ADCP data from Nearshore Isla Natividad, Baja California Mexico from July to August of 2018

Website: https://www.bco-dmo.org/dataset/872339
Data Type: Other Field Results
Version: 1
Version Date: 2022-03-24

Project
» Collaborative Research: Evaluating how abalone populations in the California Current are structured by the interplay of large-scale oceanographic forcing and nearshore variability (Abalone Safe Places)

Contributors	Affiliation	Role
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Abstract
ADCP data collected as part of a Nearshore study conducted Isla Natividad, Baja California Mexico from July to August of 2018 that included currents, water level, wave data, temperature, and dissolved oxygen.

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Coverage

Spatial Extent: **Lat**:27.8869 **Lon**:-115.1887
Temporal Extent: 2018-07 - 2018-08

Methods & Sampling

Location: Isla Natividad, Baja California, Mexico (27º53.215 N, 115º11.325 W depth 15-30m)

From July - Aug of 2018, numerous instruments were deployed around Isla Natividad in Baja California Mexico. . These included ADCPs, which were bottom-mounted by lead weights.

Folders and filenames included in this dataset contain transect and target depth identifiers.
Prefix letters represent a cross-shore transect line and the 2 numerals represent the approximate target depth of a mooring along that line. There were 4 transects (LG,PP, MP, BB) and moorings were targeted at 15, 20, and 25m on each transect. For example "BB15" indicates transect BB and target mooring depth of 15m. See the supplemental file "deploy_info.csv" for a list of transect-mooring deployments included in this dataset.

Data Processing Description

MATlab 2019 b is used for all QA/QC and processing. The following steps are taken for QA/QC

- NaN if vel error > 5* the standard deviation of velocity in ADCP plan
- NaN if vel correlation < 100
- NaN if percent_good (which is outputted from RDI ADCPs) < 90
- NaN if Echo Intensity < 30
- NaN if fish is observed (the difference between two bins is >30)
- NaN 15% below sea level for side lobe
- NaN if pitch or roll > 15
- Cleaned data was then filtered to 10 minutes using a low pass filter

BCO-DMO Data Manager Processing Notes:
* .mat file context examined and example structures provided in data file descriptions.
* .mat and .txt vector and array exports provided by the submitter were bundled into .zip files and attached to dataset.
* .netcdf files containing the same ADCP data as the .mat files were added as a separate .zip file. These were added as the primary data for this dataset.
* deploy_info.csv was created by extracted the contents of every *_Info*.txt file within the provided file hierarchy. The Deployment ID was extracted from the filename of the _Info file.
* ISO_DateTime_UTC_Start was added as a column by converting start time in Mountain Time

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Data Files

File

ADCP netcdf files

filename: ADCP_netcdf.zip (ZIP Archive (ZIP), 19.82 MB)
MD5:ab498194da10d811bac06ef5f7cd51de

10 ADCP files in netCDF format.

Filelist:
ADCP_BB15.nc
ADCP_BB20.nc
ADCP_LG15.nc
ADCP_LG20.nc
ADCP_LG25.nc
ADCP_MP20.nc
ADCP_MP25.nc
ADCP_PP15.nc
ADCP_PP20.nc
ADCP_PP25.nc

Example netCDF header (from file ADCP_BB15.nc):

```
netcdf ADCP_BB15 {
dimensions:
        z = 30 ;
        time = 2719 ;
variables:
        double u(time, z) ;
                u:units = "m/s" ;
                u:comment = "East/West velocities" ;
        double v(time, z) ;
                v:units = "m/s" ;
                v:comment = "North/South velocities" ;
        double w(time, z) ;
                w:units = "m/s" ;
                w:comment = "vertical velocities, from beam 5" ;
        double P(time) ;
                P:units = "dbar" ;
        double dnum(time) ;
        double unixtime(time) ;
        double z(z) ;
                z:units = "m" ;
                z:comment = "vertical positive up, above bottom" ;

// global attributes:
                :time_coverage_start = "26-Jul-2018 12:00:00" ;
                :time_coverage_end = "14-Aug-2018 09:00:00" ;
                :time_zone = "MT" ;
                :longitude = "-115.186" ;
                :latitude = "27.863" ;
                :name = "BB15" ;
}
```

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Supplemental Files

File

ADCP .mat files

filename: ADCP_mat_and_txt.zip

(ZIP Archive (ZIP), 42.04 MB)
MD5:c2f31aed3fa53590c8a72f59e65a514b

ADCP data. Contains matlab .mat files and txt files containing exported vectors and arrays from the .mat file.

