

## Chapter 1 Outline of the Survey

### 1-1 Survey Title

The Cooperative Study on the Deepsea Mineral Resources in Selected Offshore Areas of the SOPAC Region, 2003

-Sea Area of the Republic of Kiribati-

### 1-2 Survey Objective

The survey aims at the assessment of potential of cobalt-rich manganese crust (hereafter referred as cobalt crust) by conducting deep seafloor mineral resources survey within the Exclusive Economic Zone (EEZ) of the Republic of Kiribati, a member country of SOPAC. The survey comprises ship survey and the data analysis for assessment of mineral resources and understanding of environmental characteristics within the sea area.

### 1-3 Sea Area of the Survey

The survey area of the SOPAC project for fiscal year 2003 is a quadrilateral sea area (approximately 13,400km<sup>2</sup>) within the EEZ of the Republic of Kiribati, enclosed by geodesic lines connecting the following coordinates (Fig. 1-1). The area was selected in accordance with the joint sturdy program for deepsea mineral resources in the EEZ of the SOPAC member countries agreed upon by the Japanese executing agency and South Pacific Applied Geoscience Commission (SOPAC) on February 27, 2003.

	Latitude	Longitude
a	5° 00' N	172° 10' E
b	5° 00' N	173° 10' E
c	4° 00' N	173° 10' E
d	4° 00' N	172° 10' E
a	5° 00' N	172° 10' E

### 1 - 4 Survey Period

Survey cruising: November 8, 2003 to December 5, 2003

(Departed Majuro on November 10, 2003, and arrived at Majuro on December 4, 2003.

The period of survey in the Republic of Kiribati Area is from November 30, 2003 to December 3, 2003.)

