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STRUCTURAL EVOLUTION OF FEIRAN-SOLAF METAMORPHIC BELT, SOUTHWEST SINAI

Dissertation

Submitted for the award of

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(GEOLOGY)

BY

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ABSTRACT

The Feiran-Solaf metamorphic belt is one of the most prominent terrains in the South Sinai Peninsula. It consists of amphibolite facies rocks that developed during late-Proterozoic (850-550 Ma) orogenesis. It is intruded and surrounded by large volumes of granitic rocks. The belt has been internally subdivided into two zones: one to the south-east, the Solaf Zone, and another to the north-west, the Feiran Zone. Within each zone, ten or more cross-strike transects are made, along which styles of deformation including fold and fault geometry, and fabric orientations are examined.

Deformation in the belt is polyphase, widespread, intense and resulted in complex fold geometries. Three phases of progressive deformations were affecting the belt that are temporally and genetically related. On outcrop scale the F_1 deformation is recognized as isoclinal folds and an associated steeply dipping gneissic (S_1) fabric. F_2 deformation is characterized by tight "recumbent" similar folds, whereas F_3 is represented by open folds. Major folds of the first two phases account for the over-all structural pattern shown by the lithologic units, while the last phase "F_3" occurs mostly as minor folds. The early SE and NW plunging F_1 and F_2 folds may be related to the arc-arc accretion, while the late NE-trending upright folds "F_3" may be related to the post-accretionary structures. However, all the deformation was accommodated by shortening and there was no simple shear component. Moreover, the late brittle structures that oriented NW-SE may be accompanied the Najd fault corridor. Comparison between the Feiran-Solaf belt and the other metamorphic belts exposed in South Sinai is given in order to predict and reconstruct the overprinting structures of the late-Proterozoic orogenesis.

Some types of gneisses that has pleasing fabric in addition to the pegmatites and micas that are concentrating in some domains could have a commercial value.

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