

GFE Forecast Monitor (GFM) Introduction and Overview

The logo for GFE Forecast Monitor (GFM) consists of the letters 'GFM' in a bold, blue, italicized sans-serif font.

GFM Project Team

Programming Development by Global Systems Division (GSD) and Field Tested

March 2019

Presentation Objectives

- ***Goal of the GFM Project***
- ***GFM Application Overview***
- ***How the GFM can Benefit Operations***
- ***Additional Documentation and Software available on VLAB***

GFM Project Team

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GFM Project Goal

AWIPS application

GFE Forecast Monitor (GFM)



Improving
IDSS Support
to our
Partners

Purpose: Increase situational awareness of the near term forecast performance and improve IDSS support to our customers.

Intended Users: (Enhanced) Short Term Forecaster and Aviation Forecaster

The VLab page for the GFM Project:

<https://vlab.ncep.noaa.gov/redmine/projects/nwsscp/wiki/GfeForecastMonitor>

GFM Overview

The screenshot shows the 'GFE Forecast Monitor' application window. The title bar reads 'GFE Forecast Monitor'. Below the title bar is a menu bar with 'File', 'Options', and 'About'. The main area contains a table with columns for 'Id', 'Source', 'Temp', 'Dewpt', 'RH', 'Wind Dir-Speed', 'Gust', 'Sky', 'Ceiling', 'Cld Base', 'Vis', and 'Weather'. The 'Source' dropdown is set to 'METAR' and the 'Obs/Fcst pairs' button is highlighted. The table lists 17 airports: DEN, BJC, APA, FNL, GXY, FMM, STK, HEQ, AKO, LIC, MNH, CCU, OCO, 20V, and 33V. Each row contains observation and forecast values for temperature, dewpoint, relative humidity, wind, gust, sky, ceiling, cloud base, visibility, and weather. The values are color-coded: green for high accuracy, orange for medium, purple for low, and red for very low. The 'Obs/Fcst pairs' button is highlighted in green.

