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Adaptation of coastal defence structure as a mechanism to alleviate coastal erosion in monsoon dominated coast of Peninsular Malaysia

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Abstract

The complexity of the coastal environment and the advent of climate change cause coastal erosion, which is incontrovertibly a significant concern worldwide, including Peninsular Malaysia, where, the coast is threatened by severe erosion linked to anthropogenic factors and monsoonal wind-driven waves. Consequently, the Malaysian government implemented a mitigation plan using several coastal defence systems to overcome the coastal erosion problem. This study assesses coastal erosion management strategies along a monsoon-dominated coasts by evaluating the efficacy of coastal protection structures against the coast. To this end, we analysed 244 km of the coastline of Terengganu, a federal state located on the east coast of Peninsular Malaysia. Due to a higher frequency of storms and the ensuing inception of high wave energy environments during the northeast monsoon (relative to southwest monsoon), the study area is the most impacted region in Malaysia with regard to coastal erosion. Fifty-five (55) coastal defence structures were detected along the Terengganu coastline. The Digital Shoreline Analysis System (DSAS) was utilised to compute changes in the rate statistics for various historical shoreline positions along the Terengganu coast to assess the efficacy of the defence structures. Additionally, this study acquired the perception of the existing coastal management strategies through an interview session with the concerned stakeholders. The rate statistics revealed the effectiveness and impact of the coastal defence structure on the coastline. Assessing the functionality of the coastal defence structures shed light on the present scenario of coastal erosion management. Greater efficacy and lower impact of coastal defence structures are prescribed for coastal erosion management strategies across the monsoon-dominated coast. © 2023 Elsevier Ltd

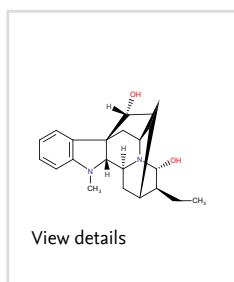
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Breakwater; Coastal erosion; Coastal management; Digital shoreline analysis system (DSAS); Terengganu

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