Preliminary Report
of
The Hakuho Maru Cruise
KH-06-4 Leg 1,2

Leg 1: Nov. 2, 2006 - Nov. 23, 2006
Leg 2: Nov. 26, 2006 - Dec. 4, 2006
(Eel Cruise Indian Ocean)

Atmosphere and Ocean Research Institute
The University of Tokyo
2012

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By
The Scientific Members of the Expeditions

Edited by
Shun Watanabe, Kazuki Yokouchi
and Katsumi Tsukamoto

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Preface

The KH-06-4 research cruise of the R/V Hakuho Maru (Leg. 1-2) was the first research effort to determine the spawning areas of the freshwater eels (genus *Anguilla*) in the western Indian Ocean since the historical Carlsberg Foundation's Oceanographic Expedition Around the World from 1928-1930 by the Danish scientist Dr. Johannes Schmidt. A total of 31 scientists and technical staff from Indonesia, France, China, USA and Japan, and observation scientists from Mauritius participated in this historic cruise. We also aimed to reveal the mysterious larval migration of amphidromous gobies of the Sycidinae during this cruise, so the research cruise represented a historic international collaboration to study eels and other organisms in the Indian Ocean.

During the cruise, we succeeded to collect a total of 1145 leptocephali that will provide valuable new information about the ecology and biodiversity of marine eels in the Indian Ocean, and many other fish larvae were also collected, which may include some sycidinid gobies. The transect of 20 stations across the Indian Ocean and the two latitudinal transects of stations in the western Indian Ocean also included standardized CTD observations that will be useful for understanding the distribution and ecology of leptocephali and other fish larvae in relation to ocean currents and different water masses. All these specimens and oceanographic data will be analyzed in detail after going back to the laboratory, so they will surely give us new insight into the fish ecology and geographic species composition in the Indian Ocean. Only five anguillid leptocephali (3 specimens in Leg 1 and 2 specimens in Leg 2) were collected during the cruise, so it was not enough to determine exact spawning area of the freshwater eels that live on both sides of the Indian Ocean. However, the anguillid leptocephali collected in the eastern Indian Ocean during Leg 2 were only the 16th and 17th specimens of *Anguilla* leptocephali ever collected in the region including those collected there during Danish expedition more than 80 years ago.

We have made the first step forward to reveal migratory ecology of *Anguilla* and Sycidinae in the Indian Ocean during this cruise, and I expect to have further research efforts in this fascinating ocean in the future.

In the cabin of Hakuho Maru, 3 Dec. 2006

Chief scientist: Jun Aoyama

Station and working log. KH-06-4_Leg1

No.1

2006	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
02-Nov (Thu.)	Tokyo														14:00 Reave port Tokyo GMT+9									
03-Nov (Fri.)	~	06-Nov (Mon.) GMT+8		~	11-Nov (Sat.)																			
12-Nov (Sun.)	←←←	Clock Aback GMT+7																				Stn.1 01-56N 094-02E IKMT**********		
13-Nov (Mon.)																					Stn.2 02-00S 098-00E IKMT**********			
14-Nov (Tue.)				Stn.3 02-00S 097-00E IKMT**********		CTD**					Stn.4 02-00S 096-00E IKMT**********				CTD**					Stn.5 02-00S 095-00E IKMT******** CTD**				
15-Nov (Wed.)			Stn.6 02-00S 094-00E IKMT*********																		Stn.7 03-50S 090-20E IKMT***** CTD**			
16-Nov (Thu.)		Stn.8 04-15S 089-32E IKMT**********			←←←	Clock Aback GMT+6															Stn.9 06-16S 085-30E IKMT***** CTD*			
17-Nov (Fri.)		Stn.10 06-41S 084-40E IKMT**********																			Stn.11 08-37S 080-47E IKMT**** CTD*			
18-Nov (Sat.)		Stn.12 09-00S 080-03E IKMT**********																	Stn.13 10-38S 076-43E IKMT********** CTD****		←←←	GMT+5 Clock Aback		
19-Nov (Sun.)		Stn.14 11-04S 075-57E IKMT**********																		Stn.15 12-43S 072-28E IKMT**** CTD**				
20-Nov (Mon.)		Stn.16 13-13S 071-25E IKMT**********																		Stn.17 14-56S 067-48E IKMT***** CTD**				
21-Nov (Tue.)	Clock Aback ←←←	GMT+4	Stn.18 15-33S 066-31E IKMT*	IKMT*****										Stn.19 16-25S 064-40E IKMT**********						Stn.20 16-25S 064-39E CTD* IKMT*********				
22-Nov (Wed.)																								
23-Nov (Thu.)											Port Louis													

Station and working log. KH-06-4_Leg2

No.2

2006	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
26-Nov (Sun.)	Port Louis																							
27-Nov (Mon.)					**Stn.21 18-00S 055-00E** IKMT*******		CTD**					**Stn.22 17-00S 055-00E** CTD**	IKMT*******					**Stn.23 16-00S 055-00E** CTD**	IKMT**********					
28-Nov (Tue.)	**Stn.24 15-00S 055-00E** CTD**	IKMT*******					**Stn.25 14-00S 055-00E** CTD**	IKMT*******						**Stn.26 13-00S 055-00E** CTD**	IKMT*****					**Stn.27 12-00S 055-00E** CTD**	IKMT**********			
29-Nov (Wed.)				**Stn.28 11-00S 055-00E** IKMT*****	CTD*					**Stn.29 10-00S 055-00E** CTD*	IKMT******					**Stn.30 9-00S 055-00E** CTD*	IKMT******					**Stn.31 8-00S 055-00E** CTD*	IKMT**********	
30-Nov (Thu.)	********																	**Stn.32 8-00S 059-00E** CTD*	IKMT**********					
01-Dec (Fri.)	**Stn.33 9-00S 059-00E** CTD*	IKMT******					**Stn.34 10-00S 059-00E** CTD*	IKMT**********						**Stn.35 11-00S 059-00E** CTD*	IKMT*******					**Stn.36 12-00S 059-00E** CTD**	IKMT**********			
02-Dec (Sat.)				**Stn.37 13-00S 059-00E** IKMT**********		CTD*				**Stn.38 14-00S 059-00E** CTD*	IKMT**********						**Stn.39 15-00S 059-00E** CTD*********		IKMT**********					
03-Dec (Sun.)	**Stn.40 16-00S 059-00E** IKMT**********					CTD*						**Stn.41 17-00S 059-00E** CTD*	IKMT*********						**Stn.44 18-00S 059-00E** CTD**	IKMT**********				
04-Dec (Mon.)											Port Louis													

Scientists on board HAKUHO-MARU (KH-06-4)

Name	Affiliation
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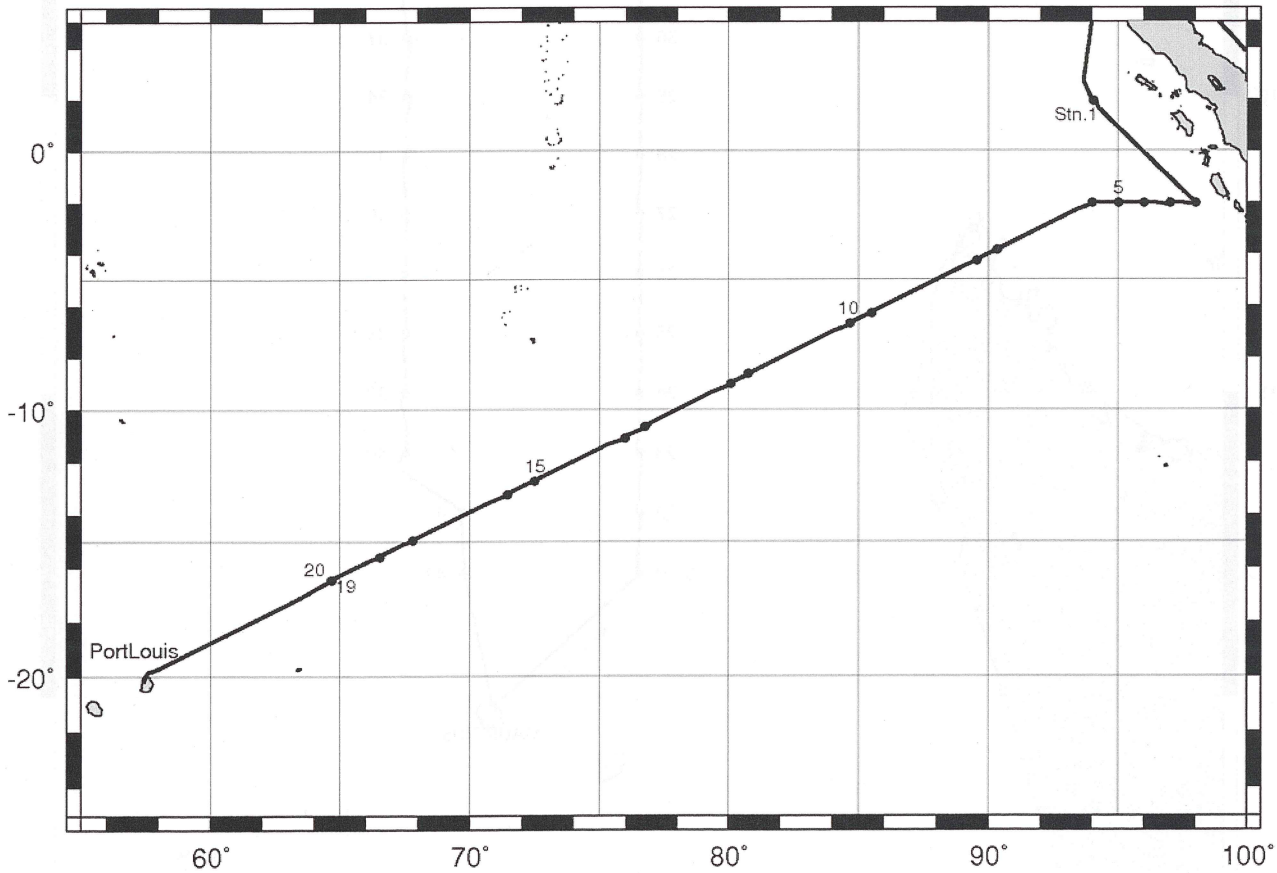
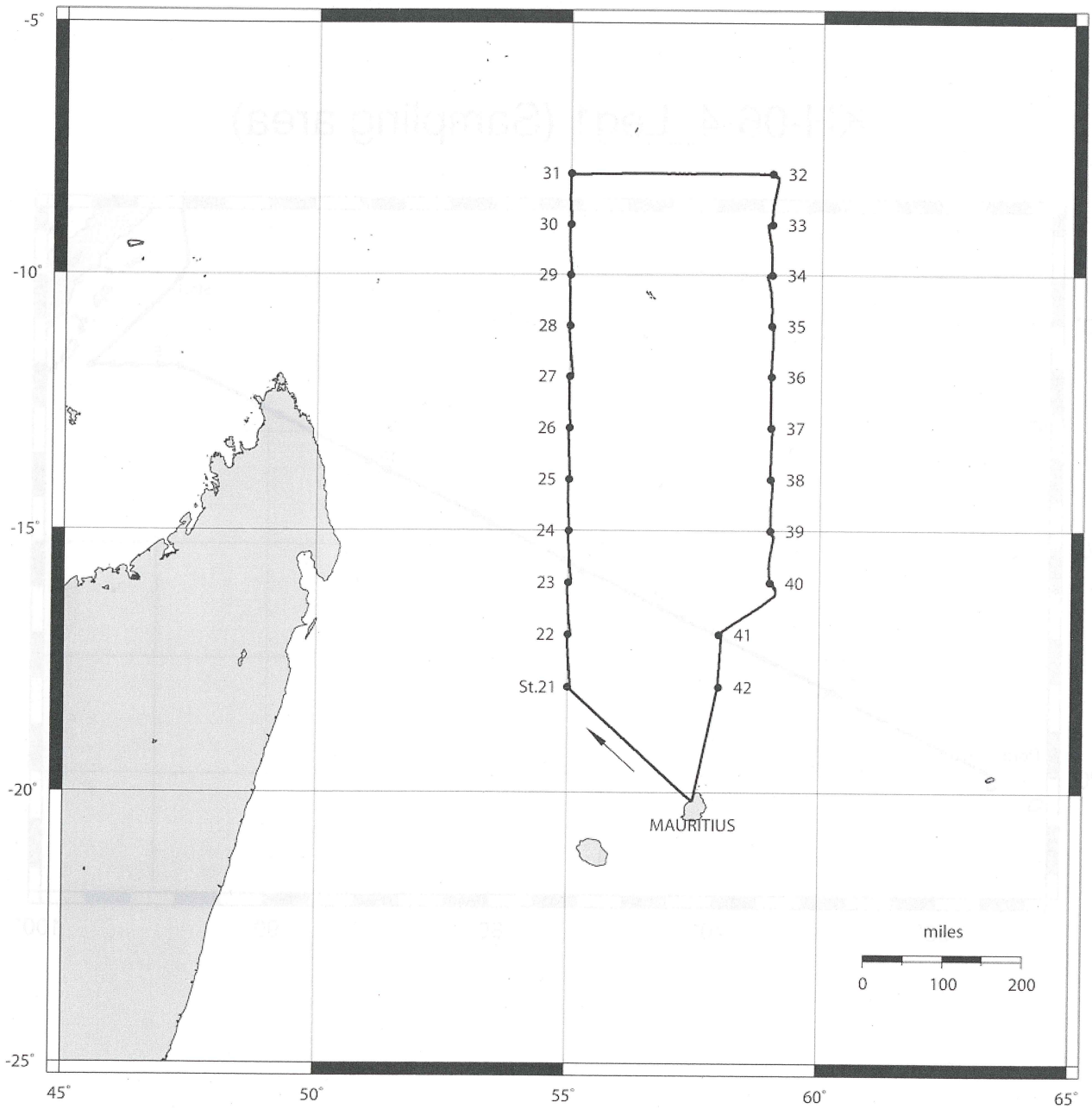
KH-06-4_Leg1 (Sampling area)



KH-06-4_Leg2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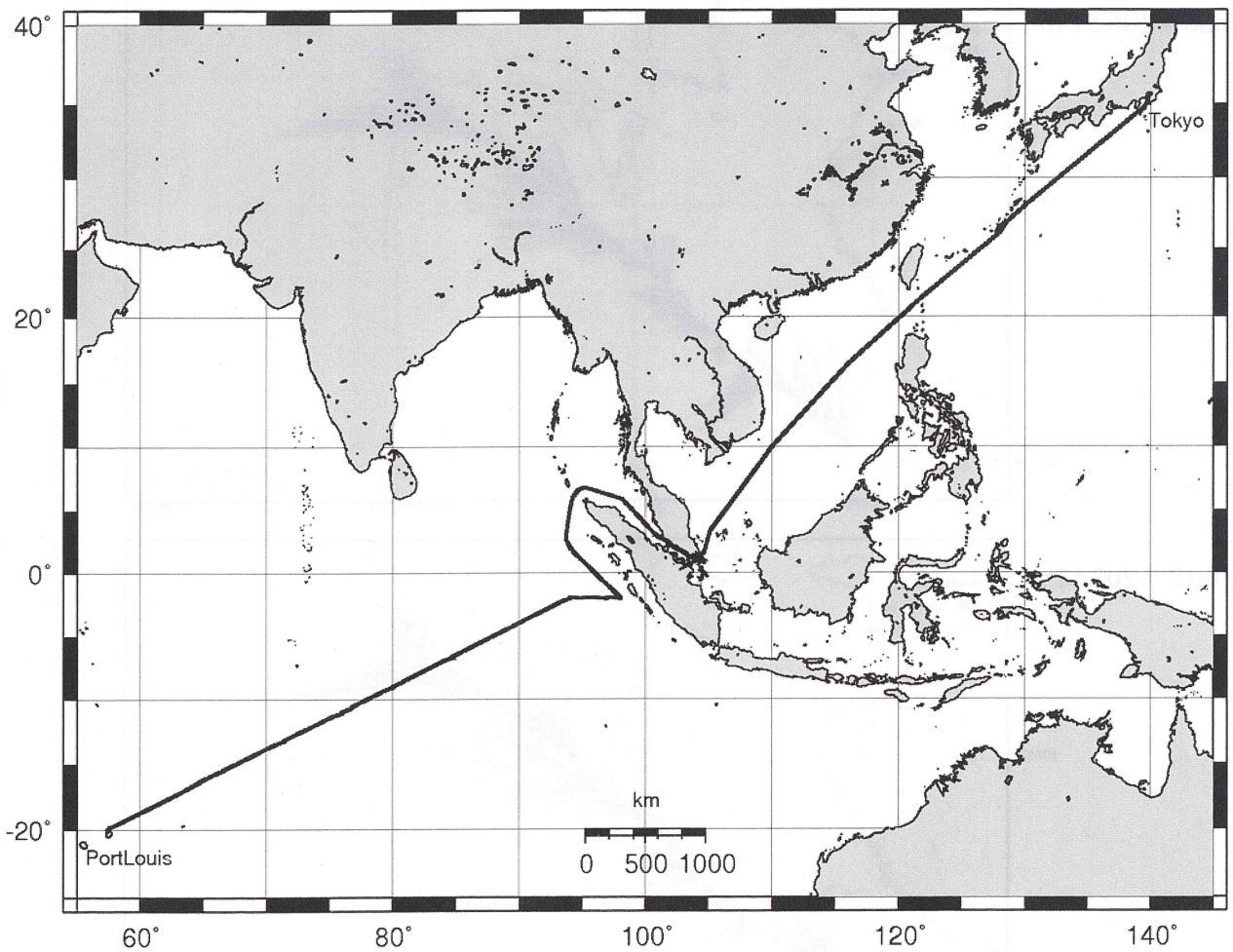
KH-06-4 (Total area)



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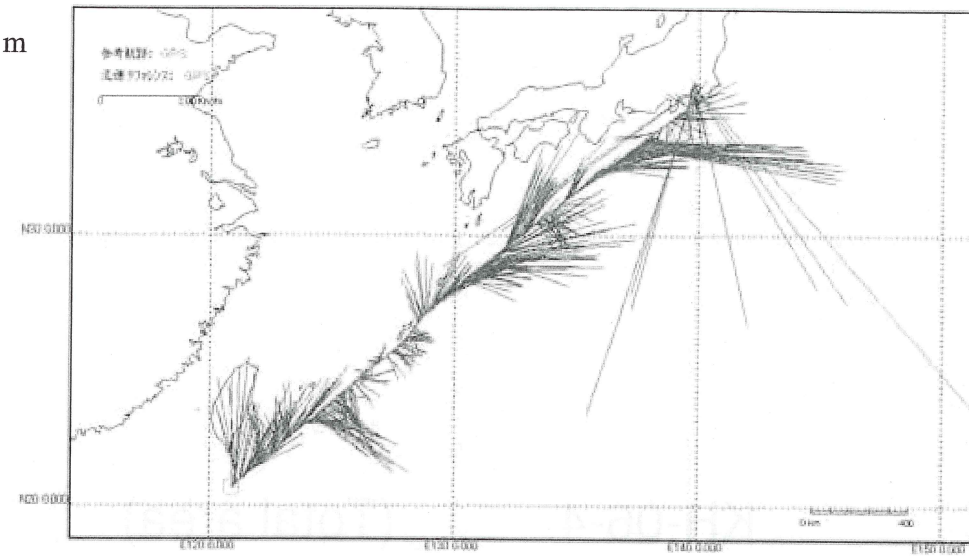

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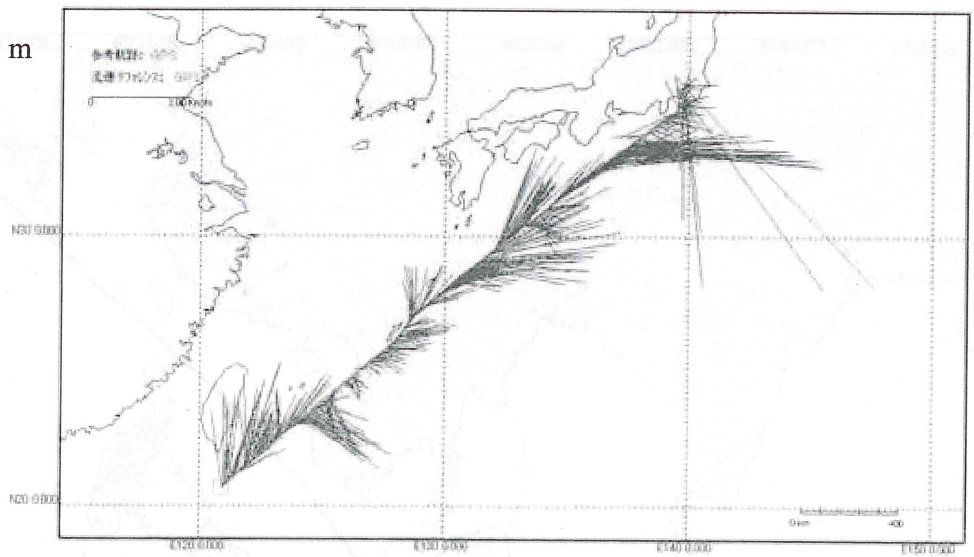

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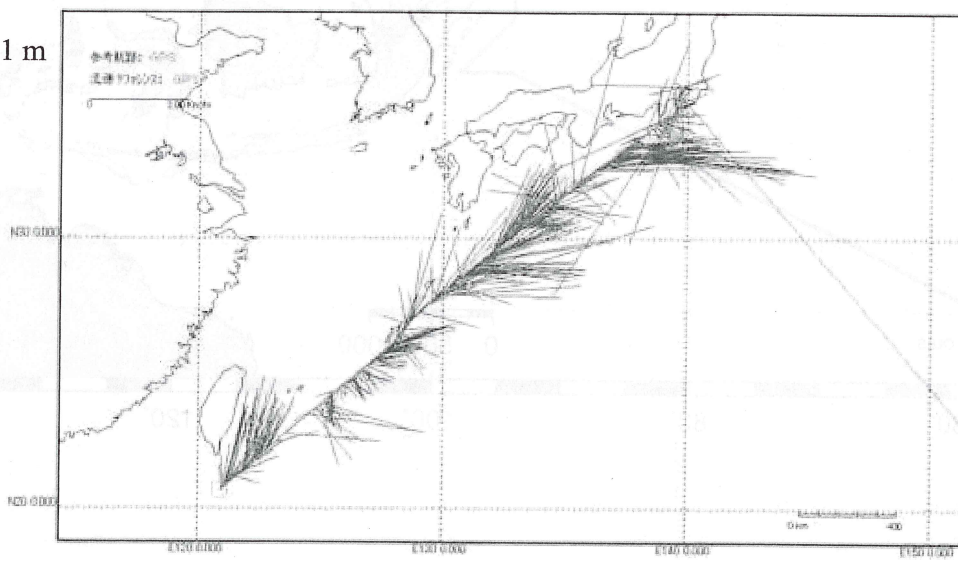

Figure: The stickdiagrams on track chart drawn by ADCP data (.LTA) with "ADCPTracker" .
[2006/11/02 01:41 - 2006/11/05 17:11 (GMT)]
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> Minimum ship speed : 1 knot
> Box averaging : 0 ens.
> Scale averaging : 0 ens.

