



Bending of the Bolivian orocline and structural evolution of the Andes of Southern Peru

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During the last two decades, a number of geological and geophysical studies have addressed issues concerning mountain building in the Central Andes and especially the Neogene uplift of the Altiplano-Puna plateau. Because the Andes occur where the oceanic Nazca plate is subducted below the continental South American plate, it is tempting to relate the building of the Andes to parameters such as changes in the rate and angle of convergence, absolute plate motion, the age and morphology of the subducting slab or the subduction of oceanic plateau or aseismic ridges. The width of the Altiplano is maximum at the latitude of northern Chile where the Andes have a N-S orientation while the southern Peruvian Andes trend NW-SE. This curvature is also known as the Bolivian orocline. Paleomagnetic studies in the Andes demonstrate that a major phase of bending occurred in the late Eocene-Oligocene. This major phase of deformation is possibly associated with the subduction of an oceanic plateau under the central Andes. If this bending is associated with a major phase of shortening across the Andes, then a major phase of uplift should be expected prior to the Neogene. Recent studies using stable isotope paleoaltimetry techniques have suggested that most of the Altiplano plateau uplift occurred very rapidly during the upper Miocene (~10-6Ma). However, progresses in paleoclimate modeling indicate that estimates of paleoelevation are affected by a changing regional climate. Thus there are still significant uncertainties about the timing of Andean uplift.

We will review the structural evolution of the southern Peruvian Andes and the formation of the Bolivian orocline in relation to the history of the subducting Nazca plate, magmatism and periods of volcanic quiescence, timing and amount of shortening in the Andes.