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# Precision Rock Temperature Monitoring System

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A multichannel precision system for monitoring the temperature of mountain rocks has been developed at the Schmidt Institute of Physics of the Earth Russian Academy of Sciences, which can record temperature changes with a relative accuracy of 0.005 degrees Celsius [1]. Currently, the system is constantly being modernized, both with the aim of improving resolution and reducing noise components of temperature signals, and increasing the number of observation channels [2].

The developed system is part of a comprehensive installation for monitoring geophysical parameters of the North Caucasus Geophysical Observatory of the IPE RAS, located in the adit of the Baksan Neutrino Observatory. Simultaneous recording of the air temperature in the adit and the temperature of the surrounding mountain rocks (at a depth of about 5 meters from the adit walls), as well as tilts, humidity, atmospheric pressure and monitoring of the density of aerosols inside the adit is performed [3, 4].

Knowledge of quantitative information about heat flow from the Earth’s interior is of great importance for understanding the relationship between fluid-magmatic and geodynamic processes. Today, only the first kilometers of the Earth’s crust are available for direct measurements of deep temperatures. However, precision temperature measurements are sometimes difficult because of the presence of interference associated with changes in the temperature of air masses at observation points, as well as because of wind impulses. Therefore, for precise temperature recording, it is necessary to ensure the most stable conditions at the measurement point.

One of the most suitable places for such observations is the adit of the Baksan Neutrino Observatory. Its location in proximity to the magma chamber of the Elbrus volcano makes it possible to obtain unique data on the structure and dynamics of the thermal field in its vicinity. The study of this volcano is an important task, both from the point of view of obtaining new fundamental knowledge about the structure of magmatic structures, and from the point of view of assessing the volcanic hazard caused by the presence of liquid magmatic melt in the depths of the volcano.

Further assessment of the contribution of conductive and convective components to the heat flow will allow us to draw conclusions about the dynamics of the fluid-magmatic system of the Elbrus volcanic center and study the mode of its functioning. The data obtained can also be used directly for monitoring volcanic hazards.

**Reference**

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