

## Effect of the Cold Nazca Slab on the Depth of the 660-km Discontinuity in South America

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The Nazca subducted plate beneath South America makes the 660-km discontinuity deeper and the transition zone (TZ) thicker under the continent. TZ variations are associated with mantle temperature and, therefore, can help confirm the slab position at greater depths. Recent P- and S-wave tomographies show the Nazca plate, near 20°S, being held below the TZ for longitudes between 70°W and 55°W. We used 63,809 LQT deconvolved P-wave receiver functions (from 1,126 stations) to image the mantle TZ in South America. The RF were corrected for move-out, stacked in cells of 3x3 degrees every 1x1 degree. We obtained 1,879 and 2,214 stacked RF traces imaging the 410-km and the 660-km discontinuities, respectively. The discontinuity times were corrected using the SL2013 global tomography model to obtain depths. A thickened TZ follows the trend of the Nazca plate beneath the sub-Andes. To the north of 18°S the thickened TZ extends for about 250 km; to the south, the thickened zone reaches up to a 1,100 km width. This observation clearly indicates that the Nazca slab flattens close to the TZ lowering the mantle temperature and thickening the TZ. The 660-km discontinuity is more affected than the 410-km, which is consistent with the Nazca slab being held just below the TZ and not inside the TZ. Individual discontinuity times indicate that upper mantle velocities are faster than IASP91 for cratonic areas, and slower than expected for the Altiplano as also mapped by local tomography.