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The Influence of Earthquakes on the Temperature Regime of Rocks

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During monitoring of the rock's temperature regime, a correlation was discovered between the signals of a laser strainmeter, a laser LIDAR (measuring the density of aerosol variations) and temperature values inside the rock base in the dead-end tunnel of the Baksan Neutrino Observatory (BNO), during the first and second strong earthquakes in Turkey (06 February 2023), having almost identical magnitudes 7.8 and 7.7.

We estimate of the stress zone radius from the epicenters as a value around 2000 km. It exceeds the distance from the earthquake epicenters to the BNO tunnels (~900 km), and thus allows the possibility of variations in the stress-strain state in the strainmeter, thermometer and LIDAR signals. And during the preliminary analysis of the captured data it was discovered.

In the underground laboratory, monitoring of variations in aerosols, temperature and deformation of the Earth's crust was performed using unique instruments developed at institutions of the Russian Academy of Sciences: Schmidt Institute of Physics of the Earth (precision multichannel thermometer), Prokhorov Institute of General Physics (LIDAR) and Sternberg State Astronomical Institute Moscow State University (laser strainmeter).