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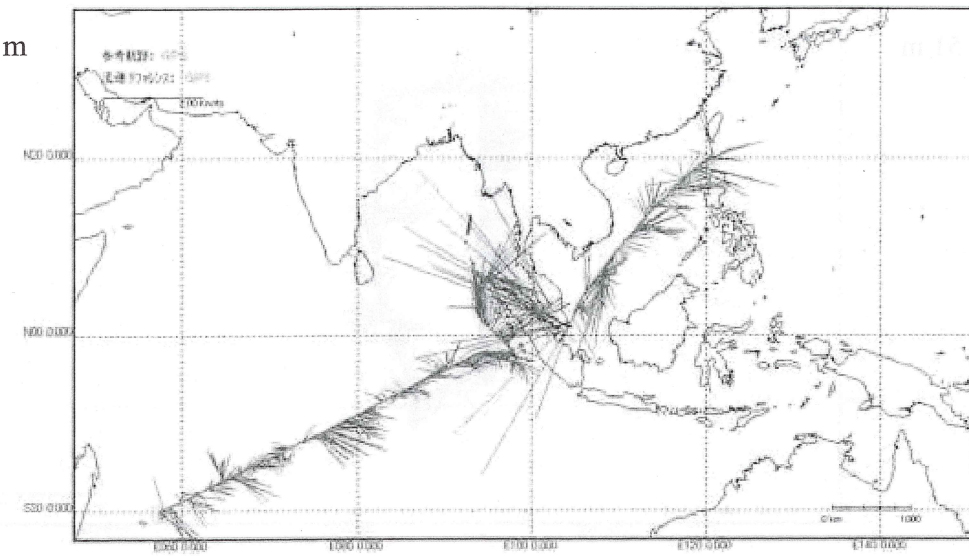

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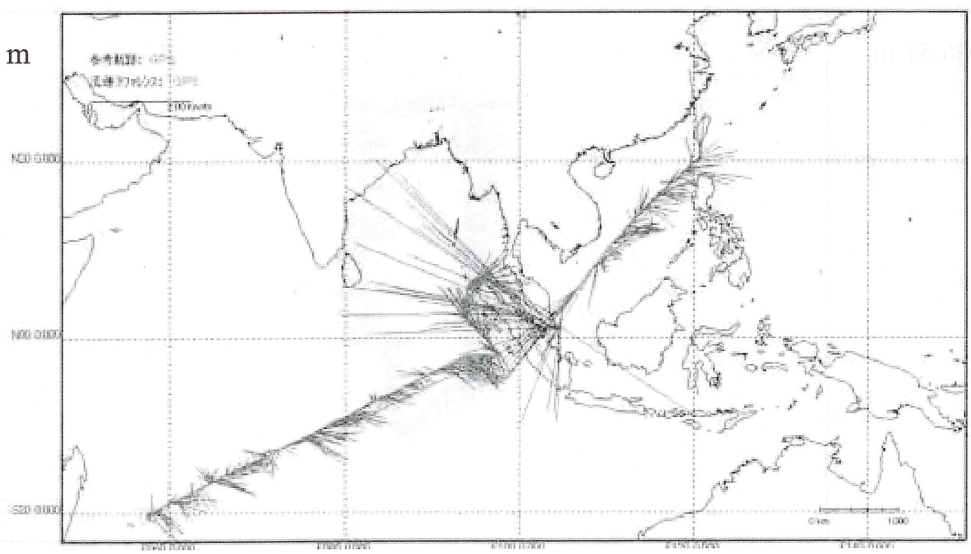

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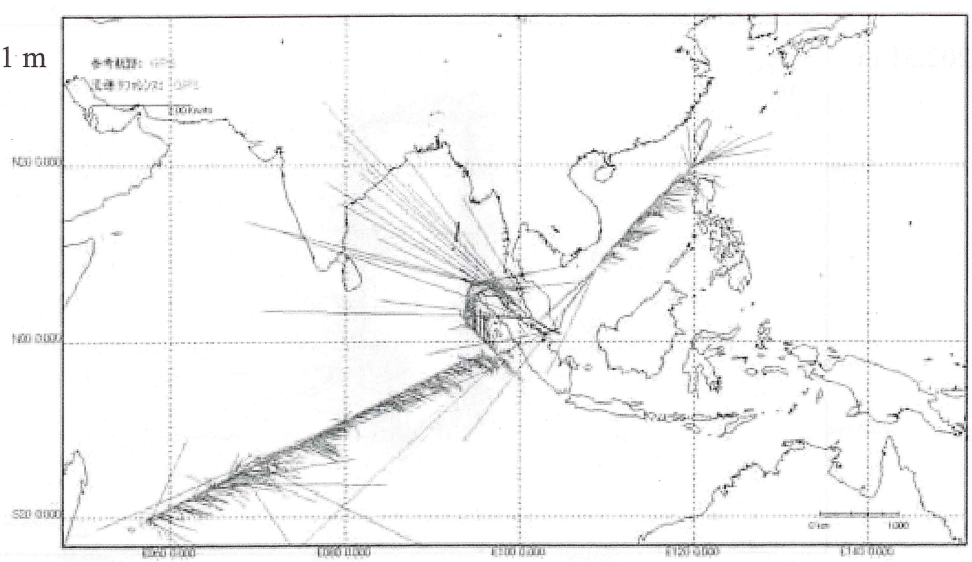

Figure: The stickdiagrams on track chart drawn by ADCP data (.LTA) with "ADCPTracker" .
[2006/11/05 17:19 - 2006/11/23 03:39 (GMT)]
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> Scale averaging : 0 ens.

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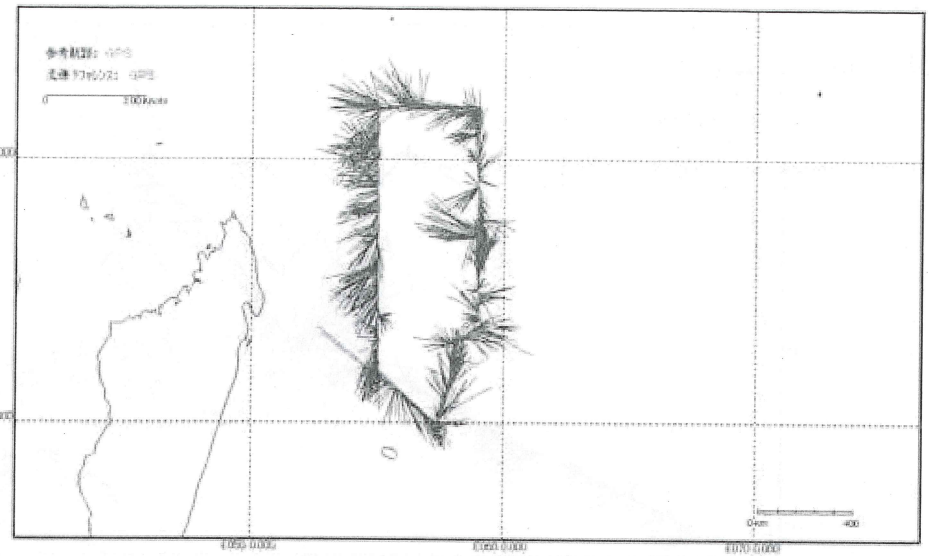
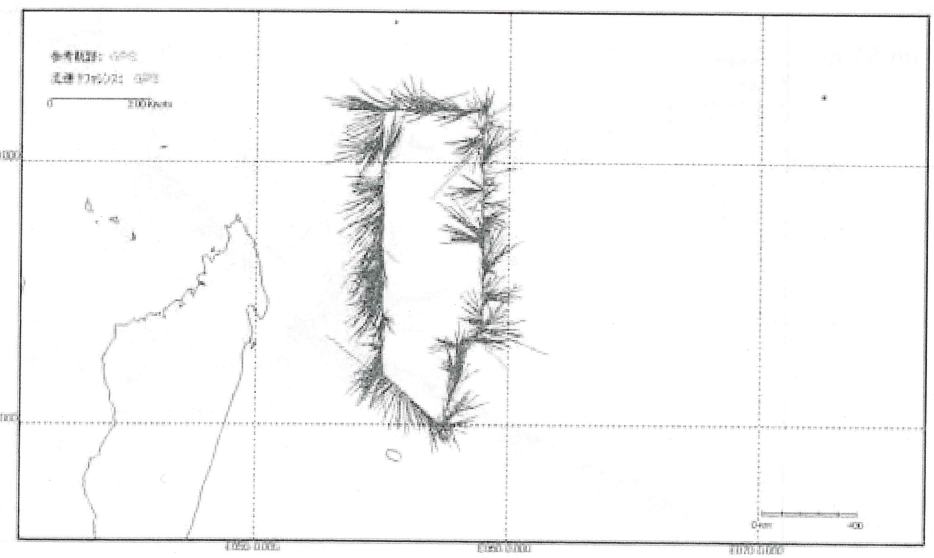


Bin6 = 106.51 m



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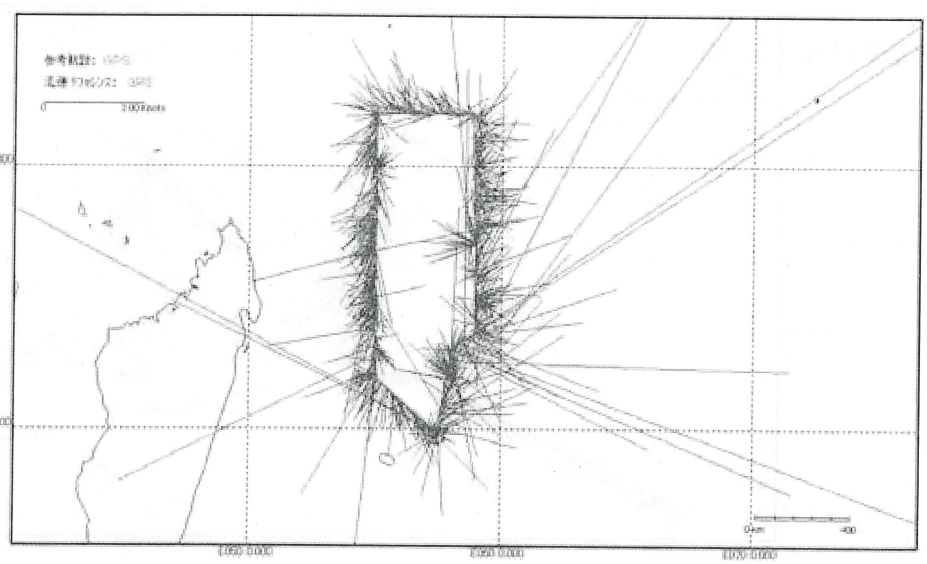

Figure: The stickdiagrams on track chart drawn by ADCP data (.LTA) with "ADCPTracker" .
[2006/11/26 06:52 - 2006/12/04 03:12 (GMT)]
The processing configurations were indicated below.

> Max current speed : 5 knot
> Minimum ship speed : 1 knot
> Box averaging : 0 ens.
> Scale averaging : 0 ens.

Anguilla Leptocephali Collected During the KH-06-4 Cruise

Jun Aoyama, Eric Feunteun, Sam Wouthuyzen, Michael J. Miller, Tony Robinet, Mari Kuroki, Elodie Reveillac, Pierre Alexandre, Akira Shinoda, Yuki Minegishi, Machiko Oya, Bunpei Ai, Patrick Berrebi, Raymonde Lecomte-Finiger, and Katsumi Tsukamoto (in random order)

Sampling for leptocephali was carried out using 75 net tows at 42 stations between 12 November and 3 December 2006 during the KH-06-4 cruise of the R/V Hakuho Maru in the Indian Ocean. A total of 5 *Anguilla* leptocephali were collected using the Isaacs Kidd Midwater Trawl during the two legs. The IKMT had an 8.7 m^2 mouth opening and 0.5 mm mesh. The IKMT was fished in oblique and step tows during daytime and nighttime. Some stations were located in the region to the west of Sumatra where anguillid leptocephali had been collected during a historical survey in 1929 (Jespersen, 1942) and a recent collaborative survey between ORI and Indonesia using the R/V Baruna Jaya VII of LIPI in Indonesia (Aoyama et al., In press). The collections during these two previous surveys indicated that several species of tropical anguillids spawn somewhere off west Sumatra or in adjacent regions, and the collection of three anguillid leptocephali in that region confirmed that tropical *Anguilla* leptocephali are probably typically present in the area due to spawning occurring there.

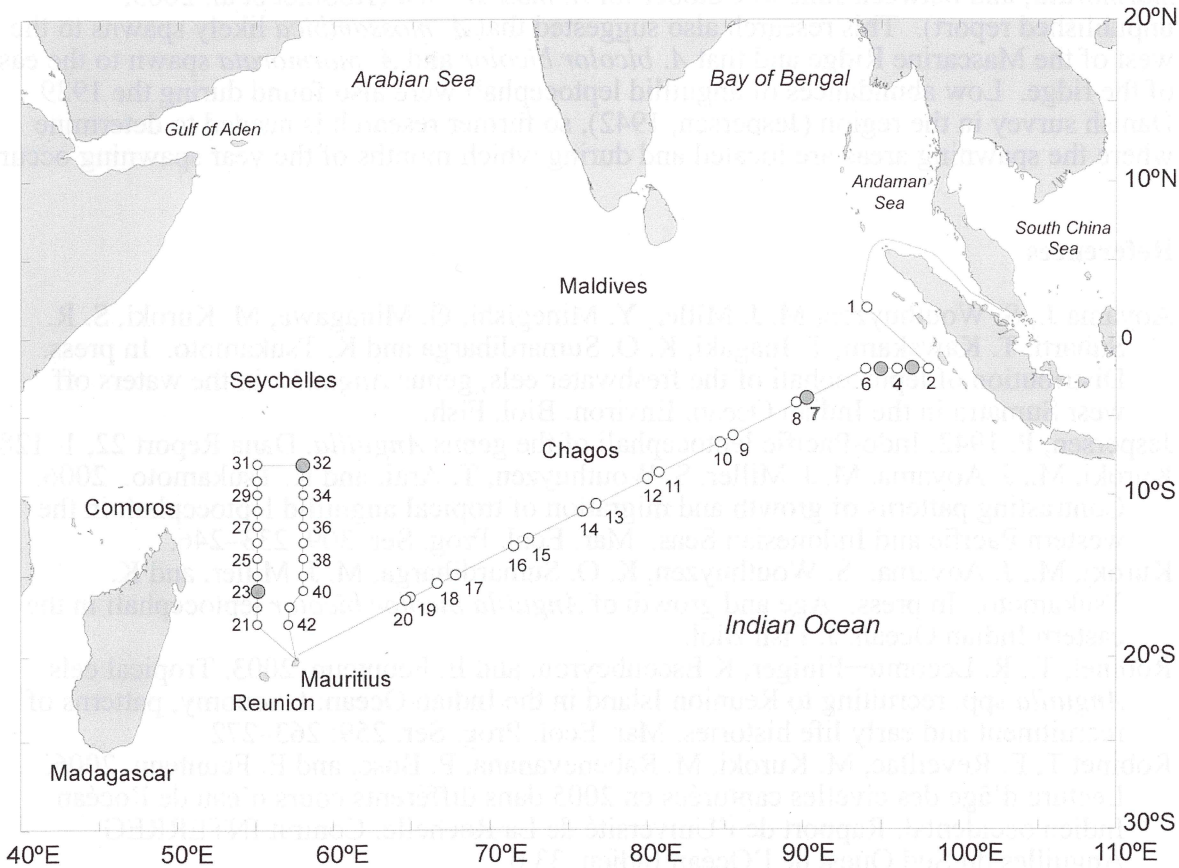

Figure 1. Map showing the sampling stations using the IKMT in the Indian Ocean during the KH-06-4 cruise of the R/V Hakuho Maru and the locations were anguillid leptocephali were collected (red circles). Leg 1 included Stn. 1 – 20, and Leg 2 included Stn. 21 – 42.

The anguillid leptocephali at collected Stn. 3 and 5 were both *Anguilla bicolor bicolor* (44.0 and 47.8 mm TL), because that is the only shortfin species found in the Indian Ocean. The 44.2 mm TL anguillid leptocephalus collected at station 7 was likely *Anguilla marmorata* based on its morphological characteristics, but its species identity will be verified later in the laboratory using molecular genetic techniques. Based on research on the age and growth of tropical species of anguillid leptocephali, these three specimens (42 – 47 mm) were likely about 60 – 120 days old (Kuroki et al., 2006, In press).

There were two anguillid leptocephali collected during Leg 2 that were genetically identified on board using Real-Time PCR as being *A. bicolor bicolor* (35.0 mm TL) and *A. marmorata* (48.3 mm TL). A piece of tissue collected from both specimens will be used in Montpellier, France for microsatellite genotyping to be included in population genetics studies of *A. marmorata* and *A. bicolor bicolor* in the southwestern Indian Ocean. Their otolith microstructure will also be examined to determine their hatching dates.

The lack of high densities of anguillid leptocephali to the west of the Mascarine Ridge located at about 61°E suggests that spawning had not occurred in this area in recent weeks and that relatively few leptocephali had been transported into the region from possible spawning areas further to the east. Previous research on glass eels using catch data at the time of recruitment at a number of locations in the region, and examinations of their otolith microstructure, had suggested that the spawning period of anguillid eels range from mid-September to mid-January with peaks during December for *A. bicolor bicolor* and *A. marmorata*, and between June to October for *A. mossambica* (Robinet et al. 2003, unpublished report). This research also suggested that *A. mossambica* likely spawns to the west of the Mascarine Ridge and that *A. bicolor bicolor* and *A. marmorata* spawn to the east of the ridge. Low abundances of anguillid leptocephali were also found during the 1929 Danish survey in the region (Jespersen, 1942), so further research is needed to determine where the spawning areas are located and during which months of the year spawning occurs.

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Eel Report

Genetic Approach

Patrick Berrbi and Pierre-Alexandre Gangnarie

University of Monpellier

We have collected, for each of the two sampled anguillid leptocephalii, half of the remaining part of the body after ablation of the head and the gut. Real time PCR species determination was conducted for each individual. Our conclusion is that the leptocephali sampled in the station 23 belongs to the species A. marmorata whereas the one sampled at station 32 belongs to A. bicolor bicolor. Piece of tissue collected in both specimen will be used in Montpellier for microsatellite genotyping to be included in population genetics studies of A. marmorata and A. bicolor bicolor in the South Western Indian Ocean.

Spawning area for Anguillid eels

Eric Feunteun[1], Tonny Robinet[2] and Elodie Réveillac[2]

[1]French National Museum of Natural History
[2]University of La Rochelle

The total number of anguillid eels caught after a significant sampling effort combining oblique and step IKMT tows at night and at day is low. Only two specimens were caught at the beginning of the night during a step tow.

According to morphological and real time PCR species determinations. In the station 23 (16°S 55° E), a 35 mm long A. marmorata leptocephalus was caught at 8pm between 0 and 134 m deep. In the station 32 (8°S 59°E) a 48 mm long A. bicolor bicolor leptocephalus was caught at 8pm between 0 and 134 m deep.

As inferred to size both specimens are thought to be at the end of their leptocephalus stage, and probably close to the beginning of metamorphosis (estimate age according to Kuroki et al).

These results shows that the anguillid eel population is very low compared to expected abundance around spawning areas (ref). This suggests 1) a timing problem (eg missed the spawning period) and/or 2) a location problem (eg, the spawing area is not in the suspected area).

Indeed, according to Robinet et al. (2003, unpublished data), the spawning period of anguillid eels range from:

- mid September to mid January and peaks during December in A. bicolor bicolor and A. marmorata;
- between June to October in A. mossambica.

According to the same authors, the spawning area is located as shown on fig. 1. :

- A. bicolor bicolor at the East of Mascarene ridge 9°-15° S and 62°-65°E
- A marmorata at the east of Mascarene ridge 12°-18° S and 63°-66°E
- A mossambica at the west of Mascarene ridge 18°-20°S and 53°-56°E

Therefore, it is acceptable to think that the sampling occurred just at the beginning of the spawning season of A bicolor and A. marmorata. The larvae did not have time to be drifted to 59°E. The spawning season of A. mossambica had just ended and the larvae had already been transported westward.

The leptocephali which have been caught are thought to be old (over 80 days) and could have hatched during summer 2006 and drifted westward. The age determination will be very helpful to confirm this hypotheses. As a conclusion, these results are very useful to design a more accurate sampling plan for a future cruise.

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Robinet T, Réveillac E. Kuroki M., Rabenevanana M., Bosc P., Feunteun E. (2006) Lecture d'âge des civelles capturées en 2005 dans différents cours d'eau de l'océan Indien occidental. Rapport de l'Université de La Rochelle. Contrat INTERREG Anguilles du Sud Ouest de l'Océan Indien. 33 p.

