

# Cruise Report S-220

Scientific Data Collected Aboard  
*SSV Robert C. Seamans*

Puerto Vallarta, Mexico –  
Taiohae, Nuku Hiva, Marquesas – Papeete, Tahiti  
26 November 2008 – 3 January 2009



Sea Education Association  
Woods Hole, Massachusetts

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## **Ship's Company**

SSV *Robert C. Seamans*, Cruise S-220

### **Nautical Staff**

Jeremy Law	Captain
Johnny O'Keeffe	Chief Mate
Sandy Aylesworth	Second Mate
Jay Amster	Third Mate
Dave Reynolds	Engineer
Colleen Allard	Assistant Engineer
Sarah Overton	Steward
Nova Ewers	Deckhand
Jess McGreehan	Deckhand
Elijah Thanhauser	Deckhand

### **Scientific Staff**

Amy Siuda	Chief Scientist
Jane McCamant	First Assistant Scientist
Erin Roach	Second Assistant Scientist
Adam Traina	Third Assistant Scientist
Dave Murphy	Labhand

### **Students**

Emily Allen	College of Charleston
Cory Bantam	University of Washington, Seattle
Alex Budden	Williams College
Brant Chlebowski	University of California, San Diego
Paul Clerkin	Cornell University
Hannah Darrin	University of Washington, Seattle
Paul Dixon	Sewanee, The University of the South
Nicole Fronczkowski	Juniata College
Meg Gilley	University of Pennsylvania
Katie Giuliano	Hamilton College
Matthew Hoselton	Oberlin College
Carly Moreno	University of Washington, Tacoma
Kristine Salters	Smith College
William Skinner	Harvard University
Timbo Stillinger	University of California, Berkeley
Madeline Weigner	Smith College

## **Introduction**

This cruise report provides a summary of scientific activities aboard the SSV *Robert C. Seamans* during cruise S-220 (26 Nov 2008 – 3 Jan 2009). The cruise served as the second half of the 12-week Sea Semester: Oceans and Climate program with Sea Education Association (SEA), during which extensive oceanographic sampling was conducted for both student research projects (Table 1) and the ongoing SEA research program. Students examined physical, chemical, biological, and environmental oceanographic characteristics in accordance with their written proposals and presented their results in a final poster session and papers (available upon request from SEA). The brief summary of 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.

This was certainly a semester marked by holidays. Shortly after gobbling up our Thanksgiving dinner, we got underway for the start of S220. During the 3000 nm, month-long, first leg of our voyage from Puerto Vallarta, Mexico to Taiohae, Nuku Hiva, Marquesas we accomplished a lot. Not only did we complete all of the required sampling for student research projects, but we crossed into the southern hemisphere after battling through the squalls that are all too common at the inter-tropical convergence zone.

After celebrating a great Christmas at anchor in Nuku Hiva, we began the final leg of our voyage to Papeete, Tahiti. While underway, we celebrated our third and final holiday by ringing in the New Year. As the 2-meter net came back to the surface from great depth and the anchor ball covered in Christmas lights lowered from the main mast, we called out the final seconds of 2008. Clearly, a New Year celebration to remember.

Thank you to an outstanding staff and equally outstanding group of students. I know that we all have to go our separate ways, but I hope that this community will remain as strong as it became at sea!

Amy NS Siuda  
Chief Scientist, S-220

Table 1. Student research projects, S-220.

<b>Title</b>	<b>Student Investigator(s)</b>
The contribution of chlorophyll-a concentration to planktonic foraminifera health in the Equatorial Pacific Ocean.	Emily Allen
Coccolithophore Abundance as a Function of Temperature, Salinity and Nitrate in the Equatorial Pacific.	Cory Bantam
Proximal Causes of Vertical Migration.	Alex Budden
Interannual Equatorial Current Variability in the Eastern Pacific.	Brant Chlebowski Will Skinner
Bioluminescent intensity as a function of chemical and physical parameters in the Eastern Equatorial Pacific.	Paul Clerkin Katie Giuliano
Eastern Equatorial Pacific Food Web Interactions and Efficiency in Sequestered Carbon.	Hannah Darrin
Nutrient Ratios and Autotrophic Biomass in the Eastern Equatorial Pacific.	Paul Dixon
The effect of pH on Abundance of Foraminifera in the Equatorial Pacific Ocean.	Nicole Fronczkowski
Proximal Causes of Diurnal Vertical Migration.	Meg Gilley
Copepod trophic efficiency: Quantifying Carbon in Grazing Rates and Metabolic Byproducts.	Matthew Hoselton Timbo Stillinger
Fall 2008 carbon flux in the eastern equatorial Pacific.	Carly Moreno
Phytoplankton population dynamics in iron fertilized eastern equatorial Pacific waters.	Kristine Salters
Pacific Foraminifera Development as a Function of Ocean Temperatures and Alkalinity: Two Effects of Climate Change.	Madeline Weigner

Table 2. Academic Program.

<b>Date</b>	<b>Topic</b>	<b>Speaker(s)</b>
28 Nov	Introduction to Academic Program Heaving To & HC Deployment	Siuda & Law Crew
30 Nov	Set, Strike, Furl	Mates
1 Dec	Line Chase	All Hands
2 Dec	Geology of Eastern Pacific	McCamant
3 Dec	Squall Formation and Response	Law
4 Dec	Lab Practical	All Hands
5 Dec	Reynolds Number	Traina
8 Dec	Seabirds	Siuda
9 Dec	Clean Power	Reynolds
10 Dec	Data Discussion I	Students
11 Dec	Marlinspike Seamanship	Deckhands
12 Dec	Harmful Algal Blooms	Roach
14 Dec	Argo Program Summary and Deployment	Siuda
16 Dec	Rig Design	Amster
17 Dec	Polynesian Navigation	Aylesworth
18 Dec	Introduction to the JWO Phase	Law
19 Dec	Waves	Traina
21 Dec	Data Discussion II	Students
29 Dec	Poster Presentations	Students
30 Dec	Steam Engines	Reynolds
31 Dec	Life in the Deep Sea	Siuda
1 Jan	Summary of Oceanographic Research	Siuda and Murphy

## Data Description

This section provides a record of data collected aboard the SSV *Robert C. Seamans* cruise S-220 (US State Department Cruise: 2008-067, leg 1) on a northeast to southwest transect of the eastern Equatorial Pacific, beginning in Puerto Vallarta, Mexico and ending in Papeete, Tahiti (Figure 1). A single port stop was made at Taiohae, Nuku Hiva, Marquesas.

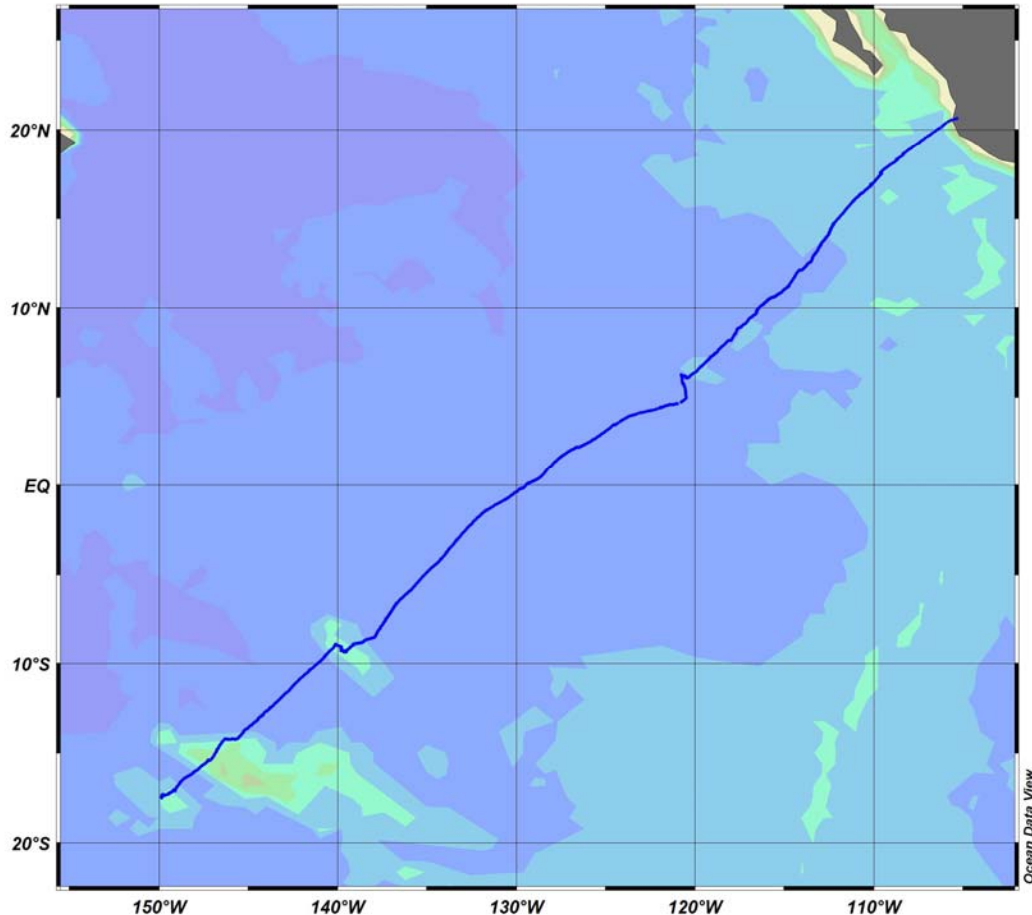


Figure 1. Hourly positions along the S-220 cruise track.

