

Analysis of Remote Sensing Imagery data over Narmada - Cambay / Deccan Syncline region -Central India

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Abstract

In search of new areas for hydrocarbon exploration, integrated ground geophysical studies have been taken up in Central India with seismic, magnetotellurics, deep resistivity and gravity surveys. Since the region is covered with basalt and well known for its intensive tectonic activity, remote sensing method seems to have a value addition to the subsurface information derived from geophysical, geological and tectonic studies. The Narmada and Tapti rift zone and Deccan basalt co regions of Central India, stems from its complexity. A Resourcesat-1 (IRS-P6) LISS-III satellite images covering an area of approximately 302,500 sq. km corresponding to the region in and around Baroda (Vadodara), Indore, Nandurbar, Khandwa, Akot, Nasik, Aurangabad, Pune and Latur in Central India was digitally processed and interpreted to present a schematic map of the geology and elucidate the structural fabric of the region.

In the present study, the remote sensing data of four different bands; Band-2, Band-3, Band-4 (NIR) and Band-5 (SWIR) are analysed. These data sets are compared with regional geological map, regional tectonic map, surface elevation map drainage maps and by ground truth studies. From our study, the disposition of the intense dyke system, various faults, buried river channels and lineaments in the region are delineated. Among which some are well correlatable with the known features and a few of them are new from our study. New features indicated from Remote Sensing (RS) image analysis are verified by ground checks. They have shown good correlation with lineaments/dykes and have revealed distinct ENE-WSW trend, which are more prominent near Narmada and Tapti river course. Evolution of these features with Deccan volcanism is discussed with available geochronological data set. Part of this

area was covered by multiparametric geophysical surveys conducted by NGRI using integrated deep electrical, wide band magnetotellurics, seismic and gravity, studies. They have provided Deccan trap thickness map, sediment thickness map and depth to the basement map. The lineaments, dykes indicated from the RS analysis have shown correlation with major trend of the subsurface features. These findings are significant in relation to structural data and form a part of the geo-structural database for ground surveys.

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