Southeast Asian Fisheries Development Center

Training Department

CRUISE REPORT ON RESEARCH ACTIVITIES

M.V.SEAFDEC 2 Cruise No. 8-2/2005

20 February– 7 April 2005

Fisheries Resources Survey
Brunei Darussalam and Western Philippine

TD/RP/86

This report is base on preliminary data

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

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Cruise Report on Research Activities

1. Cruise Summary

Vessel name: M.V. SEAFDEC 2
Cruise no.: 8-2/2005 **Leg no:** 1
Project Title: Marine environment and resource survey in the Brunei Darussalam waters and the western of Philippine
Duration: 20 February – 7 April 2005
Covered water: The Brunei Darussalam Waters
Latitude 04°40'.00 N-07°15'.00 N
Longitude 112°15'.00 E-115°00'.00 E
Port of call: Muara fishing port, Brunei Darussalam
Objective:

1. Conduction the fish and squid sampling by Squid jigging and Pelagic long-line,
2. Oceanographic survey by using Integrated Conductivity Temperature and Depth System (ICTD), ThermoSalinograph-Fluorometer Sytsem (TSG),
3. Biological Data collection; Fish, squid, eggs and other zooplankton collection by Bongo and larvae net, soil samples and benthic organism collection by Smith McIntyre grab and
4. Hydro-acoustic bottom survey by Scientific Echo Sounder (Furuno FQ-80)

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	Thirdofficer	Mr. Somphote Vudthipanyo
5	Second engineer	Mr. Komson Sangphuek
6	Boatswain	Mr. Vudthirat Vudthipanyo
7	Steerman	Mr. Pradit Kui-prasert
8	Steerman	Mr. Tana Rungjoy
9	A/S	Mr. Phairoj Sudkangwan
10	Fitter	Mr. Vallop Phimroon
11	Oiler	Mr. Plew Shodok
12	Oiler	Mr. Boontarin Wora-in
13	Oiler	Mr. Nuttapong Chaitanavisut
14	Cook	Mr. Saichol Kornnoom
15	Ship's boy	Mr. Phaithoon Sriratanaphon

Researcher from SEAFDEC/TD

No.	Position	Name
16	Chief/Scientist	Mr. Isara Chanrachkij
17	Researcher	Mr. Pratakphonl Prajakjit
18	Oceanographer	Mr. Sukchai Anuparpboon
19	Assistant researcher	Mr. Nakaret Yasook
20	Assistant researcher	Mr. Aussawin Buachuay
21	Assistant researcher	Ms. Sayan Phomjinda

Researcher from DOF of Brunei Darussalam

No.	Position	Name
22	Researcher	
23	Researcher	
24	Researcher	
25	Researcher	
26	Researcher	

3. Observation Summary

Oceanographic survey summary

Oceanographic survey in this cruise was 40 stations. Each station conducted with 2 main activities including physical and biological oceanographic survey. Five oceanographic instruments were operated through the cruise that composed of iCTD, Bongo net, Larvae net, Smith McIntyre and TSG with Fluorometer. The positions of oceanographic station, used oceanographic instruments and field names in each station are shown in **table 1**. Additionally, in every station physical parameters collected by iCTD and TD (temperature depth recorder) are shown in Appendix I.

***Remark**: TD was applied in stead of The iCTD at some station where sea condition was unable to be operated by the iCTD.*

Conclusion of operating methods

iCTD (SBE 911) equipped with carousel: The iCTD was lowered from the ship through the water from surface up to 500 m or 5-10 m. above sea bottom with constant velocity 0.5 m/s and retrieved to sea surface at the same speed. During retrieved instrument, it was stopped to collect water sampling for nutrient analyzing at SEAFDEC laboratory, the data will be submitted as soon as possible.

Bongo net equipped with flow meter: Bongo net consisted of zoo plankton net and larvae net with mesh size are 330 µm and 500 µm, respectively. Net diameter was 60 cm. This instrument was used for long oblique tows for 30 minuses of operation period. It was lowered and retrieved from surface to 10 m above sea bottom or until 150 m where water was too deep, exceed 160 m. The speed of tow was 1.5 knots approximately. A flow meter was attached to the mouth part of the net. Flow rate of flow meter in front of zooplankton was 30.1945 rpm and larvae net was 29.500 rpm.

Larvae net: The larvae net, 1.26 m in diameter with a 2-mm mesh size at the mouth part and 500 micron at the cod end, was used with the surface horizontal towing method (2 from 3 parts of the net submersing into sea water). A flow meter was attached to the mouth part of the net. Flow rate of flow meter was 9.88 rpm. The sampling period was for 30 minutes with the speed of tow at about 2.5 knots. Specimens were preserved in 10% of formalin immediately after retrieving.

Smith McIntyre grab: Smith McIntyre grab was operated in some stations where sea water depth was less than 100 m., each station was conducted two times. First time it was operated for benthos taxonomy. Sediment sampling was carried out of grab and washed through sieve. Specimen was then sought and preserved in 10% formalin. Second time, sediment sampling was collected as soon as possible after retrieval by plastic box and preserved with 10% of formalin for plankton at sediment surface study. After that some part of remaining sediment sampling was collected in plastic bag and kept it in refrigerator for heavy metal study.

TSG with Fluorometer: TSG with fluorometer was operated during ship sailing from station to station. Its system was designed to continuously collect three parameters including temperature, salinity and fluorescence from underway vessel at approximately 5 meters below the sea surface. However, some station was canceled to avoid un-expectant damage. Owing to power pump in this ship was not enough for required rate.

TD: This instrument was done to measure temperature and depth when iCTD was cancel within unsafely sea condition. It was dipped to maximum at 300 m.

Hydro-acoustic survey summary

This marine resource survey has been carried out in collaboration with the DOF (Department of Fisheries) of Brunei Darussalam order to obtain the preliminary data on the Bio-mass assessment in the waters of Brunei Darussalam.

The survey was conducted by using the Scientific Echo Sounder model FQ-80 equipped onboard M.V. SEAFDEC 2. There are 23 tracks (24 stations) plus 1 track of resurvey from station 1 to 2 in zone 2-3 and 15 tracks (31 stations) in zone 4. All data were recorded and preliminary analyzed onboard.

Please use the other information of operation on the table of FQ-80 Log Book that include in FQ-80 data DVD disk especially date and time.

Fishing survey summary

In this survey, 2 kinds of fishing gear were used for fish sampling.

Pelagic Longline

This survey was operated pelagic longline total 2 stations. The maximum catch was about 135.90 kg. at operation no.01 (station no.01).

Automatic Squid-Jigging

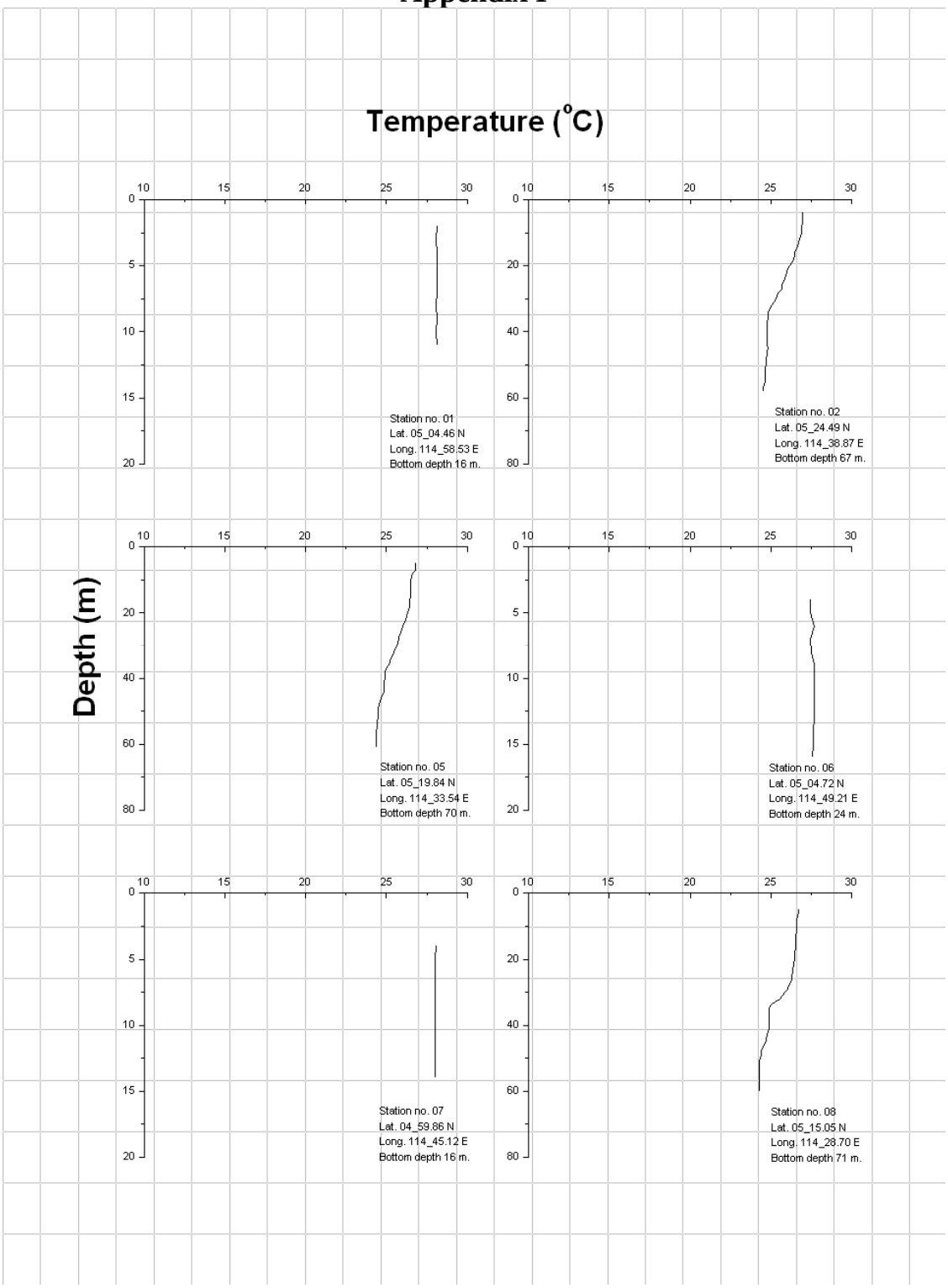
This survey was operated automatic squid-jigging total 10 stations. The maximum catch was about 7.55 kg. at operation no.10 (station no.PLL1).

The detail of fishing operation had shown in fishing logsheet.

Table 1. Survey position and oceanographic activity

St.No. (SEAFDEC)	St.No. (Brunei)	Date	Time (Brunei)	Lat	Long	Oceanographic instruments						Transparancy		Bottom Depth(m)	Filename			Remark
						SBE CTD	TSG	TD	Bongo net	Larvae net	Grab	Sechi disc (m)	Foral scale		SBE CTD	TD	TSG	
1	301	20-Feb-05	1000	05° 04'.70 N	114° 59'.70 E	✔	✔		✔	✔	✔	✔	✔	17	s2d01008		20050220	
2	302	20-Feb-05	1515	05° 25'.10 N	114° 40'.10 E	✔	✔		✔	✔		✔	✔	64	s2d08002		20050220(1)	
3	303	21-Feb-05	0630	05° 40'.19 N	114° 24'.11 E	✔	✔		✔	✔		✔	✔	137	s2d08003		20050221(1)	
4	304	21-Feb-05	0916	05° 34'.90 N	114° 19'.80 E		✔		✔	✔		✔	✔	380			20050221(2)	
5	305	21-Feb-05	1412	05° 19'.80 N	114° 35'.00 E	✔	✔		✔	✔	✔	✔	✔	70	s2d08005		20050221(3)	
6	306	21-Feb-05	1845	05° 04'.90 N	114° 50'.00 E	✔			✔		✔			23	s2d08006			
7	307	22-Feb-05	2049	04° 59'.86 N	114° 48'.12 E	✔	✔		✔	✔	✔			16	s2d08007		20050222(1)	
8	308	22-Feb-05	0947	05° 14'.90 N	114° 30'.00 E	✔	✔		✔	✔	✔	✔	✔	69	s2d08008		20050222(2)	
9	309	22-Feb-05	1356	05° 30'.00 N	114° 15'.30 E		✔		✔	✔		✔	✔	536			20050222(3)	
10	310	22-Feb-05	1700	05° 24'.90 N	114° 10'.00 E	✔	✔		✔	✔				592	s2d08010		20050222(4)	
11	311	23-Feb-05	0617	05° 10'.18 N	114° 25'.27 E	✔	✔		✔	✔	✔	✔	✔	65	s2d08011		20050223(1)	
12	312	23-Feb-05	0945	04° 54'.93 N	114° 40'.19 E	✔	✔		✔	✔	✔	✔	✔	12.5	s2d08012			
13	313	23-Feb-05	1205	04° 49'.82 N	114° 35'.09 E	✔	✔		✔	✔	✔	✔	✔	16	s2d08013		20050223(2)	
14	314	23-Feb-05	1605	05° 05'.10 N	114° 20'.10 E	✔	✔		✔	✔	✔	✔	✔	63	s2d08014		20050223(3)	
15	315	24-Feb-05	0616	05° 20'.26 N	114° 05'.15 E	✔	✔		✔	✔				706	s2d08015		20050224(1)	
16	316	24-Feb-05	0814	05° 14'.50 N	113° 59'.80 E	✔	✔		✔	✔		✔	✔	563	s2d08016		20050224(2)	
17	317	24-Feb-05	1204	04° 59'.80 N	114° 15'.00 E	✔	✔		✔	✔	✔	✔	✔	59	s2d08017		20050224(3)	
18	318	24-Feb-05	1535	04° 44'.80 N	114° 30'.30 E	✔			✔	✔	✔	✔	✔	14	s2d08018			
19	319	24-Feb-05	1741	04° 42'.90 N	114° 23'.00 E	✔			✔	✔	✔			22	s2d08019		20050224(4)	
20	320	25-Feb-05	0617	04° 55'.00 N	114° 10'.30 E	✔	✔		✔	✔	✔			55	s2d08020		20050225(1)	
21	321	25-Feb-05	0924	05° 09'.90 N	113° 35'.10 E	✔	✔		✔	✔		✔	✔	362	s2d08021		20050225(2)	
22	322	25-Feb-05	1135	05° 04'.80 N	113° 50'.00 E	✔	✔		✔	✔		✔	✔	222	s2d08022		20050225(3)	
23	323	25-Feb-05	1501	04° 49'.82 N	114° 05'.25 E	✔	✔		✔	✔	✔	✔	✔	52.5	s2d08023		20050225(4)	
24	324	25-Feb-05	1740	04° 39'.80 N	114° 15'.20 E	✔			✔	✔	✔			14	s2d08024			
25	401	1-Mar-05	0536	05° 36'.48 N	114° 14'.37 E	✔	✔		✔	✔				868	s2d08025		20050301(1)	
26	403	1-Mar-05	1146	06° 04'.30 N	113° 46'.80 E	✔	✔		✔	✔		✔	✔	2,099*	s2d08026		20050301(2)	
27	405	1-Mar-05	1833	06° 34'.10 N	113° 18'.00 E	✔	✔		✔					1,307	s2d08027		20050301(3)	
28	407	2-Mar-05	0608	07° 02'.60 N	112° 50'.10 E	✔	✔		✔	✔				1,805	s2d08028		20050302(1)	
29	409	2-Mar-05	1037	07° 05'.20 N	112° 30'.80 E	✔	✔		✔	✔		✔	✔	2,266*	s2d08029		20050302(2)	
30	411	2-Mar-05	1640	07° 38'.80 N	112° 57'.00 E	✔	✔		✔	✔				1,418	s2d08030		20050302(3)	
31	413	3-Mar-05	0508	06° 09'.70 N	113° 25'.80 E	✔	✔	✔	✔	✔				1,464	s2d08031	Td08031	20050303(1)	
32	415	3-Mar-05	1138	05° 41'.50 N	113° 53'.30 E	✔	✔	✔	✔	✔		✔	✔	2,132	s2d08032	Td08032	20050303(2)	
33	417	3-Mar-05	1658	05° 18'.40 N	113° 59'.70 E	✔	✔	✔	✔	✔				799	s2d08033	Td08033	20050303(3)	
34	421	4-Mar-05	0523	06° 14'.43 N	113° 02'.15 E	✔			✔	✔				1,604	s2d08034		20050304(1)	
35	423	4-Mar-05	1158	06° 43'.40 N	112° 34'.80 E	✔		✔	✔	✔		✔	✔	1,600	s2d08035	Td08035		
36	425	4-Mar-05	1650	06° 46'.10 N	112° 15'.10 E	✔		✔	✔	✔				1,407	s2d08036	Td08036		
37	427	5-Mar-05	0524	06° 20'.30 N	112° 41'.60 E	✔			✔	✔				1,322	s2d08037			
38	429	5-Mar-05	1145	05° 52'.07 N	113° 10'.10 E			✔	✔	✔				1225*		Td08038		
39	431	5-Mar-05	1835	05° 23'.60 N	113° 38'.40 E			✔	✔					1927*		Td08039		
40	TLL 01	10-Mar-05	1558	05° 19'.58 N	113° 47'.90 E	✔									s2d08040			

