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CSK NEWSLETTER

JAPAN OCEANOGRAPHIC DATA CENTER
Hydrographic Department, Maritime Safety Agency
Tokyo, Japan

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CONTENTS

I. REPORT ON FISHERIES OCEANOGRAPHIC INVESTIGATION FOR THE CSK DURING 1974-75

The following report on fisheries oceanographic investigation for the CSK during 1974-75 from Prof. Inocencio A. Ronquillo, Assistant International Co-ordinator for the CSK was received by Dr. Kiyoo Wadati, International Co-ordinator for the CSK.

Fisheries- Oceanographic Investigation in the CSK Region 1974-75

Following the Symposium III of the CSK in May 1973, in Bangkok, Thailand, there was a lull in the reporting of fisheries-Oceanographic activities of participating states. Except for the publication of the proceedings of the Third CSK Symposium, much of the activities of other CSK Members have been devoted to the reconstruction of respective fisheries programme for submission to the United Nation Development Programme South China Sea Fisheries Development and Co-ordinating Programme and other developmental Schemes provided by other external and bilateral sources.

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In 1973, the South China Sea Fisheries Development and Co-ordinating Programme was formally organized to help boost the fisheries development of the countries bordering the South China Sea through regional co-operation. Conceived by the Indo-Pacific Fisheries Council during the 13th session in Brisbane, Australia in 1968, the Programme was in close contact with other international agencies such as Indian Ocean Programme, Southeast Asian Fisheries Development Centre, and other FAO regional Fisheries projects.
The member countries include China (Mainland and Taiwan Provinces), Hongkong, Vietnam, Khmer, Thailand, Malaysia, Singapore, Indonesia and the Philippines.

Thru bilateral arrangements, Thailand and Malaysia were recipients ients of the Federal Republic of Germany's Technical Assistance in fisheries-oceanographic research last year, Indonesia was also recipient of the same assistance in marine biological research. U.N.D.P. assisted Projects like the Fisheries Training in the Philippines and Malaysia, and the Offshore Fishery Development Project of Vietnam have provided the nucleus of developmental activities in these countries. All fisheries undertakings of the South China Sea regions more or less evolve around the developmental aspects provided for in the assisted programmes.

Emphasis of Investigations

All fisheries activities of the S.C.S. regions are geared towards the fulfillment of the desire of countries to increase

fish production. The fact is that the demand for fish of the region is so great while the production is relatively low. Based from the acute number of population the per caput fish protein consumption per year of the region is proportionately low. However, Hongkong has the highest per caput consumption with 41.2 kg/year, Singapore followed with 38.1 Khmer Republic-25.8, Malaysia with 23.6, Philippines- 23.5, Vietnam- 21.0, Thailand- 17.0, and lastly, Indonesia with 10.1 kg/year. Consequently the calory consumption per day was estimated to be not exceeding 2,225 calories except in Singapore and Hongkong. It is a well-known fact that the S.C.S. region including the Philippines rely on fish as a supplier of protein inasmuch as there is a shortage of supply of meat protein in these Southeast Asian Countries. Therefore the primary aim of increasing fish production is to support the increased per capita consumption brought about by the increased population. Creating surplus for export earnings constitute one gain out of this situation.

Hongkong

The Department of Agriculture and Fisheries thru the Fisheries Research Division has been carrying out the primary research programme on trawl fishing exploration on the shallower and deeper grounds with the hope of evaluating the available demersal stook to the fishery. This is made possible by trawl and long line operations. The effort consisted of the combined force of the Department Research vessel and various classes of commercial bottom trawlers.

A continuing demersal programme is in force consisting of assessment of deep water and shallow water resources, comparative trawling by the government and commercial or private sectors, and the study of catch per unit effort for fisheries management. Landings of demersal fishes during the 1969 to 1971 period represented 82-87% of the total landings including shrimps and molluscs. This may be due to the expansion of inshore trawl fishery.

Partly because of this fact and partly of the reduction in the numbers of fishing efforts especially in the category of sailboats, purse seiners, and gill netters, pelagic fishery is in its declining state. In this connection, a plan to integrate pelagic resources survey with semi-commercial fishing ventures wil be initated towards the end of 1974. This will cover an annual cruise programme for the research vessel. acoustic survey techniques for wider detection of pelagic fishes, semi-commercial fishing by chartered purse=seiner, and regional co-ordination of pelagic research activities covered by the South China Sea Programme. However, the possibility of exploiting tuna resources

is temporarily phased out.

For a long-term development programme of the Hongkong marine fisheries which is in line with the international goal of increasing fish production, the Department plans to; 1) locate and assess new and previously unknown utilizable pelagic and demersal resources for possible exploitation and establishment for commercial prospects, 2) assess the potential resource through biological and statistical means and identifyling the production problems for reliable management of stock.

Hydrographic and pollution studies are being carried out to compliment the biological programme. This is made possible through the use of their fisheries research vessel the "Cape St. Mary" a 242 tonner.

Indonesia

The Marine Fisheries of Indonesia is reported to have a bright prospect due to its five-year development plan (1969-74) which made possible the expansion of the commercial fisheries to offshore exploration for tunas and tuna-like fishes. It is still however, in its early stages of development.

Majority of the fishing activities are confined to shallow and coastal waters where operation of traditional gears for pelagic and baby trawl fishery usually yield substantial catch. The operation are carried out by small and non-motorized crafts which are 2 to 10 meters in length at a distance of less than 5 miles from the shore. In view of this limited capacity, foreign capitals for fishing ventures, are considered and welcomed. To help boost the production, the state operates four fishing enterprises which are supervised by the Directorate General of Fisheries.

Because of the country's progress in aquaculture where dollar input has consistently backed the country's economy, aquaculture occupies much of the fish production especially the Macrobrachium species.

A greater portion of the fishery development programme of Indonesia are supported by the bilateral and international aids.

Malaysia

The fishing industry in Malaysia is principally an inshore fishery which is fact creating an imbalance in the natural productivity of the waters by the depletion of the resources. A new programme entailing expansion of the unit fisheries for deep-sea and off shore operations in therefore envisioned. Aside from this, the feasibility of developing the inshore fishery into an industrial magnitude is being studied.

Malaysian fishing industry is backed up by the trawl fishery in the West complimented by the pelagic fishery (purse seines "Pukat jerut", liftnets, gillnets, etc.) in the East. Together, they produced a total of about 360,000 metric tons annually, employing about 80,000 fishermen not mentioning the M. $142 million export earnings. These returns were observed to be more or less stabilized for the last 5 years which is an indication of the lack of increment.

Appraisal of the marine and brackishwater resources is being instigated by the Fishery Research Institute in Penang. The research programme includes trawl surveys, basic biological investigations, fish breeding projects and the problems confronting the industry. The survey work is carried out on 2 research vessels, both 75-tons capacity.

Philippines

A definite and systematically planned programme for fishery-oceanographic investigations of the Philippine waters started only in 1957 when Dr. K. Tiews, an FAO expert, rendered technical assistance to the Filipino technicians and the Deep-Sea Fishing Programme of 1965-71. In 1968, an international co-ordinating programme for CSK studies undertook two series of cruises in eastern Pacific side of the Philippines on board the Bureau of Fisheries research vessel, the R/V RESEARCHER. Left alone in 1970, the Filipino technicians, fresh from training abroad, organized a fishery-oceanographic survey programme for the R/V RESEARCHER, covering such projects as biological studies of commercially important pelagic and demersal species including stock assessments, fisher-oceanographic investigations of Manila Bay, etc.

When the Test-Fishing Programme was implemented in 1973, a well organized set of programmes for fisheries development and research was initiated. These programmes cover such projects as indicated below which are continuation or modifications of earlier studies.

1. Fishery Oceanography Investigation of Traditional and Non-Traditional Fishing Grounds of the Philippines (R/V RESEARCHER)
2. Exploratory Investigation of Important Prospective Fishing Grounds (M/V Lapu-lapu, M/V Sabalo and M/V Malasugui)

To accelerate fish production and to fully develop the fishing industry, a "Four-Year Test Fishing Programme", was initiated by the Bureau of Fisheries and Aquatic Resources with full scale efforts. It plans to undertake fishery-oceanographic investigations in the traditional fishing grounds which extend to deeper

waters with emphasis on the improvement of fishing gears and resource and on stock assessment for the development of commercial fisheries.

In this connection, 12 trips in the territorial waters of the Philippines were made from November 1973 to May 1974 (inclusive) by our research vessel, the R/V RESEARCHER, M/V SABALO, a purse seniner; and M/V Lapu-Lapu, a trawler; all of which belong to the Bureau of Fisheries and Aquatic Resources. These activities are continually being undertaken and are considered on-going projects as hereunder summarized:

Boat	Area	Operation	Fishing
1. R/V RESEARCHER	Malampaya Sound, Western Palawan, Tayabas Bay & Adjacent waters	Fishery-oceanographic	Trawl Tuna Long line
2. M/V Sabalo	Tayabas Bay, Ragay Gulf Fishing, Samar Sea, Carigara Bay, Ormoc Bay, Melgar Bay, Pantao Bay, Paglugaban Rock, Malampaya Sound, Saddle Rock & Melgar Bay	"	Purse-Seine
3. M/V Lapu-Lapu	Ragay Gulf, Burias Pass, Ticao Pass & Guimaras Strait	"	Trawl

The arrival of two refrigerated boats from Japan the, M/V Albacora and M/V Lumba-Lumba in 1974 has marked the expansion of various activities under this Programme. These boats are intended for studies in fish handiling. Several trips to Palawan waters off western Philippines initiated the activities of these fish carriers which undertook tuna long lining operations.

