



Federal Service for Hydrometeorology  
and Environmental Monitoring



Hydrometeorological  
Center of Russia



**SWFDP-CA: Severe Weather Forecast Demonstration Project for Central Asia**  
**CARFFGS: Central Asia Regional Flash Flood Guidance Project**

# **SWFDP-CA & CARFFGS:**

## **Potential collaboration (proposals)**

**Gdaliy Rivin, Inna Rozinkina**  
*and SWFDP-CA team*

**Astana, 14 Sept. 2015**



## SWFDP-CA main components:

Monitoring of SW events

Case studies

Implementation of LAM Technology

Development and use of integrated SWFDP-CA  
web-portal

Trainings

Introduce to LAM techniques

How to use the LAM results

**SWFDP-CA: Severe Weather Forecast Demonstration Project for Central Asia**

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## Proposed area of SWFDP-CA & CARFFG cooperation

Monitoring of SW events, incl. FF

Case studies of heavy precipitation forecasts

Implementation of LAM Technology

References between SWFDP-CA and CARFFG  
sites

Trainings

Introduce to LAM techniques

How to use the LAM results

**SWFDP-CA: Severe Weather Forecast Demonstration Project for Central Asia**

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## **SWFDP-CA & CARFFG cooperation: activities**

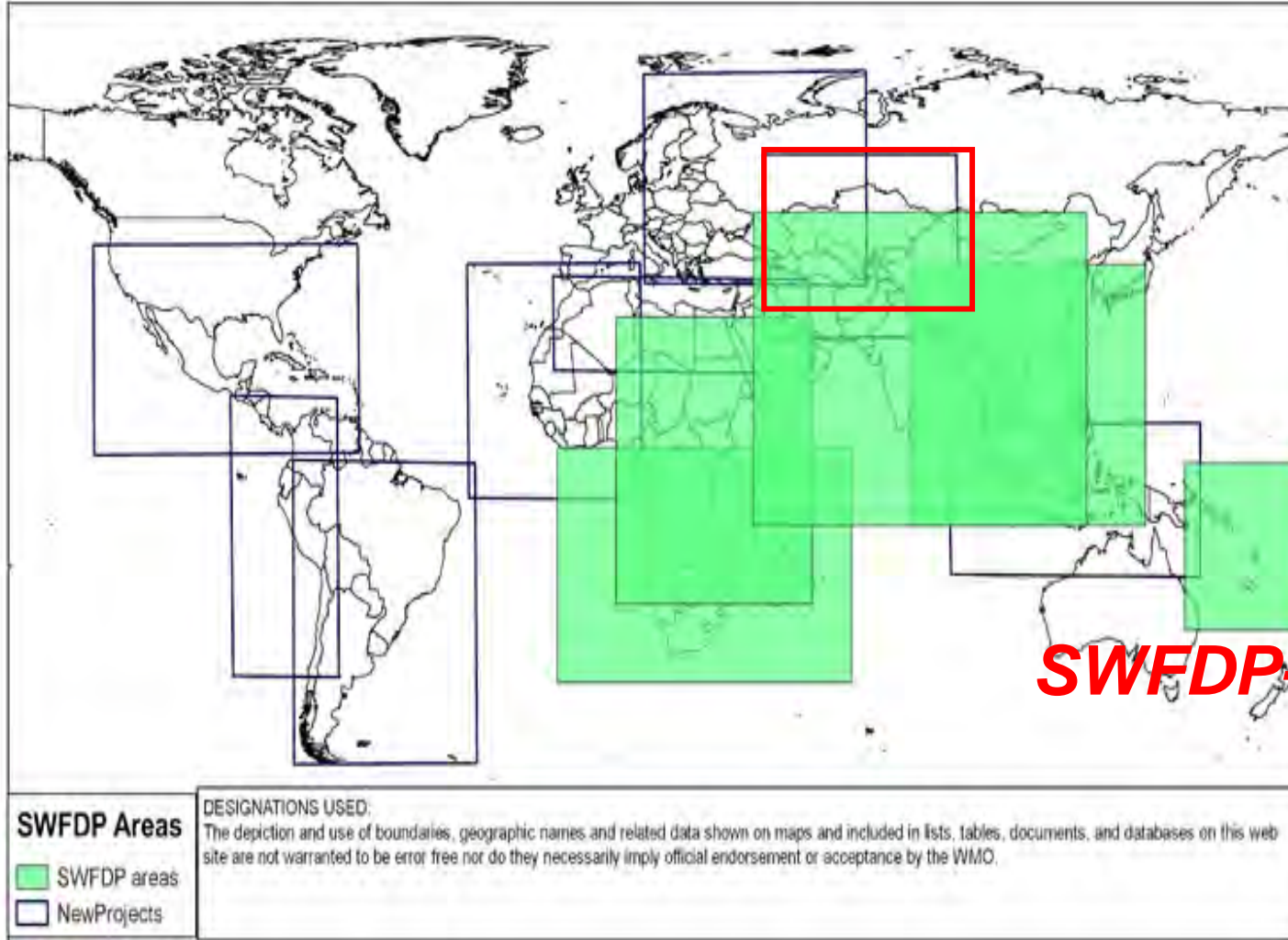
### **proposals:**

- 1. To prepare letter from secretariat WMO to heads of NMC – participants of SWFDP-CA & CARFFG to increase of speed of Internet-transmissions (finance support -?)**
- 2. To provide the available COSMO-Ru GRIBs extended output**
- 3. To indicate the FF cases on the monitoring lists of SW phenomena of NMC – participants of SWFDP-CA and in the ALARM pictures <http://swfdp-ca.meteoinfo.ru/>**
- 4. To investigate some case studies with calculations of COSMO for mountain CA domain with resolution 2 km**
- 5. To analyze the feasibility of 1-2 days LAM (COSMO) forecasts of heavy rains for risks of FF events**



# WMO SWFDP areas,

<http://www.wmo.int/pages/prog/www/swfdp//>



**SWFDP-CA**



# SWFDP –CA:

- **Started at April 2015,**
  - **Participants:** Kazakhstan, Kirgizstan, Uzbekistan, Tadjikistan +Russia + COSMO
  - **Participant centers of NWP:**  
ECMWF, CMA, KMA, DWD, Roshydromet
- 2 directions:**
- **To realize the concept of SWFDP for CA region**
  - **To develop the Technology of HR LAM in region**
- **<http://swfdp-ca.meteoinfo.ru/>**



