GIS-BASED ESTIMATION OF SHORELINE CHANGE IN THE OLIE PIER HARBOR HERITAGE SITE, MANGGAR, EAST BELITUNG, INDONESIA

Coastal areas, where land meets sea, are highly dynamic and vulnerable to changes driven by both natural processes and human activities. The coastline, constantly reshaped by the interaction of waves, tides, and currents, faces significant threats from extreme weather events and human interventions (Baig et al., 2020; Mentaschi et al., 2018). In East Belitung, Indonesia, these challenges are exacerbated by intensive tin mining activities, which have led to severe coastal erosion and environmental degradation. This research aims to analyze the extent of coastline changes in East Belitung using remote sensing technology, identify the contributing factors, and propose sustainable management strategies to mitigate the impacts of coastal erosion.

Introduction

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Methodology

Coastal areas, where land meets sea, are highly dynamic and vulnerable to changes driven by both natural processes and human activities. The coastline, constantly reshaped by the interaction of waves, tides, and currents, faces significant threats from extreme weather events and human interventions (Baig et al., 2020; Mentaschi et al., 2018). In East Belitung, Indonesia, these challenges are exacerbated by intensive tin mining activities, which have led to severe coastal erosion and environmental degradation. This research aims to analyze the extent of coastline changes in East Belitung using remote sensing technology, identify the contributing factors, and propose sustainable management strategies to mitigate the impacts of coastal erosion.

Results

Coastal areas, where land meets sea, are highly dynamic and vulnerable to changes driven by both natural processes and human activities. The coastline, constantly reshaped by the interaction of waves, tides, and currents, faces significant threats from extreme weather events and human interventions (Baig et al., 2020; Mentaschi et al., 2018). In East Belitung, Indonesia, these challenges are exacerbated by intensive tin mining activities, which have led to severe coastal erosion and environmental degradation. This research aims to analyze the extent of coastline changes in East Belitung using remote sensing technology, identify the contributing factors, and propose sustainable management strategies to mitigate the impacts of coastal erosion.

Conclusion

The coastal area of Manggar Subdistrict, East Belitung, from 2015 to 2023, experienced changes in its shoreline, both through erosion and accretion. The highest erosion occurred in Lalang Village (sub-zone D2), with a shoreline retreat of 65.38 meters and a retreat rate of 8.78 meters per year. In addition to erosion, the Manggar coast also experienced instances of accretion. The highest accretion occurred in Baru Village (sub-zone B2), with a shoreline advancement of 56.68 meters and an advancement rate of 7.61 meters per year.

The dominance of shoreline changes on the Manggar coast falls under the moderate erosion category. Oceanographic factors such as currents, waves, tides, wind, and bathymetry significantly influence the phenomenon of shoreline changes in Manggar, East Belitung. It is due to the conditions of the waters in East Belitung being in open waters directly adjacent to the Karimata Strait, causing the generated wave energy to impact the increasing wind speed.

Reference/Footnotes


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