



UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION

FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

**REPORT OF THE TYPHOON COMMITTEE
ON ITS TWENTY-SECOND SESSION**

**Tokyo, Japan
30 October - 6 November 1989**



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FOR PARTICIPANTS ONLY
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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
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Typhoon Committee
Twenty-second session
30 October - 6 November 1989
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DRAFT REPORT OF THE TYPHOON COMMITTEE
ON ITS TWENTY-SECOND SESSION

I. ORGANIZATION OF THE SESSION

1. The twenty-second session of the Typhoon Committee was held at the Japan Meteorological Agency (JMA) Headquarters, Tokyo, Japan from 30 October to 6 November 1989.

Attendance

2. The session was attended by representatives of China, Hong Kong, Japan, Malaysia, the Philippines, the Republic of Korea and Thailand. Observers from the Union of Soviet Socialist Republics and the United States of America attended the session. Observers from the Commission for Atmospheric Science (CAS) of WMO, the United Nations Development Programme (UNDP), the Office of the United Nations Disaster Relief Co-ordinator (UNDRO), United Nations Department of Technical Co-operation for Development (UNDTCD) and the League of Red Cross and Red Crescent Societies (LRCS) were also present.

Opening address

3. The Chairman expressed his gratitude to the Government of Japan, especially JMA, for the arrangements made for the session. He invited Mr. Cengiz Ertuna, representative of the Executive Secretary of

ESCAP, Mr. Ho Tong Yuen, representative of the Secretary-General of WMO, Dr. Yukio Kikuchi, Director-General of JMA, and Mr. Toru Kondo, Director-General, River Bureau of the Ministry of Construction, Japan to address the session.

4. In his message delivered by Mr. Ertuna, the Executive Secretary of ESCAP expressed his appreciation to the Government of Japan for hosting the session. He pointed out that the achievements of the Typhoon Committee were due to the excellent spirit of co-operation among Members and the related international organizations. Referring to the resolution adopted at the 45th Commission session of ESCAP on fulfilling the objectives of the International Decade for Natural Disaster Reduction (IDNDR), he gave the assurance that ESCAP would continue to undertake activities in support of the Typhoon Committee within the framework of its own work programme and available resources and to play an increasing role in natural disaster reduction in the region.

5. Mr. Ho, on behalf of the Secretary-General of WMO, thanked the Government of Japan for hosting the twenty-second session of the Typhoon Committee and extended a warm welcome to all participants. He expressed the gratitude of WMO to UNDP for its continued support and acknowledged the co-operation given by ESCAP in facilitating the working of the Committee. He also recorded his appreciation of the good work of the Typhoon Committee Secretariat (TCS) under the able leadership of its Co-ordinator, Dr. R. L. Kintanar. Commenting on the future activities of the Committee he emphasized the need for Members to further strengthen the co-ordination between the activities of the Committee and that of the Tropical Cyclone Programme (TCP) of WMO. In this regard he reiterated that it would be important for Members to provide appropriate inputs to the TCP's plan of action in response to the IDNDR for inclusion in the Third WMO Long-term Plan. He wished the session every success.

6. Dr. Yukio Kikuchi, Director-General, JMA, welcomed the participants. He noted with pleasure that the Typhoon Committee had

achieved significant progress in all the ^{spelled out} five components. He informed the session of the development of the RSMC Tokyo-Typhoon Center. Noting the importance of the timely issuance of accurate typhoon and hydrological forecasts and warnings he stressed the need for international co-operation in achieving the goal of the Committee. ✓

7. Mr. Toru Kondo, Director-General, River Bureau of the Ministry of Construction, noted in his address that Members of the Typhoon Committee were affected by many types of natural disasters such as floods, storm surges and debris flows caused by typhoon and heavy rainfall. He stressed the increasingly important role of the Typhoon Committee in disaster reduction and the necessity to enhance its efforts to mitigate flood damage.

ESCAP/WMO Typhoon Committee Natural Disaster Prevention Award

8. Following the decision of the twenty-first session of the Committee to use the income derived from the Typhoon Committee Foundation to generate greater public awareness on disaster prevention and preparedness measures, Mr. Saburo Yamamoto and Mr. Yujiro Ogawa were presented the ESCAP/WMO Typhoon Committee Natural Disaster Prevention Award for 1989, consisting of a plaque and US\$3,000. Mr. Saburo Yamamoto devoted himself to flood control works and flood disaster prevention measures in Japan. Mr. Yujiro Ogawa received the award on behalf of the Disaster Prevention Week Promotion Conference which was established in 1982 for the prevention and reduction of disaster damages.

Election of officers

9. The Committee elected Mr. P. Sham (Hong Kong), Chairman and Mr. Luo Jibin (China), Vice-Chairman for the year 1989-1990. Col. V. R. Pagulayan, Jr. (Philippines) was elected Chairman of the Drafting Committee for the session.

Agenda

10. The Committee adopted the agenda as follows:

1. Opening of the session
2. Election of officers
3. Adoption of the agenda.
4. The Committee's activities during 1989:
 - (a) Meteorological component;
 - (b) Hydrological component;
 - (c) Disaster preparedness and prevention component;
 - (d) Training component;
 - (e) Research component.
5. Review of the 1988 and 1989 typhoon seasons/annual publication.
6. Co-ordination with other activities of the WMO Tropical Cyclone Programme.
7. Programme for 1990 and beyond:
 - (a) Report of the Expert Meeting on Planning a Typhoon Committee Special Experiment;
 - (b) The role of the Typhoon Committee in the International Decade for Natural Disaster Reduction;
 - (c) Review of the Committee's Regional Co-operation Programme Implementation Plan.
8. Support required for the Committee's programme.
9. Agenda for the twenty-third session.
10. Date and place of the twenty-third session.
11. Scientific lectures.
12. Adoption of the report.

II. THE COMMITTEE'S ACTIVITIES DURING 1989

(Item 4 of the agenda)

11. The Committee reviewed and evaluated in detail its activities during 1989.

12. The Committee noted with satisfaction the activities undertaken by the Members, with the assistance of ESCAP, WMO and TCS, in the context of the Regional Co-operation Programme such as the upgrading of the meteorological satellite ground receiver, telecommunication and computer systems.

13. The Committee also noted with satisfaction the publication of the TC Newsletter and brochure. However, it agreed that technical articles should be submitted more appropriately to the Typhoon Committee Annual Review and not to the Newsletter which should include only brief news items of interest to Members.

A. Meteorological component

(Item 4(a) of the agenda)

14. The Committee was pleased to note the issuance and distribution by WMO of the approved amendments as Supplement No. 1 to the Typhoon Committee Operational Manual (meteorological component).

15. The Committee was informed of the designation by the Government of Japan of Dr. Y. Yamagishi, Director, Forecast Division of JMA, as Rapporteur for the Operational Manual replacing Mr. S. Kadowaki to provide continuity in the updating of the Manual. The Committee approved the amendments submitted by Dr. Yamagishi (Annex I) and requested WMO to publish Supplement No. 2. It expressed its appreciation to Mr. Kadowaki and Dr. Yamagishi for their excellent work. It also welcomed the offer of Japan to continue to provide the services of a rapporteur.

16. The Committee noted with satisfaction the recent developments in the services provided by RSMC Tokyo-Typhoon Center, in particular the transmission of new products such as typhoon analyses, 48-hour typhoon forecasts, and the outputs of the numerical typhoon movement prediction model up to 60-hour via the GTS, broadcasting of 24/48-hour progress charts of the streamline field at 850 hPa level through the JMH (the

Hardware needed was completed.

✓ meteorological radio facsimile transmitted from Tokyo) since 1 July 1989, as well as the ~~first~~ ^{for the first time} delivery of the best tracks for the typhoons 18901 to 18918 in October 1989.

17. The Committee was pleased to note that in response to the request of Thailand, a consultancy mission on equipment ^{requirements} maintenance was dispatched by the Government of Japan to look into the upgrading of the existing telecommunication and weather observing networks. ^{A list of equipment and hardware needed was submitted to the Government of Japan for consideration.}

18. The Republic of Korea informed the Committee that the deployment of an ocean data buoy system was put off until the end of 1989. It assured, however, that the buoy would be in place in the Yellow Sea at 37N 125 40'E as planned and the data acquired would be made available to all Members.

19. The Committee was pleased to note that a continuing program of upgrading the radar networks of Members had proceeded smoothly. It also noted with satisfaction the continued exchange of radar information among the Members through the GTS. In Japan seventeen of its twenty radars would be equipped with Radar Echo Digitizing and Dissemination System (REDIS) by the end of 1989 while radar stations 58367, 58760, 58847, 59316 and 59981 in China had been refitted with the new digital radars (model 714). China further reported the establishment of new radar stations at Lianyungang and Baihai.

20. Japan had proceeded to automate its upper air observation system and Members were revitalizing their upper air networks in response to the needs of the typhoon experiment in the summer of 1990.

21. The Committee was informed by Japan that GMS-4 was successfully launched in September 1989 and positioned at 160E above the equator. In early December 1989, it would replace GMS-3 at 140E while the latter would be moved to a new location, 120E, to serve as a back-up system.

A list of equipment & hardware needed prepared for submission to the Govt of Japan.

22. The Committee was pleased to note that Malaysia, the Philippines, the Republic of Korea, and Thailand had upgraded their GMS receiver systems to receive S-VISSR data. In the case of the Philippines this was made possible through a grant-in-aid by the Government of Japan.

23. The Committee expressed appreciation to Japan and the United States for providing meteorological satellite information through the operation of GMS and NOAA polar orbiting satellites, respectively.

24. The Committee was also informed by China that it had successfully launched its first polar orbiting meteorological satellite FY-1 in September 1988 on a trial basis. Although short-lived, the results had been encouraging and the project had enhanced China's meteorological satellite capability.

25. With regard to the regional telecommunications circuit, the Committee was pleased to know that the Bangkok-Kuala Lumpur circuit and the Kuala Lumpur-Singapore circuit had been upgraded from 75 bauds to 1200 bps, the former being funded by the UNDP/WMO regional project. The Bangkok-Jeddah circuit with 75 bauds was completed and made operational since November 1988. The Tokyo-New Delhi circuit was upgraded from 1200 to 9600 bps since December 1988.

26. The Committee was pleased to learn of the growing use of prognostic products of global numerical models from RSMC Tokyo-Typhoon Center and the European Centre for Medium Range Weather Forecasts (ECMWF).

27. The Committee was informed that Viet Nam and the USSR conducted joint air reconnaissance of the tropical atmosphere and tropical cyclones in August-October 1989.

28. The Committee was pleased to note that with the co-operation of oil companies Malaysia has gained access to marine meteorological

1. W. Commission - The installation of data base was carried out by a team of Chinese experts from 8 Sep to 11 Oct 1989.

Observations made by several off-shore oil platforms located in Malaysian waters.

B. Hydrological Component

29. The Committee noted with appreciation that Members had continued to monitor and improve their flood forecasting and warning systems and to implement comprehensive flood loss prevention measures. It also noted the increased co-operation among meteorological and hydrological services at both national and regional levels.

30. The Committee was informed that TCS in co-operation with ESCAP and WMO had organized the pre-session meeting of the hydrological component on 29 October 1989 in order to exchange information on hydrological activities of each Member. The meeting identified two new projects for the hydrological component, namely, "Preparation of manual and guidelines for integrated river system development and management" and "Management overview of flood forecasting systems".

31. The Committee also noted with satisfaction that ESCAP, in co-operation with TCS and WMO, had organized the second mission during 7 February to 7 March 1989 on comprehensive flood loss prevention and management which visited all Members except Lao PDR and Democratic Kampuchea and the Second Expert Group Meeting on Comprehensive Flood Loss Prevention and Management held from 3 to 7 July 1989 in Bangkok. It was agreed that Members would participate in the project more actively by contributing examples, case studies and other information to the manual and guidelines.

✓ 32. Thailand informed the Committee that the Bangkok Metropolitan Administration (BMA) had proposed to the national government enactment of legislation on basin conservation for flood protection and the development of a retention basin in the King's Royal Guard area.

33. The Committee was informed that ESCAP, in co-operation with TCS, was implementing the project on urban flood loss prevention and mitigation in the ESCAP region. Missions had been fielded to eight countries/areas among which seven were the Members of the Typhoon Committee. The report of the missions was under preparation and would be reviewed in a workshop to be held in 1990.

