Alumni Sail Cruise Report
Cruise C-283A

Scientific Data Collected Aboard SSV *Corwith Cramer*

St. Croix, U.S. Virgin Islands – St. Croix, U.S. Virgin Islands
December 29, 2018 – January 3, 2019

Sea Education Association
Woods Hole, Massachusetts

Cover photo caption:

SEA C-283A Alumni Cruise participants, on SSV *Corwith Cramer*, dockside in Gallows Bay, St. Croix, U.S. Virgin Islands.

This document should be cited as:

Smith, Victoria and Audrey Meyer. 2019. Final report for S.E.A. Cruise C-283A. Sea Education Association, Woods Hole, MA 02543. www.sea.edu.

To obtain unpublished data, contact the SEA data archivist:

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Tristan Feldman	Second Mate
Rocky Bonner	Third Mate
Annika Savio	Chief Engineer
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Introduction

This cruise report provides a summary of scientific activities aboard the SSV *Corwith Cramer* during Cruise C-283A (December 29, 2018 – January 3, 2019). This was an SEA Alumni Sail, during which *SEA Semester* alumni and their guests sailed from St. Croix to St. John and back, enjoying shore time in Francis Bay. While onboard the ship, the SEA alumni shared the experience of shipboard life with their guests. True to SEA and *SEA Semester*, they became part of the crew and stood watch, handled sail, navigated, steered, performed boat checks, and helped in the science lab and galley. Scientific sampling was conducted throughout the cruise in Caribbean Sea waters.

Data Description

This section provides a record of data collected aboard SSV *Corwith Cramer* Cruise C-283A, which departed from and returned to Christiansted, St. Croix, U.S. Virgin Islands, with a stop at Francis Bay, St. John, U.S. Virgin Islands (Figure 1).

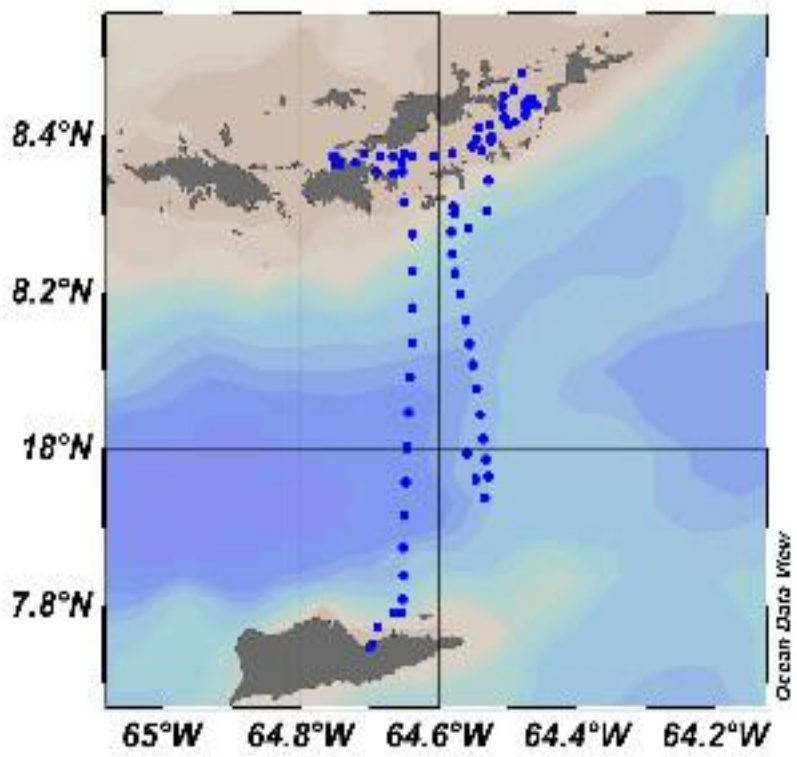

Figure 1. Positions along the C-283A cruise track, 29 December 2018 – 3 January 2019. Not shown are positions for the first six hours of the voyage, when *Cramer* initially left Gallows Bay, Christiansted, St. Croix and sailed northeast towards 18° latitude.

During the 6-day cruise, we collected biological samples with the neuston net at two discrete stations (Table 1). Additionally, we continuously sampled water depth and sub-bottom profiles (CHIRP system), oceanographic currents (ADCP; Figure 2), and sea surface temperature and salinity (Figure 3), chlorophyll in-vivo fluorescence (Figure 4), colored dissolved organic matter (CDOM) fluorescence, and transmissivity with the seawater flow-through system. No meter net, phytoplankton net, hydrocast, CTD, secchi disk, or sediment sampling deployments were made. Data summaries of the two neuston tow samples are given in Tables 2 and 3. Voluminous ADCP, CHIRP, and flow-through data are not fully presented here. All unpublished data can be made available by arrangement with the SEA data archivist (contact information, p. 2). The brief summary of C-283A data contained in this report is not intended to represent final data interpretation and should not be excerpted or cited without written permission from SEA.

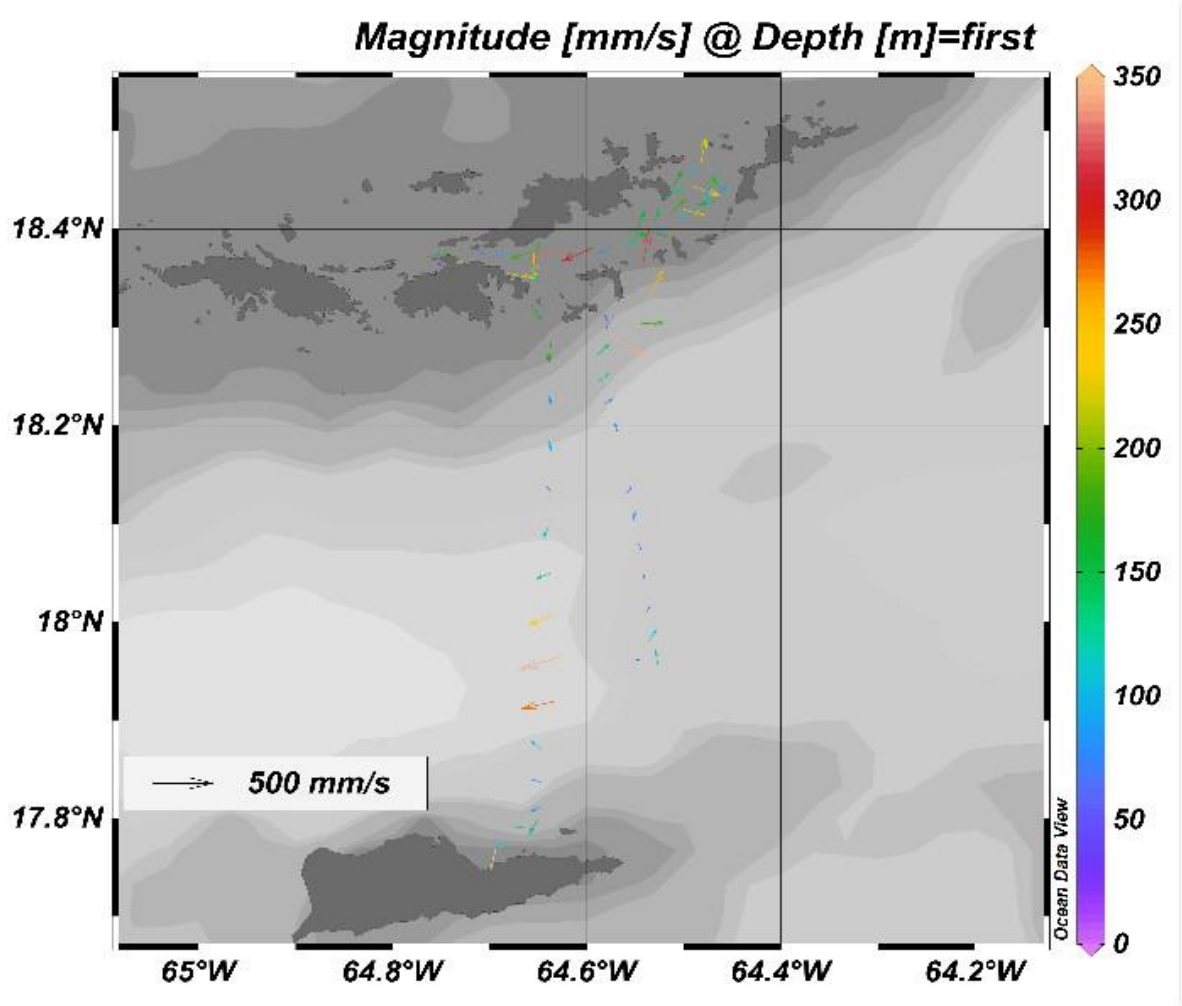

Figure 2. Vectors (magnitude and direction) for surface currents measured with the Acoustic Doppler Current Profiler (ADCP) during Cruise C-283A. Current magnitude is shown both with color scale on the right side of the figure and relative length of current vectors.

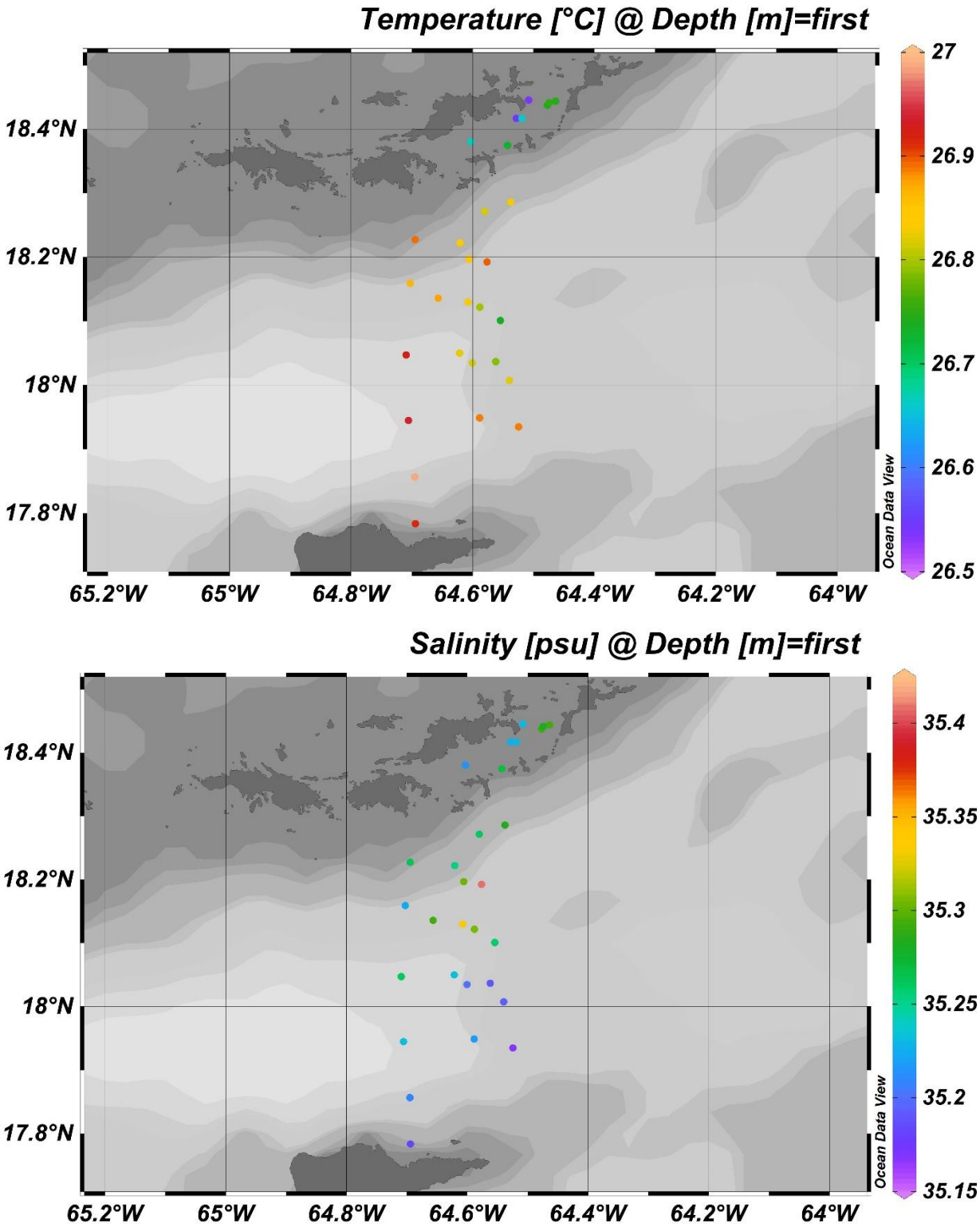

Figure 3. Hourly sea surface temperature (top figure) and sea surface salinity (bottom figure) measurements from the continuous flow-through SeaBird Thermosalinography (S/N 0022) data logger collected during Cruise C-283A. Color scales provided on right side of each figure.

