Millennial-Scale Climate Change in the Valles Caldera Sediment Core During Glacial Period MIS 12

Raven Longwolf Alcott and Peter Fawcett

1University of New Mexico, Earth and Planetary Sciences Department, raven.alcott063@gmail.com

The mid-Pleistocene sedimentary record from the Valles Caldera preserved 14 millennial-scale climate oscillations that were assessed for Total Organic Carbon (TOC), Total Organic Nitrogen (TON), carbon isotopes, nitrogen isotopes and C/N ratios. The in-depth geochemical analysis of these sediments helped determine the relative proportions of terrestrial (higher C/N values) to aquatic productivity (lower C/N values) contributions to the lacustrine organic matter over the abrupt climate change events. The warmer to colder climate oscillations during the MIS 12 glacial period allowed an assessment of changes in productivity and what the relative contributions were from land plants vs. aquatic algae. Meanwhile, examination of the carbon isotopes helped determine whether there were more C4 grasses (which prefer warmer and drier conditions) around the lake during the brief warmer episodes. Data collected and analyzed showed that organic carbon was algae derived and that C4 grasses did not occur during brief warm episodes in the glacial period. Further investigation of the abrupt climate changes using lake sediments can provide a window to the past that allows us better to understand a future that will be heavily influenced by anthropogenic warming.

References:


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paleoclimate, lake sediments, climate change