

Preliminary Report
of
The Hakuho Maru Cruise KH-84-2

June 20-July 31, 1984

The East China Sea

Ocean Research Institute

University of Tokyo

1988

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by

The Scientific Members of the Expedition

Edited by

Toshiyuki Hirano

PREFACE

This cruise was conducted in and around the Kuroshio from the East China Sea to the south of Japan during June 20-July 31 in 1984, following the previous cruise of KH-81-1. The main purpose of this cruise was to clarify the structure of oceanographic environment and its relation to the distribution of marine organisms. The emphasis was placed on fisheries oceanographical aspects with special references to the processes of transport of fish eggs and larvae which seemed to be closely related with year-to-year fluctuations in the abundance of marine fish resources.

The shelf-break area of the East China Sea is one of the biggest spawning ground of the pelagic fish. The fish eggs and larvae are entrained by the Kuroshio and carried towards downstream nursery grounds in the coastal waters north and south of Japan. In the entrainment process, disturbances in the Kuroshio front may have a great importance. The structures and their effects on the material exchange were studied multi-disciplinarily.

This report contains mainly hydrographical data obtained by each scientist aboard. This cruise was conducted also as one of the training course of the ocean science in the WESTPAC program and two scientists from Thailand and Malaysia participated.

On behalf of the scientists aboard, I would like to express our sincere thanks to I. Tadama, officers and all the crew of the R. V. Hakuho-Maru for their cooperation and support throughout this cruise.

Dec. 1987 Toshiyuki Hirano

Chief Scientist

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Outline of the Cruise

The cruise consisted of three legs as shown in Table 1 and Fig. 1. Leg I was from Tokyo to Naha, leg II was from Naha to Pusan, and leg III was from Pusan to Tokyo. The names and specialities of 31 scientists who participated in this cruise are listed in Table 2.

The following research items were investigated in and around the Kuroshio from the East China Sea to the south of Japan during summer season :

- (1) Distribution and transport of fish eggs and larvae in the East China Sea are observed laying stress on the Kuroshio front.
- (2) Distribution of fish populations is observed by use of scientific echo sounder.
- (3) Three dimensional oceanographic structures of the Kuroshio front and their fluctuations are studied by hydrographic observations and moored current meter.

Table 1. Cruise itinerary

	<u>Arrival</u>	<u>Departure</u>
Tokyo	-----	June 20, 14:00
Naha	July 9, 10:00	July 12, 08:00
Pusan	July 16, 10:00	July 20, 14:00
Tokyo	July 31, 10:00	-----

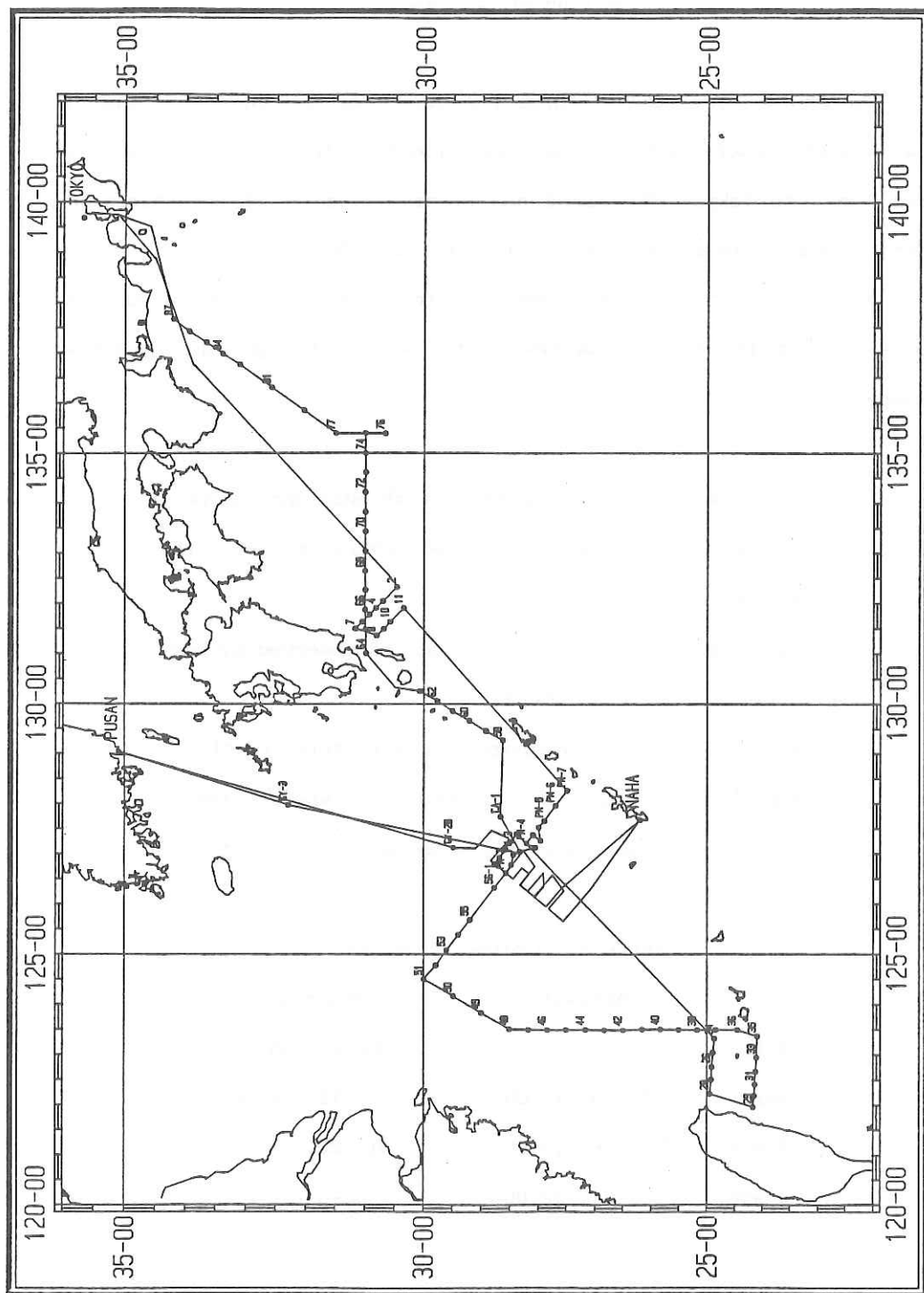


Fig. 1 Track chart of the KH-84-2 cruise of the Hakuho Maru.

Table 2. Scientists aboard

Toshiyuki HIRANO	Ocean Res. Inst., Univ. of Tokyo
Chief Scientist	
Tsuneo AOYAMA	Ocean Res. Inst., Univ. of Tokyo
Muneo OKIYAMA	Ocean Res. Inst., Univ. of Tokyo
Takashige SUGIMOTO	Ocean Res. Inst., Univ. of Tokyo
Toshisuke NAKAI	Ocean Res. Inst., Univ. of Tokyo
Hiroshi MUKAI	Ocean Res. Inst., Univ. of Tokyo
Ichiro AOKI	Ocean Res. Inst., Univ. of Tokyo
Hideaki NAKATA	Ocean Res. Inst., Univ. of Tokyo
Ken FURUYA	Ocean Res. Inst., Univ. of Tokyo
Yoh YAMASHITA	Ocean Res. Inst., Univ. of Tokyo
Hiroko SHIMIZU	Ocean Res. Inst., Univ. of Tokyo
Tadashi INAGAKI	Ocean Res. Inst., Univ. of Tokyo
Hideo NAGAE	Ocean Res. Inst., Univ. of Tokyo
Ikuo HAYASHI	Ocean Res. Inst., Univ. of Tokyo
Sachiko TSUJI	Ocean Res. Inst., Univ. of Tokyo
Chung-Hui CHEN	Ocean Res. Inst., Univ. of Tokyo
Lei-zong CHENG	Ocean Res. Inst., Univ. of Tokyo
Nobuhito HOSAKA	Ocean Res. Inst., Univ. of Tokyo
Shingo KIMURA	Ocean Res. Inst., Univ. of Tokyo
Kenichi ISHIDA	Ocean Res. Inst., Univ. of Tokyo
Satoru TAWARA	Shimonoseki Univ. of Fisheries
Tetsuo YANAGI	Fac. of Engineering, Univ. of Ehime
Katsumi MATSUSHITA	Fac. of Agriculture, Univ. of Tokyo
Hiroshi ICHIKAWA	Fac. of Fisheries, Univ. of Kagoshima
Tooru YAMASHITA	Fac. of Engineering, Univ. of Kagoshima
Kazunori KURODA	Tokai Reg. Fish. Res. Lab.
Kuniaki MIYAJI	Seikai Reg. Fish. Res. Lab.
Yoshimi SUZUKI	Meteorological Res. Inst.
Yoshito TSUJI	Japan Marine Science and Technology Center
Apichart TERMVIDCHAKORN	Exploratory Division Fisheries Dept. Thailand
Din ZUBIR	School of Biological Sciences. Malaysia

1. Hydrographic Structures of the Kuroshio Front and Their Variations

T. Sugimoto, K. Miyaji and S. Kimura

To investigate water exchange processes between the Kuroshio and the shelf water, hydrographic structures of the front and their variations were observed in the East China Sea, north-west of Naha of Okinawa Island, during June 25 - July 24 in 1984. Fig.2 A and B show sections of water temperature and salinity along PN-line across the Kuroshio. To describe three-dimensional spatial structures of the front, quick grid surveys of six lateral sections along the Kuroshio front were done twice with CTD, XBT and surface ST meter. Fig.3 A and B show horizontal distributions of water temperature, salinity and $\Delta \sigma_t$ at the depth of 100 m during July 7-8 and July 12-14, respectively. The wave length and the amplitude of the frontal-disturbance was about 300-400 km and 5-10 km, respectively. The wavy structure propagated about a half of the wave length in 5-7 days. Longer term variation of about 20 days was also investigated by the hydrographic observations which repeated five times every 5-10 days in a specified lateral section (PN-line), whose results are shown in Fig.4. To obtain information on the short-term variations of the front due to tide, hydrographic structures in the PN section were observed six times repeatedly every six hours. The results are shown in Fig.5, which indicate the amplitude of the day-to-day variation is much larger than that of the diurnal and the semi-diurnal variations.

Infrared thermal images of the same area, which were taken in another season with satellite AVHRR, also showed that the wave lengths of the dominant frontal disturbance of about 350 km and 1/3 - 1/2 of it.

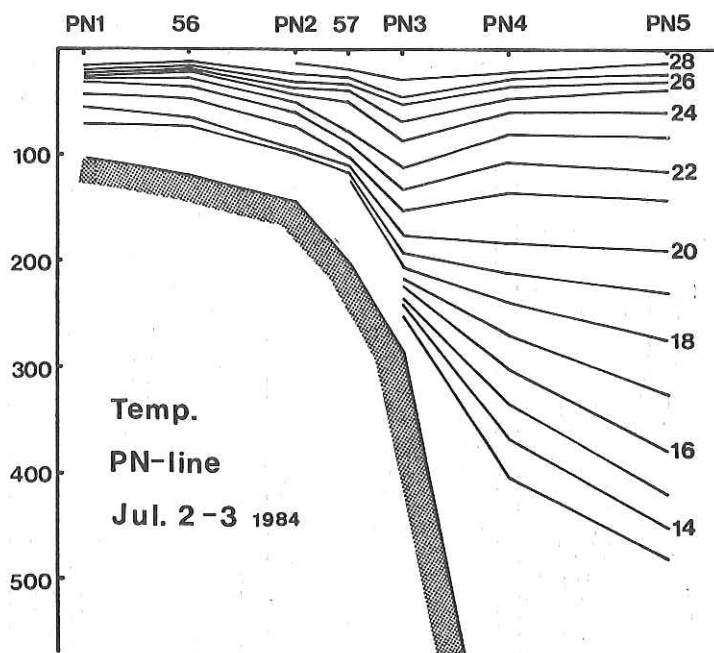


Fig. 2A

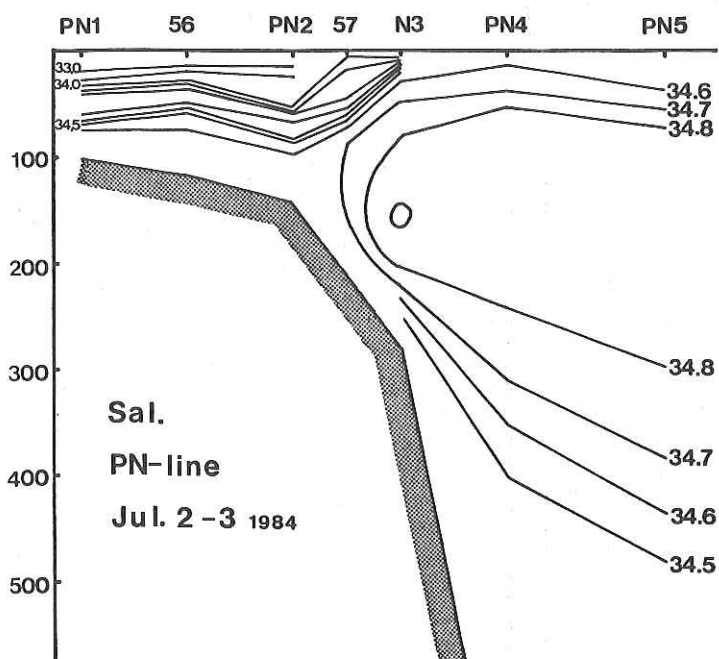


Fig. 2B

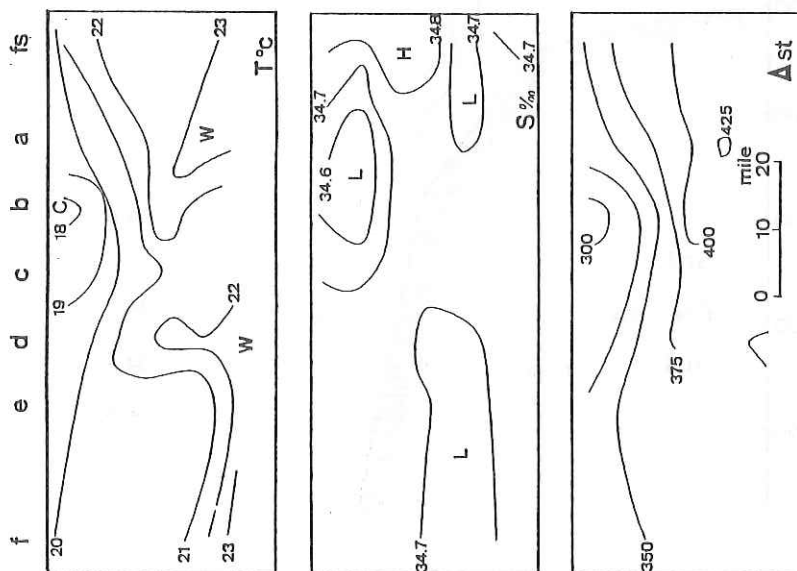


Fig. 3A

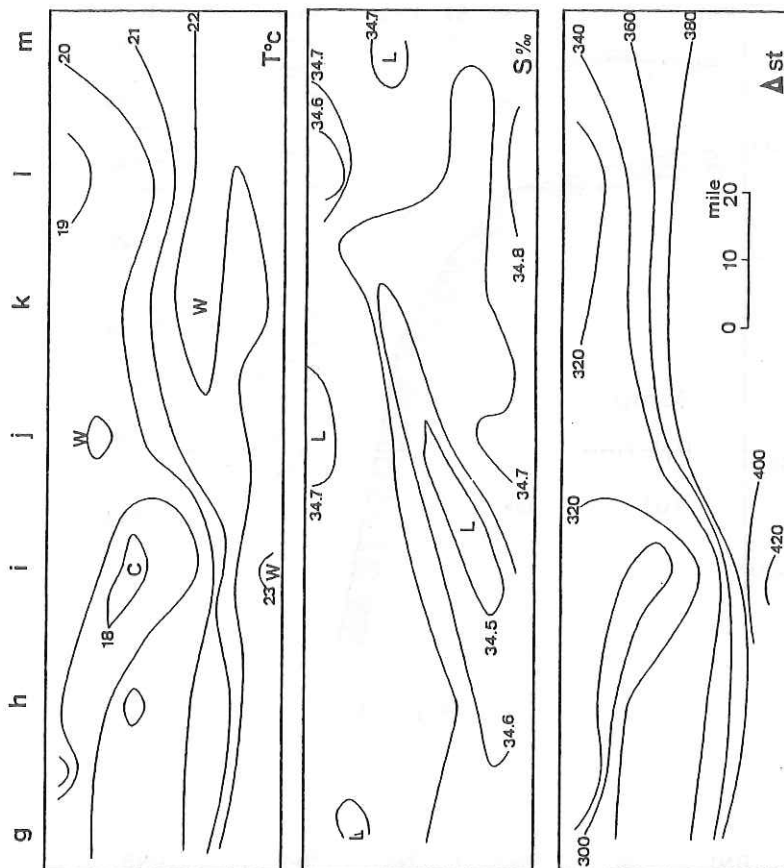


Fig. 3B

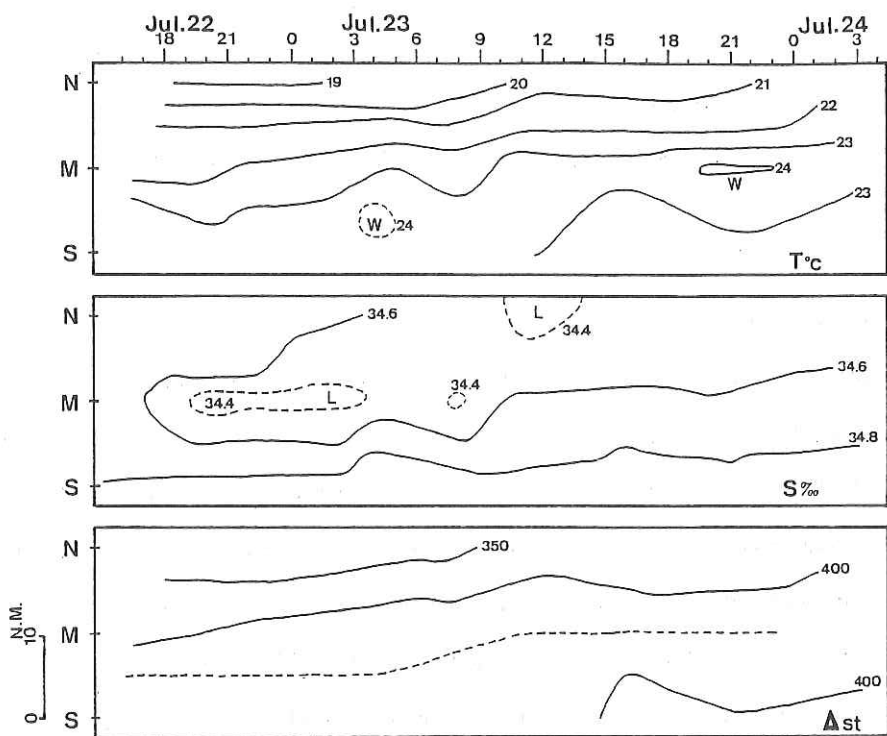


Fig. 4

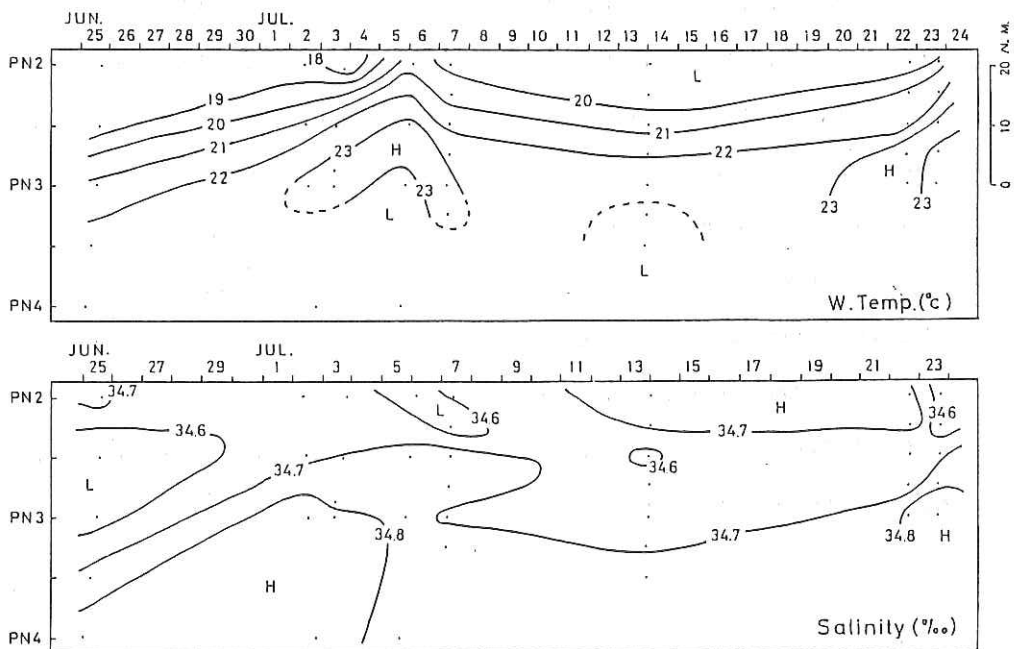


Fig. 5

2. Direct Current Observation with Moored Current Meters

in the Kuroshio and at the shelf-break

T. Sugimoto, K. Miyaji, H. Nagae and S. Kimura

To investigate fluctuations of the Kuroshio front, four mooring systems with two current meters were deployed at the shelf-break and on the continental slope in the East China Sea, northwest of Naha of Okinawa Island, during June 25 - July 22 in 1984. Two mooring systems (S-1, T-1) were set at the depth of about 800 m depth on the slope (under the Kuroshio), which were separated about 30 km along stream direction each other. Another two systems (S-2, T-2) were set at the depth of about 300 m near the shelf-break. The mooring systems and their mooring sites were shown in Fig.6 and Fig.7, respectively. Latitude and longitude of the mooring sites were as followings,

S-1 ($28^{\circ}-18.5'N$, $127^{\circ}-04.1'E$), S-2 ($28^{\circ}-29.4'N$, $126^{\circ}-57.2'E$)

T-1 ($28^{\circ}-35.6'N$, $127^{\circ}-05.7'E$), T-2 ($28^{\circ}-41.4'N$, $126^{\circ}-58.7'E$).

The records of the current and water temperature are shown in Fig.8-Fig.14. Progressive vectors of the current are shown in Fig.15-Fig.20. The current in the Kuroshio front showed the predominance of the fluctuations of 11-14 day period. When the Kuroshio front approached to the shelf-break, the water temperature increased and the current direction changed from the upstream to the downstream of the Kuroshio. Current records at the shelf-break showed fluctuations of about 4-5 day period as well as 11-14 day period.

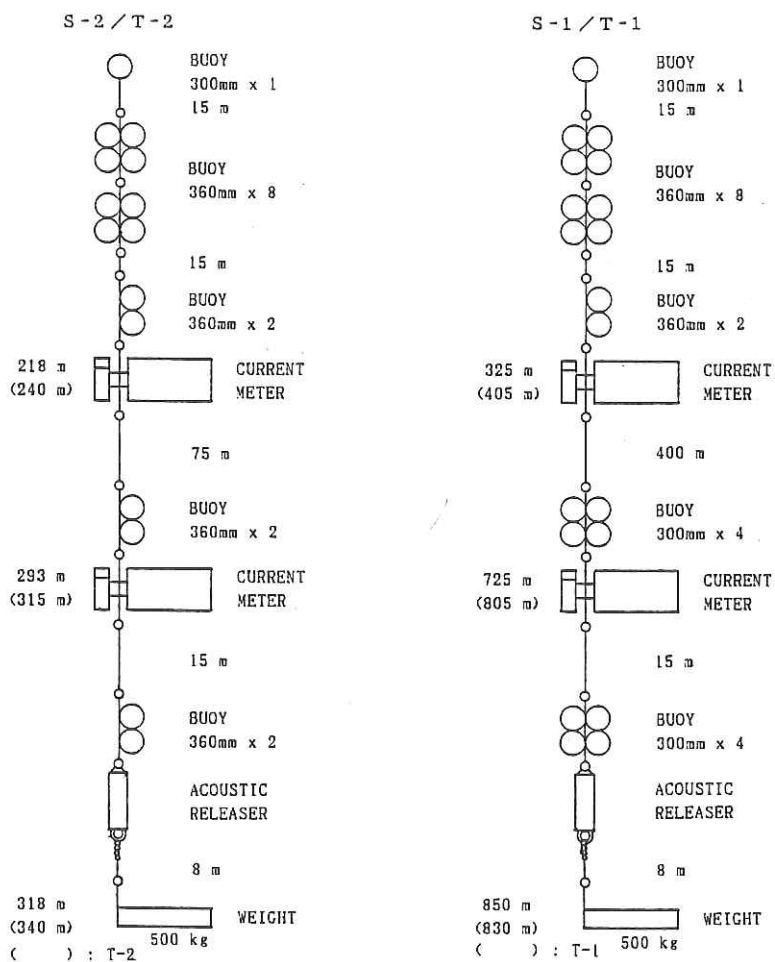


Fig. 6 Mooring system

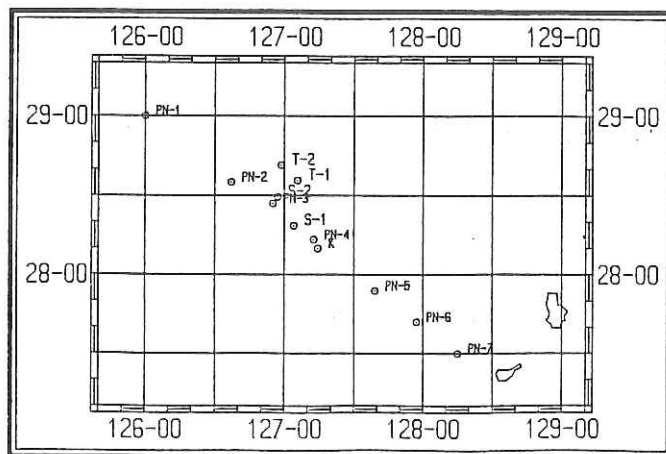


Fig. 7 Map of the mooring station

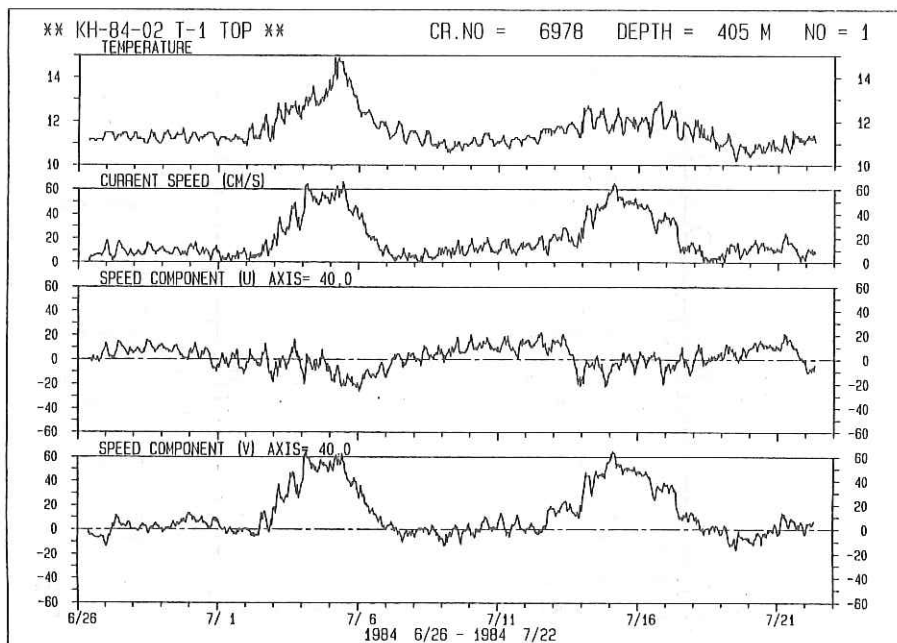


Fig. 8 Time series of temperature and current speed of the upper layer at the T-1 station.

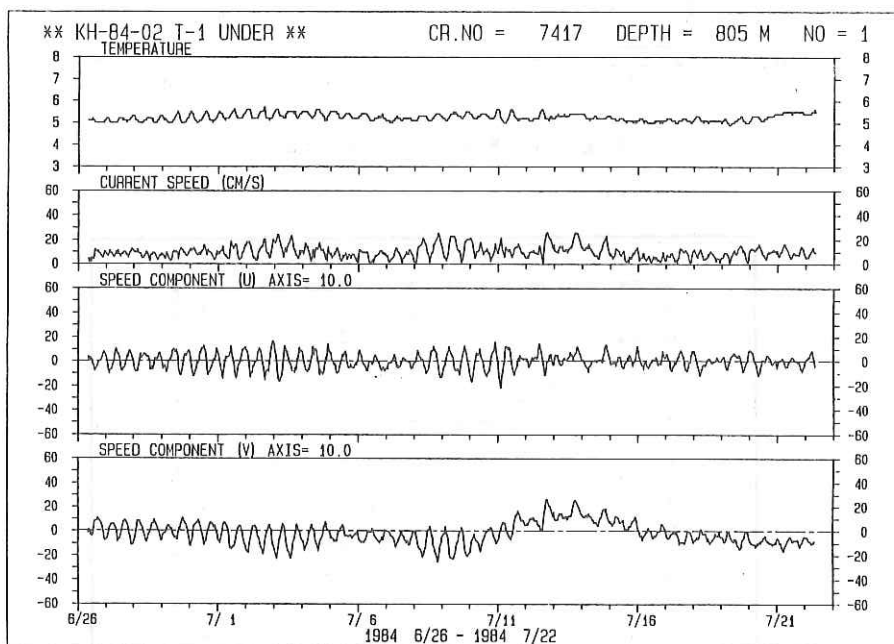


Fig. 9 Time series of temperature and current speed of the lower layer at the T-1 station.

