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Landscape Evolution of Kachchh palaeo-rift basin, Western India: Quaternary Climate and Tectonic Odyssey

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Abstract:

Kachchh intra-plate, marginal cratonic basin generated during the rifting phase of Gondwana in late Triassic time, while the rift generated half-grabens made a room for the Jurassic and Cretaceous sediments. Post Indo-Eurasia collision tectonics has evolved the once subsided cratonic blocks to the present day varied rocky landscape to the Quaternary salt playa terrain in Kachchh, western India. They evolved through the original weak planes that behaved normal during rift and reverse during uplift [1]. These E-W striking faults from north to south in the basin are: Nagar Parker Fault (NPF), Island Belt Fault (IBF), Kachchh Mainland Fault (KMF) and North Kathiyawar Fault (NKF) (Fig 1) [1]. There are numerous

N-S, NW-SE, NE-SW striking transverse faults that segmented the E-W master faults at many places [2].

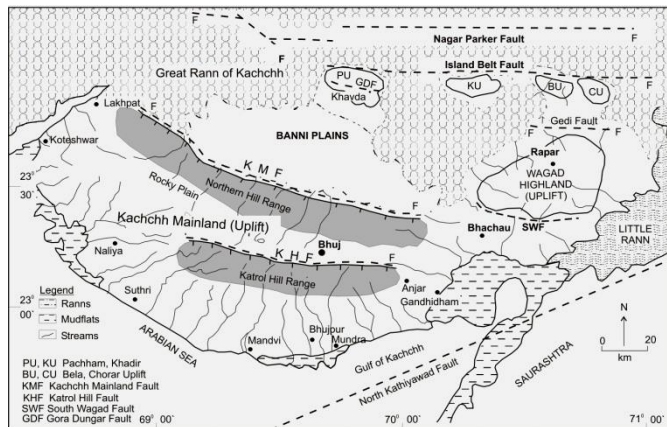


Figure 1 Morphotectonic map of Kachchh basin of western India showing major geomorphic units and faults

The overall stress from south to north in the basin squeezes the crustal blocks upward with Mesozoic and Cenozoic sediments forming various structural features in them. The present study will focus on the major evidences of episodic tectonic and climatic evolution of Kachchh landscape through Quaternary period. These include various morphotectonic features like bedrock gorges, Quaternary flexurings, straight mountain fronts, Quaternary cliff incisions, defunct and deranged drainages, large paleoseismic uplifts as *Allah bund* – the dam of God formed

during 1819 earthquake and runs for 90 km in the playa landscape known as the Great Rann of Kachchh. As the Allahbund earthquake, 1844-45 earthquakes, 1956 Anjar earthquake and 2001 Bhuj earthquake have evidently modified the topography of the region, serve their accountability in sequential landscape evolution [3]. The sedimentation dynamics from the Himalayan river system and marine influence from the Arabian Sea has modified the topography of the western great Rann during 5.5 to 2 ka [4]. These landscape features in the seismically active basin of Kachchh proves that the landscape of Kachchh encapsulate three major geological phenomena like climate, tectonics and eustatic sea-level changes through the last phase of geological time.

Key words: Kachchh intra-plate basin, Quaternary climate, neotectonics, landscape evolution

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