



## **CRUISE REPORT ON RESEARCH ACTIVITY**

**M.V.SEAFDEC 2 Cruise No. 18-2/2006**

**21 February – 21 March 2006**

**Pelagic Fish Resource Survey in the West Coast of  
Peninsular Malaysia**

**TD/RP/95**

This report is based on preliminary data

For readers who may need data in the report, please contact to:

**Southeast Asian Fisheries Development Center**

**Training Department**

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# Cruise Report on Research Activity

## 1. Cruise Summary

**Vessel name:** MV.SEAFDEC2  
**Cruise no.:** 18-2/2006 Leg: -  
**Project Title:** Pelagic fish resource survey in the west coast of Peninsular Malaysia (Malaysia National Survey)  
**Duration:** 21 February-21 March 2006(29 day)  
**Covered water:** West cost of Peninsular Malaysia (Malacca Strait) from 99°00' – 100°50' E and 3°10' – 6°10' N  
**Port of call:** 1. Bukit Malut port  
2. Penang port  
3. Kg. Aceh  
4. Klang port  
**Objective:** To carry out the Malaysia national research survey  
- Acoustic survey  
- Oceanographic survey  
- Trawl fishing survey (High opening bottom trawl operation)

## 2. List of personal on board

Ship personnel

No.	Position	Name
1	Captain	Mr. Tossaporn Sukhapindha
2	Chief engineer	Mr. Veerachai Chettasumon
3	Second officer	Mr. Suren Pruksarat
4	Third officer	Mr. Somphote Vudthipanyo
5	Second engineer	Mr. Komson Sangphuek
6	Boatswain	Mr. Vudthirat Vudthipanyo
7	Steersman	Mr. Pradit Kui- prasert
8	"	Mr. Tana Rungjoy
9	Able seaman	Mr. Somkiat Phetrasatien
10	Fishing Assistant	Mr. Aussawin Buachuay
11	Fitter	Mr. Vallop Phimroom
12	Oiler	Mr. Plew Shodok
13	"	Mr. Boontarin Wara-in
14	"	Mr. Watchara Panasri
15	Cook	Mr. Saichol Kornnoom
16	Ship's boy	Mr. Phaithoon Sriratanaphon

SEAFDEC Researchers

No.	Position	Name
16	Chief/Scientist	Mr. Isara Chanrachkij
17	Researcher	Dr. Taweekiet Amornpiyakrit
18	“	Mr. Naronng ruangsivakul
19	“	Mr. Sukchai Arnupapboon
20	“	Mr. Sayan Promjinda

Malaysia Researcher

No.	Position	Name
1	Chief. Scientist-Senior research officer	Mr. Samudin Basir
2	Chief. Scientist-Research officer	Mr. Salahudin Jamon
3	“	Mr. Mohamad Faisal
4	Senior research officer	Mr. Raja Bidin Raja Hasam
5	Research officer	Mr. Abd. Haris Hilmi Ahmad Arshad
6	“	Mr. Ryon Siow
7	Senior Research Assistant	Mr. Ramly Abu Bakar
8	Asst. Research officer	Mr. Osman Muda
9	“	Mr. Azmi Abd. Rahman
10	Asst. Marine officer	Mr. Norazman Ahmad
11	Research Assistant	Mr. Samsudin Mahmud
12	Senior laboratory Assistant	Mr. Abd. Malek Daud
13	“	Mr. Mohd Isa Abd. Manap
14	“	Mr. Abd. Rahman Majid
15	Laboratory Assistant	Mr. Rajendran
16	“	Mr. Mohd. Nawab Arshad
17	“	Mr. Muhamad Ibrahim
18	“	Mr. Samsudin Mahmood
19	“	Mr. Desmond Hassan
20	“	Mr. Maalan Johari
21	“	Mr. Ali Ibramsah
22	“	Mr. Mohd. Fahmi Ahmad
23	Senior Engine man	Mr. Abd. Rashid Aziz
24	Engine man	Mr. Alias Darus
25	“	Mr. Mohd. Tahir Md. Nor
26	Scrang	Mr. Saad saari
27	“	Mr. Rothi Hassan

### 3. Observation summary

#### 3.1 Oceanographic survey

Oceanographic observations were carried out from 23 February – 15 March 2006 by M.V.SEAFFDEC2 at 23 stations in West cost of Peninsular Malaysia (Fig 1). Two main activities composing of physical and biological oceanographic survey were conducted in each station. . The equipments that were used in each station were shown in table no. 1. Figure 2 show ship route.

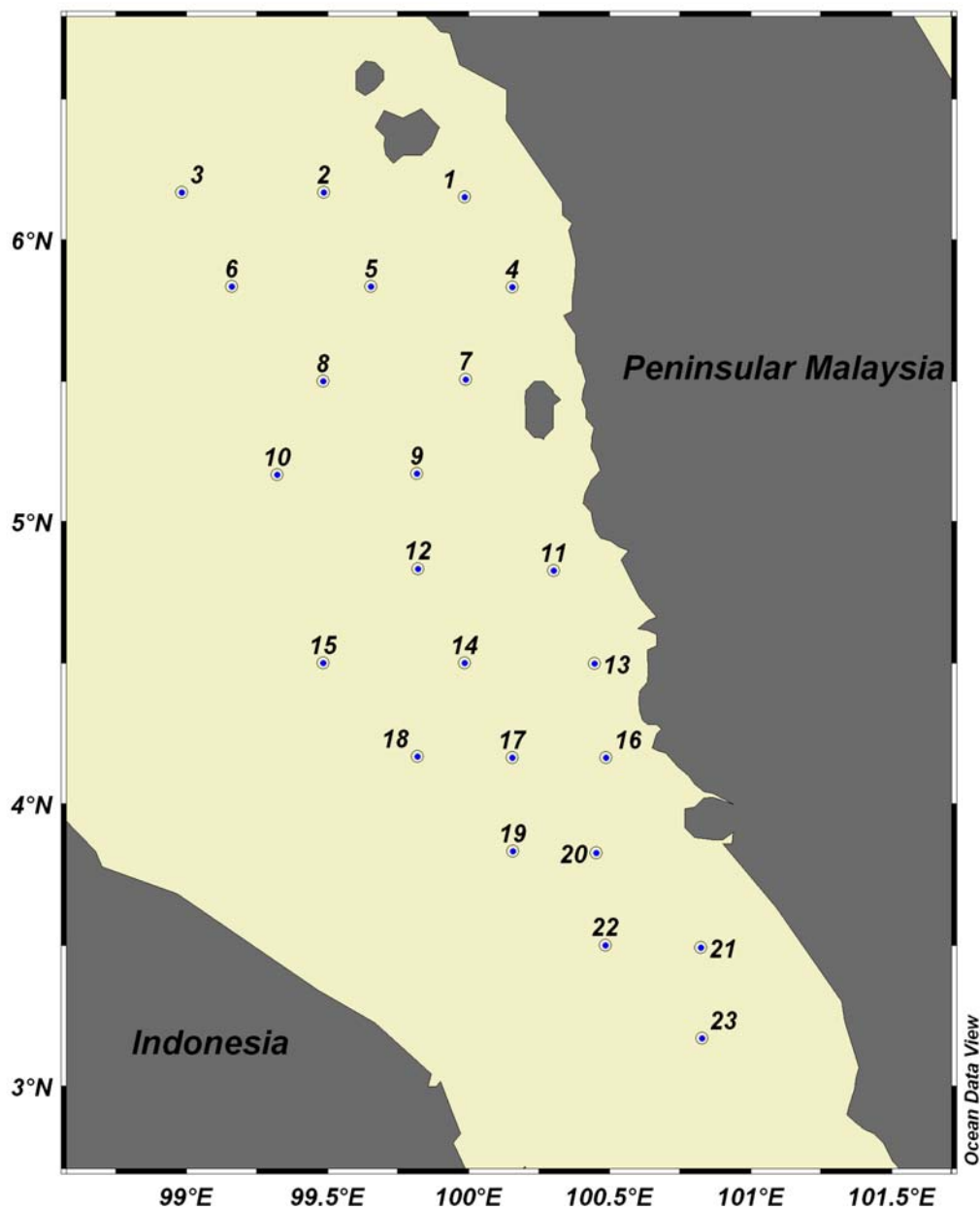


Fig. 1 Map of oceanographic station

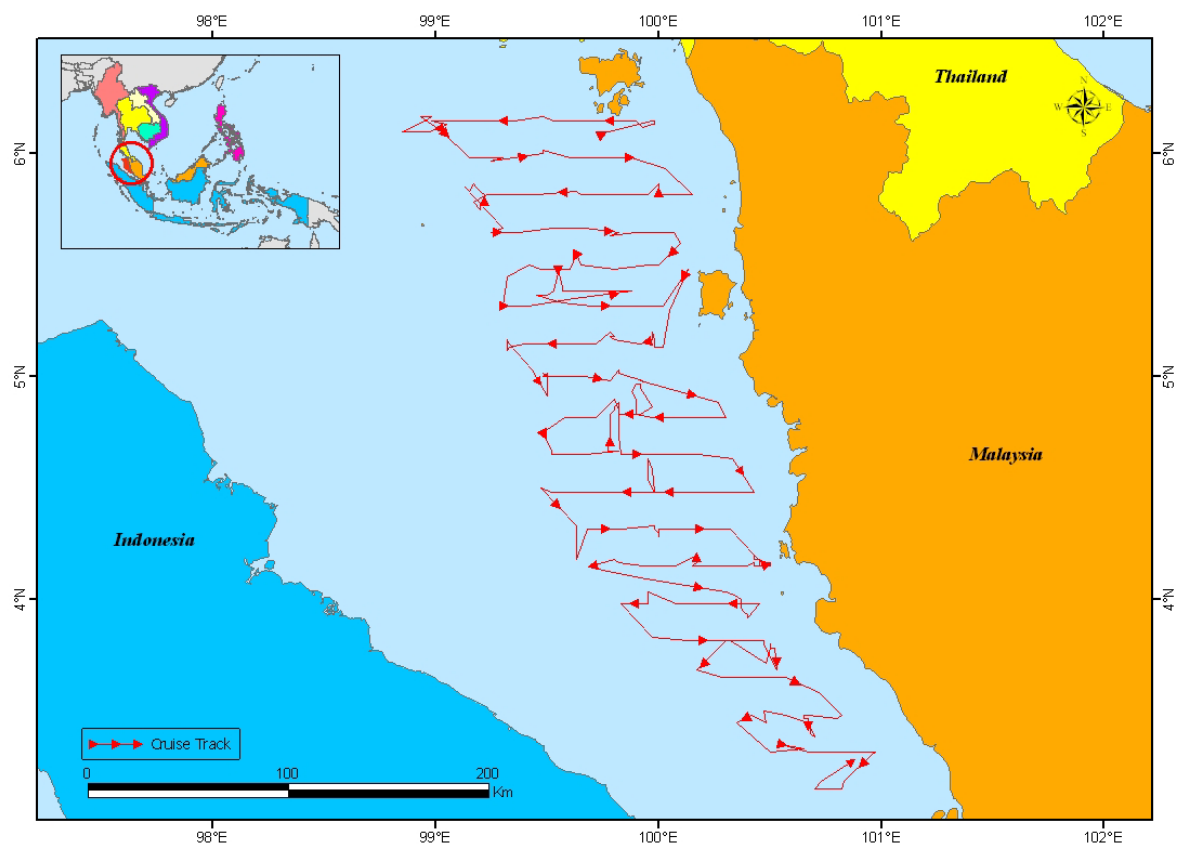


Fig. 2 Ship route

### iCTD (SeaBird 911)



Fig. 3 Deploying iCTD

M.V.SEAFFDEC2, iCTD systems equipped with three main sensors for conductivity, temperature and depth and four auxiliary sensors for dissolved oxygen, pH, chlorophyll fluorometer and PAR in order to obtain the vertical profiles of water characters (Fig.3). Additionally, 12 Carousel water samplers (Niskin Bottles, 1.7 liter) were also equipped with iCTD to collect water samples. iCTD was operated for two times at each station.

First operation; iCTD was operated for collecting 20 L of subsurface seawater approximately 1 m below sea surface to avoid sampling water from the ship engine discharge. Then water sample was filtered through 50 micron mesh plankton net and collected in 1 L plastic sample bottle for study of phytoplankton enumeration.

Second operation: iCTD was deployed from the sea surface to approximately 5 m. above sea bottom with constant velocity 0.5 m/s and retrieved to the surface at a similar speed in order to study of the water characters. All parameters in each station were divided into down cast and upper cast and average into every 1 meter interval. Some profile of parameters like temperature, salinity, pH and fluorescence chlorophyll-a in each station are shown in **Annex I**.

During retrieving iCTD from bottom to surface, carousel water samplers No. 1-6 were used to collect water sampling at standard depth. They were then filtered through Whatman GFC filter paper and stored in the freezer at -40 °C for nutrient analysis (nitrite, nitrate, phosphate and silicate) at SEAFDEC/Training Department laboratory later. All samples will be analyzed as soon as possible after cruise. Then the result will be sent to Malaysia national coordinator. Meanwhile, carousel water samplers No. 7-12 were used to collect water sample at 3 depths comprising of surface, middle and bottom. Water sample at each depth, 1L for Universiti Sains Malaysia (USM) and 250 ml for Fishery Research Institute (FRI) was then transferred into plastic sample bottle and frozen for nutrient analysis by USM researcher and hydrocarbon analysis by FRI researcher.

***Remark1:** Profiles of physical oceanographic data were plotted from down cast. Due to oxygen data showing a bit of irregular pattern, thus Oxygen data could not be used until new calibration will be done (good-data will be send to you as soon as they were possible)*

### **Thermosalinograph with Fluorometer (TSG-Fluorometer)**

TSG – Fluorometer were operated during MV.SEAFDEC2 was sailing along the cruise track. The system was designed to continuously record three parameters including temperature, salinity and fluorescence chlorophyll-a, at approximately 5 meters below the sea surface. The data were average every 6 second. Operating summary is shown in table 2.

### **Bongo net equipped with flow meter:**

Bongo net consisted of zoo plankton and larvae net with mesh size of 300  $\mu\text{m}$  and 500  $\mu\text{m}$ , respectively (Fig. 3). They were attached to 60 cm. diameter bongo frames. A flow meter was attached at the aperture of net to measure the water volume passing through the net.

Each station bongo net was operated with two methods, oblique and surface horizontal. Oblique method of the bongo net was towed with the ship speed of 1.5-3 knots approximately. Angel of towing cable was maintained at 45° angle. The wire length was release as long as depth of bottom, with speed of 0.3 m/s for releasing and retrieving (maximum speed of ship's winch). Surface horizontal method was towed with ship speed of 2



Fig. 4 Towing Bongo net

knot and sampling period was 10 minutes. The plankton samplings from both methods were preserved in 10% formalin immediately.

Number of revolution, flow meter's serial number and quality of water ( $m^3$ ) per one flow meter revolution in front of zooplankton and larvae net is shown in table 3.

### **Piston core sample**



To determine of sediment profile as well as metal profile in sediment with depth, piston core was used for collecting a depth of sediment (Fig. 4). Liner was then removed and closed the both end with liner end cap. After that it was immediately stored in freezer in standing position

Fig. 5 Piston core

### **Smith McIntyre grab**



Smith McIntyre grab was conducted four times at each station. First three operation, it was operated for the macro benthic populations and providing an indication of their benthic productivity. Sediment sampling was carried out of grab and gently washed through sieve (0.5 mm mesh opening). All material retained on the sieve was fixed in 10% buffered sea water-formalin and stored in plastic container.

The fourth operation, it was operated to study heavy metals, total petroleum hydrocarbon (TPH) and ascertain the texture of sediment. Sediment sample were collected by 3 method. The first, sample of top 5 cm surface sediment was collected into zip lock plastic bag and frozen for storage. The second sample, 500g of the sediment was stored in jam glass container and chilled. The third sample was kept in polyethylene bag and chilled

Fig.6 Smith McIntyre grab

### 3.2 Fishery resource survey

There were two methods of fishery resources survey conducted during this cruise: hydro acoustic survey and High opening bottom trawl fishing survey.

#### Hydro acoustic survey

See annex III: Report of the Hydro-acoustic Survey by using the Scientific Echosounder (Furuno, FQ-80) in the Western Coast of Malaysia Peninsula, on M.V.SEAFFDEC2, Cruise Order No.18-2/2006 During 21 February to 21 March 2006 By Taweekiet Amornpiyakrit (Researcher), Training Division

#### High opening bottom trawl fishing survey

Twenty four trawl fishing operation were carried out. Partial detail of trawl fishing operation were shown in table 4, Fig. 5

This is the first cruise of MV.SEAFFDEC2 for using high opening bottom trawl for fishery resources survey. (See MV SEAFFDEC 2 high opening bottom trawl plan in annex II).

