Cross shelf undulating towed vehicle (Acrobat with MIDAS) survey data from R/V Pelican PE08-54, PE10-01, PE09-12 in the Northwest Florida shelf off Panama City, FL. from 2008-2009 (BenDiM project)

Website: https://www.bco-dmo.org/dataset/3781
Version:
Version Date: 2012-11-16

Project
» Benthic Dinoflagellate Migration: Occurrence and Processes (BenDiM)

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Table of Contents

- Dataset Description
  - Methods & Sampling
- Data Files
- Parameters
- Instruments
- Deployments
- Project Information
- Funding

Dataset Description

MIDAS (Multiple Instrument Data Acquisition System) is the ship's underway data acquisition system. Water flows through the system pumped from approximately one meter below the surface passing by sensors that measure various water quality parameters like temperature, salinity, chlorophyll, and turbidity.

Methods & Sampling

MIDAS is a PC based Multiple Instrument Data Acquisition System (MIDAS) controlled by a rack mounted dual processor Digital Server 3000R with 21" monitor, and 10 gigabyte hard drive. A National Instruments 16 port serial expansion board allows modular integration of instrumentation, rapid sampling rates, and the maintenance of a real-time data display. Analog sensor signals are converted to a serial format for output to the host PC using using R.M. Young A/D devices. The controlling software was developed using National Instruments LabVIEW, to allow accessibility and ease of modification.

A real time graphical display provides charting and data display to the ships two labs as well as anywhere else on the ships network. Navigational data is acquired from a Starlink differential GPS or a Trimble GPS with a Micronet Receiver Station. The Micronet Receiver Station is a land based differential system privately maintained (provided for LUMCON's use by Doug Chocrane Technologies, Lafayette, Louisiana), with sub 5-meter accuracy and available out to 300 miles in the Gulf of Mexico. A sea water flow-through system provides sea surface temperature, conductivity, chlorophyll fluorescence, and transmissometry data using: a Sea-bird Electronics SBE 21 Thermosalinograph; a Sea-Bird Electronics SBE 38 Remote Digital Immersion Thermometer;

Turner Designs Model 10 Series Fluorometers; and a WETLabs 10 centimeter or 25.0-centimeter path length transmissometer. MIDAS also integrates the data from the ships meteorological suite into the data set and display. The meteorological suite consists of a R.M. Young 05103 Wind Monitor, a R.M. Young model 61201 Barometric Pressure sensor, a R.M. Young TS05327 Temperature and Relative Humidity sensor and photo synthetically active radiation (PAR) is measured with a LI-COR LI-190SZ Quantum Sensor.

[table of contents | back to top]

Data Files

File
midas.csv(Comma Separated Values (.csv), 13.03 MB) MD5:aa533c3b67e56e98f6e52472540b5bb5 Primary data file for dataset ID 3781

[table of contents | back to top]

Parameters

Parameter	Description	Units
date	date (GMT)	yyyymmdd
time	time(GMT)	hhmmss
lon	longitude (West is negative)	decimal degrees
lat	latitude (South is negative)	decimal degrees
wind_speed	True Wind Speed	knots
wind_dir	True Wind Direction	degrees
temp_air	Air Temperature	degrees celsius
humidity	Humidity	percentage
press_bar	Barometric_Pressure	hPa
PAR	Photosynthetically active radiation	mE/m2/s
sog	speed over the ground	knots
cog	course over the ground	DegT

depth	Depth (High Freq)	meters
fluor2	Turner AU10 fluorescence	microgram/liter
light_trans	Transmittance	percentage
temp	Sea Temperature	degrees celsius
cond	Conductance	S/m
sal	Salinity from underway thermosalinograph	psu
temp2	Seachest Temp	degrees celsius
wind_speed_r	Relative Wind Speed	knots
wind_dir_r	Relative Wind Direction	degrees
fluor	Wetlabs fluorescence	milligrams/meter^3
flvolt	Wetlabs Volts	volts
fl_counts	Wetlabs raw counts	counts
year	Year of data collection	yyyy
cruise_id	cruise identification; PE = RV/Pelican	
yrday_gmt	yearday in gmt. GMT day and decimal time, as 326.5 for the 326th day of the year, or November 22 at 1200 hours (noon).	
month	month of year, GMT time	1 to 12
day	day of month, gmt time	1 to 31

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	Anemometer
Generic Instrument Name	Anemometer
Dataset-specific Description	Young MA05103 Wind Monitor anemometer: An anemometer with a four blade helicoid propeller and lightweight direction vane. Vane angle is sensed by a precision potentiometer. The instrument body is UV stabilized plastic with stainless steel and anodized aluminum fittings. The instrument mounts on standard 1 inch pipe. Windspeed accuracy is +-0.3m/s and wind direction accuracy is 3 degrees.
Generic Instrument Description	An anemometer is a device for measuring the velocity or the pressure of the wind. It is commonly used to measure wind speed. Aboard research vessels, it is often mounted with other meteorological instruments and sensors.

