ESCAP/WMO Typhoon Committee
The Fifty-eighth Session
10-13 March 2026
Jeju Island, Republic of Korea

FOR PARTICIPANTS ONLY
WRD/TC.58/8.1
26 January 2026
ENGLISH ONLY

WORKING GROUP ON METEOROLOGY ACTIVITIES

ANNUAL REPORT 2025

(Submitted by WGM Chair)

ACTION REQUIRED:

The Committee is invited to:

a) Take note of the Members activities and major progress and issues in meteorology component in 2025 as reported by Members at the 20th IWS.

b) Review the activities of WGM conducted in 2025.

c) Approve the recommendations and planned activities of WGM for 2026 and beyond.

APPENDICES:

A. DRAFT TEXT FOR INCLUSION AT SESSION REPORT

B. Report on activities of Working Group on Meteorology (WGM) in 2025

C. Summary Report of WGM Parallel Meeting at the 20th IWS

APPENDIX A

DRAFT TEXT FOR INCLUSION IN THE SESSION REPORT

8.1 Meteorological Component

1. The Committee took note of the Member's activities and major progress and issues in Meteorological Component in 2025 as reported by Members at the 20th IWS/High-Level Forum.

2. 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 ??**.

3. The Committee took note of the outcomes of the WGM Parallel Session at the 20th IWS/High-Level Forum on 2-5 December 2025. With the assistance of TCP/WMO and TCS and the strong support from all Members, WGM has successfully completed the tasks in 2025 with significant outcomes as follows:

   a. WGM has fulfilled all the action plans (3 POPs, 13 AOPs and 1 PP) in 2025, which were endorsed at the 57th TC Session.

   b. After the 57th TC Session in 2025, WGM has been carrying out the following activities that involve cooperations among Members as well as other TC WGs and international organizations:
      i. Coordinated with the Hong Kong Observatory (HKO), Hong Kong, China to organize the 8th WGM Annual Meeting in hybrid mode from 21 to 22 October 2025.
      ii. Coordinated with China Meteorological Administration (CMA) for the Roving Seminar 2025 from 3 to 5 November 2025.
      iii. Coordinated with RSMC Tokyo Typhoon Center for the Attachment Training Course from 13 to 22 January 2026.
      iv. Coordinated with TRCG to offer research fellowships hosted by Korea Meteorological Administration (KMA) and the Hong Kong Observatory (HKO).

Conclusions of WGM

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 important progress in the implementation of the TC Strategic Plan during the year 2025.

b. Members made significant progress during 2025 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 Tropical Cyclone Programme (TCP) of WMO and Typhoon Committee Secretariat (TCS), and the sincere cooperation of all Members and the effective efforts of the WGM focal points, WGM has successfully completed the tasks in 2025 as listed in Annex I of Appendix C.

d. Based on the discussion on the operating plans in 2025 during the 20th IWS, it was concluded to adopt the operating plans as follows:

   i. POP items 1-3 and AOP items 1-13 will continue in 2026.

   ii. PP item 1 will continue and move to AOP item 14 in 2026.

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 2026 is US$54,000.

f. The proposed WGM 2026 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

a. To request KMA to:

   (i) improve typhoon summer prediction techniques; share knowledge and encourage TC Member's cooperation.

   (ii) continue to share GK2A products related to typhoon forecast.

   (iii) provide real-time ocean observation data using drifting buoys for monitoring tropical cyclones; and enhance the use of ocean data in analyzing impact on tropical cyclone activities.

b. To request STI/CMA to:

   (i) enhance the role of the TCRR editorial board; increase international influence; and align research and publication with the development of the Asia Pacific-Typhoon Collaborative Research Center (AP-TCRC).

(ii) expand scientific experiments for EXOTICCA focusing on typhoon structure and influences in urban settings and air-sea interaction in offshore areas; enhance cooperation with HKO, YNO, and other international partners to yield more research outcomes; and integrate manned aircraft and more Unmanned Aerial Vehicles (UAVs) into the unified typhoon experiment platform.

(iii) conduct tropical cyclone track, intensity, precipitation and wind forecast verification for the 2025 TC season; extend the TC forecast verification dataset to include wind and precipitation forecast with coverage to global TC regions; and continue strengthening international cooperation and promote the exchange of TC data and verification techniques.

c. To request CMA to:

(i) host an in-person workshop for satellite data analysis in early May 2026, with participants from member states and invited consulting advisors; and highlight the use of new satellite data in the operational monitoring of tropical cyclones.

(ii) organize an in-person expert meeting in December 2025 to facilitate face-to-face discussions on the TC-AR4, and complete the first draft of the TC-AR4 by the end of 2026.

(iii) use AI techniques to improve the key components of CMA-TRAMS and CMA-TRAMS(EPS); develop model initialization scheme, including the assimilation of multiple sources of observations; and develop Air-Sea Coupled Model and produce more products for marine meteorological forecasts.

(iv) conduct FengYun satellite high frequency typhoon targeted observations, provide fast sharing of observation data in 2026; continue to develop the TC platform of FengYun satellite; and strengthen the application of newly launched FengYun satellites (FY-4C and FY-3H).

d. To request JMA to:

(i) continue providing tropical cyclone operational products using ensemble forecasts.

(ii) report a follow-up on the progress of the planned improvements to probabilistic forecast products around 2030.

(iii) further refine quality control and QPE techniques applied to the observation networks of the participating Members, including dual-polarization radars, to improve their capability to use observation data for severe weather monitoring and forecasting.

(iv) facilitate the implementation and expansion of experimental radar data exchange, and to share the progress with the Regional WIGOS project in Southeast Asia as a contribution to RBON implementation.

(v) organize meeting(s)/workshop(s) to understand the current status and possibility to support regional exchange of observation data for GBON/RBON implementation.

(vi) publish verification results of storm surge predictions and improve storm surge watch scheme mode; add storm surge time series points if requested by TC Members.

(vii) improve Himawari-8/9 RDCA algorithm product verification with technical assistance by JMA to MMD, MSS, TMD and VNMHA; and provide supports for operating of RDCA by PAGASA.

(viii) provide 1-month and 3-month ensemble NWP model data, necessary for the project and available, to ICHARM; continue sharing knowledge and experience on awareness raising through lectures for online workshops and meetings of IFI project; and promote awareness with hydrological authorities to both local governments and public, including the appropriate use of products.

e. To request MET Malaysia to organize the next Attachment Training on RaINS in 2026, covering SWIRLS (developed by HKO), RaINS (developed by MET Malaysia), and satellite-derived reflectivity techniques (developed by HKO), as well as nowcast verification.

f. To request Expert Team on AI Applications in Tropical Cyclone Analysis and Forecasting (ET-AITC) to continue the verification for tropical cyclone AI forecasts over 2025; consider the verification for weak tropical cyclones/disturbances, genesis and pre-genesis tracks; and organize a workshop and Expert Team meeting in 2026.

g. To endorse the proposed action plans in 2026 (including 3 POPs and 14 AOPs) as listed in Annex II of Appendix B – Progress Report on Activities of WGM in 2025, which summarizes the above recommendations with additional action items.

h. To endorse the WGM budget request included in the budget proposal to be submitted by AWG for TC's approval.

i. To re-appoint Dr. ISHIHARA Koji as the rapporteur of TOM.

j. To encourage project coordinators of all working groups to submit the outcome (research paper) to the TCRR journal.

k. To encourage more members to join the collaborative research of AP-TCRC and apply the funding of STCRF of AP-TCRC.

l. To encourage the AP-TCRC to assist the Expert Team ET-AITC to host the AI-TC workshop in Shanghai, China in 2026.

Appendix B: Report on activities of Working Group on Meteorology (WGM) in 2025

2025 ANNUAL REPORT OF WGM

(Submitted by Chair of WGM)

1. Introduction

1.1 According to the terms of reference, Working Group on Meteorology (WGM) is to promote cooperation among the Members of Typhoon Committee (TC) in the implementation of activities under the Meteorological Component of the Committee's Strategic Plan with the aim to support the socio-economic development process and enhance cooperation among the Members in all the three components. (Training and Research are incorporated as part of these three components.) Towards this end, the WGM is expected to advise and assist the Committee in:

(a) Identifying priority issues and areas of cooperation in the Meteorological Component;
(b) Promoting and facilitating the exchange of experiences and knowledge on latest developments and techniques related to the above issues and areas;
(c) Coordinating and implementing priority activities and programmes of the Committee aiming at strengthening capacity of the Members in meteorology;
(d) Mobilizing resources to carry out priority activities of the Committee related to the meteorological Component;
(e) Reporting overall progress in the implementation of the meteorology component of the Strategic Plan;
(f) Recommending to the Committee priority areas, programmes and activities for cooperation in meteorological research by related experts of the Members.

