Geophysical Research Abstracts, Vol. 8, 05675, 2006
SRef-ID: 1607-7962/gra/EGU06-A-05675

Two station phase velocity measurements under French Polynesia

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French Polynesia lies atop of the South Pacific Superswell, a region of anomalously shallow ocean several thousand kilometers in extent, with an unusually dense concentration of hotspots (McNutt, 1998). This region of the south Pacific, which is far from any plate boundary, comprises oceanic lithosphere with ages varying between 30 and 100 Ma, as well as two major fracture zones and several volcanic islands chains - the Society, Austral, Gambier and Marquesas islands- that may represent hot spot tracks. The region is also characterized at depth by a large-scale, shear wave and attenuation anomaly in the lower-most mantle (Megnin & Romanowicz, 2000) and anomalous converted phases from the 660-km discontinuity (Niu et al., 2002). The French Ministere de la Recherche recently funded a multi-disciplinary project, the Polynesian Lithosphere and Upper Mantle Experiment (PLUME), to image the upper mantle structures beneath French Polynesia. As part of PLUME, 10 broadband stations were deployed in French Polynesia between October 2001 and August 2005 (Barruol et al., 2002).

A surface waveform tomography study using data from the Global Digital Seismic Network, the Geoscope network and the PLUME temporary deployment has found that the average upper mantle shear wave velocity in the region of the Superswell does not differ significantly from that found elsewhere in the Pacific upper mantle of comparable age. However, some Polynesian hotspots (particularly the Society and McDonald) appear to be associated with localized and vertically trending low velocity anomalies (Maggi et al., 2006). In this study, we present two-station phase velocity measurements of Rayleigh waves between the stations of the PLUME deployment. We interpret the observed phase velocity data in terms of local upper mantle anomalies, to obtain better resolution of the upper mantle structure related to the diverse hotspot

activity under French Polynesia.