An international commitment by the Philippines for the South China Sea Fisheries Development and Co-ordinating Programme has given the South China Sea Region especially the Philippines a new dimension in fisheries developemnt. In this connection, new problems were identified whereby assistance of the Programme was requested. This include training of fishermen. Two Canadian fishing vessels are now in the Philippines to try

purseseine in the South China Sea fishing on new grounds for institutional improvement especially relating to reconstruction of obselete laws, marketing and trade, improvements of statistical process, aquaculture, tuna fisheries, shrimp fishery, fish handling and preservation, credit supervision, banking system and laon distribution improvements.

A Workshop on Planning and Co-ordination of Resources Survey and Evaluation was held at the UNDP Office in Manila from 28 August to 4 September to gather information on marine fishery facilities of member countries and to help assess their fishery programmes and developments for better planning. At the conclusion of the meeting, the group listed priority species as well as areas to be investigated including methods to be employed in the investigations. The Group further stressed their co-ordination of research activities and contribution of the member countries as the best means of speeding evaluation works. As a result, creation of an Adhoc Co-ordination Group for Resources Survey and Evaluation was recommended to maintain close co-ordination and continuous flow of information among member countries.

The arrival in the Philippines of a chartered purse-seiner of the South China Programme, the "M/V Royal Venture" serves as an initial effort towards the development of pelagic fishery in the region. With Filipino technician on board, purse seining operations were under taken in the deeper waters of Mindanao in December 1974. This was followed by three cruises in the same water in January, and March to April 1975 after the arrival of "M/V Southward Ho." The three cruises were complemented with Bathythermograph investigation for oceanographic inferences.

A report on the status of Pelagic Fishing in the South China Sea was circularized by the UNDP/SCSFDCP; the Philippines' participation in this fishing venture was given emphasis and recognition.

The most significant result of the trips made by the three functioning vessels of the BFAR is the efficiency test of modified trawl with kite board. This kind of trawl net is very efficient in catching not only demersal fishes but also pelagic species like round-scads, anchovies, mackerel and big-eyed scads. For this reason, the use of this gear is being monitored and certain regulations must be followed for fish resources management purposes. The result of the Oceanographic research investigation is still in the stage of analysis, utilizing the data from 1970 to the latest survey.

The phasing out of the Dagat-dagatan Central Laboratory of the BFAR temporarily halted the research activities covered

by the Programmes. However, data are being processed for immediate evaluation.

So far, the oceanographic survey was concentrated in the west side of the Philippines facing South China Sea. These are Western Mindoro, western Luzon (Zambales), South China Sea, Maqueda Bay and Carigara Bay, Panay Gulf, Sulu Sea, Western Negros, Western Palawan, Tayabas Bay and Malampaya Sound. The CSK Programme in 1968 has studied partly the eastern Pacific side.

With the establishment of the Fishermen's Training Center (UNDP Project), it may be assumed that the manpower training is certain to add to increased production due to the acquisition of technical know how. Coupled with training being afforded to local technician by the three Departments of SEAFDEC, it is likely that optimum development can be reached within the shortest span of time.

Singapore

Being an inland state with limited land and water resources, Singapore fishing industry depends heavily on the landings of foreign fishing vessels, Thai, Malaysia, Indonesian, and soviet carriers. Majority of fishing operation are confined to shallow coastal areas around the island using a wide variety of gears. Offshore ventures with local and foreign capitals has been growing in importance.

Research work in fisheries is being taken care of by the Marine Fisheries Research Department of the Southeast Asian Fisheries Development Center.

Being the host country, Singapore contributes 1/3 of its annual operation cost subject to a maximum of US $ 40,000 through the Primary Production Department, Fisheries Division.

The center has a 309-ton research vessel, the M/V Changi which has been carrying out fishing and oceanographic surveys in the South China Sea and in the Indian Ocean since its acquisition in 1970. Since 1973, monitoring assessment of demersal resources has been carried out in selected reference areas near Tioman Island, Sabah and Sarawak in the South China Sea during the Southwest Monsoon and near Penang and North Addaman Sea in the northeast monsoon. Exploratory survey using vertical handlines gear was tried at untrawlable grounds of Sabah and Andaman Sea.

Some of the cruises were conducted in collaboration with the traing vessels of SEAFDEC Bangkok, the M/V Paknam, and the FAO fishery training vessel in Singapore, the M/V Jurong.

The SEAFDEC Research Department trains research workers from the member countries in all disciplines related to fisheries. The presence of the UNESCO sponsored regional Marine Bioligical Centre for plankton sorting has added to the research activities and international co-operation of this country in the field of fisheries.

The addition of Koder Sonar on board the Changi enables the Department to include research on pelagic fisheries resources.

Thailand

Majority of fishing activities in the country takes place in the Gulf of Thailand where there are around 3,000 trawlers fleet which is about 53 per cent of all of the fishing vessels, among others such as gillnets, purse-seines which comprise the remaining percent, are able to catch a total of 1.5 million tons of fish, crustaceans, and mollusks annually. At present, the Gulf is faced with the problem of over-exploitation which the government is fully aware of. However, since any developmental planning for the conservation of the Gulf of Thailand and other inshore fishery will affect mostly the small indigeneous fishermen, one of the alternative which is being considered is the fish farming feasibility.

The conservation of demersal resources has occupied most of the marine biology research in the Department of Fisheries. So many researches have already been published especially on demersal fish biology which are undertaken by the Marine Center in Phuket, and in the Marine Fisheries Division in Bangkok with the addition of the Fisheries Institutes and Universities offering Marine fisheries subjects. Some oceanographic phases of the research were largely undertaken by the NAGA Expeditions in the South China Sea. Reports have been circulated from various surveys in the South China Sea including part of Celebes Sea up to the Northern S.C.S.

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II. RESOLUTIONS RELATING TO CSK ADOPTED BY THE ASSEMBLY AT THE 9TH SESSION OF THE IOC (Unesco, Paris, 22 October - 4 November 1975, IOC-IX/3, Annex II)

Resolution IX-12

Co-operative Study of the Kuroshio and Adjacent Regions(CSK)

The Intergovernmental Oceanographic Commission,

Noting that the International Co-ordination Group for the Co-operative Study of the Kuroshio and adjacent regions(CSK) held its tenth session in Tokyo from 13 to 17 March 1975,

Approves in principle the Summary Report of the above session (document IOC/CSK-X/3) and requests the Executive Council at its seventh session, to consider the matter further;

Expresses its appreciation to the Government of Japan for its courtesy in hosting the above session.

Resolution IX-22

Regional Co-operation in Marine Science

The Intergovernmental Oceanographic Commission,

Noting that certain Co-operative Investigations of the Commission are shortly to be terminated and that new investigations are likely to be considered,

Noting further that various major programmes of the Commission, while related to long-term fundamental scientific objectives, have regional components of immediate short-term importance to participating countries,

Recognizing that the increased multiple use of the oceans requires an understanding of the oceans which can best be obtained by a multidisciplinary approach to the various problems,

Recognizing further that large-scale investigations, because of their complexity, the facilities required and the costs involved, can only be implemented effectively through the co-operation of interested States,

Taking into account that the outcome of the Third United Nations Conference on the Law of the Sea is likely to influence the institutional framework under which international co-operation in marine science and its application is at present promoted and conducted,

Noting in that context the need to increase the effectiveness of the Commission in meeting its objectives, as well as those of the ICSPRO* agencies,

Instructs the Secretary to prepare, in close consultation with the ICSPRO agencies and other international organizations concerned:

(a) a detailed review of existing arrangements for co-operation in marine science and its applications, with special reference to their constitution, objectives, budget funding, major programmes, operation and administration;

(b) criteria to guide the Commission's decisions on future mechanisms for regional co-operation, keeping in mind the scientific need to understand oceanic processes, in order to avoid duplication and to make full use of existing bodies;

Further instructs the Secretary to prepare, on the basis of the above review and criteria, alternative proposals for improving the effectiveness of co-operation on a regional basis and for rationalization of institutional arrangements, bearing in mind that for reasons of economy and efficiency, it would in principle be desirable to have single regional bodies with wider terms of reference for each region;

Requires these studies to be submitted through the Executive Council at its eight session, to the tenth session of the Assembly in 1977.

