



Latitudinal variations in erosion rates due to shifts in Southerly Westerlies during glacial maxima

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Glaciation globally affected the shape of mountain ranges and the rates at which they erode on Earth. However, the link between climate and glacial erosion processes remains unclear. The nearly 2000 km north-south extend of Patagonian Andes provides a unique opportunity to study the long term relationship between climate and erosion. Here we perform a formal analysis of an extensive set of thermochronological data collected in Patagonia and exploit its latitudinal distribution to investigate the role climate played on modulating glacial erosion rates. We find that the erosion rates are higher in northern Patagonia and peak about 44 °S during the last 2 Myr. The position of this maximum in erosion rates coincides with the location of maximum precipitation and storm track during glacial maxima. Using an ice-sheet model, we demonstrate that high precipitation rates lead to enhanced ice flux and ice sliding velocity and, in turn, glacial erosion rates. These results imply that latitudinal shifts in mid-latitude Westerlies towards the equator during global cooling may be responsible for increased erosion in mid-latitude regions on Earth.