



REPORT OF THE FIFTY-SIXTH SESSION OF TYPHOON COMMITTEE

Kuala Lumpur • Malaysia
27 February - 01 March 2024

56

TABLE OF CONTENTS
Fifty-Sixth Session of Typhoon Committee

	PART I – DECISIONS OF THE COMMITTEE	1
	PART II – PROCEEDINGS OF THE COMMITTEE	3
I.	ORGANIZATION OF THE SESSION Opening of the Session (agenda item 1)	3
II.	REPORT ON CREDENTIAL COMMITTEE (agenda item 2)	4
III.	ELECTION OF OFFICERS (agenda item 3)	4
IV.	ADOPTION OF THE AGENDA (agenda item 4)	4
V.	TECHNICAL PRESENTATION (agenda item 5) 5.1 Summary of the 2023 typhoon season 5.2 Verification of tropical cyclone operational forecast in 2023 typhoon season 5.3 Other presentations on EW4ALL initiative and technical advancements	5-6
VI.	REPORT ON TC'S KEY ACTIVITIES AND OVERVIEW SUMMARY OF MEMBERS' REPORTS (agenda item 6) 6.1 Report on TC's Key Activities and Main Events in the Region 6.2 Overview Summary of Members' Reports	7
VII.	REVIEW OF THE ACTIVITIES OF RSMC TOKYO AND AMENDMENTS OF TOM (agenda 7) 7.1 Review of the activities of RSMC Tokyo 2023 7.2 Typhoon Committee Operational Manual (TOM)	7-9
VIII.	REPORTS OF TC WORKING GROUPS AND TRCG (agenda 8) 8.1 Working Group on Meteorology (WGM) Report 8.2 Working Group on Hydrology (WGH) Report 8.3 Working Group on Disaster Risk Reduction (WGDRR) Report 8.4 Training and Research Coordination Group (TRCG) Report	9-16
IX.	REPORTS OF TCS AND AWG (agenda 9) 9.1 Typhoon Committee Secretariat (TCS) Report 9.1.1. Revamp of TC Website 9.2 Advisory Working Group (AWG) Report	16-17
X.	UPDATE ON THE SSOP III PROJECT (agenda item 10)	17
XI.	AOP ANALYSIS QUESTIONNAIRE EW4ALL (agenda 11)	18
XII.	PUBLICATIONS (agenda 12)	18
XIII.	PROGRAMME FOR 2024 AND BEYOND (agenda item 13) 13.1 Replacement of Typhoon Names	19
XIV.	COORDINATION WITH OTHER ACTIVITIES OF THE WMO TROPICAL CYCLONE PROGRAMME (agenda item 14)	20
XV.	SUPPORT REQUIRED FOR THE COMMITTEE'S PROGRAMME (agenda item 15) 15.1 Typhoon Committee Trust Fund (TCTF) by WMO 15.2 In-kind Contributions 15.3 Approval of Typhoon Committee Trust Fund 2024/2025 Budget	21
XVI.	DATE AND PLACE FOR THE 19th INTEGRATED WORKSHOP (agenda item 16)	22
XVII.	DATE AND PLACE FOR THE 57th TC Session (agenda item 17)	22
XVIII.	HOSTING OF THE 20th INTEGRATED WORKSHOP and 58th TC Session (agenda item 18)	22
XIX.	OTHER BUSINESS (agenda item 19)	22
XX.	ADOPTION OF THE REPORT (agenda item 20)	22
XXI.	CLOSURE OF THE SESSION (agenda item 21)	22

**REPORT OF THE FIFTY-SIXTH SESSION
OF TYPHOON COMMITTEE**

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PART I – DECISIONS OF THE COMMITTEE

1. The Committee decided to:
 - a. Approve Mr. Muhammad Helmi ABDULLAH, Director General of Malaysian Meteorological Department, as Chairperson and Mr. Nathaniel SERVANDO, Administrator of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) as Vice-Chairperson of the Committee. Mr. Christopher BRENCHLEY, Director, RSMC Honolulu, USA, was elected as Chairperson of the Drafting Committee.
 - b. Consider the key tropical cyclone impacts on Members in 2023 and review the initiatives and activities to be pursued in support of the 19 TC Priorities to mitigate future impacts.
 - c. Adopt Section 2 of the Summary of Members' Reports 2023 as an "Executive Summary" to be distributed to Members' governments for information and reference.
 - d. Approve the Typhoon Committee Operational Manual (TOM) with the amendments provided in the **Appendix X**.
 - e. Approve the recommendations submitted by Working Group on Meteorology (WGM) as expressed in **paragraph 49**.
 - f. Approve the recommendations submitted by Working Group on Hydrology (WGH) as expressed in **paragraph 52**.
 - g. Approve the recommendations submitted by Working Group on Disaster Risk Reduction (WGDRR) as expressed in **paragraph 56**.
 - h. Approve the recommendations submitted by Training and Research Coordination Group (TRCG) as expressed in **paragraph 64**.
 - i. Approve the suggestions submitted by Typhoon Committee Secretariat (TCS) as expressed in **paragraph 71**.
 - j. Approve the recommendations submitted by Advisory Working Group (AWG) as expressed **paragraph 75**.
 - k. To continue to support the amended submission for an SSOP III project to the UN ESCAP Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness as expressed **paragraph 77**.
 - l. Request TCS to disseminate questionnaires using online sharing platforms in the future.
 - m. Endorse the recommendations by Working Group Chairs in collaboration with TCS for the Summary Report on Analysis of AOP Implementation Questionnaire as presented in Appendix XVIII.
 - n. Approve the revamp of the TC website and the enhanced format of the TC Newsletter.

- o. Approve **JAMJARI, TSING-MA, TOKEL, ONG-MANG, AMUYAO, GOSARI, HODU, SARBUL** and **LUC-BINH** as replacement names for NALGAE, MA-ON, KOMPASU, HINNAMNOR, MALAKAS, MEGI, NORU, RAI and CONSON, respectively, in the list of the names of tropical cyclones.
- p. Approve the retirement of the names of tropical cyclone DOKSURI, SAOLA and HAIKUI and request TCS to issue letters to relevant Members (Republic of Korea, Socialist Republic of Viet Nam and China) to provide replacement names in accordance with the Committee's procedure.
- q. Approve the 2024/2025 Budget as presented below (see Appendix XXIII for detail):

By Group	Apr-Dec2024/ Jan-Mar2025
	Proposed
TCS	38,500.00
ALL WGS (IWS ONLY)	55,000.00
TRCG	27,000.00
WGM	39,500.00
WGH	29,000.00
WGDRR	24,500.00
Total Proposed Budget in 2024/2025	213,500.00

- r. Accept the kind offer of China to host the 19th IWS. The proposed dates are XX November 2024 in Shanghai, China. The final date and place will be confirmed in due course by China and later communicated to TCS.
- s. Accept the kind offer of the Philippines to host the 57th Session of TC in 2025, tentatively in the third week of February 2025. The final date and place will be confirmed in due course by the Philippines and later communicated to TCS.
- t. Request TCS to communicate to ESCAP and Members about the possibility of hosting of the 20th IWS and later communicate the findings.
- u. Accept kind offer of the Republic of Korea host the 58th Session in 2026. The final date, place and arrangements will be confirmed by Republic of Korea to TCS and communicated later to Members.

PART II – PROCEEDINGS OF THE COMMITTEE

I. ORGANIZATION OF THE SESSION

2. The Fifty-Sixth Session of the ESCAP/WMO Typhoon Committee (TC) was held at the Swiss-Garden Hotel, Kuala Lumpur, Malaysia, from 27 February to 01 March 2024.

