

Thirty day time series of avg daily phytoplankton concentration over ridges in the surf zone at Sand City, Monterey Bay, California in 2010 (Surf zone larval transport project)

Website: <https://www.bco-dmo.org/dataset/561352>

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Project

» [Does coupling between the inner shelf and surf zone regulate larval supply to intertidal populations?](#) (Surf zone larval transport)

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Dataset Description

Thirty day time series of average daily phytoplankton concentration over ridges in the surf zone at Sand City, CA (36.615760 degrees N, 121.85485 degrees W).

Methods & Sampling

Phytoplankton samples were collected within the Sand City surf zone at about low tide each day. From 06 to 15 July, samples were collected over the shoal within the surf zone just south of the sampled rip current. Within the surf zone, swimmers collected replicate (n=3) 1 L water samples from a depth of about 1 m by filling a sample jar. The investigators assumed that due to the turbulence of the surf zone that there was no vertical stratification of the phytoplankton. Samples were preserved in acid Lugols. Phytoplankton were identified to genus and counted on Sedgwick Rafter slides using standard techniques (Sournia 1978).

Data Processing Description

Three samples were collected each day in the water over the ridges. Counts from the microscopic analysis of

the samples were converted to number per liter and the average and 95% confidence interval for each daily set of samples were calculated. On the first two samples dates, only one sample was collected so no 95% confidence interval could be calculated.

BCO-DMO Processing:

- Re-formatted date, and added separate columns for month, day, year, and year-day.
- Added column containing site name.
- Added lat and lon (from metadata form).
- Modified parameter names to conform with BCO-DMO naming conventions.
- Replaced blanks (missing data) with 'nd' to indicate 'no data'.

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Data Files

File
SandCity_Ridge_Phyto2010.csv (Comma Separated Values (.csv), 2.27 KB) MD5:1aedaef41cdcadadd7113f3d806d2cbe
Primary data file for dataset ID 561352

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Parameters

Parameter	Description	Units
site_name	Name of the sampling site.	text
lat	Latitude of the sampling site.	decimal degrees
lon	Longitude of the sampling site.	decimal degrees
date	Month/day/year of sample collection.	mm/dd/yyyy
PseudoN	PseudoN Ave #/L (mean of the 3 replicate samples).	average number per liter
PseudoN_95CI	PseudoN 95% confidence interval.	average number per liter
Chaetoceros	Chaetoceros Ave #/L (mean of the 3 replicate samples).	average number per liter
Chaetoceros_95CI	Chaetoceros 95% confidence interval.	average number per liter
Eucampia	Eucampia Ave #/L (mean of the 3 replicate samples).	average number per liter
Eucampia_95CI	Eucampia 95% confidence interval.	average number per liter

Thalassionema	Thalassionema Ave #/L (mean of the 3 replicate samples).	average number per liter
Thalassionema_95CI	Thalassionema 95% confidence interval.	average number per liter
Coscinodiscus	Coscinodiscus Ave #/L (mean of the 3 replicate samples).	average number per liter
Coscinodiscus_95CI	Coscinodiscus 95% confidence interval.	average number per liter
Skeletonema	Skeletonema Ave #/L (mean of the 3 replicate samples).	average number per liter
Skeletonema_95CI	Skeletonema 95% confidence interval.	average number per liter
Guindardia	Guindardia Ave #/L (mean of the 3 replicate samples).	average number per liter
Guindardia_95CI	Guindardia 95% confidence interval.	average number per liter
Asterionellopsis	Asterionellopsis Ave #/L (mean of the 3 replicate samples).	average number per liter
Asterionellopsis_95CI	Asterionellopsis 95% confidence interval.	average number per liter
Dictyocha	Dictyocha Ave #/L (mean of the 3 replicate samples).	average number per liter
Dictyocha_95CI	Dictyocha 95% confidence interval.	average number per liter
Stephanopyxis	Stephanopyxis Ave #/L (mean of the 3 replicate samples).	average number per liter
Stephanopyxis_95CI	Stephanopyxis 95% confidence interval.	average number per liter
Dissondium	Dissondium Ave #/L (mean of the 3 replicate samples).	average number per liter
Dissondium_95CI	Dissondium 95% confidence interval.	average number per liter
Ditylum	Ditylum Ave #/L (mean of the 3 replicate samples).	average number per liter
Ditylum_95CI	Ditylum 95% confidence interval.	average number per liter

