

### Scope

The release includes the following highlights:

- Resolved bugs in the "nagrib2" program, allowing NAWIPS to combine variables from GRIB1 and GRIB2 into a single GEMPAK file
- Addition of a new grid diagnostic function MFRQ (by WPC/EMC)
- Addition of Mountain Wave indicator to G-AIRMET Turbulence product (by AWC)
- Volcanic Ash Advisory updates (for SAB)
- Table updates for March 2025 zone changes and new and modified surface observation stations
- Various bug fixes and issue resolutions

### Tickets

The following Jira work items are included in this version.

(Items marked with \* have expanded detail provided at the end of this document.)

- NAWIPS-33 - Add a new grid diagnostic function MFRQ \*
- NAWIPS-89 - Add warning if lightning strikes capacity exceeded \*
- NAWIPS-218 - Add Mountain Wave indicator to G-AIRMET Turbulence product (by AWC)
- NAWIPS-237 - Update NEXRAD table for KLIX -> KHDC relocation/renaming (SCN24-11)
- NAWIPS-243 - RHEL8 GPMAP errors (WPC) \*
- NAWIPS-247 - Implement maps/bounds table (zone) updates for March 2025 (previously distributed to remote users)
- NAWIPS-248 - Reduce NAWIPS build warning messages on WCOSS2 (3rd round)
- NAWIPS-253 - NMAP2 hangs or crashes on startup if \$GEMTBL/config/forecasters.tbl exceeds limit of 50 names
- NAWIPS-256 - Update DCWARN and possibly other decoders if and as needed to be consistent with the proposed changes to warnings in WwW CONOPS (determined no changes required) \*
- NAWIPS-258 - Help with ECMWF GEMPAK job for new encoded GRIB2 CAPE \*
- NAWIPS-262 - Assess the implications of SCN 25-06 (Adding Day-3 64 kt radii to TCM) on NAWIPS decoders
- NAWIPS-263 - Assess the implications of PNS 25-04 (Proposed changes to Convective SIGMET Product) on NAWIPS decoders
- NAWIPS-264 - DCHRCN decoder needs to accept "4 M SEAS" which will soon replace "12 FT SEAS" in TCM product
- NAWIPS-265 - Scan all table files to remove stray commas that could cause unintended field termination on RHEL 8 due to 'gfortran' bug
- NAWIPS-275 - KGVW METAR location is incorrect
- NAWIPS-276 - Undefined State/area related to SGX March change for Watch By County
- NAWIPS-278 - Incorrect product headers in \$GEMTBL/pgen/awdef.tbl (CPC)

- NAWIPS-279 - Volcanic Ash Advisory updates requested by SAB for SCN 25-43
- NAWIPS-281 - Fix buffer overflow vulnerability in Volcanic Ash Advisory lat/ion conversion
- NAWIPS-282 - Cumulative update to metadata for surface obs (METAR/SYNOP/BUOY/CMAN) stations
- NAWIPS-283 - Restoration of the South Sudan border

## Known Issues, Limitations, and Restrictions

N/A

## System Requirements

### Operating Systems Supported

- RedHat 7 Linux 64 bit Version 3.10.0-957.27.2 \*
- RedHat 8 Linux 64 bit Version 4.18.0-348.12.2

### System requirements

- Operating system:
  - RHEL 7.6: RedHat Linux 64 bit version 3.10.0-957.21.3.el7.x86\_64
  - RHEL 8.5 RedHat Linux 64 bit version 4.18.0-348.12.2.el8\_5.x86\_64
- Number of physical processors: 1
  - RAM: 12G
- Graphics:
  - NVIDIA Quadro P1000 4GB video memory, or
  - NVIDIA Quadro K2200 4GB video memory
- Hard drive:
  - 256GB SATA SSD drive
- Network:
  - 1Gbps Ethernet

## Remote Centers Deployment Instructions

STEP	ACTION
1	Save a copy of the lightning decoder software and keys to a temporary folder (\$TEMP1 \$TEMP2): cp \$GEMPAK/source/programs/dc/ltgdecode/* \$TEMP1 cp \$OS_BIN/etc/.kf/* \$TEMP2
2	Download the compressed tar file from the distribution site, <a href="http://www.nco.ncep.noaa.gov/sdb/nawips/distribution">http://www.nco.ncep.noaa.gov/sdb/nawips/distribution</a> , and unpack the file in an NAWIPS user directory.
3	Copy the lightning decoder keys over: mkdir \$GEMAK/source/programs/dc/ltgdecode