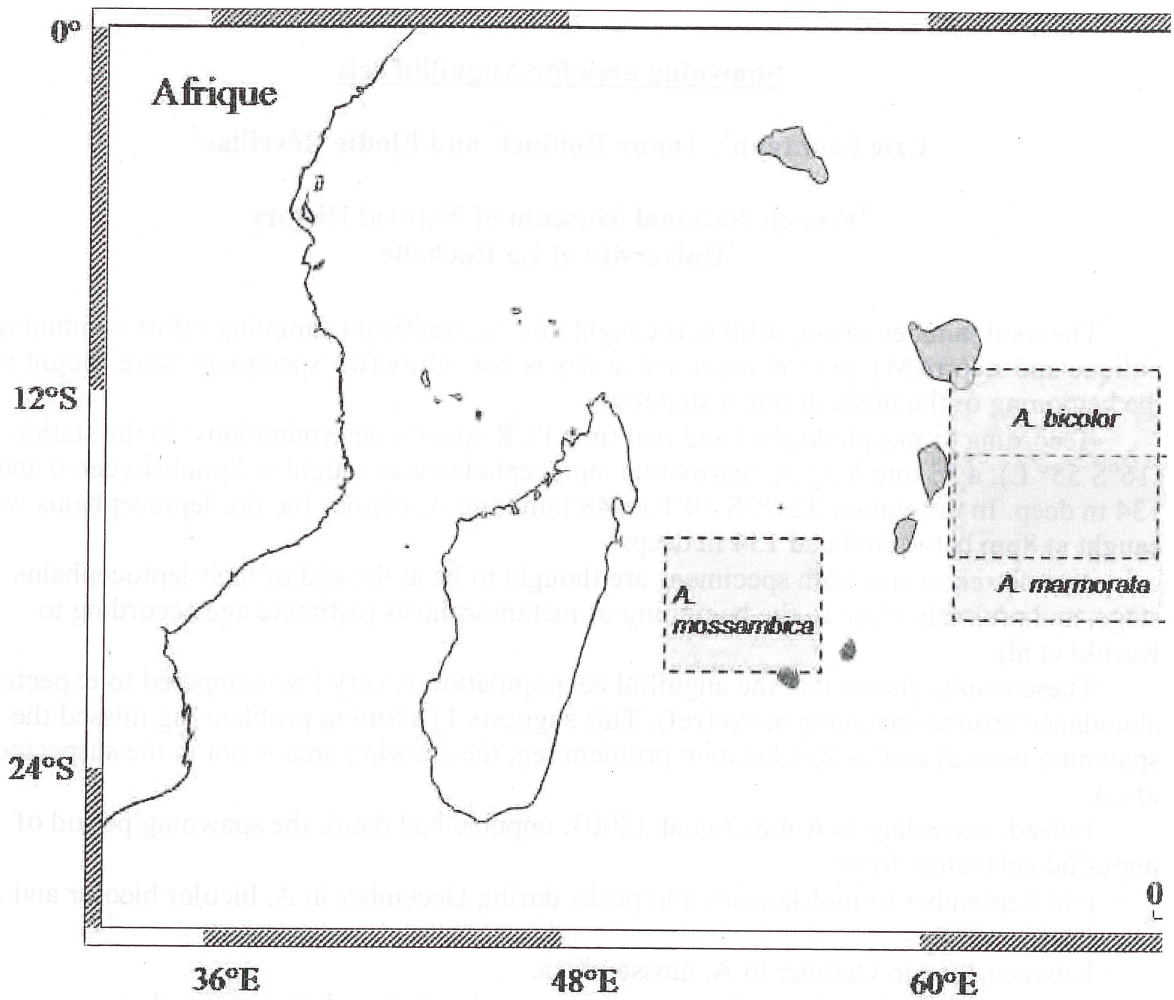

Figure 1. Suggested spawning areas of anguillid eels in the south western Indian Ocean as inferred by age readings of glass eel otoliths (Robinet et al., 2003; unpublished).

Leptocephali Collected During the KH-06-4 Cruise

Michael J. Miller, Tao Ma, Etsuko Sawada, Mari Kuroki, Sam Wouthuyzen
Eric Feunteun, Katsumi Tsukamoto and Jun Aoyama

A total of 1126 leptocephali and 46 juveniles of many species eels and their close relatives were collected in the Indian Ocean between 12 November and 3 December 2006 during the first two legs of the KH-06-4 cruise (Table 1). Sampling occurred at 20 stations across the Indian Ocean from off west Sumatra to the southeast towards Mauritius during Leg 1 and in two north-south transects to the west of the Mascarene Ridge in Leg 2 (Fig. 1). Leptocephali were collected using the Isaacs Kidd Midwater Trawl (IKMT) with an 8.7 m^2 mouth opening and 0.5 mm mesh that was fished in oblique and step tows during both daytime and nighttime primarily in the upper 150 m, except during daytime when fishing was deeper, and only using oblique tows.

During Leg 1, net tows were made at 6 stations in the region to the west of Sumatra and a high abundance and a wide variety of species was collected. Many congrid leptocephali such as *Ariosoma*, *Bathycongrus*, and *Uroconger* were collected in this region along with muraenids, chlopsids, and ophichthids. The abundance and species richness of these families whose juveniles and adults live in shallow water or on the upper slope dropped off rapidly to the west of 90°E in the transect of stations extending to the southwest across the southern Indian Ocean (Fig. 2). The size ranges of these taxa in Leg 1 were large (Fig. 3, 4, 5).

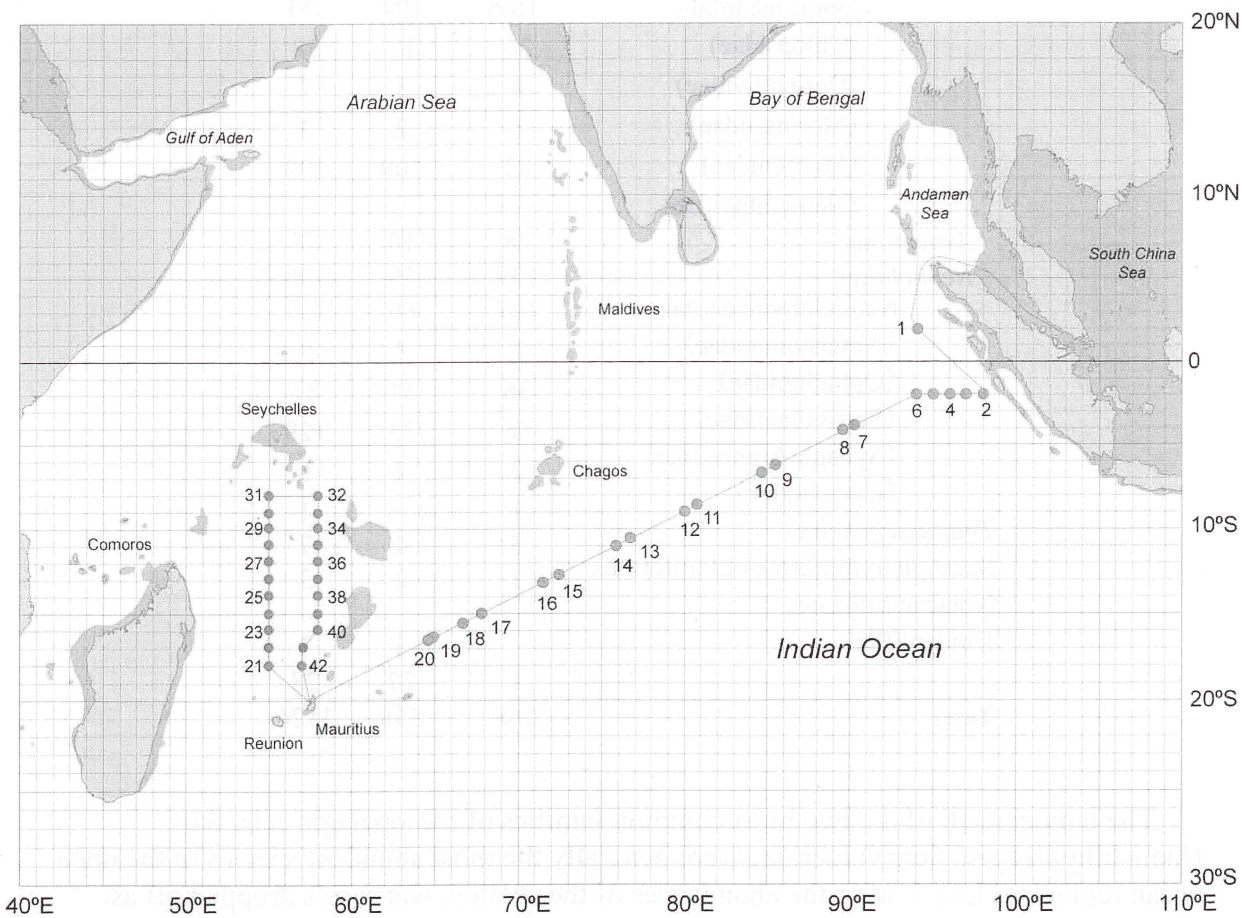

Figure 1. Map of the stations sampled for leptocephali with the IKMT during Leg 1 (Stn. 1 – Stn. 20) and Leg 2 (Stn. 21 – Stn. 42). Areas shallower than 200 m where most species of marine eels live are shown in blue (some shallow areas along the southwest margin of the map are not shown).

Table 1. List of the numbers and size ranges of the leptocephali collected during the two legs of the KH-06-4 cruise in the Indian Ocean.

	Leg 1	Leg 2	Total
Anguillidae	3	2	5
Congridae			
Ariosoma sp. 1	10	2	12
Ariosoma sp. 2	2		2
Ariosoma sp. 3	1		1
Ariosoma sp. 4	1	6	7
Ariosoma sp. 5	19		19
Ariosoma sp. 6	4	34	38
Ariosoma sp. 7	4	10	14
Ariosoma sp. Type A	2		2
Ariosoma sp.	9	69	78
Conger	11	14	25
Gnathophis	5	40	45
Bathycongrus	23	2	25
Gavialiceps	4		4
Uroconger	44		44
Congrinae spp.	6		6
Gorgasia	12	1	13
Heteroconger	1	1	1
Congridae total	157	194	351
(Chlopsidae)	26	12	38
(Derichthyidae)	4	3	7
(Moringuidae)	1	2	3
(Muraenidae)	83	109	192
(Nemichthyidae)			
Avocettina	28	10	38
Nemichthys	139	59	198
Nemichthyidae total	167	69	129
(Nettastomatidae)	6	3	9
(Ophichthidae)	36	51	87
(Serrivomeridae)	56	73	129
(Synaphobranchidae)	2	4	6
(Cyematidae)	1		1
Thallassenchelys	3	4	7
Saccopharyngiformes Elopiformes	1	2	3
Notacanthiformes			
Unidentified		3	3
	1	27	28
Total	568	558	1126

The leptocephali of the two most common families of mesopelagic eels, the Nemichthyidae and Serrivomeridae were generally the most abundant species in the open ocean regions of Leg 1, after the abundances of the shallow water eels dropped off as sampling moved to the southwest across the Indian Ocean (Fig. 2). A wide range of sizes of leptocephali was collected from recently spawned leptocephali to large individuals close to metamorphosis (Fig. 3). *Nemichthys* leptocephali reach very large sizes (> 250 mm TL), but the maximum size of serrivomerid leptocephali is < 75 mm TL.

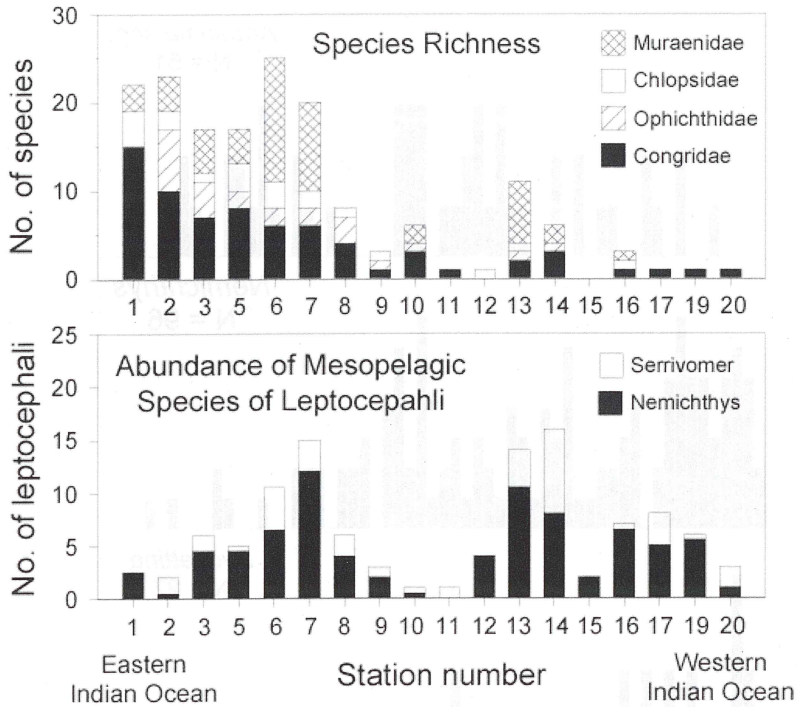

Figure 2. The number of species of leptocephali collected at each station during **Leg 1** of the four most abundant families of marine eels that live in shallow water or on the upper slope (top panel). The bottom panel shows the number of leptocephali per tow of the leptocephali of the mesopelagic eels of *Nemichthys* and the Serrivomeridae at each station. Two stations that only included deep day tows are excluded. See Figure 1 for a map of stations.

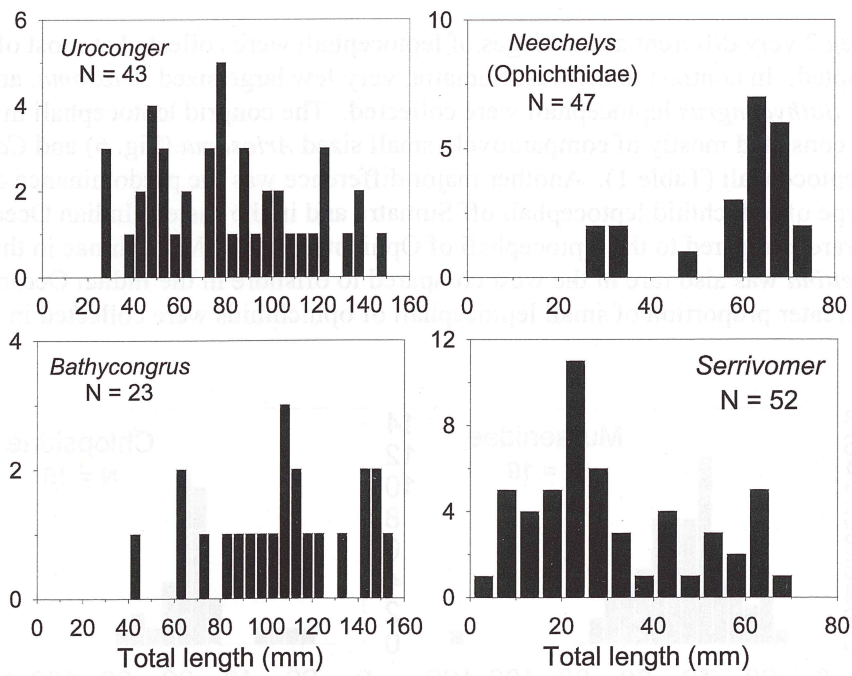

Figure 3. Length frequency plots of species of leptocephali of the congrid genera *Uroconger* and *Bathycongrus*, and ophichthid and serrivomerid leptocephali during **Leg 1** of the KH-06-4 cruise.

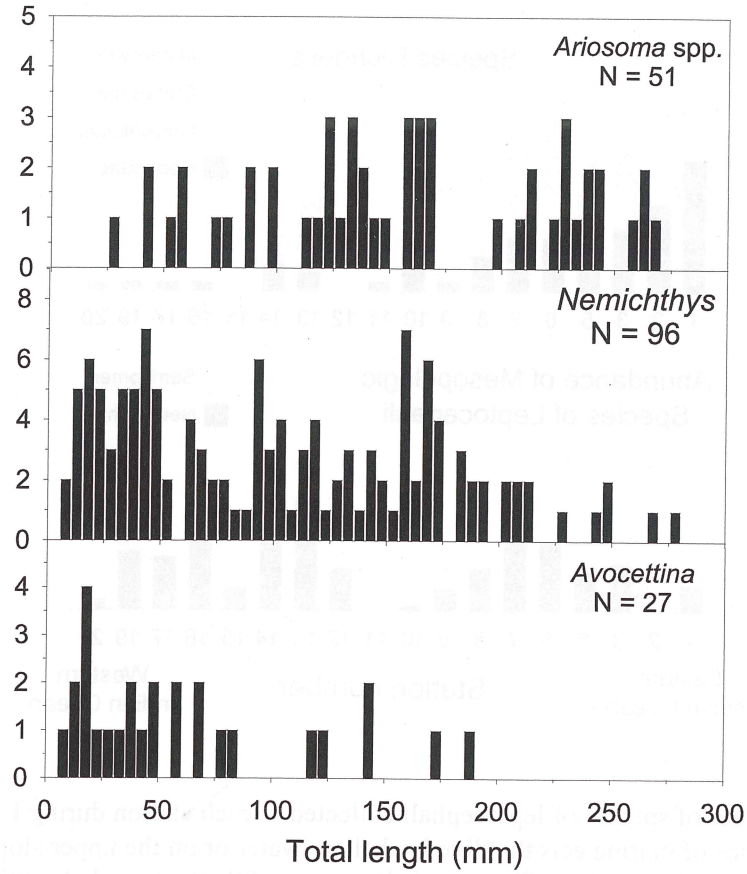

Figure 4. Length frequency plots of leptocephali of *Ariosoma* (Congridae) and of the mesopelagic eels of the family Nemichthyidae (*Nemichthys* and *Avocettina*) collected during **Leg 1** of the KH-06-4 cruise.

During Leg 2 very different assemblages of leptocephali were collected at most of the stations that were sampled. In contrast to off west Sumatra, very few large sized *Ariosoma*, and no *Uroconger* or *Bathycongrus* leptocephali were collected. The congrid leptocephali in the western Indian Ocean consisted mostly of comparatively small sized *Ariosoma* (Fig. 6) and *Conger* and *Gnathophis* leptocephali (Table 1). Another major difference was the predominance of the *Neenchelys* type of ophichthid leptocephali off Sumatra and in the eastern Indian Ocean, compared to it being very rare compared to the leptocephali of Ophichthinae and Myrophinae in the western Indian Ocean. *Avocettina* was also rare in the west compared to offshore in the Indian Ocean. Similar to *Ariosoma*, a greater proportion of small leptocephali of ophichthids were collected in Leg 2 (Fig. 7).

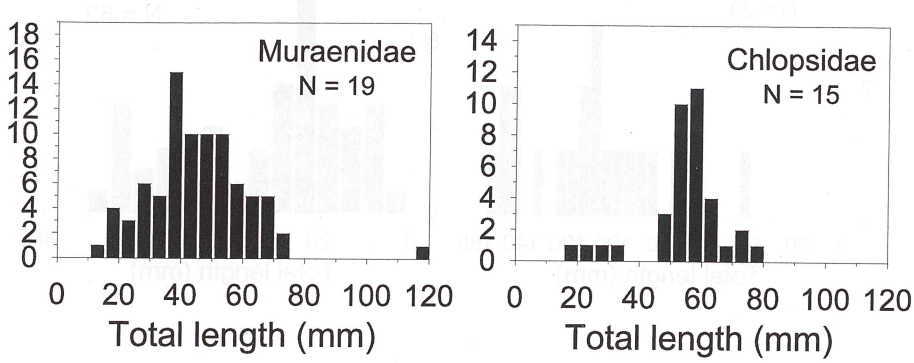

Figure 5. Length frequency plots of leptocephali of the Muraenidae and Chlopsidae that were collected during **Leg 1** of the KH-06-4 cruise.

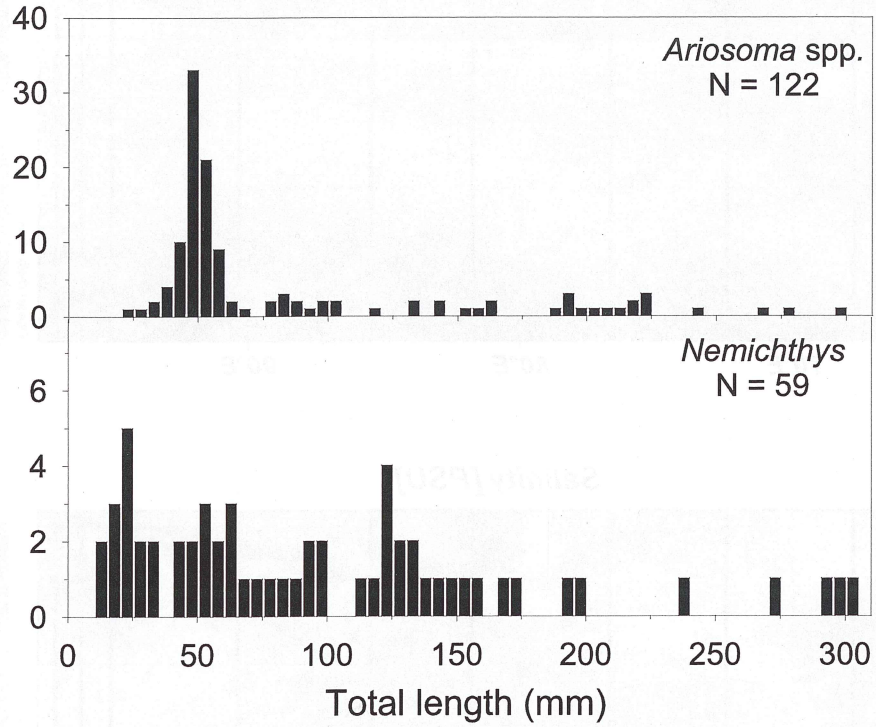

Figure 6. Length frequency plots of leptocephali of leptocephali of *Ariosoma* (Congridae) and of the mesopelagic eels of the family Nemichthyidae (*Nemichthys*) that were collected during **Leg 2** of the KH-06-4 cruise.