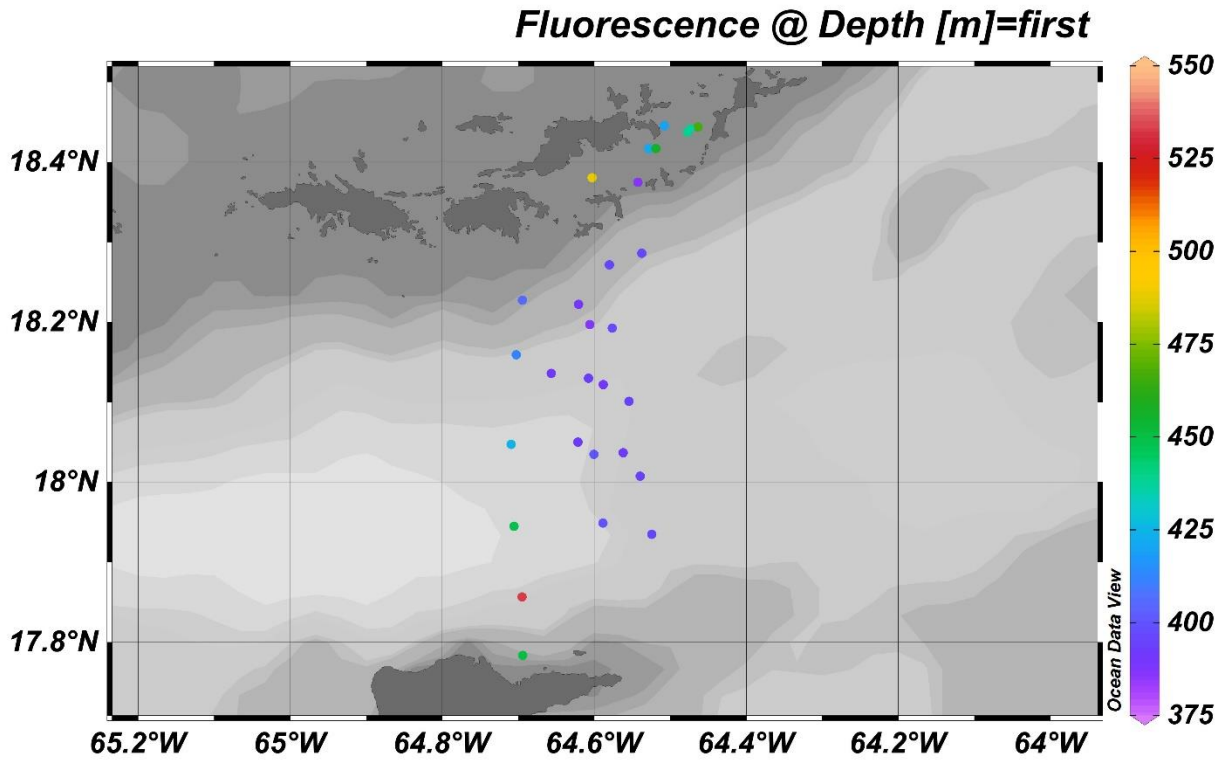

Figure 4. Hourly sea surface relative chlorophyll-*a* in-vivo fluorescence (in volts) collected from the continuous flow-through system during Cruise C-283A. Color scale provide on right side of figure.

Table 1. C-283A neuston tow sampling stations and associated oceanographic values from flow-through surface seawater system. No associated samples were collected for chemical analyses of surface waters.

Station	Date	Start Time (Local)	End Time (Local)	Log (nm)	Latitude (N)	Longitude (W)	General Locale	Water Temp (°C)	Salinity (PSU)	Chlorophyll Fluorescence (volts)
C283A-001-NT	31-Dec-18	1548	1618	144.6	18° 26.8'	064° 28.6'	Francis Drake Passage	26.7	35.26	445.2
C283A-002-NT	2-Jan-19	1015	1045	172.5	18° 22.4'	064° 39.2'	Francis Drake Passage	26.4	35.19	560.6

Table 2. C-283A neuston net tow (NT) data. Station locations and general locales are given in Table 1. 100-count data of zooplankton samples are given in Table 3, below. Explanatory footnotes are given below.[1,2]

Station	Time In (Local)	Moon Phase (%)	Risen or Set?	Cloud Cover (%)	Tow Area [1] (m^2)	Zoopl. Biomass [1] (ml)	Zoopl. Density [1] (ml/m^2)	Total Nekton >2cm (#) [2]	*S. natans* I (g) [2]	*S. natans* II (g) [2]	*S. natans* VIII (g) [2]	*S. fluitans* III (g) [2]	Other *Sargassum* (g) [2]	Total *Sargassum* (g) [2]	Plastic Pellets (#) [2]	Plastic Pieces (#) [2]	Tar Pieces (#) [2]	Halo-bates (#) [2]	Gelatinous Organisms >2cm (#) [2]
C283A-001-NT	1548	28	Set	30	1017.0	24.0	0.0236	0	27.5	0.0	52.0	125.0	74.0	278.5	0	0	0	0	0
C283A-002-NT	1015	12	Risen	80	2064.7	2.5	0.0012	0	29.5	0.0	33.0	62.0	60.0	184.5	0	0	0	0	0

[1] Tow area calculated using distance (meters) between successive minutes' GPS positions while net was deployed. Neuston net opening 1.0m wide by 0.5m tall, with a 333 µm mesh net. Zooplankton density recorded as wet volume displacement of zooplankton biomass per tow area (ml/m^2).

[2] No nekton >2cm, gelatinous organisms >2cm, plastic pellets, plastic pieces, tar pieces, or water striders (Halobates) were recovered in either neuston tow. *Sargassum* was removed from the net tow contents, identified, and weighed with a spring balance scale.

Table 3. 100-count data of zooplankton samples collected in C-283A neuston net tows. Station locations and general locales are given in Table 1.

Station	Siphonophores	Pteropods	Other Snails	Chaetognaths	Copepods	Zoea	Shrimp	Mysids	Cladocera	Fish Eggs	Other [1]	Total # of Organisms Counted
C283A-001-NT	12	1	33	3	49	0	0	0	0	1	1	100
C283A-002-NT	1	1	8	0	82	4	1	2	1	0	0	100

[1] 'Other' counted in zooplankton sample C283A-001-NT was a small, round, brown, ribbed shell that looked like a tiny Nautilus.

Colleague Voyage Report
C-283B

Scientific Data Collected Aboard SSV *Corwith Cramer*

Christiansted, St. Croix to San Juan, Puerto Rico
January 6 – 10, 2019

Sea Education Association
Woods Hole, Massachusetts

Cover photo caption:

C-283B Colleague Voyage participant group photo, taken aboard SSV *Corwith Cramer* docked in San Juan, Puerto Rico.

This document should be cited as:

Meyer, A.W. 2019. Final report for S.E.A. Cruise C-283B. Sea Education Association, Woods Hole, MA 02543. www.sea.edu.

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Steward: Ger Tysk
Assistant Steward: Cat Quinn
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Sailing Intern: Emma Hayward*
Sailing Intern: Sonia Pollock*
Sailing Intern: Madeleine Weisman

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Gary DeAngelis	College of the Holy Cross
Louis Derry	Cornell University
Jeff Dusek	Olin College of Engineering
John Gallaugher	Boston College
James Jones	Villanova University
Matthew Jungers	Denison University
Kathy McDaniel	UNC-Wilmington
Sam Pack*	Kenyon College
Patrick Reynolds	Hamilton College
Kimberly Schultz*	SUNY College of Environmental Science & Forestry
Cathy Schaeff	American University
Rich Schaeff	Consultant
Blaire Umhau*	University of South Carolina
Steve Van Holde	Kenyon College

Introduction

This cruise report provides a summary of scientific activities aboard the SSV *Corwith Cramer* during Colleague Voyage C-283B (January 6-10, 2019). The voyage served as an introduction for 15 academic colleagues to *SEA Semester* programs and to what it is like to live and work on the ocean. It included lectures, discussions, demonstrations, and active participation in oceanography, nautical science, and maritime studies. All participants served as full, working members of the scientific team and sailing crew while onboard. They stood watches and contributed to round-the-clock operations on deck including sail handling and navigation, and in the laboratory deploying oceanographic sampling gear, collecting data, and processing samples. Several *SEA Semester* alumni sailed as SEA crew, and were able to demonstrate their knowledge and skills, and describe their own experience and what they learned during their *SEA Semester* programs.

Participants joined the 134' brigantine SSV *Corwith Cramer* in the historic seaport of Christiansted, on the island of St. Croix in the U.S. Virgin Islands. After boarding and stowing of personal gear in bunks below deck, everyone enjoyed a guided tour around the historic seaport of Christiansted, led by SEA Maritime Studies faculty member Mark Long, as our first group activity. The participants were then oriented to the boat and safety procedures through the first afternoon and evening and the following morning, after which we set sail. From Christiansted we sailed generally north and then northwest toward Puerto Rico, including a picturesque afternoon passage through Sir Francis Drake Channel between the British and U.S. Virgin Islands. During the voyage, participants cycled through their watches throughout the day and night, falling into the routine of shipboard life as they helped to keep the vessel operating safely in the lab, engine room, galley, and on deck. In several classes on the quarterdeck, we talked about SEA academics, research, and field opportunities, and discussed the region's hurricane history from a multidisciplinary perspective. The voyage ended when we entered San Juan harbor with the sun low in the afternoon sky. We enjoyed a final evening at anchor, with a discussion of the scientific data we had collected followed by a swizzle. Disembarking after breakfast the next morning, we said our fond farewells and the participants headed back to their home campuses.

C-283B was a great cruise, with cooperative weather that allowed us to conduct a full program of scientific sampling as we sailed our ~225nm cruise track in the Caribbean Sea around the U.S. and British Virgin Islands and the North Atlantic waters north of Puerto Rico. Thanks to all my 32 shipmates for such a wonderful voyage. A special thanks to my SEA faculty colleagues Rick Miller and Mark Long, and the other 15 members of SEA's professional crew, who did an excellent job and made everything run so smoothly. It was a true pleasure sailing with you in delightfully warm weather, far away from chilly New England! The summary of C-283B data contained in this report is not intended to represent final data interpretation and should not be excerpted or cited without written permission from SEA.

Audrey W. Meyer
Chief Scientist, C-283B

Daily Schedule, Colleague Voyage C-283B

Day 1 – Sunday, 6 January 2019

0900 Participants arrive at SSV *Corwith Cramer*, stash sea bags in bunks.
0915-1200 Maritime Studies Shore Excursion: Historic walking tour of Gallows Bay and Christiansted, led by Mark Long.
1200 Colleague participants board *Cramer*. Explore vessel, meet and greet.
1230 All Hands muster on quarterdeck
Welcome, pre-departure overview, and safety briefing
- Introductions – staff and participants
- Initial introduction to heads, hot water, and 'hotel'
- Watch assignments
- Introduction to SEA's new watch schedule

1300 All Hands Lunch/Cleanup
1400 All Hands Galley Orientation
1430 Watch Meetings
1500-1700 Orientation I – Lab Orientation (lab safety, introduction to science equipment and procedures); Boat Check/Walkthrough (guided tour of *Cramer*, how to do a boat check, evacuation routes); Line Handling (hands-on instruction in safe handling of lines under strain).
1720 C283B-001-PN: Phytoplankton Net, collected dockside at Gallows Bay
1727 C283B-SS-001: Surface Station for phosphate and chlorophyll determination, collected dockside at Gallows Bay
1800 All Hands Dinner/Cleanup
1900-2030 Orientation II – Harnesses/Watch Meetings; Doghouse (introduction to charting, deck log, radar, etc.)
2030 Evening All Hands muster
2100 End of Day! Participants sleep through the night; SEA staff stand dock watch.

Day 2 – Monday, 7 January 2019

0700 All Hands Breakfast/Cleanup
0745 All Hands Daily Cleaning (DC) training
0830 All Hands muster on quarterdeck: Introduction to SEA programs, admissions, and financial aid, led by Mark Long and Jordan Eckstein.
0930 Climbing aloft training (led by mates); Introduction to Celestial Navigation (Rick Miller)
1100 Explain and walk-through safety drills:
- Fire/Emergency
- Man Overboard
- Abandon Ship

1230 All Hands Lunch/Cleanup
1330 Get underway and set sail; Sea watches in effect (B Watch)

1500-1900 Afternoon Watch (C Watch)
1600 Maritime Studies Discussion Group with Mark Long (C Watch)
1703 C283B-002-NT: Neuston Tow
1716 C283B-SS-002: Surface Station for phosphate and chlorophyll determination
1820/1900 Dinner
Optional sextant work at sunset
1900-2200 Evening Watch (A Watch)
2000 Maritime Studies Discussion Group with Mark Long (A Watch)
2200 Midnight Watch (B Watch) begins
Sail through the night, north from St. Croix towards the British Virgin Islands

Day 3 – Tuesday, 8 January 2019

Sea watches in effect
0000-0300 Midnight Watch (B Watch), continued
0012 C283B-003-NT: Neuston Tow
0030 C283B-SS-003: Surface Station for phosphate and chlorophyll determination
0300-0700 Dawn Watch (C Watch)
0620/0700 Breakfast
0700-1200 Morning Watch (A Watch)
0815 C283B-004-PN/HC/SD: Phytoplankton Net, Hydrocast/CTD, Secchi Disk
0841 C283B-SS-004: Surface Station for phosphate and chlorophyll determination
1120/1200 Lunch
1200-1500 Midday Watch (B Watch)
1400 Maritime Studies Discussion Group with Mark Long (B Watch)
1500-1900 Afternoon Watch (C Watch)
1500-1600 Ships meeting/Class:

- Community announcements
- Reports by participants: Weather, Navigation, Science
- Multidisciplinary discussion of hurricanes from meteorological, marine science and social science/history perspectives (Rick Miller, Audrey Meyer, and Mark Long)

