Third Joint Session
Panel on Tropical Cyclones | Typhoon Committee
(42nd Session of PTC and 47th Session of TC)
9- 13 February 2015
ESCAP - UN Conference Center
Bangkok, Thailand

FOR PARTICIPANTS ONLY
WRD/TC.47/4.4
5 January 2015

ENGLISH ONLY

TRAINING & RESEARCH COORDINATION GROUP (TRCG)

(submitted by TRCG Chair)

Action Proposed

The Committee is invited to:

(a) note the major activities and development progress of TRCG as summarized in the APPENDIX;
(b) endorse the training and research priority areas as outlined in Section 5 of the APPENDIX; and
(c) endorse the future plans of TRCG as outlined in Section 6 and Annexes VI and VIII of the APPENDIX.
(d) endorse the proposed plan of the RSMC Tokyo Attachment Training for 2016-17 in Annex IX of the APPENDIX.

APPENDIX : TRCG Annual Report 2014

APPENDIX

TRAINING & RESEARCH COORDINATION GROUP (TRCG) ANNUAL REPORT 2014

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 2014) 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 2014

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 2014was successfully held on 3-5 November 2014 in Hong Kong, China. The seminar was hosted by the Hong Kong Observatory of Hong Kong, China. The theme of this seminar was on "Warning Communication" with the following three sub-topics :

Topic A – Effective early warning systems and risk communications
Topic B – Media liaison and crisis management for Disaster Risk Reduction
Topic C – Warning communication strategies in the era of web technology and social media - Hong Kong Experience

3.3 The Seminar was attended by 13 participants from Cambodia (2); Hong Kong, China (2); Laos PDR (1); Macao, China (1); Philippines (1); Republic of Korea (4); and Thailand (2). The four resource persons came from Hong Kong, China; Malaysia, and USA along with two representatives from the Typhoon Committee Secretariat. More than half of participants felt that skills and knowledge learnt from this seminar would be useful to operational in their services within the next few years. A summary report of the seminar

can be found in Annex II.

Forecasters' Training Attachment

3.4 The 14th Training Attachment course was held at JMA Headquarters from 23 July to 1 August 2014. In line with this year's increase in the number of trainees from two to three, the course was attended by Mr. Vanhdy Douangmala (from Lao PDR), Ms. Nurul Salwa Abdul Ghani (from Malaysia) and Ms. Maria Ana Glaiza Ganace Escullar (from the Philippines). The contents of the training included:

(i) The satellite analysis and viewer program (SATAID)
(ii) Tropical cyclone analysis (Dvorak technique)
(iii) Tropical cyclone forecasting
(iv) Storm surges
(v) Quantitative precipitation estimation (QPE) and quantitative precipitation forecasting (QPF)
(vi) Interpretation of microwave imagery

Research Fellowship Scheme

3.5 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.

3.6 In 2014, fellowships were offered by China, Hong Kong, China and Republic of Korea. Three experts from China, Vietnam and the Philippines participated in KMA's fellowship scheme from May to July 2014,carrying out training and research onoptimizing typhoon forecast using TAPS and studying typhoon-mid latitude pressure system interaction, recurving typhoon and moving speed, and the relationship between central pressures and maximum sustained winds for typhoon. From July to September 2014, Shanghai Typhoon Institute of CMA hosted three experts from Thailand and DPR Korea carrying out studies on developing tropical cyclone genesis forecasts based on global model output and/or the genesis forecast evaluation. From 6 October to 5 December 2014, an expert from the Philippines participated in the fellowship scheme hosted by the Hong Kong Observatory (HKO), undertaking a research project on nationwide nowcast of tropical cyclone rainfall. Moreover, as part of the WGM Annual Operating Projects with WGH, a two-week training on QPE/QPF was included in the Research Fellowship programme offered by Hong Kong,

China. The training covered principles on QPE/QPF, severe weather nowcasting algorithms and the operation of HKO SWIRLS nowcasting system. 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.

SSOP Training Workshop

3.7 The Training Workshop on Synergized Standard Operating Procedures (SSOP) for Coastal Multi-Hazards Early Warning System was conducted in the WMO RTC Nanjing, China, on 9-11 June 2014. The Workshop was attended by 33 participants, including decision-makers, disaster managers, media professionals, and warning issuers, from the beneficiary countries: 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). Cambodia was the only SSOP beneficiary country not attending due to a lack of available human resources.

