

## Boron Isotope Budget in the Mono Basin, Eastern California USA

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Mono Lake is a hydrologically closed lake in the center of the Mono Basin with a relatively simple hydrologic budget that is controlled by inputs from streams, groundwater springs, and limited precipitation, with water loss to evaporation or sublimation. Previous studies have examined Li, Ca, and Sr isotope budgets to the basin [1,2,3], providing a firm foundation from which to understand boron isotope systematics. Evaporative concentration of the lake waters results in extremely high salinity and alkalinity with one of the highest reported boron concentrations in terrestrial waters at approximately 450 ppm and a  $\delta^{11}\text{B}$  of +7‰. Although creeks are volumetrically the most important influx of waters to Mono Lake, they have the lowest boron concentrations at ~ 2 ppb with a  $\delta^{11}\text{B}$  of +7‰. Warm springs have variable concentrations ranging from +3 to +7‰ with the highest concentration springs having  $\delta^{11}\text{B}$  similar to the Mono Lake water. Cold springs have a range of  $\delta^{11}\text{B}$  from - 4 to -10‰ with concentrations variable but mostly lower than 1 ppm boron. The  $\delta^{11}\text{B}$  offset of at least 5‰ from the combined sources to the lake water suggests that, like seawater, the boron isotopic composition of the lake may be dominated by preferential removal of light boron as borate. The extreme difference in concentration and measured isotopic composition of the water sources suggest that boron fractionation likely occurs prior to the water sources entering the lake. We suggest that the famous tufa towers are a representation of a 'chemical delta' that alters the boron isotope composition of the source fluids prior to delivery to the lake.

[1] Tomascak *et al.* (2003) *GCA* 67 (4):601-611. [2] Nielson and DePaolo (2013) *GCA* 118:276-294. [3] Neumann and Dreiss (1995) *Water Resources Research* 31 (12):3183-3193