1820/1900 Dinner
Optional sextant work at sunset
1900-2200 Evening Watch (A Watch)
2011 C283B-005-NT: Neuston Tow
2020 C283B-SS-005: Surface Station for phosphate and chlorophyll determination
2200 Midnight Watch (B Watch) begins
Sail through the night, out into the Atlantic north of St. Thomas and Puerto Rico

Day 4 – Wednesday, 9 January 2019

Sea watches in effect
0000-0300 Midnight Watch (B Watch), continues

0012 C283B-006-NT: Neuston Tow
0026 C283B-SS-006: Surface Station for phosphate and chlorophyll determination
0300-0700 Dawn Watch (C Watch)
0620/0700 Breakfast
0700-1200 Morning Watch (A Watch)
0929 C283B-007-SD/HC: Secchi Disk, Hydrocast/CTD/Styrocast (to 600m)
1006 C283B-SS-007: Surface Station for phosphate and chlorophyll determination
1120/1200 Lunch
1200-1500 Midday Watch (B Watch)
1500-1900 Afternoon Watch (C Watch)
1430-1600 Ships meeting/Class:

- Community announcements
- *SEA Semester* alumni testimonials of their SEA experience (Emma Hayward, Blaire Umhau, Peg Brandon)
- History of Puerto Rico, San Juan, and El Morro (Mark Long)

1600 At entrance into San Juan Harbor for evening anchorage
1800 All Hands Dinner/Cleanup
1930 Ship's Gathering

- Discussion of C283B scientific data (Audrey Meyer)
- Discussion of C283B colleague voyage experience (Mark Long)
- Swizzle

2100-2230 Run analyses of extracted chlorophyll samples
SEA crew stand anchor watch overnight

Day 5 – Thursday, 10 January 2019

0620/0700 Breakfast/Cleanup
0800 Get underway, transit to dock
0900 Dockside in San Juan; Final muster & photos
1000 End of program
(C-283B phosphate samples were analyzed in the afternoon, after participants had departed)

Data Description

This section provides a record of data collected aboard the SSV *Corwith Cramer* Cruise C-283B, beginning at St. Croix, U.S. Virgin Islands and ending at San Juan, Puerto Rico (Figure 1).

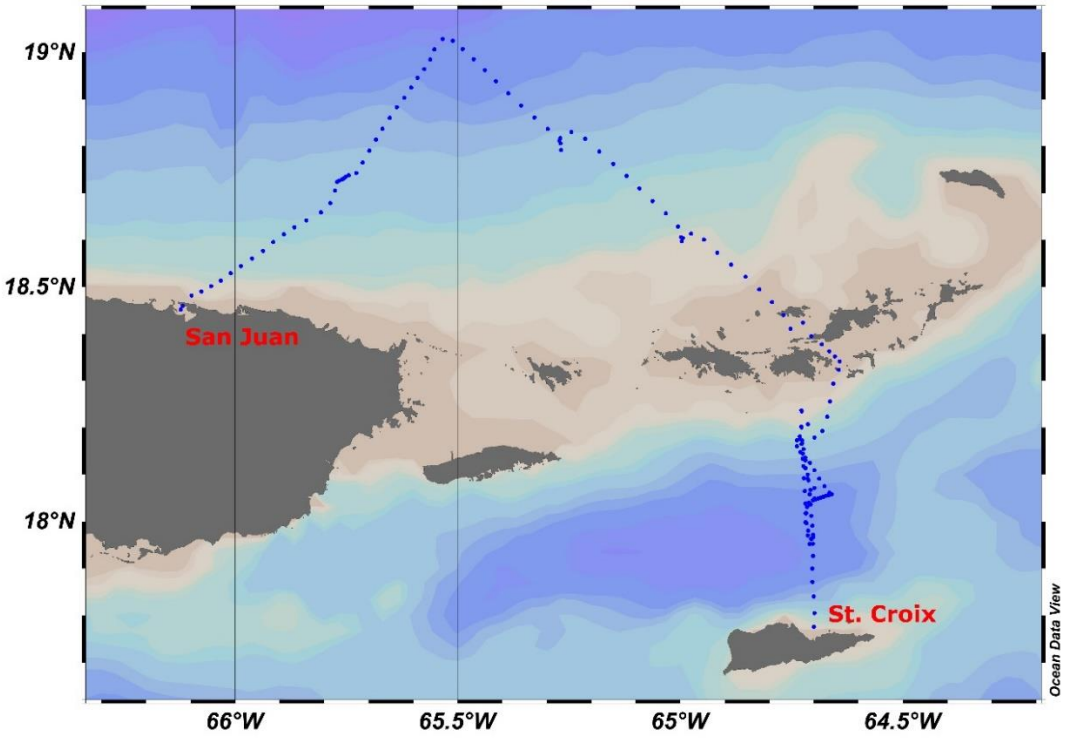


Figure 1. C-283B voyage track, 6-10 January 2019, from St. Croix to San Juan, Puerto Rico.

During the 5-day cruise, we collected oceanographic samples and deployed scientific gear at seven discrete stations (Table 1). Chemical analyses were made of seven surface water samples, all of which occurred coincident with hydrocast/CTD and biological sampling (neuston net and phytoplankton net) stations (Table 2). Additionally, we continuously sampled water depth and sub-bottom profiles (CHIRP system), ocean currents to depths of ~600m (Acoustic Doppler Current Profiler; ADCP), and sea surface temperature, salinity, chlorophyll in-vivo fluorescence, colored dissolved organic matter (CDOM), and transmittance with the seawater flow-through system. Discrete CTD measurements of vertical temperature, salinity, and density profiles were collected at two stations, both of which were hydrocasts with Niskin bottles. Water samples were collected from the Niskin bottles for extracted chlorophyll and phosphate analyses (Table 3). Additional instrumentation on the hydrocast carousel allowed profiling of chlorophyll-*a* fluorescence and dissolved oxygen (Figures 2 and 3). Summaries of secchi disk deployments and phytoplankton and neuston net tows are given in Tables 4-7. Voluminous CHIRP, ADCP and flow-through data are not fully presented here. All unpublished data can be made available by arrangement with the SEA data archivist (contact information, p. 2).

Table 1. C-283B oceanographic sampling stations. **X** indicates type of station. (NT = Neuston Tow, PN = Phytoplankton Net, HC = Hydrocast with 12 Niskin bottles, CTD and optical instrumentation, SD = Secchi Disk, SS = Surface Station.) See footnote at bottom of table.[1]

Station	Date	Start Time (Local)	Log (nm)	Latitude (N)	Longitude (W)	General Locale	NT	PN	HC [1]	SD [1]	Associated Surface Sample
C283B-001	6-Jan-19	1720	0.0	17° 44.8'	064° 42.0'	Gallows Bay, Christiansted, St. Croix		X			SS-001
C283B-002	7-Jan-19	1703	14.3	17° 58.2'	064° 42.4'	North of St. Croix	X				SS-002
C283B-003	8-Jan-19	0012	43.4	18° 02.5'	064° 42.9'	North of St. Croix	X				SS-003
C283B-004	8-Jan-19	0815	71.7	18° 03.5'	064° 39.9'	North of St. Croix		X	X (600m)	X (31m)	SS-004
C283B-005	8-Jan-19	2011	131.4	18° 36.6'	064° 59.8'	North Atlantic North of St. Thomas	X				SS-005
C283B-006	9-Jan-19	0012	154.5	18° 49.3'	065° 16.2'	North Atlantic North of St. Thomas	X				SS-006
C283B-007	9-Jan-19	0929	200.2	18° 43.9'	065° 45.2'	North Atlantic North of Puerto Rico			X (605m)	X (32m)	SS-007

[1] Depths given in parentheses for HC and SD deployments are maximum wire-out values. Especially for the hydrocasts (HC), this depth is usually greater than the actual cast depth due to wireline angle.

Table 2. C-283B surface sampling station (SS) data. Associated oceanographic sampling stations are given in Table 1, above. See footnote at bottom of table.[1]

Surface Station	Date	Time (Local)	Log (nm)	Latitude (N)	Longitude (W)	General Locale	Temp [1] (°C)	Salinity [1] (PSU)	Fluor [1] (Chl)	Fluoro [1] (CDOM)	Tx [1] (1-min Avg)	Chl-*a* [1] (µg/l)	PO_4 [1] (µM)
SS-001	6-Jan-19	1727	0.0	17° 44.8'	064° 42.0'	Gallows Bay, Christiansted, St. Croix	27.1	35.34	520.0	-	13420.0	0.216	0.091
SS-002	7-Jan-19	1716	14.5	17° 57.8'	064° 42.5'	North of St. Croix	26.8	35.17	396.0	80.1	14482.0	0.120	0.264
SS-003	8-Jan-19	0030	43.4	18° 02.0'	064° 43.1'	North of St. Croix	26.7	35.19	370.9	89.5	9777.4	0.055	0.215
SS-004	8-Jan-19	0841	72.7	18° 03.4'	064° 40.4'	North of St. Croix	26.7	35.25	374.7	81.1	14051.5	0.095	0.022
SS-005	8-Jan-19	2020	131.6	18° 36.4'	064° 59.8'	North Atlantic North of St. Thomas	26.5	35.54	400.0	78.2	14493.1	0.082	0.043
SS-006	9-Jan-19	0026	155.0	18° 48.8'	065° 16.1'	North Atlantic North of St. Thomas	26.6	35.70	390.8	76.0	14843.5	0.061	0.000
SS-007	9-Jan-19	1006	200.4	18° 43.9'	065° 45.7'	North Atlantic North of Puerto Rico	26.6	35.62	400.1	78.9	14653.3	0.107	0.000

[1] Sea surface water temperature, salinity, chlorophyll in-vivo fluorescence, colored dissolved organic matter (CDOM) fluorescence, and transmittance (Tx) determined from samples collected in lab by flow-through seawater system. Extracted chlorophyll-*a* and phosphate determined from surface water samples collected using a bucket, deployed over the side of the ship. Extracted chloropyll-*a* samples were filtered through 0.45 µm filters and measured with a Turner Designs Model 10-AU fluorometer. Phosphate (PO_4) was assessed with colorometric spectrophotometry. A blank indicates no measurement was recorded.

Table 3. C-283B hydrocast (HC) bottle data. Station locations and general locales of both hydrocasts are given in Table 1. Oceanographic data from associated surface stations (SS-004 and SS-007) are given in Table 2. Analyses conducted as given in footnote below.[1]

Station	Bottle #	Depth (m)	Temp (°C)	Salinity (PSU)	Density (sigma-t, kg/m^3)	O_2 (ml/L)	Chl-*a* Fluorescence (V)	Chl-*a* (µg/L)	PO_4 (µM)	Associated Surface Station
C283B-004-HC	12	9.9	26.56	35.238	23.04	4.597	0.089			SS-004
	11	25.1	26.56	35.240	23.04	4.597	0.115	0.094		
	10	50.0	26.58	35.258	23.04	4.594	0.145	0.128	0.091	
	9	74.5	27.25	36.930	24.09	4.501	0.238	0.275		
	8	99.6	25.34	37.143	24.86	4.640	0.426	0.363	0.098	
	7	124.2	24.36	37.270	25.25	4.714	0.235			
	6	149.4	23.01	37.218	25.61	4.827	0.115	0.027		
	5	198.8	20.65	36.914	26.05	5.043	0.054		0.305	
	4	298.2	17.57	36.472	26.51	5.355	0.042		0.367	
	3	398.1	15.07	36.034	26.75	5.637	0.044			
	2	497.2	12.84	35.678	26.95	5.912	0.047			
	1	560.4	11.44	35.475	27.06	6.095	0.048		1.257	
C283B-007-HC	12	10.2	26.52	35.644	22.93	4.589	0.102			SS-007
	11	25.6	26.51	35.650	22.93	4.590	0.083	0.140		
	10	49.6	26.84	35.823	23.04	4.560	0.096	0.244	0.050	
	9	75.3	26.93	36.978	23.19	4.523	0.116	0.402		
	8	99.0	25.50	37.176	24.47	4.627	0.134	0.266	0.140	
	7	124.4	24.04	37.211	24.50	4.742	0.125			
	6	149.6	22.03	37.052	25.28	4.916	0.056	0.008		
	5	199.5	19.61	36.713	25.31	5.146	0.056		2.948	
	4	297.8	17.81	36.502	26.12	5.329	0.022			
	3	397.8	15.90	36.190	26.13	5.540	0.022		0.429	
	2	496.8	13.51	35.810	26.90	5.825	0.011		0.761	
	1	575.2	11.45	35.472	27.18	6.095	0.014			

[1] Temperature, salinity, and density data were determined from a SeaBird 19Plus V2 CTD. Dissolved oxygen and chlorophyll-*a* fluorescence were determined with a SeaBird SBE-43 oxygen sensor and Sea Point in-vivo chlorophyll-*a* fluorometer, respectively, both deployed with the hydrocast carousel. Extracted chlorophyll-*a* samples were filtered through 0.45 µm filters and measured with a Turner Designs Model 10-AU fluorometer. Phosphate (PO_4) was assessed with colorometric spectrophotometry. A blank indicates no sample was collected for that analysis.