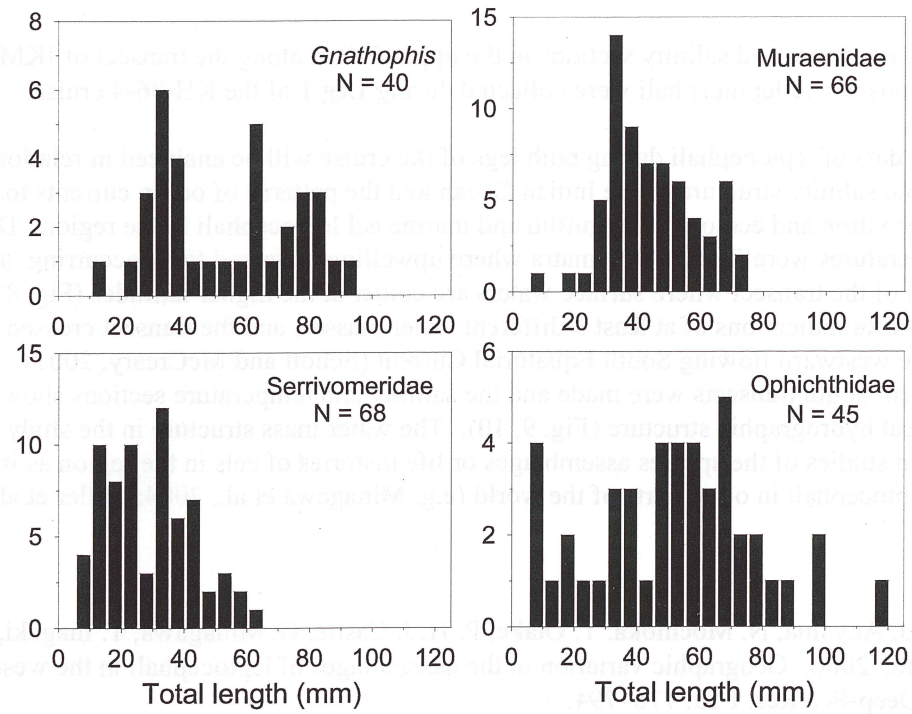

Figure 7. Length frequency plots of leptocephali of leptocephali of *Gnathophis* (Congridae), Muraenidae and Ophichthidae, and of the mesopelagic eels of the family Serrivomeridae that were collected during **Leg 2** of the KH-06-4 cruise

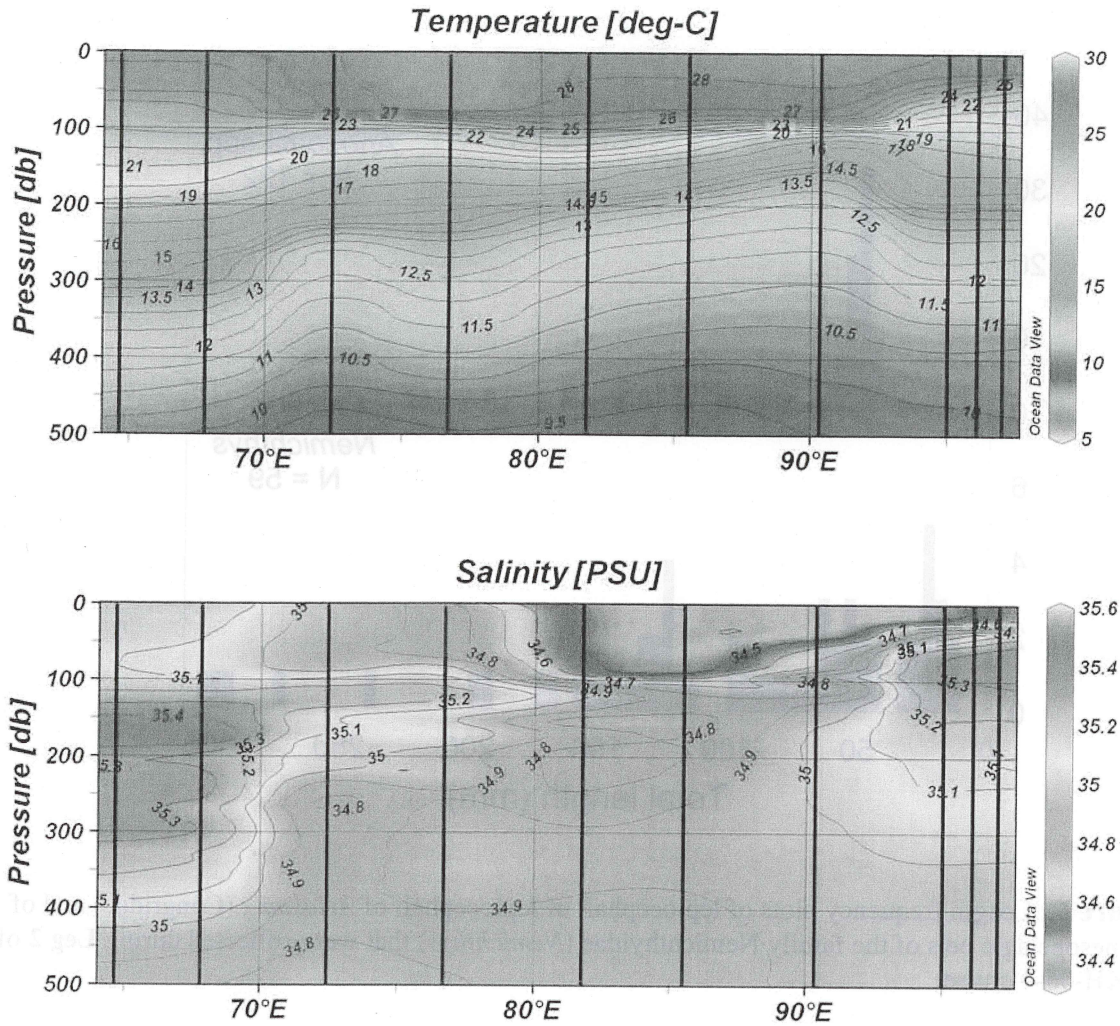

Figure 8. Temperature and salinity sections in the upper 500 m along the transect of IKMT sampling stations where leptocephali were collected during **Leg 1** of the KH-06-4 cruise.

The catch data of leptocephali during both legs of the cruise will be analyzed in relation to the temperature and salinity structure of the Indian Ocean and the patterns of ocean currents to learn about the distribution and ecology of anguillid and marine eel leptocephali in the region. During Leg 1, lower temperatures were found off Sumatra where upwelling appeared to be occurring, and at the southwest end of the transect where surface waters are colder at the higher latitudes (Fig. 8). The salinity plot shows indications of at least 3 different water masses, and the transect crossed the latitudes of the westward flowing South Equatorial Current (Schott and McCreary, 2001). During Leg 2, two north-south transects were made and the salinity and temperature sections showed similar, but not identical hydrographic structure (Fig. 9, 10). The water mass structure in the study area will be evaluated in studies of the species assemblages or life histories of eels in the region as in previous research on leptocephali in other parts of the world (e.g. Minagawa et al., 2004; Miller et al., 2006).

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Minagawa G., M. J. Miller, J. Aoyama, S. Wouthuyzen, and K. Tsukamoto. 2004. Contrasting assemblages of leptocephali in the western Pacific. Marine Ecology Progr.Ser. 271: 245-259.

Schott, F., and J. P.McCreary. 2001. The monsoon circulation of the Indian Ocean. Progr. Oceanogr. 51: 1–123.

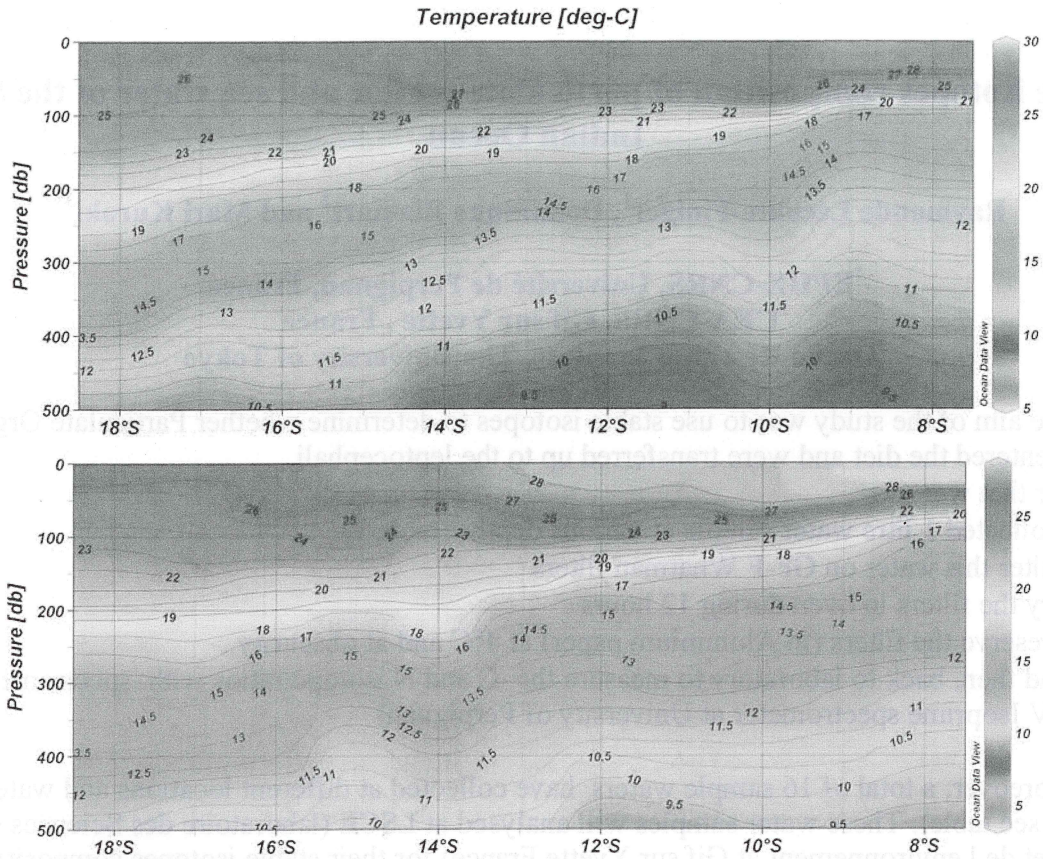

Figure 9. Temperature sections in the upper 500 m along the transect of IKMT sampling stations where leptocephali were collected during **Leg 2** along 55°E (top) and 59 E (bottom).

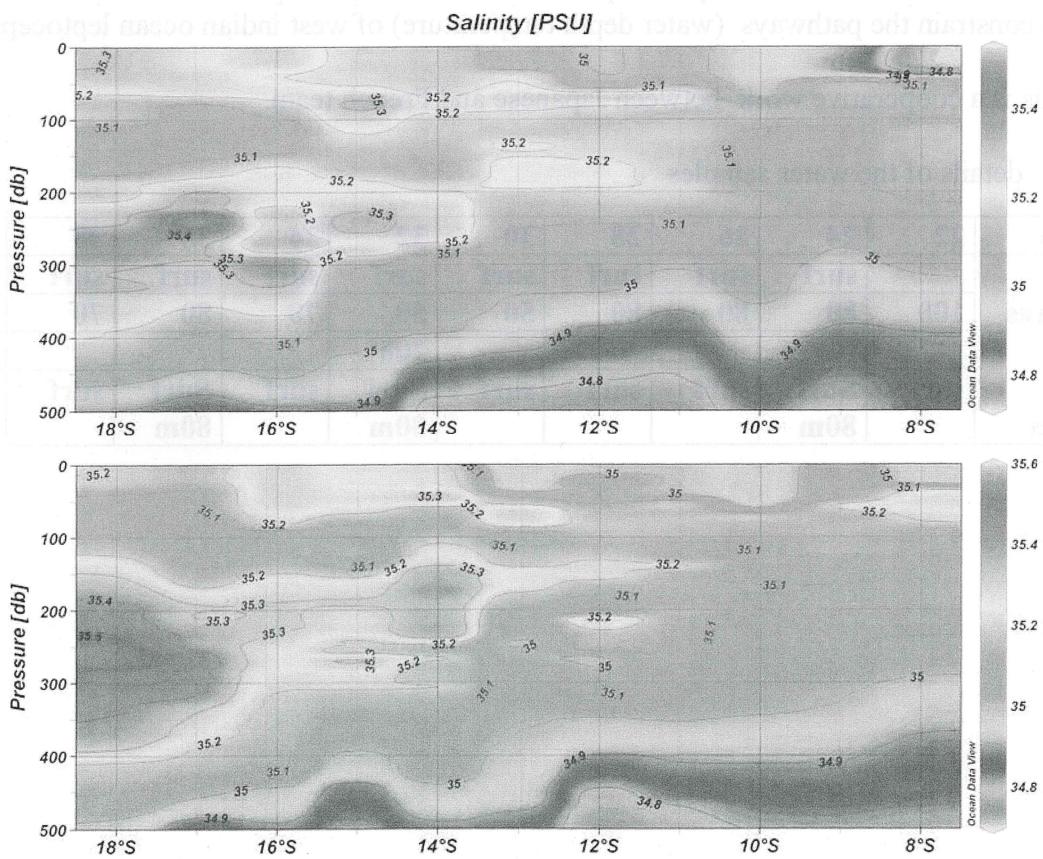

Figure 10. Salinity sections in the upper 500 m along the transect of IKMT sampling stations where leptocephali were collected during **Leg 2** along 55°E (top) and 59°E (bottom).

Stable isotopes composition of particulate matter and sea water of the S-W Indian Ocean

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The aim of the study was to use stable isotopes to determine whether Particulate Organic Matter entered the diet and were transferred up to the leptocephali.

For that we:

- collected 1 litre water sample at various depths (table 1)
- filter this water on GF-F Whatman filters
-dry the filters in oven during 12 hours
-preserve the filters (in Aluminium paper) at 4°C and at obscurity .

And then, back to laboratory to measure the C and N isotope ratios with spectrometry (GV Isoprime spectrometer at University of Perpignan)

Moreover, a total of 16 sample waters have collected at different locations and water depths (see table). These water samples will analysed at LSCE (laboratoire des Sciences du Climat et de l environnement at Gif sur Yvette France) for their stable isotopes composition (18/16 oxygen).

The two main purposes of this study are

-to document the stable isotope composition of sea water composition in this area and
-to constrain the pathways (water depth temperature) of west indian ocean leptocephales.

This is a cooperative work between Japanese and French team.

Table 1 details of the water samples

Station	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**
Depth		**surf**	**surf**	**surf**	**surf**	**surf**	**surf**	**surf**	**surf**	**surf**
In metres	**100**	**80**	**80**	**80**	**50**	**50**	**70**	**80**	**70**	**70**
						200				
Stable isotopes	**surf**	**Surf 80m**	**surf**	**surf**	**surf**	**Surf 80m**	**surf**	**Surf 80m**	**surf**	**surf**

Larval Distribution and Early Life History of the Amphidromous Goby, *Sicyopterus lagocephalus* in the Indian Ocean

Shun Watanabe[1], Midori Iida[2], Thierry Hoareau[3], Emilie Boissin[2], Patrick Berreb[2], Eric Feunteun[3], Katsumi Tsukamoto[1] and Jun Aoyama[1]

[1] Ocean Research Institute, The University of Tokyo
[2] University of Montpellier
[3] French National Museum of Natural History

The Sicydiinae is a major group with many amphidromous species (Birdsong et al. 1988) and is widespread from the tropics to warm temperate regions. One species that has an extremely wide geographic distribution is Sicyopterus lagocephalus, and this species is found longitudinally from the western Indian Ocean (Comoros Islands and Mascarene Islands) through Sri Lanka and Indonesia to the western and eastern Pacific (New Caledonia and Marquesas Islands) and latitudinally from Japan to Australia (Watson et al. 2000, Keith et al. 2005). There have been many biological and ecological studies on these amphidromous species of the Gobiidae in the Indo-Pacific and the Caribbean regions (see Keith 2003). However, only a few attempts have so far been made to study the marine life stages of the Sicydiinae (Radtke et al. 2001). To consider dispersal and early life history for the larvae of S. lagocephalus, we tried to collect goby larvae in the open ocean of Indian Ocean.

Sorting larvae had appear similar to the Gobiidae in IKMT samples was done in Leg 1 (from Sumatra to Mauritius) and Leg 2 (near Mauritius and Seycelles islands) of the KH 06-4 cruise of the Hakuhomaru. The larvae goby-like were identified by their general body shape, the presence of two separated dorsal fins, the anal region at the middle at the body, the pigmentation and melanophores, and the gas bladder. A total of 1242 specimens (total length 1.5 – 22.0 mm) in Leg 1 were collected (number of specimens collected in Leg 2 was not counted). All specimens collected in Leg 1 and Leg 2 were preserved in 95% ethanol. After this cruise, all specimens will be analyzed using molecular genetic identification with mitochondrial DNA cytochrome b sequences. If the larvae of S. lagocephalus are found by molecular genetic identification, their morphology will be observed in detail, and their age and hatching dates will be estimated using their otoliths.

Report on Larval Fish Observation

Sam Wouthuyzen and Augy Syahailatua

Research Center for Oceanography Indonesian Institute of Sciences

Observation on larval fish had been conducted during the Hakuho-Maru (KH 06 – 04) cruise in Leg-1 (Tokyo – West Sumatera Coast – Mauritus) and Leg-2 (Mauritius Waters – Indian Ocean). This observation was aimed to document diversity and distribution of larval fish taxa. Larval samples were collected by the IKMT-net using oblique and step tow methods. The IKMT-net was operated up to 500 m during daytime, and about 150 m at nighttime. Sub-samples of larval fish were taken at each station as possible, and preserved into 5% formalin/seawater. The larval samples will be then taken to the lab and identified to as low a taxon as possible. Larval fish composition off coast of west Sumatera will be compared with either larval fish taken at the similar stations of the Baruna Jaya Cruise off west Sumatera in 2003 or larval fish caught in the western coast of Indian Ocean (Leg-2). The remained plankton samples were preserved into 10% formalin and will be stored at the Ocean Research Institute, University of Tokyo, Japan.

Larval fish caught during the Leg 1 and 2 of the KH 06 – 04 was dominated by oceanic and deep fish larvae, e.g. family of Mictophidae. However, some clupeiform larvae were also collected. On Leg-2, several coral fish larvae were found, such as labrids and scarids. We also found 1 juvenile of flyingfish, but need further examination for species or genus levels. Two species of adult flyingfishes were caught accidentally, and were identified as species of Cheilopogon suttoni and Hirundicthys sp. Some otoliths and parasites from the flyingfishes caught in Leg-2 were already taken on board, and will be examined.

Regarding to Anguilid leptocephali, only 5 specimens were caught during the cruise. In the leg one, two specimens of Anguilla bicolor bicolor were collected in the west off Sumatra waters (Indian Ocean), and one specimen of A. marmorata in just out the border of Indonesian EEZ waters. In the leg two, 2 specimens of Anguilid eels were found in the Mauritian waters. Based on the genetic analysis using PCR on the board of Hakuho-Maru, these 2 specimens are belong to A, marmorata and A. bicolor bicolor. It seems that the anguilid leptocephali collected during the present cruise in the west off Sumatra Waters were far less abundance compared to those collected in the BJVII cruise in June 2003. Besides of Anguilid leptocephali, the same tendency of less abundance on marine eels leptocephali were also found.

Acknowledgments ; We would like to thank Prof. Katsumi Tsukamoto and Dr. Jun Aoyama of the ORI, The University of Tokyo for their kindness in inviting us to participate in this cruise that allow us to have more experience on studying eel leptocephali, and it would be a great beneficiary to our long-term cooperative research on marine biodiversity of fish larvae including lepthocephali.

Parasitological report

Pierre Sasal

Parasitologie Fonctionnelle et Evolutive Centre de Biologie et d'Ecologie Tropicale et Méditerranéenne Université de Perpignan

Beside the fact that parasite can affect the host population dynamic, they have been widely used as biological tags for fish populations or migration routes. In the general context of looking for the migration routes of the West Indian Ocean eels, it appeared interesting to see if parasites could be a complementary tool to the others used by the members of the cruise (genetics, morphometry, otoliths, ...).

The objectives of the parasitological survey during the HM-O6 leg 2 cruise were to :

1- check for parasites on the collected leptocephalae of eels,

2- dissect as many as possible large fish to evaluate their parasitological condition.

Concerning the first point, the leptocephalae of eels were inspected to establish if they were infected (for example by metacercariae of digeneans) and none of the eels collected were found parasitized.

Concerning point 2 several fishes were dissected (table 1). Identification to the species level of dissected fishes was not possible and only family was recorded. After dissection, all uninfected fish were put back in the mother bottle of the considered station. Infected fishes with adult parasites were kept in alcohol in order to try an identification later.

Only 5 fishes were found infected (table 2). Nematodes were put in alcohol for lab examination. Five monogeneans were fixed on board for morphological examination in Perpignan and 3 were kept in alcohol in case molecular analysis is needed. Six Exocoetidae (Hirundichthys oxycepalus) were dissected. One was found infected with monogeneans and with a larvae of a cestode. Three complete gills were kept in alcohol for further examination. None of the intestine were found infected.

These preliminary results seem to indicate that the parasito fauna of the considered fish is not very diversified. This maybe due to the lack of potential intermediate hosts such as bivalvs. However, the sample size of the dissected fish is too low to conclude and comparison with previous studies on the same host (if they exist) should be done.

Table 1 Dissected fish for parasitological observation during the leg 2 of HM-06 cruise.

Station	Fish Family (N)	Number
ST 23	Melanostomiidae	1
ST 27	Myctophidae	3
	Sternoptychidae	3
	Chauliodontidae	1
ST 29	Unidentified	1
	Gonostomatidae	1
	Echeneidae	1
ST 32	Myctophidae	3
ST 35	Myctophidae	1
	Atherinidae	1
ST 36	Myctophidae	1
	Atherinidae	1
ST 37	Myctophidae	1
	Chauliodontidae	1
ST 38	Myctophidae	2
	Unidentified	1
ST 39	Melanostomiidae	1
ST 40	Exocoetidae	5
ST 42	Chauliodontidae	1
	Melanostomiidae	1
	Exocoetidae	1
TOTAL		**32**

Table 2 Data concerning the infected fishes. Hosts of ST 29 and ST 32 were kept in alcohol for further identification.

Station	Fish family	Size (cm)	Parasite
ST 27 O	Myctophidae (Lampadena sp ?)	7.2	1 larvae of nematode
	Myctophidae (Lampadena sp ?)	6.2	1 larvae of nematode
ST 29 O	Echeneidae	6.8	8 monogeneans
ST 32 O	Myctophidae	6.7	1 nematode
ST.40	Exocoetidae	19.4	2 monogeneans + 1 cestode larvae

Macrobrachium sampling

Céline Ellien[1] and Eric Feunteunm[2]

[1] University of Paris VI
[2] French National Museum of Natural History

TWe collected Macrobrachium sp. larvae for Gabrielle Zimmerman (PhD student) who works in the National Museum of Natural History, in Paris (France).

As the larvae are supposed to be at Zoe to Megalope stage, their size is below 20 mm in length. Therefore, it is difficult to determine species without a deep examination of pleiopode shape. Therefore a number of "Macrobrachium like" larvae were collected in each station.

Samples have been taken from stations 21 to 42, but after deeper examination of the first samples collected on stations 21 to 30, the larvae collected revealed not to be Macrobrachium sp., and the samples have been restituted to the Japanese team.

