

Macao • China | Issue 28 • Year 2014

# **THE FORTY-SIXTH SESSION OF THE TYPHOON COMMITTE**

Typhoon Committee

he Government of Thailand, in cooperation with ESCAP and WMO hosted the forty-sixth Session of the Typhoon Committee, which was held at the Maple Hotel, Bangkok, Thailand, from 10 to 13 February 2014



Group photo of the Participants in the forty-sixth Session of the Typhoon Committee

The Session was attended by 72 participants from 10 of 14 Members of the Typhoon Committee, namely: China; Hong Kong, China; Japan; Malaysia; Philippines; Republic of Korea; Singapore; Thailand; the United States of America (USA); and the Socialist Republic of Viet Nam.

The Session was also attended by nine observers from Asian Disaster Preparedness Center (ADPC), Asian Disaster Reduction Center (ADRC), International Civil Aviation Organization (ICAO), International Telecommunication Union (ITU), Joint Typhoon Warning Center (JTWC) and Tohoku University. Representatives of the Economic and Social Commission for Asia and the Pacific (ESCAP), Word Meteoroligcal Organization (WMO) and Typhoon Committee Secretariat (TCS) also attended the Session.

















Mr.Worapat Tiewthanom, Director-General of TMD was elected Chairperson and Mr. Alui Bahari, Deputy Director-General of Malaysian Meteorological Department was elected Vice-Chairperson of the Committee. Mr. Raymond Tanabe, Acting Regional Director National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Pacific Region, was elected Chairperson of the Drafting Committee.



Following decision of the previous TC Session, it was created a Credential Committee and Mr. Lei XiaoTu, Chair of WGM, Mr. Minoru Kamoto, Chair of WGH and Dr. Jaehyun Shim, on behalf of the Chair of WGDRR were appointed its members.

# Delivery of Dr. Kintanar Award-2013

During the Opening Ceremony of the TC 46<sup>th</sup> Session the Dr. Roman L. KINTANAR Award for Typhoon related Disaster Mitigation was presented to the Shanghai Typhoon Institute of China Meteorological Administration (CMA) by Mr. Worapat Tiewthanom, in recognition of their commitment and outstanding contribution towards the typhoon-related disaster mitigation, particularly, the publications "Tropical Cyclone Research and Review" and the assessment on the impacts of climate change on tropical cyclones in Typhoon Committee's region.



Delivery of the Dr. Kintanar Award-2013 to the representative Shanghai Typhoon Institute of China Meteorological Administration (CMA)

# THE 41<sup>ST</sup> SESSION OF THE PANEL ON TROPICAL CYCLONES (PTC)

Following decision of the  $45^{\text{th}}$  Session of TC, and invitation from Mr. Shah Alam, Director

Bangladesh Meteorological Department, the Secretary of TC, Mr. Olavo Rasquinho, attended the 41st session of this sister organization, which was held in Dhaka, Bangladesh, on 02-06 March 2014.

This session was of great importance to promote cooperation between PTC and TC, to the extent that there was consensus to hold a joint session PTC/TC in 2015, and he Members of PTC committed to collaborate with TC Members under the framework of the project Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System (SSOP)



Aspect of the PTC 41st Session

# TRAINING WORKSHOP ON SSOP

The Training Workshop under the SSOP project was carried out in the WMO RTC Nanjing, China, on 9-11 June 2014, in conformity with the Activity 2.1 - "Conduct training of users and issuers in the interpretation and preparation of EWS SOPs and products for decision-making, media, and communications".

The training consisted of lectures, presentations and training scenarios followed by very active discussions among participants, representatives of the beneficiary countries, and lecturers/ trainers. The Workshop was attended by 33 participants from Bangladesh (4); China (3); India (1); Lao PDR (1); Malaysia (1); Maldives (4); Myanmar (4); Pakistan (3); Philippines (3); Sri Lanka (2); Thailand (4); Viet Nam (2).

The lectures were delivered by nine specialists from different organizations (ABU, ADPC, CMA, IOC-UNESCO, Shanghai Typhoon Institute, Shanghai Meteorological Service, University of Tohoku, TCS and WMO).

The lectures and training were distributed in modules: Module 1 - Overview/Introduction; Module II - Social/ cultural aspects of EWS; Module 3 – Coastal Hazards/ Monitoring and Warnings; Module 4 – Communications/ Dissemination; Module 5 – After actions review; Module 6 – Lessons Learnt; Module 7 – Development of SOP scenarios; Module 8 – Panel/group discussions.















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Aspect of the SSOP Training Workshop in the WMO RTC Nanjing

# Post-Typhoon Haiyan Expert Mission To The Philippines

Following recommendation by the TC at its 46<sup>th</sup> Session, the Secretary of TC participated in an expert mission to the Philippines, on 7-12 April 2014, together with representatives of ABU, ESCAP, NDMI, NEMA, RSMC Tokyo, UKMO and WMO. The mission, coordinated by WMO, visited Manila and Tacloban, where several meetings have been held with the main stakeholders involved in the Early Warning System of this TC Member.



