

Cruise Report MF-96-07
NOAA Ship *Miller Freeman*

Dates: 17-29 April 1996

Itinerary: Dutch Harbor to Kodiak, Alaska.

Area of Operations: We first made observations in Amukta Pass and south of the central Aleutian Islands. Observations then shifted to the eastern Bering Sea shelf, southeast of the Pribilof Islands. Finally, limited operations were conducted in Shelikof Strait.

Participating Organizations: Pacific Marine Environmental Laboratory (PMEL) and Alaska Fisheries Science Center (AFSC) of NOAA; Dalhousie University; and University of South Florida.

Chief Scientist: Ronald K. Reed, PMEL, NOAA.

Other Scientific Personnel: Bill Parker, Carol DeWitt, and Kevin Kinsey of PMEL; Lisa Britt, AFSC; Aurea Ciotti and Gordana Lazin of Dalhousie University; and Jennifer Patch, University of South Florida.

Cruise Objectives: We planned to obtain information on inflow and outflow through Amukta Pass by use of CTDs and recovery of deep pressure gauges. Another objective was to measure characteristics and transport of the Alaskan Stream south of the Aleutian Islands. Numerous observations were planned over the southeastern Bering Sea shelf, including CTD casts, deployment of satellite-tracked drifters, and recovery and redeployment of two biophysical moorings. Other observations planned were various net tows for plankton and measurements of light attenuation, ocean color, and chlorophyll. These latter observations were also in support of similar measurements to be made by a NOAA research aircraft. We also wished to recover and redeploy a current mooring in Shelikof Strait.

Summary of Operations: A summary of observations made is contained in the enclosed table. A total of 43 CTD casts were taken during the cruise. On 22 of these casts, light and chlorophyll sensors were used, and nutrient and chlorophyll samples were obtained on some of the casts. Four bottom pressure sensors were recovered in Amukta Pass. Five satellite-tracked drifters were deployed. A total of four subsurface moorings (at three sites) were recovered; two surface biophysical moorings were deployed, and a subsurface current mooring was redeployed. Various surface measurements, especially of light attenuation and chlorophyll concentration, were made in support of six passes over the ship, on two days (23 and 25 April), by a NOAA research aircraft. A total of 19 successful deployments of a self-contained SeaCat profiler, with light and chlorophyll sensors, plus 14 deployments of a surface light sensing buoy, were made by researchers from Dalhousie University. In general, two-hourly measurements of phytoplankton absorption, from surface seawater samples during daylight, were made by a researcher from the University of South Florida. Finally, a total of 22 net tows of various types were taken under supervision of L. Britt of AFSC.

Summary of Cruise: The CTD sensors worked flawlessly, and the operations were conducted without problems. The planned mooring recoveries and redeployments were accomplished, even though weather was bad in Shelikof Strait. (A pressure gauge in Unimak Pass and temperature sensors in Pavlof Bay were not at their deployment sites.) Although there were some early problems with equipment from Dalhousie University, these were mainly resolved, and considerable data were obtained. Various types of nets were used to collect plankton and other organisms; no serious problems were encountered. Although the deep CTD casts we took were at sites that had been occupied before and whose depths were known, the lack of a 12 KHz or similar deep echosounder would be a serious problem if deep casts were to be taken at specific depths.

