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JAPAN OCEANOGRAPHIC DATA CENTER

Hydrographic Department, Maritime Safety Agency

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CSK NEWSLETTER



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JAPAN OCEANOGRAPHIC DATA CENTER

C O N T E N T S

I. Summary Report of the 9th Session of the International Co-ordination Group for the Co-operative Study of the Kuroshio and Adjacent Regions (CSK), Bangkok, Thailand, 30 May - 1 June 1973 (IOC/CSK-IX/2)

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II. Cruise Reports

Ryofu Maru	(1 June - 30 July 1972)
Shumpu Maru	(17 July - 13 August 1972)
Chofu Maru	(27 July - 14 August 1972)
Takuyo	(14 August - 1 September 1972)
Takuyo	(25 October - 13 November 1972)

III. Data Received

- Republic of Korea (Suro No.3)
- Japan (Chofu Maru, Shumpu Maru, Ryofu Maru, Kofu Maru, Kaiyo Maru, Meiyo, Shoyo, Umitaka Maru)
- Thailand (Kledkeo)
- U.S.S.R. (Orlick, A.I. Voejkov, U.M. Schokalsky, Priboj)
- Singapore (Changi)

I. SUMMARY REPORT OF THE 9TH SESSION OF THE INTERNATIONAL CO-ORDINATION GROUP FOR THE CO-OPERATIVE STUDY OF THE KUROSHIO AND ADJACENT REGIONS (CSK), BANGKOK, THAILAND, 30 May - 1 June 1973.

(IOC/CSK-IX/2, Original: English)

Item 1 - Opening of the Session

The session was opened by Dr. Pradisth Cheosakul, Secretary-General of the National Research Council and Chairman of the National Marine Science Committee. After a short welcoming address, Dr. Cheosakul invited Dr. Kiyoo Wadati, International Co-ordinator for CSK, to take the Chair.

Dr. Mamayev, Assistant Secretary IOC, highlighted the most important matters that have occurred in the life of CSK and stressed the necessity for consideration by the session of future CSK activities. He also stated that another recent problem is that of marine pollution and this, too, must be studied closely to see what action could be taken in this problem area.

The Chairman proposed that Mr. Chilvers (United Kingdom, Hong Kong) and Captain Tavorn Pongsapipatt (Thailand) act as Rapporteur and Assistant Rapporteur respectively. This proposal was seconded by Dr. Loi (Viet-Nam) and carried unanimously.

A list of participants is attached as Annex IV to this Report.

Item 2 - Adoption of the Agenda

Following lengthy discussion and suggestions from the floor, the provisional agenda, with the inclusion of a new item 4 and consequent renumbering was adopted. This is attached as Annex I to this Report.

Item 3 - Progress Report of CSK Activities since the Eighth Session

(a) Reports of the ICG/CSK Officers

The following reports were delivered to the session.

3.1 Report of the International Co-ordinator

3.1.1 Based on a request from Dr. N.J. Campbell,

member of the ad hoc Working Group on Rationalizing the Structure of the Intergovernmental Oceanographic Commission, an answer concerning the activities and future of the ICG/CSK was forwarded to him on 2 November 1972.

3.1.2 Activities concerning GIPME in the Kuroshio region were reported on 19 February 1973 for the first session of the ICG for the Global Investigation of Pollution in the Marine Environment (GIPME, 2-6 April 1973, London).

3.1.3 In accordance with the recommendations of the eighth session of the ICG/CSK, the questionnaire on the present status of marine pollution in member countries of CSK was forwarded in May 1972 to each of the member countries, by Drs. Hirano and Sugawara; to date, replies have been received from six countries (the Philippines, Hong Kong, United States of America, Singapore, the Republic of Korea and Japan). The contents of the replies were distributed to the ICG under Item 6 "Marine Pollution".

3.1.4 The proceedings of the second CSK Symposium, edited under the direction of the convener, Dr. Sugawara, were published in 1972, with the financial assistance of Unesco and the Ministry of Education in Japan, as "The Kuroshio II". Copies of this publication were distributed to all national co-ordinators of member countries of CSK and to the authors of papers therein.

3.1.5 The CSK cruises which have been reported to the Kuroshio Data Centre from all participating countries as at the end of 1972 amount to 364. Numbers of cruises in each year from 1965 to 1972 are 34, 58, 78, 67, 46, 30, 25 and 26 respectively, showing a tendency to decrease in recent years.

3.2 Report of the Assistant International Co-ordinator for Fisheries

3.2.1 3rd CSK Symposium

During the eighth session of the International Co-ordination Group for the Co-operative Study of the Kuroshio and Adjacent Regions, Manila, 6-10 March 1972, the Assistant International Co-ordinator for CSK for Fisheries was nominated as the Convener of the 3rd CSK Symposium on the Results of CSK, to be held prior to the ninth session of ICG/CSK.

The appropriate arrangements for this symposium were made and invitations distributed. Subsequently the 3rd CSK Symposium

was held in Bangkok from 26 to 29 May 1973 and twenty-four papers were presented. (See Item 4 below and Recommendation 3 (Annex II)).

3.2.2 Activities of the Indo-Pacific Fisheries Council (IPFC)

From 12 to 21 July 1972, the Assistant International Co-ordinator for Fisheries, in his capacity as a member of the Working Party on Pelagic Fisheries Resources of the Indo-Pacific Fisheries Council (IPFC), attended the Working Party meeting at Bangkok, Thailand, in preparation for the IPFC Symposium on Coastal and High Seas Pelagic Resources.

From 18 to 27 October 1972, the Assistant International Co-ordinator served as Philippine Delegate at the above Symposium and at the 15th session of the IPFC, held in Wellington, New Zealand. He was elected Discussion Leader of the Section on Jack Mackerels and Mackerels, when his paper on the Review of the Rounscad (Galunggong) Fishery in the Philippines was presented in summary form.

During the 15th session of the IPFC, the Assistant International Co-ordinator reported on the results of the eighth session of the ICG for the CSK, Manila (March 1972). The Council noted favourably the Group's recommendation that certain fisheries in the region should be studied, as this corresponds closely to work being conducted by the Council and member countries.

3.3 Report of the Director of the Kuroshio Data Centre (KDC)

In the absence of the Director, the report was delivered by Dr. Kiyoo Wadati.

3.3.1 Cruise plans and reports for CSK

CSK cruise plans and/or cruise reports received by the Centre from each participating country have been included in the CSK Newsletters.

According to Resolution VII-25 of the Seventh Session of the IOC, it was agreed to adopt the ROSCOP (Report of Observations/Samples Collected by Oceanographic Programmes) form to report cruises operated in the International Co-operation Programmes, as well as Declared National Programmes. The National Co-ordinators were informed by the Director of the KDC in September 1972 that the CSK Cruise Reports should be forwarded

to the World Data Centres through the KDC, where they would be copied and edited for CSK Newsletters (see Newsletter No. 39, p.12). At present, the ROSCOP forms received by the KDC cover 19 cruises (Japan: 14, USSR: 1, Korea: 4).

3.3.2 CSK Newsletter

No.36 to No.40 of the CSK Newsletter were published from January 1972 to March 1973 by the Kuroshio Data Centre.

3.3.3 Data Received

The lists of data received from the CSK participating agencies are included in the CSK Newsletters.

The data for 2,090 oceanographic stations from 51 cruises were received by the Centre from January 1972 to the end of March 1973, and the total number amounts to 13,526 stations from 366 cruises.

3.3.4 Data Report of CSK

The data received by the Centre are processed and printed as the Data Report of CSK.

From January 1972 to March 1973, 20 volumes containing data from 979 stations obtained during 20 cruises were issued and widely distributed throughout the world by the Centre, in addition to the 265 volumes published to the end of December 1971.

3.3.5 CSK Atlas

"CSK Atlas Volume 6, April 1968-March 1969" is now under preparation at the Centre and will be published during 1973.

3.4 Report of the Director of the Regional Marine Biological Centre (RMBC), Singapore

In the absence of the Director, this report was delivered by Dr. M. Steyaert (Unesco) who had brought copies of the report from Singapore for the session.

The main function of the Regional Marine Biological Centre consists in the sorting and maintenance of plankton samples collected during the CSK cruises. The following plankton samples were received for sorting during the period under review:

- (a) Sixty samples from the Marine Fisheries Research Department, Southeast Asian Fisheries Development

- (b) Thirty samples from the Ocean Research Institute, University of Tokyo, Japan.
- (c) One hundred and thirty samples from the Institute of Marine Research, National Institute of Oceanology, Indonesian Institute of Sciences, Indonesia.
- (d) Twenty samples from the Fisheries Biology Unit, University of Singapore.

The total number of samples received during this period is 240.

Primary sorting was completed for a total of 285 samples during the 12 months under review, as follows:

- (a) Twenty-eight samples from Thailand.
- (b) Ninety-three samples from the USSR.
- (c) Twenty-nine samples from Malaysia.
- (d) One hundred and sixteen samples from Korea.
- (e) Nineteen samples from the Republic of Singapore.

During this period, 243 sorting reports were completed and dispatched to the Institutes from which the samples originated, as follows:

- (a) One hundred and seventeen reports (CSN 1131-CSN 1247) to the Republic of the Philippines.
- (b) One hundred and twenty-six reports (CSN 767a-CSN 810c) to the Republic of Singapore.

From March 1968, when the Centre was established, to March 1973, a total of 2,307 samples have been received for sorting and a total of 1,793 samples have been sorted under primary sorting procedure. A total of 14 decayed samples was received and cannot be sorted, thus leaving a balance of 500 samples to be sorted.

The sorting rate during the period under review is lower than that of previous years. Many reasons contributed to this lower rate of sorting. Among these the following may be mentioned:

- (a) resignations of sorters and difficulty in recruit-

ing replacements;

- (b) the total holding of plankton samples and in particular sorted samples, has increased considerably which means that much more time has to be spent on maintenance work, viz: (1) the checking of the pH of the samples; (2) the topping-up of samples in which evaporation has occurred; and (3) the checking of the condition of the samples;
- (c) much difficulty was experienced in the sorting of the samples from Thailand because of the incidence of large numbers of phytoplankters including Trichodesmium and also large numbers of small zooplankters such as Copepod Nauplii. For example, one sample was split into four equal portions and it took 615 sorter-hours to sort one portion. There was no alternative but to sub-divide such samples further before sorting was started.

Most of the remaining unsorted samples are from the South China Sea and other tropical areas. Because of this and the fact that the total holding of sorted samples will increase further, it may be expected that the sorting rate will be further lowered in the future.

During the period under review, certain problems related to the maintenance of the International Collection have emerged. It was found that the pH of the samples which had been stored since 1968 had decreased and were now within the range of 6.5 and 7.0. More recently the slow deposition of crystalline platelets in the samples had also been observed. The advice of Dr. Steedman of the University of Bath who is an expert on this subject has been sought: it is his opinion that the buffering agent, hexamine, which has been used is the cause of these difficulties and he has suggested that borax or some other preservative be used. This matter will be discussed further with representatives of the Unesco-sponsored Advisory Panel for Marine Biological Centres and it is expected that remedial action will be taken in June 1973 as soon as agreement is reached as to the best course to be taken.

Publication of the data accumulated at the Centre has been initiated with the publication of the first issue of CSK Zooplankton Data Report No.1, 1972. This issue lists the data for 310 CSK samples. Two other issues which list the data for 456 CSK samples are now in press. These publi-

cations will be sent to all the CSK National Co-ordinators, as well as to 57 marine biological and oceanographic research institutions throughout the world.

Action has also been initiated to select plankton specialists to carry out further study of the sorted plankton samples held at this Centre. This is being carried out in accordance with Recommendation 2.8 adopted at the 7th Meeting of the International Co-ordination Group for the Co-operative Study of the Kuroshio and Adjacent Regions, Tokyo, 1-3 October 1970. As soon as the CSK group of senior specialists has formulated a list of specialists, it will be sent to the Unesco-sponsored Advisory Panel for Marine Biological Centres, for further action.

3.5 Discussion

The above reports were accepted without demur by the session but later, considerable discussion arose concerning the Regional Marine Biological Centre (RMBC) and the procedure for the examination of the sorted samples by specialists and junior planktologists. In the absence of the RMBC Director, Dr. Vagn Hansen, Secretary for the Unesco-sponsored Advisory Panel for Marine Biological Centres, clarified the situation by pointing out that processed, and at a later stage, the identified samples are kept as a permanent reference collection at the RMBC now housed at the University of Singapore, to which the collection from the National Museum of Singapore has been transferred. The plankton samples will be kept as a regional reference collection under the responsibility of the Government of Singapore.