Picture taken during the mission to the Philippines

# 9th Workshop of Working Group on Disaster Risk Reduction

The 9th International workshop of WGDRR was successfully held on 26-27 May 2014 at Intercontinental Seoul COEX Hotel in Seoul, Republic of Korea. The main theme for this year's workshop was "Past, Present, and Future of WGDRR." There were 22 participants from 6 Members (i.e. Hong Kong, Macau, Malaysia, Thailand, and USA, Viet Nam), Mr. Woon Kwang YEO (President of NDMI), Mr. Olavo Rasquinho (TC secretary), Mr. Yuichi ONO of Tohoku University; Ms. Ye Jin HA of UNESCAP, Raymond TANABE (NOAA), and Representatives from The River Tech, SDM ENG. and Chung-Ang Aero Survey attended this workshop.

The National Disaster Management Institute of The Republic of Korea hosts this workshop every year. The principal objectives of the WGDRR Annual meeting are to strengthen international cooperation, and the members of WGDRR took this opportunity to share the recent information related to DRR field and follow up the WGDRR Annual Operating Projects. During the meeting, the participants shared the International Cooperation Research Strategy and information on Media Reporting guidelines on disasters. In addition, some impressive videos were presented by HKO related to increasing public awareness of typhoon dangers to the general public, which was one of this year's AOPs of



Group photo of the Workshop

WGDRR. The participants shared the view that it would be a project with successful outcome and will be effective in increasing the public awareness of the typhoon related dangers and catastrophes with the hope of minimizing storm related casualties.

# OSUFFIM Field Survey Conducted in Chiang Mai, Thailand

As one of activities of Implementation Plan in 2014 and beyond for the WGH project on Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM), a field survey was successfully conducted in Chiang Mai, Thailand, which is one of the pilot cities of OSUFFIM, from February 5 to 9, 2014 in conjunction with the 46th Session held in Bangkok, Thailand from February 10 to 13, 2014.

The field survey was attended by Prof. Chen Yangbo from SYS University as chief scientist of OSUFFIM; Mr. Thada Sukhapunnaphan, Assistant Deputy DG of RID and his 7 staffs in total; Abdul Hafiz Bin Mohammad from DID, Malaysia; one professor from Salamagong University and hydrologist of TCS.

The activities included 2 indoor seminars in RID local office; surveying Chiang Mai urban area and visiting 3 hydrological stations and 1 dam.



Field survey in Chiang Mai urban area

The main outcomes achieved included: (1) identified the needs for OSUFFIM pilot study in Chiang Mai; 2) identified the data requirement including hydrometeorological data and space data; 3) discussed the implementation plan for Thailand OSUFFIM pilot project; and 4) identified the 3-4 day training course in 2014 by TCTF supporting and exercitation working



Participants visiting RID local office in Chiang Mai

Seminar in RID local office in Chiang Mai

in 2015 (RID will seek funds for supporting one staff working 3 month in SYS university; DID of Malaysia may also if possible).

# WGH Field Survey on Hydrology in China

China has rich experience and advanced technology on flood forecasting and early warning. At the request from TC Members, TCS communicated with Ms. LI Yan, deputy division director of BOH of China and vice chairperson of WGH during TC 46th Session, which was held in Bangkok, Thailand from 10 to 13 February 2014, for organizing the field survey on hydrology as WGH activity.

Bureau of Hydrology (BOH) of China had very positive response on this request and organized the field survey from 5 to 7 May 2014 in Guangxi, China. The survey was focused on 1) application and operation of flood forecasting models, and its performance and effectiveness; 2) dissemination system of flood information and early warning to the public; and 3) technologies and equipment used in hydrological data monitoring, collection and transmission, which could be shared among TC Members. The mission was composed of participants from Royal Irrigation Department (RID), Thailand; Bureau of Hydrology (BOH) of China; Nanjing Automation Institute of Water Conservancy and Hydrology, China; Nanjing Hydraulic Research Institute, China; Guangxi Provincial Bureau of Hydrology and TCS.

The Mission visited local and provincial offices of BOH and sediment disaster monitoring and river hydrological stations. Also The mission had seminar with presentations and discussion on sediment disaster monitoring and early warning; capacity building on hydrological station and flood forecasting system; and development on hydrological telemeasuring equipment and data transmission network.

This activity will highly benefit TC Members to enhance their technical exchange and capacity building on typhoonrelated disaster reduction.



