AGU Advances

Supporting Information for

A Taxonomy of Upper Mantle Stratification in the US

Steve Carr[1*] and Tolulope Olugobji[1,2,3]

[1] *Department of Earth and Environmental Sciences, University of Rochester, NY*
[2] *Department of Electrical and Computer Engineering, University of Rochester, NY*
[3] *Georgen Institute of Data Sciences, University of Rochester, NY*

Contents of this file

1. Figures S1, S2, S3, S4, S5, S6 S7, S8 and S9.
2. All data, codes, and files described here can be accessed on the open repository at Carr, S., & Olugboji, T. (2024). URseismology/USMantleTax: Preprint Release (0.0.1). Zenodo. https://doi.org/10.5281/zenodo.10452228

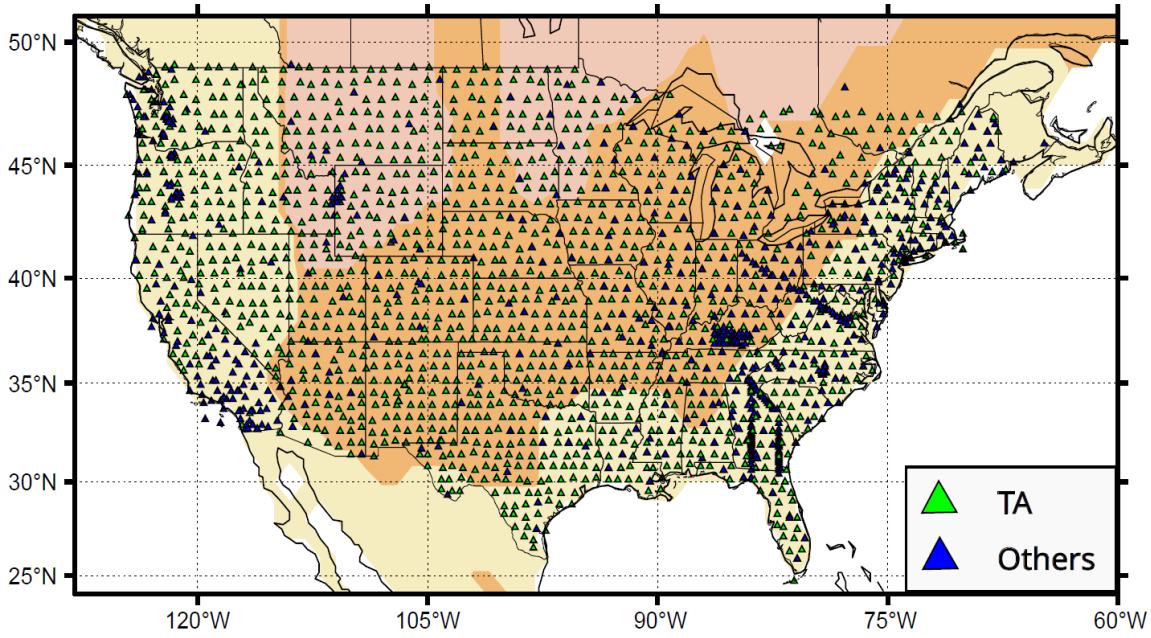

Figure S1. Distribution of all stations evaluated. Most stations belong to the transportable array (TA) with other contributing stations from all major seismic networks across the contiguous US.

