



HimawariCast Newsletter

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Japan Meteorological Agency 

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HimawariRequest

Service Overview

The Japan Meteorological Agency (JMA) launched a new international “HimawariRequest” service, in collaboration with the Australian Bureau of Meteorology (AuBoM). The service allows National Meteorological and Hydrological Service (NMHS) users in Himawari-8/9 coverage area to request Target Area observation.

The Advanced Himawari Imager (AHI) on board Himawari-8/9 is capable of frequent and flexible observation, providing Full-Disk images of the earth every 10 minutes and regional images with shorter intervals. Full-Disk and other regional observations have spatial resolutions of 0.5 to 2 km and spectral coverage incorporating 16 bands.

Target Area observation covers a 1,000 km x 1,000 km area every 2.5 minutes with flexibility for location changes to support JMA’s national and international services. The observation is normally focused on an area of active volcanoes in the domain of the Tokyo Volcanic Ash Advisory Center (VAAC), and is adapted to encompass typhoons within the responsibility area of the Regional Specialized Meteorological Center (RSMC) - Tokyo Typhoon Center.

Basic Principles

The HimawariRequest service is based on the following fundamental principles:

1. Requests from users may be overridden or interrupted depending on circumstances within Japan or JMA.

2. The service is provided on a best-effort basis in consideration of operational limitations.
3. Users’ requests relating to emergency operations for tropical cyclones and volcanic eruptions are prioritized over other users’ requests.
4. Observations shall not initially exceed 48 hours, but may be extended in response to additional requests.

Registration

Before using the service, Users must submit a completed registration form specifying the e-mail address from which requests will be sent in order to enable validation by JMA and AuBoM. The registration form is available at following URL:

<https://www.jma-net.go.jp/sat/data/Tg/pdf/RegistrationForm.docx>

Service Availability

The HimawariRequest service is available 24/7 and provided as soon as possible. The request procedure is normally completed within around three hours during working hours and within around six hours otherwise.

Request Management

A 2016 feasibility study conducted by JMA and AuBoM on request-based Himawari-8 Target Area observation indicated potential advantages from AuBoM brokerage of RA V (South-West Pacific) observation requests in order to mitigate burdens placed on JMA in relation to extreme events.

Accordingly, RA V Users should submit requests

directly to AuBoM. In the event of conflicting requests from different Users, AuBoM shall assign priority in line with Basic Principle above. If this is impractical, AuBoM shall assign priority at its own discretion. AuBoM shall inform JMA of a single request for each time slot. Users of RA II (Asia) and the United States of America (USA) should submit requests directly to JMA. The related procedures are outlined in the HimawariRequest Service Description at <https://www.jma-net.go.jp/sat/data/Tg/pdf/HimawariRequest.pdf>.

HimawariRequest Web Tool

This section describes the online facility for e-mail request submission to JMA or AuBoM from RA II and RA V users. Each registered NMHS has a dedicated web page.

To submit a request:

1. Access the relevant NMHS web page.
2. Provide the requester’s name in the designated field.

3. Indicate the event type, purpose, observation area, start time and duration.

The observation end time is calculated from the start time and duration data provided. The red square marks the Target Area observation, with users being able to choose any position within the earth image. Selection can be made by:

- clicking the green and blue buttons to shift the area;
- selecting the relevant latitude and longitude from the drop-down menu; or
- clicking on the earth image.

4. Click “Send HimawariRequest e-mail” in the panel on the right. Your e-mail program should open automatically.
5. Send the e-mail to JMA (RA-II) or AuBoM (RA V) as appropriate.

