

**A HYDROGRAPHIC SURVEY
OF THE AMMEN ROCK AREA OF THE GULF OF MAINE:
RESULTS OF R/V CAPE HATTERAS CRUISE
14-19 OCTOBER 1990**

By

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I. INTRODUCTION

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This reports presents the results of hydrographic profiles taken in the vicinity of Ammen Rock in the Gulf of Maine aboard the R/V Cape Hatteras, ~~April 21 to 26~~, 1990. This work was part of a project headed by J. Witman of Northeastern University and comprises a subcontract on NSF Grant No. OCE-8800640.

Two sites on Ammen Rock were studied in detail: North Ammen Rock Pinnacle, located at 42° 55.15'N, 68° 58.18'W, and Ammen Rock Pinnacle, located approximately 5 miles to the south at 42° 50.78'N, 68° 57.26'W. Weather cut short the cruise objectives which was to have conducted a time series of seven hourly CTD/transmissometer/*in situ* fluorometer casts at each site, and two transects (north-south and east-west) of seven stations each; the stations were spaced one mile apart, with the middle station centered at the sample site. The west to east transect on Ammen Rock Pinnacle includes stations numbered 1 to 7 (from east to west); the time series there includes stations 8 to 14, corresponding to 1730 to 2330 hours on 15 October. The west to east transect on North Ammen Rock Pinnacle includes stations 15 to 21; stations 22 and 23 were the only two stations for what was to have been a six-hour time series at North Ammen Rock Pinnacle, which was cancelled because of rough weather.

II. MATERIALS AND METHODS

Hydrographic data

Physical data were collected using the R/V *Cape Hatteras's* Neil Brown Smart CTD (conductivity, temperature, depth profiler) with a Sea Tech *in situ* fluorometer and 25 cm path-length transmissometer. The CTD was calibrated during the cruise against salinity samples analyzed with an AutoSal on board the ship and against temperatures recorded with a recently-calibrated Sea Bird thermistor. Water samples for determining phytoplankton pigments were collected with a General Oceanics rosette sampler and 5-L Niskin bottles. The CTD, *in situ* fluorometer and transmissometer data were collected on the down cast, and the rosette bottles samples were collected on the up cast, bracketing the thermocline and any chlorophyll maximum layers. The transmissometer data are presented as percent transmission and the fluorometer data are given as equivalent chlorophyll a using the manufacturer's calibration, which we have found in the past to be quite accurate against discrete water samples.

Phytoplankton pigments

Chlorophyll a and phaeopigment concentrations were determined by filtering 100 ml of water from each sample depth onto a 0.45 μ m Millipore HA

filter. The filter was then put in 10 ml of 85% acetone and placed in a freezer (-18° C); the samples were analyzed on shore one week following the cruise. The samples were analyzed fluorometrically using a Turner Designs fluorometer calibrated against pure chlorophyll from Sigma Chemical Co.

Particulate Carbon and Nitrogen

Samples for the determination of particulate carbon and nitrogen concentrations were collected by filtering 500 mls (at less than 10 mm Hg vacuum) through 25 mm GF/F Glass Fiber Filters that had previously been muffled at 450°C for 2 hrs. Forceps and filter towers were kept clean by rinsing with methanol between each sample. Blank samples were based on GF/F filtered seawater. The samples were placed in aluminum envelopes and frozen for later analysis with a Control Equipment Model 240-XA CHN analyzer.

Data Presentation

The discrete bottle data for phytoplankton pigments and particulate carbon and nitrogen are given in tabular form. The CTD / transmissometer / fluorometer data are presented as vertical section plots generated using Surfer software.

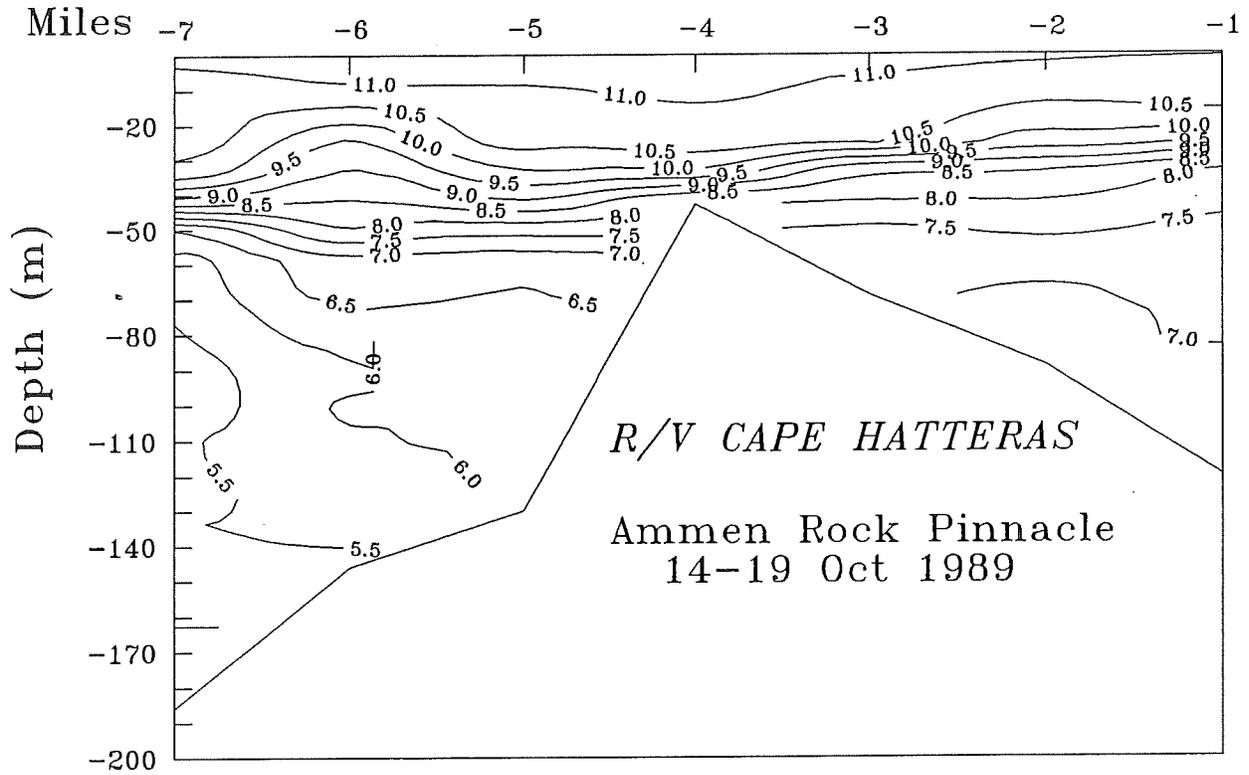
R/V Cape Hatteras, 14-18 October 1989, Ammen Rock

