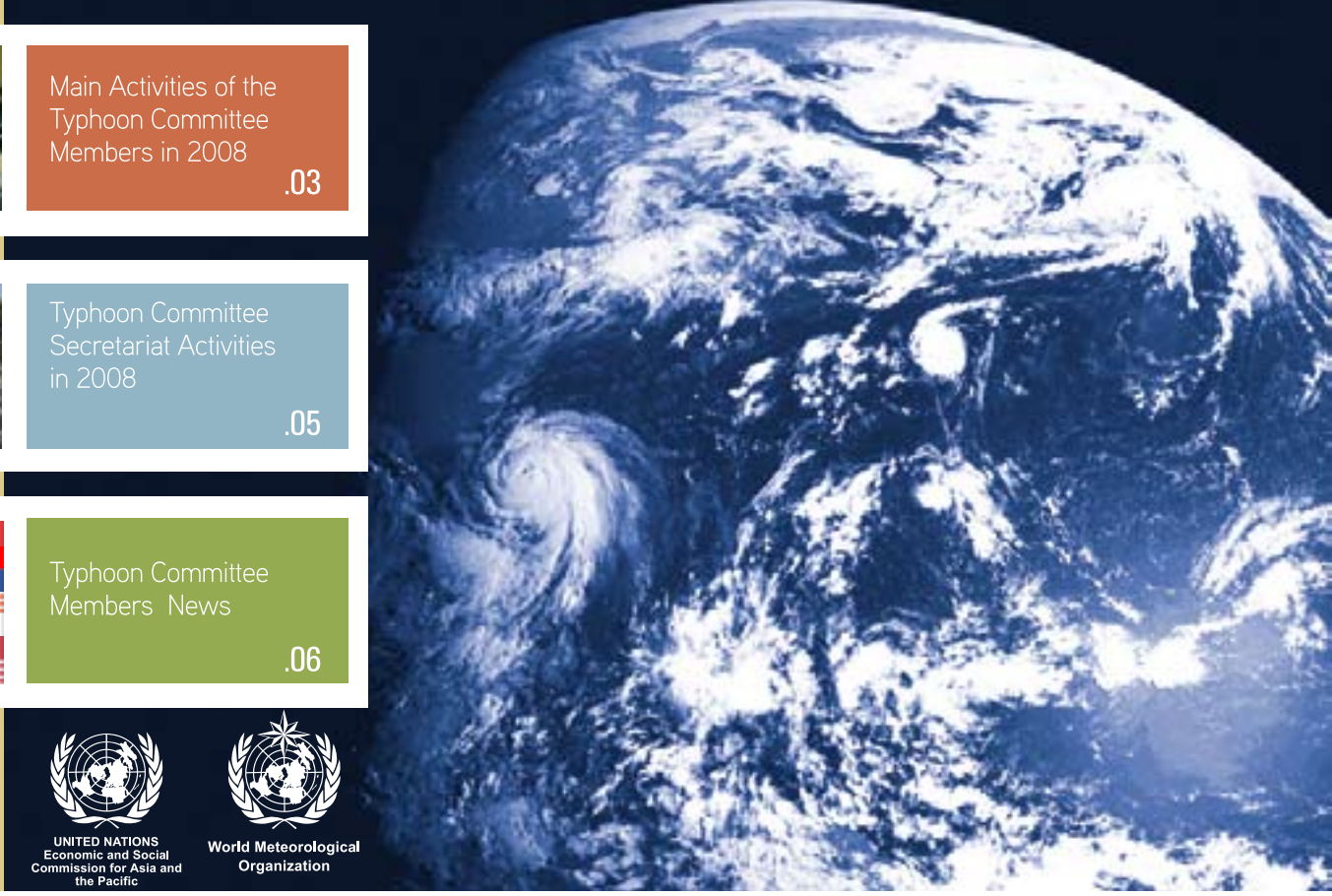

UNITED NATIONS Economic and Social Commission for Asia and the Pacific

World Meteorological Organization

UNESCAP/WMO Typhoon Committee

Newsletter

TCS-Macao,China
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ESCAP/WMO Typhoon Committee

Editorial

The Typhoon Committee celebrates in 2008 its fortieth anniversary. The first steps for its creation were given in the distant sixties, some years before the first session, which was held in December 1968, in Bangkok, Thailand. Forty years later, also in Thailand, we have now the opportunity to celebrate the successful career of this intergovernmental body.

During these four decades, four more intergovernmental bodies were created to struggle against the consequences of tropical cyclones. These five bodies are integrated in the WMO Tropical Cyclone Programme, and two of them, our Committee and the WMO/

The Fortieth Session of the Typhoon Committee

Group Photo during the 40th Session of Typhoon Committee

The Government of the Macao Special Administrative Region (SAR) of People's Republic of China, in cooperation with ESCAP and WMO hosted the fortieth Session of the Typhoon Committee, which was held in Lotus Room, World Trade Center, Macao, China, from 21 to 26 November 2007.

The Session was attended by 82 participants from 13 out of 14 Members of the Typhoon Committee: Cambodia; China; Hong Kong, China; Japan; Lao PDR; Macao, China; Malaysia; Philippines; Republic of Korea; Singapore; Thailand; the Socialist Republic of Viet Nam and the United States of America (USA).

The Session was also attended by two observers, one from United Nations International Strategy for Disaster Reduction Secretariat (UN/ISDR) and one from the Asian Disaster Reduction Center (ADRC).

Olavo Rasquinho, TCS

EDITORIAL

CONTINUED FROM PAGE 1

ESCAP Panel on Tropical Cyclones, were simultaneously created under the auspices of ESCAP and WMO.

Since the fortieth Session, which was held in Macao, 21-26 November 2007, the Typhoon Committee has given some more steps forward on the reinforcement of its identity. Further to a decision of TC taken at that Session, a contest was run for a symbol/emblem for Typhoon Committee to celebrate its fortieth anniversary. The Macao Meteorological and Geophysical Bureau (SMG) and Typhoon Committee Secretariat have promoted a contest in Macao, and a panel of evaluation composed of designers and representatives of TCS and SMG evaluated the 42 proposals submitted by 29 candidates. The selected proposal and another entry proposed by Hong Kong were both submitted to the Advisory Working Group, which has selected the proposal from Macao. The selected emblem/symbol is now the official logo of Typhoon Committee.

Also following a decision of Typhoon Committee, the Typhoon Committee Secretariat invited all Members to propose a song to celebrate the 40th anniversary of TC. Three Members have proposed lyrics and music: Hong Kong, China; USA and Viet Nam. The songs were submitted to the appreciation of the Advisory Working Group that has selected the entry from Hong Kong, "Typhoon! Typhoon!", whose author of the lyrics is Dr. C. Y. Lam, Director of Hong Kong Observatory. These two symbols, the new logo and the song, will surely contribute for strengthening of the TC identity.

In order to disseminate the mission, vision and key result areas of Typhoon Committee and following a decision taken at fortieth Session, TCS has created a brochure of two pages, in which the objectives of TC are highlighted. A booklet was also published with the same purpose. Both publications were supervised by the Advisory Working Group.

During the year 2008 some Members of Typhoon Committee were affected by typhoon-related hazards, such as storm surges, floods, flash floods and landslides. Thousands of lives were saved thanks to the prompt action of meteorological and hydrological authorities, who have issued timely early warnings which permitted the civil defense authorities to proceed to the evacuation of populations. Even the premises of the Typhoon Committee Secretariat in Macao were affected by a storm surge associated to the typhoon Hagupit, which caused serious damage to the building and equipment.

Despite the efforts of the Members, many lives were still lost and the Typhoon Committee is increasingly determined to join forces to achieve the its mission: reducing the loss of lives and minimizing the social, economical and environmental impacts caused by typhoons.

41 st Session of TC

Opening Ceremony and Members photos.

Representatives from the Economic and Social Commission for Asia and the Pacific (ESCAP), the World Meteorological Organization (WMO) and Typhoon Committee Secretariat (TCS) also attended the session.

The Session was declared open by his Excellency, Mr. Edmund Ho, Chief Executive of Macao in the presence of his Excellency Mr. Wan Yong Xiang, Commissioner of the Ministry of Foreign Affairs of the People's Republic of China in the Macao SAR and his Excellency Mr. Lau Si Io, Secretary for Transport and Public Works for Macao.

At the opening ceremony statements were delivered by Dr. Fong Soi Kun, Director of Macao Meteorological & Geophysical Bureau (SMG); Mr. Le-Huu Ti, the representative of UNESCAP Secretariat, on behalf of the Director of the Environment and Sustainable Development Division of UNESCAP; Dr. Tokiyoshi Toya, the representative of the WMO Secretariat on behalf of Mr. Michel Jarraud, Secretary-General of WMO. The key note speech was addressed by Mr. Olavo Rasquinho, Secretary of Typhoon Committee in representation of the Chairman of Typhoon Committee, Dr. Prisco D. Nilo.

Dr. Fong Soi Kun, Director of SMG was elected Chairman of the Typhoon Committee and Mr. Suparerk Tansriratanawong, Director-General of Thai Meteorological Department and Dr. M.C. Wong, Assistant Director of Hong Kong Observatory were elected Vice-Chairmen. Mr. Jeffrey LaDouce, Director of National Weather Service, NOAA-Pacific Region Headquarters was elected Chairman of the Drafting Committee.
Prior to the plenary session, three parallel sessions on meteorology, hydrology and disaster prevention and preparedness (DPP) were convened on the morning of 21 November 2007 in three separate meeting areas to review the progress of work during 2007, to identify priorities for cooperation and to recommend points to the Committee for consideration.

The Typhoon Committee discussed in detail the activities carried out by its members, including important achievements, major issues and future directions by each member related to the Meteorological, Hydrological, and Disaster Prevention and Preparedness components. It also reviewed the activities undertaken on Training and Research.

The Committee also discussed the information provided by the members and the findings of the parallel sessions of the Working Group on Meteorology (WGM), Working Group on Hydrology (WGH) and Working Group on Disaster Prevention and Preparedness (WGDPP). The Committee re-established the WGM, WGH, WGDPP and the Advisory Working Group (AWG).

The major outcomes of the parallel sessions of the three Working Groups were reported to the plenary session and are described in detail in the Report of the Fortieth Session of Typhoon Committee.

MAIN ACTIVITIES OF TC MEMBERS IN 2008

Parallell Session of WGM during 40th Session

Meteorological Component

The Typhoon Committee Working Group on Meteorology is developing three projects: "Typhoon Information Processing Systems (TIPS)", "Experiment of Improvement of Precipitation Forecasting related to Interaction between Monsoon and Tropical Cyclone" and "Global Telecommunication System (GTS) and Digital Video Broadcasting System (DVBS) Data Sharing" with an aim to be adopted by the Typhoon

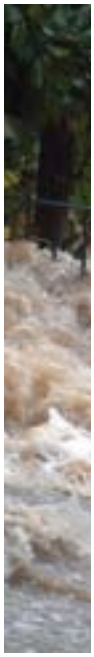
A workshop is being prepared by WGM for introduction of TIPS of each Member. This workshop is intended to allow the interaction among the TC Members and among system developers and users. TIPS is a powerful tool that helps forecasters to process and display prognostic information for either deterministic or probabilistic forecasts. At this stage only some TC Members have this type of tool and this workshop will surely contribute for the less developed Members to develop their systems. This forecasting tool is a great help for forecasters to produce weather forecasts and the issuance of early warnings.

Simultaneously, in conjunction with WGM workshop on TIPS, the Training and Research Coordination Group is also preparing a workshop on Ensemble Prediction Systems (EPS). This workshop will provide information and training to forecasters based on numerical prediction methods which generate representative states of the atmosphere and complement other forecasting methods. The more advanced TC Members have already this type of information which can be used by other Members.

