Absolute abundance of Foraminifera in Pacific Panama, 2019

Website: https://www.bco-dmo.org/dataset/776411
Data Type: Other Field Results
Version: 1
Version Date: 2019-09-09

Project
» Collaborative Research: Climate Change, Mesoscale Oceanography, and the Dynamics of Eastern Pacific Coral Reefs (Coral Climate ETP)

Contributors	Affiliation	Role
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Abstract
Absolute abundance of Foraminifera in Pacific Panama, 2019.

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Coverage

Spatial Extent: **N**:8.63174 **E**:-79.02817 **S**:7.40309 **W**:-81.75907
Temporal Extent: 2019-03 - 2019-03

Dataset Description

Absolute abundance of Foraminifera in Pacific Panama, 2019.

Methods & Sampling

In March 2019, samples were collected at 3 sites in the Gulf of Chiriqui and 3 sites in the Gulf of Panama. Five, 10-20 cm3 samples of sand from each location were collected with a spoon and placed in a plastic bag for a total of 30 samples. They were taken back to the lab where foraminifera abundances and identification to the genus level were collected using a stereomicroscope.

Data Processing Description

BCO-DMO Processing Notes:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions

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Data Files

File
foram_abund.csv (Comma Separated Values (.csv), 2.83 KB) MD5:420163fe552a7902c22e41ec00afd053 Primary data file for dataset ID 776411

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Parameters

Parameter	Description	Units
Gulf	location of the study	unitless
Location	experimental site	unitless
Site	coded identifier for sampling location	unitless
Year	time when sample was collected	unitless
Weight_of_Sediment	sediment weight containing the foraminiferas	grams (g)
Quinqueloculina	the relative abundance of Quinqueloculina in the sediment	unitless
Spiroloculina	the relative abundance of Spiroloculina in the sediment	unitless
RosaDiscorbis	the relative abundance of RosaDiscorbis in the sediment	unitless
Peneroplis	the relative abundance of Peneroplis in the sediment	unitless
Neoconorbina	the relative abundance of Neoconorbina in the sediment	unitless
Sorites	the relative abundance of Sorites in the sediment	unitless
Uvigerina	the relative abundance of Uvigerina in the sediment	unitless
Bolivina	the relative abundance of Bolivina in the sediment	unitless
Elphidium	the relative abundance of Elphidium in the sediment	unitless
Cymbaloporetta	the relative abundance of Cymbaloporetta in the sediment	unitless
Nonioinella	the relative abundance of Nonioinella in the sediment	unitless
Hayesina	the relative abundance of Hayesina in the sediment	unitless
Borelis	the relative abundance of Borelis in the sediment	unitless
Pseudohauerina	the relative abundance of Pseudohauerina in the sediment	unitless
Amphistegina	the relative abundance of Amphistegina in the sediment	unitless
Marginopora	the relative abundance of Marginopora in the sediment	unitless
Triloculina	the relative abundance of Triloculina in the sediment	unitless
Reusella	the relative abundance of Reusella in the sediment	unitless
Articulina	the relative abundance of Articulina in the sediment	unitless
Planorbulina	the relative abundance of Planorbulina in the sediment	unitless
Miliolinella	the relative abundance of Miliolinella in the sediment	unitless
Textularia	the relative abundance of Textularia in the sediment	unitless
Total	the total abundance of foraminifera in the sediment	unitless

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Instruments

Dataset-specific Instrument Name	stereo microscope
Generic Instrument Name	Microscope - Optical
Dataset-specific Description	Used to count and identify foraminifera.
Generic Instrument Description	Instruments that generate enlarged images of samples using the phenomena of reflection and absorption of visible light. Includes conventional and inverted instruments. Also called a "light microscope".

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Project Information

Collaborative Research: Climate Change, Mesoscale Oceanography, and the Dynamics of Eastern Pacific Coral Reefs (Coral Climate ETP)

Website: https://research.fit.edu/marine-paleolab/research-projects/eastern-tropical-pacific/

Coverage: Pacific Panamá

Coral reefs are under threat around the world, and climate change is the main reason they are declining. Knowing how local conditions on a reef exaggerate or mask the impacts of climate change make it possible to predict which reefs are most likely to survive longer and, therefore, which reefs deserve the greatest effort and funding for conservation. Reefs off the Pacific coast of Panama are vulnerable to the impacts of global climate change but are also strongly influenced by small-scale currents and other local conditions. The goal of this study is to see how those local differences affect coral growth and the ability of the corals to build reefs. Climate change appears poised to shut down reef growth off Pacific Panama within the next century. Considering that sea-level rise is accelerating at the same time, if coral reefs shut down they will not be able to protect populated shorelines from storm damage and erosion. In addition to its scientific insights, this project will provide undergraduate and graduate training, provide research training for underrepresented groups, advance women in scientific careers, and contribute important information for management and policy. The results will be incorporated into innovative curricular materials for K through 12 classes in Title-I schools in Florida aligned with Next Generation (Common Core) standards, and standards for Climate and Ocean Literacy. An annual film festival will be organized for K through 12 students to explore themes in marine science through videography.

Global climate change is now the leading cause of coral-reef degradation, but the extent to which mesoscale oceanography overprints climatic forcing is poorly understood. Previous studies in Pacific Panama showed that reef ecosystems collapsed from 4100 to 1600 years ago. The 2500-yr hiatus in reef-building occurred at locations throughout the Pacific, and the primary cause was increased variability of the El Nino-Southern Oscillation. This study will determine the influence of contemporary variability in mesoscale oceanography in the eastern tropical Pacific (ETP) on variability in the condition of local coral populations. Insights from the living populations will be combined with paleoecological and geochemical studies of reef frameworks to infer past conditions that were inimical or beneficial to coral growth and reef accretion. Three primary hypotheses will be tested in Pacific Panama:
H1. Mesoscale oceanography is manifested in gradients of reef condition, coral growth, and coral physiological condition. Physiographic protection from upwelling currents and thermocline shoaling confers positive effects

on coral growth rate and physiology.
H2. The impacts of mesoscale oceanographic regimes on the growth and condition of reef-corals were felt at least as far back as the mid- to late Holocene.
H3. Physiographic protection from upwelling currents and thermocline shoaling conferred positive effects on vertical reef accretion in the past and shortened the late-Holocene hiatus.
Specific research approaches to test these hypotheses will include collecting high-resolution, oceanographic time series to characterize contemporary environments along gradients of physical conditions; collecting ecological and geochemical data on the condition of living coral populations; and extracting cores from the reef frameworks and analyzing the coral assemblages taxonomically, taphonomically, and geochemically to assess patterns of biotic and paleoenvironmental variability. Strong spatial and temporal variability in the physical drivers of reef development make the ETP an excellent model system in which to examine the response of coral reefs to climate change over a range of physical regimes. This research will provide a unique opportunity to tease apart the controls on reef development across multiple spatial and temporal scales. The climatology underlying the late-Holocene hiatus was similar to probable scenarios for the next century, implying that climate change could be driving reef ecosystems of the ETP (and elsewhere) toward another collapse. Understanding how the hiatus unfolded along oceanographic gradients will increase our power to predict the future responses of reefs to a rapidly changing climate.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1535007

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