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Deep structure of the southern margin of the Siberian craton and its role the formation of modern geodinamics

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The results of teleseismic wave modeling show that the south-southwestern boundary of the Siberian craton is close to vertical to a depth of 120 km and corresponds to the southern margin of the Siberian platform (fig. 1). The deepest part of the craton (in the depth interval of 150–250 km) passes under the Tunkinsky rift, and then under the foot of the Khamar-Daban ridge. The edge of the craton is a wedge moving at an angle of 45° under Baikal, and wedges out completely to the east of the lake at a depth of about 150 km.

The distribution of velocity heterogeneities shows a logical connection with the existing tectonic structures. The wedge-shaped form of the southeastern margin of the craton exists possibility along all of the Baikal rift. It is this oblique shape of the craton that could have contributed to the accretion-collisional processes that formed the uplift at the edge of the craton.

At the end of the Mesozoic – Cenozoic, compression ceased and did not prevent the accumulated heat from rising from under the Siberian craton, due to which the collision uplift on the southeastern edge of the craton was destroyed, and the thrust faults were transformed into gentle faults, which led to the formation of rifts and to the exhumation of metamorphic cores. In addition to the inclined edge of the craton, the expansion of the Baikal rift depression is facilitated by the thinned margin of the craton, which is prone to faults, and the heated volume under the wedge (“canopy”), where convection traps are formed, which appear on tomography as intense negative anomalies of seismic wave velocities. Such conditions can lead to decompression magmatism of varying intensity. These conclusions are supported by our more detailed model (fig. 1D), constructed by the method of the longitudinal receiver function (according to Vinnik, 1977).

