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Mass extinctions, recovery and resilience

The onset of CAMP volcanism, environmental change, and the magnitude of carbon-cycle perturbation at the Triassic–Jurassic mass extinction (Neuquen Basin, Argentina)

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The end-Triassic mass extinction (at ∼201.5 Ma), approximately synchronous with the onset of Central Atlantic Magmatic Province (CAMP) emplacement, is associated with a global carbon-cycle perturbation.
We present data from a new Triassic–Jurassic boundary succession in the Neuquén Basin, Argentina, and show that Increased accumulation rates of sedimentary Hg (and Hg/TOC) began significantly before the end-Triassic mass extinction, and before the commencement of CAMP-related basalt emplacement, but contemporaneous with CAMP-associated dyke and sill formation, suggesting thermal alteration of intruded country rocks as a potential major source of elevated Hg fluxes to the atmosphere at this time.
We also show that despite significant increases in atmospheric pCO_2 across the Triassic–Jurassic transition, the magnitude of the associated carbon-cycle perturbation (and observed negative carbon isotope excursion (CIE)) was relatively modest (2–3‰. Furthermore, the Neuquén Basin was marked by oxygen-depleted marine conditions across the Triassic–Jurassic transition, enabling increased preservation of organic matter. Combined with similar observations across the Panthalassic margin and the north-western Tethyan seaway, burial rates of organic matter must have been relatively elevated in a global context. Using simple mass-balance calculations, we show that enhanced carbon burial rates, either during or directly succeeding the end-Triassic mass extinction, and in line with the major phase of CAMP basalt emplacement, can explain the observed evolution of the global exogenic carbon cycle at this time.