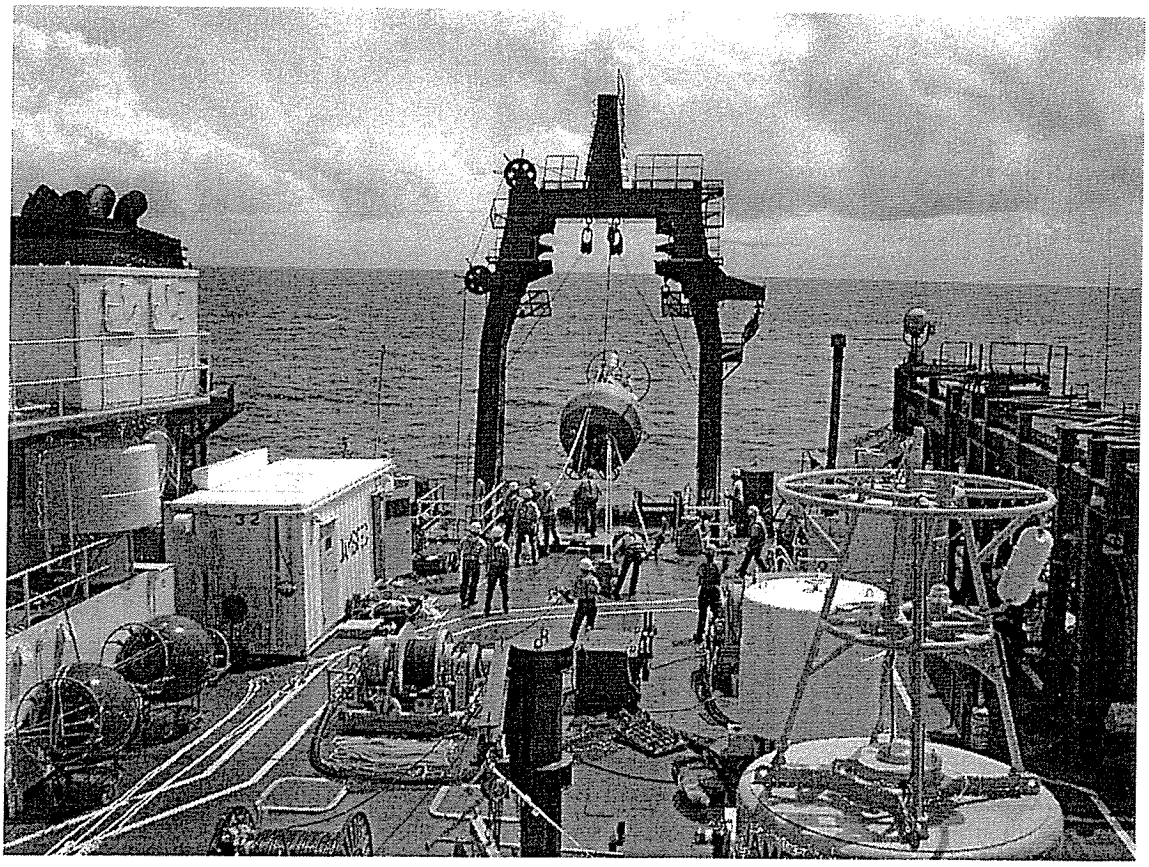
doi : 10.17596/0003695

Tropical Ocean Climate Study

TOCS

KY01-11 Cruise Report

November 29, 2001 – December 27, 2001



Japan Marine Science and Technology Center (JAMSTEC)

TOCS KY01-11 Cruise Report

Contents

1. Cruise Summary

1. Cruise Summary

Ship	: R/V KAIYO
Chief Investigator	: Yuji Kashino (JAMSTEC)
Cruise Code	: KY01-11
Project Title	: Tropical Ocean Climate Study
Period	: November 29, 2001 – December 27, 2001
Ports of call	: Yokosuka (Japan)
	Kavieng (Papua New Guinea)
	Koror (Republic of Palau)
Institute	: JAMSTEC (Japan Marine Science and Technology Center)
	MWJ (Marine Work Japan Co. LTD)
	NME (Nippon Marine Enterprise Co. LTD)

Purpose: The purpose of this cruise is to observe currents, temperature, salinity etc., in the western equatorial Pacific to understand the ENSO (El Nino/Southern Oscillation) phenomena. Because the El Nino is occurred with migration of the warm water pool in the western equatorial Pacific, variability of the warm water pool is focused in this study. For this observations, TRITON and ADCP buoy maintenance is main work during this cruise.

Observation Summery :

(Leg 1)

A TRITON buoy at 5N, 156E was repaired.

Three ARGO floats were deployed at 24N, 150E.

Five CTD casts using SBE 911 plus were conducted near TRITON buoys and at ARGO floats cast to check temperature and salinity values derived from CT sensors of the TRITON buoy and ARGO floats.

Thirteen XCTD casts were conducted along 156E line to measure vertical profiles of temperature and salinity

Sea water at 1000m depth were sampled by Niskin bottles at CTD casts to check CTD salinity.

Current along the cruise track was measured by a shipboard ADCP from 30m depth to 1000m depth.

These observations were conducted in the open ocean and Micronesia EEZ.

(Leg 2)

A TRITON buoy at 0N, 147E was recovered and re-installed.

Two ADCP buoys at 0N, 147E and 2.5S, 142E was recovered and re-installed. One current meter provided by Ocean Research Institute (ORI, Tokyo Univ.) was installed in these moorings at 700m depth at these sites.

Two CTD casts were conducted near TRITON buoys at 0N, 156E and 0N, 147E until 1000m depth to check temperature, salinity values derived from CT sensors of the TRITON buoy, and Seventeen CTD casts were conducted along 142E to observe water masses along this line.

Sea water at 1000m depth were sampled by Niskin bottles at CTD casts to check CTD salinity and observe the Antarctic Intermediate water along 142E line.

Eight XCTD casts were conducted along the equator to measure vertical profiles of temperature and salinity

Current along the cruise track was measured by a shipboard ADCP from 30m depth to 1000m depth.

These observations were conducted in the open sea, Micronesia, Papua New Guinea and Palau EEZ.

Preliminary Results

This KY01-11 cruise has been mainly carried out for TRITON buoy work. However, because of rough sea state due to the westerly burst, which would be the trigger of the El Nino, we could maintain only TRITON buoys at 0N, 147E and 5N, 156E. In particular, we went to 0N, 156E two times during Legs 1 and 2 to repair the TRITON buoy #4, which is very important buoy for monitoring the El Nino, it failed to do because of storm and strong eastward current associating with the westerly burst. Although it is good timing to make observations during the westerly burst condition, our buoy works were ironically failed due to it.

In spite of rough sea state, TRITON buoys #2 (5N, 156E) was successfully repaired by the hard and excellent work by technicians of Marine Work Japan and crew of R/V Kaiyo. In present, data communication from this buoy is very good.

It is first cruise to deploy the TRITON buoy (#9, 0N147E) using R/V Kaiyo. In spite of less equipment for TRITON buoy work than R/V Mirai, its work finished well. Recovery work also did well. However, we should prepare some equipment for this work

considering the many TRITON buoys' deployment/recovery work two years later. In particular, we could not did preparation previous day of deployment different from R/V Mirai, because it is impossible to tightly fix a float of the TRITON buoy near the A-frame crane. We should make something to fix the float there.

Two ADCP buoys were replaced during this cruise. These buoy works also did well except for lost of the lower releaser at 2.5S, 142E. But we found that data acquisition of the ADCP at 0N, 147E stopped at December 2000, and its data was divided into ninety-nine files. Because of this error, we failed to get data during the El Nino in 2001. This problem might be due to degradation of the ADCP transducer. We should refresh it next year.

During CTD and XCTD observations, there were following small troubles:

(1) A pump of the CTD (SBE 911plus) did not sometimes work well. (Usually, it worked when CTD fish was around 10m depth.) Then, we lowered the fish until 20m depth. The CTD system should be checked by the maker (Sea Bird Electronic Inc.) after this cruise.

(2) Data acquisition of CTD was stopped during water sampling by human error at St.034. Clumsiness menu system of the data acquisition program, "Win-Seasave", may induce this error. We will ask the maker to revise this program.

(3) On-board computer for XCTD hung up before data was saved into the hard disk at St.016 and XCTD data was lost then. Program for XCTD observation should be also checked by the maker (Tsurumi Seiki Co.).

(4) Almost XCTD observations finished before a probe reached until 1000m. Similar problem also occurred during the last R/V Mirai TOCS cruise (MR01-K05).

(5) A Niskin bottle was broken. We sampled water using eleven bottles.

(6) Autosal did not work well: it became impossible to control bath temperature of the Autosal. Therefore, salinity value from sampled water will be measured after the cruise.

Data from a shipboard ADCP was also not very good during this cruise. It worked well and measured current until 1000m depth last year, however, measurement depth became shallow during this cruise (about 800m depth). We found some cracks on the lid of the ADCP when R/V Kaiyo was in the dock (May 2001). These cracks might become large due to bad sea state.

Thus, buoy work for TRITON and ADCP buoys, and observations using CTD, XCTD, Niskin bottles and the shipboard ADCP were not carried out as the plan because of instrument troubles and bad weather. However, crew and technicians

made efforts of good observations. Therefore, in spite of above troubles, observations along 156E, equator and 142E lines, and buoy data will give us interesting results during the westerly burst condition.

Acknowledgments:

We would like to express special thanks to Captain F. Saito and crew of R/V Kaiyo. During the cruise, technicians of Marine Work Japan Co. Ltd. and Nihon Marine Enterprise Co. Ltd., participated in this cruise and helpfully supported us.

This cruise was conducted under the Tropical Ocean Climate Study (TOCS) project. We thank our colleagues of JAMSTEC for their efforts in conducting this cruise.

To get the clearances from Micronesia, Papua New Guinea, and Republic of Palau, many persons in these countries and of Japanese Government worked. We would also like to say thanks for their works.

2. List of Instruments

2.List of Instruments

(1) CTD (Conductivity-Temperature-Depth profiler)

SBE9-11 plus system, Sea-Bird Electronics,Inc.,USA

CTD Fish for 10,500m S/N 09P8010-0319

C-Sensor	S/N 041174 (Primary)
	S/N 040960(Secondary)
T-Sensor	S/N 031465 (Primary)
	S/N 031207(Secondary)
D.O.-Sensor	S/N 130311
P-Sensor	S/N 41223

(2) Shipboard ADCP (Acoustic Doppler Current Profiler)

Ocean Surveyor,RD Instruments,USA

(3) Salinity

Guildline Autosal Model 8400B

(4) Dissolved Oxygen

D.O.meter:TOA portable Dissolved Oxygen Meter Model DO-25A

Titrater:Metrohm Model 716 DMS Titrino/10ml of tritration vessel

Detector:Pt Electrode/6.0401.100

Software:Data acquisition/Metrohm,Tinet 2.4

3. Participants List

3.Participants List

On board Scientists / Technical staff

Name	Institute	On boad
Yuji Kashino	JAMSTEC	Yokosuka - Palau
Yasushi Takatsuki	JAMSTEC	Yokosuka - Palau
Toru Nakamura	JAMSTEC	Kavieng - Palau
Kazumi Baba	NME	Yokosuka - Kavieng
Yui Hashimoto	NME	Kavieng - Palau
Atsuo Ito	MWJ	Kavieng - Palau
Masayuki Fujisaki	MWJ	Yokosuka - Palau
Takeo Matsumto	MWJ	Yokosuka - Palau
Mizue Hirano	MWJ	Yokosuka - Palau
Hiroshi Matsunaga	MWJ	Yokosuka - Palau
Takayoshi Seike	MWJ	Yokosuka - Palau
Yuichi Sonoyama	MWJ	Yokosuka - Palau

JAMSTEC :
Japan Marine Science and Technology Center
2-15, Natsushima, Yokosuka, Kanagawa, Japan
Phone +81-468-66-3811

NME :
Nippon Marine Enterprises, LTD.
14-1, Ogawa-cho, Yokosuka, Kanagawa, Japan
Phone +81-468- 24-4611

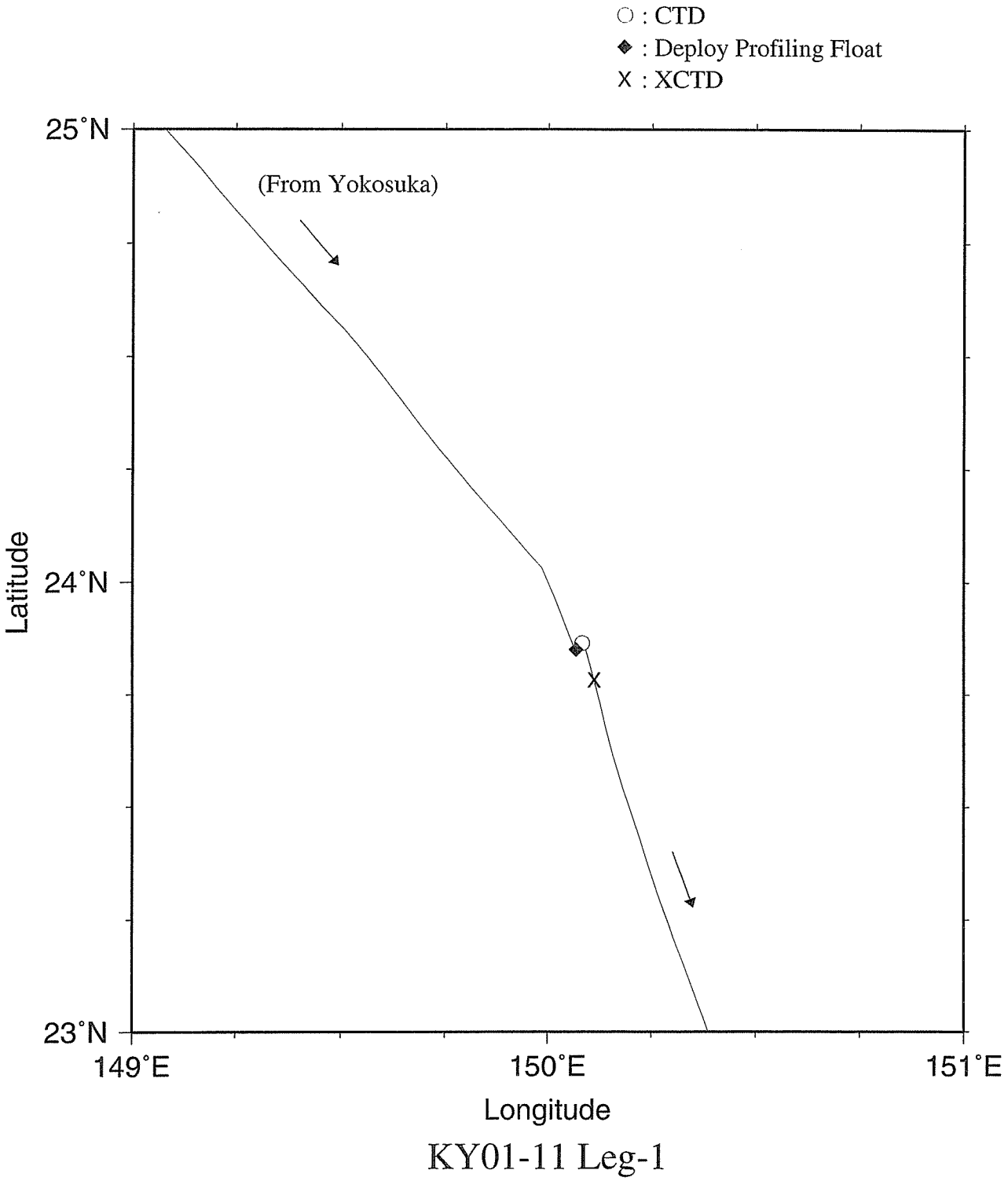
MWJ :
Marine Works Japan Ltd.
1-1-7, Mutsuura, Kawazawa-ku, Yokohama, Japan
Phone +81-45-787-0041

Ship Crew

Captain	Fusao Saito
Chief Officer	Yoshiyuki Nakamura
Second Officer	Kenji Yano
Third Officer	Hiroyuki Kato
Jr. Third Officer	Kota Izawa
Chief Engineer	Kiyonori Kajinishi
First Engineer	Kazuhiko Kaneda
Second Engineer	Koji Funae
Third Engineer	Makoto Kotani
Chief Radio Officer	Satoshi Watase
Second Radio Officer	Akihisa Ishikawa
Boatswain	Makio Nakamura
Able Seaman	Akio Hama
Able Seaman	Kazuo Abe
Able Seaman	Kinya Shoji
Able Seaman	Yasuo Konno
Able Seaman	Kazuya Yamamoto
Able Seaman	Hideaki Oishi
No.1 Oiler	Kazumi Sakamoto
Oiler	Kazuaki Nakai
Oiler	Takeshi Fukuhara
Oiler	Katsuyuki Miyazaki
Oiler	Keita Funawatari
Chief Steward	Kaoru Takashima
Steward	Jihei Nakatsuka
Steward	Koji Kirita
Steward	Toyonori Shiraishi
Steward	Tadayuki Takatsu

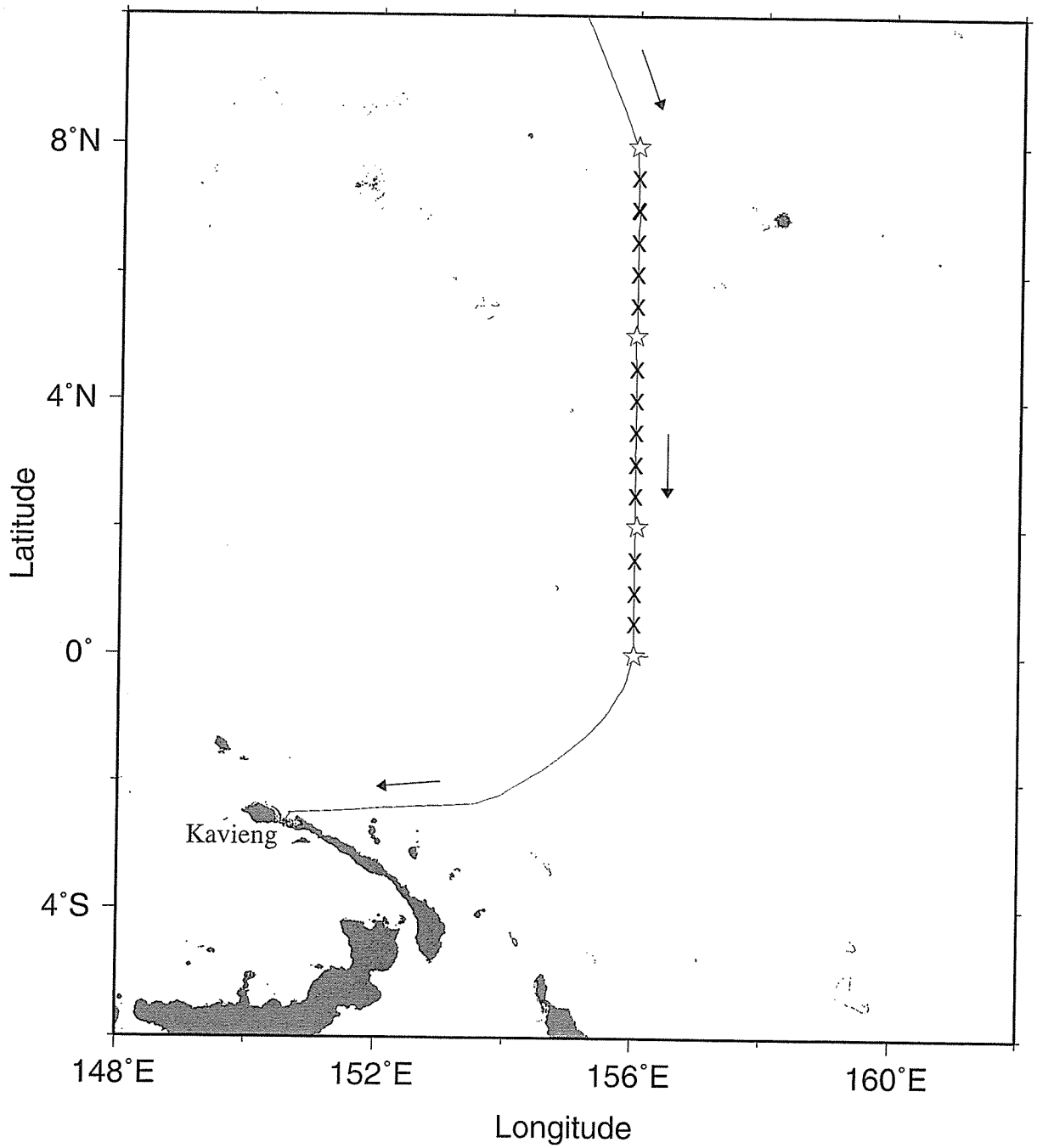
4. Hydrographic Measurements

4.1 Site map

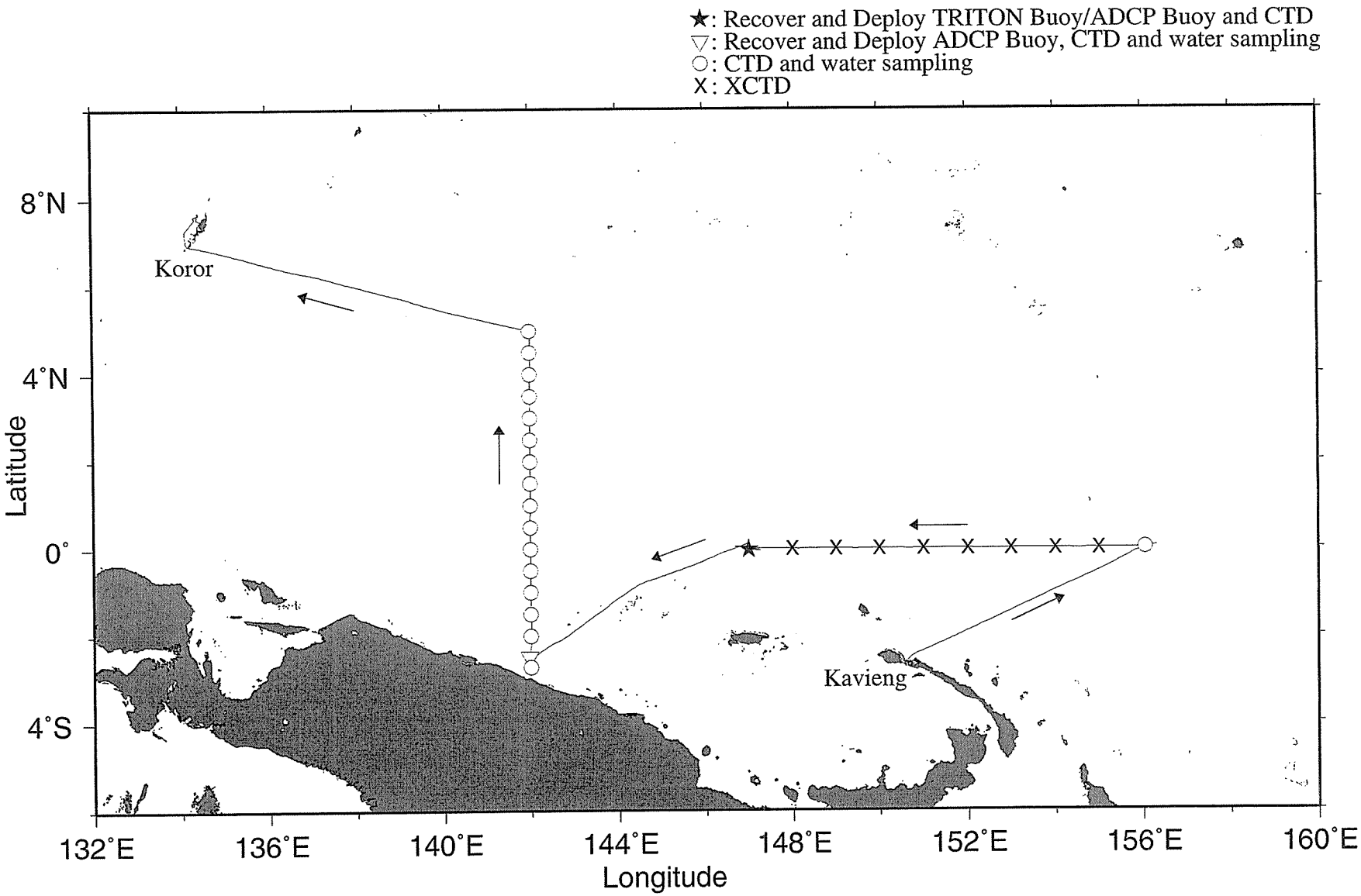


KY01-11 Leg-1

☆: Repair/Check TRITON Buoy and CTD
X : XCTD



KY01-11 Leg-1


★: Recover and Deploy TRITON Buoy/ADCP Buoy and CTD
▽: Recover and Deploy ADCP Buoy, CTD and water sampling
○: CTD and water sampling
X: XCTD
Koror
Kavieng
8°N
4°N
0°
4°S
Latitude
132°E
136°E
140°E
144°E
148°E
152°E
156°E
160°E
Longitude

KY01-11 Leg-2

4.2 Cast table

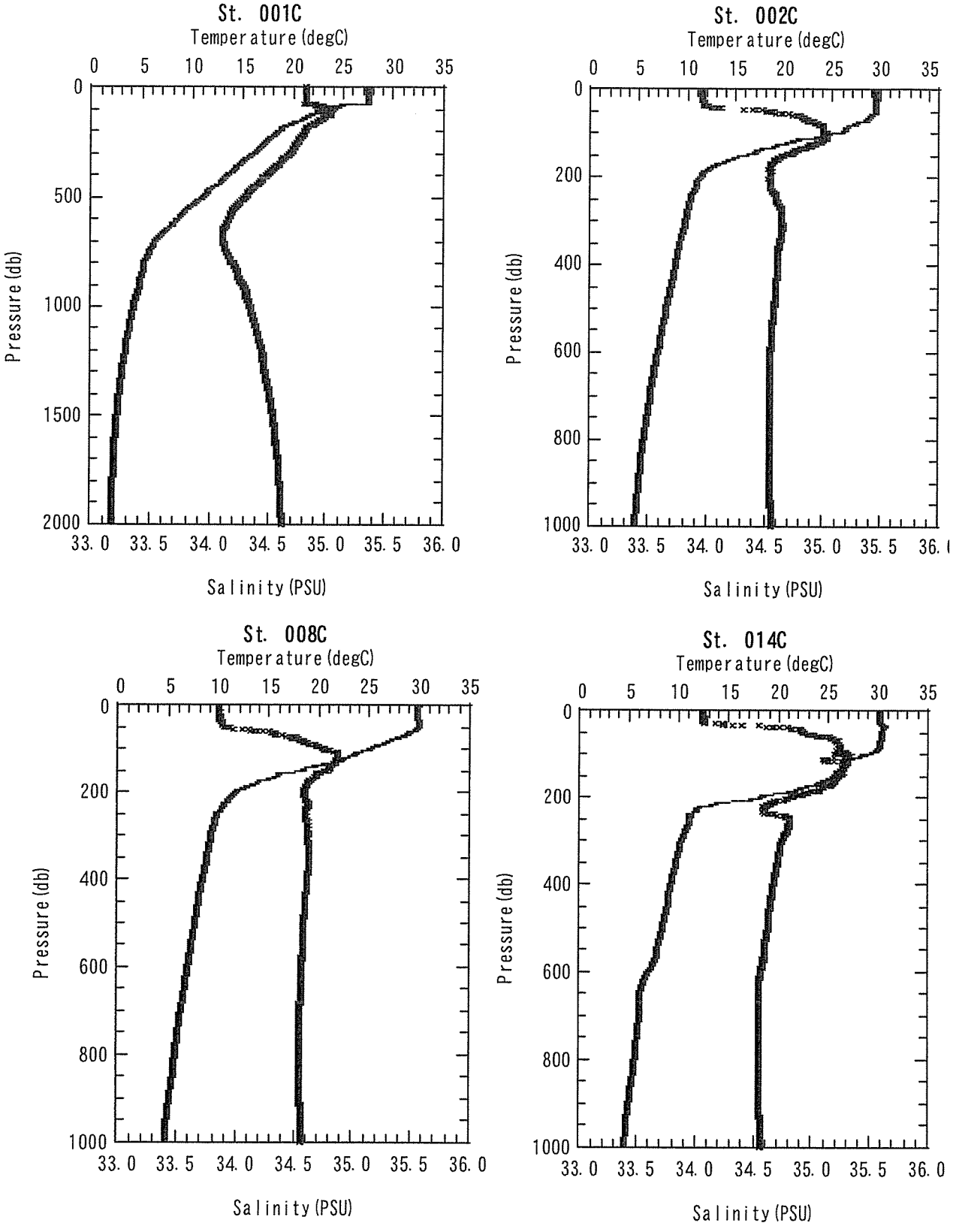
CTD/XCTD Cast Table(Leg.1)

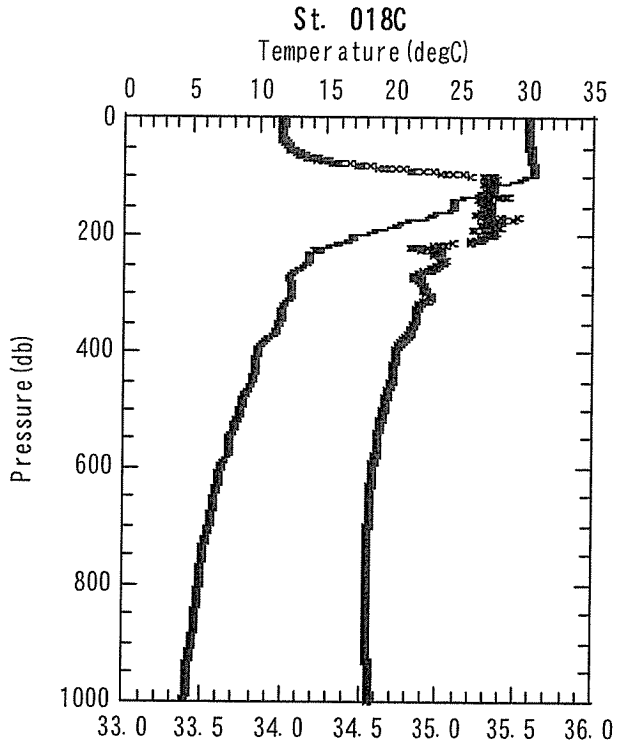
St.	Date	Time(GMT)	Latitude	Longitude
001C	02-Dec.-01	04:55	23-51.9282N	150-05.0035E
001X	02-Dec.-01	06:47	23-46.9956N	150-06.6427E
002C	06-Dec.-01	00:16	07-59.0439N	155-59.7392E
003X	07-Dec.-01	00:41	07-29.9090N	155-59.9586E
004X	07-Dec.-01	03:23	06-59.9944N	156-00.0001E
005X	07-Dec.-01	06:05	06-29.9870N	156-00.0045E
006X	07-Dec.-01	08:44	05-59.9445N	156-00.0158E
007X	07-Dec.-01	11:32	05-29.9938N	156-00.0050E
008C	08-Dec.-01	00:13	05-02.3983N	155-59.3239E
009X	08-Dec.-01	07:04	04-29.9928N	155-59.9829E
010X	08-Dec.-01	10:55	03-59.8428N	156-00.0074E
011X	08-Dec.-01	12:43	03-29.8240N	156-00.0030E
012X	08-Dec.-01	15:27	02-59.9986N	156-00.0044E
013X	08-Dec.-01	18:08	02-29.9949N	155-59.9995E
014C	08-Dec.-01	21:59	02-01.5815N	156-01.4633E
015X	09-Dec.-01	01:24	01-29.9929N	155-59.9970E
016X	09-Dec.-01	05:10	00-58.5133N	155-59.9774E
017X	09-Dec.-01	07:43	00-29.9938N	156-00.0239E
018C	09-Dec.-01	21:33	00-00.2927N	155-59.8747E

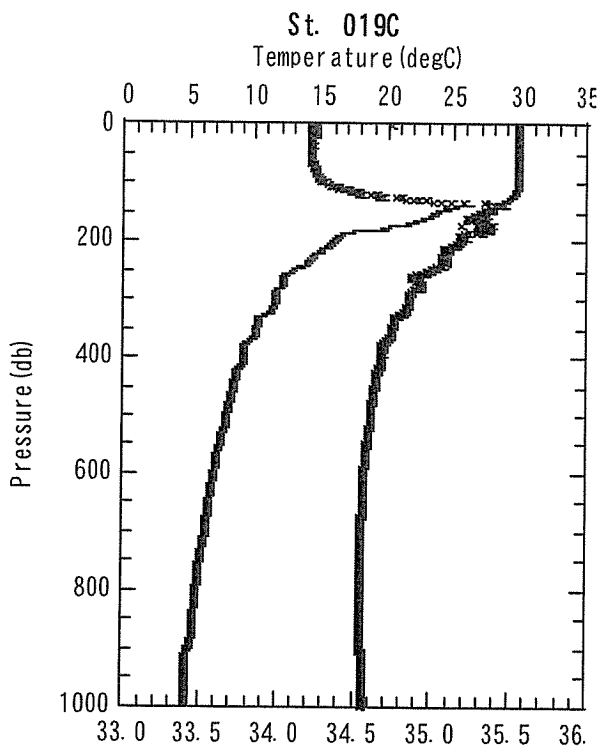
CTD/XCTD Cast Table(Leg.2)

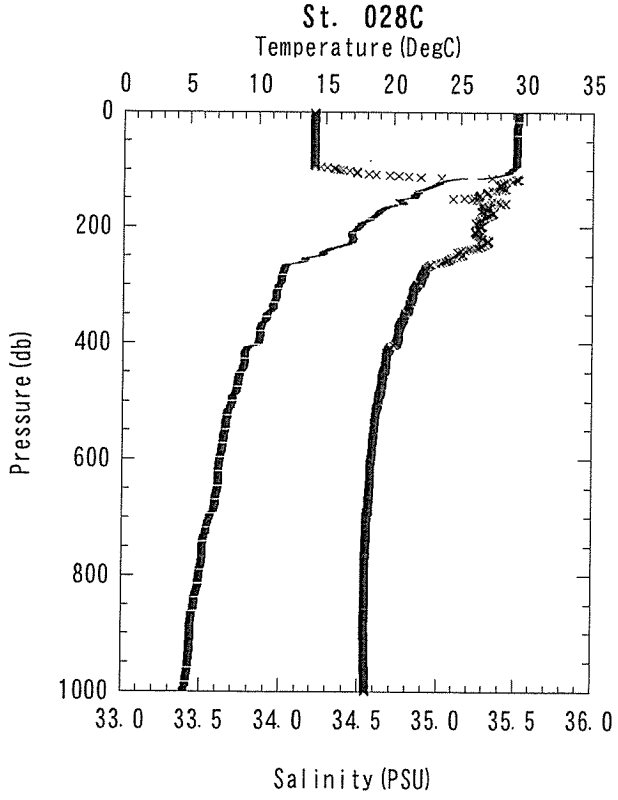
St.	Date	Time(GMT)	Latitude	Longitude
019C	15-Dec.-01	02:32	00-00.9528N	156-03.1186E
020X	15-Dec.-01	10:00	00-00.0065S	154-59.9949E
021X	15-Dec.-01	16:19	00-00.0040S	153-59.9936E
022X	15-Dec.-01	22:25	00-00.0204S	152-59.3827E
023X	16-Dec.-01	04:14	00-00.0050N	151-59.9887E
024X	16-Dec.-01	10:03	00-00.0008N	151-00.0007E
025X	16-Dec.-01	15:57	00-00.0008N	149-59.9975E
026X	16-Dec.-01	21:44	00-00.0015N	148-59.9955E
027X	17-Dec.-01	03:35	00-00.0047S	147-59.9938E
028C	19-Dec.-01	08:37	00-00.3684S	147-00.0957E
029C	21-Dec.-01	21:04	02-42.6445S	142-00.2019E
030C	22-Dec.-01	06:32	02-27.9875S	141-58.1792E
031C	22-Dec.-01	10:20	02-00.1859S	142-00.4260E
032C	22-Dec.-01	14:01	01-30.1849S	142-00.2716E
033C	22-Dec.-01	17:30	01-00.1143S	142-00.2875E
034C	22-Dec.-01	21:09	00-30.0158S	142-00.2136E
035C	23-Dec.-01	00:39	00-00.0404N	142-00.0024E
036C	23-Dec.-01	04:09	00-29.9319N	142-00.1058E
037C	23-Dec.-01	07:32	00-59.9287N	142-00.2461E
038C	23-Dec.-01	11:00	01-29.9569N	141-59.9050E
039C	23-Dec.-01	14:23	01-59.9999N	141-59.9548E
040C	23-Dec.-01	17:46	02-29.9422N	141-59.9401E
041C	23-Dec.-01	21:10	02-59.9683N	142-00.1200E
042C	24-Dec.-01	00:25	03-30.0602N	141-59.9907E
043C	24-Dec.-01	03:38	04-00.0066N	142-00.2397E
044C	24-Dec.-01	06:58	04-29.8793N	142-00.2896E
045C	24-Dec.-01	10:24	04-59.8353N	142-00.0730E

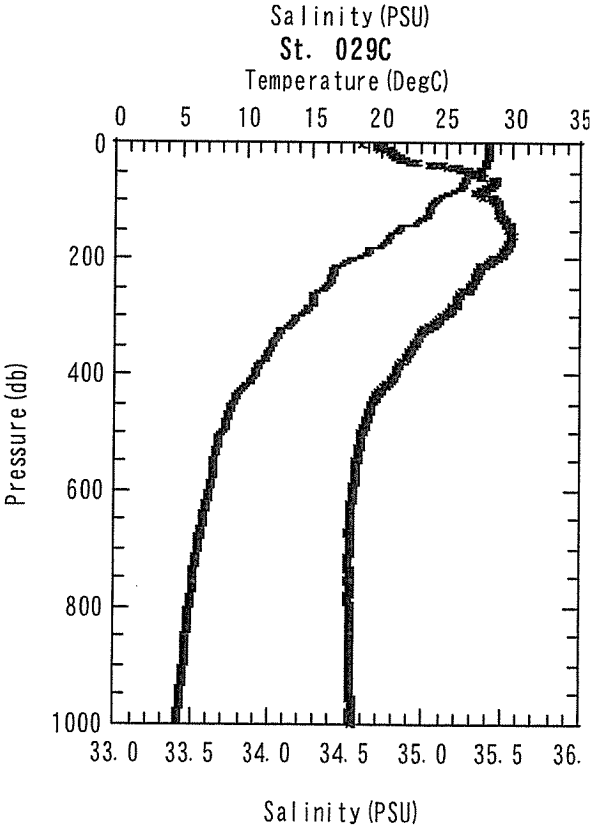
4.3 Plofile
4.3.1 CTD

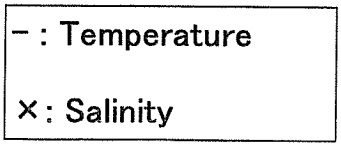


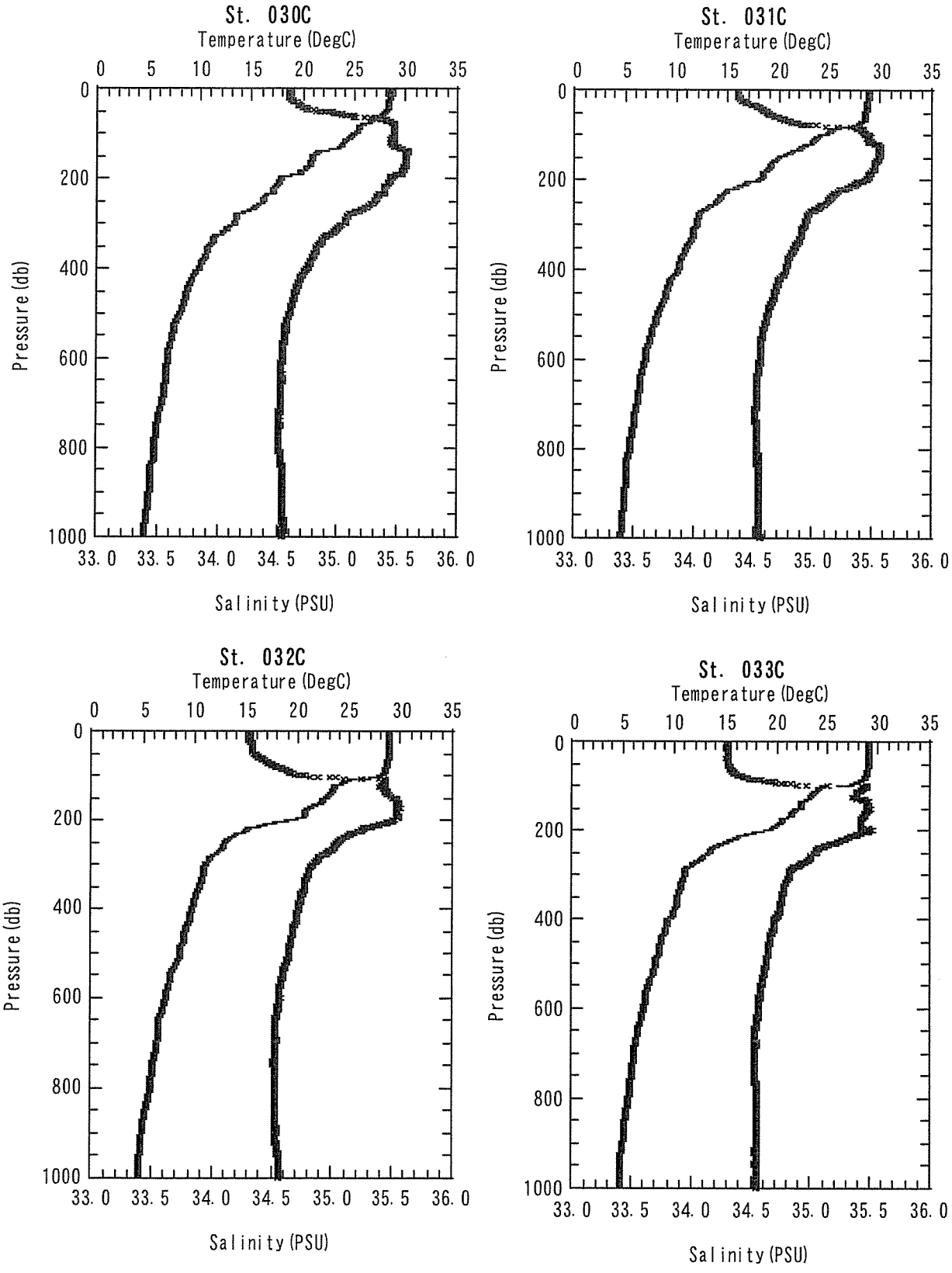

St. 018C
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

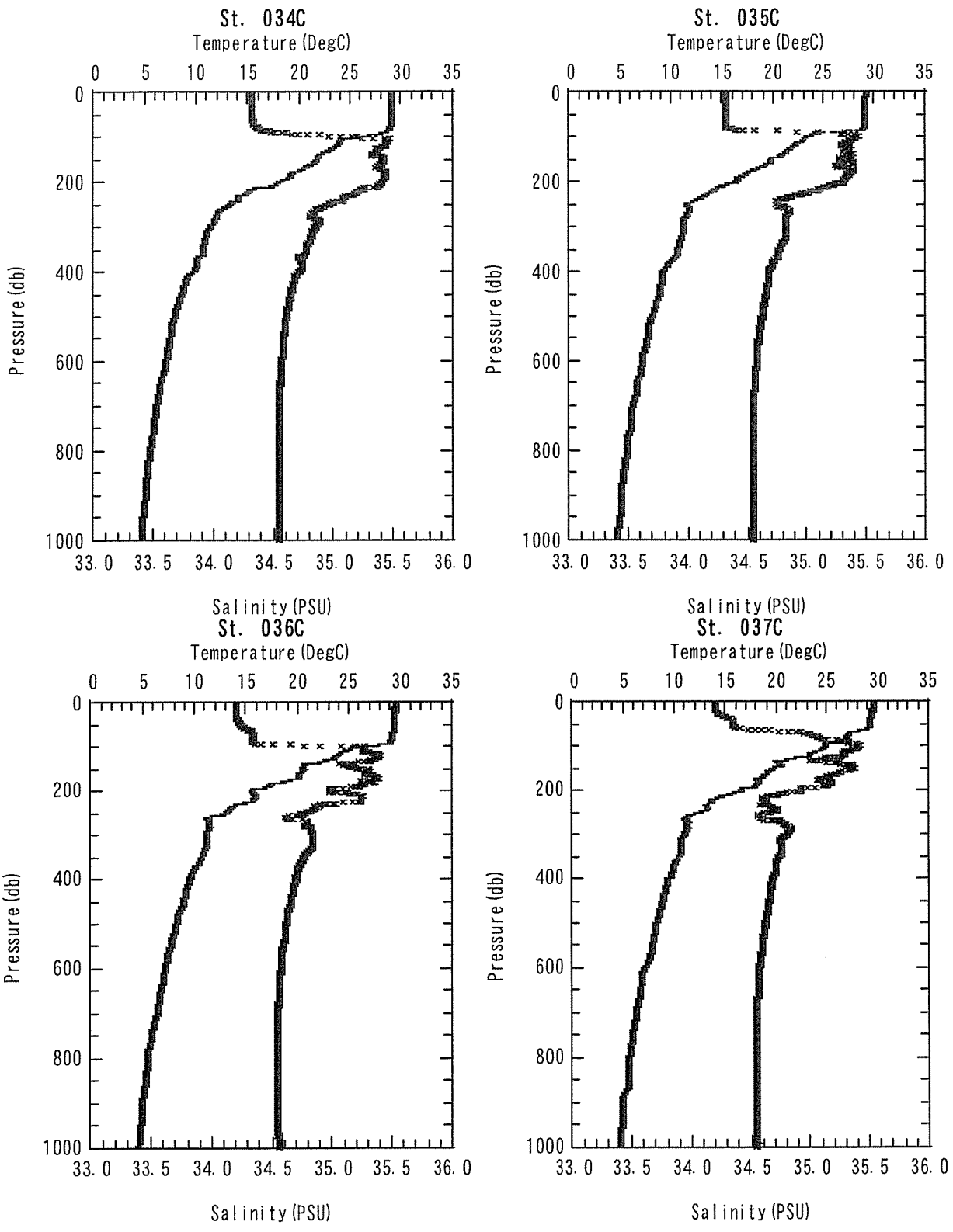

St. 019C
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.
Salinity (PSU)

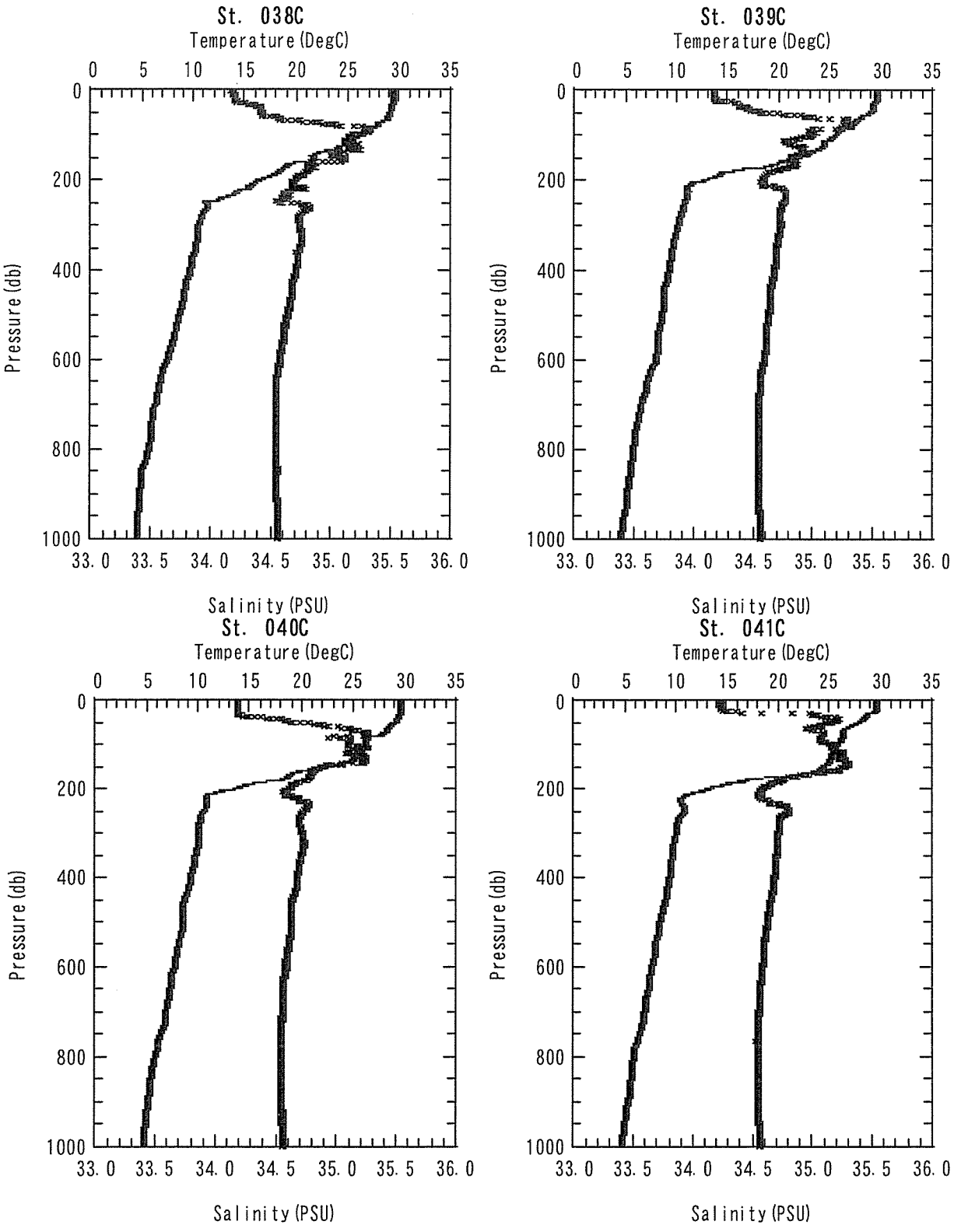

St. 028C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

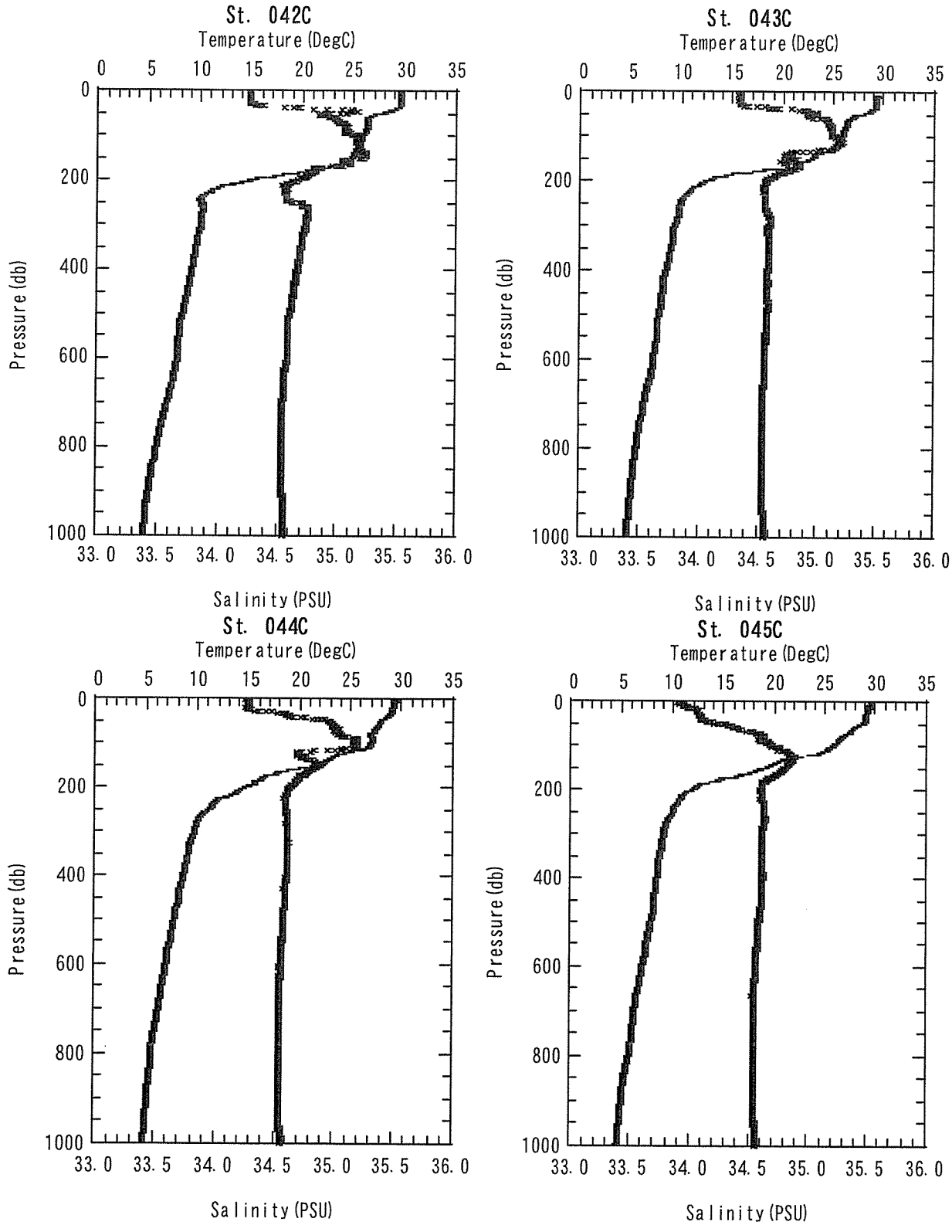

St. 029C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.
Salinity (PSU)


