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FOR PARTICIPANTS ONLY
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ACTIVITIES OF THE RSMC TOKYO - TYPHOON CENTER IN 2025

(Submitted by the RSMC Tokyo - Typhoon Center)

ACTION REQUIRED:

The Committee is invited to review the activities of the RSMC Tokyo - Typhoon Center in 2025 and future plans.

APPENDIXES:

- (A) DRAFT TEXT FOR INCLUSION IN SESSION REPORT
- (B) RSMC Tokyo - Typhoon Center Activity Report 2025 and future plans

APPENDIX A:
DRAFT TEXT FOR INCLUSION IN THE SESSION REPORT

x.x Review of the activities of the Regional Specialized Meteorological Center (RSMC) Tokyo in 2025

1. The Committee noted with appreciation the review of RSMC advisories, products and operational activities and changes made in 2025. It noted the forecast verification results for 27 TCs that reached TS intensity or higher in 2025: forecast track errors for the year of 67 km (71 km in 2024), 105 km (106 km), 179 km (152 km), 302 km (245 km) and 508 km (424 km) for 24-, 48-, 72-, 96- and 120-hour forecasts, respectively; annual mean root mean squared errors (RMSEs) for central pressure forecasts of 10.3 hPa (10.9 hPa), 13.2 hPa (13.4 hPa), 13.8 hPa (16.5 hPa), 13.5 hPa (20.4 hPa) and 13.7 hPa (23.8 hPa) for 24-, 48-, 72-, 96- and 120-hour forecasts, respectively; and those for maximum wind speed forecasts of 4.8 m/s (5.3 m/s), 6.0 m/s (6.2 m/s), 6.4 m/s (7.3 m/s), 6.6 m/s (8.6 m/s) and 7.2 m/s (10.5 m/s) for 24-, 48-, 72-, 96- and 120-hour forecasts, respectively. Please note that the track/intensity commentaries for **Koto (2527)** are preliminary at the moment and subject to change after best-track data are finalized.
2. The Committee noted with appreciation the changes made to RSMC advisories, products and operational/coordination activities in 2025, especially the upgrades to the Japan Meteorological Agency's (JMA's) operational global model and the introduction of early announcement issuance via the TC Communication platform.
3. The Committee noted with appreciation the operation of RSMC Tokyo's Numerical Typhoon Prediction (NTP) website, and noted changes planned for the near future.
4. The Committee noted with appreciation 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 and early-announcement updates. In the 2025 typhoon season, 34 inquiries relating to tropical cyclones were submitted, with related discussion helping to clarify TC status and forecasts.
5. The Committee noted with appreciation 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 ICAO Meteorological Information Exchange Model (IWXXM) 3.0 formats via multi-platform channels such as the TCAC Tokyo website.
6. The Committee noted with appreciation the ongoing contribution of RSMC Tokyo to the regional Storm Surge Watch Scheme (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.
7. The Committee welcomed RSMC Tokyo's efforts in seeking further approaches to increase the benefits of ensemble forecast utilization, including improvement of current operational products.
8. The Committee was pleased to note the progress of the regional radar network development project, especially the creation of a sample regional composite map based on Members' radar data. The project has been expanded, with Japan, Thailand, Malaysia, Vietnam and Singapore now participating in the regional radar data exchange. The Committee appreciated the Members' attendance at a February 2026 workshop focusing on legal frameworks, including data policies, to promote data distribution in Japan.
9. The Committee was pleased to note 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, the Philippines, 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.

10. The Committee noted with appreciation RSMC Tokyo's publication of Technical Review No. 27 in January 2025 and the Annual Report on the Activities of the RSMC Tokyo - Typhoon Center 2024 in November 2025.
11. The Committee was pleased to note RSMC Tokyo's completion of tropical cyclone satellite re-analysis in 2023 along with basic quality checking (QC) begun in 2012 for the period from 1987 to 2016 to enable evaluation and improvement regarding the quality of current intensity (CI) numbers in satellite TC analysis. The Committee also noted that there had been 14 requests for dataset provision since the service began.
12. The Committee noted with appreciation 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 their usage.
13. The Committee noted with appreciation RSMC Tokyo's conduct of the 25th Attachment Training course from 13 to 22 January 2026, hosting four forecasters from Malaysia, the Philippines, Thailand and Viet Nam, and two (self-funded) from Hong Kong (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 one forecaster from PTC Member: Sri Lanka.
14. The Committee noted with appreciation 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 participation 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 to support consistent cross-basin information delivery.

APPENDIX B: RSMC Tokyo - Typhoon Center Activity Report 2025 and future plans

1. RSMC advisories, products and operational/coordination activities

The RSMC Tokyo – Typhoon Center provides Typhoon Committee Members with a range of products related to tropical cyclones over the western North Pacific and the South China Sea through the Global Telecommunication System (GTS) of the World Meteorological Organization (WMO) and the Aeronautical Fixed Telecommunication Network (AFTN). This section reviews RSMC advisories, products and operational activities in 2025 and summarizes changes and future plans.

1.1 Review of RSMC advisories, products and operational activities in 2024

Table 1 shows the total number of RSMC Tropical Cyclone (TC) advisories and information issuances made via GTS in 2025.

✧ Verification of track forecasts

Operational track forecasts for 27 TCs reaching Tropical Storm (TS) intensity or higher in 2025 were verified against the Center's analysis data. Figure 1 shows a time-series representation of annual mean positional errors for 24-hour (from 1982), 48-hour (from 1989), 72-hour (from 1997), 96-hour and 120-hour (from 2009) forecasts. The errors by year are 67 km (71 km in 2024), 105 km (106 km), 179 km (152 km), 302 km (245 km) and 508 km (424 km) for 24-, 48-, 72-, 96- and 120-hour forecasts, respectively (Table 2).

✧ Verification of track forecast probability circles

RSMC Tokyo uses track forecast probability circles* to represent TC track forecast uncertainty. The mean hit ratios of circles for 24-, 48-, 72-, 96- and 120-hour forecasts throughout 2025 are 82% (75% in 2024), 85% (81%), 79% (78%), 69% (69%) and 64% (62%), respectively (Table 3).

* Track forecast probability circle: an area within which the center of a TC is expected to be located with a probability of 70% at each forecast time.

✧ Verification of intensity forecasts

Tables 4 a and 4 b give the mean errors and root mean square errors (RMSEs) for 24-, 48-, 72-, 96- and 120-hour central pressure (Table 4a) and maximum sustained wind forecasts (Table 4 b) for 27 TCs in 2025. The annual mean RMSEs for central pressure forecasts are 10.3 hPa (10.9 hPa in 2024), 13.2 hPa (13.4 hPa), 13.8 hPa (16.5 hPa), 13.5 hPa (20.4 hPa) and 13.7hPa (23.8 hPa) for 24-, 48-, 72-, 96- and 120-hour forecasts, respectively, while those for maximum wind speed forecasts for 24-, 48-, 72-, 96- and 120-hour forecasts are 4.8 m/s (5.3 m/s in 2024), 6.0 m/s (6.2 m/s), 6.4 m/s (7.3 m/s), 6.6 m/s (8.6 m/s) and 7.2 m/s (10.5 m/s), respectively.

