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A new carbonate clumped isotope (Δ_{47}) record for an early Paleogene high-elevation lake basin in the Western U.S.

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Paleogene paleoclimate records in the Western U.S. are important for understanding the response of terrestrial environments to greenhouse climate intervals. The Sheep Pass Formation type section in east-central Nevada is unique compared to other Western U.S. lacustrine strata because it preserves carbonates and microbialites that formed in a *high-elevation* lake basin from the latest Cretaceous to middle Eocene, a time interval spanning the K-Pg mass extinction, several hyperthermal climate events, and significant global carbon cycle perturbations. Here we present new carbonate clumped isotope (Δ_{47}) temperatures and $\delta^{18}O_{water}$ values, which serve as the most comprehensive and sedimentologically-contextualized geochemical paleoclimate record in the >1-km-thick Sheep Pass Formation type section. We followed a thorough process for interrogating the role of diagenesis, contamination, and/or disequilibrium in the Δ_{47} values generated; we qualitatively screened for primary versus altered sample fabrics through optical and cathodoluminescence microscopy, and established which samples showed analytical signs of contamination or disequilibrium, thus warranting further investigation (e.g., requiring double cleaning or high precision analyses). Our results suggest that the majority of samples, regardless of facies, fall in the earth surface temperature range (~10-40°C), with most in a narrower range between ~15-30°C. Double cleaning samples with initial Δ_{47}-temperatures higher than the earth surface range confirmed that hotter temperatures appear to be an artifact of contamination. Overall, most samples, save a few, look to be equilibrium values. We also constrained the Δ_{47}-temperatures and $\delta^{18}O_{water}$ values within sedimentological intervals that preserved noticeable environmental change; these include a microbialite-dominated interval, as well as several intervals with sedimentological evidence for increased evaporation and/or water chemistry shifts. Ultimately, these data complement ongoing efforts to characterize the sedimentology, geochronology, and stable isotope geochemistry of the Sheep Pass Formation type section in order to develop a new, high-elevation late Cretaceous to middle Eocene lacustrine paleoclimate record in the Western U.S.