



Field campaign and information resources of the FROST-2014 project

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The WMO World Weather Research Program project FROST-2014 (FROST - Forecast and Research in the Olympic Sochi Testbed) connected to the XXII Olympic and XI Paralympic Winter Games in Sochi is targeted at advancement and demonstration of state-of-the-art nowcasting and short-range forecasting systems for winter conditions in mountainous terrain. The list of the international project participants includes the mesoscale modeling consortia COSMO and HIRLAM/ALADIN, the Central Institute for Meteorology and Geodynamics (Austria), Environment Canada, the Finnish Meteorological Institute, the National Oceanic and Atmospheric Administration of the United States and the Korea Meteorological Administration.

For purposes of weather analysis, forecasting and nowcasting, data assimilation and forecast verification about forty automatic meteorological stations were installed in the region of Olympics by Roshydromet and other investors. For majority of the stations the sampling interval did not exceed 10 minutes. For some stations and variables it was enhanced to 1 minute. C-band dual polarization Doppler weather radar was installed on Akhun mountain in Sochi. Wind profiler, two temperature profilers and two Micro Rain Radars supplemented the network. During the Olympic winter the frequency of upper air soundings in Sochi was enhanced to 4 times/day. Additional observations were provided by the neighbourhood countries – Armenia, Turkey and Ukraine.

Five nowcasting systems and seven deterministic mesoscale NWP systems contributed to FROST-2014. Several models were implemented for region of the Olympics with grid spacing of 1 km or finer (down to 250 m in GEM system of the Environment Canada). Six ensemble prediction systems (including two convection permitting ones) participated in the project. The project operational forecasts were deeply integrated into the system of meteorological support of the Olympics. With the closure of the Olympics in March 2014 the project field campaign was mostly over. Today the focus of FROST-2014 activities is switched to analysis of results of the field campaign.

Due to the lack of the observational data and coordinated forecasting efforts quite few systematic comparisons of various forecasting systems in mountain conditions are known so far. In this respect FROST-2014 provides a valuable information resource for mesoscale predictability studies, development and validation of forecasting systems under winter conditions in complex terrain.