

Ice Stations

Transects of ice thickness, snow depth and ice cores can provide additional information about ice conditions that is not possible to gauge with shipboard methods. Ice cores were taken to provide temperature and salinity profiles through the ice, and chemistry sample. We had four objectives for ice station work:

- (1) to determine the mean level ice thickness and variability at point locations during the cruise;
- (2) to collect ice cores for physical characterization of ice at Kristina Brown's chemistry core sites;
- (3) to collect stable isotopes of dissolved inorganic carbon, Oxygen-18 and particulate organic carbon and bacteria samples; and
- (4) to characterize the snow pack.

Table 1: Measurements and samples at each ice stations.

Ice Station	Date	Latitude	Longitude	# Cores	# thickness	Thickness transects	Snow Pits	Other Samples
1	3-Oct	80	151	2	0	0	No	Snow transect
2	6-Oct	77	149	1	0	0	Yes	
3	7-Oct	77	135	6	7	2	Yes	EM-31
4	10-Oct	74	134	2	0	0	No	
		35.0N	45.5W					

Participants

EM-31 & snow pits: Kazutaka Tateyama

Ice Coring: Kristina Brown (Chemistry) and Alice Orlich (Physical)

Drill and snow transects: Alice Orlich and Jenny Hutchings

Many thanks to Dan Carlson, Glenn, Lori and Misun for assistance on the ice.

Chemistry Cores Summary

Date	Station	Type of Sample	Depth of Sample	Bag #	13C-POC	DIC/TALK	13C-DIC	13C-TOC	18O	Bacteria	salinity
03/10/2009	ITP8	Core 2: Section 1	5-25cm	10		1	2	1	1	1	1
03/10/2009	ITP8	Core 2: Section 2	40-60cm	13		1	2		1		
03/10/2009	ITP8	Core 2: Section 3	70-90cm	12		1	2		1	1	1
03/10/2009	ITP8	Core 2: Section 4	116-126cm	9		1	2	1	1	1	1
03/10/2009	ITP8	Core 2: Section 5	bottom 20	3		1	2	1	1	1	1
06/10/2009	ITP33	PUMP 1	110cm	1	2	1	2		2		1
06/10/2009	ITP33	PUMP 2	110cm	2	1	1	2		2		1
07/10/2009	ITP35	Core 2: Section 1	28 - 54cm	10		1	2				
07/10/2009	ITP35	Core 2: Section 2	98-118cm	1		1	2	2	1	1	1
07/10/2009	ITP35	Core 2: Section 3	157-177cm	20		1	2	2	1	1	1
07/10/2009	ITP35	Core 2: Section 4	186-206cm	7		1	2	2	1	1	1
07/10/2009	ITP35	Core 2: Section 5	226-251cm	5		1	2	2	1	1	1
07/10/2009	ITP35	Core 2: Section 6	302-322cm	6		1	2		1	1	1
07/10/2009	ITP35	Core 2: Section 7	bottom chunks	2		1	2	2	1	1	1
07/10/2009	ITP35	SNOW	upper snow layer (loose)						2	1	
07/10/2009	ITP35	SNOW	lower hard pack snow						2	1	
07/10/2009	ITP35	SNOW	Kazu's snow pits 18O						17		
07/10/2009	ITP35	Core 4: Section 1	0-21cm	21		1	2	2	1	1	1
07/10/2009	ITP35	Core 4: Section 2	21-46cm	22		1	2	2	1	1	1
07/10/2009	ITP35	Core 4: Section 3	46-79cm	23		1	2	2	1	1	1
07/10/2009	ITP35	Core 5: Section 1	0-88cm	1	2						
07/10/2009	ITP35	Core 6: Section 1	0-80cm	2	2						1
08/10/2009	Zodiac SITE 1	POC-1	7cm	1	1						
08/10/2009	Zodiac SITE 1	POC-2	6.5cm	2	1						
08/10/2009	Zodiac SITE 1	DIC-1	6.5cm	L3		4	2	2	1	1	1
08/10/2009	Zodiac SITE 1	DIC-2	7cm	L1		4	2	2	1	1	1
08/10/2009	Zodiac SITE 1	Core 1	6cm	S17			2				1
08/10/2009	Zodiac SITE 1	Core 2 + 3	4 + 4cm	S14							
08/10/2009	Zodiac SITE 2	Core 4 + 6	6.5cm + 7 cm	S15		1	2		1	1	1

