PT CORSO-A:

Final status

E. Astakhova, D. Alferov, E.Avgoustoglou, J-M. Bettems, D.Blinov, P.Eckert, A.Montani, G.Rivin, I.Rozinkina, M.Shatunova, J.Helmert,

(RHMC, DWD, MS, ARPA-SIMC, HMC)

TL :   I.Rozinkina,   G.Rivin

PT CORSO-A:

Goal:

- **To transfer of results of the PP CORSO to COSMO software, applications and know-how.**

- **To prepare the new COSMO tools and practical instructions for be available for COSMO-community**

The resources requested: 1.0 FTE

Period: 09.2014 - 08.2015

Participants: DWD, MeteoSwiss, ARPA-SIMC,HMS, RHM

Subtasks:

ST1: The guidance of the optimal domain's size selection for COSMO-1 versions for the regions with complex mountain relief

ST2: Implementation of algorithm of subgrid "h-correction" of T2m (due to the differences between model's and real heights) based on COSMO T lapse rate forecasts (h-correction)

ST3: Preparing of archives COSMO-Sochi-EPS applicable for research aimed at improving COSMO EPS systems and available for community

ST4: Preparing of recommendations for forecasters "The features of using and interpretation of the results of deterministic and ensemble meso- scale modeling"

Subtasks expected results :

ST1: The results of experiments and know how proposals for choosing minimal domain size of COSMO-1

ST2: Results of tests for different weather conditions and adapted aalgorithm & software for the implementation into Fieldextra and into techniques of forming of COSMO meteogram tables

ST3: Archives of EPSs forecasts for the Sochi 2014 modelling area and the corresponding manuals

ST4: Guidelines for forecasters – presentation concerning the features of interpretation of High resolution NWP products

The guidance of the optimal domain's size selection for COSMO-1 versions for the regions with complex mountain relief

Exp. results: The results of experiments and know how proposals for choosing minimal domain size for COSMO-1 domains

G.Rivin, M.Shatunova,D.Blinov, (RHMC)

J.Helmert (DWD)

ST1: The guidance of the optimal domain's size selection for COSMO-1 versions for the regions with complex mountain relief

G.Rivin, M.Shatunova,D.Blinov, (RHMC)

J.Helmert (DWD)

Motivation: **CORSO PP obtained results shown the strong dependence of the predicted precipitation amount and spatial distribution on the model's domain size.**

What was performed:
1. **Several simulation domains were selected taking into account the prevailing direction of air mass transfer (using of GWT_27 weather type classification) and its transformation due to local conditions (e.g. orography effect).**
2. **Simulations are made for the period 3-20 February, 2014.**
3. **Forecasts verification by VERSUS was made for the mentioned period.**
4. **Forecasts for different domains for heavy precipitation cases were investigated.**
5. **Forecasts evaluated for the central part of the domains only.**

Simulation domains for test cases

DOMAIN 1
startlat_tot = -10.45,
startlon_tot = -37.5
ie_tot = **750**, je_tot =
750

DOMAIN 5
startlat_tot = -10.0,
startlon_tot = -37.0
ie_tot = **450**, je_tot =
450

DOMAIN 2
startlat_tot = -10.0,
startlon_tot = -36.0
ie_tot = **400**, je_tot =
650

DOMAIN 6
startlat_tot = -9.5,
startlon_tot = -36.0
ie_tot = **300**, je_tot =
300

DOMAIN 4
startlat_tot = -10.0,
startlon_tot = -36.0
ie_tot = **300**, je_tot =
450

- initial and boundary conditions from COSMO-Ru7
- without data assimilation

*Verification also made by VERSUS*
*for a period 3-20 February,*

The experiments have demonstrated that

– the more sensitive process are the cloudiness development over whole region and the precipitation amounts near border (app 30-40 rm) of selected domains.

