Cruise track position data from USCGC Healy cruise HLY1202 from the Arctic, North of Alaska in 2012 (OA - Canada Basin project)

Website: https://www.bco-dmo.org/dataset/525521
Version: 09 September 2014
Version Date: 2014-09-09

Project
» Ocean Acidification in the Canada Basin: Roles of Sea Ice (OA - Canada Basin)

Program
» Science, Engineering and Education for Sustainability NSF-Wide Investment (SEES): Ocean Acidification (formerly CRI-OA) (SEES-OA)

Contributors	Affiliation	Role
Wynn, Jonathan	University of South Florida (USF)	Principal Investigator
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Dataset Description

HLY1202 Cruise track generated from R2R Archive file
Cruise Id, Date/Time UTC, Lat, Lon, SOG, COG
1 minute fixes

For aditional information see:
HLY1202 Cruise Report, Appendix E
U.S. Geological Survey Data Series 862 - Methods

Methods & Sampling

Generated from R2R archive file by BCO-DMO staff

For aditional information see:
HLY1202 Cruise Report, Appendix E
U.S. Geological Survey Data Series 862 - Methods

Data Processing Description

Generated from R2R archive file by BCO-DMO staff

For aditional information see:
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U.S. Geological Survey Data Series 862 - Methods

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Data Files

File
CruiseTrack.csv (Comma Separated Values (.csv), 2.80 MB) MD5:1df0d115306da47d8254c09119929d35 Primary data file for dataset ID 525521

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Parameters

Parameter	Description	Units
CruiseId	Official UNOLS cruise id	text
ISO_DateTime_UTC	ISO formatted UTC Date and Time	YYYY-MM-DDTHH:MM:SSZ
Latitude	Latitude Position (South is negative)	decimal degrees
Longitude	Longitude Position (West is negative)	decimal degrees
SOG	Instantaneous Speed-over-ground	meters/sec
COG	Instantaneous Course-over-ground [deg. clockwise from North]	decimal degrees

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Instruments

Dataset-specific Instrument Name	GPS
Generic Instrument Name	Global Positioning System Receiver
Dataset-specific Description	Navigation Equipment HEALY is outfitted with Sperry Marine's Voyage Management System (VMS). This system utilizes multiple heading, position, environmental, and navigation inputs to steer the ship along a desired course. Currently, HEALY has the following GPS receivers: GPS, DGPS, P-Code GPS, and 3-D GPS. Heading inputs include two gyrocompasses and the 3-D GPS heading information. The ship is also outfitted with an electronic magnetic compass. A Dynamic Positioning System (DPS) is available for station keeping and slow speed transits (towing, dredging). HEALY's DPS attempts to do with props and a bowthruster what smaller ships do with fore and aft thrusters, so it has limitations. It was designed and built by ALSTOM and integrates the use of propellers, rudders, and the bow thruster to accomplish ship movement. DPS Limitations: At best heading in openwater, in a 20 kt wind, seas with a significant wave height of 4.0 feet and a 1 knot currents, HEALY shall be capable of maintaining a position of +/- 150 feet or 3% of water depth (whichever is greater) from a point or trackline and maintain a heading of +/- 5 degrees. The seas and wind shall be from the same direction, with the current from less the 45 degrees off the wind. Antenna Layout Top View PDF
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.

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Deployments

HLY1202

Website	https://www.bco-dmo.org/deployment/523780
Platform	USCGC Healy
Report	http://dmoserv3.whoi.edu/data_docs/OA_Canada_Basin/HEALY1202_FINAL_CRUISE_REPORT-3.pdf
Start Date	2012-08-26
End Date	2012-09-24
Description	Original cruise data are available from the NSF R2R data catalog USCGC Healy Science-Technical Support Summary From August 25 to September 27, 2012, the United States Coast Guard Cutter (USCGC) Healy was part of an Extended Continental Shelf Project to determine the limits of the extended continental shelf in the Arctic. On a non-interference basis, a USGS ocean acidification team participated on the cruise to collect baseline water data in the Arctic. The collection of data extended from coastal waters near Barrow, Alaska, to 83°2'N., -175°36'W., and southward back to coastal waters near Barrow and on to Dutch Harbor, Alaska. As a consequence, a number of hypotheses were tested and questions asked associated with ocean acidification, including: - What is the saturation state for different parts of the basin? - What factors drive the saturation state in the different parts of the basin? - How does saturation state compare to other regions? - How do the carbon fluxes compare in the different parts of the basin? - What is the buffering capacity of the water (Revelle factor)? - What kind of variability does carbon demonstrate in the Arctic (near shore versus offshore and diurnal)? During the cruise, underway continuous and discrete water samples were collected, and discrete water samples were collected at stations to document the carbonate chemistry of the Arctic waters and quantify the saturation state of seawater with respect to calcium carbonate. These data are critical for providing baseline information in areas where no data have existed prior and will also be used to test existing models and predict future trends.