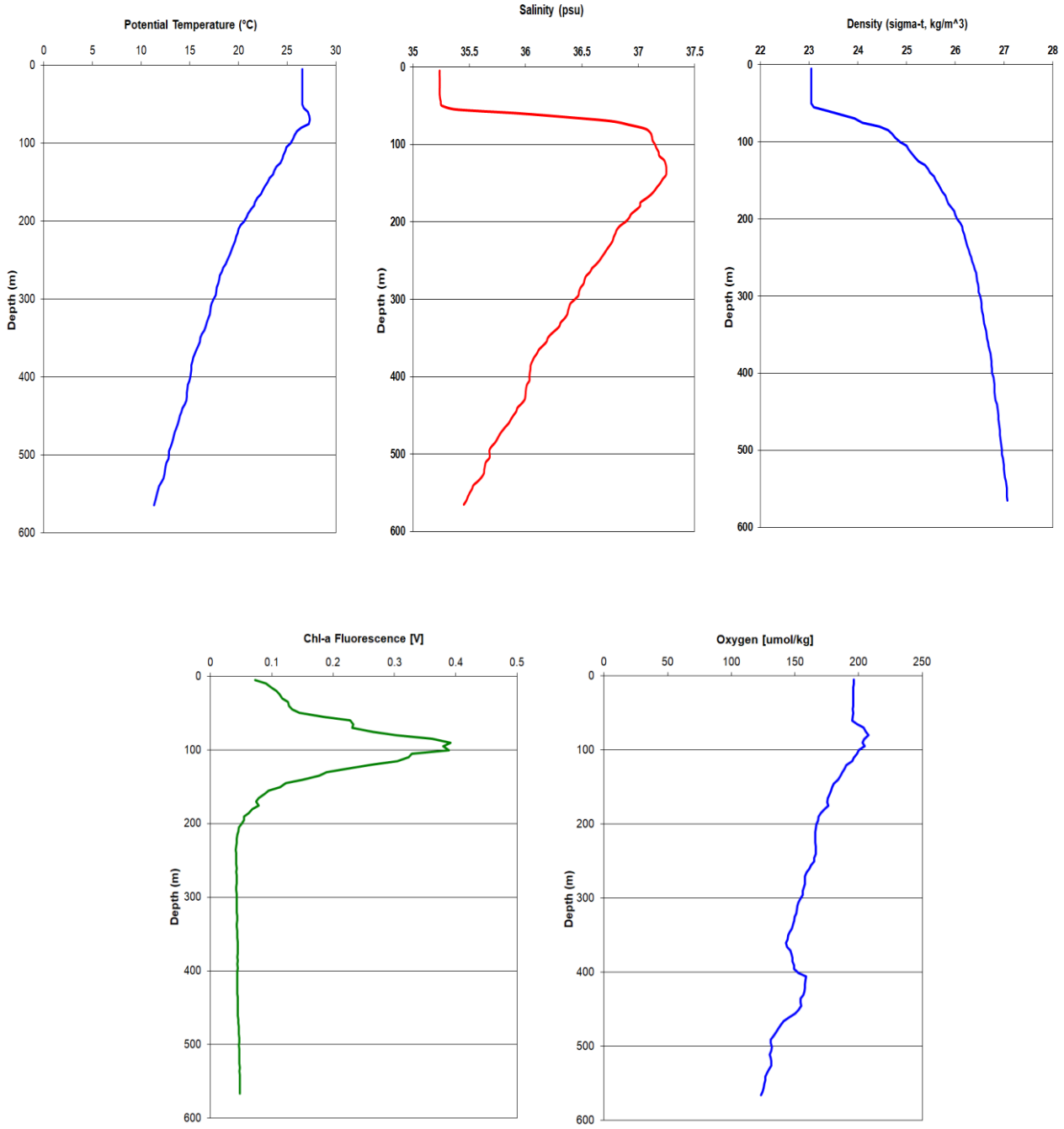


Figure 2. Depth profiles of temperature, salinity, density, chlorophyll fluorescence, and dissolved oxygen data for hydrocast Station C-283B-004-HC. Station location and general locale are given in Table 1. Data from water samples collected in bottles at depth during hydrocast deployment are given in Table 3. Digital data are available from SEA upon request.

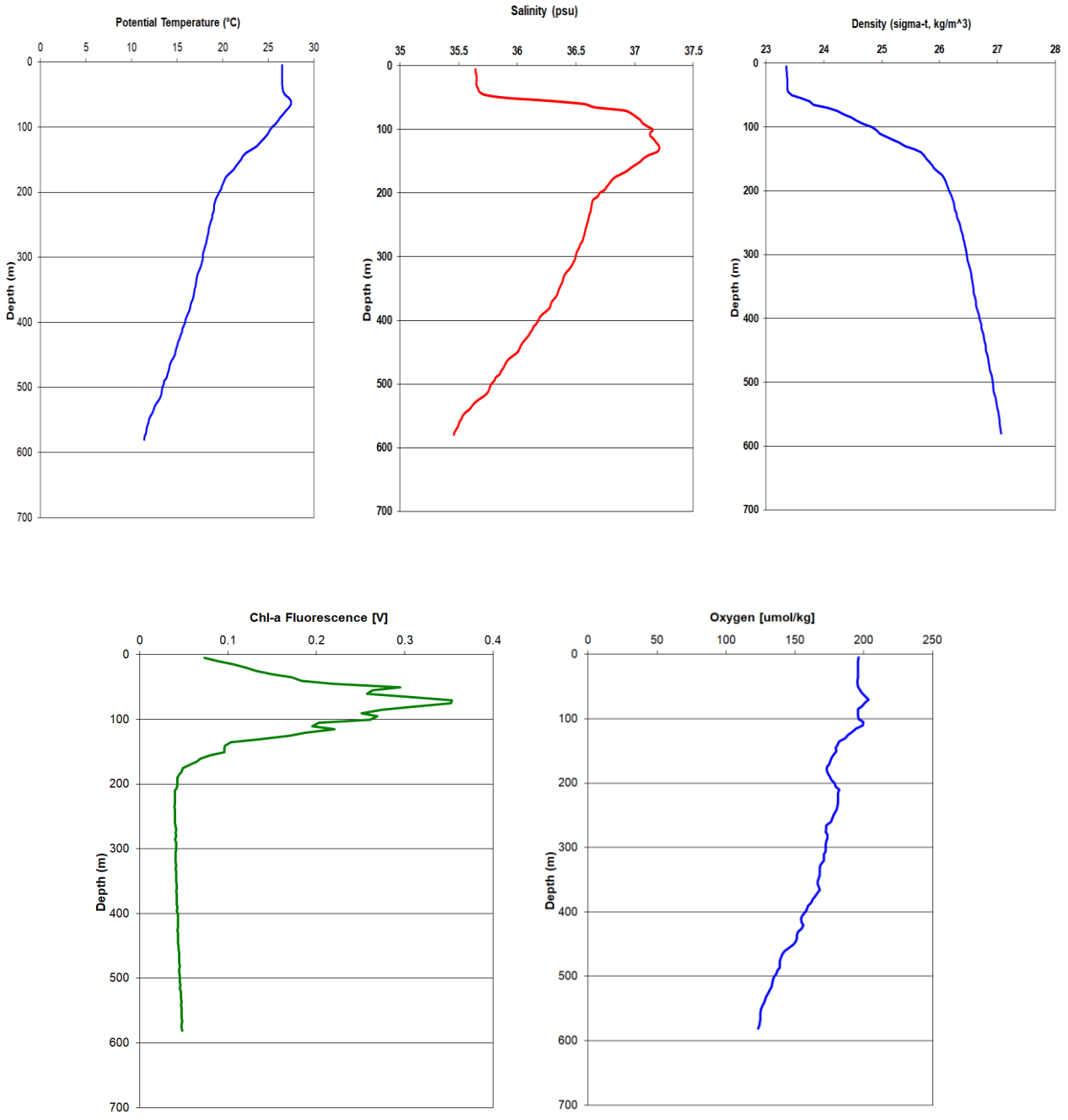


Figure 3. Depth profiles of temperature, salinity, density, chlorophyll fluorescence, and dissolved oxygen data for hydrocast Station C-283B-007-HC. Station location and general locale are given in Table 1. Data from water samples collected in bottles at depth during hydrocast deployment are given in Table 3. Digital data are available from SEA upon request.

Table 4. C-283B secchi disk (SD) data. Station locations and general locales are given in Table 1. Oceanographic data from associated surface stations are given in Table 2. See explanatory footnotes at bottom of table.[1,2]

Station	Date	Time (Local)	Water Temp (°C)	Salinity (PSU)	Log (nm)	Water Depth (m) [1]	Chl-*a* Fluoro. (volts)	CDOM Fluoro. (volts)	Transmiss-ivity (volts)	Cloud Cover (%)	Wave Height (ft)	Wind Speed (BF) [2]	Secchi Depth (m)	Calculated Depth of 1% Light Level (m)	Associated Surface Station
C283B-004-SD	8-Jan-19	0928	26.6	35.28	76.4	3400	372.6	80.8	13960.0	25	5	3	31	83	SS-004
C283B-007-SD	9-Jan-19	0929	26.6	35.63	200.0	1832	417.0	78.8	13347.0	5	4	3	32	86	SS-007

[1] Water depth at Station C283B-004-SD estimated from nautical chart. Water depth at Station C283B-007-SD determined from CHIRP.

[2] BF = Beaufort Force.

Table 5. C-283B phytoplankton net (PN) data. Station locations and general locales are given in Table 1. Oceanographic data from associated surface stations are given in Table 2. Diatom and dinoflagellate percentages are based on 100-count data of collected samples. See explanatory footnotes at bottom of table.[1,2]

Station [1,2]	Date	Time (Local)	Log (nm)	Water Temp (°C)	Salinity (PSU)	Chl-*a* Fluoro. (volts)	Diatoms (%)	Dinoflagellates (%)	Associated Surface Station
C283B-001-PN	6-Jan-19	1720	0.0	27.1	35.34	520.0	78	22	SS-001
C283B-004-PN	8-Jan-19	0815	71.7	26.6	35.25	375.6	82	18	SS-004

[1] Station C283B-001-PN was a sparse sample, so a total of only 41 diatoms and dinoflagellates were counted; percentages are based on this count. Several radiolarians were also noted in this sample as the diatom/dinoflagellate count was made.

[2] 19 radiolarians were also noted during the diatom/dinoflagellate 100-count of Sample C283B-004-PN, as well as many copepod nauplii.

Table 6. C-283B neuston net tow (NT) data. Station locations, general locales, and associated surface stations are given in Table 1. Oceanographic data from associated surface stations are given in Table 2. 100-count data of zooplankton samples are given in Table 7 on next page. Explanatory footnotes are given below.[1,2,3,4]

Station	Date	Time (Local)	Moon Phase (%)	Risen or Set?	Cloud Cover (%)	Tow Area (m^2) [1]	Zoopl. Biomass (ml) [1]	Zoopl. Density (ml/m^2) [1]	Lepto-cephali (#) [2]	Mycto-phids (#) [2]	Other Nekton >2cm (#) [2]	Total Nekton >2m (#) [2]	Total Nekton >2cm (ml) [2]	Gelatinous Organisms >2cm (#) [2]	*S. natans* I (g) [3]	*S. natans* VIII (g) [3]	*S. fluitans* III (g) [3]	Total *Sargassum* (g) [3]	Plastic Pieces (#) [4]	Halo-bates (#) [4]
C283B-002-NT	7-Jan-19	1703	2	Set	20	1843.8	35.0	0.0190	0	0	0	0	0.0	0	2399.0	173.0	1727.0	4299.0	0	0
C283B-003-NT	8-Jan-19	0012	5	Set	5	1672.4	9.0	0.0054	0	15	2	17	2.8	0	0.0	0.0	0.0	0.0	0	3
C283B-005-NT	8-Jan-19	2011	5	Set	25	1441.7	10.5	0.0073	1	0	0	1	0.5	0	0.0	0.0	2.0	2.0	0	0
C283B-006-NT	9-Jan-19	0012	10	Set	5	1850.8	14.0	0.0076	1	6	1	8	1.4	0	389.0	36.0	230.0	655.0	2	0

[1] Tow area calculated using distance (meters) between successive minutes' GPS positions while net was deployed. Neuston net opening 1.0m wide by 0.5m tall, with 333 µm mesh net. Zooplankton density recorded as wet volume displacement of zooplankton biomass per tow area (ml/m^2).

[2] Micronekton and gelatinous organisms were sorted from net contents using a 1cm mesh sieve, identified, counted, and biovolume determined. No spiny lobster (Phyllosoma) or Cephalopods were found. Other nekton recovered included 1 *Sargassum* crab and 1 file fish (C283B-003-NT), and 1 needlefish (C283B-006-NT). No gelatinous organisms >2cm were recovered.

[3] *Sargassum* species (*S. natans* I, *S. natans* VIII, and *S. fluitans* III) were removed from net contents, separated and identified, and weighed with a spring scale balance. No *S. natans* II was recovered. Further information about *Sargassum* clumps versus fragments is available from SEA.

[4] Floating plastic, tar, and water striders (Halobates) were removed from net contents, sorted, and recorded as numbers collected per tow. No plastic pellets or tar pieces were recovered in any of the neuston tows.