08/10/2009	Zodiac SITE 2	DIC-3	7cm + 8cm	L5		7	2	2	1	1	1
08/10/2009	Zodiac SITE 2	POC-3	8cm	3	2						
10/10/2009	ITP34	T&S Core	295cm						30		
10/10/2009	ITP34	CORE 2: Section 1	113	1	2						
10/10/2009	ITP34	CORE 2: Section 2	104	2	2						
10/10/2009	ITP34	CORE 2: Section 3	77.3	3	2						
10/10/2009	ITP34	PUMP 1	110 cm	2	1	1	2		1		1
10/10/2009	ITP34	PUMP 2	110 cm	1	1	1	2		1		1
TOTAL					19	35	48	25	75	19	23

Physical Cores

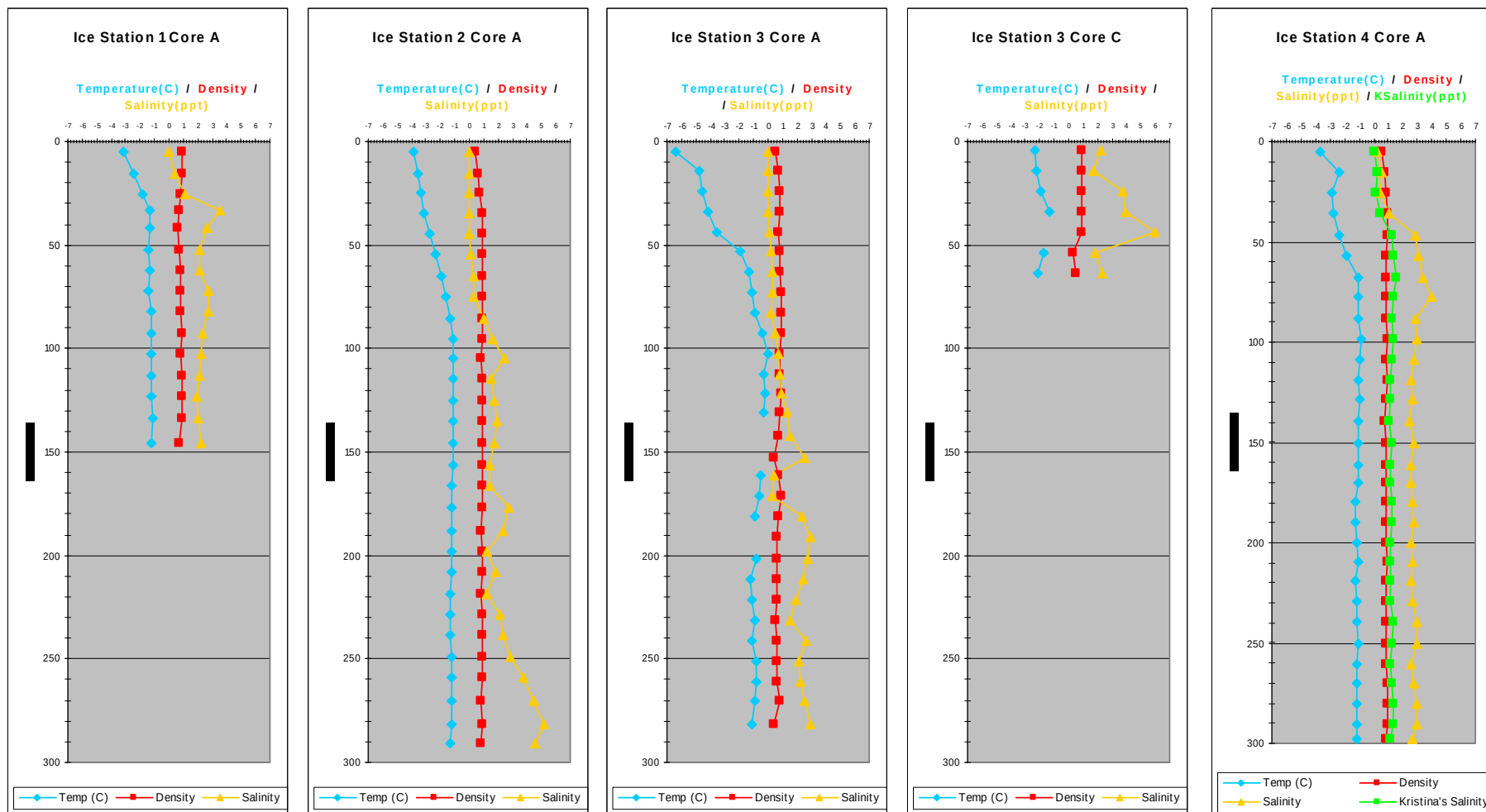
Ice Station 1 Core A: 3 October 2009; 80° 18' 42.7" N 151 58' 39.07" W; ITP8 recovery site. Core was taken for T/S.