Analysis and other works: April 1, 2003 to March 31, 2004

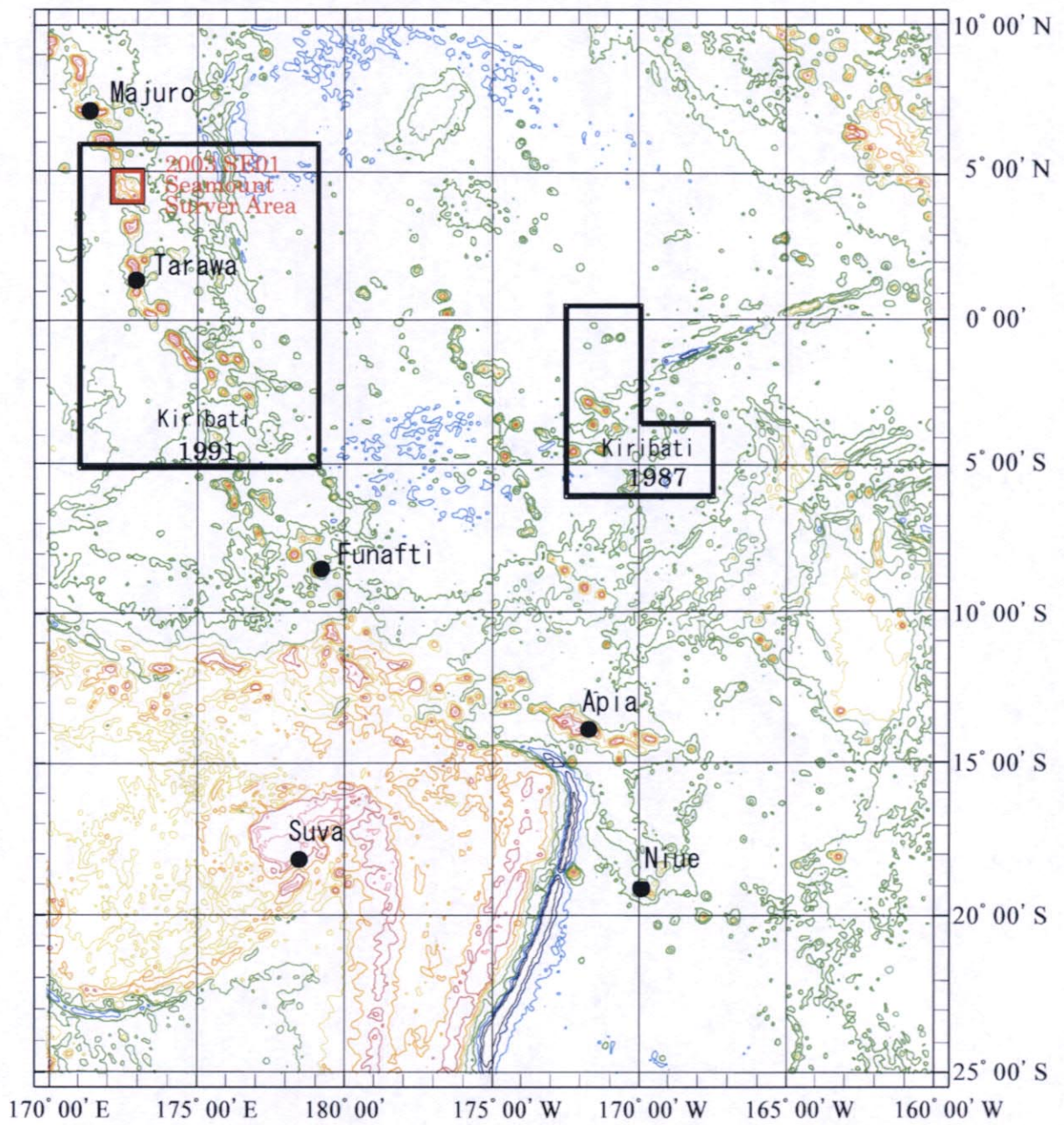


Fig. 1-1 Location Map of the Survey Area

## 1 – 5 Survey Participants

### Negotiators for the Agreement

#### Japanese Participants

Yoshitaka HOSOI (Metals Research & Development Group, JOGMEC)

Hiroyuki YASUNO (Mineral and Natural Resources Division, Agency for Natural Resources and Energy)

Masayoshi KAMEYAMA (Metals Research & Development Group, JOGMEC)

Norihiro YAMAJI (Energy and Mining Development Study Division, JICA)

Natsumi KAMIYA (Representative, JOGMEC Canberra Office)

#### Consigning Participants

Kodaro GALLEN (Federated States of Micronesia)

Tania T. TAGICAKIBAU (The Republic of the Fiji Islands)

Bhaskar Rao (The Republic of the Fiji Islands)

Meita BEIABURE (The Republic of Kiribati)

Alfred SIMPSON (Niue)

Alfred SIMPSON (SOPAC SECRETARIAT)

Russell HOWORTH (SOPAC SECRETARIAT)

Cristelle PRATT (SOPAC SECRETARIAT)

Nobuyuki OKAMOTO (SOPAC SECRETARIAT)

#### Survey Members

Team Leader Nobuyuki MURAYAMA

(Deep Ocean Resources Development Co., Ltd.: DORD)

#### Survey Members

Nobuhiro GOTO (DORD)

Kazunori MATSUI (DORD)

Saburo TACHIKAWA (DORD)

Mutsuo KONDO (DORD)

Kazuyuki KADOSHIMA (DORD)

Fujio TANAKA (DORD)

Tomoki MIYAMUKAI

(Marine Biological Research Institute of Japan Co., Ltd.)

Yuji SUGAYA

(Ocean Engineering & Development Co., Ltd.: OED)

Yoshikazu YOSHINO (OED)

Tsutomu SATO (OED)

Takeshi SETSUTAI (OED)

Susumu KANZAKI (OED)

Takashi SOEJIMA (OED)

Nobuhiro YAMAMOTO (OED)

Trainee

Richard A. T. SIATAGA (Niue)

Atauea NAOMI (The Republic of Kiribati)

## 1 - 6 Amount of Work

The work given on Table 1-6-1 was conducted according to the schedule given on Table 1-6-2.