	<pre>cp \$TEMP1/* \$GEMPAK/source/programs/dc/ltgdecode cp \$TEMP2/* \$OS_BIN/etc/.kf</pre>
4	Update all users' .cshrc or .profile as needed
5	<pre>Build the new NAWIPS system cd \$GEMPAK/build external_libs_compile &gt;&amp;! EXTERNAL_BUILD_\${NA_OS}</pre>
6	<pre>cd \$NAWIPS make all &gt;&amp;! MAKE_ALL_\${NA_OS} make link &gt;&amp;! MAKE_LINK_\${NA_OS}</pre>
7	<pre>cd \$GEMPAK/utilities/a2conv make &gt;&amp;! A2CONV_MAKE_\${NA_OS}</pre>
8	To install NAWIPS onto AWIPS systems, follow the instructions from <a href="#">this link</a>

## Supplemental Detail on Selected Jira Work Items (Tickets)

- [NAWIPS-33 - Add a new grid diagnostic function MFRQ](#)
  - [NAWIPS-89 - Add warning if lightning strikes capacity exceeded](#)
  - [NAWIPS-243 - RHEL8 GPMAP errors \(WPC\)](#)
  - [NAWIPS-256 - Update DCWARN and possibly other decoders if and as needed to be consistent with the proposed changes to warnings in WwW CONOPS](#)
  - [NAWIPS-258 - Help with ECMWF GEMPAK job for new encoded GRIB2 CAPE](#)
- **NAWIPS-33 - Add a new grid diagnostic function MFRQ**

Original Requirement:

Add Keith Brill's/EMC MFRQ function to allow a user to apply the Ebert (2001) probability matching method of calibration to a QPF field. The code and auxiliary files are attached.

Reference

[Ebert, E. E., 2001: Ability of a poor man's ensemble to predict the probability and distribution of precipitation. Mon. Wea. Rev., 129, 2461–2480.](#)

Affects the following 7 added or changed files:

📁 nawips/gempak		
📁 error		
📄	pd.err	+2 -0 🟡
📁 help/hlx		
📄	gparm.hl2	+1 -0 🟡
📁 source/diaglib		
📁 df		
📄	df.h	+2 -0 🟡
📄	dfmfrq.c	+69 -0 🟢
📁 dg		
📄	dgdriv.c	+4 -1 🟡
📁 pd		
📄	pd.h	+6 -0 🟡
📄	pdmfrq.c	+176 -0 🟢

It looks like Keith originally wrote (some of) this code in 2015; we're just adding it to the N-AWIPS/GEMPAK baseline now.

I understand none of this (yet), but the help text added to gparm.hl2 reads:

MFRQ (S1,S2) S2 modified to match S1 freq. distribution

From the header of new .../gempak/source/diaglib/pd/pfmfrq.c:

```

/*****
 * pd_mfrq
 *
 * This subroutine creates output grid xo by modifying the values of
 * xf so that the frequency distribution of the xo values matches that
 * of the xa values.
 *
 * The frequency matching is most commonly used to correct the
 * frequency bias of a QPF by matching it to an analysis (Clark et al.
 * 2009) or another forecast known to have near unit frequency bias.
 *
 * pd_mfrq ( xa, xf, np, xo, iret )
 *
 *****/

```

```

* Input parameters:
*   *xa          const float      Input array of reference values
*   *xf          const float      Input values to be modified
*   *np          const int        Number of points
*
* Output parameters:
*   *xo          float            Array of xf values having the
*                               same frequency distribution
*                               as the input array xa.
*   *iret        int             Return code
*                               0 = normal return
* Reference:
*
* Clark, A. J., W. A. Gallus Jr., M. Xue, and F. Kong, 2009: A
*   comparison of precipitation forecast skill between the
*   convection-allowing and large convection-parameterizing
*   ensembles. Wea. Forecasting, 24, 1121-1140.
*
* NOTE: The irep array is used to track penetration into repeated
*   order statistics values to facilitate accurate frequency
*   matching.
**
* Log:
* K. Brill/IMSG      20150625   First working version finished
* K. Brill/IMSG      20150701   Error checking finalized
*****/

```

...and ../gempak/source/diaglib/df/dfmfrq.c:

```

void df_mfrq ( int *iret )
/*****
* df_mfrq
*
* This subroutine computes modified values of the second input so that
* the modified values match the frequency distribution of values in
* the first input array.
*
* [ Modified S2 with same freq. dist. as S1 ] = PD_MFRQ ( S1, S2 )
*
* df_mfrq ( iret )
*
* Output parameters:
*   *iret        int             Return code
*                               As for DG_GETS
**
* Log:
* K. Brill/IMSG      6/15   Created
*****/

```

- NAWIPS-89 - Add warning if lightning strikes capacity exceeded

The original request for this was as follows:

*"As a forecaster who is using lightning data, I want the lightning strikes capacity to be configurable. A warning message will be generated for large data volume."*

