Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.15943

Late-Pleistocene Paleodust Records from the Guliya Ice Cap (Northwestern Tibet)

DR. EMILIE BEAUDON[1], ELIZABETH M. GRIFFITH[1], JULIA SHEETS[1], HOWARD SCHER[2], MICHAEL BIZIMIS[2], JIM SEXTON[2], ROXANA SIERRA-HERNÁNDEZ[1], ELLEN MOSLEY-THOMPSON[1] AND LONNIE G. THOMPSON[1]

[1]The Ohio State University

[2]University of South Carolina

Presenting Author: beaudon.1@osu.edu

Pre-Holocene data are too sparse to constrain the composition of aerosols in climate models for the remote inner Asian continent despite that it is Earth's second largest source area for dust. To reduce climate model uncertainties pertaining to mineral aerosols' feedbacks on radiative forcing, this study provides the first datasets of the mineralogical and geochemical composition of aeolian dust preserved in two Guliya ice cores (Kunlun Mountains, Tibet, China). The dust composition is used to trace its geographical source and infer past environmental changes and changing atmospheric influences on the NW Tibetan Plateau. The sensitivity of the Westerlies and the Indian Monsoon system which are associated with abrupt changes in the chemical signatures of the dust is assessed.

The mineralogical, elemental, and Sr-Nd radiogenic signatures of the aeolian dust particles sampled along the two Guliya ice cores are characterized to identify the dust lithological and geographical sources, trace the long-term variability of paleo-hydro-climatic conditions prevailing in NW Tibet, and provide theoretical knowledge on how Holocene paleoenvironmental records are entrained into the ice at the Guliya summit site compared to that at the Guliya plateau site.

Late Pleistocene Sr-Nd isotopes time series extracted from the two Guliya drilling sites are presented. A particular focus is placed on the changing composition of dust through stadial/interstadial transitions recorded in the Guliya core, and on the different stratigraphic features visible in the ice (including the grey clay layers in the oldest part of the record). The results are interpreted in light of the composition of new Potential Source Area (PSA) samples and on previously published regional loess records.