



Multiple late Triassic carbon cycle perturbations preceding intensified volcanic activity in the Central Atlantic Magmatic Province

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The end-Triassic mass extinction (\sim 201.5 Ma), marked by terrestrial ecosystem changes and a 50% loss in marine biodiversity, coincides with a major disruption of the global carbon cycle. These events closely coincide with the onset of Central Atlantic Magmatic Province emplacement (Deenen et al., 2010) and the subsequent release of isotopically depleted carbon as gaseous CO₂ and from the methane hydrate reservoir.

Here we show that the end-Triassic C-cycle perturbation is preceded by two successive 2-3‰ Rhaetian negative excursions in marine and continental $^{13}\text{CTOC}$ records from the western Tethys and north-west European sections. A coinciding, albeit slightly smaller, negative excursion in a ^{13}C leaf-record (*Lepidopteris ottonis*) further suggests successive ^{13}C depletion of the late Triassic global atmosphere. Extensive dyke and sill systems that allowed major flood basalt emplacement in the Central Atlantic Magmatic Province, already intruded sedimentary basins over large parts of Pangea during the late Triassic. Subsurface thermal metamorphism of organic rich strata potentially led to oxidation of organic carbon and the transfer of isotopically depleted carbon to the exogenic carbon pool. In this way causing changes in the global C-cycle already before the onset of major volcanic activity.