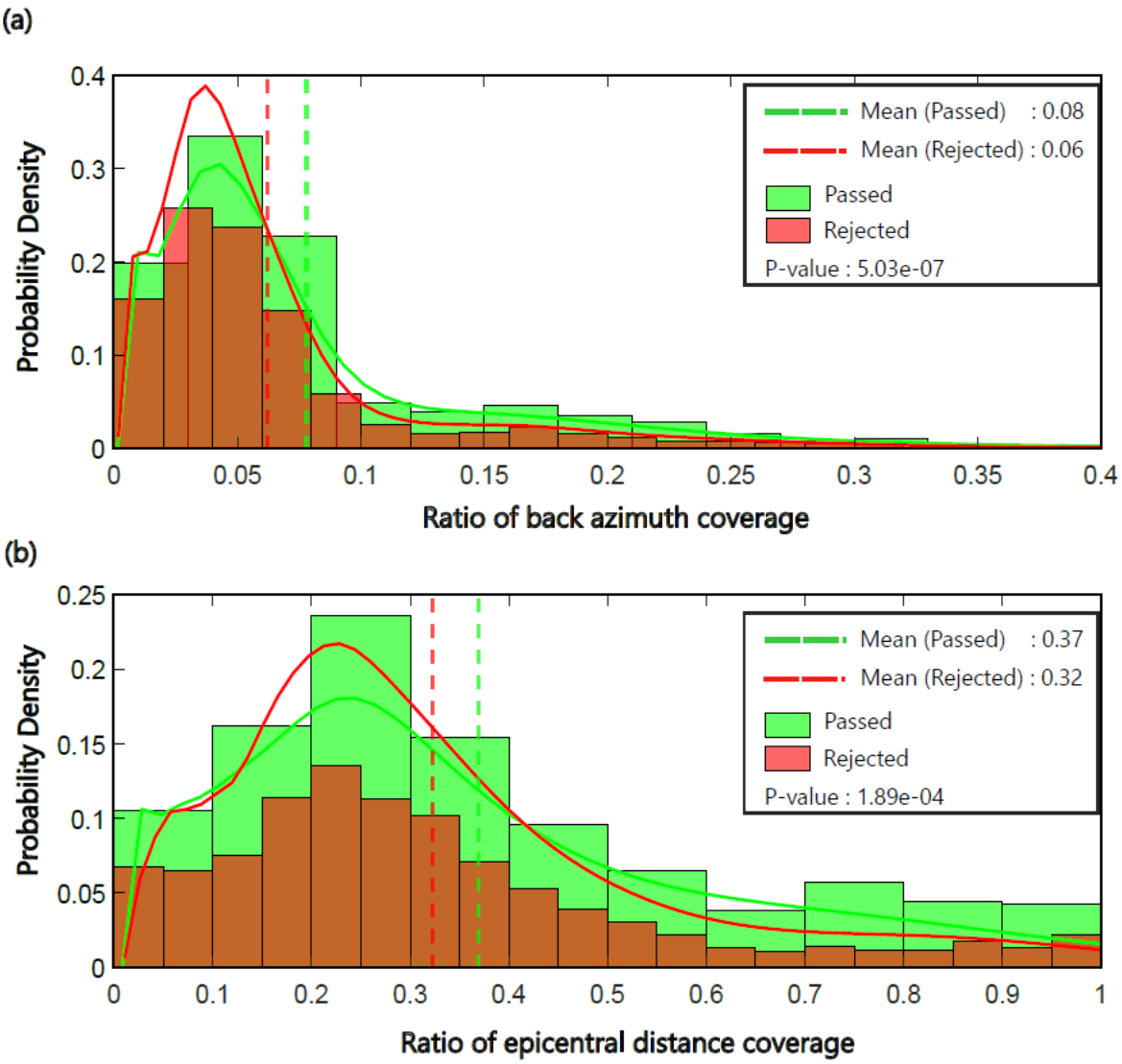

Figure S2. A statistical analysis of stations that pass (green) or fail (brown) our quality selection criteria. The 417 stations that pass are in Figure 2 of the manuscript.