34. The Committee was pleased to note ESCAP's readiness to increase its involvement in the Typhoon Committee's activities and to assume the leading role among the United Nations agencies concerned with the Typhoon Committee's work in the field of hydrology.

35. The Committee noted that WMO was implementing a number of technical co-operation projects in the region which were of relevance to the hydrological component of its Regional Co-operation Programme Implementation Plan. These were undertaken with the financial support of UNDP.

36. The Committee was pleased to note that, under the auspices of the WMO Commission for Hydrology, a consultant had prepared a report based on the analysis of the monitoring reports submitted by Members on their flood forecasting systems for the period 1984-1988. The report entitled "Some aspects of flood forecasting in Asia" had been submitted for publication and was expected to be issued before the end of 1989.

37. With regard to the description and monitoring of the flood forecasting systems by Members, the Committee noted that some problems had arisen in the application of the current monitoring procedures and that this had led to incomplete reports being received from many countries. Consequently WMO had developed a new monitoring procedure entitled "Management Overview of Flood Forecasting Systems (MOFFS)".

38. Finally, the Committee emphasized the importance of the activities under the hydrological component in supporting the aims of

the IDNDR and requested all Members to participate fully in the activities of the Decade at both the national and international levels.

C. Disaster Prevention and Preparedness (DPP) Component
(Item 4(c) of the agenda)

39. The Committee reviewed the activities under the DPP component and took note of the recommendation of the twenty-first session related to carrying out effective measures based on the Members national plans and the Committee's current plans.

40. The Committee was pleased to note the increasing collaboration and cooperation among the disaster prevention and preparedness, meteorological and hydrological agencies to achieve timely and effective responses to disasters.

41. The Committee also took note of the first celebration in the Philippines of Natural Disaster Consciousness Week during the first week of July 1989 in Manila as well as in all schools, provincial and local governments to create better public awareness on disasters.

42. The Committee received reports from Members concerning the monitoring of hazardous areas and removal of obstructions from rivers especially in the Republic of Korea.

✓ 43. Thailand reported that its Local Administration Department, in co-operation with the Asian Institute of Technology, had prepared three draft project proposals on flood protection and relief management for technical and financial assistance from external sources.

44. The Committee was pleased to know of activities to enhance disaster response through the conduct of drills and exercises. In this regard the Republic of Korea mentioned that command post exercises were held involving six ministries, three provincial governments and water resource and power agencies.

45. The Committee was informed of the continuing activities of ESCAP related to disaster prevention and preparedness especially on flood loss prevention and mitigation aspects. In this regard, Members also reported to the Committee the establishment of national committees to undertake appropriate activities during the IDNDR.

46. The Committee urged Members to participate actively in the exchange of information on disaster prevention and preparedness and requested the expert on DPP (part-time) to continue his effort on this matter.

47. The Committee took note of the information that Thailand would host a meeting of the ASEAN Experts on Natural Disasters in Bangkok from 13-15 December 1989.

48. The Committee further noted with satisfaction that Members had continued their submission of damage survey reports using the prescribed format.

49. The Committee was informed that UNDTCD was executing projects which contained elements of disaster forecasting, modelling and flood protection. It was pleased to note UNDTCD's willingness to provide advisory services and preparation of pre-feasibility studies in the field of coastal engineering.

50. The Committee was informed that UNDTCD/UNCRD (United Nations Centre for Regional Development) had organized several international seminars related to disaster reduction and prevention in 1989. Members were invited to a workshop on "Integrated Approach to Disaster Management and Regional Development Planning with People's Participation" to be organized by UNDTCD/UNCRD in collaboration with Centre on Integrated Rural Development for Asia and Pacific (CIRDAP) in Dhaka, Bangladesh from 28 January to 1 February 1990.

D. Training Component
(Item 4(d) of the agenda)

51. The Committee reviewed the activities under this component of the programme. It was pleased to note that Members had made use of current available training opportunities to enhance the competence of their staff in the meteorological, hydrological, and DPP disciplines.

52. The Committee noted with appreciation the organization of the following seminars/training courses for Members by the Government of Japan:

- (a) Forecasting service
- (b) Meteorological satellites
- (c) Radar meteorology
- (d) Numerical Weather Prediction (NWP) modelling
- (e) Meteorological telecommunications
- (f) Long-range forecasting
- (g) Group training in meteorology
- (h) Group training in river and dam engineering

53. Japan also provided expert services to four Members in the following fields:

- (a) Probability forecasts
- (b) Improvement of meteorological services
- (c) Meteorological telecommunications
- (d) Automation of meteorological observations
- (e) Meteorological satellite receiving systems
- (f) River and dam engineering
- (g) Flood damage mitigation systems

54. The Committee noted with appreciation the conduct of the "International Meeting on Numerical Weather Prediction with Emphasis on Disaster Prevention" under the joint auspices of JMA and the Japan Foundation for Shipbuilding Association (JAFSA) in which some Members participated. It thanked the Association for Science Co-operation in

Asia (ASCA) for sponsoring the Seminar on Mitigation Technology of Storm and Flood Disasters in Tsukuba, Japan. Some Members were represented in the seminar.

55. The Committee expressed its appreciation to the Government of Hong Kong for admitting two Malaysian staff into the five-month Meteorological Training Course for Experimental Officers and waiving the usual tuition fees in favour of the trainees.

56. The Committee thanked the Governments of the United States and United Kingdom for offering their training facilities on NWP and hydrology, and meteorology, respectively.

57. The Committee noted with appreciation the conduct of a two-week study tour on meteorological instruments and equipment for staff of the Philippines and Thailand by the State Meteorological Administration of China under the TCDC arrangements.

58. The Committee was pleased with the support and guidance provided by the Malaysian Meteorological Service to a Chinese meteorologist on operational techniques in marine meteorological forecasts.

59. The Committee acknowledged with thanks the assistance provided by WMO in obtaining fellowships/training grants for Members in meteorology and hydrology.

E. Research Component
(Item 4(e) of the agenda)

60. The Committee reviewed the activities under the research component of the programme and was pleased to know that research continued to assume an integral part of the three major components of the Committee's activities.

61. It expressed satisfaction with the work of Dr. T. Kitade (Japan), Mr. Law Kong Fook (Malaysia) and Col. V. Pagulayan, Jr. (Philippines) in their roles as Meteorological, Hydrological, and DPP Research Co-ordinators, respectively.

The Committee was informed by Dr. T. Kitade, Research Co-ordinator for papers from the meteorological component, that a report had been compiled of research from China, HK, Japan, Rep. of Korea, Malaysia, Phil., Thailand and Viet Nam, had been prepared and distributed to Members.
62. The Committee was informed by Mr. Law, Research Co-ordinator for the hydrological component, that a ^{similar} report compiling contributions from Japan, Malaysia, Thailand and Viet Nam had been prepared and distributed to Members.

63. The Committee was pleased to note that many researches on tropical cyclones were conducted by Members. It urged Members to cooperate more fully in the exchange of research information and results.

III. THE REVIEW OF THE 1988 AND 1989 TYPHOON SEASONS/ANNUAL PUBLICATION (Item 6 of the agenda)

64. The Committee noted with satisfaction the excellent quality of the "ESCAP/WMO Typhoon Committee Annual Review 1988" which had been prepared under the direction of the Chief Editor provided by Hong Kong, with the assistance of national editors. It thanked Hong Kong for its contributions in the production of the publication. The Annual Review was distributed to Members of WMO, the Typhoon Committee and other agencies concerned.

65. The Committee expressed its deep appreciation to the Chief Editor, Mrs. E. Koo, and requested that she continue to serve in the same capacity for another year. The Committee was, however, informed that this was not possible but Hong Kong would be prepared to undertake the task for one more year by providing another Chief Editor.

66. The Committee was pleased to learn that the publication was much sought after by government departments and national agencies in

some Member countries. It, therefore, urged Members to continue their efforts to further widen the readership of the publication.

IV. CO-ORDINATION WITH OTHER ACTIVITIES OF THE WMO TROPICAL CYCLONE PROGRAMME (Item 6 of the agenda)

67. On the basis of the fifteenth status report presented at the session, the Committee noted with satisfaction the achievements made toward the mitigation of tropical cyclones under the Tropical Cyclone Programme (TCP). It noted with appreciation, in particular, the efforts of the Programme towards the promotion of collaboration at the regional and international levels and the provision of assistance in the transfer of technology and methodology and the training of personnel.

68. Since the objectives of the TCP are fully within the scope and purpose of the IDNDR, the Committee agreed that the Programme should play a major role in the activities of the IDNDR. In this regard, the Committee was pleased to learn that provision had been made for the preparation of a WMO plan of action for the IDNDR to ensure its co-ordination with the Third WMO Long-term Plan (TLTP), with increased emphasis on the strengthening of technology transfer and the promotion of public information, education and awareness.

69. The Committee was pleased to note that the Second WMO International Workshop on Tropical Cyclone (IWTC-II), scheduled to be held in Manila from 27 November to 8 December 1989, would provide a useful forum for the interaction between forecasters and researchers which would encourage the application of research results to operational use. It further noted that an expert meeting on the preparation of a guide on tropical cyclone forecasting would take place in conjunction with the IWTC-II. Taking advantage of the IWTC-II and the meeting in Manila, the Committee felt that it would be opportune for the Co-ordinator of the TCS and its staff to be involved in the above two events.

70. The Committee was informed that the fifth training course on tropical meteorology and tropical cyclone forecasting to be organized by the USA in co-operation with WMO would be held in Miami from 26 February to 4 May 1990. Invitations had been extended to all the WMO regional tropical cyclone bodies. It was also informed that an RA II/Typhoon Committee Training Workshop on Telecommunications and Implementation Co-ordination Meeting on the GTS would be held in Bangkok from 18 to 22 December 1989. The purpose of the workshop was to provide participants with the advanced knowledge needed to improve and upgrade the GTS centres and circuits.

71. In order to further develop the regional co-operation programmes of the tropical cyclone regional bodies and to facilitate the co-ordination of the activities of the RSMCs with activity specialization in tropical cyclones, the Committee requested WMO to consider the possibility of organizing a technical co-ordination meeting among the RSMCs during the 11th financial period of WMO (1992-1995) at one of the centres.

72. The Committee noted the interest expressed by the Panel on Tropical Cyclones in its sixteenth session to receive information on the preparations for the Typhoon Committee Special Experiment for 1990. The Committee agreed to provide the Panel with a copy of the plan for the Experiment as adopted by the session (see Annex II).

73. The Committee was pleased to note that ESCAP had increasing interest in participating in the activities of the regional programmes related to cyclones and in undertaking relevant work jointly with WMO and other concerned international organizations, particularly in the field of hydrology and natural disaster reduction.

V. PROGRAMME FOR 1990 AND BEYOND
(Item 7 of the agenda)

A. REPORT OF THE EXPERT MEETING ON PLANNING
A TYPHOON COMMITTEE SPECIAL EXPERIMENT
(Item 7(a) of the agenda)

74. The Committee reviewed the Report of the Expert Meeting on Planning a Typhoon Committee Special Experiment held at Seoul, Republic of Korea, from 11-13 July 1989. On the basis of the Report the Committee adopted a plan for the Experiment as shown in Annex II.

75. The Committee approved the establishment of a steering group as recommended in the Report and whose terms of reference were to oversee the planning, execution, evaluation, and other follow-up actions required of the Experiment. The Committee also approved the acronym SPECTRUM suggested by Hong Kong as the code word for the experiment. SPECTRUM stands for Special Experiment Concerning Typhoon Recurvature and Unusual Movement.

76. The Committee decided that Hong Kong should be invited to designate an expert to serve as the chairman of the steering group to co-ordinate the work of the group. The group would then commence its work immediately through correspondence. As far as possible, the steering group should be constituted by the same members who participated in the Experts Meeting in Seoul. It decided that the technical specifications (para 3.5 of the Report) were acceptable subject to modifications, if necessary, by the steering group. It further decided that the group should be allowed some latitude at coming up with detailed arrangements for SPECTRUM keeping in mind the need for proper co-ordination with the US and USSR experiments and what would be attainable within the available resources. The group would meet before May 1990 to finalize implementation details for SPECTRUM. The group should invite observers from the USA and USSR responsible for their national experiments to attend the meeting.