Appendix I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Bottom depth 67 m.
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Bottom depth 24 m.
Station no. 07
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Bottom depth 16 m.
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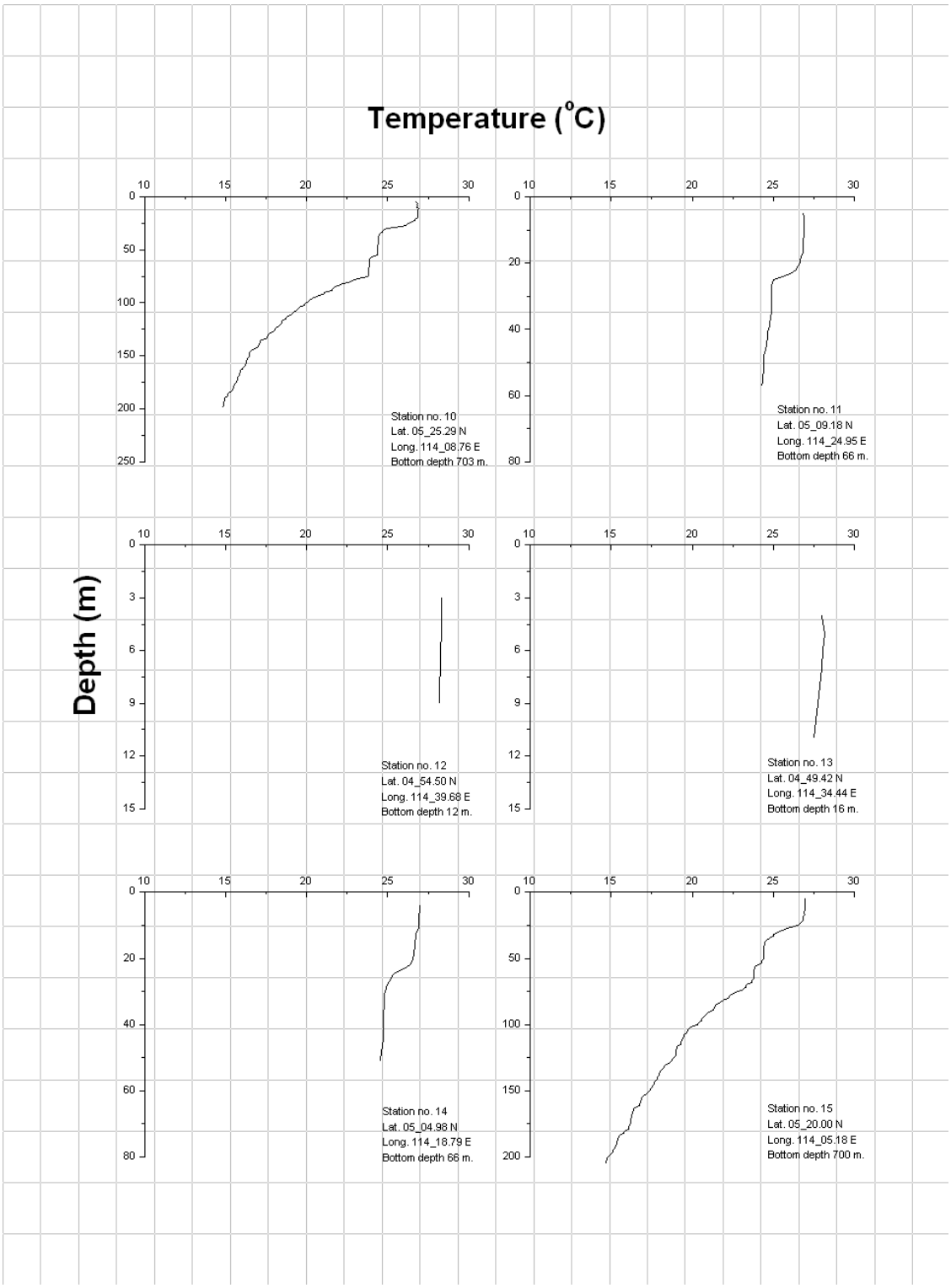
Bottom depth 71 m.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Long. 114_39.68 E
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Bottom depth 16 m.
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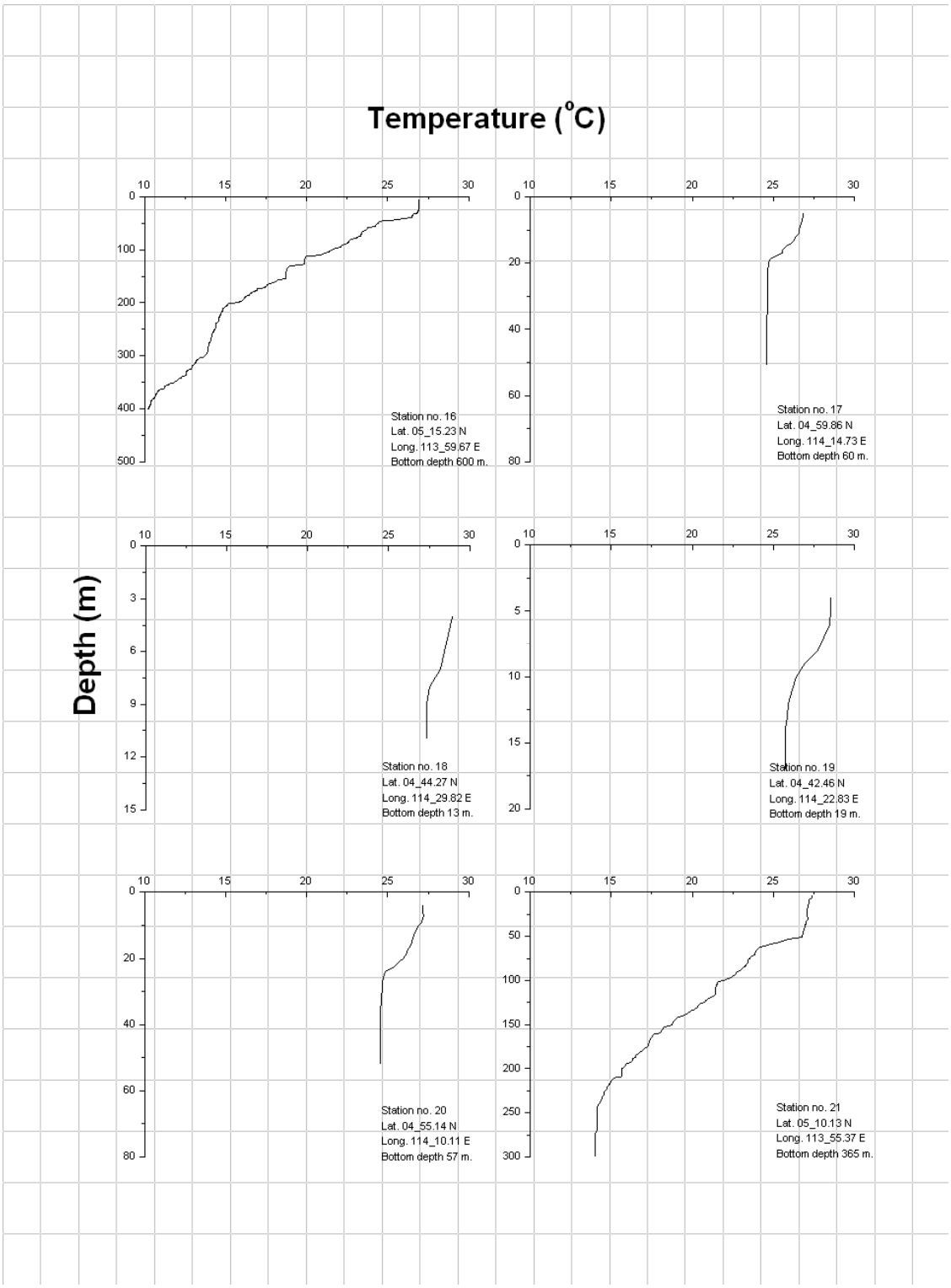
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Bottom depth 13 m.
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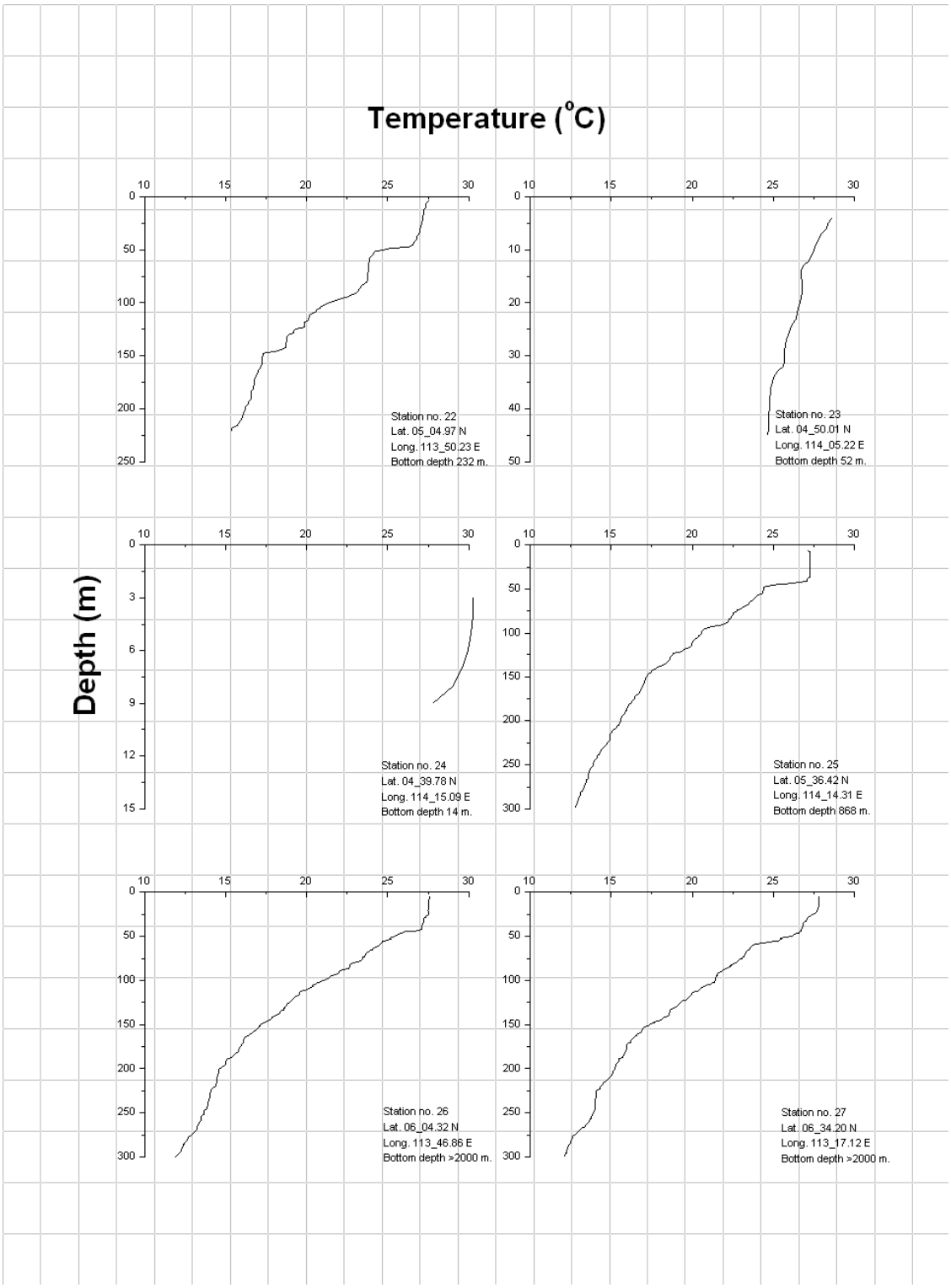
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Long. 114_14.31 E
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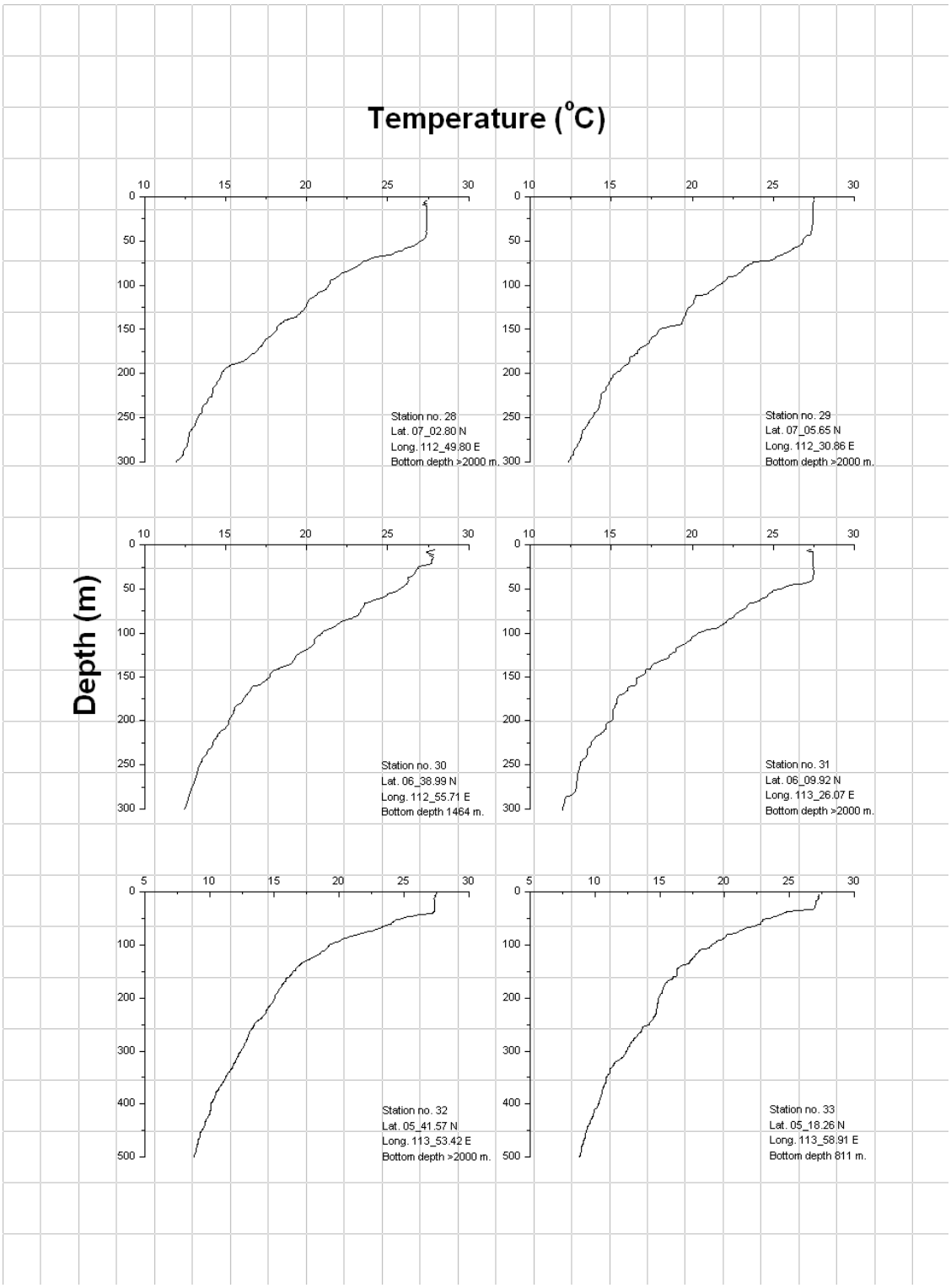
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Long. 112_55.71 E
Bottom depth 1464 m.
Station no. 31
Lat. 06_09.92 N
Long. 113_26.07 E
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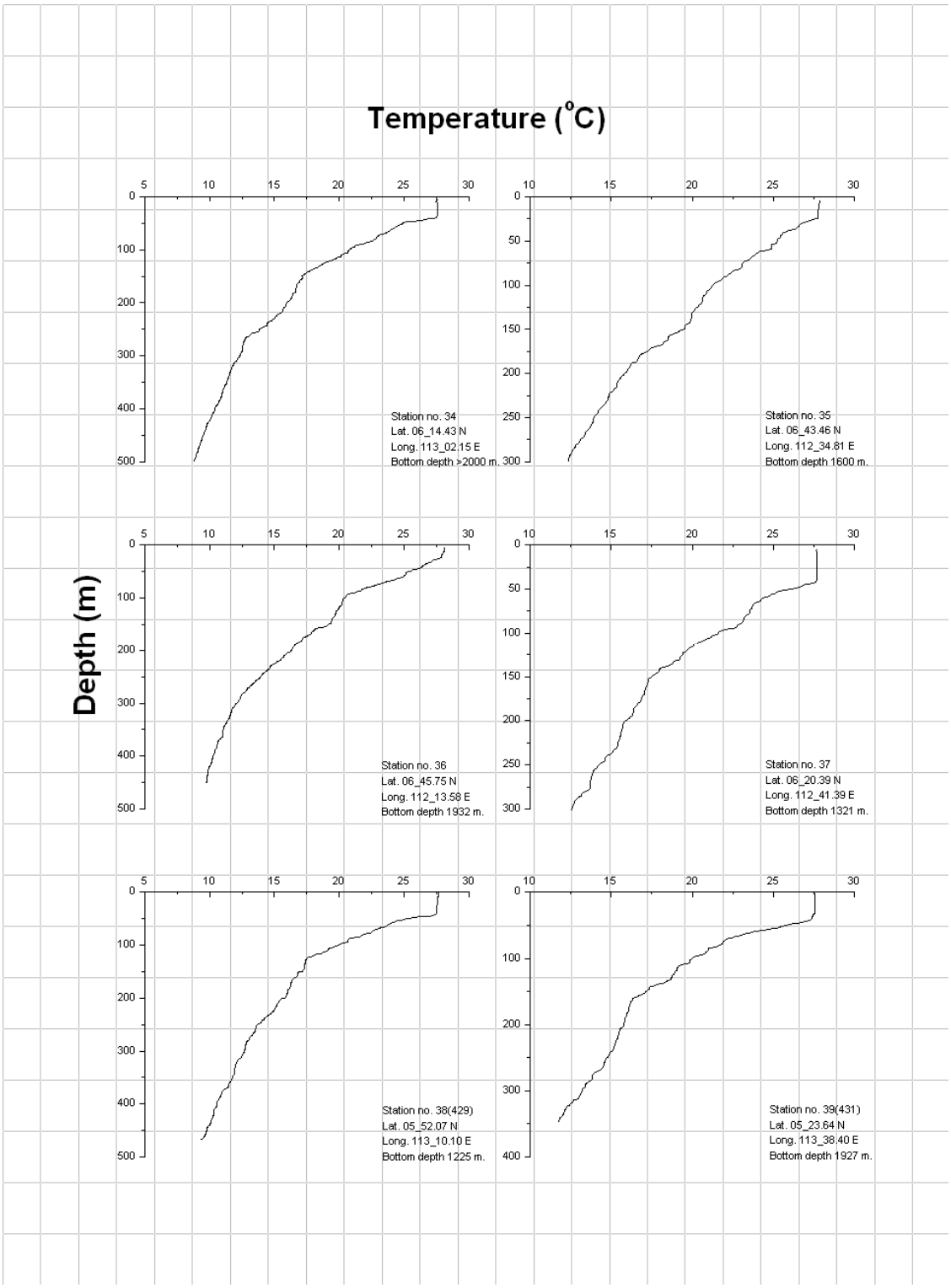
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Bottom depth 1600 m.
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Lat. 06_45.75 N
Long. 112_13.58 E
Bottom depth 1932 m.
Station no. 37
Lat. 06_20.39 N
Long. 112_41.39 E
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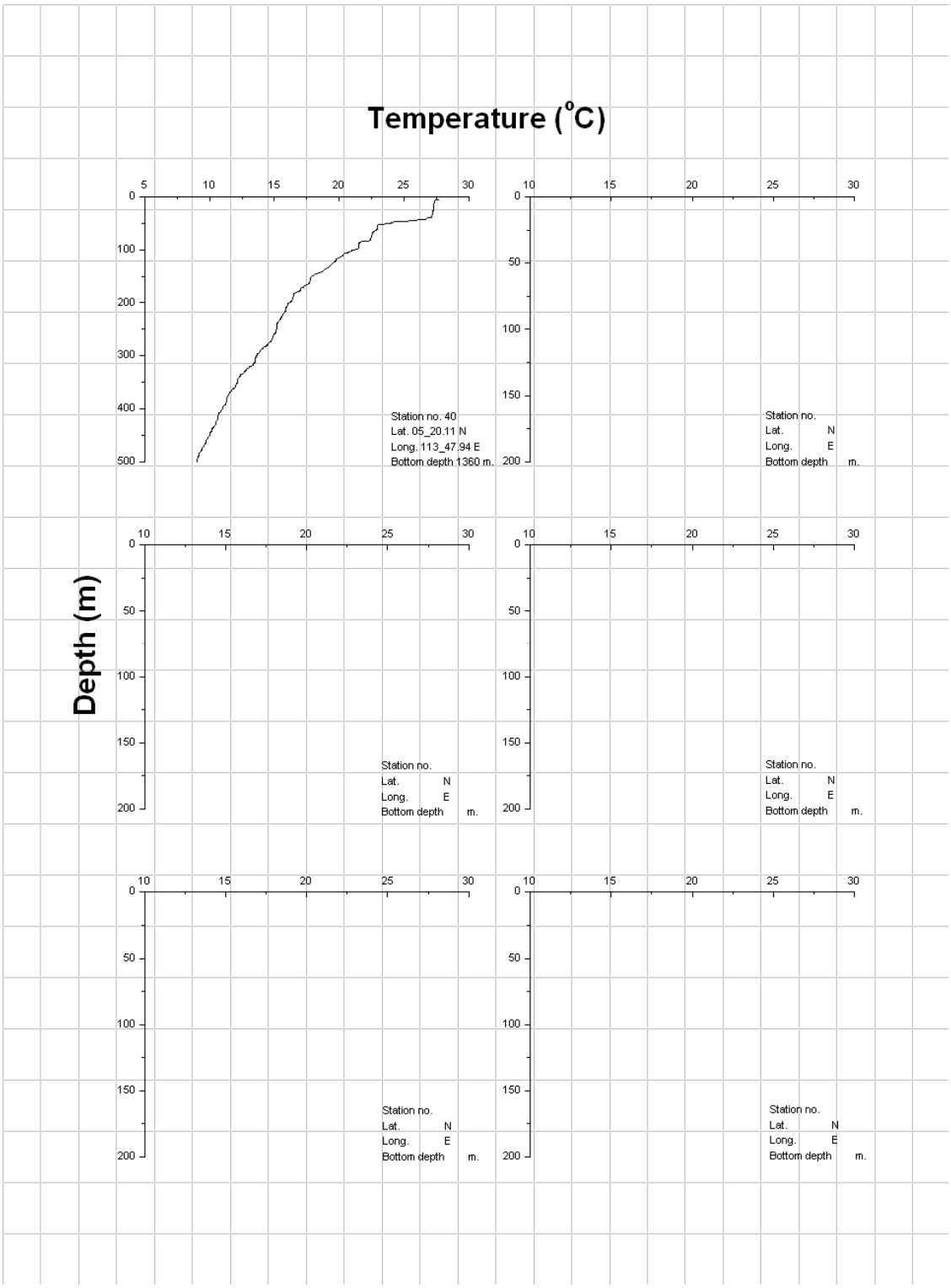
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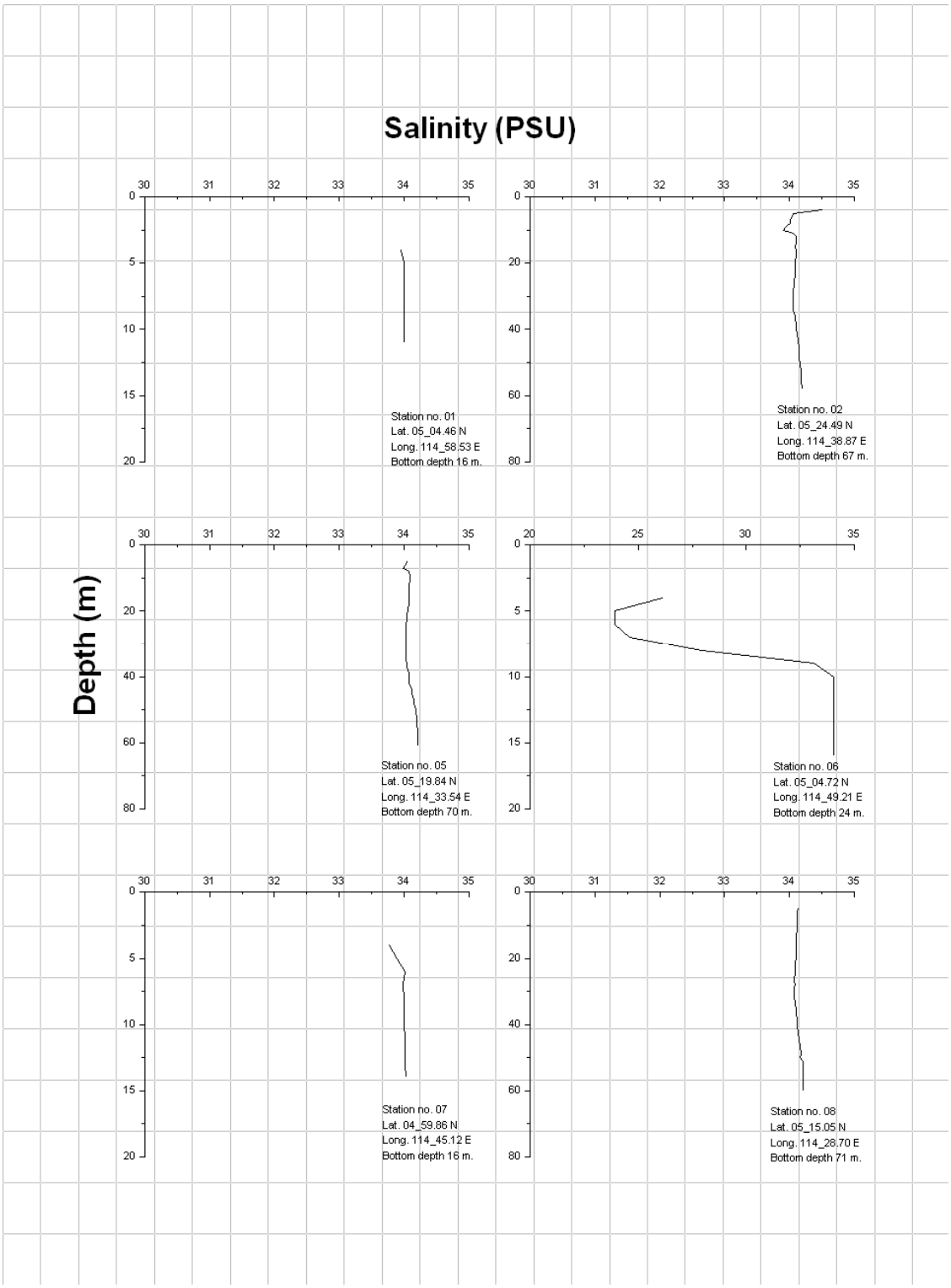
Long. E
Bottom depth m.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Long. 114_58.53 E
Bottom depth 16 m.
Station no. 02
Lat. 05_24.49 N
Long. 114_38.87 E
Bottom depth 67 m.
Station no. 05
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Bottom depth 70 m.
Station no. 06
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Bottom depth 24 m.
Station no. 07
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Long. 114_45.12 E
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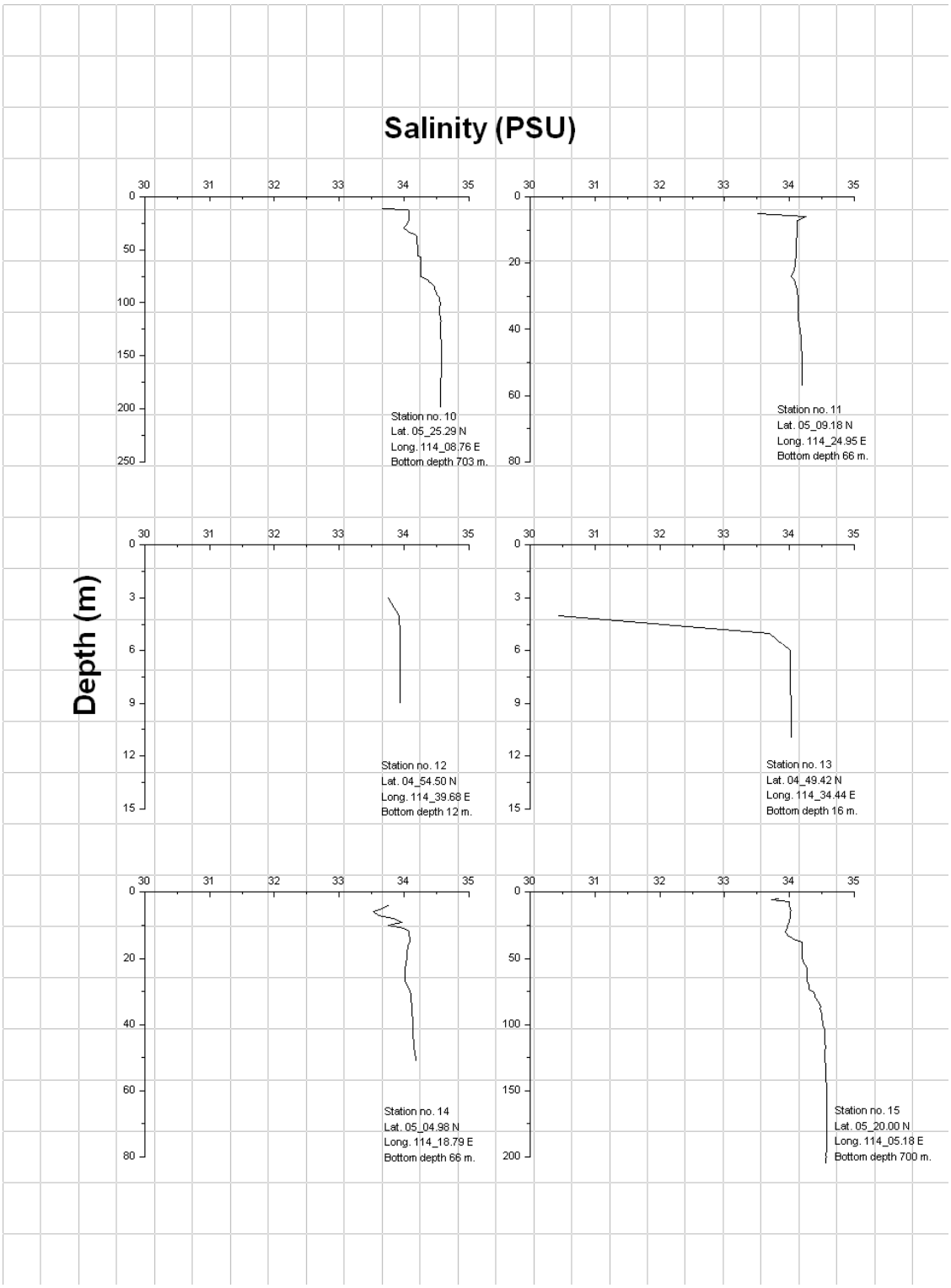
Station no. 08
Lat. 05_15.05 N
Long. 114_28.70 E
Bottom depth 71 m.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Depth (m)
Station no. 10
Lat. 05_25.29 N
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Bottom depth 703 m.
Station no. 11
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Bottom depth 66 m.
Station no. 12
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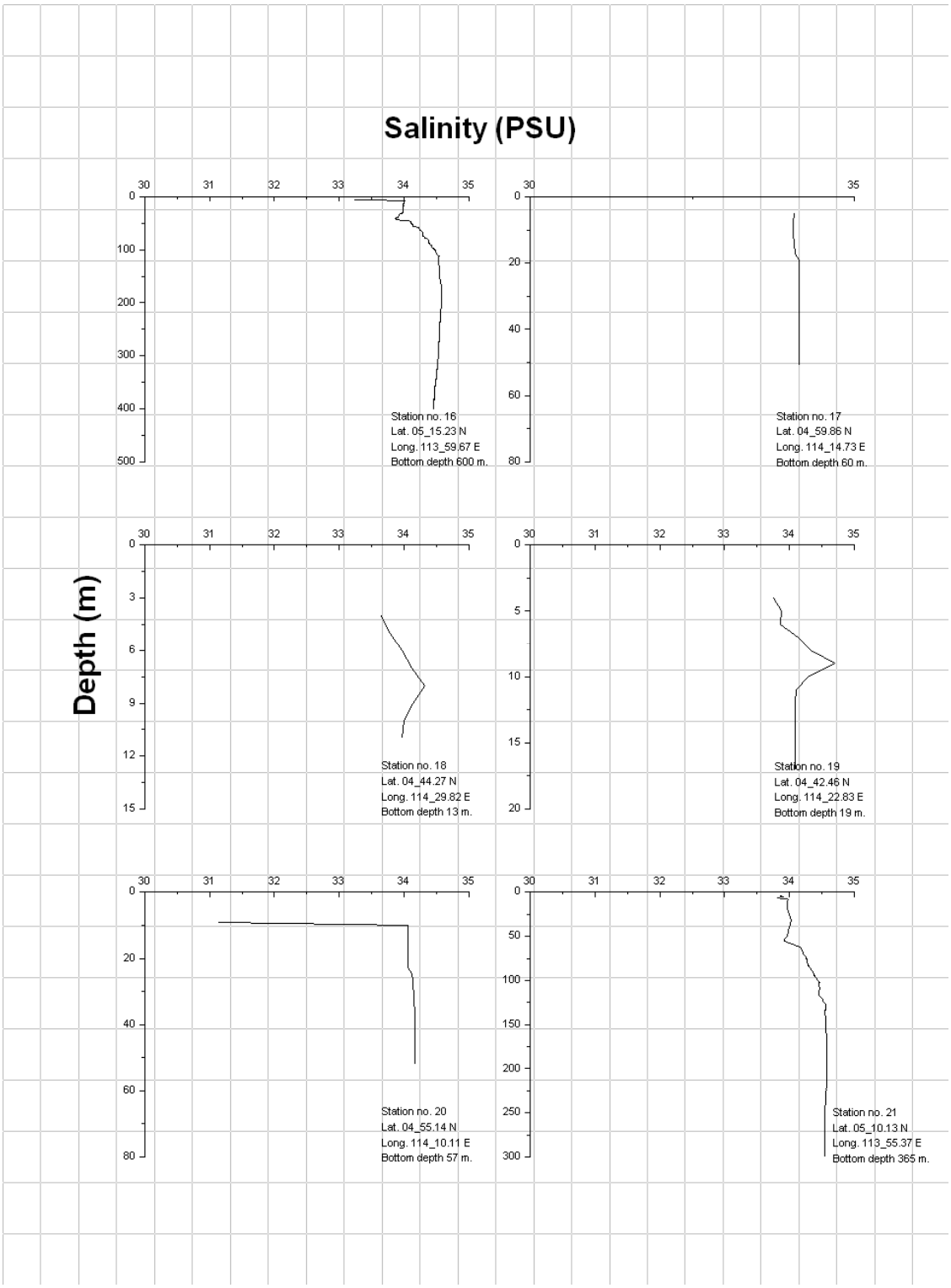
Bottom depth 16 m.
Station no. 14
Lat. 05_04.98 N
Long. 114_18.79 E
Bottom depth 66 m.
Station no. 15
Lat. 05_20.00 N
Long. 114_05.18 E
Bottom depth 700 m.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Lat. 05_15.23 N
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Bottom depth 600 m.
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Long. 114_14.73 E
Bottom depth 60 m.
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Lat. 04_44.27 N
Long. 114_29.82 E
Bottom depth 13 m.
Station no. 19
Lat. 04_42.46 N
Long. 114_22.83 E
Bottom depth 19 m.
Station no. 20
Lat. 04_55.14 N
Long. 114_10.11 E
Bottom depth 57 m.
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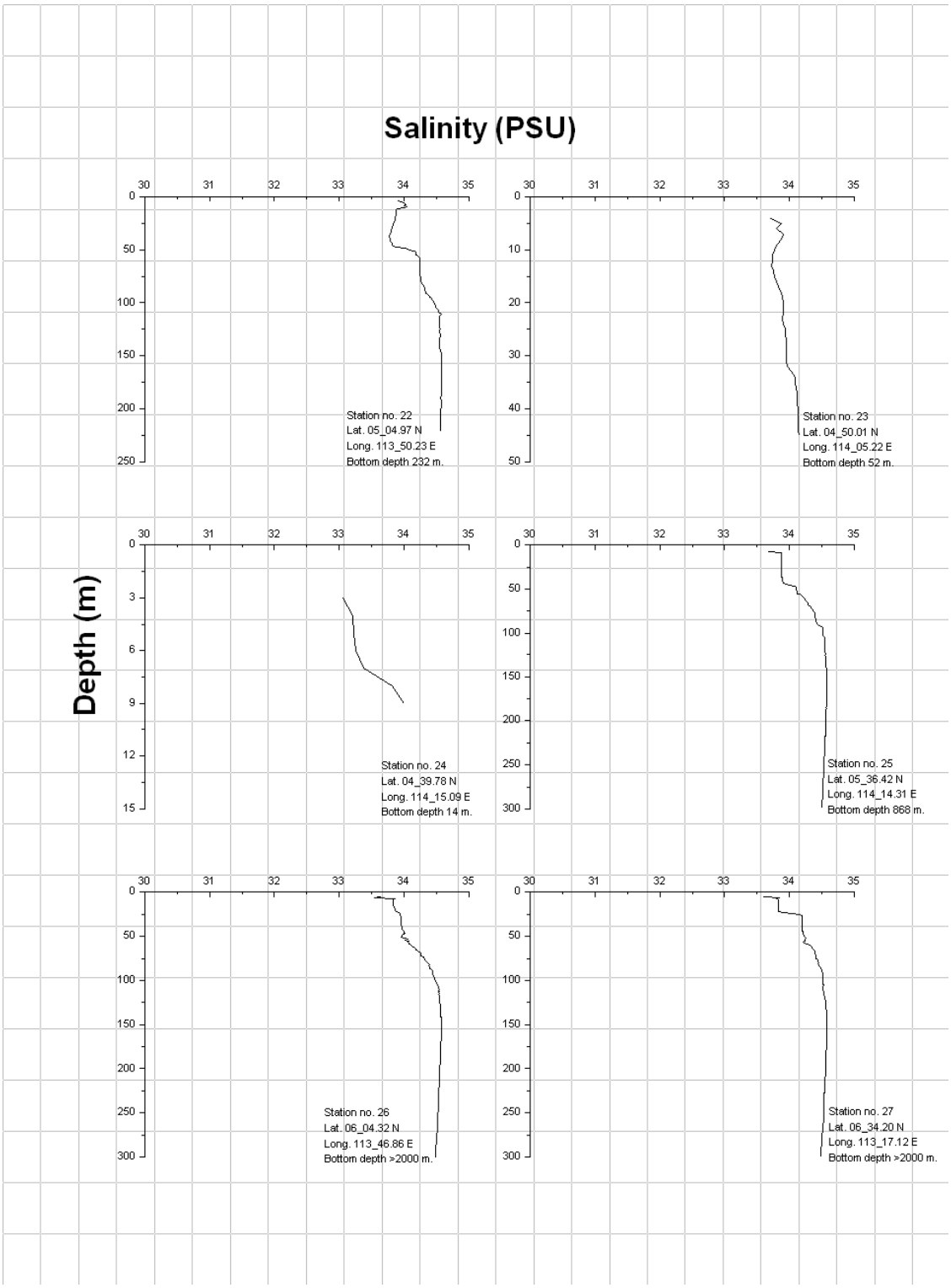
Long. 113_55.37 E
Bottom depth 365 m.