Ice Station 2 Core A: 6 October 2009; 77° 59' 42" N 149° 14' 30" W; ITP33 recovery site. Core was taken for T/S.

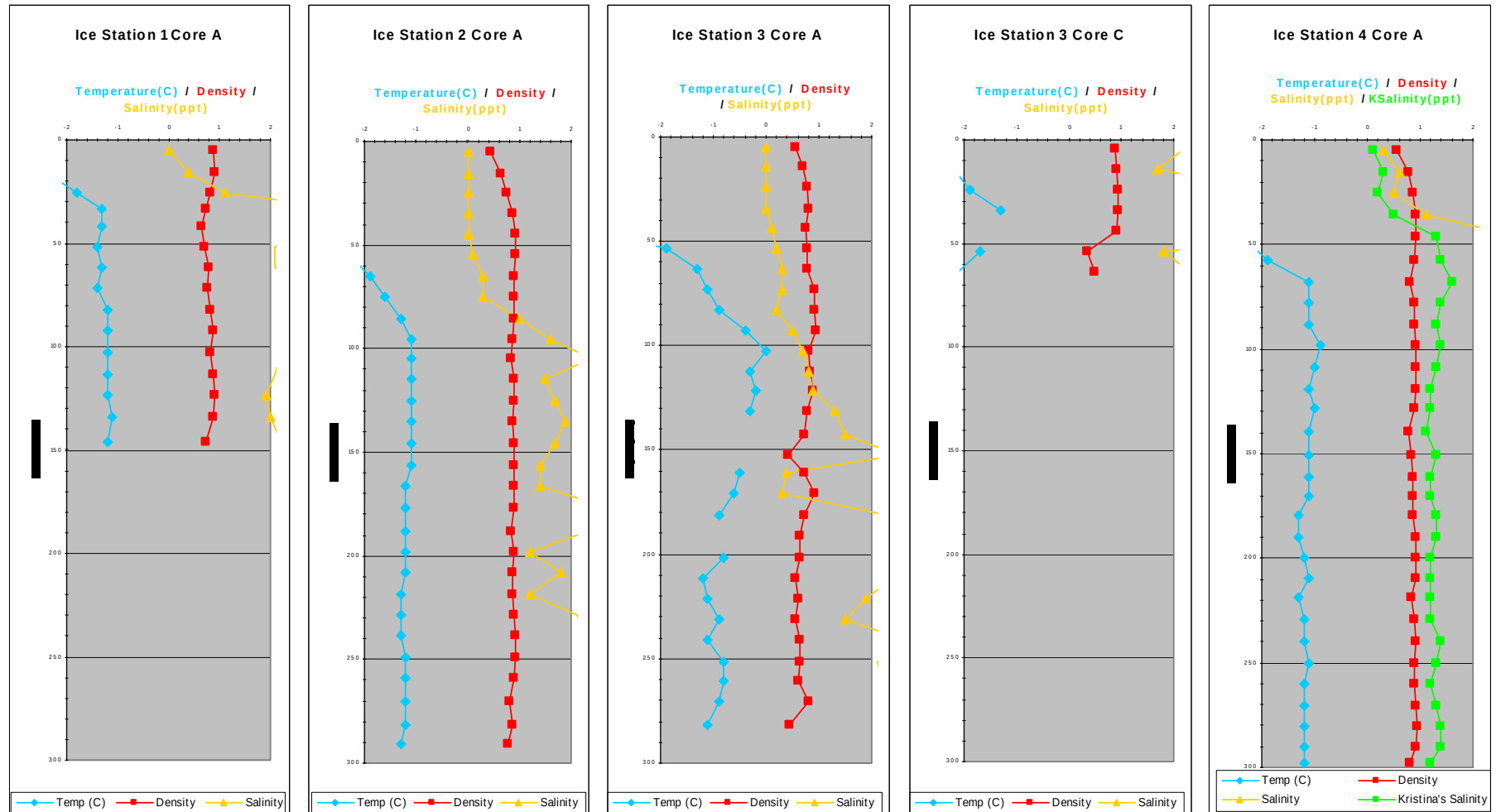
Ice Station 3 Core A: 7 October 2009; 77° 4' 4.56" N 135° 25' 47.1" W; ITP35 recovery site. Core was taken for T/S in thick ice.

