

**International Conference on Occupational Radiation Protection:  
Strengthening Radiation Protection of Workers –Twenty Years of Progress  
and the Way Forward**

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## **Spatial Distribution and Occupational Exposure to NORM in the Artisanal gold Mines in the Migori Transmara Gold Mining Areas of Southwestern Kenya.**

Gold mining economically empowers not only the miners but also the entire country. However, it involves massive discharge of wastes like tailings, gangues etc. containing radionuclides that maybe harmful to the miners and the populace. It was therefore necessary to determine spatial distribution and exposure to NORM in the artisanal gold mines in the Migori Transmara gold mining complex of Southwestern Kenya in order advice the concerned parties. To achieve our objectives soil samples were randomly collected from various gold mining areas and analyzed using HPGe gamma ray spectrometric technique. Ordinary Kriging analysis was then used to show their spatial distribution.

The average activity concentration of  $^{238}\text{U}$ ,  $^{232}\text{Th}$  and  $^{40}\text{K}$  were found to be  $33.09 \pm 10.12$  Bq/kg,  $58.37 \pm 18.62$  Bq/kg and  $417.05 \pm 163.95$  Bq/kg respectively while the absorbed and annual effective doses were  $70.48 \pm 24.14$  nGy/h and  $0.09 \pm 0.03$  mSv/yr respectively. Even though the level of NORM is within the world average according to UNSCEAR, however, there is accumulation of radionuclides around Lake Victoria as seen in the maps. Miners (especially women and children) are encouraged to wearing protective masks and clothing to shield them dust and hence exposure to radioactivity. Results from this study will help local and national government formulate policies on artisanal gold mining besides acting as a baseline for future studies.

Key words: NORM, artisanal gold mining, Ordinary Kriging, soil

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