



Geological position and regime of mantle seismicity in the Alpine-Himalayan belt

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Tectonic position and origin of the XX century strong mantle earthquakes (depths up to 270 km) in five regions of the Alpine-Himalayan belt in and northward the Neo-Tethys suture between 16° and 100° E are discussed. They are: (1) the Crete–Hellen and Cyprus arcs; (2) the Aegean region; (3) the Wranche mega-source in Eastern Carpathians; (4) the Middle Caspian; (5) the Pamir–Hindu Kush zone with the Hindu Kush mega-source. The Pamir–Himalayan region underwent intensive Oligocene–Quaternary deformation. Large portions of the upper crust were detached and displaced up to several hundreds kilometers under compression. Relics of the Precambrian, Paleo-Tethys and Meso-Tethys oceanic crust were overthrust by the upper crust masses and sank to the 40–70 km depths, where they were transformed to dense metabasites, like eclogite. In the Pliocene–Quaternary, the region has risen quickly, mainly because of decrease of density of the upper mantle. As a result, the detached metabasites have sunk up to 270 km. Breakage of the sinking metabasites produces mantle earthquake. The same process has taken place probably in the Wranche area, where the basites on the boundary between the Misian plate and East European platform were overthrust in Neogene by the External Carpathian zone. Possibly, a part of the mantle earthquakes in the Aegean have similar origin. In the Middle Caspian, the lower crust could be metamorphosed and weighted under load of thick sediments. So, only the Crete–Hellen and Cyprus mantle seismicity is related to recent subduction. The chronological comparison of released energy of the mantle earthquakes demonstrates the total fall in the end of the XX century and features of direct correlation between the Kurile–Kamchatka, Pamir–Hindu Kush and Crete–Hellen zones, while the Wranche events shows the low correlation with them.