Visiting Nanning hydrological station



Visiting hydrological data Center of Guilin BOH



Visiting sediment disaster monitoring and early warning station

# Typhoon Committee loses WGH Focal Point of Philippines

WGH focal point in Philippines Dr. Susan Espinueva, chief of Hydro-meteorological Division of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), died on May 12 afternoon 2014 due to cancer.

Dr. Susan Espinueva was serving with the Committee as focal point of WGH for more than 10 years. She was very active in the Committee and provided strong support and close cooperation to WGH. Under her guidance, Philippines led and implemented very successfully two projects of WGH, namely: the project on Communitybased Flood Forecasting and Warning System (CBFFWS) and the project on Hydrological Products to Meet the Requirements of Users.

She contributed her wisdom and expertise to TC crosscutting project of Urban Flood Risk Management (UFRM) and other projects of WGH.

She was an active and well respected member of not just Typhoon Committee but the entire weather community in the Pacific. As head of the hydro-meteorological division, Dr. Suan Espinueva was responsible for monitoring of waterbeds and flooding in the country. She, often interviewed on television on floods and dam water levels, is also the president of the Philippine Meteorological Society.

Dr. Susan Espinueva will be kept in our hearts and prayers.





Dr. Susan Espinueva was in UFRM working meeting in Beijing, April 4, 2011



Dr. Susan Espinueva was in URFM Guidelines Drafting meeting in Nanjing, February 16, 2012



Dr. Susan Espinueva was in TC 8<sup>th</sup> IWS/2<sup>nd</sup> TRCG Forum in Macao, December 3, 2013

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# WGM News

Since the 46<sup>th</sup> Typhoon Committee Session held in Bangkok, Thailand on February 2014, WGM members have been making their efforts to implement the annual operating plans, which are progressing satisfactorily.

For the first half of the year, most of the activities that have been organized are related to the capacity building of the Members through the Typhoon Committee Research Scheme as well as other Fellowships offered by the Members. Three forecasters from Lao PDR, Malaysia and the Philippines will have their attachment training on late July at the JMA Headquarters, while another research fellowship offered by STI was awarded to the expert from TMD and will be organized from August to September. Three forecasters from China, the Philippines and Viet Nam attended the 2 months research fellowship offered by KMA from May to June.

Among the ongoing action items of the operating plans, some of them have already certain results. JMA has added 9 stations in the Philippines and 1 station in the United States for storm surge time-series forecasting services on the JMA Numerical Typhoon Prediction Website (https://tynwp-web.kishou.go.jp) from June 11. It is foreseen to add more stations in Viet Nam and Hong Kong in this typhoon season in the website. KMA issued the typhoon prediction Gystem (http://gtaps.kma.go.kr/TSP/index.php). As for the 3<sup>rd</sup> Assessment Report on the impact of climate change on tropical cyclone in the TC Region, 5 renowned experts on climatology has already agreed to participate as members in the expert team.

Thanks to all the Members for their supports as well as the contributions from the authors of the articles, the TC journal "Tropical Cyclone Research and Review" has been recognized by Members as an important means to share the knowledge and experiences among the TC members as well as the international meteorological and hydrological community. Members may wish to consult the journal website <a href="http://tcrr.typhoon.gov.cn">http://tcrr.typhoon.gov.cn</a> for the comprehensive collection of the articles for their operational works and research. Members are encouraged to submit the articles to the Journal to share their knowledge. In order to further improve the editorial work of the editorial office has recently inviting a visiting editor from the Philippines to work at the editorial office for 5 days tentatively in August, and another one from Thailand on September.

Looking forward to the second half of the year, WGM members will sure do their best in order to successfully accomplish all the projects. TCS has recently made the announcement of the 9<sup>th</sup> Integrated Workshop which will be held in ESCAP Headquarters on 20 – 24 October with the topic of the Workshop on "Synergized, Integrated, Collaborative Standard Operating Procedures Strategies to Improve Early Warning System for Coastal Multi-hazards. Members Reports as well as more details of the progress of the projects will be presented at the Workshop. WGM members will have the opportunity to review the progress of various projects as well as to make plans for the coming year on this occasion.

At last, on behalf of Chair of WGM, we wish to thank all the Members in particular the coordinators of the AOPs for their significant contributions.



# TC News from Members

### Hong Kong, China

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# 1. Meeting of Taskforce on Tropical Cyclone Intensity Analysis for Upgrading Tropical Depressions Convened in Hong Kong

Typhoon chiefs from the operational warning centres of the western North Pacific and South China Sea basin gathered in Hong Kong on 13 May 2014 to attend a meeting of the Taskforce on Tropical Cyclone Intensity Analysis for Upgrading Tropical Depressions under the Working Group on Meteorology of the Typhoon Committee. The meeting was chaired by Mr. Chan Sai-tick of the Hong Kong Observatory, the Leader of the Taskforce. Participants of the meeting included Dr. Qian Chuanhai, Director of the Typhoon and Marine Meteorological Forecast Center of the China Meteorological Administration; Mr. Tsukasa Fujita, Head of the National Typhoon Center of the Japan Meteorological Agency and his team member, Mr. Koji Kato. Mr. Derek Leong from the Typhoon Committee Secretariat also joined to offer useful advice to the meeting.

