Issue 27 ▪ Year 2013
2nd Semester
Typhoon Committee
Secretariat
Macao, China

TCS
Activities

Members
Activities 2nd
Semester 2013

ESCAP/ WMO
Typhoon Committee

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific
WMO

2nd Semester 2013

Newsletter

ESCAP/WMO Typhoon Committee held its **8th IWS/2nd TRCG Forum in Macao, China**

The Guests at Opening Ceremony
(from left: Sangheon Lee, representative of HRFCO, Korea; Olavo Rasquinho, Secretary of TC; Alf Ivar Blikberg, Representative of ESCAP; Fong Soi Kun, Director of SMG, Macao; Koji Kuroiwa, Representative of WMO; Edwin Lai, Chair of TRCG, HKO; 金城 lam, Macao fundation)

The ESCAP/WMO Typhoon Committee (TC) 8th Integrated Workshop (8th IWS)/2nd Training and Research Coordination Group (TRCG) Forum was held in Macao Science Center, Macao, China from 2 to 6 December 2013, and is organized by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the World Meteorological Organization (WMO), and the ESCAP/WMO Typhoon Committee Secretariat (TCS), and hosted by the Macao Meteorological and Geophysical Bureau (SMG). The workshop is financially supported by Macao

Foundation and the Ministry of Land, Infrastructure and Transport (MOLIT) of Republic of Korea.

Participants in the plenary session

IWS is an annual event for TC Members to review TC activities and work progress through the Advisory Working Group (AWG) and the three TC Working Groups (WGs) on Meteorology, Hydrology and Disaster Risk Reduction, and to make work plans for the coming year. Meanwhile, TRCG members normally meet every four years to draw up training and research work plans for the next 4-year cycle. Since the first TC IWS held in Macao, China in the year of 2006, this event is third time for SMG to host this important annual event for the Committee.

Typhoons (hurricanes, tropical cyclones) are one of the world's most devastating natural disasters causing significant casualties and billions of dollars in damages to homes, building and infrastructure annually. The United Nations estimates that cyclones have caused on average 11,000 deaths per year over the last two decades. The Asia and pacific Region is one of the most vulnerable areas to natural disasters.

From 1950 to 2005, 54 percent (approximately 3 million people) of the worldwide deaths produced by natural disasters occurred in this region and many of these deaths are due to typhoon-related impacts. Besides this, the wind storms and floods associated with typhoon-related impacts account for 57 percent (approximately US$33.5 billion) of the economic losses in this region in the same period. It was reported that, the super typhoon Haiyan flattened dozens of towns across the central Philippines on November 8, 2013, affected 14 million people, caused more than 5,200 death with another more than 1,600 people still

Parallel Session of Working Group on Hydrology (WGH)

unaccounted and more than 4 million people homeless.

In response to this challenge, subsequently the ESCAP/WMO Typhoon Committee adopted "Forecasting, Warning and DRR Strategies in the Mitigation of Tropical Cyclone Impact in a Multi-hazard Environment" as the main theme of the 8th IWS/2nd TRCG Forum as well as sub-themes for Meteorology (WGM): Predictability and uncertainty in tropical cyclone landfall forecasts; for Hydrology (WGH): Hydrological role in the mitigation of hazards caused by tropical cyclones; and for DRR (WGDRR): Future Disaster Management Technology for Disaster Risk Management.

The 8th IWS/2ndTRCG Forum is intended to provide the opportunity not only for the exchange of ideas among experts from the various fields covered by the Committee on the topics of dealing with climate change and the strategy of typhoon-related disaster impact reduction, but also to assess the progress in the various activities endorsed by the Committee at its 45thAnnual Session.

The participants were from Economic and Social Commission for Asia and the Pacific (ESCAP), World Meteorological Organization (WMO), and from 13 of 14 Members of Typhoon Committee including Cambodia; China; Democratic People's Republic of Korea; Hong Kong, China; Japan; Lao People's Democratic Republic; Macao, China; Malaysia; Philippines, Republic of Korea; Thailand; United States of America and Viet Nam. Typhoon Committee also invited 15 well-known specialists and scholars from USA; Canada; Australia; China; Japan; Korea and Hong Kong, China for keynote lectures as well as parallel discussion. The total participants are more than 100 including meteorologists, hydrologists and experts on disaster risk reduction.

COOPERATION BETWEEN PANEL ON TROPICAL CYCLONES AND TYPHOON COMMITTEE

First PTC Integrated Workshop (IWS)

The Secretary of Typhoon Committee, Mr Olavo Rasquinho, and the Vice-Chair of the Working Group on Hydrology of TC, Dr. Lee Sang-heon, were invited by ESCAP and PTC to participate in the first Integrated Workshop of the Panel on Tropical Cyclones, in Bangkok, on 27-29 November 2013, where they had the opportunity to share with the participants their experience related to the activities of the TC working groups, particularly on what refers to crosscutting activities involving meteorologists, hydrologists and experts in disaster risk reduction. They also gave assistance in drafting of the terms of reference of the working groups of PTC.
The representative of ESCAP in this meeting has encouraged both regional bodies of the WMO Tropical Cyclone Programme to develop a stronger cooperation. The SSOP project was referred as an excellent example of this cooperation.

Aspect of the discussions during the PTC Integrated Workshop

Group photo – 1st PTC Integrated Workshop

SSOP Project – Visit to Pilot Countries – Philippines, Bangladesh and Pakistan

The project Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System (SSOP) is in progress, under the auspices of the ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asian Countries.
Highly successful two-day pilot workshops were conducted in the Philippines, Bangladesh and Pakistan, from 3 to 11 October 2013, by an international multi-agency team. The main purpose of the workshops was to identify Standard Operating Procedures (SOP) best practices, gaps and needs in those countries.

The team was composed of the Project Manager/Technical Advisor and experts on Meteorology, Hydrology and Media, from TC, PTC, Asia-Pacific Broadcasting Union (ABU) and Asian Disaster Preparedness Center (ADPC).

Manila, Philippines, group photo - 3 October 2013

Dhaka, Bangladesh, group photo - 6 October 2013

The expert team was efficiently assisted by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Bangladesh Meteorological Department (BMD) and Pakistan Meteorological Department (PMD).

TCS takes this opportunity to express its gratitude to PAGASA, BMD and TMD for their vital assistance, support, and active participation in these successfully workshops, and to the experts Ahmed Said Al Barwani, Hydrology Expert (PTC – Oman), Mr. Atiq Kainan Ahmed, Disaster Response Expert (ADPC), Mr. Nadeem Ahmed and Mr. Walter Welz, Media Experts (ABU), who provided excellent support and insights as part of the team who visited the pilot countries. We are also grateful to the SSOP Project Manager/ Technical Adviser, Mr. James Weyman, who provided excellent guidance to the team.

Islamabad, Pakistan, group photo - 10 October 2013

The Counsellor of the Commissioner of MFA of China in Macao SAR visiting TCS

Ms. Zhang Yunfei, the Counsellor of the Commissioner of the Ministry of Foreign Affairs (MFA) of People's Republic of China in the Macao SAR, visited Typhoon Committee Secretariat (TCS) on October 18 2013 at the moment when she is going to leave Macao for Beijing.

Ms. Zhang praised the very active activities of the Committee during TCS stationing in Macao SAR which played very positive role to Macao not only in the aspect of international/regional exchange and cooperation but also in the aspect of tourism and economic development. She expressed her satisfaction with the cooperation of both sides in the past years during her term in the Commissioner.

TC Secretary Mr. Olavo Rasquinho introduced the progresses of TC activities and the situation of TCS hosting. On behalf of the Committee, he took the opportunity to represent the greatest appreciation to China Government through the Commissioner of MFA, China in Macao SAR for the very strong support to the Committee, particular Ms. Zhang, as the contact person of the Committee in the Commissioner.

TC Secretary Mr. Olavo Rasquinho talking with Ms. ZHANG Yunfei m Ms. LI Nan and Ms. WANG Cheng

The Counsellor of the Commissioner of MFA of China in the Macao SAR Ms. ZHANG Yunfei (front, right) and her successor Ms. LI Nan (front, left) visiting TCS

TCS ACTIVITIES Meetings and Workshops

At the invitation with funding support from Applied Hydrometeorological Research Institute (AHMRI) of the Nanjing University of Information Science & Technology (NUIST), TC Secretary Mr. Olavo Rasquinho and TCS hydrologist Mr. Jinping Liu participated in the International Conference with the theme of Extreme Hydro-meteorological Events and Flood Control & Disaster Reduction with Risk Analysis from October 26 to 28, 2013 in Xiamen, China. Totally more than 60 participants from China; USA and Taiwan, China attended the Conference.

Mr. Olavo Rasquinho was invited to deliver his keynote speech with title of Typhoon Related Hydro-Meteorological Disaster Risk Reduction, in which he introduced the background information of Typhoon Committee, the strategy on disaster risk reduction and cooperation mechanism among the Committee. Mr. Jinping Liu delivered his presentation with title of Effective Linkage between Meteorological Service and Hydrological Service, in which he discussed how to promote and enhance the cooperation between meteorological component and hydrological component in aspects of research and operation. They had opportunity to learn the latest development and achievement related to Probable Maximum Precipitation (PMP) and flood risk reduction in dealing with climate change from the Conference, which could benefit TC Members for reviewing and studying PMP and Probable Maximum Flood (PMF).

Taking the opportunity, Mr. Olavo Rasquinho and Mr. Jinping LIU visited the Bureau of Hydrology in Zhangzhou and Xiamen of Fujian Province.

Field Survey on Mechanism and Emergency Response to Typhoon-related DRR Conducted in China

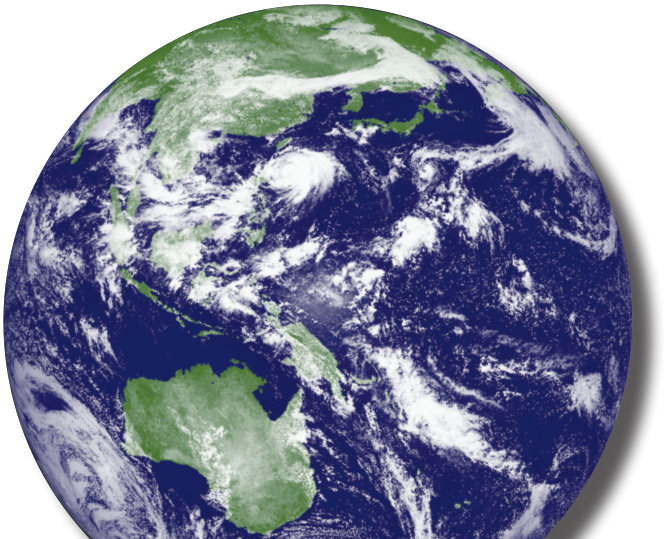
In view of existing problem on DRR emergency response during super typhoon Haiyan in Philippines, TCS sent its DRR expert Mr. LEI Pun Chi (Barrie) and hydrologist Mr. LIU Jinping to China for field survey on mechanism and emergency response to typhoon-related disaster risk reduction based on the communication between Mr. LIU Xuefeng, Deputy Director-General of Bureau of Hydrology (BOH) of China and staffs of TCS during the TC 8th Integrated Workshop (IWS) in conjunction with the 2nd Training and Research Coordination Group (TRCG) Forum which was held in Macao, China from 2 to 6 December 2013.

