HimawariCast Newsletter

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Japan Meteorological Agency

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Utilization of HimawariCast in MetMalaysia

Malaysian Meteorological Department (MMD) has started the operation of HimawariCast receiving system on December 2015, to replace the Multi-functional Transport Satellite (MTSAT) system operation following the launched of new-generation of meteorological satellite known as Himawari-8 by Japan Meteorological Agency (JMA) had successfully entered operational service starting on 7 July 2015.

The HimawariCast receiving system consists of two major (2) components: (1) Receiving & Ingesting System; and (2) Data Processing & Display System. JMA distribute the high-frequency and high-resolution data of Himawari-8 by HimawariCast and Himawari Cloud services. HimawariCast service is set up as MMD main system via communication satellite, while HimawariCloud service responsible as the backup system via Internet cloud approaches.

The HimawariCast service provides full-disk 14 channels HRIT data and SATAID data that include Numerical Weather Prediction (NWP) products and In–Situ observations data. MMD receives all the data same like the other National Hydro Meteorological Services (NHMSs).

Animation and Interactive Diagnosis (SATAID) application is useful as an operational and analysis tool to support meteorological forecaster for its enable to overlay satellite imagery with other data received by HimawariCast service. SATAID is currently being used in MMD Headquarters and National Meteorological Aviation Centre (NAMC), KLIA. MMD is planning to increase the usage of SATAID application in regional forecast offices throughout Malaysia in the future.

HimawariCast image data and RGB products that generated by the HimawariCast system are sent to MMD's internal web for the use of meteorological officer. The multispectral and high temporal resolution data would enhance better forecasting in the field of nowcasting, weather analysis and environmental monitoring for its offer many choices of satellite image and products. Instead of using common satellite image like Visible, Infrared and Water Vapor images, they also can make analysis using RGB products (Day Convective Storms, Natural Colour, Day and Night Microphysics, etc.). Forest fire(hotspots) or volcanic ash information are also possible to detect by using RGB products.

(Mahani Binti Abllah: MMD)

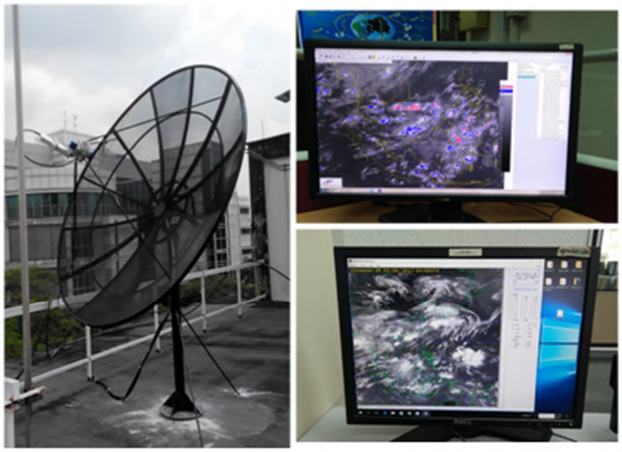

Figure 1. Left: HimawariCast Reception Antenna
Right (Upper): Data processing and Display System
Right (Bottom): SATAID Display Computer

Addition of new RGB functions in SATAID

JMA released an update to its meteorological data visualization program on 27 June 2017, changing its name from GMSLPD to SATAID (Fig. 2)

SATAID features a new function allowing the display of new RGB recipes and color interpretations for all RGB recipes in this version. The latest version is available at http://www.data.jma.go.jp/mscweb/en/himawari89/himawari_cast/himawari_cast.html#software.

New RGB recipes

SATAID allows the display of new RGB images using:

1) EUMETSAT recipes
   - Day Microphysics*1
   - Day Snow-Fog*1

2) JMA original recipes (experimental*2)
   - Water Vapors
   - Water Vapors2
   - Cloud Phase Distinction
   - Fire Detection
   - Natural Fire Color*3
   - Simple Fire & Smoke
   - SO2

The method for understanding these new RGB images via the color interpretation display function is described later. Day Snow-Fog RGB is outlined in more detail in the next section.

For details of RGB image display, see page 14 of the Quick Guide to SATAID at http://www.wis-jma.go.jp/cms/sataid/manual/.

*1) These new recipes require 3.9 μm solar component images (referred to as I4S in SATAID). The new version of SATAID can be used to create I4S images from I4 and IR images.

*2) JMA's proprietary recipes and related interpretations remain experimental, and are subject to change.

*3) Natural Fire Color is JMA's own enhanced version of CIRA's Natural Fire Color, and differs from the CIRA product.

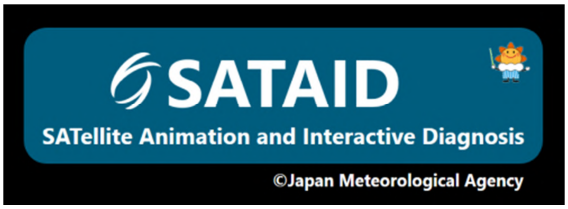

Figure 2. SATAID logo

Color interpretation display function for all RGB recipes

SATAID supports the display of various RGB image types. Despite the usefulness of these images, understanding color correspondence with individual phenomena can be challenging. The new version of SATAID allows color interpretation display for all RGB recipes, thereby supporting image analysis.