Sampled stations	Number of collected individuals	Collecting protocole
31	between 100-200 individuals	IK step tow
32	between 100-200 individuals	IK oblique tow
34	between 100-200 individuals	IK oblique tow
35	between 100-200 individuals	IK oblique tow
37	between 100-200 individuals	IK oblique tow
38	between 100-200 individuals	IK oblique tow
40	between 100-200 individuals	IK step tow
41	between 100-200 individuals	IK oblique tow

All the samples have been preserved in 90% ethanol.

Once in Paris, these samples will be identified to the species level by Gabrielle Zimmermann, and, if Macrobrachium genus is found, a genetic study will be processed in collaboration with Dr. Patrick Berrebi, in Montpellier.

The aim of this genetic study will be to assess the population structure of this amphidromic genus, in comparison with the genetic structure of the adults collected in rivers of the Mascareigne islands and Mayotte.

A report will be sent to ORI team once the results will be available.

Cephalopods catches

Elodie Réveillac[1], Tony Robinet[2] and Eric Feunteun[1]

[1] French National Museum of Natural History
[2] University of La Rochelle

Cephalopods occupy a predominant niche in the trophic chains. They are eaten by many oceanic animals such as marine mammals and seabirds. Moreover they are predators for many fish and invertebrates which confers them a mean trophic level. Some studies have shown that cephalopods accumulate high levels of heavy metals lourds (Cd, Ag, Hg, Cu, Zn, Se, Mn) via gills, skin and food pathways. There are some differences according to habitat preferences (benthic or pelagic), geographical location and life stages.

Consequently, analyses of metal concentration in these samples enable to describe the bioaccumulation and distribution of metals in several species from Indian Ocean and contribute to the understanding of metallic transfert along the trophic webs.

Frozen samples will be determined, measured, weighed, dissected, and dried. After mineralization metal burden will be measured by AAS.

Research will be conducted by Pr. Paco Bustamante, University of La Rochelle-CRELA, in France.

A total of less than 100 specimens were sampled (ie one to three according to stations).

Station	IK type	Date
35	O	1/12
31	S	29/11
28	S	29/11
24	O	28/11
37	S	2/12
23	S	27/11
23	O	27/11
26	O	28/11
25	O	29/11
21	O	27/11
27	O	28/11
32	S	30/11
31	O	29/11
34	O	1/12
32	O	30/11
36	O	1/12
36	S	1/12
33	O	1/12
38	O	2/12
41	O	3/12

St.	Location		Date	Time		Net	Mesh	Towing	Wire	Sampl.	Reel.	Ship	Filt.	Flow-	Flow-	Sea
	Net in	Net out		Net in	Net out	Type	size (mm)	Method	out (m)	layer (m)	speed (m/s)	speed (kt)	volume (m³)	meter Revol.	meter No.	Depth (m)
01	N 01-56.0 E094-01.9	N 01-55.2 E094-00.7	061112	21:06	21:38	IKMT	0.5	Obl.	602	0-157	1.0~0.5	3.0~2.5	25639	29470	2199	4464-4471
01	N 01-55.4 E094-00.6	N 01-57.7 E094-03.8	061112	21:50	23:09	IKMT	0.5	Step	712	0-155	1.0~0.5	3.0~2.5	73296	84248	2199	4466-4490
02	S 01-59.9 E097-59.8	S 02-01.1 E098-00.7	061113	20:41	21:13	IKMT	0.5	Obl.	601	0-138	1.0~0.5	3.0~2.5	35108	40354	2199	5368-5406
02	S 02-01.4 E098-00.9	S 02-04.3 E098-03.1	061113	21:27	22:45	IKMT	0.5	Step	688	0-154	1.0~0.5	3.0~2.5	61004	70120	2199	5405-5417
03	S 02-00.1 E097-00.1	S 02-03.2 E097-01.5	061114	03:01	04:17	IKMT	0.5	Step	605	0-153	1.0~0.5	3.0~2.5	57498	66090	2199	4874-4879
03	S 02-03.7 E097-01.6	S 02-05.3 E097-02.4	061114	04:33	05:09	IKMT	0.5	Obl.	604	0-133	1.0~0.5	3.0~2.5	31546	36260	2199	4878-4880
04	S 02-00.2 E096-00.2	S 01-59.9 E096-06.1	061114	10:31	13:51	IKMT	0.5	Obl.	4000	—	1.0~0.5	2.5~2.0	111412	128060	2199	4226-5049
05	S 02-00.0 E095-00.7	S 02-00.4 E095-03.0	061114	20:08	20:40	IKMT	0.5	Obl.	600	0-165	1.0~0.5	3.0~2.5	24543	28210	2199	4690-4811
05	S 02-00.5 E095-02.1	S 02-01.5 E095-04.6	06114	20:48	21:55	IKMT	0.5	Step	489	0-161	1.0~0.5	3.0~2.5	43867	50422	2199	4784-4808
06	S 02-00.1 E093-59.9	S 02-01.3 E094-00.7	061115	02:20	02:55	IKMT	0.5	Obl.	600	0-146	1.0~0.5	3.0~2.5	24882	28600	2199	4693-4694
06	S 02-01.4 E094-00.8	S 02-03.4 E094-03.1	061115	03:02	04:19	IKMT	0.5	Step	589	0-155	1.0~0.5	3.0~2.5	50484	58028	2199	4685-4692
07	S 03-50.0 E090-19.8	S 03-50.8 E090-21.9	061115	20:53	22:04	IKMT	0.5	Step	555	0-164	1.0~0.5	3.0~2.5	45775	52615	2199	3686-3792
08	S 04-14.7 E089-32.2	S 04-15.0 E089-33.3	061116	02:00	02:34	IKMT	0.5	Obl.	600	0-148	1.0~0.5	3.0~2.5	28198	32411	2199	3216-3320
08	S 04-14.9 E089-33.5	S 04-16.0 E089-35.7	061116	02:46	04:08	IKMT	0.5	Step	653	0-168	1.0~0.5	3.0~2.5	57142	65680	2199	3307-3364
09	S 06-15.9 E085-29.7	S 06-16.3 E085-31.5	061116	20:58	22:04	IKMT	0.5	Step	459	0-159	1.0~0.5	3.0~2.5	(36379)	(41815)	2199	5081-5103
10	S 06-41.5 E084-39.9	S 06-42.4 E084-41.3	061117	02:01	02:41	IKMT	0.5	Obl.	601	0-194	1.0~0.5	3.0~2.5	32842	37749	2199	4694-4796
10	S 06-42.5 E084-41.4	S 06-44.3 E084-43.9	061117	02:49	04:09	IKMT	0.5	Step	630	0-167	1.0~0.5	3.0~2.5	56211	64610	2199	4387-4684
11	S 08-37-1 E080-47-3	S 08-38-1 E080-50.2	061117	21:02	22:13	IKMT	0.5	Step	583	0-162	1.0~0.5	3.0~2.5	53084	61016	2199	5084-5190
12	S 08-59.9 E080-03.0	S 09-00.6 E080-04.5	061118	01:59	02:36	IKMT	0.5	Obl.	600	0-134	1.0~0.5	3.0~2.5	30651	35231	2199	5204-5227
12	S 09-00.7 E080-04.8	S 09-01.6 E080-08.6	061118	02:54	04:22	IKMT	0.5	Step	771	0-184	1.0~0.5	3.0~2.5	69800	80230	2199	5202-5453
13	S 10-38.3 E076-43.4	S 10-39.3 E076-46.8	061118	20:08	21:21	IKMT	0.5	Step	573	0-162	1.0~0.5	3.0~2.5	54192	62290	2199	5282-5603
13	S 10-39.4 E076-47.5	S 10-40.0 E076-51.1	061118	21:33	22:46	IKMT	0.5	Step	627	0-176	1.0~0.5	3.0~2.5	54823	63015	2199	5316-5364

KH-04-2 Net Record

St.	Location		Date	Time		Net	Mesh	Towing	Wire	Sampl.	Reel.	Ship	Filt.	Flow-	Flow-	Sea
	Net in	Net out		Net in	Net out	Type	size (mm)	Method	out (m)	layer (m)	speed (m/s)	speed (kt)	volume (m³)	meter Revol.	meter No.	Depth (m)
14	S 11-04.0 E075-56.9	S 11-04.7 E075-58.8	061119	02:10	02:48	IKMT	0.5	Obl.	600	0-134	1.0~0.5	3.0~2.5	30775	35373	2199	5284-5565
14	S 11-04.8 E075-59.2	S 11-06.0 E076-03.1	061119	02:58	04:16	IKMT	0.5	Step	627	0-159	1.0~0.5	2.5~2.0	60359	69378	2199	5040-5291
15	S 12-42.7 E072-27.7	S 12-43.4 E072-29.9	061119	20:01	21:08	IKMT	0.5	Step	501	0-167	1.0~0.5	3.0~2.5	49020	56345	2199	4410-5105
16	S 13-13.0 E071-24.8	S 13-13.7 E071-26.0	061120	01:59	02:34	IKMT	0.5	Obl.	600	0-146	1.0~0.5	3.0~2.5	29067	33410	2199	4312-4388
16	S 13-13.9 E071-26.3	S 13-15.0 E071-29.2	061120	02:46	04:05	IKMT	0.5	Step	664	0-167	1.0~0.5	3.0~2.5	58906	67708	2199	3877-4397
17	S 14-56.0 E067-47.8	S 14-57.0 E067-50.5	061120	19:58	21:10	IKMT	0.5	Step	584	0-158	1.0~0.5	3.0~2.5	56587	65042	2199	2722-3044
18	S 15-32.6 E066-31.3	S 15-33.3 E066-32.6	061121	01:58	02:32	IKMT	0.5	Obl.	601	0-162	1.0~0.5	3.0~2.5	27518	31630	2199	3110-3425
18	S 15-33.2 E066-32.7	S 15-33.7 E066-35.7	061121	03:28	04:44	IKMT	0.5	Step	600	0-163	1.0~0.5	3.0~2.5	55480	63770	2199	2816-3316
19	S 16-24.8 E064-39.7	S 16-28.6 E064-46.4	061121	13:53	17:28	IKMT	0.5	Obl.	4039	—	1.0~0.5	3.0~2.5	146486	168375	2199	3140-3547
20	S 16-24.5 E064-38.9	S 16-25.0 E064-40.0	061121	19:50	20:22	IKMT	0.5	Obl.	602	0-134	1.0~0.5	3.0~2.5	25971	29852	2199	3243-3449
20	S 16-25.0 E064-40.2	S 16-26.0 E064-42.6	061121	20:31	21:45	IKMT	0.5	Step	623	0-159	1.0~0.5	3.0~2.5	54210	62310	2199	3526-3646
21	S 18-00.1 E055-00.2	S 17-58.7 E055-03.2	061127	04:19	05:45	IKMT	0.5	Obl.	1669	0-511	1.0~0.5	3.0~2.5	66377	76295	2199	4588-4589
22	S 17-00.1 E055-00.3	S 16-58.4 E055-03.1	061127	11:43	13:08	IKMT	0.5	Obl.	1669	0-632*	1.0~0.5	3.0~2.5	58710	67483	2199	4590-4902
23	S 16-00.9 E054-59.4	S 15-58.7 E055-02.0	061127	18:08	19:34	IKMT	0.5	Obl.	1615	0-581*	1.0~0.5	2.8~2.5	58816	67605	2199	4608-4618
23	S 15-58.5 E055-02.1	S 15-56.9 E055-03.6	061127	19:44	20:41	IKMT	0.5	Step	364	0-134	1.0~0.5	3.0~2.5	35831	41185	2199	4606-4608
24	S 15-00.3 E054-59.0	S 14-59.0 E055-00.8	061128	01:34	02:36	IKMT	0.5	Step	631	0-176	1.0~0.5	3.0~2.5	46705	53684	2199	4026-4312
25	S 14-00.3 E054-59.1	S 14-00.1 E055-01.7	061128	07:33	08:56	IKMT	0.5	Obl.	1600	0-690*	1.0~0.5	3.0~2.5	52461	60300	2199	4506-4529
26	S 13-00.2 E054-59.0	S 12-58.8 E055-01.2	061128	13:59	15:15	IKMT	0.5	Obl.	1501	0-533*	1.0~0.5	3.0~2.5	55610	63920	2199	3968-4148
27	S 12-00.6 E054-59.5	S 11-59.8 E055-02.5	061128	20:14	21:42	IKMT	0.5	Obl.	1652	0-562*	1.0~0.5	3.0~2.5	62827	72215	2199	4564-4611
27	S 11-59.9 E055-02.7	S 11-58.2 E055-03.6	061128	21:52	22:54	IKMT	0.5	Step	602	0-185*	1.0~0.5	3.0~2.5	44809	51505	2199	4577-4609
28	S 11-00.2 E054-59.1	S 10-59.6 E055-01.0	061129	03:07	04:10	IKMT	0.5	Step	563	0-135	1.0~0.5	3.0~2.5	44396	51030	2199	4269-4391
29	S 09-59.2 E054-59.4	S 09-59.6 E055-01.5	061129	09:58	11:17	IKMT	0.5	Obl.	1499	0-543	1.0~0.5	3.0~2.5	57968	66630	2199	4076-4088

St.	Location		Date	Time		Net	Mesh	Towing	Wire	Sampl.	Reel.	Ship	Filt.	Flow-	Flow-	Sea
	Net in	Net out		Net in	Net out	Type	size (mm)	Method	out (m)	layer (m)	speed (m/s)	speed (kt)	volume (m³)	meter Revol.	meter No.	Depth (m)
30	S 08-60.0 E054-58.6	S 08-59.7 E055-00.7	061129	16:03	17:17	IKMT	0.5	Obl.	1260	0-529	1.0~0.5	3.0~2.5	42178	48480	2199	4089-4104
31	S 07-59.9 E054-59.6	S 08-00.2 E055-02.1	061129	22:22	23:38	IKMT	0.5	Obl.	1499	0-547	1.0~0.5	3.0~2.5	54217	62318	2199	3636-3809
31	S 08-00.3 E055-02.1	S 08-00.9 E055-04.3	061129	23:48	25:04	IKMT	0.5	Step	577	0-126	1.0~0.5	3.0~2.5	54740	62920	2199	3797-3836
32	S 08-00.1 E058-59.3	S 08-02.6 E059-03.5	061130	17:41	19:24	IKMT	0.5	Obl.	2001	0-605*	1.0~0.5	3.0~2.5	81236	93375	2199	1189-1208
32	S 08-02.8 E059-03.8	S 08-04.7 E059-07.1	061130	19:33	20:48	IKMT	0.5	Step	662	0-134	1.0~0.5	3.0~2.5	61892	71140	2199	1196-1204
33	S 08-59.8 E058-59.1	S 09-01.0 E058-55.5	061201	01:31	02:40	IKMT	0.5	Step	531	0-145	1.0~0.5	2.7~2.2	50377	57905	2199	2026-2329
34	S 09-59.3 E058-59.6	S 10-00.2 E058-55.2	061201	07:42	09:24	IKMT	0.5	Obl.	2000	0-607*	1.0~0.5	3.0~2.5	76373	87785	2199	2385-2714
35	S 11-00.1 E058-59.5	S 11-01.2 E059-02.3	061201	14:31	15:51	IKMT	0.5	Obl.	1589	0-530	1.0~0.5	3.0~2.5	56915	65420	2199	3385-3395
36	S 12-00.2 E058-59.5	S 11-58.8 E058-58.5	061201	20:27	21:36	IKMT	0.5	Obl.	1284	0-554	1.0~0.5	3.0~2.5	41671	47898	2199	4138-4162
36	S 11-59.2 E058-58.4	S 12-04.4 E058-59.4	061201	21:46	23:09	IKMT	0.5	Step	639	0-131	1.0~0.5	2.5	74517	85652	2199	4142-4176
37	S 13-00.0 E059-00.0	S 12-57.6 E059-02.4	061202	03:01	04:45	IKMT	0.5	Step	780	0-185	1.0~0.5	3.0~2.5	77191	88725	2199	4007-4020
38	S 14-00.7 E059-00.3	S 14-05.8 E059-02.2	061202	10:39	12:20	IKMT	0.5	Obl.	2002	0-447	1.0~0.5	3.0~2.5	96350	110747	2199	4006-4017
39	S 15-00.4 E059-00-2	S 15-03.6 E059-02.1	061202	17:56	19:13	IKMT	0.5	Obl.	1502	0-507	1.0~0.5	2.5	45595	52408	2199	3917-3946
39	S 15-03.8 E059-02.3	S 15-07.3 E059-04.2	061202	19:20	20:47	IKMT	0.5	Step	596	0-153	1.0~0.5	2.5	65234	74982	2199	3881-3935
40	S 15-59.9 E058-59.5	S 16-01.0 E059-01.8	061203	00:39	01:47	IKMT	0.5	Step	579	0-160	1.0~0.5	3.0~2.5	51440	59126	2199	1902-2312
40	S 16-01.2 E059-01.8	S 16-04.0 E059-04.3	061203	01:57	03:24	IKMT	0.5	Step	516	0-155	1.0~0.5	3.0~2.5	69242	79588	2199	1373-2030
40	S 16-04.3 E059-04.5	S 16-07.9 E059-07.3	061203	03:35	05:15	IKMT	0.5	Obl.	2000	0-612*	1.0~0.5	3.0~2.5	78930	90724	2199	994-1292
41	S 17-00.0 E057-59.9	S 17-02.3 E058-03.0	061203	12:32	14:09	IKMT	0.5	Obl.	1901	0-626*	1.0~0.5	3.0~2.5	68490	78724	2199	3539-3571
42	S 18-05.9 E058-02.3	S 18-07.1 E058-04.6	061203	19:43	20:44	IKMT	0.5	Step	753	0-193*	1.0~0.5	3.0~2.5	50125	57615	2199	3468-3808
42	S 18-07.2 E058-04.7	S 18-08.9 E058-07.5	061203	20:54	22:09	IKMT	0.5	Step	601	0-151*	1.0~0.5	3.0~2.5	62508	71848	2199	2780-3433
42	S 18-09.0 E058-07.7	S 18-09.7 E058-08.9	061203	22:18	22:50	IKMT	0.5	Step	301	0-66*	1.0~0.5	3.0~2.5	29479	33884	2199	2686-2796

・Time: Local time, ・Sampl. Layer: *: by depth meter, others: by realtime sensing system

KH-06-4_Leg1	Stn5	Depth	4670m
Date:	2006.11.14	Lat.	1 59.98S
Time:	12:18	Long.	95 00.28E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	28.214	34.392	3.55	0.08
3	28.212	34.392	3.55	0.08
4	28.200	34.391	3.55	0.08
5	28.186	34.390	3.55	0.08
10	28.163	34.388	3.56	0.08
20	27.890	34.395	3.56	0.13
30	27.572	34.717	3.57	0.50
40	27.287	34.797	3.44	0.49
50	26.024	34.848	2.41	0.32
75	21.181	35.278	1.59	0.10
100	19.620	35.322	1.62	0.04
125	17.921	35.228	1.16	0.03
150	17.491	35.229	1.19	0.03
175	16.920	35.211	1.12	0.03
200	15.183	35.119	0.89	0.03
250	13.133	35.103	1.16	0.03
300	12.087	35.049	1.28	0.03
400	10.374	34.971	1.16	0.03
500	9.830	34.982	1.01	0.03
502	9.820	34.980	***	0.03

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	27.50	***	***	***
1	497	501	9.817	34.980	1.00	0.03
2	497	501	9.821	34.980	1.00	0.03
3	298	300	12.080	35.047	1.28	0.03
4	298	300	12.082	35.048	1.28	0.03
5	199	200	15.056	35.117	0.89	0.03
6	199	200	15.147	35.117	0.89	0.03
7	149	150	17.593	35.233	1.22	0.03
8	149	150	17.601	35.237	1.22	0.03
9	99	100	19.652	35.317	1.61	0.04
10	100	101	19.657	35.318	1.62	0.04
11	49	49	24.732	35.087	1.99	0.22
12	50	50	24.760	35.077	2.05	0.24
13	199	200	15.127	35.119	0.89	0.02
14	174	175	16.845	35.205	1.11	0.03
15	149	150	17.599	35.237	1.22	0.03
16	125	125	18.112	35.221	1.14	0.03
17	100	101	19.658	35.319	1.62	0.04
18	78	79	20.421	35.308	1.65	0.06
19	59	59	22.600	35.253	1.61	0.13
20	50	50	25.006	35.024	2.09	0.24
21	39	40	26.603	34.756	2.83	0.30
22	30	30	27.253	34.793	3.40	0.46
23	20	20	27.542	34.703	3.54	0.37
24	11	11	28.149	34.385	3.54	0.09

KH-06-4_Leg1	Stn7	Depth	3685m
Date:	2006.11.15	Lat.	3 50.27S
Time:	13:09	Long.	90 19.73E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	28.460	34.427	3.51	0.03
3	28.462	34.427	3.51	0.03
4	28.461	34.427	3.51	0.03
5	28.463	34.427	3.51	0.03
10	28.467	34.427	3.51	0.03
20	28.458	34.424	3.52	0.03
30	28.449	34.421	3.52	0.04
40	28.318	34.411	3.53	0.05
50	28.170	34.598	3.55	0.19
75	27.170	34.753	3.26	0.20
100	18.938	34.718	1.67	0.14
125	15.285	34.890	1.09	0.06
150	14.005	34.990	0.96	0.03
175	12.767	35.049	1.26	0.02
200	12.258	35.057	1.41	0.03
250	11.485	35.022	1.33	0.03
300	10.964	34.997	1.28	0.03
400	10.148	34.953	1.38	0.03
500	9.597	34.935	1.07	0.02
501	9.593	34.935	1.06	0.03

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	27.90	***	***	***
1	496	499	9.599	34.934	1.06	0.03
2	497	500	9.598	34.934	1.06	0.03
3	298	300	10.951	34.994	1.30	0.03
4	299	301	10.967	34.995	1.29	0.03
5	199	200	12.200	35.051	1.42	0.03
6	199	200	12.202	35.052	1.41	0.03
7	150	151	14.028	34.981	0.97	0.03
8	150	151	14.019	34.984	0.95	0.03
9	99	100	18.556	34.683	1.59	0.12
10	99	100	18.750	34.676	1.56	0.12
11	49	49	28.161	34.622	3.54	0.21
12	50	50	28.144	34.625	3.54	0.22
13	199	200	12.208	35.053	1.41	0.03
14	174	175	12.678	35.064	1.32	0.03
15	150	151	14.018	34.984	0.96	0.03
16	125	125	15.037	34.916	0.97	0.05
17	100	100	18.440	34.680	1.58	0.12
18	80	80	26.223	34.694	2.92	0.20
19	60	61	27.714	34.679	3.44	0.32
20	49	49	28.099	34.614	3.54	0.23
21	40	40	28.081	34.441	3.54	0.07
22	30	30	28.457	34.427	3.51	0.03
23	20	20	28.459	34.429	3.51	0.03
24	10	10	28.451	34.430	3.51	0.03