gmt date	gmtime	altata	station	haul	diat	mlat	dlong	mlong	botdpth	gearabrv	netcom	haulcomm
4/18/96	18:30		1	1	52	36.14	170	57.45	439	phyto absorb		J. Patch - U of S Florida
4/18/96	18:53	CTD001	2	1	52	36.25	170	57.34	439	CTD		
4/18/96	20:29	CTD002	3	1	52	26.97	171	5.68	433	CTD		
4/18/96	20:30		3	2	52	26.57	171	6.10	433	phyto absorb		J. Patch - U of S Florida
4/18/96	22:30		4	1	52	24.62	171	32.85	512	phyto absorb		J. Patch - U of S Florida
4/18/96	22:35	CTD003	4	2	52	24.67	171	32.33	512	CTD		
4/19/96	0:13		5	1	52	21.12	171	36.08	303	Moor		@ F-95AP1
4/19/96	1:08		6	1	52	21.68	171	43.21	300	Moor		@ F-95AP2
4/19/96	2:48		7	1	52	22.41	171	57.78	308	Moor		@ F-95AP3
4/19/96	4:50		8	1	52	23.74	172	10.67	363	Moor		@ F-95AP4
4/19/96	6:13	CTD004	8	2	52	22.00	172	7.98	501	CTD		
4/19/96	7:29	CTD005	9	1	52	21.62	171	58.63	335	CTD		
4/19/96	9:15	CTD006	10	1	52	22.14	171	44.06	288	CTD		
4/19/96	16:30	CTD007	11	1	51	54.85	173	30.61	111	CTD		
4/19/96	17:15		12	1	51	52.59	173	32.61	645	phyto absorb		J. Patch - U of S Florida
4/19/96	17:25	CTD008	12	2	51	52.46	173	32.77	687	CTD		
4/19/96	18:20		13	1	51	51.98	173	33.91	1100	phyto absorb		J. Patch - U of S Florida
4/19/96	19:34	CTD009	14	1	51	52.46	173	32.77	1411	CTD		
4/19/96	20:15		15	1	51	49.02	173	32.19	3292	phyto absorb		J. Patch - U of S Florida
4/19/96	21:50		16	1	51	43.62	173	33.35	3292	phyto absorb		J. Patch - U of S Florida
4/19/96	22:03	CTD010	17	1	51	43.61	173	33.30	3292	CTD		
4/19/96	23:36		17	2	51	43.00	173	32.89	3292	light buoy		Ciotti & Lazin - Dalhousie
4/20/96	0:00		17	3	51	42.10	173	33.50	3292	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/20/96	2:05	CTD011	18	1	51	38.35	173	32.66	4171	CTD		
4/20/96	5:20	CTD012	19	1	51	29.26	173	33.25	4687	CTD		
4/20/96	9:21	CTD013	20	1	51	14.93	173	31.28	4869	CTD		
4/20/96	17:20		21	1	51	15.03	171	29.41	3600	phyto absorb		J. Patch - U of S Florida
4/20/96	19:10		22	1	51	14.78	170	57.74	2600	phyto absorb		J. Patch - U of S Florida
4/20/96	21:50		23	1	51	14.40	170	9.59	7390	phyto absorb		J. Patch - U of S Florida
4/20/96	22:23		25	1	51	14.17	170	3.24	7390	light buoy		Ciotti & Lazin - Dalhousie
4/20/96	22:51		25	2	51	13.61	170	2.77	7390	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/21/96	0:00		24	1	51	14.25	170	2.58	7390	phyto absorb		J. Patch - U of S Florida
4/21/96	0:11	CTD014	25	3	51	14.44	170	2.50	7390	CTD		
4/21/96	4:18	CTD015	26	1	51	31.26	170	11.99	5500	CTD		
4/21/96	8:34	CTD016	27	1	51	46.65	170	18.91	3161	CTD		
4/21/96	11:57	CTD017	28	1	51	56.92	170	23.17	3400	CTD		
4/21/96	15:13	CTD018	29	1	52	4.96	170	29.14	2730	CTD		
4/21/96	17:10		30	1	52	11.88	170	31.19	1200	phyto absorb		J. Patch - U of S Florida
4/21/96	17:43	CTD019	31	1	52	12.25	170	31.97	1240	CTD		
4/21/96	18:32		31	2	52	12.82	170	33.05	1191	light buoy		Ciotti & Lazin - Dalhousie
4/21/96	18:50		31	3	52	13.47	170	33.56	633	phyto absorb		J. Patch - U of S Florida
4/21/96	19:02		31	4	52	13.66	170	33.72	795	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/21/96	20:18	CTD020	32	1	52	20.18	170	32.04	501	CTD		
4/21/96	20:30		32	2	52	20.28	170	32.22	496	phyto absorb		J. Patch - U of S Florida
4/21/96	21:39	CTD021	33	1	52	28.00	170	34.63	309	CTD		
4/21/96	22:04		33	2	52	27.76	170	34.92	316	light buoy		Ciotti & Lazin - Dalhousie
4/21/96	22:30		33	3	52	27.47	170	35.44	315	phyto absorb		J. Patch - U of S Florida
4/21/96	22:53		33	4	52	27.13	170	36.39	313	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/22/96	0:45		34	1	52	40.13	170	20.31	321	phyto absorb		J. Patch - U of S Florida
4/22/96	12:20		35	1	54	32.86	167	35.42	810	Ring.8		live bugs for AJ Paul
4/22/96	19:10		36	1	55	37.24	165	58.47	116	phyto absorb		J. Patch - U of S Florida
4/22/96	21:00		37	1	55	55.79	165	29.66	97	phyto absorb		J. Patch - U of S Florida
4/22/96	22:30		38	1	56	12.46	165	5.30	88	phyto absorb		J. Patch - U of S Florida
4/23/96	3:13	CTD022	39	1	56	51.80	164	3.10	68	CTDB	Dalhousie - chls	@ F96BS2
4/23/96	3:15		39	2	56	51.79	164	3.09	67	phyto absorb		J. Patch - U of S Florida
4/23/96	3:29		39	3	56	51.83	164	2.66	68	Moor		F96BS2-a
4/23/96	4:41		39	4	56	52.04	164	2.93	67	Moor		F96BS2-b
4/23/96	10:40	CTD023	39	5	56	51.94	164	1.93	69	CTDB		@ F96BS2
4/23/96	11:23	CTD024	39	6	56	51.91	164	2.25	68	CTDB		@ F96BS2
4/23/96	11:45	CTD025	39	7	56	51.94	164	2.21	68	CTDB		phytogrowth-expt
4/23/96	12:23		39	8	56	52.00	164	2.87	73	Tuck1,LG-CB		@ F96BS2-night
4/23/96	14:07		39	9	56	52.39	164	2.54	73	Sled,LG-CB		middle shelf-night
4/23/96	15:26		39	10	56	52.03	164	3.03	73	Live		K. Bailey feeding expt
4/23/96	15:59		39	11	56	51.61	164	3.21	68	Cal/Vet		@ F96BS2
4/23/96	16:52		39	12	56	52.12	164	3.09	68	SatBuoy	Dalhousie-chls	color satellite drifter #7780
4/23/96	17:09		39	14	56	52.28	164	3.14	68	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie

grmt date	grmtime	ststa	station	haul	dist	mlat	dlong	mlong	botdpth	gearabrv	netcom	haulcomm
4/23/96	17:19			39	13	56 52.28	164	3.44	68	light buoy		Ciotti & Lazin - Dalhousie
4/23/96	18:30			39	15	56 52.17	164	2.24	68	phyto absorb		J. Patch - U of S Florida
4/23/96	18:52			39	18	56 52.00	164	2.73	68	light buoy		Ciotti & Lazin - Dalhousie
4/23/96	19:00			39	17	56 52.17	164	2.24	68	phyto absorb		J. Patch - U of S Florida
4/23/96	19:04			39	18	56 52.03	164	2.95	68	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/23/96	19:30			39	19	56 51.86	164	3.14	68	phyto absorb		J. Patch - U of S Florida
4/23/96	20:00			39	20	56 51.99	164	3.30	68	phyto absorb		J. Patch - U of S Florida
4/23/96	20:03			39	21	56 52.00	164	3.25	68	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/23/96	21:00			39	22	56 51.99	164	3.30	68	phyto absorb		J. Patch - U of S Florida
4/23/96	21:06			39	23	56 52.08	164	4.05	68	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/23/96	22:10			39	24	56 51.96	164	4.64	68	phyto absorb		J. Patch - U of S Florida
4/23/96	22:12			39	25	56 51.99	164	4.61	68	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/24/96	2:05			39	26	56 52.40	164	3.23	68	Moor		F96BS2-surface
4/24/96	3:16	CTD026		39	27	56 52.03	164	3.31	68	CTDB		@ F96BS2
4/24/96	3:45	CTD027		39	28	56 52.07	164	3.51	68	CTDB		@ F96BS2
4/24/96	4:18			39	29	56 52.35	164	3.78	67	Tuck1,LG-CB		@ F96BS2-night
4/24/96	4:46			39	30	56 52.38	164	3.62	68	Cal/Vet		@ F96BS2
4/24/96	5:28			39	31	56 52.20	164	3.88	68	Sled,LG-CB		middle shelf-DAY
4/24/96	8:10			39	32	56 52.55	164	4.00	68	Sled,LG-CB		middle shelf-DAY
4/24/96	9:31			39	33	56 52.18	164	4.35	68	Sled		failed tow
4/24/96	11:02	CTD028		39	34	56 51.90	164	2.88	68	CTDB		line between moor 2&3
4/24/96	13:40	CTD029		40	1	56 37.72	164	36.27	77	CTDB		line between moor 2&3
4/24/96	15:25	CTD030		41	1	56 30.53	164	59.90	80	CTDB		line between moor 2&3
4/24/96	16:15			42	1	56 27.11	165	11.29	78	phyto absorb		J. Patch - U of S Florida
4/24/96	17:00	CTD031		43	1	56 23.41	165	23.47	82	CTDB		line between moor 2&3
4/24/96	17:37			43	2	56 23.57	165	23.26	83	light buoy		Ciotti & Lazin - Dalhousie
4/24/96	17:40			43	3	56 23.70	165	23.01	83	phyto absorb		J. Patch - U of S Florida
4/24/96	17:44			43	4	56 23.69	165	23.08	82	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/24/96	19:05			44	1	56 17.80	165	40.97	87	phyto absorb		J. Patch - U of S Florida
4/24/96	19:36	CTD032		45	1	56 16.25	165	46.19	89	CTDB		line between moor 2&3
4/24/96	20:04			45	2	56 16.28	165	46.45	89	light buoy		Ciotti & Lazin - Dalhousie
4/24/96	20:14			45	3	56 16.36	165	46.66	90	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/24/96	20:40			46	1	56 15.86	165	47.94	89	phyto absorb		J. Patch - U of S Florida