✧ TC communication platform

RSMC Tokyo maintains a dedicated platform for enhanced communication between operational forecasters and RSMC-Tokyo, as well as for the sharing of advance-notice and early-announcement updates. In the 2025 typhoon season, 34 inquiries on tropical cyclones were submitted, with related discussion helping to clarify TC status and forecasts. To further encourage active discussion on the platform, RSMC Tokyo has provided support to Members with accounts showing limited recent activity.

1.2 Changes in RSMC advisories, products and operational activities in 2025

✧ Operational global model upgrade

JMA upgraded its operational Global Spectral Model (GSM) and Global Ensemble Prediction

System (GEPS).

✧ **Early announcement prior to advance notice**

During the 2025 typhoon season, RSMC Tokyo commenced early announcement of potential upgrade prior to conventional advance notice via the TC Communication platform.

1.3 Plans for changes in RSMC advisories, products and operational activities

✧ **Advancement of Tropical Cyclone Information toward 2030 and beyond**

JMA plans to advance technical development and system upgrades for even more detailed and timely tropical cyclone advisories toward 2030 and beyond. The scope of the planned improvements includes long-range outlooks on timescales ranging from a week to six months, and enhanced forecasts with six-hourly intervals accompanied by detailed radii for 30 and 50 kt wind areas.

✧ **Upgrade of Ocean Wave Height Prediction Website to Expand Coverage in the Indian Ocean**

To cover a broader area of the Indian Ocean, RSMC Tokyo plans to upgrade its ocean wave height prediction website in the 2026 typhoon season with the display range extended from 70 to 40°E and from 40 to 50°S.

2. Web-based RSMC TC Products

2.1 Numerical Typhoon Prediction (NTP) website

Since October 2004, RSMC Tokyo has operated the Numerical Typhoon Prediction (NTP) website as part of its contribution to the WMO/ESCAP Typhoon Committee. All website products are listed in Table 5.

2.2 Tropical cyclone advisories for SIGMET in text, graphical and XML formats

As an International Civil Aviation Organization (ICAO) Tropical Cyclone Advisory Centre (TCAC Tokyo), RSMC Tokyo provides tropical cyclone advisories in text, graphical and XML formats, with ICAO Standards and Recommended Practices (SARPs) compliance. TCAs are issued when 1) a tropical cyclone with TS intensity or higher is present in TCAC Tokyo's area of responsibility, or 2) a tropical cyclone is expected to reach TS intensity in the area within 24 hours.

Message details include the following:

✧ Graphical TCAs

- In addition to official RSMC Tokyo TC advisories, TCAs describe areas of cumulonimbus (Cb) associated with tropical cyclones potentially affecting aviation safety as derived from Himawari geostationary satellite data. Graphical TCA information and related specifications are provided via the TCAC Tokyo web resource at <https://www.data.jma.go.jp/tca/data/index.html>. Graphical TCAs are sent to World Area Forecast Centres (WAFCs) for transmission via WAFS Internet File Service (WIFS) and Secure Aviation Data Information Service (SADIS) FTP.
- Gale force wind areas are not included for tropical cyclones lower than tropical storm intensity.

✧ ICAO Meteorological Information Exchange Model (IWXXM) 3.0-formatted TCAs

- TCAs in IWXXM format are provided via Air Traffic Services (ATS) Message Handling Services (AMHS) and the TCAC Tokyo website.

TCAC Tokyo contributes to annual ICAO Asia-Pacific (APAC) and Europe (EUR) SIGMET tests by issuing tropical cyclone advisory test messages.

2.3 Experimental version of TC advisory in CAP format

RSMC Tokyo has experimentally provided TC advisory content in CAP format on the JMA website (https://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/RSMC_HP.html) since 12 November 2012.

3. RSMC Tokyo-led activities

3.1 Regional storm surge watch scheme suitable for the Typhoon Committee region

To support storm surge prediction, RSMC Tokyo has provided products since 2011 within the framework of the Storm Surge Watch Scheme (SSWS) in response to the results of a survey conducted in 2009 after a devastating storm surge caused by Cyclone Nargis in 2008 (Hasegawa et al. 2017).

As described in 2.1, RSMC Tokyo provides Members with graphical SSWS products via the NTP website. These include storm surge forecast distribution maps and time-series charts for selected stations (Table 5). In order to predict storm surges for the regional SSWS, RSMC Tokyo runs a storm surge watch scheme model four times a day, even when no TCs are present in the area of responsibility, providing information on surges generated by monsoon winds or extra-tropical cyclones.

The number of stations provided with storm surge time-series predictions has been increased in response to requests from Committee Members. As of January 2025, predictions are provided to 78 stations in the USA (1), the Philippines (10), Vietnam (20), Hong Kong (China) (6), Macao (China) (1), the Republic of Korea (11), Thailand (2), Malaysia (17), Cambodia (4) and Singapore (6). Time-series representations of storm surge predictions are provided on top of astronomical tides for stations with figures calculated from a few years of hourly tidal observational data provided by Members. Since February 2019, data on astronomical and storm tides have also been made available via a global ocean tide solution (FES) for stations where related observational data are not available.

Annual verification results for storm surge products have been published in the Annual Report on Activities of the RSMC Tokyo since 2015. Statistical verification is conducted for stations where sea level observation data are available in the University of Hawaii Sea Level Center (UHSLC) and Global Sea Level Observing System (GLOSS) database. Verification is constantly enhanced with results for high-impact storm surges in addition to statistical checking.

As well as storm surge forecast products, RSMC Tokyo provides week-range wave forecast products based on the JMA Wave Ensemble System (WENS) via the NTP website (Table 5). WENS covers most of the global region (grid resolution: 0.5 degrees; ensemble members: 51), running at 00 and 12 UTC daily to predict conditions such as wave heights and periods up to 264 hours ahead.

In 2026, RSMC Tokyo plans to enhance typhoon bogussing in SSWS model including the introduction of a vortex relocation scheme to resolve typhoon doubling issues and the upgrading of TC wind profiles. For wave products, the display area of WENS charts on the NTP website will be expanded.

3.2 Enhanced use of ensemble forecasts

RSMC Tokyo works to enhance operational use of ensemble forecasts by Committee Members. Such forecasts are currently used for:

- ✧ Provision of ensemble TC track guidance from ECMWF, NCEP, UKMO and JMA via the NTP website.
- ✧ Provision of two- and five-day tropical cyclone activity prediction (TCAP) maps displaying percentages of ensemble members in which TC-like vortices are represented within 300 km of certain locations during the relevant forecast time. Provision via the NTP website

started in 2016, and accuracy improvement based on parameter tuning was introduced in 2020 along with the addition of climatological normal maps.