77. The Committee acknowledged with gratitude the offer of China to host the second meeting of the Steering Group in late 1991.

conference

R. THE ROLE OF THE TYPHOON COMMITTEE IN THE
INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

(Item 7(b) of the agenda)

78. The Committee was informed by the representative of IDNDR/UNDRO of the main objective of the Decade and the criteria for Decade projects corresponding to the strategy proposed by the UN Secretary-General to the Forty-fourth General Assembly^{in 1989}. All Decade activities at international levels are to be financed by extra-budgetary sources. He suggested that it would be possible and appropriate for the Committee to participate in the Decade not only by its example of undertaking disaster preparedness and reduction activities but with new projects particularly in the field of public education and awareness on natural disaster reduction. He further informed the Committee of the plans for IDNDR/UNDRO in cooperation with ESCAP to organize a workshop for the ESCAP region in the first half of 1990.

79. The Committee noted with satisfaction that since its inception more than twenty years ago it had already been playing a leading role in natural disaster prevention and reduction, the very concept that IDNDR would be promoting in the 1990s. The Committee, however, agreed that its work should be given wider publicity and be further enhanced in the light of the Decade. In this regard, the Committee agreed that the TCS would act as a focal point for information exchange between the UN organizations and the Committee on activities related to the Decade.

80. The Committee noted that due to the multi-sectoral nature and capability of the regional commissions, ESCAP was well positioned to take the leading role in implementation of a programme of work on the IDNDR in Asia and the Pacific Region. The Committee was also pleased to note that future work of ESCAP on water-related natural disaster reduction was well reflected in its programme of work for 1990-1991 and the medium term plan for 1992-1997.

C. REVIEW OF THE COMMITTEE'S REGIONAL CO-OPERATION

PROGRAMME IMPLEMENTATION PLAN

(Item 7(c) of the agenda)

81. In consideration of its programme for 1990 and beyond, the Committee reviewed and adopted, with amendments, the draft consolidated implementation plan of the Regional Co-operation Programme (see Annex III).

82. In this connection, the Committee was pleased to note the future implementation plan of the RSMC Tokyo-Typhoon Center presented by Japan as given in Annex III, Appendix. The Committee urged Members to indicate to the Center their priority needs for products to be distributed via the GTS and via the JMH from those appearing with an asterisk in Annex III, Appendix.

83. Two new projects in the hydrological component were proposed, namely, "Preparation of Manual and Guidelines for Integrated River System Development and Management" and "Management Overview of Flood Forecasting Systems (MOFFS)" which the Committee endorsed in general. Under the first project, the Committee requested TCS, in close consultation with ESCAP and WMO, to identify activities to be implemented which could be reviewed taking advantage of the Third Expert Group Meeting on Comprehensive Flood Loss Prevention and Management to be organized by ESCAP in 1990, and submit a detailed project document to the next session of the Committee.

VI. SUPPORT REQUIRED FOR THE COMMITTEE'S

PROGRAMME

(Item 8 of the agenda)

84. Under this agenda item, the Committee reviewed the need for support to carry out its present and future activities on the basis of a document submitted jointly by WMO and ESCAP.

85. The Committee considered the staffing of TCS and was pleased to learn that the Philippine Government would continue to facilitate the functioning of TCS in Manila. It also noted with appreciation the Government's offer to continue to make available the services of a co-ordinator, a meteorologist and an expert (part-time) on disaster prevention and preparedness.

86. The Committee expressed its thanks and gratitude to Dr. R. L. Kintanar for his past contribution and guidance as Co-ordinator.

87. The Committee welcomed with appreciation the statement of Japan that it would make every effort to continue to provide a hydrologist to the TCS.

88. The Committee thanked the Governments of China, Malaysia and the Republic of Korea for their contributions to the Trust Fund for 1989. The Committee also clarified that the annual contribution would not be limited to a definite time span but would go on until such time when it would no longer be required to support its Programme. It was pleased to learn that the Government of Japan had already initiated action to pay its contribution for 1989. The Committee stressed the need for promoting voluntary annual cash contributions by Members to the Trust Fund with a view to increasing self-reliance in meeting the institutional support to its programme. Members were therefore urged to send their contribution to WMO at their earliest convenience.

89. The TCS Co-ordinator the Committee informed that in accordance with the decision of the twenty-first session, the Trust Fund was utilized to support the following:

- (i) the expert meeting at Seoul (11-13 July 1989) for planning a special typhoon experiment;
- (ii) publishing a brochure on the ESCAP/WMO Typhoon Committee;
- (iii) publishing a Typhoon Committee Newsletter;

- (iv) printing cost of documents for the twenty-second session of the Committee.

90. The Committee also agreed at this session to the use of the Trust Fund for the following activities for 1989 and 1990:

- (a) travel expenses of the disaster prevention and preparedness expert at TCS (part-time) to undertake a mission to countries in the region;
- (b) augmentation of travel funds for TCS staff missions, for example, for participation in selected meetings of international and regional organizations;
- (c) support for organizing symposia or technical conferences on a regular basis (for example, every two or three years);
- (d) support for TC special typhoon experiment including intensive observational programmes and steering group meetings;
- (e) publishing a newsletter by TCS on a periodical basis;
- ✓ (f) representation and emergency expenses of TCS;
- (g) support to collaboration of research activities among Typhoon Committee Members;
- (h) printing cost of documents for the twenty-third session not exceeding US\$1,000.

91. The Committee was informed that in accordance with the decision taken at the twenty-first session of the Typhoon Committee a Typhoon Committee Foundation was established from the 1988 Sasakawa-UNDRO Disaster Prevention Award of US\$45,000. The income derived as accrued interest was used for the ESCAP/WMO Typhoon Committee Natural Disaster Prevention Award which was presented to two recipients nominated by Japan (See para. 8).

92. A number of activities of the Committee were carried out under the UNDP/WMO Regional project RAS/86/175-"Programme support to the Typhoon Committee". The Committee reiterated its sincere thanks to UNDP

for its strong support and expressed the hope that the assistance from UNDP would continue in future.

93. The Committee decided that for the coming year enhanced efforts would be made to carry out the following activities:

- (i) modernization of techniques in typhoon forecasting, warning and dissemination utilizing modern equipment
- (ii) electronic equipment maintenance and repair workshop
- (iii) software transplantation in meteorological applications
- (iv) disaster prevention and preparedness
- (v) support for extension of intensive observational programmes of SPECTRUM
- (vi) support for steering group meeting
- (vii) TCDC activities
- (viii) technology transfer on medium to high speed message switching systems in collaboration with Japan and China.

94. It was also agreed that a project on "Typhoon Disaster Reduction" would be prepared for consideration by UNDP for the 1992-1996 cycle. The project would be prepared by WMO, ESCAP and TCS.

95. The Committee was informed that ESCAP would continue to undertake activities in support of the Typhoon Committee within the framework of its own work programme and available resources. The Committee was pleased to note that Japan, at the fifteenth session of the Natural Resources and Energy of ESCAP held from 9 to 13 October 1989, had expressed its willingness to consider proposals on water-related natural disaster reduction activities to be funded through Japan ESCAP Co-operation Fund in meeting the needs of the developing countries of the region.

96. It was encouraging to note that the participating Members of the Committee were shouldering the responsibilities on their own for institutional support of the inter-country project of the Committee and

had recognized that as an important principle in the management of the Regional Co-operation Programme. The Committee emphasized the need for greater efforts by Members to mobilize national resources to the extent possible for the implementation of its Programme.

97. The Committee recognized that much had been achieved and much more could still be achieved in the transfer of technology through TCDC arrangements. Exchange visits of experts and support to trainees were of immense benefit to Members. Members were urged to give strong support to this concept of self-reliance. Members were further urged to submit their requirements in order of priority and offer of facilities under TCDC for 1990 by the end of 1989 through TCS for submission to WMO and ESCAP.

98. The Committee recognized that the Voluntary Co-operation Programme (VCP) of WMO provided enormous potential for support of its activities and Members were advised to take full advantage of this system of mutual assistance.

VII. AGENDA FOR THE TWENTY-THIRD SESSION

(Item 9 of the agenda)

99. The Committee requested TCS, in close consultation with ESCAP and WMO, to prepare the provisional agenda for the twenty-third session. It was agreed that Members might propose to ESCAP, WMO and TCS, by the end of February 1990, additional specific items for inclusion in the agenda of the next session.

VIII. DATE AND PLACE OF THE TWENTY-THIRD SESSION

(Item 10 of the agenda)

100. The representative of the Republic of Korea extended an official invitation to the Committee to hold its twenty-third session in Seoul in late October 1990. The Committee in accepting this gracious and kind invitation expressed its thanks and deep appreciation to the

Government of the Republic of Korea. The date would be determined later in consultation among the Republic of Korea, ESCAP, WMO and TCS.

IX. SCIENTIFIC LECTURES
(Item 11 of the agenda)

101. The following scientific lectures were presented.

1. Estimation of Typhoon Intensity from Meteorological Satellite Data

by Mr. Yukio Takemura
Meteorological Satellite Center,
Japan Meteorological Agency

and

Mr. Shingo Osano
Forecast Division, Forecast Department,
Japan Meteorological Agency

2. Capability of Typhoon Track Prediction Model

by Mr. Mitsuru Ueno
Numerical Prediction Division, Forecast Department,
Japan Meteorological Agency

3. Rainfall Forecast Using Radar Raingauge and its Application to Flood Run-off Forecast

by Dr. Fumio Yoshino
Chief, Hydrology Division, River Department,
Public Works Research Institute,
Ministry of Construction

4. The System for Typhoon Damage Prevention in the Tone River Basin

by Mr. Toshikatsu Omachi
Director, Lower Tone River Office,
Kanto Regional Construction Bureau,
Ministry of Construction

5. Status of Implementation of Japan's Tropical Rainfall Measuring Mission

by Dr. Takeo Kinoshita
Director, First Research Division,
National Research Center for Disaster Prevention
Science and Technology Agency

The Committee expressed its thanks to the lecturers.

102. The Committee also expressed its thanks to China for showing a 15-minute video entitled "A Brief Introduction To The Tropical Cyclone Warning System in China".

X. ADOPTION OF THE REPORT
(Item 13 of the agenda)

103. The Committee adopted its report on 6 November 1989.

SUMMARY OF AMENDMENTS TO THE TYPHOON
COMMITTEE OPERATIONAL MANUAL
(Meteorological Component)

1. Updating in relation to new services of the RSMC Tokyo - Typhoon Center initiated on the first of July 1989; changes of the formats of advisories for analysis and forecast, introduction of guidance for the NWP forecasting etc;
2. Updating in relation to improvement of services of the RSMC; extending the eastern boundary of the area where the SAREP reports cover from 140 degree east to the international date line;
3. Updating in connection with the introduction of S-VISSR broadcasting service instead of HR-FAX to disseminate the GMS imagery data in January 1989;
4. Amendments related to installation of new observing stations, introduction new observation techniques, upgrade of telecommunication circuits, introduction of new forecast methods, etc;
5. Renewal of the list of names for tropical cyclones; *and*
6. Editorial corrections.

PLAN FOR A SPECIAL TYPHOON EXPERIMENT1. Objective of the experiment

- 1.1. The overall objective of the experiment should be "To obtain enhanced meteorological observational data, required for studies by Typhoon Committee Members, on the movement of tropical cyclones in the western North Pacific with a view to improving operational tropical cyclone forecasting". While this would serve as the basis for planning the experiment, Members should be encouraged to employ the data for studies on other aspects of tropical cyclones.
- 1.2. The scientific problems which the experiment should seek to elucidate should be:
 - (a) recurvature
 - (b) westward movement in spite of weakness in subtropical ridge
 - (c) motion in weak environmental flow (very slow movement, looping, unusual movement, multiple tropical cyclones)
 - (d) mutual interaction between the large scale environment and tropical cyclone motion.

2. Interaction with other activities

- 2.1. In order to enhance the benefits to be derived from the Typhoon Committee special experiment in 1990, it would be desirable if the planning and execution of the experiment is carried out taking into account comprehensive and up-to-date information about other national experiments which will take place at the same time.