The meeting discussed the operational issues in tropical cyclone intensity analysis, with particular focus on the upgrading of tropical depressions to tropical storms leading to the naming of tropical cyclones. Through the examination of past cases and some active exchanges, effort was made to reach a mutual understanding of the warning operations and strategies adopted by different warning centres. The meeting has also mapped out ways to further enhance cooperation on the relevant issues.



Active exchanges of views by participants at the meeting held at the Hong Kong Observatory.

# 2. The Hong Kong Observatory Adopting New Weakening Rules for Landfalling Tropical Cyclones

In the original Dvorak intensity analysis scheme, the rules that govern the assessment of intensity during the weakening stage of tropical cyclone sometimes led to intensity estimates lagging behind the actual weakening rate for landfalling tropical cyclones, thereby limiting the usefulness of Dvorak technique in intensity determination. To overcome this issue, the Observatory has adopted the following new weakening rules for landfalling tropical cyclones starting from the tropical cyclone season of 2014:

(a) Asthetropical cyclone makes landfall

# 3. "Meteorology Series IV"

To promote public awareness on climate

and weakens, Current Intensity (CI) number is immediately held 0.5 higher than the final T-number, defined by cloud features that are related to the tropical cyclone intensity.

- (b) When the final T-number has already levelled off for more than 12 hours, CI is held the same as the final T-number.
- (c) When re-development occurs over land, CI is held the same as the final T-number.

The above new weakening rules were first tried out in the tropical cyclone season of 2013. Results showed that they gave generally better estimates of tropical cyclone intensity with smaller mean absolute errors and lower percentages of over-estimation when verified against the Observatory's best track data.

change and severe weather events, the Hong Kong Observatory and the Radio Television Hong Kong joined hands again to produce the fourth instalment



 Figure 2
 The aftermath of Super Typhoon Haiyan in the Philippines shown in "Meteorology Series IV" (photo courtesy of Radio Television Hong Kong). The documentary (in Cantonese only) can be found at <a href="http://programme.rthk.hk/rthk/tv/programme.php?name=tv/meteorology2014&d=2014-04-26&p=6225&e=255935&m=episode">http://programme.rthk.hk/rthk/tv/programme.php?name=tv/meteorology2014&d=2014-04-26&p=6225&e=255935&m=episode</a>.

of the TV documentary, "Meteorology Series".

"Meteorology Series IV" consists of four episodes, with themes covering typhoon disasters, meltdown of cryosphere, rainstorms and flooding, and drought and water resources. Through first-hand filming of extreme weather conditions in Hong Kong and different parts of the world, including the Philippines, Vietnam, Lesotho in southern Africa and Greenland within the Arctic Circle, the series explores the underlying causes of the changes in severity and frequency of extreme weather phenomena and their associated impacts on mankind, and invites the viewers to reflect on the relationship between the development of human civilisation and its impacts on Mother Nature.

# 4. Typhoon Committee Research Fellowship Scheme 2013

While attending a training course on the SWIRLS nowcasting system at the Hong Kong Observatory, Dr Sukrit Kirtsaeng from Thailand Meteorological Department conducted a research project under the Typhoon Committee Research Fellowship Scheme from late October to December 2013. He reviewed various techniques for developing a location-specific lightning nowcast module in SWIRLS. The methodology studied was verified using nine tropical cyclones that affected Hong Kong in 2012 and 2013. The research findings will be published in Tropical Cyclone Research and Review.

# 5. "Hong Kong Typhoon Historical Photo Exhibition"

for Heritage organized an exhibition of "Hong Kong in the Storm – Hong Kong Typhoon Historical Photo Exhibition" from 8 March to 17 April 2014 showing historical information of typhoons in Hong Kong. A wide array of invaluable collectibles, including historical photos acquired by Mr C M Shun, Director of the Hong Kong Observatory, were shown in the exhibition, documenting the history of severe casualties and extensive damages to the territory caused by major typhoon events in the old days of Hong Kong. Through such valuable exhibits and oral history based on recollection by eye witnesses of Super Typhoon Wanda in 1962, the visitors could reflect on the evolution of the city against a background of natural disasters. The enhancement of public awareness and preparedness would also help to mitigate the impact of typhoon hazards in the future.



Figure 3 Mr C M Shun, Director of the Hong Kong Observatory, (fifth from left), with collectors and other guests at the opening ceremony of the "Hong Kong Typhoon Historical Photo Exhibition" (photo courtesy of The Conservancy Association Centre for Heritage).