– The processes for coastal region and over Sea were more sensitive that the processes into mountains

Accumulated precipitation (February 18, 2014)

Period 6-9 h

750x750

400x650

450x45

300x45

mm/3
h
0
0.1
0.5
1
3
5
10
15
20
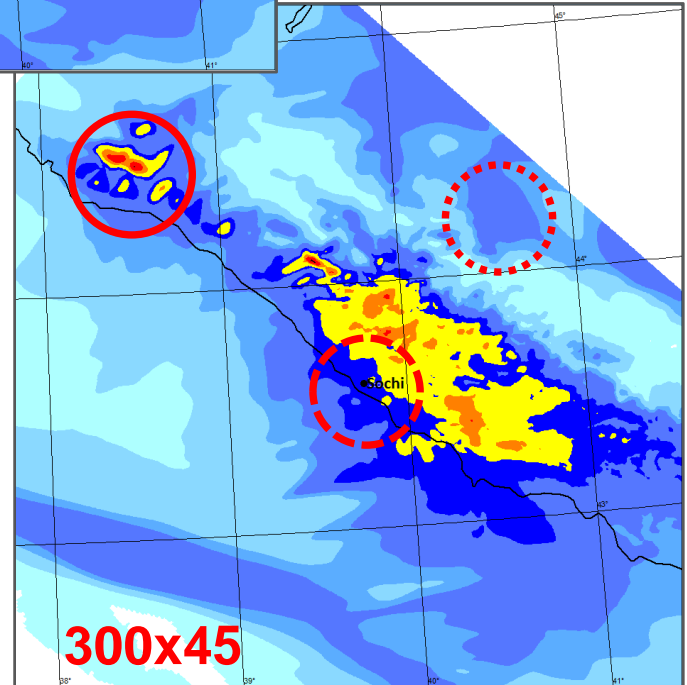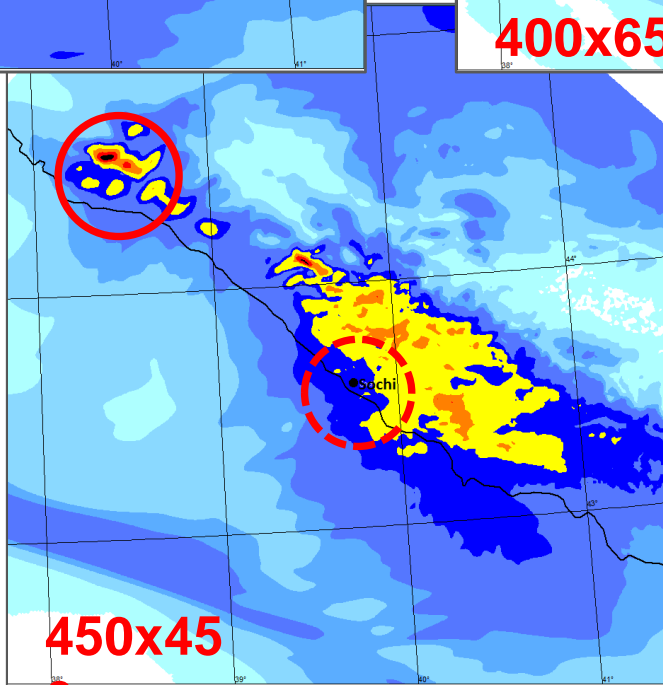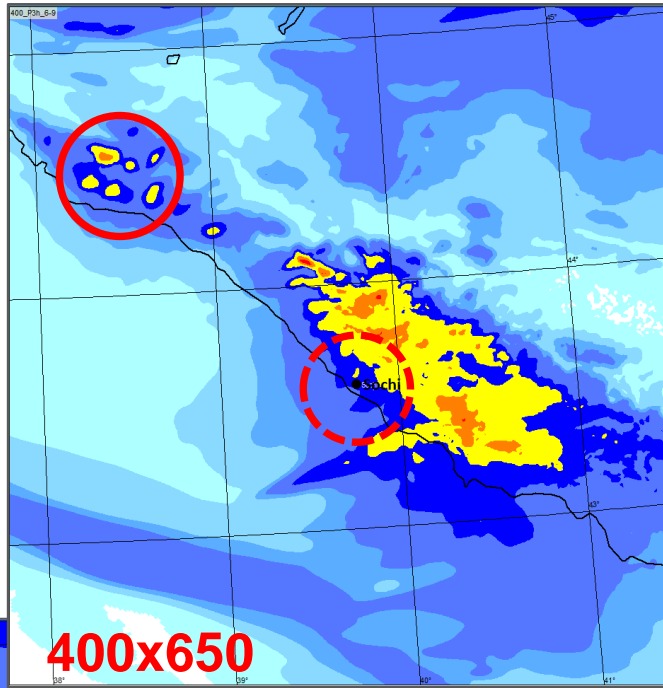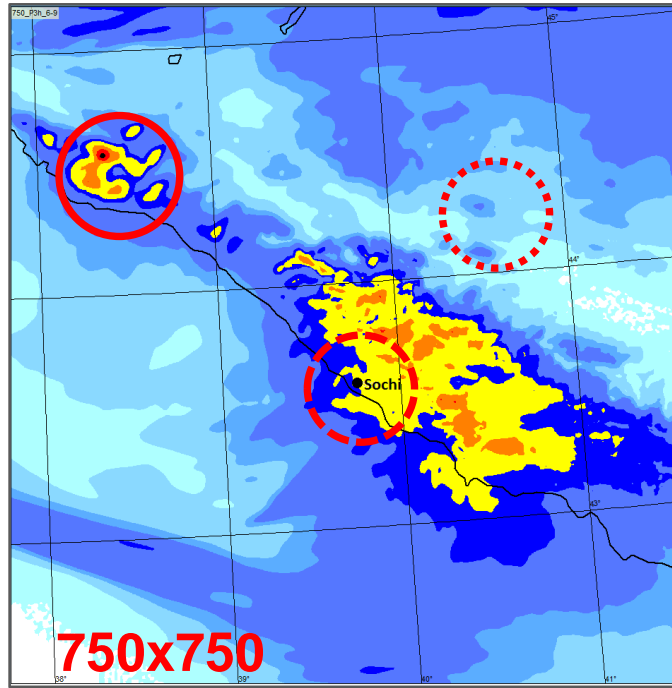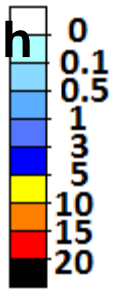
Results and conclusions:

