

NOHRSC PRODUCT IDENTIFIERS, DESCRIPTIONS, and DISTRIBUTION

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The NWS National Operational Hydrologic Remote Sensing Center (NOHRSC) in Chanhassen, Minnesota, generates and distributes snow information products to end-users in various formats via several different communications mechanisms. The purpose of this document is to summarize the NOHRSC product types, their identifiers, their formats, their resolutions, and their various distribution methods.

A. SHEF PRODUCTS

NOHRSC alphanumeric text products (in Standard Hydrologic Exchange Format - SHEF) are distributed on the NWS Advanced Weather Interactive Processing System (AWIPS) and posted to the NOHRSC web page.

AWIPS ID AND WMO HEADER PRODUCT IDENTIFIERS

AWIPS ID	WMO HEADER	DESCRIPTION
MSPRRMASB	SRUS43 KMSR	Airborne Soil Moisture by Basin
MSPRRMASF	SRUS43 KMSR	Airborne Soil Moisture by Flight Line
MSPRRMASP	SRUS43 KMSR	Airborne Snow Water Eq by Flight Line
MSPRRMASW	SRUS43 KMSR	Airborne Estimated Snow Water Eq by Basin
MSPSCVALR	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for SERFC
MSPSCVFWR	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for WGRFC
MSPSCVKRF	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for MBRFC
MSPSCVMSR	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness,

MSPSCVORN	SRUS43 KMSR	Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for NCRFC Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for LMRFC
MSPSCVPTR	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for NWRFC
MSPSCVRHA	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for MARFC
MSPSCVRSA	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for CNRFC
MSPSCVSTR	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for CBRFC
MSPSCVTAR	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for NERFC
MSPSCVTIR	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for OHRFC
MSPSCVTUA	SRUS43 KMSR	Modeled Snow Cover, Snowpack Thickness, Blowing Snow Sublimation, Snowmelt, Snowpack Average Temperature, Sublimation, and Rain Plus Melt for ABRFC

MSPSWEALR	SRUS43 KMSR	Modeled SWE by Basin for SERFC
MSPSWEFWR	SRUS43 KMSR	Modeled SWE by Basin for WGRFC
MSPSWEKRF	SRUS43 KMSR	Modeled SWE by Basin for MBRFC
MSPSWEMSR	SRUS43 KMSR	Modeled SWE by Basin for NCRFC
MSPSWEORN	SRUS43 KMSR	Modeled SWE by Basin for LMRFC
MSPSWEPTR	SRUS43 KMSR	Modeled SWE by Basin for NWRFC
MSPSWERHA	SRUS43 KMSR	Modeled SWE by Basin for MARFC
MPSWERSA	SRUS43 KMSR	Modeled SWE by Basin for CNRFC

MSPSWESTR	SRUS43 KMSR	Modeled SWE by Basin for CBRFC
MSPSWETAR	SRUS43 KMSR	Modeled SWE by Basin for NERFC
MSPSWETIR	SRUS43 KMSR	Modeled SWE by Basin for OHRFC
MSPSWETUA	SRUS43 KMSR	Modeled SWE by Basin for ABRFC

In the above headers:

- * RRM is used for NOHRSC airborne survey gamma products which are generated for the surveyed area and released only during airborne survey operations.
- * SCV is used for modeled Snowpack State Variable products which are generated for each RFC and released daily at approximately 15z.
- * SWE is used for Estimated Snow Water Equivalent by Basin products which are generated for each RFC and released daily at approximately 15z.

The NOHRSC SHEF products are ftp'd to the NWS Telecommunications Gateway (NWSTG) where they are routed across the High Speed Interface (HSI) to the Network Control Facility (NCF) for broadcasting on the Satellite Broadcast Network (SBN). NOAAPORT data and product delivery service are provided over the SBN. The NOHRSC SHEF products are also posted to the NOHRSC web page (www.nohrsc.nws.gov under Operational Products Search Engine).

B. GRIB-IMAGE PRODUCTS FOR AWIPS

NOHRSC generates and distributes GRIB-image products to AWIPS and to the National Centers for Environmental Prediction (NCEP) Environmental Modeling Center (EMC).

The NOHRSC GRIB-image products are ftp'd to the NWSTG which routes them across the HSI to the NCF for broadcast on SBN/NOAAPORT for display on AWIPS. The GRIB-image products are generated and released once per day at approximately 15z, except for weekends and holidays.

The NOHRSC GRIB-image files were made available on the AWIPS D2D pulldown menus in October 2001 with the installation of Build 5.1.1. Click on Surface, click on Precip & Stability, click on Snow Images, to display the NOHRSC menu. The GRIB-images are stored locally (at

the NCRFC) in the AWIPS directory: /data/fixa/Grid/SBN/Snow.