The Session was attended by **97** participants from 12 of 14 Members of the Typhoon Committee, namely: China; Hong Kong, China; Japan; Lao People's Democratic Republic (PDR); Macao, China; Malaysia; Philippines; Republic of Korea; Singapore; Thailand; United States of America (USA); and the Socialist Republic of Viet Nam. Representatives of United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), World Meteorological Organization (WMO) and Typhoon Committee Secretariat (TCS) also attended the Session.

The Session was attended by observers from Brunei Darussalam Meteorological, India Meteorological Department, Asian Disaster Reduction Center (ADRC), International Federation of Red Cross and Red Crescent Societies (IFRC), Sun Yat-Sen University of China, Tohoku University of Japan and CTI Engineering International Co., Ltd of Japan. The list of participants is given in Appendix I.

Opening of the Session (agenda item 1)

3. The opening ceremony of the Session began at 9:30 am on Tuesday, 27 February 2024. Ms. Siti Nurhaida BASRI, Local Organizing Committee of Malaysia, conducted the opening ceremony.
4. The following speeches were delivered at the opening ceremony and are provided in Appendix II:
 - a) **Mr. LEONG Weng Kun**, Director, Macao Meteorological and Geophysical Bureau (SMG) of Macao SAR and TC55 Chairperson
 - b) **Prof. Celeste SAULO**, Secretary-General of WMO, by video recorded.
 - c) **Ms. Soomi HONG**, Associate Economic Affairs Officer, Information and Communications Technology Disaster Risk Reduction, ESCAP
 - d) **Dr. DUAN Yihong**, Secretary of the Typhoon Committee.
 - e) **Mr. Muhammad Helmi ABDULLAH**, Director General Malaysian Meteorological Department
 - f) **Dr. CHING Thoo A/L Kim**, Secretary General of Natural Resources and Environmental Sustainability, declared the Session opened at 10:15am.
5. Due to the COVID19 restrictions, the Dr. Roman L. KINTANAR Award for typhoon related disaster mitigation Ceremony was conducted and plaque delivered from 2019 to the present year. The two winners of 2023, Dr. Roman L. KINTANAR Award: **(i) Weather Forecast Office (WFO Guam), National Weather Services, NOAA, USA** in recognition of their early outreach and ongoing updates of key information to prepare the people of Guam and Commonwealth of the Northern Mariana Islands CNMI) for the damaging effects of Super Typhoon Mawar in 2023; and **(ii) The Malaysian Meteorological Department (MET Malaysia), Malaysia**, in recognition of their outstanding contribution in enhancement of weather monitoring, early warning capabilities and dissemination of information and strengthening of regional cooperation

II. REPORT ON CREDENTIAL COMMITTEE (agenda item 2)

6. Dr. DUAN Yihong, TC Secretary, reviewed the Credential Letters submitted by Members, presented the Summary Report of the Credential Committee which can be consulted at Appendix III.

III. ELECTION OF OFFICERS (agenda item 3)

7. Mr. Muhammad Helmi ABDULLAH, Director General of Malaysian Meteorological Department, was elected Chairperson and Mr. Nathaniel SERVANDO, Administrator of PAGASA of the Philippines was elected Vice-Chairperson of the Committee.
8. Mr. Christopher BRENCHLEY, Director, RSMC Honolulu, USA, was elected Chairperson of the Drafting Committee.

IV. ADOPTION OF THE AGENDA (agenda item 4)

9. The Committee adopted the agenda as shown in Appendix IV.

V. TECHNICAL PRESENTATIONS (agenda item 5)

5.1 Summary of the 2023 typhoon season

10. The Committee noted with appreciation the review of the 2023 typhoon season provided by RSMC Tokyo in Appendix V, for which a summary is presented in paragraphs 11 – 22 below:
11. Over the western North Pacific and the South China Sea, 17 named tropical cyclones occurred in 2023, which was below the 30-year average of 25.1 (1991 – 2020). Ten of these reached typhoons (TY) intensity, which was below the 30-year average of 13.3. A total of five formed after September, which was the fewest since records began (average: 11.6). The lower number of formations during the peak period may have contributed to the reduced annual total. This may be partially attributable to the monsoon trough (an area of low atmospheric pressure extending from the South China Sea to the Philippines in autumn) being weaker than normal and convective activity in the area being relatively inactive. However, further investigation is needed.
12. The 2023 typhoon season started with Sanvu (2301), which formed over the sea southwest of the Marshall Islands at 00 UTC on 19 April 2023. The last-named tropical cyclone of the year was Jelawat (2317), which formed in December over the sea east of the Philippines and dissipated west of Mindanao.
13. The mean genesis point of named tropical cyclones was 15.1°N and 137.9°E, representing a south-eastward deviation from the 30-year average (16.3°N and 135.9°E). The coordinates were 17.0°N and 138.2°E for summer (June to August), representing a east-southeastward deviation from the 30-year summer average (18.5°N and 134.2°E), and 16.3°N and 131.8°E for autumn (September to November), representing a westward deviation from the 30-year autumn average (16.2°N and 137.0°E). The south-eastward shift of the mean genesis point in summer is presumed to be partly associated with the El Niño event that started in 2023.
14. The mean duration of tropical cyclones with tropical storm (TS) intensity or higher was 6.1 days, which was longer than the 30-year average of 5.2. The mean duration of tropical cyclones with TS intensity or higher in summer was 6.7 days, which was longer than the average of 5.0, and that of TCs with TS intensity or higher in autumn was 5.4 days, which matched the average. The longer-than-average duration in summer is consistent with the results of statistical studies on the prevailing El Niño event.

15. The only named tropical cyclone in April was Sanvu (2301), which formed as a tropical depression (TD) over the sea southwest of the Marshall Islands (here, tropical cyclones locations are expressed as the area of TD formation unless otherwise noted).
16. The only named tropical cyclone in May was Mawar (2302), which formed over the sea around the Caroline Islands and further developed to typhoon intensity, bringing widespread devastation and flooding to central and northern parts of Guam. It brought heavy rainfall to the Pacific side of western and eastern Japan, caused flooding and landslides. Mawar reached peak intensity with maximum sustained winds of 115 kt and a central pressure of 900 hPa (a record for 2023).
17. The only named tropical cyclone in June was Guchol (2303), which formed over the sea east of the Philippines and reached TY intensity.
18. Three named tropical cyclones (Talim (2304), Doksuri (2305) and Khanun (2306)) in July formed over the sea east of the Philippines. Talim reached severe tropical storm (STS) intensity before making landfall on the Leizhou Peninsula. It brought rain to parts of China, Macao (China), Hong Kong (China) and Viet Nam. Doksuri reached TY intensity before making landfall on Southern China and bringing severe rainfall to wide areas of China and the Philippines. Khanun reached TY intensity before making landfall on Korea and bringing heavy rain and strong wind to Japan, Korea and parts of China. Despite being far from the Philippines, the enhanced Southwest Monsoon brought in prolonged periods of heavy rainfall in the area.
19. Six named tropical cyclones formed in August. The first, Lan (2307), formed over the sea, west of Minamitorishima Island and reached TY intensity before making landfall on Shionomisaki in Japan's Wakayama Prefecture. Dora (2308) crossed longitude 180° east over the sea south of Midways with TY intensity. Saola (2309) formed over the sea east of the Philippines and reached TY intensity and bringing heavy rain, strong wind and storm surges to partial areas of China, Macao (China), Hong Kong (China), the Philippines. Damery (2310) formed over the sea south Minamitorishima Island. Haikui (2311) formed over the sea west of the Mariana Islands and crossed Taiwan island with TY intensity, and bringing torrential rain to partial areas of China, Macao (China) and Hong Kong (China). Kirogi (2312) formed around the Chuuk Islands.
20. Two named tropical cyclones formed in September. The first, Yun-yeung (2313), formed over the sea south of Okinawa, bringing heavy rain to Japan. Koinu (2314) formed over the sea east of the Philippines and reached TY intensity, bringing rain and strong wind to parts of China, Macao (China), Hong Kong (China) and the Philippines.
21. Two named tropical cyclones formed in October. The first, Bolaven (2315), formed over the sea west of the Marshall Islands, and after reaching TY intensity transitioned into an extratropical cyclone and crossed longitude 180°E south of Aleutians. Sanba (2316) formed over the South China Sea, bringing rain to parts of China.
22. The year's last-named tropical cyclone, Jelawat (2317), formed in December around the Caroline Islands. It weakened to TD intensity over Mindanao Island and dissipated over the island's southwestern part.