2. Membership

2.1 After the 57th TC Session, the composition and focal point members list of WGM are:

Chair	Dr. TANG Jie (China)
Vice Chair	Mr. Ambun Dindang (Malaysia) Mr. Juanito Galang (Philippines)
Members	Mr. OY Thaily (Cambodia) Ms. XIANG Chunyi (China) Mr. RI Song Min (DPR Korea) Mr. HE Yu heng (Hong Kong, China) Dr. ISHIHARA Koji (Japan) Ms. Phetsakhone MISOMPHANE(Lao PDR) Mr. LOK Chan Wa (Macao, China) Ms. WON Seonghee (Rep. of Korea) Mr. Lesley CHOO (Singapore) Ms. Prapaporn WONGSAMING (Thailand) Mr. Christopher BRENCHLEY (USA) Dr. Hoang Phuc LAM (Viet Nam)
Secretary of Mete.	Mr. Clarence FONG

2.2 Experts from other working groups of TC, TCP/WMO, WWRP/WMO, TCS, RSMC-Tokyo, etc. have also provided assistances to accomplish the tasks of WGM over 2025, endorsed at the 57th session of TC.

3. The progress of WGM's plans in 2025

With the assistances of TCP/WMO and TCS and the strong support from all Members, WGM has successfully completed the action plans (3 POPs, 13 AOPs and 1 PP) in 2025, which were endorsed at the 57th Session. The WGM activities and the progress of all action items in 2025 are reported in the **Appendix C – Summary Report of the WGM Parallel Meeting at the 20th IWS**. The complete table of the 2025 action plans and its implementation status are listed in **Annex I** of Appendix C.

After the 57th TC Session in 2025, WGM has been carrying out the following activities that involve the cooperation among Members as well as other TC WGs and international organizations:

i. Coordinated with the Hong Kong Observatory (HKO), Hong Kong, China to organize the 8th WGM Annual Meeting in hybrid mode from 21 to 22 October 2025.
ii. Coordinated with China Meteorological Administration (CMA) for the Roving

Seminar 2025 from 3 to 5 November 2025.

iii. Coordinated with RSMC Tokyo Typhoon Center for the Attachment Training Course from 13 to 22 January 2026.

iv. Coordinated with TRCG to offer research fellowships hosted by Korea Meteorological Administration (KMA) and the Hong Kong Observatory (HKO).

4. Conclusions

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 important progress in the implementation of the TC Strategic Plan during the year 2025.

b. Members made significant progress during 2025 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 Tropical Cyclone Programme (TCP) of WMO and Typhoon Committee Secretariat (TCS), and the sincere cooperation of all Members and the effective efforts of the WGM focal points, WGM has successfully completed the tasks in 2025 as listed in Annex I of Appendix C.

d. Based on the discussion on the operating plans in 2025 during the 20th IWS/High-Level Forum, it was concluded to adopt the operating plans as follows:

   i. POP items 1-3 and AOP items 1-13 will continue in 2026.

   ii. PP item 1 will continue and move to AOP item 14 in 2026.

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 2026 is US$54,000.

f. The proposed WGM 2026 operating plans (AOPs, POPs and PPs) including the actions, the success indicators, coordinators and budget is listed in Annex II of Appendix C.

5. Recommendations

a. To request KMA to:

   (i) improve typhoon summer prediction techniques; share knowledge and encourage TC Member's cooperation.

(ii) continue to share GK2A products related to typhoon forecast.

(iii) provide real-time ocean observation data using drifting buoys for monitoring tropical cyclones; and enhance the use of ocean data in analyzing impact on tropical cyclone activities.

b. To request STI/CMA to:

(i) enhance the role of the TCRR editorial board; increase international influence; and align research and publication with the development of the Asia Pacific-Typhoon Collaborative Research Center (AP-TCRC).

(ii) expand scientific experiments for EXOTICCA focusing on typhoon structure and influences in urban settings and air-sea interaction in offshore areas; enhance cooperation with HKO, YNO, and other international partners to yield more research outcomes; and integrate manned aircraft and more Unmanned Aerial Vehicles (UAVs) into the unified typhoon experiment platform.

(iii) conduct tropical cyclone track, intensity, precipitation and wind forecast verification for the 2025 TC season; extend the TC forecast verification dataset to include wind and precipitation forecast with coverage to global TC regions; and continue strengthening international cooperation and promote the exchange of TC data and verification techniques.

c. To request CMA to:

(i) host an in-person workshop for satellite data analysis in early May 2026, with participants from member states and invited consulting advisors; and highlight the use of new satellite data in the operational monitoring of tropical cyclones.

(ii) organize an in-person expert meeting in December 2025 to facilitate face-to-face discussions on the TC-AR4, and complete the first draft of the TC-AR4 by the end of 2026.

(iii) use AI techniques to improve the key components of CMA-TRAMS and CMA-TRAMS(EPS); develop model initialization scheme, including the assimilation of multiple sources of observations; and develop Air-Sea Coupled Model and produce more products for marine meteorological forecasts.

(iv) conduct FengYun satellite high frequency typhoon targeted observations, provide fast sharing of observation data in 2026; continue to develop the TC platform of FengYun satellite; and strengthen the application of newly launched FengYun satellites (FY-4C and FY-3H).

d. To request JMA to:

(i) continue providing tropical cyclone operational products using ensemble forecasts.

(ii) report a follow-up on the progress of the planned improvements to probabilistic forecast products around 2030.

(iii) further refine quality control and QPE techniques applied to the observation networks of the participating Members, including dual-polarization radars, to improve their capability to use observation data for severe weather monitoring and forecasting.

(iv) facilitate the implementation and expansion of experimental radar data exchange, and to share the progress with the Regional WIGOS project in Southeast Asia as a contribution to RBON implementation.

(v) organize meeting(s)/workshop(s) to understand the current status and possibility to support regional exchange of observation data for GBON/RBON implementation.

(vi) publish verification results of storm surge predictions and improve storm surge watch scheme mode; add storm surge time series points if requested by TC Members.

(vii) improve Himawari-8/9 RDCA algorithm product verification with technical assistance by JMA to MMD, MSS, TMD and VNMHA; and provide supports for operating of RDCA by PAGASA.

(viii) provide 1-month and 3-month ensemble NWP model data, necessary for the project and available, to ICHARM; continue sharing knowledge and experience on awareness raising through lectures for online workshops and meetings of IFI project; and promote awareness with hydrological authorities to both local governments and public, including the appropriate use of products.

e. To request MET Malaysia to organize the next Attachment Training on RaINS in 2026, covering SWIRLS (developed by HKO), RaINS (developed by MET Malaysia), and satellite-derived reflectivity techniques (developed by HKO), as well as nowcast verification.

f. To request Expert Team on AI Applications in Tropical Cyclone Analysis and Forecasting (ET-AITC) to continue the verification for tropical cyclone AI forecasts over 2025; consider the verification for weak tropical cyclones/disturbances, genesis and pre-genesis tracks; and organize a workshop and Expert Team meeting in 2026.

g. To endorse the proposed action plans in 2026 (including 3 POPs and 14 AOPs) as listed in Annex II of Appendix B – Progress Report on Activities of WGM in 2025, which summarizes the above recommendations with additional action items.

h. To endorse the WGM budget request included in the budget proposal to be submitted by AWG for TC's approval.

i. To re-appoint Dr. ISHIHARA Koji as the rapporteur of TOM.

j. To encourage project coordinators of all working groups to submit the outcome (research paper) to the TCRR journal.

k. To encourage more members to join the collaborative research of AP-TCRC and apply the funding of STCRF of AP-TCRC.

l. To encourage the AP-TCRC to assist the Expert Team ET-AITC to host the AI-TC workshop in Shanghai, China in 2026.