－ : Temperature
× : Salinity

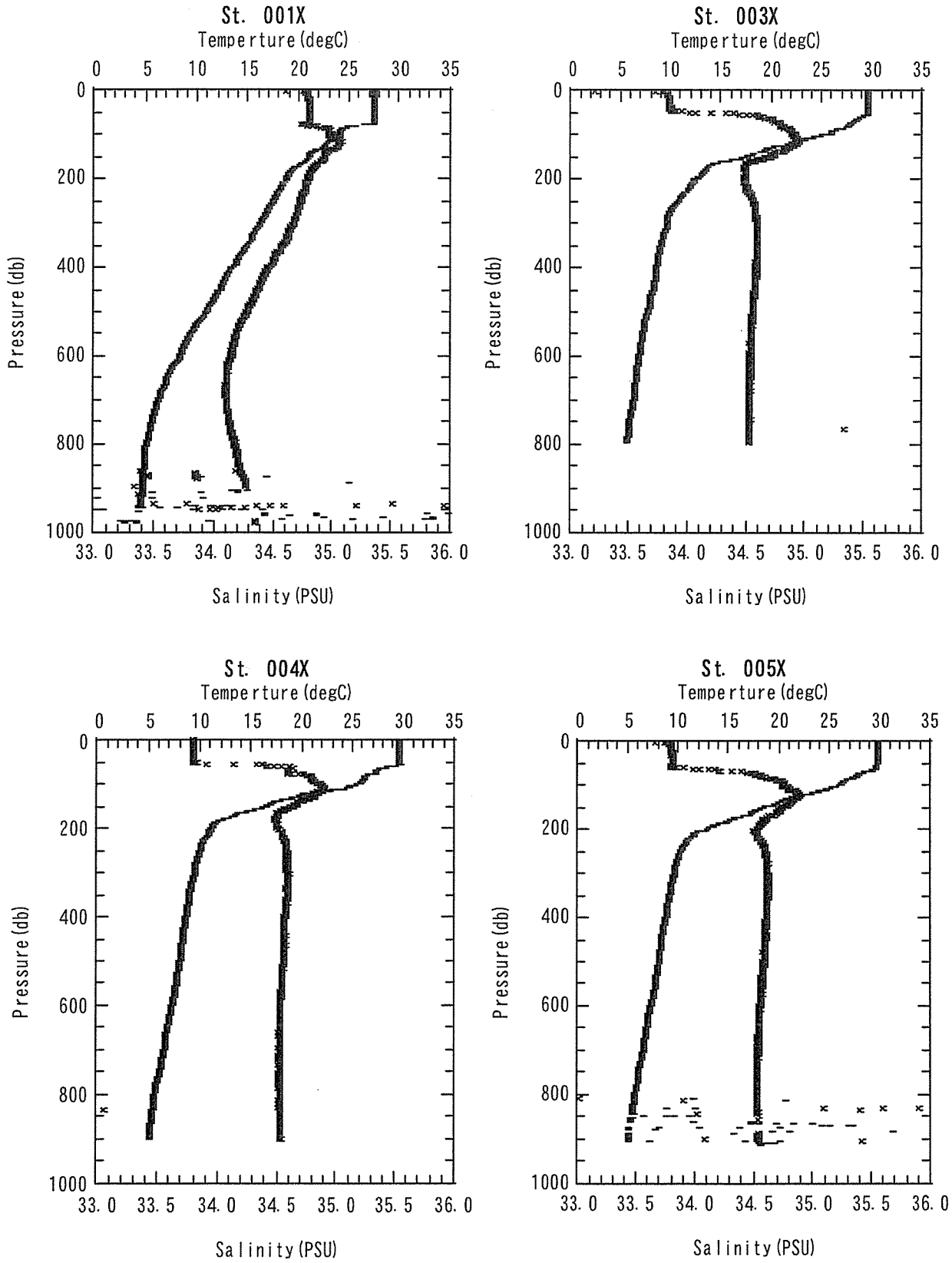

St. 030C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 031C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 032C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 033C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
－ : Temperature
× : Salinity

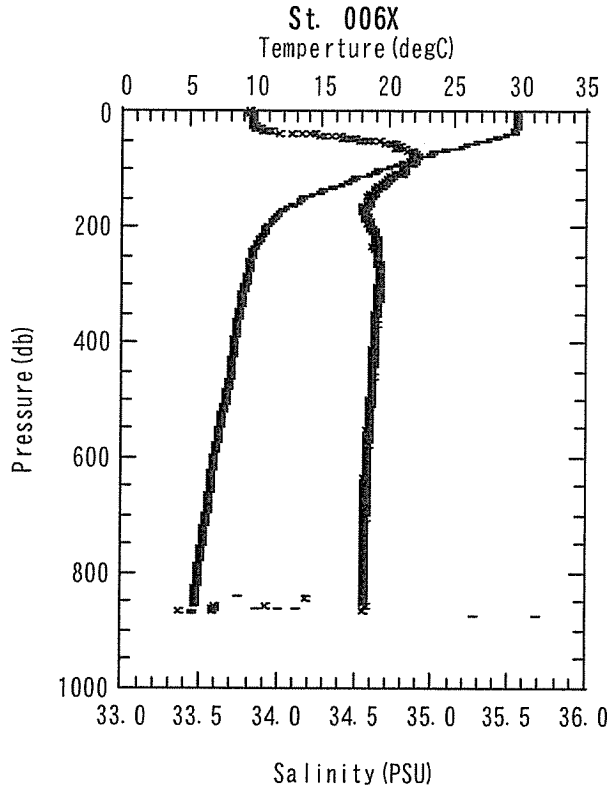

St. 034C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 035C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 036C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 037C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
－ : Temperature
× : Salinity

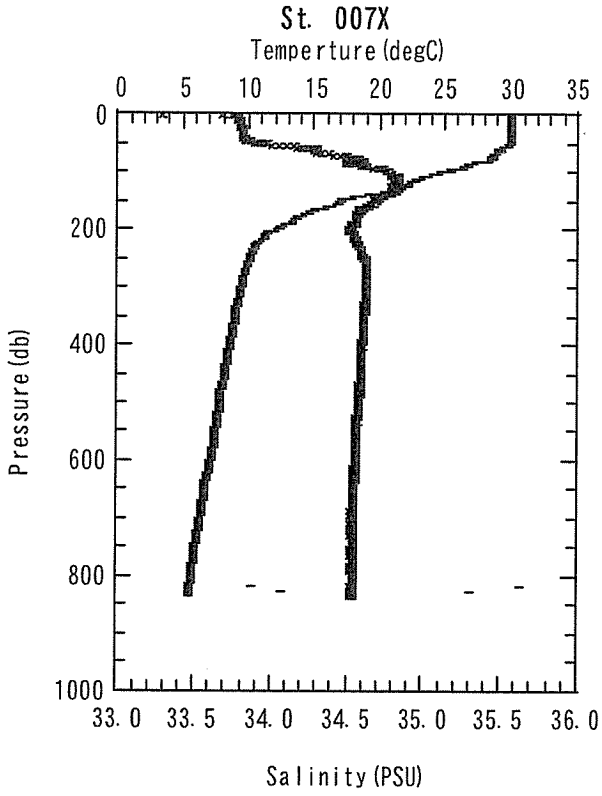

St. 038C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 039C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 040C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 041C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
－ : Temperature
× : Salinity

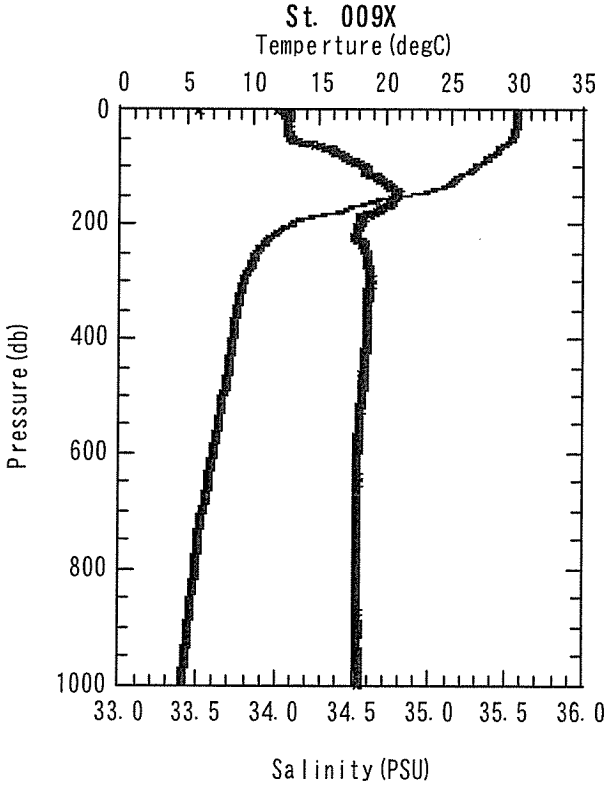

St. 042C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 043C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 044C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 045C
Temperature (DegC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
－ : Temperature
× : Salinity

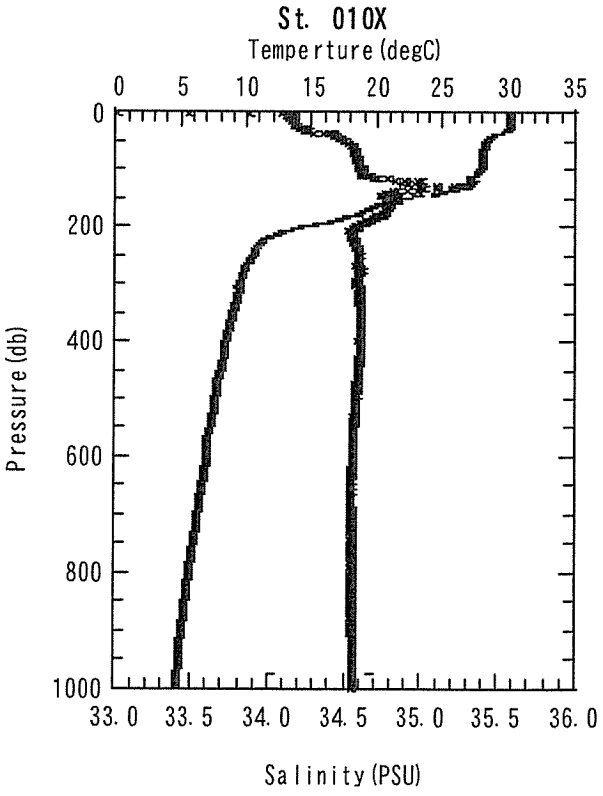
4.3.2 XCTD

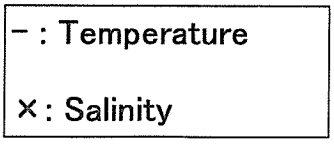

St. 001X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 003X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 004X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 005X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
－ : Temperature
× : Salinity

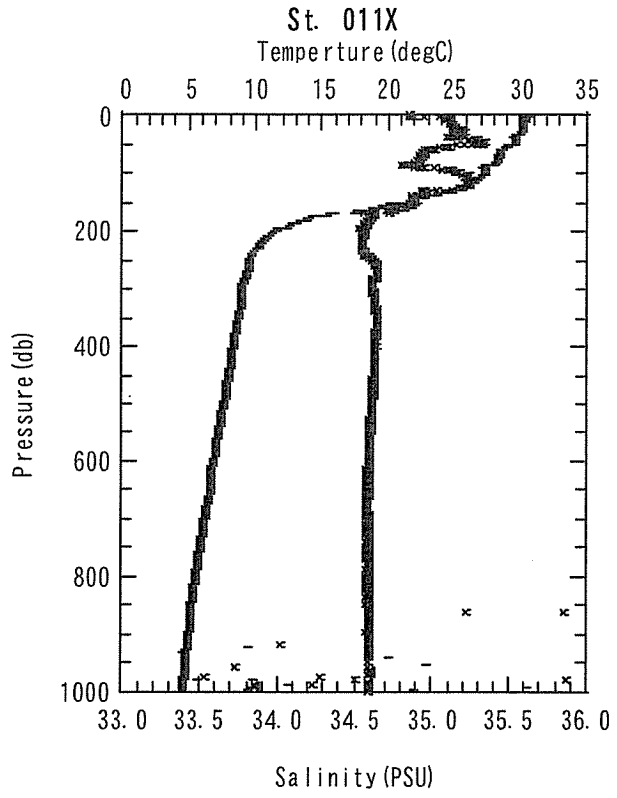

St. 006X
Temperture (degC)
0 5 10 15 20 25 30 35
0
200
400
600
800
1000
Pressure (db)
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

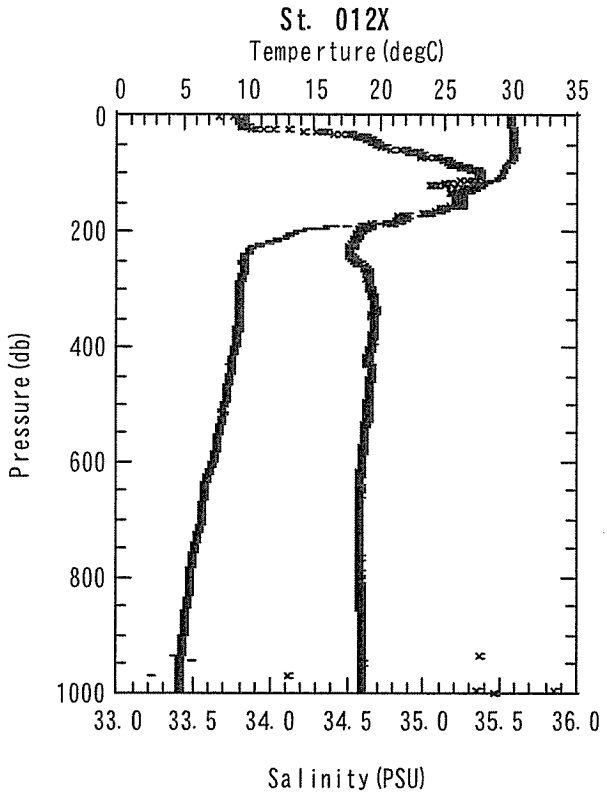

St. 007X
Temperture (degC)
0 5 10 15 20 25 30 35
0
200
400
600
800
1000
Pressure (db)
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

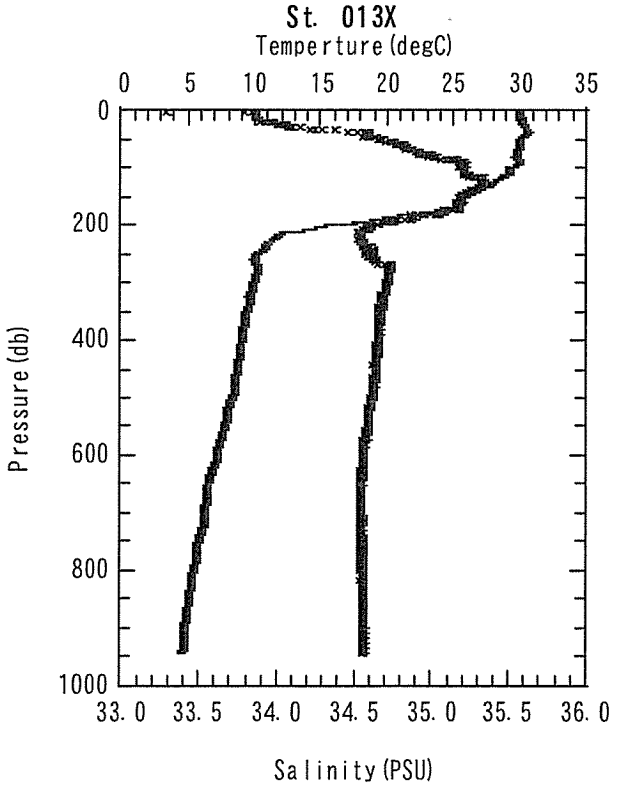

St. 009X
Temperture (degC)
0 5 10 15 20 25 30 35
0
200
400
600
800
1000
Pressure (db)
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

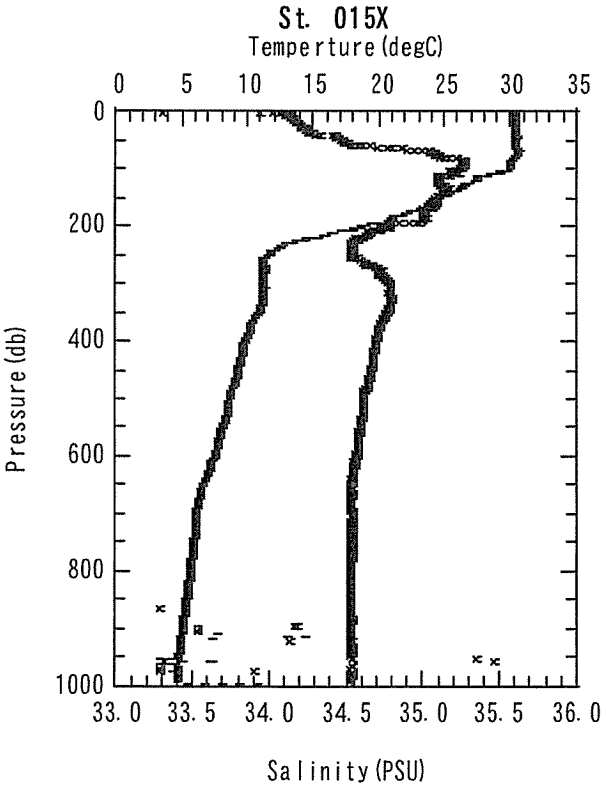

St. 010X
Temperture (degC)
0 5 10 15 20 25 30 35
0
200
400
600
800
1000
Pressure (db)
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

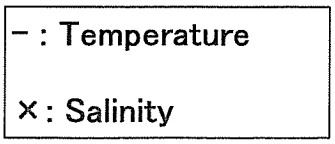

－ : Temperature
× : Salinity

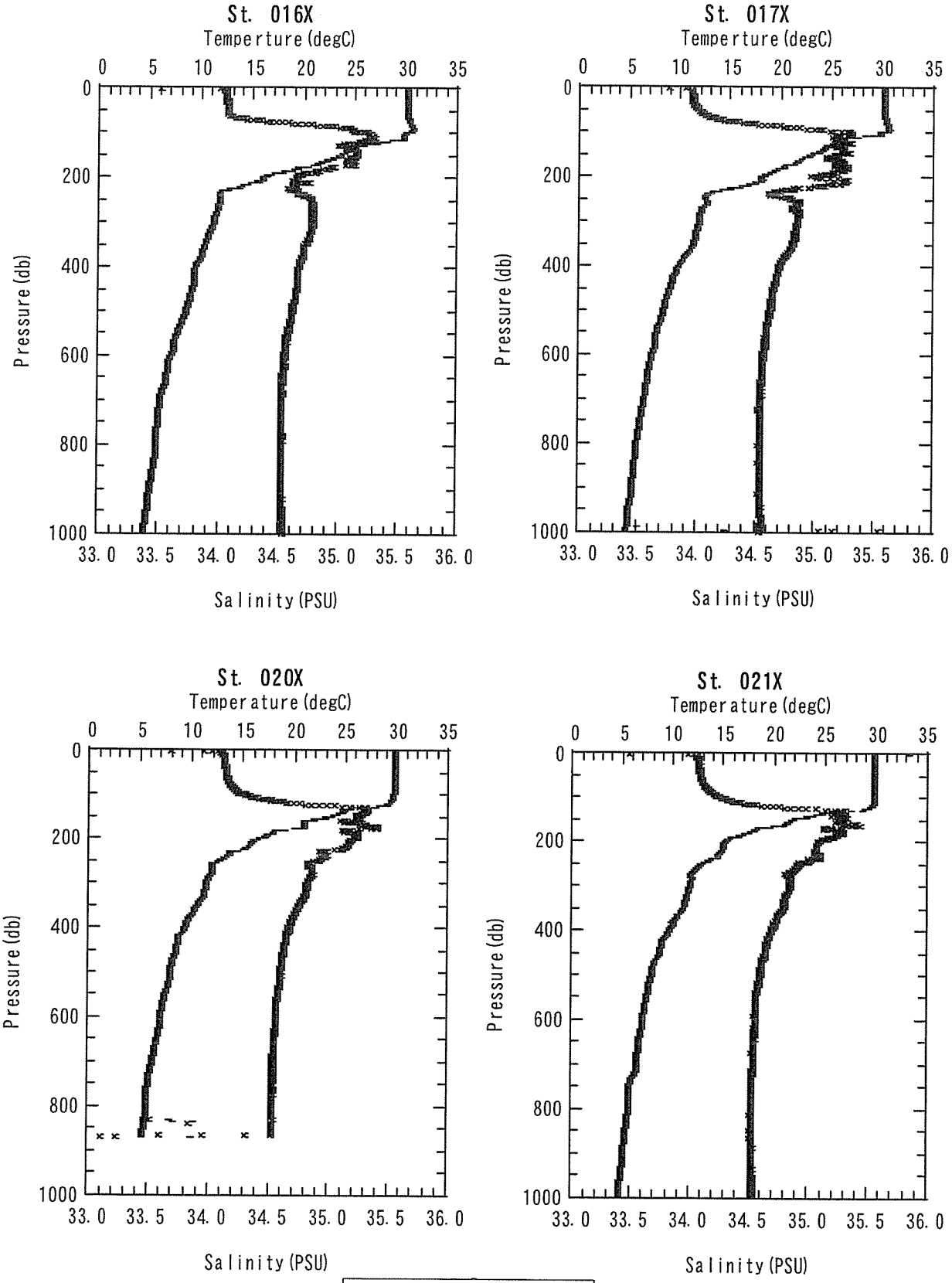

St. 011X
Temperture (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

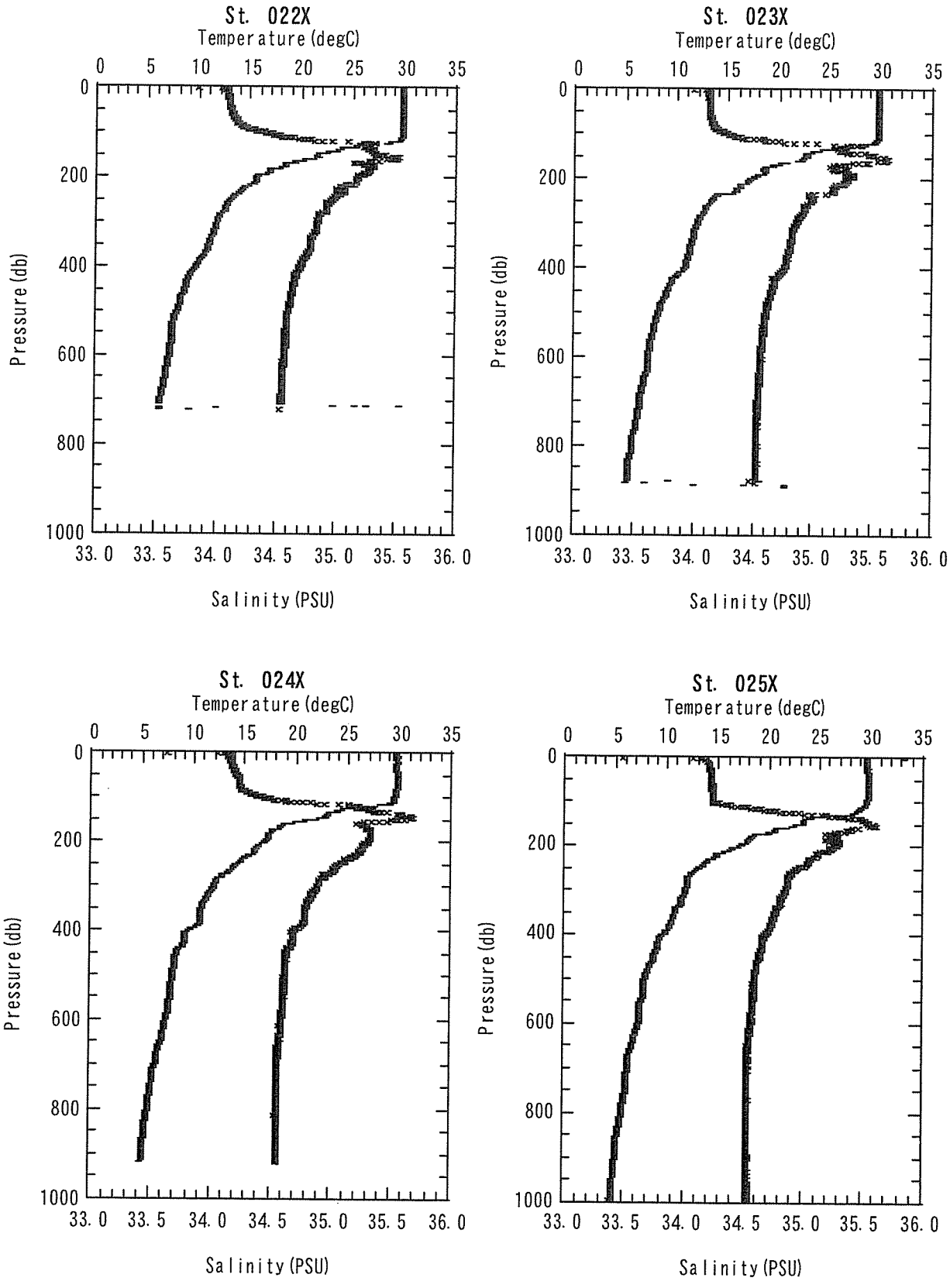

St. 012X
Temperture (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

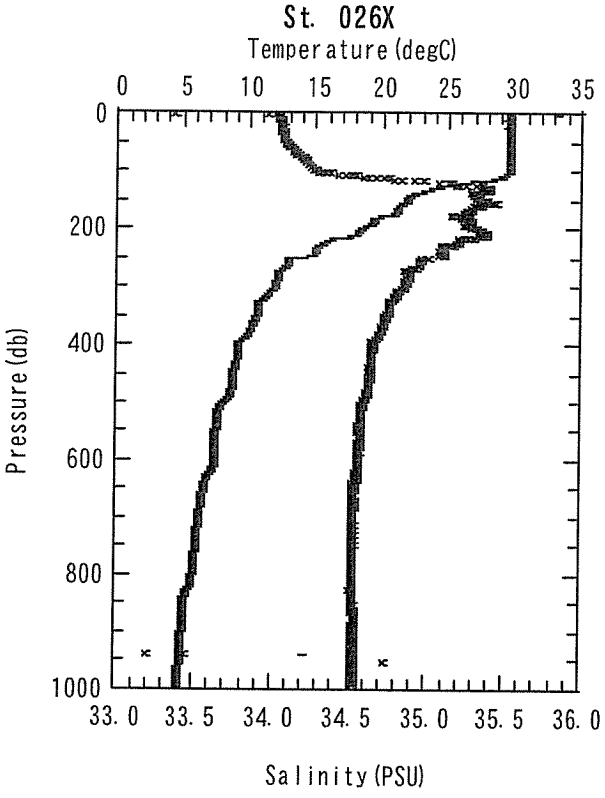

St. 013X
Temperture (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)

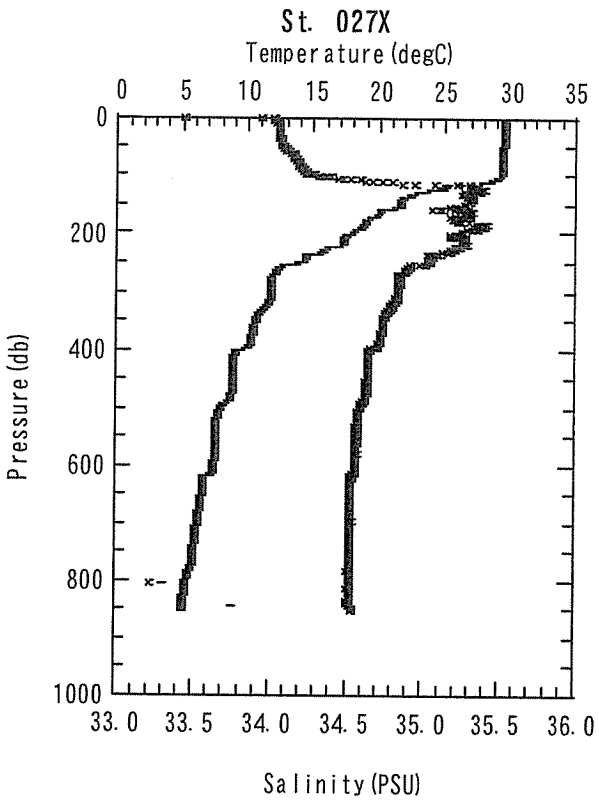

St. 015X
Temperture (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)


－ : Temperature
× : Salinity


St. 016X
Temperture (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 017X
Temperture (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 020X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 021X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
－ : Temperature
× : Salinity


St. 022X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 023X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 024X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
St. 025X
Temperature (degC)
0 5 10 15 20 25 30 35
Pressure (db)
0 200 400 600 800 1000
33.0 33.5 34.0 34.5 35.0 35.5 36.0
Salinity (PSU)
– : Temperature
× : Salinity





−: Temperature

×: Salinity

4.4 Sections

4.4.1 Temperature & Salinity

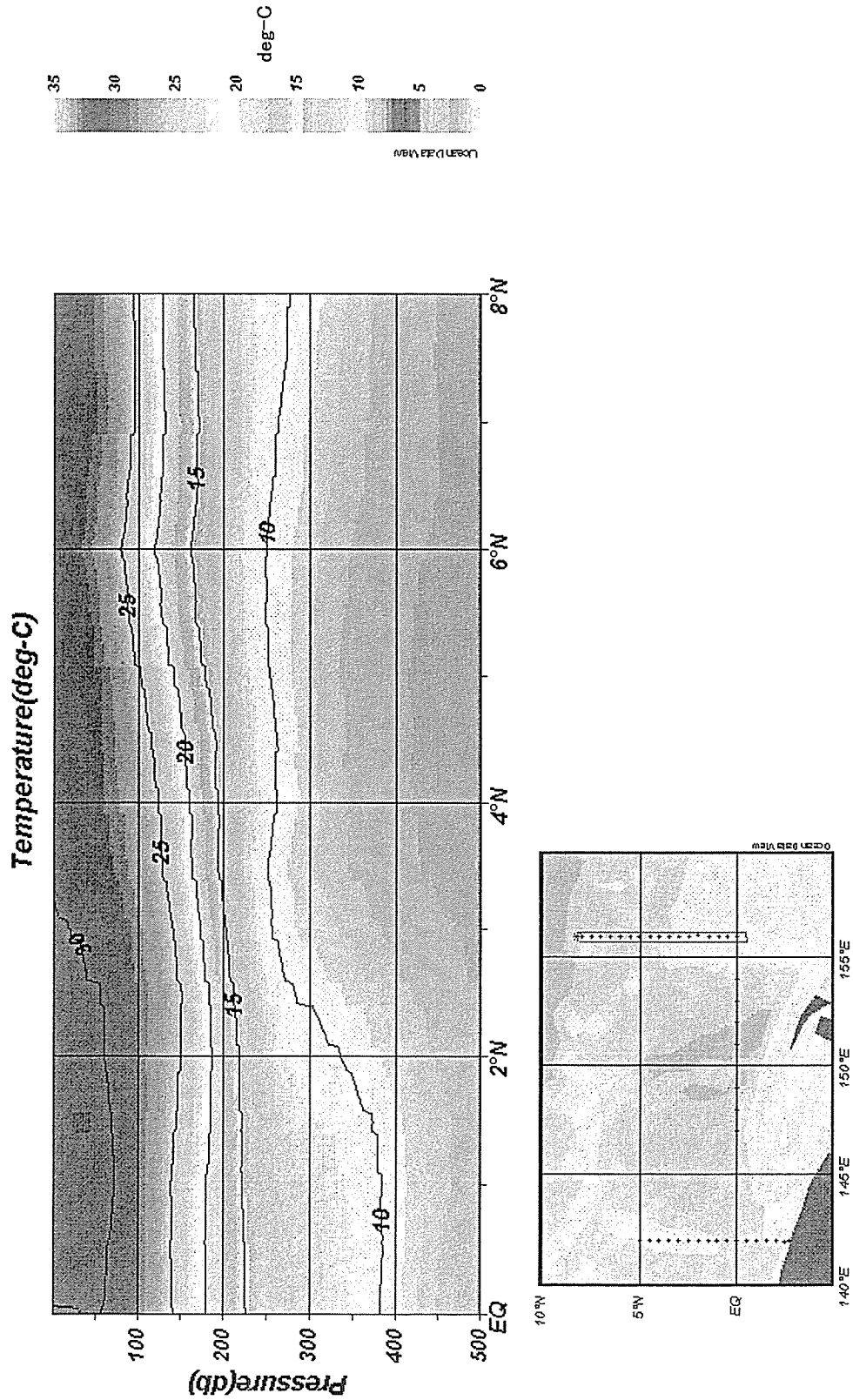


Fig.4.4.1-1 Stn.001-Stn.019

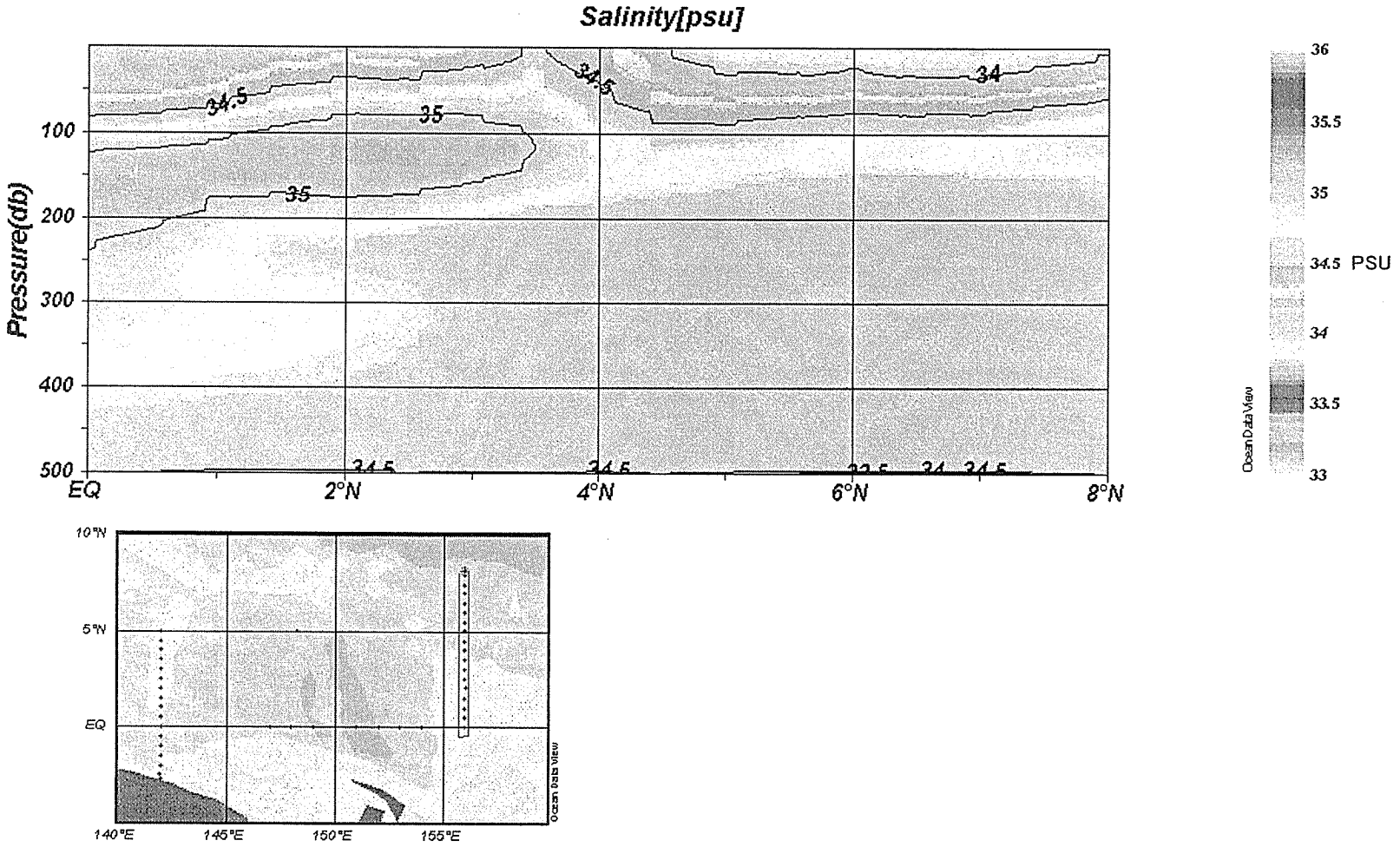


Fig.4.4.1-2 Stn.001-Stn.019

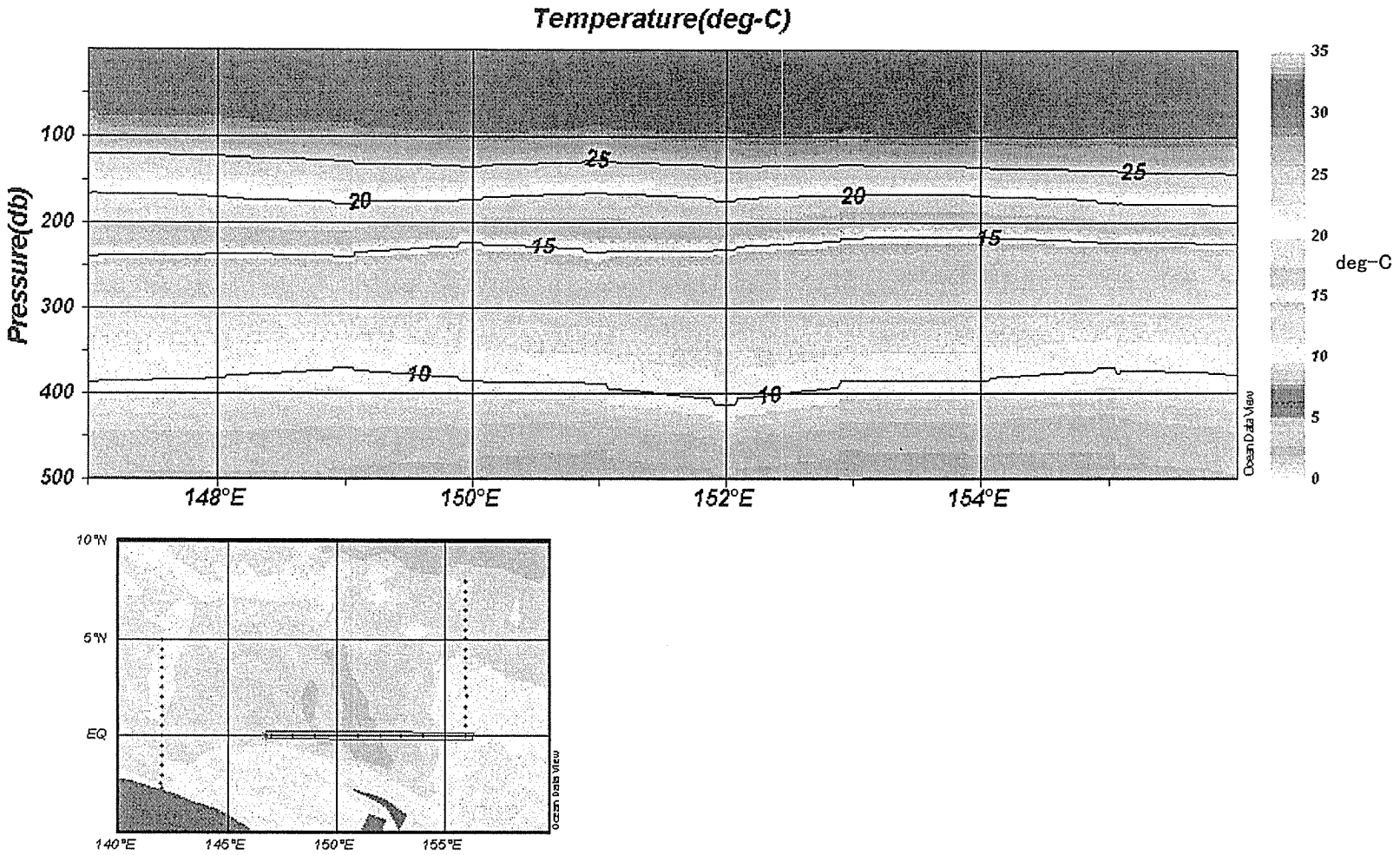


Fig.4.4.1-3 Stn.019-Stn.028

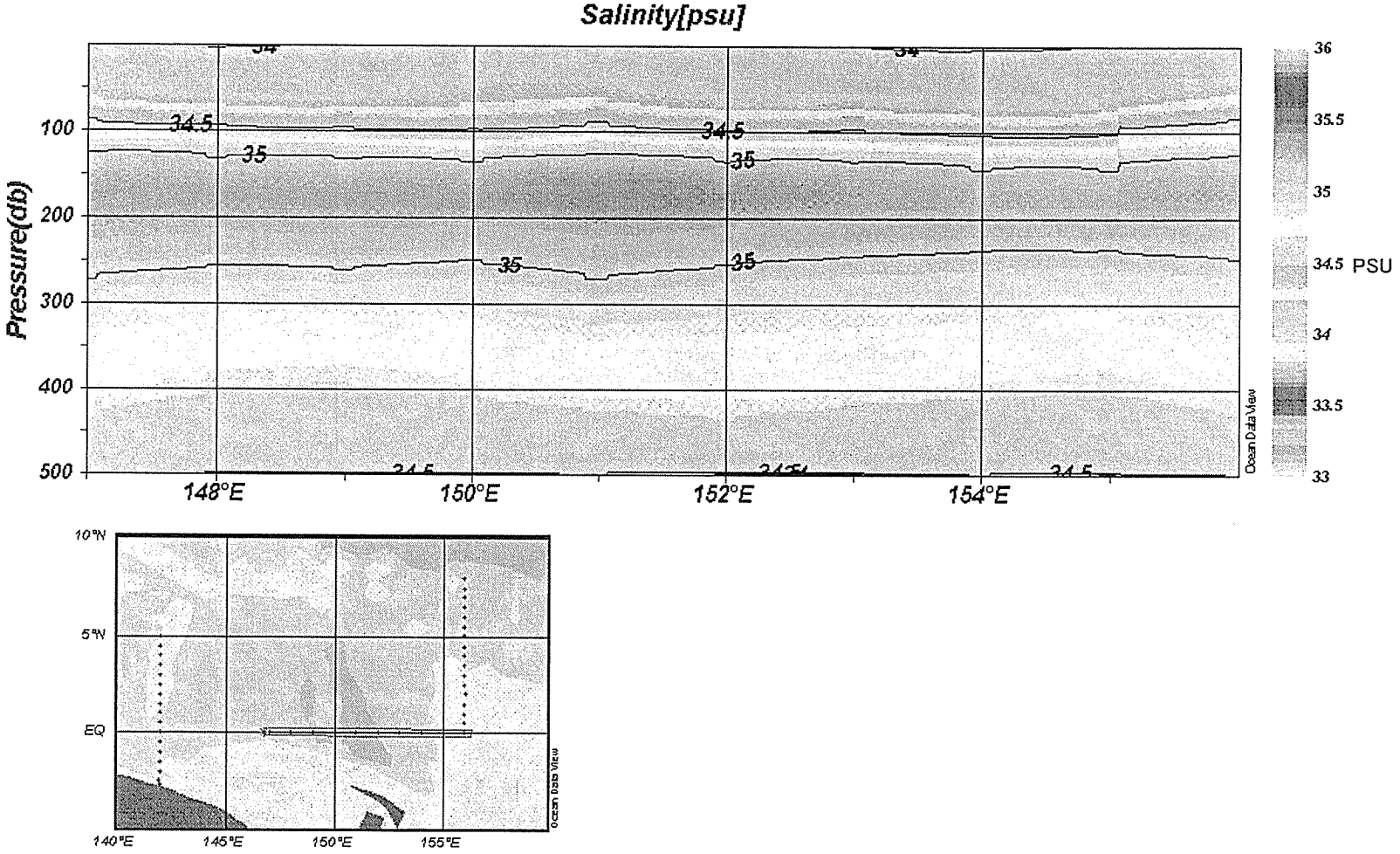


Fig.4.4.1-4 Stn.019-Stn.028

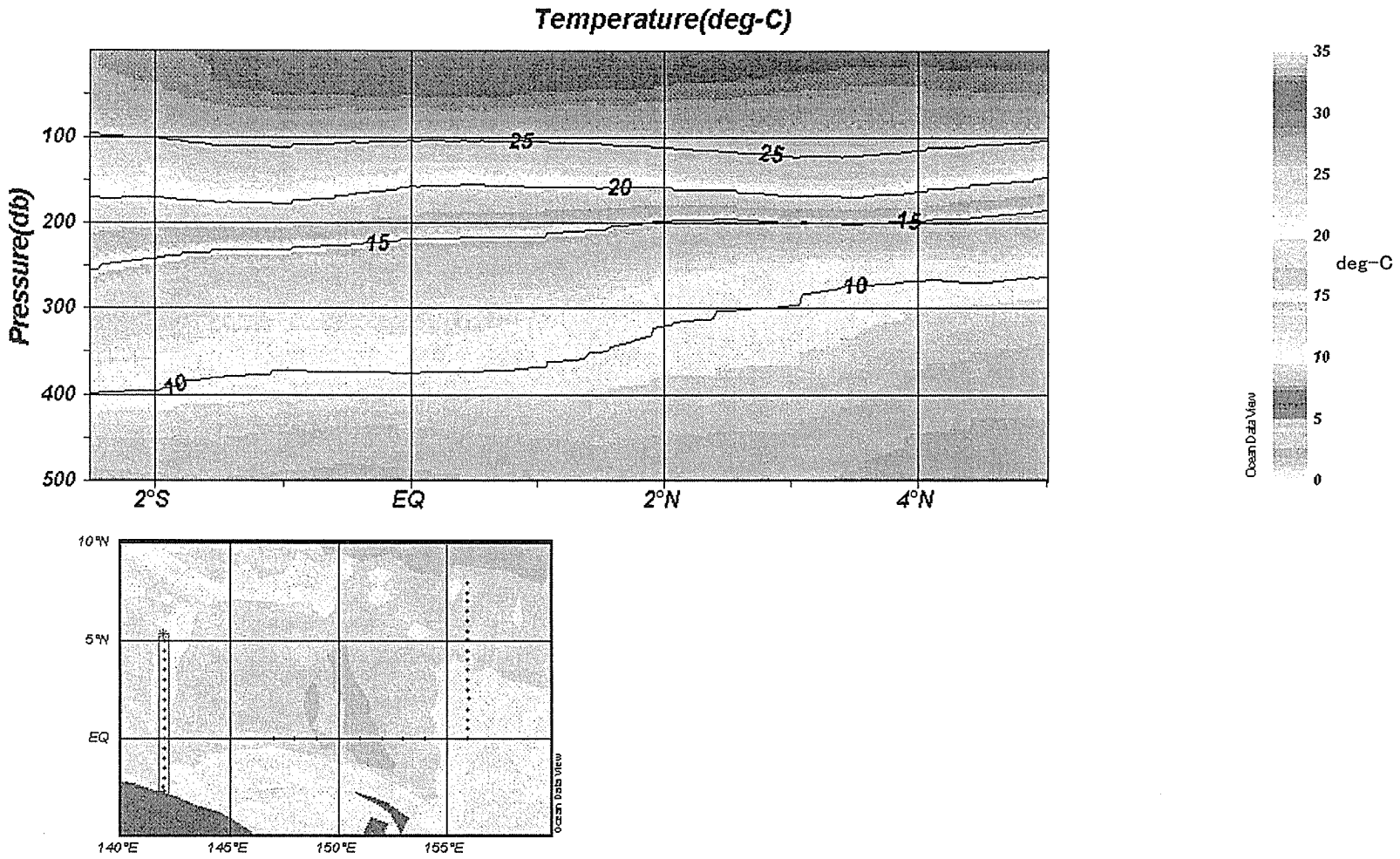


Fig.4.4.1-5 Stn.029-Stn.045

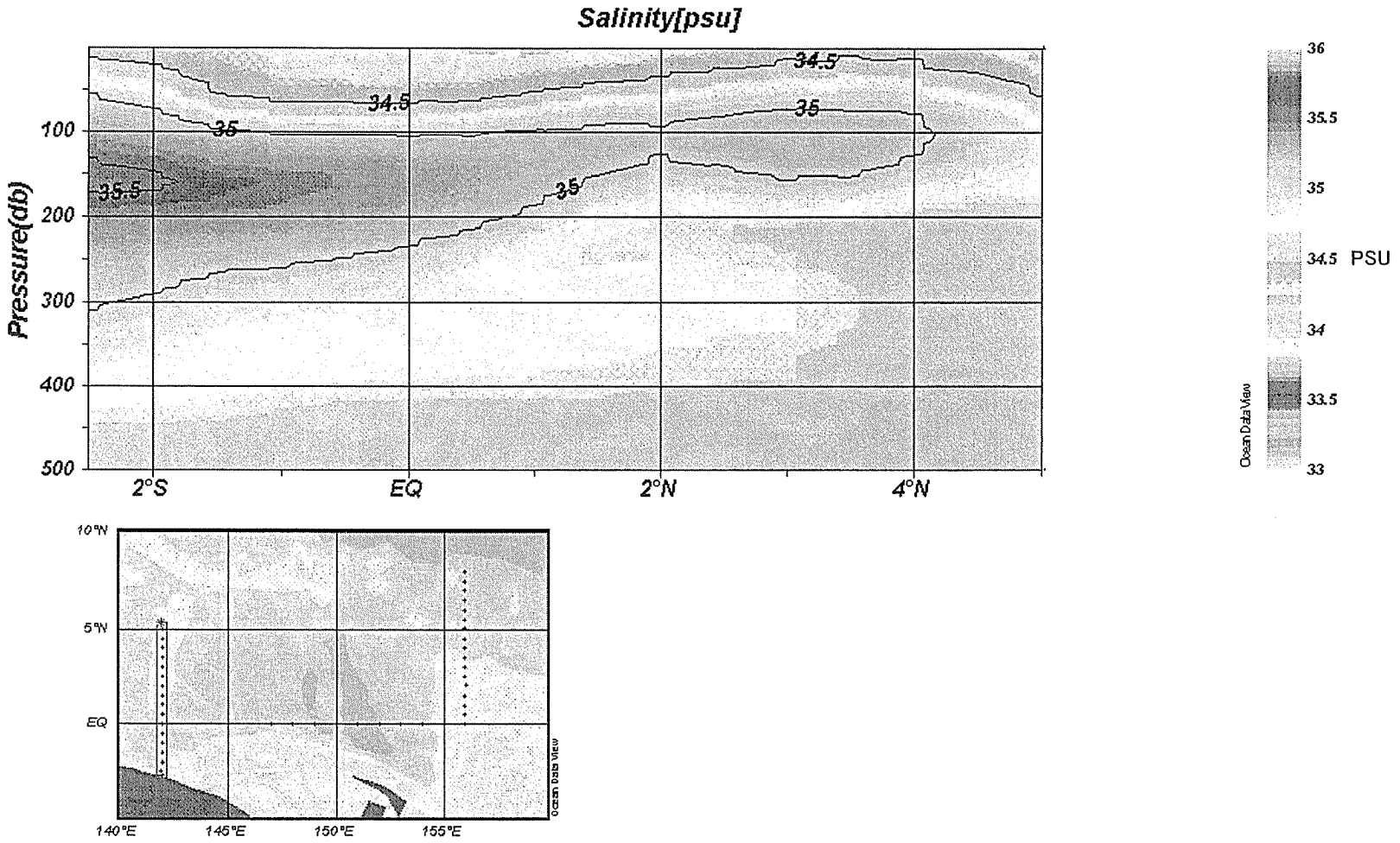


Fig.4.4.1-6 Stn.029-Stn.045

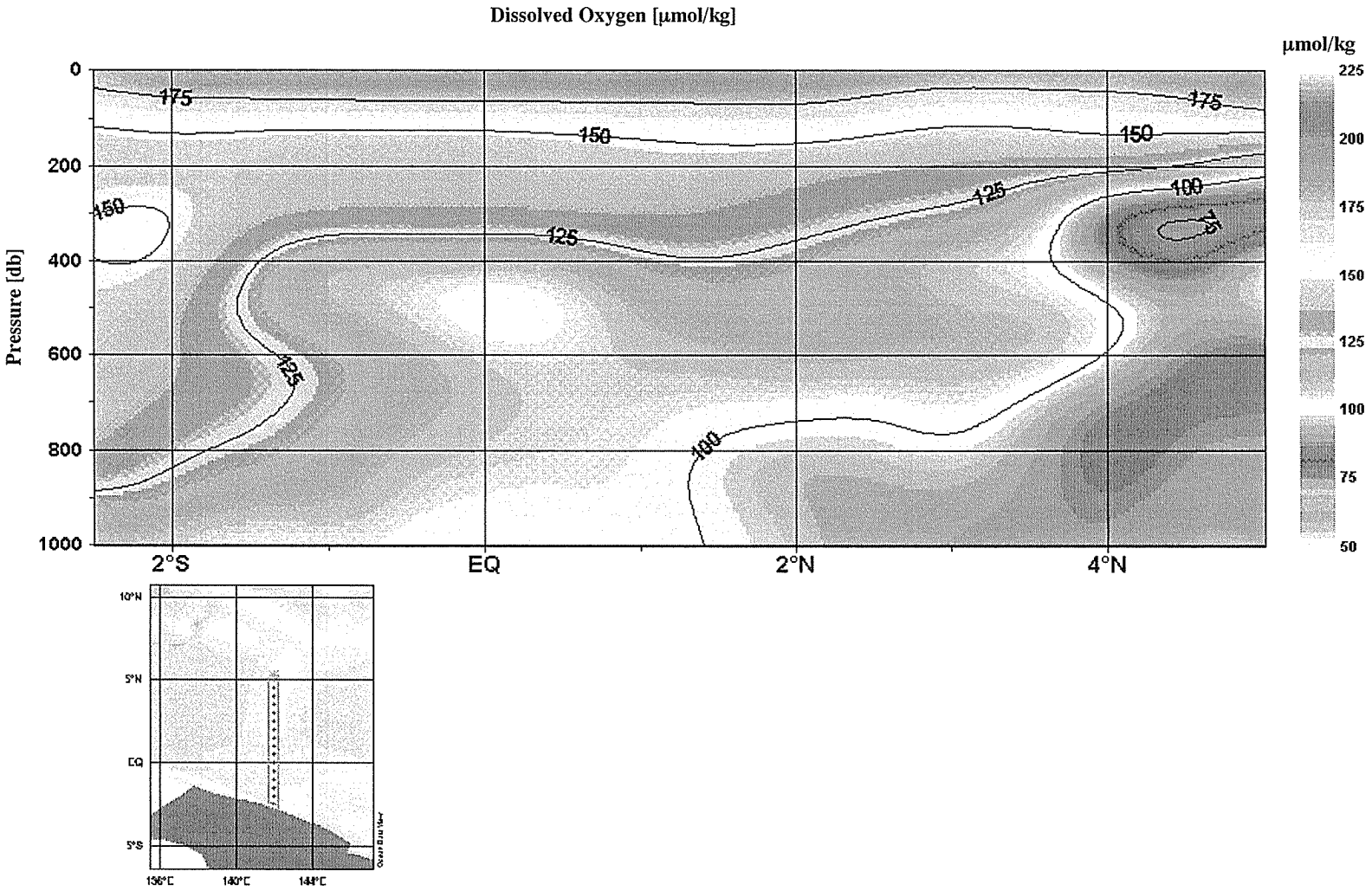


Fig.4.4.2-1 Stn.029-Stn.045

4.5 Bottle Salinity

To confirm the difference the conductivity sensors of CTD from data of salinity measurements by using Guildline Autosal Salinometer model 8400B

1. Salinity Sample Collection

Seawater samples were insect from the variable layer (2000m, 1900m, 1700m, 1500m, 1250m, 1000m, 750m, 500m, 200m, 100m, 50m, 10m) in Leg.1 and the deepest layer (1000m), variable layer (1000m, 800m, 700m, 600m, 500m, 400m, 300m, 200m, 150m, 100m, 50m) in Leg.2 of Niskin Sample Bottle. The bottles in which the salinity samples were collected and stored were 250 ml Phoenix brown glass bottle with cap. These bottles were rinsed three times and full with sample seawater. Salinity samples were stored in same laboratory as the salinity measurement was making.