5.2 Verification of tropical cyclone operational forecast in 2023 typhoon season

23. The Committee took note with appreciation of the report on Verification of tropical cyclone operational forecast in 2023 typhoon season provided by the Shanghai Typhoon Institute (STI) in Appendix VI and presented by Ms. HUANG Xin.
24. Verification of tropical cyclone operational forecast in 2023 focuses on the forecast performance of 17 tropical cyclones that occurred in the western North Pacific in 2023. For track forecast, mean position errors for the most subjective and objective forecasts at lead times of 24, 48, and 72 hours, respectively, are smaller than the ones in 2022. ECMWF-IFS

and NCEP-GFS show the best performance among the global numerical weather prediction (NWP) models, especially at longer prediction lead times.

25. In 2023, the AI-based weather forecasting systems, including FENGWU, FUXI and PANGU, have been installed and began trial operation. Most AI-based weather forecasting systems outperformed ECMWF-IFS in track forecast.
26. For intensity forecast, the AI-based weather forecasting systems are not competitive with the NWP models, because they greatly underestimated tropical cyclone intensity.
27. Besides the routinely operational forecast verification, the STI/CMA also added verification of precipitation and wind forecasts in China. Meanwhile, STI/CMA is looking forward to more improvement in the Asia-Pacific regions through cooperation with the Typhoon Committee Members.

5.3 Other presentations on EW4ALL initiative and technical advancements

28. The technical presentations were presented as shown below. The Committee expressed its appreciation to all the speakers and requested the TCS to post all the technical presentations on the TC website. The following technical presentations were presented:
 - 1) Global Disaster Risk Reduction Project for EW4All Initiative – Dr. Chihun LEE, NDMI, Republic of Korea
 - 2) Assessment and verification of Artificial Intelligence Models on Tropical Cyclone Forecasting in 2023 - Mr. LUI Yuk-sing, Scientific Officer, Hong Kong Observatory (HKO)
 - 3) Brief Introduction to Guangdong Emergency Early Warning Release Platform – Dr CHENG Zhengquan, China
 - 4) Changes in tropical cyclones associated with the climate Oscillations - Dr. Wattana KANBUA, Director of Meteorological Development Division, Thai Meteorological Department (TMD)
 - 5) IFRC Early Warnings in Asia Pacific – Mr. Luis RODRIGUES, IFRC, Asia Pacific
 - 6) Introduction to Typhoon Prediction Research at the Japan Meteorological Agency - Dr. YAMAGUCHI Munehiko, Senior Researcher, Meteorological Research Institute, Japan Meteorological Agency, Japan
 - 7) Enhancing Prediction of Precipitation and Winds during Typhoon Approaches – Ms. Seonghee WON, Korea Meteorological Administration (KMA), Republic of Korea
 - 8) Key technologies and recent performance of CMA-TRAMS - Dr ZHANG Xubin, CHINA
 - 9) Utilization of the QZSS DC Report and GLIDE Number System in Support of the Early Warnings for All Initiative - Mr. Gerald POTUTAN, ADRC, Japan
 - 10) Preliminary Explorations on Data-driven AI Models in Tropical Cyclone Prediction by Dr QIAN Qifeng, China
 - 11) Invention of a Smart-phone based Two-way Pinpoint Alert System to implement the Sendai Global Target G and achieve “No one left behind”- Prof. ONO Yuichi, International Research Institute of Disaster Science (IRIDeS), Tohoku University, Japan
 - 12) Tropical Cyclone Characteristics stratified by Genesis Environment and Introduction of TRC - Prof. FUDEYASU Hironori, Typhoon Science and Technology Research Center (TRC), Yokohama National University, Japan
 - 13) Prepare for the fourth assessment report on impacts of climate change on tropical cyclones in the Typhoon Committee region - Dr HUANG Xin, China

- 14) The Recent Progress of EXOTICCA-II: a Lidar Observational Study in the Downtown of Shanghai during Typhoon Muifa - Dr TANG Jie, China

VI. REPORT ON TC'S KEY ACTIVITIES AND OVERVIEW SUMMARY OF MEMBERS' REPORTS (agenda item 6)

6.1 Report on TC's Key Activities and Main Events in the Region

29. The Committee took note of the report of the Typhoon Committee Chairperson on the TC's Key Activities and Main Events in the Region, 2023. (Appendix VII)
30. The Committee expressed appreciation to the contributions of Mr. LEONG Weng Kun and Mr. Muhammad Helmi ABDULLAH, as the chairperson and Vice Chairperson of the Committee.

6.2 Overview Summary of Members' Reports

31. The Committee took note of the Summary of Members' Reports 2023 highlighting the key tropical cyclone impacts on Members in 2023 and the major activities undertaken by Members under the TC Priorities and components during the year. (Appendix VIII)
32. The Committee expressed appreciation to AWG Chair for preparing the Summary of Members' Reports and the observations made with respect to the progress of Members' activities in support of the 19 Priorities identified in the TC Strategic Plan 2022-2026.

RECOMMENDATIONS of AWG

33. Consider the key tropical cyclone impacts on Members in 2023 and review the initiatives and activities to be pursued in support of the 19 TC Priorities to mitigate future impacts.
34. Adopt Section 2 of the Summary of Members' Reports 2023 as an "Executive Summary" to be distributed to Members' governments for information and reference.

VII. REVIEW OF THE ACTIVITIES OF RSMC TOKYO AND AMENDMENTS OF TOM (agenda item 7)

7.1 Review of the activities of the Regional Specialized Meteorological Center (RSMC) Tokyo 2023

35. The Committee noted the review of RSMC advisories, products and operational activities and changes made in 2023. It noted the RSMC official forecast verification results for 17 tropical cyclones that reached TS intensity or higher formed in 2023. Refer to the Appendix IX for details.
36. The Committee noted with appreciation the following:
- a) the changes made to RSMC advisories, products and operational/coordination activities in 2023, especially the update to probability-circle radii of tropical cyclone track forecasts.
 - b) the operation of RSMC Tokyo's Numerical Typhoon Prediction (NTP) website, and noted changes made in 2023 as well as those planned for the near future.
 - c) RSMC Tokyo's maintenance of a dedicated platform for enhanced communication between operational forecasters and RSMC Tokyo, as well as the sharing of advance-notice updates. In the 2023 typhoon season, 13 inquiries relating to tropical cyclones have been submitted, with related discussion helping to clarify tropical cyclone status and forecasts.
 - d) the contribution of RSMC Tokyo (which also serves as an International Civil Aviation Organization (ICAO) Tropical Cyclone Advisory Centre (TCAC Tokyo)) to compliance

with ICAO Standards and Recommended Practices (SARPs), addressing the provision of TCA information in text, graphical and the ICAO Meteorological Information Exchange Model (IWXXM) 3.0 formats via multi-platform channels such as the TCAC Tokyo website.