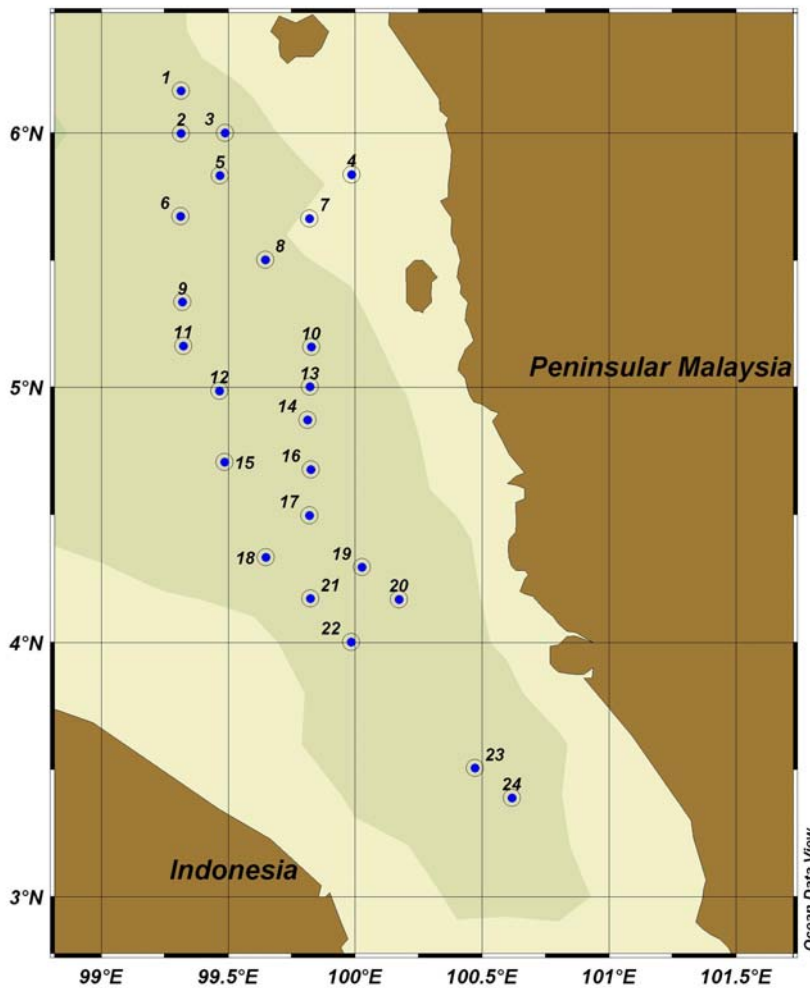


Fig. 7 Position of trawl fishing survey



**Table 1.** Partial detail of oceanographic survey station of cruise no.18-2/2006

St.No.	Date	Time (malaysia)	Lat	Long	Oceanographic instruments		Transparency		Bottom Depth(m)	Remark
					SBE CTD	TSG	Secchi disc (m)	Foral scale		
01(01)	24-Feb-06	07:00	06_09.08 N	099_59.18 E	✓	✓	x	x	19	
02(04)	24-Feb-06	13:53	06_10.13 N	099_29.21 E	✓	✓	15cos25	3	58	
03(07)	25-Feb-06	07:10	06_10.09 N	098_59.01 E	✓	✓	x	x	79	
04(14)	26-Feb-06	06:30	05_49.98 N	100_09.31 E	✓	✓	x	x	30	
05(17)	26-Feb-06	13:03	05_50.11 N	099_39.17 E	✓	✓	14cos22	7	56	
06(20)	27-Feb-06	06:42	05_50.11 N	099_09.60 E	✓	✓	x	x	62	
07(27)	28-Feb-06	07:00	05_30.37 N	099_59.44 E	✓	✓	x	x	38	
08(30)	28-Feb-06	13:55	05_29.95 N	099_29.05 E	✓	✓	x	x	68	
09(39)	03-Mar-06	08:40	05_10.32 N	099_49.01 E	✓	✓	20cos40	7	56	
10(42)	03-Mar-06	17:26	05_10.01 N	099_19.32 E	✓	✓	19cos27	7	78	
11(48)	04-Mar-06	16:30	04_49.69 N	100_18.12 E	✓	✓	4	9	16	
12(51)	05-Mar-06	08:37	04_50.11 N	099_49.21 E	✓	✓	x	x	67	
13(60)	06-Mar-06	13:49	04_29.97 N	100_26.81 E	✓	✓	x	x	17	
14(63)	06-Mar-06	18:00	04_29.98 N	099_59.10 E	✓	✓	12	4	60	
15(66)	07-Mar-06	12:14	04_30.00 N	099_29.11 E	✓	✓	16	5	56	
16(72)	08-Mar-06	12:21	04_09.84 N	100_29.26 E	✓	✓	14	9	54	
17(74)	10-Mar-06	9:40	04_09.91 N	100_09.29 E	✓	✓	14	9	65	
18(76)	10-Mar-06	14:44	04_10.09 N	99_49.14 E	✓	✓	11	9	53	
19(84)	11-Mar-06	16:11	03_49.96 N	100_09.37 E	✓	✓	13	9	67	
20(83A)	12-Mar-06	7:00	03_49.68 N	100_27.16 E	✓	✓	x	x	66	
21(90)	12-Mar-06	16:10	03_29.51 N	100_49.39 E	✓	✓	11	9	43	
22(92)	13-Mar-06	8:34	03_30.03 N	100_29.07 E	✓	✓	11	9	69	
23(101)	14-Mar-06	7:09	03_10.21 N	100_49.61 E	✓	✓	x	x	17	

Remark: Number in the blanket is reference station number of Malaysia

**Table 2.** Operation summary of Thermosalinograph with Fluorometer (TSG-Fluorometer)

Date	File name	Start	Destination
24-Feb-06	20060224(1)	St.1	St.2
24-Feb-06	20060224(2)	St.2	St.3
25-Feb-06	20060225(1)	St.3	St.4
25-Feb-06	20060225(2)	St.3	St.4
26-Feb-06	20060226(1)	St.4	St.5
26-Feb-06	20060226(2)	St.5	St.6
27-Feb-06	20060227(1)	St.6	St.7
27-Feb-06	20060227(2)	St.6	St.7
28-Feb-06	20060228(1)	St.7	St.8
28-Feb-06	20060228(2)	St.8	St.9
01-Mar-06	20060301(1)	St.8	St.9
03-Mar-06	20060303(1)	St.9	St.10
04-Mar-06	20060304(1)	St.10	St.11
04-Mar-06	20060304(2)	St.10	St.11
04-Mar-06	20060304(3)	St.11	St.12
05-Mar-06	20060305(1)	St.12	St.13
06-Mar-06	20060306(1)	St.12	St.13
06-Mar-06	20060306(2)	St.13	St.14
07-Mar-06	20060307(1)	St.14	St.15
07-Mar-06	20060307(2)	St.15	St.16
10-Mar-06	20060310(2)	St.17	St.18
10-Mar-06	20060310(3)	St.18	St.19
11-Mar-06	20060311(1)	St.18	St.19
11-Mar-06	20060311(2)	St.18	St.19
11-Mar-06	20060311(3)	St.19	St.20
12-Mar-06	20060312(1)	St.20	St.21
13-Mar-06	20060313(1)	St.21	St.22
13-Mar-06	20060313(2)	St.22	St.23
13-Mar-06	20060313(3)	St.22	St.23
14-Mar-06	20060314(1)	St.23	Klang port

**Tabel 3.** Summary of flow meter

Station	Flow meter's serial		Calibration (cycle/m <sup>3</sup> )		Owner
	Larvae-net	Zooplankton	Larvae-net	Zooplankton	
1	2120	fail	0.02467	fail	SEAFDEC
2	18006	18012	*	*	Malaysia
3	“	“	*	*	“
4	“	“	*	*	“
5	“	“	*	*	“
6	“	“	*	*	“
7	“	“	*	*	“
8	“	“	*	*	“
9	“	“	*	*	“
10	“	“	*	*	“
11	“	19319	*	*	“
12	“	“	*	*	“
13	“	“	*	*	“
14	“	“	*	*	“
15	“	“	*	*	“
16	“	“	*	*	“
17	“	“	*	*	“
18	“	“	*	*	“
19	“	“	*	*	“
20	“	“	*	*	“
21	“	“	*	*	“
22	“	“	*	*	“
23	“	“	*	*	“

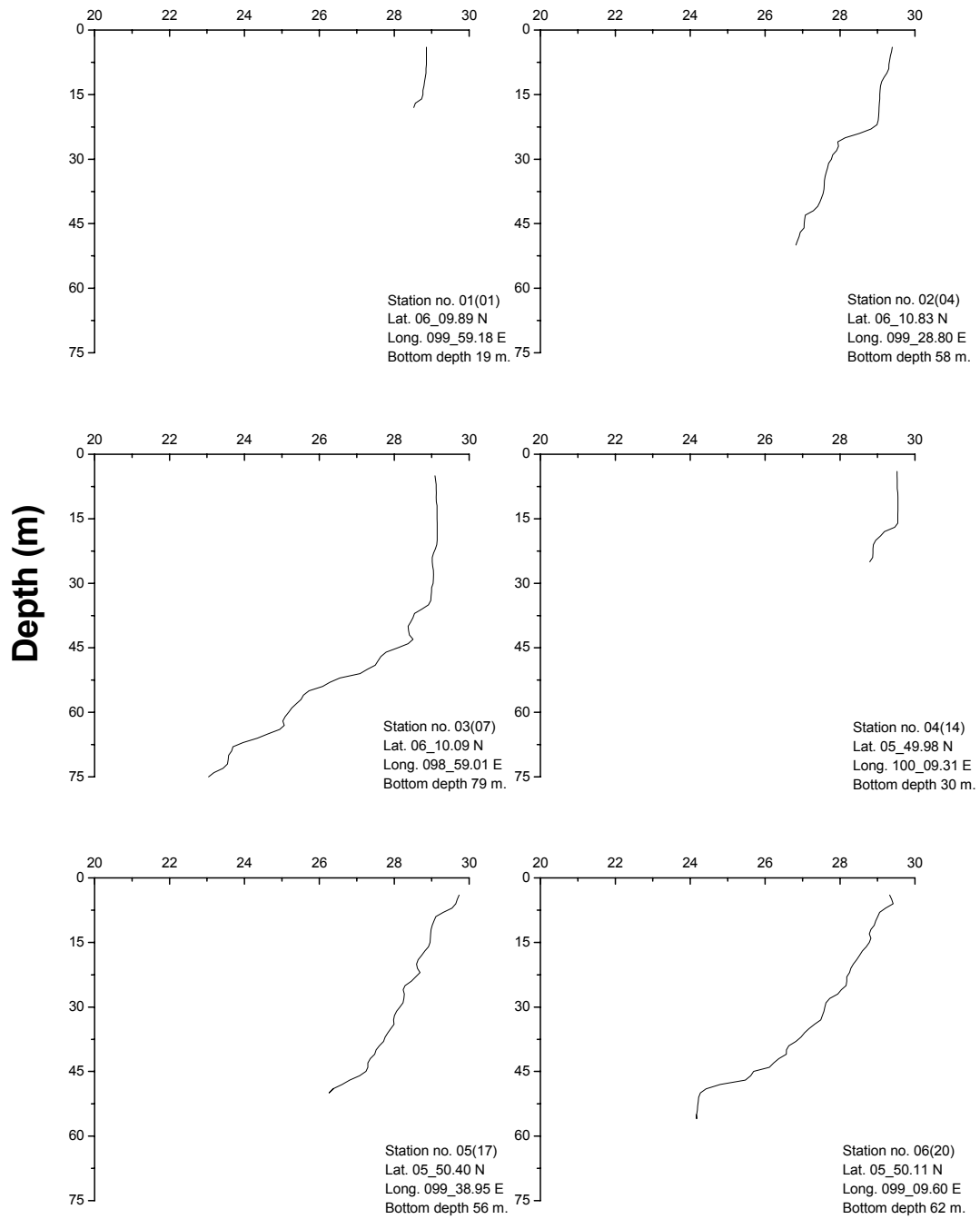
\* waiting calibration data from Malaysia researcher

**Table 4** Partial Detail of trawl fishing survey

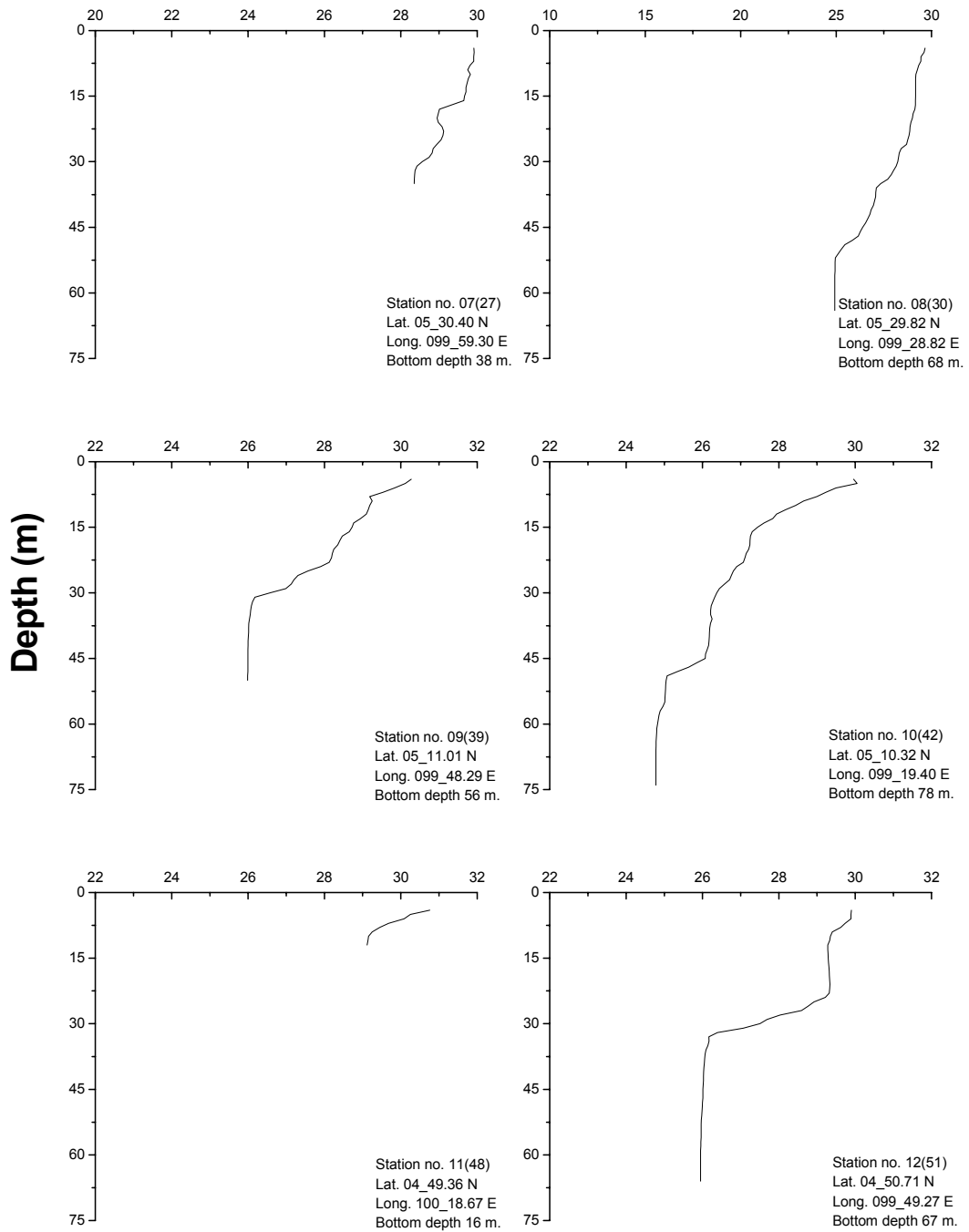
Operation no.	Date	Time		Position		Depth of capture (m)	Towing distance (nm)	Bot.Temp (°C)	Total catch(kg)
		Start	Finish	Start Shooting	Finish Hauling				
1	24-Feb-06	17:14	18:35	06_09.9N,99_18.9E	06_09.8N,99_14.9E	66	1.4	-	4.26
2	25-Feb-06	12:08	14:13	05_59.9N,99_18.9E	05_58.7N,99_15.4E	56	1.3	25.13	37.84
3	25-Feb-06	14:50	15:58	06_00.0N,99_29.3E	06_02.3N,99_29.7E	69	0.8	25.6	26.96
4	26-Feb-06	9:21	16:25	05_50.2N,99_59.2E	05_53.7N,100_00.1E	34-38	0.9	28.1	52.17
5	26-Feb-06	15:45	16:55	05_49.9N,99_28.1E	05_50.1N,99_25.5E	62	1.9	24.8	35.8
6	27-Feb-06	10:07	11:14	05_40.3N,99_18.7E	05_39.6N,99_15.3E	66-73	1.8	24.9	40.64
7	27-Feb-06	14:54	15:57	05_39.8N,99_49.2E	05_37.4N,99_46.6E	45	2.1	27.3	35.07
8	28-Feb-06	10:57	12:24	05_30.1N,99_38.8E	05_34.0N,99_38.3E	55	1.8	25.5	71.34
9	28-Feb-06	17:43	18:53	05_20.1N,99_19.2E	05_18.1N,99_16.4E	65	1.7	24.5	35.39
10	3-Mar-06	10:39	11:49	05_09.5N,99_49.7E	05_13.3N,99_47.0E	60-67	1.9	26.1	24.82
11	3-Mar-06	15:38	17:00	05_09.8N,99_19.4E	05_07.1N,99_21.9E	80	2.2	24.94	91.38
12	4-Mar-06	7:30	8:46	04_59.2N,99_27.9E	05_02.4N,99_30.2E	62-66	2	25	31
13	4-Mar-06	11:19	12:35	05_00.1N,99_49.3E	05_05.0N,99_48.8E	58-63	1.9	25.8	11.66
14	5-Mar-06	10:28	11:36	04_52.3N,99_48.8E	04_56.4N,99_47.8E	64-77	1.7	-	15.46
15	5-Mar-06	15:12	16:18	04_42.4N,99_29.2E	04_39.9N,99_32.5E	61	1.8	26.6	14.72
16	6-Mar-06	7:25	8:56	04_40.6N,99_49.6E	04_38.8N,99_53.6E	63	2.7	26.4	55.12
17	7-Mar-06	8:40	9:48	04_29.8N,99_49.2E	04_28.2N,99_50.9E	60-63	1.4	-	4.2
18	7-Mar-06	15:01	16:18	04_20.1N,99_38.9E	04_16.0N,99_38.3E	53	2.7	27	32.28
19	8-Mar-06	7:31	8:41	04_17.7N,100_01.6E	04_20.4N,99_59.7E	63-66	1.8	26.81	28.87
20	10-Mar-06	11:09	12:13	04_10.1N,100_10.4E	04_13.3N,100_10.1E	59	1.6	-	2.99
21	10-Mar-06	15:55	16:50	04_10.3N,99_49.4E	04_11.9N,99_47.2E	57	1.1	27.5	19.4
22	11-Mar-06	10:44	12:25	04_00.1N,99_59.1E	04_03.4N,99_57.8E	66-71	1.7	27.9	14.32
23	13-Mar-06	10:10	11:15	03_30.3N,100_28.3E	03_27.5N,100_29.4E	70	1.5	-	14.12
24	13-Mar-06	15:32	16:44	03_23.3N,100_37.1E	03_19.8N,100_39.8E	59	1.9	28	14.52

