Nautical Area Scattering Coefficients (NASC) from an R/V BIP cruise in the Guaymas Basin, Gulf of California in 2013 (Jumbo Squid El Nino Response project)

Website: https://www.bco-dmo.org/dataset/520594
Data Type: Cruise Results
Version: 1
Version Date: 2014-07-23

Project
» Adaptable life history strategy of a migratory large predator in response to El Nino and climate change (Jumbo Squid El Nino Response)

Contributors	Affiliation	Role
Benoit-Bird, Kelly	Oregon State University (OSU-CEOAS)	Principal Investigator
Waluk, Chad	Oregon State University (OSU-CEOAS)	Contact
Rauch, Shannon	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Integrated, area scattering values, or Natuical Area Scattering Coefficients (NASC) are provided from one cruise in the Guaymas Basin that occurred October 2013. Also included are the time (UTC) and location at the start and end of each integration bin, mean depth of the exclusion line for each bin, and the average thickness of the integrated cell. Note that noise removal from this data set (e.g. splash down, electrical interference, and CTD casts) was minimal before integration. Raw acoustic scattering data (.raw files) are extremely large. These are archived at Oregon State University and will be shared using physical media upon request.

Table of Contents

Coverage

Spatial Extent: **N**:28.8857926 **E**:-111.3343637 **S**:27.24179 **W**:-113.3081006
Temporal Extent: 2013-10-20 - 2013-10-25

Dataset Description

Integrated, area scattering values, or Natuical Area Scattering Coefficients (NASC) are provided from one cruise in the Guaymas Basin that occurred October 2013. Also included are the time (UTC) and location at the start and end of each integration bin, mean depth of the exclusion line for each bin, and the average thickness of the integrated cell.

Note that noise removal from this data set (e.g. splash down, electrical interference, and CTD casts) was minimal before integration. Raw acoustic scattering data (.raw files) are extremely large. These are archived at Oregon State University and will be shared using physical media upon request.

Related References:

See Benoit-Bird & Gilly (2012) and Hoving et al. (2013).

Related project: Hypoxia and the ecology, behavior and physiology of jumbo squid, *Dosidicus gigas* (http://www.bco-dmo.org/project/2279)

Methods & Sampling

Acoustic data were collected nearly continuously using Simrad EK60s at 4 frequencies (38, 70, 120, and 200 kHz). Split beam transducers (Simrad model numbers: 38-12, 70-7c, 120-7c, 200-7c) were mounted 1.5 m below the surface on a rigid pole. Each transmitted a 512 us pulse as frequently as possible for the water depth. Raw data were stored using Simrad ER60 software.

Acoustic backscattering values at 38 kHz that were greater than -75 dB were integrated in 1 km horizontal bins from depths of 5m to 500m or 1 m above the bottom, whichever was shallower. These integrated, area scattering values or Nautical Area Scattering Coefficients (NASC: m2 nmi-2) are provided. Noise removal from this data set (e.g. splash down, electrical interference, and CTD casts) was minimal before integration.

Data Processing Description

BCO-DMO Processing Notes:
- Modified parameter names to conform with BCO-DMO naming conventions.
- Reformatted display of time from HH:MM:SS to HHMM.mmmm

[table of contents | back to top]

Data Files

File
acoustics.csv (Comma Separated Values (.csv), 112.84 KB) MD5:0305092d8170d027cb69bfbb80fabb54 Primary data file for dataset ID 520594

[table of contents | back to top]

Related Publications

Benoit-Bird, K., & Gilly, W. (2012). Coordinated nocturnal behavior of foraging jumbo squid Dosidicus gigas. Marine Ecology Progress Series, 455, 211–228. doi:10.3354/meps09664
General

Hoving, H.-J. T., Gilly, W. F., Markaida, U., Benoit-Bird, K. J., -Brown, Z. W., Daniel, P., … Campos, B. (2013). Extreme plasticity in life-history strategy allows a migratory predator (jumbo squid) to cope with a changing climate. Global Change Biology, 19(7), 2089–2103. doi:10.1111/gcb.12198
General

[table of contents | back to top]

