

Fractured Basement Oil: A significant untapped hydrocarbon play in Western offshore Basin, India.

*S. K. Biswal**, *Harilal and H. S. Vachak*,
GEOPIC, Oil and Natural Gas Corporation Ltd, Dehradun.
**sudhansubiswal@rediffmail.com*

Abstract

The present study focuses the exploration activities for fractured Basement oil of Mumbai High field in Western Offshore Basin of India. This field is a giant oil field in Miocene carbonate reservoirs sitting on the basement high. Many wells were drilled into the basement and presence of hydrocarbon has already established in few wells. Generally basement oil is regarded as non-productive and has failed to draw the attention of the explorationist. The present work was carried out to address the challenges in qualitative characterization of lithologically different and mineralogically heterogeneous fractured and foliated basement rock for hydrocarbon exploration. Fracture identification within basement is still in infancy.

The available geophysical, geological, petrophysical data have been integrated for identification of fractured basement along with the findings of the earlier workers. 3-D seismic attributes in association with drilled well results, mostly explain the occurrence of fractures in the basement. Curvature and windows attributes in reference to basement top can be interpreted for identification of fractures. Decrease in the amplitude near sediment-basement interface is interpreted as decrease in impedance contrast due to fracturing/weathering of the basement. In addition, basement typing, paleotectonics and the evolutionary history of the basement play a major role in identifying the fractured zones. Major fractures are associated with the igneous/metamorphic rocks present in Mumbai High south close to the main Mumbai High East fault. Quantitative characterization of basement rock is a challenge due to the degree of complexity, non availability of good quality seismic data, non availability of image logs and absence of sufficient deep penetrated wells. Use of advance interpretation techniques, e.g., multi-component seismic and borehole breakouts, FMI logs, rock physics etc. are still to be applied for modeling the basement fractures.

The present study has brought out areas of fractured basement which are highly prospective for hydrocarbon accumulation.