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Study on radioactivity levels in the Kelani River outfall sediments

Knowledge of natural radioactivity in river ecosystems is important in itself as it concerns the most abundant radionuclides on Earth and radiation protection problems. It is also valuable as a reference term to determine the relative importance of artificial radioactivity from controlled or accidental releases. As such establishment of baseline data on radioactivity levels is necessary. This study reports a qualifative and quantitative analysis of gamma radionuclides in the sediments from the Kelani River outfall and attempts to determine their temporal behavior. Fourty sediment samples collected before and after the monsoon rains in 1997 from the near shore region of the Kelani estuary were analysed by gamma spectrometry. Only natural radionuclides were

detected. ^{40} K a mineral constituent of the Earth's crust was the predominant radionuclide representing more than 75% of the natural radioactivity. The activities of ^{238}U, ^{232}Th and ^{40}K ranged from 29-60, 53-117 and 289-416Bq kg^{-1} with mean values of 43,83 and 416Bq kg-1 respectively. The ^{238}U and ^{40}K reported in this study are in the same range reported in river sediments whereas the ^{232}Th levels are higher.

A significant impact due to rainfall on the presence of the nuclides was not observed from the F-test at 95% confidence level. The Th/U activity ratios were greater than unity and could be due to any of the following. The geological substratum of the river basin could be richer in thorium containing minerals and/or Th is low in solubility. The findings of this study would be useful for the purpose of detecting any future changes in radioactivity levels and help to define both local and regional background levels.