

A tomography imaging in the mantle of the Alpine orogen belt and flanked tectonic zones into terrane from Iberia to the Himalayas

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New large scale 3-D *P*-velocity models of the mantle beneath the Alpine orogenic belt and flanked tectonic zones into terrane from Iberia to the Himalayas (sector 20° W–80° E 30–50° N) to 850 km depth and more has been reconstructed. Examined area covers the eastern margin of the Atlantic fringing Iberia and northwestern Africa, the Southern Europe, Mediterranean, northern coast of Africa, Asia Minor, Near East, Black Sea, Caucasus region, Caspian Sea, Kazakhstan, Middle Asia, northern India and northwestern China. As initial data have been exploited the set of first-arrival times of *P*-waves from strong earthquakes and explosions. For data recovering a new traveltimes tomography method, has been employed proposed by V. Geyko, that compared to the usual linearization method distinguishes the considerable preferences. The following solid mantle properties of the explored terrane have been explained: 1) The mantle falls into the two shells by the global boundary situated at 550–680 km depth. The upper shell (tectonosphere) is notably inhomogeneous laterally, while the lower one is almost radial-symmetric (deeper than 750–780 km); 2) Into velocity inhomogeneities of the recovering model found contrast mapping not only

major tectonic structures but also locates and traces of sutures and boundaries between great structures. Into zones flanking to sutures and boundaries immediately observes usual anomalous velocity varying that reflects effect of the smoothness, diffusing of the contact region stipulated by coupling, interacting and collision of the associated structures. The clearly expressed sutures are greatest from there the suture between the EEP and Turanian plate and the Palaeozoic, Mesozoic structures of Western and Central Europe and the Alpine structures in the south-east, suture between the northern border of the African platform and the Alpine structures of the Atlas and Mediterranean and between the African platform and the structures of the Anatolian and Caucasus–Iranian segments of the Alpine orogens; (3) Age and genetic type of the tectonic structures reflect in the thickness and structure of the tectonosphere. The tectonic structures of the first order (plates) have roots piercing full the tectonosphere, while those of higher order are clear-cut in the upper and unclear in the lower tectonosphere; (4) The intermediate boundary into tectonosphere situated at 390–450 km depth and the asthenosphere are not global. The former is peculiar to the ancient and formed tectonic structures and later to those actively living now.