Geophysical Research Abstracts, Vol. 7, 03838, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03838


# Shear-wave splitting measurements along the Tasman Line: evidence for a supracrustal structure ?

**M. Heintz**, B.L.N., Kennett

Research School of Earth Sciences, The Australian National University, Mills Road, ACTON ACT 0200, CANBERRA, AUSTRALIA (maggy@rses.anu.edu.au, brian@rses.anu.edu.au)

Seismological stations have been extensively deployed all over the Australian continent since 1992 within the framework of various temporary deployments: this has provided 190 sites equipped with broadband seismological recorders for an average time span of recording of 6 months. 20 of those stations are part of the current Tasman Line project, a 2-year deployment, which aim is to simultaneously record events on both sides of the "Tasman line" (TL), the hypothetical line separating western Precambrian from eastern Phanerozoic Australia, in a way that was not achieved in the earlier deployments.

The concept of the TL has been extensively discussed and argued, with different authors suggesting various locations. Even if not simply related to any of the suggested locations of the TL as deduced from crustal informations, the contrast between western Precambrian and eastern Phanerozoic Australia in the upper mantle is a strong and undisputed result of surface wave tomography.

We here study the structure of the upper mantle along the TL using teleseismic shear wave splitting to extract seismic anisotropy. The favourable location of Australia with respect to the worldwide seismicity in a distance range of 85 to 150° suitable for SKS shear wave splitting analysis, together with the 2-year long current deployment, allow us to better constrain anisotropy on both sides of the TL than in previous studies taking into account only data recorded during the first three stages of SKIPPY.

Seismic anisotropy in the upper mantle is related to the development of lattice preferred orientation (LPO) of olivine, resulting either from the active deformation of the asthenospheric mantle that accommodates or causes absolute plate motion, or was frozen in the lithosphere during post tectonic thermal relaxation. Comparing the ori-

entation of the polarisation plane of the fast S-waves, Ø, assumed to be a proxy for the orientation of the [100] axis of olivine in the upper mantle, with surface geology, helps to provide insights into the lithospheric structure and the possible mechanical coupling between the crust and upper mantle.

Shear wave splitting measurements obtained at ˜15 stations located in the vicinity of the TL highlight directions of Ø that exhibit a curvilinear trend somewhat similar to the proposed Tasman Lines. The behaviour of the seismic waves on both sides of the TL is however not similar to the one observed on both sides of the TESZ, the European and only equivalent of the TL in terms of basic geological description.