2. Instrument and Method

The salinity analysis was carried by Guildline Autosal Salinometer model 8400B that was modified by addition of an Ocean Science International peristaltic-type sample intake pump. Data of the salinometer was collected simultaneously by personal computer. A double conductivity ratio was defined as a median of 31 reading of the salinometer. Data collection was started after 5 seconds and it took about 10 second to collect 31 readings by personal computer.

The salinometer was operated in the air-conditioned ship's laboratory at the bath temperature of 24 deg C.

3. Standard Sea Water

Autosal Model 8400B (S/N 59248) was standardized only before sequence of measurements by use of IAPSO Standard Sea Water batch P137 which conductivity ratio was 0.99995 (salinity=34.9980psu). After the standardization, 2-3 SSW amples monitored 8400B before and after the measurements for samples.

Leg.1- 19samples
Leg.2- 40samples

4. Result

At St.001C, measurement the average of difference between CTD and Autosal is 0.0035psu. The standard deviation is 0.021psu. This result is except Bottle No.7 (Pressure

750db), which found the bottle damage.

5. Remarks

After the measurement of sample at 001C, the Autosal could not control the bath temperature because of the impossible of cooling unit. They for we will measure rest samples at the laboratory in JAMSTEC after the cruise

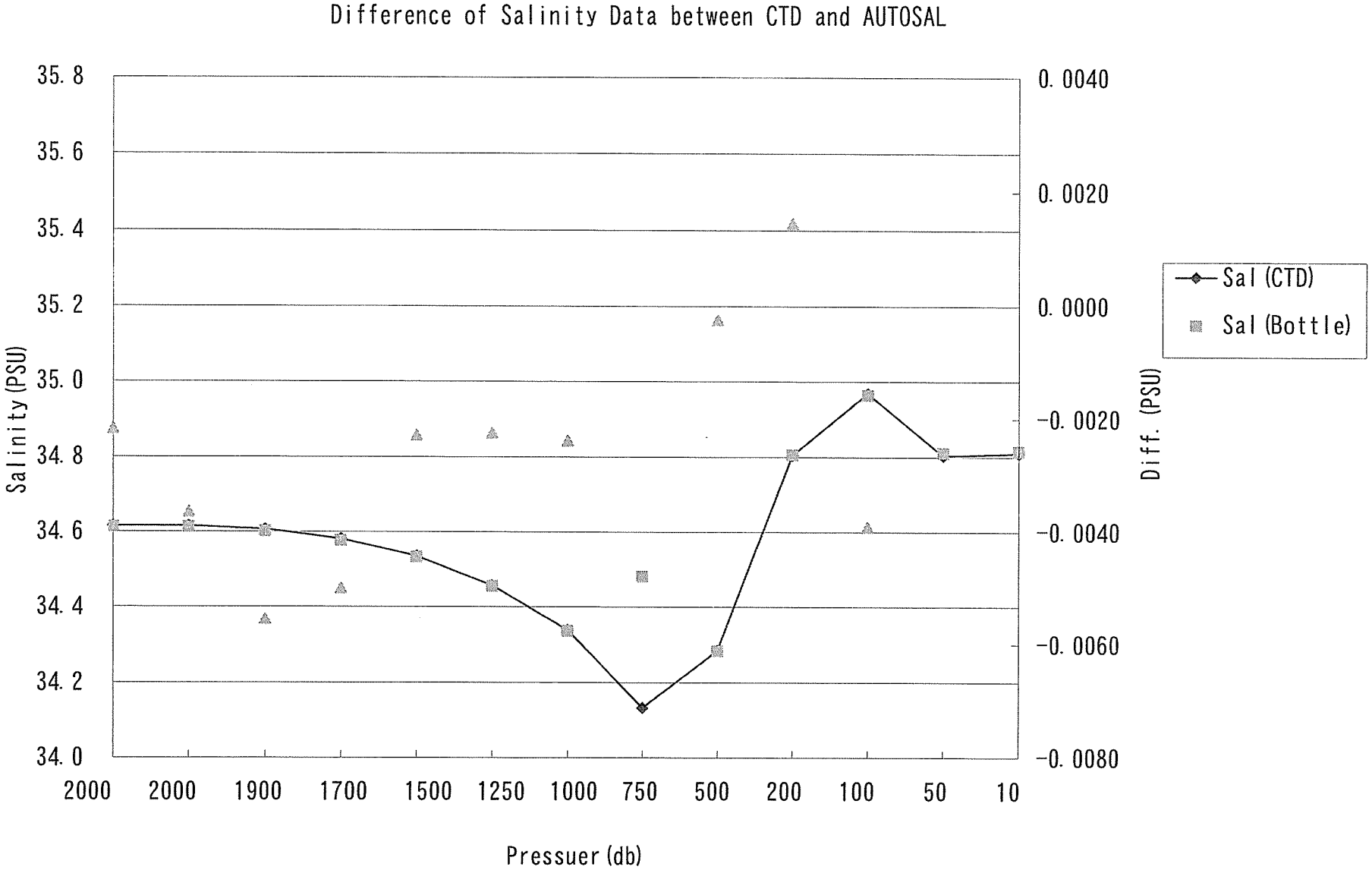
Salinity Data Comparrison between CTD and AUTOSAL

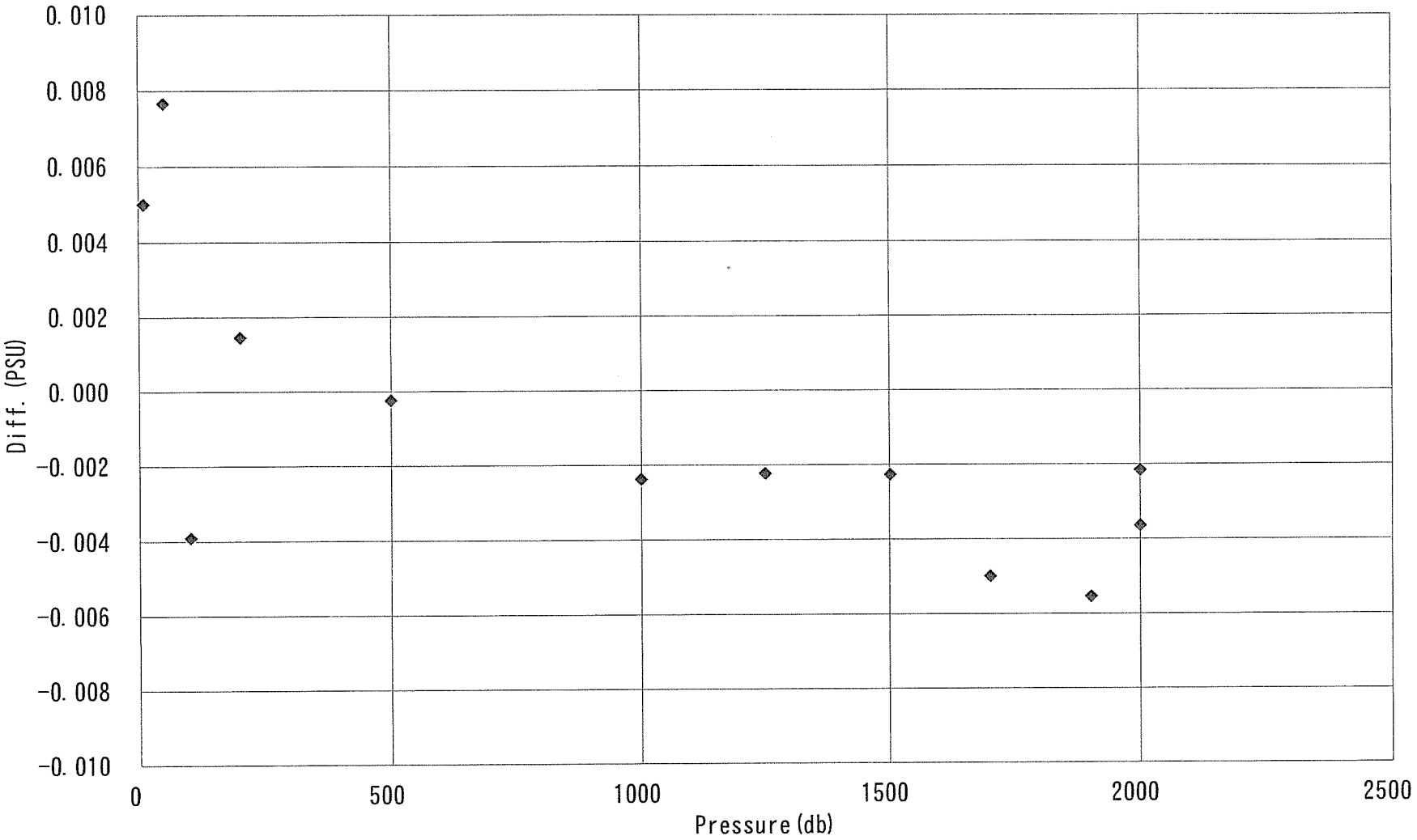
		Bath Tem	24		
Station	Bottle	2K	offset	2K(cor)	Smeasure
001C	097	1.98036	-1	1.98035	34.6135
001C	098	1.98028	-1	1.98027	34.6121
001C	099	1.97972	-1	1.97971	34.6011
001C	100	1.97847	-1	1.97846	34.5765
001C	101	1.97621	-1	1.97620	34.5320
001C	102	1.97226	-1	1.97225	34.4546
001C	103	1.96622	-1	1.96621	34.3360
001C	104	1.97359	-1	1.97358	34.4807
001C	105	1.96351	-1	1.96350	34.2829
001C	106	1.99013	-1	1.99012	34.8055
001C	107	1.99818	-1	1.99817	34.9639
001C	108	1.99040	-1	1.99039	34.8109
001C	109	1.99059	-1	1.99058	34.8147

Difference of Salinity Data between CTD and AUTOSAL

Station	Bottle.No	Niskin.No	Pres(CTD)	Temp(CTD)	Sal(CTD)	Sal(Bottle)	Diff(CTD-Btl)	ABS	Duplicate
001C	97	1	2000.4	1.9330	34.6157	34.6135	-0.0022	0.0022	0.0015
001C	98	1	2000.4	1.9330	34.6157	34.6121	-0.0036	0.0036	
001C	99	2	1902.0	2.0064	34.6066	34.6011	-0.0055	0.0055	
001C	100	3	1701.7	2.2253	34.5815	34.5765	-0.0050	0.0050	
001C	101	4	1502.1	2.5133	34.5343	34.5320	-0.0023	0.0023	
001C	102	5	1250.4	3.0649	34.4568	34.4546	-0.0022	0.0022	
001C	103	6	1000.0	4.0465	34.3384	34.3360	-0.0024	0.0024	
001C	104	7	750.9	5.4707	34.1332	34.4807	0.3475	0.3475	
001C	105	8	500.3	10.8535	34.2831	34.2829	-0.0002	0.0002	
001C	106	9	200.6	18.5802	34.8041	34.8055	0.0014	0.0014	
001C	107	10	101.2	23.5300	34.9678	34.9639	-0.0039	0.0039	
001C	108	11	50.1	27.4409	34.8032	34.8109	0.0077	0.0077	
001C	109	12	10.2	27.5034	34.8097	34.8147	0.0050	0.0050	
								Avg	0.0035
								Std	0.0021

Except for a Bottle 104's data


Difference of Salinity Data between CTD and AUTOSAL
35.8
35.6
35.4
35.2
35.0
34.8
34.6
34.4
34.2
34.0
Salinity (PSU)
0.0040
0.0020
0.0000
-0.0020
-0.0040
-0.0060
-0.0080
Diff. (PSU)
Sal (CTD)
Sal (Bottle)
2000
2000
1900
1700
1500
1250
1000
750
500
200
100
50
10
Pressuer (db)


Stn. 001C Salinity difference (CTD-Btl)
0.010
0.008
0.006
0.004
0.002
0.000
-0.002
-0.004
-0.006
-0.008
-0.010
Diff. (PSU)
0
500
1000
1500
2000
2500
Pressure (db)

4.6 Bottle dissolved Oxygen

T. Seike and Y. Sonoyama 1)

1) :Marine Works Japan, LTD.

Objectives:

Measurement of dissolved oxygen (below D.O.) using D.O.meter corrected by the Winkler titration processed to the WHP Operations and Methods (Dickson, 1996).

Comparison of the data from D.O.meter corrected by the Winkler titration with D.O. data from CTD D.O. sensor.

Instruments:

D.O.meter; TOA Portable Dissolved Oxygen Meter Model DO-25A
Titrator; Metrohm Model 716 DMS Titrino/ 10ml of titration vessel
Detector; Pt Electrode/ 6.0401.100
Software; Data acquisition/ Metrohm, Tinet 2.4

Methods:

The 12 positions water samplers (SBE32) sampled seawater during CTD up cast.

The water samples for D.O. were sampled from the 5-liter Niskin water samplers into 100ml D.O. glass bottles. After the sampling, we analyzed D.O. with salinity correction within 30 minutes (Before measurement, the D.O. meter was adjusted to 0-100% (see TOA D.O. meter operation manual)).

In every cast, water samples for the Winkler titration were also sampled to calibrated BOD flasks (ca, 180 ml). Water corresponded to three times of bottles was used to flush, and water temperature was measured. The samples for the titration method were analyzed after 1 hours sampling. These samples were analyzed by Metrohm piston burette of 10ml with Pt Electrode. The standardizations have been performed once a day before the sample titration.

The data from the D.O.meter were corrected with calibration factors. The factors were decided by linear regression based on the Winkler titration values vs. D.O.meter values at all station.

Results:

(1) Precision of Winkler titration data

We took 9 duplicate samples for Winkler titration method in this cruise. Standard deviation of each samples were less than 0.5 μmol kg^{-1} (Table 4.6.1).

(2) Correction of the data from D.O. meter

The data from D.O. meter were compared with Winkler titration data at all station (54 pairs). We took a liner regression line (Fig. 4.6.1).

$Y = 0.9689 * X + 8.2244$ ($R^2 = 0.9975$)

Y; Corrected D.O. value [μmol/kg], X; D.O. meter value [μmol/kg]

All data from D.O. meter were corrected by this formula. Corrected data were shown in Table 4.6.2.

(3) Comparison of the data from CTD D.O. sensor

The data from CTD D.O. sensor were compared with corrected D.O. data at all station (185 pairs). We took a liner regression line (Fig. 4.6.2).

$Y = 0.8342 * X + 0.2154$ ($R^2 = 0.9796$)

Y; Corrected D.O. value [ml/l], X; CTD D.O. sensor value [ml/l]

(4) Vertical profiles

Vertical profiles in this cruise were shown in Fig. 4.6.3.

References:

Culberson, C.H. (1991) Dissolved Oxygen, in WHP Operations and Methods, Woods Hole., pp1-15

Culberson, C.H., G.Knapp, R.T.Williams and F.Zemlyak (1991) A comparison of methods for the determination of dissolved oxygen in sea water (WHPO 91-2), Woods Hole.

Dickson, A. (1996) Dissolved Oxygen, in WHP Operations and Methods, Woods Hole., pp1-13

Green, E.J. and D.E.Carritt (1966) An Improved Iodine Determination Flask for Whole-bottle Titrations, Analyst, 91, 207-208.

Horibe, Y., Y.Kodama and K.Shigehara (1972) Errors in sampling procedure for the determination of dissolved oxygen by Winkler method, J. Oceanogr. Soc, Jpn., 28, 203-206.

Murray, N., J.P.Riley and T.R.S.Wilson (1968) The solubility of oxygen in Winkler reagents used for determination of dissolved oxygen, Deep-Sea Res., 15, 237-238

S.Kitagawa and K.Taira (1993) Measurement of dissolved oxygen by an electrode method,Umi no Kagaku (in Japanese), 2, 15-18.

Umi no Kagaku (in Japanese), 2, 15-18.TOA Electronics Ltd. (1991) DO-25A Portable Dissolved Oxygen meter Operation Manual, Tokyo, 29

Table 4.6.1 Precision of Winkler titration data

St. No.	Pressure[db]	D.O. [μmol/kg]	Average	Std.-Dev.
C29	700	148.05 148.02	148.04	0.02
C29	800	135.74 136.06	135.90	0.23
C29	1,000	116.00 116.19	116.10	0.13
C33	700	125.25 125.54	125.40	0.21
C33	800	111.26 111.48	111.37	0.16
C33	1,000	104.09 104.30	104.20	0.15
C34	700	111.04 111.13	111.09	0.06
C34	800	104.01 103.75	103.88	0.18
C34	1,000	103.80 104.16	103.98	0.25

Table 4.6.2 Corrected D.O. data

St. No.	Pressure[db]	D.O. [μmol/kg]	D.O. [ml/l]
C29	0	195.28	4.469
	51	161.41	3.700
	101	150.72	3.456
	152	146.54	3.362
	202	146.52	3.362
	301	158.05	3.626
	401	163.40	3.748
	501	161.95	3.714
	601	163.43	3.748
	701	147.76	3.389
	799	135.94	3.117
	999	–	–
C30	0	–	–
	49	178.02	4.080
	101	144.22	3.307
	151	141.51	3.246
	201	144.44	3.314
	300	149.77	3.436
	401	–	–
	501	–	–
	600	146.54	3.362
	700	144.47	3.314
	800	140.92	3.233
	999	105.46	2.419
C31	0	199.49	4.564
	49	192.64	4.412
	100	149.58	3.429
	150	145.06	3.328
	200	146.79	3.368
	302	154.77	3.551
	400	162.77	3.734
	500	144.15	3.308
	600	137.06	3.145
	700	141.78	3.253
	799	118.14	2.711
	1002	102.19	2.345

St. No.	Pressure[db]	D.O. [μmol/kg]	D.O. [ml/l]
C32	0	194.33	4.445
	50	189.98	4.351
	101	147.81	3.389
	151	143.02	3.280
	202	–	–
	300	143.34	3.287
	400	–	–
	501	106.40	2.439
	601	133.30	3.057
	701	131.80	3.023
	800	120.85	2.772
	1000	100.16	2.297
C33	0	196.95	4.505
	49	196.22	4.493
	100	142.46	3.267
	151	140.06	3.212
	201	143.27	3.287
	299	143.87	3.301
	400	94.52	2.168
	501	108.70	2.494
	600	125.55	2.880
	701	125.54	2.880
	800	111.95	2.568
	1001	105.46	2.419
C34	0	196.94	4.505
	48	195.88	4.487
	100	153.42	3.517
	149	139.75	3.206
	200	141.78	3.253
	301	144.74	3.321
	399	108.10	2.480
	500	101.90	2.338
	601	116.67	2.677
	699	111.65	2.562
	800	104.86	2.406
	1001	104.29	2.392

St. No.	Pressure[db]	D.O. [μmol/kg]	D.O. [ml/l]
C35	0	197.20	4.511
	50	197.68	4.527
	101	140.96	3.233
	150	139.48	3.199
	200	144.45	3.314
	300	142.10	3.260
	400	107.78	2.473
	501	90.34	2.074
	601	105.71	2.426
	701	112.51	2.582
	801	105.75	2.426
	1000	–	–
C36	0	196.24	4.488
	52	197.45	4.521
	101	147.53	3.382
	151	145.70	3.341
	201	143.31	3.287
	300	143.58	3.294
	401	98.66	2.263
	501	96.30	2.200
	600	103.39	2.372
	700	104.28	2.392
	800	103.41	2.372
	1000	–	–
C37	0	196.99	4.505
	50	200.04	4.582
	101	146.01	3.348
	152	144.75	3.321
	199	148.89	3.416
	300	142.36	3.267
	401	129.37	2.968
	499	111.36	2.555
	601	114.32	2.623
	701	104.85	2.406
	800	109.88	2.521
	1001	105.75	2.426

St. No.	Pressure[db]	D.O. [μmol/kg]	D.O. [ml/l]
C38	0	197.61	4.519
	50	192.06	4.399
	101	150.79	3.456
	152	149.56	3.429
	202	146.88	3.368
	302	136.50	3.131
	402	–	–
	501	116.93	2.684
	602	99.21	2.277
	702	106.88	2.453
	801	89.16	2.046
	1001	98.92	2.270
C39	0	196.44	4.492
	49	199.16	4.561
	101	163.23	3.741
	151	156.94	3.599
	201	127.61	2.928
	300	137.63	3.158
	401	114.87	2.636
	501	116.94	2.684
	601	123.73	2.840
	700	104.82	2.406
	800	91.23	2.094
	1000	96.28	2.209
C40	0	196.53	4.494
	49	181.02	4.148
	100	150.48	3.450
	150	150.76	3.456
	202	131.18	3.009
	300	128.47	2.948
	402	111.92	2.568
	501	120.51	2.765
	600	109.87	2.521
	701	94.51	2.168
	800	92.44	2.121
	1001	91.25	2.094

St. No.	Pressure[db]	D.O. [μmol/kg]	D.O. [ml/l]
C41	0	196.31	4.489
	51	163.20	3.741
	101	147.79	3.389
	150	144.22	3.307
	201	129.98	2.982
	301	127.89	2.934
	402	93.91	2.155
	502	109.57	2.514
	600	112.83	2.589
	700	112.54	2.582
	802	100.41	2.304
	1000	90.38	2.073
C42	0	196.47	4.493
	51	175.44	4.019
	103	149.34	3.422
	152	147.84	3.389
	202	122.03	2.799
	298	123.75	2.840
	398	103.66	2.379
	500	111.63	2.562
	598	121.95	2.799
	702	93.60	2.148
	801	88.56	2.033
	1000	88.86	2.040
C43	0	196.59	4.496
	50	171.55	3.931
	102	150.50	3.450
	150	163.77	3.755
	199	121.99	2.799
	300	61.99	1.423
	398	82.08	1.884
	502	106.01	2.433
	601	109.54	2.514
	698	72.03	1.653
	802	82.95	1.904
	1001	90.04	2.067

St. No.	Pressure[db]	D.O. [μmol/kg]	D.O. [ml/l]
C44	0	198.08	4.530
	50	182.44	4.182
	102	154.30	3.538
	151	152.49	3.497
	202	116.97	2.684
	300	60.82	1.395
	401	69.98	1.606
	500	102.18	2.345
	600	75.29	1.728
	701	86.21	1.979
	801	90.93	2.087
	1001	91.82	2.107
C45	0	200.06	4.574
	51	197.63	4.527
	100	176.81	4.053
	151	141.24	3.239
	201	82.39	1.890
	301	62.30	1.429
	400	108.98	2.501
	499	102.47	2.351
	600	75.29	1.728
	701	87.40	2.006
	801	90.35	2.073
	1001	92.43	2.121

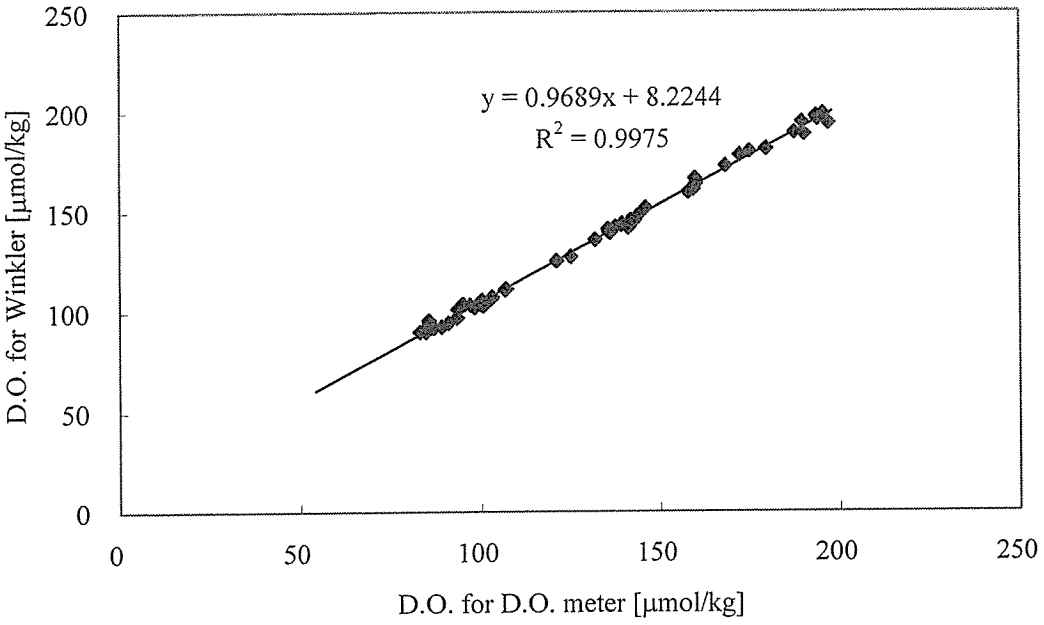


Fig. 4.6.1 Correction of the data from D.O. meter

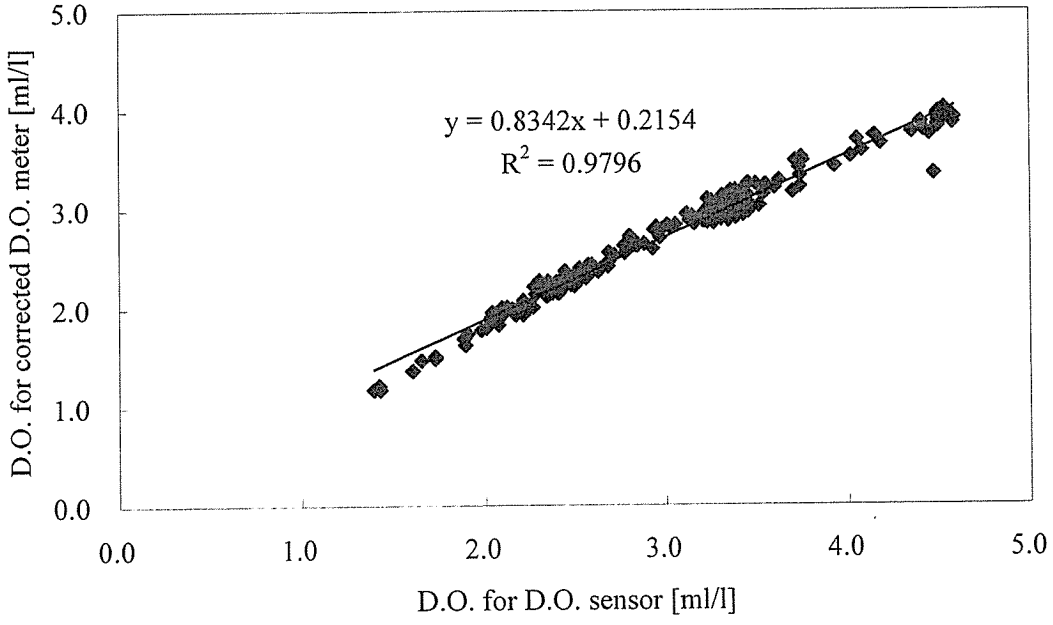


Fig. 4.6.2 Comparison of the data from CTD D.O. sensor

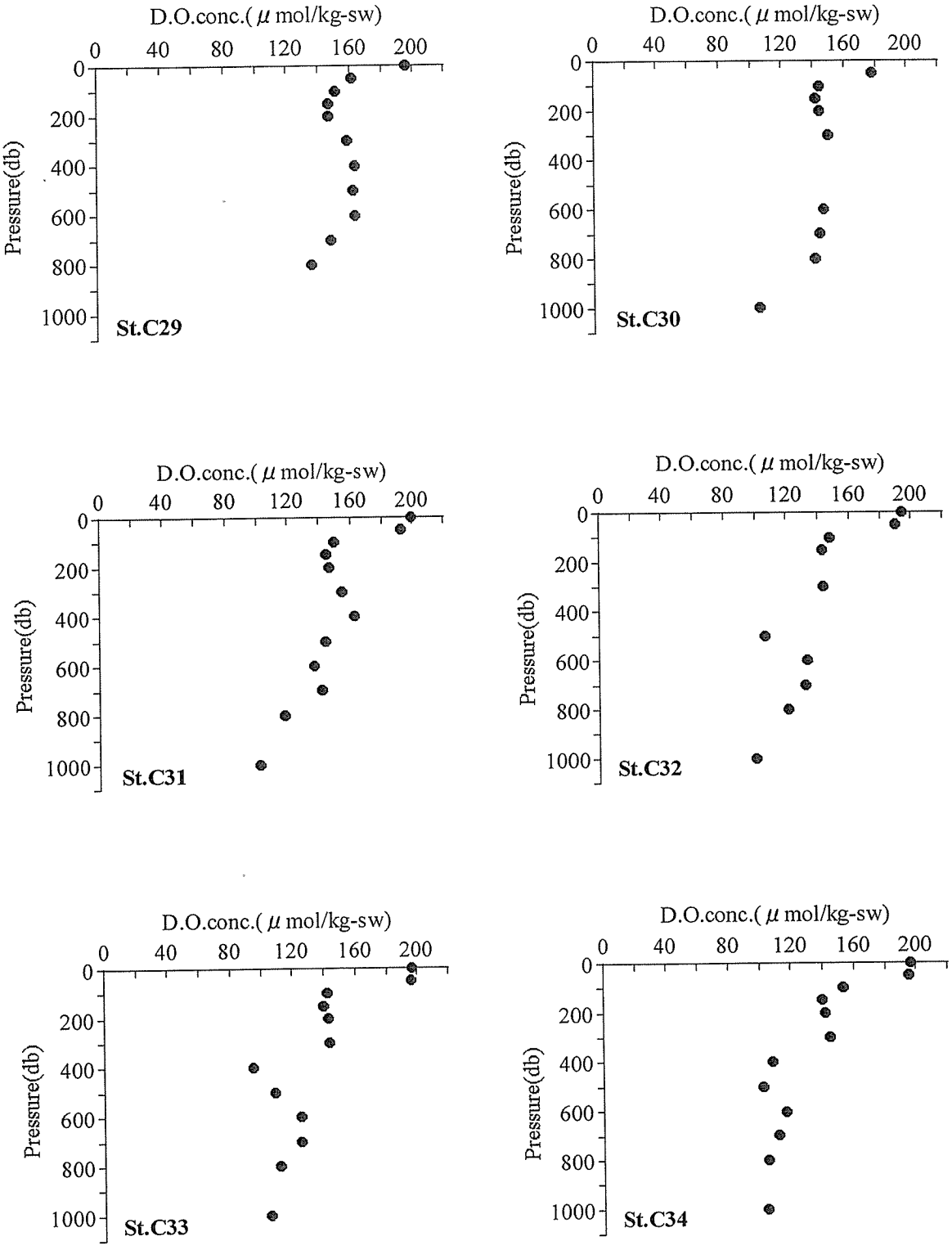
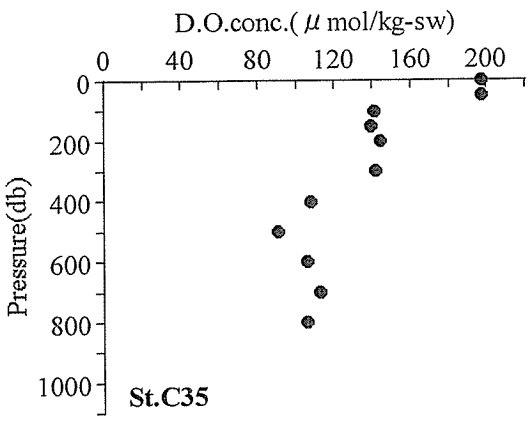
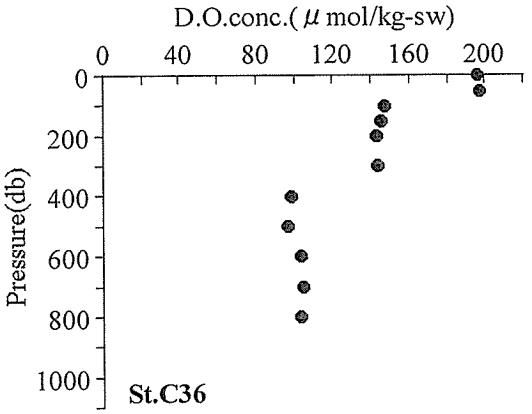
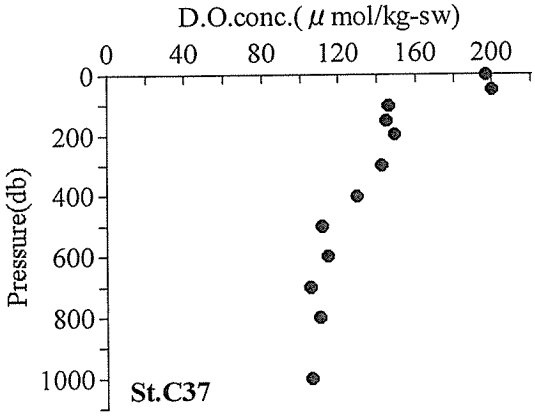
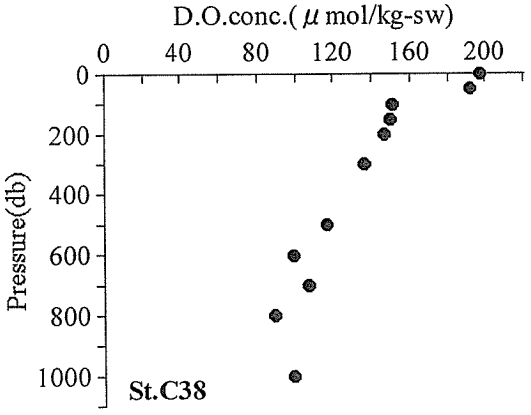


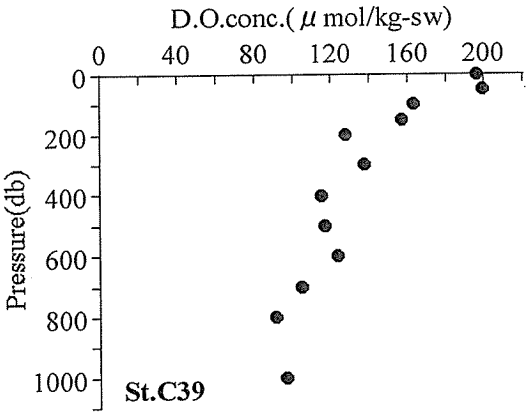
Fig. 4.6.3 Vertical profiles

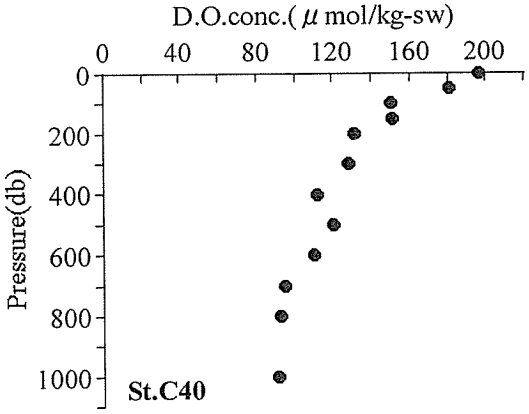

D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
Pressure(db)
0
200
400
600
800
1000
St.C35

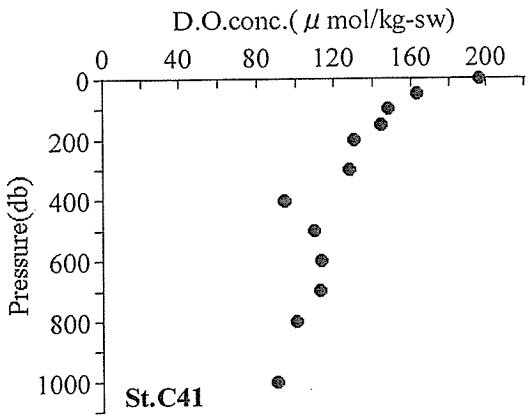

D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
Pressure(db)
0
200
400
600
800
1000
St.C36

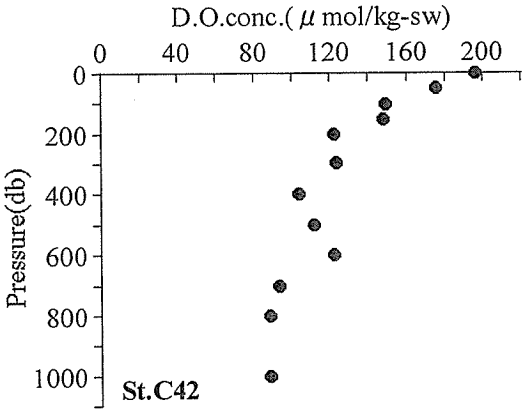

D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
Pressure(db)
0
200
400
600
800
1000
St.C37

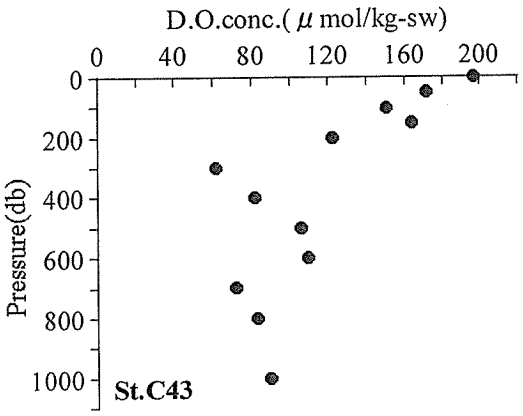

D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
Pressure(db)
0
200
400
600
800
1000
St.C38

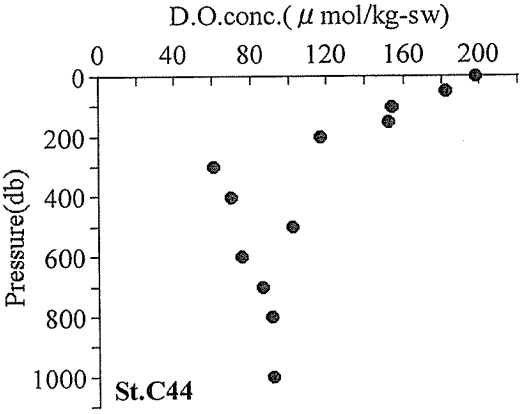

D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
Pressure(db)
0
200
400
600
800
1000
St.C39

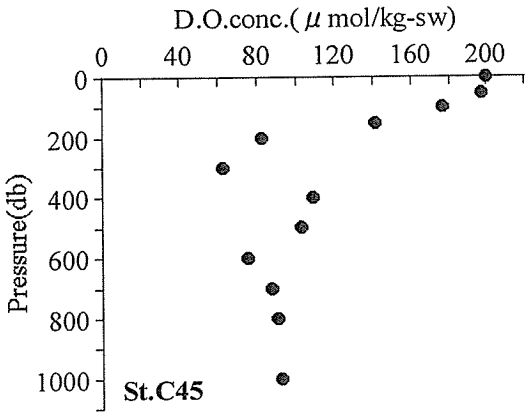

D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
Pressure(db)
0
200
400
600
800
1000
St.C40


D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
0
200
400
600
800
1000
Pressure(db)
St.C41


D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
0
200
400
600
800
1000
Pressure(db)
St.C42


D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
0
200
400
600
800
1000
Pressure(db)
St.C43


D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
0
200
400
600
800
1000
Pressure(db)
St.C44


D.O.conc.(μ mol/kg-sw)
0
40
80
120
160
200
0
200
400
600
800
1000
Pressure(db)
St.C45

5. Shipboard ADCP

5 Shipboard ADCP

(1) Personel name affiliation

Kazumi Baba(NME) -Leg1-

Yui Hashimoto -Leg2-

(2) Methods

In order to measure the current velocity, the shipboard ADCP (the 38kHz Ocean Surveyor,OS Ⅱ)was operated. Data Acquisition package is VMDAS program and CODAS programs were used for Analysis. The data acquisition was continued almost this cruise. Table 1 shows major parameters for the acquisition. All data have collected by using Kaiyodefault.ini, which include the parameters showing in Table1.

Table 1. Major parameters of the acquisition

Frequency	38.4kHz
Mode	Water Tracking (Narrowband)
Number of bins	16 meters
Blank Distance	16 meters
Number of cell(bin)	75
Transducer Depth	5 meters
Beam Angle	30 deg.(instrument default)
Heading Correction	K(Amplitude coefficient):0, phi(Phase coefficient):0, EV(Magnetic Offset):0, EA(Alignment error):43.28
First time interval (STA)	60 sec.
Second time interval (LTA)	300 sec.
First depth cell position	36.95 meters
Last depth cell position	1220.95 meters
Ensemble time	2 .0sec

(3) Reliability of the system

This ADCP system have mounted on R/V Kaiyo from 2000, changed from former 75kHz to 38kHz. During TOCS cruise in 2000(KY00-06 Leg3), Symonds(RDI) and Shimoda(SEA) confirmed the reasonableness, accuracy, and reliability of this OS-Ⅱ 38kHz ADCP.

As for sampling depth, it was reliably performing to obtain beyond 1000m in the TOCS 2000. But in this cruise we could not get the data under 800meters, during the speed of the ship is more than 9-10knots. The speed of the ship and the maximum depth of the data are related. The result of speed test is Fig.1. When speed of ship is 4-5knots ,we get data almost 1000m. As the speed of a ship increase, maximum observation depth become lower gradually. The reason is not clear, but we guess that there is something wrong with ship's bottom transducer or window. For example the adhesive living things on window, broken window, or broke down transducer and so on.

(4) Preliminary result

(4)-1 Data Files Description and Location

Table 2. Data files acquired towards the survey area

No	File name		Time(UTC)	latitude	Longitude	Remarks	Palmeter Type1*	DB name
1	Ky0111001_000000.*	Start	2001/11/29 03:43	35 13 22N	139 46 19E	From Japan to Survey Area.	Couldn't Calculation	T1001
		End	2001/11/30 03:43	31 36 16N	142 51 02E			
2	Ky0111002_000000.*	Start	2001/11/30 03:44	31 36 14N	142 51 04E		Type A	T1002
		End	2001/12/02 04:58	23 51 29N	150 04 42E			
3	Ky0111003_000000.*	Start	2001/12/02 04:59	23 51 29N	150 04 41E		Couldn't Calculation	T1003
		End	2001/12/02 06:13	23 51 57N	150 05 02E			
4	Ky0111004_000000.*	Start	2001/12/02 06:14	23 51 57N	150 05 02E		Couldn't Calculation	T1004
		End	2001/12/03 11:17	18 12 11N	152 14 12E			
all	Ky0111001_000000.*	Start	2001/11/29 03:43	35 13 22N	139 46 19E	From Japan to Survey Area.		TWSA*1
	Ky0111002_000000.*							
	Ky0111003_000000.*							
	Ky0111004_000000.*	End	2001/12/03 11:17	18 12 11N	152 14 12E			

*1 TWSA Fig Name : KY01-11 Leg1toward Survey area

Table 3. Data files acquired in the survey area(Towards Kevieng)

No	File name		Time(UTC)	latitude	Longitude	Remarks	Palmeter Type1*	DBname
5	ky0111005_000000.*	Start	2001/12/05 23:24	08 02 30N	155 57 17E	Test file		
		End	2001/12/05 23:39	08 00 44N	155 58 48E			
6	ky0111006_000000.*	Start	2001/12/05 23:42	08 00 36N	155 59 11E	Maintenance of Triton No.1 and CTD observation		
		End	2001/12/06 21:56	07 58 25N	155 58 35E			
7	ky0111007_000000.*	Start	2001/12/06 21:56	07 58 23N	155 58 35E	Towards Triton No.2	Type B	T1007
		End	2001/12/07 14:26	05 03 20N	155 59 53E			
8	ky0111008_000000.*	Start	2001/12/07 14:28	05 03 21N	155 59 46E	Towards Triton No.3	Type A	T1008*1
		End	2001/12/08 21:43	02 02 30N	156 00 48E			
9	ky0111009_000000.*	Start	2001/12/08 21:48	02 02 19N	156 00 52E	Towards Triton No.4	Type A	
		End	2001/12/09 10:18	00 01 17N	156 03 31E			
10	ky0111010_000000.*	Start	2001/12/09 10:22	00 00 47N	156 03 42E	standby for weather		
		End	2001/12/10 01:47	00 00 04N	155 57 07E			
11	ky0111011_000000.*	Start	2001:/12/10 1:49	00 00 55S	155 57 16E	Towards Kevieng	Type A	T1011
		End	2001/12/11 15:24	2 29 60S	150 39 17E			
all	ky0111007_000000.*	Start	2001/12/06 22:00	7 57 51N	155 58 34E	Triton No1 to Kevieng		s1al*2
	ky0111008_000000.*							
	ky0111009_000000.*							
	ky0111011_000000.*	End	2001/12/11 12:15	1 26 39S	155 03 45E			

1* File No 8-9 are Analyzed as one file named t1008.

