The Kenyan basin of Lake Victoria covers Western, Nyanza and parts of Rift Valley provinces. It is characterized by population densities of $221\pm 154$ km$^2$, $174\pm 127$ km$^2$, $220\pm 148$ km$^2$, $224\pm 183$ km$^2$, $46\pm 56$ km$^2$ in Nzoia/Yala, Nyando, Sondu Miriu, Gucha and Mara basins respectively. There are fifty one large towns (well linked with road networks), sixteen various industries, two oil pipeline deports (in Eldoret and Kisurnu) and in some areas, igneous and sedimentary rocks are found. The agricultural, artisanal mining and industrial activities discharge effluents containing TENORM and anthropogenic heavy metals directly onto land or in water bodies while the rocks through geological weathering results to NORM and naturally occurring heavy metals in L. Victoria basin. River Nzoia is the largest river draining the basin and forms an integral part of the lake shoreline at Port Victoria. The elevated levels of both radionuclides and heavy metals at the shoreline are an indication of anthropogenic pollution in the Victoria basin rather than natural enrichment caused by geological weathering. The aim of the study was to determine the levels and explore multivariate relationships of radionuclides and heavy metals and their fluxes in Lake Victoria shore sediments at Port Victoria. Therefore, bottom sediments from the shoreline were sampled and analyzed for both radionuclide activity and heavy metal concentration using NaI(Tl) and XRF spectrometries and chemometric techniques; principal component analysis (PCA) and hierarchical cluster analysis (HCA). The mean concentration levels of the radionuclides K-40, U-232 and Th-232 were $523.21\pm 26.53$, $66.23\pm 8.55$ and $76.23\pm 7.32$ Bq/kg which were found to be above the world wide accepted average values of 420, 33 and 45Bq/kg respectively. However, the effective dose rate at 0.4 outdoor occupancy factor was 0.629 mSv/y which is below the 1 mSv/y recommended by the ICRP. The mean concentration levels of Ti, Zn, Cu, Mn, Rb, Sr and Zr were $1915.05\pm 103.92$, $43.33\pm 5.32$, $27.15\pm 4.91$, $682.86\pm 21.21$, $39.41\pm 1.04$, $162.95\pm 5.22$ and $113.63\pm 1.18$ ug/g which were found to be below their natural background levels of 4400, 132, 170, 950, 90, 370 and 220 J/kg. However, the mean concentration of Pb was $29.0216\pm 2.41$ ug/g which was found to be above its natural background level of 6 ug/g. The enrichment factors indicated Pb, Rb and Sr are more highly enriched compared to other metals which is an indication of anthropogenic influence at Port Victoria shoreline. PCA performed on the measured data for both radionuclides and heavy metals indicates that U-238 and Pb-214 are mostly TENORM while Th-232, K-40 and Ac-228 as mostly NORM at Port Victoria shoreline. The heavy metals measured in this work were mostly anthropogenic at the Port Victoria shoreline. RCA performed on the measured data apportioned the sources of TENORM, NORM and anthropogenic heavy metal fluxes. U-238 and Pb-214 may be attributed to the applied fertilizers and oil spills in the catchment of Lake Victoria. Th-232, Ac-228 and K-40 may be mostly from the natural weathering of the igneous and sedimentary rocks that characterize the Victoria catchment. Agricultural use of fertilizers, pesticides and fungicides was attributed to be the source of Mn, Pb and Cu respectively in the catchment of Lake Victoria. The industrial discharges from the lake basin were attributed to be the source of Ti, Rb, Zr, Sr and Zn measured from the sediments at Port Victoria shoreline. PCA and RCA performed on measured (radionuclides and heavy metals) indicates a strong correlation between U-238, Pb-214, Mn, Zn and Cu. All these elements are associated with the phosphorous ore that is used to manufacture fertilizers. The continuous application of these fertilizers in the lake basin may be the source of these elements in the Lake Victoria basin. The elevated levels of both radionuclides and heavy metals at the port Victoria shoreline is attributed to the industrial, agricultural, artisanal mining and municipal discharge of effluents within the catchment of Lake Victoria. Through biomagnifications and food chains in the aquatic system, radionuclides can directly or indirectly ionize the living cells of humans.
causing somatic effects such as cancer while some heavy metals such as Pb are very toxic even when ingested in trace amounts. Therefore an urgent need to control pollution (both radionuclides and heavy metals) in the Lake Victoria basin by both government and nongovernmental organizations is called for in this study.