Ain Shams University
Faculty of Science
Geology Department

Fault damage zones in the Hammam Faraun block, Suez Rift, Egypt

A Thesis Submitted to
Ain Shams University, Faculty of Science,
Geology Department

In Partial Fulfilment of the Requirements for the Degree of Master of Science in

Geology

By

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Approval Sheet

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The present thesis is submitted to the Faculty of Science, Ain Shams University in partial fulfillment for the requirements of the Degree of Master of Science in Geology. Besides the research work materialized in this thesis, the candidate attended eleven post-graduate courses for one academic year in the following topics:

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VITA

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Fault damage zones in the Hammam Faraun block, Suez Rift, Egypt

ABSTRACT

Hammam Faraun block is a NW-SE elongated rift block that occupies an intermediate position between the NE dipping rift blocks of the central half graben of the Suez rift and the SW dipping Sudr block that belongs to the northern half graben. The Hammam Faraun block includes a complete section of pre-rift, early-rift and syn-rift rocks.

The structural setting of the Hammam Faraun block follows the regional framework of the Suez rift. The block is faulted by normal faults with NW, NNW, E-W and NNE orientations. The Hammam Faraun block is characterized by well exposed faults that allow the study of the fault damage zones.

The aim of the study is identifying the fault damage zones associated with the faults of the Hammam Faraun block by recording the fractures orientation, spacing, density and distance to the fault.

Fracture data were collected from nine scanlines over the study area to represent the NW to NNW, NE to NNE faults in addition to the background fractures away from the faults. The fracture data were plotted on rose diagrams and 3D scanline MATLAB module. The data show a correspondence between the fractures orientation and the fault orientation in addition to fractures formed perpendicular to the tensile stress that led to rifting of the area. Three scanlines were measured for a fault in order to study the change in the damage zone along and across the fault. The fracture

density for the fault damage zones shows a general gradual decrease away from the fault. The damage zone half width was defined by using the dissimilarity in the fracture density between the damage zone and the host rock. The damage zone half widths for two faults was defined as 25 m. The fault damage zone along the fault is asymmetric and widens with the increasing displacement. The fault damage zone across the fault in the hanging wall and the footwall has differences in the damage zone width, deformation and characters.

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