# Exploration of Hydrocarbons in Gulf of Kutch Using Geochemical Techniques

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Near surface soil and shallow seafloor sediment samples collected from the Kutch Basin, located in the northwestern part of India, have been analyzed for hydrocarbon gases resident in samples. The data on sediment samples show that the methane ($C_1$) and heavier hydrocarbon such as ethane ($C_2$) and propane ($C_3$) content ranges between 7 to 261 and 1 to 19 ppmv respectively. The scatter plots among various hydrocarbon components ($C_1$ vs. $C_2$; $C_2$ vs. $C_3$ and $C_1$ vs. $C_3$) show excellent linear trends ($r > 0.8$) indicating that these gases are genetically related and might have been sampled from a thermogenic source.

Total Scanning Fluorescence studies carried out on these sediments indicates presence of aromatic hydrocarbons. The stable carbon isotope signatures of individual hydrocarbon components ($\delta^{13}C_1$ -44.0 to -37.7‰; $\delta^{13}C_2$ -30.5 to -24.6‰; and $\delta^{13}C_3$ -34.0 to -26.1‰ V-PDB) also indicate thermogenic source for these gases. Extending analogy used for seep gas analysis to the present study, it is probable that these sediment gases might have been derived from mature reservoir source such as from oil zone. The preliminary investigation suggests that the area is warm for future hydrocarbon exploration.