

INTRODUCTION OF HIMAWARI-8/9

Hiromi OWADA

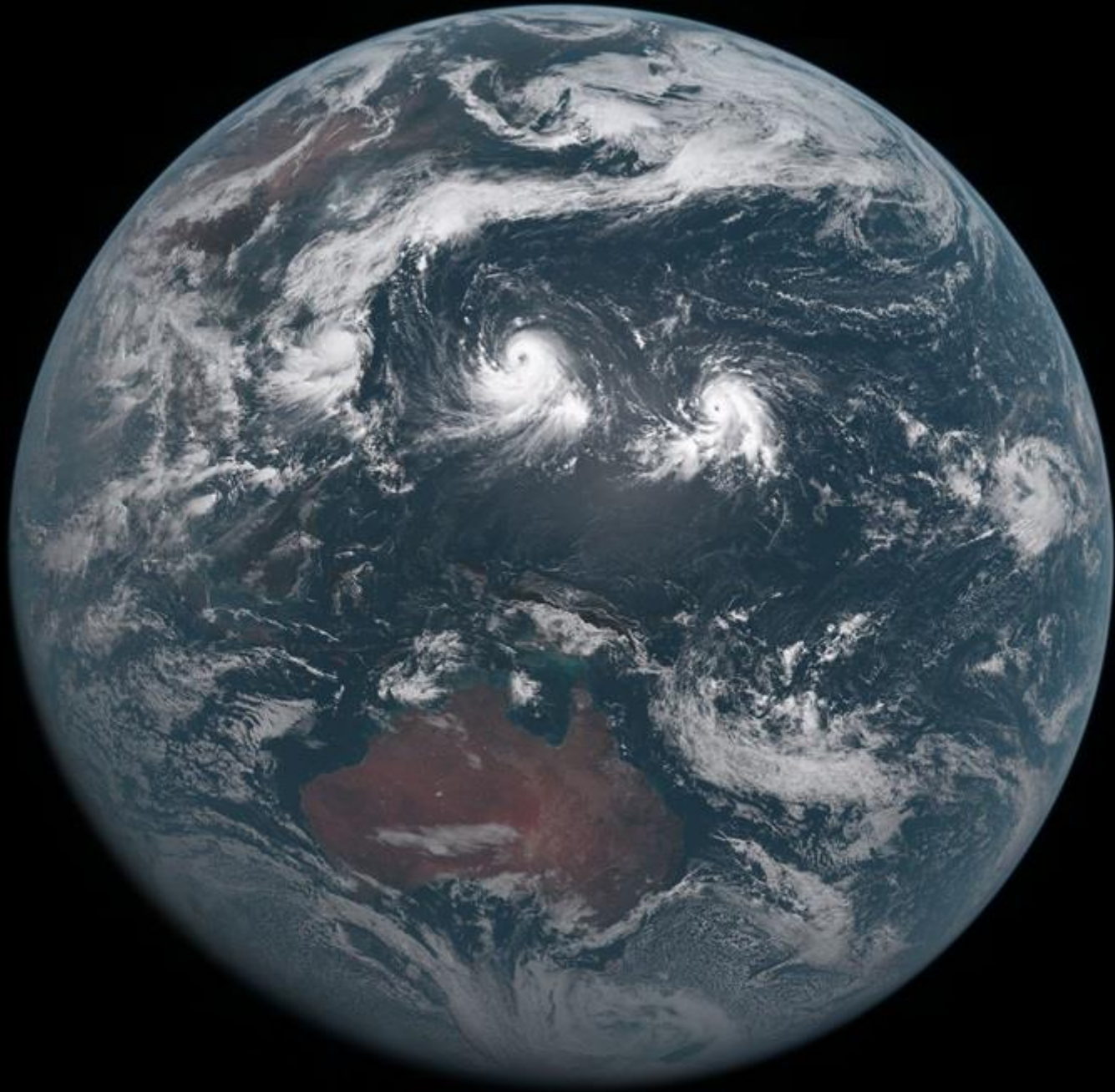
Satellite Program Division
Japan Meteorological Agency
(Updated as of 08 July, 2020)



Himawari-9

Himawari-8

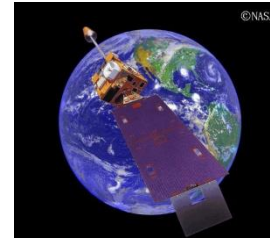
Himawari-8 began operation at 02:00 UTC on 7th July 2015.



