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Fe isotopes response during OAE 2 in the Western Interior seaway

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Iron is a redox sensitive trace metal whose concentration in sediments increases under anoxic conditions. In anoxic setting, accumulation of Fe is expected to be higher in part because Fe(II) minerals, such as pyrite, precipitate authigenically when Fe(III)(hydr)oxides are reduced via microbially mediated pathways or abiotically. Since OAE 2 involves the emplacement of Large Igneous province (LIPs) whose increase and expansion of hydrothermal activity in the ocean during this time resulted in abundant delivery of trace elements in the proto–North Atlantic basin. Hence, not only will the accumulation of trace metals such as Fe, Ni, Cu, Cr, Zn be expected to increase during OAE 2, but their accumulation can be used to track the redox changes in the ocean during this interval as well as fingerprint the source of iron into the ocean. However, interpretation of seawater Fe isotope values because of expansion of anoxia via increase hydrothermal activity during OAE 2 isn't always straight forward. Previous study on Fe isotopes from sections in the proto-North Atlantic during OAE 2 had difficulty in distinguishing between Fe from hydrothermal or other sources, except for shuttling, thus warranting the need for more studies on this proxy during OAE 2. In this study, we examine the Fe isotope analysis from Iona 1 core, a well calibrated section with a suite of other volcanic proxies as such as $^{187}Os/^{188}Os$, $^{87}Sr/^{86}Sr$ as well as $\delta^{53}Cr$ previously measured on the same samples, including Zn isotopes from other studies to elucidate the iron response during OAE 2 in the WIS and determine whether iron in the trace metal enriched interval can be isotopically traced to a hydrothermal source. If a hydrothermal source can be demonstrated for iron, then many of the other co-enriched metals may be inferred to have a hydrothermal source as well, though scavenging from seawater inventories is also possible.