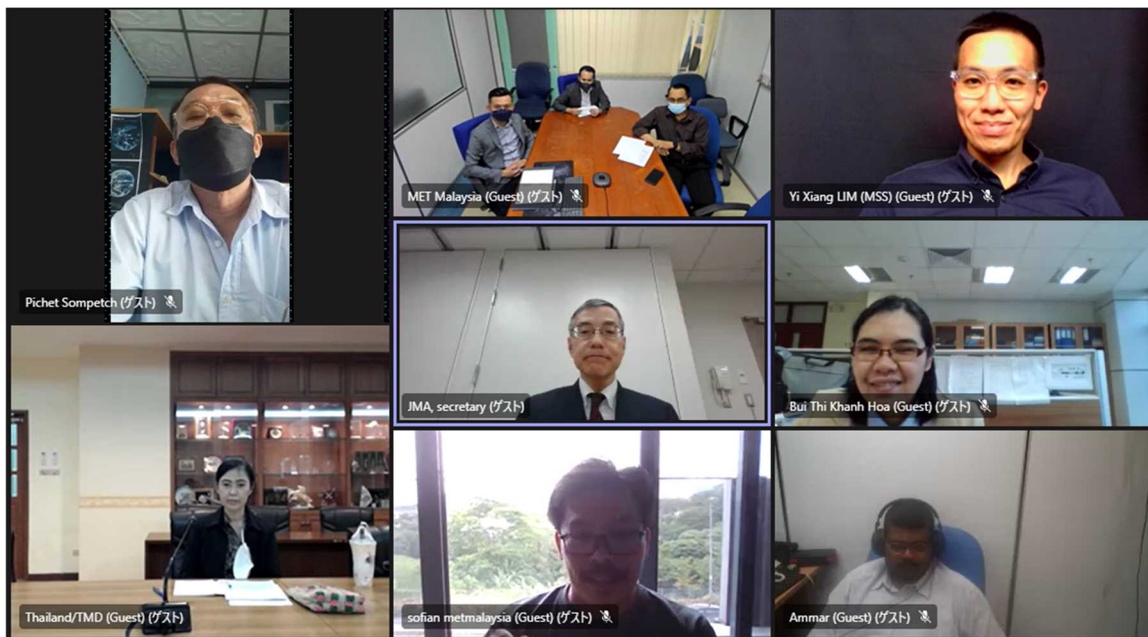


SUMMARY REPORT

Technical meeting on Himawari-8/9 Rapidly Developing Cumulus Area (RDCA) products

(Online, 18 February 2022)



A technical meeting on Himawari-8/9 Rapidly Developing Cumulus Area (RDCA) products was held online by the Japan Meteorological Agency (JMA) on 18 February 2022. This was part of activities conducted under the Annual Operating Plan (AOP) 2021 – 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 53rd session of TC held online hosted by JMA from 23 to 25 February 2021. The meeting was attended by representatives from National Meteorological and Hydrological Services (NMHSs) in Malaysia, Singapore, Thailand and Viet Nam, and was the first simultaneous gathering of all NMHSs contributing to the initiative.

The project is intended to enhance NMHS utilization of observation data from the Himawari-8/9 geostationary meteorological satellites via the development of RDCA detection techniques based on such data. Meeting attendees learned about such techniques and discussed progress for this year as well as possible efforts in future years.

Mr. MINEMATSU Hiroaki from JMA served as a moderator. The meeting program and the list of attendees are provided as Appendix I and II, respectively.

1. Opening

1.1. The meeting was opened by Mr. OBAYASHI Masanori, the Director-General of the Atmosphere and Ocean Department of JMA. He mentioned his high expectation that this project would certainly contribute to enhancement of meteorological services and further utilization of Himawari-8/9 among participating NMHSs.

2. Outline of the project and purpose of the meeting

2.1. Mr. MINEMATSU Hiroaki from JMA gave an introductory presentation on 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 utilization of Himawari-8/9 among NMHSs via developing the RDCA detection techniques. In addition, he explained this meeting aimed for confirming specific works this year and possible steps after that.