Station	Depth (m)	Chl.a (ug/L)	Phaeo (ug/L)	Tot.Pig. (ug/L)	In Situ Fluor.	% Trans.	Beam Atten.	Carbon (ug/L)	Nitrogen (ug/L)	C/Chla ratio	C/Tot.Pig ratio
1	25	0.83	0.22	1.05	0.64	87.5	0.534	88	13.34	106.35	83.92
1	6	3.83	0.14	3.97				420	69.76	109.60	105.80
2	25	0.78	0.30	1.09	0.59	87.6	0.530	314	49.56	400.58	289.11
2	0	4.01	0.04	4.04	3.76	78	0.994	84	15.68	20.97	20.77
3	44	0.35	0.10	0.45	0.24	88.3	0.498	46	6.36	132.04	102.35
3	24				0.59	88	0.511	72	12.1		
3	18	2.96	0.11	3.07	2.25	83.3	0.731	228	42.84	76.99	74.24
3	0	3.31	-0.16	3.15	2.63	78.9	0.948	340	58.9	102.73	108.08
4	42	0.35	0.18	0.52	0.25	88.5	0.489	40	6.9	114.81	76.29
4	34	0.44	0.24	0.67	0.39	88.2	0.502	56	11.34	128.59	83.07
4	16	3.57	0.17	3.75	2.93	81.6	0.813	212	38.96	59.37	56.61
4	1				2.44	79.6	0.913				
5	45				0.3	88.3	0.498	56	832		
5	25	1.22	0.00	1.22	0.88	86.8	0.566	94	17.54	77.09	77.09
5	11	3.22	0.37	3.60	3.08	79.4	0.923	254	42.24	78.82	70.65
5	1	2.96	0.48	3.45	2.28	80.2	0.883	246	42.7	83.07	71.40
6	25	0.26	0.26	0.52	0.34	88.8	0.475	50	9.42	191.36	95.36
6	8				1.82	83.2	0.736	160	30.04		
7	25	2.83	0.02	2.85	1.86	83	0.745	164	31.22	57.94	57.62
7	0	3.83	-0.01	3.82	2.71	78.8	0.953	256	44.06	66.80	67.01
8	27	0.48	0.16	0.64	0.4	88.4	0.493	40	7.06	83.50	62.83
8	0	5.14	-0.57	4.57	4.07	75.4	1.129	650	133.7	126.49	142.26
9	41	0.22	0.16	0.37	0.18	88.5	0.489	28	2.92	128.59	74.76
9	0				3.22	78.1	0.989	94	14.9		
10	36	1.74	0.17	1.91	1.08	87	0.557	110	20.24	63.15	57.59
10	7	5.84	-0.59	5.24	4.15	78.2	0.984	332	55.26	56.89	63.32
11	40	3.79	-0.61	3.18	3.07	81.7	0.808	180	33.22	47.51	56.54
11	20	5.40	-0.38	5.02	4.92	75.5	1.124	416	80.84	77.04	82.89
12	39	0.61	0.21	0.82	0.49	87.9	0.516	70	10.78	114.81	84.96
12	10				1.49	84.3	0.683	154	28.62		
13	45	1.05	-1.05	0.00	0.33	88.3	0.498				
13	7	3.14	0.01	3.15	2.78	79.7	0.908	228	41.36	72.72	72.47

