

Organism counts from photo-transects collected during quantitative benthic surveys in Southwest Puerto Rico at 20m during 2013-2014 and 2018-2019.

Website: <https://www.bco-dmo.org/dataset/847866>

Data Type: Other Field Results

Version: 1

Version Date: 2021-04-07

Project

» [The impact of Hurricane Maria on the mesophotic reefs of southwest Puerto Rico](#) (Hurricane impacts on deep reefs)

Contributors	Affiliation	Role
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Abstract

Organism counts from photo-transects collected during quantitative benthic surveys in Southwest Puerto Rico at 20m during 2013-2014 and 2018-2019.

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Coverage

Spatial Extent: N:17.890483 E:-66.98483 S:17.889667 W:-66.988667

Temporal Extent: 2013-09-13 - 2019-03-15

Acquisition Description

Quantitative benthic surveys were made during 2013-2014 and 2018-2019 at two outer shelf, spur-and-groove reefs, Buoy (17° 53.380' N; 66° 59.090' W) and Weinberg (17° 53.429' N; 66° 59.320' W). The two sites are located near the insular slope, 7.2 km offshore. Diving operations involved a team of two divers using NITROX or air. Dives were made to target depths of 20 m at each site.

The modified CARICOMP protocol (Weil et al. 2002, 2009) was used to assess the spatial and temporal variability in the number, distribution along 10 × 2 m band permanent transects. Within each band transect, all coral, octocoral, zoanthid and sponge colonies were counted. Only scleractinian corals and a few octocoral species and other reef invertebrates were identified to species level.

Processing Description

BCO-DMO processing notes

- Merged 4 dataset files
- renamed headers to comply with database requirements
- Adjusted wrong date

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Related Publications

Weil E, I Urreiztieta, J Garzón-Ferreira (2002) Geographic variability in the incidence of coral and octocoral diseases in the wider Caribbean. Proc 9th Int Coral Reef Symp, Bali, Indonesia 2:1231-1238
https://www.researchgate.net/publication/228788040_Geographic_Variability_in_the_Incidence_of_Coral_and_Octocoral_Diseases_in_the_Wider_Caribbean
Methods

Weil, E., Croquer, A., Urreiztieta, I. (2009) Temporal variability and impact of coral diseases and bleaching in La Parguera, Puerto Rico from 2003-2007. Caribbean Journal of Science 45(2-3), 221-246 <https://doi.org/10.18475/cjos.v45i2.a10>
Methods

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Parameters

Parameter	Description	Units
Date	Sampling date	Unitless
Zone	Zone	Unitless
Site	Site	Unitless
Transect	Transect	Unitless
Depth	Depth	Meters
Quadrat	Quadrat	Unitless
Meter	Meter	Meter
Group	Group	Unitless
Genus	Genus	Unitless
Species	Species	Unitless
spp_A	spp-A	Unitless
Cover	Cover	Unitless
Observer	Observer	Unitless

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Project Information

The impact of Hurricane Maria on the mesophotic reefs of southwest Puerto Rico (Hurricane impacts on deep reefs)

Website: <http://www.schizaslab.com/nsf-rapid>

Coverage: Caribbean Sea, Southwest Puerto Rico, Lat. 17.8849 Long. -67.01546

NSF Award Abstract:

Major Hurricane Maria, on 20 September 2017, delivered a devastating blow to the island of Puerto Rico. Both terrestrial and marine ecosystems were heavily impacted. This powerful and rare weather event provides an opportunity to examine the effects of extreme physical forces on coral reefs. The research team will concentrate on the mesophotic reefs or "twilight zone reefs", which rival shallow water coral reefs in diversity and beauty. Mesophotic coral ecosystems are reefs found between 30 and 100 m depth, and are thought to serve as refugia for the declining shallow water coral reefs because they are further removed from anthropogenic and natural disturbances. Hurricane Maria is one of those rare, high-magnitude disturbance events that could affect even those deeper, mesophotic reefs. The investigators are positioned with pre-deployed oceanographic instruments and previously-collected ecological data to measure the effects of Hurricane Maria on the presumably sheltered, mesophotic reefs. The investigators will document the hurricane effects on the reef communities by comparing photographic data from pre-established transects at shallow and mesophotic reefs. Misplaced corals will be used to test the capacity of extreme weather events to shape the population connectivity of key species. Radioisotope analysis will be used to identify the origin of sediments collected from the mesophotic reefs. The investigators will interpret all data described above in light of the physical conditions that were recorded before, during, and after the passage of Hurricane Maria. The project will involve the collaboration of an interdisciplinary team of five researchers and a graduate student from a Hispanic-serving Institution. The investigators will disseminate the results to Natural Resources Management Agencies and will use local media outlets and organize outreach events to inform local communities about the effects of hurricanes on coral reefs.

The landfall of major Hurricane Maria on the south coast of Puerto Rico provides a unique opportunity to examine its impacts on an insular shelf margin reef ecosystem (~25 to 70-80 m depth). The powerful weather system likely triggered major off-shelf transport of sediments, turbidity, terrigenous material and benthic organisms, affecting entire shelf margin benthic ecosystems. It also constitutes a unprecedented natural experiment where coral colonies were likely dislodged and transplanted to deeper areas, allowing to test various hypotheses related the deep refugia model and connectivity between shallow and mesophotic coral reefs. The investigators will assess the ecosystem stability that underlies the deep-reef refuge hypothesis of the insular-slope mesophotic reefs by: a) repeating high resolution photo-transects at pre-established sites at shallow and mesophotic stations, b) documenting the type and extent of displaced/damaged benthic taxa, c) examining the possibility of hurricane-assisted vertical connectivity through the displacement of shallow corals to deeper depths, d) measuring the potential recent input of terrigenous material to mesophotic depths by radioisotope analysis of sediment samples and, e) relating all the above observations to actual physical conditions, which were measured in situ before, during, and after Hurricane Maria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1809878

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