The field survey was conducted a series of meaningful activities at levels of provincial, city, county, town and village in Fujian Province, China from 15 to 19 December 2013, including 1) Seminar and discussion in the Office of Flood Control and Drought Relief; 2) visiting the projects on non-disaster prevention; 3) visiting the projects on structure measure of small watershed management and harnessing for sediment disaster prevention; 4) visiting the operational platform of emergency response system related to typhoon-related risk reduction for fishery industry; 5) visiting the sites impacted by typhoon Usagi and the coastal levee for storm surge prevention.

The ship positioning system applied in joint Command Center of Emergency Marine Rescue in Fujian Province during typhoon event

The successful and fruitful field survey will definitely benefit TCS staffs promoting their knowledge and enhancing their capacity of coordination. The practical experience in China on the mechanism and emergency response to typhoon-related disaster risk reduction, including institutional framework related to DRR, typhoon warning information dissemination, emergency evacuation, capacity building on sediment-disaster prevention and preparedness, could be shared among TC Members.

The field survey was cooperated closely and supported strongly by Bureau of Hydrology (BOH) of Ministry of Water Resources (MWR) of China and Headquarters of Flood Control and Drought Relief of Government of Fujian Province of China.



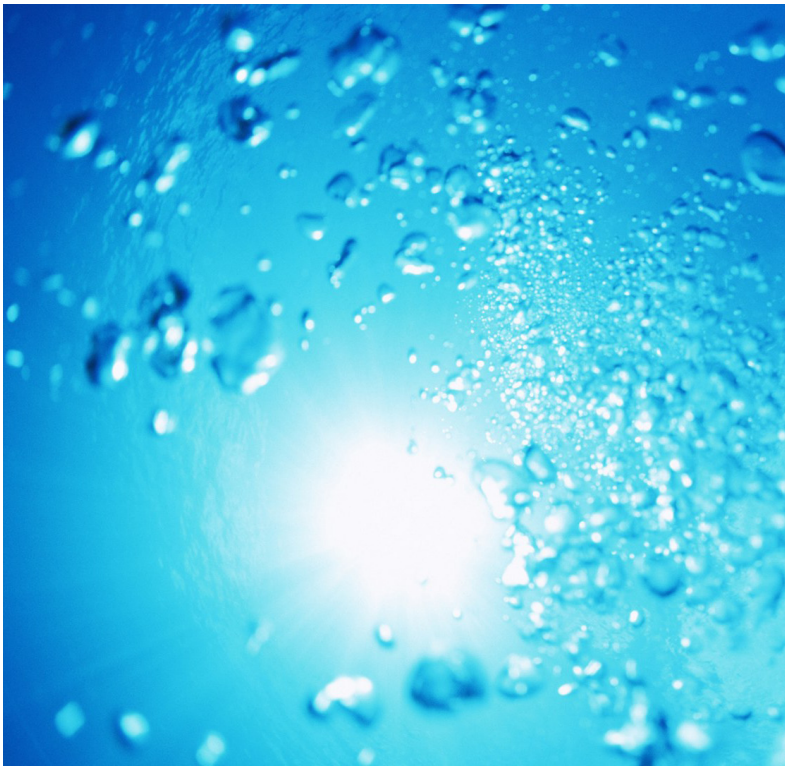
The mission was in the Provincial Office of Flood Control and Drought Relief of Fujian Province, China. The experts from Department of Water Resources, Provincial Flood Control Office and provincial Waning Center joined the discussion.

The mission was visiting the emergency response system of sediment disaster in a town's office.

The contingency plan and sketch map of emergency rescue in a village's office for sediment disaster reduction

TC WGH Held Its 2nd Working Meeting in Seoul, Korea

Referring to the decision of the 45th Session of the ESCAP/ WMO Typhoon Committee (TC) which was held in Hong Kong, China from 29 January to 01 February 2013, the Working Group on Hydrology (WGH) had its second working meeting with the theme of "Extreme Flood and Flood Forecasting System in TC" in Han River Flood Control Office (HRFCO) of Korea, Seoul from 14 to 17 October 2013 at the kind invitation of the Ministry of Land, Infrastructure and Transport (MOLIT) HRFCO, Republic of Korea with generous offering of financial support.



The objectives of the meeting were:

- to review the implementation progresses of WGH Annual Operating Plan (AOP);
- to discuss the definition of extreme flood;
- to review the flood vulnerability analysis in the TC region;
- to share flood forecasting system and flood control organization in the TC region;
- to review the technical report of Assessment System of Flood Control Measures on Socio-economic Impacts (ASFCM), one project led by Korea;
- to discuss the preparation and hydrological contribution
- to prepare the 8th Integrated Workshop and 2nd TRCG Forum to be held in Macao, China from 2 to 6 December 2013.

Speakers at the 2nd WGH Meeting

The meeting was hosted by HRFCO of MOLIT in cooperation with Korea Institute of Construction (KICT) and co-chaired by WGH chairperson Mr. Kamoto Minoru and the director of Information Center of HRFCO Dr. Sang Heon LEE. The Director General of HRFCO Dr. Mr. Hajoon Park delivered his open address and attended the meeting of 2nd day morning.

Totally about 25 participants from Japan, Korea, Laos, Malaysia, Philippines, Thailand, Vietnam and TCS took part in the meeting.

The participants from Members presented the status of flood forecasting system (FFS) and flood control organization in their countries. The meeting noted that, the developments of FFS including data collection, transmission and analysis are uneven in the Members even with similar structure and procedure. Meanwhile, the meeting also noted that there two topics were raised as below:

- the balance of flood risk and water resource utilization; and
- the combination of hydrological monitoring information and flood-risk public warning.

The meeting reviewed and discussed the implementation status and progresses of WGH AOPs in 2013 and the plan in 2014 and beyond.

TC WGH Had Its Kick-off Meeting for the Project of OSUFFIM in SYS University, Guangzhou, China

Referring to the discussion at the Typhoon Committee (TC) 8th Integrated Workshop in conjunction with the 2nd Training and Research Coordination Group (TRCG) Forum

which was held in Macao, China from 2 to 6 December 2013, TC Working Group on Hydrology (WGH) held the kick-off meeting for implementation of the project on Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM), which was proposed to be led by

China, in Sun Yat-Sen (SYS) University, Guangzhou, China from 27 to 28 December 2013.
The kick-off meeting was attended by 13 participants from Bureau of Hydrology (BOH) of China, Sun Yat-Sen (SYS) University of China, Department of Irrigation and Drainage (DID) of Malaysia; Royal Irrigation Department (RID) of Thailand, National Center for Hydro-Meteorological Forecasting (NCHMF) of Vietnam and hydrologist of Typhoon Committee Secretariat (TCS).

The meeting achieved the expected objectives, including:

- discussed the mechanism of implementation and roles for partners
- reviewed the data availability of proposed pilot cities from Malaysia, Thailand and Vietnam;
- deeply discussed the road map and implementation plan in 2014 and beyond; and
- discussed the possibility of exploring mobilization of the funding support for the pilot studies in the Members of pilot cities.

Dr. AISHAK Asnor Muizan, Assistant Director of Water Resources and Hydrology Division, IDI of Malaysia, presented the situation of urban flood and flood forecasting in Malaysia. He proposed Kuala Lumpur in Klang valley and Kuantan City in Kuantan river basin as candidates of pilot city. One of them will be selected as pilot city in Malaysia after the field investigation scheduled in July of 2014.

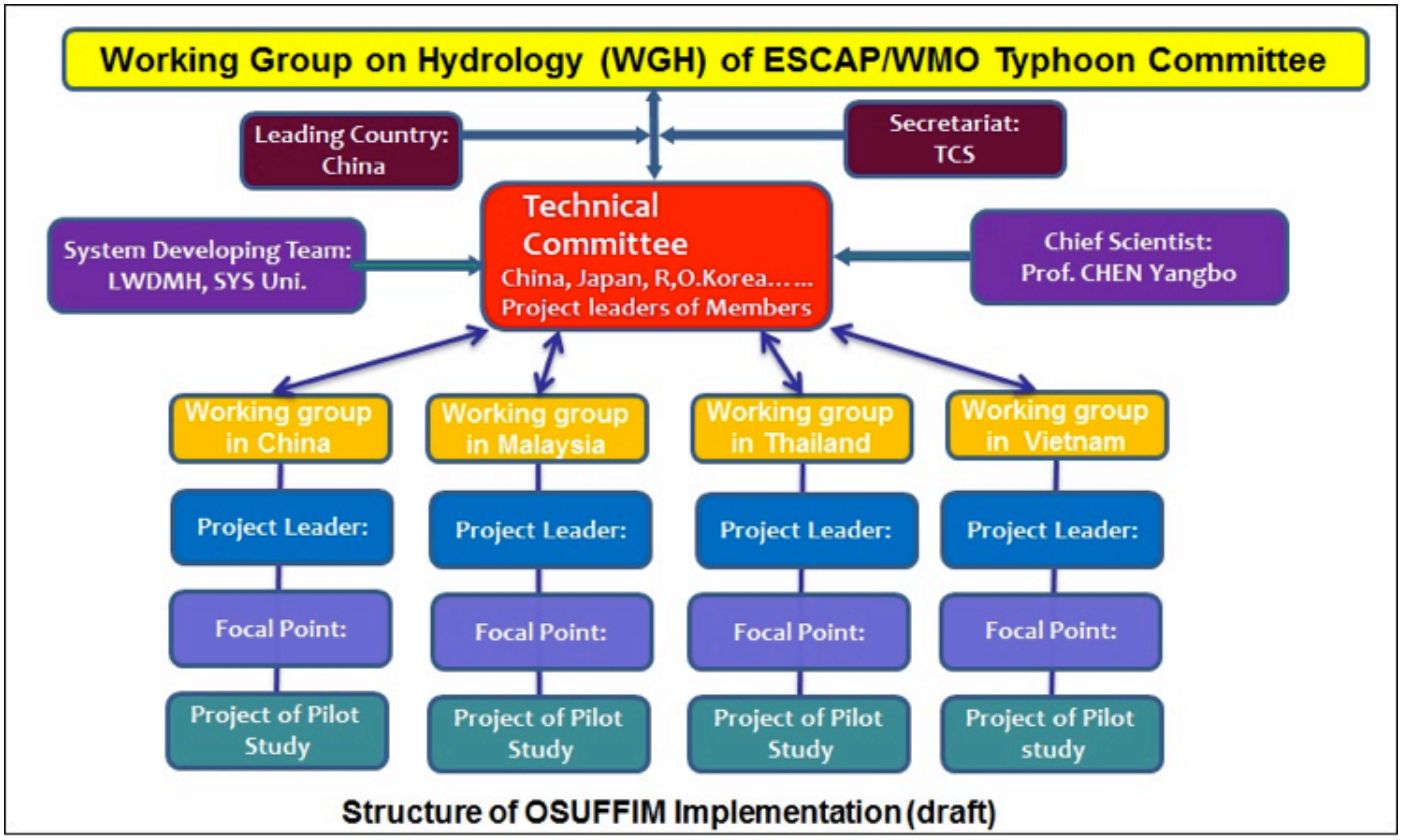
Mr. Thada SUKHAPUNNAPHAN, Director of Hydrological Division of RID of Thailand, presented the situation of urban flood in Thailand. He proposed Chinag Mai in Mae Nam Ping river basin and Hat Yai in Thale Sap Songkhla river basin as candidates of pilot city. According to the background information he presented and the availability of data collection, Chiang Mai was selected as pilot city in Thailand.

