Geophysical Research Abstracts, Vol. 8, 02970, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02970

Anisotropic S-wave tomography of the Mediterranean upper mantle: New measurements, new tomographic methods.

L. Boschi (1), B. Fry (1), D. Peter (1), G. Ekstrom (2), D. Giardini (1)
(1) Institute of Geophysics, ETH Zurich, (2) Harvard University, U.S.A.

Using a new method to account for the non-linear effects of strong crustal heterogeneities, Boschi and others (2004) derived radially anisotropic shear velocity maps of the upper mantle underlying the Mediterranean Basin. Their study utilized a relatively small, high-quality database of teleseismic dispersion observations. We complement their original data with analogous measurements made from MidSEA (van der Lee et al., 2001) and Tomo-CH (Fry et al., 2005) stations densely distributed over the region of interest. The resulting improvement in tomographic resolution should lead to a more stable image of radial anisotropy, and finer snapshots of debated geodynamical processes taking place in the region.

Improving the theoretical formulation of our inversion by abandoning the ray-theory approximation in favor of a finite-frequency approach further increases our model resolution, particularly for models based on relatively long period observations. As a first step toward 3-D imaging with 3-D finite-frequency kernels, we derive 2-D phase velocity maps from the improved surface wave dispersion dataset using both ray-theoretical and (2-D) finite-frequency kernels. We subsequently compare the results. Being both increasingly well sampled by seismic observations, and a complex region with a variety of geodynamical features, the Mediterranean upper mantle provides an optimal laboratory to test new approaches to regional tomography.