Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

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GEOCHEMISTRY OF SPINIFEX-TEXTURED KOMATIITE, MANICA AREA, NORTHERN MOZAMBIQUE

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ABSTRACT

Ultramafics volcanics of the komatiite type are widespread in the greenstone belts of Manica area, Northern Mozambique. They are made up of massive and pillow lava flows with massive serpentinites which pass to talcschists and tremolites schists. The komatiite rocks dominated by peridotitic and basaltic komatiite showing olivine spinifex texture

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where the peridotitic komatiite is volumetrically most prevalent. Based on $Ca/Al_2O_3 \approx 1.0$ and $Al_2O_3/TiO_2 \approx 20$ ratios, these komatiites are classified with the Al – undepleted Munro type kpmatiite. They exhibit a marked depletion in Zr, Nb, Y, Rb and As, and enrichment in Cr and Ni. Replacement textures (lobate and curves boundaries between chromian spinel and magnetite) in addition to the mineral chemistry of chromian spinel indicate that these komatiite underwent regional metamorphism under greenschist amphibolite transition conditions in a temperature about 500° C. the chromain spinel have low Al and Mg values (up to 0.26 and 0.21 respectively), low Mg and high Cr and Fe values. The high Cr [=Cr/Cr+Al] atomic ratio of spinel chemistry exhibits limited compositional range from 0.77 to 0.99 and very low $TiO_2 < 0.2$. This suggests the upper mantle from which the Manica komatiite had been derived was highly refractory. Bulk major element chemistry combined with spinel mineral chemistry indicate that the formation of Manica komatiite may have been linked with some high-Mg magma such as high-Mg tholeiite. The komatiite under consideration may be formed from high degrees of partial melting of reduced, depleted mantle in a mantle wedge or sub-arc mantle environment.