During the six-week voyage, we sampled at 95 discrete oceanographic sampling stations (Table 3) and a total of 53 surface sampling stations (Table 4). Additionally, we continuously sampled water depth and sub-bottom profiles (CHIRP system), upper ocean currents (ADCP, Figure 2), and sea surface temperature, salinity, and *in vivo* and CDOM fluorescence (seawater flow-through system, Figure 3). Discrete CTD measurements of vertical temperature and salinity profiles are presented in Figure 4. Additional instrumentation allowed for profiling of dissolved oxygen, raw fluorescence and bioluminescent intensity (Figure 5). Summaries of sea surface and water column chemical and biological properties are found in Tables 4-7. Lengthy CTD, 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 3. Oceanographic sampling stations. Sampling depth indicated.

Station	Date	Local Time	Latitude	Longitude	Depth (m)	General Locale
<b>CTD and CTD/HC</b>						
003-CTD	28-Nov-08	1520	18°36.2' N	108°19.8' W	425	Subtropical North Pacific
003-HC	28-Nov-08	1614	18°36.2' N	108°19.8' W	236	Subtropical North Pacific
004-CTD	28-Nov-08	2109	18°18.9' N	108°42.9' W	494	Subtropical North Pacific
006-CTD	29-Nov-08	1005	17°33.5' N	109°36.9' W	0	Subtropical North Pacific
008-CTD	29-Nov-08	2042	16°54.5' N	110°9.4' W	494	Subtropical North Pacific
008-HC	29-Nov-08	2040	16°54.5' N	110°9.4' W	236	Subtropical North Pacific
011-CTD	30-Nov-08	0843	16°24.2' N	110°40.5' W	502	Subtropical North Pacific
011-HCb	30-Nov-08	0951	16°24.2' N	110°40.9' W	20	Subtropical North Pacific
012-CTD	30-Nov-08	2038	15°57.0' N	111°9.5' W	497	Subtropical North Pacific
014-CTD	1-Dec-08	0940	14°41.0' N	112°16.0' W	496	Subtropical North Pacific
016-CTD	1-Dec-08	2040	14°13.9' N	112°29.3' W	485	Subtropical North Pacific
016-HC	1-Dec-08	2040	14°13.9' N	112°29.3' W	486	Subtropical North Pacific
018-CTD	2-Dec-08	0935	13°37.1' N	112°55.3' W	490	Subtropical North Pacific
018-HC	2-Dec-08	0935	13°37.1' N	112°55.3' W	495	Subtropical North Pacific
020-CTD	2-Dec-08	2045	13°5.6' N	113°14.6' W	489	Subtropical North Pacific
022-CTD	3-Dec-08	0936	13°5.6' N	113°14.6' N	490	Subtropical North Pacific
023-CTD	3-Dec-08	2045	12°8.1' N	114°8.1' W	499	Subtropical North Pacific
023-HC	3-Dec-08	2045	12°5.1' N	114°8.1' W	499	Subtropical North Pacific
025-CTD	4-Dec-08	0934	11°13.3' N	114°45.7' W	495	Subtropical North Pacific
025-HC	4-Dec-08	1021	11°13.1' N	114°46.0' W	490	Subtropical North Pacific
027-CTD	4-Dec-08	2028	10°50.4' N	115°14.4' W	489	Subtropical North Pacific
028-CTD	5-Dec-08	0933	10°32.9' N	115°46.0' W	491	Subtropical North Pacific
030-CTD	5-Dec-08	2040	10°15.2' N	116°8.0' W	490	Subtropical North Pacific
030-HC	5-Dec-08	2136	10°15.1' N	116°8.5' W	497	Subtropical North Pacific
032-CTD	6-Dec-08	0935	9°46.3' N	116°32.2' W	489	Equatorial Pacific
032B-HC	6-Dec-08	1047	9°45.9' N	116°33.2' W	8	Equatorial Pacific
032A-HC	6-Dec-08	1103	9°45.8' N	116°33.2' W	496	Equatorial Pacific
034-HC	7-Dec-08	2128	7°37.1' N	118°41.0' W	494	Equatorial Pacific
036-CTD	8-Dec-08	1005	7°12.8' N	119°8.5' W	0	Equatorial Pacific
036-HC	8-Dec-08	1050	7°12.8' N	119°7.9' W	DNF	Equatorial Pacific
040-CTD	9-Dec-08	1010	6°6.3' N	120°32.3' W	434	Equatorial Pacific
041-CTD	9-Dec-08	2030	5°43.4' N	120°40.8' W	8	Equatorial Pacific
041-HC	9-Dec-08	2135	5°44.8' N	120°40.0' W	312	Equatorial Pacific
044-CTD	10-Dec-08	2216	4°25.5' N	121°52.9' W	359	Equatorial Pacific
047-CTD	11-Dec-08	2042	3°27.9' N	124°28.3' W	371	Equatorial Pacific
049-CTD	12-Dec-08	0939	2°38.0' N	125°38.9' W	20	Equatorial Pacific
051-CTD	12-Dec-08	2035	2°10.9' N	126°30.8' W	320	Equatorial Pacific
051-HC	12-Dec-08	2130	2°11.2' N	126°33.0' W	324	Equatorial Pacific
055-CTD	13-Dec-08	2045	1°3.7' N	128°7.2' W	380	Equatorial Pacific
057-CTD	14-Dec-08	0904	0°14.2' N	129°1.8' W	270	Equatorial Pacific
057-HC	14-Dec-08	0956	0°13.8' N	129°3.2' W	290	Equatorial Pacific
059-CTD	14-Dec-08	2115	0°11.7' S	129°39.4' W	252	Equatorial Pacific
059-HC	14-Dec-08	2211	0°11.1' S	129°40.7' W	335	Equatorial Pacific
063-CTD	15-Dec-08	2115	1°25.0' S	131°39.5' W	365	Equatorial Pacific

Table 3 continued.

Station	Date	Local Time	Latitude	Longitude	Depth (m)	General Locale
065-HC	16-Dec-08	0938	2°13.8' S	132°33.4' W	20	Equatorial Pacific
067-CTD	16-Dec-08	2048	3°5.2' S	133°19.1' W	6	Equatorial Pacific
067-HC	16-Dec-08	2144	3°5.9' S	133°20.2' W	90	Equatorial Pacific
069-CTD	17-Dec-08	0930	4°6.1' S	134°10.1' W	474	Equatorial Pacific
069-HC	17-Dec-08	1030	4°6.3' S	134°11.1' W	468	Equatorial Pacific
071-HC	18-Dec-08	0936	5°54.8' S	135°57.3' W	20	Subtropical South Pacific
073-CTD	18-Dec-08	2044	6°36.1' S	136°41.9' W	452	Subtropical South Pacific
073-HC	18-Dec-08	2133	6°36.5' S	136°42.9' W	193	Subtropical South Pacific
075-CTD	19-Dec-08	0930	7°28.9' S	137°15.4' W	471	Subtropical South Pacific
075-HC	19-Dec-08	1017	7°22.2' S	137°16.1' W	468	Subtropical South Pacific
078-CTD	20-Dec-08	1014	8°44.1' S	138°30.0' W	472	Subtropical South Pacific
078-HC	20-Dec-08	1113	8°44.6' S	138°31.0' W	480	Subtropical South Pacific
080-HC	20-Dec-08	2044	8°55.8' S	139°6.6' W	20	Subtropical South Pacific
082-CTD	21-Dec-08	1107	9°18.0' S	139°34.6' W	494	Subtropical South Pacific
085-CTD	27-Dec-08	1039	10°22.7' S	141°33.8' W	478	Subtropical South Pacific
088-CTD	28-Dec-08	1322	12°29.9' S	143°46.3' W	488	Subtropical South Pacific
090-CTD	29-Dec-08	1001	13°47.3' S	145°16.0' W	450	Subtropical South Pacific
091-CTD	30-Dec-08	1014	14°48.8' S	146°44.9' W	474	Subtropical South Pacific
093-CTD	31-Dec-08	1000	16°5.0' S	148°2.8' W	482	Subtropical South Pacific
095-CTD	1-Jan-09	0712	17°5.2' S	149°10.1' W	2903	Subtropical South Pacific
<b>Neuston Net</b>						
004-NT	28-Nov-08	2213	18°18.3' N	108°42.7' W	0	Subtropical North Pacific
006-NT	29-Nov-08	1043	17°33.2' N	109°35.7' W	0	Subtropical North Pacific
008-NT	29-Nov-08	2308	16°53.4' N	110°8.5' W	0	Subtropical North Pacific
011-NT	30-Nov-08	1045	16°23.9' N	110°40.9' W	0	Subtropical North Pacific
012-NT	30-Nov-08	2131	15°56.3' N	111°9.3' W	0	Subtropical North Pacific
014-NT	1-Dec-08	1042	14°40.3' N	112°15.6' W	0	Subtropical North Pacific
016-NT	1-Dec-08	2242	14°12.1' N	112°49.6' W	0	Subtropical North Pacific
018-NT	2-Dec-08	1155	13°35.0' N	112°56.5' W	0	Subtropical North Pacific
020-NT	2-Dec-08	2116	13°5.1' N	113°15.1' W	0	Subtropical North Pacific
022-NT	3-Dec-08	1017	12°24.8' N	113°45.1' W	0	Subtropical North Pacific
023-NT	3-Dec-08	2247	12°7.8' N	114°9.0' W	0	Subtropical North Pacific
025-NT	4-Dec-08	1115	11°12.8' N	114°46.4' W	0	Subtropical North Pacific
027-NT	4-Dec-08	2108	10°50.1' N	115°14.7' W	0	Subtropical North Pacific
028-NT	4-Dec-08	1020	10°33.1' N	115°46.5' W	0	Subtropical North Pacific
030-NT	5-Dec-08	2241	10°14.5' N	116°8.9' W	0	Subtropical North Pacific
032-NT	6-Dec-08	1207	9°45.5' N	116°33.4' W	0	Equatorial Pacific
034-NT	7-Dec-08	2231	7°36.2' N	118°41.7' W	0	Equatorial Pacific
037-NT	8-Dec-08	1326	7°11.0' N	119°10.2' W	0	Equatorial Pacific
038-NT	8-Dec-08	2109	4°43.7' N	119°36.2' W	0	Equatorial Pacific
040-NT	9-Dec-08	1055	6°7.3' N	120°31.6' W	0	Equatorial Pacific
041-NT	9-Dec-08	2241	5°45.7' N	120°38.6' W	0	Equatorial Pacific
042-NT	10-Dec-08	1119	4°38.9' N	120°58.5' W	0	Equatorial Pacific
044-NT	10-Dec-08	2259	4°25.9' N	121°54.5' W	0	Equatorial Pacific

Table 3 continued.