# Annex I

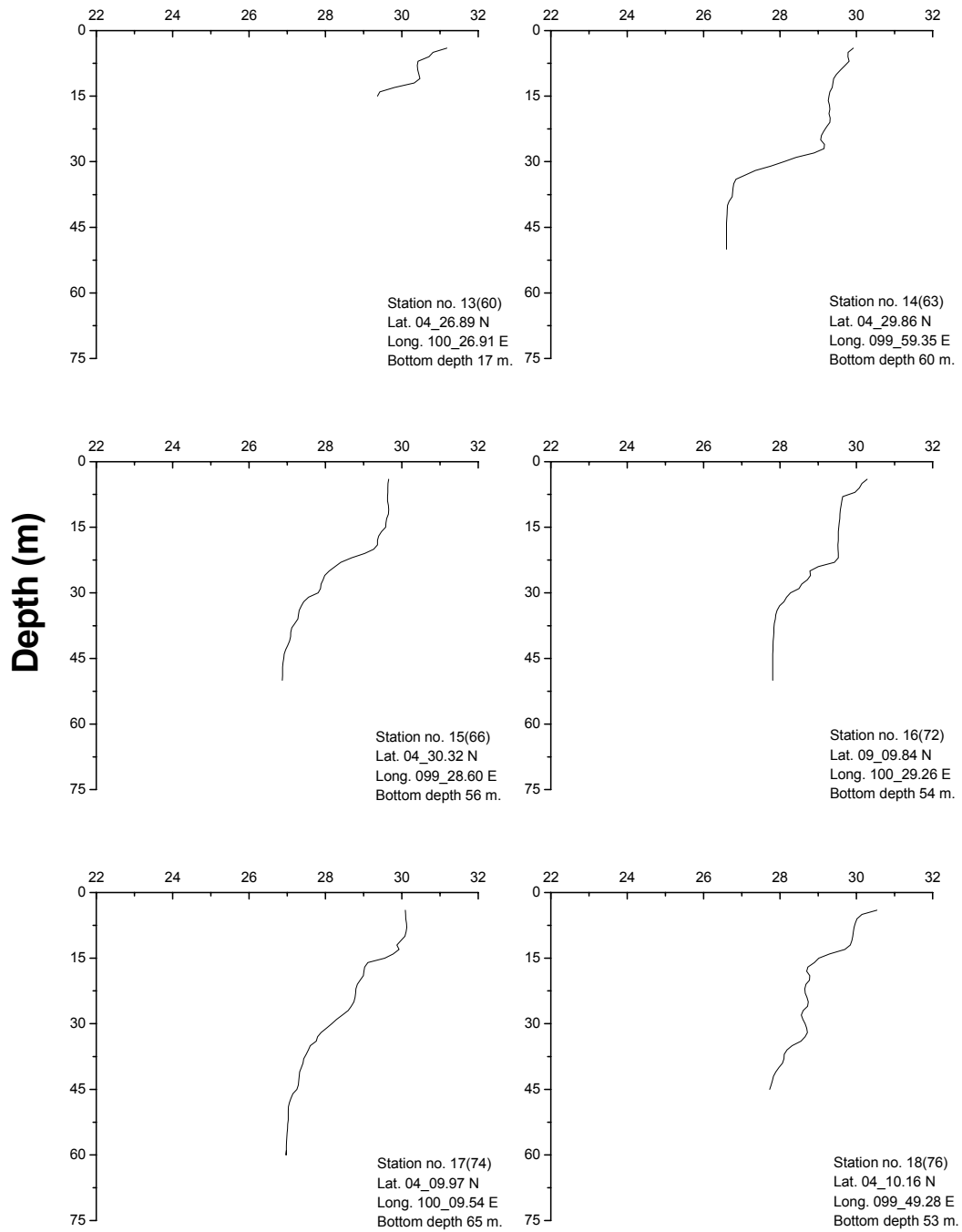
## Temperature (°C)



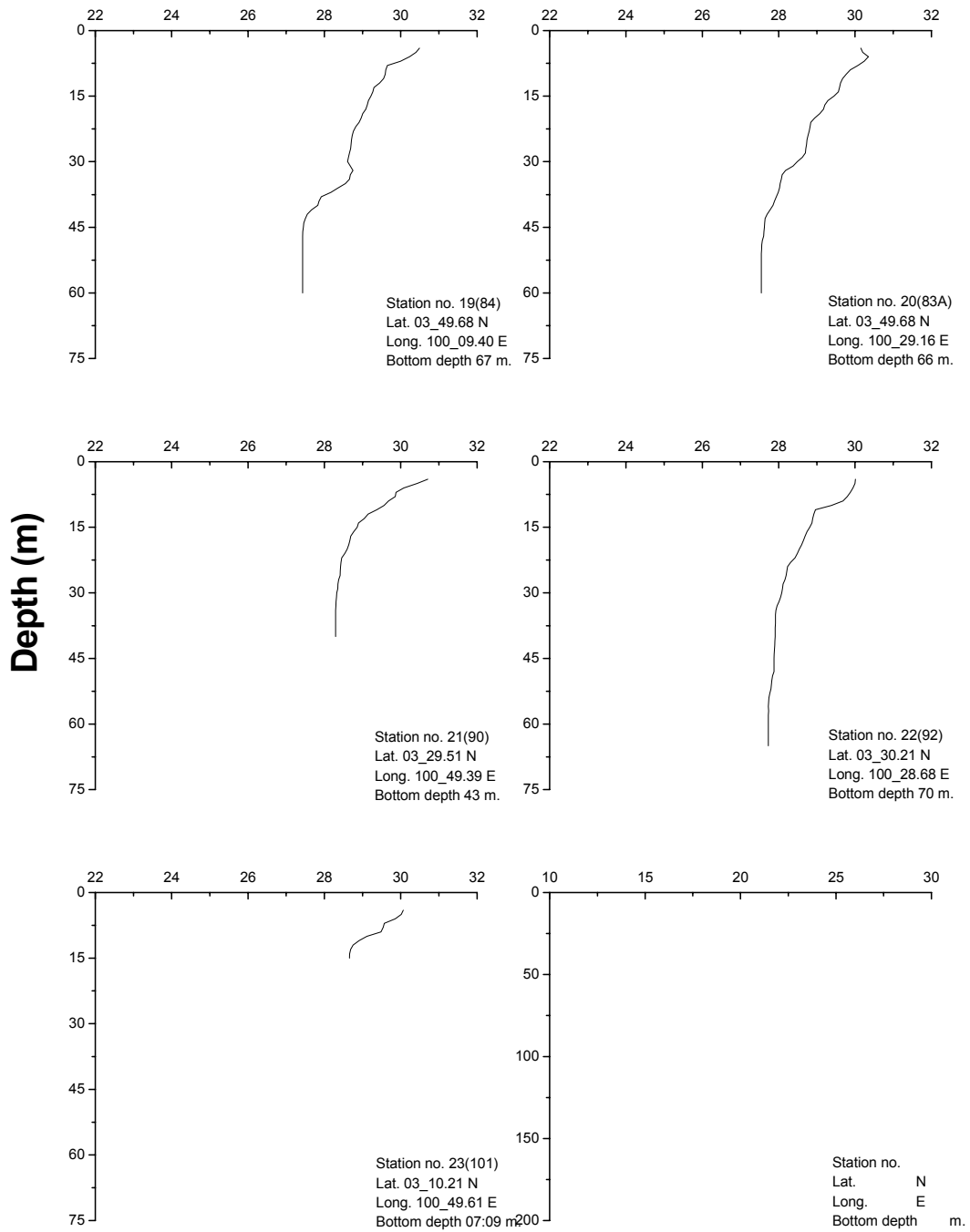
## Temperature (°C)



## Temperature (°C)

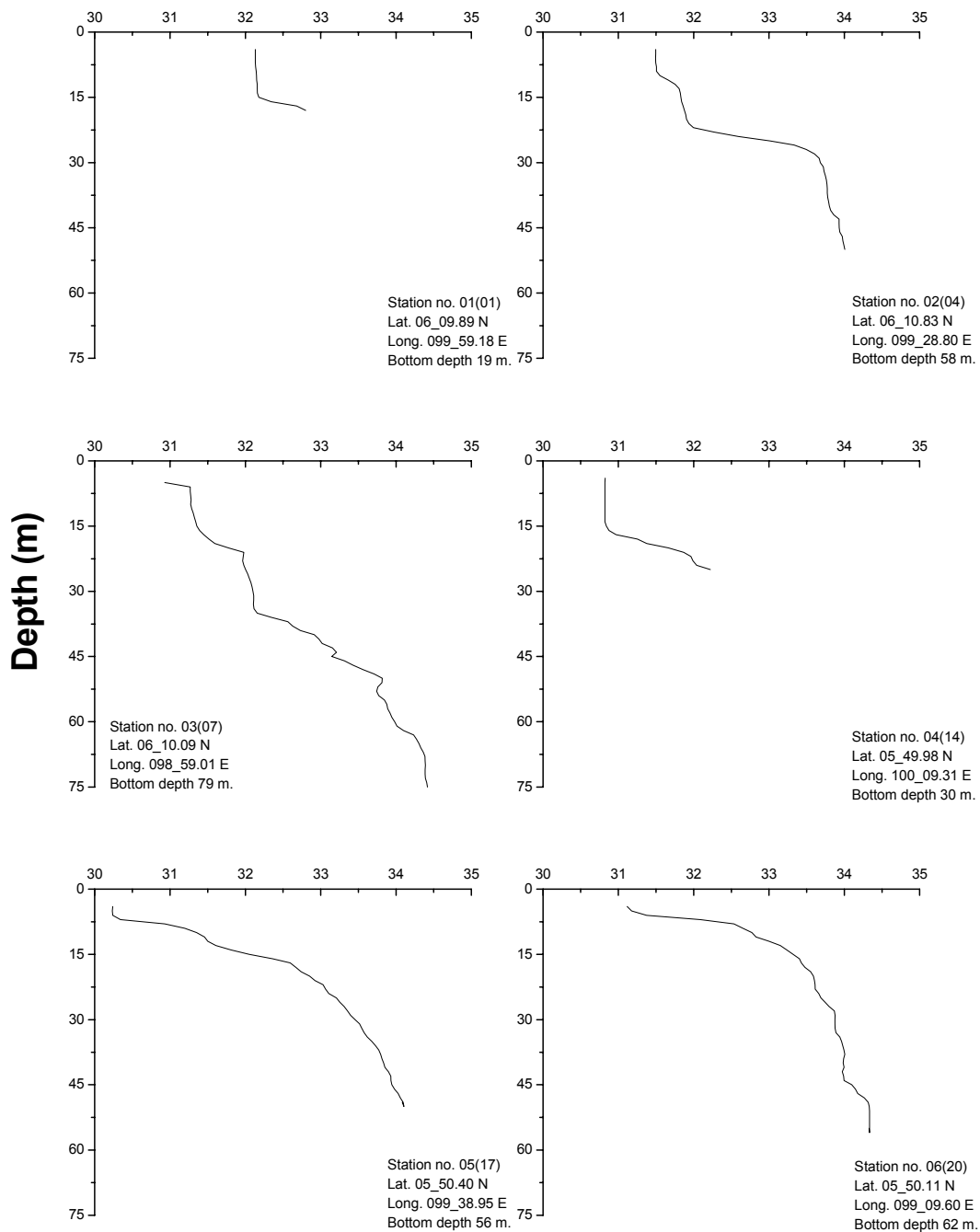


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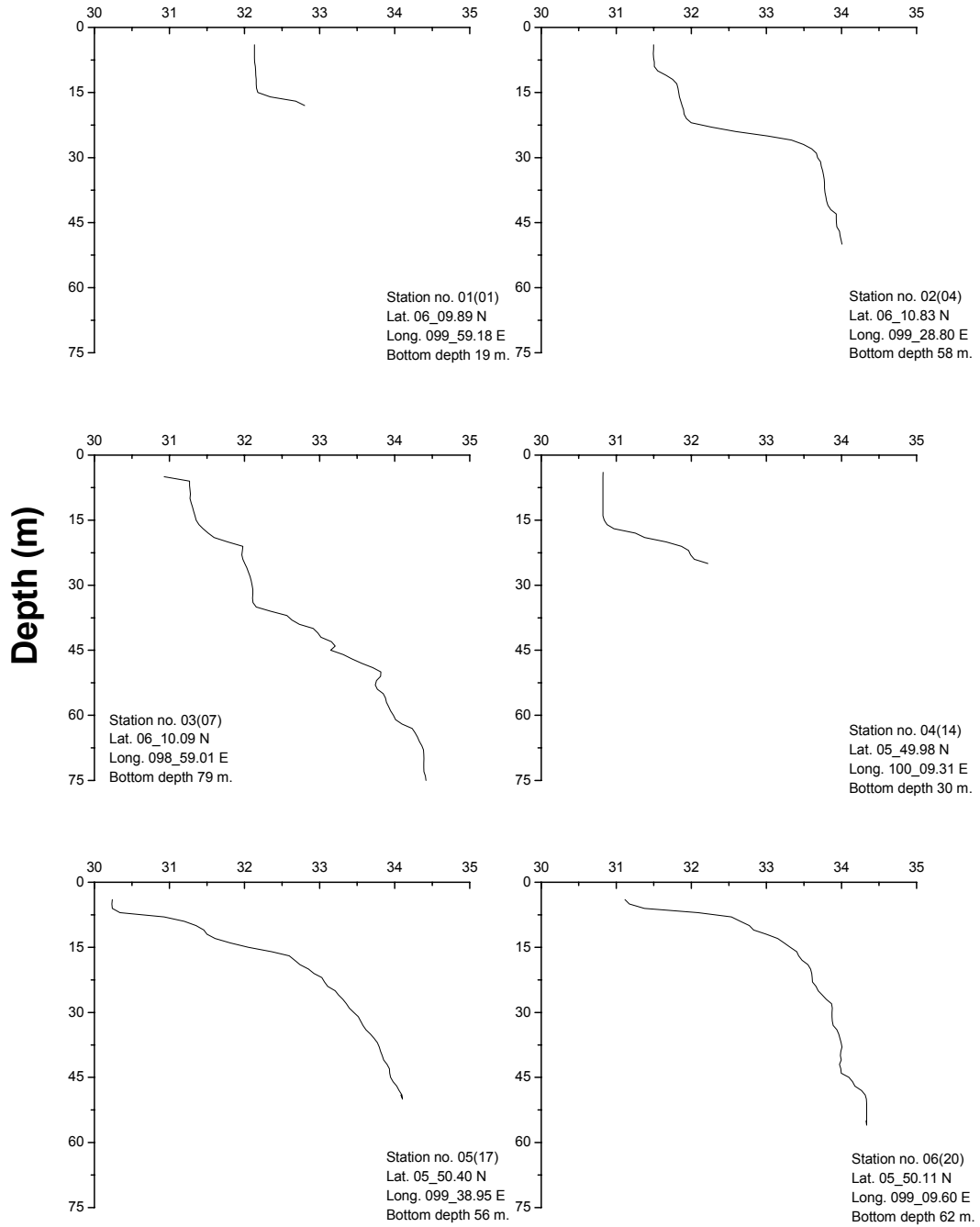




