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Joint 56th Annual North-Central/ 71st Annual Southeastern Section Meeting - 2022

Paper No. 19-1

Presentation Time: 1:30 PM-5:30 PM

EARLY MISSISSIPPIAN CALCIUM ISOTOPE STRATIGRAPHY AND IMPLICATIONS FOR CONDITIONS OF CARBONATE DEPOSITION

HABER, Peter, SALTZMAN, Matthew, GRIFFITH, Elizabeth M. and ADIATMA, Yoseph, School of Earth Sciences, The Ohio State University, 125 S Oval Mall, Columbus, OH 43210

A +5.5 ‰ to +7.0 ‰ magnitude $\delta^{13}\text{C}$ excursion, known as the Kinderhookian Osagean Boundary Excursion or KOBE, is preserved in lower Mississippian strata (during the Tournasian age, ca. 353 Ma) in North America, Europe, and East Asia. This has been linked to an interval of cooling as part of a long-term shift from greenhouse to icehouse conditions. One proposed cause of the cooling is the rise of vascular land plants which increased silicate weathering, CO_2 consumption, and phosphorus delivery to the oceans, which enhanced primary production and burial of organic matter to produce the $\delta^{13}\text{C}$ excursion. However, the link between burial of organic matter and $\delta^{13}\text{C}$ remains unclear because potential local controls on $\delta^{13}\text{C}$, which include diagenetic or mineralogic controls in shallow platform carbonates, can potentially decouple the shallow platform $\delta^{13}\text{C}$ signal from the primary global DIC. This study pairs $\delta^{44}\text{Ca}$ data with Sr/Ca and $\delta^{13}\text{C}$ to examine the possible diagenetic and mineralogic (calcite or aragonite) controls on the magnitude of the $\delta^{13}\text{C}$ excursion. We present a bulk carbonate $\delta^{44/40}\text{Ca}$ record across this lower Mississippian stratigraphic interval from the Confusion Range, Utah. The beginning and end of the $\delta^{13}\text{C}$ excursion have identical values of $\delta^{44/40}\text{Ca}$ (relative to the SRM915a standard) around 0.80 ‰ and similar Sr/Ca while $\delta^{13}\text{C}$ values shift from 2.64 to -0.02 ‰, suggesting there is not covariation associated with diagenetic or mineralogic controls. Future work will provide higher resolution $\delta^{44}\text{Ca}$ data across this interval, along with Sr/Ca to pair with previously measured $\delta^{13}\text{C}$.

Session No. 19--Booth# 30

[T5. Development and Application of Geochemical Proxies to Paleoclimate Studies \(Posters\)](#)

Thursday, 7 April 2022: 1:30 PM-5:30 PM

Junior Ballroom B (Duke Energy Convention Center)

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