T2m

- **Influence of the simulation domain size on the results appears after several hours of the simulation in dependence of the sites' location (8 h for coastal cluster, 15 h for mountain)**

- **The difference between the T2m forecasts varies from 1 to 3°.**

- **Difference of RMSE of the T2m and DPT forecast obtained for different domains can reach 1°.**
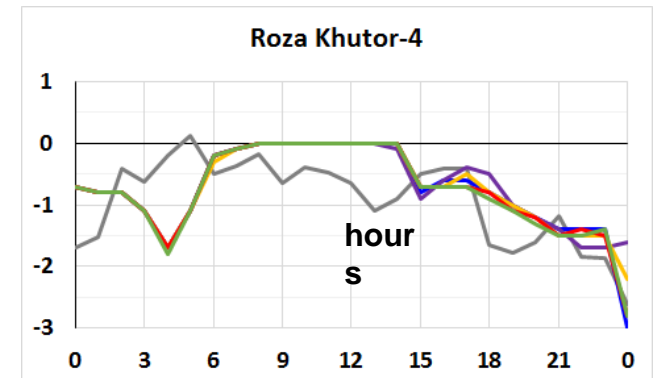
Wind

- **There is no significant effect of the domain size on wind speed forecast.**

Coastal cluster

°C   Imeretinka
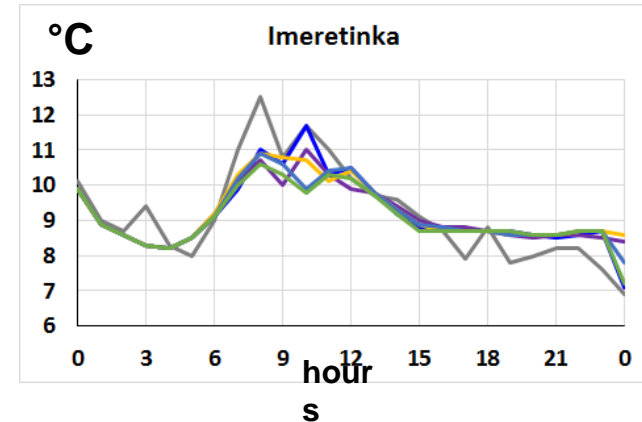
hours

Mountain cluster (h>1000 m)
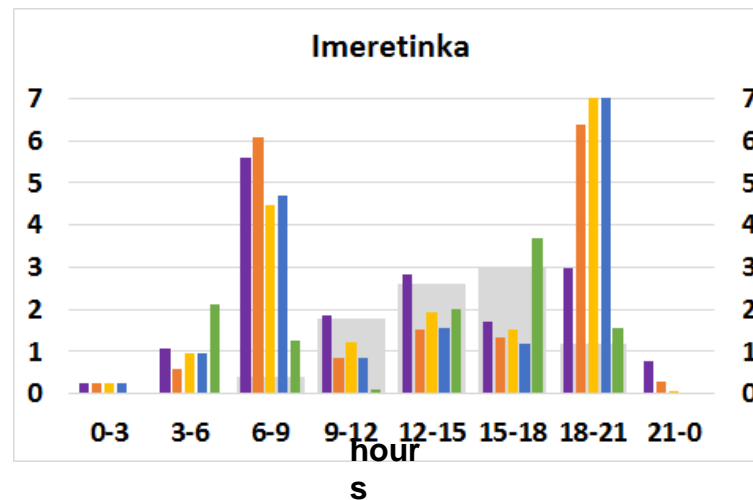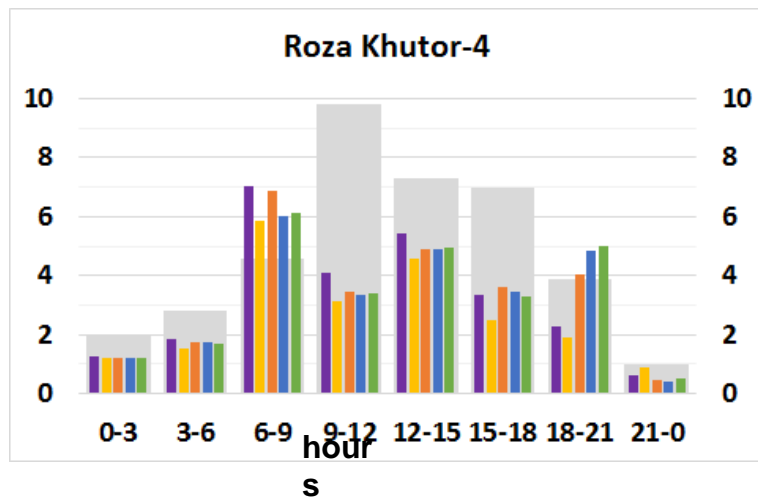

Roza Khutor-4

hours

Results and conclusions:
Precipitation

- **Influence of the simulation domain size on the precipitation forecasts appears after 6 hours.**
- **Increasing of precipitation sum was noted in the border area of the smaller domain vs. greater one.**
- **For the site located in the center part of domains maximum difference between forecasted precipitation (for different domains) was 4 mm/3h and reached 20mm/24h.**

Mountain cluster, h > 1000 m   *Coastal cluster*

Roza Khutor-4

Imeretinka

ST2: Implementation of algorithm of subgrid "h-correction" of T2m (due to the differences between model's and real heights) based on COSMO T lapse rate forecasts (h-correction)

Expected results:

Results of tests for different weather conditions and adapted algorythm & software for the implementation into Fieldextra and into techniques of forming of COSMO meteogramm tables

Will be finalize till Dec 2015

D.Blinov, I.Rozinkina(RHMC),

E.Avgoustoglou (HMC), J-M. Bettems (MS)

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ST3: Preparing of archives COSMO-Sochi-EPS applicable for research aimed at improving COSMO EPS systems and available for community

Expected results:

Archives of EPSs forecasts for the Sochi 2014 modeling area and the corresponding manuals

E. Astakhova, D.Alferov (RHMC),

A.Montani (ARPA-SIMC)

Goal:

Preparation of archives of 7 km and 2.2 km EPSs forecasts for the Sochi-2014 modeling area applicable for research aimed at improving COSMO EPS systems and available for community

Results:

1) Archive of COSMO-EPS forecasts in TIGGE-LAM style for the period of Olympics/Paralympics

