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EXTENSIONAL TECTONICS AND COLLAPSE STRUCTURES IN THE SUEZ RIFT (EGYPT)

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The Suez Rift is a 300 km long and 50 to 80 km wide basin which cuts a granitic and metamorphic shield of Precambrian age, covered by sediments of Paleozoic to Paleogene age. The rift structure is dominated by tilted blocks bounded by NW-SE normal faults. The reconstruction of the paleostresses indicates a N 050 extension during the whole stage of rifting.

Rifting began 24 My ago with dikes intrusions; main faulting and subsidence occurred during Early Miocene producing a 80 km wide basin (Clysmic Gulf). During Pliocene and Quaternary times, faulting is still active but subsidence is restricted to a narrower area (Present Gulf).

On the Eastern margin of the Gulf two sets of fault trends are predominant - 1) N 140-150 E faults parallel to the gulf trend with pure dip-slip displacement - 2) cross faults, oriented N00 to N 30 E that have a strike-slip component consistent with the N 050 E distensive stress regime. The mean dip of cross fault is steeper (70-80°) than the dip of the faults parallel to the Gulf (30 to 70°). These two sets of fault define diamond shaped tilted block.

The difference of mechanical behaviour between the basement rocks and the overlying sedimentary cover caused structural disharmony and distinct fault geometries.

In the basement faults display a planar geometry while in the sedimentary cover (Cretaceous to Eocene sands, shales and limestones) faults are spoon shaped. Spoon faults are generally superimposed over concave wedges of the basement blocks but are decoupled from basement fault sets (Fig. 1). The decoupling is accommodated by plastic deformation in the Cretaceous marls. Along major normal faults, gravity sliding produced collapse structures with recumbent folds and thrusts (Fig. 2). Collapse structures are sealed by Early Miocene marine depostis and occurred during the first stage of rifting.

This kind of collapse structures may be found in various parts of the rift. They are related with normal faulting and should not be interpreted as the result of compressive events during the rifting.

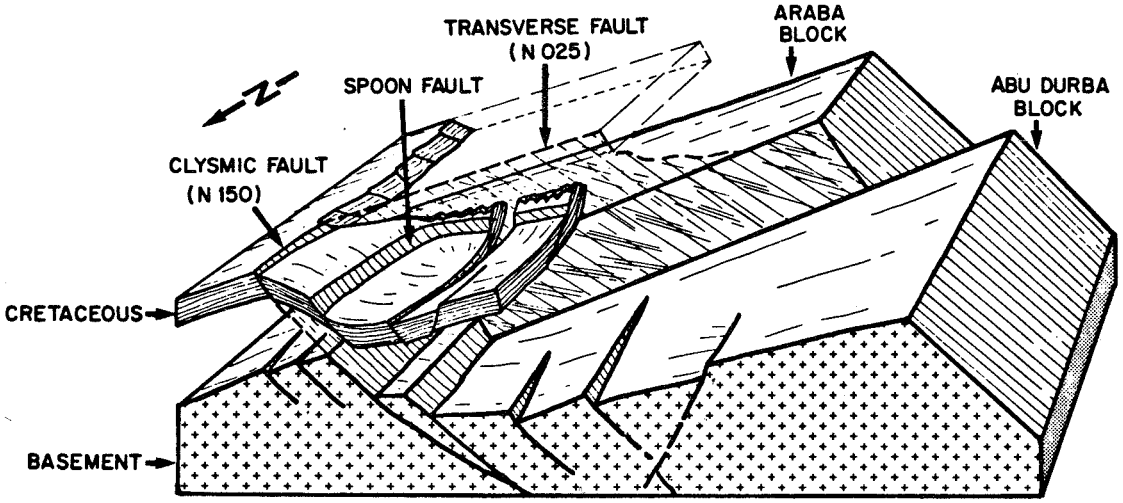

Fig. 1: Schematic block diagram of the Wadi Araba area (Western Sinaï).

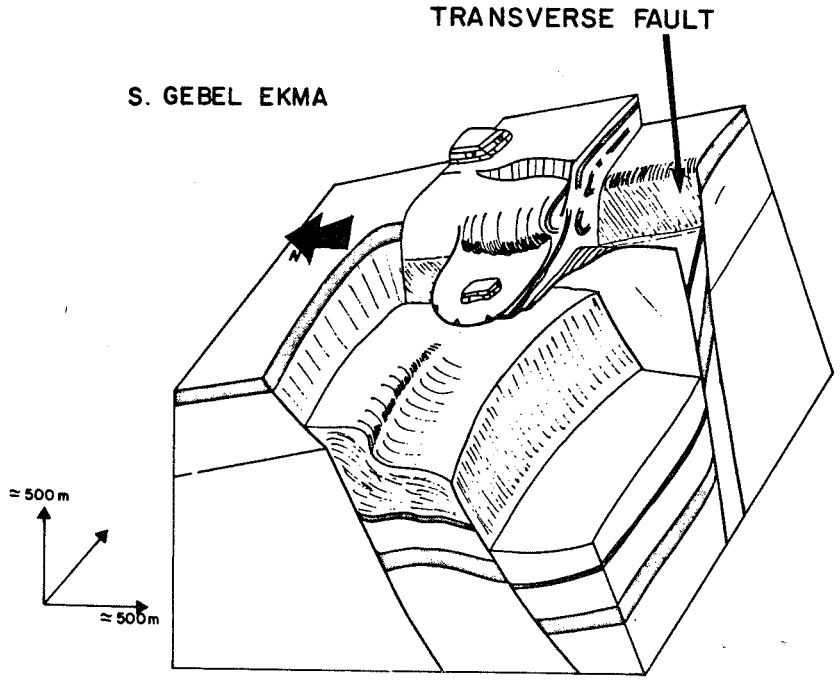

Fig. 2: Schematic block diagram of the collapse structure associated with major normal faults in the Gebel Ekma (Western Sinaï)