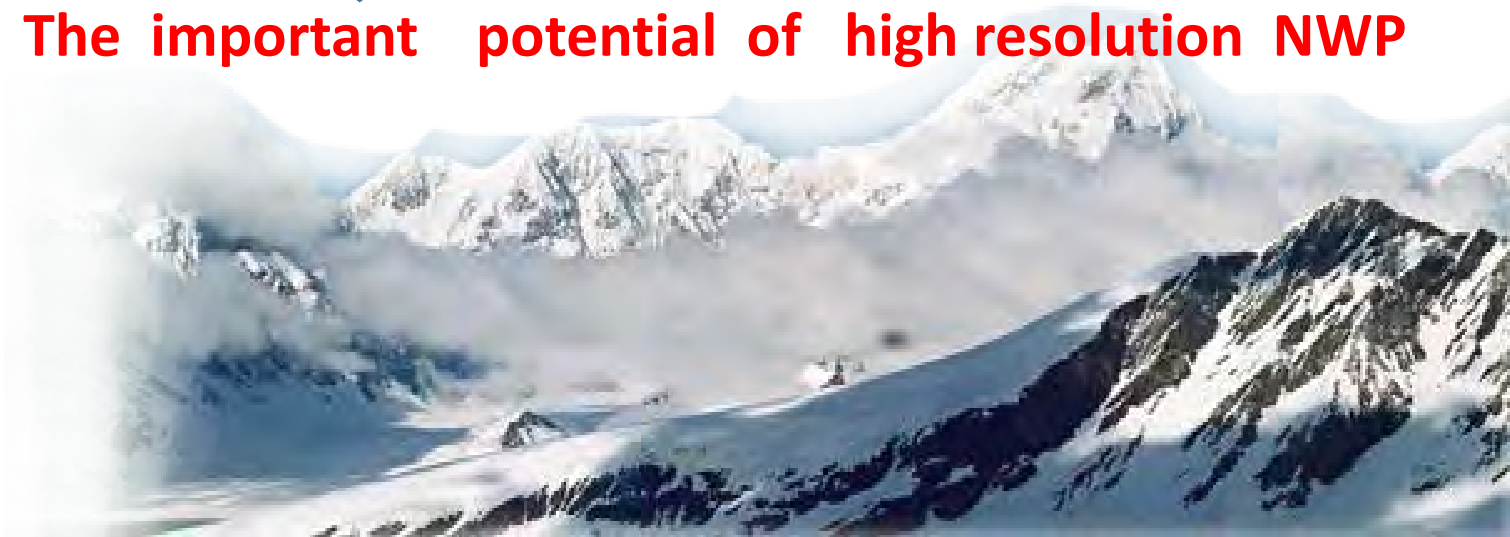
# All geographic areas have their own unique forecasting challenge

Weather components typical features for CA region:

- Convection processes over flat terrains
- The significant influence of high mountains



The important potential of high resolution NWP



**RSMC: TASHKENT (UZBEKISTAN)**

**NMC: Astana (KAZAKHSTAN), Bishkek (KIRGIZSTAN), Dushanbe (TADJIKISTAN)**





## 2. RMSC & WMO & Global centers:

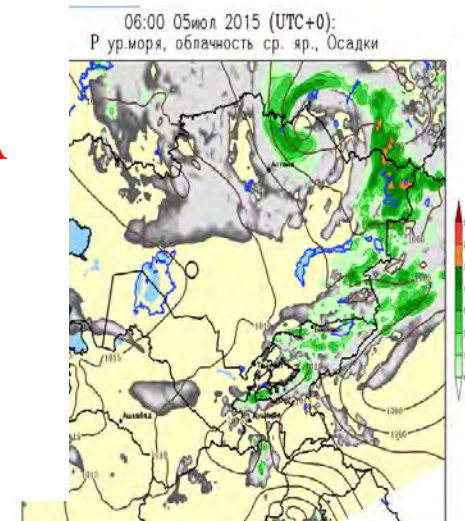
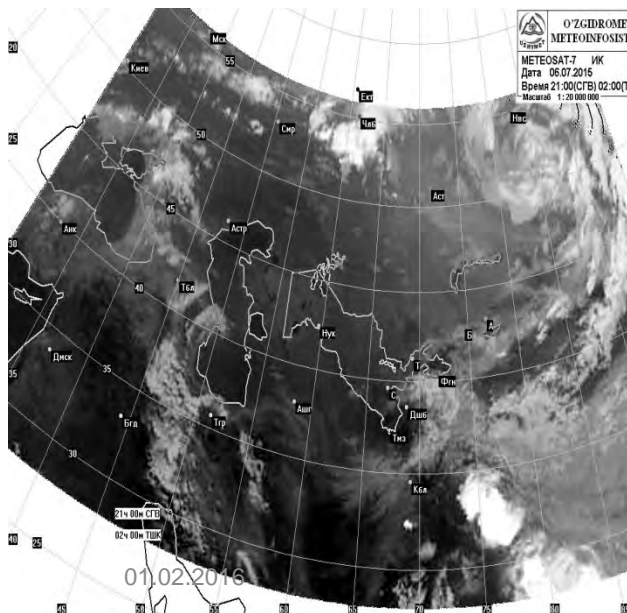
To create the unified information exchange

