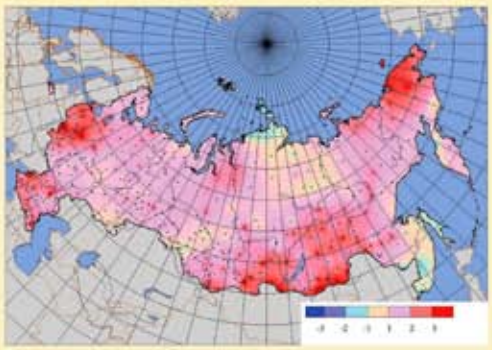
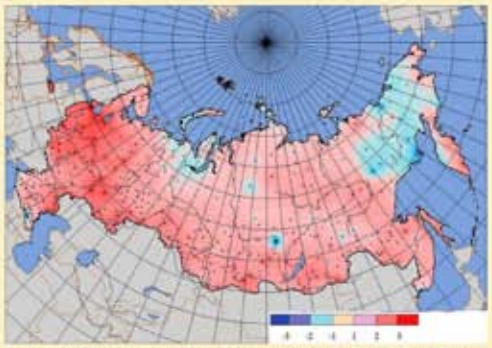
CLIMATE VARIATIONS AND CHANGES IN THE CLIMATE EXTREME EVENTS IN RUSSIA

Olga N. Bulygina[1], Vyacheslav N. Razuvaev[1], Natali .N. Korshunova[1], Pavel Ya. Groisman[2]

1- All-Russia Research Institute of Hydrometeorological Information – World Data Center
6, Korolev Str., Obninsk, Russia
2- National Climatic Data Center
Federal Building, 151 Patton Avenue, Asheville, NC 28801



Linear trend coefficients (n /10 yr) in the time-series of number of days with abnormally high temperatures in Summer (JJA). 1976-2005



Linear trend coefficients (n /10 yr) in the time-series of number of days with abnormally high temperatures in Winter (DJF).1976-2005

Meteorological observations were used to study space-time variability of the frequency of extreme values of air temperature, precipitation and wind speed at 940 Russian stations.

Indices of climate extremes were represented by the number of days in each season of the year, when daily air temperature (daily precipitation totals, wind speed) was either higher or lower than a limiting value (a limiting value is taken to be the value appropriate to the boundary of the 95- or 5-percent interval). The number of the days was calculated in the season of each year, when the value of the meteorological element is beyond the limiting value. Linear trend coefficients were calculated at each station from the series of the values derived.

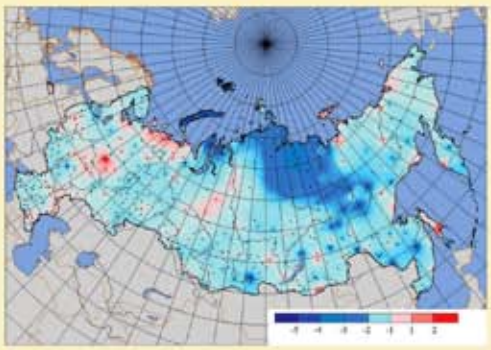
The increase in extreme precipitation is recorded in winter nearly on the whole of the Russian territory. In summer, zones with negative linear trend coefficients are of larger area. In the east of Russia, the number of days with extremely high summer precipitation tends to decrease.

On most of the Russian territory, the number of winter days with maximum air temperature, which is above the limiting value, increases. The highest linear trend coefficients are obtained in European Russia. In summer and in autumn, the areas of negative linear trend coefficients are found in the central and eastern territories of European Russia. In summer, in the south of the East Siberia, the number of days with extremely high air temperatures increases. Summer extreme temperatures is one of the reasons for fires in this regions.

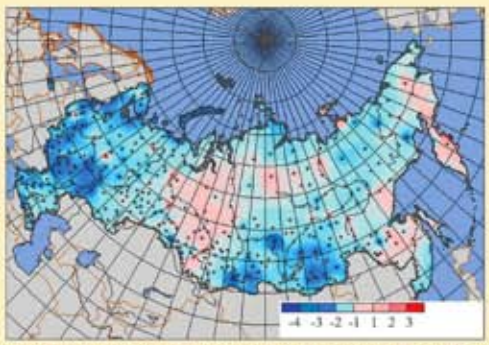
Against the background of the general tendency to the minimum temperature increase in individual regions of Russia, the number of cases, when minimum temperatures attain the lowest values, is shown to increase. In summer, individual regions show higher extremeness in temperature regime, which is connected with high air temperature gradients during the day.

Strong wind causes heavy damage to the economy. In winter, the days with abnormally strong winds was found in East Siberia and Yakutia.

