Geophysical Research Abstracts,
Vol. 11, EGU2009-2285, 2009
EGU General Assembly 2009

Studying climate change in Siberia based on climatic indices assessment

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Nowadays substantial progress has been achieved in studying climatic changes. However, standrad set of meteorological and climatic characteristics, used for climate change assessment on global scale, is not sufficient for assessment of regional manifestations of climate changes. To study peculiarities of climate behavior in the selected region, it is necessary to enlarge the set of indicators and to improve spatial resolution. The most practically important are the data on change of extreme values of meteorological elements and not just on change of their average values.

This paper is devoted to studying climate change in Siberia based on analysis of climate change indices characterizing behavior of thermal conditions and precipitation in the region considered. The indices used for calculation have been developed by CC1/CLIVAR working group (http://cccma.seos.uvic.ca/ETCCDMI/indices.shtml) and approved by Expert Group on detection, monitoring and climate change indices at WMO Climatology Commission. Initial data are data from JMA/CRIEPI JRA Reanalysis on air temperature and precipitation amount over period from 1979 till 2001 with resolution of 1.25o1.25o, as well as observation data at weather stations (meteorological data of RIHMI-WDC /NOAA and Zapsibgidromet).

Using the data available we determined spatial behavior of climatic characteristics on Siberian territory for the first half of 20th century, when there was no anthropogenic impact, and for the second half of that century, when such an impact become sufficient. Comparative analysis was made for behavior of thermal conditions and precipitation amount. The results obtained refine pattern of regional climate change in Siberia. For example, we revealed that on the Siberian territory number of freezing days and days with frost sufficiently changed towards increase by 1 day annually, while number of summer days decreased by 0.5 – 1 day.

The Reanalysis datasets used for this study are provided from the cooperative research project
of the JRA long-term reanalysis by the Japan Meteorological Agency (JMA) and
the Central Research Institute of Electric Power Industry (CRIEPI).