Station	Date	Local Time	Latitude	Longitude	Depth (m)	General Locale
046-NT	11-Dec-08	1114	3°59.5' N	123°28.6' W	0	Equatorial Pacific
047-NT	11-Dec-08	2126	3°27.9' N	124°30.0' W	0	Equatorial Pacific
049-NT	12-Dec-08	0959	2°37.9' N	125°39.7' W	0	Equatorial Pacific
051-NT	12-Dec-08	2230	2°11.5' N	126°35.1' W	0	Equatorial Pacific
053-NT	13-Dec-08	1029	1°39.5' N	127°29.1' W	0	Equatorial Pacific
055-NT	13-Dec-08	2124	1°3.4' N	128°8.4' W	0	Equatorial Pacific
057-NT	14-Dec-08	1057	0°13.2' N	129°4.8' W	0	Equatorial Pacific
059-NT	14-Dec-08	2315	0°10.5' S	129°42.2' W	0	Equatorial Pacific
061-NT	15-Dec-08	1109	0°47.4' S	130°34.7' W	0	Equatorial Pacific
063-NT	15-Dec-08	2216	1°25.2' S	131°41.6' W	0	Equatorial Pacific
065-NT	16-Dec-08	1010	2°14.4' S	132°34.3' W	0	Equatorial Pacific
067-NT	16-Dec-08	2152	3°6.8' S	133°21.4' W	0	Equatorial Pacific
069-NT	17-Dec-08	1128	4°6.9' S	134°12.4' W	0	Equatorial Pacific
071-NT	18-Dec-08	1001	5°55.1' S	135°57.7' W	0	Subtropical South Pacific
073-NT	18-Dec-08	2216	6°37.2' S	136°43.5' W	0	Subtropical South Pacific
075-NT	19-Dec-08	1117	7°27.6' S	137°16.8' W	0	Subtropical South Pacific
077-NT	19-Dec-08	2211	8°6.9' S	137°42.2' W	0	Subtropical South Pacific
078-NT	20-Dec-08	1222	8°45.7' S	138°32.1' W	0	Subtropical South Pacific
080-NT	20-Dec-08	2118	8°56.6' S	139°6.9' W	0	Subtropical South Pacific
082-NT	21-Dec-08	1208	9°18.7' S	139°35.2' W	0	Subtropical South Pacific
084-NT	26-Dec-08	2235	9°36.0' S	140°42.2' W	0	Subtropical South Pacific
086-NT	27-Dec-08	1123	10°23.1' S	141°34.4' W	0	Subtropical South Pacific
087-NT	27-Dec-08	2207	11°18.4' S	142°31.1' W	0	Subtropical South Pacific
088-NT	28-Dec-08	1417	12°31.1' S	143°47.5' W	0	Subtropical South Pacific
089-NT	28-Dec-08	2234	13°4.4' S	144°26.1' W	0	Subtropical South Pacific
090-NT	29-Dec-08	1045	13°48.1' S	145°16.5' W	0	Subtropical South Pacific
091-NT	30-Dec-08	1110	14°49.7' S	146°45.2' W	0	Subtropical South Pacific
092-NT	30-Dec-08	2208	15°26.5' S	147°15.8' W	0	Subtropical South Pacific
093-NT	31-Dec-08	1034	16°5.5' S	148°3.3' W	0	Subtropical South Pacific
094-NT	31-Dec-08	2133	16°38.5' S	148°48.0' W	0	Subtropical South Pacific
<b>2-Meter Net</b>						
092-2MN	30-Dec-08	2114	15°25.1' S	147°15.4' W	700	Subtropical South Pacific
094-2MN	31-Dec-08	2024	16°37.6' S	148°47.3' W	1100	Subtropical South Pacific
<b>SPAR</b>						
001	27-Nov-08	1622	20°34.5' N	105°32.7' W	0	Subtropical North Pacific
002	28-Nov-08	0705	19°16.8' N	107°27.4' W	0	Subtropical North Pacific
003	28-Nov-08	1520	18°36.3' N	108°20.4' W	0	Subtropical North Pacific
005	29-Nov-08	0759	17°41.3' N	109°30.3' W	0	Subtropical North Pacific
006	29-Nov-08	1101	17°33.1' N	109°34.2' W	0	Subtropical North Pacific
007	29-Nov-08	1741	17°3.5' N	109°58.2' W	0	Subtropical North Pacific
009	29-Nov-08	2202	16°53.9' N	110°9.1' W	0	Subtropical North Pacific
010	30-Nov-08	0704	16°28.3' N	110°35.1' W	0	Subtropical North Pacific
011	30-Nov-08	0845	16°24.2' N	110°40.6' W	0	Subtropical North Pacific
012	30-Nov-08	2032	15°56.8' N	111°9.5' W	0	Subtropical North Pacific
013	1-Dec-08	0658	14°57.2' N	112°1.3' W	0	Subtropical North Pacific

Table 3 continued.

Station	Date	Local Time	Latitude	Longitude	Depth (m)	General Locale
014	1-Dec-08	1045	14°40.2' N	112°15.5' W	0	Subtropical North Pacific
015	1-Dec-08	1616	14°27.0' N	112°21.8' W	0	Subtropical North Pacific
016	1-Dec-08	2040	14°13.9' N	112°29.3' W	0	Subtropical North Pacific
017	2-Dec-08	0700	13°44.3' N	112°50.2' W	0	Subtropical North Pacific
018	2-Dec-08	1129	13°36.1' N	112°56.4' W	0	Subtropical North Pacific
019	2-Dec-08	1600	13°5.6' N	113°4.0' W	0	Subtropical North Pacific
020	2-Dec-08	2116	13°5.1' N	113°15.1' W	0	Subtropical North Pacific
021	3-Dec-08	0708	12°13.0' N	113°36.6' W	0	Subtropical North Pacific
022	3-Dec-08	1018	12°24.8' N	113°45.1' W	0	Subtropical North Pacific
023	3-Dec-08	2305	12°7.6' N	114°9.6' W	0	Subtropical North Pacific
024	4-Dec-08	0746	11°17.1' N	114°43.4' W	0	Subtropical North Pacific
025	4-Dec-08	1122	11°12.5' N	114°46.5' W	0	Subtropical North Pacific
026	4-Dec-08	1637	11°1.2' N	115°0.8' W	0	Subtropical North Pacific
027	4-Dec-08	2111	10°49.9' N	115°14.8' W	0	Subtropical North Pacific
028	5-Dec-08	1025	10°33.0' N	115°46.6' W	0	Subtropical North Pacific
029	5-Dec-08	1630	10°22.7' N	115°58.6' W	0	Subtropical North Pacific
030	5-Dec-08	2248	10°14.4' N	116°8.8' W	0	Subtropical North Pacific
031	6-Dec-08	0700	9°51.5' N	116°30.5' W	0	Equatorial Pacific
032	6-Dec-08	0935	9°46.3' N	116°32.2' W	0	Equatorial Pacific
033	7-Dec-08	1631	7°55.4' N	118°22.2' W	0	Equatorial Pacific
034	7-Dec-08	2234	7°36.5' N	118°41.5' W	0	Equatorial Pacific
035	8-Dec-08	0712	7°15.1' N	119°5.5' W	0	Equatorial Pacific
036	8-Dec-08	1052	7°12.4' N	119°7.9' W	0	Equatorial Pacific
039	9-Dec-08	0700	6°6.7' N	120°19.6' W	0	Equatorial Pacific
040	9-Dec-08	1104	6°8.8' N	120°32.3' W	0	Equatorial Pacific
043	10-Dec-08	1300	4°36.8' N	121°7.1' W	0	Equatorial Pacific
044	10-Dec-08	2300	4°25.8' N	124°54.7' W	0	Equatorial Pacific
045	11-Dec-08	0750	4°7.1' N	120°4.3' W	0	Equatorial Pacific
046	11-Dec-08	1117	3°58.5' N	123°33.3' W	0	Equatorial Pacific
047	11-Dec-08	2141	3°27.4' N	124°31.0' W	0	Equatorial Pacific
048	12-Dec-08	0700	2°47.1' N	125°25.9' W	0	Equatorial Pacific
049	12-Dec-08	1006	2°37.7' N	125°40.1' W	0	Equatorial Pacific
050	12-Dec-08	1750	2°16.7' N	126°19.6' W	0	Equatorial Pacific
052	13-Dec-08	0700	1°48.6' N	127°16.6' W	0	Equatorial Pacific
053	13-Dec-08	1036	1°39.5' N	127°29.1' W	0	Equatorial Pacific
054	13-Dec-08	1636	1°18.5' N	127°52.4' W	0	Equatorial Pacific
056	14-Dec-08	0713	0°18.5' N	128°53.7' W	0	Equatorial Pacific
057	14-Dec-08	1026	0°14.2' N	129°17.2' W	0	Equatorial Pacific
058	14-Dec-08	1402	0°6.9' N	129°17.2' W	0	Equatorial Pacific
060	15-Dec-08	0701	0°33.4' S	130°14.5' W	0	Equatorial Pacific
068	17-Dec-08	0708	3°54.2' S	134°12.5' W	0	Equatorial Pacific
069	17-Dec-08	1139	4°7.1' S	134°12.5' W	0	Equatorial Pacific
070	17-Dec-08	1639	4°27.2' S	134°32.8' W	0	Equatorial Pacific
071	18-Dec-08	1755	6°25.2' S	136°31.7' W	0	Equatorial Pacific
074	19-Dec-08	0721	7°19.7' S	137°10.2' W	0	Subtropical South Pacific

Table 3 continued.

