

Tracing thermal history of the central Patagonian Andes with detrital multi-dating of foreland basin deposits

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Detrital thermochronology in wide foreland basins documents erosion of diverse sediment source areas along an adjacent orogen through time. This study presents new detrital apatite thermochronology data (U-Pb and fission tracks) from the whole central Patagonian foreland (44°S – 48 °S) that identify at first a persistent volcanic input from Oligocene to late Miocene. The apatite U-Pb dating was effective to discriminate AFT ages related to either the exhumation of the source or the volcanic input, which can easily overtake the exhumation signal along the Patagonian Andes. Lag time, calculated from the youngest AFT component (~30 Ma) and stratigraphically constrained with new zircon U-Pb ages, indicates that the entire central Patagonian Cordillera was probably in steady-state erosion at ca. 30 Ma until the resumption of shortening during the late Neogene. Furthermore, these new detrital thermochronological data emphasize a signal of low rate post-orogenic erosional processes (0.1 – 0.4 km/Ma) corresponding to a significant unroofing of 2 – 4 km between the Oligocene and the late Miocene; a period characterized by a relative tectonic quiescence, subsequent to the late Early Cretaceous – middle Eocene interval in which significant deformation took place.

This study identifies sediment contribution from different source areas to the central Patagonian foreland and constrains the timing and rates of the post-orogenic cooling along the central Patagonian Andes, thus defining great sediment sourcing from the Andes in spite of tectonic quiescence.

Mots-clés : detrital thermochronology, double dating, lag time, central Patagonia

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