- 2.2. The RSMC Tokyo-Typhoon Center is well placed to act as a center within the Typhoon Committee to liaise with national experiments during the experiment period.
- 2.3. During the experiment period, it would be highly desirable if a means could be found to facilitate dialogue among the three centres involved, that is the Typhoon Committee experiment center (see para 3.3) and the centers for the two national experiments.
- 2.4. A mechanism should be worked out so that, in the post experiment phase Typhoon Committee would be able to gain access to data sets obtained in the national experiments.

3. Organizational and institutional arrangements

- 3.1. A steering group has been set up to oversee the planning execution, evaluation and other follow-up actions in connection with the 1990 special experiment during intersessional periods of the Typhoon Committee. The Committee agreed to invite Hong Kong to provide a chairman to coordinate the work of the group.
- 3.2. From the operational point of view, the choice of target tropical cyclones, the activation and termination of intensive observation periods (see section 4) should be left to one center, provided that it should operate following guidelines set up by the Steering Group beforehand.
- 3.3. RSMC Tokyo-Typhoon Center should be invited to carry out the function of the experiment center for the 1990 special experiment. Recognizing the emphasis on data collection for research, the setting up of a TOPEX-style international experiment centre with the participation of forecasters from Members would not be necessary.

- 3.4 RSMC Tokyo-Typhoon Center should also be invited to communicate with Typhoon Committee Members if opportunities arise such that other Typhoon Committee Members could make useful contributions in support of the work of the experiment center.
- 3.5. A catalogue of data sets held by Members will help direct scientists to the appropriate courses of data. Japan Meteorological Agency (JMA) should be invited to compile such a catalogue based on information supplied by Members. The first version of the catalogue should be distributed by December 1990.
- 3.6. Japan Meteorological Agency should be invited to assemble a quick-look data set based on real-time data transmitted to JMA via GTS. Other data which are conveniently available to JMA might be included in the quick-look data set also. Copies of the quick-look data set on magnetic tape should be made available to Members participating in the 1990 special experiment. Detailed arrangements should be worked out in due course.
- 3.7. Further considerations should be given to developing procedures on non-real-time data exchanges of observational data, derived parameters and other processed products.

4. Experiment activities and schedules

- 4.1. The experiment period should be the two months period, August and September 1990. During this period, to optimize the use of limited resources 'intensive observation period' (IOPs) should be identified in addition to routine ones. For planning purposes, the total duration of the IOPs should be at least two weeks. Based on the experience gained from TOPEX and the limited capability for continuous 6-hourly observation

by the USA stations shown in Fig. 1, it is expected that each IOP would be extended for two days or more and on occasion up to 5 days.

- 4.2. The Experiment Center should alert Typhoon Committee Members 24 hours in advance when it intends to activate an IOP. A message to confirm the activation of an IOP should be sent again 12 hours before it is due to commence.
- 4.3. On enhanced observations, the key element will be 6-hourly upper-air observations at selected stations. This will be supplemented by reports from weather ships with upper-air observation capability. Fig. 1 shows the locations of the selected stations and the weather ships together with buoys and other stations which will make routine 12-hourly upper-air observations. Further details of the enhancement of the observational programme including surface, wind profiler, radar and satellite observations, are described in Appendix which will be finalized by the Steering Group.

4.4. Throughout all the IOPs, enhanced observations in respect of upper-air observations should be made by all Members irrespective of the location of the tropical cyclone.

4.5. Established GTS procedures should be followed by Members in transmitting the enhanced observations to the Experiment Center in real-time.

5. Technical specifications

5.1. On the selection of target tropical cyclones, the following criteria were adopted:

(a) expected strength :

severe tropical storm or above for 2-3 days

(b) expected position :

0-48 hours forecast track crossing the target area (see Fig.1)

(c) relevance to scientific problems :

likely to serve as an example of :

- recurvature
- movement close to weakness in subtropical ridge
- moving into an area of weak environmental flow

5.2. On the activation of IOPs, the following criteria should be adopted 'one day or so before possible major changes in direction of movement, as indicated by NWP or synoptic consideration (interaction with westerly trough, weakness in subtropical ridge, etc.)'

5.3. On the timing of the termination of IOPs, notification of termination should be issued when one of the following criteria is satisfied:

- (a) one day after an event of interaction between the environment and tropical cyclone motion
- (b) a predicted event of interaction no longer expected
- (c) landfall over the continent
- (d) weakening of target tropical cyclone to below severe tropical storm strength
- (e) departure from area of interest to Members (see Fig. 1)
- (f) five days after IOP activation.

6. Evaluation

6.1. The ^e Steering Group should make arrangements for evaluation of its special experiment and associated follow-up activities. The performance of the experiment should be measured against the agreed-upon objective of the experiment. Account should be taken of the level of interest obtained and of the extent of data collected and its availability in non-real-time. Attention should also be given to the usefulness and availability of data in real-time during the experiment period. Evaluation should be made of relevant post-experiment activities, particularly research on tropical cyclones, with attention being given and use being made of activities such as the

reports, technical conferences etc. in this connection.

7. Follow-up

7.1. There should be a wide range of activities as direct follow-up to the 1990 special experiment. The major thrusts should be to encourage full utilization of the data sets and promote research work related to tropical cyclones, in particular on the movement of tropical cyclones. The activities should include:

- (a) Issue of annual reports in mid 1991, 1992 and 1993 for the preceding year. The reports should record the achievements made possible by the special experiment, contain summaries of research work, give preliminary findings and facilitate exchange of information and views on various aspects of tropical cyclone research, including promotion of such research
- (b) A small technical conference in late 1990 (This may be associated with a meeting of the steering group for the experiment-see para. 3.1). It may be part of the exercise of evaluation of the special experiment.
- (c) A major scientific conference, symposium or technical conference possibly in the latter part of 1992, close to the time of the Typhoon Committee (twenty-fifth) session.
- (d) Exchange visits
- (e) Attachment of Typhoon Committee scientists at advanced centers

- (f) Task to be assumed by TCS through coordination with the TCP and the Research Component of the Typhoon Committee.
- (g) Award of prizes for outstanding research work
- (h) Participation by researchers and forecasters of
Members in the Third International Workshop on Tropical Cyclones, provisionally planned for late 1993.
- (i) Research grant to be offered by the Typhoon Committee to encourage well-directed and time-framed research work on tropical cyclone motion using the data set.
- (j) Establishment of special ad hoc research groups by international co-operation
- (k) Participation in scientific conference, and symposia
(Information was given that participants in the special experiment would be invited to participate in a symposium being planned by the USSR for early 1991 and that WMO support would be sought)
- (l) Technical presentation on significant progress by lead researchers at annual sessions of the Typhoon Committee
- (m) Review of on-going research undertaken by individual Members.

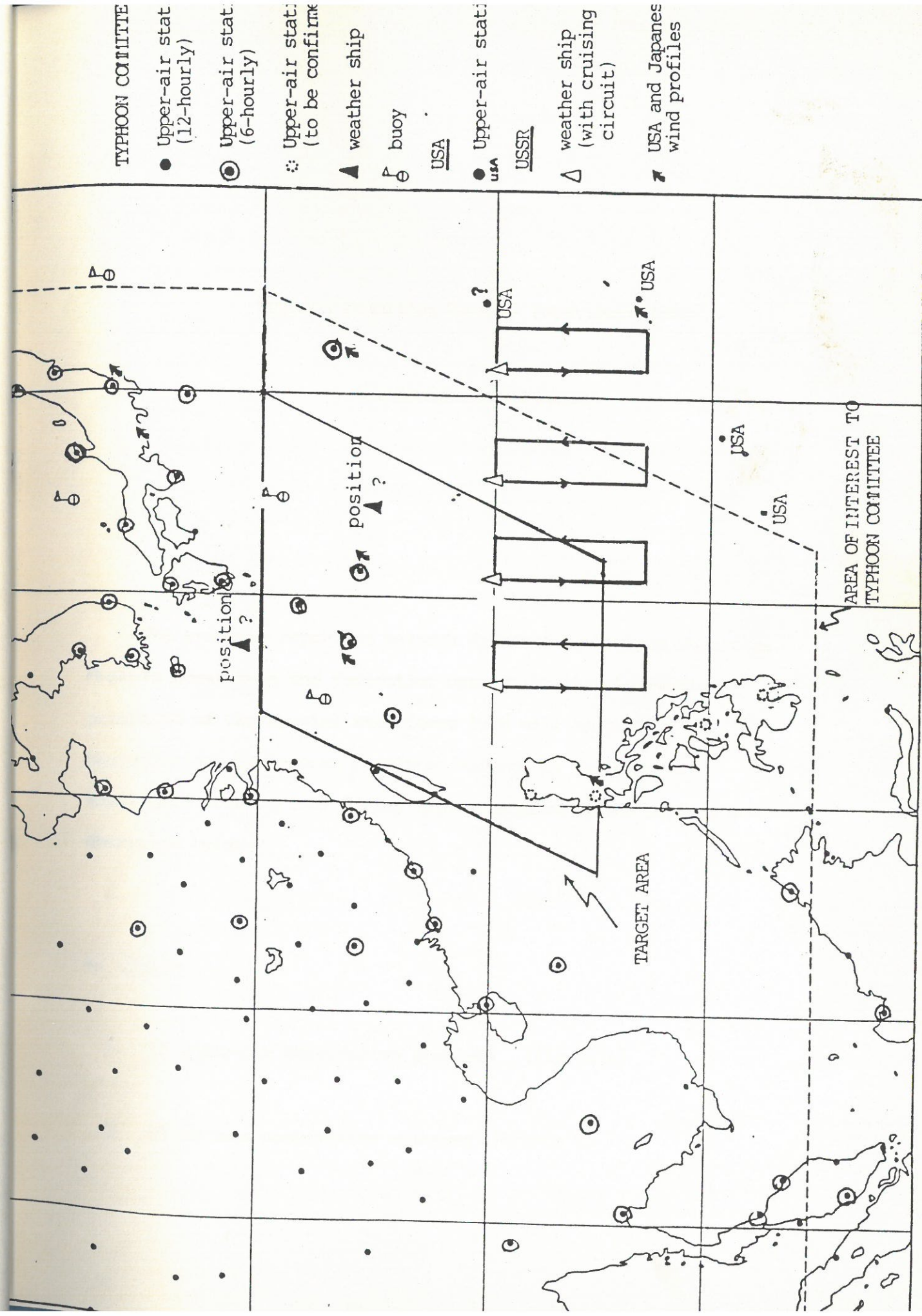


Figure 1

Typhoon Committee Special Experiment 1990:

Observational Programme

The synoptic reporting network operated by Typhoon Committee Members constitute the foundation upon which the observational programme of the special experiment 1990 will be built.

Contributions by Typhoon Committee Members in the form of additional observations during intensive observation periods are described below.

