



Construction of a high resolution model of the European-Mediterranean lithosphere

R. Kind

GFZ Potsdam, Telegrafenberg, 14473 Potsdam, Germany, email:kind@gfz-potsdam.de

High-resolution seismic observation of the lithosphere was so far hampered due to the nature of the lithosphere-asthenosphere boundary (LAB). As a gradient transition zone and as an upper boundary of a low-velocity zone, the LAB was hard to be detected seismically. Most observations about the lithospheric thickness came so far from surface wave studies with relatively low resolution. Recently a new technique employing converted body waves (S receiver functions) has been developed that can be used to identify the LAB with a high resolution. Essential parts of this technique have been developed at the GFZ Potsdam. The S receiver function technique looks for S-to-P converted waves at seismic discontinuities beneath a station. It is developed from the well-known conventional P receiver function method. P-to-S conversions of the lithosphere-asthenosphere boundary are often obscured by crustal multiples, which are, however, separated from the primary conversions in the S receiver functions. Therefore, the S receiver function technique is very promising for detecting and mapping the LAB. We have published already a number of papers with detailed local or regional LAB maps and with, in some cases, completely unexpected results. Examples are thinning of the Hawaiian lithosphere due to the passage over the plume, detachment of the Indian lithosphere beneath southern Tibet, thinning of the Indian lithosphere due to the passage over the East African-West Indian Ocean superplume or the structure of the Aegean subducting lithosphere. Judging from the results obtained so far, we expect to derive a model of the European-Mediterranean lithosphere with so far unprecedented resolution. Byproducts will be nearly automatically improved models of the moho and other upper mantle discontinuities obtained from P receiver functions. The necessary data will come from the existing permanent European broadband stations and from available data of mobile experiments.