



Influence of inherited structures in along-strike segmentation of the foreland basins in the Central Andes

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The Central Andes are characterized by marked along-strike variations in the deformational styles. At 24°S the sedimentary units thin out and reactivated inherited structures with double vergence have produced discrete ranges and deformed the associated sediments, defining the Santa Barbara “broken foreland” system. Farther south (>26.5°S), the Sierras Pampeanas are characterized by high-angle thrust-bounded basement-cored ranges with “pop-up” structures, surrounded by less deformed sediments in the foreland basins. Located at the SE border of the Puna Plateau and in the southern limit of the Santa Barbara system is the 5400 meter-high Sierra Aconquija; the Pipanaco basin is located directly south of this range and in the same along-strike position. This 1000 masl Miocene basin is part of the Sierras Pampeanas province. Between the Sierra Aconquija and the Pipanaco Basin is a NE-trending structure called the Tucuman lineament. We have obtained new apatite U-Th-Sm/He and apatite fission-track data from a 3000 m composite elevation profile across the Tucuman lineament, between the Pipanaco Basin and the Aconquija range. Additionally, stratigraphy descriptions and zircon U-Pb geochronology were conducted on Miocene strata to reconstruct the geometry and precise age of the associated basins. Results indicate that exhumation of the southern end of the Aconquija range started at 10 Ma, and at least three reactivated normal faults with SW and W vergence accommodated at least 6 km of rock uplift between the Sierra Aconquija and the Pipanaco Basin. The geometry of these faults is inherited from the Cretaceous rift basin, which was also controlled by the Tucuman lineament, which we interpret as a long-lived structure that has been active through several tectonic cycles, controlling the geometry of the former sedimentary basin and therefore controlling the deformational style. The presence of inherited structures facilitated the along-strike fragmentation of the former Miocene basin into several foreland basins. Our new data shows how these structures played a key role in the along-strike segmentation of the Central Andes foreland basin and the development of thick-skin deformational styles during the Late Miocene.