

THE ESCAP / WMO

Typhoon Committee

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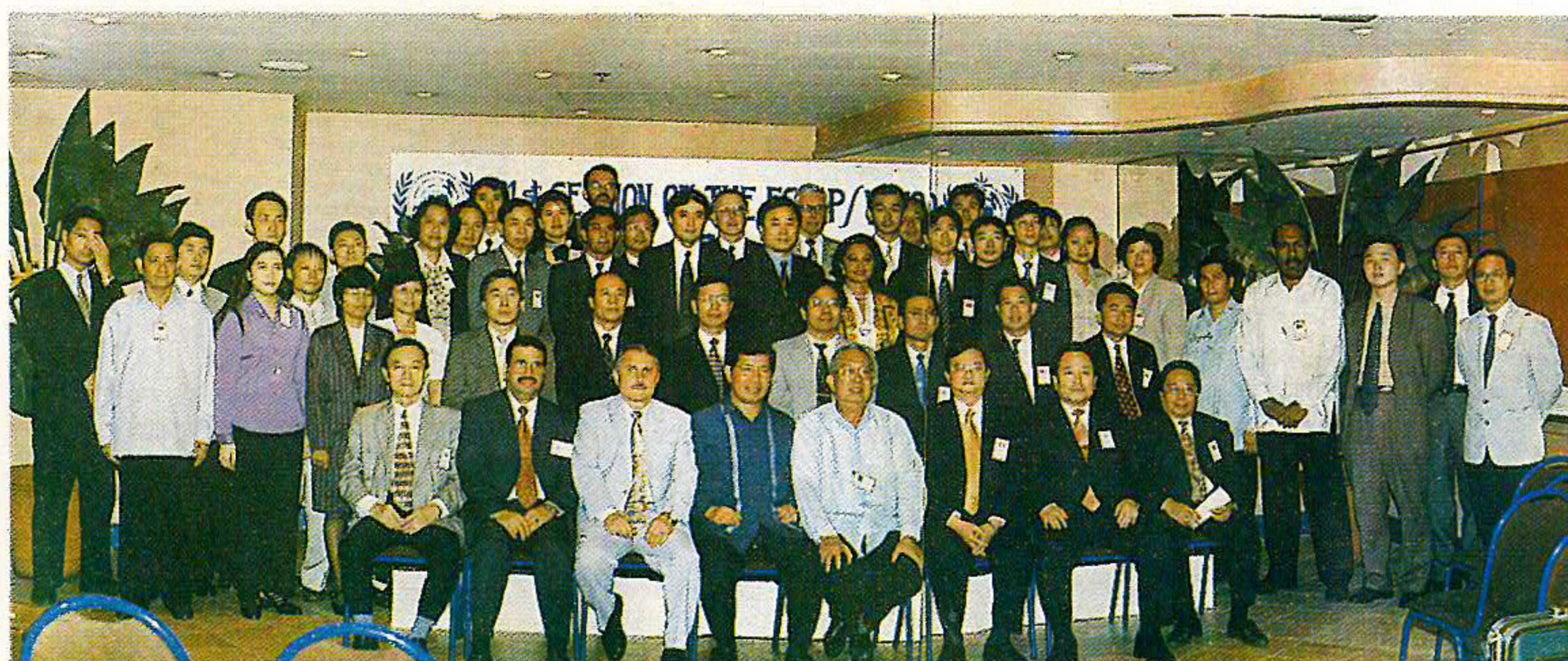
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THIRTY-FIRST SESSION OF THE TYPHOON COMMITTEE

held in the Philippines on Dec. 1-7, 1998

Committee adopts new scheme for naming typhoons beginning 1 Jan 2000



Dr. Roman Kintanar (seated, 4th from right), TCS Coordinator, pose with the participants in the 31st session of the Typhoon Committee, with Guest of Honor, Philippine Defense Secretary Orlando Mercado (seated, 4th from left).

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Weather specialists from member-countries of the Typhoon Committee including the United States, agreed on a new procedure of naming tropical storms and typhoons in the Western North Pacific and the South China Sea, set at the start of the new millennium, during the thirty-first session of the ESCAP/WMO Typhoon Committee, held in Quezon City, Philippines, from 1-7 December 1998.

Opening the session, Orlando Mercado, Defense Secretary and Chairman of National Disaster Response Coordinating Council of the Philippines, welcomed the representatives to the annual session even as he called them partners interdependent in solving the natural calamities that come with their existence. Mercado said he hopes to be able to sharpen their council's cutting edge in disaster preparedness by way of cooperation and

sharing among these countries in the region.

In a message, the representative of ESCAP, Cengiz Ertuna, assured the members that ESCAP will continue to undertake activities in support of the Committee within its own work programme and available resources. These will include projects on substantive issues relating to mitigation of damage from typhoons, floods and droughts in Asia and the Pacific.

The WMO representative, Eisa Al-Majed, addressing the session, stressed the importance of cooperation on regional initiatives and projects that can attract appropriate financial support. In this respect, Al-Majed said, WMO has been assisting the national Meteorological and Hydrological Services in their development plans like the mobilization of resources for the implementation of regional projects such as the *Integrated System for*

the Mitigation of Typhoon, Flood and Environmental Disasters in the Western North Pacific Area in cooperation with ESCAP.

At the meeting, a new procedure was approved wherein tropical cyclones that enter the Western North Pacific and the South China Sea areas will be given internationally adopted names in addition to the usual four-digit reference number. Beginning on 1st January 2000, the Tokyo Typhoon Center, operated by the Japan Meteorological Agency, will begin including names in addition to the usual-four digit reference number in the advisories issued by the Center.

The names will be drawn from a list of 140 selected names contributed by Cambodia, China, DPR of Korea, Hong Kong, China, Japan, Lao PDR, Macau, Malaysia, Federated States of Micronesia, the Philippines, Republic of Korea, Thailand, U.S.A., and Viet Nam. These names are for the use of the international press and all the members of ESCAP and WMO when they issue bulletins for the international marine and aviation communities.

As this developed, the Committee reaffirmed the request of the 1997 WMO Executive Council for the Tropical Cyclone RSMCs to supply the first level of basic information covering the tropical cyclone's present and forecast movement and intensity to the international media, where a clearly defined source of reliable information is needed. In line with this, the Committee reiterated the need to improve the capacity of NMHSs to deliver accurate forecasts and issue timely warning services to the public, government agencies and local media.

At the session, the United States formalized their entry as the fourteenth member of the Typhoon Committee. The US reported on the construction of a new forecast office building in Guam. China informed their co-members it is set to launch FY-1C, their third polar-orbiting meteorological satellite, in mid-1999. Japan also reported the launching of its Multifunctional Transport Satellite (MTSAT) in August 1999. The MTSAT will start operation in March 2000 succeeding GMS-5 to provide digitized cloud imagery.

Meanwhile, hydrologists from TC members in their pre-session meeting urged for cooperation between hydrologists and meteorologists at the national and regional levels to develop reliable Quantitative Precipitation Forecasting for the enhancement of flood forecasting. The flood experts requested the Committee to organize workshops and seminars aimed to promote greater information exchange and technology transfer among hydrologists of TC members. In line with this, the Committee held a workshop on *The Impact of the El Niño Southern Oscillation (ENSO) and La Niña on Meteorology and Hydrology in the Typhoon Committee Area* in Macau on June 29-July 1, 1999. A seminar on *Development of Forecasting and Warning System for Typhoon-Induced Sediment Disasters* is scheduled in year 2000.

A special Typhoon Committee session to commemorate the year 2000 will undertake activities suggested by the TC Secretariat as follows: to hold a conference on networking and scientific exchange with other tropical cyclone regional bodies within Asia-Pacific; to launch an expert exchange programme with other countries through bilateral agreement; and to conduct an intensive information drive by all the members on the work of the Typhoon Committee. Details of these activities will be discussed in the thirty-second session of TC which will be held in Republic of Korea in November 1999.



(Top) Opening session with (L-R) Tropical Cyclone Programme Chief Katsuhiro Abe, Eisa Hussain Al-Majed, Director of Regional Office for Asia and the South-West Pacific, PAGASA Director Leoncio Amadore, Cengiz Ertuna, Director of ESCAP Environment and Natural Resources Development Div., and TCS Coordinator Roman Kintanar. (Above) The session at work.



U.S.A. Representatives Richard Hagemeyer (left), Director of Pacific Region National Weather Service and John Miller, (right) Meteorologist in Charge of Tiyan (Guam) NWS Forecast Office with Thailand Representative Patipat Patvivatsiri.