- e) the ongoing contribution of RSMC Tokyo to the regional SSWS, especially the provision of various products including storm surge forecast distribution maps and time-series charts for selected stations, as well as week-range probabilistic wave forecasts for significant wave heights and peak wave periods. The Committee again encouraged Members to make their sea level observation data available in order to support verification activity.
 - f) RSMC Tokyo's publication of Technical Review Nos. 25 and 26 in May and December 2023, respectively, and the Annual Report on the Activities of the RSMC Tokyo - Typhoon Center 2022 in January 2024.
 - g) the operation of Himawari-8/9 geostationary meteorological satellites and further welcomed the intention of RSMC Tokyo to continue providing Himawari products as well as technical support for using them.
 - h) RSMC Tokyo had conducted the 23rd Attachment Training course from 15 to 26 January 2024, hosting four forecasters from Lao PDR, Malaysia, the Philippines and Vietnam, and three (self-funded) from Hong Kong (China), Macao (China) and the Republic of Korea. In accordance with a decision made at the third joint session of the Panel on Tropical Cyclones (PTC) and the Typhoon Committee, the RSMC Tokyo, ESCAP, WMO, and PTC secretariats invited two forecasters from PTC Members: Saudi Arabia and Sri Lanka.
 - i) RSMC Tokyo's regular monitoring of observation data exchanges in 2023 as per the TOM - Meteorological Component, with results to be provided by March 2024. The Committee expressed appreciation to all Members providing special observation data to Committee Members in 2023, and further encouraged all Members to conduct additional observation as requested by TOM.
 - j) RSMC Tokyo's contribution to WMO Programmes and related activities, and its promotion of cooperation with other RSMCs for the Tropical Cyclone Programme. These included participations in the Advisory Group on Tropical Cyclones (AG-TC) under the Standing Committee on Disaster Risk Reduction and Public Services (SC-DRR), provision of real-time forecast guidance to Typhoon Committee Members, and contribution to capacity building within the framework of the Severe Weather Forecasting Programme – Southeast Asia (SWFP-SeA) and the Expert Team of Marine Services (ET-MS) under WMO Regional Association II. The Committee also noted with thanks the Center's coordination with adjacent RSMCs for ensuring consistent information delivery across basins.
37. The Committee welcomes RSMC Tokyo's efforts in seeking further approaches to increase the benefits of ensemble forecast utilization, including improvement of current operational products.
38. The Committee noted the progress of the regional radar network development project, under which experimental exchange of radar composite data among Japan, Thailand and Malaysia started in 2016. The project has been expanded, and three more Members (Lao PDR, the Philippines and Viet Nam) joined in 2018. Singapore joined the regional radar data exchange in April 2023. The Committee noted with appreciation the progress made on regional radar data exchanges, especially the creation of a sample regional composite map based on Members' radar data.
39. The Committee noted the activities of the project for enhancing the utilization of Himawari-8/9 products, under which technical support for developing Rapidly Developing Cumulus Area (RDCA) identification using Himawari-8/9 data is provided. The Committee noted with appreciation the ongoing discussion, support and efforts contributed by project Members (Malaysia, Singapore, Thailand and Vietnam). The Committee also noted that HCAI (High-resolution Cloud Analysis Information) data and AMV-based Sea-surface Wind data are provided to NMHSs every 10 minutes.

40. The Committee was informed that RSMC Tokyo had started tropical cyclone satellite re-analysis in 2012 for the period from 1981 onward to enable evaluation and improvement regarding the quality of the Current Intensity (CI) number in satellite tropical cyclone analysis. The Committee was also pleased to note that the Center had completed reanalysis along with basic quality checking (QC) for the period from 1987 to 2016 and had begun to share the whole dataset for this period with Members in December 2023.

7.2 Typhoon Committee Operational Manual (TOM)

41. The Committee noted that the TOM rapporteur requests WMO to publish and upload the 2024 edition of TOM on the Tropical Cyclone Programme (TCP) Website as submitted by the Rapporteur, with the amendments given in Appendix X.
42. The Committee also noted that the tropical cyclone forecast competency in the region is kept the same when added to the Compendium of WMO Competency Frameworks (WMO-No. 1209).
43. The Committee expressed its appreciation to the rapporteur for update of TOM.

VIII. REPORTS OF TC WORKING GROUPS AND TRCG (agenda item 8)

44. Parallel sessions of the Working Groups on Meteorology, Hydrology and Disaster Risk Reduction were convened during the 18th IWS to review progress of work during the past year, identify priorities for cooperation and make recommendations to the Committee.
45. The outcomes of the parallel sessions of the three Working Groups were reported to the plenary session as given in the following sections.

8.1. Meteorological Component

46. The Committee took note of the Member's activities and major progress and issues in Meteorological Component in 2023 as reported by Members at the 18th IWS.
47. The Committee reviewed the activities of Members in implementing the TC Strategic Plan and its annual operating plan in relation to Meteorological Component during past year, details of which are presented in Appendix XI.

CONCLUSIONS of WGM:

48. Based on the information provided by Members and the respective coordinators of the operating plans, and discussions during the Parallel Meeting, the following conclusions were reached:
 - a. Members have made progress in the implementation of the TC Strategic Plan during the year 2023.
 - b. Members made progress during 2023 in tropical cyclone monitoring and communication systems, data assimilation and numerical weather prediction systems, tropical cyclone forecast-aiding systems, and scientific understanding of tropical cyclone activities.
 - c. With the help of TCP of WMO and TCS, and the sincere cooperation of all Members and the effective efforts of the WGM focal points, WGM has successfully completed the tasks in 2023 as listed in Annex I of Appendix C.
 - d. Based on the discussion on the operating plans for 2023 during the 18th IWS, it was concluded to adopt the operating plans as follows:
 - i. The POP items 1-4 will be continued in 2024.

- ii. The AOP items 1-10 will be continued in 2024.
 - iii. The PP item 1 will continue and will be moved to AOP item 11 in 2024.
 - iv. The PP item 2 will continue and will be moved to AOP item 12 in 2024.
 - v. A new PP item 1 “Promoting Technical Exchange of AI Applications in Tropical Cyclone Analysis and Prediction” was proposed by HKO for 2024.
- e. The total budget proposed by WGM, which will be concurred at the AWG meeting, for undertaking the operating plans (AOPs, POPs and PPs) in 2024 is USD39,500.
 - f. The proposed WGM 2024 operating plans (AOPs, POPs and PPs) including the actions, the success indicators, coordinators and budget is listed in Annex II of Appendix C.

RECOMMENDATIONS of WGM

49. On the basis of the outcomes of the WGM Parallel Session at the 18th IWS and subsequent discussion, the WGM made the following recommendations:
- a. To request KMA to improve typhoon summer prediction techniques and share knowledge/encourage Member’s cooperation.
 - b. To request CMA to encourage TC Members to use the Collaborative Discussion (CoDi) platform especially for tropical cyclones in the basin of South China Sea.
 - c. To request CMA to enlarge the usage of CoDi platform for the International Training Course on Tropical Cyclone and re-examination of tropical cyclone track and intensity.
 - d. To request STI to publish the TCRR Journal on a quarterly basis, and to improve the editorial procedure and Journal’s influence.
 - e. To request STI to issue the summary report on verification of tropical cyclone forecast products in 2023 typhoon season in the western North Pacific.
 - f. To request STI to strengthen international cooperation and promote the exchange of TC data and verification techniques.
 - g. To request JMA to provide the current operational tropical cyclone genesis guidance products using ensemble forecast.
 - h. To request JMA to seek further approaches to increase the benefit of ensemble forecast utilization, including improvement of the current operational TC genesis guidance products.
 - i. To request CMA to improve the performance of CMA-TRAMS model.
 - j. To request JMA to further refine quality control techniques applied to the participants’ radar networks to improve their quality of radar composites, and to implement and refine MET Malaysia and TMD’s QPE calibration using rain-gauge with technical assistance of JMA.
 - k. To request JMA to support applicants to join the experimental regional radar data exchange in the future, and to share the progress with the RA II/V WIGOS radar project in Southeast Asia.
 - l. To request JMA to hold follow-up technical meeting(s) upon receipt of progress reports on the project Development of Regional Radar Network (AOP3) from participants.