*2 S1al Fig Name : KY01-11 Leg1ALL

Table 4. Data files acquired in the survey area(Towards Palou)

No	File name		Time(UTC)	latitude	Longitude	Remarks	Palmeter Type1*	DB name
12	ky0111012_000000.*	Start	2001/12/11 03:27	2 29 59S	150 39 17E	Kevieng		
		End	2001/12/12 06:12	2 35 05S	150 47 18E			
13	ky0111013_000000.*	Start	2001/12/12 09:03	2 35 04S	150 47 18E	Towards Triton No.4	Type A	T2013
		End	2001/12/14 23:03	0 01 04N	156 00 25E			
14	ky0111014_000000.*	Start	2001/12/14 23:26	0 01 28N	155 59 33E	XCTD survey	Type A	T2014
		End	2001/12/1714:01	0 02 19S	157 10 02E			
15	ky0111015_000000.*	Start	2001/12/17 14:09	0 02 18S	147 10 26E	ADCPbouy,TritonNo9 setup&recall		
		End	2001/12/19 09:39	0 00 44S	147 00 46E			
16	ky0111016_000000.*	Start	2001/12/19 9:46	0 00 33S	147 00 51E	On boad ADCP Speed Test		
		End	2001/12/19 21:51	0 03 36N	147 01 50E			
17	ky0111017_000000.*	Start	2001/12/19 21:56	0 03 33N	147 01 36E	Toward ADCPbouy	Type B	T2017
		End	2001/12/21 23:06	2 29 10S	141 58 05E			
18	ky0111018_000000.*	Start	2001/12/21 23:09	2 29 09S	141 58 04E	CTD survey	Type B	T2018
		End	2001/12/24 09:59	4 57 53N	142 00 22E			
19	ky0111019_000000.*	Start	2001/12/24 10:01	4 57 55N	142 00 22E	CTD survey	TypeB	T2020
		End	2001/12/24 10:56	4 59 49N	142 00 02E			
20	ky0111020_000000.*	Start	2001/12/24 10:01	5 00 27N	141 56 40E	Ensemble Time change from 2 to3sec.Only this No.		
		End	2001/12/24 10:56	5 40 06N	139 19 07E			
21	ky0111021_000000.*	Start	2001/12/25 12:44	5 40 16N	139 18 27E	Toward Palou		
		End	2001/12/26 08:54	7 35 39N	134 20 52E			
22	ky0111022_000000.*	Start	2001/12/26 8:58	7 35 41N	134 20 48E	Toward Palou		
		End	2001/12/26 22:00	7 22 20N	134 25 23E			
all	ky0111013_000000.*	Start	2001/13 05:00	0 01 04N	156 00 25E	Kevieng to palau		S2al*3
	ky0111014_000000.*							
	ky0111017_000000.*							
	ky0111018_000000.*							
	ky0111019_000000.*							
	ky0111020_000000.*							
	ky0111021_000000.*							
	ky0111022_000000.*	End	2001/12/26 22:00	7 22 20N	134 25 23E			

* 1 Palameter for carrying out angle conpensation in timslip.cnt file.

TypeA : min_n_fixes= 9 n_refs= 9 i_ref_l0= 1 i_ref_l1= 3 i_ref_r0= 6 i_ref_r1= 8

TypeB: min_n_fixes= 7 n_refs= 7 i_ref_l0= 1 i_ref_l1= 2 i_ref_r0= 5 i_ref_r1= 6

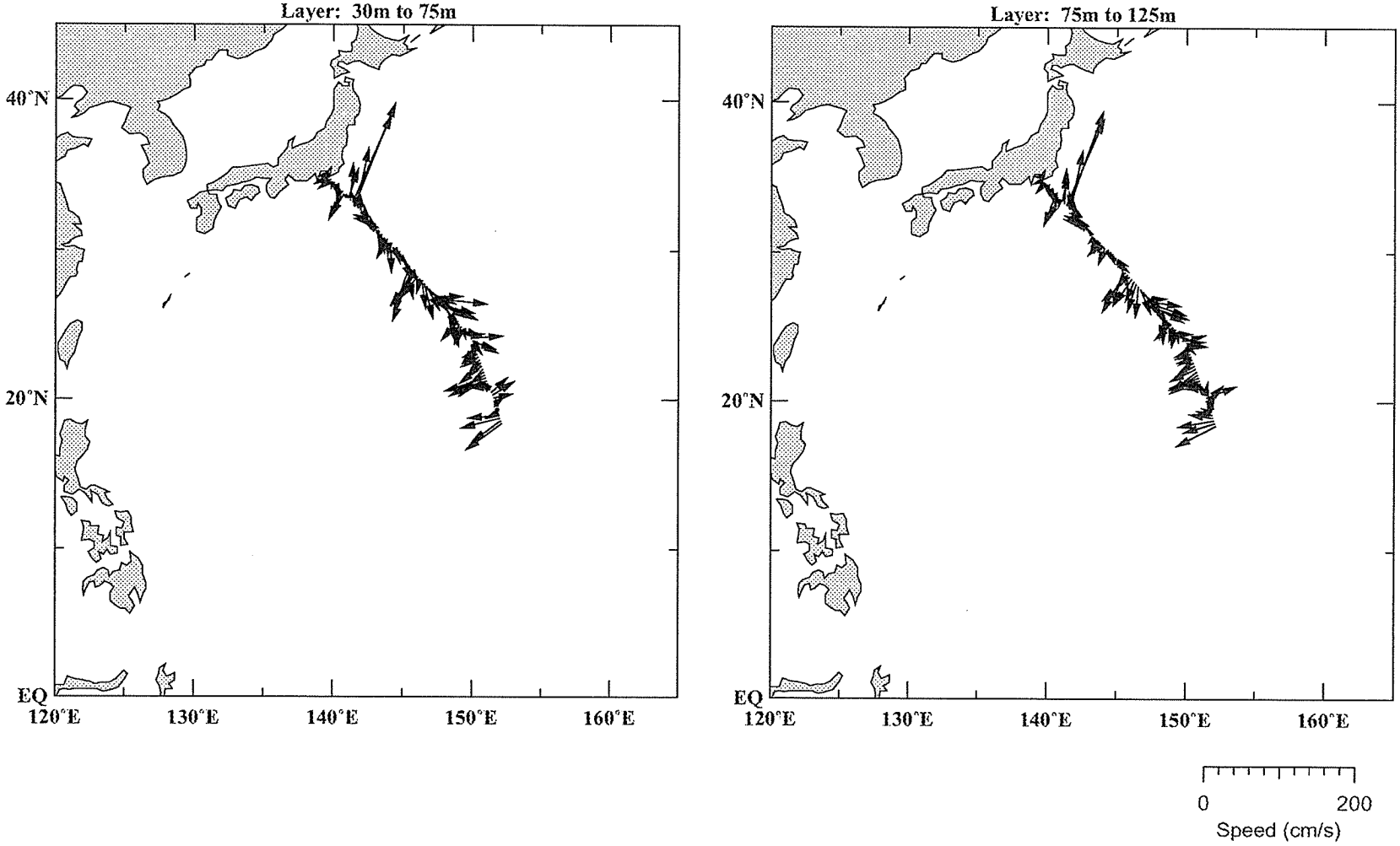
Compensation value of each FileNo are fig2. The value of "amp" & "phase" are used in order to execute the rotate command.

*2 File No 19-20 are Analyzed as one file named t2020.

*3 S2al Fig Name : KY01-11 Leg2ALL

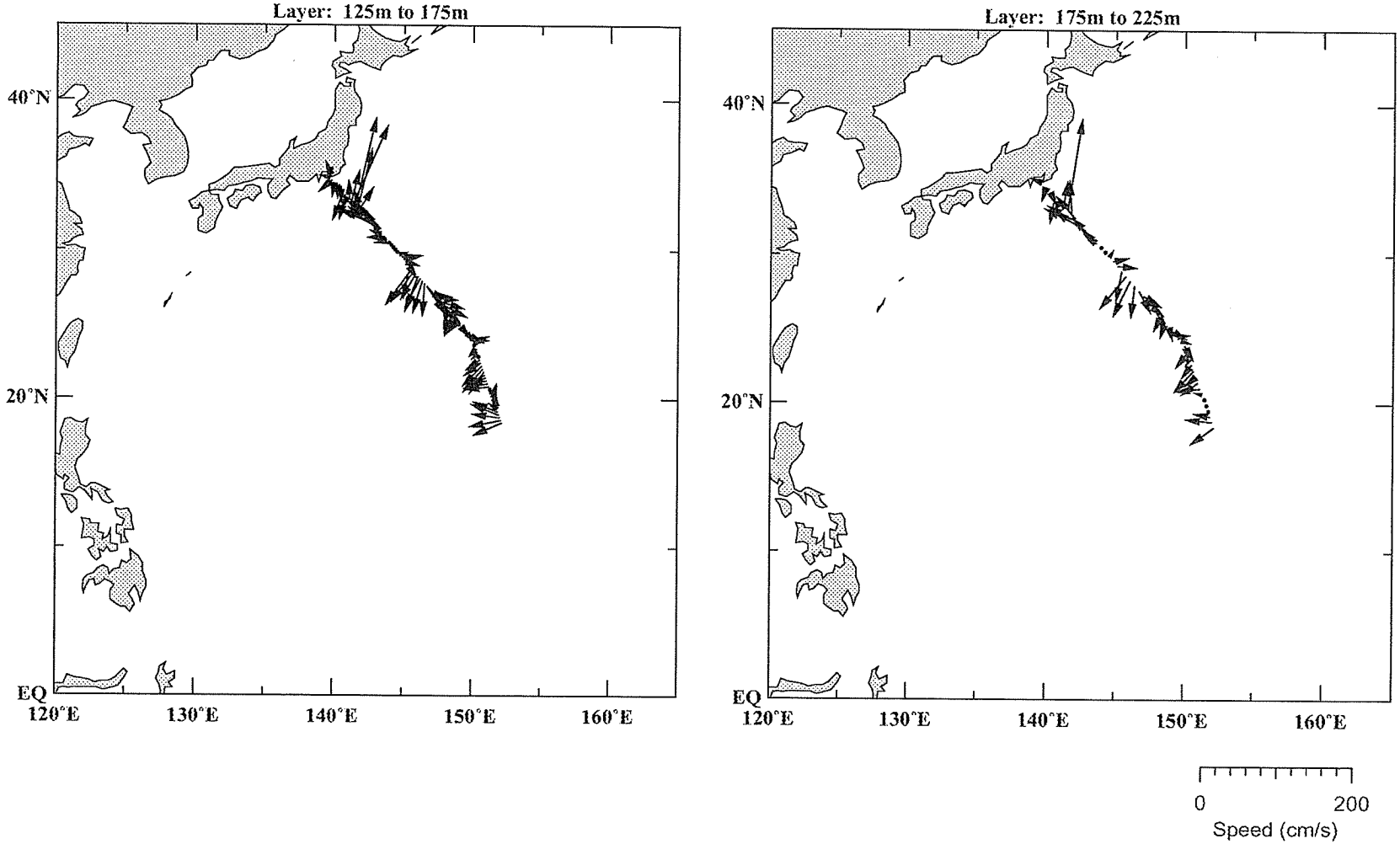
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



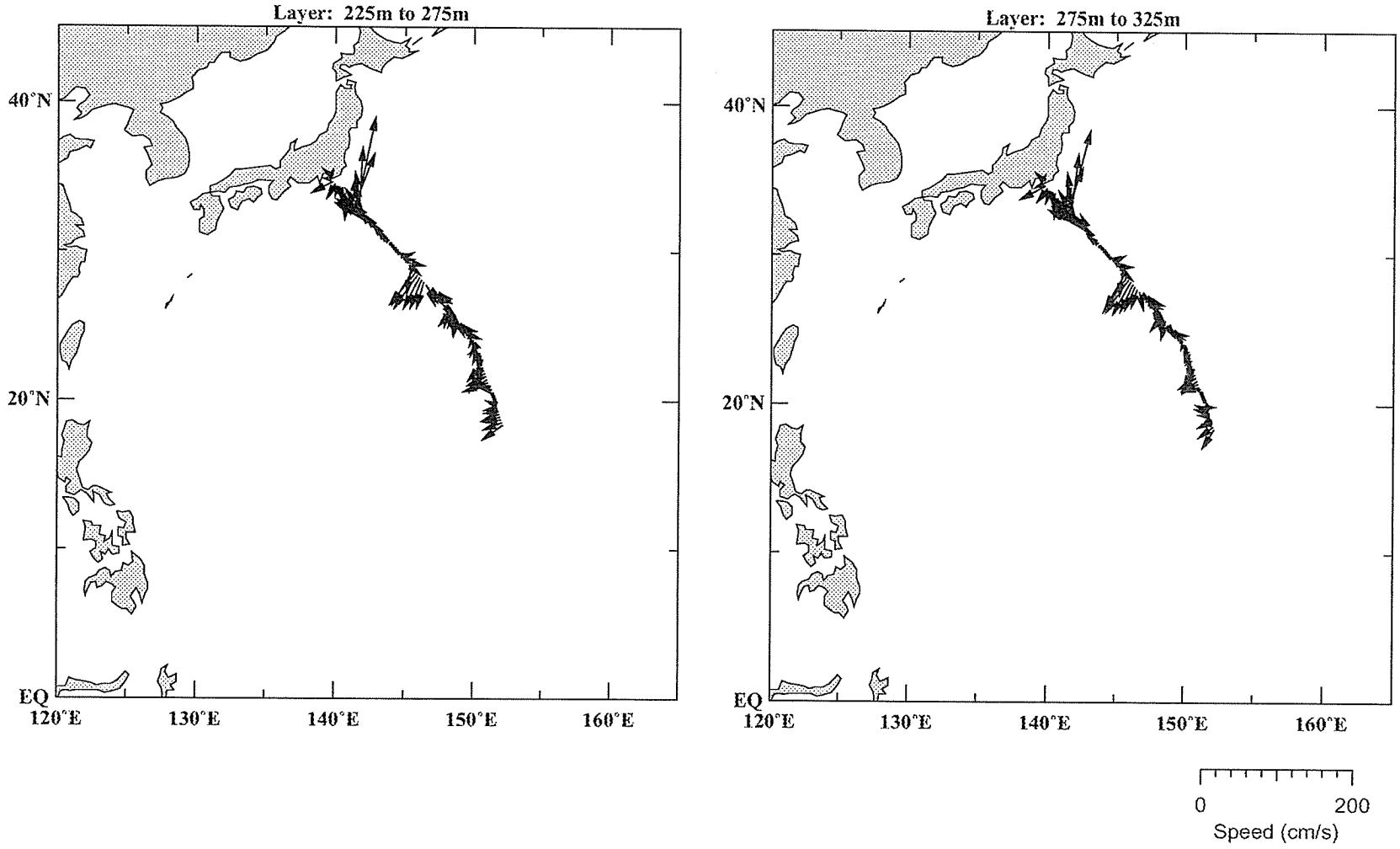
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



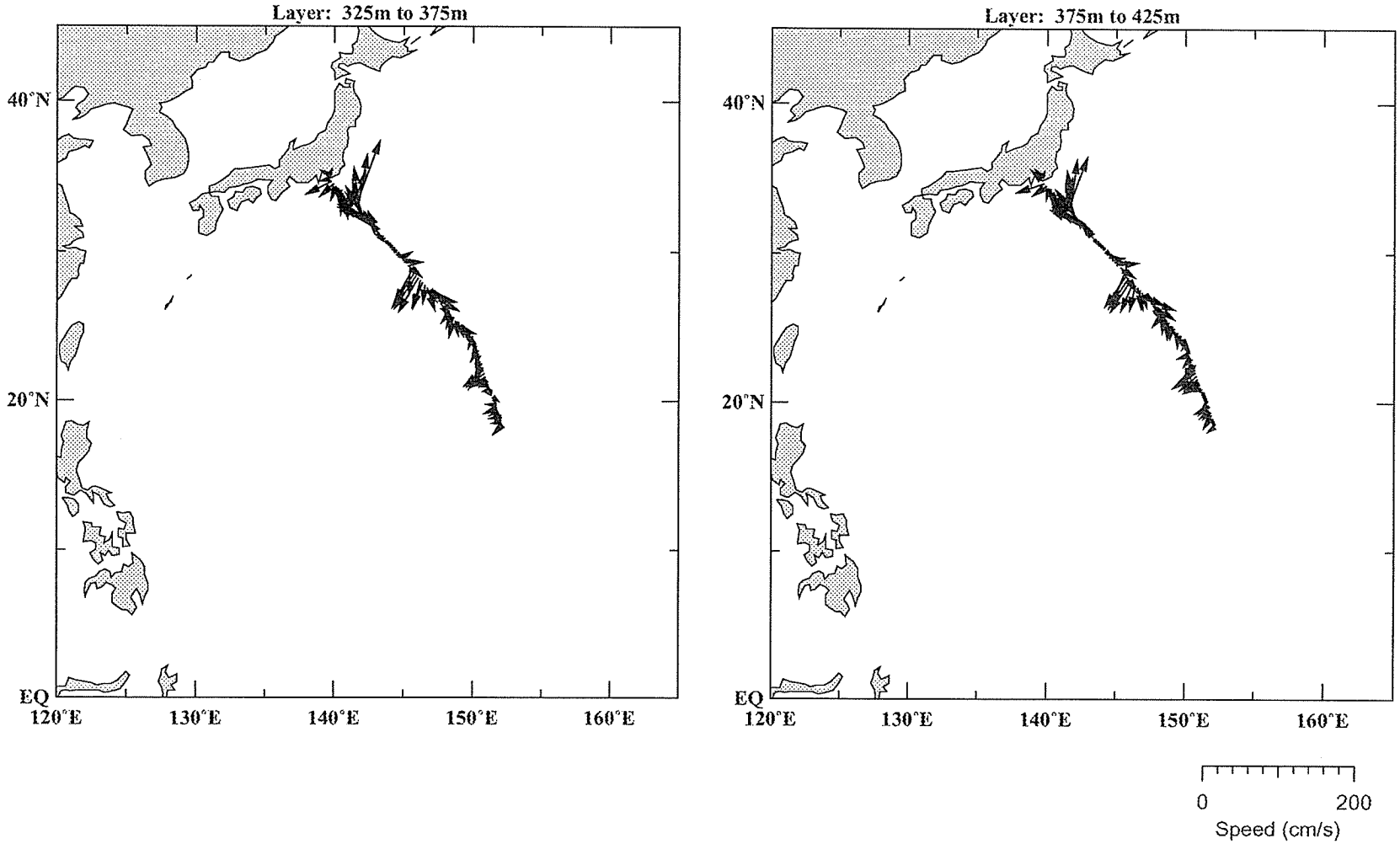
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



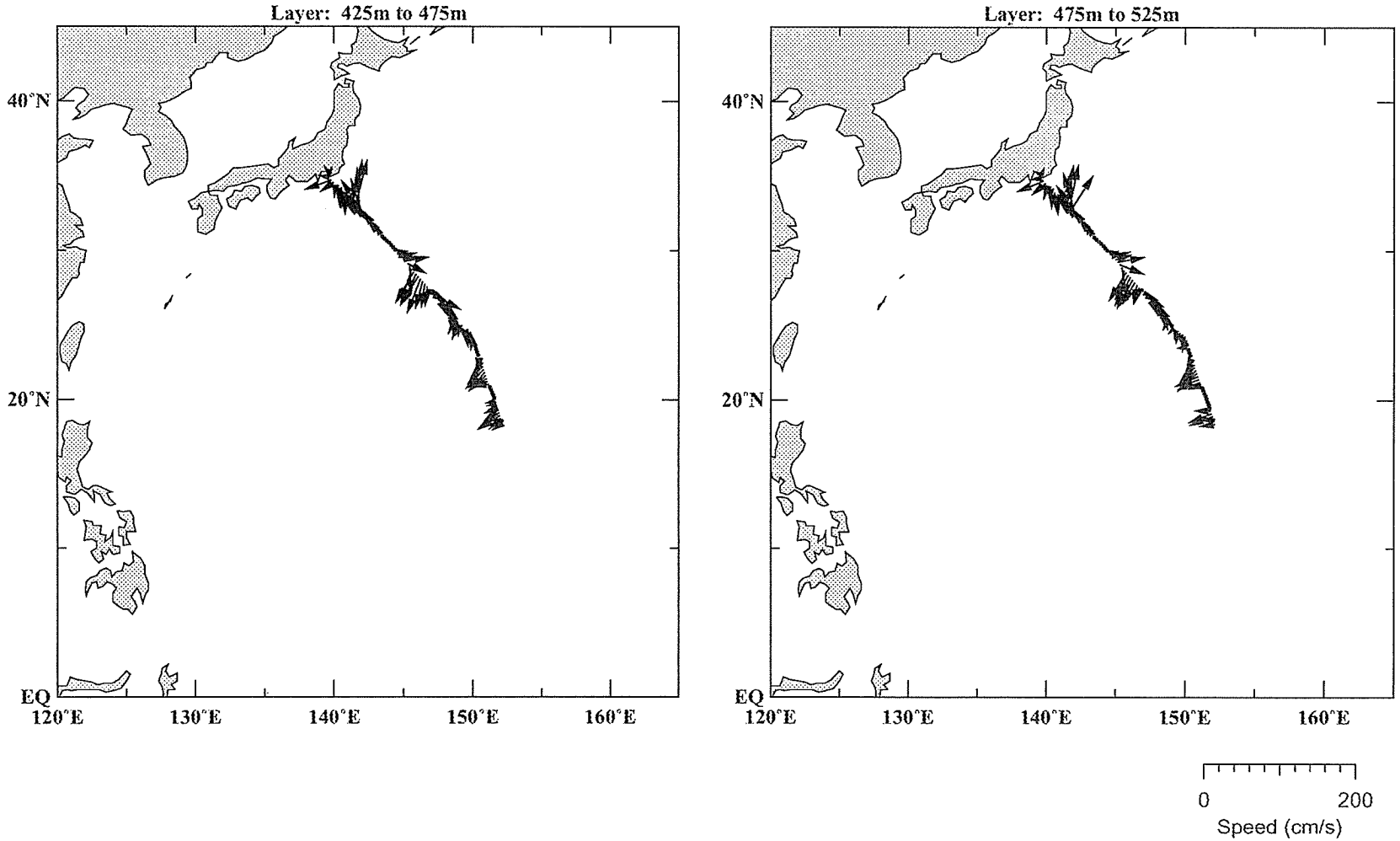
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



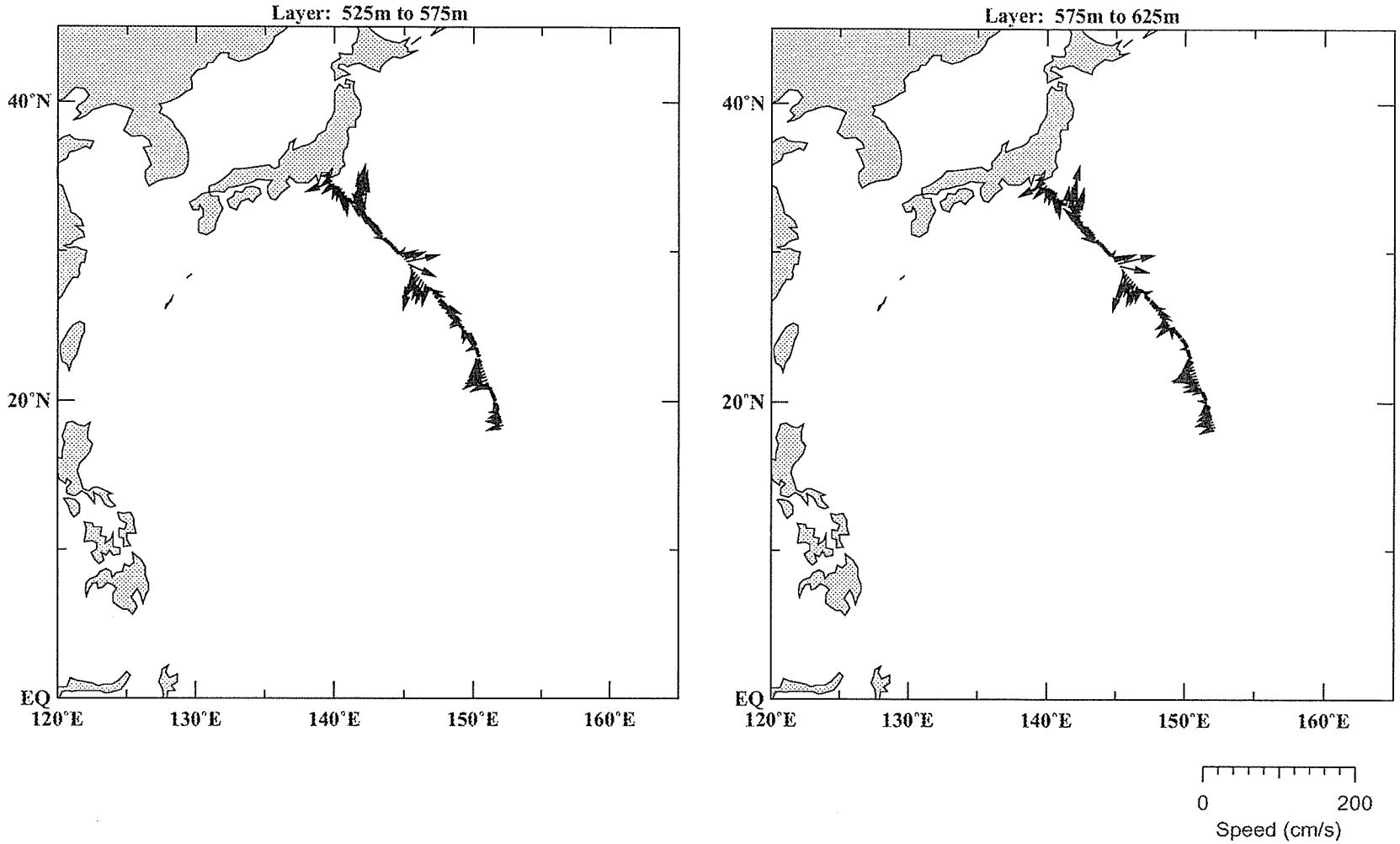
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



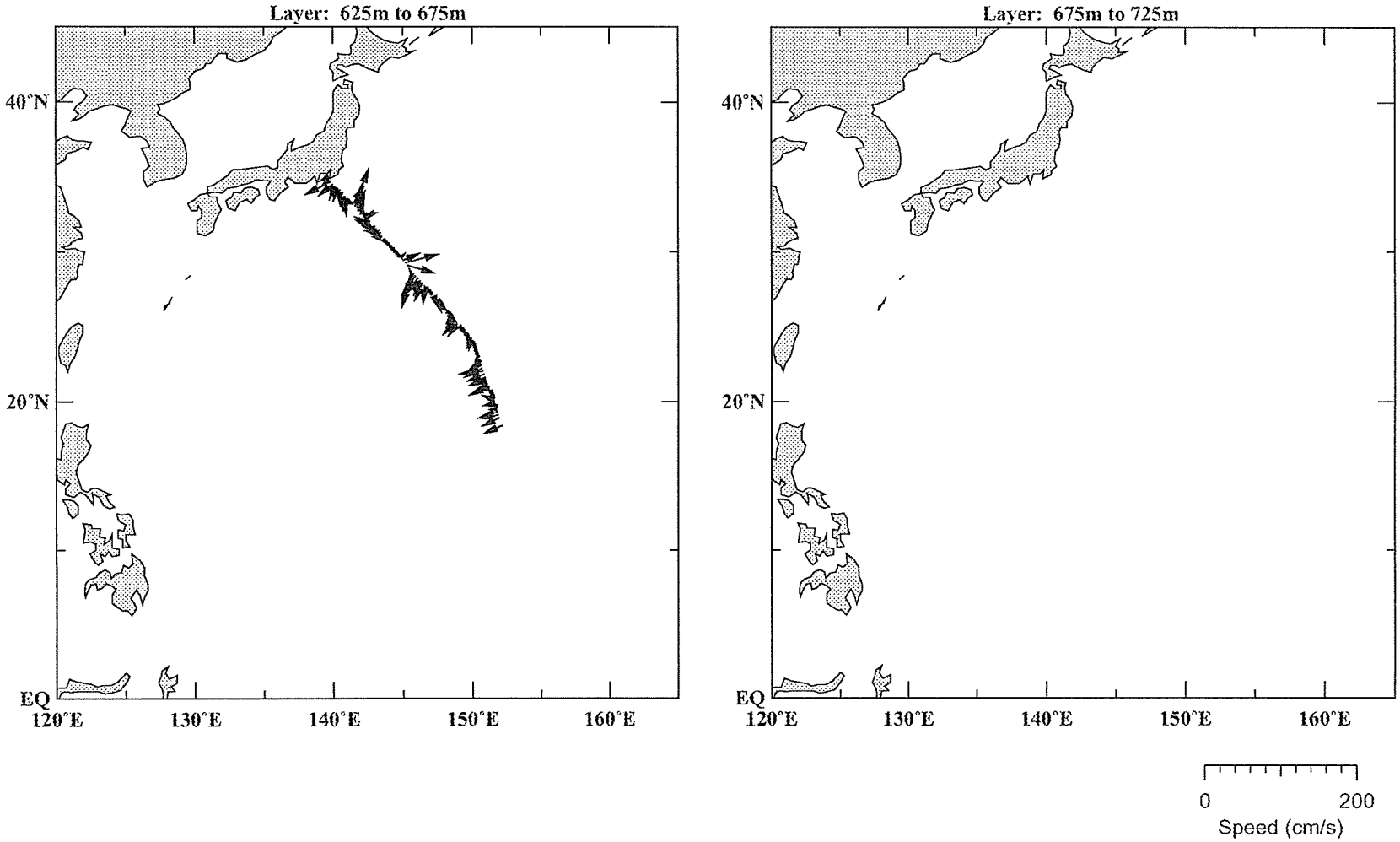
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



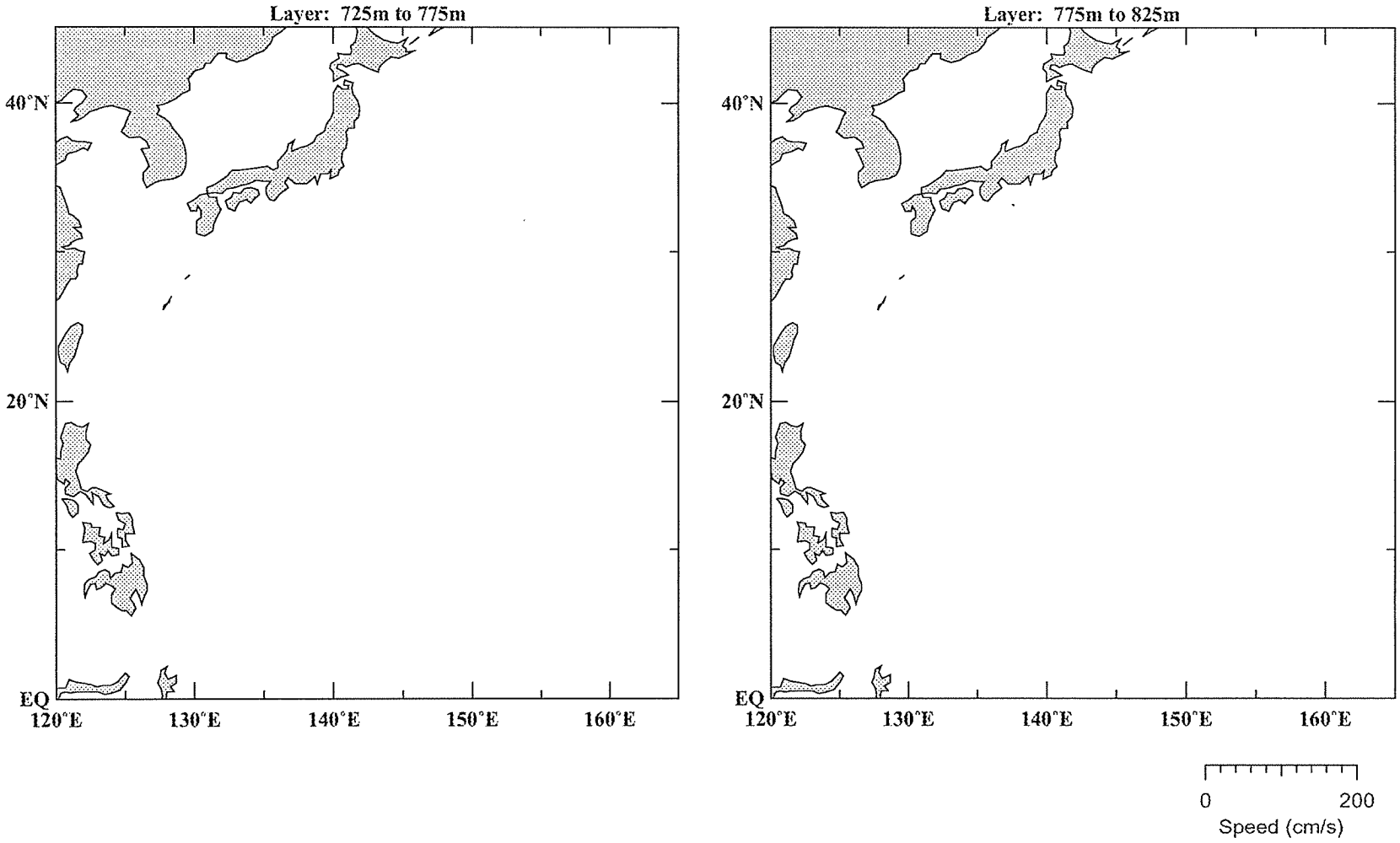
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



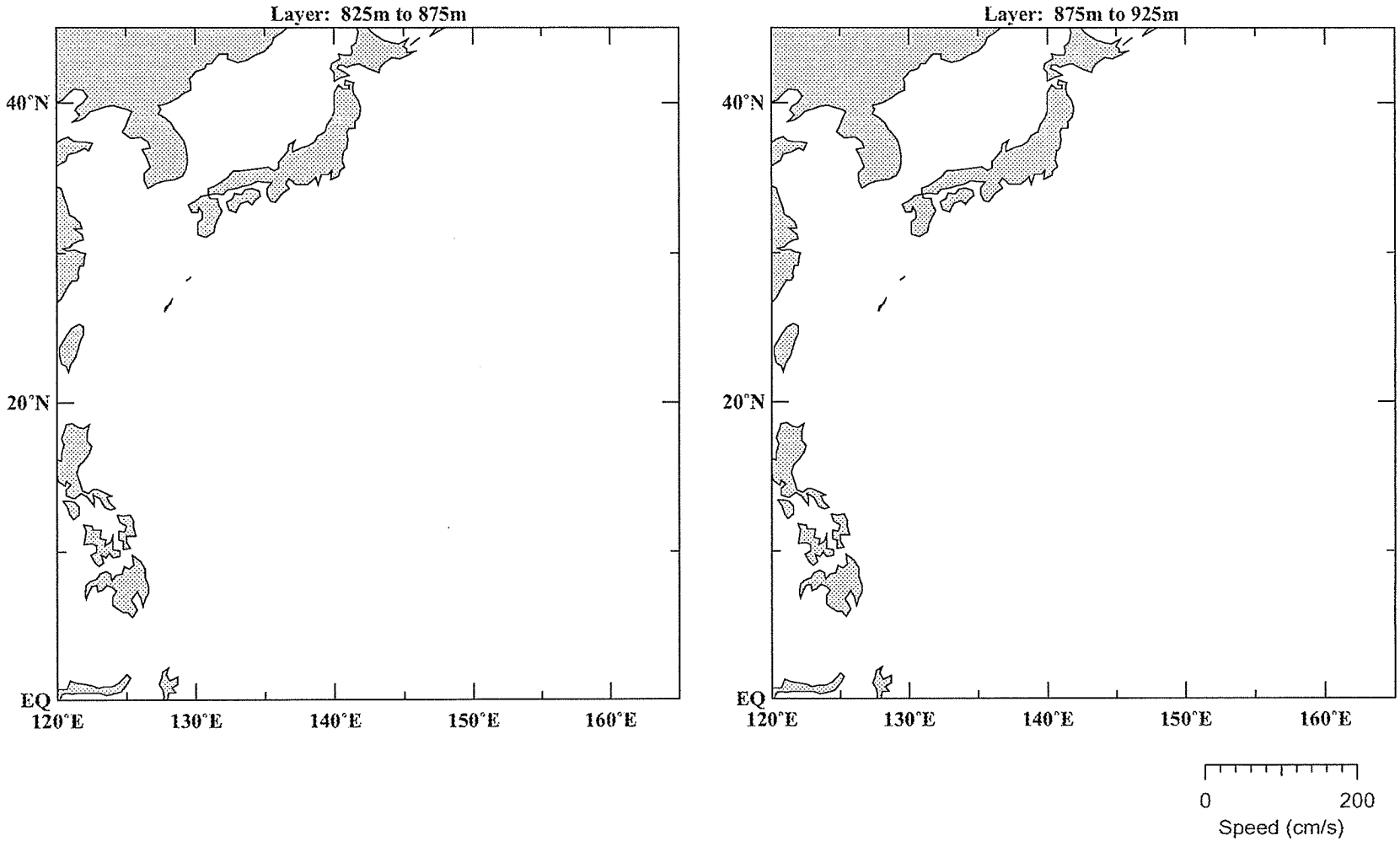
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



