# Studying low-energy seismic activity in Elbrus volcanic area using underground seismic array

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Results of experiment with underground seismic array for studying low-energy seismic activity in the Elbrus volcanic area ( north Caucasus, Russia) are presented. Linear seismic array of 2.5 km aperture is created in the tunnel of Baksan neutrino observatory of INR RAS. Horizontal tunnel of 4.3 km length is located in the mount Andyrchi at a distance of 20 km from Elbrus volcano. Array includes 6 three-component seismic sensors SC-1P with 24-byte recorders "Baikal". The placement of seismic sensors in the array are uniform, sensors are mounted on a concrete base on bedrock at 500 m from each other along the tunnel. Underground seismic array is the new instrument of geophysical observatory organized for studies of geophysical processes in the Elbrus volcanic area. The observatory equipped with modern geophysical instruments including broadband tri-axial seismometers, quartz tilt-meters, magnetic variometers, geo-acoustic sensors, hi-precision distributed thermal sensors and gravimeters.

The experiment identified the main characteristics of microseismic noise in the points of seismic sensors installation, their mutual correlation, diurnal variations in the noise level, the characteristics of man-made noise, signal levels from regional and local seismic events recorded by the group. Over the experiment period dozens of local seismic events were recorded. The analysis of seismic signals recorded by seismic array allows us to detect low-energy seismic activity in the Elbrus volcanic area beginning from the distance of 3-10 km (the faults in a vicinity of mount Andyrchi) up to 15-25 km (area of Elbrus volcano). The regional micro-earthquakes with magnitude 1-2 at the distances 50-100 km was also recorded.

Underground linear seismic array with 2.5 km aperture make it possible to determine with high accuracy hypocenters of local seismic events associated with geodynamic of volcanic magmatic structures and to realize seismo-emission tomography of the active zones of Elbrus volcano. Creation the permanent working seismic group of BNO with short-period and middle-period three-component seismometers complements the network of seismic stations GS RAS in the Caucasus region new seismological system of high spatial resolution for problems of regional seismology and monitoring of microseismic activity Elbrus region to identify areas with active seismic processes related to geodynamics magma chamber of the volcano.