

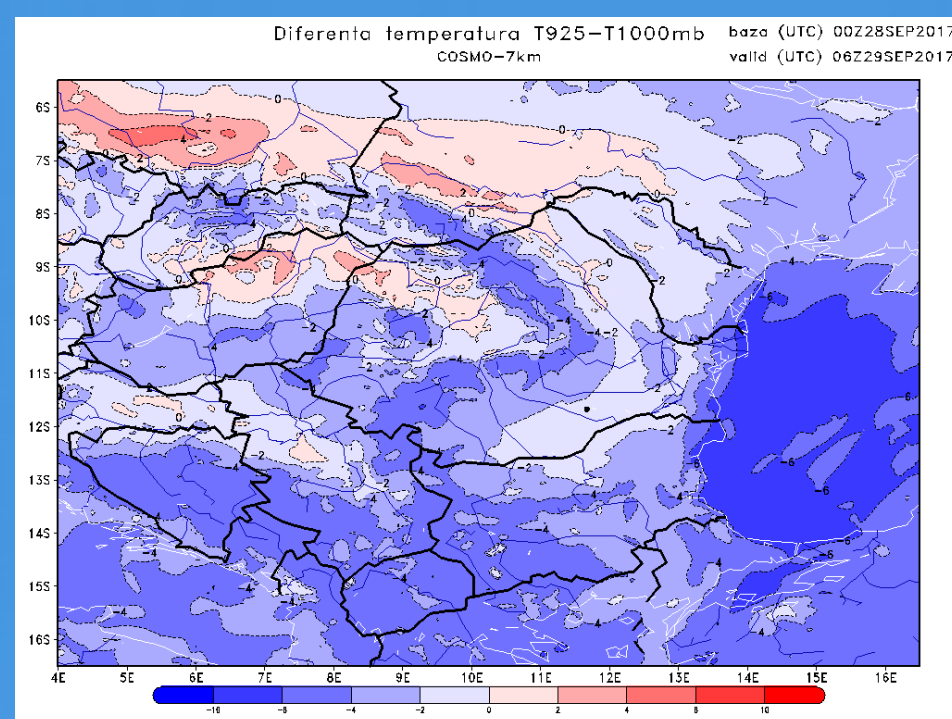
# THE COSMO MODEL AT THE NATIONAL METEOROLOGICAL ADMINISTRATION ROMANIA

Tudor BALACESCU, Rodica Claudia DUMITRACHE, Cosmin Danut BARBU,  
Amalia IRIZA-BURCA, Mihaela BOGDAN, Bogdan Alexandru MACO  
tudor.balacescu@meteoromania.ro

