## PACIFIC REGION CCG VESSEL -POST CRUISE REPORT

NAME OF SH	IP/PLATF	ORM:	CCGS "Sir Wilfrid Laurier				
DATE:	FROM:	20 Sep	tember 2005	<b>TO:</b> 12 October 2005			
<u>SCIENCE CR</u>	UISE NUM	BER:	2005-06	SHIP'S PATROL NUMBER:			
<u>CHIEF SCIENTIST[S]:</u>			Bon van Hardenberg, DFO/IOS				
AREAS OF O	PERATION	<u> </u>	Beaufort and Ch	ukchi Seas			

## <u>INTRODUCTION/</u> PROGRAM BACKGROUND:

JWACS (Joint Western Arctic Climate Studies) is an ongoing multi-disciplinary joint research program between the Department of Fisheries and Oceans Canada and various partners from other nations, institutes and universities. This component involved scientists from the Institute of Ocean Sciences (Sidney, B.C.), the Japan Marine Science and Technology Center (JAMSTEC), the Freshwater Institute (DFO/Central & Arctic, Winnipeg), and the University of Manitoba.

## **CRUISE OBJECTIVE/OBJECTIVES:**

The objectives of the science program were the recovery and re-deployment of a series of instrumented oceanographic moorings both in the Beaufort Sea and in the Chukchi Sea, and collection of hydrographic profiles, sea water samples and plankton for bio-geochemical analysis from stations along the shelf break and at the location of the mooring sites.

## **DAYS ALLOCATED:**

## **DAYS OF OPERATION:**

## **DAYS LOST DUE TO WEATHER:**

### **RESULTS:**

Nearly all of the objectives of the program were successfully completed. The sea ice cover along the Beaufort Sea shelf prevented sampling at many of the target deeper water stations. This had been anticipated, and several sections at alternate locations provided a satisfactory substitute. Most targeted moorings were recovered, but strong winds and rough seas, predicted to last several days, prevented the recovery of three moorings at locations in the central Chukchi Sea region and one scheduled re-deployment near there.

### RADIOISOTOPE USE: NONE



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## **PROBLEMS** [SCIENTIFIC GEAR AND OPERATIONS]:

The data acquisition system for the CTD/rosette system developed some glitches, refusing to recognize the NMEA automatic position reporting from GPS input. Using this option then required time-out before another attempt. To avoid this, cast locations were entered manually in data file headers. The deck unit was often reluctant to recognize the data stream from the CTD instrument, but no significant time was lost in dealing with this.

On two occasions where a single acoustic release was used on a science mooring, hours of additional time were spent to drag when it failed to release from the mooring anchor. We were successful in recovering both those moorings, but the extra time involved (an overnight wait in one instance) might have jeopardized the successful completion of the cruise objectives.

The dragging winch proved to be not powerful enough to pull the mooring, once snagged, back to the ship which may have contributed to the mooring dropping off the drag hooks several times before successful recovery. Opening and securing the cargo doors into the well-deck lab container is not safe when weather conditions cause roll and pitching on the ship, especially when moving instruments into and out of it. A proper weather-tight man-door of adequate size is needed for access into this space. Repairs will be made to the container bottom, and at that time a door could be added if one can be found that meets recertification requirements.

The Simrad EK5 sounder control units presently located in the aft lab would be more useful on the bridge, with the repeater maintained in the CTD control station.

## SUCCESSES [SCIENTIFIC]:

In spite of the presence of extensive sea ice near the shelf break, the failure of several releases on moorings, and a number of days of rough weather, valuable data were obtained from all recovered mooring instruments: four instrumented moorings were recovered and three were re-deployed at three sites in the Canadian Beaufort Sea, and six moorings were deployed at three sites on the Alaskan North Slope. In the Chukchi Sea region, ranging from Barrow Canyon in the east, the Northwind Ridge to the northwest, and the Bering Strait to the south, moorings were recovered at twelve of the fifteen target locations, and eight out of nine were e redeployed.