- m. To request MET Malaysia and HKO to conduct training attachment for two participants from two TC Members on Radar Integrated Nowcasting System (RaINS) in 2024.
- n. To request JMA to add storm surge time series prediction points if requested by Members, and to publish verification results of storm surge predictions.
- o. To request JMA to encourage Members to provide complete hourly sea level data of at least one year and sea level observations during storm surge events for providing accurate astronomical tides at the stations and verification of storm surge predictions.
- p. To request CMA to conduct more scientific experiments in different scenes, and to share experiment datasets under support of the Asia-Pacific Typhoon Collaborative Research Center (AP-TCRC).
- q. To request CMA to improve forecast skills based on experimental data from EXOTICCA-II.
- r. To request JMA to improve Rapidly Developing Cumulus Area (RDCA) algorithm through the joint development with technical assistance by JMA to MET Malaysia.
- s. To request JMA to provide support for development of RDCA by MSS, TMD and VNMHA.
- t. To request JMA to hold follow-up technical meeting upon receipt of progress reports on the project Enhancing Utilization of Himawari 8/9 Products (AOP7) from participants.
- u. To request CMA to improve the tropical cyclone satellite position accuracy during nighttime and engage more sensors.
- v. To request CMA to facilitate the possibility of a specific seminar on satellite application.
- w. To request JMA to support AOP7 of WGH by providing 1-month and 3-month ensemble NWP model data, necessary for the project and available, to ICHARM.
- x. To request JMA to continue sharing knowledge and experience on awareness raising through lectures for online workshops and meetings of IFI project.
- y. To request JMA to promote awareness with hydrological authorities to both local governments and public, including the appropriate use of products.
- z. To request KMA to introduce GK2A high level products related to typhoon forecast and share the technique using GK2A data.
- aa. To request CMA to prepare for the fourth assessment report on impacts of climate change on tropical cyclones in the Typhoon Committee region.
- bb. To request KMA to enhance the monitoring of tropical cyclone development and intensification in the WNP using drifting buoys.
- cc. To request KMA to fill the missing ocean observation over the main region of tropical cyclone generation, and enhance the utilization of observed ocean data to analyze the influence of oceanic environment in tropical cyclone activities.
- dd. To endorse the proposed action plans in 2024 (including 4 POPs, 12 AOPs and 1 PP) as listed in Annex II of Appendix C – Summary Report for the WGM Parallel Meeting at

the 18th IWS, which summarizes the above recommendations with additional action items.

- ee. To endorse the WGM budget request included in the budget proposal to be submitted by AWG for TC's approval.
- ff. To appoint Dr. ISHIHARA Koji as the rapporteur of TOM.
- gg. To nominate Dr. Wattana KANBUA (Thailand) to replace Dr. Vicente MALANO (Philippines) as the new TC expert for ISSC of AP-TCRC.
- hh. To encourage project coordinators of all working groups to submit the outcome (research paper) to the TCRR journal.
- ii. To encourage more members to join the collaborative research of AP-TCRC and apply the funding of STCRF of AP-TCRC.

8.2. Hydrological Component

- 50. The Committee reviewed the activities of the Members related to the implementation of the decision of TC 56th Session and its Annual Operating Plan (AOP) for the hydrological component during the past year. Details can be found in the Appendix XII.

CONCLUSIONS of WGH

- 51. On the basis of the discussion and outcomes at 12th WGH working meeting and the parallel session of TC 18th IWS, participants recognized the importance in following aspects for further direction of WGH:
 - a) WGH 12th working meeting was held as a hybrid meeting. The number of participants reached 58, the historical high. The meeting had remarkable effectiveness and efficiency. It is a consensus on that, the annual working meeting is very important for WGH to review and push forward hydrological activities and is very necessary to prepare IWS and annual session. WGH continues to encourage Members to host its working meeting, and more Members now are willing to contribute to hosting working meeting for WGH.
 - b) Flood Hazard Mapping and Flood Risk Mapping are vital components for appropriate land use planning in flood-prone areas and emergency response in real-time flood events. Flood Hazard Mapping product already exists, the WGH recognized that the "Flood Risk Mapping with Ground/Satellite Observation Data", proposed by MLIT, Japan will be a great added benefit to TC Members as a new AOP, and encourage interested Members to take part in this meaningful cooperation project.
 - c) WGH recognized that continuing to enhance the regional cooperation with ESCAP, WMO RA II CPH, PTC and other regional organizations could be benefit the activities on hydrological component in TC Members. WGH is willing to make a synergy between TC WGH and WMO RA II CPH under WMO umbrella, and reached consensus on the four potential cooperation areas to align with WGH AOPs in future, including: (1) Flood/inundation/risk mapping; (2) Flash Flood, Debris Flow, Landslide forecasting and early warning; (3) Assessment of the Variability of Water Resources in a Changing Climate; and (4) AI and big data application in Hydrological data quality control and modelling. In near future, TC WGH and WMO RA II CPH will take tangible measures and activities to realize the identified action items.
 - d) WGH recognized that the review of AOP progresses is needed to ensure the efficiency of activities of the working group and to increase the participation of Members.
 - e) Due to the success of the TC WGH's collaboration framework with WMO RA II CPH, several countries have expressed their interest/willingness to join in the collaboration. This enhancement to the visibility of the TC across the regional

associations is very important and the WGH will take tangible measures to continue, strengthen and expand the collaboration under the umbrella of ESCAP and WMO.

RECOMMENDATIONS of WGH

52. On the basis of the deep discussion and communication, participants agreed to submit the following recommendations to the Committee at TC 56th Annual Session:
- a. To request USD29,000 from TCTF in 2024 for supporting overall WGH activities for 2024 calendar year.
 - b. To thank RID, Thailand and MLIT, Japan for co-hosting WGH 12th Working Meeting on 20-22 September, 2023.
 - c. To thank China for offering to host WGH 13th working meeting with funding support in 2024, and also thank MLIT, Japan for its willingness of support the hosting of WGH working meeting.
 - d. To request USA and Japan to consider the feasibility of co-hosting WGH 14th working meeting of 2025 in Guam.
 - e. To request China to extend AOP4 (OSUFFIM-II) one more year to the TC 57th Session in the early of 2025.
 - f. To approve the proposal on “Flood Risk Mapping with Ground/Satellite Observation Data” from MLIT, Japan as an AOP of WGH in the period of 4 years from 2024 to 2027.
 - g. To request China to submit two proposals as WGH AOPs for 2025 and beyond for discussion at 13th WGH working meeting in 2024.
 - h. To thank TCS for coordinating WGs’ AOP Implementation Questionnaire Review.
 - i. To thank TCS for updating TC webpage, especially opening webpages for WGs.
 - j. To thank WMO for the coordination of cooperation between TC WGH and WMO RA II CHP.
 - k. To approve the appointments of the WGH liaison/focal point for enhancing the future cooperation with WMO RA II CPH, and one TC WGH Member (working in flood forecasting) as focal point in the Flood Forecasting Initiative Advisory Group (FFI-AG).
 - l. To continue focusing on improving the ability to forecast hydrological phenomena and provide measures for the effectiveness of the improvements.

