In situ video frames of Mitrocoma swimming for PIV analysis (Jellyfish predation in turbulence project)

Website: https://www.bco-dmo.org/dataset/651347
Data Type: Other Field Results
Version:
Version Date: 2016-07-06

Project
» Influence of organism-scale turbulence on the predatory impacts of a suite of cnidarian medusae (jellyfish predation in turbulence)

Contributors	Affiliation	Role
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Methods & Sampling

In situ behavioral and fluid motion measurements were collected by divers using a self-contained underwater velocimetry apparatus (SCUVA) (Katija and Dabiri, 2008).

Sections of video where the animal was in the field of view and swimming were noted.

Data Processing Description

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- renamed parameters to BCO-DMO and BODC standards
- added date column

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Data Files

File
PIV_field_obs.csv (Comma Separated Values (.csv), 1.98 KB) MD5:90c0f929c661afc6ac0d3df5c8860c7e Primary data file for dataset ID 651347

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Parameters

Parameter	Description	Units
filename	file name	unitless
date	date of measurements in field formatted as yyy-mm-dd	unitless
time_start	time of first measurement; formatted as HH:MM	unitless
time_end	time of last measurement; formatted as HH:MM	unitless
comments	comments	unitless

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Instruments

Dataset-specific Instrument Name	SCUVA
Generic Instrument Name	Acoustic Doppler Velocimeter
Dataset-specific Description	Self-Contained Underwater Velocimetry Apparatus (SCUVA) (Katija and Dabiri, L&O, 2008).
Generic Instrument Description	ADV is the acronym for acoustic doppler velocimeter. The ADV is a remote-sensing, three-dimensional velocity sensor. Its operation is based on the Doppler shift effect. The sensor can be deployed either as a moored instrument or attached to a still structure near the seabed. Reference: G. Voulgaris and J. H. Trowbridge, 1998. Evaluation of the Acoustic Doppler Velocimeter (ADV) for Turbulence Measurements. J. Atmos. Oceanic Technol., 15, 272–289. doi: http://dx.doi.org/10.1175/1520-0426(1998)0152.0.CO;2

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Deployments

FHL_Sutherland

Website	https://www.bco-dmo.org/deployment/649916
Platform	Friday_Harbor
Start Date	2012-06-01
End Date	2016-06-30

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Project Information

Influence of organism-scale turbulence on the predatory impacts of a suite of cnidarian medusae (jellyfish predation in turbulence)

Coverage: Friday Harbor Labs, WA

Bloom-forming jellyfish are increasing in number, frequency and magnitude, in part due to anthropogenic impacts, underscoring a need for enhanced understanding of trophic exchanges in jellyfish-dominated ecosystems. Interactions between jellyfish and their prey are driven by morphology, behavior, and unique fluid signatures that result in species-specific prey selection patterns. Fluid signatures generated by predators entrain prey, and motile prey organisms have evolved to sense and respond to these stereotyped fluid signatures. The shape and coherence of these unique fluid signatures are strongly mediated by turbulence, which is ubiquitous in the ocean. Yet, the effects of turbulence are almost always neglected in feeding studies. This three-year project will investigate the influence of turbulence on predator-prey interactions using a suite of cnidarian hydromedusae with unique morphologies, fluid signatures and prey selection patterns collected in the region of Friday Harbor Laboratory, WA.

This project seeks to establish a detailed, mechanistic understanding of the effects of turbulence on organism-scale predator-prey interactions using gelatinous zooplankton predators with contrasting predation modes. The PI will investigate prey selection under varying levels of turbulence by studying swimming behavior, wake structure, and predator-prey interactions in a laboratory turbulence generator designed for fragile plankton. The PI will also make in situ measurements of turbulence and observations of organism behavior using a Self-contained Underwater Velocimetry Apparatus (SCUVA). This is a fully submersible instrument for flow visualization, and its use will provide a cross-calibration of field and laboratory rates and behaviors. The influence of turbulence on trophic position among the different species of hydromedusae will be quantified through field studies of prey selection patterns. The proposed comparative approach using species with distinct predation modes will provide insights applicable to other planktonic predators that can be similarly grouped.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1155084

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