

Structural Geometry and Tectonics of Southern Part of Karachi Arc - A Case Study of Pirmangho & Lalji Area

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The south-western end of the Kirthar fold belt is underlain by Nari and Gaj Formation of Oligocene- Miocene ages respectively deposited on the northwestern edge of the Indian continental shelf. Structures are northeast-southwest oriented with folds plunging mainly towards southwest. Pir Mangho anticline and Lalji synclines are the major structures of the region. Both are fault induced folds indicated by their double hinges and kink geometries. Thrust is blind and not exposed in the region; however several sinistral strike slip faults transect the areas which are antithetic to the tectonic transport of the Karachi arc. The upper detachment lies in the Metan clays at the base of the Gaj Formation while the lower detachment lies probably within the Eocene shale.

Major folding of the strata has taken place on frontal ramps while at places oblique ramps are also the cause of some folding. Pir Mangho dome is a consequence of thrusting on such a pair of ramps. Structural vergence indicates tectonic transport towards southeast. However, structures of the region may have been initially north south oriented and may have been rotated clockwise, evidenced by the presence of some extensional structures to the south of the area. However, partly structural geometry of the Karachi arc is original, evidenced by the presence of en-echelon folds. Eastward tectonic transport of the Karachi arc is post Miocene in a thin skinned fashion as a result of India -Arabia convergence.

These structural geometries extend towards north and northeast all along the Karachi arc and the Kirthar fold belt. Pir Mangho- Lalji area studied can be used as an analogue to interpret and explore the region.