KH-06-4_Leg1	Stn9	Depth	5278m
Date:	2006.11.16	Lat.	6 15.78S
Time:	14:08	Long.	85 29.99E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
2	28.281	34.370	3.52	0.03
3	28.282	34.371	3.52	0.03
4	28.292	34.371	3.52	0.03
5	28.325	34.372	3.52	0.03
10	28.274	34.371	3.53	0.03
20	28.262	34.371	3.53	0.03
30	28.089	34.371	3.55	0.04
40	27.593	34.365	3.59	0.06
50	27.098	34.349	3.62	0.06
75	26.744	34.354	3.51	0.21
100	22.535	34.744	1.80	0.14
125	18.547	34.770	1.54	0.07
150	15.894	34.732	1.36	0.05
175	13.774	34.739	1.30	0.02
200	12.642	34.788	1.17	0.02
250	11.819	34.910	1.00	0.03
300	11.092	34.933	1.19	0.03
400	9.920	34.875	1.27	0.03
500	8.974	34.847	1.15	0.03
503	8.943	34.846	1.15	0.02

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	28.70	***	***	***
1	498	502	8.947	34.845	1.14	0.03
2	497	500	8.948	34.845	1.14	0.03
3	297	299	11.015	34.929	1.29	0.03
4	298	300	11.040	34.930	1.29	0.03
5	201	202	12.315	34.815	1.12	0.02
6	201	202	12.358	34.811	1.13	0.02
7	149	150	15.062	34.715	1.35	0.03
8	150	151	15.143	34.715	1.36	0.04
9	100	100	20.714	34.642	1.78	0.09
10	100	100	20.935	34.638	1.80	0.10
11	52	52	26.971	34.336	3.59	0.06
12	51	51	27.003	34.338	3.58	0.06
13	200	201	12.398	34.807	1.14	0.02
14	174	175	13.304	34.754	1.20	0.02
15	149	150	15.159	34.714	1.35	0.03
16	125	125	17.489	34.718	1.49	0.06
17	101	101	21.162	34.643	1.81	0.10
18	81	81	24.659	34.321	2.50	0.18
19	59	59	26.878	34.355	3.54	0.10
20	52	52	26.986	34.335	3.59	0.06
21	41	41	27.131	34.344	3.60	0.05
22	30	30	27.868	34.366	3.54	0.03
23	21	21	28.221	34.369	3.52	0.02
24	9	10	28.276	34.368	3.51	0.02

KH-06-4_Leg1	Stn11	Depth	5102m
Date:	2006.11.17	Lat.	8 37.03S
Time:	14:10	Long.	81 47.10E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
2	27.920	34.498	3.53	0.04
3	27.918	34.498	3.53	0.04
4	27.920	34.498	3.53	0.03
5	27.920	34.498	3.53	0.04
10	27.924	34.498	3.53	0.04
20	27.926	34.498	3.53	0.03
30	27.927	34.498	3.53	0.04
40	27.926	34.499	3.52	0.04
50	27.933	34.499	3.53	0.04
75	27.474	34.509	3.56	0.11
100	26.360	34.646	2.98	0.36
125	23.132	35.117	1.86	0.11
150	19.373	34.769	1.64	0.05
175	17.580	34.873	1.29	0.03
200	14.653	34.723	1.36	0.02
250	12.121	34.745	1.21	0.02
300	11.578	34.890	1.17	0.03
400	10.388	34.876	1.42	0.02
500	9.368	34.825	1.40	0.02
502	9.342	34.825	1.40	0.02

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	28.25	***	***	***
1	495	498	9.375	34.825	1.38	0.02
2	495	498	9.379	34.825	1.39	0.02
3	299	301	11.474	34.893	1.24	0.02
4	299	301	11.475	34.892	1.18	0.02
5	199	200	13.993	34.703	1.36	0.02
6	199	200	14.388	34.697	1.37	0.01
13	149	149	18.773	34.683	1.65	0.04
8	149	150	18.716	34.662	1.68	0.04
9	100	101	25.795	34.700	2.63	0.32
10	100	101	26.301	34.642	2.93	0.33
11	50	50	27.910	34.499	3.53	0.04
12	51	51	27.909	34.500	3.53	0.04
7	199	200	14.376	34.700	1.38	0.02
14	174	175	17.392	34.860	1.30	0.02
15	149	150	18.704	34.661	1.68	0.05
16	125	126	22.338	35.036	1.73	0.07
17	100	101	26.165	34.662	2.96	0.33
18	80	80	27.400	34.513	3.53	0.15
19	61	61	27.835	34.505	3.53	0.05
20	51	51	27.909	34.500	3.53	0.04
21	41	41	27.921	34.496	3.53	0.04
22	31	31	27.920	34.496	3.53	0.04
23	20	20	27.916	34.496	3.53	0.04
24	11	11	27.913	34.496	3.53	0.03

KH-06-4_Leg1	Stn13	Depth	5342m
Date:	2006.11.18	Lat.	10 38.32S
Time:	12:58	Long.	76 42.65E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
5	29.124	34.880	3.46	0.03
10	29.118	34.881	3.46	0.03
20	29.126	34.881	3.46	0.03
30	29.111	34.881	3.46	0.03
40	29.116	34.882	3.46	0.03
50	29.123	34.882	3.46	0.03
75	28.931	34.971	3.48	0.10
100	22.436	35.225	2.48	0.27
125	19.918	35.248	1.61	0.11
150	17.478	35.008	1.12	0.06
175	16.702	35.093	1.13	0.04
200	15.205	34.955	1.08	0.03
250	13.656	34.917	1.10	0.02
300	12.709	34.980	1.26	0.03
400	11.034	34.917	1.85	0.02
500	9.482	34.792	1.96	0.01
501	9.492	34.793	1.95	0.02

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	29.40	***	***	***
1	497	500	9.484	34.792	1.95	0.02
2	497	500	9.484	34.792	1.95	0.02
3	299	301	12.615	34.976	1.28	0.03
4	299	301	12.587	34.977	1.29	0.02
5	200	201	14.947	34.983	1.07	0.02
6	199	200	14.983	34.977	1.07	0.02
7	151	152	17.180	35.035	1.08	0.06
8	150	151	17.164	35.013	1.08	0.06
9	99	100	21.685	35.237	2.17	0.22
10	99	100	21.697	35.238	2.18	0.24
11	51	51	29.069	34.880	3.46	0.05
12	51	51	29.069	34.879	3.46	0.05
13	199	201	14.978	34.978	1.06	0.02
14	177	178	16.472	35.061	1.13	0.04
15	151	152	17.202	35.047	1.08	0.06
16	125	125	19.631	35.220	1.44	0.11
17	98	98	21.743	35.236	2.19	0.23
18	80	81	26.782	35.130	3.36	0.34
19	60	60	29.073	34.882	3.46	0.06
20	51	51	29.070	34.878	3.46	0.05
21	40	40	29.089	34.869	3.46	0.04
22	30	30	29.084	34.870	3.46	0.04
23	20	20	29.080	34.870	3.46	0.04
24	10	11	29.078	34.871	3.46	0.04

KH-06-4_Leg1	Stn15	Depth	4375m
Date:	2006.11.19	Lat.	12 42.60S
Time:	14:07	Long.	72 27.79E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
4	27.896	34.965	3.50	0.02
5	27.896	34.964	3.51	0.02
10	27.899	34.965	3.50	0.02
20	27.894	34.964	3.50	0.02
30	27.865	34.962	3.51	0.02
40	27.735	34.953	3.52	0.03
50	27.463	34.916	3.54	0.04
75	27.261	34.911	3.55	0.09
100	22.034	35.076	2.23	0.25
125	20.664	35.271	2.72	0.10
150	18.501	35.096	1.75	0.03
175	17.151	35.040	2.06	0.02
200	15.802	34.996	2.03	0.01
250	12.527	34.736	1.58	0.02
300	11.586	34.799	1.58	0.02
400	10.356	34.830	2.30	0.01
500	9.093	34.722	2.37	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	28.30	***	***	***
1	496	499	9.102	34.722	2.37	0.01
2	498	501	9.100	34.722	2.37	0.01
3	299	301	11.622	34.798	1.60	0.02
4	299	301	11.648	34.798	1.61	0.02
5	200	201	16.405	35.054	2.08	0.01
6	201	202	16.335	35.043	2.09	0.01
7	148	149	18.743	35.095	1.53	0.03
8	149	150	18.805	35.097	1.50	0.03
9	100	100	22.460	35.121	2.73	0.25
10	100	100	22.542	35.126	2.86	0.25
11	50	50	27.378	34.910	3.54	0.05
12	50	50	27.383	34.911	3.53	0.05
13	199	201	16.442	35.059	2.10	0.01
14	174	175	17.432	35.075	2.07	0.01
15	150	151	18.809	35.097	1.43	0.03
16	124	125	21.121	35.258	2.72	0.10
17	100	100	22.537	35.126	2.87	0.25
18	79	79	25.856	34.893	3.17	0.47
19	61	61	27.321	34.909	3.53	0.05
20	50	50	27.388	34.911	3.54	0.04
21	39	39	27.751	34.951	3.51	0.03
22	30	30	27.817	34.958	3.50	0.02
23	20	20	27.888	34.964	3.50	0.02
24	9	9	27.893	34.965	3.51	0.02

KH-06-4_Leg1	Stn17	Depth	3156m
Date:	2006.11.20	Lat.	14 56.07S
Time:	14:07	Long.	67 47.63E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
4	26.760	35.189	3.58	0.02
5	26.852	35.194	3.57	0.02
10	26.260	35.155	3.62	0.03
20	25.670	35.116	3.66	0.04
30	25.573	35.110	3.66	0.05
40	25.321	35.085	3.68	0.06
50	25.085	35.081	3.69	0.08
75	23.974	35.076	3.72	0.14
100	23.449	35.091	3.64	0.23
125	22.302	35.260	3.42	0.17
150	20.914	35.408	3.06	0.05
175	19.922	35.510	3.01	0.02
200	17.912	35.240	2.39	0.01
250	15.749	35.361	2.64	0.01
300	14.231	35.314	2.86	0.01
400	11.573	35.028	3.26	0.01
500	9.904	34.801	3.49	0.00
502	9.872	34.796	3.49	0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	27.40	***	***	***
1	497	501	9.866	34.794	3.50	0.00
2	497	500	9.868	34.795	3.50	0.00
3	299	301	14.178	35.310	2.89	0.00
4	299	301	14.202	35.313	2.89	0.01
5	199	200	18.199	35.277	2.43	0.01
6	199	200	18.331	35.287	2.45	0.01
7	149	150	20.996	35.424	3.11	0.05
8	149	150	21.130	35.424	3.13	0.05
9	99	100	23.625	35.072	3.64	0.20
10	99	100	23.635	35.071	3.65	0.20
11	50	51	25.290	35.084	3.65	0.07
12	50	50	25.292	35.085	3.65	0.06
13	200	201	18.373	35.289	2.45	0.01
14	174	175	19.940	35.502	2.97	0.01
15	150	151	21.123	35.423	3.13	0.05
16	124	125	22.269	35.263	3.39	0.16
17	99	99	23.642	35.071	3.65	0.20
18	80	80	23.984	35.074	3.70	0.13
19	59	60	24.933	35.074	3.66	0.09
20	50	50	25.294	35.085	3.65	0.06
21	39	40	25.350	35.084	3.65	0.06
22	30	31	25.591	35.109	3.63	0.05
23	20	20	25.765	35.123	3.62	0.04
24	10	10	26.885	35.188	3.55	0.03

KH-06-4_Leg1	Stn20	Depth	3240m
Date:	2006.11.21	Lat.	16 24.86S
Time:	15:04	Long.	64 39.01E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
4	26.054	35.184	3.62	0.03
5	26.057	35.184	3.62	0.03
10	26.052	35.185	3.62	0.03
20	26.022	35.186	3.62	0.03
30	25.850	35.197	3.61	0.04
40	25.842	35.197	3.62	0.04
50	25.285	35.167	3.68	0.07
75	23.583	35.111	3.77	0.12
100	22.949	35.139	3.65	0.24
125	21.979	35.259	3.23	0.19
150	21.188	35.437	3.21	0.10
175	20.336	35.488	3.09	0.02
200	18.237	35.275	2.55	0.01
250	16.176	35.317	2.52	0.01
300	14.566	35.370	2.98	0.01
400	11.790	35.076	3.71	0.00
500	10.141	34.830	3.70	0.00
501	10.123	34.828	3.70	0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	26.50	***	***	***
1	497	501	10.141	34.830	3.69	0.00
2	498	501	10.138	34.829	3.69	0.00
3	298	300	14.820	35.384	2.94	0.01
4	300	302	14.731	35.381	2.94	0.00
5	198	199	18.118	35.315	2.52	0.01
6	199	200	18.122	35.311	2.52	0.01
7	150	151	20.543	35.457	3.07	0.03
8	150	150	20.575	35.453	3.07	0.04
9	101	102	22.752	35.164	3.51	0.26
10	101	102	22.730	35.168	3.51	0.27
11	51	51	24.299	35.119	3.72	0.08
12	50	50	24.420	35.126	3.71	0.08
13	199	201	18.128	35.314	2.51	0.01
14	173	174	19.536	35.390	2.79	0.01
15	149	150	20.653	35.448	3.09	0.04
16	124	125	21.509	35.329	3.12	0.11
17	101	102	22.825	35.154	3.54	0.26
18	79	79	23.146	35.112	3.69	0.13
19	60	60	23.756	35.105	3.74	0.10
20	50	50	24.530	35.137	3.70	0.07
21	40	40	25.734	35.186	3.61	0.05
22	29	29	25.811	35.195	3.60	0.05
23	19	19	25.845	35.195	3.60	0.04
24	10	10	26.062	35.178	3.60	0.04

KH-06-4_Leg2	Stn21	Depth	4587m
Date:	2006.11.27	Lat.	17 58.68S
Time:	02:06	Long.	55 03.18E

CTD data (LAY)	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
	3	26.894	35.304	3.56	0.04
	4	26.895	35.303	3.56	0.04
	5	26.896	35.304	3.56	0.04
	10	26.899	35.304	3.57	0.04
	20	26.898	35.303	3.56	0.04
	30	26.895	35.303	3.57	0.04
	40	26.469	35.296	3.62	0.07
	50	26.022	35.263	3.65	0.10
	75	25.335	35.150	3.66	0.19
	100	25.005	35.160	3.57	0.23
	125	24.367	35.053	3.58	0.13
	150	24.035	35.049	3.50	0.06
	175	22.311	35.085	2.84	0.04
	200	21.050	35.145	2.46	0.03
	250	19.521	35.317	2.58	0.01
	300	17.034	35.310	2.46	0.01
	400	13.596	35.208	2.81	0.01
	500	10.548	34.894	3.34	0.00
	501	10.488	34.886	3.34	0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	27.1	***	***	***
1	496	500	10.442	34.880	3.34	0.01
2	496	499	10.457	34.882	3.34	0.00
3	297	299	16.925	35.302	2.45	0.01
4	297	299	16.984	35.305	2.45	0.01
5	199	200	21.183	35.155	2.51	0.02
6	199	200	21.248	35.153	2.54	0.02
7	148	149	23.835	35.046	3.39	0.04
8	149	150	23.942	35.046	3.44	0.05
9	99	99	24.860	35.137	3.55	0.20
10	99	100	24.918	35.143	3.55	0.22
11	49	49	25.898	35.242	3.63	0.10
12	49	50	25.909	35.244	3.62	0.10
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn22	Depth	4300m
Date:	2006.11.27	Lat.	17 00.00S
Time:	07:01	Long.	55 00.02E

CTD data (LAY)	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
	3	26.779	35.225	3.57	0.01
	4	26.792	35.226	3.57	0.01
	5	26.797	35.226	3.57	0.01
	10	26.808	35.226	3.57	0.02
	20	26.740	35.226	3.57	0.03
	30	26.729	35.228	3.57	0.03
	40	26.096	35.269	3.64	0.04
	50	25.966	35.265	3.65	0.05
	75	25.185	35.119	3.68	0.13
	100	24.546	35.032	3.63	0.29
	125	24.305	35.035	3.49	0.17
	150	22.662	35.084	3.00	0.05
	175	21.137	35.166	2.52	0.04
	200	19.562	35.325	2.62	0.01
	250	17.590	35.475	2.89	0.01
	300	15.149	35.268	2.58	0.01
	400	12.037	35.072	3.07	0.01
	500	10.199	34.847	3.32	0.00
	514	9.933	34.814	3.34	0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	27.4	***	***	***
1	0					
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	0					
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	98	99	24.495	35.025	3.59	0.21
22	99	100	24.509	35.025	3.59	0.22
23	99	100	24.507	35.025	3.60	0.23
24	99	99	24.509	35.026	3.60	0.23

KH-06-4_Leg2	Stn23	Depth	4616m
Date:	2006.11.27	Lat.	16 00.82S
Time:	13:22	Long.	54 59.10E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
3	27.352	35.276	3.55	0.03
4	27.353	35.277	3.55	0.03
5	27.359	35.277	3.55	0.03
10	27.319	35.277	3.55	0.04
20	27.160	35.277	3.55	0.04
30	26.483	35.224	3.66	0.06
40	26.055	35.199	3.70	0.07
50	25.825	35.218	3.74	0.08
75	25.114	35.187	3.64	0.33
100	24.556	35.095	3.56	0.25
125	23.921	35.083	3.30	0.14
150	21.967	35.109	2.65	0.07
175	19.782	35.235	2.39	0.02
200	18.603	35.228	2.15	0.02
250	16.073	35.161	1.83	0.01
300	15.126	35.395	2.87	0.01
400	12.337	35.142	3.42	0.00
500	10.473	34.883	3.60	0.00
502	10.450	34.881	3.61	0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	27.6	***	***	***
1	496	500	10.419	34.874	3.61	0.00
2	496	500	10.425	34.875	3.61	0.00
3	299	301	14.679	35.372	3.00	0.01
4	299	301	14.846	35.373	2.99	0.01
5	200	201	18.361	35.221	2.04	0.02
6	200	201	18.421	35.223	2.09	0.01
7	151	152	21.877	35.106	2.58	0.05
8	150	151	22.038	35.100	2.60	0.06
9	99	100	24.377	35.074	3.52	0.20
10	100	100	24.403	35.080	3.53	0.21
11	50	50	25.804	35.222	3.71	0.12
12	50	51	25.792	35.222	3.72	0.08
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn24	Depth	4036m
Date:	2006.11.27	Lat.	15 00.40S
Time:	20:52	Long.	54 59.00E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
2	27.412	35.174	3.52	0.04
3	27.412	35.175	3.53	0.03
4	27.412	35.175	3.52	0.03
5	27.416	35.175	3.52	0.04
10	27.410	35.174	3.52	0.04
20	27.398	35.172	3.53	0.04
30	27.310	35.164	3.53	0.04
40	27.128	35.200	3.56	0.06
50	26.871	35.173	3.58	0.07
75	26.327	35.312	3.54	0.25
100	25.150	35.270	3.22	0.17
125	22.722	35.192	2.68	0.10
150	20.301	35.132	2.05	0.06
175	19.056	35.156	2.02	0.03
200	17.775	35.225	2.17	0.01
250	15.637	35.325	2.56	0.01
300	13.525	35.108	2.22	0.01
400	11.807	35.021	2.56	0.01
500	10.364	34.875	3.13	0.01
500	10.364	34.875	3.13	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	27.8	***	***	***
1	79	79	25.752	35.300	3.38	0.18
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	79	79	25.835	35.303	3.39	0.18
13	79	80	25.864	35.305	3.39	0.19
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	79	79	25.902	35.307	3.41	0.19

KH-06-4_Leg2	Stn25	Depth	4515m
Date:	2006.11.28	Lat.	14 00.39S
Time:	02:50	Long.	54 59.31E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
3	27.539	35.157	3.51	0.03
4	27.544	35.157	3.51	0.03
5	27.543	35.157	3.51	0.03
10	27.539	35.158	3.51	0.03
20	27.550	35.157	3.52	0.03
30	27.549	35.157	3.52	0.04
40	27.549	35.157	3.52	0.03
50	27.538	35.157	3.53	0.04
75	26.807	35.226	3.58	0.12
100	23.820	35.172	2.97	0.21
125	22.154	35.160	2.58	0.13
150	19.614	35.119	1.97	0.06
175	17.503	35.123	1.70	0.04
200	16.218	35.213	2.13	0.02
250	14.460	35.263	2.56	0.01
300	12.805	35.061	2.23	0.02
400	11.288	34.987	3.01	0.01
500	9.600	34.786	3.10	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	27.9	***	***	***
1	497	501	9.562	34.782	3.08	0.01
2	496	500	9.575	34.783	3.09	0.01
3	297	299	12.775	35.056	2.23	0.01
4	297	299	12.792	35.057	2.23	0.01
5	198	199	16.130	35.210	2.16	0.02
6	198	200	16.131	35.211	2.16	0.01
7	149	150	18.778	35.110	1.82	0.06
8	150	150	19.231	35.110	1.85	0.06
9	99	100	23.211	35.162	2.80	0.17
10	99	100	23.575	35.165	2.86	0.18
11	50	51	27.369	35.166	3.52	0.05
12	50	50	27.477	35.157	3.53	0.05
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn26	Depth	4070m
Date:	2006.11.28	Lat.	13 00.06S
Time:	09:22	Long.	54 58.98E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	27.874	35.052	3.50	0.01
3	27.881	35.052	3.51	0.01
4	27.879	35.052	3.51	0.01
5	27.868	35.052	3.51	0.01
10	27.838	35.051	3.51	0.01
20	27.787	35.048	3.52	0.02
30	27.753	35.054	3.52	0.03
40	27.257	35.195	3.57	0.05
50	27.066	35.206	3.57	0.08
75	25.926	35.240	3.53	0.29
100	24.045	35.183	2.95	0.26
125	21.253	35.161	2.46	0.13
150	18.830	35.193	2.09	0.06
175	17.274	35.222	2.11	0.02
200	15.166	35.174	2.10	0.01
250	13.164	35.097	2.15	0.01
300	12.125	35.022	2.31	0.01
400	10.772	34.929	2.79	0.01
500	9.333	34.771	2.76	0.01
504	9.242	34.763	2.78	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	28.3	***	***	***
1	80	80	25.858	35.240	3.44	0.22
2	80	81	25.814	35.237	3.47	0.22
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	80	80	25.860	35.240	3.46	0.22
12	80	80	25.862	35.240	3.46	0.23
13	79	80	25.884	35.241	3.47	0.23
14	80	80	25.864	35.241	3.47	0.23
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	4	4	27.882	35.051	3.51	0.01
24	79	79	25.848	35.237	3.43	0.23

