

# KAIYO Cruise Report

## KY09-07



Kuroshio Extension region

24 August 2009 – 7 September 2009

Japan Agency for Marine-Earth Science and Technology  
(JAMSTEC)

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1. Cruise Information

1.1 Cruise number: KY09-07

1.2 Name of vessel: KAIYO

1.3 Title of the cruise: Observation Research on the Kuroshio Transport and Sea Surface Flux

1.4 Title of proposal: Observation Research on the Kuroshio Transport and Sea Surface Flux

1.5 Cruise period: 24 August – 7 September 2009

1.6 Ports of call: From / To JAMSTEC Wharf 2.

1.7 Research area: Kuroshio Extension Region

1.8 Research map:

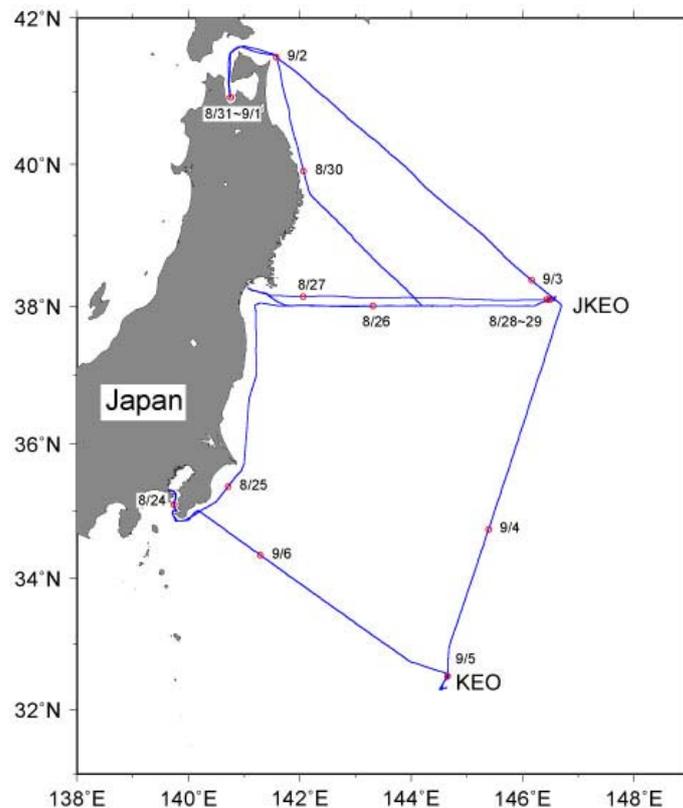


Figure 1. Cruise track with ship position at noon (circle) on each day.

## 2. Researchers

### 2.1 Chief scientist: Yoshimi Kawai

Ocean-Atmosphere Interaction Research Team  
Ocean Climate Change Research Program  
Research Institute for Global Change (RIGC)  
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

### 2.2 Representative of the science party:

Hiroshi Ichikawa            RIGC/JAMSTEC

### 2.3 Science party:

Yoshimi Kawai	RIGC/JAMSTEC
Hiroshi Ichikawa	RIGC/JAMSTEC
Akira Nagano	RIGC/JAMSTEC
Kyoko Taniguchi	RIGC/JAMSTEC
Hitoshi Tamura	RIGC/JAMSTEC
Hiroyuki Tomita	RIGC/JAMSTEC (not on board)
Takuji Waseda	RIGC/JAMSTEC (not on board)
Yasumasa Miyazawa	RIGC/JAMSTEC (not on board)
Shuichi Watanabe	Mutsu Institute of Oceanography (MIO)/JAMSTEC (not on board)
Robert Kamphaus	Pacific Marine Environmental Laboratory (PMEL)/National Oceanic and Atmospheric Administration (NOAA)
Keith Ronnholm	PMEL/NOAA
Meghan Cronin	PMEL/NOAA (not on board)

### 2.4 Observation technicians:

Hirokatsu Uno	Marine Works Japan Ltd. (MWJ)
Kazuho Yoshida	Global Ocean Development Inc. (GODI)
Keisuke Matsumoto	MWJ
Akira Watanabe	MWJ
Syungo Oshitani	MWJ
Hiroyuki Hayashi	MWJ
Takami Mori	MWJ
Hiroto Tanouchi	GODI

### 3. Observation

#### 3.1 Purpose and background

The amount of air-sea turbulent heat flux in the Kuroshio Extension (KE) region is the largest among the world oceans. It is expected that the large heat transfer affects the atmosphere on both small and large scales. To understand the interaction between the atmosphere and the ocean circulation in the North Pacific, it is necessary to examine the spatial distribution of surface heat flux around the KE region and its temporal variations with high accuracy. However, the existing heat flux data have still large uncertainty. Furthermore, this is one of the major CO<sub>2</sub>-sink regions, and the partial pressure measurement of CO<sub>2</sub> in the surface water is very important to evaluate the CO<sub>2</sub> budget.

The KY09-07 cruise was conducted around the KE region. There were two moored buoys in the observation area: one is the K-TRITON buoy of JAMSTEC, which was deployed at 38°04.8'N, 146°25.2'E (JKEO site) north of KE in November 2008, and the other is the KEO buoy of NOAA, which was deployed at 32°19.0'N, 144°33.3'E (KEO site) south of KE in September 2008. They had been obtaining oceanic and surface meteorological data for research on surface heat flux estimation and air-sea interaction. These buoys also had pCO<sub>2</sub> sensors for biogeochemical research.

One of the main purposes of this cruise was the recovery and deployment of these moored buoys to maintain the long-term fixed-point oceanic and meteorological observations. We also planned radiosonde and XCTD (eXpendable Conductivity, Temperature and Depth profiler) observations along a line across KE to investigate atmospheric response to spatial/temporal variations in ocean temperature, and to evaluate lateral water mass and heat budgets. In addition, a drifting GPS buoy was deployed at the JKEO site in this cruise. This buoy was designed to measure wave height and period for research on freak wave. The new K-TRITON buoy deployed in this cruise also has a function to measure them.

#### 3.2 Observations and activities

##### 1) Oceanographic survey using XCTD

Vertical profiles of water temperature and salinity up to 1000-m depth were observed 46 times in total at 44 sites along a closed line shown in Figure 2a (11 sites along the N line, 17 sites along the E line, 14 sites along the X line, the JKEO and KEO sites).

##### 2) Oceanographic survey using CTD with LADCP

Vertical profiles of water temperature, salinity and current velocity were

observed at 2 sites (Figure 2a). We observed them from the surface to 2000-m depth at the N07 site, to the bottom at the JKEO site.

3) Atmospheric sounding using radiosonde

Vertical profiles of air temperature, relative humidity, and wind velocity were observed 18 times in total at 13 sites along the E line shown in Figure 2b (11 sites along the E line, the JKEO and KEO sites).

4) Recovery and deployment of the K-TRITON buoys

The K-TRITON buoys have anemometers, thermometers for air temperature, hygrometers, longwave radiometers, shortwave radiometers, pCO<sub>2</sub> sensors, CTs (water temperature and salinity) and CTDs (water temperature, salinity, and pressure). The K-TRITON buoy deployed in the KY09-07 cruise also has a wave gauge, a rain gauge and a barometer.

5) Recovery and deployment of the KEO buoys (PMEL/NOAA)

The KEO buoys have anemometers, thermometers for air temperature, hygrometers, longwave radiometers, shortwave radiometers, pCO<sub>2</sub> sensors, rain gauges, barometers, current meters, CTs (water temperature and salinity) and CTDs (water temperature, salinity, and pressure).

6) Surface water sampling at the JKEO site (MIO/JAMSTEC)

Bucket water sampling was done just before and after the deployment of the K-TRITON buoy at the JKEO site for DIC and TA measurements.

7) Release of a drifting buoy

A drifting buoy was released after the deployment of the K-TRITON buoy at the JKEO site 0.3 nautical miles off the K-TRITON buoy. The drifting buoy has a function of measuring wave height, wave period, wave direction, water level, wind speed, wind direction, atmospheric pressure, air temperature and water temperature.

8) Underway marine meteorological measurements on the vessel

We observed shortwave and longwave radiations, air temperature, and relative humidity, wind speed, wind direction, atmospheric pressure during the cruise.

9) Underway oceanic measurements on the vessel

We observed surface temperature, current velocity, wave height, and wave period during the cruise.