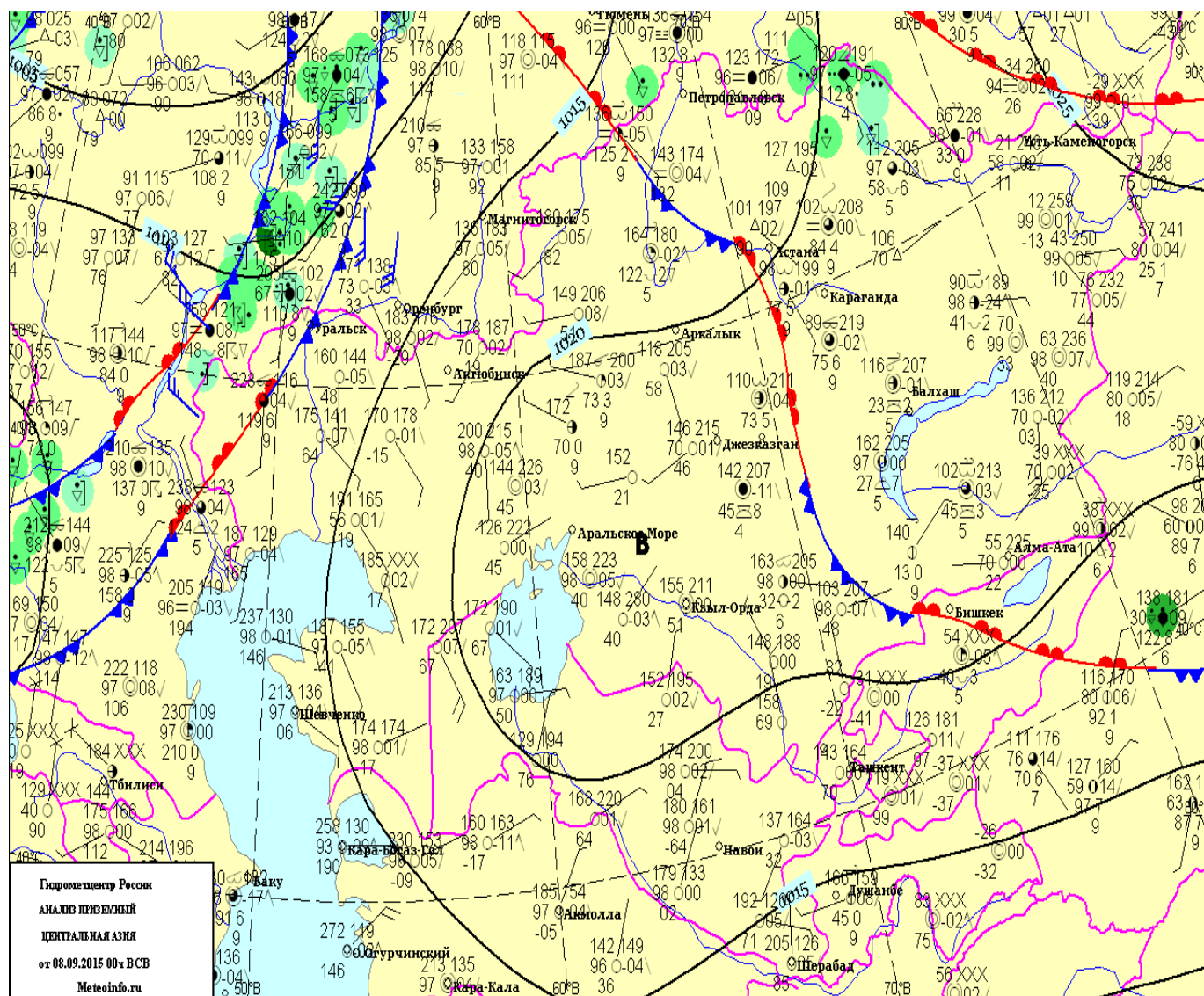


**Whole region: unified web-site**

### Portal SWFPD-CA:

1. links to NWP centers websites
2. placement or links to synoptic map for CA region
3. placement or links to satellite images
4. interactive ALARM-CA system
5. placement of daily forecasts of NHMC
6. archiving



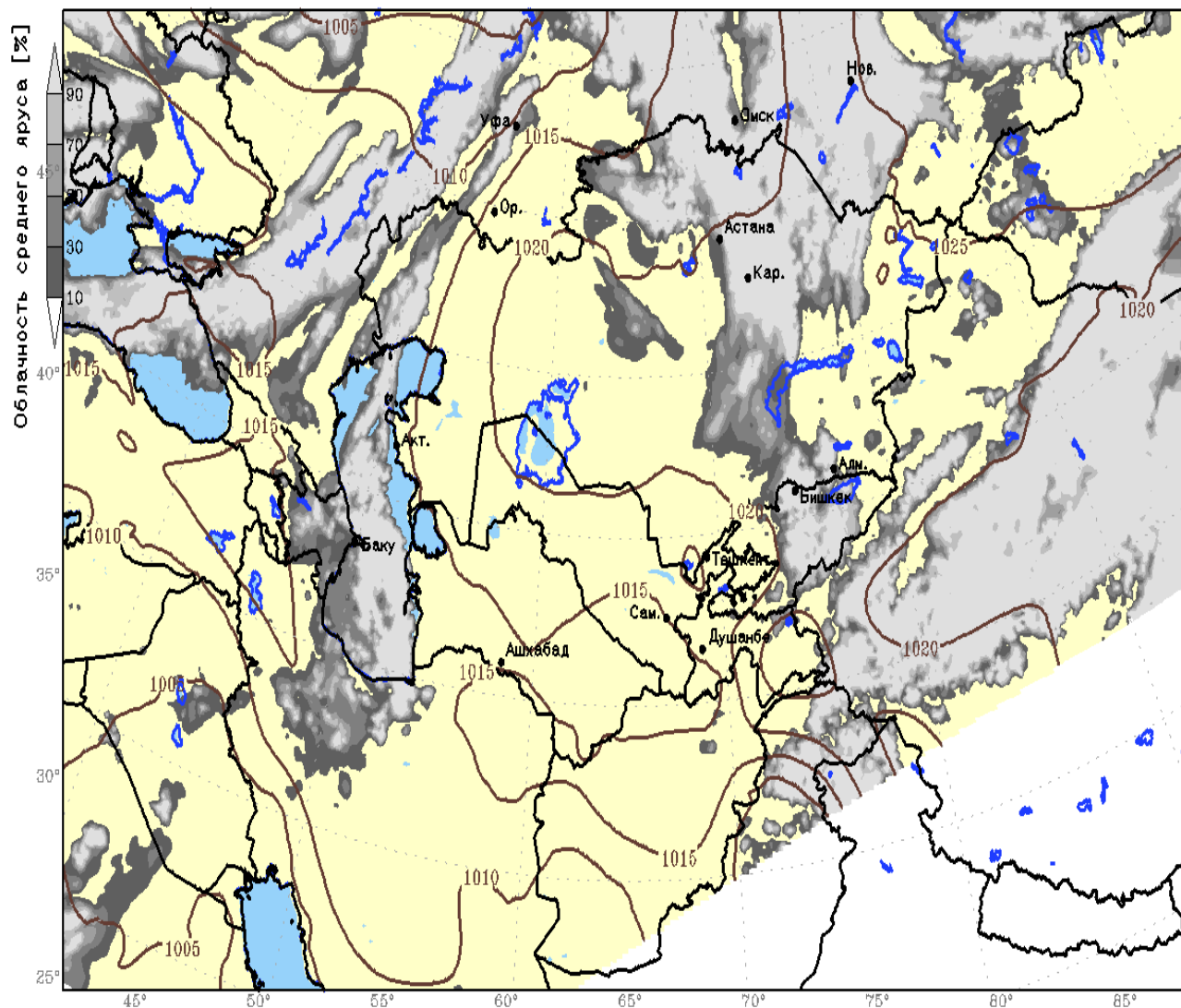


01.02.2016

SWFDP CA for CA RFFGS



00:00 08сен 2015 (UTC):  
Р ур. моря, облачность ср. яр., Осадки



Прогноз на 0ч. от 00:00 08сен 2015 (UTC)

01.02.2016

COSMO-RU 13.2км

— Давление на уровне моря



swfdp-ca.meteoinfo.ru - Г x МетеоАларм x

swfdp-ca.meteoinfo.ru/meteoalarm

FB2book.com - Эле... Snow Forecast, Sno... Greg Hakim's Annot... AMS Journals Onlin... Переводчик Google Pantene Russia - Yo...

