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Late Quaternary large-scale folds in intracratonic central Amazonia evidenced from tectonic geomorphology

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In intracratonic South America, the origin of neotectonic activity and its impact on large Amazonian rivers have been of continuous research interest, but the available evidence has been only for extensional structures. This investigation focuses on a megascale (~60,000 km^2) domal relief from central Amazonia (the Juruá dome). The main goal was to verify the relationship of this anomalous relief with a growing fold and determine the origin of the stress field within the context of Andean uplift along with the westward movement of the South American plate. The approach applied here is unprecedented for the Amazon lowlands. This is because it combines evidence of tectonic adjustments of river systems using morphostructural and morphometric analyses from remote sensing imagery, integrated with subsurface data consisting of gravity and magnetic maps, seismic reflection, and well logs. The Juruá dome consists of a broad, rounded, and smooth, convex relief, with altitudes generally not exceeding 110 m developed into Pleistocene-Holocene deposits. The drainage over the dome is arranged concentrically into a broad annular pattern with localized anomalous segments in the Solimões River and various Amazonian tributaries. The results revealed that the Juruá dome evidence the growth of a broad anticline. Non-linear slightly convex χ-profiles of many rivers that cross or contour the dome evidence transient rivers, consistent with a development under growth fold. The fold modified the course of several rivers within the domal relief area, including the Juruá River, which is entrenched along NE-striking faults that released the stress along the fold axis. NE- and NW-striking normal and reverse faults with flower structure geometries are abundant in subsurface and suggest deformation from strike-slip tectonics. Gravity and magnetic data revealed that the fold and many of its associated faults are deep-rooted into basement rocks. The geomorphological and structural data are collectively compatible with a long-term NW-trending maximum horizontal compressive stress-field that is driving basin inversion. This neotectonic activity can be linked to far-field stresses from the pushes from the Andean orogeny and the movement of the South American plate against the North Andean and Nazca plates. Thus, this study can expand our knowledge on the impact of far-field stresses in intracratonic settings transmitted from collisional and constructional tectonic plates. Detecting active folded reliefs in central Amazonia is a new approach that can help characterize the extension and source of compressive far-field stresses in intracratonic northern South America.