

# The Northeast Pelagic Survey 2013: A Report

Dates: February 4 – February 26, 2013



**Vessel:** NOAA Ship Pisces

**Location:** Northeast coast of the United States

**NASA FSG Participants:** Joaquin Chaves (mobilization/demobilization) Scott Freeman, Aimee Neeley, Mike Novak

**Chief Scientist:** Jerry Prezioso (NEFSC/NOAA)

**Principle Investigator:** Charles R. McClain (NASA/GSFC)

The Ocean Ecology Laboratory's Field Support Group (FSG; code 616) participated in a cruise of opportunity aboard the NOAA Ship *Pisces*, a 209-foot research vessel operated out of Pascagoula, MS. The field campaign, titled the **Northeast Pelagic Survey** (*Pisces* 13-01), was a seasonal, multidisciplinary survey that supports the goals of the Northeast Fisheries Science Center. During the cruise, small and large bongo plankton nets were deployed to study taxonomy, abundance, distribution, and genetics of lower trophic level organisms, as well as to collect fish larvae and eggs. Midwater trawls were deployed opportunistically based on the acoustic returns from the sensors (i.e., if there were intimations of large amounts of fish). Marine bird observers from Cornell University and the City University of New York were stationed on the flying bridge to log observations of birds and marine mammals along the cruise track during daylight hours. A bat detector was also located on the flying bridge and was tuned to detect sounds emitted by bats. SSAI's Scott Freeman, Aimee Neeley and Mike Novak represented the OEL during the field campaign, collecting biogeochemical and optical data, details described below.

Joaquin Chaves, Scott Freeman, Aimee Neeley and Mike Novak traveled to Norfolk, VA on February 4, 2013 to complete mobilization. Once in Norfolk, equipment was craned onto the *Pisces* and the telescoping mast required for the incoming solar irradiance ( $E_s$ ) was installed. The ship was originally scheduled to depart on February 7 but was delayed due to ship logistics and weather. Joaquin Chaves departed for home from Norfolk on February 7. The ship left the Atlantic Marine Operations Center in Norfolk, VA at 0930 (EST) on February 10, with work commencing in the afternoon with a shallow CTD rosette cast to approximately 24 m. Although many stations were completed during the first week after setting sail, the field campaign experienced four delays in order to avoid weather systems with gale-force winds. On Sunday February 17, the ship anchored just outside of Provincetown to avoid 50-knot winds until the morning of Tuesday February 19th. Science activities resumed until Wednesday, February 20<sup>th</sup> when, at 2330, the *Pisces* docked in Portland, Maine to avoid another weather system. The ship then departed Portland on Friday February 22 at 0730. On Sunday February 24, the *Pisces* anchored in Narragansett Bay to avoid the final storm system. During this time, a station was conducted, with the full suite of biogeochemical samples collected, and this also allowed time for calibrating the acoustic fish-locating system on the vessel. After setting sail again on Monday, February 25, the *Pisces* completed the remaining four stations before docking at the Newport Naval Station in Rhode Island on Tuesday February 26. See Map 1 for the full cruise track.

For discrete oceanographic sampling, the *Pisces* was equipped with a SeaBird 9/11 Plus CTD (conductivity, temperature, depth) instrument with recording system as well as a chlorophyll fluorescence meter, and an oxygen sensor (SBE 43). These were attached to a 12-bottle (10 liters each) rosette. Each bottle could be triggered to sample at specific depths. The ship's scientific flow-through seawater system was running continuously to collect chlorophyll, temperature and salinity data along the cruise track.

The following biogeochemical parameters were collected from **38** stations: HPLC pigments, particulate absorption ( $a_p$ ), particulate organic carbon (POC), absorption due to colored dissolved organic matter ( $a_{CDOM}$ ), dissolved organic carbon (DOC), and suspended particulate matter (SPM; See Table 1). Dissolved inorganic carbon (DIC) was collected only at the surface for **12** stations. For stations 36-49, 85, 86, samples were collected from the ship's flow-through system.

At all other stations, water was collected from the Niskin system of the CTD rosette. Radiometry deployments were conducted at 7 stations (26, 37, 50, 58, 68, 76 and 113). Samples for each parameter were collected from the CTD rosette at the surface (~3-4 m), mid column, the 10% light depth and the bottom (when the bottom depth was greater than 90 m). Water samples were also collected to measure nutrient levels for researchers from the University of Maine.

Additional samples were collected from the scientific seawater flow-through system in between stations or at non-rosette stations to maximize special coverage. The ship decreased its speed to less than 4 knots to allow the samples to be drawn from the flow-through if it was not a scheduled station. One to two carboys of water were filled, and the samples were processed and stored following standard protocols.

