THE PHOTOGRAMMETRIC COMPILATION OF WATER DEPTH TO DETERMINE WATER COLUMN ABSORPTION FOR COSTAL REEF MAPPING

SUPAWAN WONGPRAYOON AND JOSEPH H. J. LEACH
Department of Geomatics, Faculty of Engineering, University of Melbourne, Parkville, Victoria 3010, Australia
E-Mail: s.wongprayoon@pgrad.unimelb.edu.au

Coral reefs are an integral part of some of the world's most biologically diversity communities. The enormous diversity of these communities is important economically and environmentally for millions of people in numerous ways: as source of food, leisure, tourism and pharmaceutical raw materials. Moreover, they serve as a protective barrier against coastal storms. The Global Coral reef Monitoring Network estimates that approximately 27% of World's reefs have effectively vanished as a consequence of human impact on the environment, such as climatic change. If no action is taken to decrease or eradicate the effect of human activities on reefs, researchers estimate that 60% of world's coral reefs could be lost by 2003.

The process of coastal reef mapping is of significant value for a variety of purposes such as the base mapping, condition monitoring and allowing cross-referencing of the observational data in a timely manner for manager and stakeholders. Accurate maps are necessary for coastal resources management to enable informed decisions for protection, policing and sustainable management of these resources to be made.

Conventional, stereoscopic colour aerial photography and bathymetry mapping permit benthic habitats to be explored in greater detail than ever before. In mapping and studying under water features like coral, seagrasses and their benthic communities using remotely sensed imagery, refraction is one factor to be considered. Photogrammetrically measuring bottom depth without refraction correction gives only an apparent and relative depth. In order to increase our understanding of underwater features, depth independent bottom reflectance was retrieved from stereoscopic colour aerial photography and bathymetry maps. The two medium photogrammetry algorithm was used to remove the distorting influence of the water column on the remotely sensed signal and to retrieve an estimate of reflectantance at the seafloor. The retrieved bottom reflectance was then used to classify the benthic habitat.

The results should assist and improve the monitoring of coral cover and gain a better understanding of the limitations the distorting influence of the water column places on remote sensing for reef science. This may need to be evaluated and modified individually for different environments. Two test areas were selected: Phuket, Thailand and Port Phillip Bay, Victoria, Australia.