2) Web-tool to export forecasts and observations

3) A list of most interesting cases during Olympics/Paralympics

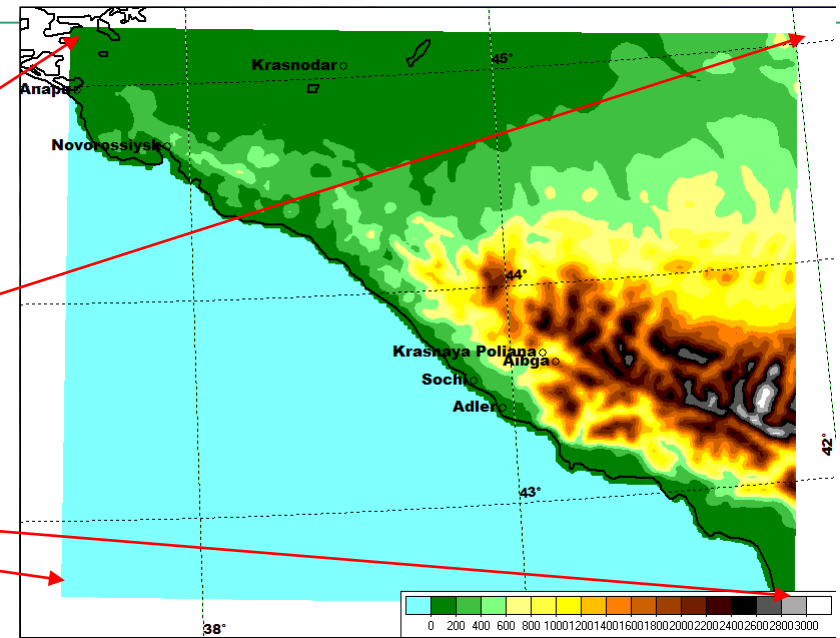4) ICs and BCs for high-resolution EPS available on demand

Two COSMO-EPS were developed in CORSO project

COSMO-S14-EPS – a "clone" of COSMO-LEPS moved to the Sochi region
COSMO-Ru2-EPS – downscaling of COSMO-S14-EPS
10 members
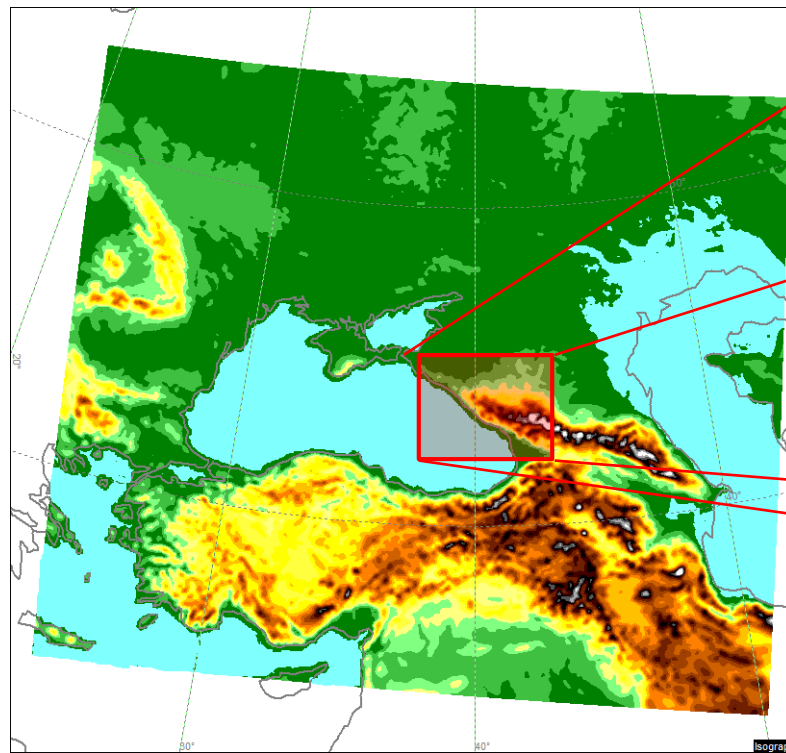
COSMO-S14-EPS
Domain: 1575 km * 1680 km
Grid: 226*241, 40 lev
Step: 7 km

COSMO-Ru2-EPS
Domain: ~ 376 km *288 km
Grid: 172x132, 50 lev
Step: 2.2 km

Specification of CORSO Unified Archive for Sochi (follows TIGGE-LAM)

