Experience and features of the operation of the molecular–electronic seismometer on Sakhalin Island

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Abstract At the complex geophysical observation site in the village of Petropavlovskoye, testing of the CME-6111 broadband molecular-electron seismometer, installed as part of the Russian Foundation for Basic Research (RFBR) project "Study of trigger deformation effects based on the data on Sakhalin's seismicity using a new type of seismic sensors" was continued. The results of processing waveform records and seismic noise of the CME-6111 seismometer installed in the seismic camera in the village of Petropavlovskoye during the period of little snow in the winter of 2018-2019 and in conditions of a large amount of snow cover in the winter of 2021-2022 were compared in order to determine the energy characteristics of the seismic events that occurred. The results of testing in 2018-2019 allowed the authors to make an assumption about the effect of low temperatures on the amplitude-frequency characteristics of the CME-6111 molecular-electronic seismometer, which was expressed in an overestimation of the energy characteristics of seismic events based on the results of processing of the seismometer waveform records. The large amount of snow cover in the winter of 2021-2022 showed that the stabilization of the temperature of the subsoil led to the stabilization of the seismometer parameters. Additionally, an analysis was made of the level of the power spectral density of seismic noise for both winter periods. For the period 2018-2019 there is an excess of the New High Noise Model (NHNM) at low frequencies for horizontal channels and for the winter of 2021-2022 there are no such violations due to the significant amount of snow cover that compensates for the influence of interference, which has a positive effect on stability performance of the instrument itself and improve the quality of seismic data.

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