Dr. DANG Thanh Mai, Deputy Director of NCHMF of Vietnam, presented the situation of urban flood in Vietnam. She introduced the background information of Hanoi in Red river delta and Phu Yen in Ba river basin as candidates of pilot city. One of them will be decided as pilot city subject to further survey on availability of data in 2015.

The Members of Pilot Cities are encouraged to take part in the field survey conducted in other countries by self-funding support so that they can take the advantages for learning from each other and discussing with resource persons
All participants recognized the importance of establishing a perfect mechanism and organization to implement the project effectively and efficiently. The participants affirmed the structure of OSUFFIM implementation and identified the specific roles for System Development Team (SYS Uni., CHINA), Members of Pilot Cities and TCS in OSUFFIM implementation.

The Members of pilot cities are encouraged to set up working groups at national level for the project on the pilot study of OSUFFIM application in their countries. The participants discussed very carefully the road map and implementation plan for 2014 and beyond prepared by SYS University and reached a consensus with taking into consideration the various situations in the Members.

Also the participants recognized that the proposed activities



Structure of OSUFFIM Implementation (draft)

will be conducted subject to the availability of data, human resources and funding support from Members of pilot cities. The Members of pilot cities are encouraged to explore mobilization of the self-funding for supporting the activities related to the pilot studies of development and application of OSUFFIM in the countries.

TC Publication: Guidelines on UFRM

Typhoon Committee published the Guidelines on UFRM in December 2013 and distributed at TC 8th IWS/2nd TRCG Forum held in Macao, China, as the main outcome of the cross-cutting project of the Committee on Urban Flood Risk Management (UFRM) in Typhoon Committee Area.

As the first cross-cutting project of the Committee, the implementation of UFRM project brought the remarkable and obvious benefits to the Committee, including the aspects of technology, cooperation and visibility. In general, the main outcomes of the project could be summarized as following six aspects: (1) provided and accumulated the experience for the Committee on how to carry on the cross-cutting project in the Committee; (2) summarized and abstracted the good practices in TC area on urban flood risk management; (3) identified the main gaps and needs in TC Members on urban flood risk management in aspects of hydrology, meteorology and disaster prevention and preparedness; (4) trained the staffs and transferred the technique for TC Members on QPE/QPF application, urban flood inundation mapping and disaster assessment; (5) Published the UFRM Guidelines for TC Members; and (6) Enhanced the visibility of the Committee in a sense. The achievements and outcomes on UFRM would be used not only in TC Members but also in outside of TC area. As the executive body of the Committee, TCS staffs played their efforts and roles, and also learnt a lot from coordinating this cross-cutting project.

As a technical report, the Guidelines on UFRM was supposed to compile rules or instructions about the best way to manage urban flood risk in the Typhoon Committee Region. The target users will include technicians and decision-makers. This document seeks to: a) present a brief review of urban flood issues in the Typhoon Committee Area, and identify good practices and progress of urban flood risk management from the model cities study, b) propose a new framework of urban flood risk management, c) illustrate with technical methods and tools for urban flood risk management, with emphasis on the aspects of meteorology, hydrology and disaster risk reduction.

The main drafters of the UFRM Guidelines includes Prof. LIU Zhiyu, Prof. CHENG Xiaotao, Dr. CHEN Zuhua, Dr. Wan Haotao and Ms. Zhou Li from China; Mr. Edwin ST Lai from Hong Kong, China; Mr. Masashi Kunitsugu from Japan, Dr. Yang-Su Kim, Dr. Tae Sung Cheong, Dr. Gunhui Chung from Republic of Korea, and Dr. Susan P. Espineva from Philippines.

The finalizing the cross-cutting project on UFRM, does not mean the end of research on urban flood risk management in the committee. Actually, there are many topics on the aspect of UFRM still exiting and waiting for further action. Tthe further research, cooperation and exchange on UFRM will be continued to promote and enhance the capacity of urban flood forecasting, warning and inundation mapping among TC Members.

WGM News

With the kind support from Macao Meteorological and Geophysical Bureau and the financial sponsorship from Macao Foundation, the 8th Integrated Workshop together with the 2nd Training and Research Group Forum with the main theme on "Forecasting, Warning and DRR strategies in the Mitigation of Tropical Cyclone Impact in a Multi-hazard Environment", was successfully held in Macao, China on 2 – 6 December 2013.

The Meeting was attended by 102 participants including the representatives from 13 Typhoon Committee Members and 15 invited speakers to deliver the keynote lectures, which cover the topics on meteorology, hydrology and disaster risk reduction.

The first 3 days of this joint event was dedicated to the TRCG Forum while the 8th IWS was taken place on the following 2 days in which the WGM members had the opportunities to meet on 5 December in the WGM Parallel Meeting to review the progresses and results of the 2013 action plans as well as to discuss the action plans for 2014 and beyond. On the basis of the information provided by Members and the respective coordinators of the action plans and based on the subsequent discussions during the Parallel Meeting, WGM noted that the action plans in 2013 which includes the Annual Operating Plans, Perennial Operating Projects and the Preliminary Projects were successfully completed. WGM also noted that Members had made significant progress during 2013 in tropical cyclone monitoring and communication systems, data assimilation and numerical weather predication systems, tropical cyclone forecast-aiding systems, and scientific understanding of tropical cyclone activities. Here are some of the significant outcomes:

- The second assessment report on the impacts of climate change on tropical cyclones has been published in February 2013 and it is available on the TCS website (http://www.typhooncommittee.org/docs.htm). The two papers related to the second assessment report published in the Journal of Tropical Cyclone Research and Review, and were cited by the IPCC AR5, three times in Chapter 14 (Climate change 2013: The physical science basis, the WGI report).
- With the support of all Members, the editorial office together with WGM has been successfully published the journal Tropical Cyclone Research and Review (Vol.2, No.1-4) under the name of Typhoon Committee since 2012.
- WGM has provided help for WMO Landfall Typhoon Forecast Demonstration Project (LTFDP) and NW Pacific Tropical Cyclones Ensemble track Forecast Project (NWP-TCEFP) concerning related Members. Both projects have been applied into service of Members from 2010, and have been extended to 2015.
- WGM has drafted the proposal of the field experiment - Experiment on Typhoon Intensity Change in the Coastal Area (EXOTICA) based on the recommendation at the 45th TC Session.

After the 45th TC Session in 2013, WGM has been carrying out many activities that involved the cooperation among Members as well as other TC WGs and international organization which includes:

- The coordination meeting with CMA and WMO/WWRP/WGTMR on Typhoon Experiment (EXOTICA) held in Beijing in March, to revise the draft proposal of the project.
- AWG small meeting and SSOP workshop, held in Bangkok of Thailand on 8-9 May. The Typhoon Experiment project proposal was introduced to the AWG members.
- 8th WGDRR Workshop held at Seoul of Republic of Korea in May in which TCS meteorologist made a presentation on the Typhoon Experiment on this occasion. WGDRR members were invited to provide further input to the proposal.
- Coordinate with STI and National Meteorology Center (NMC) of CMA and National Typhoon Center (NTC) of Korea Meteorological Administration (KMA) to organize the 6th China-Korea joint workshop on the tropical cyclones, held in Shanghai and Beijing of China on 26-28 May 2013.
- Coordinate with STI of CMA and HKO to organize the training workshop on Dvorak technique, held in Shanghai from 28 to 30 May, 2013.
- Coordinate with KMA to conduct a training course on TAPS, held at KMA in May. Three forecasters from Vietnam, Philippines and Thailand participated the training.
- Coordinate with RSMC Tokyo to organize the Annual Attachment Training, conducting the training of storm surge and QPE/QPF, held at RSMC Tokyo in July. Two experts from Cambodia and Thailand attended the Attachment Training.
- Participate and coordinate with PAGASA to organize the in-country pilot workshop on Synergized Standard Operating Procedures (SSOP) for coastal multi-hazards early warning system, held in Quezon City of Philippines on 3-4 October.
- Coordinate with HKO to organize the training on QPE/QPF and nowcasting of severe weather in SWIRLS (HKO's operational nowcasting system), conducted from 21 Oct. to 1 Nov.

8th IWS WGM Parallel Meeting participants

- Coordinate with JMA and TMD to hold a technical meeting at JMA on 25-28 November among the radar experts from both organizations to follow up on the progress of the project on the Development of Regional Radar Network.
- Coordinate with STI of CMA and TCS to edit and publish the Typhoon Committee Journal "Tropical Cyclone Research and Review", No.1-4 of Vol.2.

With the strong support from Tropical Cyclone Program (TCP) of WMO and Typhoon Committee Secretariat (TCS), and the absolute sincerity cooperation of all Members, WGM has made significant progress in related to the planned tasks in 2013. Looking forward ahead, WGM will continue to put their efforts to implement the action plans in 2014 as well as to carry out the studies on the future research works with the focus on developing high resolution typhoon model and medium and long range forecasting of tropical cyclones.

TC NEWS FROM MEMBERS

CHINA

I. WMO-TLFDP Project (http://tlfdp.typhoon.gov.cn)

WMO-TFLDP has introduced the latest tropical cyclone forecast, including ensemble and probability forecasting, technology and software into the Asia-Pacific area, expanding forecasters' objective reference tools. The project developed and established typhoon forecast evaluation methods and procedures used to verify and analyze simulations and forecasting techniques. It provides technical assistance to forecasters to improve usage of objective operational forecast products. The WMO-TLFDP Training Workshops on Tropical Cyclone Forecasting were held in 2010 and 2012. It enhanced forecasters' forecasting techniques and facilitated academic exchange among Members.

