CRUISE REPORT

Cruise Number: MF-01-06
FOCI Number: none
Ship: Miller Freeman

Area of Operations: Bering Sea and Aleutian Islands

Itinerary:

Dutch Harbor - May 12, 2001
Dutch Harbor (touch and go) – May 14, 2001
Dutch Harbor – May 22, 2001

Participating Organizations:

NOAA Pacific Marine Environmental Laboratory
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Objectives of Cruise:

1. Conduct CTD survey of southeastern Bering Sea basin, slope and shelf
2. Recover and deploy moorings in support of NMFS Crab Research Program, Southeast Bering Sea Carrying Capacity, Pollock Conservation Program, and Steller Sea Lion Research Program

Operations:

CTD casts	31
Bongos, 60 cm	3
Mooring deployments	18
Mooring recoveries	4

Satellite-tracked buoy deployments	4

Samples Collected:

Chlorophyll samples	24
Nutrient samples	72
Plankton samples	3

Summary of Cruise:

The first two days of the cruise (devoted to objective 1: CTD survey) were cancelled because of a storm that kept the ship in Dutch Harbor and the scientific party for that part of the cruise unable to fly to Dutch Harbor from Anchorage. Refer to Table 1, a schedule of operations, and Fig. 1, a map of operations, for summary information about MF-01-06.

Shortly after departing Dutch Harbor at 1400 ADT (2200 GMT) on 14 May, the ship's complement deployed the northern Akutan Pass mooring and conducted a calibration CTD afterward. Because we were unable to locate the current meter for this mooring so soon into the cruise, the hardware and instrumentation (ADCP) for AKP-2, the southern Akutan Pass mooring, were used instead.

After successful interrogation and release the KC-01 crab mooring failed to surface, probably because of excessive marine growth. The ship successfully dragged for the mooring, and it was recovered with only about 90 minutes lost. Figure 2 shows the recovered mooring hardware. The second crab mooring recovery and deployment went smoothly.

We conducted three bongo tows for euphausiids at mooring site 2 and two nearby stations. Diatoms were abundant in the shallowest sample. The subsurface mooring was recovered and a surface mooring (Fig. 3) deployed in its place. Then a second sediment trap mooring was deployed. The shelf was still cold. Surface water ranged from 3 to 4 deg C. The upper layer was about 20-40 m deep. Temperature below was on the order of 2 deg C.

During the night, we conducted a 6-station CTD survey of the 70-m isobath between sites 2 and 4. Water samples for analysis of nutrients and chlorophyll were collected at multiple depths.

At site 4, we recovered the subsurface mooring and deployed a replacement. Then we steamed to Seguam Pass, deploying four Argo floats en route. Early reports from Argo headquarters are that these floats are functioning well. They will sink to the ocean bottom, then rise and report again every ten days. These floats will contribute to a worldwide oceanographic network that will revolutionize the field of physical oceanography in the same way the radiosonde network revolutionized meteorology in the last century.

At Seguam Pass, two moorings were deployed, the second with a nutrient meter.

Due to hardware problems, there was no CTD after deployment of SMP-1.

Four upward looking ADCP moorings were deployed across Unimak Pass. One mooring (AMP-4) sustained minor damage when the syntactic float containing the ADCP (Fig. 4) accidentally struck the ship during deployment. The float was recovered, the ADCP tested, then redeployed. Calibration CTDs completed each mooring operation.

In deploying the Alaska Stream moorings (GS-1 through GS-5), we first located the 1000-m isobath along the survey line using the echo sounder, then deployed GS-1 and completed its CTD. We then surveyed the bottom depth southward along the line. The deepest bottom depth we could discern with the echo sounder was about 5100 m. The deepest mooring was designed for 6000 m. It was decided to modify the deepest mooring for 5100 m and the next deepest mooring for 3500 m instead of its designed depth of 4500 m. This gave better horizontal spacing versus depth. All moorings were deployed successfully, and water conditions were documented by CTD casts.