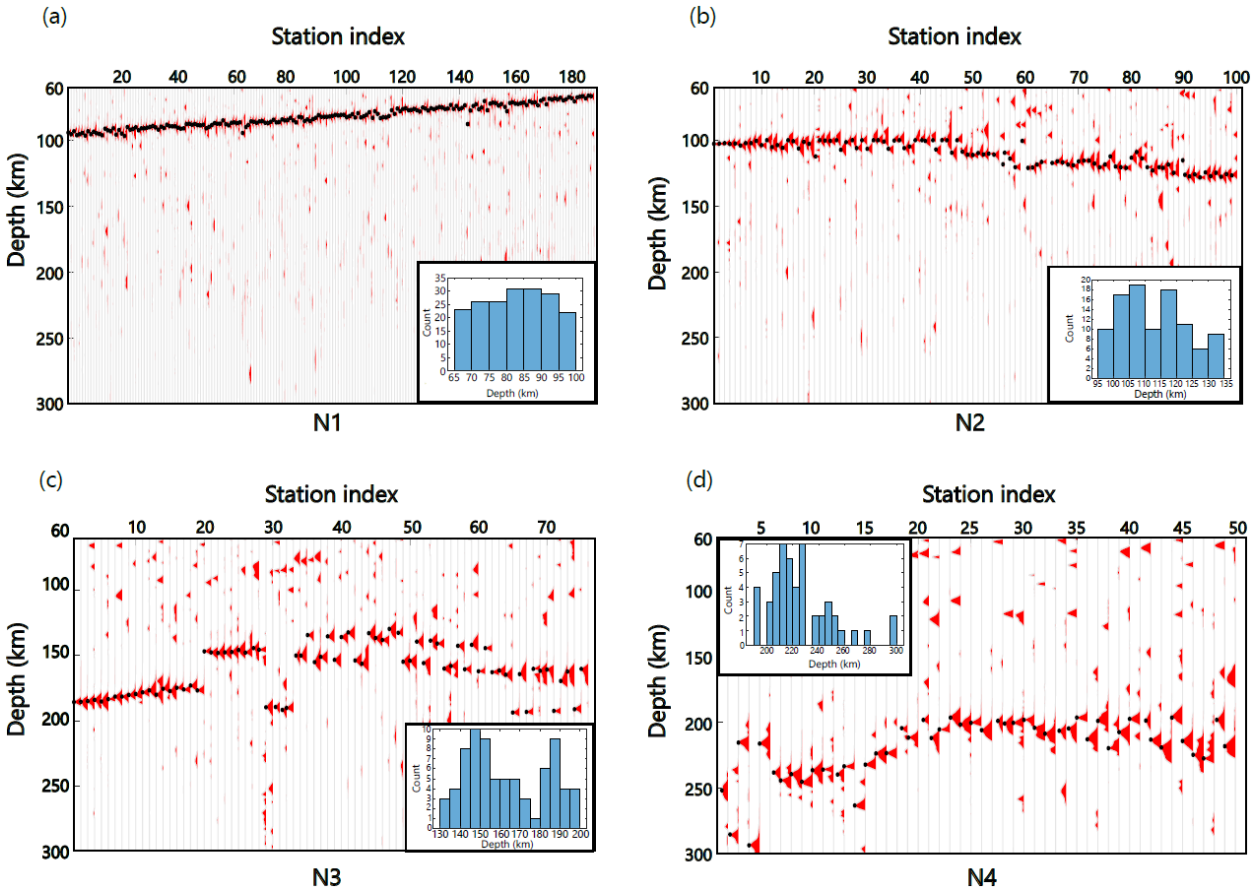

Figure S3. Stations with upper mantle discontinuities marked by a velocity drop(same as Figure 6 in the manuscript but with the depth identified as black dots and histograms)