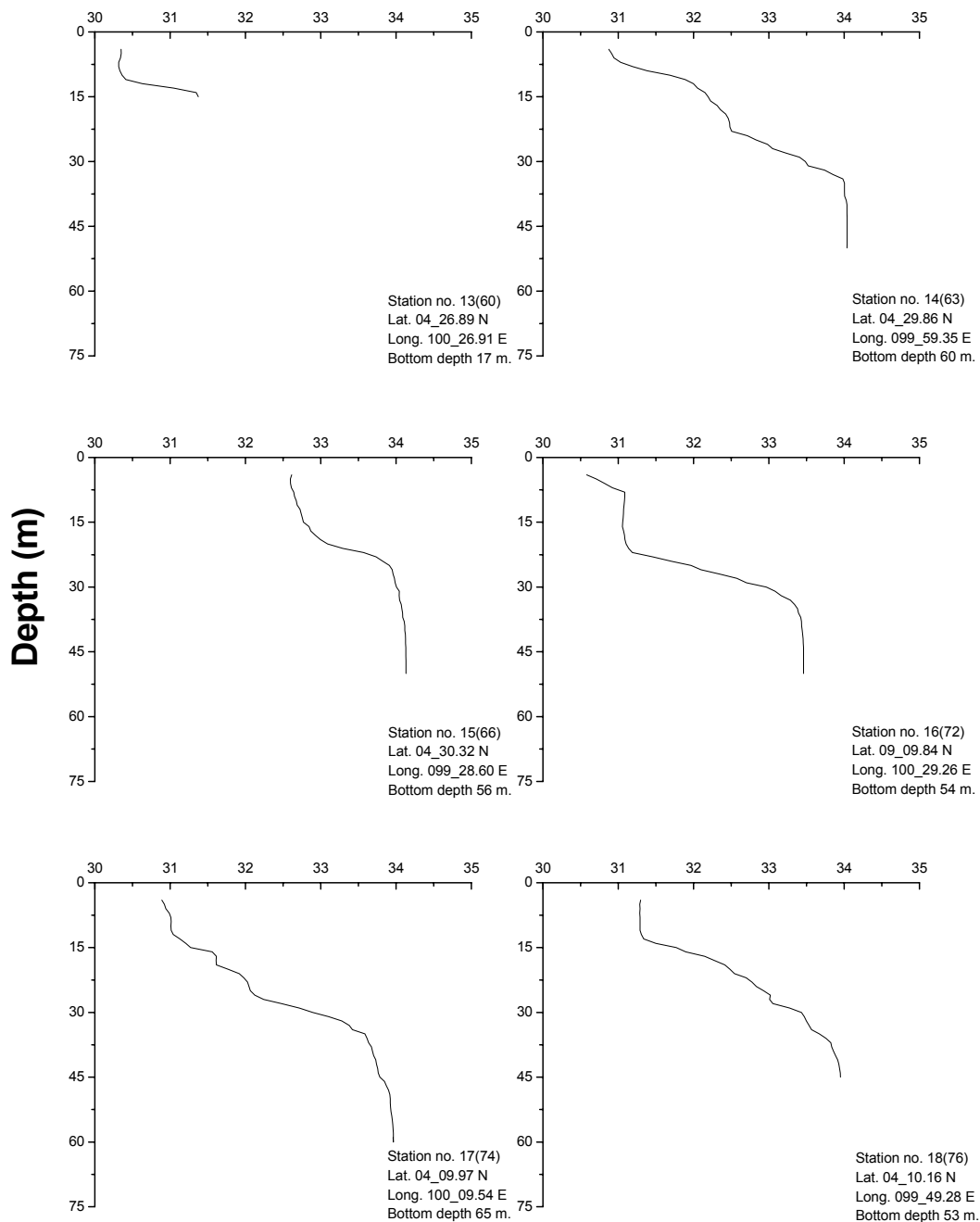
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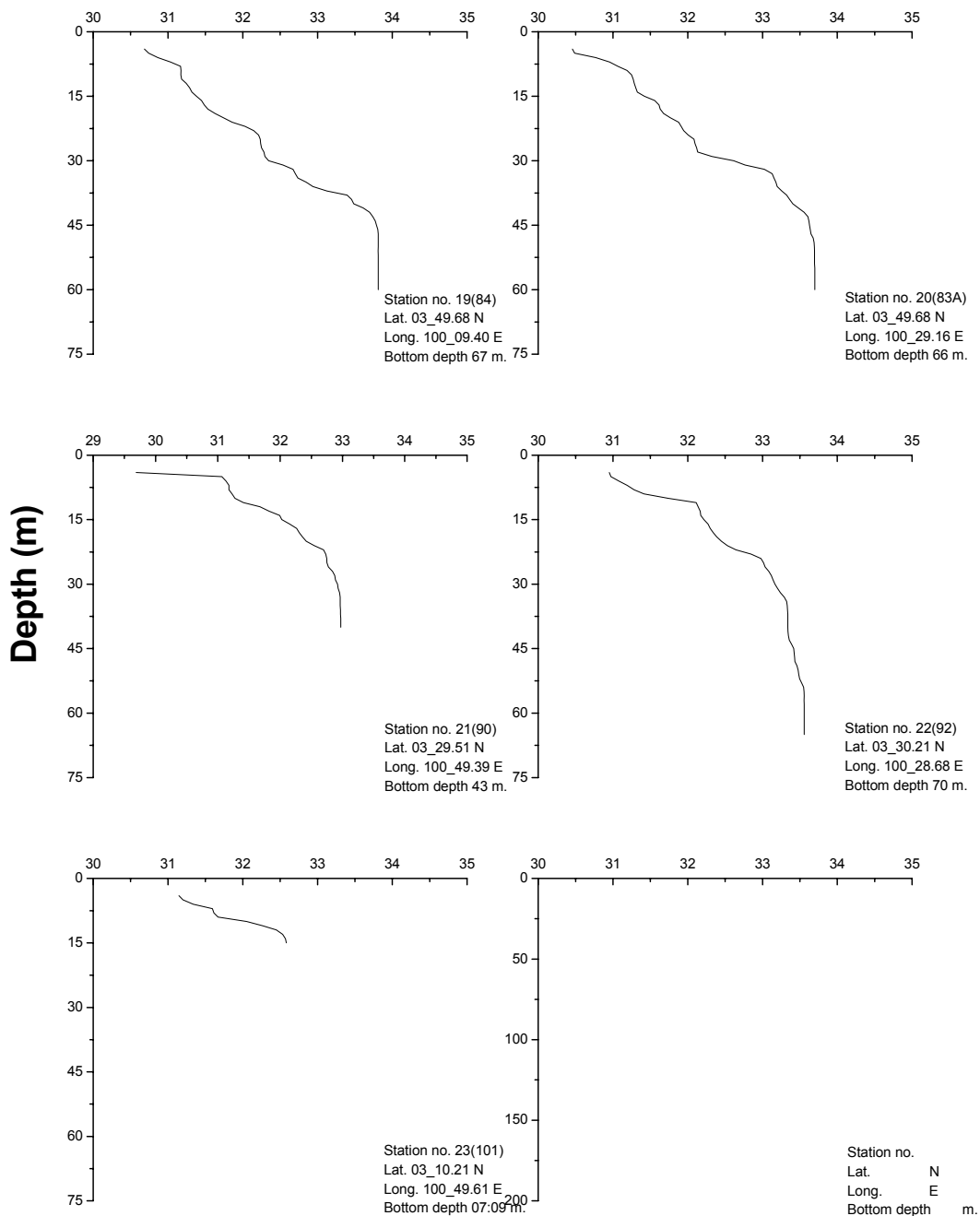
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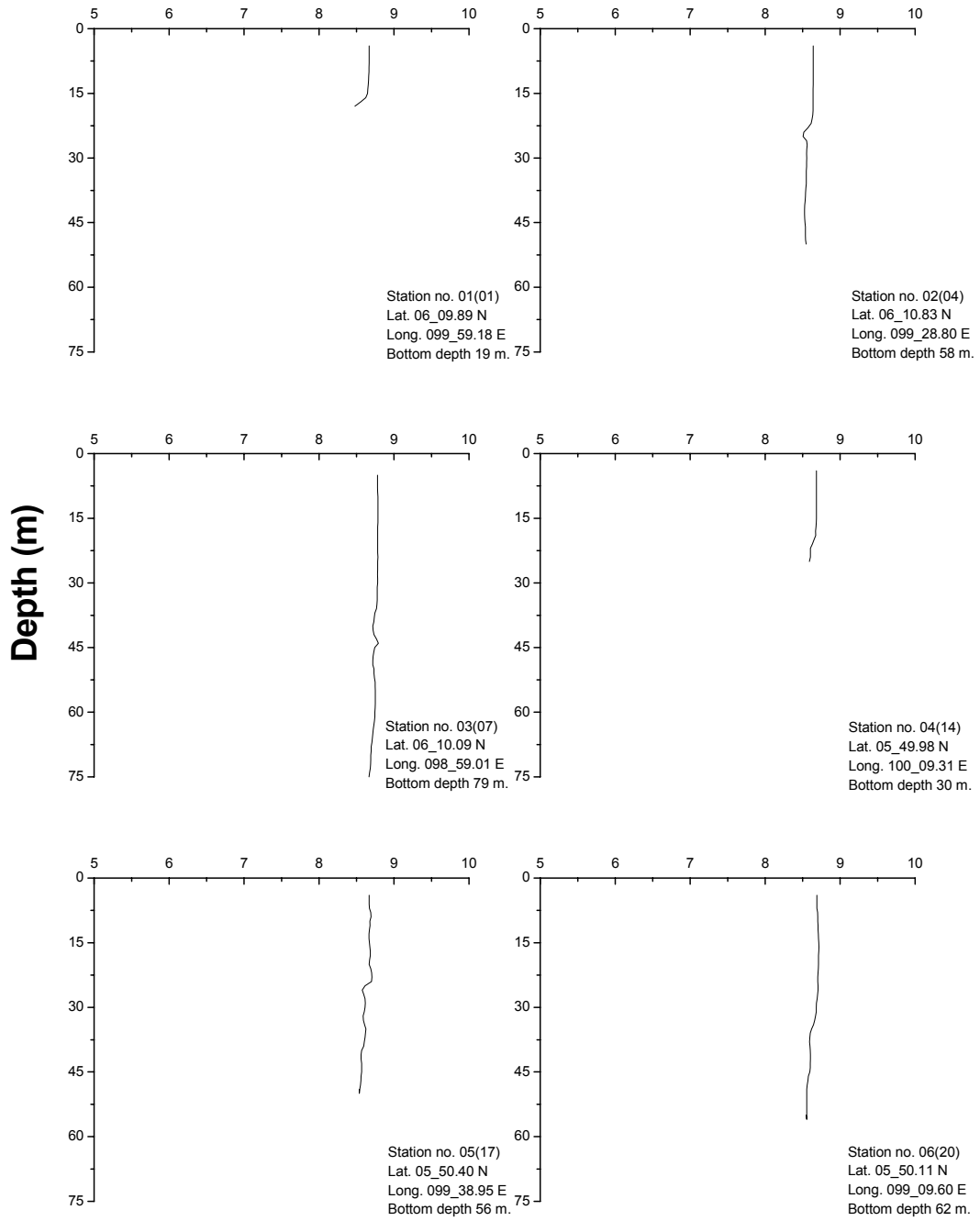
## Salinity (PSU)



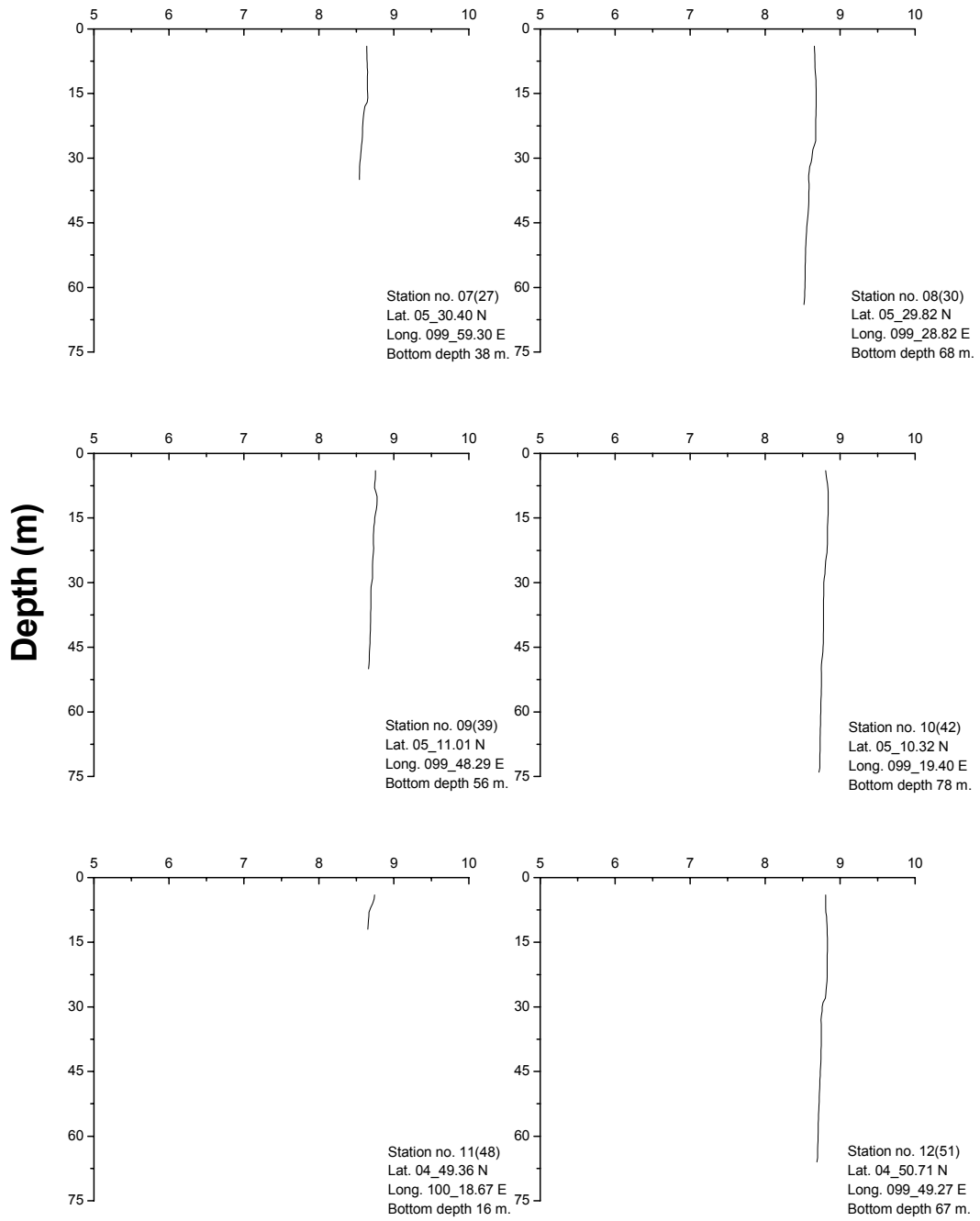
## Salinity (PSU)