Table 7. 100-count data of zooplankton collected in C-283B neuston tows. Station locations, general locales, and associated surface stations are given in Table 1. Oceanographic data from associated surface stations are given in Table 2. Information on net contents is given in Table 6. Explanatory footnote is given below.[1]

Station	Siphono-phores	Other Snails	Polycheate Worms	Chaetog-naths	Cope-pods	Gammarid Amphipods	Hyperiid Amphipods	Mega-lopae	Zoea	Shrimp	Mysids	Ostra-cods	Clado-cera	Fish Eggs	Other [1]	Total # of Organisms Counted
C283B-002-NT	10	26	0	1	62	0	0	0	0	0	0	0	0	0	0	99
C283B-003-NT	1	4	3	1	74	0	11	1	0	1	1	1	0	0	2	100
C283B-005-NT	10	0	1	4	67	6	0	0	1	6	0	0	3	0	2	100
C283B-006-NT	0	1	0	0	85	1	0	0	0	0	1	0	10	2	0	100

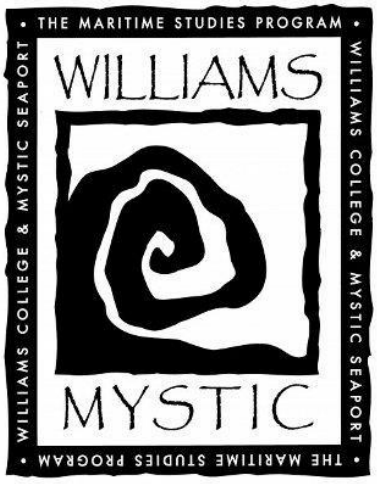
[1] 'Other' organisms counted in zooplankton 100-count include: 2 other (non-fish) eggs (Station C283B-003-NT); 1 hermit crab larva and 1 bivalve larva (Station C283B-005-NT).

Williams-Mystic Voyage Cruise Report
Cruise C-283C

Scientific Data Collected Aboard SSV *Corwith Cramer*

San Juan, Puerto Rico – St. Croix, U.S. Virgin Islands
27 January 2019 – 6 February 2019

Sea Education Association
Woods Hole, Massachusetts



Cover photo caption: Downwind sailing on a beautiful evening in the Caribbean Sea.

This document should be cited as:

Page, G. 2019. Final report for S.E.A. Cruise C-283C. Sea Education Association, Woods Hole, MA 02543. www.sea.edu.

To obtain unpublished data, contact the SEA data archivist:

Data Archivist
Sea Education Association
PO Box 6
Woods Hole, MA 02543
Phone: 508-540-3954
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E-mail: data-archives@sea.edu
Web: www.sea.edu

Table of Contents

C-283C Ship's Company, *SSV Corwith Cramer*

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Lisa Gilbert	Chief Scientist/Williams Mystic Faculty
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Tristan Feldman	Second Mate
Colin Graham	Third Mate
Annika Savio	Chief Engineer
Sonia Pollock	Assistant Engineer
Ger Tysk	Steward
Cat Quinn	Assistant Steward
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Bonny Clarke	First Assistant Scientist
Emily Burke	Second Assistant Scientist
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Kylie Wiegel
Matthew Wilson

Introduction

This cruise report provides a summary of scientific activities aboard the SSV *Corwith Cramer* during Cruise C-283C (27 January 2019 – 6 February 2019). This voyage was the offshore seminar of the Williams-Mystic Maritime Studies' Spring semester.

The cruise track spanned waters north of Puerto Rico as well as the British Virgin Islands, U.S. Virgin Islands, and Caribbean Sea. Scientific sampling occurred during the entirety of the voyage and provided the students with an opportunity to collect and process physical, chemical, geological and biological oceanographic data in the field.

Students onboard constituted an integral part of the crew and were involved in all aspects of ship operations including navigation, oceanographic gear deployment and sail handling. They worked in groups to examine and present on the oceanographic datasets collected.

The brief summary of C-283C data contained in this report is not intended to represent final data interpretation and should not be excerpted or cited without written permission from SEA.

Data Description

This section provides a record of data collected aboard SSV *Corwith Cramer* Cruise C-283C, which departed San Juan, Puerto Rico and arrived in Christiansted, St. Croix, U.S. Virgin Islands, with a stop at Francis Bay, St. John, U.S. Virgin Islands (Figure 1).

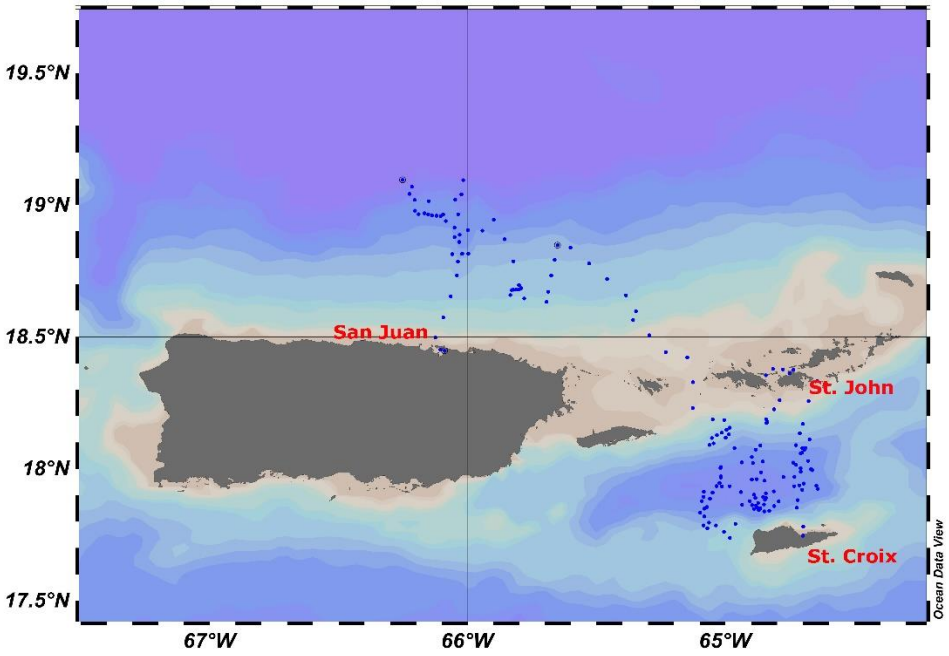

Figure 1. C-283C voyage track, 27 January 2019 – 6 February 2019, from San Juan, Puerto Rico to St. Croix, USVI. Dots display hourly GPS locations of the ship while underway.

During the 10-day cruise, we collected oceanographic samples and deployed scientific gear at twelve discrete stations (Table 1). An initial training deployment in San Juan harbor was conducted with a phytoplankton net, a secchi disk, and a shipek grab (Station C263C-001). Three daytime stations involved a phytoplankton net, a secchi disk, a hydrocast, and a neuston tow (Stations C263C-003, -005, and -007), while routine neuston tows were deployed at night (Stations C263C-002, -004, -006, and -008). The shipek grab was deployed three more times near the end of the trip (Stations C263C-009, -010, and -011), and the final station was a deep meter net deployment (Station C263C-012).

Surface water samples were collected every six hours and analyzed for chlorophyll-α fluorescence, phosphate (PO_4) concentration, and pH (Table 2). Continuous underway sampling included current data from the Acoustic Doppler Current Profiler (ADCP), water depth and sub-bottom profiles from the 3.5kHz CHIRP echo sounder, and surface water properties such as temperature, salinity, chlorophyll-α fluorescence, colored dissolved organic matter (CDOM), and transmittance from a seawater flow-through system. Hourly sea surface water temperature, salinity, and chlorophyll fluorescence data are displayed in Figures 2-4.

Three hydrocasts included 12 Niskin bottles for water sampling at depth (Table 3), CTD measurements of temperature, salinity, and density, and additional instrumentation for vertical profiling of chlorophyll fluorescence and dissolved oxygen (Figures 5-7). Summaries of secchi disk and biological net data are given in Tables 4-9. Results of sediment analyses of shipek grab samples are given in Table 10.

Certain large datasets, namely CTD, CHIRP, ADCP and flow-through data, are not fully presented here due to their size but are available by request. All unpublished data can be made available by arrangement with the SEA data archivist (contact information, p. 2).

Table 1. C-283C oceanographic sampling stations. **X** indicates type of station. (NT = Neuston Tow, PN = Phytoplankton Net, MN = Meter Net, HC = Hydrocast with 12 Niskin bottles, CTD and optical instrumentation, SD = Secchi Disk, SG = Shipek Grab, SS = Surface Station.) See footnotes at bottom of table.[1,2]

Station	Date	Start Time (Local)	Latitude (N) [1]	Longitude (W) [1]	General Locale	NT	PN	MN [2]	HC [2]	SD [2]	SG [2]	Associated Surface Station
C283C-001	28-Jan-19	1422	18° 27.1'	066° 06.4'	San Juan Harbor		**X**			**X** (2m)	**X** (13m)	SS-001
C283C-002	28-Jan-19	2316	18° 54.1'	066° 00.5'	Puerto Rico Deep	**X**						SS-002
C283C-003	29-Jan-19	0810	18° 57.5'	066° 06.5'	Puerto Rico Deep	**X**	**X**		**X** (2000m)	**X** (30m)		SS-004
C283C-004	29-Jan-19	2313	18° 48.6'	066° 01.8'	Puerto Rico Deep	**X**						SS-006
C283C-005	30-Jan-19	0802	18° 40.9'	065° 48.1'	Puerto Rico Slope	**X**	**X**		**X** (1450m)	X (29m)		SS-008
C283C-006	30-Jan-19	2319	18° 35.4'	065° 21.2'	Puerto Rico Slope	**X**						SS-010
C283C-007	31-Jan-19	0740	18° 09.1'	064° 59.4'	Puerto Rico Shelf	**X**	**X**		**X** (1510m)	**X** (28m)		SS-012
C283C-008	31-Jan-19	2327	18° 03.7'	064° 53.4'	Puerto Rico Shelf	**X**						SS-014
C283C-009	1-Feb-19	0837	18° 11.6'	064° 50.2'	Puerto Rico Shelf						**X** (422m)	
C283C-010	1-Feb-19	1344	18° 22.5'	064° 49.3'	USVI, S of St. Thomas						**X** (33m)	
C283C-011	1-Feb-19	1419	18° 23.6'	064° 48.2'	USVI, N of St. Thomas						**X** (29m)	
C283C-012	4-Feb-19	2213	17° 43.3'	065° 04.1'	USVI, N of St. Thomas			**X** (1003m)				

[1] Start time and latitude/longitude location are for first scientific gear deployed at each station.

[2] Depths given in parentheses for meter net (MN), hydrocast (HC), secchi disk (SD), and shipek grab (SG) deployments are maximum wire-out values, which may differ slightly from actual depth sampled due to wire angle.

Table 2. C-283C surface sampling station (SS) data. Associated oceanographic sampling stations are given in Table 1. See footnote at bottom of table.[1]

Surface Station	Date	Time (Local)	Log (nm)	Latitude (N)	Longitude (W)	General Locale	Temp (°C) [1]	Salinity (PSU) [1]	Fluoro. Chl-*a* (Volts) [1]	Fluoro. CDOM (Volts) [1]	Tx (1 min Avg) [1]	Chl-*a* (µg/l) [1]	PO_4 (µM) [1]	pH [1]
SS-001	28-Jan-19	1500	2.0	18° 27.1'	066° 06.4'	Puerto Rico Deep	-	-	-	-	-	5.521	0.273	-
SS-002	28-Jan-19	2343	32.3	18° 53.6'	066° 01.4'	Puerto Rico Deep	26.4	35.109	470.1	90.1	14640.0	0.075	0.157	8.040
SS-003	29-Jan-19	0515	57.3	19° 04.8'	066° 01.5'	Puerto Rico Deep	26.4	35.350	483.2	91.8	14491.8	0.079	0.255	7.952
SS-004	29-Jan-19	1110	71.0	18° 57.9'	066° 09.4'	Puerto Rico Deep	26.3	35.094	448.0	89.6	14676.0	0.505	0.105	8.005
SS-005	29-Jan-19	1742	87.5	19° 05.0'	066° 13.8'	Puerto Rico Deep	26.4	35.200	483.8	89.7	13647.0	0.077	0.115	8.142
SS-006	29-Jan-19	2325	109.8	18° 48.3'	066° 02.0'	Puerto Rico Deep	26.5	35.142	476.2	90.9	14568.0	0.086	0.119	8.104
SS-007	30-Jan-19	0510	138.7	18° 46.5'	065° 49.2'	Puerto Rico Deep	26.5	35.424	473.1	89.5	14222.0	0.096	0.222	8.054
SS-008	30-Jan-19	1110	149.7	18° 46.6'	065° 49.2'	Puerto Rico Slope	26.5	35.112	472.2	89.9	14522.8	0.176	0.133	8.074
SS-009	30-Jan-19	1715	170.9	18° 49.4'	065° 39.3'	Puerto Rico Slope	26.7	35.800	476.2	85.5	14245.9	0.071	0.022	7.942
SS-010	30-Jan-19	2328	201.1	18° 35.1'	065° 21.3'	Puerto Rico Slope	26.5	35.705	529.6	93.6	14445.9	0.169	0.087	8.030
SS-011	31-Jan-19	0515	232.4	18° 13.2'	065° 06.5'	Puerto Rico Shelf	26.4	35.528	623.9	101.2	14729.0	0.389	0.189	8.041
SS-012	31-Jan-19	1020	244.8	18° 07.5'	065° 02.5'	Puerto Rico Shelf	26.3	35.375	504.9	77.7	14841.0	0.104	0.250	7.954
SS-013	31-Jan-19	1710	265.0	18° 04.6'	064° 57.8'	Puerto Rico Shelf	26.4	35.478	511.5	74.8	14272.0	0.080	0.073	8.123
SS-014	31-Jan-19	2349	294.7	18° 03.0'	064° 53.7'	Puerto Rico Shelf	26.3	35.584	457.9	73.6	14678.0	0.062	0.096	7.989
SS-015	1-Feb-19	0500	314.0	17° 57.0'	064° 50.9'	Puerto Rico Shelf	26.3	35.426	463.9	74.5	14710.0	0.067	0.362	8.093

[1] Sea surface temperature, salinity, chlorophyll in-vivo fluorescence, colored dissolved organic matter (CDOM) fluorescence, and transmittance (Tx) determined from samples collected in lab by flow-through seawater system. Extracted chlorophyll-*a*, phosphate, and pH determined from surface water samples collected using a bucket, deployed over the side of the ship. Extracted chlorophyll-*a* samples were filtered through 0.45 µm filters and measured with a Turner Designs Model 10-AU fluorometer. Phosphate (PO_4) and pH were assessed with colorometric spectrophotometry. A blank (-) indicates no measurement was recorded.

