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Glacial-Interglacial climatic shifts during the mid-Pleistocene in northern New Mexico, USA: inferences fromδ^{13}C and δD analyses of lacustrine organic matter

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An 82 m long core containing 75 m of lacustrine sediments was retrieved from Valles Caldera, located in Northern New Mexico, USA. The age of the sediments was constrained by Ar-Ar dating of a primary tephra layer from the base of the core in combination with correlation to the deep-sea marine isotope stage (MIS) record along the length of the core. The core spans from 350 k YBP to 552 k YBP covering two glacial-interglacial stages, from MIS 11 to MIS 14 and part of MIS 10. Higher productivity during interglacial periods was evidenced by marked increases in total organic carbon (TOC) and C/N ratios at the onset of these stages, with lowest values observed during glacial periods. TOC ranged overall from <1% to 7% and C/N ratios from <2 to 11. TOC is particularly high during the long interglacial MIS 11. δ^{13}C values of bulk organic matter (siderite free) provide insight into vegetation changes and lake productivity. δ^{13}C values ranged from -28 permil to -20 permil and remained less negative overall during interglacial times. This could be the result of mainly two factors: 1) different species of dominant vegetation surrounding the lake (e.g. C3 versus C4) and 2) higher algal productivity within the lake. D/H ratios of sedimentary *n*-alkanes can be used to infer the D/H ratio of precipitation. Preliminary data on the abundance of *n*-alkanes down-core indicate increased terrestrial productivity during interglacial

periods, in agreement with TOC data and C/N ratios. Ongoing work on the D/H ratios of terrestrial- and aquatic-derived *n*-alkanes will provide insight into the sources of meteoric water to the region during the climatic stages, i.e. relative contributions of summer monsoonal (from the Gulfs of Mexico and California) vs. winter frontal precipitation (from the North Pacific).