



THE ESCAP/WMO

# Typhoon Committee

NEWSLETTER

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TC NEWSLETTER is a publication of the Typhoon Committee Secretariat, Manila, Philippines. The expressed opinions, scientific or otherwise, do not necessarily reflect those of the Committee. The Editor reserves the right to edit and will exert every effort to publish articles received. TC Members are enjoined to send their contributions. Articles must be of relevance to TC activities and should not exceed 1,500 words.

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## Twenty-Eighth Typhoon Committee Session hosted by Malaysia



Participants in the Twenty-Eighth WMO/ESCAP Typhoon Committee Session held in Hilton Hotel, Kuala Lumpur, Malaysia.

Delegates of TC meteorological agencies drew up new plans to implement TC's programme of work at the conclusion of the 28th ESCAP/WMO Typhoon Committee session held on December 5-11, 1995 in Kuala Lumpur, Malaysia.

TC member-countries China, Hong Kong, Japan, Republic of Korea, Macau, Thailand, Vietnam, the Philippines and host Malaysia were joined at the session by observers from Brunei Darussalam, the Russian Federation, USA, Indonesia and Singapore; and organizations such as the United Nations Development Programme (UNDP), United Nations Educational, Scientific and Cultural Organi-

zation (UNESCO), Department of Humanitarian Affairs/International Decade for Natural Disaster Reduction (DHA/IDNDR) Secretariat, World Meteorological Organization (WMO), Commission for Atmospheric Sciences (CAS), Economic and Social Commission for Asia and the Pacific (ESCAP), and the Typhoon Committee Secretariat (TCS).

"Developing countries must include the components of technology transfer and training in their activities to make them more useful," Malaysian Meteorological Service director general Cheang Boon Khean said as he welcomed the delegates at the opening of the week-long meeting.

Khean noted that the Typhoon Committee was



at the threshold of meeting more complex demands from specialized users of meteorological, hydrological and social welfare services in view of rapid development in the region, adding that TC played a very important role in the improvement of its members' services to meet this demand.

"The adverse impacts of typhoons could be reduced by more timely prediction and warning," Secretary-General V. Danabalan of the Ministry of Science, Technology and Environment of Malaysia, told the delegates in his opening address even as he noted the increasing losses in lives and economies suffered by Asia-Pacific countries in recent years.

Danabalan added that only through persistent scientific research to better understand the behavior of typhoons that more timely prediction and warning could be issued. He also noted that accurate forecast of the movement of typhoons and timely warning of their landfall were important but would not be very useful without sufficient support in terms of mitigation measures and relief services.

The representative of ESCAP, Cengiz Ertuna, issued a statement calling for continued cooperation among its members on activities related to natural disaster reduction since natural disasters transcended national boundaries, and undertaking natural disaster reduction activities was a duty of all the countries.

A statement from the Department of Humanitarian Affairs (DHA)/International Decade for Natural Disaster Reduction (IDNDR) Secretariat was delivered by Dr. Roman L. Kintanar, Chairman of IDNDR Scientific and Technical Committee, urging the members of the Typhoon Committee to instruct their representatives to the United Nations General Assembly to actively support any effort to increase the financial resources available to the IDNDR.

At the session, ESCAP assured the Committee of its continued support with a lineup of activities on substantive issues relating to mitigation of damage from typhoons, floods and droughts in the Asia-Pacific region which will be drawn up in consultation with TCS. The project proposals on land use planning and practices in watershed management and disaster reduction, and training workshops on flood risk analysis have also been readied for submission to donor countries to bankroll said projects.



(Top) Key officials in session's opening. (Above) Pre-session meeting of hydrologists presided by TCS Hydrologist T. Okazumi (center) with TCS Meteorologist N. Lomarda.

The Members gave their approval on the Priority Mission of the WMO Commission for Atmospheric Sciences (CAS) which was tasked with the development of the autonomous aerosonde for operational application, and the CAS statement on climate change aspects of tropical cyclones. The CAS Aerosonde Project was viewed as a significant data source to augment the density of upper-air observations in the future. CAS representative Russell Elsberry informed TC that a committee had been established to gather all available evidence and produce the draft CAS statement.

The Chairman of the Working Group of Rapporteurs on Tropical Meteorology Research (WGRTMR) of CAS informed the Committee of its group's continued commitment for closer interaction with the operational community, and its plans for a series of International Workshops on

Monsoon Studies, the first of which is set for late 1996.

In underscoring the need for better international coordination and agreement on protocols for the exchange of warnings, the Committee lauded WMO for taking an active role in coordinating the supply of meteorological and hydrological information for disaster mitigation, as well as organizing meteorological and hydrological support to humanitarian and relief efforts of the United Nations in time of natural disasters and other crises.

At the meeting, the Meteorological Office of the United Kingdom offered to provide advisory messages on the forecast tracks of tropical cyclones to meteorological centers in Asia and the Pacific region while the Thailand Meteorological Department agreed to host a WMO-sponsored regional workshop on the operation of



doppler weather radar in April 1977.

The Chinese officials also offered to host a study tour in December 1996 with the objective of increasing the capability of operational typhoon forecasts with the results of recent research studies.

Airing their concern over the shortage of data from Cambodia and Lao P.D.R., the Members stressed the need for WMO to finalize preparation of the UNDP national project on the development of typhoon forecast and warning services in the two member-countries.

In a related development, a consultative meeting on the Cambodia project was held on July 22-25, 1996 at the Typhoon Committee Secretariat (TCS) in Manila while a WMO-Typhoon Committee consultation mission visited Laos from 4-6 September 1996.

The members acknowledged the gridded data received from the Regional Specialized Meteorological Center (RSMC) in Tokyo through the Internet or Integrated Services Digital Network (ISDN) even as some members expressed doubts on the reliability of the Internet for real-time applications. The grid-point data had been helpful to the members in eliminating subjectivity in the analysis in the data-sparse region.

The Committee also opened consultation talks with the Korean delegation in an effort to solicit their assistance to provide a hydrology expert to the Typhoon Committee Secretariat as recommended during the pre-session meeting of hydrologists. The last hydrologist sent by Japan ended his two-year assignment at the Secretariat in June 1996.

