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Semipalatinsk Test Site: Underground Nuclear Explosions Signatures in the Velocity Field on P- And S- Waves (for the OSI Purposes)

At the location of explosive nuclear boreholes at Semipalatinsk Test Site area an active seismic investigations have been conducted along 8 parallel profiles with 6 km length and distance of 500 m between them. During these works 3-component signal registration was carried out, which allowed us to make analyses of the P- and S-waves first arrivals. Using forward ray tracing method, velocity structure of the section has been determined up to the depth of 300 m. In the vicinity of UNE boreholes location, a technogenically changed layer with the thickness of 40-80 m and velocity that is reduced with regards to undisturbed rocks by the value of up to 1.5 km/sec for P-waves and 1.35 km/sec for S-waves has been detected. This layer underlays the low velocity zone at the depth of 20-70 m, it's thickness changes proportionally to the yield of the nuclear charge. The obtained information can be used to update the UNEs phenomenology database and for the development of active seismic techniques for the On-site inspection purposes.

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