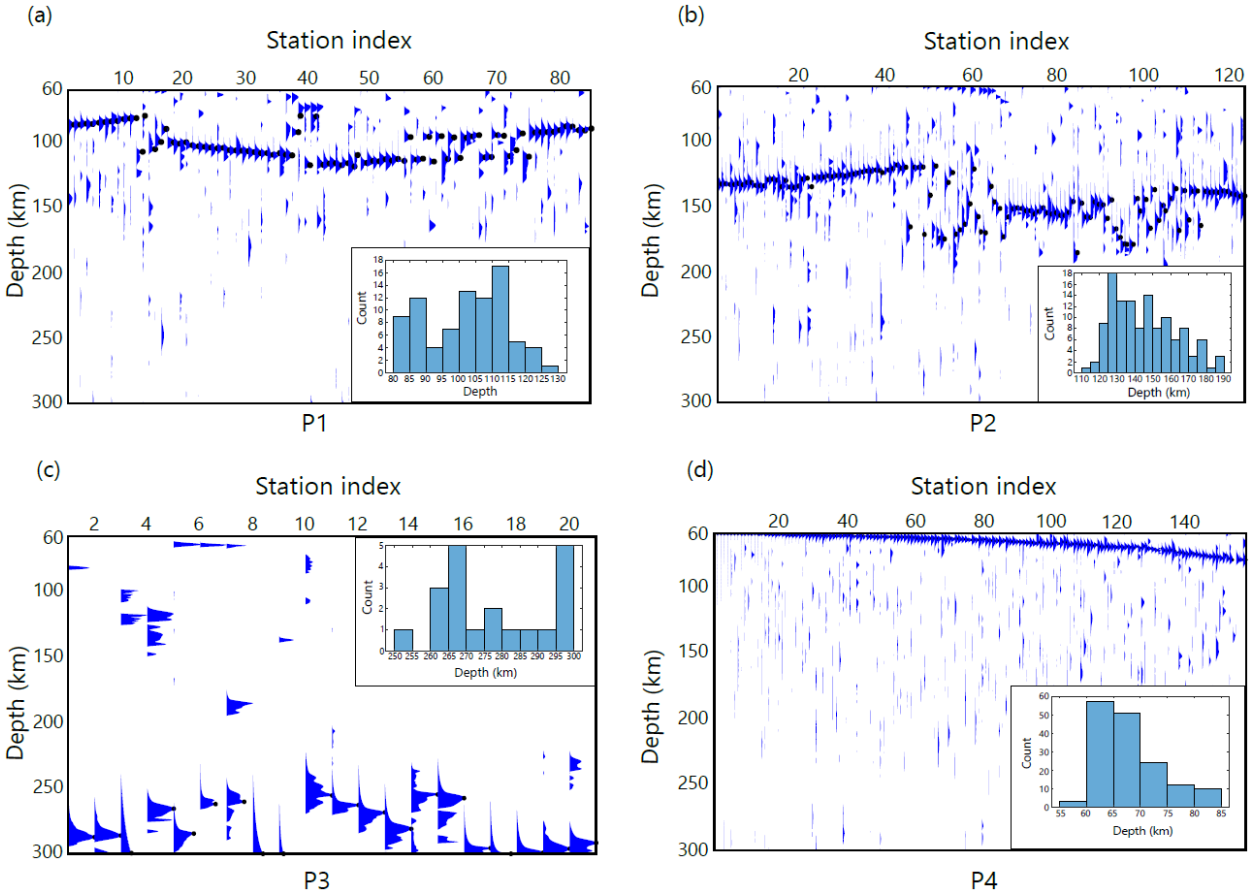

Figure S4. Same as Figure S5 and Figure 7 but for upper mantle discontinuities marked by a velocity increase (depth identified as black dots and statistics highlighted with histograms)

