

EVALUATING GEOCHEMICAL VARIATION ACROSS MODERN AND ANCIENT CARBONATE PLATFORMS AND THE IMPLICATIONS FOR THE USE OF TRACE ELEMENTS AS PALEOENVIRONMENTAL PROXIES

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ABSTRACT

Trace elements preserved in marine carbonates have been used to address paleoecological and diagenetic questions and offer great promise to expand our knowledge of past environments and global conditions. They do, however, rest upon several underlying assumptions that have not been fully tested. Several questions that need to be addressed are: If used as a local proxy, do the preserved elements of interest represent a one-to-one proxy or are they being significantly influenced by other environmental or diagenetic processes? If the element is to be used as a global proxy, for example to quantify the extent of deposition under anoxic conditions, is the preserved signal truly representative of global conditions or does it contain both a global and local signal? To what extent does the perseveration of carbonates within a restricted marine setting with limited exchange with the global ocean effect the preserved elemental signal?

I will address these questions by examining variations in several elements across a modern carbonate platform in the Bahamas and two in the Paleozoic. The samples examined will allow for broad geographical coverage at discrete points in time as well as depth effects during early diagenesis. I will also carefully quantify in what phase within a bulk carbonate rock these elements reside and what effect different laboratory extraction methodologies have on these elements. The results of this study will allow for a more complete understanding of the use of such proxies as well as improve the methodologies involved in their use.

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