

Differential exhumation driven by Tectonic processes in the Abancay deflection (Peruvian Andes)

B. Gérard¹, X. Robert¹, L. Audin¹, C. Gautheron², M. Bernet¹, C. Benavente³, F. Delgado³

¹Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, IRD, IFSTTAR, ISTERre, 38000 Grenoble, France

²GEOPS, Univ. Paris-Sud, CNRS, Université Paris-Saclay, 91405 Orsay, France

³INGEMMET, Instituto Geológico, Minero y Metalúrgico, Lima, Perú

The Abancay deflection (12-13.5°S), forming the northern edge of the Altiplano in the Central Andes of Peru, is a remarkable geomorphologic feature marking the along-strike segmentation of the Andes (Dalmayrac et al., 1980). Little is known about the timing and spatial distribution of exhumation in this peculiar part of the Eastern Cordillera for the last 40 Ma; however, it is characterized by 4 km-high relief and 2 km-deep gorges suggesting significant recent incision. To better constrain the exhumation and incision history of this northern edge of the Altiplano, we present apatite and zircon (U-Th)/He and fission-track data from 6 steep altitudinal profiles collected within the deflection (40 sampling sites). Thermochronology results highlight differential exhumation episodes between the Eastern Cordillera and the Altiplano with young thermochronological ages (<10 Ma) and older ones (>15 Ma) respectively. We processed these ages into QTQt (Gallagher, 2012) and PECUBE (Braun, 2003) to discuss and unravel the exhumation timing, magnitude and settings of this area. Data inversion reveals the (re)activation of the crustal scale Apurimac fault system tilting the entire deflection like a pop-up structure (< 10 Ma) leading to differential exhumation between the Eastern Cordillera and the Altiplano. We speculate that the Abancay deflection, with its “bulls-eye” morphology and the abrupt increase in exhumation rate < 10 Ma, may represent an Andean proto-syntaxis, somewhat similar to the syntaxes described in the Himalaya or Alaska (Zeitler et al., 2001).

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