FeO-Al2O3-TiO2-rich rocks of the Tertiary Bana igneous complex, west Cameroon

Gilbert Kuepouo[1]; Hiroaki Sato[2]; Jean-Pierre Tchouankoue[3]; Mamoru Murata[4]

[1] Grad School of Sci Tech, Kobe Univ; [2] Earth and Planetary Sci, Kobe Univ; [3] Dept. Earth Sci., Univ. Yaounde-I; [4] Dept. of Geosciences, Naruto Univ. of Education

http://www.kobe-u.ac.jp/volcano/kuepouo.html

FeO*-Al2O3-TiO2-rich rocks associated with tholeiitic basalt lava flows have been discovered in the Bana Tertiary plutono-volcanic complex in the continental sector of the Cameroon line. These peculiar rocks consist principally of iron-titanium oxides, aluminosilicates and apatite occurring as part of composite lava flows on the southwest (site 1) and northwest (site 2) sides of the complex. Texturally and compositionally, the rocks can be subdivided into globular type, banded type, and Al-rich fine-gained massive type. The first two types consist of dark globule or band enriched in Fe-Ti oxides and apatite and lighter colored groundmass or bands enriched in aluminosilicate and quartz. Occasionally, phenocrysts of albite, sanidine and/or zeolite emerge in the Al-rich fine-grained type. The presence of ferropseudobrookite solid solution in some of the FeO*-Al2O3-TiO2-rich rocks suggests temperatures of crystallization more than 1150C. The Bana FeO*-Al2O3-TiO2-rich rocks are characterized by low concentrations of silica (25-54. 2 wt%), CaO and MgO, and high concentrations of iron (20-42 wt% FeO*), alumina (20-42 wt% Al2O3), TiO2 (3-9.2 wt%), and P2O5 (0.26-1.30). They can be represented by the pseudo-ternary system ((FeO*+P2O5+MnO)-(Al2O3 +MgO+TiO2)- SiO2). The bulk rock compositions cannot be derived simply by the differentiation of basaltic magma or by partial melting of the mantle or granite, diorite or granulite. The high alumina contents and lack of common mafic minerals suggest that the FeO*-Al2O3-TiO2-rich rocks could have been generated within the crust, from Al- and Fe-rich sources such as lateritic materials. A hydrothermal origin is discounted because the rocks contain high-temperature mineral assemblages and lack sulfides minerals. We propose that the FeO*-Al2O3-TiO2-rich rocks were formed by partial melting of laterite by underplated basaltic magmas and emplaced on the surface as part of lava flows.