The Conservancy Association Centre



RSMC Tokyo has released the Annual Report on the Activities of the RSMC Tokyo - Typhoon Center 2012 and RSMC Technical Review No. 16. Both publications are available on the RSMC Tokyo -Typhoon Center website at http://www.jma.go.jp/jma/ jma-eng/jma-center/rsmc-hp-pub-eg/techrev.htm.

### II) Annual Report on the Activities of the RSMC Tokyo - Typhoon Center

The Annual Report on the Activities of the RSMC Tokyo - Typhoon Center 2012 was released in December 2013. The publication details RSMC products, analysis of tropical cyclones, and verification/specifications of numerical models. The DVD version distributed to Members includes MTSAT satellite images of all 2012 tropical cyclones along with a satellite viewer program, SATAID.

Annual Report on the Activities of the RSMC Tokyo - Typhoon Center 2012

### III) RSMC Technical Review No. 16

Japan

RSMC Technical Review No. 16 was released in May 2014. This issue features two methods for TC intensity estimation using microwave satellites developed by RSMC Tokyo. One is a method proposed by Oyama (2014) which estimates TC central pressure by using a regression equation which relates the maximum brightness temperature (TB) anomaly value from observations of Advanced Microwave Sounding Unit-A (AMSU-A) channels 6, 7 and 8 near a TC center (within a radius of 200 km) to TC central pressure.

The other, proposed by Sakuragi et al. (2014), is a technique for estimating maximum TC wind speeds with TC cluster analysis of parameterized Tropical Rainfall Measurement Mission (TRMM) Microwave Imager (TMI) brightness temperature distribution. Details of these methods and verification results are described in this Technical Review.



Japan Meteorological Agency

Annual Report (DVD version also available)



JMA Headquarters



Figure (Left) Brightness temperature (TB) anomalies retrieved from AMSU-A channel 7 observation at 0500 UTC on 28 October 2010, which represents the warm core of the TC and is used for TC central pressure estimation. (Right) 85-GHz polarization corrected temperature derived from TRMM/TMI observation at 0709 UTC on 27 May 2011, which implies the distribution of convection and is used for maximum wind speed estimation. Parameter calculation regions (concentric circles) and a TC motion direction (bold arrow) are also shown in the figure.

# JMA/WMO Workshop on Effective Tropical Cyclone Warnings in Southeast Asia

The JMA/WMO Workshop on Effective Tropical Cyclone Warning in Southeast Asia was held in collaboration with the World Meteorological Organization (WMO) from 11 to 14 March 2014 at the Headquarters of the Japan Meteorological Agency (JMA) in Tokyo.

The workshop was intended to promote understanding among participating countries regarding the latest tropical cyclone (TC) analysis/forecasting techniques and products, to identify challenges faced by these countries in improving their operational forecasting and warning services, and to discuss ways to address the challenges including external assistance. The session was attended by 51 people, including representatives of WMO and the Japan International Cooperation Agency (JICA), distinguished lecturers from the National Hurricane Center (NHC), the Central Pacific Hurricane Center (CPHC) of the US National Oceanic and Atmospheric Administration's National Weather Service and the Joint Typhoon Warning Center (JTWC), and TC experts from JMA and nine National Meteorological and Hydrological Services (NMHSs) in South and Southeast Asia (Bangladesh, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Thailand, the Philippines and Viet Nam).

The representatives of the nine NMHSs provided Country Reports highlighting their current tropical cyclone operational service capacities as well as challenges and needs relating to the further enhancement of warning capacity. Attendees from NHC, CPHC, JTWC and JMA gave a series of lectures on tropical cyclone operational techniques, including storm surge forecasting techniques. The event further addressed the importance of warning development based on effective communication with emergency managers. In this regard, JMA reviewed recent efforts to improve its warning services in accordance with past tropical cyclone disasters; the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) shared information on its response to Typhoon Haiyan and lessons learned from the experience; and NHC detailed its improvement plan for storm surge forecasts and warnings based on lessons learned



from Hurricane Sandy.

The workshop's discussions centered on the need for more effective regional cooperation initiatives such as training on satellite and weather radar-based monitoring/analysis techniques and further enhancement of real-time forecast supporting products including NWP guidance products from RSMCs. It also highlighted the importance of providing easy-to-understand warnings in text and/or graphical formats based on coordination with emergency managers, as well as continued efforts to increase public awareness in order to ensure the effectiveness of warnings. The event further encouraged ongoing enhancement of technical cooperation activities on storm surge forecasting, including the technical transfer of JMA's storm surge modeling methods.

The workshop materials and summary report are available at http://www.jma.go.jp/jma/jma-eng/jma-center/ rsmc-hp-pub-eg/2014\_Effective\_TC\_Warning/documents.html.