On the Committee's publication, the Typhoon Committee Annual Review (TCAR), the TCS has agreed to continue its work and preparation after Hong Kong decided to beg off from the job.

The Typhoon Committee and the Panel on Tropical Cyclones agreed to hold their second joint session in Thailand scheduled in early 1977.



(Top to bottom) Messrs. Cheang Boon Khean, Director-General of Malaysian Meteorological Service, V. Danabalan, Secretary-General of Ministry of Science, Technology and the Environment of Malaysia, Elsa Hussain Al-Majed, Director of Regional Office for Asia and the South-West Pacific, and Cengiz Ertuna, Representative of ESCAP, read their prepared messages.



## Kintanar conferred top WMO meteorological honor

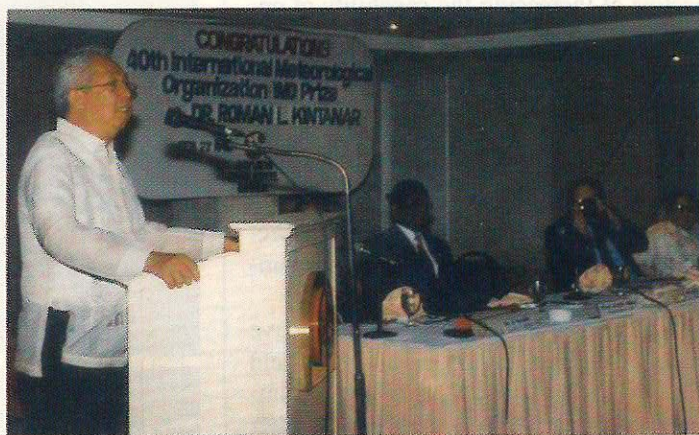
Typhoon Committee Secretariat coordinator Roman L. Kintanar received the 1995 World Meteorological Organization's top meteorologist award, a long overdue triumph which came a year after his retirement as director of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).

The 67-year-old Filipino accepted the 40th International Meteorological Organization (IMO) Prize from Dr. John W. Zillman and Prof. G.O.P. Obasi, President and Secretary-General of WMO, respectively, at a ceremonial Manila dinner on February 27, 1996.

Dr. Kintanar, who had a 'pleasant, pleasant reaction' at learning of his selection for the prestigious award, was both proud and humbled. He said that he "wished to acknowledge that the basis for the recognition was mostly the good works of PAGASA and the high status and prestige it had established among national meteorological services in the region and around the world," and "expressed his gratitude to the PAGASA workers who had made it possible for him to win the prize."

The award citation credited Dr. Kintanar for "his dynamic leadership and valuable contribution to the promotion and enhancement of international cooperation in meteorology, hydrology and related disciplines over a period of three decades; his wise guidance and judicious counsel in relation to the affairs of the World Meteorological Organization; his untiring efforts in the strengthening of the worldwide network of national meteorological and hydrological services, especially the amelioration of capacity building in the services of the developing countries particularly in the areas of operations, education and training as well as research; his significant role in the initiation and development of intergovernmental cooperation in the study of tropical cyclones through the creation of the WMO/ESCAP Typhoon Committee and the establishment of the WMO Tropical Cyclone Programme; as well as his pioneering work in natural disaster management and his leading role in the International Decade for Natural Disaster Reduction."

The IMO Prize, which represents the highest distinction offered by WMO, is given annually to an individual who has made outstanding work in meteorology and related fields.



40th IMO PRIZE AWARDEE. Former PAGASA Director Roman L. Kintanar accepts the 1995 International Meteorological Organization (IMO) Prize during a ceremony in Manila, Philippines.



Dr. John W. Zillman, President of WMO, hands the IMO Prize Medal to the beaming Dr. Kintanar.

## Fourth SPECTRUM Technical Conference in Tsukuba new typhoon research coordinating group proposed

Participants to the Fourth Technical Conference on SPECTRUM (Special Experiment Concerning Typhoon Recirculation and Unusual Movement) held in Tsukuba, Japan, from November 27 to December 1, 1995, reached a decision to dissolve the SPECTRUM Research Coordinating Group (SRCG) and form a



Participants in the Fourth Technical Conference on SPECTRUM.

new typhoon research coordinating group.

Some 55 typhoon experts led by Mr. Haruo Ohnishi, Chairman of SRCG, agreed to widen their source of financial support such as from the WMO Fellowship and Typhoon Committee Trust funds for the attachment of TC members' typhoon experts to advanced



centers to carry out studies, particularly, in latest developments in numerical prediction of typhoons. Also noting how valuable the input of the Commission for Atmospheric Sciences (CAS) for future research activities of the Typhoon Committee, they urged that communication between the CAS representatives and the new TRCG be maintained.

The new TRCG working group, composition of which will include a new chairman, will work on a new research programme. It

is set to organize a regional technical conference on typhoon at the request of the Typhoon Committee and in cooperation with WMO. The conference is proposed as a biennial affair with the first conference possibly in 1997.

While the conference witnessed a remarkable progress in tropical cyclone track prediction by several forecast centers, the need for the Committee to explore methods of improving existing observations from remote sensing platforms (satellites, wind

profilers) or direct measurements (aerosonde) was clearly evident.

The meeting also encouraged numerical modelling groups of TC members to focus on operationalizing the results of SPEC-TRUM research studies geared towards promoting the capability of tropical cyclone forecasting. Researchers, on the other hand, need to center their studies on the precipitation aspect of tropical cyclones and on the interaction between the storm and the environment.

## ***ESCAP/WMO Typhoon Committee Natural Disaster Prevention Award*** **Department of Social Welfare of Malaysia** **named laureate of 1995 TC Prize**

The Department of Social Welfare of Malaysia received the 1995 ESCAP/WMO Typhoon Committee Natural Disaster Prevention Award at a ceremony during the opening of the twenty-eighth session of the Typhoon Committee on December 5, 1995 in Kuala Lumpur, Malaysia.

A highly-respected institution in Malaysia, the Department of Social Welfare was honored for its outstanding services in the promotion of natural disaster prevention and preparedness through its efficient administration in the preparation of evacuation centres, delivery and distribution of relief goods, and rehabilitation of flood victims in Malaysia.