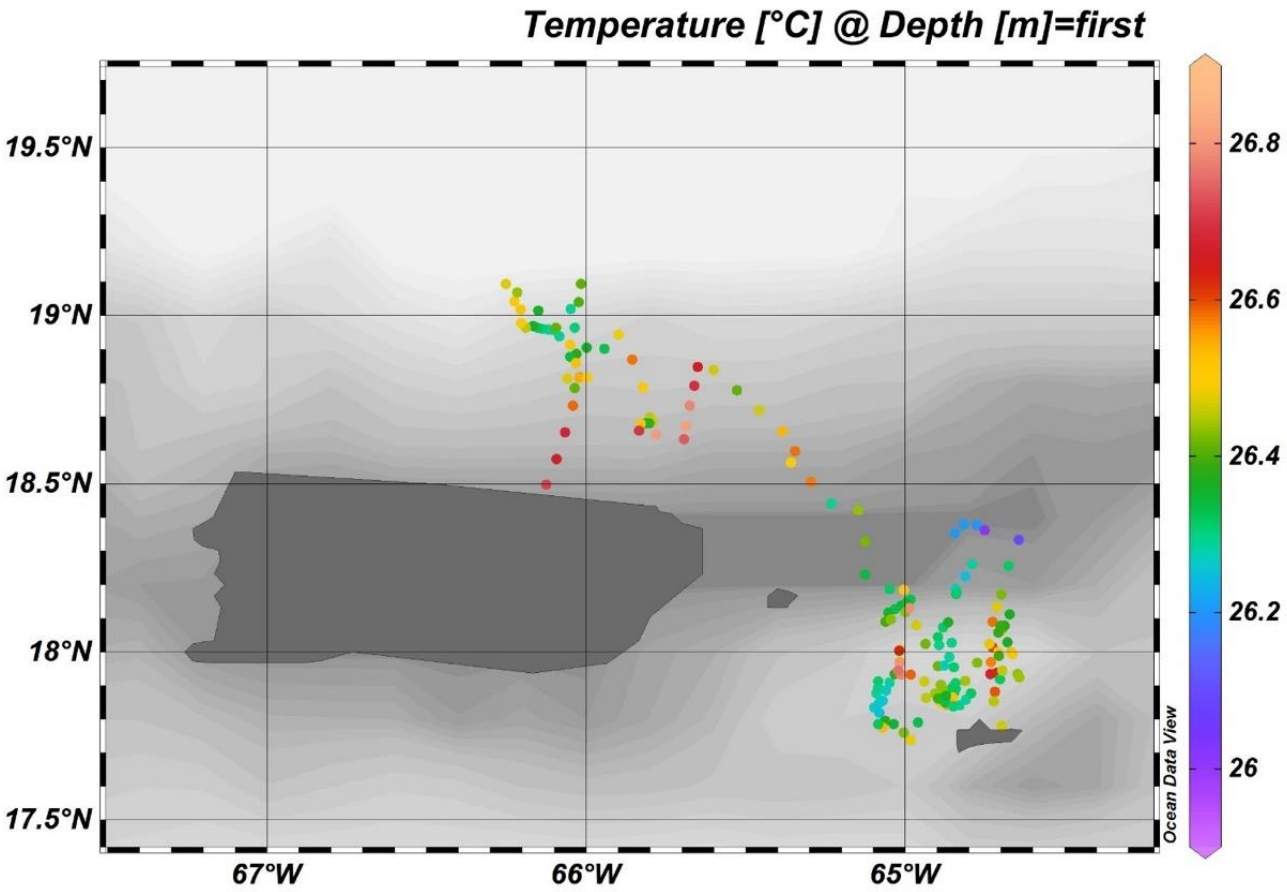

Figure 2. Hourly sea surface temperature measurements from the continuous flow-through SeaBird Thermosalinography (S/N 0022) data logger collected during Cruise C-283C. Sea surface temperatures recorded ranged from a minimum of 25.975°C to a maximum of 26.813°C. Color scale is provided on right side of figure.

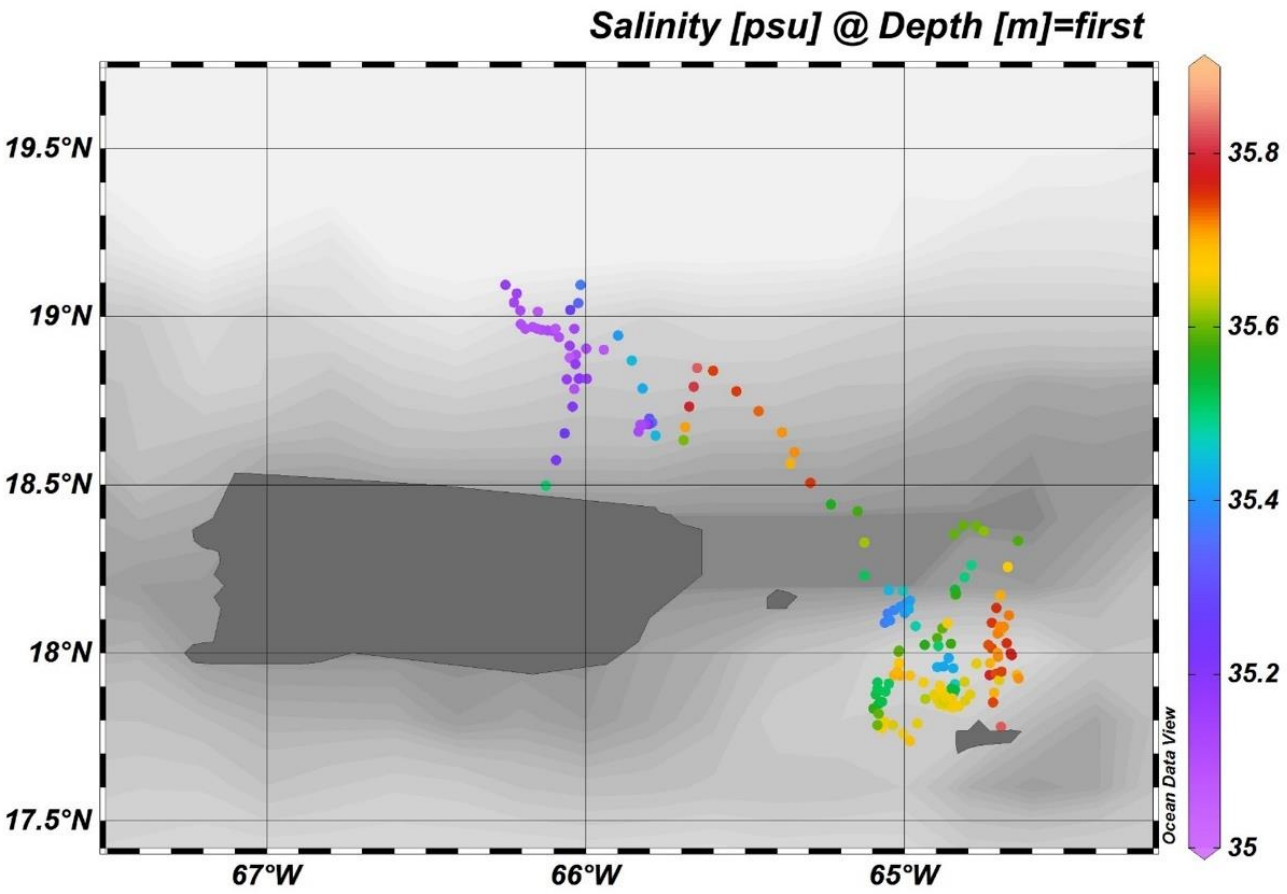

Figure 3. Hourly sea surface salinity measurements from the continuous flow-through SeaBird Thermosalinography (S/N 0022) data logger collected during Cruise C-283C. Sea surface salinities recorded ranged from a minimum of 35.07 PSU to a maximum of 35.827 PSU. Color scale is provided on right side of figure.

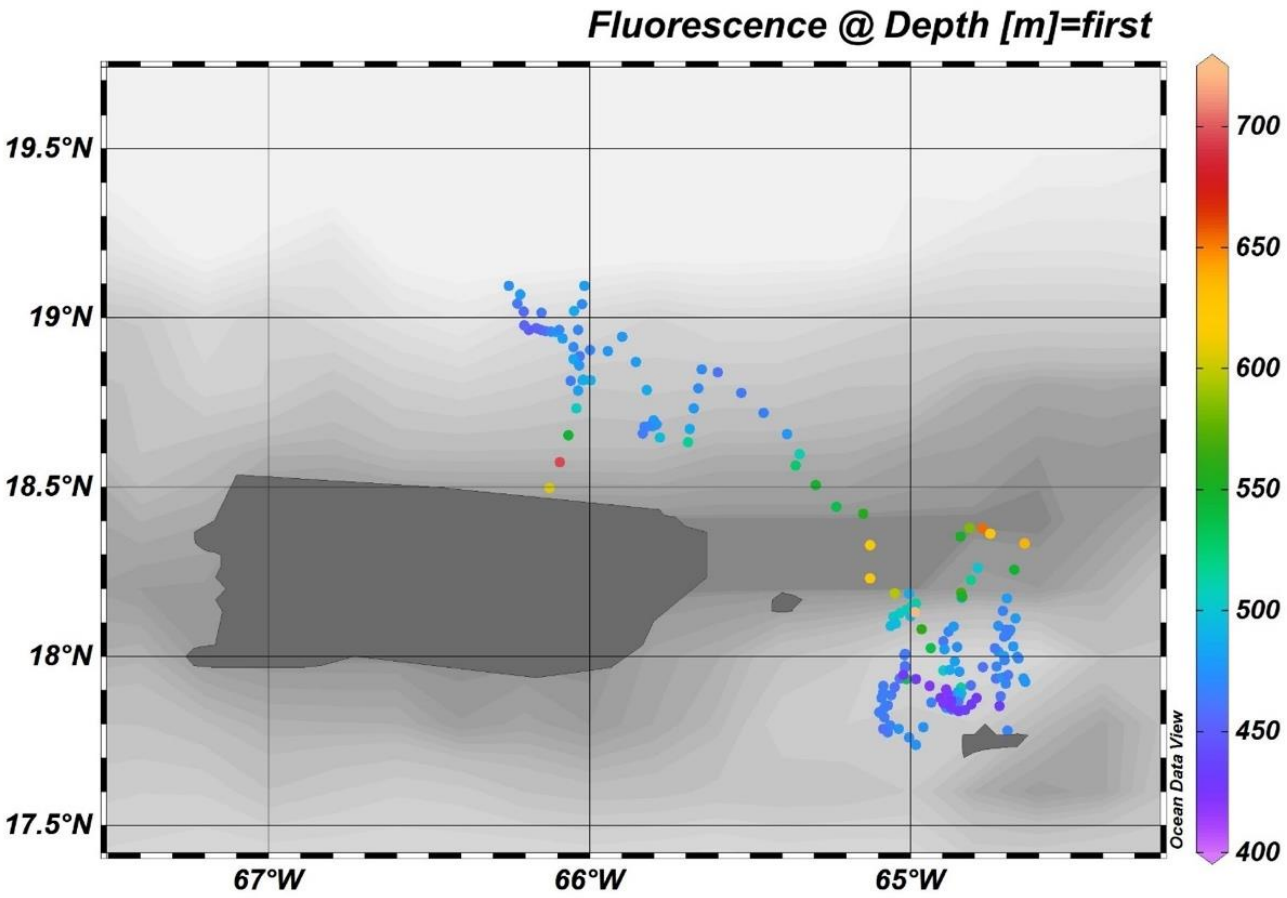

Figure 4. Hourly sea surface relative chlorophyll in-vivo fluorescence (in volts) from the continuous flow-through system collected during Cruise C-283C. Sea surface chlorophyll fluorescence recorded ranged from a minimum of 419.2 volts to a maximum of 720.4 volts. Color scale is provided on right side of figure.

