

**ESCAP/WMO Typhoon Committee**

Forty-eighty Session  
22- 25 February 2016  
Honolulu, Hawaii  
USA

FOR PARTICIPANTS ONLY  
WRD/TC.48/8.4  
**31 December 2015**

ENGLISH ONLY

**TRAINING & RESEARCH COORDINATION GROUP (TRCG)**

*(submitted by TRCG Chair)*

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**Summary and Purpose of Document:**

This document reviews past activities, progress and future plans of TRCG.

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Action Proposed

The Committee is invited to:

- (a) note the major activities and development progress of TRCG as summarized in the APPENDIX B;
- (b) endorse the training and research priority areas as outlined in Section 5 of the APPENDIX B; and
- (c) endorse the future plans of TRCG as outlined in Section 6 and Annexes VI and VIII of the APPENDIX B.

APPENDICES :

A : Draft text for inclusion at Session Report

B : TRCG Annual Report 2015

**APPENDIX A**  
**DRAFT TEXT FOR INCLUSION IN THE SESSION REPORT**

**8.4. Training and Research Coordination Group**

The Committee took note of the progress made in training and research activities as presented in the TRCG Report 2015 (Appendix ???)

The Committee expressed its appreciation to the Department of Meteorology and Hydrology (DMH), Lao PDR for hosting the Roving Seminar in Lao PDR, the assistance of WGH for coordinating the speakers, and the support of resource persons by China, Japan and Republic of Korea.

The Committee thanked China, Hong Kong, China and Republic of Korea for hosting research fellowship programs in 2015.

The Committee took note of the successful RSMC Tokyo training attachment of six forecasters from TC and PTC Members, including Cambodia, Thailand, Vietnam, Bangladesh, the Maldives, and Myanmar, and thanked JMA and WMO TCP for continuously supporting this capacity-building initiative.

The Committee was informed of the plan to extend the RSMC Tokyo training attachment for TC Members by 2 days to enhance the capacity building in warning development and coordination in the TC region on a regular basis with the financial support from WMO Secretariat.

The Committee appreciated TRCG's input in support of training and research activities in connection with TC's cross-cutting projects.

**RECOMMENDATIONS of TRCG:**

On the basis of the conclusions reached by the deliberation of Members, the TRCG made the following recommendations :

- a. To re-appoint Dr. T.C. LEE (Hong Kong, China) and Mr. Roger EDSON (USA) as Chairperson and Vice Chairperson of TRCG respectively.
- b. To request Members to confirm their respective focal points as members of TRCG and update the list of resource persons as appropriate.
- c. To endorse the priority training and research areas as proposed in TRCG Report 2015.
- d. To endorse the organization of Roving Seminar in Viet Nam in 2016 and consider participation of PTC Members in the Roving Seminar and Research Fellowship Scheme subject to availability of extra funding support and hosting venue capacity.
- e. To endorse the TRCG AOP and budget request which are included in the budget proposal to be submitted by AWG.

**APPENDIX B**  
**TRAINING & RESEARCH COORDINATION GROUP (TRCG)**  
**ANNUAL REPORT 2015**

T C Lee (TRCG Chair)  
Hong Kong, China

**1. Introduction**

1.1 According to the Terms of Reference, TRCG is to promote research and training activities on various aspects of tropical cyclone analysis and forecasting, including assessment of tropical cyclones' impacts on Members' socio-economic development processes, and to encourage cooperation of efforts among Members. Towards this end, TRCG is expected to assist in:

- (a) identifying scientific and technical problems in the analysis and forecasting of tropical cyclones and their impacts on water resources and measures for disaster prevention and preparedness;
- (b) facilitating the exchange of experience and knowledge on the latest development and techniques related to the above problems;
- (c) coordinating training and research programmes, including activities in support of cross-cutting initiatives and other collaboration programmes among Members such as twinning and mentoring arrangement, aimed at improving the technical capacity and capability of Members to better serve the people in the region;
- (d) evaluating the effectiveness of training and research activities undertaken by TRCG, and providing support to other working groups in performing such evaluation; and
- (e) recommending to the Committee priority areas and long-term plans for cooperation in research and training in support of the various KRAs of the Committee's Strategic Plan.

**2. Membership**

2.1 The composition and members list of TRCG (as at 31 December 2015) are:

Chair: Dr. T C LEE (Hong Kong, China)  
Vice Chair: Mr. Roger EDSON (USA)

Members: Mr. So Im MONICHOTH (Cambodia)  
Mr. QIAN Chuanhai (China)  
Mr. Kang Bom Jin (DPR Korea)  
Dr. Naoko KITABATAKE (Japan)  
Mr. Bounteum SYSOUPHANTHAVONG (Lao PDR)  
Mr. IAN Vai Kei, Brian (Macao, China)  
Mr. Muhammad Helmi Abdullah (Malaysia)  
Dr. Carina G. LAO (Philippines)  
Dr. Jiyoung KIM (Republic of Korea)  
Mr. Chien Wan THAM (Singapore)  
Ms. Patchara PETVIROJCHAI (Thailand)  
Mr. NGUYEN Dai Khanh (Viet Nam)

### **3. Major TRCG Activities in 2015**

#### ***Roving Seminar / Visiting Lecturers Programme***

3.1 Roving seminars have been arranged for capacity building purposes on both research and operational aspects. Knowledgeable experts travel to Members' countries and deliver lectures focused on subjects of current interest to operational centers. A record of all roving seminars previously organized can be found in Annex I.

3.2 The Typhoon Committee Roving Seminar 2015 was successfully held on, 4-6 November 2015 in Lao PDR. The seminar was hosted by the Department of Meteorology and Hydrology (DMH), Lao PDR. The theme of this seminar was on "Flash flood and landslides" and, in collaborating with WGH, the sub-topics and speakers of the seminar have been identified as follows :

Topic A – Risk Reduction and Mitigation of Sediment-related Disaster  
(Mr Yoshiki Nagai from National Institute for Land and Infrastructure Management)

Topic B – Advances and Challenges of Flash Flood Modeling and Prediction  
(Prof Xu-dong Fu from Tsinghua University)

Topic C – River and Urban Flash Flood's forecasting and Mitigation  
(Dr Dong-ryul Lee from Korea Institute of Civil Engineering and Building Technology)

3.3 The Seminar was attended by 22 participants from Bangladesh (1); Cambodia (2);

China (2); Myanmar (1); Pakistan (1); Philippines (1); Lao PDR (8); Sri Lanka (1) and Thailand (5). Three resource persons came from China, Japan and Republic of Korea with two representatives from the Typhoon Committee Secretariat and ESCAP. With the support of ESCAP, Members of Panel on Tropical Cyclones (PTC) are also invited to attend the seminar. The participants considered the lectures and advice provided by the four resource persons are useful and examples of good practices on the relevant topics. Most participants also indicated that they learned new ideas and methodologies on flash flood and landslides, while they might not have the resources for implementation at the moment. A summary report of the seminar can be found in Annex II.

### ***Forecasters' Training Attachment***

3.4 The 15th RSMC Tokyo Training Attachment course was held at JMA Headquarters from 22 to 31 July 2015. In accordance with a decision passed at the 3rd Joint Session of the Panel on Tropical Cyclones and the Typhoon Committee held in February 2015 in Bangkok, Members of Typhoon Committee (TC) and PTC were both invited to participate in this training. The training was attended by six forecasters from TC and PTC, including Mr. Soim Monichoth from Cambodia, Ms. Praphasri Udjai from Thailand, Mr. Tran Van Hung from Vietnam, Mr. Md. Azizur Rahman from Bangladesh, Mr. Hussain Afshal from the Maldives, and Mr. Hla Tun from Myanmar.