3. Data dissemination and distribution of Himawari-8/9 and their recent updates

- 3.1. Mr. BESSHO Kotaro from JMA presented the current status and recent updates of Himawari-8/9 data distribution, new online imagery contents, user support information, and the request-based high-frequency target area observation service for NMHSs, called “HimawariRequest”. He also explained a plan to switch over the operational satellite from Himawari-8 to Himawari-9 to be conducted almost seamless, with no change in data format and data dissemination system, except for the file name change of Himawari Standard Data (HSD) from HS_H08_yyyymmdd_hhnn_Bbb_cccc_Rjj_Skkl.DAT.bz2 (for Himawari-8) to HS_H09_yyyymmdd_hhnn_Bbb_cccc_Rjj_Skkl.DAT.bz2 (for Himawari-9).

4. The outline of the Himawari-8/9 RDCA products

- 4.1. Mr. SUZUE Hiroshi from JMA gave a presentation on the overview of the RDCA product. In the first half of the presentation, he explained the RDCA detection method, which used seven bands of Himawari-8/9 and a statistical method called logistic regression analysis. In addition, several case studies were shown, including early detection of convective clouds which would generate lightning in the near future and accuracy differences between such detection during daytime and nighttime. In the latter half of the presentation, he explained the validation method of RDCA detection and its results using lightning data as the ground truth data. Additionally, the difference in accuracy between daytime and nighttime and seasonal changes were also introduced. He also showed the validation results of RDCA detection in the tropics.

5. Country reports

- 5.1. Ms. Mahani Abllah from the Malaysian Meteorological Department (METMalaysia) presented current status and progress of the RDCA product in METMalaysia. The outlines of the report included Himawari-8/9 Satellite

Receiving System, Data Acquisition from HimawariCloud Service, Purpose and expected usage of RDCA product, Current ways of monitoring convective clouds, and Current Status and Challenges for RDCA product operationally. She also highlighted two main issues for METMalaysia to investigate in more details, firstly on the overestimated of RDCA detection at night-time that occur once in a while. Secondly, on the possibility of using another appropriate techniques for verification of RDCA product, other than using lightning data for RDCA verification.

- 5.2. Mr. WONG Songhan from the Meteorological Service Singapore (MSS) gave an overview of the meteorological satellite reception system installed in Singapore. The system receives and processes data from both polar and geostationary satellites. He highlighted examples of satellite products used in MSS, including RGB images, VIIRS Day-Night Band, JMA HCAI cloud products and fire hotspots. Singapore has also several satellite products developed in-house including SatView, HATS for haze monitoring and SatSuite for convective weather monitoring. Mr. BESSHO from JMA asked how did MSS obtain ground-truth data for hotspot verification, to which Mr. WONG replied that this was done through manual analysis using very high-resolution images from satellites such as SPOT and Sentinel. Mr. WONG also clarified that SatSuite is primarily used internally by MSS forecasters. Some of the products will also be shared with users from the aviation community as part of the on-going MET-ATFM integration initiatives.
- 5.3. Mr. Peeranat LONGSOMBUN from the Thai Meteorological Department (TMD) summarized the current ways of using satellite data including Himawari-8/9 and others. TMD uses Himawari-8/9 products for monitoring tropical cyclone and uses automatic script for ingesting Himawari-8/9 data into SATAID application. Then, TMD develops automatic wind barb plot every thirty minute with automatic weather station and METAR data compare with convective cloud that monitors by SATAID and makes a report through social network via the website and Line application. In the fastest case, after receiving Himawari-8/9 data, TMD's staff need 3-5 minutes to issue a report to the stakeholders. Moreover, TMD

estimations of PM2.5 ($\mu\text{g./m}^3$) concentrations from Himawari (visible (B02)). In the future, TMD wants to develop RDCA detection techniques and uses the Machine Learning for estimating PM2.5 which Himawari-8/9 data.

- 5.4. Ms. BUI THI KHANH Hoa from the Viet Nam Meteorological and Hydrological Administration (VNMHA) presented Vietnam's country report. The report focused on analyzing the current status of using Himawari-8 data in the development of RGB, HRP, HCAI products for monitoring convection clouds, heavy rainfall, tropical cyclone and dangerous weather phenomena in Viet Nam. In addition to using these types of products, VNMHA has also developed a product for monitoring convective clouds and thunderstorms based on weather radar data and lightning detection. Initial evaluation results show that the integration of satellite data, weather radar data and lightning detection is effective in monitoring convective clouds in Vietnam.

6. The way forward to develop techniques about Himawari-8/9 RDCA products

- 6.1. Mr. SUZUE explained the future plans of this project. He said that in 2022, after the exchange of official letters including condition of use, JMA would provide the source codes of RDCA detection computer programs to each participating NMHS. He requested them to port the program in their development environment, discuss the RDCA detection results with their internal users, and introduce their findings and notices at the next technical meeting. He also referred they planned to validate the RDCA detection and tuned the statistical model if necessary. In addition, he expected JMA's RDCA products would be able to improve based on the project feedback.