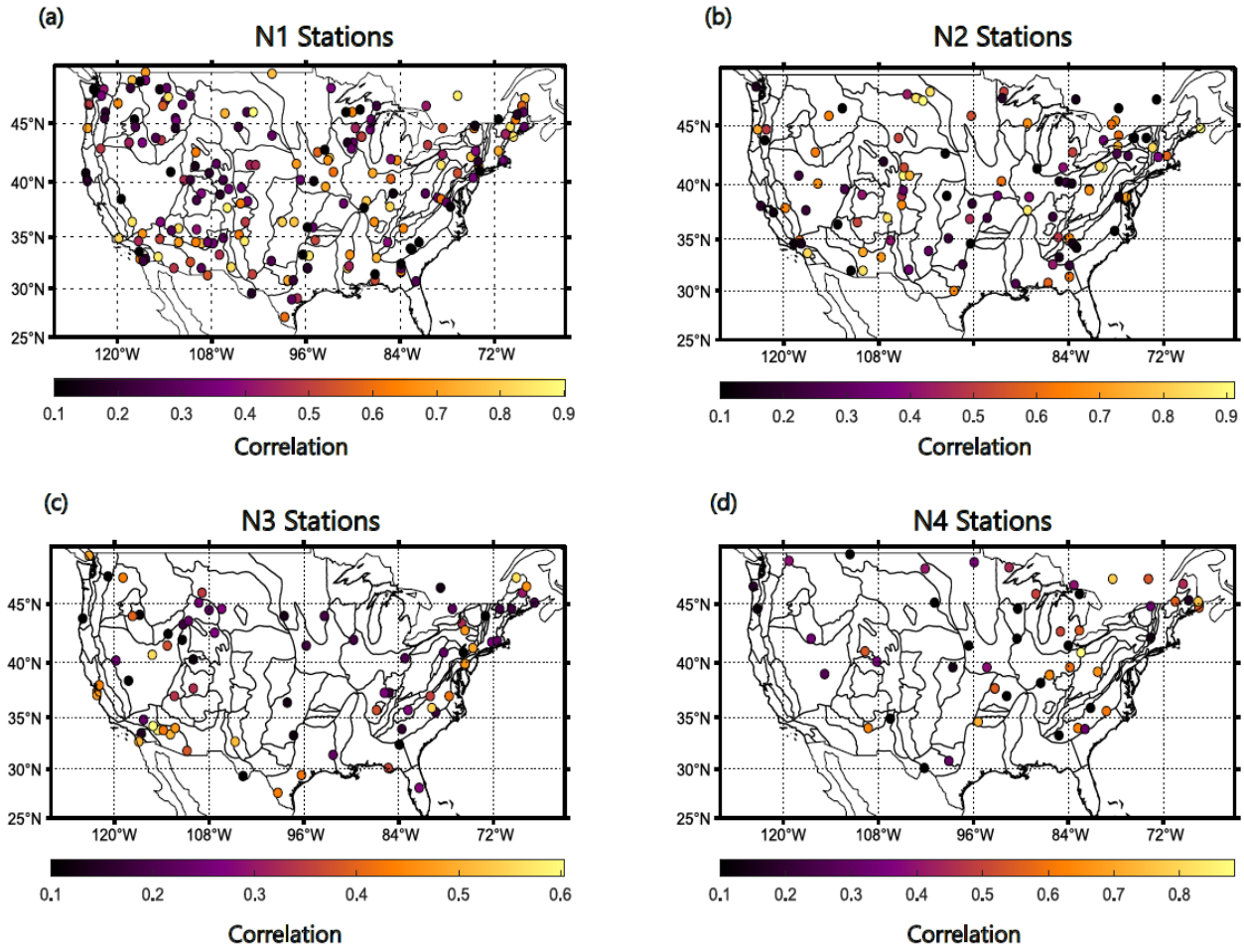

Figure S5. Geographic distribution of stations detecting intra-lithospheric and transitional discontinuities exhibiting velocity drops (N1-N4).

