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On the lagtime between initial deformation and rock cooling in Orogens: An example from the northern Andes

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RESUMO: The growth of ancient orogens is recorded in syn-orogenic sediments in foreland basins and can be reconstructed by studying their provenance. The southern Eastern Cordillera and the adjacent Putumayo retro-arc foreland basin synorogenic sediments in the southern Colombian Andes show a Late Maastrichtian to Paleocene (75-72) polarity reversal in detrital zircon U-Pb ages corresponding to the shift sources in the Amazonian Craton to Andean arc sources. These provenance changes had been associated with the early stages of the orogenic construction and are often undetectable through low-temperature thermochronometry. We present 30-20 Ma apatite fission-track and 5- 8 Ma apatite (U-Th)/He ages retrieved from the Jurassic subvolcanic arc rocks along the easternmost deformation front of the southern Colombian Andes. Thermal modeling constrains the onset of cooling as Eocene (50-40 Ma). This 30-20 myr discrepancy between the estimates of the initial uplift and thermal cooling exhumation result from slow initial exhumation, at rates, insufficient to cause measurable cooling with available thermochronometric methods. Oligocene to recent uplift occurred at 4,4-5,0 °C/km. A similar pattern of cooling lagging behind the initial minor uplift has been documented elsewhere in the northern sector of Eastern Cordillera.

PALAVRAS-CHAVE: PROVENANCE ANALYSIS, THERMOCHRONOLOGY, FORELAND BASIN.