In the remaining time, we elected to complete the six southernmost CTD stations along the line from mooring site #6 to mooring site #3. This is a significant fraction of the work that was lost to the storm at the beginning of the cruise. Results will permit estimation of the strength of the Aleutian North Slope Current

Our final sea day saw the deployment of the southern Akutan Pass mooring and its accompanying CTD cast.

We feel most fortunate to have accomplished all of the mooring deployments and recoveries during this cruise. Despite the initial poor weather that kept us from completing the CTD survey, the excellent weather after we sailed and the skill of the ship's complement allowed us to complete all the scheduled work and even complete some of that missed early in the cruise. Our thanks go out to the capable men and women of the NOAA Ship *Miller Freeman* under the leadership of Captain Dean Smehil. We especially recognize the effort expended by Chief Boatswain Rick Pietrusiak and the entire deck department who spent many long hours on mooring deployments and recoveries. We thank Chief Survey Technician Greg Kaufmann and all of the bridge watchstanders for their tireless assistance in completing the scientific objectives of this cruise.

Specifics of operations:

2001 Date (GMT)	Time (GMT)	N Latitude (deg min)		W Longitude (deg min)		ID number	Operation	Depth (m)	Comments
05/15	0023	54	04.02	166	17.83	AKP-01-1	Deploy mooring	82.5	mooring 2 (ADCP) deployed in north position in pass

05/15	0043	54	03.77	166	17.07	CTD001	CTD	83.2	At AKP-2
05/15	2222	56	25.09	160	12.80	CTD002	CTD	23.0	At crab mooring 1
05/16	0030	56	24.86	160	13.33	KC-00-1	Recover mooring	23.1	After dragging operation
05/16	0130	56	25.04	160	12.97	KC-01-1	Deploy mooring	23.6	
05/16	0144	56	25.28	160	13.31	CTD003	CTD	24.2	At KC-1
05/16	0421	56	30.03	161	00.18	CTD004	CTD	67.2	At KC-2
05/16	0442	56	29.88	160	59.85	KC-00-2	Recover mooring	66.1	
05/16	0458	56	29.90	160	59.92	KC-01-2	Deploy mooring	66.3	
05/16	0511	56	30.07	161	00.15	CTD005	CTD	66.9	At KC-2
05/16	1345	56	59.54	163	46.96	Bongo01	Bongo	69.8	Station Z
05/16	1508	56	52.65	164	03.07	Bongo02	Bongo	73.3	Site #2
05/16	1531	56	52.94	164	02.83	CTD006	CTD	73.0	
05/16	1634	56	52.19	164	03.98	BS-2	Recover mooring	72.4	Subsurface mooring
05/16	2152	56	52.99	164	03.50	BSM-2	Deploy mooring	72.8	“Peggy”
05/16	2326	56	52.99	164	03.20	BSST-2	Deploy mooring	72.7	Sediment trap
05/16	2348	56	53.20	164	02.98	CTD007	CTD	72.8	Site #2
05/17	0146	56	46.11	164	19.60	Bongo03	Bongo	75.0	Y
05/17	0444	57	06.93	164	60.00	CTD008	CTD	70.3	AA
05/17	0757	57	24.89	165	51.97	CTD009	CTD	68.4	AB
05/17	1056	57	32.15	166	43.86	CTD010	CTD	70.3	AC
05/17	1403	57	37.97	167	36.14	CTD011	CTD	70.9	AD
05/17	1702	57	45.98	168	28.12	CTD012	CTD	71.8	AE
05/17	1837	57	51.33	168	52.16	CTD013	CTD	72.5	Site #4
05/17	1932	57	50.53	168	52.65	BS-4	Recover mooring	72.1	BS-4
05/17	2249	57	51.18	168	52.16	BS-4	Deploy mooring	72.4	BS-4
05/17	2303	57	51.34	168	52.00	CTD014	CTD	72.4	Site #4
05/18	1220	55	29.96	170	30.14	Argo 464	Deploy satellite drifter	3179	Argo float 1
05/18	1608	54	50.10	170	58.05	Argo 470	Deploy satellite drifter	3179	Argo float 2
05/18	1946	54	10.09	171	25.96	Argo 503	Deploy satellite drifter	3279	Argo float 3
05/18	2328	53	30.11	171	54.02	Argo 507	Deploy satellite drifter	2661	Argo float 4
05/19	0637	52	15.98	172	45.04	SM-1	Deploy mooring	159.6	Seguam Pass
05/19	0846	52	08.07	172	25.19	SM-2	Deploy mooring	167.7	