To measure Inherent and Apparent Optical Properties (IOPs and AOPs) of the water, staff used a variety of instruments. The FSG IOP package was disassembled and attached to the rosette cage, and collected data with each cast (Table 2). The instruments used included: Seabird SBE-49 CTD; WET Labs ac-s, bb-9, and VSF-9; and a Satlantic OCR-7. The ac-s measures absorption and attenuation (and total scattering by difference) at ~ 80 wavelengths between 400 and 740 nm, while the bb-9 measures backscatter at 9 wavelengths and 117°. The VSF-9 measures scattering at 9 angles from 60° to 170° at 532 nm. The OCR-7 measures downwelling irradiance ( $E_d$ ) at 7 wavelengths in the visible portion of the spectrum. The IOP package reached up to 500 m in depth, collecting data autonomously for later download.

At seven stations, both downwelling irradiance ( $E_d$ ) and upwelling radiance ( $L_u$ ) were measured using a Satlantic Hyperpro system, and incoming solar irradiance ( $E_s$ ) was measured with a matching reference radiometer. At three of these stations, the sky was clear enough to use a Microtops Sun Photometer, on loan from Alexander Smirnov, who will incorporate the data into the AERONET database.

In addition to the profiling instruments, a flow-through system was used to collect IOP data between stations. The instruments included: Seabird SBE-49 CTD; Wetlabs acs, C-star, and CDOM fluorometer. Hourly files were recorded for later analysis. The C-star measures attenuation at one wavelength, the CDOM fluorometer estimates the abundance of colored dissolved organic material by emitting short-wavelength light and measuring fluorescence at a longer wavelength, and the ac-s is described above. The ship's scientific seawater was plumbed into a Vortex debubbler to remove bubbles before measurements were taken.

\*\*Some descriptions in this report were borrowed from Jerry Prezioso's email updates\*\*

## TABLES, FIGURES and PHOTOGRAPHS

Table 1: Biogeochemical parameters collected on the Northeast Pelagic Survey 2013.

Parameter	Number of samples collected
HPLC Pigments	156
$a_p$	175
POC	209
$a_{CDOM}$	74
DOC	191
DIC	36
SPM	66

Figure 1: Station Locations. **Black** dots represent stations with IOP data only, **Blue** dots represent stations with IOP and Biogeochemistry, and **Red** dots represent stations with IOP, Biogeochemistry, and AOP profiles.

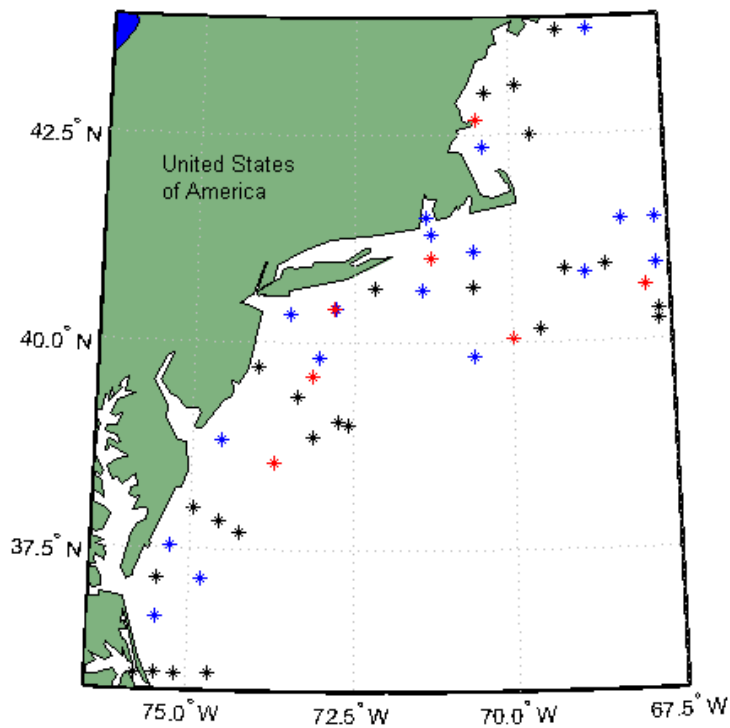


Table 2: Stations occupied, environmental conditions encountered. Darkened cells indicate stations where biogeochemistry and/or radiometric data were collected.