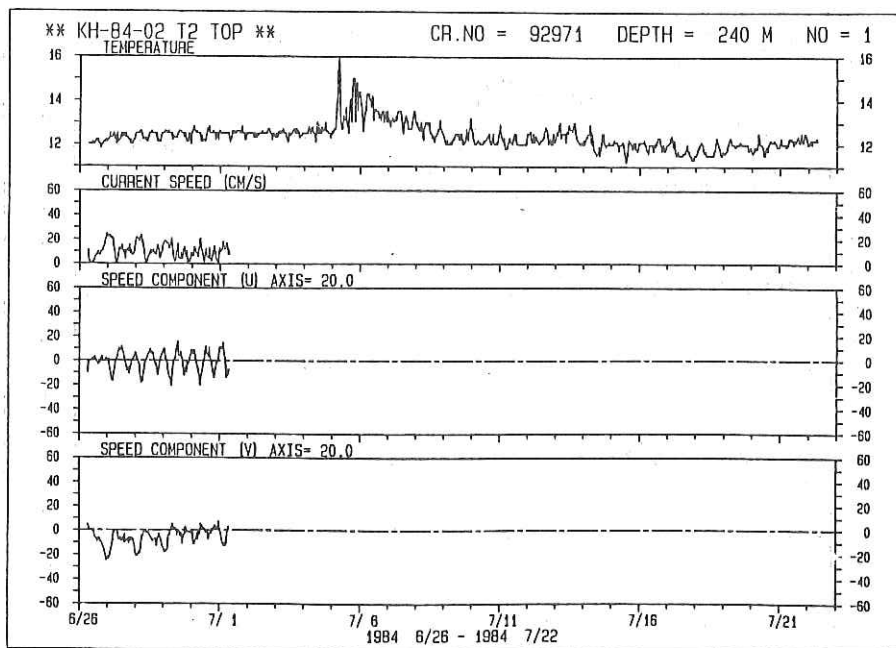


Fig. 10 Time series of temperature and current speed of the upper layer at the T-2 station.

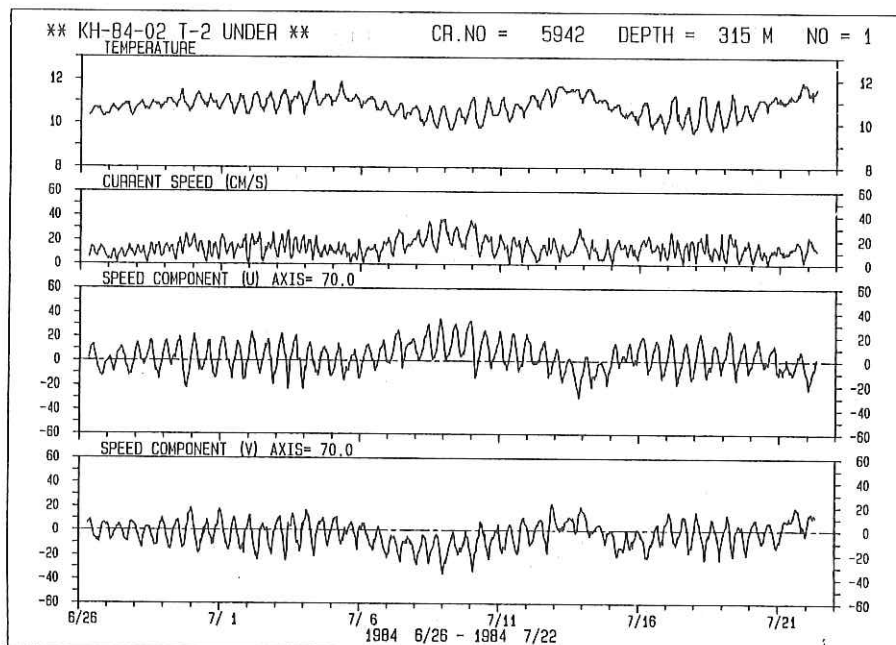


Fig. 11 Time series of temperature and current speed of the lower layer at the T-2 station.

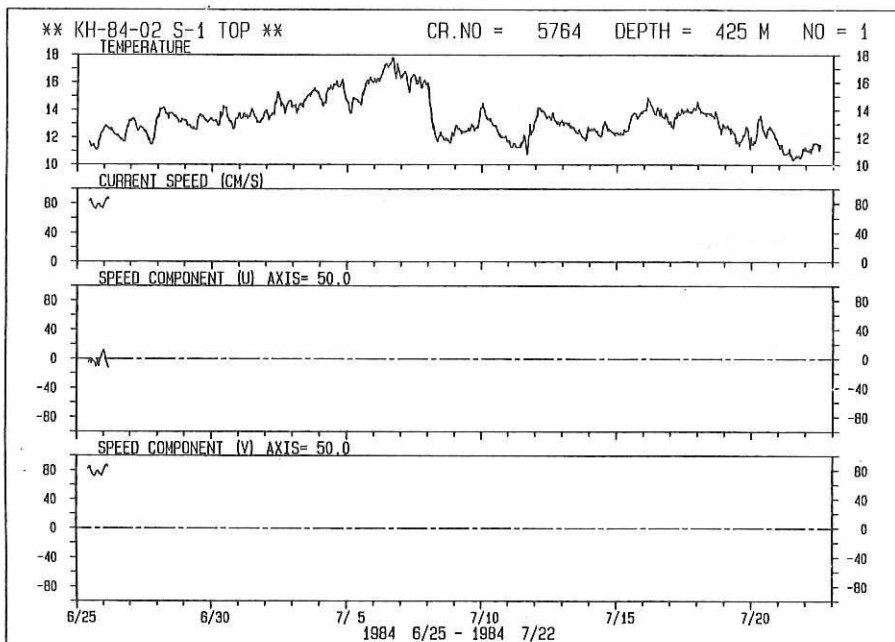


Fig. 12 Time series of temperature and current speed of the upper layer at the S-1 station.

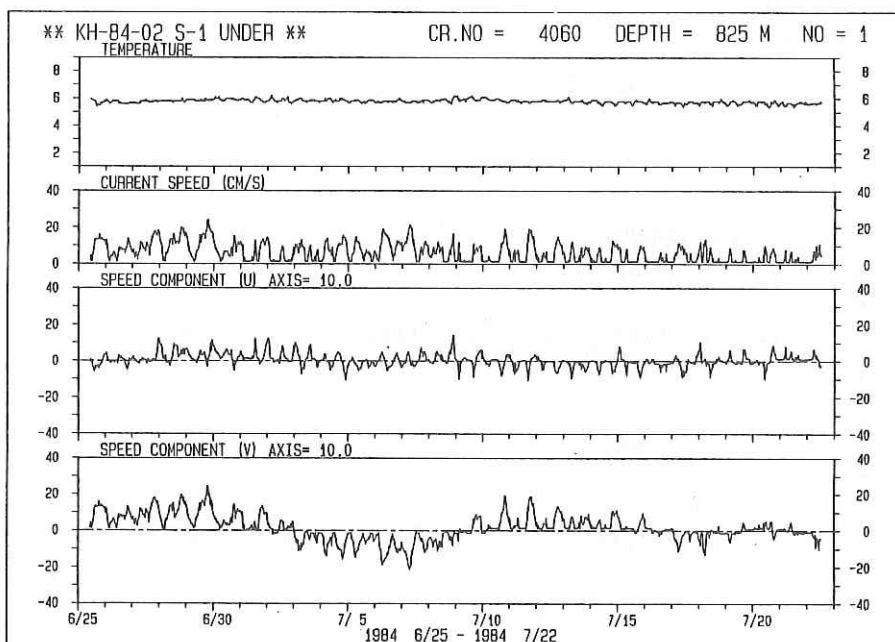


Fig. 13 Time series of temperature and current speed of the lower layer at the S-1 station.

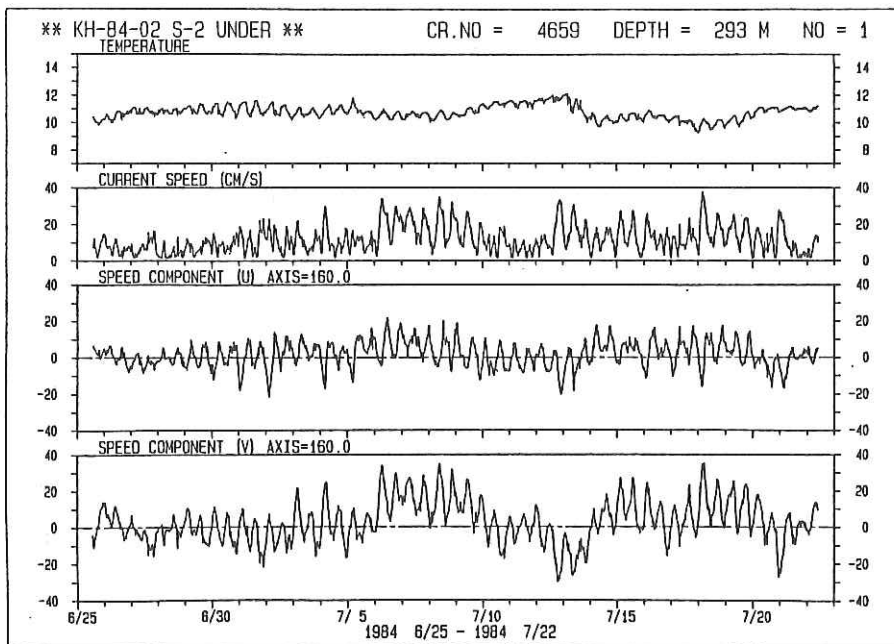


Fig. 14 Time series of temperature and current speed of the lower layer at the S-2 station.

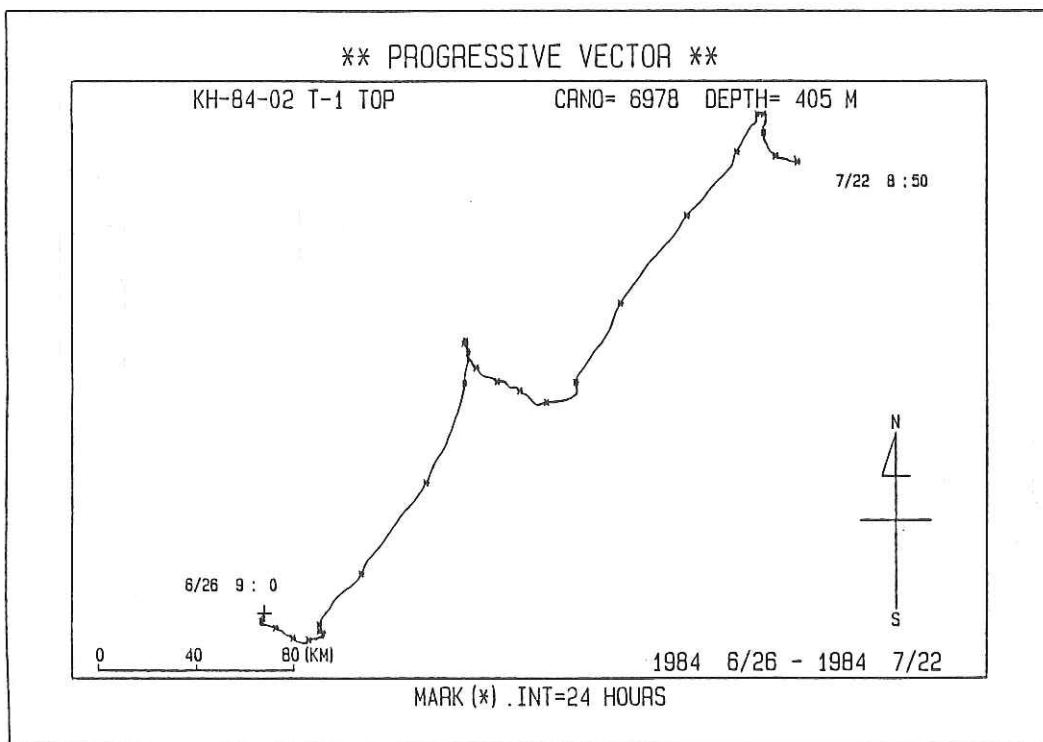


Fig. 15 Progressive vector of the upper layer at the T-1 station.

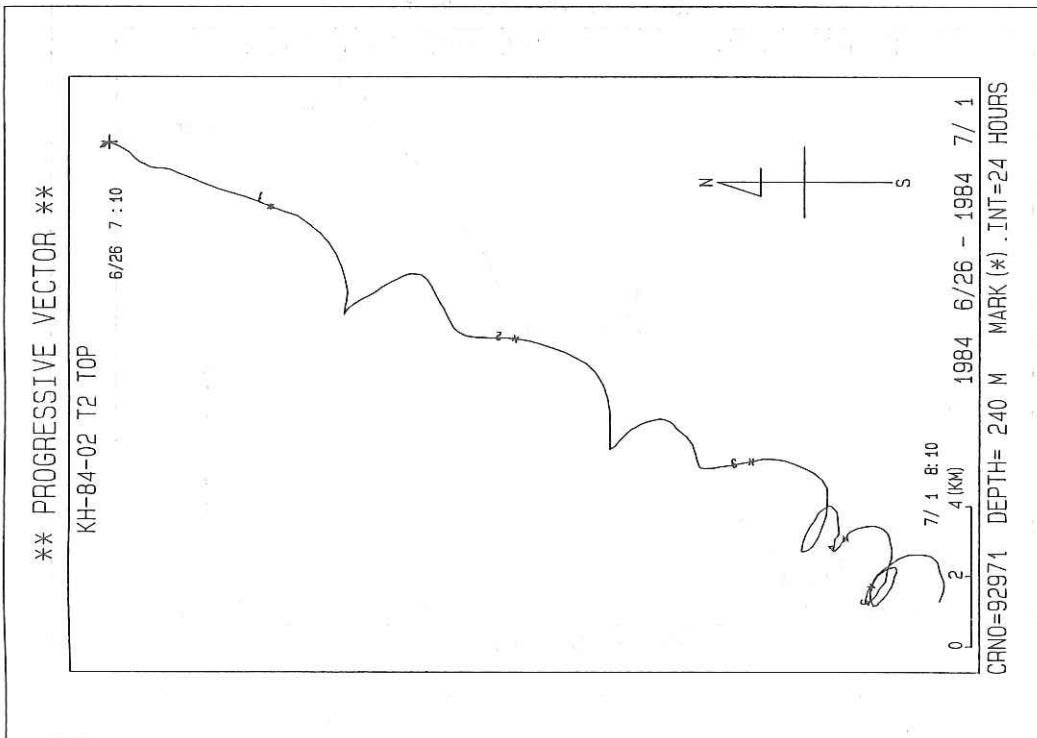


Fig. 17 Progressive vector of the upper layer at the T-2 station.

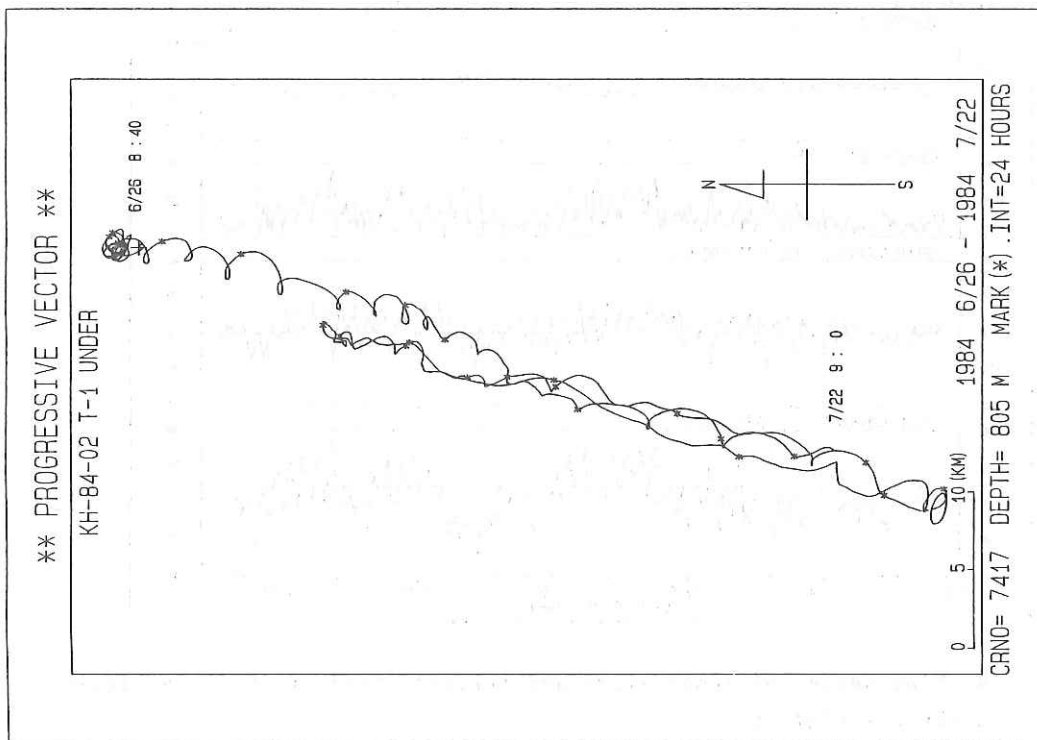


Fig. 16 Progressive vector of the lower layer at the T-1 station.

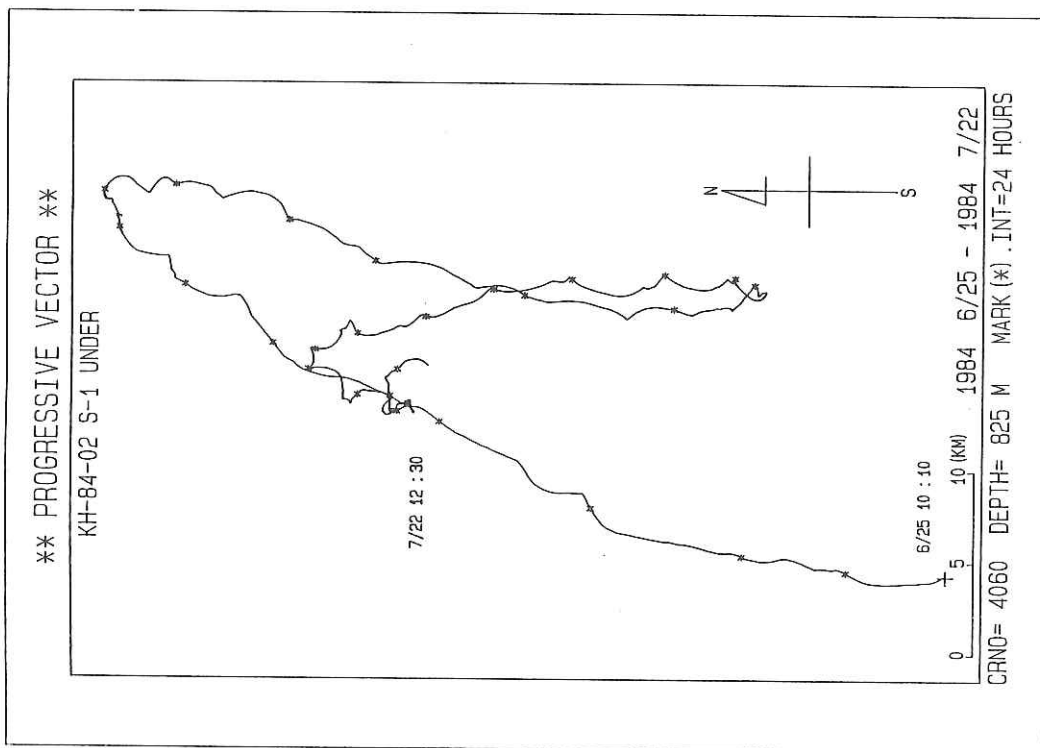


Fig. 19 Progressive vector of the lower layer at the S-1 station.

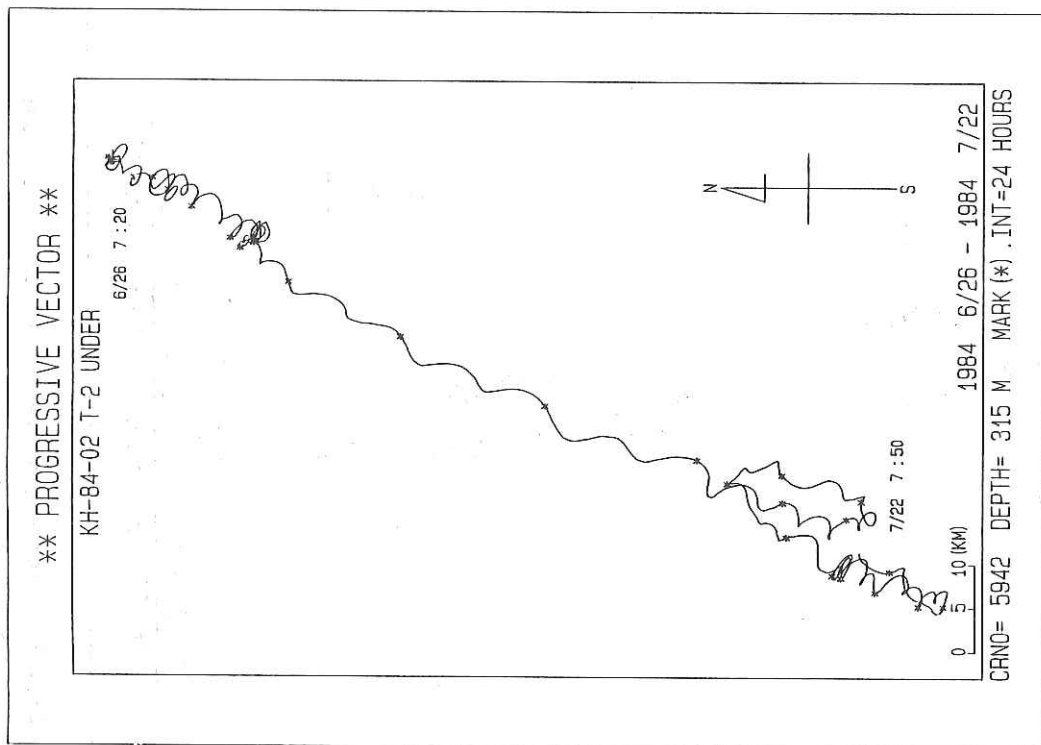


Fig. 18 Progressive vector of the lower layer at the T-2 station.

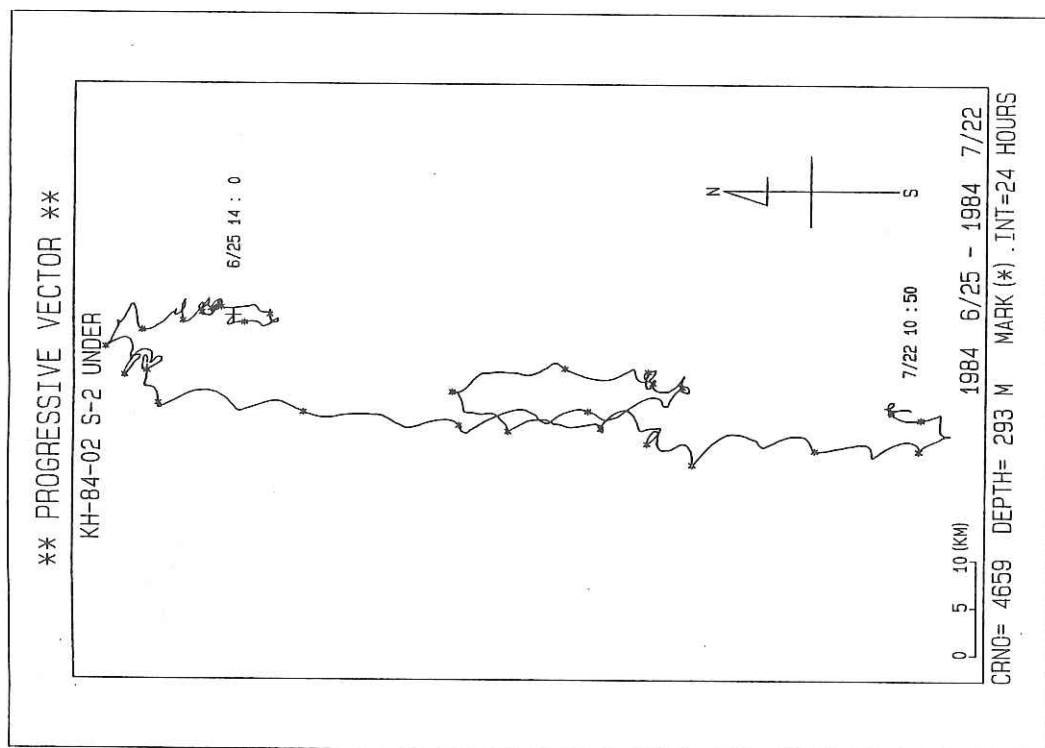


Fig. 20 Progressive vector of the lower layer
 at the S-2 station.

3. CTD observations off Cape Toimisaki and direct current measurements in the Okinawa Basin

H. Ichikawa and T. Yamashiro

1). CTD Observations off Cape Toimisaki

Since 1981, our group (TAKAHASHI, MAEDA, CHAEN, SAKURAI, ICHIKAWA and YAMASHIRO of Kagoshima University) has been made the direct current measurements bellow the Kuroshio southeast off Cape Toimisaki. In order to clarify the relation between the current velocity obtained by direct measurement and the relative current velocity obtained by the geostrophic approximation, we made ten CTD obvservations at intervals of 10 or 20 miles along two lines which are parallel and ca. 20 miles apart. At four stations in the region enclosed by these two lines, two current meters were respectively moored from Nov. 1983 to Oct. 1984. From present CTD data, we can estimate not only the vertical sections of geostrophic current velocity perpendicular to the observational lines but also the relative current velocity spirals (east and north components of relative current velocity). Figure 21 shows the relative current velocity spiral referred to 1500 db level at 30-30.6N and 132-05.5E, which is estimated from the CTD data at Stns. 2, 3 and 11. The comparison of the absolute current velocity spiral estimated by Beta-spiral method (SCHOTT and STOMMEL, 1978) with the directly measured current velocity is under the preparation.

2). Direct current measurements in the Okinawa basin.

In order to clarify the deep layer circulation in the Okinawa basin, three current meters were moored on June 25 at Stn. KG (28-09.9N, 127-14.4E) of which water depth is 1060 m. These current meters

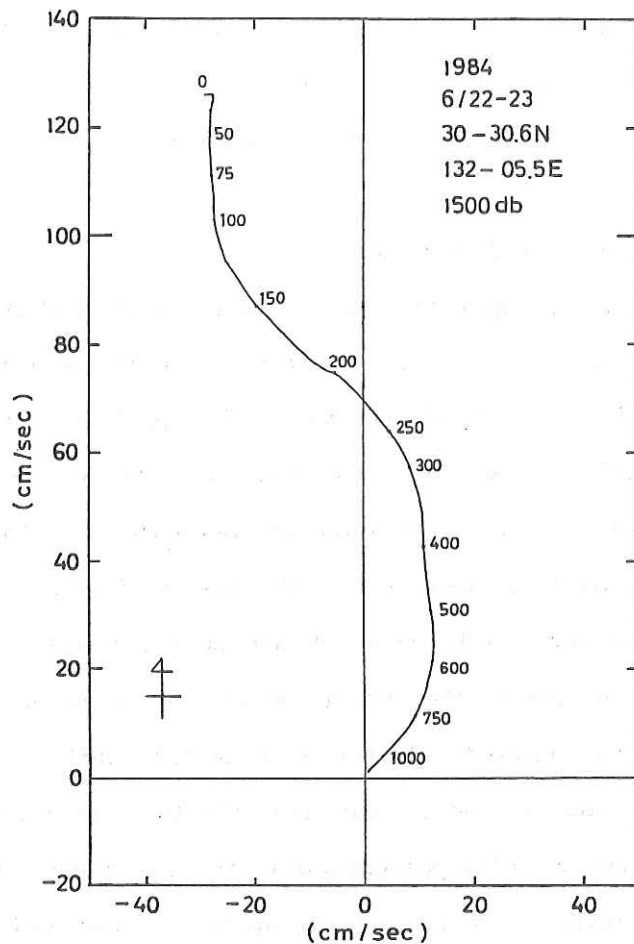


Fig. 21 Relative current velocity spiral

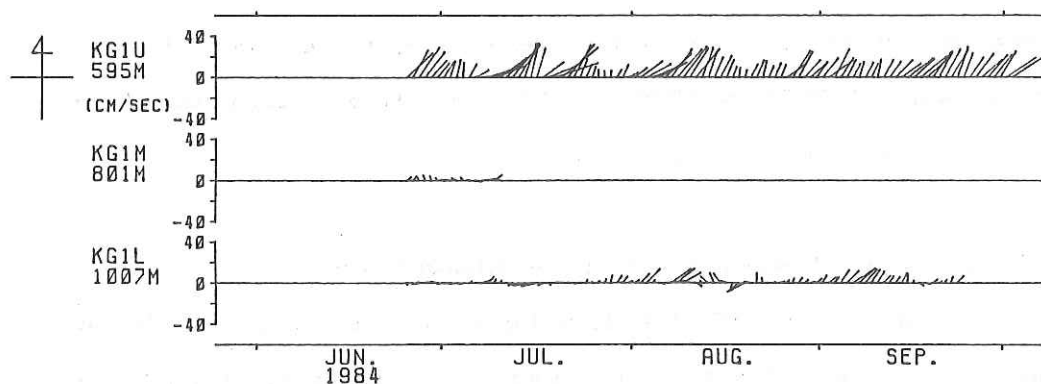


Fig. 22 25 hours running mean vector stick diagrams at three layers

were retrieved on Oct. 2 by the training ship Kagoshima-maru of Kagoshima University and the current fluctuations during ca. 100 days were obtained at two layers (on the middle layer of the three, the data during only 15 days was obtained due to trouble of instrument). Figure 22 shows the 25 hours running mean vector stick diagrams at three layers. It can be said from this figure that the current velocity changes with ca. 20 days period, the current velocity on 595m layer reaches up to ca. 40cm/sec, and that the mean direction is NNE which coincides with the surface current direction of the Kuroshio.

This observation is the first attempt to measure the long-term current variability below the Kuroshio in the East China Sea.

4. Observations of the fine structure of the oceanic surface layer

S. Tawara and H. Nakata

In order to observe the fine structure of the Kuroshio front in the East China Sea, we made observations as follows ; CTD observations at interval of 2.5 miles along line FS1 on July, 3 and at interval of 2.5-5.0 miles along line FS2 during from July, 6-7th.

The temperature and salinity sections along line FS1 and FS2 are shown in Fig. 23 and Fig. 24, which were prepared from the CTD data read at depth interval of 5 m.