Salinity (PSU)
Depth (m)
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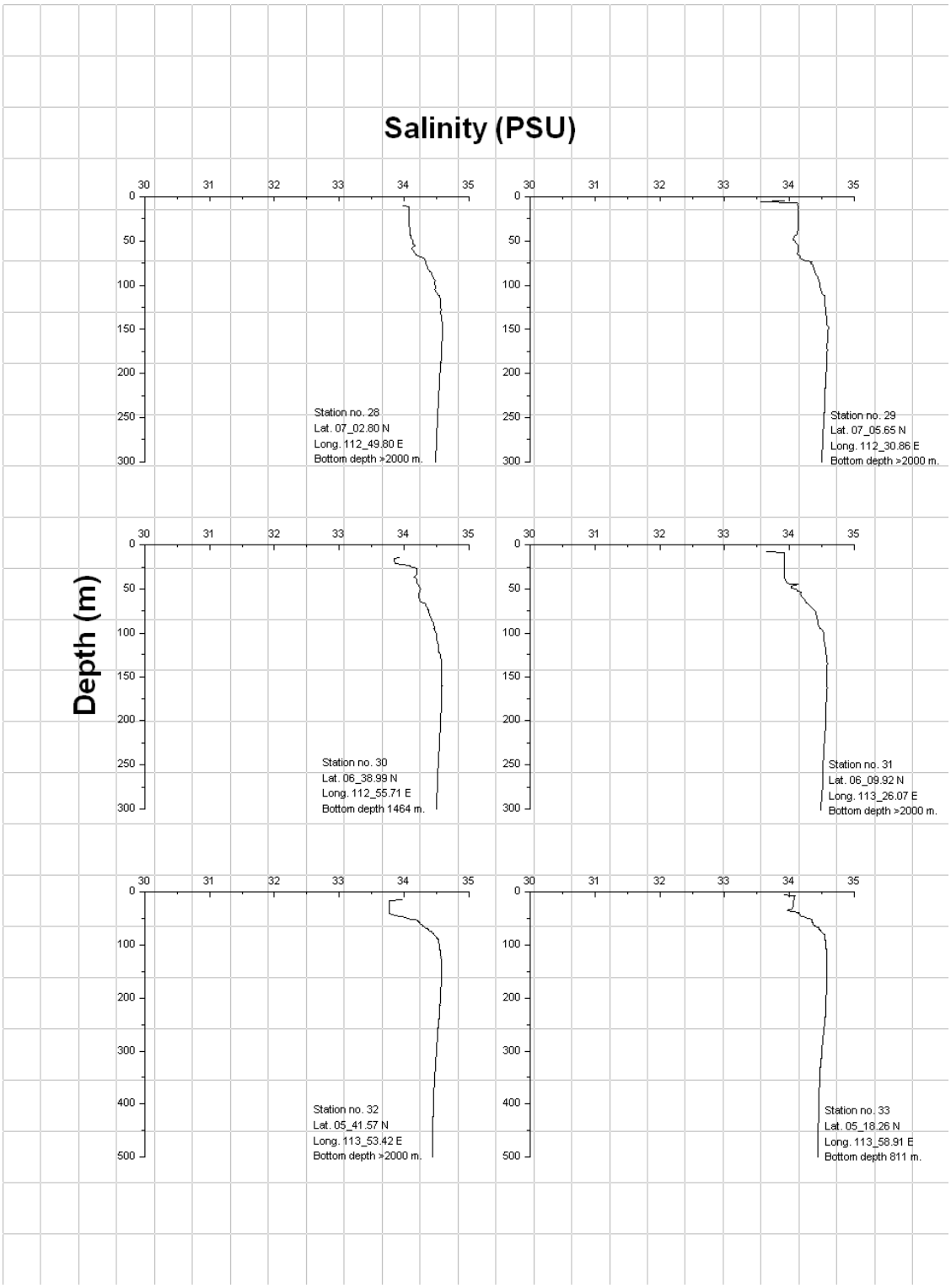
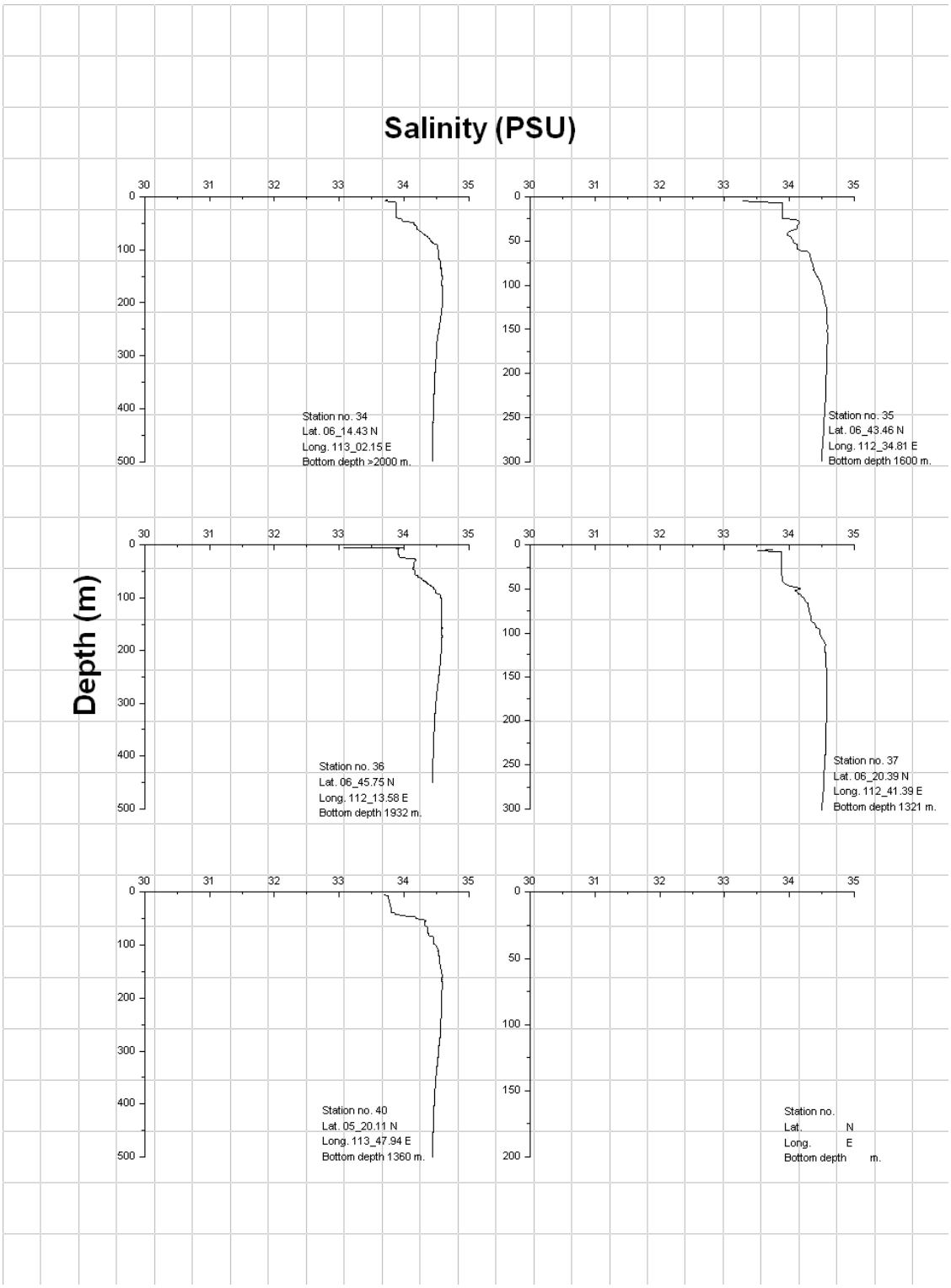
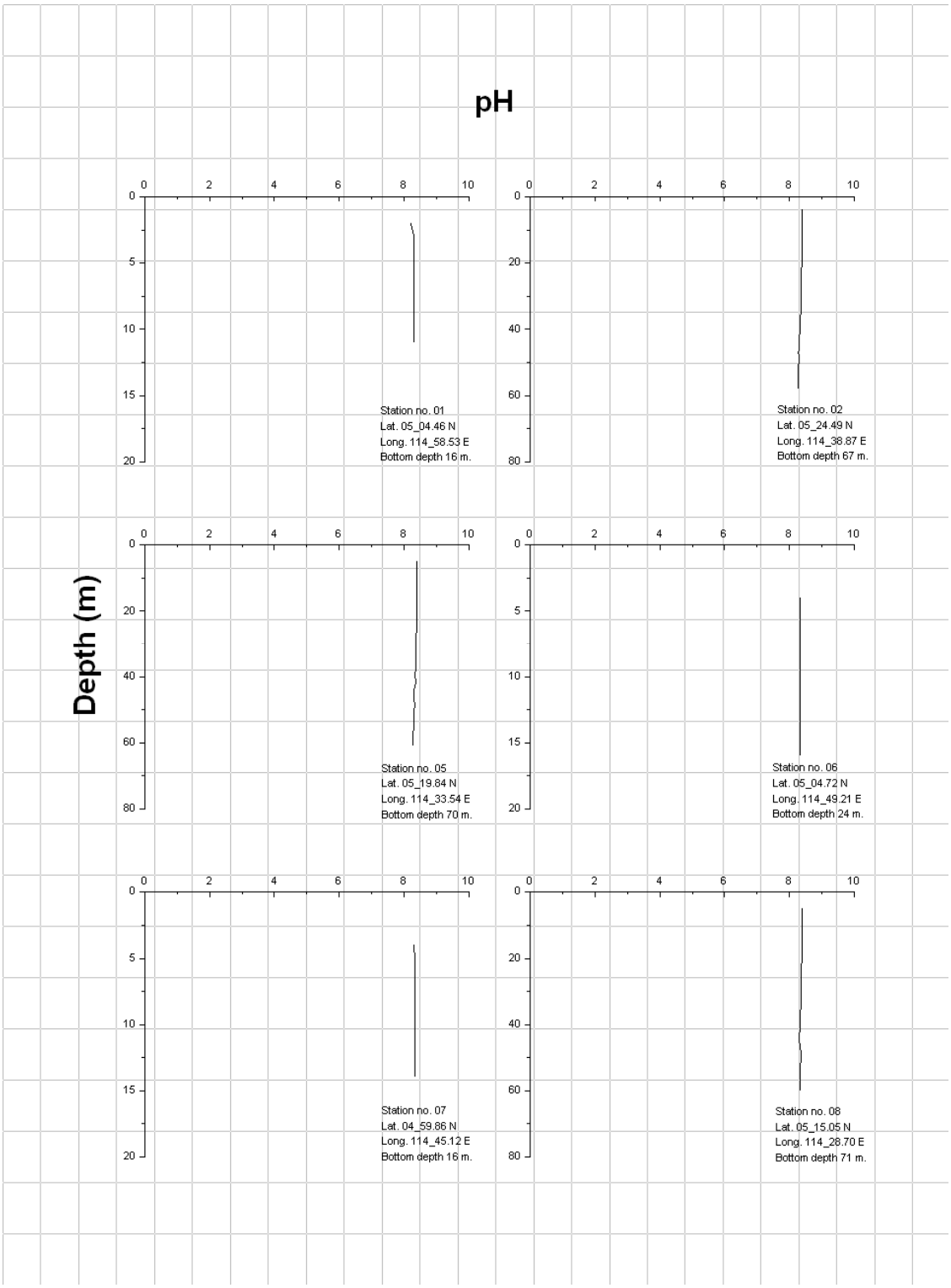
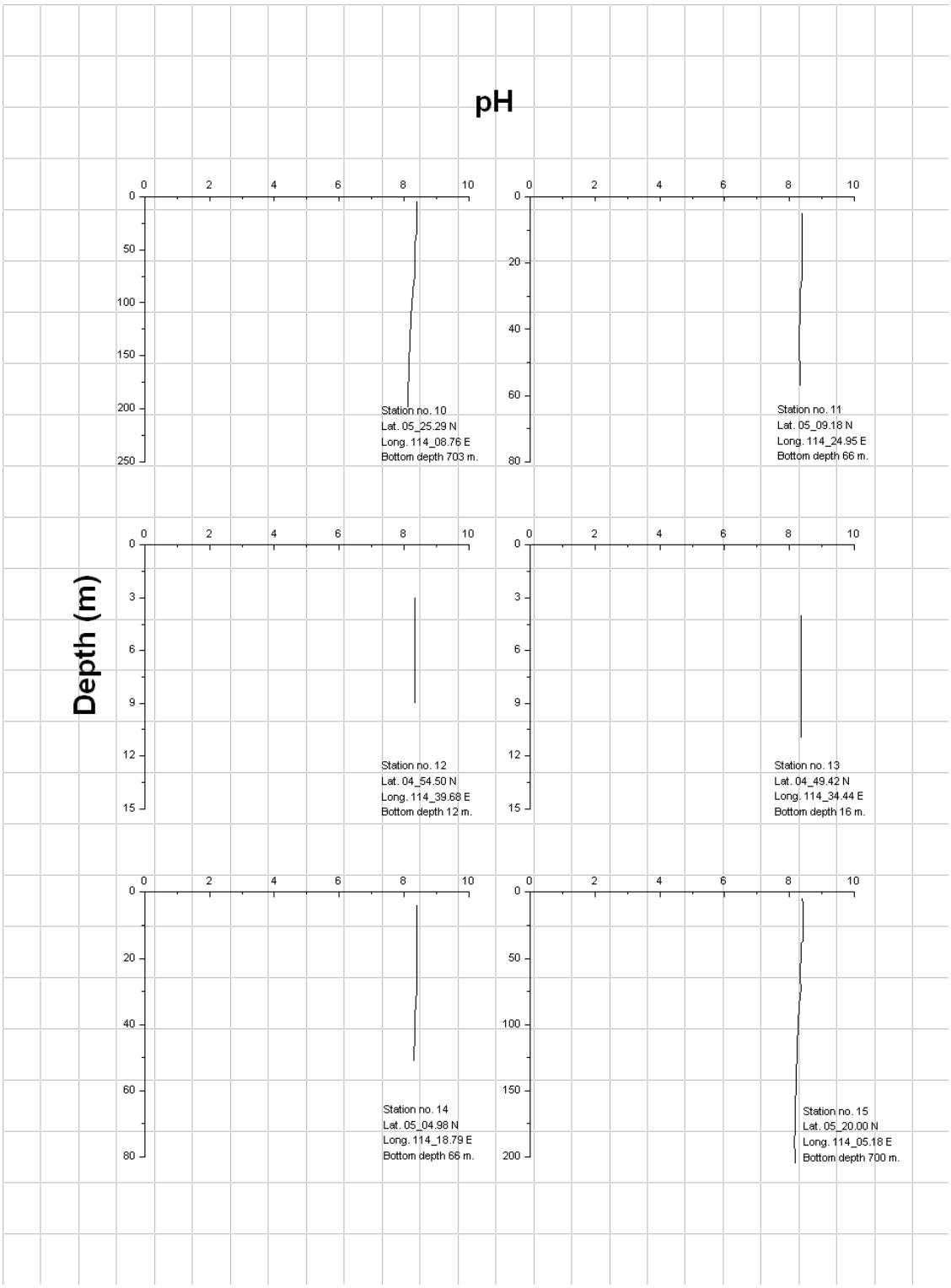
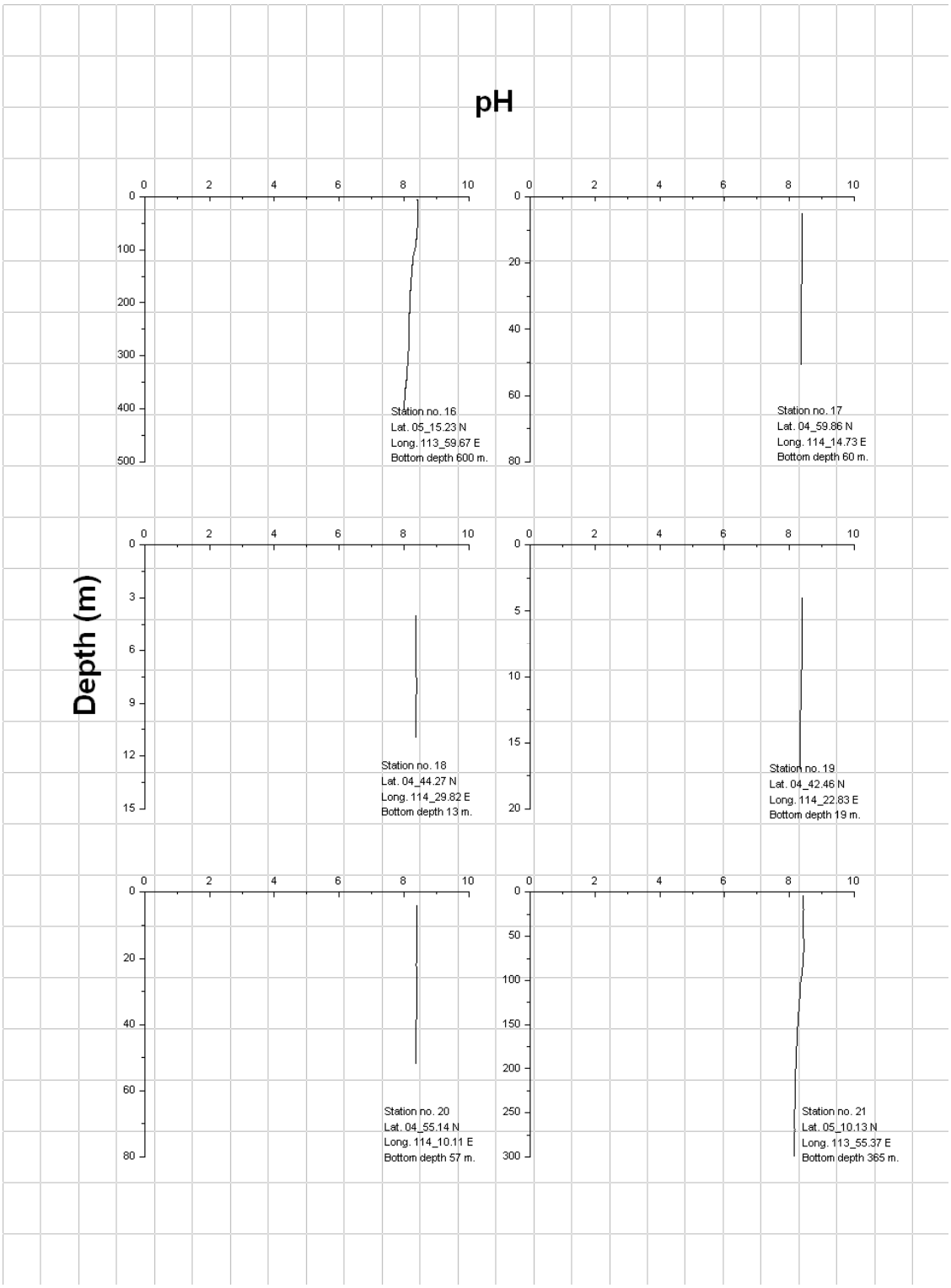
Long. 113_50.23 E
Bottom depth 232 m.
Station no. 23
Lat. 04_50.01 N
Long. 114_05.22 E
Bottom depth 52 m.
Station no. 24
Lat. 04_39.78 N
Long. 114_15.09 E
Bottom depth 14 m.
Station no. 25
Lat. 05_36.42 N
Long. 114_14.31 E
Bottom depth 868 m.
Station no. 26
Lat. 06_04.32 N
Long. 113_46.86 E
Bottom depth >2000 m.
Station no. 27
Lat. 06_34.20 N
Long. 113_17.12 E
Bottom depth >2000 m.

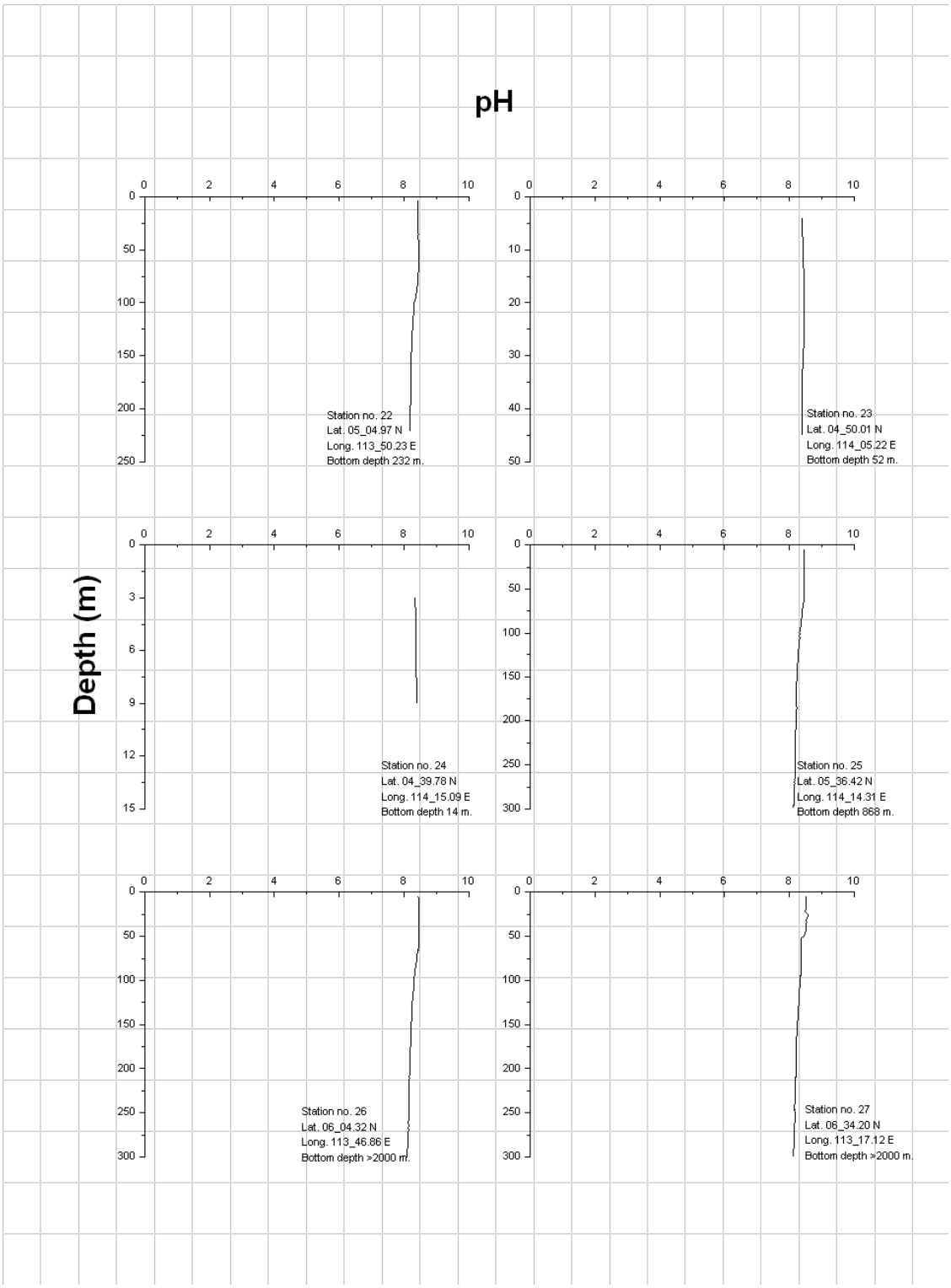

Salinity (PSU)
Depth (m)
Station no. 28
Lat. 07_02.80 N
Long. 112_49.80 E
Bottom depth >2000 m.
Station no. 29
Lat. 07_05.65 N
Long. 112_30.86 E
Bottom depth >2000 m.
Station no. 30
Lat. 06_38.99 N
Long. 112_55.71 E
Bottom depth 1464 m.
Station no. 31
Lat. 06_09.92 N
Long. 113_26.07 E
Bottom depth >2000 m.
Station no. 32
Lat. 05_41.57 N
Long. 113_53.42 E
Bottom depth >2000 m.
Station no. 33
Lat. 05_18.26 N
Long. 113_58.91 E
Bottom depth 811 m.

