Petrology of the Marginal Part of Mbozi Syenite—Gabbro Complex, Mbozi District, Mbeya Region, Tanzania

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Abstract
Petrology of the marginal portion of the Mbozi syenite-gabbro complex occurring in southwestern Tanzania was studied. Petrographically, four rock types are recognised: gabbro, nepheline gabbro, nepheline syenite and nepheline-sodalite syenite. Texturally, the rocks exhibit a typical poikilitic texture in gabbro with large plates of undeformed plagioclase enclosing pyroxene and nepheline crystals to a protoclastic nepheline syenite and nepheline-sodalite syenite in which phenocrysts of nepheline, sodalite and pyroxene are set in a groundmass of shattered feldspars. Pyroxene and amphibole are sodic and aluminous in composition and their paragenesis indicates incomplete reaction relation; amphiboles exhibit exsolution of Ti in the form of ilmenite. It is concluded that an initially undersaturated magma favoured crystallization of nepheline and pyroxene in preference to plagioclase feldspars. Later shearing and granulation of the plagioclase and permiation of alkalic fluids may have given rise to the marginal alkaline rocks. Nepheline and mafic crystals are unaffected by the shearing as the strain was absorbed by the host plagioclase crystals. Twinning in pyroxene and amphibole crystals may, however, indicate effect of strain. Straight line variation diagrams of major elements and some of the trace elements and their ratios indicate probable mixing of magmas to produce the observed variation in rock types.