High Resolution Geospatial Coastal Risk Assesment for Climate Resilience in Mauritius

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SUMMARY

Small island Developing states (SIDS) such as Mauritius are highly vulnerable to coastal hazards caused by sea-level rise, storm surge, strong waves, and rapid coastal development. Geospatial technology provides the opportunity to conduct a more effective risk assessment of the dynamic nature of tropical coastlines. This study developed a framework for coastal hazard assessment using multiple source datasets, which includes bathymetric data and satellite imagery. The study focused on shoreline extraction and coastal inundation analysis by combining spectral classification with tidal variability and wave dynamics. Wave processes and their interaction with coastal morphology were incorporated to improve the representation of flood extent and coastal exposure. High-resolution satellite data enabled the mapping of low-lying areas, supporting the identification of zones at risk from storm surge and extreme water levels. A shoreline spatial risk variation along the coastal area under study was derived. This map can serve as a guide to the development of a more climate resilient coastal zone. The proposed methodology provided an effective coastal protection approach for data-limited island environments and can contribute to improved coastal management strategies in Mauritius was well as other SIDS. By integrating advanced geospatial analysis with locally relevant datasets, this research supports evidence-based decision making for climate adaptation and sustainable coastal development.