The project was greatly successful at the Shanghai World Exposition (Expo 2010), and gained WMO's recognition. The project, which will be end in 2015, will continue benefits Typhoon Committee Members.

In order to further improve the evaluation system for tropical cyclone forecast conjunction with WMO-TLFDP, the following new measures (track and landfall forecast) are applied.

- Relative forecast skill of TC moving speed and direction
- Hit rate of landfall
- Relation between track forecast error and guiding flow
- Track Forecast Integral Deviation (TFID) --- 2013
- New attempts (intensity forecast)
- Skill score
- Category skill score
- Joint charts of POD and FAR
- Trend analyses

What is new on the website of WMO-TLFDP in 2013

- **GFS from NCEP**
- **COAMPS-TC, GFDN from FNMOC**
- **Thanks to the NCAR Tropical Cyclone Guidance Project (TCGP) developed by Dr. Jonathan Vigh**

- Relation between intensity forecast error and initial intensity error of NWP models
- BS, PRS, and ranking analyses of EPS forecasts

II. Experiment on Typhoon Intensity Change in Coast Area (EXOTICA)

CMA, coordinated with HKO and KMA is planning the experiment on typhoon intensity change in coast area. The following things are supposed to be accomplished,
(a) To held a small meeting for preparing (revising the proposal and confirming the actions etc.) of the experiment
(b)To test the field campaign by using aircraft (un/manned) drop-sounds, mobile GPS rise-sound and rocket drop-sound.
(c) Demonstration research on tropical cyclone intensity change by using target typhoon data from the field campaign.(to be included in the TC Fellowship Scheme)

III. Tropical Cyclone Research and Review

With great support from the Typhoon Committee Working Groups and all its members, especially the Typhoon Committee Secretariat (TCS), the Typhoon Committee scientific journal "Tropical Cyclone Research and Review" (TCRR) was officially launched in February 2012. The editorial office is hosted by the STI/CMA, and contains one chief, three

staff, and visiting editors, from Typhoon Committee Members, who work on peer-reviewing, editing, and publishing. TCRR is a periodical journal which has published 8 issues.

Typhoon experts in the Typhoon Committee region have enthusiastically made contributions. This not only improves motivation in personnel from all Members on summary and research study, but also enhances their ability to implement typhoon operational forecasts and disaster risk reduction. Inviting visiting editors each year promotes academic exchange between Typhoon Committee Members and Working Groups.

The journal is highly respected by the international typhoon research community. Distinguished researchers, including Prof. William M Gray, Prof. Russell L. Elsberry, and Dr. Frank Marks published papers on the journal. Many other famous typhoon experts are volunteering their time to review papers. Its online version was viewed and downloaded over 40,000 and 25,000 times, respectively. The journal has become a useful platform for academic exchange, which certainly elevates Typhoon Committee's visibility.

As the organizer, STI covers all peer review, editing, publishing, promotion, and operating costs. STI, though this initiative, has contributed to the dissemination of academic achievements and to the expansion of the Typhoon Committee's sphere of influence. For further information, please visit http://tcrr.typhoon.gov.cn .

The following two papers published on the Journal of Typhoon Committee *Tropical Cyclone Research and Review* were cited by the IPCC three times in Chapter 14 of IPCC AR5 (*Climate Change* 2013: *The Physical Science Basis*, the WGI report) — once in Section 14.6.1.1 and twice in Section 14.6.1.2.

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Yokoi, S., and Y. Takayabu, 2009: Multi-model projection of global warming impact on tropical cyclone genesis frequency over the western north Pacific. *Journal of the Meteorological Society of Japan*, **87**, 525-538.

14.6.1.1 Understanding the Causes of Past and Projected Regional Changes

Detection of past trends in measures of tropical cyclone activity is constrained by the quality of historical records and uncertain quantification of natural variability in these measures (Knutson et al., 2010; Lee et al., 2012; Seneviratne et al., 2012). Observed regional climate variability generally represents a complex convolution of natural and anthropogenic factors, and the response of tropical cyclones to each factor is not yet well understood (see also Section 10.6.1.5 and Supplementary Material Section 14.SM.4.1.2). For example, the steady long-term increase in tropical Atlantic SST due to increasing greenhouse gas can be dominated by shorter-term decadal variability forced by both external and internal factors (Mann and Emanuel, 2006; Baines and Folland, 2007; Evan et al., 2009; Ting et al., 2009; Zhang and Delworth, 2009; Chang et al., 2011; Evan et al., 2011a; Solomon and Newman, 2011; Booth et al., 2012; Camargo et al., 2012; Villarini and Vecchi, 2012). Similarly, tropical upper-tropospheric temperatures, which modulate tropical cyclone potential intensity (Emanuel, 2010), can be forced by slowly-evolving changes in the stratospheric circulation of ozone (Brewer-Dobson circulation) due to climate change with occasional large amplitude and persistent changes forced by volcanic eruptions (Thompson and Solomon, 2009; Evan, 2012). This convolution of anthropogenic and natural factors, as represented in a climate model, has also been shown to be useful in prediction of Atlantic tropical storm frequency out to a few years (Smith et al., 2010).

IV. The 6th China-Korea Joint Workshop on Tropical Cyclones, Shanghai, China, 26-28 May, 2013

The 6th China-Korea Joint Workshop on Tropical Cyclones was held in Shanghai, China on 26-28, 2013. Theme of the workshop is "Analysis and Forecast of Tropical Cyclone Intensity and Mesoscale Structure". Shanghai Typhoon Institute (STI), Shanghai Meteorological Service of CMA and National Typhoon Center of KMA co-organized it and there are 38 participants from CMA, KMA, HKO, and several renowned universities in Korea, China, and U.S.A. This annual event promotes the mutual exchange of the latest progress in tropical cyclone research and operation between Korea and China. It also enhances bilateral cooperation on tropical cyclone forecasting techniques.

HONG KONG, CHINA

Topics

1. Tropical cyclone surveillance flight
2. Enhanced tropical cyclone information service for the public
3. Typhoon Committee Research Fellowship Scheme
4. "Hong Kong Observatory - Under the Same Sky 130 Years" exhibition

1. Tropical cyclone surveillance flight

The Hong Kong Observatory continued to conduct reconnaissance flights in collaboration with the Hong Kong Government Flying Service (GFS) in 2013 to collect meteorological observations for tropical cyclones over the South China Sea. A total of seven flights were conducted, including a low pressure system (14 June), Bebinca (1305) (21, 22 June), Rumbia (1306) (1 July), Jebi (1309) (1, 2 August), and Utor (1311) (13 August). In particular, the centre of Utor was traversed a couple of times to collect wind and pressure data, aiding operational determination of the location of the system (Figure 1).

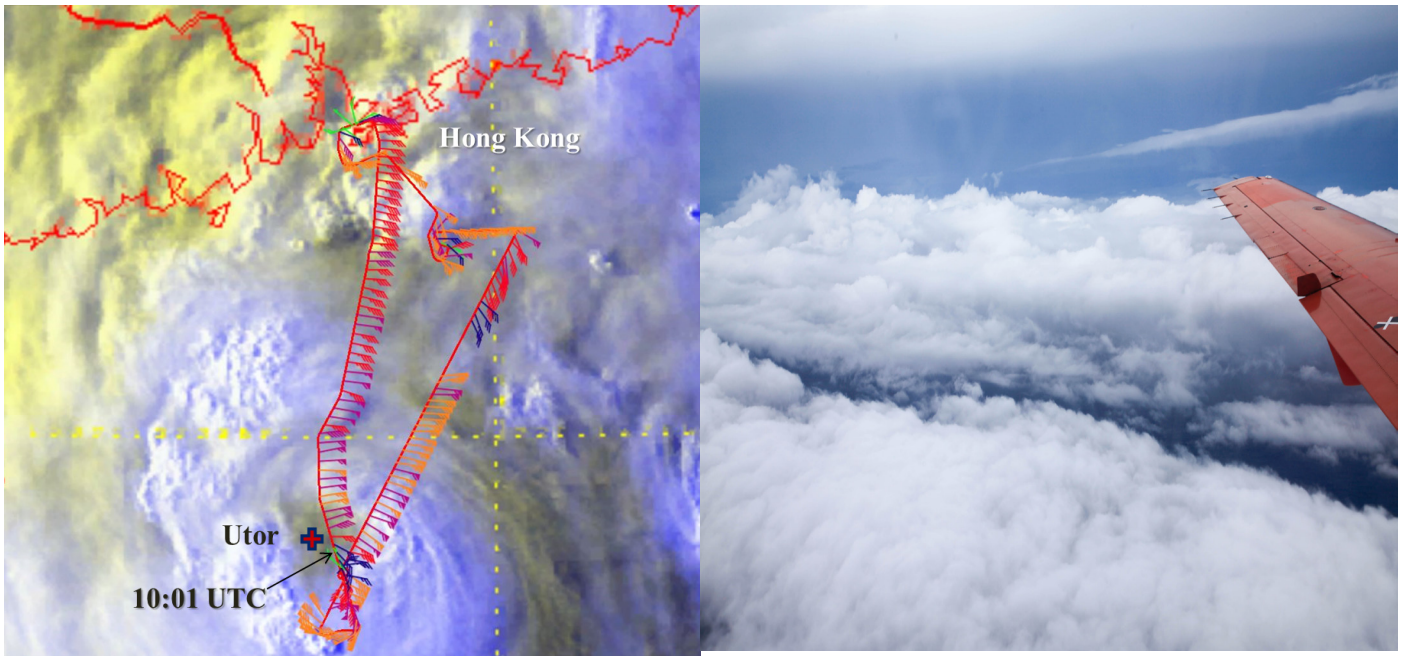


Figure 1 Wind observation data collected during the reconnaissance flight for Utor (1311) on 13 August 2013 overlaid on MTSAT false colour image of the tropical cyclone (left). Image on the right shows cloud bands observed on-board at 10:01 UTC (position as marked on the photo to the left).

In recognition of its contribution towards mitigating effort against weather hazards, GFS was awarded the Dr Roman L Kintanar Award 2012 during the Typhoon Committee 45th Session held in Hong Kong in early 2013. The Observatory and GFS together also won the bronze award under the Team Award in the 2013 Civil Service Outstanding Service Award Scheme, organized by the Civil Service Bureau of the Government of the Hong Kong Special Administrative Region, for their joint effort in Tropical Cyclone Surveillance Flight.