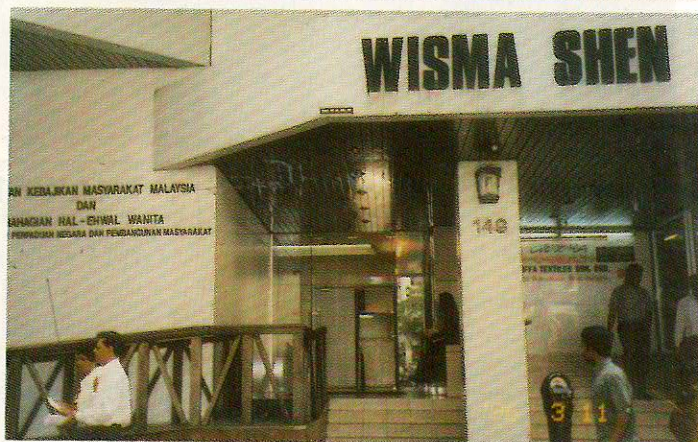
As a leading national agency, the Department aims to improve the quality of life of the Malaysian people through social welfare developmental activities which emphasize socio-economic activities involving local efforts and initiatives of the people; to reduce the incidence of social problems that can effect societal stability and harmony, ensuring substitute care that encourage healthy development for the dependent segments of society; and to rehabilitate victims of social maladjustment and natural disasters, along with supportive services to welfare voluntary organizations and other agencies.

The Department, under its preventive and rehabilitation services for disaster victims, locates and prepares an average of 3,000 evacuation centers mainly in schools,

mosques and community centers to provide temporary accommodation an estimated 800,000 flood victims each year. It has about 300 Forward-bases set up in remote and isolated areas where food supplies and other essential items are stored.

The Department has a standing arrangement with local and non-governmental organizations like the Civil Defense Corps, Malaysian Red Crescent Society and St. John Ambulance Brigade to assist in relief operations in evacuation centers. It also gets assistance from the Royal Malaysian Air Force in relief-dropping operations in areas totally cut off by flood waters.

For the evacuees, the Department provides adequate rations of food as they return to their homes in addition to a rehabilitation grant-aid for shelter and livelihood extended the displaced victims.



(Top photo) Dato' Mohamad Bin Hussain (right), Director-General of the Department of Social Welfare of Malaysia, accepts the 1995 Typhoon Committee Natural Disaster Prevention Award from Dr. Roman L. Kintanar, Chairman, Typhoon Committee Foundation, Inc. during simple ceremonies at the Hilton Hotel in Kuala Lumpur, Malaysia. (Above) Headquarters building of the Social Welfare Department at Wisma Shen, Jalan Masjid India, Kuala Lumpur.



# T C h a n g e s

## Malheiro leaves Macau



Dr. Antonio Pedro F. da Costa Malheiro

Dr. Antonio Pedro F. da Costa Malheiro ended his mission as Director of the Macau Meteorological and Geophysical Services (MMGS) on August 24, 1996, a post he held since March 1991. He was responsible for MMGS' remarkable progress and development, and its becoming a member of the Typhoon Committee in December 1992.

Dr. Malheiro had been invited by the Portuguese Government after his mission in Macau to be the president of the Institute of Meteorology of Portugal.

## Ono named new JMA director-general



Mr. Toshiyuki Ono

Mr. Toshiyuki Ono has been designated new Director-General of the Japan Meteorological Agency (JMA) and Permanent Representative of Japan

with WMO, taking over from Dr. Kozo Ninomiya, effective April 1, 1996.

Mr. Ono, 58, holds a bachelor's degree (BSc in Faculty of Science) from the University of Tokyo. He started his career as a meteorologist at the Osaka District Meteorological Observatory in 1961. He served as Director of the Office of Meteorological Satellite Planning, Marine Management Division and Planning Division of JMA (1984-1991) and as Director-General at Okinawa Observatory and Forecast Department of JMAHQ (1991-1996) prior to heading JMA.

At the 10th World Meteorological Congress in 1987, Mr. Ono delivered a scientific lecture entitled "Marine Meteorological

Services in the Future."

Mr. Ono is married to Mizue Ono and has three children, Aki, Tetsuya and Midori.

## Okazumi ends TCS stint

Mr. Toshio Okazumi successfully completed his two-year assignment at the Typhoon Committee Secretariat as Hydrologist and Flood Forecasting Expert on June 7, 1996. Hardworking like his predecessor, Mr. Yanagiya, the soft-spoken Mr. Okazumi is the ninth and last hydrologist provided by the Government of Japan.

In simple ceremony held at the Weather and Flood Forecasting Center on June 5, Mr. Okazumi was presented a plaque of appreciation by PAGASA and TCS for his valuable service to the Committee.

Mr. Okazumi now holds the position of Deputy Director at the River Bureau of the Japan Ministry of Construction. He is hoping for the best that a successor would come soon from other generous Members to continue their work in overseeing the activities under the hydrological component of the Committee.



(Upper photo) Dr. Kintanar expresses gratitude in behalf of the Typhoon Committee to Mr. Okazumi (left) while Dr. Amadore (2nd from left), Director of PAGASA, waits for his turn during a luncheon tendered in honor of the Japanese hydrologist. (Lower photo) Dr. Kintanar and members of his staff pose for a souvenir photo with Okazumi a week before his departure.

## THAILAND

### TMD officials visit Vietnam

A delegation from the Thailand Meteorological Department (TMD) led by Mr. Smith Tumsaroach, Director-General of TMD, visited the Hydrometeorological Service (HMS) of the Socialist Republic of Vietnam, from April 19 to 25, 1996, upon the invitation of Dr. Nguyen Duc Ngu, Director-General of HMS.

The TMD and HMS officials exchanged views on the possibilities of strengthening meteorological and scientific cooperation between the two countries on the follow-

ing aspects:

1) exchange of information, technology and methodology on hydrometeorological forecasts;

2) exchange of technique and equipment; and

3) scientific research, education and training

The Thai delegates also visited the National Center for Hydrometeorological Forecasts of HMS in Hanoi, the Nam Bo Hydrometeorological Center and the Center for Meteorology and Hydrology, both in Ho Chi Minh City.

