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Gravity magnetic survey across Moyar Bhavani Shear Zone, Southern Granulite Terrain, India and its implications for Neoarchean-Paleoproterozoic subduction-accretion tectonics:

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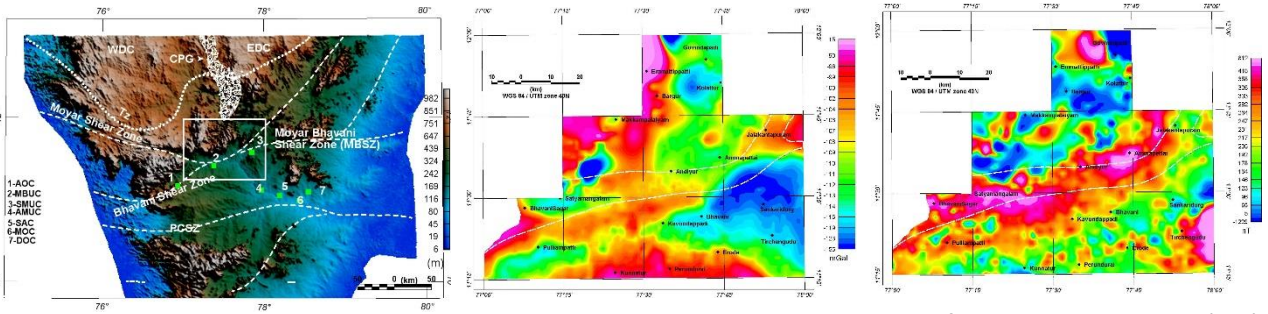
Southern Peninsular India, a key component for understanding crustal accretionary history from Archean to Proterozoic , is composed of two prominent crustal provinces , the granite-greenstone belt as Archean Dharwar Craton (DC) in the north and granulite facies collage in south, the Southern Granulite Terrain (SGT). The accretion of SGT to DC is believed to be marked by a Paleoproterozoic suture known as Moyar Bhavani Shear Zone (MBSZ) or recently named as Moyar Bhavani Suture Zone (MBCS) , representing a distinct crustal domain and fossil of Mozambique ocean, closure of which juxtaposed the northern part of SGT and DC . The study area forms a part of the highland charnockite massif in the north and low lying gneissic terrain in south, separated by a NE-SW trending ductile shear zone (MBSZ).The southern periphery of MBSZ is dotted with domal shaped granotoids bodies of Neoproterozoic age. MBSZ is intruded by Meso to Neoarchean mafic-ultramafic complexes in



association with amphibolites and rare ferruginous quartzite (BIF). Recently ophiolite complexes (AOC, Fig:1)) are reported at BSZ which are interpreted to be a manifestation of Suprasubduction Zone setting [1].

Gravity Map, *Figure: 3 Magnetic Map*

The Bouguer gravity map and the total horizontal derivative map show disposition of mafic-ultramafic bodies along the shear zone and gravity maxima along the shear zone, conforming MBSZ as a terrain boundary. The southern periphery of the shear zone is mainly marked by low gravity anomaly attributed to granite plutons and thickening of the crust. The gravity high at north and north western corner indicates emplacement of high density rock units and mantle upwarp. Magnetic anomaly map shows predominantly low anomalies north of MBSZ representing of charnockitic crust while the moderate anomaly south of it, represents gneissic crust. It implies presence of two magnetically distinct crustal domains in north and south of MBSZ. The shear zone itself is represented by magnetic high which may represent amphibolites. The magnetic lows within the high represent emplacement of pyroxinites/metagrabbos.

The gravity magnetic study shows that the MBSZ represents a suture/terrain boundary and the high density rock units along the shear zone may represent fossil of oceanic crust. Thickening of crust from north to south may be indicating a southward subduction of DC into SGT.

References:

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