



Quality factors Q and attenuation of body waves in the Elbrus volcanic center and on surrounding territories

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The territory of the North Caucasus, being part of the extended Crimea-Caucasus-Kopetdag zone of the Iran-Caucasus-Anatolian seismic region, is characterized by the highest seismic hazard in the European part of Russia. As a complementary to seismic hazard several active volcanic centers are known in Northern Caucasus. The largest volcanic center featuring the Elbrus volcano is characterized by high population density, developed infrastructure and economic activity as well as tourism.

Results of recent studies designate the Elbrus volcano as is still in active status. The Elbrus volcanic center is also the area of potential seismic hazard. Seismic hazard is naturally estimated by the map of the "General Seismic Zoning of Northern Eurasia" (OSR-97) and is characterized mainly by 8 and 9-levels of seismic intensity (on average soils in terms of the MSK-64 scale).

The study of the attenuation of seismic waves with distance provides fundamental information on the inelasticity and scattering properties of the earth's environment, as well as the actual attenuation properties in a particular region. Information on the intensity of attenuation of seismic waves is also necessary for the estimation of focal spectra, seismic energy, seismic moments and other focal parameters of earthquakes, for modeling possible strong ground motions, etc.

A total of 240 events are finally selected for determination of the Q factor. The Coda Q , was calculated at central frequencies from (1.5–12.5) Hz and eight lapse time windows from 20 to 90 s using seismograms recording from three seismic stations GUZR, DOM, NEY.

In this article, such fundamental problems as the relative role of the actual path (ray) and ground-and-geological conditions near the site (site effect) have not been studied.

The quantitative estimate of the absorption has been carried out. The following method was used for calculation: observations of changes in the shape of the spectrum of earthquake records with distance were used to estimate the absorption regardless of the discrepancy.

The initial data is the catalog of earthquakes in the North-Western Caucasus, obtained in the results of instrumental observations of the network of seismic stations of FRC GS RAS. For work, earthquake records recorded from 2013 to 2018 were selected. The signal-to-noise ratio was more than three. All the recorded earthquakes are upper crusts and their depths do not exceed 40 km. Hypocentral distances up to 100 km, local magnitudes $M_L = 1.6-5.5$. As a result of the study, a summary table of the average Q_c values of the region varying with all the lapse time and frequencies are mentioned and absorption coefficients determined by different methods was obtained. The attenuation of body waves and the quality factor Q is estimated. The values obtained were compared with those calculated earlier by other authors for other seismically active regions of Russia and the World.

This work was carried out with the financial support of the grant of the President of the Russian Federation for the support of scientific schools No. SS 5545.2018.5.