05/19	0905	52	08.29	172	24.88	CTD015	CTD	168.5	
05/19	1119	52	22.91	172	07.05	AMP-4	Deploy mooring	370.0	Amukta Pass, damaged on deployment, sensor OK
05/19	1140	52	23.16	172	06.85	CTD016	CTD	360.7	
05/19	1249	52	24.00	171	55.08	AMP-3	Deploy mooring	308.6	
05/19	1308	52	24.23	171	54.98	CTD017	CTD	307.6	
05/19	1434	52	24.98	171	39.93	AMP-2	Deploy mooring	458.6	
05/19	1500	52	25.24	171	39.81	CTD018	CTD	477.9	
05/19	1607	52	26.00	171	27.04	AMP-1	Deploy mooring	414.0	
05/19	1628	52	26.11	171	26.49	CTD019	CTD	392.9	
05/20	0052	52	23.81	169	44.78	GS-1	Deploy mooring	986.1	Alaska Stream (mooring position and anchor drop position are the same
05/20	0157	52	23.69	169	44.80	CTD020	CTD	1090	
05/20	1257	51	43.11	169	22.38	GS-5	Deploy mooring	5100	Anchor dropped at 51 43.69 N, 169 22.69 W
05/20	1348	51	44.19	169	22.84	CTD021	CTD	4670	
05/20	1825	51	59.00	169	31.00	GS-4	Deploy mooring	3500	Anchor dropped at 51 59.39 N, 169 31.22 W
05/20	2002	51	59.05	169	30.91	CTD022	CTD	3492	
05/21	0300	52	10.78	169	37.05	GS-3	Deploy mooring	3000	Anchor dropped at 52 11,05 N, 169 37.31 W
05/21	0351	52	11.37	169	37.99	CTD023	CTD	2957	
05/21	0608	52	16.05	169	40.12	GS-2	Deploy mooring	2000	Anchor dropped at 52 16.23 N, 169 40.23 W
05/21	0651	52	15.98	169	39.97	CTD024	CTD	2040	
05/21	1433	53	22.19	168	43.88	CTD025	CTD	291	Start 6-3 survey, A
05/21	1537	53	26.21	168	46.00	CTD026	CTD	1085	B, site #6
05/21	1729	53	31.12	168	53.76	CTD027	CTD	1758	C
05/21	1927	53	36.14	169	02.82	CTD028	CTD	1767	D
05/21	2202	53	46.93	169	16.19	CTD029	CTD	1542	E
05/22	0058	54	02.36	169	34.37	CTD030	CTD	1810	F
05/22	1358	53	56.02	165	55.00	AKP-01-2	Deploy mooring	90.7	AKP-2 with RCM-9
05/22	1412	53	56.24	165	54.73	CTD031	CTD	100.0	

Attachments:

Table 1. Schedule of operations
Figure 1. Map of operations
Figure 2. Photograph of recovered hardware from KC-1.
Figure 3. Photograph of surface float of BSM-2.
Figure 4. Photograph of syntactic float with ADCP.