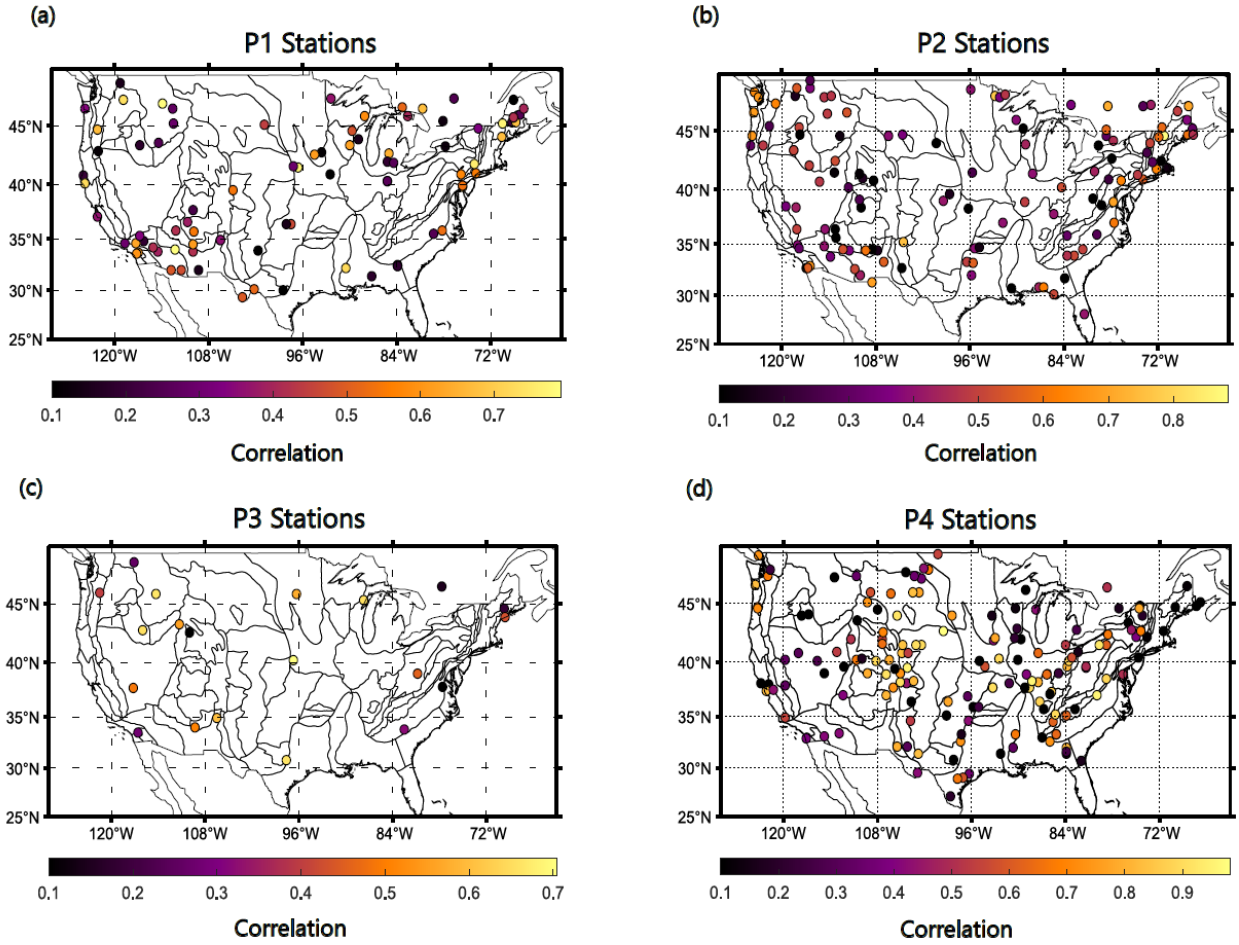

Figure S6. Geographic distribution of stations detecting intra-lithospheric and sub-lithospheric discontinuities exhibiting velocity increases (P1-P4).