Mr. Tumsaroach extended an invitation which was accepted by Dr. Nguyen for a similar mission to Thailand.



## PHILIPPINES

### *PAGASA-JICA seminar on flood loss mitigation*

The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), and the Japan International Cooperation Agency (JICA), in cooperation with the Typhoon Committee, jointly conducted a seminar-workshop on Flood Loss Mitigation at the PAGASA Weather and Flood Forecasting Center from 28 February to 8 March 1996.

Dr. Atsushi Yoshii (Hokkaido Development Bureau), Mr. Maruo Kawaguchi (Ministry of Construction) and TCS Hydrologist Toshio Okazumi shared their technical expertise in the seminar attended by some twenty-five participants from local agencies and TC member-countries Cambodia, China, Malaysia and Vietnam.

The seminar-workshop was designed to provide the participants greater knowledge and skills on non-structural measures of mitigating flood loss. The concept of non-structural techniques is hard to apply due to its complicated methodology and the lack of technical materials except from Japan.

### *Nepalese experts in operational hydrology training*

A training in the field of Operational Hydrology, arranged by ESCAP on request by the Government of Nepal, was conducted by PAGASA and TCS for three Nepalese experts on 2-15 May 1996 under the Technical Cooperation among Developing Countries (TCDC) arrangement.

The trainees were Messrs. B. Tiwari (Disaster Prevention Technical Center), J.K. Bhusal (Department of Hydrology and Meteorology) and S.R. Gautam (Ministry of Water Resources).

Nepal had sought to draw ESCAP's assistance for the training of their nationals in Operational Hydrology particularly in the fields of computer applications in rainfall-runoff analysis, flood routing using computer models, computer assisted flood risk mapping and flood disaster management.



(Counterclockwise) Participants in the PAGASA-JICA workshop. WMO President J. Zillman graces seminar's opening flanked by (from left) Mr. T. Okazumi, TCS Hydrologist, Dr. L. Amadore, PAGASA Director, Ms. N. Lomarda, TCS Meteorologist and Dr. Kintanar, TCS Coordinator, JICA experts M. Kawaguchi (left) and A. Yoshii (right) at Okazumi's office.



Dr. Kintanar (left) receives the Nepalese trainees in Operational Hydrology at TCS accompanied by Mr. Okazumi (right) who served as instructor.



Dr. Cheang Boon Khean (2nd from left), Director-General of the Malaysian Meteorological Service, pays a courtesy call to PAGASA (above left) and TCS officials (above right) during his official travel in Manila in February 1996.



## TCS hosts consultation meeting on Cambodia project

A consultation meeting on the development of typhoon forecast and warning services in Cambodia was held at the Typhoon Committee Secretariat (TCS) in Manila, on July 22-25, 1996.

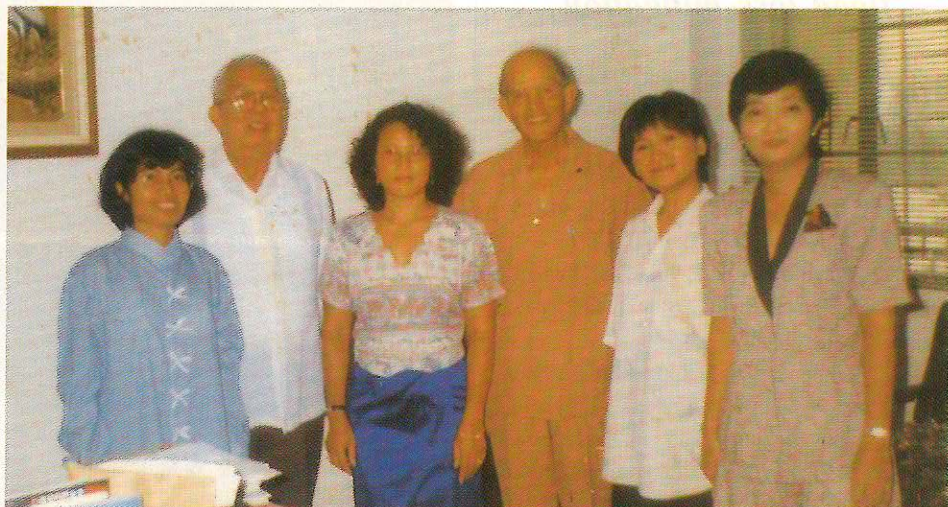
Organized by the World Meteorological Organization in collaboration with TCS, the three-day meeting was attended by Dr. Roman L. Kintanar and Ms. Nanette C. Lomarda, TCS Coordinator and Meteorologist, respectively, with representatives from the Cambodian National Meteorological Service (CNMS), Mr. Fritz Herry, Meteorological Consultant and Ms. Seth Vannareth, Director of CNMS. Ms. Lunaly Ith-Nguon, interpreter of WMO Secretariat, also took part in the meeting.

The TCS meeting was a follow-up to the Sectoral Support Mission in meteorology to Cambodia, arranged by WMO on request by the Government of Cambodia, which was completed on October 10, 1995. Cambodian weather service suffered from unavailability of equipment, trained staff and expert guidance, unable to provide needed information and warnings for safety of life and property.

The Sectoral Support Mission was aimed to draw up a plan for the further development of the meteorological and hydrological services of Cambodia which included assessment of existing meteorological facilities and manpower in Cambodia; and of the statutory, administrative and procedural capabilities for the management of meteorological services.

The WMO mission had mapped out a two-phased project for rehabilitation and development: one (24 months) phase for urgent emergency support, and a following (36 months) phase for bringing the CNMS up to international standards to enable it to serve the country's socio-economic development and the safeguarding of the environment.

The first phase of the project included the refurbishment of 16 observing stations and the establishment of 3 new stations. While to make the project economically viable and to speed up the process, the national communication must be based on the existing system of HF communication, and that the connection to the WMO/GTS be



*Participants to the Consultation Meeting on Cambodia. (From left) Ms. Seth Vannareth, CNMS Director, Dr. Kintanar, Ms. Lunaly Ith-Nguon, WMO Interpreter, Mr. Fritz Herry, Meteorological Consultant, Ms. Margaret Bautista, Hydrologist, and Ms. Lomarda.*

implemented immediately.