Dataset-specific Instrument Name	Barometer
Generic Instrument Name	Barometer
Dataset-specific Description	R.M. Young model 61201 Barometric Pressure sensor
Generic Instrument Description	A barometer is an instrument used to measure atmospheric pressure. There are many types of barometers identified by make and model and method of measurement.

Dataset-specific Instrument Name	Global Positioning System Receiver
Generic Instrument Name	Global Positioning System Receiver
Dataset-specific Description	Starlink differential GPS or a Trimble GPS with a Micronet Receiver Station. The Micronet Receiver Station is a land based differential system privately maintained (provided for LUMCON's use by Doug Chocrane Technologies, Lafayette, Louisiana) with sub 5-meter accuracy and available out to 300 miles in the Gulf of Mexico.
Generic Instrument Description	The Global Positioning System (GPS) is a U.S. space-based radionavigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. The U.S. Air Force develops, maintains, and operates the space and control segments of the NAVSTAR GPS transmitter system. Ships use a variety of receivers (e.g. Trimble and Ashtech) to interpret the GPS signal and determine accurate latitude and longitude.

Dataset-specific Instrument Name	Multiple Instrument Data Acquisition System
Generic Instrument Name	Multiple Instrument Data Acquisition System
Dataset-specific Description	MIDAS is a PC based Multiple Instrument Data Acquisition System (MIDAS) controlled by a rack mounted dual processor Digital Server 3000R with 21" monitor, and 10 gigabyte hard drive. A National Instruments 16 port serial expansion board allows modular integration of instrumentation, rapid sampling rates, and the maintenance of a real-time data display. Analog sensor signals are converted to a serial format for output to the host PC using using R.M. Young A/D devices. The controlling software was developed using National Instruments LabVIEW, to allow accessibility and ease of modification. A real time graphical display provides charting and data display to the ships two labs as well as anywhere else on the ships network. Navigational data is acquired from a Starlink differential GPS or a Trimble GPS with a Micronet Receiver Station. The Micronet Receiver Station is a land based differential system privately maintained (provided for LUMCON's use by Doug Chocrane Technologies, Lafayette, Louisiana), with sub 5-meter accuracy and available out to 300 miles in the Gulf of Mexico. A sea water flow-through system provides sea surface temperature, conductivity, chlorophyll fluorescence, and transmissometry data using: a Sea-bird Electronics SBE 21 Thermosalinograph; a Sea-Bird Electronics SBE 38 Remote Digital Immersion Thermometer; Turner Designs Model 10 Series Fluorometers; and a WETLabs 10 centimeter or 25.0-centimeter path length transmissometer. MIDAS also integrates the data from the ships meteorological suite into the data set and display. The meteorological suite consists of a R.M. Young 05103 Wind Monitor, a R.M. Young model 61201 Barometric Pressure sensor, a R.M. Young TS05327 Temperature and Relative Humidity sensor and photo synthetically active radiation (PAR) is measured with a LI-COR LI-190SZ Quantum Sensor.
Generic Instrument Description	MIDAS System

Dataset-specific Instrument Name	Photosynthetically Available Radiation Sensor
Generic Instrument Name	Photosynthetically Available Radiation Sensor
Dataset-specific Description	LI-COR LI-190SZ Quantum Sensor
Generic Instrument Description	A PAR sensor measures photosynthetically available (or active) radiation. The sensor measures photon flux density (photons per second per square meter) within the visible wavelength range (typically 400 to 700 nanometers). PAR gives an indication of the total energy available to plants for photosynthesis. This instrument name is used when specific type, make and model are not known.

Dataset-specific Instrument Name	Sea-Bird SBE 38 Remote Digital Immersion Thermometer
Generic Instrument Name	Sea-Bird SBE 38 Remote Digital Immersion Thermometer
Generic Instrument Description	Sea-Bird SBE 38 Remote Digital Immersion Thermometer is a seawater temperature sensor in a 10,500 meter (34,400 ft) titanium pressure housing. Real-time temperature data is transmitted in ASCII characters (degrees C or raw counts) via an RS-232 or optional RS-485 serial interface for display or logging by PC or data logger. The SBE 38's measurement range is -5 to +35 C; absolute accuracy is better than 0.001 C (1 mK) and resolution is approximately 0.00025 C (0.25 mK).