2. Enhanced tropical cyclone information service for the public

The provision of tropical cyclone forecast tracks to the public was enhanced in 2013 with an earlier issuance of the forecast tracks for tropical cyclones within the storm watch area as well as for distant tropical cyclones. The associated Tropical Cyclone Track Information webpage on the Observatory's website was also enriched with satellite images and track accuracy cones (Figure 2).

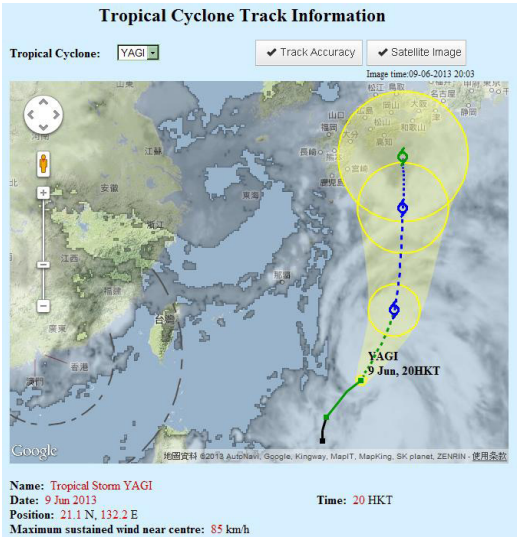


Figure 2 Tropical Cyclone Track Information webpage on the Hong Kong Observatory's webpage.

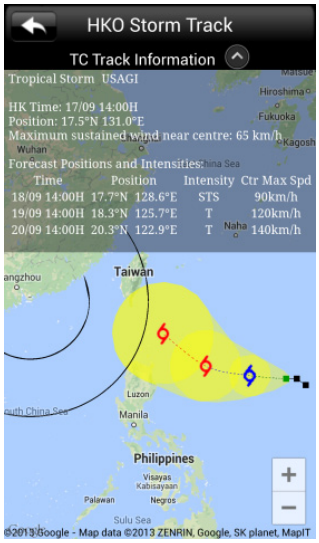


Figure 3 Enhanced user interface of tropical cyclone track on the mobile app "MyObservatory" on Android platform.

The conveyance of timely weather information such as tropical cyclone warnings is very much facilitated by the increasingly popular use of personal mobile devices. In 2013, usage of an in-house developed weather app, "MyObservatory" (with more than 32 billion page views), exceeded that of the Observatory's website (with more than 30 billion page views) for the first time, suggesting that more and more users made use of mobile platform to gain access to weather information. The peak daily figures of "MyObservatory" reached a record high of 205 million on 22 September 2013 during the approach of Severe Typhoon Usagi. Features on "MyObservatory" (Figure 3) were enhanced for the benefits of users, e.g. track accuracy cones for tropical cyclone forecast tracks on the app.

3. Typhoon Committee Research Fellowship Scheme

A training course on nowcasting was organized during 21 October – 1 November 2013 as part of the Typhoon Committee Research Fellowship Scheme. The course covered topics on rainstorm warning system, quantitative precipitation estimates and forecasts, nowcasting techniques of severe weathers such as thunderstorms and associated wind gusts, as well as practice sessions on the Observatory's SWIRLS nowcasting system. Colleagues from the Thai Meteorological Department (TMD), the National Hydro-Meteorological Service (NHMS) of Viet Nam, and the Macao Meteorological and Geophysical Bureau (SMG) participated in the training programme (Figure 4). They considered the course very fruitful in facilitating their understanding of nowcasting techniques of rainstorms and high-impact weather.

Figure 4 Participants of the training course on nowcasting. From left to right: Mr Mai Khanh Hung from NHMS of Viet Nam, Dr Sukrit Kirtsaeng from TMD, Mr Woo Wang-chun and Mr Cheng Tsz-lo, trainers from the Hong Kong Observatory, Mr Wong Chan-seng and Mr Wong Ngai-kin from SMG.

4. "Hong Kong Observatory - Under the Same Sky 130 Years" exhibition

To celebrate the 130th Anniversary of the Hong Kong Observatory, an exhibition "Hong Kong Observatory – Under the Same Sky 130 Years" was jointly organized with the Hong Kong Museum of History from 9 July to 2 September 2013. One of the objectives of the exhibition was to look back on the historical disastrous weather events in Hong Kong for the purpose of enhancing public awareness and preparedness against extreme weather. More than 146,000 visitors attended the 8-week long event after the opening by Mr Shun Chi-ming, Director of the Hong Kong Observatory on 9 July (Figure 5). A virtual tour of the exhibition will be available on the Observatory's website (http://www.weather.gov.hk/contente.htm) in due course.

Figure 5 Mr Shun Chi-ming (right), Director of the Hong Kong Observatory, explaining to VIPs at the opening of the exhibition about a historical weather chart for a devastating typhoon in 1906.

Recent developments with JMA's Typhoon and One-week Ensemble Prediction System

The Japan Meteorological Agency (JMA) plans to upgrade its Typhoon Ensemble Prediction System (Typhoon EPS) and its One-week EPS (Table 1). The upgrade includes enhancement of the horizontal resolution of the forecast model from TL319 to TL479 and revision of the model physical processes, such as the stratocumulus scheme and the radiation scheme, for both EPSs. This resolution enhancement will lead to better representation of tropical cyclone (TC) structures and high-impact weather conditions such as heavy precipitation and strong winds accompanying TCs.

The planned upgrade for the Typhoon EPS includes increased ensemble size from 11 to 25 for improved reliability of TC strike probability forecasts. The results of related experiments show that the upgrade will have a positive impact on TC track forecasts in both ensemble mean and control runs as shown in Figure 1. Examples of TC track forecasts using the upgraded (left) and operational (right) Typhoon EPS are shown in Figure 2. The upgrade reduces excessive spread and improves the reliability of TC strike probability forecasts. Figure 3 shows examples of six-hour cumulative precipitation and mean sea level pressure predicted by the control member of the upgraded Typhoon EPS (left) and the operational Typhoon EPS (right). Owing to the higher horizontal resolution, the representation of the upgraded Typhoon EPS (lower typhoon center pressure and heavier precipitation accompanying the TC) corresponds more closely with analysis of typhoon center pressure and forecasting using JMA's high-resolution (TL959) operational deterministic global model than that of the operational Typhoon EPS.

The planned upgrade for the One-week EPS includes increased frequency of operation from once a day to twice a day and an approximate halving of each ensemble size (from 51 to 27). The results of related experiments show that the upgrade will have a positive impact on forecast scores for both ensemble mean and probabilistic forecasts and also on TC track forecasts in both ensemble mean and control runs (not shown).

Table 1 Specifications of JMA's medium-range EPSs (red: upgrade plan)

		Typhoon EPS	One-week EPS
Objectives		TC information	One-week forecasts
EPS model and related integration	Model type	GSM (an atmospheric general circulation model)	
	Horizontal resolution	TL319 (~ 55 km) → TL479 (~ 40 km)	
	Vertical levels	60 levels up to 0.1 hPa	
	Forecast range	132 hours (00, 06, 12, 18 UTC) only when tropical cyclones of TS/STS/TY intensity are present or are expected to appear in the RSMC Tokyo – Typhoon Center's area of responsibility	264 hours (12 UTC) → 264 hours (00, 12 UTC)
Ensemble settings	Members (per day)	11 → 25 (44/day → 100/day)	51 → 27 (51/day → 54/day)
	Initial perturbation	SV method, 1 fixed target area (Northwestern Pacific) and up to 3 movable target areas (vicinities of up to 3 TCs)	SV method, three target areas (NH, TR, SH)
	Model ensemble	Stochastic physics	

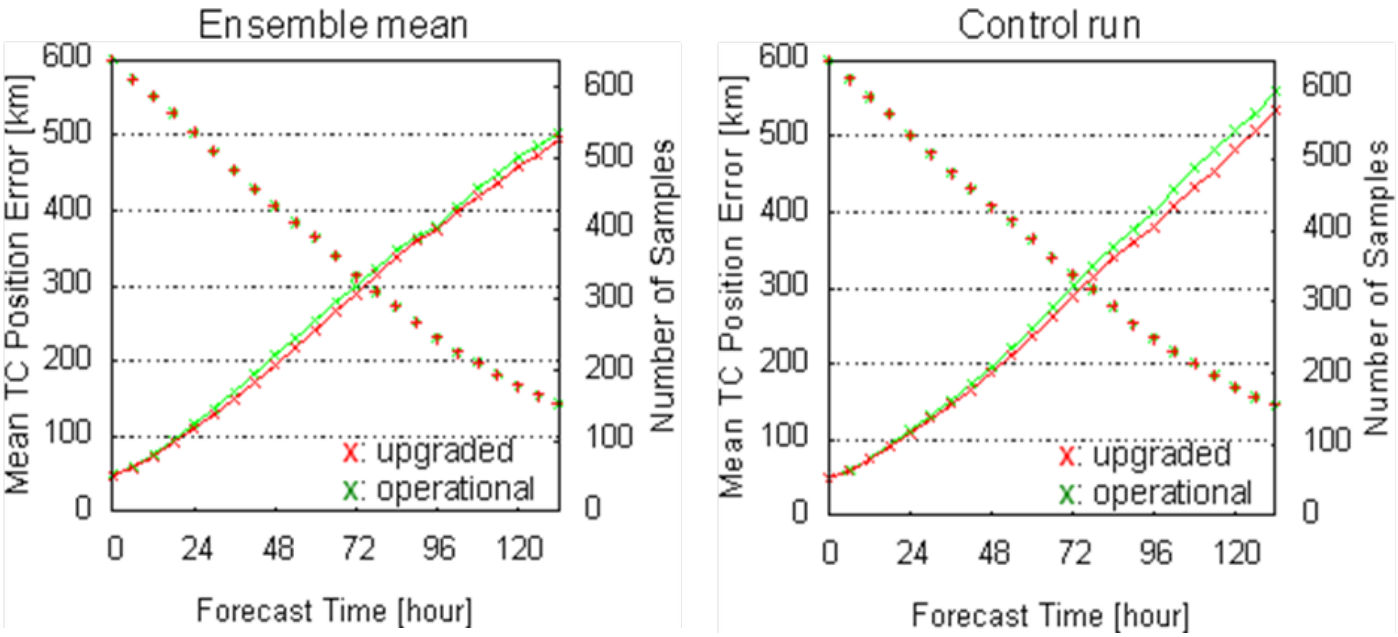


Figure 1 Mean TC position errors (in km) of ensemble mean (left) and control run (right) forecasts for June to December 2012 as a function of forecast time up to 132 hours. The red and green lines indicate errors of the upgraded Typhoon EPS (TL479, 25 members) and the operational Typhoon EPS (TL319, 11 members), respectively. The dots correspond to the vertical axis on the right, which represents the number of verification samples.