Station	Date	Local Time	Latitude	Longitude	Depth (m)	General Locale
075	19-Dec-08	1126	7°27.8' S	137°19.4' W	0	Subtropical South Pacific
076	19-Dec-08	1325	7°33.4' S	137°19.4' W	0	Subtropical South Pacific
078	20-Dec-08	1223	8°15.7' S	138°32.1' W	0	Subtropical South Pacific
081	21-Dec-08	0700	9°21.5' S	139°31.6' W	0	Subtropical South Pacific
083	21-Dec-08	1552	9°18.4' S	139°41.1' W	0	Subtropical South Pacific
085	27-Dec-08	0331	9°55.6' S	141°0.0' W	0	Subtropical South Pacific
<b>Bathyphotometer</b>						
008-BP	29-Nov-08	2117	16°54.3' N	110°9.3' W	100	Subtropical North Pacific
016-BP	1-Dec-08	2117	14°13.2' N	112°29.4' W	100	Subtropical North Pacific
023-BP	3-Dec-08	2120	12°8.3' N	114°8.2' W	100	Subtropical North Pacific
030-BP	5-Dec-08	2130	10°15.1' N	116°8.0' W	0	Subtropical North Pacific
034-BP	7-Dec-08	2104	7°37.3' N	118°40.8' W	100	Subtropical North Pacific
041-BP	9-Dec-08	2111	5°44.3' N	120°40.4' W	100	Equatorial Pacific
051-BP	12-Dec-08	2112	2°11.0' N	126°32.1' W	100	Equatorial Pacific
059-BP	14-Dec-08	2150	0°11.3' S	129°40.3' W	100	Equatorial Pacific
067-BP	16-Dec-08	2122	3°5.6' S	133°19.8' W	100	Equatorial Pacific
073-BP	18-Dec-08	2122	6°36.4' S	136°42.7' W	0	Subtropical South Pacific

Table 4. Surface sampling station data (SS-XXX and XXX-HC).

Station	Date	Latitude	Longitude	Temp. (°C) *	Salinity (ppt) *	Raw Flour.	NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	>0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *	Alkalinity (mEq/L) *
003-HC	28-Nov-08	18°37.6' N	108°20.3' W	28.4	34.30	4.3	0.256	0.161	7.362	0.110	0.046	8.152	2.451
SS-001	29-Nov-08	17°33.4' N	109°36.7' W	28.1	34.20	4.6	1.571	0.081	14.090	0.137	0.055	8.124	2.287
008-HC	29-Nov-08	16°53.9' N	110°9.1' W	28.3	33.90	4.9	0.089	0.230	10.189	0.199	0.084	8.121	2.392
011-HC	30-Nov-08	16°24.2' N	110°40.6' W	27.9	34.20	4.1	0.875	0.275	13.440	0.202	0.097	8.115	2.440
SS-002	30-Nov-08	15°57.0' N	111°9.5' W	27.3	34.40	8.3	0.294	0.265	6.218	0.166	0.093	8.083	2.405
SS-003	1-Dec-08	14°41.0' N	112°16.0' W	27.2	34.40	4.2	0.089	0.071		0.182	0.059	8.067	2.402
016-HC	1-Dec-08	14°13.9' N	112°29.3' W	27.7	33.90	4.1	0.552	0.171	13.510	0.069	0.046	8.122	2.317
018-HC	2-Dec-08	13°36.6' N	112°55.9' W	28.0	34.00	4.2		0.066	12.915	0.173	0.045	8.106	2.434
SS-004	2-Dec-08	13°5.5' N	113°14.8' W	28.2	33.60	4.6	0.014	0.265	8.208	0.109	0.034	8.156	2.266
SS-005	3-Dec-08	12°25.2' N	113°44.5' W	27.8	33.40	5.0	-0.372	0.315	6.245	0.164	0.053	8.108	2.368
023-HC	3-Dec-08	12°8.5' N	114°8.3' W	27.5	33.30	4.6	0.285	0.246	6.746	0.096	0.025	8.168	2.240
025-HC	4-Dec-08	11°13.1' N	114°45.7' W	28.0	33.20	4.0	-0.094	0.120	9.977	0.094	0.024	8.136	2.428
SS-006	4-Dec-08	10°50.4' N	115°14.4' W	28.1	33.10	4.3	-0.107	0.221		0.105	0.038	8.106	2.252
SS-007	5-Dec-08	10°32.9' N	115°46.1' W	27.9	33.30	4.0	3.124	0.230	11.867	0.088	0.024	7.893	2.229
030-HC	5-Dec-08	10°15.1' N	116°8.0' W	27.8	33.60	4.1	0.140	0.236	19.324	0.066	0.032	8.235	2.369
032-HC	6-Dec-08	9°45.8' N	116°33.1' W	27.8	33.60	4.2	0.949	0.205	9.968	0.141	0.031	8.150	2.412
034-HC	7-Dec-08	7°36.5' N	118°41.6' W	27.9	34.10	4.7	0.949	0.104	8.339	0.160	0.039	8.145	2.393
036-HC	8-Dec-08	7°12.6' N	119°8.4' W	28.0	34.20	4.0	0.791	0.118	12.700	0.140	0.033	8.139	2.350
SS-008	8-Dec-08	6°43.7' N	119°36.7' W	27.6	34.60	9.0	-0.347	0.301	13.580	0.167	0.072	8.141	2.427
SS-009	9-Dec-08	6°6.3' N	120°32.3' W	27.3	34.70	7.5	0.848	0.325	12.665	0.164	0.102	8.109	2.392
041-HC	9-Dec-08	5°44.3' N	120°40.4' W	26.7	34.70	12.4	1.929	0.330	14.518	0.121	0.110	8.098	2.441
SS-010	10-Dec-08	4°38.9' N	120°59.0' W	25.8	34.20	6.1	1.695	0.455	10.683	0.039	0.015	8.102	2.414
SS-011	10-Dec-08	4°25.6' N	121°53.5' W	25.8	34.20	11.5	1.569	0.488	15.526	0.040	0.016	8.102	2.361
SS-012	11-Dec-08	3°59.4' N	123°30.1' W	24.7	34.30	6.6	6.103	0.647	5.903	0.033	0.024	8.048	2.423
SS-013	11-Dec-08	3°27.9' N	124°28.3' W	24.9	34.30	14.0	6.197	0.779	16.296	0.148	0.092	8.028	2.509
SS-014	12-Dec-08	2°38.0' N	125°25.9' W	24.5	34.50	8.9	7.804	0.616	18.073	0.129	0.023	7.968	2.390

\* blank spaces indicate no data collected

Table 4 continued.