3.5 Through lectures and exercises, the training focused on imparting practical information and skills on tropical cyclone analysis and forecasting using the Satellite Analysis and Viewer Program (SATAID). The teaching also covered a range of other relevant topics including Dvorak analysis, interpretation of microwave data, quantitative precipitation estimation (QPE), quantitative precipitation forecasting (QPF) and storm surge forecasting. Moreover, all attendees gave presentations to help JMA staff understand the current status of their meteorological and hydrological services.

### ***Research Fellowship Scheme***

3.6 The Research Fellowships are awarded to Members to promote joint research through the exchange of visiting scientists on a short-term basis with voluntary funding and logistic support by host Members. One of the merits of the scheme is that the visiting fellow has a chance to work closely with experienced scientists at the host centre, providing an opportunity to transfer knowledge and latest research findings to operational applications. The scheme has worked well on the basis of bilateral cooperation mutually agreed between the host and the applicant.

3.7 In 2015, fellowships were offered by China, Hong Kong, China and Republic of Korea. Information of the latest projects under the scheme, as well as a summary of previous fellowships awarded, can be found in Annex III. Publications and papers published in connection with the scheme are listed in Annex IV.

(a) KMA Fellowships

Five experts respectively from the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), the Vietnam National Center for Hydro-Meteorological Forecasting (NCHMF), the Department of Meteorology and Hydrology (DMH) of the Lao PDR, and the Thailand Meteorological Department (TMD) participated in KMA's fellowship scheme from 19 April to 2 May 2015. The participants received trainings on typhoon monitoring, interpretation of satellite-based and radar images, typhoon track and intensity forecast and tropical depression or extra-tropical transition, and practicing the typhoon forecast using the typhoon analysis and prediction system and carried out research on optimizing typhoon forecast using Typhoon Analysis and Prediction System (TAPS).

(b) CMA Fellowships

From 26 October to 25 November 2015, Shanghai Typhoon Institute hosted a one-month visit of two experts from DPRK to develop the tropical cyclone forecast verification technique, jointly funded by the Typhoon Committee and STI/CMA. Progress has been made in the verification of tropical cyclone genesis forecast over the western North Pacific from 2014 to 2015.

Two experts, Dr. Jason Sippel from NOAA EMC, USA and Dr. Nguyen Dang Quang from NCHMF, Vietnam participated in the fellowship as visiting editors for TC's journal "Tropical Cyclone Research and Review (TCRR)" in December 2015. Each of them sent at least 50 emails to invite contributions to the Journal. At least 6 papers have been successfully invited so far. Dr. Jason Sippel, Associate Editor of American Meteorological Society Monthly Weather Review, also submitted helpful recommendations on the future progress of TCRR.

(c) HKO Fellowships

The HKO hosted the Typhoon Committee Research Fellowship this year on a topic entitled "Development of Objective Guidance on Tropical Cyclone Genesis Forecast using Global Models". One expert from the Hainan Meteorological Bureau of the China Meteorological Administration undertook the research project for two months starting from mid-November 2015. He verified the performance of several global models for short-range TC genesis prediction and worked on the development of the numerical algorithms of the objective guidance on TC genesis for operational application.

### ***Training Workshop on Community Weather Station Project (iCoWIN) 2015***

3.8 A training workshop for Typhoon Committee Community Weather Station Project (iCoWIN) was conducted during 2 to 4 November 2015 in Hong Kong, China. The project was led by Hong Kong Observatory under Typhoon Committee Working Group on Disaster Risk Reduction (WGDRR) to raise public awareness on weather through community weather observing scheme. Participants from DPR Korea and Thailand attended the workshop to acquire experience in setting up the community weather stations. Vietnam that participated in the workshop in 2014 installed an iCoWIN weather station at An Hai Secondary School at Ly Son Island and conducted a campaign to promote it to the students in November 2015.

### ***WMO International Training Workshop on Tropical Cyclone Forecasting and Warning 2015***

3.9 The training workshop was successfully held in Nanjing, China on 7-11 December 2015. With the support of WMO, 34 participants from Typhoon Committee region attended the workshop to update and improve knowledge on operational tropical cyclone forecasting and warning with focus on forecasting processes and Dvorak analysis techniques.

## **4. Resource Support for Research and Training**

4.1 Resource persons or contact points on specialized research subjects provided by some Members are tabulated for reference in Annex V.

4.2 The Pacific International Training Desk (PITD), funded by the USA National Weather Service as part of the US contribution to the WMO Voluntary Cooperation Program (VCP), after an evaluation period relaunched in 2014 with a restructured and expanded curriculum and training programme. The PITD, now managed by the Telecommunications and Social Informatics (TASI) Research Program at the University of Hawaii, has four components: 1) eLearning Prerequisite Course, a 15-hour course implemented through the use of e-learning modules; 2) On-Site Training Program, a 4-week long, instructor-led on-site training programme carried out at the US Weather Forecast Offices in Honolulu and Guam; 3) Communications Training, a training on the use of communication systems; and 4) Advanced In-Island workshops on severe weather event topics. Subject to space availability, Typhoon Committee Members may also apply.

## **5. Prioritization of Training and Research Areas**

5.1 Taking into account the discussions during the 47th Session of Typhoon Committee in February 2015 and the inputs by the Members of TRCG, the list of priority research topics is as follows :

**(A) Meteorology**

- (a) rainfall forecasting: development of nowcasting and very short range forecasting techniques, and understanding of interaction between tropical cyclones and monsoon;
- (b) application of Dvorak and microwave satellite image analysis techniques;
- (c) application of radar-based analysis/products for landfalling tropical cyclones and monsoon depressions;
- (d) application of ensembles of guidance from dynamical models, conceptual models, statistical models and systematic knowledge-based approach;
- (e) use of high resolution numerical models with advanced data assimilation techniques;
- (f) better understanding of TC-related issues across different spatial and time scales, from mesoscale and synoptic analysis for track prediction, to climatological impact arising from El Nino/La Nina and global warming/climate change;
- (g) better understanding of wave, storm surge and marine forecasting;

**(B) Meteorology and Hydrology**

- (h) application of meteorological and hydrological information for forecasting of river flooding and urban flash flood, including implementation of UFRM guidelines;
- (i) mudslides and landslides associated with heavy rain;

**(C) Meteorology and DRR**

- (j) development of technical procedures to quantify forecast uncertainties and to convert probabilistic information into effective warnings; and
- (k) development of decision-making tools for DRR purpose, including the integration of forecast information with GIS and the use of automated information processing systems.
- (l) making use of new communication technology; and
- (m) community response and outreach effort for mitigation of the societal impact caused by disasters.

5.2 In view of the devastating impacts of tropical cyclones that affected Members in recent years, attention should also be given to capacity-building in the following aspects:

- (a) assessment of rain-induced geological hazards such as landslides and mudflow;



- (b) forecasting and warning systems for better coastal protection from hazards such as storm surge, river delta inundation and urban flooding; and
- (c) effective communication of warning messages to stakeholders, DRR users and communities at risk.

## **6. Future Directions and Strategies**

6.1 Following the new 4-year plan for 2014 -2017 (Annex VI), TRCG will try to set up more activities in support of training and research topics covered in Roving Seminars and research fellowship projects. Moreover, training and research opportunities will also be explored in collaboration with WGM, WGH, and WGDRR as well as WMO Training Centre in Nanjing. Review of the TRCG AOP 2015 can be found in Annex VII and the proposed AOP 2016 is in Annex VIII.

6.2 The new arrangement in Roving Seminar introduced in 2014 will be continued during the current 4-year plan. This will provide more opportunities for local forecasters to attend the roving seminar and reduce the need for long distance travel.

