ESCAP/WMO Typhoon Committee
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23-25 February 2022
Lao PDR

FOR PARTICIPANTS ONLY
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ENGLISH ONLY

TRAINING & RESEARCH COORDINATION GROUP (TRCG)

(submitted by TRCG Chair)

Summary and Purpose of Document**:**

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

Action Proposed

The Committee is invited to:

(a) note the training and research activities, and progress of development in 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 work plan, Annual Operating Plan and budget of TRCG as outlined in Section 6 and Annexes VII and VIII of the APPENDIX B including the 4th TRCG Forum and TRCG Planning Meeting.

APPENDICES :
A : Draft text for inclusion at Session Report
B : TRCG Annual Report 2021

APPENDIX A

DRAFT TEXT FOR INCLUSION IN THE SESSION REPORT

Report of the Training and Research Coordination Group

The Committee took note of the progress made in training and research activities as presented in the TRCG Report 2021 (Appendix ##)

The Committee recognized that the RSMC Tokyo Training Attachments were successively held in 9-11 March 2021 and 11-13 January 2022 with a total of nearly 100 forecasters from TC and PTC Members participating in the two Attachments. The Committee thanked Japan and WMO TCP for continuous support in this capacity-building initiative.

The Committee noted the successful completion of the Sixth International Distance Training Course on Tropical Cyclone Monitoring and Forecasting hosted by CMA and conducted online from 25 November to 3 December 2021; and appreciated China on organizing this Typhoon Forecaster Training Programme for 64 local trainees and 133 forecasters from 30 NMHSs including TC and PTC Members.

The Committee thanked Hong Kong, China for hosting research fellowship project in 2021/2022.

The Committee was informed about the proposed plan of the 4th TRCG Forum and TRCG Planning Meeting to be held in Q4 of 2022 in conjunction with the 17th IWS. In view of COVID-19 situation, the Roving Seminar would be further postponed to Q2 of 2023 and would be hosted by Vietnam.

The Committee thanked TRCG's contribution to develop a proposal on a time-bound Pilot Project to be pursued under the collaborative agreement between the Committee and the Asia-Pacific Typhoon Collaborative Research Center (AP-TCRC).

The Committee appreciated TRCG's inputs 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 request Members to confirm their respective focal points as members of TRCG and update the list of resource persons as appropriate.

b. To endorse the priority training and research areas as proposed in TRCG Annual Report 2021.

c. To endorse the TRCG Work Plan for 2022-2023 and AOP 2022 (with Q1 of 2023) including the hosting of the 4th TRCG Forum cum TRCG Planning Meeting under the support of TCTF, and other budget requests which are incorporated into the budget proposal to be submitted by AWG.

APPENDIX B

TRAINING & RESEARCH COORDINATION GROUP (TRCG)
Annual Report 2021

Wai-Kin WONG (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 targets and various KRAs of the Committee's Strategic Plan.

2. Membership

2.1 The composition and members list of TRCG in 2021 are:

Chair:	Mr WONG Wai-Kin (Hong Kong, China)
Vice Chair:	Dr CHA Eun Jeong (Republic of Korea)
Members:	Mr So Im Monichoth (Cambodia)
	Mr QIAN Chuanhai (China)
	Mr Kang Bom Jin (DPR Korea)
	Mr HOSOMI Takuya (Japan)
	Dr Mayphou Mahachaleun (Lao PDR)

Mr Ho Kuok Hou (Macao, China)
Mr Hamray bin Muhammad Yazit (Malaysia)
Dr Bonifacio G. Pajuelas (Philippines)
Ms LEE Kyungho (Republic of Korea)
Mr Eugene Chong (Singapore)
Ms Patchara Petvirojchai (Thailand)
Mr Eric Lau (USA)
Dr Do Tien Anh (Viet Nam)

3. Major TRCG Activities in 2021

COVID-19

3.1 COVID-19 together with the outbreaks of successive coronavirus variants continue to affect the activities of various sectors extensively around the world. Travel restrictions, stringent quarantine, social distancing measures and border closures prevail in many countries/places. The planned activities of TRCG for 2021/22 have been further postponed or cancelled. Information about the impact of COVID-19 on each TRCG related programme are described in the subsequent paragraphs where appropriate.

