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The Cretaceous–Paleogene (KPg) mass extinction event 66 million years ago witnessed one of the 'Big Five' mass extinctions of the Phanerozoic. Two major catastrophic events, the Chicxulub asteroid impact and the Deccan trap eruptions, were involved in complex climatic and environmental changes that culminated in the mass extinction including oceanic biogenic carbonate crisis, sea water chemistry and ocean oxygen level changes. Deep understanding of the coeval sulfur biogeochemical cycle may help to better constrain and quantify these parameters.

Here we present the first stratigraphic high resolution isotopic compositions of carbonate associated sulfate (CAS) based on monospecific planktic and benthic foraminifers' samples during the Maastrichtian-Danian transition from IODP pacific site 1209C. Primary δ34SCAS data suggests that there was a major perturbation of sulfur cycle around the KPg transition with rapid fluctuations (100-200kyr) of about 2-4‰ (±0.54‰, 2SD) during the late Maastrichtian followed by a negative excursion in δ34SCAS of 2-3‰ during the early Paleocene.

An increase in oxygen levels associated with a decline in organic carbon burial, related to a collapse in primary productivity, may have led to the early Paleocene δ34SCAS negative shift via a significant drop in microbial sulfate reduction. Alternatively, Deccan volcanism could also have played a role and impacted the sulfur cycle via direct input of isotopically light sulfur to the ocean. A revised correlation between δ34SCAS data reported in this study and a precise dating of the

Deccan volcanism phases would allow us to explore this hypothesis.

Keywords : KPg boundary, Sulphur cycle, cycle du calcium, Planktic and benthic foraminifera