

## **A Pliocene Climatic Proxy for Abrupt Gain of Denudation in Orogens: Example and Implications from the Central Andes – Peru**

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The high elevation of the active mountain belts represents a balance between the tectonic processes that create topography and erosional surface processes that destroy it. The understanding how internal (tectonic) forces act to shape the Earth's surface requires knowledge of long-term changes whereas few studies have shown convincing correlations between observable indices of climatic and tectonic processes at the scale of an orogen. The Andean Chain is 8000 kms long along the western edge of the South American plate and results from the ENE convergence between the subducting oceanic Nazca and South American plates. Between 12 and 15°S the Central Andes are constituted of two different mountain ranges, the Eastern and Western Cordillera, each having elevation up to 6000 m separated by the 3800m high Altiplano. To better constrain the orogenic growth of the Andean chain by identifying and quantifying episodes of vertical movements, we produced and compiled Fission-Track thermochronological ages from the Eastern Cordillera and Sub-Andean Zone. This region was void of such data even though varying climatic conditions are there ideal to debate the relative importance of climate and far-field tectonism in influencing denudation. Patterns of apatite fission-track apparent ages with elevation as well as compilation from far east oil datasets indicate a ten-fold increase in apparent denudation rate between 4 Ma and today. The time frame for this change corresponds to that of global climate cooling since the Pliocene associated with the onset of widespread glaciation and the development of El Niño like conditions. There is no information for important modification in tectonics of the Andes with the exception of the approaching nail of the buoyant Nazca ridge below the orogen over this interval. This suggests a mostly climatic operator for enhanced erosion in the Eastern Andes since the Pliocene.

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