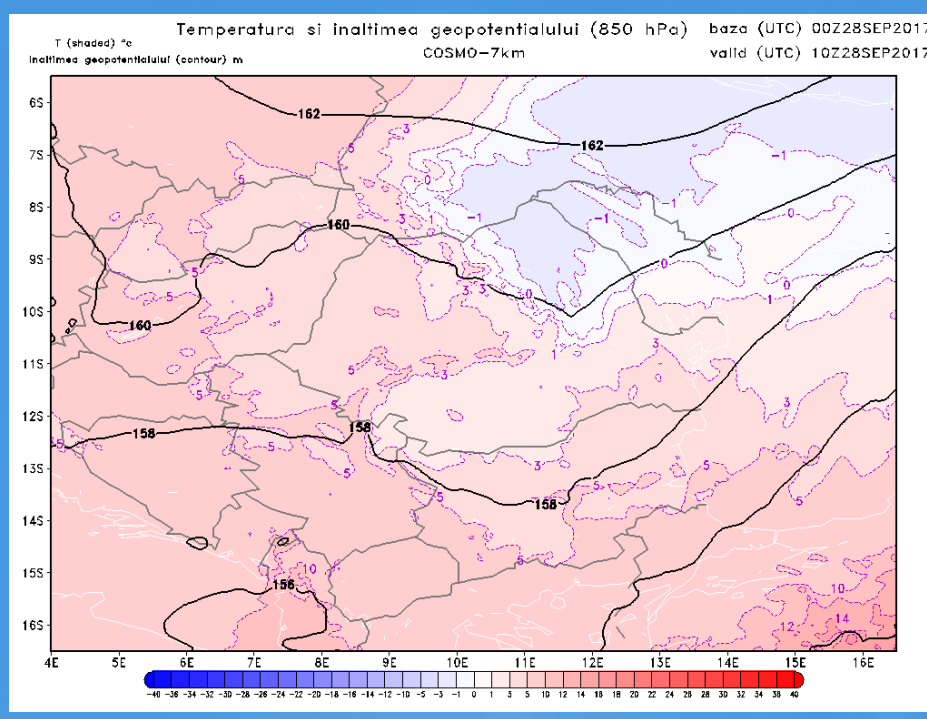
## COSMO-RO Operational Suite

### Operational characteristics

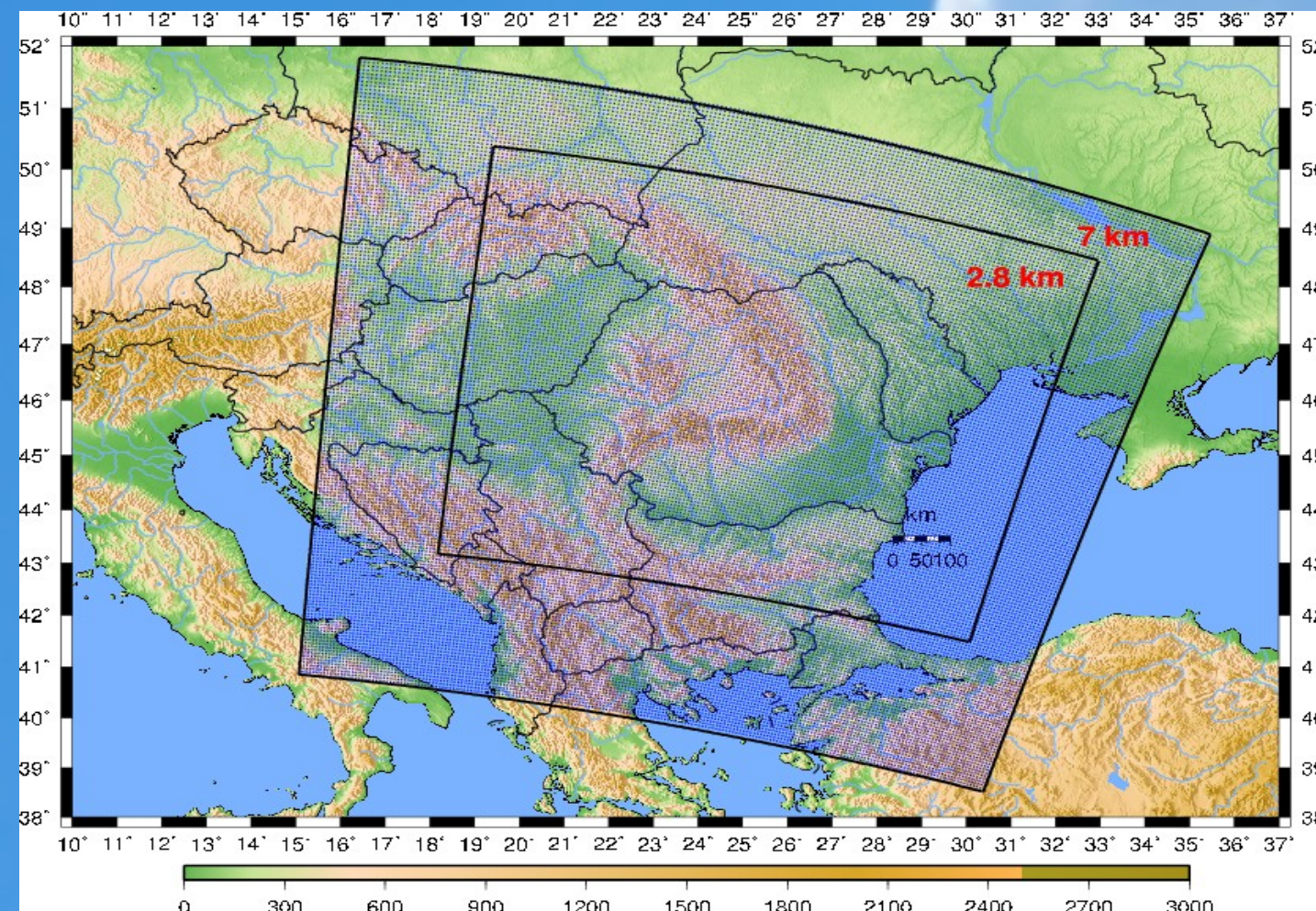
- grid-scale precipitation scheme - extension of the basic scheme with cloud water and cloud ice;
- convection scheme: Tiedtke;
- radiation scheme - grid and sub-grid scale (including convective) water and ice clouds are considered (cloud cover, water content and ice content are calculated by the default diagnostic scheme);
- turbulence parameterization which calculates the transport coefficients for momentum and heat in the atmosphere and the transfer coefficients at the ground;
- multi-layer soil model TERRA ML;
- time-integration scheme 2 time-level Runge-Kutta scheme with time-split treatment of acoustic and gravity waves – order 3.