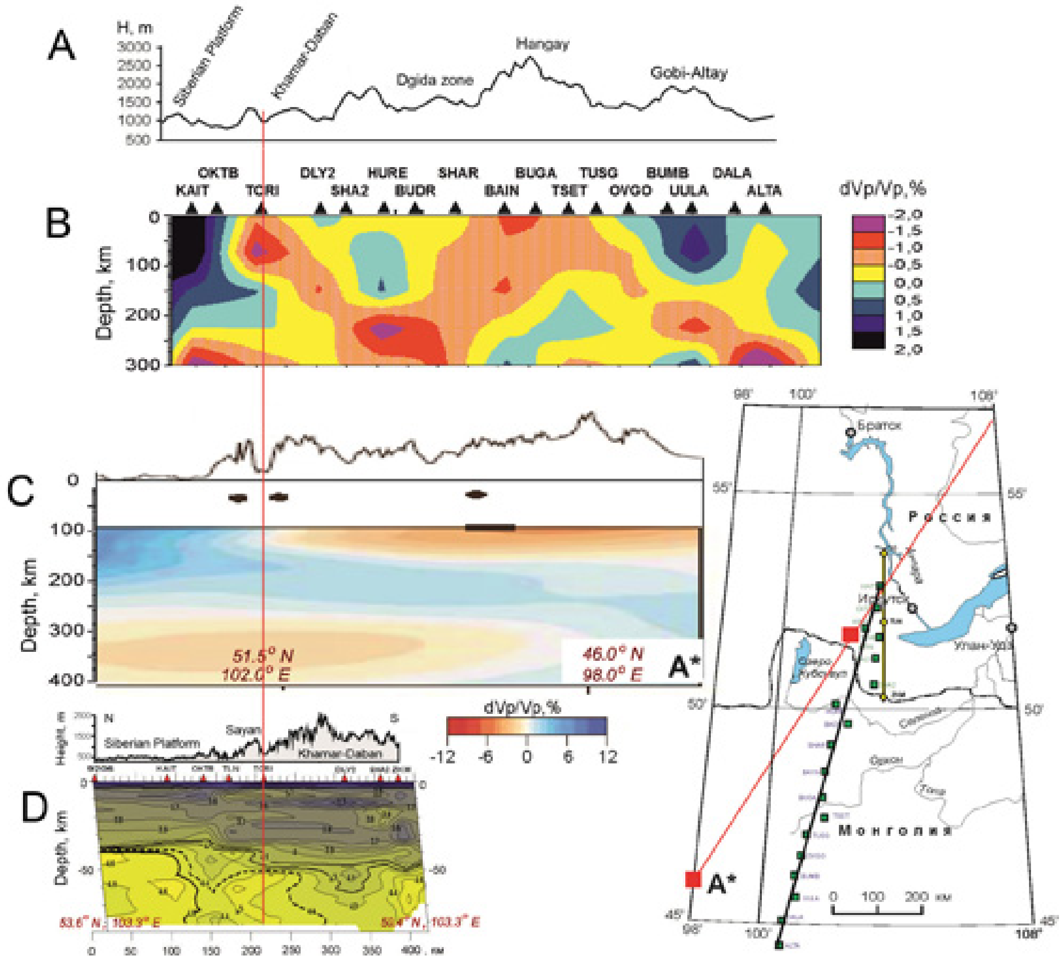

Fig. 1. V_S -section and topography along profile 9206–ZAK (Bratsk reservoir – Zakamensk).

P - tomography MOBAL_2003 (A - the triangles mark, B - the position of seismic stations). Surface-wave tomography (C). The red vertical line near the Tunka rift is a correlation reference mark for all the models. The models are shown in the same scale, except the depth-stretched meridional section D. Velocity isolines are drawn from 2.4 to 4.6 km/s with a step of 0.1 km/s. The red line shows the profile route, red boxes mark the termination of profile A* and the point where the profile crosses the Tunka rift.

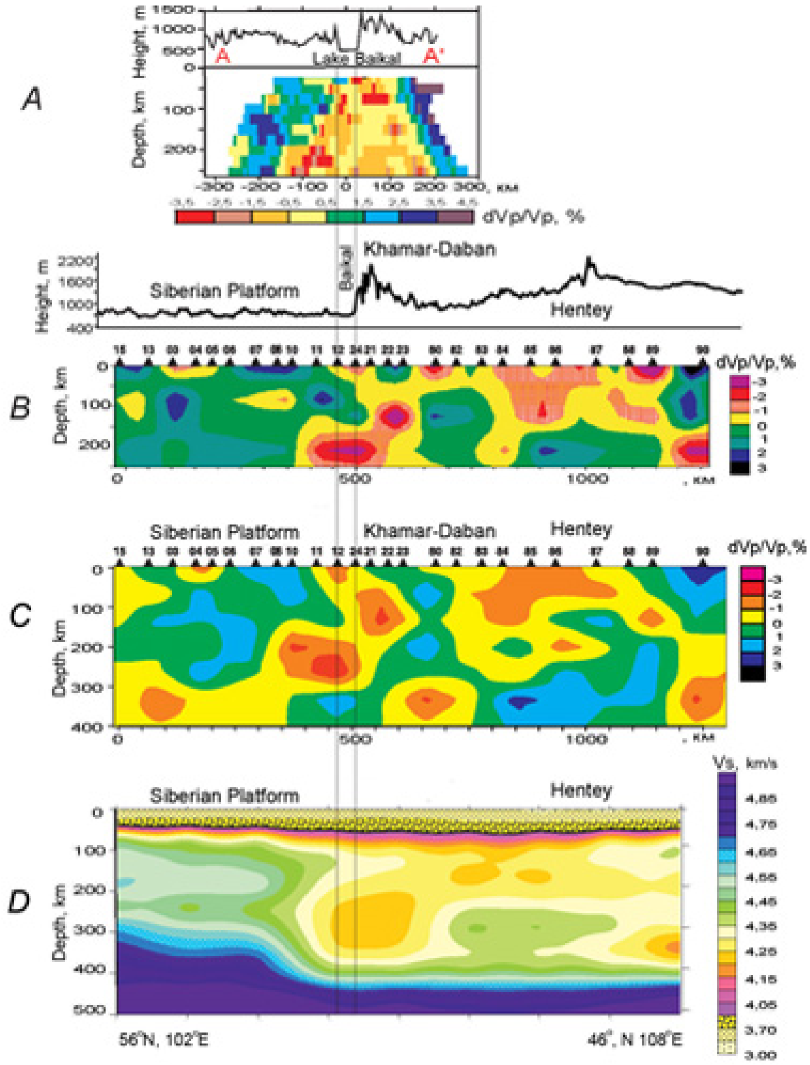

Fig. 2. V_S -section and topography along profile 9206–ZAK.

A, *B*, *C* -- *P* - tomography MOBAL_2003 . D - Surface-wave tomography. The red vertical line near the Tunka rift is a correlation reference mark for all the models. The models are shown in the same scale, except the depth-stretched meridional section D. Velocity isolines are drawn from 2.4 to 4.6 km/s with a step of 0.1 km/s.

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