Selection of taxonomists. A list of senior taxonomists from the CSK Member States will be drawn up not later than 30 June 1973 by a panel organized by the CSK group of senior specialists and forwarded through the RMBC director to the Unesco Advisory Panel for final selection. Priority will be given to taxonomists from the region but in cases of conflict involving the preparation of international monographs, priority will be given to those taxonomists irrespective of their nationality, who are working on international monographs. Senior taxonomists should be encouraged to study material with a team of junior workers (at post-graduate or doctorate level) as part of a training programme, either in their own country or in Singapore. Funds will be available for the latter purpose.

The Group considered that a portion of the processed

samples should be returned to the country of origin.

Dr. Steyaert stated that with the retirement, in June 1973, of Dr. Than Ah Kow, the new director will be Dr. Chuang, Head of the Department of Zoology, University of Singapore and that a new post as full-time Curator has been created for Mrs. Yong. Unesco has drawn up a new contract operative from 1 April 1973 to 31 March 1974.

Further, discussion concerned the production of follow-up reports as elaborations on reviews; fish egg and larvae distributions were cited as examples in view of their importance to the FAO/UNDP South China Sea Fisheries Development and Co-ordinating Programme.

Recommendation 4 on the activities of RMBC was adopted by the Session (Annex II).

(b) Reports of the National Co-ordinators

In view of the length of some of the reports, only summaries, where applicable, are presented here as follows:

3.6 France

3.6.1 Cruise Report in 1972

In 1972, the work at sea by the Nouméa ORSTOM Centre has been essentially devoted to the completion of programmes on the biology of tropical tunas, mostly albacores and on the circulation in the tropical area of the western South Pacific. They completed various surveys made at different period between 1965 and 1970.

The cruise "Diaplus 10", in June/July, was aimed at the study of the micronekton distribution east of New Caledonia, in tropical waters in which albacores are found. Three hundred and thirty-seven Isaacs-Kidd midwater trawl hauls were made to define the biological environment of these albacores.

In November/December, the cruise "Gorgone" studied the physical oceanography and the surface and subsurface circulation in the Coral Sea, the formation of the southern hemisphere countercurrents and the exchange of waters between the northern Coral Sea and the western equatorial Pacific Ocean around the New Guinea region.

In addition systematic surface sampling was carried out between Japan and New Caledonia thanks to the co-operation

of Japanese merchant ships.

3.6.2 Plans for 1973 and 1974

Two cruises will be made in 1973 in the equatorial region to study the equatorial circulation and its effects on the distribution in surface and sub-surface layers of the nutrient salts. In July 1973, the cruise "Minepo" will specially study the effects of the north-south circulation on the productivity of surface waters at 170°E. In November/December 1973 the cruise "Vate" will study the variations of the currents at the equator and 170°E over a period exceeding one month.

If this shows possibilities, similar work will be done in 1974.

As far as the biological programme is concerned, the study of the biology and distribution of albacores near New Caledonia will continue until its expected end in 1974. The work will then be aimed at the equatorial yellowfins of the western Pacific, especially north of New Guinea.

Remark

In the Central Pacific, at Tahiti, CNEXO (Centre National pour l'Exploitation des Océans) has started a programme of research on fish culture, beginning with prawns.

3.7 Japan

3.7.1 Cruise Plan and Report

Thirty-two cruises were carried out or are being planned during the period April 1973-March 1974. Twenty-four of these cruises were operated or are being planned as standard section observations in the sea around Japan; three cruises are in the South China Sea and five in the North-Western Pacific. The measurement of marine pollutants such as oil spill, COD and heavy metals, etc., are included in most of the above cruises.

3.7.2 The South China Sea Survey

Participating ships from Japan in the South China Sea Survey during the above period were:

Hakuho Maru (Ocean Research Institute, University of Tokyo) May-August 1972

Oshoro Maru (Hokkaido University)
November-December 1972

Nagasaki Maru (Nagasaki University)
August 1973

3.8 Korea

3.8.1 Cruise Report for 1972

I. Six synoptic observations in the sea adjacent to Korea (22 observation lines) were conducted during even-numbered months, together with six drift bottle experiments on 26 stations in the Southern Sea of Korea.

II. In the Southern Sea of Korea, two oceanographic cruises during May, and 14 August-11 September 1972, were conducted; data therefrom were sent to KDC, Japan in March 1973.

III. At five stations in or near the valley of the western channel of Korea Strait (Tsu-shima strait), four seasonal hour-to-hour current measurements with an Ekman-merz current meter were conducted.

IV. Five water pollution studies were conducted at different polluted areas around Korea.

V. Geological and geophysical exploration was conducted in the near-shore area of the northern part of the Yellow Sea, delimited by the latitudes 37°N and 36° 30'N, and longitude 125° 30'E, during the period 26 September-20 November 1972.

3.8.2 Future plans

I. Six synoptic observations (in even-numbered months) in the Sea adjacent to Korea and two oceanographic observations during May and August/September in the Southern Sea of Korea, will be conducted.

II. Seasonal water pollution studies in five polluted areas will be conducted.

III. Geological surveys will be conducted in August-September 1973 and a geophysical survey is being carried out in April-May 1973, in the near shore area of the northern part of the Yellow Sea area, delimited by latitudes 36° 30'N

and 36°N, and longitude 125° 30'E.

3.9 Philippines

3.9.1 Hydrographic/Oceanographic Survey

The Coast and Geodetic Survey Ship ATYIMBA conducted an hydrographic/oceanographic survey on the Philippines Sea and the South China Sea.

Oceanographic stations were occupied and observations of temperature and salinity at standard depths were made. Bathythermograph observations were also conducted at stations and while under way.

3.9.2 Fishery Oceanographic Investigations

Investigations on the physico-chemical and biological conditions of the various fishing grounds of the country were made on board some of the fishing vessels of the Bureau of Fisheries. The number of cruises was reduced from previous years as a direct result of the inactive status of two of the Bureau's fleet of vessels, the research ship R/V RESEARCHER and the trawler-fish carrier M/V MALASUGUI.

At the time of writing, the R/V RESEARCHER has just successfully completed sea trials and now requires only minor repair of its refrigeration equipment. A similar situation was experienced by the M/V MALASUGUI. Thus, a complete resumption of fishery oceanographic investigations of Philippine waters in the immediate future is now a certainty.

A resumé of the oceanographic activities of the Bureau vessels for the past two years is as follows:

1. The purse-seiner M/V MAYA-MAYA undertook two Exploration Survey and daytime Tuna-Purse-seining Cruises in the Southern Philippines (Sulu Sea, Moro Gulf, Davao Gulf, Celebes Sea, and Panay Gulf) during the periods July to August and October to November 1971. Oceanographic observations made included bathy-thermograph measurements, air and water temperature measurements, plankton collection and biological sampling.

2. Of the 17 cruises made by the R/V RESEARCHER during the fiscal year 1970-1971, only three were extensive survey and exploratory trips, the rest being one- and two-day experimental fishing, demonstration or exploratory fishing trips. Only one of these was a CSK cruise.

For the period July 1970, the same research vessel undertook an oceanographic survey of the Sama Sea, Carigara Bay and Maqueda Bay which included exploratory fishing for mature shrimps and determination of squid potential.

For the period March-April 1971, the R/V RESEARCHER undertook the last CSK Cruise to date (R71-5), a survey of the South China Sea west of Lubang Island, Mindoro and Balayan Bay. In addition to the standard oceanographic and biological observations usually carried out (sea colour observations, dissolved oxygen content, meteorological observations, depth, etc.), tuna long-lining in the CSK area and a bottom echo-survey of Balayan Bay were also undertaken for possible other trawl fishing in connexion with "miralya" fishing in the area.

The third long cruise (22 April-4 May 1971) undertaken by the R/V RESEARCHER was the oceanographic and biological survey and tuna long-line fishing in Southern Mindoro, Western Panay (Antique), Panay Gulf and west and south-western Negros.

Further extensive surveys were ruled out by the condition of the research vessel which was very apparently in need of drydocking and repairs.

3. Oceanographic observations were also carried out during the survey trips of the purse-seiner M/V SABALO (December 1971) in the waters around Pangasinan, Palawan and Mindoro Occidental; of the trawler M/V LAPU-LAPU (January to February 1972) in the Boayan Area and Bacuit Bay, Northern Palawan, Southwestern Negros including Campomanes Bay, Pandan Bay and Southwestern and Southern Mindoro; and of the trawler M/V MALASUGUI in Pandan Bay, Sindagan Bay and Panabutan Bay (April to May 1972), in search of suitable areas for setting upon of Otoshi-ami.

4. Oceanographic observations in Lingayen Gulf (May and April 1972), Manila Bay (March 1972) and Sorsogon Bay (April and August 1972) were carried out on board private fishing vessels and chartered boats.

Although the past year has not been very productive in terms of fishery oceanographic observations, it is hoped that with the renewed seaworthiness of the R/V RESEARCHER, oceanographic research activities in Philippine waters will be resumed and accelerated as fishing test programmes will shortly be initiated for all the fishing vessels of the Bureau of Fisheries.

The Bureau of Fisheries (Division of Marine Fisheries Biology) sponsored a Pelagic Fisheries Training Workshop for representatives of Asian member countries, at Manila from 25 March to 14 April 1973. This was undertaken in the knowledge that the Philippines is the leading nation in the use of purse-seines and bag nets in pelagic fisheries.

3.10 Thailand

3.10.1 Cruise activities of Hydrographical Department and the Department of Fisheries for oceanographic and fisheries resources surveys in 1970-1972

1. R/V "Chantara" of the Hydrographical Department of Royal Thai Navy had carried out an oceanographic survey in the coastal waters of about 30-40 miles from shore in the Gulf of Thailand between July and August 1971.
2. R/V "Kledkeo" of the Royal Thai Navy had made a cruise in the Andaman Sea from January to May 1972 for collecting general oceanographic data on the structure of water mass circulation.
3. Between January 1970 and December 1972, M/V Fisheries Research No.1 of the Fisheries Department had conducted 17 cruises to collect fishery and oceanographic data in the Gulf of Thailand.
4. From December 1970 to May 1972, M/V Fisheries Research No.2 of the Fisheries Department has made two long period cruises: the first cruise from December 1970 to May 1971 for oceanographic and trawl survey of demersal and pelagic resources in the Andaman Sea, Bay of Bengal, southern part of the Indian Ocean and the South China Sea including an oceanographic study of the CSK reference station No.10; the second cruise from January to May 1972, the routine fisheries resources survey in the Andaman Sea, South China Sea and the Sulu Sea of the Philippines was made, together with the oceanographic survey of the CSK reference station Nos.10-11.

In addition, an extraordinary cruise of this vessel was made for fishing demonstration to six Thai commercial fishing boats from 15 July to 20 August 1972 in the international waters of the coasts of Sarawak and Bornéo.

5. M/V "Pramong 1" and M/V "Pramong 6" of the Department of Fisheries had accomplished 22 routine fishery oceanographic cruises between October 1969 and September 1972 with 1,445 samples, mostly obtained from the inner Gulf of Thailand, for the studies of salinity, temperature and oxygen of sea water, in connexion with the studies of biology and/or the stock of pelagic fishes.

Data obtained from the above cruises were documented and some are now being processed.

3.10.2 Research and investigation on the biology and stocks of commercially important aquatic animals

As far as the biological programme is concerned, the studies of the biology and distribution of both pelagic and demersal fishes and shrimps are in progress, in particular the artificial breeding, eggs and larvae survey, diurnal vertical distribution and the tagging programme of the Indo-Pacific mackerel. The other species included in this study are Scomberomorus, Stolephorus, Nemipterus, Saurida, Lutianus and Sciaena. The first phase of the artificial propagation of Caranx malam, C. leptolepis, C. mate, C. crumenophthalmus, Decapterus russellii, Lutianus vitta, Sciaena, sp.; Sphraena sp. and Saurida sp. have been recently established. The exploratory fishing for mature shrimps was separately undertaken both in the Gulf of Thailand and the Andaman Sea for their artificial breeding programmes.

3.10.3 Monitoring surveys of the trawl fisheries resources in the Gulf of Thailand

The M/V "Pramong 2" of the Fisheries Department has conducted annual monitoring trawl surveys in the Gulf of Thailand to the depth of 50 metres in 9 separate zones, with about 80 haul/hr in each zone. The latest results show a drastic decrease in abundance of the resources. Consequently, in July 1972, the Ministry of Agriculture announced the prohibition of commercial trawling operations by all types and sizes of trawlers, within 3 km. of the shore.

3.10.4 Studies on certain aspects of marine biology

Studies of plankton, fish eggs and larvae, including primary production, have been continued. Work has also been carried out on the taxonomic problems of various local commercially important fishes, especially on the CSK selected species, Nemipterus, Decapterus and Polinemidae.