Appendix C: Summary Report of WGM Parallel Meeting at the 20th IWS/High-Level Forum

ESCAP/WMO Typhoon Committee
20th Integrated Workshop / High-Level Forum
December 2-5, 2005
Macao, China

FOR PARTICIPANTS ONLY
December 5, 2025
ENGLISH ONLY

REPORT on Activities of Working Group on Meteorology (WGM)

of Typhoon Committee (TC) in 2025

(For WGM Parallel Meeting in the 20th IWS)

(Submitted by WGM Chair)

ACTION REQUIRED:

The Working Group is invited to:

d) Review the activities of WGM conducted in 2025 as summarized in the Appendix.

e) Approve the recommendations and proposed activities with related budget of WGM in 2026.

APPENDIX:

A. Draft text for inclusion in the 58th TC Session Report

B. Progress Report on activities of WGM in 2025 for the 20th IWS

ANNEX:

I. Implementation status of WGM activities in 2025

II. Proposed activities of WGM with success indicators in 2026

III. Report of the 8th Annual Meeting of WGM

APPENDIX A. DRAFT TEXT FOR INCLUSION IN THE 58th TC SESSION REPORT

8.1 Meteorological Component

1. The Committee took note of the Members' activities and major progress and issues in Meteorological Component in 2025 as reported by Members at the 20th IWS/High-Level Forum.

2. 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 ??**.

3. The Committee took note of the outcomes of the WGM Parallel Session at the 20th IWS/High-Level Forum on 2-5 December 2025. With the assistance of TCP/WMO and TCS and the strong support from all Members, WGM has successfully completed the tasks in 2025 with significant outcomes as follows:

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Conclusions of WGM

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 important progress in the implementation of the TC Strategic Plan during the year 2025.

b. Members made significant progress during 2025 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 Tropical Cyclone Programme (TCP) of WMO and Typhoon Committee Secretariat (TCS), and the sincere cooperation of all Members and the effective efforts of the WGM focal points, WGM has successfully completed the tasks in 2025 as listed in Annex I of Appendix B.

d. Based on the discussion on the operating plans in 2025 during the 20th IWS, it was concluded to adopt the operating plans as follows:

   i. POP items 1-3 and AOP items 1-13 will continue in 2026.

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e. The total budget proposed by WGM, which will be concurred at the AWG meeting, for undertaking the operating plans (AOPs and POPs) in 2026 is USD54,000.

f. The proposed WGM 2026 operating plans (AOPs and POPs) including the actions, the success indicators, coordinators and budget is listed in Annex II of Appendix B.

Recommendations of WGM

a. To request KMA to:

   (i) improve typhoon summer prediction techniques; share knowledge and encourage TC Member's cooperation.

   (ii) continue to share GK2A products related to typhoon forecast.

   (iii) provide real-time ocean observation data using drifting buoys for monitoring tropical cyclones; and enhance the use of ocean data in analyzing impact on tropical cyclone activities.

b. To request STI/CMA to:

   (i) enhance the role of the TCRR editorial board; increase international influence; and align research and publication with the development of the Asia Pacific-Typhoon Collaborative Research Center (AP-TCRC).

   (ii) expand scientific experiments for EXOTICCA focusing on typhoon structure and influences in urban settings and air-sea interaction in offshore areas; enhance cooperation with HKO, YNO, and other international partners to yield more research outcomes; and integrate manned aircraft and more

Unmanned Aerial Vehicles (UAVs) into the unified typhoon experiment platform.

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(ii) organize an in-person expert meeting in December 2025 to facilitate face-to-face discussions on the TC-AR4, and complete the first draft of the TC-AR4 by the end of 2026.

(iii) use AI techniques to improve the key components of CMA-TRAMS and CMA-TRAMS(EPS); develop model initialization scheme, including the assimilation of multiple sources of observations; and develop Air-Sea Coupled Model and produce more products for marine meteorological forecasts.

(iv) conduct FengYun satellite high frequency typhoon targeted observations, provide fast sharing of observation data in 2026; continue to develop the TC platform of FengYun satellite; and strengthen the application of newly launched FengYun satellites (FY-4C and FY-3H).

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(i) continue providing tropical cyclone operational products using ensemble forecasts.

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(iii) further refine quality control and QPE techniques applied to the observation networks of the participating Members, including dual-polarization radars, to improve their capability to use observation data for severe weather monitoring and forecasting.

(iv) facilitate the implementation and expansion of experimental radar data exchange, and to share the progress with the Regional WIGOS project in Southeast Asia as a contribution to RBON implementation.

(v) organize meeting(s)/workshop(s) to understand the current status and possibility to support regional exchange of observation data for GBON/RBON implementation.

(vi) publish verification results of storm surge predictions and improve storm surge watch scheme mode; add storm surge time series points if requested by TC Members.

(vii) improve Himawari-8/9 RDCA algorithm product verification with technical assistance by JMA to MMD, MSS, TMD and VNMHA; and provide supports for operating of RDCA by PAGASA.

(viii) provide 1-month and 3-month ensemble NWP model data, necessary for the project and available, to ICHARM; continue sharing knowledge and experience on awareness raising through lectures for online workshops and meetings of IFI project; and promote awareness with hydrological authorities to both local governments and public, including the appropriate use of products.

e. To request MET Malaysia to organize the next Attachment Training on RaINS in 2026, covering SWIRLS (developed by HKO), RaINS (developed by MET Malaysia), and satellite-derived reflectivity techniques (developed by HKO), as well as nowcast verification.

f. To request Expert Team on AI Applications in Tropical Cyclone Analysis and Forecasting (ET-AITC) to continue the verification for tropical cyclone AI forecasts over 2025; consider the verification for weak tropical cyclones/disturbances, genesis and pre-genesis tracks; and organize a workshop and Expert Team meeting in 2026.

g. To endorse the proposed action plans in 2026 (including 3 POPs and 14 AOPs) as listed in Annex II of Appendix B – Progress Report on Activities of WGM in 2025, which summarizes the above recommendations with additional action items.

h. To endorse the WGM budget request included in the budget proposal to be submitted by AWG for TC's approval.

i. To re-appoint Dr. ISHIHARA Koji as the rapporteur of TOM.

j. To encourage project coordinators of all working groups to submit the outcome (research paper) to the TCRR journal.

k. To encourage more members to join the collaborative research of AP-TCRC and apply the funding of STCRF of AP-TCRC.

l. To encourage the AP-TCRC to assist the Expert Team ET-AITC to host the AI-TC workshop in Shanghai, China in 2026.

APPENDIX B. PROGRESS REPORT ON ACTIVITIES OF WGM IN 2025 FOR THE 20th IWS

1. Introduction

According to the terms of reference, Working Group on Meteorology (WGM) is to promote cooperation among the Members of Typhoon Committee (TC) in the implementation of activities under the Meteorological Component of the Committee's Strategic Plan with the aim to support the socio-economic development process and enhance cooperation among the Members in all the three components. (Training and Research are incorporated as part of these three components.) Towards this end, the WGM is expected to advise and assist the Committee in:

(a) Identifying priority issues and areas of cooperation in the Meteorological Component;
(b) Promoting and facilitating the exchange of experiences and knowledge on latest developments and techniques related to the above issues and areas;
(c) Coordinating and implementing priority activities and programmes of the Committee aiming at strengthening capacity of the Members in meteorology;
(d) Mobilizing resources to carry out priority activities of the Committee related to the meteorological Component;
(e) Reporting overall progress in the implementation of the meteorology component of the Strategic Plan;
(f) Recommending to the Committee priority areas, programmes and activities for cooperation in meteorological research by related experts of the Members.

2. Composition

- After the 57th TC Session, the composition and focal point members list of WGM are:

Chair	Dr. TANG Jie (China)
Vice Chair	Mr. Ambun Dindang (Malaysia) Mr. Juanito Galang (Philippines)
Members	Mr. OY Thaily (Cambodia) Ms. XIANG Chunyi (China)

	Mr. RI Song Min (DPR Korea) Mr. HE Yu heng (Hong Kong, China) Dr. ISHIHARA Koji (Japan) Ms. Phetsakhone MISOMPHANE(Lao PDR) Mr. LOK Chan Wa (Macao, China) Ms. WON Seonghee (Rep. of Korea) Mr. Lesley CHOO (Singapore) Ms. Prapaporn WONGSAMING (Thailand) Mr. Christopher BRENCHLEY (USA) Dr. Hoang Phuc LAM (Viet Nam)
Secretary of Mete.	Mr. Clarence FONG

- At the 7th IWS held in Nanjing, China, WGM Chair proposed to restructure the table of Annual Operating Plans (AOPs), namely the inclusion of 2 additional tables, which are the Perennial Operating Plans (POPs) and Preliminary Projects (PPs), and the proposal was adopted by WGM. POPs refer to WGM activities that will be carried out repeatedly in following years while PPs refer to projects which preliminary studies are needed to be undertaken by WGM.
- The action plans in 2025 (including 3 POPs, 13 AOPs and 1 PP) have been endorsed by 57th TC Session.