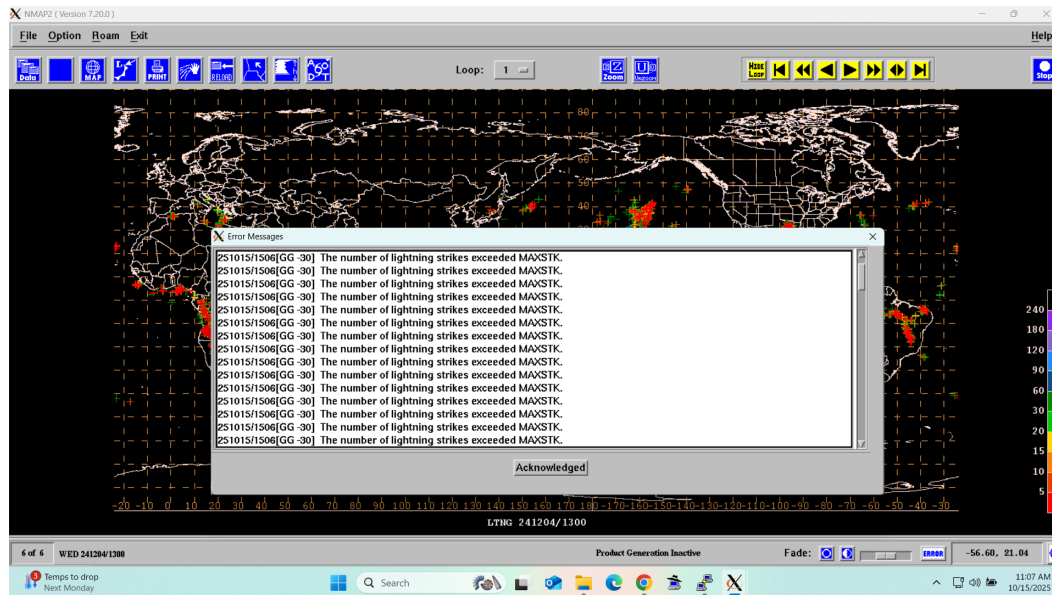
In NAWIPS-51 ([v7.6.0](#)) we increased the lightning capacity from 160K to 800K strikes/hour. We will further increase the user-awareness while using the lightning data by make the max lightning strike capacity configurable in prefs.tbl. For any instance if the strikes are greater than the limit, a warning message will be shown on the Nmap2 error window (lower right).

However, making the lightning strike capacity configurable was deemed infeasible (and in any case prefs.tbl for preferences wouldn't be the place to do it). So the scope of this task was downsized to issuing the warning message:

if the strikes are greater than the limit, a warning message will be shown on the Nmap2 error window (lower right).

...where "the limit" is MAXSTK, which Shucaï has now made uniformly set as  $LLMXPT * 10$ , where LLMXPT is (officially) target machine dependent, but appears to be 80000.

A supplied screenshot from the test procedure shows what the warning message looks like:



- NAWIPS-243 - RHEL8 GPMAP errors (WPC)

The problem:

Running the GPMAP program on RHEL 8 with WSTM parameter set to plot current winter weather events (watch/warning/advisory) terminates with fatal error...

"At line 239 of file [...]nawips/gempak/source/gemlib/gg/ggwstm.f

Fortran runtime error: Bad value during floating point read"

...in cases where one of the events includes a public forecast zone whose name string field contains a comma (",") character (in table file \$GEMTBL/stns/zones.tbl)

#### Selected solution:

Note that the commas in name fields of the \*.wstm file(s) are passed on from table file \$OBS/stns/zones.tbl by the decoder (dcwstm) which looks up the station info there based on the UGC code (e.g., MTZ320) in the transmitted bulletin. Rather than change the decoder [since commas in any station table name fields are troublesome], we have fixed the program (shpcv) which generates the zones.tbl table in the first place from the 'upstream' shapefiles which are provided to us every time the zones change. Since we don't control those 'upstream' shapefiles, we can't remove the original commas from there (and assume they'll never return!), so we have the shpcv program now modified to strip them out when processing the input shapefiles into its output tables (landzones.tbl which becomes zones.tbl).

- NAWIPS-256 - Update DCWARN and possibly other decoders if and as needed to be consistent with the proposed changes to warnings in WwW CONOPS

Determine in final detail what updates are needed to the DCWARN and (perhaps) other decoders, in order to be compatible with proposed changes to certain 'short-fused' warnings as specified in the ["WwW CONOPS" document](#)."

Shucaï investigated this and determined that "The proposed changes to warnings in WwW CONOPS do not affect dcwarn." and provided a test procedure to confirm.

- NAWIPS-258 - Help with ECMWF GEMPAK job for new encoded GRIB2 CAPE

When drafting the Release Notes, I didn't understand the significance of this; Shucaï reviewed and helpfully set me straight...

I have one suggestion: for NAWIPS v7.20.0, the fix for NAWIPS-258 ("Help with ECMWF GEMPAK job for new encoded GRIB2 CAPE") is quite important. We resolved bugs in `nagrib2`, allowing NAWIPS to combine variables from GRIB1 and GRIB2 into a single GEMPAK file. Perhaps we should consider adding this as a highlight in the release announcement.

...hence the first bullet under "Highlights of this release include"