Table 3. C-283C hydrocast (HC) bottle data. Station locations and general locales of the three hydrocasts are given in Table 1. Oceanographic data from associated surface stations (SS-004, SS-008, and SS-012) are given in Table 2. Analyses conducted as given in footnote below.[1]

Station	Bottle #	Water Depth (m)	Temp (°C)	Salinity (PSU)	Density (kg/m^3)	Chl-*a* (µg/L)	PO_4 (µM)	pH	Associated Surface Station
C283C-003-HC	12	10.6	26.13	35.386	1023.33	0.071	0.026	7.912	SS-004
	11	20.9	26.12	35.386	1023.38	0.059	0.026	7.916	
	10	40.5	26.16	35.410	1023.47	0.079	0.110	7.903	
	9	60.3	27.20	36.821	1024.28	0.147	0.012	7.905	
	8	79.6	26.03	37.097	1024.94	0.291	0.091	7.859	
	7	99.6	24.91	37.130	1025.40	0.293	0.073	7.808	
	5	298.2	18.28	36.568	1027.70	0.000	0.325	7.675	
	4	596.3	11.12	35.411	1029.75	0.000	1.066	7.475	
	3	793.9	7.59	35.004	1030.95	0.000	1.844	7.636	
	2	992.3	6.07	35.024	1032.11	0.000	1.746	7.666	
	1	1843.1	3.63	34.972	1036.29	0.000	1.271	7.717	
C283C-005-HC	12	10.2	26.28	35.443	1023.32	0.084	0.026	8.016	SS-008
	11	20.2	26.23	35.442	1023.38	0.086	0.189	8.062	
	10	39.5	26.35	35.722	1023.64	0.091	0.068	8.034	
	9	59.2	26.37	35.744	1023.73	0.131	0.082	8.058	
	8	79.5	26.86	36.890	1024.52	0.505	0.101	8.031	
	7	99.7	25.50	37.124	1025.22	0.395	0.036	8.043	
	6	199.0	20.14	36.776	1026.94	0.002	0.133	7.935	
	5	298.1	17.85	36.507	1027.76	0.000	0.273	7.687	
	4	595.9	11.05	35.430	1029.77	0.000	1.373	7.899	
	3	793.6	7.78	35.048	1030.95	0.000	1.518	7.672	
	2	992.1	6.07	35.034	1032.11	0.000	1.355	7.658	
	1	1408.0	4.30	35.003	1034.25	0.000	1.229	7.580	
C283C-007-HC	12	10.3	26.20	35.429	1023.34	0.097	0.059	8.1241	SS-012
	11	19.4	26.19	35.430	1023.38	0.083	0.026	8.1306	
	10	40.4	26.18	35.475	1023.51	0.150	0.054	8.1306	
	9	59.5	26.17	35.492	1023.61	0.212	0.026	8.1273	
	8	79.3	26.45	36.734	1024.54	0.276	0.000	8.2172	
	7	99.4	25.24	37.111	1025.29	0.360	0.000	8.1168	
	6	199.0	20.99	36.963	1026.85	0.002	0.022	8.0185	
	5	298.3	17.51	36.461	1027.82	0.000	0.334	7.9748	
	4	595.4	10.35	35.335	1029.83	0.000	1.345	7.7646	
	3	793.3	7.35	34.974	1030.97	0.000	2.156	7.7145	
	2	991.2	5.49	34.954	1032.14	0.000	1.788	7.7227	
	1	1269.8	4.34	34.964	1033.58	0.000	1.578	7.7633	

[1] Temperature, salinity, and density data were determined from a SeaBird 19Plus V2 CTD. Extracted chlorophyll-a samples were filtered through 0.45 µm filters and measured with a Turner Designs Model 10-AU fluorometer. Phosphate (PO_4) and pH were assessed with colorometric spectrophotometry.

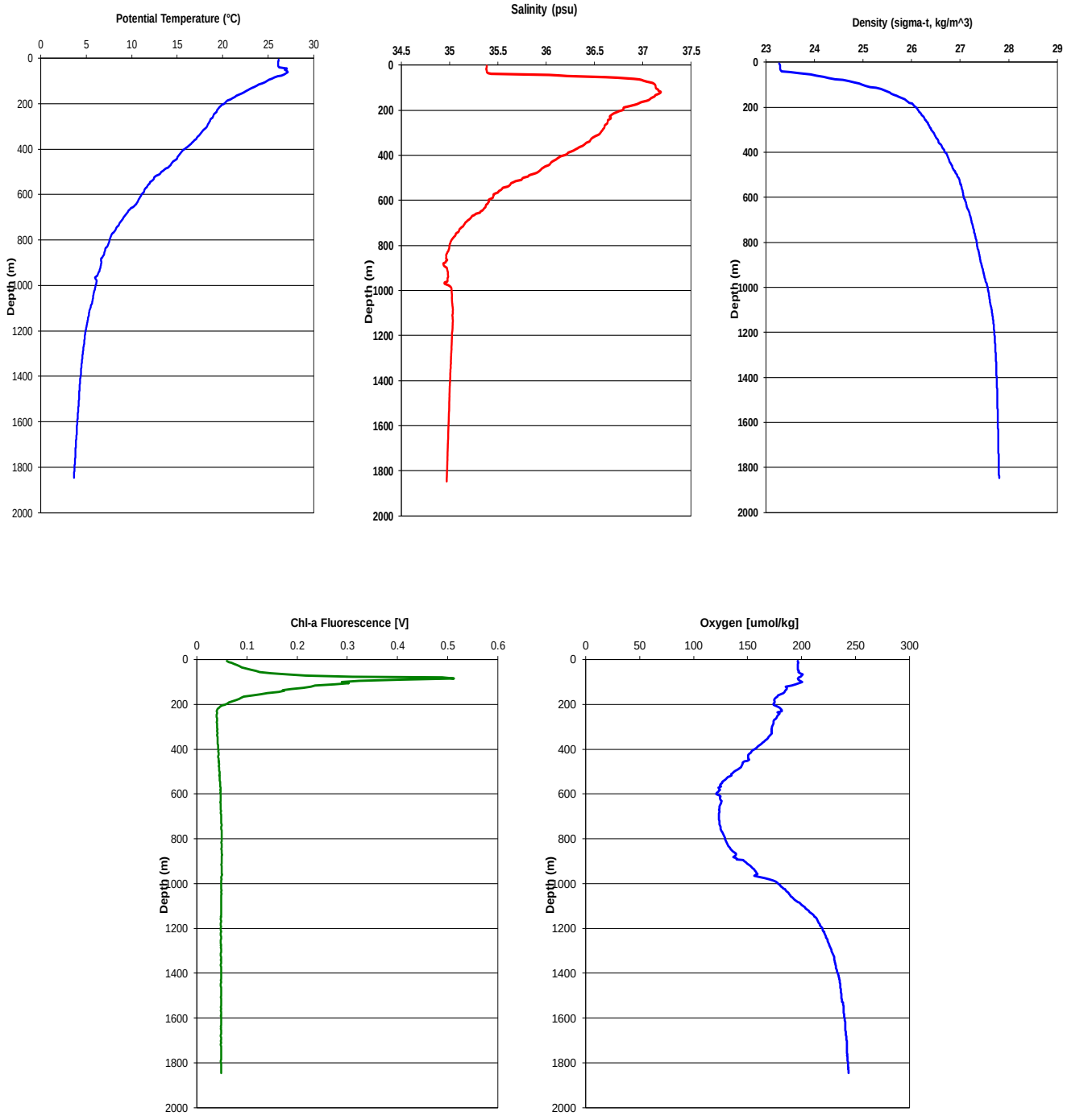

Figure 5. Depth profiles of temperature, salinity, density, chlorophyll fluorescence, and dissolved oxygen data for hydrocast Station C-283C-003-HC. Station location and general locale are given in Table 1. Data from water samples collected in bottles at depth during hydrocast deployment are given in Table 3. Digital data are available from SEA upon request.

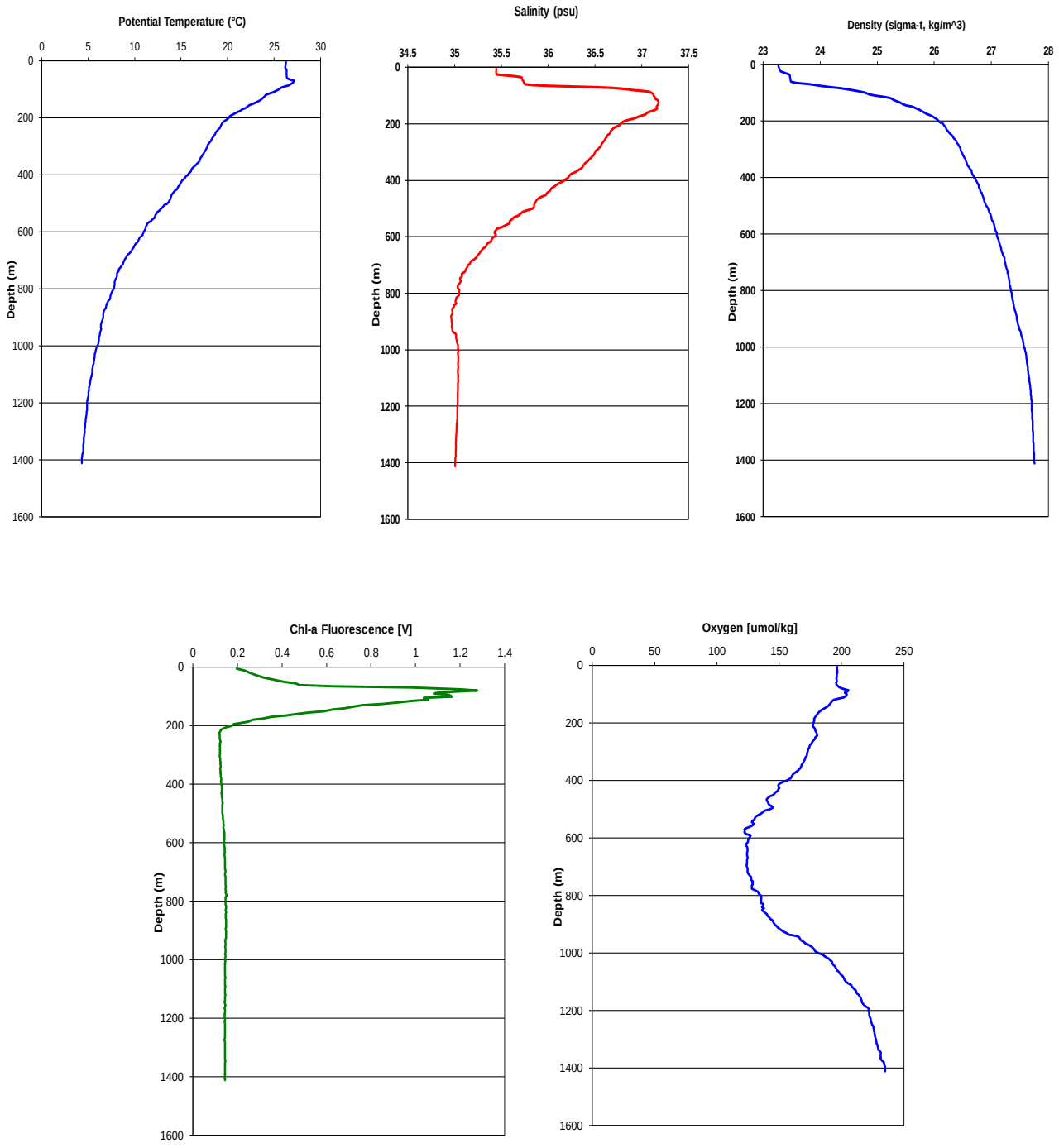

Figure 6. Depth profiles of temperature, salinity, density, chlorophyll fluorescence, and dissolved oxygen data for hydrocast Station C-283C-005-HC. Station location and general locale are given in Table 1. Data from water samples collected in bottles at depth during hydrocast deployment are given in Table 3. Digital data are available from SEA upon request.