6.3 As approved in the 47<sup>th</sup> Session, new nomination arrangements for the Forecasters' Training Attachment will be adopted in 2016-17. To ensure sufficient time for implementing the new arrangements, a proposed schedule for the nomination procedures in 2016-17. Details of the new arrangement and the proposed nomination schedule are in Annex IX. Moreover, according to the outcome from the meeting of Severe Weather Forecasting Demonstration Project held in Ha Noi, Viet Nam on 10 August 2015 and with additional financial support from WMO Secretariat (PWS), the training attachment for the three participants from TC Members will be extended by 2 days to enhance the capacity building in warning development / coordination in the TC region on a regular basis.

6.4. TRCG will continue to support plans to have more cross-cutting training and research initiatives in consultation with the meteorology, hydrology and DRR components. Members are in turn encouraged to promote such initiatives through proactive involvement of the appropriate meteorological, hydrological and DRR personnel in their countries.

## Summary of Roving Seminars

Year	Dates	Venue	Topic	Lecturers
2003	20 – 21 Oct	Seoul	Interpretation of Typhoon Forecasts and Analyses	Dr. H-J Kwon Mr. Nobutaka Mannoji
	22 – 24 Oct	Hong Kong	Interpretation of Satellite Data and Use of Radar Data in Operational Tropical Cyclone Forecasting	Dr. Mark Lander Dr. P.W. Li Dr. B.-J. Sohn
	27 – 29 Oct	Shanghai	Interpretation of Satellite Data and Use of Radar Data in Operational Tropical Cyclone Forecasting	Dr. Mark Lander Dr. P.W. Li
2004	22 – 24 Nov	Beijing	Operational Application of Multi-model Ensemble Typhoon Forecasts	Prof. Johnny C.L. Chan Mr. Nobutaka Mannoji
	25 – 27 Nov	Kuala Lumpur	Operational Application of Multi-Model Ensemble Typhoon Forecasts	Prof. Johnny C.L. Chan Mr. Nobutaka Mannoji
2006	4 – 7 Sep	Ha Noi	Tropical Cyclone Motion and Intensity, and Principles of Dvorak Method	Prof. Johnny C.L. Chan Mr. Joe Courtney Dr. B.-J. Kim
2007	5 – 8 Sep	Manila	Satellite and Radar Analysis Techniques, and Tropical Cyclone Interaction with Monsoon Systems	Mr. Roger Edson Mr. Bart Hagemeyer Dr. Tetsuo Nakazawa
2009	16 – 19 Nov	Nanjing	Forecasting of High-impact Weather associated with Tropical Cyclones, and Formulation and Communication of Warning Messages	Mr. S.T. Chan Mr. Chip Guard Mr. Sam Muchemi
2010	30 Nov – 3 Dec	Ubon Ratchathani	Tropical Cyclone Genesis and Large Scale Interaction	Mr. S.M. Lee Prof. Zhang Qinghong Dr. Mark Lander
2011	20 – 23 Sep	Petaling Jaya	Heavy Rain and Flood Hazards associated with Landfalling Tropical Cyclones	Dr. Siriluk Chumchean Mr. H.Y. Yeung Prof. Chen Charng-Ning
2012	30 Oct – 1 Nov	Seoul	Tropical Cyclone Damage Assessment and Impact Forecast	DRR experts from NDMI Ms. Xu Jing Mr. W.K. Wong

2014	3-5 Nov	Hong Kong	Warning communication	Mr. Chip Guard Mr. Ahmed Nadeem Ms. Sandy, M.K. Song Mr. K.L. Lee
2015	4-6 Nov	Lao PDR	Flash flood and landslides	Mr Yoshiki Nagai Prof Xu-dong Fu Dr Dong-ryul Lee

**SUMMARY OF TYPHOON COMMITTEE ROVING SEMINAR  
2015  
(Lao PDR, 4-6 November 2015)**

**I. Organization**

1. The Typhoon Committee Roving Seminar (TCRS) 2015 with the theme on Flash Flood and Landslides was successfully held on 4-6 November 2015 in Lao PDR. It was organized by ESCAP/WMO Typhoon Committee (TC) and hosted by the Department of Meteorology and Hydrology (DMH), Lao PDR.

2. The Seminar was attended by 22 participants from Bangladesh (1); Cambodia (2); China (2); Myanmar (1); Pakistan (1); Philippines (1); Lao PDR (8); Sri Lanka (1) and Thailand (5). Three resource persons came from China, Japan and Republic of Korea with two representatives from the Typhoon Committee Secretariat and ESCAP. The list of participants is given in Attachment A.

**II. Opening**

1. The TCRS 2015 was officiated by Mr. Khanmany Khounphonh, Deputy Director General of DMH, Lao PDR. Mr. Khounphonh delivered the opening speech, highlighting the adverse weather phenomena Members are facing such as heavy rain, flash flood, riverine devastating, landslides and typhoons. He also stressed the importance of enhancing good understanding of hydro-meteorological information, forecast, and early warnings in order to prevent and reduce disaster risk.

2. The Programme Officer of ESCAP, Mr. Alf Ivar Blikberg in his address expressed his gratitude to TC for the excellent initiative and Lao PDR for hosting the Roving Seminar. ESCAP was pleased to be sponsoring 4 Members of the Panel of Tropical Cyclones (PTC) to attend the Seminar this year.

3. The Meteorologist of Typhoon Committee Secretariat (TCS), Mr. Clarence Fong in his address expressed his gratitude to Lao DPR for hosting the Roving Seminar as it was one of the main activities of the TC,

coordinated by the TRCG since 2003. He also expressed his gratitude to the speakers from China, Japan and Republic of Korea for sharing valuable experience in flash flood and landslides which help Members to have a better understanding of the topic, improve forecast to provide a more effective disaster risk reduction approach.

### **III. Seminar Programme**

1. Mr. Yoshiki Nagai and Mr. Naoki Matsumoto from National Institute for Land and Infrastructure Management presented Topic A on “Risk Reduction and Mitigation of Sediment-related Disaster”.
2. Prof. Xu-dong Fu from Tsinghua University presented Topic B on “Advances and Challenges of Flash Flood Modeling and Prediction”.
3. Dr. Dong-ryul Lee from Korea Institute of Civil Engineering and Building Technology presented Topic C on “River and Urban Flash Flood’s Forecasting and Mitigation”.
4. A technical visit to the DMH and a city tour were conducted on the afternoon of 6 November 2015.
5. The Roving Seminar Programme is given in Attachment B.

### **IV. Proposals and Recommendations**

1. The participants gave a warm appreciation to the four resource persons for their presentations and useful advice as well as examples of good practices on the relevant topics.
2. During the wrap up discussion, most participants indicated that they learned new ideas and methodologies on flash flood and landslides, although they might not have the resources for implementation at the moment. Views on early warning considerations were also discussed. The Feedbacks and recommendations collated from the participants are summarized in Attachment C.
3. Suggestions from the resource persons and organizers for future reference:
  - (a) hydrologists can be invited to give lectures at the Roving Seminar

- in the future;
- (b) backgrounds of participants and their operational needs will be useful in designing the lectures;
  - (c) case studies with challenges faced by participant may be designed in future lectures.

## **V. Closing**

1. The resource persons and participants expressed their gratitude to the DMH for hosting this seminar and for the warm hospitality.
2. Mr. Clarence Fong and Mr. Alf Ivar Blikberg presented the attendance certificates to the participants.
3. The Roving Seminar was closed on 6 November 2015.

