2012 Robert E. Sheriff Lecture Student Abstracts

[These are ten of the 27 entries for the Sheriff poster series, presented as is. The remainder will be published next month along with identification of the winners. - Ed.]

Radial anisotropy in the northeastern Tibetan Plateau from Surface Wave Tomography

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Three-dimensional anisotropic shear wave velocity structure and radial anisotropic model of lower crust and upper mantle beneath NE Tibetan plateau are constructed from measurements of Love wave dispersions and previously obtained Rayleigh wave dispersion in order to answer two important questions regarding the plateau dynamics: (1) whether the deformation in the crust and upper mantle is coupled; (2) whether asthenosphere upwelling exists beneath the NE Tibetan Plateau. We have analyzed Love waves recorded at the Northeast Tibet Seismic (NETS) array and applied the two-plane-wave tomography method to compute average and 2-D phase velocities. Transverse component seismograms from 66 events at 36 stations were filtered at 14 center frequencies with a narrow bandwidth of 10 mHz. Average phase velocity varies from 3.55 km/s at 20 s to 4.55 km/s at 100 s, which are higher than previously obtained Rayleigh wave phase velocities at corresponding periods. 2-D variation of Love phase velocity was calculated at the periods from 20 s to 100 s using 2-D, Born sensitivity kernels. Low-velocity anomalies are imaged along and to the south of the Kunlun fault at each period, similar as from Rayleigh wave tomography. However, the magnitude and size of the low phase velocity are much stronger and larger in Love wave images than in the Rayleigh wave maps. We invert the 2-D phase velocities of Rayleigh and Love waves in the period range from 20 to 100 s simultaneously, to construct a radially anisotropic shear wave velocity model. Such anisotropic properties, which cannot readily be obtained from body wave studies only, can provide new insights into geodynamic process in this tectonically actively region. ■