Parallell Session of WGH during 40th Session

Hydrological Component

Four projects were finalized in 2008: Development of Guidelines for Reservoir Operation in Relation to Flood Forecasting; Decision Support System for Flood Forecasting System Operation & Planning (DSS-FOP); Project on operational flood forecasting systems and its application (OFFSIA); Project on the Establishment of Community-based Blood Forecasting & Warning System (CBFFWS). The first two projects were led by the Republic of Korea, the third one by China and the forth one by the Philippines.



Projects to be finalized in 2009: Flood Hazard Mapping and Debris Flow & Landslides Warning System, both to be led by Japan.

Projects to be continued beyond 2009: On-the-job Training on Flood Forecasting between TC Members, to be led by Malaysia.New projects were proposed by the WGH: Project on Urban Flood Management in TC Region (proposed by China); Project on Assessment System of Socio-economic Impacts of Water-related Disasters for Infrastructure (proposed by ROK); Project on Hazard Mapping for Sediment-related disasters (proposed by Japan); Project on the Establishment of Flood Disaster Preparedness Indices (proposed by Japan). The Project on Urban Flood Management in TC Region is a crosscutting project involving the three components of TC: Meteorology, Hydrology and Disaster Prevention and Preparedness.


Parallell Session of WGDPP during 40th Session

Disaster Prevention and Preparedness Component

WGDPP is currently developing the Typhoon Committee Disaster Information System (TCDIS), which is intended to become a timely and efficient way of typhoon-related disaster information via internet, which can also be used as a platform for the Members to share disaster data, knowledge and experiences, good practices, and other information related to typhoon-disaster risk reduction. The respective website is under construction and contains detailed information on the Disaster Management Systems and Early Warning Systems of some TC Members.

With the objective of introducing the TCDIS and collect disaster related information, an expert mission visited the following TC Members (12-19 May 2008): Lao People's Democratic Republic, the Philippines, Thailand and Viet Nam. Very detailed documents elaborated by Korean National Emergency Management Agency (NEMA), namely Guidelines of TCDIS, and Questionnaire for Web-GIS Based TCDIS, were provided to the participants from the visited countries. In this mission was also collected information on the need for public outreach projects in relation to early warning systems and disaster risk reduction in the participating Members. The Development of Web-GIS Based TCDIS is the next step for providing spatial information on typhoon-related disasters using Geographic Information System technology, which will enable users to visualize the locations where the disasters occurred.

WGDPP published in 2008 the technical documents "Typhoon Committee Expert Mission Report" (WMO/TD-No 1448), "Typhoon Committee Disaster Information System" (WMO/TD-No 1449) and drafted two other, "Early Warning System" and "Disaster Management System".

Training and research

Various research and training activities are already being pursued under the three components of TC, namely on forecasting and warning issues (meteorological component), application issues such as flood forecast and water management (hydrological component) and impact issues (DPP component). The research and training activities that have been undertaken or being pursued can be summarized as follows: attachment of women forecasters to the Regional Specialized Meteorological Centre (RSMC) of Tokyo; roving seminars; research fellowships; special projects, workshops of TC, WMO or other organizations.


TRCG Chair, Mr. Edwin Lai

The Training and Research Coordination Group takes charge of coordinating these activities and has recently prepared the document "TRCG Concept Note on the Management of Typhoon Committee Knowledge-based Resources", which was submitted to the AWG and is a kind of guideline for future activities on training and research. In this document it is planned the establishment of a portal to be managed and operated by TCS under the Typhoon Committee website with input of contents to be provided by TRCG and TC Members.

Due to unavoidable circumstances the Roving Seminar 2008 with the focus on training on tropical cyclone warning services was postponed to 2009.

ACTIVITIES OF THE TYPHOON COMMITTEE SECRETARIAT IN 2008

The Typhoon Committee Secretariat, as executive body of TC, takes charge of putting into practice the decisions of TC taken in the annual sessions. Recently installed in Macao, TCS has developed activities of interest for the good achievement of the TC objectives.

Participation of TCS staff in International Meetings

Climate change has been a major concern of the TC Members and the Integrated Workshop on Coping with Climate Change that was held in Beijing, China, from 22 to 26 September 2008, was the first step for joint projects in this regard. Following this workshop, a meeting of chairs of the TC working groups was held in Macao, 11-12 December 2008. In this workshop the participants had the opportunity to analyze the feasibility of projects involving the three working groups, namely projects on urban floods and on strengthening the capacity of Typhoon Committee Members on climate change adaptation.

Since the issue of the TC Newsletter No. 19, besides the two referred meetings the TC Secretariat representatives have participated in various events, namely in the 4th General Meeting of IFNet, where a presentation was addressed by the TC Secretary, and Asia Pacific Water Summit, both at Beppu City, Japan; 5th Disaster Management Practitioners' Workshop, in Phnom Penh, Cambodia; Third DPP Meeting - Seoul, Republic of Korea; 64TH Session of ESCAP – Bangkok, where a summary of the report on the activities of TC in 2007 was presented by the TC Secretary; Fifth Annual Meeting of the Asia Oceania Geosciences Society (AOGS) in Busan, Korea, where the hydrologist of TCS, Mr Jinping Liu, made a presentation on "Experiences on Water-Related Disaster Management in China"; Asian Conference on Disaster Reduction, in Bali, Indonesia. The TCS was also represented by its Secretary in DPP expert mission to some TC Members.

Dr. Roman L. Kintanar Award for Typhoon-Related Disaster Mitigation

TCS in consultation with AWG prepared the rules and procedures related to the implementation of the Roman L. Kintanar Award for Typhoon-Related Disaster Mitigation.

Regular publications

Besides this Newsletter TCS has also published in 2008 the Typhoon Committee Annual Review (2007).

TCS staff in the 40th Session of TC

Celebration of the 40th anniversary of TC

TCS and the Macao Meteorological and Geophysical Bureau (SMG) organized in 2008 a contest for creating an emblem/symbol for TC, to celebrate the 40th anniversary of Typhoon Committee. The selected logo was proposed by a designer from Macao.

A contest for a song for TC was also organized. Several Members have proposed music and lyrics and the selected song, "Typhoon! Typhoon!", was proposed by Hong Kong, China. The panel of evaluation for both contests was composed of the members of Advisory Working Group.

As part of the celebrations TCS, under the supervision of AWG, created a brochure and the booklet "ESCAP/WMO Typhoon Committee - Forty years of International Cooperation" outlining the profile of this intergovernmental body, namely in what refers TC's vision, mission, key result areas and strategic goals.

ACTIVITIES OF ESCAP AND WMO IN SUPPORT OF TC IN 2008

UNITED NATIONS Economic and Social Commission for Asia and the Pacific

World Meteorological Organization

In 2008 the ESCAP and WMO continued to extend their support to the Committee's activities in several areas of its work. The advices of their representatives, both ex-officio members of the Advisory Working Group, greatly contributed to facilitate the work of the Typhoon Committee Secretariat.

TC NEWS FROM MEMBERS

Hong Kong, China

1. Aviation Weather Disaster Risk Reduction website focuses on tropical cyclone hazards:

At the 13th Session of the Commission for Aeronautical Meteorology (CAeM) held in 2006, a pilot project on "Aviation Weather Disaster Risk Reduction" led by the Hong Kong Observatory, Hong Kong, China, was established in Regional Association II (Asia) to assist NMHSs in the Region in disaster risk reduction and to facilitate aviation stakeholders in their operational planning and decision-making. Priority was given to tropical cyclone hazards in view of its significant impact on airport operations in the Region.

Based on feedback from aviation users, a website (http://adrr.weather.gov.hk) was launched by the Hong Kong Observatory in September 2007 for trial use and evaluation by Members in RA II and local aviation users. The website contains tropical cyclone warnings issued by weather services in China, Hong Kong - China, Japan and the Philippines, advisories/warnings issued by the Tropical Cyclone Advisory Centre of Japan and the Joint Typhoon Warning Centre of USA, and NWP forecasts of the European Centre for Medium-Range Weather Forecasts and China Meteorological Administration, amongst other products (Figure 1). To demonstrate how the products could be utilized for operationaldecision-making by aviation users at an airport, weather forecasts for the Hong Kong International Airport and its alternates are also included on the website.

In a survey conducted jointly with WMO in 2008, more than 97% of the responses from RA II Members and aviation users rated the performance of the products in the website as 'good' or 'acceptable'. They generally considered the products beneficial to the aviation community and the population in the Region affected by natural disasters.

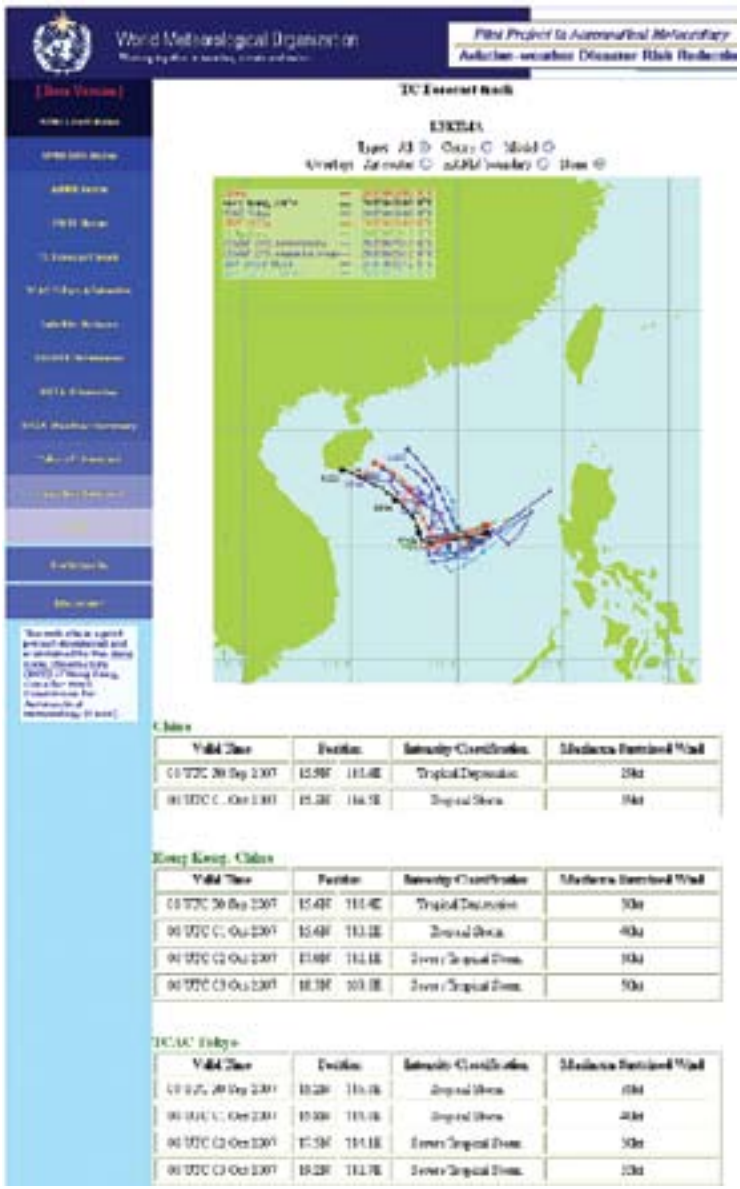


Figure 1 Forecast tracks of tropical cyclone Lekima (0714) shown on the Aviation Weather Disaster Risk Reduction website.