**List of Participants of the Typhoon Committee Roving Seminar 2015  
(Lao PDR, 4-6 November 2015)**

<b>Members</b>	<b>Name of Participants</b>
Bangladesh	Mr. Sanaul HoQue MONDAL
Cambodia	Mr. Ryna OUM
Cambodia	Ms. Phalla PEOU
China	Mrs. LI Jing
China	Ms. GUO Dongyan
Myanmar	Ms. Htay Htay THAN
Pakistan	Mr. Sarfaraz
Philippines	Mr. Victor B. FLORES
LAO PDR	Mr. Vanhdy DOUANGMALA
LAO PDR	Mr. Somphanh VITHAYA
LAO PDR	Mr. Bounteum SYSOUPHANTHAVONG
LAO PDR	Mr. Sengduangduan PHOUTHANOXAY
LAO PDR	Ms. Phetsakone MISOMPHANE
LAO PDR	Mr. Somboun PONGKHAMSAO
LAO PDR	Ms. Sengkeo KEOMANIVONG
LAO PDR	Ms. Viengkham SITTHIVONG
Sri Lanka	Mr. Malavige Don Dayanada
Thailand	Mr. Stephan HUPPERTZ
Thailand	Mr. Worapojn KHUNAWIWATTANANGKUN
Thailand	Mr. Pattara SUKTHAWEE
Thailand	Mr. Pongsak TEERAKITTIWATTANA
Thailand	Ms. Woraorn SONGKAMILIN
Resource person	Prof Xu-dong FU (China)
Resource person	Mr Yoshiki NAGAI (Japan)
Resource person	Mr. Naoki MATSUMOTO (Japan)
Resource person	Dr Dong-Ryul LEE (Rep. of Korea)
TCS	Mr. FONG Chi Kong
ESCAP	Mr. Alf Ivar BLIKBERG

**Typhoon Committee Roving Seminar 2015  
Seminar Programme**

**Dates and Venue:** 4 – 6 November 2015, Conference Hall, Vansana Riverside Hotel (VRH), Ban Sithane neua, Sikhottabong District, Vientiane, Lao PDR

**Main Theme: Flash flood and landslides**

**Topic A – Risk Reduction and Mitigation of Sediment-related Disaster**

*(Mr Yoshiki Nagai from National Institute for Land and Infrastructure Management)*

**Topic B – Advances and Challenges of Flash Flood Modeling and Prediction**

*(Prof Xu-dong Fu from Tsinghua University)*

**Topic C – River and Urban Flash Flood's forecasting and Mitigation**

*(Dr Dong-ryul Lee from Korea Institute of Civil Engineering and Building Technology)*

**Seminar Schedule:**

		Day 1 (4 Nov, Wed)	Day 2 (5 Nov, Thu)	Day 3 (6 Nov, Fri)
A M	0900 – 1030	Registration & Opening Ceremony	Presentation about GIDRM project by representative from GIZ	<b>Lecture Topic C (3)</b> Strategies and Methods for Urban Flash Flood Forecasting and Warning
			<b>Lecture Topic A (2)</b> Sediment Disaster Countermeasures: Structural Measures and Monitoring for the Preservation of National Land	
	1030 – 1045	Tea Break		
	1045 – 1200	Experience Sharing by Member Representatives <sup>(a)</sup>	<b>Lecture Topic B (2)</b> Disposal of earthquake-triggered barrier dams in China	Wrap-up Discussion
Lunch Break (1200 – 1330)				
P M	1330 – 1445	<b>Lecture Topic A (1)</b> Sediment-related disaster in Japan: The features, tendency and actual situation	<b>Lecture Topic C (2)</b> Rainfall Radar System and Its Utilization for Flood Warning	Visit to DMH Head Quarter
	1445 – 1500	Tea Break		
	1500 – 1615	<b>Lecture Topic B (1)</b> Modeling and prediction of flash flood altered by sediment transport in mountain streams	<b>Lecture Topic A (3)</b> Non-structural Measures: Designation of Sediment Disaster Alert Areas, Soil Precipitation Index, Warning and Evacuation systems	
	1615 – 1625	Short Break		
	1625 – 1730	<b>Lecture Topic C (1)</b> River Flood Forecasting System and Mitigation in Korea	<b>Lecture Topic B (3)</b> Strategies and methods for flash flood hazard mitigation in China	

- (a) One of the participants from each Member will be invited to represent his/her weather services to deliver a 10 to 15 minutes presentation regarding strategy to handle Flash Flood and Landslides of his/her Service.



**TRCG ACTIVITIES EVALUATION FORM**

Roving Seminar 2015  
(Vientiane, Lao PDR, 4 – 6 Nov 2015)

**24 responses (out of 20 participants + 4 lecturers)  
(not all questions answered by responders)**

**Part A: Event Logistics**

<i>Expectation levels as indicated number of responders</i>	Below expectation ☹		Met expectation ☺		Exceeded expectation ☺	
	P	R	P	R	P	R
	<i>(P = participants; R = resource persons)</i>					
1. Overall administration/organization	1	0	9	1	10	3
2. Pre-event arrangement and liaison	1	0	11	1	8	3
3. Venue facilities	0	0	14	3	6	1
4. Informative announcements and instructions	1	0	8	2	11	2
5. Travel arrangements	1	0	12	2	7	2
6. Funding arrangements	1	0	12	1	5	3
7. Accommodation	0	0	13	2	7	2
8. Refreshments	2	0	14	2	4	2
9. Social events and visitors' information	3	0	11	1	6	3
10. Helpfulness and friendliness of organizers	0	0	9	1	11	3

**Specific points for improvement, if any:**

More powerful PC for supporting animations in presentations

Earlier notification of presentations/reports arrangement. Lecturers should have weather background

Travel arrangement and refreshment

Food arrangement for vegetarians

## Part B: Technical Contents (from participants only)

	A – Lectures by Yoshiki Nagai	B – Lectures by Prof. Xu-dong Fu	C – Lectures by Dr. Dong-ryul Lee
	A	B	C
Interest in Topic (1 to 5 ; from disinterested to most interested)			
Topic Contents (1 to 5 ; from irrelevant to topic to most relevant)			
Topic Organization (1 to 5 ; from loosely structured to well-structured)			
Lecture/Workshop Presentation (1 to 5 ; from poor to excellent)			
Training or Practical Material (1 to 5 ; from ill-prepared to well-prepared)			
Language (1 to 5 ; from hard to understand to easy to follow)			
Effectiveness (1 to 5 ; from little understanding gained to much understanding gained)			

Objectives and Scope (L = too narrow; M = just right; R = too wide)			
Emphasis (L = too theoretical; M = just right; R = too practical)			
Length (L = too short; M = just right; R = too long)			
Technical level (L = too elementary; M = just right; R = too difficult)			

## Part C: Follow-ups (from participants only)

1. What operational benefits (new ideas, skills or methodology) you think would be gained from your attendance in the event?

Early warnings management/operational system/disaster preparedness of flash flood (also at local level)  
 Forecast/handling/losses mitigation/experience sharing of flash flood  
 Use of social media as a sensor of disaster  
 Use of Modified Mannings Roughness coefficient for flash flood  
 Spatial-temporal rain observation, ISO standard of alert sign

2. Any foreseeable opportunity for operational implementation of the above benefits?

Answer: Yes, benefits likely to be felt in about

(a) a couple of years or less	4
(b) in 2 – 5 years	4
(c) in 5 years or more	5
(d) no foreseeable opportunity	3



The participants of the Roving Seminar taking a group photo with the Deputy Director General of Department of Meteorology and Hydrology, Lao PDR, Mr. Khanmany Khounphonh, (3rd to the right, 1st row), Meteorologist of Typhoon Committee Secretariat, Mr. Clarence Fong (2nd to the right, 1st row), Programme Officer of ESCAP, Mr. Alf Ivar Blikberg (1st to the right, 1st row) and the lecturers.



Participants visiting the Department of Meteorology and Hydrology, Lao PDR.

