

Multi-Radar Multi-Sensor (MRMS) v12.1.0

General information can be found on MRMS's VLab community page at <https://vlab.ncep.noaa.gov/web/mrms/>

SBN Distribution Updates

- (New/Removed) Certain Multi-Radar Multi-Sensor (MRMS) products will be added to or removed from the Satellite Broadcast Network (SBN). These changes are intended to assist with a more efficient, reliable delivery process for new and future NWS products.

Tables 1-3 below contain descriptions of the SBN actions for MRMS products. Products removed from the SBN will remain available on

1. The National Centers for Environmental Prediction (NCEP) Web Services:
<https://mrms.ncep.noaa.gov/data/>
2. The NCEP Local Data Manager (LDM) by requesting access:
https://www.nssl.noaa.gov/projects/mrms/MRMS_data.php

Domain	WMO Header	Product Name (to be added to SBN)
CONUS	YAUE01	Flooded Locations and Simulated Hydrographs (FLASH) Coupled Routing and Excess Storage (CREST) Unit Streamflow
	YAUE04	FLASH Sacramento Soil Moisture Accounting (SAC) Unit Streamflow
	YAUE06	FLASH SAC Soil Saturation
	YAUE09	FLASH Precipitation Average Recurrence Interval
	YAUE10	FLASH Quantitative Precipitation Estimate to Flash Flood Guidance (QPE-to-FFG) Ratio
	YAUS09	Probability of Severe Hail

	YAUF01	Probability of Severe (JSON format)
Alaska	YAAC01	Composite Reflectivity
	YAAP02	PrecipRate
	YAAP03	RadarOnly_QPE_01H, 03H, 06H, 12H, 24H, 48H, 72H
	YAAP04	MultiSensor_QPE_[01,03,06,12,24,48,72]H_Pass1
	YAAP06	MultiSensor_QPE_[01,03,06,12,24,48,72]H_Pass2
Hawaii	YAHP02	PrecipRate
	YAHP03	RadarOnly_QPE_01H, 03H, 06H, 12H, 24H, 48H, 72H
	YAHP04	MultiSensor_QPE_[01,03,06,12,24,48,72]H_Pass1
	YAHP06	MultiSensor_QPE_[01,03,06,12,24,48,72]H_Pass2

Table 1. World Meteorological Organization (WMO) Headers and product names for MRMS products to be added to MRMS SBN.

Domain	WMO Header	Product Name (to be retained on SBN)
CONUS	YAUC01	Composite Reflectivity
	YAUP01	Surface Precipitation Type (Convective, Stratiform, Tropical, Hail, Snow)
	YAUP02	Precipitation Rate
	YAUP03	Radar precipitation accumulation
	YAUP04	MultiSensor_QPE_[01,03,06,12,24,48,72]H_Pass1
	YAUP06	MultiSensor_QPE_[01,03,06,12,24,48,72]H_Pass2
	YAUQ01	Mosaic Base Reflectivity (optimal method)

	YAUS04	Low-Level Rotation Tracks (30, 60, ... min. accum.)
	YAUS06	Mid-Level Rotation Tracks (30, 60, ... min. accum.)
	YAUS10	Maximum Estimated Size of Hail (MESH)
	YAUS11	MESH Hail Swath (* min)
	YAUS15	Vertically Integrated Ice (VII)
	YAUS16	xx dBZ Echo Top (ET)
	YAUS22	Reflectivity At Lowest Altitude (RALA)

Table 2. WMO Headers and product names for MRMS products currently on MRMS SBN to be retained.

Domain	WMO Header	Product Name (to be removed from SBN)
CONUS	YAUC02	Composite Reflectivity Height
	YAUC03	Composite Reflectivity [0-4 km]
	YAUD01	Radar Quality Index
	YAUD02	Seamless Hybrid Scan Reflectivity (HSR)
	YAUL01	Cloud-to-Ground Lightning Density (1, 5, 15, 30 min.)
	YAUL02	Cloud-to-Ground Lightning Probability (0-30 min.)
	YAUM03	Probability of warm rain
	YAUS13	Vertically Integrated Liquid (VIL)
	YAUS17	Height of 50dBZ Echo Above -20C
	YAUS18	Height of 50dBZ Echo Above 0C

	YAUS20	Height of 60dBZ Echo Above 0C
	YAUS21	Reflectivity at xC
	YAUC09	Composite Reflectivity Mosaic (optimal method; 5km)
	YAUS01	Reflectivity At Lowest Altitude (RALA) 5km

Table 3. WMO Headers and product names for MRMS products to be removed from MRMS SBN.