To save valuable climatological data, which are at present stored in paper form in unsuitable conditions, the WMO CLICOM system must be introduced in the service for access to existing data for information and advice to government undertakings,

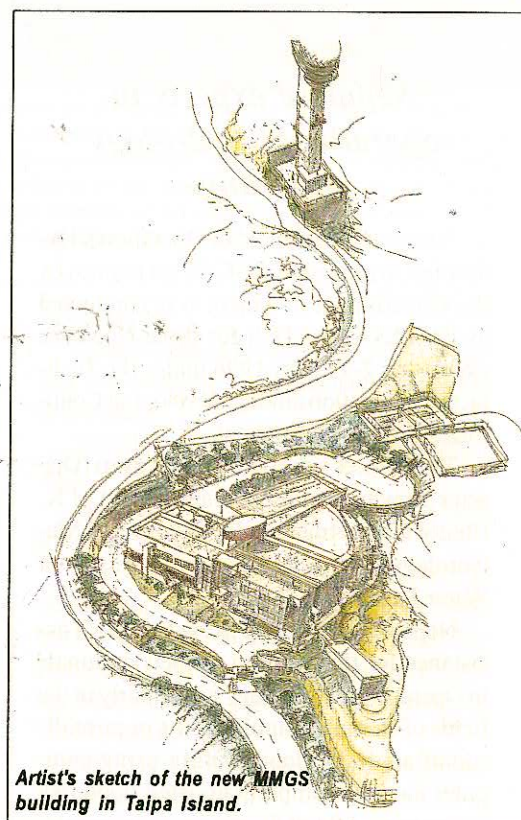
and to enable the CNMS to obtain revenue on delivery of information to the private sector. The shortage of data from Cambodia as well as neighboring Laos was a major concern aired by the members of the Typhoon Committee at its 28th session in Kuala Lumpur.

### MACAU

#### *MMGS inaugurates new headquarters*

The Macau Meteorological and Geophysical Services (MMGS) inaugurated its new headquarters on July 24, 1996. The occasion was held in conjunction with the meeting of directors of meteorological and hydrological services from Portuguese-speaking countries on the signing of a Memorandum of Understanding creating the Agency for Climate and Environment for Official Portuguese-Speaking Countries and the Territory of Macau.

The new three-story building is located on the eastern side of Taipa Island overlooking the newly built Macau International Airport. A forty meter-high meteorological radar tower is constructed at the main building's west side, conceived entirely by MMGS for its fast-growing present and future needs.



*Artist's sketch of the new MMGS building in Taipa Island.*



## Airport Meteorological Office installs SADIS system

The Meteorological Office of the MMGS at the Macau International Airport (MIA) aims to provide aeronautical meteorological services to operators to ensure safety operation of aircrafts, conforming to the International Civil Aviation Organization (ICAO) standards and regulation.

The MIA is classified in the category of CAT II, currently the only one in the Pearl River Delta region. In order to satisfy the criteria of CAT II, the Airport Meteorological Office (AMO) is equipped with the most advanced meteorological equipment including an Automatic Weather Station with the meteorological sensors located along the runway. These sensors provide the weather observation needed in a CAT II airport along with the observations made by observers. The AMO is also equipped with a high resolution satellite reception

workstation and by the end of 1996, a Doppler Radar workstation.

Recently, with the introduction of satellite broadcast of WAFC's products in 1995 as the major step towards the final phase of implementation of WAFS, it is now possible to receive the satellite WAFS broadcast in the Southeast Asia region through the SADIS system from WAFC of London. As the SADIS system able to provide the WAFS products, namely the gridded binary coded data, digital T4 coded facsimile charts, and alphanumeric data, which are beneficial to the services provided to operators, the system was acquired and installed at the AMO in March 1996.

The SADIS system consists of one receiving terminal called Very Small Aperture Terminal (VSAT) and an industry standard workstation to process information. The system processes SADIS messages as follows:

Receive the messages in X.25 protocol;

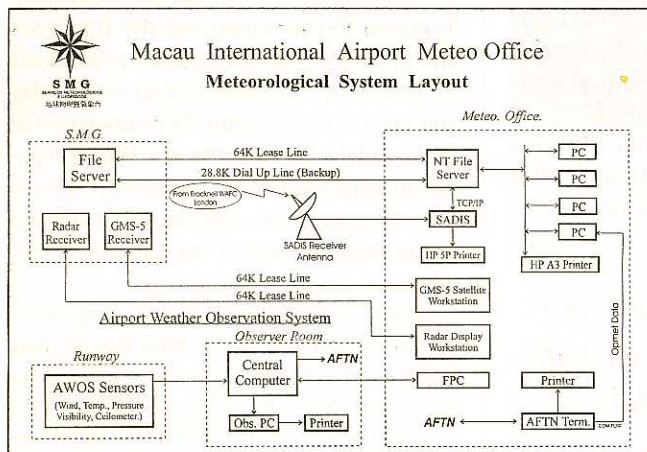
Filter out unwanted messages;

Save the desired messages;

Produce a series of Facsimile Weather Charts;

Process the thinned GRIB to usable formats; and

Automate the tailored processes to the maximum extent.



## MGSCO emergency plans launched

The Macau Government Security Coordination Office (MGSCO) carried out activities during the year to improve public awareness regarding natural disasters and the capabilities of several government bodies involved in this field.

The Contingency Plan for Tropical Storms named *Tai Fong* was revised and updated with an emergency response exercise held on 3 May just as a public awareness campaign was launched through the local press, radio and TV to achieve better preparedness for the residents of the territory.

An agreement was also signed on 11 August concerning the use of ambulances

belonging to several government and private organizations. To test the procedures contained in the document, a specific emergency exercise was conducted. Several training sessions aimed at schools were implemented to provide the guidelines for the evacuation plans.