TRCG Online Meeting

3.2 With new Members, Chair and vice-Chair, an online meeting was conducted on 14 July 2021 to review and update the planned activities of TRCG. The developments of draft agreement between the Committee and the Asia-Pacific Typhoon Collaborative Research Centre (AP-TCRC) under the Joint Task Team (JTT) were discussed.

The Fourth TRCG Forum

3.3 According to the TRCG's 4-year plan (2018-2021), the 4th TRCG Forum and TRCG Planning Meeting have been scheduled to late 2021 in conjunction with the 16th IWS. Due to COVID-19 situation, the 4th TRCG Forum would be postponed to the Q4 of 2022, in conjunction with the 17th IWS in ESCAP Conference Center, Bangkok, Thailand. The proposed theme remained as before, namely "Towards a typhoon resilient society". The plan of provisional budget and tentative schedule would be unchanged. TRCG Members have been requested to consider the keynote speakers and topics of technical presentation for the TRCG Forum. A physical TRCG Planning Meeting would also be held during the TRCG Forum.

Roving Seminar / Visiting Lecturers Programme

3.4 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.

3.5 With the prevailing of COVID-19 and after consulting the hosting Member, the Typhoon Committee Roving Seminar 2020 originally planned to conduct in Vietnam in October/November 2020 has been postponed with the same theme on "Impact based forecasting". The latest tentative plan will be discussed in Section 6.

Forecasters' Training Attachment

3.6 The RSMC Forecaster's Training Attachment originally for 2020 was successfully conducted online from 9 to 11 March 2021. There were 44 international participants from Hong Kong, China, Macao, China, Malaysia, the Philippines, Republic of Korea, Singapore and Thailand attended the training and delivered presentations to share their experience on tropical cyclone related services. RSMC New Delhi senior forecaster Ms Sunitha Devi attended as an invited presenter to deliver knowledge on Asian monsoon affecting tropical cyclones.

3.7 CMA's Typhoon Forecaster Training Programme, namely the Sixth International Distance Training Course on Tropical Cyclone Monitoring and Forecasting, has been scheduled to conduct online from 25 November to 3 December 2021 due to COVID-19 situation. The training focused on knowledge and skills of TC monitoring and forecasting, and enhancement of trainees' application of meteorological satellite data and ensemble forecast products. There were 133 international participants from 30 NMHSs and 64 local trainees that joined the training course.

3.8 In view of persisting COVID-19 pandemic, the RSMC Tokyo continued to organize the Attachment Training course remotely on 11 – 13 January 2022. Besides presentations on tropical cyclone analysis / forecasting and practical sessions, invited lectures were delivered by: (a) Dr SHIMADA Udai of the Meteorological Research Institute, JMA on improvement of rapid intensification prediction, and (b) Professor FUDEYASU Hironori of Yokohama National University on multiscale interactions of tropical cyclone formation. A total of 55 participants from China, Hong Kong, China, Republic of Korea, Macao, China, Malaysia, Thailand, the United States of America, and Vietnam attended the Training.

Research Fellowship Scheme

3.9 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 forecasters, experienced scientists or forecast system developers 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.

3.10 Due to COVID-19, there was only one fellowship research project conducted in Q1 of 2021 that hosted by Hong Kong, China on the topic entitled "Verification of tropical cyclone wind structure forecasts from global NWP models and ensemble prediction system" via a remote approach to discuss and implement the research studies. This HKO fellowship offer demonstrated a feasible approach or as a new option for carrying out the project remotely at participant's country / place, and to reduce substantial overheads in arranging administrative and logistical matters on physical travel, vaccination, and quarantine measures.

3.11 In 2021, the fellowship by Republic of Korea and China were cancelled again due to difficulties arisen from physical attachments under COVID-19. A fellowship was offered by Hong Kong, China entitled "Study on characteristics of rapid intensification (RI) in coastal tropical cyclones". The project was awarded to Mr Nawin SERMSOOK of Thai Meteorological Department and it was being conducted remotely in Q1 of 2022. Information of the latest project under the scheme and a summary of previous fellowships awarded can be found in Annex II. Publications and papers published in connection with the scheme are listed in Annex III.