MRMS binary formatted products - ending distribution

- (Removed) The binary data products will be removed from the MRMS LDM feed. These products are available in GRidded Binary version 2 (GRIB2) format. The binary data files to be removed from the MRMS Local Data Manager (LDM) feed and their equivalent GRIB2 data files are listed in Table 4 below.

Binary	GRIB2
cref/CREF	MergedReflectivityQCComposite
etp18/ETP18	EchoTop_18
etp30/ETP30	EchoTop_30
posh/POSH	POSH
shi/SHI	SHI
vil/VIL	VIL
tile01/mrefl/MREF3D33L	MergedReflectivityQC*
tile02/mrefl/MREF3D33L	MergedReflectivityQC*
tile03/mrefl/MREF3D33L	MergedReflectivityQC*
tile04/mrefl/MREF3D33L	MergedReflectivityQC*

Table 4. Product identifiers for the MRMS files to be removed from the MRMS LDM and their equivalent in GRIB2 format.

The intermediate binary format of these products are available only for the CONUS and only via LDM (feedtype: NOTHER). They are not distributed by any other method.

*NOTE: There are 33 2D MergedReflectivityQC products (one per vertical level of the MRMS 3D reflectivity mosaic). The intermediate binary files are 3D products covering a quarter of the CONUS each. Tile 01, 02, 03, and 04 represent the CONUS northwest, northeast, southwest, and southeast tiles, respectively.

Web Services

- (Update/New) Each MRMS domain/product has its own directory on NCEP's Web Services at <https://mrms.ncep.noaa.gov/data/> Some product directories contain a .latest file, which is a copy of the most recent product. For example, https://mrms.ncep.noaa.gov/data/2D/EchoTop_18/MRMS_EchoTop_18.latest.grib2.gz.

Many products added to MRMS in later versions do not have an accompanying .latest file in their directory. This will be corrected with MRMS v12.1, and .latest files will be available for all MRMS products on NCEP's Web Services.

2-D Reflectivity Mosaics - CONUS only

- (Update) The gap filling radar in Alamosa, CO will be added to several 2-D mosaics
- Affected products are listed in Table 5. All GRIB2 and GeoTIFF formatted products are available via LDM and NCEP web services. NIDS products are available via LDM only.

Domain(s)	Product Name	Format
CONUS	MergedReflectivityComposite	GRIB2, GeoTIFF, NIDS
	MergedReflectivityQComposite	GRIB2, GeoTIFF
	MergedBaseReflectivity	GRIB2,

		GeoTIFF, NIDS
	MergedBaseReflectivityQC *GRIB2 on SBN with WMO code YAUQ01*	GRIB2, GeoTIFF, NIDS
	MergedReflectivityAtLowestAltitude	GRIB2

Table 5. 2-D reflectivity mosaics with additional input from Alamosa, CO radar. SBN info / WMO codes included where appropriate.

Rotation Products - CONUS only

- (Update) The gap filling radar in Alamosa, CO will be added to AzimuthalShear and RotationTrack products.
- Affected products are listed in Table 6. All GRIB2 and GeoTIFF formatted products are available via LDM and NCEP web services. NIDS products are available via LDM only.

Domain(s)	Product Name	Format
CONUS	MergedAzShear_0-2kmAGL	GRIB2
	MergedAzShear_3-6kmAGL	GRIB2
	RotationTrack[30,60,120,360,1440]min *GRIB2 on 60 and 1440min on SBN with WMO code YAUS04*	GRIB2, NIDS
	RotationTrackML[30,60,120,360,1440]min *GRIB2 on 60 and 1440min on SBN with WMO code YAUS06*	GRIB2, NIDS

Table 6. Rotation products with additional input from Alamosa, CO radar. SBN info / WMO codes included where appropriate.

Quantitative Precipitation Estimates (QPEs)

- (Update) Handling of the gap filling radar in Alamosa, CO is improved for the SeamlessHSR, SeamlessHSRHeight, RadarQualityIndex, RadarAccumulationQualityIndex, PrecipFlag, PrecipRate, and RadarOnlyQPE products.