The intrusion of Kuroshio water is evident in the sections of salinity, between station 7 and the shelf edge on line FS1, and between station 12 and the shelf edge on line FS2. This seems to indicate that the complex mixing processes produce on the interface between coastal water and Kuroshio water.

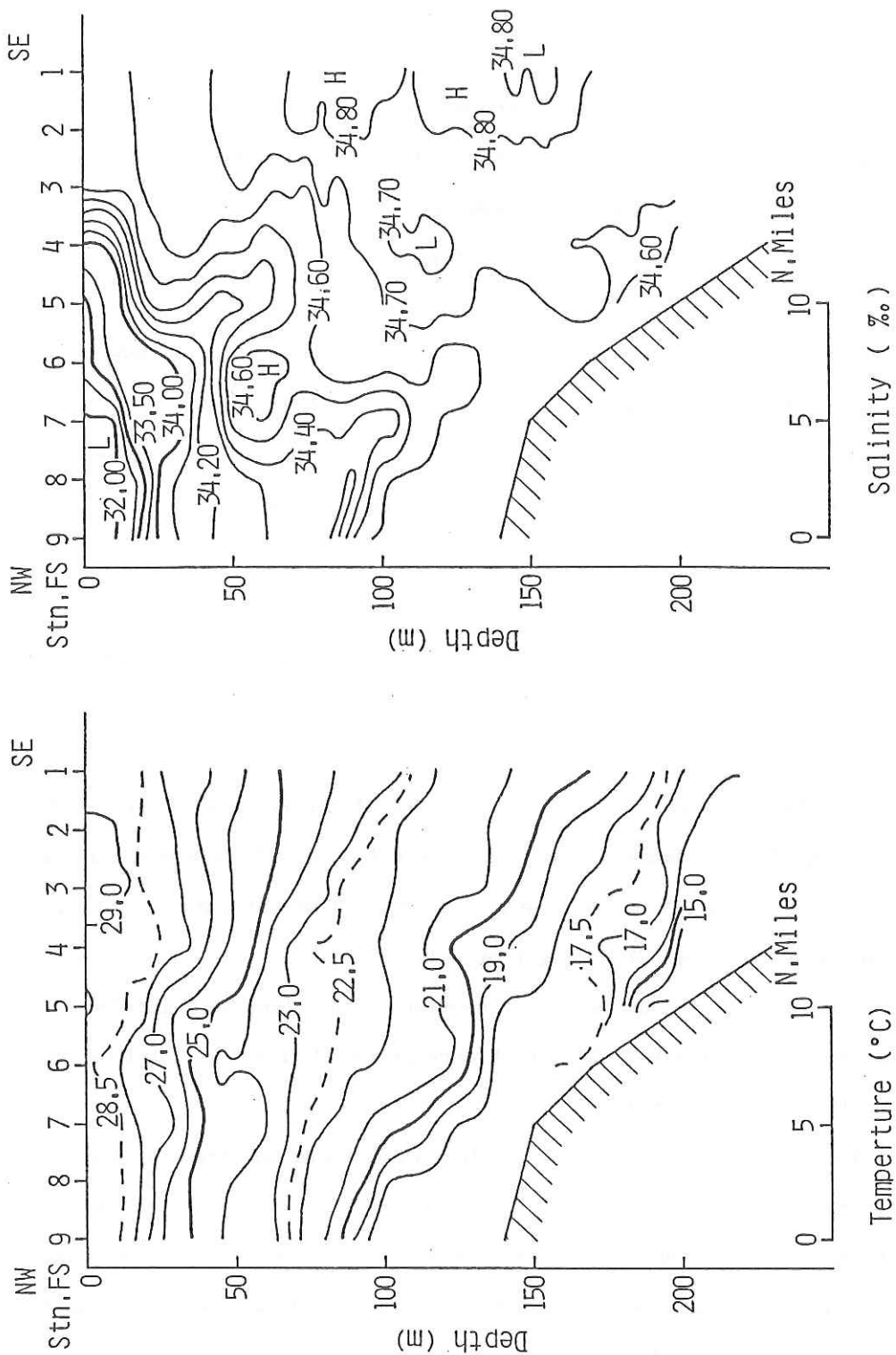


Fig. 23 The temperature and salinity section along line FS1

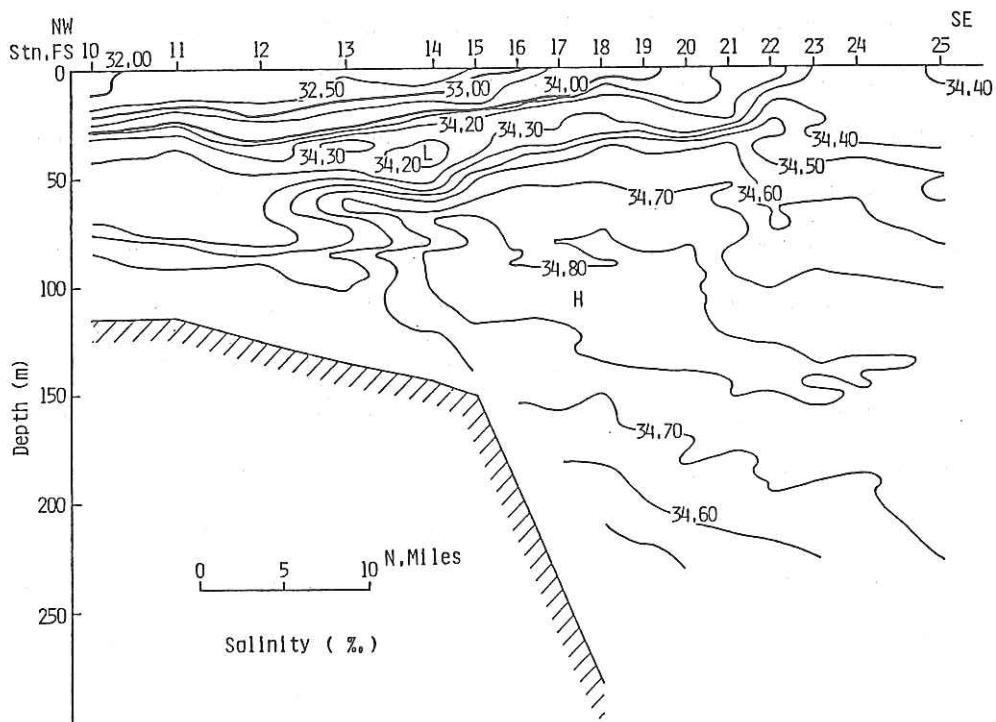
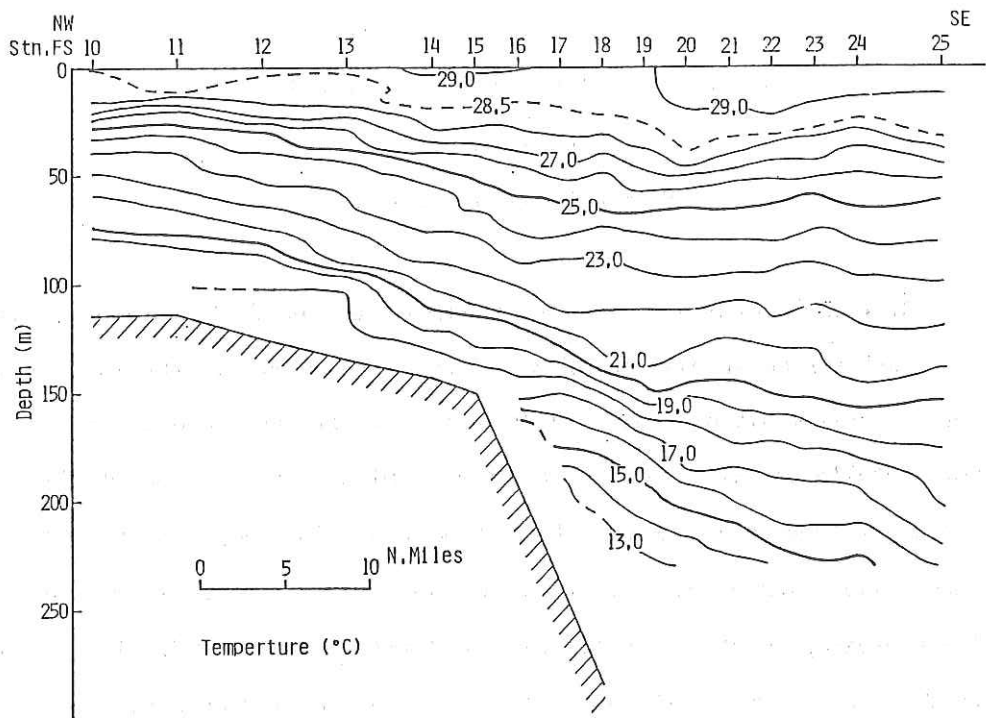


Fig. 24 The temperature and salinity section along line FS2

5. Distribution of fish eggs and larvae in the vicinity of the shelf front

H. Nakata and K. Kuroda

In order to clarify the fine structure of the distribution of fish eggs and larvae in the vicinity of the shelf front in the East China Sea, a 160-cm ORI net, made of 0.69mm mesh filtering cloth, was towed horizontally at the surface layer for 15 minutes at a speed of 2kt and obliquely through the layer of 0-100 meters. The samplings by ORI net were carried out along 2 sections (Stns. FS 1-9 and Stns. FS 10-25). The hydrographic structure of these sections is reported in this volume by S. Tawara and H. Nakata. Table. 3 shows total number of fish eggs and larvae per 100 cubic meters collected by surface tows and oblique tows. The values of temperature and salinity at the sampling stations are also presented in the right-hand columns of the table. The detailed analysis of the relations between the distribution of fish eggs and larvae and the oceanic structure of the shelf region are now in progress. In addition to the above sampling, more detailed plankton samplings were conducted along Section III (FS 26-68) in almost the same area as the above-mentioned sections. A 56-cm MTD net was continuously towed horizontally at the surface layer along the section and sampling of surface water was carried out at intervals of about 0.4 miles for the measurement of temperature, salinity, nutrients and phytoplankton. Figure 25 shows a preliminary result of these measurements. An oceanic front seemed to be located between Stn. FS-42 and Stn. FS-44, while notable changes of nutrients and chlorophyll could not be found in the vicinity of the front. Fish eggs and larvae collected with MTD net are now under investigation.

Table 3 Total number of fish eggs and larvae (No./100m³) along Section I(FS 1-9) and Section II (FS 10-25).

	Surface tow		Oblique tow		Temperature		Salinity	
	Total eggs	Total larvae	Total eggs	Total larvae	0m	50m	0m	50m
FS 9	42.2	102.6	74.7	240.1	28.6	23.8	32.0	34.2
8	34.0	11.2	64.0	188.4	28.6	24.0	31.9	34.2
7	6.3	4.2	69.6	616.4	28.9	24.7	31.9	34.6
6	13.4	2.8	127.7	547.8	28.8	23.9	32.2	34.5
5	119.5	47.9	263.8	589.7	29.0	24.8	32.7	34.3
4	132.4	7.3	103.9	261.9	28.9	25.9	34.0	34.5
3	75.9	22.5	94.5	412.9	29.2	26.0	34.5	34.7
2	133.7	11.8	60.8	289.6	29.1	25.9	34.5	34.7
1	49.3	55.6	341.2	409.2	28.9	26.3	34.6	34.7
FS10	1.3	1.3	135.4	195.9	28.7	21.8	31.9	34.4
11	11.8	0	132.5	188.0	28.7	22.3	32.1	34.3
12	9.4	3.3	71.0	115.1	28.7	23.2	32.0	34.3
13	3.9	2.4	23.0	262.8	29.3	23.3	32.2	34.4
14	54.2	9.5	86.8	326.3	29.5	24.6	32.1	34.3
15	19.5	20.0	33.1	134.9	29.6	25.2	32.2	34.6
16	120.2	35.9	24.2	323.9	29.2	25.6	32.5	34.7
17	273.7	7.2	70.9	498.6	28.6	26.3	33.8	34.7
18	84.0	33.6	83.2	563.2	28.9	25.9	33.7	34.6
19	48.4	366.9	8.1	456.1	28.9	26.8	33.9	34.7
20	16.8	231.5	14.7	1011.8	29.5	27.1	34.0	34.7
21	3.6	152.9	3.9	680.2	29.4	26.5	34.1	34.7
22	138.6	293.9	12.5	799.7	29.3	26.3	34.2	34.5
23	831.1	517.7	163.2	1291.0	29.2	26.2	34.3	34.5
24	237.6	422.7	28.2	994.4	29.4	26.0	34.3	34.6
25	299.3	424.3	14.0	786.3	29.1	26.3	34.4	34.5

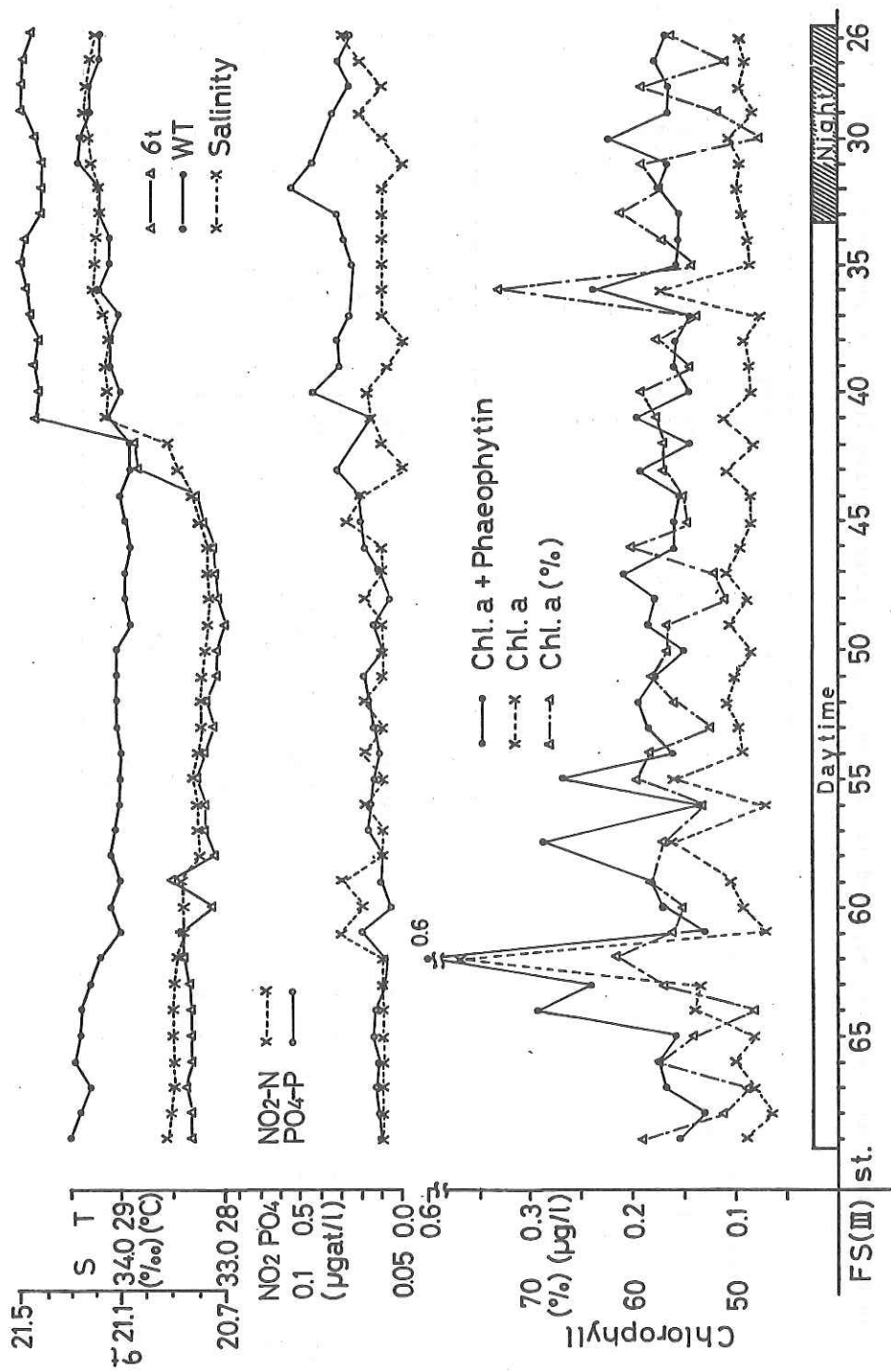
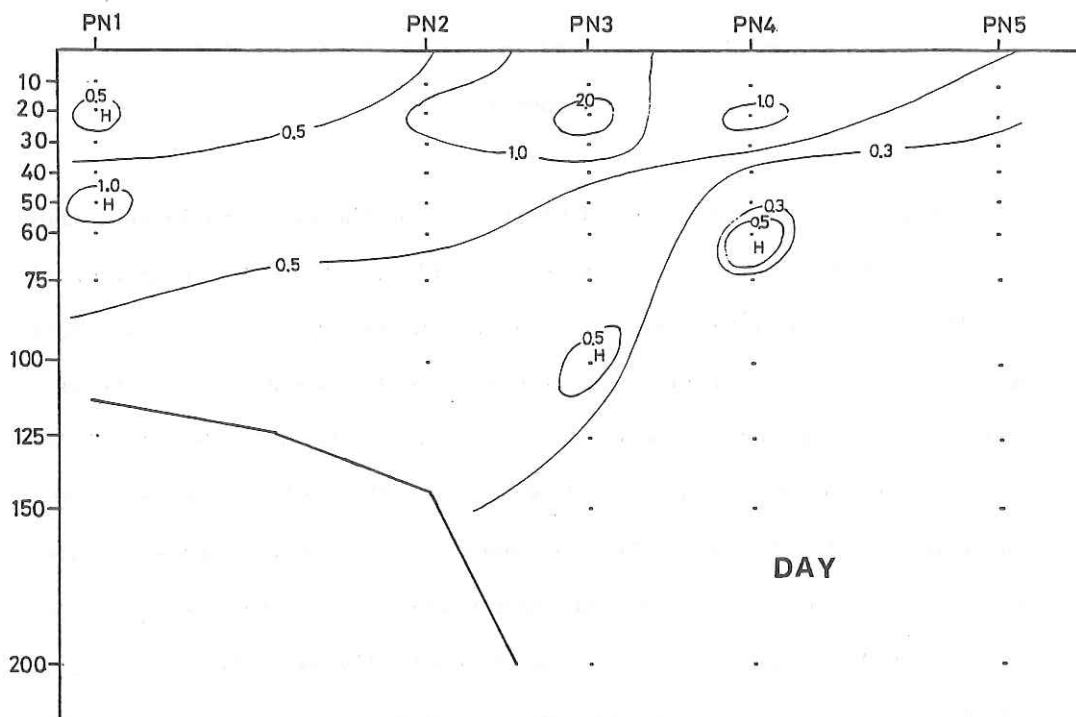


Fig. 25 Variations of temperature, salinity, nutrient salts and chlorophyll in the surface water along Section (FS 26-FS 68)

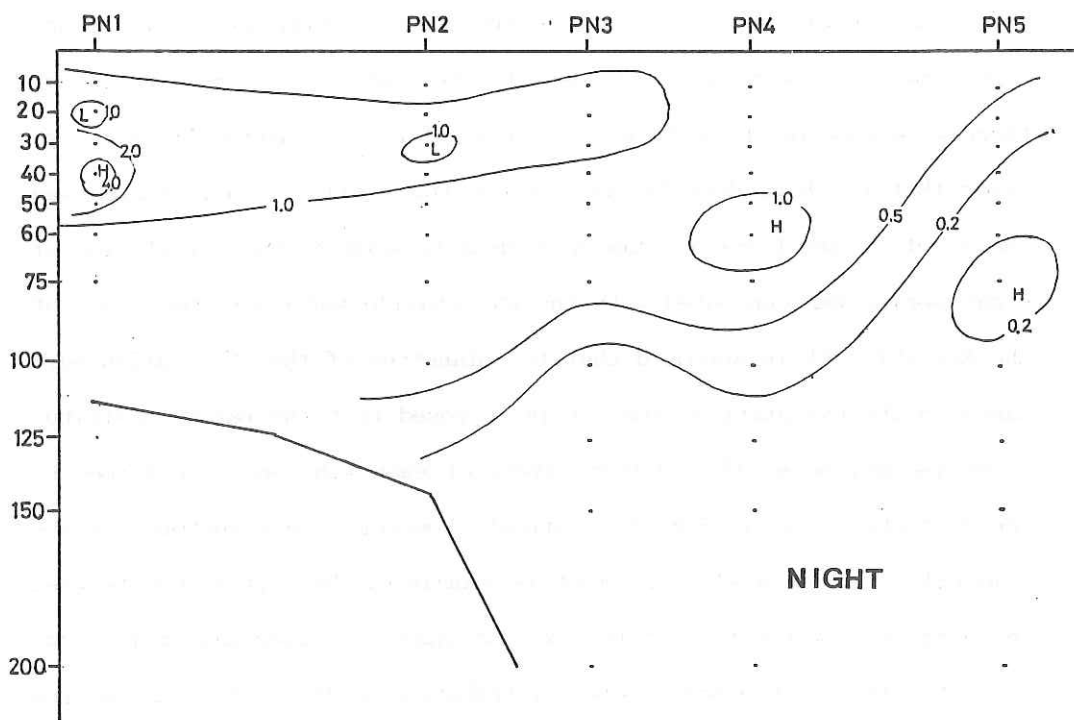
6. The distribution of the eggs and larvae at the front of the Kuroshio

K. Matsushita

It is considered that the distribution of the eggs and larvae, they are not vigil organisms, are greatly influenced by the environmental conditions, especially, ocean currents. Furthermore, the distribution has important roles concerning to the transport and survival of the eggs and larvae. From the viewpoint mentioned above the distribution of the eggs and larvae at the cross sections of the front of the Kuroshio were surveyed by the MTD nets. The MTD nets surveys of the cross sections were carried out two times, day and night series, at the layers of 0,10,20,30,40,50,60,75,100,125,150,200m until the bottom. The analysis of the distributions of the eggs and larvae are yet completed. The settling volumes of the cross sections are shown in Fig. 26. It is recognized that there were some high density areas at the 20-50m layers. And, there were some patchy high density areas at deeper layers. It is recognized that the high density area of the PN3 station of day series was the front of the Kuroshio. The high density area of the PN1 station of night series was connected with the PN3 station where was the front of the Kuroshio. It is supposed that the planktons of the PN3 station were taken to the PN1 station. And, it is supposed that the patchy distributions recognized at the 60-100m layers of each stations were formed by the disturbance of the Kuroshio current. However, the structures of the communities of each stations must be examined. The difference between the vertical distribution of the day and night was especially not recognized but there was a belt-shaped distribution at the 20-50m layers from PN1 to PN3 stations of night series. The thermocline was formed at the layers by the coastal water mass and bottom water mass. However, the PN1



DAY



NIGHT

Fig. 26 The distribution of the density of the setting volume (cm^3/m^3) of the nets.

and PN3 stations were separated too long in order to say exactly, the pattern of the distribution may be arranged two patches.

7. Vertical distribution of fish larvae

Y. Yamashita and H. Yamada

The vertical distribution of fish larvae was examined at the stations of PN1 above the continental shelf, and PN5 deeper than 1000m. The samples were collected with MTD horizontal nets of 0.303mm mesh size and fixed with 10% buffered formalin-seawater solution. The sampling layers were 0, 5, 10, 20, 30, 40, 50, 60, 70, 80m for PN1, and 0, 10, 20, 30, 40, 50, 60, 75, 100, 125, 150, 175, 200m for PN5, respectively.

9426 specimens were collected at PN5 and the samples taken at PN1 have not been finished the soating yet. Larvae and juveniles of 134 taxa in 54 families were taken during night (22:56, 4 July) and daytime (10:52, 5 July) hauls at PN5. Eighty of these taxa were identified to species, 26 to genus and 28 to family. The composition of larvae were 71.5% of mesopelagic species, 12.4% of coral reef species, 3.2% of pelagic species, 1.9% of coastal species and 11% of total larvae could not be identified. The characteristics of vertical distribution of dominant taxa were shown in the following:

Cyclothone spp.; This taxa was most abundant with 791 specimens and occupied 31.1% of all larvae. The larvae were usually collected from 10 to 60m and the most abundant layer was 20m during daytime and 30m during night, respectively. The larvae of this taxa usually occurred within the thermocline layer of 20-50m.

Vinciguerrria spp.; 180 specimens were collected. The larvae were collected from 20 to 150m and the most abundant layer was 80m during

daytime. But in the night, they showed the bimodal distribution with 40m and 80m peaks. The larvae of this taxa changed their distribution depth according to their growth. The larvae were distributed 60-100m at 1-5mm SL and, moved to 40m at 5-9mm SL. The larvae of 9-11mm SL became to show a wide distribution range of 20-100m. The juveniles after metamorphosis (11mm SL) became to occur only below 60m, and they went downward with their growth.

Diogenichthys atlanticus; 271 specimens were collected. The larvae were usually collected 80-100m and the most abundant layer was 80m during both daytime and night. This species occurred below the thermocline layer.

Scombridae spp.; 76 specimens were collected (This taxa included 3 species and unidentified 8 larvae). This taxa was in the layers shallower than 40m and the most abundant layer was 20m during daytime and the surface during night, respectively. They occurred above the thermocline layer.

8. The distribution and dispersal of shell-bearing molluscs in plankton, with emphasis on pelagic larvae of benthic molluscs

I. Hayashi

Although very little is yet known on the pelagic larval ecology of marine benthic animals, recently the knowledge on distribution and dispersal has been increasing. Among benthic animals, molluscan larvae have been reported to have various pelagic periods; while some produce no pelagic larvae at all, some others belonging to such families as Architectonicidae and Tonnidae suspend in water for several months, resulting in a wide range of geographical distribution by being transported for a long distance with currents and even crossing the oceans. Therefore, it is expected that the molluscan larvae collected through this cruise by MTD net (mesh: GG 54) sampling give some idea of larval dispersal and geographical distribution. Samples were collected at various depths and times of a day, and an intention will be made to sort out not only larval forms of benthic molluscs but also totally pelagic molluscs although many specimens were found to have already dissolved away in formalin preservatives. From these, it is also expected to collect some ecological informations such as species composition, vertical distribution and migration, and population density for all the shell-bearing molluscs found in the samples. As a mesh size (GG 54) used for MTD nets was supposed to be too large to collect many small molluscan larvae, extra 25 surface tows by a NORPAC net (mesh: XX 13) were made each for 5 minutes mainly in the regions of Kuroshio Current (PN5) and East China Sea (PN1). These samples have not been fully examined yet, but it is thought that between both the areas there are much differences in larval density, species composition, etc.

9. Studies on dispersion of tropical grass shrimps

H. Mukai

Geographical distributions of tropical seagrasses and grass shrimps associated with them in Western Pacific can be predicted to be attributed to dispersions by drifting on warm currents, because the following facts were already clarified. (1) The center of distribution of tropical seagrasses was considered to exist around Torres Straight in northern Australia and New Guinea Island. (2) Geographical distributions of tropical seagrasses in Western Pacific are restricted almostly on the islands along the warm current. (3) The number of species of seagrasses on their islands is reversely related with distance from the center of distribution. It is likely that wide-distributed grass shrimp has more eggs in a brood than restricted-distributing shrimps. It is true in the genus Periclimenes of grass shrimps. However, the genus Latreutes has a contrary results. A hypothesis can explain well these contradictory results is that two genera of grass shrimps have different modes of dispersion; that is, Periclimenes disperses in a larval stage, but Latreutes disperses in adult stage. To examine this hypothesis, collections of grass shrimps in dispersion were performed by towing ORI-type fish larvae net and MTD-type plankton net in this cruise. The samples collected are yet sorting out and examining. Some larvae of hippolytid shrimps and drifting leaves of tropical seagrasses are observed in the samples already sorted out, but no Latreutes shrimps are occurred. We need more samplings in the warm current to catch the propagules of tropical shrimps and to examine the hypothesis on dispersion form of littoral benthos. A dense school of a benthic shrimp, Lep-
tochela hawaiiensis which was recorded in only Hawaii Islands, was ob-

served at Stns. 28, east of Taiwan Island. This shrimp was known to swim up to surface of sea at night.

10. Mid-summer ichthyoplanktons in the East China Sea
and its adjacent waters
M. Okiyama and C. Chen

Kinds, abundances and distributions of the ichthyoplanktons were studied in the East China Sea and its adjacent waters including the Kuroshio Domains. Materials were obtained mostly by the surface tows of ORI-60 net covering 29 stations and the oblique hauls of IKPT- net(10-feet IKMT equipped with small mesh -0.5mm-net throughout) at six stations each with double hauls sampling the different depth ranges.

Results of the ORI surface collections were summarized in Table 4 and Fig.27, with special references to flying fishes of the junior worker's concern. Total numbers of ichthyoplanktons fluctuated remarkably among stations or according to the sampling time with distinctly greater figures in the night time samples, while those of the flying fishes occurred less variably throughout the stations(Fig.28). Complete absences of the flying fishes were recorded at the innermost station of the East China Sea characterized by the low temperature and low salinity, besides the small areas off the coast of Taiwan possibly associated with the local up welling. IKPT net was successfully operated, yielding enormous numbers of small ichthyoplanktons all in the excellent features. Identification of these materials are still in progress.