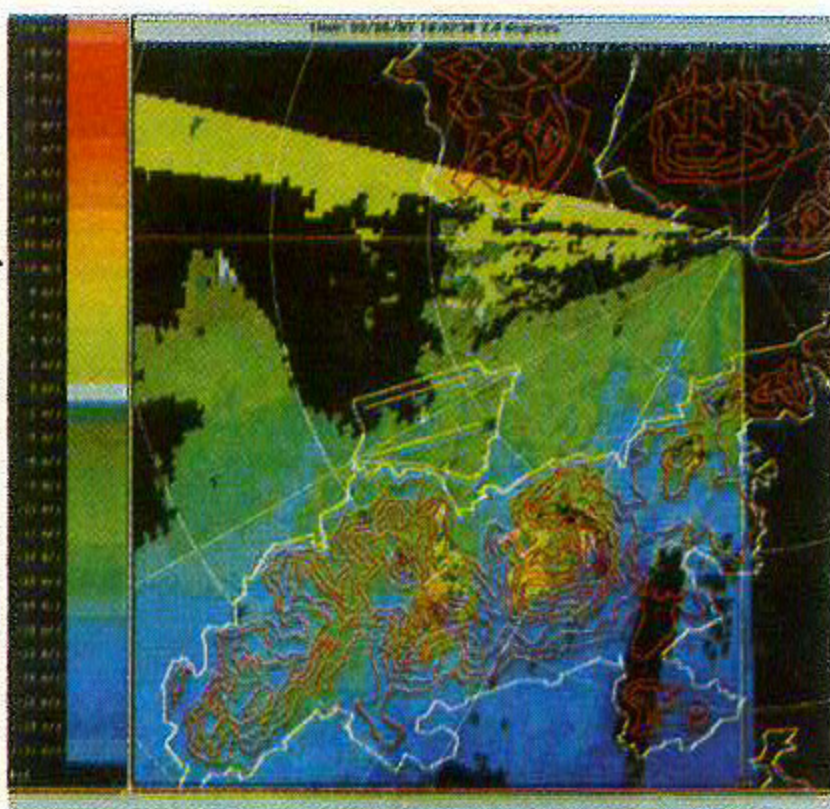
Terrain-Induced Wind Shear over Lantau Island - Observations by the Terminal Doppler Weather Radar During the Passage of Typhoon Maggie

by: SHUN CHI-MING, Hong Kong Observatory

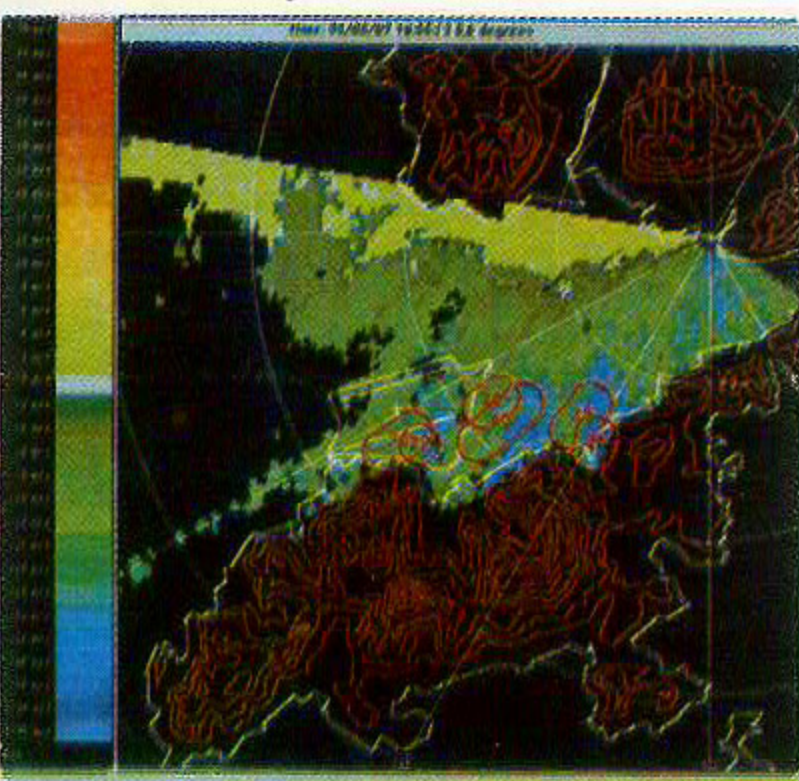
With the commissioning of the Terminal Doppler Weather Radar (TDWR) in 1997, interesting high resolution radar data were collected in strong southerlies during the passage of tropical cyclones, including Victor in 1997, Penny in 1998 and Maggie in 1999. These data sets reveal the complex low-level atmospheric flow in the vicinity of the Hong Kong International Airport (HKIA) which is located just off the northern shore of the Lantau Island.

The Lantau Island has a northeast-southwest oriented ridge, with a width of about 5 km, length of about 20 km, and several peaks rising to between 700 and 950 m above mean sea level. The HKIA lies on the lee side of Lantau when winds come from the east through southwest. In the following figures, contours of the Lantau topography are shown in 100 m intervals.

Figure 1 shows the Doppler radial velocity data of a 2.4° elevation scan at 18:42 UTC on 7 June 1999 when Maggie was bringing strong southerly winds to Hong Kong (the radar beam is at about 500 m over the HKIA when scanning at 2.4° elevation). It clearly shows strong gap flows between the peaks of Lantau revealed by the streaks of up to about 20 - 25 m/s radial velocity towards the radar, reverse flow revealed by the areas of up to about 7 m/s radial velocity away from the radar just on the lee side of the peaks, and streaks of lower speed flow displaying wave-like behaviour in the wake of the peaks. Animation sequences of the radar images suggest existence of von Kármán vortex streets and vortex shedding in the wake regions.



(FIG. 1) TDWR Doppler Radial Velocity Data at 2.4° elevation at 18:42 UTC, 7 June 1999



(FIG. 2) TDWR Doppler Radial Velocity Data at 0.6° elevation overlaid with microburst and wind shear detected by the TDWR algorithm at 18:55 UTC, 7 June 1999.

ranging from 20 to 40 knots when an area of precipitation moved across the region (the present TDWR microburst detection thresholds require the simultaneous existence of an area of 30 dBZ reflectivity to declare microburst or wind shear when sufficiently strong divergence features are detected on the 0.6° elevation scan). The existence of terrain-induced vortices and significant wind shear and turbulence on the lee side of Lantau has been confirmed independently by aircraft reports and other observations in similar conditions.

The existence of von Kármán vortex streets in the wake of islands is already well known from cloud patterns with the advent of meteorological satellite. Theoretical, numerical, laboratory and field studies of stably stratified flow over simple mountain topography have provided insights to the mechanisms of their formation. However, few studies have been undertaken on neutral (or near neutral) flow across simple mountain topography, not to mention neutral flow across complex terrain with multiple peaks and valleys like Lantau. The TDWR observations are the first data sets which provide high resolution information (in both space and time) on the structure and evolution of the wake region of such a complex terrain in neutral flow. Ongoing studies are being conducted to better understand the cause and behaviour of these phenomena, and to improve on the operational system for detection and warning of terrain-induced wind shear for the HKIA.

The U.S. National Weather Service

The National Weather Service (NWS) is an organization within the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce. NWS is the primary source of weather data, forecasts and warnings for the United States. Television weathercasters and private meteorology companies prepare their forecasts using this information.

The NWS is the sole United States official voice for issuing warnings during life-threatening weather situations. The agency has about 4,800 employees and operating budget of approximately \$680 million. NWS is completing a \$4.5 billion modernization program. When the program is completed over the next few months, the agency will be a leaner, more efficient operation, with 121 field offices, 13 River Forecast Centers, and nine national centers.

Products and Services

The NWS provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, to protect life and property and enhance the national economy. The agency has a national infrastructure in place to gather and process data from the land, sea and air. This includes data from the most advanced technologies in the world including weather radars and satellites as well as data buoys for marine observations and surface observing systems for data that help the aviation industry.

The NWS's highly trained and skilled workforce uses sophisticated computer models and high-speed communications systems to generate data, outlooks, forecasts and warnings. In addition, trained community volunteers enhance weather service operations. Cooperative observers collect weather data that becomes part of the United States' climate records. Storm spotters provide the NWS with visual confirmation of severe weather events.

Ongoing research and development efforts yield breakthroughs in all areas of weather, hydrologic and climate forecasting. Advances in climate forecast modeling, for example, allowed NWS scientists to predict the onset of the 1997-98 El Niño event as early as late 1996. The NWS maintains the largest meteorological telecommunications switching center in the world, sending and receiving around 400,000 weather bulletins each day through a gateway in Silver Spring, Maryland. This data originates from weather offices around the United States.

