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## Decline of coral reefs during late Paleocene to early Eocene global warming

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

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