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Decline of coral reefs during late Paleocene to Eocene global warming

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Abstract. Since the 1980s the frequency of warming events has increased and simultaneously widespread coral bleaching, and enhanced coral mortality have been observed. Yet, it remains unpredictable how coral reef communities will react to prolonged adverse conditions. If coral reef systems are sufficiently robust to withstand continued environmental pressures. But if coral mortality increases, what will communities of the future look like? The co-evolution of early Paleocene carbonate platforms and palaeoclimate may provide insight. Here we document the impact of early Paleogene global warming on shallow carbonate platforms in the Tethys. Between 59 and 55 Ma, three distinct stages in platform development can be identified Tethys-wide: during the first stage carbonate platforms mainly consisted of coralgal reefs; during the second – transitional – stage coralgal reefs thrived only at mid latitudes and gave way to larger foraminifera as dominant carbonate producer in low latitudes; finally, during the third stage, newly developed larger foraminifera lineages completely took over the role as main carbonate-producing organisms in low to middle latitudes. We propose that rising temperatures led to a stepwise demise of Paleocene coral giving way to an unprecedented expansion of larger foraminifera, dominating Tethyan platforms during the early Eocene.

[Final Revised Paper](#) (PDF, 822 KB) [Supplement](#) (10 KB) [Discussion Paper](#) (eED)

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