WMO HEADERS AND DESCRIPTIONS FOR THE GRIB-IMAGE PRODUCTS

WMO HEADER DESCRIPTION

YSQA88 KMSR	CONUS Modeled Areal Extent of Snow Cover
YEQA88 KMSR	CONUS Modeled Snow Water Equivalent
ZSQA88 KMSR	CONUS Modeled Areal Extent of Snow Cover by Elevation
ZEQA88 KMSR	CONUS Modeled Deviation from Normal Snow Water Equivalent

B.1. GRIB-IMAGE RESOLUTION INFORMATION

The original, full-resolution NOHRSC GRIB-gridded products ranged in file size from 3 megabytes to 9 megabytes. The maximum file size that can be successfully processed by the NWSTG is 330 kilobytes. That's a problem. The original, full-resolution NOHRSC GRIB-gridded products range in size from 756 columns x 736 rows to 3467 columns x 1671 rows. The maximum size gridded product that AWIPS can contour and display in a reasonable amount of time is approximately 300 x 300. That's another problem. Fortunately, the maximum size GRIB-image product that AWIPS can display in a reasonable amount of time is approximately 3000 x 3000.

As a result of the above NWSTG and AWIPS limitations, we have opted to create and ship our products to AWIPS in GRIB-image format. To accommodate the NWSTG and AWIPS limitations, we have made several modifications to the GRIB products:

1. We converted the GRIB-gridded products to GRIB-image products. GRIB-image files are smaller than GRIB-gridded files and they do not require contouring. Both factors can enhance display performance, and the smaller file size allows the file to flow without obstruction through the AWIPS communications network. This approach was agreed upon by representatives of the Forecast Systems Laboratory, the AWIPS Program Office, the NWSTG, and NOHRSC.
2. The spectral resolution for some of the products was degraded when converted from a GRIB-gridded product to a GRIB-image product. In the GRIB-image product, the data are represented by only 255 integer values. In a GRIB-gridded product, the data

are floating-point and, consequently, the files are much larger. The fixed-point, GRIB-image files are smaller but have degraded spectral resolution.

3. The spatial resolution was degraded. The conversion from a GRIB-gridded product to a GRIB-image product alone did not render a file size sufficiently small to accommodate the limited NWSTG bandwidth. Therefore, the spatial resolution was degraded for all products and is given in the table below. The spatial resolution was degraded until a file size of less than 330 kilobytes could be generated on a routine basis.

These sacrifices are required to distribute the NOHRSC products over AWIPS given the limitations of AWIPS and the NWSTG. Information on how to obtain the NOHRSC full-resolution, gridded raster products is provided in Section C.

NOHRSC GRIB-IMAGE PRODUCT RESOLUTION

	GRIB-GRIDDED	GRIB-IMAGE	GRIB-GRIDDED	GRIB-
IMAGE				
PROD.	SPATIAL	SPATIAL	SPECTRAL	SPECTRAL
TYPE	RESOLUTION	RESOLUTION	RESOLUTION	RESOLUT.
SC	1km x 1km	8km x 8km	dna	dna
SCE	1km x 1km	8km x 8km	1m	100m
SWE	3km x 3km	9km x 9km	1mm	2cm
SWEPN	3km x 3km	9km x 9km	< 1%	1%

where SC = areal extent of snow cover,
 SCE = areal extent of snow cover by elevation,
 SWE = snow water equivalent,
 SWEPN = deviation from normal snow water equivalent.

B.2. GRIB PRODUCT DEFINITION SECTION

The product definition section (PDS) of the GRIB-image files includes a description of the data contained in the files (data type and themes/units):

For the NOHRSC GRIB-image products, the originating center code is set to 9, the sub-center code is set to 163, the generating process is set to 185, and the parameters are set as follows:

207 = Snow cover (snow=250, clouds=100, no-snow/no-clouds=50), abbreviation set to SC, non-dimensional units.

208 = Snow cover by elevation (snow=0 to 252, no-snow/no-cloud =253, clouds=254), abbreviation is set to SCE, units are in 100s of meters.

209 = Snow water equivalent; units set to increments of 2 cm, abbreviation is set to SWE.

210 = Snow water equivalent percent of normal, units set to percent of normal, abbreviation is set to SWEPN.

C. GRIDDED RASTER PRODUCTS

NOHRSC generates and distributes full-resolution, gridded raster products in GIS compatible format to the following end-users:

- * NOHRSC web page.
- * RFCs: CNRFC, CBRFC, MARFC, NCRFC, NWRFC.
- * NASA GSFC, NASA Hydrologic Services Branch, NESDIS IMS.

These full-resolution, gridded raster products have a spatial resolution that varies from 1km x 1km to 3km x 3km depending on the product type. The areal extent of snow cover products have a spatial resolution of 1km x 1km. The SWE products have a spatial resolution of 3km x 3km. The numerical resolution for gridded SWE products is 1mm. The full-resolution, gridded raster products are released once per day at approximately 15z, except for weekends and holidays.

D. IMAGE PRODUCTS

NOHRSC generates and distributes image products, in GIF and gunzipped PostScript format (to facilitate hardcopy map printout), to the NOHRSC web page and to MARFC. The NOHRSC image products are generated and released once per day at approximately 15z, except for weekends and holidays.

NOTE: The PostScript files are retained on the NOHRSC web page for only 5 days due to their large file size and storage limitations.

This document is intended to clarify the NOHRSC product specifications and the AWIPS and web distribution process. If you have any questions,

require any additional information, or have any suggestions for improving this document, please contact Dave Savage at the NOHRSC: (952) 361-6610 ex 236 or dave.savage@noaa.gov.