**Summary of Awarded Research Fellowships**

<b>Subject</b>	<b>Fellow</b>	<b>Host</b>	<b>Period</b>
Analysis of evolution of landfalling tropical cyclones with a view to developing forecast guidance for wind and rain	Mr. XUE, Jianjun (China)	Hong Kong Observatory	1 Feb – 31 Mar. 2001
TC track forecasting with use of super-ensemble	Dr. PENG, Taoyong (China)	Korea Meteorological Administration	15 Jun – 15 Nov 2001
Near real-time analysis of the wind structure of tropical cyclones	Dr. Nathaniel T. SERVANDO (Philippines)	Hong Kong Observatory	5 May – 4 Jul 2002
Numerical modelling on typhoon intensity change	Miss YU, Hui (China)	Kongju National University and Korea Meteorological Administration	15 Jul – 15 Sep 2002
Tropical cyclone track forecasting method	Dr. KANG, Bom Jin Dr. KIM, Tae Jin (DPR Korea)	Shanghai Typhoon Institute	Feb – Mar 2001 Oct – Nov 2002
Analyses on the responses of extratropical transition of tropical cyclone to its environment	Dr. Vicente B. MALANO (Philippines)	Korea Meteorological Administration	Jun – Aug 2004
Effect of tropical cyclone bogussing on model analysis and forecasts	Ms. WANG, Dongliang (China)	Hong Kong Observatory	11 Oct – 10 Dec 2004
Evaluation of the model performance in typhoon prediction in the high-resolution global model (T426L40)	Ms. Sugunyane YAVINCHAN (Thailand)	Kongju National University and Korea Meteorological Administration	1 Aug – 30 Oct 2005
Impact study of Moisture Data on TC forecasting in South China Sea and Western North Pacific	Dr. Vicente B. MALANO (Philippines)	Hong Kong Observatory	20 Sep – 19 Nov 2005
Using ensemble prediction system (EPS) information in tropical cyclone forecasting	Ms. CHEN, Peiyan (China)	Hong Kong Observatory	13 Oct – 12 Dec 2006
Numerical simulation of Typhoon RUSA	Mr. HOA, Vo Van	Korea Meteorological Administration	Jun – Aug 2006

with a very high resolution mesoscale model, and calibration of intensity of typhoon with Kalman filtering	(Viet Nam)		
Use of EPS information in TC forecasting	Mr. NGUYEN, Dang Quang (Viet Nam)	Hong Kong Observatory	15 Sep – 14 Nov 2007
Seasonality of Tropical Cyclone Activities over the Western North Pacific	Ms. YING, Ming	Korea Meteorological Administration	22 Sep – 20 Dec 2008
Study of high resolution non-hydrostatic model in prediction of landfalling tropical cyclones	Mr. Santi SUMDIN (Thailand)	Hong Kong Observatory	20 Oct – 19 Dec 2008
Tropical cyclone bogus in NHM and its impact on forecast track and intensity	Mr. QU, Anxiang (China)	Hong Kong Observatory	29 Oct – 28 Dec 2009
Typhoon Vortex Initialization Scheme and typhoon Ensemble Forecast Techniques	Ms. NGUYEN Thi Minh Phuong (Viet Nam) and Mr. Chatchai CHAIYASAEN (Thailand)	National Meteorological Center, China Meteorological Administration	Early Dec 2009 – Early Feb 2010
Improvement of typhoon analysis and forecast with KMA's TAPS	Mr. TRAN Quang Nang (Viet Nam)	Korea Meteorological Administration	1 Sep – 27 Nov 2010
Study on the tropical cyclone genesis in the northwestern Pacific	Mr. Kamol Promasakha Na SAKOLNAKHON (Thailand)	Korea Meteorological Administration	1 Sep – 27 Nov 2010
Typhoon Information Processing System	Mr. NGUYEN Manh Linh (Viet Nam) and Ms. Kamolrat SARINGKARNPHASIT (Thailand)	National Meteorological Center, China Meteorological Administration	8 Oct – 8 Dec 2010
Can the extreme rainfall associated with Typhoon Morakot (0908) happen in Hong Kong?	Mr. HUANG, Yiwu (China)	Hong Kong Observatory	29 Oct – 28 Dec 2010
Improvement of typhoon analysis and forecast with KMA's TAPS	Mr. Jori J. LOIZ (Philippines)	Korea Meteorological Administration	Sep – Nov 2011
Improvement of typhoon analysis and forecast with KMA's TAPS	Mr. Chukiat THAIJARATSATIAN (Thailand)	Korea Meteorological Administration	Sep 2011
Implementation of Tropical Cyclone Intensity Forecast in the Tropical Cyclone Information Processing System (TIPS) of the Hong Kong Observatory	Mr. Nursalleh K. CHANG (Malaysia)	Hong Kong Observatory	24 Oct – 23 Dec 2011
Improvement of Prediction Method for	Dr. Sukrit KIRTSANG (Thailand)	National Meteorological Center,	2 Nov – 29 Dec 2011



the Rapid Intensification of Tropical Cyclones in the South China Sea		China Meteorological Administration	
Application of Numerical Ensemble Prediction in the Forecasting of Typhoon Sharp Turning Tracks	Mr. Raymond C. ORDINARIO (Philippines)	National Meteorological Center, China Meteorological Administration	14Nov 2011 – 13 Jan 2012
Typhoon Analysis and Prediction System (TAPS), genesis and dissipation of tropical cyclones, and change of typhoon characteristics due to climate change	Mr. Renito B. PACIENTE (Philippines), Ms. Plaidao KHUMCHAIYAPHUM (Thailand) and Mr. Bounteum SYSOUPHANTHAVONG (Lao PDR)	Korea Meteorological Administration	May – June 2012
Enhancement of rainfall nowcast in tropical cyclone situation	Mr. Maqrun Fadzli Mohd Fahmi (Malaysia) and Mr. Michael S. Bala (Philippines)	Hong Kong Observatory	22 Oct – 21 Dec 2012
Optimizing typhoon forecast using Typhoon Analysis and Prediction System (TAPS), and research on intensity and track forecasts using model ensemble, correction of track forecast bias according to synoptic patterns, and analysis of synoptic features and typhoon model forecast errors in anomalous typhoon tracks.	Dr. Bonifacio Galt Pajulelas (Philippine) , Mr. Nguyen Huu Thanh (Vietnam), and Ms. Prapaporn Wongsaming (Thailand)	Korea Meteorological Administration	1 May – 30 June 2013
Development of location-specific severe weather nowcasting techniques.	Dr. Sukrit KIRTSAENG (Thailand)	Hong Kong Observatory	21 Oct – 20 Dec 2013
Optimizing typhoon forecast using Typhoon Analysis and Prediction System (TAPS) and separate researches (typhoon-mid latitude pressure system interaction, study on the typhoon recurvature and moving speed, and study on the relationship between the central pressure and maximum sustained winds for typhoon)	Ms. Bai Lina (China) Mr. Nguyen Tung Thanh (Vietnam) Mr. Juanito S. Galang (The Philippines)	Korea Meteorological Administration	1 May – 30 June 2014
Tropical Cyclone Genesis Forecast Technique	Mr. Boonthum Tanglumlead (Thailand)	Shanghai Typhoon Institute	1 Jul – 31 Aug 2014

