



# Unconventional Exploration in Indian basins - An Overview

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## Abstract

Unconventional exploration in Indian Basins is gaining movement in the recent years as the Easy Oil days have gone and the quest for oil & gas reached to deeper and unconventional reservoirs like sub basalt, basement, HPHT, shale gas and ultra-shallow to deep to ultra-deep waters in offshore. As the companies are offering various technologies and the cost has become a concern as the oil prices are dipping to the bottom, judicious selection of technology depending upon the seriousness of the geological problem and the techno-economic scenario of the field is to be explored.

In this paper, author tried to address the issues related to the Indian scene and the possible solution to the problems envisaged to be encountered.

## Introduction

Indian basins, including onshore and offshore, have always been challenging and always known to be providing learning experiences for geoscientists.

Basement exploration in Western onland basin in Padra area, Western offshore in Mumbai High, Heera fields, in Cauvery onland, Madanam, Pandanallur and Mattur Pundi areas and in Borholla area in Assam -Arakan areas identified locales for Hydrocarbons. Good seismic data and reasonable data with proper conditioning efforts can provide information about basement fracture scenario in a better way.

Sub-basalt Exploration: In Kutch offshore, sub basalt exploration has paid dividends. In western onland exploration for sub basalt mesozoics has been carried out by ONGC and search for Mesozoics has been carried out in KG and Cauvery too. Efforts need to be put up in this line to explore this hidden treasure with upcoming technologies in the industry.

HPHT in KG and Cauvery is not uncommon. Hydro-fracturing of tight reservoirs is also a daunting task in the area. Temperature and pressure measurements in this environment are of utmost importance as this is the basic need for dealing with the drilling hazards expected.

India is now planning to go ahead in a big way to explore shale gas reservoirs in India for example Cambay shale in western onland, Raghavapuram shale in KG and Andimadam, Bhuvanagiri in Cauvery basins are known for shale prominence. Technologies available and know how in this potential sector is still upcoming in India.

Deep waters, ultra-deep waters, ultra-shallow waters are always posing challenges as the huge money involved and restricted success due to many reasons.

Author discusses in the coming paras about the possible ways to explore the said potential fields with reference to Indian context.

## Discussions

Basement exploration needs availability/accessibility to essential amenities to identify the fracture network. Industry is now keen to provide various methodologies to pinpoint the locales. Understanding the primary and secondary porosity networks and the necessary permeability factors require reasonably good seismic data. Almost all companies are claiming to provide broadband seismic data and claiming to take good care of available data for increasing the bandwidth considering feasibility percentage factor.

Sub basalt exploration needs good migration of data with reasonably longer offsets to collect the requisite reflections from basalt and below. Imaging both top and bottom of the basalt is a daunting task in Kutch and Kerala Offshore. Rugosity affected the bottom reflection of basalt at places and multiples played dominant role in places where top basalt is clear and plain in hiding the image from mesozoics. Judicious selection of processing parameters by multi-disciplinary G&G teams lead to acceptable solution in this scenario.

It is pertinent to note at this juncture that industry many a time tried to deal with basalt and salt together. Basalt in India behaved in an entirely different way warning us to deal with it differently. Beam migration with above said precautions helped us to identify the path for success. Present day technologies for broadband processing may pave the way for betterment in this part of exploration.

HPHT environment in KG in Bantumilli and Kottalanka and in fields in Cauvery warranted to go in to this arm of exploration. Hydro-fracturing of tight reservoirs is also a daunting task in the area which needs a solution for environmental issues in addition to the technological