# SWFDP-CA

О проекте МетеоАларм Фактическая погода Прогнозы Семинары Библиотека Ссылки

Выйти

Режим редактирования  
Архив  
Критерии для МетеоАларм: Казахстан  
Критерии для МетеоАларм: Таджикистан  
Критерии для МетеоАларм: Узбекистан

МетеоАларм

2015-09-07 2015-09-08 2015-09-09

Прогноз на 2015-09-07

Legend:

- Данные отсутствуют
- Оповещения о погоде не требуется
- Погода потенциально опасна
- Погода опасна. Имеется вероятность стихийных бедствий, нанесения ущерба
- Погода очень опасна. Имеется вероятность крупных разрушений и катастроф

<http://swfdp-ca.meteoinfo.ru/meteoalarm>



# SWFDP-CA components



<b>Synoptic</b>	<b>Technological</b>
<b>Daily: NMC, RSMC</b>	<b>RSMC, NWP center</b>
<p><b>Analysis of all matters, incl. skill of NWP products</b></p> <p><b>Placing on the site of daily forecasts for list of points</b></p> <p><b>Placing pf ALARM CA data</b></p> <p><b>Case-study</b></p> <p><b>The SWFDP-CA reports</b></p>	<p><b>- Development of SWFDP CA site</b></p> <p><b>The goals of SWFDP SITE:</b></p> <ul style="list-style-type: none"> <li><b>- To provide the information for forecasters</b></li> <li><b>- To unify the efforts and the information from NMC</b></li> <li><b>- Development of systems of processing of LAM output</b></li> <li><b>- Trainings</b></li> <li><b>- Development of COSMO-LAM</b></li> </ul>



# Table of recommended LAM NWP products in concept of SWFDP

Precipitation (3, 6, 12, 24 sum)
T2m,
Wind 10m
Wind gust
T max, T min (as postprocessing product)
MSPL
Cloudiness of middle and low levels
Bottom of convective cloudiness
Snow depth, SWE
New snow depth for 6 and 24 hours
Parameters on levels 925, 850, 700, 500 hPa: U,V, T, H, R%
Vertical velocity on levels 850, 700, 500
K index, CAPE, CIN, Showatler Index (+ others-?), SKEW-T
Meteogrammes



# PT CACOIM (Central Asia COSMO Implementation) proposals

N	Period	Activities	FTE	Deliverables
1	DJF 2015-2016	Trainings for first stage: Preparing of matters, feed-back from 4 NMC	0.2	Extended and adapted Guidelines for first stage of COSMO licensed USERS (based the existing COSMO Education matters)
2	MAM 2016	Software development: postprocessing extension and tests (Indices for warnings)	0.2	Proposed, tested algorithms for indices calculation for Severe weather events Proposals for COSMO new products
3	JJA 2016	Analysis of skill of new COSMO products for subtropical continental conditions Development of adapted version COSMO-CA Trainings for NMC staff	0.1	Case-study results of comparison of importance of COSMO and ECMWF EPS products for some sub-tropical continental severe weather events
4	SON 2016	feed-back from 4 NMC Testing of COSMO-CA2 technology, trainings	0.1	Matters of trainings Guidelines for forecasters concerning use of COSMO LAM products for forecasting of different weather phenomena
5	DJF 2016-2017	Analysis of results Adaptation of COSMO-CA2 version.	0.2	Extended software of COSMO postprocessing in concordance with WMO requirements, Presentations on CUS and COSMO GM, Papers



# COSMO-Ru system products

## COSMO-Ru7

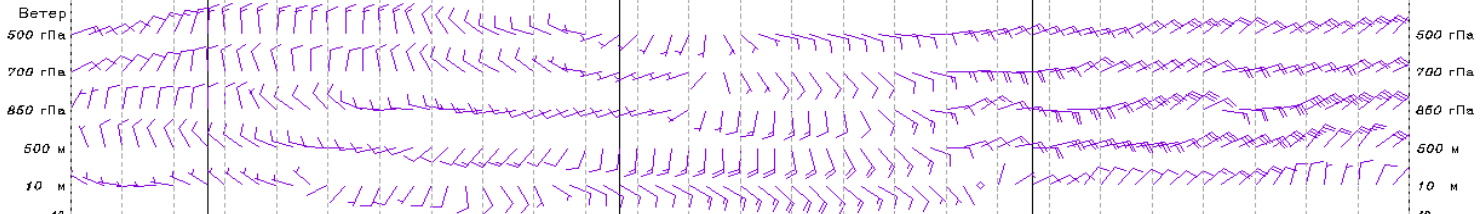


**Heavy rainfall caused extreme flood**

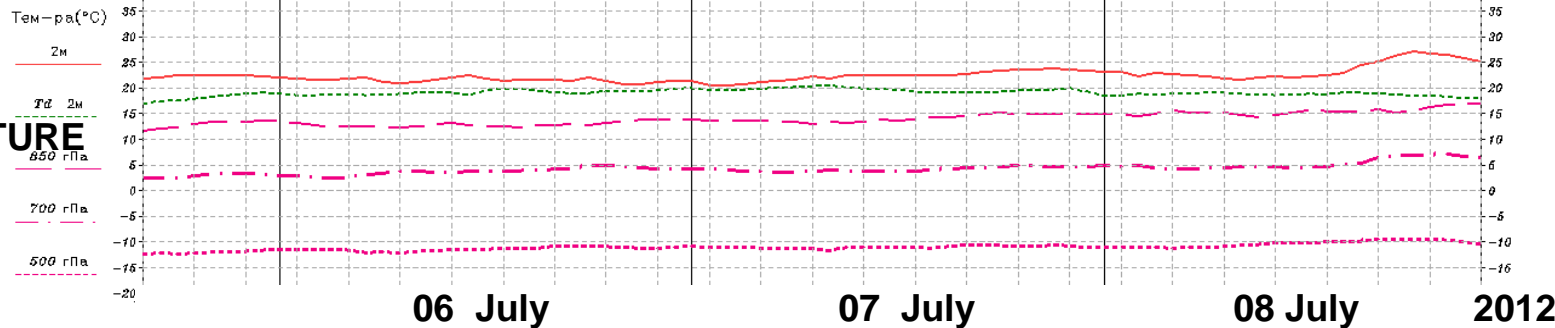
**Meteographs for Gelendjik**  
**05/07/12, 12 UTC, fc+78 h**

