

O.N. Bulygina, N. Korshunova, T. Dementieva, and P.Ya. Groisman

Changes in the wind regime in Russia

The main objective of this research is to monitor wind characteristics change in Russia. The wind regime of Russia varies a great deal due to the large size of the country's territory and variety of climate and terrain conditions. Changes in the regime of surface wind are of great practical importance. They can affect heat and water balance. Strong wind is one of the most hazardous meteorological event for various sectors of economy and for infrastructure.

At meteorological stations wind speed and wind direction are measured at the height of 10-12 meters over the land surface with the help of wind meters or wind wanes.

Calculations were made on the basis of data for the period of 1976-2016. It allowed the massive scale disruption of homogeneity to be eliminated and sufficient period needed to obtain sustainable statistic characteristics to be retained. Data on average and maximum wind speed measured at 1340 stations of Russia were used. The analysis of changes in wind characteristics was made on the basis of point data and series of average characteristics obtained for 9 quasi-homogeneous climatic regions. Statistical characteristics (average and maximum values of wind speed, prevailing wind direction, values of the boundary of 95%- confidence interval in the distribution of maximum wind speed) were obtained for all seasons and for the year as a whole. Values of boundaries of the 95%-confidence interval in the distribution of maximum wind speed were considered as indicators of extremeness of the wind regime. The trend of changes in average and maximum wind speed was assessed with a linear trend coefficient. The analysis of the results allowed seasonal and regional features of changes in the wind regime on the territory of the Russia to be determined. The trends of decreasing wind speed are discovered in the European territory and Western Siberia, especially in the winter and fall seasons. Negative trends in changes of the number of days with strong wind are also dominated, but in the spring at a considerable number of meteorological stations (especially in Western Siberia) recorded growth in the number of days with high velocities.

The work was supported by the Ministry of Education and Science of the Russian Federation (grant 14.B25.31.0026).