ICSPRO* --- Inter-secretariat Committee on Scientific Programmes Relating to Oceanography

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III. CRUISE REPORTS

1. Republic of Korea

1.1 Suro No. 3

(ROSCOP)

SHIP OR PLATFORM	SCIENTIST IN CHARGE
Suro No. 3	Choo Kyo Sung

INSTITUTION OR OPERATING AGENCY

Hydrographic Office, Republic of Korea (ROK, HO)

EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO.	COUNTRY
CSK, ROK, HO-2-74	Republic of Korea

DATE OF CRUISE

FROM: 15 DAY / 8 MONTH / 1974 YEAR — TO: 28 DAY / 9 MONTH / 1974 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF △ STATIONS	Q	F D	TYPE OF FORMAT AVAILABLE
DESCRIPTIVE OCEANOGRAPHY				
D 1 SERIAL STATIONS	19	a	a,b	RDC,MT
D 2 STD				
D 3 OXYGEN	19	a	a,b	PUB,MT
D 4 PHOSPHATES				
D 5 TOTAL-P				
D 6 NITRATES				
D 7 NITRITES				
D 8 TRACE ELEMENTS				
D 9 pH	19	a	a,b	PUB,MT
D 10 ALKALINITY				
D 11 SILICATES				
D 12 RADIOACTIVITY				
D 13 ISOTOPE CHEMISTRY				
D 14 OTHER DISSOLVED GASES				
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)				
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	19	a	a	PUB
D 17 TRANSPARENCY (NO. OF OBS.)	19	a	a,b	PUB,MT
D 18 SOUND VELOCIMETER DATA				
D 19 INSTRUMENTED WAVE RECORDING (✓)				
D 20 TIDES (✓)				
D 21 SEA (✓)				
D 22 SWELL (✓)				
D 23 ICE (✓)				
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)				
D 25 SEA SURFACE TEMPERATURE (✓)	✓	a	a	PUB
CURRENT MEASUREMENTS				
C 1 CURRENT METERS				
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)				
C 2 GEK (✓)				
C 3 DROGUES (✓)				
C 4 SWALLOW FLOATS (✓)				
C 5 SURFACE DRIFTERS (NO. RELEASED)				
C 6 BOTTOM DRIFTERS (NO. RELEASED)				
METEOROLOGY				
M 1 UPPER AIR OBSERVATIONS (✓)				
M 2 SURFACE METEOROLOGICAL OBS. (✓)	✓	a	a	RDC
M 3 INCIDENT RADIATION (✓)				
GEOLOGY AND GEOPHYSICS				
G 1 DREDGE AND GRAB SAMPLES (NO. OF SAMPLES)				
G 2 CORES (NO. CORES)				
G 3 SEISMIC—REFLECTION PROFILES (Km)				
G 4 SEISMIC—REFRACTION PROFILES				

Q QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:

a. ROK, HO

b.

c.

d.

e.

f.

F D FINAL DISPOSITION OF DATA
(NATIONAL REPOSITORY, INSTITUTION, REGIONAL CENTER, OR WORLD DATA CENTERS)

a. ROK, HO

b. JODC (MT)

c.

d.

e.

f.

△ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER. WHEN OBSERVED PARAMETER IS FOLLOWED BY A CHECK MARK (✓) DO NOT ENTER ANY NUMBER BUT ENTER THE CHECK MARK INSTEAD.

TOTAL KILOMETERS STEAMED:

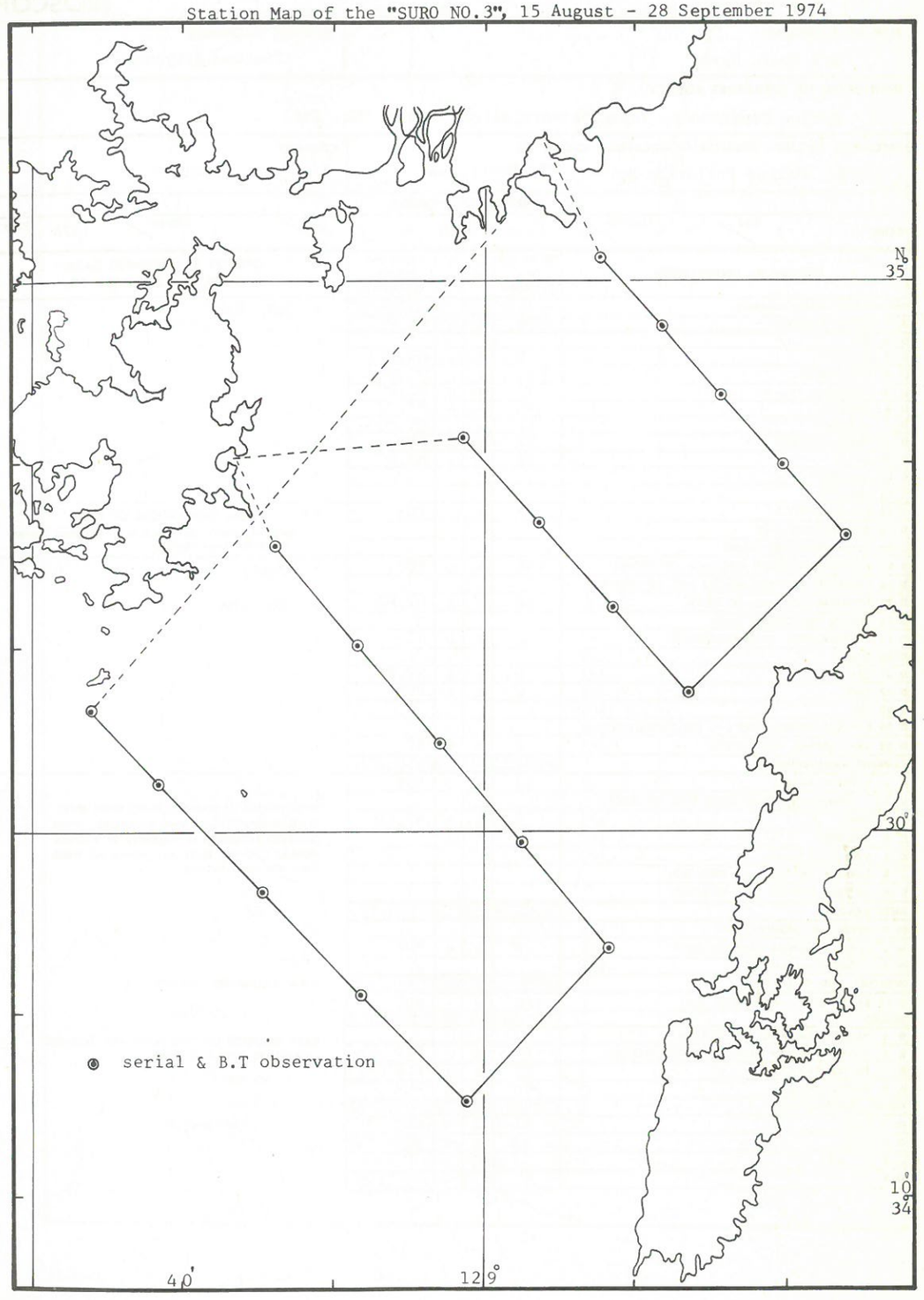
DATA REPORTED ON THIS FORM ARE DECLARED NATIONAL PROGRAM (DNP):

(✓) YES

( ) NO

( ) PART (SPECIFY)

Station Map of the "SURO NO.3", 15 August - 28 September 1974



2. Japan

2.1 Ryofu Maru

(ROSCOP)

SHIP OR PLATFORM
R/V Ryofu Maru

SCIENTIST IN CHARGE
Tsutomu Akiyama

INSTITUTION OR OPERATING AGENCY
Marine Department, Japan Meteorological Agency (MD, JMA)

EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO.
CSK, Marine Pollution Survey - 74-06 Cruise

COUNTRY
Japan

DATE OF CRUISE

FROM: 7 DAY / 6 MONTH / 1974 YEAR TO: 27 DAY / 7 MONTH / 1974 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF △ STATIONS	Q	F D	TYPE OF FORMAT AVAILABLE
DESCRIPTIVE OCEANOGRAPHY				
D 1 SERIAL STATIONS	76	a	a	MT,PC
D 2 STD				
D 3 OXYGEN	76	a	a	MT,PC
D 4 PHOSPHATES	67	a	a	MT,PC
D 5 TOTAL-P	22	a	a	MT,PC
D 6 NITRATES	22	a	a	MT,PC
D 7 NITRITES	11	a	a	MT,PC
D 8 TRACE ELEMENTS	14	a	a	PUB
D 9 pH	16	a	a	MT,PC
D 10 ALKALINITY				
D 11 SILICATES				
D 12 RADIOACTIVITY	8	a	b	PUB
D 13 ISOTOPE CHEMISTRY				
D 14 OTHER DISSOLVED GASES				
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)	166	a	a	PUB
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)				
D 17 TRANSPARENCY (NO. OF OBS.)	46	a	a	MT,PC
D 18 SOUND VELOCIMETER DATA				
D 19 INSTRUMENTED WAVE RECORDING (✓)	✓	a	b	AT
D 20 TIDES (✓)				
D 21 SEA (✓)	✓	a	a	MT,PC
D 22 SWELL (✓)	✓	a	a	PUB
D 23 ICE (✓)				
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)				
D 25 SEA SURFACE TEMPERATURE (✓)	✓	a	b	AT
CURRENT MEASUREMENTS				
C 1 CURRENT METERS	43	a	a	PUB
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)				
C 2 GEK (✓)	5	a	a	MT,PC
C 3 DROGUES (✓)				
C 4 SWALLOW FLOATS (✓)				
C 5 SURFACE DRIFTERS (NO. RELEASED)				
C 6 BOTTOM DRIFTERS (NO. RELEASED)				
METEOROLOGY				
M 1 UPPER AIR OBSERVATIONS (✓)				
M 2 SURFACE METEOROLOGICAL OBS. (✓)	✓	a	a	PUB
M 3 INCIDENT RADIATION (✓)				
GEOLOGY AND GEOPHYSICS				
G 16 BATHYMETRY—WIDE BEAM (Km)	100	a	b	RDS
BIOLOGY				
B 1 PRIMARY ORGANIC PRODUCTION				
B 2 PHYTOPLANKTON PIGMENT CONCENTRATION	51	a	a	PUB
B 7 PHYTOPLANKTON	75	a	a	PUB
B 8 ZOOPLANKTON	76	a	a	PUB
OTHER OBSERVATIONS				
O 1 COD	11	a	a	PUB
O 2 NH3	11	a	a	PUB
O 3				
O 4				

Q — QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:

a. MD, JMA
b.
c.
d.
e.
f.