The utilization of ECMWF products in detecting storm tracks over the North Western Pacific	Mr Pak Sang Il and Mr Song Yong Chol (DPR Korea)	Shanghai Typhoon Institute	1-30 Sept 2014
Nationwide Nowcast of Tropical Cyclone Rainfall	Mr Evan James K. Carlos (The Philippines)	Hong Kong Observatory	6 Oct – 5 Dec 2014
Optimizing typhoon forecast using Typhoon Analysis and Prediction System (TAPS), and research on typhoon monitoring, interpretation of satellite-based and radar images, typhoon track and intensity forecast and tropical depression or extra-tropical transition	Ms. Akhom THAMALANGSY (Lao PDR) Mr. Aldezar D. Aurelio (Philippine), Mr. Jose Frivaldo, JR. (Philippine), Mr. Somprat Srithagon (Thailand), and Ms. DO Thi Thanh Thuy (Viet Nam)	Korea Meteorological Administration	19 April - 2 May 2015
Tropical cyclone genesis forecast technique	Mr. Pak Sang Il (DPR Korea) Mr. Ri Hak Il (DPR Korea)	Shanghai Typhoon Institute	26 Oct - 25 Nov 2015
Visiting editor for Tropical Cyclone Research and Review (TCRR)	Dr Jason Sippel (USA) Dr Nguyen Dang Quang (Viet Nam)	Shanghai Typhoon Institute	6-13 Dec 2015 20-26 Dec 2015
Development of objective guidance on tropical cyclone genesis forecast using global models	Mr Wen FENG (China)	Hong Kong Observatory	Mid Nov 2015 – mid Jan 2016



**TRCG Publications / Papers**

Xue, J.J., 2002: Structural and Diagnostic Analyses of Landfalling Tropical Cyclones near Hong Kong in 1999 and 2000. Typhoon Committee Annual Review 2001, pp. 153-161

Servando, N.T., P.W. Li and E.S.T. Lai, 2003: Near Real-time Analysis of the Wind Structure of Tropical Cyclones. Typhoon Committee Annual Review 2002 (in CD form)

Peng, T.-Y., H.-J. Kwon, W.-J. Lee, and J.-H. Lim, 2005: A systematic approach to tropical cyclone track. *The International Journal of Systems & Cybernetics*. **34**, 681-693.

Wang, D.L., W.K. Wong and E.S.T. Lai, 2005: A Study on Tropical Cyclone Bogussing Strategies in NWP Model Analysis and Forecast. Typhoon Committee Annual Review 2004.

Yu, Hui and H. Joe Kwon, 2005: Effect of TC–Trough Interaction on the Intensity Change of Two Typhoons. *Weather and Forecasting*. **20**, 199–211.

Malano, V.B., W.K. Wong and E.S.T. Lai 2006: Effect of Moisture Data to the Numerical Simulation of Tropical Cyclone in the Western North Pacific. Typhoon Committee Annual Review 2005, pp. 242 – 251.

Chen, P.Y. and S.T. Chan, 2009: Use of the JMA Ensemble Prediction System for Tropical Cyclone Intensity Forecasting. Typhoon Committee Annual Review 2008, pp. 276-285.

Nguyen, D.Q. and S.T. Chan, 2009: Study on Application of Ensemble Prediction System Information in Tropical Cyclone Track Forecasting. Typhoon Committee Annual Review 2008, pp. 286-291.

Wong W.K., S. Sumdin, and E.S.T. Lai 2010: Development of Air-Sea Bulk Transfer Coefficients and Roughness Lengths in JMA Non-hydrostatic Model and Application in Prediction of an Intense Tropical Cyclone. *Scientific Online Letters on the Atmosphere (SOLA)*, **6**, 65-68.

Chan, S.T. and Y. Huang, 2012: Can the Extreme Rainfall Associated with Typhoon Morakot (2009) Happen in Hong Kong? *Tropical Cyclone Research and Review*, **1**, 1-15.

Chang, N.K., L.S. Lee and Y.S. Li, 2012: Comparison of Performance of Various Multiple-Model Ensemble Techniques in Forecasting Intensity of Tropical Cyclone. *Tropical Cyclone Research and Review*, **1**, 353-360.

Woo, W.C., K.K. Li and Michael Bala 2014: An Algorithm to Enhance Nowcast of Rainfall Brought by Tropical Cyclones Through Separation of Motions[J]. Tropical Cyclone Research and Review, 2014, 3(2): 111-121. doi:10.6057/2014TCRR02.04

Choi, K-S, Prapaporn Wongsaming, S. Park, Y. Cha, W. Lee, I. Oh, J-S Lee, S-B Jeong, D-J Kim, K-H Chang, J. Kim, W-S Yoon, and J-H Lee, 2013: An Analysis of Model Bias Tendency in Forecast for the Interaction between Mid-latitude Trough and Movement Speed of Typhoon Sanba. Jour. Korean Earth Science Society, 34, 303-312.

*Annex V*

**List of Resource Persons**

<b>Member</b>	<b>Specialties</b>	<b>Name</b>	<b>E-mail</b>	<b>Affiliation</b>
<b>(A) Data Assimilation</b>				
China	TC vortex initialization	LIANG, Xudong	Liangxd@mail.typhoon.gov.cn	Shanghai Typhoon Institute
	TC intensity estimation by radar, satellite, SSMI and QuikScat	GAO, Shuanzhu ZHOU, Bing	<a href="mailto:gaosz1129@sina.com">gaosz1129@sina.com</a> <a href="mailto:bingz@cma.gov.cn">bingz@cma.gov.cn</a>	National Meteorological Center
	Radar data quality control and assimilation scheme	GONG, Jiandong	<a href="mailto:gongjd@cma.gov.cn">gongjd@cma.gov.cn</a>	National Meteorological Center
Hong Kong, China	TC data assimilation	W.K. WONG	<a href="mailto:wkwong@hko.gov.hk">wkwong@hko.gov.hk</a>	Hong Kong Observatory
Japan	Satellite data assimilation	Kazumasa AONASHI	<a href="mailto:aonashi@mri-jma.go.jp">aonashi@mri-jma.go.jp</a>	Meteorological Research Institute
	Satellite data assimilation	Naotaka UEKIYO	<a href="mailto:n-uekiyo@mri-jma.go.jp">n-uekiyo@mri-jma.go.jp</a>	Meteorological Research Institute
	Satellite data assimilation	Hiromi OWADA	<a href="mailto:howada@mri-jma.go.jp">howada@mri-jma.go.jp</a>	Meteorological Research Institute
	Data assimilation	Toshiyuki ISHIBASHI	<a href="mailto:ishibasi@mri-jma.go.jp">ishibasi@mri-jma.go.jp</a>	Meteorological Research Institute

<b>(A) Data Assimilation (cont'd)</b>				
Republic of Korea	Typhoon bogussing	YOO, Hee Dong	<a href="mailto:hyoo@kma.go.kr">hyoo@kma.go.kr</a>	Korea Meteorological Administration
		KWON, H. Joe	<a href="mailto:hjkwon@kongju.ac.kr">hjkwon@kongju.ac.kr</a>	Kongju National University
	Satellite data analysis	CHOI, Byoung-Choel	<a href="mailto:cbc123@korea.kr">cbc123@korea.kr</a>	Korea Meteorological Administration
	Radar data analysis	PARK, Jong Seo	<a href="mailto:jspark@kma.go.kr">jspark@kma.go.kr</a>	Korea Meteorological Administration
USA (western North Pacific)	TC analysis, satellite interpretation, use of microwave imagery and scatterometer data	Tom LEE Peter BLACK Paul CHANG	<a href="mailto:Lee@nrlmry.navy.mil">Lee@nrlmry.navy.mil</a> <a href="mailto:Peter.Black.ctr@nrlmry.navy.mil">Peter.Black.ctr@nrlmry.navy.mil</a> <a href="mailto:Paul.S.Chang@noaa.gov">Paul.S.Chang@noaa.gov</a>	NRL, Monterey, CA NRL, Monterey CA NOAA/NESDIS, Suitland MD
<b>(B) Modelling</b>				
China	Numerical schemes of TC model	DUAN, Yihong	<a href="mailto:duanyh@mail.typhoon.gov.cn">duanyh@mail.typhoon.gov.cn</a>	Shanghai Typhoon Institute
	TC model physics and bogussing schemes	MA, Suhong	<a href="mailto:mash@cma.gov.cn">mash@cma.gov.cn</a>	National Meteorological Center
	Ensemble track forecasting	ZHOU, Xiaqiong	<a href="mailto:zhouxq@mail.typhoon.gov.cn">zhouxq@mail.typhoon.gov.cn</a>	Shanghai Typhoon Institute
	Typhoon modelling	LIANG, Xudong	<a href="mailto:Liangxd@mail.typhoon.gov.cn">Liangxd@mail.typhoon.gov.cn</a>	Shanghai Typhoon Institute
Hong Kong, China	TC modelling and bogussing schemes	W.K. WONG	<a href="mailto:wkwong@hko.gov.hk">wkwong@hko.gov.hk</a>	Hong Kong Observatory