Sochi\_Gelendjik W — Предоставлено: ГУ "Гидрометцентр РФ" | Долгота: 37.935  
 Прогноз на 78 часа(ов) от 05.07.2012 16:00 МСК (12ч. UTC+0) | Модель COSMO-RU / 7 км | Период: 05.07.2012 16:00 МСК

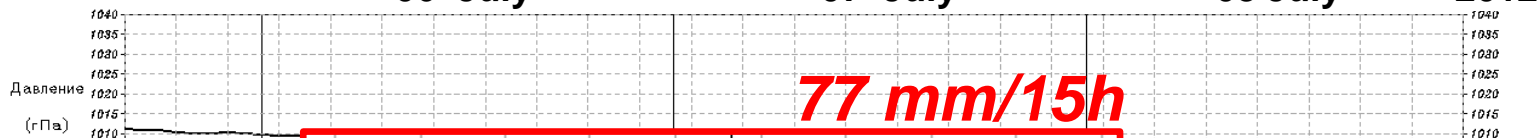
**WIND**



**TEMPERATURE**

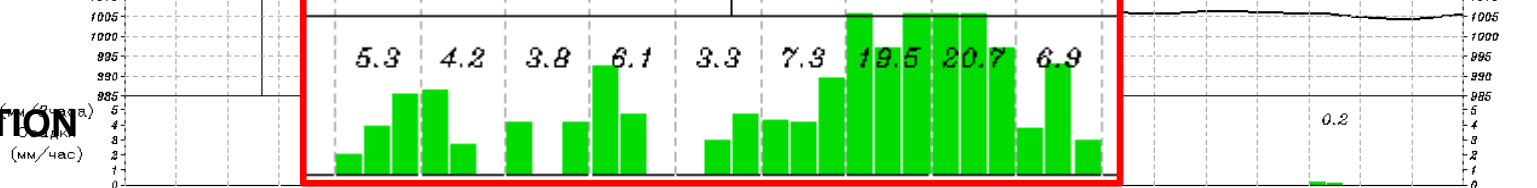


**PMSL**



**77 mm/15h**

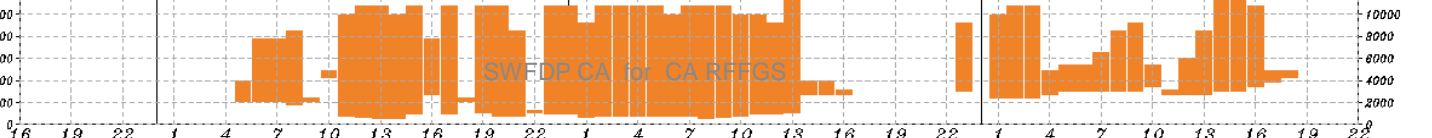
**PRECIPITATION**



**CLOUD COVER**



**CONVECTIVE CLOUDS**



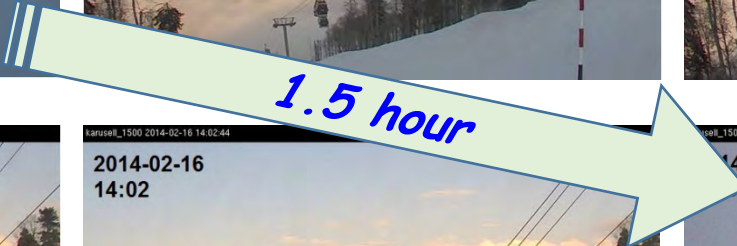
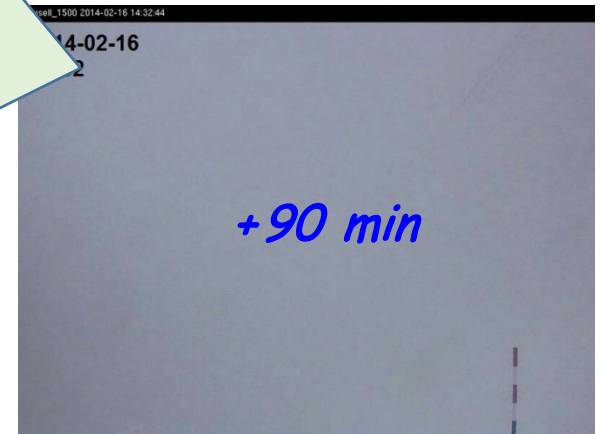
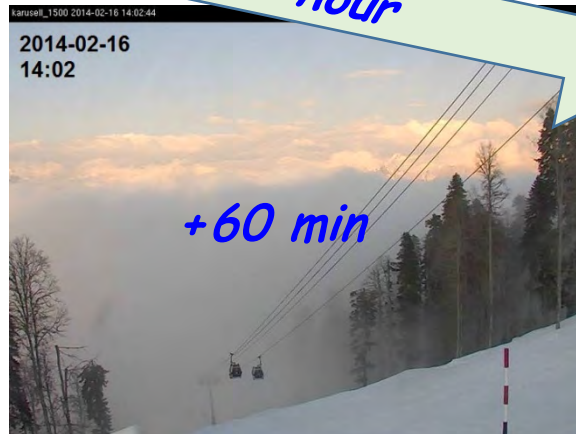
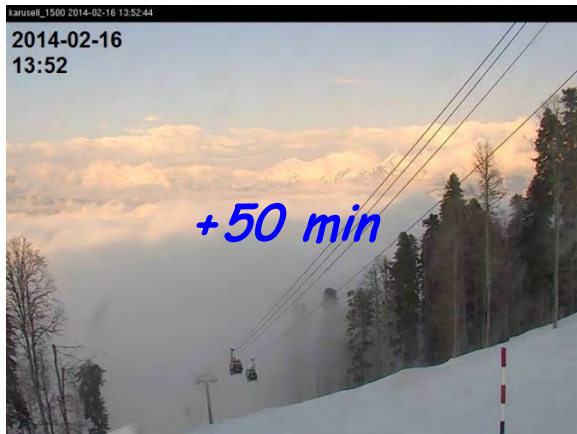
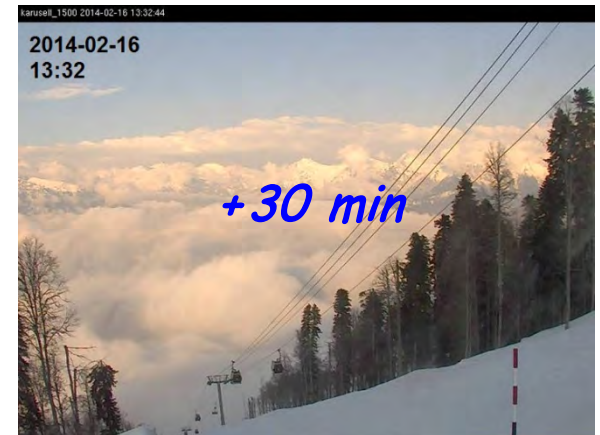
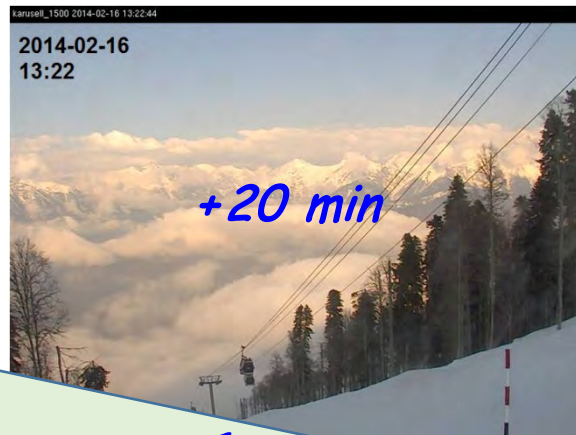
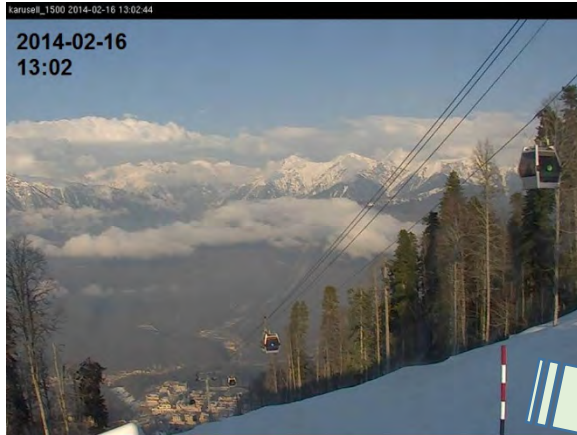