Station	Date	Latitude	Longitude	Temp. (°C) *	Salinity (ppt) *	Raw Flour.	NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	>0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *	Alkalinity (mEq/L) *
051-HC	12-Dec-08	2°11.3' N	125°33.9' W	24.3	34.70	13.6	8.417	0.786	14.136	0.027	0.030	7.994	2.448
SS-015	13-Dec-08	1°38.8' N	127°30.2' W	24.8	34.70	9.5	8.999	0.468	7.811	0.069	0.098	8.013	2.469
SS-016	13-Dec-08	1°3.7' N	128°7.4' W	25.1	34.59	14.4	7.253	0.492	15.398	0.047	0.053	5.819	2.491
057-HC	14-Dec-08	0°14.0' N	129°2.4' W	24.9	34.61	8.9	14.531	0.439	10.404	0.039	0.022	7.995	2.422
059-HC	14-Dec-08	0°11.7' S	129°39.4' W	24.3	34.70	14.8	13.614	1.036	14.357	0.064	0.045	8.006	2.457
SS-017	15-Dec-08	0°47.4' S	130°35.6' W	24.1	34.70	7.1	8.986	0.726	14.834	0.151	0.079	8.016	2.480
SS-018	15-Dec-08	1°24.9' S	131°41.1' W	24.5	34.59	14.2	8.613	0.444	8.880	0.149	0.097	8.021	2.366
SS-019	16-Dec-08	2°13.8' S	132°33.4' W	24.5	34.58	8.2	8.044	0.588		0.098	0.063	8.030	2.372
067-HC	16-Dec-08	3°5.4' S	133°19.5' W	24.7	34.65	11.8	14.727	0.525	13.925	0.087	0.053	8.037	2.419
069-HC	17-Dec-08	4°6.1' S	134°10.2' W	25.8	35.20	8.2	15.258	0.559	17.622	0.082	0.025	8.048	2.481
073-HC	18-Dec-08	6°36.1' S	136°41.9' W	26.8	35.30	15.5	10.299	0.516	17.230	0.065	0.064	8.092	2.380
075-HC	19-Dec-08	7°27.0' S	137°15.6' W	27.0	35.30	11.1	7.109	0.664	13.485	0.129	0.048	8.085	2.168
SS-021	19-Dec-08	8°6.9' S	137°42.4' W	27.4	35.50	18.0	2.678	0.319	10.521	0.106	0.086	8.090	1.734
078-HC	20-Dec-08	8°44.2' S	138°30.1' W	27.7	35.60	15.8	6.123	0.602		0.165	0.059	8.140	2.402
SS-020	18-Dec-08	5°55.0' S	135°52.2' W	27.7	35.40	9.1	9.719	0.463		0.062	0.058	8.101	2.634
SS-022	20-Dec-08	8°55.8' S	139°6.7' W	27.7	35.66	26.1	3.028	0.420		0.151	0.067	8.147	2.628
SS-023	21-Dec-08	9°18.0' S	139°34.6' W	27.9	35.67	19.3	3.251	0.391		0.308	0.111	8.114	2.399
SS-024	26-Dec-08	9°36.0' S	140°28.2' W			13.0				0.251			
SS-025	27-Dec-08	10°22.8' S	141°31.9' W			7.8				0.186			
SS-026	27-Dec-08	11°18.9' S	142°31.2' W			13.6				0.166			
SS-027	28-Dec-08	12°30.0' S	143°46.5' W			6.8				0.111			
SS-028	28-Dec-08	13°4.4' S	144°26.1' W			10.7				0.136			
SS-029	29-Dec-08	13°47.3' S	145°16.0' W			7.0				0.150			
SS-030	30-Dec-08	14°48.9' S	146°44.9' W			6.9				0.165			
SS-031	30-Dec-08	15°27.0' S	147°15.9' W			11.8				0.143			
SS-032	31-Dec-08	16°5.1' S	148°2.9' W			6.0				0.087			
SS-033	31-Dec-08	16°38.7' S	148°48.3' W			5.8				0.094			

\* blank spaces indicate no data collected

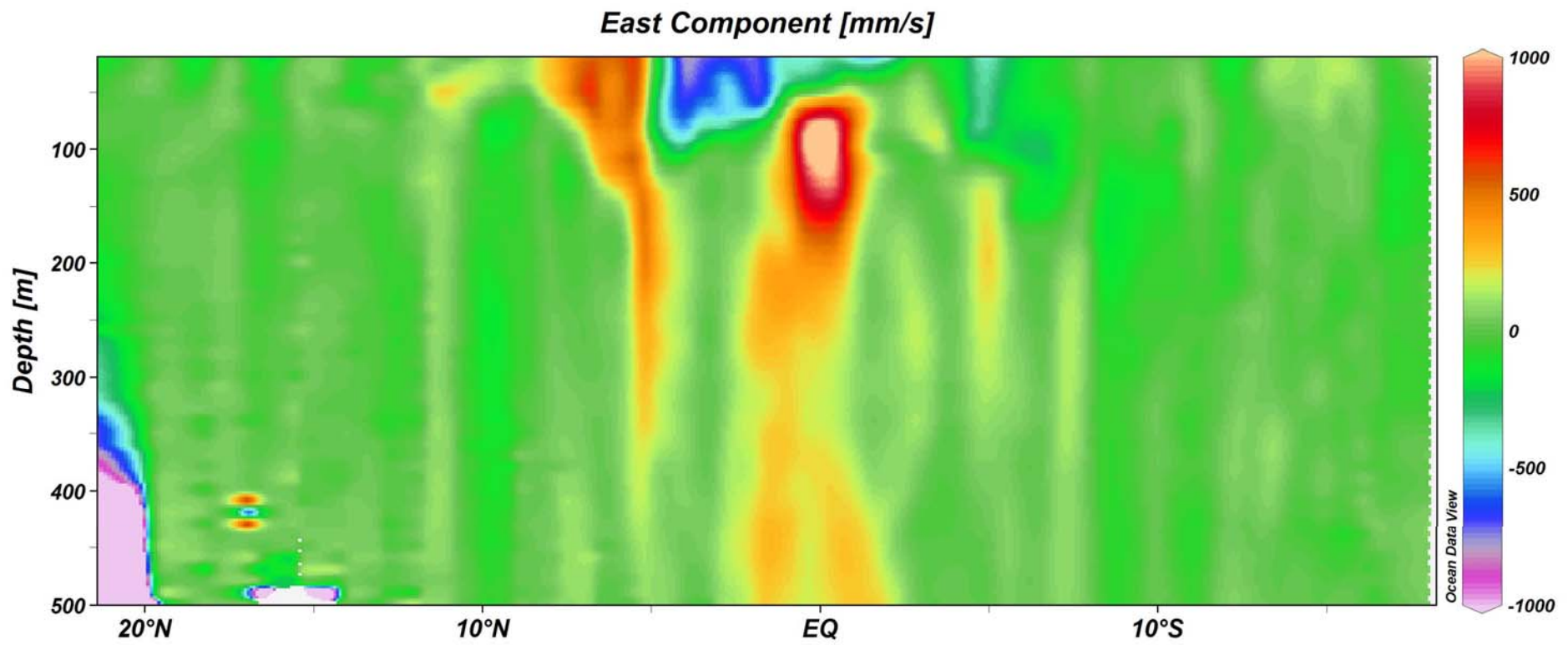


Figure 2. Eastward water velocity measured with the ADCP.



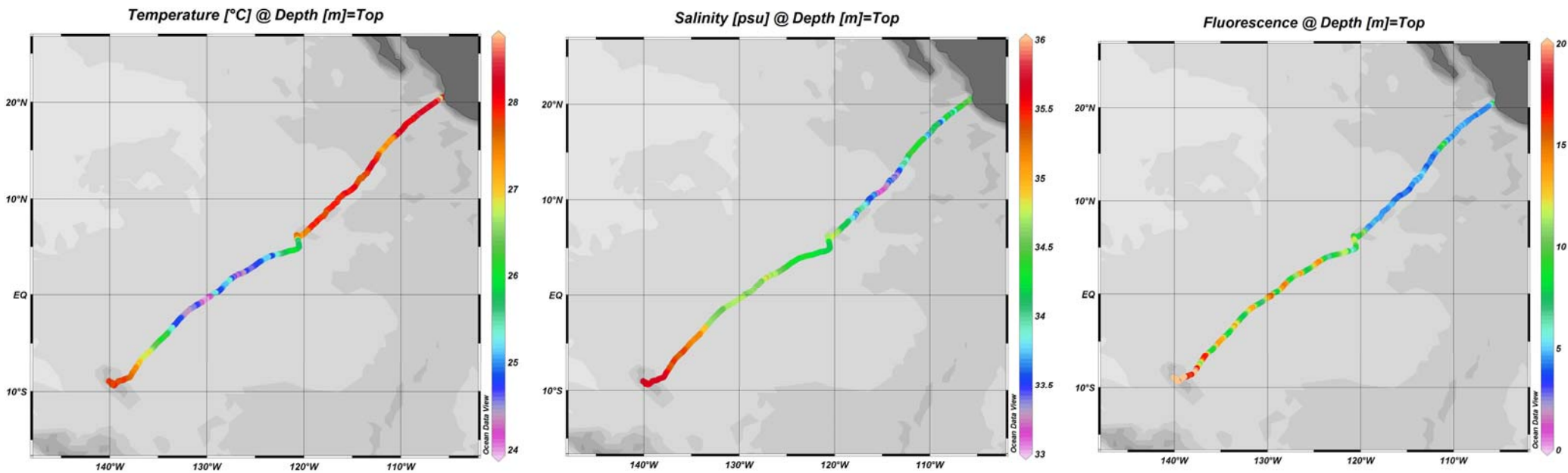


Figure 3. Surface temperature (left panel), salinity (middle panel) and fluorescence (right panel) measurements from the continuous flow-through data logger. No data collected during the leg between Nuku Hiva and Tahiti due to instrument error.

