PALEOTHERMOMETRY OF LACUSTRINE ENVIRONMENTS DURING THE TRIASSIC-JURASSIC MASS EXTINCTION (FUNDY BASIN, NOVA SCOTIA): INSIGHTS FROM CARBONATE CLUMPED ISOTOPE ANALYSIS

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Modern ecological changes associated with rising global temperatures have increased interest in mass extinctions related to warming events. Most ancient temperature proxies across extinction events come from ocean basins, while non-marine environments remain relatively uninvestigated. This study will take clumped isotope measurements from lacustrine stromatolites within the Fundy Basin of Nova Scotia to provide the first non-marine temperature proxies during the Triassic-Jurassic mass extinction. New clumped isotope methods overcome the problems inherent in traditional d18O paleothermometers, which assume the initial isotopic composition of fluids during carbonate precipitation, a parameter essentially unknown for ancient lacustrine systems. Within more recent lakes, carbonate clumped isotopes from stromatolite laminae provide detailed paleo-thermometry data, but these methods have not yet been applied to lake systems during mass extinctions. The rocks have not experienced burial temperatures greater than 50 degrees C, and thus are excellent candidates for clumped isotope paleothermometry. Temperatures will be evaluated by taking carbonate samples from individual stromatolite laminae, dissolving these samples in phosphoric acid, and measuring the isotopic mass of the subsequent CO_2 gas. A higher ratio of heavy carbon and oxygen isotopes within individual CO_2 molecules will indicate cooler temperatures during carbonate precipitation. Analyzing these temperatures in subsequent stromatolite laminae will provide a detailed progression of temperature over time within the lake basin. Studies such as this will not only fill in missing climate data over key transitions in Earth's history, but comparing temperatures with associated biotic shifts can help model future changes in non-marine environments during warming climates.

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