

## **Type section of the Thebes Formation (Lower Eocene, Egypt)**

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The Thebes Formation forms an extensive carbonate platform on the southern margin of Tethys, outcropping along the Nile Valley and over large areas of the Western Desert of Upper Egypt. It has an extensive literature, but its biostratigraphy, depositional environments and sequence stratigraphy are still not well integrated on a regional scale.

The type section of the Thebes Formation is Gebel Gurnah, on the west bank of the Nile opposite Luxor. The current study, in progress, is part of the TIGA (Thebes International GeoArchaeology) project, with authorisation from the Supreme Council of Antiquities, participation of Assiut University, and funding from the National Geographic Society. It was primarily intended to provide a detailed stratigraphic context for the West Bank Pharaonic tombs and other antiquities, but also documents a key Lower Eocene section.

The Thebes Formation in Gebel Gurnah forms a succession of stepped escarpments. The maximum thickness is preserved in the area of the high peak El Qurn, which overlooks the Valley of the Kings. A 350 m section was logged in this area; samples were collected for XRD analysis, microfauna and nannofossils. The Thebes Formation comprises mainly chalk and chalkstone (chalk with secondary interstitial cement). Layers of chert nodules are common, and siliceous limestones become increasingly common in the upper part. Lithofacies range from calcareous and dolomitic claystone through chalk to nodular limestone. These largely reflect relative water depths. Thin bioclastic limestones with larger foraminiferids represent episodes of reduced sedimentation.

Three levels of cyclicity can be identified: submetric chalk/chert or chalk/chalkstone interbedding, representing probable Milankovitch-scale cycles; decimetric parasequences based by bioclastic units; and 100 m-scale shallowing-upwards sequences. The base of the second sequence at 93 metres is a prominent burrowed omission surface, overlain by a thin bed of phosphatic pebbles. The third sequence is abruptly terminated at a thick sharp-based oyster coquina. This contact is interpreted as a major sequence boundary.

Calcareous nannofossil assemblages are considerably impoverished at most levels, but a few levels have yielded common, well preserved, highly diversified assemblages that confer an NP12 zonal age to the bulk of the formation.

This study has shown that a detailed record of Ypresian depositional history is preserved in the El Qurn section. We anticipate that it will be the basis for further regional study, and that it should serve as an international reference section for Ypresian sequence stratigraphy.

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Artikel/Article: [Type section of the Thebes Formation \(Lower Eocene, Egypt\) 102](#)