3.11 United Kingdom (Hong Kong)

3.11.1 Physical oceanography

As indicated in the last report submitted to the eighth session, the off-shore physical oceanographic programme was terminated in 1972. The results will appear in Number 3 of the Hong Kong Fisheries Bulletin in the form of two papers; this Bulletin is expected to be published later in 1973. As regards the inshore physical oceanographic survey, the results will also appear in the same publication.

3.11.2 Aquaculture

Work is continuing on the breeding of the local edible oysters, Crassostrea gigas and C. rivularis, using both the traditional bottom culture method and the more recently introduced hanging-drop method, as for the last period, with the object of assessing the suitability of selected new areas as oyster production grounds. Concurrently, a study of the existing oyster culture industry was conducted, with the object of providing information on the existing grounds for comparison with that from the experimental sites. The results of this programme will form the subjects of three papers for publication in the Hong Kong Fisheries Bulletin in 1973 and 1974.

Marine fish culture is continuing as for the last period. The results of the first phase of this programme are being presented in two papers: one on the growth and feeding of local serranids and sparids; the other on diseases.

The first phase of the programme of artificial propagation of the commercially cultivated Chinese carps, was terminated in the period. The results are due to appear in Number 3 of the Hong Kong Fisheries Bulletin. The second phase of this programme has recently been initiated with the object of refining on the techniques established during the first phase of this work.

3.11.3 Marine Resources

A fishing survey of the demersal resources on the continental shelf south of Hong Kong, and an exploratory survey of the edge of this area between 100 and 150 fathoms have been completed recently. The results of these projects will form the subject of two papers to be submitted to the Hong Kong Fisheries Bulletin for publication.

A five-year survey of the catch-and-effort relationship of the commercial trawler fleet of Hong Kong was initiated

with the object of estimating the abundance of fish stocks.

The book, Hong Kong Cephalopods by Voss and Williamson, was published in 1972. Other taxonomic studies on marine fishes of commercial importance to Hong Kong are being actively pursued as in the past.

3.12 Union of Soviet Socialist Republics

As part of the international programme of research of the CSK, the Soviet vessels "Priboy", "Ocean", "A.I. Voeykov" and "Orlik" have been conducting routine observations on the basis of a shortened CSK Programme on the following sections:

N.3	145°E.	43-30°N.	January	"Priboy"
N.3	145°E.	43-30°N.	April	"Ocean"
N.5	149°E.	43-34°N.	April-May	"Orlik"
N.12	138°E.	to 20°N.	April-May	"Orlik"
N.3	145°E.	41°30'-30°N.	September	"A.I. Voeykov"
N.3	145°E.	41°30'-30°N.	November	"Priboy"

These research vessels have been conducting the following observations according to the International CSK Programme.

1. Meteorological: atmospheric pressure, wind, air temperature, humidity, cloudiness, rainfall.

2. Physical oceanographic: temperature and salinity of the water column from the surface down to 1,500 m. depth, and from the surface to the bottom. The minimum depth of observation achieved by "Orlik" is 1,200 m. The stations were occupied in the Kuroshio front zone-every 20 miles, in the Kuroshio current stream-every 30 miles and in the subtropical zone (34°-20°N) every 60 miles.

During the winter "Priboy" occupied stations every 20 miles; in the summer "A.I. Voeykov", "Ocean" and "Priboy" occupied stations every 30 miles.

3. Hydrochemical: oxygen, silicate, nitrate, alkalinity.

4. Biological observations have only been conducted by the research vessel "Orlik". These are: the primary production defined by the radiocarbon method; the catch of phytoplankton and mesoplankton using the Jady and Norpac nets; the catch of macroplankton using the Isaacs-Kidd trawl; the observation of behaviour and abundance of the separate fish species at the sea surface.

The total number of stations occupied by "Orlik" in the

spring was 52; in the summer 54. "Priboy" occupies 39 stations during the winter and 23 in the autumn; "Ocean" occupied 26 stations in the spring; "A.I. Voeykov" 19 stations in the summer.

3.13 Viet-Nam

Due to war conditions in the Republic of Viet-Nam several scientific activities had to be slowed down; oceanographic research connected with CSK programmes was also affected.

Only short trips in the Nhatrang area have been undertaken once a week, during which temperature, salinity, dissolved oxygen content and phosphate content determinations were made.

Sediment samples were also collected in order to study the grain size distribution pattern.

Ecological observations in mangrove swamps in the Nhatrang area have been carried out.

Plankton sampling using NORPAC nets was conducted. Taxonomy and seasonal variations of dominant planktonic organisms were undertaken.

Work on the culture of Mytilus viridis using the method of pole culture, has been carried out since January 1973.

Fisheries data obtained on previous cruises are now being processed by the Directorate of Fisheries in Saigon.

Drift cards released in 1972 have not yet been recovered.

Following the presentation of the National Co-ordinators' reports, the Chairman invited country observers and the representatives of the regional and international organizations to make their reports.

3.14 FAO/IPFC

The FAO representative made a brief statement to the effect that it seemed to be preferable to report on specific aspects of collaboration between CSK and FAO/IPFC programmes under the appropriate agenda items. He then described the FAO/UNDP South China Sea Fisheries Development and Co-ordinating Programme, which is presently in Phase I, the planning stage of one year's duration. The Programme is concerned with: fisheries development, i.e. acquiring a better knowledge of the resources by survey and evaluation of the stocks and their potential; and technical matters, e.g. harbour development, vessel and gear improvement, fish processing. From the results of Phase I, an action plan will be developed

for Phase II which is expected to be implemented in early 1974 and may be of 4-5 years duration. Marine pollution studies may also form part of the Programme.

3.15 SEAFDEC

The SEAFDEC representative gave a brief report on research activities of SEAFDEC in connexion with CSK which have been undertaken mainly by its Marine Fisheries Research Department in Singapore and partly by its Training Department in Thailand.

Up to April 1973, the two vessels of the Centre, both of which are 380 ton stern trawlers, have carried out a number of survey and training cruises in the South China Sea and adjacent waters. The Research Vessel "Changi" has made 32 trawling and oceanographic survey cruises while the Training Vessel "Paknam" has undertaken 15 training cruises. Raw data obtained from every cruise were compiled and circulated immediately to SEAFDEC member countries as "Quick Reports", and also sent to the CSK Data Centre in Japan. The detailed results were later analysed and were presented in 15 technical papers submitted at the Technical Seminar on the South China Sea Fisheries Resources, held in Bangkok just prior to this session of the ICG/CSK.

In addition, the SEAFDEC participated in the Joint SEAFDEC/Unesco/CSK Training Cruise on Plankton Sampling Methodology in the South China Sea, 2-10 March 1972, by providing the service of the Research Vessel "Changi".

(c) Review on the implementation of the recommendations of the Eighth session of the International Co-ordination Group for CSK

3.16 Following the Chairman's invitation to delegates to comment on the implementation of the recommendations adopted at the Eighth session of the ICG, considerable discussion developed. In order to expedite this matter, the Group established two ad hoc working groups, one on oceanographic aspects, the other on biological and fisheries aspects, to discuss these problems in more detail, in the light of the recommendations made by the 3rd CSK Symposium. Based on verbal reports by the ad hoc working groups, the ICG then gave full consideration to the various aspects of the CSK programme and developed a number of recommendations which are reproduced as Annex II to this Summary Report.

Additionally, Dr. Sugawara and his colleagues had prepared reports on the establishment of a project for research

and monitoring of Marine Pollution, following the replies to the questionnaire on the present state of marine pollution in member countries. The Assistant International Co-ordinator for Fisheries apologized for his failure to prepare a status report covering the CSK selected fish species, and due to the unfortunate illness of Professor Muromtzev (USSR), the programmes on physical and chemical oceanography have also not yet been prepared. However this item received attention under Item 5 of the Agenda (below).

The Session expressed its sympathy and hope for Professor Muromtzev's speedy recovery.

Item 4 - Report on recommendations of the 3rd CSK Symposium by its Chairman

4.1 The Chairman of the Symposium gave a brief report on the major results of the meeting and referred in particular to the recommendations which were now before the Group for further consideration. After some discussion, the Group decided to endorse the Symposium recommendations in toto, as well as those made earlier during the SEAFDEC Technical Seminar on the South China Sea Fisheries Resources which had been re-endorsed by the Symposium. The Group further decided to include both the Symposium and Technical Seminar recommendations in this report (Annex III).

The Group noted the relevance of the SEAFDEC Seminar to the further development of marine research in the South China Sea and adjacent waters and expressed its appreciation to SEAFDEC for holding this Seminar. Recommendation 3 on the results of the CSK Symposium was adopted by the Session (Annex II)

Item 5 - Discussions on the future activities of CSK

Following introductory remarks which demonstrated the wish of Japan to continue with the project in one form or another and which recalled Professor Sugawara's introductory paper presented to the 3rd CSK Symposium, the Chairman called for opinions of the delegations present. These views are as follows:

5.1 France (ORSTOM, New Caledonia)

The delegation considered that the CSK should continue its activity in basic physical, chemical and biological research related to oceanography and leave the fisheries aspects to specialized bodies (FAO, IPFC, SEAFDEC). Besides, should the CSK put an end to its activity as an international group,

some countries which do not participate in the above-mentioned specialized bodies would not be able to contribute to any international co-ordinated work in the western Pacific area.

5.2 Japan

Professor Sugawara reiterated the views which he had expressed throughout the session, amplifying his concept of the CSK which he hoped would ultimately become a regional body similar to the International Council for the Exploration of the Sea (ICES).

5.3 Korea

The Korean delegate favoured the continuation of CSK activities under the name of CSK or in the form of an international body like ICES, as mentioned by Professor Sugawara. Korea has not actually participated in CSK activities since 1970 because the CSK programme has concentrated on investigations of the South China Sea. Therefore, for Korea to participate in CSK activities hereafter, new CSK programmes, such as both oceanographic and fisheries investigations in the North Pacific area and Yellow Sea, are desirable. Such a programme would also interest the USSR, Japan, China, United States and the other member countries.

5.4 Viet-Nam

The delegate from Viet-Nam commented that Viet-Nam is very interested in CSK activities, mainly for its work in South China Sea waters which are still poorly known; Viet-Nam would like to see the continuation of CSK.

Due to the fact that there are other bodies (SEAFDEC, IPFC, UNDP/SF-FAO for Fisheries) which cover the fishery aspect, he suggested that CSK should leave this fishery aspect to the above-mentioned organizations and should concentrate its effort in the field of basic sciences.

5.5 Philippines

The Philippines delegate considered it important that the CSK activities should be continued, especially in basic marine science in the western part of the Pacific Ocean. In his opinion this body acts as a focal point to encourage governments to give priority to the study of the marine sciences, especially now that the world's concern with marine pollution has increased.

This body also encourages and interests younger scientists in marine research thereby, in a way, enhancing the

production of food from the shallow marine waters which are most productive in this region, but not as yet sufficiently studied to be of greater use. There is great room for improvement along this line of research if governments give priority to this study.

There is much work to be done in marine research especially on basic aspects and in the absence of an organized body, the individual nations would slide back in their individual local research and the region therefore suffers.

In the light of growing attention given to the oceans and their preservation from pollution, any move to discourage international co-operation in the study of a part of the ocean for the common interest would be a backward step.

In view of the above, the activities of the CSK should be continued until such time as a more permanent body be created to replace it. The name may be changed if felt necessary.

5.6 Thailand

The Thai delegate expressed his agreement with the statement of the delegate of Viet-Nam. His viewpoint was that CSK should continue to study the basic sciences of the ocean. He suggested that a new name might be considered, but in any case this study should remain under the umbrella of the IOC. He further expressed his opinion that FAO bodies, such as IPFC, should concentrate only on pure fisheries, leaving basic sciences to the CSK. Collaboration with SEAFDEC should continue but SEAFDEC covers only a relatively small area compared to the CSK region. He further stated that in view of the number of countries with common membership of both IPFC and CSK, a country representative at IPFC meetings should also be appointed representative of CSK in order to present a unified regional view.

5.7 Union of Soviet Socialist Republics

The Soviet delegation also supported in principle the decisions of the eighth session of CSK since all countries have common scientific tasks to solve (namely in the fields of oceanography, biology, chemistry) not only directly related to fisheries. This is an important reason for CSK to continue its activities within the IOC. Apart from some evident advantages, it would ensure the unified approach to the research of the world ocean.

The delegation was also of the opinion that it is quite premature to discuss the problem of changing the observation

periods since even the solar period has not yet been covered, to say nothing of the 18 years lunar period. The observations should be carried on regularly, for any deviation in this regard would considerably reduce the possibilities of applying mathematical methods in the study of fluctuation of oceanographic and biological conditions, which still remains one of the main tasks of CSK.