**Table1-6-1 List of Survey Achievements**

	Item	Achievements
Survey Schedule	Depart Majuro Arrive in the survey area of Kiribati Start Survey Finish Survey Depart survey area of Kiribati Arrive Majuro	Nov. 10 10:00 Nov. 30 05:26 Nov. 30 11:30 Dec. 3 16:42 Dec. 3 17:58 Dec. 4 12:00
Sampling	Arm Dredge (AD) Multiple Corer (MC)	8 points 4 points
Deep Sea Observation	Seafloor photographs taken by MC	4 Sheets
CTD	Effective CTD	1 location
Acoustic Sounding	NBS 30.0 KHz PDR 12.0 KHz nSBP 3.5 KHz MBES 15.5 KHz	Length of track lines 307.9nm 307.9nm 307.9nm 307.9nm
Data Processing	MBES Map Composing	1 CD-ROM Track lines map, Bathymetric map, Profiles and Bird-eye map etc.

**Table1-6-2 Records of Survey Schedules**

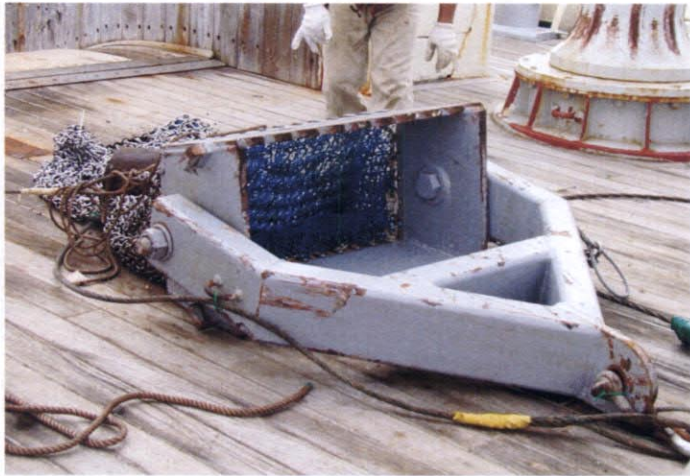
No.of Days		Month/Day		Survey Items	Bathymetric Survey (Cumulative Length)	Remarks
1		11/8	Sat			Preparation for Sailing
2		9	Sun			Preparation for Sailing
3		10	Mon			Lv. Majuro (10:00)
4		11	Tue			Sailing & Preparation
5		12	Wed			Sailing & Preparation
6		13	Thu			Sailing & Preparation
7		14	Fri			Sailing & Preparation
8		15	Sat			Sailing & Preparation
9		16	Sun			Sailing & Preparation Arrive survey area (15:03)
10	1	17	Mon	Mn Nodule Survey 03501 (SC01,FG02,03) 03502 (FG01,02,03)	142.3 (142.3)	Start survey (06:00)
11	2	18	Tue	Mn Nodule Survey 03503 (SC01,FG01,02) 03504 (FG01,02,03)	138.4 (280.7)	
12	3	19	Wed	Mn Nodule Survey 03505 (SC01,FG02,03) 03506 (FG01,02,03)	138.6 (419.3)	
13	4	20	Thu	Mn Nodule Survey 03507 (SC01,FG02,03) 03508 (FG01,02,03)	141.3 (560.6)	
14	5	21	Fri	Mn Nodule Survey 03509 (AD01) 03510 (FG01,02,03)	157.4 (718.0)	
15	6	22	Sat	Mn Nodule Survey 03511 (AD01) 03512 (SC01,FG02,03)	140.2 (858.2)	
16	7	23	Sun	Mn Nodule Survey 03513 (SC01,FG02,03) 03514 (SC01,FG02,03)		Finish survey and Depart for Kiribati
17		24	Mon			Depart survey area
18		25	Tue			Sailing & Preparation
19		26	Wed			Sailing & Preparation
20		27	Thu			Sailing & Preparation
21		28	Fri			Sailing & Preparation
22		29	Sat			Sailing & Preparation
23		30	Sun	Co-rich Crust Survey 03SE01 MC01	137.1 (137.1)	Arrive survey area (05:26) Start survey (11:30)
24	8	12/1	Mon	Co-rich Crust Survey 03SE01 MC02,03,04,	93.1 (230.2)	
25	9	2	Tue	Co-rich Crust Survey 03SE01 AD10,11,12,13	77.7 (307.9)	
26	10	3	Wed	Co-rich Crust Survey 03SE01 AD14,15,16		Finish survey (16:42) Depart survey area
27		4	Thu			Ar. Majuro (12:00)
28		5	Fri			

