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Multistratigraphic Correlation across the Paleocene-Eocene Boundary in a Carbonate Platform-basin Setting (Southern Galala Mountains, Eastern Desert, Egypt)

The Paleocene-Eocene transition (ca. 55 Ma) witnessed a brief period of sudden global warming known as the Paleocene-Eocene thermal maximum (PETM). Climatic and oceanographic changes triggered a major extinction of deep-sea benthic foraminifera and evolutionary innovations amongst planktic foraminifera, calcareous nannofossils and terrestrial mammals. The carbonate platform represents one of the few sedimentary settings where there is still great uncertainty with respect to the position and biotic effects of the PETM. In this study we present a 40 km long transect across a Paleocene-Eocene prograding carbonate platform from the northern edge of the Southern Galala Mountains (Eastern Desert, Egypt) southwards. The transect shows text-book examples of sedimentary patterns forming along a platform-basin transition with a well exposed lateral transition from patch-reefs/larger foraminifera shoals through debris-flows to calciturbidites interfingering with basinal marls. Biostratigraphic correlation of basinal and carbonate platform settings is made by calcareous nannoplankton, planktonic foraminifera and larger foraminifera. The combination of these different groups enables a high-resolution biostratigraphy both in the basin and on the platform. Additional to the biostratigraphic correlation, facies changes, gamma-ray, delta13C and geochemical analyses were used for correlation of basin and platform sections. Especially the transitional sections between platform and basin yield a very good potential to correlate the biozonal scheme of the shallow benthic zone with the planktonic foraminifer and calcareous nannoplankton zones. This precise biocorrelation allowed the detailed documentation of rotational block movements with increased subsidence at the platform margin and a coeval uplift at the toe of slope.