- Affected products are listed in Table 7. All GRIB2 and GeoTIFF formatted products are available via LDM and NCEP web services. NIDS and XMRG products are available via LDM only.

Domain(s)	Product Name	Format
CONUS	SeamlessHSR	GRIB2
	SeamlessHSRHeight	GRIB2
	RadarQualityIndex	GRIB2
	RadarAccumulatedQualityIndex_[01,03,06,12,24,48,72]H	GRIB2
	PrecipFlag *GRIB2 on SBN with WMO code YAUP01*	GRIB2, NIDS, GeoTIFF
	PrecipRate *GRIB2 on SBN with WMO code YAUP02*	GRIB2
RadarOnly_QPE_15M, [01,03,06,12,24,48,72]H *GRIB2 1-72H on SBN with WMO code YAUP03*	GRIB2, NIDS (01,03,06,24H), XMRG (01H)	

Table 7. QPE-related products with additional input from Alamosa, CO radar. SBN info / WMO codes included where appropriate.

- (Update) Quality control of the XMRG formatted RadarOnly_QPE and MultiSensor_QPE (Pass1,Pass2) products is improved to better retain low values.
- Affected products are listed in Table 8. XMRG products are available via LDM only.

Domain(s)	Product Name	Format
CONUS	RadarOnly_QPE_01H XMRG: q3rad/1h_acc/xmrg*z.gz	XMRG

(and special regions within CONUS)	MultiSensor_QPE_01H_Pass1 XMRG: q3ms_pass1/1h_acc/xmrg*z.gz	
	MultiSensor_QPE_01H_Pass2 XMRG: q3ms_pass2/1h_acc/xmrg*z.gz	

Table 8. XMRG formatted products with improved QC.

- (Update) The latencies of the MultiSensor QPE and Gauge Influence Index products (Pass1 and Pass2) are significantly reduced. Pass1 product latency will move up from 60-minutes to 20-minutes. Pass2 product latency will move up from 120-minutes to 60-minutes. Moving up the processing time, lessens the number of gauge observations available to each pass. The impact varies by domain. Table 9 breaks down the effect by pass and domain.
- Affected products are listed in Table 10. All GRIB2 and GeoTIFF formatted products are available via LDM and NCEP web services. NIDS and XMRG products are available via LDM only.

Reduction in gauge counts with new timing		
Domain(s)	Pass1	Pass2
CONUS	28% (or ~5,000 gauges)	negligible
Alaska	41% (or ~120 gauges)	negligible
Caribbean	46% (or ~70 gauges)	21% (or ~40 gauges)
Guam	42% (or ~2 gauges)	16% (or ~1 gauge)
Hawaii	68% (or ~110 gauges)	negligible

Table 9. Reduction in the number of gauge observations available (per domain) to MultiSensor QPE due to changing of the Pass1 and 2 timing.

Domain(s)	Product Name	Format
CONUS Alaska Caribbean Guam	GaugeInflIndex_[01,03,06,12,24,48,72]H _Pass1	GRIB2

Hawaii	GaugeInflIndex_[01,03,06,12,24,48,72]H_Pass2	
	MultiSensor_QPE_[01,03,06,12,24,48,72]H_Pass1 *GRIB2 on SBN with WMO code YAUP04*	
	MultiSensor_QPE_[01,03,06,12,24,48,72]H_Pass2 *GRIB2 on SBN with WMO code YAUP06*	
CONUS (and special regions within CONUS)	q3ms_pass1/1h_acc/xmrg*z.gz	XMRG
	q3ms_pass2/1h_acc/xmrg*z.gz	

Table 10. Gauge Infl Index and MS QPE products with lower latency. SBN info / WMO codes included where appropriate.

- (Updated) A small subset of MRMS v12 products were found to have incorrect background values. These are corrected in MRMS v12.1.
- Affected products are listed in Table 11 along with the background value change. All GRIB2 products are available via LDM and NCEP web services. NIDS formatted products are available via LDM only.

Domain(s)	Product Name	Format: background value change
CONUS Alaska Caribbean Guam Hawaii	RadarAccumulatedQualityIndex_01H	GRIB2: -0.01 to -1
	RadarAccumulatedQualityIndex_[03,06,12,24,48,72]H	GRIB2: -99.9 to -1
	RadarOnly_QPE_15M, [03,06,12,24]H *GRIB2 1-24H on SBN with WMO code YAUP03*	GRIB2: -99.9 to -3 NIDS (03,06,24H): no change

Table 11. List of products with background value corrections. SBN info / WMO codes included where appropriate.