Table 4 Ichthyoplanktons collected by the surface tows of ORI-60
with detail figures on flying fishes

Station	Date	Total No. of larvae	Flying fishes *											
			Total No.	1	2	3	4	5	6	7	8	9	10	11
28	June 28	82	5	-	1	-	-	-	3	-	1	-	-	-
29		105	0	-	-	-	-	-	-	-	-	-	-	-
31		14	0	-	-	-	-	-	-	-	-	-	-	-
33		211	0	-	-	-	-	-	-	-	-	-	-	-
35		28	0	-	-	-	-	-	-	-	-	-	-	-
37		29	162	3	-	-	2	-	-	-	-	1	-	-
39		29	129	1	-	-	-	-	-	-	-	-	-	-
40		29	7	1	-	-	-	-	-	-	-	-	-	-
41		29	53	11	-	1	7	-	-	1	1	-	-	-
44		29	94	0	-	-	-	-	-	-	-	-	-	-
48	30	96	1	-	-	-	-	-	-	-	1	-	-	
51	30	0	0	-	-	-	-	-	-	-	-	-	-	
PN-1-1	July 1	45	1	-	-	-	-	-	1	-	-	-	-	
PN-2-1		7	0	-	-	-	-	-	-	-	-	-	-	
PN-3-1		2	0	-	-	-	-	-	-	-	-	-	-	
PN-4-1		2	20	0	-	-	-	-	-	-	-	-	-	
PN-5-1		3	248	9	-	8	-	-	-	-	-	1	-	-
PN-5-2A		4	804	7	-	-	2	-	2	1	-	1	-	1
PN-5-2B		5	1	0	-	-	-	-	-	-	-	-	-	-
PN-4-2		5	126	0	-	-	-	-	-	-	-	-	-	-
PN-3-2		5	53	0	-	-	-	-	-	-	-	-	-	-
PN-2-2		6	248	3	1	1	-	-	-	-	-	1	-	-
PN-1-2	6	111	3	-	1	-	-	-	-	-	-	-	-	
58	25	5	0	-	-	-	-	-	-	-	-	-	-	
59	25	436	8	-	4	-	2	-	-	-	2	-	-	
60	25	37	3	-	1	1	-	-	-	1	-	-	-	
61	25	43	24	-	20	-	-	-	2	1	1	-	-	
62	25	12	7	-	7	-	-	-	-	-	-	-	-	
63	25	31	3	1	-	-	-	-	2	-	-	-	-	
	25	95	6	-	1	-	-	-	5	-	-	-	-	

* 1, *Oxyporhamphus micropterus*. 2, *O. conurus conurus*. 3, *Exocoetus monocirrus*. 4, *E. volitans*.
5, *Parexocoetus brachypterus*. 6, *Hirundichthys oxycephalus*. 7, *Prognichthys brevipinnis*.
8, *Cypselurus poecilopterus*. 9, *Cheilopogon katoptron*. 10, *Ch. longibarbus*. 11, *Ch. spilonoctopus*.

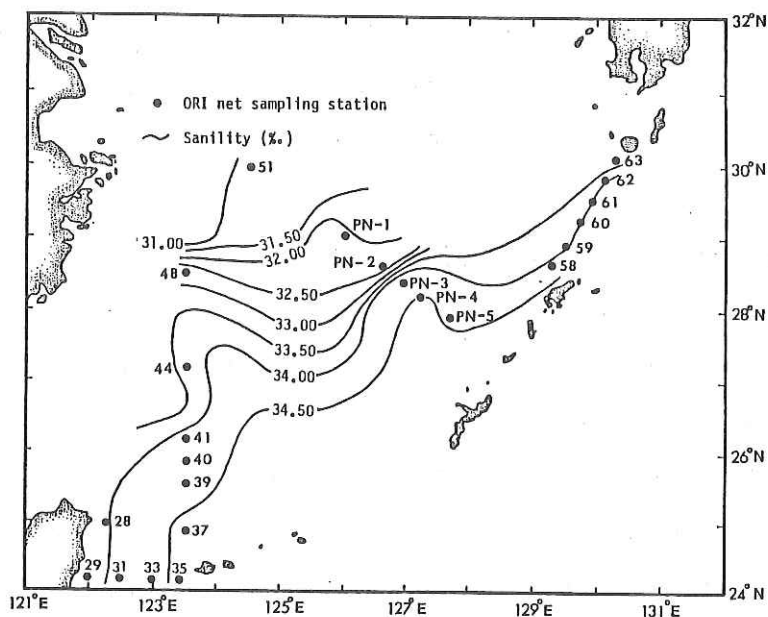


Fig. 27

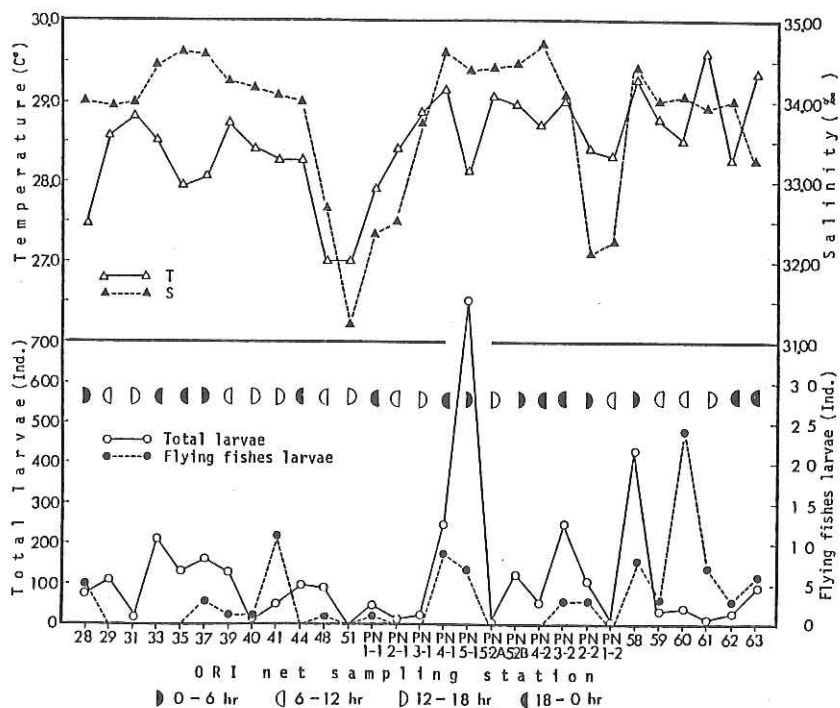


Fig. 28 Relationships between water temperature-salinity and ichthyoplankton catches by stations

11. Geochemical studies of chemical substances in sea water
in the Kuroshio Region and the East China Sea

Y. Suzuki

Organic carbon and nitrogen dissolved in sea water

Organic carbon and nitrogen dissolved in sea water were determined by using the CO₂ analyzer(NDIR) and colorimetric method respectively after the high temperature catalytic oxidation of sea water sample(Suzuki et al., 1985). The concentration of organic carbon in surface water ranged from 200 $\mu\text{M l}^{-1}$ to 516 $\mu\text{M l}^{-1}$, with an average value of $304 \pm 116 \mu\text{M l}^{-1}$. The concentration of carbon in continental shelf water is higher than that in the Kuroshio region. The concentration of organic nitrogen in surface water ranged from 38 $\mu\text{M l}^{-1}$ to 43 $\mu\text{M l}^{-1}$, with an average value of $41 \pm 2 \mu\text{M l}^{-1}$. The concentration of organic nitrogen dissolved is fairly uniform in all of the region observed. The vertical distribution of both organic carbon and nitrogen is the same trend, i.e., the concentration is high in the surface and low in the deep waters.

Molecular size distribution of organic carbon and nitrogen were also examined by using gel exclusion chromatographic method.

Free amino acid and combined amino acid in sea water

The concentration of free and total amino acid in sea water were determined by fluorometric method with o-phthalaldehyde (OPTA)-amino acids fluorogenic adduct adsorbed on XAD-2 resin (Sugimura and Suzuki, 1983). Free amino acids react to OPTA without any treatment prior to the analysis, and the total amino acids react to the reagent after the acid

hydrolysis. The combined amino acid is defined as the difference between total and free.

The concentration of free amino acid in surface water ranged from $18.4 \mu\text{g l}^{-1}$ to $123 \mu\text{g l}^{-1}$, and it is high in the continental shelf water (54 to $123 \mu\text{g l}^{-1}$) and low in the Kuroshio region (18 to $40 \mu\text{g l}^{-1}$). The concentration of combined amino acids ranged from $130 \mu\text{g l}^{-1}$ to $260 \mu\text{g l}^{-1}$. The distribution of combined amino acid in surface water is different from that of free amino acid, i.e., the concentration of combined amino acid is low in the continental shelf water (130 to $180 \mu\text{g l}^{-1}$) and high in the Kuroshio region (180 to $260 \mu\text{g l}^{-1}$).

Metallic elements: chemical form, concentration and distribution

Surface and deep water were collected by the non-metallic sampler. Immediately after sampling, they were filtered through membrane filter ($0.45 \mu\text{m}$). The separation of total and organic form metals in the filtered sea water was done by using preconcentration technique of XAD-2 - oxine and XAD-2 adsorption method on board (Sugimura et al., 1980).

The distribution of total iron dissolved in surface water is shown in Fig. 29. The concentration of total iron dissolved in surface water is low in the Kuroshio region and high in the continental shelf water. In Fig. 30, the concentration of particulate, particulate iron, total iron dissolved and iron organic compounds with molecular weight (neutral or basic fraction and acid fraction) are summarized. The determination of some minor metallic elements will be also done on land laboratory.

Artificial radionuclides in the surface water

To study the surface distribution of the nuclides produced by the nuclear testing, surface water samples for the measurement of Pu-

239+240, Cs-137 and Sr-90 were collected on board. Pu-239+240: Plutonium was collected from 400 liters of sea water by the method of coprecipitation on board. After the electrodeposition of Pu-239+240 is going to be measured by the α -ray spectrometric method at the laboratory on land(Hirose and Sugimura).

Cs-137 and Sr-90: The method employed in this study is the same as described in the previous report(Preliminary Report of the Hakuho-Maru Cruise KH-68-4).

Reference

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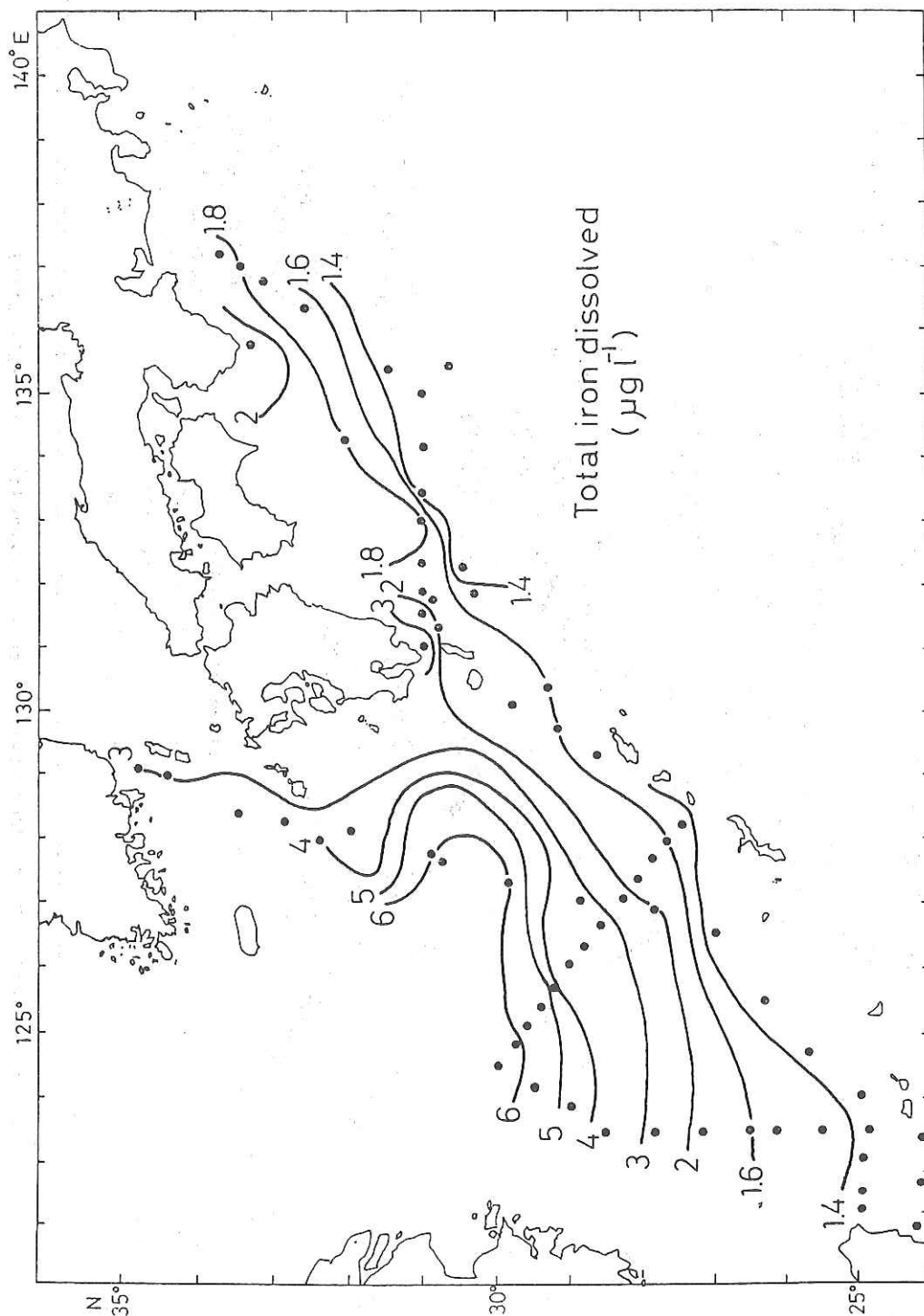


Fig. 29 The concentration of total dissolved iron in surface water

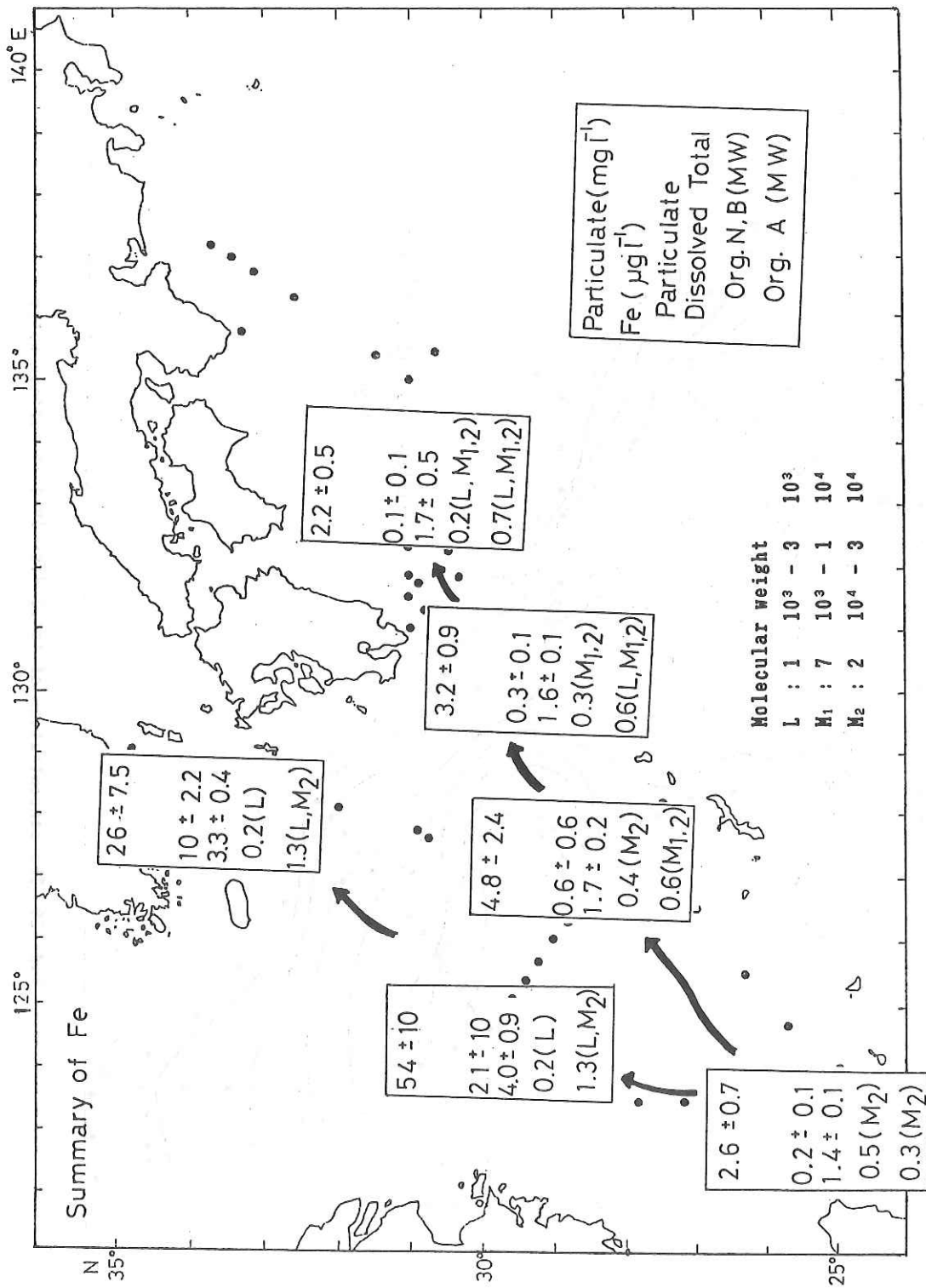


Fig. 30 The summary of concentration of iron compounds in surface water.

12. Some observations on the vertical microscale distribution
of chlorophyll fluorescence

Y. Tsuji

Chlorophyll fluorescence, temperature and salinity were observed at 5 stations from 4 to 6 July, 1984. Both changes in vertical structure were obtained between stations and within 14 hours in a fixed position. A subsurface fluorescence maximum was present at each profile. Maximal values decreased by ca. 30% in 14 hours at the fixed position. Fluorescence profiles had different patterns at different stations.

The parameters were measured simultaneously with a CTD(Tsuji et al, 1983)-VARIOSENS combined system. The system was lowered about 0.5m/s; data were sampled at 4 Hz and running-averaged over 8 sec. The regression analyses for sum of concentrations of chlorophyll a and phaeophytin (Y, micro gram per liter), as a function of logarithm of fluorescence (X, arbitrary unit), gives

$$Y = 0.167(\log X) + 0.062 \quad (r=0.95, n=13, \text{Stn. PN1}).$$

Figure 31 shows short term variabilities in profiles of fluorescence and temperature at Stn. PN5. The fluorescence profile obtained after 14 hours is different from those profiles observed within one hour, which seem to be similar. The maximal value of fluorescence decreased by 32% in 14 hours.

Figure 32 shows horizontal changes in profiles of fluorescence and temperature. All the fluorescences maxima located in the weak thermocline and not just below the strongest thermocline. The fluorescence maximum shifts upward as the water depth of the station decreases except for Stns. PN4, where the largest fluorescence maximum was observed.

Acknowledgements

The author is grateful to Mr. T. Nakai and Dr. K. Furuya, Univ. of Tokyo, for providing facility for use of VARIOSENS.

Reference

Tsuji, Y., T. Hara and K. Sasaki(1983); JAMSTECTR(10),147-160

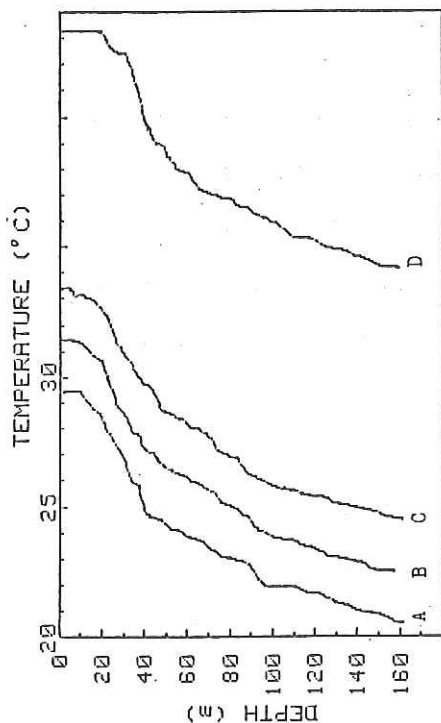


Fig. 31 Vertical distributions of temperature and fluorescence at st. PN5. Three profiles(A,B and C) were obtained on 4 July 1984(at 16:40, 17:45, respectively); profile D at 7:13 on 5 July 1984. The axes of temperature(fluorescence) shifts 2, 4 and 14°C(150, 300 and 600 unit) to the right for B, C and D, respectively.

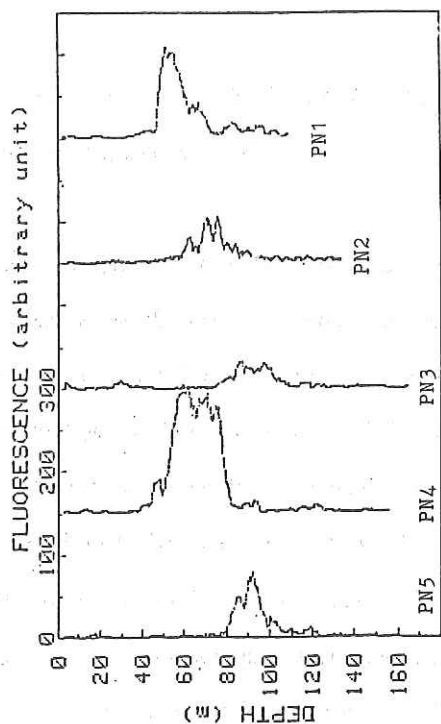
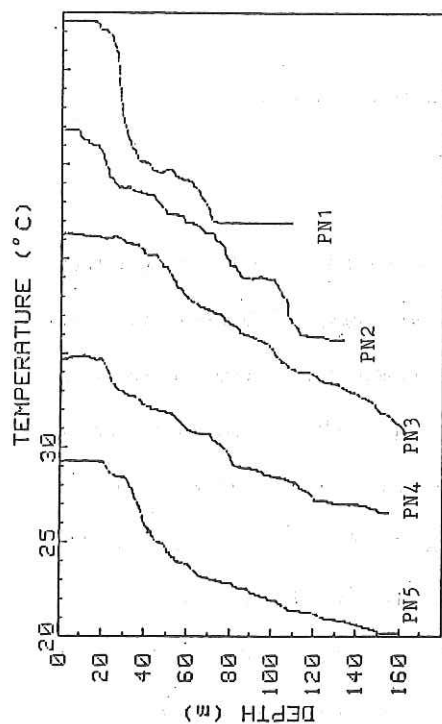


Fig. 32 Vertical distributions of temperature and fluorescence observed at 5 stations from 5 to 6 July 1984. The axes of temperature (fluorescence) shifts 6°C (150 unit) to the right for each successive trace.

13. Phytoplankton studies in the Kuroshio waters

K. Furuya and N. Hosaka

Size structure of phytoplankton biomass in terms of cell volume and carbon was examined for the 200m water column at every CTDO station with an emphasis on biomass and cell size of cyanobacteria. Phytoplankton collected with a rosette multisampler mounted on a CTDO were fixed with 1% glutaraldehyde, and epifluorescence microscopic specimens were prepared after the method of Tsuji and Yanagita(1981). Photosynthetic forms with chlorophyll fluorescence were enumerated and their cell volume was measured using an image analyzer system (Furuya, 1982), and the cell volume was converted to carbon content. Phycoerythrin-containing cyanobacteria(0.5-2 μ m in diameter) were recognized from other phytoplankters by the orange fluorescence of phycoerythrin under green light(520-550 nm) excitation.

Integrated cell number of the cyanobacteria in the upper 150m was between 10^7 - 10^8 cells/cm² in the Kuroshio waters. The layers, where the maximum cell numbers(more than 10^4 cells/ml)were found, became shallower from the open sea(40-60m) to coastal and continental shelf waters. In these layers of the maximum abundance, the cyanobacteria occupied 5-11.5% of total phytoplankton cell volume.

References

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14. Acoustic observations on fish scattering layers

I. Aoki, T. Inagaki, T. Aoyama and K. Ishida

Acoustic observations were made throughout this cruise using the scientific echo sounder (FQ50-FURUNO). The echoes were recorded on a moist paper, and at the same time the mean volume back scattering strength(SV) was calculated in real time for each of ten contiguous depth intervals and each 0.2 nautical mile interval of distance. The output was typed on a printer and saved on a 5 inch disket.

The distribution of fish traces recorded along a section from Stn. 51 to Stn. PN5 are superimposed on vertical sections of temperature and salinity (Fig. 34). Fish schools concentrated at a depth range of 10 to 25m around Stn. 52 and at a greater depth of 20 to 70m around Stn. PN2. The vertical distribution of the schools seems to correspond with the vertical temperature structure. Around Stn. 57 there existed a frontal zone where horizontal salinity gradient was steep. Also during other survey periods fish schools were always aggregated near frontal zone.

Three grid surveys were carried out during this cruise. Fig. 33 shows an example of results of the grid surveys. The values of SV at a depth range of 20 to 40m for every 0.2 mile interval of distance are given along tracklines and contours drawn at four level of SV. In this area surveyed many large patches of fish traces were observed. Although identification of the fish traces was impossible, since a number of dead juvenile filefish were drifted on the water surface in this area, the echo traces was likely to be traces of filefish. Mean fish density can be obtained from mean volume back scattering strength, if target strength (TS) of a single fish is known. However, TS of the filefish is unknown. Supposing TS=-60dB, for example, the densities are calculated

according to the formula, $SV = TS + 10 \log n(n, \text{fish density})$, as 3.2, 1.6, 1.0 and 0.3 fish/m³ for very high, high, middle and low density areas, respectively.

Sound scattering layers associated with change in density of water often appear on echograms. A echograms is compared with profiles of temperature and salinity in Fig. 35. It is clear that the scattering layers correspond with the thermocline and salinocline. Such echo traces give us information on the vertical structure of water mass.

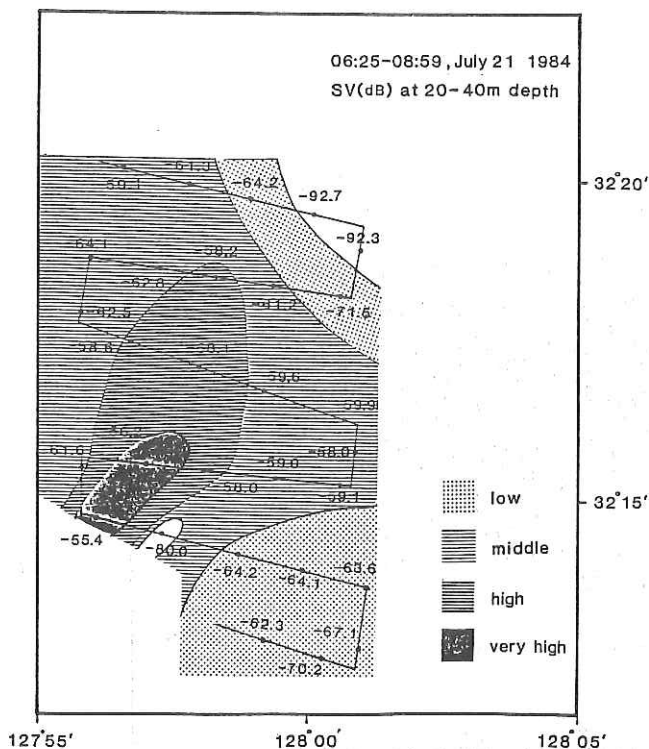


Fig. 33 Distribution of fish traces superimposed on temperature(A)
and salinity(B) along a section from st.51 to st.PN5.

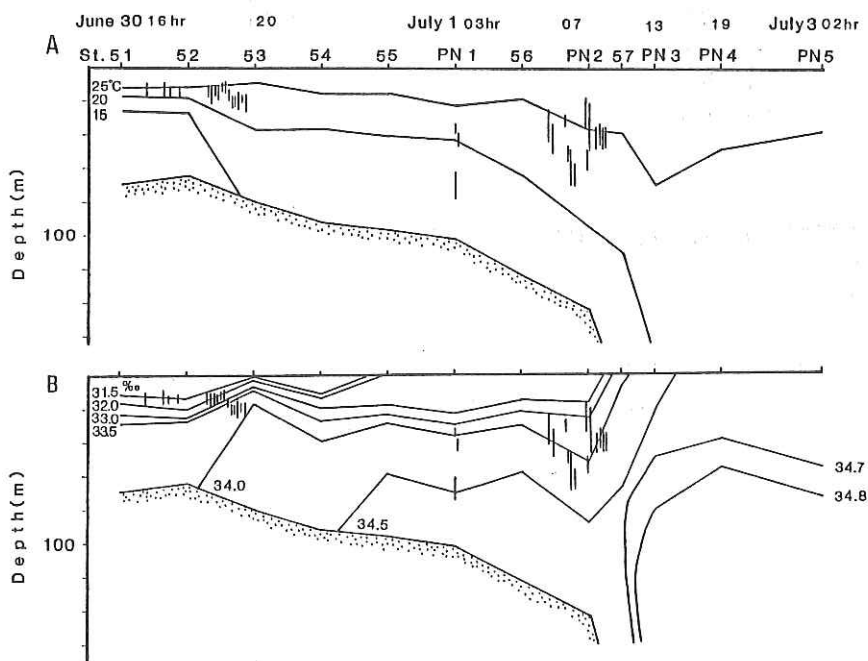


Fig. 34 Results of a grid survey .