3. Progress of WGM operating plans (POPs, AOPs and PPs) in 2025

- The progress and the results of all the priority plans (include 3 POPs, 13 AOPs and 1 PP) since the 57th TC Session as well as the proposed plans for 2026 submitted by the respective coordinators, which were reported as shown in the following sub-sections.
- The implementation status of WGM operating plans in 2025 including the action plans and completion status; and the proposed operating plans in 2026 including success indicators and budget request are listed in Annex I and Annex II, respectively.

3.1 POP1: Improve the Algorithm of Typhoon Summer Prediction (Previous name: Development of Typhoon Seasonal Prediction System)

- KMA continued to provide the products of typhoon seasonal prediction for TC Members and distributed the forecasts to Members by email in June 2025.

- In May 2025, Positive SST deviation east of the Philippines indicated favorable conditions for tropical cyclone (TC) development. The major TC development region in the Western North Pacific (WNP) showed near-normal conditions, with a westward extension of the 5880 gpm line. No clear trend in lower-level convergence, but negative deviation of upper-level divergence was observed southeast of the Philippines.
- The Statistical Model demonstrated the smallest errors, highest correlation, and best trend match compared to other models. The Dynamical Model tended to overestimate TC frequency and showed low correlation. Hybrid Model (I) followed the trend well but was less accurate than the Statistical Model. Hybrid Model (II) showed the poorest performance, failing to capture the trend effectively.

3.2 POP2: Tropical Cyclone Research and Review

- Since its launch in February 2012, 57 issues of Tropical Cyclone Research and Review (TCRR) have been published, with contributors from 34 countries and regions. 4/5 were international authors and 2/3 were international peer-reviewers.
- Readers spreaded over 126 Countries, and over 160,000 full-text downloads through ScienceDirect each year since 2021.
- The journal received an impact factor of 4.1 and Scopus CiteScore was 4.8 in 2025.

3.3 POP3: Verification of Tropical Cyclone Operational Forecast

- Forecast verification of 20 tropical cyclones over Western North Pacific in 2025 was performed for 7 numerical weather prediction (NWP) models and 6 artificial intelligence weather prediction (AIWP) models.
- Mean Direct Position Error (DPE) for NWP ranged from 60-70 km (24h) to 430-545 km (120h). Mean DPE for AIWP ranged from 55-95 km (24h) to 330-530 km (120h). Track errors for most NWP and AIWP models increased in 2025 compared to 2024, except for FengQing.
- Mean Absolute Error (MAE) for NWP ranged from 4-6 m/s (24h) to 5-13 m/s (120h). MAE for AIWP ranged from 10-12 m/s (24h) to 11-17 m/s (120h). NWP models showed varying under/overestimation, while AIWP models consistently underestimated TC intensity, especially for stronger TCs. Intensity errors for AIWP models decreased in 2025 compared to 2024.
- Release of TC Forecast Verification Dataset covers TC track and intensity forecast error over the western North Pacific and will be updated annually, in the first half of next year.

3.4 AOP1: Enhanced Use of Ensemble Forecast

- JMA continued to provide Tropical cyclone activity prediction with probability-circle radii based on multiple ensemble methods from four centers (ECMWF, NCEP, UKMO, JMA); multi-center ensemble TC track predictions; and 2- and 5-day TC activity prediction maps on JMA's website and the Numerical Typhoon Prediction (NTP) website.
- In March 2025, JMA updated its GEPS with the aim of increasing variability in the tropics and improving probabilistic forecast accuracy.
- JMA reported its plan to enhance probabilistic forecast products by around 2030.

3.5 AOP2: Improve the Performances and Impacts of South China Sea Typhoon Model

- More high-resolution forecast products from CMA-TRAMS (deterministic and EPS) are in operational service, through the World Meteorological Centre (Beijing) Guangdong-Hong Kong-Macao Greater Bay Area (GBA) Branch website (wmc-gba.cn).
- Slight improvement in TC track forecasting in 2025, with 24, 48, and 72-h forecast errors below 60, 90, and 160 km respectively. Slightly increasing ability in forecasting TC intensity within 48 hours, with 48-h errors in minimum central pressure below 10 hPa.
- Demonstrated capability in predicting TC genesis, movement, landfall, and associated heavy rainfall for several cases (e.g., Wipha, Kajiki, Ragasa, Matmo, Nakri, Halong).

3.6 AOP3: Development of Regional Radar Network

- AOP3 operates within a broader context of regional radar development, including the ESCAP/WMO Typhoon Committee's project, the Regional WIGOS project (approved at RA II-18 and RA V-17), and WMO/ASEAN Radar workshops.
- Multiple Weather Radar Workshops were held in Tokyo (January/February 2023, October 2023, February 2025) and Bangkok (WMO/ASEAN Training Workshop, January/February 2024). The next workshop will be held in February 2026.
- A regional radar observation network covering Japan and five Southeast Asian countries has been established, with ongoing technical coordination for data exchange.
- The project aims to support applicants to join this experimental data exchange and share progress with the Regional WIGOS project.

3.7 AOP4: Radar Nowcasting based on RaINS/SWIRL

- The 5th Attachment Training on RaINS was held from 17 to 30 September 2025 with participating Members from Philippines and Thailand.
- The next Attachment Training on RaINS will continue in 2026, covering SWIRLS (developed by HKO), RaINS (developed by MET Malaysia), and satellite-derived reflectivity techniques (developed by HKO), as well as nowcast verification.

3.8 AOP5: Storm Surge Watch Scheme

- Currently, 78 points are established across various countries (e.g., Hong Kong, Malaysia, Republic of Korea, Philippines, Viet Nam). Additions can be made upon request.
- Model improvements were operational in January 2025 which included speed up of storm surge watch scheme model, introduction of extrapolation method of typhoon bogussing and updated astronomical tide database from FES2014 to FES2022.
- Annual verification results have been published in RSMC Tokyo's Annual Report since 2015. Verification for 2024 is ongoing for stations with data from University of Hawaii Sea Level Center (UHSLC) and Global Sea Level Observing System (GLOSS) database .
- Members are encouraged to provide sea-level observations during storm surge events for verification of storm surge predictions.

3.9 AOP6: Contribution for the Experiment on Typhoon Intensity Change in Coastal Area (EXOTICCA-II)

- Successfully sampled 1-3 cases: Typhoons Danas (2504), Co-may (2508), and Ragasa (2518) were observed.
- A unified typhoon field scheme based on surface-ocean-aero-satellite platforms has been established.
- The project has received endorsement from the WMO WWRP, providing an international framework, increased visibility, and enhanced networking opportunities.
- The project will go to third phase EXOTICA-III in 2026.

3.10 AOP7: Enhancing Utilization of Himawari 8/9 Products

- PAGASA formally joined the project in February 2025 and received the RDCA detection source code from JMA.
- An online technical meeting was conducted on March 18, 2025, involving MMD, MSS, TMD, VNMHA, and PAGASA, focusing on explaining the RDCA product and source code, and addressing participant questions.
- To provide further support tailored to the development status in each country, a face-to-face technical meeting is planned to take place in Tokyo in December 2025, with hands-on support in the development of the RDCA product.

3.11 AOP8: Parallel Analysis of Satellite Data in Operational Tropical Cyclone Monitoring

- An online workshop was organized on November 5, 2025 with speakers from CIMSS and University of Maryland to introduce tropical cyclone satellite monitoring products.
- A meeting between JMA, KMA and CMA took place on May 15, 2025 for a joint WGM integrated satellite AOP as recommended by AWG Chair during TC 57th Session. The integration includes products and platform, technique, experience and exchange, in order to optimize usage of budget and benefit more members among TC. A coordination group for discussion of further plans and an international workshop on a rotating basis were also discussed.

3.12 AOP9: Enhancement of Disaster Risk Reduction against Heavy Rain in Collaboration of AOP7 of WGH

- JMA provided 1-month ensemble NWP model data and was arranged to provide 3-month ensemble NWP model data to ICHARM.
- At RSMC Tokyo attachment training in 2025, ICHARM talked about the hydrology related to typhoon and gave a presentation on flood forecasting.