- ✧ Probability circles show the range into which the center of a TC is expected to move with 70% probability at each validation time. Since June 2019, the radius for all forecast times has been determined using the multiple ensemble method, which is solely premised on confidence levels based on cumulative ensemble spread calculated using ECMWF, NCEP and UKMO global EPSs in addition to GEPS.

RSMC Tokyo upgraded its global ensemble model in March 2025, including sophistication of the model ensemble method, adjustment of initial perturbation amplitude, and improvement on of sea surface temperature perturbation. The new ensemble products are utilized for TC activity prediction maps, track forecast probability circles and TC genesis guidance.

3.3 Development of Regional Radar Networks

Development of Regional Radar Networks is a project of the Typhoon Committee's Working Group on Meteorology. Technical assistance provided via the project includes development of a domestic radar network, radar data quality control and application of composite as well as quantitative precipitation estimation (QPE) techniques to the nationwide radar network. As a result of activities conducted in collaboration with Thailand and Malaysia (such as participation in technical meetings and workshops), an experimental radar data exchange involving these Members and Japan was initiated in 2016. Since the second half of the 2010s, international radar workshops were held in Japan to share knowledge and discuss the expansion of data exchange. In 2019, the Guidelines for Participation in Experimental Regional Radar Composite Data Exchange in Southeast Asia were developed by the participating Members. Since then, Members that have agreed to the Guidelines have joined the data exchange and the technical coordination for data exchange was processed between the participants and JMA. The project has been expanded, with Japan, Thailand, Malaysia, Vietnam and Singapore now participating in the regional radar data exchange. In 2025, a summary report was compiled that outlined the current situations and challenges. Hourly regional radar composite imagery based on exchange data is available on the RSMC Tokyo NTP website at <https://tynwp-web.kishou.go.jp/remote/radar/index.html>.

While there is a strong desire among Members to monitor the precipitation in their own and surrounding areas, some Members are limited in their provision of observation data externally due to their legal frameworks. Therefore, JMA held a workshop focusing on legal frameworks, including data policies, to promote data distribution in Japan in February 2026.

3.4 Enhancement of Himawari-8/9 Data Utilization

Enhancing Utilization of Himawari 8/9 Products is a project conducted by the Working Group on Meteorology under the Typhoon Committee. Technical assistance provided through the initiative includes a developing Rapidly Developing Cumulus Area (RDCA) detection technique using Himawari-8/9 products. A technical meeting was held with experts from Malaysia at JMA headquarters in October 2018 to discuss recent progress and ideas for advanced products in the field, and technical support/interaction between Malaysia and RSMC Tokyo is conducted via e-mail.

An online technical meeting was also held with Members from Singapore, Thailand and Vietnam in February 2020 to outline RDCA detection, including technical aspects and the wide-ranging usage and verification methods implemented. Members also considered potential RDCA applications and data suitable for verification. In 2021, Japan experts considered future initiatives, including another meeting in February 2022, to promote the adoption of RDCA detection techniques.

Since the 2022 meeting, JMA has provided source code for RDCA detection with Singapore, Thailand and Vietnam, and reviewed the development status of each country along with that of Malaysia. The 2024 meeting was held with Members from the Philippines in addition to Malaysia, Singapore, Thailand and Vietnam, and JMA has provided support for related

activities. JMA also provided the source code to the Philippines, and an online meeting with Members from all five countries was held in March 2025 to support the RDCA products development of Members. In December 2025, an in-person technical meeting was held in Japan, bringing together Members from Malaysia, the Philippines, Singapore, Thailand and Vietnam, to review their development status and provide hands-on technical support.

The High-resolution Cloud Analysis Information (HCAI) satellite-derived product based on data from the Advanced Himawari Imager (AHI) units on the Himawari-8/-9 satellites incorporates information on cloud mask (including dust mask), snow and ice mask, cloud top height, cloud type and quality control. HCAI data are provided to National Meteorological and Hydrological Services (NMHSs) via the JMA Data Dissemination System (JDDS) every 10 minutes in addition to AMV-based Sea-surface Wind data.

3.5 Cross-cutting activities with ICHARM

Enhancement of disaster risk reduction against heavy rain in collaboration with the Annual Operating Plan (AOP) of the Working Group on Hydrology (WGH), led by ICHARM, is undertaken by RSMC Tokyo for the Working Group on the Meteorology (WGM) side. RSMC Tokyo currently provides a range of JMA NWP model data to ICHARM for effectiveness testing and determination of which data to use for the project. RSMC Tokyo has provided one-month and three-month ensemble NWP model data since 2021.

As part of collaborative efforts, ICHARM highlighted typhoon-related hydrology and gave a presentation on flood forecasting at RSMC Tokyo attachment training in 2025.

4. Publications

4.1 Technical Review

RSMC Tokyo published “Upgrade of JMA’s Operational Global Numerical Weather Prediction System” in Technical Review No. 27 in January 2025. This is available on the Center’s website at <https://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/techrev.html>.

4.2 Annual report on the activities of the RSMC Tokyo – Typhoon Center

RSMC Tokyo published the Annual Report on the Activities of the RSMC Tokyo – Typhoon Center 2024 in November 2025. This is available on the Center’s website at <https://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/annualreport.html>.

5. Other related activities

5.1 Tropical cyclone satellite re-analysis

In response to discussions held at the Seventh WMO International Workshop on Tropical Cyclones (IWTC-VII La Reunion, France, 15 – 20, November 2010) and the 2nd International IBTrACS Workshop (Honolulu, Hawaii, 11 – 13 April 2011) in conjunction with the WMO-sponsored International Workshop on Satellite Analysis of Tropical Cyclones (IWSATC) (Honolulu, Hawaii, 13 – 16 April 2011), RSMC Tokyo started tropical cyclone satellite re-analysis in 2012 for the period from 1981 onward to check and enhance the quality of Current Intensity (CI) numbers in satellite TC analysis. Re-analysis for the period from 1987 to 2016 was completed in 2023, and RSMC Tokyo provides the full dataset to Members on request. There have been 14 requests since the service began.

5.2 Himawari-8/9

JMA’s Himawari-8/9 geostationary meteorological satellites are both equipped with optimized Advanced Himawari Imagers (AHIs). The Agency aims to provide stable and continuous satellite observation with redundancy based on operation of these satellites to support disaster risk reduction in East Asia and the western Pacific until Japan Fiscal Year (JFY) 2030. Himawari-8 was chiefly used for observation from 7 July 2015 onward, with Himawari-9 in a back-up role. These roles were switched on 13 December 2022, placing Himawari-9 in the

main observational role and Himawari-8 as back-up. In particular, the satellites are expected to support unprecedented levels of mitigation for tropical cyclone-related disasters in the above target areas. To provide Himawari-8/9 imagery, JMA runs the HimawariCast service (by which primary sets of imagery are disseminated for operational meteorological services via a communication satellite) and the HimawariCloud service (by which full sets of imagery are delivered to National Meteorological and Hydrological Services (NMHSs) via an Internet cloud service). The Agency continuously provides Himawari-8/9 imagery in SATAID format via the WIS/GISC Tokyo server with its automatic downloader.

