Mineralogy, geochemistry and thermobarometry of garnet-amphibolites in Delbar metamorphic complex, Biarjmand (Southeast of Shahrood)

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Abstract: Delbar metamorphic complex is located in 130 Km south of Shahrood (Biarjmand area) in Northern margin of the central Iran zone. The varied metamorphic rocks including meta-psammite, meta-greywacke, meta-pelite, marble and amphibolite and mylonitized granites and leucogranites intrusions are exposed in this complex. The field and petrography evidences indicated the evolutions resulted of the increasing in temperature and pressure from phylites and mica-schists to garnet bearing gneisses in meta-pelitic sequence and from amphibole schist to ortho-amphibolite and garnet amphibolite in meta-basite sequence. The thermobarometry studies based on the garnet, amphibole and plagioclase minerals chemistry in the garnet bearing amphibolites demonstrate 529-693°C temperature ranges and 9.6-12.9 Kbar pressure ranges indicating of amphibolite to upper amphibolite facies for meta-basites, which has reached to the partial melting initiation. The field and geochemical evidences indicate that the protolith of the studied amphibolites were diabase dykes and basic-moderate lavas. These rocks originated from the primary magmas which were depleted in Nb, Ti and Zr and enriched in Pb and LREE with the calc-alkaline nature. The primary magmas derived from sub-continental lithospheric mantle in the extensional back arc basin during late Neoperotrozoic- Early Cambrian in Central Iran.

Keywords: Thermobarometry, metabasite, garnet amphibolite, Delbar metamorphic complex, Shahrood, Central Iran.