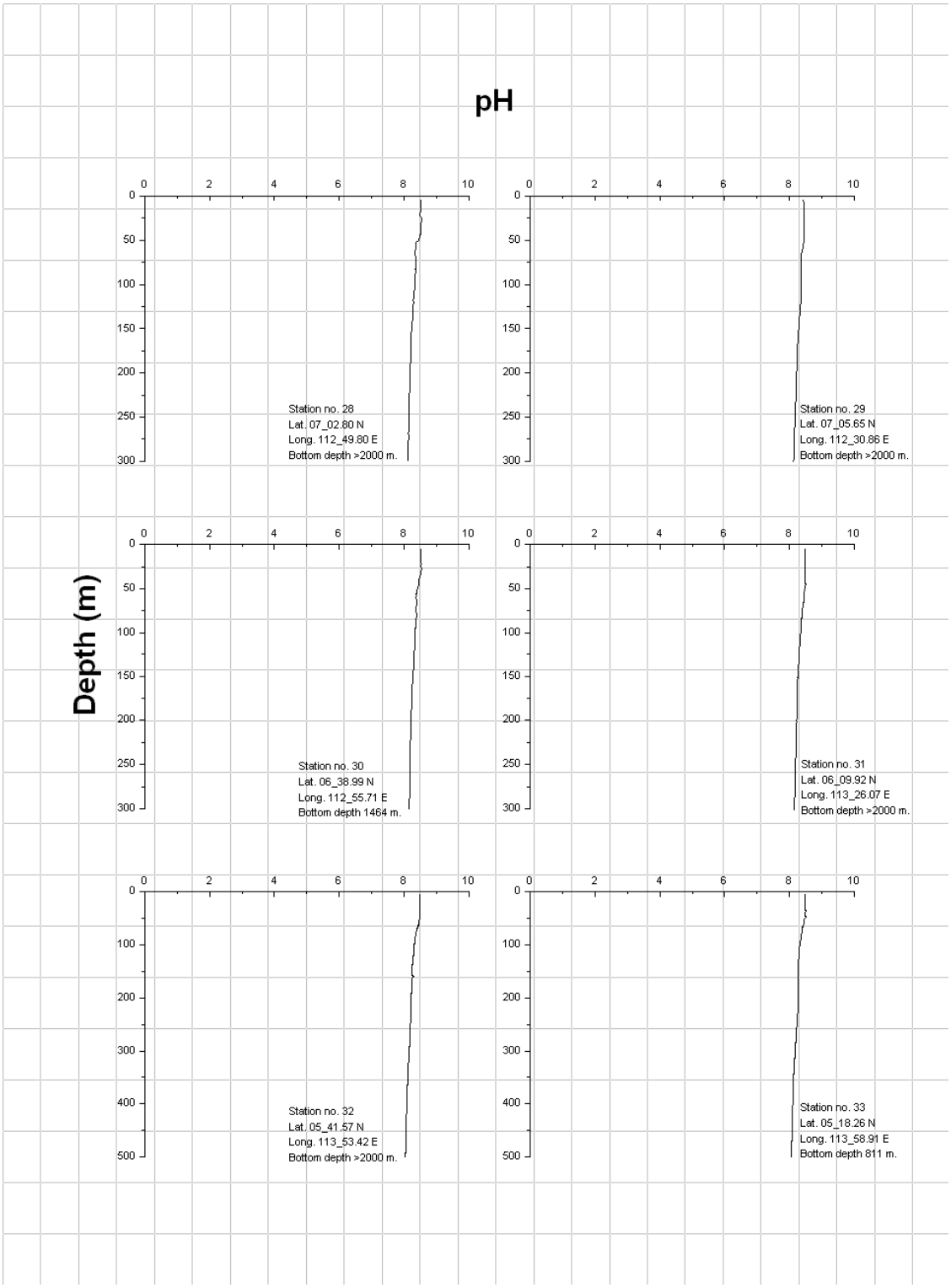

Salinity (PSU)
Depth (m)
Station no. 34
Lat. 06_14.43 N
Long. 113_02.15 E
Bottom depth >2000 m.
Station no. 35
Lat. 06_43.46 N
Long. 112_34.81 E
Bottom depth 1600 m.
Station no. 36
Lat. 06_45.75 N
Long. 112_13.58 E
Bottom depth 1932 m.
Station no. 37
Lat. 06_20.39 N
Long. 112_41.39 E
Bottom depth 1321 m.
Station no. 40
Lat. 05_20.11 N
Long. 113_47.94 E
Bottom depth 1360 m.
Station no.
Lat. N
Long. E
Bottom depth m.

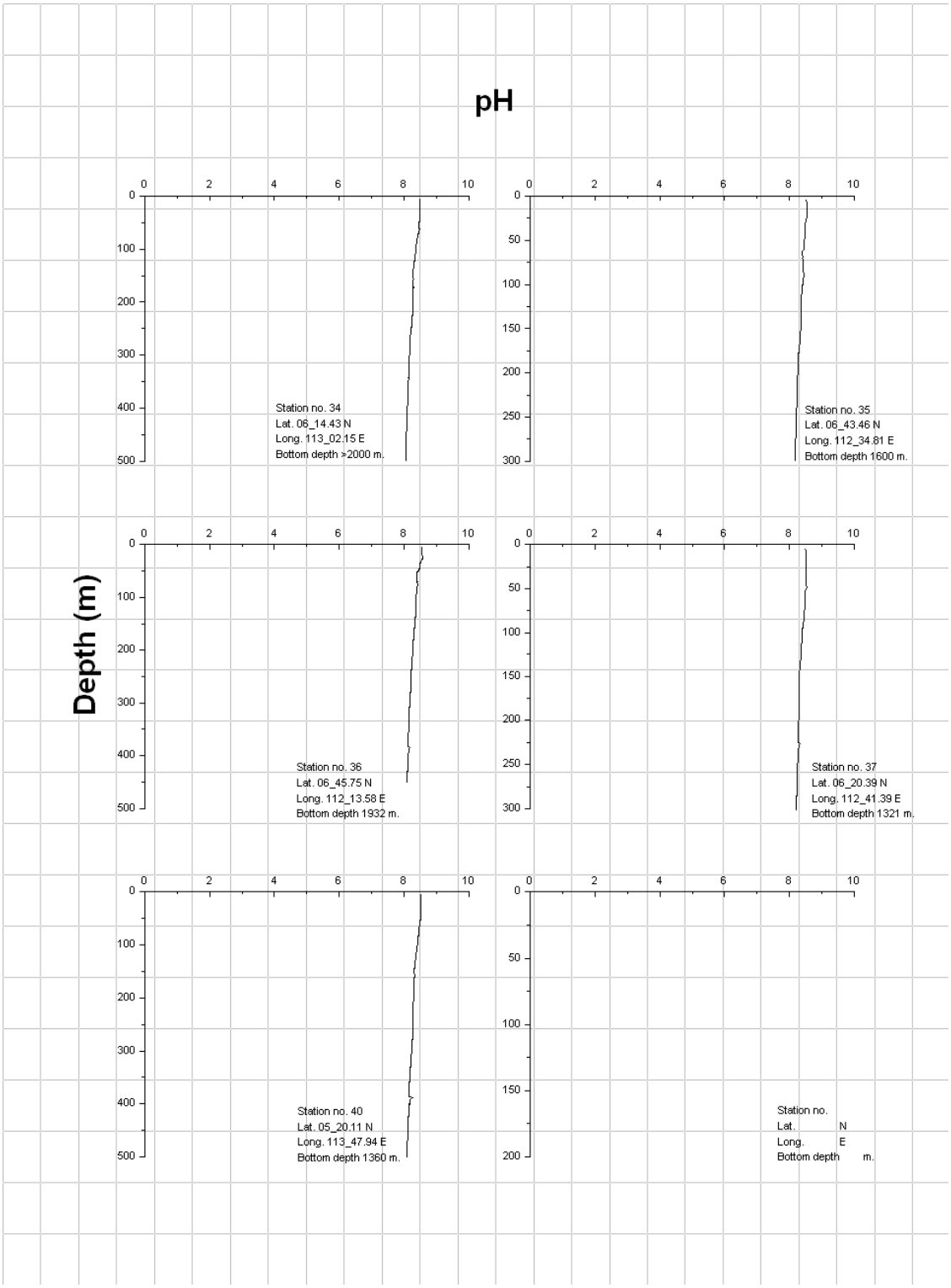

pH
Depth (m)
Station no. 01
Lat. 05_04.46 N
Long. 114_58.53 E
Bottom depth 16 m.
Station no. 02
Lat. 05_24.49 N
Long. 114_38.87 E
Bottom depth 67 m.
Station no. 05
Lat. 05_19.84 N
Long. 114_33.54 E
Bottom depth 70 m.
Station no. 06
Lat. 05_04.72 N
Long. 114_49.21 E
Bottom depth 24 m.
Station no. 07
Lat. 04_59.86 N
Long. 114_45.12 E
Bottom depth 16 m.
Station no. 08
Lat. 05_15.05 N
Long. 114_28.70 E
Bottom depth 71 m.

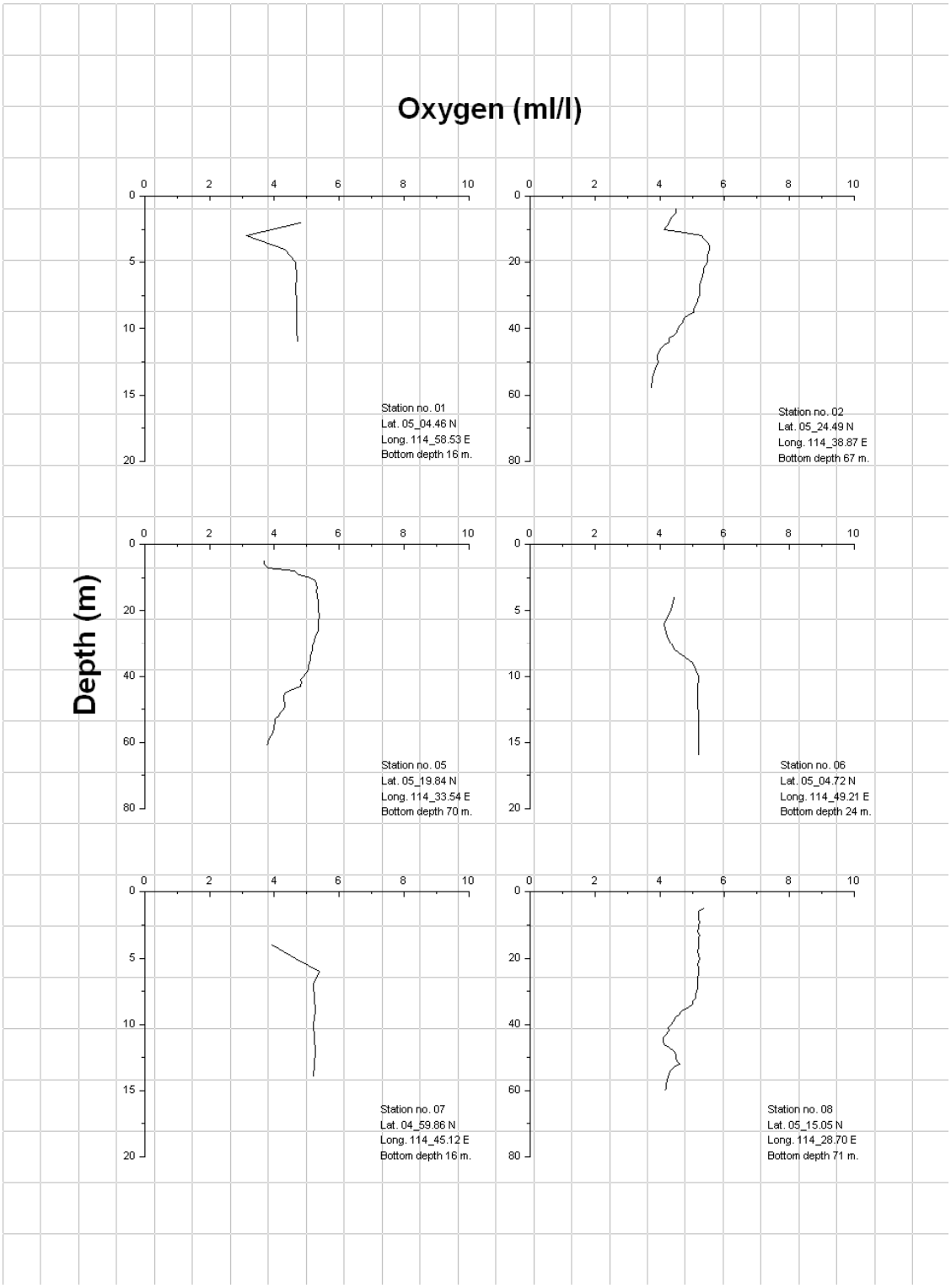

pH
Depth (m)
Station no. 10
Lat. 05_25.29 N
Long. 114_08.76 E
Bottom depth 703 m.
Station no. 11
Lat. 05_09.18 N
Long. 114_24.95 E
Bottom depth 66 m.
Station no. 12
Lat. 04_54.50 N
Long. 114_39.68 E
Bottom depth 12 m.
Station no. 13
Lat. 04_49.42 N
Long. 114_34.44 E
Bottom depth 16 m.
Station no. 14
Lat. 05_04.98 N
Long. 114_18.79 E
Bottom depth 66 m.
Station no. 15
Lat. 05_20.00 N
Long. 114_05.18 E
Bottom depth 700 m.

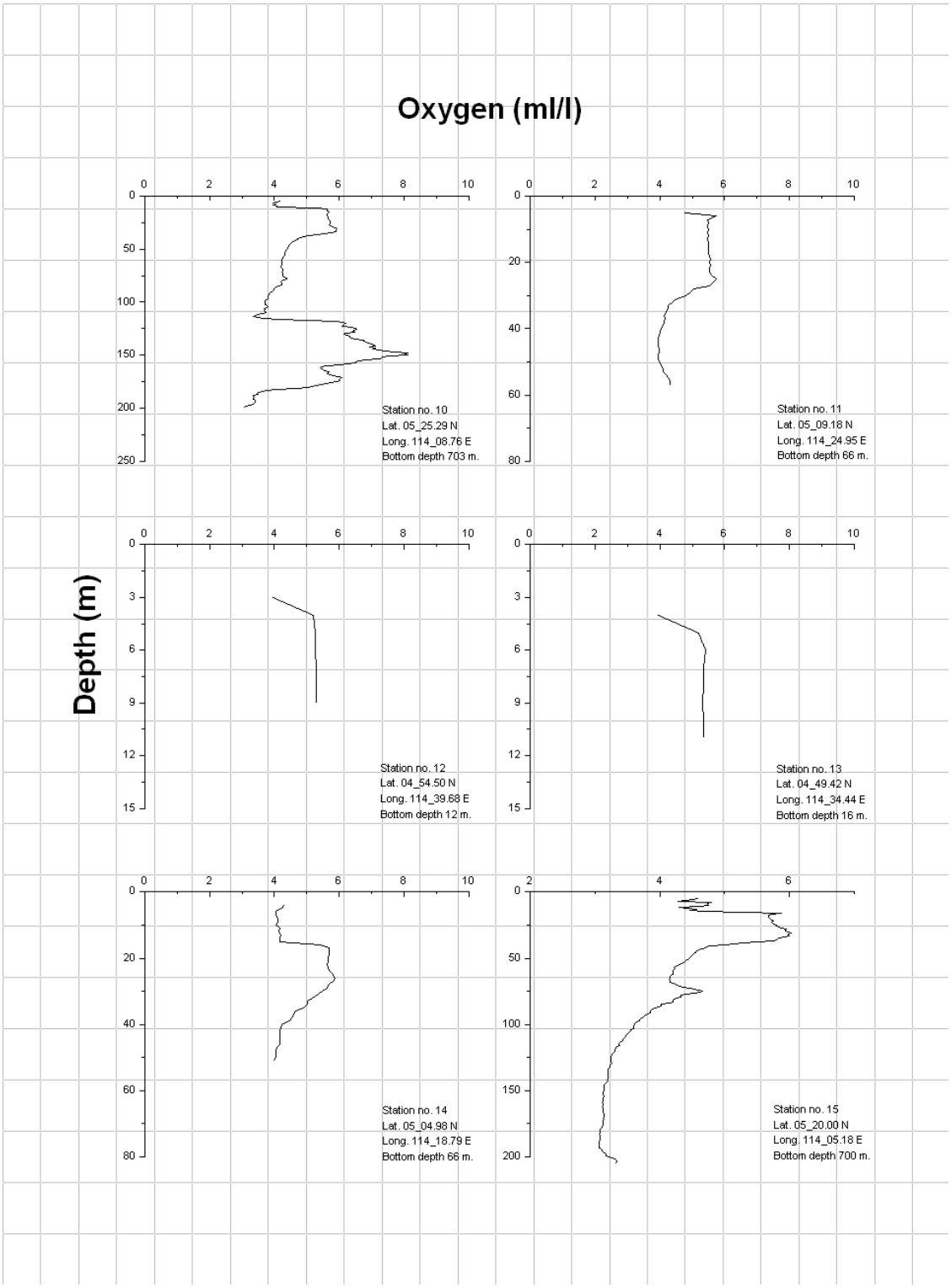

pH
Depth (m)
Station no. 16
Lat. 05_15.23 N
Long. 113_59.67 E
Bottom depth 600 m.
Station no. 17
Lat. 04_59.86 N
Long. 114_14.73 E
Bottom depth 60 m.
Station no. 18
Lat. 04_44.27 N
Long. 114_29.82 E
Bottom depth 13 m.
Station no. 19
Lat. 04_42.46 N
Long. 114_22.83 E
Bottom depth 19 m.
Station no. 20
Lat. 04_55.14 N
Long. 114_10.11 E
Bottom depth 57 m.
Station no. 21
Lat. 05_10.13 N
Long. 113_55.37 E
Bottom depth 365 m.

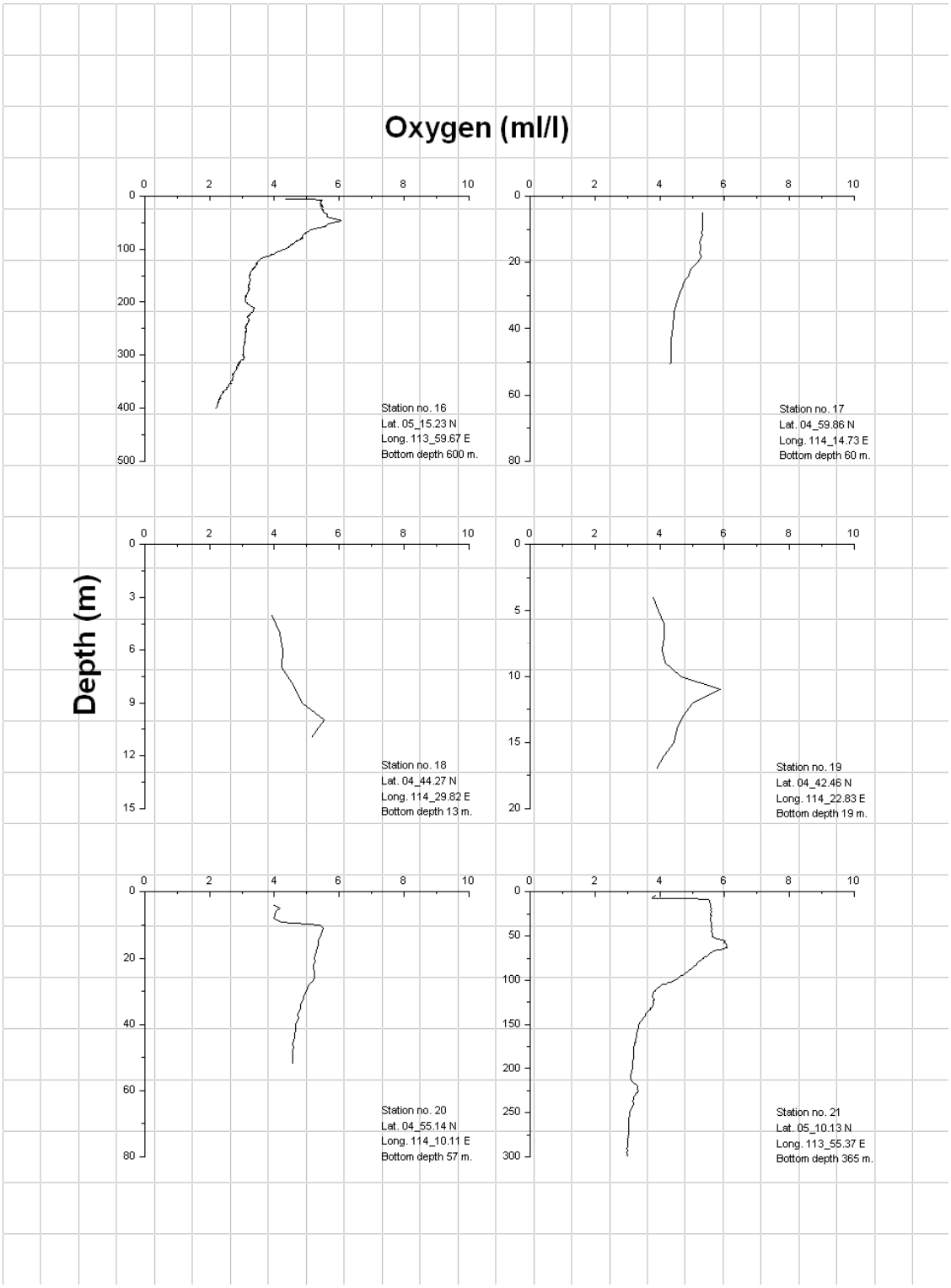

pH
Depth (m)
Station no. 22
Lat. 05_04.97 N
Long. 113_50.23 E
Bottom depth 232 m.
Station no. 23
Lat. 04_50.01 N
Long. 114_05.22 E
Bottom depth 52 m.
Station no. 24
Lat. 04_39.78 N
Long. 114_15.09 E
Bottom depth 14 m.
Station no. 25
Lat. 05_36.42 N
Long. 114_14.31 E
Bottom depth 868 m.
Station no. 26
Lat. 06_04.32 N
Long. 113_46.86 E
Bottom depth >2000 m.
Station no. 27
Lat. 06_34.20 N
Long. 113_17.12 E
Bottom depth >2000 m.

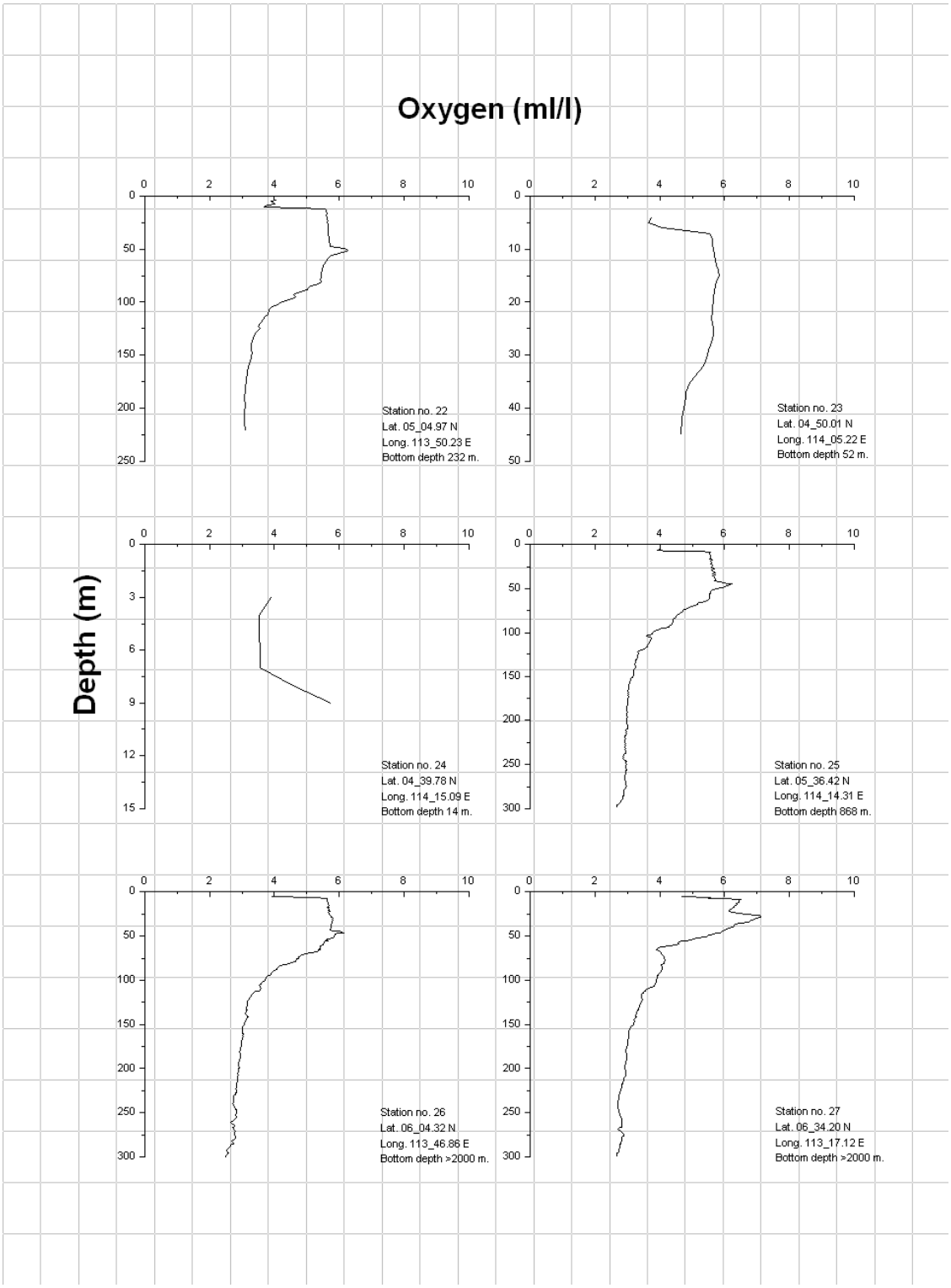

pH
Depth (m)
Station no. 28
Lat. 07_02.80 N
Long. 112_49.80 E
Bottom depth >2000 m.
Station no. 29
Lat. 07_05.65 N
Long. 112_30.86 E
Bottom depth >2000 m.
Station no. 30
Lat. 06_38.99 N
Long. 112_55.71 E
Bottom depth 1464 m.
Station no. 31
Lat. 06_09.92 N
Long. 113_26.07 E
Bottom depth >2000 m.
Station no. 32
Lat. 05_41.57 N
Long. 113_53.42 E
Bottom depth >2000 m.
Station no. 33
Lat. 05_18.26 N
Long. 113_58.91 E
Bottom depth 811 m.