The AHIs on board Himawari-8/9 are capable of frequent and flexible observation, providing full-disk images of the earth every 10 minutes and regional images with shorter periodicity. In regional monitoring, target-area observation provides imagery covering an area of approximately 1,000 x 1,000 km every 2.5 minutes with flexibility for locational changes. This rapid observation provides superior insight for extreme events such as tropical cyclones and volcanic eruptions. An example of application for tropical cyclones is ASWind (Chapter 2.1), which is used operationally by RSMC Tokyo for estimation relating to sea surface winds in the vicinity of tropical cyclones.

In January 2018, JMA launched the international HimawariRequest service, allowing NMHSs to request Target Area observations, within a framework of a WMO RA II (Asia) regional project conducted in collaboration with WMO RA V (South-West Pacific) Members. As of the end of December 2025, the Agency had taken registrations from 22 NMHSs in RA II and RA V and opened the service to 19 whose preparations for request submission were complete. The service is provided upon request for monitoring of tropical cyclones, volcanic ash and forest fires. Further information on HimawariRequest, including a service description and registration form, is available on the JMA website at <https://www.jma.go.jp/jma/jma-eng/satellite/HimawariRequest.html>. JMA expects the service to support disaster risk reduction activities in the region based on monitoring of tropical cyclones and other extreme events.

In March 2023, JMA contracted the manufacture of Himawari-10 as a follow-on to Himawari-8/9, with initial operation scheduled for JFY 2030. Himawari-10 will carry the visible/infrared Geostationary Himawari Imager (GHMI) and the infrared Geostationary Himawari Sounder (GHMS). The GHMS is intended to improve JMA's services in extreme weather monitoring, nowcasting and numerical weather prediction. Ongoing evolution is planned for the Himawari satellite series to address universal concerns around climate-related issues such as heavy rain, droughts and floods across East Asia and the Western Pacific.

5.3 Updates to the operational global model

The Japan Meteorological Agency (JMA) upgraded its Global Spectral Model (GSM) and Global Ensemble Prediction System (GEPS) on 18 March 2025.

- GSM enhancements included:
 - Implementation of new parallelization methods for improving computational efficiency and optimizing memory usage
 - Use of new climatology of leaf area index and carbon dioxide concentration for land surface and radiation processes
- GEPS enhancements include:
 - The above GSM enhancements
 - A new model ensemble scheme called Stochastic Humidity Profile for Convective Parametrization (SHPC) to represent uncertainty in convective activity and mitigate

under-dispersiveness in the tropics

- Reduced amplitude of initial perturbations in the tropics
- Revised SST perturbations

As a result of these enhancements, cold bias in the lower troposphere and warm bias in the stratosphere in the GSM were reduced. GEPS also exhibited improvements in probabilistic forecast skill.

JMA additionally upgraded its data assimilation system for the GSM on 15 October 2025.

● Enhancements included:

- Assimilation of CO2-band CSR data from Himawari, GOES and Meteosat
- Assimilation of AMSU-A and ATMS window channels
- Assimilation of COSMIC-2 and Metop-C GNSS RO
- Assimilation of Metop-B and Metop-C polar AMV data
- Improvement of usage for all-sky assimilation of microwave humidity sounders

These updates improved the accuracy of analysis and forecasting for temperature, water vapor, and wind in the troposphere and tropical stratosphere.

6. Typhoon Committee Attachment Training at RSMC Tokyo

The RSMC Tokyo – Typhoon Center has organized ESCAP/WMO Typhoon Committee Attachment Training courses every year since 2001 (with the support of the WMO Tropical Cyclone Programme and the Typhoon Committee) to advance the tropical cyclone (TC) analysis and forecasting capacity of Committee Members. In accordance with a decision made at the third joint session of the Panel on Tropical Cyclones (PTC) and the Typhoon Committee, forecasters from PTC Member countries have also been hosted since 2015. The course is set as a Category 2 Unit of Tropical Cyclone Forecast Competency in the Typhoon Committee Region specifications.

The 25th course was held at JMA Headquarters from 13 to 22 January 2026. The Center welcomed Dr. Yu Ting KWOK (Hong Kong, China), Dr. Hanashriah Hassan (Malaysia), Mr. Munir Julsadjiri Baldomero (the Philippines), Mr. Gyeong Su JO (Republic of Korea), Ms. Naponpan Ritmahun (Thailand), Mr. Le Dinh Quyet (Viet Nam) and Mr. Ponna Handi Chaminda de Silva (Sri Lanka). Researchers and Japanese experts from the Typhoon Committee's Hydro and Disaster Risk Reduction group gave presentations, with the expectation that the training would give forecasters broader perspectives in the field and contribute to the UN's EW4ALL initiative.

7. Ties with WMO Programmes/activities and tropical cyclone RSMCs

The Advisory Group on Tropical Cyclones (AG-TC) under the Standing Committee on Disaster Risk Reduction and Public Services (SC-DRR) supports the delivery of globally consistent services on tropical cyclones. Representatives of RSMCs and TCWCs, including the RSMC Tokyo – Typhoon Center, attended two meetings in 2025. The Center also contributes to the Severe Weather Forecasting Programme – Southeast Asia (SWFP-SeA) as a participating organization, providing meteorological data for operational purposes and supporting capacity building.

The third Joint Session of TC and PTC (February 2015) recommended establishing a cooperative mechanism to promote the transfer of technical expertise between TC and PTC Members. In this regard, a representative from the Center gave a presentation during a forecaster training course held online by RSMC New Delhi in July 2025.

Guidelines on responsibility transfer have been exchanged between RSMC Tokyo and RSMC New Delhi and between RSMC Tokyo and RSMC Honolulu to ensure information delivery when a named tropical cyclone crosses the boundary of each area of responsibility.

8. Implementation plans

Table 6 shows the Center's implementation plans for the period from 2025 to 2029.

