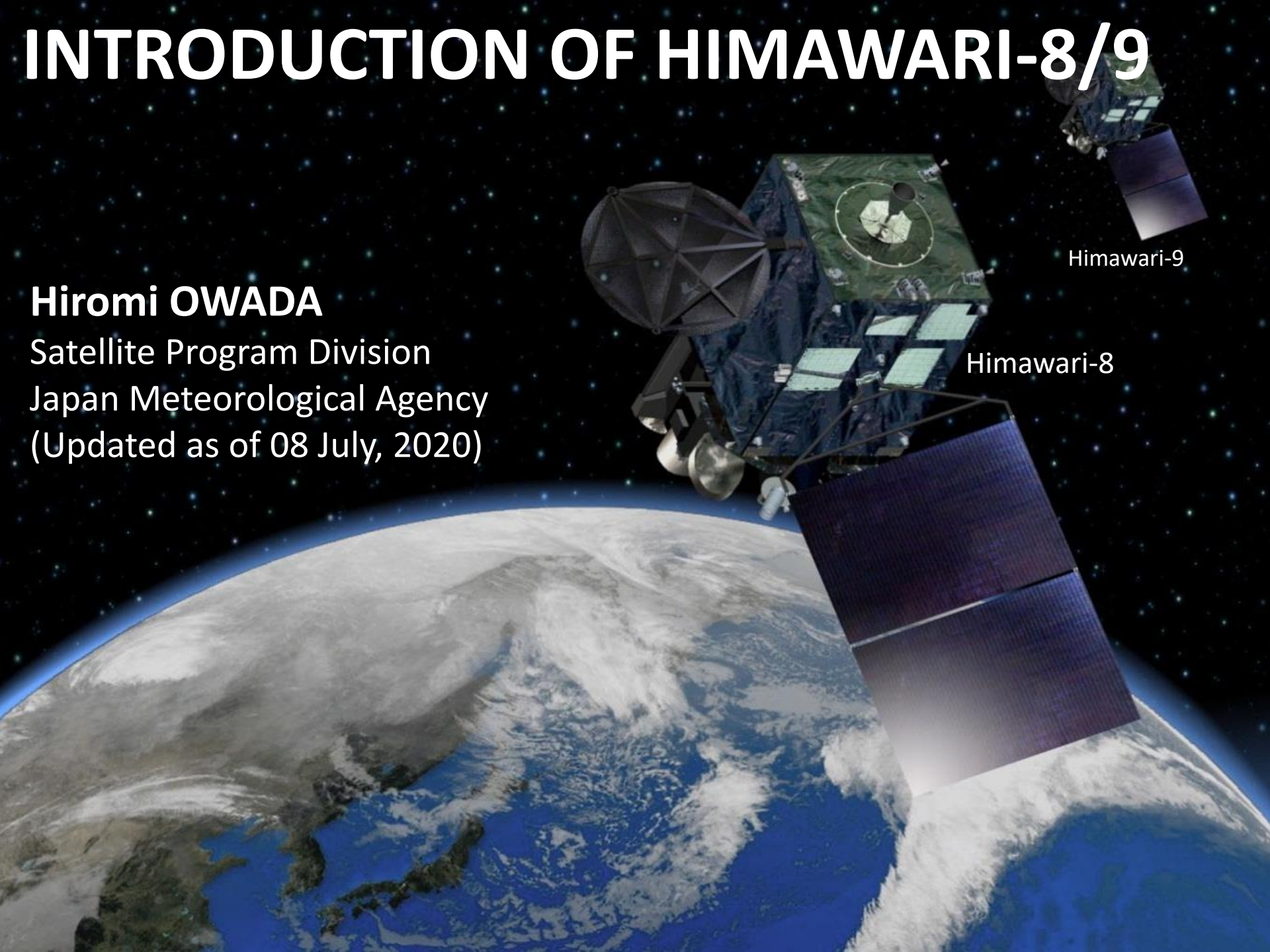