- *Data format:* **WMO-GRIB2**

- *Period:* **January 14,2014 – March 16, 2014**

- *Ensemble systems:* **COSMO-S14-EPS, COSMO-Ru2-EPS**

- *Model runs:* **2 per day (00 UTC, 12 UTC)**

- *Time step frequency:* **3h (cumulated parameters are not archived at step 0)**
- *Grid:* **original model grid**
- *Parameters:* **T 2m, Td 2m, U 10m, V 10m, gusts 10m, pmsl, 3-h accum prec**
- *Static fields:* **orography, land-sea mask (are archived only once)**

GRIB files for ensembles contain the following metadata: **size of ensemble; ensemble member's number; type of forecast (perturbed/control)**

CORSO archive is a part of FROST-2014 archive,
which additionally contains forecasts by 4 other EPSs:
GLAMEPS (11km), HarmonEPS(2.5 km), NMMB-EPS(7 km),LAEF-EPS (11 km)

Web-tool to export gridded ensemble forecasts from the archive

Select interval of forecast initial dates

From `2014-01-14` To `2014-03-16`

Select forecast origin and initial time

	COSMO-S14-EPS	GLAMEPS	LAEF-EPS	NMMB-EPS	COSMO-Ru2-EPS	HarmonEPS
00:00	☐		☐	☐	☐	
06:00		☐				☐
12:00	☐		☐	☐	☐	
18:00		☐				☐

Select all Clear

Select ensemble members

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14
☐ 15 ☐ 16 ☐ 17 ☐ 18 ☐ 19 ☐ 20 ☐ 21 ☐ 22 ☐ 23 ☐ 24 ☐ 25 ☐ 26 ☐ 27 ☐ 28 ☐ 29
☐ 30 ☐ 31 ☐ 32 ☐ 33 ☐ 34 ☐ 35 ☐ 36 ☐ 37 ☐ 38 ☐ 39 ☐ 40 ☐ 41 ☐ 42 ☐ 43 ☐ 44
☐ 45 ☐ 46 ☐ 47 ☐ 48 ☐ 49 ☐ 50 ☐ 51 ☐ 52 ☐ 53 ☐ 54

Select all Clear

Forecast Lead Time [hr]

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14
☐ 15 ☐ 16 ☐ 17 ☐ 18 ☐ 19 ☐ 20 ☐ 21 ☐ 22 ☐ 23 ☐ 24 ☐ 25 ☐ 26 ☐ 27 ☐ 28 ☐ 29
☐ 30 ☐ 31 ☐ 32 ☐ 33 ☐ 34 ☐ 35 ☐ 36 ☐ 37 ☐ 38 ☐ 39 ☐ 40 ☐ 41 ☐ 42 ☐ 43 ☐ 44
☐ 45 ☐ 46 ☐ 47 ☐ 48 ☐ 51 ☐ 54 ☐ 57 ☐ 60 ☐ 63 ☐ 66 ☐ 69 ☐ 72

Select all Clear

Select meteorological parameters

☐ 10 metre U wind component   ☐ 10 metre V wind component   ☐ Wind Gusts at 10 m height, m/s

☐ Dew Point Temperature (at 2 m above the ground), K   ☐ Temperature (at 2 m above the ground), K   ☐ Land-sea mask

☐ Mean sea level pressure, Pa   ☐ Orography   ☐ Total precipitation, mm

Select all Clear

Your email: `_____`

[Submit (Once your data are ready you will get a notification to this E-mail)]

http://frost2014.meteoinfo.ru/forecast/exportgridforcs

PT CORSO-A: ST3

Web-tool to export observations from the automatic meteorological stations in the Sochi region