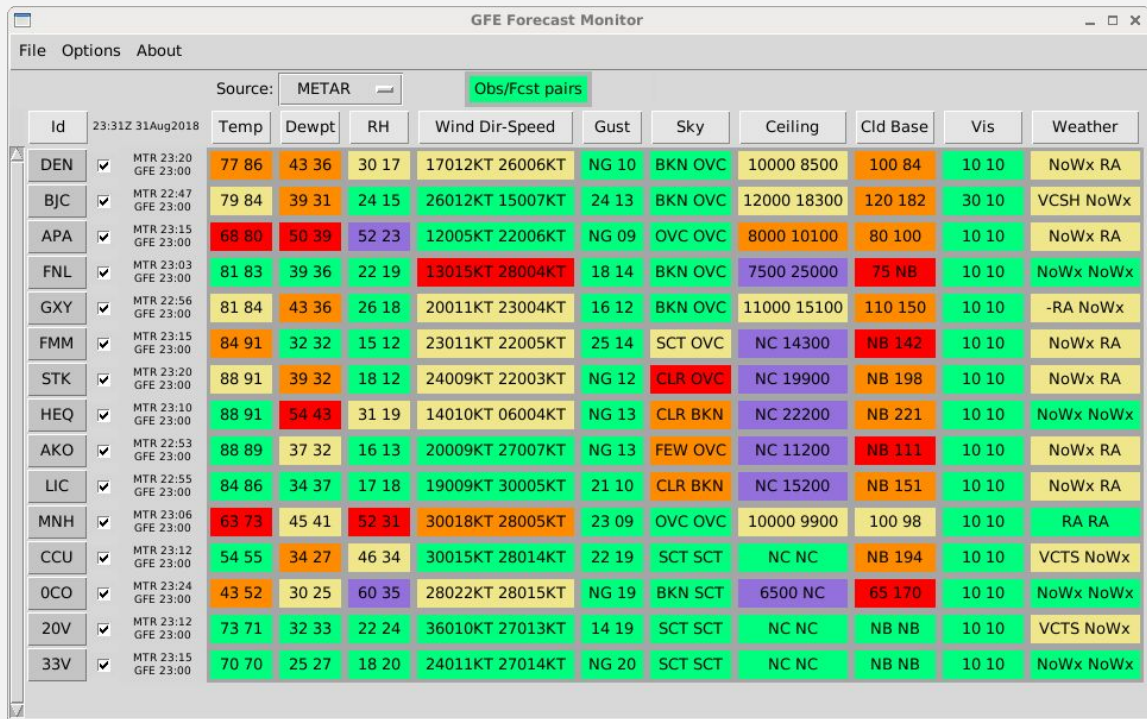
| Id | Source | Temp | Dewpt | RH | Wind Dir-Speed | Gust | Sky | Ceiling | Cld Base | Vis | Weather |
|-----|------------------------|-------|-------|-------|-----------------|-------|---------|-------------|----------|-------|-----------|
| DEN | MTR 23:20 GFE 23:00 | 77 86 | 43 36 | 30 17 | 17012KT 26006KT | NG 10 | BKN OVC | 10000 8500 | 100 84 | 10 10 | NoWx RA |
| BJC | MTR 22:47 GFE 23:00 | 79 84 | 39 31 | 24 15 | 26012KT 15007KT | 24 13 | BKN OVC | 12000 18300 | 120 182 | 30 10 | VCSH NoWx |
| APA | MTR 23:15 GFE 23:00 | 68 80 | 50 39 | 52 23 | 12005KT 22006KT | NG 09 | OVC OVC | 8000 10100 | 80 100 | 10 10 | NoWx RA |
| FNL | MTR 23:03 GFE 23:00 | 81 83 | 39 36 | 22 19 | 13015KT 28004KT | 18 14 | BKN OVC | 7500 25000 | 75 NB | 10 10 | NoWx NoWx |
| GXY | MTR 22:56 GFE 23:00 | 81 84 | 43 36 | 26 18 | 20011KT 23004KT | 16 12 | BKN OVC | 11000 15100 | 110 150 | 10 10 | -RA NoWx |
| FMM | MTR 23:15 GFE 23:00 | 84 91 | 32 32 | 15 12 | 23011KT 22005KT | 25 14 | SCT OVC | NC 14300 | NB 142 | 10 10 | NoWx RA |
| STK | MTR 23:20 GFE 23:00 | 88 91 | 39 32 | 18 12 | 24009KT 22003KT | NG 12 | CLR OVC | NC 19900 | NB 198 | 10 10 | NoWx RA |
| HEQ | MTR 23:10 GFE 23:00 | 88 91 | 54 43 | 31 19 | 14010KT 06004KT | NG 13 | CLR BKN | NC 22200 | NB 221 | 10 10 | NoWx NoWx |
| AKO | MTR 22:53 GFE 23:00 | 88 89 | 37 32 | 16 13 | 20009KT 27007KT | NG 13 | FEW OVC | NC 11200 | NB 111 | 10 10 | NoWx RA |
| LIC | MTR 22:55 GFE 23:00 | 84 86 | 34 37 | 17 18 | 19009KT 30005KT | 21 10 | CLR BKN | NC 15200 | NB 151 | 10 10 | NoWx RA |
| MNH | MTR 23:06 GFE 23:00 | 63 73 | 45 41 | 52 31 | 30018KT 28005KT | 23 09 | OVC OVC | 10000 9900 | 100 98 | 10 10 | RA RA |
| CCU | MTR 23:12 GFE 23:00 | 54 55 | 34 27 | 46 34 | 30015KT 28014KT | 22 19 | SCT SCT | NC NC | NB 194 | 10 10 | VCTS NoWx |
| OCO | MTR 23:24 GFE 23:00 | 43 52 | 30 25 | 60 35 | 28022KT 28015KT | NG 19 | BKN SCT | 6500 NC | 65 170 | 10 10 | NoWx NoWx |
| 20V | MTR 23:12 GFE 23:00 | 73 71 | 32 33 | 22 24 | 36010KT 27013KT | 14 19 | SCT SCT | NC NC | NB NB | 10 10 | VCTS NoWx |
| 33V | MTR 23:15 GFE 23:00 | 70 70 | 25 27 | 18 20 | 24011KT 27014KT | NG 20 | SCT SCT | NC NC | NB NB | 10 10 | NoWx NoWx |

GFM -- each grid box pairs the observation values (left) with the forecast values (right).

The colors indicate the accuracy of the forecast.

The colors represent the alert threshold values, 1- high score (green), 5- low score (purple). The Alert color scheme as well as parameter Alert threshold values are configurable. 5

GFM Overview



The screenshot shows the 'GFE Forecast Monitor' application window. The 'Source' is set to 'METAR'. The table displays weather data for 18 airports, including DEN, BJC, APA, FNL, GXY, FMM, STK, HEQ, AKO, LIC, MNH, CCU, OCO, 20V, and 33V. The data is color-coded: green for good conditions, yellow for some issues, orange for significant issues, and red for severe conditions. The 'Obs/Fcst pairs' button is highlighted in green.