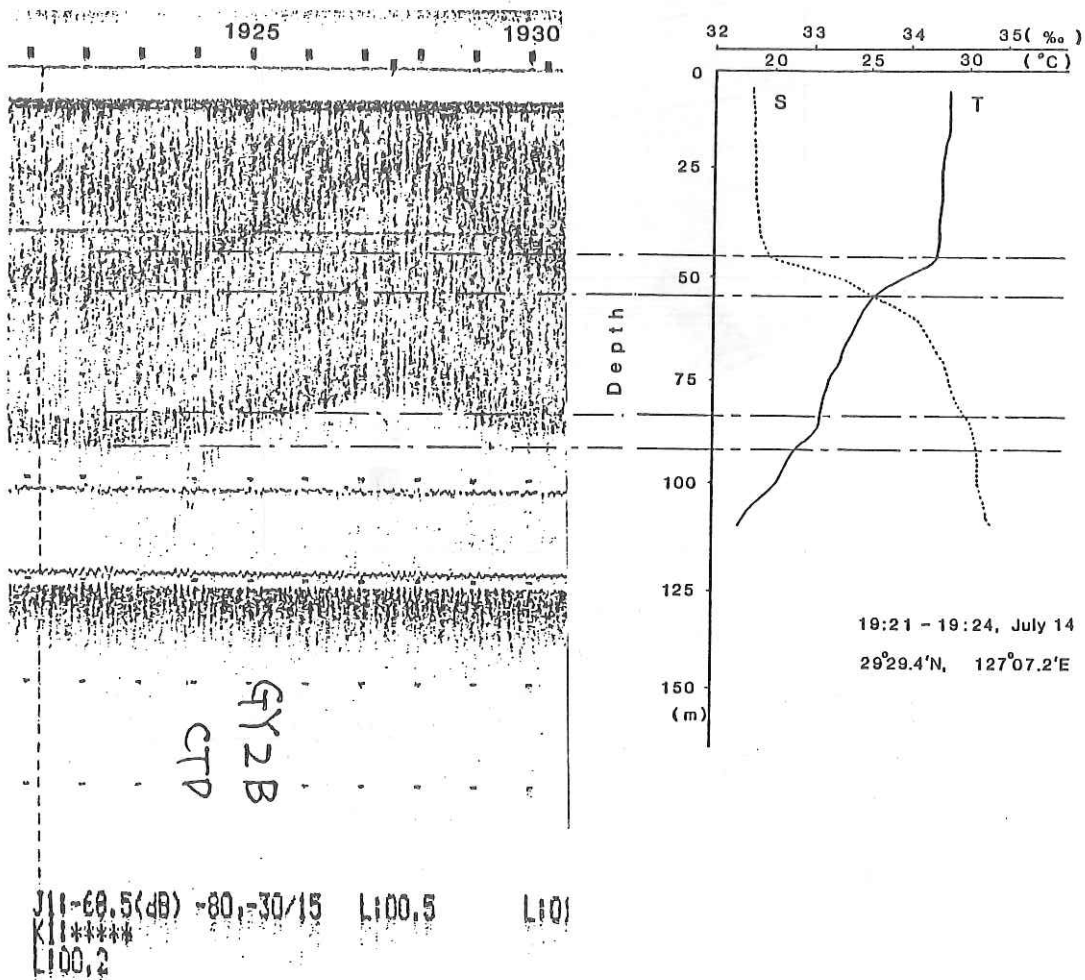


Fig. 35 Comparison between echo trace and vertical profiles of temperature and salinity.

Station	Latitude	Longitude	Date	Time	Depth
2	30-28.3 N	132-19.1 E	JUN. 22, 1984	15:00	3750
	30-29.6 N	132-19.2 E		16:21	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	27.124	34.026	21.968	586.0	0.0
10	26.523	34.035	22.165	567.2	0.057
20	25.808	34.170	22.489	536.9	0.112
30	25.373	34.365	22.770	509.3	0.165
50	24.237	34.720	23.380	451.0	0.262
75	23.341	34.814	23.715	419.2	0.371
100	22.432	34.840	23.995	392.4	0.473
125	21.106	34.806	24.337	359.8	0.567
150	20.019	34.891	24.654	329.5	0.655
200	18.722	34.817	24.971	299.3	0.814
250	17.459	34.760	25.239	273.9	0.962
300	16.434	34.739	25.468	252.3	1.097
400	14.071	34.561	25.852	215.5	1.340
500	10.523	34.325	26.355	167.8	1.78.6
600	8.226	34.228	26.655	139.3	1.703
700	6.347	34.247	26.935	112.7	1.837
800	5.157	34.277	27.106	96.5	1.950
900	4.272	34.310	27.231	84.7	2.049
1000	3.792	34.376	27.334	74.9	2.137
1200	3.191	34.463	27.462	62.8	2.291
1500	2.569	34.530	27.570	52.5	2.487
2000	2.035	34.598	27.669	43.2	2.767

Station	Latitude	Longitude	Date	Time	Depth
4	30-49.3 N	131-54.7 E	JUN. 22, 1984	20:15	1800
	30-51.7 N	131-54.3 E		21:41	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	27.358	34.045	21.907	591.9	0.0
10	27.311	34.037	21.916	591.0	0.059
20	26.155	34.044	22.286	555.5	0.116
30	25.571	34.140	22.540	531.3	0.171
50	24.264	34.325	23.075	480.2	0.271
75	23.876	34.595	23.393	449.9	0.389
100	22.106	34.578	23.888	402.5	0.496
125	20.223	34.625	24.437	350.3	0.590
150	19.085	34.654	24.754	320.0	0.674
200	16.912	34.622	25.264	271.5	0.825
250	15.052	34.594	25.666	233.2	0.955
300	13.228	34.570	25.994	202.0	1.067
400	11.056	34.415	26.330	170.2	1.263
500	8.415	34.215	26.724	132.8	1.421
600	6.572	34.257	26.913	114.8	1.553
700	5.185	34.269	27.097	97.4	1.667
800	4.456	34.346	27.240	83.8	1.765
900	3.858	34.392	27.340	74.4	1.851
1000	3.483	34.437	27.413	67.4	1.930
1200	2.934	34.485	27.503	59.0	2.070
1500	2.430	34.543	27.593	50.4	2.258

Station	Latitude	Longitude	Date	Time	Depth
3	30-42.3 N	132-02.7 E	JUN. 22, 1984	17:58	2270
	30-44.2 N	132-02.6 E		19:19	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	26.869	34.020	22.044	578.7	0.0
10	27.121	34.006	21.954	587.4	0.058
20	26.122	34.033	22.289	555.3	0.115
30	25.858	34.112	22.431	541.8	0.170
50	25.406	34.198	22.634	522.3	0.276
75	24.790	34.440	23.003	480.0	0.403
100	22.612	34.438	23.640	429.9	0.517
125	21.771	34.632	24.023	394.3	0.621
150	20.066	34.677	24.518	347.7	0.715
200	17.782	34.695	25.111	286.0	0.872
250	15.984	34.663	25.511	248.0	1.010
300	14.737	34.601	25.740	234.7	1.131
400	11.858	34.465	26.220	180.6	1.342
500	9.035	34.351	26.625	142.2	1.516
600	6.619	34.229	26.885	117.5	1.653
700	5.461	34.266	27.061	100.8	1.770
800	4.739	34.302	27.174	90.1	1.874
900	4.040	34.385	27.315	76.7	1.965
1000	3.617	34.427	27.392	69.5	2.046
1200	3.012	34.477	27.489	60.3	2.192
1500	2.461	34.540	27.588	50.9	2.382

Station	Latitude	Longitude	Date	Time	Depth
5	30-55.9 N	131-46.6 E	JUN. 22, 1984	22:30	1710
	30-57.8 N	131-46.1 E		23:53	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	27.214	34.117	22.007	582.3	0.0
10	27.181	34.107	22.010	582.0	0.058
20	25.620	33.987	22.410	543.8	0.114
30	25.107	34.159	22.696	516.4	0.167
50	23.678	34.337	23.256	464.8	0.264
75	21.838	34.607	23.985	393.4	0.371
100	20.654	34.732	24.403	353.5	0.464
125	19.190	34.748	24.800	315.8	0.548
150	18.263	34.720	25.011	295.5	0.626
200	15.871	34.664	25.537	245.4	0.763
250	14.170	34.549	25.822	218.4	0.882
300	12.386	34.492	26.139	188.2	0.988
400	9.580	34.277	26.482	155.8	1.166
500	7.585	34.243	26.764	128.9	1.316
600	5.868	34.272	27.016	105.0	1.442
700	4.947	34.281	27.134	93.9	1.550
800	4.111	34.357	27.285	79.5	1.643
900	3.890	34.398	27.341	74.3	1.728
1000	3.450	34.433	27.413	67.5	1.806
1200	2.980	34.482	27.496	59.6	1.948
1500	2.483	34.540	27.585	51.1	2.137

Station	Latitude	Longitude	Date	Time	Depth
6	31-03.3 N	131-38.3 E	JUN. 23, 1984	00:47	1120
	31-04.2 N	131-37.8 E		01:42	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	26.498	34.118	22.235	560.5	0.0
10	26.066	34.170	22.409	543.8	0.055
20	25.155	34.206	22.716	514.2	0.108
30	24.315	34.367	23.090	478.7	0.158
50	22.817	34.667	23.754	415.3	0.248
75	21.077	34.691	24.258	367.4	0.346
100	18.803	34.643	24.561	338.4	0.434
125	18.679	34.671	24.870	309.0	0.517
150	17.157	34.681	25.251	272.7	0.590
200	14.625	34.567	25.739	226.3	0.718
250	12.973	34.500	26.031	198.6	0.827
300	11.101	34.379	26.293	173.6	0.923
400	8.881	34.355	26.653	139.5	1.089
500	8.425	34.353	26.722	132.9	1.233
600	6.045	34.322	27.033	103.4	1.358
700	4.965	34.322	27.164	91.0	1.463
800	4.256	34.368	27.279	80.1	1.556
900	3.761	34.401	27.356	72.8	1.640
1000	3.403	34.433	27.417	67.0	1.717

Station	Latitude	Longitude	Date	Time	Depth
8	30-48.9 N	131-21.6 E	JUN. 23, 1984	05:17	275
	30-48.1 N	131-21.5 E		05:32	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	26.089	34.036	22.301	554.1	0.0
10	25.084	34.179	22.718	514.3	0.053
20	24.292	34.220	22.987	488.6	0.103
30	22.016	34.452	23.818	409.2	0.148
50	21.081	34.702	24.265	366.6	0.225
75	19.602	34.638	24.609	333.9	0.314
100	18.632	34.698	24.895	306.6	0.394
125	17.649	34.662	25.118	285.5	0.469
150	16.158	34.543	25.379	260.5	0.538
200	14.668	34.565	25.728	227.3	0.662
250	12.553	34.500	26.114	190.7	0.767

Station	Latitude	Longitude	Date	Time	Depth
7	31-10.3 N	131-30.2 E	JUN. 23, 1984	02:44	255
	31-10.7 N	131-30.1 E		03:03	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	26.255	34.062	22.269	557.2	0.0
10	26.291	34.048	22.248	559.3	0.055
20	24.581	34.239	22.914	495.5	0.108
30	23.450	34.377	23.352	453.7	0.156
50	21.796	34.326	23.935	398.0	0.241
75	20.141	34.672	24.494	347.5	0.334
100	18.506	34.675	24.917	304.5	0.416
125	17.399	34.667	25.182	279.3	0.490
150	16.475	34.616	25.361	262.2	0.558
200	13.749	34.518	25.886	212.3	0.679

Station	Latitude	Longitude	Date	Time	Depth
9	30-41.4 N	131-29.7 E	JUN. 23, 1984	06:41	1400
	30-41.5 N	131-29.6 E		07:45	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	26.952	34.061	22.049	578.3	0.0
10	26.932	34.073	22.064	576.9	0.057
20	25.826	34.107	22.436	541.3	0.113
30	24.482	34.213	22.925	493.7	0.165
50	23.064	34.472	23.536	436.1	0.258
75	20.753	34.572	24.255	370.3	0.359
100	18.129	34.365	24.774	318.1	0.445
125	16.984	34.449	25.115	289.7	0.521
150	16.041	34.533	25.398	258.7	0.589
200	13.841	34.524	25.872	213.7	0.710
250	12.282	34.474	26.146	187.6	0.813
300	10.833	34.415	26.370	166.3	0.904
400	9.061	34.359	26.628	141.9	1.088
500	7.131	34.316	26.883	117.6	1.204
600	5.423	34.301	27.094	97.7	1.319
700	4.378	34.339	27.243	82.5	1.417
800	3.955	34.366	27.325	75.8	1.503
900	3.648	34.414	27.378	70.7	1.583
1000	3.367	34.442	27.427	66.1	1.659
1200	2.942	34.484	27.501	59.1	1.798

Station	Latitude	Longitude	Date	Time	Depth
10	30-35.2 N	131-38.2 E	JUN.23, 1984	08:49	1800
	30-36.8 N	131-37.1 E		10:00	
Depth	Temp	Sal	σ_t	$\Delta\sigma_t$	ΔD
0	26.695	34.055	92.126	570.9	0.0
10	26.624	34.056	22.149	568.7	0.057
20	25.334	34.227	22.678	518.1	0.111
30	24.265	34.312	23.064	481.2	0.161
40	23.195	34.393	23.439	445.4	0.254
50					
75	20.902	34.503	24.162	376.5	0.356
100	19.182	34.461	24.583	339.7	0.446
125	18.252	34.622	24.940	302.4	0.526
150	17.092	34.583	25.191	276.4	0.600
200	15.027	34.613	25.687	231.2	0.731
250	13.661	34.520	25.906	210.4	0.844
300	12.266	34.476	26.151	187.2	0.946
400	8.979	34.356	26.638	141.0	1.117
500	6.894	34.279	26.887	117.3	1.253
600	5.235	34.350	27.155	91.9	1.364
700	4.370	34.352	27.254	82.5	89.3
800	3.869	34.388	27.335	74.8	81.7
900	3.557	34.429	27.399	68.8	75.9
1000	3.274	34.454	27.446	64.3	71.6
1200	2.848	34.494	27.517	57.5	65.1

Station	Latitude	Longitude	Date	Time	Depth
PN-7	27-29.9 N	128-15.1 E	JUN.24, 1984	12:19	1030
	27-30.0 N	128-15.1 E		13:00	
Depth	Temp	Sal	σ_t	$\Delta\sigma_t$	ΔD
0	27.224	34.106	21.995	583.4	0.0
10	27.238	34.136	22.014	581.7	0.068
20	25.117	34.405	22.878	499.0	0.112
30	24.813	34.589	23.109	476.9	0.161
50	23.661	34.804	23.614	428.7	0.251
75	22.714	34.861	23.931	398.5	0.355
100	21.847	34.906	24.209	371.9	0.451
125	21.102	34.898	24.408	353.0	0.542
150	20.653	34.896	24.528	341.5	0.630
200	19.377	34.859	24.836	312.2	0.797
250	18.303	34.829	25.085	296.8	0.950
300	17.193	34.782	25.320	266.2	1.092
400	15.141	34.647	25.688	231.2	1.352
500	12.337	34.416	26.090	192.9	1.578
600	9.919	34.381	26.502	153.8	1.760
700	7.687	34.319	26.806	125.0	1.912
800	6.163	34.317	26.880	118.0	1.903
900	6.816	34.339	26.945	111.8	1.918
1000	6.395	34.343	27.004	106.2	1.945

Station	Latitude	Longitude	Date	Time	Depth
11	30-22.1 N	131-54.6 E	JUN.23, 1984	12:16	2620
	30-22.4 N	131-54.8 E		13:37	
Depth	Temp	Sal	σ_t	$\Delta\sigma_t$	ΔD
0	27.641	34.112	21.866	595.8	0.0
10	27.311	34.163	22.011	581.9	0.058
20	26.274	34.285	22.431	541.7	0.115
30	25.930	34.400	22.624	523.2	0.168
40	25.241	34.575	22.968	490.3	0.270
50					
75	24.115	34.763	23.448	444.6	0.389
100	23.928	34.828	23.789	411.9	0.495
125	22.124	34.722	23.982	392.7	0.586
150	21.692	34.703	24.098	382.5	0.694
200	19.471	34.673	24.670	338.0	0.875
250	16.744	34.658	25.331	265.1	1.023
300	14.117	34.557	25.839	216.8	1.146
400	11.197	34.427	26.314	171.7	1.308
500	8.592	34.346	26.691	135.9	1.512
600	5.871	34.257	27.004	106.2	1.641
700	4.852	34.343	27.194	88.2	1.745
800	3.995	34.381	27.317	76.5	1.835
900	3.585	34.418	27.388	69.9	1.915
1000	3.348	34.458	27.442	64.7	1.969
1200	2.904	34.500	27.517	57.6	2.126
1500	2.424	34.548	27.597	50.0	2.311

Station	Latitude	Longitude	Date	Time	Depth
PN-6	27-41.9 N	127-57.1 E	JUN.24, 1984	14:47	715
	27-41.7 N	127-56.9 E		15:21	
Depth	Temp	Sal	σ_t	$\Delta\sigma_t$	ΔD
0	27.880	34.033	21.729	608.9	0.0
10	28.004	34.015	21.662	615.3	0.061
20	27.043	34.177	22.120	571.5	0.120
30	24.706	34.516	23.086	479.1	0.173
50	23.678	34.762	23.577	432.2	0.264
75	22.604	34.854	23.957	396.0	0.368
100	21.812	34.878	24.197	373.1	0.465
125	21.079	34.881	24.402	358.1	0.557
150	20.378	34.865	24.578	336.8	0.644
200	19.533	34.829	24.773	318.2	0.813
250	18.026	34.810	25.139	283.3	0.964
300	17.271	34.778	25.298	268.2	1.106
400	15.393	34.667	25.647	235.0	1.367
500	12.873	34.502	26.052	196.6	1.588
600	10.407	34.381	26.419	161.7	1.787
700	7.942	34.327	26.775	127.9	1.942

Station	Latitude	Longitude	Date	Time	Depth
PN-5	27-54.1 N 27-54.2 N	127-39.1 E 127-39.2 E	JUN. 24, 1984	17:06 17:49	1110
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.435	34.085	21.912	591.4	0.0
10	27.482	34.086	21.897	592.8	0.059
20	26.770	34.052	22.100	573.4	0.117
30	24.993	34.580	23.048	483.9	0.170
50	23.595	34.816	23.642	427.9	0.260
75	22.394	34.867	24.026	392.3	0.363
100	21.483	34.885	24.294	363.8	0.457
125	20.701	34.893	24.513	343.0	0.546
150	20.237	34.892	24.636	331.2	0.631
200	19.750	34.876	24.752	320.2	0.798
250	19.050	34.844	24.908	305.3	0.959
300	17.734	34.805	25.206	276.9	1.109
400	15.359	34.666	25.654	234.4	1.373
500	13.229	34.514	25.990	202.5	1.605
600	10.502	34.382	26.403	163.2	1.801
700	8.251	34.363	26.757	129.7	1.959
800	6.126	34.339	27.036	103.2	2.085
900	5.201	34.382	27.184	89.1	2.193
1000	4.689	34.416	27.270	81.0	2.288

Station	Latitude	Longitude	Date	Time	Depth
14	27-58.1 N 27-59.1 N	127-15.1 E 127-15.4 E	JUN. 24, 1984	21:10 22:00	1140
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.652	34.297	22.001	582.8	0.0
10	27.660	34.297	21.998	583.1	0.058
20	25.578	34.571	22.862	500.5	0.112
30	24.827	34.672	23.167	471.3	0.161
50	23.840	34.797	23.614	428.6	0.251
75	22.636	34.845	23.941	397.6	0.355
100	21.779	34.877	24.206	372.2	0.451
125	21.245	34.891	24.364	357.3	0.544
150	20.567	34.894	24.549	339.5	0.632
200	19.550	34.870	24.799	315.7	0.798
250	18.067	34.830	25.144	282.9	0.950
300	16.717	34.765	25.419	256.7	1.097
400	14.118	34.574	25.852	215.5	1.338
500	10.931	34.391	26.334	169.8	1.543
600	8.712	34.351	26.676	137.3	1.705
700	6.554	34.358	26.941	112.2	1.841
800	5.909	34.347	27.070	99.9	1.958
900	5.262	34.375	27.172	90.3	2.063
1000	4.680	34.407	27.241	83.7	2.160

Station	Latitude	Longitude	Date	Time	Depth
13	28-00.1 N 28-00.3 N	127-31.1 E 127-31.5 E	JUN. 24, 1984	18:47 19:37	1150
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.436	34.225	22.017	581.3	0.0
10	27.435	34.223	22.016	581.5	0.058
20	26.434	34.260	22.362	548.3	0.111
30	24.093	34.777	23.486	442.8	0.164
50	23.005	34.811	23.816	409.4	0.249
75	22.449	34.861	24.006	391.4	0.350
100	21.467	34.885	24.298	363.4	0.445
125	20.905	34.890	24.455	348.5	0.535
150	20.389	34.892	24.596	335.1	0.622
200	19.758	34.876	24.749	320.4	0.788
250	18.917	34.849	24.946	301.8	0.948
300	17.729	34.804	25.207	276.9	1.098
400	15.329	34.664	25.659	233.9	1.359
500	12.848	34.494	26.050	196.7	1.587
600	9.717	34.369	26.528	151.4	1.769
700	7.840	34.361	26.817	124.0	1.920
800	6.347	34.348	27.014	105.2	2.045
900	5.180	34.363	27.187	88.8	2.153
1000	4.697	34.413	27.266	81.3	2.248

Station	Latitude	Longitude	Date	Time	Depth
15	28-06.9 N 28-06.9 N	127-22.1 E 127-22.2 E	JUN. 24, 1984	22:52 23:33	1000
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.678	34.308	22.001	582.9	0.0
10	27.680	34.328	22.015	581.5	0.058
20	27.295	34.331	22.142	569.4	0.115
30	25.029	34.639	23.081	479.5	0.168
50	24.081	34.735	23.438	445.5	0.260
75	22.909	34.836	23.856	405.7	0.367
100	21.952	34.879	24.159	376.7	0.465
125	21.122	34.882	24.391	354.7	0.558
150	20.396	34.889	24.591	335.5	0.643
200	19.406	34.856	24.908	305.3	0.809
250	17.790	34.820	25.204	277.1	0.959
300	16.719	34.761	25.416	257.0	1.097
400	13.824	34.553	25.897	211.2	1.341
500	10.795	34.371	26.343	168.9	1.543
600	8.660	34.361	26.693	135.7	1.706
700	6.904	34.345	26.937	112.5	1.838
800	5.889	34.356	27.080	99.0	1.954
900	5.252	34.372	27.170	90.5	2.058

Station	Latitude	Longitude	Date	Time	Depth
PN-4	28-13.1 N	127-12.3 E	JUN. 25, 1984	00:55	1015
	28-14.3 N	127-12.8 E		01:43	

Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.279	34.297	21.797	602.4	0.0
10	28.286	34.298	21.795	603.0	0.060
20	28.097	34.298	21.850	597.3	0.120
30	28.348	34.607	22.650	520.8	0.176
50	28.147	34.732	23.130	474.9	0.276
75	28.847	34.874	23.612	431.9	0.388
100	22.740	34.865	23.926	402.6	0.492
125	21.532	34.886	24.281	365.1	0.589
150	20.619	34.893	24.535	340.9	0.678
200	18.698	34.893	24.996	296.9	0.842
250	17.185	34.801	25.336	264.6	0.986
300	15.780	34.706	25.590	240.5	1.117
400	12.999	34.462	26.114	190.6	1.343
500	9.586	34.368	26.548	149.4	1.522
600	7.705	34.368	26.842	121.6	1.667
700	6.344	34.357	27.022	104.5	1.790
800	5.499	34.373	27.141	93.2	1.898
900	5.011	34.402	27.222	85.5	1.997

Station	Latitude	Longitude	Date	Time	Depth
19	28-20.0 N	127-02.3 E	JUN. 25, 1984	10:14	800
	28-21.0 N	127-03.1 E		10:54	

Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.852	34.224	21.553	625.8	0.0
10	28.845	34.225	21.555	625.6	0.062
20	28.840	34.226	21.558	625.3	0.125
30	28.805	34.223	21.567	624.4	0.187
50	28.242	34.551	22.641	521.7	0.305
75	24.131	34.717	23.409	448.3	0.425
100	22.739	34.739	23.831	408.0	0.533
125	21.541	34.823	24.231	370.0	0.631
150	19.777	34.709	24.617	333.0	0.721
200	18.065	34.691	25.038	292.9	0.880
250	14.941	34.699	25.733	226.9	1.018
300	13.055	34.516	26.026	199.0	1.130
400	9.744	34.386	26.536	150.6	1.307
500	7.752	34.337	26.811	124.5	1.452
600	6.556	34.353	26.991	107.4	1.574
700	6.009	34.376	27.080	99.0	1.687

Station	Latitude	Longitude	Date	Time	Depth
18	28-03.7 N	127-06.7 E	JUN. 25, 1984	03:30	1055
	28-04.6 N	127-07.0 E		04:15	

Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.805	34.285	21.614	619.9	0.0
10	28.808	34.284	21.612	620.1	0.062
20	28.413	34.354	21.795	602.6	0.123
30	27.057	34.514	22.355	546.9	0.180
50	24.952	34.776	23.208	467.4	0.282
75	23.892	34.845	23.577	432.3	0.394
100	22.739	34.877	23.936	398.0	0.499
125	21.717	34.896	24.238	369.3	0.596
150	21.093	34.887	24.402	353.5	0.687
200	19.309	34.862	24.856	310.3	0.856
250	17.621	34.817	25.243	273.4	1.003
300	16.082	34.725	25.536	254.7	1.136
400	12.663	34.469	26.067	195.1	1.366
500	9.945	34.348	26.472	156.6	1.550
600	8.148	34.360	26.770	128.4	1.703
700	6.553	34.363	26.999	106.6	1.829
800	5.825	34.370	27.099	97.2	1.941
900	5.069	34.394	27.209	86.8	2.042
1000	4.645	34.417	27.275	80.5	2.135

Station	Latitude	Longitude	Date	Time	Depth
PN-3	28-26.9 N	126-58.0 E	JUN. 25, 1984	12:03	400
	28-27.7 N	126-58.6 E		12:31	

Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.377	34.164	21.664	615.1	0.0
10	28.393	34.163	21.659	615.6	0.061
20	28.313	34.156	21.680	613.6	0.123
30	28.335	34.126	21.716	610.2	0.184
50	24.553	34.383	23.032	484.3	0.293
75	22.822	34.431	23.574	432.6	0.408
100	21.240	34.523	24.088	383.5	0.510
125	19.622	34.645	24.609	333.9	0.601
150	18.878	34.716	24.855	310.4	0.682
200	15.651	34.661	25.585	241.0	0.825
250	11.938	34.464	26.204	182.1	0.929
300	10.684	34.411	26.393	164.2	1.018

Station	Latitude	Longitude	Date	Time	Depth
57-1	28-29.0 N	126-46.2 E	JUN.25, 1984	15:00	205
	28-29.4 N	126-46.3 E		15:16	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.005	33.548	21.647	616.8	0.0
10	26.994	33.549	21.651	616.8	0.061
20	26.969	33.604	21.826	599.6	0.122
30	25.023	33.834	22.476	538.5	0.179
50	22.439	34.473	23.715	419.0	0.274
75	20.810	34.583	24.248	368.3	0.374
100	18.817	34.670	24.835	315.7	0.458
125	17.675	34.682	25.127	284.6	0.533
150	16.330	34.616	25.395	263.6	0.603

Station	Latitude	Longitude	Date	Time	Depth
20	28-46.6 N	126-47.1 E	JUN.25, 1984	18:00	140
	28-46.7 N	126-47.1 E		18:10	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.096	33.565	21.631	618.3	0.0
10	26.964	33.564	21.672	614.4	0.061
20	23.739	33.947	22.944	492.7	0.117
30	23.446	34.455	23.413	447.9	0.164
50	21.666	34.615	24.038	388.2	0.248
75	19.819	34.728	24.621	332.8	0.339
100	18.747	34.710	24.883	307.7	0.419
125	16.949	34.646	25.267	271.3	0.493

Station	Latitude	Longitude	Date	Time	Depth
PN-2	28-34.8 N	126-36.9 E	JUN.25, 1984	16:24	140
	28-35.0 N	126-36.9 E		16:35	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	26.808	33.559	21.699	611.8	0.0
10	26.817	33.580	21.730	608.8	0.061
20	24.604	34.088	22.794	507.0	0.116
30	22.408	34.341	23.624	427.7	0.163
50	21.054	34.342	23.999	391.9	0.245
75	19.195	34.602	24.686	326.6	0.336
100	18.248	34.706	25.005	296.1	0.413
125	17.893	34.684	25.051	291.8	0.488

Station	Latitude	Longitude	Date	Time	Depth
21	28-41.5 N	126-55.0 E	JUN.25, 1984	19:18	265
	28-41.8 N	126-55.3 E		19:31	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.484	33.951	21.796	602.5	0.0
10	27.491	33.953	21.795	602.6	0.060
20	26.081	33.984	22.265	557.6	0.118
30	24.777	34.150	22.789	507.5	0.171
50	22.607	34.375	23.593	430.7	0.265
75	20.605	34.752	24.432	350.8	0.362
100	18.489	34.664	24.913	304.9	0.446
125	18.163	34.692	25.016	299.3	0.522
150	15.883	34.606	25.490	254.5	0.593
200	12.467	34.494	26.126	189.6	0.697

Station	Latitude	Longitude	Date	Time	Depth
22	28-35.5 N	127-04.8 E	JUN.25, 1984	20:50	770
	28-36.9 N	127-05.6 E		21:37	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	27.773	34.065	21.788	603.2	0.0
10	27.780	34.065	21.785	603.9	0.060
20	27.782	34.062	21.782	604.6	0.120
30	27.508	34.032	21.849	597.4	0.181
50	23.170	34.290	23.368	452.2	0.282
75	21.843	34.597	23.976	394.2	0.389
100	20.444	34.634	24.385	355.1	0.483
125	19.183	34.722	24.781	317.5	0.567
150	17.991	34.679	25.048	292.0	0.645
200	14.073	34.581	25.867	214.1	0.781
250	11.898	34.483	26.226	180.0	0.879
300	10.878	34.419	26.365	166.8	0.969
400	8.912	34.320	26.621	142.6	1.132
500	7.558	34.331	26.835	122.2	1.271
600	6.577	34.357	26.992	107.4	1.394

Station	Latitude	Longitude	Date	Time	Depth
17	28-23.3 N	127-23.2 E	JUN.26, 1984	01:29	1140
	28-24.8 N	127-24.3 E		02:23	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	28.113	34.379	21.912	591.4	0.0
10	28.118	34.378	21.910	591.5	0.059
20	28.074	34.373	21.921	590.6	0.118
30	26.799	34.544	22.460	534.9	0.174
50	25.121	34.754	23.140	478.0	0.275
75	23.681	34.825	23.624	427.8	0.389
100	22.501	34.879	24.005	391.4	0.491
125	21.191	34.889	24.377	356.0	0.586
150	20.252	34.875	24.619	332.8	0.673
200	18.771	34.847	24.981	298.3	0.833
250	17.273	34.803	25.316	266.5	0.977
300	15.904	34.718	25.571	242.2	1.108
400	12.144	34.431	26.140	188.2	1.333
500	9.778	34.370	26.518	152.3	1.509
600	7.938	34.367	26.807	124.9	1.657
700	6.293	34.366	27.036	103.2	1.782
800	5.589	34.385	27.140	93.3	1.869
900	4.995	34.402	27.224	85.4	1.988
1000	4.734	34.414	27.263	81.7	2.082

