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Deep Crustal structure near Puga Geothermal field, NW Himalaya, India and its relation to plate collision tectonics

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The collision boundary of Indian plate and Eurasian plate is considered to be an active region from geodynamic implications such as high seismic activity and distribution of geothermal springs over the Himalayan belt. The Puga geothermal field, located towards near Indus suture zone, is considered to be an important geothermal region in Indian sub-continent from geological and shallow geophysical studies. Deleneation of the deep structure is an essential component to derive the evolution and the geodynamic processes involved in collision zones. In order to derive the geo-electric structure related to the geothermal source in the region, broad band magnetotelluric (MT) (1000 Hz - .001 Hz) studies are carried out in Puga geothermal field. The invariant transformation models and 2-D modeling results of MT sounding data indicate the presence of shallow (< 400 m) and deep (2 km) conductive zone related to geothermal anomaly. Modeling of the data along three profiles and dimensionality studies (Phase sensitive skew and Swift skew) point to the presence of three-dimensional (3D) electric structure beneath the anomalous area and signify a 3-D model of the data. In the present study, the geo-electric structure of the area is analyzed using 3-D modeling studies using short period data. Deep electric structure derived from the long period data near the Indus suture is discussed with its relation to plate collision tectonics in the region.