Forecast of Meteorological Variables and Turbulence Parameters

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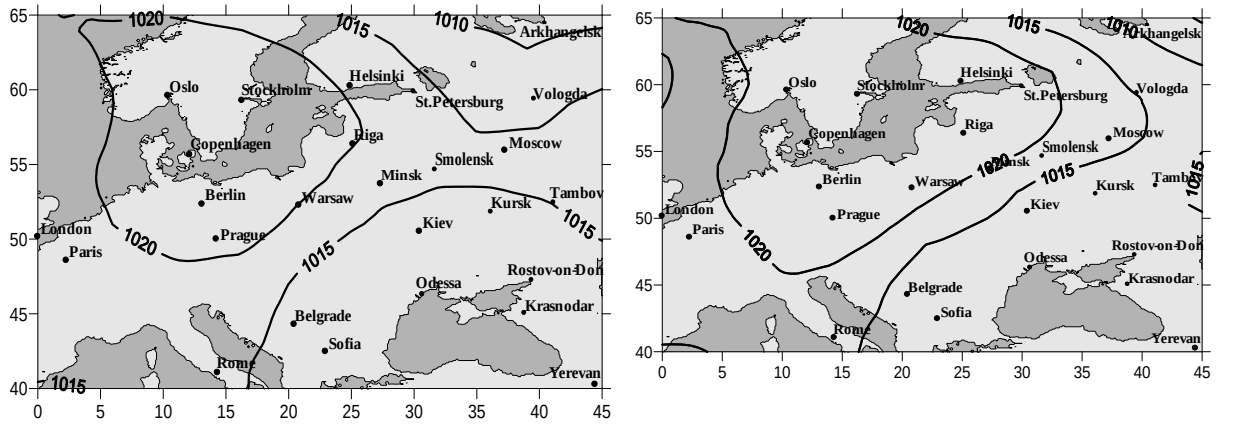
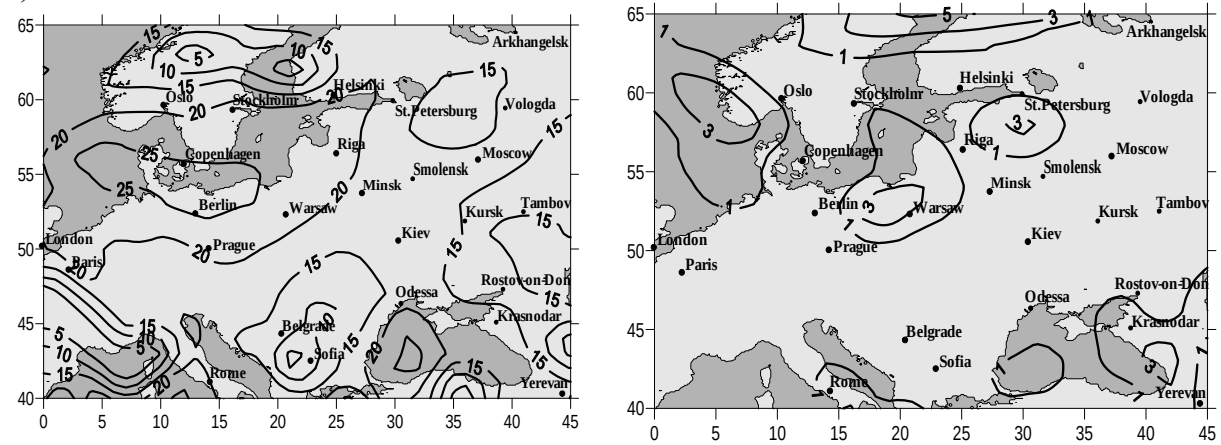
The fields of the wind, temperatures, specific humidity and the geopotential on the basic isobaric surfaces, as well as ground temperature and specific humidity are predicted in hemispheric model of Hydro-meteorological center of Russia. The prediction is based on the solution of the equations of hydro thermodynamics and the description of turbulent processes are carried out under the simplified closure boundary layer one-dimensional model (1). The calculated fields are used for the forecasts in the points of Central Russia area, and vertical structures of a wind and vertical turbulent coefficient are applied in laboratory of unfavorable meteorological condition warning. The results obtained showed that the model with inclusion of the three-dimensional equations for turbulent kinetic energy and dissipation have future before one. The developed research forecast model used the currently available linearization, thermal stratification influence valuation and time integration method in the turbulence closure equations (2). This improved forecast model is testing now. The sample of testing results for the predicted fields and vertical distribution is given in the figures. The maps of predicted values: surface pressure a), vertical turbulence coefficient b), wind module c). Left forecast is for 12 hours, right forecast is for 24 hours.

