

Source Rock Evaluation and Petroleum System Modeling in a Part of Bengal basin, India

Adarsh K. Sinha, Vibha Prabhakar, B. L. Sharma, Jagat Ram, M. M. Rajkhowa, D. K. Srivastava, I.V.S.V. Prasad, Harvir Singh, and R. R. Singh

Geochemistry Group, KDMIPE, ONGC, Dehradun-248 195, India

aks1010@gmail.com, Sinha_ak2@ongc.co.in

The Bengal basin, the largest fluvio-deltaic sedimentary system on Earth, is located in the Himalayan foreland at the junction of the Indian, Eurasian, and Burmese plates. It is broadly divided into a stable shelf and a foredeep separated by a deep seismic hinge zone. The narrow elongated hinge zone separates the thick post Eocene sediments in the east from the shelf zone of the west. The study area covers NELP-VII blocks WB-ONN-2005/2 and WB-ONN-2005/4 covering both the shelfal and basinal part on both sides of hinge zone. During Gondwana times most of sedimentation took place towards western side and later the depocentre shifted towards east. Increasing supply of sediments from rising Himalayan range in the north, transported by developing river systems, led to molasses type of basin. The high load of sediments towards south-east caused the main tilt of entire western margin plate (Moore and Lyenberger, 1994). The approx. 22 km thick Early Cretaceous–Holocene sedimentary succession has long been of interest for hydrocarbon exploration.

All hydrocarbon shows are from onshore wells and distributed in Cretaceous to Pliocene indicating that hydrocarbon generation has taken place in the basin. But there has been no sustained flow except in wells IP-1 and GG-1 (gas and oil) and GP-1 (gas). The liquid hydrocarbon from IP-1 (Oligocene) is a well preserved, low density (API Gravity 47.74), low pore point (-15°C), low wax crude, more like a condensate. The gases from GG-1 (Eocene), IP-1 (Oligocene), M-1 (Miocene), B-2 (Miocene), J-1 (Eocene) and GP-1 (Eocene) differ slightly in isotopic and chemical compositions but all are thermogenic in nature.