



Radiological Mapping of the Alkaline Intrusive Complex of Jombo, South Coastal Kenya by In-Situ Gamma-Ray Spectrometry

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Carbonatites and alkaline intrusive complexes are rich in a variety of mineral deposits such as rare earth elements (REEs), including Nb, Zr and Mn. These are often associated with U and Th bearing minerals, including monazite, samarskite and pyrochlore. Mining waste resulting from mineral processing activities can be highly radioactive and therefore poses a risk to human health and environment. The Jombo complex located in Kenya's south coastal region is potentially one of the richest sources of Nb and REEs in the world. It consists of the main intrusion at Jombo hill, three associated satellite intrusions at Mrima, Kiruku and Nguluku hills, and several dykes. The complex is highly heterogeneous with regard to its geological formation as it is characterized by alkaline igneous rocks and carbonatites which also influence its radio-ecological dynamics. In-situ gamma spectrometry offers a low-cost, rapid and spatially representative radioactivity estimate across a range of landscapes compared to conventional radiometric techniques. In this work, a wide ranging radiological survey was conducted in the Jombo complex as follow up on previous studies[1,2], to determine radiation exposure levels and source distributions, and perform radiological risk assessments. The in-situ measurements were carried out using a 2.0 l NaI(Tl) PGIS-2 portable detector from Pico Envirotec Inc integrated with GPS, deployed for ground (back-pack) and vehicular gamma-ray spectrometry. Preliminary results of radiological distribution and mapping will be presented.

[1] Patel, J. P. (1991). *Discovery and Innovation*, 3(3): 31-35.

[2] Kebwaro, J. M. et. al. (2011). *J. Phys. Sci.*, 6(13): 3105-3110.