Intro to METimage

Quick Guide

What is METimage?

EUMETSAT's next generation polar-orbiting satellite constellation is Metop Second Generation (Metop-SG), which will include the Metop-SGA1 satellite. METimage is a scanning optical imaging radiometer onboard Metop-SGA1. The instrument consists of 20 spectral channels, expanding upon the six channels of the legacy Advanced Very High Resolution Radiometer (AVHRR), and is comparable to imagery from JPSS VIIRS. METimage provides high resolution imagery for environmental monitoring and nowcasting applications, and supports regional and global Numerical Weather Prediction (NWP).

Thunderstorms are seen over the northern Bahamas and the Atlantic Ocean, while fair weather cumulus can be spotted across Florida at ~1626 UTC, 25 September 2025. The METimage True Color RGB imagery is courtesy of EUMETSAT.

METimage and How it Compares to VIIRS

	Metop SGA1 - METimage	JPSS - VIIRS
Scan Type	Cross-Track Scanning Radiometer	Cross-Track Scanning Radiometer
Swath Width and Orbit	~2700 km, Sun-synchronous	~3000 km, Sun-synchronous
Coverage & Number of Channels	Global, 20 Channels	Global, 22 Channels
Spatial Resolution	**VII Bands** @ 500-m	**I-Bands** @ 375-m, **M-Bands** & **DNB** @ 750-m
Equatorial Overpass Time and Temporal Resolution **Assumes 1 METimage and 3 VIIRS instruments*	0930 local time. *1 to 2 day and night overpasses across CONUS. More frequent coverage over Alaska.	1330 local time. *3 to 6 day and night overpasses across CONUS. More frequent coverage over Alaska.

METimage

Water Vapor Imagery: METimage contains three water vapor channels. The solar water vapor band at 0.914 µm is sensitive to low-level water vapor in the boundary layer. The 6.725 µm and 7.325 µm channels sense higher-level water vapor similar to MODIS.

Oxygen-A Bands and CO_2 Channel: The 0.752 µm and 0.763 µm Oxygen-A bands and the 13.345 µm CO_2 channel are used for cloud height retrievals. The CO_2 band is similar to GOES ABI.

Pixel Growth: All METimage bands have 500 m native resolution at nadir, degrading to ~2.5 km toward the swath edge.

METimage Does Not Have: a Day/Night Band (DNB) or 0.412 µm and 0.488 µm blue bands.

Fires: METimage mid-wave IR bands have lower saturation brightness temperatures than VIIRS, so fires saturate more quickly.

Future Satellites: METimage on Metop-SGA2 & Metop-SGA3.

VIIRS

DNB: The unique band provides nighttime visible imagery for observing environmental features and anthropogenic light sources at 750-m spatial resolution.

Blue Bands: VIIRS includes three bands located in the blue portion of the visible spectrum: 0.412 µm, 0.445 µm, and 0.488 µm.

High Resolution Data: VIIRS has five Imagery Bands (I-bands) at 375-m resolution, finer than METimage.

Preserved Pixel Size: VIIRS uses a pixel aggregation scheme that limits pixel growth toward the swath edge and preserves pixel shape.

VIIRS Does Not Have: dedicated water vapor or CO_2 absorption bands.

Future Satellites: VIIRS will fly on JPSS-4 and JPSS-3, expected to launch during the next decade.

Both Instruments Have: Broadly similar visible, near-infrared, and infrared imaging channels that support many of the same single-band and multispectral applications. Both instruments provide direct broadcast capability for low-latency data access, benefiting nowcasting, especially at higher latitudes.

Both Instruments Do Not Have: An ozone band near 9.3 µm, which is required for the Airmass RGB.

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http://cira.colostate.edu/

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Channel Comparison: METimage and VIIRS

METimage Channel	METimage - Central Wavelength (µm)	Type	VIIRS Channel	VIIRS - Central Wavelength (µm)
------	------	Visible / Reflective	**M1**	0.412 µm
VII - 4	0.443 µm	Visible / Reflective	**M2**	0.445 µm
------	------	Visible / Reflective	**M3**	0.488 µm
VII - 8	0.555 µm	Visible / Reflective	**M4**	0.555 µm
------	------	Visible / Reflective	**I1**	0.640 µm
VII - 12	0.668 µm	Visible / Reflective	**M5**	0.672 µm
------	------	Visible / Reflective	**DNB**	0.5 - 0.9 µm
VII - 15	0.752 µm	Near-Infrared	**M6**	0.746 µm
VII - 16	0.763 µm	Near-Infrared	------	------
VII - 17	0.865 µm	Near-Infrared	**M7** **I2**	0.865 µm 0.865 µm
VII - 20	0.914 µm	Near-Infrared	------	------
VII - 22	1.240 µm	Shortwave Infrared	**M8**	1.240 µm
VII - 23	1.375 µm	Shortwave Infrared	**M9**	1.378 µm
VII - 24	1.630 µm	Shortwave Infrared	**M10** **I3**	1.610 µm 1.610 µm
VII - 25	2.250 µm	Shortwave Infrared	**M11**	2.250 µm
VII - 26	3.740 µm	Mid-wave Infrared	**M12** **I4**	3.700 µm 3.740 µm
VII - 28	3.959 µm	Mid-wave Infrared	------	------
VII - 30	4.050 µm	Mid-wave Infrared	**M13**	4.050 µm
VII - 33	6.725 µm	Longwave Infrared	------	------
VII - 34	7.325 µm	Longwave Infrared	------	------
VII - 35	8.540 µm	Longwave Infrared	**M14**	8.550 µm
VII - 37	10.690 µm	Longwave Infrared	------	------
------	------	Longwave Infrared	**M15**	10.763 µm
------	------	Longwave Infrared	**I5**	11.450 µm
VII - 39	12.020 µm	Longwave Infrared	**M16**	12.013 µm
VII - 40	13.345 µm	Longwave Infrared	------	------

The table highlights similarities and differences in channel central wavelengths between METimage and VIIRS. The spatial resolution of METimage's channels are 500-m, while VIIRS M-bands and I-bands are 750-m and 375-m resolutions, respectively.

Tropical Cyclones: During the middle of the day on 28 October 2025, Category 5 Hurricane Melissa made landfall over Jamaica. Both METimage and the VIIRS instruments captured the cyclone as it approached the island. METimage had the earlier overpass, while VIIRS passed over a few hours later near the time of landfall.

METimage True Color RGB overpass at ~1500Z, 28 October 2025. Image courtesy of EUMETSAT.

VIIRS True Color RGB observes Hurricane Melissa at ~1748Z, 28 October 2025.

Resources

EUMETSAT

Metop Second Generation, METimage - First Images

Metop SG-A and SG-B: Facts and Figures

METimage Data Guide

EUMETSAT User Preparation Webinar

EPS-SG METimage Overview and Products

VAWS Webinar

Intro to the Metop-SG Constellation and METimage

CIRA

JPSS VIIRS Calibration, Validation, & Visualization

METimage: Algorithm Description Document

VIIRS Data: CIRA SLIDER - JPSS Sectors

CONUS, Northern Hemisphere and Southern Hemisphere