

Did volcanism of the Central Atlantic Magmatic Province trigger the end-Triassic mass extinction?

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Radiometric dating suggests that eruptions in the Central Atlantic magmatic province (CAMP) are synchronous with the ~200 Ma end-Triassic mass extinction. Although stratigraphic evidence for major flows prior to the extinction horizon is still lacking, the vast extent of the province allows the assumption of cause-and-effect relationship between volcanism and extinction, mediated by drastic environmental change. A recently recognized negative carbon isotope anomaly at the Triassic–Jurassic boundary is interpreted to reflect combined effects of volcanically derived CO₂ input, methane release through dissociation of gas hydrates in a global warming episode, and a possible marine productivity crisis. Maximum duration of the Rhaetian stage is estimated as only 2 m.y., and the isotope event appears short, lasting for less than 100 k.y. A variety of marine and terrestrial fossil groups (e.g., radiolarians, corals, bivalves, and plants) experienced correlated and sudden extinction at the end of Triassic, although some groups (e.g., ammonoids and conodonts) underwent a prolonged period of declining diversity. Post-extinction faunas and floras are cosmopolitan. Biotic recovery was delayed and the earliest Hettangian is a lag phase characterized by low diversity, possibly due to sustained environmental stress. The hypothesis of CAMP as the principal driving force in the end-Triassic extinction appears more consistent with paleontological and isotopic observations than alternative models. The temporally adjacent large igneous provinces, the Siberian Traps at the Permian–Triassic boundary and the Early Jurassic Karoo–Ferrar province, are also linked to extinction events, albeit of differing magnitude.