Aerogeophysical, Geological and Geochemical Investigation of the Late Archaean Granitoids in the Musoma- Mara Greenstone Belt, NE Tanzania.

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Abstract
The Musoma Mara Greenstone Belt (MMGB) is intruded with syn-to-post orogenic suites of granitoids which range in composition from Tonalite Trondhjemite Granodiorites (TTG) to granite. High resolution aerogeophysical data surveyed by GST in 2003 has provided aeromagnetic and radiometric data that were used in this study to classify various granitoids existing in MMGB. The individual radioactive element content of K, Th and U, ternary image and K: U: Th composite classification map have been used in data presentation and interpretation. In addition the radioactive element ratios were used to enhance the radiometric signals. Based on the analysis and interpretations made on airborne radiometric, magnetic data and previous geological maps, a geophysical interpretation map was obtained. This map broadly categorized the MMGB granitoids into two types, the first granitoid type is characterized by high contents of all the three elements (K, U and Th) and low magnetic intensity (< 33997 nT). The second granitoid type is characterized by high K relative to U and Th, and higher magnetic intensity (>33997 nT). The aerogeophysical interpretation map was used as a base map for ground follow-up whereby the granite types were sampled accordingly for geochemical analysis. Geochemical classification of the two granitoid types from geophysical data interpretations further subdivided them into three types i.e. biotite granite, calcic granite and TTG. The overall analysis showed high correlation between aerogeophysical and geochemical data whereby the voluminous biotite and calcic granite are the subdivisions from the first granite type and the less voluminous TTG precisely correlated to the second granite type. Their compositional similarity in geochemistry with the northern MMGB high-K and Na-rich granitoids (Manya et al. 2007a, b) suggested tectonic setting and petrogenetic analogy. Biotite and calcic granites are inferred to have been generated from partial melting of pre-existing materials including TTG, intermediate and felsic volcanic rocks whereby TTGs were generated from partial melting of hydrous basaltic crust that transformed into garnet amphibolites.