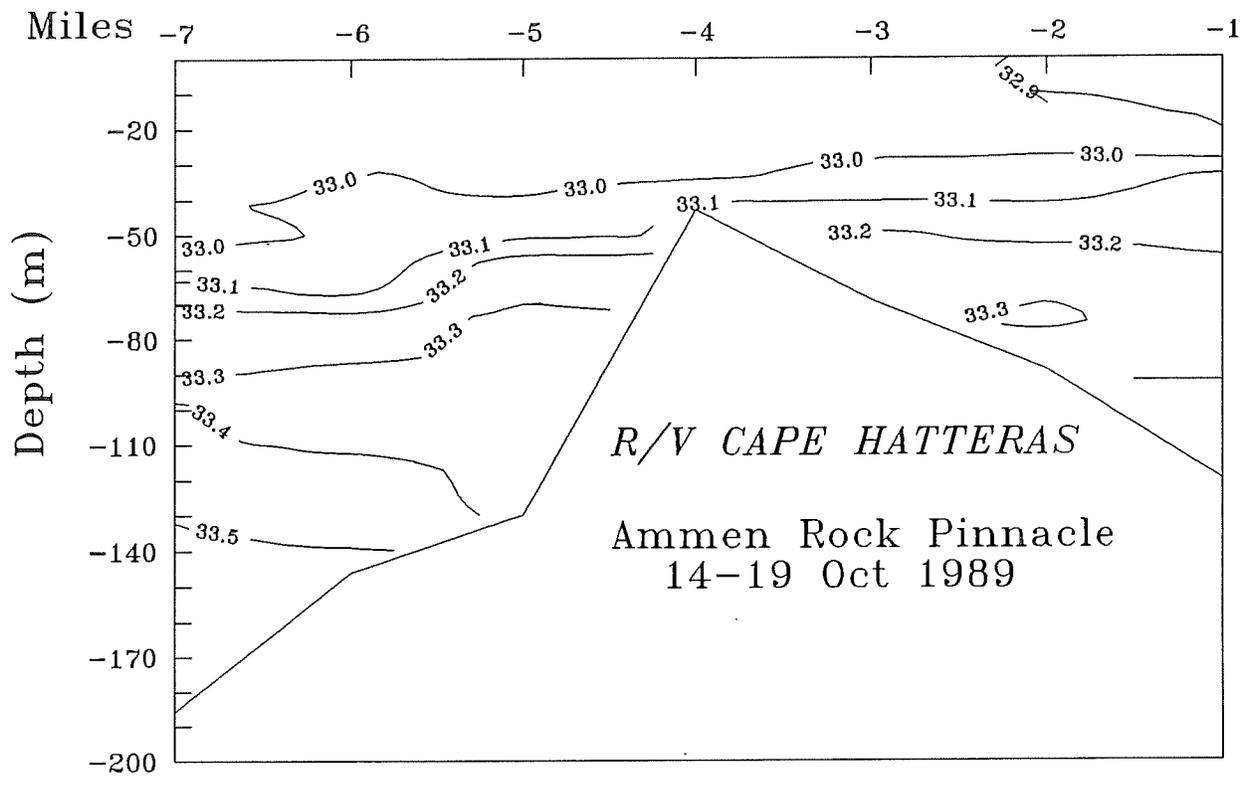
R/V Cape Hatteras, 14-18 October 1989, Ammen Rock

Station	Depth (m)	Chl.a (ug/L)	Phaeo (ug/L)	Tot.Pig. (ug/L)	In Situ Fluor.	% Trans.	Beam Atten.	Carbon (ug/L)	Nitrogen (ug/L)	C/Chla ratio	C/Tot.Pig ratio
14	25	0.74	0.23	0.97	0.7	87.6	0.530	84	15.42	113.46	86.27
14	13	5.14	-0.12	5.02	2.06	83.3	0.731	170	31.5	33.08	33.87
15	30	1.39	0.40	1.80	1.19	86.1	0.599	556	99.28	398.98	309.29
15	15				3	81.9	0.799	114	20.38		
16	35	1.83	0.23	2.06	1.2	86.9	0.562	126	23.02	68.89	61.17
16	12	3.22	-0.23	3.00	2.55	82.5	0.769	278	42.44	86.27	92.79
17	20	2.00	-0.02	1.98	1.16	87.2	0.548	144	22.44	71.88	72.55
17	9	3.14	-0.06	3.07	2.5	84.1	0.693	292	38.72	93.13	95.08
18	30	0.61	0.14	0.75	0.41	89.5	0.444	48	8.4	78.73	64.08
18	11				1.85	84.9	0.655	298	39.96		
19	24	0.52	0.15	0.67	0.21	89.6	0.439	76	12.78	145.43	112.74
19	0	2.61	0.01	2.62	1.81	85.1	0.645	296	42.68	113.28	112.91
20	26	0.52	-0.04	0.49	0.26	89.6	0.439	54	10.3	103.33	110.91
20	6				1.33	85.8	0.613	254	37.76		
21	21	1.61	-0.11	1.50	0.27	89.1	0.462	296	60.62	183.70	197.59
21	0	0.52	0.15	0.67	1.48	85.59	0.622	38	8.4	72.72	56.37
22	20	0.48	0.20	0.67	0.23	89.5	0.444				
22	0	3.05	0.02	3.07	1.9	84.2	0.688				
23	18	0.39	0.17	0.56	0.31	89.7	0.435				
23	0				1.42	84.7	0.664				

