



Shape of the subducted slab beneath the Sunda arc derived from regional tomographic inversion

Jaxybulatov Kairly (1) and Koulakov Ivan (2)

(1) Novosibirsk State University, 2, Pirogova str, 630090, Novosibirsk, Russia, (2) Institute for Petroleum Geology and Geophysics, SB RAS, Novosibirsk, 630090, Russia

Three-dimensional models of P and S seismic anomalies beneath Sunda arc (down to the depths of 1000 km) were obtained from regional earthquake tomography based on the traveltimes data from global seismological catalogues ICS. Special attention was paid to the verification of the computed models based on different tests. Comparison of these results with models, obtained by other authors on the basis of independent approaches and the data, shows that they similarly reveal the main features. Along the arc we observe classical shape of oceanic slab which generally coincides in P and S models, as well as with the distribution of deep seismicity. Based on the obtained results we constructed a parametrical model of the top and bottom surfaces of the slab, which allows estimating its geometrical characteristics. We see that the slab thickness is strongly variable in depth and in the lateral extent. In addition we observe different depths of maximum penetration of the slab into the mantle in different segments of the arc. From the Sumbawa island to East Timor the slab, penetrating to depth of 800 km, mainly tends to move in horizontal direction and its thickness is nearly constant in depth. In eastern Java the slab begins to penetrate steeply down to depths of 900-1000 km, and the dipping angle of the slab gradually increases to the western Java. We clearly observe almost vertical slab dipping (with the maximum penetration depth of 1000 km) and its thickening beneath the Sunda strait. Further to northern Sumatra maximal depth of the slab penetration decreases and the slab structure becomes more heterogeneous. From northern Sumatra approximately to Burma "slab" is strongly heterogeneous; moreover, it changes its penetration direction. We suppose that the horizontal movement of the slab and its thickening relates to the "push" mechanism. Thinning of the lithosphere and its steep penetration to the lower mantle shows that the "gravitational pull" mechanism predominates.