Pacific Offices

The NWS is organized into five regions. The Pacific Region is headquartered in Honolulu, Hawaii, and is responsible for managing 13 offices throughout Hawaii and the Pacific including offices in Honolulu, Hilo, Kahului, and Lihue, Hawaii; Pago Pago, American Samoa; Tiyan, Guam; Koror, Palau; Chuuk, Pohnpei and Yap, Federated States of Micronesia; and Majuro, Republic of the Marshall Islands.

One of the two tsunami warning centers in the United States is operated by the Pacific Region of the NWS. The Pacific Tsunami Warning Center, located in Ewa Beach, Hawaii, is responsible for monitoring tsunamis in the Pacific Basin and Hawaii. The International Tsunami Information Center in Honolulu is also supported by the National Weather Service Pacific Region.

The Central Pacific Hurricane Center and the Honolulu Forecast Office are co-located at the University of Hawaii at Manoa. Co-location with the university has stimulated research in tropical meteorology including cyclones. Both the Honolulu Forecast Office and the Guam Forecast Office have responsibilities internationally within their respective areas of responsibility for issuing high seas marine and aviation forecasts.

The Pacific ENSO (El Niño Southern Oscillation) Applications Center (PEAC) is a collaboration of the University of Hawaii, University of Guam, Pacific Basin Development Council, National Weather Service, and the NOAA Office of Global Programs. PEAC, located at the University of Hawaii at Manoa, has been instrumental in developing climate products for Pacific Island governments to help them plan for water shortages, impacts on fisheries, agriculture, and other climate-sensitive sectors of the economy. Additional information is available at the following website: <http://naulu.soest.hawaii.edu/>

NOAA Weather Radio

Weather warnings do not mean anything if they are not received by those in harm's way. The NWS broadcasts public life-saving information during severe weather events and other hazardous situations on the NOAA Weather Radio network, operating 24 hours a day. This service is available in the continental U.S., Alaska, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, the U.S. Virgin Islands and Puerto Rico. The newest models of NOAA Weather Radios can be programmed to sound an alert for specific geographic areas. This feature has been known to wake people with warnings when they are asleep.

EMWIN

In the past year, a new system has been deployed in the South Pacific that is proving to be immensely valuable to emergency managers and government planners. Known as EMWIN, or the Emergency Managers Weather Information Network, the system broadcasts live weather and emergency information to computers across the U.S., the Caribbean, and over parts of the Pacific.

EMWIN uses several methods to broadcast including satellite, radio and the Internet. A satellite downlink is the key that enables computer users to access a stream of real-time weather information from the Geostationary Operational Environmental Satellites-GOES 8 and GOES 10. Using free retransmission software that can be downloaded from the Internet, agencies can tailor the information to fit their specific area. To some small island countries, it is the most reliable method for receiving forecasts and warnings.

Compared to other systems, EMWIN is very inexpensive requiring only a standard PC capable of running Windows 95, a small satellite receiver (5 ft. grid dish antenna will do), and an EMWIN signal processor box. The entire system will cost between \$200 - \$1500 depending on whether a radio signal is available or a satellite transmitter is used. The NWS is looking into the possibility of extending EMWIN coverage into the western Pacific. Additional information is available on the Internet at: <http://www.nws.noaa.gov/emwin/index.htm>

What does the future hold?

Weather services cost each American about \$4 a year - the same price as a hamburger, french fries and a milkshake. This investment of tax dollars allows the NWS to issue more than 734,000 forecasts (fire weather, public, aviation, marine) and 850,000 river and flood forecasts annually. Each year, the NWS issues between 45,000 and 50,000 potentially life-saving severe weather warnings.

The NWS has a vision of becoming a "no surprise weather service," and that goal is becoming a reality today. For example, the weather service has doubled the warning lead-time for tornadoes from approximately 5-10 minutes over the last five years. These extra minutes save lives. Today's three-to-four day forecast is as accurate as the two day forecast was 15 years ago. The NWS is working to make the 6-10 day forecast as accurate as the forecast for tomorrow.

The NWS uses the Internet to reach a growing number of the online population. Information includes official forecasts and warnings as well as outlooks and summaries on climate topics such as El Nino. Most weather service Internet sites are linked to the NWS home page at the following address: <http://www.nws.noaa.gov>



Weather Balloon Release. Pohnpei Weather Service Office (Credit: Herman Chan)



Pacific Tsunami Warning Center, Ewa Beach, Hawaii, with its staff (L-R) Rich Nygard, Bob Cessaro, Stuart Weinstein, Bill Mass, Chip McCreery, Geophysicist-in-charge, Marilyn Ramos, and Barry Hirshorn. (Credit: Delores Clark)



(Top) National Weather Service Forecast Office, Tiyan, Guam. (Above) EMWIN Demonstration in Honolulu. (L-R) Pene Lefale, South Pacific Regional Environment Program; Ed Young, National Weather Service Pacific Regional Technical Services Chief; Jim Doherty, National Weather Service EMWIN Program Manager. (Credit: Delores Clark)

T C h a n g e s

New SMG Director

Fong Soi Kun had been appointed director of the Servicos Meteorológicos e Geofísicos de Macau (SMG) on November 1, 1998. He took over from Olavo Francisco Valente Rasquinho.

Fong Soi Kun, who holds a M. Sc. in Atmospheric Science from Zhong Shan University in China, joined the SMG in 1982. He made significant contributions in the development and modernization of SMG, especially in the introduction of numerical weather prediction model (MM5) and the Automatic Air Quality Monitoring System project.



FONG SOI KUN

Worakupt succeeds Ruangis



LT. JG. WIT WORAKUPT

Lt. JG. Wit Worakupt, 58, was named Director-General of the Thailand Meteorological Department succeeding Manun Ruangis on 1 October 1998. Worakupt graduated from the Naval Academy (Royal Thai Navy), Flying Training School (Royal Thai Air Force) and National Defense College.

Worakupt transferred from the Royal Thai Navy to be the Official of the Harbor Department in 1974 becoming its Director-General from 1994 to 1997. He served as Inspector-General at the Office of the Permanent Secretary, Ministry of Transport and Communications, from 1997 to 1998.

Worakupt was conferred the Knight Grand Cordon of the Most Noble Order of the Crown of Thailand.

HONG KONG, CHINA

New weather radar station at Tai Mo Shan

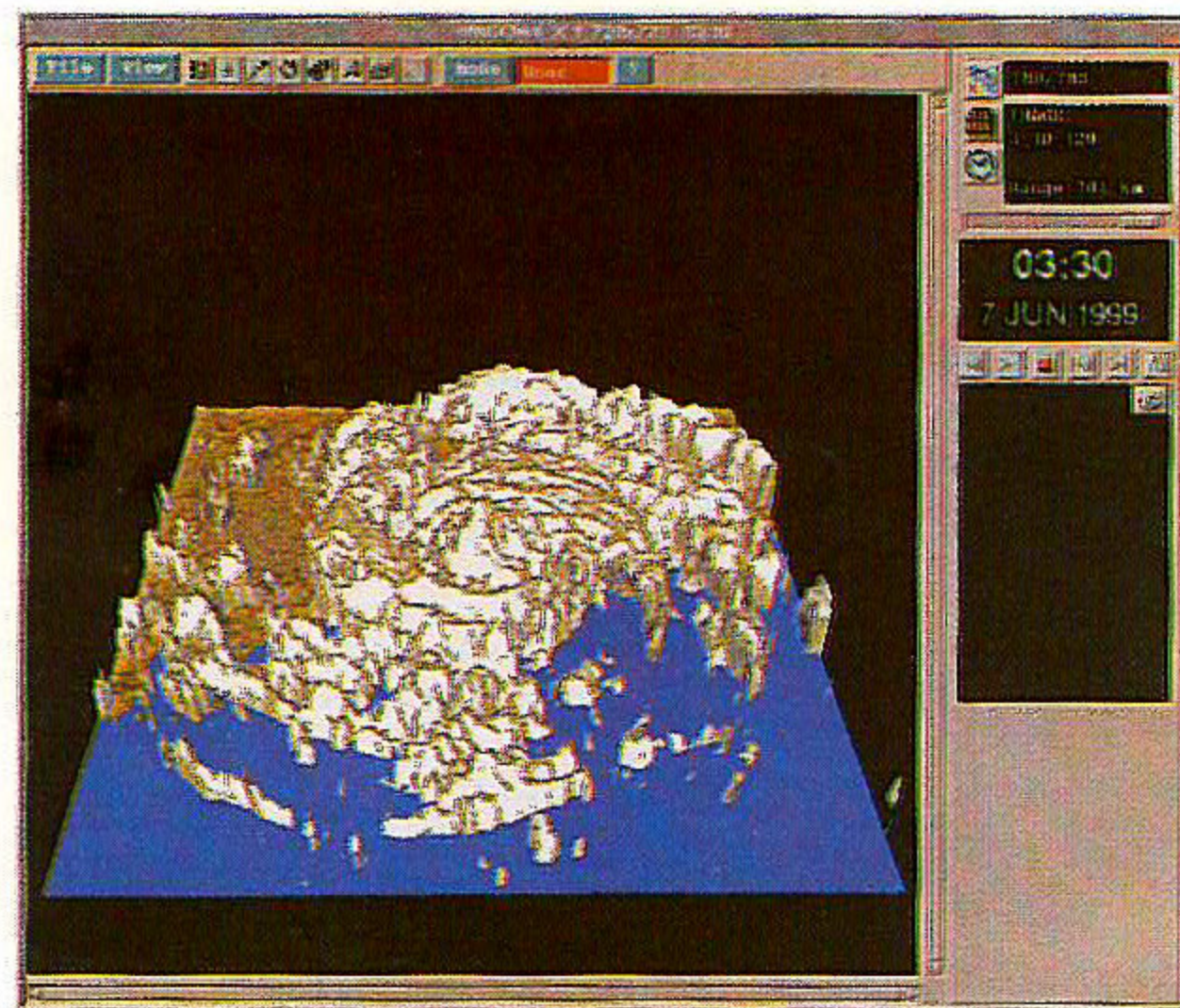
A major upgrade in Hong Kong Observatory's weather radar systems was made in early 1999 with the installation of a new weather radar at Tai Mo Shan, the highest peak in Hong Kong. The new S-band Doppler weather radar is unobstructed by local terrain on all sides. Data from the Tai Mo Shan Weather Radar System, Tate's Cairn Weather Radar System, and Tai Lam Chung Terminal Doppler Weather Radar are integrated for combined processing and display.