2. New tropical cyclone forecasting tools developed for aviation forecasting

Since June 2008, an empirical model based on tropical cyclone parameters including strong/gale/storm/hurricane wind radii, forecast positions and intensities was developed to provide objective guidance on wind forecast for the Hong Kong International Airport during the passage of tropical cyclones up to 72 hours ahead. Manual adjustments to the tropical cyclone parameters could be applied on-the-fly to facilitate the formulation of alternative warning strategies.

A tropical cyclone track analog tool was also developed to facilitate automatic extraction of past weather data of tropical cyclone cases with similar tracks for easy reference.

3. The Director's Blog

The Hong Kong Observatory launched the "Director's Blog" on its website http://www.weather.gov.hk/blog/en/ in May 2008. Through the blog, the Director shares his views with the public on current affairs, particularly those related to tropical cyclone and other severe weather. The Blog serves as a channel to increase the public's awareness of disaster prevention and mitigation, and provides a human touch to promote a better understanding of the weather services and warnings in Hong Kong.

4. Typhoon Committee Research Fellowship at the Hong Kong Observatory

In late 2007, Mr. Nguyen Dang Quang of the National Centre for Hydro-Meteorological Forecasting (NCHMF) of Vietnam was attached to the Hong Kong Observatory under the Research Fellowship Scheme to study the use of EPS information in tropical cyclone track forecasting. Mr Nguyen found that the simple ensemble mean tracks from JMA or ECMWF EPS were highly correlated with the corresponding tracks from the deterministic models. As such, inclusion of the EPS mean tracks in the multi-model consensus would not improve the forecast skill, at least in the first 72 hours or so. Mr Nguyen's study also revealed that both multi-model consensus and EPS exhibit a common tendency of an increasingly slow bias with forecast range in the motion of the model tropical cyclone vortices.

The Research Fellowship 2008 was taken up by Mr. Santi Sumdin of the Thai Meteorological Department (TMD). Mr. Sumdin would spend two months (20 Oct – 19 Dec 2008) at the Hong Kong Observatory. He has been involving in the NWP model operation and research in TMD for more than 10 years. The theme of the research project is to study the use of high-resolution non-hydrostatic NWP model in forecast of landfalling tropical cyclones over the South China Sea.

Mr. Nguyen Dang Quang working at HKO

Mr. Santi Sumdin's research is on landfalling tropical cyclones

The Hong Kong Music Office Youth Choir performed the Typhoon Committee Song "Typhoon! Typhoon!" during the recording session.

7. Hong Kong, China Composition "Typhoon! Typhoon!" selected as the Song for the Typhoon Committee

The Panel of Judges of a song composition context organized by the Typhoon Committee selected the song "Typhoon! Typhoon!" as the Committee Song. The lyrics of "Typhoon! Typhoon!" was the work of Mr Lam Chiu-ying, Director of the Hong Kong Observatory, and the score was that of Mr Lam Fung, a Hong Kong composer. The Hong Kong Observatory invited the Music Office Youth Choir of the Leisure and Cultural Services Department to sing the song, under the direction of Dr Angelina Au, Senior Music Officer, for recording. Members of the choir braved a rainstorm in October 2008 to get to the recording theatre, and gave a performance that was filled with enthusiasm and vitality. Mr and Mrs Lam showed up at the recording session to cheer up the choir.

Japan

The Eighth Typhoon Committee Training Seminar at the RSMC Tokyo - Typhoon Center

The responsibility of the RSMC Tokyo - Typhoon Center is to assist Members of the ESCAP/WMO Typhoon Committee in typhoon forecasting services. One of the activities of the Center is to hold on-the-job training sessions on typhoon operations for forecasters in the region to improve analysis and forecasting skills through exchanging views and sharing experiences in the field.

This year, two female forecasters, Dr. Eun-Jeong Cha from the Republic of Korea (the Korea Meteorological Administration) and Ms. Suntanee Chaichiangpin from Thailand (the Thai Meteorological Department) visited JMA from 23 July to 1 August 2008 to participate in the eighth Typhoon Committee Training Seminar at the RSMC Tokyo - Typhoon Center. Through the course, the two forecasters learned skills related to satellite analysis of tropical cyclones mainly using the Dvorak method.

Dr. Cha and Ms. Chaichiangpin in the operation room at JMA's Forecast Department

Adaptation strategy against climate change in Japan

In the IPCC 4th Assessment Report, there is concern that climate change may raise the sea, increase the intensity of heavy rainfall and typhoons, worsen drought, and cause more severe water-related disasters. Countermeasures relying only on mitigation are insufficient in the face of climate change, therefore appropriately combining adaptation and mitigation can largely reduce risks.

In Japan, policy report of 'Climate Change Adaptation Strategies to Cope with Water-related Disasters due to Global Warming' was drawn up by Panel on Infrastructure Development in June 2008.

The policy report aims at 'Water-Disaster Adaptive Society' for sustainable socioeconomic activity and daily life by adequate mix of adaptation and mitigation measures. Basic direction of this report is minimizing damages. Adaptation measures to achieve "Zero casualty" should be considered, because "Zero damage" from disasters is difficult. And in a nerve center like the Tokyo metropolitan area, intensive efforts should be made such as preventing from ceasing national function.

Specifically, following five responses to hazards and five adaptations measures are required.

Five responses to hazards
(1) Response to floods
(2) Response to sediment related disasters
(3) A phased approach to storm surges and responses to coastal erosion
(4) Response to drought
(5) Response to changes in river and coastal environment

Five adaptation measures
(1) Adaptation measures by structures
(2) Adaptation measures combined with city planning including land use restriction
(3) Adaptation measures focusing on crisis management
(4) Adaptation measures to reduce drought risk
(5) Adaptation measures to changes in river environment

Policy Report: http://www.mlit.go.jp/river/basic_info/english/climate.htm

Upgrade of the Global Spectral Model (GSM) and Introduction of the Typhoon Ensemble Prediction System (TEPS)

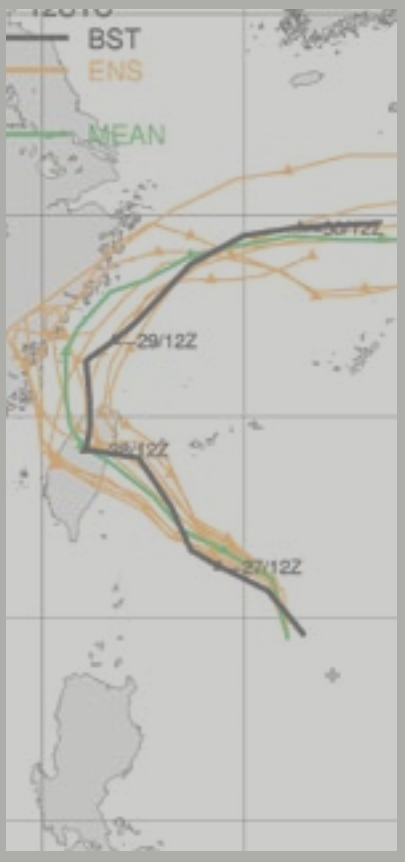
In November 2007, the Japan Meteorological Agency (JMA) upgraded its Global Spectral Model (GSM), greatly enhancing its spatial resolution from the previous TL319L40 (approximately 60 km in the horizontal and 40 layers up to 0.4 hPa in the vertical) to TL959L60 (approximately 20 km and 60 layers up to 0.1 hPa). At the same time, JMA stopped operating the 24-km resolution Typhoon Model (TYM) because the resolution-enhanced GSM started providing detailed representations of synoptic and sub-synoptic features such as tropical cyclone (TC) structures four times a day for all TCs. The TYM had covered TCs and their surrounding area, and had provided finer-resolution TC track and intensity predictions to complement the previous GSM predictions.

In February 2008, JMA started operating a new Ensemble Prediction System (EPS) called the Typhoon EPS (TEPS). TEPS is designed to improve track forecasts of TCs in the area of responsibility covered by the Regional Specialized Meteorological Center (RSMC) Tokyo - Typhoon Center. TEPS has an ensemble size of 11, and is operated four times a day up to 132 hours ahead. The singular vector method is employed to make initial perturbations. The figure below shows an example of TC track prediction using TEPS.

The upgrading of the GSM and the introduction of TEPS is expected to contribute to enhancing the accuracy of TC forecasts.

Maximum instantaneous wind speed data available at AMeDAS stations

In March 2008, JMA started to provide maximum instantaneous wind speed at about 230 stations of the Automated Meteorological Data Acquisition System (AMeDAS), in addition to about 150 meteorological observatories, which have provided maximum instantaneous wind speed data. The maximum instantaneous wind speed data obtained every ten minutes are available for public use at the JMA website. In 2007, JMA started to deploy new AMeDAS equipments to obtain maximum instantaneous wind speed data; the total number of stations with the new equipments will increase to about 800 by March 2009. Detailed meteorological information that includes the maximum instantaneous wind speed at AMeDAS stations, is expected to contribute to disaster prevention activities of JMA.