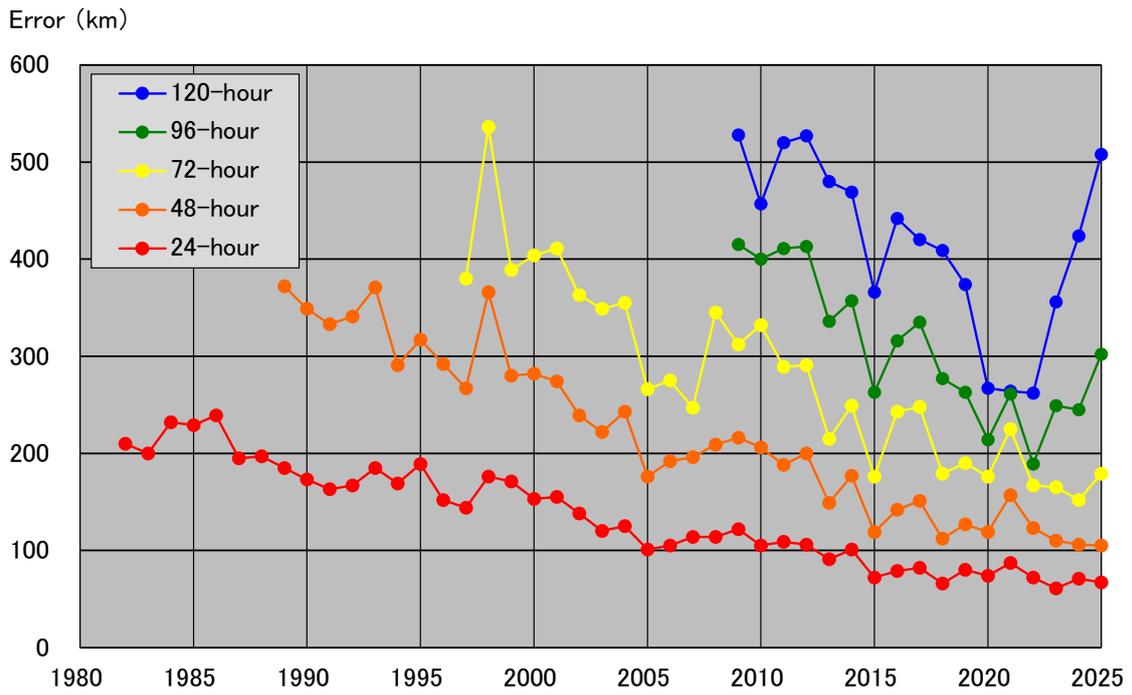


Figure 1 Annual mean position errors of track forecasts

Vertical axis: position error (km), Horizontal axis: year

Table 1 Monthly and annual total numbers of products issued by the RSMC Tokyo - Typhoon Center in 2025

Product	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
IUCC10	0	0	0	0	0	51	286	165	254	187	166	3	1112
WTPQ30-35	0	0	0	0	0	32	164	100	147	103	98	2	646
WTPQ50-55	0	0	0	0	0	60	322	194	290	202	190	3	1261
FXPQ20-25	0	0	0	0	0	29	109	80	76	80	76	1	451
FXPQ30-35	0	0	0	0	0	29	109	80	76	80	76	1	451
FKPQ30-35	0	0	0	0	0	29	158	95	141	99	94	1	617
AXPQ20	7	1	0	0	0	0	0	0	1	8	3	7	27

Notes:

IUCC10 RJTD	SAREP (BUFR format)
WTPQ30-35 RJTD	RSMC Prognostic Reasoning
WTPQ50-55 RJTD	RSMC Tropical Cyclone Advisory
FXPQ20-25 RJTD	RSMC Guidance for Forecast by Global Model
FXPQ30-35 RJTD	RSMC Guidance for Forecast by Global Ensemble Prediction System
FKPQ30-35 RJTD	Tropical Cyclone Advisory for SIGMET
AXPQ20 RJTD	RSMC Tropical Cyclone Best Track

Table 2 Mean position errors of track forecasts for the TCs in 2025

Tropical Cyclone	24-hour Forecast				48-hour Forecast				72-hour Forecast				96-hour Forecast				120-hour Forecast			
	Mean (km)	S.D. (km)	Num.	Impr. (%)	Mean (km)	S.D. (km)	Num.	Impr. (%)	Mean (km)	S.D. (km)	Num.	Impr. (%)	Mean (km)	S.D. (km)	Num.	Impr. (%)	Mean (km)	S.D. (km)	Num.	Impr. (%)
STS Wutip (2501)	59	20	9	70	84	31	5	78	53	0	1	94	-	-	0	-	-	-	0	-
TS Sepat (2502)	24	0	1	88	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS Mun (2503)	38	19	19	76	44	28	15	85	71	47	11	81	132	59	7	66	157	113	3	54
TY Danas (2504)	54	25	14	78	69	25	10	85	79	32	6	81	143	64	2	64	-	-	0	-
TS Nari (2505)	84	32	5	84	167	0	1	88	-	-	0	-	-	-	0	-	-	-	0	-
STS Wipha (2506)	44	23	14	78	42	19	10	92	34	18	6	97	61	19	2	96	-	-	0	-
TS Francisco (2507)	97	28	5	37	89	0	1	61	-	-	0	-	-	-	0	-	-	-	0	-
STS Co-may (2508)	78	47	15	74	105	55	8	83	217	146	6	72	-	-	0	-	-	-	0	-
TY Krosa (2509)	70	38	41	64	124	56	37	74	230	129	33	66	408	242	29	45	626	311	25	27
TS Bailu (2510)	71	16	7	67	115	6	3	70	-	-	0	-	-	-	0	-	-	-	0	-
TY Podul (2511)	59	15	22	50	118	32	18	64	215	63	14	68	360	126	10	70	396	190	6	78
TS Lingling (2512)	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
TY Kajiki (2513)	50	32	10	46	54	32	6	54	43	19	2	71	-	-	0	-	-	-	0	-
TS Nongfa (2514)	111	48	2	51	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
TS Peipah (2515)	186	103	4	27	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS Tapah (2516)	55	15	4	79	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS Mitag (2517)	56	15	3	80	47	0	1	87	-	-	0	-	-	-	0	-	-	-	0	-
TY Ragasa (2518)	37	25	22	67	71	43	18	78	110	64	14	83	129	51	10	86	175	19	6	83
TY Neoguri (2519)	45	22	39	82	85	35	35	86	162	62	31	83	223	99	27	81	297	86	23	77
TY Bualoi (2520)	98	66	20	44	172	90	16	62	252	114	12	70	291	59	8	77	409	136	4	71
TY Matmo (2521)	27	13	11	78	46	24	7	87	45	9	3	93	-	-	0	-	-	-	0	-
TY Halong (2522)	93	36	23	59	213	52	19	63	448	73	15	49	947	147	11	-2	1943	225	7	-130
TY Nakri (2523)	89	48	23	63	118	72	19	79	129	74	15	85	173	77	11	83	525	276	7	43
STS Fengshen (2524)	100	57	17	42	107	41	13	71	186	61	9	53	251	69	5	46	252	0	1	22
TY Kalmaegi (2525)	86	54	18	55	113	58	14	65	159	33	10	67	253	33	6	69	432	32	2	65
TY Fung-wong (2526)	65	32	24	62	121	55	20	74	167	58	16	75	190	70	12	75	172	60	8	70
TY Koto (2527)	52	28	19	74	57	38	15	86	68	32	11	89	75	36	7	89	148	15	3	82
Annual Mean (Total)	67	45	391	67	105	66	291	77	179	124	215	75	302	249	147	67	508	483	95	50

Notes: S.D. means standard deviation of operational forecast errors.
Num. means numbers of forecasts.
Impr. indicates the ratios of position errors in operational forecasts to those in CLIPER predictions.