A. China

1. 10 upper-air observation stations (Figure A)
2. 56 surface observation stations (Figure B)

3. 5 radar stations (Figure C)

B. Hong Kong

1. 1 upper-air observation station

2. 1 radar station : images on magnetic tape/videotape
(tropical cyclones within 250km)

3. Satellite imageries on slides/videotape/magnetic tape
(tropical cyclone within 500km)

C. Japan

1. 14 upper-air stations south of 40 °N (see Figure D)

2. 1 or 2 vessels with upper-air observation capability: locations
under study (see Figure D)

3. meteorological satellite observations over the experiment area north of the equator and west of 180° longitude to be enhanced as follows :
 - to augment the number of cloud wind vectors retrieved in the routine operations 4 times per day.
 - to carry out special-mode consecutive observations with 15-minute intervals once per day around 04 UTC for the purpose of retrieving low-level winds at high density.
4. wind profiler : continuous observation at the Meteorological Research Institute (MRI) in Tsukuba (see Figure D)
5. Doppler radar : deployment to Nansei Islands is under study
6. conventional radars and buoys (see Figure D)

D. Malaysia

1. 4 upper-air observation stations (48615, 48647, 96413, 96471)
2. 12 surface stations (48601, 48615, 48620, 48647, 48657, 48665, 96413, 96441, 96449, 96471, 96491) : hourly observations when tropical cyclones are within 300km
3. 8 radar stations (48601, 48602, 48615, 48647, 48657, 48672,

96471, 96413) : hourly observation when centre of tropical cyclone is within range ; data of 48647 and 96471 on magnetic tapes

E. Philippines

1. up to 4 upper-air observation stations

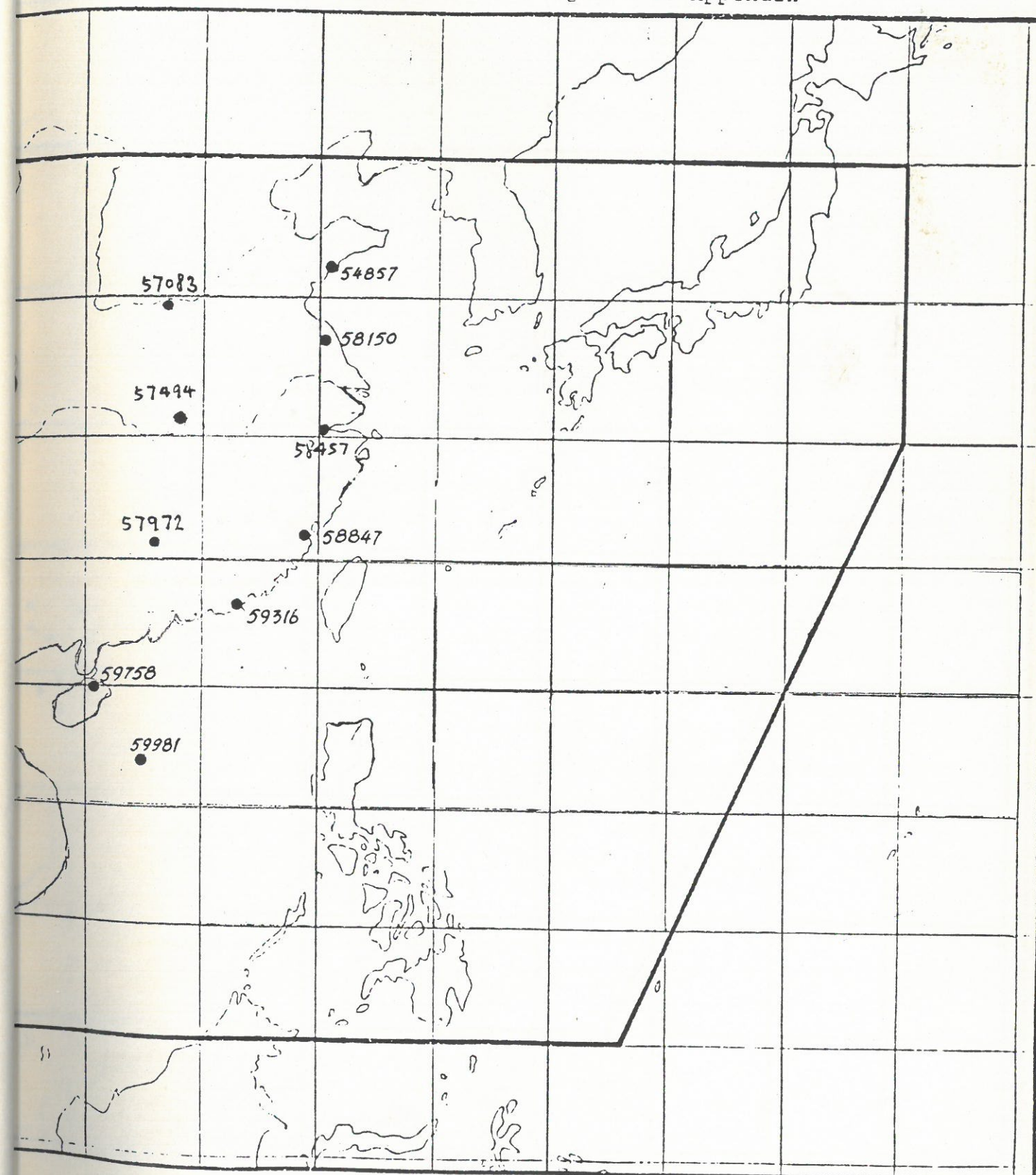
F. Republic of Korea

1. 4 upper-air observation stations (47122, 47138, 47158, 47185),
4 observations a day during IOPs
2. surface observations : hourly or every thirty minute observation
when the typhoon approaches within 300 km of Korea.
3. Satellite : increase of the number of cloud motion vector analyses
4. Weather radar : increase of the echo observation

G. Thailand

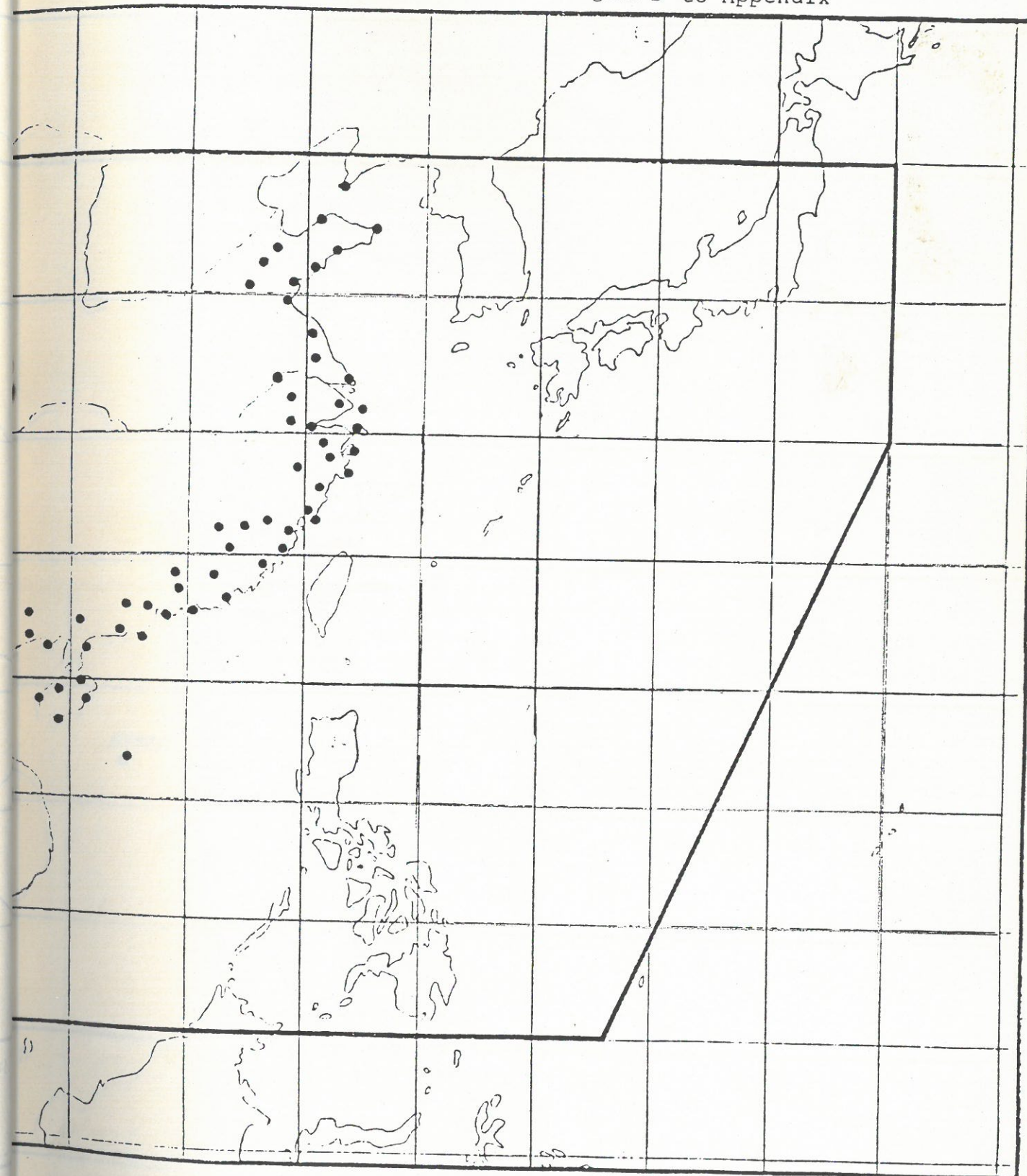
1. 4 upper-air observation stations (48327, 48407, 48455, 48568)

Figure A to Appendix



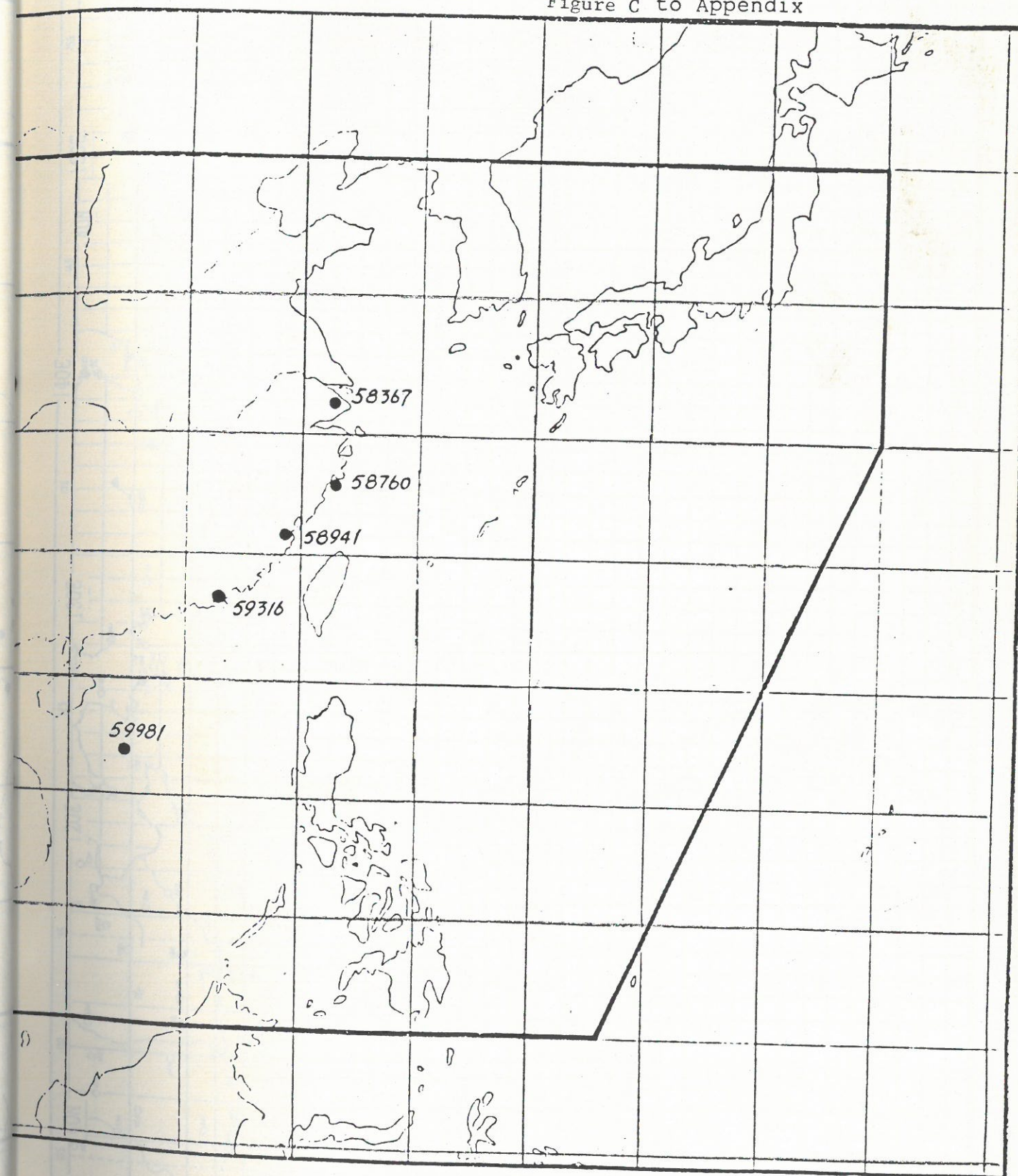
CHINA : Distribution of the intensive upper-air observation stations during the periods of Typhoon Committee Special Experiments 1966-1967