3.8 The training consisted of lectures, presentations, training scenarios and group discussions, covering topics on :

- social/cultural aspects of Early Warning System (EWS),
- coastal hazards monitoring and warnings,
- communications/dissemination,
- after actions review and lessons learnt; and
- development of SOP scenarios

The Workshop also came up with a number of recommendations for the elaboration ofStandard Operating Procedures (SOPs) for EWS

Training Workshop on Community Weather Station Project (iCoWIN) 2014

3.9 A training workshop for Typhoon Committee Community Weather Station Project (iCoWIN) was conducted during 5 to 7 November 2014 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 Vietnam and Lao attended the workshop to acquire experience in setting up the community weather stations. The trainees were also provided with a basic set of community weather station which will be installed in the community of Vietnam and Lao for data sharing and contribution to the iCoWIN project.

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), was re-started and expanded in scope. The PITD postponed operations for much of the past two years to allow for a broad ranging evaluation and decisions on how to improve the programme. The PITD, managed by the Telecommunications and Social Informatics (TASI) research programme at the University of Hawaii, has four components: 1) basic forecaster training, to be implemented through the use of e-learning modules that will be readily available to anyone; 2) a month-long, instructor-led on-site training programme carried out at the US Weather Forecast Office in Honolulu; 3) training on the use of communication equipment; and 4) 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 46th Session of Typhoon Committee in February 2014 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 impact of tropical cyclones that affected Members in recent years, attention should also be given to capacity-building in the following aspects:

(1) assessment of rain-induced geological hazards such as landslides and mudflow;
(2) forecasting and warning systems for better coastal protection from hazards such as storm surge, river delta inundation and urban flooding; and
(3) 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 2014 can be found in Annex VII and the proposed AOP 2015 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 per the request of the 46th Session, aproposed plan for the Forecasters' Training Attachment arrangements in 2016-17 has been developed in consultation with WMO TCP and RSMC-Tokyo. The proposed plan is in Annex IX.

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.

Annex I

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

Annex II

SUMMARY OF TYPHOON COMMITTEE ROVING SEMINAR 2014
(Hong Kong, China, 3-5 November 2014)

I. Organization

1. The Typhoon Committee Roving Seminar (TCRS) 2014 with the theme on warning communication was successfully held on 3-5 November 2014 in Hong Kong, China. It was organized by ESCAP/WMO Typhoon Committee (TC) and hosted by the Hong Kong Observatory.

2. The Seminar was attended by 13 participants from Cambodia (2); Hong Kong, China (2); Laos PDR (1); Macao, China (1); Philippines (1); Republic of Korea (4); and Thailand (2). The four resource persons came from Hong Kong, China; Malaysia, and USA along with two representatives from the Typhoon Committee Secretariat. The list of participants is given in Attachment A.

II. Opening

1. The TCRS 2014 was officiated by Mr. Shun Chi-ming, Director of the Hong Kong Observatory. Mr. Shun delivered the opening speech, highlighting the urgent needs to act on climate change and prepare for extreme weather events arising from the changing climate. He also stressed the importance of partnership and stakeholder engagement in warning communication and disaster risk reduction, especially with the upsurge of the social media and big data concept.

2. The Secretary of TC in his address expressed his gratitude for the very active collaboration of the Hong Kong Observatory with the Typhoon Committee. He also stated that the series of TCRS is one of the main activities of the Typhoon Committee, coordinated by the TRCG since 2003 and the topics of TCRS 2014 are of great importance for improving the relationship between the warning issuers and the media professionals, who have an important role in the dissemination of official warnings, alerts and bulletins in case of eminent disasters.

III. Seminar Programme

1. Mr. Chip Guard of NOAA presented Topic A on “Effective early warning systems and risk communications”.

2. Mr. Ahmed Nadeem of Asia-Pacific Broadcasting Union presented Topic B on “Media liaison and crisis management for Disaster Risk Reduction”.

3. Ms. Sandy, M K Song and Mr. K L Lee of the Hong Kong Observatory presented

Topic C on “Warning communication strategies in the era of web technology and social media - Hong Kong Experience”.

4. A technical visit to the Tai Mo Shan Radar Station and the Ho Koon Nature Education cum Astronomical Centre was conducted on the afternoon of 5 November 2014.