The Vice-Chairman of the National Civil Defence Service of Portugal, Major-General Alipio Tome Falcao, gave a lecture on 12 December on the subject of natural disasters focusing on earthquakes. In addition, a contingency plan for nuclear accidents was prepared including publication of an instructional booklet for residents in the event of a nuclear mishap in the territory.

## REPUBLIC OF KOREA

### construction of new KMA building under way

Top officials of the Korea Meteorological Administration (KMA) attended the ground-breaking rites of the construction of a new KMA headquarters building held on April 25, 1996.

Located at Boramae Park, in Seoul, Korea, the proposed eight-story building has a total space of 18,150 square meters. It is scheduled to be completed by the end of 1998.



Artist's model of the new KMA headquarters building.

### revised book on typhoon issued

The KMA has published its newly revised Typhoon White Book (in Korean) which contains typhoon information affecting the Korean peninsula from the period 1904 to 1995. The book also includes updates on typhoon climatology and methods applied on typhoon disaster prevention, among others.

### KMA hooks up with World Wide Web

KMA has opened a home page on the World Wide Web (part of the Internet) with IP address as "<http://www.kma.go.kr>." By using the IP address, interested parties can easily obtain information on KMA including climate and weather forecasts in the Korean peninsula, international affairs and activities of the Korea Meteorological Research Institute, among others.



## JAPAN

### JMA upgrades COSMETS

The Computer Systems for Meteorological Services (COSMETS) for telecommunications and data processing of the Japan Meteorological Agency (JMA) was upgraded on March 1, 1996 with a new advanced supercomputer system.



JMA's newly installed advanced supercomputer

The COSMETS consists of two major subsystems, i.e. the Central-Automated Data Editing and Switching System (C-ADESS) and the Numerical Analysis and Prediction System (NAPS). C-ADESS is an on-line telecommunication system which performs editing and switching of meteorological bulletins while NAPS is a batch system which works on mainly numerical analyses and prediction.

Since JMA serves as a Regional Telecommunication Hub (RTH), Regional Specialized Meteorological Center (RSMC) and Regional Area Forecast Center in Asia, C-ADESS is connected with the national Meteorological Services in Asia and the rest

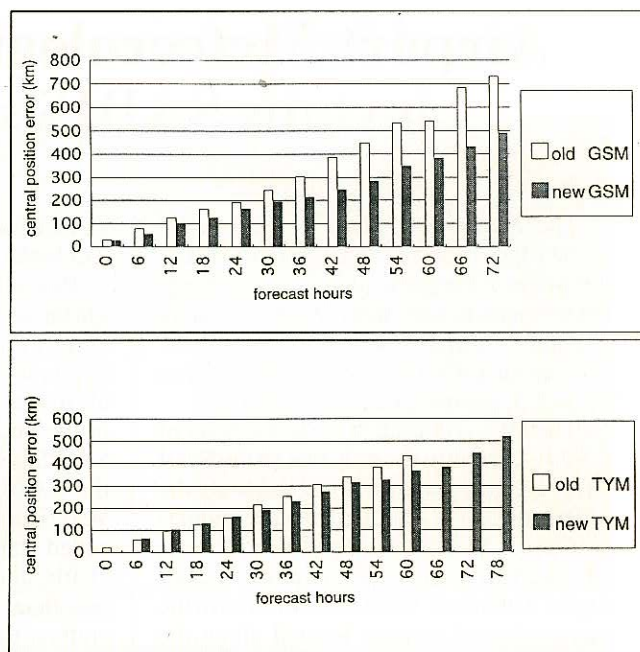
of the world through the Global Telecommunication System (GTS) and the Aeronautical Fixed Telecommunication Network (AFTN). At present, the total data volume of transmission and reception is up to about 500 MB a day. Utilizing the global observation reports received at C-ADESS, numerical analysis and prediction are performed with NAPS.

Numerical prediction models such as the new Global Spectral Model (GSM), Dynamical One-month Forecast Model, Regional Spectral Model (RSM) and Typhoon Prediction Model (TYM) are operated by JMA for its meteorological services while providing the national Meteorological Services in Asia including Members of the Typhoon Committee with some of its products to support their services.

### numerical analyses and predictions enhanced with advanced models

On the occasion of the installation of its new computer system, the JMA started operation of advanced numerical analysis and prediction models to meet requirements for enhanced meteorological services.

A new Global Spectral Model (GSM) with the horizontal resolution of T213 and 30 vertical layers makes 84-hour and 192-hour predictions with the initial time at 0000 and 1200 UTC, respectively. A new Typhoon Prediction Model (TYM) with the horizontal resolution of 40 km and 15 vertical layers runs for up to two target typhoons in the western North Pacific to



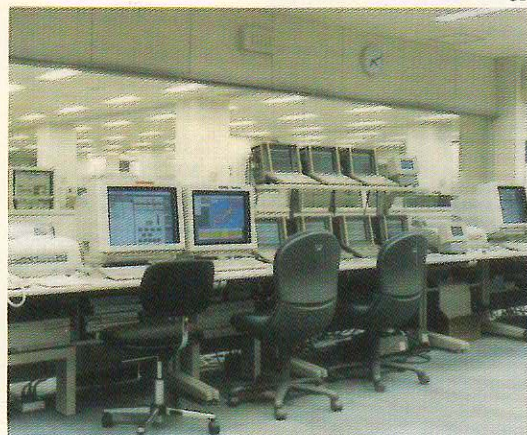
Statistics of the typhoon position error for GSM (top) for 21 cases and TYM (bottom) for 25 cases

make 78-hour predictions with the initial time at 0600 and 1800 UTC.

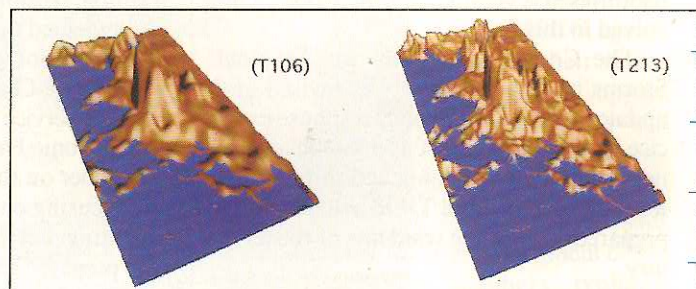
On March 1, 1996, the RSMC Tokyo-Typhoon Center enhanced the frequency and the valid time of its guidance products for forecast of typhoons to four times a day and up to 84 hours and 78 hours with the GSM and TYM, respectively. Typhoon positions and intensities predicted with the old TYM were disseminated just twice a day to the members of the Typhoon Committee.

