geology geochemistry and structural analysis of the basement rocks of beda area،south eastern desert،egypt

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The Precambrian rocks of Egypt (l00.000 Km2) outcrop overan extensive area in the Eastern Desert, south western part of theWestern Desert and south Sinai. The Precambrian belt represents theNE part of the Arabian Nubian shield which is exposed in both sidesof the Red Sea, and belonging to the Pan-African organic -belt.The Egyptian Precambrian belt of the Eastern Desert IScomposed of an upper Proterozoic volcano- sedimentary complexcontaining scattered ultramafic bodies and intruded by syn-to late -tectonic plutonites (mainly tonalite to granodiorite) with extensivesenes of calc-alkaline volcanic rocks. This sequence ISunconformably overlain by molasse sediments of the· Hammamatgroup. The sequences are cut by alkaline to sub-alkaline, late - topost tectonic granites.In the central and southern Eastern Desert , the deformed andlargely mylonitized rocks of the infrastructure -crop out in gneissdomes disposed along the axes of genetic lines trending NNW SSEwhich also functioned as magnetic area (EI Gaby, 1983) .Remobilize infrastructure rocks are well displayed at WadiFeiran, SW Sinai (EI Gaby & Ahmed 1980), along the Qena Safagaroad (Sabet et. a!., 1972 , Akaad et a!., 1973).Wadi Beida area lies in the southern part of the Eastern Desertabout 30Km west of Shalatein town between latitudes 22° 54’ _23°04’ 30” N and longitudes 35° 10’ - 35° 22’ 30” E and covers an areaCfiapter 0/1The present thesis involves detailed field, geological,geochemical, mineralogical and structural studies for the rock unitsat Wadi Beida area. These rock units comprise dismemberedophiolities, arc volcanic assemblage, Arc-grantitoid and youngergabbros.The ophiolites occupy and extend in NW-SE direction in thenortheastern part of the mapped area. They embrace ultramaficrocks, metagabbros, pillow lavas and cherts. These rocks are set, inplaces, inside a schistose matrix of highly sheared ultramafic rocks,foliated metasiltstone and metamudstone. Elsewhere, this matrixencloses small bands of quartz carbonates. All these componentsshow tectonic contact in-between and alltogether were tectonicallytransported and intermingled with the metavolcanics. At Bir Beida,the contact of ophiolites against the metavolcanics is characterizedby strong shearing in NW-SE direction. Veinlets of talc, chromitelenses and magnesite bands are aligned along this contact.,The Ultramafic rocks consist of intensively sepentinizedhurzbergite, lherzolite and subordinate dunite. They are representedby main outcrop on the right side at the entrance of Wadi Beida andby unmappable slices east and southeast of G. Beida. These rocksare brown, dark grey to black and

have a general NW -SE elongation.In localities, the ultramafics contain veinlets and pockets (5-11 emthick) of chrysotile indicating the tectonic effect. Petrographically,the ultramafic rocks are represented by serpentinites (with relics ofhurzbergite, lherzolite and dunite). The serpentinites are composedof antigorite, low contents of chrysotile, lizardite and ankeritetogether with opaques (about 15-20% of the whole rock). Theopaques are mainly iron oxides and chromite with traces of sulfides.The iron oxides are represented by magnetite that is densely alteredCfiapter'VI Summary and Condusionsinto goethite. The chromite occurs as disseminated crystals and ispartly altered into magnetite.The metagabbros are exposed in the east of the mapped areaand cover an area of about 60 km2• They form low to moderate reliefand have, along their eastern and western sides, tectonic contactsagainst the ultramafics and their highly sheared derivativesrespectively. In places, these rocks exhibit layering , and rosettefeature. The layering is mostly disturbed and is not continued forlong distances. The layers are generally striking NW-SE and dippingat moderate and steep angles towards plagiogranites. The latterforms white bodies in the rocks. The metagabbros are coarse-grainedbut they are fine-grained in the uppermost parts.Petrographically, the metagabbros are mainly composed ofplagioclase, actinolitic hornblende and pyroxenes. Opaques andsphene are the main accessory minerals. Biotite, chlorite, epidoteand calcite are the secondary minerals. Quartz is found in thestrongly sheared varieties and is mainly of secondary origin.Plagioclase (An 36-44) reaches to 60% of the rock. It showslamellar and composite twinning and zoning. In samples, the core ofplagioclae crystals are charged with epidote while the peripheries areclear indicating high and low calcic compositions respectively.Occasionally, these crystals are obscured by dense kaolinitizationand sericitization. Actinolitic hornblende is partly or completelychloritized and still shows relics of pyroxenes. These relics includeaugite, enstatite and sometimes diopside; being altered to chloriteand epidote.Opaques (2-10%) are dominated by ilmenite (70 % of theopaques), magnetite (30 % of the opaques) and traces of pyrite.Ilmenite is occasionally homogeneous and shows two types ofalterations; high temperature alteration to sphene and/or hematiterutilegraphic intergrowths -and low temperature alteration togoethite. Magnetite is Ti-poor variety. Hematite ilmenite exsolutionintergowth (metamorphic origin; Takla et al., 1981) is widespread inmost samples. Magnetite external granules in ilmenite are rarelyencountered.The pillow lavas are encountered near Bir Beida and trendingNNW-SSE .The pillows are generally dark green and exhibit finegrainedbasaltic composition with amygdales filled with epidote,carbonates and iron oxides. The individual pillows are circular oroval-shaped with massive cores and a zone of vesicles near theperiphery. The pillows range in size from 2S cm to 1 m and showgeneral dipping toward the NE.Cherts occur as dark grey to grayish, yellowish and greenishgray bands. They are tectonically interleaved with the ultramaficrocks and pillowed basalt. The thickness of the chert bands varyfrom S to 30 ern. Petraographically, the pillow lavas are composed ofplagioclase laths, tremolite, epidote and clorite together with fewamounts of sphene, quartz, calcite and opaques. The opaquesconstitute about S% of the rock and are dominated by magnetitewhich is partly martitized. They are characterized by schistose andamygdaloidal textures. Some amygdales are filled

with calcite,epidote and chlorite.