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Testing the Synchronicity of a Proposed 17–19 Ma CO_2 Minimum Using Sr Isotope Stratigraphy

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Several published carbon isotope fractionation (ε_p) records from the early-middle Miocene suggest a CO_2 minimum between 17 and 19 Ma, preceding the Miocene Climatic Optimum. Discrepancies in the timing of this event may reflect chronological uncertainties - inherent to age models based on magneto- and biostratigraphy - or be an artefact of aliasing of high-amplitude CO_2 variability. Revising the age models of these records can help to assess the synchronicity of this event. Sr isotope stratigraphy provides a powerful tool for this time interval, as the steep rise in seawater $^{87}Sr/^{86}Sr$ offers a high temporal sensitivity with relatively small uncertainties (~100–300 kyr).

In this study, we aim to refine the early-middle Miocene age models of sites DSDP 516 and ODP 608 by integrating new Sr-derived ages with existing stratigraphic data using Bayesian age–depth modelling (e.g., Bacon).

This work aims to assess, whether previously reported offsets among early-middle Miocene ε_p records arise from chronological uncertainties or instead reflect aliasing effects or regional carbon cycle variability. These findings will improve constraints on the timing and nature of CO_2 change leading up to the Miocene Climatic Optimum.