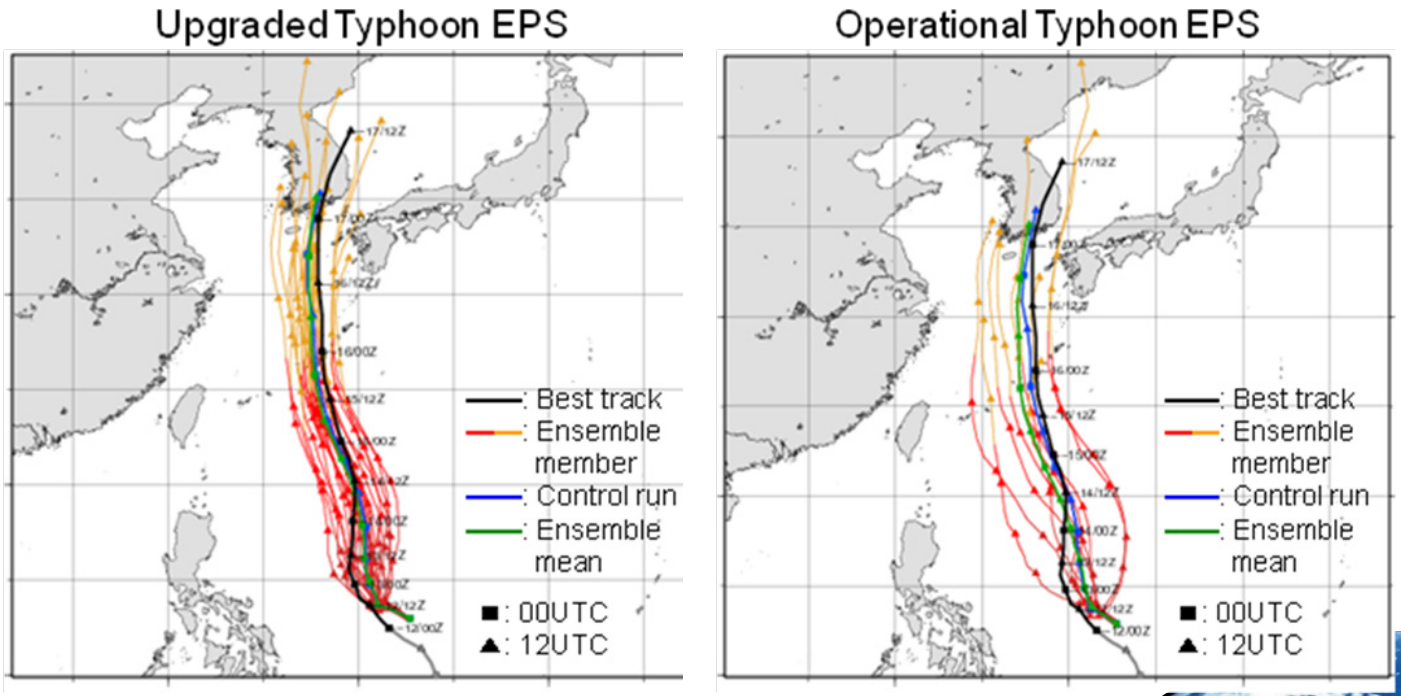
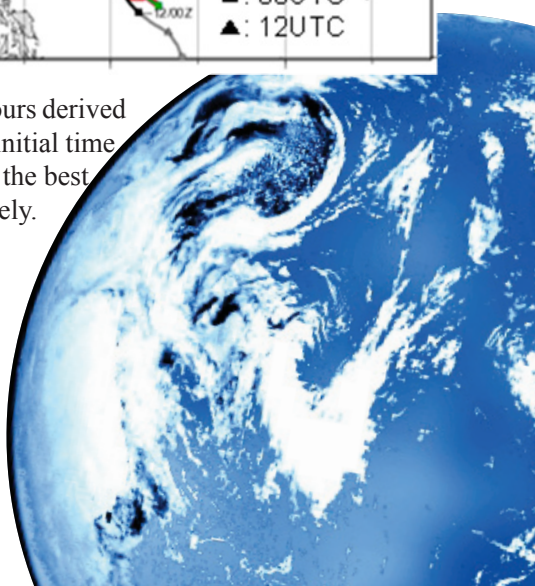


Figure 2 Ensemble TC tracks of Typhoon T1216 (Sanba) covering periods up to 132 hours derived from the upgraded Typhoon EPS (left) and the operational Typhoon EPS (right). The initial time is 00 UTC on 12 September, 2012. Black, red to yellow, blue and green lines indicate the best track, forecast track of ensemble members, control run and ensemble mean, respectively.



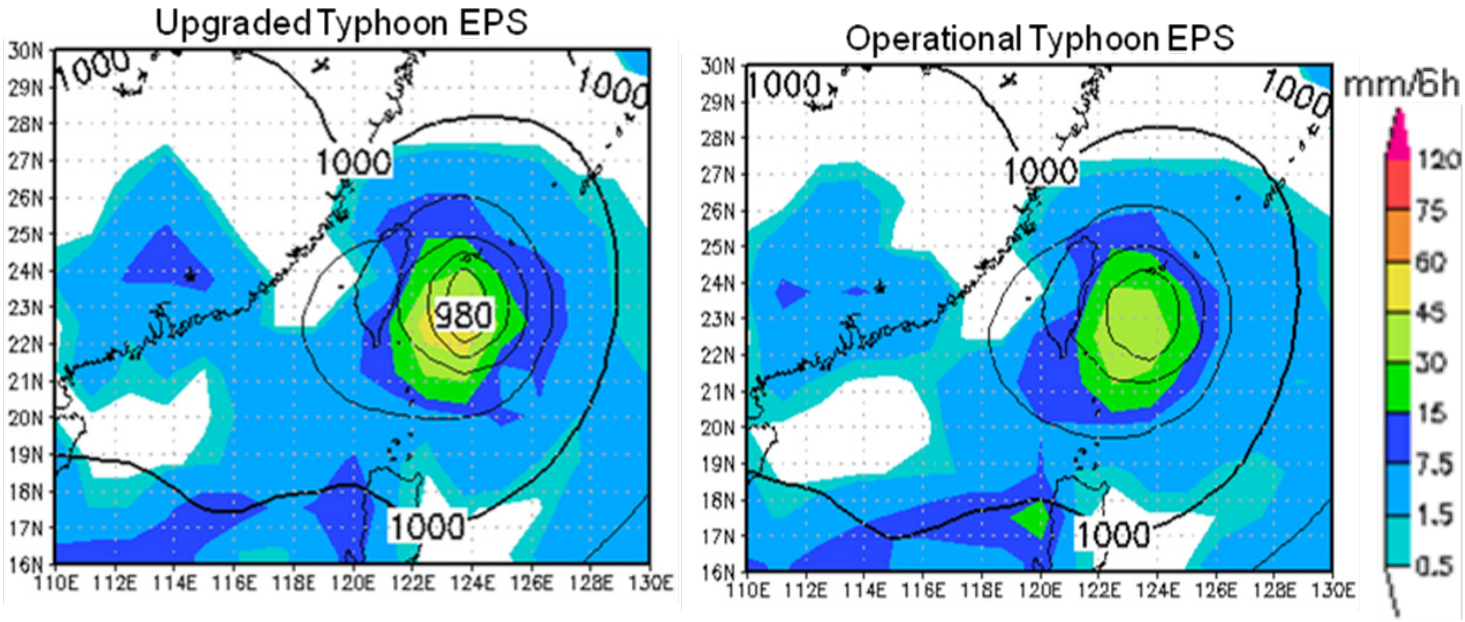


Figure 3 Six-hour cumulative precipitation (mm, shading) and mean sea level pressure (hPa, contours) as of 12 UTC on 4 August, 2012, as predicted by the control member of the upgraded Typhoon EPS (left) and the operational Typhoon EPS (right). The initial time of the forecasts is 12 UTC on 1 August, 2012.

13th Typhoon Committee Attachment Training at the RSMC Tokyo – Typhoon Center

The RSMC Tokyo – Typhoon Center has organized ESCAP/WMO Typhoon Committee Attachment Training sessions every year since 2001 with the support of the WMO Tropical Cyclone Programme (TCP) and the Typhoon Committee to enhance the capacity of Committee members in typhoon analysis and forecasting.

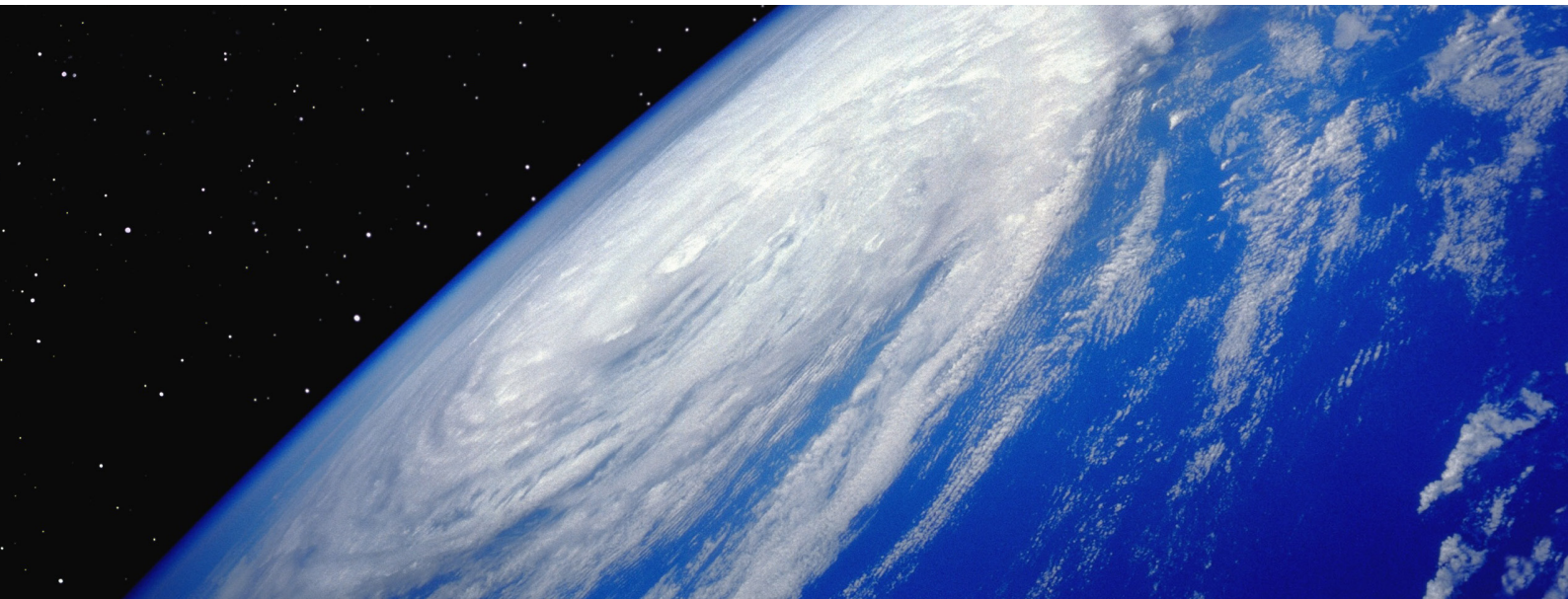
This year, Mr. Monichoth So Im from Cambodia and Mrs. Roongrawee Onkot from Thailand attended the 13th Attachment Training session held at JMA Headquarters from 17 to 26 July, 2013. The session focused on improving skills in tropical cyclone analysis and forecasting through practical training, including hands-on learning using the Satellite Analysis and Viewer Program (SATAID). It also incorporated lectures on a variety of subjects, such as quantitative precipitation estimation (QPE) and quantitative precipitation forecasting (QPF), the basics of storm surges, the Severe Weather Forecasting Demonstration Project (SWFDP) and an introduction to Japan's next generation of meteorological satellites (Himawari 8/9). During the sessions, the two trainees also attended daily tropical weather briefings to discuss the outlook for tropical cyclone formation and development in the western North Pacific region using real-time data including MTSAT images as well as numerical weather prediction (NWP) output. The training was successful in deepening the attendees' basic understanding of operational TC monitoring, analysis and forecasting together with practical skills in TC monitoring and analysis.

