

Upper Cretaceous-Paleogene clastic wedge development in the inverted sedimentary basin, Southern Tethyan Shelf, Egypt

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Introduction

Areas of oblique convergence commonly undergo spatial and temporal changes in tectonic activity. Within such settings, basin can be subjected to rapid switches between extension and compression often characterized by tectonic inversion. Basin inversion is represented by uplift of a marine basin commonly exists along Syrian arc belt at the North Eastern desert of Egypt. Here, Oblique collision between Africa and European Plate has resulted in the destruction of the Mesozoic sedimentary basins (Moustafa and Khalil, 1995). This paper presents a detailed analysis of the facies and stratigraphic framework of the Upper Cretaceous-Paleogene clastic wedge.

Methodology

This study includes results of research conducted between 2003 and 2010. The dataset for this study consists of fourteen detailed stratigraphic profiles for the Upper Cretaceous-Paleogene clastic wedge along the length of the Ataqa scarp (see Fig. 1a). Detailed facies and facies associations will be prepared and build sequence stratigraphic model for the Upper Cretaceous-Paleogene clastic wedge at the study area

Results and Discussion

Twenty four facies were described within the Upper Cretaceous-Eocene clastic wedge at Gabal Ataqa area based on characteristic bedding style(s), constituent sedimentary structures, fabric, grain-size and composition. Facies associations were described as mappable sedimentary units, which extend laterally over several hundreds of meters to kilometers. Each facies association comprises a complex mixture of architectural elements, sedimentary structures and related lithologies indicative of a particular depositional setting. Eleven facies associations are differentiated in the Upper Cretaceous-Eocene clastic wedge at Gabal Ataqa. This approach allows a process-orientated interpretation of the data for Upper Cretaceous-Eocene red bed sequences in each profile, documenting the progressive changes and the evolution of the depositional setting during the deposition of the Upper Cretaceous-Eocene clastic wedge across the basin. The Upper Cretaceous-Eocene clastic wedge is internally subdivided into 8 discontinuity-bounded sequences, 5-30m thick. These sequences are defined by distinct bounding surfaces, across which there are pronounced changes in facies and stacking architectures.

Conclusions

The Upper Cretaceous-Paleogene clastic wedge is subdivided into eight sequences separated by stratigraphic discontinuities. Each consists of several laterally interfingering facies associations. Sequences 1-3 typically stack as basinward-stepping sequences and are characteristic of regressive and lowstand sequence sets with the successive inversion in the northern Gulf of Suez. Sequence 4 contains an aggrading pattern of facies that reflects the stages of tectonic quiescence. Sequences 5 and 6 represent the local inversion of the northern part of the study area that associated with lateral

switching of the depositional axis to the south and the northern area became site of erosion or non-deposition. Sequences 7-8 represent onlapping, transgressive sequence set.

References

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