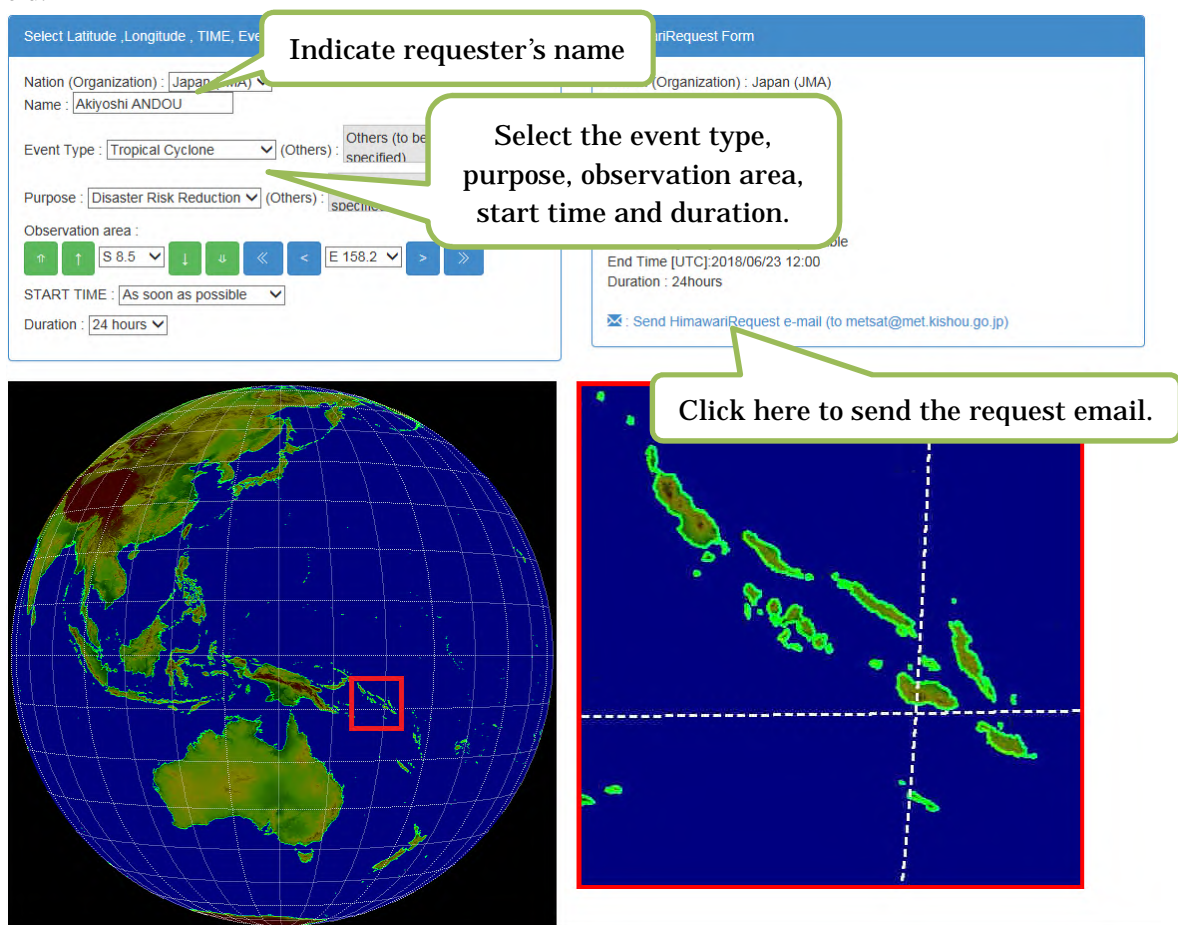


Figure 1 HimawariRequest web page

Overall Testing

Several NMHSs registering for the service have conducted overall testing of the request procedure, including requests from users and for JMA's actual Target Area observation conducted every 2.5 minutes.

For the first test on 8 March 2018, JMA collaborated with the Solomon Islands Meteorological Service (SIMS) and AuBoM. On 14 and 16 March, JMA also conducted tests with the Hong Kong Observatory and the Meteorological Service of New Zealand. This work involved checking of the various procedures with the relevant NMHSs. Figure 2 shows imagery from Target Area observation requested by SIMS.