The new Tai Mo Shan Weather Radar has an 8.5 m parabolic antenna, a narrow beam width of 0.9 degree and low sidelobes of no more than -30 dB. It is equipped with a highly stable klystron transmitter and provides better ground clutter rejection and Doppler velocity measurements than the magnetron-based Tate's Cairn Weather Radar.

By networking the three radars together and using the versatile new radar software, a number of new radar products are available to forecasters. Dual-Doppler winds calculated from velocity data of the Tai Mo Shan and Tate's Cairn radars can capture the detailed wind flow of significant weather systems over Hong Kong. Composite reflectivity radar images of the three radars, overcoming the problem of blockage at the individual radar sites, are also available.

Other advanced features include multi-layer CAPPI images, 3-dimensional display of storm structure, automatic generation of forecast radar products, automatic tracking and warning of severe weather systems, profiles of winds, horizontal divergence, and vertical velocity.

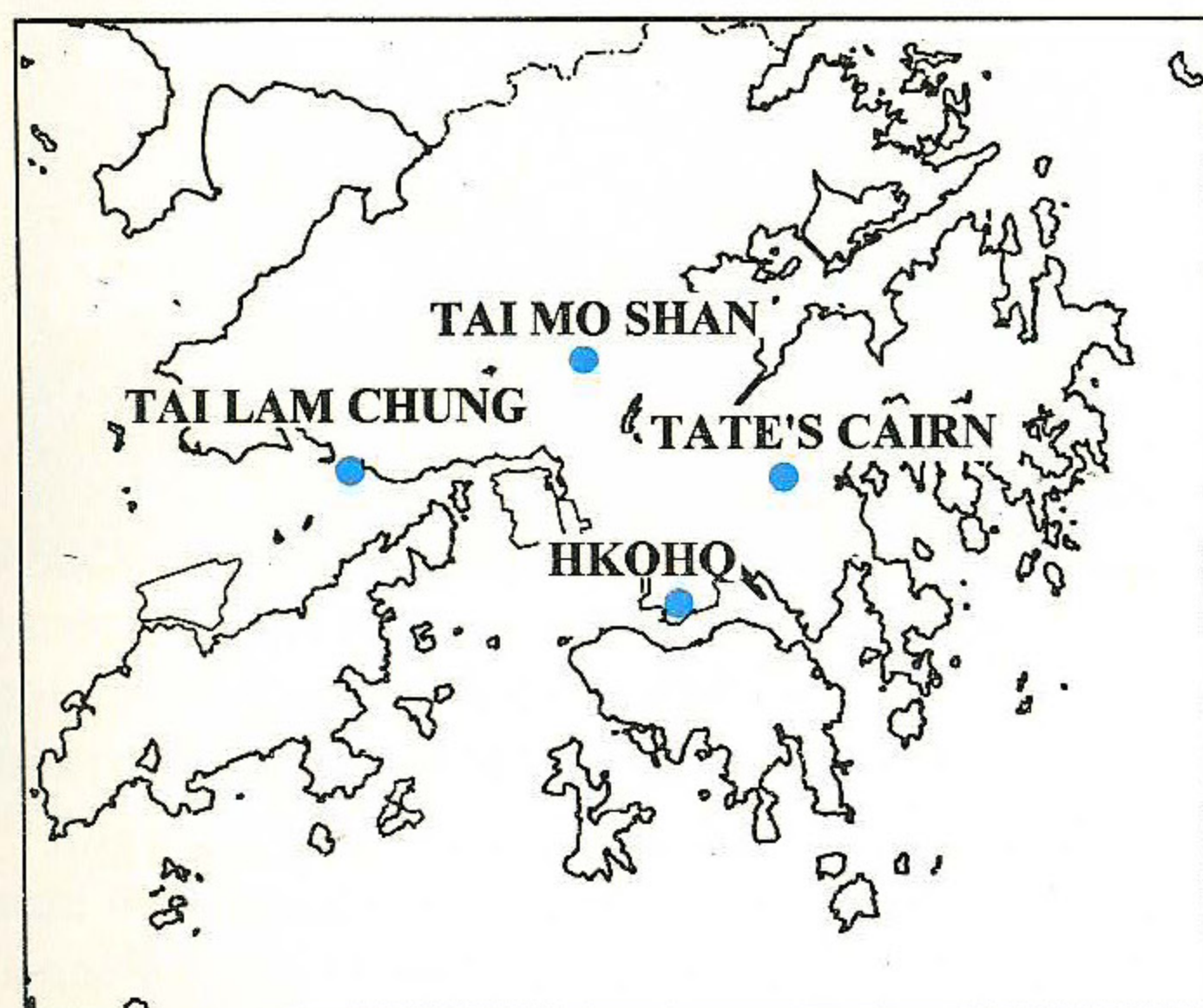
The Tai Mo Shan weather radar system and the advanced processing software usher the Observatory into a new era of radar observations and pave the way for better weather forecasting and warning services to the public.



3-Dimensional display of Severe Tropical Storm Maggie over Hong Kong in the early morning of 7 June 1999.



Tai Mo Shan Weather Radar System



Approximate locations of the three radar sites with the Observatory Headquarters.

MACAU

Air monitoring system inaugurated on WMD '99

As member of the WMO, Macau celebrated World Meteorological Day (WMD) 1999 on 23 March with the inauguration of Automatic Air Quality Monitoring System (AAQMS) on 23 March by the Servicos Meteorológicos e Geofísicos de Macau (SMG) with this year's theme "Weather, climate and health."

The opening ceremonies of the air monitoring system was led by José Alves de Paula, and José Alarcão Troni, under-secretaries for Transportation and Public Work and Social Affair and Budget, respectively. Fong Soi Kun, Director of SMG, introduced the system before invited guests and government officials from the Environmental Protection Department.

ments of Guangzhou and Hong Kong, and Zhuhai Environmental Protection Monitoring Station. The officials also held a meeting to share experiences and discuss future collaboration.

The AAQMS, consists of three automatic air quality monitoring stations, monitors the air quality from environment of ambience, high density residence and roadside.

Other activities on the occasion of WMD '99 were the introduction of two new services through the mass media, the Daily Air Quality Index and the Main Cities Weather Forecast in Mainland China; and the distribution of leaflets to the public by SMG to increase public awareness of the importance of meteorological services.