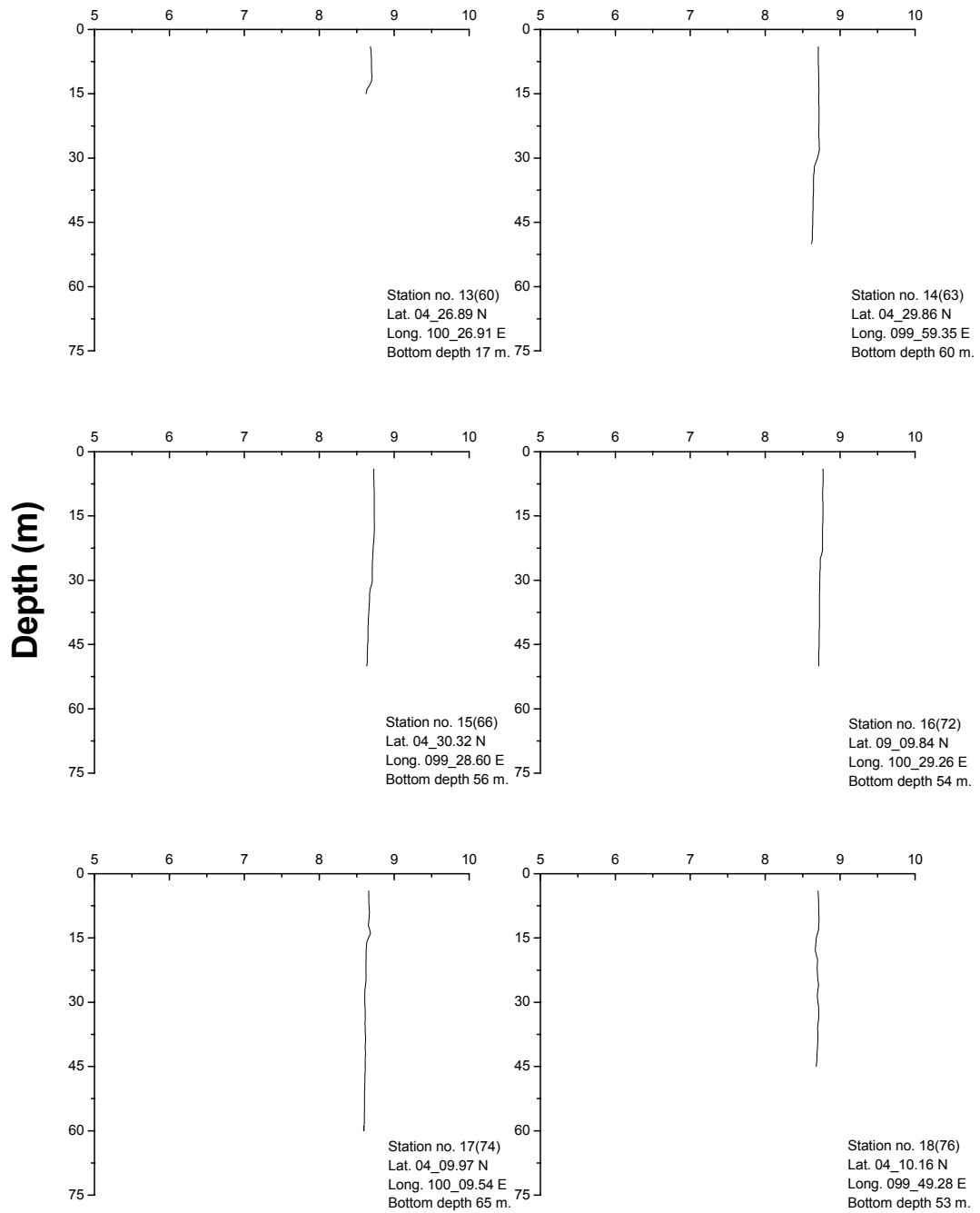
# pH



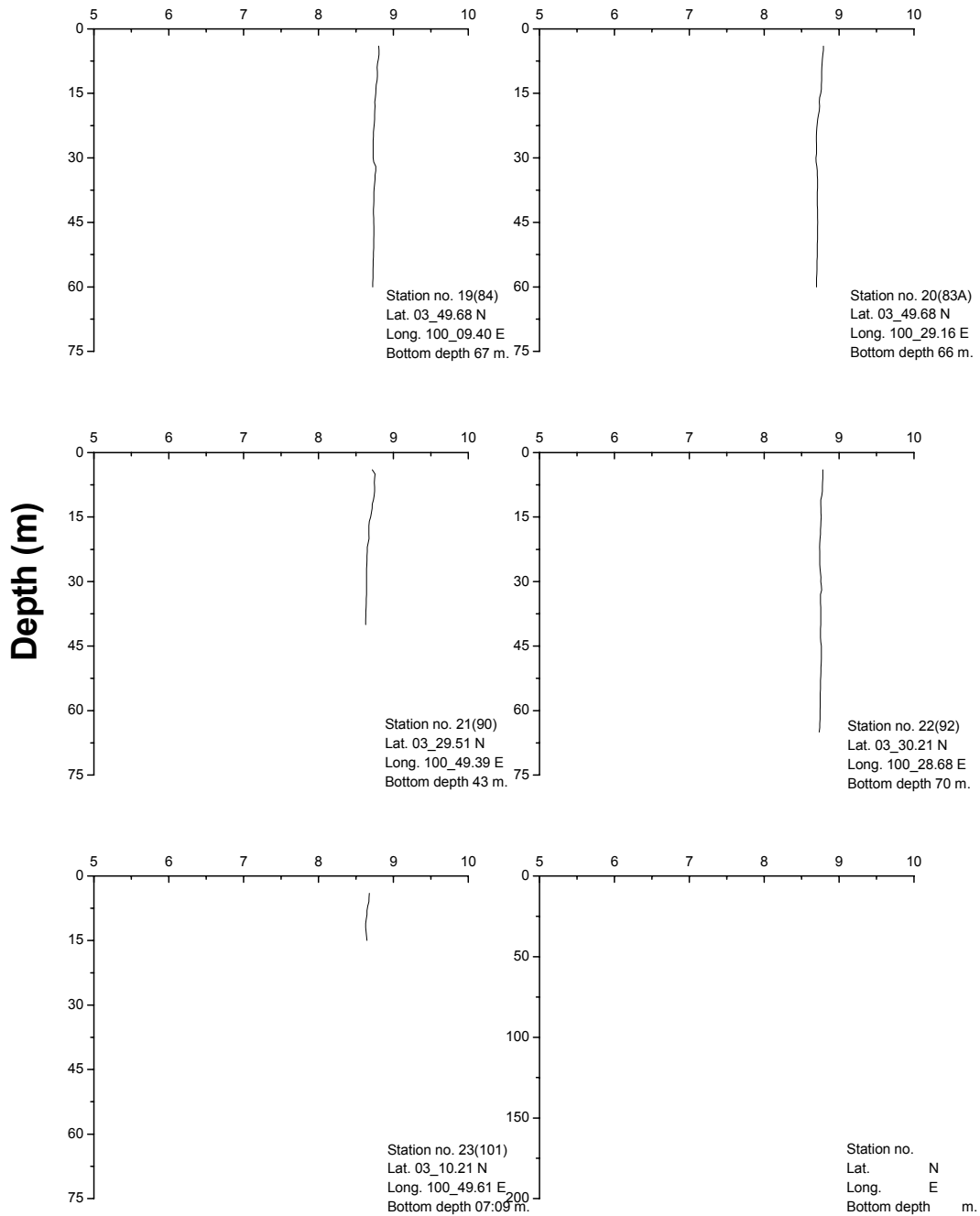
# pH



# pH

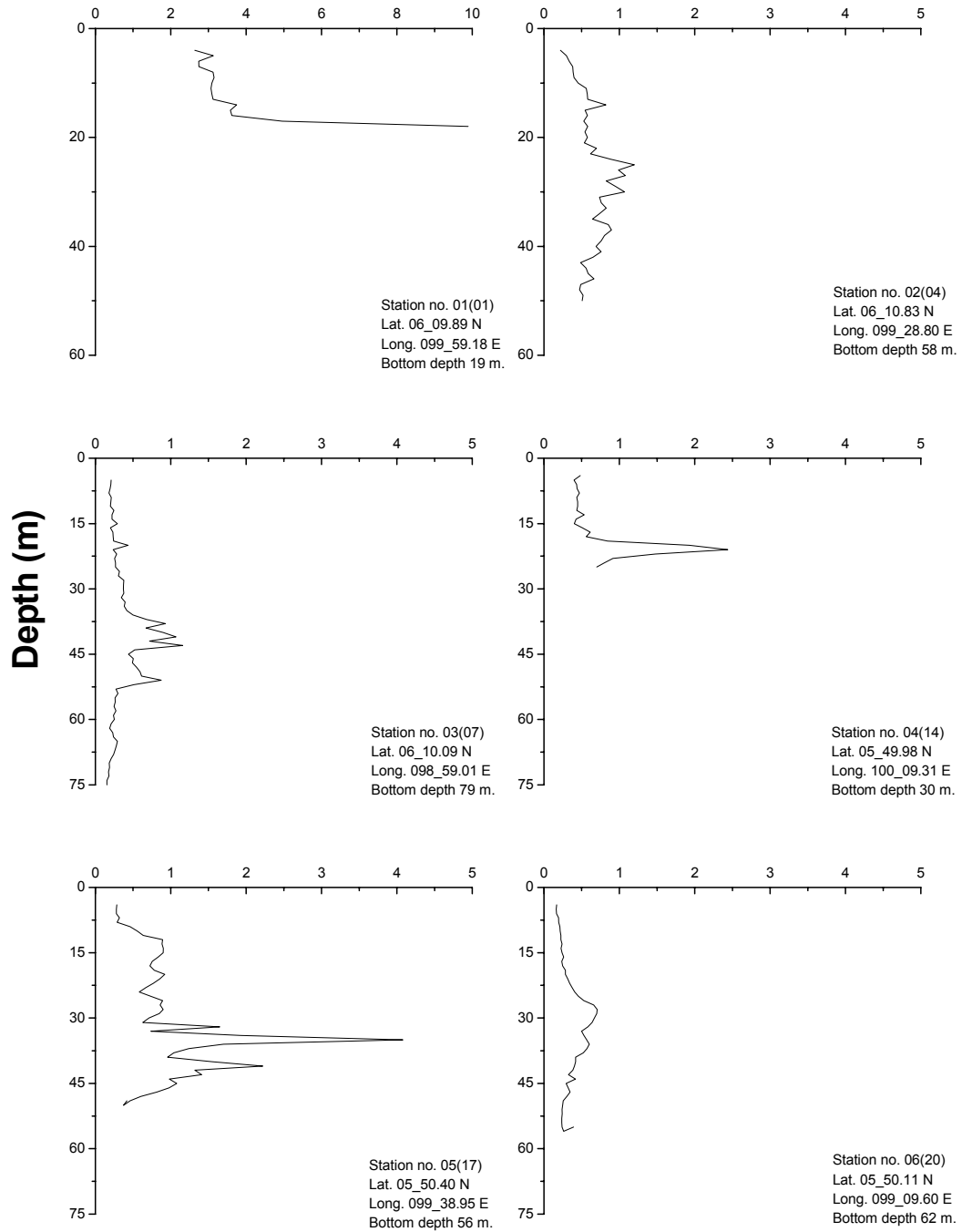


# pH

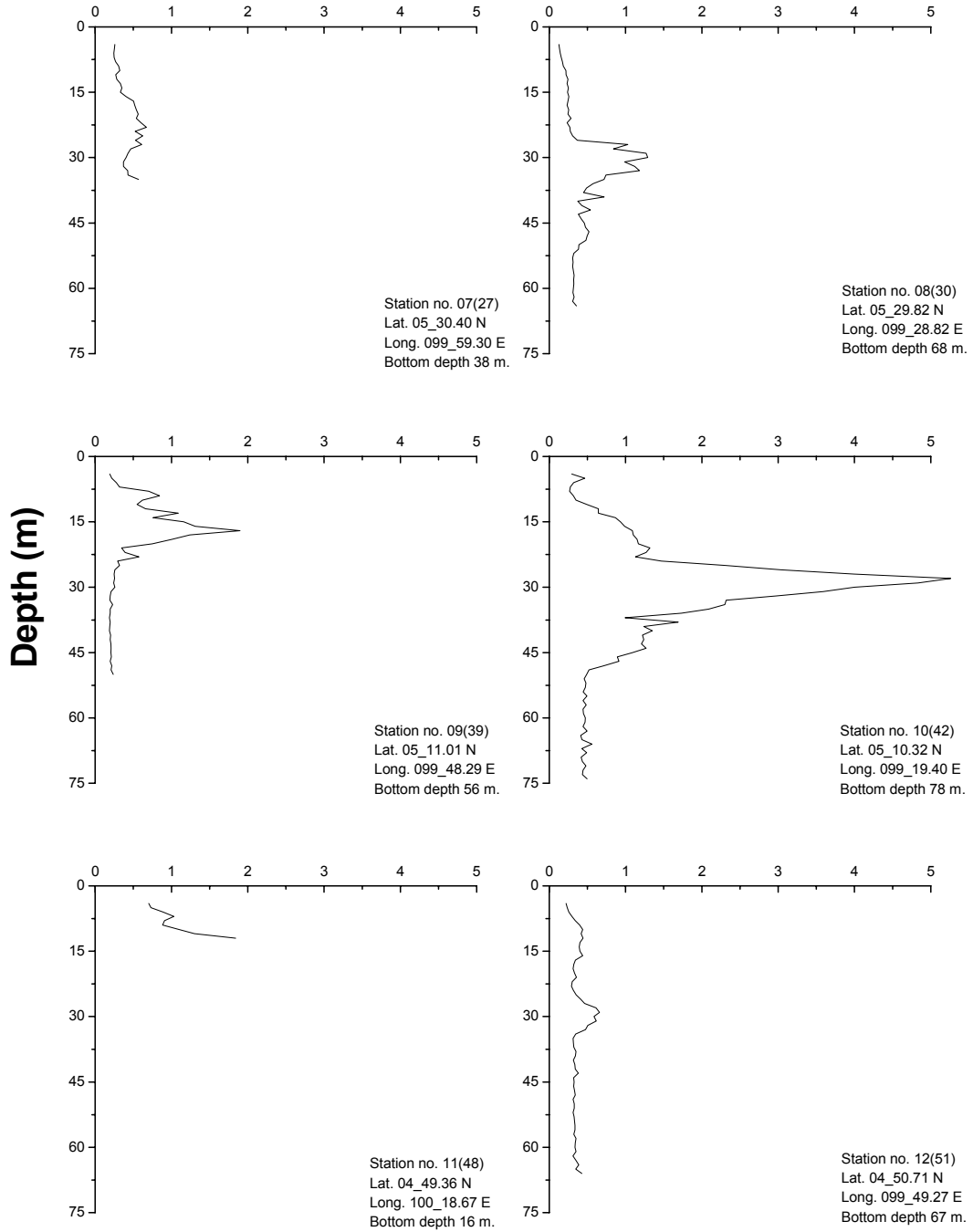




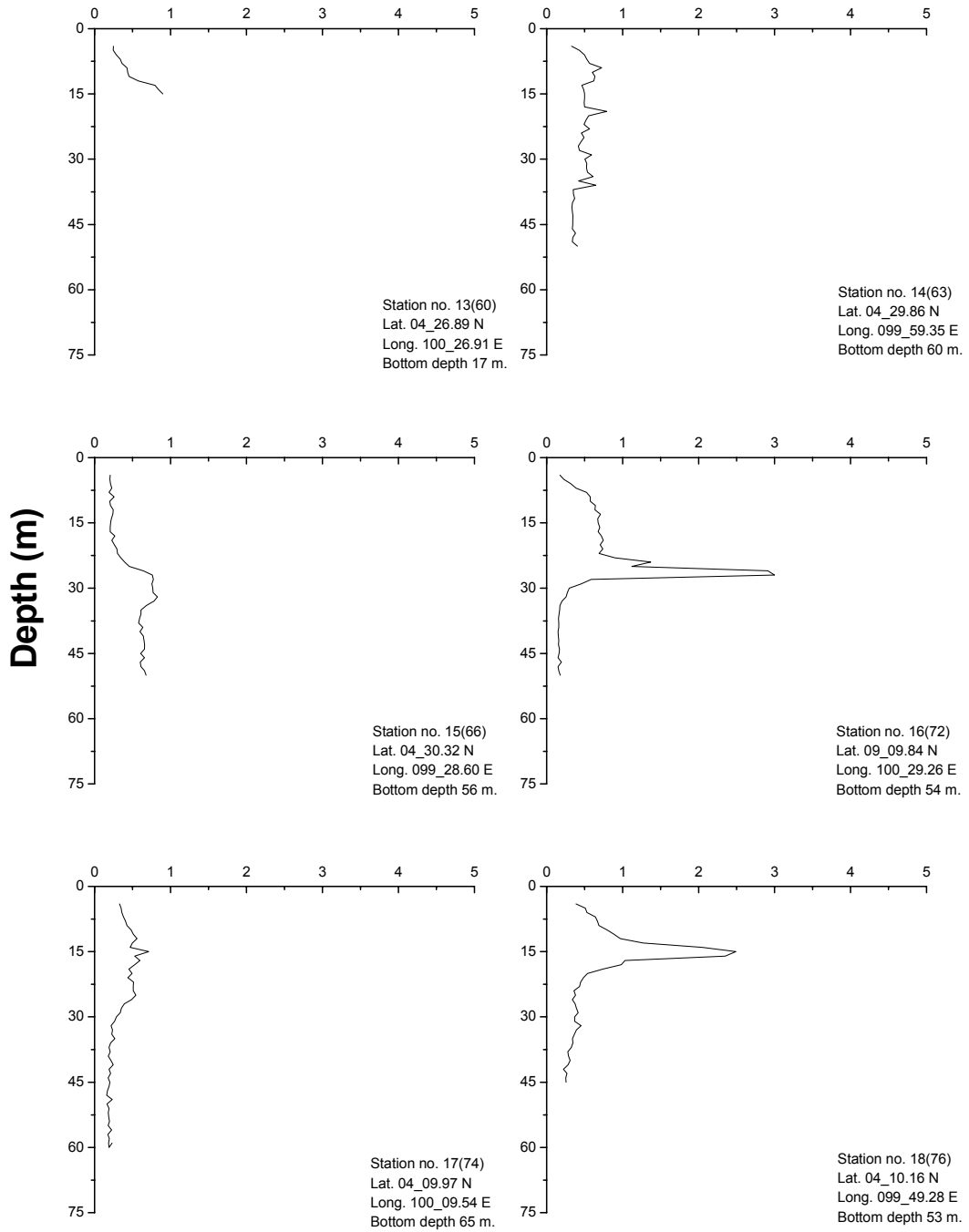
# Fluorescence



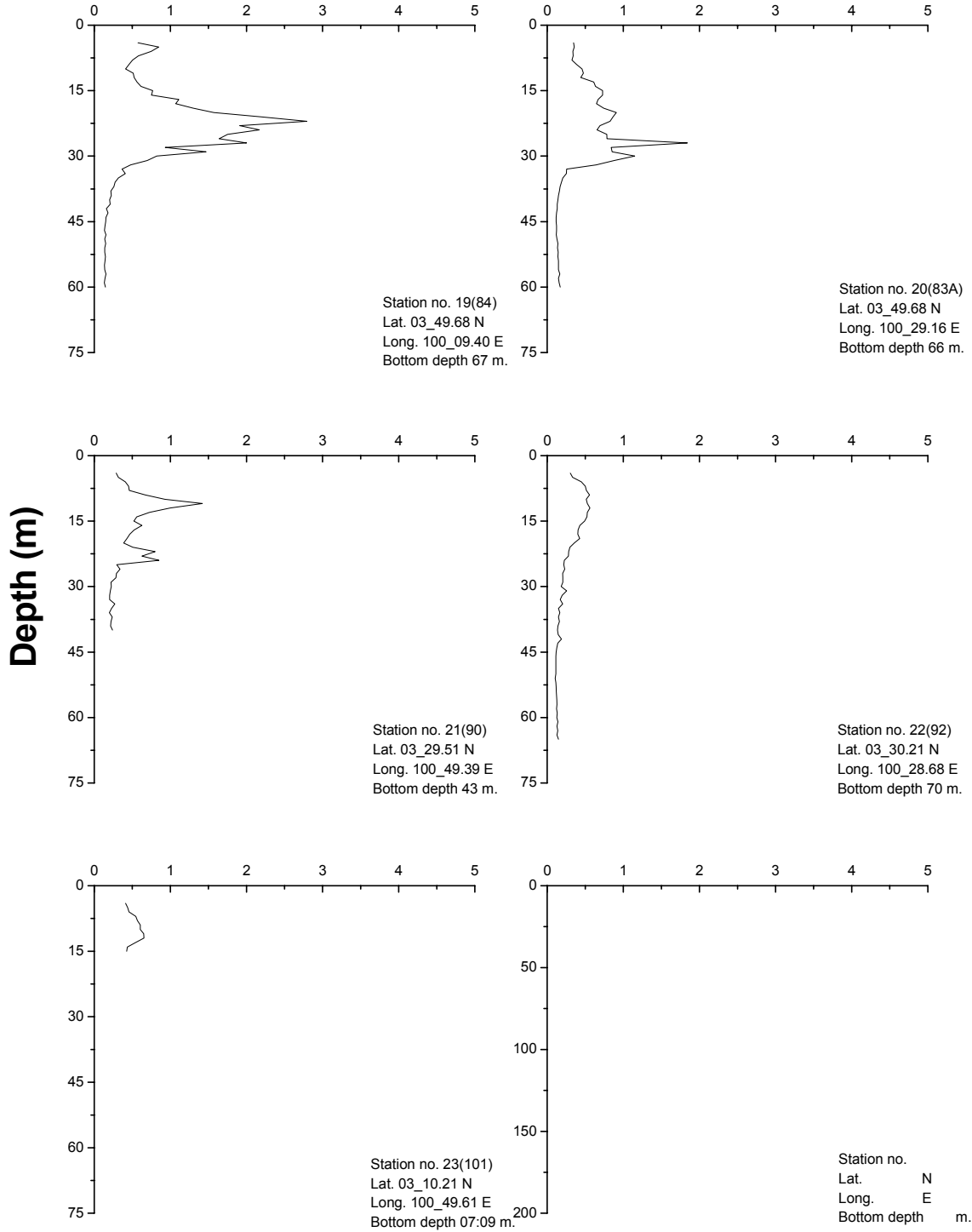
# Fluorescence



# Fluorescence

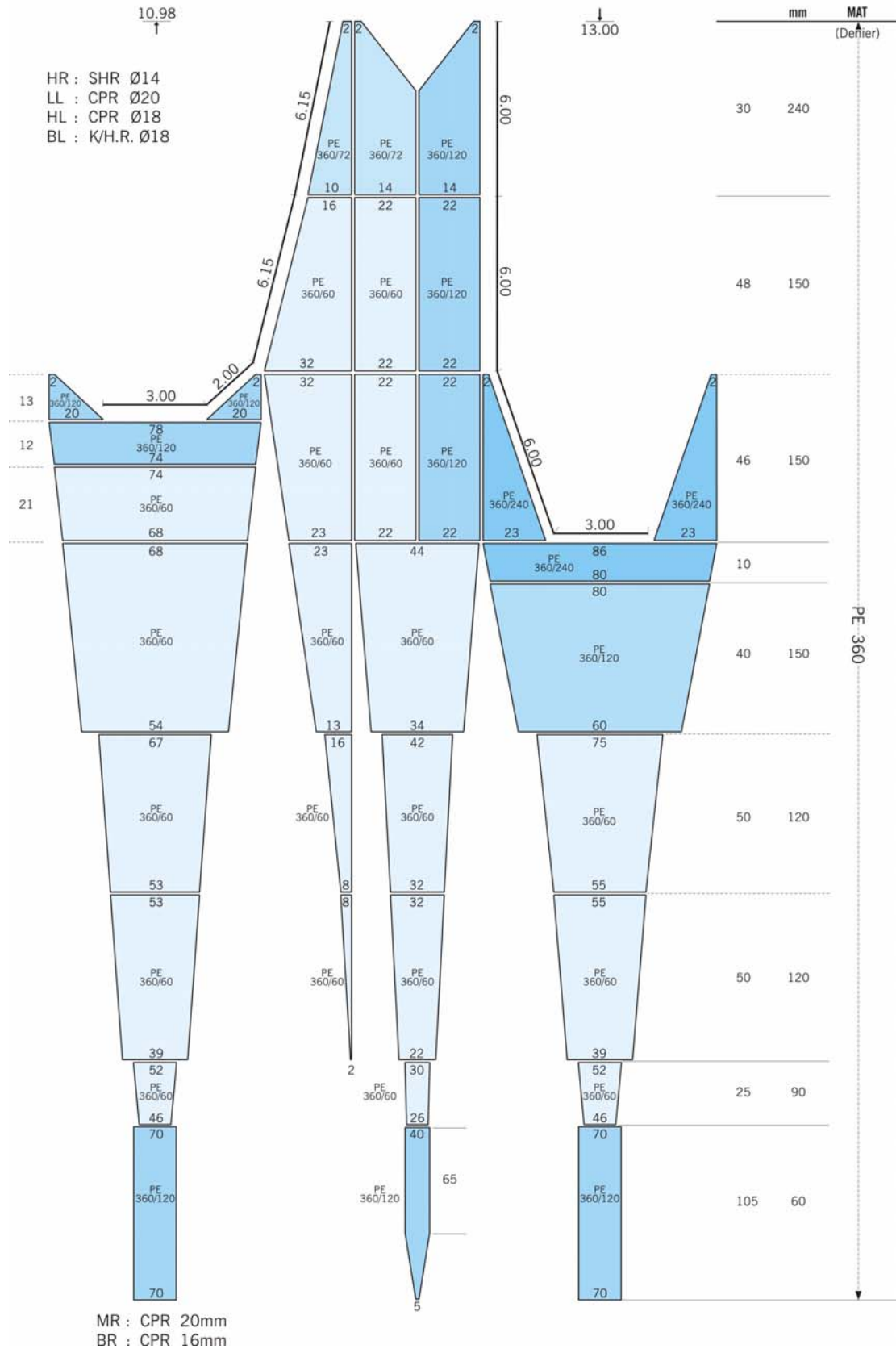


# Fluorescence



# ANNEX II

## BOTTOM TRAWL NET



## **Annex III**

### **Report of the Hydro-acoustic Survey by using the Scientific Echosounder (Furuno, FQ-80) in the Western Coast of Malaysia Peninsula, by M.V.SEAFFDEC2, Cruise Order No.18-2/2006**

**During 21 February to 21 March 2006**

**By Taweekiet Amornpiyakrit (Researcher), Training Division**

The Hydro-acoustic survey was one of the National survey activities namely; High opening bottom trawl, Oceanographic survey and Hydro-acoustic survey as a cost sharing research between the DOF of Malaysia and SEAFDEC/TD. The survey has been carried out in the Western Coast of Malaysia Peninsula starting from Langkawi Island to Klang Port, Selangor State by M.V.SEAFFDEC2 during 23 February to 14 March 2006. The survey has been divided into 3 trips starting from Trip No.1, 24 February to 1 March 2006, Langkawi Island to Pinang Island, Trip No. 2, 2-8 March 2006, Pinang Island to Lumut and Trip No. 3, 10-14 March 2006, Lumut to Klang Port in order to take provisions and re-fill the fuel oil and substitute the researchers.

Prior to the survey, the calibration of the equipment has been made at a depth of 60 m near Langkawi Island by using three fishing rods and the calibration sphere. The sound velocity was also investigated.

All together 80 tracks (Fig.1 to Fig. 19) have been plotted and surveyed except the tracks closed to Klang Port where they were considered massive transportation and strong current conditions. The stations where the High opening bottom trawl was operated, the surveys have also been done. While the diagonal survey tracks were omitted. The speed of the surveys ranged from 8.0-9.6 knots when the sea condition was calm or slightly and 3.0-4.4 knots when simultaneously done with the operation of bottom trawl. The list of the researchers is shown at the last page of each trip.

All survey data was saved in to the hard disk of the Analyzer Unit and finally backed-up into DVDs (1 copy for DOF of Malaysia and 1 copy for SEAFDEC/TD). MFRDMD, Malaysia will be responsible for its own data analysis.

#### **Problems and resolutions**

Mostly, the survey has been carried out smoothly except on the days which the sea condition was slightly. Noise would appear and repeated when the ship made a sharp turn or accelerated immediately.

However, there were two existing problems occurring during the survey as follows:

1. No GPS signal connected to both Processor and Analyzer Units when turning on the Power. (Fig. 20 & 21). This problem repeated several times and could be resolved by re-starting the Processor Unit or left the power on until the survey finished
2. Every 800 pings of the transmission, the connection would be interrupted, stopped recording and must be re-transmitted by clicking the transmission icon on the Processor Unit's screen. This incidence occurred 3-4 times in each survey track. These problems have been reported to TRDH by facsimile on 28<sup>th</sup> February 2006.

**Table 1** Details of the records of Hydro-acoustic survey (Scientific Echosounder, Furuno FQ-80) 23 February to 14 March 2006  
 West Coast of the Peninsular Malaysia by M.V. SEAFDEC2, Cruise Order 18-2/2006  
 Trip#1, 24 February to 1 March 2006  
 Langkawi Island to Pinang Island  
 Recorded and observed by Messrs. Raja Bidin Raja Hasan-Senior Research Officer and Osman Muda-Assistant Research Officer  