# Himawari-8/9 data distribution/dissemination plan

The Japan Meteorological Agency (JMA) plans to launch the world's first next-generation geostationary satellite, Himawari-8, in 2014 and to start its operation in 2015 as a replacement for MTSAT-2 (also called Himawari-7). Himawari-9 will also be launched in 2016 as a backup and successor satellite. Both satellites will be located at around 140 degrees east, and will observe the East Asia and Western Pacific regions for a period of 15 years.

Himawari-8/9 will have 16 bands, which is more than three times the 5 bands of the current MTSAT series.

Three of these will be visible bands corresponding to red, green and blue to enable the creation of truecolor images. Observation frequency will also be enhanced, with full-disk imagery obtained every 10 minutes. In addition, rapid scanning will be conducted in several regions, one of which will be for targeted observation of tropical cyclones.

### Bands of Himawari-8/9

Dun			The second s			
Band	Wavelength [µm]	Spatial Resolution				
1	0.47	1 km	RGB			
2	0.51	1 km 🗲	Composited	A PART AND		
3	0.64	0.5 km	True Color Ir	nage		
4	0.86	1 km				
5	1.6	2 km				
6	2.3	2 km				
7	3.9	2 km				
8	6.2	2 km	14/			
9	6.9	2 km	water Vapor			
10	7.3	2 km		Interval. 10 minutes (6 times per bour)		
11	8.6	2 km	SO <sub>2</sub>	Interval: <b>TO minutes</b> (6 times per hour)		
12	9.6	2 km	<b>O</b> 3	<b>Japan Area</b> Interval: <mark>2.5 minutes</mark> (4 times in 10 minutes) Dimension: EW x NS: 2000 x 1000 km x 2		
13	10.4	2 km	Atmospheric			
14	11.2	2 km	Windows	<b>Target Area</b> Interval: <b>2.5 minutes</b> (4 times in 10 minutes) Dimension: EW x NS: 1000 x 1000 km		
15	12.4	2 km				
16	13.3	2 km	<b>CO</b> 2			
Number of Bands: 5 16 Interval: 30/60 min. 10 min.						

Imagery from JMA's current operational satellite, MTSAT-2 (Himawari-7), is provided via MTSAT-1R (Himawari-6) direct dissemination through L-band frequency High Rate Information Transmission (HRIT) and Low Rate Information Transmission (LRIT) services. Most National Meteorological and Hydrological Services (NMHSs) in the East Asia and Western Pacific regions receive this imagery using L-band antennas and receivers, and process it with dedicated systems. JMA also provides the same HRIT service imagery via the online JMA Data Dissemination System (JDDS).

Himawari-8/9 will not carry equipment for direct dissemination. Instead, all imagery derived from the satellites will be distributed to NMHSs via an Internet cloud service. JMAalso plans to start the HimawariCast service, by which primary sets of imagery will be disseminated to NMHSs via a communication satellite using Digital Video Broadcasting – Satellite – Second Generation (DVB-S2) technology.

For more details such as data content, data formats and sample data, see:

http://www.jma.go.jp/jma/jma-eng/satellite/ http://mscweb.kishou.go.jp/himawari89/

# Newly added stations for storm surge time-series forecasts

To improve the quality of storm surge forecasts issued by Typhoon Committee (TC) Members, the Japan Meteorological Agency (JMA) added 10 stations for storm surge time-series forecasts on 9 June 2014. The current number of stations is 20, which will be increased to 45 at the end of 2014.

The new stations for time-series forecast services are at Manila South Harbor, Cebu Port, Legaspi Port, San Fernando Harbor, San Vicente Port, Batangas Port, Curimao Port, Subic Bay, Mariveles Harbor (nine stations in the Philippines) and Guam (the United States). A total of 20 stations in Viet Nam and 5 in Hong Kong are also scheduled for addition this typhoon season.

JMA invites TC Members to submit requests for the addition of further stations to support storm surge time-series forecast services. These storm surge products are provided on JMA's Numerical Typhoon Prediction website (https://tynwp-web.kishou.go.jp/)

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when one or more typhoons are present in the forecast region of storm surge model.



Location of stations for storm surge time-series forecasts Black stars indicate existing stations, blue stars are those added in June, and red stars are scheduled stations.



# 1. Launching a new version of the Macao Meteorological and Geophysical Bureau website

With the growing popularity of the use of smart phones and the Internet, the Macao Meteorological and Geophysical Bureau(SMG) has been improving its weather service. In recent years, SMG has put much effort in promoting the use of Internet platform for the dissemination of weather information, which provides a more diversify and convenient way to receive weather information for the public. Besides the launching of the smart phone application (APP) and the mobile version of website last year, SMG also launched a new version of the website (trial version in Chinese only) in April 2014. The new version of the bureau's website provides more detailed and practical information, which includes real-time precipitation record (which is the greatest concern to the public), real-time flooding level, information on particulate matters, monitoring records of all automatic weather stations, etc. Moreover, not only the content being renewed and reorganized, but also the display method of the new website being changed in style, the new website has a much better interface for illustration of information to the public.

