

# **Studies of Lithospheric Plates with S Receiver Functions**

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## **Abstract**

For seismologists the lower boundary of the lithospheric plates is a very exotic boundary. It was not defined by seismic means. There is broad agreement that the asthenosphere may be imaged as low velocity zone by surface waves. The boundary between lithosphere and asthenosphere (the LAB), however, can only be imaged with this technique as a broad transition due to the large wavelength of the seismic waves used. This is not seen as a problem by those, who define the LAB by an isotherm, since no sharp transition is expected in this case. It could, however, be a sharp boundary in a mechanical model. Seismic techniques which use converted body waves are now far enough developed to be successful in observing the LAB with higher resolution than known so far. The principle of this technique is that a strong mother phase (e.g. P or S) produces at the LAB beneath a seismic station a small converted phase, which indicates the properties of the LAB. Also other scattered phases, like PP or SS precursors could be used. Due to the freely available data from very many seismic stations it is now possible to obtain maps of the LAB topography with so far unprecedented spatial resolution. The receiver function technique has the potential to gain the same significance for the lower lithosphere like steep angle seismics for the crust. Observations of the LAB mainly with S-receiver functions in tectonically different regions are reviewed.