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 the media and public liaison techniques and strategies learnt from this seminar would be useful for the operational work. Moreover, the experience sharing between participants could broaden their view on early weather warning and media communication. 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) selection of participants with relevant background and experience to facilitate the training progress;
   (b) notification for nomination to be issued as early as possible (say 2-3 months ahead) to allow more time for Members to identify suitable nominations and apply for visa;
   (c) involvement relevant stakeholders in the workshop when it covers common area like such as DRR, media and communication;
   (d) incorporating some levels of SOP development; and
   (e) including some scenario based exercises to get participants more involved in the progress.

V. Closing

1. The resource persons and participants expressed their gratitude to the Hong Kong Observatory for hosting this seminar and for the warm hospitality.

2. Dr. T C Lee, the Chair of TRCG, delivered the closing remark. He highlighted the need to engage the media and stakeholders and provide relevant meteorological training to the media when the opportunity arises. Then, Mr. Edwin Lai, the Assistant Director of the Hong Kong Observatory presented the attendance certificates to the participants.

3. The Roving Seminar was closed on 5 November 2014.

Attachment A of Annex II

List of Participants of the Typhoon Committee Roving Seminar 2014 (Hong Kong, China, 3-5 November 2014)

Members	Name of Participants
Cambodia	Mr. SOIMMonichoth
Cambodia	Mrs. TEPPhollarath
Hong Kong, China	Mr. CHOY Chun Wing
Hong Kong, China	Mr. TSOI Tze Shun
Lao PDR	Mr. Vanhdy DOUANGMALA
Macao, China	Mr. LOK Chan Wa
Philippines	Ms. Venus R. VALDEMORO
Republic of Korea	Dr. KANG Nam Young
Republic of Korea	Mr. KIM Dong-Jin
Republic of Korea	Mr. KANG Ju Hyeong
Republic of Korea	Ms. LIM Myeong-Soon
Thailand	Ms. Surangkana JONGSAWAT
Thailand	Ms. Praphasri UDJAI

Resource person	Mr. Chip Guard from (NOAA)
Resource person	Mr. Ahmed Nadeem (ABU)
Resource person	Ms. Sandy M K Song (HKO)
Resource person	Mr. K L Lee (HKO)
TCS	Mr. Olavo Rasquinho
TCS	Mr. Derek Leong

Attachment B of Annex II

Typhoon Committee Roving Seminar 2014
Seminar Programme

Dates and Venue: 3 – 5 November 2014, Conference Hall, Hong Kong Observatory, Hong Kong, China

Day 1 3 November 2014 (Monday)

Time	Tasks
0915-0945	Registration and Greeting
0945-1000	Welcome speeches: - Mr Shun Chi-ming, Director of the Hong Kong Observatory - Mr Olavo Rasquinho, Secretary of ESCAP/WMO Typhoon Committee
1000-1010	Introduction of speakers (by Dr Lee Tsz-cheung, TRCG Chair)
1010-1015	Group photos
1015-1045	Tea break
1045-1200	Participant self-introduction and experience sharing by Members Representatives (about 10-15 min each)
1200-1330	Welcome Lunch hosted by Hong Kong Observatory (at Hillview Café of Stanford Hillview Hotel)
1330–1445	Lecture Topic A (1) *Common Sense Aspects of Risk Communication* *by Chip Guard*
1445-1500	Tea Break
1500-1615	Lecture Topic B (1) *Role of media, importance of coordination and integration with other stakeholders* *by Ahmed Nadeem*
1615-1625	Short Break
1625-1730	Lecture Topic C (1) *Warning communication strategies - Hong Kong Experience* *by K L Lee*

Day 2 4 November 2014 (Tuesday)

Time	Tasks
0915-1030	Lecture Topic B (2) *Lessons learned from media integration* *by Ahmed Nadeem*
1030-1045	Tea Break
1045-1200	Lecture Topic A (2) *US Programs that Enhance Effective Early Warning* *by Chip Guard*
1200-1330	Lunch Break
1330-1445	Lecture Topic B (3) *Effective media communication, reaching the general public and the most vulnerable* *by Ahmed Nadeem*
1445-1500	Tea Break
1500-1615	Lecture Topic A (3) *Getting Effective Warnings to Isolated and Rural Locations* *by Chip Guard*
1615-1625	Short Break
1625-1730	Visit to Central Forecasting Office and Studio

Day 3 5 November 2014 (Wednesday)