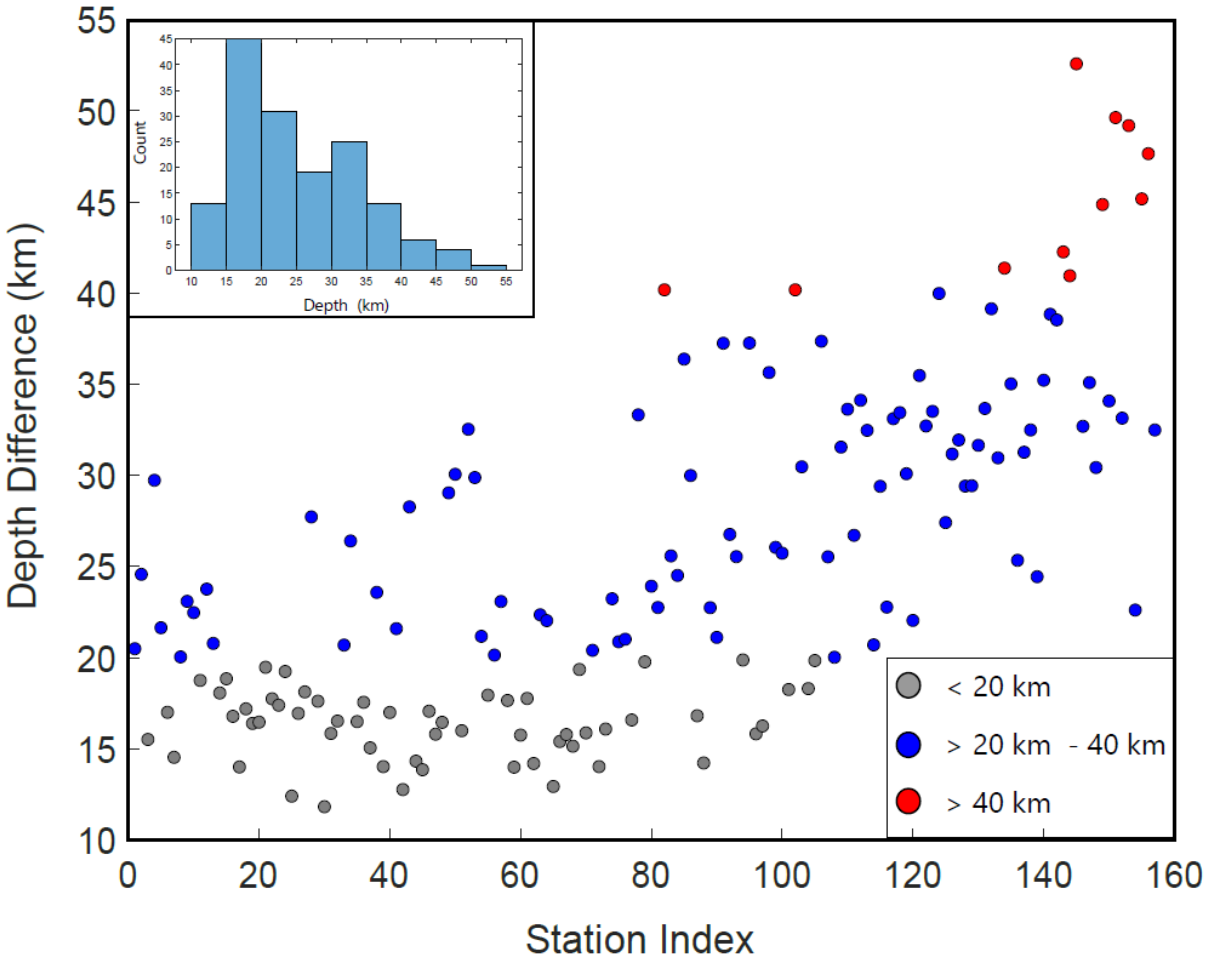

Figure S7. Analysis showing Ps-RFs in the P4 cluster are null detections for upper mantle discontinuities. Comparison of Moho depth and Ps-RF arrivals after depth migration. Most detections are sidelobes of the Moho (<20 km). Some detections are gradational Mohos (20-40 km) and others are signatures of terrane sutures.

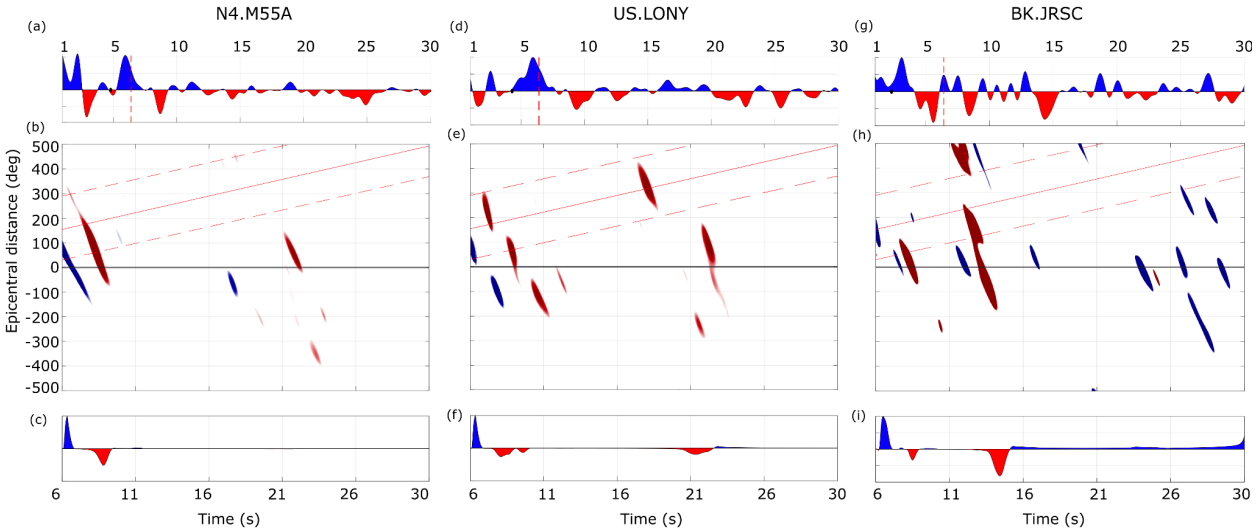

Figure S8. A selection of three Ps-RF traces from the analysis in Figure S7 above. Station N4.M55A is a moho sidelobe, US.LONY is a gradational Moho and BK.JRSC is along the previous Farallon paleo-subduction during the Laramide orogeny