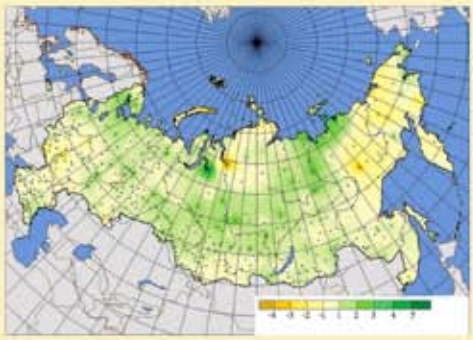
Research on extreme climate characteristics made it possible to reveal regional and seasonal features in the change of extremeness of temperature, precipitation and wind conditions.



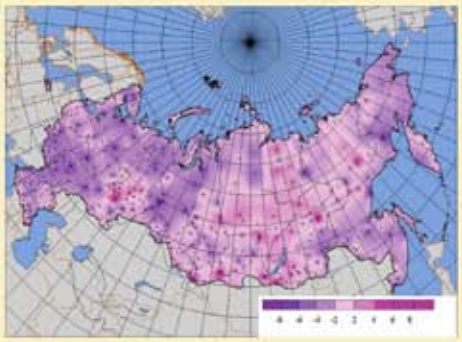
Linear trend coefficients (n /10 yr) in the time-series of number of days with abnormally low temperatures in Winter (DJF). 1976-2005.



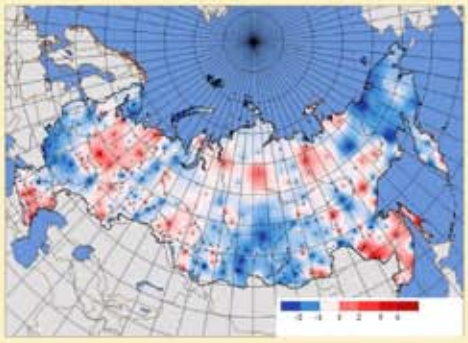
Linear trend coefficients (n /10 yr) in the time-series of number of days with abnormally low temperatures in Summer (JJA). 1976-2005.



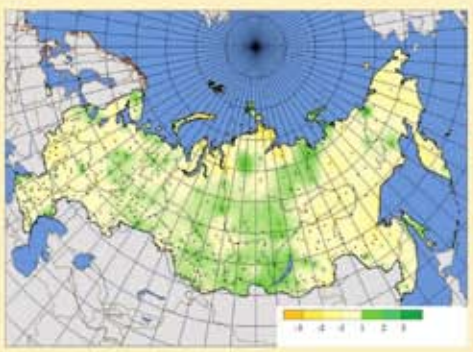
Linear trend coefficients (n / 10 yr) in the time-series of the number of days with heavy precipitation in Winter (DJF).1976-2005



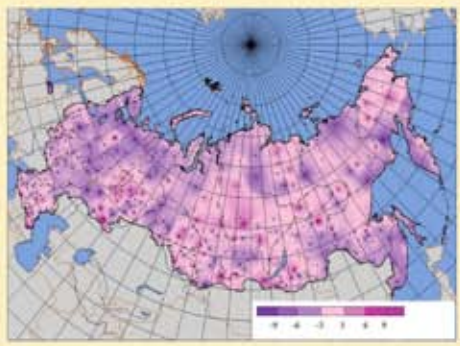
Linear trend coefficients (n /10 yr) in the time-series of number of days with abnormally severe winds in Winter (DJF) 1976-2005



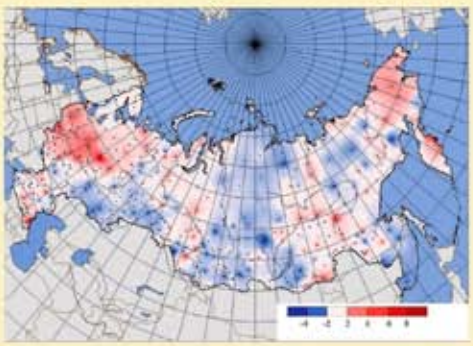
Linear trend coefficients (n /10 yr) in the time-series of number of days with abnormally high diurnal temperature range (DTR) in Winter (DJF)



Linear trend coefficients (n / 10 yr) in the time-series of the number of days with heavy precipitation in Summer (JJA).1976-2005



Linear trend coefficients (n /10 yr) in the time-series of number of days with abnormally severe winds in Summer (JJA).1976-2005



Linear trend coefficients (n /10 yr) in the time-series of number of days with abnormally high diurnal temperature range (DTR) in Summer (JJA)