Geophysical Research Abstracts
Vol. 12, EGU2010-2317, 2010
EGU General Assembly 2010


# Seismic model of the upper mantle beneath the Alpine-Himalayan orogenic belt from tomographic inversion of the ISC data

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A new seismic model of P and S anomalies in the upper mantle beneath the Alpine-Himalayan orogenic belt is presented. Travel-time data from the ISC catalogue have been inverted using a linearized approach. A large amount of global data for more than 40 years enables good ray coverage which ensures high quality of synthetic tests (e.g. checkerboard tests). At the same time, these data are very noisy, and the noise seems often to be biased. The data quality varies in different parts of the study area that makes adequate simulating of real situation in synthetic modeling almost impossible. To validate our results, we present the result of independent inversion of two data subsets (with odd and even events) that allows us revealing robust features which are not affected by random factors.

The presented seismic model reveals some important features which can be attributed to geodynamical processes controlling the collision process. In the Mediterranean part we observe complex shapes of the subducting African lithosphere. In particular, the Calabrian slab looks as an elongated ($\sim$700 km long and $\sim$100 km thick) "sausage" which penetrates to the depth of 300-400 km. In Asia we observe a few high velocity patterns which can be attributed to the process of the lithosphere recycling in the collision belts. Beneath Zagros (Iran) a slab-shaped anomaly coincides with active seismicity down to 100 km depth and probably marks the final stage of the Tethyan subduction. A trace of suspended old slab is observed beneath Tien Shan. We observe an almost isometrical bright high-velocity anomaly beneath Pamir – Hindukush. We interpret this pattern as a drop of delaminating material triggered by eclogitization of the lower part of thickened crust, and not as a subducting lithosphere as often proposed. Based on our tomographic models, we claim that the delamination is the major mechanism of the lithosphere recycling in the continent-continent collision areas. Today we have a chance to observe such falling drops at least in two places of Eurasia: in Pamir-Hindukush and in Vrancea (Romania).