

# SUMMARY REPORT

## The 5th technical meeting on Himawari-8/9 Rapidly Developing Cumulus Area (RDCA) products

(JMA Headquarters, Tokyo Japan, 8 – 9 December 2025)



The 5th technical meeting on Himawari-8/9 Rapidly Developing Cumulus Area (RDCA) products was held at the Japan Meteorological Agency (JMA) Headquarters from 8 to 9 December 2025. This was part of activities conducted under the Annual Operating Plan (AOP) 2025 – item 7 “Enhancing Utilization of Himawari 8/9 Products” of the Working Group on Meteorology (WGM) of the ESCAP/WMO Typhoon Committee (TC), which was endorsed at the 57th session of TC held in Manila, the Philippines from 17 to 20 February 2025. Attendees included representatives from National Meteorological and Hydrological Services (NMHSs) in Malaysia, the Philippines, Singapore, Thailand and Vietnam. The project aims to enhance NMHSs’ utilization of observation data from the Himawari-8/9 geostationary meteorological satellites by developing RDCA detection techniques based on such data. Discussions at the meeting covered recent activities/challenges relating to RDCA development, hands-on support for development of RDCA product and future work in the field.

Mr. YASUI Kazuki from JMA served as a moderator. The meeting program and attendees list are provided in Appendix I and II, respectively.

## **1. Opening**

1.1. The meeting was opened by Mr. NAGATA Kazuhiko, the Head of the Office of Meteorological Analysis and Application Development of JMA. He welcomed participants to the in-person meeting and encouraged them to take full advantage of the opportunity to learn technologies through face-to-face discussions. He outlined the support for actual development work to be conducted during the meeting. In addition, He expressed expectations for further development in each country based on the results of the training.

## **2. Outline of the project and purpose of the meeting**

2.1. Mr. YASUI Kazuki from JMA gave an introductory presentation at this technical meeting. He made a brief explanation of RDCA products based on Himawari-8/9 data and insisted the goal of this project was

to enhance the utilization of Himawari-8/9 among NMHSs via developing the RDCA detection techniques. In addition, he explained this meeting aimed at sharing the development status, issues and challenges of each country and providing hands-on support for actual development work.

### **3. Data utilization of Himawari-8/9 and the follow-on satellite**

3.1. Mr. YASUI presented the current status of Himawari-8/9 data distribution via HimawariCloud and HimawariCast. He also explained data distribution for R&D users and the Regional Specialized Meteorological Center (RSMC) Tokyo for Nowcasting to support NMHSs in the Asia and Pacific regions to provide early warnings, and the overview of the Himawari-10 which will start operation in JFY 2030.

### **4. Review of the previous meeting**

4.1. Mr. SUZUE Hiroshi from JMA gave a presentation on the review of the previous meeting. He reviewed country-specific progress on data acquisition and development, and outlined the challenges faced by each country in development and operations. Overall, there has been progress in acquiring Himawari observation data as input, obtaining lightning observation data for accuracy validation and logistic regression coefficient calculation, and executing RDCA detection processing. However, the following challenges remain:

- Slow download speeds of Himawari observation data due to network constraints
- Storage shortages caused by large Himawari observation data volumes
- Difficulties in understanding source code written in multiple programming languages

### **5. Country reports**

5.1. Ms. Mahani Binti Abllah from the Malaysian Meteorological

Department (METMalaysia) presented a country report on Malaysia regarding RDCA operational status and implementation. She reported that METMalaysia has operationalized the RDCA product with 10-minute update intervals for internal convective nowcasting. Preliminary verification indicates a lower Probability of Detection (POD) compared to JMA's, mainly due to regional spatial differences and limited seasonal datasets. Operational challenges include data latency, limited long-term storage capacity for data reprocessing, and the need for specialized technical training for staff. Future work will focus on verification using local lightning data, with recalibration of RDCA coefficients if systematic biases are identified. MET Malaysia appreciates JMA's continued support in technical training and data management to ensure operational continuity.

