Structural and thermobarometric investigations of metamorphic rocks in the north of Asadabad (Sanandaj-Sirjan zone)

B. Hosseini*, A. Ahmadi

Department of Geology, Payame Noor University,19395-4697 Tehran, Iran

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Abstract: The Almaghoulagh antiform in north of Asadabad, Hamedan, is one of the areas where the Paleozoic rocks are exposed in the Sanandaj-Sirjan zone. The antiform comprises two metamorphosed units. The Almaghoulagh unit in the lower part is over lain by the Chenar Sheikh unit, whereas the former derived from a volcanic protolith, the latter had a protolith with a significant sedimentary component. The Late Jurassic and Early Cretaceous felsic and mafic plutonic bodies are situated in the core of the antiform. The S1 foliation, which can be recognized throughout all the lithological units, is considered to formed during a regional metamorphic event. The amphibole-plagioclase thermometer and amphibole-garnet-plagioclase-quartz barometer yielded metamorphic temperature of 570°C and an average pressure of 7.2 kbar for the Almaghoulagh metabasites. The P-T condition of metamorphism in the Chenar sheikh metapelites was also estimated at 462°C and an average pressure of 2.6 kbar using the biotite-garnet thermometer and garnet-plagioclase-biotite-muscovite-quartz and garnet-plagioclase-muscovite-quartz barometers. These P-T estimations suggest that the regional metamorphism reached the amphibolite grade and the lower part of the Almaghoulah antiform experienced a higher degree of metamorphism. The S2 foliation, which is the most penetrative structural element of all the rock units in the region, formed within a shear zone. Occurrence of the shear stress in the region, facilitated intrusion of the Late Jurassic and Early Cretaceous plutonic bodies into the core of the antiform. The emplacement of the plutonic bodies has played a major role in folding and doming the region.

Keywords: thermometry; barometry; regional metamorphism; Almaghoulagh antiform, Sanandaj-Sirjan zone.

*Corresponding author; Tel: 09352454316; Fax: 08643250525; email: Be.hosseini@pnu.ac.ir