Thalassiosira	Thalassiosira Ave #/L (mean of the 3 replicate samples).	average number per liter
Thalassiosira_95CI	Thalassiosira 95% confidence interval.	average number per liter
Protoperidinium	Protoperidinium Ave #/L (mean of the 3 replicate samples).	average number per liter
Protoperidinium_95CI	Protoperidinium 95% confidence interval.	average number per liter
Odontella	Odontella Ave #/L (mean of the 3 replicate samples).	average number per liter
Odontella_95CI	Odontella 95% confidence interval.	average number per liter
Prorocentrum_micans	Prorocentrum micans Ave #/L (mean of the 3 replicate samples).	average number per liter
Prorocentrum_micans_95CI	Prorocentrum micans 95% confidence interval.	average number per liter
other_dinos	other dinos Ave #/L (mean of the 3 replicate samples).	average number per liter
other_dinos_95CI	other dinos 95% confidence interval.	average number per liter
Corenthon	Corenthon Ave #/L (mean of the 3 replicate samples).	average number per liter
Corenthon_95CI	Corenthon 95% confidence interval.	average number per liter
Lauderia	Lauderia Ave #/L (mean of the 3 replicate samples).	average number per liter
Lauderia_95CI	Lauderia 95% confidence interval.	average number per liter
Phaeocystis	Phaeocystis Ave #/L (mean of the 3 replicate samples).	average number per liter
Phaeocystis_95CI	Phaeocystis 95% confidence interval.	average number per liter
Total_cells_per_L	Total cells Ave #/L (mean of the 3 replicate samples).	average number per liter
Total_cells_per_L_95CI	Total cells 95% confidence interval.	average number per liter

mon	2-digit month of year.	mm (01 to 12)
day	2-digit day of month.	dd (01 to 31)
year	4-digit year.	YYYY
yrday	Consecutive day of year (Jan 1st = 1)	

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Deployments

SC_2010

Website	https://www.bco-dmo.org/deployment/560852
Platform	Sand_City_Surf_Zone
Start Date	2010-06-15
End Date	2010-07-15

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Project Information

Does coupling between the inner shelf and surf zone regulate larval supply to intertidal populations? (Surf zone larval transport)

Coverage: Sand City Beach and Carmel River State Beach, Monterey Bay, CA

Description from NSF award abstract:

Many intertidal invertebrates and fishes have complex life cycles that include a planktonic larval phase. At the end of their pelagic development, larvae must return to shore and cross the surf zone. The purpose of this study is to investigate for the first time the role of surf zone hydrodynamics in the rate of delivery of cyprids of intertidal barnacles to the shore. To exploit the greater physical oceanographic understanding of the hydrodynamics of sandy beach surf zones, this initial study will focus on cyprid settlement on hard substrates in surf zones associated with sandy beaches. In the first two years of the study, the investigators will carry out an intensive two-month physical and biological study of a reflective and dissipative surf zone, respectively. At each site they will sample cyprids in the waters of the inner-shelf, just outside the surf zone, and within the surf zone and they will measure settlement on plates in the intertidal zone. At the same time they will collect physical oceanographic data with both in-situ instruments and a fleet of GPS-equipped surface drifters to describe the hydrodynamics of the surf zone. The time series of the physical and biological data will be correlated to investigate mechanisms of delivery of cyprids to the shore. To simulate the hydrodynamic processes responsible for the transport of larvae, the investigators will use a 3D model, resolving both the horizontal and vertical structure of the unsteady nearshore flow. To evaluate potential transport of larvae through the surf zone, a biological module describing the spatial distribution of the larvae will be coupled to the hydrodynamic module to predict the pathways of the larvae and compare with observations. Intensive sampling will help provide insight into the actual processes transporting cyprids from the inner shelf, through the surf zone, and to the intertidal zone. During each summer, weekly barnacle recruitment and daily cyprid settlement will be measured for two months to settlement plates at reflective and dissipative beaches in central California and southern Oregon. Population densities at many beaches along the West Coast will be surveyed each year to determine if a latitudinal gradient in wave energy is correlated with adult barnacle population densities.

Because the fundamentals of surfzone dynamics are universal, results of this research will be broadly applicable not only along the West Coast, but worldwide. This project will have significant impacts on education and public outreach. It will support three graduate students and nine undergraduate students and will create new research opportunities for students of diverse backgrounds from three undergraduate institutions, local high schools and the public. The research will be included in the curriculum of intensive hands-on courses, and undergraduates will participate in the research while learning how a real-world research project addresses fundamental questions. Both a website that highlights findings and an interactive display for visitors to the Bodega Marine Laboratory will be developed. A model coupling nearshore hydrodynamics and onshore transport across the surf zone will be made available to the community to stimulate research into this emerging research topic.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0926923

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