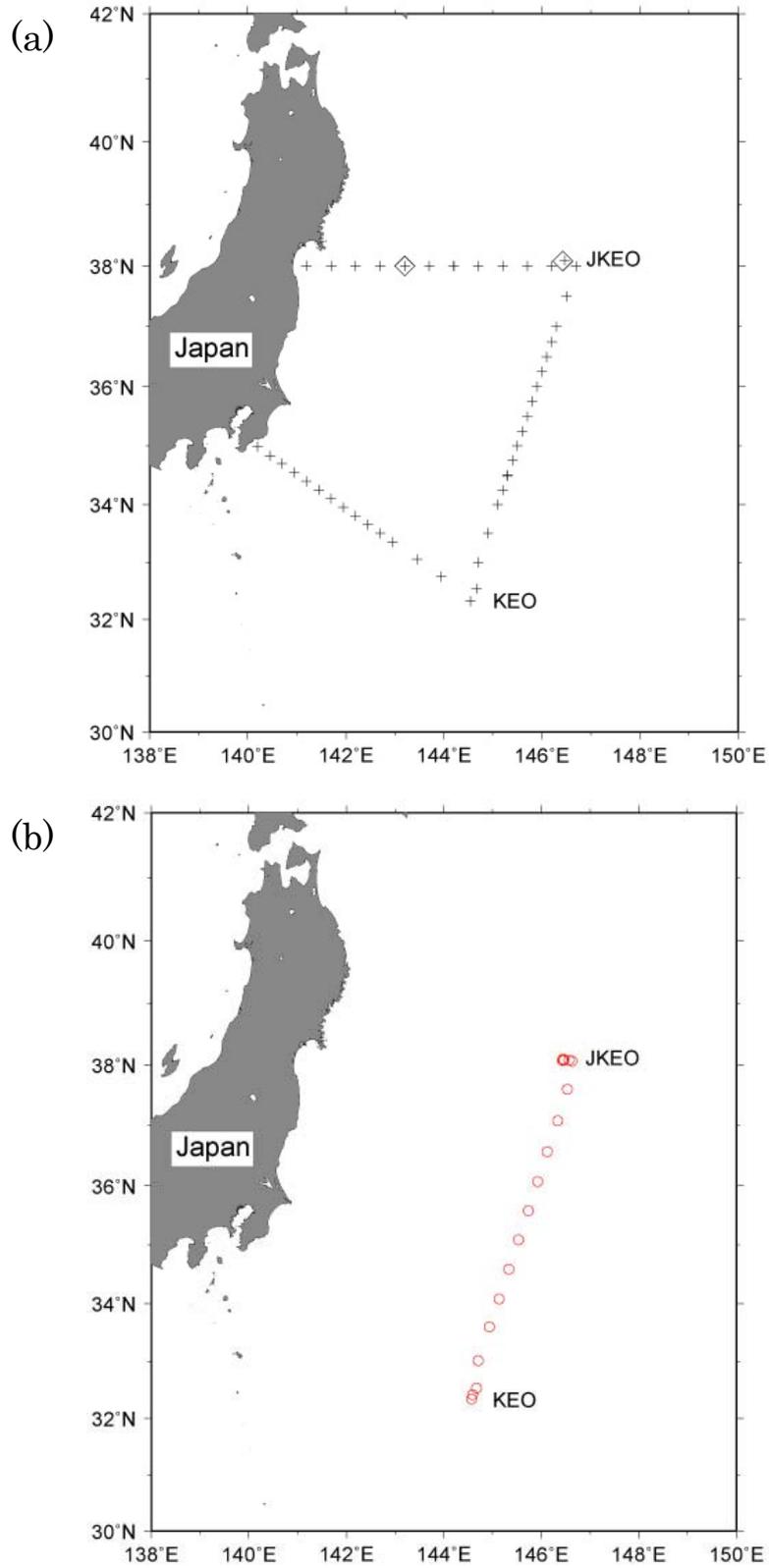


Figure 2. Locations of (a) the XCTD (plus) and CTD/LADCP (diamond) observations and (b) the radiosonde observations.

### 3.3 Instruments

XCTD	XCTD-1 (Tsurumi Seiki)
CTD	SBE-9 plus (Sea-Bird Electronics)
LADCP	WH-300 (RDI)
Radiosonde	RS92-SGPD (sonde), SPS311G (receiving set) (Vaisala)
Thermometer/hygrometer	CVS-HMP-45A (Climatec)
Shortwave radiometer	CM-21 (Kipp&Zone)
Longwave radiometer	CG-4 (Kipp&Zone)
K-TRITON buoy	JAMSTEC
Anemometer	ASIMET WS/D Module (Star Engineering)
Thermometer/hygrometer	ASIMET RH/AT Module (Star Engineering)
Shortwave radiometer	ASIMET SW Module (Star Engineering)
Longwave radiometer	ASIMET LW Module (Star Engineering)
CTD	37-IM, 39-IM, 37-SM (Sea-Bird Electronics)
pCO <sub>2</sub> sensor	handmade at MIO
Wave gauge	Zeni lite buoy
Drifting GPS buoy	Zeni lite buoy
KEO buoy	PMEL/NOAA

### 3.4 Observation results ADCP measurements

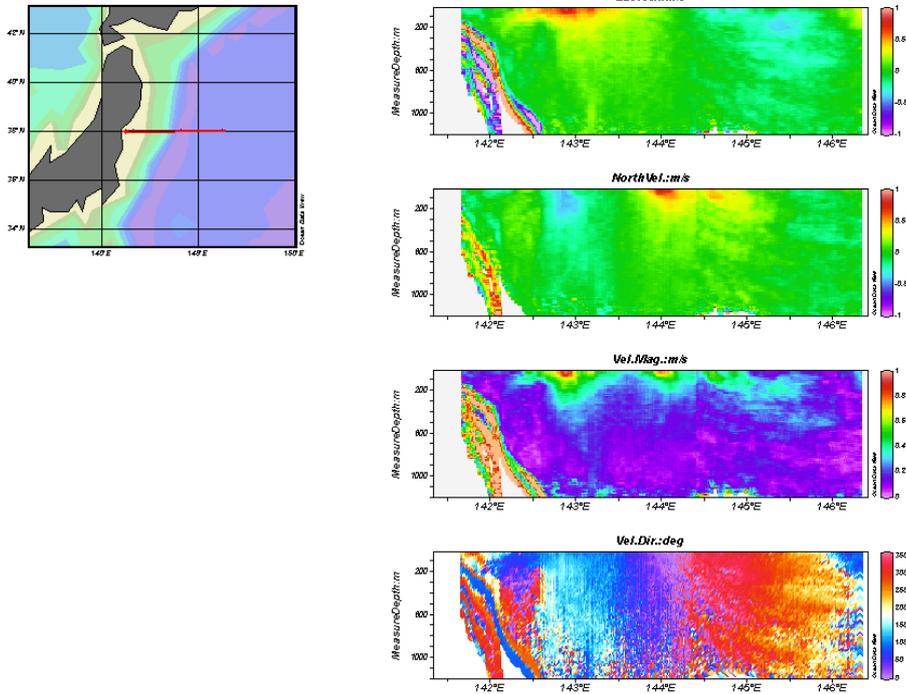


Figure 3. Magnitude (third panel) and direction (bottom panel) of the current, and its zonal (top panel) and meridional (second panel) components along the N line (left panel).

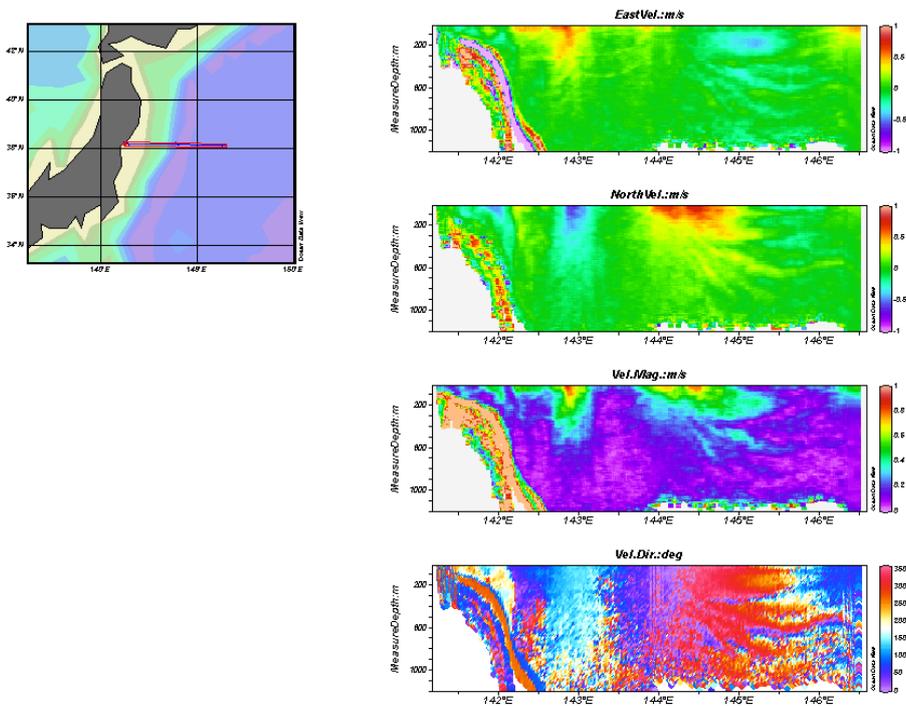


Figure 4. Same as Fig.3 except for the line slightly north of the N line (left panel).

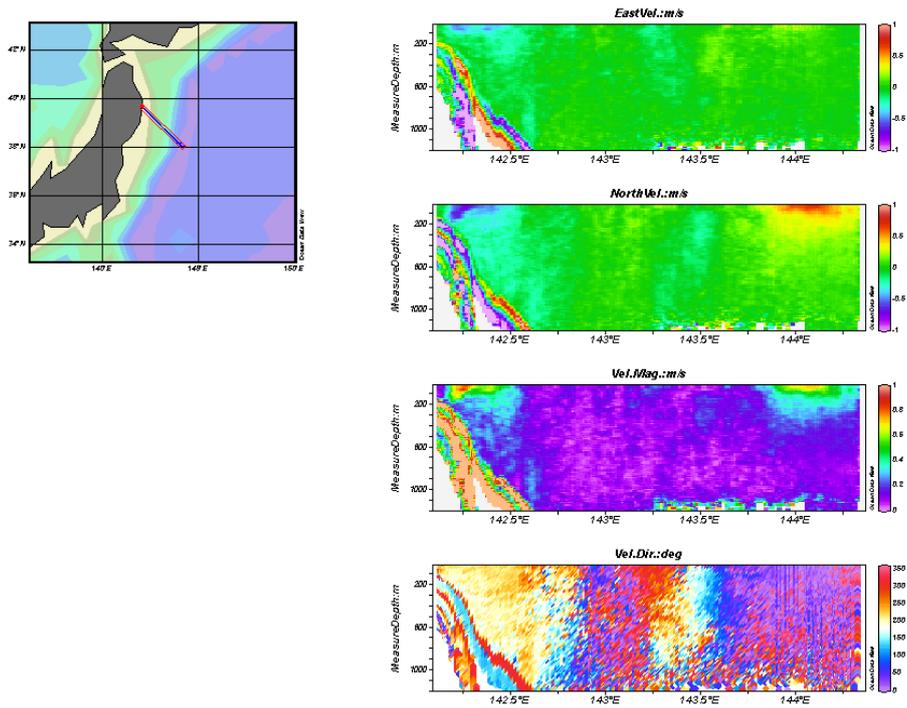


Figure 5. Same as Fig.3 except for the line from the N5 site to off Miyako (left panel).