3.13 AOP10: GK2A Utilization for Tropical Cyclone

- One rapid scan about typhoon Wutip (2501) was carried out in 2025. To support national and international services over RA II and RA V in Asia-Pacific region, official requests for rapid scan were made available on the designated webpage of NMSC/KMA.
- GK2A satellite and ocean products (sea surface temperature, ocean heat content) were utilized for typhoon analysis, including Krosa (2509), Lingling (2512) and Ragasa (2518).

- The NMSC/KMA produces SSW data from five active scatterometer sensors (ASCAT, OSCAT and HSCAT) and passive sensors (AMSR-2 and GMI) and 15m/s wind radius around the typhoon center from the numerical models.
- By analyzing dry areas using water vapor images, the development, weakening and movement of typhoon can be analyzed. NMSC/KMA is producing simulated water vapour images using numerical models for typhoon prediction.

3.14 AOP11: Prepare for the 4th Assessment Report on Impacts of Climate Change on Tropical Cyclones in the Typhoon Committee Region

- The expert team was established in July 2025, with experts from CMA, KMA, JMA and HKO and Utah State University of USA.
- The structure of TC-AR4 was confirmed and chapter assignment among experts was competed. A face-to-face meeting to discuss the contents will be held in Macao, China in December 2025 in parallel with the 20th IWS.

3.15 AOP 12: Tropical Cyclone Monitoring using Drifting Buoys

- 15 drifting buoys were deployed between July and October 2025 by NTC/KMA, with collaboration with NTNU, JNU and KIOST. The buoys recorded sea-surface temperature and pressure every 30 minutes.
- A webpage was set up for sharing observation data.
- Estimation of central pressure of typhoons was carried out using the observations.

3.16 AOP13: Promoting Technical Exchange of AI Applications in Tropical Cyclone Analysis and Forecasting

- Expert Team on AI Applications in Tropical Cyclone Analysis and Forecasting (ET-AITC) was set up with experts from 10 TC Members and TCS in 2025. Four online meetings were held.
- A face-to-face meeting was held in JMA from 24 to 26 June 2025 with presentations on latest advancements by ET Members and invited AI teams, summary of and discussion on verification results in 2024, and review of data exchange and further requirements. A detailed activity report for 2025 has been prepared. A manuscript has also been submitted to journal for peer review.
- Verification for tropical cyclone forecasts in 2025 will continue. Verification for weak tropical cyclones/disturbances, genesis and pre-genesis tracks are under consideration.

- A workshop and Expert Team meeting will be held in Shanghai, China from 21 to 23 April 2026 with extra budget request USD10,000.

3.17 PP1: Utilization of FengYun Satellite for High Frequency Observation of Tropical Cyclone

- High frequency typhoon targeted observations were carried out for tropical cyclones in 2025, and a typhoon application platform for FengYun satellites was developed for TC Members to access.
- QPE products were used in typhoon Kajiki (2513) disaster monitoring after its landfall.
- A technical meeting between CMA and TMD was held in Nanjing, China on June 27, 2025 to discuss about the PP.

4. Review of Budget Status in 2025 and Budget Request for 2026

No.	Objectives	Budget in 2025 (USD)	Expenditure as of Nov 2025 (USD)	Budget Request for Apr-Dec 2026 (USD)	Budget Request for Jan-Mar 2027 (USD)
POP2	Tropical Cyclone Research and Review	8,000		4,000	4,000
AOP3	Development of Regional Radar Network	8,000			8,000
AOP4	Radar Nowcasting based on RaINS/SWIRL	5,000	5,000	5,000	
AOP7	Enhancing Utilization of Himawari 8/9 Products	8,000	*In progress*	8,000	
AOP8	Parallel Analysis of Satellite Data in Operational Tropical Cyclone Monitoring	7,000	0	7,000	
AOP11	Prepare for the 4th Assessment Report on Impacts of Climate Change	3,000	*In progress*	3,000	
AOP13	Promoting Technical Exchange of AI Applications in TC Analysis and Forecasting	5,000	4,985.30	12,000	
	Support WGM annual meeting	3,000	2,844.76	3,000	
	Total	47,000	12,830.06	54,000	

Annex I: Status of Perennial Operating Plans (POPs), Annual Operating Plans (AOPs) and Preliminary Projects (PPs) of WGM in 2025

Status of Perennial Operating Plans (POPs) of WGM in 2025

SP's KRA &SG	POP/AOP / PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Partici-pants	Coordinator (with email Address)	Status of completion
KRA1 KRA2 KRA6	POP1	Improve the algorithm of typhoon summer prediction	(a) To improve typhoon summer prediction techniques (b) To share knowledge and encourage member's cooperation	(a) Provide the information of typhoon summer prediction via e-mail for members on early June (b) Submission of the progress report	-	KMA	-	Ms. Seonghee Won (shwon11@korea.kr)	Completed
KRA1-6	POP2	Tropical Cyclone Research and Review	(a) To publish the journal quarterly in 2025. (b) Improvement of the editorial procedure and the journal's influence	Submission of the progress report	USD8,000	CMA	Members	Mr. Fang Zheqing (CMA) fangzq@typhoon.org.cn Ms. Lin Yutong (CMA) Dr. Wang Dongliang, (CMA)	Completed
KRA1 KRA2 KRA6 SG 6b SG 6c	POP3	Verification of tropical cyclone operational forecast	(a) To carry out post-season verification on the operational forecast of 2024 typhoon and report to Committee session. (b) To further improve the verification methodologies of evaluation system for typhoon forecast and conjunction with WMO-TLFDP. (c) To offer fellowship for training on (b).	(a) Submission of the post-season verification report for TC Session. (b)Progress report on the improvement of evaluation system for tropical cyclone forecast.	/	CMA, HKO	Members	Ms. Mengqi YANG (CMA) yangmq@typhoon.org.cn	Completed

Status of Annual Operating Plans (AOPs) of WGM in 2025

SP's KRA &SG	POP/AOP /PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Partici-pants	Coordinator (with email Address)	Status of completion
KRA2	AOP1	Enhanced use of ensemble forecast	(a) To continue providing the current operational products using ensemble forecast. (b) To research probabilistic forecast products using ensemble forecast. (c) To update the Global Ensemble Prediction System (GEPS) for improving probabilistic forecasts.	Submission of the progress report	/	JMA	/	Dr. ISHIHARA Koji (JMA) k-ishihara@met.kishou.go.jp	Completed
KRA1 KRA2 KRA6	AOP2	Improve the performances and impacts of South China Sea typhoon model	(a) Improving the long-term forecast performance of CMA-TRAMS in terms of TC track. Expanding the model domain of CMA-TRAMS. (b) Upgrading the physical parameterizations, especially the convection parameterization. (c) Use of AI techniques in improving the surface analysis and model integration. (d) Improving the perturbation methods in ensemble forecasting.	Submission of the assessment report for the forecast performance of CMA-TRAMS	/	CMA	SMG	Dr. Xubin Zhang (CMA) xbzhang@gd121.cn	Completed
KRA2 KRA5	AOP3	Development of regional radar network	(a) To further refine quality control techniques applied to the participants' radar networks, including dual pol. radars, to improve their quality of radar composites	Submission of the progress report by involved Members	USD8,000	TMD, MET Malaysia, JMA	Lao PDR, Viet Nam, Philippines	Mr. Tanya THONGNUNUI (TMD) krootan@gmail.com; Mr. Asmadi	Completed

SP's KRA &SG	POP/AOP /PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Partici-pants	Coordinator (with email Address)	Status of completion
			(b) To implement and refine MMD and TMD's QPE calibration using rain-gauge or other suitable techniques with technical assistance of JMA. (c)Aiming for contribution to RBON, to support applicants to join the experimental radar data exchange in the near future, and to share the progress with the Regional WIGOS project in Southeast Asia. (d) Submission of progress reports by participants. Upon the receipt of the reports, holding follow-up technical meeting(s)/workshop(s) to identify a way forward.					Abdul Wahab(MET Malaysia) asmadi@met.gov.my; Mr. HAGIYA Satoshi(JMA) hagiya@met.kishou.go.jp	
KRA1, KRA2, KRA3, KRA4, KRA5, KRA6, KRA7	AOP4	Radar nowcasting based on RaINS/SWIRL	(a)To promote sharing of knowledge on radar-based nowcasting system (b)To introduce operational implementation of radar-based nowcasting system in participants' National Hydrological and Meteorological Services (NHMSs). (c)Lectures and practical (hands-on) training basis with a focus on the modules of: i. Introduction and concept of Nowcasting based on WMO Guideline ii. Introduction to RaINS	(a) A Training Attachment Report (b) Progress report on the feasibility of operating the RaINS at the Participants' NHMSs	Regular (USD5,000 for two participants)	MET Malaysia HKO	All Members of the ESCAP/WMO TC	Mr. Muhammad Firdaus Ammar bin Abdullah (kumar@met.gov.my, antarabangsa@met.gov.my)	Completed

