

Integration of Acoustic and Video Data for Coral Reef Mapping

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Coral reef provide natural protection to the coastline, productive mangrove forests and seagrass beds. The high level of biodiversity found in the coral reef areas, provide active ingredients for medicine and cosmetics and corals have been used successfully as bone transplant material. Coral reefs also provide nursery ground for juveniles of commercially important fish species, habitat for a large number of fish species and more than 30% of fish landed consists of coral reef species. Moreover, the natural beauty of coral garden surrounded by colourful fishes has become an attraction for both local and international tourists and has successfully generated a lot of economic opportunities for the tourism related industries in Malaysia. However, at present, many coral reefs are damaged by various factors including the indiscriminate development of the coastal zone, pollution, unsustainable tourism development and the occasional rise of sea surface temperature.

In order to protect and manage coral reefs, traditional methods are used for detecting and monitoring corals distribution and health. These traditional methods employ direct observations such as line transect, belt transect and manta tow using scuba diving and snorkelling gear. These methods are costly and time consuming and require special observers trained in scuba diving and coral reef methods. This constraints calls for the development of a new coral reef assessment /mapping method. Acoustic technology is a feasible alternative to these methods for monitoring coral reef features. A better alternative is acoustic technology incorporated with video survey. This has proved to be a cost-effective and time-efficient tool for reef survey, change detection and management. This technology consists of integration of several types of systems such as underwater video camera, digital camera, global positioning system and an echo sounder, which operate with Windmill software. The underwater camera and digital camera record coral images with GPS synchronous time stamp to determine the primary benthic cover at sample location. With the GPS signal correction system presently installed in the both the Straits of Malacca and the South China Sea, GPS signals can be corrected to accuracies of 1 to 5 m. Thus this system provide a low-cost method using the public domain software for accurate sea floor mapping. Integration of acoustic data, GPS and digital video picture is a new technique for coral reef mapping in this region. Pulau Payar Marine Park was selected as study area, being the only Marine Park Island located the northwest of Peninsular Malaysia.



Fig. 1. The Equipment Array

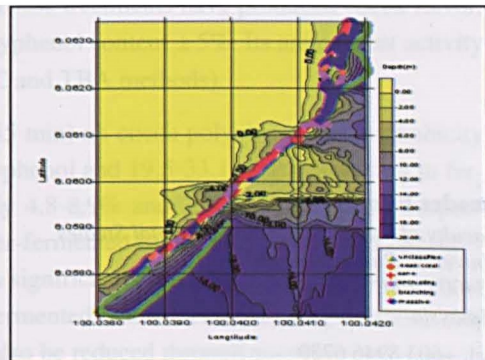


Fig. 2. Depth Contour and coral reef cover

Combinations of this hydro acoustic information and video data was able to classify common reef substrates such as live hard coral, dead coral, coral massive, encrusting coral, sands, and rocks. The advantages of this system are low cost, not complex and were able to cut survey time drastically. This method is also useful for satellite imagery ground truthing. A permanent video record of the coral reef area surveyed is also obtained for visual identification for change detection studies. Combination of this system with satellite remote sensing should prove valuable to the authorities in their efforts to manage this valuable coastal resource more efficiently and effectively.

Reader Enquiry

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