Temperature difference (T925 hPa – T1000 hPa)



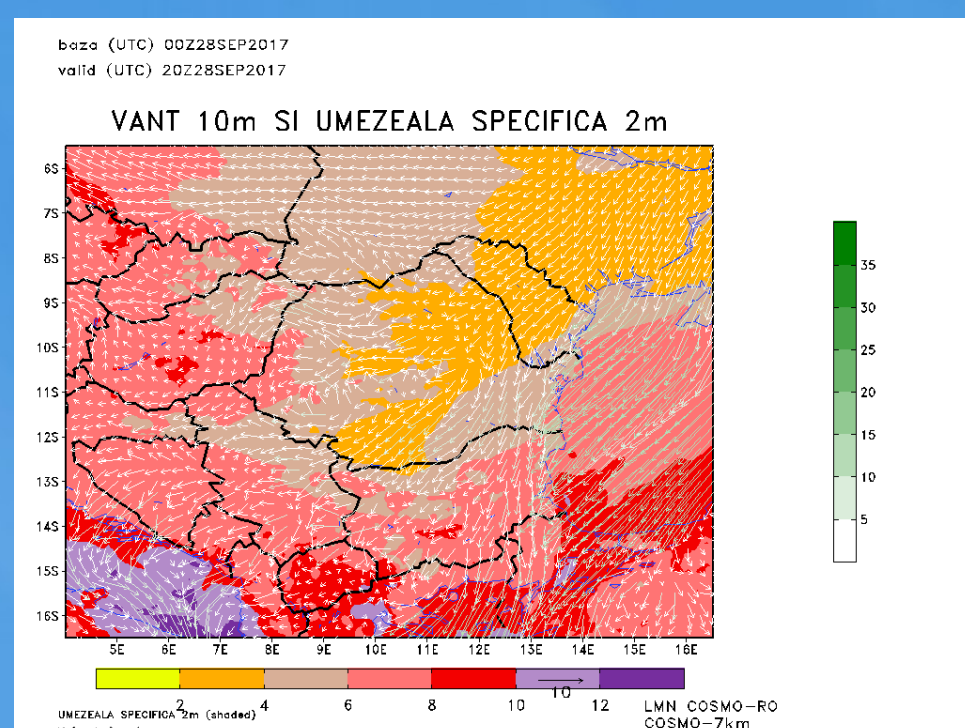
Surface temperature and MSLP



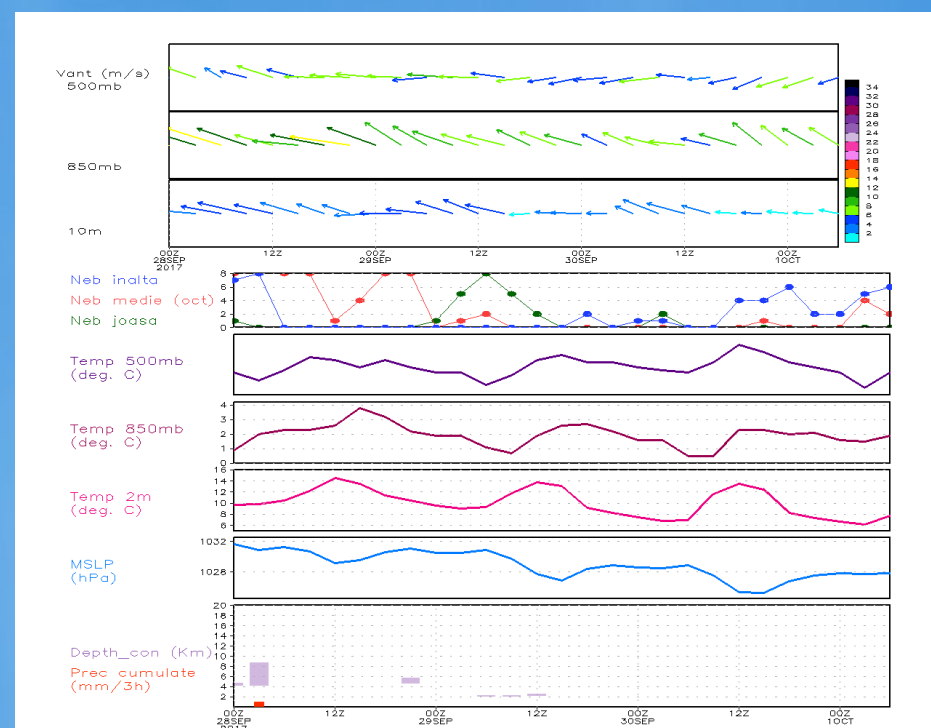
Operational domains

### COSMO-Ro7

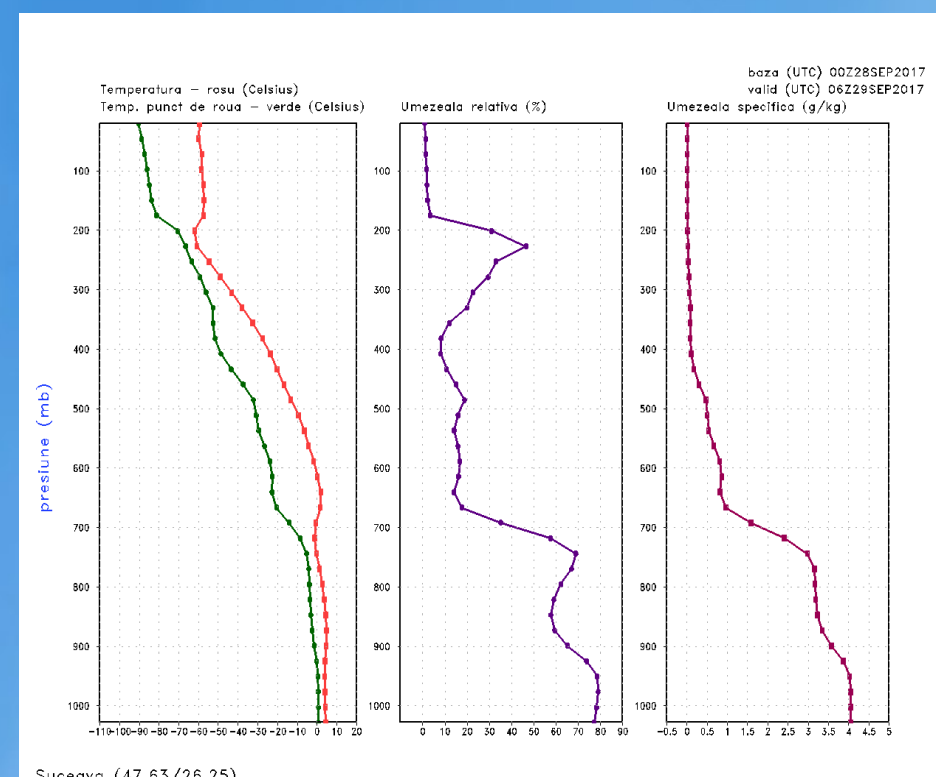
- x= 7km ; 201 x 177 grid points, 40 levels, t=40s
