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of signals of aerosol variations, rock temperature, and crustal deformation in the far tunnel of the Baksan Neutrino Observatory during strong earthquakes In Turkey on 6 February 2023

Since 2004, a unique underground geophysical laboratory has been equipped at the Baksan Neutrino Observatory (BNO) at a distance of about 4 km from the mouth of the tunnel. A complex of scientific equipment was installed in the laboratory, which allows continuous studies of fluid activity, deformation processes, weak seismicity, as well as studying temperature anomalies within the Elbrus volcanic center. The underground geophysical laboratory successfully operates geophysical information and measurement systems that have no analogues in the world, providing registration of deformation, seismic, temperature and magnetic variations in conditions of minimal natural interference. Recently, we discovered a correlation between the signals of a laser deformograph, a laser lidar measuring the density of aerosol variations and the temperature values inside the rocky base in the dead-end tunnel of the BNO, at the time of both strong earthquakes in Turkey (6 February 2023), which had almost identical magnitudes of 7.8 and 7.7. An estimate of the radius of the stress zone from the epicenters gives a value of about 2000 km, which exceeds the distance to the BNR tunnels (about 900 km) and, thus, allows for variations in the stress-strain state in the signals of the deformograph, thermometer and lidar.

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