Asia-Pacific Typhoon Collaborative Research Centre (AP-TCRC)

3.12 Following to the decision of 53rd Session of the Committee (TC53), the Joint Task Team (JTT) was established to develop: (a) draft agreement on technical cooperation between the Committee and AP-TCRC, and (b) a proposal of time-bound Pilot Project under TRCG as stipulated in paragraph 104 of the TC53 Final Report. Several members of TRCG including Chair and Vice-chair were nominated to join JTT and develop the two aforementioned documents. A tentative theme of the time-bound Pilot Project, namely "*Advances in application of new observations and technologies for improving tropical cyclone prediction in various time scales and related disaster prevention activities*" with three potential research topics have been identified. Further information can refer to the Session document WRD/TC.54/11 - "Report on Draft Agreement and Time-bound Pilot Project on Technical Cooperation between TC and AP-TCRC". Opportunities would also be taken to synergize TRCG activities with AP-TCRC to benefit the Members in capacity building and research areas identified in TRCG annual report, as well as prioritized training and research areas under the new Typhoon Committee Strategic Plan (2022-2026).

4. Resource Support for Research and Training

4.1 The available resource persons on specialized research subjects provided by Members are tabulated for reference in Annex IV.

4.2 The Pacific International Training Desk (PITD), funded by the USA's National Weather Service as part of the US contribution to the WMO Voluntary Cooperation Programme

(VCP) is currently managed by the Telecommunications and Social Informatics (TASI) Research Programme at the University of Hawaii. PITD provides one-on-one basic weather forecast training with an emphasis on the tropics. The training programme is focused on operational forecasting to enable its participants to prepare and disseminate locally-produced meteorological, hydrologic and climate products for their home countries. There are four components to the training, including: (a) eLearning Prerequisite Course, (b) On-Site Training Programme, (c) Communication Training, and (d) Advanced In-Island workshops on severe weather event topics. In 2021, several webinars were organized by PITD including the subjects on wave modelling, aviation forecasting, and effective communication in meteorology. Further information on the activities of PITD are available from http://pacificdesk.org/.

5. Prioritization of Training and Research Areas

5.1 Based on the discussion during the 3rd TRCG Meeting held in conjunction with the 12th Integrated Workshop (IWS) in Jeju on 31 October – 1 November 2017, the priority and need for training and research activities have been reviewed by TRCG Members and updated as follows:

(A) Meteorology

Monitoring

(i) application of Dvorak and microwave satellite image analysis techniques;
(ii) application of radar-based analysis/products for landfalling tropical cyclones and monsoon depressions; and
(iii) application of new observation technologies (such as aircraft reconnaissance, weather buoys, automatic weather network and mobile observations) in tropical cyclone monitoring and forecasting.

Forecasting and warning

(i) development and enhancement of tropical cyclone analysis and forecast techniques from nowcast to medium range, and seasonal to long-range predictions.
(ii) development of tropical cyclone structure and intensity forecasting techniques such as rapid intensification and wind structure;
(iii) application of ensembles of guidance from global and regional dynamical models, ensemble prediction systems, conceptual models, statistical models and systematic knowledge-based approach;
(iv) use of high-resolution numerical models with advanced data assimilation techniques;
(v) rainfall forecasting: development of nowcasting and very short-range forecasting techniques, and understanding of interaction between tropical cyclones and monsoon;
(vi) development of probability forecasting and extended outlook;
(vii) development of impact-based forecast and risk-based warnings; and

(viii) better understanding of wave, storm surge and marine forecasting.

(B) Meteorology and Hydrology

(i) application of meteorological and hydrological information for forecasting of river flooding and urban flash flood; and
(ii) geological hazards associated with heavy rain and tropical cyclones such as flash flood, mudslides and landslides.

(C) Meteorology and DRR

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

(D) Other Cross Cutting Topics

(i) better understanding of tropical cyclone related issues, such as rapid intensification, and impacts across different spatial and time scales, from mesoscale and synoptic analysis arising from El Nino / La Nina and global warming / climate change;
(ii) forecasting and warning systems for better coastal protection from multi-hazards such as storm surge, high winds, heavy rain, river delta inundation and urban flooding;
(iii) effective communication of warning messages to stakeholders, DRR users and communities at risk; and
(iv) utilization of big data, social media, crowdsourcing and artificial intelligence in tropical cyclone and weather monitoring, impact assessment, DRR and public education.

