Subtidal temperature values from RAPDGALPGS project in the Eastern Tropical Pacific, Galapagos Islands, Ecuador in 2015 and 2016 (RAPDGALPGS project)

Website: https://www.bco-dmo.org/dataset/628180
Data Type: Other Field Results
Version:
Version Date: 2017-02-10

Project
» RAPID: Understanding Thresholds and regime shifts in marine ecosystems: effects of the 2014-2015 El Nino in the Galapagos rocky subtidal (RAPDGALPGS)

Contributors	Affiliation	Role
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Coverage

Spatial Extent: **N**:-0.14065 **E**:-90.23696 **S**:-0.74908 **W**:-91.32879

Dataset Description

This dataset contains subtidal temperature data from 2015 to 2016 at sites in the central Galapagos Islands, Ecuador at depths of 6-15 m.

Approximate sampling location:
Eastern Tropical Pacific, Galapagos Islands, Ecuador

Methods & Sampling

Temperature data collected by Onset Tidbit temperature loggers (http://www.onsetcomp.com/products/ data-loggers/utbi-001) at 10-minute intervals. Loggers were attached to subtidal rock walls at 6-15 m depth. The temperature loggers have an accuracy of 0.2 degrees C.

Data Processing Description

Data Processing:
Data are raw, with no processing.

BCO-DMO Processing Notes
- Generated from original .csv file: galapagos_temperatures_20150107-20150715.csv contributed by Franz Smith
- Parameter names edited to conform to BCO-DMO naming convention found at Choosing Parameter Name
- "time" header changed to "Date" since no times were included with the data
- Date reformatted to YYYYMMDD
- Added ISO Date format generated from Date and Time values
- Data version 10 Feb 2017 replaces version 03 Dec 2015 and includes more temperature deployments extending into 2016 and also includes data from additional sites.
- Data format updated to accommodate new data. Depth stripped from previous site names and added to new "depth" parameter to match new data.
- Data sorted so it can be viewed by site.
- Added two new deployments

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Data Files

File
TempBySite.csv (Comma Separated Values (.csv), 78.82 MB) MD5:7e5fa1f8187be91f70f8abe9d72ac96d Primary data file for dataset ID 628180

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Parameters

Parameter	Description	Units
site	Site	text
date	Date of Measurement in format yyyy-mm-dd (UTC)	Date (UTC) in format yyyy-mm-dd
temp	Temperature	degrees Celsius
time	Time of measurement in format HH:MM (UTC)	unitless
depth	Depth of temperature logger	meters
deployment	Deployment name (made from date range)	unitless
lat	Site Latitude (South is negative)	decimal degrees
lon	Site Longitude (West is negative)	decimal degrees
ISO_DateTime_UTC	ISO timestamp based on the ISO 8601:2004(E) standard in format YYYY-mm-ddTHH:MM:SS[.xx]Z (UTC)	unitless

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Instruments

Dataset-specific Instrument Name	Onset Tidbit temperature logger
Generic Instrument Name	Onset HOBO TidbiT v2 (UTBI-001) temperature logger
Dataset-specific Description	Temperature data collected by Onset Tidbit temperature loggers (http://www.onsetcomp.com/products/ data-loggers/utbi-001) at 10 minute intervals. Loggers were attached to subtidal rock walls at 12-15 m depth. The temperature loggers have an accuracy of 0.2 degrees C.
Generic Instrument Description	A temperature logger that measures temperatures over a wide temperature range. It is designed for outdoor and underwater environments and is waterproof to 300 m. A solar radiation shield is required to obtain accurate air temperature measurements in sunlight (RS1 or M-RSA Solar Radiation Shield). With an operational temperature range between -20 degrees Celsius and +70 degrees Celsius, the TidbiT v2 has an accuracy of +/-0.21 and a resolution of 0.02 degrees Celsius.

