



# THE MESOSCALE SHORT-RANGE WEATHER FORECAST SYSTEM COSMO-RU



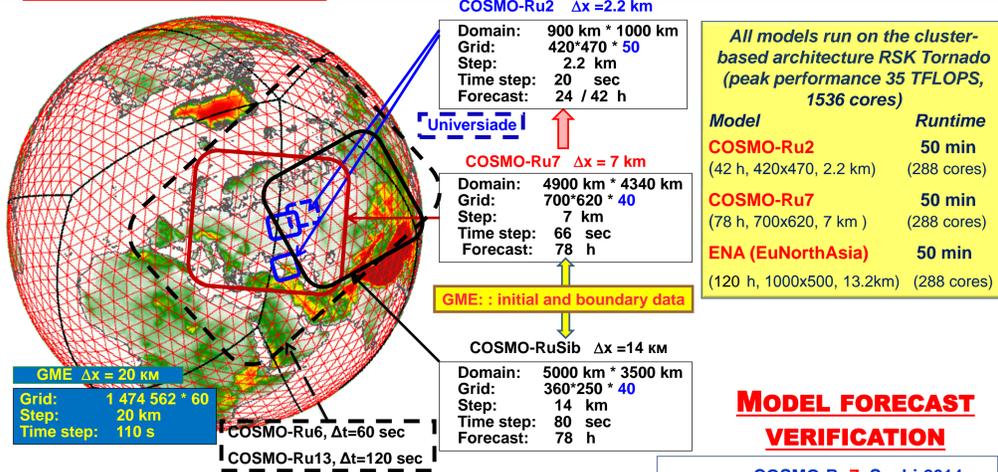
Roshydromet, Hydrometeorological Center of Russia  
[www.meteoinfo.ru](http://www.meteoinfo.ru) [Gdaly.Rivin@mail.ru](mailto:Gdaly.Rivin@mail.ru) [Inna.Rozinkina@mail.ru](mailto:Inna.Rozinkina@mail.ru)

## OPERATIONAL WEATHER FORECAST SYSTEM

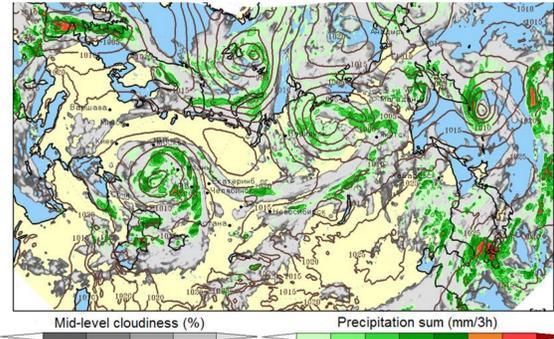
Daily 4 times (00, 06, 12, 18 h UTC):

- more than 8000 (total for 1 day) weather forecast maps and about 1000 (total for 1 day) meteograms (images) prepared
- maps and meteograms are sent to the weather forecasting offices of Roshydromet
- GRIB and graphical files (about 70 Gb) are distributed on a FTP-servers