6. Future Directions and Strategies

6.1 The 4-year cycle of TRCG work plan from 2018 to 2021 has reached its final stages and plans for the new cycle (2022-2025/2026) were being consolidated. Research projects and training opportunities arising from the time-bound Pilot Project under the collaboration of the Committee with the Asia-Pacific Typhoon Collaborative Research Centre (AP-TCRC) would be incorporated in the TRCG's work plan and Annual Operating Plan.

6.2 According to TRCG 4-year plan (2018-2021), the 4th TRCG Forum and TRCG Planning Meeting was originally planned to conduct in late 2021 with the 16th IWS.

However, due to COVID-19, the 4th TRCG Forum would be postponed to late 2022 in conjunction with the 17th IWS. A proposed plan can be found in Annex V. TRCG will follow up closely with AWG and TCS to work out the details of the programme and activities (e.g. invited lectures and break-out discussion sessions) for the proposed theme "Towards a typhoon resilient society".

6.3 Furthermore, in view of situation of COVID-19 pandemic, the next Roving Seminar hosted by Vietnam would be scheduled to Q2 2023 with a proposed theme on "Impact based forecasting".

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/places.

6.5 The current arrangements in RSMC Forecasters' Training Attachment operated smoothly in the past few years and will generally be maintained. Starting from 2019, the self-funded participation by Members will be considered. The RSMC Attachment Training will continue to be conducted during the first quarter of the year for better allocation of manpower.

6.6 The possibility of involving hydrologists and DRR experts in RSMC Attachment Training, CMA Typhoon Forecaster Training, and TC Research Fellowship Schemes could be explored by corresponding Members. Moreover, training and research opportunities will be explored in collaboration with WGM, WGH, WGDRR, and WMO Training Centre in Nanjing, as well as various interested Members (and AP-TCRC in future when cooperation with the Committee would be established).

6.7 Review of the TRCG AOP 2021 (including the Q1 of 2022) can be found in Annex VI. A provisional work plan and the proposed AOP 2022 (including Q1 of 2023) are provided in Annex VII and Annex VIII respectively.

6.8 Given the large uncertainty in the COVID-19 pandemic, the planned TRCG activities in 2022 and early 2023 may still be subject to changes. TRCG will work closely with TCS and relevant Members to monitor the development of COVID-19 and develop feasible options or contingency plan for major events such as the TRCG Forum.

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. MANNOJI Nobutaka
	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. MANNOJI Nobutaka
	25 – 27 Nov	Kuala Lumpur	Operational Application of Multi-Model Ensemble Typhoon Forecasts	Prof. Johnny C.L. Chan Mr. MANNOJI Nobutaka
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. NAKAZAWA Tetsuo
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 NAGAI Yoshiki Prof. Xu-dong Fu Dr. Dong-ryul Lee
2016	15-17 Nov	Viet Nam	Storm Surge	Mr. KOHNO Nadao Mr. Author Taylor Mr. Dickson Lau
2018	20-22 Nov	Singapore	Application of Remote Sensing Technologies	Mr. YAMASHITA Koji Dr. Xiang Fang Mr. Ray Kong
2019	11-13 Nov	China	Quantitative precipitation estimation and forecasting (QPE/QPF)	Mr. W C Woo Mr. Erik Becker Prof. NAKAKITA Eiichi

Annex II

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 – 4 Jul 2002
Numerical modelling on typhoon intensity change	Ms. 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. Sugunyanee 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 with a very high resolution mesoscale model, and calibration of intensity of typhoon with Kalman filtering	Mr. HOA, Vo Van (Viet Nam)	Korea Meteorological Administration	Jun – Aug 2006
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 the Rapid Intensification of Tropical Cyclones in the South China Sea	Dr. Sukrit KIRTSAENG (Thailand)	National Meteorological Center, China Meteorological Administration	2 Nov – 29 Dec 2011
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. Aldczar D. Aurelio (The Philippines), Mr. Jose Frivaldo, JR. (The Philippines), 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
Training for typhoon forecast - Typhoon genesis and analysis - Typhoon track and intensity forecast - TAPS* operations and products	Benison Jay N. Estareja(The Philippines) Boonthum Tanglumlead(Thailand) Narongpon Thongsang(Thailand)	Korea Meteorological Administration	1 May to 14 May 2016

