

# **Spatial and temporal trends of Cenozoic rock denudation along the Santa Marta range, southern Caribbean margin**

AIRTON N. C. DIAS<sup>1</sup>, MAURICIO PARRA<sup>2</sup>, DAVID M  
CHEW<sup>3</sup>, ANTONIO SAID WEBBE SALES<sup>4</sup> AND VINICIUS  
DE QUEIRÓS PEREIRA<sup>4</sup>

<sup>1</sup>Department of Physics, Chemistry and Mathematics, Federal  
University of Sao Carlos, Sorocaba, Brazil

<sup>2</sup>Institute of Geosciences, University of São Paulo, São Paulo,  
Brazil

<sup>3</sup>Trinity College Dublin

<sup>4</sup>Material Sciences Graduate Program, Federal university of Sao  
Carlos, Sorocaba, Brazil

Presenting Author: diasanc@ufscar.br

New geo-thermochronological data from modern sediments of the Sierra Nevada de Santa Marta (SNSM), a prominent mountain range along the Caribbean-South America plate margin in northern Colombia reveal the patterns of both Cenozoic erosion associated with mountain building, as well as of modern denudation. We applied U-Pb and fission track analyses in detrital apatite in order to document the cooling histories across intermediate (500-420°C) and low temperatures (60-110°C). In addition, patterns of Sr/Y vs  $\Sigma$ LREE contents obtained by LA-ICP-MS inform on the petrogenesis and help identify potential specific sources of apatites. The apatite fission track (AFT) results indicate that the main pulse of exhumation in the northern SNSM occurred in late Oligocene to early Miocene (30-17 Ma). Three additional detrital ages populations likely associated with pulses of exhumation are late Cretaceous (100-66 Ma), Paleocene to Eocene (62-34 Ma), and middle-late Miocene (13-8 Ma). These results show a spatial trend of younger central ages in the northwestern SNSM, consistent with higher exhumation rates described in previous works [1]. Furthermore, all samples include a population of young ages, less than 10 Ma, without a clear spatial trend, which may represent a recent exhumation episode. This hypothesis will be evaluated deeper in the future. Inverse modeling of detrital data are applied to identify cooling patterns and interpret possible triggering mechanism of rock cooling. U-Pb results in detrital apatites include Neoproterozoic (600-1000 Ma), Permo-Triassic (300-200 Ma), and Eocene-Oligocene (50-30 Ma), and remarkably, a dominant Jurassic (200-150 Ma) age population. The latter is consistent with the crystallization age of several acidic plutonic bodies of the region. The Sr/Y vs  $\Sigma$ LREE reveal that Cenozoic apatites are dominantly low- and medium-grade metamorphic grains, whereas older apatites are dominantly sourced by I-type and S-type granitoids, with a minor occurrence of some Triassic and Jurassic high-grade metamorphic species.

[1] Parra, M. et al., (2020). In: Gómez, J. & Mateus-Zabala, D. (editors), *The Geology of Colombia, Volume 3 Paleogene – Neogene*. Servicio Geológico Colombiano, Publicaciones