## 1 - 7 Survey Apparatus and Equipments

Major apparatus and equipments used for the survey are shown in Table 1- 7-1, and photographs of main survey equipments are shown in Fig.1-7-1.

**Table 1-7-1 Survey Apparatus and Equipments**

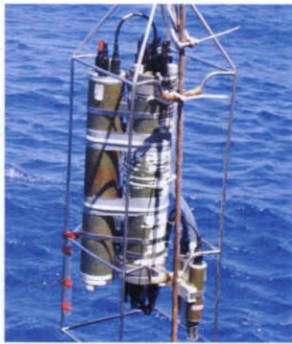
	Survey Method	Survey Apparatus and System	Abbreviation
Positioning	Satellite Navigation	Global Positioning System	GPS
Sea Bottom Topography and Geological Survey	Acoustic Sounding Bathymetric survey	Multinarrow-Beam Echo Sounder Narrow Beam echo Sounder Precision Depth Recorder	MBES NBS PDR
	Subsurface Sediments Survey	narrow-beam Sub-Bottom Profiler	nSBP
	Seawater Sonic-Velocity Survey	Conductivity, Temperature and Pressure Measuring System	CTD
	Sampling	Arm Dredge	AD
		Multiple Corer	MC
Sea Bottom Observation	Photograph	Deep Sea One-Shot Camera	
Data Recording and Processing	On-Line Functions	LAN MBES Real-time Mapping System	DAS
	Data Storage Functions	Data Sampling System	
	Off-Line Functions	MBES Post-processing System Off-line recovering system Analysis PC	
	Image Processing PC	Traverse line map, Bathymetric map, Various Plane Maps and Profiles etc.	



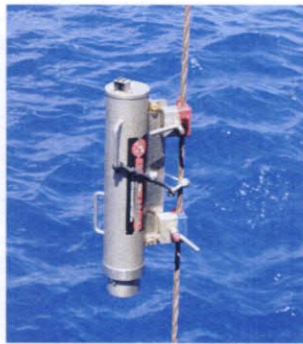
Arm Dredge Bucket (AD)



AD



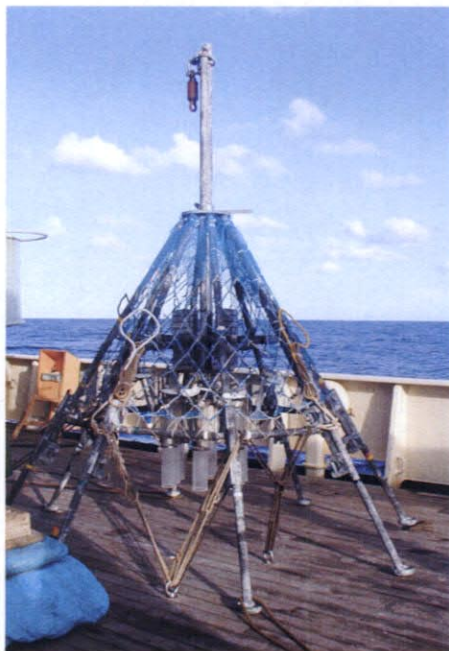
Conductivity, Temperature and  
Depth Measuring System (CTD)



Bottom Pinger (Acoustic Sounding  
Equipment)



Weights for AD (250kg/piece)



Multiple Corer (MC)



MC



One-shot Deepsea Camera (Installed to MC)

Fig. 1-7-1 Photographs of Main Survey Equipments