

Occurrence, distribution and sources of petroleum contamination in reef-associated sediments of Gulf of Mannar, India

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Gas chromatography with mass spectrometer was used to quantitatively analyze saturated hydrocarbons, including n-alkanes, isoprenoids, petroleum biomarkers, and polycyclic aromatic hydrocarbons (PAHs) in sediment samples collected from the sea subsurface of Mandapam Group of islands in the Gulf of Manar, Tamil Nadu, India. The study employed various indices and diagnostic ratios to differentiate between biogenic and anthropogenic sources of input and to identify sites of petroleum contamination. The presence of petroleum pollution was indicated by a low Pristane to Phytane ratio, the identification of hopanes and unresolved complex mixture (UCM). The evaluation of petrogenic sources of contamination in marine sediments was also carried out by analyzing PAHs which provided a nuanced understanding of the source of petroleum contamination. A multivariate approach was used to improve the assessment of anthropogenic influence on marine ecosystems. Results indicate that sites associated with human activities such as shipping, industrial discharge, and sewage outfalls were more likely to exhibit molecular indicators of petroleum contamination, which disrupt the equilibrium of the ecosystem and damage seagrass and coral populations. The study also assessed the impact of hydrocarbons on the ecosystem by analyzing C₂₀ highly branched isoprenoid (HBI), a crucial molecular indication of diatom ooze which tend to impair the coral community.