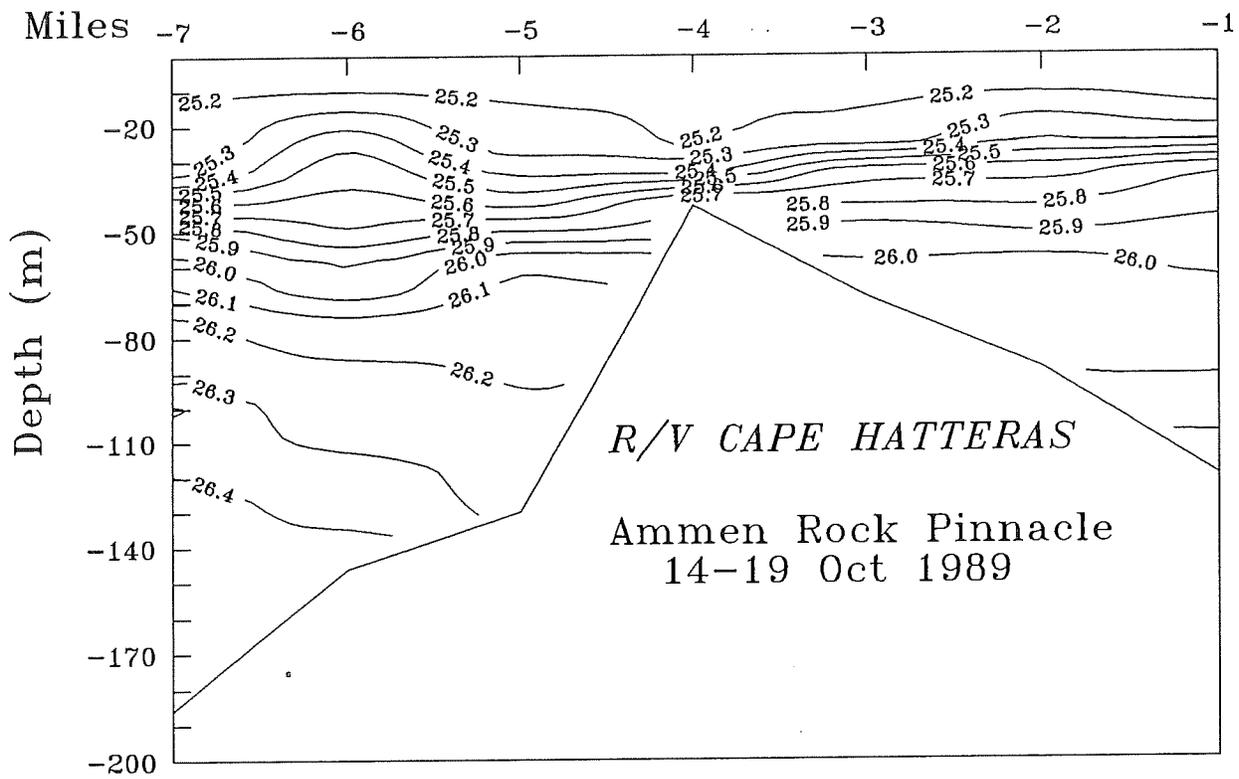
Temperature (Deg. C)



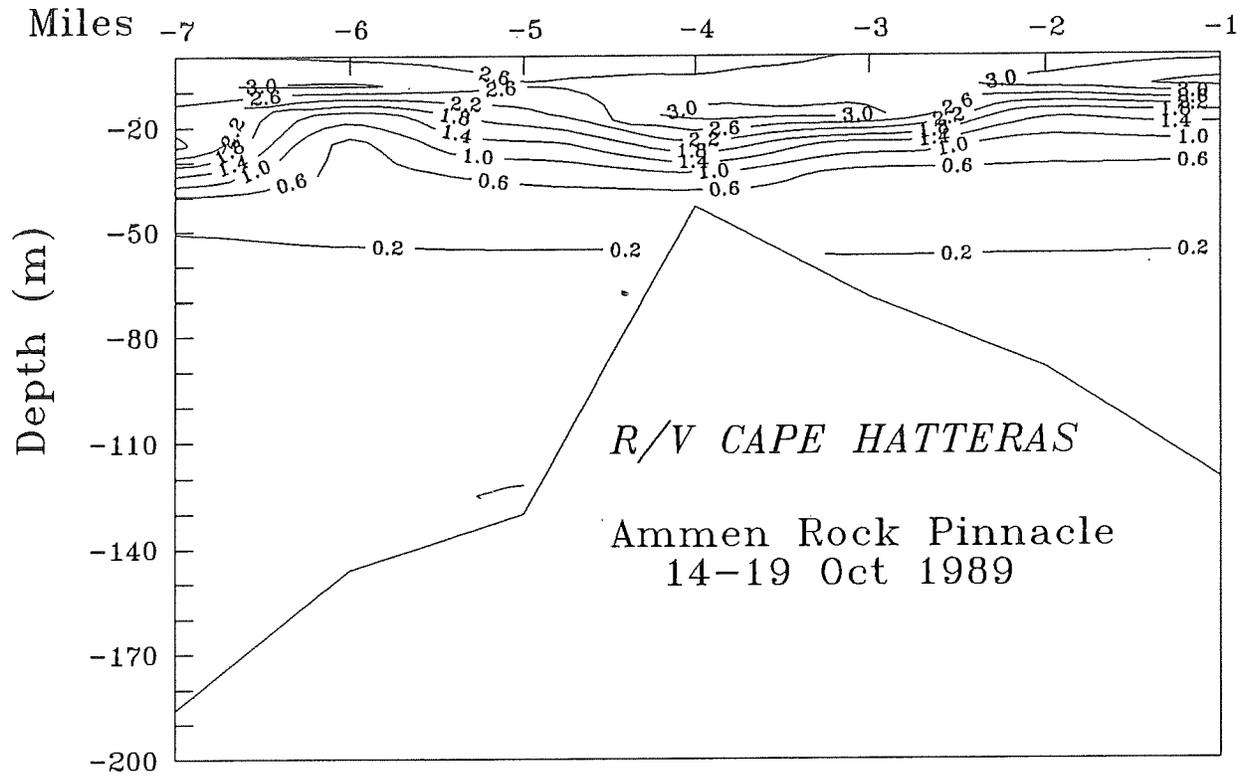
Salinity (ppt)



