D" discontinuity structure beneath the North Atlantic from *Scd* observations

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Abstract

We analyzed transverse and radial component recordings from the 2010 M6.3 southern Spain earthquake (depth = 620 km) recorded on 370 broadband stations in North America. We grouped these seismograms into subarrays and applied 4th root vespa processing (vespagram analysis) in order to enhance low amplitude arrivals. These vespagrams show clear *Scd* arrivals which indicate the existence of the D" discontinuity beneath the North Atlantic Ocean (4560°N, 4555°W). These observations are best fit with a +24% velocity increase at the top of the D" discontinuity at a height above the core-mantle boundary of 304 ± 14 km. We do not observe *Scd* arrivals at the eastern end of our study region which is consistent with the presence of the easternmost edge of the ancient Farallon plate.

Figure 1. (a) Summary of previous research and our study area. The event and stations used in our study are shown as a yellow star and inverted triangles respectively. The theoretical bounce points of *ScS* on the CMB as calculated by Taup are shown as green crosses (good-cases), yellow crosses (borderline-cases) and black crosses (no-*Scd* arrival). (b) Detailed view with labeled bins and two clusters of our study area displayed on top of *S*-wave tomography model TXBW . [*Grand*, 2002] at the CMB.