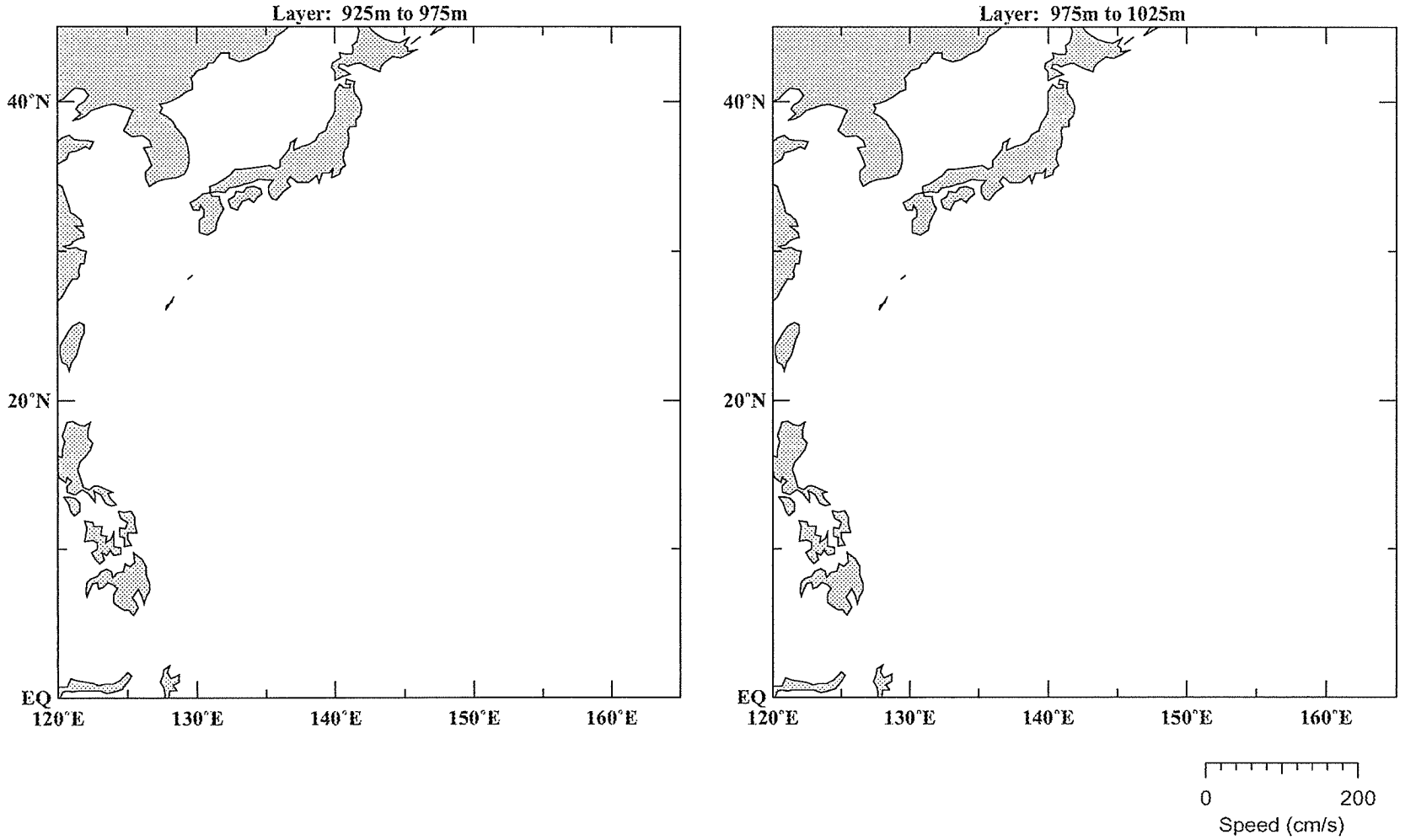
KY01-11 Leg1 toward Survey area

29 November to 03 December,2001



KY01-11 Leg1 toward Survey area

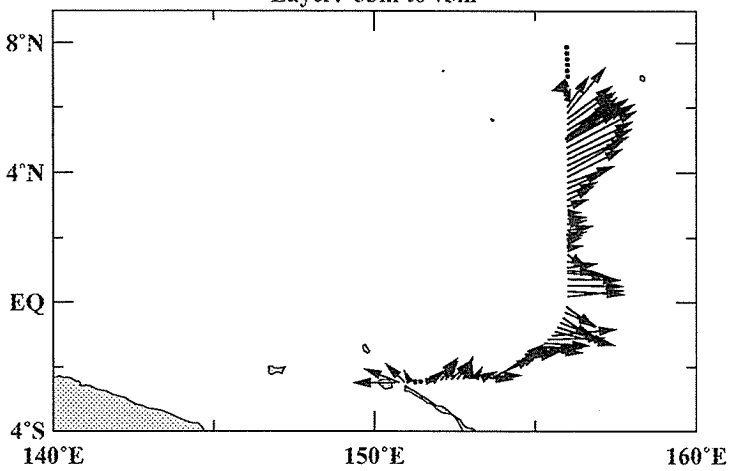
29 November to 03 December,2001



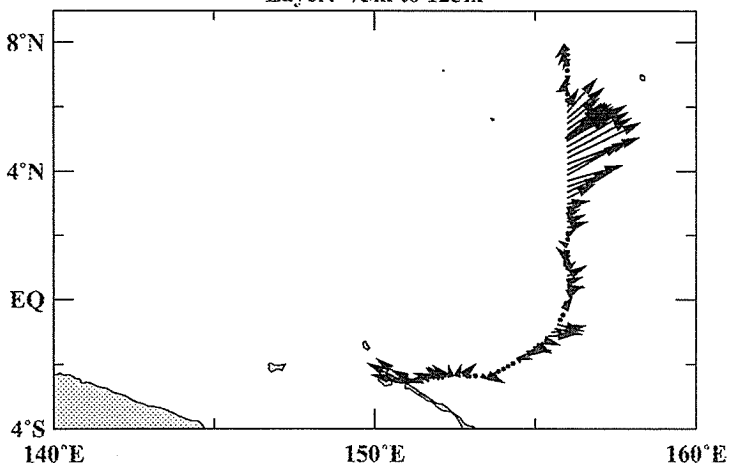
KY01-11 Leg1ALL

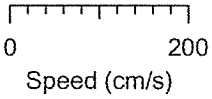
Dec 6 , 2001 to Dec 11 ,2001

Layer: 35m to 75m



Layer: 75m to 125m

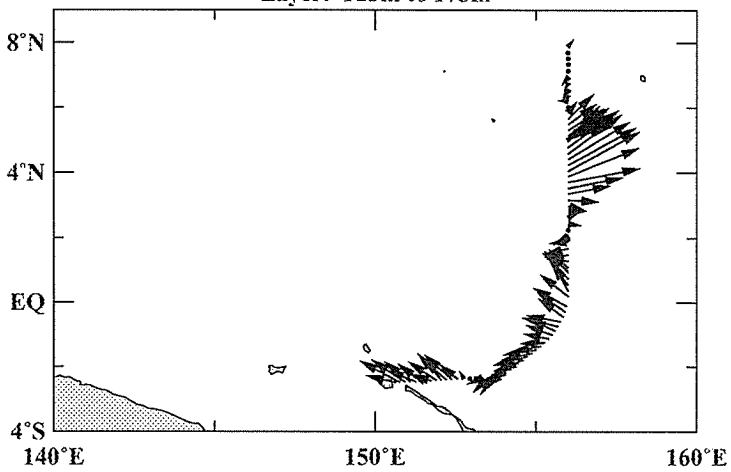




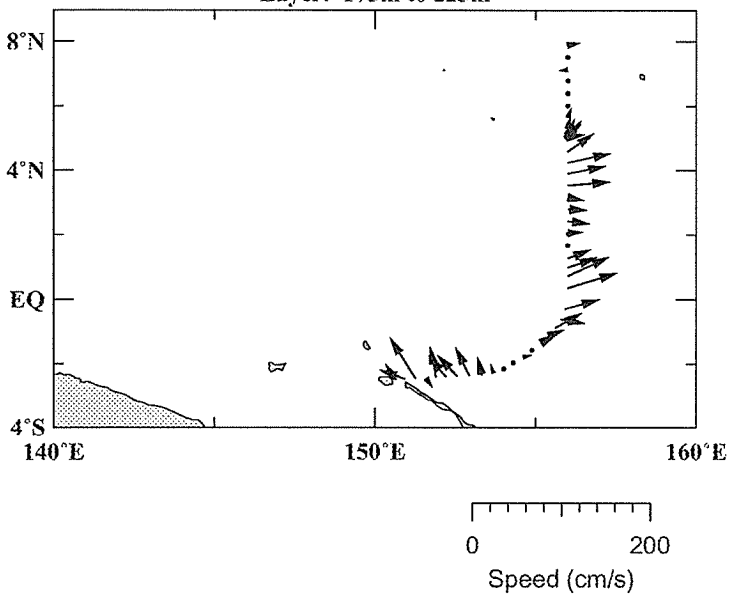
KY01-11 Leg1ALL

Dec 6 , 2001 to Dec 11 ,2001

Layer: 125m to 175m



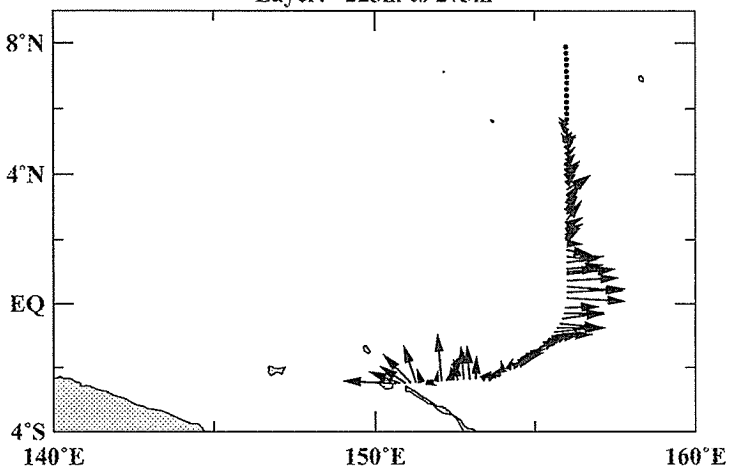
Layer: 175m to 225m



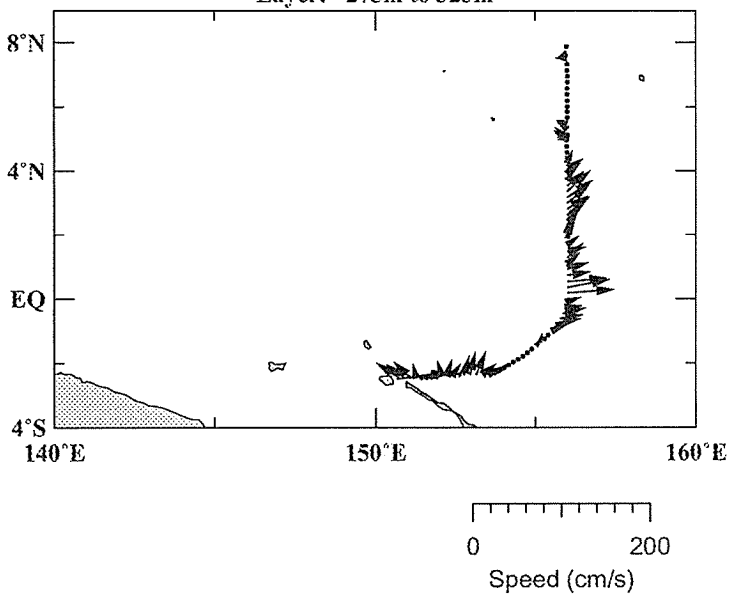
KY01-11 Leg1ALL

Dec 6 , 2001 to Dec 11 ,2001

Layer: 225m to 275m

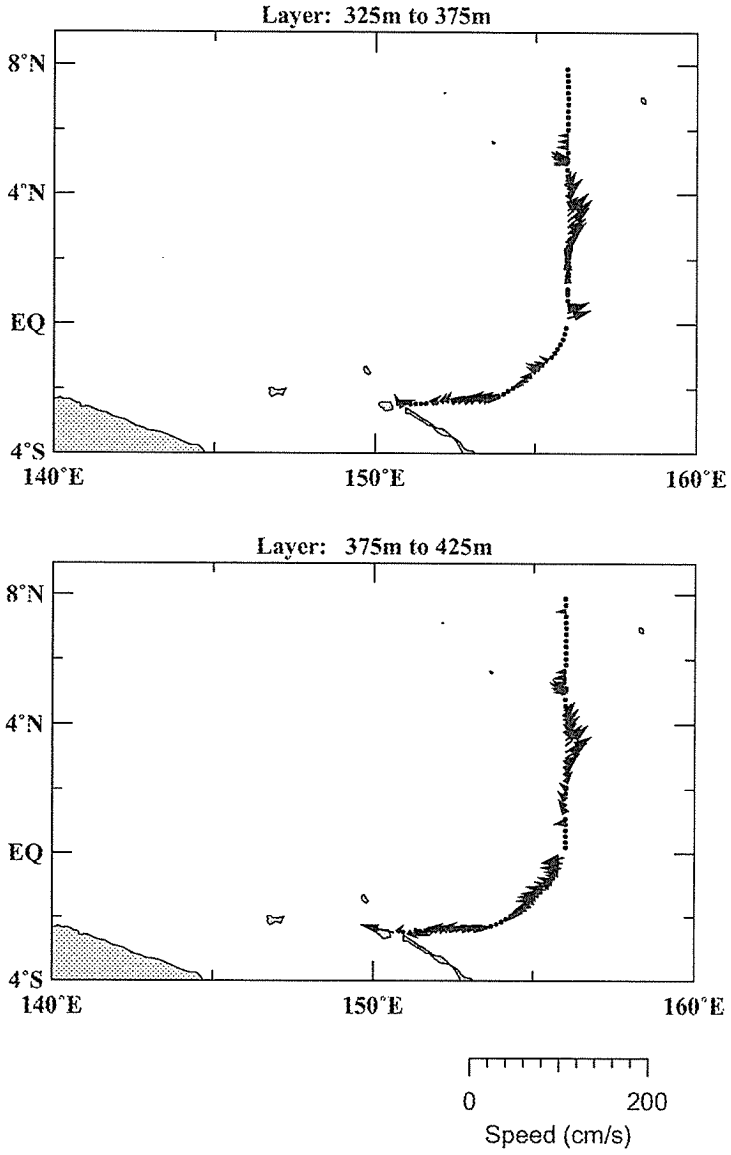


Layer: 275m to 325m



KY01-11 Leg1ALL

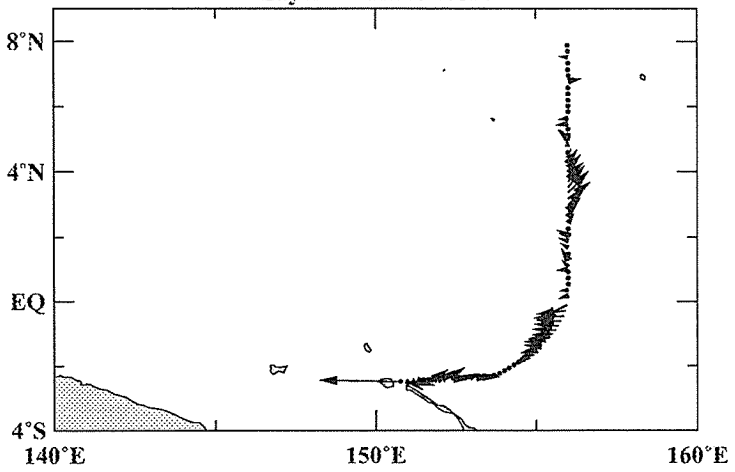
Dec 6 , 2001 to Dec 11 ,2001



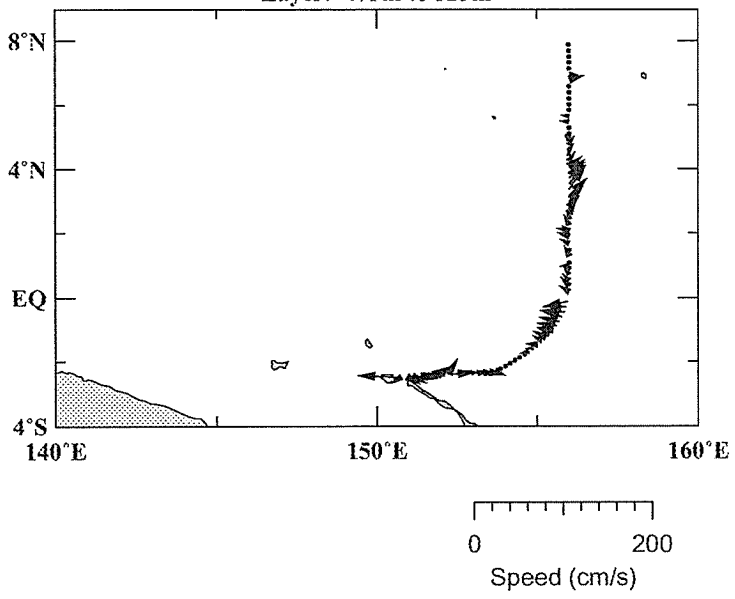
KY01-11 Leg1ALL

Dec 6 , 2001 to Dec 11 ,2001

Layer: 425m to 475m



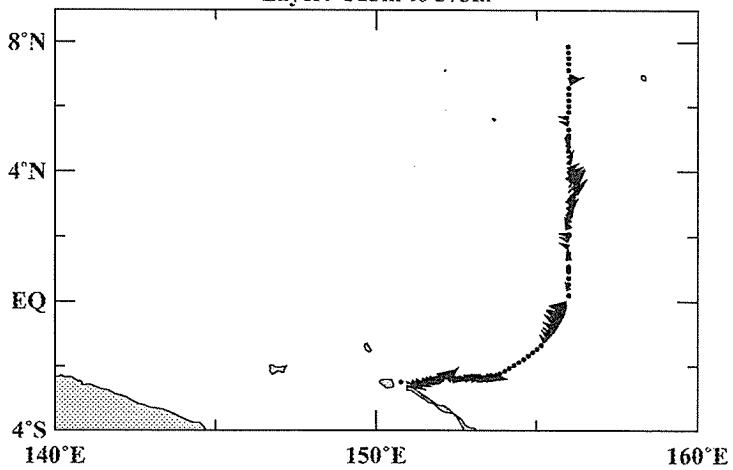
Layer: 475m to 525m



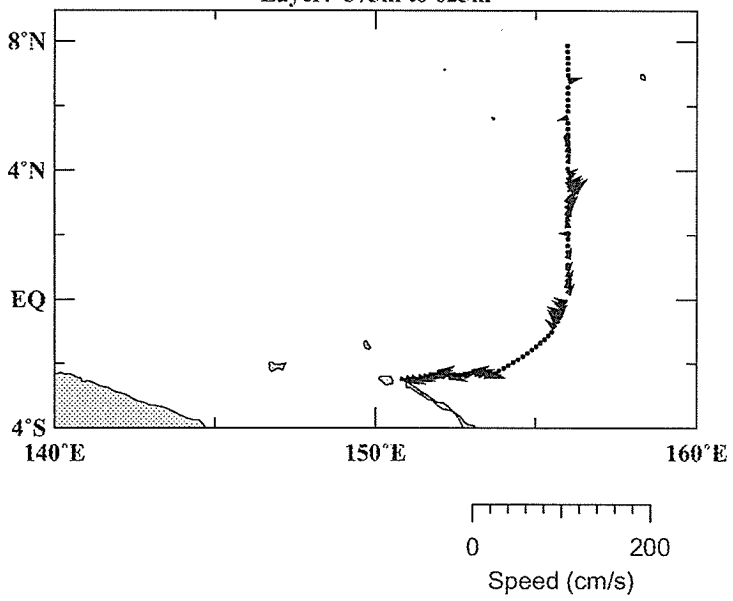
KY01-11 Leg1ALL

Dec 6 , 2001 to Dec 11 ,2001

Layer: 525m to 575m



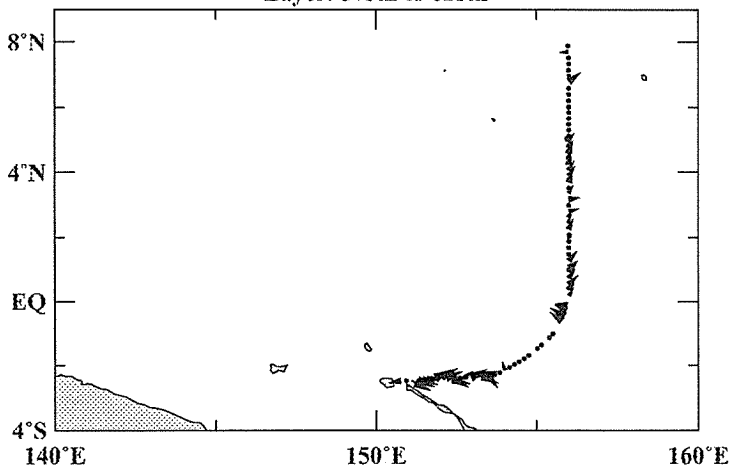
Layer: 575m to 625m



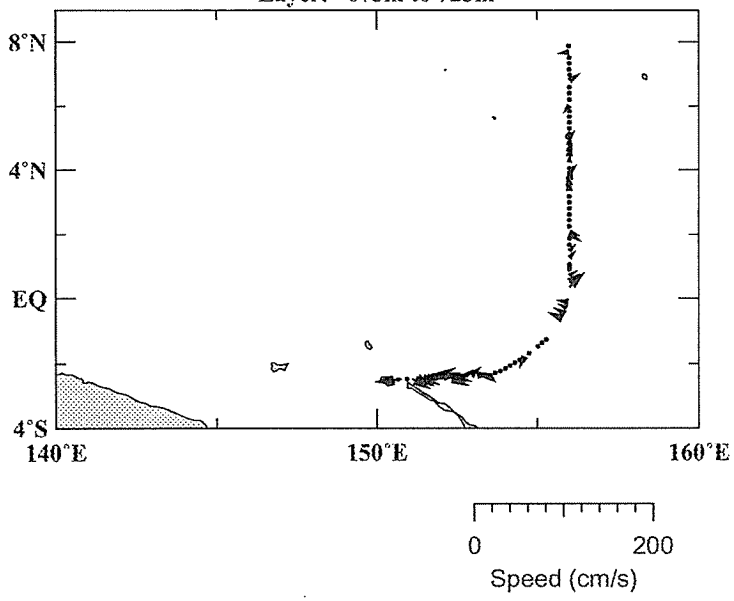
KY01-11 Leg1ALL

Dec 6 , 2001 to Dec 11 ,2001

Layer: 575m to 625m



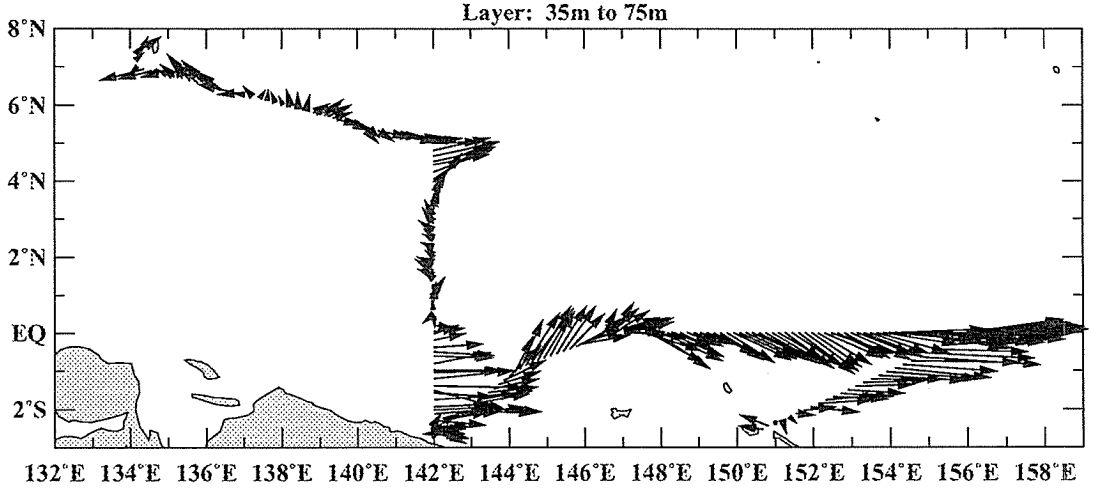
Layer: 675m to 725m



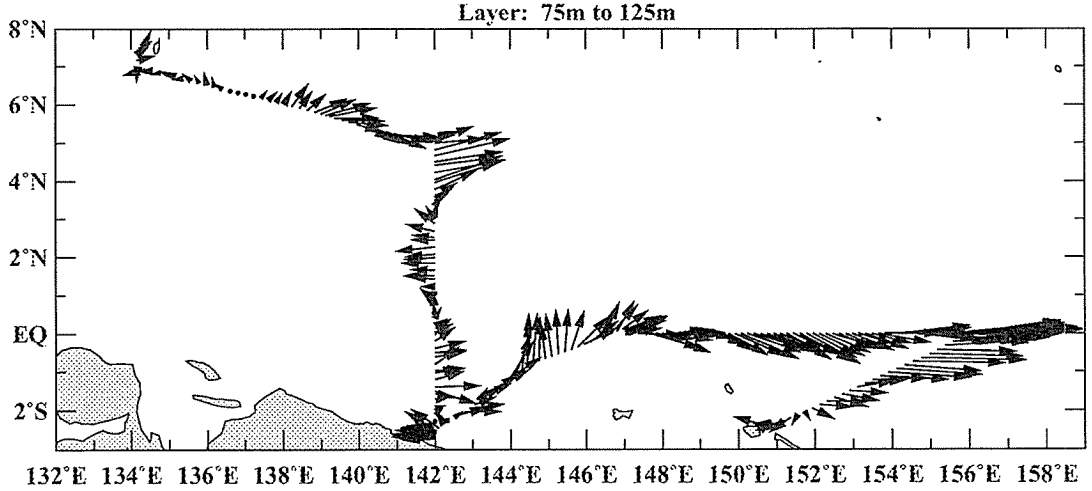
KY01-11 Leg2ALL

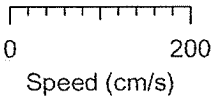
Dec 13 , 2001 to Dec 26 ,2001

Layer: 35m to 75m



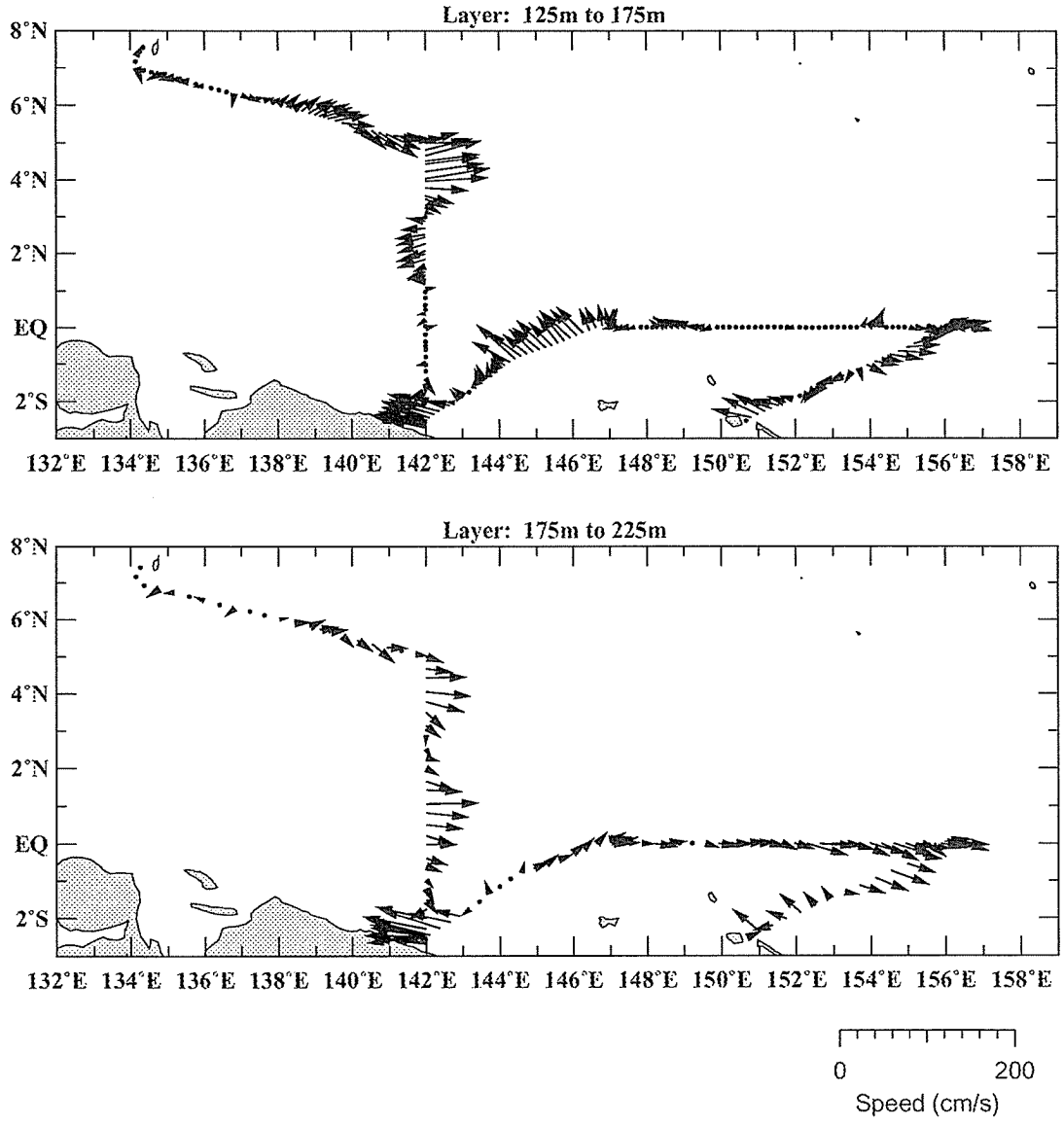
Layer: 75m to 125m





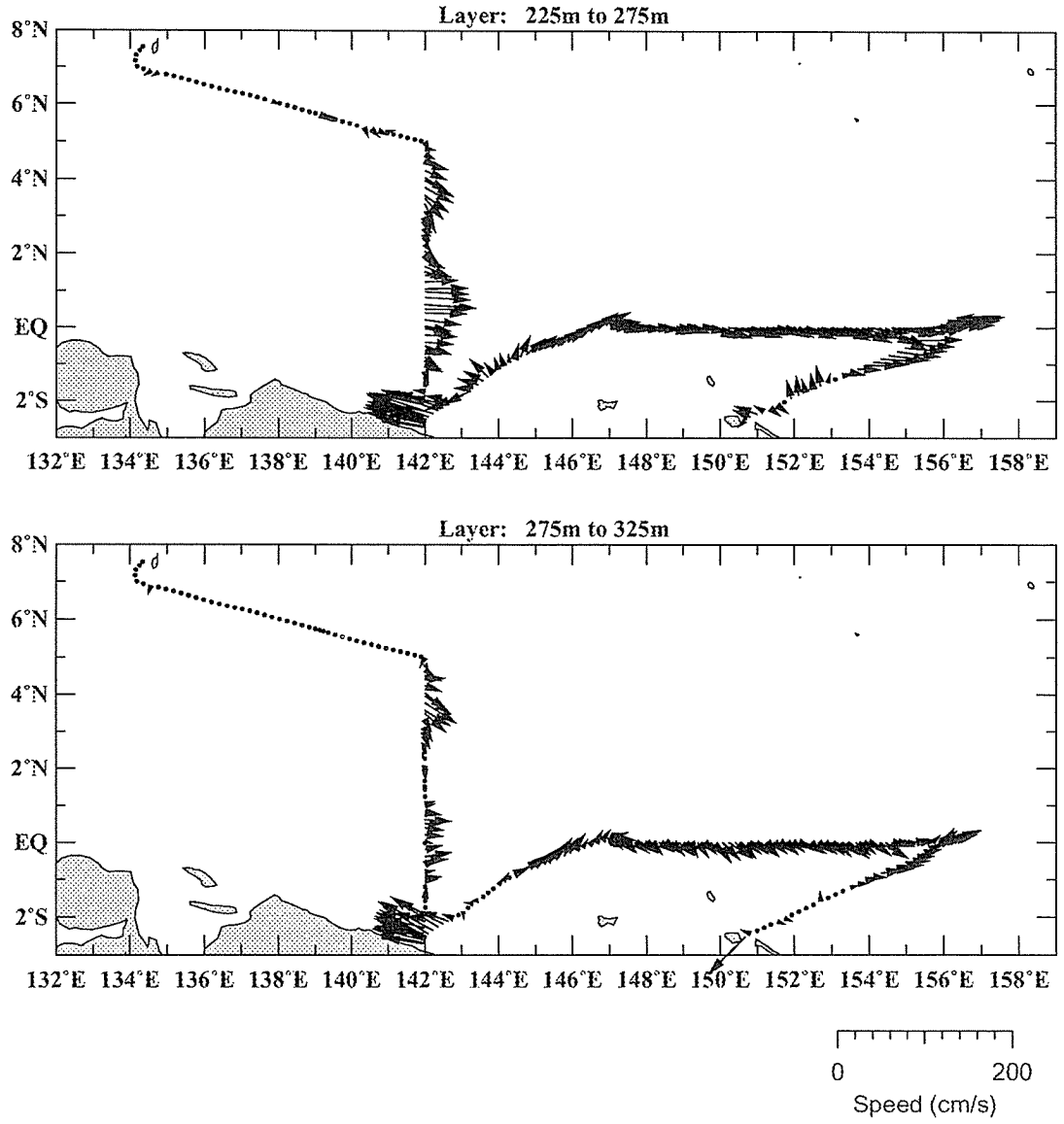
KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



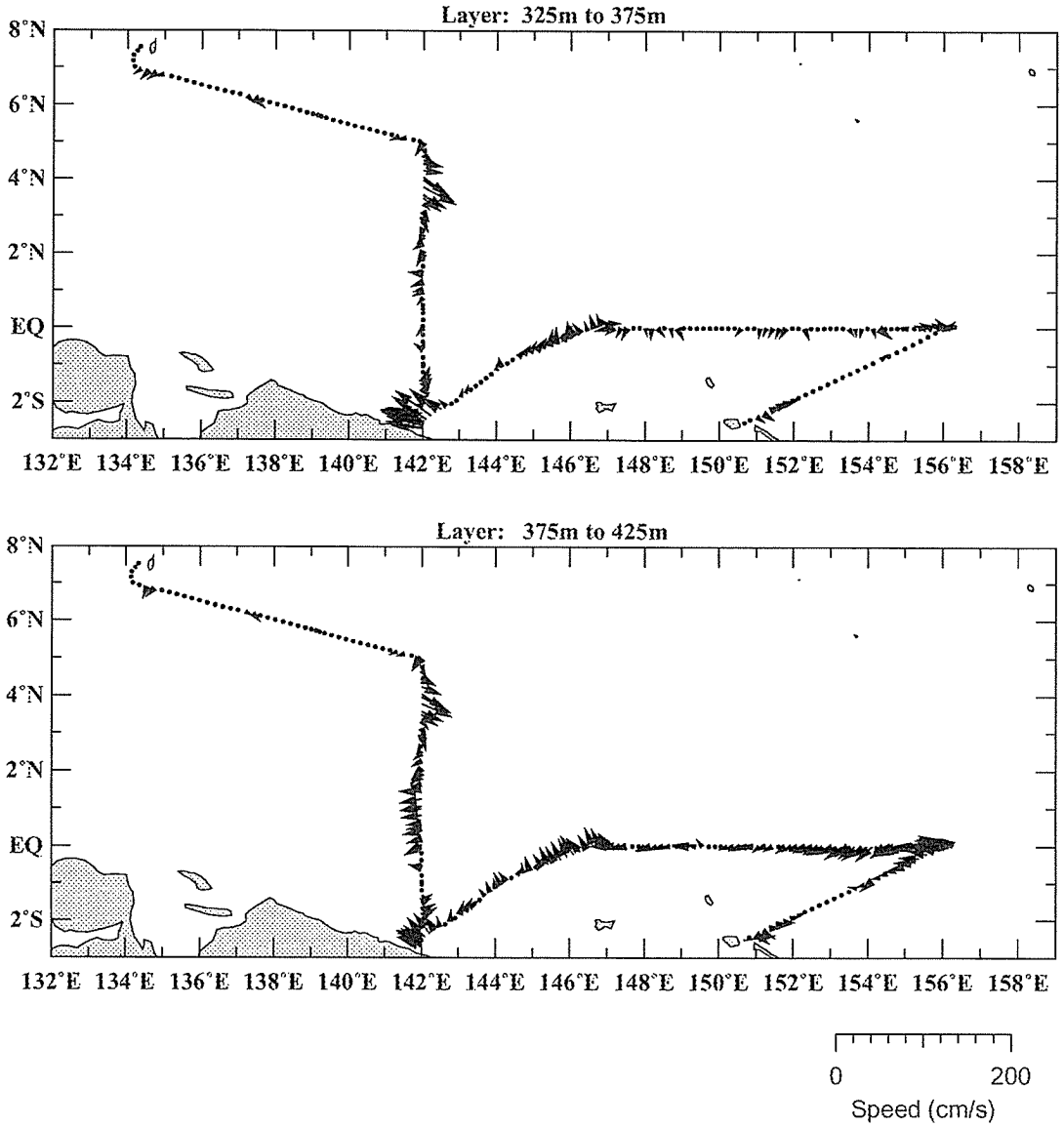
KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



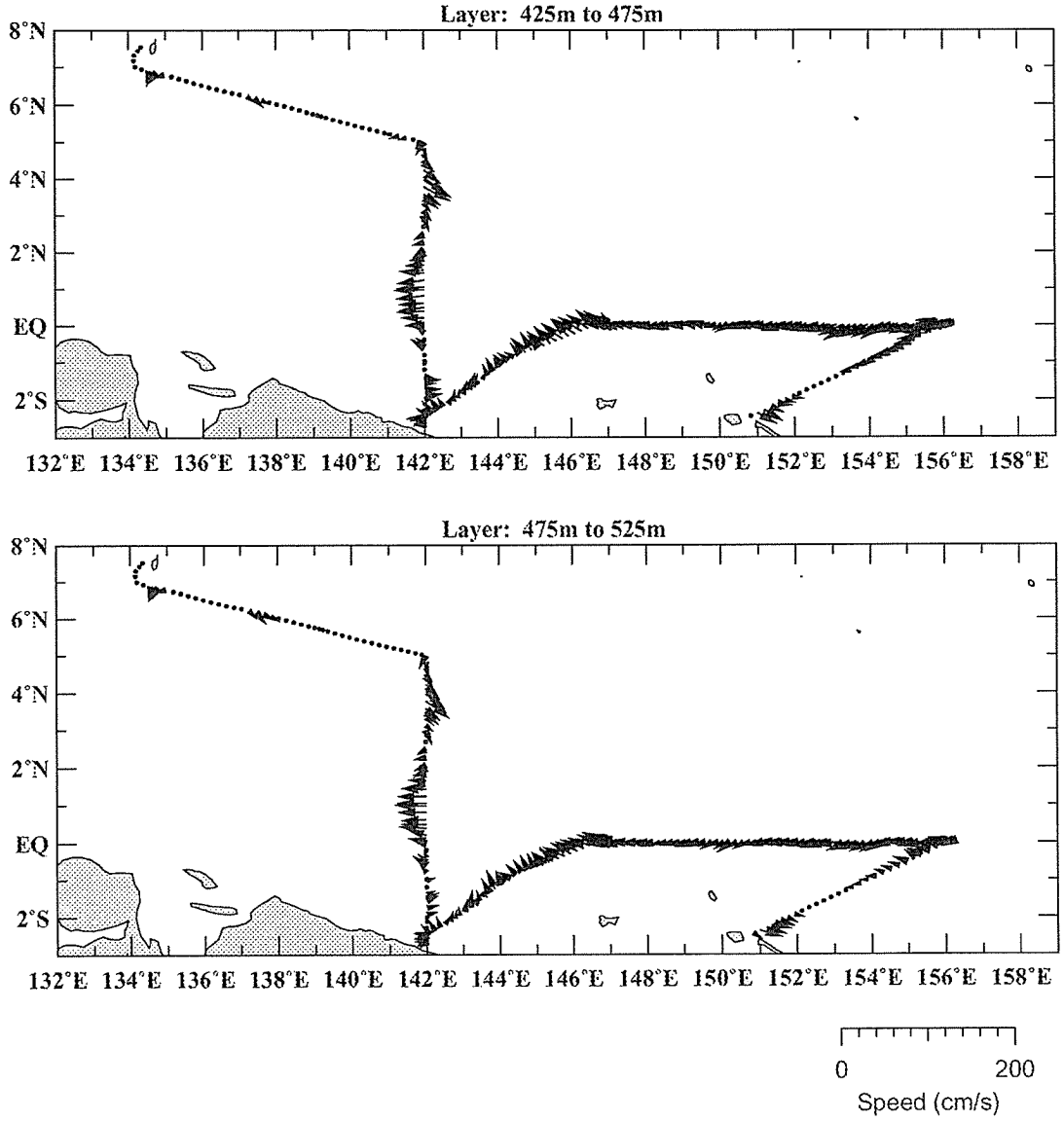
KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



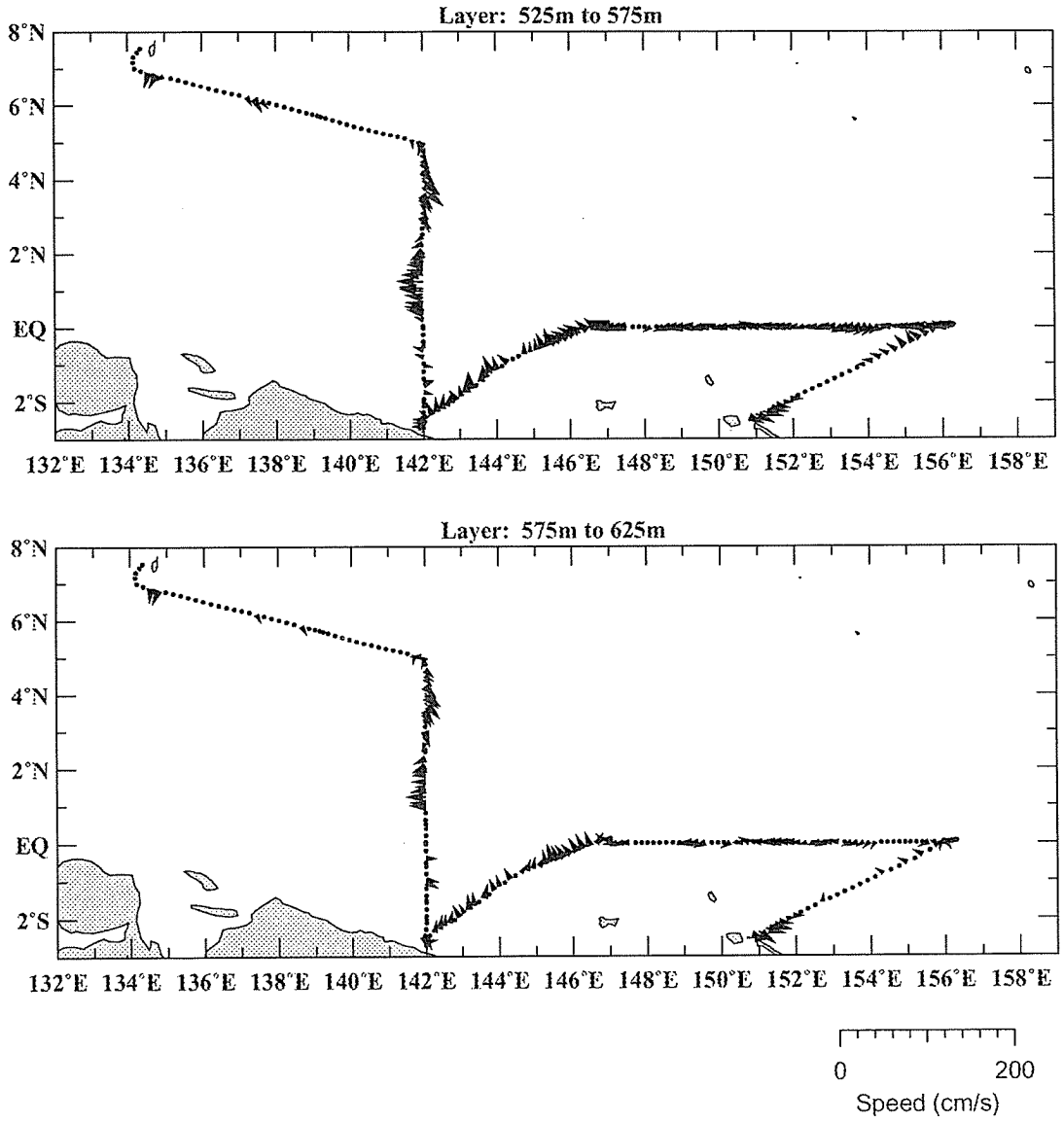
KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



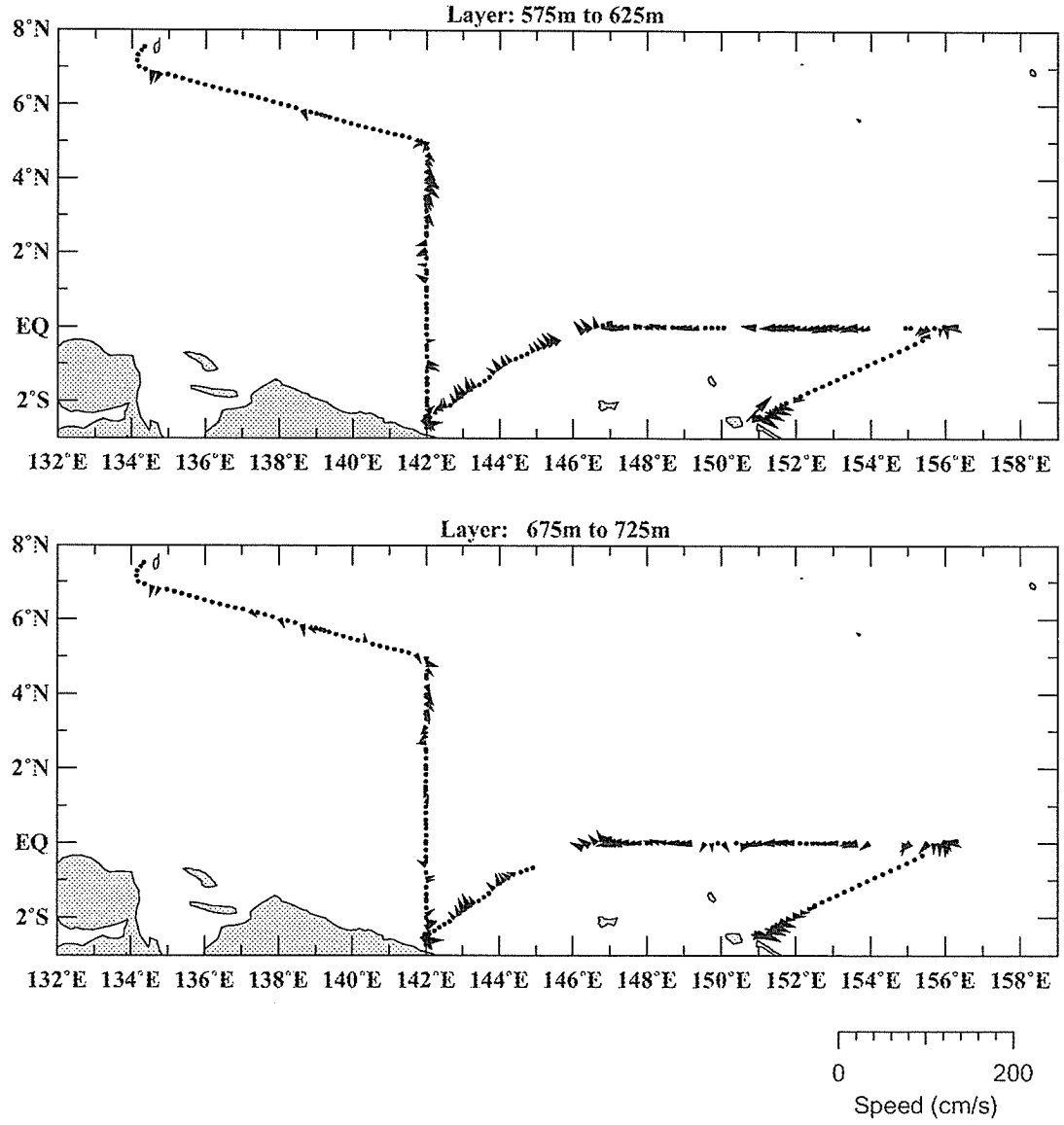
KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



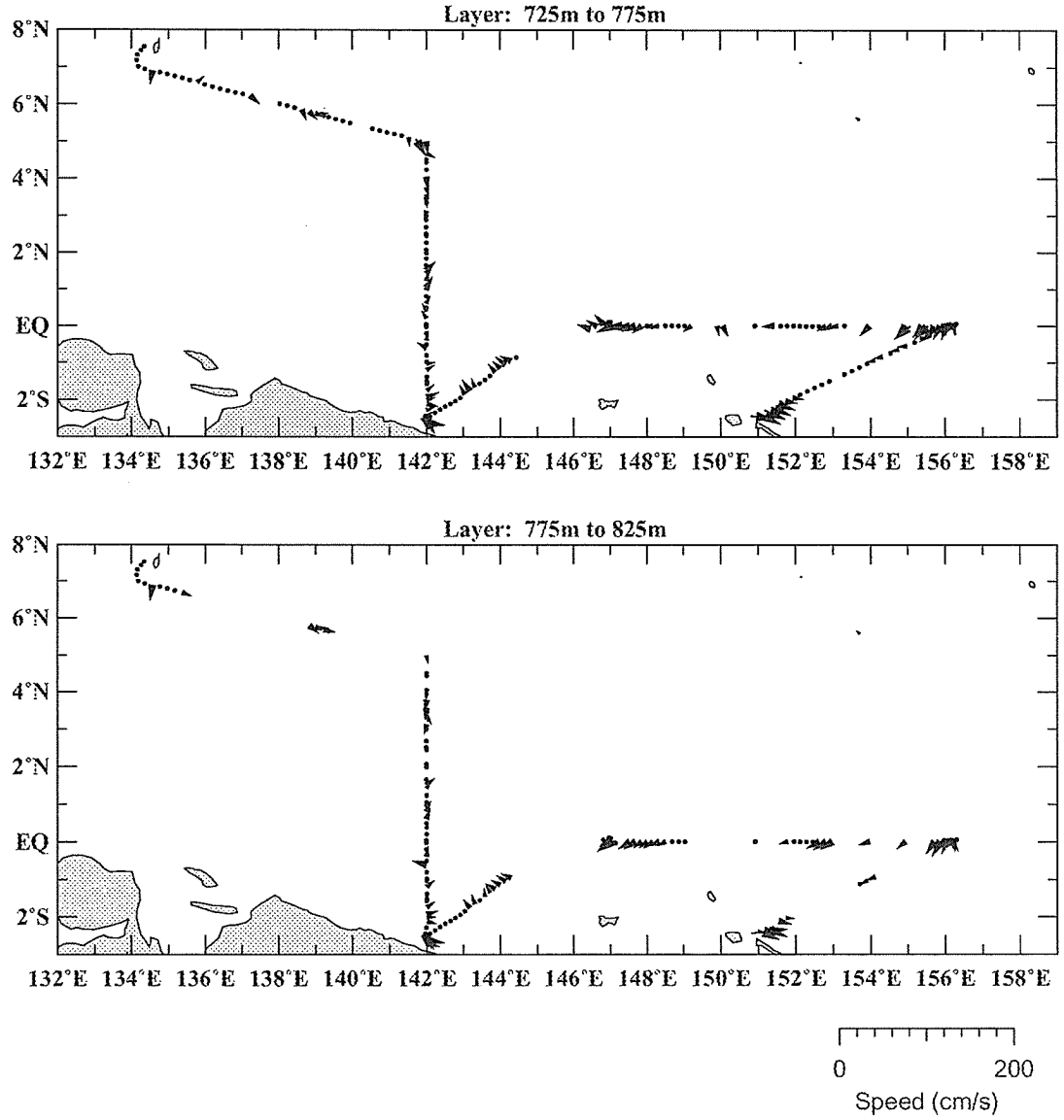
KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



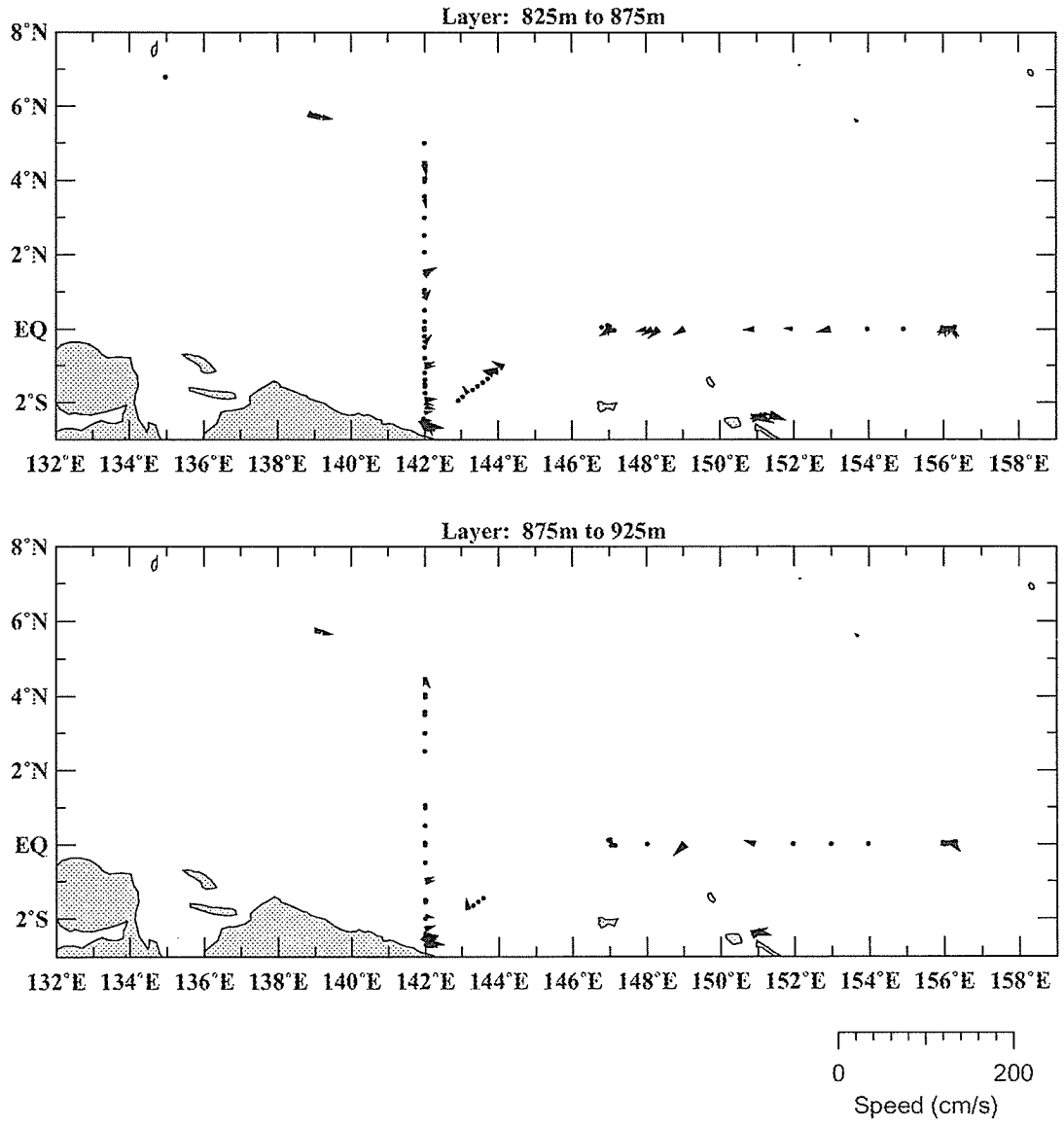
KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



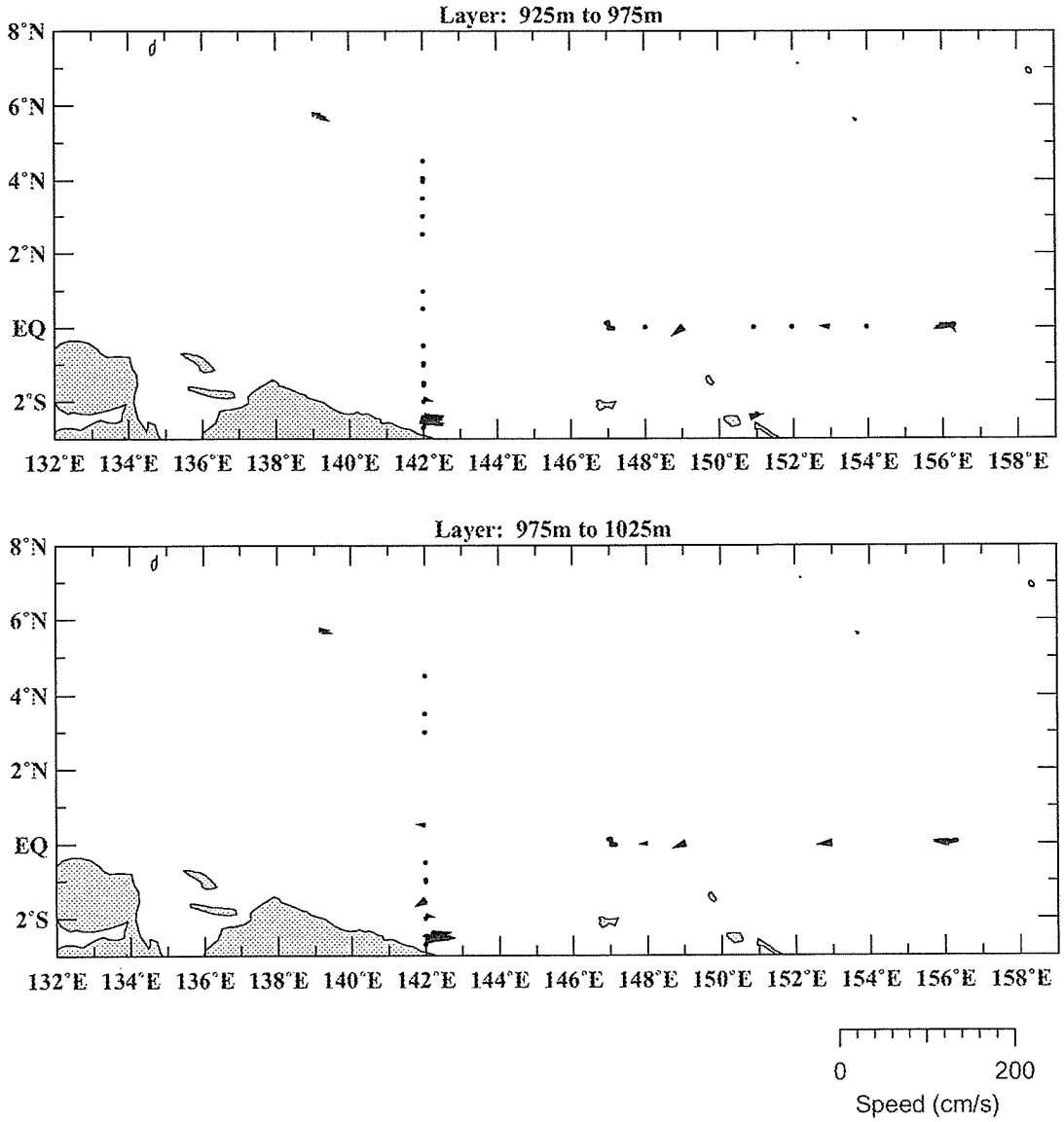
KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



KY01-11 Leg2ALL

Dec 13 , 2001 to Dec 26 ,2001



6. Profiling Float Deployment

6. Profiling float deployment

6.1. Participant

Yasushi Takatsuki (JAMSTEC)

6.2. Objective

The objective of deployment is to test performance of profiling floats before full-scale deployment for Argo program. We deployed two models of profiling float, i.e. METOCEAN PROVOR float and TSK experimental float. The PROVOR has been improved to send level-sampled data with higher resolution by our request. Over 40 PROVOR will be deployed in the western Pacific until the end of the March 2002. The TSK float is still under development. We have a possibility to use this float in future. It is important for us to evaluate the performance of both floats before deployment as Argo floats.

6.3. Methods

We deployed two PROVOR and one TSK float at 23-50N, 150-04E (Figure 6-1). The specifications and parameters of the floats are listed in Table 6-1 and Table 6-2, respectively. Before the deployment, each float was tested to confirm function well on the deck. The float was put into wooden box, hung down about 1 meter above the sea surface and then launched by rotating box. After deployment, we carry out a CTD observation down to 2000 dbar depth for a comparison. The deployment information is shown as below.

PROVOR S/N MT008 (ARGOS ID 23817)
Power on Date and Time: December 2, 2001 04:02 (UTC)
Launch Date and Time: December 2, 2001 04:15 (UTC)
Launch Position: 23-51.0019 N, 150-04.0973 E

PROVOR S/N MT012 (ARGOS ID 24374)
Power on Date and Time: December 2, 2001 04:17 (UTC)
Launch Date and Time: December 2, 2001 04:30 (UTC)
Launch Position; 23-50.2155 N, 150-04.3883 E

TSK-2 (ARGOS ID 29375)
Power on Date and Time: December 2, 2001 04:33 (UTC)
Launch Date and Time: December 2, 2001 04:44 (UTC)
Launch Position: 23-51.3417 N, 150-04.5616 E

After the launch, the cylinder head module of the PROVOR, whose length is about 15 cm, stuck out from the sea surface. On the other hand, the TSK float was located just below the sea surface and was sunk entirely including the antenna.

6.4. Preliminary Results

1) Float Cycle

All floats were expected to re-surface on December 4. However, both PROVOR surfaced only after 12 hours from the deployment. First ascent dates of all the PROVOR previously deployed were also earlier than the date expected from the cycle period. The firmware seems to have a problem to decide first date of the ascent start time. After the first cycle, the floats repeated their cycle correctly. On the other hand, the TSK float did not re-surface even after several days. Considering with the float position to the sea surface just after the launch, the buoyancy of the TSK float seems to be insufficient to surface itself.

Until December 21, each PROVOR has been completed 7 cycles. Figure 6-2 shows the float location fixed by ARGOS system. The floats moved eastward slowly at first, turned to north and then, moved westward. For these cycles except first cycle, time to descent to the drift depth and

ascent to the sea surface are about 16.4 +/– 1.2 hours and 6.6 +/– 0.1 hours, respectively. Estimated descent speed and ascent speed are 3.4 +/– 0.2 cm/s and 8.4 +/– 0.1 cm/s, respectively.

The submerged drift data and the statistics are shown in Figure 6-3 and Table 6-3, respectively. The float stayed within 10 meters depth range in most cases during the submerged drift. However, the drift depth evidently changed about 50 meters without repositioning during the cycle 5 of MT012. MT012 was repositioned during the cycle 3 and cycle 7 at submerged depth. The submerged drift depths of MT012 are often unstable.

Figure 6-4 shows the vertical profiles of each cycle. Due to the early ascent mentioned above, the pressures of deepest data for cycle 1 are only 780.1 dbar and 571.6 dbar for MT008 and MT012, respectively. All the data are properly transmitted by ARGOS system.

2) Comparison with CTD station

Before the comparison, CTD data are corrected according to the result of salinity measurement of sampled water. Slope and offset coefficients for conductivity correction are 1.000337 and –0.0013 (S/m), respectively. Figure 6-5 shows the potential temperature vs. salinity diagram for each float. Both float seem to be lower about 0.01-0.02 in salinity compared with the CTD cast over the whole layer. The differences are clearly found in the main thermocline. Although the floats are almost stationary, potential temperature vs. salinity relations in deeper layer seem to be larger than the other area in north Pacific. This may be influenced by the bottom topography around the floats.

Table 6-1. The specifications of the deployed floats

PROVOR (METOCEAN Data Systems Limited)
- Length: 240 cm (with antenna) / 190 cm (without antenna)
- Diameter: 17 cm (casing) / 35 cm (damping disk)
- Weight: 36 kg
- Firmware version 1.3.3
- Buoyancy control: Self-ballasted active control using with hydraulic pump
- Depth maintenance accuracy: +/– 30 dbar at parking depth
- Volume of the buoyancy control: 2.3 liters
- Maximum profiling depth; 2000 dbar
- Expected life: approximately 150 cycles
- CTP sensor: SBE-41CP (Sea-Bird Electronics Inc.)
- Resolution of the data in ARGOS message
  - Pressure: 0.1 dbar, Temperature: 0.001 degC, Salinity: 0.002 in PSS-78

TSK experimental float (Tsurumi-Seiki, Co. Ltd.)
- Length: 233 cm (with antenna) / 163 cm (without antenna)
- Diameter: 16.5 cm (casing) / 37 cm (damping disk)
- Weight: 30 kg
- Buoyancy control: Self-ballasted active control using with plunger
- Volume of buoyancy control: 285 cc
- Maximum profiling depth; 2000 dbar
- Expected life: approximately 150 cycles
- CTP sensor:
  - Pressure: Semi-conductor strain gauge
  - Temperature: Thermister
  - Conductivity: Inductive conductivity sensor
- Resolution of the data in ARGOS message
  - Pressure: 0.1 dbar, Temperature: 0.001 degC Salinity: 0.001 in PSS-78

Table 6-2. Parameter list of the deployed floats

PROVOR (METOCEAN Data Systems Limited)

Parameter Name	**(short name)**	**value**
Number of cycles	NOC	255
Cycle period, days	CYP	3
Reference day	RED	0
Ascent time, hours	AST	14
Delay before mission, minutes	DBM	30
Descent sample period, seconds	DES	0
Drift sample period, hours	DRI	1
Ascent sample period, seconds	ASC	11
Drift depth, decibars	DRD	2000
Profile depth, decibars	PRD	2000
Grounding mode	GRM	0
ARGOS period, seconds	ARP	30
ARGOS transmission duration, hours	ATD	12
ARGOS ID	ARI	7427B (MT008) 7CDA8 (MT012)

TSK experimental float (Tsurumi-Seiki, Co. Ltd.)

