

Investigating mineral dust in the southern latitudes and its paleoclimatic effects

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Abstract

Atmospheric aerosols influence the global radiation budget and the ocean's productivity, and variations in their load and distribution are directly linked to climate change. Wind-blown dust can be used to trace past and present atmospheric circulation patterns, through the study of its geographical provenance, its spatial distribution, and temporal variability. Antarctic and marine records indicate that Patagonia has been a principal source of dust for the southern latitudes, particularly during glacial times. The aim of this project is to collect a suite of samples that will help unravel the role of glaciations in dust supply by defining the dust sources from Southern South America that are recorded in the southern latitudes, and comparing them with the sinks or final resting places of the dust. We propose to sample material from potential dust source areas in Patagonia and define their geochemical signatures using Sr, Nd, Pb, Hf and He isotopes, and major and trace elements. At the same time, we are analyzing, using the same proxies, the dust component from well-dated lacustrine cores from Patagonia and a marine core from the South Atlantic. Comparing the results from these different settings will allow for a better understanding of the changes in dust supply and provenance through time, and provide a strong set of data to be leveraged into an externally funded project. We thereby seek financial support from the Climate Center to cover a first field campaign in Patagonia specifically intended for such efforts, led by C. Recasens as part of her postdoctoral research project at LDEO.