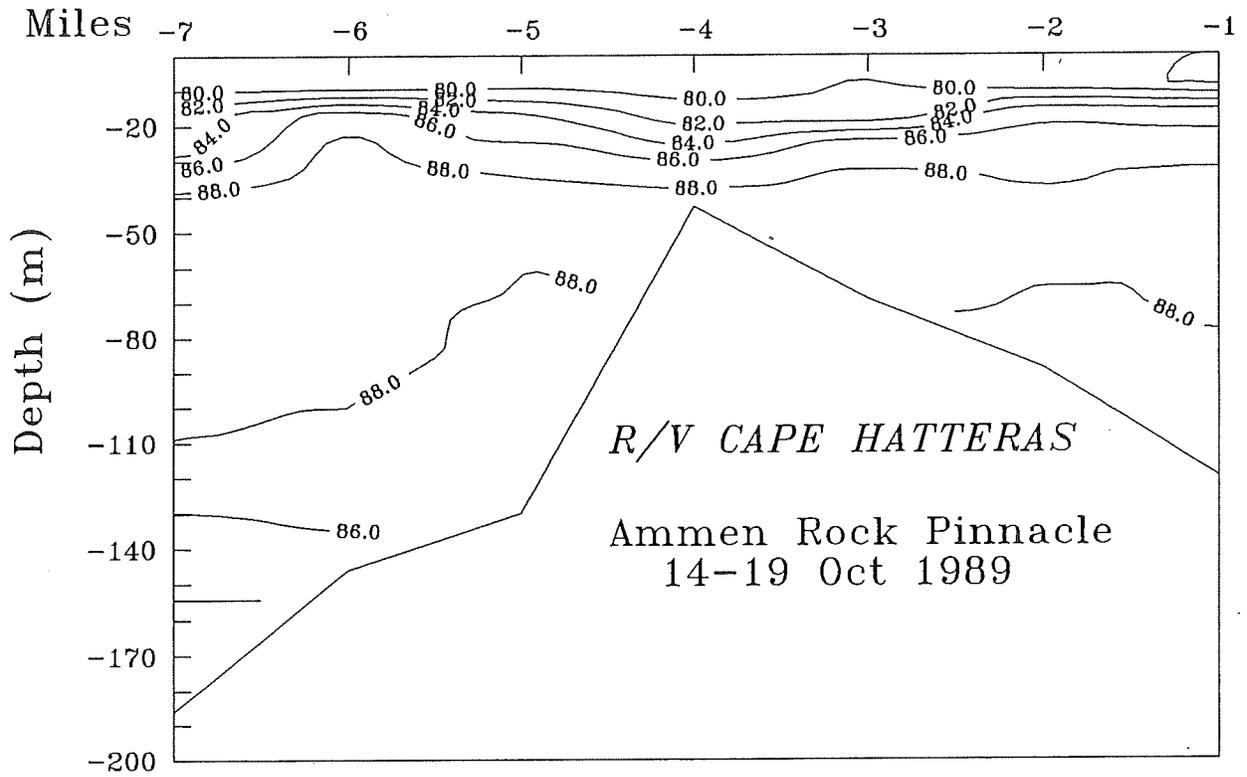
Density (Sigma-t)



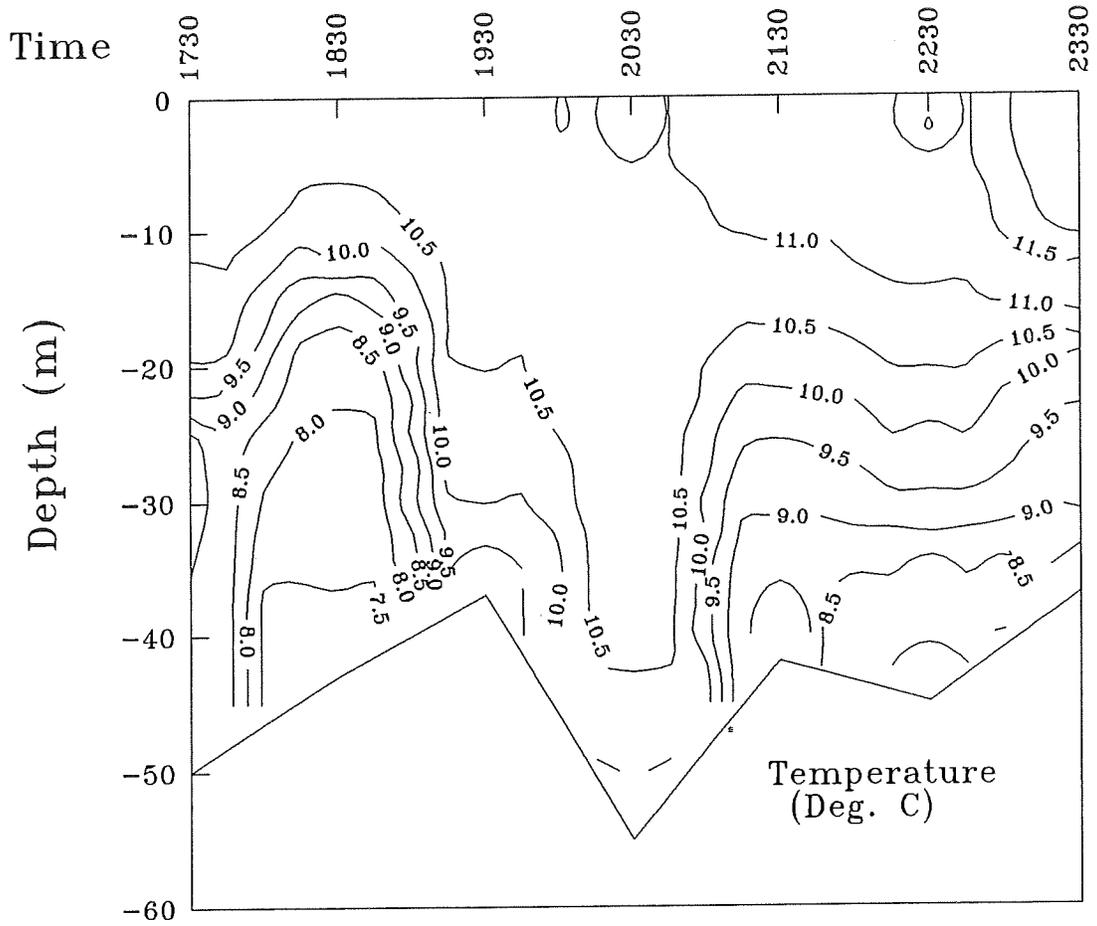
Chlorophyll (ug/L)