Hydrographic profiles were taken at 45 stations, and at most of those water samples were collected for geochemical analysis (salinity, nutrients, and trace-elements O18-isotopes, Barium and Mercury).

## PROBLEMS [SHIP'S EOUIPMENT/OPERATIONS/PLATFORM SUITABILITY]:

Working space for dealing with the large quantity of mooring instruments was limited, and hauling the heavier ones several levels up to the science labs for testing, powering, downloading data and re-programming was awkward. To deal with the lack of dust-free well lighted work-space with benches near the well-deck level, many of the lighter instruments were programmed and tested in the personal cabins of mooring scientists. An additional container with electric power, light and work benches could be located near the forward bulkhead in the between-decks area of the hold for working on mooring instruments. Access to the hold during rough weather is still a problem. The over-the-side lights for work after dark at the CTD/rosette station was not adequate during marginal weather conditions when entry/exit from the water becomes critical to instrumentation.

There was some limited UPS power provided in the main lab as a temporary solution.

### SUCCESSES [SHIP]:

## **DELAYS [OTHER THAN WEATHER]:**

The one delay in program execution was to stand by overnight waiting for daylight in order to continue dragging for a mooring when the single-release failed to open.

SAFETY CONCERNS: proper man-door into well-deck lab container (see above).

HAZARDOUS OCCURRENCES: none reported.



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## EVENT LOG:

Date & time	Station	Lat Deg (N)	Lat Min (N)	Lon Deg (W)	Lon Min (W)	Bottom Depth (m)	Sample Depth (m)	Activity
05/09/20 14:30	Cambr Bay	69	6.520	105	3.760			Science team joins ship
05/09/23 15:00	Cambr Bay	69	6.540	105	3.760	57	52	CTD/ros test cast
05/09/25 16:30	AG-CTD	70	33.580	121	29.272	466	444	CTD/R & Net
05/09/26 16:30	ITC03-8	72	34.680	127	27.174	113		Mooring recover+CTD
05/09/27 03:36	Jctd-01	71	19.990	134	15.060	1100	1000	CTD/R
05/09/27 07:00	ITC04-2	70	59.196	133	44.878	111		Recover&Deploy+CTD
05/09/27 12:30	ITC04-1	70	19.938	133	44.289	55		Recover&Deploy+CTD
05/09/27 20:55	ITC04-1	70	19.977	133	44.483	55		Recover&Deploy+CTD
05/09/28 11:48	Jctd-02	70	37.038	137	0.326	1055	1000	CTD/R
	Jctd-03	70	37.000	140	0.000	1076	1000	Xctd only
05/09/30 02:43	Jctd-04	70	50.023	142	30.304	1571	1000	CTD/R
05/09/30 08:15	HM-B05	70	15.000	143	58.200	32	bottom	2 Moorings Deploy & CTD
05/09/30 13:10	HM-K05	70	17.400	145	19.200	32	bottom	2 Moorings Deploy & CTD
05/09/30 15:33	HM-A05	70	22.200	146	0.000	32	bottom	2 Moorings Deploy & CTD
05/09/30 21:35	Jctd-05	71	5.000	145	0.000	1163	1000	CTD/R
05/10/01 00:58	Jctd-06	71	7.000	147	30.000	1121	1000	CTD/R
05/10/01 05:12	Jctd-09	71	20.000	150	0.000	1049	1000	CTD/R
	Jctd-10	71	51.000	153	0.000	1076		Xctd only
	BCC-03	71	43.770	155	9.490	287	bottom	Mooring recover
05/10/01 16:51	BCE-03	71	40.310	154	59.160	110	bottom	Mooring recover+CTD
05/10/01 18:14	BCE-05	71	40.310	154	59.160	110	bottom	Mooring Deploy
	Jctd-11	72	4.977	153	0.000	1076	1000	CTD/R
05/10/02 07:03	BCC-05	71	48.130	155	20.060	287	bottom	Mooring Deploy
05/10/02 09:03	BCW-03	71	48.130	155	20.060	170	bottom	Mooring recover+CTD
05/10/02 11:00	BCW-05	71	48.130	155	20.060	170	bottom	Mooring Deploy
05/10/02 17:00	Jctd-14	72	45.000	157	15.000	1219	1000	CTD/R
05/10/02 23:00	Jctd-18	73	19.980	158	40.000	1813	1000	CTD/R
05/10/03 01:03	Jctd-19	73	10.000	159	10.020	1050	1000	CTD/R
05/10/03 03:05	Jctd-20	73	5.000	159	40.020	264	bottom	CTD/R
05/10/03 06:52	HSN-03	73	8.650	160	30.370	284	bottom	Mooring recover+CTD
05/10/03 12:22	HCE-05	73	10.000	161	53.000	200	bottom	Mooring Deploy +CTD
05/10/03 16:14	M07-04	73	3.609	163	45.490	100	93	Mooring recover+CTD
05/10/03 22:12	Jctd-22	73	44.969	166	39.973	144	137	CTD
05/10/04 03:12	Jctd-23	74	29.997	168	0.142	281	275	CTD
05/10/04 08:04	AIM04-1	75	6.363	167	59.602	169	156	Mooring recover+CTD
05/10/04 12:10	AIM04-1	75	6.001	167	59.911	169.2		Mooring Deploy