Figure B to Appendix



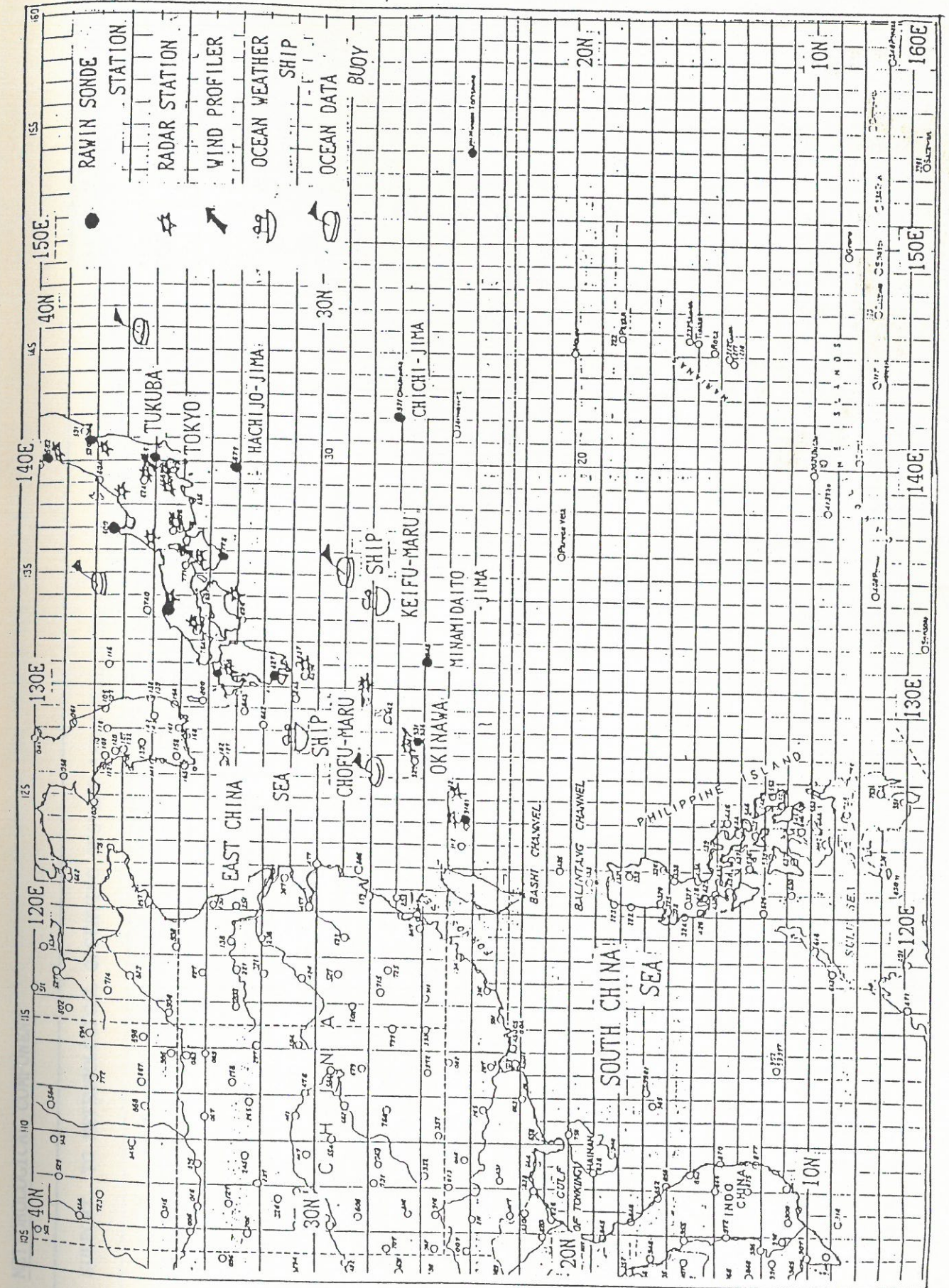
CHINA : Distribution of the intensive surface
observation stations during the periods of
Typhoon Committee Special Experiment in 1990.

Figure C to Appendix



CHINA : Distribution of the intensive radar
observation stations during the periods of
Typhoon Committee Special Experiment in 1990.

Figure D to Appendix



I. METEOROLOGICAL COMPONENT

1.1 SUPPORT TO METEOROLOGICAL OBSERVING SYSTEMS AND FACILITIES					
T A S K S	TIME SCALE				COMMENTS
	89	90	91	92	
1.1.1 Maintaining services specified in the Operational Manual, including intensified observations (surface, upper-air and radars)					Members National
1.1.2 Provision of automated observation facilities and real-time telemetry of meteorological parameters, e.g., winds, rainfall, pressure, etc., by replacing with automatic instruments					Members National
1.1.3 Establishment of AMeDAS, ASDAR, anemometer tide gauge and wave recorder networks					Members National
1.1.4 Establishment of upper-air stations: - 98645 Cebu (Philippines)					- Philippines National and external assistance
1.1.5 Expansion of observational programme: - 98223 Lacag (Philippines) at 12 GMT Radiosonde/Radiowind					- Philippines National and external assistance
1.1.6 Replacement/Upgrading of old radars (places to be identified) Bangkok Airport Dongtou					Malaysia, Philippines Thailand China National

1.1 SUPPORT TO METEOROLOGICAL OBSERVING SYSTEM AND FACILITIES (Cont'd.)

T A S K S	TIME SCALE				BY WHOM	RESOURCES	COMMENTS
	89	90	91	92			
1.1.7 Establishment of new weather radars:							
- Pusan (Republic of Korea)					-Rep. of Korea	- National	
Kangnung (Republic of Korea)					-ditto-	-ditto-	
- Danang (Viet Nam)					- Viet Nam	- National and external assistance	
- Vientiane (Lao PDR)					- Lao PDR	- External assistance	
- Bangkok (Thailand)					- Thailand	- National and external assistance	
- Phitsanulok (Thailand)					-ditto-		
- Rayong (Thailand)					-ditto-		
- Khon Kaen (Thailand)					-ditto-	-ditto-	
- Chantburi (Thailand)					-ditto-	-ditto-	
- Phuket (Thailand)					-ditto-	- National	
1.1.8 Establishment/upgrading of satellite equipment (GMS/TIROS-N)							
- Hanoi (Viet Nam)					- Viet Nam	- External assistance	
- Bangkok (Thailand)					- Thailand	- National	APT & HRPT/LR-FAX & HR/FAX (NOAA/GMS)
1.1.9 Establishment of a WWN data user system for the reception of FAX and GPV data from the LR Channel of GMS transmissions (See App.)					- Members	- National	

I. METEOROLOGICAL COMPONENT

1.2 SUPPORT TO METEOROLOGICAL TELECOMMUNICATION SYSTEMS AND FACILITIES						
T A S K S	TIME SCALE				BY WHOM	RESOURCES
	89	90	91	92		
1.2.1* Maintaining (a) services and facilities for the real-time exchange of data and products (b) monitoring of data exchange					Members - RTHs Bangkok, Beijing and Tokyo concerned	National Members
1.2.2 Improvement of facilities and their operation as necessary for the rapid and reliable collection and distribution of the required observational and processed information						
1.2.2.1 Establishment of regional telecommunication links						
- Bangkok-Hanoi						
1.2.2.2 Upgrading of regional telecommunication links					-Thailand and Viet Nam	National and External assistance
- Beijing-Hong Kong					-China and Hong Kong	National and bilateral support
1.2.2.3 Strengthening of RTH, Bangkok					-Thailand	National and External assistance
1.2.2.4 Improvement of data completeness and quality, including use of real-time and non-real-time monitoring results for this purpose					-Members	National
						Continuous activities Continuous activity

* During 1989 and 1990 items with an asterisk to be given priority attention

1.2 SUPPORT TO METEOROLOGICAL TELE COMMUNICATION SYSTEMS AND FACILITIES (Cont'd.)

T A S K S	TIME SCALE				BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93		
1.2.2.5 Review of existing arrangements for dissemination of typhoon warnings with a view to introducing improvements where necessary						National	
1.2.2.6 Improvement of national data collection and re-transmission to associated RTHs;							
- Laos PDR						National	
- Philippines						National and bilateral support	
- Viet Nam						External assistance	

1. METEOROLOGICAL COMPONENT

1.3 REQUIREMENTS SPECIFICALLY FOR TROPICAL CYCLONE FORECASTING AND WARNING						
T A S K S	TIME SCALE				BY WHOM	RESOURCES
	89	90	91	92		
1.3.1* Continuing provision and dissemination of processed information, advisories and other products needed by TC Members for their forecasting and warning systems, archival of information on typhoon data in accordance with the TC Operational Manual					RSMC, Tokyo	Japan Continuous activity
1.3.2 Exchange of forecasts including products of different objective methods in accordance with the TC Operational Manual					Members	National Continuous activity
1.3.3* Enhancement of co-operation in typhoon monitoring, forecasting and warning					Members	National Continuous activity
1.3.4 Establishment of a regional computer network					Members	National and External assistance Continuous activity
1.3.5 Installation of a computer processing system with a view to integrating satellite radar and rainfall data so as to provide spatial distribution of rainfall amount over a large region					Members	National and External assistance TCDC, Technical consultancy and assistance from external sources would be required
1.3.6 Setting up of electronic equipment maintenance and repair workshops					Members	National and External assistance including TCDC Continuous activity
1.3.7 Promotion of developments at the interface between the Meteorological warning services and the users of warnings for increasing the impact and effectiveness of these services					Members	National and External assistance in conjunction with IDNDR Continuous activity

* During 1989 and 1990 items with an asterisk to be given priority attention.

II. HYDROLOGICAL COMPONENT

2.1 FLOOD FORECASTING AND WARNING

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
2.1.1 Installation and operation of networks of observing stations required for flood forecasting systems						Members	National	Continuous activity
<ul style="list-style-type: none"> - Installation of telemetering systems complemented by radar-raingauges and satellite systems for important cities and other densely populated areas prone to flash floods. - Integration and use of data from existing meteorological and hydrological observing stations operated by various agencies - Improvement of means of transmission to reduce data collection time - Development of an on-line systems - Development of hydrometric stations on urban drainage 						China Malaysia Republic of Korea China China China Hong Kong	National National National National National National National	
2.1.2 Establishment and operation of flood forecasting and warning systems:						Members	National	Continuous activity
<ul style="list-style-type: none"> - Nam Ngum and Se Bang Hieng basins (Lao PDR) - Pasak River basin (Thailand) 						Lao PDR Thailand	National National	Includes real-time data collection and hydrological modelling
<ul style="list-style-type: none"> - One river basin (Viet Nam - to be selected by Viet Nam) - Application of computer-based mathematical models to study the hydrology of urban zones 						Viet Nam Hong Kong	National National	In Co-operation with ESCAP

II. HYDROLOGICAL COMPONENT

2.1 FLOOD FORECASTING AND WARNING

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
<ul style="list-style-type: none"> - Extension of flood forecasting services to other basins subject to flooding especially in medium-scale catchments - Development of forecasting of the location and intensity of rainfall in densely populated areas which are subject to flash floods (e.g. Metro Manila) - Increased use of existing radar raingauges for providing QPF data 						Malaysia Republic of Korea Thailand Philippines	National National and bilateral support National JICA	
2.1.3 Establishment of flood forecasting and warning systems for dam operations						Philippines	National	
2.1.4 Establishment of flood forecasting and warning systems for inundation from storm surges						Philippines, Malaysia and Interested Members concerned	Members concerned and external assistance including TDCD	Faulty dam operation aggravates flooding downstream
2.1.5 Continuation of monitoring of and reporting on performance of existing flood forecasting systems						Members	National and external assistance including TDCD and with support of TCS and WMO	Co-ordinated by WMO. Using standard TOPEX monitoring and forecast accuracy formats as amended
2.1.6 Further improvement of existing flood forecasting and warning systems, making use, where appropriate, of the results of TOPEX						Members	Members concerned and external assistance	Includes catchment modelling

