



Tectonic or Climate Control on Mountain Erosion: the Answer might be in the Sea

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There is a longstanding discussion about the roles of tectonics and climate in mountain erosion. To answer this question mountain erosion has to be quantified and linked either to tectonic or climatic forcing factors. There are many ways to assess mountain erosion. As this is a very slow process only geological data provide information spanning time spans long enough to allow for significant denudation. Such longer time spans are covered e.g. by often used thermochronometric methods providing erosion rates over several hundreds of thousands to millions of years. However, on these time scales the effects of major climatic changes such as glacial/interglacial cycles are smoothed and, consequently, the impact of climate is hard to assess. Here we present a different approach by analysing the deposition of sediments, which are mostly terrigenous in origin, along the Chilean continental margin right off the Andes. With elevations up to >6 km the Andes form a pronounced topographic barrier to the atmospheric circulation. Especially in their southern part they block the southern westerlies resulting in one of the most pronounced orographic rain settings in the world. From this region in the south to the Atacama desert in the north of Chile a very strong precipitation gradient exists. As known for long time, this precipitation gradient is mirrored in the amount of Cenozoic sediments deposited along the Chilean margin. New investigations show now that also glacial/interglacial precipitation changes in the region are reflected in the sedimentation rates along the Chilean margin. These results clearly point to a dominant role of climate in modulating erosion rates in the Andes.