Statistics for several cases during an experimental period in 1995 show that the new GSM can reduce error in the predicted typhoon position by 15% (T+24h), 36% (T+48h) and 33% (T+72h) while TYM can do modestly by 9% (T+36h) and 15% (T+60h), even though the tests were performed using global analyses made by the old-version model for their initial fields.

The RSMC Tokyo-Typhoon Center plans to commence a 72-hour typhoon forecasts soon after the new models prove to have enough accuracy in typhoon predictions.



Office of Computer Systems Operations



Comparison between the old (T106) GSM and the new (T213) GSM by orography



## *global numerical wave model installed*

A global numerical wave model has been introduced into JMA's new computer system for meteorological services.

The model contains the global area except the region higher than 70° in latitude, and its grid size is 2.5° x 2.5°. Wind data used in computation of waves are the output of the new Global Spectral Model (GSM). In addition, for typhoons in the area for which Japan is responsible, gradient winds and moving speed of typhoons are calculated based on positions and pressures of the centers of the typhoons and their radii of strong wind, which are analyzed and estimated by forecasters.

As an example of results of the global numerical wave model, 24-hour forecast initiated by the data at 00 UTC, 14 May 1996 is shown in chart. At that time, Typhoon 9603 was east of the Philippines. The model predicted a region of high waves in the eastern side of the typhoon area, and made a good expression of the asymmetric distribution of wave heights around the typhoon. It can also be seen in the model result that swells of 2 meter heights are propagating far from the typhoon.

The numerical wave model runs twice a day, one is initialized at 00 UTC to calculate for 72 hours (3 days), and the other is initialized at 12 UTC to calculate for 192 hours

(8 days). The results are used as basis for the charts of wave analysis and forecast which are broadcast on radio facsimile, JMH.

## *multifunctional transport satellite mulled*

JMA and the Japan Civil Aviation Bureau (JCAB) have been planning since 1994 for the procurement and production of a Multifunctional Transport Satellite (MTSAT) aimed at improving further Japan's meteorological and air-traffic control services.

As the successor to GMS-5, the MTSAT is scheduled to be launched in August 1999 aboard an H-2 rocket of the National Space Development Agency (NASDA) of Japan, and will be set into geostationary orbit over 140° E.

A three-axis stabilized satellite, the MTSAT will be equipped with the same type of imager as the one loaded on GOES-8. It will follow the specifications of the meteorological mission of the GMS-5 except for the addition of an infrared sensor for a band of 3.5 - 4.0 m m. The data relay function of the MTSAT will be basically the same as the Data Collection System (DCS) of GMS-5.

The resolution of the imager at the sub-satellite point of MTSAT will be 1 km for Visible and 4 km for Infra-red (IR). The High

Resolution Imager Data (HiRID), in place of Stretched-VISSR, will have the resolutions, 1.25 km for Visible and 5 km for IR regarding the continuity of data while GMS-5 will be used as back-up satellite of MTSAT. The HiRID format will be designed based on the GMS-5/Stretched-VISSR format so the S-VISSR users can continue to receive the imagery in the S-VISSR format with no change in their facilities.

The Low Rate Information Transmission (LRIT) will be newly introduced to disseminate image data. Detailed specifications of LRIT format have yet to be determined.

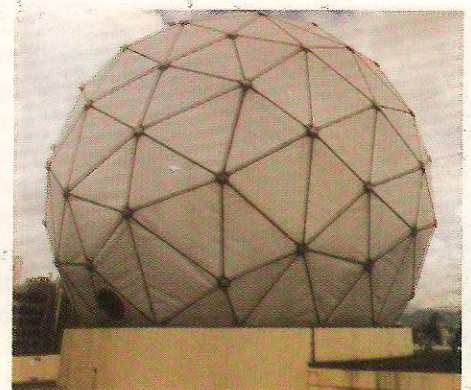
Lastly, JMA will make available the WEFAX service a few years after the launch of MTSAT-1. The service will have the same format as the current one.

## **HONG KONG**

### *HK operates new GSM ground reception system*

The Royal Observatory of Hong Kong started operating in March 1996 a new ground reception system to receive images from the Geostationary Meteorological Satellite (GMS) 5 of the Japan Meteorological Agency while putting the old reception system installed in 1988 on hot-standby.

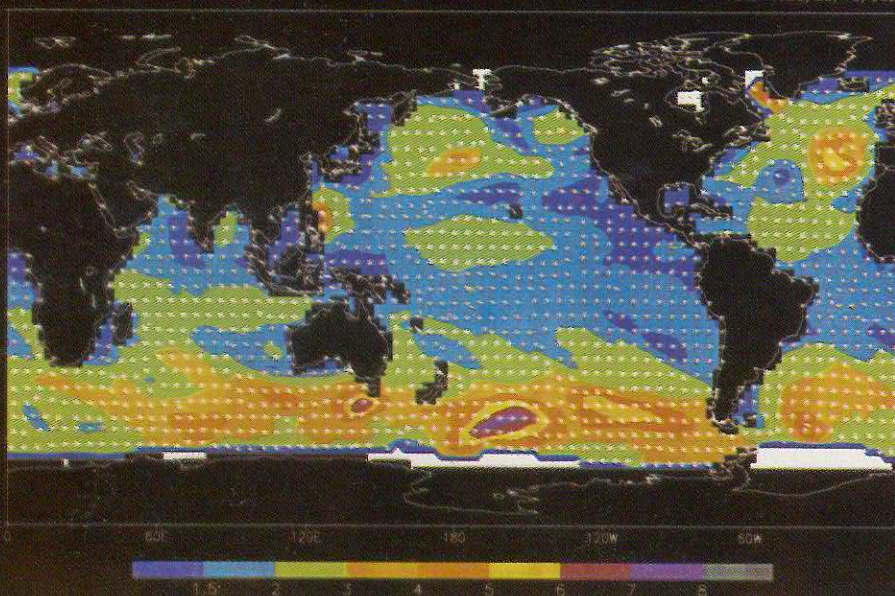
The new ground reception system is capable of processing and displaying images of GMS 5 from all four data channels: one visible, two thermal infra-red, and one water vapour. The raw GMS signals are received by a 5-meter diameter antenna on the roof of the Centenary Building of the Observatory headquarters. These signals are passed to a UNIX based central computer workstation which converts the raw signals into a variety of images.