As to the setting up of another body to supervise research in the north west areas of the Pacific and adjacent areas (namely the South China and Philippines seas), the Soviet delegation believes that if such a body is to be set up, it still should function within the IOC.

5.8 United Kingdom (Hong Kong)

The delegate reported that although bracketed with the United Kingdom, marine sciences research in the South China Sea is financed by the Hong Kong Government and has only limited resources with which to contribute to regional programmes. In view of the changing emphasis of the work carried out by the Fisheries Research Division and the limited number of staff available to conduct the more applied research now carried out on aquaculture and fisheries, Hong Kong regrets that it cannot support the continuation of CSK.

The relevant international organizations commented as follows:

5.9 Indo-Pacific Fisheries Council (IPFC)

The Regional Secretary of the Indo-Pacific Fisheries Council (IPFC), informed the Group of the discussions on CSK that took place during the 15th Session of IPFC, Wellington, New Zealand, 18-27 October 1972. There was some discussion during the IPFC Session, after Professor I. Ronquillo had outlined to the Council the recent activities of CSK and particularly the report of the eighth session of the ICG for CSK, and the possibility of permanent arrangements for the co-ordination of marine research by a body similar to the International Council for Exploration of the Sea, which might follow the termination of CSK. The Council had agreed that a proliferation and duplication of international bodies was undesirable and that the co-ordination of research of direct interest to fisheries was already being carried out by IPFC, as well as other existing bodies such as SEAFDEC; in this connexion, the Council welcomed the close co-operation that existed between SEAFDEC and IPFC.

The Council of IPFC had also noted that oceanographic research in general fell within the competence of IOC, which

could well undertake the co-ordination of any oceanographic research activities, e.g. on some aspects of physical oceanography which might not be of direct interest to IPFC and that close co-operation existed between IOC and FAO. The Council considered, therefore, that there was no need for any additional machinery for marine research in the Indo-Pacific region.

The Group was furthermore informed by the Regional Secretary of IPFC of the functions of IPFC which include, among others, the formulation of the oceanographic, biological and other technical aspects of the problems of development and proper utilization of living aquatic resources who recommended to member countries to undertake, where appropriate, co-operative research and development projects.

In view of the need for undertaking further co-operative efforts in the CSK region on ocean exploration and oceanographic activities, the Regional Secretary suggested that the Group may wish to consider the possibility of strengthening already existing institutions or organizations such as IOC, IPFC, SEAFDEC, etc.

5.10 Southeast Asian Fisheries Development Center (SEAFDEC)

The SEAFDEC observer had already expressed his view that five of the six member countries of his organization were also members of CSK, that SEAFDEC was only concerned with fisheries matters and as an implementing body was in liaison with IOC and CSK.

5.11 In view of the opinion expressed above, it is recommended that CSK continue to function. Professor Sugawara presented further views on the manner in which this could be organized.

In connexion with the recommendation from the eighth session of ICG for CSK to publish an English version of the Japanese Manual on Fishery Oceanography, it was decided to shelve this matter as there were in existence a number of more recent manuals, some of which covered this topic.

Proposals for these and other future activities considered by the Session, are incorporated in Recommendation 1 of this Session (Annex II to this Report).

Item 6 - Marine Pollution

The attention of the Session was drawn to the questionnaire

concerning the state of pollution in member countries. Professor Sugawara presented a map of the Japanese monitoring scheme prepared for IOC and the summary reports of the first session of the Joint IOC/WMO Planning Group for IGOS (IPLAN) and the first session of the ICG for GIPME, for consideration.

Professor Sugawara also presented an outline of a project for research and monitoring of marine pollution for consideration by the delegates and was complimented on his ability to function as a one-man working party. After some discussion and amendments, this outline was incorporated in Recommendation 2 (Annex II) as a contribution to regional action within the framework suggested by the ICG for Global Investigation of Pollution in the Marine Environment (GIPME).

The representative of FAO gave an outline of aquatic pollution activities of his organization and its Indo-Pacific Fisheries Council (IPFC). In particular, he referred to the close collaboration of FAO with other United Nations agencies concerned which are participating in the Inter-Secretariat Committee on Scientific Programmes Relating to Oceanography (ICSPRO) and are supporting and using the IOC as a joint specialized mechanism for oceanographic research. He further commented on the work of the Joint Group of Experts on Scientific Aspects of Marine Pollution (GESAMP) and reported briefly on the Seminar on Methods for Detection, Measurement and Monitoring of Pollutants in the Marine Environment, Rome, December 1970 held in connexion with the FAO Technical Conference on Marine Pollution and its effects on living resources and fishing (see Annex III - Recommendations of the 3rd CSK Symposium). It was noted with appreciation that FAO has prepared a world-wide list of experts on marine pollution on a computerized basis, containing about 3,000 entries, which will be published very soon. FAO was also obtaining, on a world-wide basis, information required for the preparation of an inventory of data on the level of contaminants in living aquatic organisms, to be stored in the FAO Fishery Data Centre. The recent publication of the General Fisheries Council for the Mediterranean (GFCM) on "The State of Marine Pollution in the Mediterranean and Legislative Controls" was quoted by the representative of IOC as a good example for a regional review.

The ICG noted also that FAO, with financial support from the Swedish International Development Authority (SIDA), was organizing as part of a longer-term programme, Training Courses on Marine Pollution in relation to protection of living resources and fishing, the first of which was held in

May-June 1972 in Sweden, to be followed by a second course in August-September 1973 with the participation of scientists from South East Asia. The ICG is of the opinion that such training courses are most useful for the region and recommends that FAO should organize further courses of this kind.

The representative of FAO then referred to the ongoing activities of the IPFC Working Group on Aquaculture and Environment which is already concerned with aquatic pollution problems in coastal waters, and he suggested that arrangements be made for a proper co-ordination of related programmes between CSK and IPFC.

The Group considered the needs for the establishment of a tropical centre for the study of marine pollution and decided to ask the Secretary of IOC to explore the possibilities in this regard (see Recommendation 2, Annex II).

Developing this idea further, it was proposed that Member States should select as soon as possible suitable islands or other areas which are yet unaffected by pollution and which could be declared by their governments as reserved zones and used for the collection of data on pre-pollution characteristics of the environment for comparison with those in polluted areas (see Recommendation 2, Annex II).

Item 7 - Next Session

After lengthy discussion, it was decided that the International Co-ordinator should approach the National Co-ordinator of Singapore to request his country to act as host to the 10th session of the ICG in December 1974.

In the event that Singapore would be unable to host the meeting, Japan is to be requested to consider holding the ICG meeting and a Symposium on Marine Pollution at some date to be arranged in 1975.

Item 8 - Other business

8.1 Additional contributions to the Proceedings of the 3rd CSK Symposium

Dr. Lee (Korea) raised the question of the possibility of inclusion in the above proceedings of additional papers, which were not presented at the Symposium, but which directly relate to the subject.

After a short discussion, it was decided that late papers are welcome and that they should form a separate chapter of the volume. It was noted however that this procedure should

not be regarded as a usual but only as an occasional occurrence.

The Group requested, after some discussion, that the Convened of the Symposium, Professor I. Ronquillo, in consultation with the National Research Council of Thailand, issue an informative letter to National Co-ordinators and to contributors to the Symposium, setting out manuscript requirements, the address to which the full texts of the contributions are to be sent and the deadline for submission of papers.

8.2 South China Sea Survey Co-ordination

It was decided to resume the South China Sea Survey after the one year recess, as more information relating to this area is required. In view of the retirement of the incumbent (Dr. Sérène), Captain Pongsapipatt, the Assistant National Co-ordinator of Thailand, was elected as the new Co-ordinator for the South China Sea Survey.

8.3 Resolution EC-II.12 "Summary Report and Recommendations of the First Session of the Working Group on Training, Education and Mutual Assistance (TEMA)"

The Assistant Secretary, IOC, introduced this Resolution and asked for comments from the floor.

During the discussion in which the representatives of Japan, Philippines, SEAFDEC and FAO participated, attention was drawn to the continuing need for specific courses in marine science in the region.

The International Co-ordination Group felt that co-ordination in this field is required in order to avoid any overlapping with the existing programmes. The matter was left to the International Co-ordinator for future consideration and action, if necessary.

8.4 IDOE Workshop on Marine Geology and Geophysics in South East Asia

The Assistant Secretary, IOC, introduced the relevant document (IOC/EC-00/12), an article from CCOP Newsletter, Vol. 1, No. 1, and an excerpt from Tokyo Planning Meeting of CCOP Report, 12-16 April 1973) and also suggested that this matter should be given further consideration. The session took note of this matter.

8.5 Reference collection on marine flora and fauna

Upon the proposal of the delegate of Viet-Nam, the session adopted Recommendation 5 (Annex II) concerning the above reference collection.

Item 9 - Adoption of Report

The Session adopted the Summary Report.

Item 10 - Closing of the Session

Dr. Sahrhage (FAO) stressed the importance of continuing collaboration and goodwill between IOC and FAO and thanked the International Co-ordination Group for their co-operation.

Dr. Marumo (Japan) expressed, on behalf of the Session, sincere thanks to the Thai Government for hosting the Session and to the National Research Council of Thailand and its staff for the excellent arrangements.

Dr. Pradisth Cheosakul (Thailand) expressed his thanks to the Chairman of the Session for conducting the meeting and for his patience.

Finally, the Chairman, Dr. Wadati (Japan), upon closing the Session, expressed his thanks to the Rapporteur and the technical staff of the Session.

With no other business on the Agenda, the Session was closed at 21.00 on 1 June.

AGENDA

1. Opening of the Session
2. Adoption of the Agenda
3. Progress Report of CSK activities since the 8th Session:
 - (a) Reports of ICG/CSK officers
 - (b) Reports of the National Co-ordinators
 - (c) Review on the implementation of Recommendations of the 8th session
4. Report on recommendations of the 3rd CSK Symposium by its Chairman
5. Discussions on the future activities of CSK
6. Marine Pollution
7. Next Session
8. Other business
9. Adoption of Report
10. Closing of the Session

International Co-ordination Group for the Co-operative
Study of the Kuroshio and Adjacent Regions (CSK)

(9th Session, Bangkok, Thailand, 30 May-1 June 1973)

LIST OF RECOMMENDATIONS

- | | |
|------------------|--|
| Recommendation 1 | Future activities of CSK |
| Recommendation 2 | CSK Project for research and monitoring of marine pollution |
| Recommendation 3 | Results of the 3rd CSK Symposium |
| Recommendation 4 | Future activities of the Regional Marine Biological Centre (Singapore) |
| Recommendation 5 | Reference Collections on Marine fauna and flora |

Recommendation 1 - Future activities of CSK

The International Co-ordination Group,

Recognizing that the past activities of CSK have greatly increased our knowledge of the sea regions concerned and at the same time founded a strong basis upon which the Member States could continue the mutual assistance in the advancement of oceanography and fisheries science in individual countries,

Agrees to reaffirm the importance of enhancing future activities further to develop the achieved basis for concerted action by Member States in the advancement of marine sciences;

Recognizing also the importance of the concepts contained in the "Comprehensive Outline of the Scope of the Long-term and Expanded Programme of Oceanic Exploration and Research (LEPOR)", and also of the International Decade of Ocean Exploration (IDOE) adopted by the seventh session of the IOC,

Decides that future programming of CSK should be conducted with due consideration of the above concepts;

Noting also that CSK has contributed to the planning and implementation of fishery research projects in the area, particularly the FAO/UNDP South China Sea Fisheries Development and Co-ordinating Programme,

Realizing that applied research of fisheries resources and their potentials is being undertaken under the framework of the Indo-Pacific Fisheries Council (IPFC), the Southeast Asian Fisheries Development Centre (SEAFDEC) and the above-mentioned South China Sea Programme,

Concludes therefore that CSK should concentrate its work on basic marine sciences;

Noting further that closer collaboration between oceanographers, marine biologists and fisheries scientists is required,

Stresses the need for closer co-ordination of activities and exchange of information between CSK, IPFC, SEAFDEC and other bodies in the region, including the holding of joint meetings, where appropriate, and

Requests the International Co-ordinator to liaise with IPFC,

SEAFDEC and other bodies concerned;

Further requests the International Co-ordinator to approach appropriate Member States to elaborate renewed programmes on physical, chemical and biological oceanography, based on the main idea of continuing the investigations on the inter-annual variability of the whole Kuroshio System, with a view to achieving maximum synchronization of surveys;

Recommends Member States, in order to secure the permanency and enhancement of the activities of the CSK, to consider further the idea of establishing in the CSK region a machinery, somewhat similar to the International Council for the Exploration of the Sea (ICES).

