

## Influence of surroundings features on the velocity structure of mantle under South-East Asia from data of seismic tomography

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The region of Southeast Asia is characterized by numerous micro-plates, which are separated by a complex system of subduction zones, marginal and back-arc basins, strike-slip boundaries and

accreted terrains. The western part of Southeast Asia is comprised of three tectonic plates: the Southeast Asia plate, the Burma plate, and the Indo-Australian plate. The Pacific plate has influence on

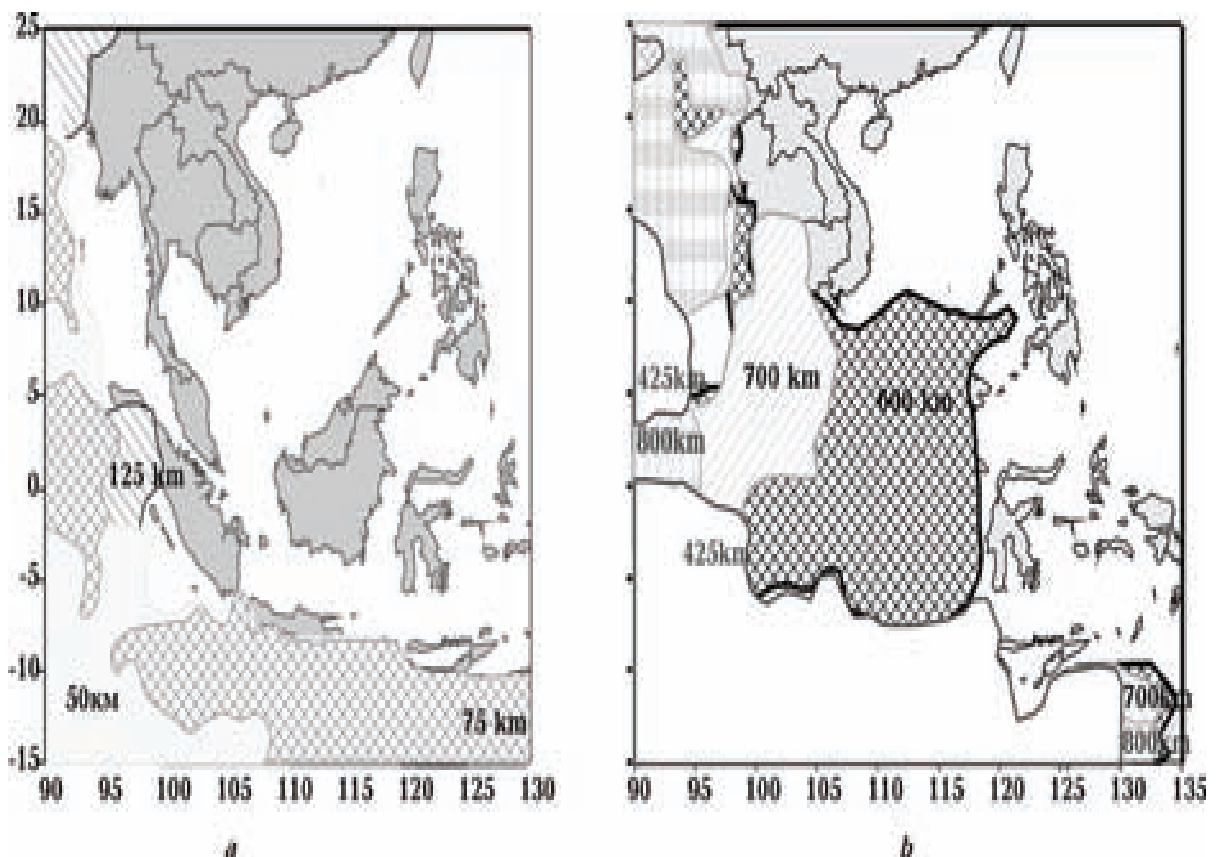


Fig. 1. Pattern of spreading of velocity boundaries in the mantle corresponding to the Indo-Australian Plate on the depth 50, 75, 125 (a), 425, 600, 700, 800 (b).

