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ABSTRACT

Abstract

The present study deals with the litho- and biostratigraphy, microfacies, depositional environments, sequence stratigraphic and the geological history of a well established Upper Cretaceous–Lower Eocene succession marking the scarp faces and plateau surfaces of the Farafra Oasis. It is invoked by a variety of shallow and deep marine sediments with many distinct lateral variations in facies and thickness due to the synsedimentary movements, sea-level fluctuations and varied sedimentation rates especially during the Paleocene/Eocene time. Fourteen stratigraphic sections were measured to cover the facies variations of the Upper Cretaceous–Lower Eocene succession. This succession is organized into eight well-defined, third-order depositional sequences which are punctuated by obvious sequence boundaries as a result of a drastic fall in relative sea-level. The Upper Cretaceous–Lower Eocene succession exposed in the Farafra Oasis starts at the base by El-Hefhuf Formation (Santonian–Campanian) with a clastic-dominated facies (SQ1); its top is flooded with many reworked Cenomanian fauna (SB1). It is followed by a carbonate unit (SQ2); the topmost part of El-Hefhuf Formation. This Formation is unconformably overlain by the white chalk of the Maastrichtian Khoman Formation (CF8b–CF3 zones, SQ3). The top of this formation coincides with the major extinction of the Cretaceous planktic species at the C/T boundary. The chalk changes into argillaceous chalk of Early Paleocene (P1c Subzone) and calcareous shale of Late Paleocene (P2–P3 zones) that belong to the Kharga Member of the Dakhla Formation. This formation wedges out northward and disappear further north in south Qaret El-Sheikh Abd Alla. The Upper Paleocene Tarawan Formation (SQ5) of P4 Zone overlies unconformably the Dakhla Formation in the east and west Farafra Oasis mostly due to the absence of the P3 Zone. The time-lapse of this hiatus varies from place to place. This contact (SB4) is absent in northwest Bir Bidni due to continuous sedimentation. The Tarawan Formation exhibits lateral facies change especially along Farafra–Ain Dalla passing which consists of chalky limestone generally with shale at top. The Tarawan Formation is succeeded the miliolids alveolinid packstone of the Maqfi Member of the Esna Formation (SQ6) with unconformity surface along the eastern part of the Farafra Oasis due to the lack of P5 Zone. The Esna Formation starts in the Farafra central basin by calcareous shale with a minor hiatus at the base due to the missing of P5a Subzone. Another sequence boundary is detected in the lower part of the Esna Formation due to the absence of P6b Subzone (SB6) in the Farafra Oasis. The sequence boundary SB6 is characterized by evaporite formation, erosional surface and for intense dolomitization. The Esna Formation changes laterally into carbonate rocks of Ain Dalla Formation in northwest Farafra Oasis. The Farafra Limestone conformably follows the Esna Formation to form the cap rock of the Farafra Oasis. In the extreme northern part of the Farafra Oasis, the Farafra Limestone overlies the Tarawan Formation with a great time gap. A remarkable sequence boundary is locally detected in the upper part of the Farafra Limestone marked by branched burrow system of *Thalassinoides* (SB7).