# Low visibility event

Cloudiness formation due to adiabatic cooling of the moisture air during its rise along the slope of the valley

**February, 16-17, 2014**



*Camera shots at Gornaya Karusel-1500*



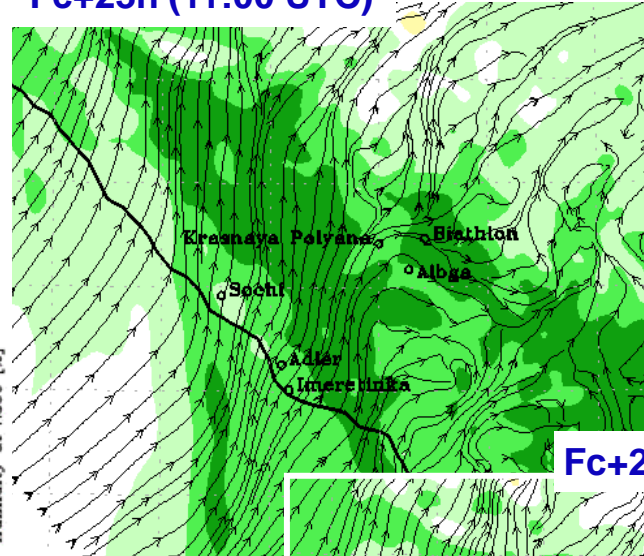
# COSMO-Ru system products

## COSMO-Ru1

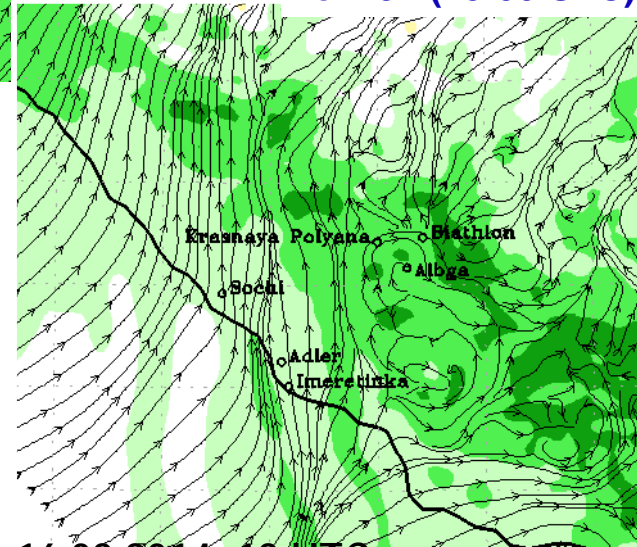
### Low visibility event during Sochi Olympics

#### Stream lines and relative humidity at 850 hPa

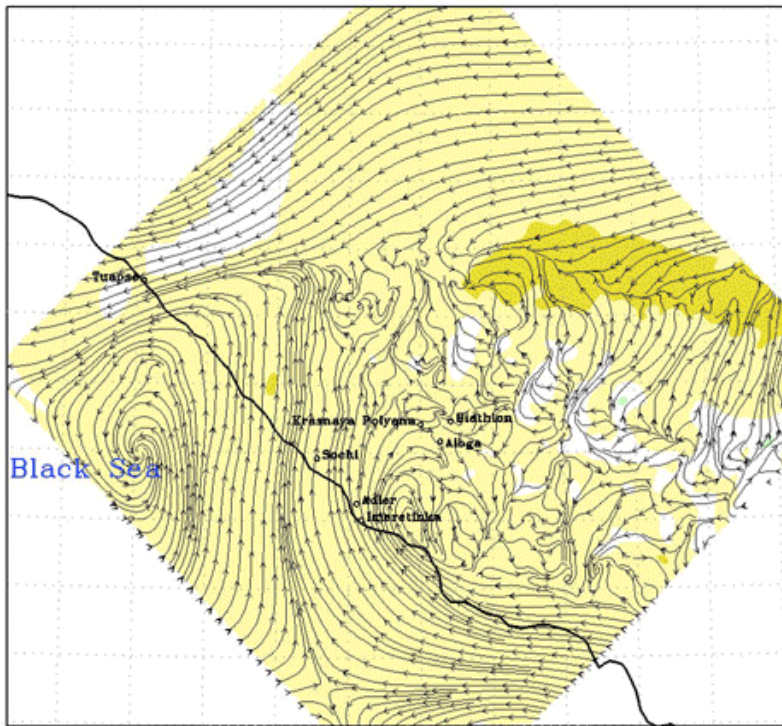
Fc+23h (11:00 UTC)



