

Global warming leads to Early Triassic nutrient stress across northern Pangea

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Summary

The largest extinction in Earth history, in the latest Permian, was followed throughout most of the Early Triassic by a prolonged period of ecologic recovery. What factors delayed biotic recovery are still under debate and partly revolve around impacts of global warming on primary marine productivity. We examined N isotope records from the Smith Creek section on Ellesmere Islands and the Festningen section on Spitsbergen to examine changes in nutrient availability through the Early to Middle Triassic along the northern margin of Pangea. Our results show progressive decline in N availability throughout the Griesbachian, leading to severe nutrient limitations through the remainder of the Early Triassic, until returning to a highly productive continental margin in Middle Triassic time. These results are consistent with other studies from northern and western Pangea and thus show regional nutrient limitations occurred in what should have been the main zone of marine primary productivity. Such nutrient limitation likely stressed primary production and consequently contributed to prolonged marine recovery. We suggest this was driven by high ocean temperatures depressing the marine nutricline.