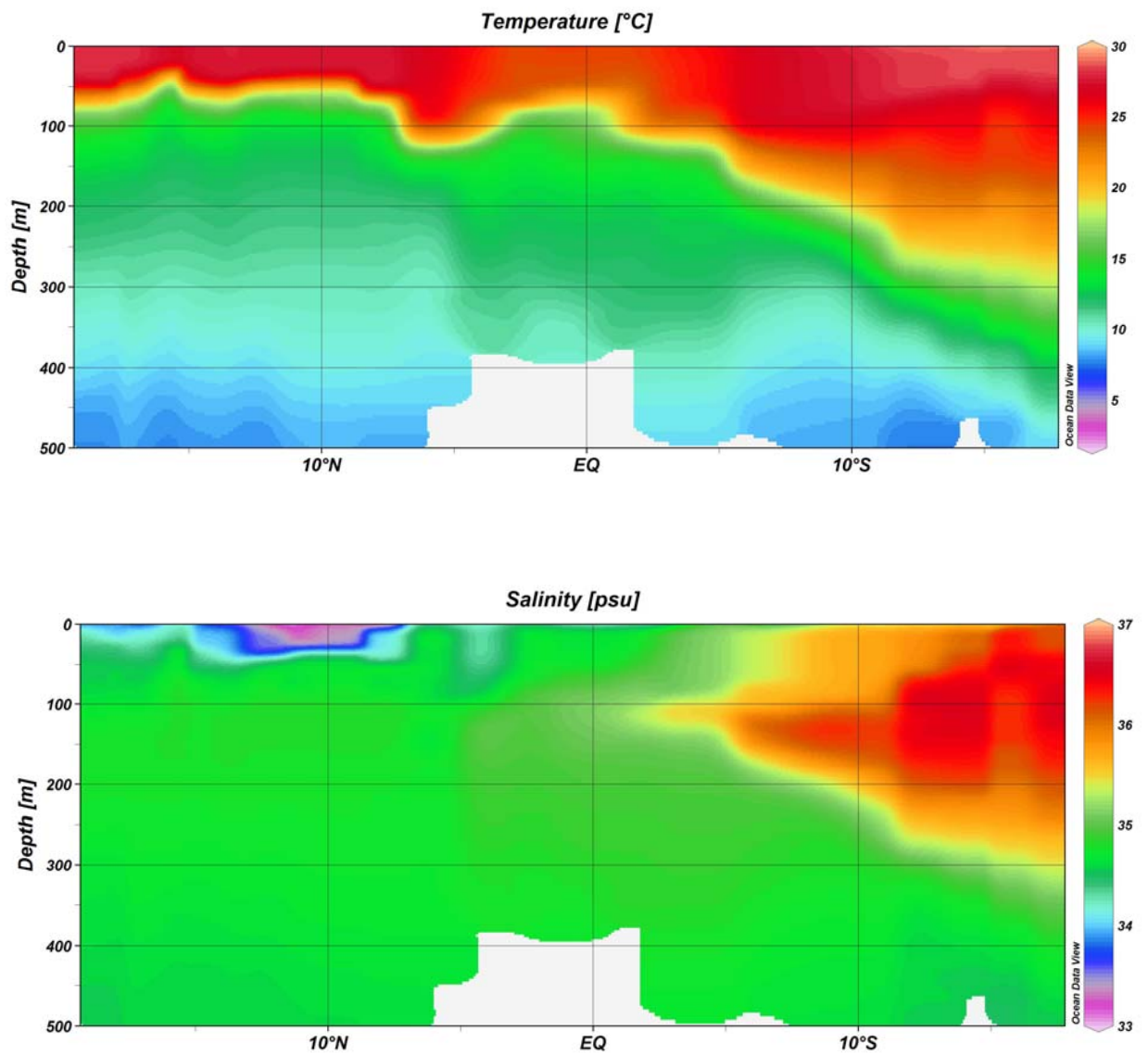


Figure 4. Temperature (upper panel) and salinity (bottom panel) cross sections created from CTD data collected along the entire cruise track.

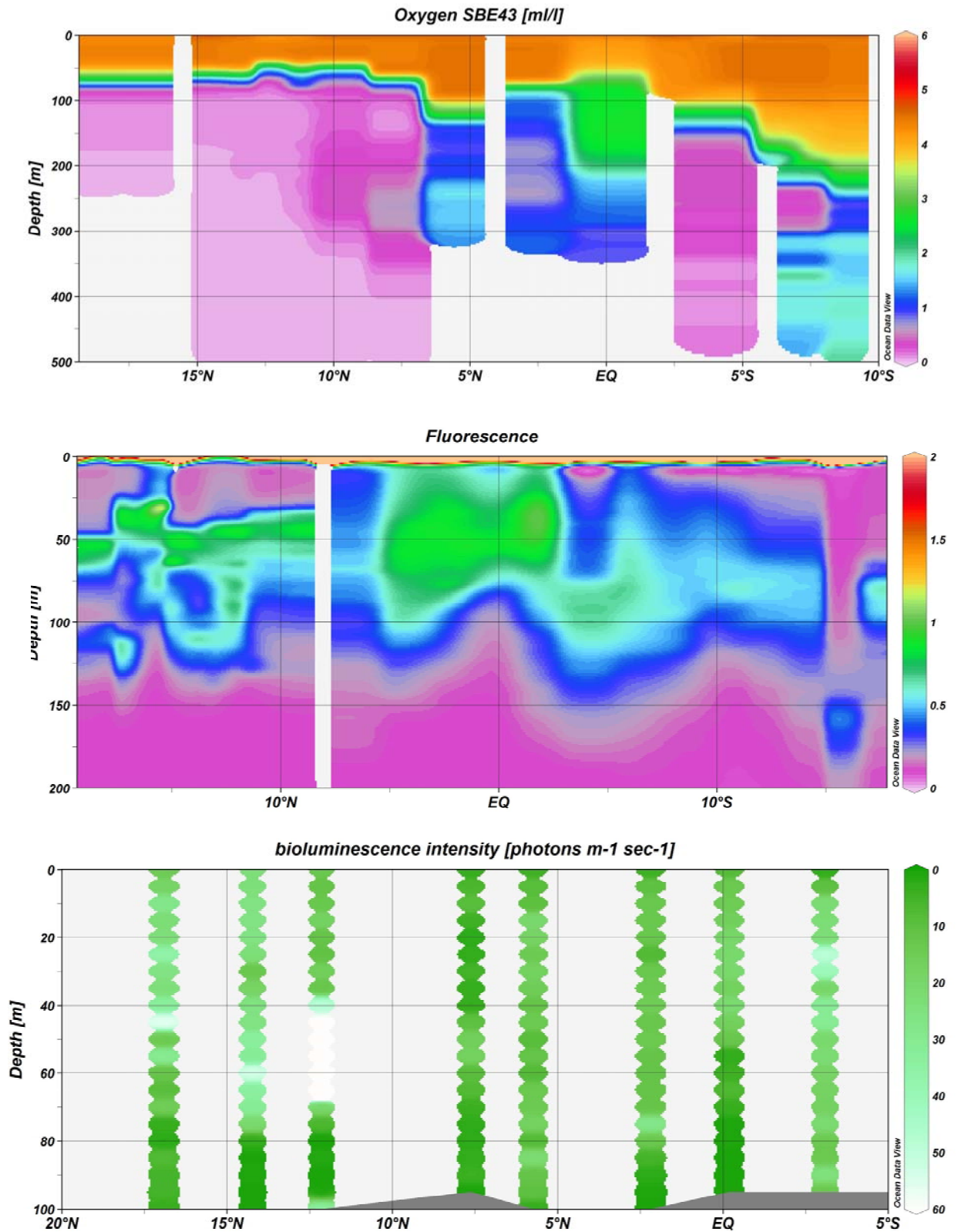


Figure 5. Oxygen (upper panel), raw fluorescence (middle panel), and bioluminescent intensity (lower panel) cross sections. The oxygen and fluorescence sensors are mounted on CTDs. A bathyphotometer deployed independently at night to measure bioluminescent intensity. Bathyphotometer stations were always coincident with CTD casts.

Table 5. Hydrocast bottle data.

Station	Bottle	Depth (m)	NO <sub>2</sub> + NO <sub>3</sub> (µM) *	PO <sub>4</sub> (µM) *	SiO <sub>2</sub> (µM) *	> 0.45 µm Chl a (µg/L) *	> 8 µm Chl a (µg/L) *	pH *
S220-003-HC	13	0.0	0.256	0.161	7.632	0.110	0.046	8.152
S220-003-HC	12	15.6	0.613	0.245	9.89	0.125	0.053	
S220-003-HC	11	30.2	1.403	0.081	2.51	0.216	0.101	
S220-003-HC	10	39.4	0.378	0.215	12.590	0.337	0.082	
S220-003-HC	9	60.6	3.846	0.554	1.220	0.630	0.235	
S220-003-HC	8	79.2	12.323	1.847	4.810	0.093	0.080	
S220-003-HC	7	99.6	13.485	1.698	21.360	0.029	0.040	
S220-003-HC	5	118.9	18.759	2.374	45.490	0.047	0.060	
S220-003-HC	4	139.2	16.997	1.658	34.390	0.047	0.087	
S220-003-HC	3	159.4	14.148	2.712	29.990	0.026	0.058	
S220-003-HC	2	178.9	12.552	1.504	33.120	0.024	0.044	
S220-003-HC	1	199.7	10.434	1.752	16.970	0.080	0.099	
S220-008-HC	13	0.0	1.571	0.230	10.190	0.199	0.084	8.121
S220-008-HC	12	10						8.140
S220-008-HC	11	25						
S220-008-HC	10	35						7.843
S220-008-HC	9	45						7.750
S220-008-HC	8	60						7.731
S220-008-HC	7	70						7.593
S220-008-HC	6	80						7.601
S220-008-HC	5	100						7.326
S220-008-HC	4	125						7.585
S220-008-HC	3	200						
S220-008-HC	2	300						7.567
S220-008-HC	1	400						7.571
S220-011-HC	13	0.0	0.875	0.275	13.44	0.202	0.097	8.115
S220-011-HC	12	10	0.343	1.603	14.59	0.143	0.090	

\* blank spaces indicate no data collected

Table 5 continued.