SP's KRA &SG	POP/AOP /PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Partici-pants	Coordinator (with email Address)	Status of completion
			iii. Running Radar Nowcast iv. Radar Nowcast Verification v. Blending Numerical Weather Prediction (NWP) data with Radar Nowcast Integrating Satellite Data with Radar						
KRA-2 KRA-3 KRA-5 KRA-7	AOP5	Storm surge watch scheme	(a) To add storm surge time series prediction points if requested by Members. (b) To publish verification results of storm surge predictions. (c) Request Members to provide complete hourly sea level data of at least one year to provide accurate astronomical tides at the stations. (d) Request Members to provide sea level observations during storm surge events for verification of storm surge predictions. (e) To improve the storm surge watch scheme model.	Submission of the progress report	/	JMA	/	Dr. ISHIHARA Koji (JMA) k-ishihara@met.kishou.go.jp	Completed
KRA1 KRA2 KRA6	AOP6	Contribution for the EXperiment On Typhoon Intensity Change in Coastal Area (EXOTICCA)-II	(a)Activities conducted in past 5 years: (b)Flight observation during Typhoon Ragasa in 2025 (c)Lidar matrix for wind observation in Typhoon Co-may in 2025 (d) Structure observation and	Submission of the progress report	-	CMA/STI	HKO SMG AP-TCRC	Dr. Jie TANG (CMA) tangj@typhoon.org.cn; Wai-kin Wong (HKO) wkwong@hko.gov.hk	Completed

SP's KRA &SG	POP/AOP /PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Partici-pants	Coordinator (with email Address)	Status of completion
			microphysics observation during Typhoon Danas in 2025						
KRA 2 KRA 5	AOP7	Enhancing Utilization of Himawari 8/9 Products	(a) Joint development to improve RDCA algorithm product verification with technical assistance by JMA to MMD, MSS, TMD and VNMHA. (b) To provide supports for operating of RDCA by PAGASA. (c) Submission of progress reports by the participants. Upon the receipt of the reports, holding follow-up technical meeting(s) to identify a way forward.	Submission of the progress report.	USD8,000	JMA	MMD, MSS, PAGASA, TMD, VNMHA	Mr. YASUI Kazuki (JMA) k_yasui@met.kishou.go.jp; Ms. Norasmawati Shahlal (MET Malaysia) asmawati@met.gov.my; Mr. Lim Yi Xiang (MSS) lim_yi_xiang@nea.gov.sg; Ms. Samantha Christine V. Monfero (PAGASA) cham@pagasa.dost.gov.ph; Mr. Jaral Yiemwech (TMD) mywebcenter@hotmail.com and copy to: manoonon2510@hotmail.com, tmd_inter@tmd.mail.go.th ; Mr. Nguyen Vinh Thu (VNMHA) vinhthu73@gmail.com	Completed
	AOP8	Parallel analysis of satellite data in operational	(a) enhance regional early warning capabilities based on multiple satellite data in	Submission of the progress report	USD7,000	National Meteorological Center,	China	xiangcy@cma.gov.cn	Completed

SP's KRA &SG	POP/AOP /PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Partici-pants	Coordinator (with email Address)	Status of completion
		tropical cyclone monitoring	strengthening international exchanges (b) Hold the 2rd international workshop by the end to 2025			CMA			
KRA1 KRA2 KRA3 KRA4 KRA5	AOP9	Enhancement of disaster risk reduction against heavy rain in collaboration of AOP7 of WGH	To support AOP7 of WGH through (a) Providing 1-month and 3-month ensemble NWP model data, necessary for the project and available, to ICHARM. (b) Continuing sharing knowledge and experience on awareness raising through lectures for online workshops and meetings of IFI project. (c) Promoting awareness with hydrological authorities to both local governments and public, including the appropriate use of products.	Submission of the progress report	/	JMA	Philippin es	Dr. ISHIHARA Koji (JMA) k-ishihara@met.kishou.go.jp	Completed
KRA1 KRA4	AOP10	GK2A Utilization for Tropical Cyclone	(a) Introduce GK2A products related typhoon forecast and share the technique using GK2A data	Submission of the progress report	-	KMA	-	Ms. Okhee KIM (koh@korea.kr)	Completed
	AOP11	Prepare for the fourth assessment report on impacts of climate change on tropical cyclones in the Typhoon	(a) Review latest climate research on typhoons activity and related regional influence since finalization of the third assessment report.	Submission of the progress report	USD3,000	CMA	HKO JMA KMA AP-TCRC	Dr. Xin HUANG (CMA) huangx@typhoon.org.cn	Completed

SP's KRA &SG	POP/AOP /PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Partici-pants	Coordinator (with email Address)	Status of completion
		Committee region	(b) Enhance scientific understanding of the impact of climate change on typhoon activities and related regional influence. (c) Promote research collaboration with the Typhoon Committee Members to assess and understand the impact of climate change on typhoons from history to future. (d) Develop the fourth assessment report and prepare to contribute to the seventh IPCC assessment cycle.						
KRA1 KRA4	AOP12	Tropical Cyclone Monitoring using Drifting Buoys	(a) To provide real-time ocean observation data using drifting buoys for monitoring tropical cyclones (b) To enhance the use of ocean data in analyzing its impact on TC activities	(a) Sharing ocean observations to members (b) Submission of the progress report	-	KMA	-	Ms. Seonghee Won (shwon11@korea.kr)	Completed
	AOP13	Promoting Technical Exchange of AI Applications in Tropical Cyclone	(a) Establish an Expert Team (ET) under TC WGM (b) Decide the scope and implementation plan regarding the R2O	Submission of progress report	USD5,000	(Members - TBD)	Members of the Expert Team	Chair/Co-chairs of the Expert Team	Completed

SP's KRA &SG	POP/AOP /PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Partici-pants	Coordinator (with email Address)	Status of completion
		Analysis and Forecasting	initiative on TC forecasting and verification (c) Develop a summary report (d) Organize a workshop if resources available						

Status of Preliminary Plans (PPs) of WGM in 2025

SP's KRA &SG	POP/AOP/ PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Participants	Coordinator (with email Address)	Status of completion
	PP1	Utilization of FengYun Satellite for High Frequency Observation of Tropical Cyclone	(a) Conducting FengYun satellite high frequency typhoon targeted observation and providing fast sharing of observation data. (b) Enhancing the FengYun satellite QPE product utilization in typhoon related rainstorm disaster monitoring and warning. (c) Organizing a workshop to discuss the FengYun satellite data application in typhoon.	Submission of the progress report	/	National Satellite Meteorological Center, CMA	TMD, Members interested in this project	Mr. XIAN Di (xiandi@cma.gov.cn) Mr. Wattana KANBUA (wattkan@gmail.com)	Completed

Annex II: Proposal for Perennial Operating Plans (POPs), Annual Operating Plans (AOPs) and Preliminary Projects (PPs) of WGM in 2026

Proposal for Perennial Operating Plans (POPs) of WGM in 2026

SP's KRA &SG	POP/AOP/ PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Participants	Coordinator (with email Address)	Remarks
KRA1 KRA2 KRA6	POP1	Improve the algorithm of typhoon summer prediction	(a) To improve typhoon summer prediction techniques (b) To share knowledge and encourage member's cooperation	(a) Provide information on summer typhoon prediction via e-mail for member countries in late May (b) Submission of the progress report	-	KMA	-	Ms. Seonghee Won (shwon11@korea.kr)	Continued (2021-)
KRA1-6	POP2	Tropical Cyclone Research and Review	(a) To publish the journal quarterly in 2026. (b) Improvement of the editorial procedure and the journal's influence	Submission of the progress report	USD8,000	CMA	Members	Mr. Fang Zheqing (CMA) fangzq@typhoon.org.cn Ms. Lin Yutong (CMA) Dr. Wang Dongliang, (CMA)	Continued (2013-)
KRA1 KRA2 KRA6 SG 6b SG 6c	POP3	Verification of tropical cyclone operational forecast	(a) To carry out post-season verification on the operational forecast of 2025 typhoon and report to Committee session. (b) To further improve the verification methodologies of evaluation system for typhoon forecast. (c) To offer fellowship for training on (b).	(a) Submission of the post-season verification report for TC Session. (b)Progress report on the improvement of evaluation system for tropical cyclone forecast.	/	CMA, HKO	Members	Ms. Mengqi YANG (CMA) yangmq@typhoon.org.cn	Continued (2015-)

