

Anatomy and Development of Tectonically-Induced Middle Eocene Clastic Wedge on the Southern Tethyan Shelf, North Eastern Desert, Egypt

S. S. Selim¹, A. A. Araby¹, M. Darwish¹, and A. M. Abu Kharadah¹

¹*Cairo University, Giza, Egypt*

Abstract

The Middle Eocene red beds are well exposed at the North Eastern Desert (Shabraweet area) and they show a spectrum from proximal alluvial fan to lagoonal sediments. The depositional history and development of the clastic wedge at the Shabraweet area are controlled by the tectonic inversion pulses along the Syrian Arc inverted belts (Abu Sultan-Abu Hammad belt) and the sea-level fluctuation in the southern Tethyan domain. In order to evaluate the development and the controlling factors of middle Eocene clastic wedge at the Shabraweet area, detailed sedimentologic anatomy, facies, paleoflow direction, clast composition, clast variation in the downstream were evaluated and interpreted.

The study leads to the subdivision of the middle Eocene clastic wedge into five main stacked depositional sequences from base to top. Sequence 1 shows variation from stream-dominated fan-delta in the north to lagoonal deposits through fan-delta fringes. Sequence 2 shows downstream variation from stacked fluvial channels to alluvial fan fringes to distal alluvial floodbasin. Sequence 3 shows downstream variation from amalgamated fluvial channels to alluvial plain deposits. Sequence 4 shows downstream variation from alluvial deposits to lagoon margin deposits. Sequence 5 shows variation from transitional environ (estuarine/deltaic) to off-shore lagoonal environment.

The sedimentary evolution is interpreted as a progradation of an alluvial system, to a lagoonal system, with deltaic environments. This was followed by a tectonic quiescence, sea-level rise and retrogressive alluvial deposits with the development of the lagoonal system. The abrupt increase in the sediment supply relative to the accommodation space leads to a progradation of alluvial/fan delta systems. This was followed by a decrease in the sediment supply and associated by rising in the sea level leading to a retrogradation of the deltaic/estuarine and prevailing lagoonal system.