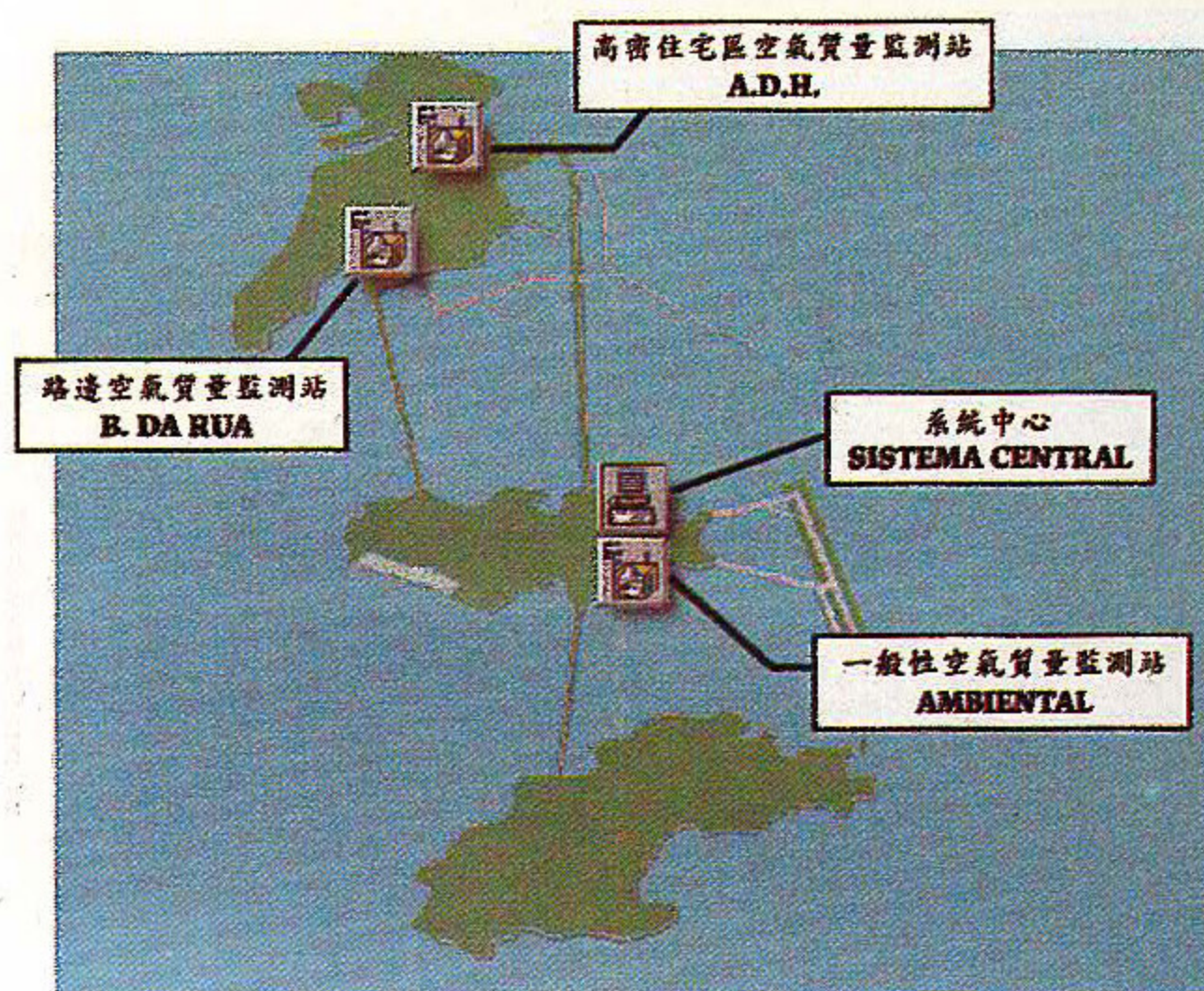
(Above): Mr. Fong Soi Kun, SMG Director, kicks off WMD commemoration with the inauguration of Automatic Air Quality Monitoring System (right)



AIR QUALITY INDEX (AQI)

AQI	Air Quality Level	Symbol	Influence to Health	Advice to the Public
0 ~ 50	Good		No influence is expected.	No response action is required.
51 ~ 100	Moderate		The general public may not experience immediate effect. It might cause unhealthy influence if people expose under such environment for a long time.	No immediate response action is required, it might cause unhealthy influence if people expose under this level persistently for a long time.
101 ~ 200	Bad		For people who have heart and respiratory system disease, the symptom might become slightly worse. The general public might experience uncomfortable.	People who have heart and respiratory system disease are advised to avoid outdoor activities.
201 ~ 300	Very Bad		For people who have heart and respiratory system disease might be obviously affected. The general public would experience uncomfortable.	People are advised to avoid outdoor activities.
301 ~ 500	Severe		Same as above.	Same as above.
> 500	Harmful		Same as above.	Same as above.

Reference: World Health Organization, United States Environmental Protection Agency (EPA), State Environmental Protection Administration of China, Bureau of Environmental Protection, Taiwan and Hong Kong Environmental Protection Department.



Automatic Air Quality Monitoring System
自動空氣監測系統

Measured Pollutant	測量的污染物
Inhalant suspended Particulate	(PM10) 可吸入懸浮粒子
Sulphur Dioxide	(SO ₂) 二氧化硫
Nitrogen Monoxide	(NO) 一氧化氮
Nitrogen Dioxide	(NO ₂) 二氧化氮
Oxides of Nitrogen	(NO _x) 氮氧化物
Carbon Monoxide	(CO) 一氧化碳
Ozone	(O ₃) 臭氧

Third SCSMEX/SSC Joint Meeting held

The Third South China Sea Monsoon Experiment (SCSMEX) Organizing Committee (SOC) and the Second Scientific Steering Committee (SSC) Joint Meeting was held at SMG on 29-31 March 1999 attended by 31 participants, including members of SOC and SSC.

The participants to the joint meeting exchanged views on SCSMEX field observations, data collection and preliminary research results. Discussions focused on future plans and research direction such as full collection of data, publication of future SCSMEX research results and meetings.

A proposal was made to hold a SCSMEX scientific conference in early 2001, and to publish proceedings of SCSMEX scientific research.



Participants in the SCSMEX/SSC Joint Meeting.

Macau to become a member-territory of WMO

The Territory of Macau will return under China's sovereignty on 20 December 1999. In anticipation of this event, the XIII Congress of WMO (4-26 May), agreed unanimously that Macau would continue as Member Territory of WMO and will be known as Macau, China.

Since admitted as a member of WMO in 1996, Macau has played an active role in the implementation of some aspects of WMO regional programmes, especially, in the activities of the Typhoon Committee.

Workshop on the Impact of El Niño and La Niña on Meteorology and Hydrology

The Workshop on the Impact of the El Niño Southern Oscillation (ENSO)/La Niña on Meteorology and Hydrology in the Typhoon Committee Area, organized by the Typhoon Committee Secretariat, in coordination with WMO and ESCAP, was held in Macau from 29 June to 1 July 1999.

The workshop, attended by some 27 participants, discussed national experiences in assessment of economic and social impacts of the recent ENSO event, uses of information, and enhancement of public awareness in Members of TC. It concluded that there is an inter-relationship between typhoons and ENSO. The workshop recommended the following for presentation to TC Members in the 32nd TC session:

- to incorporate in their sustainable development programmes, at the national, regional and international levels, strategies to prevent, mitigate and rehabilitate the damage caused by natural disasters, such as typhoons and the ENSO event;
- to integrate contingency plans into their development programs at the local, national and regional levels to reduce the impact of ENSO related crises;
- to appeal to international agencies, donors and other organizations involved in natural disaster reduction to participate actively in financial and technical support and in increased levels of cooperation for mitigation of damages caused by typhoons and ENSO;
- to establish a framework between the Members and other countries to promote exchange of information and experiences in monitoring ENSO event as well as strategies for reduction of its adverse impacts;
- to strengthen early warning, public awareness and information programs related to natural hazards, including those induced by ENSO, and to be integrated into comprehensive national disaster management programs focusing on strategies for risk reduction and disaster prevention; and
- to undertake impact assessments after ENSO events and review the lessons learned to be better prepared for such events in the future.

PHILIPPINES

Workshop on project- Integrated System for the Mitigation of Typhoons, Flood and Environmental Disasters in the Western North Pacific Area

The Philippines hosted the workshop on the proposal for the project *Integrated System for the Mitigation of Typhoons, Flood and Environmental Disasters in the Western North Pacific Area* on Nov. 30- Dec. 1, 1998. The project-proposal aims to upgrade the facilities of the national Meteorological and Hydrological Services in the Western North Pacific region for the improvement of their services with a view to minimizing the loss of life and property caused by severe weather phenomena.

Participants in the WMO-organized workshop, experts and representatives of recipient countries, and the financing institutions, emphasized the need for stronger cost-benefit analysis as particularly important to allow funding agencies to set priorities, but would also be useful for NHMS to implement the project. So far, six potential funding agencies had been approached, and although reactions were encouraging, no firm offers of funding had been made.

The Economic and Social Commission for Asia and the Pacific (ESCAP) said the project would have greater chance to succeed if the document were modified to use the formats and terminology that the banks are familiar with. Comments were made to revise the proposed terms of reference for the feasibility study to take into account suggestions that more use be made of local experts and that more detail might be appropriate in the finances.