History of Japanese Geostationary-Met. Satellites



GMS (Geostationary Meteorological Satellite)
nicknamed “Himawari”



GOES-9



Himawari-8 Himawari-9

Jul 1977 Aug 1981 Aug 1984 Sep 1989 Mar 1995 May 2003 Feb 2005 Feb 2006 Oct 2014 Nov 2016



GMS-2

Himawari-2



GMS-3

Himawari-3



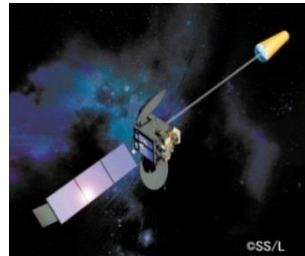
GMS-4

Himawari-4



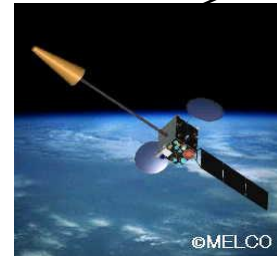
GMS-5

Himawari-5



MTSAT-1R

Himawari-6



MTSAT-2

Himawari-7

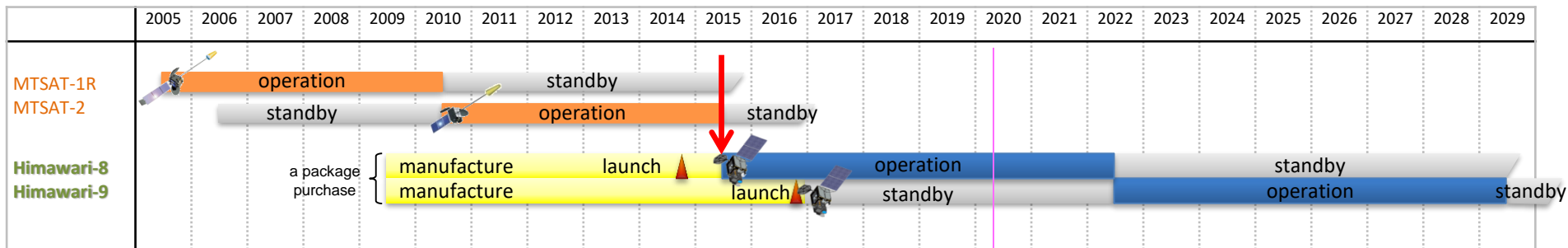
Satellite	Observation period
GMS	1977~1981
GMS-2	1981~1984
GMS-3	1984~1989
GMS-4	1989~1995
GMS-5	1995~2003
GOES-9 *	2003~2005 *
MTSAT-1R	2005~2010
MTSAT-2	2010~2015
Himawari-8	2015~2022
Himawari-9	2022~2029

Himawari-8/9



Himawari-8 began operation on 7 July 2015, replacing the previous MTSAT-2 operational satellite

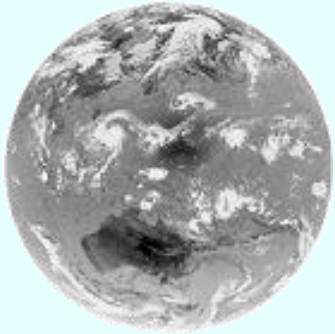
Geostationary position	Around 140.7° E
Attitude control	3-axis attitude-controlled geostationary satellite
Communication	1) Raw observation data transmission Ka-band, 18.1 - 18.4 GHz (downlink)
	2) DCS (Data collection System) International channel 402.0 - 402.1 MHz (uplink) Domestic channel 402.1 - 402.4 MHz (uplink) Transmission to ground segments Ka-band, 18.1 - 18.4 GHz (downlink)
	3) Telemetry and command Ku-band, 12.2 - 12.75 GHz (downlink) 13.75 - 14.5 GHz (uplink)



