REFINING HABITAT MAPPING OF BENTHIC COMMUNITIES IN THE STRAITS OF FLORIDA

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PROJECT OBJECTIVES

- Produce habitat maps in the Straits of Florida along Great Bahama Bank using high-resolution bathymetry, backscatter, and sidescan sonar (SSS) in conjunction with images/videos from remotely operated vehicles (ROV).
- Calibrate high-resolution backscatter data with visual data and grab samples to classify facies of the seafloor.
- Calculate area of coral growth sites relative to shape and orientation of seafloor morphology.

PROJECT RATIONALE

High-resolution bathymetry, backscatter, and sidescan sonar (SSS) data in conjunction with images/videos from remotely operated vehicles (ROV) were collected on several research cruises along the western side of Great Bahama Bank (RSMAS AUV Florida Straits 2005, CARAMABAR Bordeaux 2010, MARUM Bremen MSM20/4 2012). These data allow for extensive habitat mapping that includes both the cold-water coral mounds and the sedimentary facies. The slope and adjacent basin is a complex arrangement of slope sediments dissected by slope scars, mass transport complexes and unconsolidated fine and coarse carbonate sediments (Correa et al., 2012; Mulder et al., 2012; Betzler et al., 2014). In addition, various cold-water coral (CWC) mound fields have been discovered (Grasmeuck et al., 2006; Hebbeln et al., 2012, Lüdmann et al., 2016). A previous habitat map model was created from classification attributes based on morphological features (Fig. 1; Schynder et al., 2014). Additional data and new techniques now allow a comprehensive and aerially extensive habitat map to be created for the toe-of-slope environment that will capture the dimensions and lateral juxtaposition of facies and cold-water coral reefs.

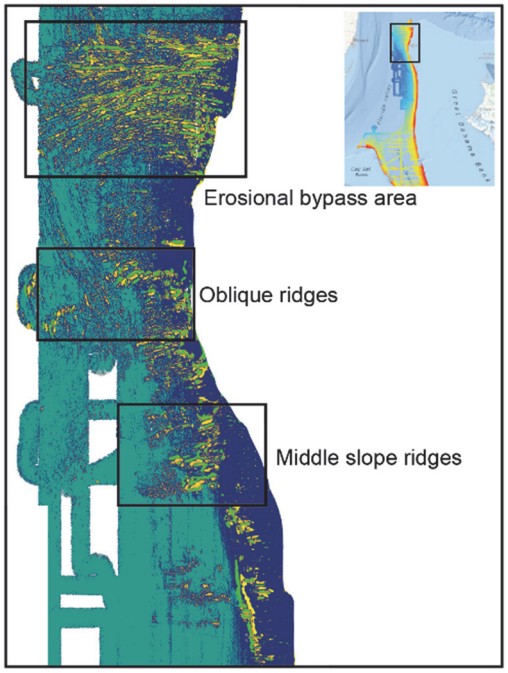

Figure 1. Habitat map of GBB slope. (Schnyder et al., 2014)

METHODS

We will be following the methodology outlined in Correa et al. (2013) that relies on ground-truthing images from submersible (submersible and ROV) transects to create sea-floor categories based on coral coverage and particle grain size. In our data set, five habitat classes are distinguishable. Using the corresponding color coding, the habitat classes are used to classify the entire acoustic values through a supervised classification algorithm (ENVI; Mahalanobis distance classifier). The acoustic images are identified through pixel by pixel classification, whereby each pixel represents a specified acoustic property assigned to distinguish it from other classes. Pixels are then converted to a vector-based classification (i.e. polygon) and then polygons are assigned the classifications and subsequently exported as a shapefile to be overlain on the bathymetry data in ArcGIS, thus forming a habitat map.

SIGNIFICANCE

Incorporation of the high-resolution backscatter data will further refine the habitat classification maps of the seafloor of the western GBB. The planned high-resolution habitat map provides the necessary cataloguing of spatial distribution of facies and CWCs in relation to the physical features of the seabed. The habitat map will document the dimensions and diversity of sedimentologic and biologic features in the Straits of Florida and shed light on the importance of benthic communities as carbonate sediment producers.

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