In order to reduce the capacity gap that has appeared between developed and developing Committee Members in recent years, TRCG is considering a possible increase in the number of trainees from two to three every year, placing higher priority on developing countries (including Cambodia, Lao People's Democratic Republic, Malaysia, the Philippines, Thailand and Viet Nam) as training targets.

A courtesy visit to JMA Director-General Dr. Mitsuhiko Hatori
Dr. Hatori between Mr. Monichoth So Im (left) and Mrs. Roongrawee Onkot (right) with Tokyo Typhoon Center staff (17 July, 2013, Director-General's office)

Briefing in the office room (JMA's Forecast Division)

Lecture and training in JMA's seminar room



1. Hosting the WMO Fifth Integrated Workshop on Monsoons (IWM-V)

The WMO fifth Integrated Workshop on Monsoons, organized by the WMO/WWRP Monsoon Panel and hosted by the Macao Meteorological and Geophysical Bureau, was held in Macao China during 28th to 31st October 2013 in Macao China. More than 150 monsoon experts participated in the workshop, with contributions of 36 invited review, 36 invited and contributed oral papers, and 63 poster papers.

The workshop provided a forum for researchers and forecasters to discuss recent advances and current issues covering all time scales (meso-, synoptic, intraseasonal, climate) that are relevant to the forecast of high-impact weather in the world's monsoon regions.

The workshop included one day session in Hong Kong on 1st November. Prior to the workshop is the preliminary meetings of WWRPs Working Group on Tropical Meteorology Research and Joint Working Group on Forecast Verification Research, during which the two groups had reviewed progress in implementing tropical meteorology and forecast verification research, discussed and evaluated the current status of the activities of the Working groups.

2. Co-organizing the 8th ESCAP/WMO Typhoon Committee 8th IWS/2nd TRCG Forum

Organized by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the World Meteorological Organization (WMO), the ESCAP/WMO Typhoon Committee Secretariat (TCS), and hosted by the Macao Meteorological and Geophysical Bureau, the ESCAP/WMO Typhoon Committee (TC) 8th Integrated Workshop (8th IWS) and the 2nd Training and Research Coordination Group (TRCG) Forum was held in the Macao Science Center, Macao, China from 2 to 6 December 2013. More than 100 participants including meteorologists, hydrologists and experts on disaster risk reduction attended the meeting. The participants were mainly representatives of the TC members, including Cambodia, Democratic People's Republic of Korea; Hong Kong, China; Japan; Lao People's Democratic Republic; Macao, China; Malaysia; Philippines, Republic of Korea; Thailand; United States of America and Viet Nam, as well as representatives of the organizing institutions. Typhoon Committee also invited 15 well-known specialists and scholars from USA; Canada; Australia; China; Japan; Korea and Hong Kong, China for keynote lectures as well as parallel discussion. The theme of this year's workshop is "Forecasting, Warning and DRR Strategies in the Mitigation of Tropical Cyclone Impact in a Multi-hazard Environment"

The 2nd Field Survey in the Philippines, Thailand, and Lao PDR for Extreme Flood Management in TC

As a key part of the project "**Extreme Flood Management in TC**" under Working Group Hydrology AOP2 & AOP6 led by the Republic of Korea, Ministry of Land, Infrastructure and Transport, Han River Flood Control Office, the expert group conducted the 2nd field survey on the selected basins in the Philippines, Thailand, and Lao PDR from 27th October to 2nd November 2013.

Figure 1. The expert group in RID(left) and DMH(right)

The expert group List ;

Country	Name	Organization
the Philippines	Ms. NIEVARES. C. Nivagine	The Philippines Atmospheric, Geophysical and Astronomical Services Administration(PAGASA)
Thailand	Mr. Saphaokham Somkid	Royal Irrigation Department(RID)
Lao PDR	Mr. VITHAYA Somphanh	Department of Meteorology and Hydrology(DMH)
Korea	Mr. Changhwan Kim	Han River Flood Control Office(HRFCO)
Korea	Mr. Dongryul Lee	Korea Institute of Construction Technology(KICT)
Korea	Mr. Seongkyu Kang	Korea Institute of Construction Technology(KICT)
Korea	Mr. Cheolkyun Shin	K-water
Korea	Mr. Wanhee Cho	K-water

The investigation items were

- Flood Forecasting System operated by related agency of each country.
- The river related challenges and projects which were related with river and flood of each country.
- The unique circumstances, status and plans for flood management.

Figure 2. Sulipan stage gauge in the Philippines

FIgure 3. Information Mark in the Philippines

Figure 4. Flood forecasting system in Thailand

Figure 5. Nam Ngum dam in Lao PDR

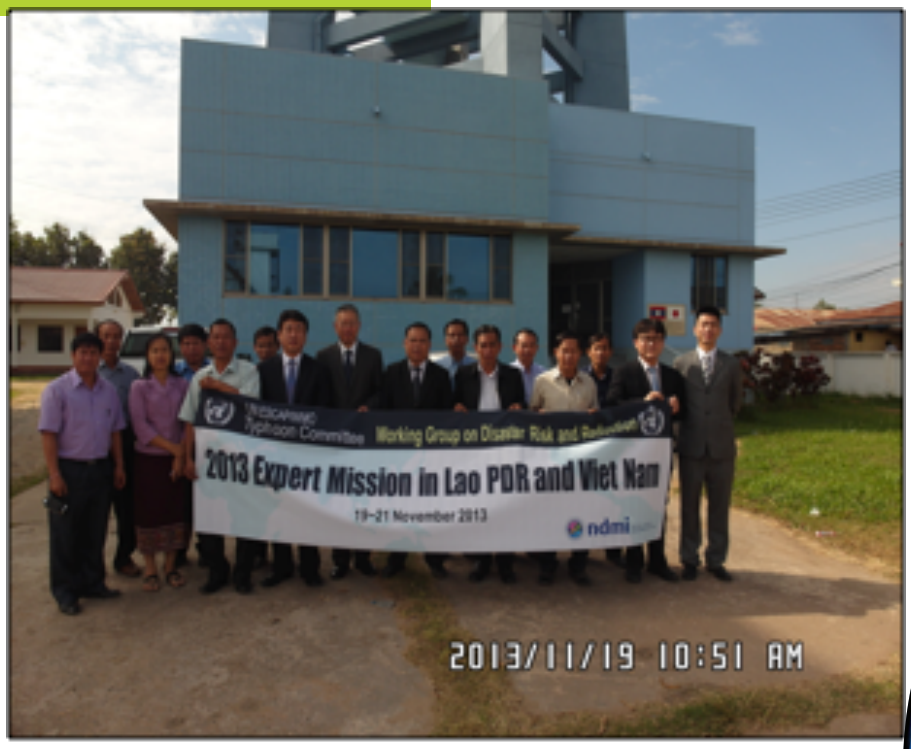
The expert group visited the Philippines Atmospheric, Geophysical and Astronomical Services Administration(PAGASA) and submerged area of Pampanga river in the Philippines. In Thailand, the group had a meeting and discussion about the 'Thailand integrated water management', the way of flood management using dam operation. The organization and important roles of DMH(Department of Meteorology and Hydrology) of Lao PDR were determined. The expert group could get detailed information of the hydrological observation system and the way of dam operation from visiting Nam Ngum Hydropower plant in Lao PDR.

The expert group found out **the cause and result of flood, the appearing way of damage from flood**. Through these outcomes of this field survey, it is possible to suggest the direction of **appropriate flood forecasting system** and the **counter measure against flood damage for TC member countries**. **Thanks to the nice and seamless preparation of the relevant organizations and local agencies, the investigation was successfully implemented.**

TC WGDRR Expert Mission that Visited Laos and Vietnam

Following its Annual Operating Plan (AOP) of 2013, Working Group on Disaster Risk Reduction (WGDRR) of Typhoon Committee (TC) conducted its expert mission in Laos and Vietnam from 18 to 22 November 2013. Dr. Jitae Kim and Mr. Kyoungjun Kim from National Disaster Management Institute (NDMI) of Republic of Korea, Mr. Leong Kai Hong (Derek) and Mr. Lei Pun Chi (Barrie) from Typhoon Committee Secretariat (TCS) as experts participated in the Mission.

