

Full-waveform inversion for localized 3-D S-velocity structure in D" beneath the Caribbean using USArray data

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We take advantage of the dense coverage made available by USArray stations (enhanced by records from the IRIS/USGS, SCSN, PNSN, BDSN, and CNSN networks) to invert for the localized 3-D S-velocity in the lowermost 400 km of the mantle beneath the Caribbean (see in the Fig. below the distribution of stations (blue), events (red), and the location of the voxels that define the target region (green)). We use a much larger dataset than Kawai *et al.* (2014), with an improved eastward geographical coverage. We use around 13,000 S and ScS transverse component waveforms (including possible ScS precursors important to image strong velocity contrasts) down to 12.5 s for 68 intermediate and deep focus events in the period 1993–2015 beneath South America. The resulting 3-D model shows a more complex S-velocity structure than that resolved by global tomography, with vertical high velocity anomalies extending from the top of our target region down to the CMB with the strongest high-velocity perturbations 300 km and 100 km above the CMB. Our model is consistent with that of Kawai *et al.* (2014), where they overlap, and reveals another high velocity anomaly located beneath the north of South America, which is in agreement with previous works using ray tomography. Our 3-D model is consistent with the presence of cold slab material surrounded by hotter material.

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