**(B) Modelling (cont'd)**

Japan	Ensemble track forecasting	Munehiko YAMAGUCHI	<a href="mailto:myamagu@mri-jma.go.jp">myamagu@mri-jma.go.jp</a>	Meteorological Research Institute
	TC-ocean interaction (incl. mixed-layer ocean and ocean surface wave modelling)	Akiyoshi WADA	<a href="mailto:awada@mri-jma.go.jp">awada@mri-jma.go.jp</a>	Meteorological Research Institute
	TC modelling	Masahiro SAWADA	<a href="mailto:msawada@mri-jma.go.jp">msawada@mri-jma.go.jp</a>	Meteorological Research Institute
	Storm surge modelling	Nadao KOHNO	<a href="mailto:nkono@met.kishou.go.jp">nkono@met.kishou.go.jp</a>	Japan Meteorological Agency
Republic of Korea	Global NWP model tracks	PARK, Hoon	<a href="mailto:hoon@kma.go.kr">hoon@kma.go.kr</a>	Korea Meteorological Administration
	Ensemble track forecasting	PARK, Hoon	<a href="mailto:hoon@kma.go.kr">hoon@kma.go.kr</a>	Korea Meteorological Administration
	Typhoon modelling	PARK, Hoon	<a href="mailto:hoon@kma.go.kr">hoon@kma.go.kr</a>	Korea Meteorological Administration
		KWON, H. Joe	<a href="mailto:hjkwon@kongju.ac.kr">hjkwon@kongju.ac.kr</a>	Kongju National University
		HO, Chang Hoi	<a href="mailto:hoch@cpl.snu.ac.kr">hoch@cpl.snu.ac.kr</a>	Seoul National University
USA (western North Pacific)	TC Modeling	Jim DOYLE	<a href="mailto:James.Doyle@nrlmry.navy.mil">James.Doyle@nrlmry.navy.mil</a>	NRL, Monterey CA
	Extratropical Transition TC Genesis Sub-Tropical Systems Structure	Pat HARR  Jenni EVANS	<a href="mailto:paharr@nps.edu">paharr@nps.edu</a>  <a href="mailto:evans@meteo.psu.edu">evans@meteo.psu.edu</a>	Naval Postgraduate School, Monterey CA  Pennsylvania State Univ
Viet Nam	Computational fluid dynamics and modelling	LE, Duc	<a href="mailto:leducvn@yahoo.com">leducvn@yahoo.com</a>	National Hydro-Meteorological Service

				of Viet Nam
<b>(C) Forecasting</b>				
China	Track and intensity forecasting	LEI, Xiaotu	Leixt@mail.typhoon.gov.cn	Shanghai Typhoon Institute
	Long-range prediction of typhoon	XU, Ming	Xum@mail.typhoon.gov.cn	Shanghai Typhoon Institute
Hong Kong, China	TC climatology and best track analysis	C.W. CHOY	cwchoy@hko.gov.hk	Hong Kong Observatory
	TC rainfall nowcasting	W.C. Woo	wcwoo@hko.gov.hk	Hong Kong Observatory
	TC intensity, structure and landfall impact	S.T. Chan	stchan@hko.gov.hk	Hong Kong Observatory
	Long-range forecasting of TCs	S.M. LEE	smlee@hko.gov.hk	Hong Kong Observatory
	TC motion, intensity, size, modelling and seasonal prediction	Johnny C.L. CHAN	Johnny.Chan@cityu.edu.hk	City University of Hong Kong.
Japan	Data analysis related to extratropical transition	Naoko KITABATAKE	<a href="mailto:nkitabata@mri-jma.go.jp">nkitabata@mri-jma.go.jp</a>	Meteorological Research Institute
	Satellite data analysis, use of microwave imagery, AMSU	Ryo OYAMA	<a href="mailto:royama@mri-jma.go.jp">royama@mri-jma.go.jp</a>	Meteorological Research Institute
	Doppler radar data analysis	Udai SHIMADA	<a href="mailto:ushimada@mri-jma.go.jp">ushimada@mri-jma.go.jp</a>	Meteorological Research Institute
Republic of Korea	Track and intensity forecasting	PARK, Hoon	<a href="mailto:hoon@kma.go.kr">hoon@kma.go.kr</a>	Korea Meteorological Administration
		KWON, H. Joe	<a href="mailto:hjkwon@kongju.ac.kr">hjkwon@kongju.ac.kr</a>	Kongju National University

	Long-range prediction of typhoon	HO, Chang Hoi	<a href="mailto:hoch@cpl.snu.ac.kr">hoch@cpl.snu.ac.kr</a>	Seoul National University
		SOHN, Byung-Ju	<a href="mailto:sohn@snu.ac.kr">sohn@snu.ac.kr</a>	Seoul National University
		KWON, H. Joe	<a href="mailto:hjkwon@kongju.ac.kr">hjkwon@kongju.ac.kr</a>	Kongju National University
		HO, Chang Hoi	<a href="mailto:hoch@cpl.snu.ac.kr">hoch@cpl.snu.ac.kr</a>	Seoul National University
Singapore	Seasonal prediction of typhoon	LIM, Tian Kuay	<a href="mailto:LIM_Tian_Kuay@nea.gov.sg">LIM_Tian_Kuay@nea.gov.sg</a>	Meteorological Services Division, National Environment Agency
<b><i>(C) Forecasting (cont'd)</i></b>				
USA (western North Pacific)	TC analysis and forecasting, seasonal prediction, use of microwave imagery and scatterometer data, Dvorak technique	Mark LANDER Roger EDSON	<a href="mailto:mlander@uguam.uog.edu">mlander@uguam.uog.edu</a> <a href="mailto:Roger.Edson@noaa.gov">Roger.Edson@noaa.gov</a>	University of Guam (WERI) National Weather Service, Forecast Office Guam
	Satellite data analysis, use of microwave imagery	Jeff HAWKINS	<a href="mailto:Jeff.Hawkins@nrlmry.navy.mil">Jeff.Hawkins@nrlmry.navy.mil</a>	Navy Research Laboratory, Monterey
USA (western North Pacific)	Satellite data analysis, use of microwave imagery, automated Dvorak Technique, AMSU	Chris VELDEN Derrick HERNDON	<a href="mailto:chris.velden@ssec.wisc.edu">chris.velden@ssec.wisc.edu</a> <a href="mailto:dherndon@ssec.wisc.edu">dherndon@ssec.wisc.edu</a>	CIMSS, University of Wisconsin-Madison

	Satellite data analysis, use of microwave imagery, AMSU	John KNAFF	john.knaff@noaa.gov <a href="mailto:john.knaff@noaa.gov">mailto:</a>	NOAA/NESDIS at CIRA, Colorado State University
	Satellite-based rainfall estimates in TCs (eTRaP)	Bob KULIGOWSKI Shelden KUSSELSON	bob.kuligowski@noaa.gov <a href="mailto:sheldon.kusselson@noaa.gov">sheldon.kusselson@noaa.gov</a>	NOAA/NESDIS Suitland, Maryland