# 2. Installation of an S-band dual-polarization meteorological Doppler radar in Macao

The monitoring and the advance warning of severe weather including thunderstorms, rainstorms, tropical



The newly installed S-band dual-polarization meteorological Doppler radar

cyclones, etc., are very much relying on the use of meteorological radar. Therefore, besides setting up an X-band dual-polarization meteorological Doppler radar in Macao in 2009, the Macao Meteorological and Geophysical Bureau(SMG) cooperated with Zhuhai city in China to set up another S-band dualpolarization meteorological Doppler radar (Zhuhai-Macao radar) near the airport of Zhuhai city. The cooperation between the Macao and Zhuhai city provides a mutual complementary and upgrade of the weather monitoring abilities. The Zhuhai-Macao radar had finished its testing earlier this year, and was in daily operation since then. Real-time meteorological radar images are available in SMG website, which enables the public to receive the latest weather information

# 3. Continuous improvement in water-level monitoring system in Macao

Macao was frequently affected by tropical cyclones and rainstorms, which brought great loss to the city with the storm-surge and flooding caused respectively. Therefore, to reinforce the monitoring abilities during the events of storm-surge and flooding, several waterlevel monitoring system had been installed earlier in Macao. And, to further increase the monitoring efficacy, a total of 8 more water-level monitoring stations were set up last year. The 8 new water-level monitoring stations are equipped with meteorological



Inspecting the operation of the water-level monitoring stations



The internal structure of the water-level monitoring stations

monitoring instruments and webcams, which can provide real-time water-level monitoring and record the instant on-site weather and road conditions simultaneously. In addition, the 9 current operating water-level monitoring stations will be upgrading this year, with webcams being installed for all stations and meteorological monitoring instruments installed for some appropriate stations. The latest water-level monitoring and related information is available to the public on the Macao Meteorological and Geophysical Bureau website.

# 4. Active promotion of meteorological knowledge to the public in Macao

Meteorology is closely related to the daily lives of human societies. Especially for the young people, there are the needs to increase their public awareness, to build up their interest on meteorology, and to encourage them for active participation in actions combating climate change. For years, the Macao Meteorological and Geophysical Bureau(SMG) has been actively cooperated with local schools and media, to educate and promote the knowledge of meteorology to the young people. Through the platforms of the Internet, exhibition center, etc., we held different forms of activities including lectures, competitions, exhibitions, game stalls, etc.

In line with the theme of the World Meteorological Day this year, which is "Weather and climate: engaging youth.", SMG has launched the project of "Weather monitoring stations in campus" with local schools in Macao. By setting up weather monitoring stations in campus, students are offered the opportunity to practice on working in daily weather monitoring, which is in an environment very similar to the real world manner.



The publics actively participate in Meteorological promotion activities



Students are learning how to perform meteorological monitoring



The Macao Meteorological and Geophysical Bureau serve more than 1000 people for visits each year

Republic of Korea

# Begin to provide the seasonal typhoon activity outlook for TC members

The Korea Meteorological Administration (KMA) began to provide the seasonal typhoon activity outlook on May 2014 through the website operated by the National Typhoon Center (NTC)/KMA (Internet address: http://gtaps.kma.go.kr/TSP/index.php). The information about the number of typhoon genesis and track pattern is produced based on the results of three types of models: multi-regression model, global dynamical model, and hybrid model of statistical and dynamical method.

The users can find a variety of information about the tropical seasonal prediction in the website including prediction products, model information, model verification and climate monitoring. The model or agency's products from ECMWF and TSR for summer (June to August) and fall (August to October) season are available, too. It also provides time series of the climatological indicators which are related with typhoon seasonal activity such as ENSO, Arctic Oscillation Index (AOI), Pacific Decadal Oscillation (PDO), etc.





## 2014 Typhoon Seasonal Prediction

Issue Date: 201405

WNP Frequency Jun~Dec : 24~25 Jun~Aug : 10~12	Probability East of Philippines(-) the Korean Peninsula(-) East of china sea(+)	Observation Jan~May : 5
Climatology	Prediction	Impact on Korea
JJA : 11.2	Jun~Aug:12	Jun~Aug : 1~2
National Typhoon Center (699-94	2) 810beon-gil2 Seoseong-ro, Nanwon-eup, Seogwipo-si	i, Jeju, Republic of Korea
Copyrig	ht: 2013 © National Typhoon Center. All Right Reserved	. E-mail : fb_ty@korea.kr

Fig. 1. Front page of the website for the KMA's seasonal typhoon activity outlook.