ESCAP advised the representatives of TC Members to the next session of ESCAP to indicate strong support for the project since representatives of donors and development bankers attend the annual session. The United Nations Development Project (UNDP) suggested at the meeting that the technical and capacity building aspects of the project should be highlighted separately as this could increase the range of potential funding agencies.

All participating NMHSs were invited to arrange with their respective governments to approach possible donors which would support the approach by WMO and demonstrate actual commitment. Other projects had found it useful to have regular meetings with donors as a way of securing resources and that approach could be considered for this project in order to attract funding for its implementation.

The China Meteorological Administration said it would



(Top) Workshop opening with SMG Director Fong Soi Kun (speaking), TCS Meteorologist Nanette Lomarda, ESCAP's Cengiz Ertuna, Guest of Honor Jose de Paula of Macau and WMO's Don Vickers. (Above) Mr. Hao I Pan of Macau briefs participants on the services provided by SMG.



Participants in the Workshop on the Impact of El Niño/La Niña on Meteorology and Hydrology in the Typhoon Committee Area.

participate in the project but it would need to be compatible with national development plans, and must address the issue of the gap between the capabilities of nations in the area. It added that utilization of experts from the Asian region where available would be advantageous to the project.

Pilot activities were suggested, such as network design, exchange of plans and preparation of national plans. Other activities, such as increased exchange of hydrological observations among various national agencies and across national borders, may also contribute to the objectives of the project at minimal cost.

4th Meeting of the ESCAP Regional Working Group on Meteorological Satellite Applications and Natural Hazards Monitoring

The Fourth Meeting of the ESCAP Regional Working Group on Meteorological Satellite Applications and Natural Hazards Monitoring was held at the Century Imperial Palace Suites, Quezon City, on 14-17 April. The meeting, organized by ESCAP in cooperation with the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), was attended by 16 participants from member-countries China, India, Japan, Republic of Korea, Malaysia, host Philippines, and representatives of ESCAP.

The ESCAP meeting recognized the important role that meteorological satellite applications play in disaster monitoring, environment management and sustainable development. It urged that in order to derive maximum benefit from the technology applications, it was necessary to further bridge the gap between disaster management and space technology experts through awareness creation and sensitization, implementation of pilot projects, and the use of integrated techniques to develop operational solutions.

The meeting noted the Working Group members' continued implementation of the regional strategy and action plan adopted by the 1994 Ministerial Conference on Space Applications for Development in Asia and the Pacific. It added that though the progress achieved at the national level by some countries in the field of meteorological satellite applications have been impressive, only a few could marginally benefit from the technology owing to limited resources for capability building.

The Working Group acknowledged that adequate resources for disaster monitoring and management activities were necessary as this critical public service sector required high prioritization and continuing support from national governments, international organizations and donors. The meeting considered the Group as a unique platform for cohesive and coordinated regional cooperative initiatives in the field of satellite applications and disaster monitoring.

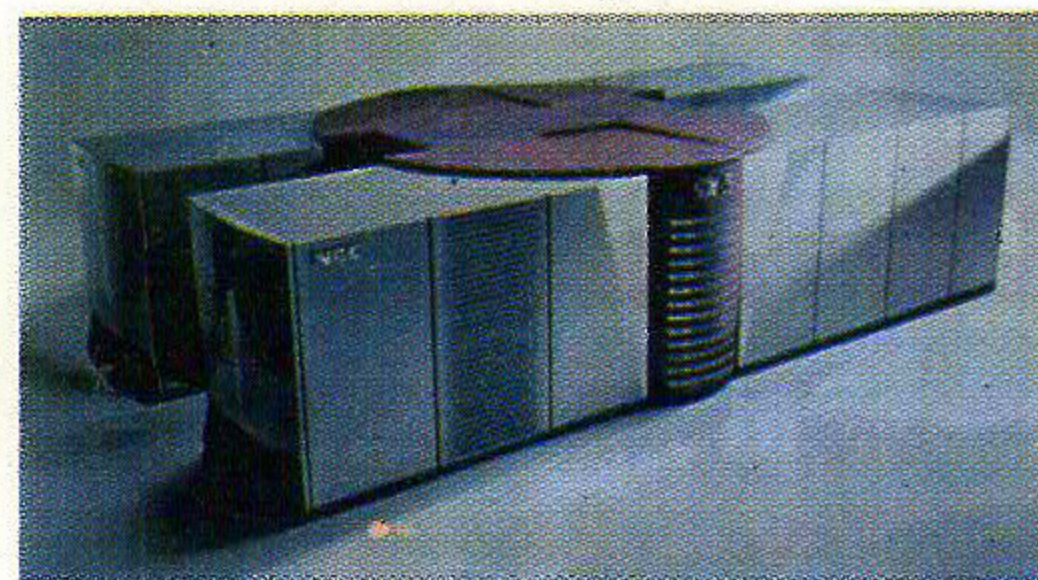
The annual meeting recommended that ESCAP continue with its effort of providing technical assistance to the Working Group's activities and to help members in sourcing out funds for the conduct of a workshop to be participated in by Task Force members. The Republic of Korea offered to host the fifth Working Group meeting.

REPUBLIC OF KOREA

KMA's first super computer installed

The KMA has installed its first super computer, SX-5/16A (128Gflops), manufactured by NEC Japan, and started operation on June 1, 1999. The system computes the atmospheric governing equations with sixteen high advanced electronic brains (CPUs). Each CPU performs eight billion routines of computing per second. It is designed to transmit the computed results by one CPU to the other adjacent CPU via high speed neutral network able to carry more than one billion of electronic information per second.

The high computing performance of this newly installed system is expected to allow KMA to further improve its current numerical weather prediction models and its capability for predicting severe weather phenomena.



SX-5/16A (128Gflops), KMA's first supercomputer



(Top) Front view of the new KMA bldg. (Above) Side view of the Bldg.

KMA moves to new headquarters building

The Korea Meteorological Administration (KMA) transferred to its new headquarters building in Seoul, 10 km. south of its old building's location, on 15 December 1998. The construction of the new KMA building took all of two years and eight months to complete at the cost of US\$ 21 million.

The old KMA building, constructed in early 1960s, had no adequate space for the installation and operation of advanced meteorological systems and facilities such as super-computers and various telecommunication equipment. KMA officials felt the necessity of putting up a new and larger building to effectively carry out the ever-increasing active role the KMA is expected to play coming into the next millennium.

The new eight-floor building with two basement levels has a total floor space of 18,150m². It features a fully automatic building management system designed to improve the working environment with its modern facilities. It has an international conference room, three seminar rooms, two computer system rooms, as well as an exhibition hall which displays pieces of historical observing equipment such as a 15th century Korean rain gauge and sundial.

The new building stands as a symbol of the growing importance of KMA as a vital public service for the people of Korea in addressing national meteorological concerns. Conveniently located in the middle of a public park, the structure creates a fancy forest-castle like appearance, the design of which won first prize in the 1998 Seoul Architecture Awards given by the Seoul Metropolitan Government.