Station	Bottle	Depth (m)	NO <sub>2</sub> + NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	> 0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *
S220-011-HC	11	25	0.081	0.370	14.80	0.149	0.087	
S220-011-HC	10	50	13.584	1.136	18.00	0.586	0.330	
S220-011-HC	9	60	17.106	1.558	19.45	0.239	0.170	
S220-011-HC	8	80	15.586	2.543	28.481	0.178	0.093	
S220-011-HC	7	90	12.894	1.548	26.82	0.143	0.093	
S220-011-HC	6	100	12.248	1.593	29.69	0.127	0.065	
S220-011-HC	5	150	12.970	2.150	23.48	0.037	0.045	
S220-011-HC	4	225						
S220-011-HC	3	225	12.856	2.499	27.925			
S220-011-HC	2	350	1.358	3.016	46.10			
S220-011-HC	1	400	27.218	2.329	49.88			
S220-016-HC	13	0.0	0.552	0.171	13.51	0.069	0.046	8.122
S220-016-HC	12	10.3						8.175
S220-016-HC	11	25.2						8.174
S220-016-HC	10	35.1						8.185
S220-016-HC	9	45.0						8.061
S220-016-HC	8	60.1						7.761
S220-016-HC	7	69.6						7.619
S220-016-HC	6	80.1						7.534
S220-016-HC	5	99.4						7.573
S220-016-HC	4	124.3						7.539
S220-016-HC	3	198.7						7.538
S220-016-HC	2	298.1						7.472
S220-016-HC	1	397.3						7.437
S220-018-HC	13	0.0	0	0.066	12.915	0.173	0.045	8.106
S220-018-HC	12	15.2	2.927	0.146	12.723	0.144	0.038	
S220-018-HC	11	30.2	0.093	0.240	13.036	0.161	0.067	
S220-018-HC	10	40.0	0.218	0.056	11.855	0.176	0.076	

\* blank spaces indicate no data collected

Table 5 continued.

Station	Bottle	Depth (m)	NO <sub>2</sub> + NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	> 0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *
S220-018-HC	9	54.4	6.878	1.802	14.752	0.418	0.255	
S220-018-HC	8	79.7	16.297	2.528	28.632	0.150	0.057	
S220-018-HC	7	109.3	17.795	1.728	31.863	0.142	0.118	
S220-018-HC	6	124.7	13.768	1.160	30.045	0.096	0.051	
S220-018-HC	5	149.3	10.311	2.016	33.730	0.013	0.010	
S220-018-HC	4	197.9	13.996	2.091	30.146	0.012	0.011	
S220-018-HC	3	247.9	9.969	1.976	31.509			
S220-018-HC	2	297.7	7.613	2.339	29.036			
S220-018-HC	1	396.1	4.576	2.817	33.428			
S220-023-HC	13	0.0	0.285	0.246	6.75	0.096	0.025	8.168
S220-023-HC	12	10.1						8.100
S220-023-HC	11	25.2						8.154
S220-023-HC	10	34.9						8.116
S220-023-HC	9	45.0						7.852
S220-023-HC	8	60.5						7.633
S220-023-HC	7	69.6						7.518
S220-023-HC	6	79.7						7.540
S220-023-HC	5	99.9						7.403
S220-023-HC	4	124.2						7.483
S220-023-HC	3	198.8						7.422
S220-023-HC	2	298.2						7.460
S220-023-HC	1	397.6						7.487
S220-025-HC	13	0.0	0	0.120	9.977	0.094	0.024	8.136
S220-025-HC	12	15.4	0.488	0.247	12.168	0.115	0.036	
S220-025-HC	11	30.3	0	0.196	8.917	0.215	0.061	
S220-025-HC	10	44.9	13.665	1.076	11.350	0.283	0.158	
S220-025-HC	9	59.5	27.822	2.031	13.488	0.243	0.148	
S220-025-HC	8	79.4	26.621	2.076	12.680	0.232	0.096	

\* blank spaces indicate no data collected

Table 5 continued.

Station	Bottle	Depth (m)	NO <sub>2</sub> + NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	> 0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *
S220-025-HC	7	94.4	28.139	2.474	20.404	0.115	0.046	
S220-025-HC	6	119.5	27.5	2.489	24.392	0.123	0.041	
S220-025-HC	5	134.2	93.527	2.553	23.433	0.066	0.037	
S220-025-HC	4	173.9	97.637	2.508	33.125	0.012	0.010	
S220-025-HC	3	223.2	73.989	1.926	28.127			
S220-025-HC	2	298.1	78.352	2.155	26.058			
S220-025-HC	1	397.3	79.743	2.613	37.415			
S220-030-HC	13	0.0	0.140	0.236	19.324	0.066	0.032	8.235
S220-030-HC	12	10.6						8.357
S220-030-HC	11	24.8						8.160
S220-030-HC	10	34.7						7.881
S220-030-HC	9	45.3						7.886
S220-030-HC	8	60.2						7.681
S220-030-HC	7	70.1						7.584
S220-030-HC	6	79.4						7.575
S220-030-HC	5	99.6						7.548
S220-030-HC	4	124.5						7.493
S220-030-HC	3	199.1						7.542
S220-030-HC	2	297.8						7.467
S220-032-HC	13	0.0	0.949	0.205	9.968	0.141	0.031	8.150
S220-032-HC	12	50.0	0.6458	0.056	10.014	0.139	0.045	
S220-032-HC	11	54.5	0.0767	-0.004	11.776	0.120	0.046	
S220-032-HC	10	62.8	0.0514	0.176	10.673	0.156	0.061	
S220-032-HC	9	73.1	2.5491	0.375	2.7624	0.365	0.219	
S220-032-HC	8	81.3	12.951	2.832	7.8944	0.427	0.228	
S220-032-HC	7	89.7	21.967	1.598	20.019	0.273	0.176	
S220-032-HC	6	104.1	22.233	2.011	20.25	0.226	0.144	
S220-032-HC	5	131.3	22.72	2.558	22.983	0.099	0.079	

\* blank spaces indicate no data collected

Table 5 continued.

Station	Bottle	Depth (m)	NO <sub>2</sub> + NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	> 0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *
S220-032-HC	3	224.8	22.429	2.394				
S220-032-HC	2	314.8	23.264	2.633	26.688			
S220-032-HC	1	408.5	26.071	2.961	35.674			
S220-034-HC	13	0.0	0.949	0.104	8.339	0.160	0.039	8.145
S220-034-HC	11	44.8						
S220-034-HC	10	45.0						8.074
S220-034-HC	9	45.2						8.032
S220-034-HC	8	59.9						7.979
S220-034-HC	7	69.6						7.762
S220-034-HC	5	98.8						7.485
S220-034-HC	4	149.0						7.458
S220-034-HC	3	198.5						7.468
S220-034-HC	2	298.3						7.413
S220-034-HC	1	397.0						7.375
S220-036-HC	13	0.0	0.791	0.118	12.700	0.140	0.033	8.139
S220-041-HC	13	0.0	1.9294	0.330	14.518	0.12	0.11	8.098
S220-041-HC	12	10.9		0.325	16.371	0.197	0.097	8.102
S220-041-HC	11	25.6						8.102
S220-041-HC	10	39.6	2.0053	0.263	7.4201	0.172	0.103	8.096
S220-041-HC	9	49.7	1.7207				0.154	8.043
S220-041-HC	8	62.1	1.8851	0.479	8.5521	0.18	0.151	8.087
S220-041-HC	7	74.5	1.2592	0.335	10.014	0.222	0.147	8.091
S220-041-HC	6	99.4	10.946	0.945	12.839	0.192	0.101	7.945
S220-041-HC	5	114.4	11.876		16.174	0.205		7.900
S220-041-HC	4	149.7	19.267	1.666	27.244	0.026	0.017	7.595
S220-041-HC	3	174.1						7.574
S220-041-HC	2	198.9						7.574
S220-041-HC	1	248.5	6.305	0.830	13.488	0.181	0.147	7.986

\* blank spaces indicate no data collected



Table 5 continued.

Station	Bottle	Depth (m)	NO <sub>2</sub> + NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	> 0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *
S220-051-HC	13	0.0	8.4169	0.786	14.136	0.027	0.030	7.994
S220-051-HC	12	10.0	7.1333	0.810	12.376	0.064	0.032	7.960
S220-051-HC	11	20.2	7.4305	0.806	15.618	0.073	0.025	7.990
S220-051-HC	10	29.5	7.7783	0.868	6.1232	0.184	0.035	8.030
S220-051-HC	9	39.7	7.7214	0.782	10.06	0.173	0.048	8.022
S220-051-HC	8	49.8	8.0628	0.637	8.856	0.148	0.025	8.003
S220-051-HC	7	60.4						
S220-051-HC	6	75.2	43.511	1.675	19.324	0.293	0.033	7.752
S220-051-HC	5	84.9	38.137	1.892	13.534	0.278	0.066	7.664
S220-051-HC	4	100.0	33.331	2.007	19.787	0.187	0.036	7.734
S220-051-HC	3	149.5	38.74	2.238	19.648			7.619
S220-051-HC	2	199.1	32.003	2.339	31.135			7.535
S220-051-HC	1	297.9	44.397	2.430	25.53			7.518
S220-057-HC	13	0.0	14.531	0.439	10.404	0.039	0.022	7.995
S220-059-HC	13	0.0	13.614	1.036	14.357	0.064	0.045	8.006
S220-059-HC	12	9.9	11.243	0.883	14.785	0.196	0.196	8.004
S220-059-HC	11	25.7	10.725	0.772	16.741		0.072	8.014
S220-059-HC	10	35.4	10.194	0.738	12.401	0.273	0.178	8.006
S220-059-HC	9	50.0	10.643	0.955	14.169	0.385	0.316	7.888
S220-059-HC	8	60.0	15.575	1.108	18.022	0.242	0.051	7.736
S220-059-HC	7	70.0	17.2	1.315	12.988	0.107	0.006	7.861
S220-059-HC	6	79.7	15.113	1.248	16.313	0.137	0.039	7.823
S220-059-HC	5	90.2	13.437	1.272	20.225	0.026	0.105	7.841
S220-059-HC	4	100.1	11.332	1.243	13.281	0.081	0.005	7.828
S220-059-HC	3	149.5	15.1	1.430	15.335	0.059	0.009	7.787
S220-059-HC	2	199.5	19.754	1.757	18.269			7.650
S220-059-HC	1	248.6		0.974		0.287	0.120	7.873
S220-067-HC	13	0.0	14.727	0.525	1.502	0.087	0.053	8.037

\* blank spaces indicate no data collected

Table 5 continued.

