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Seismic wave attenuation tomography in Central Chile – Western Argentina (30˚-34˚S)

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We present 3-D seismic wave attenuation models of P- and S-wave (Qp and Qs respectively) in Central Chile-Western Argentina (30˚-34˚S). This region is a transition zone between a flat to steep segment of the oceanic Nazca plate: north to 33˚S, where the slab is flat, the Juan Fernandez ridge subducts along the oceanic plate and Quaternary volcanoes are absent , whereas to the south, the slab dips with an angle of 30˚ and volcanic edifices are active. Recent 3-D velocity models deduced from tomography of local first arrival travel times do not show clear anomalies related to the transition zone. In this study, seismic wave attenuation has been estimated using $\sim$250 local earthquakes recording at 60 stations of two temporary seismic networks installed into the region. More than 20,000 seismic displacement spectra were modeled to estimate as well source parameters (corner frequency, amplitude) as t*=t/Q, representative of the attenuation of the seismic waves. 3-D seismic attenuation models of P- and S-wave have been obtained independently, by tomographic inversion of t*. These models mainly show: (1) the Quaternary volcanoe belt, south to 33˚S, is associated with a negative Qs anomaly at shallow depth ($<$ 20km), characterizing high S-wave attenuation; (2) also south to 33˚S, a clear negative anomaly for both Qs and Qp around 100km depth is likely related to an astenospheric wedge whereas to the north, on the flat segment, no such anomaly is observed; (3) the subducted Juan Fernandez ridge is associated with a Qp and Qs positive anomaly.