

2nd International Convention on

Geosciences and Remote Sensing

November 08-09, 2017 | Las Vegas, USA

Vertical distribution, source and historical trend of aliphatic hydrocarbons in recent sediment cores from Imo River, Southeastern Nigeria

Inyang Okon Oyo-Ita¹, Orok E Oyo-Ita¹, Unyime U Umoh² and Ugim S Ugim¹¹University of Calabar, Nigeria²Tongji University, China

Four recent sediment cores (0-30 cm long) from Afam (AF), Mangrove (MG), Estuary (ES) and illegal Petroleum Refinery (PT) sites of the Imo River, Southeastern Nigeria were analyzed using Gas Chromatography-Mass Spectrometry (GC-MS) in order to characterize the sources, distribution and fate of aliphatic hydrocarbons, as well as examine their historical trends of deposition and assess human-induced changes in the last ca. 5 decades. Evaluation of proxy parameters such as carbon preference index (CPI, 2.01-2.19), carbon number maximum (C_{max}, 29, 31) and atomic C/N (16.51-31.32) for the most recent top layers (0-5 cm) revealed greater wash-in of land-derived organic matter (OM), attributable to the recent rise in water height/flood following intense rainfall occasioned by global climate change. The bottom layer (PT1, 25-30 cm) of the PT core deposited ca. 1964-1972 exhibited a CPI of 0.97 and pristane/phytane (Pr/Ph, 3.75), suggesting that oil bunkering/illegal refinery activity had begun in the region ca. 8 years after the first commercial discovery of oil in Nigeria in 1956. The non-detection of petroleum biomarkers (e.g., $\alpha\beta$ -hopanes) in the bottom layer (MG1, 25-30 cm; 1964-1972) of the MG core revealed a period of relatively pristine depositional environment and the occurrence in high abundance of heptadecane (C₁₇) in the middle layer (ES4, 10-15 cm, ca. 1981-1989) of the ES core corresponded with the period of eutrophication that blocked the waterway in the area. Measurement of a marked unresolved complex mixture (UCM) at the near-top layer (AF5, 5-10 cm) of the AF core indicated that the heaviest contamination by petroleum hydrocarbons occurred at ca. 1997-2005. This time frame coincided with the period of intensive bunkering and oil pipeline vandalism by Niger Delta militant groups who campaign for fair allocation of oil revenue in the oil-rich region.

inyangoyoita@yahoo.com