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Seismic studies in Southern Peru from Array Data

Abstract

Studies were performed using data collected from an array of 50 seismic stations in Southern Peru. The seismic array runs perpendicular to the trench between Mollendo and Juliaca and is part of a UCLA CENS (Center for Embedded Networked Systems) project. This area is of interest because Southern Peru represents a transition between subduction with a dip angle of around 30 degrees and shallow subduction to the north. The current line is located in a region with steeper subduction while a second line has been constructed between Cusco and Juliaca to study the transition between flat and steep subduction. A third line from Cusco to the coast is will study the region with shallow subduction. Based on teleseismic receiver functions (RFs), the crustal thickness gradually thickens to a depth of approximately 70km beneath the Altiplano. A mid-crustal structure has also been observed at a depth of close to 40km. This may represent a remnant of the original Moho before the rapid uplift of the Altiplano, or may indicate some type of underplating episode. Images also show the subducting slab, which is best imaged by RFs based on PKP phases. Additional information on the subducted slab and overlying crust is being sought from PP phases, S-wave RFs, and undersided reflections. The goal of this study is to compare the structure and properties of the “normally” subducting slab with the “flat” slab that will be imaged on the third line.