The protective radome of the 5-meter antenna on the rooftop of the RO headquarters.

Wave Height & Direction

initial: 1996/05/14/00Z  
valid: 1996/05/15/00Z



Wave heights and directions calculated by the global numerical wave model (24-hour forecast initialized at 00 UTC, May 14, 1996). The color scale indicates significant wave height, and arrows indicate direction of propagation.



This highly automatic and user-friendly system provides many new features not available on the old system, such as multiple animation sequences of satellite images, image manipulation capabilities, user-controlled correction of gridding errors, and synchronous animation display of two image sequences.

The images are distributed through a high speed computer network to displays in the Central Forecasting Office and TV Studios at the Headquarters and the Airport Meteorological Office. Photographic quality hardcopies of satellite pictures are produced either manually or automatically on a colour printer for use by forecasters as well as research scientists.

### *a TV studio at the Royal Observatory*

The Royal Observatory started operating its own TV studio set up right at the Observatory Headquarters in March 1996.

Funded under the Hong Kong Government's "Serving the Community" scheme, the studio aims to improve the Observatory's weather service by creating an exclusive environment for conducting press briefings and television weather programmes. Observatory presenters now appear on weather programmes of all three local television stations 11 times a week with the number of presentations likely to increase in the days ahead.

The studio is equipped with professional acoustic and lighting facilities with five different scene settings. Its operation has been enhanced recently by the addition of dedicated optical communication links to local TV stations, a remote-controlled camera, and a new television weather graphics



Filming TV weather programmes using the chroma-keyed technique.

system capable of displaying imageries in three dimensions.

The response from the broadcasting media has been enthusiastic. A general improvement in the quality of sound recordings has been noted. The visual image also conveys a more professional flavour in TV weather programmes.

### *RO's OPTIS developed*

The Operational Tropical Cyclone Information System (OPTIS) was developed by the Royal Observatory to provide its forecasters with a fast and accurate means of disseminating information on tropical cyclones that affect the western North Pacific and the South China Sea.

A user's guide on OPTIS and a system manual including flowcharts and source codes were compiled. A briefing on the application of OPTIS was presented to colleagues at the Observatory and likewise

presented at the Tenth Guangdong-Hong Kong- Macau Seminar on Hazardous Weather held in Macau in December 1995.

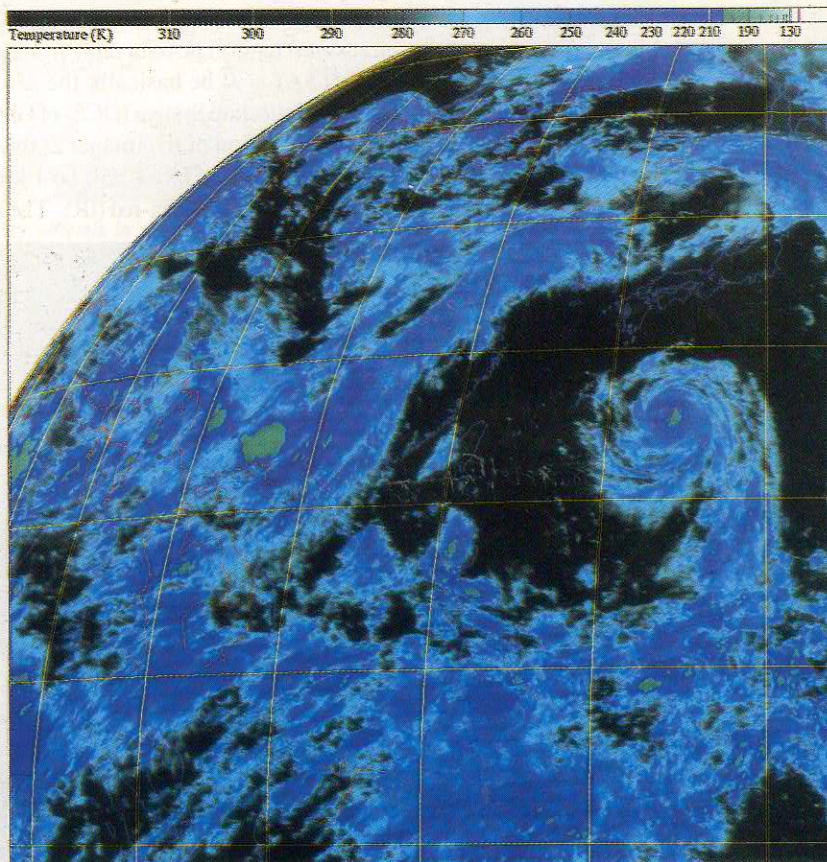
The OPTIS was put into trial run at RO's Central Forecasting Office in the 1996 typhoon season.

### **TCS gains access with Internet**

The Typhoon Committee Secretariat in Manila gained access to the Internet computer network on 1 March 1996, with the acquisition of an Accura 144 internet-fax modem, a donation from the Japan International Cooperation Agency (JICA), serving as linking device.

The linkup service with Internet, provided through Cybernet, Phils., gives the Secretariat the advantage of advance information technology and easier communication with the rest of the meteorological community. Its E-mail address is as follows: [TCS@cyber.cyb-live.com](mailto:TCS@cyber.cyb-live.com).

11:35 UTC 16 Jul 1996 x2P IRI  
Royal Observatory Hong Kong



An infra-red satellite image taken on 16 July 1996 showing Typhoon Eve over the western North Pacific (extreme right).

The cloud imagery was originally captured by GMS of JMA  
Space Technology Systems Ltd.