 Reported by Taweekiet Amornpiyakrit-Researcher

Remark: Time indicated as Malaysia's Local Time (+8.0 UTC)

Date	Station (From-To)	Position (Start-Finish)	Depth Range (Start-Finish, m)	Ship Course (deg)	Ship Speed (kt)	Duration (Start to Finish, hrs)	Remark	Document ID	
23 Feb. 06	Calibration		60.0		Anchored	P.M.	Test	0443	
24 Feb. 06	Trawl Fishing Trial	Lat. 6.08.49 Lon. 99.58.04	24.2	210	3.0	9:12	Test	0472	
		Lat. 6.07.26 Lon. 99.57.10				9:43			
24 Feb.06	1-2	Lat. 6.69.91 Lon. 99.59.17	15.9	275	9.0	10:21	Calm	0473, Last ping No. 5947	
		Lat. 6.08.00 Lon. 99.48.00	16.9			11:30			
	2-3	Lat. 6.08.88 Lon. 99.48.76	17.8	250	9.2	11:31	Calm	0475, Last ping No.6908	
		Lat. 6.09.90 Lon. 99.39.10	38.7			12.35			
	3-4		Lat. 6.09.94 Lon. 99.39.15		270	9.2	12:36	Calm	0476, Last ping No. 6500
			Lat. 6.09.95 Lon. 99.29.40				13:40		

	4-5	Lat. 6.09.94 Lon. 99.29.23	55.3	270.1	9.0	16:02	Calm	0477, 0478 (Connection interrupted)
		Lat. 6.09.970 Lon. 99.18.98				17:07		
25 Feb. 06	5-6 Trawl Fishing No. 1	Lat. 6.09.965 Lon. 99.18.94	55.2	270		18:57	Slightly	0479
		Lat. Lon.				20:01		
	5-6	Lat. 6.09.90 Lon. 99.18.93	60.0	270	9.0	18:57	Slightly	0480, 0481
		Lat. 6.09.966 Lon. 99.09.166				20:02		
	6-7	Lat. 6.09.964 Long. 99.09.166	71.0	270	9.0	8:01	Slightly	0482, Last ping No. 5147
		Lat. 6.09.94 Lon. 9.859.39	75.0			9:06		
25 Feb. 06	8-9	Lat. 5.59.96 Lon. 99.09.312	73.0	090	8.5	10:56	Slightly	0483, 0484,0485,0486 (GPS signal disconnected, restarted the comp.)
		Lat. 5.59.92 Lon. 99.19.20				11:59		
	Trawl fishing No. 2	Lat. 5.59.44 Lon. 99.17.98	56.6	251.8	3.7			0488
		Lat. Lon.						
	9-10	Lat. 5.55.90 Lon. 99.19.71	51.6	090	9.1	13:39	Calm	0489, Last ping No. 4337



		Lat. 5.59.96 Lon. 99.29.19				14:45		
	Trawl fishing No. 3	Lat. 6.00.194 Lon. 99.29.655	60.0	056	3.6	14:57	Calm	0491, Last Ping 3576
		Lat. 6.00.161 Lon. 99.30.535	54.5			15:41		
	10-11	Lat. 5.59.97 Lon. 99.29.36	66.0	090	9.0	16:15	Calm	0492, 0493 (Connection interrupted)
		Lat. Lon.	55.0					
	11-12	Lat. 5.59.98 Lon. 99.40.50	53.0	090	9.1	17:28	Calm	0494, Last ping No. 4648
		Lat. 5.59.96 Lon. 99.49.41	40.0			18:26		
	12-13	Lat. 5.59.96 Lon. 99.49.52	41.0	090	9.2	18:27	Calm	0495, Last ping No. 5307
		Lat. 5.59.95 Lon. 99.59.28	30.0			19:30		
26 Feb. 06	14-15	Lat. 5.49.98 Lon. 100.09.25	27.2	270	9.0	08:11	Calm	0496, Last ping No.5566
		Lat. 5.49.960 Lon. 99.59.235	34.3			09:17		
	Trawl Fishing No. 4	Lat. 5.50.95 Lon. 99.89.528	35.0	20.7	4.1	09:35	Slightly	0497, Last ping No. 4086
		Lat. 100.00.695 Lon.	34.0			10:10		
	15-16	Lat. 5.50.0196 Lon. 99.59.2014	35.6	270	9.2	10:57	Slightly	0498, 0499, Last ping No. 5840

		Lat. 5.49.92 Lon. 99.49.29	40.0			11:55		
	16-17	Lat. 5.49.97 Lon. 99.49.07	40.8	270	9.5	11:56	Calm/Slightly	0500, Last ping No. 6396
		Lat. 5.49.962 Lon. 99.39.340	52.5			12:55		
	17-18	Lat. 5.49.8755 Lon. 99.39.078	53.9	270	9.2	14:39	Slightly	0501, Last ping No. 5001
		Lat. 5.49.95 Lon. 99.29.39	59.2			15:41		
	17-18 Trawl Fishing No. 5	Lat. 5.49.73 Lon. 99.28.69	56.5	251	3.8	15:53	Slightly	0502, Last ping No. 3885
		Lat. 5.89.707 Lon. 99.26.4436	53.7			16:39		
	18-19	Lat. 5.49.9361 Lon. 99.29.1613	59.4	270	9.2	17:22	Slightly	0503, 0504, Last ping No. 4450
		Lat. 5.49.98 Lon. 99.19.23	61.4			16:27		
	19-20	Lat. 5.49.98 Lon. 99.19.23	63.8	270	9.2	18:27	Calm	0505, Last ping No. 5222
		Lat. 5.49.99 Lon. 99.09.34	58.0			19:32		
27 Feb. 06	A.M. → The GPS signal has not been connected between the Processor Unit and Analyzer Unit then checked the connecting cables of the power supply, GPS and computer LAN setup, Restarted both of the units and the problems have been resolved							
27 Feb. 06	Trawl Fishing No. 6 (Station 21)	Lat. 5.80.2930 Lon. 99.18.596	63.0	250	3.5/4.4	10:07	Calm	0533, Last ping No. 4299
		Lat. 5.39.40 Lon. 99.15.98	61.5			10:58		

