

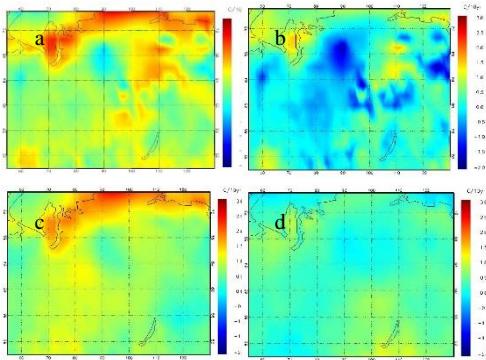
Variations of the Hydrothermal Characteristics over the Baikal Natural Territory on the Background of Global Climate Changes

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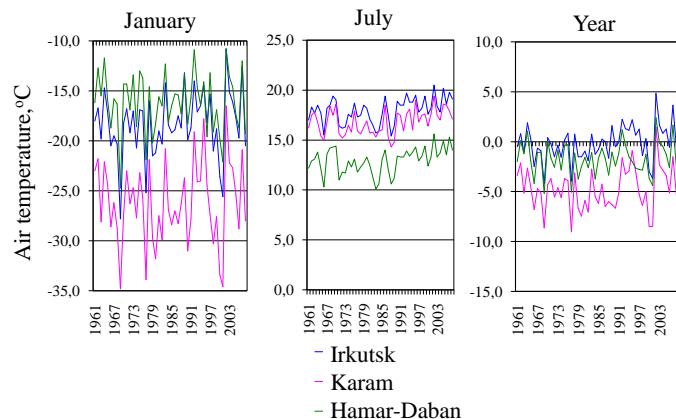
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Trend of air temperature at 2 m (°C/10 years) in terms of annual (a), winter (b), spring (c), summer (d) and fall (f) mean values. Trend coefficients were calculated based on ECMWF ERA Interim for time span 1979-2007

The aim of the present work is to estimate intensity of hydrothermal characteristics changes for 1961-2008 over the Baikal Natural Territory under global climate change.

Long-term changes in air temperatures



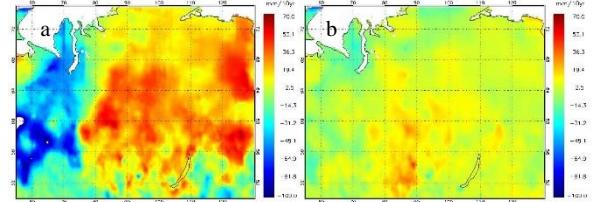
Recent decades studying of climate changes on the globe became one of the most important researches. From this point of view, Siberia is particular climatically interest region in Northern Eurasia because of its complicated bioclimatic structure.

Climatic changes observed over the region substantially contributes into global climate processes. In particular, temperature trends in the second half of the 20th century were quite high (>0.2 °C/10 years).



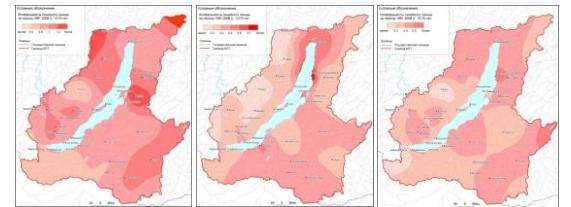
The Baikal Natural Territory have three ecological zones:
1. Central ecological zone
2. Buffer ecological zone
3. Ecological zone of atmospheric impact

The most part of the area is characterized by extreme continental climate while the climate of the Baikal coast is close to the seaside. Winter temperature at the shores of Lake Baikal is on 5°C higher than at the central areas, but summer air temperature is lower.

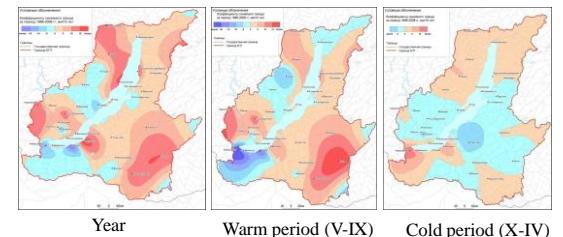


Trend for precipitation amount (mm per 10 years) in terms of (a) warm (May - October) and (b) cold (November - April) periods, and total precipitation. Calculations were based on APHRODITE JMA data for time period 1979-2007

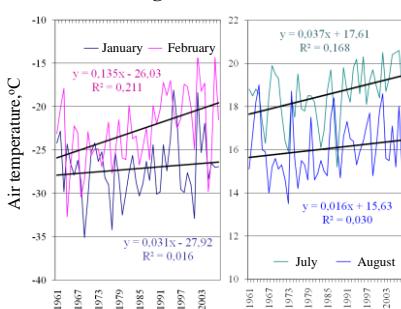
Trends in the annual and monthly air temperatures, °C/10 years (1961-2008)



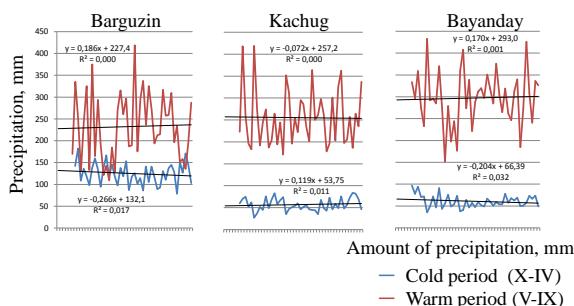
Trends in precipitations, mm/10 years (1961-2008)



Long-term changes in monthly air temperatures at Barguzin weather station



Long-term changes in the amount of precipitation at weather stations (1961-2008)

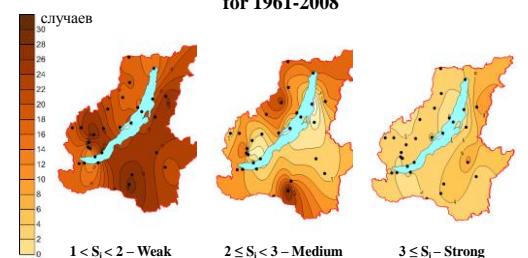


The annual mean temperature is negative at the whole area mostly. Annual trends of air temperature are positive and ranged from 0.24 to 0,52 °C per 10 years. Trends calculated for individual months are positive as well. They vary from 0.33 °C (September) to 0.99 °C per 10 years (February).

Precipitation amounts over the territory are distributed irregularly. A highest precipitation amount observes within the Khamar-Daban ridge and on the windward slopes of the ridges bordering the Baikal Lake (up to 1400 mm), at the hinterland highlands (400-700 mm), and in the central part of the Transbaikalian steppe (200-250 mm). Minimal amount of precipitation observes in winter, the highest - in July and August. Obtained precipitation trends are not statistically significant.

The most important extreme hydrothermal phenomena occurring at the study area are droughts. Months and years were revealed when more than 60% of the territory was occupied by the drought.

The frequency of drought occurrence in July for 1961-2008



The highest frequency of these events was registered in the period from 1990 to 2008. Increased drought intensity observed at coastal stations of the Baikal Lake from May to June, Predbaikalia - in July, Transbaikalia - in June and July. Investigation of regional features of hydrothermal characteristics, their long-term fluctuations and extreme events on the background of global climate change allows us to solve the problems associated with economic and environmental objectives.

