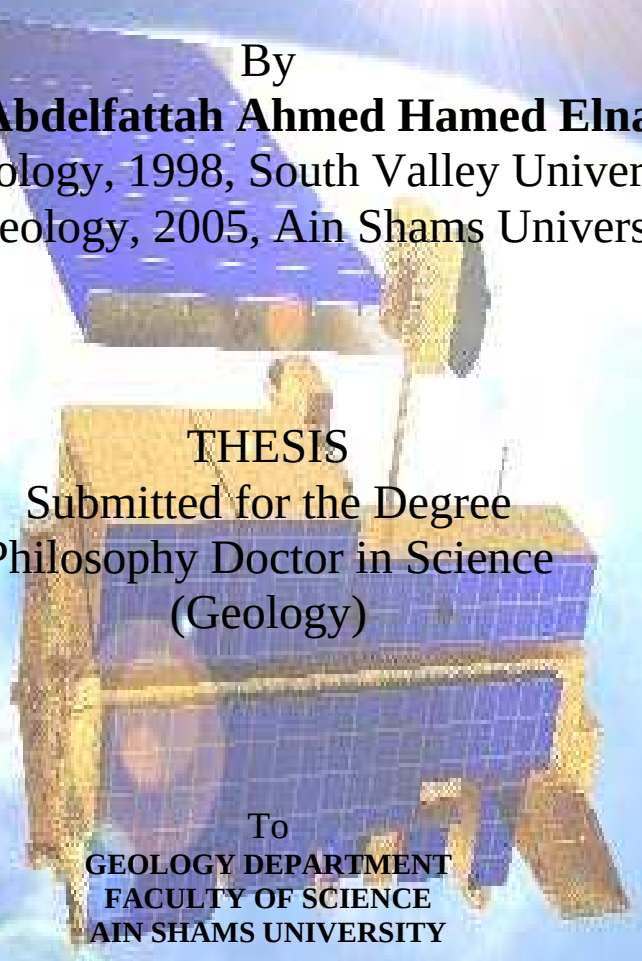
"Geological studies on Wadi Kalalat, South Eastern Desert, Egypt using Remote Sensing and GIS applications"

By

Ahmed Abdelfattah Ahmed Hamed Elnazer

B.Sc. Geology, 1998, South Valley University

M.Sc. Geology, 2005, Ain Shams University



THESIS

Submitted for the Degree

Philosophy Doctor in Science

(Geology)

To

GEOLOGY DEPARTMENT

FACULTY OF SCIENCE

AIN SHAMS UNIVERSITY

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APPROVAL SHEET

Ph. D. Thesis:

Name of Student: Ahmed Abdelfattah Ahmed Hamed Elnazer

Title of thesis: Geological studies on Wadi Kalalat, South Eastern Desert, Egypt using Remote Sensing and GIS applications.

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ABSTRACT

The study area is situated near Bernice, along Red Sea Coast in the SED, Egypt; between Lat 24^{o} 05` – $23^{o}$ 45` N and Long 35^{o} 10` – $35^{o}$ 25` E. It comprises the early orogenic rocks (Gneiss and Schist rocks) and late orogenic rocks (Ultrabasic and basic, granodiorite, monzogranite, dykes and veins). In ***Remote Sensing and GIS***, Principal Component color images (PC3, PC6, and PC7), Minimum Noise Fraction image of MNFs (1, 2, and 3), and False Color Composite (FCC) of ASTER image of (4/6, 4/7 and 4/12) in (RGB) are good in discrimination of for lithlogic interpretation of all rock types. ***Petrographically,*** Gneiss is represented by migmatite gneiss consists of quartz, plagioclase, hornblende, and biotite; accompanied by epidot and sphene. They are of the stromatic variety with parallel layered leucosome and melanosome. Schist is principally made of hornblende and biotite, with minor pyroxene with plagioclase and quartz, with epidote and sphene. Ultrabasic rocks are Lherzolite (with cumulus texture). Basic rocks are gabbros (gabbro-norite, leuco-gabbro and mela-gabbro). Granodiorite is composed mainly of plagioclase (An_{20} to An_{30}), quartz, K-feldspars (orthoclase and microcline) and minor amounts of biotite and hornblende. Monzogranite consists mainly of alkali feldspars, quartz and plagioclase (An_{14} to An_{25}) in addition to biotite and muscovite. Sphene, garnet and iron oxides occurs as accessory minerals, while epidote as secondary minerals. ***Geochemically and Petrogensis***, the migmatite gneiss is mainly related to intermediate-acidic composition especially granitic origin and varying from diorite to granodiorite in composition and of high grade of metamorphism. Schist is particularly related to igneous origin and of amphibolite facies. The most of ultrabasic and basic are of gabbro-diorite and diorite of calcic series, while a few samples are gabbro-diorite of calc alkalic. They have poor alkali nature with two magma types (most tholeiitic and few calc alkaline) of destructive plate-margin basalt and differentiate. Granites are calc-alkaline and of the acid differentiate; whereas Granodiorite is calcic and intermediate differentiate. Late orogenic Granites are tectonically syn-collision and related to I-type granite.

Key words: Remote sensing, GIS, Petrology, Geochemistry, Petrogensis, Basement rocks, Gneiss, Schist, Gabbro, Ultrabasic, Granite , Granodiorite, Wadi Kallalat, Wadi Naait.

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The Author

Ahmed Elnazer

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