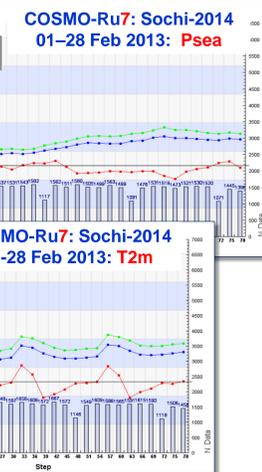
### COSMO-Ru SYSTEM



**COSMO-Ru13** Psea, clouds and precipitation. 99h forecast from 02.09.1013, 00 UTC

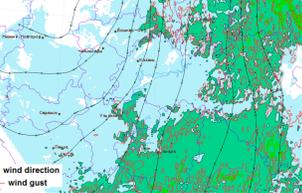


### MODEL FORECAST VERIFICATION

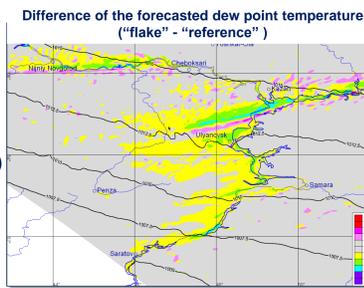


### METEOSUPPORT OF THE 27TH SUMMER UNIVERSIADE IN KAZAN

**COSMO-Ru2** Wind @ 10m, 12 h forecast from 02.07.2013, 00 UTC

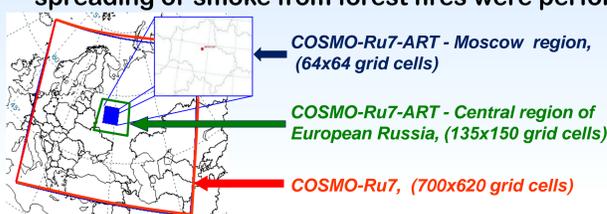


**Flake (lake-model) parameterization** was introduced into the COSMO-Ru2 for Kazan region

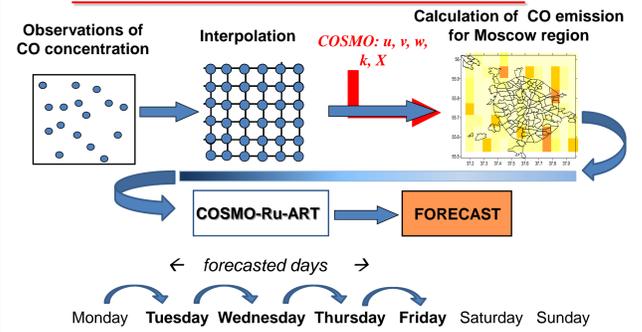


## COSMO-RU-ART

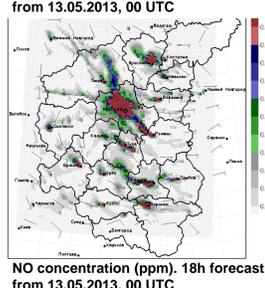
- The COSMO-Ru7 - ART configuration was developed and implemented for the Moscow region (once a day)
- Tests for transport and transformation of gaseous pollutants and spreading of smoke from forest fires were performed.



### EMISSIONS CALCULATION METHOD

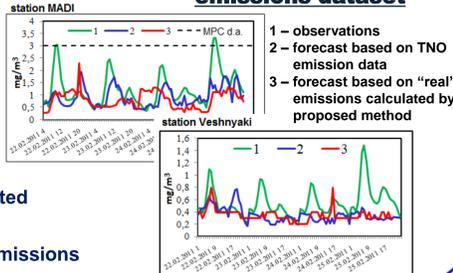


SO2 concentration (ppm). 9h forecast from 13.05.2013, 00 UTC



NO concentration (ppm). 18h forecast from 13.05.2013, 00 UTC

**Forecast of CO concentration with different emissions dataset**



### WILD FIRE EVENT CALCULATION WITH MODIS FRP DATA

- MODIS fire radiative power (FRP) data is converted to biomass burned using empiric coefficient.
- Model's emissions are calculated using emission factor.
- Model run with defined fire emissions