Cycle period: 3 days
Drift depth: 2000 dbar
Profile depth: 2000 dbar
ARGOS transmission repetition periods: 45 seconds
ARGOS transmission duration: 10 hours

Table 6-3. Statistics of submerged drift depth

MT008

Cycle	Duration (hours)	Pressure (dbar)		in-situ density (kg/m^3)	
		mean	S.D.	mean	S.D.
2	26	1979.8	3.7	1036.78	0.02
3	21	1949.3	3.4	1036.62	0.02
4	23	2044.5	8.0	1037.09	0.04
5	24	1971.9	5.3	1036.75	0.02
6	23	1981.5	3.9	1036.79	0.02
7	22	1997.2	4.0	1036.87	0.02

MT012

Cycle	Duration (hours)	Pressure (dbar)		in-situ density (kg/m^3)	
		mean	S.D.	mean	S.D.
2	26	2023.5	3.7	1036.99	0.02
3-1*	15	2053.6	8.6	1037.13	0.04
3-2*	8	2028.4	6.7	1037.02	0.03
4	21	2001.8	5.9	1036.89	0.03
5	21	1991.8	22.8	1036.85	0.10
6	23	2007.6	3.5	1036.91	0.02
7-1*	6	1947.7	47.5	1036.90	0.21
7-2*	18	2025.7	9.0	1037.00	0.04

* Repositioned during the submerged drift.

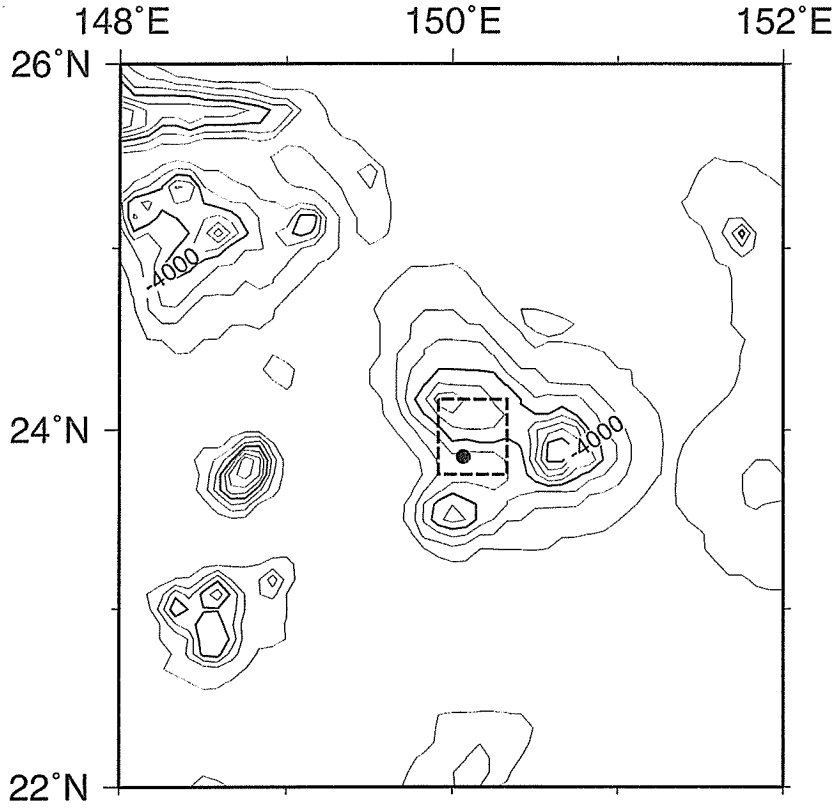


Figure 6-1. Bottom topography of the deployment area. Contour interval is 500 meters. Closed circle represents the launch position.

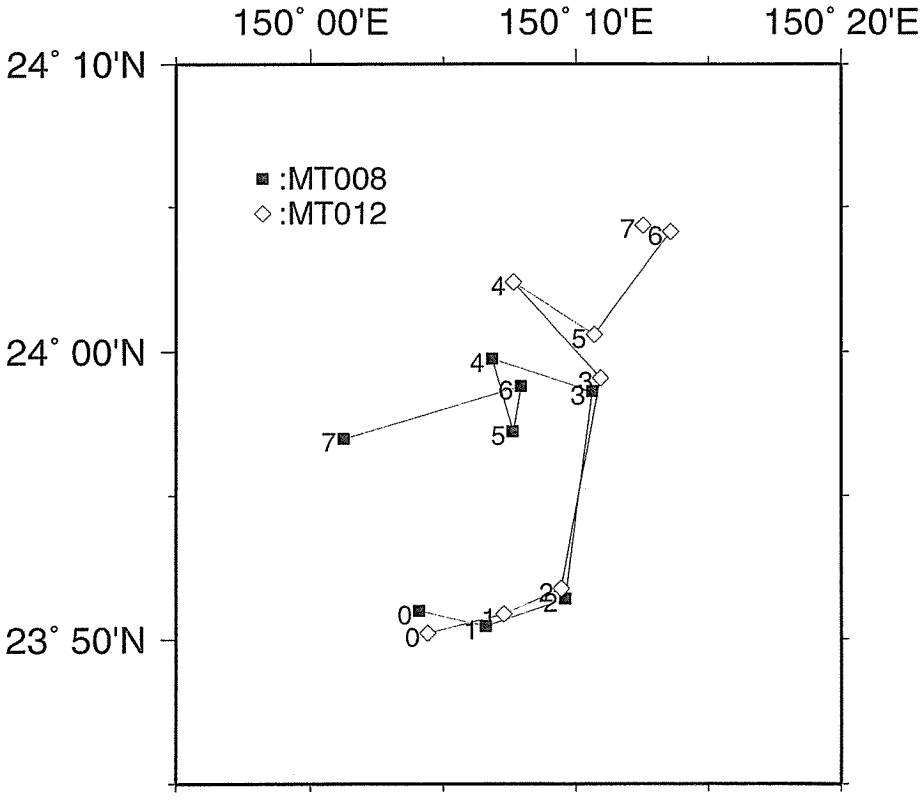


Figure 6-2. Float location map of the each ascent. Figures represent the cycle number. Cycle 0 means the deployment.

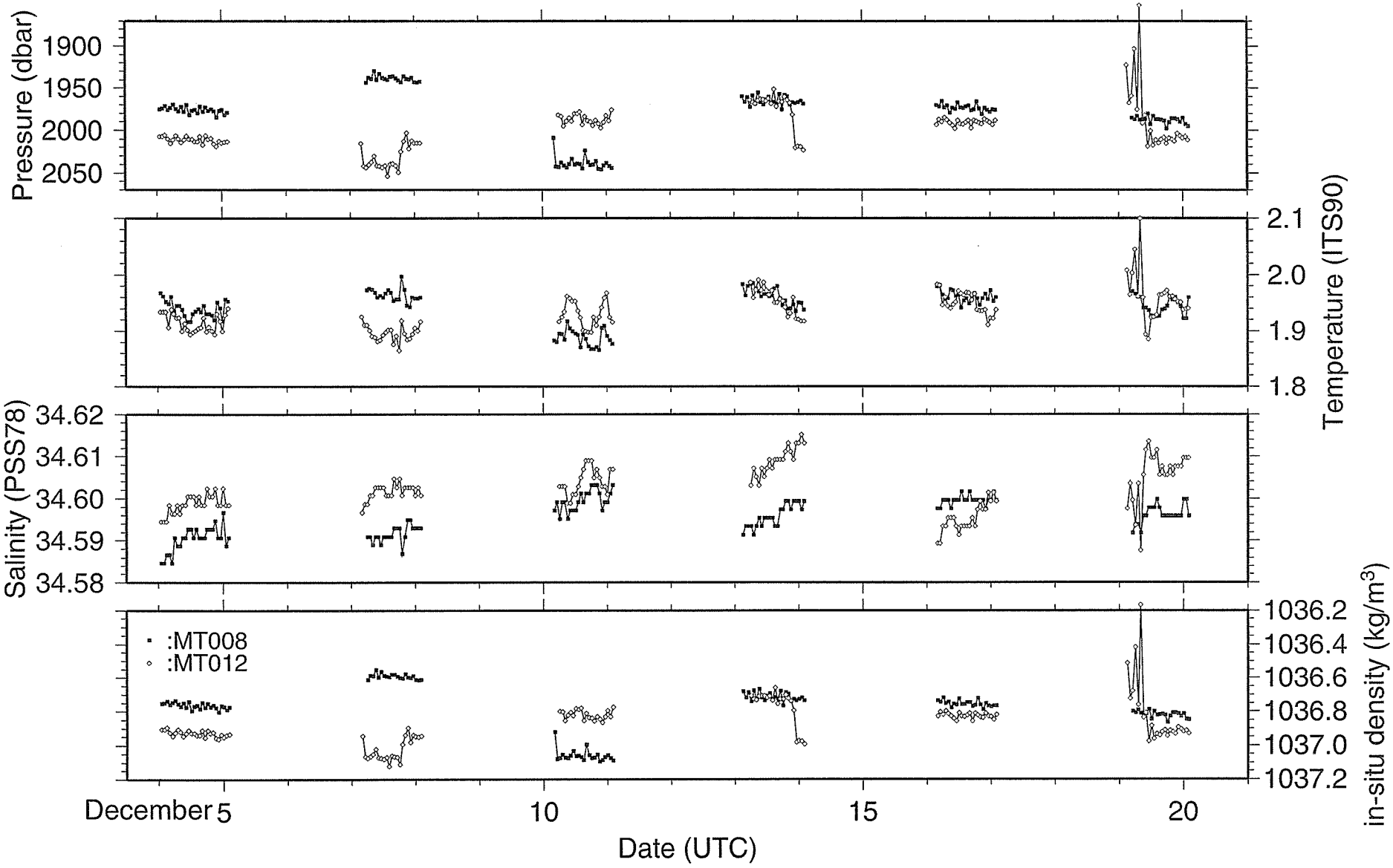


Figure 6-3. Time plot of float data during the submarged drift.

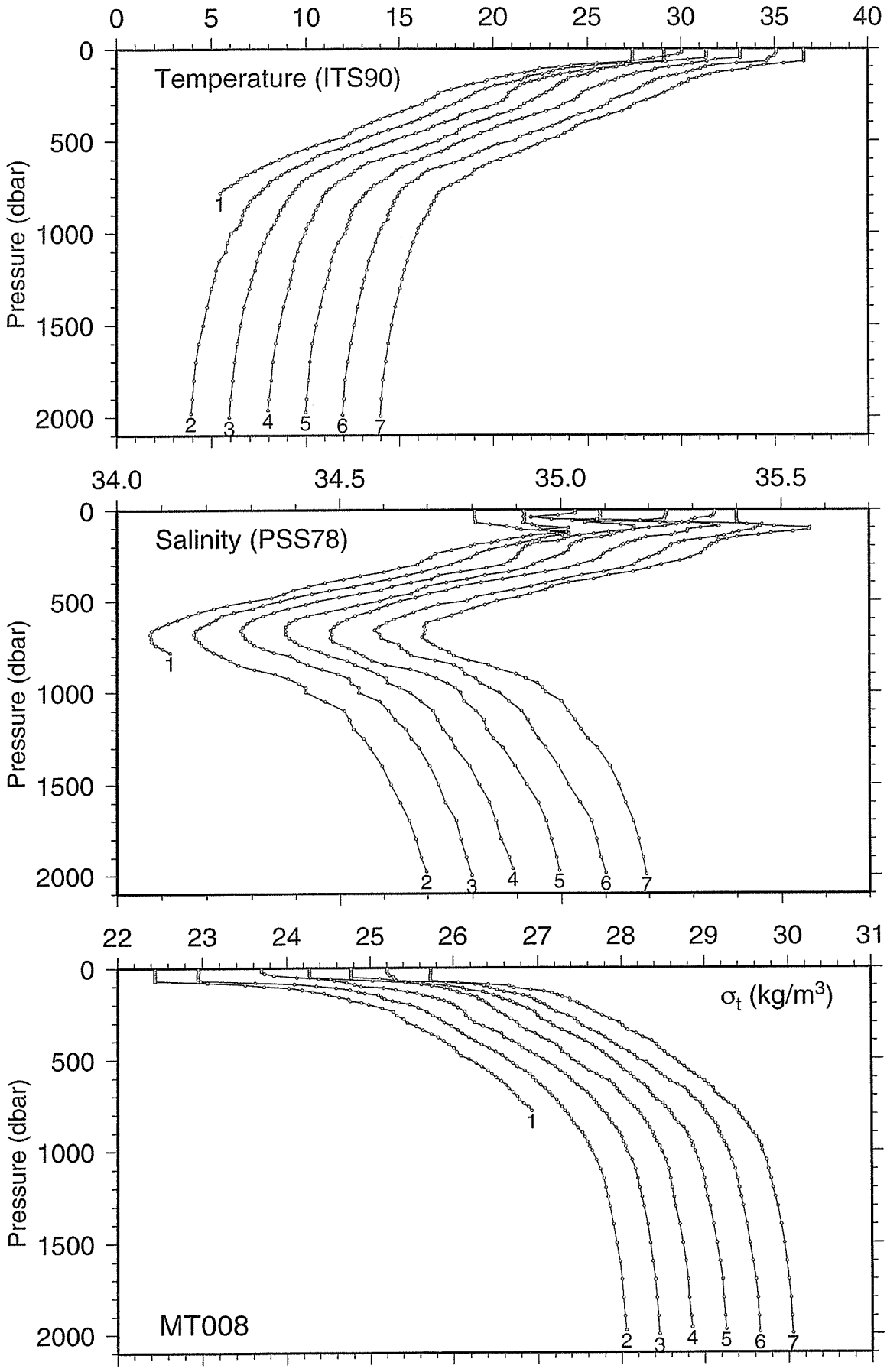


Figure 6-4. Vertical profiles of temperature (upper), salinity (middle) and density (lower) for each cycle. The origin of each profile is shifted with 2.0, 0.10 and 0.40 for temperature, salinity and density, respectively.

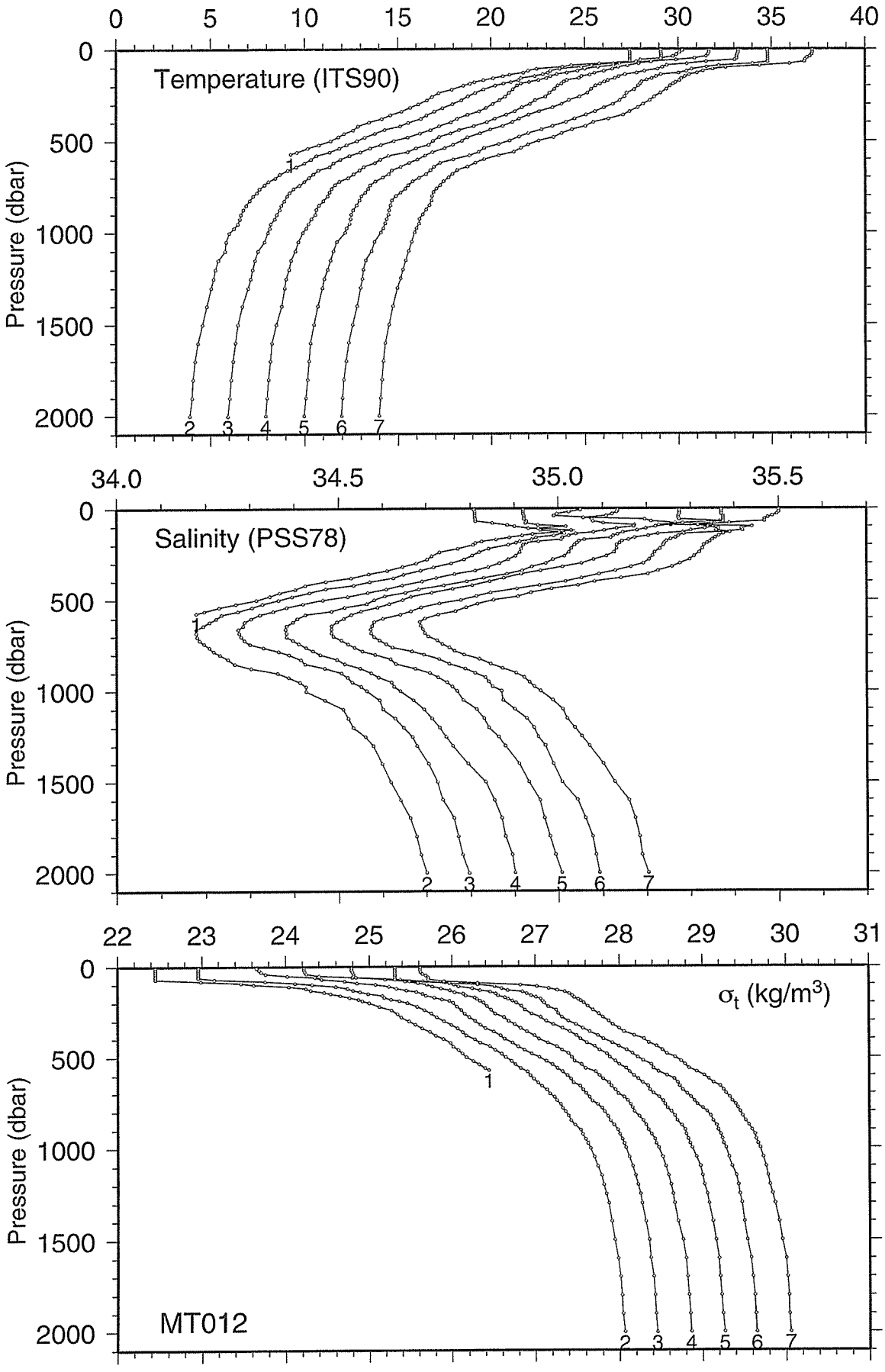


Figure 6-4. (continued)

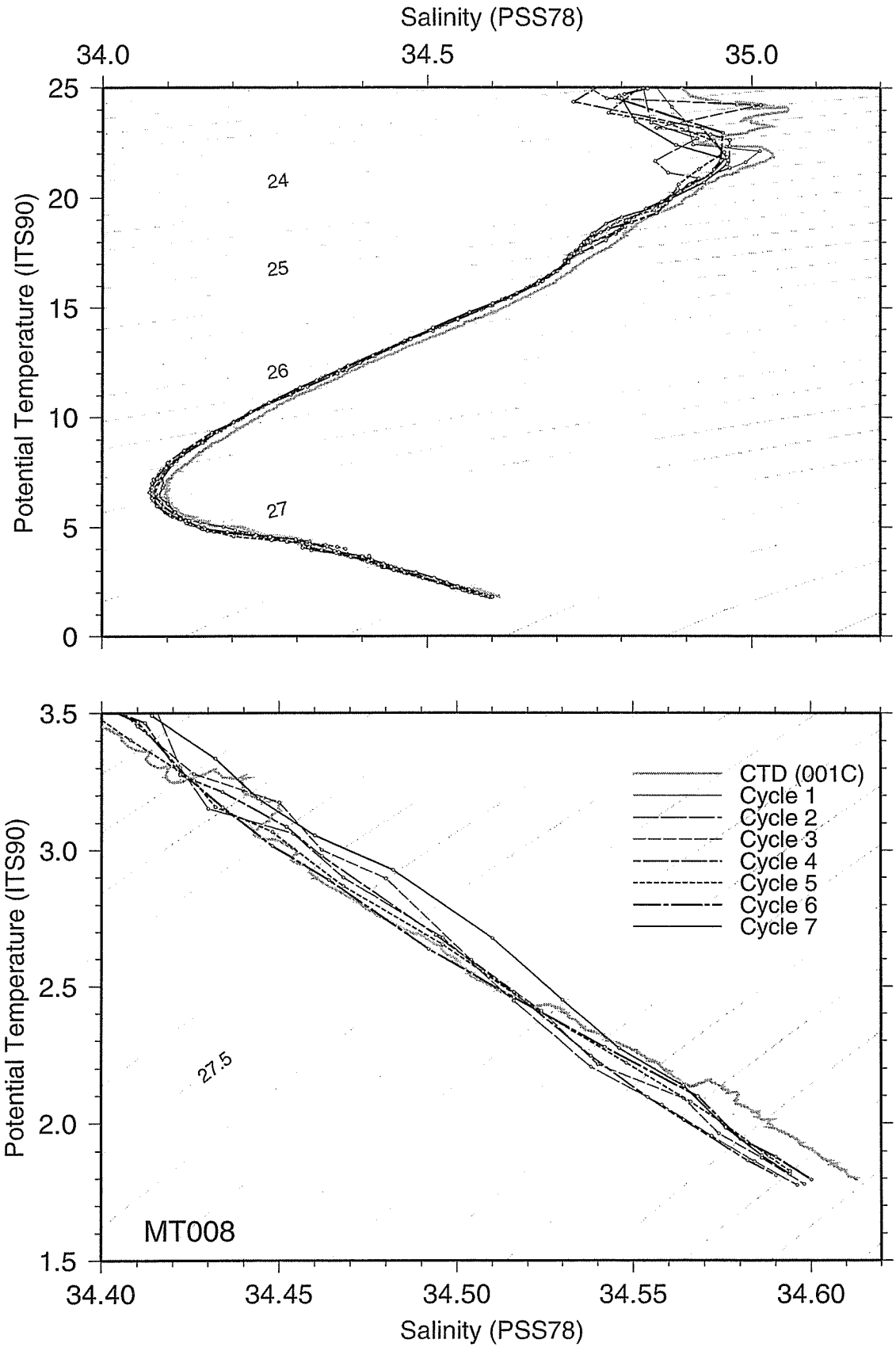


Figure 6-5. Potential temperature vs. Salinity plot for each cycle.

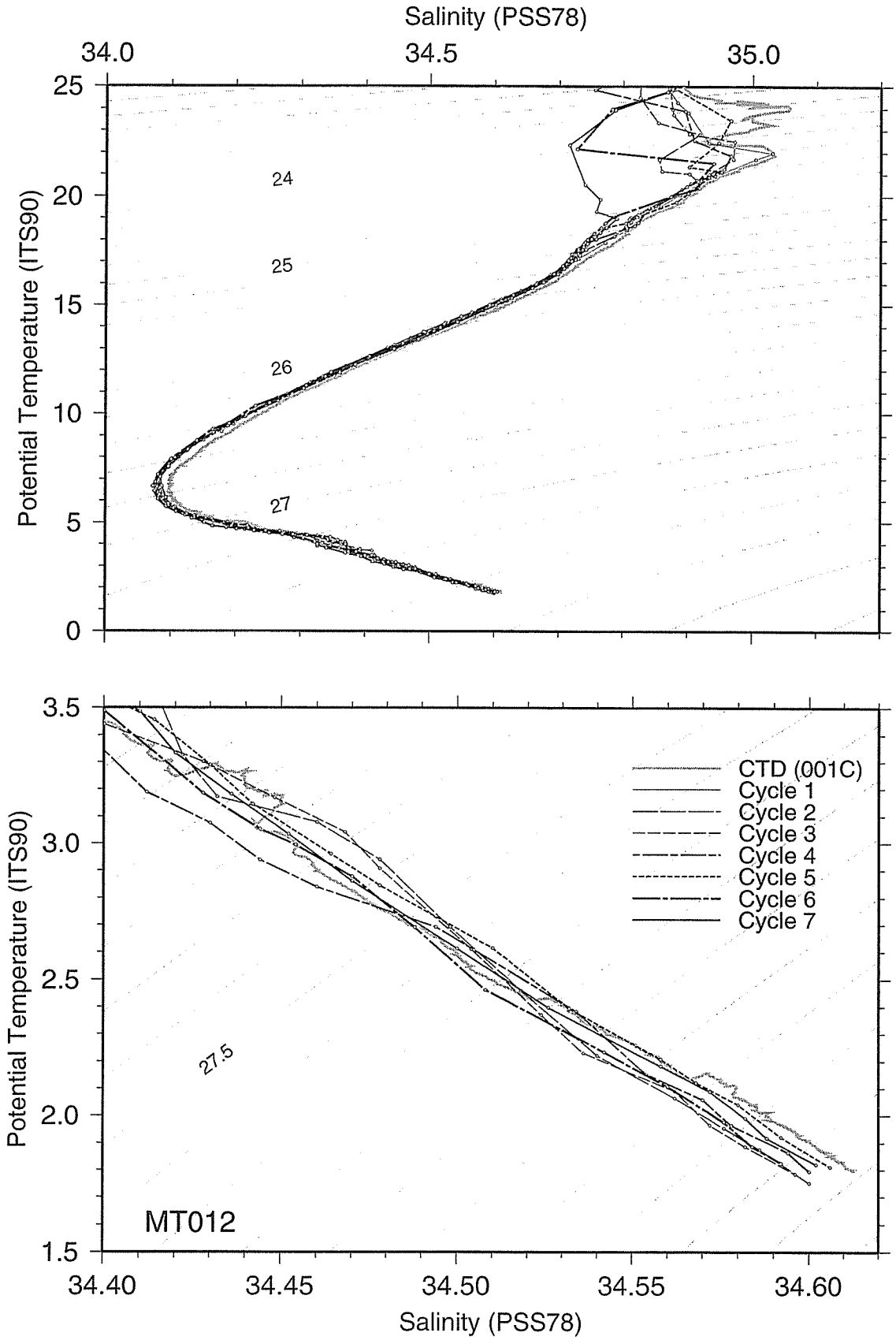


Figure 6-5. (continued)

7. ADCP Mooring

7. ADCP MOORING

(1) Objectives

The purpose is to get the knowledge of physical process in the western equatorial pacific. In this cruise (KY01-11), we recovered two subsurface moorings at (00-147E), (2.5S-142E) and deployed two ADCP mooring at the same place.

(2) Parameters

- Current profiles
- Echo intensity
- Pressure, Temperature and Conductivity

(3) Methods

The mooring consists of a top float , instruments , ropes which length is about 3000- 4000 m, some additional floats , two releasers and sinker. Two instruments are mounted in the top float for observation. One is ADCP (Acoustic Doppler Current Profiler) to observe current profiles upward. The another one is CTD to observe P, T, S at top of the mooring and Current Meter is fasten on each moorings at 700m depth. there is one more CTD at 700m Depth at 2.5S-142E. Details of the instruments are as follows.

1) ADCP

Self-Contained Broadband ADCP 150 kHz (RD Instruments)

Distance to first bin : 8m

Pings per ensemble : 16

Time per ping : 2.00s

Bin length : 8.00m

Sampling Interval : 3600s

Recovered ADCP

- Serial Number : 1151 (Mooring No.000908-00N147E)
- Serial Number : 1155 (Mooring No.000916-25S142E)

Deployed ADCP

- Serial Number : 1221 (Mooring No.011218-00147E)
- Serial Number : 1224 (Mooring No.011222-25S142E)

2) CTD

SBE-16 (Sea Bird Electolonics Inc.)

Sampling Interval : 1800s

Recovered CTD

・Serial Number : 1279 (Mooring No.000908-00N147E)

・Serial Number : 1288 (Mooring No.000916-25S142E)

Deployed CTD

・Serial Number : 1286 (Mooring No.011218-00147E)

・Serial Number : 1285 (Mooring No.011222-25S142E)

SBE-37 (Sea Bird Electolonics Inc.)

Sampling Interval : 1800s

Deployed CTD

・Serial Number : 1685 (Mooring No.011222-25S142E)

3) Current Meter

RCM-8 (AANDERAA Instruments :These belong to Tokyo Univercity)

Recovered Current Meter

・Serial Number : 7413 (Mooring No.000908-00N147E)

・Serial Number : 4054 (Mooring No.000916-25S142E)

Deployed Current Meter

・Serial Number : 5352 (Mooring No.011218-00147E)

・Serial Number : 3806 (Mooring No.011222-25S142E)

(4) Deployment

Two ADCP mooring were deployed at (00-147E), (2.5S-142E) . The moorings were planed to make the ADCP buoy placed at about 300m.

After we dropped the anchor, we monitored depth of the acoustic releaser (Fig.7-1～7-2). Each position of the mooring were showed below.

Results of calibration

・Mooring No.011218-00147E

18-Dec. 2001 Lat: 00° 00.3982S Long: 147° 04.2602E Depth: 4480m

・Mooring No.011222-25S142E

22-Dec. 2001 Lat: 02° 28.7974S Long: 141° 57.7325E Depth: 3443m

(5) Recovery

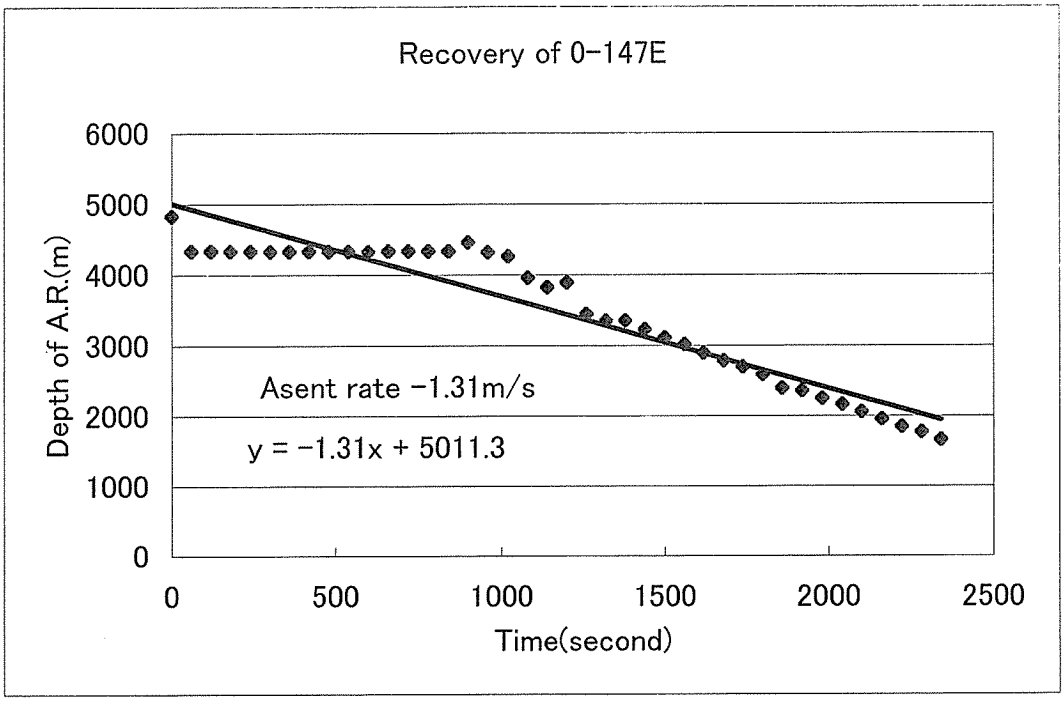
We recovered two ADCP moorings which were deployed on Sep.2000 (KY00-06). We monitored depth of acoustic releaser after we released the anchor (Fig.7-1～7-2).But, we failed to monitor at 2.5S-142E

After the recovery, we uploaded ADCP and CTD data into a computer, then raw data were converted into ASCII code. Results were shown in the figures on following pages. Fig.7-3～7-4

shows CTD pressure, temperature ,salinity data. Fig.7-5～7-8 shows the velocity data (eastward and northward component) .

(6) Data archive

The velocity data will be reconstructed using CTD pressure data. The all data will be archived by the member of TOCS project at JAMSTEC. And, all data will be submitted to DMO at JAMSTEC within 3 years after each recovery.



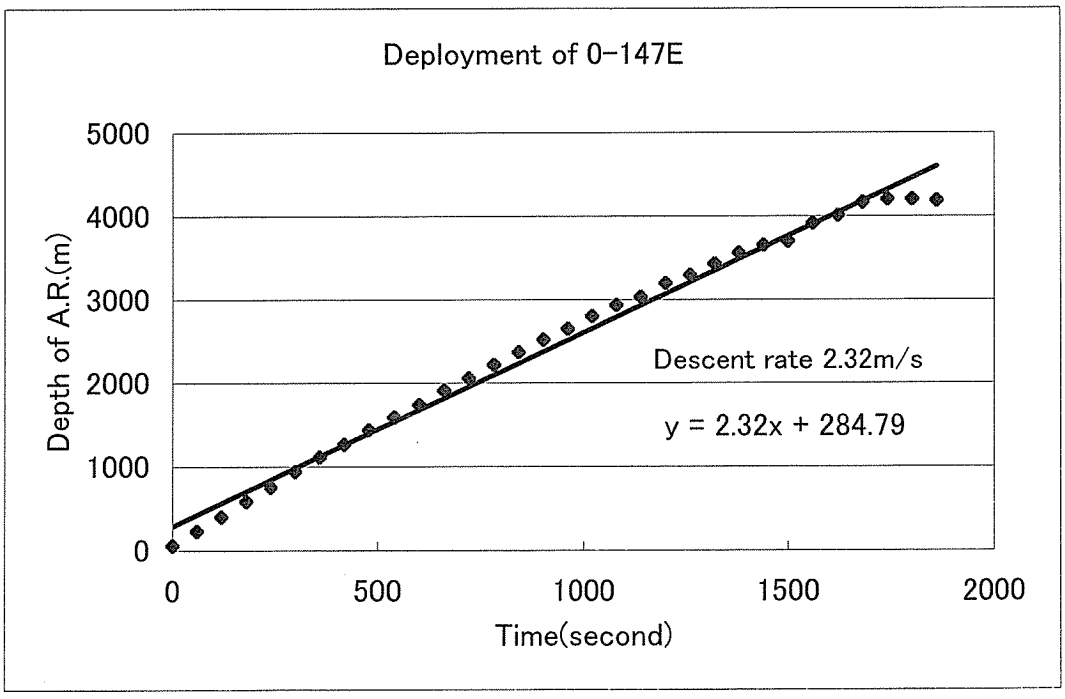


Fig.7-1 Releaser Depth Monitor

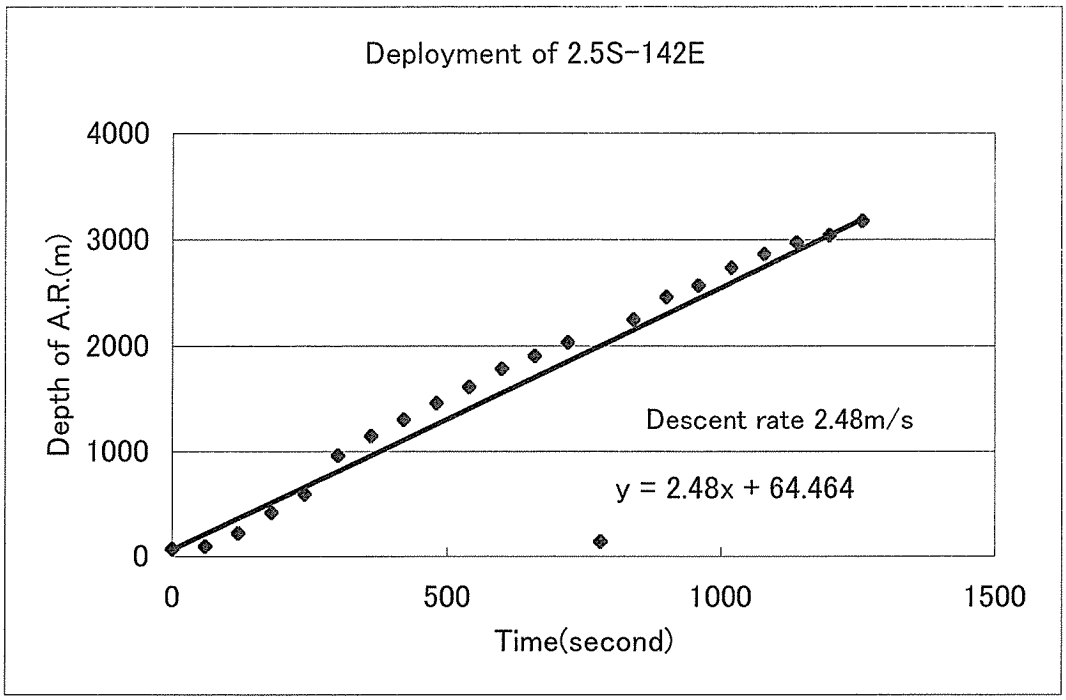
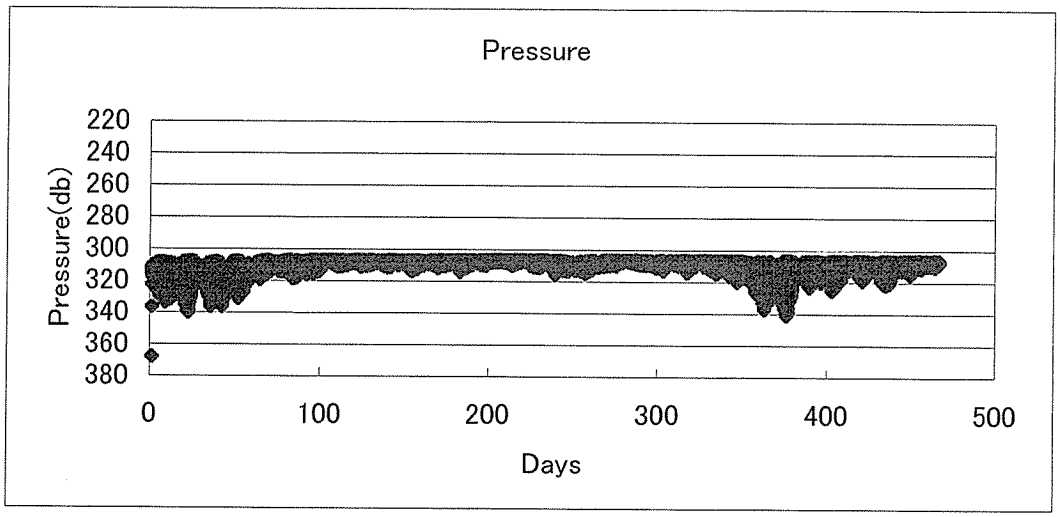
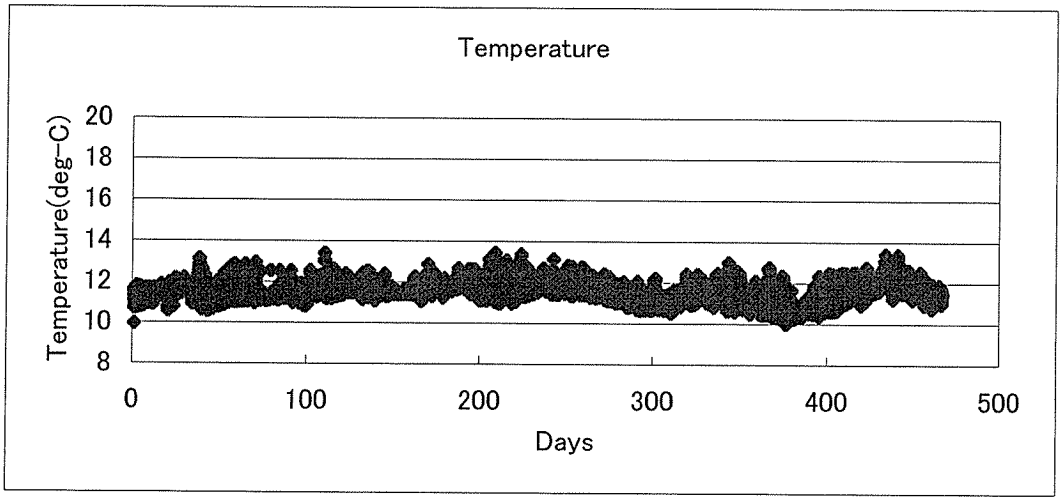


Fig.7-2 Releaser Depth Monitor





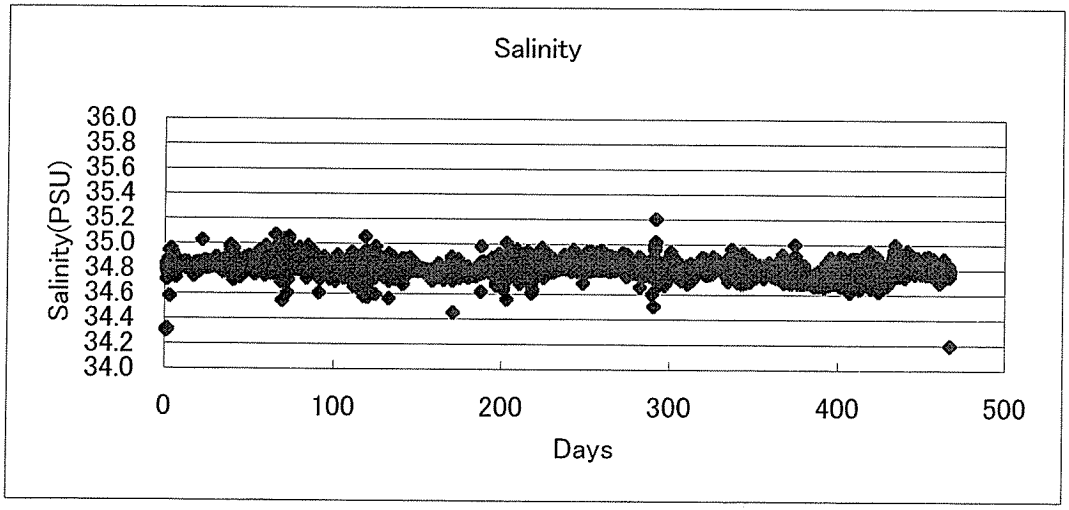
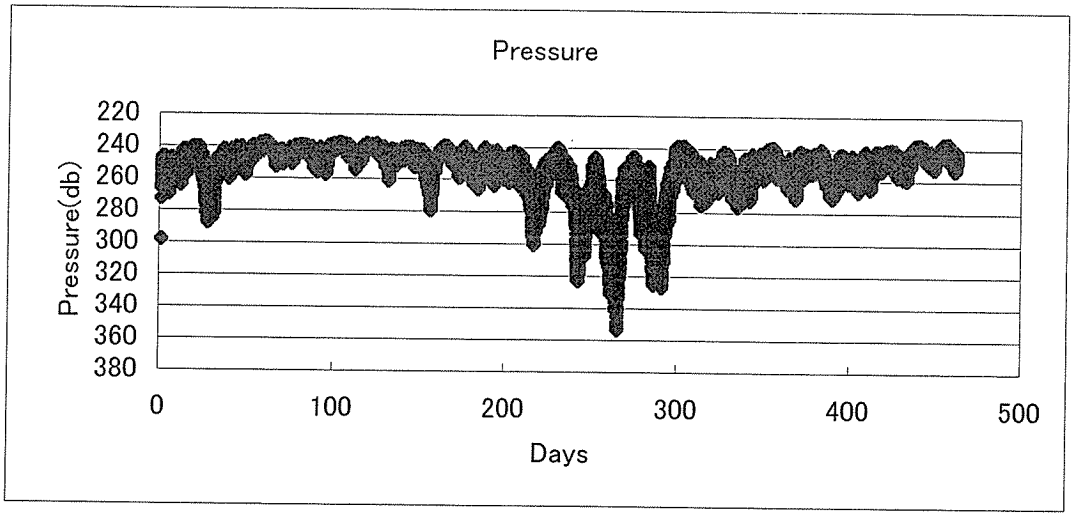
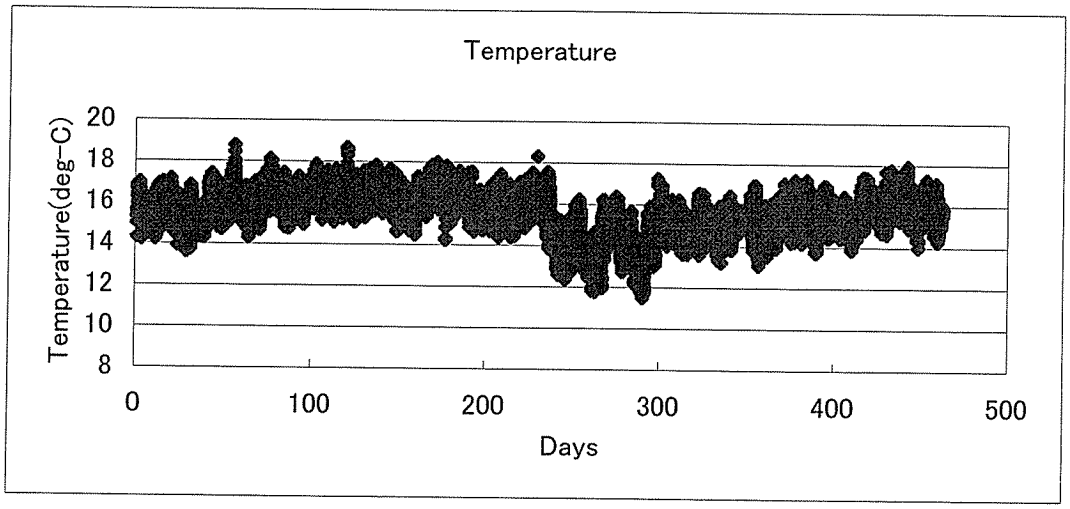


Fig.7-3 Time Series of CTD Data (0-147E)





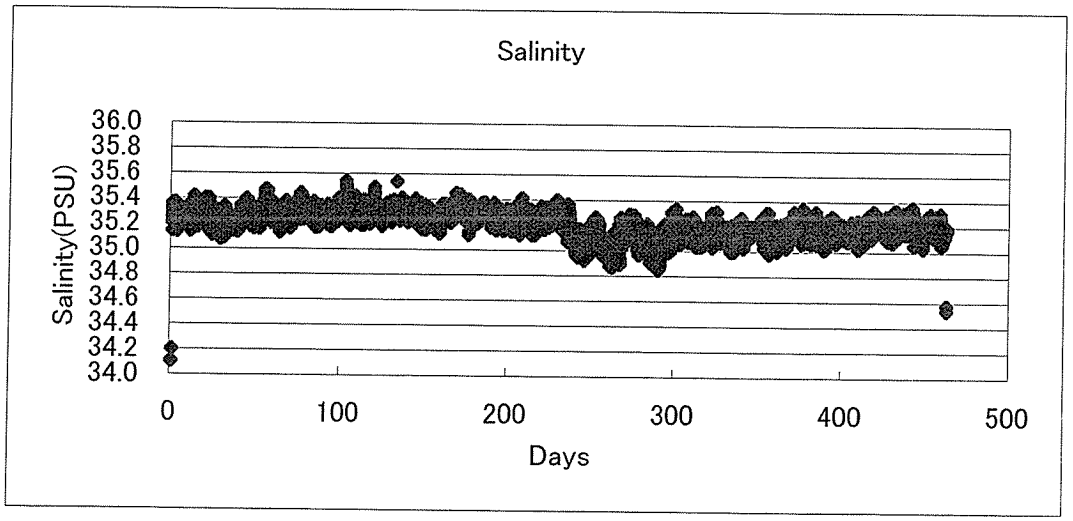
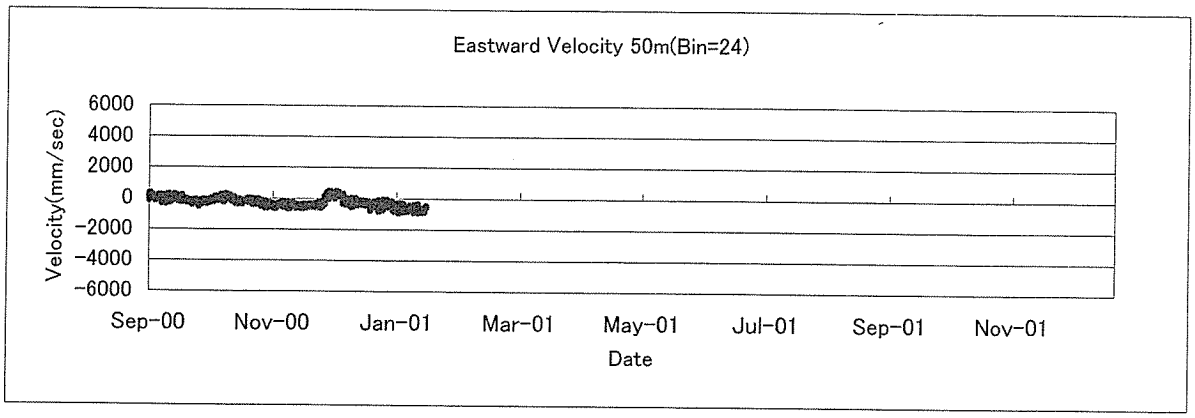
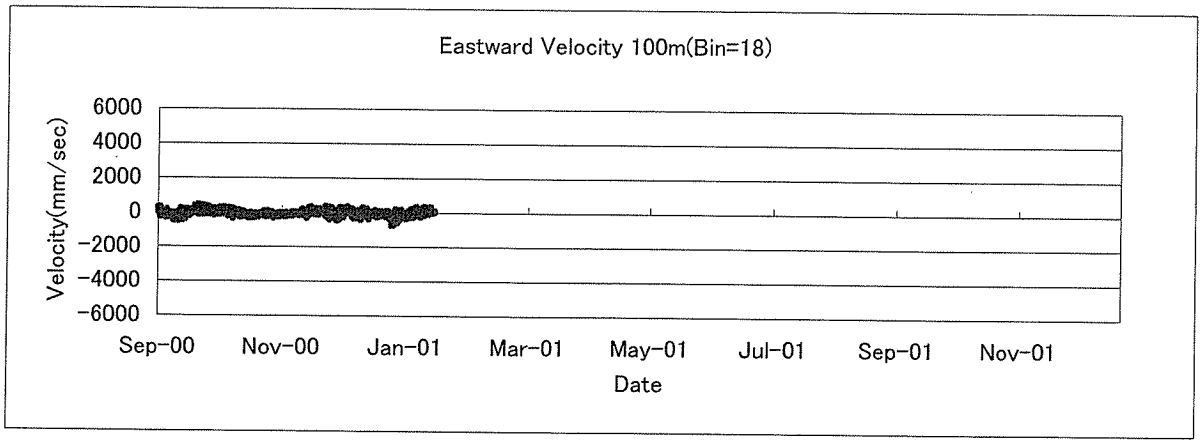
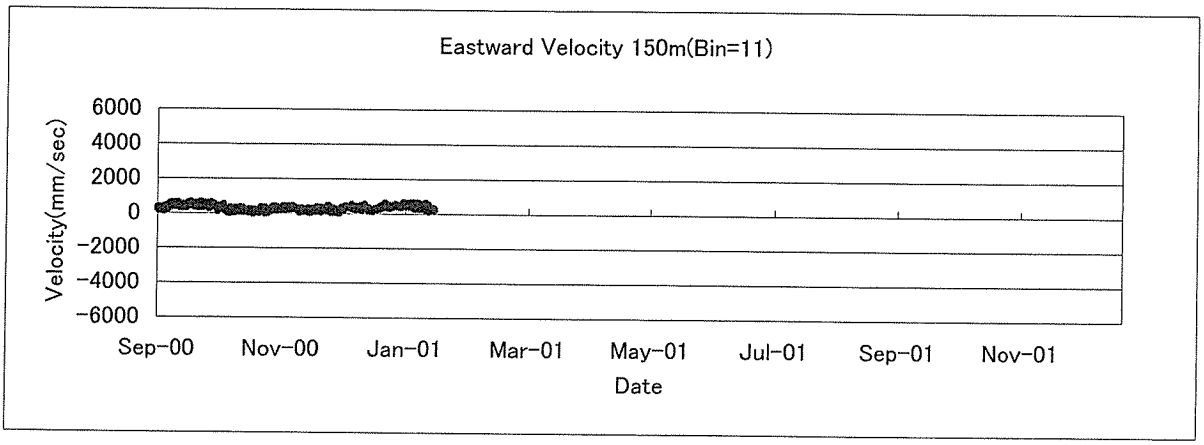


