

Upper Cretaceous Bahariya Formation, Western Desert, Egypt: A Unique Occurrence of Glaucony in Bioturbated, Marginal Marine Deposits

Sean B. Miller* and S. George Pemberton
Ichnology Research Group, Dept. of Earth and Atmospheric Sciences
Earth Sciences Building, University of Alberta,
114 St – 89 Ave. Edmonton, AB T6G 2E3
sbmiller@ualberta.ca

Fred Wehr
Apache Egypt, Cairo, Egypt
fred.wehr@egy.apachecorp.com

ABSTRACT

Since the first discovery of onshore oil in Egypt, reserves exceeding 15.7 billion barrels of oil equivalent have been found. A significant portion of the production originates from the Upper Cretaceous (Cenomanian) Bahariya Formation, particularly in the Khalda Concession of the Western Desert of Egypt. Detailed core studies applying ichnology, sedimentology and the glauconitic content suggest that these strata were deposited during a transgressive event dominated by tidal processes in an estuarine environment.

The Upper Bahariya Formation was formed on a broad tidally influenced ramp on the southern margin of the Neotethys seaway. It is primarily comprised of thin, sand-poor parasequences that correlate regionally. The system is dominated by parautochthonous and allochthonous glaucony mixed with a variety of both clastic and carbonate facies. Sedimentary structures such as tidal mud doublets, flaser and wavy bedding, convolute bedding, slump structures and planar laminations, along with *Glossifungites* surfaces and a mixture of trace fossils from the *Skolithos* and *Cruziana* ichnofacies, suggest deposition in a tidally influenced, relatively low energy, restricted marine setting. Characteristics of glauconitic material support an interpretation that is consistent with deposits of the transgressive systems tract. Very fine-grained sandstones in the upper portion of the Upper Bahariya Formation are interpreted as thin bayhead deltas, tidal flats and distributary mouth bars. Modern day estuaries, containing analogous sub-systems, provide useful insights into the processes operating during deposition of the Bahariya Formation and can be utilized as a supplementary interpretive tool.

This study characterizes the occurrence and distribution of glaucony within an ichnologic and sedimentologic framework, producing a more constrained and detailed understanding of the depositional system.