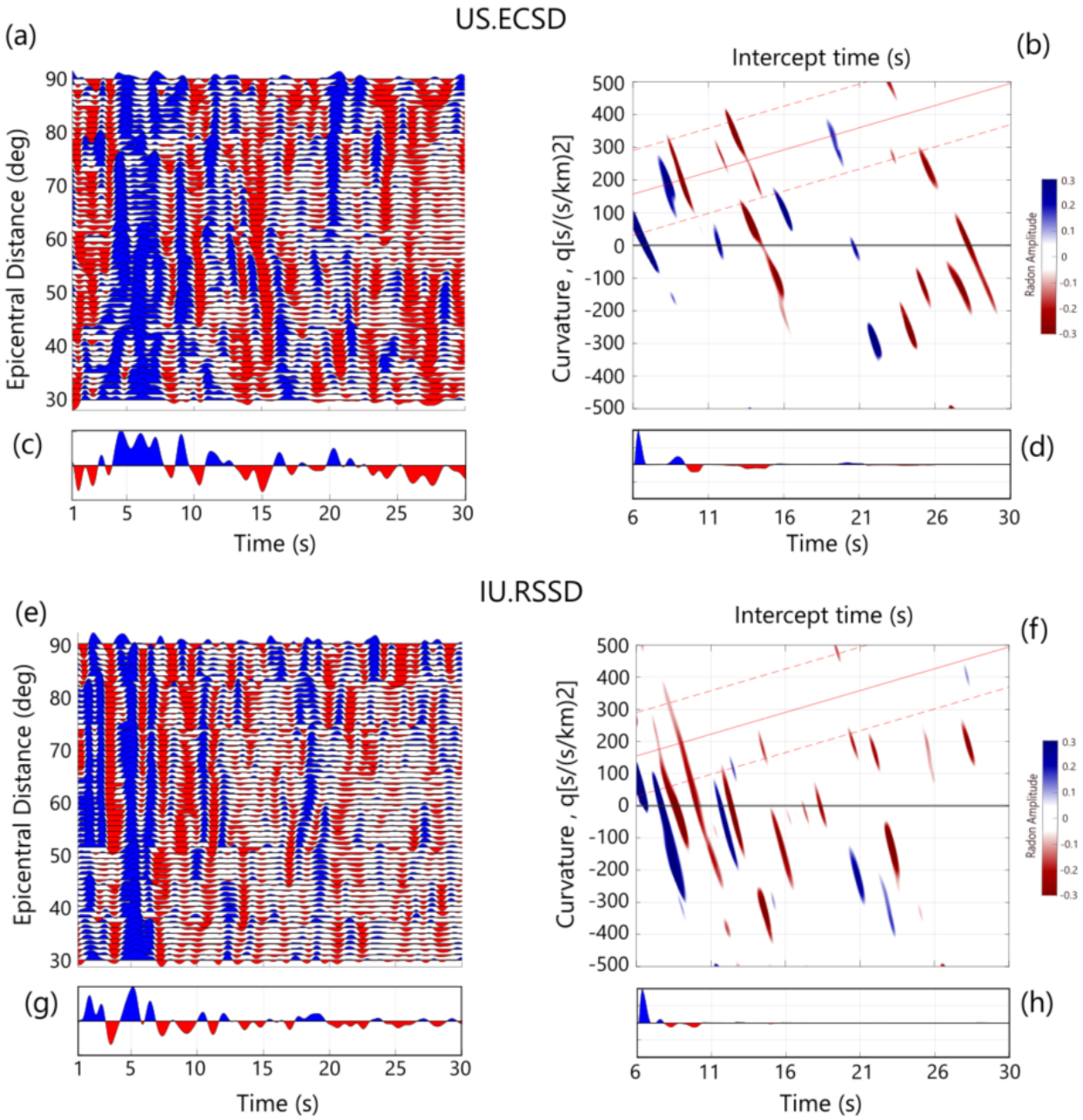

Fig. S9 An example CRISP-RF for two stations on the Wyoming craton previously studied by Liu and Shearer, 2021 and Krueger et al., 2021a