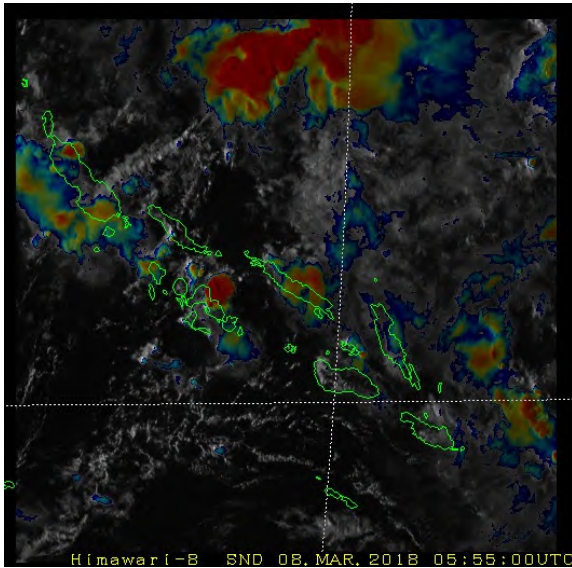


Figure 2 Imagery from Target Area observation requested by SIMS (sandwich product, 05:55 UTC on 8 March 2018)

Data Access

Target Area observation data are provided via the HimawariCloud service. Related imagery is also available on the Himawari Real-time Image website (imagery products and observation area):

- https://www.data.jma.go.jp/mscweb/data/himawari/sat_tgb.php
- https://www.data.jma.go.jp/mscweb/data/himawari/sat_tga.php

Welcome to Requests

JMA expects the HimawariRequest service to support disaster risk reduction activities in the Asia Oceania region based on the regional monitoring of extreme events such as tropical cyclones and volcanic eruptions using the Target Area observation. The Agency invites NMHSs to register and submit observation requests.

(Akiyoshi Andou)

Parallax Shift

A frequently asked question from NMHS users:

- Why don't cloud locations in Himawari-8 imagery match radar reflectivity core data?

Cloud locations in Himawari-8/9 imagery may appear to be displaced from information in other data sets, such as those for radar observation and lightning detection.

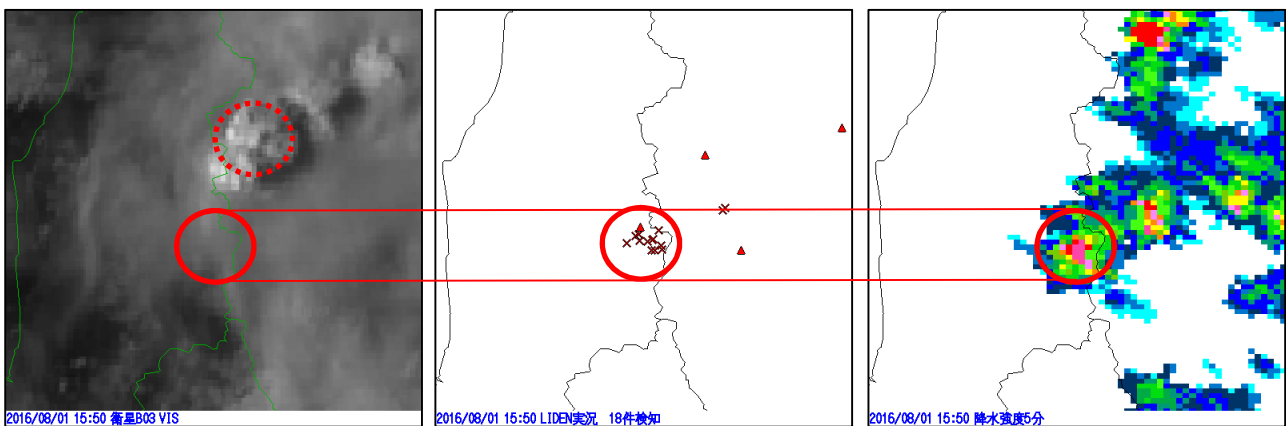


Figure 3 Left: visible image from Himawari-8; center: lightning detection; right: radar image from 1 August 2016, Hokkaido Prefecture, Japan