Recommendation 2 - CSK Project for Research and Monitoring of Marine Pollution

The International Co-ordination Group,

Recommends that Member States make increased efforts in the study of marine pollution and protection and improvement of the environment, taking into account the present situation and the serious problems the countries will be faced with in the near future, and that wherever needed, machinery for the planning and execution of related programmes should be established or improved;

Requests the International Co-ordinator of CSK to make arrangements for the exchange of information on marine pollution;

Requests further that each Member State nominate an appropriate specialist to act as correspondent;

Reaffirms the importance of intercalibration experiments of methods and instruments for ocean research and particularly for marine pollution studies;

Brings this matter to the attention of SCOR;

Recommends that the Secretary of IOC, in consultation with the International Co-ordinator, explore the possibility of arranging in the near future for a meeting of CSK experts in the field of marine pollution to review the results of the research and monitoring programmes carried out by the member countries and for the development of further national and international programmes;

Invites participation from other bodies in the region concerned, such as IPFC;

Recommends the IOC to explore the possibility of establishing a tropical centre for the study of marine pollution;

Noting that training courses in marine pollution in relation to living aquatic resources are being held by FAO/SIDA and AID/PMBC,

Realizing the need for further specialized training of research workers from South-East Asia in pollution study techniques, including investigations on water quality criteria,

Recommends that further training courses should be encouraged both at the national and international level;

Noting further the importance of selected areas (islands) unaffected by pollution which could be used for collecting information on pre-pollution characteristics of the environment,

Recommends that Member States select as soon as possible appropriate areas (islands) which are free from pollutants to be declared by their governments as reserved zones to be used for monitoring of possible future pollution effects on the living resources and their environment.

Recommendation 3 - Results of the 3rd CSK Symposium

The International Co-ordination Group,

Noting the Summary Report of the 3rd CSK Symposium,

Expresses its deep appreciation to the Government of Thailand for allowing the Symposium to be held in its delightful country;

Recognizing the relevance of the recommendations in the report,

Adopts these Recommendations fully;

Noting further the desirability of publishing the proceedings of the Symposium,

Recommends that the National Research Council of Thailand take the responsibility of setting up an editorial board for publishing these proceedings;

Recommends further that Unesco/IOC contribute to the cost of publication of the Proceedings of the 3rd CSK Symposium.

Recommendation 4 - Future activities of the Regional Marine Biological Centre (Singapore)

The International Co-ordination Group,

Appreciating the work which has been undertaken so far by the RMBC (Singapore) for the benefit of Member States of CSK,

Noting that the further activities of the Regional Marine Biological Centre are very essential in connexion with the study of marine ecosystems and fisheries science not only for CSK programmes but also for other marine research programmes in South East Asia,

Referring also the activities of the South China Sea Fisheries Development and Co-ordinating Programme now being implemented by FAO,

Recommends that the research activities of the RMBC be programmed and strengthened to meet these needs;

Urges the RMBC to arrange for the evaluation of the fish eggs and larvae material, to review their quantitative distribution in space and time and to arrange for speedy publication of the results, so that these could be used for the study of the abundance and distribution of the fishery resources in the South China Sea area.

Recommendation 5 - Reference Collections on Marine fauna and flora

The International Co-ordination Group,

Noting the importance of developing better comprehensive knowledge on the marine fauna and flora in the CSK area,

Recommends that Member States and international bodies in the region make every effort to prepare catalogues of reference collections, with a view to future exchange of information on this subject.

Recommendations of the 3rd CSK Symposium

(Bangkok, 26-29 May 1973)

Recommendation 1 - Improvement of observations to study the Kuroshio inter-annual variability

The Symposium,

Recalling that one of the main problems of the international study of the Kuroshio is the investigation of inter-annual variability, and that it is clear that the period of observations of nine years, starting from 1965, is not sufficient for the purpose of drawing quantitative conclusions,

Recommends the continuation of standard observations and direct current measurements, the frequency of which should not be less than twice a year (once during each main season of the year). It is also highly desirable to achieve complete synchronization of the surveys.

Recommendation 2 - Current measurements in the South China Sea

The Symposium,

Noting the general lack of direct current measurements in the South China Sea,

Recommends that all efforts be made to obtain these.

Recommendation 3 - The analysis of bottom sediments and the study of bottom topography

The Symposium,

Noting that there are few works on the analysis of bottom sediments and the study of bottom topography in the CSK area,

Recommends that survey ships should include programmes of collection of bottom sediments and studies on bottom topography by echo sounders in their activities.

Recommendation 4 - Marine Pollution

The Symposium,

Recommends that the International Co-ordination Group should

explore the possibility of establishing a tropical centre for the study of marine pollution.

Recommendation 5 - Phytoplankton Research

The Symposium,

Recommends that further research be encouraged in qualitative and quantitative variability of phytoplankton and also include the most useful biochemical methods such as the C14 technique and fluorescence method, among scientists in the region.

Recommendation 6 - Zooplankton Research

The Symposium,

Noting the relatively small amount of work presently undertaken on zooplankton, and

Realizing the urgent need to improve the knowledge on fish eggs and larvae which may provide additional information on the abundance and distribution of fishery resources in the CSK area,

Recommends that more work on zooplankton, particularly the early life stages of fish, be conducted by member countries. Such studies would be a most useful supplement to the fisheries resources surveys and assessments to be undertaken under the framework of the FAO/UNDP South China Sea Fisheries Development and Co-ordinating Programme and studies carried out by SEAFDEC;

Nothing further that substantial material on zooplankton, including fish eggs and larvae, is available at the Regional Marine Biological Centre in Singapore,

Urges the final evaluation of those samples and publication of the results, special attention being given to annual variability.

Recommendation 7 - Larval Feeding

The Symposium,

Recommends that studies similar to those on Rastrelliger neglectus (Paper No.304) be encouraged in the region.

Recommendation 8 - Fish Taxonomy

The Symposium,

Appreciating the results of the FAO/DANIDA Technical Seminar on Fish Taxonomy in South East Asia, hosted by the Government of Thailand and held in November/December 1972 in Phuket, Thailand,

Requests FAO to expedite the publication of Identification Sheets for 280 species prepared during that Seminar so that they may be used for the improvement in the collection of fisheries statistics and for other purposes;

Recommends further that FAO and DANIDA should explore the possibility of organizing as soon as possible a further seminar or workshop on the taxonomy of commercially important crustacea in South East Asia.

Recommendation 9 - Fisheries Statistics

The Symposium,

Recommends that the collection of catch and effort statistics by member countries should receive the priority attention of their governments.

Recommendation 10 - Fishery Resources

The Symposium,

Noting that the Southeast Asian Fisheries Development Centre (SEAFDEC) held a Technical Seminar on South China Sea Fisheries Resources in Bangkok from 21 to 25 May 1973,

Welcomes the recommendations made by the SEAFDEC Seminar (attached as an Appendix to this Annex); and

Endorses the Recommendations fully;

Noting further the importance of the results presented in paper number 301 on the trawl catch rates in the northern part of the South China Sea,

Recommends that this paper should be studied in relation to those presented at the SEAFDEC Seminar.

Recommendation 11 - Shipboard Training

The Symposium,

Recommends that the International Co-ordination Group

explore the possibility of making arrangements with member countries for the shipboard training of young scientists, wherever possible.

Recommendation 12 - Publication of Symposium Papers

The Symposium,

Recommends that the Symposium Papers be published in a form similar to that of the two previous CSK Symposia, and that the IOC be approached to contribute to the cost of publication through the assistance of the Unesco Regular Programme for IOC and for the IOC Fund-in-Trust.

Recommendations from the SEAFDEC Technical Seminar
on South China Sea Fisheries Resources

Bangkok, 21-25 May 1973

Recommendation 1 - Statistics

Recognizing the real need for basic statistical information necessary for national fisheries development planning and its successful implementation, and the general lack of trained personnel and adequate support to undertake this task, the seminar recommends that urgent and timely attention be given to national fisheries statistical systems by the governments of the member countries, and further recommends that SEAFDEC establish a co-ordinating mechanism such as a working group consisting of responsible workers in the field of fisheries statistics from all member countries to complement the activities of the existing IPFC/IOFC Joint Working Party of Experts on Western Pacific and Indian Ocean Fishery Statistics in implementing the programme within the area.

Recommendation 2 - Monitoring

For the proper evaluation of the status of the fisheries resources and their potential for development and/or management, it is essential to complement the collection of statistical data by biological monitoring of the major fish stocks on a regular basis with studies on the species composition of the catches including trash fish and on length composition as a minimum basic requirement.

It is realized that some member countries have been undertaking monitoring surveys on demersal resources with research vessels for a number of years and that the results have been most useful. The Seminar, therefore, recommends that such monitoring surveys be continued and that SEAFDEC promote these activities through further cruises of its vessels and co-ordination of the national programmes of member countries.

Recommendation 3 - Exploratory Survey

It is appreciated that the exploratory fishing surveys, carried out by SEAFDEC and some member countries, have provided useful results and improved knowledge of the resources available for fisheries development. The Seminar recommends that such

surveys be continued and expanded wherever possible. Increased attention should be given to the wide range study of the distribution and abundance of pelagic resources, particularly in the relatively less exploited offshore areas which may offer considerable possibilities for further development; in addition, studies on demersal resources in untrawlable fishing grounds should be expanded. It is further recommended that modern acoustic techniques be used for the detection and abundance estimation of fish during these surveys and realized that trained personnel will be needed for that purpose.

Recommendation 4 - Pelagic Resources

Realizing the possibility of developing and expanding fisheries on certain pelagic resources, the Seminar recommends that SEAFDEC and member countries should promote the application of modern pelagic gear already existing in the region (e.g. pelagic trawl and purse-seine).

Recommendation 5 - Comparison of Gear

Realizing that a considerable number of types of local traditional fishing gear may need only slight modifications to reach a maximum level of efficiency, and taking note of a related resolution by IPFC, the Seminar recommends that SEAFDEC, in collaboration with the member governments, organize a comparative study on the efficiency of the most promising local traditional gear within the area.

Recommendation 6 - Management

Noting the rapid and welcome expansion of many fisheries in the region, the Seminar emphasized that this had already resulted in some stocks becoming fully exploited, and others were likely to become fully exploited in the near future. Unless suitable action is taken, this will result in economic waste, social distress and damage to the resource. The Seminar, therefore recommends that governments give early and urgent attention to the possible need for management action including the discouragement of over expansion and the diversion of fishing to less heavily exploited resources, e.g. to some offshore stocks. The Seminar further noted that to an increasing extent some stocks are being exploited by more than one country. Management of these stocks requires close international co-ordination. The Seminar recommends that these needs for co-ordinated international action be drawn to the attention of member governments and relevant international bodies such as IPFC.

Recommendation 7 - Aquaculture

In view of the importance of aquaculture and the need to obtain further information on the status of aquaculture research and progress in the region, it is recommended that a SEAFDEC Aquaculture Seminar be held in conjunction with the establishment of the new Aquaculture Department of SEAFDEC in 1974, and it is further recommended that regional experts attending the proposed Seminar make a study tour in the region prior to it. The proposed Seminar will also be in preparation for the FAO World Technical Conference on Aquaculture scheduled to be held in 1975 or 1976.

Recommendation 8 - Future Seminars

Noting the value of the present Seminar in bringing together fishery workers from all member countries, and the fruitful discussions that had resulted, the Seminar recommends that arrangements be made by SEAFDEC for further seminars on specialized topics of regional interest to be held of which the proposed seminar on Aquaculture might be the first. Another subject for a future seminar which it was believed deserved special attention was the survey and evaluation of natural freshwater fishery resources.

The Seminar realized that the implementation of most of these recommendations will have a bearing on the work of both SEAFDEC and the FAO/UNDP South China Sea Fisheries Development and Co-ordinating Programme, and it therefore urges that SEAFDEC and the Programme collaborate as closely as possible for the benefit of fisheries development and rational utilization of the living resources in the South China Sea area.

