



New constraints on the disappearance of archaeocyathan reefs in the western United States

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Archaeocyathan reefs have been well described from the western United States, particularly in the lower Cambrian stratigraphy in the White-Inyo Mountains of California and Esmeralda County, Nevada. Reefs in the Lower Cambrian Harkless Formation, argued to be some of the youngest archaeocyathan reefs in the world, are a consortium of archaeocyaths and microbial fabrics, with rare occurrences of early Cambrian corallomorphs. Although archaeocyathan reefs are not known from any stratigraphic unit that overlies the Harkless Formation, it remains unknown how and when these reefs finally disappeared from western Laurentia, and if this timing matches with the global record of their disappearance. Here, we show the first evidence for a negative carbon isotope excursion stratigraphically above the uppermost Harkless archaeocyathan reefs, preserved in ooid and quartz-rich carbonates that overlie the reefs. At all measured localities, carbon isotopes veer from 0‰, to more negative values, reaching the lowest value of -4‰ at one locality, and then recovering to more positive values (1‰) in overlying carbonates. We interpret this as the negative AECE excursion (archaeocyath extinction carbon isotope excursion); the presence of this excursion in strata within 30 m of the last archaeocyathan reefs in the Harkless Formation suggests that the global extinction excursion is present here and links the disappearance of archaeocyathan reefs from the western United States with their global demise.