Station	Latitude	Longitude	Date	Time	Depth
23	28-29.5 N	127-14.0 E	JUN.25, 1984	23:06	1050
	28-31.4 N	127-14.9 E	JUN.26	00:00	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	28.228	34.289	21.808	601.4	0.0
10	28.227	34.289	21.808	601.4	0.060
20	28.229	34.291	21.809	602.1	0.120
30	27.900	34.371	21.876	585.3	0.179
50	25.604	34.669	22.928	494.2	0.287
75	24.107	34.814	23.490	440.6	0.405
100	22.853	34.876	23.902	401.2	0.511
125	21.344	34.851	24.306	362.8	0.607
150	19.936	34.752	24.609	333.8	0.695
200	18.451	34.828	25.047	292.1	0.857
250	16.733	34.773	25.422	256.5	0.997
300	13.250	34.529	25.996	209.7	1.115
400	9.791	34.380	26.524	151.8	1.291
500	8.048	34.350	26.777	127.7	1.439
600	6.831	34.344	26.947	111.6	1.566
700	5.891	34.376	27.096	97.5	1.678
800	5.327	34.393	27.178	89.7	1.780
900	4.851	34.410	27.247	82.2	1.877
1000	4.577	34.422	27.287	79.4	1.968

Station	Latitude	Longitude	Date	Time	Depth
24	24-52.0 N	123-19.3 E	JUN.27, 1984	16:52	1550
	24-52.2 N	123-18.9 E		17:52	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	28.278	34.592	22.018	581.2	0.0
10	28.268	34.592	22.016	581.4	0.058
20	28.286	34.593	22.017	581.4	0.116
30	27.859	34.602	22.163	567.3	0.173
50	25.373	34.814	23.108	477.0	0.278
75	22.880	34.891	23.905	403.8	0.387
100	21.697	34.905	24.250	368.0	0.484
125	21.034	34.900	24.428	351.1	0.576
150	20.118	34.890	24.666	328.4	0.662
200	18.669	34.845	25.006	298.0	0.820
250	16.658	34.765	25.433	255.4	0.960
300	15.394	34.673	25.651	234.6	1.086
400	13.829	34.548	25.893	211.7	1.319
500	11.661	34.388	26.197	182.8	1.533
600	9.191	34.249	26.520	152.1	1.715
700	6.813	34.360	26.962	110.2	1.854
800	5.382	34.402	27.178	89.8	1.962
900	4.906	34.419	27.298	83.1	2.058
1000	4.453	34.434	27.310	77.2	2.148
1200	4.106	34.448	27.359	72.6	2.318

Station	Latitude		Longitude		Date		Time	Depth
	24-53.6 N	123-02.8 E	24-54.0 N	123-01.9 E	JUN. 27, 1984	JUN. 27, 1984		
25	24-53.6 N	123-02.8 E	24-54.0 N	123-01.9 E	JUN. 27, 1984	JUN. 27, 1984	19:10	1830
	Temp	Sal	σ _t	Δσ _t	Δσ _t	Δσ _t	Δσ _t	ΔD
0	28.823	34.270	21.586	621.6	621.6	621.6	0.0	0.0
10	28.825	34.267	21.594	621.8	621.8	622.3	0.062	0.062
20	28.822	34.266	21.594	621.9	622.7	622.7	0.124	0.124
30	28.730	34.253	21.615	619.8	621.1	621.1	0.186	0.186
50	26.960	34.634	22.477	537.3	539.3	539.3	0.302	0.302
75	23.494	34.856	23.701	420.4	423.3	423.3	0.418	0.418
100	22.074	34.897	24.138	378.7	382.4	382.4	0.518	0.518
125	21.260	34.897	24.365	357.2	361.7	361.7	0.610	0.610
150	20.220	34.884	24.842	330.7	336.0	336.0	0.897	0.897
200	18.781	34.850	24.981	298.4	305.2	305.2	0.859	0.859
250	17.207	34.794	25.326	265.6	273.6	273.6	1.003	1.003
300	15.811	34.710	25.586	240.8	249.8	249.8	1.134	1.134
400	12.864	34.418	27.256	198.8	209.1	209.1	1.363	1.363
500	10.077	34.295	26.410	162.6	173.0	173.0	1.555	1.555
600	8.138	34.269	26.701	135.0	145.4	145.4	1.715	1.715
700	6.697	34.357	26.977	108.8	119.0	119.0	1.847	1.847
800	5.744	34.412	27.142	93.1	103.3	103.3	1.957	1.957
900	4.826	34.418	27.256	82.3	92.0	92.0	2.054	2.054
1000	4.494	34.432	27.304	77.7	87.7	87.7	2.144	2.144
1200	4.140	34.447	27.354	73.0	84.1	84.1	2.315	2.315
1500	3.911	34.459	27.387	69.9	82.8	82.8	2.565	2.565

Station	Latitude		Longitude		Date		Time	Depth
	24-55.5 N	122-30.5 E	24-56.8 N	122-31.3 E	JUN. 27, 1984	JUN. 28, 1984		
27	24-55.5 N	122-30.5 E	24-56.8 N	122-31.3 E	JUN. 27, 1984	JUN. 28, 1984	23:39	1490
	Temp	Sal	σ _t	Δσ _t	Δσ _t	Δσ _t	Δσ _t	ΔD
0	28.348	34.091	21.620	619.4	619.4	619.4	0.0	0.0
10	28.351	34.082	21.619	619.4	619.8	619.8	0.062	0.062
20	28.296	34.238	21.747	607.2	608.0	608.0	0.123	0.123
30	27.439	34.336	22.122	571.3	572.5	572.5	0.182	0.182
50	26.064	34.526	22.678	518.1	520.1	520.1	0.291	0.291
75	23.281	34.671	23.623	427.9	430.7	430.7	0.411	0.411
100	21.314	34.744	24.234	369.6	373.2	373.2	0.513	0.513
125	18.279	34.755	24.611	314.6	318.3	318.3	0.599	0.599
150	18.025	34.758	25.100	287.1	292.0	292.0	0.674	0.674
200	17.050	34.735	25.317	266.4	272.7	272.7	0.817	0.817
250	14.069	34.570	25.859	214.9	221.8	221.8	0.941	0.941
300	13.195	34.406	25.999	201.6	209.5	209.5	1.048	1.048
400	11.665	34.406	26.211	181.5	191.0	191.0	1.245	1.245
500	8.063	34.391	26.607	124.9	133.6	133.6	1.402	1.402
600	6.760	34.386	26.997	106.8	113.7	113.7	1.526	1.526
700	5.832	34.413	27.119	95.3	104.5	104.5	1.636	1.636
800	5.358	34.420	27.196	88.0	97.6	97.6	1.738	1.738
900	4.871	34.430	27.260	81.9	91.7	91.7	1.832	1.832

Station	Latitude		Longitude		Date		Time	Depth
	24-55.0 N	122-45.6 E	24-56.3 N	122-45.3 E	JUN. 27, 1984	JUN. 27, 1984		
26	24-55.0 N	122-45.6 E	24-56.3 N	122-45.3 E	JUN. 27, 1984	JUN. 27, 1984	21:26	1200
	Temp	Sal	σ _t	Δσ _t	Δσ _t	Δσ _t	Δσ _t	ΔD
0	28.850	34.473	21.740	607.9	607.9	607.9	0.0	0.0
10	28.864	34.467	21.730	608.8	608.8	608.2	0.060	0.060
20	28.834	34.537	21.794	603.7	603.6	603.6	0.121	0.121
30	27.778	34.492	22.107	572.7	572.9	572.9	0.180	0.180
50	25.568	34.619	22.902	496.7	496.7	496.7	0.286	0.286
75	23.992	34.716	23.450	444.4	447.3	447.3	0.404	0.404
100	22.484	34.805	23.954	396.2	400.0	400.0	0.510	0.510
125	21.321	34.855	24.215	361.9	366.4	366.4	0.605	0.605
150	20.426	34.839	24.540	340.4	345.7	345.7	0.691	0.691
200	18.174	34.831	25.118	285.3	292.0	292.0	0.853	0.853
250	16.291	34.746	25.504	248.7	256.3	256.3	0.987	0.987
300	15.363	34.665	25.652	234.5	243.4	243.4	1.112	1.112
400	11.961	34.368	26.126	189.6	199.2	199.2	1.336	1.336
500	9.848	34.278	26.434	160.2	170.5	170.5	1.520	1.520
600	7.015	34.346	26.923	113.8	123.0	123.0	1.664	1.664
700	6.265	34.409	27.073	99.6	109.3	109.3	1.778	1.778
800	5.479	34.416	27.178	89.7	99.5	99.5	1.883	1.883
900	4.709	34.434	27.282	79.9	89.3	89.3	1.978	1.978

Station	Latitude		Longitude		Date		Time	Depth
	24-57.0 N	122-13.6 E	24-58.3 N	122-14.3 E	JUN. 28, 1984	JUN. 28, 1984		
28	24-57.0 N	122-13.6 E	24-58.3 N	122-14.3 E	JUN. 28, 1984	JUN. 28, 1984	02:30	990
	Temp	Sal	σ _t	Δσ _t	Δσ _t	Δσ _t	Δσ _t	ΔD
0	27.468	33.993	21.832	599.0	599.0	599.0	0.0	0.0
10	27.433	33.993	21.844	597.9	598.3	598.3	0.059	0.059
20	26.991	34.015	22.002	582.8	583.6	583.6	0.119	0.119
30	26.562	34.037	22.154	568.2	569.4	569.4	0.176	0.176
50	24.381	34.126	22.889	497.9	499.8	499.8	0.282	0.282
75	20.797	34.400	24.111	381.4	384.1	384.1	0.391	0.391
100	17.425	34.684	25.174	280.1	283.3	283.3	0.474	0.474
125	15.773	34.643	25.542	245.1	248.8	248.8	0.540	0.540
150	14.398	34.596	25.816	219.0	223.2	223.2	0.598	0.598
200	13.798	34.568	25.914	209.6	215.1	215.1	0.707	0.707
250	13.569	34.557	25.953	205.9	212.7	212.7	0.814	0.814
300	12.742	34.516	26.089	193.1	200.8	200.8	0.917	0.917
400	9.938	34.399	26.513	152.7	161.1	161.1	1.099	1.099
500	7.806	34.397	26.835	122.2	130.8	130.8	1.244	1.244
600	6.560	34.399	27.027	104.1	112.7	112.7	1.365	1.365
700	5.754	34.419	27.146	92.7	101.7	101.7	1.475	1.475
800	4.930	34.435	27.258	82.2	91.0	91.0	1.572	1.572
900	4.779	34.438	27.277	80.3	89.9	89.9	1.662	1.662

Station	Latitude	Longitude	Date	Time	Depth
29	24-10.1 N	121-57.5 E	JUN. 28, 1984	08:21	2470
	24-10.6 N	121-57.5 E		10:02	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.584	33.950	21.436	637.0	0.0
10	28.582	33.564	21.440	636.6	0.063
20	28.350	34.105	21.629	618.5	0.126
30	27.888	34.147	21.812	600.9	0.187
50	24.748	34.376	22.968	490.4	0.288
75	21.362	34.702	24.189	376.7	0.405
100	20.208	34.774	24.554	339.0	0.450
125	18.790	34.781	24.926	303.8	0.574
150	17.362	34.731	25.240	273.7	0.647
200	15.628	34.670	25.596	239.8	0.777
250	14.131	34.575	25.850	215.7	0.895
300	12.772	34.483	26.057	196.0	1.001
400	10.433	34.299	26.351	168.2	1.192
500	7.871	34.216	26.698	135.2	1.351
600	6.997	34.322	26.907	115.4	1.484
700	6.137	34.385	27.071	99.8	1.602
800	5.801	34.409	27.132	94.1	1.709
900	4.774	34.466	27.300	78.2	1.806
1000	4.084	34.503	27.404	68.3	1.888
1200	3.255	34.547	27.522	57.1	2.030
1500	2.559	34.560	27.595	50.2	2.216
2000	2.103	34.621	27.682	42.0	2.487

Station	Latitude	Longitude	Date	Time	Depth
30	24-08.9 N	122-11.4 E	JUN. 28, 1984	12:07	2790
	24-09.5 N	122-11.4 E		14:47	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.764	33.937	21.367	643.6	0.0
10	28.844	33.923	21.330	647.2	0.064
20	28.610	33.961	21.435	637.0	0.128
30	28.194	34.023	21.619	619.4	0.191
50	26.745	34.184	22.207	563.2	0.312
75	23.272	34.515	23.508	438.9	0.435
100	21.806	34.696	24.061	386.0	0.537
125	19.985	34.760	24.602	334.6	0.628
150	18.600	34.700	24.912	304.9	0.709
200	16.123	34.671	25.485	250.5	0.849
250	14.644	34.607	25.765	220.8	0.970
300	13.311	34.528	25.983	203.1	1.080
400	9.983	34.320	26.444	159.3	1.267
500	7.198	34.158	26.750	130.3	1.430
600	6.776	34.330	26.943	112.0	1.552
700	6.297	34.394	27.057	101.1	1.667
800	5.748	34.421	27.149	92.5	1.774
900	4.937	34.467	27.282	79.8	1.871
1000	4.094	34.501	27.402	68.5	1.954

Station	Latitude	Longitude	Date	Time	Depth
29-1	24-11.0 N	121-58.3 E	JUN. 28, 1984	10:25	2600
	24-11.4 N	121-58.3 E		11:03	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.596	33.926	21.414	639.1	0.0
10	28.609	33.924	21.408	639.7	0.064
20	28.313	34.107	21.643	617.2	0.126
30	27.837	34.273	21.923	590.3	0.187
50	24.580	34.392	23.030	484.4	0.297
75	21.588	34.653	24.089	383.5	0.403
100	20.094	34.717	24.541	340.3	0.494
125	18.810	34.762	24.907	305.5	0.575
150	17.819	34.746	25.141	283.2	0.650
200	15.507	34.653	25.611	238.5	0.783
250	13.888	34.564	25.892	211.7	0.900
300	12.320	34.450	26.120	190.1	1.003
400	9.820	34.264	26.429	160.8	1.188
500	7.712	34.220	26.725	132.6	1.343

Station	Latitude	Longitude	Date	Time	Depth
31	24-08.2 N	122-25.2 E	JUN. 28, 1984	14:02	1970
	24-09.3 N	122-25.2 E		14:47	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.821	34.008	21.401	640.4	0.0
10	28.992	34.007	21.343	645.9	0.064
20	28.380	34.113	21.636	618.8	0.127
30	28.046	34.222	21.817	600.5	0.188
50	25.952	34.381	22.604	525.2	0.304
75	24.117	34.717	23.413	447.9	0.424
100	23.003	34.778	23.785	412.4	0.532
125	21.270	34.841	24.319	361.5	0.629
150	19.950	34.826	24.662	328.8	0.716
200	17.421	34.744	25.236	274.1	0.867
250	16.054	34.676	25.505	248.6	1.001
300	14.677	34.599	25.752	225.1	1.123
400	10.640	34.341	26.347	168.6	1.327
500	8.146	34.230	26.668	138.0	1.490
600	6.373	34.159	26.862	119.7	1.627
700	5.860	34.236	26.989	107.7	1.750
800	5.405	34.387	27.169	91.0	1.858
900	4.872	34.447	27.274	80.6	1.955
1000	3.802	34.450	27.391	69.5	2.038

Station	Latitude	Longitude	Date	Time	Depth
32	24-07.3 N	122-40.3 E	JUN. 28, 1984	16:24	1620
	24-08.2 N	122-39.8 E		17:35	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.948	34.454	21.692	612.4	0.0
10	28.846	34.533	21.787	603.4	0.060
20	28.625	34.647	21.945	589.1	0.120
30	26.784	34.673	22.562	530.4	0.176
50	25.454	34.806	23.077	479.9	0.276
75	23.510	34.822	23.671	423.3	0.391
100	21.982	34.839	24.166	376.0	0.491
125	20.621	34.839	24.539	340.6	0.581
150	19.941	34.900	24.720	323.2	0.665
200	18.255	34.855	25.117	285.5	0.820
250	17.028	34.794	25.368	261.5	0.961
300	15.826	34.712	25.594	241.0	1.090
400	12.000	34.407	26.148	187.4	1.316
500	9.629	34.257	26.455	158.3	1.497
600	7.151	34.160	26.758	129.5	1.651
700	6.050	34.230	26.960	110.3	1.778
800	5.177	34.310	27.130	94.3	1.889
900	4.579	34.394	27.264	81.5	1.987
1000	3.721	34.450	27.400	68.7	2.071
1200	3.100	34.515	27.511	58.2	2.213

Station	Latitude	Longitude	Date	Time	Depth
35	24-05.5 N	123-22.4 E	JUN. 28, 1984	21:43	920
	24-06.2 N	123-22.2 E		22:37	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.924	34.629	22.162	567.5	0.0
10	27.942	34.631	22.158	567.8	0.056
20	27.870	34.626	22.178	566.0	0.113
30	26.366	34.654	22.680	517.9	0.167
50	23.408	34.856	23.727	417.9	0.261
75	21.852	34.831	24.196	373.3	0.360
100	20.681	34.899	24.523	342.0	0.450
125	19.894	34.882	24.719	323.5	0.534
150	19.162	34.867	24.897	306.4	0.613
200	17.830	34.829	25.202	277.4	0.761
250	16.590	34.768	25.451	253.6	0.897
300	15.867	34.690	25.520	247.1	1.025
400	13.569	34.514	25.920	209.1	1.265
500	11.401	34.381	26.241	178.6	1.470
600	9.346	34.307	26.540	150.2	1.650
700	7.295	34.310	26.855	120.3	1.794
800	5.690	34.383	27.126	94.7	1.911
900	4.350	34.441	27.327	75.6	2.005

Station	Latitude	Longitude	Date	Time	Depth
33	24-06.4 N	122-57.1 E	JUN. 28, 1984	19:01	540
	24-06.5 N	122-56.9 E		19:24	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.505	34.468	21.850	597.3	0.0
10	28.446	34.492	21.888	593.7	0.059
20	28.224	34.489	21.959	586.9	0.118
30	26.892	34.630	22.495	535.6	0.174
50	24.032	34.783	23.489	440.6	0.272
75	22.157	34.897	24.116	380.9	0.375
100	21.061	34.898	24.419	351.9	0.467
125	20.001	34.887	24.694	325.8	0.553
150	19.163	34.863	24.894	306.7	0.632
200	18.107	34.877	25.170	280.4	0.781
250	16.889	34.783	25.392	259.2	0.920
300	15.746	34.702	25.595	240.0	1.049
400	13.448	34.515	25.946	206.6	1.287
500	10.642	34.314	26.325	170.6	1.485

Station	Latitude	Longitude	Date	Time	Depth
36	24-27.5 N	123-30.0 E	JUN. 29, 1984	00:50	1140
	24-27.6 N	123-29.5 E		01:35	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.077	34.651	22.129	570.6	0.0
10	28.084	34.653	22.127	570.8	0.057
20	27.801	34.656	22.223	561.7	0.113
30	26.531	34.651	22.625	523.1	0.243
50	24.329	34.828	23.435	445.8	0.265
75	22.895	34.888	23.916	399.9	0.371
100	21.833	34.903	24.211	371.8	0.467
125	20.988	34.903	24.443	349.7	0.558
150	20.247	34.896	24.636	331.2	0.644
200	18.640	34.847	25.014	285.3	0.804
250	17.544	34.816	25.261	271.7	0.949
300	16.416	34.758	25.484	250.5	1.084
400	13.710	34.534	25.907	210.4	1.326
500	11.779	34.428	26.206	181.9	1.538
600	9.354	34.351	26.574	147.0	1.710
700	7.330	34.367	26.895	116.5	1.853
800	5.369	34.412	27.188	88.8	1.964
900	4.688	34.434	27.286	79.5	2.056
1000	4.501	34.439	27.309	77.3	2.144

Station	Latitude	Longitude	Date	Time	Depth
37	24-50.4 N	123-30.1 E	JUN. 29, 1984	03:27	1900
	24-50.5 N	123-29.5 E		04:26	
Depth	Temp	Sal	σ_t	$\Delta\sigma$	ΔD
0	28.088	34.581	22.073	576.0	0.0
10	28.095	34.582	22.071	576.2	0.057
20	28.097	34.584	22.072	576.1	0.115
30	27.270	34.600	22.351	549.3	0.171
50	23.974	34.823	23.536	436.1	0.269
75	22.877	34.899	23.913	400.2	0.373
100	21.800	34.810	24.225	370.4	0.470
125	21.029	34.803	24.432	350.8	0.562
150	20.109	34.886	24.665	328.4	0.648
200	18.338	34.835	25.080	288.9	0.805
250	17.565	34.805	25.248	273.0	0.949
300	16.208	34.733	25.513	247.7	1.082
400	14.194	34.575	25.837	217.0	1.321
500	12.028	34.410	26.145	187.7	1.535
600	9.049	34.234	26.531	151.0	1.718
700	6.889	34.361	26.952	111.1	1.855
800	5.694	34.401	27.139	93.4	1.967
900	4.869	34.420	27.253	82.6	2.064
1000	4.589	34.428	27.290	79.1	2.155
Station	Latitude	Longitude	Date	Time	Depth
39	25-30.2 N	123-30.0 E	JUN. 29, 1984	08:39	900
	25-31.0 N	123-30.5 E		09:25	
Depth	Temp	Sal	σ_t	$\Delta\sigma$	ΔD
0	28.742	34.283	21.634	618.1	0.0
10	28.732	34.282	21.636	617.8	0.061
20	28.477	34.286	21.724	609.4	0.123
30	27.771	34.353	22.005	582.5	0.183
50	26.640	34.674	22.608	524.8	0.285
75	24.443	34.838	23.407	448.5	0.416
100	23.016	34.856	23.841	407.1	0.524
125	21.930	34.896	24.178	374.9	0.623
150	21.078	34.900	24.416	352.2	0.714
200	19.345	34.860	24.845	311.4	0.883
250	17.432	34.797	25.274	270.5	1.031
300	15.930	34.711	25.560	243.3	1.164
400	12.540	34.416	26.075	194.4	1.395
500	8.295	34.285	26.689	136.0	1.573
600	6.829	34.365	26.963	110.1	1.703

Station	Latitude	Longitude	Date	Time	Depth
38	25-10.4 N	123-29.9 E	JUN. 29, 1984	06:19	1830
	25-10.7 N	123-30.1 E		07:00	
Depth	Temp	Sal	σ_t	$\Delta\sigma$	ΔD
0	28.389	34.463	21.885	594.0	0.0
10	28.390	34.459	21.882	594.3	0.059
20	28.321	34.487	21.926	590.1	0.118
30	27.998	34.586	22.106	572.8	0.177
50	25.766	34.717	22.914	495.5	0.286
75	22.956	34.895	23.887	402.8	0.397
100	21.827	34.902	24.212	371.7	0.494
125	20.877	34.898	24.469	347.3	0.586
150	19.981	34.891	24.703	324.9	0.671
200	18.281	34.842	25.101	287.0	0.828
250	16.532	34.757	25.456	253.2	0.965
300	15.834	34.713	25.584	241.1	1.093
400	13.984	34.557	25.884	212.5	1.327
500	11.058	34.345	26.275	175.4	1.537
600	8.935	34.277	26.583	146.1	1.709
700	7.216	34.354	26.901	115.9	1.851
800	5.813	34.394	27.119	95.3	1.968
900	4.912	34.422	27.249	83.0	2.067
1000	4.532	34.432	27.300	78.2	2.157

Station	Latitude	Longitude	Date	Time	Depth
40	25-50.1 N	123-30.5 E	JUN. 29, 1984	11:45	120
	25-50.2 N	123-30.6 E		11:56	
Depth	Temp	Sal	σ_t	$\Delta\sigma$	ΔD
0	28.412	34.170	21.658	615.7	0.0
10	28.387	34.167	21.664	615.2	0.061
20	28.207	34.194	21.743	607.6	0.122
30	27.179	34.457	22.274	558.7	0.181
50	24.163	34.656	23.354	453.5	0.282
75	22.681	34.795	23.890	402.5	0.389
100	21.180	34.798	24.311	362.2	0.484

Station	Latitude	Longitude	Date	Time	Depth
41	26-09.7 N	123-30.4 E	JUN. 29, 1984	16:35	125
	26-09.7 N	123-30.6 E		16:53	
Depth	Temp	Sal	σ_t	Δst	ΔD

0	28.290	34.096	21.642	617.2	0.0
10	28.479	34.089	21.575	623.7	0.062
20	27.050	34.078	22.031	580.8	0.122
30	24.984	34.171	22.742	512.0	0.177
50	22.074	34.633	23.939	397.7	0.271
75	19.857	34.779	24.650	332.6	0.362
100	19.041	34.822	24.893	310.1	0.441

Station	Latitude	Longitude	Date	Time	Depth
43	26-50.0 N	123-30.5 E	JUN. 29, 1984	20:52	150
	26-50.1 N	123-30.6 E		21:07	
Depth	Temp	Sal	σ_t	Δst	ΔD

0	28.033	33.461	21.251	654.8	0.0
10	28.034	33.493	21.275	652.5	0.065
20	27.762	33.822	22.609	620.4	0.129
30	26.727	33.844	22.032	579.9	0.189
50	24.308	34.116	22.903	496.5	0.288
75	21.257	34.357	23.947	399.6	0.413
100	17.367	34.624	25.157	281.6	0.495
125	16.778	34.647	25.315	266.7	0.565

Station	Latitude	Longitude	Date	Time	Depth
45	27-30.3 N	123-29.9 E	JUN. 30, 1984	01:22	95
	27-30.3 N	123-30.1 E		01:31	
Depth	Temp	Sal	σ_t	Δst	ΔD

0	28.022	33.801	21.509	630.0	0.0
10	28.022	33.800	21.509	630.0	0.063
20	28.023	33.803	21.510	629.9	0.126
30	26.517	33.893	22.060	577.2	0.186
50	25.383	34.079	22.551	530.2	0.297
75	20.011	34.333	24.241	369.0	0.417

Station	Latitude	Longitude	Date	Time	Depth
42	26-30.0 N	123-29.5 E	JUN. 29, 1984	18:56	150
	26-30.0 N	123-29.4 E		19:08	
Depth	Temp	Sal	σ_t	Δst	ΔD

0	27.712	33.147	21.119	667.4	0.0
10	27.400	33.732	21.658	615.7	0.064
20	26.308	34.081	22.267	557.4	0.122
30	25.222	34.072	22.595	526.0	0.177
50	22.650	34.363	23.572	432.7	0.272
75	17.652	34.559	25.039	292.9	0.359
100	17.376	34.677	25.195	278.0	0.430
125	17.275	34.698	25.236	274.2	0.500

Station	Latitude	Longitude	Date	Time	Depth
44	27-10.0 N	123-30.0 E	JUN. 29, 1984	22:50	110
	27-10.5 N	123-30.3 E		23:16	
Depth	Temp	Sal	σ_t	Δst	ΔD

0	28.254	33.976	21.564	624.7	0.0
10	28.296	33.975	21.549	626.1	0.062
20	27.811	33.934	21.678	614.6	0.124
30	26.293	34.004	22.213	562.5	0.183
50	25.448	34.135	22.574	526.0	0.292
75	21.512	34.267	23.790	412.0	0.417
100	17.129	34.650	25.234	274.3	0.497

Station	Latitude	Longitude	Date	Time	Depth
46	27-50.4 N	123-29.8 E	JUN. 30, 1984	03:19	93
	27-50.3 N	123-30.2 E		03:27	
Depth	Temp	Sal	σ_t	Δst	ΔD

0	27.817	33.728	21.521	628.8	0.0
10	27.829	33.728	21.517	629.2	0.062
20	25.996	33.964	22.276	556.6	0.122
30	25.639	34.158	22.533	532.0	0.176
50	24.779	34.242	22.858	500.9	0.280

Station	Latitude	Longitude	Date	Time	Depth
47	28-10.4 N	123-30.0 E	JUN.30, 1984	05:14	80
	28-10.4 N	123-30.1 E		05:21	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.480	33.118	21.172	662.3	0.0
10	27.486	33.112	21.163	663.6	0.066
20	27.010	33.672	21.738	608.8	0.129
30	24.640	33.951	22.680	519.0	0.186
50	23.929	34.247	23.114	478.3	0.285

Station	Latitude	Longitude	Date	Time	Depth
49	29-00.0 N	123-50.0 E	JUN.30, 1984	10:08	78
	29-00.2 N	123-50.1 E		10:17	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.088	30.534	19.367	835.7	0.0
10	24.044	33.377	22.825	542.7	0.068
20	23.056	33.679	22.915	493.3	0.120
30	21.259	34.046	23.719	419.7	0.166
50	18.863	34.413	24.627	333.8	0.238

Station	Latitude	Longitude	Date	Time	Depth
51	29-59.7 N	124-30.3 E	JUN.30, 1984	15:55	69
	29-59.6 N	124-30.9 E		16:11	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	26.982	31.183	19.880	786.3	0.0
10	26.994	31.154	19.855	789.1	0.078
20	18.471	32.570	23.322	458.6	0.141
30	13.948	33.748	25.252	272.6	0.177
50	13.892	33.789	25.295	269.9	0.231

Station	Latitude	Longitude	Date	Time	Depth
48	28-30.6 N	123-30.6 E	JUN.30, 1984	07:08	68
	28-31.0 N	123-30.6 E		07:22	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.024	32.628	20.951	683.5	0.0
10	27.199	32.542	20.830	695.1	0.069
20	25.120	34.173	22.702	515.8	0.129
30	24.175	34.312	23.091	478.6	0.179
50	23.618	34.342	23.278	460.8	0.273

Station	Latitude	Longitude	Date	Time	Depth
50	28-28.4 N	124-09.9 E	JUN.30, 1984	12:52	72
	28-29.4 N	124-10.2 E		13:00	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.430	31.288	19.817	792.4	0.0
10	27.091	31.537	20.104	765.2	0.077
20	23.690	33.895	22.919	495.8	0.140
30	22.738	34.325	23.518	438.9	0.187
50	19.819	34.309	24.303	364.7	0.269

Station	Latitude	Longitude	Date	Time	Depth
52	28-47.7 N	124-46.6 E	JUN.30, 1984	17:59	65
	28-47.7 N	124-46.6 E		18:03	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.017	31.200	19.882	786.1	0.0
10	26.997	31.193	19.883	786.1	0.078
20	19.218	31.681	22.459	539.0	0.144
30	14.697	33.876	25.319	268.2	0.185
50	13.808	33.914	25.408	257.7	0.237