8.3. Disaster Risk Reduction Component

53. The Committee took note of the activities; relevant major progress and issues related to Working Group on Disaster Risk Reduction (WGDRR) as presented in WGDRR report 2023.
54. The Committee took note of the outcome of Parallel Session of WGDRR at the 18th IWS that was held in Bangkok, Thailand from 28 November to 01 December 2023, which are included the progress of implementation of Annual Operating Projects of (AOPs) 2023 of WGDRR. Details can be found in the **Appendix XIII**.

CONCLUSIONS of WGDRR

55. Based on the information provided by the Members, the reports presented by project coordinator/leader and findings of the parallel session on WGDRR, the following conclusions were reached:
- a. With the release of travel restrictions, all the face-to-face meetings were resumed such as the Knowledge Sharing program in the Philippines and Lao PDR, the installation of Early Warning Systems in Danao city and the Municipality of Argao in the Philippines. NDMI will continue to host projects which aims to exchange information and experience sharing related to DRR such as policies and technologies among the members.
 - b. NDMI will proceed with the 2024's Global DRR Project for the Philippines. Olongapo city in Zambales province and Municipality of La Paz in Abra province were decided as target areas for the project in 2024.
 - c. STI/CMA will continue the Benefit Evaluation of typhoon disaster prevention and preparedness" project in 2024. STI/CMA fellowship program will resume and 1-2 fellowships are expected for a budget of USD6,000 to work in this project.
 - d. The 18th WGDRR annual meeting was hosted by NDMI Korea on 13 June, 2023, to discuss the issues related to WGDRR activities. WG reviewed the AOPs implementation with the budget expenditure in 2023 and proposed the plans for 2024. Besides the TC DRR members, ADRC, WMO and ESCAP were also invited to the meeting to give informative and valuable comments for WG. As a result, participating members agreed to allocate USD3,000 to NDMI for hosting the meeting.
 - e. WGDRR decided to continue conducting the projects which can improve capacities of disaster management among TC Members through the project of information exchange and sharing such as participation in the important DRR world conferences, organizing the expert team to selected member state and using effective platform to exchange DRR information, as well as holding the WGDRR annual meeting. Discussion for Member focal points and guidance for using Glide will be arranged and members are kindly invited to visit the <https://glidenumber.net> for further information.
 - f. At the 18th WGDRR annual meeting, HKO expressed that they can continue contributing educational videos related to DRR for TC DRR public education use. The project will continue to be led by HKO.
 - g. For implementation of the proposed projects in 2024, WGDRR proposed the request of USD24,500 to be allocated TCTF for the following items:
 - i. To allocate USD12,500 budget of TCTF in 2024 for Capacity Building/Knowledge Sharing in WGDRR.
 - ii. To allocate USD3,000 budget of TCTF in 2024 to supporting the WGDRR Annual Meeting in 2024 in ROK.
 - iii. To allocate USD6,000 budget of TCTF in 2024 for STI Benefit Evaluation of Typhoon Project
 - iv. To allocate USD3,000 budget of TCTF in 2024 for Making Education Video related to DRR.

RECOMMENDATIONS of WGDRR

56. On the basis of the conclusion of discussion and deliberations, the WGDRR made the following recommendations:

- a. To allocate USD24,500 budget of TCTF in 2024 for supporting overall WGDRR activities for 2024 calendar year.
- b. To request NDMI to organize the team to the selected member for the project of capacity building and knowledge sharing in DRR.
- c. To request NDMI to continue supporting the development and improvement of the early warning and alert systems related to typhoon disaster in the participating members.
- d. To request NDMI, to continue supporting and hosting the WGDRR Annual Meeting in 2024 in ROK.
- e. To request STI, China to continue conducting the research of the project of benefit evaluation of typhoon disaster prevention and preparedness.
- f. To encourage the Members to share information related to DRR on the established forum of TC Website and GLIDE system.
- g. To request the HKO to continue providing WGDRR with a video related to typhoon disaster or severe weather and translate it into English version (voiceover and subtitle) for Members use on DRR public education.
- h. To request the cooperation of the Synergized Standard Operating Procedures for Coastal Multi-Hazard Early Warning System Phase 3 project (SSOP III) with WGDRR.
- i. To appoint the new Director-General of NDMI (expected to be appointed in March 2024) as WGDRR Chair and to reappoint Mr. Marcus AYDLETT and Dr. CHOI Woojung to serve as WGDRR Co-Vice Chairs.

8.4. Training and Research Coordination Group (TRCG)

57. The Committee took note of the progress made in training and research activities as presented in the TRCG Report 2023, including the successful completion of the 4th TRCG Forum in conjunction with 18th IWS in Bangkok, Thailand. (Appendix XIV)
58. The Committee expressed its appreciation to TCS and ESCAP for hosting the 4th TRCG Forum.
59. The Committee took note of the planning and recommendations made in the TRCG Planning Meeting held on 30 November 2023 after the 4th TRCG Forum, particularly with respect to the revised priority research and training areas and the formulation of a new 4-year work plan for 2024-2027. The Committee thanked TRCG members for their continuing effort and commitment in support of TRCG initiatives.
60. The Committee thanked China, Hong Kong, China and Republic of Korea for hosting research fellowship programs in 2023.
61. The Committee took note of the successful RSMC Tokyo training attachment of forecasters in January 2024, and thanked JMA and WMO TCP for continuously supporting this capacity-building initiative.
62. The Committee was informed of the proposed changes with respect to the organization and implementation of future Roving Seminars.
63. The Committee appreciated TRCG's input in support of training and research activities in connection with TC's cross-cutting projects.

RECOMMENDATIONS of TRCG:

64. Based on the discussion in the TRCG Planning Meeting on 30 November 2023 and as presented in the TRCG Report 2023, TRCG recommended the Committee to:
 - a. Take note of TRCG's Report 2023, including report on the 4th TRCG Forum.
 - b. Endorse the priority training and research areas as proposed in TRCG's Report 2023.
 - c. Approve the changes in the arrangement with respect to the Roving Seminar.
 - d. Endorse the TRCG's Work Plan for 2024 – 2027.
 - e. Endorse TRCG's AOPs 2024.

IX. REPORTS OF THE TCS AND AWG (agenda item 9)

9.1 Activities of TCS

65. The Committee took note of the report of the TCS, as expressed in Appendix XV.
66. The Committee expressed gratitude to Members for their contributions to the Typhoon Committee Trust Fund and in-kind donations, while encouraging ongoing support for the Committee's activities.
67. The Committee thanks Macao China, through SMG, for supporting TCS in the past years, and for increment of the endowment fund to TCS in 2024 and for cooperating to implement the Agreement between the Government of the Macao Special Administrative Region of the People's Republic of China and the ESCAP/WMO Typhoon Committee regarding Administrative, Financial and Related Arrangements for the Typhoon Committee Secretariat.

CONCLUSIONS of TCS

68. Establishing a proficient and influential Secretariat is vital for the Committee to carry out its annual decisions, coordinate WG and Member activities, and achieve its Strategic Plan goals. TCS, as the executive body, is resolute in implementing measures to enhance its internal capacity, cultivating professional competence and efficiency with the active participation in regional activities, and collaboration with regional/international organizations, among other aspects.
69. Resource mobilization is a key focus in the Committee's Strategic Plans. Since the 44th Session in Hangzhou, China in 2012, TCS collaborates with WMO and ESCAP for resource mobilization activities. The latest Strategic Plans (2022-2026) emphasize facilitating resource mobilization with support from international organizations and funding agencies. TCS will continue efforts to mobilize resources for the Committee's activities.
70. The latest Strategic Plans (2022-2026) highlight that for the Committee to achieve its mission, it should focus on the effectiveness and efficiency of its activities, including monitoring and evaluating Annual Operating Plans (AOPs). The review of the TC AOP implementation questionnaire produced valuable findings, benefiting future enhancements in AOP implementation. TCS is committed to improving the effectiveness, efficiency, and international cooperation of the Committee.

