

## **GC31B-1177: Kharlamova, N. F. Climate Changes over the 20th and 21st Centuries in the Upper Basin of the Ob and Irtysh Rivers (Altai Region)**

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The Russian climate is more sensitive to global warming than the climate in many other parts of the world. According to the Second Climate Change National Assessment, since the mid-1970s, the average temperature has been rising with rate of 0.43 ° C / 10 years, which is more than two times higher than the rate of global warming.

In the Altai region, the rate of temperature change is higher than the average for Russia with an annual surface air temperature increase equal to 1.8°C the 20<sup>th</sup> century. The maximum value of this increase the past 50 years (1963-2013) was found in the intermountain basins of Altai (+ 2.6°C) mainly due to the winter and spring warming with changes in the summer season being considerably smaller. This warming is accompanied with negative tendencies in annual precipitation over the entire Altai Krai. The mountain ranges of Altai are called the "water tower" of Northern Eurasia. The northward flow of numerous rivers streaming down from these ranges in the Basin of the Ob and the Irtysh Rivers is formed by melting of Altai glaciers and snowfields. Since the middle of the 19<sup>th</sup> century the largest glaciers in the Altai have retreated by 1.5-2 km and the thickness of their tails decreased by 50-70 m. The reduction of mountain glaciers poses a threat of depletion of water flow to major agricultural regions downstream affecting human activity and even the drinking water availability.

Permafrost in the Altai Mountains is actively degraded (thawing), which represents a danger for infrastructure (first of all for roads and pipelines) and increases risk of catastrophic events (landslides, mudflows). Continued warming could contribute to a significant reduction of water resources, biodiversity and other negative processes in the region.

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