Percent Transmission

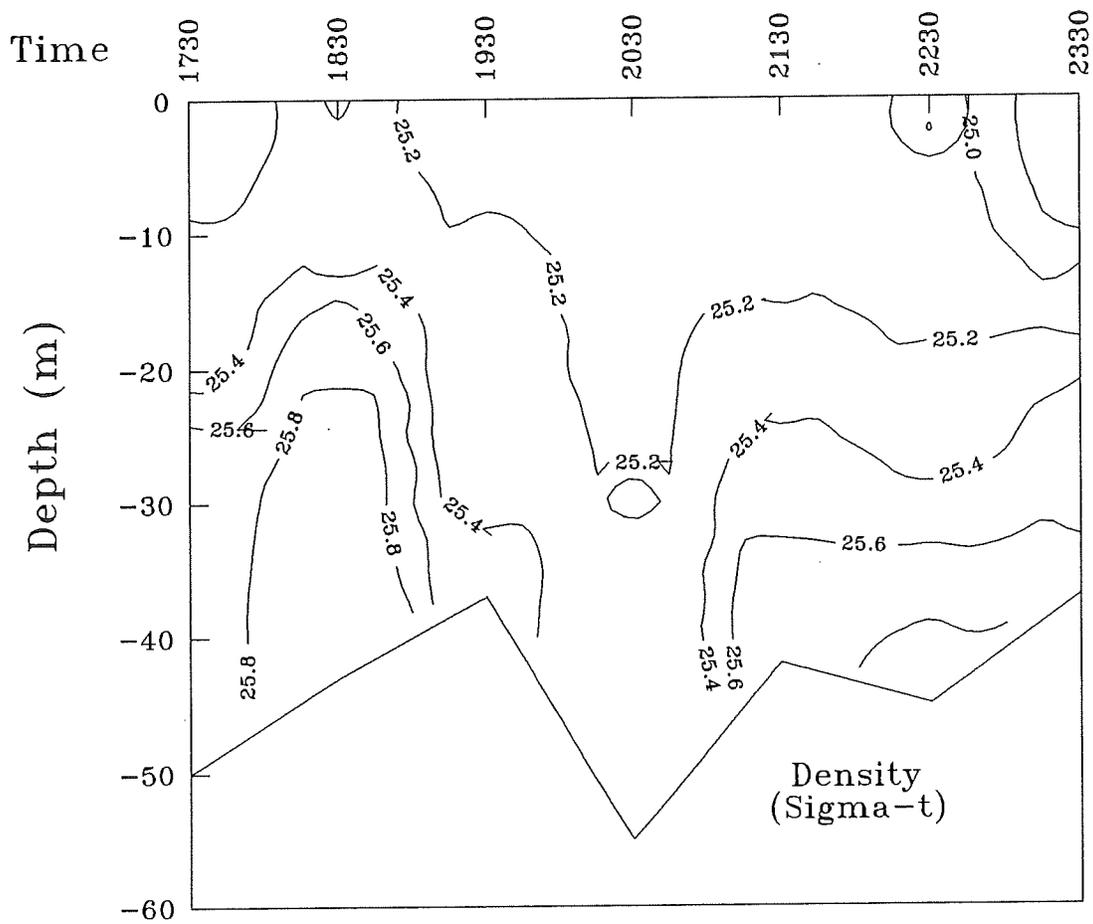


Ammen Rock Pinnacle 15 Oct 1989

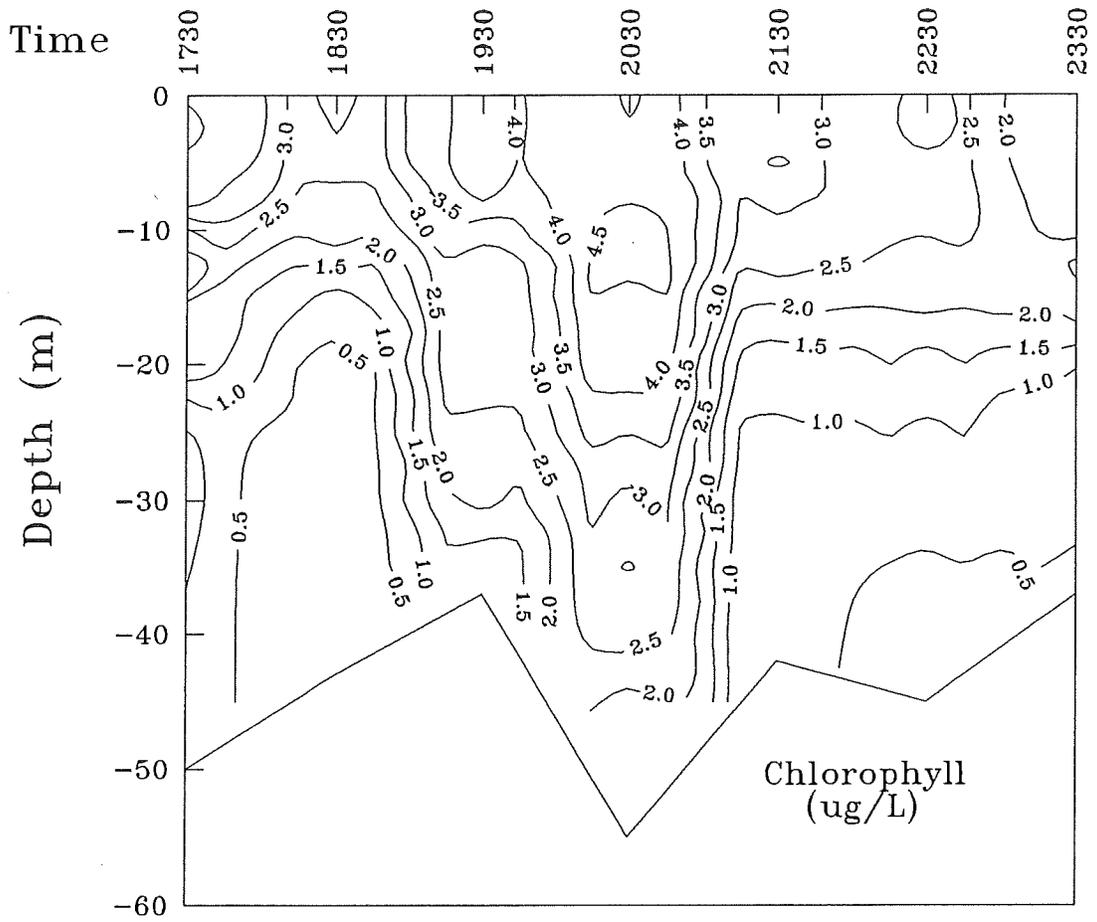


Ammen Rock Pinnacle