Fc+25h (13:00 UTC)



04:00 16FEB 2014 (MSK):  
Wind direction, Relative Humidity at H850



Forecast on 0 hours from 04h 16FEB 2014 (Msk)  
COSMO-RU 1.1km

→ Wind direction

Forecast from 16.02.2014, 00 UTC

Forecast from 16.02.2014, 12 UTC



# COSMO-Ru system products

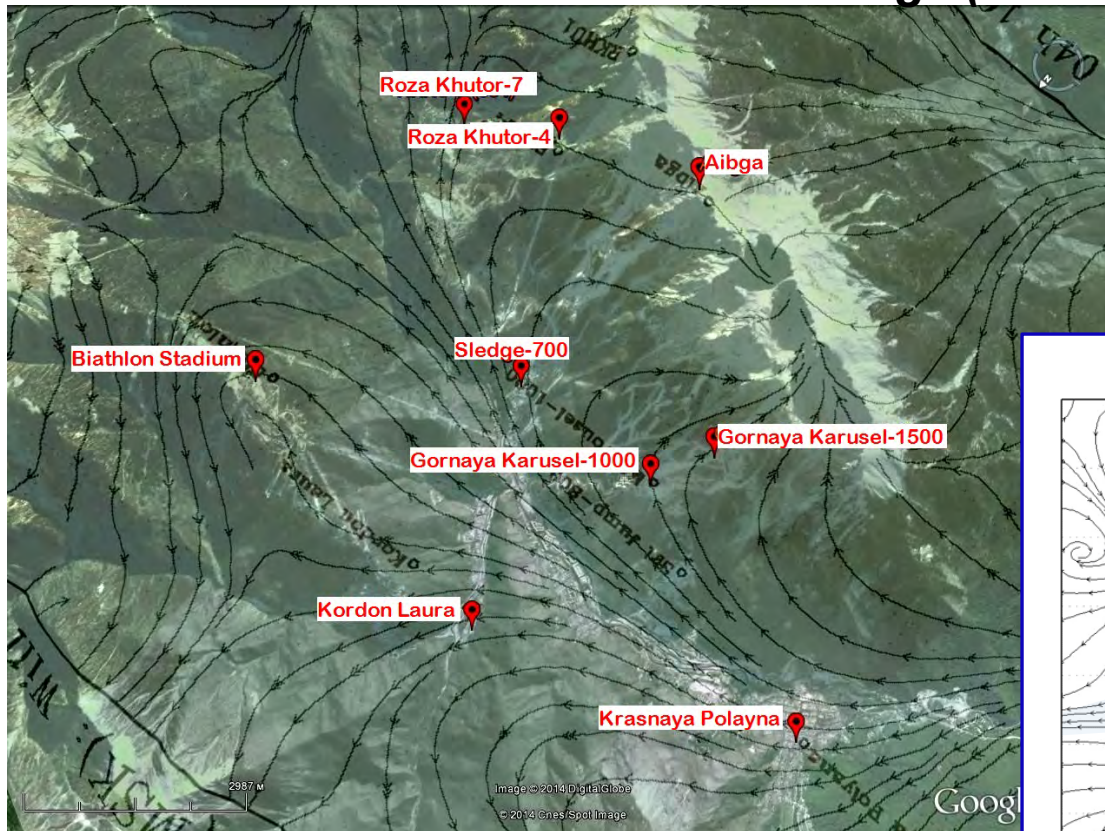
## COSMO-Ru1



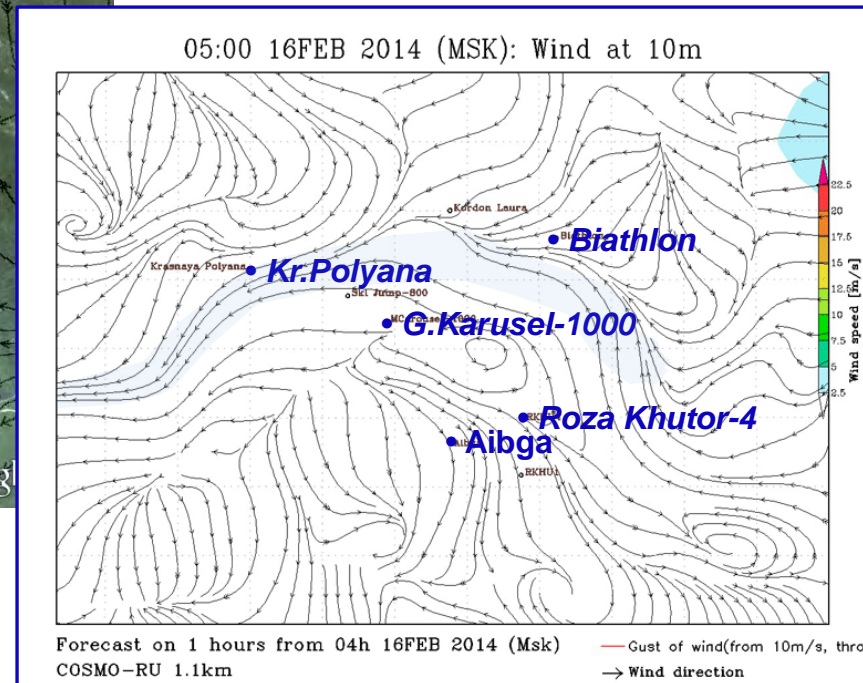
Low visibility event during Sochi Olympics

Streamlines within the valley

Forecast chart overlaid on the relief image (fc+13h)