Station	Bottle	Depth (m)	NO <sub>2</sub> + NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	> 0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *
S220-069-HC	13	0.0	15.258	0.559	17.622	0.082	0.025	8.048
S220-069-HC	12	14.6	14.31	0.832	16.184	0.121	0.069	8.113
S220-069-HC	11	30.4	11.68	0.889	13.338	0.159	0.109	8.097
S220-069-HC	10	39.9	11.231	0.789	16.497	0.121	0.078	8.096
S220-069-HC	9	49.9	10.99	0.923	8.5868	0.183	0.142	8.093
S220-069-HC	8	74.0	11.294	1.061	17.504	0.240	0.172	8.086
S220-069-HC	7	89.8	15.315	0.937	11.814	0.256	0.201	8.025
S220-069-HC	6	104.4	20.102	1.306	12.008	0.171	0.131	7.949
S220-069-HC	5	125.0	24.895	1.712	10.347	0.156	0.125	7.839
S220-069-HC	4	148.7	56.411	2.134	10.445	0.073	0.039	7.778
S220-069-HC	3	198.5	62.734	2.306	20.91			7.625
S220-069-HC	2	297.4	62.544	2.167	31.961			7.602
S220-069-HC	1	396.7	65.958	2.593	39.98			7.542
S220-073-HC	13	0.0	10.299	0.516	17.230	0.065	0.064	8.092
S220-073-HC	12	1.5						
S220-073-HC	11	1.9						
S220-073-HC	10	2.6						
S220-073-HC	9	3.7						
S220-073-HC	8	4.5						
S220-073-HC	7	5.0						
S220-073-HC	6	15.5						8.100
S220-073-HC	5	35.7						8.173
S220-073-HC	4	50.4						7.697
S220-073-HC	3	64.9						8.141
S220-073-HC	2	79.8						8.211
S220-073-HC	1	99.5						8.150
S220-075-HC	13	0.0	7.109	0.664	13.485	0.129	0.048	8.085
S220-075-HC	12	10.2	3.832	0.568	10.697	0.127	0.090	

\* blank spaces indicate no data collected

Table 5 continued.

Station	Bottle	Depth (m)	NO <sub>2</sub> + NO <sub>3</sub> (μM) *	PO <sub>4</sub> (μM) *	SiO <sub>2</sub> (μM) *	> 0.45 μm Chl a (μg/L) *	> 8 μm Chl a (μg/L) *	pH *
S220-075-HC	11	20.6	3.935	0.683	16.164	0.121	0.057	
S220-075-HC	10	30.0	2.400	0.535	15.9	0.143	0.060	
S220-075-HC	9	40.7	0	0.645	15.304	0.153	0.098	
S220-075-HC	8	49.5	26.541	0.611	15.401	0.158	0.084	
S220-075-HC	7	60.2	5.812	0.774	16.223	0.169	0.108	
S220-075-HC	6	85.1	3.919	0.769	16.546	0.203	0.137	
S220-075-HC	5	109.5	3.808	1.004	19.932	0.151	0.108	
S220-075-HC	4	148.9	4.858	0.774	16.311	0.082	0.055	
S220-075-HC	3	248.6	29.962	2.115	15.335			
S220-075-HC	2	297.7	26.700	1.746	28.733			
S220-075-HC	1	397.7	24.711	1.961	19.736			
S220-078-HC	13	0.0	6.123	0.602		0.165	0.059	8.140
S220-078-HC	12	9.9	0	0.406		0.143	0.133	
S220-078-HC	11	24.9	3.139	0.588		0.135	0.105	
S220-078-HC	10	35.1	3.402	0.535		0.195	0.100	
S220-078-HC	9	44.7	3.267	0.583		0.183	0.102	
S220-078-HC	8	54.6	1.866	0.477		0.164	0.100	
S220-078-HC	7	75.0	15.041	0.281		0.161	0.073	
S220-078-HC	6	89.5	3.919	0.674		0.162	0.064	
S220-078-HC	5	109.2	2.487	0.774		0.214	0.128	
S220-078-HC	4	149.7	6.719	0.272		0.162	0.032	
S220-078-HC	3	199.0	9.623	1.033				
S220-078-HC	2	297.5	35.292	2.177				
S220-078-HC	1	396.7	34.099	2.790				

\* blank spaces indicate no data collected

Table 6. Neuston net tow data.

Station	Tow Area (m <sup>2</sup> )	Zoop. Biomass (ml)	Zoop. Density (ml/m <sup>2</sup> )	Gelatinous Zoop. Biomass (>2 cm)	Micronekton Biomass (>2 cm)	Plastic Pcs (#)
S220-004-NT	2181.9	37	0.017	2	1.3	0
S220-006-NT	2127.0	18	0.008	0	0	8
S220-008-NT	2027.0	62	0.031	12	1	0
S220-011-NT	1852.0	18	0.010	0	0	0
S220-012-NT	1111.2	200	0.180	15	0	1
S220-014-NT	1958.3	55	0.028	2.5	0	1
S220-016-NT	412.0	100	0.243	0	0	0
S220-018-NT	2778.0	15	0.005	0	130	2
S220-020-NT	1308.0	13	0.010	1.2	2	1
S220-022-NT	2593.0	24	0.009	0	0	3
S220-023-NT	1871.0	80	0.043	11	0	7
S220-025-NT	1992.0	3.8	0.002	2.5	0.0	1
S220-027-NT	2150.0	33	0.015	26	1	0
S220-028-NT	1695.0	5	0.003	3	0	3
S220-030-NT	943.0	12.8	0.014	4	1.9	3
S220-032-NT	2250.0	4.5	0.002	0	0	1
S220-034-NT	1932.0	13	0.007	10.3	1	1
S220-037-NT	2408.0	2	0.001	1	0	0
S220-038-NT	1300.7	30	0.023	5	6	0
S220-040-NT	1491.0	7	0.005	4		0
S220-041-NT	1482.0	65	0.044	60	0	0
S220-042-NT	3322.6	1	0.000	0.1	1	0
S220-044-NT	3160.8	30	0.009	9	3	0
S220-046-NT	3897.0	3	0.001	1	0.5	0
S220-047-NT	2730.0	29	0.011	7.5	0.6	0
S220-049-NT	2593.0	9.5	0.004	7.5	0.1	0
S220-051-NT	2926.0	22	0.008	8	2	0
S220-053-NT	3148.0	15	0.005	4.3	1	0
S220-055-NT	2628.0	76	0.029	0	0	0
S220-057-NT	3648.0	1140	0.313	52	1	0
S220-059-NT	2070.0	76	0.037	74	3	0
S220-061-NT	2802.0	20	0.007	2	0	0
S220-063-NT	3276.0	72	0.022	51	17	0
S220-065-NT	4321.0	22	0.005	1	0	0
S220-067-NT	3812.2	60	0.016	130	15	0
S220-069-NT	2819.8	34	0.012	0	0	0
S220-071-NT	2482.1	1.8	0.001	0	0	0
S220-073-NT	1932.5	22	0.011	0	10	0
S220-075-NT	1676.9	2	0.001	1.5	1	0
S220-077-NT	1309.3	13	0.010	23	0	1
S220-078-NT	1861.0	9.7	0.005	0	3	1

Table 6 continued.

Station	Tow Area (m <sup>2</sup> )	Zoop. Biomass (ml)	Zoop. Density (ml/m <sup>2</sup> )	Gelatinous Zoop. Biomass (>2 cm)	Micronekton Biomass (>2 cm)	Plastic Pcs (#)
S220-080-NT	1481.6	30.0	0.020	16.0	4.0	0
S220-082-NT	2110.0	3.5	0.002	5.0	0.0	0
S220-084-NT	1666.8	23.0	0.014	25.0	3.0	0
S220-086-NT	2650.0	4.5	0.002	0.6	0.8	0
S220-087-NT	1705.9	5.0	0.003	6.0	1.0	0
S220-088-NT	2885.2	28.0	0.010	0.0	0.0	11
S220-089-NT	2415.0	10.0	0.004	20.0	20.0	0
S220-090-NT	2648.3	6.0	0.002	0.0	0.5	0
S220-091-NT	2335.0	1.5	0.001	0.0	0.0	0
S220-092-NT	1125.5	4.5	0.004	0.0	0.0	0
S220-093-NT	1750.0	1.3	0.001	0.0	0.0	0
S220-094-NT	1481.6	9.0	0.006	0.0	0.0	0

Table 7. 2-Meter net tow data.

Station	Tow Depth (m)	Net Area (m <sup>2</sup> )	Tow Volume (m <sup>3</sup> )	Mesh Size (μm)	Zoop. Biomass (ml)	Zoop. Density (ml/m <sup>3</sup> )
092	700	2.49	15289	1000	80.0	0.00523
094	~ 1100	2.49	15371	1000	58.0	0.00377