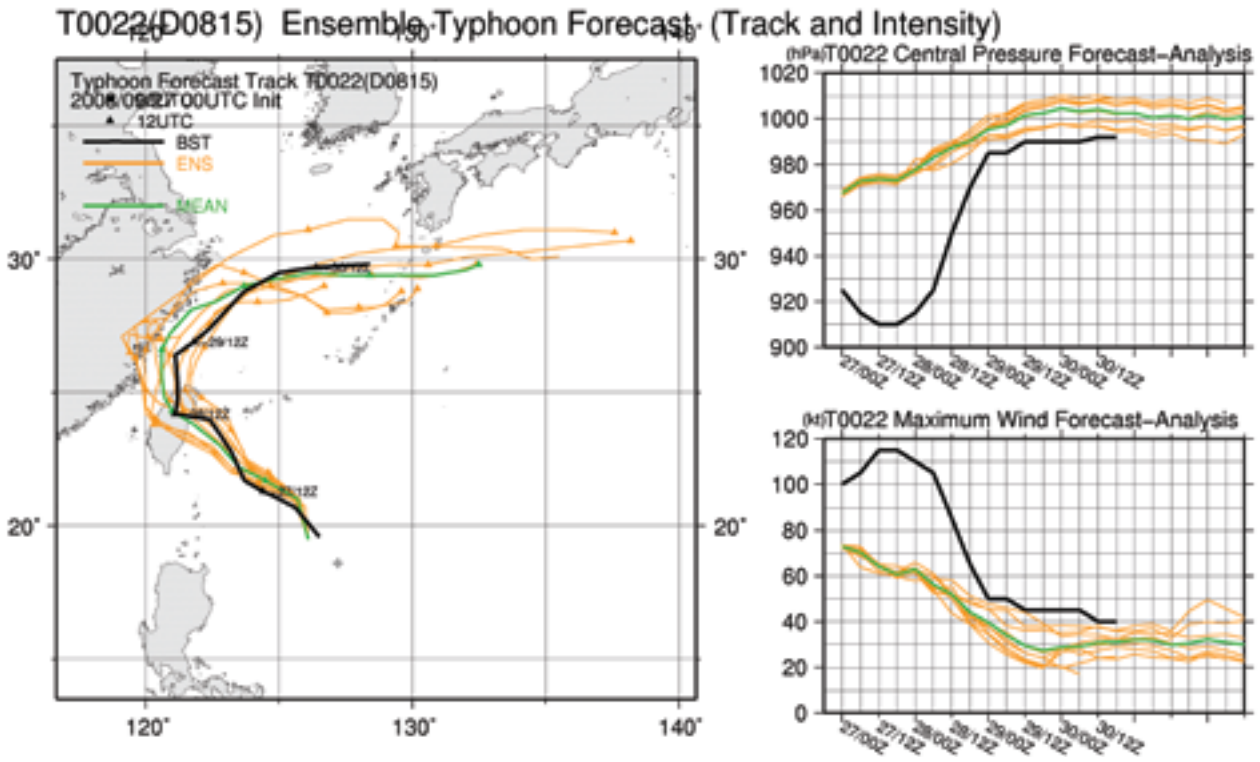
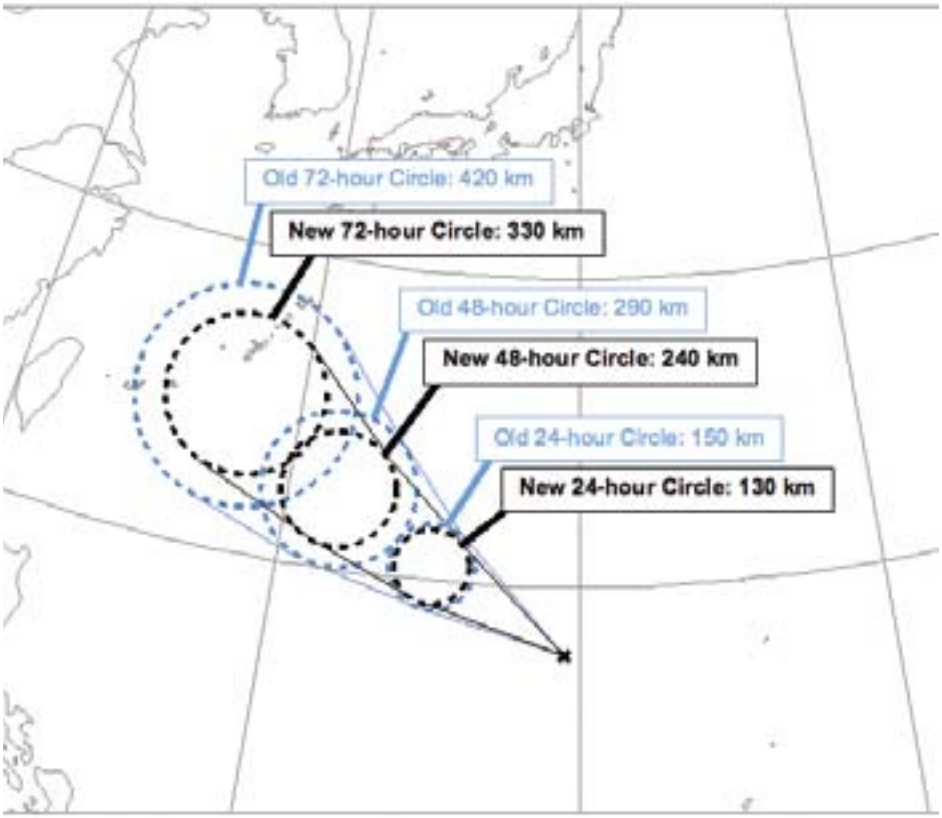


Figure: Example of TC track prediction using TEPS
The initial time is 0000 UTC on 27 September 2008. The black line represents the observed track of the TC, the orange lines represent the tracks predicted by ensemble members, and the green line shows the ensemble mean track.

Improvement of JMA's Tropical Cyclone Track Forecasts

From 21 May 2008, JMA's RSMC Tokyo - Typhoon Center improved its forecasts, reducing the radii of the probability circles* in its Tropical Cyclone (TC) track predictions. The radius of the circle is determined statistically based on performance over the past several years depending on the direction and speed of TC movement. Verification of JMA's operational forecasts from 2004 to 2007 indicated the feasibility of a reduction in the radii of the circles by about 15% on average, and by 20% in the case of a TC moving northwestward and 10% for other directions. This improvement of TC track forecasting was enabled mainly by advances in numerical weather prediction techniques.

* Probability circle: a circular area within which a TC will be located with a probability of 70% at each forecast time to indicate the uncertainty of a forecast



Examples of track forecasts with new/old probability circles and their radii in the case of tropical cyclone Saomai (0608)

THORPEX Pacific Asian Regional Campaign (T-PARC)

In the typhoon season of 2008, an international field experiment involving special typhoon observation was carried out as part of a World Meteorological Organization (WMO) research programme.

THORPEX is a ten-year international global atmospheric research project being implemented under the WMO's World Weather Research Programme (WWRP). Its aim is to accelerate improvements in the accuracy of one-day to two-week high-impact weather forecasts and in society's utilization of weather products. The program was established in May 2003 by the 14th WMO Congress (see http://www.wmo.int/pages/prog/arep/thorpex/index_en.html).

As a regional THORPEX project, a summer field experiment by the THORPEX Pacific Asian Regional Campaign (T-PARC) was implemented this year. T-PARC is a project based on societal needs, and aims to improve prediction in the following two areas: (i) the lifecycle of Western Pacific and Asian typhoons from genesis to extratropical transition/decay, and (ii) high-impact weather events over North America, the Arctic and other locations whose dynamical roots and/or forecast errors are driven by typhoons and other intense cyclogenesis events over east Asia and the Western Pacific.

This summer field experiment had three specific major areas of focus: (i) tropical cyclogenesis, (ii) recurvature, and (iii) extra-tropical transition (ET). The objectives of T-PARC include both the improvement of regional prediction in Asia and North America and study of the impact of these events on the downstream flow of global atmospheric circulation.

During the T-PARC special observation period between August 1 and October 5 2008, eleven tropical circulation systems, including four named tropical storms (Nuri, Sinlaku, Hagiput and Jangmi), were observed using a variety of observation tools including sondes, manned aircraft (the DLR Falcon, and planes from the US Air Force and a related science project) and the MTSAT satellite. The observation data gathered are expected to lead to a deeper understanding of typhoons and other high-impact weather events and to help improve forecasting of them.

The contributions of each participating country are outlined below.

Germany

In the framework of T-PARC, the Falcon 20 aircraft of the Deutsches Zentrum für Luft- und Raumfahrt (DLR) was deployed to the US Naval Facility Atsugi in Japan for six weeks. Scientists from JMA and the Forschungszentrum Karlsruhe/University of Karlsruhe joined the aircraft support team in Atsugi and the operations were closely coordinated with other T-PARC resources. The Falcon performed 25 research flights and gained observations with a worldwide unique combination of instruments: a scanning coherent wind lidar, a four wave length water vapor lidar and a dropsonde system. The lidar systems provide volume-averaged observations and are therefore seen as more useful (representative) information for assimilation in numerical models than point observations like dropsondes. However, lidar observations are restricted to cloud-free regions or regions above clouds. An unprecedented data set for typhoon research and the investigation of the extra-tropical transition (ET) of tropical cyclones could be obtained through the coordination of four aircraft that followed the typhoon Sinlaku and Jangmi for 13 and 9 days respectively. This enabled simultaneous observations of the typhoon core, the typhoon environment and sensitive areas related to the midlatitude flow or the subtropical high that are often highlighted by singular vector sensitivity calculations.

Support was provided for the operations center in Monterey by doctoral students from Karlsruhe and the DLR and by the preparation of model forecast products, including high resolution forecasts with the COSMO model of the Deutscher Wetterdienst run at the Steinbuch Centre for Computing in Karlsruhe.

Scientists from the DLR, Karlsruhe and the European Centre for Medium-range Weather Forecasts (ECMWF) will collaborate with Asian and American partners on the data analysis, will carry out modeling and diagnostic studies for the T-PARC cases, and will conduct data denial studies with the ECMWF global model to evaluate the benefit of additional observations for typhoon forecasts, determine optimal observing strategies for typhoon targeting, evaluate the relative benefit of different observing systems and gain a better understanding of the downstream impact of ET.

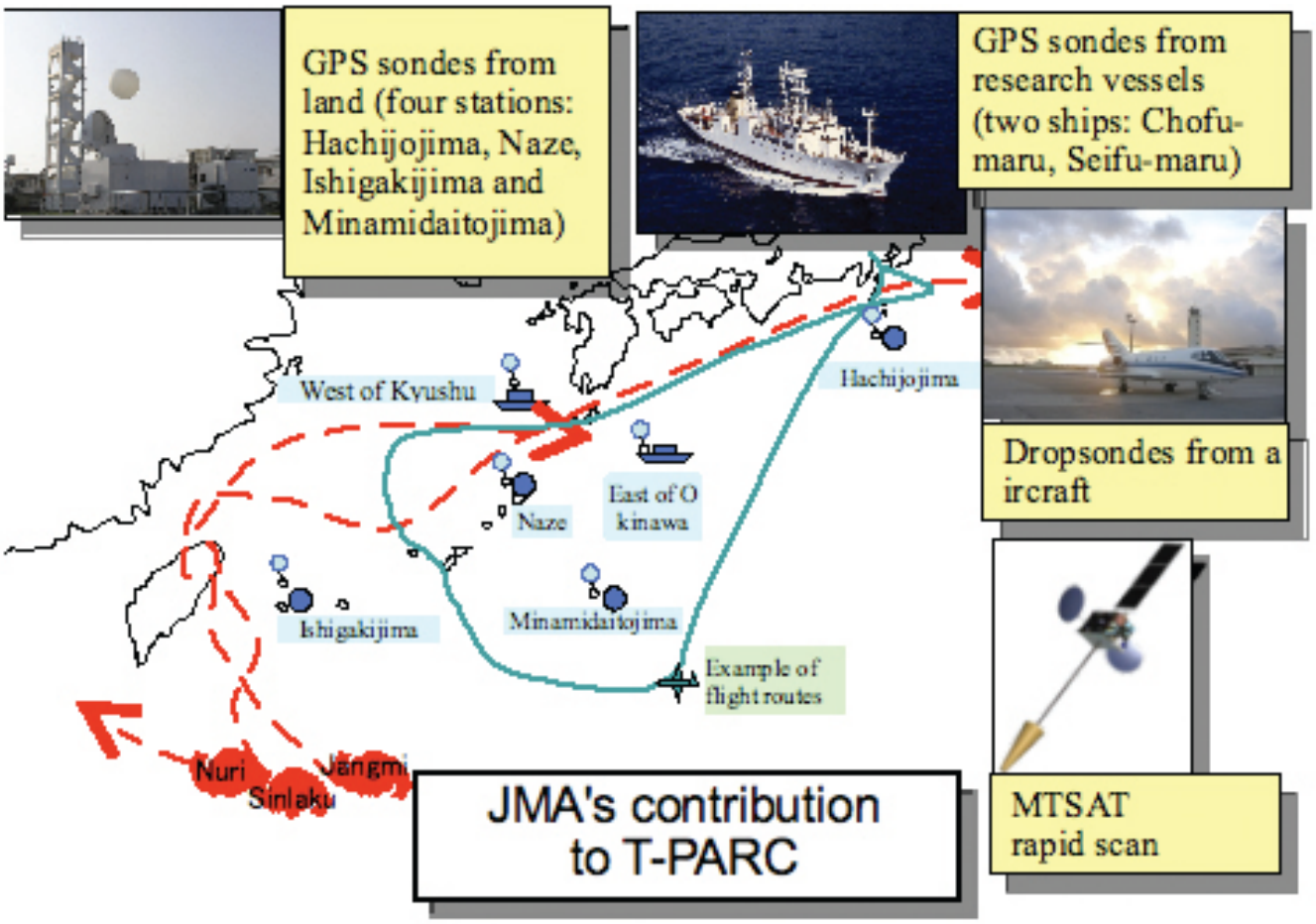
Further information on the Falcon deployment can be found on:
http://www.pa.op.dlr.de/tparc/

Japan

During the campaign, the Japan Meteorological Agency (JMA) deployed the following enhanced observations targeting Nuri, Sinlaku and Jangmi: (i) enhanced upper soundings by two research vessels and four land stations, and (ii) MTSAT rapid-scan operations, in addition to collaborative dropsonde operations by aircraft. JMA also provided products related to typhoon ensemble forecasting and sensitive-area information useful for typhoon-targeting observation.