Tropical cyclone genesis forecast technique	Mr. Pak Sang Il and Mr. Kim Kum Song (DPR Korea)	Shanghai Typhoon Institute	24 October to 23 November 2016
Visiting editor for Tropical Cyclone Research and Review (TCRR)	Mr. Kamol Promasakha na Sakolnakhon (Thailand) Dr. Chen Yi-Leng (USA)	Shanghai Typhoon Institute	17-21 October 2016
Tropical Cyclone Size Climatology	Mr. Wei HONG (China)	Hong Kong Observatory	mid-Dec 2016 – 31 Jan 2017
Training for typhoon forecast - Typhoon genesis and analysis - Typhoon track and intensity forecast - TAPS* operations and products	Ms. Pensiri Trisataya and Ms. Chuanpit Ngernchalad (Thailand) Mr. Robert B. Badrina (The Philippines) Ms. Hoang Thi Mai (Viet Nam)	Korea Meteorological Administration	16-29 April 2017
Observational Study on Intensity and Structure of Offshore Typhoon for EXOTICCA	Mr. Jaral Yiemwech (Thailand) Ms. Khanh Hoa Bui Thi (Viet Nam)	Shanghai Typhoon Institute	September 2017
Benefit evaluation of Typhoon disaster prevention and preparedness	Mr. Nursalleh Chang (Malaysia)	Shanghai Typhoon Institute	September 2017
Visiting Editor for Tropical Cyclone Research and Review	Mr. Somkuan Tonjan (Thailand) Dr. Doan Quang Tri from (Viet Nam)	Shanghai Typhoon Institute	February 2018
Tropical Cyclone Precipitation Verification	No nomination was received	Shanghai Typhoon Institute	NA
Short-term Rainfall Forecast for Tropical Cyclone Using Himawari-8 Data and NWP Model Products	Applicant who was accepted for the fellowship withdrew from the offer	Hong Kong Observatory	NA
Benefit evaluation of Typhoon disaster prevention and preparedness	Mr. Nursalleh K Chang (Malaysia)	Shanghai Typhoon Institute	2 May – 1 June 2018
Training for forecasters: - Tropical meteorology & climatology - Processing observed meteorological variables - Typhoon analysis and monitoring- - Producing typhoon information using TAPS and TOS - Seasonal typhoon prediction	Mr. Nuthakit Singhaphet, (Thailand) Mr. Tran Quang Nang, Typhoon (Viet Nam) Dr. Guanbo Zhou (China) Mr. Robb Prieto Gile (the Philippines) Mr. Wan Muhammad Hafiz Bin Husin, (Malaysia)	Korea Meteorological Administration	23 April to 4 May 2018

Short-term Rainfall Forecast for Tropical Cyclone Using Himawari-8 Data and NWP Model Products	Ms. Nguyen Thu Hang (Viet Nam)	Hong Kong Observatory	January – March 2019
Training for forecasters: - Tropical meteorology & climatology - Processing observed meteorological variables - Typhoon analysis and monitoring- - Producing typhoon information using TAPS and TOS - Seasonal typhoon prediction	Ms. Reyes Sheilla Mae R. (the Philippines) Mr. Tran Van Vu (Viet Nam)	Korea Meteorological Administration	20 May to 14 June 2019
Visiting Editor for Tropical Cyclone Research and Review	Prof. Kimberly Wood (USA) Prof. Shishir Dube (India)	Shanghai Typhoon Institute	24-29 March 2019 13-19 October 2019
Integrated Precipitation Estimator using Radar and Satellite (IPERS) for Tropical Cyclone Rainfall (TC) Analysis and Nowcasting	Mr. Benison Jay N Estareja (the Philippines)	Hong Kong Observatory	January – February 2020
Verification of tropical cyclone wind structure forecasts from global NWP models and ensemble prediction system	Ms LU Xiaoqin (China)	Hong Kong Observatory	Q1 2021
Study on the characteristics and model forecast performance of rapid intensification (RI) of near-landfall tropical cyclones (TCs)	Mr Nawin Sermsook (Thailand)	Hong Kong Observatory	Q1 2022