Fig.7-4 Time Series of CTD Data (2.5S-142E)







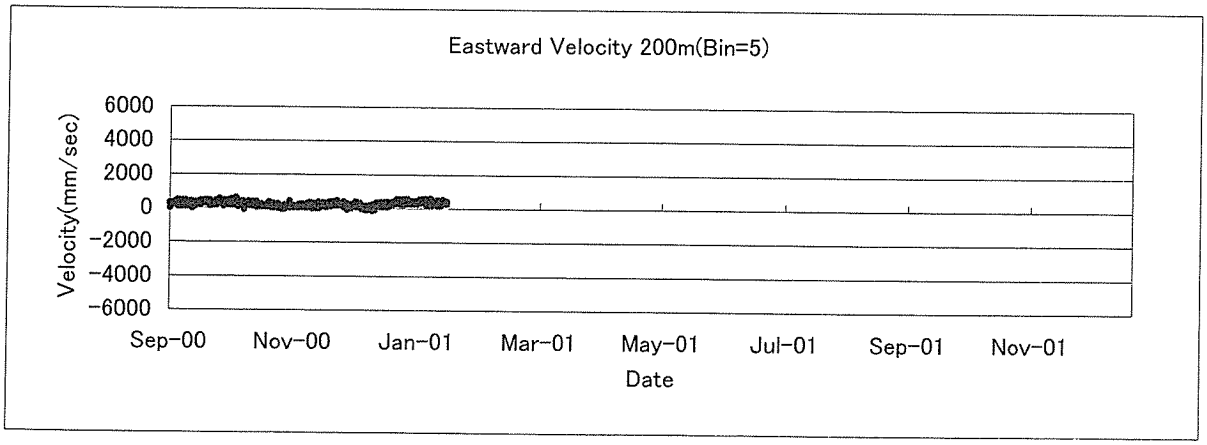
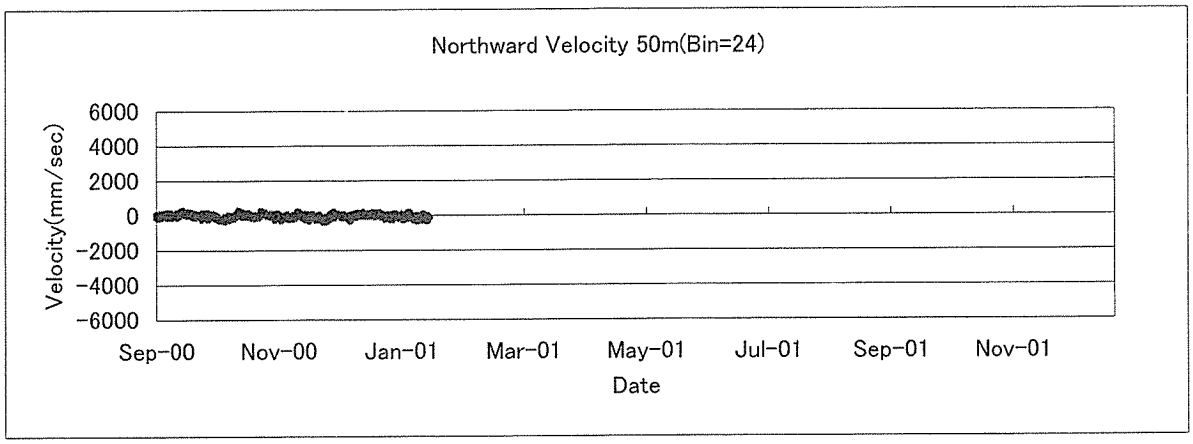
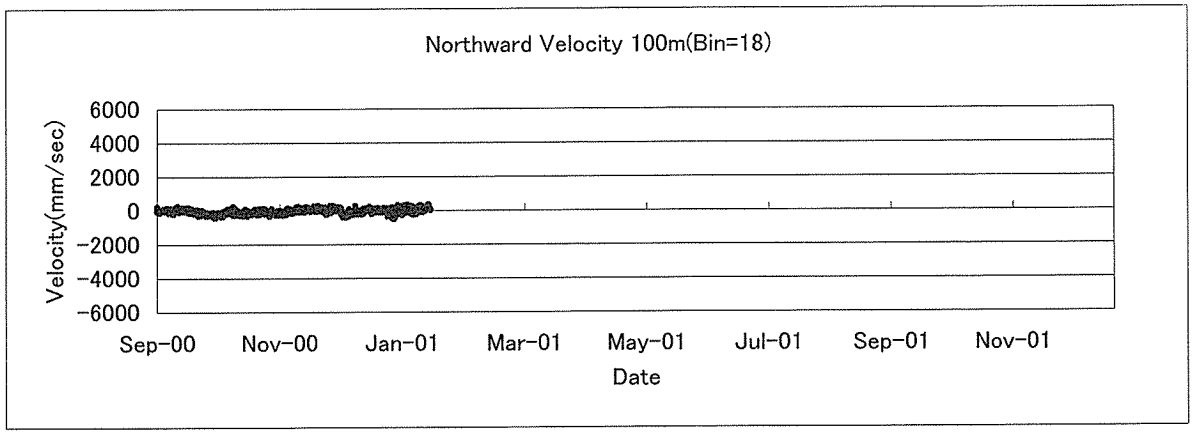
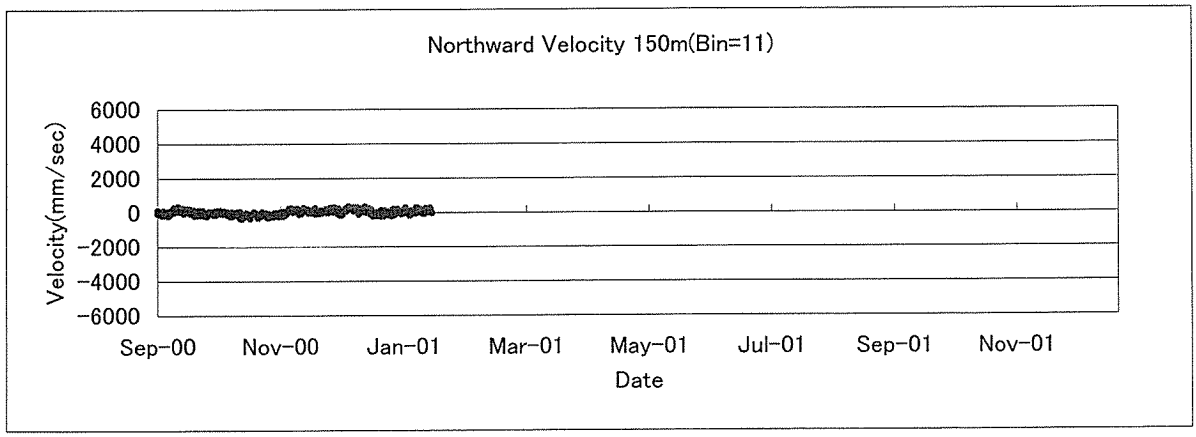


Fig.7-5 0-147E Eastward Velocity







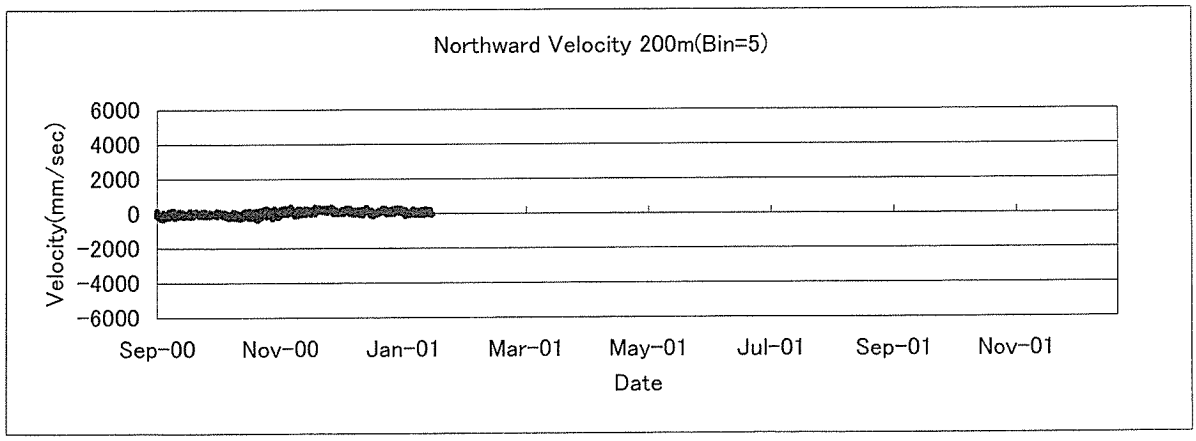
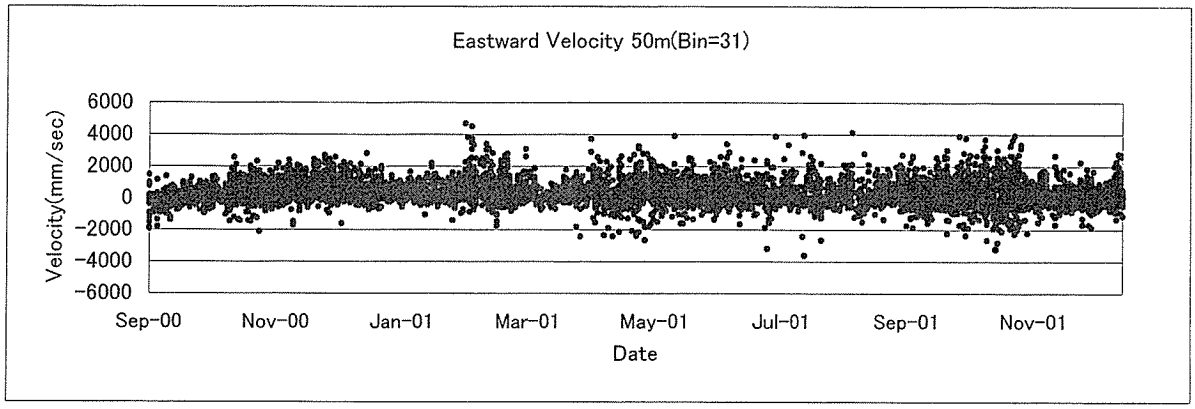
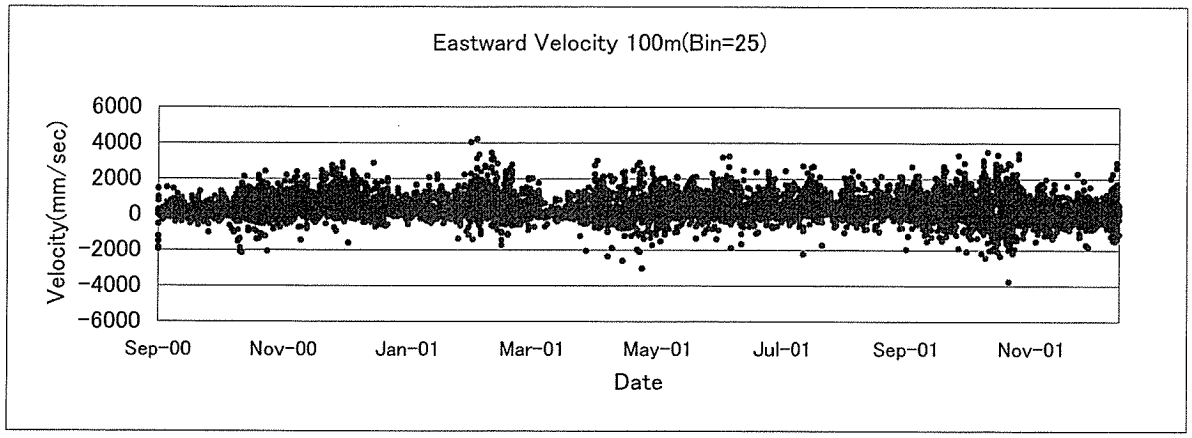
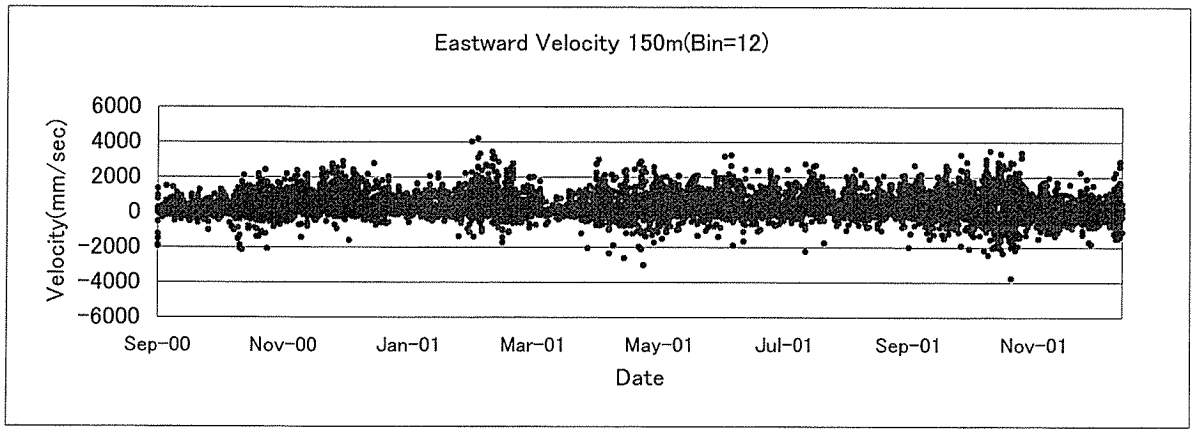


Fig.7-6 0-147E Northward Velocity







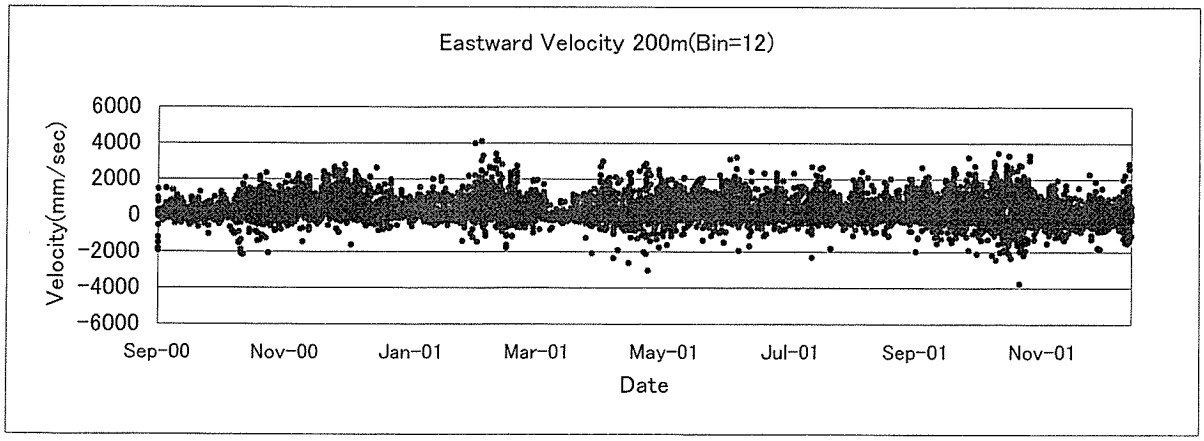
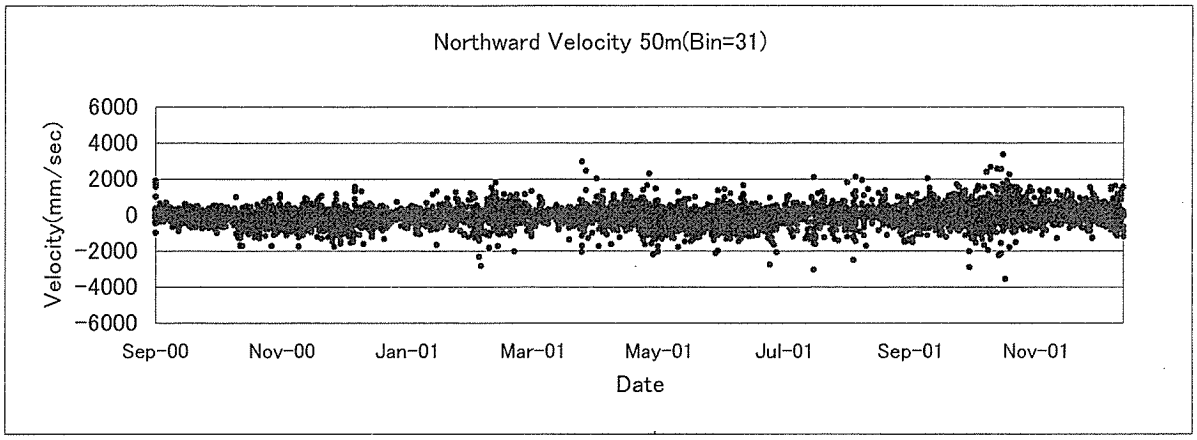
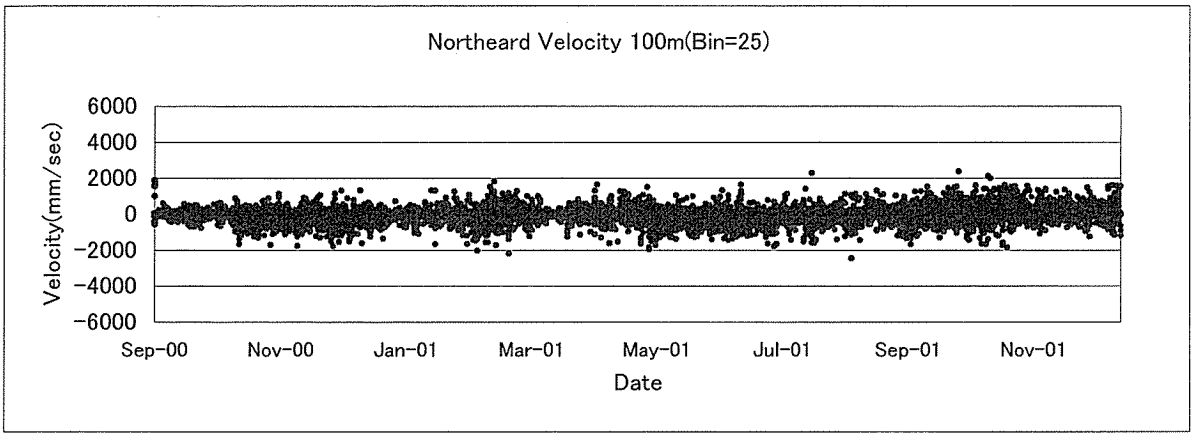
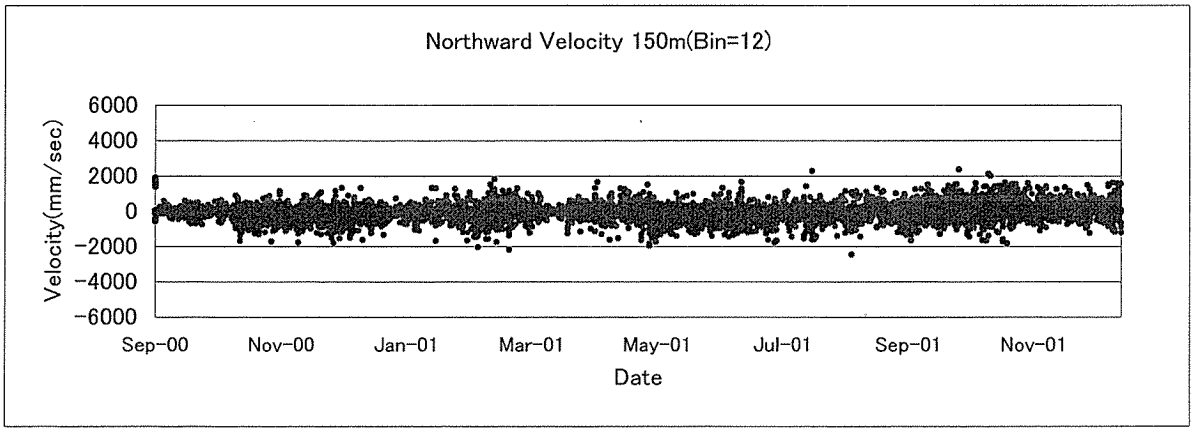


Fig.7-7 2.5S-142E Eastward Velocity







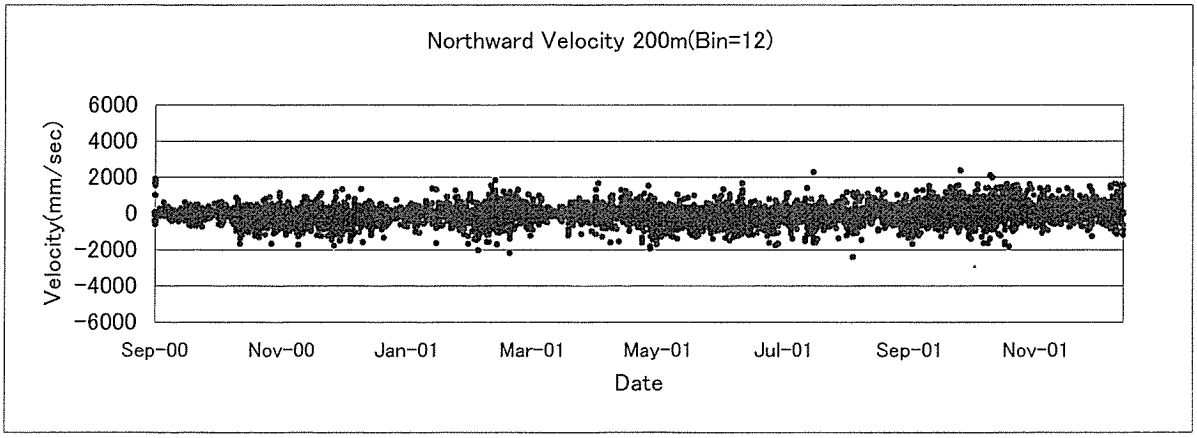
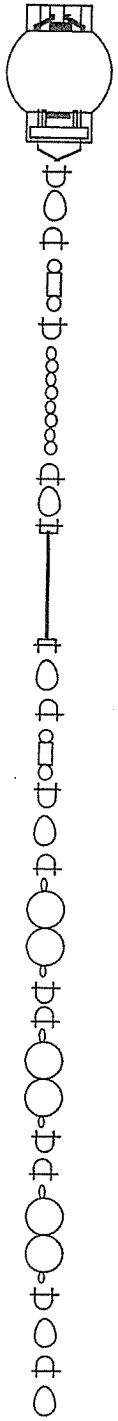


Fig.7-8 2.5S-142E Northward Velocity

00-147(Summer)'00 KY0[illegible]06 Deployment

図47



FLOAT(F-12)
ADCP S/N 1151
CTD SBE16 S/N 1279

SHACKLE 7/8
RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8

CHAIN
13mm x 3.0m

SHACKLE 5/8
RING 19mm

WIRE
10mm x 50m

RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8
RING 19mm
SHACKLE 7/8

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8
SHACKLE 7/8

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8
SHACKLE 7/8

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8
RING 19mm
SHACKLE 5/8
RING 19mm

WIRE
10mm x 200m

RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K2-13)
12mm x 200m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
CHAIN
13mm x 3.0m
BENTHOS
GLASS BALL 3ps.
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

VECTOLAN
12mm x 10m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8
SHACKLE 5/8

RING(SUS) 19mm

CURRET METER
S/N 7413
(700m)

VECTOLAN
12mm x 1.5m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K10-06)
12mm x 870m

SHACKLE 5/8
SHACKLE 5/8

KEVLER(K10-02)
12mm x 961m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K10-03A)
12mm x 823m

SHACKLE 5/8
SHACKLE 5/8

KEVLER(K5-03)
12mm x 485m

SHACKLE 5/8
SHACKLE 5/8

KEVLER(K2-14)
12mm x 200m

SHACKLE 5/8
SHACKLE 5/8

KEVLER(K2-11)
12mm x 186m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

BENTHOS
GLASS BALL
2040-17V x 12ps.

CHAIN
13mm x 8.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
SWIVEL BS103
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

BENTHOS A.R.
S/N 911 E.C.=A
13.5/11kHz R.C.=G

SHACKLE 5/8

CHAIN
13mm x 5.0m

SHACKLE 5/8

BENTHOS A.R.
S/N 693 E.C.=F
14.5/13kHz R.C.=E

SHACKLE 5/8

CHAIN
13mm x 2.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

NYLON
16mm x 102m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

CHAIN
13mm x 5.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8 x 2

CHAIN
13mm x 2.5m x 2

SHACKLE 5/8 x 2

ANCHOR 1.8t

0°N, 147°E
水深:4,480 m
索長:4,191.6m

DEPLOYMENT & RECOVERY

MOORING No. 000908－00N147E

PROJECT TOCS 「かいよう」		TIME	UTC
AREA 熱帯赤道域		RECORDER (D)	K. AKIZAWA
POSITION 0°－147°E		(R)	

DEPTH 4505 m

PERIOD　　NAVIGATION SYSTEM :

No.of DAYS

LENGTH : m　　DEPTH of BUOY : m　　BUOYANCY : kg

ACOUSTIC RELEASER

TYPE	BENTHOS (Upper)	TYPE	BENTHOS (Lower)
S/N	911	S/N	693
RECEIVE F.	11.0 kHz	RECEIVE F.	13.0 kHz
TRANSMIT F.	13.5 kHz	TRANSMIT F.	14.5 kHz
ENABLE C.	A	ENABLE C.	F
RELEASE C.	G	RELEASE C.	E
BATTERY		BATTERY	
TEST on DECK		TEST on DECK	

DEPLOYMENT

DATE 08. Sep. 2000　　SHIP KAIYO　　CRUISE No. KY00-06

WEATHER　　CONDITIONS　　DIR. of WIND　　VEL. of WIND

DEPTH 4480 m　　DEPTH of A.R. 4307 m　　DESCEND. RATE m/s　　BUOY :

POS. of STRT 00°01.9886N 147°02.8605E　　HOR.RANGE m

POS. of DEP. 00°00.0426S 147°04.2011E　　SINKER 05:17　　DISAPPEAR. :

POS. of MOORING 0°00.0605 147°04.1982　　LANDING 05:45

NOTE

○設置に際し、深度調整の為、NYLONロープを140mから102mに変更。

○シンカー投入時、すでにトップブイが確認不可能であった。

○Releaser Depth : 4300m

POS. : 00-00.0531S, 147-04.2070E

	TIME	S/R	DEPTH
S			
S			
B			
L			

RECOVERY

DATE 2001.12.17　　SHIP KAIYO　　CRUISE No. KY01-11

WEATHER bc　　CONDITIONS 1.8 m　　DIR. of WIND WNW　　VEL. of WIND 5.8 m/s

START of RELEASE 21:55　　FINISH of RELEASE 22 ~~21~~ : ~~58~~ 14

POS. of ~~DISCOVERY~~ START 00°00.'S 147°04.8E　　ASCENDING RATE 1.31 m/s

DIRECTION °　　DISTANCE m

NOTE デッキユニット使用

21:55 イネーブルコマンド送信

21:58 〃 2回目

22:00 〃 3回目

舷側のトランスデューサ使用

22:02 DEPTH 4301 m HORIZ RANGE 1200 m

[illegible]

22:14 切り離しコマンド送信 切り離し確認

＊水深 4506 m

＊流速計 22:24 水上がり

	TIME	S/R	DEPTH
S	22:15		847
S	22:17		456
B	22:18		771
L	22:21		819
	22:24		599
	22:27		394

S/N 981 (上側) 回収後 テスト OK

TIME RECORD

MOORING NO. 000908-00N147E

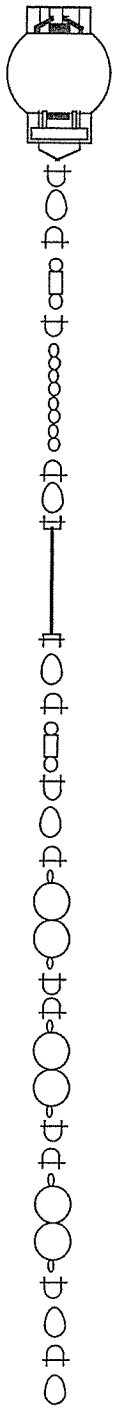
	DEPLOYMENT '00.09.08		RECOVERY (Date '01.12.17 (UTC))	
	START : 03:45		START : 23:02 ('01.12.17)	
	FINISH : 05:17		FINISH : ('01.12.18)	

ITEM	S/N etc.	TIME	MEMO	TIME	MEMO
ADCP	ADCP 1151 CTD 1279	03:45	着水	23:02	0m デッキ
WIRE	50m	03:45～		23:02～	
ABS BUOY	2×3	03:48		23:10	
WIRE	200m	03:48～03:53		23:10～17	
KEVLER (K2-13)	200m	03:55～03:59		23:17～25	
GLASS BALL	3Ps	04:04		23:25	
AANDERAA	S/N 413	04:04		23:29	23:24 水切り
KEVLER (K10-06)	870m	04:04～04:17		23:29～23:47	
KEVLER (K10-02)	961m	04:17～04:32		23:47～00:05	
KEVLER (K10-03A)	823m	04:32～04:44		00:05～00:20	
KEVLER (K5-03)	485m	04:44～04:51		00:20～00:30	
KEVLER (K2-14)	200m	04:51～04:56		00:30～00:36	
KEVLER (K2-11)	186m	04:56～05:01		00:36～00:44	
GLASS BALL	12Ps	05:05		00:45	
Benthos A.R.	S/N 911	05:06	13.5/11kHz	00:45	
Benthos A.R.	S/N 693	05:10	14.5/13.0kHz	00:44	
NYLON	~~140~~ 102m	05:10～05:13	NYLON 102m		
ANCHOR	1.8t	05:17			

浮上確認
作業テイ
船より作業テイへADCP巻き上げ用ロープ手渡し 22:35
作業テイ ADCPへ向かう 22:36
〃 ADCPへロープとりつけ 22:37～39
ADCP 巻きとり開始 22:40～
((作業テイもどる 22:45)
ADCPふれ止め巻きつけ 22:59
(作業テイ揚収作業のため ADCP巻きとり 一時停止 巻きとり再開 22:48)

00-147E (01/12/18)

Deployment KY01-11



FLOAT(F-05)
ADCP S/N 1221
CTD SBE16 S/N 1286

SHACKLE 7/8
RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8

CHAIN
13mm x 3.0m

SHACKLE 5/8
RING 19mm

WIRE
10mm x 50m

RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8
RING 19mm
SHACKLE 7/8

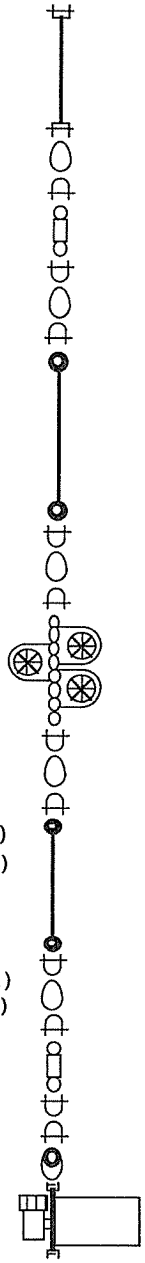
ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8(used)
SHACKLE 7/8(used)
ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8(used)
SHACKLE 7/8(used)

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8
RING 19mm
SHACKLE 5/8
RING 19mm



WIRE
10mm x 200m

RING 19mm
SHACKLE 5/8
SWIVEL AB102(used)
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K1-15)
12mm x 100m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
CHAIN
13mm x 3.0m
BENTHOS
GLASS BALL 3ps.
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

VECTOLAN
12mm x 10m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8
SHACKLE 5/8
RING(SUS) 19mm

CURRET METER
S/N 5352
(691m)

VECTOLAN
12mm x 1.5m

SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)

KEVLER(K10-13)
12mm x 944m

SHACKLE 5/8(used)
SHACKLE 5/8(used)

KEVLER(K10-14)
12mm x 944m

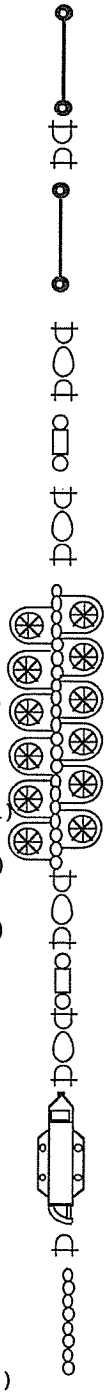
SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)
SWIVEL AB102(used)
SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)

KEVLER(K10-09)
12mm x 972m

SHACKLE 5/8(used)
SHACKLE 5/8(used)

KEVLER(K5-08)
12mm x 462m

SHACKLE 5/8(used)
SHACKLE 5/8(used)



KEVLER(K1-11)
12mm x 100m

SHACKLE 5/8(used)
SHACKLE 5/8(used)

KEVLER(K1-16)
12mm x 100m

SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)
SWIVEL AB102(used)
SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)

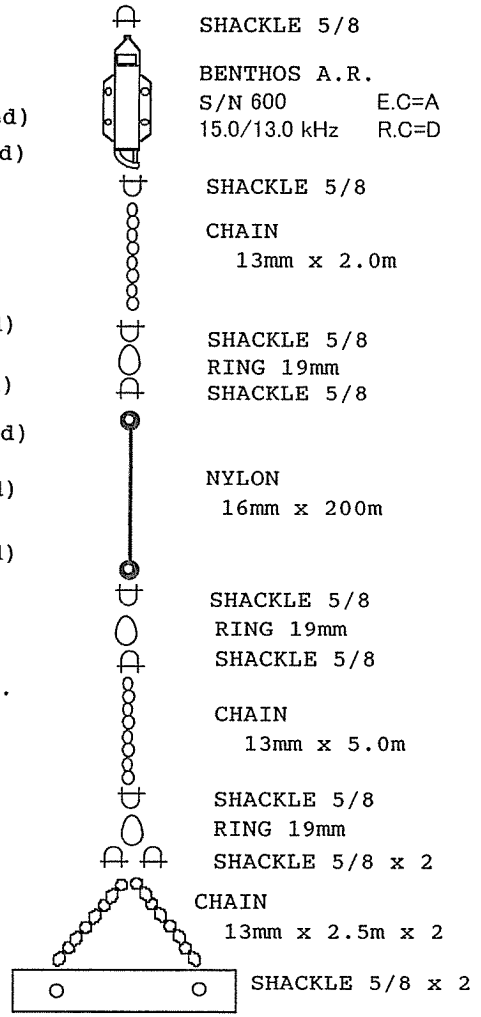
BENTHOS
GLASS BALL
2040-17V x 12ps.

CHAIN
13mm x 8.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
SWIVEL BS103
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

BENTHOS A.R.
S/N 955 E.C=A
15.5/11.0kHz R.C=F

SHACKLE 5/8
CHAIN
13mm x 5.0m



SHACKLE 5/8

BENTHOS A.R.
S/N 600 E.C=A
15.0/13.0 kHz R.C=D

SHACKLE 5/8
CHAIN
13mm x 2.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

NYLON
16mm x 200m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

CHAIN
13mm x 5.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8 x 2

CHAIN
13mm x 2.5m x 2

SHACKLE 5/8 x 2

ANCHOR 1.8t

0°N, 147°E
水深:4,480 m
索長:4,130.5m
ADCP:304.4m
(計算後)

DEPLOYMENT & RECOVERY

MOORING No. 01218-00147E

PROJECT	TOCS「かいよう」	TIME	UTC
AREA	熱帯赤道域	RECORDER (D) :	Hirano
POSITION	0.147E	RECORDER (R) :	
DEPTH	4506 m		
PERIOD		NAVIGATION SYSTEM :	WGS 84
No. of DAYS			
LENGTH :	4130.5 m	DEPTH of BUOY :	m BUOYANCY : kg

ACOUSTIC RELEASERS

TYPE	BENTHOS (Upper)		TYPE	BENTHOS (Lower)	
S/N	955		S/N	600	
RECEIVE F.	11.0	kHz	RECEIVE F.	13.0	kHz
TRANSMIT F.	15.5	kHz	TRANSMIT F.	15.0	kHz
ENABLE C.	A		ENABLE C.	A	
RELEASE C.	F		RELEASE C.	D	
BATTERY	2 years		BATTERY	2 years	
TEST on DECK	Ok		TEST on DECK	OK	

DEPLOYMENT

DATE	2001. 12. 18	SHIP	KAIYO	CRUISE No.	KY01-11
WATHER	0	CONDITIONS	2.0	DIR. of WIND	WNW
VEL. of WIND	8.2 m/s				
DEPTH	4480 m	DEPTH of A.R.	4202 m	DESCEND. RATE	2.37~~32~~ m/s
BUOY	3:12				
POS. of START	00°00.2S	147°06.4E	HOR. RANGE	m	
POS. of DEP.	00°00.4S	147°04.1E	ANCHOR	05:18	DISAPPEAR :
POS. of MOORING	0°00.3982'S	147°04.2602'E	LANDING	05:50	

○流速計(東大海洋研)
S/N 5352
2001.12.17
00:00:00
スイッチON

RECOVERY

DATE		SHIP	CRUISE No.
WATHER	CONDITIONS	DIR. of WIND	VEL. of WIND
START of RELEASE :		SENDING E.C. :	
SENDING R.C. :			
FINISH of RELEASE :			
DISTANCE from A.R.	m	DISCOVERY ADCP :	

TIME RECORD

MOORING NO. 01218-0147E

		DEPLOYMENT 01.12.18 START : 03:08 FINISH :		RECOVERY (Date :) START : FINISH :	
ITEM	S/N etc.	TIME	MEMO	TIME	MEMO
ADCP CTD SBE16	1221 1286	03:12	着水		
WIRE	10mm×50m	03:08~03:16			
ABS BUOY	2×3	03:16			
WIRE	10mm×200m	03:16~03:25			
KEVLER	K1-15 12mm×100m	03:25~03:33			
GLASS BALL	3	03:33			
VECTOLAN	12mm×10m	03:35			
CURRENTMETER	5352	03:35	着水		
VECTOLAN	12mm×1.5m	03:35			
KEVLER	K10-13 12mm×944m	03:35~03:50			
KEVLER	K10-14 12mm×944m	03:50~04:10			
KEVLER	K10-09 12mm×972m	04:10~04:37			
KEVLER	K5-08 12mm×462m	04:37~04:47			
KEVLER	K1-11 12mm×100m	04:47~04:51			
KEVLER	K1-16 12mm×100m	04:51~05:00			
GLASS BALL	12	05:01			
BENTHOS A.R.	955	05:02			
BENTHOS A.R	600	05:02			
NYLON	200m	05:03~05:12			
ANCHOR		05:18			

水深調整のためナイロンロープを195mから200mに変更
作業開始 03:00
上側 955 R11.0 T15.5 E:A R:F
下側 600 R:13.0 T:16.0 E:A R:D
ブイが見えなくなる 3:40
15:17
00-00 3749
147 04.0987E

HR	DEPTH	Time
322	472	05:22
387	668	05:23
413	742	05:24:00
418	813	05:24:25
416	906	05:24:55
423	997	05:25:30
432	1017	05:25:45
445	1198	05:26:45
429	1306	05:27:20
		05:28:05
392	1416	05:28:30
371	1503	05:29:25
376	1592	05:29:45
397	1699	

4480

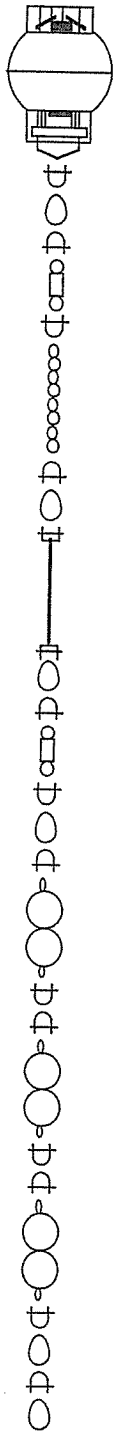
463	1805	05:30:20
550	1911	05:31:00
640	2012	05:31:45
844	2192	05:32:00
890	2309	05:33:00
1061	2440	05:33:30
1118	2508	05:34:00
1081	01	05:35:00

3009 05:38
3509 05:42
4051 05:47
~~4114 05:50~~ 着底
~~4100~~ 05:48
4200

0-04268S
147 02.01

4202 ~ 1114 + 4110 ?

2.5S-142(Summer)'00 KY0 06 Deployment 回収



FLOAT(F-01)
ADCP S/N 1155
CTD SBE16 S/N 1288

SHACKLE 7/8
RING 19mm
SHACKLE 5/8

SWIVEL AB102
SHACKLE 5/8

CHAIN
13mm x 3.0m

SHACKLE 5/8
RING 19mm

WIRE
10mm x 50m

RING 19mm
SHACKLE 5/8

SWIVEL AB102
SHACKLE 5/8
RING 19mm
SHACKLE 7/8

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8
SHACKLE 7/8

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8
SHACKLE 7/8

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8
RING 19mm
SHACKLE 5/8
RING 19mm

WIRE
10mm x 200m

RING 19mm
SHACKLE 5/8
SWIVEL AB102
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K2-01)
12mm x 174m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

BENTHOS
GLASS BALL 3ps.
CHAIN 13mm x 3.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

VECTOLAN
12mm x 10m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
SWIVEL AB102

SHACKLE 5/8
SHACKLE 5/8
RING(SUS) 19mm

CURRENT METER
Ru-1 S/N 4054U
(700m)

VECTOLAN 1.5m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K10-04)
12mm x 961m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

SWIVEL AB102
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K10-05)
12mm x 961m

SHACKLE 5/8
SHACKLE 5/8

KEVLER(K5-05)
12mm x 464m

SHACKLE 5/8
SHACKLE 5/8

KEVLER(K1-04)
12mm x 86m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

SWIVEL AB102

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

BENTHOS
GLASS BALL
2040-17V x 12ps.

CHAIN(USED)
13mm x 8.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8
SWIVEL BS103
SHACKLE 5/8
RING 19mm
SHACKLE 5/8

BENTHOS A.R.
S/N 694 E.C.=C
13/13.5kHz R.C.=B

SHACKLE 5/8

CHAIN
13mm x 5.0m

SHACKLE 5/8

BENTHOS A.R.
S/N 676 E.C.=A
13/15 kHz R.C.=F

SHACKLE 5/8

CHAIN
13mm x 2.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

NYLON
16mm x 176m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

CHAIN
13mm x 5.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8 x 2

CHAIN
13mm x 2.5m x 2

SHACKLE 5/8 x 2

ANCHOR 1.8t

2.5°S, 142°E
水深:3,448 m
索長:3,118.6m

Attention!:
Wing of Current Meter has bended

DEPLOYMENT & RECOVERY

MOORING No. 000916-2S142E

PROJECT TOCS	TIME UTC
AREA Western Pacific	RECORDER (D): K. AKIZAWA
POSITION 2.5°S 142°E	RECORDER (R):
DEPTH 3.440m	
PERIOD	NAVIGATION SYSTEM:
No. of DAYS	
LENGTH: m DEPTH of BUOY: m	BUOYANCY: kg

ACOUSTIC RELEASERS

TYPE	BENTHOS (upper)	TYPE	BENTHOS (lower)
S/N	694	S/N	676
RECEIVE F.	13.0 kHz	RECEIVE F.	13.0 kHz
TRANSMIT F.	13.5 kHz	TRANSMIT F.	15.0 kHz
ENABLE C.	C	ENABLE C.	A
RELEASE C.	B	RELEASE C.	F
BATTERY	2 years	BATTERY	2 years
TEST on DECK	OK	TEST on DECK	OK

DEPLOYMENT

DATE	16. Sep. 2000	SHIP	KAIYO	CRUISE No.	KY00-06
WATHER	0	CONDITIONS	Smooth	DIR. of WIND	VEL. of WIND
DEPTH	3448 m	DEPTH of A.R.	3179 m	DESCEND. RATE	m/s BUOY 04 : 10
POS. of START	02° 28.7703S	141° 55.972/E		HOR. RANGE	m
POS. of DEP.	02° 28.81775	141° 57.9184E		ANCHOR 05 : 27	DISAPPEAR 05 : 40
POS. of MOORING	02° 28.8488	141° 57.8547		LANDING	05: 47

・アンテナ 羽根 片側 下方向にまわしたまま投入
アンテナ on 15th Sep. 2000 09:00 (GMT) Ru-1 S/N 4054u

RECOVERY

DATE	01 Dec 21~22 (UTC)	SHIP	KAIYO	CRUISE No.	KY01-11
WATHER	C	CONDITIONS	1.5 m	DIR. of WIND	305°(NW) VEL. of WIND 8.5 m/sec
START of RELEASE	23 : 05	SENDING E.C.	23 : 05		
SENDING R.C.	23 : 14				
FINISH of RELEASE	:				
DISTANCE from A.R.	817 m	DISCOVERY ADCP	23 : 17		

水深 3445 m
切り離しを石垣島でできなかったため、ブイ浮上確認
リリーサーコードが長かったため上昇リリーサーより切り離し
回収リリース。
S/N 694
RECIVE 13.0 KHz ENABLE CODE : G
TRANCE 14.5 KHz RELEASE CODE : F

・アンテナ羽根(水平方向)
少し下方向に曲っていた。

TIME RECORD

MOORING NO. 000916・25S142E

		DEPLOYMENT '00. Sep. 16 (UTC)		RECOVERY (Date '01. DEC 22)	
		START: 04:08		START: 00:08 (UTC)	
		FINISH: 05:27		FINISH: 01:23	
ITEM	S/N etc.	TIME	MEMO	TIME	MEMO
ADCP	ADCP1155 CTD 1288	04:10		00:08	ON デッキ
WIRE	50 m	04:10 ~ 04:14		00:08 ~ 00:16	
ABS Buoy	2 × 3	04:14		00:16	
WIRE	200m	04:14 ~ 04:22		00:16 ~ 23	
KEVLER (K2-01)	174 m	04:25 ~ 04:28		00:23 ~ 00:29	
GLASS BALL	3 ps.	04:34		00:29	
AANDERAA (Rw-1)	4054U	04:34		00:33	00:27 [illegible]
KEVLER (K10-04)	961 m	04:35 ~ 04:48		00:33 ~ 00:51	
KEVLER (K10-05)	961 m	04:49 ~ 05:01		00:51 ~ 01:07	
KEVLER (K5-05)	464 m	05:02 ~ 05:07		01:07 ~ 01:18	
KEVLER (K1-04)	86 m	05:08 ~ 05:09		01:18 ~ 01:23	
GLASS BALL	12 ps.	05:16		01:23	
BENTHOS A.R.	694	05:21		01:23	
〃	676	05:21			
NYLON	176 m	05:21 ~ 05:23			
ANCHOR	1.8 t	05:27			

※ AANDERAA 赤い羽根の片側、下方向にまがったまま投入。

2001/12/21 23:05 イネーブル送信
07
08 〃 ないよう
イネーブル確認
DEPTH 3171m
HR 924m
リリースコード送信
15 〃
17 浮上確認
水深 3445m
23:21 作業ボート ブイへ
29 ブイへ到着
32 ブイを確保.
35 ブイより離れる
45 ブイ側 シャックルに巻きとり用ロープとりつけ
47 巻きとり開始
53 作業艇 船へ戻る
56 ロープ巻きとり開始

2.5S-142E (01/12/22)
Deployment KY01-11

FLOAT(F-08)
ADCP S/N 1224
CTD SBE16 S/N 1285

SHACKLE 7/8
RING 19mm
SHACKLE 5/8

SWIVEL AB102
SHACKLE 5/8

CHAIN
13mm x 3.0m

SHACKLE 5/8
RING 19mm

WIRE
10mm x 50m

RING 19mm
SHACKLE 5/8

SWIVEL AB102

SHACKLE 5/8
RING 19mm
SHACKLE 7/8

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8(used)
SHACKLE 7/8(used)

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8(used)
SHACKLE 7/8(used)

ABS BUOY CT608B
NYLON 2.2m

SHACKLE 7/8
RING 19mm

SHACKLE 5/8
RING 19mm

WIRE
10mm x 200m

RING 19mm
SHACKLE 5/8

SWIVEL AB102(used)

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K1-08)
12mm x 100m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

BENTHOS
GLASS BALL 3ps.
CHAIN 13mm x 3.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

VECTOLAN
12mm x 10m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

SWIVEL AB102

SHACKLE 5/8
SHACKLE 5/8

RING(SUS) 19mm

CURRENT METER
Ru-1 S/N 3806
(690m)

VECTOLAN 1.5m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

SWIVEL AB102

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

CTD SBE37 S/N 1685
(693m)

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

KEVLER(K1-05)
12mm x 74m

SHACKLE 5/8(used)
SHACKLE 5/8(used)

KEVLER(K10-20)
12mm x 944m

SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)

SWIVEL AB102(used)

SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)

KEVLER(K10-21)
12mm x 947m

SHACKLE 5/8(used)
SHACKLE 5/8(used)

KEVLER(K5-02)
12mm x 462m

SHACKLE 5/8(used)
SHACKLE 5/8(used)

KEVLER(K1-01)
12mm x 74m

SHACKLE 5/8(used)
SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)

SWIVEL AB102(used)

SHACKLE 5/8(used)
RING 19mm(used)
SHACKLE 5/8(used)

BENTHOS
GLASS BALL
2040-17V x 12ps.