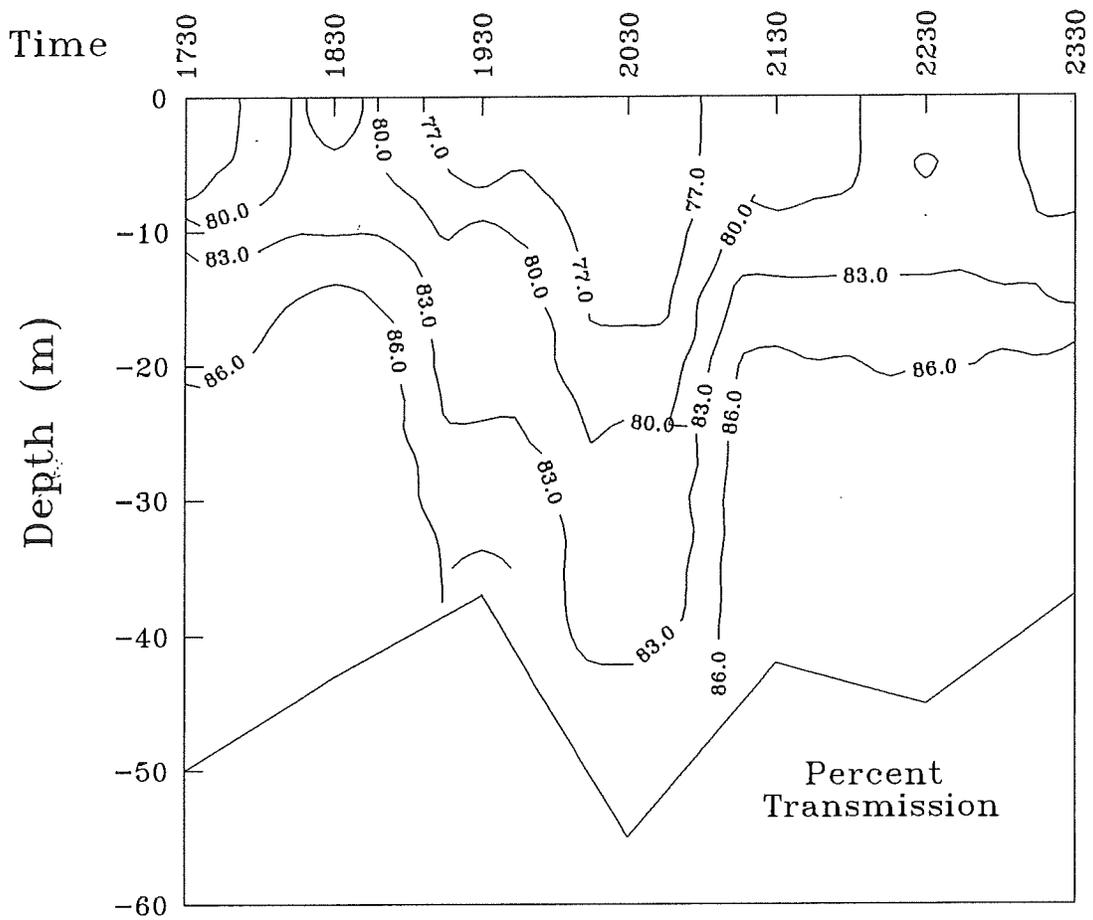
15 Oct 1989



Ammen Rock Pinnacle 15 Oct 1989

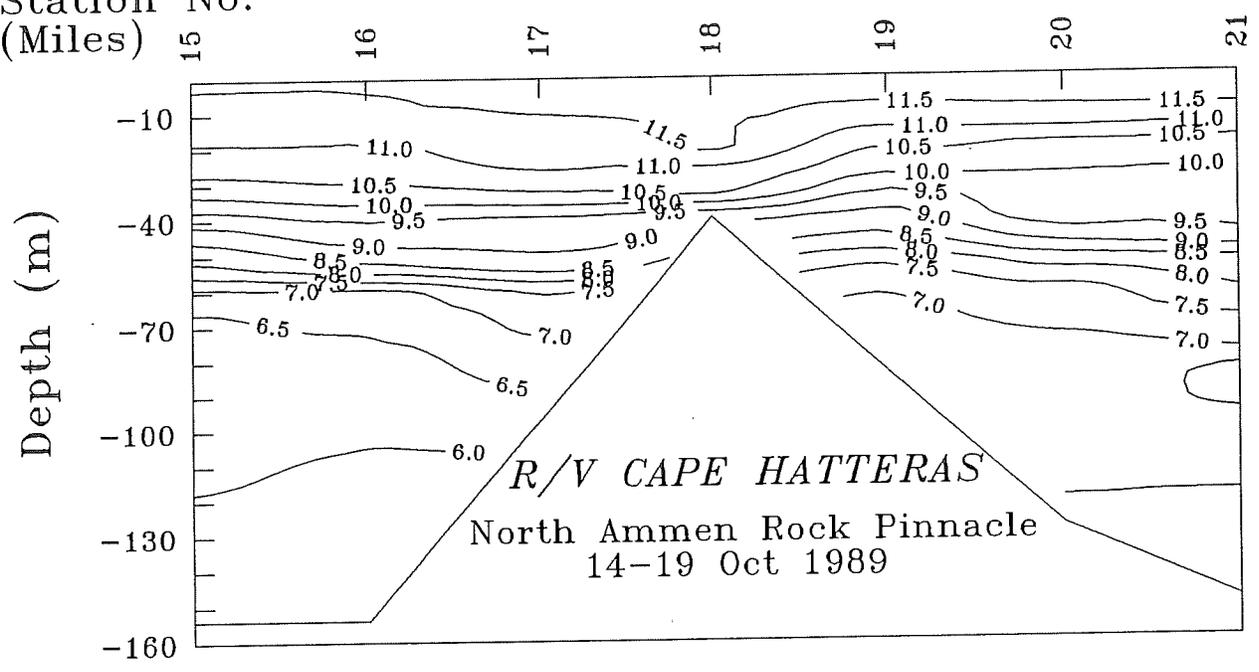


Ammen Rock Pinnacle 15 Oct 1989