F D — FINAL DISPOSITION OF DATA (NATIONAL REPOSITORY, INSTITUTION, REGIONAL CENTER, OR WORLD DATA CENTERS)

a. JODC
b. MD, JMA
c.
d.
e.
f.

△ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER. WHEN OBSERVED PARAMETER IS FOLLOWED BY A CHECK MARK (✓) DO NOT ENTER ANY NUMBER BUT ENTER THE CHECK MARK INSTEAD.

TOTAL KILOMETERS STEAMED:

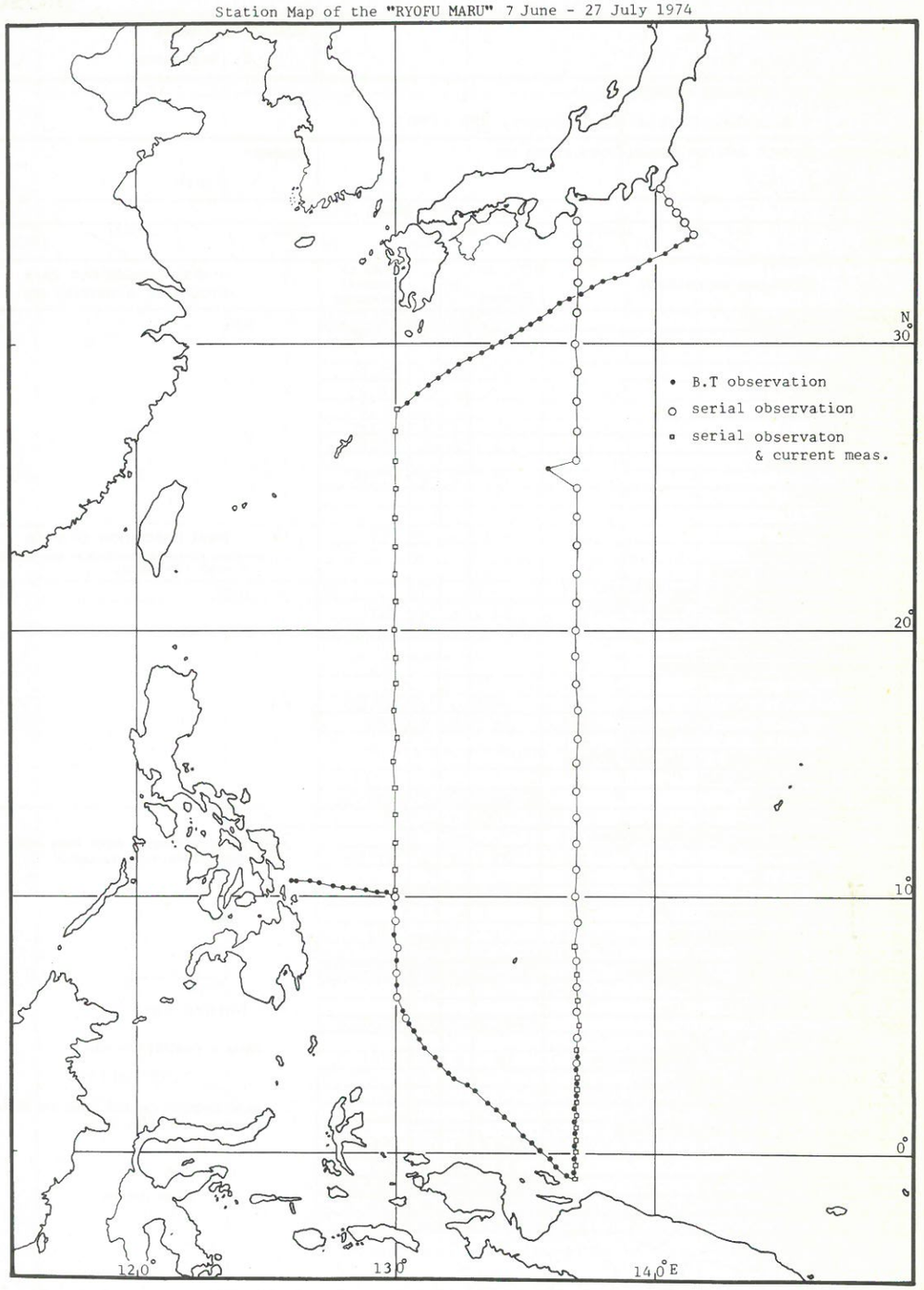
11,000km

DATA REPORTED ON THIS FORM ARE DECLARED NATIONAL PROGRAM (DNP):

(✓) YES
( ) NO
( ) PART (SPECIFY)

'76

Station Map of the "RYOFU MARU" 7 June - 27 July 1974



2.2 Kofu Maru

(ROSCOP)

SHIP OR PLATFORM	SCIENTIST IN CHARGE
Kofu Maru	S. Kuronuma
INSTITUTION OR OPERATING AGENCY	
Hakodate Marine Observatory, JMA (HMO)	
EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO.	**COUNTRY**
CSK, 74-5	Japan

DATE OF CRUISE

FROM: 5 DAY / 7 MONTH / 1974 YEAR TO: 18 DAY / 7 MONTH / 1974 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF △ STATIONS	Q	F D	TYPE OF FORMAT AVAILABLE
DESCRIPTIVE OCEANOGRAPHY				
D 1 SERIAL STATIONS	33	a	a	MT,PC
D 2 STD				
D 3 OXYGEN	33	a	a	MT,PC
D 4 PHOSPHATES	33	a	a	MT,PC
D 5 TOTAL-P	3	a	a	MT,PC
D 6 NITRATES	3	a	a	MT,PC
D 7 NITRITES	3	a	a	MT,PC
D 8 TRACE ELEMENTS				
D 9 pH	3	a	a	MT,PC
D 10 ALKALINITY				
D 11 SILICATES				
D 12 RADIOACTIVITY	4	a	b	PUB
D 13 ISOTOPE CHEMISTRY				
D 14 OTHER DISSOLVED GASES				
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)				
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	83	a	a	PUB
D 17 TRANSPARENCY (NO. OF OBS.)				
D 18 SOUND VELOCIMETER DATA				
D 19 INSTRUMENTED WAVE RECORDING (✓)				
D 20 TIDES (✓)				
D 21 SEA (✓)	V	a	a	MT,PC
D 22 SWELL (✓)	V	a	a	PUB
D 23 ICE (✓)				
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)				
D 25 SEA SURFACE TEMPERATURE (✓)				
CURRENT MEASUREMENTS				
C 1 CURRENT METERS				
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)				
C 2 GEK (✓)	79	a	a	MT,PC
C 3 DROGUES (✓)				
METEOROLOGY				
M 1 UPPER AIR OBSERVATIONS (✓)				
M 2 SURFACE METEOROLOGICAL OBS. (✓)	V	a	a	PUB
M 3 INCIDENT RADIATION (✓)				
GEOLOGY AND GEOPHYSICS (CONTINUED)				
G 22 BOTTOM RADIOACTIVITY (✓)				
G 23 SIDE-SCANNING SONAR (Km)				
BIOLOGY				
B 1 PRIMARY ORGANIC PRODUCTION				
B 2 PHYTOPLANKTON PIGMENT CONCENTRATION	18	a	a	PUB
B 3 PARTICULATE ORGANIC MATTER				
B 4 DISSOLVED ORGANIC MATTER				
B 5 NEUSTON AND PLEUSTON				
B 6 BACTERIA AND OTHER MICROORGANISMS				
B 7 PHYTOPLANKTON	18	a	a	PUB
B 8 ZOOPLANKTON	12	a	a	PUB
OTHER OBSERVATIONS				
O 1 Ammonia	3	a	a	PUB
O 2 COD	3	a	a	PUB

Q QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:

a. HMO
b.
c.
d.
e.
f.

F D FINAL DISPOSITION OF DATA (NATIONAL REPOSITORY, INSTITUTION, REGIONAL CENTER, OR WORLD DATA CENTERS)

a. JODC
b. MD, JMA
c.
d.
e.
f.

△ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER.

