Geophysical Research Abstracts
Vol. 16, EGU2014-7103-2, 2014
EGU General Assembly 2014

Evidence for thin low-velocity layers in the Hellenic-Aegean uppermost mantle

Maria Sachpazi (1), Alexandrine Gesret (2), Mireille Laigle (3), Marinos Charalampakis (1), Jordi Diaz (4), and Alfred Hirn (5)

(1) Geodynamical Institute, National Observatory of Athens, Greece, (2) Mines ParisTech, Centre de Géosciences, Fontainebleau, France (alexandrine.gesret@mines-paristech.fr), (3) Géoazur, Université Nice Sophia Antipolis and CNRS, Valbonne, France, (4) Institute of Earth Sciences 'Jaume Almera', CSIC, Barcelona, Spain, (5) Sismologie, UMR 7154, Institut de Physique du Globe de Paris, France

Subcrustal low-velocity layers have been evidenced from a number of large scale controlled–source experiments in the 70ies, such as along the former convergence zone of orogenic belts in the Variscan and Fennoscandian (e.g. Ansorge and Mueller, 1973; Hirn et al ., 1973).
We bring here evidence of fine layering with one or more thin LVL, Low-Velocity-Layers within the upper 100 km of the mantle under the Hellenic-Aegean convergent region. These LVL are revealed by the analysis of teleseismic observations recorded along a 300-km-long N-S swath across Greece. Indeed several tens of sites were occupied temporarily with three-component digital seismometers in the frame of the EU supported "Thales was right" project between the cooperating institutions.
In this study, the required resolution for thin low-velocity layers is obtained from the multiscale analysis of P-to-S teleseismic converted waves, with the receiver-function method. The multiscale approach has already allowed to show a LVL at depth under the Aegean Moho with a thickness typical of an oceanic crust. This LVL has been located at the top of the long known volume of slightly higher velocity than the surrounding mantle, interpreted as a subducting lithospheric slab (Gesret et al., 2010). A second LVL, and possibly a third one, are resolved for the first time within the so-called subduction mantle-corner between the Aegean Moho and the LVL at the present slab top. Fine analysis of the teleseismic data give us indications on the nature and physical properties of these LVL and their boundaries, as well as on the geometric relations with the LVL at the top of the active slab and with deformation of the surface of the overriding plate. These analyses carried out on a presently convergent margin shed light on the processes which may have contributed to the formation of deep layering and structures in the lithospheric mantle that have been found under ancient orogenic regions.
The fine imaging of the LVL at the slab top as well as of the other LVL provide the structural frame to discuss the high resolution locations of the current seismicity obtained jointly by our 3 year dense deployment and by the National Observatory of Athens permanent stations operating in parallel.