

# **Detection of Natural Hydrocarbon Seepages Using SAR Technology and Associated Subsurface Studies in Offshore Mahanadi Basin for Delineation of Possible Areas of Hydrocarbon Exploration**

**H. D. Dave, S. Mazumder, J. K. Samal, K. K. S. Pangtey, and D. S. Mitra**

*Remote Sensing & Geomatics KDMIPE, Dehradun*

[davharsh@gmail.com](mailto:davharsh@gmail.com)

Hydrocarbon seepages in oceans are direct indicators of the existence of a petroleum system in deep water basins and detection of such seepages helps in lowering the cost and risk involved in the exploration activities. Detection of offshore oil seepages by radar satellites offers a cost effective means of locating such offshore oil reserves. Seeps are surface expressions of migration pathways of hydrocarbons where oil and gas seeping out of faults opening in the sea bed are transported to the sea surface due to their buoyancy in the form of thin oil films covering bubbles of gas. At the sea surface, these gas bubbles burst with the oil films forming oil layers on ocean surface.

In normal conditions, capillary waves on the sea surface reflect the radar energy to produce a bright image. However, if oil is present in the sea surface, it dampens the wave signature and is detected as a dark area on a bright surface. The amount of the backscattered radiation in the oil covered region detected by the SAR sensors is less than the surrounding sea as the oil decreases the aerodynamic roughness of the ocean and consequently decreases the radar backscatter (Bartsch.N et.al. 1987).

An attempt had been made to identify such hydrocarbon seepages in Mahanadi offshore area from ENVISAT ASAR and ERS data and correlate them with free air gravity, and available seismic data so that they can be tied up with sub surface features, instrumental in generating or contributing oil for the detected seepages.