Proposal for ,Annual Operating Plans (AOPs) of WGM in 2026

SP's KRA &SG	POP/AOP/ PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Participants	Coordinator (with email Address)	Remarks
KRA2	AOP1	Enhanced use of ensemble forecast	(a) To continue providing the current operational products using ensemble forecast. (b) To report a follow-up to the planned improvement of probabilistic forecast products around 2030.	Submission of the progress report	/	JMA	/	Dr. ISHIHARA Koji (JMA) k-ishihara@met.kishou.go.jp	Continued (2011-)
KRA1 KRA2 KRA6	AOP2	Improve the performances and impacts of South China Sea typhoon model	(a) Improving the long-term forecast performance of CMA-TRAMS in terms of TC track. Expanding the model domain of CMA-TRAMS. (b) Upgrading the physical parameterizations, especially the convection parameterization. (c) Use of AI techniques in improving the surface analysis and model integration. (d) Improving the perturbation methods in ensemble forecasting.	Submission of the assessment report for the forecast performance of CMA-TRAMS	/	CMA	SMG	Dr. Xubin Zhang (CMA) xbzhang@gd121.cn	Continued (2012-)
KRA2 KRA5	AOP3	Development of regional observation network (Previous name: Development of regional radar network)	(a) To further refine quality control and QPE techniques applied to the observation networks of the participating Members, including dual pol. radars, to improve their capability to use observation data for severe weather monitoring and forecasting. (b) To facilitate the implementation and expansion of experimental radar data exchange, and to share the progress with the Regional WIGOS project in Southeast Asia as a contribution to RBON implementation.	Submission of the progress report	USD8,000	TMD, MET Malaysia, JMA	Lao PDR, Viet Nam, Philippines	Mr. Fatah Masthawee (TMD) (fatah_m@yahoo.com), copy to (ii.arrm.bb@gmail.com), (prapaporn.w@tmd.mail.go.th); Mr. Asmadi Abdul Wahab(MET Malaysia) asmadi@met.go	Continued (2011-)

SP's KRA &SG	POP/AOP/ PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Participants	Coordinator (with email Address)	Remarks
			(c)To organize meeting(s)/workshop(s) to understand the current status and possibility to support regional exchange of observation data for GBON/RBON implementation.					v.my; Mr. ENDO Hiroya(JMA) h_endo@met.kishou.go.jp	
KRA1, KRA2, KRA3, KRA4, KRA5, KRA6, KRA7	AOP4	Radar nowcasting based on RaINS/SWIRL	(a)To promote sharing of knowledge on radar-based nowcasting system (b)To introduce operational implementation of radar-based nowcasting system in participants' National Hydrological and Meteorological Services (NHMSs). (c)Lectures and practical (hands-on) training basis with a focus on the modules of: i. Introduction and concept of Nowcasting based on WMO Guideline ii. Introduction to RaINS iii. Running Radar Nowcast iv. Radar Nowcast Verification v. Blending Numerical Weather Prediction (NWP) data with Radar Nowcast Integrating Satellite Data with Radar	(a) A Training Attachment Report (b) Progress report on the feasibility of operating the RaINS at the Participants' NHMSs	Regular (USD5,000 for two participants)	MET Malaysia HKO	All Members of the ESCAP/WMO TC	Mr. Muhammad Firdaus Ammar bin Abdullah (kumar@met.gov.my, antarabangsa@met.gov.my)	Continued (2019-)
KRA-2 KRA-3 KRA-5 KRA-7	AOP5	Storm surge watch scheme	(a) To add storm surge time series prediction points if requested by Members. (b) To publish verification results of storm surge predictions. (c) Request Members to provide complete hourly sea level data of at least one year to provide accurate astronomical tides at the stations. (d) Request Members to provide sea level observations during storm	Submission of the progress report	/	JMA	/	Dr. ISHIHARA Koji (JMA) k-ishihara@met.kishou.go.jp	Continued (2012-)

SP's KRA &SG	POP/AOP/ PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Participants	Coordinator (with email Address)	Remarks
			surge events for verification of storm surge predictions.						
KRA1 KRA2 KRA6	AOP6	Contribution for the EXperiment On Typhoon Intensity Change in Coastal Area (EXOTICCA)-III	(a)Activities conducted in past 5 years: (b)International cooperational flight experiment for typhoons in the East China Sea in 2026 with NIMS/KMA and other partners. (c) Cooperational experiment with HKO for typhoons in the South China Sea in 2026 (d) Wind profiles during typhoon landfall	Submission of the progress report	-	CMA/STI	HKO AP-TCRC	Dr.Robert Rogers (AP-TCRC) robert@typhoon.org.cn Dr. Jie TANG (CMA) tangj@typhoon.org.cn; Dr. Wai-kin WONG (HKO) wkwong@hko.gov.hk	Continued (2014-)
KRA 2 KRA 5	AOP7	Joint Development of Rapidly Developing Cumulus Areas product for weather monitoring (Previous name: Enhancing Utilization of Himawari 8/9 Products)	(a) Joint development to improve RDCA algorithm product verification with technical assistance by JMA to MMD, MSS, TMD and VNMHA. (b) To provide supports for operating of RDCA by PAGASA. (c) Submission of progress reports by the participants. Upon the receipt of the reports, holding follow-up technical meeting(s) to identify a way forward.	Submission of the progress report.	USD8,000	JMA	MMD, MSS, PAGASA, TMD, VNMHA	Mr. YASUI Kazuki (JMA) k_yasui@met.kishou.go.jp; Ms. Norasmawati Shahlal (MET Malaysia) asmawati@met.gov.my; Mr. Lim Yi Xiang (MSS) lim_yi_xiang@nea.gov.sg; Ms. Samantha Christine V. Monfero (PAGASA) cham@pagasa.dost.gov.ph; Mr. Jaral Yiemwech (TMD) (mywebcenter@hotmail.com)	Continued (2018-)

SP's KRA &SG	POP/AOP/ PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Participants	Coordinator (with email Address)	Remarks
								and copy to: (manoonon2510@gmail.com), (prapaporn.w@tmd.mail.go.th) Mr. Nguyen Vinh Thu (VNMHA) vinhthu73@gmail.com	
	AOP8	Parallel analysis of satellite data in operational tropical cyclone monitoring	(a) To host an in-person workshop in early May 2026, with participants from member states and invited consulting advisors. (b) To highlight the use of new satellite data in the operational monitoring of tropical cyclones.	Submission of the progress report	USD7,000	National Meteorological Center, CMA	China	xiangcy@cma.gov.cn	Continued
KRA1 KRA2 KRA3 KRA4 KRA5	AOP9	Enhancement of disaster risk reduction against heavy rain in collaboration of AOP7 of WGH	To support AOP7 of WGH through (a) Providing 1-month and 3-month ensemble NWP model data, necessary for the project and available, to ICHARM. (b) Continuing sharing knowledge and experience on awareness raising through lectures for online workshops and meetings of IFI project. (c) Promoting awareness with hydrological authorities to both local governments and public, including the appropriate use of products.	Submission of the progress report	/	JMA	Philippines	Dr. ISHIHARA Koji (JMA) k-ishihara@met.kishou.go.jp	Continued (2019-)
KRA1 KRA4	AOP10	GK2A Utilization for Tropical Cyclone	(a) Introduce GK2A products related typhoon forecast and share the technique using GK2A data	Submission of the progress report	-	KMA	-	Ms. Okhee KIM (koh@korea.kr)	Continued (2021-)
	AOP11	Prepare for the fourth assessment report on impacts of climate change on tropical	(a) Organize an in-person expert meeting in December 20205 to facilitate face-to-face discussions on the TC-AR4. (b) Aim to complete the first draft of the TC-AR4 by the end of 2026.	Submission of the progress report	USD3,000 (Travel expenses for expert group members)	CMA	HKO JMA KMA AP-TCRC	Dr. Xin HUANG (CMA) huangx@typhoon.org.cn	Continued (2023-)

