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The influence of atmospheric circulation on the climate over Western Siberia

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The correlations between variabilities of large- and mesoscale circulation processes and surface temperatures in West-Siberian region were analysed. The surface temperature trends over this region were also obtained. The coordinate positions of the region were bounded at 50–70°N and 60–110°E.
We used the daily observational data (ftp://ftp.cdc.noaa) at 169 stations for 1976–2006, the SCAND and POL indices (http://www.cpc.ncep.noaa.gov) describing the global circulation and the synoptic data (a surface pressure in the centers and a lifetime of cyclons and anticyclons in West-Siberian region) describing the regional circulation.
The method of multiple linear regression was applied for analysis of correlations between variabilities of surface temperature fields and atmospheric circulation characteristics.
Main results are the following:
- for 1976–2006 the positive trend of annual average surface temperature was observed at most stations of West-Siberian region. The mean trend assessment was 0.36°C/decade. While there was the negative trend of annual average surface pressure by –0.18 hPa/decade. The maximal values of warming were observed in February, March, May and October;
- the variability of surface temperatures in West-Siberian region is well correlated with the variability of large- and mesoscale circulation processes. For all months the multiple regression coefficients are variated from 0.57 to 0.84 on significance level at 0.05;
- the essential correlations (from 25 to 100 %) between variabilities of surface temperatures and large-scale circulation processes in West-Siberian region are observated within a year except January for SCAND indices;
- for POL indices, the essential correlations (from 25 to 29 %) are only observated in January, September and October;
- the variability of surface pressure in the centers of cyclons from January until April is well correlated with the variability of surface temperatures (C. of C. are 36–42 %), the variability of lifetime of anticyclons in autumn and spring times has essential correlation (15–22 %) with the variability of surface temperatures