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Recent upgrades and progress of satellite radiance data assimilation at JMA



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List of Upgrades

- Assimilation of GOES-18/CSR,AMV replacing GOES-17 (GA, May 2023)
- Resume use of Meteosat-10/CSR,AMV replacing Meteosat-11 (GA, May 2023)
- Upgrade to the JMA's 11th generation supercomputer systems, including all NWP subsystems (Mar. 2024)
- Assimilation of NOAA-21/ATMS, CrIS (GA, MA and LA, Mar. 2024)
- Upgrading the coefficients and sea surface emissivity models used in RTTOV-13.0 (MA and LA, Feb. 2025)
- Assimilation of window channels of AMSU-A and ATMS (23.8 and 31.4GHz) (MA and LA, Feb. 2025)

Future Plans

- Upgrading the coefficients and sea surface emissivity models used in RTTOV-13.0 in GA
- Assimilation of window channels of AMSU-A and ATMS in GA
- Improvement of assimilation schemes for all-sky assimilation of microwave water vapor sounder in GA
- Assimilation of GOSAT-GW/AMSR3 in GA, MA and LA
- Assimilation of GOES-19 and Meteosat-12 in GA
- Additional use of CO2 band of the geostationary satellites' CSR in GA and MA
- All-sky infrared radiance assimilation in GA
- Preparation for the assimilation of Himawari-10/GHMS

Satellite data used in the operational assimilation systems. (as of May 2025)

Type	Satellite/Instrument	Global Analysis	Meso-scale Analysis	Local Analysis
MW Sounder	NOAA-15,18,19, Metop-B,-C/AMSU-A	Radiance	Radiance	Radiance
	NOAA-19, Metop-B,-C/MHS	Radiance	Radiance	Radiance
	DMSP-F17,18/SSMIS	Radiance	-	-
	Suomi-NPP, NOAA-20,21/ATMS	Radiance (T,H)	Radiance (H)	Radiance (H)
IR Sounder	Metop-B,-C/IASI	Radiance (T,H)	Radiance (T,H)	Radiance (H)
	NOAA-20,21/CrIS	Radiance (T,H)	Radiance (T,H)	Radiance (H)
MW Imager	DMSP-F17,18/SSMIS	Radiance	Radiance, Rain Rate	Radiance
	GCOM-W/AMSR2	Radiance	Radiance, Rain Rate	Radiance, Soil Moisture
	GPM-core/GMI	Radiance	Radiance, Rain Rate	Radiance
VIS/IR Imager	Himawari-9	CSR, AMV	CSR, AMV	CSR, AMV
	GOES-18	CSR, AMV	-	-
	Meteosat-9,10	CSR, AMV	-	-
	NOAA-15,18,19, Metop-B,-C/AVHRR	AMV	-	-
	Suomi-NPP, NOAA-20/VIIRS	AMV	-	-
	LEO GEO composite image	AMV	-	-
Scatterometer	Metop-B,-C/ASCAT	OSWV	OSWV	OSWV Soil Moisture (Metop-B only)
Radio Occultation	Metop-B/GRAS	Bending Angle	Refractivity	-
	TerraSAR-X/IGOR	Bending Angle	Refractivity	-
	TanDEM-X/IGOR	-	Refractivity	-
Radar	GPM/DPR	-	Relative Humidity	-

*) Red indicates updates in the operational system since ITSC-24.

*) Blue indicates all-sky assimilation.

CSR: Clear Sky Radiance on water vapor channels,
AMV: Atmospheric Motion Vector,
OSWV: Ocean Surface Wind Vectors