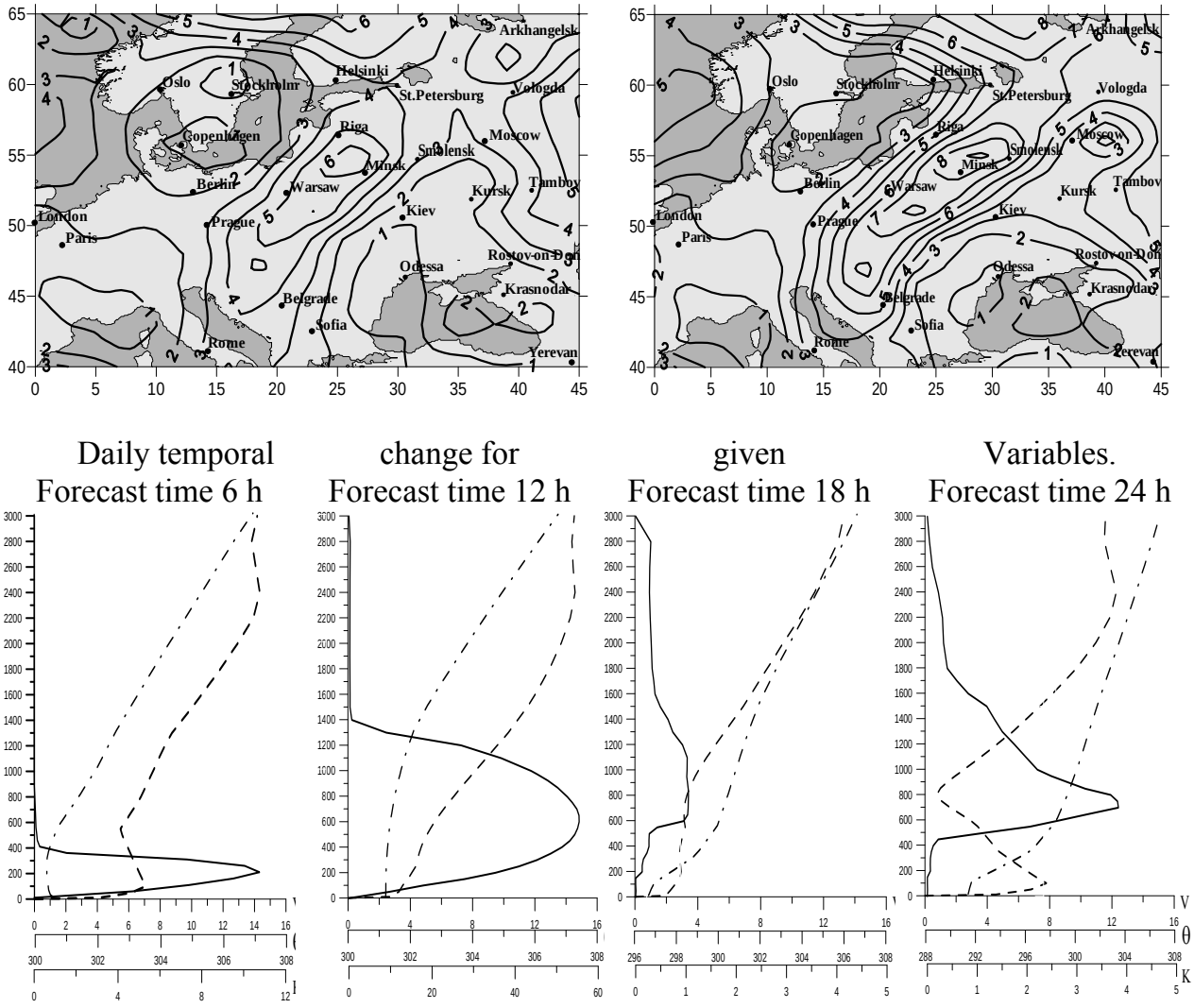
a)



b)



c)



- - wind ($|\vec{V}|$) top scale, $-\cdot-$ potential temperature (θ) middle scale,
—— turbulence coefficient (K) bottom scale.

1.Berkovich L, Tarnopolskiy A., Shnaydman V, (1997) Hydrodynamic model of the atmospheric and oceanic boundary layers. Russian Meteorology and Hydrology **7,** 40-52.

2.Shnaydman V. (2010) Improved numerical solution of three-dimensional turbulence closure equations Research Activity in Atmospheric and Oceanic Modeling #40, 4-13