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Project Information

Ocean Acidification in the Canada Basin: Roles of Sea Ice (OA - Canada Basin)

Website: http://coastal.er.usgs.gov/ocean-acidification/polar.html

Coverage: Beaufort Sea, Canada Basin

Extracted from the NSF award abstract:

The proposed research aims to identify mechanisms of ocean acidification and carbonate undersaturation in the Canada Basin of the Arctic Ocean. The investigators will use a 3-year dataset to address the role of two specific mechanisms involving sea-ice processes: (1) surface water freshening and undersaturation resulting from recent enhanced melting of multi-year sea-ice, and (2) surface water undersaturation resulting from a "carbon-pumping" mechanism driven by brine rejection and carbonate mineral precipitation during increasingly cyclical seasonal sea ice growth and decay. The proposed work would expand understanding of the inorganic carbon cycle, air-sea CO2 exchange rates and acidification in the Arctic Ocean. Understanding baselines and how they are changing is important for setting realistic parameters for process studies on the effects of ocean acidification on flora and fauna.

Models project the Arctic Ocean will become undersaturated with respect to carbonate minerals in the next decade. Recent field results indicate parts may already be undersaturated in late summer months when ice melt is at its greatest extent. However, few comprehensive datasets of carbonate system parameters in the Arctic Ocean exist. Researchers from the U.S. Geological Survey (USGS) and University of South Florida (USF) collected high-resolution measurements of pCO2, pH, total dissolved inorganic carbon (DIC), total alkalinity (TA), and carbonate (CO3-2) from the Canada Basin that fill critical information gaps concerning Arctic carbon variability. A Multiparameter Inorganic Carbon Analyzer (MICA) was used to collect approximately 1,800 measurements of pH and DIC along an 11,965-km trackline in August and September 2012. In addition, over

500 discrete surface water samples were taken. These data are being used to characterize and model regional pCO2, pH, and carbonate mineral saturation state. A high-resolution, three-dimensional map of these results will be presented.

Data collected on the August 2012 Arctic Cruise will be used to create regional maps of seawater carbonate parameters, including pCO2 flux/change maps, and derivative maps on saturation state. Maps depicting pCO2 and carbonate saturation states over large latitudinal and nearshore to offshore gradients are needed for the Arctic, where significant decline of carbonate ecosystems, habitats, and calcifying organisms are predicted over the next decade. The data will allow the USGS to map variations in ocean chemistry along designated tracks and will be used in models to predict future Arctic Ocean saturation states.

Note: Jonathan Wynn is a former Pricipal Investigator for this project

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Program Information

Science, Engineering and Education for Sustainability NSF-Wide Investment (SEES): Ocean Acidification (formerly CRI-OA) (SEES-OA)

Website: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503477

Coverage: global

NSF Climate Research Investment (CRI) activities that were initiated in 2010 are now included under Science, Engineering and Education for Sustainability NSF-Wide Investment (SEES). SEES is a portfolio of activities that highlights NSF's unique role in helping society address the challenge(s) of achieving sustainability. Detailed information about the SEES program is available from NSF (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504707).

In recognition of the need for basic research concerning the nature, extent and impact of ocean acidification on oceanic environments in the past, present and future, the goal of the SEES: OA program is to understand (a) the chemistry and physical chemistry of ocean acidification; (b) how ocean acidification interacts with processes at the organismal level; and (c) how the earth system history informs our understanding of the effects of ocean acidification on the present day and future ocean.

Solicitations issued under this program:
NSF 10-530, FY 2010-FY2011
NSF 12-500, FY 2012
NSF 12-600, FY 2013
NSF 13-586, FY 2014
NSF 13-586 was the final solicitation that will be released for this program.

PI Meetings:
1st U.S. Ocean Acidification PI Meeting(March 22-24, 2011, Woods Hole, MA)
2nd U.S. Ocean Acidification PI Meeting(Sept. 18-20, 2013, Washington, DC)
3rd U.S. Ocean Acidification PI Meeting (June 9-11, 2015, Woods Hole, MA – Tentative)

NSF media releases for the Ocean Acidification Program:

Press Release 10-186 NSF Awards Grants to Study Effects of Ocean Acidification

Discovery Blue Mussels "Hang On" Along Rocky Shores: For How Long?

Discovery nsf.gov - National Science Foundation (NSF) Discoveries - Trouble in Paradise: Ocean Acidification This Way Comes - US National Science Foundation (NSF)

Press Release 12-179 nsf.gov - National Science Foundation (NSF) News - Ocean Acidification: Finding New Answers Through National Science Foundation Research Grants - US National Science Foundation (NSF)

Press Release 13-102 World Oceans Month Brings Mixed News for Oysters

Press Release 13-108 nsf.gov - National Science Foundation (NSF) News - Natural Underwater Springs Show How Coral Reefs Respond to Ocean Acidification - US National Science Foundation (NSF)

Press Release 13-148 Ocean acidification: Making new discoveries through National Science Foundation research grants

Press Release 13-148 - Video nsf.gov - News - Video - NSF Ocean Sciences Division Director David Conover answers questions about ocean acidification. - US National Science Foundation (NSF)

Press Release 14-010 nsf.gov - National Science Foundation (NSF) News - Palau's coral reefs surprisingly resistant to ocean acidification - US National Science Foundation (NSF)

Press Release 14-116 nsf.gov - National Science Foundation (NSF) News - Ocean Acidification: NSF awards $11.4 million in new grants to study effects on marine ecosystems - US National Science Foundation (NSF)

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Funding

Funding Source	Award
NSF Arctic Sciences (NSF ARC)	PLR-1220032

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