- 5.2. Mr. Joules Jan Carpio from the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) presented a country report on the Philippines. RDCA at PAGASA aims to enhance public weather services and aviation safety by improving the reliability and lead time of nowcast-based thunderstorm advisories, particularly for aerodrome warnings. RDCA is still under development and has not yet been deployed on PAGASA's on-premise servers; it is expected to be operationalized through the MIRAGE system, with validation using PAGASA's total lightning detection data. Key challenges include limited technical expertise, insufficient storage for continuous Himawari data, and infrastructure constraints. Future plans focus on institutionalizing RDCA across PRSD units, integrating it with radar, lightning, and forecasting platforms, and upgrading infrastructure to ensure reliable operations.
- 5.3. Mr. Yi Xiang Lim from the Meteorological Service Singapore (MSS) presented a country report on Singapore. RDCA is currently produced every 10-minutes upon reception of Himawari Standard Data (HSD) (via HimawariCloud) for the region 90E to 190E, 50S to 50N. It is then coupled with cloud-top height information (obtained from JMA's High-resolution Cloud Analysis Information (HCAI)

product<sup>1</sup>) relative to the preceding observation, to provide tactical air navigation information for our aviation partners. Ongoing work include the redownload of past HSD data for RDCA regeneration to perform both tuning & validation of the RDCA product for our FIR. MSS expresses gratitude to JMA for continued collaboration and sharing of tools and knowledge. Our forecasters regularly use these tools for operations, especially in SIGMET issuance.

- 5.4. Mr. Jaral Yiemwech from the Thai Meteorological Department (TMD) presented a country report on Thailand, outlining the progress of the RDCA system, which is currently in the learning and development stage. The system utilizes HimawariCloud products from JMA based on data from the Himawari-9 satellite, with an ad hoc setup established to support enhanced monitoring during severe thunderstorm events. At present, default configuration parameters are still being used while further refinement is under consideration. RDCA products are generated every 10 minutes for experimental monitoring of convective storms, with outputs displayed as maps on the Department's website to support severe weather surveillance and risk mapping, particularly when storm systems affect Thailand. Although lightning data from airport observations are available, they have not yet been incorporated into the verification process, and technical guidance is sought on adjusting system constants or thresholds to improve performance. Future plans include integrating RDCA products into the SIGMET system for aviation, enhancing real-time tracking capabilities, and deploying the system to aviation meteorological units for operational use.
- 5.5. Ms. Bui Thi Khanh Hoa from the Viet Nam Meteorological and Hydrological Administration (VNMHA) presented a country report on Viet Nam. The presentation focused on providing an overview of the current status of the development and implementation of RDCA in

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<sup>1</sup> [https://www.data.jma.go.jp/mscweb/en/product/product\\_HCAI.html](https://www.data.jma.go.jp/mscweb/en/product/product_HCAI.html) (Website of the Meteorological Satellite Center at JMA)

Viet Nam, highlighting the main difficulties and challenges faced by VNMHA in the process. In addition, the report outlined a number of proposals and recommendations, including expectations and areas of interest that VNMHA would like to submit to JMA for consideration. These proposals aimed at seeking technical guidance, capacity building support, and potential cooperation to assist Viet Nam and other countries in the region in effectively participating in and implementing activities under the AOP7 project.

## **6. The procedure to develop Himawari-8/9 RDCA product**

6.1. Mr. SUZUE explained the procedure to develop Himawari-8/9 RDCA product. He stated that a hands-on demonstration would be conducted using Himawari observation data and lightning data for Japan's Kanto region, following the process below.

1. Define RDCA detection area
2. Convert Himawari Standard Data
3. Execute RDCA detection processing
4. Convert lightning observation data
5. Perform accuracy validation using lightning data as ground truth
6. Calculate logistic regression coefficients using lightning data as ground truth

Additionally, it was noted that regression coefficients vary depending on the brightness temperature range of Himawari-8/9 Band 13.