Dataset-specific Instrument Name	Thermosalinograph
Generic Instrument Name	Thermosalinograph
Dataset-specific Description	Sea-bird Electronics SBE 21 Thermosalinograph
Generic Instrument Description	A thermosalinograph (TSG) is used to obtain a continuous record of sea surface temperature and salinity. On many research vessels the TSG is integrated into the ship's underway seawater sampling system and reported with the underway or alongtrack data.

Dataset-specific Instrument Name	Transmissometer
Generic Instrument Name	Transmissometer
Dataset-specific Description	WETLabs 10 centimeter or 25.0-centimeter path length transmissometer
Generic Instrument Description	A transmissometer measures the beam attenuation coefficient of the lightsource over the instrument's path-length. This instrument designation is used when specific manufacturer, make and model are not known.

Dataset-specific Instrument Name	Turner Designs Fluorometer -10-AU
Generic Instrument Name	Turner Designs Fluorometer 10-AU
Generic Instrument Description	The Turner Designs 10-AU Field Fluorometer is used to measure Chlorophyll fluorescence. The 10AU Fluorometer can be set up for continuous-flow monitoring or discrete sample analyses. A variety of compounds can be measured using application-specific optical filters available from the manufacturer (read more from Turner Designs, turnerdesigns.com, Sunnyvale, CA, USA).

[table of contents | back to top]

Deployments

PE08-54

Website	https://www.bco-dmo.org/deployment/58880
Platform	R/V Pelican
Start Date	2008-05-15
End Date	2008-05-21
Description	Acrobat surveys and CTD/rosettes transects Cruise information and original data are available from the NSF R2R data catalog.

PE10-01

Website	https://www.bco-dmo.org/deployment/58882
Platform	R/V Pelican
Start Date	2009-07-08
End Date	2009-07-15
Description	Acrobat surveys and CTD/rosettes transects Cruise information and original data are available from the NSF R2R data catalog.

PE09-12

Website	https://www.bco-dmo.org/deployment/58881
Platform	R/V Pelican
Start Date	2008-10-15
End Date	2008-10-20
Description	Acrobat surveys and CTD/rosettes transects Cruise information and original data are available from the NSF R2R data catalog.

[table of contents | back to top]

Project Information

Benthic Dinoflagellate Migration: Occurrence and Processes (BenDiM)

Coverage: Northwest Florida shelf off Panama City, FL

Most applications of the standardized dinoflagellate diel vertical migration (DVM) hypothesis consider a surface goal in daylight and a subsurface nutrient goal at night because of the visibility of surface blooms. The sub-surface nutrient source, however, can be so deep that dinoflagellates are unable to reach the surface during a 12 h ascent. At least three literature reports document a sediment-oriented expression of an alternative DVM pattern characteristic of continental boundaries with wider, more gently sloping shelves that can yield high biomass, near-bottom dinoflagellate accumulations. The targeted dinoflagellate niche, here termed 'Benthic Dinoflagellate Migration' or 'BenDiM', is influenced by light and nutrient gradients but is unique in that a DVM exists between a nutrient source near or at the sediment-sea interface and a light intensity in the lower euphotic zone that supports a net increase in population size. The project specifically deals with: 1) the different dinoflagellate species that occupy the BenDiM niche on the continental shelf off Panama City, FL between the 60 m and 20 m contours between May and Nov; 2) the light acclimation, the nutrient uptake capabilities, and the behavioral patterns required of different dinoflagellate species that occupy the BenDiM niche; and, 3) the effect of representative physical water motion on the formation, transport and fate of the

different BenDiM dinoflagellate species populations. The study includes: 1) a pelagic/benthic field program with three 7-day cruises during different months between May and Oct in 2008 and Jul 2009; 2) laboratory studies on the light, nutrient, and behavioral characteristics of BenDiM dinoflagellates that allow successful competition with near-bottom pelagic diatoms and the microphytobenthos; and 3) a physical-biological modeling study to plan, integrate and extend the field and laboratory results. The cruise program applies standard UNOLS ship capabilities extended with instrumentation that includes: 1) an Acrobat undulating system instrumented with SeaBird CTD-O2 system, Biospherical PAR, SeaPoint Chlorophyll and CDOM Fluorometers, Seapoint Turbidity, Satlantic ISUS Nitrate Sensor, Brooke-Oceans Laser Optical Plankton Counter, and General Oceanics Flow Meter with integrated GPS and echo sounding location system and a real-time graphical display of the collected data, 2) the FlowCAM, and 3) the autonomous vertical profiler (AVP). The laboratory effort applies a proven motion analysis system for studying dinoflagellate behavior and a well-developed mesocosm capability for studying dinoflagellate physiology, biochemistry, and behavior. The modeling effort builds on an existing, biologically intense modeling approach that incorporates parameterization of dinoflagellate physiology, biochemistry and behavior in a representative physical field.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0726271

[table of contents | back to top]