Time	Tasks
0915-1030	Lecture Topic C (2) *Challenges and Opportunities of media communication (include social media)* *by Sandy Song*
1030-1045	Tea Break
1045-1200	Wrap-up Discussion
1200-1330	Lunch Break
1330-1730	Technical Visit to Tai Mo Shan Radar Station and Ho Koon Nature Education cum Astronomical Centre
1800	Return to Hotel and Farewell

TRCG ACTIVITIES EVALUATION FORM
Roving Seminar 2014
(Hong Kong, China, 3 – 5Nov 2014)

14 responses (out of 13 participants + 4 lecturers)
(not all questions answered by responders)

Part A: Event Logistics

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

Specific points for improvement, if any:

It could be improved if the lectures cover a higher diversity of content.
TC analysis and forecasting techniques should be included in the discussion items next time.

Part B: Technical Contents (from participants only)

A – Lectures by Chip Guard B – Lectures by Ahmed Nadeem C – Lectures by K. L. Lee and Sandy M. K. Song	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)			
TopicOrganization (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?

   - Methods for public communication
   - Necessity of providing more visualizations and applications to the public to receive warning messages easily
   - Importance of developing a good relationship with social media
   - Skills and experience on media communication in Hong Kong

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 5
   (b) in 2 – 5 years 3
   (c) in 5 years or more 0
   (d) no foreseeable opportunity 0

The participants of the Roving Seminar taking a group photo with the Director of the Hong Kong Observatory, Mr. Shun Chi-ming (4th to the right, 1st row), the Secretary of Typhoon Committee, Mr. Olavo Rasquinho (3rd to the right, 1st row) and the lecturers.

Participants visiting the Ho Koon Nature Education cum Astronomical Centre

Annex III

Summary of Awarded Research Fellowships

Subject	Fellow	Host	Period
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– 4Jul 2002
Numerical modelling on typhoon intensity change	Miss YU, Hui (China)	Kongju National Universityand 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. Sugunyanee YAVINCHAN (Thailand)	Kongju National Universityand 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 KIRTSAENG(Thailand)	National Meteorological Center,	2Nov – 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 (DPRKorea)	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

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Annex V

List of Resource Persons

Member	Specialties	Name	E-mail	Affiliation
(A) Data Assimilation				
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	gaosz1129@sina.com bingz@cma.gov.cn	National Meteorological Center
	Radar data quality control and assimilation scheme	GONG, Jiandong	gongjd@cma.gov.cn	National Meteorological Center
Hong Kong, China	TC data assimilation	W.K. WONG	wkwong@hko.gov.hk	Hong Kong Observatory
Japan	Satellite data assimilation	Kazumasa AONASHI	aonashi@mri-jma.go.jp	Meteorological Research Institute
	Satellite data assimilation	Naotaka UEKIYO	n-uekiyo@mri-jma.go.jp	Meteorological Research Institute
	Data analysis related to extratropical transition	Naoko KITABATAKE	nkitabat@mri-jma.go.jp	Meteorological Research Institute

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

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

(C) Forecasting				
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.
Republic of Korea	Track and intensity forecasting	PARK, Hoon	hoon@kma.go.kr	Korea Meteorological Administration
		KWON, H. Joe	hjkwon@kongju.ac.kr	Kongju National University
		HO, ChangHoi	hoch@cpl.snu.ac.kr	Seoul National University
		SOHN, Byung-Ju	sohn@snu.ac.kr	Seoul National University
	Long-range prediction of typhoon	KWON, H. Joe	hjkwon@kongju.ac.kr	Kongju National University
		HO, ChangHoi	hoch@cpl.snu.ac.kr	Seoul National University
Singapore	Seasonal prediction of typhoon	LIM, Tian Kuay	LIM_Tian_Kuay@nea.gov.sg	Meteorological Services Division, National Environment Agency