## COSMO PRIORITY PROJECT CORSO

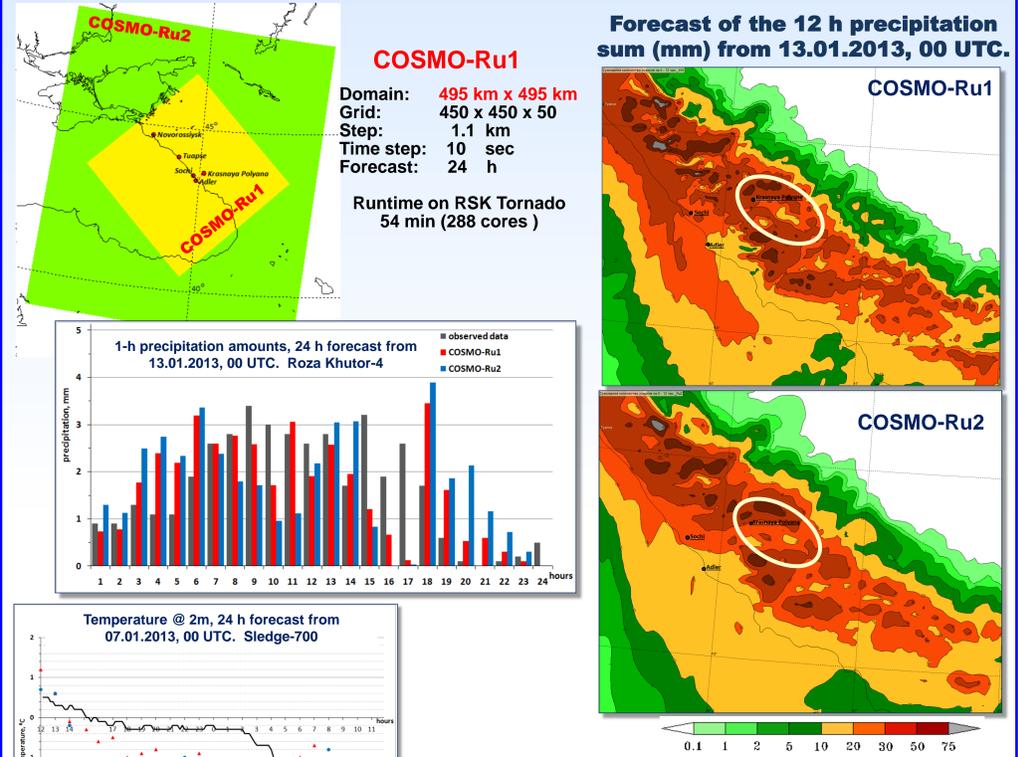


The main goal:

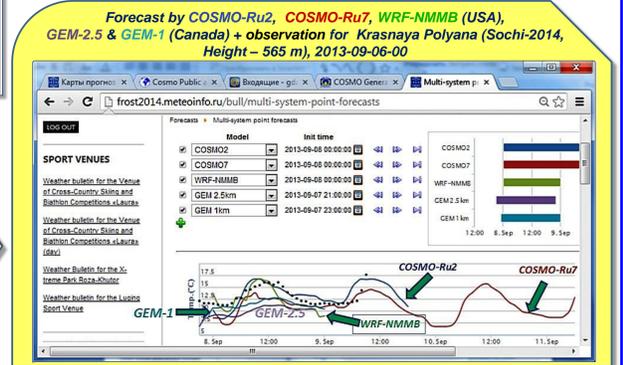
to enhance and demonstrate the capabilities of COSMO-based systems of short-range numerical weather prediction in winter conditions for mountainous terrain and to assess the effect of practical use of this information during SOCHI-2014 Olympic Games.

Participants: Russia, Germany, Italy, Switzerland and Greece

### HIGH RESOLUTION COSMO-MODELING (TASK 1)



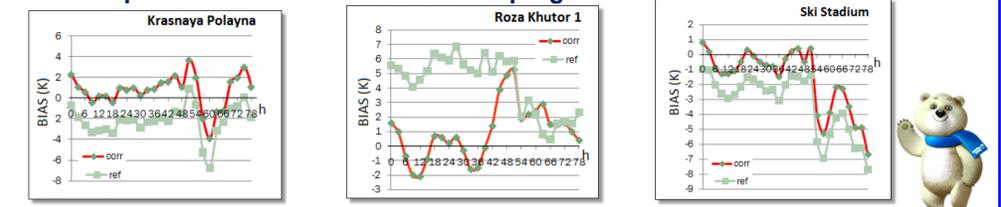
Models forecasts for Sochi region are presented at WMO project FROST <http://frost2014.meteoinfo.ru>



### DOWNSCALING CORRECTION / POSTPROCESSING (TASK 2)

The two-step correction technology of COSMO meteograms:

- I step: Correction temperature vertical gradient - close to operational implementation
- II step: Kalman-Filter correction - in progress



### ENSEMBLE PREDICTION SYSTEM (TASK 3)

COSMO-S14-EPS: relocation of COSMO-LEPS over the Sochi area. Development of COSMO-Ru2-EPS, a convective-scale ensemble system for the Sochi area, nested into COSMO-S14-EPS

### COSMO-Ru2-EPS

- $\Delta x \sim 2.2$  km; 50 ML; fc+48h;
- initial time: 00/12 UTC;
- ICs&BCs from COSMO-S14-EPS (ARPA-SIMC (Italy), runs at ECMWF);
- No physical parameters perturbed;
- Runs at Roshydromet