Table 3 Mean hitting ratios (%) and radii (km) of 70% probability circles issued for track forecasts for the TCs in 2025

Tropical Cyclone			24-hour Forecast			48-hour Forecast			72-hour Forecast			96-hour Forecast			120-hour Forecast		
			Ratio (%)	Num.	Radius (km)	Ratio (%)	Num.	Radius (km)									
STS	Wutip	(2501)	89	9	89	100	5	157	100	1	222	-	0	-	-	0	-
TS	Sepat	(2502)	100	1	78	-	0	-	-	0	-	-	0	-	-	0	-
STS	Mun	(2503)	100	19	85	100	15	151	100	11	236	100	7	327	100	3	429
TY	Danas	(2504)	100	14	108	100	10	183	100	6	256	100	2	389	-	0	-
TS	Nari	(2505)	40	5	84	0	1	130	-	0	-	-	0	-	-	0	-
STS	Wipha	(2506)	100	14	97	100	10	180	100	6	278	100	2	370	-	0	-
TS	Francisco	(2507)	80	5	114	100	1	213	-	0	-	-	0	-	-	0	-
STS	Co-may	(2508)	80	15	103	88	8	196	83	6	278	-	0	-	-	0	-
TY	Krosa	(2509)	78	41	104	84	37	192	79	33	288	41	29	363	36	25	452
TS	Bailu	(2510)	71	7	91	100	3	182	-	0	-	-	0	-	-	0	-
TY	Podul	(2511)	100	22	97	94	18	168	50	14	238	30	10	307	50	6	364
TS	Lingling	(2512)	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
TY	Kajiki	(2513)	90	10	82	100	6	156	100	2	259	-	0	-	-	0	-
TS	Nongfa	(2514)	50	2	130	-	0	-	-	0	-	-	0	-	-	0	-
TS	Peipah	(2515)	25	4	102	-	0	-	-	0	-	-	0	-	-	0	-
STS	Tapah	(2516)	100	4	89	-	0	-	-	0	-	-	0	-	-	0	-
STS	Mitag	(2517)	100	3	94	100	1	204	-	0	-	-	0	-	-	0	-
TY	Ragasa	(2518)	91	22	75	94	18	114	93	14	167	100	10	208	100	6	269
TY	Neoguri	(2519)	100	39	96	94	35	172	94	31	271	89	27	354	100	23	459
TY	Bualoi	(2520)	65	20	104	56	16	191	67	12	275	75	8	354	50	4	442
TY	Matmo	(2521)	100	11	72	100	7	110	100	3	173	-	0	-	-	0	-
TY	Halong	(2522)	65	23	100	32	19	186	0	15	282	0	11	370	0	7	500
TY	Nakri	(2523)	70	23	107	89	19	199	100	15	284	100	11	350	43	7	423
STS	Fengshen	(2524)	53	17	112	92	13	196	67	9	255	40	5	287	100	1	333
TY	Kalmaegi	(2525)	67	18	107	86	14	199	100	10	279	100	6	366	50	2	491
TY	Fung-wong	(2526)	83	24	90	65	20	144	69	16	197	75	12	239	88	8	306
TY	Koto	(2527)	84	19	88	100	15	150	100	11	219	100	7	271	100	3	333
Annual Mean (Total)			82	391	97	85	291	172	79	215	255	69	147	328	64	95	420

Table 4a Root mean square errors and mean errors of central pressure forecasts for the TCs in 2025

Tropical Cyclone			24-hour Forecast				48-hour Forecast				72-hour Forecast				96-hour Forecast				120-hour Forecast			
			Error (hPa)	RMSE (hPa)	Num.	Impr. (%)	Error (hPa)	RMSE (hPa)	Num.	Impr. (%)	Error (hPa)	RMSE (hPa)	Num.	Impr. (%)	Error (hPa)	RMSE (hPa)	Num.	Impr. (%)	Error (hPa)	RMSE (hPa)	Num.	Impr. (%)
STS	Wutip	(2501)	-1.0	4.0	9	50	3.2	4.8	5	63	0.0	0.0	1	100	-	-	0	-	-	-	0	-
TS	Sepat	(2502)	0.0	0.0	1	100	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS	Mun	(2503)	-4.3	5.8	19	-40	-3.1	4.6	15	45	-2.0	2.9	11	69	1.1	2.1	7	84	-1.3	1.6	3	93
TY	Danas	(2504)	3.6	7.8	14	38	0.8	12.6	10	31	-1.3	4.4	6	76	-3.0	3.2	2	82	-	-	0	-
TS	Nari	(2505)	-6.2	6.6	5	-56	-6.0	6.0	1	61	-	-	0	-	-	-	0	-	-	-	0	-
STS	Wipha	(2506)	-4.6	8.1	14	-39	-3.5	6.9	10	35	-0.8	6.8	6	52	-2.5	3.5	2	76	-	-	0	-
TS	Francisco	(2507)	1.2	2.7	5	56	-2.0	2.0	1	90	-	-	0	-	-	-	0	-	-	-	0	-
STS	Co-may	(2508)	2.5	6.7	15	50	6.6	7.7	8	14	6.5	6.8	6	69	-	-	0	-	-	-	0	-
TY	Krosa	(2509)	-1.3	6.2	41	21	-0.9	8.7	37	30	-0.1	11.3	33	14	0.0	10.5	29	27	-1.6	8.5	25	47
TS	Bailu	(2510)	0.0	0.0	7	100	0.7	1.2	3	66	-	-	0	-	-	-	0	-	-	-	0	-
TY	Podul	(2511)	2.8	7.7	22	27	6.3	10.7	18	25	6.9	8.5	14	52	11.4	13.9	10	18	14.0	17.7	6	-16
TS	Lingling	(2512)	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
TY	Kajiki	(2513)	5.2	20.0	10	26	6.5	10.7	6	60	-7.0	8.6	2	70	-	-	0	-	-	-	0	-
TS	Nongfa	(2514)	0.0	2.0	2	82	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
TS	Peipah	(2515)	3.0	4.5	4	25	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS	Tapah	(2516)	0.0	3.8	4	46	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS	Mitag	(2517)	4.7	5.3	3	1	0.0	0.0	1	100	-	-	0	-	-	-	0	-	-	-	0	-
TY	Ragasa	(2518)	4.4	13.1	22	36	13.3	18.1	18	46	10.6	19.5	14	50	0.9	14.1	10	57	-8.5	16.3	6	34
TY	Neoguri	(2519)	4.3	15.5	39	-4	4.2	20.9	35	8	-0.4	18.3	31	14	1.3	12.1	27	20	6.0	13.5	23	23
TY	Bualoi	(2520)	-1.6	12.4	20	14	-7.2	13.1	16	42	-7.0	16.5	12	35	-10.5	19.1	8	39	-8.5	12.6	4	62
TY	Matmo	(2521)	-5.8	7.2	11	37	-5.3	6.3	7	44	-2.0	5.4	3	77	-	-	0	-	-	-	0	-
TY	Halong	(2522)	2.4	14.5	23	8	8.7	17.7	19	31	12.4	23.5	15	21	8.7	19.9	11	22	0.0	11.0	7	6
TY	Nakri	(2523)	1.5	4.7	23	52	2.7	6.2	19	66	8.7	9.9	15	50	17.0	17.6	11	-22	20.6	20.9	7	-183
STS	Fengshen	(2524)	-0.5	3.6	17	67	0.4	3.0	13	84	0.1	3.1	9	88	-4.8	6.8	5	79	-10.0	10.0	1	75
TY	Kalmaegi	(2525)	-1.6	8.7	18	39	3.2	10.4	14	23	5.5	8.8	10	31	2.5	15.7	6	-19	-5.0	15.8	2	21
TY	Fung-wong	(2526)	-12.9	15.4	24	16	-16.2	19.9	20	12	-18.4	20.9	16	21	-22.8	23.6	12	25	-23.0	25.0	8	28
TY	Koto	(2527)	1.2	10.2	19	39	-1.4	8.0	15	62	-3.7	4.8	11	78	-3.1	5.6	7	78	-9.7	10.0	3	64
Annual Mean (Total)			-0.2	10.4	391	23	0.9	13.1	291	33	0.8	14.1	215	37	0.3	14.4	147	33	0.0	14.5	95	30