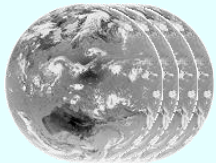
Improved Resolutions

Spectral

VIS 1 band



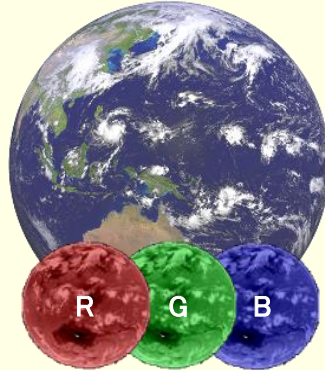
IR 4 bands



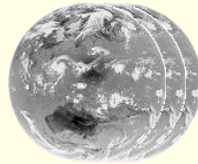
5 bands

MTSAT-1R/2

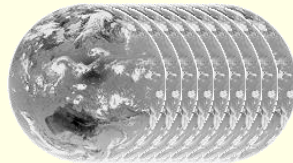
VIS 3 bands



NIR 3 bands



IR 10 bands



16 bands

Himawari-8/9

Spatial

At sub-satellite point

VIS 1 km
IR 4 km

MTSAT-1R/2

VIS 0.5/1 km
IR 2 km

Himawari-8/9

Temporal

Observation Frequency

60min.
[full-disk
obs.]

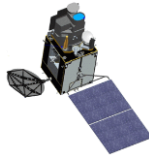
MTSAT-1R/2

10min.
10min.
10min.
10min.
10min.
10min.

Himawari-8/9

Spectral Bands

Himawari-8/9 Imager (AHI; Advanced Himawari Imager)



cf.
MTSAT-2
Bands



VIS
0.68 μm

IR4
3.7 μm

IR3
6.8 μm

IR1
10.8 μm

IR2
12.0 μm

Band		Spatial Resolution	Central Wavelength	Physical Properties
1	Visible (VIS)	1 km	0.47 μm	vegetation, aerosol
2			0.51 μm	vegetation, aerosol
3		0.5 km	0.64 μm	Vegetation, low cloud, fog
4	Near Infrared (NIR)	1 km	0.86 μm	vegetation, aerosol
5		2 km	1.6 μm	cloud phase
6			2.3 μm	particle size
7	Infrared (IR)	2 km	3.9 μm	low cloud, fog, forest fire
8			6.2 μm	mid- and upper-level moisture
9			6.9 μm	mid-level moisture
10			7.3 μm	mid- and lower-level moisture
11			8.6 μm	cloud phase, SO ₂
12			9.6 μm	Ozone content
13			10.4 μm	cloud imagery, information of cloud top
14			11.2 μm	cloud imagery, sea surface temperature
15			12.4 μm	cloud imagery, sea surface temperature
16			13.3 μm	cloud top height, CO ₂