Figure 3 shows thunderstorm data from the Himawari-8 visible band, lightning detection data and radar imagery from 1 August 2016 for northern Japan's Hokkaido Prefecture. The highest cloud top in the satellite imagery is northwest of the lightning detection and radar reflectivity core. This displacement is approximately 10 km, and is referred to as parallax shift (see Figure 4). Essentially, as Himawari-8 is located over the sub-satellite point on the equator looking downward, clouds can appear shifted from their actual positions. Parallax shift increases with greater cloud distances from the sub-satellite point. Figure 5 shows this shift for cloud at a height of 10 km. The value is less than 2.5 km near the sub-satellite point on the equator at 140.7°E longitude, but increases rapidly toward the earth's edge. Tall clouds such as cumulonimbus are also associated with greater parallax shift than low clouds. By way of example, the shift of clouds at a height of 15 km is 1.5 times that for clouds at 10 km.

The direction of parallax shift is away from the sub-satellite point. Clouds appear northward of their actual positions in the Northern Hemisphere and southward in the Southern Hemisphere, and eastward or westward of the sub-satellite point (on the equator at 140.7°E longitude).

Understanding the concept of parallax shift is essential for effective satellite imagery usage.

(Akiyoshi Andou)

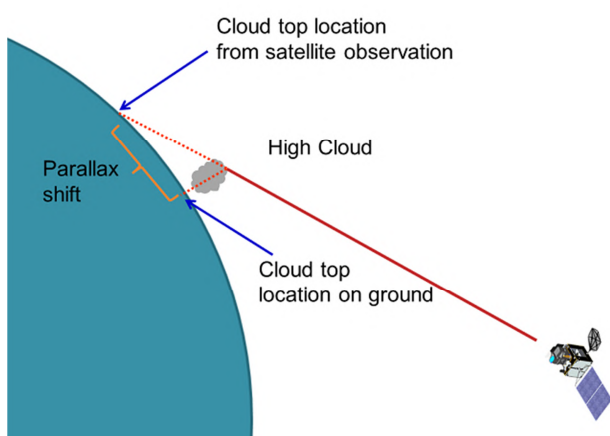


Figure 4 Outline of parallax

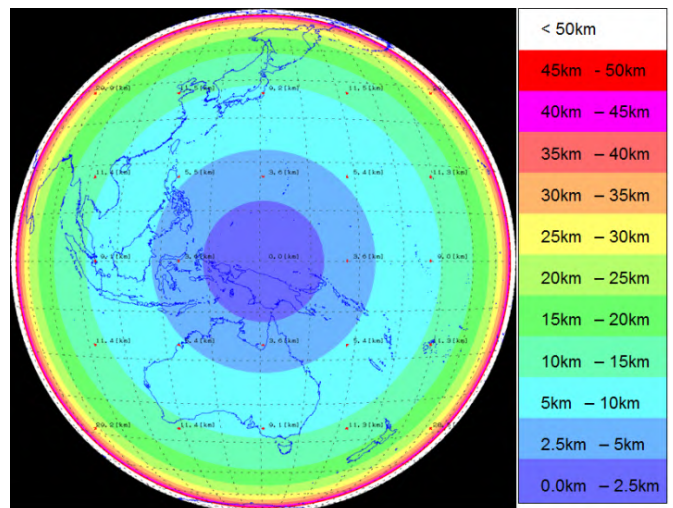


Figure 5 Parallax shift of cloud at a height of 10 km

Himawari-8 Maintenance Results

Maintenance of the Himawari-8 took place over a two-day period from 13 to 14 February 2018. This was featured in HimawariCast Newsletter No. 6, and included an update of the best detector selection (BDS) map.