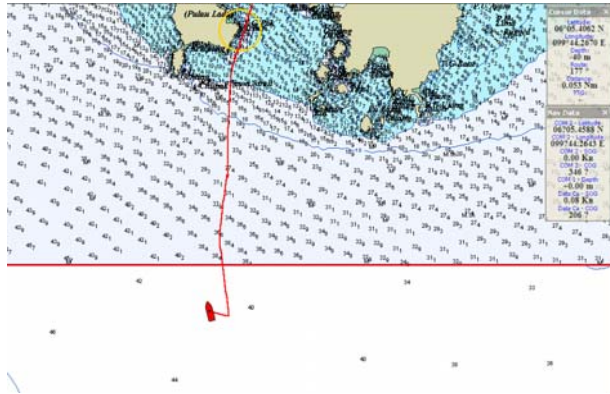
	21-22	Lat. 5.39.962 Lon. 99.19.316	74.0	090	9.3	11:36	Calm	0534, 0535, Last ping No.4447
		Lat. 5.39.98 Lon. 99.29.33	66.0			12:40		
	22-23	Lat. 5.39.98 Lon. 99.29.41	64.0	090	9.3	12:40	Calm	0536, Last ping No.5402
		Lat. 5.39.96 Lon. 99.39.29	33.0			13:45		
	Trawl Fishing No. 7	Lat. 5.29.961 Lon. 99.49.2258	46.0	218	4.0	14:52	Calm	0538, Last ping No. 5628
		Lat. 5.37.667 Lon. 99.87.06	53.0			15:43		
	23-24	Lat. 5.39.96 Lon. 99.39.42	37.4	090	9.3	13:46	Calm	0537, Last ping No.5431
		Lat. 5.39.96 Lon. 99.49.22	42.0			14:50		
	24-25	Lat. 5.39.96 Lon. 99.49.36	41.3	090	9.2	16:19	Calm	0539, 0540, Last ping No. 5198
		Lat. 5.38.97 Lon. 99.59.37	32.1			17:23		
	25-26	Lat. 5.39.97 Lon. 99.59.37	32.1	090	9.2	17:23	Calm	0541, Last ping No.6067
		Lat. 5.39.928 Lon. 100.01.29	16.6			18:28		
Sent a Trouble report to SEAFDEC/TD, attention TRD on GPS signal problem (a.m.)								
28 Feb. 06	27-28	Lat. 5.30.012 Lon. 99.59.222	32.0	270	9.2	0848	Calm	0546

		Lat. Lon.				0950		
	28-29	Lat. 5.29.95 Lon. 99.49.07	46.3	270	9.4	09:50	Calm	0547, Last ping No. 6498
		Lat. 5.29.96 Lon. 99.39.50	50.7			10:53		
	Trawl Fishing No. 8	Lat. 5.29.962 Lon. 99.29.304	51.1			10:56	Slightly	0548, Last ping No. 7266
		Lat. 5.33.97 Lon. 99.38.86	42.6			12:08		
	29-30	Lat. 5.30.159 Lon. 99.39.042	53.1	270	9.2	12:48	Slightly	0549, 0550, Last ping No.4366
		Lat. 5.29.98 Lon. 99.29.31	60.5			13:50		
	30-31	Lat. 5.29.99 Lon. 99.29.21	59.9	270	9.2	15:39	Calm	0551, Last ping No. 5373
		Lat. 5.29.98 Lon. 99.29.98	74.4			14:44		
	32-33	Lat. 5.19.165 Lon. 99.19.23	58.0	090	9.2	19:17	Calm	0553, 0554, Last ping No. 0882
		Lat. 5.19.93 Lon. 99.29.28	65.7			20:26		
	33-34	Lat. 5.19.93 Lon. 9.29.42	66.2	090	9.0	20:27	Calm	0555, Last ping No. 5442
		Lat. 5.19.95 Lon. 99.39.30	55.1			21:32		
1 March 2006	34-35	Lat. 5.19.977 Lon. 99.39.307	51.0	090	9.0	07:53	Slightly	0557, Last ping No. 7094
		Lat. 5.19.93 Lon. 99.49.33	48.1			08:40		

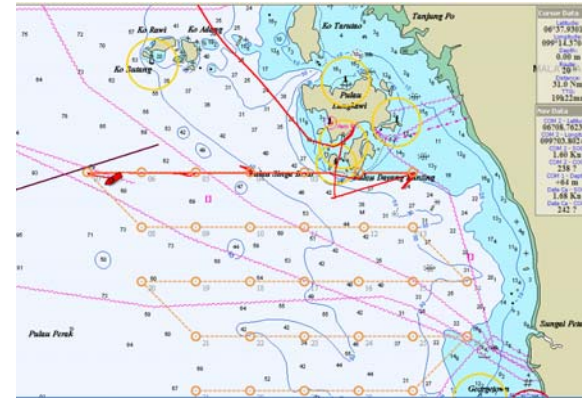
	35-36	Lat. 5.19.93 Lon. 99.49.46	49.6	090	9.2	08:40	Calm	0558, Last ping No. 6656
		Lat. 5.20.01 Lon. 99.59.31	40.5			09:44		
	36-37	Lat. 5.20.01 Lon. 99.59.43	41.2	090	9.2	09:44	Calm	0559, Last ping No. 5827
		Lat. 5.19.966 Lon. 100.08.26	10.1			10:40		

To be continued on the Trip#2

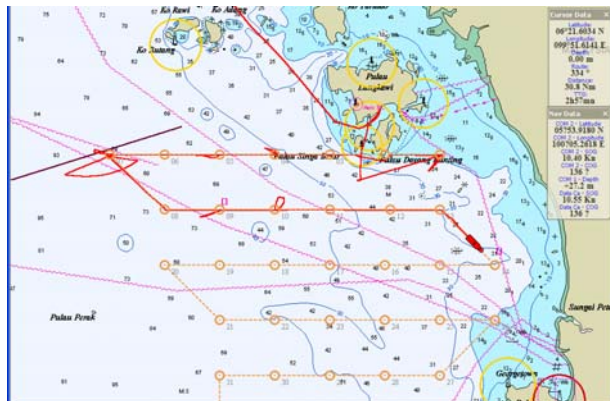
**Figures of the Survey Tracks (As indicated by red lines, Transactional plane survey tracks have been omitted)**



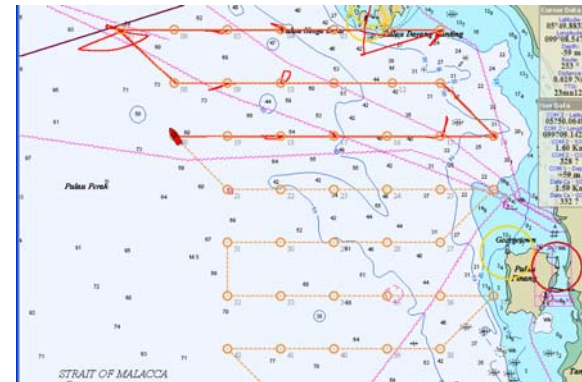
**Fig. 1** Location of Calibration of Scientific Echosounder, Furuno FQ-80 near Langkawi Island, Malaysia on 23 February 2006



**Fig. 2** Survey tracks Station 1 to Station 7 on 24 February 2006



**Fig. 3** Survey tracks Station 8 to Station 13 on 25 February 2006



**Fig. 4** Survey tracks Station 14 to Station 19 on 26 February 2006



## Researchers for the Trip 1



Raja Bidin Raja Hasan  
MFRDMD, Malaysia



Osman Muda  
MFRDMD, Malaysia



Taweekiet Amornpiyakrit  
SEAFDEC, Thailand

**Table 2** Details of the records of Hydro-acoustic survey (Scientific Echosounder, Furuno FQ-80) 24 February to 14 March 2006  
West Coast of the Peninsular Malaysia by M.V. SEAFDEC2, Cruise Order 18-2/2006  
Trip#2, 2-8 March 2006  
Pinang Island to Lumut

Recorded and observed by Messrs. Sallehudin Jamon-Team Leader, Research Officer and Osman Muda-Assistant Research Officer  
Reported by Taweekiet Amornpiyakrit-Researcher

Remark: Time indicated as Malaysia's Local Time (+8.0 UTC)

Date	Station (From-To)	Position (Start-Finish)	Depth Range (Start-Finish, m)	Ship Course (deg)	Ship Speed (kt)	Duration (Start to Finish, hrs)	Remark	Document ID
3 Mar. 2006	38-39	Lat. 5.09.98 Lon. 99.98.22	45.3	270	9.3	07:28	Calm	0560, 0561, 0562, Last ping No. 5109
		Lat. 5.09.95 Lon. 99.49.30	58.1			08:33		
	Trawl Fishing No. 10 (st39)	Lat. 5.10.83 Lon. 99.49.16	55.2	322	3.9	10:55	Calm	0563, 0564, 0565, Last ping



		Lat. 5.12.94 Lon. 99.47.50	63.6			11:37		No. 1930
	39-40	Lat. 5.09.96 Lon. 99.49.20	58.0	270.1	9.2	12:19	Calm	0566, 0567, Last ping No. 4599
		Lat. 5.09.95 Lon. 99.39.31	61.5			13:23		
	40-41	Lat. 5.09.96 Lon. 99.39.39	62.4	271	9.1	13:24	Calm	0568, Last ping No. 5143
		Lat. 5.09.97 Lon. 99.29.26	67.0			14:27		
	41-42	Lat. 5.09.98 Lon. 99.29.05	66.4	270	9.4	14:27	Calm	0569, Last ping No. 4942
		Lat. 5.09.95 Lon. 99.19.35	75.5			15:31		
	Trawl Fishing No. 11 (st.42)	Lat. 5.09.02 Lon. 99.19.96	78.0	145	4.0	15:53	Slightly, Swell	0570, Last ping No. 3934
		Lat. 5.06.81 Lon. 99.21.55	76.0			16:40		
4 March 2006	Trawl Fishing No. 12 (st. 43)	Lat. 4.59.73 Lon. 99.28.58	59.6	46.7	4.1	07:41	Slightly	0571, Last ping No. 3685
		Lat. 5.01.63 Lon. 99.30.32	59.4			08:25		
	43-44	Lat. 4.59.95 Lon. 99.29.41	64.4	91, 92	9.3	09:07	Calm	0572, 0573
		Lat. 4.59.96 Lon. 99.39.48	59.2			10:11		
	44-45	Lat. 4.59.96 Lon. 99.39.96	59.2	090	9.1	10:11	Calm	0574, Last ping No. 5453
		Lat. 4.59.93 Lon. 99.49.28	57.6			11:16		

	45-46	Lat. 4.59.9 Lon. 99.49.38	58.0	090	9.6	13:10	Calm	0576, Last ping No. 5178
		Lat. 4.59.98 Lon. 99.59.33	57.4			14:12		
	46-47	Lat. 4.59.98 Lon. 99.59.48	57.0	89.4	9.5	14:12	Calm	0577, Last ping No. 5179
		Lat. 4.59.95 Lon. 100.09.29	35.6			15:14		
	48-49	Lat. 4.49.68 Lon. 100.19.26	6.00	280	9.2	17:38	Calm	0578, Last ping No.5352
		Lat. 4.49.95 Lon. 100.09.36	47.9			18:42		
	49-50	Lat. 4.49.95 Lon. 100.09.19	48.0	270	9.2	18:42	Calm	0579, Last ping No. 5438
		Lat. 4.49.96 Lon. 99.59.37	54.9			19:47		
5 Mar. 06	50-51	Lat. 4.49.95 Lon. 99.59.32	54.0	270	9.1	07:27	Slightly, Noise appeared	0580, 0581, 0582 Last ping No. 3925
		Lat. 4.49.96 Lon. 99.49.30	57.2			08:33		
	Trawl Fishing No. 14_st51	Lat. 4.52.99 Lon. 99.48.88	67.2	343	3.4	10:35	Slightly, Noise appeared	0583, Last ping No.3654
		Lat. 4.55.48 Lon. 99.48.16	71.5			11:20		
	51-52	Lat. 4.49.97 Lon. 99.49.29	56.2	270.7	9.0	12:22	Slightly, Noise appeared	0584, Last ping No. 5294
		Lat. 4.49.96 Lon. 99.39.96	75.2			13:26		
52-53	Lat. 4.49.95 Lon. 99.39.08	79.7	270.3	9.6	13:27	Slightly, Noise	0585, Last ping No. 5000	

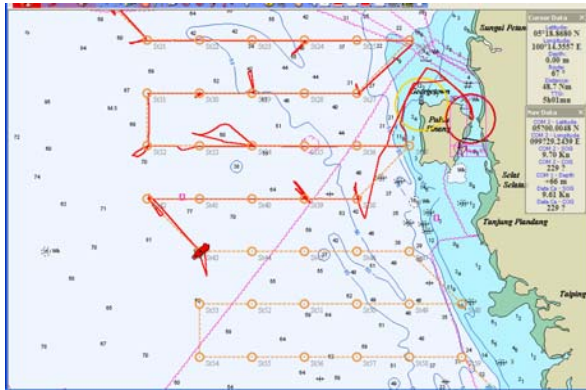
		Lat. 4.49.93 Lon. 99.29.31	57.5			14:29	appeared	
	Trawl Fishing No. 15_st54	Lat. 4.41.82 Lon. 99.30.02	58.1	136	3.5	15:21		0586, Last ping No. 3367
		Lat. 4.40.10 Lon. 99.31.83	56.1			16:01		
	54-55	Lat. 4.39.93 Lon. 99.29.28	57.0	089	9.0	16:42	Calm	0587, 0588, Last ping No. 4479
		Lat. 4.39.97 Lon. 99.39.21	60.0			17:48		
	55-56	Lat. 4.39.96 Lon. 99.39.45	60.0	90.6	9.2	17:49	Slightly, Noise appeared	0589, Last ping No. 5315
		Lat. 4.39.98 Lon. 99.49.23	62.0			18:52		
6 Mar. 06	Trawl Fishing No.16_st56	Lat. 4.40.13 Lon. 99.50.17	60.0	123	3.43	07:37	Calm	0590, 0591, Last ping No.4490
		Lat. Lon.	57.0			08:40		
	56-57	Lat. 4.40.00 Lon. 99.49.24	62.0	090	9.2	09:25	Calm	0592, 0593, Last ping No. 4646
		Lat. 4.39.93 Lon. 99.59.39	58.0			10:30		
	58-59	Lat. 4.39.92 Lon. 100.09.42	47.5	090	9.0	11:36	Calm	0595, Last ping No. 5237
		Lat. 4.39.98 Lon. 100.19.28	43.8			12:39		
	60-61	Lat. 4.29.92 Lon. 100.26.87	14.2	270	9.2	14:54	Calm	0596, Last ping No. 4125
		Lat. 4.29.95 Lon. 100.19.29	36.1			15:43		

	61-62	Lat. 4.29.95 Lon. 100.19.11	40.0	270	9.3	15:44	Calm	0597, Last ping No. 5331
		Lat. 4.29.97 Lon. 100.09.36	38.4			16:48		
	62-63	Lat. 4.29.93 Lon. 99.59.36	49.5	270	9.4	16:48	Calm	0598, Last ping No. 5384
		Lat. 4.29.98 Lon. 100.09.25	56.7			18:54		
7 Mar. 06	63-64	Lat. 4.29.96 Lon. 99.59.31	56.9	270	9.3	07:30	Calm	0599, Last ping No. 5502
		Lat. 4.29.96 Lon. 99.49.35	60.5			08:37		
	Trawl Fishing No.17_st64	Lat. 4.29.37 Lon. 99.49.37	57.4	159.7	3.3	08:48	Calm	0600, Last ping No.3170
		Lat. 4.27.82 Lon. 99.50.05	59.9			09:26		
	64-65	Lat. 4.29.96 Lon. 99.49.26	60.6	270		10:02	Calm	0601, 0602, Last ping No. 4549
		Lat. 4.29.96 Lon. 99.39.30	57.6			11:06		
65-66	Lat. 4.29.96 Lon. 99.39.97	55.3	270	9.0	11:07	Calm	0603, Last ping No. 5210	
	Lat. 4.29.92 Lon. 99.29.32	51.9			12:11			
	Trawl Fishing No.18_st67	Lat. 4.19.71 Lon. 99.38.91	50.2	188	3.4	15:08	Calm	0604, Last ping No. 4567
		Lat. 4.16.49 Lon. 99.38.47	63.0			16:04		
	67-68	Lat. 4.19.95 Lon. 99.39.30	48.1	090	9.2	16:42	Slightly	0605, 0606, Last ping No.

