

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

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# **OPERATIONAL WEATHER FORECAST SYSTEM**

✓ The COSMO-Ru02 (nested into COSMO-Ru07) for the central and North-Caucasian regions of Russia was implemented in operational mode (4 times per day).

✓ The "nudging" (continuous data assimilation system) supported by the COSMO software for COSMO-Ru07 and COSMO-Ru02 was activated. First results demonstrating the efficiency of this system and proposals for partial modifications of algorithms were obtained.

✓ The new configuration of COSMO-RU for the integration domain, which includes the entire territory of Russia (6.6-km spatial resolution) was developed (implementation is in progress).

COSMO-RU SYSTEM	SMO-RU2 ∆x =2.2 km	THE OLD AND NEW OPERATIONAL SCHEME OF COSMO-RU07 AND COSMO-RU02	EXAMPLE OF FORECASTS FOR METEOSUPPORT OF THE 27TH SUMMER UNIVERSIADE IN KAZAN, JULY 6-17 2013 (WIND FORECASTS)
	Grid: 420*470 * 50 Step: 2.2 км Time step: 15 с Forecast: 24 h Cores: 400	Download GME   00UTC 06UTC 12UTC 18UTC   Start 02:50 08:50 14:50 20:50   End 03:25 09:10 15:25 21:10   Time work 00:35 00:20 00:35 00:20	2013 RUSSIA
	<b>SMO-RU7</b> $\Delta x = 7 \text{ km}$ <b>Domain:</b> 4900 km * 4340 km Grid: 700*620 * 40 Step: 7 km Time step: 40 c	OLD scheme NEW scheme with DA   00 06 12 18   02:50 08:50 14:50 20:50   03:30 09:10 15:30 21:10	22.5 20 17.5
	Forecast: 78 h Cores: 800	00:40 00:20 00:40 00:20 Time work 00:20 00:40 00:20 00:20 00:40 00:20 00:20 00:20	











1.1. Improving of technology of deterministic weather forecasting COSMO-RU07/So02 for the North-Caucasian area

SMO

1.2. Development of COSMO-So-1km

# TASK 2. Downscaling / postprocessing for Sochi area and applications (*Leader: Inna Rozinkina*)

- 2.1. Adapted down-scaling techniques for winter conditions in the mountains and IOC requirements
- 2.2. Determination of typical COSMO-model inaccuracies for typical synoptic situations
- TASK 3. Development and adaptation of COSMO EPSs for Sochi region (Leaders: Elena Astakhova, Andrea Montani
- 3.1. Adaptation of COSMO LEPS 7 km to the Sochi region and IOC requirements. Operational ensemble forecasts during the Olympics
- 3.2. Development and verification of COSMO-RU-LEPS 2.2 km for the Sochi region (with ICs and BCs from SOCHMEL7)

#### PREDICTION SYSTEM SVETEM **IDLE**

03.45

END

360\*250 \* 40

14 km

80 C

78 h

48

#### **OSMO-RU-A**

✓ The activities within the framework of the COSMO Perspective Project "CORSO" (TASK 3 «Development and adaptation of COSMO EPSs for the Sochi region») and WMO Project "FROST" was developed on the base of the COSMO-FROST-LEPS (step 7km).

✓ The operational technological processing line of COSMO-FROST-LEPS results for the Sochi region was developed (in cooperation with ARPA-SIMC colleagues). ✓ The runs of 2.2 -km version for Sochi region nested into COSMO-FROST-LEPS (7km) were performed and selected case-studies were analyzed.

# **COSMO-FROST-EPS @ ECMWF: present status**



✓The COSMO-RU07 - ART configuration was developed and implemented for Moscow region (once a day).)

✓ Tests for transport and transformation of gaseous pollutants and spreading of smoke from forest fires were performed.



#### **OPERATIONAL EMISSIONS CALCULATIONS**

18

4 February 2012

19:00



## WILD FIRE EVENT CALCULATION







**Temporal variation of the CO concentration** 

#### could be needed in the future.

# COSMO-RU-LEPS- 2.2 km

#### **COSMO-FROST-EPS 7km** □ 10 members; BCs & ICs from COSMO-FROST-EPS □ No physical parameters perturbed or modified □ ~ 2h (min ~ 70 minutes) on 120PE (10\*12) 14.02.2012 **Given Step 5** Forecast length 48 h; output time step 1h COSMO-RU-LEPS- 2.2 km **COSMO-FROST-EPS** 1575 km \* 1680 km **Domain:** 187 km \* 143 km **Domain:** 226\*241, 40 lev Grid: 86\*66, 50 lev Grid: 7 km Step: 2.2 km Step:





## Valdai observatory (Valdai branch office of the State Russian Hydrological Institute)

The specificity of Valdai data (in addition for standard SYNOP and flux radiation measurements) is the hydrological aspects: the temperature profiles into lake (daily),

interception of precipitation into forest (time series)

the special complex of measurements for the mires (time series)

August ,12, 2011, units – mg/m<sup>3</sup>

the evaporation (network (~10 stations) covering the area ~10 000 m<sup>2</sup>, snow-free period)

the depth of freezing/thawing layer of soil (time series) the water snow equivalent (during the snow period, timeseries)

#### The special formats are required for data exchange.

(Valdai)

Since the 2012 the Valdai hydrological observatory has started the participation on the SRNWP Data Exchange Program

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