Geophysical Research Abstracts
Vol. 14, EGU2012-5486-1, 2012
EGU General Assembly 2012

New Pn and Sn tomographic images of the uppermost mantle beneath the Mediterranean region

A. Gil, J. Díaz, and J. Gallart
ICTJA - CSIC, Barcelona, Spain (jdiaz@ictja.csic.es, 34 934110012)

We present here new images of the seismic velocity and anisotropy variations in the uppermost mantle beneath the Mediterranean region, compiled from inversion of Pn and Sn phases. The method of Hearn (1996) has been applied to Pn and Sn lectures from the catalogs of the International Seismological Center and the Spanish Instituto Geografico Nacional. A total of 1,172,293 Pn arrivals coming from 16,527 earthquakes recorded at 1,657 stations with epicentral distances between 220 km and 1400 km have been retained (331,567 arrivals from 15,487events at 961 stations for Sn). Our results, grossly consistent with available 3D tomography images, show significant features well correlated with surface geology. The Pn velocities are high (>8.2 km/s) beneath major sedimentary basins (western Alboran Sea, Valencia Trough, Adriatic Sea, Aquitaine, Guadalquivir, Rharb, Aquitaine and Po basins), and low (<7.8 km/s) in orogenic areas (Betics, Pyrenees, Alps, Apennines, Dinarides, Helenides and Calabrian Arc), confirming the existence of marked variations in crustal thicknesses already documented in some active seismic experiments. The lowest velocity values are found under the Betics and the eastern and western Alps. Another low velocity anomaly is located below the south of Balearic Islands, probably related to a thermal anomaly associated to the westward displacement of the Alboran block along the Emile Baudot escarpment 16 Ma ago. The Pn anisotropic image shows consistent orientations sub-parallel to major orogenic structures, such as Betics, Apennines, Calabrian Arc and Alps. The station delays beneath Betic and Rif ranges are strongly negative, suggesting the presence of crustal thickening all along the Gibraltar Arc. However, only the Betics have a very strong low-velocity anomaly and a pronounced anisotropy pattern. The Sn tomographic image correlates well with the Pn image, even if some relevant differences can be observed beneath particular regions.