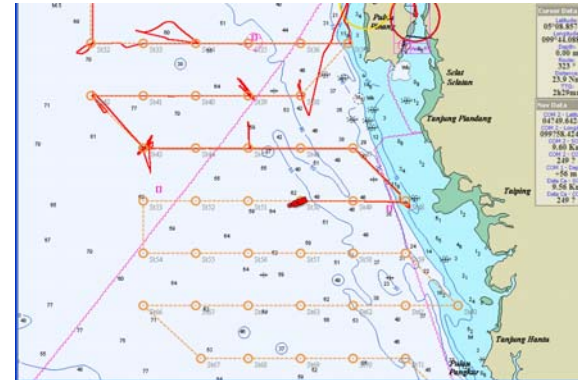
		Lat. 4.19.96 Lon. 99.49.25	56.4			17:47		4559
	68-69	Lat. 4.19.95 Lon. 99.49.42	56.1	90.6	8.9	17:48	Slightly, Ripples	0607, 0608, Last ping No.1499
		Lat. 4.19.94 Lon. 99.59.23	62.0			18:52		
8 Mar. 06	Trawl Fishing No. 19_st69	Lat. 4.18.27 Lon. 100.00.92	59.9	345.7	3.7	07:40	Slightly, Rolling	0611, Last ping No.3453
		Lat.4.20.45 Lon. 100.00.233	56.5			08:25		
	69-70	Lat. 4.19.96 Lon. 99.59.30	61.6	090	9.0	08:48	Slightly	0612, Last ping No. 5166
		Lat. 4.19.99 Lon. 100.09.27	53.5			09:54		
	70-71	Lat. 4.19.98 Lon. 100.09.49	51.5	090	9.0	09:55	Calm	0613, Last ping No. 5407
		Lat. 4.09.95 Lon. 100.19.26	47.1			11:00		

To be continued on the Trip#3

## Figures of the Survey Tracks



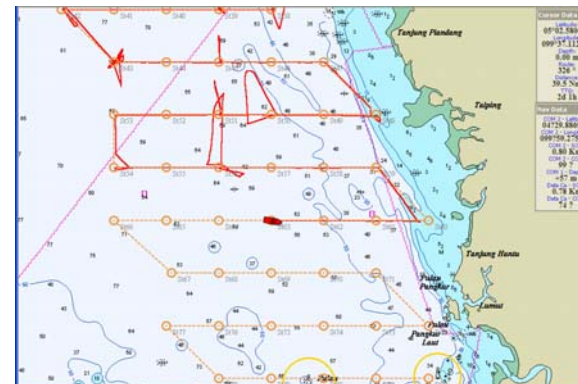
**Fig. 8** Survey tracks of Station 38 to Station on 3 March 2006



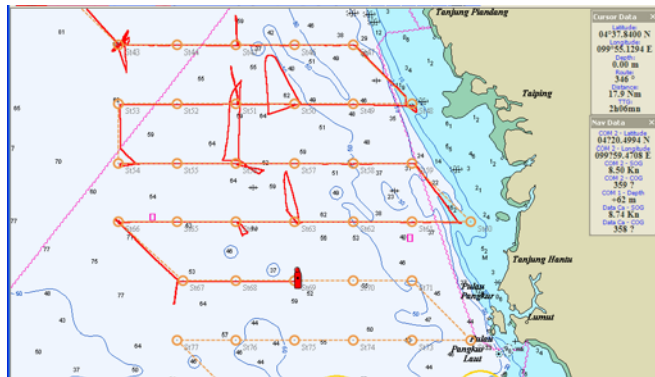
**Fig. 9** Survey tracks Station 43 to Station 50 on 4 March 2006



**Fig. 10** Survey tracks Station 50 to Station 56 on 5 March 2006



**Fig. 11** Survey tracks Station 56 to Station 63 on 6 March 2006



**Fig. 12** Survey tracks Station 64 to Station 69 on 7 March 2006



**Fig. 13** Survey tracks Station 69 to Station 72 on 8 March 2006 and then proceeded to Lumut on 8 March 2006

### Researchers for the Trip 2



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**Table 3** Details of the records of Hydro-acoustic survey (Scientific Echosounder, Furuno FQ-80) 24 February to 14 March 2006  
 West Coast of the Peninsular Malaysia by M.V. SEAFDEC2, Cruise Order 18-2/2006  
 Lumut to Klang Port  
 Trip#3, 10-14 March 2006  
 Lumut to Klang Port  
 Recorded and observed by Messrs. Sallehudin-Team Leader, Research Officer and Osman Muda-Assistant Research Officer  
 Reported by Taweekiet Amornpiyakrit-Researcher

Remark: Time indicated as Malaysia's Local Time (+8.0 UTC)

<b>Date</b>	<b>Station (From-To)</b>	<b>Position (Start-Finish)</b>	<b>Depth Range (Start-Finish, m)</b>	<b>Ship Course (deg)</b>	<b>Ship Speed (kt)</b>	<b>Duration (Start to Finish, hrs)</b>	<b>Remark</b>	<b>Document ID</b>
10 Mar. 06	72-73	Lat. 4.09.96 Lon. 100.29.26		270	9.0	07:24	Calm	0614, Last ping No. 5562
		Lat. 4.09.95 Lon. 100.19.28				08:31		
	73-74	Lat. 4.09.95 Lon. 100.19.115	51.5	270	9.0	08:30	Calm	0615, Last ping No. 5447
		Lat. 4.09.968 Lon. 100.09.29	68.8			09:40		
	Trawl Fishing No. 20_st74	Lat. 4.10.72 Lon. 100.10.30	55.5	354	3.4	11:16	Calm, Noise	0616, Last ping No. 3470
		Lat. 4.12.90 Lon. 100.10.03	57.9			11:59		
	74-75	Lat. 4.10.01 Lon. 100.09.20	70.5	255	9.0	12:34	Calm	0617, 0618, 0619, Last ping No. 3555
		Lat. 4.09.97 Lon. 99.59.31	56.0			13:37		



	75-76	Lat. 4.09.97 Lon. 99.59.18	56.0	270	9.6	13:37	Calm	0620, Last ping No. 5102
		Lat. 4.09.99 Lon. 99.49.33	48.0			14:37		
	Trawl Fishing No. 21_st76	Lat. 4.10.52 Lon. 99.48.82	43.1	290	4.1	16:03	Calm	0621, 0622, 0623, Last ping No. 729
		Lat. 4.11.12 Lon. 99.47.44	53.1			16:31		
	76-77	Lat. 4.09.97 Lon. 99.49.26	45.6	270	9.4	17:12	Calm, Noise	0624, 0625, Last ping No. 4463
		Lat. 4.09.95 Lon. 99.39.32	76.0			16:17		
11 Mar. 06	82-81 (Reverse order)	Lat. 3.59.91 Lon. 100.29.34	44.8	270	9.0	07:22	Calm	0626, Last ping No. 5543
		Lat. 3.59.97 Lon. 100.19.28	50.0			08:28		
	81-80 (Reverse order)	Lat. 3.59.97 Lon. 100.19.12	47.2	270	9.1	08:28	Calm	0627, Last ping No. 5443
		Lat. 3.59.97 Lon. 100.09.25	58.8			09:33		
	80-79 (Reverse order)	Lat. 3.59.97 Lon. 100.09.09	58.8	270	9.0	09:34	Calm	0628, Last ping No. 5351
		Lat. 3.59.96 Lon. 99.59.33				10:37		
	Trawl Fishing No. 22_st79	Lat. 4.01.05 Lon. 99.58.47	63.5	320	3.5	11:01	Calm	0629, Last ping No. 3495
		Lat. 4.02.85 Lon. 99.57.34	61.5			11:43		
	79-78 (Reverse	Lat. 3.59.88 Lon. 99.59	73.2	270	9.3	12:43	Calm	0630, Last ping No. 5087

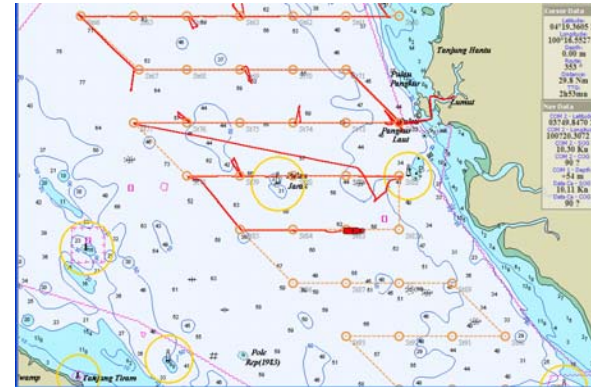
	order)	Lat. 3.59.96 Lon. 99.49.30	69.3			13:47		
	85-84 (Reverse order)	Lat. 3.49.94 Lon. 99.59.34	50.0	090	9.0	15:05	Calm	0631, Last ping No. 5271
		Lat. 3.49.95 Lon. 100.09.23	65.0			16:08		
	84-83 (Reverse order)	Lat. 3.49.95 Lon. 100.09.28	64.6	090	9.1	17:46	Calm	0632, 0633, Last ping No. 4737
		Lat. 3.49.92 Lon. 100.09.25	54.7			18:52		
12 Mar. 06	83A-83 (Reverse order)	Lat. 3.49.94 Lon. 100.29.24	61.5	270	9.0	08:46	Calm	0634, Last ping No. 5459
		Lat. 3.49.79 Lon. 100.19.27	53.3			09:52		
	86-87	Lat. 3.40.01 Lon. 100.09.29	70.5	090	9.1	11:09	Calm	0635, Last ping No. 5381
		Lat. 3.39.93 Lon. 100.19.29	60.0			12:15		
	87-88	Lat. 3.39.93 Lon. 100.19.43	56.0	090	9.0	12:16	Calm	0636, Last ping No. 5079
		Lat. 3.39.98 Lon. 100.29.25	60.0			13:17		
	88-89	Lat. 3.39.98 Lon. 100.29.40	60.0	090	9.5	13:18	Calm	0637, Last ping No. 5089
		Lat. 3.39.96 Lon. 100.39.25	54.0			14:20		
	90-91	Lat. 3.29.95 Lon. 100.49.25	37.0	270	8.0	16:54	Slightly, Swell, Noise appeared a lots	0638, 0639, Last ping No. 5355
		Lat. 3.30.01 Lon. 100.39.22	50.0			18:08		

13 Mar. 06	91-92	Lat. 3.29.97 Lon. 100.39.28	47.7	270	9.2	07:26	Calm	0640, 0641, 0642, Last ping No. 3839
		Lat. 3.29.96 Lon. 100.29.29	67.7			08:31		
	Trawl Fishing No. 23_st92	Lat. 3.29.87 Lon. 100.28.59	67.7	148.3	3.3	10:17	Calm	0643, Last ping No. 3497
		Lat. 3.28.03 Lon. 100.29.62	69.5			11:00		
	92-93	Lat. 3.29.98 Lon. 100.29.22	64.4	270	9.0	11:32	Calm	0644, 0645, 0646, Last ping No. 347095-96
		Lat. 3.29.98 Lon. 100.19.31	80.0			12:36		
	94-95	Lat. 3.19.96 Lon. 100.29.36	53.7	090	9.0	13:52	Calm	0647, Last ping No. 5622
		Lat. 3.19.97 Lon. 100.39.26	56.5			15:00		
	95-96	Lat. 3.19.94 Lon. 100.39.28	57.5	090	9.0	16:53	Calm	0650, 0651, 0652, Last ping No. 3828
		Lat. 3.19.94 Lon. 100.49.25	32.2			17:58		
	96-97	Lat. 3.19.94 Lon. 100.49.38	31.6	090	9.0	17:58	Calm	0653, Last ping No. 5605
		Lat. 3.19.95 Lon. 100.59.23	10.3			19:05		
14 Mar. 06	101-100	Lat. 3.09.98 Lon. 100.49.22	17.8	270	9.0	08:18	Calm	0654, 0655, 0656, Last ping No. 3747
		Lat. 3.09.97 Lon. 100.39.29	59.9			09:23		

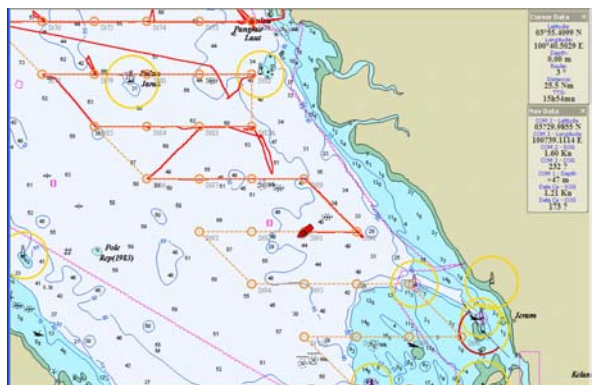
## Figures of the Survey Tracks



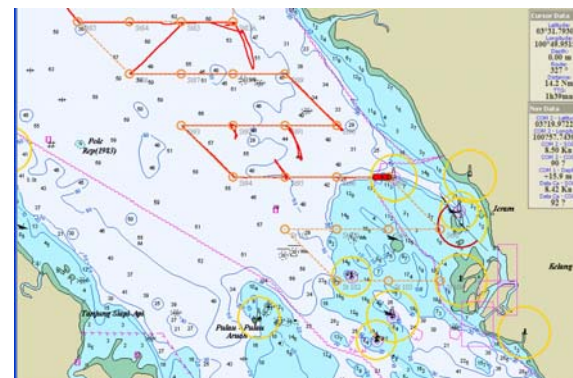
**Fig. 14** Survey tracks Station 72 to Station 77 on 10 March 2006  
March 2006



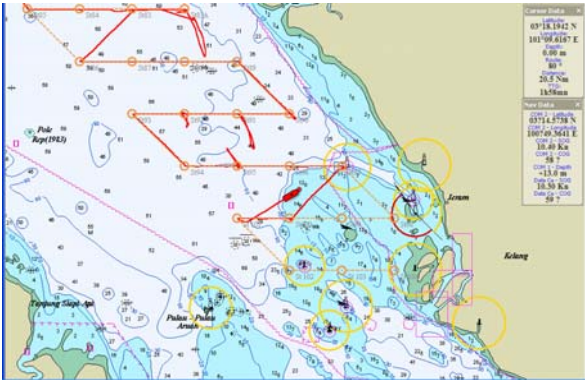
**Fig. 15** Survey tracks of Station 82 to Station 83A on 11  
March 2006



**Fig. 16** Survey tracks Station 83A to Station 90 on 12 March 2006  
2006

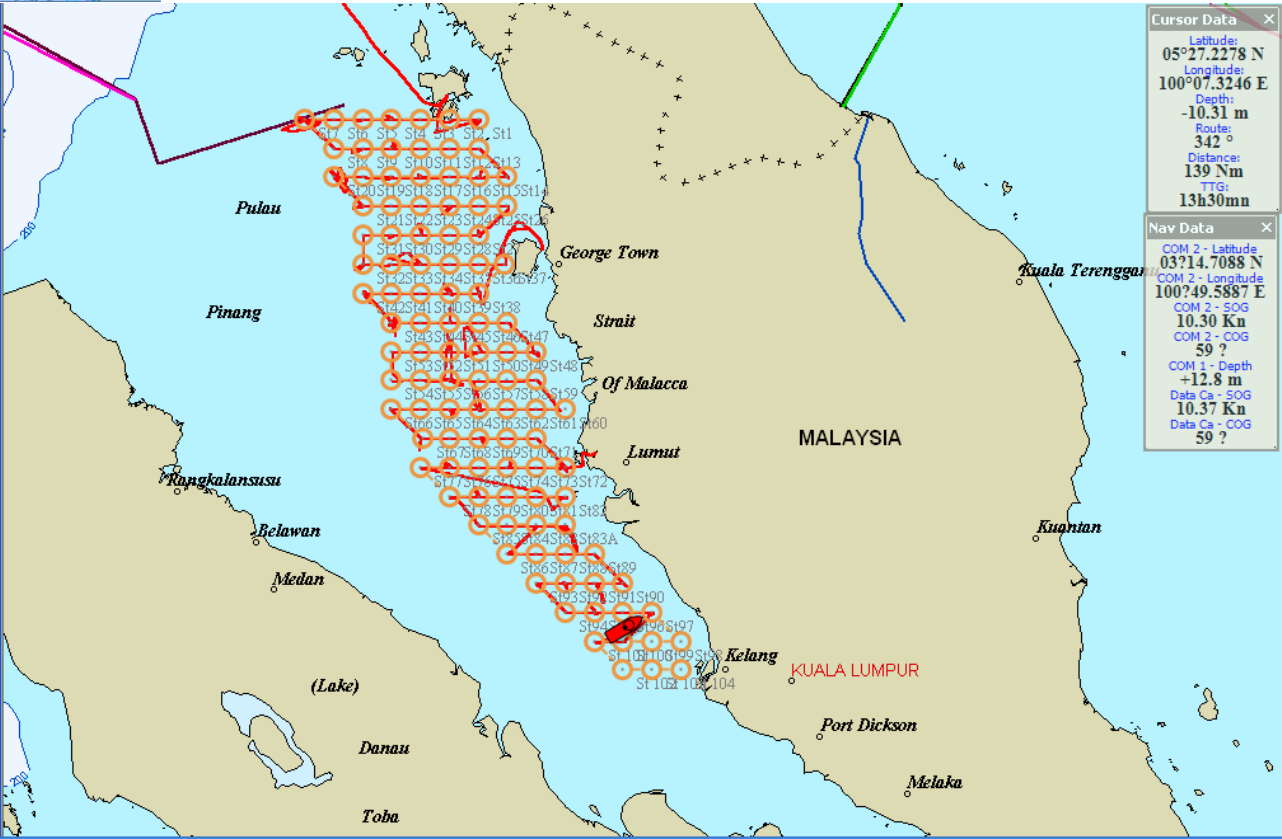


**Fig. 17** Survey tracks Station 90 to Station 97 on 13 March  
2006



**Fig. 18** Survey tracks Station 101 to Station 100 and then proceeded to Klang Port on 14 March 2006

**Fig. 19** Entire Survey Tracks from 24 February to 14 March 2006



### Researchers for the Trip 3



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**Fig. 20** No GPS signal appears on the Analyzer Unit and Processor Unit.



**Fig. 21** Analyzer Unit's screen when functions normally (with GPS signal transmitted and connected)