To support T-PARC's operations, JMA also created a web page at http://tparc.mri-jma.go.jp to give an overview of the campaign. The web page includes the special observation schedule, provides information on current atmospheric conditions and forecasts, and gives guidance on special observation and data/information for THORPEX researchers. Plans are also under way to provide special observation datasets for researchers through the web page.

After the special observations, JMA conducted a preliminary study on the impact of the T-PARC observation data on numerical prediction. The study indicated a case where special observation data had had a large impact on tropical cyclone track forecasts of Sinlaku and Jangmi. JMA plans to perform detailed studies on the impact of each type of observation data in sensitive areas as well as on the quantitative prediction of rain/wind by downscaling.



USA

In the United States, participation in T-PARC was made possible via funding from the National Science Foundation (NSF). The funding from the NSF provided for participation by the National Center for Atmospheric Research/Earth Observing Laboratory (NCAR/EOL), which provided a large portion of the operational support during the field program. Support was provided to operation observating platforms in the field, operations centers, Driftsonde deployment, and a web interface that allowed for observation products, numerical products, and documents to be shared among all experiment participants (i.e., see http://catalog.eol.ucar.edu/tparc)
A second major tropical cyclone project in the U.S. was the Tropical Cyclone Structure 2008 (TCS-08) program that was funded by the Office of Naval Research (ONR). The TCS-08 field program was run in conjunction with T-PARC to leverage the use of operations centers, observation platforms, aircraft, and support. The TCS-08 represents the field phase of a multi-year effort of ONR with objectives directed at increasing the understanding and prediction of tropical cyclone formation, intensification, and structure change.
The primary observational components provided by the U.S. for T-PARC and TCS-08 included a WC-130J aircraft from the U. S. Air Force Hurricane Reconnaissance Squadron and a P-3 from the Naval Research Laboratory (NRL). The P-3 was outfitted with the ELDORA radar by NCAR/EOL and by a Doppler Wind Lidar. Additionally, the P-3 contained a dropsonde system. The WC-130J was outfitted with a stepped frequency microwave radiometer (SFMR) to measure surface wind speeds. In addition to a dropsonde system, the WC-130J also deployed AXBTs to measure ocean thermocline structure. As part of the Driftsonde program, the NCAR/EOL provided support for the deployment of dropsondes and communication systems to relay the data to operational weather centers in real time.
During the T-PARC and TCS-08 field campaigns, the primary operations center was housed on the campus of the Naval Postgraduate School in Monterey, CA. From this center, daily communication was conducted with all participants, which included representatives from Asia, North America, Australia, and Europe. Additionally, flight operations were planned and monitored from the operations center such that communication and data transfer to and from the aircraft and the operations center were conducted for all aircraft missions.
Although the operation of the T-PARC and TCS-08 field program was conducted across nine time zones and 4 continents, communication, operation, and logistics were designed and implemented with great success in that a very successful field program was conducted. In the end, all science objectives were addressed during the field campaign. This has allowed for the collection of many unique data sets that will enable progress in understanding and predicting many facets of tropical cyclone formation, intensification, motion, and extratropical transition. Additional information is available at http://met.nps.edu/~tparc.

Macao, China

CEREMONY OF "APPLICATION OF THE KYOTO PROTOCOL TO MACAO"
16 December 2007 , Macao

With the objective of policy Government of the RAEM in what respects to the environment protection, as well as prevent the quick impact of the Climate Change in the development of Macao, the Government of the RAEM is going to request to the Central Government the application of the Kyoto Protocol to Macao, of the measures of control of emission of greenhouse gas preventing.
To first of the series of activities of the Application of the Kyoto Protocol to Macao is called " Carnival of Application of the Kyoto Protocol to Macao" that will take place at 15 - 17 o'clock of date 16 of December in the Square of Tap Seac, with cultural programs, composed streak for thousand persons, games, thematic exposition and to Ceremony of Starter of the "Application of the Protocol Lau Itself Io Secretary for the Transports and Public Works that will preside him.

The application of the Kyoto Protocol to Macao will be helpful to the plan of environment protection policity and also will be reduced the pollutants emission and save energy.And will introduct the natural gas power, in trial of planning of the systems of light meter and of automatic crosswalks as well as the strategies of give priority to the public transports of the pollutants emissions motorcycles, will be important strategies of future improvement of the reduction of emission of greenhouse gas and pollutants. As regards the save of energy, we have environmental hotel, reduce the utilization of electricity of the Public Service and the program of reduce to waste of water. Not only the government will take a series activities for publicizing the spirit of the "UNFCCC " and the " Kyoto Protocol " but also expects that the citizen understand the situation of the global climatic change and possible influence to increase the knowledge of the environmental protection and of saving energy.

WORLD METEOROLOGICAL DAY – 20 MARCH 2008
20 March 2008, Macao

This year the celebrating activities of "World Meteorological Day" started by giving a course of lectures about the subject "saved energy and reduced emission by me". The main purpose of the course was to strengthens the students to know the problem of climate change, the influence of the climate change to our live and how we made regarding this response. This Activity related closely to the Kyoto protocol which carried out in Macao at 14/01/2008.

Other activities included the promotion of a new service "the e-ME weather report express". The resident only make the registration and choose the services at our homepage. The Meteorological and Geophysical Bureau then will sent the weather report by E-mail.

In the morning of 20th March, we held the ceremony in the building of Meteorological and Geophysical Bureau. The secretary of the Typhoon Committee announced the Typhoon Committee symbol creation competition. This activity cooperated with the Meteorological and Geophysical Bureau. Afterwards also held the press conference about this competition.

Finally, there was a dinner in the evening with all guests and staff, both retired and at work of the Bureau. Five staff were awarded for their 20 years to 30 years of service. This five staff included our Director and one was retired.

SERIES ACTIVITY OF THE " KYOTO PROTOCOL " CEREMONY OF OFFERING OF BOOKS AND LITERARY CONTEST 28 April 2008 , Macao

In order to accompany the application of the " Kyoto Protocol " to Macao, the SMG lectures in the schools and let the students know the Climate Change and will be end of April of the current year. This activity arranged togo to 34 Schools. Between them, 17schools are of the secondary education and 17schools of the primary education and in a total are 40 sessions carried out. Total of 10399 students, between them 6067 of the secondary education and 4332 of the primary education.

It incite the youths to understand the Climate Change and its impact in the life, to concern the problems of the environment protection, to give theirs viewpoints about the Climate Change and environment protection and participate in the activities of the environment protection.

The Environmental Council and the SMG held the Ceremony of offering of books and literary contest in the Fatima School by the 15:40 hours of the day 28 of the current month and at the same time announced the details of the Literary Contest.

The Fatima School has promoted the environmental education many years, specially in the area of green environment and at the ceremony the Fatima School will introduce its environmental protection activities.

CEREMONY, OF THE APPLICATION OF THE KYOTO PROTOCOL TO MACAO,OF AWARD OF THE CONTEST FOR THE CREATION OF AN EMBLEM FOR THE TYPHOON COMMITTEE AND OF AWARD OF LITERARY CONTEST "CLIMATE CHANGE" 29 September 2008 , Macao

The SMG held the Ceremony of the Application of the Kyoto Protocol to Macao Award of the Contest for the Creation of an Emblem for the Typhoon Committee and of the Literary Contest "Climate Change" at the day 29 of September of 2008 in the Room Lotus of "World Trade Center", The Ceremony were presided by the Secretary for the Public Works and Transports Eng. Lau Si Io and by the Mr..Ye Xuenong Deputy director of the Foreign Business in the RAEM of the People's Republic of China.

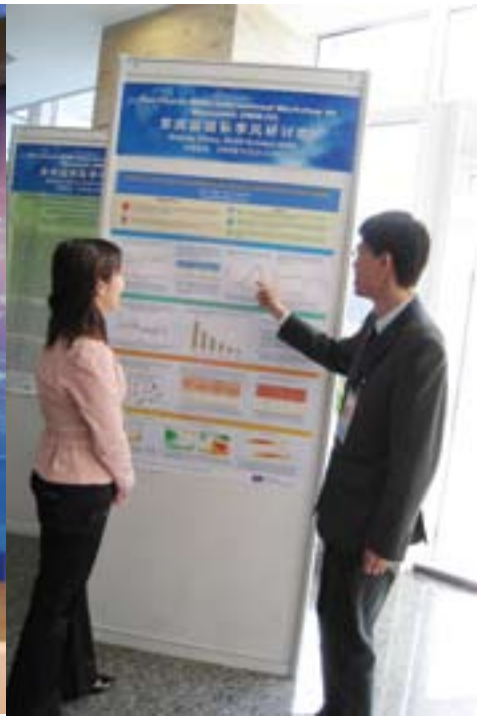
After application of the Kyoto Protocol to Macao, in order to do the relative duty, the Government of the RAEM already reinforced the relative plans, activities and programs. With the design of balance between different partners economic and the profit of the society,avoid the deterioration of the global climate and improve of the quality of the environment and appeal to all people of different walks of life to cooperate to do these work. Like this, the SMG

Cooperated with the Council of the Environment to hold the Literary Contest "Climate Change" in order to make publicity of relative knowledge to schools and had a best participation. Also the ceremony of awards of the contest be held together with the Ceremony of the Application of the Kyoto Protocol to Macao.

The award ceremony of the Contest for the Creation of an Emblem for the Typhoon Committee(Region of Macao) held by Typhoon Committee already announced the results before, will be held at the same time. The design of champion is simplicity and clear meaning and abtain an unanimous vote of the Jury. The design of champion of Macao will be delivered jointly with others designsof Members of the Typhoon Comittee for compete for the final emblem of the Typhoon Comittee.

WMO 4th International Workshop on Monsoons (IWM-IV)
20-25 October, 2008, Beijing China

IWM is the seminar and workshop about the monsoon held by World Weather Research Programme of WMO per four years. This conference lets the meteorology researcher and forecaster gather together, mainly aims to discuss the newest topic about the monsoon,tropical cyclone or other climate system that will cause extreme weather events in the related monsoon region at world. From the scientific viewpoint to discuss problems, analysis possible reason. Finally we hope to enhance the forecasting technology of fierce weather by National Meteorological and Hydrological Services (NMHS) We hope that can reduce the disaster loss which are caused by the monsoon. Besides of various Participants of countries representative of WMO NMHS, but also includes meteorological expert related monsoon research which invited by the sponsor unit.The SMG are participate in this time conference by the WMO member identity.