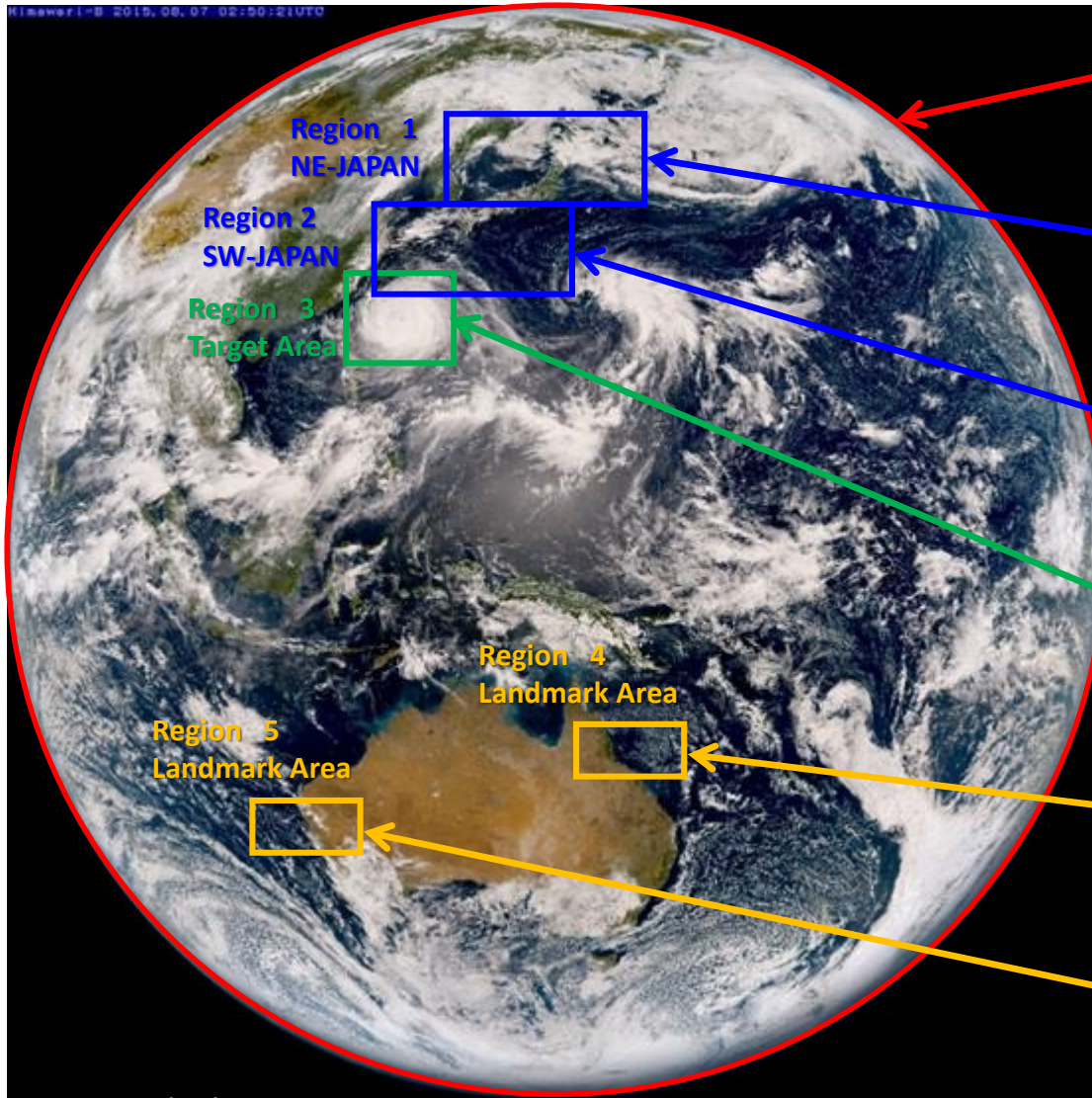
3 Visible Bands

Addition of NIR Bands

Increase of WV Bands

Increase of TIR Bands

AHI Observation Modes



Full disk

Interval : **10 minutes** (6 times per hour)

Region 1 JAPAN (North-East)

Interval : **2.5 minutes** (4 times in 10 min)

Dimension : EW x NS: 2000 x 1000 km

Region 2 JAPAN (South-West)

Interval : **2.5 minutes** (4 times in 10 min)

Dimension : EW x NS: 2000 x 1000 km

Region 3 Target Area

Interval : **2.5 minutes** (4 times in 10 min)

Dimension : EW x NS: 1000 x 1000 km

Region 4 Landmark Area

Interval : **0.5 minutes** (20 times in 10 min)

Dimension : EW x NS: 1000 x 500 km


Region 5 Landmark Area


Interval : **0.5 minutes** (20 times in 10 min)

Dimension : EW x NS: 1000 x 500 km

Overview of Himawari-8 and -9

https://www.jstage.jst.go.jp/article/jmsj/94/2/94_2016-009/_article

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Journal of the Meteorological Society of Japan. Ser. II

Online ISSN : 2186-9057
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Articles

An Introduction to Himawari-8/9— Japan's New-Generation Geostationary Meteorological Satellites