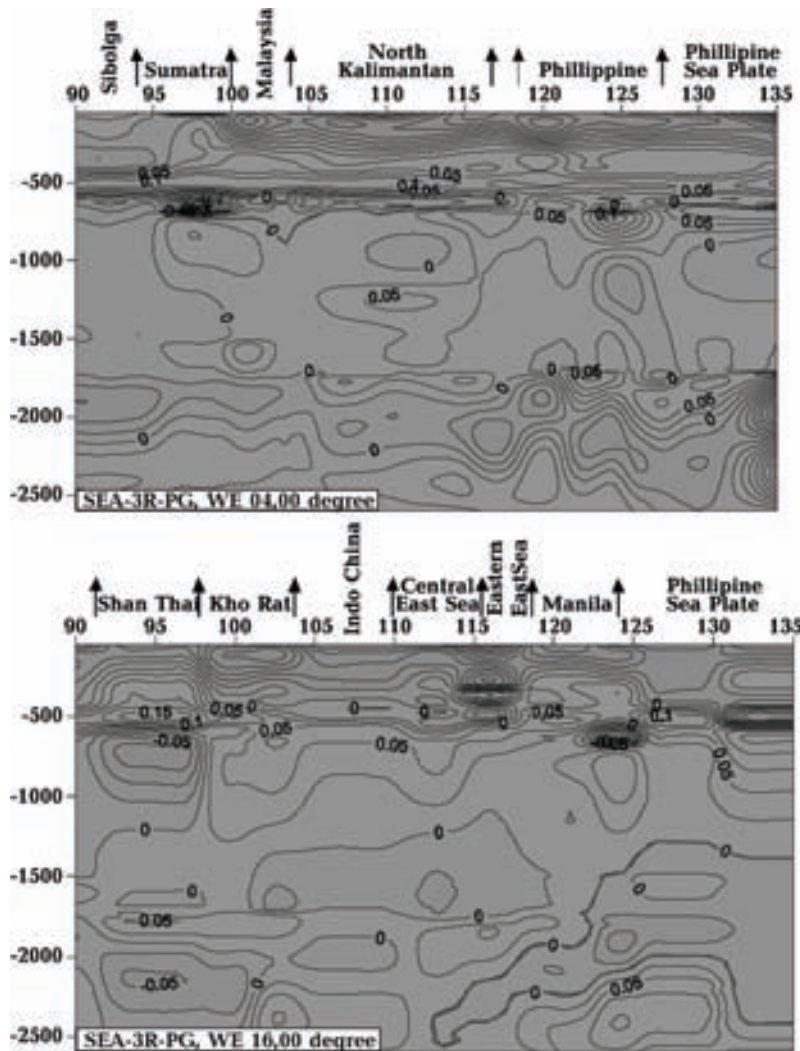


Fig. 2. The latitudinal cross-section of the 3D *P*-velocity model of mantle of the SE Asia.

east part. Tomographic methods can provide new information which can help to test tectonic models. The main objective of the research presented in this thesis is to improve our understanding about influence of surrounding structures on the velocity structure of mantle under South-East Asia of the on depths 50—2500 km. 3D *P*-velocity model of SE Asia has been obtained as a result of application of the method of Taylor approximation of solution of seismic tomography of *P*-waves arrival time introduced by V. S. Geyko [Geyko, Tsvetkova, 1989; Geyko, 1997; 2004]. The solution is represented in a form of vertical sections (latitudinal and longitudinal) up to 2500 km depths with 1° spacing in residual in relation to one-dimensional referential model obtained as a result of seismic tomography analysis for Eurasia.

In obedience to our model there is prevailing influence on the structures of SE Asia of velocities structures, proper the Indo-Australian plate. The mantle of the Indo-Australian plate is characterized by a double-layer structure of upper mantle (heavy high-velocity seismic lithosphere and thin low-velocity layer), high-velocity transition zone of upper mantle, low-velocity layer of the zone-1 and quasi-homogeneous middle mantle. Each of layers has the features. Disparity of tectonic boundary of plate and boundary of distribution of low-velocity and high-velocity areas, corresponding to this structure, is thus marked (the boundary of velocity area is distinguished for residual 0.0 km/s to that at changing of sign of velocity heterogeneity) (Fig. 1). Maximal advancement of velocity layers of mantle structures of Indo-Australian plate — to 118° longitudes on a

depth 600 km. Other there is business with the east outskirts of SE Asia. Boundary of mantle of the Philippine plate, distinguished on the boundary of velocity areas observed in a middle mantle and zone-1. So, Philippine plate is selected a sloping low-velocity layer, going from the side of the Philippine plate (1300—2000 to the depth 2400 km). The boundary of plate on a low-velocity layer (on depths 1400—2400 km) comes to  $112^\circ$  longitudes. Partly the boundary of the Philippine plate can be selected on completion of high velocities layer which goes down on the depths of middle mantle and reaches in a westward to  $110^\circ$  longitudes, and under Java to  $108^\circ$  longitudes (600—1400 km). In an upper mantle

the boundary of the Philippine plate is expressed by changing of depth of bedding of bottom and top of velocity layers. About the degree of influence of velocity structures corresponding to the Philippine plate on the structures of Asia judging is difficult. It is fact that the tectonic boundary of plate coincides with the exit of low-velocities from a bottom mantle. The South-China Sea is the knot of joining of structures of velocities, going from a south (Indo-Australian Plate) and from a north (velocities structure of South China). The picture of mutual introduction of layers of velocities is observed in upper mantle and transitional zone of upper mantle with  $112^\circ$  longitudes to  $118^\circ$  longitudes, within the limits of  $10\text{--}20^\circ$  latitude North (Fig. 2).

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