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Annex IV

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, ensemble radar assimilation	K. K. Hon	kkhon@hko.gov.hk	Hong Kong Observatory
Japan	Satellite data assimilation	OKAMOTO Kozo	kokamoto@mri-jma.go.jp	Meteorological Research Institute
	Data assimilation	ISHIBASHI Toshiyuki	ishibasi@mri-jma.go.jp	Meteorological Research Institute
Republic of Korea	Typhoon bogussing	HA, Ji-Hyun	jhha80@korea.kr	Korea Meteorological Administration
	Satellite data analysis	CHUN, Hyoung-Wook	chunhw@korea.kr	Korea Meteorological Administration
	Radar data analysis	HA, Jong-Chul	bellfe@korea.kr	Korea Meteorological Administration

Member	Specialties	Name	E-mail	Affiliation
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	Mesoscale and ensemble TC modelling	K.K. HON	kkhon@hko.gov.hk	Hong Kong Observatory
Japan	Ensemble track forecasting	KAWABATA Yasuhiro	kawabata@mri-jma.go.jp	Meteorological Research Institute
	TC-ocean interaction (incl. mixed-layer ocean and ocean surface wave modelling)	WADA Akiyoshi	awada@mri-jma.go.jp	Meteorological Research Institute
	TC modelling	TSUJINO Satoki	satoki@mri-jma.go.jp	Meteorological Research Institute
	Storm surge / wave modelling	KOHNO Nadao	nkohno@mri-jma.go.jp	Meteorological Research Institute

Member	Specialties	Name	E-mail	Affiliation
Republic of Korea	Global NWP model	CHOI, Hyun-Joo	hjchoi81@korea.kr	Korea Meteorological Administration
	Ensemble track forecasting	SHIN, Hyun Cheol	sinhyo@korea.kr	Korea Meteorological Administration
	Storm surge / wave modelling	CHANG, Pil-Hun	phchang@korea.kr	Korea Meteorological Administration
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
	Radar and satellite nowcasting in TC	W.K. WONG	wkwong@hko.gov.hk	Hong Kong Observatory
	TC intensity, structure and landfall impact	S.T. CHAN	stchan@hko.gov.hk	Hong Kong Observatory

Member	Specialties	Name	E-mail	Affiliation
	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	Satellite data analysis, use of microwave imagery, AMSU	OYAMA Ryo	oyama@met.kishou.go.jp	Japan Meteorological Agency
	Doppler radar data analysis	SHIMADA Udai	ushimada@mri-jma.go.jp	Meteorological Research Institute
Republic of Korea	Track and intensity forecasting	LEE, Kyung-Ho	khlove1119@korea.kr	Korea Meteorological Administration
	Long-range prediction of typhoon			
Singapore	Seasonal prediction of typhoon	CHOW Kwok Wah	CHOW_Kwok_Wah@nea.gov.sg	Meteorological Service Singapore National Environment Agency
USA (western North Pacific) 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

Member	Specialties	Name	E-mail	Affiliation
	Satellite data analysis, use of microwave imagery	Jorel TORRES Dan LINDSEY	Jorel.Torres@colostate.edu Dan.Lindsey@colostate.edu	NOAA/NESDIS at CIRA, Colorado State University
	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 of Wisconsin-Madison
	Satellite data analysis, use of microwave imagery, AMSU	John KNAFF	john.knaff@noaa.gov	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	H.Y. YEUNG	hyyeung@hko.gov.hk	Hong Kong Observatory
	TC information visualization and display systems	C.K. PAN	ckpan@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 V

Proposed plan for the 4th TRCG Forum/Planning Meeting in 2022 in conjunction with the 17th IWS of the Typhoon Committee

1. Date/location

Q4 of 2022, in conjunction with the 17th IWS to be held in ESCAP Conference Center, Bangkok, Thailand.