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Deployments

RAPDGALPGS_Champion-15m

Website	https://www.bco-dmo.org/deployment/628044
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-07
End Date	2015-07-12
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Champion Site, 15 meter depth

RAPDGALPGS_Cuatro_Hermanos-15m

Website	https://www.bco-dmo.org/deployment/628047
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-07
End Date	2015-07-13
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Cuatro Hermanos Site, 15 meter depth

RAPDGALPGS_Islote_Gardner-15m

Website	https://www.bco-dmo.org/deployment/628056
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-07
End Date	2015-07-12
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Islote Gardner Site, 15 meter depth

RAPDGALPGS_Las_Cuevas-15m

Website	https://www.bco-dmo.org/deployment/628062
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-07
End Date	2015-07-12
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Las Cuevas Site, 15 meter depth

RAPDGALPGS_La_Botella-15m

Website	https://www.bco-dmo.org/deployment/628059
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-07
End Date	2015-07-13
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - La Botella Site, 15 meter depth

RAPDGALPGS_Pinzon-15m

Website	https://www.bco-dmo.org/deployment/628065
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-07
End Date	2015-07-14
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Pinzon Site, 15 meter depth

RAPDGALPGS_Rocas_Beagle-15m

Website	https://www.bco-dmo.org/deployment/628068
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-09
End Date	2015-07-14
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Rocas Beagle Site, 15 meter depth

RAPDGALPGS_Daphne_Menor-15m

Website	https://www.bco-dmo.org/deployment/628050
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-09
End Date	2015-07-15
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Daphne Menor Site, 15 meter depth

RAPDGALPGS_Guy_Fawkes-15m

Website	https://www.bco-dmo.org/deployment/628053
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-08
End Date	2015-07-15
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Guy Fawkes Site, 15 meter depth

RAPDGALPGS_Champion-12m

Website	https://www.bco-dmo.org/deployment/628219
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-07
End Date	2015-07-12
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Champion Site, 12 meter depth

RAPDGALPGS_Daphne_Menor-6m

Website	https://www.bco-dmo.org/deployment/628223
Platform	RAPDGALPGS Temperatures
Start Date	2015-01-09
End Date	2015-07-15
Description	Subtidal temperature data from 2015 at sites in the central Galápagos Islands (12-15 m depth), Ecuador - Daphne Menor Site, 6 meter depth

RAPDGALPGS_Rocas_Gordon-15m

Website	https://www.bco-dmo.org/deployment/682537
Platform	RAPDGALPGS Temperatures
Start Date	2015-07-15
End Date	2016-01-09

RAPDGALPGS_Cousins-6m

Website	https://www.bco-dmo.org/deployment/682554
Platform	RAPDGALPGS Temperatures
Start Date	2015-07-22
End Date	2016-07-21

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Project Information

RAPID: Understanding Thresholds and regime shifts in marine ecosystems: effects of the 2014-2015 El Nino in the Galapagos rocky subtidal (RAPDGALPGS)

Website: http://www.witmanlab.com

Coverage: Eastern Tropical Pacific, Galapagos Islands: 00.41100 S, 90.27525 W

The question addressed in this project is: Does the 2014-2015 El Niño cause a regime shift in Galapagos subtidal ecosystems? And if so, what thresholds are crossed to drive the change from rocky subtidal communities with abundant corals to a barnacle dominated regime? Regime shifts are non-linear "ecological surprises" in the sense that the endpoint is not predictable as a linear outcome of a driver variable. The working hypothesis for this project is that the forthcoming 2014-2015 El Niño will create non-linear effects that are negative for corals which bleach during extreme temperature variability of the El Niño Southern Oscillation (ENSO), but are positive for the benthic (bottom dwelling) food chain dependent on barnacles for food. The specific work in the Galapagos will contribute to the general understanding of non-linear effects of climate stress in marine ecosystems, which has been highlighted as a critical information gap needed to understand the effects of climate change on ecosystems. The study will also inform best practices for the conservation of corals, which are threatened worldwide by multiple stressors and cumulative direct, and indirect impacts.

Perturbations such as El Niños can drive ecosystems to a tipping point as thresholds are exceeded and a sudden transition to a different state (regime) occurs. Since the frequency of extreme El Niños is projected to increase with climate change, there is a pressing need to develop a more comprehensive understanding of how ENSOs affect marine communities in the context of climate change. Currently, the National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Center predicts a 70-80 % chance of an El Niño occurring during the northern hemisphere summer-winter of 2014-2015. This project leverages an existing quantitative baseline on benthic community structure in the Galapagos subtidal to address 12 predictions

about community-ecosystem level impacts of the oncoming 2014-2015 El Niño. The research employs an observational-experimental approach to test the predictions and to discern if additional bleaching stress to corals and further increases in barnacles associated with this ENSO ultimately leads to an ecosystem state (regime) characterized by declining coral populations and increasing barnacles and their predators.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1450214

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