



Active shortening, intermontane basin formation, and geomorphic evolution in an orogenic plateau: Central Puna Plateau, NW Argentina (24°37'S, 67°03'W)

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The high-elevation Andean Plateau (Altiplano-Puna; 4km) is a first-order morphotectonic province of the Central Andes and constitutes the world's second largest orogenic plateau. While there are many unifying basin characteristics in this region, including internal drainage, semi-arid to arid climate and associated deposition of evaporites, there are notable differences between the northern and southern parts of the plateau. In contrast to the vast basins of the Altiplano (north) and incipient establishment of fluvial connectivity and sediment transport to the foreland, the Puna (south) comprises numerous smaller basins, bordered by reverse-fault bounded ranges up to 6 km high. The plateau is internally drained and fluvial connectivity with the foreland does not exist leading to thick sedimentary basin fills that comprise continental evaporites, volcanic and clastic deposits, typically between 3 and 5 km thick. However, repeated impacts of climate change and superposed tectonic activity in the southern plateau have resulted in further basin differentiation, abandonment or re-arrangement of fluvial networks and impacts on sediment transport.

Here we report evidence for sustained contractional tectonic activity in the Pocitos Basin in the southern plateau. On the western margin of the basin fanning of dipping strata and regraded, steeply inclined gravel-covered pediment surfaces and wind gaps associated with gravel derived from distant sources in the west document late Tertiary to Pleistocene growth of an approximately N-S oriented and N plunging anticline. The growth of the eastern limb of this anticline has caused the isolation of a formerly more extensive basin. In addition, Late Pleistocene and Holocene lake shorelines and lacustrine deposits are tilted eastward along the same structure and InSAR measurements of deformed lake terraces document that the fold is growing. Despite widely reported extensional faulting in the southern Puna, we conclude (1) that the central sectors of the plateau are deformed by active shortening, suggesting that the kinematic changeover from shortening to neotectonic extension on the plateau must be highly disparate in space and time; (2) sustained deformation within the plateau results in a high degree of basin compartmentalization, which impacts the fluvial network and re-distribution of sediments, leading to similar geomorphic and sedimentary processes, although highly disparate in space and time.