2. Proposed theme :

The proposed theme for the 4th TRCG Forum will be "***Towards a typhoon resilient society***" which echoes the vision of the Tokyo Statement announced in 2019.

3. Draft programme

It is proposed that the 4th TRCG Forum and 16th IWS will be a 4 to 5-day event (2 days Forum + 2 to 2.5 days IWS (including the post-IWS AWG Meeting)).

<table>
<tr><th>Time</th><th>Day 1</th><th>Day 2</th><th>Day 3</th><th>Day 4</th><th>Day 5</th></tr>
<tr><td rowspan="2">AM</td><td>Opening Ceremony</td><td rowspan="2">Technical presentations
(7-8 presentations, 20-min each)</td><td rowspan="2">WGM, WGH, WGDRR and TRCG Meetings
(parallel sessions)</td><td>WGM, WGH, WGDRR and TRCG Meetings - Cont'd
(parallel sessions, if required)</td><td>Reserved half day for Plenary Session
(if required)</td></tr>
<tr><td>Keynote presentations
(3-4 presentations, 30-min each)</td><td>Plenary Session
(1) Reports of WGM and WGH</td><td>Post-IWS AWG Meeting
(AWG Members only)</td></tr>
<tr><td rowspan="2">PM</td><td>Keynote presentations
(3-4 presentations, 30-min each)</td><td>Topical discussions
(3-4 Breakout groups)</td><td rowspan="2">WGM, WGH, WGDRR and TRCG Meetings - Cont'd
(parallel sessions)</td><td rowspan="2">Plenary Session
(2) Reports of WGDRR and TRCG
(3) Discussion of AOPs and Strategic Plan
(4) Other business
(5) Closing</td><td rowspan="2"></td></tr>
<tr><td>Technical presentations
(3-4 presentations, 20-min each)</td><td>Wrap up discussions
(Plenary)</td></tr>
</table>

4. Presentation/discussion arrangements:

The Forum is expected to include Keynote/Technical Presentations. About 6-8 Keynote Presentations will be delivered by invited speakers (nominated by WG Chairs). Other Technical Presentations (around 10-12) will be contributed by IWS participants / WG representatives (nominated by TC Members, similar to the technical presentations of IWS). Similar to previous Forums, "topical discussions" in breakout group approach will also be arranged for participants to discuss concerned topics with the invited speakers.

5. TRCG Planning Meeting (Day 3)

The TRCG Planning Meeting is a quadrennial gathering of the TRCG Members to discuss the new 4-year plan and priority areas of TRCG during 2022 - 2025/2026.

6. Budget:

Additional funding to support the participation of up to 8 invited speakers and about 9 TRCG Members (others will be supported by IWS budget) is estimated to be about USD 26,000.

7. Contingency arrangements

To be discussed and confirmed with AWG and TCS based on the development of the COVID-19 pandemic.

Annex VI

Review of Training and Research Coordination Group (TRCG) Annual Operating Plan 2021 (including Q1 of 2022)											
Objective Number	**KRA**	**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 1-3	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Attachment of forecasters from TC Members to RSMC Tokyo	nil	Provision of administrative and logistic support.	Q1	RSMC Tokyo, WMO	Assessment as given in RSMC Tokyo report.	USD 11,000*	TCTF and Member self-funded	Yes
2	KRA 1-3	To facilitate technology transfer among TC Members through research and development initiatives.	Research Fellowship	WGM, WGH and WGDRR	Provision of administrative and logistic support.	Q1 of 2022	TC Members	Publication of research findings and development output in TCRR or other journals.	Fellowship offered by voluntary hosts.	TC Members	To be conducted online
3	KRA1-3	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Up to 4 forecasters from TC to CMA Forecaster Training	nil	Provision of administrative and logistic support.	Q3-Q4	CMA	Assessment as given in CMA report.	Participation will be supported by CMA	CMA	To be conducted online
4	KRA 1-3	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	4th TRCG Forum and Planning Meeting (in conjunction with the 16th IWS)	WGM, WGH and WGDRR	Provision of administrative and logistic support.	Q4	-	Feedback from evaluation forms to be completed by a target audience of about 30 people.	USD 26,000	TCTF	Postponed to Q4/2022 with the 17th IWS
5	KRA 1-3	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Attachment of forecasters from TC Members to RSMC Tokyo	nil	Provision of administrative and logistic support.	*Q1 of 2022*	RSMC Tokyo, WMO	Assessment as given in RSMC Tokyo report.	USD 11,000	TCTF and Member self-funded	To be conducted online

