Numerical simulation of a meteorological regime of Pontic region

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The Black Sea Coast of Caucasus is one of priority in sense of meteorological researches. It is caused both strategic and economic importance of coast, and current development of an infrastructure for the winter Olympic Games «Sochi-2014». During the winter period at the Black Sea Coast of Caucasus often there are the synoptic conditions leading to occurrence of the dangerous phenomena of weather: «northeast», ice-storms, strong rains, etc.

The Department of Meteorology (Moscow State University) throughout 8 years spends regular measurements on the basis of Southern Department of Institute of Oenology of the Russian Academy of Sciences in July and February. They include automatically measurements with the time resolution of 5 minutes in three points characterizing landscape or region (coast, steppe plain, top of the Markothsky ridge), measurements of flux of solar radiation, measurements an atmospheric precipitation in 8 points, which remoteness from each other – 2-3 km. The saved up material has allowed to reveal some features of a meteorological mode of coast. But an overall objective of measurements – an estimation of quality of the numerical forecast by means of «meso scale» models (for example - model WRF).

The first of numerical experiments by WRF model were leaded in 2007 year and were devoted reproduction of a meteorological mode of the Black Sea coast. The second phase of experiments has been directed on reproduction the storm phenomena (Novorossiysk nord-ost). For estimation of the modeling data was choused area witch limited by coordinates 44,1 - 44,75 (latitude) and 37,6 - 39 (longitude). Estimations are spent for the basic meteorological parameters - for pressure, temperature, speed of a wind. As earlier it was marked, 8 meteorological stations are located in this territory. Their values are accepted for the standard. Errors are calculated for February 2005, 2006, 2008, 2011 years, because in these periods was marked a strong winds. As the initial data in WRF model are used FNL the analysis, pumped up each six hours. The data is in the open access (http://nomad3.ncep.noaa.gov/pub/) in a grib format. Spatial step FNL of the FNL analysis is 1 degree. In the experiment 1-3 February 2011, was made the assimilation of station data located within the territory or identified during our expeditions.

It is shown that the model WRF successfully reproduces the meteorological regime the Black Sea coast. The average error of simulation n without learning station data is as follows: for a temperature of 1.5 s for wind speed - 2 m / sec. The maximum error for the temperature is 5 C, and for wind speed 10 m / sec. To experiment with the assimilation of station data the error is reduced by an average of 20%. The spatial structure of temperature and wind fields close to the actually observed. Thus, it can be argued that the model WRF can be successfully applied to numerical forecast a dangerous phenomenon, such as «Novorossiysk nord-ost». The work is done in Natural Risk Assessment Laboratory under contract G.34.31.0007.