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Deep velocity structure and anisotropic properties of the upper mantle in Central Asia

Alena Seredkina (1,2), Vladimir Kozhevnikov (1), and Oksana Solovey (1)

(1) Institute of the Earth's crust SB RAS, Irkutsk, Russian Federation (ale@crust.irk.ru), (2) Diamond and Precious Metal Geology Institute SB RAS, Yakutsk, Russian Federation

Mantle structure Central Asia (40°–60° N, 80°–130° E) was investigated from the data on dispersion of the fundamental mode of the Rayleigh and Love wave group velocities along more than 3200 earthquake-station paths for each surface-wave type. The dispersion curves were processed by a frequency-time analysis procedure at periods from 10 to 250 s. The group velocity maps were computed separately for each period, at different sampling intervals. We used a tomography method developed for spherical surface. Resolution was estimated according to the effective averaging radius and presented likewise in the form of maps. For the major part of the investigated area the horizontal resolution is about 300 km. To estimate the depths of the inhomogeneities and to calculate the anisotropy coefficient, locally averaged dispersion curves were calculated using the group velocity maps, with reference to the radius R, and were then inverted to SV-and SH-wave velocity-depth profiles. The obtained results show that anisotropy is observed in the upper mantle up to the depths of about 250 km (i.e. in the asthenosphere) and it is the most prominent in the depth interval from the Moho to 150 km. The upper mantle under the Siberian platform is characterized by the minimum anisotropy coefficient (∼1.5 %). Maximum anisotropy is seen in the area of the Japan sea coast (∼5.0 %). The local maximum of the coefficient values is observed under the northeastern flank of the Baikal rift at the depths from 70 to 125 km.
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