

A First Look at the Dust Production Pathways of the Southern South American Pleistocene Loess Using Detrital Zircon Geochronology

Bruner, A.
Pullen, A.

Abstract

Quaternary dust production in southern South America is of particular interest because of its impacts on the global radiative forcing budget and on ocean chemistry. Characterizing dust production and delivery pathways is fundamental for understanding how dust-climate feedbacks in this region operate. A Holocene centered view of South American dust production emphasizes hyper arid basins on the Puna-Altiplano Plateau and the glaciated terrains of Patagonia as primary dust sources. Applying this Holocene-centric view to Pleistocene glacial-stadial period dust production is problematic as it largely ignores how glacial-inter-glacial variability impacts surficial processes and regional humidity, and thus dust production and transport. We sampled fluvial, loess and eolian dune deposits from central Argentina for U-Pb detrital zircon analysis in order better understand Pleistocene-Holocene dust production pathways and assess the relative importance of Andean rivers and dunes fields of the Pampa Plains as dust sources. Our data indicate that rivers draining the Andes south of the Pampa Plains and large vegetation-stabilized dune fields could have played a fundamental role in late Pleistocene glacial and stadial period dust production. If valid, dust production in this manner is at odds with the Holocene-centric view of South American dust production.

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