



Crustal and upper mantle P and S seismic structure beneath the southern mountain framing of Siberia from simultaneous inversion of local and teleseismic data

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Two different groups of data have been used in simultaneous tomographic inversion for investigation of crustal and upper mantle P- and S velocity structure and Moho depth in the southern mountain framing of Siberia. First group is the records of the Altai-Sayan and Baikal regional seismic networks. Second group includes the travel times from the sources located in the study volume recorded by the worldwide stations at all available distances (ISC catalogue, 1964 - 2001). Location of sources is based on all available phases of P and S rays with the epicentral distances up to 8 deg. Travel times for the location were computed in 1D starting model and corrected for variable Moho depth (2x2 deg. global Moho model by G.Laske, pers. comm.). Together with absolute location of sources, we correct their position using double difference method. Further correction of the source parameters is performed at the step of simultaneous inversion which includes also determination of P and S velocity anomalies in the crust and in the upper mantle and the Moho depth. The inversion step is repeated several times iteratively. The obtained images of the crust are consistent with position of the main tectonic units in the Altai-Sayan-Baikal area and with available geophysical observations. At the depth of 100 km we see the contrast between high velocity Siberian craton and low-velocity mantle under the Baikal rift zone. In the deeper levels the negative anomaly which is observed both in P and S velocities is slightly shifted (30-50 km) in NW direction. We interpret this anomaly as the mantle plume that went up under the Siberian craton, spread out along its bottom towards its margin, weakened the lithosphere in the boundary area and facilitated the origin of the Baikal rift. Another low velocity anomaly is observed in both P and S velocity images beneath Altai down to the bottom of the study area. This feature is consistent with some geological evidences of plume tectonics in this area.