

Paradigm Shift in Exploration Strategy: Identification of Prospective Corridors in Ramnad- Palk Bay Sub Basin, Cauvery Basin, India

Chandan Chakraborty, D. K. Srivastava, M. S. Rana, V. M. Saxena, and G. C. Sati

BSD, KDMIPE, ONGC, Dehradun

chanchak2@yahoo.com

The basin architecture of Ramnad sub basin of Cauvery basin in the Pre-Albian and Post-Albian set up have been evaluated for its tectono-sedimentation and prospectivity. The study identified two prospective corridors adjoining lesser explored West Palk Bay and East Palk Bay lows, which may establish more HC bearing structures in this sub basin for its substantial asset growth.

The morpho-tectonic elements of Cauvery basin are well defined by the deep-seated basement controlled fault systems with a series of sub-basins and ridges. The present study in Ramnad –Palk Bay sub basin, one out of six sub basins of Cauvery basin, identifies three basement related depocentres viz Ramnad low in the onshore part, West Palk Bay and East Palk Bay lows in the offshore part. The deepest Ramnad low, the principal kitchen area, is fairly explored and established five hydrocarbon bearing structures, believed to be mainly sourced from Pre-Albian sediments. The other two depocentres i.e. West Palk Bay low and East Palk Bay low in the off shore part holds sediments over 5000m at their respective deepest part, ranging in age from Lr.Cretaceous to Recent.

In Ramnad low, the lull period of tectonic activity coupled with high rate of sedimentation during Pre-Albian time shrunk its spread from its basement position. The renewed tectonic activity during Albian time helped in regaining the spread of Ramnad low and with passage of time, the basinal deep of Ramnad low started shifting towards east- northeast. The West Palk Bay low, separated from Ramnad low by a NW-SE high trend at basement level, obliterated during Pre-Albian time due to lesser tectonic activity coupled with high rate of sedimentation. Later some selective reactivation resulted in inversion bordering the low. This inversion related structuration with respect to its critical time demand merits for exploration. Whereas, the East Palk Bay low shows progressive spreading in space and time with continued tectonic activity along with lesser amount of sedimentation compare to other lows and being considered as another potential depocentre for commercial H.C generation and migration.

The abundant mature Valangian source sequence in recently drilled LK-H well in Ramnad area and also in QI-C well near East Palk Bay low led us to infer good amount of source sequence in Pre-Albian and Albian sediments in the basinal low. Hydrocarbon generation and maturity modeling based on drilled as well as synthetic locations in respective basinal deep reveals Pre-Albian sediments of West Palk Bay low and Albian & Pre-Albian sediments of East Palk Bay low entered hydrocarbon generation stage (0.7 VRo) at 59mybp and 58mybp respectively.

The structural analysis based on relief and chronopach of Pre-Albian, Albian and Post Albian sequences have brought out several high trending corridors among which the gentler flank of East Palk Bay low and N-S and NW-SE trending high corridors of respective western and southern part of West Palk Bay low would be the most prospective targets and need paradigm shift in exploration strategy in Ramnad-Palk Bay sub basin.