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The COSMO-Ru2By configuration of the COSMO model: skill and methodology for estimating of the forecasts of β- and γ-mesoscale processes / Rozinkina I. A., Rivin G. S., Bagrov A.N., Blinov D.V., Bykov F.L., Vaskova D.V., Zakharchenko D.I., Bundel A.Yu., Vorobyeva E.V., Kirsanov A.A., Polyukhov A.A., Shatunova M.V., Shuvalova Yu.O., Eliseev G.V. // Hydrometeorological research and forecasts, 2023, no. 2 (388), pp. 6-34.

The paper gives a brief description of the COSMO-Ru2By configuration (the grid spacing is 2.2 km) of the COSMO model, which provides numerical weather forecasts for up to 48 hours for the European part of Russia and for the Republic of Belarus, as well the methodology and results of skill of these forecasts. The COSMO-Ru2By was realized in the Hydrometcentre of Russia and operates as an element of the COSMO-Ru operational limited-area numerical weather prediction system on the CRAY XC40-LC supercomputer.

The features of the COSMO-Ru2By are: 1) a vast calculation domain with a grid spacing that allows an explicit description of large (over 5-6 km high) convective motions and considering in detail the features of terrain; 2) the “embedded” technology for assimilation of DMRL-C Doppler weather radar data providing more accurate forecasts of rapidly developing weather processes for the next few hours; 3) coupled visualization system providing a great number of maps for different regions with a cascade image detailing. Operational trials in 2020-2021 showed a high skill of forecasts of the basic weather parameters with the COSMO-Ru2By. For comparison with forecasts of highly variable weather parameters (wind gusts, hourly precipitation, parameters in mountain areas, etc.) based on mesoscale models with lower resolution (e.g., COSMO-Ru6ENA, the grid size is 6.6 km), it was proposed to apply expanded trial approaches and criteria: e.g., the estimation over geographically homogeneous areas, the use of special criteria for predicting rare events, the comparison with radar data.

Keywords: numerical weather prediction, mesoscale atmospheric modeling, radar data assimilation, weather forecast skill estimation, non-hydrostatic atmosphere models

Tab. 2. Fig. 11. Ref. 25.