- IC & LBC: ICON (grib2), every 3h
- Nudging data Assimilation for SYNOP, TEMP, PILOT (netcdf format)
- Forecast range: 78h (00 and 12 UTC) and 48h (06 and 18 UTC)
- Operational suite for 4 runs/day
- Operational version 5.03



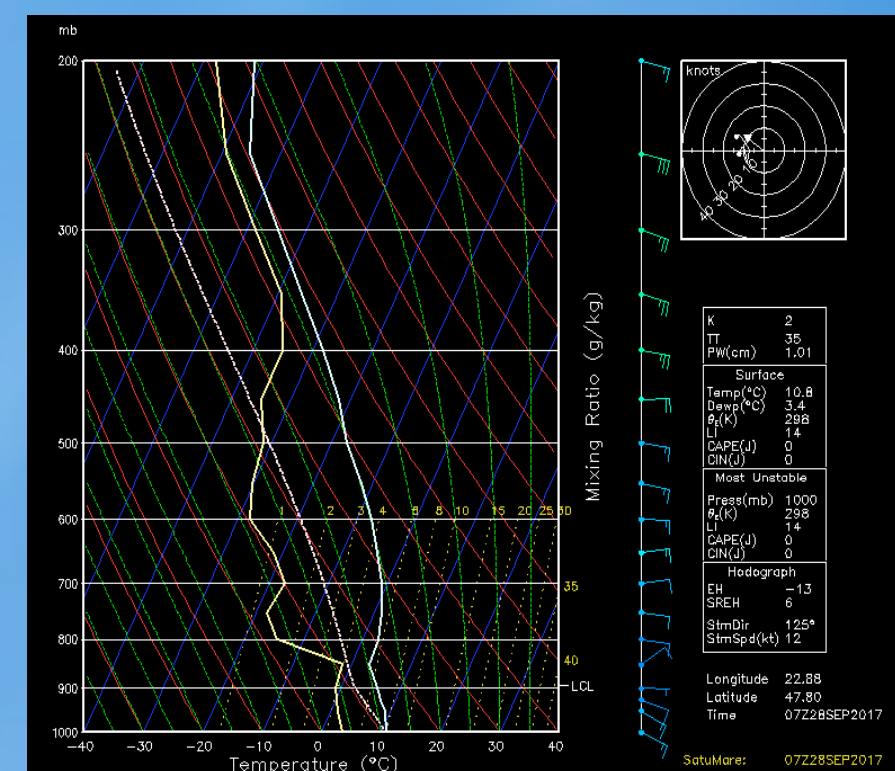
10 m wind speed and direction, 2 m specific humidity



