High-resolution seismic tomography in the northeast United States using Transportable Array data

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High-density seismic data for the New England area has recently become available thanks to the installation of the Transportable Array network. Additionally, the recent release of the Automated Surface-Wave Phase-Velocity Measuring System (developed at Lamont by Ge Jin and James Gaherty) offers a new level of automation in the production of seismic tomographic maps. The program calculates Rayleigh wave velocity vectors over multiple paths at multiple periods, using the Eikonal equation to determine the slowness vector from the phase delay between stations. A Helmholtz frequency correction is applied to the results and they are stacked into maps. Phase velocity maps for Rayleigh waves from 15 s to 60 s periods have been generated for the Northeast at a resolution of 1 degree latitude by 1 degree longitude. Prominent visible features include a strong northeast-southwest trending boundary between faster Canadian craton and slower New England crust and a fast region at lower periods extending roughly from New York City to Boston. These maps could provide information about local Earth structure when analyzed; an established relationship between wavelength and wave velocity depth sensitivity aids in the interpretation of the maps with regards to the depth of specific features.