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# Evaluating Coastal Erosion and Accretion Along Batu Ferringhi Beach with Digital Shoreline Analysis System

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## Abstract

Coastal areas face significant challenges due to climate change, particularly through intensified wave action, which contributes to alterations in shoreline dynamics. The primary objective of this study is to assess these coastal changes by examining shoreline variations over eight years from 2016 to 2024, utilizing Sentinel satellite imagery for shoreline creation. A comprehensive methodology involving Shoreline Change Envelope (SCE), Net Shoreline Movement (NSM), End Point Rate (EPR), Linear Regression Rate (LRR), and Weighted Linear Regression (WLR) was applied through DSAS. Results indicate that the maximum distance observed in SCE was 52.75 m, while the minimum was 12.85 m. NSM showed a maximum positive distance of 41.4 m and a maximum negative distance of -35.91 m. On the other hand, EPR indicated a maximum erosion rate of -4.49 m/yr and a maximum accretion rate of 5.18 m/yr. Similarly, LRR and WLR reported maximum erosion rates of -3.11 m/yr and maximum accretion rates of 6.26 m/yr. In conclusion, the findings underscore the dynamic nature of Batu Ferringhi Beach, highlighting the necessity for effective coastal management strategies to mitigate erosion impacts. Future research should focus on integrating climate modeling with shoreline management practices to enhance resilience against ongoing environmental changes. © The Authors, published by EDP Sciences.

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