SHALLOW WATER BATHYMETRY MAPPING AND BENTHIC COVER ESTIMATION USING WORLDVIEW-2 HIGH-RESOLUTION SATELLITE IMAGERY

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ABSTRACT: This paper examines the applicability of Worldview-2 (WV-2) high-resolution satellite remote sensing in mapping coastal and nearshore marine resources. Previous efforts achieved limited results due to few number of spectral bands. With the availability of WorldView-2 sensor, there is prospect to apply and operationalize such technique. The main objective of this study is to examine the potential of simultaneously retrieving bottom benthic cover, depth and water quality from tropical coastal reef using the 8-band W-2 data. Here, a combination of an iterative spectral mixture model and two-stream radiative transfer model was used in estimating fractional cover and depth. To validate the results, field surveys were carried out obtaining field benthic cover data, field bottom spectra and precise shallow-water bathymetry. Further, we tested the effectiveness of the additional additional bands in estimating bathymetry. Spectral bands simulation results indicate higher accuracy in classifying different shallow water benthic habitats in Worldview-2 image over simulated Quickbird. However, the two sensors have no significant difference in depth estimates except for the advantage of WV-2 in spatial resolution. Comparison of two WV-2 images in two dates for classification and bathymetry estimates also reveal consistent results. It was shown that the yellow band (584 to 632nm) contributed better results in bathymetry estimation than the coastal blue band (396 to 458nm). The use of the two Near-Infrared (NIR1 and NIR2) bands were useful in delineating water and non-water zones and for removal of sunglint in the image prior to processing.