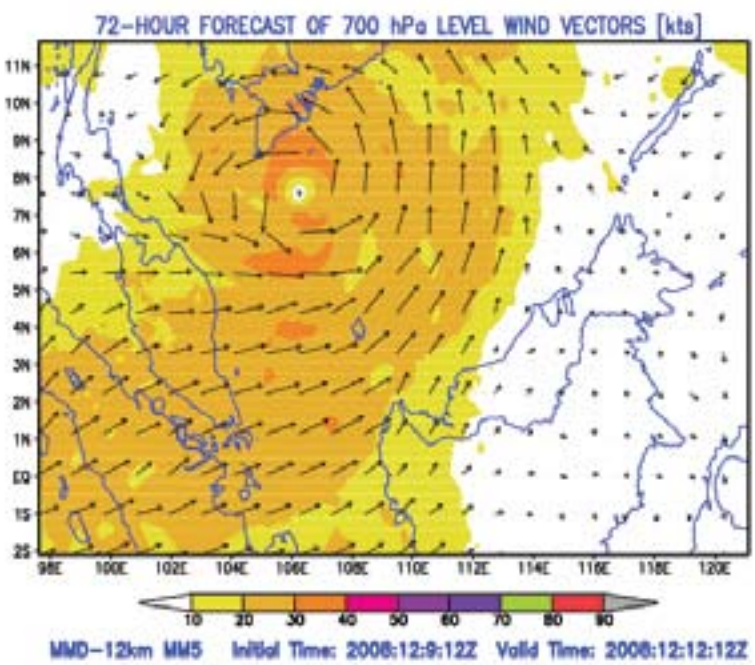
Malaysia

Implementation of High-Resolution Numerical Weather Prediction to Support Severe Weather Early Warning System at Malaysian Meteorological Department (MMD)

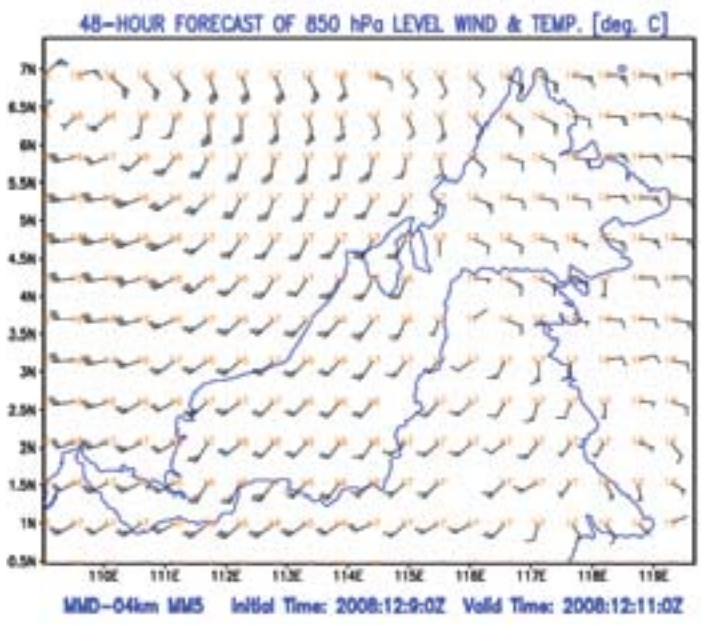
Numerical weather modelling using high performance parallel computing technology is a very important component of weather prediction operations in modern meteorological service. MMD has successfully employed this technology for the purposes of analyzing and obtaining objective weather forecasts using a high-resolution regional model MM5 (Fifth Generation Mesoscale Model) to produce numerical weather prediction (NWP) products, which support the needs of weather forecasting operations. NWP products are an important source of reference for weather forecasting operations. The MM5 model is run twice a day at 00UTC and 12UTC respectively for up to 72 hours forecasts over Malaysia (12km resolution) and Southeast Asia regions (36 km resolution).

In 2008, MMD has acquired two SGI high performance computer systems. These two new systems, each with 128 Processors (dual core), run the MM5 and WRF (Weather Research Forecasting) numerical weather models respectively with higher resolutions of up to 4 kilometres over Peninsular Malaysia, Sabah and Sarawak which can resolve severe tropical storms over the regions. The products generated are the rain histogram for principal meteorological stations; temperatures, winds, relative humidity and geopotential height at 1000hPa, 850hPa, 700hPa, 500hPa and 200hPa levels; mean sea level pressure; 2 metres temperatures; 10 metres winds and the hourly, 3-hourly, 6-hourly, 12-hourly and 24-hourly accumulated rainfall.

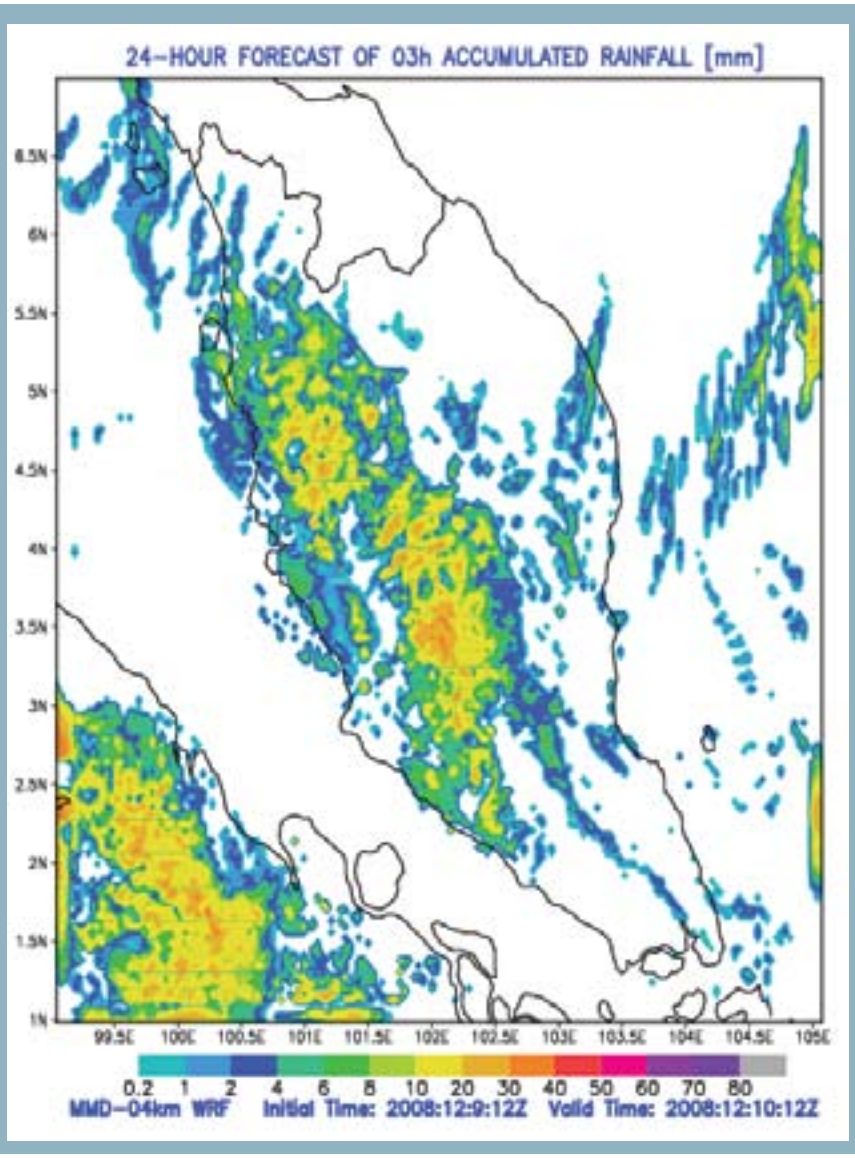
SGI High performance computer systems acquired in 2008 for the upgrading of numerical weather prediction systems



A product of MM5, the 72-hour forecast of 700 hPa level wind vectors with 12 km resolution.



The MM5 48-hour forecast of 850 hPa level winds& temperature with 4 km resolution.



The WRF 24-hour forecast of 3 hourly accumulated rainfalls with 4 km resolution.

Rep.of Korea

Frame 1: Front scene of the National Typhoon Center located at Jeju Island (33o19'53"N, 126o40'42"E), Korea.

1. KMA opened the National Typhoon Center (NTC)

The Korea Meteorological Administration (KMA) has established the National Typhoon Center in Jeju, Korea, on April 21, 2008. The basic function of this center is to monitor, analyze, and forecast the tropical cyclones formed from the Northwestern Pacific area, and to carry out the research and technique development related to the typhoon forecasting, and to build up the domestic and international cooperation with other agencies. One of eventual goal is to decrease the typhoon-induced disasters and to increase safety level from typhoon damages in Korea. The number of staff is 18 working at the operational, research and supporting teams. We also expect to co-work with other countries about the tropical cyclone and related subjects.

2. KMA hosted the First Korea-China Joint Workshop on the Tropical Cyclones

The First Korea-China Joint Workshop on the Tropical Cyclones was held in Jeju Island, Korea, on December 1-5, 2008, focusing on the observation, typhoon-ocean interaction, and forecasting. This workshop was one part of agreements from the 9th session of Joint Working Group on Cooperation in the Field of Meteorology between Korea Meteorological Administration and China Meteorological Administration which was held in Seoul, Sept 10-12, 2007. During this workshop, 6 experts from Shanghai Typhoon Institute/CMA were participated and gave talks, and visited the National Typhoon Center/KMA December 2 in order to discuss how to make cooperation between NTC and STI in the future. We actively exchanged a lot of useful information about the typhoon in terms of the operational and research viewpoint, and also agreed to have the second workshop in China next year, which will be hosted by CMA.

Frame 2: Group photo of the participants of the First Korea-China Joint Workshop on the Tropical Cyclones. The workshop was held at Jeju, Korea on Dec 1-5, 2008, and the National Typhoon Center/KMA and Shanghai Typhoon Institute/CMA have mainly discussed about the future cooperation with 17 presentations.

Thailand

TMD Hosted the Junior Meteorologist Activity to Commemorate the World's Meteorological Day

Mr. Tausak Wanichkhajon, Deputy Director-general of Technical Services, on behalf of the Director-general of the Thai Meteorological Department, opened the Junior Meteorologist Activity as a part of the Department's public relation promoting scheme on the World's Meteorology Day (25th March 2008). About 130 students in grade 7 – 9 from 7 high schools nearby turned up at the Department's Main Hall to attend this event.

The purposes of such activity were to commemorate the World's Meteorology Day 2008 and to encourage the high school students to be aware of the nature of daily meteorological and seismological tasks, including weather observations; weather forecasts; and natural disaster warnings, from real operating procedures. The attended students were expected to be able to apply the obtained knowledge in their daily lives.

Pic 01 : Mr. Tausak Wanichkhajon (Deputy Director-general of Technical Affairs, TMD) at the opening ceremony of the Junior Meteorologist Activity

The morning session of the Junior Meteorologist Activity contained a lecture concerning the weather and earthquake forecasts, followed by the site visit to see routine operations at the Weather Forecast Bureau; the Earthquake Bureau; and the meteorological observation site. The afternoon session was the meteorological quiz competition for 7 teams of 3 students representing their own schools below:

1. Streesmutprakran School
2. Sirirattanathorn School
3. Amnuayvid School
4. Prakhanongpittayalai School
5. Watsongtham School
6. Navaminthrachinuthit Suankularb Witayalai Samutprakran School
7. Matthayom Dan Samrong School

At the end of the meteorological quiz competition, the Sirirattanathorn School Team was the winner while the Streesmutprakran School Team and the Prakhanongpittayalai School Team were the 1st and 2nd runner-ups, respectively.

At the closing ceremony, Mr. Kriangkrai Korwattana, Deputy Director-general of Operations, gave certificates as well as rewards to every student who participated the activity that day before delivering the closing speech and joining the group photograph session together with both teachers and students from each school afterward.

Pic 02 : High school students at the event

Pic 03 : A group of students made a visit at the Earthquake Bureau.

Pic 04 : A visit at the weather observation site

Pic 05 : Mr. Kriangkrai Korwattana (Deputy Director-general of Operation, TMD) gave certificates as well as rewards to the students at the closing ceremony.

