Imaging Basin Structures with Teleseismic P Reverberation Virtual Sources
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We demonstrate a case of using teleseisms recorded on single component high frequency geophones to image upper crustal structure. The dataset was obtained through the EarthScope FlexArray Bighorn Arch Seismic Experiment (BASE). In addition to traditional active and passive source seismic data acquisition, BASE included a 15 day continuous (passive source) deployment of 850 geophones with ‘Texan’ dataloggers. The geophones were deployed in three E-W lines in north-central Wyoming extending from the Powder River Basin, across the Bighorn Mountains, and across the Bighorn Basin, and two N-S lines on east and west flanks of the Bighorn Mountains. The approach used in this study is equivalent to conventional active source seismic reflection profiles except that high-frequency (up to 2.5 Hz) transmitted wave fields from distant earthquakes are used as natural sources. Our preliminary seismic profiles along the E-W line show strong reflections which we interpret as dipping basement beneath the sedimentary basins flanking the Big Horn Mountains. This study demonstrates the feasibility of using passive Texan data to image shallow crustal layers, increasing the function of EarthScope Flexible Array datasets.