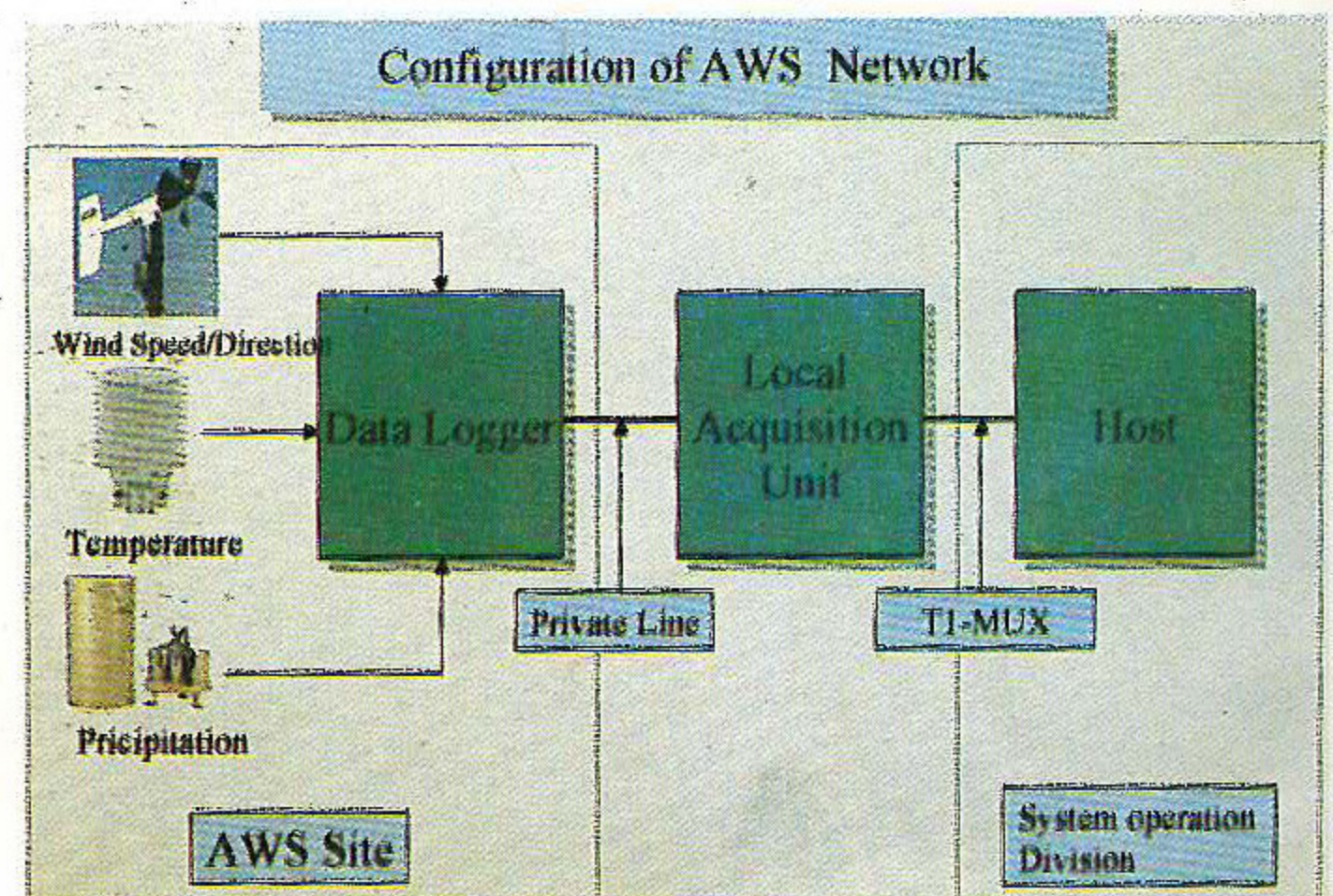
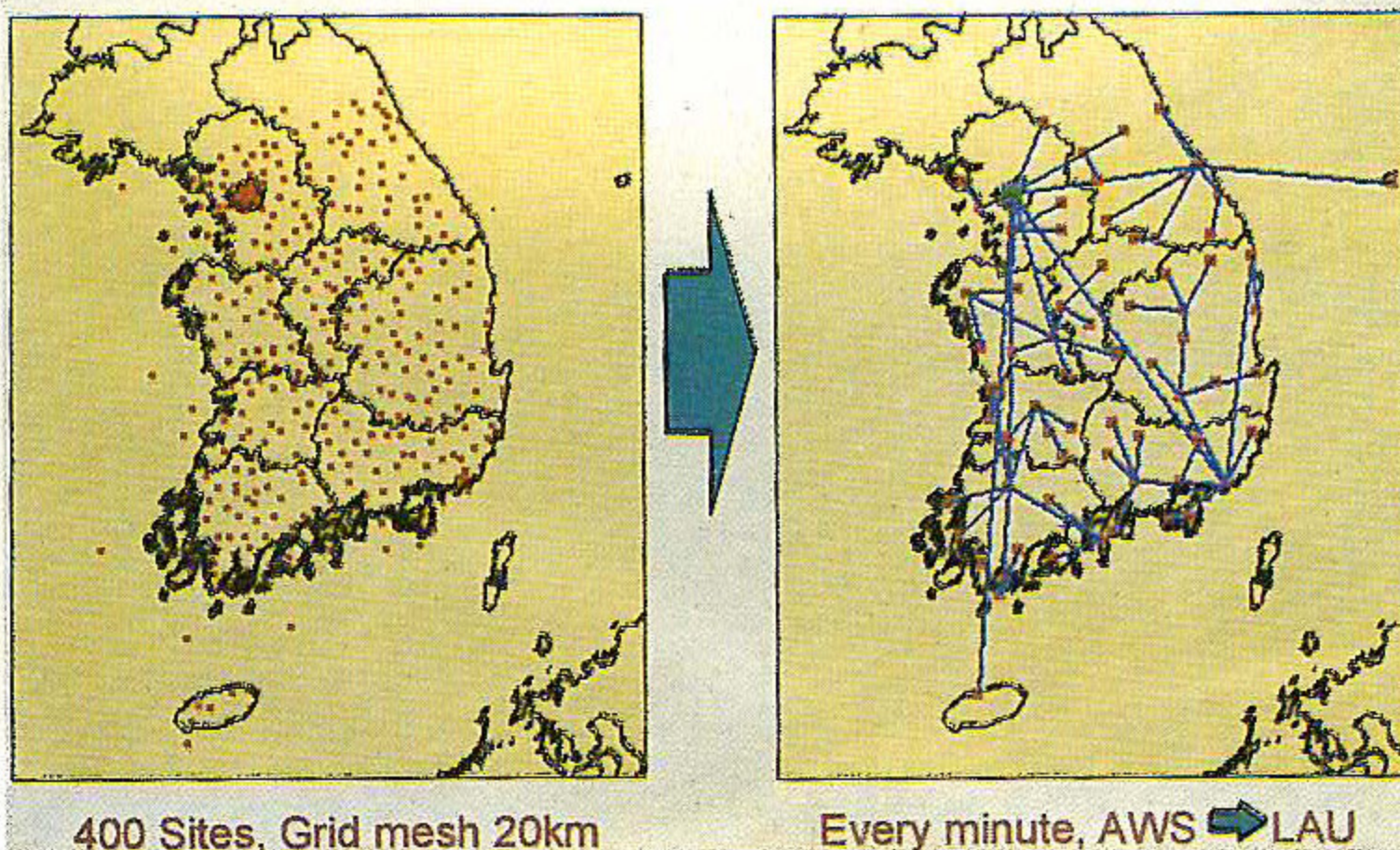
Additional AWSs set for installation

Since 1990, KMA has been operating a network of 400 Automatic Weather Systems (AWSs) nationwide over an observation mesh size of 18.5 km for severe weather watch. However, KMA has experienced obstacle to detect severe weather events in a scale smaller than the size of observation mesh.

To cope with this problem, KMA plans to install an additional 100 systems to the current network from the period 1999-2003, in particular, on islands and mountain areas to supplement the network. An initial twenty systems of one hundred systems will be installed this year.

When completed, the denser AWS network is expected to contribute to measures in lessening the disastrous impact of severe but smaller scale weather events.

AWS Data Flow Diagram(1)





Participants in the 2nd Joint Meeting on Seasonal Prediction of the East Asian Monsoon.

2nd Joint Meeting on Seasonal Prediction of East Asian Monsoon

The second joint meeting on Seasonal Prediction of East Asian Monsoon was held at the KMA headquarters on May 20-21 with forty five experts in attendance including those from the Japan Meteorological Agency (JMA) and China Meteorological Administration (CMA).

The JMA, CMA and KMA experts exchanged views on the evolution of the East Asian summer monsoon and typhoon behavior, and shared experience and technologies on long-range weather forecasting, particularly, on seasonal prediction of the East Asia summer monsoon. They discussed recent characteristics of regional climate in the area, the perspective of weather and typhoon behavior during the 1999 season.

The joint meeting recognized the need for closer cooperation among the three countries to improve accuracy of prediction technologies and long-range forecasting, and called for the participation of academic and research communities to insure sufficient knowledge in advancing prediction technologies.

JAPAN

MTSAT launched

Japan's Multi-functional Transport Satellite (MTSAT), successor to the Geostationary Meteorological Satellite-5 (GMS-5) was launched this summer on board H-II Rocket at the Tanegashima Space Center of the National Space Development Agency (NASDA). MTSAT will commence operation in around March 2000 after its in orbit tests.