Meteograms



Vertical sounding



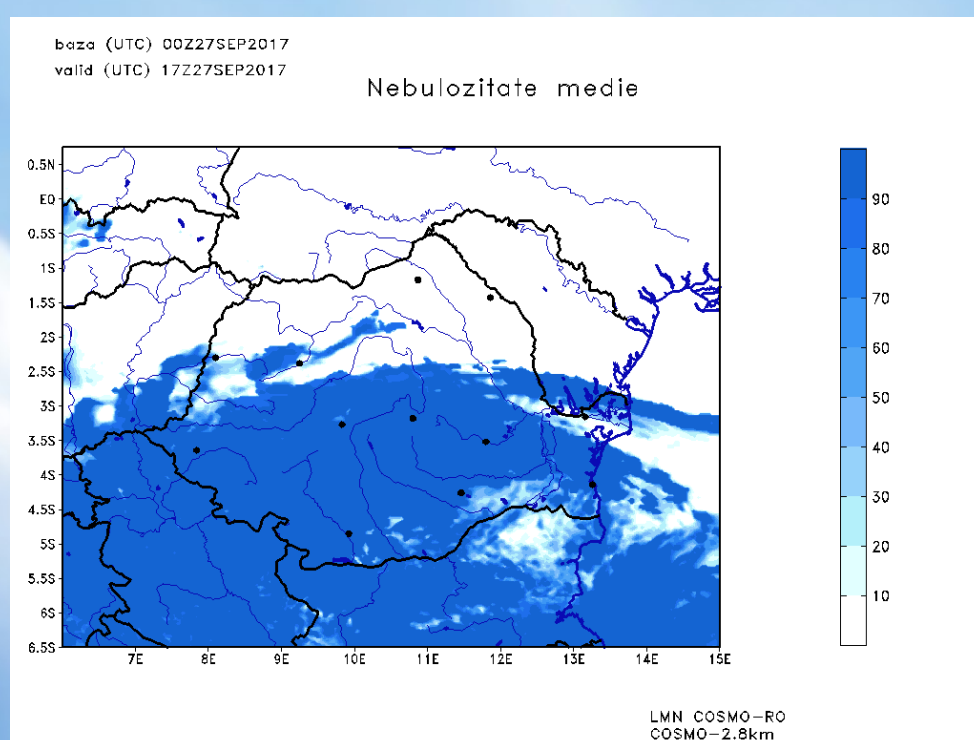
Skew-T

### COSMO-Ro2.8

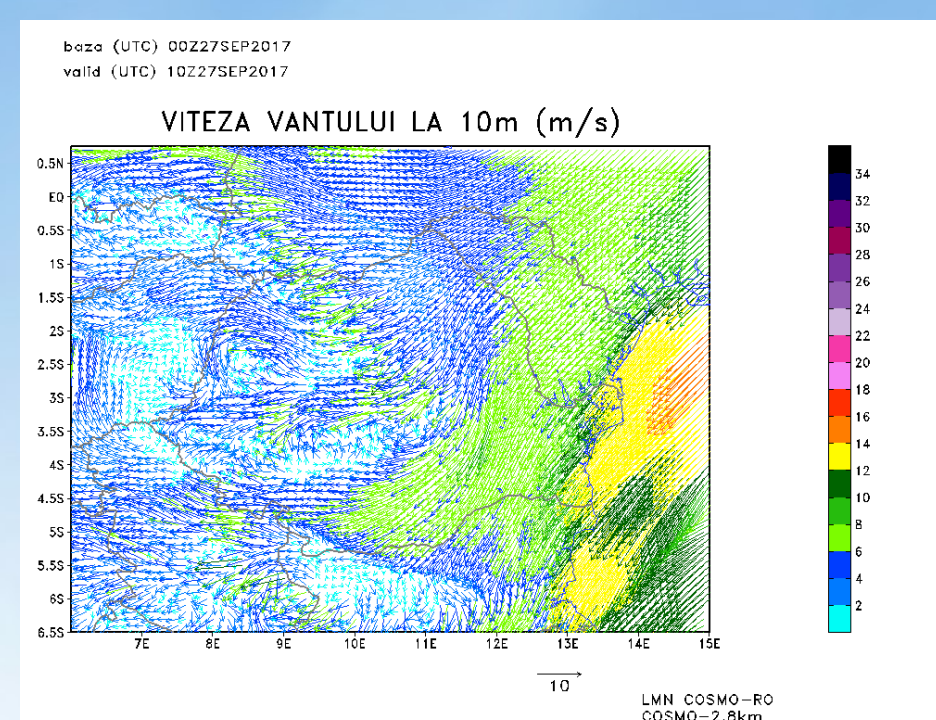
- x= 2.8km ; 361 x 291 grid points, 50 levels, t=25s
- IC & LBC: COSMO-Ro7, every hour
- Nudging data Assimilation for SYNOP, TEMP, PILOT (netcdf format) and radar data (grib1 format)
- Forecast range: 30h (00, 12 and 18 UTC) and 18h (06 UTC)