Kotaro BESSHO, Kenji DATE, Masahiro HAYASHI, Akio IKEDA, Takahito IMAI, Hidekazu INOUE, Yukihiro KUMAGAI, Takuya MIYAKAWA, Hidehiko MURATA, Tomoo OHNO, Arata OKUYAMA, Ryo OYAMA, Yukio SASAKI, Yoshio SHIMAZU, Kazuki SHIMOJI, Yasuhiko SUMIDA, Masuo SUZUKI, Hidetaka TANIGUCHI, Hiroaki TSUCHIYAMA, Daisaku UESAWA, Hironobu YOKOTA, Ryo YOSHIDA

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Keywords: [geostationary meteorological satellite](#), [Himawari](#), [satellite meteorology](#)


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2016 Volume 94 Issue 2 Pages 151-183


 <https://doi.org/10.2151/jmsj.2016-009>

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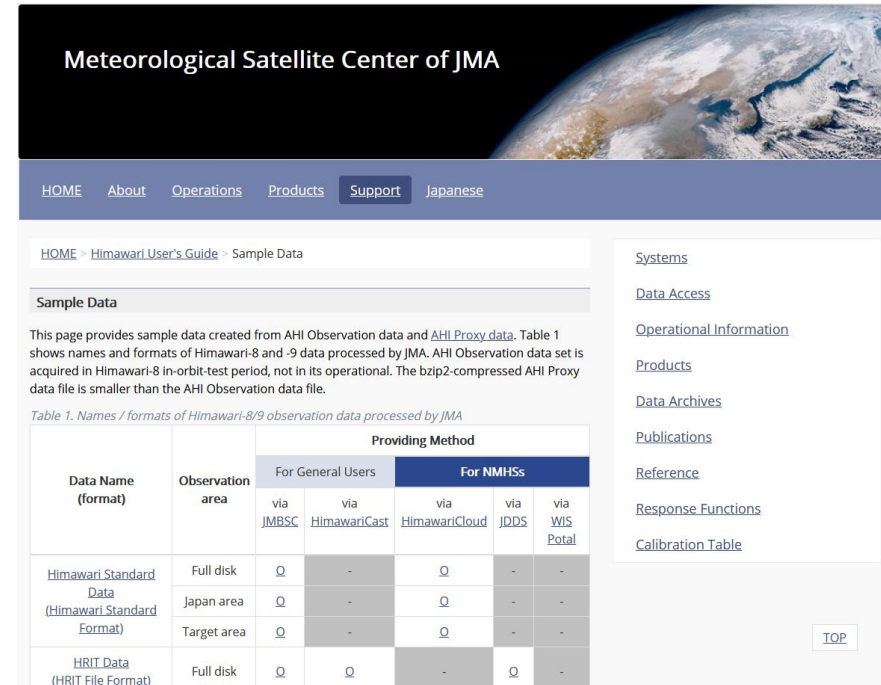
feedback

Himawari-8/9 Users Support Information

<https://www.data.jma.go.jp/mscweb/en/support/support.html>

Contents:

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- Overview of data dissemination
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- [Sample source code](#) to read Himawari-8 data and convert into other formats
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 - From HSD or HRIT to SATAID Data
 - From HSD to HRIT Data etc.



Meteorological Satellite Center of JMA

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Sample Data

This page provides sample data created from AHI Observation data and AHI Proxy data. Table 1 shows names and formats of Himawari-8 and -9 data processed by JMA. AHI Observation data set is acquired in Himawari-8 in-orbit-test period, not in its operational. The bzlp2-compressed AHI Proxy data file is smaller than the AHI Observation data file.

Table 1. Names / formats of Himawari-8/9 observation data processed by JMA

Data Name (format)	Observation area	Providing Method				
		For General Users		For NMHSs		
		via JMBSC	via HimawariCast	via HimawariCloud	via JDDS	via WIS Potal
Himawari Standard Data (Himawari Standard Format)	Full disk	Q	-	Q	-	-
	Japan area	Q	-	Q	-	-
	Target area	Q	-	Q	-	-
HRIT Data (HRIT File Format)	Full disk	Q	Q	-	Q	-

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Feel free to contact:

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Thank you!!

The first image of Himawari-9
02:40 UTC, 24 Jan. 2017



True Color Reproduction imagery

This imagery was developed on the basis of collaboration between the JMA Meteorological Satellite Center and the NOAA/NESDIS GOES-R Algorithm Working Group imagery team.