SP's KRA &SG	POP/AOP/ PP No.	Objectives	Actions	Success Indicators	Funding (Regular/ Special)	Organizer	Participants	Coordinator (with email Address)	Remarks
		cyclones in the Typhoon Committee region							
KRA1 KRA4	AOP12	Tropical Cyclone Monitoring using Drifting Buoys	(a) To provide real-time ocean observation data using drifting buoys for monitoring tropical cyclones. (b) To enhance the use of ocean data in analyzing its impact on TC activities.	(a) Sharing ocean observations with members (b) Submission of the progress report	-	KMA	-	Ms. Seonghee Won (shwon11@korea.kr)	Continued (2023-)
	AOP13	Promoting Technical Exchange of AI Applications in Tropical Cyclone Analysis and Forecasting	(a) Continue intercomparison verification work; (b) Maintain data exchange platform; (c) Develop a summary report; (d) Organize a workshop and face-to-face expert team meeting.	Submission of progress report	USD12,000 (Cost to maintain data exchange platform, support for workshop/ ET meeting)	Lead by the Expert Team on AI Applications in Tropical Cyclone Analysis and Forecasting (ET-AITC)	Members of the Expert Team, all TC Members (for participation of Workshop)	Mr. Yu-heng He (HKO) yhhe@hko.gov.hk And Dr. Munehiko Yamaguchi (JMA) myamagu@mri-jma.go.jp	Continued (2024-)
	AOP14	Utilization of FengYun Satellite for High Frequency Observation of Tropical Cyclone	(a) Conducting FengYun satellite high frequency typhoon targeted observation, providing fast sharing of observation data, and providing operational service in 2026. (b) Continue to develop the TC platform of FengYun satellite. (c) Strengthen the application of newly launched FengYun satellites (FY-4C and FY-3H), including new instruments such as microwave, infrared hyperspectral, space-borne radar, and lightning imager. (d) Reserve seats for TC members in the 2026 Meteorological Satellite Utilization Training hosted by CMA.	Submission of the progress report	/	National Satellite Meteorological Center, CMA	TMD, Members interested in this project	Mr. XIAN Di (xiandi@cma.gov.cn); Ms.Prapaporn Wongsaming (TMD) (prapaporn.w@tmd.mail.go.th) and copy to (thaweesakc@gmail.com), (manoonon2510@gmail.com),	Continued(2025~) Moved from PP1 to AOP14 in 2026

Annex III: Report of the 8th Annual Meeting of Working Group on Meteorology (WGM)

Report of the 8th Annual Meeting of Working Group on Meteorology (WGM)

Organization of the Meeting

1. The 8th Annual Meeting of Working Group on Meteorology (WGM) was hosted by Hong Kong, China and was held at the Hong Kong Observatory (HKO) headquarters from 21 to 22 October 2025. The meeting was held in hybrid mode.

2. More than 28 participants from 12 Members from the Typhoon Committee participated in the meeting, including Cambodia; China; Hong Kong, China; Japan; Lao PDR; Macao, China; Malaysia; Philippines; Republic of Korea; Thailand; United States of America and Viet Nam. 3 representatives from Typhoon Committee Secretariat (TCS) and World Meteorological Organization (WMO) were also present. The final programme of the meeting is listed in Annex I, and the participant list (with group photo) is listed in Annex II.

3. The opening remarks were delivered by Dr. CHAN Pak Wai, Director of HKO; Mr. YU Jun, Regional Officer of WMO and Dr. TANG Jie, Chairperson of WGM. The meeting was moderated by Dr. TANG Jie and Mr. Ambun DINDANG.

Technical Presentations and Member Reports

4. Technical presentations/invited talks were given by four experts from Japan; Hong Kong, China and China, respectively. The topics included overview of tropical cyclone activities in 2025, advanced in weather forecasting and warning communication; objective identification of tropical cyclone landfall and applications of artificial intelligence in tropical cyclone analysis and forecasting.

5. Members also presented their Members Reports in the meeting.

WGM Annual Operating Plans in 2025

6. The main purpose of the meeting was to review the progress of the annual operating plans of WGM in 2025, which included 3 POPs (Perennial Operating Plans), 13 AOPs (Annual Operating Plans) and 1 PP (Preliminary Plan). Project coordinators or representatives gave presentations to report the progress of their plans.

7. The action plans of these annual operating plans in 2026 were also reviewed. All plans will continue in 2026, with AOP3 renamed to “Development of Regional Observation Network” and AOP7 renamed to “Joint Development of Rapidly Developing Cumulus Areas Product for Weather Monitoring” to reflect the latest status of the plan. PP1 will be moved to AOP14.

8. The budget requirement for most annual operating plans remained unchanged in 2026. AOP13 “Promoting Technical Exchange of AI Applications in Tropical Cyclone Analysis and

Forecasting" requested an increase of budget requirement from USD5,000 to USD12,000 for organizing a workshop in Shanghai, China in 2026 as well as maintaining the data exchange platform.

Technical Tour

9. A technical tour to the Hong Kong Observatory including the Forecasting Office and Centenary Building was arranged in the afternoon of 22 October 2025.

Other Business

10. The date and place for the 9th Annual Meeting of WGM was discussed. Republic of Korea expressed interested to host the Meeting. More details will be available during the 20th IWS in Macao, China to be held in December 2025.

11. The meeting also discussed the establishment of a unified typhoon landfall data set for the Northwest Pacific region and the related objective standard, with the aim of supporting climate research.

12. Being no other business, the meeting was closed at 4:25 pm on 22 October 2025.

Annex I ***Final Programme of the Meeting***

Date	Time	List	Remarks
Day 1 21 Oct (Tue)	09:00-09:30	Registration	
	09:30-10:00	Opening Remarks 1. **Dr. Pak-wai CHAN**, Director of the Hong Kong Observatory 2. **Mr. Jun YU**, Regional Officer of WMO 3. **Dr. Jie TANG**, Chairperson of WGM	
	10:00-10:05	Photo Session	
	10:05-11:10	Round-table introduction Technical presentations/ Invited talks of AOP 1. Overview of Tropical Cyclone Activities in 2025 and Planned Operational Enhancements by **Dr. Koji ISHIHARA, JMA** 2. Advances in Weather Forecasting and Warning Communication for Super Typhoon Ragasa - Hong Kong Experience by **Mr. Chun-wing CHOY, HKO**	About 30 min for each including Q&A
	11:10-11:30	Coffee Break	
	11:30-12:30	Technical presentations/ Invited talks of AOP (continued) 3. Objective Identification of Tropical Cyclones Making Landfall in the Asia-Pacific Region by **Dr. Lina BAI, CMA** 4. Progress on AOP 13: Promoting Technical Exchange of AI Applications in Tropical Cyclone Analysis and Forecasting by **Mr. Yuheng HE, HKO**	About 30 min for each including Q&A
	12:30-14:00	Welcome Lunch at New Bamboo Garden, a Chinese dim-sum restaurant	
	14:00-15:45	POP/AOP/PPs Presentations	15 min. for each including Q&A
	15:45-16:05	Coffee Break	
	16:05-17:50	• POP/AOP/PPs Presentations (continued) • New AOP Discussion	

Day 2 22 Oct (Wed)	9:00-10:30	Member Report (Cambodia; China; Hong Kong, China; Japan; Lao PDR; Macao, China)	15 min. for each including Q&A
	10:30-11:15	Coffee Break	
	11:15-12:30	Member Report (Malaysia; Philippines; ROK; Singapore; Thailand; USA)	15 min. for each including Q&A
	12:30-14:00	Lunch Time	
	14:00-15:20	Tour at HKO headquarters and break	
	15:20-16:40	• Review of WGM 2025 Budget • Discussion for WGM 2026 Plans and Budget • Date and Place for the 9th Annual Meeting of WGM • A.O.B.	
	16:40-17:00	Closing **Mr. Chun-wing CHOY**, Acting Assistant Director of the Hong Kong Observatory	

Annex II List of participants

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Group photo of participants taken at the Hong Kong Observatory in Hong Kong, China on 21 October 2025.