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# 3D shear-wave velocity structure of the eastern Tennessee seismic zone from ambient noise correlation data

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The Eastern Tennessee Seismic Zone (ETSZ) is an intraplate seismic region characterized by frequent but low magnitude earthquakes and is the second most active seismic area in the United States east of the Rocky Mountains. One key question in the ETSZ is the actual relationship between earthquake distribution and geological structure at depth. Seismicity is mostly confined in the Precambrian basement, below the Paleozoic cover of the southern Appalachian foreland fold-and-thrust belt and shows little to no correlation with surface geological features. Since the middle of the seventies, the Center for Earthquake Research and Information (CERI) has installed and maintained several seismic networks in central and eastern United States. In this work, we use Rayleigh wave group and phase velocity dispersion information obtained from cross-correlation of seismic ambient noise at 24 short-period stations located in the vicinity of the ETSZ. The 3D velocity structure is estimated in four steps. First, dispersion curves are obtained for simultaneously recording station pairs for periods ranging from 2 to 20 s. Then, 2D group and phase velocity maps are determined for each period. Those maps are further used to reconstruct dispersion curves at fixed, regularly spaced locations. For each of these locations, a 1D shear-wave velocity profile is finally inverted for, that takes velocity information from previous studies into account. By providing new information about the upper crustal structure of this region, this work is a contribution to the understanding of the seismic activity of the ETSZ, and -to a broader extent- of the structure and evolution of the North American lithosphere.