KH-06-4_Leg2	Stn27	Depth	4619m
Date:	2006.11.28	Lat.	12 00.52S
Time:	15:31	Long.	54 59.48E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	27.883	34.996	3.50	0.03
3	27.882	34.996	3.51	0.03
4	27.883	34.996	3.51	0.03
5	27.883	34.996	3.51	0.03
10	27.887	34.996	3.51	0.03
20	27.886	34.995	3.51	0.03
30	27.870	34.995	3.52	0.04
40	27.828	34.996	3.52	0.05
50	27.820	35.016	3.52	0.07
75	25.065	35.240	3.28	0.36
100	22.231	35.139	2.65	0.18
125	19.864	35.164	2.23	0.09
150	19.215	35.190	2.12	0.08
175	17.679	35.229	2.11	0.03
200	16.174	35.183	2.06	0.01
250	13.585	35.078	2.01	0.02
300	12.343	35.047	2.34	0.01
400	10.273	34.871	2.58	0.01
500	8.984	34.766	2.39	0.01
502	8.958	34.764	2.38	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	28.2	***	***	***
1	497	500	8.967	34.764	2.38	0.01
2	497	500	8.987	34.765	2.38	0.01
3	298	300	12.155	35.032	2.38	0.01
4	298	300	12.295	35.036	2.33	0.01
5	198	199	15.963	35.174	2.07	0.01
6	198	200	15.965	35.179	2.07	0.01
7	149	150	18.399	35.204	2.09	0.04
8	149	150	18.894	35.189	2.08	0.05
9	99	100	22.618	35.144	2.67	0.16
10	100	100	22.508	35.146	2.67	0.17
11	50	50	27.311	35.089	3.55	0.12
12	50	50	27.355	35.085	3.55	0.11
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn28	Depth	4391m
Date:	2006.11.29	Lat.	10 59.55S
Time:	00:25	Long.	55 00.90E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	27.711	35.017	3.50	0.04
3	27.714	35.017	3.50	0.04
4	27.717	35.017	3.50	0.04
5	27.713	35.017	3.51	0.04
10	27.715	35.017	3.51	0.04
20	27.714	35.017	3.51	0.04
30	27.717	35.017	3.51	0.04
40	27.714	35.019	3.51	0.04
50	27.512	35.060	3.54	0.10
75	25.187	35.241	3.32	0.25
100	21.672	35.145	2.55	0.16
125	19.718	35.178	2.20	0.10
150	17.588	35.153	1.83	0.06
175	15.597	35.161	1.79	0.04
200	14.745	35.186	2.19	0.01
250	12.959	35.096	2.34	0.01
300	11.620	35.003	2.57	0.01
400	10.140	34.859	2.66	0.01
500	8.930	34.763	2.36	0.01
504	8.896	34.762	2.34	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	27.9	***	***	***
1	69	70	25.909	35.239	3.56	0.17
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	70	70	25.764	35.223	3.57	0.18
13	70	70	25.798	35.227	3.57	0.18
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	70	71	25.749	35.222	3.57	0.19

KH-06-4_Leg2	Stn29	Depth	4090m
Date:	2006.11.29	Lat.	9 59.63S
Time:	05:17	Long.	54 59.40E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
3	27.707	34.960	3.51	0.03
4	27.708	34.960	3.51	0.03
5	27.708	34.960	3.51	0.03
10	27.706	34.960	3.51	0.03
20	27.699	34.959	3.51	0.05
30	27.700	34.959	3.51	0.05
40	27.701	34.960	3.51	0.05
50	27.702	34.960	3.51	0.06
75	27.583	35.000	3.51	0.10
100	21.733	35.130	2.32	0.21
125	18.404	35.082	1.67	0.10
150	17.009	35.071	1.57	0.06
175	15.196	35.083	1.58	0.04
200	14.489	35.097	1.61	0.03
250	13.526	35.099	1.82	0.02
300	12.459	35.053	1.93	0.02
400	10.994	34.952	2.21	0.02
500	9.840	34.841	2.22	0.01
502	9.795	34.838		0.02

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	28.0	***	***	***
1	497	501	9.838	34.841	2.21	0.02
2	498	502	9.839	34.841	2.21	0.01
3	299	301	12.418	35.048	1.89	0.02
4	299	301	12.416	35.049	1.89	0.02
5	199	200	14.438	35.102	1.63	0.03
6	199	200	14.487	35.094	1.62	0.03
7	149	150	16.912	35.063	1.55	0.05
8	149	150	16.840	35.071	1.55	0.06
9	100	100	20.931	35.105	2.01	0.16
10	100	101	21.242	35.117	2.15	0.17
11	49	50	27.694	34.957	3.50	0.05
12	50	50	27.696	34.957	3.51	0.05
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn30	Depth	4096m
Date:	2006.11.29	Lat.	8 59.98S
Time:	11:25	Long.	54 59.03E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	28.903	34.918	3.47	0.03
3	28.897	34.918	3.47	0.03
4	28.879	34.917	3.47	0.03
5	28.911	34.919	3.47	0.03
10	28.911	34.918	3.47	0.03
20	28.596	34.902	3.48	0.04
30	28.569	34.901	3.48	0.05
40	28.340	34.954	3.49	0.19
50	25.932	35.140	3.27	0.41
75	22.007	35.148	2.43	0.29
100	17.484	35.116	1.70	0.11
125	15.061	35.077	1.62	0.04
150	13.858	35.086	1.76	0.02
175	13.330	35.093	1.82	0.02
200	12.902	35.081	1.74	0.02
250	11.786	35.007	2.07	0.02
300	11.222	34.963	2.25	0.02
400	9.963	34.866	2.00	0.02
500	9.069	34.798	2.02	0.01
501	9.069	34.798	2.02	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	29.2	***	***	***
1	101	102	17.708	35.110	1.69	0.10
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	103	103	17.488	35.116	1.68	0.09
13	50	50	25.193	35.156	3.07	0.34
14	49	49	25.163	35.161	3.11	0.34
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	50	50	25.309	35.162	3.14	0.35

KH-06-4_Leg2	Stn31	Depth	3633m
Date:	2006.11.29	Lat.	7 59.65S
Time:	17:40	Long.	54 59.83E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
3	28.380	34.723	3.48	0.08
4	28.382	34.723	3.49	0.08
5	28.380	34.723	3.49	0.08
10	28.379	34.723	3.48	0.08
20	28.383	34.723	3.48	0.08
30	28.346	34.727	3.49	0.10
40	27.865	34.934	3.52	0.24
50	25.910	35.117	3.28	0.44
75	23.122	35.150	2.69	0.39
100	16.850	35.100	1.60	0.13
125	15.332	35.154	1.62	0.06
150	14.443	35.143	1.65	0.04
175	13.915	35.131	1.71	0.03
200	13.298	35.121	1.80	0.02
250	12.500	35.074	1.89	0.02
300	11.921	35.031	1.87	0.02
400	10.354	34.896	2.01	0.02
500	9.652	34.851	1.88	0.02

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	28.6	***	***	***
1	497	501	9.585	34.845	1.85	0.02
2	498	501	9.586	34.845	1.85	0.02
3	299	301	11.874	35.023	1.83	0.03
4	299	301	11.876	35.023	1.86	0.02
5	198	199	13.249	35.115	1.82	0.02
6	198	200	13.269	35.117	1.81	0.02
7	149	150	14.411	35.138	1.66	0.04
8	149	150	14.430	35.140	1.66	0.04
9	99	100	15.832	35.136	1.58	0.08
10	99	99	16.112	35.100	1.52	0.08
11	50	50	24.547	35.107	2.95	0.34
12	50	50	24.661	35.112	2.95	0.37
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn32	Depth	1185m
Date:	2006.11.30	Lat.	7 59.82S
Time:	12:58	Long.	58 59.35E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	28.679	34.930	3.49	0.04
3	28.709	34.930	3.49	0.04
4	28.710	34.930	3.49	0.04
5	28.698	34.930	3.49	0.04
10	28.687	34.930	3.49	0.04
20	28.586	34.929	3.50	0.04
30	28.449	35.056	3.56	0.07
40	25.779	35.258	3.47	0.34
50	24.063	35.282	3.00	0.35
75	18.862	35.217	1.87	0.13
100	16.491	35.110	1.36	0.07
125	14.889	35.116	1.35	0.05
150	14.322	35.122	1.47	0.04
175	13.862	35.129	1.56	0.03
200	13.677	35.123	1.58	0.03
250	12.763	35.074	1.69	0.03
300	11.440	34.976	2.08	0.02
400	10.115	34.870	2.09	0.02
500	9.012	34.806	1.76	0.02
502	9.009	34.806	1.75	0.02

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	29.1	***	***	***
1	496	499	9.012	34.805	1.75	0.02
2	496	499	9.012	34.805	1.75	0.02
3	298	300	11.348	34.966	2.07	0.02
4	299	301	11.347	34.967	2.07	0.02
5	199	200	13.678	35.121	1.58	0.02
6	200	201	13.694	35.122	1.57	0.02
7	150	151	14.365	35.119	1.47	0.04
8	149	150	14.346	35.119	1.47	0.04
9	99	100	16.615	35.105	1.35	0.07
10	100	100	16.676	35.108	1.35	0.07
11	50	50	25.177	35.264	3.24	0.31
12	50	50	25.188	35.268	3.26	0.31
13	49	50	25.221	35.268	3.27	0.30
14	49	49	25.250	35.269	3.28	0.30
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	200	201	13.694	35.122	1.57	0.02
24	200	201	13.693	35.122	1.57	0.02

KH-06-4_Leg2	Stn33	Depth	2092m
Date:	2006.11.30	Lat.	8 59.96S
Time:	20:50	Long.	58 59.90E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	28.523	35.098	3.47	0.05
3	28.527	35.099	3.48	0.05
4	28.525	35.099	3.48	0.05
5	28.522	35.099	3.48	0.05
10	28.528	35.099	3.48	0.05
20	28.514	35.099	3.48	0.05
30	28.473	35.098	3.47	0.07
40	28.459	35.097	3.48	0.07
50	27.834	35.107	3.48	0.23
75	21.352	35.126	2.47	0.19
100	19.431	35.144	1.92	0.10
125	17.639	35.117	1.59	0.08
150	16.353	35.083	1.42	0.07
175	15.522	35.108	1.37	0.05
200	14.831	35.133	1.44	0.05
250	13.337	35.096	1.63	0.02
300	12.142	35.020	1.93	0.02
400	10.649	34.911	2.38	0.01
500	9.427	34.809	2.25	0.01
503	9.422	34.808	2.24	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	28.8	***	***	***
1	0					
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	0					
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn34	Depth	2380m
Date:	2006.12.1	Lat.	9 59.41S
Time:	02:59	Long.	58 59.81E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	28.173	34.915	3.48	0.03
3	28.173	34.915	3.48	0.03
4	28.173	34.915	3.48	0.03
5	28.173	34.915	3.48	0.03
10	28.171	34.914	3.48	0.03
20	28.170	34.914	3.49	0.04
30	28.173	34.915	3.49	0.04
40	28.175	34.915	3.48	0.04
50	28.175	34.914	3.48	0.04
75	26.318	35.222	3.48	0.25
100	21.609	35.121	2.27	0.17
125	18.054	35.086	1.65	0.06
150	17.209	35.063	1.46	0.06
175	15.699	35.107	1.64	0.05
200	14.000	35.061	1.66	0.02
250	13.318	35.052	1.75	0.02
300	12.538	35.036	1.97	0.02
400	10.750	34.915	2.39	0.02
500	9.498	34.809	2.34	0.01
502	9.529	34.812	2.33	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	28.6	***	***	***
1	497	501	9.499	34.809	2.33	0.01
2	497	500	9.502	34.809	2.33	0.01
3	298	300	12.560	35.037	1.97	0.02
4	298	300	12.560	35.037	1.97	0.02
5	199	200	14.438	35.030	1.57	0.02
6	200	201	14.445	35.023	1.51	0.02
7	148	149	17.245	35.063	1.46	0.06
8	148	149	17.283	35.065	1.46	0.06
9	99	99	20.513	35.095	1.96	0.12
10	99	100	20.516	35.101	1.99	0.12
11	51	51	28.148	34.919	3.48	0.04
12	50	51	28.171	34.913	3.48	0.05
13	68	68	26.659	35.217	3.53	0.22
14	68	69	26.659	35.217	3.54	0.21
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	79	80	23.427	35.132	2.64	0.19
24	79	80	23.436	35.143	2.67	0.19

KH-06-4_Leg2	Stn35	Depth	3395m
Date:	2006.12.1	Lat.	11 00.01S
Time:	09:50	Long.	58 59.78E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
2	28.310	34.995	3.49	0.02
3	28.305	34.995	3.49	0.02
4	28.318	34.995	3.50	0.02
5	28.322	34.995	3.49	0.02
10	28.181	34.993	3.50	0.02
20	28.039	34.992	3.50	0.03
30	27.985	34.986	3.50	0.04
40	27.948	34.996	3.51	0.05
50	27.683	35.112	3.56	0.08
75	24.743	35.191	3.19	0.32
100	22.757	35.132	2.74	0.17
125	19.154	35.099	1.89	0.09
150	17.220	35.124	1.82	0.04
175	16.571	35.131	1.74	0.03
200	16.269	35.158	1.85	0.02
250	14.376	35.114	1.56	0.03
300	13.139	35.070	1.91	0.02
400	10.614	34.906	2.45	0.02
500	9.064	34.768	2.41	0.01
501	9.060	34.767	2.40	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	28.6	***	***	***
1	0					
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	0					
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn36	Depth	4162m
Date:	2006.12.1	Lat.	11 59.69S
Time:	15:41	Long.	58 59.78E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
4	28.274	35.002	3.50	0.03
5	28.278	35.007	3.50	0.04
10	28.119	34.967	3.51	0.03
20	28.261	35.077	3.50	0.04
30	28.099	35.039	3.51	0.05
40	27.980	35.015	3.51	0.05
50	27.756	35.047	3.55	0.08
75	26.209	35.158	3.54	0.27
100	24.270	35.167	3.03	0.26
125	20.592	35.184	2.36	0.12
150	18.457	35.223	2.18	0.06
175	16.642	35.127	1.87	0.03
200	14.827	35.020	1.63	0.02
250	13.667	35.138	2.37	0.01
300	12.361	35.024	2.44	0.01
400	10.487	34.891	3.07	0.01
500	8.996	34.748	2.57	0.01
504	8.926	34.743	2.54	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	28.7	***	***	***
1	496	499	8.967	34.745	2.53	0.01
2	496	500	8.994	34.747	2.53	0.01
3	298	300	12.334	35.092	2.92	0.01
4	298	300	12.334	35.091	2.92	0.01
5	199	200	15.229	35.299	2.60	0.01
6	199	200	15.206	35.281	2.48	0.01
7	149	150	18.421	35.221	2.18	0.05
8	149	150	18.438	35.222	2.18	0.05
9	99	100	22.963	35.139	2.62	0.17
10	99	100	23.557	35.157	2.83	0.20
11	0					
12	49	50	27.686	35.046	3.54	0.09
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	76	77	26.104	35.156	3.50	0.24
24	75	76	26.103	35.156	3.49	0.25

KH-06-4_Leg2	Stn37	Depth	4007m
Date:	2006.12.2	Lat.	12 57.61S
Time:	01:02	Long.	59 02.35E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	28.018	34.928	3.50	0.03
3	28.020	34.927	3.50	0.03
4	28.018	34.927	3.50	0.03
5	28.021	34.928	3.50	0.03
10	28.022	34.927	3.50	0.02
20	27.998	34.935	3.50	0.02
30	27.978	34.940	3.50	0.02
40	27.757	35.010	3.52	0.03
50	27.143	35.149	3.59	0.06
75	25.987	35.302	3.65	0.15
100	24.209	35.058	3.54	0.23
125	21.331	35.154	2.53	0.11
150	20.166	35.238	2.47	0.08
175	18.548	35.211	2.17	0.06
200	16.177	35.093	1.78	0.02
250	13.629	34.983	1.63	0.02
300	12.633	35.058	2.21	0.02
400	11.318	34.979	2.60	0.01
500	10.293	34.867	3.05	0.01
502	10.270	34.865	3.05	0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	28.3	***	***	***
1	0					
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	0					
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn38	Depth	4019m
Date:	2006.12.2	Lat.	14 00.33S
Time:	05:53	Long.	58 59.96E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
4	27.316	35.219	3.54	0.01
5	27.321	35.219	3.54	0.01
10	27.283	35.221	3.54	0.02
20	27.264	35.227	3.55	0.03
30	27.224	35.235	3.54	0.03
40	26.895	35.288	3.60	0.03
50	25.669	35.249	3.67	0.06
75	23.561	35.100	3.57	0.26
100	22.622	35.179	3.27	0.14
125	21.939	35.248	3.11	0.07
150	20.617	35.375	2.94	0.03
175	19.734	35.392	2.79	0.02
200	18.772	35.327	2.52	0.01
250	16.590	35.158	2.00	0.01
300	14.652	35.170	2.24	0.01
400	11.985	35.046	2.66	0.01
500	10.464	34.886	3.28	0.01
501	10.430	34.881		0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	27.8	***	***	***
1	495	498	10.429	34.880	3.29	0.00
2	495	499	10.439	34.882	3.30	0.00
3	298	300	14.727	35.156	2.20	0.01
4	298	300	14.686	35.153	2.18	0.01
5	199	201	18.821	35.327	2.51	0.01
6	200	202	18.759	35.325	2.50	0.01
7	149	150	20.403	35.371	2.87	0.02
8	149	150	20.509	35.370	2.89	0.02
9	99	100	22.562	35.180	3.23	0.11
10	100	101	22.613	35.173	3.23	0.13
11	49	49	26.253	35.329	3.63	0.05
12	50	50	26.422	35.334	3.62	0.04
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	70	70	23.928	35.123	3.55	0.19
24	70	70	24.446	35.111	3.63	0.15

KH-06-4_Leg2	Stn39	Depth	3950m
Date:	2006.12.2	Lat.	14 59.64S
Time:	12:10	Long.	59 00.04E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
4	27.413	35.225	3.55	0.02
5	27.398	35.226	3.55	0.02
10	27.335	35.230	3.55	0.02
20	27.177	35.235	3.56	0.03
30	27.113	35.239	3.56	0.03
40	27.060	35.252	3.56	0.04
50	26.184	35.260	3.64	0.06
75	25.100	35.156	3.68	0.13
100	24.486	35.024	3.67	0.27
125	23.537	35.006	3.27	0.17
150	21.320	35.176	2.76	0.04
175	19.718	35.271	2.52	0.02
200	18.262	35.286	2.37	0.01
250	15.359	35.209	2.29	0.01
300	13.541	35.218	2.92	0.01
400	11.190	34.985	3.55	0.00
500	9.811	34.804	3.36	0.00
600	8.497	34.680	3.00	0.00
800	6.209	34.661	1.98	0.01
1000	5.293	34.703	1.76	0.02
1200	4.430	34.683	1.93	0.01
1500	3.474	34.696	2.13	0.01
1503	3.454	34.696		0.01

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	27.8	***	***	***
1	0					
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	0					
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn40	Depth	1026m
Date:	2006.12.3	Lat.	16 08.01S
Time:	01:31	Long.	59 07.34E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
3	26.620	35.293	3.57	0.07
4	26.623	35.293	3.57	0.07
5	26.624	35.293	3.57	0.07
10	26.629	35.293	3.57	0.07
20	26.632	35.293	3.57	0.08
30	26.628	35.294	3.57	0.08
40	26.567	35.294	3.57	0.11
50	26.496	35.289	3.57	0.15
75	25.572	35.233	3.54	0.26
100	23.861	35.056	3.45	0.17
125	23.494	35.120	3.36	0.09
150	21.097	35.209	2.79	0.03
175	20.049	35.269	2.64	0.02
200	19.011	35.308	2.52	0.01
250	16.356	35.262	2.35	0.01
300	14.250	35.206	2.53	0.01
400	12.522	35.140	3.22	0.01
500	10.463	34.884	3.48	0.00
501	10.296	34.863	3.47	0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml・l⁻¹	FLC μg/l
Sur.	0	***	27.0	***	***	***
1	497	501	10.385	34.875	3.46	0.00
2	497	501	10.336	34.869	3.46	0.00
3	298	300	14.805	35.207	2.42	0.01
4	297	299	14.856	35.209	2.40	0.01
5	198	199	18.882	35.300	2.49	0.01
6	198	199	18.899	35.304	2.50	0.01
7	148	149	20.748	35.226	2.71	0.02
8	148	149	21.104	35.203	2.75	0.02
9	100	100	24.978	35.173	3.47	0.18
10	100	101	24.830	35.158	3.52	0.22
11	50	51	26.574	35.293	3.56	0.10
12	50	51	26.577	35.293	3.56	0.10
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	80	81	25.668	35.236	3.52	0.25
24	80	80	25.681	35.237	3.52	0.25

KH-06-4_Leg2	Stn41	Depth	3502m
Date:	2006.12.3	Lat.	17 00.15S
Time:	07:59	Long.	58 00.00E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
2	26.526	35.144	3.59	0.02
3	26.528	35.144	3.60	0.02
4	26.534	35.144	3.59	0.02
5	26.533	35.144	3.59	0.02
10	26.527	35.144	3.59	0.02
20	26.111	35.170	3.66	0.03
30	25.306	35.095	3.72	0.05
40	25.049	35.075	3.74	0.06
50	24.828	35.079	3.73	0.08
75	24.365	35.048	3.69	0.19
100	23.974	35.031	3.62	0.24
125	23.565	35.035	3.47	0.19
150	22.385	35.097	3.06	0.10
175	20.872	35.216	2.78	0.03
200	19.558	35.303	2.63	0.01
250	18.023	35.367	2.63	0.01
300	15.866	35.439	2.92	0.01
400	12.809	35.181	3.28	0.01
500	9.998	34.810	3.69	0.00
503	9.929	34.802		0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	27.0	***	***	***
1	0					
2	0					
3	0					
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	0					
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg2	Stn42	Depth	3989m
Date:	2006.12.3	Lat.	17 59.71S
Time:	14:13	Long.	58 00.07E

