



Mapping bathymetric and hydrographic features of Glover's Reef, Belize, with a REMUS autonomous underwater vehicle

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ABSTRACT: We used an autonomous underwater vehicle (AUV) to survey bathymetry and water mass properties at Glover's Reef atoll in Belize as part of a multidisciplinary study of population connectivity of Nassau grouper (*Epinephelus striatus*). Nassau grouper populations are declining dramatically throughout its range in the Caribbean because of overfishing. In response, Marine Protected Areas have been established at several spawning aggregation (SPAG) sites. However, effectiveness of these measures is presently unclear, as the regional patterns of transport and recruitment of grouper larvae have not been measured in extensive field studies. As part of a pilot study to relate oceanographic processes with transport and recruitment of Nassau grouper larvae, we used a Remote Environmental Monitoring Unit(S) (REMUS) AUV to measure the bathymetry, stratification, current velocity, and chlorophyll a fluorescence around Glover's Reef. The portability of the REMUS system enabled comprehensive oceanographic data collection in a remote location with minimal infrastructure. Using REMUS, we were able to effectively map the bathymetry of the reef and the shelfbreak. These data were merged with historical bathymetric data to develop a new chart of the atoll margin. A distinct contrast in the width of the shelves on the eastern and western sides of the atoll was demonstrated, with the widest shelf coinciding with the SPAG site. Water mass structure in the vicinity of SPAG site was also markedly different from other locations on the reef, suggesting an offshore advective influence on eggs and early-stage larvae released there.

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