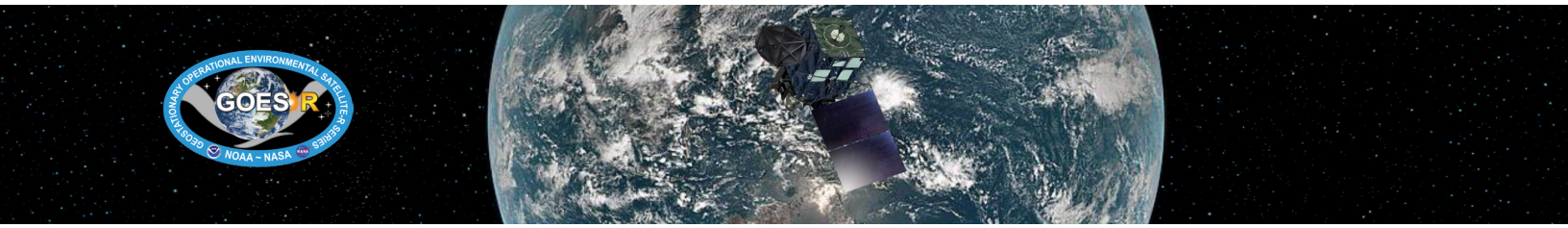
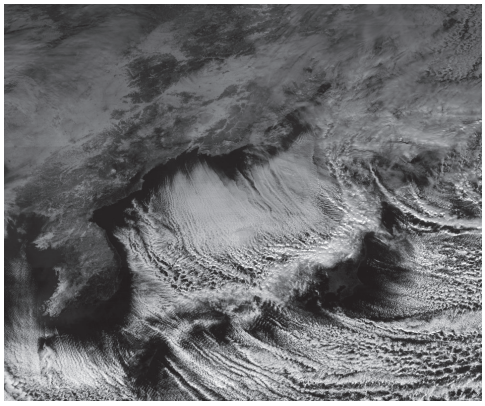


Himawari AHI Fact Sheet Band 2 ("Green" visible)

The "need to know" Advanced Himawari Imager reference guide for the NWS forecaster

The next-generation geostationary meteorological satellite of the Japan Meteorological Agency, Himawari-8, was successfully launched on October 7, 2014 from the Tanegashima Space Center in Kagoshima, Japan. Photo and caption source: Japan Meteorological Agency.

The 0.51 µm, or "green" band, is one of the three visible bands on the Himawari-8/9 Imager. The longitude for Himawari-8 is 140 East. The Japan Meteorological Agency (JMA) recently launched this satellite with the Advanced Himawari Imager (AHI) as part of its payload. A very similar band, 0.55 µm, is included on NASA's MODIS and Suomi NPP VIIRS instruments. This band will provide daytime observations related to the land, clouds and aerosols. This green band, combined with the "blue" (0.47 µm) and "red" (0.64 µm) bands will provide "natural color" imagery of the Earth-atmosphere system. This band is essential for a natural "true color" Red-Green-Blue (RGB) composite. Measurements in the green band can be used for air pollution studies and other products such as solar insolation estimates.



"First light" AHI image Band 2 (0.52 µm) from 02:40 UTC on December 18, 2014. Credit: JMA

In a nutshell

Himawari AHI Band 2 (0.51 µm central, 0.50 µm to 0.53 µm)

Also similar to the Suomi NPP VIIRS Band M4

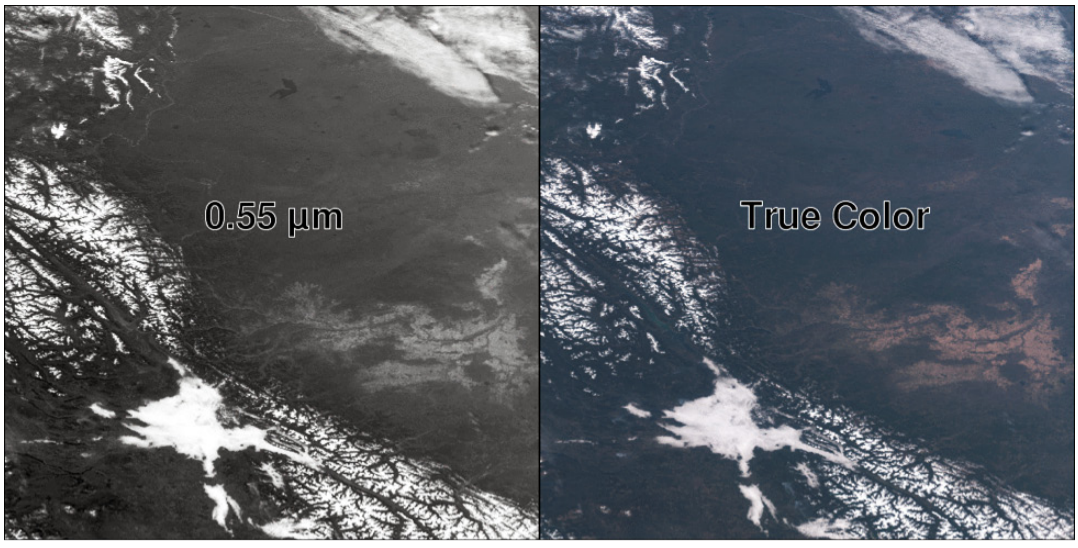
Not available on current GOES or with the GOES-R series ABI