71. Based on the experience of routine operation in 2023 and in the past years, and considering needs and potential developments, TCS made the following suggestions to TC 56th Session for consideration:
- a. To allocate USD33,500 from TCTF for supporting overall TCS activities; USD5,000 for supporting IWS and related activities.
 - b. Supporting TCS to enhance resource mobilization efforts.
 - c. Promoting internship opportunities for TC Members.
 - d. Approve the revamp of the TC Website.
 - e. Request WGs, in collaboration with TCS, to enhance the effectiveness and efficiency of their activities by monitoring and evaluating their initiatives, including Annual Operating Plans (AOPs), aligning with the stated mission in the Strategic Plans 2022-2026 and UN Early Warning for All initiative.

9.2 Activities of AWG

72. The Committee was informed of the activities and major issues discussed at the AWG Meetings in 2023 and prior to the 56th Session of the Typhoon Committee (Appendix XVI).
73. The Committee was informed of the proposed budget for 2024/2025 and noted that there was no special budget proposed in 2024/2025.
74. The Committee expressed its appreciation to AWG for offering advice and support to TC Chairperson and TCS in following up the key issues identified at the last Session and in coordinating key TC activities.

RECOMMENDATIONS of AWG

75. AWG recommended the Committee to:
- a. Recognize and thank Macao, China for their leadership and great effort in hosting the 55th Session of the Typhoon Committee virtually in March 2023.
 - b. Recognize and thank ESCAP, TCS and TRCG for their exceptional effort in coordinating, preparing and hosting the highly successful 4th TRCG Forum/18th Integrated Workshop at the ESCAP - UN Conference Center, Bangkok, Thailand from 28 November to 1 December 2023.
 - c. Appreciate the contribution of Mr. HOSOMI Takuya to the AWG in the past years and endorse Dr. ISHIHARA Koji, Head of RSMC Tokyo, as the new co-Vice Chair of the AWG.
 - d. Take note of the progress and recommendations made in the planning and implementation of Typhoon Committee's activities, including the preparation of the budget for 2024/2025.

X. REPORT ON PROPOSAL OF SSOP III (agenda item 10)

76. The Committee noted the request to submit an amended proposal for the SSOP III to the UN ESCAP Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness (Appendix XVII).

77. The Committee took note the recommendation of the Proposal of SSOP III to continue to support the amended submission for an SSOP III project to the UN ESCAP Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness.
78. The Committee noted that the representative of the ESCAP Trust Fund required the identification of a project manager prior to the resubmission of the SSOP III proposal. Therefore, if any Member has interest in providing an in-kind project manager for the SSOP III project contact the proposal coordinator.

XI. AOP ANALYSIS QUESTIONNAIRE EW4ALL (agenda item 11)

79. The Committee reviewed the summary report on AOP implementation questionnaire and suggestions submitted by TCS. Details can be found in the Appendix XVIII.
80. The Committee noted a Member comment on the summary report on AOP implementation questionnaire regarding the need to develop comprehensive and intense observation for tropical cyclones using multiple methods, including but not limited to satellites, radar, drones and dropsondes. The shared results of these experiments are likely to improve the understanding of the formation, development and impact mechanism of typhoons under climate change.
81. The close cooperation of and in-kind contribution including funding, manpower and expertise from AOP participating Members, particularly the AOP leading Members are very important to conduct the AOPs' successful and fruitful implementation activities, and should be encouraged continually.
82. The clarification of the potential areas to be enhanced for the AOPs to be linked to the pillar(s) EW4All, and the identification on how to enhance the alignment to contribute to the pillars of EW4All in future will greatly benefit WGs to improve its strategy and cooperation on the aspects of AOP proposal, Members' participation, implementation planning, budget estimation, and result review, etc.
83. The TCTF annual allocation for supporting the implementation of WGs' AOP activities played a very important role as seed's money on encouraging TC Members, particularly the AOP leading Members. To boost and encourage Members to involve more resources (in-kind contribution), including funding, manpower and expertise, into the scheduled annual implementation plan/activities to achieve the annual success indicators approved at TC Annual Session, the role of the annual TCTF allocation for supporting the activities of WGs' AOP implementation, as a seed money and a supportive attitude of the Committee to the approved AOPs, should be further enhanced.
84. As the executive body of the Committee, TCS should play its duty and function on coordinating the scheduled annual AOP implementation activities, and tracking and checking up the implementation status and progresses targeting the AOP success indicators which are approved at annual session. TCS experts should be involved in the WGs' AOP implementation activities. The conduction of the approved AOP implementation activities at TC Annual Session should be encouraged to be taken under the platform of the Committee with a notification to a close cooperation with TCS.

XII. PUBLICATIONS (agenda item 12)

12.1. Publications by TCS

85. The Committee took note of the publications of the Typhoon Committee in 2023.

86. The Committee noted with appreciation the all-Members' contributions to the publications of Typhoon Committee which have promoted the visibilities and transparencies of TC. The Committee further urged Members to take measures and actions for continuing support the TC publication and making contributions to the TCRR Journal especially.
87. The Committee approved the enhanced format of the TC Newsletter for inclusion on the revamped TC website.

12.2. Publications by WMO

88. The Committee was informed and took note on recent WMO publications; WMO Guide for NMHSs in support of national MHEW Procedures, Coordination Mechanisms, Systems and Services - Guide No. 1 – Tropical Cyclones; COPE disaster book series; WMO Strategy for Services Delivery; State of the Climate in Asia and Southwest Pacific and State of the Global Climate 2022.

12.3. Publications by ESCAP

89. The Committee was informed and took note on recent ESCAP publication on Asia Pacific Disaster Report 2023, titled Seizing the moment: targeting transformative disaster risk resilience and ESCAP Regional Strategy in support of the global and country-level implementation of the four pillars of multi-hazard early warning systems.

XIII. PROGRAMME FOR 2024 AND BEYOND (agenda item 13)

13.1. Retired and new tropical cyclone names

90. The Committee noted DPRK provided SASUM, **JAMJARI** and KUMSONG as replacement names for NALGAE.
91. The Committee noted Hong Kong, China provided MILKTEA, **TSING-MA** and FO-LUNG as replacement names for MA-ON.
92. The Committee noted Japan provided **TOKEI**, KARASU, and TOBIUO as replacement names for KOMPASU.
93. The Committee noted Lao PDR provided **ONG-MANG**, XEKATAM and DOKPHOUT as replacement names for HINNAMNOR.
94. The Committee noted Philippines provided **AMUYAO**, CALLAO and MINGAN as replacement names for MALAKAS.
95. The Committee noted Republic of Korea provided BANDI, MARU and **GOSARI** as replacement names for MEGI.
96. The Committee noted Republic of Korea provided DURUMI, **HODU** and MINARI as replacement names for NORU.
97. The Committee noted USA provided **SARBUL**, MARWARN, GONOP, WA'AB and RUMEA as replacement names for RAI.
98. The Committee noted Vietnam provided HOA-SIM, **LUC-BINH** and PO-LANG as replacement names for CONSON.
99. The Committee noted the request from the Philippines to retire the names of DOKSURI and SAOLA and to request Republic of Korea and Socialist Republic of Viet Nam to provide replacement names.

100. The Committee noted the request from China to retire the names of DOKSURI and HAIKUI and to request Republic of Korea and China to provide replacement names.