B8: Norpac net

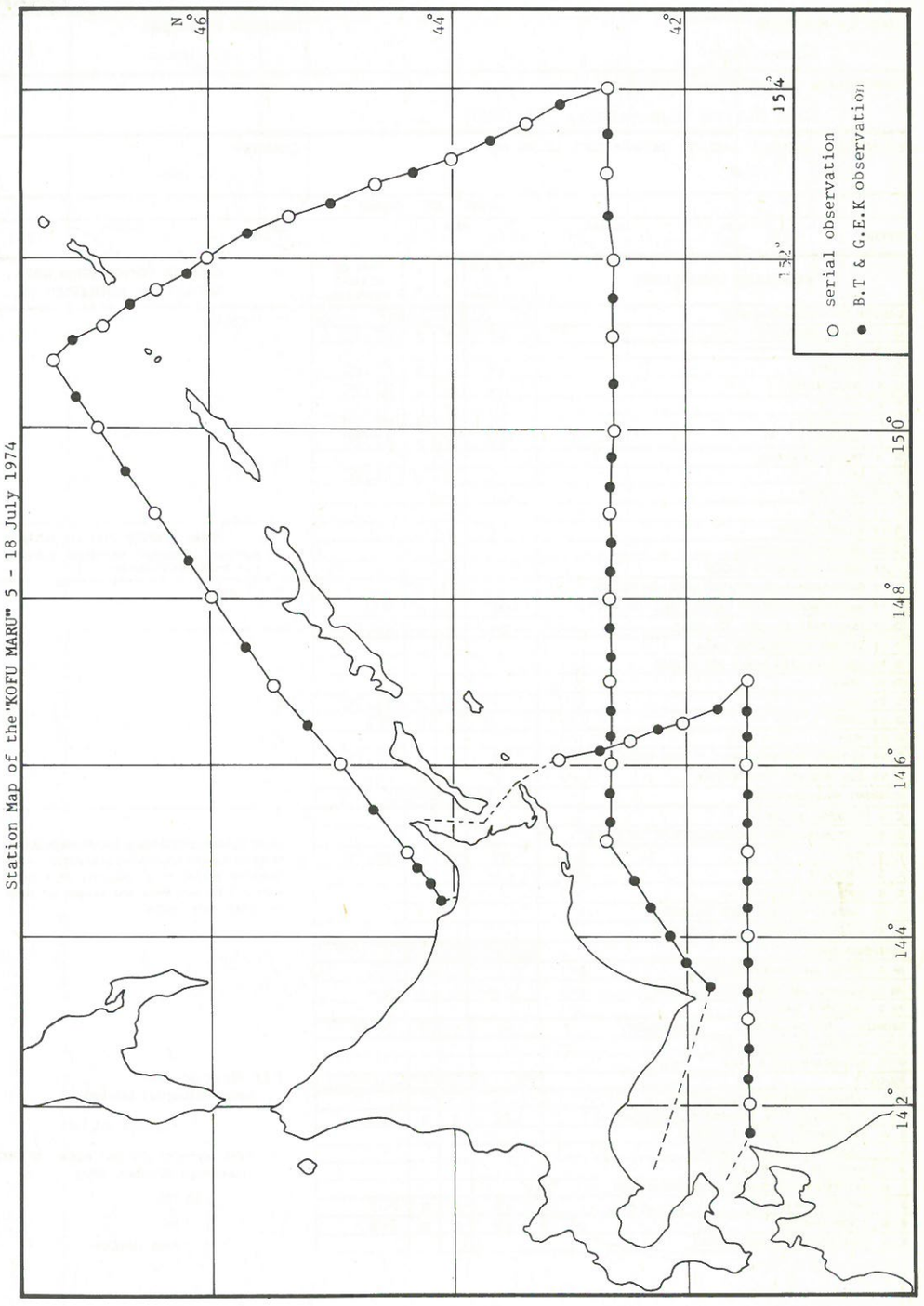
TOTAL KILOMETERS STEAMED:

1,957 miles

DATA REPORTED ON THIS FORM ARE DECLARED NATIONAL PROGRAM (DNP):

(✓) YES
( ) NO
( ) PART (SPECIFY)

'76



2.3 Shumpu Maru

(ROSCOP)

SHIP OR PLATFORM	SCIENTIST IN CHARGE
Shumpu Maru	K. Shuto

INSTITUTION OR OPERATING AGENCY

Kobe Marine Observatory, JMA (KMO)

EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO.	COUNTRY
CSK, 7407	Japan

DATE OF CRUISE

FROM: 12 DAY / 7 MONTH / 1974 YEAR TO: 3 DAY / 8 MONTH / 1974 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF △ STATIONS	Q	F D	TYPE OF FORMAT AVAILABLE
DESCRIPTIVE OCEANOGRAPHY				
D 1 SERIAL STATIONS	49	a	a	MT,PC
D 2 STD				
D 3 OXYGEN	49	a	a	MT,PC
D 4 PHOSPHATES	49	a	a	MT,PC
D 5 TOTAL-P	15	a	a	MT,PC
D 6 NITRATES	15	a	a	MT,PC
D 7 NITRITES	49	a	a	MT,PC
D 8 TRACE ELEMENTS				
D 9 pH	3	a	a	MT,PC
D 10 ALKALINITY				
D 11 SILICATES				
D 12 RADIOACTIVITY	5	a	a	PUB
D 13 ISOTOPE CHEMISTRY				
D 14 OTHER DISSOLVED GASES				
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)				
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	101	a	a	PUB
D 17 TRANSPARENCY (NO. OF OBS.)	24	a	a	MT,PC
D 18 SOUND VELOCIMETER DATA				
D 19 INSTRUMENTED WAVE RECORDING (✓)				
D 20 TIDES (✓)				
D 21 SEA (✓)	✓	a	a	MT,PC
D 22 SWELL (✓)	✓	a	a	PUB
D 23 ICE (✓)				
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)	24	a	a	MT,PC
D 25 SEA SURFACE TEMPERATURE (✓)	✓	a	a	PUB
CURRENT MEASUREMENTS				
C 1 CURRENT METERS				
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)				
C 2 GEK (✓)	82	a	a	MT,PC
C 3 DROGUES (✓)				
C 4 SWALLOW FLOATS (✓)				
C 5 SURFACE DRIFTERS (NO. RELEASED)				
C 6 BOTTOM DRIFTERS (NO. RELEASED)				
METEOROLOGY				
M 1 UPPER AIR OBSERVATIONS (✓)				
M 2 SURFACE METEOROLOGICAL OBS. (✓)	✓	a	a	PUB
M 3 INCIDENT RADIATION (✓)				
GEOLOGY AND GEOPHYSICS (CONTINUED)				
G 22 BOTTOM RADIOACTIVITY (✓)				
G 23 SIDE-SCANNING SONAR (Km)				
BIOLOGY				
B 1 PRIMARY ORGANIC PRODUCTION				
B 2 PHYTOPLANKTON PIGMENT CONCENTRATION	32	a	a	PUB
B 3 PARTICULATE ORGANIC MATTER				
B 4 DISSOLVED ORGANIC MATTER				
B 5 NEUSTON AND PLEUSTON				
B 6 BACTERIA AND OTHER MICROORGANISMS				
B 7 PHYTOPLANKTON	24	a	a	PUB
B 8 ZOOPLANKTON	29	a	a	PUB
B 9 FISH EGGS AND/OR LARVAE				

Q **QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:**

a. KMO
b.
c.
d.
e.
f.

F D **FINAL DISPOSITION OF DATA**
(NATIONAL REPOSITORY, INSTITUTION, REGIONAL CENTER, OR WORLD DATA CENTERS)

a. JODC
b.
c.
d.
e.
f.

△ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER. WHEN OBSERVED PARAMETER IS FOLLOWED BY A CHECK MARK (✓) DO NOT ENTER ANY NUMBER BUT ENTER THE CHECK MARK INSTEAD.