RGB color interpretation display (Figure 3)

1) Open the RGB image list window from the Options menu.
2) Right-click the upper-left corner of the RGB image list window.
3) Click Color in the pop-up menu to open the RGB color window.
4) The RGB color window displays interpretation information for the RGB image. (Figure 4)

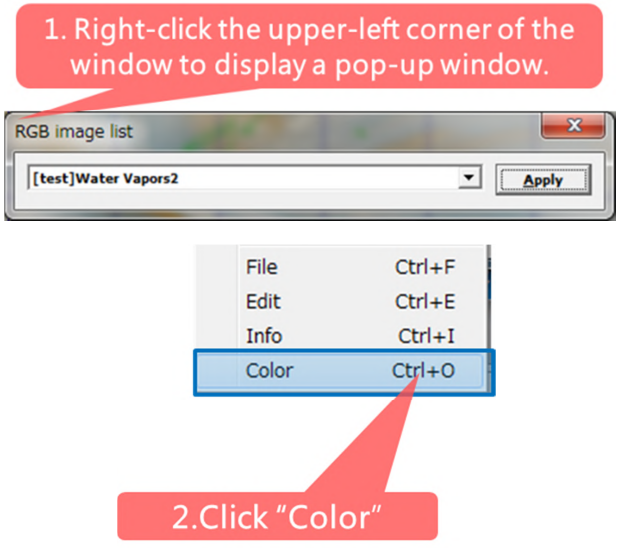

Figure 3. RGB color interpretation display function

(Hideyuki Kawada)

Day Snow-Fog RGB

A June 2017 update to the SATAID program (latest version: 3.2.0.2) provided the capacity to display a variety of additional RGB composite images. The Day Snow-Fog RGB introduced with the update is outlined here.

Day Snow-Fog RGB is composed of near-infrared bands (N1: 0.86 μm (red component); N2: 1.6 μm (green component); and I4S: 3.9 μm for sunlight reflection component (blue component)). As ice-related sunlight reflection is low (dark) in N2 and I4S images, areas of snow cover and sea ice appear reddish. Water cloud (fog) appears whitish due to strong sunlight reflection in all components.

A visible image (VS: 0.64 μm) (Figure 5) and a Day Snow-Fog RGB (Figure 6) from Himawari-8 are shown below. Fog/low-level cloud and areas of snow cover/sea ice are not easily distinguishable in the VS image, but the distinction is clear in the Day Snow-Fog RGB; areas of snow cover/sea ice are reddish, and fog/low-level cloud are whitish. RGB images are thus useful for distinguishing these phenomena.

The updated version of SATAID also enables the display of a color interpretation sample window (that for Day Snow-Fog RGB is shown in Figure 4) to help users understand colored RGB images. Oceans appear black, vegetation appears greenish, and deserts appear bright blue. Deep precipitating clouds appear ocher, and fog/low-level cloud (thick water cloud with droplets) are displayed in shades from white to gray depending on particle size.

(Yoshiyuki Terasaka)

