

Chronology of High Lake Levels at Mono Lake during the Last Glacial Cycle from ^{14}C and $^{40}\text{Ar}/^{39}\text{Ar}$ chronology

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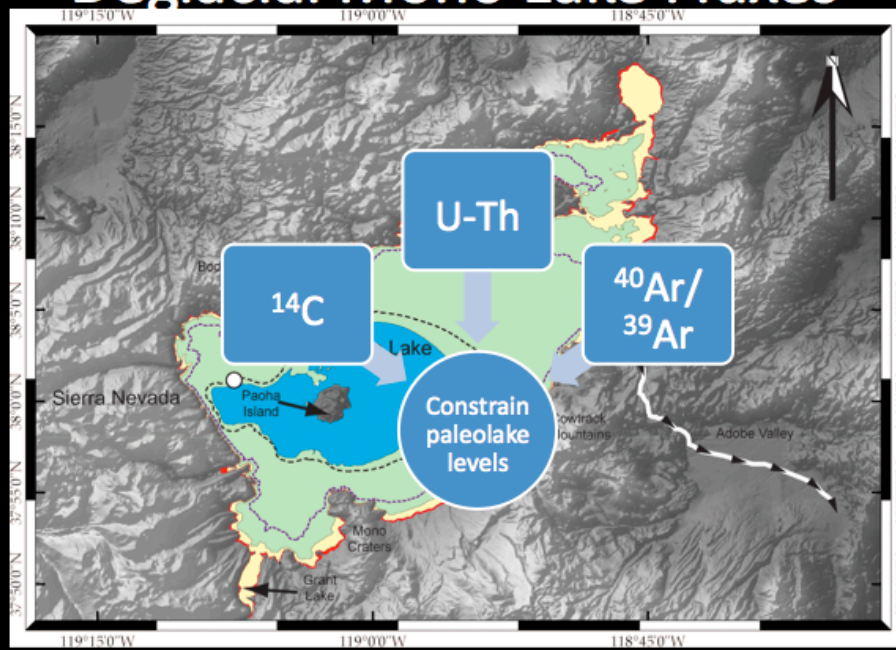
Mono Lake (Figure 1), the western-most of the Quaternary Great Basin lakes, shows evidence for past lake level fluxes from basin-wide terraces (Figure 2A, Figure 2B, and Figure 2C). Currently, the lake spills at 2196 m, and the highest level from the last glacial cycle is 2155 m (current level is 1945 m). Further evidence of high lake levels during the last glacial cycle comes from the distribution of tufa towers and of deep lake sediments from the Wilson Creek Formation (WCF).

Based on the mapped distribution of the WCF (Lajoie, 1968), the highest lake level of the last glacial cycle was attained during the deposition of volcanic ash package A (rhyolitic ashes 1, 3 and 4, and basaltic ash 2). The high lake levels during package A follow an anomalous dry period observed in the WCF stratigraphy between Ash 4 and Ash 5 (23.1 ± 1.2 ka; Chen et al. 1996). $^{40}\text{Ar}/^{39}\text{Ar}$ measurements of sanidine crystals from Ash 4 yield a minimum age population of 16.6 ± 0.7 ka, thus constraining the beginning of the lake level rise during Package A.

Package A is capped by a layer of lacustrine silt containing fans of thinolite crystals, which are pseudomorphs from the metastable cold water mineral ikaite. Six new ^{14}C measurements on thinolite crystals from the top of the WCF yield ages of ~ 10.5 - 10.7 ^{14}C kyr BP. This result is consistent with the estimated thinolite ^{14}C age of ~ 9.5 ^{14}C kyr BP based on plant macrofossils from a core in the western embayment (Davis, 1999) if the reservoir age was ~ 1 kyr in the lake as it is today. If WCF thinolite can be correlated to the thinolite found in the core, an extensive thinolite-forming event occurred during the Younger Dryas (11.5-12.9 ka).

In addition to the stratigraphic occurrence of thinolite, numerous tufa mounds with this texture have also been documented at different elevations. To test if all the thinolite formed in the Mono Basin occurred during the Younger Dryas, we measured ^{14}C ages from two thinolitic tufa mounds. One mound (2081 m) from the NE Mono Basin yielded an age of 12.8 ^{14}C kyr BP. A second mound (1955 m) just east of Black Point contains 19 layers, which yielded ^{14}C ages indicating a long interval of tufa formation during much of the last glacial interval. If all the outcrops of thinolite were coeval, the thinolite ^{14}C ages may indicate potential complications, which need further study.

Deglacial Mono Lake Fluxes



Modern, Younger Dryas?, Late Pleistocene?, Stage 6?

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