Scaling of two corner frequencies of source spectra for earthquakes near the Bering Island

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So far, the study of the source properties of Kamchatka earthquakes has been possible only for the region of Avacha Gulf (near the Petropavlovsk-Kamchatsky city). The earthquake of 2017 ($M_w = 4-7$) and its powerful aftershock sequence (more than 150 aftershocks with ML> 3.5 in the first two weeks) recorded with CMG-5TD accelerometers from the first tens of kilometers ("Bering"station, BKI) to 300 km (KBG, UK1, TUMD, SPN), allow recovering the source spectra for earthquakes in the region and determining their parameters.

For more than 500 records with $M_w = 4 - 7$, it was possible to estimate the spectra in the range of 0.2-20 Hz with a signal-to-noise ratio of at least 3. The spectra were corrected for attenuation, considering the frequency-dependent Q-factor, high-frequency "kappa"parameter, as well as local site effects, following the method described in [Skorkina, Gusev, 2017]. Using the flat level of source displacement spectra, we determined the seismic moment (M_0), using source velocity spectra, two corner frequencies (fc_1, fc_2), and then, the "stress drop" parameter was calculated [Eshelby, 1957; Brune, 1970, 1971].

The complex structure of source spectra (the presence of two separate corner frequencies) was observed in more than 70% of cases, in about 30% - the first and second corner frequencies coincided (or spectra agree with the Brune model). At the same time, the existence of dependencies of the type $fc_k \sim M_0^{-\beta_k}$, where k = 1, 2, respectively, was verified, and the estimates of the index βk were found. The scaling properties of two corner frequencies are different: β_1 is 0.30, for the second - 0.15 (which is less than 0.23, found earlier for Kamchatka earthquakes). Preliminary estimates of the "stress drop"parameter range from 0.5 to 70 MPa (with median around 3 MPa).

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