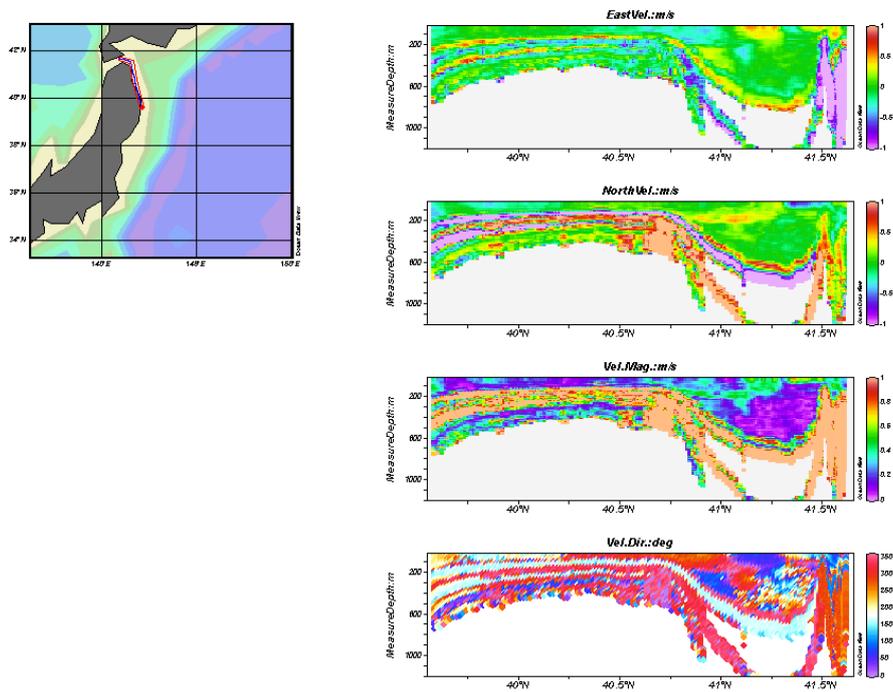


Figure 6. Same as Fig.3 except for the line along the northern Sanriku coast (left panel).

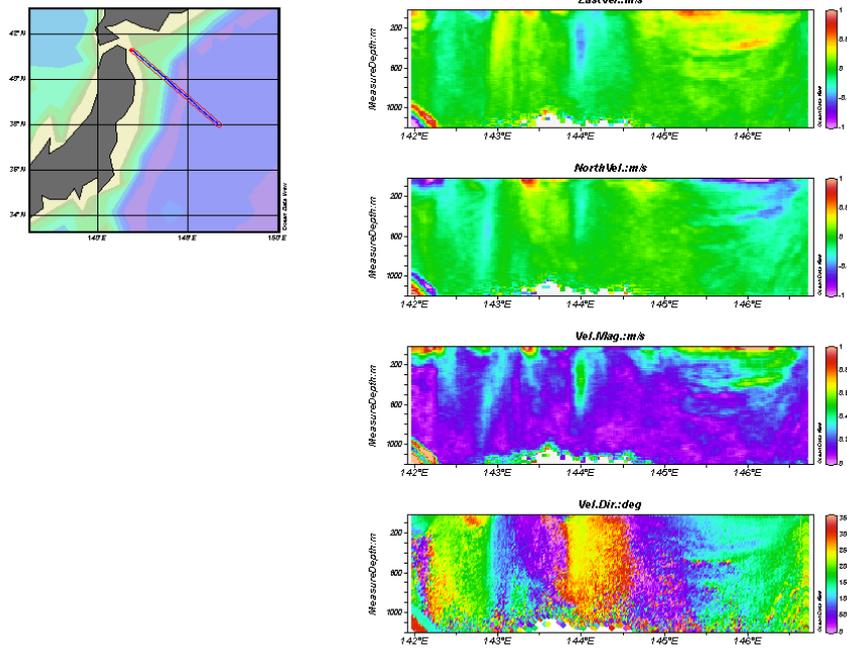


Figure 7. Same as Fig.3 except for the line from Shiriyazaki to the E1 site (left panel).

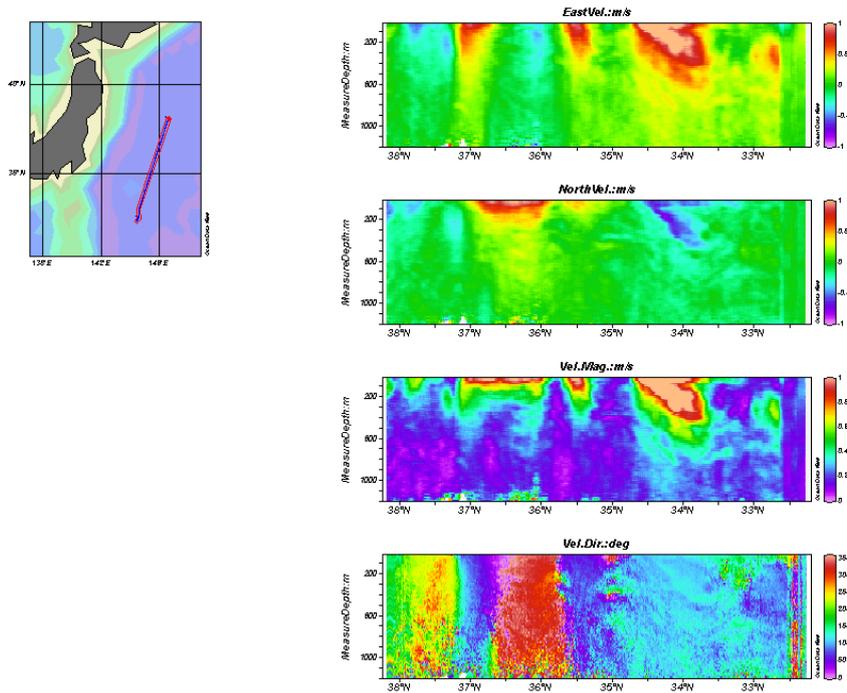


Figure 8. Same as Fig.3 except for the E line (left panel).

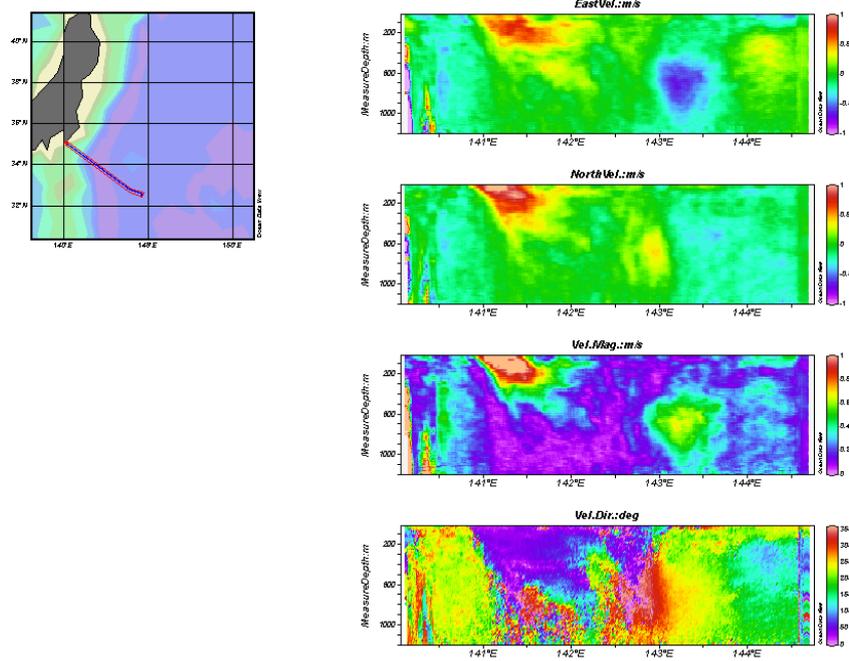


Figure 9. Same as Fig.3 except for the X line (left panel).