Table 1. Schedule of operations

Operation	Site	North Latitude deg	min	West Longitude deg	min	Distance nm	Ship Speed kt	Transit Time hr	Water Depth m	CTD Depth m	CTD Time min	Add-On Time min	Arrive (Local) Date / Time	Depart Date / Time	Cum. Time hr	Cum. Time d
Begin	Dutch Harbor	53	54.50	166	30.90									5/14/01 14:00		
Deploy/CTD	AKP-1	54	4.00	166	18.00	12.2	11.0	1.1	83	73	19	85	5/14/01 15:06	5/14/01 16:50	2.8	0.1
CTD/recover	KC-1	56	25.00	160	13.00	251.2	12.0	20.9	25	15	16	190	5/15/01 13:46	5/15/01 17:12	27.2	1.1
Deploy/CTD	KC-1	56	25.00	160	13.00	0.0	11.0	0.0	25	15	16	30	5/15/01 17:12	5/15/01 17:58	28.0	1.2
CTD/recover	KC-2	56	29.90	160	59.90	26.4	11.0	2.4	60	50	18	10	5/15/01 20:22	5/15/01 20:50	30.8	1.3
Deploy/CTD	KC-2	56	29.90	160	59.90	0.0	11.0	0.0	60	50	18	10	5/15/01 20:50	5/15/01 21:18	31.3	1.3
Bongo	Z	56	59.80	163	47.00	96.4	12.0	8.0	65	55	0	30	5/16/01 05:20	5/16/01 05:50	39.8	1.7
Bongo/CTD/recover	BS-2	56	52.90	164	3.50	11.3	11.0	1.0	73	63	19	90	5/16/01 06:52	5/16/01 08:41	42.7	1.8
Deploy	BSM-2	56	52.80	164	3.50	0.1	11.0	0.0	72	0	0	360	5/16/01 08:41	5/16/01 14:41	48.7	2.0
Deploy/CTD	BSST-2	56	52.80	164	3.50	0.0	11.0	0.0	72	62	19	110	5/16/01 14:41	5/16/01 16:50	50.8	2.1
Bongo	Y	56	46.00	164	20.00	11.3	13.0	0.9	70	0	0	15	5/16/01 17:42	5/16/01 17:57	52.0	2.2
CTD	AA	57	7.00	165	0.00	30.3	11.0	2.8	70	60	19	0	5/16/01 20:42	5/16/01 21:01	55.0	2.3
CTD	AB	57	25.00	165	52.00	33.4	11.0	3.0	70	60	19	0	5/17/01 00:03	5/17/01 00:22	58.4	2.4
CTD	AC	57	32.00	166	44.00	28.8	11.0	2.6	70	60	19	0	5/17/01 02:59	5/17/01 03:18	61.3	2.6
CTD	AD	57	38.00	167	37.00	29.0	11.0	2.6	70	60	19	0	5/17/01 05:56	5/17/01 06:15	64.3	2.7
CTD	AE	57	46.00	168	28.00	28.4	11.0	2.6	70	60	19	0	5/17/01 08:50	5/17/01 09:08	67.1	2.8
CTD/recover	AF (BS-4)	57	51.00	168	52.00	13.7	11.0	1.2	72	62	19	100	5/17/01 10:23	5/17/01 12:22	70.4	2.9
Deploy/CTD	BS-4	57	51.00	168	52.00	0.0	11.0	0.0	72	62	19	140	5/17/01 12:22	5/17/01 15:01	73.0	3.0
Deploy float	Argo float 1	55	30.00	170	30.00	150.9	11.4	13.2	3179	0	0	5	5/18/01 04:15	5/18/01 04:20	86.3	3.6
Deploy float	Argo float 2	54	50.00	170	58.00	43.1	11.6	3.7	3179	0	0	5	5/18/01 08:03	5/18/01 08:08	90.1	3.8
Deploy float	Argo float 3	54	10.00	171	26.00	43.2	12.1	3.6	3279	0	0	5	5/18/01 11:42	5/18/01 11:47	93.8	3.9
Deploy float	Argo float 4	53	30.00	171	54.00	43.3	11.9	3.6	2000	0	0	5	5/18/01 15:25	5/18/01 15:30	97.5	4.1