7. Closing

- 7.1. Mr. MINEMATSU announced the draft of JMA's official letter which contained the condition of use of the RDCA-related computer programs would be sent to participants from MSS, TMD and VNMHA as preparation of source codes provision, and mentioned the technical cooperation between

JMA and those three NMHSs as well as METMalaysia would get into full swing.

7.2. The technical meeting was closed by Mr. MINEMATSU.

PROGRAM

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Time (UTC)	Title
7:00-7:10	Opening
7:10-7:20	Outline of the project and purpose of the meeting
7:20-7:30	Data dissemination and distribution of Himawari-8/9 and their recent updates
7:30-8:00	The outline of the Himawari-8/9 RDCA products
8:00-8:20	Country report (Malaysia)
8:20-8:40	Country report (Singapore)
8:40-9:00	Country report (Thailand)
9:00-9:20	Country report (Viet Nam)
9:20-9:50	The way forward to develop techniques about Himawari-8/9 RDCA products
9:50-10:00	Closing

LIST OF ATTENDEES

Technical meeting on Himawari-8/9 Rapidly Developing Cumulus Area
(RDCA) products
(Online, 18 February 2022)

Malaysia / Malaysian Meteorological Department

Mr Maqrun Fadzli MOHD FAHMI

Director

Radar & Satellite Meteorology Division

Mr. Asmadi Abdul Wahab

Principal Assistant Director

Radar & Satellite Meteorology Division

Mr. Afizal Haqem Shapee

Assistant Director

Radar & Satellite Meteorology Division

Ms. Mahani Abllah

Meteorological Officer

Radar & Satellite Meteorology Division

Mr. Suffian Mohd Yusoff

Principal Assistant Director

Meteorological Communication Division

Mr. Muhammad Firdaus Ammar Abdullah

Principal Assistant Director

Research & Technical Development Division

Mr. Muhamad Sofian Muhamad Yusof

Meteorological Officer

Research & Technical Development Division

Singapore / Meteorological Service Singapore

Mr. WONG Songhan

Head

Customer Service Branch, Forecast Development Department

Mr. LIM Yi Xiang

Assistant Manager

Technology Solutions, Forecast Applications Development Department

Mr. YEO Cheng Xun

Executive Meteorologist

Technology Solutions, Forecast Applications Development Department

Thailand / Thai Meteorological Department

Ms Patchara PETVIROJCHAI

Director

Research and Technical Cooperation Sub-division

Mr. Kamol PROMASAKHA NA SAKOLNAKHON

Director

Meteorological Radar and Satellite Data Analysis Sub-division

Mr. Thaweesak CHANTABURI

Director

Meteorological Observation Standards Sub-division

Mr. Pichet SOMPETCH

Director

Meteorological Satellite Sub-division

Mr. Peeranat LONGSOMBUN

Meteorologist

Numerical Weather Prediction Sub-division

Ms. Pailin SANGKHAO

Foreign Relations Officer

International Affairs Sub-division

Viet Nam / Viet Nam Meteorological and Hydrological Administration

Ms. BUI THI KHANH Hoa

Forecaster

Meteorological Radar Division, Aero-Meteorological Observatory

Japan / Japan Meteorological Agency

Mr. MINEMATSU Hiroaki

International Strategy Officer for Meteorological Observations
Observation Division, Atmosphere and Ocean Department

Mr. OMORI Shiro

Deputy Head
Office of Meteorological Analysis and Application Development
Administration Division, Atmosphere and Ocean Department

Mr. SUZUE Hiroshi

Assistant Scientific Officer
Office of Meteorological Analysis and Application Development
Administration Division, Atmosphere and Ocean Department

Mr. MARUYAMA Takumi

Assistant Scientific Officer
Office of Meteorological Analysis and Application Development
Administration Division, Atmosphere and Ocean Department

Mr. BESSHO Kotaro

Senior Supervisor for Satellite Operations
Satellite Program Division, Information Infrastructure Department

Mr. SAKASHITA Takuya (*Absence*)

Senior Scientific Officer
Satellite Program Division, Information Infrastructure Department

Mr. YASUI Kazuki

Scientific Officer
Office of International Affairs
Planning Division, Administration Department