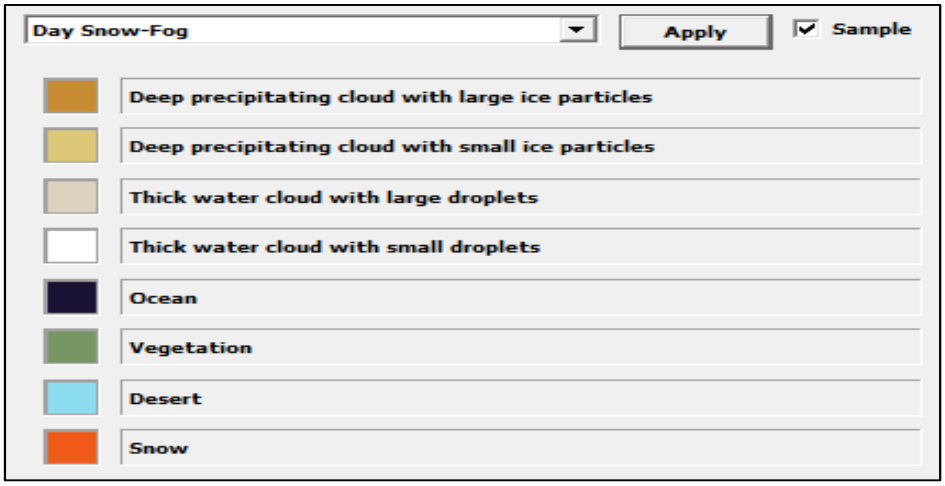

Figure 4. Day Snow-Fog RGB color interpretation sample window

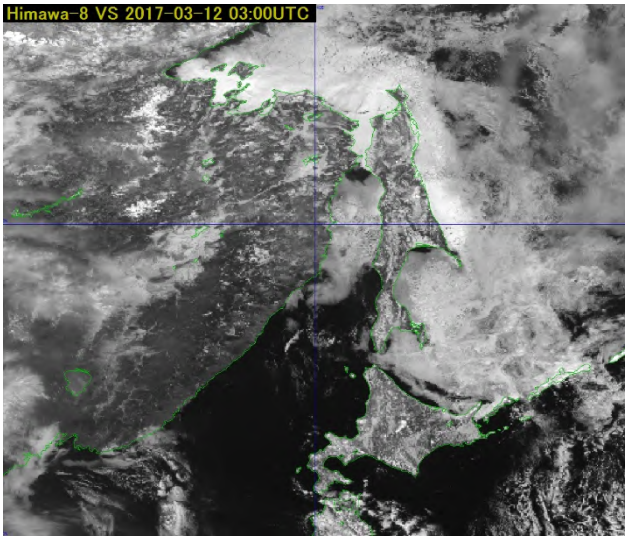

Figure 5. Visible image (VS)
(03UTC, 12 March 2017)

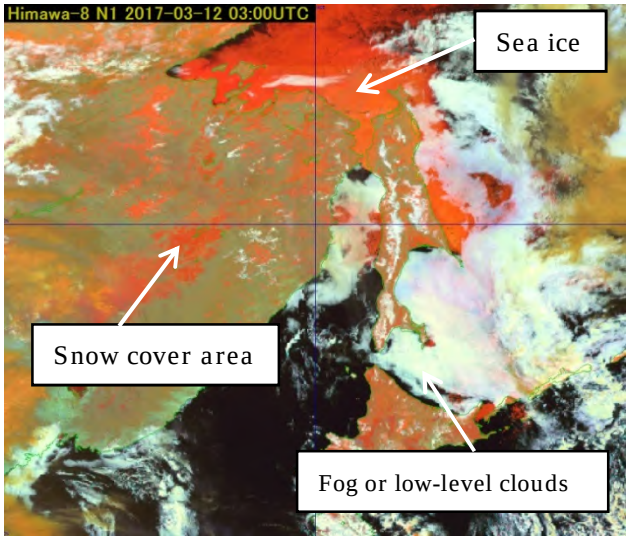

Figure 6. Day Snow-Fog RGB
(03UTC, 12 March 2017)

JMA's HimawariCast training events in Nepal, Tonga and Kiribati

1. Nepal

A HimawariCast receiving system was installed at the Meteorological Forecasting Division (MFD) of Nepal's Department of Hydrology & Meteorology (DHM) in November 2016. Against this background, a JMA expert delegation was dispatched to DHM to provide training on SATAID utilization and satellite image interpretation at Tribhuvan International Airport's MFD office. The visitors were cordially welcomed by the DHM Director-General. The DHM Deputy Director-General and around 10 MFD forecasters attended the training while working on forecasting operations in turn.

The attendees eagerly engaged in exercises on matters such as satellite image interpretation using SATAID with particular focus on the utilization of NWP data and RGB composite images. In line with demand for the ability to watch real-time satellite images on a PC and use original-resolution satellite images in operational forecasting, the JMA experts covered the WMO Information System (WIS) service and the Himawari-Cloud service on the final day.

The JMA delegation very much appreciated the kind hospitality shown during their stay in Nepal. The training is expected to be useful in related operations, and a continuing collaborative relationship between DHM and JMA is considered desirable.

(Junya Fukuda and Mikito Yamamoto)

2. Tonga and Kiribati

The three-day training course at the Tonga Meteorological & Coast Radio Services (TMCRS) was smooth and cordial thanks to the dedication and passion of the TMCRS staff. As the trainees already possessed a certain level of competence in using the SATAID program for effective operational weather analysis and forecasting, the course content was adjusted to provide higher-level training.

Although the 2.5-day duration of the training provided at the Kiribati Meteorological Service (KMS) did not allow for extensive instruction on weather analysis and forecasting, the attendees' enthusiasm for learning made the course extremely fruitful. All those present demonstrated remarkable improvements in competence.

The trainees on both courses expressed interest in further training on meteorological service provision using satellite and numerical prediction data. JMA hopes to have further opportunities to share its expertise on HimawariCast dataset usage with the two countries.

(Kotaro Bessho and Yusuke Ioka)

Figure 7. MFD staff in satellite image interpretation training

Figure 8. Seminar at TMCRS

Feedback

JMA welcomes feedback from users on HimawariCast data usage, and particularly invites articles to be posted in this newsletter. Such input will help other users consider new ideas for their services.

The Agency also invites questions on HimawariCast services. These may relate to the functions of the SATAID program, JMA's interpretation/analysis of multi-band imagery or other areas of interest. Feel free to send queries to be

answered in this newsletter.

All articles and questions are welcomed. Your contributions are greatly appreciated.

Comments and inquiries

Comments and inquiries on this newsletter and/or the HimawariCast web page are welcomed.

Mr. Akiyoshi Andou
Senior Scientific Officer, Satellite Program Division, Observation Department,
Japan Meteorological Agency
1-3-4 Otemachi, Chiyoda-ku, Tokyo, 100-8122, Japan
Fax: +81-3-3217-1036
Email: metsat@met.kishou.go.jp