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Combination of synoptical-analogous and dynamical methods to increase skill score of monthly air temperature forecasts over Northern Eurasia

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Long-range forecasts at monthly-seasonal time scale are in great demand of socio-economic sectors for exploiting climate-related risks and opportunities. At the same time, the quality of long-range forecasts is not fully responding to user application necessities. Different approaches, including combination of different prognostic models, are used in forecast centers to increase the prediction skill for specific regions and globally. In the present study, two forecasting methods are considered which are exploited in operational practice of Hydrometeorological Center of Russia. One of them is synoptical-analogous method of forecasting of surface air temperature at monthly scale. Another one is dynamical system based on the global semi-Lagrangian model SL-AV, developed in collaboration of Institute of Numerical Mathematics and Hydrometeorological Centre of Russia. The seasonal version of this model has been used to issue global and regional forecasts at monthly-seasonal time scales. This study presents results of the evaluation of surface air temperature forecasts generated with using above mentioned synoptical-statistical and dynamical models, and their combination to potentially increase skill score over Northern Eurasia. The test sample of operational forecasts is encompassing period from 2010 through 2015. The seasonal and interannual variability of skill scores of these methods has been discussed. It was noticed that the quality of all forecasts is highly dependent on the inertia of macro-circulation processes. The skill scores of forecasts are decreasing during significant alterations of synoptical fields for both dynamical and empirical schemes. Procedure of combination of forecasts from different methods, in some cases, has demonstrated its effectiveness.

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