CTD data (LAY)

Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
3	26.507	35.204	3.60	0.02
4	26.513	35.204	3.59	0.02
5	26.513	35.204	3.60	0.02
10	26.496	35.204	3.60	0.02
20	26.304	35.198	3.61	0.02
30	26.227	35.191	3.63	0.03
40	24.823	35.100	3.76	0.03
50	24.535	35.089	3.77	0.04
75	24.220	35.084	3.76	0.05
100	23.539	35.123	3.70	0.15
125	22.591	35.218	3.37	0.15
150	21.731	35.315	3.15	0.05
175	20.921	35.379	3.02	0.03
200	19.741	35.451	2.91	0.01
250	17.264	35.533	2.97	0.01
300	15.641	35.469	3.06	0.01
400	13.239	35.270	3.51	0.00
500	11.264	34.994	3.65	0.00
502	11.263	34.994		0.00

CTD data (BTL)

BTL No.	Depth m	Pres. db	Temp. ℃	Sal (psu)	DO ml·l⁻¹	FLC μg/l
Sur.	0	***	26.9	***	***	***
1	497	500	11.264	34.993	3.65	0.00
2	496	500	11.264	34.993	3.64	0.00
3	296	298	15.651	35.465	3.06	0.01
4	295	297	15.660	35.467	3.05	0.01
5	199	200	19.335	35.444	2.81	0.01
6	198	199	19.488	35.446	2.84	0.01
7	148	149	21.646	35.321	3.10	0.04
8	148	149	21.658	35.320	3.11	0.05
9	99	100	23.389	35.135	3.65	0.21
10	100	101	23.384	35.136	3.65	0.20
11	49	50	24.652	35.090	3.73	0.04
12	49	50	24.677	35.091	3.73	0.03
13	0					
14	0					
15	0					
16	0					
17	0					
18	0					
19	0					
20	0					
21	0					
22	0					
23	0					
24	0					

KH-06-4_Leg1

Local time		*Universal time*		*Latitude*	*Longitude*	*Depth*	*station*	*memo*
2.Nov	16:47	2.Nov	7:47	35°08.552N	139°44.735E			SUNSET
3.Nov	6:12		21:12	32°47.087N	136°40.824E			SUNRISE
	17:15	3.Nov	8:43	30°53.656N	133°59.717E			SUNSET
4.Nov	6:29		21:29	28°42.763N	130°56.936E	3043m		SUNRISE
	17:43	4.Nov	8:43	26°41.908N	128°27.383E	312m		SUNSET
5.Nov	6:46		21:46	24°12.337N	125°30.368E	2078m		SUNRISE
	18:10	5.Nov	9:10	22°12.128N	122°54.354E	2217m		SUNSET
6.Nov	7:09		22:09	19°55.588N	120°08.239E	4416m		SUNRISE
	18:39	6.Nov	9:39	17°58.573N	117°52.572E	4416m		SUNSET
	21:01→20:01		12:01	17°34.669N	117°25.112E	4416m		PUT CLOCK ABACK 1 HOUR
7.Nov	6:18		22:18	15°48.080N	115°29.614E	4416m		SUNRISE
	17:57	7.Nov	9:57	13°43.723N	113°32.134E	4416m		SUNSET
8.Nov	6:28		22:28	11°29.926N	111°27.425E	4416m		SUNRISE
	18:18	8.Nov	10:18	09°17.701N	109°32.722E	4416m		SUNSET
9.Nov	6:37		22:37	06°54.334N	107°46.955E	4416m		SUNRISE
	18:37	9.Nov	10:37	04°34.190N	106°03.777E	4416m		SUNSET
10.Nov	6:40		22:40	02°01.037N	104°47.487E	4416m		SUNRISE
	18:56	10.Nov	10:56	02°04.494N	102°07.850E	4416m		SUNSET
11.Nov	7:07		23:07	04°15.215N	099°38.047E	4416m		SUNRISE
	19:13	11.Nov	11:13	06°12.669N	097°00.630E	4416m		SUNSET
12.Nov	1:03→0:03		17:03	06°42.584N	095°24.587E	4416m		PUT CLOCK ABACK 1 HOUR
	6:31		23:31	05°39.902N	094°08.609E	4416m		SUNRISE
	18:27	12.Nov	11:27	02°31.999N	093°46.030E	4631m		SUNSET
	21:03		14:03	01°56.015N	094°01.995E	4469m	Stn.1	IKMT NET(Obl.) STARTED
	21:19		14:19	01°55.614N	094°01.323E	4463m	Stn.1	IKMT NET(Obl.) DEEPEST
	21:40		14:40	01°55.189N	094°00.621E	4475m	Stn.1	IKMT NET(Obl.) FINISHED
	21:48		14:48	01°55.266N	094°00.533E	4476m	Stn.1	IKMT NET(Step) STARTED
	22:03		15:03	01°55.944N	094°01.013E	4469m	Stn.1	IKMT NET(Step) DEEPEST
	23:11		16:11	01°57.713N	094°03.864E	4494m	Stn.1	IKMT NET(Step) FINISHED
13.Nov	6:21		23:21	00°36.874N	095°19.475E	4357m		SUNRISE
	18:21	13.Nov	11:21	01°35.620S	097°35.057E	5282m		SUNSET
	20:38		13:38	01°59.836S	097°59.727E	5342m	Stn.2	IKMT NET(Obl.) STARTED

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Local time		*Universal time*		*Latitude*	*Longitude*	*Depth*	*station*	*memo*
	20:52		13:52	02°00.399S	098°00.190E	5368m	Stn.2	IKMT NET(Obl.) DEEPEST
	21:14		14:14	02°01.139S	098°00.748E	5405m	Stn.2	IKMT NET(Obl.) FINISHED
	21:24		14:24	02°01.352S	098°00.871E	5407m	Stn.2	IKMT NET(Step) STARTED
	21:40		14:40	02°01.945S	098°01.348E	5416m	Stn.2	IKMT NET(Step) DEEPEST
	22:47		15:47	02°04.314S	098°03.152E	5407m	Stn.2	IKMT NET(Step) FINISHED
14.Nov	2:58		19:58	02°00.040S	097°00.105E	4873m	Stn.3	IKMT NET(Step) STARTED
	3:14		20:14	02°00.612S	097°00.490E	4874m	Stn.3	IKMT NET(Step) DEEPEST
	4:21		21:21	02°03.299S	097°01.495E	4877m	Stn.3	IKMT NET(Step) FINISHED
	4:30		21:30	02°03.531S	097°01.551E	4878m	Stn.3	IKMT NET(Obl.) STARTED
	4:47		21:47	02°04.373S	097°01.969E	4880m	Stn.3	IKMT NET(Obl.) DEEPEST
	5:13		22:13	02°05.444S	097°02.476E	4878m	Stn.3	IKMT NET(Obl.) FINISHED
	5:23		22:23	02°05.491S	097°02.520E	4877m	Stn.3	CTD-CMS STARTED
	5:42		22:42	02°05.463S	097°02.519E	4879m	Stn.3	CTD-CMS DEEPEST
	6:09		23:09	02°05.424S	097°02.488E	4878m		SUNRISE
	6:15		23:15	02°05.421S	097°02.552E	4877m	Stn.3	CTD-CMS FINISHED
	10:28	14.Nov	3:28	02°00.145S	096°00.117E	5049m	Stn.4	IKMT NET(Obl.) STARTED
	11:39		4:39	02°00.143S	096°02.869E	5044m	Stn.4	IKMT NET(Obl.) DEEPEST
	13:52		6:52	01°59.901S	096°06.073E	4405m	Stn.4	IKMT NET(Obl.) FINISHED
	14:15		7:15	02°00.149S	096°05.879E	4563m	Stn.4	CTD-CMS STARTED
	14:37		7:34	02°00.280S	096°05.660E	4566m	Stn.4	CTD-CMS DEEPEST
	15:01		8:01	02°00.541S	096°05.451E	4503m	Stn.4	CTD-CMS FINISHED
	18:30		11:30	02°00.017S	095°09.857E	4593m		SUNSET
	19:13		12:13	01°59.986S	095°00.302E	4751m	Stn.5	CTD-CMS STARTED
	19:32		12:32	01°59.994S	095°00.314E	4675m	Stn.5	CTD-CMS DEEPEST
	19:59		12:59	01°59.909S	095°00.320E	4663m	Stn.5	CTD-CMS FINISHED
	20:06		13:06	01°59.972S	095°00.530E	4757m	Stn.5	IKMT NET(Obl.) STARTED
	20:20		13:20	02°00.200S	095°01.209E	4810m	Stn.5	IKMT NET(Obl.) DEEPEST
	20:42		13:42	02°00.431S	095°02.027E	4809m	Stn.5	IKMT NET(Obl.) FINISHED
	20:45		13:45	02°00.429S	095°02.063E	4810m	Stn.5	IKMT NET(Step) STARTED
	20:56		13:56	02°00.654S	095°02.480E	4805m	Stn.5	IKMT NET(Step) DEEPEST
	21:57		14:57	02°01.466S	095°04.629E	4784m	Stn.5	IKMT NET(Step) FINISHED
15.Nov	2:18		19:18	02°00.076S	093°59.912E	4693m	Stn.6	IKMT NET(Obl.) STARTED
	2:33		19:33	02°00.650S	094°00.280E	4693m	Stn.6	IKMT NET(Obl.) DEEPEST

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Local time		*Universal time*		*Latitude*	*Longitude*	*Depth*	*station*	*memo*
	2:55		19:55	02°01.360S	094°00.733E	4693m	Stn.6	IKMT NET(Obl.) FINISHED
	3:00		20:00	02°01.429S	094°00.775E	4692m	Stn.6	IKMT NET(Step) STARTED
	3:16		20:16	02°01.878S	094°01.228E	4690m	Stn.6	IKMT NET(Step) DEEPEST
	4:22		21:22	02°03.468S	094°03.125E	4685m	Stn.6	IKMT NET(Step) FINISHED
	6:31		23:31	02°13.773S	093°34.675E	4730m		SUNRISE
	18:50	15.Nov	11:50	03°43.039S	090°34.782E	4059m		SUNSET
	20:05		13:05	03°50.311S	090°19.754E	3687m	Stn.7	CTD-CMS STARTED
	20:22		13:22	03°50.122S	090°19.690E	3680m	Stn.7	CTD-CMS DEEPEST
	20:46		13:46	03°50.072S	090°19.623E	3676m	Stn.7	CTD-CMS FINISHED
	20:51		13:51	03°50.039S	090°19.689E	3680m	Stn.7	IKMT NET(Step) STARTED
	21:04		14:04	03°50.220S	090°20.185E	3700m	Stn.7	IKMT NET(Step) DEEPEST
	22:05		15:05	03°50.775S	090°21.923E	3788m	Stn.7	IKMT NET(Step) FINISHED
16.Nov	1:57		18:57	04°14.709S	089°32.146E	3216m	Stn.8	IKMT NET(Obl.) STARTED
	2:14		19:14	04°14.958S	089°32.687E	3320m	Stn.8	IKMT NET(Obl.) DEEPEST
	2:37		19:37	04°14.947S	089°33.375E	3320m	Stn.8	IKMT NET(Obl.) FINISHED
	2:43		19:43	04°14.918S	089°33.451E	3320m	Stn.8	IKMT NET(Step) STARTED
	3:02		20:02	04°14.992S	089°34.172E	3314m	Stn.8	IKMT NET(Step) DEEPEST
	4:10		21:10	04°15.972S	089°35.745E	3367m	Stn.8	IKMT NET(Step) FINISHED
	5:07→4:07		22:07	04°19.474S	089°25.132E	3391m		PUT CLOCK ABACK 1 HOUR
	5:40		23:40	04°29.815S	089°01.661E	3492m		SUNRISE
	18:12	16.Nov	12:12	06°03.100S	085°55.523E	4960m		SUNSET
	20:04		14:04	06°15.787S	085°30.025E	5104m	Stn.9	CTD-CMS STARTED
	20:21		14:21	06°15.741S	085°29.773E	5109m	Stn.9	CTD-CMS DEEPEST
	20:44		14:44	06°15.765S	085°29.765E	5108m	Stn.9	CTD-CMS FINISHED
	20:56		14:56	06°15.819S	085°29.685E	5108m	Stn.9	IKMT NET(Step) STARTED
	21:07		15:07	06°15.980S	085°30.039E	5087m	Stn.9	IKMT NET(Step) DEEPEST
	22:06		16:06	06°16.308S	085°31.481E	5085m	Stn.9	IKMT NET(Step) FINISHED
17.Nov	1:56		19:56	06°41.403S	084°39.830E	4801m	Stn.10	IKMT NET(Obl.) STARTED
	2:14		20:14	06°41.799S	084°40.484E	4778m	Stn.10	IKMT NET(Obl.) DEEPEST
	2:44		20:44	06°42.427S	084°41.307E	4696m	Stn.10	IKMT NET(Obl.) FINISHED
	2:48		20:48	06°42.507S	084°41.417E	4688m	Stn.10	IKMT NET(Step) STARTED
	3:04		21:04	06°42.920S	084°42.034E	4601m	Stn.10	IKMT NET(Step) DEEPEST
	4:12		22:12	06°44.358S	084°43.931E	4392m	Stn.10	IKMT NET(Step) FINISHED

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Local time		Universal time		Latitude	Longitude	Depth	station	memo
	5:55		23:55	06°52.401S	084°21.014E	4849m		SUNRISE
	18:36	17.Nov	12:36	08°27.822S	081°05.602E	5122m		SUNSET
	20:04		14:04	08°37.040S	080°47.151E	0m	Stn.11	CTD-CMS STARTED
	20:26		14:26	08°37.002S	080°47.000E	5106m	Stn.11	CTD-CMS DEEPEST
	20:50		14:50	08°36.897S	080°46.906E	5105m	Stn.11	CTD-CMS FINISHED
	20:59		14:59	08°37.059S	080°47.200E	0m	Stn.11	IKMT NET(Step) STARTED
	21:13		15:13	08°37.207S	080°47.835E	5083m	Stn.11	IKMT NET(Step) DEEPEST
	22:15		16:15	08°38.173S	080°50.184E	5070m	Stn.11	IKMT NET(Step) FINISHED
18.Nov	1:56		19:56	08°59.916S	080°02.923E	5202m	Stn.12	IKMT NET(Obl.) STARTED
	2:13		20:13	09°00.237S	080°03.681E	5204m	Stn.12	IKMT NET(Obl.) DEEPEST
	2:38		20:38	09°00.609S	080°04.543E	0m	Stn.12	IKMT NET(Obl.) FINISHED
	2:51		20:51	09°00.675S	080°04.749E	5205m	Stn.12	IKMT NET(Step) STARTED
	3:10		21:10	09°00.911S	080°05.655E	0m	Stn.12	IKMT NET(Step) DEEPEST
	4:25		22:25	09°01.643S	080°08.702E	0m	Stn.12	IKMT NET(Step) FINISHED
	6:09	18.Nov	0:09	09°09.991S	079°46.438E	5237m		SUNRISE
	18:54		12:54	10°38.317S	076°42.670E	5343m	Stn.13	CTD-CMS STARTED
	18:57		12:57	10°38.315S	076°42.648E	5344m	Stn.13	SUNSET
	19:22		13:22	10°38.287S	076°42.764E	5338m	Stn.13	CTD-CMS DEEPEST
	19:57		13:57	10°38.187S	076°42.874E	5324m	Stn.13	CTD-CMS FINISHED
	20:05		14:05	10°38.316S	076°43.260E	0m	Stn.13	IKMT NET(Step1) STARTED
	20:18		14:18	10°38.499S	076°43.934E	5282m	Stn.13	IKMT NET(Step1) DEEPEST
	21:23		15:23	10°39.315S	076°46.901E	5341m	Stn.13	IKMT NET(Step1) FINISHED
	21:30		15:30	10°39.404S	076°47.317E	5335m	Stn.13	IKMT NET(Step2) STARTED
	21:45		15:45	10°39.559S	076°48.117E	5312m	Stn.13	IKMT NET(Step2) DEEPEST
	22:48		16:48	10°40.043S	076°51.115E	5317m	Stn.13	IKMT NET(Step2) FINISHED
	23:04→22:04		17:04	10°40.143S	076°51.117E	5318m		PUT CLOCK ABACK 1 HOUR
19.Nov	2:08		21:08	11°03.991S	075°56.798E	5418m	Stn.14	IKMT NET(Obl.) STARTED
	2:27		21:27	11°04.322S	075°57.818E	5378m	Stn.14	IKMT NET(Obl.) DEEPEST
	2:50		21:50	11°04.674S	075°58.888E	5157m	Stn.14	IKMT NET(Obl.) FINISHED
	2:56		21:56	11°04.761S	075°59.164E	5314m	Stn.14	IKMT NET(Step) STARTED
	3:16		22:16	11°05.092S	076°00.184E	5315m	Stn.14	IKMT NET(Step) DEEPEST
	4:19		23:19	11°06.057S	076°03.167E	5245m	Stn.14	IKMT NET(Step) FINISHED
	5:23	19.Nov	0:23	11°09.879S	075°51.270E	5278m		SUNRISE

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Local time		*Universal time*		*Latitude*	*Longitude*	*Depth*	*station*	*memo*
	18:17		13:17	12°38.268S	072°36.769E	4150m		SUNSET
	19:02		14:02	12°42.595S	072°27.825E	4354m	Stn.15	CTD-CMS STARTED
	19:20		14:20	12°42.581S	072°27.668E	4332m	Stn.15	CTD-CMS DEEPEST
	19:51		14:51	12°42.562S	072°27.431E	4315m	Stn.15	CTD-CMS FINISHED
	19:59		14:59	12°42.633S	072°27.623E	4328m	Stn.15	IKMT NET(Step) STARTED
	20:10		15:10	12°42.758S	072°28.056E	4440m	Stn.15	IKMT NET(Step) DEEPEST
	21:10		16:10	12°43.414S	072°29.906E	5106m	Stn.15	IKMT NET(Step) FINISHED
20.Nov	1:56		20:56	13°12.984S	071°24.754E	4304m	Stn.16	IKMT NET(Obl.) STARTED
	2:12		21:12	13°13.320S	071°25.382E	4378m	Stn.16	IKMT NET(Obl.) DEEPEST
	2:36		21:36	13°13.745S	071°26.095E	4396m	Stn.16	IKMT NET(Obl.) FINISHED
	2:43		21:43	13°13.869S	071°26.288E	4372m	Stn.16	IKMT NET(Step) STARTED
	3:00		22:00	13°14.221S	071°26.943E	4245m	Stn.16	IKMT NET(Step) DEEPEST
	4:09		23:09	13°14.989S	071°29.268E	3896m	Stn.16	IKMT NET(Step) FINISHED
	5:37	20.Nov	0:37	13°21.866S	071°10.849E	4635m		SUNRISE
	18:40		13:40	14°54.691S	067°50.455E	3316m		SUNSET
	19:03		14:03	14°56.072S	067°47.668E	3080m	Stn.17	CTD-CMS STARTED
	19:19		14:19	14°56.043S	067°47.595E	3245m	Stn.17	CTD-CMS DEEPEST
	19:47		14:47	14°55.814S	067°47.527E	3216m	Stn.17	CTD-CMS FINISHED
	19:55		14:55	14°55.948S	067°47.689E	3026m	Stn.17	IKMT NET(Step) STARTED
	20:08		15:08	14°56.315S	067°48.211E	2947m	Stn.17	IKMT NET(Step) DEEPEST
	21:12		16:12	14°57.049S	067°50.558E	0m	Stn.17	IKMT NET(Step) FINISHED
21.Nov	1:01→0:01		20:01	15°20.047S	066°56.838E	2751m		PUT CLOCK ABACK 1 HOUR
	1:55		21:55	15°32.549S	066°31.184E	3210m	Stn.18	IKMT NET(Obl.) STARTED
	2:12		22:12	15°32.960S	066°31.850E	3210m	Stn.18	IKMT NET(Obl.) DEEPEST
	2:38		22:38	15°33.308S	066°32.777E	3314m	Stn.18	IKMT NET(Obl.) FINISHED
	3:25		23:25	15°33.181S	066°32.593E	3270m	Stn.18	IKMT NET(Step) STARTED
	3:55		23:55	15°33.405S	066°33.852E	3116m	Stn.18	IKMT NET(Step) DEEPEST
	4:47	21.Nov	0:47	15°33.708S	066°35.721E	2821m	Stn.18	IKMT NET(Step) FINISHED
	4:52		0:52	15°33.700S	066°35.711E	2831m		SUNRISE
	13:52		9:52	16°24.796S	064°39.627E	3358m	Stn.19	IKMT NET(Obl.) STARTED
	15:14		11:14	16°25.892S	064°43.352E	3323m	Stn.19	IKMT NET(Obl.) DEEPEST
	17:30		13:30	16°28.644S	064°46.440E	3133m	Stn.19	IKMT NET(Obl.) FINISHED
	17:55		13:55	16°27.763S	064°44.741E	3372m		SUNSET

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Local time		*Universal time*		*Latitude*	*Longitude*	*Depth*	*station*	*memo*
	19:00		15:00	16°24.859S	064°39.019E	3240m	Stn.20	CTD-CMS STARTED
	19:16		15:16	16°24.770S	064°38.950E	3233m	Stn.20	CTD-CMS DEEPEST
	19:44		15:44	16°24.517S	064°38.862E	3223m	Stn.20	CTD-CMS FINISHED
	19:47		15:47	16°24.512S	064°38.888E	3229m	Stn.20	IKMT NET(Obl.) STARTED
	20:02		16:02	16°24.740S	064°39.430E	3327m	Stn.20	IKMT NET(Obl.) DEEPEST
	20:23		16:23	16°24.973S	064°40.038E	3450m	Stn.20	IKMT NET(Obl.) FINISHED
	20:28		16:28	16°25.001S	064°40.118E	3503m	Stn.20	IKMT NET(Step) STARTED
	20:41		16:41	16°25.220S	064°40.637E	3644m	Stn.20	IKMT NET(Step) DEEPEST
	21:47		17:47	16°26.061S	064°42.639E	3529m	Stn.20	IKMT NET(Step) FINISHED
22.Nov	5:03	22.Nov	1:03	17°18.955S	063°01.420E	3919m		SUNRISE