GC2026-SGG041

Comparison of Signals Spectra and Amplitudes from Vertical Pulsed Seismic Sources

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Since 2024, we have been conducting experiments to compare low-power artificial pulsed seismic sources. The ultimate goal of this series of experiments is to compare the characteristics of handy, low-cost artificial seismic sources, to determine their metrological and operational parameters, and to develop recommendations for their application [1]. The selection of an appropriate source should not be considered a purely technical task. Each survey area and target requires specialized equipment and the optimization of parameters: pulse-frequency content, source power, and operational characteristics [2].

During this time, the methodology of experiment has been developed; various sources have been designed and constructed, enabling vertical (e.g., sledgehammer blow on a plate), horizontal (e.g., pendulum impact of a weight on the wall of a trial pit), and volumetric impact (e.g., a blank shot from a seismic gun in a shallow borehole); and the suitability of the test site has been determined. Testing has confirmed the stability and reliability of the equipment [3]. At this stage, a comparison of seismic signals generated by various types of vertical impacts has been carried out.

The study compares the amplitudes and spectra of sledgehammer impacts on plates of various geometries [4] and the signals generated by dropping a 32 kg weight from a height of 270 cm. Similar characteristics for seismic gun are provided for comparison.

References

1. K.V.Kislov, A.Yu.Marchenkov, Tenth All-Russian scientific and technical conference with international participation "Problems of integrated geophysical monitoring of seismically active regions". KF FRC EGS RAS, 2025, 290.
2. A.A. Repin, A.K. Tkachuk, V.N. Karpov, V.N. Beloborodov, A.G. Yaroslavtsev and A.A. Zhikin, J Min Sci. 52 (2016) 146.
3. K.V.Kislov, A.Yu.Marchenkov, Fundamental and applied aspects of geology, geophysics and geoecology using modern information technologies. (2025). Maykop: Publishing house "IP Kucherenko V.O." 188.
4. J.-H. Jeong and J.-H. Kim, Jour. Korean Earth Science Society. 33(5) (2012) 395.