

## Doing Some New Things with EarthScope Data

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The start of a two-year Flex Array deployment for the Northern Embayment Lithosphere Experiment (NELE) is slated for the last half of July 2013. Up to this time we have been moving 6 FA and 4 other borrowed broadband instruments between TA stations to densify the future background velocity map. Nevertheless, we have been exploring ways to use TA data in new methodologies for producing wave attribute maps using wave gradiometry and different ways of processing teleseismic P wave data to produce true crustal and upper mantle transfer functions. Application of wave gradiometry to long period teleseismic body wave and surface wave data yields new views of wave attributes that indicate changes in lithospheric structure. Gradiometry of high-quality data not only implicitly produces a tomographic map of horizontal phase velocity but also anomalies in wave propagation azimuth and geometrical spreading changes. These later attributes have not been used in structure inversions but may place strong constraints on the spatial roughness of velocity structure. Structure in the NELE footprint includes shallow unconsolidated sediments of the Mississippi embayment of the Gulf coastal plain that produce extremely large Ps conversions and P wave reverberations in teleseismic P waves hiding Ps conversions from deeper Moho and upper mantle interfaces. Three component P wave transfer functions can be constructed by array stacking P waves that are recorded on stations outside of the embayment for use in the deconvolution step of receiver function processing for all stations inside and outside of the embayment. In addition, starting models for the embayment sediment have been determined using a novel method of V/H and H/V power spectral ratios on the raw teleseismic P waves.

