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Successive Quaternary shortening and extensional faulting on the southern margin of the Puna Plateau, Northwest Argentina

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On the southern margin of the Puna Plateau, in northwest Argentina, active normal and strike-slip faults accommodate extension, overprinting earlier NW-SE shortening. These relationships, noted elsewhere by other researchers, can be seen all along the topographically and hydrologically defined margin of the Puna Plateau: north of the Fiambala Basin, further east in the Punta Negra region, and further east on the west side of the El Cajon basin. In the Fiambala basin, N-S striking reverse faults place basement over late Pliocene-Quaternary Punaschotter Conglomerate, in a NW-SE direction. Deformation began before and continued during deposition of the conglomerate, and ended before re-incision of the Fiambala basin began. The reverse faults are superseded by a NE striking, steeply NW dipping normal fault with a minimum vertical displacement of 200 m. Tilted ignimbrites in the hanging wall and recent, unconsolidated volcanic ashes indicate the fault is active and has been a depocenter since faulting began. In the Punta Negra region, N-S to NW-SE striking, W to SW dipping thrust faults place basement rocks over Punaschotter Conglomerate. The NW-SE striking segment of one of these faults is reactivated as a normal fault, resulting in a modern depositional basin adjacent to tilted bedrock erosion surface in the footwall, and NE-SW extension. The situation is similar on the west side of the El Cajon basin, with older thrust faults placing basement granites over Punaschotter Conglomerate, which are then partially to totally reactivated in a normal sense.

The southern margin of the Puna Plateau thus experienced a kinematic shift within Plio-Quaternary time from NW-SE directed shortening to active N-S and NE-SW extension. Similar relationships are observed elsewhere on the southern Puna margin, where active E-W, NE-SW or NW-SE normal and strike-slip faults accommodate re-

gional extension. These faults are oblique to and often terminate against or reactivate older, N-S thrust faults. This relationship may be a result of (1) delamination of the mantle lithosphere beneath the Puna Plateau, (2) N-S extensional collapse of the Puna Plateau, (3) lower crustal flow, (4) changes in absolute plate motion, or (5) a combination of these factors. Regardless, the change in extension and shortening directions in this region reflects important, recent aspects of plateau development and may herald a new stage in the evolution of the world's second largest plateau.