Geophysical Research Abstracts
Vol. 13, EGU2011-1138, 2011
EGU General Assembly 2011

On the Plutonities of the Subduction Regime south Sinai: Discrimination and Modeling

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Petrological, geochemical and mineralogical characteristics of both calc-alkaline granites and their counterpart gabbros of southern Sinai have been carried out. The rocks are considered to pertain to the island arc regime. The study includes Nesiren, Shahira and Minader outcrops as case example. The granite composition includes diorite, tonalite and granodiorite. The gabbros are pyroxene, pyroxene/hornblende, hornblende gabbros and diorite. Opaque mineral contents are relatively enriched in gabbroid rocks and represented by magnetite, hematite and ilmenite with few sulphides. Geochemically, the granitic rocks are peraluminous, calc-alkaline and of I type syn-collision volcanic arc. The gabbros exhibit transitional calc-alkaline/tholeiite magma type of island arc setting. Microprobe data of amphiboles indicate that the amphiboles from gabbros are calcic-type and have the composition of actinolite, actinolitic hornblende with subordinate of magnesio-hornblende. They crystallized under medium (Minder and shahera) to low pressure (Nesren). amphiboles from the granites have the composition of actinolitic hornblende (Minder), ferroedenite to ferroedenitic hornblende (Nesren). They crystallized under low pressure. Plagioclase from the study rocks varies in composition from oligoclase to andesine. Biotites of the granites are Mg-rich (Minder), Fe-rich (Nesren), and lepidomelane of calc-alkaline and magmatic origin. Plagioclase favors temperature of formation at 1100 ^{o}C (Minader gabbro), 750 to 850 ^{o}C (Shahera gabbro) and 900 to 1000^{o}C (granitic rocks) under general pressure of 2 Kbs. Modeling and thermobarometric calculations elucidate magma generation at a depth of about 30 km for granite and from 15 to 35 km for gabbros. The later rocks have achieved 25% fractional melting of mantle lherzolite.