4/24/96	22:00			46	2	56 6.39	166	12.71	109	phyto absorb		J. Patch - U of S Florida
4/24/96	22:49	CTD033		47	1	56 3.92	166	19.94	116	CTDB	Dalhousie-chis	@ F96BS3
4/24/96	23:17	CTD034		47	2	56 4.08	166	19.93	115	CTDB	Dalhousie-chis	@ F96BS3
4/24/96	23:42			47	3	56 3.75	166	20.18	116	Tuck1,LG-CB		@ F96BS3-DAY
4/25/96	0:20			47	4	56 3.61	166	19.91	116	Cal/Vet		@ F96BS3
4/25/96	0:33			47	5	56 3.30	166	19.88	115	light buoy		Ciotti & Lazin - Dalhousie
4/25/96	0:49			47	6	56 3.10	166	20.13	116	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/25/96	0:50			47	7	56 3.00	166	20.00	116	phyto absorb		J. Patch - U of S Florida
4/25/96	1:23			47	8	56 3.81	166	19.78	116	Moor		F96BS3 subsurface
4/25/96	3:23			47	9	56 3.85	166	20.75	115	Sled,LG-CB		outer shelf-DAY
4/25/96	4:39			48	1	56 3.66	166	30.30	120	Sled,LG-CB		outer shelf-DAY
4/25/96	6:58	CTD035		48	2	56 4.01	166	30.16	119	CTDB		phyto growth expt
4/25/96	8:25			48	3	56 4.98	166	29.89	119	Sled,LG-CB		outer shelf-night
4/25/96	10:18			49	1	56 4.07	166	20.18	115	Tuck1,LG-CB		@ F96BS3-night
4/25/96	11:12			49	2	56 4.22	166	19.33	116	Ring.8		live tow
4/25/96	15:09			49	3	56 3.73	166	20.66	116	Live		K. Bailey feeding expt
4/25/96	17:10	CTD036		49	4	56 4.05	166	20.27	121	CTD		
4/25/96	17:20			49	5	56 4.17	166	20.28	115	phyto absorb		J. Patch - U of S Florida
4/25/96	18:10			49	6	56 3.81	166	20.56	115	light buoy		Ciotti & Lazin - Dalhousie
4/25/96	18:24			49	7	56 3.95	166	19.81	115	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/25/96	18:30			49	8	56 4.20	166	21.00	116	phyto absorb		J. Patch - U of S Florida
4/25/96	19:04			49	9	56 3.82	166	19.81	115	light buoy		Ciotti & Lazin - Dalhousie
4/25/96	19:10			49	10	56 3.87	166	19.97	116	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/25/96	20:03			49	11	56 3.71	166	19.65	115	light buoy		Ciotti & Lazin - Dalhousie
4/25/96	20:15			49	12	56 3.80	166	19.85	114	phyto absorb		J. Patch - U of S Florida
4/25/96	20:20			49	13	56 3.84	166	19.94	115	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/25/96	21:00			49	14	56 3.95	166	20.61	116	phyto absorb		J. Patch - U of S Florida
4/25/96	21:07			49	15	56 3.94	166	20.64	115	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/25/96	23:57			49	16	56 3.56	166	20.10	120	Moor		surface mooring F96BS3
4/26/96	0:16			49	17	56 4.00	166	19.93	120	Cal/Vet		@ F96BS3
4/26/96	1:11	CTD037		49	18	56 3.78	166	19.43	120	CTDB	Dalhousie-chis	@ F96BS3
4/26/96	1:44	CTD038		49	19	56 4.14	166	19.57	120	CTDB	Dalhousie-chis	@ F96BS3
4/26/96	1:50			49	21	56 4.49	166	19.87	114	SatBuoy		color satellite drifter #7781

