# Features of time variations of microseismic noise at seismic stations in Tajikistan

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**Abstract** The spectral structure of microseismic noise in the frequency range of 0.01-40 Hz at different times of the day and year, recorded by broadband equipment at eight IRIS group seismic stations in Tajikistan in 2005-2020, was analyzed. Two disjoint frequency ranges are distinguished, which we conditionally call "high-frequency" (2-40 Hz) and "low-frequency" (0.01-0.75 Hz) noise, separated by a natural drop in the noise amplitude to 20-30 Db. It is assumed that the high-frequency range of noise has a local nature, due to exogenous sources of natural origin in the form of wind gusts, concussions from powerful watercourses and fluctuations in the level of large reservoirs, as well as man-made interference due to road and quarry explosions, the work of large industrial enterprises and concussions from road traffic. Low-frequency noise is most likely caused by global storm microseisms. High-frequency noise has a well-defined daily frequency, which is completely absent in low-frequency noise. At the same time, in both frequency ranges, the existence of a clearly pronounced seasonal periodicity has been established, the amplitude of which reaches 6-7 Db for high-frequency noise and about half as much for low-frequency noise. However, at the same time, the seasonal frequency of high frequency and low-frequency noise turns out to be antiphase, which indicates in favor of the different genesis of these two components of microseismic noise. The amplitude of the diurnal periodicity in variations of the high-frequency noise level is maximal during the daytime, remaining approximately constant for 8-10 hours. At the same time, the decline in the noise amplitude in the evening lasts longer than the steeper morning growth. The time intervals of a sharp increase and decrease in the intensity of the discussed daily extreme are quite well correlated, respectively, with morning and evening twilight at different times of the year. This is reflected in the wider flat part of the maximum noise level in summer compared to winter and the differences in its level up to 6 Db in favor of summer time. This observation can be considered as a manifestation of the deep influence of the Sun on the oscillatory processes that generate high-frequency microseismic noise.

**Keywords** Microseismic noise, frequency range, seismic stations, spectra, daily periodicity, seasonal periodicity, exogenous and endogenous sources of noise.

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