Parameters

Parameter	Description	Units
date_start	Date at start of integration bin. in the format YYYYmmdd	unitless
time_start	Time (UTC) at start of integration bin in hours, minutes, and decimal minutes.	HHMM.mmmm
date_end	Date at end of integration bin. in the format YYYYmmdd	unitless
time_end	Time (UTC) at end of integration bin in hours, minutes, and decimal minutes.	HHMM.mmmm
NASC	Nautical Area Scattering Coefficient (NASC).	m2 nmi-2
lat_start	Latitude at start of integration bin.	decimal degrees
lon_start	Longitude at start of integration bin.	decimal degrees
lat_end	Latitude at end of integration bin.	decimal degrees
lon_end	Longitude at end of integration bin.	decimal degrees
exclusion_line_mean_depth	Mean depth of the exclusion line for each bin.	meters
integration_layer_thickness_mean	Average thickness of the integrated cell.	meters

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	Simrad EK-60 echosounder
Generic Instrument Name	Simrad EK-60 echosounder
Dataset-specific Description	Acoustic data were collected nearly continuously using Simrad EK60s at 4 frequencies (38, 70, 120, and 200 kHz). Split beam transducers (Simrad model numbers: 38-12, 70-7c, 120-7c, 200-7c) were mounted 1.5 m below the surface on a rigid pole.
Generic Instrument Description	A split-beam scientific echosounder primarily designed for fisheries research. It can operate seven frequencies simultaneously ranging from 18 to 710 kHz. Real time echo integration and target strength analysis in an unlimited number of layers is provided as well as storage of raw data for replay or analysis in one of several post-processing software packages such as Simrad's BI60.

[table of contents | back to top]

Deployments

BIPXII_10_2013

Website	https://www.bco-dmo.org/deployment/520503
Platform	R/V BIP XII
Start Date	2013-10-20
End Date	2013-10-25
Description	Central Gulf of California, Mexico: Santa Rosalia (27.3N 112.1W) to Bahia Las Animas (28.9N 113.3W to Guaymas (27.8N 111.3W)

[table of contents | back to top]

Project Information

Adaptable life history strategy of a migratory large predator in response to El Nino and climate change (Jumbo Squid El Nino Response)

Coverage: Gulf of California and Monterey Bay

Description from NSF award abstract:
This project will examine the response of *Dosidicus gigas* (Humboldt squid) to an El Niño event in 2009-2010 that was accompanied by a collapse of the commercial fishery for this squid in the Guaymas Basin within the Gulf of California. This large squid is a major predator of great ecological and economic importance in the Gulf of California, the California Current, and Peru Current systems. In early 2010, these squid abandoned their normal coastal-shelf habitats in the Guaymas Basin and instead were found in the Salsipuedes Basin to the north, an area buffered from the effects of El Niño by the upwelling of colder water. The commercial fishery also relocated to this region and large squid were not found in the Guaymas Basin from 2010-2012, instead animals that matured at an unusually small size and young age were abundant. A return to the large size-at-maturity condition has still not occurred, despite the apparent return of normal oceanographic conditions.

The El Niño of 2009-2010 presented an unforeseen opportunity to reveal an important feature of adaptability of *Dosidicus gigas* to an acute climatic anomaly, namely a large decrease in size and age at maturity. Now these investigators will have the opportunity to document recovery to the normal large size-at-maturity condition. The specific aims of this project are:

1) continue a program of acoustic surveys and direct sampling of squid that has already been established in the Gulf of California in order to assess distribution, biomass, life history strategy diet, and migratory and foraging behaviors relative to pre-El Niño conditions and
2) conduct analogous surveys in Monterey Bay, California in conjunction with long-term remote operated vehicle surveys of squid abundance.

The data from these studies will provide a comparison of recovery in the two different squid populations and yield valuable insights into what ecological effects an area is expected to experience with an invasion of either small or large Humboldt squid. As long-term climate change progresses, squid of both forms may expand northward into the California Current System.

Related Project: Hypoxia and the ecology, behavior and physiology of jumbo squid, *Dosidicus gigas*

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1338432

[table of contents | back to top]