



Large-scale atmospheric processes in the Arctic region reproduced by SI-AV model and reanalysis data

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The variability of large-scale atmospheric processes in the Arctic region was analyzed on the base of the NCEP/DOE reanalysis data and seasonal hindcasts from global semi-Lagrangian model (SL-AV), developed in collaboration of Hydrometeorological Centre of Russia with Institute of Numerical Mathematics. Using the factor analysis it was shown that the model reproduces well the first major variability modes to explain 85-90% of the accumulated dispersion. Teleconnection indices as the quantitative characteristics of low-frequency variability are used to identify zonal and meridional flow regimes. Composite maps indicating the spatial distribution of anomalies of the main meteorological variables (500 hPa geopotential height, the sea level atmospheric pressure, the temperature at 850 hPa, 2m air temperature, precipitation, zonal and meridional wind component) for positive and negative phases of each index of atmospheric circulation are created. Average values of composite maps are accompanied with their statistical significance assessed using the "bootstrap" technique. Main characteristics of field configuration in Arctic region of cited above meteorological parameters corresponding to positive and negative phases of circulation indices are analyzed and discussed. Ability of SL-AV model to reproduce these characteristics at monthly and seasonal time scale is discussed as well. Results of this study are aimed to improve the quality of long-range forecasts and increase the "limit of predictability" and can be useful in the practice to develop monthly and seasonal weather forecasts for the Arctic region.