

## **Operational Satellite Products from MTSAT-1R**

This paper presents a summary of operational satellite products from MTSAT-1R used in JMA.

## Operational Satellite Products from MTSAT-1R

JMA started operation of the Multi-functional Transport Satellite-1R (MTSAT-1R), which is the successor to the Geostationary Meteorological Satellite-5 (GMS-5) on 28 June 2005. The MTSAT-1R has more sophisticated meteorological functions than those of GMS-5. MTSAT-1R carries an imager with a new channel (IR4) in addition to the conventional four channels (VIS, IR1, IR2, and IR3) of GMS-5. IR4 channel is expected to meet the requirement of the detection of low-level clouds in the nighttime. Spectral bandwidth for each channel of MTSAT-1R imager is listed in the Table 1. The quantization of all channels is improved from 6 bits (VIS) or 8 bits (IR) to 10 bits.

Channel	Spectral bandwidth ( $\mu\text{m}$ )
Visible (VIS)	0.55 - 0.90
Infrared 1 (IR1)	10.3 - 11.3
Infrared 2 (IR2)	11.5 - 12.5
Infrared 3 (IR3)	6.5 - 7.0
Infrared 4 (IR4)	3.5 - 4.0

**Table 1. The spectral coverage of imager onboard MTSAT-1R**

The Meteorological Satellite Center (MSC) of JMA started processing satellite-derived products from MTSAT-1R data in July 2005. The new channel IR4 and the improvement of quantization of IR and VIS channels are expected to improve the products' quality. Besides, the total number of Atmospheric Motion Vectors (AMV) is expected to increase owing to more frequent observation (the time intervals of observations has been changed from 30 to 15 minutes) than GMS-5. The satellite products operationally derived from MTSAT-1R are summarized in Table 2.

<b>Product</b>	<b>Frequency</b>	<b>Description (Coverage area)</b>	<b>Used channel</b>	<b>Comments</b>
Cloud Information Chart (Northern and Southern Hemispheres (NH and SH))	24 times per day (hourly)	Information on cloud types, cloud top height, cloud distribution pattern for aeronautical users (50N- 0N, 90E-170W; NH 0S-50S, 90E-170W; SH)	VIS, IR1, IR2, IR3	
Aerosol Optical Thickness	7 times per day (09-15LT, hourly)	Grid data (20 x 20km) of aerosol optical thickness for environmental users (52N-17N, 114E-150E)	VIS, IR1, IR2	
Sea Surface Temperature	8 times per day (3 hourly)	Grid data (0.25 x 0.25 deg.) of sea surface temperature for marine users (60N-60S, 80E-160W)	VIS, IR1, IR2	Derived by updated algorithm (Dynamic MCSST coefficients)
Snow and Ice Index	1 time per day	Grid data (0.1 x 0.1 deg.) of an index on snow/ice cover for NWP users (60N-20N, 80E-160W)	VIS	
Atmospheric Motion Vector	4 times per day (6 hourly)	Atmospheric motion vectors for NWP users (50N-50S, 90E-170W)	VIS, IR1, IR3	Distributed to worldwide users via GTS in SATOB & BUFR formats
Atmospheric Motion Vector	24 times per day (hourly)	Atmospheric motion vectors for NWP users (50N-0N, 90E-170W)	VIS, IR1, IR3	New product from MTSAT-1R
Upper Cloud Amount Distribution	8 times per day (3 hourly)	Grid data (1.0 x 1.0 deg.) of upper cloud amount (-400hPa) for climatological users (60N-60S, 80E-160W)	IR1	
Cloud Grid Information Data	48 times per day (half-hourly)	Grid data (20 x 20 km) on cloud type, cloud amount (total (-surface), upper (-400hPa) and convective), and cloud height for short-range weather forecast (52N-17N, 114E-150E)	VIS, IR1, IR2, IR3, IR4	New product from MTSAT-1R

ISCCP (*1) Data	8 (B1, B2) 5 times per month (AC)	Grid data for ISCCP (Full Disk; B1, B2) (2000 x 2000 km around the SSP; AC)	VIS, IR1, IR2, IR3, IR4	(*1) ISCCP: International Satellite Cloud Climatology Project
GPCP (*2) Data	8 times per day (3 hourly)	Histogram data (1.0 x 1.0 deg.) for GPCP (40N-40S, 90E-170W)	IR1	(*2) GPCP: Global Precipitation Climatology Project

**Table 2. List of operational satellite products from MTSAT-1R**