- Operational suite for 4 runs/day

### Operational products

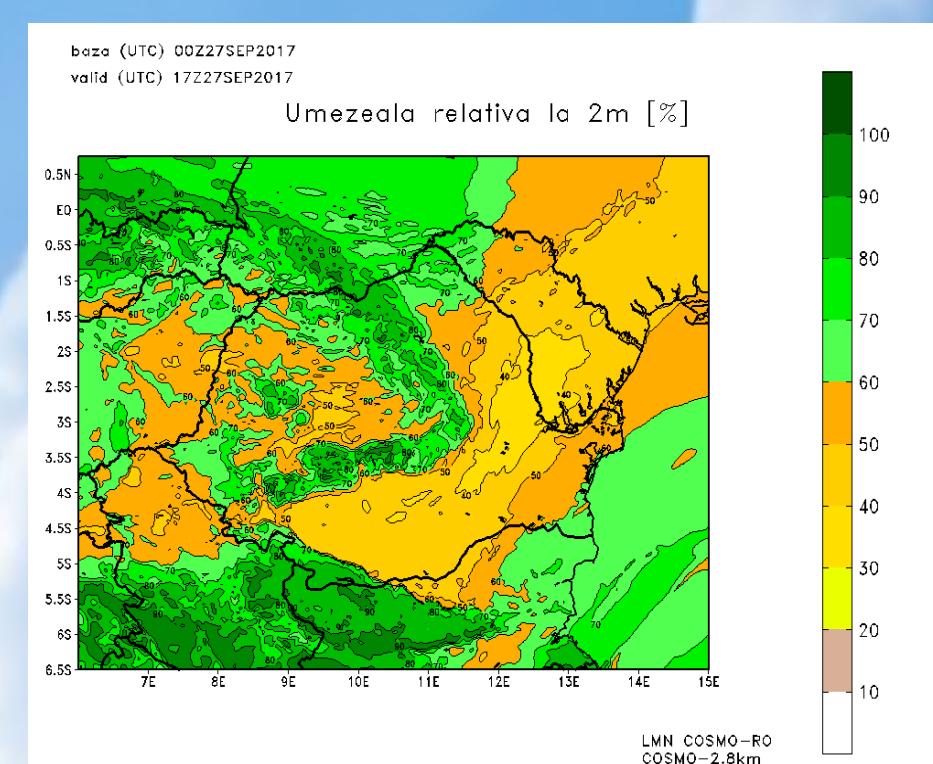
- ◆ T2m, V10m, MSLP
- ◆ Total, convective, grid scale precipitation
- ◆ Radar reflectivity, CAPE, MOCON
- ◆ 2m Relative Humidity, 10m wind gust
- ◆ Temperature, geopotential, wind speed, relative humidity (850, 700, 500 hPa)
- Cloud cover
- Meteograms
- SkewT diagrams, vertical soundings etc.



