Investigating the Role of Low Oxygen and Early Diagenetic Carbonate Preceding and During the End-Triassic Mass Extinction Event

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ABSTRACT

The end-Triassic mass extinction (ETE) is critical for understanding the evolution of life on Earth. Though it has been understudied compared to other mass extinctions it is ideal for understanding geochemical transitions in the ocean during major carbon cycle perturbations associated with the eruption of the Central Atlantic Magmatic Province (CAMP) ~201.6 Mya. My high-resolution study of the pre-extinction interval at Ferguson Hill, Nevada reveals that stressed conditions, as evidenced by anoxic sediments, depauperate fauna, and an unusual carbonate system, began well before global biotic collapse coinciding with the CAMP eruption. Although multiple authors have reported low oxygen conditions at the ETE, I documented for the first time the link between early diagenetic carbonates (in the form of preserved porosity) and anoxic sediments. Further research in other parts of the Panthalassic basin can elucidate the processes responsible for the formation of early diagenetic cementation, determine if there is a causal link to the presence of low oxygen sediments, establish if these processes had regional or global extent, and highlight their role during major biotic crises. Upper Rhaetian outcrops at Williston Lake, Canada provide an ideal setting to test these questions. Sections will be measured and their lithology, stratigraphy, ichnofabric indices, Th/U ratio and faunal content will be characterized. Rock samples will be collected every 40 cm for petrographic and geochemical (TOC%, δ^{13}Corg, δ^{13}Ccarb) analysis further undertaken in the lab. This study has broad implications for understanding carbon cycling, the formation of marine anoxic sediments and early diagenetic cementation at a time of major biotic crises in Earth history.

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