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End-Triassic Calcification Crisis and Blooms of organic-walled "Disaster Species"

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The Triassic/Jurassic (T/J) mass-extinction event is marked by coeval carbon isotope anomalies in organic and carbonate carbon reservoirs, which have been attributed to a (rapid) 4-fold rise in pCO_2 as a result of massive flood basalt volcanism and/or methane hydrate dissociation. Here we monitor the response of marine photosynthetic phytoplankton to the proposed carbon cycle perturbation. Our high-resolution micropaleontological analysis of T/J boundary beds at St-Audrie's Bay in Somerset (UK) provides evidence for a bio-calcification crisis that is characterized by extinction and malformation in calcareous nannoplankton and contemporaneous blooms of organic-walled "disaster species". Blooms of prasinophytes and acritarchs occur in conjunction with a prominent negative δ^{13}Corg shift close to the base of the *Psiloceras planorbis* ammonite Zone (Hesselbo et al., 2002). Across the same interval we obtained paleotemperature and paleosalinity estimates from oyster calcite based on Mg/Ca, Sr/Ca, δ^{13}C and δ^{18}O. Combined our palynological and geochemical results point to strong salinity stratification and warming of surface waters, inducing anoxic conditions. These conditions and the response of marine phytoplankton may have been caused by an increase pCO_2 levels The response of marine phytoplankton to the T/J boundary event resembles that of blooms of acritarchs following the Permian/Triassic mass-extinction event, which was also marked by extensive flood basalt volcanism and negative excursions in carbon isotope records. This leads us to suggest that such blooms may be symptomatic of elevated carbon dioxide levels in the atmosphere and oceans during mass-extinction events.