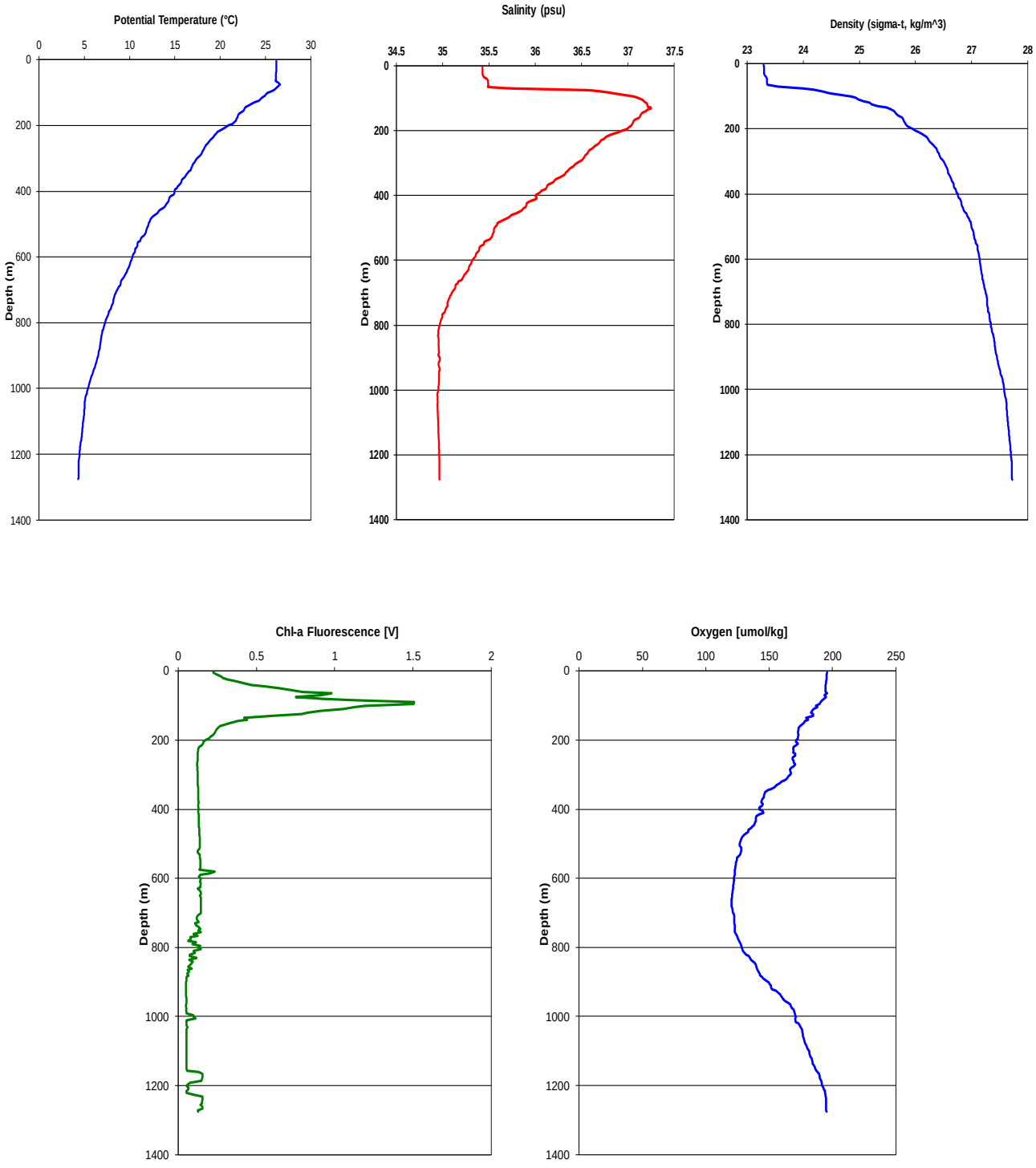

Figure 7. Depth profiles of temperature, salinity, density, chlorophyll fluorescence, and dissolved oxygen data for hydrocast Station C-283C-007-HC. Station location and general locale are given in Table 1. Data from water samples collected in bottles at depth during hydrocast deployment are given in Table 3. Digital data are available from SEA upon request.

Table 4. C-283C secchi disk (SD) data. Station locations and general locales are given in Table 1. Oceanographic data from associated surface stations are given in Table 2. See explanatory footnote at bottom of table.[1]

Station	Date	Time (Local)	Water Temp (°C)	Salinity (PSU)	Log (nm)	Water Depth (m)	Chl-*a* Fluoro. (volts)	CDOM Fluoro. (volts)	Transmiss-ivity (volts)	Cloud Cover (%)	Wave Height (ft)	Wind Speed (BF)[1]	Secchi Depth (m)	Calculated Depth of 1% Light Level (m)	Associated Surface Station
C283C-001-SD	28-Jan-19	1422	26.6	33.10	2.0	13	-	-	-	5	0.75	4	2.0	5	SS-001
C283C-003-SD	29-Jan-19	0810	26.3	35.12	68.9	3300	482.3	89.8	14539.0	60	4	3	29.0	78	SS-004
C283C-005-SD	30-Jan-19	0802	26.4	35.20	148.1	1530	478.6	89.7	14443.0	10	1.5	3	28.5	77	SS-008
C283C-007-SD	31-Jan-19	0740	26.3	35.41	241.4	1453	497.5	77.1	14800.0	50	4	4	28.0	75	SS-012

[1] BF = Beaufort Force.

Table 5. C-283C phytoplankton net (PN) data. Station locations and general locales are given in Table 1. Oceanographic data from associated surface stations are given in Table 2. Diatom and dinoflagellate percentages are based on 100-count data of collected samples.

Station	Date	Time (Local)	Log (nm)	Water Temp (°C)	Salinity (PSU)	Chl-*a* Fluoro. (volts)	Diatoms (%)	Dinoflagellates (%)	Associated Surface Station
C283C-001-PN	28-Jan-19	1528	2.0	26.6	33.10	-	60	40	SS-001
C283C-003-PN	29-Jan-19	1057	71.5	26.3	35.09	458.0	40	60	SS-004
C283C-005-PN	30-Jan-19	1014	149.3	26.4	35.13	468.2	66	34	SS-008
C283C-007-PN	31-Jan-19	1016	244.7	26.3	35.37	502.4	74	26	SS-012

Table 6. C-283C neuston net tow (NT) data. Station locations and general locales given in Table 1. Oceanographic data from associated surface stations are given in Table 2. 100-count data of zooplankton samples are given in Table 7. Qualitative descriptions of neuston net tow contents are available from SEA. Explanatory footnotes are given below.[1,2,3,4]

Station	Date	Time (Local)	Moon Phase (%)	Risen or Set?	Cloud Cover (%)	Tow Area (m^2) [1]	Zoopl. Biomass (ml) [1]	Zoopl. Density (ml/m^2) [1]	Lepto-cephali (#) [2]	Mycto-phids (#) [2]	Other Nekton >2cm (#) [2]	Total Nekton >2cm (#) [2]	Total Nekton >2cm (ml) [2]	Gelatinous Organisms >2cm (#) [2]	*S. natans* I (g) [3]	*S. natans* VIII (g) [3]	*S. fluitans* III (g) [3]	Total *Sargassum* (g) [3]	Plastic Pieces (#) [4]	Tar Pieces (#) [4]	Halo-bates (#) [4]	Associated Surface Station
C283C-002-NT	28-Jan-19	2316	44	Set	5	2287.7	9.0	0.0039	8	13	3	24	12.0	0	37.0	1.5	27.0	65.5	0	0	0	SS-002
C283C-003-NT	29-Jan-19	1240	34	Risen	20	1424.9	3.1	0.0022	0	0	3	3	0.2	0	0.0	5.0	0.0	5.0	1	0	1	SS-004
C283C-004-NT	29-Jan-19	2313	34	Set	8	2003.0	16.6	0.0083	20	16	3	39	14.5	0	6.0	0.0	38.0	44.0	1	0	0	SS-006
C283C-005-NT	30-Jan-19	1137	24	Risen	5	1447.3	0.7	0.0005	0	0	0	0	0.0	0	5.0	0.0	18.0	23.0	0	0	0	SS-008
C283C-006-NT	30-Jan-19	2319	24	Set	45	2343.8	8.0	0.0034	0	3	3	6	2.5	0	21.5	11.5	12.0	45.0	0	0	0	SS-010
C283C-007-NT	31-Jan-19	1129	17	Risen	55	1667.6	3.0	0.0018	0	0	2	2	2.0	0	106.0	27.0	24.0	157.0	0	0	0	SS-012
C283C-008-NT	31-Jan-19	2327	17	Set	2	1960.4	6.0	0.0031	1	6	2	9	4.5	uncounted	4.0	5.5	2.5	12.0	0	2	0	SS-014

[1] Tow area calculated using distance (meters) between successive minutes' GPS positions while net was deployed. Neuston net opening 1.0m wide by 0.5m tall, with 333 µm mesh net. Zooplankton density recorded as wet volume displacement of zooplankton biomass per tow area (ml/m^2).

[2] Micronekton and gelatinous organisms >2cm size were sorted from net contents using a mesh sieve, identified, counted, and biovolume determined. No spiny lobster (Phyllosoma) or Cephalopods were found. Other nekton recovered included small fish and fish larvae, the details of which are available from SEA. Gelatinous organisms >2cm in Station C283C-008-NT consisted of lots of salps, which were not counted or biovolumed.

[3] *Sargassum* species (*S. natans* I, *S. natans* VIII, and *S. fluitans* III) were removed from net contents, separated and identified, and weighed with a spring scale balance. No *S. natans* II was recovered. Further information about Sargassum clumps versus fragments is available from SEA.

[4] Floating plastic, tar, and water striders (Halobates) were removed from net contents, sorted, and recorded as numbers collected per tow. No plastic pellets were recovered in any of the neuston tows.

Table 7. 100-count data of zooplankton collected in C-283C neuston tows. Station locations, general locales, and associated surface stations are given in Table 1. Oceanographic data from associated surface stations are given in Table 2. Information on net contents is given in Table 6. Explanatory footnotes are given below.[1,2]

Station	Medusa	Siphono-phores	Salp/ Doliolids	Ptero-pods	Hetero-pods	Other Snails [1]	Chaetog-naths	Cope-pods	Gammarid Amphi-pods	Hyperiid Amphi-pods	Mega-lopae	Zoea	Shrimp	Mysids	Euphau-sids	Stomato-pods	Ostra-cods	Clado-cera	Iso-pods	Fish Larvae	Other [2]	Total # of Organisms Counted
C283C-002-NT	0	0	0	9	4	16	12	43	0	4	0	0	0	1	6	0	3	0	0	1	0	99
C283C-003-NT	1	7	1	2	0	2	1	81	0	0	0	0	0	0	0	0	0	4	0	1	0	100
C283C-004-NT	0	13	0	3	0	3	6	52	10	6	2	2	0	0	3	0	0	0	1	0	0	101
C283C-005-NT	0	0	0	0	0	51	0	40	2	0	0	0	0	1	0	0	1	0	0	1	0	96
C283C-006-NT	0	7	0	2	0	5	10	40	2	1	1	9	0	6	0	1	23	0	0	0	2	109
C283C-007-NT	2	1	0	0	0	18	0	48	0	1	0	0	24	0	0	0	3	0	0	0	5	102
C283C-008-NT	0	4	0	0	0	0	13	64	6	5	0	0	3	2	2	0	0	0	0	1	0	100

[1] C283C-005-NT 'Other Snails' includes great numbers of *Sargassum* snails.

[2] 'Other' organisms counted in zooplankton 100-count include: 2 Cyprid nauplii (Station C283C-006-NT); 5 larvae anemone (Station C283C-007-NT).

Table 8. C-283C meter net tow (MN) data. Station location and general locale are given in Table 1. Qualitative description of meter net tow contents is available from SEA. 100-count data of zooplankton samples are given in Table 9, below. Explanatory footnotes are given below.[1,2]

Station	Date	Time (Local)	Tow Depth (m)	Tow Volume (m^3) [1]	Zoopl. Biomass (ml) [1]	Zoopl. Density (ml/m^3) [1]	Lepto-cephali (#) [2]	Mycto-phids (#) [2]	Other Nekton >2cm (#) [2]	Total Nekton >2m (#) [2]	Total Nekton >2cm (ml) [2]	Gelatinous Organisms >2cm (#) [2]	Gelatinous Organisms >2cm (ml) [2]	Total *Sargassum* (g)	Plastic Pellets (#)	Plastic Pieces (#)	Tar Pieces (#)	Halo-bates (#)
C283C-012-MN	4-Feb-19	2213	706.0	1608.4	15.0	0.0093	2	1	0	3	0.4	1	0.5	0.0	0	0	0	0

[1] Tow volume (m^3) calculated from flow meter measurements. Net opening 1.0m diameter, with 333 µm mesh net. Zooplankton density recorded as wet volume displacement of zooplankton biomass per tow volume (ml/m^3).

[2] Micronekton and gelatinous organisms >2cm were sorted from net contents using a mesh sieve, identified, counted, and biovolume determined. No spiny lobster (Phyllosoma) or Cephalopods were found in C283C-012-MN. The gelatinous organism >2cm recovered in C283C-012-MN was a salp.

Table 9. 100-count data of zooplankton collected in C-283C meter net tow. Station location and general locale are given in Table 1. Information on net contents is given in Table 8, above.

Station	Siphono-phores	Cteno-phores	Ptero-pods	Other Snails	Polycheate Worms	Chaetog-naths	Cope-pods	Gammarid Amphipods	Hyperiid Amphipods	Shrimp	Mysids	Euphau-sids	Ostra-cods	Fish Larvae	Total # of Organisms Counted
C283C-012-MN	2	1	1	15	1	4	48	5	3	1	5	2	12	1	101

Table 10. C-283C Shipek grab (SG) sediment data. Station locations are given in Table 1.

Station	Date	Time (Local)	Water Depth (m)	General Locale	Sediment Size Analysis (%) [1]			Qualitative Description
					>2mm	0.25-2.0mm	<0.25mm	
C283C-001-SG	28-Jan-19	1552	12.7	San Juan Harbor	-	-	-	Well-sorted slate gray silty clay, with bits of shell. Mostly odorless.
C283C-009-SG	1-Feb-19	0837	375	USVI, S of St. Thomas	8.0	26.0	66.0	Very pale orange (10YR 8/2) silty sand. Sediment grains are rounded.
C283C-010-SG	1-Feb-19	1344	31.2	USVI, N of St. Thomas	2.7	13.3	84.0	Pale yellowish brownish gray (10YR 6/2), silty very fine sand. Sediment grains are rounded. Sample smelled like low-tide seaweed.
C283C-011-SG	1-Feb-19	1419	26.3	USVI, N of St. Thomas	23.9	69.6	6.5	Coarse sand and granules, consisting primarily of pieces of coralline algae and broken shells. Sediment grains are very angular.

[1] Sediment size analysis conducted by wet sieving a small measured amount of sample through a sieve stack that included a >2mm sieve and a 0.25mm sieve. This allowed determination of percent of sample consisting of granules and pebbles (>2mm fraction), medium and coarse sand (0.25-2.0mm fraction), and fine sand, silt, & clay (<0.25mm fraction). Size analysis was not determined for the sediment sample collected in San Juan Harbor (C283C-001-SG).