

of the Mantle Transition Zone Seismic Discontinuities Beneath Northwestern South America from P Wave Receiver Function Analysis

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Two seismic discontinuities delimit the mantle transition zone (MTZ) at 410 and 660 km. These seismic discontinuities were imaged under the north-west corner of South America using the receiver function technique and a seismological record of up to 30 years collected by the National Seismological Network of Colombia. Significant variations and spatially systematic in the discontinuity depths were observed. The mean depths for the MTZ are 412 ± 5.3 and 671 ± 5.9 km, with a mean thickness of 258 ± 6.5 km. This last value doesn't differ too much from the global average. The significant depth variation and the thicker MTZ in some areas cause a low correlation between the depths of these discontinuities. We hypothesize that this thickness irregularity in the MTZ is due to the interaction between the Nazca and Caribbean tectonic plates during the subduction process beneath the South American lithosphere – Mantle system. On the other hand, the MTZ thinning beneath the Nazca plate possibly is due to a regional thermal disturbance or local plume under the Malpelo ridge. These observations and tomography images also support hypotheses regarding lateral variations in the thermal structure linked with the difference in age and composition of the Nazca and Caribbean plates in these depths.

E-mail

cavargasj@unal.edu.co

Promotional text

The first research using receiver function analysis to unravel mantle transition zone topography in the north-west part of South America. The results help to understand geodynamical processes in this zone.

Oral preference format

in-person

Primary author: CUBILLOS GORDILLO, Jorge Enrique (Universidad Nacional de Colombia)

Co-author: VARGAS, Carlos Alberto (Universidad Nacional de Colombia)

Presenter: VARGAS, Carlos Alberto (Universidad Nacional de Colombia)

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