Petrology and geochemistry of granitoids, Mandalgobi area, central Mongolia

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Early Mesozoic alkali feldspar granites (alaskites) and associated granitic rocks of the eastern Mandalgobi are a part of the Central Mongolian Igneous Belt, which extends from west to east across central Mongolia for about 1500 km. These intrusions are spread over an area of several hundred square kilometres and are associated with coeval bimodal volcanic rocks (basalts and trachydacite to rhyolites). All these rocks have faulted contacts and/or are covered by terrigenous and continental sedimentary rocks of Jurassic and Cretaceous age.

The alaskites have a uniform mineralogy with alkali feldspar and quartz as the main phases and subordinate or no albitic plagioclase. The coarse-grained alaskites show a sub-equigranular isotropic fabric with little evidence of flowage or an oriented arrangement of tabular to prismatic feldspar crystals. The alkali feldspar is either a strongly perthitic K-feldspar, often displaying an incipient microclinization, or mesoperthite, typical of hypersolvus granites; micrographic alkali feldspar-quartz intergrowths are common. The alaskites are distinctly leucocratic containing only traces of biotite. Accessory minerals are sphene, apatite, zircon and iron oxides; rare fluorite forms single minute grains or the lining of minute cavities. The grain size is highly variable, ranging from fine (0.5 mm) to coarse, but the dominant rock types contain large (cm-size) alkali feldspar crystals set in a fine-grained, leucocratic quartz-rich matrix.

The chemical composition of these granitoids displays a wide range of SiO_2 content (68–78 wt %); the alkali content is typically around 8–9 wt %. The rocks have been assigned to a high-K calc-alkaline series.

Numerous dikes are aplites, which sometimes contain pegmatite pods. Irregular quartz veins are frequently close to the intrusion contacts. The Mesozoic granitoid intrusions were emplaced at a shallow depth as indicated by the occurrence of cogenetic rhyolitic rocks, border facies showing gradual changes of grain size, miarolitic cavities and an extensive network of aplitic and quartz veins.