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Precise Parameters of Weak Nuclear Explosions Conducted at the Semipalatinsk Test Site on the Basis of Historical Seismogram Study

During several years the IGR RK has been digitizing historical analogue seismograms of nuclear explosions collected from archives of different Organizations of Kazakhstan, currently a database contains more than 6000 seismograms at regional distances. The digitized historical seismograms allowed to recover and add parameters for more than 40 air and contact explosions conducted at Opytnoye Polye site of the Semipalatinsk Test Site in 1961-1962. The records from high-sensitive stations installed along Pamir – Baykal profile were used to determine the explosions parameters. The profile was installed by the IPE AS USSR to study earth crust structure and upper mantle, the profile length was 3500 km. The epicentral distance from some stations of the profile to Opytnoye polye site was 300-400 km. In addition, data from the permanent seismic station Semipalatinsk (SEM) located 175 km away from the site were used. The seismograms from this station became available recently. Origin time, coordinates, regional magnitudes mpv, MLV and energy class K were determined for explosions. A regional travel-time curve for Central Kazakhstan constructed using records of calibration chemical explosions conducted at the STS in 1997-2000 and ground-truth underground nuclear explosions was used to determine the explosions epicenters and origin time.

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