Impr. indicates the ratios of RMSEs of operational forecasts to those of SHIFOR predictions.

Table 4b Root mean square errors and mean errors of maximum sustained wind forecasts for the TCs in 2025

Tropical Cyclone			24-hour Forecast				48-hour Forecast				72-hour Forecast				96-hour Forecast				120-hour Forecast			
			Error (m/s)	RMSE (m/s)	Num.	Impr. (%)	Error (m/s)	RMSE (m/s)	Num.	Impr. (%)												
STS	Wutip	(2501)	1.4	3.3	9	21	-0.5	3.0	5	35	2.6	2.6	1	44	-	-	0	-	-	-	0	-
TS	Sepat	(2502)	0.0	0.0	1	100	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS	Mun	(2503)	1.5	2.7	19	16	1.2	2.6	15	35	0.7	1.7	11	52	-1.1	2.2	7	24	1.7	2.1	3	4
TY	Danas	(2504)	-1.7	4.9	14	28	0.8	7.2	10	19	1.7	3.0	6	39	6.4	6.6	2	-59	-	-	0	-
TS	Nari	(2505)	4.6	5.3	5	-114	2.6	2.6	1	15	-	-	0	-	-	-	0	-	-	-	0	-
STS	Wipha	(2506)	2.0	4.5	14	-11	1.3	4.7	10	-1	0.9	3.6	6	-3	2.6	2.6	2	3	-	-	0	-
TS	Francisco	(2507)	-0.5	1.2	5	54	2.6	2.6	1	62	-	-	0	-	-	-	0	-	-	-	0	-
STS	Co-may	(2508)	0.7	4.4	15	32	0.0	1.3	8	65	-2.6	3.9	6	53	-	-	0	-	-	-	0	-
TY	Krosa	(2509)	0.8	3.0	41	24	0.9	5.0	37	13	0.5	6.2	33	-1	1.1	5.0	29	4	2.6	4.0	25	8
TS	Bailu	(2510)	0.0	0.0	7	100	0.0	0.0	3	100	-	-	0	-	-	-	0	-	-	-	0	-
TY	Podul	(2511)	-1.3	4.5	22	18	-3.4	6.7	18	-21	-4.0	5.8	14	-61	-5.7	7.7	10	-30	-5.1	8.5	6	-13
TS	Lingling	(2512)	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
TY	Kajiki	(2513)	-3.1	7.8	10	28	-3.4	4.7	6	62	1.3	4.1	2	53	-	-	0	-	-	-	0	-
TS	Nongfa	(2514)	-1.3	1.8	2	41	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
TS	Peipah	(2515)	-3.2	3.9	4	2	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS	Tapah	(2516)	-2.6	3.6	4	-63	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	-
STS	Mitag	(2517)	-2.6	3.3	3	-25	-2.6	2.6	1	61	-	-	0	-	-	-	0	-	-	-	0	-
TY	Ragasa	(2518)	-1.9	4.8	22	46	-4.1	6.1	18	57	-2.0	6.6	14	59	1.3	6.6	10	58	4.7	9.1	6	36
TY	Neoguri	(2519)	0.4	6.5	39	-3	0.7	9.0	35	7	2.7	8.5	31	18	1.2	7.1	27	32	-0.9	7.6	23	28
TY	Bualoi	(2520)	1.2	6.2	20	9	3.9	5.9	16	34	4.1	8.0	12	-1	6.1	10.9	8	-1	7.1	9.7	4	16
TY	Matmo	(2521)	2.8	3.5	11	54	1.5	2.4	7	48	3.4	5.6	3	44	-	-	0	-	-	-	0	-
TY	Halong	(2522)	-0.6	6.7	23	14	-3.1	8.2	19	43	-4.3	11.3	15	37	-2.8	9.5	11	43	1.5	6.4	7	42
TY	Nakri	(2523)	0.7	2.6	23	51	0.3	3.6	19	61	-1.9	3.3	15	70	-6.1	6.8	11	38	-8.1	8.5	7	1
STS	Fengshen	(2524)	1.5	3.1	17	33	1.2	2.0	13	59	1.7	2.4	9	48	5.1	6.3	5	16	7.7	7.7	1	32
TY	Kalmaegi	(2525)	0.4	3.3	18	51	-1.5	5.1	14	22	-2.3	4.8	10	7	-1.3	8.1	6	7	3.9	9.8	2	-25
TY	Fung-wong	(2526)	5.5	6.4	24	2	6.3	8.6	20	-7	7.6	8.9	16	8	9.9	10.5	12	-16	10.3	11.6	8	-25
TY	Koto	(2527)	-0.5	5.9	19	31	1.0	5.0	15	40	2.3	3.5	11	43	1.8	4.2	7	43	6.0	6.1	3	1
Annual Mean (Total)			0.5	4.8	391	22	0.3	6.1	291	29	0.6	6.7	215	30	0.9	7.2	147	26	1.5	7.5	95	17

Impr. indicates the ratios of RMSEs of operational forecasts to those of SHIFOR predictions.

