



## **Deglaciation of the Great Caucasus forced by the climate changes**

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Trends in the reduction of mountain glaciers in the Greater Caucasus in the last 30 years have reached catastrophic values - 0.7% of glaciation area per year. The reasons for the sharp deglaciation are an observed increase in summer ablation and possibly a decrease in winter accumulation. We reconstructed trends in temperature and humidity in the Caucasus on the basis of meteorological observations and ERA-Interim reanalysis data, which was previously compared with both observations on meteorological stations of the Russian meteorological network and the results of field measurements. In the whole Great Caucasus region, a statistically significant summer warming in the last 30 years was found, reaching 1 °C per 10 years. No statistically significant changes in the summer precipitation were observed, although there is an increase in the integral moisture content in the atmosphere and convective available potential energy. Apparently, the growth of atmospheric moisture content is compensated by an increase in moisture divergence. This is due to the intensification of large-scale descending atmospheric movements, which may be the result of an increase in the frequency of anticyclones due to the expansion of the Hadley cell and the displacement of its descending branch to the north. Significant changes in the observed precipitation were not detected either during the accumulation period or over the year. However, according to the ice core data obtained on the western plateau of Elbrus (5150 meters above sea level) in 2009, second half of the XX century was characterized by persistent negative accumulation anomalies (using the mean value for the period 1775-2009). Long-term mean of accumulation on the plateau is  $1.54 \pm 0.55$  m of water equivalent per year, while the magnitude of the anomaly during the period of 1950–2000 is -0.4 m, which is close to the standard deviation. Thus, the negative anomalies of accumulation in the high-mountainous regions of the Caucasus could also make a significant contribution to the intensive degradation of glaciation in this region. This work was funded by the Russian Science Foundation (project №17-17-01270 (ice core interpretation)) and Russian Foundation for Basic Research (project № 17-05-00771 (climate change in the Great Caucasus region)).