Station	Latitude	Longitude	Date	Time	Depth
53	29-36.7 N	125-04.7 E	JUN. 30, 1984	19:50	80
	29-36.8 N	125-04.6 E		19:55	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.107	31.144	19.812	792.9	0.0
10	24.921	33.364	22.154	568.6	0.068
20	22.118	34.170	23.576	432.3	0.118
30	20.308	34.231	24.115	380.9	0.158
50	19.547	34.245	24.325	360.9	0.233

Station	Latitude	Longitude	Date	Time	Depth
55	29-12.0 N	125-41.0 E	JUL. 01, 1984	01:15	96
	29-12.1 N	125-41.1 E		01:23	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.632	32.054	20.326	743.5	0.0
10	27.632	32.051	20.324	743.7	0.074
20	22.984	33.136	22.549	530.4	0.138
30	20.870	34.007	23.795	411.4	0.185
50	19.341	34.299	24.419	351.9	0.261
75	18.238	34.608	24.932	303.1	0.342

Station	Latitude	Longitude	Date	Time	Depth
PN-1-1-2	29-01.1 N	126-00.5 E	JUL. 01, 1984	09:38	105
	29-01.5 N	126-01.0 E		09:58	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.164	32.365	20.709	706.7	0.0
10	27.125	32.372	20.726	705.1	0.070
20	24.229	33.191	22.230	560.9	0.134
30	21.447	33.790	23.474	442.1	0.184
50	20.175	34.278	24.186	374.1	0.264
75	18.392	34.653	24.928	303.5	0.350

Station	Latitude	Longitude	Date	Time	Depth
54	29-24.1 N	125-22.9 E	JUN. 30, 1984	21:53	93
	29-24.1 N	125-22.8 E		22:02	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.142	31.130	19.790	795.0	0.0
10	27.135	31.131	19.793	794.7	0.079
20	22.659	33.047	22.575	528.0	0.145
30	20.959	33.567	23.437	445.6	0.194
50	18.482	34.119	24.499	344.3	0.271
75	18.232	34.358	24.744	321.1	0.354

Station	Latitude	Longitude	Date	Time	Depth
PN-1-1-1	28-59.9 N	126-00.0 E	JUL. 01, 1984	06:11	120
	29-00.2 N	126-00.1 E		06:30	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.220	32.376	20.699	707.7	0.0
10	27.210	32.379	20.704	707.2	0.070
20	24.925	33.019	21.893	593.2	0.135
30	22.078	34.114	23.535	435.3	0.187
50	19.808	34.272	24.277	365.4	0.266
75	18.222	34.643	24.963	300.1	0.346
100	18.167	34.649	24.981	298.4	0.421

Station	Latitude	Longitude	Date	Time	Depth
PN-1-1-3	28-59.9 N	126-00.2 E	JUL. 01, 1984	13:12	120
	28-59.8 N	126-01.0 E		13:33	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	27.473	32.507	20.717	706.0	0.0
10	27.375	32.493	20.737	704.0	0.070
20	26.025	32.849	21.429	637.7	0.137
30	21.764	33.768	23.370	451.9	0.192
50	20.252	34.285	24.171	375.6	0.273
75	18.832	34.555	24.742	321.2	0.363
100	18.090	34.654	25.004	296.2	0.438

Station	Latitude	Longitude	Date	Time	Depth
PN-1-1-4	28-59.9 N	125-59.9 E	JUL. 01, 1984	18:28	118
	28-59.7 N	125-59.8 E		18:44	
Depth	Temp	Sal	σ_t	Δstp	ΔD
0	27.982	32.378	20.456	731.0	0.0
10	27.865	32.356	20.477	729.4	0.073
20	24.256	33.167	22.204	563.5	0.137
30	21.475	33.865	23.523	437.3	0.187
50	20.527	34.315	24.120	382.1	0.268
75	18.861	34.477	24.676	327.5	0.359
100	18.097	34.655	25.003	299.6	0.435

Station	Latitude	Longitude	Date	Time	Depth
PN-1-1-6	29-00.0 N	125-59.9 E	JUL. 02, 1984	00:22	121
	29-00.4 N	126-00.3 E		00:43	
Depth	Temp	Sal	σ_t	Δstp	ΔD
0	27.729	32.373	20.534	723.6	0.0
10	24.334	33.011	22.063	577.3	0.065
20	21.795	33.885	23.450	444.3	0.116
30	21.346	34.225	23.831	408.0	0.158
50	19.990	34.276	24.233	369.6	0.235
75	18.377	34.633	24.917	304.6	0.322
100	18.074	34.654	25.008	295.9	0.397

Station	Latitude	Longitude	Date	Time	Depth
56-1	28-46.9 N	126-19.2 E	JUL. 02, 1984	05:27	117
	28-47.1 N	126-19.5 E		05:36	
Depth	Temp	Sal	σ_t	Δstp	ΔD
0	27.824	32.634	20.698	707.7	0.0
10	27.803	32.646	20.715	706.2	0.070
20	24.149	33.445	22.445	540.4	0.133
30	22.483	34.027	23.365	452.4	0.182
50	20.751	34.293	24.044	387.7	0.266
75	18.549	34.543	24.804	315.3	0.355
100	17.899	34.638	25.039	292.9	0.430

Station	Latitude	Longitude	Date	Time	Depth
PN-1-1-5	29-00.2 N	125-59.9 E	JUL. 01, 1984	22:37	118
	29-00.5 N	125-59.8 E		23:02	
Depth	Temp	Sal	σ_t	Δstp	ΔD
0	27.791	32.358	20.502	726.6	0.0
10	27.766	32.328	20.488	727.9	0.072
20	22.661	33.505	22.920	494.9	0.134
30	21.508	34.158	23.735	417.2	0.179
50	20.230	34.276	24.170	375.7	0.258
75	18.550	34.607	24.854	313.1	0.345
100	18.097	34.654	25.002	299.7	0.421

Station	Latitude	Longitude	Date	Time	Depth
PN-1-1-7	29-00.9 N	126-00.7 E	JUL. 02, 1984	03:17	102
	29-01.1 N	126-01.3 E		03:37	
Depth	Temp	Sal	σ_t	Δstp	ΔD
0	27.658	32.401	20.578	719.3	0.0
10	27.660	32.400	20.576	719.4	0.072
20	26.499	32.575	21.076	671.5	0.141
30	21.954	33.757	23.309	457.8	0.198
50	20.441	34.295	24.128	379.7	0.280
75	18.577	34.561	24.811	314.7	0.368

Station	Latitude	Longitude	Date	Time	Depth
PN-2-1	28-35.3 N	126-37.6 E	JUL. 02, 1984	10:58	143
	28-35.6 N	126-37.7 E		11:19	
Depth	Temp	Sal	σ_t	Δstp	ΔD
0	28.410	32.524	20.426	733.9	0.0
10	28.408	32.529	20.430	733.5	0.073
20	27.355	33.273	21.328	647.3	0.142
30	26.040	33.694	22.060	577.2	0.203
50	22.916	33.891	23.139	474.0	0.307
75	20.843	34.323	24.042	388.0	0.414
100	18.274	34.603	24.920	307.5	0.505
125	17.993	34.640	25.018	299.1	0.580

Station	Latitude	Longitude	Date	Time	Depth
57-2	28-28.3 N	126-46.2 E	JUL.02, 1984	12:14	202
	28-29.5 N	126-46.6 E		12:30	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.645	33.913	21.388	641.6	0.0
10	28.389	34.029	21.559	625.2	0.063
20	27.814	34.103	21.803	602.6	0.124
30	26.393	34.045	22.213	562.6	0.183
50	23.902	34.238	23.116	476.3	0.286
75	23.067	34.603	23.634	426.8	0.399
100	21.217	34.696	24.223	370.4	0.499
125	17.742	34.645	25.083	288.8	0.581
150	17.632	34.650	25.113	285.8	0.654

Station	Latitude	Longitude	Date	Time	Depth
PN-4-1	28-14.2 N	127-12.8 E	JUL.02, 1984	20:40	1050
	28-15.1 N	127-13.0 E		21:27	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	29.151	34.627	21.754	606.5	0.0
10	29.140	34.620	21.753	606.6	0.0
20	28.176	34.515	22.039	579.2	0.060
30	26.628	34.589	22.548	530.5	0.120
50	24.851	34.758	23.225	465.9	0.273
75	23.245	34.879	23.792	411.8	0.383
100	22.229	34.901	24.098	382.5	0.482
125	21.343	34.890	24.336	359.9	0.577
150	20.591	34.893	24.543	340.1	0.665
200	19.428	34.867	24.829	312.9	0.832
250	17.542	34.786	25.238	273.9	0.983
300	16.144	34.726	25.523	246.8	1.115
400	13.084	34.506	26.012	200.3	1.349
500	9.818	34.356	26.500	154.0	1.535
600	7.451	34.369	26.880	118.0	1.679
700	6.275	34.358	27.032	103.5	1.799

Station	Latitude	Longitude	Date	Time	Depth
PN-3-1	28-25.6 N	126-55.9 E	JUL.02, 1984	14:30	285
	28-26.2 N	126-56.5 E		14:58	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.840	33.694	21.159	663.5	0.0
10	28.485	34.017	21.519	629.1	0.064
20	28.352	34.558	21.969	586.0	0.135
30	27.840	34.605	22.172	566.5	0.183
50	26.196	34.710	22.775	508.8	0.293
75	24.646	34.787	23.308	458.0	0.414
100	23.617	34.888	23.690	421.4	0.524
125	22.330	34.876	24.051	387.1	0.627
150	21.148	34.776	24.303	362.9	0.722
200	18.552	34.821	25.016	295.0	0.889
250	12.972	34.501	26.031	198.5	1.017

Station	Latitude	Longitude	Date	Time	Depth
PN-5-1	27-54.4 N	127-38.6 E	JUL.03, 1984	02:34	1115
	27-54.4 N	127-38.7 E		03:23	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.159	34.381	21.899	592.6	0.0
10	28.164	34.380	21.896	592.9	0.059
20	27.620	34.343	22.046	578.5	0.117
30	25.801	34.431	22.688	517.2	0.172
50	24.654	34.635	23.191	469.1	0.269
75	23.292	34.804	23.721	418.5	0.381
100	22.540	34.857	23.977	394.0	0.482
125	21.504	34.893	24.294	363.9	0.578
150	20.703	34.891	24.511	343.2	0.667
200	19.806	34.877	24.738	321.5	0.837
250	18.451	34.835	25.052	291.6	0.994
300	17.439	34.798	25.273	270.6	1.139
400	15.588	34.677	25.612	238.4	1.405
500	12.264	34.460	26.138	188.4	1.631
600	9.468	34.355	26.558	148.5	1.810
700	7.276	34.303	26.853	120.5	1.958
800	5.400	34.366	27.148	92.6	2.073

Station	Latitude	Longitude	Date	Time	Depth
PN-5-11-1	27-53.5 N	127-41.1 E	JUL-04, 1984	16:04	1040
	27-53.5 N	127-42.6 E			
Depth	Temp	Sal	σ_t	Δst	ΔD
0	29.049	34.425	21.637	617.7	0.0
10	28.722	34.442	21.759	606.4	0.061
20	28.145	34.381	21.904	592.2	0.121
30	27.729	34.337	22.006	582.3	0.180
50	24.158	34.727	23.409	448.3	0.280
75	22.794	34.833	23.887	402.7	0.388
100	21.873	34.860	24.167	375.9	0.486
125	21.078	34.878	24.400	353.8	0.578
150	20.708	34.876	24.498	344.4	0.666
200	19.593	34.865	24.784	317.1	0.835
250	18.507	34.822	25.029	293.9	0.993
300	17.179	34.772	25.315	266.6	1.137
400	15.079	34.637	25.693	230.6	1.393
500	12.651	34.484	26.081	193.8	1.619
600	10.017	34.360	26.470	156.9	1.803
700	6.750	34.295	26.919	114.3	1.951
800	5.383	34.368	27.152	92.2	2.065
900	4.678	34.413	27.269	81.1	2.161
1000	4.391	34.427	27.312	77.1	2.250

Station	Latitude	Longitude	Date	Time	Depth
PN-5-11-3	27-54.1 N	127-39.0 E	JUL-04, 1984	21:48	1120
	27-54.7 N	127-39.1 E		22:31	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.985	34.485	21.704	611.3	0.0
10	28.874	34.471	21.730	608.8	0.061
20	27.589	34.471	22.152	568.4	0.120
30	26.805	34.526	22.445	540.4	0.175
50	24.238	34.731	23.388	450.2	0.274
75	22.523	34.839	23.969	394.9	0.381
100	21.450	34.871	24.292	364.0	0.476
125	20.791	34.879	24.478	346.4	0.566
150	20.224	34.882	24.632	331.6	0.652
200	19.259	34.865	24.870	308.9	0.814
250	18.112	34.809	25.117	285.5	0.968
300	17.058	34.765	25.339	264.3	1.109
400	14.945	34.625	25.714	228.7	1.365
500	12.158	34.448	26.150	187.3	1.585
600	9.048	34.336	26.611	143.5	1.758
700	6.878	34.298	26.904	115.7	1.897

Station	Latitude	Longitude	Date	Time	Depth
PN-5-11-2	27-54.1 N	127-38.9 E	JUL-04, 1984	18:09	1105
	27-54.4 N	127-39.2 E		18:55	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	29.135	34.475	21.646	616.9	0.0
10	29.112	34.477	21.655	616.4	0.061
20	28.339	34.507	21.934	589.3	0.122
30	26.617	34.440	22.440	540.9	0.178
50	25.206	34.614	23.009	488.5	0.281
75	23.117	34.808	23.775	413.4	0.393
100	21.592	34.852	24.239	369.1	0.481
125	21.001	34.872	24.416	352.3	0.582
150	20.437	34.880	24.573	337.2	0.669
200	19.417	34.859	24.826	313.2	0.834
250	18.183	34.814	25.103	286.8	0.988
300	16.943	34.765	25.366	261.7	1.129
400	14.820	34.620	25.741	226.1	1.382
500	11.444	34.421	26.263	176.5	1.599
600	8.928	34.331	26.626	142.0	1.772
700	6.250	34.311	26.998	106.8	1.908

Station	Latitude	Longitude	Date	Time	Depth
PN-5-11-4	27-54.3 N	127-39.0 E	JUL-05, 1984	06:05	1110
	27-54.6 N	127-39.1 E		06:56	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.973	34.481	21.705	611.2	0.0
10	28.975	34.482	21.705	611.2	0.061
20	28.977	34.483	21.705	611.2	0.122
30	28.176	34.550	22.021	581.0	0.182
50	25.017	34.597	23.053	482.2	0.289
75	22.799	34.868	23.912	400.4	0.397
100	21.786	34.883	24.208	372.0	0.494
125	20.959	34.895	24.445	349.6	0.585
150	20.102	34.893	24.672	327.8	0.671
200	19.612	34.875	24.787	316.9	0.836
250	18.707	34.847	24.997	296.9	0.993
300	17.124	34.779	25.334	264.8	1.138
400	14.484	34.589	25.786	221.8	1.394
500	12.065	34.451	26.170	185.3	1.608
600	9.054	34.321	26.598	144.7	1.783
700	6.298	34.311	26.992	107.3	1.921

Station	Latitude	Longitude	Date	Time	Depth
PN-5-11-5	27-53.0 N 27-53.5 N	127-38.5 E 127-38.9 E	JUL.05, 1984	08:14 08:59	950
Depth	Temp	Sal	σ_t	Δst	Δb
0	29.025	34.493	21.697	612.0	0.0
10	28.909	34.509	21.747	607.2	0.061
20	28.958	34.591	21.953	587.4	0.120
30	28.883	34.711	22.935	493.5	0.174
50	28.812	34.812	23.575	432.4	0.266
75	22.489	34.869	24.001	391.9	0.369
100	21.799	34.898	24.216	371.2	0.465
125	20.790	34.884	24.482	346.0	0.555
150	20.352	34.894	24.607	334.0	0.641
200	19.573	34.868	24.792	316.4	0.805
250	18.493	34.838	25.044	292.4	0.962
300	17.117	34.770	25.329	265.3	1.106
400	14.683	34.608	25.758	224.5	1.360
500	12.469	34.456	26.096	192.4	1.581
600	8.799	34.304	26.626	142.1	1.754
700	6.442	34.300	26.964	110.0	1.892

Station	Latitude	Longitude	Date	Time	Depth
PN-4-11	28-13.2 N 28-14.2 N	127-12.1 E 127-12.6 E	JUL.05, 1984	16:39 17:33	1010
Depth	Temp	Sal	σ_t	Δst	Δb
0	28.863	34.267	21.647	616.7	0.0
10	28.860	34.288	21.701	611.6	0.061
20	28.830	34.289	21.792	602.9	0.122
30	26.989	34.431	22.314	552.9	0.180
50	25.644	34.570	22.841	502.5	0.285
75	23.506	34.730	23.603	429.8	0.401
100	22.067	34.744	24.025	389.5	0.504
125	20.942	34.826	24.397	354.1	0.598
150	20.410	34.842	24.552	339.2	0.685
200	19.862	34.821	24.681	326.9	0.856
250	18.060	34.833	25.148	282.5	1.008
300	15.515	34.636	25.596	239.9	1.147
400	10.789	34.356	26.332	170.0	1.353
500	8.319	34.315	26.709	134.2	1.512
600	6.867	34.348	26.945	111.8	1.643
700	5.709	34.347	27.095	97.6	1.757
800	5.176	34.384	27.189	88.7	1.858
900	4.871	34.397	27.234	84.4	1.954

Station	Latitude	Longitude	Date	Time	Depth
PN-5-11-6	27-53.3 N 27-54.1 N	127-39.1 E 127-39.3 E	JUL.05, 1984	11:40 12:23	940
Depth	Temp	Sal	σ_t	Δst	Δb
0	29.073	34.522	21.702	611.5	0.0
10	28.778	34.532	21.808	601.3	0.060
20	26.903	34.600	22.409	538.8	0.117
30	25.814	34.885	22.875	500.2	0.169
50	23.671	34.813	23.618	430.2	0.261
75	22.434	34.875	24.021	390.0	0.363
100	21.331	34.883	24.335	360.0	0.458
125	20.589	34.888	24.539	340.5	0.546
150	20.152	34.888	24.655	329.4	0.631
200	19.357	34.866	24.846	311.2	0.794
250	18.562	34.842	25.030	293.7	0.948
300	17.122	34.780	25.335	264.7	1.093
400	14.900	34.623	25.722	227.9	1.351
500	12.801	34.485	26.052	196.5	1.574
600	8.873	34.316	26.623	142.3	1.752
700	6.458	34.306	26.967	109.7	1.890

Station	Latitude	Longitude	Date	Time	Depth
PN-3-11	28-23.8 N 28-24.2 N	126-54.6 E 126-54.9 E	JUL.05, 1984	20:32 21:04	282
Depth	Temp	Sal	σ_t	Δst	Δb
0	28.997	34.068	21.387	641.7	0.0
10	29.045	34.040	21.351	645.2	0.064
20	28.910	34.085	21.429	637.7	0.128
30	28.587	34.620	21.937	589.0	0.190
50	27.164	34.660	22.431	541.7	0.303
75	24.481	34.769	23.344	454.5	0.425
100	22.980	34.798	23.807	410.2	0.531
125	21.401	34.941	24.253	365.0	0.631
150	19.294	34.754	24.777	322.9	0.719
200	16.160	34.659	25.467	252.1	0.861
250	12.703	34.456	26.050	196.8	0.973

Station	Latitude	Longitude	Date	Time	Depth
57-3	28-28.8 N	126-45.7 E	JUL. 05, 1984	23:35	200
	28-30.0 N	126-45.7 E		23:46	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	28.776	32.886	20.575	719.5	0.0
10	28.587	32.785	21.311	649.3	0.068
20	28.136	34.269	21.816	600.6	0.131
30	27.824	34.356	21.990	583.9	0.190
50	25.481	34.479	22.822	504.3	0.297
75	24.053	34.785	23.484	441.2	0.416
100	23.050	34.789	23.780	416.6	0.523
125	20.584	34.793	24.467	347.4	0.618
150	18.043	34.747	25.087	288.3	0.699

Station	Latitude	Longitude	Date	Time	Depth
56-2	28-47.0 N	126-18.2 E	JUL. 06, 1984	04:18	115
	28-47.1 N	126-18.4 E		04:25	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	28.389	32.065	20.089	766.3	0.0
10	28.021	32.432	20.483	728.4	0.074
20	25.906	34.071	22.385	546.2	0.138
30	24.957	34.072	22.676	518.3	0.191
50	23.163	34.280	23.362	452.7	0.288
75	19.315	34.423	24.516	342.8	0.390
100	17.604	34.600	25.082	288.8	0.466

Station	Latitude	Longitude	Date	Time	Depth
CA-1	28-40.4 N	127-43.7 E	JUL. 24, 1984	19:51	1170
	28-40.8 N	127-44.0 E		20:15	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	29.063	33.851	21.203	659.3	0.0
10	29.036	34.226	21.493	631.5	0.064
20	27.393	34.824	22.330	552.2	0.123
30	26.191	34.715	22.780	508.4	0.176
50	23.677	34.763	23.578	432.1	0.270
75	22.498	34.836	23.973	394.5	0.374
100	21.097	34.868	24.387	355.0	0.467
125	20.524	34.889	24.557	338.8	0.555
150	20.157	34.887	24.653	329.6	0.640
200	18.784	34.853	24.982	298.2	0.799
250	17.765	34.821	25.211	276.5	0.947
300	15.916	34.705	25.559	243.4	1.081
400	13.082	34.488	26.348	201.6	1.313
500	10.710	34.358	26.348	168.5	1.512
600	8.495	34.330	26.694	135.6	1.677
700	6.614	34.356	26.986	108.0	1.812
800	5.852	34.366	27.093	97.8	1.925
900	5.268	34.387	27.180	89.5	2.029
1000	4.941	34.400	27.229	84.9	2.127

Station	Latitude	Longitude	Date	Time	Depth
PN-2-11	28-35.1 N	126-36.6 E	JUL. 06, 1984	00:40	140
	28-35.5 N	126-36.3 E		01:00	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	28.423	32.061	20.075	767.6	0.0
10	28.170	32.289	20.328	743.3	0.075
20	26.991	33.531	21.638	617.6	0.143
30	25.883	34.011	22.347	549.8	0.202
50	24.283	34.210	22.982	489.1	0.307
75	22.665	34.640	23.640	426.3	0.423
100	20.439	34.724	24.655	349.1	0.519
125	17.709	34.635	25.083	292.8	0.589

Station	Latitude	Longitude	Date	Time	Depth
PN-1-11	29-00.0 N	126-00.0 E	JUL. 06, 1984	08:00	115
	29-00.2 N	126-00.3 E		08:19	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	28.305	32.250	20.255	750.3	0.0
10	28.297	32.249	20.256	750.2	0.075
20	27.914	32.378	20.478	729.7	0.149
30	23.043	33.253	22.621	523.5	0.211
50	20.308	34.246	24.127	379.8	0.299
75	18.123	34.579	24.939	302.5	0.386
100	17.811	34.608	25.038	293.0	0.460

Station	Latitude	Longitude	Date	Time	Depth
58	28-38.1 N	129-16.0 E	JUL. 25, 1984	03:45	818
	28-37.9 N	129-16.4 E		04:32	
Depth	Temp	Sal	σ_t	$\Delta \sigma_t$	ΔD
0	29.280	34.451	21.579	623.3	0.0
10	29.325	34.442	21.558	625.3	0.062
20	29.324	34.442	21.558	625.3	0.125
30	27.035	34.692	22.496	536.7	0.183
50	24.584	34.791	23.330	455.7	0.284
75	22.573	34.869	23.977	394.1	0.390
100	21.799	34.856	24.184	374.3	0.486
125	20.868	34.885	24.462	347.9	0.577
150	20.173	34.881	24.645	330.4	0.663
200	18.869	34.852	24.960	300.4	0.825
250	17.866	34.805	25.175	280.0	0.973
300	16.877	34.764	25.388	259.7	1.112
400	15.636	34.684	25.606	238.9	1.370
500	13.596	34.537	25.932	207.9	1.608
600	10.002	34.364	26.475	156.4	1.803
700	7.696	34.321	26.807	124.9	1.958
800	5.850	34.357	27.085	98.5	2.076

Station	Latitude	Longitude	Date	Time	Depth
59	28-55.6 N 28-55.5 N	129-27.2 E 129-27.1 E	JUL. 25, 1984	07:28 07:56	725
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.777	33.993	21.405	640.0	0.0
10	28.780	33.995	21.405	640.4	0.064
20	28.346	34.086	21.617	619.7	0.177
30	27.812	34.234	21.902	592.3	0.187
50	26.004	34.519	22.691	516.8	0.298
75	24.473	34.740	23.325	456.4	0.421
100	23.153	34.770	23.736	417.1	0.531
125	22.014	34.834	24.108	386.2	0.632
150	21.457	34.837	24.264	366.7	0.726
200	19.783	34.872	24.740	321.3	0.889
250	18.647	34.844	25.010	295.6	1.058
300	17.765	34.810	25.203	277.3	1.206
400	15.261	34.658	25.670	232.9	1.471
500	11.851	34.453	26.212	181.3	1.694
600	9.115	34.360	26.619	142.7	1.872
700	7.751	34.347	26.819	123.7	2.017

Station	Latitude	Longitude	Date	Time	Depth
61	29-30.5 N 29-30.5 N	129-31.5 E 129-31.5 E	JUL. 25, 1984	14:00 14:34	775
Depth	Temp	Sal	σ_t	Δst	ΔD
0	29.613	33.885	21.044	674.6	0.0
10	28.731	34.023	21.442	636.4	0.065
20	28.184	34.170	21.732	608.5	0.127
30	28.181	34.172	21.733	608.3	0.188
50	27.875	34.237	21.863	594.1	0.309
75	26.062	34.520	22.673	518.6	0.449
100	24.191	34.713	23.388	450.2	0.570
125	23.310	34.773	23.693	421.2	0.680
150	22.494	34.820	23.962	395.5	0.784
200	19.220	34.816	24.843	311.5	0.960
250	18.339	34.814	25.064	290.5	1.114
300	16.695	34.752	25.414	257.1	1.253
400	13.232	34.514	25.988	202.6	1.498
500	11.224	34.439	26.318	171.3	1.695
600	7.993	34.345	26.762	127.3	1.848

Station	Latitude	Longitude	Date	Time	Depth
60	29-12.8 N 29-12.2 N	129-39.7 E 129-39.9 E	JUL. 25, 1984	10:28 11:20	1000
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.500	34.042	21.533	627.7	0.0
10	28.488	34.039	21.534	627.6	0.062
20	28.946	34.314	22.240	560.8	0.122
30	28.432	34.419	22.482	536.8	0.177
50	25.356	34.604	22.955	491.6	0.281
75	24.441	34.772	23.359	453.1	0.400
100	23.749	34.854	23.626	427.5	0.510
125	22.574	34.876	23.982	393.7	0.614
150	21.958	34.888	24.165	376.1	0.711
200	18.703	34.866	24.757	319.7	0.886
250	18.988	34.855	24.932	303.0	1.045
300	18.388	34.836	25.069	290.0	1.199
400	15.162	34.657	25.691	230.9	1.471
500	11.859	34.435	26.189	183.5	1.688
600	8.205	34.349	26.753	130.0	1.857
700	7.112	34.349	26.912	114.9	1.990
800	4.860	34.385	27.226	85.2	2.106
900	3.514	34.433	27.407	68.0	2.189
1000	3.169	34.460	27.461	62.9	2.262

Station	Latitude	Longitude	Date	Time	Depth
62	29-46.6 N 29-45.1 N	130-03.6 E 130-04.2 E	JUL. 25, 1984	17:06 17:45	600
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.270	34.004	21.580	623.2	0.0
10	21.862	33.969	21.693	612.3	0.061
20	21.815	34.020	21.740	607.8	0.122
30	21.701	34.159	21.882	594.3	0.183
50	26.635	34.163	22.226	561.4	0.300
75	25.237	34.208	22.692	516.8	0.436
100	21.640	34.424	23.901	401.3	0.550
125	20.332	34.684	24.452	348.8	0.646
150	18.784	34.742	24.641	330.8	0.731
200	18.185	34.740	25.046	292.2	0.889
250	15.866	34.671	25.544	249.8	1.024
300	11.363	34.642	25.685	231.4	1.147
400	11.363	34.453	26.303	172.7	1.354
500	9.607	34.388	26.560	148.3	1.522

Station	Latitude	Longitude	Date	Time	Depth
63	30-04.5 N	130-15.4 E	JUL.25, 1984	20:55	565
	30-03.6 N	130-16.0 E		21:11	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	29.361	33.293	20.685	709.0	0.0
10	29.369	33.293	20.683	709.3	0.070
20	28.393	34.135	21.637	617.7	0.137
30	26.395	34.175	22.310	553.3	0.186
50	25.635	34.387	22.706	515.4	0.302
75	22.689	34.414	23.597	430.4	0.423
100	20.185	34.689	24.496	344.6	0.521
125	18.997	34.708	24.818	314.0	0.605
150	17.470	34.690	25.183	279.2	0.681
200	16.070	34.666	25.494	249.6	0.817
250	15.039	34.633	25.689	230.0	0.940
300	12.087	34.480	26.188	183.6	1.045
400	9.999	34.408	26.510	153.1	1.220
500	8.681	34.358	26.686	136.3	1.372

Station	Latitude	Longitude	Date	Time	Depth
65	30-59.9 N	131-29.4 E	JUL.26, 1984	05:31	690
	31-00.4 N	131-29.7 E		06:12	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.175	33.451	21.197	659.9	0.0
10	27.940	33.498	21.309	649.2	0.065
20	26.561	33.696	21.898	592.7	0.127
30	24.344	34.022	22.822	504.3	0.182
50	22.909	34.273	23.430	446.2	0.279
75	20.219	34.503	24.345	359.1	0.379
100	18.550	34.602	24.850	310.8	0.464
125	18.173	34.615	24.954	301.0	0.542
150	17.699	34.627	25.079	289.0	0.616
200	13.274	34.529	25.992	202.3	0.740
250	11.922	34.463	26.206	181.9	0.839
300	10.334	34.400	26.446	159.1	0.927
400	8.107	34.316	26.742	131.1	1.080
500	6.142	34.278	26.987	107.9	1.204
600	5.287	34.295	27.105	96.6	1.312