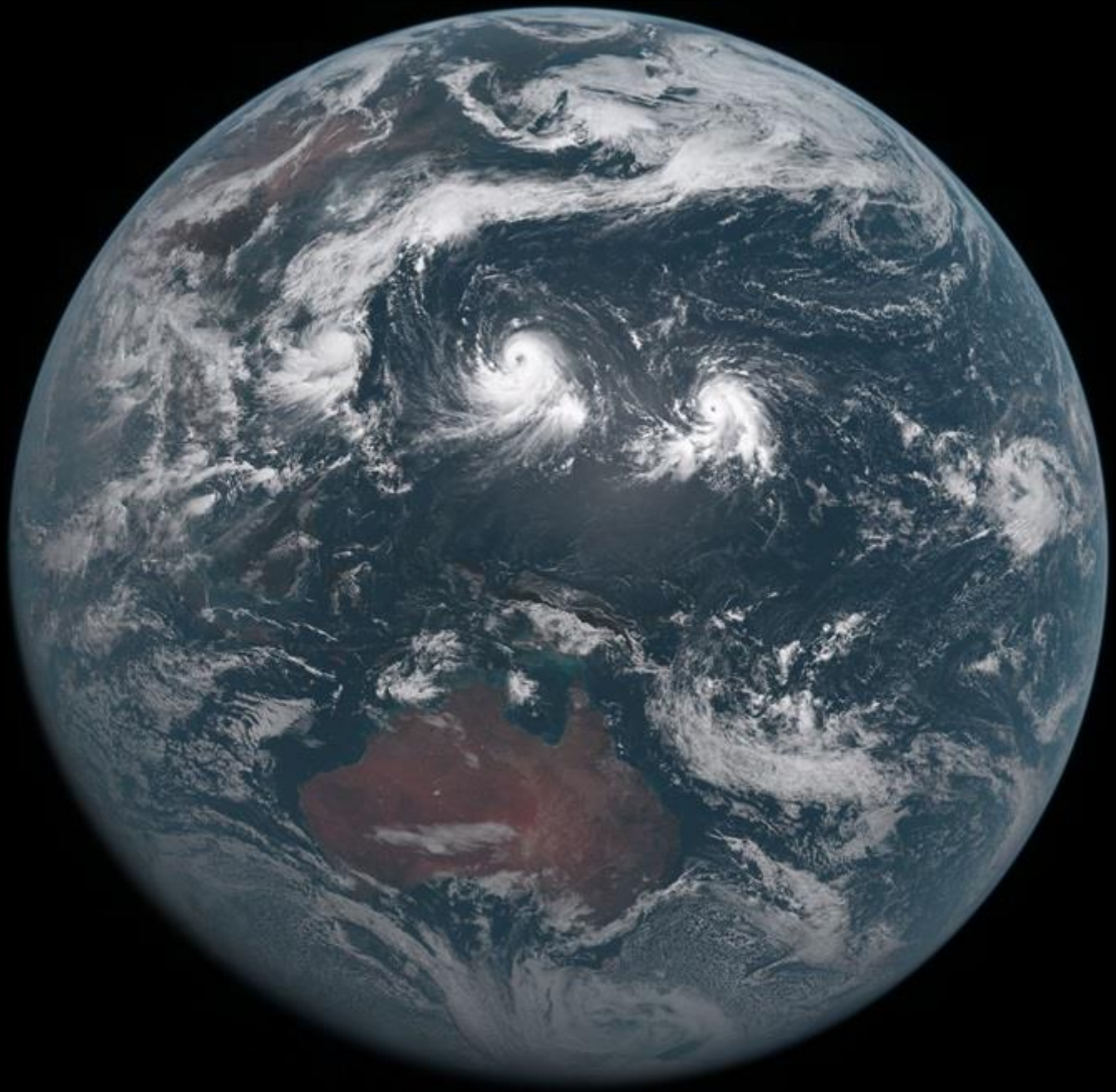
INTRODUCTION OF HIMAWARI-8/9



