Effective elastic thickness variations along the andean margin and their relationship to subduction geometry

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We present a new map of the spatial variations in effective elastic thickness, Te, along the Andes estimated using Bouguer coherence. The Te variations reflect interactions between subducting slab and preexisting terrane structure. In the forearc, conductive cooling of the continent by the subducting slab exerts primary control on rigidity, resulting in Te that is highest (?40 km) where the oceanic lithosphere is oldest and coldest (?20°S). In the central Andes, Te is relatively low (?20 km) along the volcanic chain and the Altiplano and Puna plateaus. We interpret this weakening to reflect a high geothermal gradient maintained by advective magmatic processes, a shallow and hot asthenosphere, and a very weak lower crust throughout this region. East of the plateaus, high Te delineates underthrusting of the Brazilian shield. Finally, north and south of the plateaus, flat subduction areas are characterized by high Te, high shear wave velocity, thick thermal lithosphere, and low heat flow,