XIV. COORDINATION WITH OTHER ACTIVITIES OF THE WMO TROPICAL CYCLONE PROGRAMME (agenda item 14)

101. The Committee received a presentation on activities falling under the Tropical Cyclone Programme (TCP) and those requiring coordination through it. The Committee expressed its appreciation for the thorough presentation and extended gratitude for the support provided by the WMO to the Committee. Details can be found in Appendix XIX.
102. The Committee was informed of the following Resolutions and Decisions from WMO constituent bodies, of relevance for the TCP:
- United Nations Early Warnings for All initiative (EW4All)
 - WMO Strategy for Service Delivery
 - Tropical Cyclone Programme
 - Tropical Cyclone Forecasting Competency Framework
 - WMO Guide for NMHSs in support of national MHEW Services
 - WMO Coordination Mechanism – authoritative information for the humanitarian agencies
103. The Committee was informed that SERCOM/SC-DRR/Advisory Group on Tropical Cyclone (AG-TC), looking after the global component of the TCP, has organized regular meetings since its establishment in October 2022. The fifth meeting of the AG-TC (AG-TC-5) was conducted from 12 to 14 December 2023. AG-TC addresses several important issues and recommendations on topics such as:
- WMO WIPPS centers' compliance review.
 - WMO Coordination Mechanism (WCM) and the Weather4UN project.
 - Tropical Cyclone - Probabilistic Forecast Products (TC-PFP) Project.
 - NWP Requirements to the WIPPS Manual related on TC products
 - Recommendations by the International Workshop on Tropical Cyclones – 10th session (IWTC-10, 5-9 December 2022). Countries are encouraged to submit difficult tropical cyclone cases for research purpose in the WMO database “severeweather.wmo.int/TCFW”. AG-TC recommended the organization of the 4th Session of the International Workshop on Satellite Analysis of Tropical Cyclones (IWSATC-4) tentatively online early December 2024.
 - Tropical Cyclone Forecaster Competency.
 - Development of Tropical Cyclone Impact-based Forecasting products – Implementation Decision 10 (EC-68).
104. The Committee acknowledged that numerous training activities on tropical cyclones were conducted in 2023. These initiatives aimed to enhance the capacity development of members, ensuring they acquire the necessary competency and skills for tropical cyclone forecasting and services, aligning with the regional tropical cyclone competencies.
105. The Committee received information indicating that regional activities related to tropical cyclone regional bodies were effectively organized in the previous year. These meetings served to update regional arrangements for addressing tropical cyclone situations, enhancing regional collaboration and coordination with unified approaches to managing tropical cyclones. The Committee was encouraged to further strengthen collaboration with relevant bodies of WMO Regional Associations II and IV.

106. The Committee was briefed on the seamless implementation of all activities related to the Tropical Cyclone Programme (TCP) under the WMO Annual Operating Plan in 2023, without any delays. The Committee expressed appreciation to the WMO Secretariat and Members for their commendable efforts in working closely together, facilitating the successful execution of TCP activities.

XV. SUPPORT REQUIRED FOR THE COMMITTEE'S PROGRAMME (agenda item 15)

15.1. Typhoon Committee Trust Fund (TCTF)

107. The Committee reviewed the provisional statement of account of TCTF for the period of 1 January to 31 December 2023 as in the Appendix B and the final statement for 1 January to 31 December 2022 as in Appendix C, submitted by the representative of the WMO Secretariat. The statement for 2022 had gone through auditing by WMO external auditors. The auditing report for 2022 statement had been communicated to TCS. The Committee expressed appreciation to WMO Secretariat for its good management of the TCTF.
108. The Committee encouraged its Members to continue and possibly enhance Members' contribution to the Fund, although on voluntarily basis, for the purpose of sustainable supporting of activities of the Committee.
109. The Committee reviewed the statement of account of TCTF for the period of 1 January to 31 December 2022 and the provisional statement for 1 January 2023 to 31 December 2023 submitted by the representative of the WMO Secretariat as shown in **Appendix XX**.
110. The Committee was informed by TCS, the summary of income and expenditure from 1 January to 31 December 2021 and 2022 and the provisional summary of income and expenditure for 2023 related to the execution of the Work Plan 2021, 2022 and 2023. In addition, provisional summary of income and expenditure from 1 January to 31 March 2024 and summary of TCTF budget 2021/2022, 2022/2023 and 2023/2024 with additional three months from January to March 2022 to 2024 was provided as reference. (Appendix XXI)

15.2. In-kind Contributions

111. The Committee expressed appreciation for the in-kind contributions from some Members, namely China; Hong Kong, China; Japan; Macao, China; Malaysia; the Philippines; Republic of Korea; Thailand; USA and Viet Nam. The Committee also invited the other Members to report their in-kind contributions, quantifying the corresponding unit of Man-months that have consumed in actions related to TCTF projects. (Appendix XXII).
112. The Committee also expressed the importance of having in-kind contributions with correspondence values.

15.3. Approval of Typhoon Committee Trust Fund (TCTF) 2024/2025

113. The Committee noted that the allocation of budget by WGs has been approved by the Chair of the Typhoon Committee and the Secretary of the Typhoon Committee.
114. The Committee observed the gap between budgeted expenses and contributions in the TCTF, and the need for effective budget management and resource mobilization in a long-term perspective.
115. The Committee discussed and approved the TCTF budget proposal for 2024/2025 (Appendix XXIII).

XVI. DATE AND PLACE OF THE 19TH IWS (agenda 16)

116. The Committee was informed that China will host the 19th IWS in Shanghai. The proposed dates are tentatively in late November 2024. The final arrangements will be confirmed and later communicated to TCS.

XVII. DATE AND PLACE OF THE 57TH TC SESSION (agenda 17)

117. The Committee was informed of the kind offer of the Philippines to host the 57th Session in Manila. The tentative dates would be the third week of February in 2025 and the final arrangements will be confirmed and later communicated to TCS.

XVIII. HOSTING OF THE 20TH INTEGRATED WORKSHOP AND 58TH TC SESSION (agenda 18)

118. The Committee was informed that DPRK was unable to host the 20th IWS. Based on the Mechanism for Hosting Sessions, ESCAP facility would be a choice, however, there's a cost involved on booking the rooms. ESCAP will communicate to TCS later related to the cost.
119. The Committee noted that TCS will communicate to Members about the hosting of the 20th IWS and will inform later the findings.
120. The Committee was informed that the Republic of Korea is willing to host the 58th Session of Typhoon Committee in 2026. The final date and place will be confirmed in due course by the Republic of Korea and later communicated to TCS.

XIX. OTHER BUSINESS (agenda item 19)

121. The Committee noted that AP-TCRC has an open funding of Shanghai Typhoon Collaborative Research Funding (STCRF) for forecaster and scientist position at the AP-TCRC and encourages Members to apply.
122. The Committee noted the "Promoting technical exchange of AI applications in tropical cyclone analysis and forecasting in Typhoon Committee" will be hosted in Hong Kong, China under WGM project in May 2024. Invitations will be issued by TCS after TC56 Session and Members are encouraged to participate.

XX. ADOPTION OF THE REPORT (agenda item 20)

123. The Committee adopted the report of the session at 10:49pm, 01 March 2024.

XXI. CLOSURE OF THE SESSION

124. The delegates from the Members of the Typhoon Committee, representatives of WMO, ESCAP and TCS expressed their thanks and appreciation to the Met Malaysia for the successful hosting for organizing the Fifty-Sixth Session of the Typhoon Committee. They also expressed gratitude to Mr. Muhammad Helmi ABDULLAH, Director General of Malaysian Meteorological Department and his staff for the warm hospitality and excellent arrangements made.
125. The Session was closed by the Chairperson at 11:17pm, 01 March 2024.