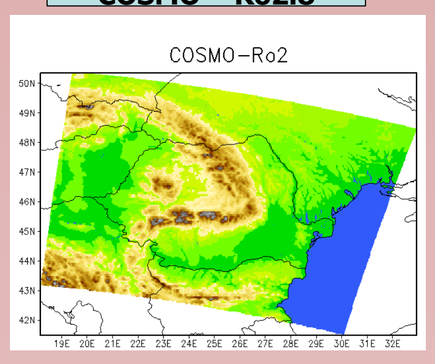
- **Clouds and precipitation**
  - Grid-scale: 2-ice category scheme, prognostic;
  - Convection scheme: Tiedtke;
  - Grid-scale and convective clouds, total cloud cover;
- **Radiation**
- **Turbulent fluxes**
- **Soil processes**

Operational domain and products

COSMO – Ro7



COSMO – Ro2.8



- ➢ T_{2m}; V_{10m}; MSLP;
- ➢ total, convective, grid scale precipitation;
- ➢ geopotential 850, 700, 500 hPa;
- ➢ cloudiness;
- ➢ meteograms;
- ➢ SkewT diagrams, etc.

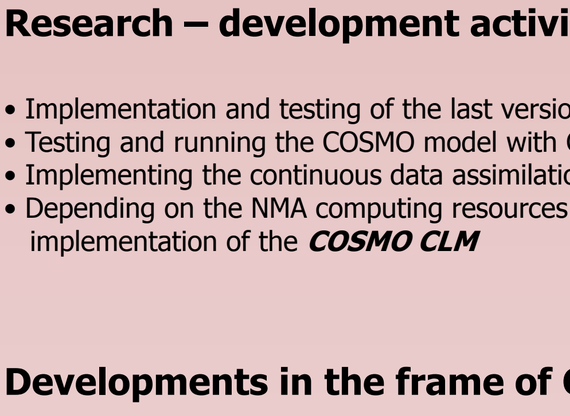
Research – development activities

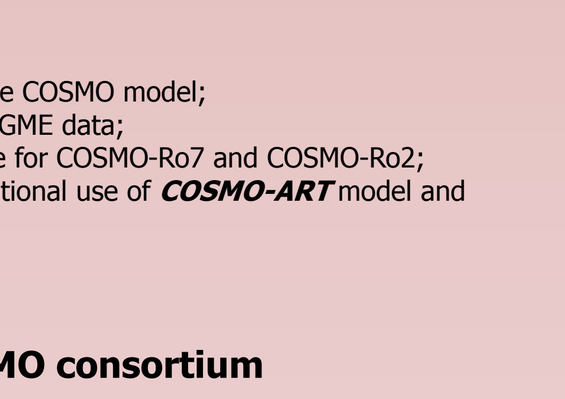
- Implementation and testing of the last version of the COSMO model;
- Testing and running the COSMO model with GRIB2 GME data;
- Implementing the continuous data assimilation suite for COSMO-Ro7 and COSMO-Ro2;
- Depending on the NMA computing resources: operational use of ***COSMO-ART*** model and implementation of the ***COSMO CLM***

Developments in the frame of COSMO consortium

- Further participation in the ***KENDA*** priority project (delivery of ensemble–related diagnostic tools);
- Coordinating the NWP Meteorological Test Suite PT;
- Further participation on priority project ***VERSUS 2;***
- Evaluation of the possibilities to get involved in the implementation of the FUZZY toolbox in the VERSUS package

VERIFICATION RESULTS - COSMO-RO7 (O. Diaconu, M. Neacșu)





Monthly skill scores for the entire Country; left – Temperature 2m; right – 10m Wind