Forecast from 16.02.2014, 00 UTC





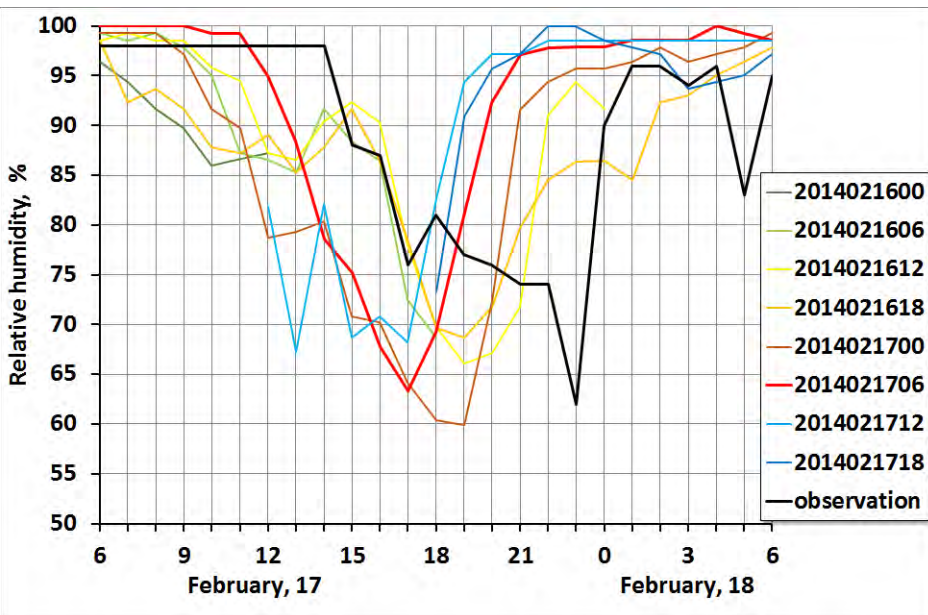
# Low visibility event

## COSMO-Ru1

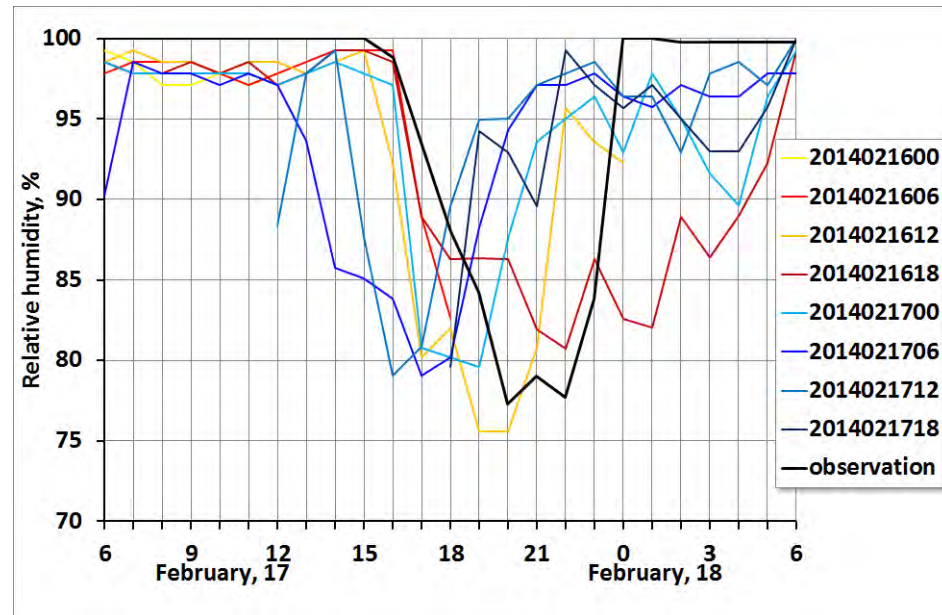
### Low visibility event during Sochi Olympics

Relative humidity at 2m: series of the forecasts for the sites

#### Biathlon Stadium (1455 m)



#### Roza Khutor-4 (1580 m)



***COSMO-Ru1 forecast for relative humidity and wind allowed forecasters to predict changes in visibility (“good visibility window”) and determine the time for the competitions.***



# Postprocessing: Fresh snow depth

FieldExtra software

Visualization software

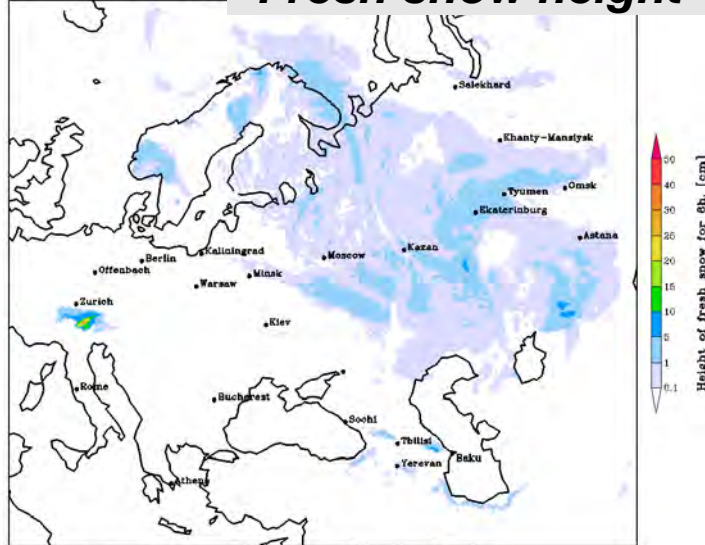
Maps of fresh snow height  
for 6 h intervals

Altitude correction of T2m

Algorithm of fresh snow height  
calculation

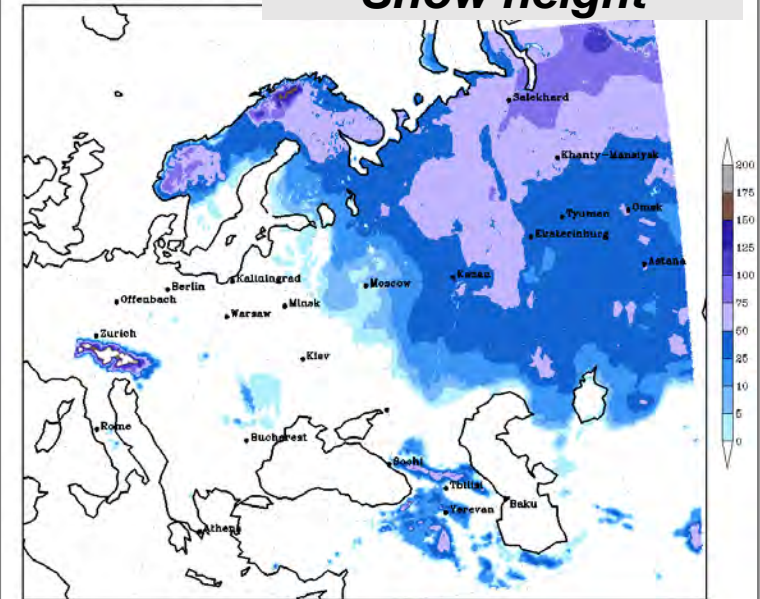
Meteographs

16:00 19FEB 2014 (1) **Fresh snow height**



Forecast on 36 hours from 04h 18FEB 2014 (Msk)  
Postprocessing of COSMO-RU 7km

16:00 19FEB 2014 **Snow height**



Forecast on 36 hours from 04h 18FEB 2014 (Msk)  
COSMO-RU 7km

*For the Sochi region (mountain terrain) algorithm was tested and tuned with use the measurements of Sochi avalanche service*



*Thank you!*  
*Questions?*