(C) Forecasting (cont'd)				
USA (western North Pacific)	TC analysis and forecasting, seasonal prediction, use of microwave imagery and scatterometer data, Dvorak technique	Mark LANDER Roger EDSON	mlander@uguam.uog.edu Roger.Edson@noaa.gov	University of Guam (WERI) National Weather Service, Forecast Office Guam
	Satellite data analysis, use of microwave imagery	Jeff HAWKINS	Jeff.Hawkins@nrlmry.navy.mil	Navy Research Laboratory, Monterey
USA (western North Pacific)	Satellite data analysis, use of microwave imagery, automated Dvorak Technique, AMSU	Chris VELDEN Derrick HERNDON	chris.velden@ssec.wisc.edu dherndon@ssec.wisc.edu	CIMSS, University ofWisconsin-Madison
	Satellite data analysis, use of microwave imagery, AMSU	John KNAFF	john.knaff@noaa.govmailto:	NOAA/NESDIS at CIRA, Colorado State University
	Satellite-based rainfall estimates in TCs (eTRaP)	Bob KULIGOWSKI Shelden KUSSELSON	bob.kuligowski@noaa.gov sheldon.kusselson@noaa.gov	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

Annex VI

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	9th 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	10th 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	11th Integrated Workshop	Research Fellowship	
			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	12th Integrated Workshop	Research Fellowship	
			3rd TRCG Forum / Meeting	Proposed to be in China (Shanghai) with themes to be confirmed

Annex VII

Summary & Review of TRCG AOP 2014

Summary and Review TRCG Annual Operating Plan 2014											
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 warning communications]	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 14,000	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 - 4th	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 (Lao PDR, Malaysia and Philippines) to RSMC Tokyo	nil	Provision of administrative and logistic support.	3rd	RSMC Tokyo, WMO	Assessment as given in RSMC Tokyo report.	USD 6,000	TCTF	Yes

Annex VIII

TRCG AOP 2015

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*
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]	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 14,000	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 (Cambodia, Thailand and Viet Nam) to RSMC Tokyo	nil	Provision of administrative and logistic support.	3rd	RSMC Tokyo, WMO	Assessment as given in RSMC Tokyo report.	USD 7,500	TCTF

Annex IX

Proposed plan of the RSMC Tokyo Attachment Training for 2016-17

1. Background

(i) The RSMC Tokyo Forecaster Training Attachment (originally Women Forecasters' Attachment to RSMC-Tokyo) first came under the care of TRCG in 2007. The nomination process and logistic arrangement of the training attachment are mostly handled among WMO Tropical Cyclone Programme (TCP), Typhoon Committee Secretariat (TCS) and RSMC-Tokyo.

(ii) On funding arrangements, WMO TCP and Typhoon Committee Trust Fund (TCTF) share the cost for Members' participation. In the past few years, WMO TCP covered the travel cost (round trip tickets and cost of transportation in Japan) of the trainees and TCTF was responsible for the lump sum.

(iii) In the Integrated Workshop in Beijing 2008, it was decided that the training attachment will no longer be restricted to women, though the participation of women forecasters will still be accorded higher priority.

(iv) According to the 2nd TRCG meeting held in Macao, China in 2013, the number of forecasters attending the attachment to RSMC-Tokyo every year was increased from two to three. For the attachment in 2014 and 2015, the target trainees will come from the six developing Members, namely Cambodia, Lao PDR, Malaysia, Philippines, Thailand and Viet Nam.

(v) In the 46thSession of the Typhoon Committee, TRCG was requested to develop a budgetary feasible plan in consultation with WMO on RSMC Tokyo attachment training for 2016-2017, to be made available for all Members, with higher priority on capacity development of less developed Members, for submission to the 47th Session of Typhoon Committee.

(vi) Members participated in the training attachment from 2010 to 2014 and proposed to participate in 2015 are listed in Appendix I.

2. Proposed plan for 2016-2017

To address the request of the 46th Session of Typhoon Committee, after consulting WMO TCP, TCS, RSMC-Tokyo and TRCG Members, the plan of the RSMC Tokyo Attachment Training for 2016-2017 is proposed as follows :

(i) *Number of trainees* : **Three**

(ii) *Nomination and priority of participation* :

(a) Invitation of nomination will be sent to **ALL** Typhoon Committee 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, it is proposed to increase the TCTF budget allocation for each participant from USD2000 to **USD2500**.

(iv) The above arrangements will be reviewed later in 2017 to formulate the plan for the 4-year period in 2018-2021.

Appendix I

List of Members participated in the RSMC Tokyo training attachment from 2010-2014 and proposed to participate in 2015

Year	**Participated Members**
2010	Hong Kong and Singapore
2011	Macao and Lao PDR
2012	Viet Nam and The Philippines
2013	Cambodia and Thailand
2014	Lao PDR, Malaysia, and The Philippines
2015	Cambodia, Thailand and Viet Nam