XCTD measurements

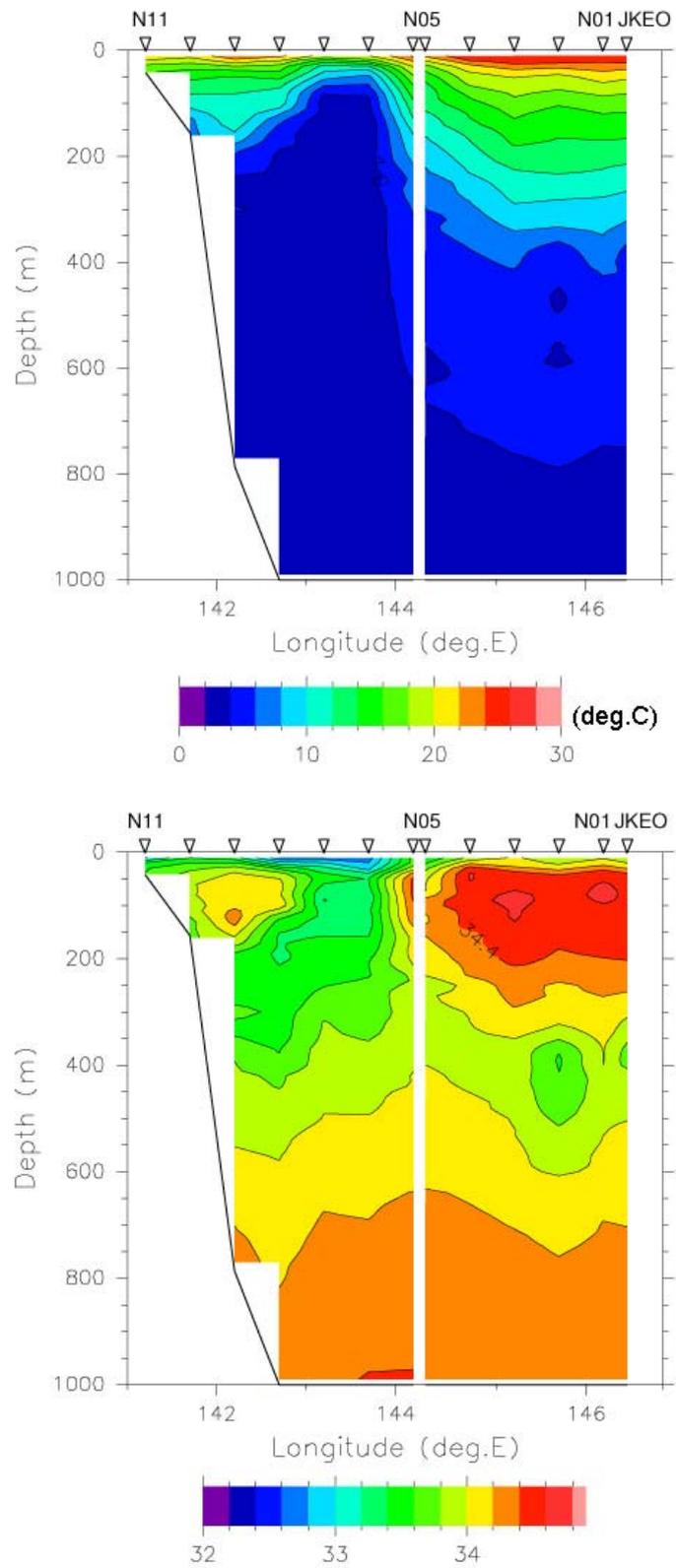


Figure 10. Potential temperature (upper) and salinity (lower) along the N line.

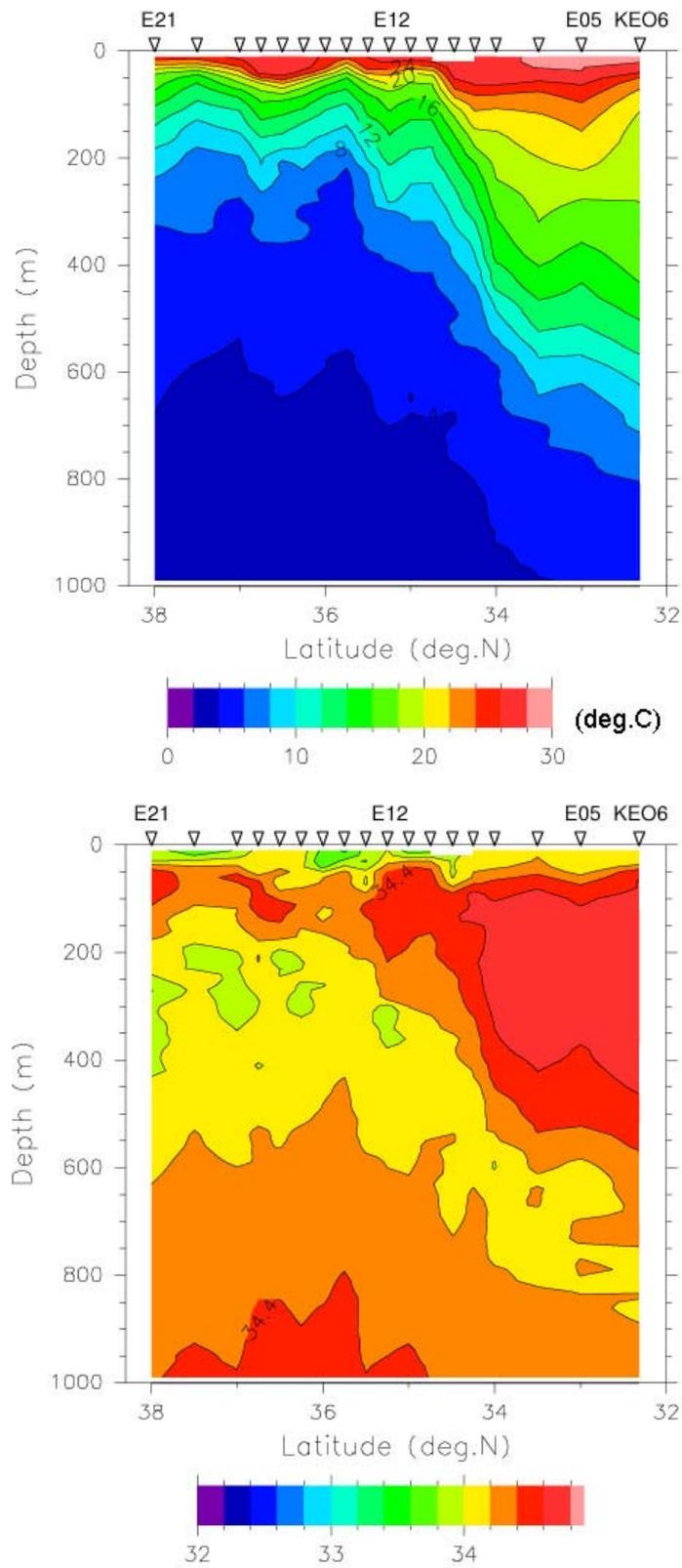


Figure 11. Potential temperature (upper) and salinity (lower) along the E line.

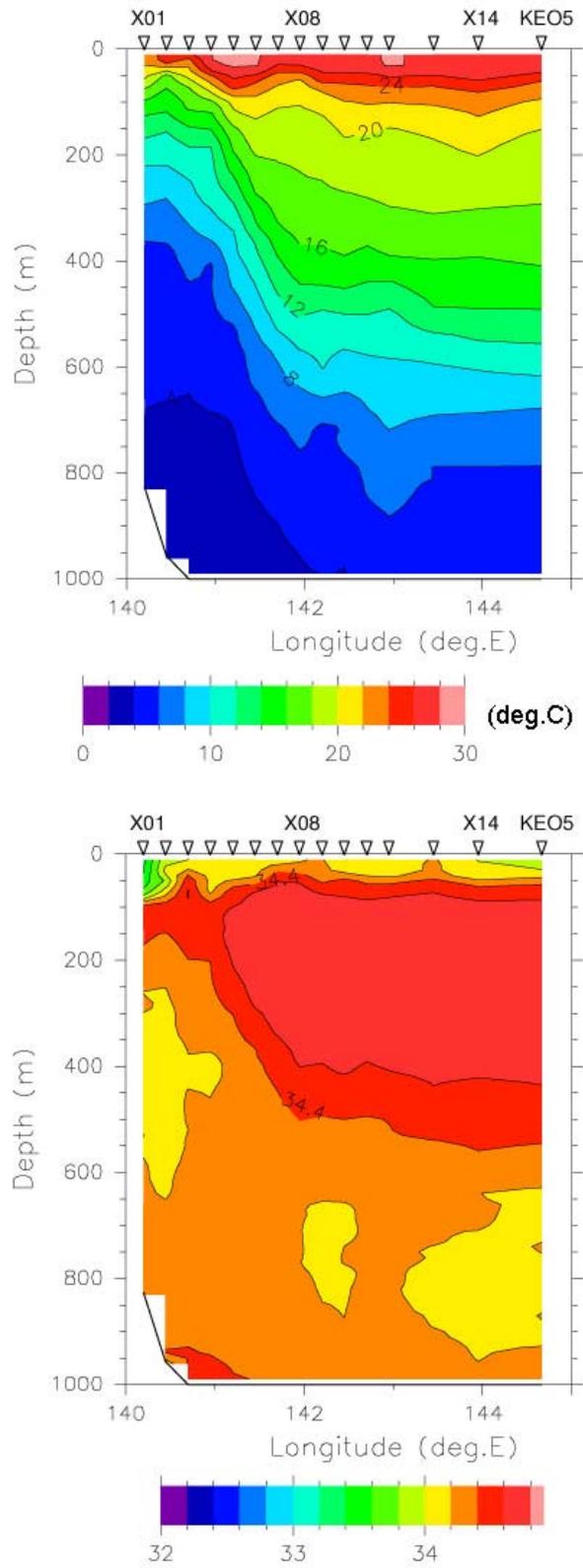


Figure 12. Potential temperature (upper) and salinity (lower) along the E line.

