

CHANGES IN THE MASS BALANCE OF GLACIERS DUE TO GLOBAL WARMING

Y.A. Pervysheva student, N. A. Skora assistant

*National aerospace University. M. E. Zhukovsky «Kharkiv aviation Institute»
Kharkiv, Chkalova, 17
khai@knai.edu*

In recent years, observations of glaciers in all glacial regions have indicated their retreat connected with the increase of global temperature. It can cause sea level rise, change rivers flow and the balance of fresh water in the ocean as well as increase the frequency of natural disasters. Observations indicate the increasing impact of climate change on the cryosphere. It has already led to disastrous consequences: unprecedented reduction in the sea ice extent in the Arctic basin; the reduction of the ice period duration in freshwater bodies; the reduction of the permafrost area; the reduction of most glaciers mass. The results of the volumetric analysis of modern changes in the cryosphere are given in the Arctic Council Assessment report. A glacier's mass balance is a recognized measure of how a glacier is gaining or losing its mass. Two areas are usually distinguished on glaciers: the upper part of the feeding area (accumulation) and the lower part of the flow area (ablation), that is, areas with a positive and negative annual balance populace. The two regions are separated by a boundary where ice accumulation equals ice loss. Glacier mass balance is an important tool for understanding the response of glaciers to long-term climate change.

Given the difficulties dealing with the statistics definition of large amounts of precipitation on the glacier, it is impossible to obtain a complete picture of the spatial distribution of the ablation and accumulation zone throughout the area under consideration. To calculate the melting over the entire glacier, the ablation gradient is calculated, that is, the ratio between the amount of melted and accumulated mass, expressed in meters of water equivalent per area. The thermal energy in the air mass is proportional to its density, so the temperature tends to decrease with height. Temperature influence is very important for the glacier, so the ablation zone decreases relatively linearly with increasing height. While studying the mass balance in the accumulation season a conclusion of how much accumulation occurred on the glacier can be drawn and therefore the accumulated mass in the winter season can be calculated.

Climate plays a fundamental role in many processes occurring on the earth's surface. Radical analysis of glacier changes is an indicator of the state of the environment, including climate change. Annual indicators of mass balance greatly, but do not tend to increase.

Literature

1. Mauri S. Pelto. Hydrologic Processes: Glacier Mass Balance of North Cascade// Washington Glaciers 1984–2004. 2008
2. Snow, Water, Ice and Permafrost in the Arctic: SWIPA 2011, Executive Summary. Oslo // AMAP, 2011. C. 397
3. Cuffey, K., W.Paterson. Oxford: Elsevier Science: //The Physics of Glaciers. 2012. 4th ed.