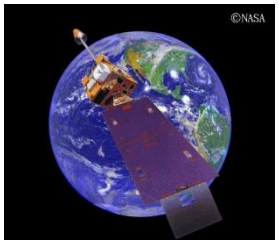
Hiromi OWADA
Satellite Program Division
Japan Meteorological Agency
(Updated as of 08 July, 2020)

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



History of Japanese Geostationary-Met. Satellites

GMS (Geostationary Meteorological Satellite)
nicknamed "Himawari"

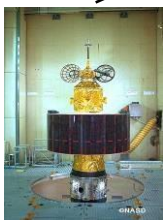


GOES-9

Himawari-8 ***Himawari-9***

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

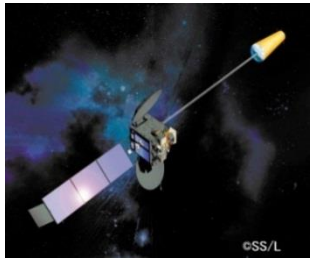
GMS-2
Himawari-2



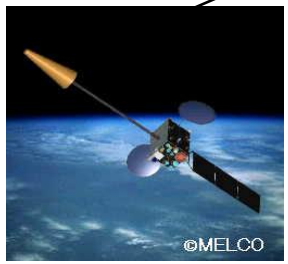
GMS-3
Himawari-3

GMS-4
Himawari-4

GMS-5
Himawari-5



MTSAT-1R
Himawari-6



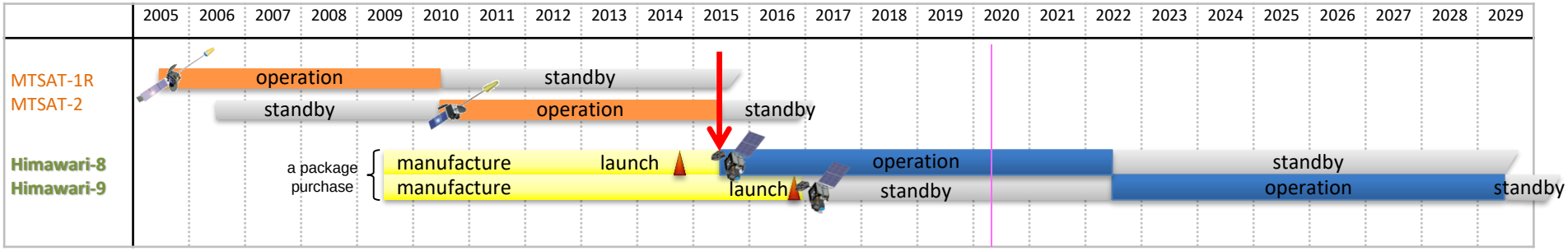
MTSAT-2
Himawari-7

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

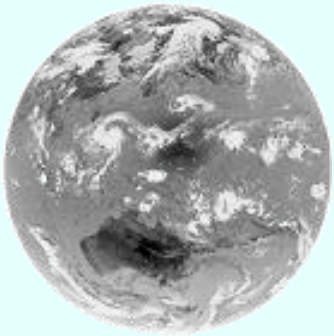
Geostationary position	Around 140.7° E
Attitude control	3-axis attitude-controlled geostationary satellite
Communication	1) Raw observation data transmission Ka-band, 18.1 - 18.4 GHz (downlink)
	2) DCS (Data collection System) International channel 402.0 - 402.1 MHz (uplink) Domestic channel 402.1 - 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)