II. HYDROLOGICAL COMPONENT

2.1 FLOOD FORECASTING AND WARNING (Cont'd.)

2.1 FLOOD FORECASTING AND WARNING (Cont'd.)									
T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS	
	89	90	91	92	93				
- Improvement of existing models and their application in catchments subject to flash floods						Philippines Malaysia Thailand Republic of Korea	National -ditto- -ditto- National		
- Improvement of currently used model on the Han River basin						Viet Nam			
- Improvement of existing flood forecasting systems for the rivers Hong and Thai Binh using micro-computers						Members concerned	External assistance. Missions to be organized by WMO and ESCAP	Using, where appropriate, technology available through HOMS	
2.1.7 Implementation of recommendations of mission by experts to provide technical guidance on items 2.1.1 to 2.1.6						Members	National external assistance	Co-ordinated by WMO	
2.1.8 Exchange of technical visits among flood forecasters						Members	External assistance WMO	On the basis of OHP (HOMS)	
2.1.9 Development and application of guidance on hydrological technology models, for tropical cyclone regions						China	National and external assistance		
- Preparation of a description of flood forecasting and warning systems for one river as an example for submission to TC						Members	Members and external assistance	WMO to assist in development and promulgation of improved techniques	
2.1.10 Development and use of improved techniques for Quantitative Precipitation Forecast (QPF), taking advantage of data provided by satellite and radar									

II. HYDROLOGICAL COMPONENT

2.1 FLOOD FORECASTING AND WARNING (Cont'd.)

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
<ul style="list-style-type: none">- Development and application of QPF derived from radar raingauges and satellites to issue flash flood warnings in densely populated small river basins- Development of QPF and its application to flood forecasting in central region.						Malaysia	National and external assistance	WMO to assist in development and promulgation of the technique
						Viet Nam	National and external assistance	

II. HYDROLOGICAL COMPONENT

2.2 COMPREHENSIVE FLOOD LOSS PREVENTION AND MANAGEMENT (Cont'd.)

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
2.2.5 Mission of experts to provide technical guidance to Members on items 2.2.1 to 2.2.4 above						Members	UNDP, TCDC and bilateral or multilateral support, if available	With assistance of ESCAP and WMO
2.2.6 Flood risk analysis and mapping in demonstration area(s):								
a) Collection of data and information and land survey;						Hosting Member(s) of project	UNDP, Members and bilateral or multilateral support	As a joint project of TC, one or two demonstration areas for implementation in co-operation with ESCAP
b) Formulation of an implementation programme for flood risk analysis and mapping;						-ditto-	-ditto-	
c) Preparation of a manual and guidelines for flood risk analysis and mapping applicable to TC Members;						-ditto-	-ditto-	
d) Organization of an expert group meeting and a workshop on flood risk analysis and mapping						-ditto-	-ditto-	
e) Extension to other areas						Members	UNDP, Members and bilateral or multilateral support, if available	

III. DISASTER PREVENTION AND PREPAREDNESS COMPONENT

3.1 PUBLIC AWARENESS

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
3.1.1 * Improvement of public awareness on typhoon and flood threat and preparedness coupled with studies of human response to warnings						Members	National and external assistance in conjunction with IDNDR	With advice and assistance of UNDRR/LRCS/WMO and other agencies concerned
3.1.2 Production of materials (audio-visual aids, pamphlets and booklets) related to public information and education						Members	National and external assistance	Work under the WMO TCP projects 12 and 14 is also relevant

* During 1990 items with an asterisk (*)

III. DISASTER PREVENTION AND PREPAREDNESS COMPONENT

3.2 DISASTER MANAGEMENT

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
3.2.1 Establishment/upgrading of national disaster prevention and preparedness plans						Members	Bilateral or multi-lateral support if available	With advice and if possible support from ESCAP
3.2.2 Strengthening national co-ordination and co-operation between departments and agencies involved in DPP activities.						Members	National	
3.2.3 Improvement in the timely dissemination of warnings of typhoons, floods and storm surges with particular attention to remote areas						Members	National	
3.2.4 Improvement of communication systems for warning dissemination and relief operation						Members	Bilateral or multi-lateral support if available	
3.2.5 Improvement of damage assessment and reporting						Members	Multi-lateral support if available	With advice from ESCAP roving mission
3.2.6 Development and exchange of information and guidance materials on structural and non-structural measures for mitigation of disasters						Members	External assistance	With guidance from international agencies such as UNDRR, LRCS, ESCAP and WMO
3.2.7 Conducting case studies of response to major disasters						Members	External assistance	With advice from UNDRR

III. DISASTER PREVENTION AND PREPAREDNESS COMPONENT

3.2 DISASTER MANAGEMENT (Cont'd.)

T A S K S	TIME SCALE					BY WHOM	RESOURCES +	COMMENTS
	89	90	91	92	93			
3.2.8 Compilation of annual information on loss of life and damage caused by typhoons, floods and storm surges including damage to houses, public facilities, agricultural products, and so on						Members	External assistance	With advice from UNDR0 in co-operation with ESCAP
3.2.9 Archiving of damage caused by natural disasters						TCS	Members	From 1986 onwards or earlier if possible
3.2.10 Where appropriate, implementing the recommendations of joint missions and seminars to evaluate DPP procedures and to provide advice on local problems						Members	Bilateral or multi-lateral support if available	
3.2.11 Establishment of disaster research and training institutes						Members	Bilateral or multi-lateral support if available	
3.2.12 Production of material related to public information and education on the Typhoon Committee activities, particularly storm warning and DPP						Members	External assistance	With support of ESCAP, WMO and TCS
3.2.13 Story of the Typhoon Committee						TCS	-ditto-	-ditto-
3.2.14 Establishment of a Philippine training and research centre for disaster prevention and preparedness, through consultancy services where appropriate						Philippines	External assistance	With advice from UNDR0

IV. TRAINING COMPONENT

4.1 METEOROLOGY

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
4.1.1 Training on engineering applications of tropical cyclone climatological data						Members	External assistance	Conferences, seminars and overseas training, programmes, including roving missions and TCDC arrangements
4.1.2 Training on applications of radar and satellite data in tropical cyclone tracking, forecasting and very short-range precipitation forecasts						Members	External assistance	
4.1.3 Training in calibration, maintenance and repair of electronic meteorological instrumentation						Members	National and external assistance	Co-ordinated by WMO
4.1.4 Training on utilization of software for integrating satellite/radar/rainfall data						Members	Short-term fellowships with external support	-ditto-
4.1.5 Training on quantitative precipitation forecast (QPF) models						Members	-ditto-	-ditto-
4.1.6 Training of personnel through fellowships on tropical cyclone forecasting						Members	UNDP, WMO and other international organizations concerned	-ditto-

IV. TRAINING COMPONENT

4.1 METEOROLOGY (Cont'd.)

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
4.1.7 Training on : - meteorology - electronics						Members	UNDP, WMO and other international organizations concerned	Courses and seminars organized by WMO and Members
4.1.8 Continuation of group training courses						Japan	Japan International Co-operation Agency (JICA)	
4.1.9 Exchange of forecaster(s) between tropical cyclone forecasting and warning centres						Members	External assistance	Through TCDC arrangements
4.1.10 Training on observing technology						Members	External support	Seminars
4.1.11 Exchange of meteorological experts between Members other than 4.1.9 above						Members	Bilateral or TCDC arrangements	
4.1.12 Training on storm surge and wave prediction						Members	Short-term fellowships with external support	
4.1.13 Training in message-switching, wave forecasting, numerical weather prediction and cloud physics, through attachments						Members	External assistance	TCDC arrangements
4.1.14 * Training of personnel through fellowships on maintenance of electronic equipment						Members	External assistance	for both meteorological and hydrological equipment

* Funding 1990 and 1991 from JICA

IV. TRAINING COMPONENT

T A S K S		TIME SCALE					BY WHOM	RESOURCES	COMMENTS
		89	90	91	92	93			
4.2	HYDROLOGY								
4.2.1	Training on repair and maintenance of electronic equipment used in flood forecasting and warning						Members	WMO, UNDP and other sources	Roing seminars organized by WMO
4.2.2	Training on advanced techniques for flood forecasting and warning and associated storms, including hardware and software						Members	WMO, UNDP and other sources	Courses and seminars organized by WMO
4.2.3	Training in hydrology with emphasis on flood forecasting						Members	-ditto-	-ditto-
4.2.4	Training of personnel through fellowships on flood loss prevention						Members	-ditto-	-ditto-
4.2.5	Training on appropriate topics relating to flood loss prevention and management						Members	ESCAP, UNDP and other sources	Seminar organized by ESCAP
4.2.6	Group training courses on river engineering						Japan	Japan International Co-operation Agency (JICA)	At the request of TC
4.2.7	Exchange of flood forecasting experts						Members	WMO, UNDP and other sources	TCDC arrangements

IV. TRAINING COMPONENT

4.3 DISASTER PREVENTION AND PREPAREDNESS

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
4.3.1 Training of disaster managers and volunteer leaders						Members	National and external assistance	With advice from international agencies
4.3.2 Test exercises						-ditto-	-ditto-	-ditto-
4.3.3 Training in DPP						Members	External assistance	Regional seminars organized by TCS with help of UNDR0, LRCS, ESCAP and WMO
4.3.4 Exchange of information on the socio-economic impact of disaster						Members	UNDR0, LRCS, ESCAP and other multi-lateral support if available	Seminars organized by UNDR0 LRCS and ESCAP
4.3.5 Training on disaster vulnerability and risk assessment						-ditto-	-ditto	Courses and seminars organized by UNDR0, LRCS and ESCAP
4.3.6 Group training courses on technology for disaster prevention						Japan	Japan International Co-operation Agency (JICA)	Continuation
4.3.7 Exchange of DPP personnel						UNDR0, LRCS, TCS and ESCAP	UNDR0, LRCS, ESCAP and other sources	TQDC arrangement organized by UNDR0, LRCS, TCS and ESCAP

V. RESEARCH COMPONENT

5.1 METEOROLOGY

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
5.1.1 General Studies on:								
5.1.1.1 Methods of typhoon location and accuracy								
5.1.1.2 Typhoon development mechanism and forecasting						Members or regionally co-ordinated programme -ditto-	National -ditto-	
5.1.1.3 Disastrous weather associated with typhoons						-ditto-	-ditto-	
5.1.1.4 Forecasting of precipitation by use of new approaches or techniques such as interactive techniques for integrating satellite, radar and other information						-ditto-	-ditto-	
5.1.1.5 Influences of meso- and micro-scale systems on typhoon characteristics						-ditto-	-ditto-	
5.1.1.6 Interaction between typhoons and the environmental circulation						-ditto-	-ditto-	
5.1.1.7 Possibility of extended track forecasting methods						-ditto-	-ditto-	
5.1.1.8 Evaluation and improvement of present objective forecasting methods						-ditto-	-ditto-	
5.1.1.9 Sensitivity of objective methods to initial data distribution and quality						-ditto-	-ditto-	
5.1.1.10 Typhoon climatology in relation with anomalies in regional circulation						-ditto-	-ditto-	
5.1.1.11 Forecasting storm surge and heavy rainfall (see also 5.2.6)						-ditto-	-ditto-	

5.1 METEOROLOGY (Cont'd.)

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
5.1.2 Utilization of TOPEX data set (radar, satellite, upper-air soundings, etc.) in tropical cyclone numerical and physical modeling, with the aim of improving existing methods of predicting formation, development and steering						Members or regionally co-ordinated programme	National	Need for short-term attachment of experts to advanced centres in the typhoon region
5.1.2.1 Establishment and operation of a tropical cyclone data bank for the north western Pacific and East Asia with software exchanges between Members						RSMC, Tokyo	Japan	According to the procedure described in TOM
5.1.2.2 Development of an operational NWP model for typhoon movement and development						Members or regionally co-ordinated programme	National	
5.1.2.3 Irregular tropical cyclone behavior such as sudden turning of tracks, sudden increase/decrease of intensity, rainfall and storm surge						-ditto-	-ditto-	
5.1.2.4 Air-sea interactions associated with the occurrence of typhoons, with emphasis on wave and storm surge generation						-ditto	-ditto-	
5.1.2.5 Utilization of SPECTRUM data						Members	-ditto-	

