

COMBINING BATHYMETRIC LIDAR AND WORLDVIEW-2 SATELLITE IMAGERY FOR CLASSIFYING BENTHIC HABITATS USING OBIA

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ABSTRACT:

The objective of this research is to combine bathymetric LiDAR (Light Detection and Ranging) point cloud data and WorldView-2 high resolution multispectral satellite imagery in classifying benthic habitats such as corals and seagrasses. The LiDAR data was obtained using an Optech Aquarius ALTM. LiDAR derivatives (mean depth, standard deviation of depth, plan curvature, profile curvature, rugosity, slope and slope of slope) were produced and these were combined with the multispectral bands of WorldView-2. These derivatives describe the complexity and structure of the seafloor. Rugosity can be used as a predictor of seagrass distribution in different bottom type variation. The slope defines the structure of the seafloor while the slope of slope has the ability to capture fine scale topographic complexity. Depth summary statistics, such as the Mean Depth and the Standard Deviation of the depth, are useful predictors in understanding the benthic zones, particularly in habitat classification. These derivatives were produced using different tools in ArcGIS. Principal Components Analysis was utilized to reduce the redundant information and produce uncorrelated data. The WorldView-2 data was corrected for radiometric and atmospheric inconsistencies using ENVI. To classify the benthic habitats, an object based image analysis approach was used using eCognition. Training and validation data sets were gathered using handheld GPS points and video tows geotagged using a dual frequency GPS receiver. The study area is a portion of the Lingayen Gulf. It is situated at the north of Dewey and east of Binabalian in Bolinao, Pangasinan, Philippines.

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