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New fission-track age constraints on the exhumation of the central Santander Massif: implications for the tectonic evolution of the Northern Andes, Colombia

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Abstract

The Late Cretaceous to late Neogene exhumation history of the central Santander Massif in the Northern Andes of Colombia is controlled by the geodynamic interactions between the Caribbean, South American and Nazca plates, as well as the Neogene collision and accretion of the Panama arc. Slab-breakoff of the Caribbean plate, with the tip of the slab tear presently being located beneath Bucaramanga, and the east-west oriented Caldas tear are the main structures relating seismic activity and Late Miocene to Pleistocene magmatic/hydrothermal activity and associated gold mineralization in the central Santander Massif.

Here we present new apatite (AFT) and zircon fission-track (ZFT) data from 18 samples collected along two profiles in the California – Vetás block (including the Rio Charta), to the south of the Rio Charta fault, and from Bucaramanga to Picacho on the western flank of the central Santander Massif. The fission-track data are used for time-temperature history modeling and for estimating long-term average exhumation rates. The California – Vetás block in the central Santander Massif to the north of the Rio Charta fault cooled rapidly at a rate of about 24°C/Myr between 10 and 5 Ma.

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