## **7. Hands-on support for development of the RDCA product**

7.1. Using sample data prepared by JMA (Himawari Standard Data and lightning observation data), participants followed the above steps to develop the RDCA product while referring to the manual. Although some countries had already made progress, all participants started from the initial step of defining RDCA detection areas for review purposes. Work was carried out by remotely accessing each country's development server from their own laptops, but close face-

to-face collaboration allowed us to proceed as planned. Notably, calculating logistic regression coefficients—which had not yet been implemented by any country—was achieved using sample data, marking significant progress. We consider that holding the technical meeting in person was highly valuable.

- 7.2. Ms. Abllah noted that the hands-on activities enhanced her practical understanding of RDCA development procedures, especially in the definition of detection areas and the calculation of logistic regression coefficients using sample data.
- 7.3. Mr. Carpio: The RDCA training provided a comprehensive overview of the detection procedure, including definition of the detection area, preparation of HSD, and execution of the RDCA algorithm, with validation using lightning data and Japan-based regression coefficients. The training highlighted RDCA's value for aviation by supporting precautionary measures and mitigating risks associated with deep convection hazards, and also presented JMA's future plans for the Himawari-10 program and its enhanced capabilities. Although remote replication of the process under Philippine conditions was attempted, limited time constrained full debugging; however, guidance from Mr. Hiroshi helped resolve several issues. Overall, the activity was highly valuable and significantly strengthened understanding of the RDCA project and its operational applications.
- 7.4. Mr. Lim found the hands-on session led by Mr. SUZUE insightful & helpful. Key concerns were raised during the session by participants, including how the RDCA should be tuned for weather conditions specific to respective regions (e.g. mesoscale convective systems & squall lines for equatorial weather). Clear instructions were provided on the validation & tuning protocols, and how these can be adapted for different regions of interest.
- 7.5. Mr. Yiemwech: This hands-on training workshop was highly beneficial, as it provided systematic knowledge of the RDCA system, beginning with installation procedures and essential configuration

settings required for operational use. It also covered verification techniques, including comparison with lightning data, which enhanced understanding of the system's processes and underlying rationale for necessary adjustments and improvements. The training helped clarify key concepts, reduced confusion, and strengthened confidence in applying and optimizing the system for actual operational settings within our own country.

- 7.6. Ms. Bui Thi Khanh Hoa followed the step-by-step procedures provided by JMA and successfully recalculated the logistic regression coefficients using the sample dataset prepared by JMA. Through this exercise, she gained a clearer understanding of the methodological requirements and implementation process for RDCA development. In addition, she raised a technical question to JMA regarding the appropriate length and representativeness of the input dataset used for determining logistic regression coefficients when applied to the Viet Nam case, particularly in relation to different weather regimes. This discussion was considered useful for future adaptation and operational application of the RDCA methodology in Viet Nam.

## **8. Utilization of RDCA products for aviation weather**

- 8.1. Ms. IKEDA Michiko from JMA explained the utilization of RDCA products for aviation weather. She mentioned aviation hazards due to deep convection, such as turbulence encounters, and furthermore, traffic congestion can make its avoidance more difficult. Early detection of developing convection mitigates the risks of en-route flight. She presented JMA's initiative of providing RDCA products on their web platform for relevant Meteorological Watch Offices in the Asia Pacific Region and supporting aviation forecasters to issue appropriate SIGMETs and coordinating them with neighboring countries. She demonstrated a case where RDCA supported early detection of deep convection and SIGMET issuance in a timely manner. RDCA can enhance situational awareness of convective weather, and improved accuracy of RDCA products contributes to

aviation safety.

## **9. Next steps**

9.1. Mr. SUZUE explained the next steps of this project. Future works include:

- Defining RDCA detection areas for each country and modifying source code accordingly
- Performing accuracy validation using each country's lightning observation data
- Calculating logistic regression coefficients

Furthermore, in case studies, it is important to compare successful and unsuccessful RDCA detection cases and calculate logistic regression coefficients for data during periods of active lightning activity. The next technical meeting is scheduled for 2026 to review progress and gather feedback from all participating countries, and the future of this project will be considered.

