Four isolated granitoid plutons in Johor: An overview on their petrochemistry and genesis

ASKURY ABD. KADIR
Geological Survey of Malaysia, Ipoh

Four isolated granitoid plutons in Johor viz. Gunung Ledang (Mt. Ophir), Bt. Mor, Lenga (Ma'Okil) and Batu Pahat were studied petrographically and chemically. Texturally, they range from medium- to coarse-grained porphyritic- to non-porphyritic biotite granite to fine-grained biotite granite or microgranite. Late phase intrusions included pegmatites in Bt. Mor and granophyres in Lenga during the middle-Triassic to Tertiary (?) respectively.

The ages of these granitoids range from Permian (173 Ma) to Cretaceous (78 Ma) according to available Rb-Sr data.

The Q-A-P, Q-P, A-B, Q-B-F and Qz-Ab-Or plots show that these granitoids do not vary considerably in composition as evidenced by their limited SiO_2 contents (67 to 79%). They fall within the granite and adamellite fields and are commonly peraluminous in nature.

All of the four plutions are characterized as ilmenite-series granites, with values of magnetic susceptibility of less than 15% x 10^{-10} SI unit. The Gunung Ledang, Bt. Mor and Lenga plutons are categorized as I-type granites, which were apparently derived from an igneous source through the partial melting at the mantle. However, the perquartzose Batu Pahat pluton can be categorized as an S-type which was presumably derived from sedimentary rocks by the process of partial remelting or anatexis.

Petrochemical evidence based on Harker and other variation diagrams show that the plutons are not genetically related to one and another. Magmatic differentiation trends are suggested and restricted only within individual pluton. These four granitoid plutons were probably emplaced separately from different magmatic sources. They are believed to represent high level epizonal intrusions and had crystallized under relatively low pressure from a minimum melt.

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