Station	Latitude	Longitude	Date	Time	Depth
64	30-59.4 N	131-01.0 E	JUL.26, 1984	03:05	95
	30-59.5 N	131-01.1 E		03:13	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	25.815	33.553	22.023	580.7	0.0
10	25.883	33.550	22.000	583.0	0.058
20	23.433	33.977	23.055	482.0	0.111
30	22.032	34.136	23.569	434.0	0.157
50	19.210	34.422	24.546	339.8	0.236
75	16.279	34.591	25.388	259.7	0.310

Station	Latitude	Longitude	Date	Time	Depth
66	31-00.5 N	131-53.1 E	JUL.26, 1984	08:26	1550
	31-02.5 N	131-54.3 E		09:35	
Depth	Temp	Sal	σ_t	Δst	ΔD
0	29.062	33.952	21.278	652.1	0.0
10	29.072	33.947	21.272	652.7	0.065
20	27.845	34.007	21.688	612.8	0.128
30	27.861	34.336	21.963	586.5	0.188
50	26.172	34.397	22.547	530.6	0.299
75	23.487	34.652	23.548	435.1	0.421
100	21.267	34.529	24.083	383.9	0.523
125	21.007	34.814	24.370	356.6	0.617
150	19.875	34.809	24.668	328.2	0.704
200	16.935	34.580	25.227	275.0	0.858
250	15.000	34.604	25.686	231.4	0.986
300	13.322	34.525	25.978	203.5	1.100
400	10.684	34.411	26.393	164.1	1.289
500	7.412	34.335	26.859	120.0	1.439
600	5.259	34.318	27.127	94.6	1.553
700	4.447	34.321	27.221	85.6	1.650
800	3.915	34.391	27.333	75.0	1.737
900	3.506	34.420	27.387	68.9	1.816
1000	3.260	34.445	27.440	64.9	1.896

Station	Latitude	Longitude	Date	Time	Depth
67	31-00.0 N	132-16.3 E	JUL.26, 1984	11:34	2550
	31-01.5 N	132-17.1 E		12:29	
Depth	Temp	Sal	σ_t	Δst	Δb
0	30.724	33.988	20.740	703.8	0.0
10	29.616	34.419	21.442	636.4	0.067
20	28.568	34.414	21.789	603.1	0.129
30	27.013	34.431	22.307	553.6	0.187
50	24.908	34.642	23.120	475.8	0.289
75	23.103	34.840	23.802	410.8	0.400
100	21.650	34.869	24.180	374.7	0.499
125	20.644	34.889	24.525	341.9	0.589
150	19.885	34.883	24.722	323.1	0.673
200	18.428	34.849	25.069	296.7	0.831
250	17.950	34.842	25.179	279.5	0.976
300	16.575	34.754	25.444	254.3	1.114
400	13.411	34.557	25.963	205.0	1.359
500	10.902	34.440	26.377	165.7	1.722
600	8.151	34.350	26.762	129.2	1.709
700	5.892	34.223	26.975	109.0	1.839
800	3.716	34.397	27.282	79.8	1.940
900	3.336	34.434	27.358	72.7	2.023
1000			27.424	66.4	2.100

Station	Latitude	Longitude	Date	Time	Depth
69	31-00.0 N	133-02.5 E	JUL.26, 1984	18:03	4680
	31-00.0 N	133-02.1 E		18:26	
Depth	Temp	Sal	σ_t	Δst	Δb
0	29.052	34.194	21.464	634.3	0.0
10	28.861	34.216	21.543	626.7	0.063
20	27.327	34.323	22.125	571.0	0.123
30	25.322	34.512	22.897	497.2	0.176
50	23.523	34.660	23.560	433.7	0.268
75	21.849	34.834	24.153	377.3	0.370
100	20.584	34.850	24.511	343.1	0.460
125	19.579	34.869	24.791	316.5	0.544
150	19.136	34.849	24.890	307.1	0.623
200	18.151	34.837	25.129	284.3	0.773
250	17.481	34.822	25.281	269.9	0.915
300	16.491	34.761	25.469	252.0	1.061
400	14.825	34.618	25.735	226.7	1.301
500	12.344	34.422	26.094	204.9	1.522
600	9.896	34.264	26.415	174.3	1.711
700	7.572	34.163	26.700	135.0	1.871
800	6.146	34.191	26.917	114.4	2.007
900	5.150	34.352	27.087	108.4	2.124
1000	4.419	34.359	27.254	92.2	2.224

Station	Latitude	Longitude	Date	Time	Depth
68	31-00.3 N	132-39.2 E	JUL.26, 1984	14:52	4870
	31-01.0 N	132-39.3 E		15:46	
Depth	Temp	Sal	σ_t	Δst	Δb
0	29.947	34.432	21.339	646.3	0.0
10	29.603	34.413	21.442	636.4	0.064
20	27.345	34.385	22.166	567.1	0.124
30	26.333	34.514	22.585	521.0	0.179
50	24.453	34.731	23.324	456.3	0.277
75	23.179	34.809	23.758	415.1	0.386
100	22.035	34.862	24.123	380.1	0.486
125	20.862	34.884	24.462	347.9	0.579
150	20.284	34.881	24.616	333.2	0.664
200	18.946	34.855	24.943	302.0	0.826
250	18.123	34.854	25.149	282.4	0.975
300	17.221	34.783	25.314	266.7	1.117
400	14.923	34.636	25.727	227.5	1.371
500	12.122	34.418	26.134	188.8	1.591
600	9.130	34.252	26.533	150.9	1.771
700	7.131	34.227	26.814	124.3	1.919
800	5.400	34.254	27.060	100.9	2.043
900	4.592	34.246	27.225	85.3	2.145
1000	3.753	34.380	27.341	74.3	2.232

Station	Latitude	Longitude	Date	Time	Depth
70	31-00.0 N	133-26.2 E	JUL.26, 1984	21:03	4600
	31-00.0 N	133-26.0 E		21:58	
Depth	Temp	Sal	σ_t	Δst	Δb
0	29.324	34.387	21.517	629.3	0.0
10	29.108	34.374	21.579	623.3	0.062
20	26.196	34.470	22.595	526.0	0.120
30	24.403	34.586	23.229	465.4	0.169
50	22.402	34.887	24.039	388.2	0.254
75	20.850	34.866	24.452	348.8	0.347
100	20.113	34.880	24.659	329.0	0.432
125	19.528	34.859	24.797	316.0	0.514
150	18.913	34.862	24.957	300.7	0.592
200	18.150	34.867	25.152	282.1	0.739
250	17.590	34.834	25.264	271.5	0.881
300	17.043	34.804	25.372	261.1	1.019
400	15.598	34.691	25.620	237.6	1.280
500	13.356	34.506	25.957	205.5	1.514
600	10.697	34.332	26.330	170.2	1.714
700	8.356	34.205	26.618	142.9	1.882
800	6.841	34.217	26.846	121.2	2.027
900	5.416	34.243	27.049	102.0	2.150
1000	4.735	34.334	27.200	87.6	2.255

Station	Latitude	Longitude	Date	Time	Depth
71	31-00.2 N	133-49.3 E	JUL.27, 1984	00:06	4500
	31-00.4 N	133-49.0 E		00:16	
Depth	Temp	Sal	σ_t	$\Delta\sigma_t$	ΔD
0	28.826	34.605	21.846	597.7	0.0
10	28.887	34.613	21.839	598.4	0.059
20	28.928	34.628	23.078	479.8	0.113
30	25.009	34.628	23.078	479.8	0.113
40	22.749	34.775	23.856	406.7	0.158
50	21.149	34.821	24.337	359.7	0.235
				361.5	
75	19.734	34.843	24.731	322.3	0.320
100	18.983	34.867	24.942	302.1	0.399
125	18.569	34.863	25.044	282.5	0.474
150	18.286	34.871	25.121	285.1	0.547
200	18.098	34.882	25.176	279.8	0.691
				286.4	
250	17.738	34.845	25.236	274.1	0.833
300	16.986	34.801	25.384	260.1	0.972
400	15.667	34.696	25.608	238.7	1.233
500	13.267	34.505	25.975	203.9	1.467
600	10.785	34.320	26.304	172.6	1.670
				185.8	
700	8.653	34.234	26.594	145.1	1.842
800	6.926	34.197	26.819	123.8	1.987
900	5.605	34.250	27.032	103.6	2.113
1000	4.793	34.312	27.176	89.9	2.220
				100.4	

Station	Latitude	Longitude	Date	Time	Depth
73	30-59.9 N	134-36.4 E	JUL.27, 1984	05:24	4330
	31-00.5 N	134-36.1 E		06:02	
Depth	Temp	Sal	σ_t	$\Delta\sigma_t$	ΔD
0	28.780	34.615	21.870	595.4	0.0
10	28.823	34.621	21.860	596.4	0.059
20	24.704	34.519	23.089	478.8	0.113
30	23.096	34.699	23.899	420.6	0.158
50	21.144	34.776	24.304	362.8	0.237
				364.6	
75	19.978	34.822	24.651	329.9	0.324
100	19.326	34.827	24.824	313.3	0.404
125	18.768	34.846	24.981	298.4	0.482
150	18.336	34.859	25.100	287.1	0.556
200	18.021	34.865	25.182	279.2	0.701
				285.8	
250	17.622	34.843	25.263	271.6	0.842
300	17.316	34.827	25.325	265.7	0.981
400	16.405	34.780	25.504	248.7	1.249
500	14.795	34.625	25.746	225.6	1.500
600	12.337	34.440	26.109	191.1	1.724
				205.9	
700	9.823	34.255	26.421	161.5	1.914
800	7.713	34.213	26.719	133.2	2.075
900	6.132	34.230	26.850	111.3	2.210
1000	5.084	34.266	27.106	96.5	2.325
				107.6	

Station	Latitude	Longitude	Date	Time	Depth
72	31-00.3 N	134-12.8 E	JUL.27, 1984	02:41	4420
	31-00.6 N	134-12.3 E		03:28	
Depth	Temp	Sal	σ_t	$\Delta\sigma_t$	ΔD
0	28.886	34.488	21.739	607.9	0.0
10	28.571	34.506	21.857	596.6	0.060
20	26.795	34.490	22.421	542.7	0.117
30	23.823	34.705	23.491	440.4	0.166
50	22.390	34.772	23.955	396.1	0.250
				398.0	
75	20.994	34.801	24.364	357.3	0.344
100	19.452	34.841	24.803	315.3	0.430
125	18.599	34.851	25.028	294.0	0.507
150	18.212	34.863	25.134	283.9	0.580
200	17.815	34.845	25.217	275.9	0.722
				282.5	
250	17.315	34.813	25.314	266.7	0.862
300	16.806	34.789	25.416	257.0	0.997
400	15.801	34.717	25.594	240.1	1.255
500	14.066	34.566	25.856	215.1	1.497
600	11.328	34.369	26.244	178.3	1.708
				192.1	
700	8.892	34.242	26.563	148.0	1.886
800	7.184	34.227	26.806	125.0	2.036
900	5.721	34.250	27.017	105.0	2.163
1000	4.748	34.281	27.140	93.3	2.273
				103.6	

Station	Latitude	Longitude	Date	Time	Depth
74	31-00.2 N	134-58.7 E	JUL.27, 1984	08:23	4300
	31-00.6 N	134-59.3 E		09:15	
Depth	Temp	Sal	σ_t	$\Delta\sigma_t$	ΔD
0	28.971	34.555	21.761	605.8	0.0
10	28.948	34.555	21.769	605.1	0.060
20	25.953	34.764	22.891	497.7	0.115
30	23.314	34.884	23.600	430.0	0.162
50	22.013	34.895	24.154	377.2	0.242
				379.0	
75	20.379	34.877	24.586	336.1	0.332
100	19.432	34.872	24.832	312.6	0.413
125	18.985	34.870	24.945	301.9	0.491
150	18.623	34.866	25.033	293.4	0.566
200	18.221	34.857	25.126	284.5	0.713
				291.2	
250	18.120	34.872	25.163	281.0	0.858
300	17.876	34.863	25.191	278.4	1.002
400	16.875	34.792	25.403	258.3	1.283
500	15.552	34.689	25.628	236.8	1.545
600	13.162	34.493	25.987	202.7	1.780
				218.3	
700	10.410	34.319	26.370	166.3	1.981
800	8.338	34.231	26.640	140.7	2.149
900	6.552	34.229	26.894	116.7	2.289
1000	5.457	34.254	27.052	101.6	2.411
				113.4	

Station	Latitude	Longitude	Date	Time	Depth
75	31-00.2 N 31-01.0 N	135-23.4 E 135-23.5 E	JUL. 27, 1984	11:18 12:38	4000
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.500	34.222	21.667	614.8	0.0
10	28.359	34.208	21.704	611.3	0.061
20	28.233	34.191	21.741	607.8	0.116
30	28.116	34.173	21.778	604.3	0.161
40	28.000	34.155	21.815	600.8	0.206
50	27.883	34.137	21.852	597.3	0.251
60	27.767	34.119	21.889	593.8	0.296
70	27.650	34.101	21.926	590.3	0.341
80	27.533	34.083	21.963	586.8	0.386
90	27.417	34.065	22.000	583.3	0.431
100	27.300	34.047	22.037	579.8	0.476
110	27.183	34.029	22.074	576.3	0.521
120	27.067	34.011	22.111	572.8	0.566
130	26.950	33.993	22.148	569.3	0.611
140	26.833	33.975	22.185	565.8	0.656
150	26.717	33.957	22.222	562.3	0.701
160	26.600	33.939	22.259	558.8	0.746
170	26.483	33.921	22.296	555.3	0.791
180	26.367	33.903	22.333	551.8	0.836
190	26.250	33.885	22.370	548.3	0.881
200	26.133	33.867	22.407	544.8	0.926
210	26.017	33.849	22.444	541.3	0.971
220	25.900	33.831	22.481	537.8	1.016
230	25.783	33.813	22.518	534.3	1.061
240	25.667	33.795	22.555	530.8	1.106
250	25.550	33.777	22.592	527.3	1.151
260	25.433	33.759	22.629	523.8	1.196
270	25.317	33.741	22.666	520.3	1.241
280	25.200	33.723	22.703	516.8	1.286
290	25.083	33.705	22.740	513.3	1.331
300	24.967	33.687	22.777	509.8	1.376
310	24.850	33.669	22.814	506.3	1.421
320	24.733	33.651	22.851	502.8	1.466
330	24.617	33.633	22.888	499.3	1.511
340	24.500	33.615	22.925	495.8	1.556
350	24.383	33.597	22.962	492.3	1.601
360	24.267	33.579	23.000	488.8	1.646
370	24.150	33.561	23.037	485.3	1.691
380	24.033	33.543	23.074	481.8	1.736
390	23.917	33.525	23.111	478.3	1.781
400	23.800	33.507	23.148	474.8	1.826
410	23.683	33.489	23.185	471.3	1.871
420	23.567	33.471	23.222	467.8	1.916
430	23.450	33.453	23.259	464.3	1.961
440	23.333	33.435	23.296	460.8	2.006
450	23.217	33.417	23.333	457.3	2.051
460	23.100	33.399	23.370	453.8	2.096
470	22.983	33.381	23.407	450.3	2.141
480	22.867	33.363	23.444	446.8	2.186
490	22.750	33.345	23.481	443.3	2.231
500	22.633	33.327	23.518	439.8	2.276
510	22.517	33.309	23.555	436.3	2.321
520	22.400	33.291	23.592	432.8	2.366
530	22.283	33.273	23.629	429.3	2.411
540	22.167	33.255	23.666	425.8	2.456
550	22.050	33.237	23.703	422.3	2.501
560	21.933	33.219	23.740	418.8	2.546
570	21.817	33.201	23.777	415.3	2.591
580	21.700	33.183	23.814	411.8	2.636
590	21.583	33.165	23.851	408.3	2.681
600	21.467	33.147	23.888	404.8	2.726
610	21.350	33.129	23.925	401.3	2.771
620	21.233	33.111	23.962	397.8	2.816
630	21.117	33.093	24.000	394.3	2.861
640	21.000	33.075	24.037	390.8	2.906
650	20.883	33.057	24.074	387.3	2.951
660	20.767	33.039	24.111	383.8	2.996
670	20.650	33.021	24.148	380.3	3.041
680	20.533	33.003	24.185	376.8	3.086
690	20.417	32.985	24.222	373.3	3.131
700	20.300	32.967	24.259	369.8	3.176
710	20.183	32.949	24.296	366.3	3.221
720	20.067	32.931	24.333	362.8	3.266
730	19.950	32.913	24.370	359.3	3.311
740	19.833	32.895	24.407	355.8	3.356
750	19.717	32.877	24.444	352.3	3.401
760	19.600	32.859	24.481	348.8	3.446
770	19.483	32.841	24.518	345.3	3.491
780	19.367	32.823	24.555	341.8	3.536
790	19.250	32.805	24.592	338.3	3.581
800	19.133	32.787	24.629	334.8	3.626
810	19.017	32.769	24.666	331.3	3.671
820	18.900	32.751	24.703	327.8	3.716
830	18.783	32.733	24.740	324.3	3.761
840	18.667	32.715	24.777	320.8	3.806
850	18.550	32.697	24.814	317.3	3.851
860	18.433	32.679	24.851	313.8	3.896
870	18.317	32.661	24.888	310.3	3.941
880	18.200	32.643	24.925	306.8	3.986
890	18.083	32.625	24.962	303.3	4.031
900	17.967	32.607	25.000	299.8	4.076
910	17.850	32.589	25.037	296.3	4.121
920	17.733	32.571	25.074	292.8	4.166
930	17.617	32.553	25.111	289.3	4.211
940	17.500	32.535	25.148	285.8	4.256
950	17.383	32.517	25.185	282.3	4.301
960	17.267	32.499	25.222	278.8	4.346
970	17.150	32.481	25.259	275.3	4.391
980	17.033	32.463	25.296	271.8	4.436
990	16.917	32.445	25.333	268.3	4.481
1000	16.800	32.427	25.370	264.8	4.526

Station	Latitude	Longitude	Date	Time	Depth
76	30-40.2 N 30-40.4 N	135-22.9 E 135-22.4 E	JUL. 27, 1984	15:35 16:12	4470
Depth	Temp	Sal	σ_t	Δst	ΔD
0	28.800	34.385	21.690	612.6	0.0
10	28.688	34.379	21.663	615.6	0.061
20	28.589	34.603	23.036	484.6	0.116
30	28.497	34.724	23.752	415.5	0.161
40	28.411	34.794	24.187	374.0	0.206
50	28.330	34.837	24.548	342.4	0.251
60	28.250	34.863	24.782	317.3	0.296
70	28.170	34.871	24.937	302.6	0.341
80	28.090	34.867	25.022	299.5	0.386
90	28.010	34.879	25.130	284.2	0.431
100	27.930	34.883	25.156	281.7	0.476
110	27.850	34.881	25.174	280.0	0.521
120	27.770	34.815	25.304	267.6	0.566
130	27.690	34.701	25.597	239.7	0.611
140	27.610	34.525	25.924	208.7	0.656
150	27.530	34.344	26.281	174.8	0.701
160	27.450	34.239	26.578	146.6	0.746
170	27.370	34.221	26.843	121.5	0.791
180	27.290	34.250	27.037	103.1	0.836
190	27.210	34.250	27.037	103.1	0.881
200	27.130	34.250	27.037	103.1	0.926
210	27.050	34.250	27.037	103.1	0.971
220	26.970	34.250	27.037	103.1	1.016
230	26.890	34.250	27.037	103.1	1.061
240	26.810	34.250	27.037	103.1	1.106
250	26.730	34.250	27.037	103.1	1.151
260	26.650	34.250	27.037	103.1	1.196
270	26.570	34.250	27.037	103.1	1.241
280	26.490	34.250	27.037	103.1	1.286
290	26.410	34.250	27.037	103.1	1.331
300	26.330	34.250	27.037	103.1	1.376
310	26.250	34.250	27.037	103.1	1.421
320	26.170	34.250	27.037	103.1	1.466
330	26.090	34.250	27.037	103.1	1.511
340	26.010	34.250	27.037	103.1	1.556
350	25.930	34.250	27.037	103.1	1.601
360	25.850	34.250	27.037	103.1	1.646
370	25.770	34.250	27.037	103.1	1.691
380	25.690	34.250	27.037	103.1	1.736
390	25.610	34.250	27.037	103.1	1.781
400	25.530	34.250	27.037	103.1	1.826
410	25.450	34.250	27.037	103.1	1.871
420	25.370	34.250	27.037	103.1	1.916
430	25.290	34.250	27.037	103.1	1.961
440	25.210	34.250	27.037	103.1	2.006
450	25.130	34.250	27.037	103.1	2.051
460	25.050	34.250	27.037	103.1	2.096
470	24.970	34.250	27.037	103.1	2.141
480	24.890	34.250	27.037	103.1	2.186
490	24.810	34.250	27.037	103.1	2.231
500	24.730	34.250	27.037	103.1	2.276
510	24.650	34.250	27.037	103.1	2.321
520	24.570	34.250	27.037	103.1	2.366
530	24.490	34.250	27.037	103.1	2.411
540	24.410	34.250	27.037	103.1	2.456
550	24.330	34.250	27.037	103.1	2.501
560	24.250	34.250	27.037	103.1	2.546
570	24.170	34.250	27.037	103.1	2.591
580	24.090	34.250	27.037	103.1	2.636
590	24.010	34.250	27.037	103.1	2.681
600	23.930	34.250	27.037	103.1	2.726
610	23.850	34.250	27.037	103.1	2.771
620	23.770	34.250	27.037	103.1	2.816
630	23.690	34.250	27.037	103.1	2.861
640	23.610	34.250	27.037	103.1	2.906
650	23.530	34.250	27.037	103.1	2.951
660	23.450	34.250	27.037	103.1	2.996
670	23.370	34.250	27.037	103.1	3.041
680	23.290	34.250	27.037	103.1	3.086
690	23.210	34.250	27.037	103.1	3.131
700	23.130	34.250	27.037	103.1	3.176
710	23.050	34.250	27.037	103.1	3.221
720	22.970	34.250	27.037	103.1	3.266
730	22.890	34.250	27.037	103.1	3.311
740	22.810	34.250	27.037	103.1	3.356
750	22.730	34.250	27.037	103.1	3.401
760	22.650	34.250	27.037	103.1	3.446
770	22.570	34.250	27.037	103.1	3.491
780	22.490	34.250	27.037	103.1	3.536
790	22.410	34.250	27.037	103.1	3.581</

Station	Latitude	Longitude	Date	Time	Depth
81	32-34.9 N	136-18.6 E	JUL.28, 1984	06:09	4530
	32-34.6 N	136-20.0 E			
Depth	Temp	Sal	σ_t	$\Delta \sigma$	ΔD
0	28.711	34.597	21.879	594.6	594.6
10	28.719	34.597	21.876	594.8	595.2
20	28.702	34.594	21.880	594.5	595.3
30	26.947	34.498	22.379	546.7	547.9
50	25.053	34.680	23.105	477.3	479.2
75	23.185	34.738	23.702	420.4	423.2
100	21.958	34.825	24.117	380.7	384.4
125	21.017	34.859	24.401	353.7	358.2
150	20.187	34.877	24.638	331.0	336.3
200	19.220	34.845	24.865	309.4	316.2
250	17.579	34.785	25.229	274.8	282.9
300	16.620	34.767	25.444	254.3	263.7
400	14.493	34.594	25.788	221.7	232.9
500	11.592	34.385	26.208	181.7	193.4
600	8.794	34.251	26.586	145.9	157.0
700	7.058	34.254	26.845	121.3	132.0
800	5.407	34.221	27.033	103.5	112.9
900	4.699	34.307	27.183	89.3	98.5
1000	4.032	34.360	27.296	78.5	87.4

Station	Latitude	Longitude	Date	Time	Depth
84	33-24.2 N	136-59.2 E	JUL.28, 1984	14:52	1900
	33-24.0 N	136-59.0 E			
Depth	Temp	Sal	σ_t	$\Delta \sigma$	ΔD
0	26.422	33.852	22.059	577.3	577.3
10	26.429	33.866	22.067	576.5	576.9
20	22.818	34.213	23.411	448.1	448.8
30	19.143	34.518	24.636	331.2	332.2
50	17.607	34.607	25.086	288.4	290.0
75	15.800	34.608	25.510	248.1	250.4
100	14.574	34.610	25.782	222.2	225.0
125	13.627	34.552	25.938	207.5	210.9
150	12.980	34.511	26.037	198.0	201.9
200	9.963	34.361	26.480	155.9	160.1
250	8.109	34.284	26.716	133.5	137.9
300	6.998	34.252	26.852	120.6	125.2
400	5.980	34.268	26.999	106.7	112.0
500	5.101	34.313	27.141	93.2	98.9
600	4.240	34.351	27.267	81.2	86.9
700	3.765	34.384	27.343	74.1	80.0
800	3.480	34.412	27.393	69.3	75.6
900	3.259	34.438	27.435	65.4	71.9
1000	3.013	34.468	27.482	60.9	67.6

Station	Latitude	Longitude	Date	Time	Depth
83	33-07.0 N	136-46.2 E	JUL.28, 1984	10:12	3350
	33-07.7 N	136-47.9 E		11:14	
Depth	Temp	Sal	σ_t	$\Delta \sigma$	ΔD
0	28.803	33.629	21.123	667.0	667.0
10	28.805	33.626	21.120	667.3	667.7
20	28.826	34.018	21.506	630.3	631.1
30	25.961	34.157	22.433	541.6	542.7
50	22.819	34.402	23.554	434.4	436.3
75	20.201	34.535	24.374	356.3	358.9
100	18.314	34.578	24.890	307.0	310.3
125	17.041	34.635	25.293	273.5	277.5
150	15.888	34.640	25.515	247.6	252.1
200	14.301	34.581	25.819	218.7	224.3
250	12.611	34.498	26.100	192.0	198.4
300	10.011	34.362	26.472	156.7	163.0
400	7.673	34.274	26.773	128.1	134.7
500	5.127	34.255	26.970	109.5	116.2
600	5.163	34.293	27.118	95.4	102.2
700	4.529	34.326	27.217	86.0	93.1
800	3.957	34.369	27.311	77.1	84.2
900	3.603	34.400	27.372	71.4	78.6
1000	3.315	34.432	27.425	66.3	73.7

Station	Latitude	Longitude	Date	Time	Depth
85	33-40.0 N	137-12.9 E	JUL.28, 1984	17:12	1450
	33-40.1 N	137-12.3 E		17:49	
Depth	Temp	Sal	σ_t	$\Delta \sigma$	ΔD
0	24.888	33.635	22.368	547.8	547.8
10	25.085	33.577	22.264	557.7	558.1
20	24.631	34.420	24.173	375.4	376.1
30	19.049	34.500	24.646	330.3	331.3
50	17.894	34.568	24.987	297.9	299.5
75	15.571	34.578	25.538	245.5	247.8
100	13.588	34.513	25.926	208.5	211.2
125	12.303	34.474	26.142	188.1	191.3
150	11.384	34.431	26.282	174.7	178.2
200	10.171	34.360	26.443	159.4	163.7
250	8.637	34.298	26.647	140.1	144.7
300	7.520	34.270	26.792	126.3	131.2
400	6.104	34.271	26.985	108.0	113.3
500	5.040	34.286	27.127	94.5	100.1
600	4.395	34.333	27.236	84.2	90.0
700	3.935	34.371	27.315	76.7	82.9
800	3.540	34.407	27.383	70.3	76.6
900	3.298	34.434	27.428	66.1	72.7
1000	3.082	34.459	27.468	62.2	69.1

Station	Latitude	Longitude	Date	Time	Depth	
86	33-57.0 N 33-57.6 N	137-26.2 E 137-25.1 E	JUL-28, 1984	19:53 20:36	1450	
Depth	Temp	Sal	σ_t	Δst	Δstp	ΔD
0	26.371	34.119	22.276	556.6	556.6	0.0
10	26.374	34.128	22.281	556.0	556.4	0.055
20	26.280	34.206	22.369	547.6	548.4	0.110
30	22.979	34.436	23.533	436.4	437.5	0.160
50	19.305	34.638	24.686	326.5	328.2	0.233
75	17.496	34.659	25.153	282.1	284.5	0.309
100	16.228	34.649	25.444	254.3	257.4	0.377
125	15.174	34.618	25.858	234.1	237.8	0.439
150	14.025	34.570	25.869	214.0	218.1	0.495
200	12.399	34.481	26.129	189.2	194.3	0.597
250	10.797	34.388	26.355	167.8	173.4	0.689
300	9.012	34.311	26.597	144.8	150.5	0.770
400	7.195	34.264	26.833	122.4	128.6	0.908
500	5.502	34.270	27.060	100.9	107.0	1.024
600	4.736	34.288	27.163	91.1	97.4	1.127
700	4.194	34.327	27.253	82.6	89.1	1.220
800	3.865	34.371	27.322	76.1	82.9	1.306
900	3.544	34.406	27.382	70.4	77.4	1.386
1000	3.266	34.436	27.433	65.6	72.8	1.461

Station	Latitude	Longitude	Date	Time	Depth	
87	34-13.0 N	137-40.8 E	JUL-28, 1984	22:32	1130	
	34-13.2 N	137-40.1 E		23:18		
Depth	Temp	Sal	σ_t	Δst	Δstp	ΔD
0	26.385	34.132	22.281	556.0	556.0	0.0
10	26.359	34.262	22.387	545.9	546.3	0.055
20	26.168	34.262	22.447	540.2	541.0	0.109
30	22.708	34.510	23.667	423.6	424.7	0.157
50	20.777	34.621	24.286	364.6	366.4	0.236
75	17.870	34.656	25.060	291.0	293.4	0.317
100	16.029	34.631	25.476	251.3	254.3	0.385
125	15.154	34.613	25.658	234.0	237.7	0.446
150	14.006	34.555	25.861	214.7	218.8	0.503
200	12.543	34.486	26.112	190.8	195.9	0.606
250	10.986	34.416	26.343	168.9	174.6	0.699
300	9.564	34.345	26.534	150.8	156.9	0.781
400	7.891	34.271	26.739	131.4	138.2	0.928
500	6.858	34.240	26.862	119.7	127.2	1.059
600	5.385	34.261	27.066	100.3	107.4	1.173
700	4.661	34.319	27.196	88.0	95.3	1.274
800	3.988	34.365	27.305	77.7	84.8	1.363
900	3.657	34.396	27.363	72.2	79.5	1.445
1000	3.312	34.434	27.426	66.2	73.5	1.522