Although intra-plate earthquakes can cause extensive damage to densely populated regions of the central and eastern US, mechanisms controlling these intra-plate earthquakes are poorly understood. Additionally, thick sedimentary layers common in this region lead to increased amplitude and duration ground shaking during a seismic event, so mapping the structure of sedimentary basins has implications for seismic hazard mapping.

Previous studies have suggested that isolated regions of intra-plate seismicity are correlated with deeper earth structures, including abrupt changes in thickness of the tectonic plate (lithosphere), a weak intra-lithospheric layer, and changes in thickness of the continental crust (Soto-Cordero et al 2017).We use complementary receiver function data calculated from converted seismic waves (P-to-s and S-to-p) to map out lithospheric structure variations across the East Coast. Since receiver functions are sensitive to sharp changes in seismic velocity and density with depth, they are commonly used for studying the depth variations of geologic discontinuities, such as the crustal thickness, intra-lithospheric layering, and the base of the lithosphere. However, traditional receiver function techniques are difficult to interpret in regions with sediment, because the signal from the crust and lithosphere can be contaminated by large amplitude sedimentary signals.

To remove contamination from shallow-layer multiples, we apply a removal filter (Yu et al. 2015), constructed using an automatic procedure that constrains properties of the sedimentary layer. This allows us to map large-scale variations of sedimentary thickness along the East Coast, and to obtain much clearer images of lithospheric structure using common conversion points of the sediment-corrected receiver functions. Preliminary show a correlation between abrupt changes in crustal thickness and seismicity, and no strong evidence of intra-lithospheric laying or variations in lithospheric thickness, implying that intra-plate seismicity on the eastern US may be better linked to crustal thickness variations

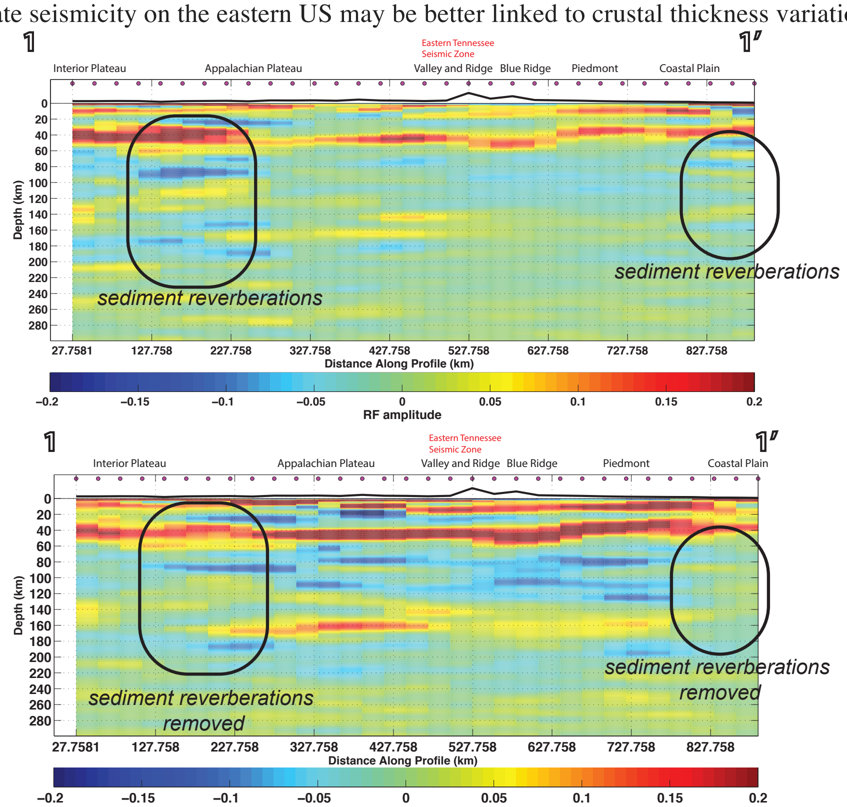

Figure 1- P-to-s receiver function common conversion point (CCP) stacks for a N-S region in the eastern U.S. Top: CCP stack using P-to-s receiver functions before the removal filter is applied. Bottom: CCP stack using P-to-s receiver functions after removal filter is applied. The amplitude of the reverberations are decreased and the signal from the Moho is stronger.