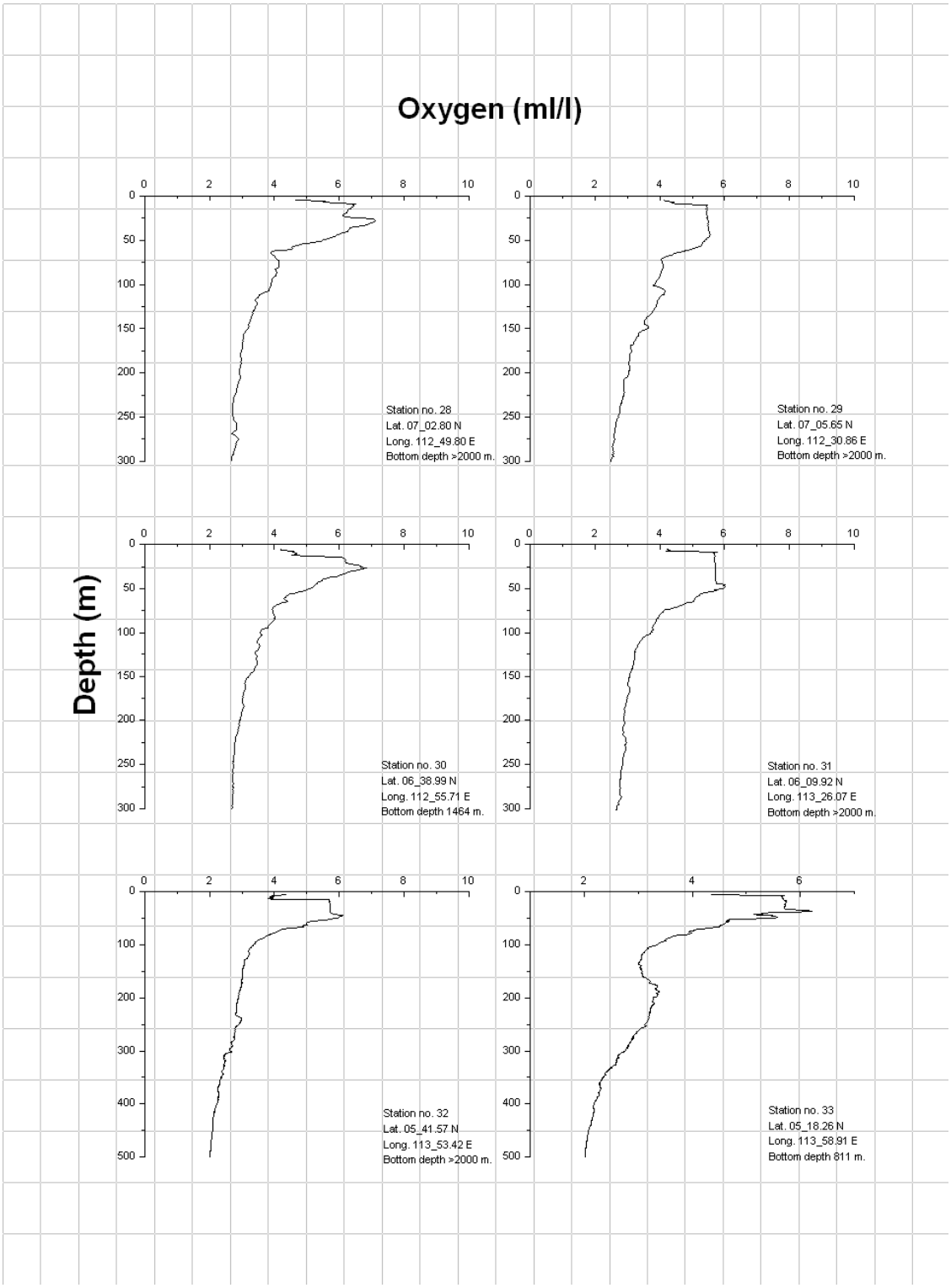

pH
Depth (m)
Station no. 34
Lat. 06_14.43 N
Long. 113_02.15 E
Bottom depth >2000 m.
Station no. 35
Lat. 06_43.46 N
Long. 112_34.81 E
Bottom depth 1600 m.
Station no. 36
Lat. 06_45.75 N
Long. 112_13.58 E
Bottom depth 1932 m.
Station no. 37
Lat. 06_20.39 N
Long. 112_41.39 E
Bottom depth 1321 m.
Station no. 40
Lat. 05_20.11 N
Long. 113_47.94 E
Bottom depth 1360 m.
Station no.
Lat. N
Long. E
Bottom depth m.

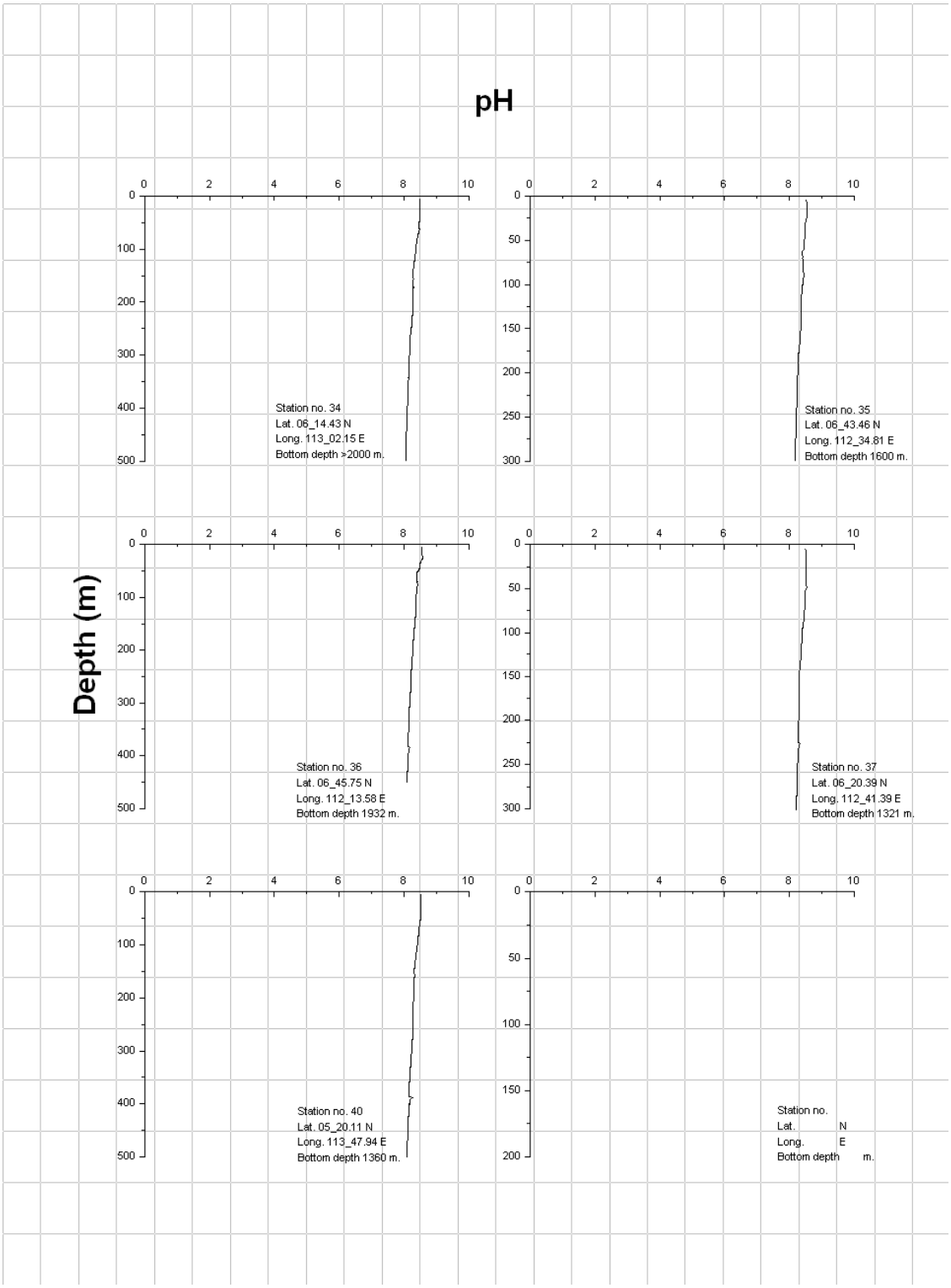

Oxygen (ml/l)
Depth (m)
Station no. 01
Lat. 05_04.46 N
Long. 114_58.53 E
Bottom depth 16 m.
Station no. 02
Lat. 05_24.49 N
Long. 114_38.87 E
Bottom depth 67 m.
Station no. 05
Lat. 05_19.84 N
Long. 114_33.54 E
Bottom depth 70 m.
Station no. 06
Lat. 05_04.72 N
Long. 114_49.21 E
Bottom depth 24 m.
Station no. 07
Lat. 04_59.86 N
Long. 114_45.12 E
Bottom depth 16 m.
Station no. 08
Lat. 05_15.05 N
Long. 114_28.70 E
Bottom depth 71 m.

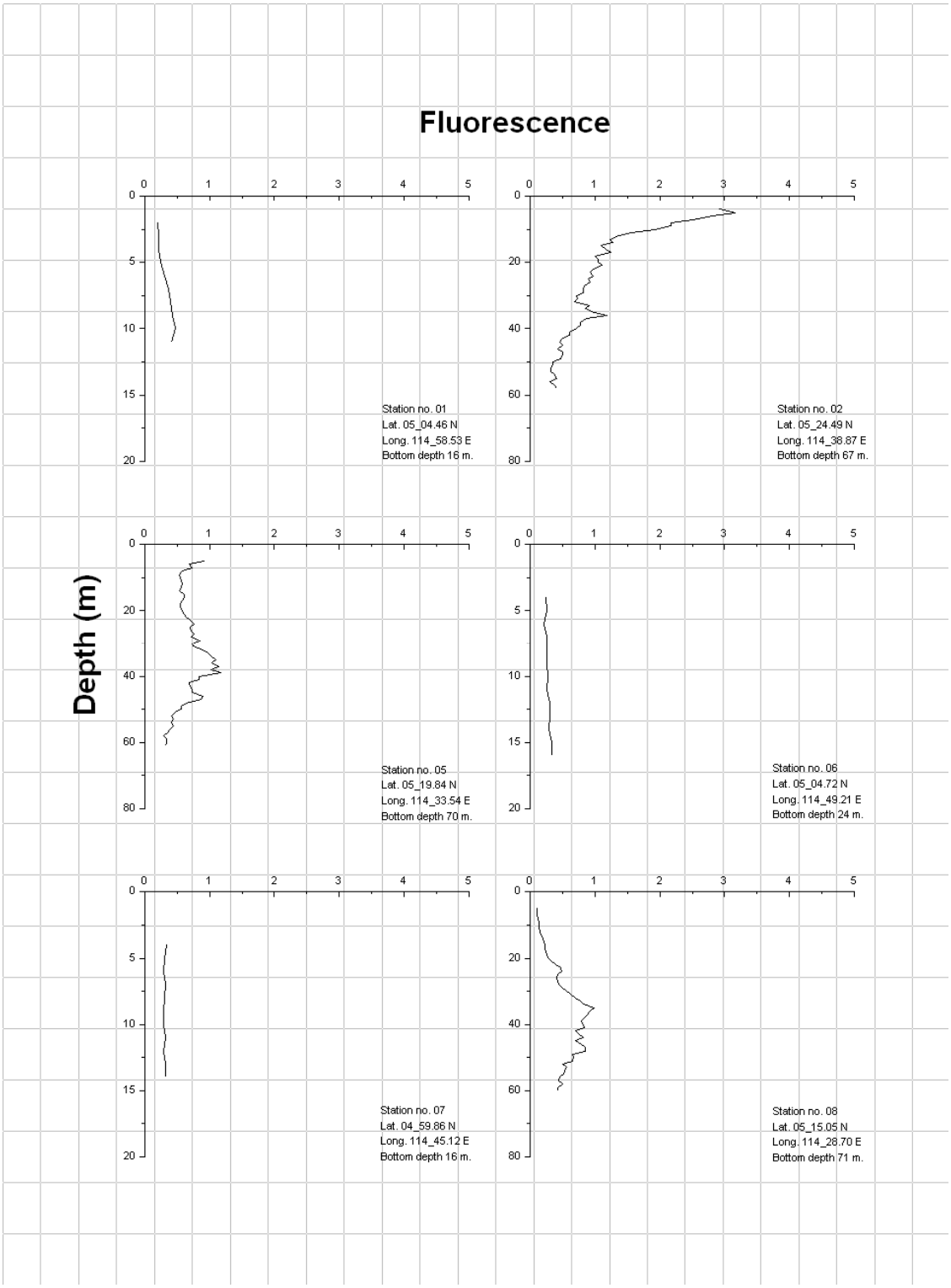

Oxygen (ml/l)
Depth (m)
Station no. 10
Lat. 05_25.29 N
Long. 114_08.76 E
Bottom depth 703 m.
Station no. 11
Lat. 05_09.18 N
Long. 114_24.95 E
Bottom depth 66 m.
Station no. 12
Lat. 04_54.50 N
Long. 114_39.68 E
Bottom depth 12 m.
Station no. 13
Lat. 04_49.42 N
Long. 114_34.44 E
Bottom depth 16 m.
Station no. 14
Lat. 05_04.98 N
Long. 114_18.79 E
Bottom depth 66 m.
Station no. 15
Lat. 05_20.00 N
Long. 114_05.18 E
Bottom depth 700 m.

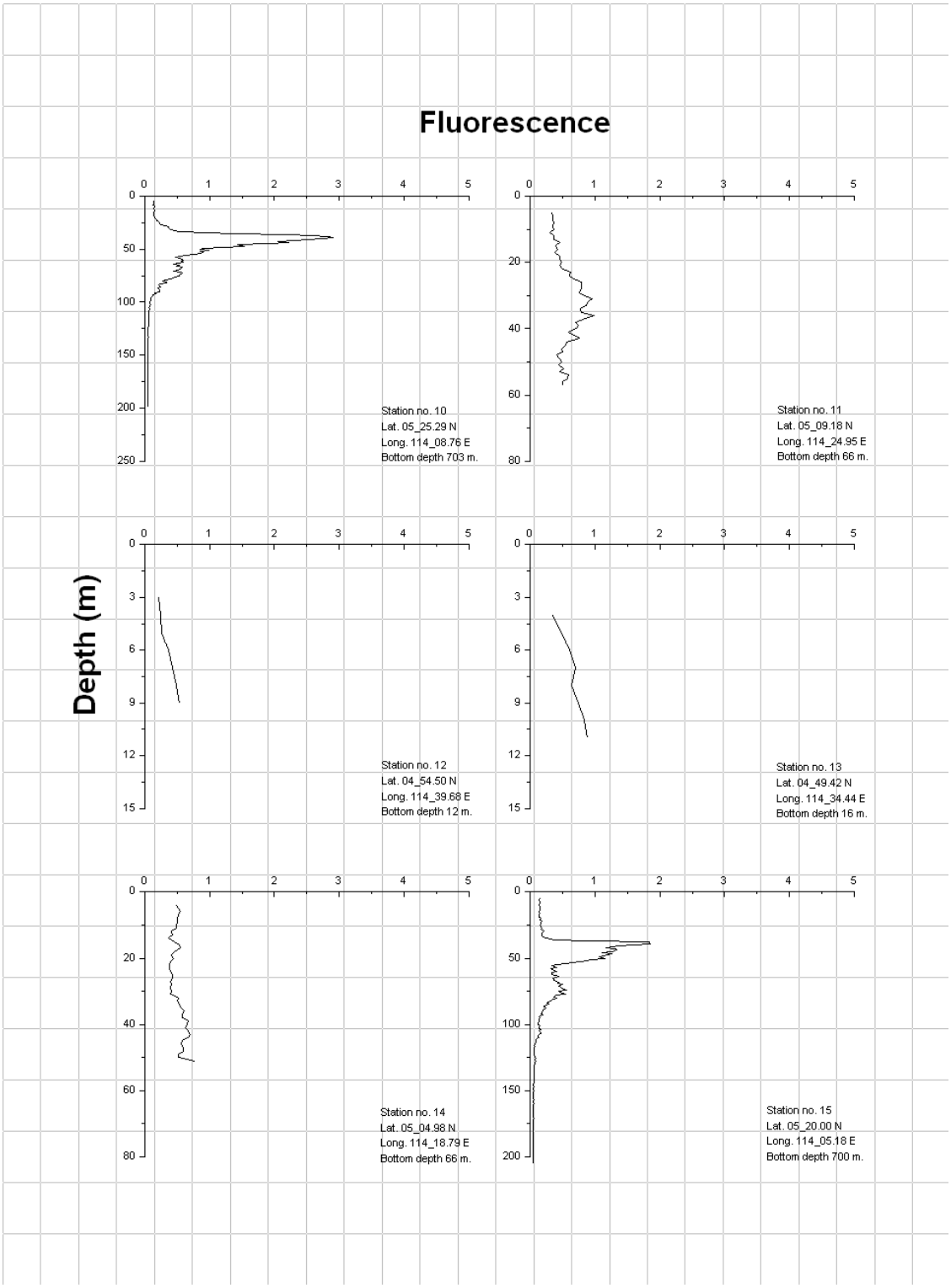

Oxygen (ml/l)
Depth (m)
Station no. 16
Lat. 05_15.23 N
Long. 113_59.67 E
Bottom depth 600 m.
Station no. 17
Lat. 04_59.86 N
Long. 114_14.73 E
Bottom depth 60 m.
Station no. 18
Lat. 04_44.27 N
Long. 114_29.82 E
Bottom depth 13 m.
Station no. 19
Lat. 04_42.46 N
Long. 114_22.83 E
Bottom depth 19 m.
Station no. 20
Lat. 04_55.14 N
Long. 114_10.11 E
Bottom depth 57 m.
Station no. 21
Lat. 05_10.13 N
Long. 113_55.37 E
Bottom depth 365 m.

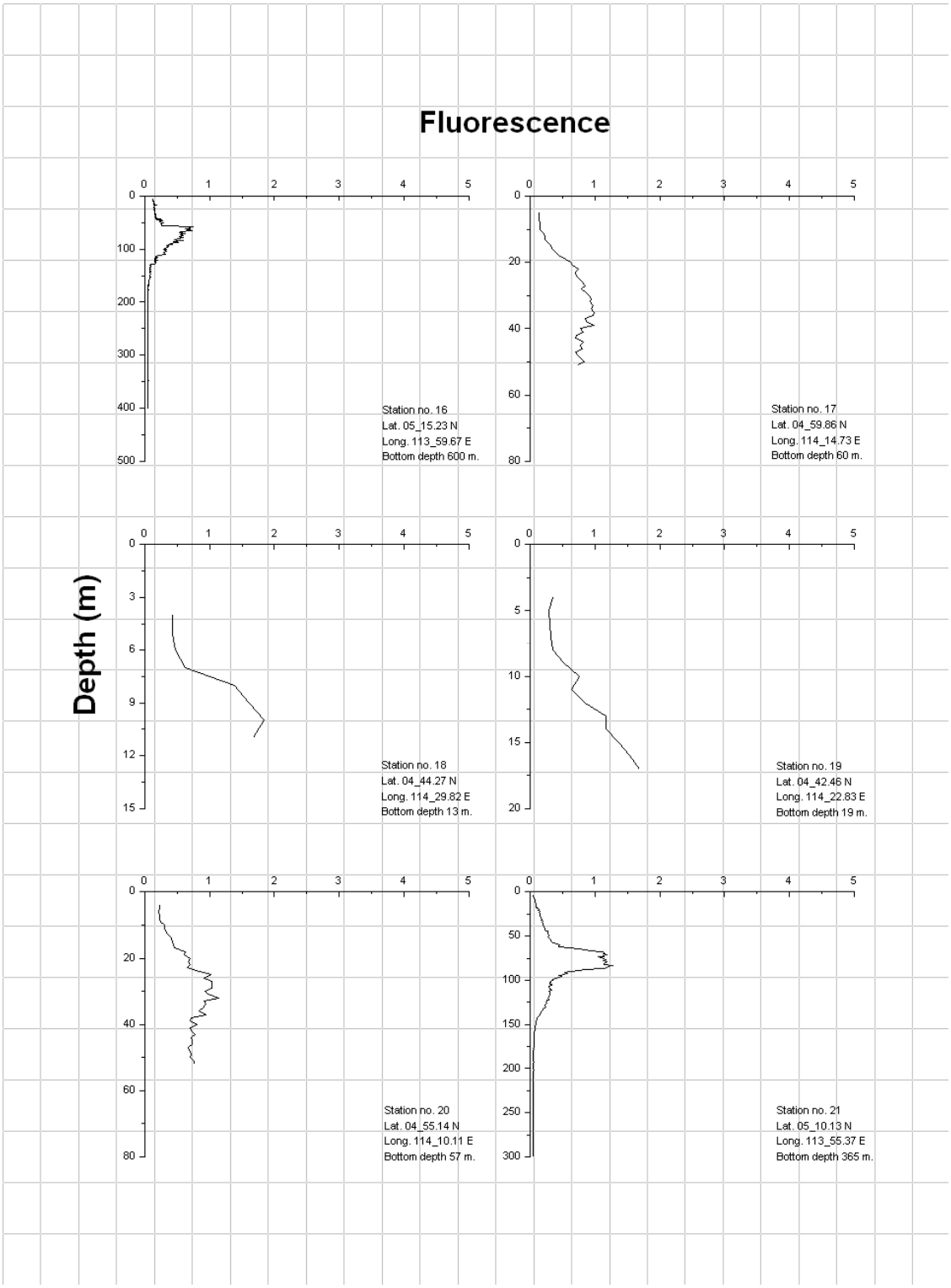

Oxygen (ml/l)
Depth (m)
Station no. 22
Lat. 05_04.97 N
Long. 113_50.23 E
Bottom depth 232 m.
Station no. 23
Lat. 04_50.01 N
Long. 114_05.22 E
Bottom depth 52 m.
Station no. 24
Lat. 04_39.78 N
Long. 114_15.09 E
Bottom depth 14 m.
Station no. 25
Lat. 05_36.42 N
Long. 114_14.31 E
Bottom depth 868 m.
Station no. 26
Lat. 06_04.32 N
Long. 113_46.86 E
Bottom depth >2000 m.
Station no. 27
Lat. 06_34.20 N
Long. 113_17.12 E
Bottom depth >2000 m.

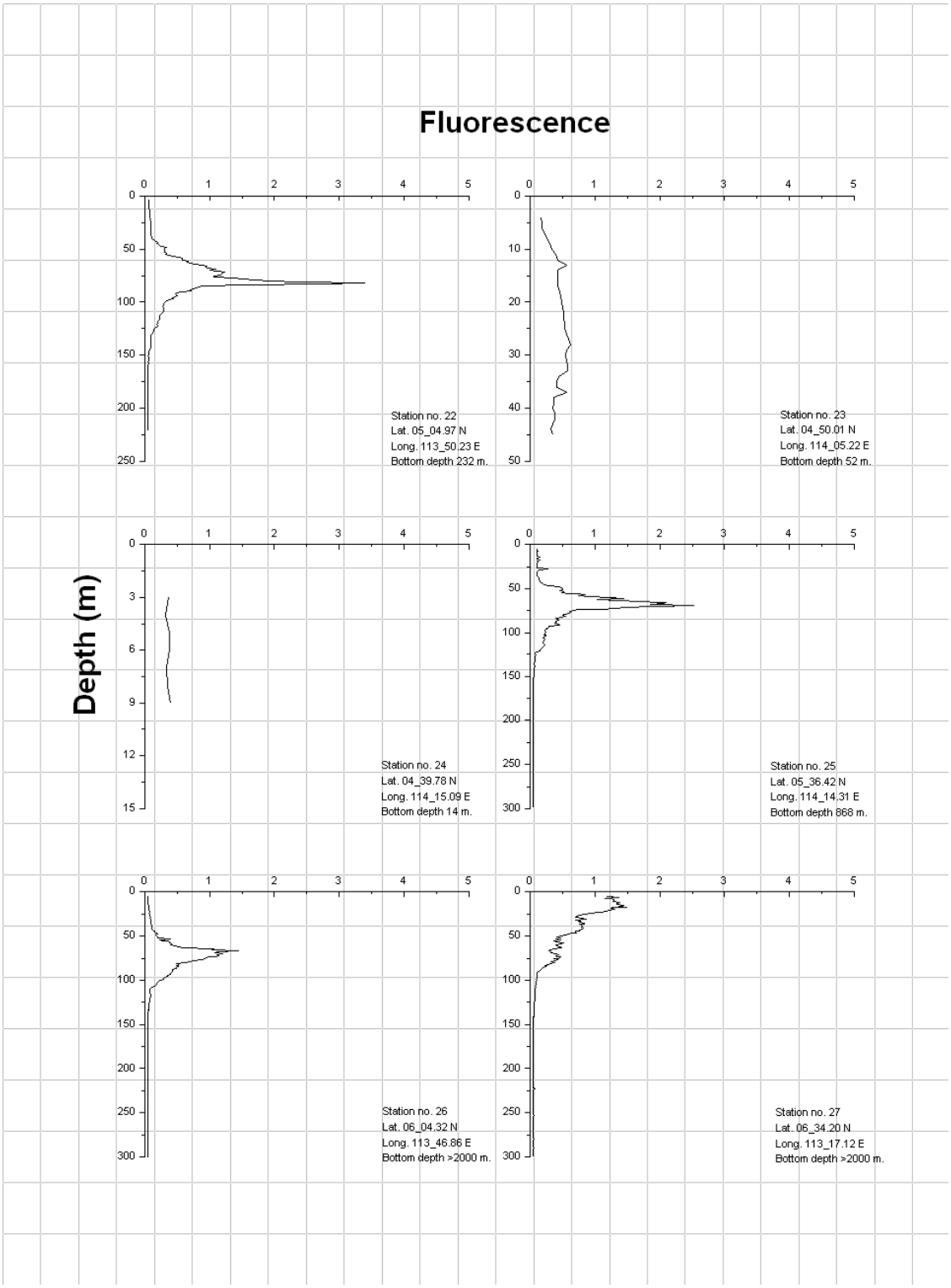

Oxygen (ml/l)
Depth (m)
Station no. 28
Lat. 07_02.80 N
Long. 112_49.80 E
Bottom depth >2000 m.
Station no. 29
Lat. 07_05.65 N
Long. 112_30.86 E
Bottom depth >2000 m.
Station no. 30
Lat. 06_38.99 N
Long. 112_55.71 E
Bottom depth 1464 m.
Station no. 31
Lat. 06_09.92 N
Long. 113_26.07 E
Bottom depth >2000 m.
Station no. 32
Lat. 05_41.57 N
Long. 113_53.42 E
Bottom depth >2000 m.
Station no. 33
Lat. 05_18.26 N
Long. 113_58.91 E
Bottom depth 811 m.

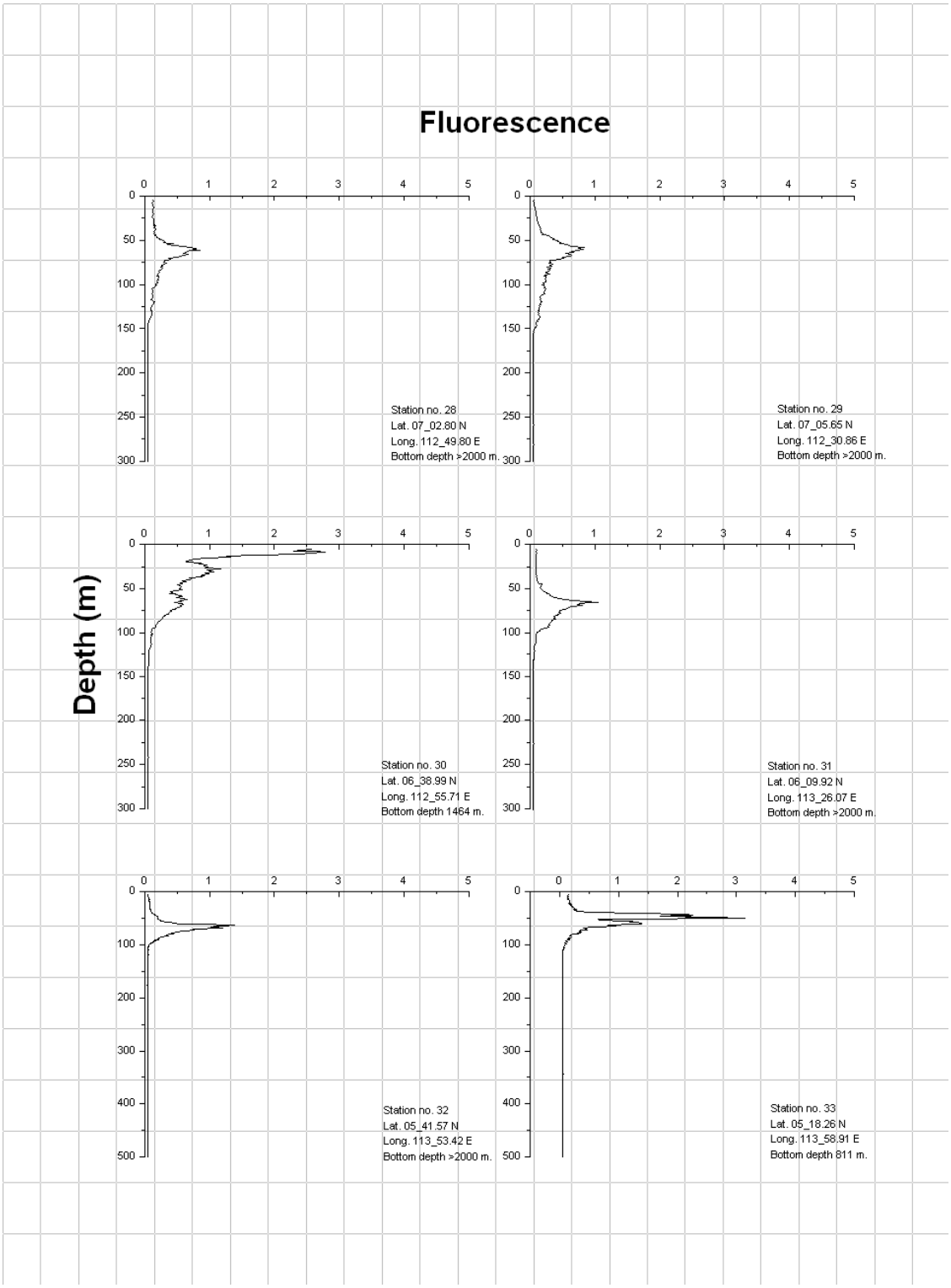

pH
Depth (m)
Station no. 34
Lat. 06_14.43 N
Long. 113_02.15 E
Bottom depth >2000 m.
Station no. 35
Lat. 06_43.46 N
Long. 112_34.81 E
Bottom depth 1600 m.
Station no. 36
Lat. 06_45.75 N
Long. 112_13.58 E
Bottom depth 1932 m.
Station no. 37
Lat. 06_20.39 N
Long. 112_41.39 E
Bottom depth 1321 m.
Station no. 40
Lat. 05_20.11 N
Long. 113_47.94 E
Bottom depth 1360 m.
Station no.
Lat. N
Long. E
Bottom depth m.