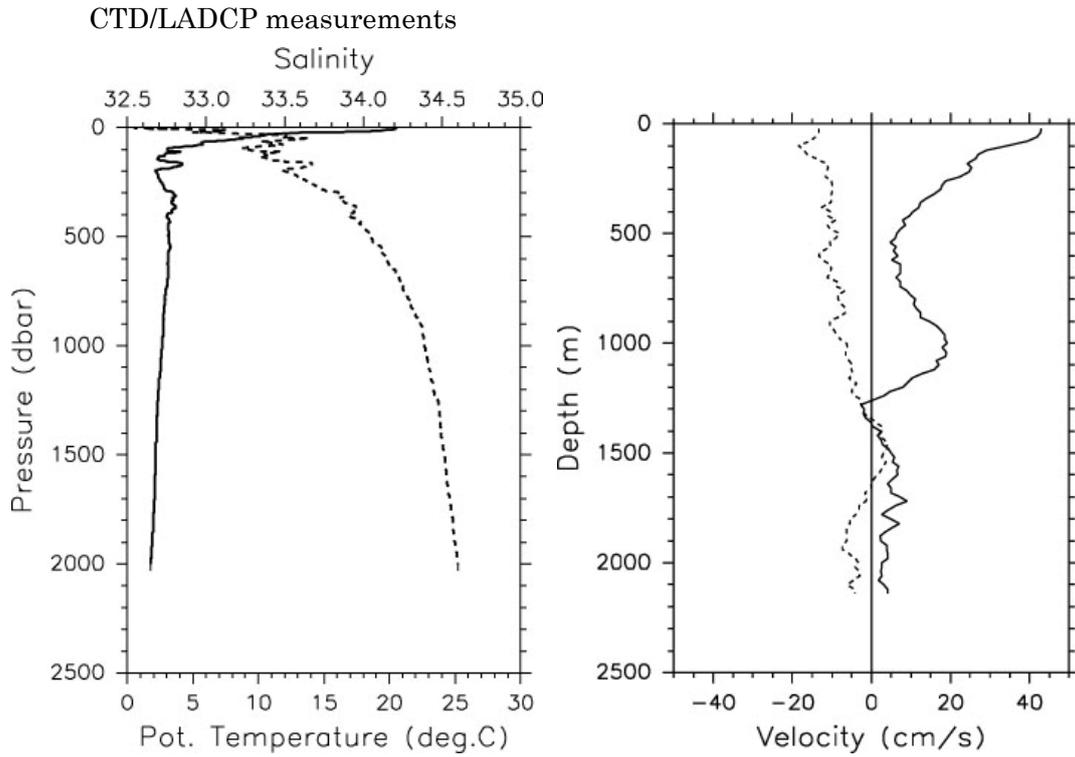


Figure 13. Vertical profiles of potential temperature (left, solid), salinity (left, broken), zonal (right, solid) and meridional (right, broken) current speed at the N07 site.

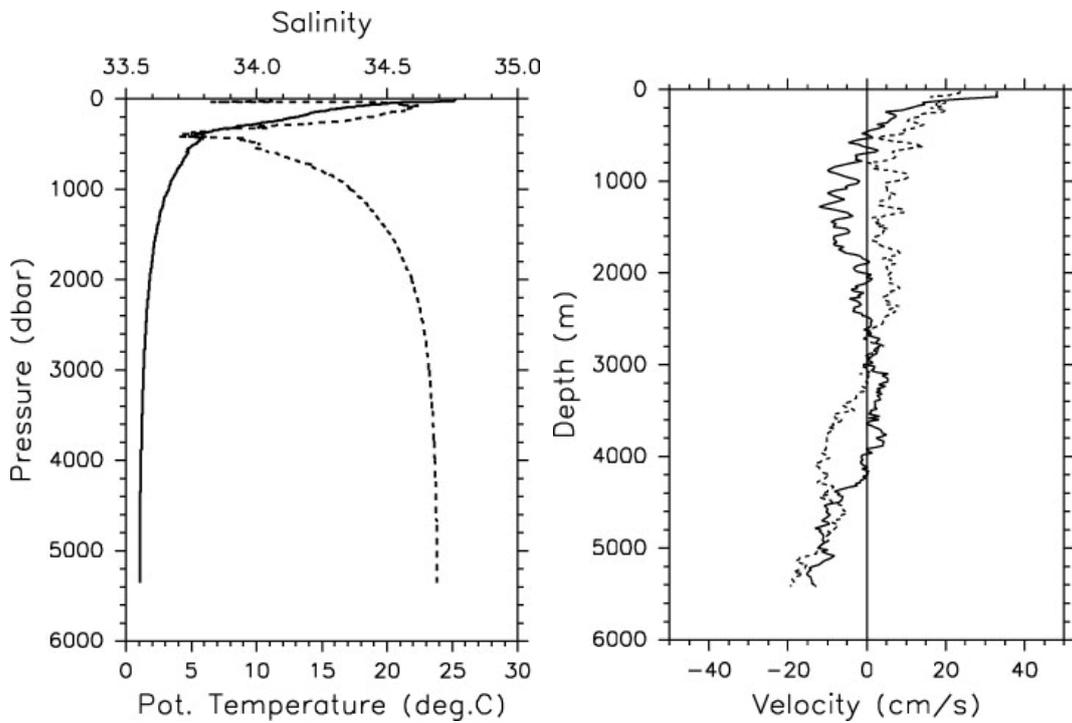
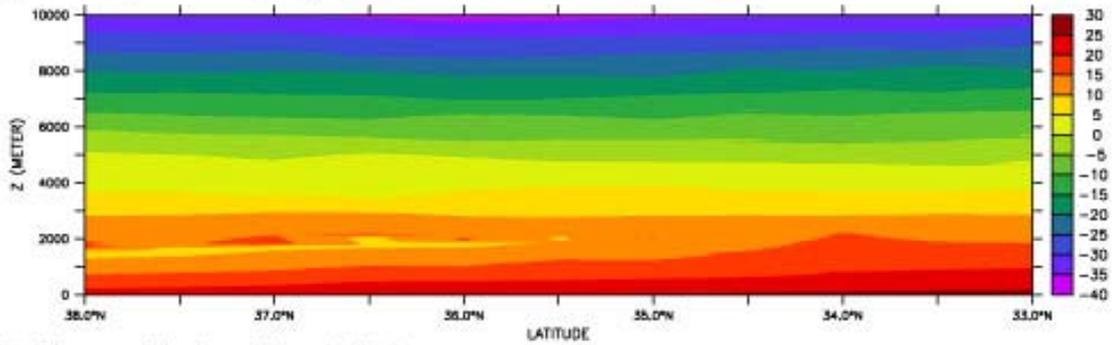


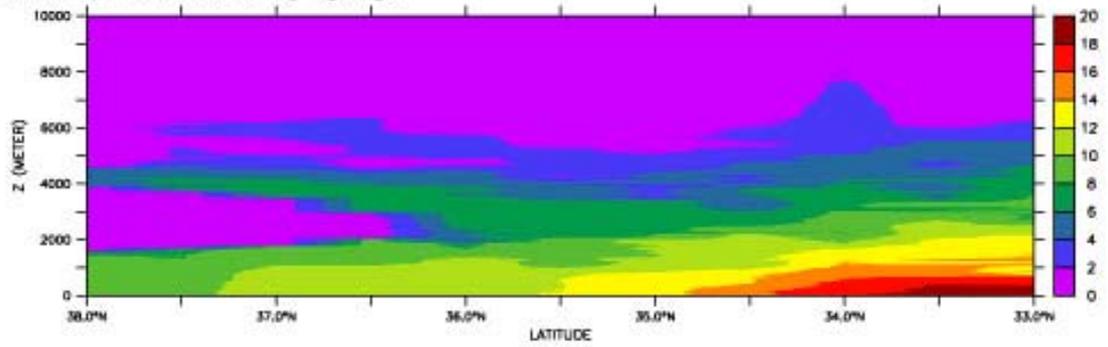
Figure 14. Same as Fig.13 except for the JKEO site.

Radiosonde measurements

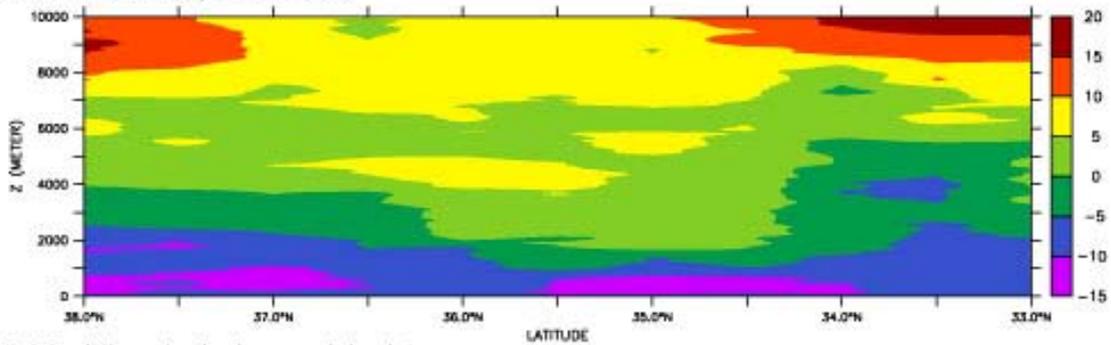
(a) Air temperature (deg.C)



(b) Air specific humidity (g/kg)



(c) Zonal wind speed (m/s)



(d) Meridional wind speed (m/s)

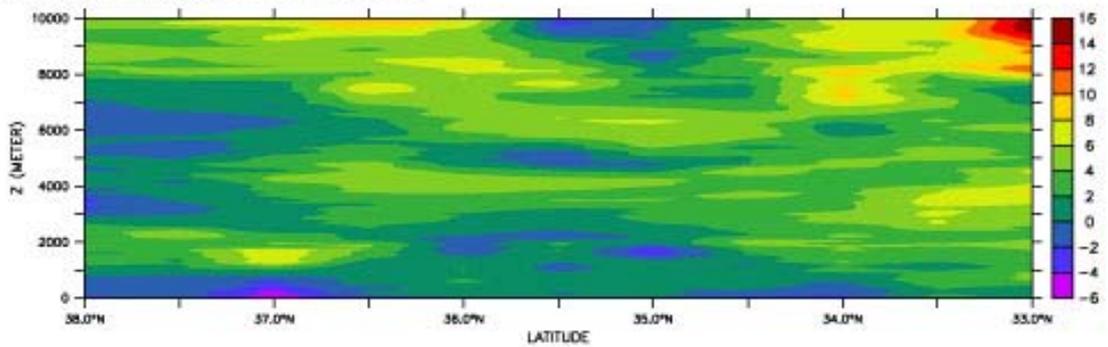


Figure 15. Atmospheric temperature, specific humidity, zonal and meridional wind speed observed with radiosondes along the E line.

