



## What controls erosion (exhumation) along the humid eastern margin of the Northern Andes? Insights from U-Th/He thermochronology

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The relative controls of rock uplift (tectonics) and precipitation (climate) on the exhumation of earth's rocks in tectonically active mountain ranges are still debated. In low latitude tropical regions where rates of precipitation and the amount of vegetation cover are higher, more data is required to test the relative contribution of these factors to the evolution of orogenic topography. To contribute to this debate, cooling ages were derived for 25 bedrock and four detrital samples using the apatite (U-Th-Sm)/He (AHe) low temperature thermochronometer. AHe ages are reported along a ~450-km-wide swath on the eastern flank of the Northern Andes in Colombia (South America). The AHe cooling ages, that range from 2.5 Ma to 17 Ma, are compared to precipitation rates and geomorphic parameters in order to discern the relative importance of climate and/or tectonics on exhumation. Along the transect, AHe cooling ages are poorly correlated with the rates of precipitation but show a good correlation with landscape parameters such as average hillslope and average channel steepness. Moreover, young AHe cooling ages coincide with areas where deformation is mainly compressional; older AHe cooling ages are found in the middle part of the study area where strike-slip deformation dominates. The spatial distribution of the new AHe cooling ages suggests that in mountainous regions, in this case with high precipitation rates (> 1500 mm/yr), denudation is mainly controlled by the rate of vertical advection of material via tectonic processes. The spatial variations in precipitation may only have a second-order role in modulating exhumation rates.

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