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Influence of Near Shore Structures on the Coastal Processes of West Coast of India

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The West Coast of India is a rifted continental margin characterised by a wide continental shelf extending NNW-SSE from Kutch to Kanyakumari. Geological and geophysical studies conducted in the area reveal the existence of a number of deep seated faults, bathymetric highs, numerous buried basement ridges, grabens etc. Several onshore lineaments including faults and basement arches extend to the offshore areas over considerable distances. The west coast sector from Vengurla Arch to the Tellichery arch (basement high) shows evidence of upliftment, subsidence, erosion, slumping and mass movements due to the reactivation of existing faults and high sedimentation rates. The presence of Quaternary deposits of both marine and continental origin suggests a marine transgression and regression below 16°N.

Systematic seabed mapping together with shallow seismic profiling revealed the presence of several buried nearshore structural features off Honavar, Hangarkatta and Mulki in the Konkan basin and off Kasaragod in the Kerala basin. Seismic reflectors off Honavar are characterized by erosional features and slumping features. Several studies related to the shoreline changes showed distinct zones of high erosion and accretion along these sites. Records of earlier studies conducted on coastline migration in a structurally controlled region in the Konkan basin showed erosion being dominant in every sector of study area. However, at present the human intervention in the form of sea wall construction has led to the migration of erosional sites to the down drift side.

The shallow seismic records off Kasaragod also revealed a buried fault aligned at an angle to the coast that intersects where the Konkan and Kerala offshore basins are separated. The study of annual, decadal, centennial and millennial scale shoreline change in this area showed constant erosion in the area north of the fault (Konkan basin) and accretion south of the fault (Tellicherry Arch) indicating a structural controlled shoreline change. The characteristic features of a submerging coast like rocky beaches, promontories, narrow beaches and several sharp shifts in shoreline alignments are common features in the area north of fault. In comparison, the features of emerging coasts such as wide beaches, well developed multiple sand dunes, parallel sand bars etc. are well preserved in the southern part.