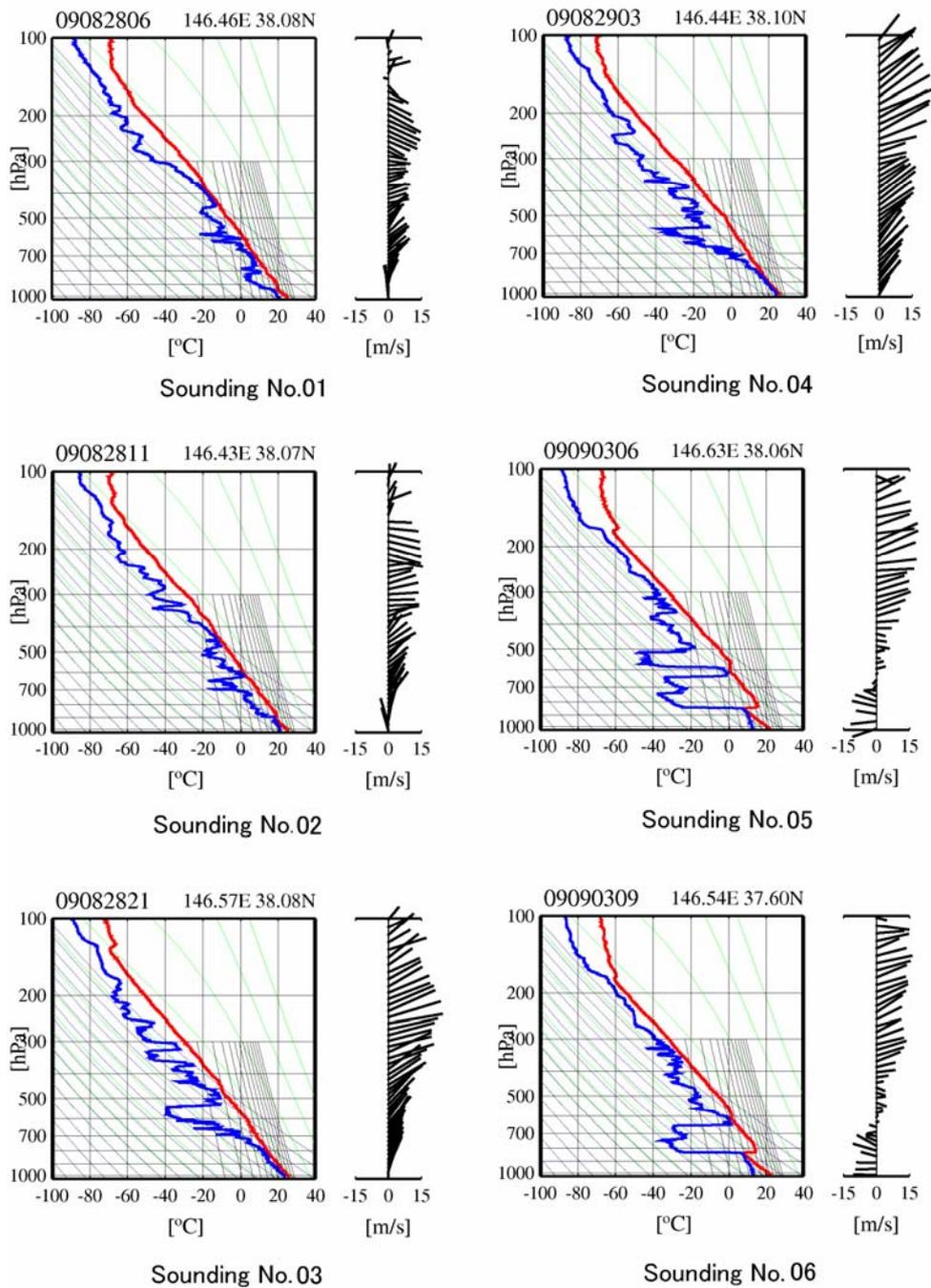


Figure 16. Vertical profiles of air temperature (red, left panel), dew point (blue, left panel), and wind (right panel) at each point.

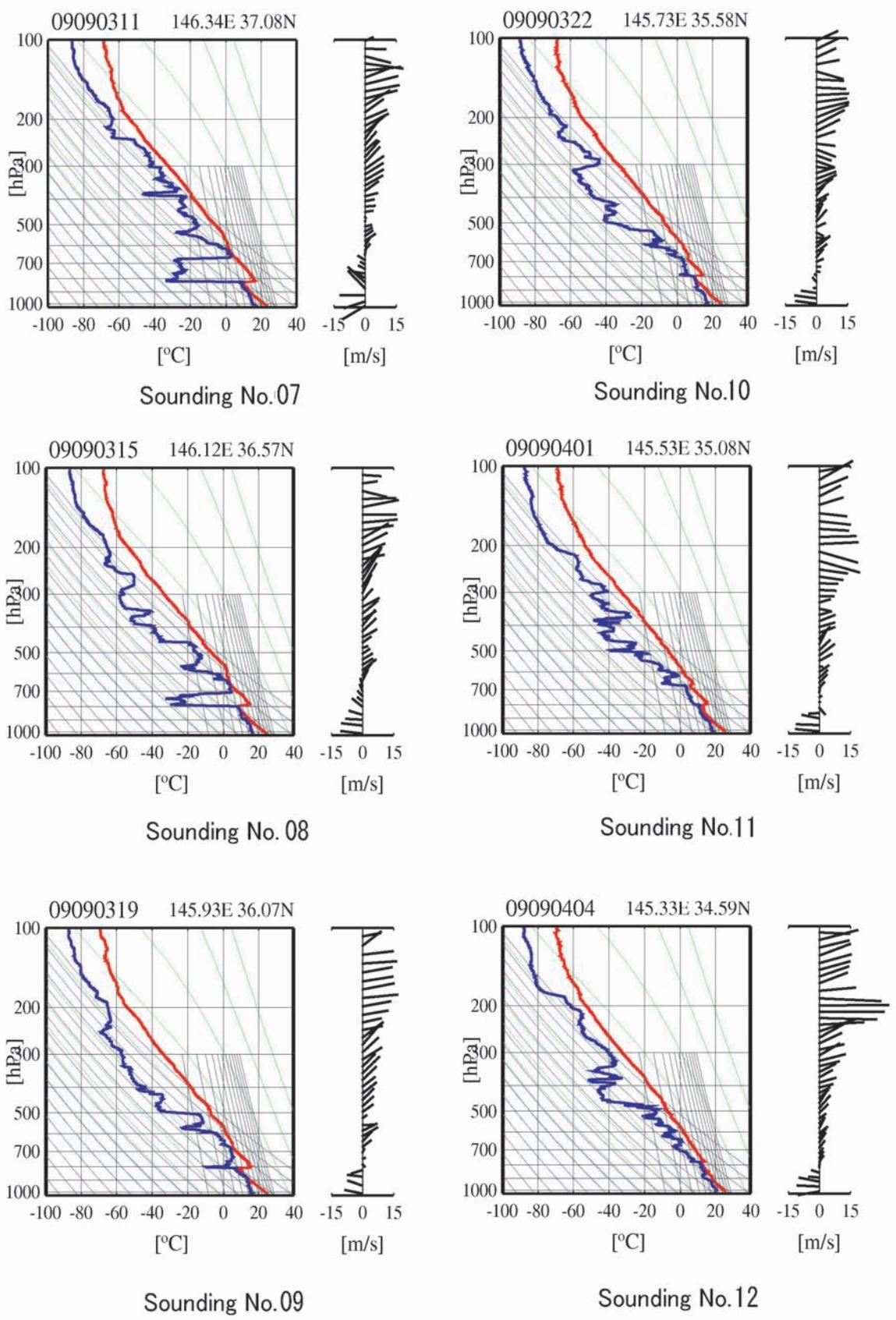


Fig.16 (continued)