This file bundle contains subfolders named by deployment ID (transectID+target_depth). Each folder contains a file ending with _Info.txt which contains deployment information such as start and end time, lat,lon, depth, units.

Within each folder is the .mat file for the deployment containing a structure "DATA"

```
% example DATA struct
% DATA =
%
%   struct with fields:
%
%          East: [30×2719 double]
%         North: [30×2719 double]
%          Vert: [30×2719 double]
%          Time: [7.3727e+05 7.3727e+05 7.3727e+05 7.3727e+05 7.3727e+05 7.3727e+05 7.3727e+05 7.3727e+05 7.3727e+05 7.3727e+05 ... ]
%      pressure: [14.8000 14.7660 14.7140 14.7010 14.6850 14.6770 14.6160 14.6470 14.5660 14.5670 14.5920 14.5690 14.5730 ... ]
%       bin_MAB: [0.9000 1.4000 1.9000 2.4000 2.9000 3.4000 3.9000 4.4000 4.9000 5.4000 5.9000 6.4000 6.9000 7.4000 7.9000 ... ]
%      SiteInfo: [1×1 struct]
%
% DATA.SiteInfo
%
% ans =
%
%   struct with fields:
%
%      programming: [1×1 struct]
%       start_date: 7.3727e+05
%         end_date: 7.3729e+05
%        Time_Zome: 'MT'
%         latitude: 27.8630
%        longitude: -115.1860
%            notes: {'Not really near kelp, Sandy bed'}
%             name: 'BB15'

% DATA.SiteInfo.programming
%
% ans =
%
%   struct with fields:
%
%      vert_vel_prec: 0.0070
%       hor_vel_prec: 0.0220
```

Velocity units are meters per second (m/s). Pressure units are decibars(dbar).

Time is a matlab datenum type in time zone Mountain Time (MT).

Deployment Information

filename: deploy_info.csv

(Comma Separated Values (.csv), 5.04 KB)
MD5:85b804862d2c8f74418595fe27222216

Deployment Information for transects and moorings.

Columns (parameter) info:
Data_Type, Data type collected (e.g. MiniDOT,CTD)
Deployment_ID, Deployment identifier. Prefix letters represent a cross-shore transect line and the 2 numerals represent the approximate target depth of a mooring along that line.
Transect_ID, There were 4 transects (LG,PP, MP, BB).
Target_Depth, Moorings targed deployment depth along transect. Targeted at 15, 20, and 25m on each transect.
Start_Date,Start Date local time zone (MT) in format "%d-%b-%Y %H:%M:%S"
End_Date, End Date local time zone (MT) in format "%d-%b-%Y %H:%M:%S"
Time_Zone, Timezone (MT, mountain time) used for Start_Date and End_Date
ISO_DateTime_UTC_Start, Start Date time zone UTC in ISO 8601 format "%Y-%m-%dT%H:%M:%SZ"
Latitude, latitude in decimal degrees
Longitude, longitude in decimal degrees
Units,units used for the data type
Depth, notes "Bottom(seafloor) or no value"

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Related Datasets

IsRelatedTo

Monismith, S. G., Woodson, C. B., Daly, M., Fong, D. (2023) **CTD data from Nearshore Isla Natividad, Baja California Mexico from July to August of 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-03-24 doi:10.26008/1912/bco-dmo.872345.1 [view at BCO-DMO]
Relationship Description: Data collected as part of the same study. A Nearshore study conducted Isla Natividad, Baja California Mexico from July to August of 2018 that included currents, water level, wave data, temperature, and dissolved oxygen.

Monismith, S. G., Woodson, C. B., Daly, M., Fong, D. (2023) **Dissolved oxygen and temperature from Nearshore Isla Natividad, Baja California Mexico from July to August of 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-03-24 doi:10.26008/1912/bco-dmo.872351.1 [view at BCO-DMO]
Relationship Description: Data collected as part of the same study. A Nearshore study conducted Isla Natividad, Baja California Mexico from July to August of 2018 that included currents, water level, wave data, temperature, and dissolved oxygen.