Annex IV

LIST OF PARTICIPANTS/LISTE DES PARTICIPANTES/
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FRANCE/FRANCIA

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FILIPINAS

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Dr. Shigeaki Shindo
Deputy Secretary-General
Southeast Asian Fisheries Development
Center

Observers/Observateurs/Observadores

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TAILANDIA

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SOVIETIQUES/UNION DE
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Deputy Secretary-General for Natural
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Local Secretariat
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Mrs. Boonthom Dhamcharee
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National Research Council

Miss Praparsri Thanasukarn
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Co-ordination Division
National Research Council

* * * * *

II. CRUISE REPORT

1. Ryofu Maru

(ROSCOP)

SHIP OR PLATFORM R/V Ryofu Maru	SCIENTIST IN CHARGE Dr. Mamoru Ohwada
INSTITUTION OR OPERATING AGENCY Marine Department, Japan Meteorological Agency	
EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO. 72-06 JMA Programme for Monitoring of Marine Pollution & CSK Programme	COUNTRY Japan
DATE OF CRUISE FROM: 1 DAY / 6 MONTH / 1972 YEAR TO: 30 DAY / 7 MONTH / 1972 YEAR	

PROGRAMS UNDERTAKEN	TOTAL NO. OF Δ STATIONS	Q	F	D	TYPE OF FORMAT AVAILABLE	Q	QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:
DESCRIPTIVE OCEANOGRAPHY							
D 1 SERIAL STATIONS	86	a	a		PC, MT	a.	Marine Department, JMA
D 2 STD	45	a	b		AT	b.	
D 3 OXYGEN	86	a	a		PC, MT	c.	
D 4 PHOSPHATES	86	a	a		PC, MT	d.	
D 5 TOTAL-P	18	a	a		PC, MT	e.	
D 6 NITRATES	86	a	a		PC, MT	f.	
D 7 NITRITES	18	a	a		PC, MT		
D 8 TRACE ELEMENTS	18	a	a		PC, MT		
D 9 pH	18	a	a		PC, MT		
D 10 ALKALINITY							
D 11 SILICATES							
D 12 RADIOACTIVITY	10	a	b		PIIB		
D 13 ISOTOPE CHEMISTRY							
D 14 OTHER DISSOLVED GASES	86	a	b		RDS		
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)							
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	110	a	b		PUB, AT	a.	JODC
D 17 TRANSPARENCY (NO. OF OBS.)	49	a	a		PC, MT	b.	Marine Department, JMA
D 18 SOUND VELOCIMETER DATA						c.	
D 19 INSTRUMENTED WAVE RECORDING (✓)	✓	a	b			d.	
D 20 TIDES (✓)	✓					e.	
D 21 SEA (✓)	✓					f.	
D 22 SWELL (✓)	✓						
D 23 ICE (✓)	✓						
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)							
D 25 SEA SURFACE TEMPERATURE (✓)	✓	a	b		AT		
CURRENT MEASUREMENTS							
C 1 CURRENT METERS *	15	a	b		PIIB		
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	b		PIIB		
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	86	a	b		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	86	a	b		PUB		
B 8 ZOOPLANKTON	86	a	b		PIIB		
B 9 FISH EGGS AND/OR LARVAE							
B 10 MICRONEKTON							
B 11 INVERTEBRATE NEKTON							
B 12 PELAGIC FISHES							

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

- a. JODC
- b. Marine Department, JMA
- c.
- d.
- e.
- f.

Δ 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.

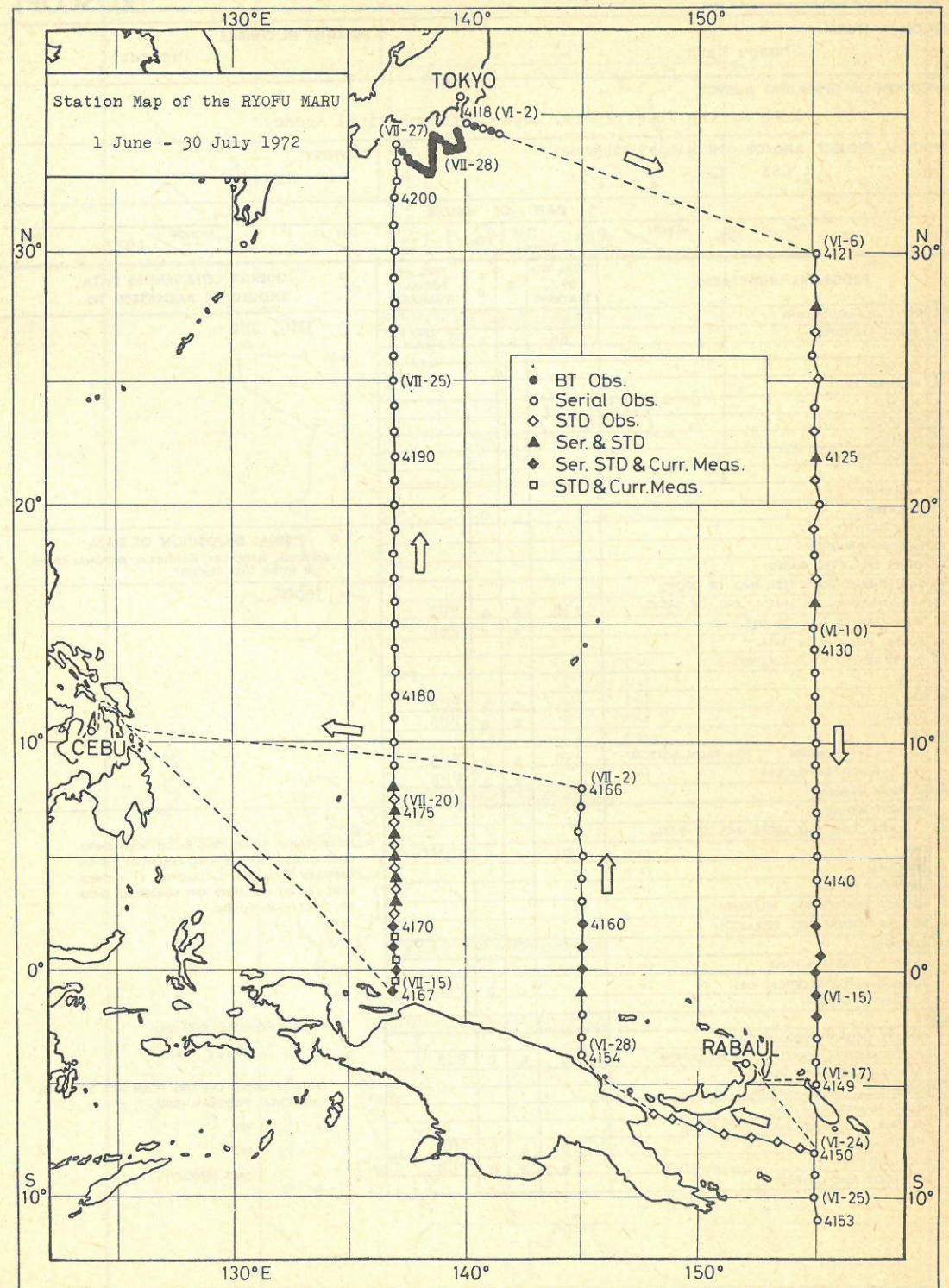
REMARKS

* measured with two TS-II currentmeters system

TOTAL KILOMETERS STEAMED:
9,500 n.m.

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

- (✓) YES
- () NO
- () PART (SPECIFY)



2. Shumpu Maru

(ROSCOP)

SHIP OR PLATFORM Shumpu Maru	SCIENTIST IN CHARGE K. Yamamoto
INSTITUTION OR OPERATING AGENCY Kobe Marine Observatory, Japan Meteorological Agency	
EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO. CSK 723	COUNTRY Japan
DATE OF CRUISE FROM: 17 DAY / 7 MONTH / 1972 YEAR TO: 13 DAY / 8 MONTH / 1972 YEAR	

PROGRAMS UNDERTAKEN	TOTAL NO. OF Δ STATIONS	Q	F	D	TYPE OF FORMAT AVAILABLE	Q	QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:
DESCRIPTIVE OCEANOGRAPHY							
D 1 SERIAL STATIONS	66	a	a		PC,MT	a.	KMO, JMA
D 2 STD						b.	
D 3 OXYGEN						c.	
D 4 PHOSPHATES						d.	
D 5 TOTAL-P						e.	
D 6 NITRATES						f.	
D 7 NITRITES							
D 8 TRACE ELEMENTS							
D 9 pH							
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)	130	a	a		PUB	a.	JODC
D 17 TRANSPARENCY (NO. OF OBS.)	37	a	a		PUB	b.	
D 18 SOUND VELOCIMETER DATA						c.	
D 19 INSTRUMENTED WAVE RECORDING (✓)						d.	
D 20 TIDES (✓)						e.	
D 21 SEA (✓)		a	a		PUB	f.	
D 22 SWELL (✓)		a	a		PUB		
D 23 ICE (✓)							
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)	30	a	a		PUB		
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 (✓)	80	a	a		PC,MT		
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 (✓)							
BIOLOGY							
B 1 PRIMARY ORGANIC PRODUCTION							
B 2 PHYTOPLANKTON PIGMENT CONCENTRATION	4	a	b		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	6	a	b		PUB		
B 8 ZOOPLANKTON	6	a	b		PUB		
B 9 FISH EGGS AND/OR LARVAE							

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

a. JODC

b.

c.

d.

e.

f.

Δ 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.

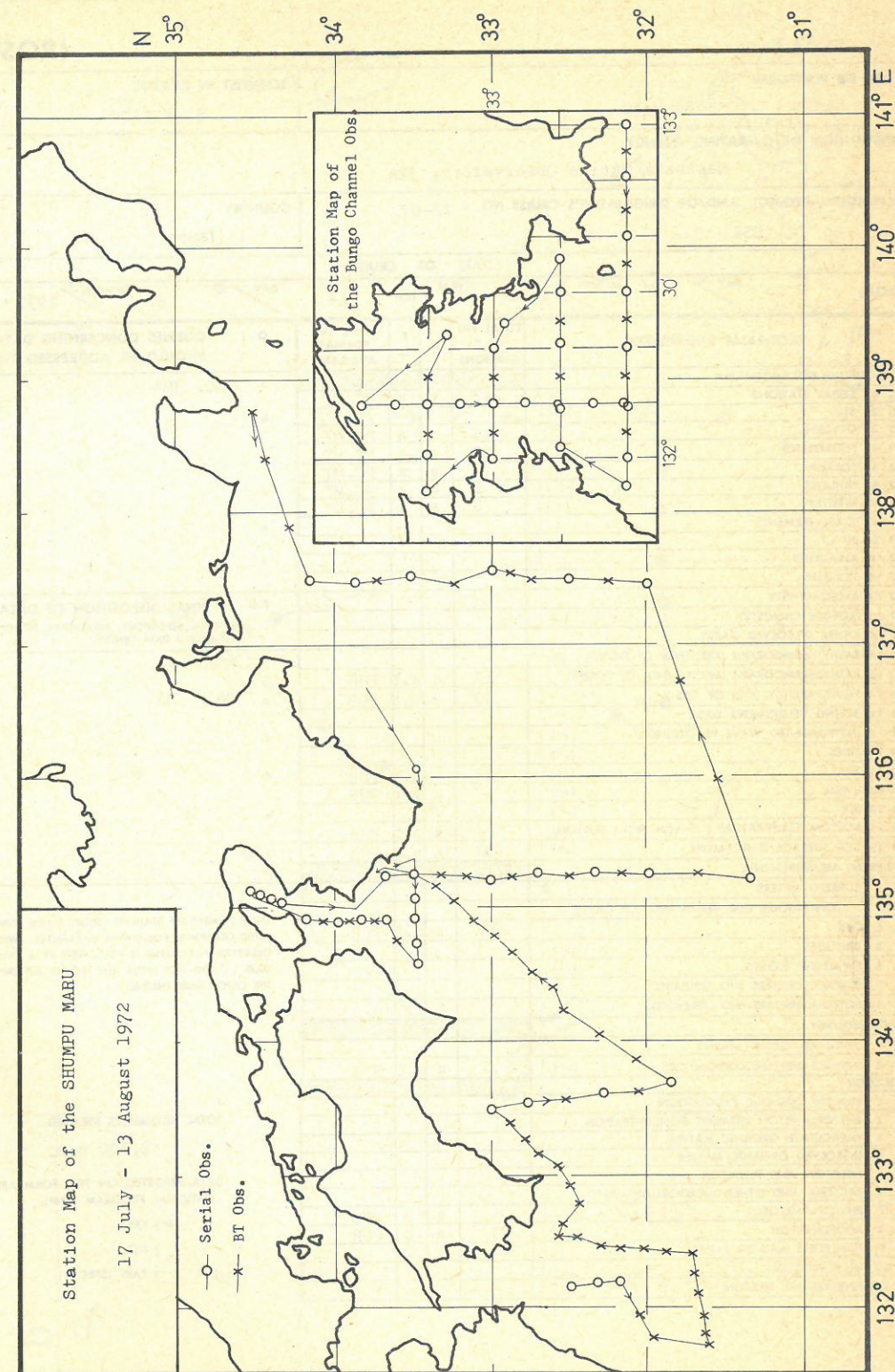
TOTAL KILOMETERS STEAMED:
2,604.7 n.m.