Deploy	SMP-1	52	16.00	172	45.00	80.1	12.0	6.7	160	0	0	60	5/18/01 22:11	5/18/01 23:11	105.2	4.4
Deploy/CTD	SMP-2	52	8.00	172	25.00	14.6	11.0	1.3	100	90	21	13	5/19/01 00:31	5/19/01 01:05	107.1	4.5
Deploy/CTD	AMP-4	52	23.00	172	7.00	18.6	11.0	1.7	400	390	38	16	5/19/01 02:46	5/19/01 03:40	109.7	4.6
Deploy/CTD	AMP-3	52	24.00	171	55.00	7.4	11.0	0.7	400	390	38	10	5/19/01 04:20	5/19/01 05:08	111.1	4.6
Deploy/CTD	AMP-2	52	25.00	171	40.00	9.2	11.0	0.8	400	390	38	22	5/19/01 05:58	5/19/01 06:58	113.0	4.7
Deploy/CTD	AMP-1	52	26.00	171	27.00	8.0	11.0	0.7	400	390	38	22	5/19/01 07:41	5/19/01 08:41	114.7	4.8
Deploy/CTD	GS-1	52	23.81	169	44.78	62.4	10.5	5.9	1000	990	67	150	5/19/01 14:38	5/19/01 18:15	124.3	5.2
Start bottom survey	Ak Stream	52	23.81	169	44.78	0.0	11.5	0.0	1000	0	0	0	5/19/01 18:15	5/19/01 18:15	124.3	5.2
End bottom survey	Ak Stream	51	43.11	169	22.38	43.0	11.5	3.7	6000	0	0	130	5/19/01 21:59	5/20/01 00:09	130.2	5.4
Deploy/CTD	GS-5	51	43.11	169	22.38	0.0	11.0	0.0	5100	1500	92	270	5/20/01 00:09	5/20/01 06:11	136.2	5.7
Deploy/CTD	GS-4	51	59.00	169	31.00	16.8	11.0	1.5	3500	3000	165	300	5/20/01 07:42	5/20/01 15:28	145.5	6.1
Deploy/CTD	GS-3	52	10.78	169	37.05	12.4	11.0	1.1	3000	1500	92	140	5/20/01 16:35	5/20/01 20:27	150.5	6.3
Deploy/CTD	GS-2	52	16.05	169	40.12	5.6	11.0	0.5	2000	1500	92	90	5/20/01 20:57	5/20/01 23:59	154.0	6.4
CTD	A	53	22.00	168	44.00	74.2	11.6	6.4	500	370	37	0	5/21/01 06:23	5/21/01 07:00	161.0	6.7
CTD	B (M6)	53	26.00	168	46.00	4.2	11.5	0.4	1090	1060	70	0	5/21/01 07:22	5/21/01 08:32	162.5	6.8
CTD	C	53	31.00	168	54.00	6.9	11.5	0.6	1793	1500	62	0	5/21/01 09:08	5/21/01 10:10	164.2	6.8
CTD	D	53	36.00	169	3.00	7.3	11.5	0.6	1500	1490	80	0	5/21/01 10:48	5/21/01 12:08	166.1	6.9
CTD	E	53	47.00	169	16.00	13.4	11.5	1.2	1700	1500	80	0	5/21/01 13:18	5/21/01 14:38	168.6	7.0
CTD	F	54	2.00	169	34.00	18.4	11.5	1.6	1800	1500	80	0	5/21/01 16:14	5/21/01 17:34	171.6	7.1
Waypoint	AKP-1	54	4.00	166	18.00	115.1	11.1	10.4	83	0	0	0	5/22/01 03:56	5/22/01 03:56	181.9	7.6
Deploy/CTD	AKP-2	53	56.00	165	55.00	15.7	11.0	1.4	70	60	19	51	5/22/01 05:22	5/22/01 06:32	184.5	7.7
Waypoint	AKP-1	54	4.00	166	18.00	15.7	11.0	1.4	83	0	0	0	5/22/01 07:57	5/22/01 07:57	186.0	7.7
Terminate	Dutch Harbor	53	54.50	166	30.90	12.2	11.0	1.1	0	0	0	0	5/22/01 09:04	5/22/01 09:04	187.1	7.8