B2: Norpac net

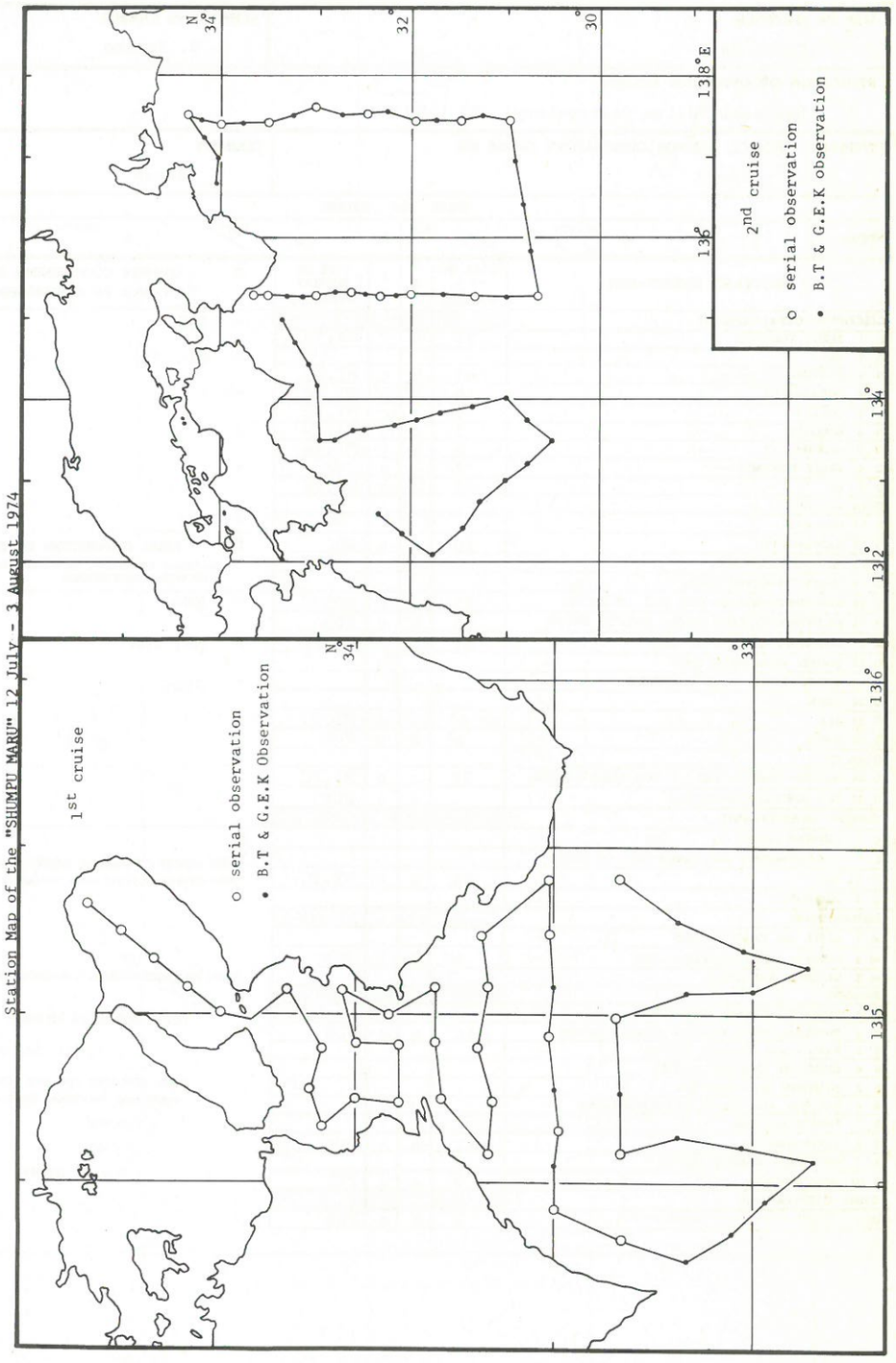
TOTAL KILOMETERS STEAMED:

1,800 miles

DATA REPORTED ON THIS FORM ARE DECLARED NATIONAL PROGRAM (DNP):

(✓) YES
( ) NO
( ) PART (SPECIFY)

'76



2.4 Chofu Maru

(ROSCOP)

SHIP OR PLATFORM	SCIENTIST IN CHARGE
Chofu Maru	S. Yamano

INSTITUTION OR OPERATING AGENCY

Nagasaki Marine Observatory, JMA (NMO)

EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO.	COUNTRY
CSK, 74-07	Japan

DATE OF CRUISE

FROM: 21 DAY / 7 MONTH / 1974 YEAR — TO: 14 DAY / 8 MONTH / 1974 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF △ STATIONS	Q	F D	TYPE OF FORMAT AVAILABLE
DESCRIPTIVE OCEANOGRAPHY				
D 1 SERIAL STATIONS	43	a	c	MT, PC
D 2 STD				
D 3 OXYGEN	43	a	c	MT, PC
D 4 PHOSPHATES	16	a	c	MT, PC
D 5 TOTAL-P	3	a	c	MT, PC
D 6 NITRATES	3	a	c	MT, PC
D 7 NITRITES	3	a	c	MT, PC
D 8 TRACE ELEMENTS	2	b	c	PUB
D 9 pH	3	a	c	MT, PC
D 10 ALKALINITY				
D 11 SILICATES				
D 12 RADIOACTIVITY	10	a	b	RDC
D 13 ISOTOPE CHEMISTRY				
D 14 OTHER DISSOLVED GASES				
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)	35	a	a	RDS
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	56	a	c	PUB
D 17 TRANSPARENCY (NO. OF OBS.)	21	a	c	MT, PC
D 18 SOUND VELOCIMETER DATA				
D 19 INSTRUMENTED WAVE RECORDING (✓)				
D 20 TIDES (✓)				
D 21 SEA (✓)	✓	a	c	MT, PC
D 22 SWELL (✓)	✓	a	c	PUB
D 23 ICE (✓)				
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)	22	a	c	MT, PC
D 25 SEA SURFACE TEMPERATURE (✓)		a	c	PUB
CURRENT MEASUREMENTS				
C 1 CURRENT METERS				
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)				
C 2 GEK (✓)	54	a	c	MT, PC
C 3 DROGUES (✓)				
METEOROLOGY				
M 1 UPPER AIR OBSERVATIONS (✓)				
M 2 SURFACE METEOROLOGICAL OBS. (✓)	✓	a	c	PUB
M 3 INCIDENT RADIATION (✓)				
BIOLOGY				
B 1 PRIMARY ORGANIC PRODUCTION				
B 2 PHYTOPLANKTON PIGMENT CONCENTRATION	16	a	c	PUB
B 3 PARTICULATE ORGANIC MATTER				
B 4 DISSOLVED ORGANIC MATTER				
B 5 NEUSTON AND PLEUSTON				
B 6 BACTERIA AND OTHER MICROORGANISMS				
B 7 PHYTOPLANKTON				
B 8 ZOOPLANKTON	11	a	c	PUB
B 9 FISH EGGS AND/OR LARVAE				
B 10 MICRONEKTON	9	a	c	PUB
OTHER OBSERVATIONS				
O 1 COD	3	a	c	PUB

Q — QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:

a. NMO
b. MD, JMA
c.
d.
e.
f.

F D — FINAL DISPOSITION OF DATA (NATIONAL REPOSITORY, INSTITUTION, REGIONAL CENTER, OR WORLD DATA CENTERS)

a. NMO
b. MD, JMA
c. JODC
d.
e.
f.

△ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER.

WHEN THE OBSERVATION IS IN NAUTICAL OR STATUTE

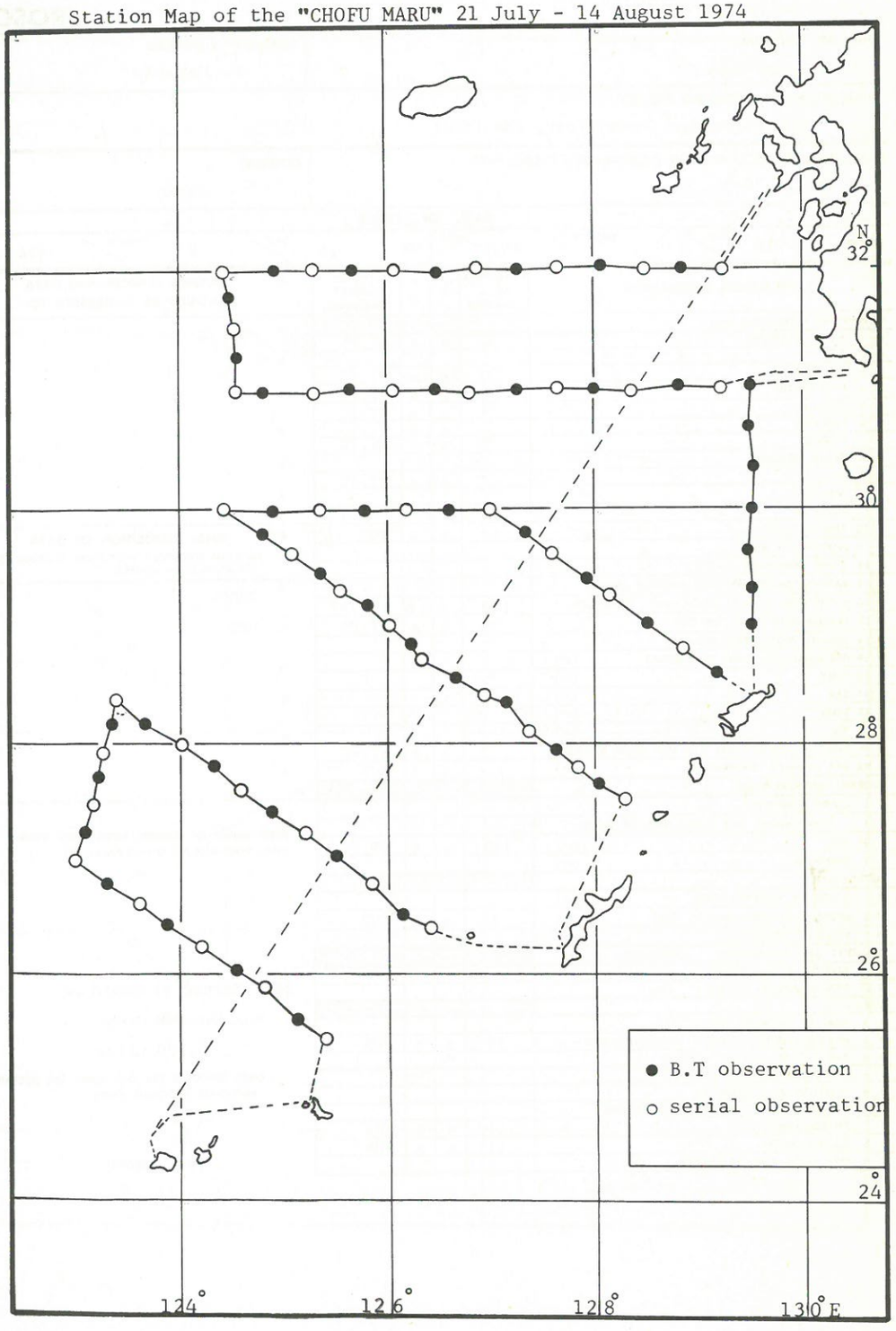
TOTAL KILOMETERS STEAMED:

2,910 miles

DATA REPORTED ON THIS FORM ARE DECLARED NATIONAL PROGRAM (DNP):

(✓) YES
( ) NO
( ) PART (SPECIFY)

Station Map of the "CHOFU MARU" 21 July - 14 August 1974



2.5 Seifu Maru

(ROSCOP)

SHIP OR PLATFORM	SCIENTIST IN CHARGE
Seifu Maru	I. Fujiwara

INSTITUTION OR OPERATING AGENCY

Maizuru Marine Observatory, JMA (MMO)

EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO.	COUNTRY
CSK, 74-04	Japan

DATE OF CRUISE

FROM: 16 DAY / 7 MONTH / 1974 YEAR TO: 14 DAY / 8 MONTH / 1974 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF △ STATIONS	Q	F D	TYPE OF FORMAT AVAILABLE
DESCRIPTIVE OCEANOGRAPHY				
D 1 SERIAL STATIONS	70	a	a	MT,PC
D 2 STD				
D 3 OXYGEN	70	a	a	MT,PC
D 4 PHOSPHATES	34	a	a	MT,PC
D 5 TOTAL-P	3	a	a	MT,PC
D 6 NITRATES	3	a	a	MT,PC
D 7 NITRITES	3	a	a	MT,PC
D 8 TRACE ELEMENTS				
D 9 pH	3	a	a	MT,PC
D 10 ALKALINITY				
D 11 SILICATES				
D 12 RADIOACTIVITY	12	a	b	PUB
D 13 ISOTOPE CHEMISTRY				
D 14 OTHER DISSOLVED GASES				
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)				
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	142	a	a, b	PUB,AT
D 17 TRANSPARENCY (NO. OF OBS.)	35	a	a	MT,PC
D 18 SOUND VELOCIMETER DATA				
D 19 INSTRUMENTED WAVE RECORDING (✓)				
D 20 TIDES (✓)				
D 21 SEA (✓)				
D 22 SWELL (✓)				
D 23 ICE (✓)				
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)	2	a	a	MT,PC
D 25 SEA SURFACE TEMPERATURE (✓)	✓	a	a	PUB
CURRENT MEASUREMENTS				
C 1 CURRENT METERS				
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)				
C 2 GEK (✓)	142	a	a	MT,PC
C 3 DROGUES (✓)				
METEOROLOGY				
M 1 UPPER AIR OBSERVATIONS (✓)				
M 2 SURFACE METEOROLOGICAL OBS. (✓)	✓	a	a	PUB
M 3 INCIDENT RADIATION (✓)				
GEOLOGY AND GEOPHYSICS (CONTINUED)				
G 22 BOTTOM RADIOACTIVITY (✓)				
G 23 SIDE-SCANNING SONAR (Km.)				
BIOLOGY				
B 1 PRIMARY ORGANIC PRODUCTION				
B 2 PHYTOPLANKTON PIGMENT CONCENTRATION	11	a	a	PUB
B 3 PARTICULATE ORGANIC MATTER				
B 4 DISSOLVED ORGANIC MATTER				
B 5 NEUSTON AND PLEUSTON				
B 6 BACTERIA AND OTHER MICROORGANISMS				
B 7 PHYTOPLANKTON	11	a	a	PUB
B 8 ZOOPLANKTON	11	a	a	PUB
B 9 FISH EGGS AND/OR LARVAE				

Q **QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:**

a. MMO
b.
c.
d.
e.
f.

F D **FINAL DISPOSITION OF DATA** (NATIONAL REPOSITORY, INSTITUTION, REGIONAL CENTER, OR WORLD DATA CENTERS)

a. JODC
b. MMO
c.
d.
e.
f.

△ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER.

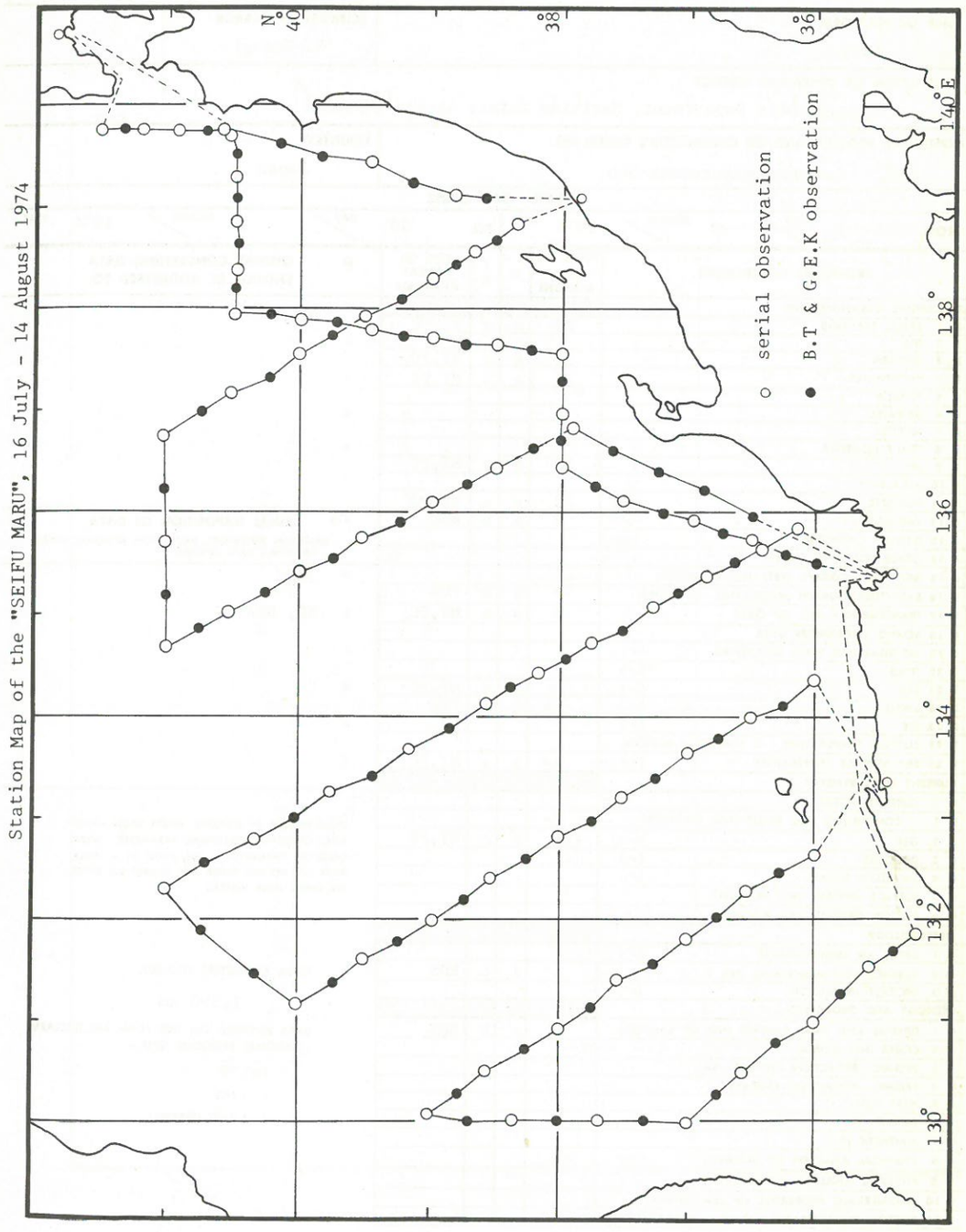
B8: Norpac standard net

TOTAL KILOMETERS STEAMED:

3,100 miles

DATA REPORTED ON THIS FORM ARE DECLARED NATIONAL PROGRAM (DNP):

(✓) YES
( ) NO
( ) PART (SPECIFY).



