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Marine Ecosystem Mapping of Taman Laut Labuan: The First Habitat Mapping Effort to Support Marine Parks Management in Malaysia

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Abstract : The marine ecosystem in Malaysia holds invaluable potential in terms of economics, food security, pharmaceuticals components and protection from natural hazards. Although exploration of oil and gas industry and fisheries are active within Malaysian waters, knowledge of the seascape and ecological functioning of benthic habitats is still extremely poor in the marine parks around Malaysia due to the lack of detailed seafloor information. Consequently, it is difficult to manage marine resources effectively, protect ecologically important areas and set legislation to safeguard the marine parks. The limited baseline data hinders scientific linkage to support effective marine spatial management in Malaysia. This became the main driver behind the first seabed mapping effort at the national level. Taman Laut Labuan (TLL) is located to the west coast of Sabah and to the east of South China Sea. The total area of TLL is approximately 158.15 km2, comprises of three islands namely Pulau Kuraman, Rusukan Besar and Rusukan Kecil and is characterised by shallow fringing reef with few submerged shallow reef. The unfamiliar rocky shorelines limit the survey of multibeam echosounder to area with depth more than 10 m. Whereas, singlebeam and side scan sonar systems were used to acquire the data for area with depth less than 10 m. By integrating data from multibeam bathymetry and backscatter with singlebeam bathymetry and side sonar images, we produce a substrate map and coral coverage map for the TLL using i) marine landscape mapping technique and ii) RSOBIA ArcGIS toolbar (developed by T. Le Bas). We take the initiative to explore the ability of aerial drone and satellite image (WorldView-3) to derive the depths and substrate type within the intertidal and subtidal zone where it is not accessible via acoustic mapping. Although the coverage was limited, the outcome showed a promising technique to be incorporated towards establishing a guideline to facilitate a standard practice for efficient marine spatial management in Malaysia.

Keywords : habitat mapping, marine spatial management, South China Sea, National seabed mapping
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