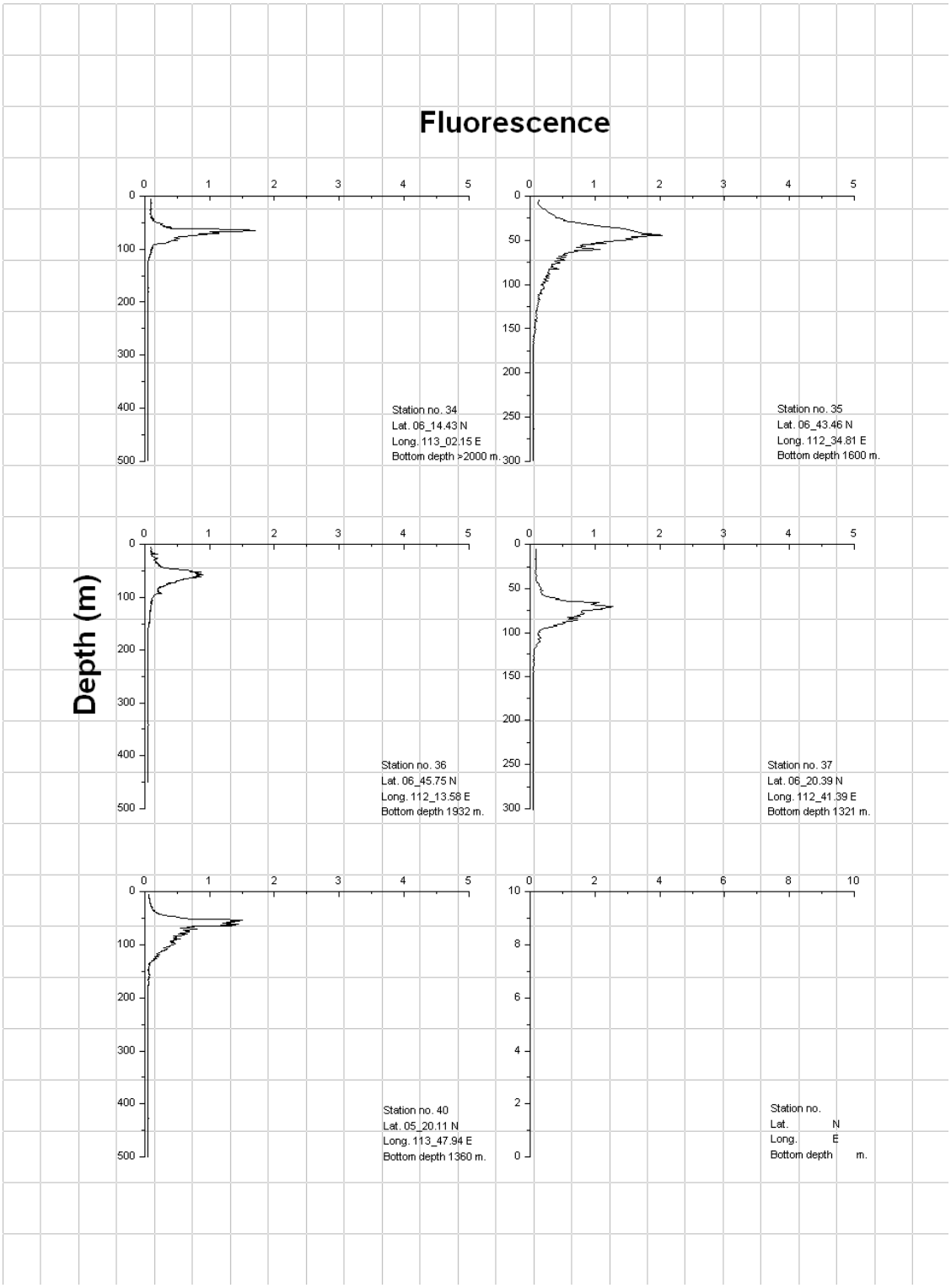

Fluorescence
Depth (m)
Station no. 01
Lat. 05_04.46 N
Long. 114_58.53 E
Bottom depth 16 m.
Station no. 02
Lat. 05_24.49 N
Long. 114_38.87 E
Bottom depth 67 m.
Station no. 05
Lat. 05_19.84 N
Long. 114_33.54 E
Bottom depth 70 m.
Station no. 06
Lat. 05_04.72 N
Long. 114_49.21 E
Bottom depth 24 m.
Station no. 07
Lat. 04_59.86 N
Long. 114_45.12 E
Bottom depth 16 m.
Station no. 08
Lat. 05_15.05 N
Long. 114_28.70 E
Bottom depth 71 m.


Fluorescence
Depth (m)
Station no. 10
Lat. 05_25.29 N
Long. 114_08.76 E
Bottom depth 703 m.
Station no. 11
Lat. 05_09.18 N
Long. 114_24.95 E
Bottom depth 66 m.
Station no. 12
Lat. 04_54.50 N
Long. 114_39.68 E
Bottom depth 12 m.
Station no. 13
Lat. 04_49.42 N
Long. 114_34.44 E
Bottom depth 16 m.
Station no. 14
Lat. 05_04.98 N
Long. 114_18.79 E
Bottom depth 66 m.
Station no. 15
Lat. 05_20.00 N
Long. 114_05.18 E
Bottom depth 700 m.


Fluorescence
Depth (m)
Station no. 16
Lat. 05_15.23 N
Long. 113_59.67 E
Bottom depth 600 m.
Station no. 17
Lat. 04_59.86 N
Long. 114_14.73 E
Bottom depth 60 m.
Station no. 18
Lat. 04_44.27 N
Long. 114_29.82 E
Bottom depth 13 m.
Station no. 19
Lat. 04_42.46 N
Long. 114_22.83 E
Bottom depth 19 m.
Station no. 20
Lat. 04_55.14 N
Long. 114_10.11 E
Bottom depth 57 m.
Station no. 21
Lat. 05_10.13 N
Long. 113_55.37 E
Bottom depth 365 m.


Fluorescence
Depth (m)
Station no. 22
Lat. 05_04.97 N
Long.113_50.23 E
Bottom depth 232 m.
Station no. 23
Lat. 04_50.01 N
Long. 114_05.22 E
Bottom depth 52 m.
Station no. 24
Lat. 04_39.78 N
Long. 114_15.09 E
Bottom depth 14 m.
Station no. 25
Lat. 05_36.42 N
Long. 114_14.31 E
Bottom depth 868 m.
Station no. 26
Lat. 06_04.32 N
Long. 113_46.86 E
Bottom depth >2000 m.
Station no. 27
Lat. 06_34.20 N
Long. 113_17.12 E
Bottom depth >2000 m.


Fluorescence
Depth (m)
Station no. 28
Lat. 07_02.80 N
Long. 112_49.80 E
Bottom depth >2000 m.
Station no. 29
Lat. 07_05.65 N
Long. 112_30.86 E
Bottom depth >2000 m.
Station no. 30
Lat. 06_38.99 N
Long. 112_55.71 E
Bottom depth 1464 m.
Station no. 31
Lat. 06_09.92 N
Long. 113_26.07 E
Bottom depth >2000 m.
Station no. 32
Lat. 05_41.57 N
Long. 113_53.42 E
Bottom depth >2000 m.
Station no. 33
Lat. 05_18.26 N
Long. 113_58.91 E
Bottom depth 811 m.


Fluorescence
Depth (m)
Station no. 34
Lat. 06_14.43 N
Long. 113_02.15 E
Bottom depth >2000 m.
Station no. 35
Lat. 06_43.46 N
Long. 112_34.81 E
Bottom depth 1600 m.
Station no. 36
Lat. 06_45.75 N
Long. 112_13.58 E
Bottom depth 1932 m.
Station no. 37
Lat. 06_20.39 N
Long. 112_41.39 E
Bottom depth 1321 m.
Station no. 40
Lat. 05_20.11 N
Long. 113_47.94 E
Bottom depth 1360 m.
Station no.
Lat. N
Long. E
Bottom depth m.

Appendix II

FQ-80 Log Book (Brunei Zone 2-3)

Doc ID.	2503	Station		1-2	Ship Course	315	Remark
Date	20-2-05	From	Lat.	5°05.996 N	Ship Speed	10 → 8.5 kt.	Wind speed 8 kt. / 020°
Start Time	1153		Long.	115°00.146 E	Sea State	Moderate	Swell 2 m.
Finish Time	1515	To	Lat.	5°25.166 N	Bottom Depth	16-58 m.	
			Long.	114°40.192 E			
Doc ID.	2504	Station		2-3	Ship Course	315	Remark
Date	20-2-05	From	Lat.	5°25.038 N	Ship Speed	8.2 kt.	Wind speed 8 kt. / 025°
Start Time	1723		Long.	114°40.250 E	Sea State	Moderate	Swell 1-2 m.
Finish Time	1956	To	Lat.	5°40.078 N	Bottom Depth	59-160 m.	
			Long.	114°25.808 E			
Doc ID.	2506	Station		3-4	Ship Course	228	Remark
Date	21-2-05	From	Lat.	5°40.017 N	Ship Speed	9 kt.	Wind speed 9 kt. / 030°
Start Time	0824		Long.	114°24.955 E	Sea State	Moderate	Swell 1-2 m.
Finish Time	0912	To	Lat.	5°34.917 N	Bottom Depth	156-369 m.	
			Long.	114°20.075 E			
Doc ID.	2507	Station		4-5	Ship Course	135	Remark
Date	21-2-05	From	Lat.	5°34.965 N	Ship Speed	9.5 kt.	Wind speed 6 kt. / 025°
Start Time	1155		Long.	114°20.145 E	Sea State	Moderate	Swell 1-2 m.
Finish Time	1409	To	Lat.	5°19.935 N	Bottom Depth	335-66 m.	
			Long.	114°35.143 E			
Doc ID.	2508	Station		5-6	Ship Course	141	Remark
Date	21-2-05	From	Lat.	5°19.846 N	Ship Speed	9.5 kt.	Wind speed 7 kt. / 000°
Start Time	1633		Long.	114°35.135 E	Sea State	Moderate	Change ship course to 128° on 17:27 hr.
Finish Time	1842	To	Lat.	5°05.071 N	Bottom Depth	64-20 m.	
			Long.	114°50.056 E			
Doc ID.	2509	Station		6-7	Ship Course	225	Remark
Date	21-2-05	From	Lat.	5°04.993 N	Ship Speed	9.5 kt.	Wind speed 8 kt. / 020°
Start Time	2000		Long.	114°49.971 E	Sea State	Slight	
Finish Time	2043	To	Lat.	4°59.895 N	Bottom Depth	20-14 m.	
			Long.	114°45.163 E			

FQ-80 Log Book (Brunei Zone 2-3)

Doc ID.	2510	Station		7-8	Ship Course	315	Remark
Date	22-2-05	From	Lat.	4°59.952 N	Ship Speed	9.3 kt.	Wind speed 8 kt. / 030°
Start Time	0725		Long.	114°45.148 E	Sea State	Moderate	Swell 1 m.
Finish Time	0945	To	Lat.	5°14.978 N	Bottom Depth	12-60 m.	
			Long.	114°30.205 E			
Doc ID.	2511	Station		8-9	Ship Course	315	Remark
Date	22-2-05	From	Lat.	5°14.952 N	Ship Speed	9.5 kt.	Wind speed 6 kt. / 045°
Start Time	1140		Long.	114°30.075 E	Sea State	Slight to Moderate	Swell 1 m.
Finish Time	1456	To	Lat.	5°30.005 N	Bottom Depth	60- >360 m.	
			Long.	114°15.293 E			
Doc ID.	2512	Station		9-10	Ship Course	225	Remark
Date	22-2-05	From	Lat.	5°29.893 N	Ship Speed	8.5 kt.	Wind speed 6 kt. / 030°
Start Time	1610		Long.	114°15.214 E	Sea State	Moderate	Swell 1-2 m.
Finish Time	1758	To	Lat.	5°24.970 N	Bottom Depth	225- >360 m.	
			Long.	114°10.115 E			
Doc ID.	2513	Station		10-11	Ship Course	135	Remark
Date	22-2-05	From	Lat.	5°24.854 N	Ship Speed	9 kt.	Wind speed 7 kt. / 000°
Start Time	1851		Long.	114°10.139 E	Sea State	Moderate	Swell 1-2 m.
Finish Time	2121	To	Lat.	5°05.940 N	Bottom Depth	>360-63 m.	
			Long.	114°25.178 E			
Doc ID.	2514	Station		11-12	Ship Course	135	Remark
Date	23-2-05	From	Lat.	5°09.881 N	Ship Speed	9.5 kt.	Wind speed 7 kt. / 030°
Start Time	0724		Long.	114°25.260 E	Sea State	Moderate	
Finish Time	0944	To	Lat.	4°54.900 N	Bottom Depth	62-8 m.	
			Long.	114°40.185 E			
Doc ID.	2515	Station		12-13	Ship Course	225	Remark
Date	23-2-05	From	Lat.	4°54.875 N	Ship Speed	9.5 kt.	Wind speed 5 kt. / 030°
Start Time	1121		Long.	114°40.812 E	Sea State	Slight	
Finish Time	1204	To	Lat.	4°49.867 N	Bottom Depth	8 m.	
			Long.	114°35.141 E			

FQ-80 Log Book (Brunei Zone 2-3)

Doc ID.	2517	Station		13-14	Ship Course	315	Remark	
Date	23-2-05	From	Lat.	4°50.098 N	Ship Speed	8.5 kt.	Wind speed 6 kt. / 020°	
Start Time	1331		Long.	114°35.079 E	Sea State	Slight		
Finish Time	1600	To	Lat.	5°05.112 N	Bottom Depth	8-59 m.		
			Long.	114°20.150 E				
Doc ID.	2518	Station		14-15	Ship Course	315	Remark	
Date	23-2-05	From	Lat.	5°05.062 N	Ship Speed	9 kt.	Wind speed 7 kt. / 020° Swell 1 m.	
Start Time	1741		Long.	114°20.070 E	Sea State	Moderate		
Finish Time	1953	To	Lat.	5°19.964 N	Bottom Depth	60- >360 m.		
			Long.	114°05.218 E				
Doc ID.	2519	Station		15-16	Ship Course	225	Remark	
Date	24-2-05	From	Lat.	5°19.894 N	Ship Speed	10 kt.	Wind speed 5 kt. / 050°	
Start Time	0726		Long.	114°05.110 E	Sea State	Slight		
Finish Time	0812	To	Lat.	5°14.610 N	Bottom Depth	>360 m.		
			Long.	113°59.899 E				
Doc ID.	2520	Station		16-17	Ship Course	135	Remark	
Date	24-2-05	From	Lat.	5°14.937 N	Ship Speed	10 kt.	Wind speed 6 kt. / 040°	
Start Time	0958		Long.	113°00.224 E	Sea State	Slight		
Finish Time	1203	To	Lat.	4°59.973 N	Bottom Depth	>360-55 m.		
			Long.	114°15.147 E				
Doc ID.	2521	Station		17-18	Ship Course	135	Remark	
Date	24-2-05	From	Lat.	4°59.957 N	Ship Speed	10 kt.	Wind speed 2 kt. / 030°	
Start Time	1323		Long.	114°15.200 E	Sea State	Slight		
Finish Time	1533	To	Lat.	4°44.864 N	Bottom Depth	55-10 m.		
			Long.	114°30.268 E				
Doc ID.	2522	Station		18-19	Ship Course	254	Remark	
Date	24-2-05	From	Lat.	4°44.840 N	Ship Speed	10 kt.	Wind speed 4 kt. / 330°	
Start Time	1654		Long.	114°30.205 E	Sea State	Slight		
Finish Time	1739	To	Lat.	4°42.940 N	Bottom Depth	10-18 m.		
			Long.	114°23.144 E				

FQ-80 Log Book (Brunei Zone 2-3)

Doc ID.	2523	Station		19-20	Ship Course	313	Remark
Date	24-2-05	From	Lat.	4°42.984 N	Ship Speed	9 kt.	Wind speed 2 kt. / 010°
Start Time	1903		Long.	114°23.111 E	Sea State	Slight	
Finish Time	2056	To	Lat.	4°55.127 N	Bottom Depth	19-53 m.	
			Long.	114°10.129 E			
Doc ID.	2524	Station		20-21	Ship Course	315	Remark
Date	25-2-05	From	Lat.	4°54.985 N	Ship Speed	11 kt.	Wind speed 2 kt. / 070°
Start Time	0725		Long.	114°10.155 E	Sea State	Calm	
Finish Time	0920	To	Lat.	5°09.937 N	Bottom Depth	54-360 m.	
			Long.	113°55.133 E			
Doc ID.	2525	Station		21-22	Ship Course	225	Remark
Date	25-2-05	From	Lat.	5°09.915 N	Ship Speed	10.5 kt.	
Start Time	1053		Long.	113°55.114 E	Sea State	Calm	
Finish Time	1130	To	Lat.	5°04.942 N	Bottom Depth	360-220 m.	
			Long.	113°50.123 E			
Doc ID.	2526	Station		22-23	Ship Course	135	Remark
Date	25-2-05	From	Lat.	5°04.962 N	Ship Speed	11 kt.	Wind speed 2 kt. / 100°
Start Time	1301		Long.	113°50.377 E	Sea State	Calm	
Finish Time	1458	To	Lat.	4°49.333 N	Bottom Depth	212-56 m.	
			Long.	114°05.253 E			
Doc ID.	2527	Station		11-12	Ship Course	135	Remark
Date	25-2-05	From	Lat.	4°49.904 N	Ship Speed	10.5 kt.	Wind speed 4 kt. / 350°
Start Time	1617		Long.	114°05.177 E	Sea State	Calm	
Finish Time	1739	To	Lat.	4°39.945 N	Bottom Depth	56-10 m.	
			Long.	114°15.268 E			

FQ-80 Log Book (Brunei Zone 4)

Doc ID.	2532	Station		1-2	Ship Course	315	Remark	
Date	28-2-05	From	Lat.	5°05.130 N	Ship Speed	8 kt.	Wind speed 8 kt. / 020°	
Start Time	1650		Long.	115°00.025 E	Sea State	Slight	Swell 1 m.	
Finish Time	2016	To	Lat.	5°25.140 N	Bottom Depth	15-53 m.	Resurvey zone 2-3 from St.no. 1 to 2	
			Long.	114°40.281 E				
Doc ID.	2533	Station		1-3	Ship Course	315	Remark	
Date	1-3-05	From	Lat.	5°36.545 N	Ship Speed	9 kt.	Wind speed 10 kt. / 030°	
Start Time	0733		Long.	114°14.114 E	Sea State	Moderate	Swell 2 m.	
Finish Time	1144	To	Lat.	6°04.276 N	Bottom Depth	>360 m.		
			Long.	113°46.939 E				
Doc ID.	2534	Station		3-5	Ship Course	315	Remark	
Date	1-3-05	From	Lat.	6°04.385 N	Ship Speed	9 kt.	Wind speed 8 kt. / 350°	
Start Time	1356		Long.	113°46.954 E	Sea State	Moderate	Swell 2 m.	
Finish Time	1830	To	Lat.	6°34.031 N	Bottom Depth	>360 m.		
			Long.	113°18.117 E				
Doc ID.	2535	Station		5-7	Ship Course	315	Remark	
Date	1-3-05	From	Lat.	6°34.334 N	Ship Speed	9 kt.	Wind speed 9 kt. / 040°	
Start Time	2000		Long.	113°17.816 E	Sea State	Moderate	Swell 2 m.	
Finish Time	0020	To	Lat.	7°02.807 N	Bottom Depth	>360 m.		
			Long.	112°50.055 E				
Doc ID.	2536	Station		7-9	Ship Course	315, 221	Remark	
Date	2-3-05	From	Lat.	7°02.451 N	Ship Speed	9 kt.	Wind speed 7 kt. / 060°	
Start Time	0726		Long.	112°49.125 E	Sea State	Moderate	Swell 1 m.	
Finish Time	1033	To	Lat.	7°05.667 N	Bottom Depth	>360 m.	Change ship course to 221° on 09:16 hr.	
			Long.	112°30.960 E				
Doc ID.	2537	Station		9-11	Ship Course	135	Remark	
Date	2-3-05	From	Lat.	7°05.455 N	Ship Speed	9 kt.	Wind speed 5 kt. / 050°	
Start Time	1235		Long.	112°31.273 E	Sea State	Slight	Swell 1 m.	
Finish Time	1637	To	Lat.	6°38.800 N	Bottom Depth	>360 m.		
			Long.	112°57.088 E				

FQ-80 Log Book (Brunei Zone 4)

Doc ID.	2538	Station		11-13	Ship Course	135	Remark	
Date	2-2-05	From	Lat.	6°38.662 N	Ship Speed	9 kt.	Wind speed 7 kt. / 050°	
Start Time	1828		Long.	112°57.133 E	Sea State	Moderate	Swell 1 m.	
Finish Time	2254	To	Lat.	6°09.585 N	Bottom Depth	>360 m.		
			Long.	113°25.841 E				
Doc ID.	2539	Station		13-15	Ship Course	135	Remark	
Date	3-2-05	From	Lat.	6°09.545 N	Ship Speed	9 kt.	Wind speed 6 kt. / 040°	
Start Time	0724		Long.	113°25.827 E	Sea State	Moderate	Swell 1 m.	
Finish Time	1134	To	Lat.	5°41.633 N	Bottom Depth	>360 m.		
			Long.	113°53.450 E				
Doc ID.	2540	Station		15-17	Ship Course	135, 219	Remark	
Date	3-2-05	From	Lat.	5°41.371 N	Ship Speed	9 kt.	Wind speed 6 kt. / 020°	
Start Time	1336		Long.	113°53.479 E	Sea State	Moderate	Swell 1 m.	
Finish Time	1657	To	Lat.	5°18.500 N	Bottom Depth	>360 m.	Change ship course to 219° on 15:50 hr.	
			Long.	113°59.940 E				
Doc ID.	2541	Station		17-19	Ship Course	315	Remark	
Date	3-2-05	From	Lat.	5°18.659 N	Ship Speed	9 kt.	Wind speed 10 kt. / 030°	
Start Time	1900		Long.	113°59.891 E	Sea State	Moderate	Swell 1-2 m.	
Finish Time	2319	To	Lat.	5°47.195 N	Bottom Depth	>360 m.		
			Long.	113°31.527 E				
Doc ID.	2542	Station		19-21	Ship Course	315	Remark	
Date	3-2-05	From	Lat.	5°47.195 N	Ship Speed	9 kt.	Wind speed 10 kt. / 030°	
Start Time	2320		Long.	113°31.527 E	Sea State	Moderate	Swell 1-2 m.	
Finish Time	0341	To	Lat.	6°15.500 N	Bottom Depth	>360 m.	has a massage during analysis data C:\afuruno\0000002542\Position\Pos.tmp cannot be read	
			Long.	113°03.122 E				
Doc ID.	2544	Station		21-23	Ship Course	315	Remark	
Date	4-2-05	From	Lat.	6°15.494 N	Ship Speed	9 kt.	Wind speed 8 kt. / 030°	
Start Time	0732		Long.	113°02.948 E	Sea State	Moderate	Swell 2 m.	
Finish Time	1151	To	Lat.	6°43.429 N	Bottom Depth	>360 m.		
			Long.	112°34.960 E				

FQ-80 Log Book (Brunei Zone 4)

Doc ID.	2545	Station		23-25	Ship Course	315, 221	Remark Wind speed 7 kt. Change ship course to 221° on 15:40 hr.
Date	4-3-05	From	Lat.	6°43.462 N	Ship Speed	9 kt.	
Start Time	1344		Long.	112°34.884 E	Sea State	Moderate	
Finish Time	1650	To	Lat.	6°46.116 N	Bottom Depth	>360 m.	
			Long.	112°15.176 E			
Doc ID.	2546	Station		25-27	Ship Course	135	Remark Wind speed 7 kt. / 030° Swell 2 m. has a massage during analysis data C:\afuruno\0000002545\Position\Pos.tmp cannot be read
Date	4-3-05	From	Lat.	6°45.983 N	Ship Speed	9 kt.	
Start Time	1907		Long.	112°15.372 E	Sea State	Moderate	
Finish Time	2307	To	Lat.	6°20.337 N	Bottom Depth	>360 m.	
			Long.	112°41.844 E			
Doc ID.	2547	Station		25-27	Ship Course	135	Remark Wind speed 5 kt. / 030° Swell 2 m.
Date	5-3-05	From	Lat.	6°20.251 N	Ship Speed	9 kt.	
Start Time	0725		Long.	112°41.779 E		Moderate	
Finish Time	1143	To	Lat.	5°52.049 N	Bottom Depth	>360 m.	
			Long.	113°10.155 E			
Doc ID.	2548	Station		29-31	Ship Course	135	Remark Wind speed 9 kt. / 060° Swell 2-3 m. has a massage during analysis data C:\afuruno\0000002548\Position\Pos.tmp cannot be read
Date	5-3-05	From	Lat.	5°52.025 N	Ship Speed	9 kt.	
Start Time	1405		Long.	113°10.082 E	Sea State	Moderate	
Finish Time	1730	To	Lat.	5°23.733 N	Bottom Depth	>360 m.	
			Long.	113°38.489 E			

Cruise report on Research Activities

1. Cruise Summary

Vessel name: M.V. SEAFDEC 2
Cruise no.: 8-2/2005 **Leg no:** 2
Project Title: Marine research survey in the Philippines waters
Duration: 16 March – 7 April 2005 (28 days)
Covered water: The Philippines Waters
Latitude 15°00'.00 N-18°00'.00 N
Longitude 117°00'.00 E-120°00'.00 E
Port of call: Subic port, The Philippines
Objective:

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	Thirdofficer	Mr. Somphote Vudthipanyo
5	Second engineer	Mr. Komson Sangphuek
6	Boatswain	Mr. Vudthirat Vudthipanyo
7	Steerman	Mr. Pradit Kui-prasert
8	Steerman	Mr. Tana Rungjoy
9	A/S	Mr. Phairoj Sudkangwan
10	Fitter	Mr. Vallop Phimroon
11	Oiler	Mr. Plew Shodok
12	Oiler	Mr. Boontarin Wora-in
13	Oiler	Mr. Nuttapong Chaitanavisut
14	Cook	Mr. Saichol Kornnoom
15	Ship's boy	Mr. Phaithoon Sriratanaphon

Researcher from SEAFDEC/TD

No.	Position	Name
16	Chief/Scientist	Mr. Isara Chanrachkij
17	Researcher	Mr. Pratakphonl Prajakjit
18	Oceanographer	Mr. Sukchai Anuparpboon
19	Assistant researcher	Mr. Nakaret Yasook
20	Assistant researcher	Mr. Aussawin Buachuay
21	Assistant researcher	Ms. Sayan Phomjinda

Researcher from DOF of the Philippines

No.	Position	Name
22	Researcher	
23	Researcher	
24	Researcher	
25	Researcher	
26	Researcher	

3. Observation Summary

Overview Report of Marine Research Survey in the Philippines Waters

The program of marine research survey in the Philippines waters has been planned to conduct 16 research survey station start from near shore to 200 NM distance. The surveys were included the 16 station of oceanographic and Biological survey, 6 Pelagic longline and 8 Automatic squid jigging operation. Respected to the plan of M/V DA BFAR, Research Vessel of Bureau of Fisheries and Aquatic Resource of the Philippines which conducted parallel with MV SEAFDEC2, Chief scientist of DA BFAR was interested in the pelagic longline operation in the northeastern of Luzon, on station No. 15 and 16. MV SEAFDEC2 was adjusted the plan to conduct pelagic longline at station No.16.

