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Mass extinctions, recovery and resilience

Constraining end-Triassic carbon cycle perturbations from single fern spore carbon isotope records

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The end-Triassic mass extinction event and related global climate changes are linked to the emplacement of the CAMP (Central Atlantic magmatic province). The release of large amounts of volatiles, such as CH4 and CO_2, are thought to be responsible for carbon cycle perturbations across the Triassic-Jurassic boundary. In particular, the main phase of the biotic crisis and the environmental changes were marked by two negative Carbon Isotope Excursions (CIEs) and it was preceded by a precursor negative carbon isotope shift. Many carbon isotope records are based on bulk organic matter analyses due to a paucity in carbonate deposition. However, bulk organic carbon isotope records can be strongly influenced by changes in composition, compromising global carbon cycle signals. Here, we investigate whether individual spores track these carbon isotope shifts. We use palynological preparations of the Schandelah core (northern Germany) spanning the Triletes Beds (Upper Triassic) and Hettangian Alpha-1 (Lower Jurassic). Individual spores of the Deltoidospora-Concavisporites complex were hand-picked using an inverted microscope. Analyses were performed with a laser-ablation nano-combustion gas chromatography/isotope ratio mass spectrometer present at Utrecht University. Preliminary results indicate that single spores can be used to better understand fluctuations in bulk organic the δ13Corg records.