

Detection and mapping of coastal changes in Salut-Mengkabung, Tuaran, Sabah using Remote Sensing Images

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Abstract

Located in the inter-tidal area of the western part of Sabah, Malaysia, Salut-Mengkabung lagoon plays an important role in coastal ecology as well as socio-economic development of the entire area. Increasing development pressure in this area leads to depletion of mangrove forests and change in coastal environment. Due to excess sediment accretion, the area is becoming shallower and the tidal inlet is becoming narrower thereby affecting the entire coastal ecology of the area. Offshore bathymetric characteristics, seasonal monsoon of wind driven waves from open sea and water flows from the lagoons were the main forces affecting the coastal processes of this area while long shore drifts play an important role on deposition and erosion along the coastline. The latest changes about 8.5 km of coastal lines of Salut-Mengkabung were studied using Landsat Multispectral Scanner (MSS) data obtained in 1973, the earliest satellite remote sensing data in this area, LANDSAT Thematic Mapper (TM) in 1991 and Landsat ETM+ in 2002. Digital topographical map in 1970s were used as the baseline applied for the three satellite images. ERDAS IMAGINE 8.6 and ArcGIS 8.3 software were applied for coastal changes detection. The findings on morphological changes have been interpreted in terms of coastal processes based on wind and wave climate of the area. The effects of morphological changes on hydrodynamics and sedimentary processes have been discussed aiming at providing an overview of the responses of tidal inlet with coastal changes. However as the next step detail studies of the hydrodynamic and sediment transport along the coastline and within the lagoon are being carried out to explain the morphodynamics of the inlet and adjacent coastal areas. The findings of this paper will provide useful tools for further detail investigation on inlet stability, hydrodynamics and sedimentary processes in the lagoon and adjacent coastal waters.