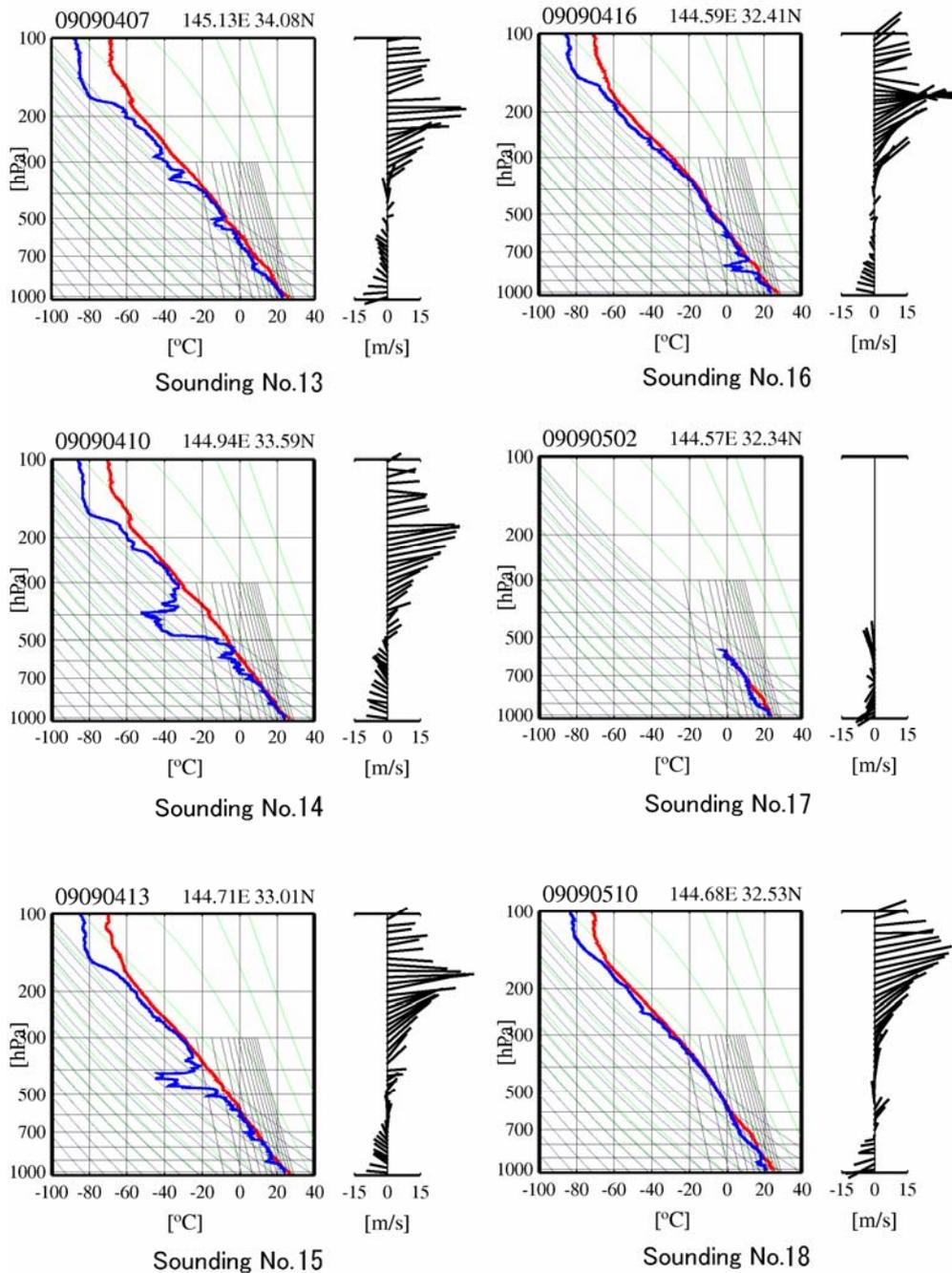


Fig.16 (continued)

### 3.5 Cruise log

Date	Time		Event
	(JST)	(UTC)	
24 Aug.	10:00	01:00	Japan Standard Time is (UTC+9h) Depart from JAMSTEC Wharf 2.
	12:40	03:40	Stay near Tateyama to avoid high waves
25 Aug.	06:00	21:00 (-1d)	Depart for the N line
26 Aug.	01:48	16:48 (-1d)	Start the XCTD observations along the N line from N11
	10:22	01:22	CTD/LADCP at N07
	16:30	07:30	Suspend the observations at N04-N01, turn to Shiogama due to an emergency case
27 Aug.	06:30	21:30 (-1d)	Arrive off Shiogama
	08:00	23:00 (-1d)	Depart for the JKEO site
28 Aug.	04:30	19:30 (-1d)	Arrive at the JKEO site
	10:35	01:35	Start the K-TRITON buoy recover operation
	14:50	05:50	Finish the recover operation
	15:24	06:24	First radiosonde observation
29 Aug.	15:47	06:47	CTD/LADCP at the JKEO site
	05:25	20:25 (-1d)	Bucket water sampling
	05:50	20:50 (-1d)	Start the K-TRITON buoy deploy operation
	11:20	02:20	Finish the deploy operation
	12:00	03:00	Bucket water sampling
	12:44	03:44	Release drifting buoy
	23:10	14:10	Depart from the JKEO site for N01-N05 Head for Mutsu Bay to evacuate from a typhoon after the observation at N05
31. Aug.	08:00	23:00 (-1d)	Arrive in Mutsu Bay
2 Sep.	06:00	21:00 (-1d)	Depart from Mutsu Bay for E21
3 Sep.	14:56	05:56	Start the radiosonde and XCTD observations along the E line from E21
5 Sep.	01:27	16:27 (-1d)	Arrive at the KEO site
	04:43	19:43 (-1d)	Start the KEO buoy deploy operation
	08:08	23:08 (-1d)	Finish the deploy operation
	13:31	04:31	Arrive at the KEO recover position Start the KEO buoy recover operation

	18:02	09:02	Finish the recover operation Start the XCTD observations along the X line from X14 Finish all observations in this cruise Arrive at JAMSTEC Wharf 2
	18:20	09:20	
6 Sep.	18:10	09:10	
7 Sep.	11:30	02:30	

### 3.6 Detailed information on research points

Station Name		Date and Time (UTC)		Lat.(N) and Lon.(E) Fixed by DGPS (WGS-84)				Dep.	Obs <sup>1)</sup>	Item <sup>2)</sup>	Memo
No.	Name	mm/dd	hh:mm	deg	min	deg	min	m			
1	N11	2009/08/25	16:48	38	00.0132	141	11.9964	----	XCT	LGO	Max: 40.4m
2	N10	2009/08/25	19:04	37	59.9871	141	41.9961	----	XCT	LGO	Max: 151.0m
3	N09	2009/08/25	21:13	38	00.0020	142	11.9843	----	XCT	LGO	Max: 768.3m
4	N08	2009/08/25	23:15	37	59.9962	142	42.0194	1386	XCT	LGO	Max: 1097.8m
5	N07	2009/08/26	01:25	37	59.96	143	11.98	2609	CLP	BGN	
5	N07	2009/08/26	01:55	38	00.00	143	11.97	2607	CLP	BTM	Max: 2027.4 dbar
5	N07	2009/08/26	02:22	38	00.04	143	11.94	2603	CLP	END	LADCP Surface
5	N07	2009/08/26	02:30	37	59.9109	143	12.1864	2631	XCT	LGO	Max: 1097.8m
6	N06	2009/08/26	04:29	38	00.0000	143	42.0025	5684	XCT	LGO	Max: 1097.7m
7	N05	2009/08/26	06:37	38	00.0000	144	12.0041	6409	XCT	LGO	Max: 1097.6m
8	JKEO3	2009/08/27	21:31	38	05.204	146	27.261	----	SBY	ENB	OK
8	JKEO3	2009/08/27	21:32	38	05.222	146	27.264	----	SBY	RNG	NG
8	JKEO3	2009/08/27	21:39	38	05.317	146	27.309	----	SBY	RLS	OK
8	JKEO3	2009/08/27	22:49	38	05.286	146	29.287	----	SBY	BGN	Recovery work
8	JKEO3	2009/08/27	23:12	38	05.362	146	29.158	----	SBY	BGN	Stop due to trouble at boat
8	JKEO3	2009/08/28	01:07	38	05.520	146	28.780	----	SBY	BGN	Re-start (boat at sea)
8	JKEO3	2009/08/28	01:44	38	05.633	146	29.042	----	SBY	RET	Buoy hull
8	JKEO3	2009/08/28	02:52	38	05.303	146	29.301	----	SBY	RET	End Wire
8	JKEO3	2009/08/28	04:50	38	04.637	146	28.937	----	SBY	RET	End Nylon rope
8	JKEO3	2009/08/28	05:31	38	04.677	146	28.225	----	SBY	RET	End Polypropylene Rope

8	JKEO3	2009/08/28	05:53	38	04.722	146	28.051	----	SBY	RET	Glass ball and Releaser
8	JKEO3	2009/08/28	06:24	38	04.716	146	26.881	5403	RSD	BGN	RS001, max:24918m
8	JKEO3	2009/08/28	06:52	38	04.70	146	25.61	5411	CLP	BGN	
8	JKEO3	2009/08/28	08:03	38	04.78	146	25.19	5411	CLP	BTM	Max: 5352 dbar (5244.5 m)
8	JKEO3	2009/08/28	09:00	38	04.89	146	24.65	5410	CLP	END	
8	JKEO3	2009/08/28	11:05	38	04.884	146	25.962	----	RSD	BGN	RS002, max: 25382m
9	JKEO4	2009/08/28	20:20	38	04.847	146	34.019	5400	RSD	BGN	RS003, max: 24239m
9	JKEO4	2009/08/28	20:30	38	04.865	146	33.975	5397	CO2	WSL	BTL1
9	JKEO4	2009/08/28	20:50	38	04.824	146	33.909	5393	SBY	BGN	Deployment work
9	JKEO4	2009/08/28	20:58	38	04.847	146	33.902	5392	SBY	LGO	Buoy hull
9	JKEO4	2009/08/28	22:01	38	04.850	146	33.363	5398	SBY	LGO	End Wire
9	JKEO4	2009/08/28	23:59	38	04.830	146	30.146	5391	SBY	LGO	End Nylon rope
9	JKEO4	2009/08/29	00:41	38	04.825	146	28.370	5397	SBY	LGO	End Polypropylene rope
9	JKEO4	2009/08/29	02:09	38	04.677	146	25.534	5409	SBY	LGO	Glass ball and Releaser
9	JKEO4	2009/08/29	02:21	38	04.799	146	25.384	5409	SBY	LGO	Sinker
9	JKEO4	2009/08/29	02:52	38	05.357	146	26.137	----	SBY	ARV	Bottom by SSBL
9	JKEO4	2009/08/29	03:05	38	05.638	146	26.439	----	CO2	WSL	BTL2
9	JKEO4	2009/08/29	03:12	38	04.7087	146	25.7551		SBY	FIX	SSBL(z=5251.2 m)
9	JKEO4	2009/08/29	03:25	38	05.581	146	26.761	----	RSD	BGN	RS004, max: 24240m
9	JKEO4	2009/08/29	03:32	38	05.3764	146	27.7323	----	XCT	LGO	Max: 1097.6m
9	JKEO4	2009/08/29	03:44	38	05.287	146	28.696	----	DWB	LGO	
10	N01	2009/08/29	05:17	37	59.9992	146	12.0011	5323	XCT	LGO	Max: 1097.7m
11	N02	2009/08/29	07:28	37	59.9951	145	41.9837	5319	XCT	LGO	Max: 1098.0m