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05/10/04 15:17	JCTD-S1	74	45.032	168	59.880	204	192	CTD
05/10/04 17:21	JCTD-S2	74	44.988	169	59.919	225	210	CTD
05/10/04 19:20	JCTD-S3	74	45.019	171	0.141	256	244	CTD/R
05/10/04 23:28	JCTD-S4	74	22.775	169	21.168	195	180	CTD
05/10/05 01:15	NCS-04	73	58.210	167	34.620	200	bottom	Mooring recover+CTD
05/10/05 10:47	NCS-05	73	58.210	167	34.620	200	bottom	Mooring Deploy
05/10/05 14:08	Jctd-A	74	15.025	165	48.949	290	280	CTD
05/10/05 17:10	Jctd-B	74	29.993	164	14.425	511	492	CTD
05/10/05 10:47	Jctd-C	74	34.943	163	43.130	962	938	CTD/R +Net
05/10/05 21:10	Jctd-D	74	16.000	163	43.000	500	bottom	CTD
05/10/06 00:10	Jctd-E	73	45.998	163	43.124	211	197	CTD
05/10/06 08:17	M06-04	72	40.168	163	42.821	58	50	Mooring recover +CTD
05/10/06 16:50	HSS-04	71	29.736	160	49.779	48	42	CTD & Mooring recover: DRAG eve(2)+AM(1)
	HSS-05	71	29.930	160	50.200	48		Mooring Deploy
05/10/07 14:33	BCH-04	71	6.271	159	21.262	84	75	Mooring recover +CTD
	BCH-05	71	6.248	159	20.072	83		Mooring Deploy
	M04-04	70	38.040	166	44.850	47.5	bottom	skip Mooring recover
	CCC-05	70	38.000	167	37.000	50	bottom	skip Mooring recover
	M05-04	70	38.030	168	14.760	43.2	bottom	skip Mooring recover
	M03-04	69	49.960	168	49.470	47	bottom	skip Mooring recover
05/10/09 14:33	M02-04	65	47.120	168	29.560	57	bottom	Mooring recover+CTD
05/10/09 14:33								CTD & Mooring recover:
00/10/09 14:00	M01-04	65	42.140	168	15.250	44	bottom	found after search
05/10/12 18:00	DutchHbr	53	58.790	166	10.410			Disembark Science

## **SUMMARY/FINAL COMMENTS:**

Near the end of the short Arctic summer, as sudden storms and rough seas become frequent and difficult to predict, and daylight hours rapidly get shorter, it becomes a challenge to complete the science mission objectives. Our special thanks go to the tireless work of the captain, officers and crew without whose contribution we would not have been able to achieve so many of the science plan objectives.