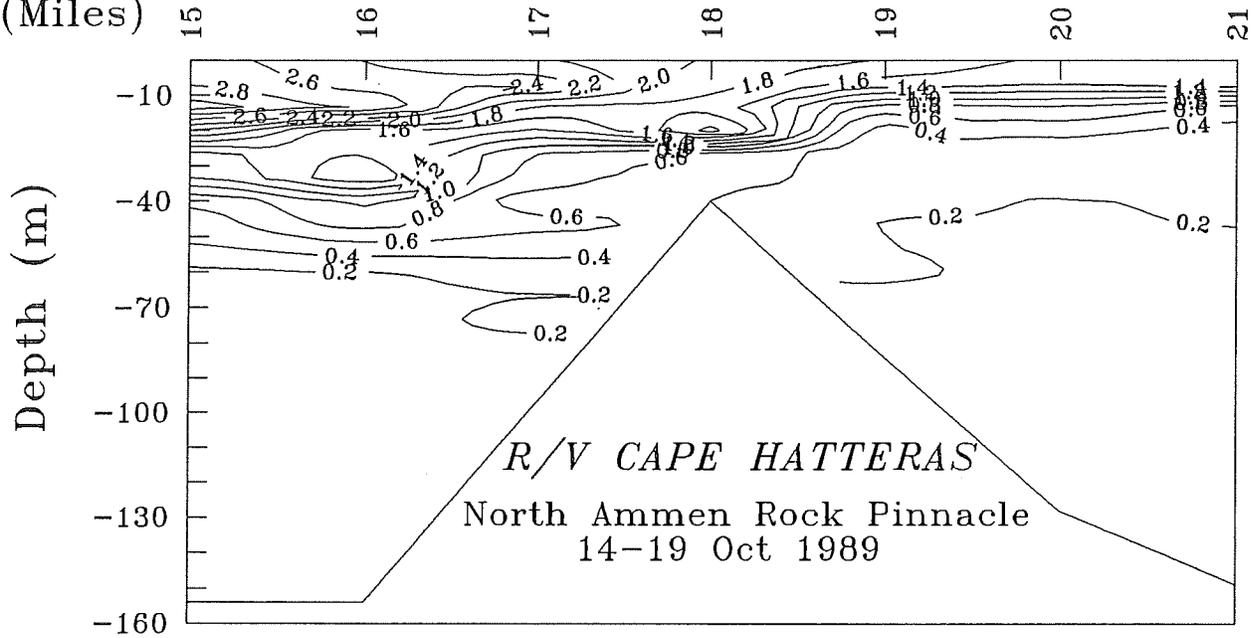
Temperature (Deg. C)

Station No.
(Miles)



Chlorophyll (ug/L)

Station No.
(Miles)



Percent Transmission

Station No.
(Miles)