gmt date	gmtime	altsta	station	haul	diat	mlat	dlong	mlong	botdpth	gearabrv	netcom	haulcomm
4/26/96	1:55		49	20	56	4.62	166	19.88	114	phyto absorb		J. Patch - U of S Florida
4/26/96	2:48	CTD039	50	1	56	1.94	166	31.99	122	CTDB		
4/26/96	4:33	CTD040	51	1	55	54.73	166	54.47	129	CTDB		
4/26/96	4:57		51	2	55	54.54	166	54.25	129	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/26/96	5:00		51	3	55	54.56	166	54.36	130	phyto absorb		J. Patch - U of S Florida
4/26/96	13:16		52	1	54	50.13	164	55.00	.73	SatBuoy		satellite drifter #7238
4/26/96	14:05		53	1	54	49.99	165	6.94	102	SatBuoy		satellite drifter #7174
4/26/96	14:56		54	1	54	50.02	165	19.94	140	SatBuoy		satellite drifter #7239
4/26/96	16:04		55	1	54	46.00	165	35.84	210	Ca/Vet		live bugs for AJ Paul
4/26/96	16:09		55	2	54	46.02	165	35.84	210	Ca/Vet		live bugs for AJ Paul
4/26/96	16:22		55	3	54	46.00	165	35.88	210	Ring.8		live bugs for AJ Paul
4/26/96	18:29		56	1	54	34.81	165	13.50	79	light buoy		Ciotti & Lazin - Dalhousie
4/26/96	18:42		56	2	54	35.03	165	13.84	80	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/26/96	18:45		56	3	54	35.12	165	14.14	82	phyto absorb		J. Patch - U of S Florida
4/26/96	20:50		57	1	54	20.43	165	5.94	135	phyto absorb		J. Patch - U of S Florida
4/27/96	0:14	CTD041	58	1	54	22.90	164	27.06	89	CTD		
4/27/96	0:31		58	2	54	22.95	164	27.09	89	light buoy		Ciotti & Lazin - Dalhousie
4/27/96	0:40		58	3	54	23.08	164	27.11	87	phyto absorb		J. Patch - U of S Florida
4/27/96	0:44		58	4	54	23.03	164	27.16	87	seacat w/AC-9	SF & abs	Ciotti & Lazin - Dalhousie
4/28/96	16:08	CTD042	59	1	57	40.70	155	16.87	295	CTD		@F9601
4/28/96	16:21		59	2	57	40.74	155	17.04	296	Moor		F9601
4/28/96	17:15		59	3	57	40.66	155	16.28	296	phyto absorb		J. Patch - U of S Florida
4/28/96	20:40		59	4	57	40.85	155	16.96	295	Moor		F9601-reconfigured
4/28/96	21:12	CTD043	59	5	57	40.47	155	16.82	298	CTD		@F9601