***(D) Application***

Hong Kong, China	TC warning systems and operations	L. S. Lee	lslee@hko.gov.hk	Hong Kong Observatory
	TC information visualization and display systems	S.T. CHAN	stchan@hko.gov.hk	Hong Kong Observatory
USA (western North Pacific)	TC warning and disaster preparedness, seasonal prediction, Dvorak technique	Chip GUARD	chip.guard@noaa.gov	NOAA National Weather Service Guam

## TRCG Work Plans (2014 – 2017)

Year	Quarter	Typhoon Committee Activity	Training and Research Activities (*activities organized by parties other than TRCG)	Themes (if any) / Remarks
2014	Q1	TC-46		
	Q2		Research Fellowship	
	Q3		RSMC Tokyo attachment*	To be confirmed with WMO and RSMC Tokyo
			Research Fellowship	
	Q4	9 <sup>th</sup> Integrated Workshop	Research Fellowship	
Roving Seminar			To be held in Hong Kong, China with themes on “warning communication”	
2015	Q1	TC-47		
	Q2		Research Fellowship	
	Q3		RSMC Tokyo attachment*	To be confirmed with WMO and RSMC Tokyo
			Research Fellowship	
	Q4	10 <sup>th</sup> Integrated Workshop	Research Fellowship	
Roving Seminar			Proposed to be in Lao PDR with themes on “flash flood and landslides”	
2016	Q1	TC-48		
	Q2		Research Fellowship	
	Q3		RSMC Tokyo attachment*	To be confirmed with WMO and RSMC Tokyo
			Research Fellowship	
	Q4	11 <sup>th</sup> Integrated Workshop	Research Fellowship	
			CMA Training Program	To be confirmed by CMA
Roving Seminar			Proposed to be in Viet Nam with themes on “storm surge”	
2017	Q1	TC-49		
	Q2		Research Fellowship	
	Q3		RSMC Tokyo attachment*	To be confirmed with WMO and RSMC Tokyo
			Research Fellowship	
	Q4	12 <sup>th</sup> Integrated Workshop	Research Fellowship	
			3 <sup>rd</sup> TRCG Forum / Meeting	Proposed to be in South Korea with themes to be confirmed

Training and Research Coordination Group (TRCG) Annual Operating Plan 2015											
Objective Number	KRA / SG	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources	Review and Target Met? (Yes / No)
1	KRA 6 / SG 6b and 6c	To: (a) implement training initiatives in the priority operational and research areas as identified in the TRCG annual report; and (b) enhance Members' capability and capacity in the assessment of damage and pre-assessment of potential impact caused by landfalling TCs	Roving Seminar [with themes on flash flood and landslides]	WGH	Provision of administrative and logistic support.	3rd or 4th	-	Feedback from evaluation forms to be completed by a target audience of about 30 people.	USD 16,000	TCTF	Yes
2	KRA 6 / SG 6b and 6c	To facilitate technology transfer among TC Members through research and development initiatives.	Research Fellowship	WGM, WGH and WGDRR	Provision of administrative and logistic support.	2nd - 4 <sup>th</sup>	TC Members	Publication of research findings and development output in TCRR or other journals.	Fellowship offered by voluntary hosts.	TC Members	Yes
3	KRA 6 / SG 6b and 6c	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Attachment of 3 forecasters from TC (Cambodia, Thailand and Viet Nam) and other forecasters from PTC to RSMC Tokyo	Nil	Provision of administrative and logistic support.	3 <sup>rd</sup>	RSMC Tokyo, WMO	Assessment as given in RSMC Tokyo report.	USD 7,500	TCTF	Yes

Training and Research Coordination Group (TRCG) Annual Operating Plan 2016										
Objective Number	KRA / SG	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources
1	KRA 6 / SG 6b and 6c	To: (a) implement training initiatives in the priority operational and research areas as identified in the TRCG annual report; and (b) enhance Members' capability and capacity in the assessment of damage and pre-assessment of potential impact caused by landfalling TCs	Roving Seminar [with themes on Storm Surge]	WGM and WGDRR	Provision of administrative and logistic support.	3rd or 4th	-	Feedback from evaluation forms to be completed by a target audience of about 30 people.	USD 15,500	TCTF
2	KRA 6 / SG 6b and 6c	To facilitate technology transfer among TC Members through research and development initiatives.	Research Fellowship	WGM, WGH and WGDRR	Provision of administrative and logistic support.	2nd - 4th	TC Members	Publication of research findings and development output in TCRR or other journals.	Fellowship offered by voluntary hosts.	TC Members
3	KRA 6 / SG 6b and 6c	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Attachment of 3 forecasters from TC and 3 forecasters from PTC to RSMC Tokyo	nil	Provision of administrative and logistic support.	3rd	RSMC Tokyo, WMO	Assessment as given in RSMC Tokyo report.	USD 7,500 <sup>1</sup>	TCTF
4	KRA 6 / SG 6b and 6c	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Attachment of up to 4 forecasters from TC to CMA	nil	Provision of administrative and logistic support.	3 <sup>rd</sup> – 4 <sup>th</sup>	CMA	Assessment as given in CMA report.	Participation will be supported by CMA	CMA

<sup>1</sup> Additional financial supports from WMO Secretariat (PWS) for 2 day extension of the training (i.e., DSA for three trainees staying 2 days in Tokyo) will be provided from 2016 on a regular basis

## **RSMC Tokyo Attachment Training Arrangement for 2016-17**

The new arrangements for the RSMC Tokyo Attachment Training for 2016-2017 as adopted in the 47<sup>th</sup> Session of the Typhoon Committee (TC) are as follows :

- (i) *Number of trainees* : **Three forecasters from TC Members**
- (ii) *Nomination and priority of participation* :
  - (a) Invitation of nomination will be sent to **ALL** TC Members by TCS (up to one nomination for each Member).
  - (b) If there are more than three nominations from Members, preference will be given to :
    - Members that have more urgent need in capacity-building in operational forecasting;
    - women forecasters; then
    - Members that have not participated for a longer period of time.
  - (c) Based on (a) and (b) as well as in consultation with WMO TCP, TRCG and RSMC-Tokyo will jointly determine which Members attend the RSMC-Tokyo Attachment Training.
- (iii) *Budget Allocation* :
  - (a) Members' participation will continue to be supported by WMO TCP and TCTF.
  - (b) The budget will be reviewed regularly by taking into consideration of the cost of living in Tokyo. For 2016-17, the TCTF budget allocation for each participant will be **USD2500**.
- (iv) The above arrangements will be reviewed later in 2017 to formulate the plan for the 4-year period in 2018-2021.

Also, as endorsed in the 3<sup>rd</sup> TC/PTC Session in February 2015, subject to availability of extra funding support and venue capacity, the participation of PTC Members in the Attachment Training will also be considered.

**Proposed nomination schedule for RSMC Tokyo Attachment Training in 2016-2017**

<b>5 months before</b> <i>(late February)</i>	<ul style="list-style-type: none"><li>• RSMC Tokyo informs TCS of the date and a tentative schedule.</li><li>• TCS sends invitation letters for application to the Members of the Typhoon Committee (and PTC).</li></ul>
<b>4 months before</b> <i>(late March)</i>	<ul style="list-style-type: none"><li>• Application Deadline.</li><li>• Trainees of TC are selected by RSMC Tokyo and TRCG in consultation with WMO TCP (as agreed at 47<sup>th</sup> Session)</li></ul>
<b>3 months before</b> <i>(late April)</i>	<ul style="list-style-type: none"><li>• TCS informs results of the TC Members who submitted applications.</li></ul>