Nickname:
"Green" visible band

Availability:
Daytime only

Primary purpose:
Solar insolation estimates

Uses similar to:
GOES-R ABI Band 1, Band 2



Suomi NPP images of a similar green (left) and true color (right) images. Note the snow, low cloud and vegetation in the 0.55 µm band, which is a key component to the true color image. The image is over part of Canada (October 17, 2014). Image from CIMSS.

Did You Know?

Unlike the AHI, there is no green band on the GOES-R series ABI. Hence, this band will be approximated from other spectral bands for use in generating true color imagery. In the case of the ABI, this approach will be a look-up table using the blue (0.47 µm), red (0.64 µm) and "veggie" (0.86 µm) bands.

Ward's Words

In the Pacific Region, we are very fortunate to have the opportunity with Japan's Himawari satellite to explore the capabilities of the ABI prior to the launch of GOES-R. The AHI instrument is very similar to the ABI, with only a few differences. One of the major differences is that the AHI hosts a green visible band. Other than allowing us to produce true color imagery that is useful for communicating weather hazards to the public and our emergency partners, the green band can be used in concert with the 0.86 µm veggie band to provide forecasters with information about land use and healthy vegetation for fire weather forecasting, as well as substantial vegetation on or near the surface of bodies of water.

The green band complements the blue and red visible bands, which have very similar utilities for monitoring cloud features during the day. Even with the green band, the AHI does not observe the complete visible spectrum. For that reason, even with true color imagery using the green band, certain yellow and orange features may not appear on imagery in the same fashion that they are observable with the human eye.

NWS forecasters in Alaska Region and Pacific Region will be able to access imagery from Himawari in the summer of 2015. Full-resolution Himawari imagery will be shared with the NWS from NESDIS via a terrestrial line, but antennas in Alaska and Hawaii will also be able to receive a subset of the bands with a reduced spatial resolution.

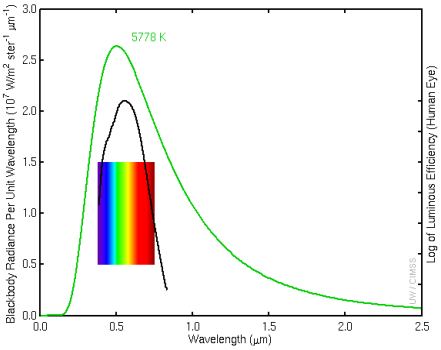
Bill Ward is the ESSD Chief in NWS Pacific Region and a former Guam forecaster.

Tim's Topics

There are two main avenues for acquiring AHI imagery from JMA in near real-time. The first is a downlink (HimawariCast) via a communication satellite, although this will be a limited number of bands (14) and at reduced spatial resolutions (4 and 1 km for the infrared and visible bands, respectively). This downlink option is only possible over part of the globe. The other option is via an internet cloud service, accessed by a single recipient in each country, which consists of the full-resolution data (both spectrally and spatially) and hence a larger data rate.

A spectral band centered near 0.5 µm is unique in that it is an ingredient when generating true color imagery (the green band), but also because that wavelength is very near the peak intensity from our sun, as well as the peak wavelength for the response of the human eye. Also, aerosol products, such as optical depth, have a standard reference wavelength: 0.5 µm.

Tim Schmit is a research meteorologist with NESDIS in Madison, Wisconsin.



Intensity plots for solar emission (green line) and human eye (black line). Source: Colour and Vision Research laboratory. Credit: CIMSS.

AHI Visible/ near-IR Band	Approximate Central Wavelength	Band Nickname	Nominal sub satellite pixel spacing	Difference from ABI
1	0.47 µm (Blue)	"Blue" visible band	1 km	None
2	0.51 µm (Green)	"Green" visible band	1 km	Not present on ABI
3	0.64 µm (Red)	"Red" visible band	0.5 km	None
4	0.86 µm	"Veggie" band	1 km	Slight difference from central wavelength
5	1.6 µm	"Snow" band	2 km	ABI resolution is 1 km
6	2.3 µm	"Cloud top phase" band	2 km	Slight difference from central wavelength

Further reading

True color journal article: http://dx.doi.org/10.1080/01431161.2011.637529
Himawari home page: http://www.data.jma.go.jp/mscweb/en/himawari89
COMET AHI module: https://www.meted.ucar.edu/satmet/himawari_ahi/
Interactive spectral webapp: http://cimss.ssec.wisc.edu/goes/webapps/bandapp/
GOES-R acronyms: http://www.goes-r.gov/resources/acronyms.html
ABI Quick Information Guides: http://www.goes-r.gov/education/ABI-bands-quick-info.html