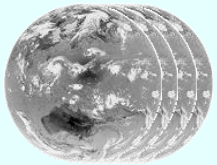
Improved Resolutions

Spectral

VIS 1 band



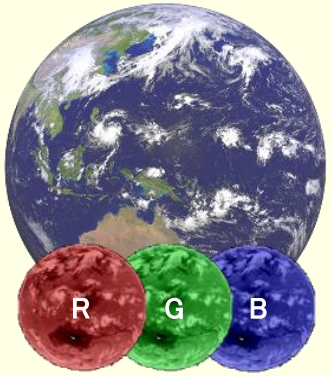
IR 4 bands



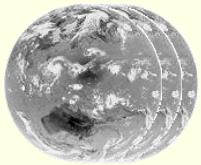
5 bands

MTSAT-1R/2

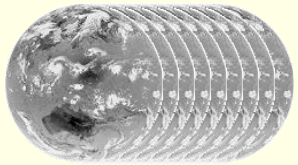
VIS 3 bands



NIR 3 bands



IR 10 bands



16 bands

Himawari-8/9

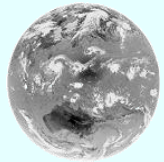
Spatial

At sub-satellite point

MTSAT-1R/2	Himawari-8/9
VIS 1 km IR 4 km	VIS 0.5/1 km IR 2 km

Temporal

Observation Frequency



60min.
(full-disk obs.)