The research plan had been disturbed by weather condition since arrived at Port of Subic. M.V. SEAFDEC2 had to postpone the leaving date from the 16 to be 17 March 2005, according to the directed affected by tropical storm 02W *"Roke"*. After left Port of Subic on 17 March 2005, M.V. SEAFDEC2 conducted the survey at station No. 1 and 2 then M.V. SEAFDEC2 had to abort the station No.3 after finish Plankton survey by Bongo net because sea condition is too rough. Swell height was 2-3 m and wind velocity was up to 20 knot. The other Oceanographic activities i.e. ICTD, Larvae net, tuna longline and Automatic squid jigging fishing operation at Station No.3 were cancelled and M.V. SEAFDEC2 had sheltered at anchorage area of Marcinloc under the guidance of M/V DA BFAR. The gale, affected from Northeast monsoon, was strong during 18-20 March 2005. On 20 March 2004, M.V SEAFDEC2 left anchorage area for survey station near shore No.7 and continue conducted to survey station No.8 and 9. During the 1st session, stations near shore, No.1, 2, 7, 8, 9 were completely conducted the oceanographic survey. Squid jigging had been operated at station No.7 and 8. Pelagic Longline had been operated only station No.7. The suggestion by M/V DA BFAR, that custom and immigration clearance include the provision supply at port of San Fernaldo, was more convenient on 22 March than 23 March 2005 because of the Holy-holiday period. MV SEAFDEC2 had to change research plan of visiting at Port of San Fernaldo from 23 March to be 22 March 2005, after finish station survey No.9. The station No. 3, 4, 5, 6 were aborted because too strong sea condition to conduct oceanographic survey.

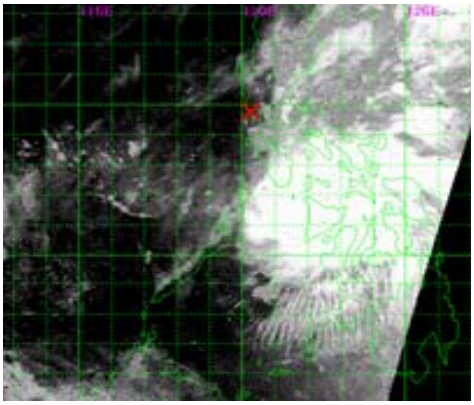


Fig 1. Tropical storm 02W "Roke"

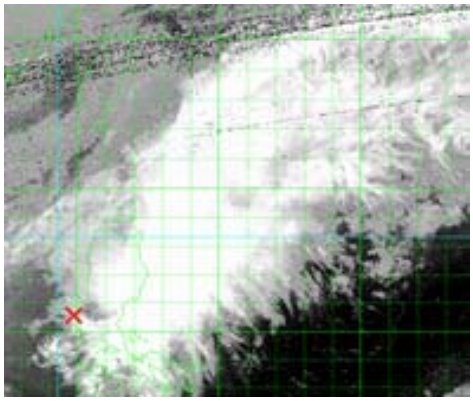


Fig 2. Weather condition on 17-18 March 2005

Gale by Northeast Moonsoon was started again on 24 March 2005, during MV SEAFDEC2 was alongside at Port of San Fernaldo. It was directly affected to 2nd session research plan. Captain and Chief scientist of MV SEAFDEC2 had discussed with Captain and Chief Scientist of M/V DA BFAR and concluded that MV SEAFDEC2 shall conduct marine research survey at No.11, 14, 15 and 16. M.V. SEAFDEC2 had to postpone the leaving time at Port of San Fernald from 0100 hrs to be 0600 hrs on 26 March 2005 because of too rough sea condition, especially in the evening and night time. Furthermore that time of 2nd session was very constraint, the research station where had been complete oceanographic survey at station No. 10, 15 and 16, Automatic squid jigging and pelagic longline at station 10 and 16. M.V. SEAFDEC2 lost a Radio buoy and 10 pieces of longline buoy at station No. 16. During pelagic longline operation, crew found main line was cut at least into 3 main pieces. 3 longline buoys with buoy rope disappeared from main line and then crew found mainline was cut. SEAFDEC2 lost a flag buoy, a radio buoy and 10 longline bouys at station No.16. The remained station i.e. No.11, 12, 13, 14 were cancelled because the time is not available. M.V. SEAFDEC 2 returned to Silanguin bay near port of Subic because vessel had the plan of refueling from M/V DA BFAR on 30 March 2005. Among the route to Silanguin bay, M.V. SEAFDEC2 conducted the last pelagic longline operation at Station No.2

It was concluded that the survey stations No. 1, 2, 7, 8, 9,10,15,16 has been conducted complete oceanographic survey, Pelagic longline had conducted at survey station No. 2, 7, 10 and 16 and Automatic squid jigging had operated at survey station No. 2, 7, 8, 10 and 16 (See figure). The hydro-acoustic survey by scientific echo sounder FQ-80 has been conducted on 9 routes of station 1-2, 2-3, 2-7, 7-8-9-10, 10-15-16.

Captain, crew and researchers of M.V. SEAFDEC2 would like to express the deeply appreciate to Captain, crew and researcher of M/V DA BFAR included the supporting officers from BFAR head office for all assisting during the collaborative research survey in The Philippine waters.

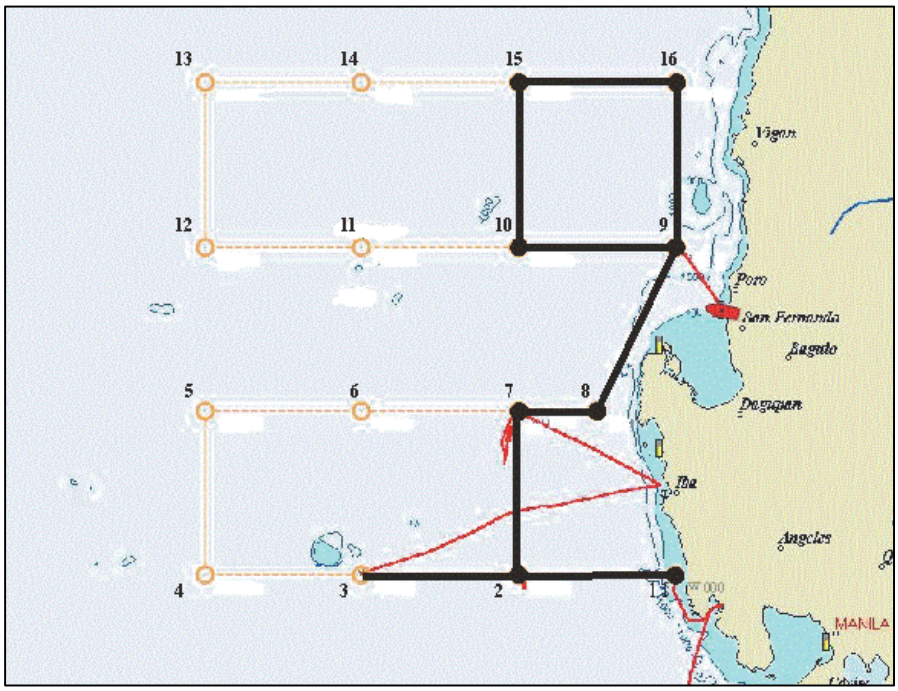


Fig 3. Station Survey and Hydro-acoustic track

Fishing survey summary

2 main fishing gear were operated during the marine research survey i.e., Automatic squid jigging machine and Pelagic longline.

1) ***Automatic squid jigging*** machine is one of the most advanced fishing gear invented for catch both coastal and deep sea squid. Since the marine research survey in year 2000, SEAFDEC has found the deep sea squid resources in The Philippine water since the previous collaborative survey. In order to follow up the investigation of squid resources especially the group of Purple backed flying squid, automatic squid fishing had been operated during this marine research survey.

SEAFDEC2 has installed 4 automatic squid jigging machines, 2 at starboard side and the others at port side. Total numbers of vertical lines were 8 lines. Each line had fixed with 25 artificial jigs.

The operation of jig had been started by turn on 4 luring lamps before operate 1 hours and 4 automatic jigs were operated for 4 hours. The station No.10, operation time was limited luring light was turned on then fishing operation started and jigging time was reduced to 2:30 hours. According to the time constraint, settings of parachute anchor were cancelled. So that 2 jigging machines could not be operated in some operations while the strong wind. Total Number of line setting in all operations were 20 line and jigging time was 20:30 hours.

Total catch by 4 fishing operations at Station No.2, 7, 8, 10 and 16 was 68.16 kg with 681 squids. Average catch is 13.62 kg/ 136 squid per operation. Result of catch has found far different between station No.16 compared with the other stations, No.2, 7, 8 and 10. Station No.16 with the surface temperature is low as 25 Degree Celsius has caught 55.6 kg/ 553 squids. Average size of squid caught by squid jigging machine is 100 g.

2) ***Pelagic longline*** is fishing gear aim to catch pelagic fish e.g. tuna, marlin, sword fish, etc. Respected to Standard Operating Procedure of SEAFDEC2, 500 hooks was deployed each operation. Mainline is made from Nylon Monofilament diameter 4.0 mm with braking strength about 500 kg. Mainline is stored in a mainline reel. Shooting has been operated by mainline shooter connected with setting beeper. Milk fish (*Chanos chanos*) is selected as bait because it is available during bait preparation. Bait size is 8-10 pieces/kg.

4 pelagic longline operations had been conducted at station No.2, 7, 10 and 16. 500 hooks were deployed at Operation No. 1, 2, 3 and 400 hooks were deployed at station No.4 because an anchor Payao was found while shooting pelagic longline at 400 hooks. 2 operations at survey station No.7 and No.16 had been operated in the nighttime and survey station No. 2 and 10 had been operated in the daytime because of operation period was suitable on daytime. Total catch by 4 fishing operations is 341.6 kg/87 fishes. Lancet fish is the dominant species. It has found in the nighttime operation than daytime operation.

Oceanographic survey summary

Oceanographic survey in this cruise was 9 stations. Each station conducted with 2 main activities including physical and biological oceanographic survey. Four oceanographic instruments were operated through the cruise that composed of iCTD, Bongo net, Larvae net, and TSG with Fluorometer. The position of oceanographic stations, used oceanographic instruments and field names each station are shown in **table 1**. Additionally, in every station physical parameters collected by iCTD are shown in **Appendix I**.

Conclusion of operating methods

iCTD (SBE 911) equipped with carousel: The iCTD was lowered from the ship through the water from surface up to 500 m or 5-10 m. above sea bottom with constant velocity 0.5 m/s and retrieved to sea surface at the same speed. During retrieved instrument, it was stopped to collect water sampler for nutrient analyzing at SEAFDEC laboratory, the data will be submitted as soon as possible.

Bongo net equipped with flow meter: Plankton net consisted of zoo plankton net and larvae net with mesh size were 330 µm and 500 µm, respectively. They was attached to 60 cm. diameter bongo frames. A flow meter, attached within the aperture of net, mearsured the amount of water filtered. Flow rate of flow meter in front of zooplankton was 30.1945 rpm and larvae net was 29.500 rpm. At each station a 30 minutes oblique tow of the bongo net was made with the ship speed was approximately 1.5 knots. The depth of haul was 5 maters above the sea bottom for the station that the depth less than 155 meters and 150 meters for the station that was too deep, exceed 155 meters. The samples were preserved in 10% buffered formalin-seawater immediately.

Larvae net: The larvae net, 1.26 m in diameter with a 2-mm mesh size at the mouth part and 500 micron at the cod end, was used with the surface horizontal towing method (2 from 3 parts of the net submersing into sea water). A flow meter was attached to the mouth part of the net. Flow rate of flow meter was 9.88 rpm. The sampling period was for 30 minutes with the speed of tow at about 2.5 knots. Specimens were preserved in 10% of formalin immediately after retrieving.

TSG with Fluorometer: TSG with fluorometer was operated during ship sailing from station to station. Its system was designed to continuously record three parameters including temperature, salinity and fluorescence from underway vessel at approximately 5 meters below the sea surface. However, sometime the data recording was canceled to avoid un-expectant damage. Owing to power pump in this ship was not enough for required rate.

Hydro-acoustic Survey Summary

This marine resource survey has been carried out in collaboration with the BFAR (Bureau of Fisheries and Aquatic Resources) order to obtain the preliminary data on the Bio-mass assessment in the waters of The Philippines.

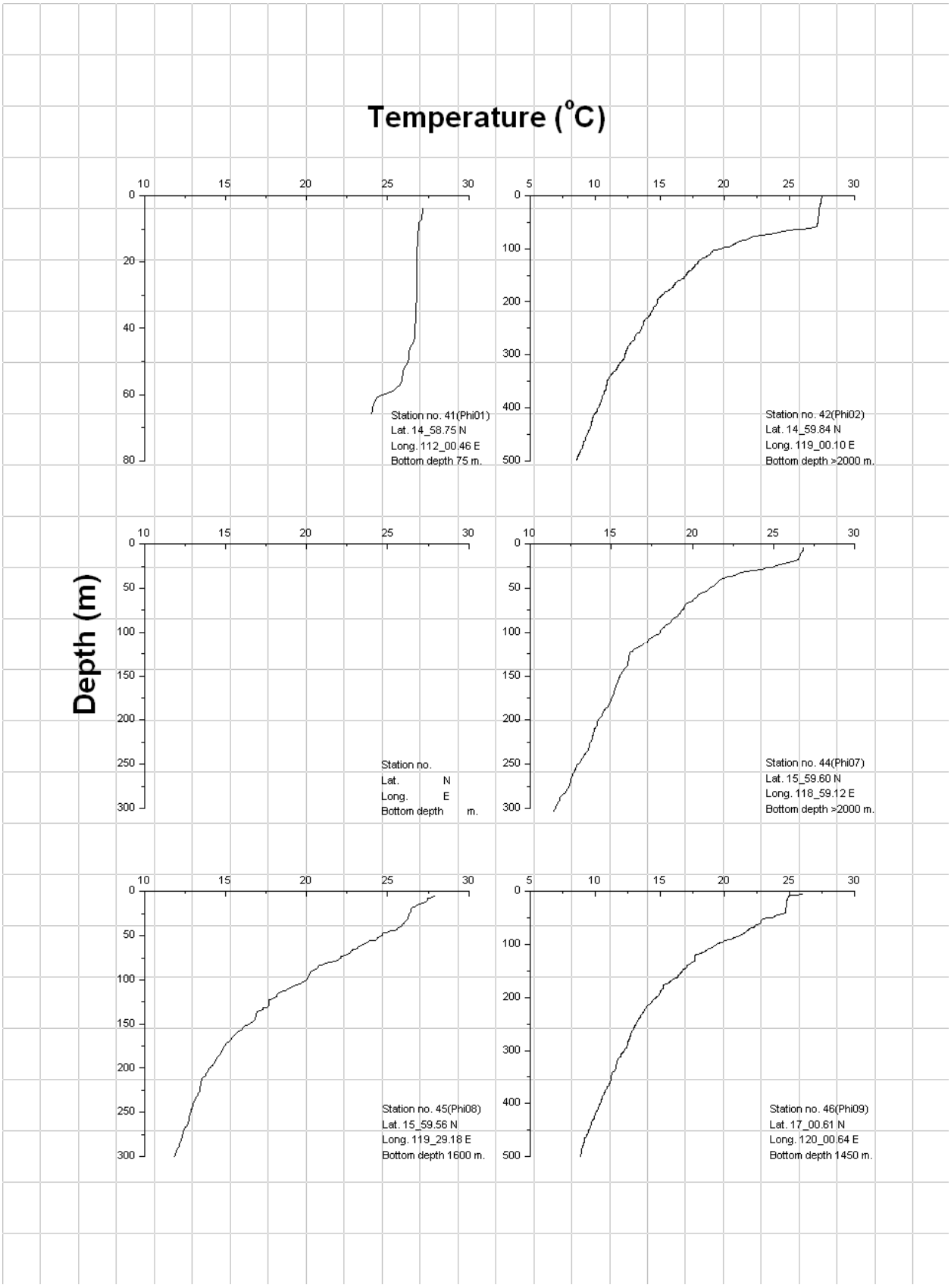
The survey was conducted by using the Scientific Echo Sounder model FQ-80 equipped onboard M.V. SEAFDEC 2. All together 9 track from 16 stations all data were recorded and preliminary analyzed onboard.

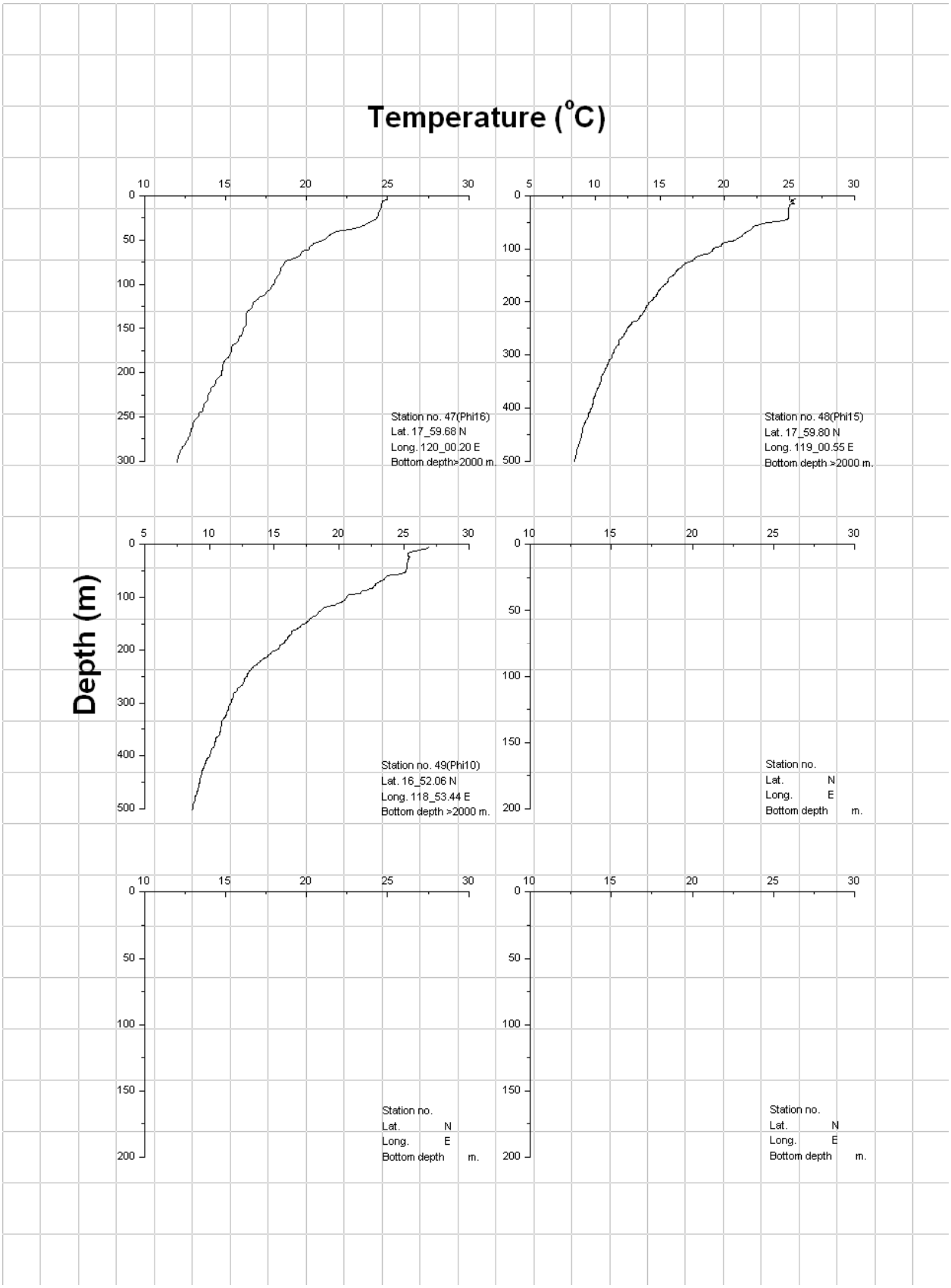
Please use the other information of operation on the table of FQ-80 Log Book that include in FQ-80 data DVD disk especially date and time.

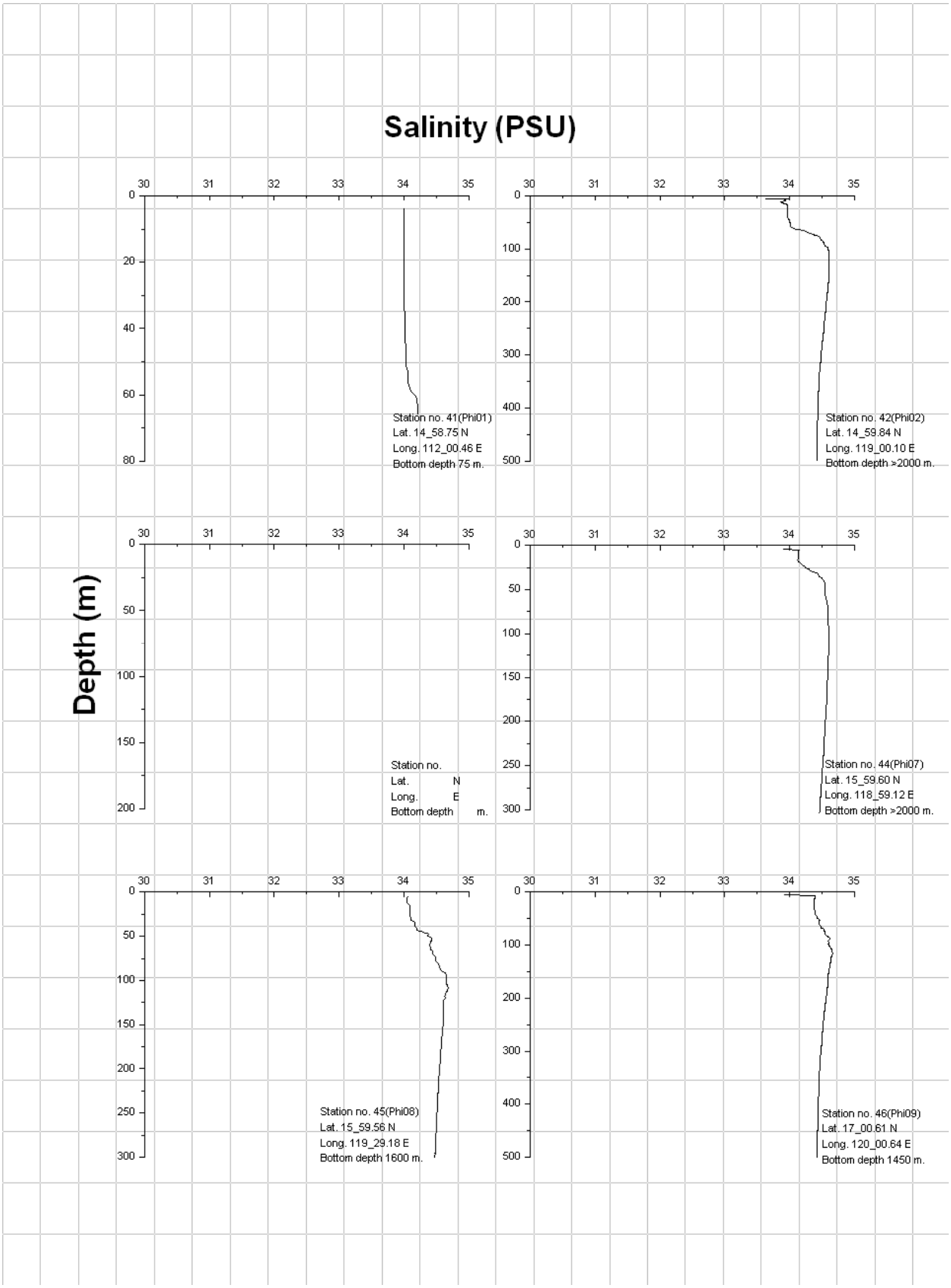
Table 1. Survey position and oceanographic activity

