DOI: https://doi.org/10.37162/2618-9631-2025-1-6-36

On the application of ensemble methods in short-range regional forecasting / Astakhova E.D., Bundel A.Yu., Alferov D.Yu., Rozinkina I.A., Rivin G.S. // Hydrometeorological research and forecasts, 2025, no. 1 (395), pp. 6-36.

A hierarchical ensemble system for short-term forecasting based on the non-hydrostatic ICON model has been developed. The global ICON-Ru-EPS system with a model horizontal grid step of 40 km over the globe and 20 km over the European part of Russia is a source of initial and boundary conditions for the regional ICON-Ru2-EPS system over the Central Federal District of Russia (CFD) with a grid step of about 2,2 km and explicitly resolved deep convection. A detailed verification of the regional ensemble system ICON-Ru2-EPS was performed using the METplus package. The high quality of probabilistic forecasts was demonstrated as well as the need to combine various metrics when analyzing the results. The efficiency of the random parameter perturbation method for accounting for model uncertainty in high-resolution ensemble forecasting was investigated for the CFD domain. Recommendations were prepared on the parameters to perturb and on the size of the regional ensemble.

Keywords: regional ensemble forecast, random parameter perturbations, model uncertainty, non-hydrostatic ICON model, verification of ensemble forecasts, METplus package

Tab. 1. Fig. 8. Ref. 72.