V. RESEARCH COMPONENT

5.2	HYDROLOGY	T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
			89	90	91	92	93			
5.2		Studies for developing or improving techniques for:								
5.2.1		Comprehensive flood loss prevention and management						National or regionally co-ordinated programme	National	In co-operation with ESCAP
5.2.2		Flood risk analysis, including flood risk mapping						-ditto-	-ditto-	-ditto-
5.2.3		Flood run-off models appropriate for the region						-ditto-	-ditto-	
5.2.4		Application of meteorological inputs to flood forecasting						-ditto-	-ditto-	
5.2.5		Comparison of the performance of the different models, using the post-TOPEX data set						-ditto-	-ditto-	
5.2.6		Forecasting floods caused by the combined effects of storm surges, heavy rainfall and stream flow (see also 5.5.1.11)						-ditto-	-ditto-	-ditto-
5.2.7		Flash flood forecasting						Members	-ditto-	
5.2.8		Study of effects of deforestation, urbanization and changing land use on the hydrology of the catchment and on the intensity of floods						Philippines China Malaysia	National	In Co-operation with ESCAP

V. RESEARCH COMPONENT

5.3 DISASTER PREVENTION AND PREPAREDNESS

T A S K S	TIME SCALE					BY WHOM	RESOURCES	COMMENTS
	89	90	91	92	93			
5.3.1 Studies on socio-economic impact of typhoon and flood disasters						Members	National	With advice and possible support of UNDR0/LRCS/ ESCAP/WMO
5.3.2 Vulnerability and risk assessment of disaster-prone areas						-ditto-	-ditto-	-ditto-
5.3.3 Socio-economic implication of availability and quality of typhoon and flood forecasts and warnings						-ditto-	-ditto-	-ditto-
5.3.4 Disaster impact modelling						-ditto-	-ditto-	-ditto-

TRIPARTITE REVIEW REPORT

RAS/86/175 Programme Support to the Typhoon Committee

1. The Tripartite review meeting was held at 11:45 a.m. of 6 November 1989 at the Japan Meteorological Agency conference room immediately following the closing ceremonies of the twenty-second session of the Typhoon Committee (30 October-6 November 1989). The meeting was attended by representatives of the Government of the People's Republic of China, Hong Kong, Japan, Malaysia, the Philippines, Republic of Korea and Thailand. Also represented were World Meteorological Organization (WMO), Economic and Social Commission for Asia and the Pacific (ESCAP), United Nations Development Programme (UNDP) and Typhoon Committee Secretariat (TCS).

Chairman of the meeting was Mr. Turhan K. Mangun, UNDP Resident Representative in the Philippines.

2. Mr. Mangun apologized for non-arrival of the documents for the meeting. A check with the UN liaison office in Tokyo revealed that the documents which left Manila on 2 November has not yet arrived.

3. Mangun, UNDP

Mr. Mangun prefaced the meeting with the statement that the UNDP is happy to be associated with the Typhoon Committee (TC) for many years. Assistance extended by UNDP dates back to 1974 amounting to roughly \$5 million. TC has done the usual good work based on the Note of the Co-ordinator and TC Progress Report. He mentioned China's contribution of 100,000 yuan for TCDC and to

SPECTRUM, the Committee's Special Typhoon Experiment in Aug.-Sept. 1990 in the western North Pacific. He cited Malaysia's favorable evaluation of the Regional/Specialized Meteorological Center (RSMC) at Tokyo, the upgrading of the Bangkok-Kuala Lumpur telecommunication circuit, SPECTRUM, Flood Analysis Project of the Upper Klang, the Comprehensive Flood Prevention Project Development. He also mentioned Hong Kong's satisfaction over the Committee's objectives generally being achieved.

He further mentioned on the establishment of basic observation networks, upgrading of telecommunication facilities, TOPEX, including plans for the regional co-operation programme which the Committee has succeeded in accomplishing.

He reported that the UNDP position, after having provided project assistance for over 15 years with \$4.9 million, is to phase out that assistance before the end of the UNDP programme cycle. Extension may be considered for short-term consultancies before the end of 1991. Other expenditures have to be met by the Members themselves.

He said additional resources may be availed of from country IPF's.

4. Kintanar, TCS

He noted that additional information will be provided by WMO and ESCAP. He said TCS has looked at the Committee as a whole package and believes that most resources were provided by Members themselves in attaining the Committee's objectives facilitated by the availability of UNDP support. There were certain anticipated

problems such as consultancies on disaster prevention and preparedness which were not realized.

5. Sarker, WMO

He acknowledged that UNDP is a major contributor to the TC and he expects this to continue due to the ever present threat caused by typhoons. He lauded activities on provision of fellowships/group training, equipment acquisition, TCDC contribution to manpower resources development. However, he felt that the delivery rate was not so encouraging due to

- a) expenditures were still charged to unspent funds of the previous year
- b) consultancy provisions were not fully utilized
- c) equipment requests were not fully met

He pointed out that TC decided consideration of the following as having top priority for 1990:

- a) Full-time consultancy on DPP
- b) Repair and maintenance workshop equipment procurement
- c) Modernization of typhoon warning system
- d) Intensive observation programme (IOP) related to SPECTRUM

Because of new developments, some deviations from the original approved plan will have to be allowed. He said that TC will ask for UNDP assistance for the program cycle 1992-96 in support of new activities.

He reported also on the Trust Fund having been programmed to support, a) the Experts Meeting held in Seoul, ROK, b) publication of TC brochure, c) publication of TC Newsletter, d) printing

cost of session documents, and e) travel expense of DPP expert (so far unutilized).

He endorsed the request for assistance by the Committee for the coming year, particularly in relation to IDNDR activities, specifically citing the typhoon project SPECTRUM before any final decision should be arrived at by UNDP.

6. Kuriki, ESCAP

ESCAP thanked UNDP for support. ESCAP has implemented the Comprehensive Flood Loss Prevention and Management project and all relevant activities connected with it. He said that he looks forward to the execution of its next project, that of the Urban Flood Loss Prevention and Mitigation. He mentioned ESCAP's commitment to IDNDR and said that ESCAP will submit to UNDP a request for funding for a new project.

7. Japan

Expressed appreciation for UNDP's generous support; requested for better understanding of the Committee's activities.

8. China

Has already commented on TPR. Added that 9 typhoons made landfall in China in the past year, 3 in October within a week of each other. The typhoon warning system has improved since 10 years ago when China joined the Committee. The Chinese government attaches great importance to the TC programme, proof of which is China's getting more deeply involved in TC activities. China has contributed to the Trust Fund since 1987, has provided 100,000 yuan for TC activities including SPECTRUM, has put up new radars.

Even then, these are not enough and China appeals strongly for UNDP support for the reduction of damage due to natural disasters.

9. Malaysia

Reiterated its request for continued support from UNDP. Asserted that many areas need further improvement: telecommunication regional computer network, computer linkage via the telecommunication circuit, expert services, etc. Argued that bilateral arrangements were cumbersome. UNDP direct support is preferable. Malaysia stated that it has fully supported the Trust Fund. Finally, expressed gratitude to UNDP for previous support.

10. Philippines

Expressed gratitude. Noted that meteorological and hydrological components of TC activities were more fully developed compared to DPP whose development he decried to be very slow. Looks forward to UNDP continued support in the light of the IDNDR to move DPP forward. Said that disaster prevention measures are very expensive and developing countries are hard put at installing these. Supported WMO's assertion and agreed with China's alarm at cessation of UNDP support.

11. Republic of Korea

Thanked UNDP. Said TC depends greatly on UNDP and the need still remains.

12. Thailand

Shared sentiments of Members. Noted improvements in telecommunications, radar networks, meteorological satellites, expert

services. Stated that Thailand suffered severe flooding in the past year. Felt a need to strengthen services particularly in disaster mitigation and typhoon warning capability. New projects re SPECTRUM and IDNDR would help Members greatly.

13. Hong Kong

Joined other Members in expressing gratitude to UNDP. In general, observed that TC goals have mostly been met. Improvement of typhoon warning system has contributed to economic and industrial development of the region inspite of the increasing number of installations that are potential targets for destruction highly likely. Much more are at stake; much more damage will be caused by tropical cyclones due to increased tropical cyclone activity caused by global warming. Noted that TC programmes have been emulated by similar groups. There are new fields to be considered: Oil rigs, holiday resorts, inhabitants of low lying areas all need these essential services. Global computer requirements need high technology inputs - including those coming from outside the region, particularly on DPP. TCDC may not be sufficient to meet these requirements.

14. Mangun, UNDP

The case for continued UNDP support has been brought out strongly. Pleased to relay the same to headquarters. If new requirements, particularly those coinciding with IDNDR goals, perhaps prospects for UNDP assistance may be good. For this Review, support will be phased out with 1990. Only short-term consultancies may be considered after 1990. Recalled that last year required programmes were decided by national co-ordinators and on this basis recommended

that Members contact their respective national co-ordinators and attach top priority to this. UNDP will mount initiative to consult countries in the Pacific. UNDRO?

15. Sarker, WMO

Reported that UNDRO was represented in the session. Considers playing significant role in Decade, to this date has not brought out any specific project.

16. Ho, WMO

Added that UNDRO has submitted a project proposal on public information dissemination on natural disaster, recommended merger with new initiatives.

17. Pagulayan, Philippines

As part-time expert on DPP, has communicated with Members and latter have indicated willingness to pursue UNDRO proposal. UNDRO headquarters may have information on status of proposal.

18. UNDP

Asked Members if project implemented satisfactorily.

19. T C S

Called attention on the need for more detailed information on contemplated Project expenditures from Members; Members to expect follow-ups from TCS. Requested that Members' responses should not take too much time and be delayed.

20. Sarker, WMO

Cited samples of TC activities

- Upgrading of telecommunication link between Bangkok and Kuala Lumpur
- Sub-contract with ESCAP on hydrological activities
- Workshop on SPECTRUM
- Workshop on meteorological telecommunications, Bangkok, Dec. 1989
- Conference on tropical cyclones (IWTC II, Manila, Dec. 1989)
- TC Annual Review

21. Hong Kong

Reiterated need for new technologies, training outside region, computer matching. Referring to SPECTRUM Steering Group, he reminded Members to nominate scientists equipped with all necessary information, in particular on equipment systems. Modules needed must be relayed to TCS for acquisition.

22. China

Installed typhoon warning system in support to TC programmes. But found these insufficient and spare parts were not readily available. China wants to provide TV stations with video cassettes.

23. UNDP - On TCDC? Others?

- Hong Kong wanted list revised soon. New areas of interest are upgrading of telecommunication circuits to cope with prospective heavy volume of data and sharing of experience in the use of more sophisticated outputs for the typhoon warning system.
- Sarker. Six activities await Members response. New requisitions will be taken care of.

- Kuriki. On individual projects, Members to provide list of requirements to ESCAP.
- Abe, WMO. Under Tropical Cyclone Programme, \$1,000,000 programmed (?) for Typhoon Committee, \$1 million for Panel on Tropical Cyclone and \$1 million for RA V Tropical Cyclone in Southwest Pacific.
- Ho, WMO. Close co-ordination needed between regional bodies. Cited interest on SPECTRUM. Considered joint session of Panel and TC possible.

24. UNDP. Bilateral Co-operation with Japan, US, USSR?
Applications of remote sensing?

- Kintanar cited Philippine examples
 - a) Flood Forecasting for Dam Operations Phase II with Japan
 - b) Meteorological telecommunication system (\$28 million) with Japan
 - c) Dissemination of natural disaster information with USAID
 - d) Dissemination of disaster information to the countryside with France
- Kintanar. Radar and satellite data are direct applications of remote sensing.
- Hong Kong. JMA assisting in numerical weather prediction. Numerical modelling adapted in Hong Kong. USA supplied typhoon reconnaissance to Members until 1988.
- USSR and Viet Nam were reported to have conducted joint experiments.
- Sarker. Minutes of meeting to be distributed?

25. UNDP. In 6 months. Thanked all those present.

26. Adjourned 1:30 P.M.

Present:

China - Lou Jibin, Chen Lian Shou, Wang Caifang

Hong Kong - P. Sham

Japan - R. Tatehira, K. Nagasaka, K. Uzuka

Malaysia - Lim Joo Tick

Philippines - V. Pagulayan, Jr.

R O K - Chung Whan Rah

Thailand - Patipat Patvivatsiri

W M O - Ho Tong Yuen

R. P. Sarker

K. Abe

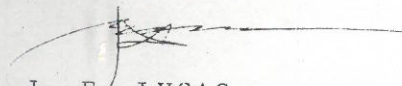
ESCAP - M. Kuriki

T C S - R. L. Kintanar

A. Yoshii

J. E. Lucas

Submitted by:


J. E. LUCAS