## **10. Closing**

10.1. Mr. YASUI expressed his gratitude for the participation in the technical meeting and the fruitful discussion, and mentioned that the exchanging the opinions between JMA and participant NMHSs will lead to new discoveries and establishment of further cooperative relationships.

10.2. The technical meeting was closed by Mr. YASUI.

## Agenda

(JMA Headquarters, 8 – 9 December 2025)

### Day 1 (8 December)

<b>Time (JST)</b>	<b>Title</b>
10:00-10:15	Opening Self-introduction
10:15-10:25	Outline of the project and purpose of the meeting (Japan)
10:25-10:35	Data Utilization of Himawari-8/9 and the Follow-on Satellite (Japan)
10:35-10:45	Review of the previous meeting (Japan)
10:45-11:00	Country report (Malaysia)
11:00-11:15	Country report (the Philippines)
11:15-11:30	Country report (Singapore)
11:30-11:45	Country report (Thailand)
11:45-12:00	Country report (Viet Nam)
12:00-13:00	Lunch
13:00-13:30	The procedure to develop Himawari-8/9 RDCA product (Japan)
13:30-15:00	Hands-on support for development of the RDCA product (All participants)
15:00-15:40	Tour to Forecast Operations, group photo and break
15:40-17:00	Hands-on support for development of the RDCA product (cont'd) (All participants)

## Day 2 (9 December)

<b>Time (JST)</b>	<b>Title</b>
10:00-10:15	Utilization of RDCA products for aviation weather (Japan)
10:15-12:00	Hands-on support for development of the RDCA product (cont'd) (All participants)
12:00-13:00	Lunch
13:30-15:00	Hands-on support for development of the RDCA product (cont'd) (All participants)
15:00-15:10	Break
15:10-16:45	Hands-on support for development of the RDCA product (cont'd) (All participants)
16:45-17:00	Next steps (Japan)
17:00-17:05	Closing

## **LIST OF ATTENDEES**

- **Malaysia / Malaysian Meteorological Department**
  - Ms. Mahani Binti Abllah
    - Assistant Director
    - Radar and Satellite Meteorological Division
  
- **The Philippines / Philippine Atmospheric, Geophysical and Astronomical Services Administration**
  - Mr. Joules Jan Carpio
    - Weather Specialist I
    - Weather Division
  
- **Singapore / Meteorological Service Singapore**
  - Mr. Yi Xiang Lim
    - Executive Manager
    - Forecast Application Development Department
  
- **Thailand / Thai Meteorological Department**
  - Mr. Jaral Yiemwech
    - Meteorologist
    - Meteorological Radar and Satellite Data Analysis Sub-division
  
- **Viet Nam / Viet Nam Meteorological and Hydrological Administration**
  - Ms. Bui Thi Khanh Hoa
    - Deputy Head of Equipment and Radar Division
    - Hydro-Meteorological Technical Observation Centre
  
- **Japan / Japan Meteorological Agency**
  - Mr. BESSHO Kotaro
    - Director
    - Satellite Program Division, Information Infrastructure Department

- Mr. YASUI Kazuki  
Senior Scientific Officer  
Satellite Program Division, Information Infrastructure Department
- Dr. YAMANE Yumiko  
Assistant Scientific Officer  
Satellite Program Division, Information Infrastructure Department
- Mr. HARADA Tsuneyuki  
Assistant Scientific Officer  
Satellite Program Division, Information Infrastructure Department
- Mr. NAGATA Kazuhiko  
Head  
Office of Meteorological Analysis and Application Development  
Administration Division, Atmosphere and Ocean Department
  
- Mr. KAMEKAWA Norio  
Senior Scientific Officer  
Office of Meteorological Analysis and Application Development  
Administration Division, Atmosphere and Ocean Department
- Mr. SUZUE Hiroshi  
Scientific Officer  
Office of Meteorological Analysis and Application Development  
Administration Division, Atmosphere and Ocean Department
- Ms. IKEDA Michiko  
Senior Coordinator for International Aeronautical Meteorology  
Planning Division, Administration Department