Log of plankton sampling during thermocline study from the Nearshore Transport cruises on R/V Gaia Pineda in the Offshore Calumet Park, La Jolla, Southern California, USA from June to July 2015

Website: https://www.bco-dmo.org/dataset/640851
Data Type: Cruise Results
Version:
Version Date: 2016-03-17

Project
» Nearshore larval transport: physical and biological processes (Nearshore larval transport)

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Coverage

Spatial Extent: **N**:32.81044 **E**:-117.27144 **S**:32.80967 **W**:-117.27322
Temporal Extent: 2015-06-11 - 2015-07-23

Dataset Description

Log of plankton samples (dates, times, location, etc.) collected during a thermocline study during the 2015 cruises.

Methods & Sampling

Plankton samples were collected using an Ebara semivortex pump (300 liters/minute) fitted with a 5 cm diameter hose that filtered ~2 cubic meters through a 112 micrometer (um) mesh net. Pump sampling locations were determined after examining a CTD cast taken by YSI Castaway.

An adaptive sampling approach was used to pump plankton during internal wave conditions. Larvae were sampled at 4 depths before, during, and after the passage of associated warm fronts at stations located between 6-3 m in depth.

Data Processing Description

BCO-DMO processing:
- added conventional header with dataset name, PI name, version date
- renamed parameters to BCO-DMO standard
- changed lat and lon to 5 digits post-decimal
- formatted time to hhmm; created separate month, day, year, and ISO_DateTime_Local columns

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Data Files

File
thermocline_log.csv (Comma Separated Values (.csv), 6.01 KB) MD5:1d568240712ee5d1c92560393b02a034 Primary data file for dataset ID 640851

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Parameters

Parameter	Description	Units
year	4-digit year (local)	YYYY
month	2-digit month (local)	mm (01-12)
season	season: summer = 1; fall=2	integer
index	record number	integer
day	2-digit day of month (local)	dd (01-31)
date_local	Date (in local time zone)	mm/dd/YYYY
time_local	Time (in local time zone)	HHMM
time_gmt	Time (GMT)	HHMM
ISO_DateTime_Local	Date and time formatted to the ISO 8601 standard	YYYY-mm-ddTHH:MM:SS.xx
replicate	replicate number	integer
sample	sample identification?	integer
station	Station number	integer
lat	Latitude; north is positive	decimal degrees
lon	Longitude; east is positive	decimal degrees
depth	Depth sampled	meters
num_plankton_pump_samples	Number of plankton pump samples	integer
ctd_filename	Name of the CTD file	text
comment	Comments about the sampling event	text

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Instruments

Dataset-specific Instrument Name	YSI Castawa
Generic Instrument Name	CTD - profiler
Dataset-specific Description	YSI Castaway
Generic Instrument Description	The Conductivity, Temperature, Depth (CTD) unit is an integrated instrument package designed to measure the conductivity, temperature, and pressure (depth) of the water column. The instrument is lowered via cable through the water column. It permits scientists to observe the physical properties in real-time via a conducting cable, which is typically connected to a CTD to a deck unit and computer on a ship. The CTD is often configured with additional optional sensors including fluorometers, transmissometers and/or radiometers. It is often combined with a Rosette of water sampling bottles (e.g. Niskin, GO-FLO) for collecting discrete water samples during the cast. This term applies to profiling CTDs. For fixed CTDs, see https://www.bco-dmo.org/instrument/869934.

