

Integrated Geochemical Studies of Hydrocarbon in Proterozoic basins

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There are number of unexplored Proterozoic basins for hydrocarbon in India. These basins are characterized by varied geology, age, tectonics and depositional environments. Hydrocarbons generated and trapped beneath the sub-surface seeps to the surface in varying but detectable quantities. Diffusion, effusion, and buoyancy allow these hydrocarbons to escape from reservoirs and migrate to the surface where they are retained in the sediments, diffuse to atmosphere or water columns. Based on these assumptions, surface geochemical prospecting lab has been developed to identify the surface or near surface occurrences of hydrocarbons. The facility includes adsorbed soil gas surveys in light hydrocarbon (C₁-C₄), ¹³C/¹²C measurement on C₁-C₄ and microbial techniques. Surface geochemical research for hydrocarbon was carried out in various in parts of Vindhyan basin, Cuddapah basin, Kaladgi basin, Kutch basin and Jamnagar sub-basin.

Soil samples from Vindhyan, Cuddapah and Kaladgi basins were analysed for light hydrocarbon, Carbon isotopic ratio and microbial analyses. Cross plot between C1-C2, C1-C3, C2-C3 show linear correlation which indicates that light hydrocarbon migrated from thermogenic source. Pixler plot (C1/C2 and C1/C3) plot distinguish the non productive zone from oil/gas producing zone. δ¹³C analyses of C1-C4 suggest thermogenic source for these hydrocarbon. Microbial analyses for MOB and POB also show anomalous concentrations in some of the samples. Integrated geochemical studies in these Proterozoic basins suggest warm area for hydrocarbon exploration.