Select a time interval between 2011-01-01 23:00:01 and 2014-09-29 13:24:53

Date from `2014-01-15 00:00` to `2014-03-19 00:00`

Select stations

- [ ] Snowboard-1025
- [ ] Freestyle-1080
- [ ] Biathlon-1500
- [ ] Biathlon-1400
- [ ] Biathlon Stadium
- [ ] Ski Stadium
- [ ] Nordic Combination-675
- [ ] Nordic Combination-615
- [ ] Ski Jump-650
- [ ] Ski Jump-800
- [ ] Sledge-830
- [ ] Sledge-700
- [ ] Krasnaya Poliana (Roshydromet)
- [ ] Kordon Laura (Roshydromet)
- [ ] Gornaya Karusel-1500 (Roshydromet)
- [ ] Gornaya Karusel-1000 (Roshydromet)
- [ ] Aibga (Roshydromet)
- [ ] Solokh-Aul (Roshydromet)
- [ ] Kichmai
- [ ] Imeretinka (Roshydromet)
- [ ] Agrostation Sochi (Roshydromet)
- [ ] Kepsha (Roshydromet)
- [ ] Lazarevskoye (Roshydromet)
- [ ] RKHU-1 (2320m)
- [ ] RKHU-2 (2137m)
- [ ] RKHU-3 (2043m)
- [ ] RKHU-8 (1740m)
- [ ] RKHU-4 (1580m)
- [ ] RKHU-7 (Finish, 980m)
- [ ] Adler-AMSG
- [ ] Magry (Roshydromet)
- [ ] Helicopter Pad Roza-Khutor
- [ ] Lunnaya Polyana (Helicopter Pad)
- [ ] Krasnaya Poliana-Verblude (Megafon)
- [ ] Adler-Norluis (Megafon)
- [ ] SBT-Dacha (Megafon)
- [ ] Adler-Airport (Megafon)
- [ ] SYNOP stations

Select all Clear

Select parameters

- [ ] Wind Speed
- [ ] Wind Direction
- [ ] Air Temperature
- [ ] Dew Point Temperature
- [ ] Ground Temperature
- [ ] Relative Humidity
- [ ] Precipitation
- [ ] Precipitation Intensity
- [ ] Atmospheric Pressure
- [ ] Visibility
- [ ] Cloud Base Height
- [ ] Reflected Sort-Wave Irradiance
- [ ] Total irradiance

Select all Clear

Your e-mail: [   ] [Accept]

http://frost2014.meteoinfo.ru/obs/export-observations-data

A list of most interesting cases during the Olympics/Paralympics

Date	Process/Phenomenon (impact on competitions)	Behavior of models
February 7, 2014	Foehn	Underestimation of temperature by the most part of models
February 10-11, 2014	Precipitation dissipation	Precipitation predicted by the overwhelming majority of models but not observed actually
February 15, 2014	Wind gusts	Underestimation of maximum wind speed in Krasnaya Polyana (by 3.5-7 m/s) by the most part of models
February 16-17, 2014	Local cyclogenesis/Poor visibility (postponed competitions in biathlon and snowboard)	Not all forecasting systems performed well
February 18, 2014	Cold front/Precipitation	Accurate precipitation forecast by the majority of models
February 22, 2014	Foehn	Underestimation of air temperature (by 2.4-4.4°C) by the most part of models
March 11, 2014	Cold front/Temperature (postponed competitions in Alpine skiing)	Not so accurate forecast of maximum air temperature and diurnal variations
March 13, 2014	Weak slow process/Precipitation above 1500 m caused by "settling" of clouds	Inaccurate forecast of precipitation by the majority of models
March 16-17, 2014	Cold front/Wind gusts	Underestimation of wind speed by the most part of models

- The CORSO and FROST-2014 archives are ready

- The Web tools to export data are prepared

- Various observation data are available

Welcome to the Sochi testbed!

ST4: Preparing of recommendations   for forecasters "The features of using and interpretation of the results of deterministic and ensemble meso- scale modeling"

Expected results:

Guidelines for forecasters – presentation concerning the features of interpretation of High resolution NWP products

I.Rozinkina, (RHMC)

P.Eckert (MS)

DRAFT

Recommendations to forecasters on the use of products of small scale NWP

CONTENTS

1 **INTRODUCTION………………………………………**
2 **The small scale (SS) NWP – why is feasible?**
3 **Types of SS NWP:…………………………………..**
    3.1.   Δx > 10 km………………………………………
    3.2   3km ≤Δx < 10 km……………………………..
    3.3.   Δx < 3 km……………………………………
4 **SS NWP products:**
    4.1. Large-scale short-range (till 3 days) forecasting
    4.2. Forecasting of weather phenomena ……………..
5 **4.3. Forecasting for mountain regions……………..**
6 **4.4. Forecasting for**
7 **points………………………………………**
8 **General comments**
    Interpretation&Post processing
    Some examples
    Forecaster trainings

2015

PT CORSO-A:

Thanks for your attention!

Thanks to:

E. Astakhova, D. Alferov, E.Avgoustoglou, J-M. Bettems, D.Blinov, P.Eckert, A.Montani, G.Rivin, I.Rozinkina, M.Shatunova, J.Helmert,

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