**RECONSTRUCTION OF TEMPERATURE CHANGES ON THE ELBRUS**

**WESTERN PLATEAU BASED ON TEMPERATURE MEASUREMENTS IN**

**BOREHOLES**

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The reconstruction of temperature changes at the bottom of the active layer (10 m) of

the glacier on the Elbrus western plateau over a period of 1910-2008 is made. The mathematical

setting of the problem involves determination of one of the boundary conditions for the heat

equation. The profiles of temperature, density of the firn-ice thickness, and advection (vertical

velocity) of ice measured in the 182 m borehole are input data for the model. The reconstruction

uses new data on advection of ice layers obtained by ice core processing. The problem is

investigated numerically. Basing on the measurements we estimated the stationary temperature

profile in the glacier thickness formed by constant geothermal flux under the assumption of

constant temperature at the base of the active layer (10 m). The residual profile associated with

temperature fluctuations at the surface is determined as the difference between the measured

and the stationary temperature profiles. The surface temperature change in the past is estimated

from the residual profile by solving an inverse problem for the heat equation using Tikhonov

regularization. The variation of temperature at a depth of the active layer of the glacier is

determined as a function of time. The visualization of the found solution is made. The obtained

results on temperature fluctuations at the boundary of the active layer of the glacier are checked

against regional meteorological and climate data.

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