The MTSAT will provide digitized cloud imagery through the High Resolution Imager Data (HiRID) broadcast

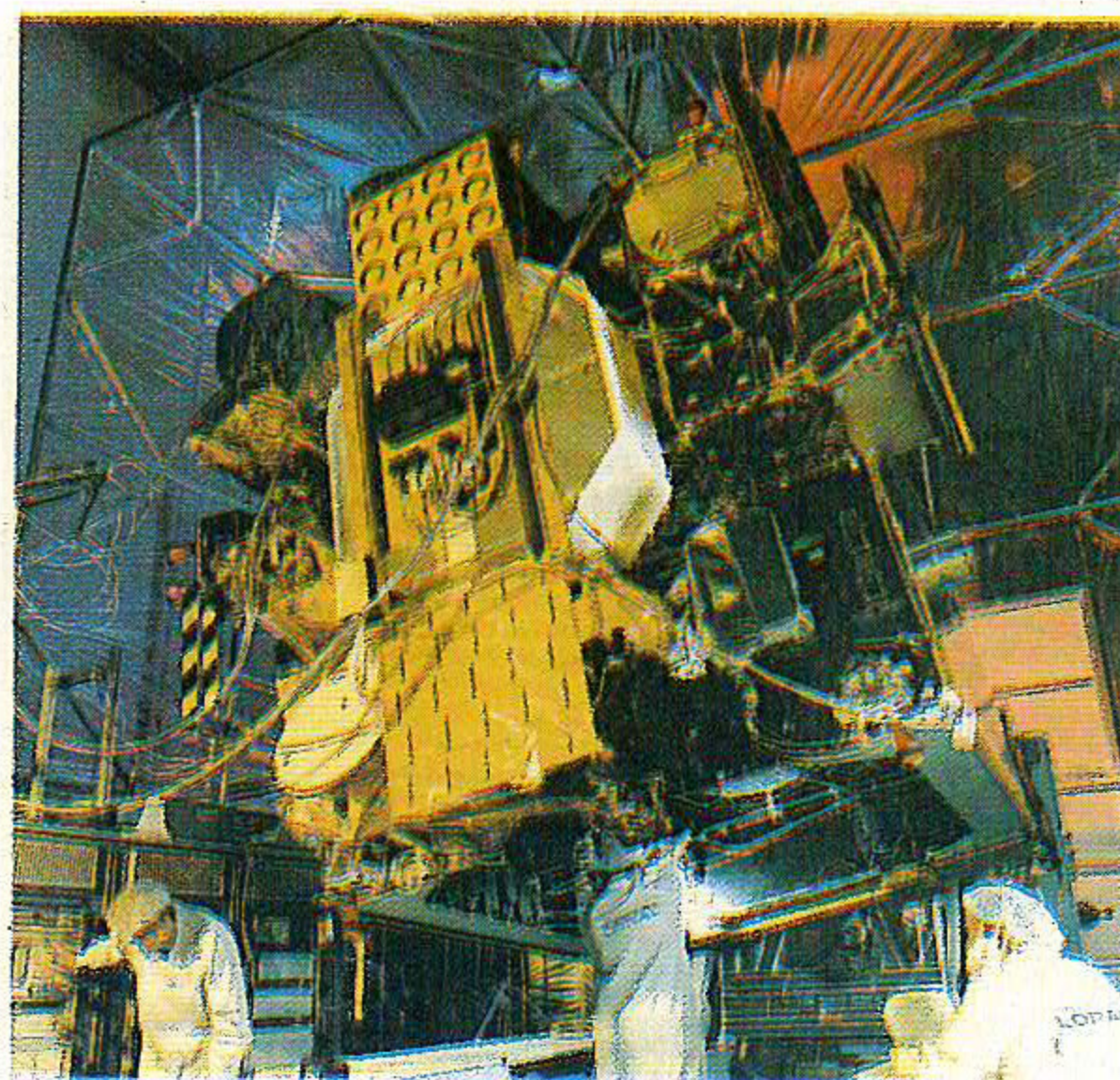
THAILAND

7th WMO Scientific Conference on Weather Modification

The Seventh WMO Scientific Conference on Weather Modification was held in Chiangmai, Thailand, on 17-22 February 1999, hosted by the Royal Rainmaking and Agricultural Aviation in cooperation with the Thailand Meteorological Department.

The conference focused on the accomplishments of the field programmes, their evaluation procedures, and research needs; and emphasized on the new methods and procedures in weather modification.

One of the more hopeful developments presented at the meeting concerns hygroscopic seeding for precipitation increase and possible hail suppression. However, much more is needed to test this promising technique. Understanding of the effects are through numerical simulations of method and innovative field work.



The MTSAT during performance test

for Medium Scale Data Utilization Stations (MDUSs) and the Low Rate Information Transmission (LRIT) for Small Scale Data Utilization Stations (SDUSs). The HiRID is compatible with present S-VISSR data. The LRIT is a new digital transmission system which is capable of disseminating meteorological data and products in addition to cloud imagery to national Meteorological Services including TC Members.

Grid Point Values (GPVs) of JMA's Global Spectral Model for the Asian area and global area, GPVs of JMA's Global Wave Model, advisories on tropical cyclones, and observational data will be available through the LRIT. The present WEFAX broadcast service will be discontinued after three years of parallel operation with the LRIT.



Participants in the Second Int'l. Training Seminar on Typhoon Monitoring and Forecasting.

2nd Int'l Training Seminar on Typhoon Monitoring and Forecasting

The Second International Training on Typhoon Monitoring and Forecasting in the western North Pacific, an activity of the RSMC Tokyo-Typhoon Center, was held in Tokyo, Japan, from January 18 to February 5, 1999. Experts from Cambodia, Hong Kong (China), Republic of Korea, Lao PDR and Macau attended the training seminar aimed at sharing recent knowledge and techniques in typhoon prediction among TC Members.

Several examples of tropical cyclone analysis and forecast with satellite data and numerical weather prediction products were presented by members of the RSMC staff. Case studies on tropical cyclones in the western North Pacific and their damages were discussed with the end view of enhancing meteorological services and disaster prevention against tropical cyclones.

COMPARE III workshop in Tokyo

The third COMPARE Workshop will be held in Tokyo, Japan, in December 1999. The powerful development of Typhoon 9019 (Flo) during the SPECTRUM special observation period is the subject for Case III of the COMPARE (Comparison of Mesoscale Prediction and Research Experiments) project under WMO-CAS/JSC-WGNE.

The workshop will be attended by several institutions and groups which carry out numerical experiments with their numerical models. The Japan Meteorological Agency (JMA) as the lead center of the Case III collects the results and conducts their verification and model intercomparisons.

The objective of COMPARE Case III is to clarify the capability of current numerical models in simulating the development of tropical cyclones, and important physical processes for the development of tropical cyclones. The workshop will discuss subjects based on the verification and model intercomparisons as follows: 1) accuracy of numerical predictions; 2) relation between characteristics of each model and its performance; and 3) common issues for the improvement of numerical models.

RSMC tropical cyclone advisories on the WMO-DDBs Web Server

In answer to the request of the 49th session of the Executive Council of WMO and the 30th session of the Typhoon Committee, the RSMC Tokyo-Typhoon Center established Internet access to RSMC tropical cyclone advisories last March to provide the international media with basic information on tropical cyclones. The advisories include the latest analysis of tropical cyclones in the western North Pacific, their track forecast up to 72 hours, etc. They are available on the WMO-Distributed Data Bases (DDBs) Web Server operated by JMA at <http://ddb.kishou.go.jp> and <ftp://ddb.kishou.go.jp>.

The DDBs Web Server provides access to GPV products of JMA's Global Spectral Model in GRIB format and map image, climate products such as monthly climate anomaly (surface temperature, sea level pressure, 500 hPa height, etc.), and oceanographic conditions for the past one year. Readers are invited to visit JMA's DDBs Web Server.

U.S.A.

New building for Tiyan Forecast Office

The construction of the new building which will house the Tiyan, Guam Forecast Office is underway with completion scheduled for mid-January 2000 and formal occupancy in mid-April 2000. The new building is specially designed to withstand winds of 195 MPH and an earthquake of 8.5 Richter Magnitude. It will be equipped with dual emergency generators, storage for two weeks of fuel for the generators and its own water supply to enable the Forecast Office to continue operations under the most difficult conditions.

Tiyan Forecast Office typhoon briefing

The Tiyan Forecast Office recently announced the Western Pacific Typhoon Season with a briefing for customers and media. The intent was to bring together the agencies that disseminate information to the public (civil defense, media) and make sure they understand the new products and schedules, particularly in light of the Joint Typhoon Warning Center (JTWC) move to Hawaii.

The briefing was well attended and significant strides were made in terms of increasing the visibility and credibility of the National Weather Service in Guam. Ginger Cruz, communications director for the Governor, said all her concerns had been addressed. The former head of civil defense publicly expressed confidence in the Weather Service's capabilities with or without the local presence of JTWC.

The incumbent acting administrator for civil defense was also there and said he was looking forward to working with the NWS. Attending for the first time were the Mayors of Tamuning, Tumon and Harmon - the most populated villages. A separate briefing was requested for the Council of Mayors.

Guam's Disaster Preparedness Week '99

NWSO Tiyan participated in Guam Civil Defense's "Disaster Preparedness Week 1999" on May 1, setting up and manning a static display booth at the Guam Premium Outlets Mall. Members of the staff met the public, answered questions regarding products and services, and provided weather disaster preparedness brochures and education materials.

NOAA Weather Radio was prominently displayed and actively promoted as an ever present source for weather forecasts and warnings. Booth visitors participated in a weather information questionnaire, requesting sources of forecast and warning information, comprehension of NWS products and services, and suggested improvement.