Table 5 Products of RSMC Tokyo via the NTP website

Products	Frequency	Details
RSMC Advisories		
RSMC TC Advisory	At least 8 times/day	<ul style="list-style-type: none"> RSMC Tokyo – Typhoon Center’s TC analysis and forecasts up to 120-hours (linked to the JMA website at https://www.jma.go.jp/bosai/map.html#contents=typhoon&lang=en)
Storm Wind Probability Map	4 times/day	<ul style="list-style-type: none"> Probabilistic forecast map for sustained wind upward of 50-kt for 1, 2, 3, 4 and 5 days ahead
Prognostic Reasoning	4 times/day	<ul style="list-style-type: none"> RSMC Tokyo Tropical Cyclone Prognostic Reasoning (WTPQ3X)
TC Advisory	4 times/day	<ul style="list-style-type: none"> TC Advisory in text, graphical and xml formats including RSMC Tokyo – Typhoon Center’s TC analysis, track and intensity forecasts up to 24-hours and horizontal extents of cumulonimbus cloud and cloud top height associated with TCs potentially affecting aviation safety (linked to the Tropical Cyclone Advisory Center Tokyo website at https://www.data.jma.go.jp/tca/data/index.html)
Remote Sensing		
Satellite Analysis	At least 4 times/day	<ul style="list-style-type: none"> Results and historical logs of RSMC Tokyo – Typhoon Center’s TC analysis conducted using satellite images (Conventional Dvorak analysis and Early-stage Dvorak analysis)
Satellite Imagery	Up to 142 times/day	<ul style="list-style-type: none"> Satellite imagery of Himawari-8/9 (linked to the JMA website at https://www.jma.go.jp/bosai/map.html#contents=himawari&lang=en)
Satellite Microwave Products		<ul style="list-style-type: none"> TC snapshot images Warm-core-based TC intensity estimates Weighted consensus TC intensity estimates made using Dvorak analysis and satellite microwave warm-core-based intensity estimates
Sea-surface AMV (ASWind)	Every 10 / 30 minutes	<ul style="list-style-type: none"> AMV-based Sea-surface Wind in the vicinity of TC (linked to Meteorological Satellite Center’s web site: https://www.data.jma.go.jp/mscweb/en/product/product_ASWind.html)
Radar	Every hour	<ul style="list-style-type: none"> Radar composite imagery of the Typhoon Committee Regional Radar Network
Atmospheric Circulation		
Weather Charts	4 times/day	<ul style="list-style-type: none"> Weather maps for surface analysis, 24- and 48-hour forecasts (linked to the JMA website at https://www.jma.go.jp/bosai/weather_map/#lang=en)
NWP Multi Center Weather Charts	Twice/day	<ul style="list-style-type: none"> Mean sea level pressure and 500 hPa Geopotential height (up to 168 hours) of deterministic NWP models from nine centers (BoM, CMA, CMC, DWD, ECMWF, KMA, NCEP, UKMO and JMA)
JMA GSM Analysis and Forecast	4 times/day	<ul style="list-style-type: none"> Upper-air analysis and forecast data based on JMA-GSM <ul style="list-style-type: none"> - Streamlines at 850, 500 and 200 hPa - Divergence at 200 hPa - Velocity potential at 200 hPa - Vertical Velocity in Pressure Coordinate at 500 hPa - Dew Point Depression at 600 hPa - Curvature Vorticity at 850 hPa - Vertical wind shear between 200 and 850 hPa - Sea Level Pressure - Genesis Potential Index
MJO Phase Diagram	Daily	<ul style="list-style-type: none"> MJO phase and amplitude diagram and MJO Hovmöller diagram (linked to the Tokyo Climate Center web site: https://ds.data.jma.go.jp/tcc/tcc/products/clisys/mjo/monitor.html)

		https://ds.data.jma.go.jp/tcc/tcc/products/clisys/ASIA_TCC/mjo_cross.html)
Asian Monsoon Monitoring Indices	Daily, only during Apr. - Oct.	<ul style="list-style-type: none"> Time series of vertical wind shear, OLR and other indices associated with SW Asian Monsoon (linked to the Tokyo Climate Center web site: https://ds.data.jma.go.jp/tcc/tcc/products/clisys/ASIA_TCC/monsoon_index.html)
Ocean Condition		
SST	Once/day	<ul style="list-style-type: none"> Sea surface temperature and related differences from 24 hours ago
TCHP	Once/day	<ul style="list-style-type: none"> Tropical cyclone heat potential and related differences from 24 hours ago
Numerical TC Prediction		
Track Bulletin	4 times/day	<ul style="list-style-type: none"> RSMC Tokyo Tropical Cyclone Track Forecast Bulletin <ul style="list-style-type: none"> Track forecast by GSM (FXPQ2X) Track forecast by GEPS (FXPQ3X)
TC intensity (TIFS monitor)	4 times/day	<ul style="list-style-type: none"> TIFS (Typhoon Intensity Forecast scheme based on SHIPS) Monitor
TC Track Prediction	4 times/day	<ul style="list-style-type: none"> TC track prediction of deterministic NWP models from nine centers (BoM, CMA, CMC, DWD, ECMWF, KMA, NCEP, UKMO and JMA) and a related consensus TC track prediction of EPS models from four centers (ECMWF, NCEP, UKMO and JMA)
TC Activity Prediction	Twice/day	<ul style="list-style-type: none"> Two- and five-day TC activity prediction maps based on EPS models from four centers (ECMWF, NCEP, UKMO and JMA) and a related consensus
TC Verification	4 times/day	<ul style="list-style-type: none"> Verification results of RSMC Tokyo's official forecasts as well as NWP model and guidance predictions
Marine Forecast		
Storm Surge Forecasts	4 times/day	<ul style="list-style-type: none"> Distribution of storm surge for RSMC Tokyo – Typhoon Center TC track forecasts and probabilistic products (ensemble mean, maximum, third quartile, spread and exceeding probabilities) of storm surge EPS from GEPS ensemble members (up to 132 hours) Time-series storm surge forecast charts (plume diagrams, box plots and exceeding probabilities) for RSMC Tokyo – Typhoon Center TC track forecasts and 51 TC track forecasts from GEPS ensemble members (up to 132 hours)
Ocean Wave Forecasts	Twice/day	<ul style="list-style-type: none"> Distribution maps for ensemble mean, maximum, probability of exceeding various thresholds and ensemble spread of wave height and period based on Wave Ensemble System (WENS) (up to 264 hours) Time-series representations with box plots for wave height/period and probability of exceeding various wave height/period thresholds based on WENS (up to 264 hours)

Table 6 Implementation Plans of the RSMC Tokyo - Typhoon Center (2025 - 2029)

PRODUCT	2025	2026	2027	2028	2029	REMARKS
Satellite Observation						{ Every 2.5 minutes (Target area) { Every 10 minutes (Full-disk)
Himawari- 8/9						
Cloud motion wind (BUFR)						24 times/day
RSMC TC Advisories / Bulletins						
RSMC Tropical Cyclone Advisory						8 times/day
SAREP (for tropical cyclones, BUFR)						{ 8 times/day Position of cloud sytem center, etc. { 4 times/day Dvorak intensity
RSMC Prognostic Reasoning						4 times/day
RSMC Guidance for Forecast						4 times/day up to 132 hrs (GSM and GEPS)
Web-based RSMC Advisories / Products						
Numerical Typhoon Prediction Website						
Tropical Cyclone Advisory in text, graphical and XML formats						
Experimental CAP Tropical Cyclone Advisory						
Others						
RSMC Tropical Cyclone Best Track						
Annual Report						Publication
Technical Review						Publication (as necessary)
Tropical Cyclone Reanalysis data provision						(as necessary)
Communication platform						(Full operation started in 2021)
SUPPORTING ACTIVITY						REMARKS
Attachment Training						The 26th training course will be conducted in 2027 1Q.
Data archive						
Monitoring of data exchange						
Dissemination of products via GISC Tokyo						