STRUCTURAL INTRICACIES: EMERGENT THRUSTS AND BLIND THRUSTS OF KACHCHH, WESTERN INDIA*

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EXTENDED ABSTRACT

Kachchh peninsula forms an example for active thin skin *'fold-and-thrust'* tectonics There are three conspicuous major E-W oriented mountain fronts characterised by fault-propagation folds with steeply dipping northern limbs and gently dipping southern limbs These three fold-and-thrust belts are known as, (i) Island Belt Fault, (ii) Kachchh Mainland Fault and (iii) Katrol Hill Fault

The region constitutes a Mesozoic rift basin located in the western margin of India and has recorded nearly an unbroken sequence of Mesozoic and Cainozoic formations Owing to intense compressional stresses, now the basin appears to be closing down leaving a salty-marshy land, *'neither a sea nor a land-like vast basin'*, known as the Great Rann of Kachchh in the north flanked by Little Rann of Kachchh in the east Apart from Mesozoic and Cainozoic sedimentary sequences there are numerous intrusive plugs, dykes and sills mainly of basic-alkaline composition By and large the sedimentary rocks are seen younging form north to south and westward Rocks older than Jurassic period are not exposed in Kachchh Nowhere the basement rocks on which Mesozoic-Cenozoic sequence deposited are encountered in the region

Commonly observed structural features are steeply dipping to vertical normal faults These are encountered mainly in the vicinity of igneous intrusives Reverse faults observed in the region are of the nature of low angle to sub-horizontal thrusts, encountered mostly along the mountain fronts, which in turn represent fault-line scarps, i e eroded hanging wall or hinge of fault-propagation folds Mesoscopic asymmetric folds are seen at several places along the mountain fronts Traces of steeply dipping eroded northern limbs are discernible at a few places, while gently dipping to sub-horizontal southern limbs of regional folds are quite obvious in Kachchh Mainland as well as in the northern islands At places the northern limbs are seen to have overturned, often giving rise to recumbent folds *'Triangular shear zone'* at the core of fault-propagation folds are exposed at a few places The Quaternary aeolian deposit known as miliolites are seen deformed developing asymmetric folds The above features indicate structural inversion of Kachchh basin and prevailing tectonic activity

The Island Belt Fault is seen dissected by strike-slip faults with left-lateral sense of movement The main reason appears to be due to the differential movement of the segments owing to anisotropy of the lithologic units, particularly the large igneous intrusives bodies and northeasterly-directed compressive stresses The igneous intrusive bodies have also modified the geometry of fault-propagation folds along the Kachchh Mainland Fault as well as Katrol Hill Fault Zone

While the fault-propagation fold in Katrol Hill Range has evolved into an *'emergent thrust'* or *break thrust'*, the fault-propagation fold in Kachchh Mainland Hill Range has remained a *'blind thrust'* From the gradual dwarfing of the linear chain of hillocks towards the east along the Kachchh Mainland Fault and the epicentre of present earthquake of 2001 lying at the eastern extreme of Kachchh Mainland Fault, it appears that the eastern part of Kachchh Mainland Fault is progressively emerging upward Along with Kachchh Mainland Fault, the Banni region also deserves to be monitored for seismicity as it has developed gentle monoclinal features It is most likely that Banni Fault forms the axis of a laterally emerging 'fault-propagation fold'

As has been observed, all the villages situated just above the *'blind thrust'* were totally destroyed during the "2001 Republic Day Earthquake", *viz* Jawarharnagar, Khirsara, Devisar, Amarsar and Bandhdi It is curious to note that the same villages were subjected to complete destruction during "1956 Anjar Earthquake" as well Thus it appears that the *'blind thrust'* along Kachchh Mainland Fault was affected during 1956 and the epicentres of both earthquakes lie in close proximity The *'blind thrust* described above is restricted to the cover rocks, i e 4-5 km thin sedimentary cover The seismogenic regional thrusts, however, lie in the basement at greater depth To understand the seismicity of the region, a systematic study of the nature of the basement rocks using geophysical methods is needed The nature of basement rocks together with sedimentary cover and large bodies of intrusive rocks add to the anisotropy of the region

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