

Application of high precision U/Th dating to constraining paleo-hydrological change recorded in Mono Lake sediments

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Abstract

Constraining the precise timing of Mono Lake level changes is necessary for our understanding of the hydroclimatic history of the lake basin and how it fits into global records of climate change. Different approaches have been applied to establishing the chronology of the Mono Lake sediments, including ¹⁴C, Ar/Ar and U/Th dating, and geomagnetic paleointensity correlation. However, the published radio-isotopic results are complicated, and the age model of the sediments remains controversial. We recently discovered two visually clean carbonate samples from the Mono Basin and found that their very low initial Th contents allowed precise and reproducible ages. We propose to search for more high quality carbonate samples from the basin, within contexts that allow constraining the lake level history, and perform high-precision U/Th dating on the samples. The results will help to refine the history of the lake level change in a global framework and if the right sample can be found, it will allow a quantitative test the vigorous debate whether Mono Lake Excursion is a local expression of the Laschamp Excursion or a separate, younger, event.