

Pulses of ocean acidification at the Triassic Jurassic boundary recorded by boron isotopes

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Ocean acidification driven by the emplacement of the Central Atlantic Magmatic Province (CAMP) has been suggested as a kill mechanism for the end-Triassic mass extinction. Although preferential extinction of heavily calcified groups and changes in shallow carbonate deposition hint at acidification as a causal mechanism, these observations can also result from other factors. Furthermore, depending on the rates of volcanic input and the efficiency of buffering by the carbonate system, volcanic emissions may not result in appreciable carbonate undersaturation. Here we present the first pH reconstruction over the Triassic-Jurassic boundary to test whether ocean acidification was a feature of environmental change at this time. These data, generated using the boron isotope composition of well-preserved fossil oyster shells, reveal a pronounced acidification pulse in the aftermath of the end-Triassic extinction, coincident with input of isotopically light carbon and ocean warming. This signal is consistent with ocean acidification due to pulses of volcanic carbon input from the CAMP, supporting the hypothesis that ocean acidification was an important component of large igneous province-associated mass extinctions.