Supplementary Figure S1. Map of the conversion points (colored Xs) from the Moho discontinuity for each of the 11 seismic stations color coded by back azimuth region and plotted in 1x1 km bins for clarity. Inset global map shows the 145 events used in the analysis also colored by back azimuth quadrant.

Supplementary Figure S2. Receiver function gathers for stations the additional 8 stations (not shown in Fig. 2) with locations shown as red triangles in Figures 1 and S1. The receiver gathers are plotted by back azimuth and use the same color code scale as in Figure S2 (orange = NE; blue = SE; red = SW; green = NW). The first arrival at 1 s is the direct P arrival and the second positive amplitude around 4 s is the converted wave signal from the Moho (Pms).

Supplementary Figure S3. Synthetic receiver gathers for a station simulating CRY (see Fig. 2 for the receiver gather and Fig. 1 for location) plotted by back azimuth for 2 different models with a velocity contrast across a vertical N-S trending fault (A) 20% velocity contrast and (B) 10% velocity contrast. Red pulses are positive arrivals (Moho and direct P) and blue are negative. Note the variation in signal for the first positive signal after the primary P arrival.
Figure S2
2 block model with 20% contrast for a station similar to CRY

2 block model with 10% contrast for a station similar to CRY

Figure S3