TRCG Work Plan for 2021 – 2022 (including Q1 of 2023)

Year	Quarter	Typhoon Committee Activity	Training and Research Activities (*activities organized by parties other than TRCG)	Themes (if any) / Remarks
2021	**Q1**	TC-53 (Video conferencing)	RSMC Tokyo Attachment Training	9-11 March (Online)
			Research Fellowship	HKO fellowship in Jan-Mar
	Q2		Research Fellowship	KMA and STI fellowships were cancelled
	Q3			
	Q4	16th IWS (Video conferencing)	TRCG Forum / 4th TRCG Meeting	Postponed to Q4 2022 in conjunction with 17th IWS
			Roving Seminar	Postponed to Q4 2022 in Vietnam
			CMA Training Programme	25 November – 3 December (Online)
2022	**Q1**	TC-54 (Video conferencing)	RSMC Tokyo Attachment Training	11 – 13 January (Online)
			Research Fellowship	HKO fellowship in Jan-Mar
	Q2		Research Fellowship	KMA fellowship in April-May * will be subjected to COVID-19 situation
	Q3			
	Q4	17th IWS (TBC)	** *Typhoon Forecasting Techniques Workshop in collaboration with WGM*	** *tentatively in October 2022*
			TRCG Forum / 4th TRCG Meeting	Proposed theme: "Towards a typhoon resilient society"
			Roving Seminar	*Postponed to Q2 2023* in Vietnam. Proposed theme: "Impact based Forecasting"
			CMA Training Programme	TBC
2023	**Q1**	TC-55	RSMC Tokyo Attachment Training	TBC

** to be hosted by Malaysia under PP1 of WGM AOP 2022

Training and Research Coordination Group (TRCG) Annual Operating Plan 2022 (including Q1 of 2023)										
Objective Number	**KRAs**	**Objective**	**Action**	**Other WGs Involved**	**TCS Responsibility**	**Expected Quarter Completed**	**Other Organizations Involved**	**Success Indicators**	**Funding Required**	**Funding Sources**
1	KRA 1-3	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Attachment of forecasters from TC Members to RSMC Tokyo	nil	Provision of administrative and logistic support.	Q1	RSMC Tokyo, WMO	Assessment as given in RSMC Tokyo report.	USD 11,000*	TCTF and Member self-funded
2	KRA 1-3	To facilitate technology transfer among TC Members through research and development initiatives.	Research Fellowship	WGM, WGH and WGDRR	Provision of administrative and logistic support.	Q1 of 2022	TC Members	Publication of research findings and development output in TCRR or other journals.	Fellowship offered by voluntary hosts.	TC Members
3	KRA1-3	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Up to 4 forecasters from TC to CMA Forecaster Training	nil	Provision of administrative and logistic support.	Q3-Q4	CMA	Assessment as given in CMA report.	Participation will be supported by CMA	CMA
4	KRA 1-3	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	4th TRCG Forum [Towards a typhoon resilient society] TRCG Planning Meeting (in conjunction with the 17th IWS)	WGM, WGH and WGDRR	Provision of administrative and logistic support.	Q4	-	Feedback from evaluation forms to be completed by a target audience of about 30 people.	USD 26,000	TCTF
5	KRA 1-3	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 [Impact based forecasting]	WGM, WGH and WGDRR	Provision of administrative and logistic support.	*Postponed to Q2 of 2023*	-	Feedback from evaluation forms to be completed by a target audience of about 30 people.	*USD 16,000 (Q2 of 2023)*	TCTF
6	KRA 1-3	To enhance TC Members' capacity and knowledge in operational tropical cyclone forecasting.	Attachment of forecasters from TC Members to RSMC Tokyo	nil	Provision of administrative and logistic support.	*Q1 of 2023*	RSMC Tokyo, WMO	Assessment as given in RSMC Tokyo report.	USD 11,000	TCTF and Member self-funded