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THE VERY-SHORT-RANGE NUMERICAL WEATHER AND THREATS
OF HAZARD FORECAST BASED ON CONVECTIVE-RESOLVING MODELING
WITH CONTINUOUS DATA ASSIMILATION

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The regional atmospheric modeling systems, which refine the results of global models, are currently actively used as a means of numerical weather forecasting for the coming days and hours. Using non-hydrostatic approach and grid spacing of several kilometers or less, these systems not only take into account complex geographical features of the terrain in detail but can also realistically predict complex weather formation mechanisms, including those associated with convection. The presentation is devoted to the description and results analysis of a continuously operating system for regional data assimilation and hourly numerical forecast updates for the next 12 h. It is based on the convective-resolving model configuration with a 2.2 km horizontal grid spacing COSMO-Ru2By, developed at the Russian Hydrometeorological Center [1]. Observations from meteorological stations and Doppler radars are used, many of which are not exchanged internationally with WMO [2]. The implemented approach was carried out in accordance with the worldwide practice in developing similar systems: High Resolution Rapid Refresh (HRRR) at the US National Centers for Environmental Prediction (NCEP) and Rapid Update Cycle (RUC) at the German Weather Service (DWD). The developed system has proven effective for forecasting rapidly developing hazardous events, as well as for monitoring the state of a meteorological fields with a resolution significantly higher than that of the observation network (which can serve as the basis for creating high-resolution reanalyses).

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References: Rozinkina I.A., Rivin G.S., et al. Short-term Numerical Forecast System COSMO-Ru2By: Short Description and Skill of Forecasts of β - and γ -mesoscale Processes. *Russian Meteorology and Hydrology* 49 (1) (2024), 48–63.
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Blinov D.V., Revokatova A.P., Rivin G.S. Assimilation of Observational Data in the COSMO-Ru Short-range Numerical Weather Prediction System of the Hydrometcenter of Russia. *Russian Meteorology and Hydrology* 49 (7) (2024), 607–617.
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