# Host to the 7<sup>th</sup> Korea-China Joint Workshop on Tropical Cyclones

The National Typhoon Center (NTC) of KMA and the Shanghai Typhoon Institute (STI) of CMA have co-hosted a joint workshop on tropical cyclones since 2008. As the 7th event, the NTC/KMA and STI/CMA held the workshop on 26-29 May 2014, at Seogwipo KAL hotel in Jeju, Korea. There were over 60 experts of typhoon and related fields from KMA, CMA, the Global Loss Control Center in Samsung and four Korean universities. The participants made 14 presentations in a keynote speech and 4 sessions: typhoon modeling, typhoon analysis and forecast, and typhoon prediction and climate. They made presentations on a wide range of topics such as predictability and improvement of operational numerical models, introduction of new prediction systems and typhoon related technologies, typhoon analyses based on satellite and observation, socio-economic impacts,

etc.

The NTC's and STI's delegates had an intensive discussion for the future collaboration activities. During this meeting, KMA introduced an observation plan to use the aircraft for the targeted observation scheme in 2015 and showed strong interest in the EXOTICA project which was introduced by STI delegates. And they also agreed to exchange the experts on sharing the technology of typhoon formation detection and the methodology about best-track data generation, depending on the interests of each organization. And KMA The 8<sup>th</sup> workshop will be held in China on the last week of May in the upcoming year.





Fig. 2. Group photos of participants in the 7<sup>th</sup> Korea-China Joint Workshop on Tropical Cyclones, Segwipo KAL hotel (left), and future cooperation meeting in the National Typhoon Center, Jeju (right).

# NOTICE of 8<sup>th</sup> WMO IWTC

The National Typhoon Center (NTC) of KMA will host the 8<sup>th</sup> WMO International Workshop on Tropical cyclones (IWTC-VIII) including the 3<sup>rd</sup> International Workshop on Tropical Cyclone Landfall Process (IWTCLP-III) at Lotte Hotel in Jeju, Republic of Korea, in 1-10 December 2014. This workshop is one of WMO's major quadrennial workshop series organized by its World Weather Research Program (WWRP) and Tropical Cyclone Program (TCP). It is a special and unique gathering of tropical cyclone researchers and warning specialists from all regions affected by tropical cyclones, including those from Members belonging to the WMO TCP regional bodies. During this workshop, it will be programed three keynote speeches as a main theme 'Quantifying and Communicating Forecast Uncertainty'. There will also be presented and discussed about 5 topics: 1. motion, 2. cyclogenesis, intensity and intensity change, 3. communication and effective warning systems, 4. structure and structure change and 5. beyond synoptic timescales. We hope that TC members show strong interest and participation in this workshop.

# 1. TMD hosted 46<sup>th</sup> Session of the Typhoon Committee in Bangkok

Thai Meteorological Department (TMD) hosted the Forty-Sixth Session of ESCAP/WMO Typhoon Committee (TC), under the auspices of the Economic and Social Commission for Asia and the Pacific (ESCAP), World Meteorological Organization (WMO), and Typhoon Committee Secretariat (TCS) at Maple Hotel, Bangkok from 10 to 13 February 2014 with the aims to review the progress in 2013 work's programme and make plans for the 2014's activities and others.

The meeting was conducted successfully with actively participation of 72 participants from TC members including observers from Asian Disaster Preparedness

### Thailand

Center (ADPC), Asian Disaster Reduction Center (ADRC), Joint Typhoon Warning Center (JTWC), International Civil Aviation Organization (ICAO), International Telecommunication Union (ITU), Tohoku University and international organizations' representatives from World Meteorological Organization (WMO), United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), and Typhoon Committee Secretariat (TCS).

The opening ceremony of the 46<sup>th</sup> Session of the Typhoon Committee (TC-46<sup>th</sup>) was held on Monday, 10 February 2014 at Grand Ballroom B, Maple Hotel, Bangkok, with keynote addresses by the representatives from ESCAP, WMO, TCS, Hong Kong China, and Thailand. Mr. Worapat Tiewthanom, Director-General, Thai Meteorological Department, as representative of H.E Gp. Capt. Anudith Nakornthap, Minister of Information and Communication Technology, welcomed all participants



Picture 1: Participants of the Session



Picture 2 and 3: Opening ceremony

and made opening address on behalf of Government of Thailand, the host country. He also presented the 2014 Dr. Roman L. KINTANAR Award for Typhoon related Disaster Mitigation to the Shanghai Typhoon Institute of China Meteorological Administration (CMA) during the TC-46<sup>th</sup>'s opening ceremony.





Picture 4 and 5: Session's atmosphere



Picture 6, 7 and 8: Participants enjoyed Welcome Reception and the Thai cultural show held in the evening of 10 February 2014



Picture 9 and 10: Participants joined a half-day sightseeing to visit the Ancient City, Samutprakan Province on 13 February 2014



Ancient City, Samutprakan Province on 13 February 2014

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