VietNam

Period of heavy rain from October 30 to November 3, 2008 in Hanoi and other Northern Provinces

1. Rain

Over five days from October 30 to November 3, a wind belt combined with a cold air system to trigger heavy rain in the north and north central coastal provinces. Average rainfall recorded ranged from 100 to 400mm. This was the first ever heavy rain in terms of both scale and intensity not only for November but also for the rainy season to date. Heavy rain occurred in four main areas:

The first area included provinces and cities such as Hanoi, Hoa Binh, Hung Yen and Ninh Binh with average recorded rainfall ranging from 400 to 600mm. Over 600mm rainfall was recorded in some station such as Thanh Oai (988mm), Ha Dong (830mm), Chuong My (727mm), Van Dinh (721mm) and Hanoi (545mm). This was the heaviest rain in 35 years in Hanoi (former boundaries) and in 48 years in the former Ha Tay.

The second area included Phu Tho and Vinh Phuc provinces with average rainfall recorded from 200 to 400mm. Over 400mm rainfall was recorded in some stations such as Vinh Yen (508mm), Tam Dao (463mm) and Phuc Yen (405mm).

The third area included Lang Son, Thai Nguyen, Bac Giang and Bac Ninh provinces where average rainfall of 150 to 300mm was recorded. Over 350mm rainfall was recorded in stations such as Dinh Lam (615mm), Viet Yen (419mm), Yen The (383mm), Hiep Hoa (378m) and Bac Ninh (373mm).

The fourth area included provinces from Thanh Hoa to Nghe An where average rainfall of 150 to 250mm was recorded. In Thanh Hoa, average rainfall of 200-300 was recorded such as in Thanh Quang (349mm), Sam Son (371mm), Cam Thuy (410mm), Bat Mot (343mm), Cua Dat (345mm), Lang Chinh (339mm) and Quy Chau (311mm).

In Ha Tinh and Quang Binh provinces, heavy rain occurred with the average recorded rainfall ranging from 50 to 100mm.

2. Flooding and inundation:

The heavy rain triggered flooding in Hoang Long, Ky Cung, Luc Nam, Thuong, Cau and Buoi rivers. Flooding in Hoang Long reached at Warning Level III at 04:00 on November 2 and peaked at 0.69m over Warning Level III at 06:00 on November 2.
In Hanoi: heavy rain caused flooding and inundation on a large scale leaving tens of thousands of houses, as well as winter crops, submerged and damaged. Electricity was cut in some places in order to ensure the safety of local people.

Heavy rain caused 90 locations to flood and be inundated with water levels ranging from 0.3m to 0.8m. In Thai Ha, Truong Chinh and Giap Bat 1-1.2m deep water was recorded and 1-2.5m deep water was recorded in Tan Mai and Dinh Cong. Up to November 2, 48 locations remained flooded. To the morning of November 3, 44 locations remained flooded.

The large scale heavy rain caused 54,356ha of winter and short-term crops to be flooded and 9,407ha of aquaculture to be submerged. 2,718ha of late rice crop was also flooded and might be damaged completely. 28,747 houses were flooded.

3. Damage caused by heavy rain and flooding:

Human:
No. of deaths: 89 including Ha Noi: 22; Ninh Binh: 1; Hung Yen: 3; Hoa Binh: 3; Vinh Phuc: 8; Phu Tho: 1; Bac Giang: 3; Ha Nam: 2; Nghe An: 22; Ha Tinh: 15; Quang Binh: 1; Thai Nguyen: 8.
No. of people missing: 5 including: Lang Son: 1, Hoa Binh: 2, Thanh Hoa: 1, and Ha Tinh: 1
No. of people injured: 9 including Hanoi: 3, Vlnh Phuc: 4 and Ha Tinh: 2

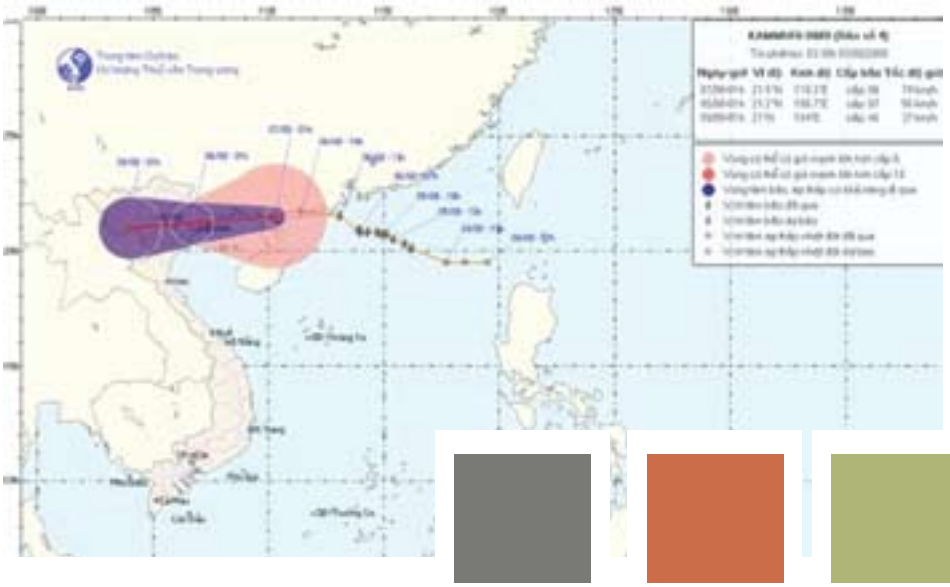
House:
No. of houses collapsed and washed away: 183
No. of houses flooded and damaged: 180,231

Agriculture:
Rice fields and short-term crop flooded: 226,552haa;
Areas of aquaculture flooded: 30.140 ha;

Irrigation:
No. of small sluices damaged: 692
Length of embankment and canals damaged: 62,639m

Transportation:
Rural roads damaged: 202km
Amount of land and rock eroded: 422,057m^3

Typhoon Kammuri (Storm No. 4)



Map: Path of the Storm

I. Development of Storm No. 4 (Kammuri) and subsequent rain and flooding

1. Storm Development:

In the early morning of August 4, 2008 a low pressure system formed in the north-eastern region of Luzon Island (Philippines) before developing into a tropical depression. Gathering strength as it passed over 120° longitude E and headed into the East Sea, the tropical depression reached typhoon status on August 5. Typhoon Kammuri (Storm No. 4) headed west northwest with wind forces reaching 10 on the Beaufort scale before making landfall in Guang Dong (China) at noon of August 6 and heading westward. The storm moved into the Northern part of the Gulf of Tonkin, continued to move westward and hit Quang Ninh Province. The typhoon then weakened into a low pressure system that operated east of Hoang Lien Son mountain range until August 9.

2. Heavy rain and flooding following Storm No. 4:

a. Heavy rain:

Due to the impacts of the low pressure system that combined with northwest-southeastern axis, rain and heavy rain occurred in many areas in the northern provinces. Average rainfall recorded in the Red and Thai Binh River basins from 13:00 on August 7 to 7:00 on August 11 was 100 – 300mm, and from 300 to 500mm in Thao and Chay rivers. In some areas over 500mm of rainfall was recorded such as: Sapa: 524mm, Bao Yen: 532mm, Bat Xat: 560mm and Thac Ba: 657mm.

b. Flooding:

Due to large amounts of heavy rain occurring over a very short period of time, large flooding in Red and Thai Binh Rivers followed as a consequence.

- In Thao River: the flood peak in Lao Cai was 84.91m as of 16:00 on August 9 (1.41m over the Warning level III); in Yen Bai it was 34.26m as of 17:00 on August 10 (2.26m over the Warning level III) – the second highest level on record and 0.16m lower than the water level recorded in the 1968 historical flooding – and in Phu Tho the peak was 19.14m as of 9:00 on August 11 (0.24m over the Warning level III)
- The flood peak in Lo River in Tuyen Quang province was 24.54m as of 23:00 on August 9 (0.54m higher than Warning level II).
- The largest water discharge in Hoa Binh reservoir was 11,800m^3/s as of 3:00 on August 11 and in Tuyen Quang reservoir it was 4,261m^3/s as of 7:00 on August 8, 2008
- As Hoa Binh, Tuyen Quang and Thac Ba reservoirs all cut the flood peak, the water level downstream in the Red River was not that large. The flood peak of the Red River in Hanoi was 10.42m as of 23:00 on August 11 (0.12 over the Warning level II). According to the National Centre for Hydro-Meteorological Forecasting, if the flood peak hadn't been cut, the water level in Hanoi would have reached 12.20m.
- Flooding in the Thai Binh River system was high, the peak of which in Cau River (Dap Cau) was 6.03m as of 1:00 on August 12 (0.23m over the Warning level III); in Thuong River (Phu Lang Thuong) it was 6.07m as of 19:00 on August 11 (0.27m higher than Warning level III); In Luc Nam

Affected by haevy rai fall made seriously flood in Phu Tho province – North o VieNam
Flash flood in Yen Ba province after storm N4 (Kammurri)

River (Luc Nam) it was 5.41m as of 6:00 on August 12 (0.39m under Warning level III) and in Thai Binh River in Phalai the peak was 5.33m at 2:00 on August 12 (0.17m under the Warning level III).

c. Tropical Depression:

On August 8, a tropical depression formed in the Gulf of Tonkin with wind forces reaching 6 and 7 on the Beaufort scale, gusting over 7. The tropical depression steadily moved northward and hit the mainland of Quang Ninh province on August 12. It then weakened to a low pressure system. Due to the impact of the tropical depression, there was strong wind operating in the northern part of the Gulf of Tonkin with wind force reaching 7 (Beaufort scale), gusting over 7. Rain and heavy rain occurred in northeastern provinces, especially in Quang Ninh province. The rainfall recorded in Quang Ninh was around 100 to 150mm. Mong Cai got the largest rainfall of 180mm. In other areas the rainfall recorded less than 100mm.

III. Damage caused by flooding following Storm No.4 and tropical depression as of early morning on August 15:

1. Human:

- No. of deaths: 144 (Lao Cai : 50 , Yen Bai: 42, Phu Tho: 9, ien Bien: 1, Quang Ninh 11, Bac Kan: 2, Ha Giang: 9, Thai Nguyen: 3, Lang Son: 5, Lai Châu:1, Vinh Phuc: 5, Son La: 6).
- No. of people missing: 33 (Lao Cai: 29, Ha Giang: 2, Quang Ninh: 2)
- No. of people injured: 100 (Lao Cai: 62, Yen Bai: 32, Quang Ninh: 1, Bac Kan: 3, Tuyen Quang: 2, Phu Tho: 3, Lang Son: 1, Quang Binh: 1, Cao Bang: 1).

2. Transportation and Irrigation:

- National roads No. 41, 4D, 4E, 279, 70, 37, 32, 32C, 311, 318, 319B, 314C, 321, 32B, 320 were damaged with landslides and erosion totaling 296,691m^3.
- Provincial and district roads were damaged with landslides and erosion totaling 511,671m^3.
- Some small irrigation structures in affected areas were damaged. Further assessments will be carried out.

3. Housing and short-term crop:

- No. of houses destroyed and washed away:1,699
- No. of houses submerged and damaged: 24,769
- Rice fields and short-term crops damaged: 23, 981 ha
- No. of castle dead: 3,533
- No. of livestock dead: 48,442

4. Other damage:

- Due to flooding that followed the heavy rain, three inter provincial optical fibre cables connecting Yen Bai and Lai Chau with Lao Cai were broken, with another four provincial and peripheral cables in Lao Cai and Yen Bai provinces also damaged. Over 100 mobile telephone stations belonging to VMS, VINAPHONE, VIETTEL and EVN networks were reported to have no signal.
- Flooding caused the National landmark No. 16 in Sin Thau Commune (Dien Bien province) to be swept away, 15 notice boards in bordering regions and 23 notice boards in the border belt to be damaged.