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

(✓) YES

() NO

() PART (SPECIFY)



3. Chofu Maru

(ROSCOP)

SHIP OR PLATFORM Chofu Maru		SCIENTIST IN CHARGE S. Yamano	
INSTITUTION OR OPERATING AGENCY Nagasaki Marine Observatory, JMA			
EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO. CSK 72-07		COUNTRY Japan	
DATE OF CRUISE			
FROM:	27 DAY / 7 MONTH / 1972 YEAR	TO:	14 DAY / 8 MONTH / 1972 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF Δ STATIONS	Q	F	D	TYPE OF FORMAT AVAILABLE	Q	QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:
DESCRIPTIVE OCEANOGRAPHY							
D 1 SERIAL STATIONS	43	a	a		PC, MT	a.	NMO, JMA
D 2 STD						b.	
D 3 OXYGEN	43	a	a		PC, MT	c.	
D 4 PHOSPHATES	17	a	a		PC, MT	d.	
D 5 TOTAL-P	3	a	a		PC, MT	e.	
D 6 NITRATES	3	a	a		PC, MT	f.	
D 7 NITRITES	3	a	a		PC, MT		
D 8 TRACE ELEMENTS							
D 9 pH							
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)	87	a	a, b		PUB	a.	JODC
D 17 TRANSPARENCY (NO. OF OBS.)	20	a	a, b		PUB	b.	NMO, JMA
D 18 SOUND VELOCIMETER DATA						c.	
D 19 INSTRUMENTED WAVE RECORDING (✓)						d.	
D 20 TIDES (✓)						e.	
D 21 SEA (✓)		✓	a	a, b	PUB	f.	
D 22 SWELL (✓)		✓	a	a, b	PUB		
D 23 ICE (✓)							
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)	18	a	a, b		PUB		
D 25 SEA SURFACE TEMPERATURE (✓)		✓	a	a, b	PUB		
CURRENT MEASUREMENTS							
C 1 CURRENT METERS							
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)							
C 2 GEK	39	a	a, b		PUB		
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, b	PUB		
BIOLOGY							
B 1 PRIMARY ORGANIC PRODUCTION							
B 2 PHYTOPLANKTON PIGMENT CONCENTRATION							
B 3 PARTICULATE ORGANIC MATTER							
B 4 DISSOLVED ORGANIC MATTER							
B 5 NEUSTON AND PLEUSTON							
B 6 BACTERIA AND OTHER MICROORGANISMS							
B 7 PHYTOPLANKTON	9	a	b		PUB		
B 8 ZOOPLANKTON	21	a	b		PUB		
B 9 FISH EGGS AND/OR LARVAE							
B 10 MICRONEKTON							
B 11 INVERTEBRATE NEKTON							

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

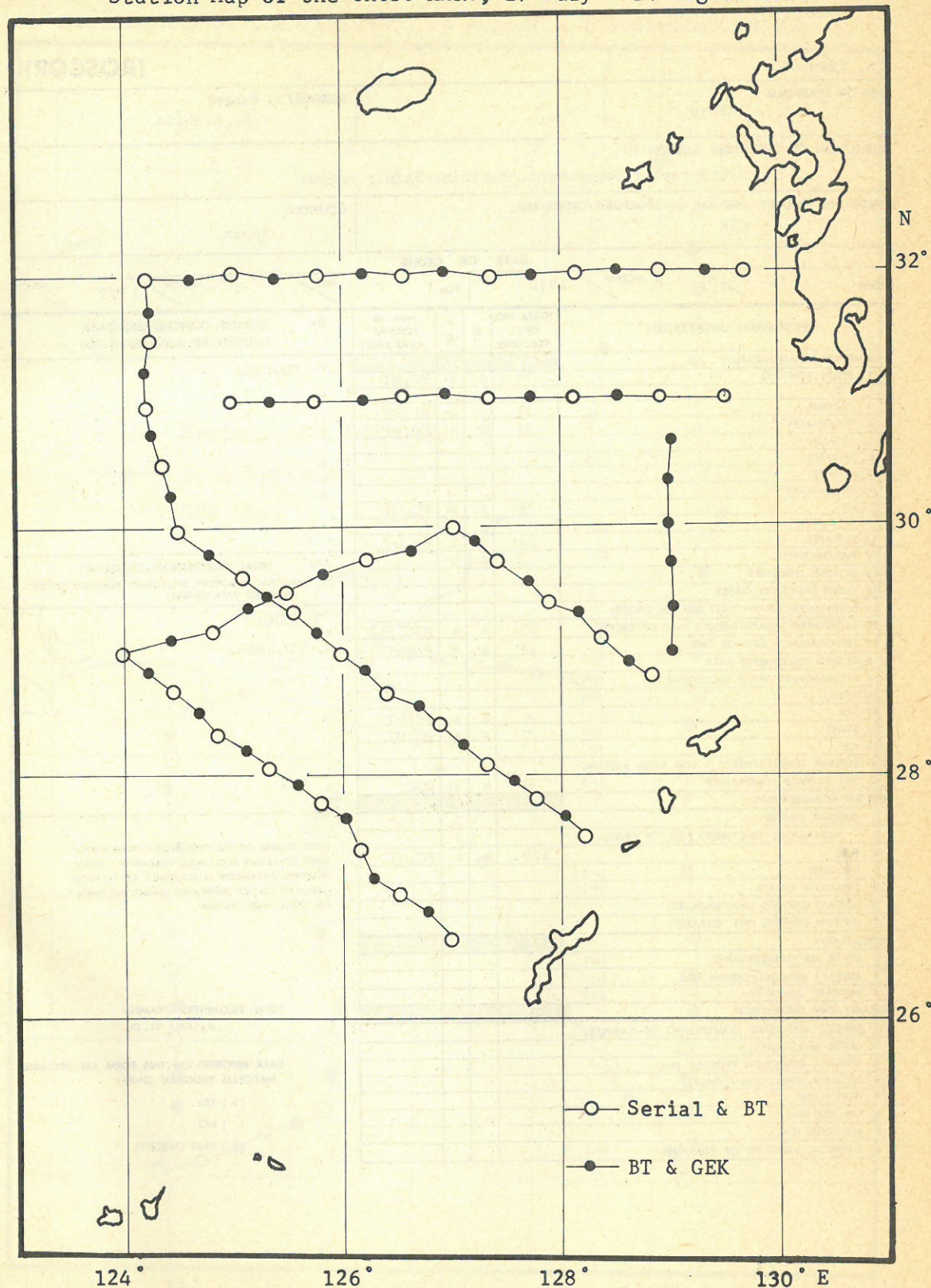
- a. JODC
- b. NMO, JMA
- c.
- d.
- e.
- f.

Δ 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:
2,300 n.m.

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

Station Map of the CHOFU MARU, 27 July - 14 August 1972



4. Takuyo

(ROSCOP)

SHIP OR PLATFORM Takuyo		SCIENTIST IN CHARGE K. Nishida	
INSTITUTION OR OPERATING AGENCY Hydrographic Department, Maritime Safety Agency			
EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO. CSK		COUNTRY Japan	
DATE OF CRUISE			
FROM:	14 DAY	8 MONTH	1972 YEAR
TO:	1 DAY	9 MONTH	1972 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF Δ STATIONS	Q	F D	TYPE OF FORMAT AVAILABLE	Q	QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:
DESCRIPTIVE OCEANOGRAPHY						
D 1 SERIAL STATIONS	34	a	a	PC, MT	a.	HD, MSA
D 2 STD					b.	
D 3 OXYGEN	34	a	a	PC, MT	c.	
D 4 PHOSPHATES	34	a	a	PC, MT	d.	
D 5 TOTAL-P					e.	
D 6 NITRATES					f.	
D 7 NITRITES						
D 8 TRACE ELEMENTS						
D 9 pH	34	a	a	PC, MT		
D 10 ALKALINITY						
D 11 SILICATES	34	a	a	PC, MT		
D 12 RADIOACTIVITY	2	a	b			
D 13 ISOTOPE CHEMISTRY						
D 14 OTHER DISSOLVED GASES						
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)						
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	95	a	a	RDC, PUB	a.	JODC
D 17 TRANSPARENCY (NO. OF OBS.)	15	a	a	PC, MT	b.	HD, MSA
D 18 SOUND VELOCIMETER DATA					c.	
D 19 INSTRUMENTED WAVE RECORDING (✓)					d.	
D 20 TIDES (✓)					e.	
D 21 SEA (✓)	✓	a	a	PC, MT	f.	
D 22 SWELL (✓)	✓	a	a	PC, MT		
D 23 ICE (✓)						
D 24 BOTTOM TEMPERATURE ($\leq 10M$ FROM BOTTOM)						
D 25 SEA SURFACE TEMPERATURE (✓)	✓	a	b	RDC		
CURRENT MEASUREMENTS						
C 1 CURRENT METERS						
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)						
C 2 GEK	106	a	a	PC, MT		
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. (✓)						
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						
G 5 HEAT FLOW						
G 6 GRAVITY (Km)						
G 7 MAGNETIC (Km)						
G 8 CHEMICAL ANALYSIS OF SEDIMENT (✓)						

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

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

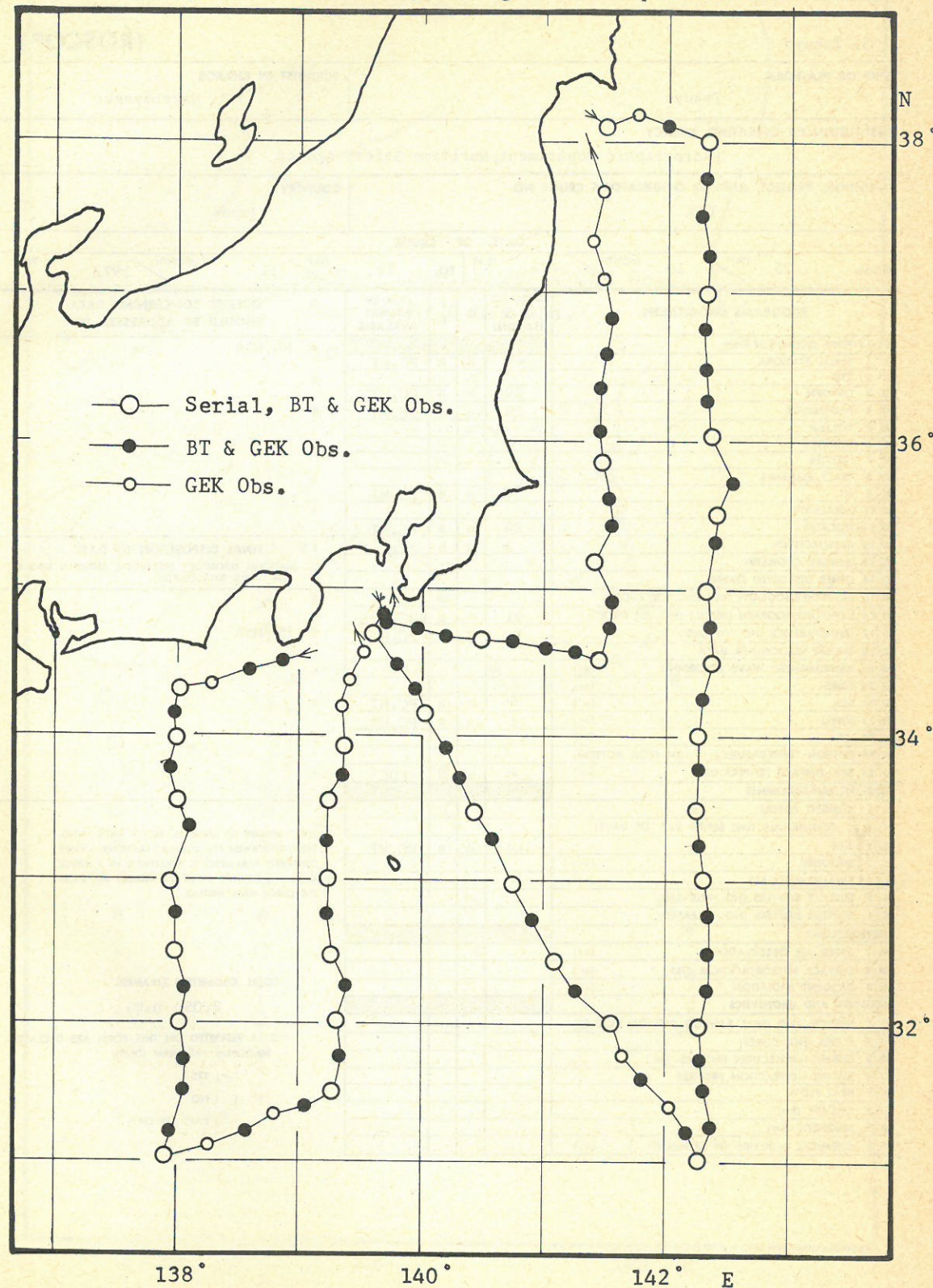
Δ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER. WHEN OBSERVED PARAMETER IS FOLLOWED BY A CHECK MARK (✓) DO NOT ENTER ANY NUMBER BUT ENTER THE CHECK MARK INSTEAD.