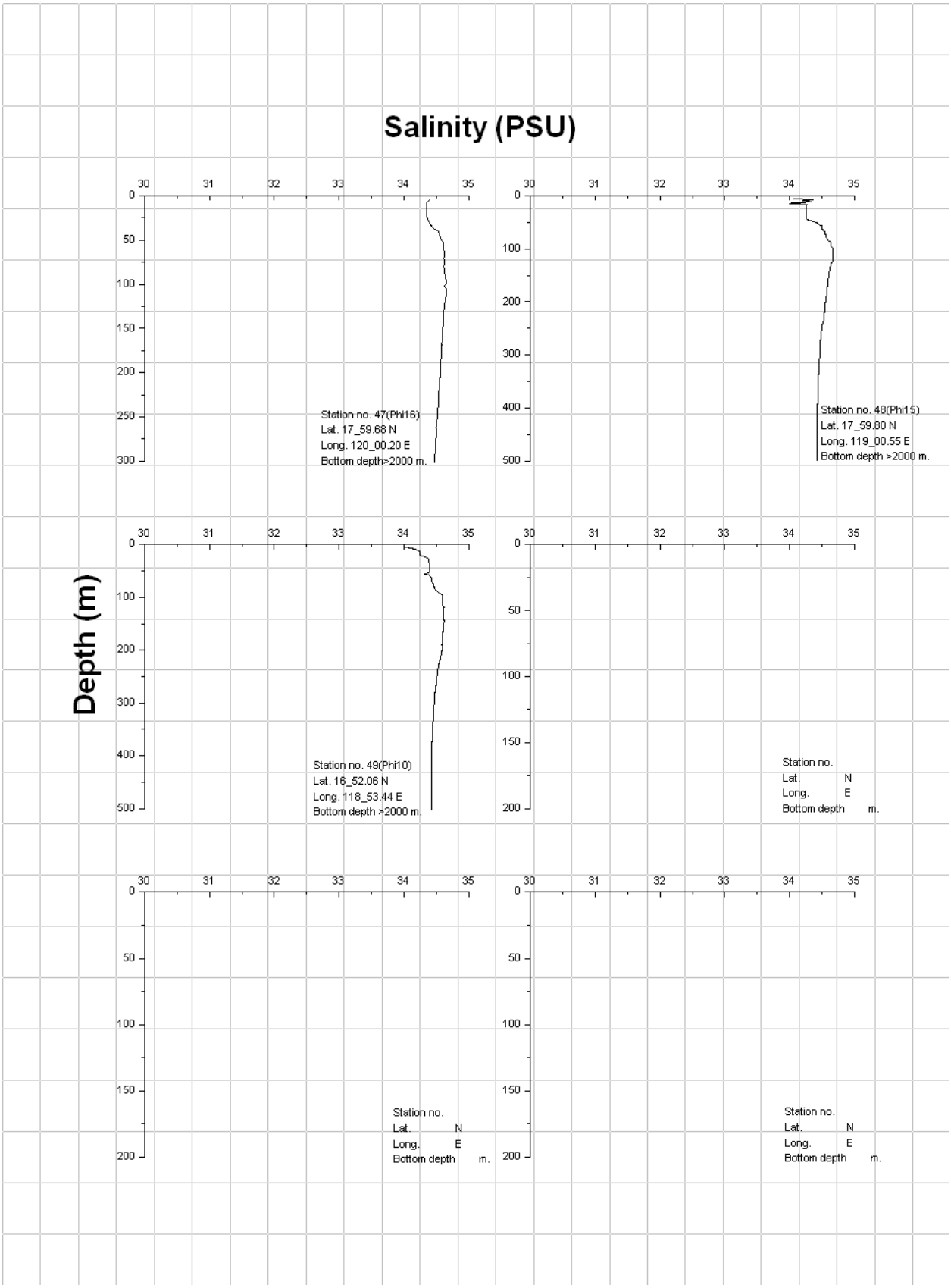
St.No. (SEAFDEC)	St.No. (Philippines)	Date	Time (Philippines)	Lat	Long	Oceanographic instruments					Transparancy		Bottom Depth(m)	Filename		
						SBE CTD	TSG	TD	Bongo net	Larvae net	Sechi disc (m)	Foral scale		SBE CTD	TD	TSG
41	1	17-Mar-05	1214	14°58.75 N	112°00.46 E	✔	✔		✔	✔	✔	✔	75	s2d08041		20050317(1)
42	2	17-18-Mar-05	1832	14°59.84 N	119°00.10 E	✔	✔		✔	✔			5,117*	s2d08042		20050318(1)
43	3	18-Mar-05	1335	15°04.01 N	118°00.00 E		✔		✔				3,429*			20050318(2)
44	7	20-Mar-05	1325	15°59.70 N	118°59.60 E		✔	✔	✔	✔	✔	✔	3,101*	s2d08044	Td08044(Phi07)	20050321(1)
45	8	21-Mar-05	1521	16°00.10 N	119°29.05 E	✔	✔		✔	✔	✔	✔	1,600	s2d08045		20050322(1)
46	9	22-Mar-05	1108	17°00.00 N	120°00.21 E	✔	✔		✔	✔	✔	✔	1,500	s2d08046		20050326(1)
47	16	26-Mar-05	1523	17°59.94 N	120°00.08 E	✔	✔		✔	✔	✔	✔	2,703	s2d08047		20050327(1)
48	15	27-Mar-05	1747	17°59.96 N	119°00.14 E	✔	✔		✔	✔			4,087*	s2d08048		20050327(2)
49	11	28-Mar-05	0608	16°52.06 N	118°53.44 E	✔	✔		✔	✔	✔	✔	3,820*	s2d08049		20050328(1)

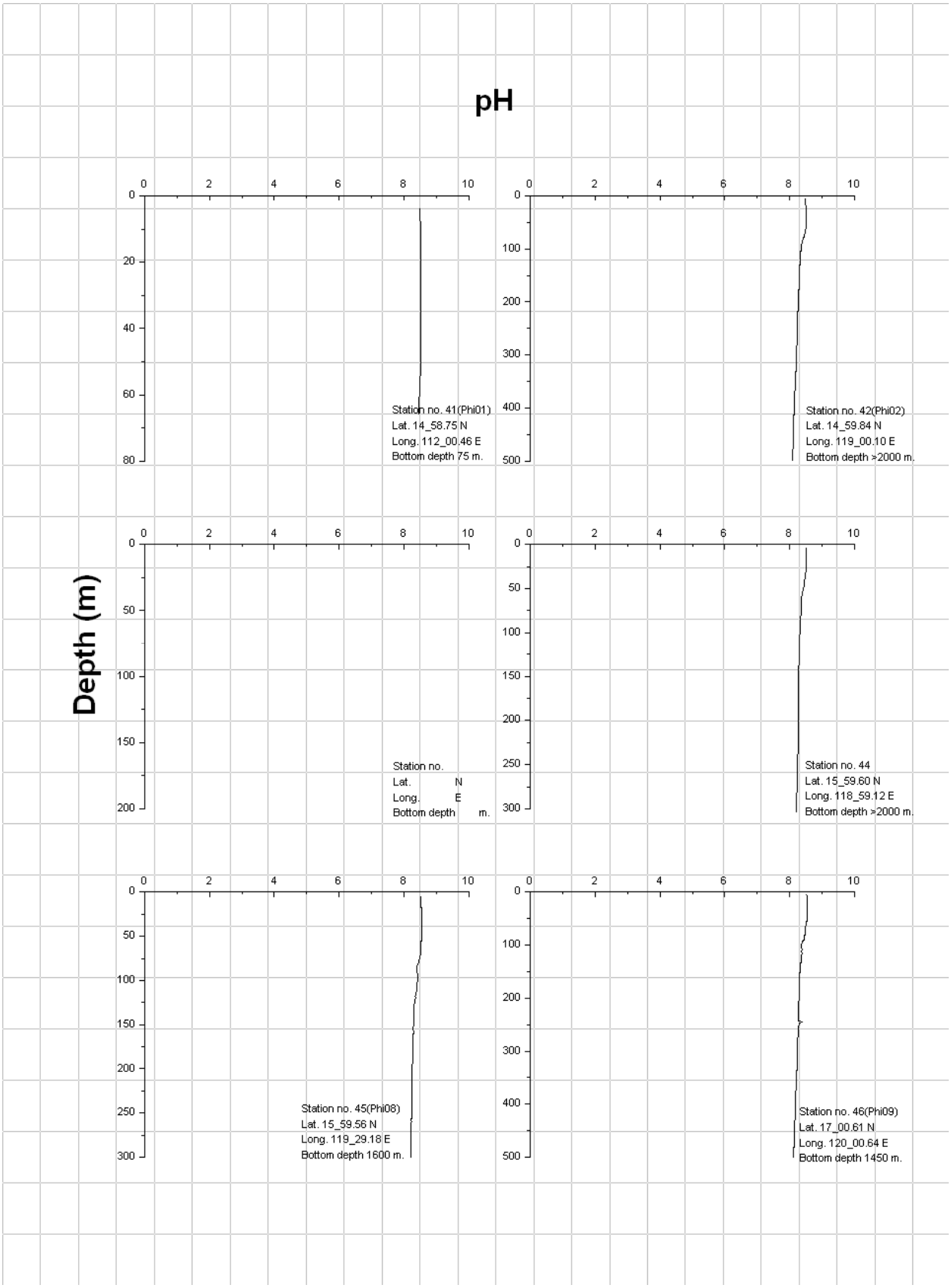
Appendix I

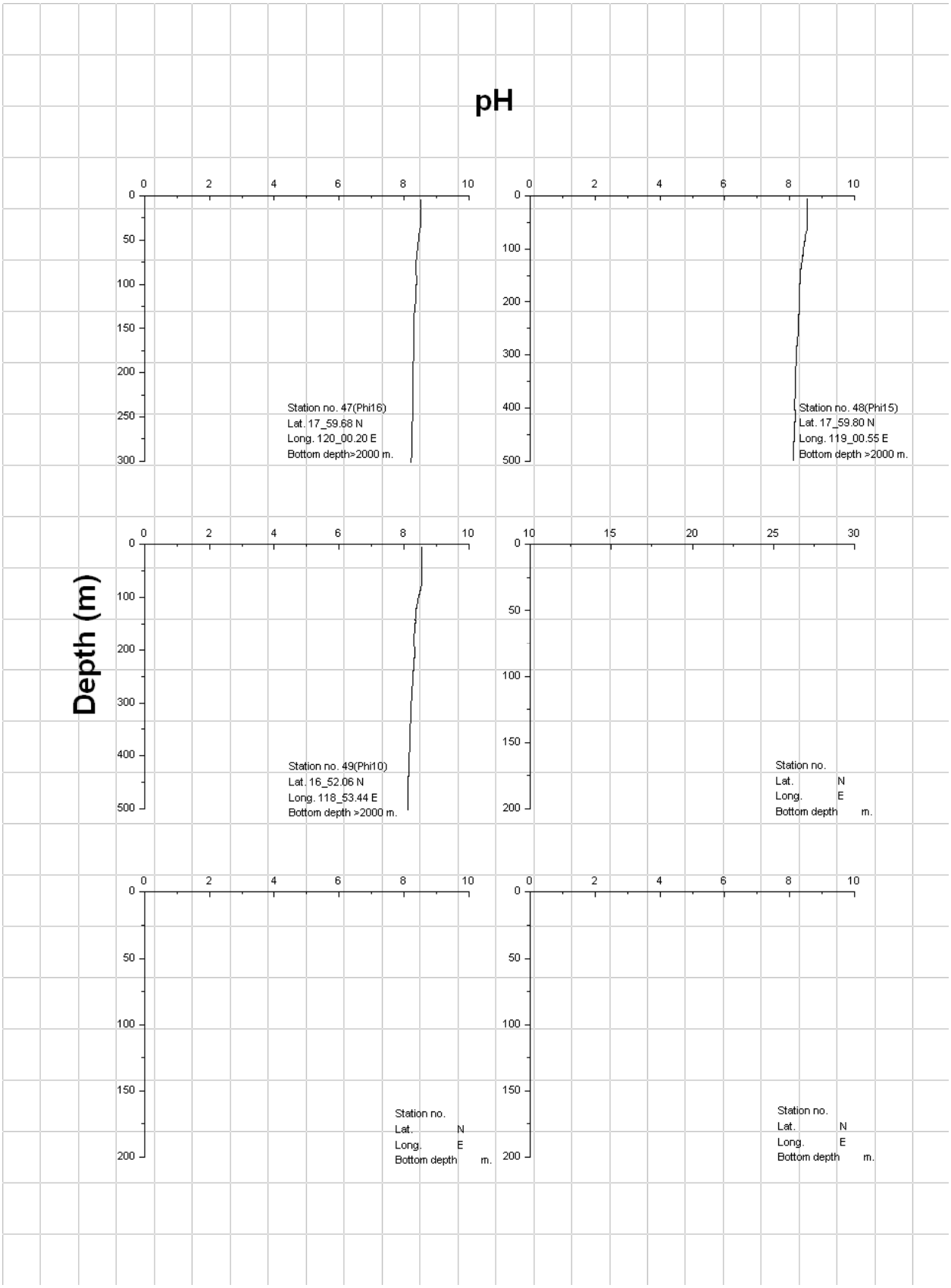

Temperature (°C)
Depth (m)
Station no. 41(Phi01)
Lat. 14_58.75 N
Long. 112_00.46 E
Bottom depth 75 m.
Station no. 42(Phi02)
Lat. 14_59.84 N
Long. 119_00.10 E
Bottom depth >2000 m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no. 44(Phi07)
Lat. 15_59.60 N
Long. 118_59.12 E
Bottom depth >2000 m.
Station no. 45(Phi08)
Lat. 15_59.56 N
Long. 119_29.18 E
Bottom depth 1600 m.
Station no. 46(Phi09)
Lat. 17_00.61 N
Long. 120_00.64 E
Bottom depth 1450 m.

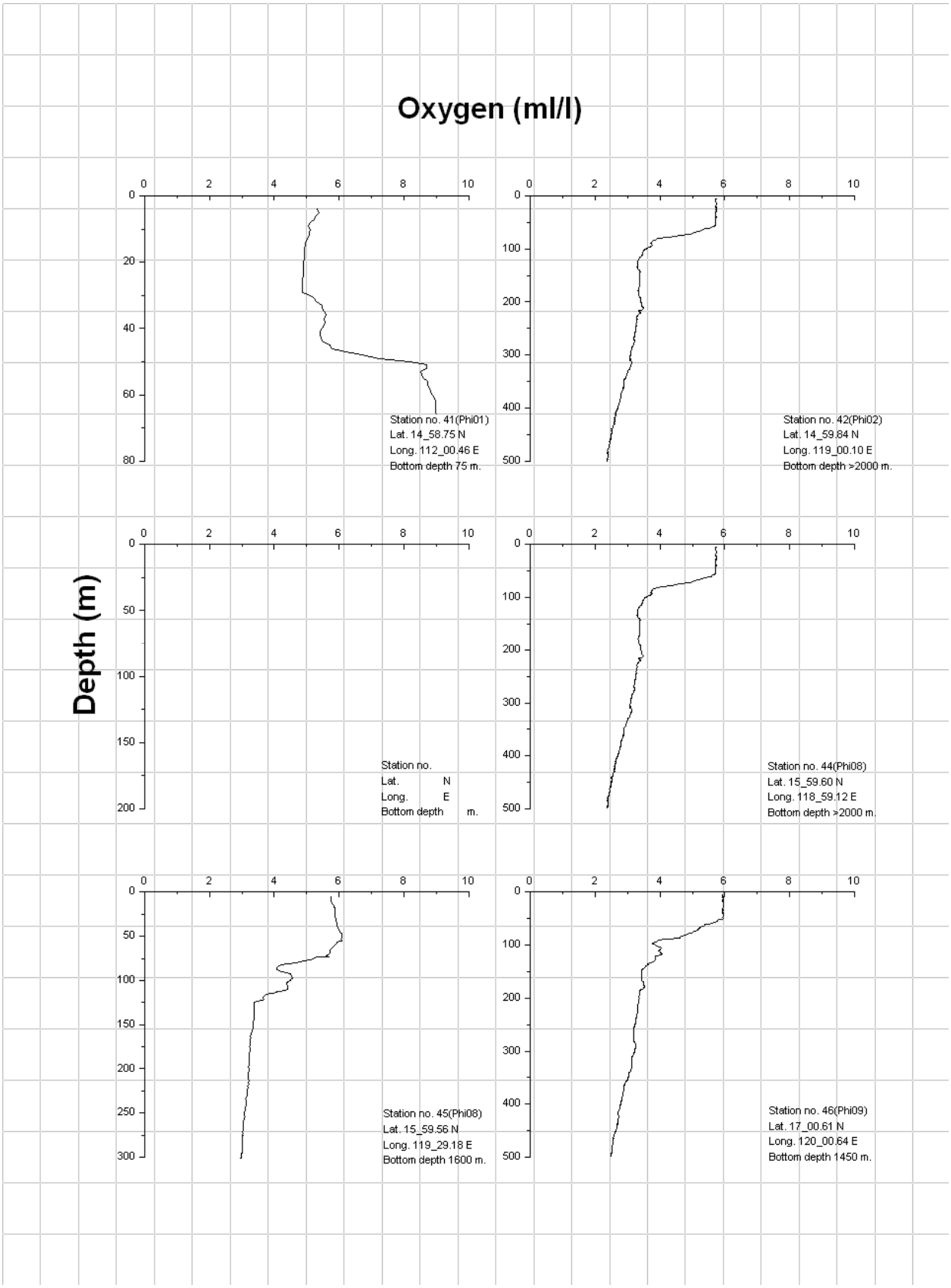

Temperature (°C)
Depth (m)
Station no. 47(Phi16)
Lat. 17_59.68 N
Long. 120_00.20 E
Bottom depth>2000 m.
Station no. 48(Phi15)
Lat. 17_59.80 N
Long. 119_00.55 E
Bottom depth >2000 m.
Station no. 49(Phi10)
Lat. 16_52.06 N
Long. 118_53.44 E
Bottom depth >2000 m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no.
Lat. N
Long. E
Bottom depth m.

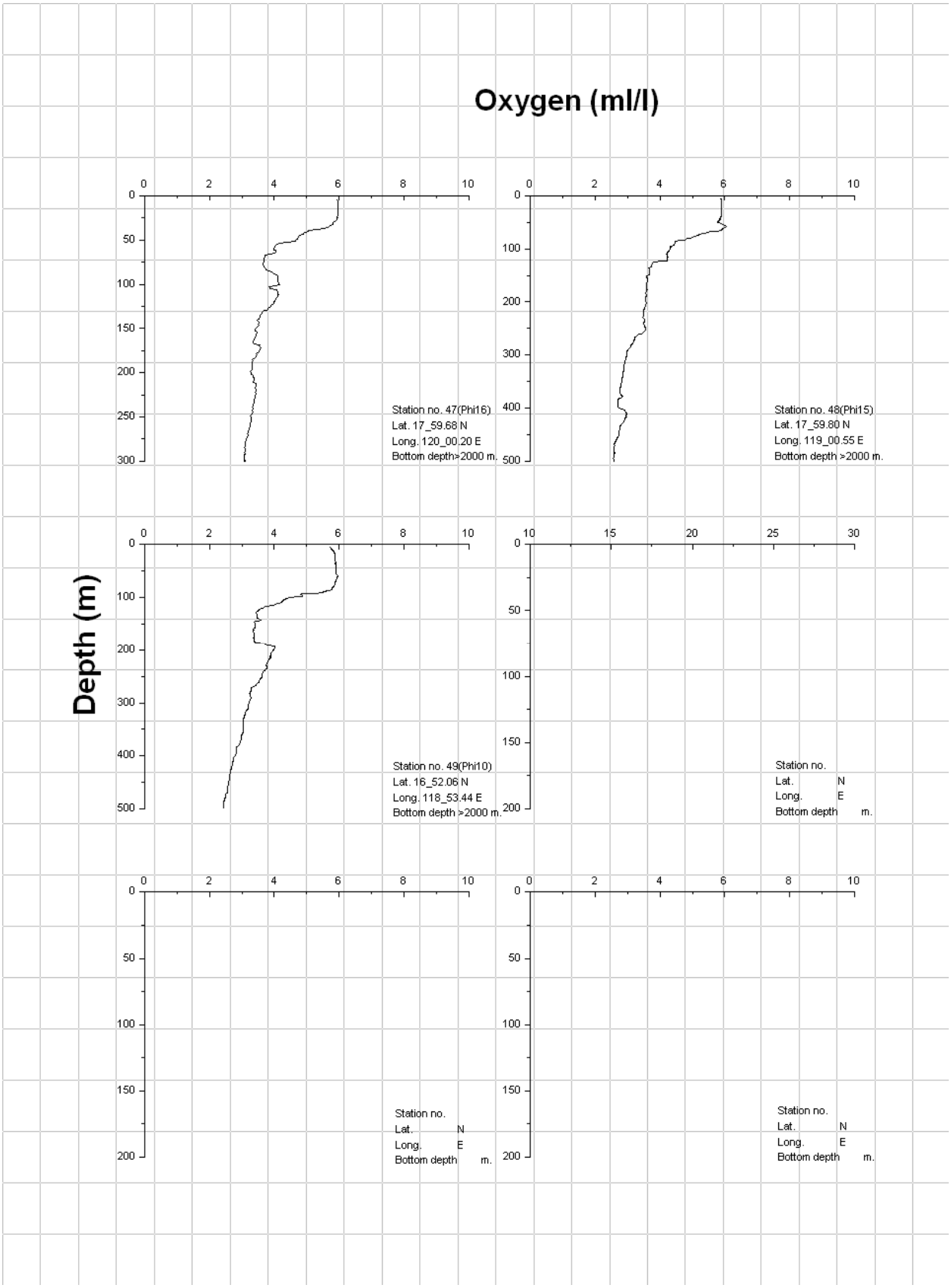

Salinity (PSU)
Depth (m)
Station no. 41(Phi01)
Lat. 14_58.75 N
Long. 112_00.46 E
Bottom depth 75 m.
Station no. 42(Phi02)
Lat. 14_59.84 N
Long. 119_00.10 E
Bottom depth >2000 m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no. 44(Phi07)
Lat. 15_59.60 N
Long. 118_59.12 E
Bottom depth >2000 m.
Station no. 45(Phi08)
Lat. 15_59.56 N
Long. 119_29.18 E
Bottom depth 1600 m.
Station no. 46(Phi09)
Lat. 17_00.61 N
Long. 120_00.64 E
Bottom depth 1450 m.


Salinity (PSU)
Depth (m)
Station no. 47(Phi16)
Lat. 17_59.68 N
Long. 120_00.20 E
Bottom depth>2000 m.
Station no. 48(Phi15)
Lat. 17_59.80 N
Long. 119_00.55 E
Bottom depth >2000 m.
Station no. 49(Phi10)
Lat. 16_52.06 N
Long. 118_53.44 E
Bottom depth >2000 m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no.
Lat. N
Long. E
Bottom depth m.

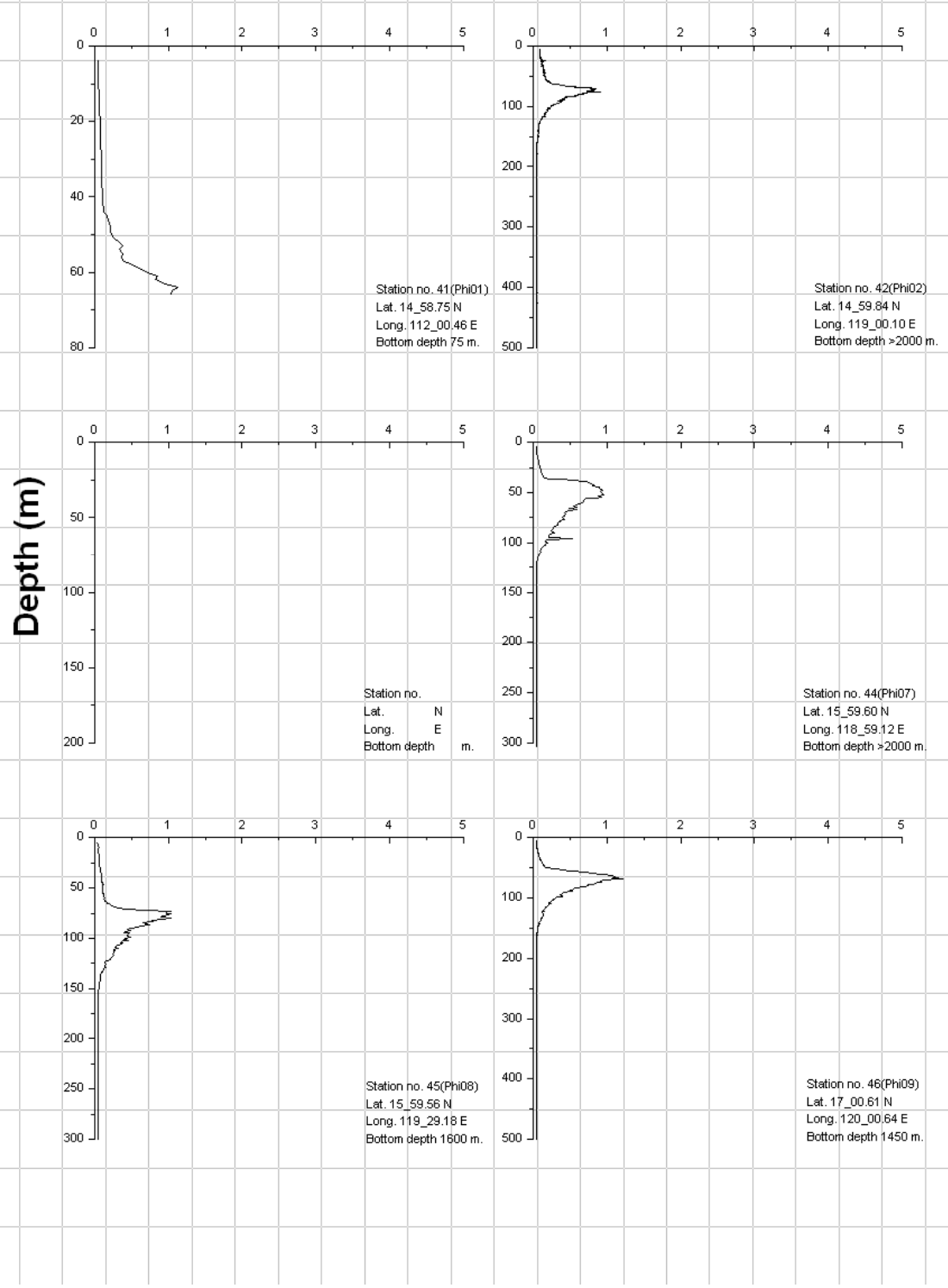

pH
Depth (m)
Station no. 41(Phi01)
Lat. 14_58.75 N
Long. 112_00.46 E
Bottom depth 75 m.
Station no. 42(Phi02)
Lat. 14_59.84 N
Long. 119_00.10 E
Bottom depth >2000 m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no. 44
Lat. 15_59.60 N
Long. 118_59.12 E
Bottom depth >2000 m.
Station no. 45(Phi08)
Lat. 15_59.56 N
Long. 119_29.18 E
Bottom depth 1600 m.
Station no. 46(Phi09)
Lat. 17_00.61 N
Long. 120_00.64 E
Bottom depth 1450 m.


pH
Depth (m)
Station no. 47(Phi16)
Lat. 17_59.68 N
Long. 120_00.20 E
Bottom depth>2000 m.
Station no. 48(Phi15)
Lat. 17_59.80 N
Long. 119_00.55 E
Bottom depth >2000 m.
Station no. 49(Phi10)
Lat. 16_52.06 N
Long. 118_53.44 E
Bottom depth >2000 m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no.
Lat. N
Long. E
Bottom depth m.


Oxygen (ml/l)
Depth (m)
Station no. 41(Phi01)
Lat. 14_58.75 N
Long. 112_00.46 E
Bottom depth 75 m.
Station no. 42(Phi02)
Lat. 14_59.84 N
Long. 119_00.10 E
Bottom depth >2000 m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no. 44(Phi08)
Lat. 15_59.60 N
Long. 118_59.12 E
Bottom depth >2000 m.
Station no. 45(Phi08)
Lat. 15_59.56 N
Long. 119_29.18 E
Bottom depth 1600 m.
Station no. 46(Phi09)
Lat. 17_00.61 N
Long. 120_00.64 E
Bottom depth 1450 m.


Oxygen (ml/l)
Depth (m)
Station no. 47(Phi16)
Lat. 17_59.68 N
Long. 120_00.20 E
Bottom depth>2000 m.
Station no. 48(Phi15)
Lat. 17_59.80 N
Long. 119_00.55 E
Bottom depth >2000 m.
Station no. 49(Phi10)
Lat. 16_52.06 N
Long. 118_53.44 E
Bottom depth >2000 m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no.
Lat. N
Long. E
Bottom depth m.
Station no.
Lat. N
Long. E
Bottom depth m.

Fluorescence



Fluorescence