- (New) Added a radar only QPE since 12Z (RadarOnly_QPE_Since12Z) for all domains.
- New products are defined in Table 12. They will be available via LDM (all listed formats) and NCEP web services (GRIB2 only).

Domain(s)	Product Name	Format	Frequency
CONUS Alaska Caribbean Guam Hawaii	RadarOnly_QPE_Since12Z	GRIB2: (Category 6, Product 46) NIDS	60-minutes

Table 12. List of new QPE products, their domains, format, and frequency.

ProbSevere - CONUS only

- https://cimss.ssec.wisc.edu/severe_conv/probsev.html
- (Update) ProbSevere configuration will be changed to use the GOES-East satellite data for the entire CONUS (not just the eastern US).
- Affected products are listed in Table 13. They are available via LDM, NCEP web services, and some via the SBN.

Domain(s)	Product / Filename	Format
CONUS	MRMS_CONVECTPROB_[timestamp].ascii	ASCII
	MRMS_PROBSEVERE_[timestamp].json	JSON
	JSON on SBN with WMO code YAUF01	

Table 13. Improved ProbSevere products. SBN info / WMO codes included where appropriate.

RIDGEII

- (Update) For all WSR-88Ds (product L3_HVIL) and TDWRs (product L2_BVIL), the VIL color table was updated to properly display areas with very small VIL values.
- Affected products are listed in Table 14. Products are available via LDM and NCEP web services. All RIDGEII products are GeoTIFFs.

Domain/Radars	Product Name	Format
single radar (TDWRs)	[radarname]_L3_BVIL	GeoTIFF
single radar (WSR88Ds)	[radarname]_L3_HVIL	

Table 14. List of updated RIDGEII products for MRMS v12.1.

MRMS Products in NIDS Format

- (Update) Modified some NIDS Product Identification numbers to ensure that MRMS provides products with unique identifications, and that those IDs will work within the NAWIPS display.
- Affected products are listed in Table 15. They are available via LDM only.

MRMS / NIDS Product Name	NEW NIDS Product ID	Domain(s)
MergedReflectivityQCComposite	211	CONUS
	50	Alaska/Hawaii (1km)
EchoTop_18	210	CONUS
	56	Alaska/Hawaii (1km)
EchoTop_30	212	CONUS
	57	Alaska/Hawaii (1km)
EchoTop_50	213	CONUS
	58	Alaska/Hawaii (1km)
ReflectivityAtLowestAltitude	203	CONUS
VIL	209	CONUS

	61	Alaska/Hawaii (1km)
VIL_Max_120min	204	CONUS
	62	Alaska/Hawaii (1km)
VIL_Max_1440min	205	CONUS
	63	Alaska/Hawaii (1km)
MergedBaseReflectivity	258	CONUS
	60	Alaska/Hawaii (1km)
MergedBaseReflectivityQC	250	CONUS
	59	Alaska/Hawaii (1km)
RadarOnly_QPE_01H	200	CONUS
	51	Alaska/Hawaii (1km)
RadarOnly_QPE_03H	201	CONUS
RadarOnly_QPE_06H	206	CONUS
RadarOnly_QPE_24H	255	CONUS
	54	Alaska/Hawaii (1km)
BREF_1H_MAX	246	CONUS
CREF_1H_MAX	247	CONUS

Table 15. List of MRMS products with updated NIDS product IDs for MRMS v12.1. Note Hawaii products are resampled from their native 500m resolution to 1km for NIDS.

- (New) MRMS v12.1 will add to the products it distributes in NIDS format. These products will be available via LDM and are listed in Table 16.

MRMS / NIDS Product Name	NIDS Product ID	Domain(s)
RadarOnly_QPE_Since12Z	266	CONUS

	55	Alaska/Hawaii (1km)
MergedReflectivityQComposite (QC applied, max merge method)	202	CONUS
MergedReflectivityAtLowestAl titude (no QC)	265	CONUS

Table 16. List of MRMS products that will be newly available with MRMS v12.1. Product names, NIDS product IDs, and domain details are included. Note Hawaii products are resampled from their native 500m resolution to 1km for NIDS.