TOTAL KILOMETERS STEAMED:
2,030 n.m.

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

(✓) YES
() NO
() PART (SPECIFY)

Station Map of the "TAKUYO", 14 August - 1 September 1972



5. Takuyo

(ROSCOP)

SHIP OR PLATFORM Takuyo		SCIENTIST IN CHARGE S. Nakabayashi	
INSTITUTION OR OPERATING AGENCY Hydrographic Department, Maritime Safety Agency			
EXPEDITION, PROJECT, AND/OR ORIGINATOR'S CRUISE NO. CSK		COUNTRY Japan	
DATE OF CRUISE			
FROM:	25 DAY / 10 MONTH / 1972 YEAR	TO:	13 DAY / 11 MONTH / 1972 YEAR

PROGRAMS UNDERTAKEN	TOTAL NO. OF Δ STATIONS	Q	F	D	TYPE OF FORMAT AVAILABLE	Q	QUERIES CONCERNING DATA SHOULD BE ADDRESSED TO:
DESCRIPTIVE OCEANOGRAPHY							
D 1 SERIAL STATIONS	29	a	a		PC, MT	a.	HD, MSA
D 2 STD						b.	
D 3 OXYGEN	29	a	a		PC, MT	c.	
D 4 PHOSPHATES	29	a	a		PC, MT	d.	
D 5 TOTAL-P						e.	
D 6 NITRATES						f.	
D 7 NITRITES							
D 8 TRACE ELEMENTS							
D 9 pH	29	a	a		PC, MT		
D 10 ALKALINITY							
D 11 SILICATES	29	a	a		PC, MT		
D 12 RADIOACTIVITY	2	a	b				
D 13 ISOTOPE CHEMISTRY							
D 14 OTHER DISSOLVED GASES							
D 15 BATHYTHERMOGRAPH (XBT) (NO. OF DROPS)							
D 16 BATHYTHERMOGRAPH (MECH.) (NO. OF DROPS)	91	a	a		RDC, PUB	a.	JODC
D 17 TRANSPARENCY (NO. OF OBS.)	11	a	a		PC, MT	b.	HD, MSA
D 18 SOUND VELOCIMETER DATA						c.	
D 19 INSTRUMENTED WAVE RECORDING						d.	
D 20 TIDES						e.	
D 21 SEA			a	a	PC, MT	f.	
D 22 SWELL			a	a	PC, MT		
D 23 ICE							
D 24 BOTTOM TEMPERATURE (≤ 10M FROM BOTTOM)							
D 25 SEA SURFACE TEMPERATURE			a	b	RDC		
CURRENT MEASUREMENTS							
C 1 CURRENT METERS							
C 1 CONTINUOUS TIME SERIES (NO. OF DAYS)							
C 2 GEK	94	a	a		PC, MT		
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.							
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							
G 5 HEAT FLOW							
G 6 GRAVITY (Km)							
G 7 MAGNETIC (Km)							
G 8 CHEMICAL ANALYSIS OF SEDIMENT							

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

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

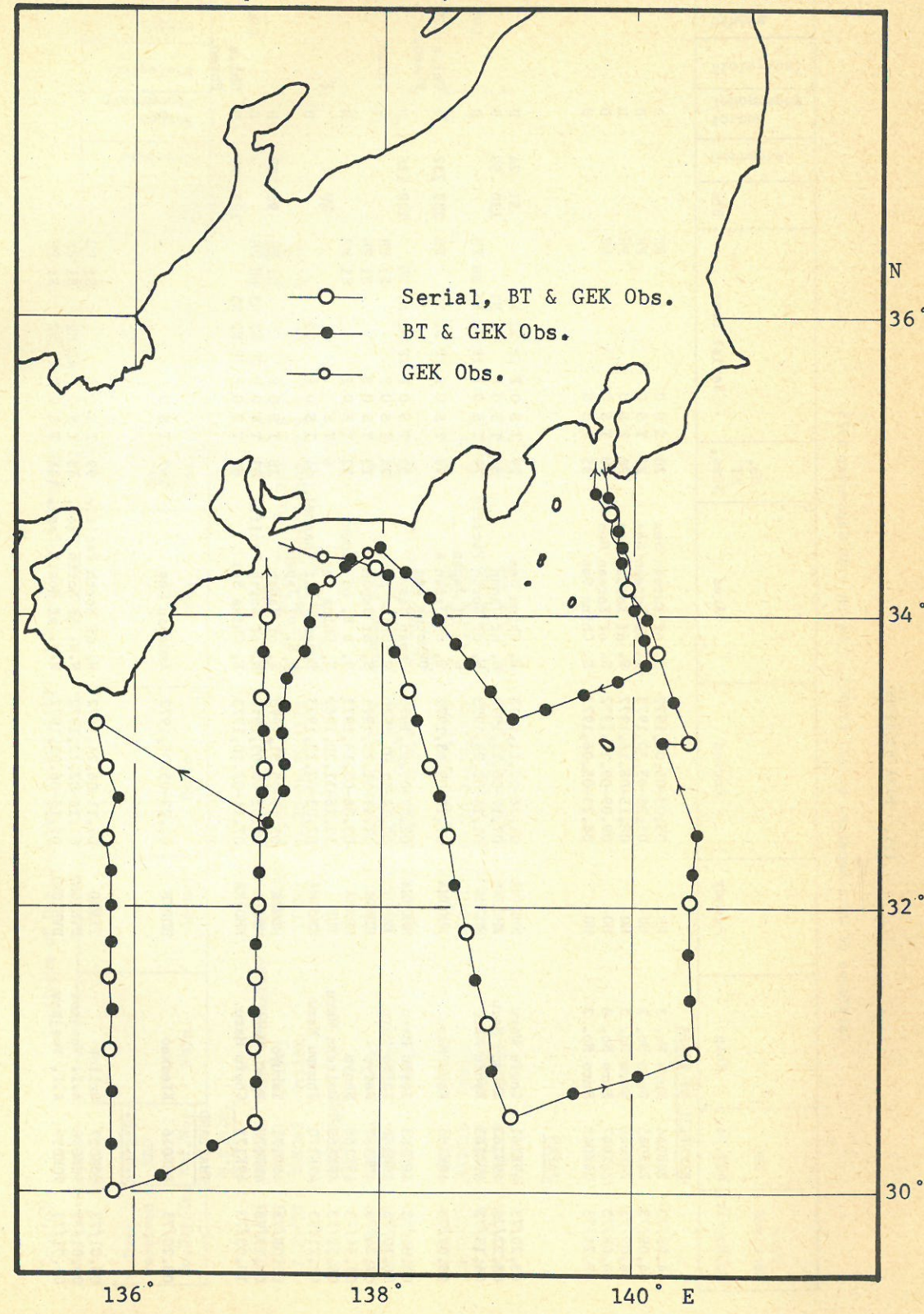
Δ ENTER NUMBER OF STATIONS, EXCEPT WHEN ANNOTATED OTHERWISE FOLLOWING PARAMETER. WHEN OBSERVED PARAMETER IS FOLLOWED BY A CHECK MARK (✓) DO NOT ENTER ANY NUMBER BUT ENTER THE CHECK MARK INSTEAD.

TOTAL KILOMETERS STEAMED:
2,050 n.m.

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

(✓) YES
() NO
() PART (SPECIFY)

Station Map of the TAKUYO, 25 October - 13 November 1972



III. DATA RECEIVED

Catalogue of Data Received by KDC (JODC), 1 March - 30 September 1973

Date Received Mo. Day/Yr.	KDC Ref. No.	Ship	Agency	Period	Area	No. of Stas.	Serial Data	BTs	Currents	Bottom Topography	Biological	Others
<u>REPUBLIC OF KOREA</u>												
04.09/73	24K044	Suro No. 3	HO	05.03-05.05, 1972	S. of Korean Sea	20	T S O					
04.09/73	24K045	Suro No. 3	HO	05.28-05.30, 1972	S. of Korean Sea	20	T S O					
04.09/73	24K046	Suro No. 3	HO	08.15-08.16, 1972	S. of Korean Sea	20	T S O					
04.09/73	24K047	Suro No. 3	HO	09.09-09.11, 1972	S. of Korean Sea	18	T S O					
08.21/73	24K048	Suro No. 3	HO	04.23-05.06, 1973	S. China Sea	35	T S O					
<u>JAPAN</u>												
03.20/73	49K161	Chofu Maru	NMOJMA	01.26-02.11, 1973	E. China Sea	29	T S O P TP N2 N3	51	24	D		
03.27/73	49K162	Shumpu Maru	KMOJMA	07.17-08.13, 1972	S. of Japan	66	T S O P N2 N3	130	80	D		
04.13/73	49K163	Ryofu Maru	MDJMA	01.14-02.28, 1973	W. of North Pacific & S. of Japan	78	T S O P TP N2 N3 NH PH			D		COD
05.07/73	49K164	Kofu Maru	KMOJMA	07.10-09.13, 1972	E. of Japan & Okhotsk Sea	98	T S O P TP N2 N3	233	232	D	Chl.a	COD
06.04/73	49K165	Seifu Maru	MMOJMA	02.07-03.23, 1973	Japan Sea	52	T S O P TP N2 N3 NH	128	136	D		
06.10/73	49K166	Kaiyo Maru	FA	10.14-11.01, 1970	S. China Sea	24	T S O P			D	Chl.a	
07.24/73	49K167	Meiyo	HDMSA	11.11-11.23, 1971	S. of Japan	13	T S O P			D		
07.24/73	49K168	Shoyo	HDMSA	03.06-03.18, 1973	S. & E. of Japan	32	T S O P			D		
08.21/73	49K169	Umitaka Maru	TUF	11.16-11.20, 1969	S. China Sea	6	T S	10		D	F	
08.21/73	49K170	Shumpu Maru	KMOJMA	02.03-02.13, 1973	Bungo & Kii Channel, & S. of Japan	44	T S O P N2			D		
09.05/73	49K171	Takuyo	HDMSA	05.17-05.31, 1973	S. of Japan	28	T S O P	98	139	D		
09.17/73	49K172	Ryofu Maru	MDJMA	06.05-08.03, 1973	W. of North Pacific	83	T S O P TP N2 N3 NH PH			D		COD
10.03/73	49K173	Chofu Maru	NMOJMA	07.11-08.10, 1973	E. China Sea	65	T S O P TP N2 N3	127	72	D	Chl.a	Phaeo.
<u>THAILAND</u>												
08.20/73	86K016	Kledkeo	HDRTN	01.22-05.05, 1972	Andaman Sea	137	T S O			D		
<u>U.S.S.R.</u>												
03.01/73	90K037	Orlick	TINRO	04.11-06.24, 1972	W. of North Pacific	99	T S O P					
03.01/73	90K038	A.I. Voejkov	DVNIGMI	01.16-02.12, 1972	N.W. of North Paci.	43	T S O P AL N2					
03.01/73	90K039	A.I. Voejkov	DVNIGMI	05.15-06.09, 1972	N.W. of North Paci.	121	T S O P AL N2					

(Cont'd)

Catalogue of Data Received by KDC (JODC), 1 March - 30 September 1973

Date Received Mo. Day/Yr.	KDC Ref. No.	Ship	Agency	Period	Area	No. of Stas.	Serial Data	BTs	Currents	Bottom Topography	Biological	Others
<u>U.S.S.R.</u>												
03.01/73	90K040	U.M. Schokalsky	HS	07.13-07.21, 1972	E. of Japan	52	T S O P AL N2					
05.30/73	90K041	Priboj	DVNIGMI	12.07'71-02.01'72	W. of North Pacific	160	T S O P AL N2					
07.26/73	90K042	Orlick	TINRO	07.20-09.21, 1972	W. of North Pacific & S. China Sea	108	T S O P N2					
<u>SINGAPORE</u>												
03.01/73	SIK012	Chang1	SEAFDEC	11.29-12.15, 1972	Andaman Sea	9	T			D		
03.01/73	SIK013	Chang1	SEAFDEC	01.16-01.31, 1973	Andaman Sea	13	T			D		
04.09/73	SIK014	Chang1	SEAFDEC	02.20-03.04, 1973	Off West Coast of Thailand	9	T				F	
04.09/73	SIK015	Chang1	SEAFDEC	03.16-03.28, 1973	S. China Sea	3	T			D	F	
08.06/73	SIK016	Chang1	SEAFDEC	04.10-04.30, 1973	S. China Sea	16	T			D	F	
08.06/73	SIK017	Chang1	SEAFDEC	05.14-05.26, 1973	S. China Sea	13	T			D	F	
09.17/73	SIK018	Chang1	SEAFDEC	08.15-09.01, 1973	S. China Sea	10	T				F	