AHI-8 has several redundant detector columns for each band, and best detector in each row is selected. The characteristics of several detectors had become unstable in orbit, resulting in stripe noise in the E-W direction on Himawari-8 imagery. The BDS map is intended to help eliminate this ongoing noise. Figure 6 shows the impacts of the update on Himawari-8 imagery. The east-west noise in the figure on the left is effectively removed in that on the right by the update.

The updates for Bands 8, 10, 13, 15 and 16 eliminated most stripe noise, but some is still occasionally observed as shown in Figure 7. JMA continues to monitor data quality and will implement further updates as necessary.

(Akiyoshi Andou)

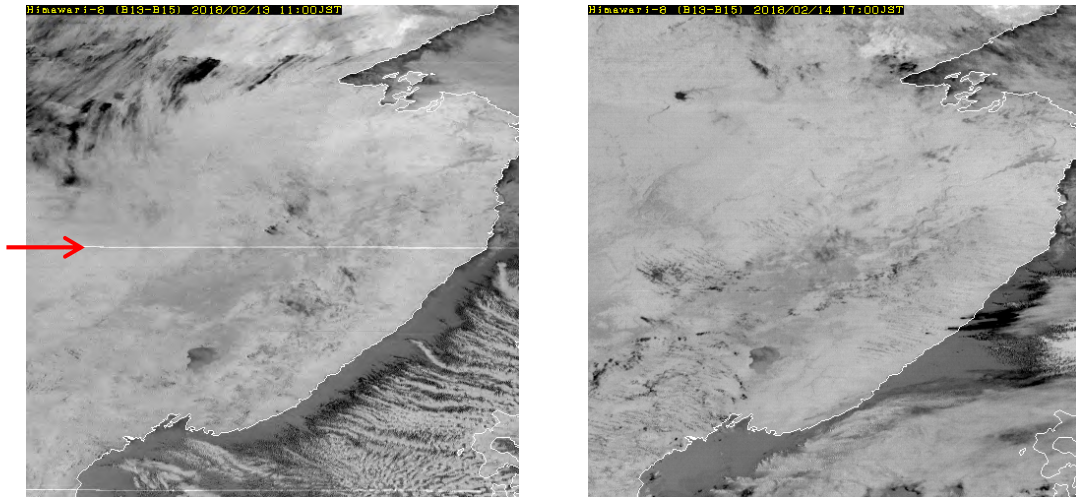


Figure 6 Infrared differential imagery (Bands 13 - 15) from Himawari-8. Left: before BDS map update at 02:00 UTC on 13 February 2018; right: after BDS map update at 09:00 UTC on 14 February 2018.

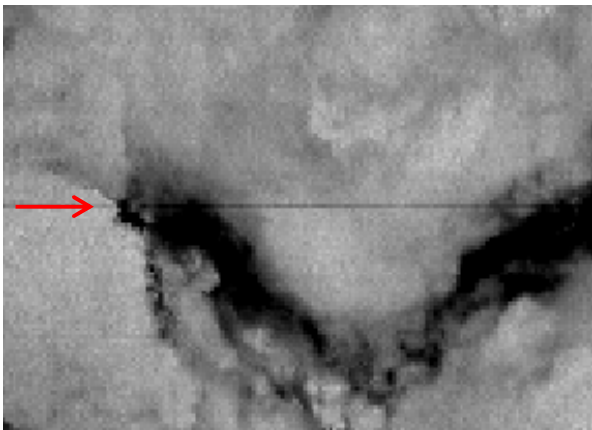


Figure 7 Remaining noise in infrared differential imagery (Bands 13 – 15) from Himawari-8 after BDS map update at 09:40 UTC on 13 February 2018

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, 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.

Editorials and Inquiries

Any comments or inquiries on this newsletter and/or the HimawariCast Web Page are much appreciated!

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