12	N03	2009/08/29	09:38	38	00.0009	145	11.9934	5335	XCT	LGO	Max: 1097.7m
13	N04	2009/08/29	11:48	38	00.0018	144	41.9999	5580	XCT	LGO	Max: 1098.0m
14	N05	2009/08/29	13:55	38	00.0024	144	12.0127	6397	XCT	LGO	Max: 1097.6m
15	E21	2009/09/03	05:56	38	00.104	146	41.976	5404	RSD	BGN	RS005, max:23712m
15	E21	2009/09/03	06:00	37	59.7591	146	41.8425	5422	XCT	LGO	Max: 1097.9m
16	E20	2009/09/03	08:17	37	33.364	146	31.328	5643	RSD	BGN	RS006, max:22704m
16	E20	2009/09/03	08:37	37	29.9942	146	30.0065	5649	XCT	LGO	Max: 1097.8m
17	E19	2009/09/03	11:12	37	02.564	146	19.049	5511	RSD	BGN	RS007, max:24220m
17	E19	2009/09/03	11:35	36	59.9964	146	18.0070	5524	XCT	LGO	Max: 1097.7m
18	E18	2009/09/03	13:27	36	45.0120	146	11.9884	5589	XCT	LGO	Max: 1097.6m
19	E17	2009/09/03	15:05	36	31.325	146	06.388	5541	RSD	BGN	RS008, max:23993m
19	E17	2009/09/03	15:15	36	30.0289	146	05.9159	5538	XCT	LGO	Max: 1097.7m
20	E16	2009/09/03	17:02	36	15.0408	145	59.9821	5566	XCT	LGO	Max: 1097.6m
21	E15	2009/09/03	18:33	36	01.950	145	54.856	5707	RSD	BGN	RS009, max:23044m
21	E15	2009/09/03	18:48	36	00.0097	145	53.9977	5753	XCT	LGO	Max: 1097.6m
22	E14	2009/09/03	20:29	35	44.9950	145	48.0012	5864	XCT	LGO	Max: 1097.8m
23	E13	2009/09/03	21:51	35	33.150	145	43.235	5857	RSD	BGN	RS010, max:17741m
23	E13	2009/09/03	22:15	35	29.9970	145	41.9968	5861	XCT	LGO	Max: 1097.6m
24	E12	2009/09/03	23:53	35	14.9902	145	35.9946	4827	XCT	LGO	Max: 1098.1m
25	E11	2009/09/04	01:11	35	02.047	146	30.769	5888	RSD	BGN	RS011, max:24148m
25	E11	2009/09/04	01:23	34	59.9939	145	29.9925	5850	XCT	LGO	Max: 1097.6m
26	E10	2009/09/04	02:50	34	44.9878	145	24.0031	5847	XCT	BGN	Max: 1097.6m
27	E09	2009/09/04	04:02	34	32.707	145	19.032	5861	RSD	BGN	RS012, max:21752m
27	E09	2009/09/04	04:19	34	29.8485	145	17.9674	5862	XCT	LGO	Failed
27	E09	2009/09/04	04:23	34	29.4201	145	17.8708	5865	XCT	LGO	Max: 1097.6m
28	E08	2009/09/04	05:47	34	14.9810	145	11.9852	5811	XCT	LGO	Max: 1097.9m
29	E07	2009/09/04	07:01	34	02.239	145	06.881	5817	RSD	BGN	RS013,

											max:22018m
29	E07	2009/09/04	07:14	33	59.9945	145	05.9941	5713	XCT	LGO	Max: 1097.6m
30	E06	2009/09/04	09:43	33	32.721	144	55.091	5779	RSD	BGN	RS014, max:24616m
30	E06	2009/09/04	09:59	33	29.9906	144	53.9969	5712	XCT	LGO	Max: 1097.7m
31	E05	2009/09/04	12:42	32	59.9932	144	41.9915	5672	XCT	LGO	Max: 1097.9m
31	E05	2009/09/04	12:59	32	57.737	144	41.066	5767	RSD	BGN	RS015, max:23157m
32	KEO6	2009/09/04	16:04	32	22.536	144	34.157	5606	RSD	BGN	RS016, max: 23870m
32	KEO6	2009/09/04	16:27	32	19.0044	144	32.4963	5705	XCT	LGO	Max: 1097.8m
32	KEO6	2009/09/04	19:19	32	20.404	144	38.957	5654	SBY	BGN	Deployment works
32	KEO6	2009/09/04	19:42	32	20.319	144	38.763	5645	SBY	LGO	Buoy hull
32	KEO6	2009/09/04	20:59	32	19.678	144	37.096	5630	SBY	LGO	End of wire
32	KEO6	2009/09/04	22:05	32	19.208	144	34.508	5690	SBY	LGO	End of Nylon rope
32	KEO6	2009/09/04	22:38	32	19.014	144	33.055	5697	SBY	LGO	End of Polyolefin
32	KEO6	2009/09/04	22:50	32	18.987	144	32.725	5701	SBY	LGO	Glass ball and releaser
32	KEO6	2009/09/04	23:08	32	18.967	144	32.190	5707	SBY	LGO	Sinker
32	KEO6	2009/09/05	01:16	32	18.174	144	33.598	----	SBY	END	3 points ranging
32				32	18.8914	144	32.5461	5700	SBY	FIX	By 3 points ranging
32	KEO6	2009/09/05	01:47	32	21.060	144	33.105	5675	RSD	BGN	RS017, max:23157m
33	KEO5	2009/09/05	02:57	32	29.975	144	39.972	5888	SBY	ARV	Recovery site
33	KEO5	2009/09/05	03:12	32	30.486	144	38.964	5891	SBY	ARV	Boat at sea surface
33	KEO5	2009/09/05	03:33	32	30.665	144	38.955	----	SBY	ENB	NG, OK
33	KEO5	2009/09/05	03:36	32	30.689	144	38.852	----	SBY	RNG	7079, 7073m
33	KEO5	2009/09/05	03:38	32	30.707	144	38.787	----	SBY	RLS	6872, 6879m
33	KEO5	2009/09/05	04:38	32	30.720	144	39.444	----	SBY	RET	Buoy hull

33	KEO5	2009/09/05	06:02	32	31.118	144	40.453	---	SBY	RET	End of Wire
33	KEO5	2009/09/05	08:24	32	31.188	144	40.604	5915	SBY	RET	End of Nylon rope
33	KEO5	2009/09/05	09:02	32	31.778	144	40.581	5909	SBY	RET	End of Polyolefin rope
33	KEO5	2009/09/05	09:11	32	31.886	144	40.506	5906	SBY	RET	Glass ball, A/R
33	KEO5	2009/09/05	09:20	32	32.2775	144	39.6176	5899	XCT	LGO	Max: 1097.8m
33	KEO5	2009/09/05	09:40	32	33.677	144	35.893	5768	RSD	BGN	RS018, max:22472m
34	X14	2009/09/05	12:27	32	45.0194	143	56.9550	5481	XCT	LGO	Max: 1097.6m
35	X13	2009/09/05	15:03	33	02.9938	143	27.0161	2400	XCT	LGO	Max: 1098.0m
36	X12	2009/09/05	17:47	33	20.9974	142	57.0057	5448	XCT	LGO	Max: 1098.1m
37	X11	2009/09/05	19:12	33	30.0001	142	42.0052	5912	XCT	LGO	Max: 1097.7m
38	X10	2009/09/05	20:34	33	39.0026	142	27.0043	6551	XCT	LGO	Max: 1097.9m
39	X09	2009/09/05	21:59	33	48.0094	142	12.0018	8458	XCT	LGO	Max: 1097.6m
40	X08	2009/09/05	23:23	33	57.0081	141	56.9932	9217	XCT	LGO	Max: 1097.8m
41	X07	2009/09/06	00:45	34	06.0188	141	41.9983	7156	XCT	LGO	Max: 1097.8m
42	X06	2009/09/06	02:07	34	15.0202	141	27.0003	7195	XCT	LGO	Max: 1096.1m
43	X05	2009/09/06	03:29	34	23.9997	141	12.0027	6931	XCT	LGO	Max: 1097.9m
44	X04	2009/09/06	04:52	34	33.0025	140	56.9966	4807	XCT	LGO	Max: 1045.9m
45	X03	2009/09/06	06:10	34	42.0019	140	42.0039	2111	XCT	LGO	Max: 1098.0m
46	X02	2009/09/06	07:30	34	51.0026	140	26.9931	958	XCT	LGO	Max: 957.4m
47	X01	2009/09/06	08:59	35	00.0017	140	11.9989	821	XCT	LGO	Max: 827.9m

### 3.7 Future plans

The XCTD/XBT/CTD observations along the E line will be done in November 2009 and February 2010.

We are also planning to recover/deploy the K-TRITON buoys and to perform the XCTD/CTD and radiosonde observations along the E line in FY2010 on R/V Mirai.

### 3.8 About data

The CTD sensor will be calibrated after the cruise. The radiosonde data may be corrected. Calibration information or corrected data will be provided within about one year.

#### 4. Notice on using

This cruise report is a preliminary documentation as of the end of the cruise.

This report may not be corrected even if changes on contents (i.e. taxonomic classifications) may be found after its publication. This report may also be changed without notice. Data on this cruise report may be raw or unprocessed. If you are going to use or refer to the data written on this report, please ask the Chief Scientist for latest information.

Users of data or results on this cruise report are requested to submit their results to the Data Integration and Analysis Group (DIAG) of JAMSTEC.

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