Figure 1. Map of operations

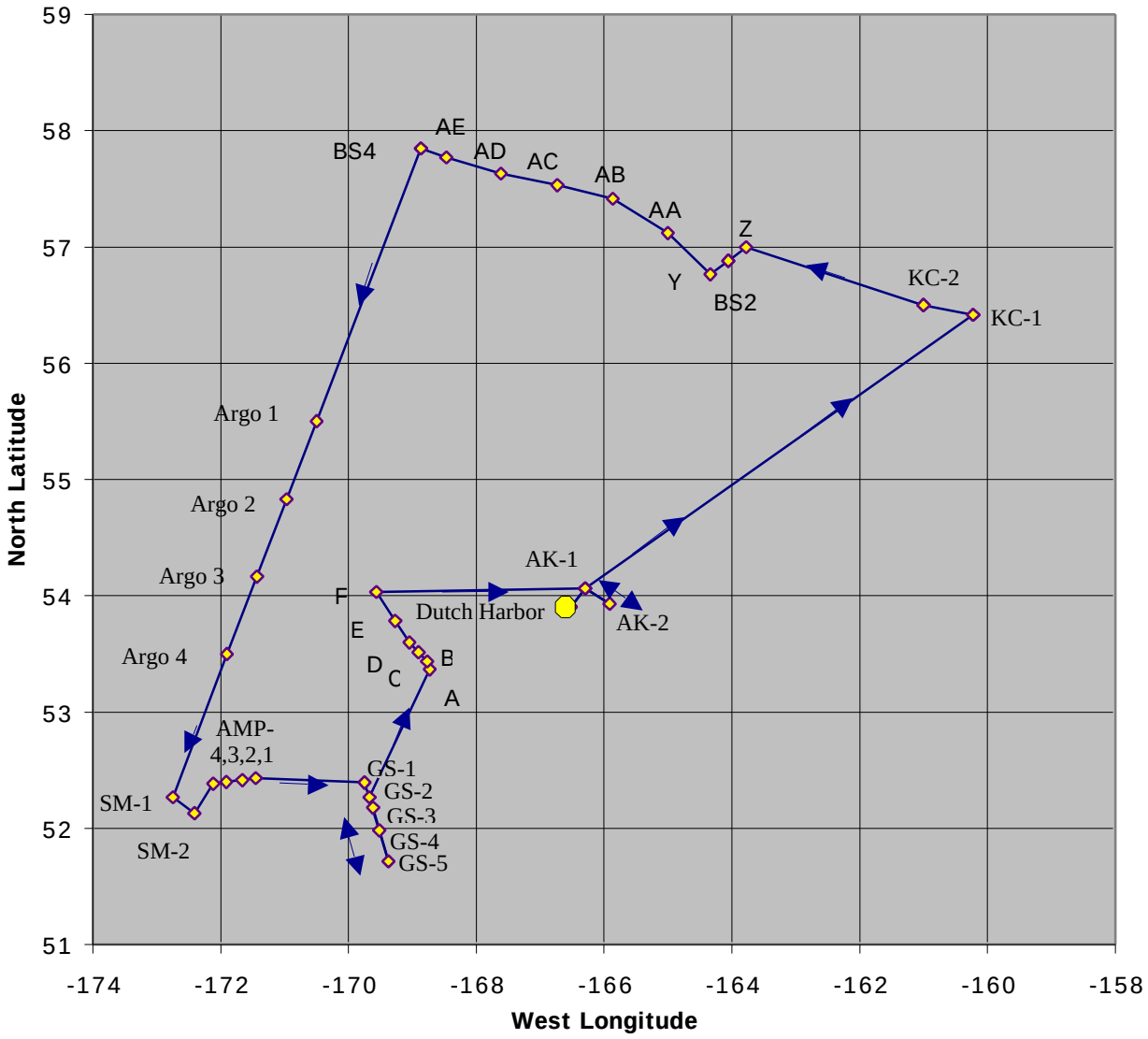

Figure 2. Photograph of recovered hardware from KC-1.

Figure 3. Photograph of surface float of BSM-2 (FOCI-Peggy).

Figure 4. Photograph of syntactic float with ADCP.