Medium cloud cover



10 m wind speed and direction

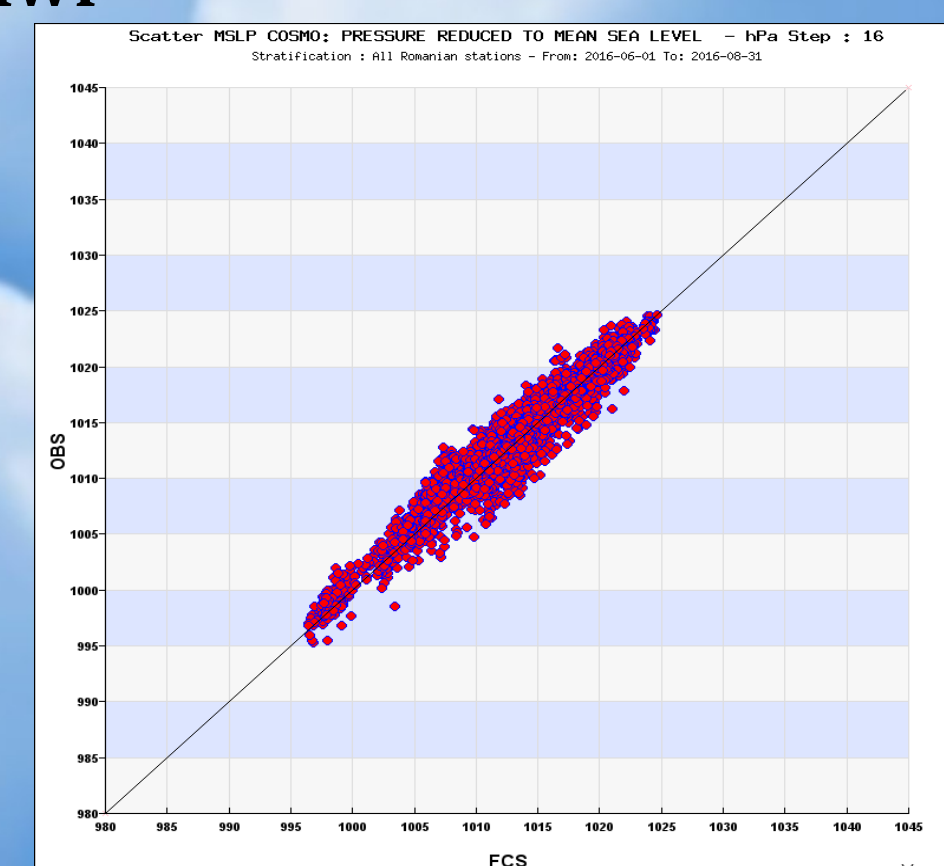
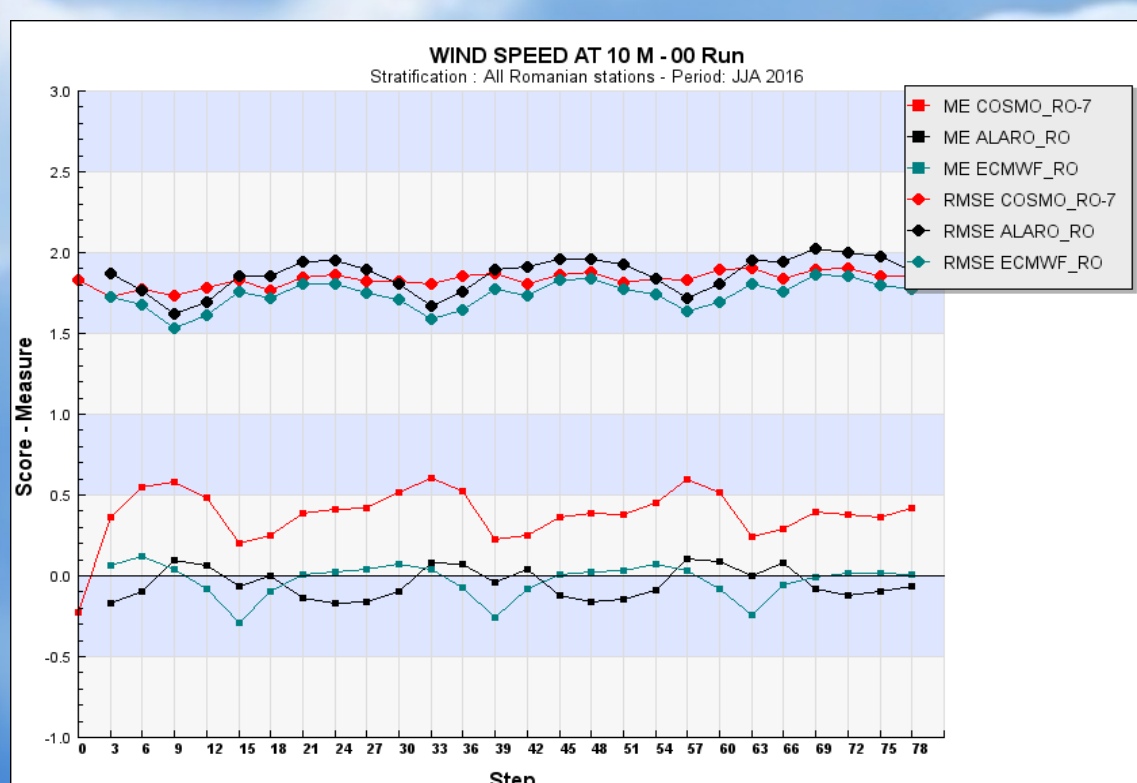
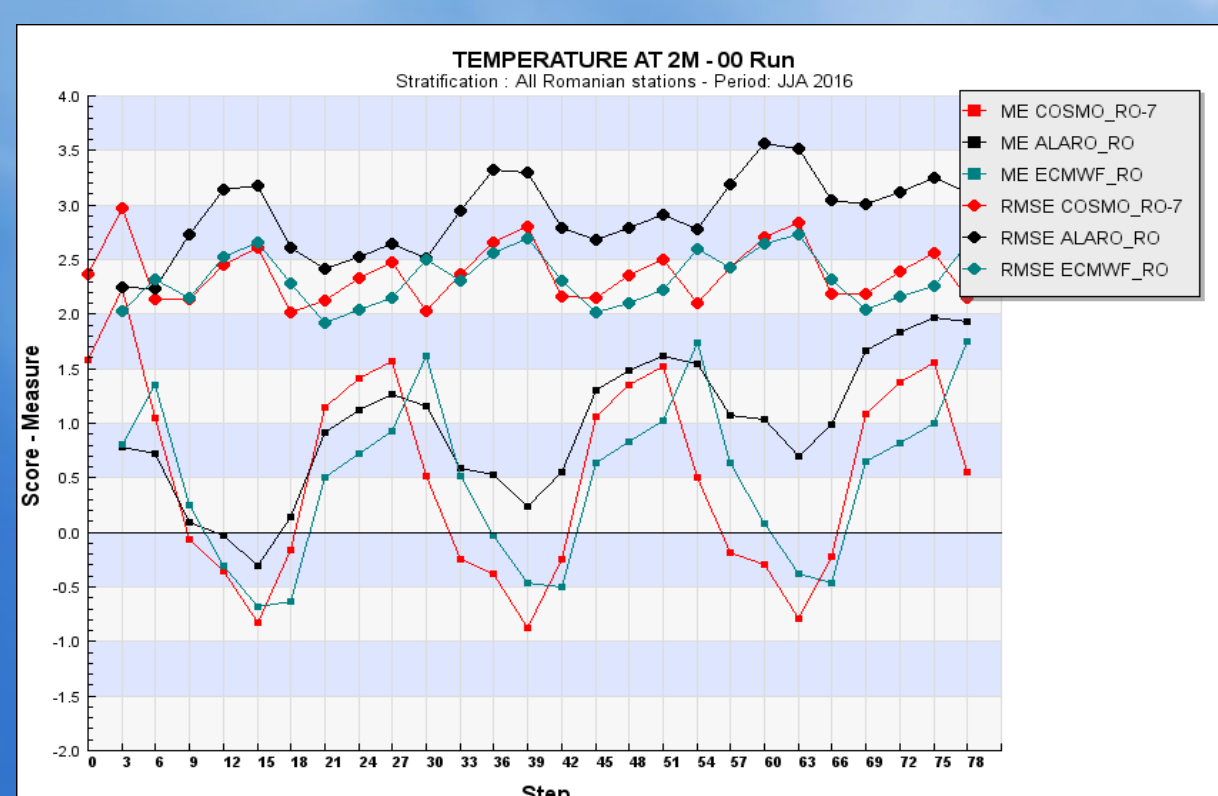


2 m relative humidity

### Participation at Priority Projects in the COSMO Consortium

- CDIC – Comparison of the dynamical core of ICON and COSMO
- WG6 – SPRT support
- NWP Meteorological test Suite

### VERIFICATION RESULTS (VERSUS) - COSMO-RO7, ALARO, ECMWF



Scatter plot – COSMO-RO7 MSLP forecast (00UTC + 16 hours) Seasonal (JJA 2016)

Seasonal (JJA 2016) ME and RMSE for all Romanian Stations  
left – 2m Temperature; right – 10m Wind speed; COSMO-RO7 (red), ALARO (black) and ECMWF (green)