Total estimated losses: VND Bill 2,137 (Lao Cai: 985 billion, Yen Bai: 438 billion, Phu Tho: 355billion, Ha Giang: 100 billion, Cao Bang: 10.47 billion, Bac Can: 35.5 billion, Thai Nguyen: 24.9 billion, Lang Son: 10.7 billion, Tuyen Quang: 68.938 billion, Quang Ninh: 8 billion, Son La: 60 billion and Dien Bien: 41.121 billion). The damage in Son La was caused by landslide in Chieng Ne, some days before the formation of Storm No. 4.

IV. Damage recoveries activities:

1. Government response:

Immediately after receiving the news, Mr. Cao Duc Phat, Minister of MARD, Chairman of the CCFSC and officers from National Committee for Search and Rescue visited Lao Cai, Yen Bai and Phu Tho provinces from August 11 to 13 to give instruction on damage recoveries and search and rescue activities.

On August 15, 2008, the Prime Minister issued Decision No. 112/QD – TTg on providing food and financial support for damage recovery to the provinces of Lao Cai (VND90 billion and 300 tons of rice), Yen Bai (VND60 billion and 200 tons of rice), Phu Tho (VND30 billion and 300 tons of rice), Tuyen Quang (VND 10 billion), Ha Giang (VND20 billion), and Son La (VND 10 billion). The decision also stated that VND950 million would be provided for the Ministry of Agriculture and Rural Development (MARD) to pay the Vietnam Northern Food Corporation for 70 tons of rice, 10 tons of noodles and 10 tons of mineral water that had been provided to Yen Bai Province.

2. Response from Ministries and other sectors:

- The Ministry of Defense provided VND Bill. 1.2 to affected provinces (Lao Cai: 400 million, Yen Bai: 300 million, Phu Tho: 300 million, Ha Giang: 200 million) to support each of the families of the deceased with VND million 5. The General Logistic Department and High Command of Military Zone II provided 80 tents, 100 water filters, 23 tons of rice, 2 tons of noodles, etc.

- High command of Border Guard support affected people and border guards VND mill. 82.
- Ministry of Industry and Trade provided VND. Mill 250 support to badly affected provinces (Lao Cai: 50 million, Yen Bai: 50 million, Phu Tho: 30 million, Ha Giang: 20 million).
- Ministry of Health provided support to Provincial Departments of Health as follows: Lao Cai: 50 medicine packs, 20 life-jackets; Yen Bai: 50 medicine packs, 500kg of Cloramin B and 100 life-jackets; Phu Tho: 50 medicine packs, 1000kg of Cloramin B and 50 life-jackets; Tuyen Quang: 20 medical packs; Ha Giang: 25 medical packs and 30 life-jackets.
- The Ministry of Public Security provided VND Mil 200 to support affected people in Tung Chi and Provincial Department of Public Security.
- The National Centre for Water Supply and Sanitation (MARD) sent a working team to Phu Tho, Lao Cai and Yen Bai provinces to assist people in cleaning and decontaminating water.

3. Vietnam Fatherland Front, the Red Cross Societies and other organizations:
- Vietnam Fatherland Front initially provided VND Bill. 20.268
- Ethnic Council provided VND Mill. 228.4.
- Vietnam Red Cross provided affected people in affected provinces VND Mill.5,488 to buy food and other essential goods.
- National Vietnam Oil & Gas Group – Petrol Vietnam provided VND Bill. 3.6
- Trade Union of agriculture and rural development sector supported VND 900 million,
- International organizations: World Vision: USD 140,000; the Embassy of China in Vietnam: 50,000 USD; Plan International: VND 851 million and the Embassy of Japan in Hanoi: 174,000 USD, Oxfam International and other organizations also delivered support to affected people in Yen Bai, Phu Tho and Lao Cai/.

(Damage recovery and relief activities are still being delivered by various organizations)

Source: Division for Flood and Storm Control - DDMFSC

A song for Typhoon Committee

1. TC DECISION ON "A SONG FOR TYPHOON COMMITTEE"

Following the decision of TC related to the development of a song for the 41st session (Paragraph 65, 12th Bullet – Report of the Fortieth Session), TCS initiated the process inviting the TC Members to present proposals for "A song for Typhoon Committee" (Circular Letter TCS/020-2008, 22 February 2008).

2. ENTRIES FOR "A SONG FOR TC"

Three TC Members proposed five entries:

• Hong Kong (Hong Kong Observatory)
"Typhoon! Typhoon!"
Lyrics - Mr C Y Lam (Director of Hong Kong Observatory)
Music - F. Lam

• USA (Central Pacic Hurricane Center)
"Eye of the Storm"
Lyrics: 5th Graders of Holy Nativity School, Honolulu
Music: Linda Weyman

"Cyclones, Typhoons, Hurricanes"
Author: Tim Ross (USA National Weather Service)

• Viet Nam (National Hydro-Meteorological Service)
"Feelings of a Weather Forecaster"
Music: Vuong Sinh Lam
Lyrics: Vuong Sinh Lam and Nguyen Dai Khanh

"Romantic Song of Hydro-meteorological Observer"
Music and lyrics: Vuong Sinh Lam

3. COMPOSITION OF THE PANEL OF EVALUATION

The panel of evaluation was composed of the members of the TC Advisory Working Group, except the members from the candidate countries/regions.

4. RESULTS OF VOTE

Considering that the number of members of AWG is 10 and that it was not possible to collect the votes from two members of the AWG, only 6 votes were obtained. The results are as follows:
Lyrics of "Typhoon! Typhoon!" - 6 votes
Music of "Typhoon! Typhoon!" - 5 votes;
Music of "Eye of the Storm" – 1 vote

5. CONCLUSION

The song "Typhoon! Typhoon!" proposed by Hong Kong, was selected.

On behalf of Typhoon Committee, TCS presents its thanks to all involved in this process for the kind collaboration to implement the decision of TC concerning this matter.
Especial thanks are due to
Vuong Sinh Lam; Nguyen Dai Khanh; Linda Weyman;
5th Graders of Holy Nativity School, Honolulu; Tim Ross; C. Y. Lam and Fung Lam.

Typhoon! Typhoon!

Lyrics: C.Y. Lam Music: F. Lam

Typhoon! Typhoon!
Our friend and our foe.
Wind and rain,
With them we live and grow.

People warned early,
Fearless we face the tempest.
Planned and prepared,
Water good for the harvest.

Countries coming together,
Always watching the sky;
Reading the signs of weather,
Sharing in spirit high

Asia and the Pacific,
Typhoon Committee does serve.
Marching forward,
From our duties never swerve.

Asia and the Pacific,
Typhoon Committee does serve.
Marching forward,
From our duties never swerve.

Countries coming together,
Always watching the sky;
Reading the signs of weather,
Sharing in spirit high

Countries coming together,
Always watching the sky;
Reading the signs of weather,
Sharing in spirit high.

An Emblem/Symbol for Typhoon Committee

1. TC DECISION TO CREATE AN EMBLEM/SYMBOL FOR THE TYPHOON COMMITTEE

The Typhoon Committee, in its 40th Session, held in Macao, China, 21-26 November 2007, decided to create an emblem/symbol for the TC as one of the activities to commemorate its 40th anniversary and noted that it would be a Member-wide submission with the TCS as the entity responsible for collecting Members' inputs and submitting the entries to the AWG (Paragraph 65, 11th Bullet - Report of the Fortieth Session of the Typhoon Committee).

2. ENTRIES FOR "AN EMBLEM/ SYMBOL FOR TC"

Two TC Members presented one entry each: Hong Kong, China; and Macao, China.
(The proposal from Macao was the 1st prize of a contest conducted by Macau Meteorological and Geophysical Bureau - SMG).

3. COMPOSITION OF THE PANEL OF EVALUATION

The panel of evaluation was composed of the members of the Typhoon Committee Advisory Working Group.
The representative of Hong Kong, China with AWG has not voted because one of the entries was proposed by Hong Kong Observatory.
It was not possible to collect the votes from two elements of the AWG.

4. RESULTS OF VOTE

Entry from Hong Kong, China – 1 vote;
Entry from Macao, China – 7 votes

5. CONCLUSION

The Emblem/Symbol proposed by Macao was selected.

On behalf of Typhoon Committee, TCS presents its thanks to all involved in this process for the kind collaboration to implement the decision of TC on this matter.
Special thanks to Hong Kong Observatory, Macao Meteorological and Geophysical Bureau, Macau Foundation, Mr. Chan Sau In (author of the Macao proposal) and Ms. Mirinna Kam-chu Chan (author of the Hong Kong proposal).

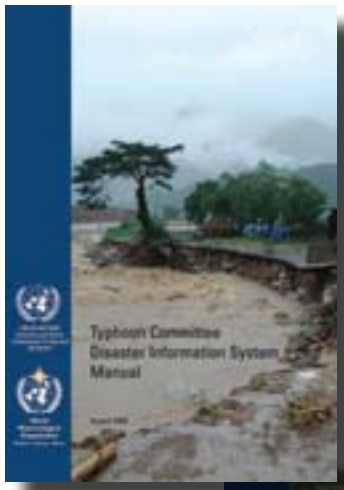
ESCAP/WMO
Typhoon Committee

Narrative describing the design approach proposed by Macao:

The concept behind the emblem design is based on the movements of a typhoon. It is composed of three moving cyclones. It states clearly the Committee is an establishment that deals with typhoons. The colors are those of different shades of blue (four colors or one pantone of different percentages) so that the emblem can be applied on different backgrounds and can match the image of nature.
The cyclone farthest to the right is in the shape of the letter "T", the initial of Typhoon, and the one in the middle looks like "C", the initial of Committee, and when they are seen as one, they make up the letter "a", representing Asia, while together with the cyclone farthest to the left, the three form the letter "p", representing Pacific. Such a design is to illustrate the major services of the Typhoon Committee that are to promote and coordinate the planning and implementation of measures required for minimizing the loss of life and material damage caused by typhoons in the Asia-Pacific region. In the emblem design, the graphic symbolizes the functional identity of the Typhoon Committee while the typography expresses its geographical span.

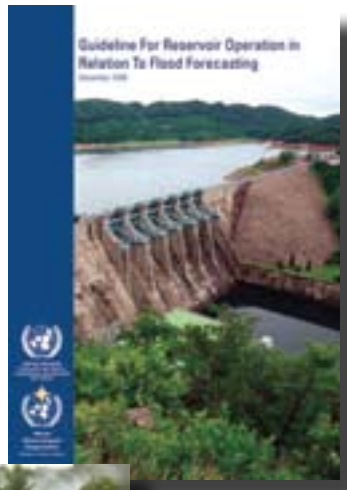
Publications of Typhoon Committee

Typhoon Committee Expert Mission Report
August 2008



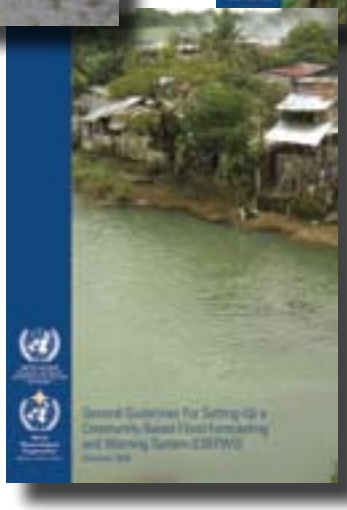
Typhoon Committee Disaster Information System Manual

August 2008



Guideline for Reservoir Operation in Relation to Flood Forecasting

December 2008



Guidelines For Setting-Up a Community-Based Flood Forecasting and Warning System (CBFFWS)

December 2008

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Humour Corner