

Estimate of the Lithospheric Structure in the Northwest South America from Receiver Functions Analysis

We have combined seismological data of the National Seismological Network of Colombia and the CTBTO program for estimating the P-to-S and S-to-P receiver functions beneath Colombia and adjacent regions to make a first-order approximation of the thickness of the Lithosphere-Asthenosphere Boundary (LAB) in the NW South America. An iterative time-domain deconvolution process was carried out and then a move-out correction with a time-depth conversion using seismograms of distant earthquakes recorded at broadband stations. P-to-S receiver functions reveal a relatively thin crust in northern Colombia, with a thickness that roughly varies between 25 and 39 km, with an increase from NW to SE. S-to-P receiver functions were used to estimate lithospheric thickness, yielding values between 65 and 110 km, also increasing from NW to SE. Lithospheric thickness beneath an oceanic island in the Caribbean is ~80 km, whereas for the Ecuador-Colombia Trench it is ~65 km and around 100 km for the Panama Arc. The transition to the continent is associated with an increase in LAB depth, where it can reach ~110 km, with no significant differences among terranes and/or tectonic blocks.

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