Dataset-specific Instrument Name	Ebara semivortex pump
Generic Instrument Name	Pump
Dataset-specific Description	Ebara semivortex pump (300 liters/minute)
Generic Instrument Description	A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: direct lift, displacement, and gravity pumps

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Deployments

Pineda_small_boat

Website	https://www.bco-dmo.org/deployment/542994
Platform	R/V Gaia
Report	http://dmoserv3.whoi.edu/data_docs/Nearshore_Larval_Transport/sampling_report_nearshore_transport_spring2014.pdf
Start Date	2014-04-18
End Date	2015-11-20
Description	Series of nearshore and intertidal cruises during Spring 2014 and continuing in 2015. R/V Gaia is a University of San Diego vessel (a 7 m Parker, with outboard motor). Description of deployment events: 18 April 2014: deployed subsurface temperature mooring in 8m; deployed ADCP with temperature logger and Seaguage in 8m. Deployed two temperature loggers in intertidal under rocks with settlement plates. 21 April 2014: deployed temperature telemetry mooring in 8m. 23 April 2014: deployed 12 settlement plates in intertidal (checked daily). 1 May: deployed temperature loggers in 0.5m and 1m within intertidal. 2 May: deployed bottom frame in 4m with Nortek, temperature logger, and Seaguage. Plankton cruises: 5/9/2014; 5/14/2014; 5/23/2014; 5/26/2014; 6/3/2014; 6/4/2014; 6/6/2014; 6/11/2014; 6/15/2014; 6/16/2014; 6/17/2014; 6/25/2014; 6/27/2024; 7/2/2014; 7/7/2014; 7/11/2014; 7/14/2014. Recovery events: Recovered telemetry mooring and 4m frame on 15 July 2014. Recovered subsurface temperature mooring and ADCP from 8m on 16 July 2014. Recovered instruments and settlement plates from rocky intertidal 16 July 2014. Refer to the proposed spring 2014 sampling plan (PDF), spring 2015 sampling report (PDF), fall-2014/spring-2015/fall-2015 sampling plan (PDF).

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Project Information

Nearshore larval transport: physical and biological processes (Nearshore larval transport)

Coverage: Southern California

Description from NSF award abstract:
Providing an award for this study will provide essential knowledge required for management of coastal resources. This study addresses near shore cross-shore larval transport processes that operate over wide geographic areas in open coast settings, namely larval transport by wave circulation / Stokes drift, and by internal tidal bores. Larval transport by wave circulation / Stokes drift is a ubiquitous process that has not been studied observationally, and it is not known how internal tidal bores deliver larvae to intertidal habitats. This project will examine near shore (region between 20 m depth and intertidal) physical and biological processes that account for the delivery of larvae to adult habitats. The study system in Southern California shares similarities with most other temperate areas and we will study marine taxa that are widely distributed and successful in a variety of environments.

Recent studies suggest that larval transport in the near shore zone plays a central role in larval dispersal and connectivity of shallow water species. These recent advances, however, have not been matched with process-oriented studies addressing circulation and behavioral processes at the appropriate temporal and spatial scales, and only a few larval transport mechanisms have been considered for near shore open coastlines. Recent advances in our understanding of hydrodynamic processes driving cross-shore flows and growing awareness of the importance of the processes to larval transport, however, make this study timely. The investigators hypothesize that a series of physical and biological events results in the delivery of invertebrate larvae to the intertidal habitat. These events include physical transport due to wave circulation / Stokes drift near the surface and internal tide circulation near the bottom, alteration of behavior for terminal larval stages, and larval use of "adaptive" behavioral responses to exploit event-dependent flows. Further, they suggest that the predominance of wave circulation / Stokes drift and internal tide circulation varies seasonally, with internal tidal bores important in spring/summer, when the water column is well-stratified, and wave circulation / Stokes drift more pervasive in fall/winter, coinciding with winter storms. The hypotheses in this study will be tested with estimates of physical transport, larval supply and settlement. These measurements will be combined with use of adaptive sampling to test the dependence of larval vertical distribution on changes in hydrodynamic conditions.

Results from this study will have important ecological implications as wave circulation / Stokes drift and internal motions may represent critical and regular transport mechanisms for larvae of marine organisms that must return to near shore habitats to complete their life cycle, thereby impacting population connectivity and management strategies used by coastal planners (e.g., ecosystem-based fisheries management, placement of Marine Protected Areas).

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1357290
NSF Division of Ocean Sciences (NSF OCE)	OCE-1357327

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