Ice Station 3 Core C: 7 October 2009; 77° 4' 4.56" N 135° 25' 47.1" W; ITP35 recovery site. Core was taken for T/S in thin ice.

Ice Station 4 Core A: 10 October 2009; 74° 35' N 134° 45' 30" W; ITP34 recovery site. Core was taken for T/S in thin ice.



Detail of Density and Salinity of JOIS 2009 Ice Core Results



Transects

October 3rd

Snow pack was wind packed drifted snow. Snow drifted in front of ridges, bare ice in places. Paced out transect. Estimated distance between paces is 70cm. Snow Depth (cm): 5,7,7,5,6,18,27,36.5,33,38,18,11,8,7,6,3,5,4,5,7,6.5,7,3,1,6,7,9,3,4.5,3,0,5,6,0,10,17,12,1,12,6,16,27,38,5

October 7th

Line A, on MY ice floe across ridge. 100m long

Hole #:	Dist (m)	Snow depth (cm)	Freeboard (cm)	Ice thickness (cm)
1	8	7.5		>800
2	64	6		>500
3	80	9	41	445
4	92	6.5	39	>500
5	98	20		32

Distance (m)	Snow Depth (cm)	Distance (m)	Snow Depth (cm)	Distance (m)	Snow Depth (cm)	Distance (m)	Snow Depth (cm)	Distance (m)	Snow Depth (cm)
1	6	21	10	41	12	61	9	81	12
2	6	22	13	42	5	62	11	82	10.5
3	6.5	23	17.5	43	19	63	11	83	9
4	7	24	18	44	11	64	9	84	8
5	9	25	25	45	31	65	9	85	9
6	9.5	26	28	46	29	66	9	86	8
7	7	27	35	47	27	67	11	87	7
8	7.5	28	43	48	5	68	8	88	7
9	10	29	50	49	5	69	7	89	9
10	7	30	76	50	11	70	32	90	8.5
11	7	31	58	51	5	71	34	91	8
12	9.5	32	61	52	8	72	51	92	6.5
13	9.5	33	62	53	7	73	37	93	4
14	10	34	63	54	5	74	31	94	7.5
15	7	35	63	55	40	75	22	95	8.5
16	8	36	53	56	7	76	8	96	21
17	9	37	42	57	12	77	25	97	20
18	9	38	6	58	26	78	29	98	20
19	8.5	39	1	59	21	79	7	99	11
20	9	40	0	60	8.5	80	9	100	6

Line B, on first year ice. 30m long.

Hole #:	Dist (m)	Snow depth (cm)	Freeboard (cm)	Ice thickness (cm)	Comments
1	6	36	2	93	
2	18	23	-2	45	negative freeboard

Distance (m)	Snow depth (cm)	Distance (m)	Snow depth (cm)	Distance (m)	Snow depth (cm)
1	54	11	2	21	33
2	36	12	14	22	30
3	35	13	17	23	18
4	34	14	15.5	24	15
5	35	15	12.5	25	14
6	36	16	7	26	13
7	28	17		27	14
8	32	18	18	28	14
9	35.5	19	18	29	14
10	11	20	24	30	17

Appendices

Appendix A: Ice Core Chemistry

Appendix B: EM & Snow

Hourly ice observations located in file ICEOBS09.xls