(ROSCOP)

SHIP OR PLATFORM
Kaiyo

SCIENTIST IN CHARGE
A. Kosugi

INSTITUTION OR OPERATING AGENCY
Hydrographic Department, Maritime Safety Agency (HD,MSA)

EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO.
CSK, Current measurement-5th

COUNTRY
Japan

DATE OF CRUISE

FROM: 9 DAY / 8 MONTH / 1974 YEAR TO: 30 DAY / 8 MONTH / 1974 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF △ STATIONS	Q	F D	TYPE OF FORMAT AVAILABLE
DESCRIPTIVE OCEANOGRAPHY				
D 1 SERIAL STATIONS	22	a	a	MT,PC
D 2 STD				
D 3 OXYGEN	22	a	a	MT,PC
D 4 PHOSPHATES	22	a	a	MT,PC
D 5 TOTAL-P				
D 6 NITRATES				
D 7 NITRITES				
D 8 TRACE ELEMENTS				
D 9 pH	22	a	a	MT,PC
D 10 ALKALINITY				
D 11 SILICATES	22	a	a	MT,PC
D 12 RADIOACTIVITY	2	a	b	RDC
D 13 ISOTOPE CHEMISTRY				
D 14 OTHER DISSOLVED GASES				
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)				
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	79	a	a	PUB
D 17 TRANSPARENCY (NO. OF OBS.)	6	a	a	MT,PC
D 18 SOUND VELOCIMETER DATA				
D 19 INSTRUMENTED WAVE RECORDING (✓)				
D 20 TIDES (✓)				
D 21 SEA (✓)	✓	a	a	MT,PC
D 22 SWELL (✓)	✓	a	a	PUB
D 23 ICE (✓)				
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)				
D 25 SEA SURFACE TEMPERATURE (✓)	✓	a	a	MT,PC
CURRENT MEASUREMENTS				
C 1 CURRENT METERS				
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)				
C 2 GEK (✓)	111	a	a	MT,PC
C 3 DROGUES (✓)				
C 4 SWALLOW FLOATS (✓)				
C 5 SURFACE DRIFTERS (NO. RELEASED)				
C 6 BOTTOM DRIFTERS (NO. RELEASED)				
METEOROLOGY				
M 1 UPPER AIR OBSERVATIONS (✓)				
M 2 SURFACE METEOROLOGICAL OBS. (✓)	✓	a	b	RDS
M 3 INCIDENT RADIATION (✓)				
GEOLOGY AND GEOPHYSICS				
G 1 DREDGE AND GRAB SAMPLES (NO. OF SAMPLES)	6	a	b	RDS
G 2 CORES (NO. CORES)				
G 3 SEISMIC—REFLECTION PROFILES (Km)				
G 4 SEISMIC—REFRACTION PROFILES				
G 5 HEAT FLOW				
G 6 GRAVITY (Km)				
G 7 MAGNETIC (Km)				
G 8 CHEMICAL ANALYSIS OF SEDIMENT (✓)				
G 9 PHYSICAL ANALYSIS OF SEDIMENT (✓)				
G 10 ENGINEERING PROPERTIES OF SEA BOTTOM				
G 11 BOTTOM PHOTOGRAPHY (NO. OF CAMERA STATIONS)				

Q **QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:**

a. HD, MSA
b.
c.
d.
e.
f.

F D **FINAL DISPOSITION OF DATA**
(NATIONAL REPOSITORY, INSTITUTION, REGIONAL CENTER, OR WORLD DATA CENTERS)

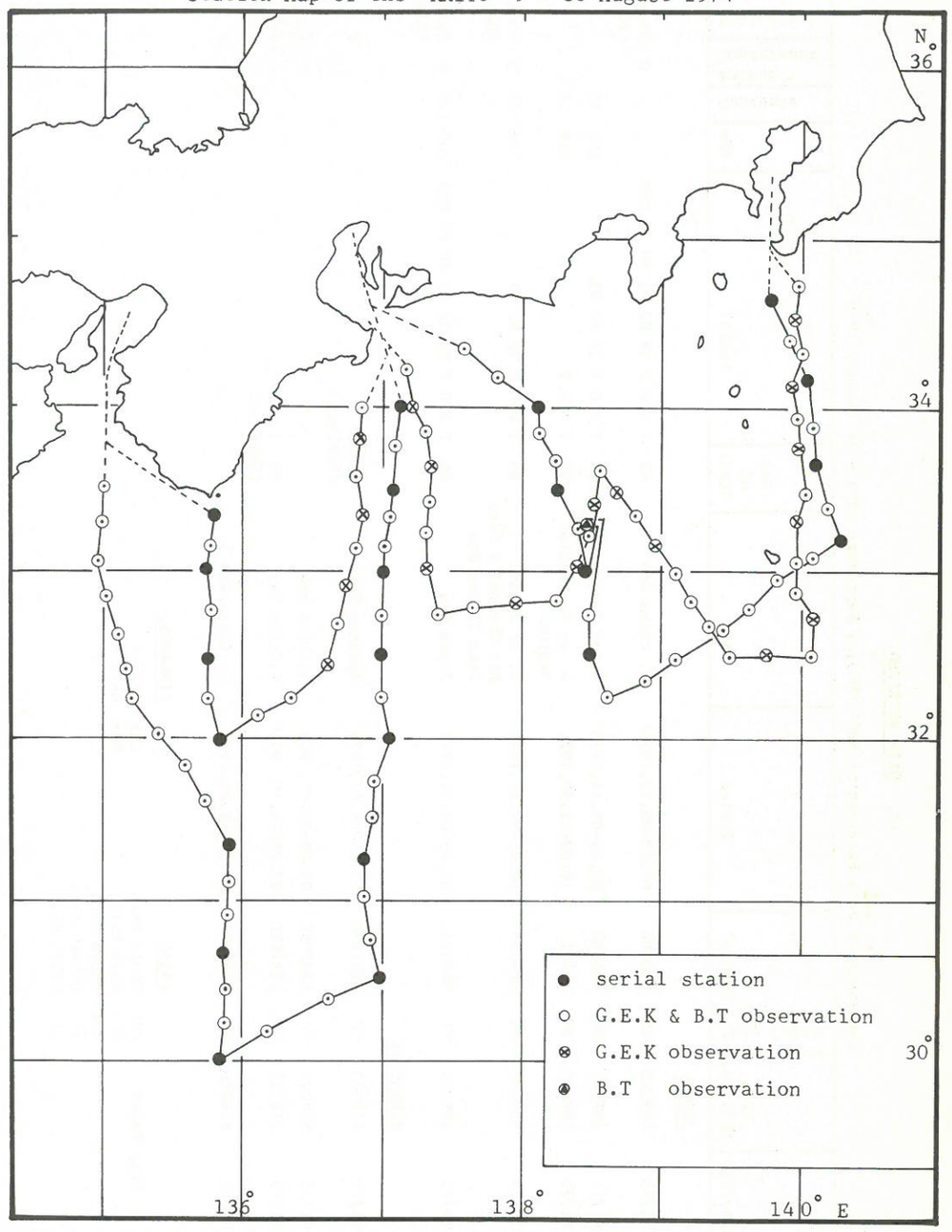
a. JODC
b. HD, MSA
c.
d.
e.
f.

△ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER. WHEN OBSERVED PARAMETER IS FOLLOWED BY A CHECK MARK (✓) DO NOT ENTER ANY NUMBER BUT ENTER THE CHECK MARK INSTEAD.

TOTAL KILOMETERS STEAMED:
2,890 km

DATA REPORTED ON THIS FORM ARE DECLARED NATIONAL PROGRAM (DNP):
(✓) YES
( ) NO
( ) PART (SPECIFY)

Station Map of the "KAIYO" 9 - 30 August 1974



IV. DATA RECEIVED

Catalogue of Data Received by KDC(JODC), 1 September 1975 - 31 January 1976

Mo.Day/Yr.	KDC Ref. No.	Ship Code*	Agency	Period	Area	No. of Stas.	Serial	BTs	Currents	Bottom Topography	Biological
	JAPAN										
09.12/75	49K200	CH	NMOJMA	07.12-08.12,1975	E. China Sea	43	T S O P TP N2 N3 NH PH COD			D	Phaeo. Chl.a
10.01/75	49K201	KO	HMOJMA	02.04-03.14,1975	E. of Japan	26	T S O P TP N2 N3	106	95		
10.01/75	49K202	YS	FSFRL	10.02-11.30,1974	W. of Equatorial Region	57	T S O P Si	119	18		
11.19/75	49K203	SH	KMOJMA	02.01-02.17,1975	S. of Japan, Kii Channel & Seto Seto Inland Sea	65	T S O P TP N2 N3	75	54	D	Phaeo. Chl.a
11.19/75	49K204	SI	MMOJMA	07.05-08.12,1975	Japan Sea	86	T S O P TP N2 N3 NH PH COD	200	127	D	Phaeo. Chl.a
	SINGAPORE										
11.01/75	SIK023	CH	SEAFDEC	02.16-03.07,1974	Andaman Sea	35	T (Surface)				F
11.01/75	SIK024	HO	SEAFDEC	06.19-07.22,1975	S.China Sea						F
11.01/75	SIK025	HO	SEAFDEC	07.26-08.30,1975	S.China Sea	33	T (Surface)				F
11.01/75	SIK026	HO	SEAFDEC	09.03-09.21,1975	S. China Sea						F

Ship Code*

JAPAN
- CH: Chofu Maru
- KO: Kofu Maru
- Ys: Shoyo Maru
- SH: Shumpu Maru
- SI: Seifu Maru

SINGAPORE
- CH: Changi
- HO: Hoyo Maru