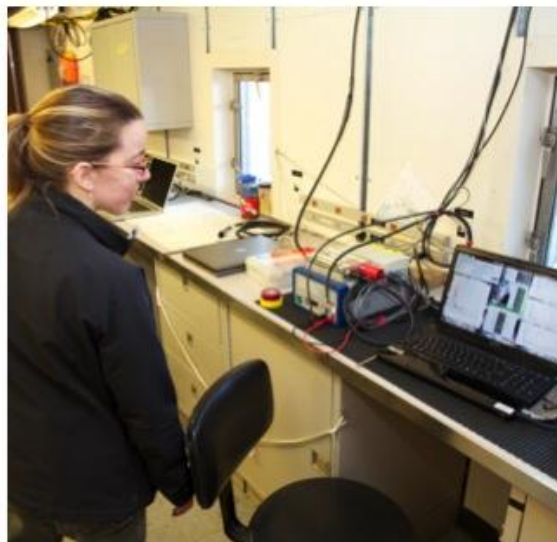
Date	Time (GMT)	Station	Latitude	Longitude	Depth (m)	Cloud percent	Wind speed (knots)	Filtration products collected	Hyperpro deployed
2013-02-10	16:55:38	3	36.67	-75.48	23	10	11		
2013-02-11	2:14:06	6	36.00	-75.47	24	Night	13		
2013-02-11	3:45:49	7	36.00	-75.18	---	Night	10		
2013-02-11	6:01:45	9	36.00	-75.78	380	Night	9		
2013-02-11	6:53:00	10	36.00	-74.67	1000+	Night	9		
2013-02-11	14:04:17	12	37.14	-74.82	57	100	24		
2013-02-11	17:52:22	14	37.15	-75.49	22.8	100	23		
2013-02-11	20:29:33	15	37.53	-75.29	23	100	17		
2013-02-12	0:53:35	17	37.70	-74.26	103	Night	23		
2013-02-12	3:11:20	19	37.84	-74.57	51	Night	36		
2013-02-12	6:05:36	21	38.00	-74.96	22	Night	22		
2013-02-12	13:29:38	25	38.81	-74.55	21	15	9		
2013-02-12	18:28:11	26	38.56	-73.74	56	0	19		
2013-02-12	22:48:14	28	38.86	-73.14	71	Night	23		
2013-02-13	1:38:55	29	39.01	-72.59	1000+	Night	20		
2013-02-13	2:53:01	30	39.05	-72.74	356	Night	16		
2013-02-13	3:18:26	---	39.05	-72.74	---	Night	22		
2013-02-13	15:45:18	36	39.81	-73.04	63	100	3.7		
2013-02-13	17:48:06	37	39.58	-73.16	37	100	7.5		
2013-02-13	22:04:57	40	39.35	-73.39	43	Night	14		
2013-02-14	9:17:30	47	39.71	-74.01	18	Night	24		
2013-02-14	14:14:59	49	40.33	-73.51	25	5	15		
2013-02-14	18:03:51	50	40.41	-72.80	40	0	2.6		
2013-02-14	22:58:08	52	40.65	-72.19	46.3	Night	12		
2013-02-15	14:54:40	57	39.83	-70.62	845	10	10		
2013-02-15	18:48:54	58	40.04	-70.00	144	60	5.7		
2013-02-15	23:06:25	59	40.16	-69.56	87	Night	7		
2013-02-16	8:29:30	63	40.24	-67.69	984	Night	12		
2013-02-16	9:42:13	64	40.38	-67.69	281	Night	10		
2013-02-16	13:58:56	66	40.93	-67.71	63	90	1		
2013-02-16	17:46:51	68	40.65	-67.88	81	100	2.4		
2013-02-16	23:02:05	71	40.93	-68.50	43	Night	7		
2013-02-19	15:48:37	75	42.36	-70.45	80	50	9		
2013-02-19	18:19:53	76	42.68	-70.54	76	100	3.6		
2013-02-19	22:56:51	78	42.99	-70.41	102	Night	25		
2013-02-20	20:04:11	88	43.76	-68.69	89	100	20		
2013-02-20	22:38:46	89	43.75	-69.20	96	Night	22		
2013-02-22	16:20:46	---	43.10	-69.91	162	100	14		
2013-02-23	1:15:23	92	42.51	-69.67	231	Night	10		

2013-02-23	14:18:15	98	41.48	-68.24	46	100	3		
2013-02-23	16:49:40	100	41.47	-67.69	40	100	8		
2013-02-23	22:36:49	102	40.83	-68.83	67	100	13		
2013-02-24	2:15:40	103	40.89	-69.15	63	Night	25		
2013-02-24	11:55:26	108	41.10	-70.62	43	100	24		
2013-02-24	18:04:23	111	41.51	-71.35	26	100	20		
2013-02-25	14:39:18	112	41.30	-71.27	33	70	12		
2013-02-25	17:11:14	113	41.02	-71.29	40	20	7		
2013-02-25	22:49:58	115	40.64	-71.43	58	Sunset	4		
2013-02-26	5:13:50	119	40.67	-70.62	56	Night	7		

**Mike Novak and Scott Freeman deploying the Hyperpro**



**Aimee Neeley communicating with Mike Novak during the Hyperpro deployment**





**Deployment of the CTD rosette (Scott Freeman, Victor Pinones, and Jerry Prezioso)**



**Mike Novak and Jerry Prezioso at the CTD operations computer**



**Scott Freeman at his computer workstation**



**Mike Novak at his filtering workstation**



**Aimee Neeley at her filtering workstation**



**Fish Trawl in action**



**De-bubbling system for the underway IOP cage and tank**



**The snow-covered back deck of the Pisces while anchored near Provincetown**

