

2D GEO-ELECTRIC STRUCTURE ACROSS VOLCANIC PLUGS IN JUNAGADH AREA OF SAURASHTRA USING MAGNETOTELLURICS

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A magnetotelluric survey has been conducted along a traverse of 220 km oriented in SW-NE direction, covering three major geological formations covering 18 broad band MT sites in Saurashtra peninsula. The traverse passes over Tertiary sediments, Deccan traps on the SW side and Mesozoic sediments on the NE side.

The Porbandar formations and alluvium are well reflected close to the coast with a thickness 1 Km. The plutonic masses towards SW of Rajkot are well reflected in 2D subsurface geo-electric section. A significant change in geological structure (from about 3 km. onwards) has been observed at sites close to NE side of the profile. Undulating basement topography has been observed throughout the traverse with as shallow as 1 km on NE side to as deep as more than 5 km. at other sites. The most interesting feature in this traverse is that the deeper structure in the SW direction is highly resistive. Another interesting feature observed is that two deep conducting features separated by a highly resistive structure is prominent in NE part of the profile at some sites indicating deep tectonic activity, probably during the Cretaceous period.

Study of gravity anomalies along the traverse are correlatable with the geo-electric section obtained through 2-D modeling. Mesozoic sediments in SW part is either thin or absent, but is well reflected upto depths of at least 500 m. towards the NE part. Extension of exposed sediments beneath the Deccan traps (~65 Ma) is seen at sites close to NE side with a thickness of about 500 m. A highly resistive feature has also been observed upto upper mantle levels at a site close to NE side.

In the present study the deep electric structure of Saurashtra peninsula is discussed in relation to its earlier tectonic activity of upliftment, erosion of volcanic plugs etc.

Saurashtra peninsula

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