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Heterogeneities of short-period S wave attenuation field in the earth's crust and uppermost mantle of the Eastern Tien Shan

Studying attenuation field characteristics is important for analysis of geodynamical processes and for solving the problem of underground nuclear explosions and earthquakes discrimination. We have carried out mapping shear wave attenuation field in the Eastern Tien Shan lithosphere including the area of Lop Nor nuclear test site. We used recordings of seismic stations MKAR and KKAR, located at regional distances, for the mapping. The methods based on the analysis of Lg and Pg, Sn and Pn wave amplitude ratios, and Lg coda were used. Zones of high attenuation, first of all to the west of Urumqi city and in the area of Lop Nor nuclear test site were picked out. No large earthquakes (M≥7.0) were recorded in these zones during the past 200 years. It is supposed that processes of large earthquake preparing can occur in the first zone. Relatively weak attenuation corresponds to the earth's crust of the second zone. At the same time, essentially high attenuation is observed in the uppermost mantle of this zone. We believe that the attenuation anomaly in the area of test site is connected with mantle fluids ascending due to protracted intensive artificial influence, like in the areas of other nuclear test sites.

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