Monismith, S. G., Woodson, C. B., Daly, M., Fong, D. (2023) **Pressure data from Nearshore Isla Natividad, Baja California Mexico from July to August of 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-03-24 doi:10.26008/1912/bco-dmo.872357.1 [view at BCO-DMO]
Relationship Description: Data collected as part of the same study. A Nearshore study conducted Isla Natividad, Baja California Mexico from July to August of 2018 that included currents, water level, wave data, temperature, and dissolved oxygen.

Monismith, S. G., Woodson, C. B., Daly, M., Fong, D. (2023) **Temperature data from Nearshore Isla Natividad, Baja California Mexico from July to August of 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-03-24 doi:10.26008/1912/bco-dmo.872332.1 [view at BCO-DMO]
Relationship Description: Data collected as part of the same study. A Nearshore study conducted Isla Natividad, Baja California Mexico from July to August of 2018 that included currents, water level, wave data, temperature, and dissolved oxygen.

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Parameters

Parameters for this dataset have not yet been identified

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Project Information

Collaborative Research: Evaluating how abalone populations in the California Current are structured by the interplay of large-scale oceanographic forcing and nearshore variability (Abalone Safe Places)

Coverage: Pacific Coast of Baja California (26 N to 32 N)

NSF Award Abstract:
Oceanographic variability is increasingly recognized as a driver of change in marine ecosystems. Understanding the effects of this oceanographic variability and its extremes on organisms, populations, ecosystems and the critical services they deliver is of great scientific interest and pivotal for resource management and policy. The overarching goal of this project is to determine how small-scale heterogeneity in habitat quality and site-specific vulnerability to extreme oceanographic conditions might help identify safe spaces and protect coastal populations and fisheries from the detrimental effects of increasing frequency, intensity and durations of extreme oceanographic conditions. This project will combine detailed nearshore oceanographic studies with ecological experiments and coupled biophysical modeling to advance understanding of the drivers of local oceanographic variability and consequent effects on coastal marine

animals. The research will determine how multiple, potentially stressful, environmental drivers co-vary in the field and how such variation affects the population dynamics of coastal species. Specifically, this project will provide key insights regarding how changes in ocean acidification, dissolved oxygen and temperature will affect green and pink abalone, an ecologically and economically important resource in the southern California Current. Team members will work with partner non-governmental organizations, resource agencies, and fishing cooperative federations to disseminate results and incorporate data and insights into fisheries management and adaptation initiatives in Baja California, Mexico and in California, USA. This project will also support the training and professional development of underrepresented groups at the high school, undergraduate, graduate and postdoctoral levels through direct involvement in research, intensive courses and international workshops.

Despite large-scale drivers and regional perturbations, local variability in ocean conditions may be a major driver of the overall performance and vulnerability of coastal marine species. Research performed as part of this project will test two specific hypotheses: (1) The relative influences of upwelling versus tides, as mediated by coastal geometry and structural complexity associated with rocky reefs and kelp forests act to create high local variability in physical conditions, at scales of 10s-1000s meters; and (2) Local variability in oceanographic conditions results in high local patchiness in the performance of sedentary marine organisms, providing for safe spaces in the face of escalating heat waves, hypoxia, and acidification, that have caused recent mass mortalities in multiple species across the California Current region. Integrated oceanographic-ecological field studies will be conducted along the coast of Baja California, Mexico, using green and pink abalone (Haliotis fulgens, H. corrugata) as model species. Complementary laboratory experiments will evaluate how different exposure regimes (frequency, intensity and duration of high temperature, and/or low dissolved oxygen and acidity events) may affect the demography and persistence of abalone populations under current and future environments. Coupled biophysical and population models will integrate results from the field and laboratory experiments to understand how local variability in ocean conditions affects population dynamics over longer periods. The research will advance the understanding of factors affecting the resilience coastal species by (1) ascertaining how large-scale oceanographic phenomena manifest in ocean conditions (dissolved oxygen, acidity, temperature) at local scales that are most relevant to coastal marine ecosystems and (2) determining the effects of current, and expected future, ocean conditions and variability on important marine species.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1736830

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