

Identification of Seismic Signals from Underground Nuclear Explosion Produced at DPRK Test Site

The most effective element of MCSM seismic network is seismic station PS45. Identification of the seismic signal from UNE carried out by determining the cross-correlation between the first arrivals of registered seismic signal and a previously registered signal from UNE, selected as the reference. Determination of duration of seismic signal record for the implementation of the correlation schema of signal detection from UNE is done by finding the minimum of function of the ratio of the cross-correlation coefficients for the signal from UNE and earthquakes (estimated value of 5 seconds). As reference signal, used signal from explosion 09.10.2006. The average cross-correlation coefficients between the signals from the DPRK UNE and the reference signal are 0.91, 0.96, 0.98 for 2009, 2013, 2016 accordingly. Also for the identification of seismic signals from the events with explosive nature used method, which is based on differences in the change of amplitudes of the envelope signals from earthquakes and explosions, depending on the frequency. The method is based on linear filtration of input signal by set of narrowband filters and calculating of the amplitudes of the envelopes of the seismic signals, which avoids the need to define the basic parameters of the seismic signal.

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