CHAIN
13mm x 8.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

SWIVEL BS103

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

BENTHOS A.R.
S/N 662 E.C.=B
13.5/13.0kHz R.C.=A

SHACKLE 5/8

CHAIN
13mm x 5.0m

SHACKLE 5/8

BENTHOS A.R.
S/N 691 E.C.=D
14.0/13.0kHz R.C.=C

SHACKLE 5/8

CHAIN
13mm x 2.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

NYLON
16mm x 185m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8

CHAIN
13mm x 5.0m

SHACKLE 5/8
RING 19mm
SHACKLE 5/8 x 2

CHAIN
13mm x 2.5m x 2

SHACKLE 5/8 x 2

ANCHOR 1.8t

2.5°S, 142°E
水深:3,448 m
索長:3,100.7m
ADCP:310.2m
(計算後)

DEPLOYMENT & RECOVERY

MOORING No. 01222 - 2S/142E

PROJECT	TOCS	TIME	UTC
AREA	Western Pacific	RECORDER (D) :	M. Hirano
POSITION	2.5S 142°E	RECORDER (R) :	
DEPTH	3443 m		
PERIOD		NAVIGATION SYSTEM :	WGS 84
No. of DAYS			
LENGTH :	m DEPTH of BUOY : m	BUOYANCY :	kg

ACOUSTIC RELEASERS

TYPE	Benthos (upper)		TYPE	Benthos (lower)	
S/N	662		S/N	691	
RECEIVE F.	13.0	kHz	RECEIVE F.	13.0	kHz
TRANSMIT F.	13.5	kHz	TRANSMIT F.	14.0	kHz
ENABLE C.	B		ENABLE C.	D	
RELEASE C.	A		RELEASE C.	C	
BATTERY	2years		BATTERY	2years	
TEST on DECK	OK		TEST on DECK	OK	

DEPLOYMENT

DATE	2001. Dec. 22	SHIP	KAIYO	CRUISE No.	KY01-11
WATHER	0	CONDITIONS	1.2 m	DIR. of WIND	305°(NW) VEL. of WIND 9.9 m/sec
DEPTH	3443 m	DEPTH of A.R.	3177.5m	DESCEND. RATE	2.48 m/s BUOY 03 : 31
POS. of START	02°29.4S	141°59.4E		HOR. RANGE	m
POS. of DEP.	02°28.8S	141°57.6E		ANCHOR	05 : 16 DISAPPEAR :
POS. of MOORING	02°28.7974S	141°57.7325E		LANDING	05 : 39

AANDERAA S/N 3806
スイッチ ON
2001. 12. 17
00:00:00 (UTC)

RECOVERY

DATE	SHIP		CRUISE No.
WATHER	CONDITIONS	DIR. of WIND	VEL. of WIND
START of RELEASE :	SENDING E.C. :		
SENDING R.C. :			
FINISH of RELEASE :			
DISTANCE from A.R. m	DISCOVERY ADCP :		

TIME RECORD

MOORING NO. 011222-2-5S142E

		DEPLOYMENT		RECOVERY (Date .)	
		START : 03:28		START :	
		FINISH : 05:16		FINISH :	
ITEM	S/N etc.	TIME	MEMO	TIME	MEMO
ADCP ADCP CTD	1224 1285	03:31	着水		
WIRE	50m	03:28~34			
ABS BUOY	2X3	03:34			
WIRE	200m	03:34~03:46			
KEVLER(KI-08)	100m	03:46~03:54			
GLASS BALL	3ps	03:55			
AANDERAA	3806	03:55			
CTD SBE37	1685	03:55			
KEVLER(KI-05)	74m	03:55~03:58			
KEVLER(KI0-20)	944m	03:58~04:20			
KEVLER(KI0-21)	947m	04:20~04:43			
KEVLER(K5-02)	462m	04:43~04:54			
KEVLER(KI-01)	74m	04:54~05:03			
GLASS BALL	12ps	05:05			
BENTHOS A.R.	662	05:06			
BENTHOS A.R.	691	05:06			
NYLON	185m	05:06~05:13			
ANCHOR		05:16			

AANDERAA S/N 3806
スイッチON 2001. 12 17
00:00:00 (UTC)

8. TRITON Moorings

8. TRITON Moorings

8.1 TRITON Mooring Operation

(1) Personnel

Toru Nakamura	(JAMSTEC): Scientist (on board Leg 2)
Yuji Kashino	(JAMSTEC): Scientist (on board Leg1, 2)
Yasushi Takatsuki	(JAMSTEC): Scientist (on board Leg1, 2)
Atsuo Ito	(MWJ): Technical staff
Masayuki Fujisaki	(MWJ): Operation Leader
Takeo Matsumoto	(MWJ): Technical staff
Hiroshi Matsunaga	(MWJ): Technical staff
Takayoshi Seike	(MWJ): Technical staff
Yuichi Sonoyama	(MWJ): Technical staff
Mizue Hirano	(MWJ): Technical staff
Yui Hashimoto	(NME): Technical staff

(2) Objectives

The large-scale air-sea interaction over the warmest sea surface temperature region in the western tropical Pacific Ocean called warm pool affects the global atmosphere and causes El Nino phenomena. The formation mechanisms of the warm pool and the air-sea interaction over the warm pool have not been well understood. Long-term data sets of temperature, salinity, currents, and so on have been required at fixed locations. In particular, the oceanic change due to the surface winds over the western tropical Pacific is important to study the relation with El Nino and rainfall over the ocean is also important parameter to study El Nino and Asia-Australian Monsoon. The TRITON program aims to obtain the basic data to improve the predictions of El Nino and variations of Asia-Australian Monsoon system.

TRITON buoy array is integrated with the existing TAO (Tropical Atmosphere Ocean) array, which is presently operated by the Pacific Marine Environmental Laboratory/National Oceanic and Atmospheric Administration of the United States. TRITON is a component of international research program of CLIVAR (Climate Variability and Predictability), which is a major component of World Climate Research Program sponsored by the World Meteorological Organization, the International Council of Scientific Unions, and the Intergovernmental Oceanographic Commission of UNESCO. TRITON will also contribute to the development of GOOS (Global Ocean Observing System) and GCOS (Global Climate Observing System).

The one TRITON buoy has been successfully recovered during this R/V Kaiyo cruise (KY01-11), deployed one TRITON buoy, and repaired one TRITON buoy.

(3) Measured parameters

Meteorological parameters:	wind speed, direction, atmospheric pressure, air temperature, relative humidity, radiation, precipitation.
Oceanic parameters:	water temperature and conductivity at 1.5m, 25m, 50m, 75m, 100m, 125m, 150m, 200m, 300m, 500m 750m, depth at 300m and 750m, currents at 10m.

(4) Instrument

1) CTD and CT

SBE-37 IM MicroCAT

A/D cycles to average : 4
Sampling interval : 600sec
Measurement range Temperature : -5～+35
Measurement range Conductivity : 0～+7
Measurement range Pressure : 0～full scale range

2) CRN(Current meter)

SonTek Argonaut ADCM

Sensor frequency : 1500kHz
Sampling interval : 1200sec
Average interval : 120sec

3) Meteorological sensors

Precipitation

SCTI ORG-115DX

Atmospheric pressure

PARPSCIENTIFIC. Inc. DIGIQUARTZ FLOATING BAROMETER 6000SERIES

Relative humidity/air temperature, Shortwave radiation, Wind speed/direction

Woods Hole Institution ASIMET

Sampling interval : 60sec
Data analysis : 600sec averaged

(5) Locations of TRITON Buoys

1) TRITON buoy deployed

Nominal location	EQ, 147E
ID number at JAMSTEC	09004
Number on surface float	T02
ARGOS PTT number	9793
ARGOS backup PTT number	11592
Deployed date	19 Dec. 2001
Exact location	00 - 01.32S, 146 - 59.54 E
Depth	4552 m

2) TRITON buoy recovered

Nominal location	EQ, 147E
ID number at JAMSTEC	09003
Number on surface float	T13
ARGOS PTT number	20434
ARGOS backup PTT number	24230
Deployed date	26 Oct. 2000
Recovered date	20 Dec. 2001
Exact location	0 - 03.72N, 147 - 00.71 E
Depth	4468 m

3) TRITON repaired

Nominal location	5N, 156E
ID number at JAMSTEC	02004
Number on surface float	T23
ARGOS PTT number	20417

ARGOS backup PTT number 24232

Deployed date	24 Feb. 2001
Repaired date	8 Dec. 2001
Exact location	05 - 01.33N, 155 - 58.25E
Depth	3608 m

(6) Details of deployed and repaired

We had deployed one TRITON buoy and repaired one TRITON buoy, described them details in the list.

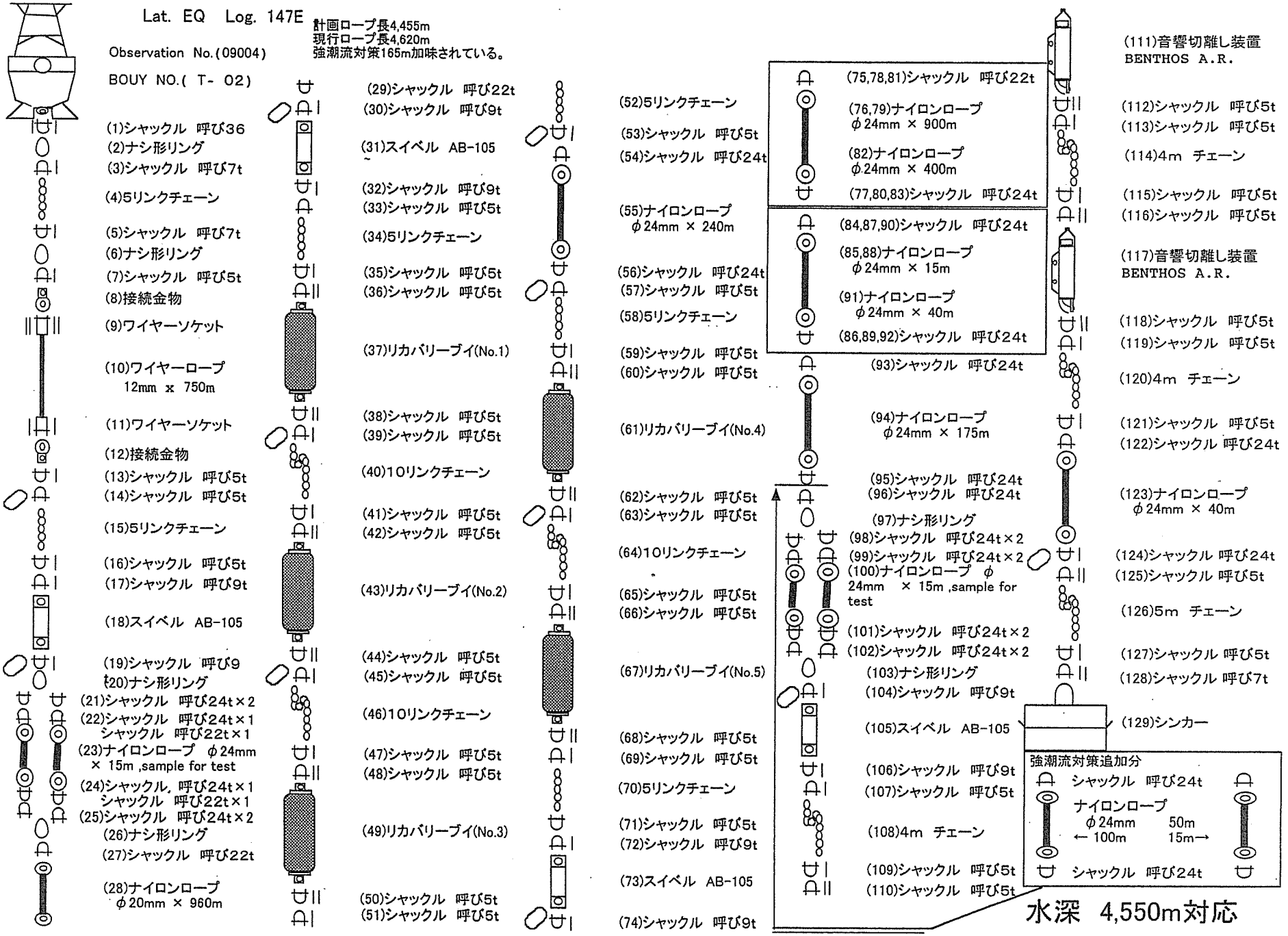
Deployed and Repaired TRITON buoys

Observation No.	Location.	Details.
02004	5N 156E	Changed ARGOS PTT
09004	EQ 147E	Deploy at full spec.

(7) Data archive

Those hourly averaged data transmitted through ARGOS satellite data transmission system in near real time. The real time data are provided to meteorological organizations via Global Telecommunication System and utilized for daily weather forecast. The data will be also distributed world wide through Internet from JAMSTEC and PMEL home pages. All data will be archived at JAMSTEC Mutsu Branch.

TRITON Homepage: http://www.jamstec.go.jp/jamstec/triton


Lat. EQ Log. 147E
計画ロープ長4,455m
現行ロープ長4,620m
強潮流対策165m加味されている。
Observation No.(09004)
BOUY NO.(T- 02)
(1)シャックル 呼び36
(2)ナシ形リング
(3)シャックル 呼び7t
(4)5リンクチェーン
(5)シャックル 呼び7t
(6)ナシ形リング
(7)シャックル 呼び5t
(8)接続金物
(9)ワイヤーソケット
(10)ワイヤーロープ 12mm x 750m
(11)ワイヤーソケット
(12)接続金物
(13)シャックル 呼び5t
(14)シャックル 呼び5t
(15)5リンクチェーン
(16)シャックル 呼び5t
(17)シャックル 呼び9t
(18)スイベル AB-105
(19)シャックル 呼び9t
(20)ナシ形リング
(21)シャックル 呼び24t×2
(22)シャックル 呼び24t×1
シャックル 呼び22t×1
(23)ナイロンロープ φ24mm × 15m ,sample for test
(24)シャックル, 呼び24t×1
シャックル 呼び22t×1
(25)シャックル 呼び24t×2
(26)ナシ形リング
(27)シャックル 呼び22t
(28)ナイロンロープ φ20mm × 960m
(29)シャックル 呼び22t
(30)シャックル 呼び9t
(31)スイベル AB-105
(32)シャックル 呼び9t
(33)シャックル 呼び5t
(34)5リンクチェーン
(35)シャックル 呼び5t
(36)シャックル 呼び5t
(37)リカバリーブイ(No.1)
(38)シャックル 呼び5t
(39)シャックル 呼び5t
(40)10リンクチェーン
(41)シャックル 呼び5t
(42)シャックル 呼び5t
(43)リカバリーブイ(No.2)
(44)シャックル 呼び5t
(45)シャックル 呼び5t
(46)10リンクチェーン
(47)シャックル 呼び5t
(48)シャックル 呼び5t
(49)リカバリーブイ(No.3)
(50)シャックル 呼び5t
(51)シャックル 呼び5t
(52)5リンクチェーン
(53)シャックル 呼び5t
(54)シャックル 呼び24t
(55)ナイロンロープ φ24mm × 240m
(56)シャックル 呼び24t
(57)シャックル 呼び5t
(58)5リンクチェーン
(59)シャックル 呼び5t
(60)シャックル 呼び5t
(61)リカバリーブイ(No.4)
(62)シャックル 呼び5t
(63)シャックル 呼び5t
(64)10リンクチェーン
(65)シャックル 呼び5t
(66)シャックル 呼び5t
(67)リカバリーブイ(No.5)
(68)シャックル 呼び5t
(69)シャックル 呼び5t
(70)5リンクチェーン
(71)シャックル 呼び5t
(72)シャックル 呼び9t
(73)スイベル AB-105
(74)シャックル 呼び9t
(75,78,81)シャックル 呼び22t
(76,79)ナイロンロープ φ24mm × 900m
(82)ナイロンロープ φ24mm × 400m
(77,80,83)シャックル 呼び24t
(84,87,90)シャックル 呼び24t
(85,88)ナイロンロープ φ24mm × 15m
(91)ナイロンロープ φ24mm × 40m
(86,89,92)シャックル 呼び24t
(93)シャックル 呼び24t
(94)ナイロンロープ φ24mm × 175m
(95)シャックル 呼び24t
(96)シャックル 呼び24t
(97)ナシ形リング
(98)シャックル 呼び24t×2
(99)シャックル 呼び24t×2
(100)ナイロンロープ φ24mm × 15m ,sample for test
(101)シャックル 呼び24t×2
(102)シャックル 呼び24t×2
(103)ナシ形リング
(104)シャックル 呼び9t
(105)スイベル AB-105
(106)シャックル 呼び9t
(107)シャックル 呼び5t
(108)4m チェーン
(109)シャックル 呼び5t
(110)シャックル 呼び5t
(111)音響切離し装置 BENTHOS A.R.
(112)シャックル 呼び5t
(113)シャックル 呼び5t
(114)4m チェーン
(115)シャックル 呼び5t
(116)シャックル 呼び5t
(117)音響切離し装置 BENTHOS A.R.
(118)シャックル 呼び5t
(119)シャックル 呼び5t
(120)4m チェーン
(121)シャックル 呼び5t
(122)シャックル 呼び24t
(123)ナイロンロープ φ24mm × 40m
(124)シャックル 呼び24t
(125)シャックル 呼び5t
(126)5m チェーン
(127)シャックル 呼び5t
(128)シャックル 呼び7t
(129)シンカー
強潮流対策追加分
シャックル 呼び24t
ナイロンロープ φ24mm
← 100m
50m
15m→
シャックル 呼び24t
水深 4,550m対応

TRITON BUOY Deployment&Recovery

Up date: 9 Mar. 2001

INFORMATION

Recorder _____

Buoy No. T 02 | PTT 9793 | Observation No. 09004

Latitude EQ ° | Longitude 147E ° | Water depth 4552 m

Period ~~TOCS~~ 19 Dec 2001 ~ _____ | Days 365 days

Deployment

Recorder _____

Project TOCS | Cruise No. KY01-11 | Ship KAIYO

Date 19 Dec. '01

Time 01:30

Weather bc

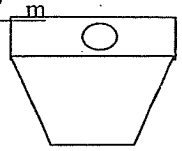
Wind Direction WNW °

Wind velocity 7.5 m/s

Sea conditions 1.5 m

Level Distance of between Floating Buoy and Releaser 1019 m

Floating Buoy level compared with sea surface 0.55m



Navigation system	Latitude	Longitude	Date	Time	Water Depth
Start Pos.(ship)	0 °-02.2796S	147°-02.0474E	19 Dec 01	01:30	4586 m
Sinker throw Pos.(ship)	0 °-01.1573S	146°-59.2188E	19 Dec 01	05:55	4540 m
Landing in Bottom Pos.(releaser)	0 °-01.3224S	146°-59.5413E	19 Dec 01	06:21	4454 (distance by SSBL) m
Deployment Pos.(releaser)	0 °-01.3224S	146°-59.5413E	19 Dec 01	06:21	4552 (by MNB) m
Floating Pos.(buoy)	0 °-01.56S	147°-00.03E	19 Dec 01	06:27	

Note

Installed Sensor

Recorder T. Matsumoto

Argos Transmiter

TOYOCOMM PTT: 11592

Floating Sensor S/N

RAN	3507
WND	334
SWR	328
HRH	326
BAR	81366
TMA	
CNR	98004
CNL	015, 016
option	

Underwater Sensor S/N

1.5m CT	1014
10m CRN	D42
25m CT	1024
50m CT	1040
75m CT	1046
100m CT	1064
125m CT	0663
150m CT	0665
200m CT	0669
250m CT	0821
300m CTD	0158
500m CT	0855
750m CTD	0160
Option	

Acoustic Releaser

	Upper	Lower
S/N	912	821
Type	865-A	865-A
Rec.Freq.	11.0 kHz	13.0 kHz
Trans. Freq.	14.0 kHz	13.5 kHz
Enable code	A	A
Release code	H	G
Battery	1year	1year
Test on deck	O.K.	O.K.

Down	Time	Distance
	05:59	972 m
	06:04	2084 m
	06:16	4030 m
	06:21	4552 m

Recovery

Recorder _____

Project _____ | Date _____

Cruise No. _____ | Time : | Get onto BUOY :

Ship _____ | Weather _____ | Acoustic Releaser Depth m

Sea conditions m | Enable code trasmitting :

Wind Direction ° | Release start :

Wind velocity m/s

Navigation system	Latitude	Longitude	Date	Time
Start Pos.(from sea)	°- .	°- .		:
Finish Pos.(Releaser on deck)	°- .	°- .		:

Note

Deploy&Recovery V1.4

TIME RECORD

No.

BUOY No.: T02	DEPLOYMENT	RECOVERY
PTT: 09793	DATE 2001/12/19	DATE
Observation No.: 09004	START 01:35	START
Position: E6, 147E	FINISH 05:55	FINISH
	Recorder A. ITO	Recorder

ITEM	S/N	etc	TIME	MEMO	TIME	MEMO
TRITON BUOY	T02		01:43~01:51			
CT-1.5m	1014		01:51			
WIRE	00A003		01:52~	01:56 再開		
CRN-10m	D42		01:48			
CT-25m	1024		01:36			
CT-50m	1040		01:57			
CT-75m	1046		01:58~02:02	2:10		
CT-100m	1064		02:02~02:07	3:35		
CT-125m	0663		02:08~02:12	3:15		
CT-150m	0665		02:12~02:15	1:55		
CT-200m	0667		02:16~02:21	3:30		
CT-250m	0821		02:21~02:24	2:00		
CTD-300m	0158		02:25~02:28	1:20		
CT-500m	0555		02:31~02:33	1:20		
CTD-750m	0160		02:56~03:11	1:20		
φ24mm 15m (B)	01-24-15-~~02~~		03:11 ~ 03:14			
φ20mm 10m (Sample)	~~99-20-10-08~~ 960-127-731		03:11 ~ 03:14			
φ20mm 960m	99-20-960-08		03:14~03:50	3:38 停止		
リカバリーブイ	708		03:47~03:50			
〃	849		〃			
〃	807		〃			
φ24mm. 40m	00-24-40-02		03:50~04:00			
リカバリーブイ	702		04:00~04:02			
〃	856		04:00~04:03			
φ24mm, 900m	99-24-900-16		04:03~04:31			
φ24mm, 900m	99-24-900-17		04:31~04:54			
φ24mm, 400m	01-24-400-01		04:54~05:02			
φ24mm. 175m	00-24-175-01		05:05~05:11	05:09 停止		
φ24mm. 100m	98-24-100-08		05:11~05:17	05:12 停止		
φ24mm, 50m	98-24-50-24		05:17~05:44	05:14 停止		
φ24mm, 15m	01-24-15-13		05:44~05:44			
φ24mm, 15m (B)	01-24-15-~~02~~		05:44~05:45			
φ24mm, 10m (Sample)	~~960-124-724~~	900-610-680				
リリーサー(U)	912		05:19~05:47			
リリーサー(L)	821		05:19~05:47			
φ24mm. 40m	00-24-40-08 ③	15m	01-24-15-10 ①, 15m 01-24-15-11 ②		05:02~05:05	
φ24mm. 40m	00-24-40-01	(アンカー重ロープ)	05:47~05:55			

01:52~01:55 ライフリリース取外し、仮置台右舷側へ移動

センサー取付は下から1~1.5mのところ

フェアリーダの取付スペースが不十分 (100, 125, 200)

02:36 ワイヤくり出しストップ

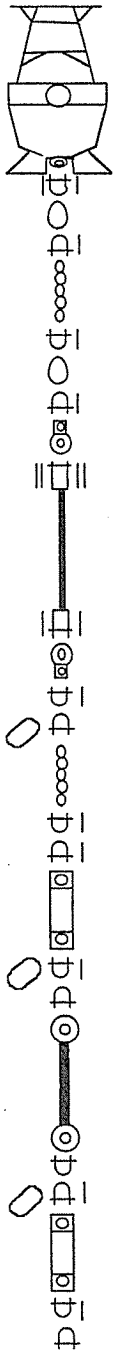
02:40 ワイヤ端末にナイロン接続開始 Time Record Ver1.1

02:43 〃 終了 アンカー投入 05:53~05:55

02:56 端末処理開始

03:07 〃 終了

03:11~03:14 クロスビットに960mナイロン掛ける



Lat. EQ Log. 147E

Observation No.(09003)

BOUY NO.(T- 13)

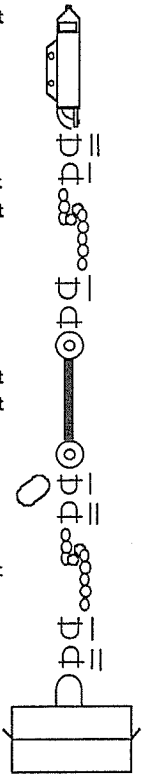
(1)シャックル 呼び36
(2)ナシ形リング
(3)シャックル 呼び7t
(4)5リンクチェーン
(5)シャックル 呼び7t
(6)ナシ形リング
(7)シャックル 呼び5t
(8)接続金物
(9)ワイヤーソケット
(10)ワイヤーロープ
12mm x 750m
(11)ワイヤーソケット
(12)接続金物
(13)シャックル 呼び5t
(14)シャックル 呼び5t
(15)5リンクチェーン
(16)シャックル 呼び5t
(17)シャックル 呼び9t
(18)スイベル AB-105
(19)シャックル 呼び9t
(20)シャックル 呼び22t
(21)ナイロンロープ
φ20mm × 960m
(22)シャックル 呼び22t
(23)シャックル 呼び9t
(24)スイベル AB-105
(25)シャックル 呼び9t
(26)シャックル 呼び5t

過去の実績
MR99-K01:4,268m対応 +25m(水深調整)
+25m(強潮流調整) 設置水深 4,307m

(27)5リンクチェーン
(28)シャックル 呼び5t
(29)シャックル 呼び5t
(30)リカバリーブイ(No.1)
(31)シャックル 呼び5t
(32)シャックル 呼び5t
(33)10リンクチェーン
(34)シャックル 呼び5t
(35)シャックル 呼び5t
(36)リカバリーブイ(No.2)
(37)シャックル 呼び5t
(38)シャックル 呼び5t
(39)10リンクチェーン
(40)シャックル 呼び5t
(41)シャックル 呼び5t
(42)リカバリーブイ(No.3)
(43)シャックル 呼び5t
(44)シャックル 呼び5t
(45)5リンクチェーン
(46)シャックル 呼び5t
(47)シャックル 呼び24t
(48)ナイロンロープ
φ24mm × 240m

過去の実績
MR99-K06:4,556m対応 +50m(強潮流調整)
設置水深 4,550m

(49)シャックル 呼び24t
(50)シャックル 呼び5t
(51)5リンクチェーン
(52)シャックル 呼び5t
(53)シャックル 呼び5t
(54)リカバリーブイ(No.4)
(55)シャックル 呼び5t
(56)シャックル 呼び5t
(57)10リンクチェーン
(58)シャックル 呼び5t
(59)シャックル 呼び5t
(60)リカバリーブイ(No.5)
(61)シャックル 呼び5t
(62)シャックル 呼び5t
(63)5リンクチェーン
(64)シャックル 呼び5t
(65)シャックル 呼び9t
(66)スイベル AB-105
(67)シャックル 呼び9t
(68)シャックル 呼び24t
(69)ナイロンロープ
φ24mm × 900m
(70)シャックル 呼び24t
(71)シャックル 呼び24t
(72)ナイロンロープ
φ24mm × 900m
(73)シャックル 呼び24t
(74)シャックル 呼び24t
(75)ナイロンロープ
φ24mm × 175m
(76)シャックル 呼び24t
(77)シャックル 呼び24t
(78)ナイロンロープ
φ24mm × 420m
(79)シャックル 呼び24t
(80)シャックル 呼び9t
(81)スイベル AB-105
(82)シャックル 呼び9t
(83)シャックル 呼び5t
(84)4m チェーン
(85)シャックル 呼び5t
(86)シャックル 呼び5t
(87)音響切離し装置
BENTHOS A.R.
(88)シャックル 呼び5t
(89)シャックル 呼び5t
(90)4m チェーン
(91)シャックル 呼び5t
(92)シャックル 呼び5t



(93)音響切離し装置
BENTHOS A.R.
(94)シャックル 呼び5t
(95)シャックル 呼び5t
(96)4m チェーン
(97)シャックル 呼び5t
(98)シャックル 呼び24t
(99)ナイロンロープ
φ24mm × 40m
(100)シャックル 呼び24t
(101)シャックル 呼び5t
(102)5m チェーン
(103)シャックル 呼び5t
(104)シャックル 呼び7t
(105)シンカー

水深 4,480m対応

TRITON BUOY Deployment&Recovery

INFORMATION Recorder M.Fujisaki

Buoy No. T 13 PTT 20434 07961 Observation No. 09003

Latitude 0 ° Longitude 147E° Water depth 4468 m ミーバーの値

Period 26 Oct 2000 ~ Days days

Deployment Recorder M.Fujisaki

Project TOCS Cruise No. MR00-K07 Ship MIRAI

Date 26 Oct 2000

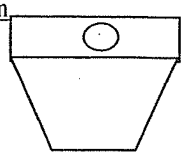
Time 22:56 Level Distance of Floating Buoy between Releaser 740 m

Weather BC

Wind Direction 328 ° Floating Buoy level compared with sea surface 60~65 cm

Wind velocity 4.6 m/s

Sea conditions 1.2 m



Navigation system WGS84	Latitude	Longitude	Date	Time	Water Depth
Start Pos.(ship)	00 °-00.45N	146 °-59.18E	26 Oct 2000	22 :56	m
Sinker throw Pos.(ship)	00 °-03.89N	146 °-00.84E	26 Oct 2000	02 :08	4465 m
Landing in Bottom Pos.(releaser)	00 °-03.72N	147 °-00.71E	27 Oct 2000	02 :33	4468 m
Floating Pos.(buoy)	00 °-03.38N	147 °-00.52E		:	

Note
強潮流対策 ロープ x100m 1本 追加. 予板アンテナ S/N 002→010 に交換 (設置後作業報告)
10/27 23:08~10/28 00:17 衛星通信容器交換 T13E → T25E (PTT07961) (PTT20434)

Installed Sensor Recorder T.Matsumoto

Argos Transmiter: TOYOCOMM PTT: 24230

Floating Sensor S/N

RAN	3512
WND	99237
SWR	321
HRH	98322
BAR	98 71345
TMA	00002
CNR	013
CNL	0017, 0018
option	

Underwater Sensor S/N

1.5m CT	970/88
10m CRN	990149
25m CT	991070
50m CT	970202
75m CT	991081
100m CT	980541
125m CT	980525
150m CT	980568
200m CT	980652
250m CT	980587
300m CTD	980492
500m CT	980589
750m CTD	980620
Option	

Acoustic Releaser

	Upper	Lower
S/N	855	866
Type		
Rec.Freq.	11.0 kHz	13.0 kHz
Trans. Freq.	14.5 kHz	14.0 kHz
Enable code	A	A
Release code	D	H
Battery		
Test on deck	O.K.	o.k.

Time	Distance
02 :29	4000 m
02 :30	4300 m
02 :33	着底(4383)m
:	m

Recovery Recorder Fujisaki

Project TOCS Date 20 Dec 2001

Cruise No. KY01-11 Time 03:50 Get onto BUOY 00 :00

Ship KAIYO Weather r Acoustic Releaser Depth 4498 m

Sea conditions 1.9 m Enable code trasmitting 22 :41

Wind Direction WNW ° Release start 22 :47

Wind velocity 6.7 m/s

Navigation system WGS84	Latitude	Longitude	Date	Time
Start Pos.(from sea)	00 °-04.29N	147 °-00.82E	12/19	23 :48
Finish Pos.(Releaser on deck)	00°-07.72N	147 °-00.75E	12/20	03 :50

Note

Deploy&Recovery V1.2

TIME RECORD

No.

BUOY No.: T13	DEPLOYMENT	RECOVERY
PTT: 07961	DATE 26. Oct. 2000	DATE 19. Dec. 2001
Observation No.: 09003	START 22:56	START 23:22
Position: 0-147E	FINISH 02:08	FINISH 03:52
	Recorder A.ITO	Recorder A.ITO

ITEM	S/N	etc	TIME	MEMO	TIME	MEMO
TRITON BUOY			23:07		23:48~00:00	
CT-1.5m	970188		23:07		23:48	
WIRE			22:56~23:56	23:09 再出	23:51~01:46	00:56 再揚
CRN-10m	99D149		23:02		23:52~01:03	
CT-25m	1070		22:56		01:04~01:06	
CT-50m	0202		22:57		01:12~01:15	
CT-75m	1081		23:10		01:15~01:18	
CT-100m	0541		23:14	75	01:19~01:20	
CT-125m	0525		23:20	70	01:21~01:23	60
CT-150m	0568		23:21	80	01:24~01:26	45
CT-200m	0652		23:30	(修理)	01:27~01:29	35
CT-250m	0587		23:34	85	01:30~01:32	50
CTD-300m	0492		23:39	〃	01:33~01:35	60
CT-500m	980589		23:47	70	01:39~01:42	
CTD-750m	980620		00:23	75	01:46~01:53	
NYLON φ						
φ20×960m	96004		00:23~00:33		01:53~02:29	02:06 再浮上
リカバリーブイ	713		00:44		02:32	
〃	848		〃		02:34	
〃	858		〃		〃	
φ24×240m	24006		00:44~00:47		02:34~02:48	
リカバリーブイ	901		00:51		02:48~02:52	
〃	812		〃		02:48~02:52	
φ24×900m	90004		00:51~01:06		02:48~03:10	02:58~
φ24×900m	90009		01:09~01:21		03:10~03:27	03:19~
φ24×175m	17505		01:27~01:30		03:35~03:40	
φ24×420m	42001		01:32~01:41		03:40~03:49	
リリーサー	98855		01:49		03:49~03:52	
〃	98866		〃		03:49~03:52	
φ24×40m	9924014		01:49~01:50			
アンカー			02:08			
φ24×100m	2410005		01:25~01:27		03:27~03:35	03:35~

ブイ吊上 22:58　01:55~02:05 航走

23:22 CT200 修理 (白のテルリに部分交換) 23:27

ブイ端末電極取付

00:01~00:15

00:23 ブイ端末水没

23:02 リカバリー浮上

23:18 引き寄せ索を作業艇に

23:21 ブイに索取付　23:29 作業艇揚収

22:13 作業艇からブイに移る　22:47 リリースコード送信

22:41 Enable コード送信 (WIND OFF)

22:42 2回目 Enable 送信

22:17~24 切り戻し石確認

8.2 Intercomparison between shipboard CTD and TRITON data

(1) Personnel

Kentaro Ando	(JAMSTEC): not on board
Takeo Matsumoto	(MWJ): on board Leg1,Leg2
Tetsuya Nagahama	(MWJ): not on board

(2) Objectives

TRITON CTD data validation.

(3) Measured parameters

- Temperature
- Conductivity
- Pressure

(4) Methods

TRITON buoy underwater sensors are equipped along wire cable of buoy below sea surface. We used the same CTD system with general CTD observation (See section 4.2) by R/V KAIYO for this intercomparision. We conducted 1 CTD casts at each TRITON buoy site. The cast was performed immediately after the deployment and before recovery. R/V KAIYO was kept the distance from the TRITON buoy within 1 nm.

TRITON buoy data was sampled every 1 hour except and transmitted to the ship. We compared CTD observation by R/V KAIYO data with TRITON buoy data using the 1 hour averaged value.

As our temperature sensors are expected to be more stable than conductivity sensors, conductivity data and salinity data are the same selected at the temperature data. Then, we calculated difference of salinity and conductivity between KAIYO CTD and TRITON buoy for each deployment and recover.

(5) Results

Most of temperature, conductivity and salinity data from TRITON buoy showed good agreement with CTD cast data. See the attached figures (fig.8.2-1).

To estimate of conductivity sensors on TRITON buoy, the data from deployed buoy and ship board CTD data at the same location were analysed. The estimation were calculated as deployed buoy data minus ship board CTD(9Plus) data. The salinity differences are –0.353 from 0.161 psu for all depths. But −0.353 and −0.201 are disregarded on account of bad data. Below 300db, salinity differences are −0.023 from −0.002 psu (See the attached figures fig 8.2-2 and table table.8.2-1). The average of salinity differences was 0.001 with standard deviation of 0.043 psu.

(6) Data archive

All of raw and processed CTD data files were copied into 3.5 inch magnetic optical disks and submitted to JAMSTEC Data Management Office. All original data will be stored at JAMSTEC Mutsu brunch.

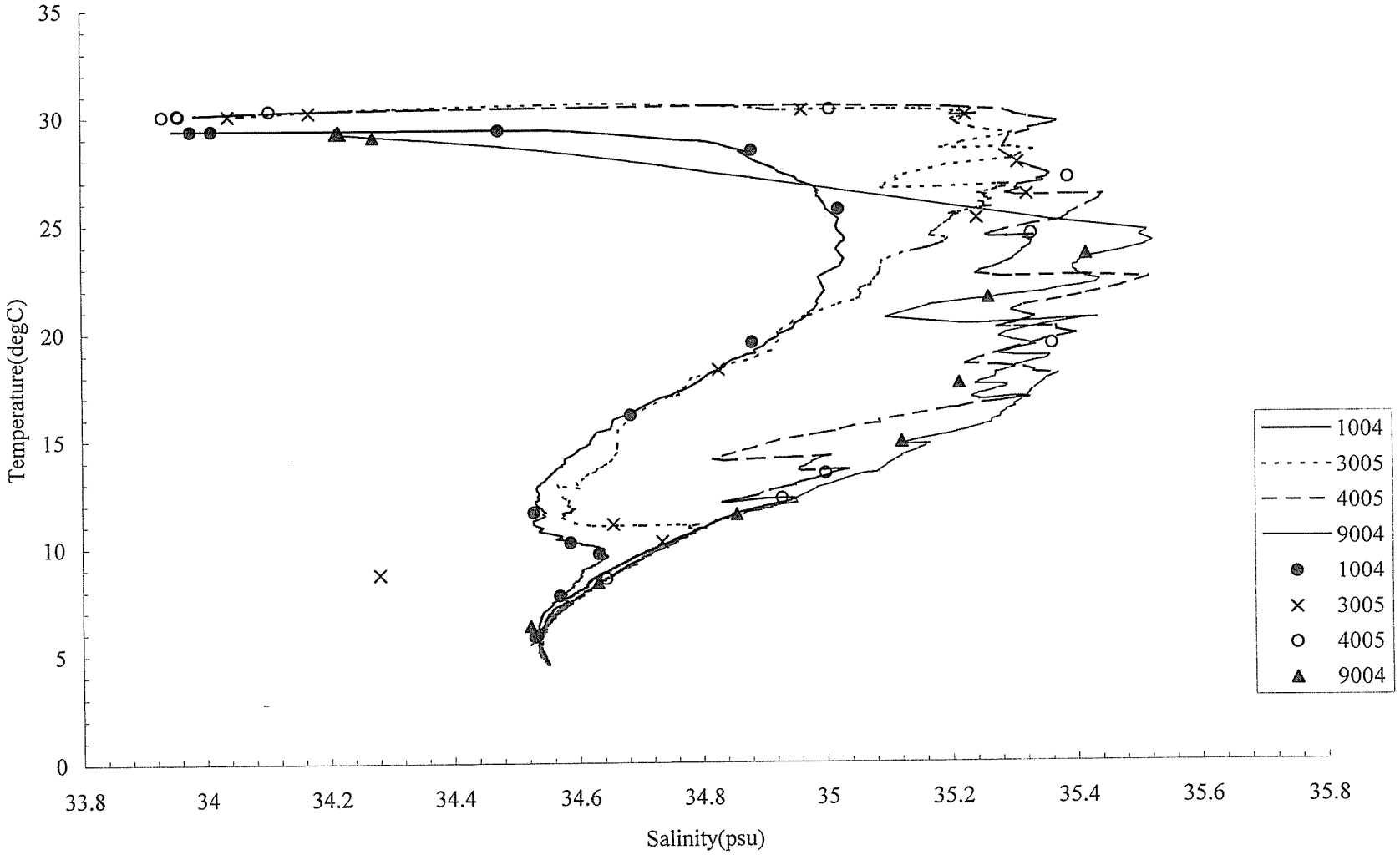


fig.8.2.-1 T-S diagram (TRITON buoys data and ship board CTD(9Plus) data)

Table 8.2.-1 Data differences between TRITON buoys data and ship board CTD(9Plus) data

Observation No.	Pressure (db)	Temperature (degC)	Conductivety (S/m)	Salinity (psu)
1004	1.5	-0.01	0.003	0.029
1004	25	0.00	0.009	0.061
1004	50	0.00	0.023	0.161
1004	75	-0.02	0.000	0.020
1004	100	0.00	0.003	0.019
1004	125	-0.06	-0.010	-0.026
1004	150	-0.12	-0.012	-0.002
1004	200	0.00	-0.002	-0.017
1004	250	0.00	0.000	-0.002
1004	300	0.00	-0.001	-0.010
1004	500	0.00	-0.001	-0.006
1004	750	0.00	0.000	-0.006
3005	1.5	-0.01	-0.004	-0.016
3005	25	-0.06	-0.005	0.013
3005	50	0.01	0.008	0.056
3005	75	0.00	0.001	0.011
3005	100	-0.12	-0.009	0.034
3005	125	0.01	0.009	0.065
3005	150	-0.02	0.002	0.039
3005	200	-0.02	-0.002	-0.004
3005	250	0.02	-0.013	-0.139
3005	300	-0.01	-0.003	-0.016
3005	500	0.00	-0.031	-0.353
3005	750	0.00	0.000	-0.003
4005	1.5	-0.05	-0.014	-0.054
4005	25	-0.02	-0.006	-0.027
4005	50	0.00	-0.006	-0.035
4005	75	0.00	-0.013	-0.081
4005	100	-0.07	-0.039	-0.201
4005	125	-0.02	0.002	0.033
4005	150	0.01	0.010	0.065
4005	200	-0.14	-0.013	0.015
4005	250	0.03	0.002	-0.009
4005	300	0.00	-0.001	-0.006
4005	500	0.00	0.000	-0.002
4005	750	0.00	0.000	-0.008
9004	1.5	-0.03	-0.004	0.005
9004	25	0.01	0.002	0.010
9004	50	0.00	-0.001	0.002
9004	75	0.00	0.000	0.009
9004	100	0.02	-0.002	-0.020
9004	125	0.02	-0.002	-0.029
9004	150	-0.02	-0.004	-0.014
9004	200	-0.04	-0.007	-0.032
9004	250	-0.02	-0.004	-0.017
9004	300	0.01	-0.001	-0.008
9004	500	-0.01	-0.001	-0.005
9004	750	0.00	-0.002	-0.023

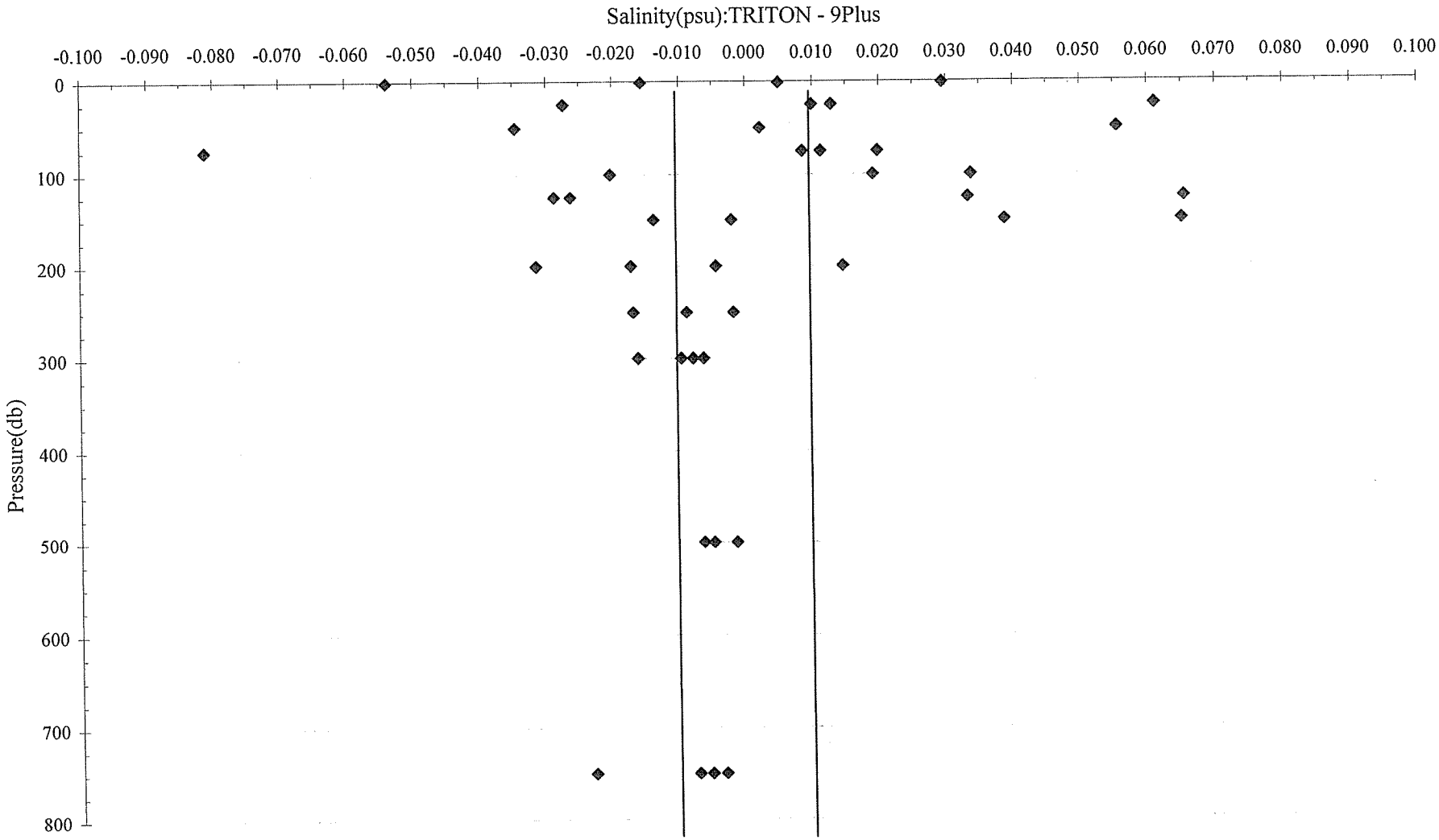


fig.8.2.-2 Salinity differences between TRITON buoys data and ship board CTD(9Plus) data

Appendices

Time Table of TOCS KY01-11 Cruise (Time in this table is that used in R/V Kaiyo.)

Nov.29 (Thu.) Cloudy

12:00	Departure from Yokosuka (Leg 1)

Nov.30 (Fri.) Fine / Cloudy

09:00	Meeting on observations

Dec.1 (Sat.) Fine / Cloudy

	Cruise to 24N,156E

Dec.2 (Sun.) Fine / Cloudy

13:15	Release ARGO float #1 (23-51.00N, 150-04.10E)
13:30	Release ARGO float #2 (23-50.22N, 150-04.39E)
13:44	Release ARGO float #3 (23-51.34N, 150-04.56E)
13:56 - 15:12	CTD at St.001 (23-51N, 150-05E)
15:47	XCTD at St.001 (23-47N, 150-07E)

Dec.3 (Mon.) Cloudy

09:00 - 10:00	Boat and fire drill

Dec.4 (Tue.) Fine / Cloudy

	Cruise to TRITON #1 (8N,156E)

Dec.5 (Wed.) Fine / Cloudy

00:00	Ship mean time adjustment (SMT=UTC+9h -> +10h)
10:51 - 15:15	Acoustic releaser test at 11-10N,154-43E

Dec.6 (Thu.) Cloudy

09:57	Arrive at TRITON buoy #1 (8N, 156E)
	(We could not repair it because of rough sea state.)
10:16 - 10:48	CTD at St.002 (8-00N, 156-00E)

Dec.7 (Fri.) Fine / Cloudy

10:41	XCTD at St.003 (7-30N, 156-00E)
13:32	XCTD at St.004 (7-00N, 156-00E)

16:05 XCTD at St.005 (6-30N, 156-00E)
18:44 XCTD at St.006 (6-00N, 156-00E)
21:32 XCTD at St.007 (5-30N, 156-00E)

Dec.8 (Sat.) Rainy
06:03 – 13:09 Repair TRITON buoy #2 (5N, 156E)
10:15 - 10:47 CTD at St.008 (5-00N, 156-00E)
17:04 XCTD at St.009 (4-30N, 156-00E)
19:55 XCTD at St.010 (4-00N, 156-00E)
22:43 XCTD at St.011 (3-30N, 156-00E)

Dec.9 (Sun.) Cloudy
01:27 XCTD at St.012 (3-00N, 156-00E)
04:08 XCTD at St.013 (2-30N, 156-00E)
06:30 Arrive at TRITON #3 (2N, 156E) and check it
08:02 - 08:31 CTD at St.014 (2-00N, 156-00E)
11:24 XCTD at St.015 (1-30N, 156-00E)
14:09 - 15:03 Acoustic releaser test at 1-00N,156-00E
15:10 XCTD at St.016 (1-00N, 156-00E)
17:43 XCTD at St.017 (0-30N, 156-00E)
20:30 Arrive at TRITON #4 (0N, 156E)
(We could not repair it because of rough sea state.)

Dec.10 (Mon.) Rainy
07:35 - 08:05 CTD at St.018 (0-00N, 156-00E)

Dec.11 (Tue.) Cloudy
Cruise to Kavieng

Dec.12 (Wed.) Cloudy
09:00 Arrive at Kavieng
Fueling

Dec.13 (Thu.) Cloudy
14:40 Departure from Kavieng (Leg 2)
Cruise to TRITON #4

Dec.14 (Fri.) Cloudy

09:00 Meeting

19:45 Arrive at TRITON buoy #4 (0N, 156E)

(We could not repair it because of rough sea state.)

Dec.15 (Sat.) Cloudy

12:28 – 13:14 CTD and water sampling at St.019 (0-00N, 156-00E)

20:00 XCTD at St.020 (0-00N, 155-00E)

Dec.16 (Sun.) Cloudy

02:19 XCTD at St.021 (0-00N, 154-00E)

08:25 XCTD at St.022 (0-00N, 153-00E)

14:14 XCTD at St.023 (0-00N, 152-00E)

20:03 XCTD at St.024 (0-00N, 151-00E)

Dec.17 (Mon.) Rainy

01:57 XCTD at St.025 (0-00N, 150-00E)

07:44 XCTD at St.026 (0-00N, 149-00E)

13:55 XCTD at St.027 (0-00N, 148-00E)

Dec.18 (Tue.) Fine / Cloudy

08:13 – 10:14 Recover ADCP buoy at 0N, 147E

13:03 – 15:17 Deploy ADCP buoy

Dec.19 (Wed.) Fine / Cloudy

11:30 – 15:54 Deploy TRITON Buoy #9 (0N, 147E)

18:37 – 19:24 CTD at St.028 (0-00N, 147-00E)

Dec.20 (Thu.) Cloudy

08:08 – 13:50 Recover TRITON Buoy #9

Dec.21 (Fri.) Fine / Cloudy

00:00 Ship mean time adjustment (SMT=UTC+10h -> +9h)

Cruise to 2-30S, 142-00E

Dec.22 (Sat.) Rainy / Cloudy

06:04 – 06:43 CTD and water sampling at St.029 (2-43S, 142-00E)
08:17 – 10:23 Recover ADCP Buoy at 2-30S, 142-00E
12:28 – 10:23 Deploy ADCP Buoy
15:32 – 16:20 CTD and water sampling at St.030 (2-30S, 142-00E)
19:20 – 20:02 CTD and water sampling at St.031 (2-00S, 142-00E)
22:58 – 23:43 CTD and water sampling at St.032 (1-30S, 142-00E)

Dec.23 (Sun.) Fine / Cloudy

02:39 – 03:19 CTD and water sampling at St.033 (1-00S, 142-00E)
06:09 – 06:50 CTD and water sampling at St.034 (0-30S, 142-00E)
09:37 – 10:23 CTD and water sampling at St.035 (0-00N, 142-00E)
13:09 – 13:50 CTD and water sampling at St.036 (0-30N, 142-00E)
16:32 – 17:12 CTD and water sampling at St.037 (1-00N, 142-00E)
19:58 – 20:37 CTD and water sampling at St.038 (1-30N, 142-00E)
23:22 – 24:00 CTD and water sampling at St.039 (2-00N, 142-00E)

Dec.24 (Mon.) Fine / Cloudy

02:46 – 03:25 CTD and water sampling at St.040 (2-30N, 142-00E)
06:08 – 06:46 CTD and water sampling at St.041 (3-00N, 142-00E)
09:25 – 10:07 CTD and water sampling at St.042 (3-30N, 142-00E)
12:38 – 13:20 CTD and water sampling at St.043 (4-00N, 142-00E)
15:56 – 16:36 CTD and water sampling at St.044 (4-30N, 142-00E)
19:23 – 20:00 CTD and water sampling at St.045 (5-00N, 142-00E)

Dec.25 (Tue.) Fine / Cloudy

Cruise to Koror

Dec.26 (Wed.) Cloudy

Cruise to Koror
15:00 Meeting

Dec.27 (Thu.) Cloudy / Rainy

09:00 Arrive at Koror