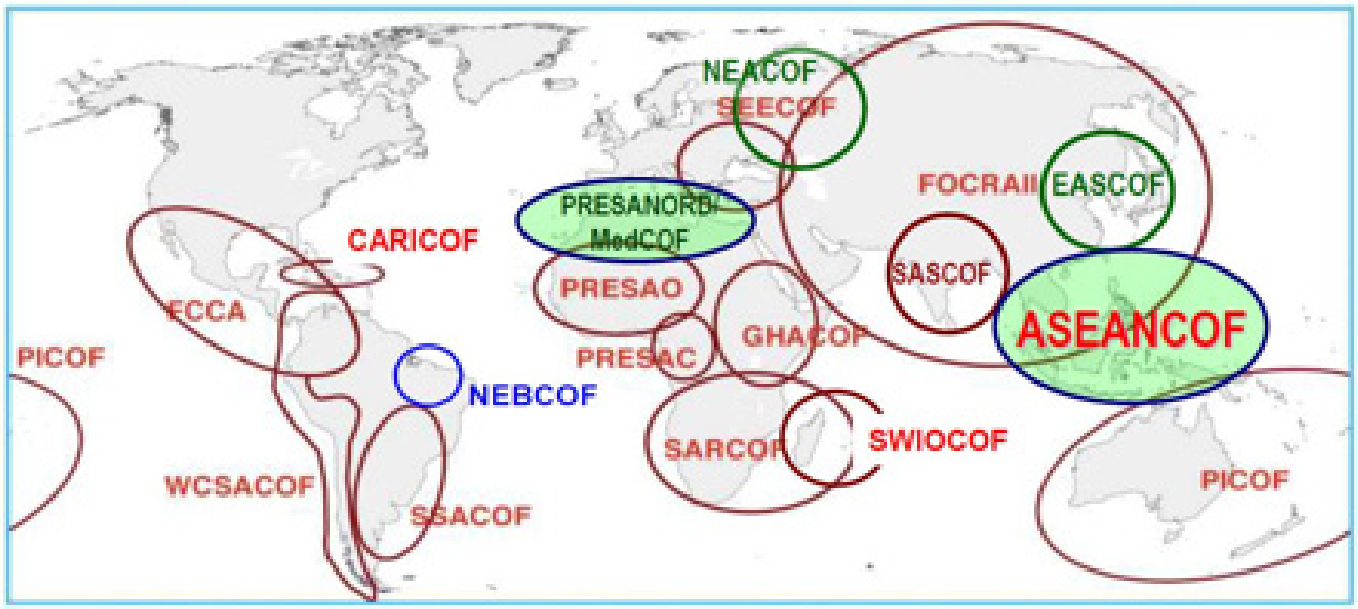
Mission in Viet Nam



Mission in Laos

The training and meeting were held in the Department of Dike Management and Flood and Storm Control of the Ministry of Agriculture and Rural Development, Hanoi, Vietnam and in the Department of Meteorology and Hydrology, Laos, PDR. The Mission presented Typhoon Committee Disaster Information System (TCDIS) to DRR departments of Laos and Viet Nam so that they could have a better understanding on the purpose and application of TCDIS as well as the necessity for collecting disaster information from the Members. The Mission also discussed with DRR colleagues of two countries on how TCDIS could help their countries in the decision making for typhoon-related disaster reduction. Meanwhile, experts also briefed the technology and policy applied in typhoon-related disaster prevention and preparedness, in which the experts introduced the Flash Flood Alert System, Frequency Analysis for Rainfall Data, Application of Radar for Urban Flood Warning and Soil Erosion Model for Mountain Areas.

SINGAPORE



Regional Climate Outlook Forums worldwide

THE INAUGURAL SESSION OF ASEAN CLIMATE OUTLOOK FORUM HELD IN SINGAPORE

Regional Climate Outlook Forums (RCOFs) have been operational in many parts of the world with the aim to provide collaboratively developed and consensus-based seasonal climate outlooks and related information on a regional scale. Based on the initiative from the World Meteorological Organization (WMO), and with strong support from the ASEAN (Association of Southeast Asian Nations) Sub-Committee on Meteorology and Geophysics, the ASEAN Climate Outlook Forum (ASEANCOF) has been established. The inaugural session was held in Singapore on 3-5 December 2013 at the Centre for Climate Research Singapore (CCRS), a newly established centre of the Meteorological Service Singapore (MSS).

Representatives from the National Meteorological Services (NMSs) of nine of the ten ASEAN member countries attended the meeting. In addition, there were participants from the WMO Global Producing Centres of Long Range Forecasts (GPCs), namely Beijing Climate Centre (BCC), European Centre for Medium-Range Weather Forecasting (ECMWF), Japan Meteorological Agency (JMA), UK Met Office (UKMO) and WMO Lead Centre for Long Range Forecast Multi-Model Ensemble (WMO LC-LRFMME), as well as the APEC Climate Centre (APCC).

Professor Chi-Pei Chang, from the US Naval Postgraduate School, was an invited speaker and opened the first session with an overview of the scientific prospects for seasonal forecasting in the boreal winter monsoon season. All participant countries and global centres represented gave presentations on the systems that they employ in making seasonal forecasts. The Forum session reviewed the current climate conditions in Southeast Asia and the current state of large-scale circulation features such as the El Niño/Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD). Multiple forecasts for December to February were also presented by the ASEAN and global centre participants, and these formed the input to the expert assessment leading to the consensus outlook.

Ahead of the ASEANCOF-1 meeting, a survey questionnaire titled: 'Priority needs for dynamical-model climate prediction: Questionnaire for suppliers of climate forecast services in the ASEAN region' was circulated to the NMSs of ASEAN member countries. A summary of the results was presented and discussed at the meeting. The meeting also discussed the future direction of ASEANCOF, which led to further recommendations on various aspects of the RCOF process in Southeast Asia.

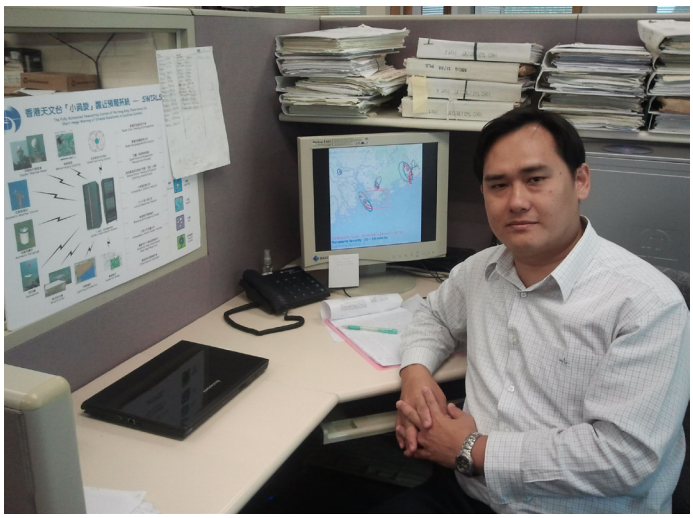
ASEANCOF-1 was co-sponsored by WMO through funds provided by the United States Agency for International Development (USAID). Technical and logistical coordination was carried out by the Centre for Climate Research Singapore.

THAILAND

1. TMD sent one staff to join in 2013 Typhoon Committee Research Fellowship Scheme at Hong Kong Observatory

One staff from the Thai Meteorological Department (TMD), Dr. Sukrit KIRTSAENG, Meteorologist, Meteorological Development Bureau, had been selected to participate in the 2013 Typhoon Committee Research Fellowship Scheme, entitled "Development of Location–Specific Severe Weather Nowcast Products" held at the Hong Kong Observatory (HKO) for two months from 21 October to 20 December 2013 with the financial support from Typhoon Committee Trust Fund (TCTF) and some additional support from TMD.

In the first two weeks of the two months research, Dr. KIRTSAENG together with other three participants (one from Viet Nam and two from Macau) received the basic training on nowcasting system SWIRLS (Short-range Warning of Intense Rainstorms in Localized System). He also had a chance to join in the last day meeting of the Fifth International Workshop on Monsoons (IWM-V) held in Macao and Hong Kong, China from 28 October to 1 November 2013.



Dr. KIRTSAENG had made a research by applying the SWIRLS for lighting nowcasting

At the end of this research scheme, Dr. KIRTSAENG had made presentation on the his research finding entitled "An Exploration on the Development of Location–Specific Severe Weather Nowcast" to the executives and scientists of the Hong Kong Observatory (HKO) on 20 December 2013.

Participants in the two-weeks SWIRLS training course

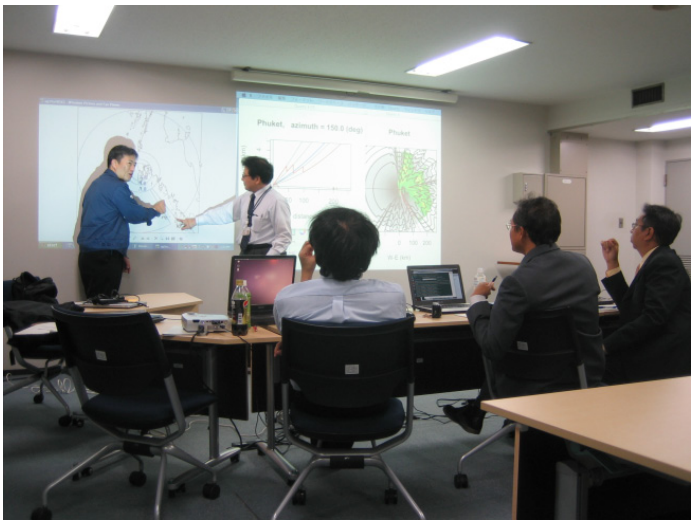
2. Two TMD staffs had participated in the technical meeting on Radar Composite Map Project at JMA, Tokyo, Japan from 25 to 28 November 2013

The Typhoon Committee (TC) had endorsed the Development of Regional Radar Network as a project of the Working Group on Meteorology at its 43rd Session.

The project was planned to work on the establishment of radar composite map in Thailand as its first step in 2011. Since then, the radar composite map has been implementing progressively by the Thai Meteorological Department with the technical assistance from the Japan Meteorological Agency (JMA).

As part of an activity of the 2013 TC Annual Operating Plan- item 7 (Development of Radar network), two staffs from the Thai Meteorological Department (TMD), Mr. Boonlert Archevarahuprok, Senior Meteorologist and Mr. Fatah Masthawee, Meteorologist, Meteorological Development Bureau had participated in the technical meeting on Radar Composite Map Project at the Japan Meteorological Agency (JMA), Tokyo, Japan from 25 to 28 November 2013 with the financial support from TCTF. The meeting's main purposes are to discuss the developments of the radar composite map at TMD as well as some follow up lecturers.

At the beginning, the two TMD staffs had an opportunity to courtesy visit to Dr. Masashi NAGATA, Director-General of the Observations Department of JMA on 25 November 2013



During the meeting, the JMA experts explained the format and how to make elevation angle composite table, introduced Radar Beam Visibility Analysis Tool to analyze vertical cross-section of beam path of contour of effective beam height in specific azimuth along topographical area, showed how to use the program for create elevation angle composite map table image in PNG format and introduced analysis of result from program and tool for adjust or modify angle composite table.

Both experts discussed and modified for appropriate value of angle and range to avoid ground clutter of KRB radar site.

In the wrap up discussion of the meeting, TMD and JMA discussed the progress and future activities regarding this project. TMD has an intention to develop a national wide radar composite and QPE. JMA suggested that TMD considers the way this project is applied to TMD services on operational basis. The technical meeting was successfully concluded by both TMD and JMA experts in the very friendly atmosphere at 17:00 on 28 Nov. 2013.

2013

PHOTO WALL

8th Integrated Workshop (IWS)/2nd TRCG Forum









The ESCAP/WMO Typhoon Committee Newsletter
is published in English by the Typhoon Committee Secretariart

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Humour Corner