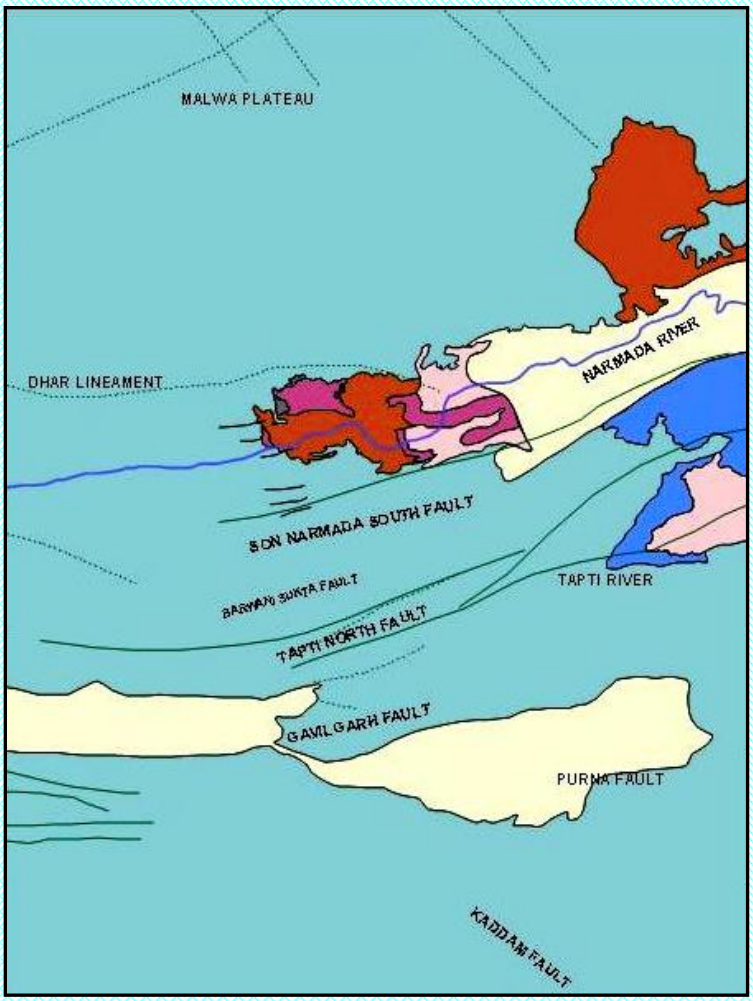
MAGNETOTELLURIC INVESTIGATIONS ALONG AKOLA-SEHORE AND INDORE-JALGAON TRAVERSES IN CENTRAL INDIA

PROJECT SUPPORTED
by
DIRECTORATE GENERAL OF HYDROCARBONS
(Ministry of Petroleum and Natural Gas)
NEW DELHI



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by
NATIONAL GEOPHYSICAL RESEARCH INSTITUTE
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HYDERABAD- 500 606, INDIA
JANUARY, 2009

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ABSTRACT

In search of hydrocarbon potential regions, the Directorate General of Hydrocarbons, New Delhi, has taken up various exploration programmes. Towards this direction two long traverses in central India have been identified, and accordingly NGRI has taken up wide band magnetotelluric studies to delineate the sediments buried below the volcanic rock cover – Deccan traps. The two traverses surveyed are Sehore-Akola and Indore-Jalgaon with a length of about 270 and 190 km respectively are oriented nearly in NS direction covering the well-known Narmada-Son lineament zone. A total of 100 stations are occupied along these traverses and acquired the data in 1000 Hz. – 0.001 Hz frequency range. The data have been processed and modeled using the industry standard software packages – MAPROS, GEOTOOLS and WINGLINK. 2D modeling of the data of both the traverses has been carried out after removing the local distortions using Groom-Bailey decomposition scheme and also down weighted the apparent resistivity to reduce the static shift effects.

The subsurface geoelectric section derived along the Akola-Sehore traverse has exhibited that the basement towards northern part is shallow (0.5-1 km) up to Narmada South Fault (NSF). The basement depth gradually increases towards south to about 4 km coincides with the location of Gavligarh Fault (GF). Further south the basement depth sharply decreases to 1.5 km. There seems to be thin or nil sedimentary layer below the trap cover towards northern part of the profile. However, south of NSF the subtrappean sediments are delineated with a thickness gradually increases from a few meters to a maximum thickness of 2km up to GF and again thinning further south of the traverse. The trap thickness is 1-2 km towards south of the profile and decreases to less than a km towards north. The Alluvium cover towards northern end of the profile is few tens of meters thick underlain by thin (<250m) volcano-sedimentary sequence rocks and Deccan traps.

The shallow geoelectric section along Indore-Jalgaon traverse show the basement depth less than a km towards north steeply increases to about 3-4 km coinciding with NSF and gradually decreases to 2 km further south of the traverse near Jalgaon. The subtrappean sediments are either thin or absent towards north of NSF but its thickness sharply increases to 2-2.5 km towards south of NSF and gradually decreases to 1 –1.5 km further south. Deccan trap thickness is less than a km towards north and increases to about a km south of NSF and also further towards south near Jalgaon. The Deccan trap layer is overlain by alluvium cover towards south, i.e. north of Jalgaon with a maximum thickness of 500m.

A few deep anomalous high conductive vertical features have been delineated along the profile near NSF, TNF, GF and PF–Purna fault. These conductive features, probably indicative of deep crustal signatures that might have played a role in vertical block movements within the NSL zone.

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