

Hydrocarbon Prospectivity of Potential Panna Formation in North-Western Tapti-Daman Block, Mumbai Offshore Basin, India*

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Abstract

The Mumbai Offshore Basin is the most prolific producer among the petroliferous basins of India and is divided into six tectono-sedimentary blocks namely, Diu block, Tapti-Daman block, Panna-Bassein block, Mumbai High-DCS block, Ratnagiri block, and Shelf margin block. The Tapti-Daman block, wherein the study area ([Figure 1](#)) is a part, occupies the northern-most component of the Mumbai Offshore Basin and is unique in terms of its location between Cambay depression towards north and Bombay High area towards south; although it has very little geological resemblance with the later one. Unlike the Mumbai Offshore basin, where the production is primarily from the carbonate reservoirs of Miocene and Middle Eocene age, the Tapti-Daman area is characterized by the intertidal to shallow-marine finer clastic sequence. The stratigraphic sequence encountered in the study area ranges from Paleocene to recent ([Figure 2](#)).

In the present study, an approach has been made to bring out a deterministic model of the various sand bodies within the Panna Formation, by studying the petrophysical parameters obtained from the well log-data. The Panna Formation overlies Deccan Trap and is composed of sandstone and claystone at the bottom, overlain by a section of coal-shale alternation and succeeded by shale unit at the top. The formation displays considerable facies variation and at places, it is represented by a fairly thick Trapwash sequence consisting of reddish brown claystone and siltstone. This formation has been deposited in a fluvial to shallow marine environment during Paleocene to Lower Eocene times.

The petrophysical parameters considered in the present study, are imperatively significant and comprises of shale volume, effective porosity, and water saturation. The envisaged model indicates that the Panna Formation has good hydrocarbon potential, with an average porosity between 10% and 20% and water saturation ranging from 50% to 70%. Efforts to locate oil and gas pools within this formation in the study area, will definitely enhance the exploratory and producing activities beyond the frontier basins.

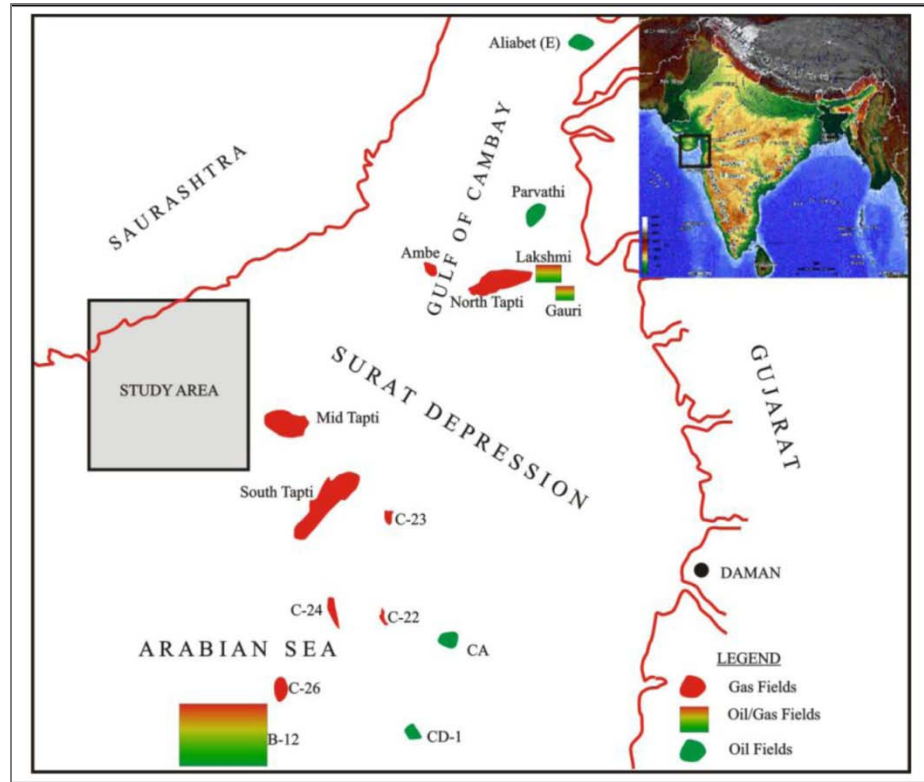


Figure 1. Location map of the study area.

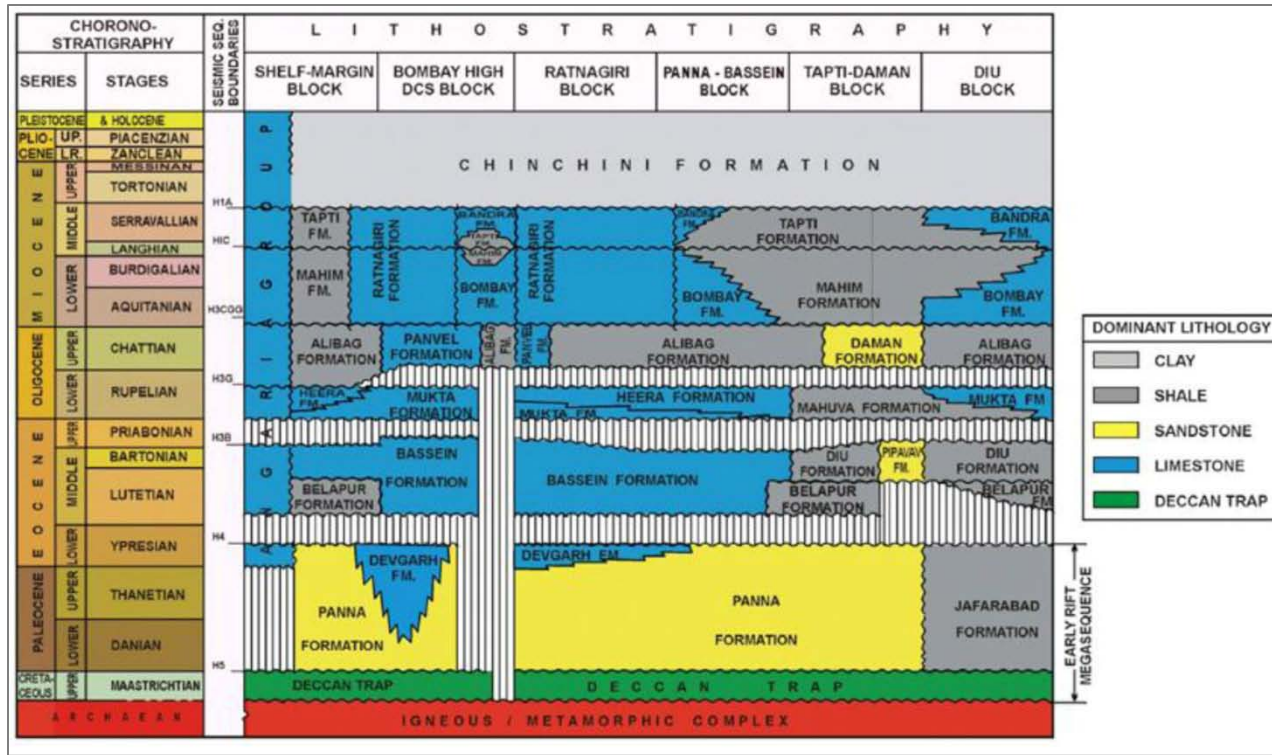


Figure 2. Generalized Litho-Stratigraphy of Mumbai Offshore Basin.