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Tidal Effects in the Fine Temperature Variations Measured in a Deep Underground Tunnel of the Northern Caucasus Geophysical Observatory of IPE RAS

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The location of the Northern Caucasus Geophysical Observatory of the Institute of Physics of the Earth, Russian Academy of Sciences (IPE RAS) in the immediate vicinity of 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. A precision temperature observation system was developed at the IPE RAS some years ago. During this time, we received first results of observations of natural temperature variations with an accuracy of up to one thousandth of a degree. The observed diurnal and semidiurnal harmonics found in microvariations of the underground temperature may be associated with the convective component of heat and mass transfer, which is largely determined by the corresponding changes in the regime of regular fluid migration due to the periodic influence of the combined solar-lunar tide effects on the geophysical medium in the deep underground tunnel. Estimation of the contributions of the conductive and convective components to the heat flow will make it possible to draw conclusions about the dynamics of the fluid-magmatic system of the Elbrus volcanic center and study the mode of its functioning, and can also be used directly for monitoring volcanic hazard.

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Promotional text

For the first time, we have been obtained scientific data showing a possible connection between microvariations of the rock's underground temperature and solar-lunar tides in the immediate vicinity of the magma chamber of the Elbrus volcano.

Oral preference format

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