Characteristics of radiation and propagation of seismic waves in the Northern Caucasus estimated from records at seismic stations «Sochi» and «Anapa»

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Abstract. Estimates are obtained of the regional characteristics of radiation and propagation of seismic waves in the Northern Caucasus, such as, parameters defining seismic source spectra, amplification of seismic waves in the upper parts of the Earth's crust, attenuation of seismic waves at high frequencies kappa, and parameters describing the shapes and duration of acceleration time histories. To do this, methods of stochastic simulations of acceleration time histories of earthquakes recorded by seismic stations «Sochi» and «Anapa» (epicentral distances $r < 290$ km, $M_w \sim 3.9–5.6$) were used. Estimates of frequency-dependent attenuation of the medium in the vicinities of Sochi and Anapa were obtained earlier by «coda normalization» method: $Q(f) \sim 55\, f^{0.9}$ for Sochi and $Q(f) \sim 90\, f^{0.7}$ for Anapa. The obtained estimates of characteristics of radiation and propagation of seismic waves show (in average) an agreement between the simulations and observations and can be used for forecasting the parameters of strong ground motion in future strong earthquakes in the Northern Caucasus, however, they should be verified in next studies.

Keywords: quality factor, geometrical spreading, amplification of seismic waves in Earth's crust, stress parameter, site effects, simulation of acceleration time histories.