FAULT KINEMATICS AND BASIN EVOLUTION IN NORTHERN PERU: IMPLICATIONS FOR TOPOGRAPHIC BARRIERS LINKING THE CENTRAL AND NORTHERN ANDES

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Abstract

The Andes of northern Peru and Ecuador record the final establishment of a fully contiguous Andes, which greatly contributed to the creation of an integrated east-flowing Amazon River, increased biodiversity, and the formation of hydrocarbon traps in the modern foreland basin. Although the precise timing and fault kinematics are well constrained to the north and south, few structural constraints exist in northern Peru. By integrating (U-Th)/He thermochronometry, U-Pb geochronology, detailed mapping, and basin analysis, this study will determine the structural evolution of the single master structure, the Almendro Jumbilla Fault, that controlled vertical rock uplift in northern Peru. Data to be collected will determine how Cenozoic shortening along the Almendro Jumbilla Fault was associated with (1) focused exhumation, (2) provenance shifts, and (3) changes in sedimentary facies within the Bagua Basin, a Permo-Triassic to Cenozoic basin ~40 km west of the fault. Together, these new constraints will allow for the construction of an E-W balanced structural cross section and will provide a critical tie point linking previous observations for the Central Andes (Bolivia) and Northern Andes (Colombia). Integrating new constraints in northern Peru with the existing literature will also facilitate a regional synthesis of north-south (along-strike) variations in deformation timing, structural geometries, and tectonic styles, offering insights into longstanding questions of how shortening is accommodated and how hydrocarbons are housed in convergent settings.

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