MTSAT-1R/2

Himawari-8/9

Spectral Bands

cf. MTSAT-2 Bands

VIS 0.68 μm

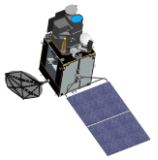
IR4 3.7 μm

IR3 6.8 μm

IR1 10.8 μm

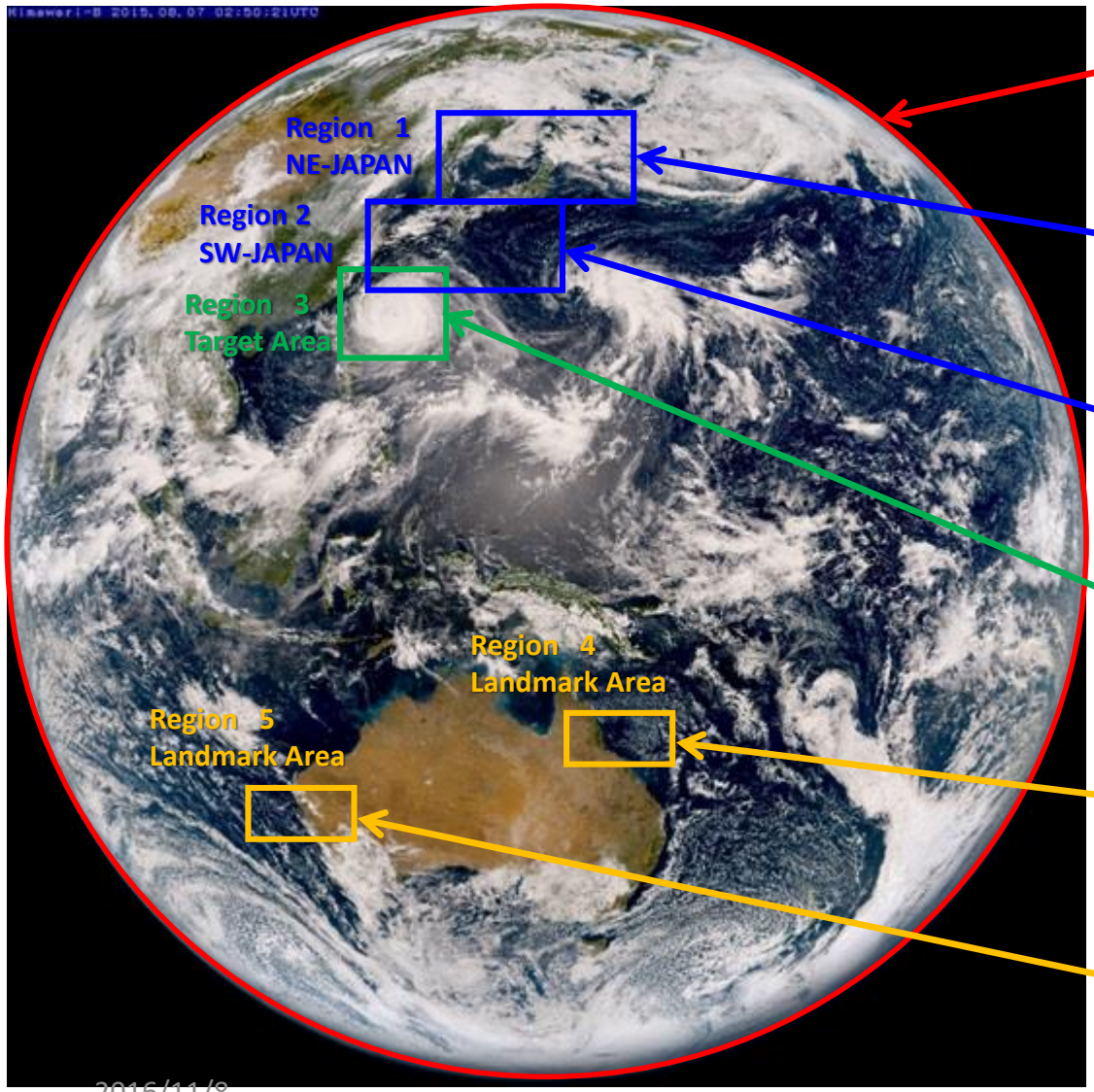
IR2 12.0 μm

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



Band		Spatial Resolution	Central Wavelength	Physical Properties	
1	Visible (VIS)	1 km	0.47 μm	vegetation, aerosol	3 Visible Bands
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	Addition of NIR Bands
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	Increase of WV Bands
9			6.9 μm	mid-level moisture	
10			7.3 μm	mid- and lower-level moisture	
11			8.6 μm	cloud phase, SO_2	Increase of TIR Bands
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, CO2	

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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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

Author information

Keywords: geostationary meteorological satellite, Himawari, satellite meteorology

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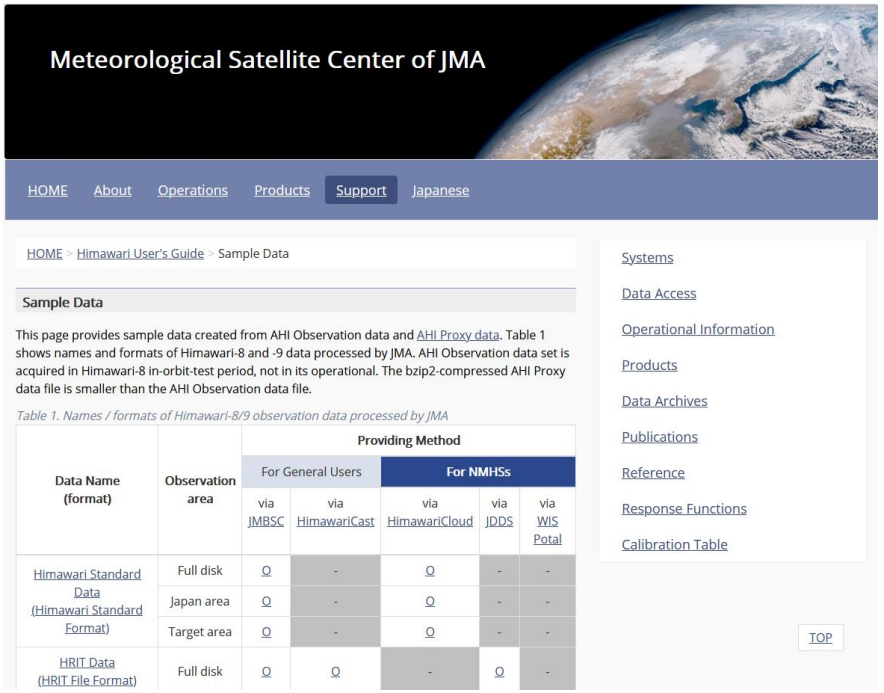
Himawari-8/9 Users Support Information

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

Contents:

- Overview of satellite observation
- Overview of data dissemination
- Imager (AHI) specifications
- Operational status
- Sample data
- Sample source code to read Himawari-8 data and convert into other formats
  - From HSD or HRIT to NetCDF Data
  - From HSD or HRIT to SATAID Data
  - From HSD to HRIT Data etc.



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.