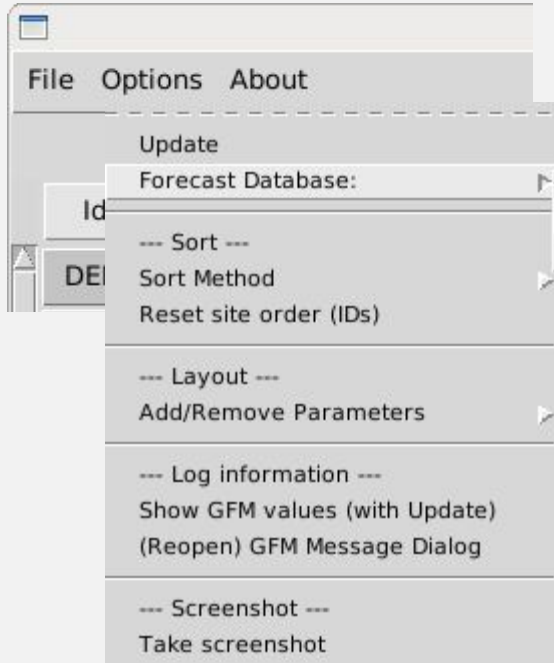
| Id | 23:31Z 31Aug2018 | Temp | Dewpt | RH | Wind Dir-Speed | Gust | Sky | Ceiling | Cld Base | Vis | Weather |
|-----|------------------------|-------|-------|-------|-----------------|-------|---------|-------------|----------|-------|-----------|
| DEN | MTR 23:20 GFE 23:00 | 77 86 | 43 36 | 30 17 | 17012KT 26006KT | NG 10 | BKN OVC | 10000 8500 | 100 84 | 10 10 | NoWx RA |
| BJC | MTR 22:47 GFE 23:00 | 79 84 | 39 31 | 24 15 | 26012KT 15007KT | 24 13 | BKN OVC | 12000 18300 | 120 182 | 30 10 | VCSH NoWx |
| APA | MTR 23:15 GFE 23:00 | 68 80 | 50 39 | 52 23 | 12005KT 22006KT | NG 09 | OVC OVC | 8000 10100 | 80 100 | 10 10 | NoWx RA |
| FNL | MTR 23:03 GFE 23:00 | 81 83 | 39 36 | 22 19 | 13015KT 28004KT | 18 14 | BKN OVC | 7500 25000 | 75 NB | 10 10 | NoWx NoWx |
| GXY | MTR 22:56 GFE 23:00 | 81 84 | 43 36 | 26 18 | 20011KT 23004KT | 16 12 | BKN OVC | 11000 15100 | 110 150 | 10 10 | -RA NoWx |
| FMM | MTR 23:15 GFE 23:00 | 84 91 | 32 32 | 15 12 | 23011KT 22005KT | 25 14 | SCT OVC | NC 14300 | NB 142 | 10 10 | NoWx RA |
| STK | MTR 23:20 GFE 23:00 | 88 91 | 39 32 | 18 12 | 24009KT 22003KT | NG 12 | CLR OVC | NC 19900 | NB 198 | 10 10 | NoWx RA |
| HEQ | MTR 23:10 GFE 23:00 | 88 91 | 54 43 | 31 19 | 14010KT 06004KT | NG 13 | CLR BKN | NC 22200 | NB 221 | 10 10 | NoWx NoWx |
| AKO | MTR 22:53 GFE 23:00 | 88 89 | 37 32 | 16 13 | 20009KT 27007KT | NG 13 | FEW OVC | NC 11200 | NB 111 | 10 10 | NoWx RA |
| LIC | MTR 22:55 GFE 23:00 | 84 86 | 34 37 | 17 18 | 19009KT 30005KT | 21 10 | CLR BKN | NC 15200 | NB 151 | 10 10 | NoWx RA |
| MNH | MTR 23:06 GFE 23:00 | 63 73 | 45 41 | 52 31 | 30018KT 28005KT | 23 09 | OVC OVC | 10000 9900 | 100 98 | 10 10 | RA RA |
| CCU | MTR 23:12 GFE 23:00 | 54 55 | 34 27 | 46 34 | 30015KT 28014KT | 22 19 | SCT SCT | NC NC | NB 194 | 10 10 | VCTS NoWx |
| OCO | MTR 23:24 GFE 23:00 | 43 52 | 30 25 | 60 35 | 28022KT 28015KT | NG 19 | BKN SCT | 6500 NC | 65 170 | 10 10 | NoWx NoWx |
| 20V | MTR 23:12 GFE 23:00 | 73 71 | 32 33 | 22 24 | 36010KT 27013KT | 14 19 | SCT SCT | NC NC | NB NB | 10 10 | VCTS NoWx |
| 33V | MTR 23:15 GFE 23:00 | 70 70 | 25 27 | 18 20 | 24011KT 27014KT | NG 20 | SCT SCT | NC NC | NB NB | 10 10 | NoWx NoWx |

There is a choice of three observation data sources.

Choose from the sources menu on the main GFM display. The choices, if available, are:

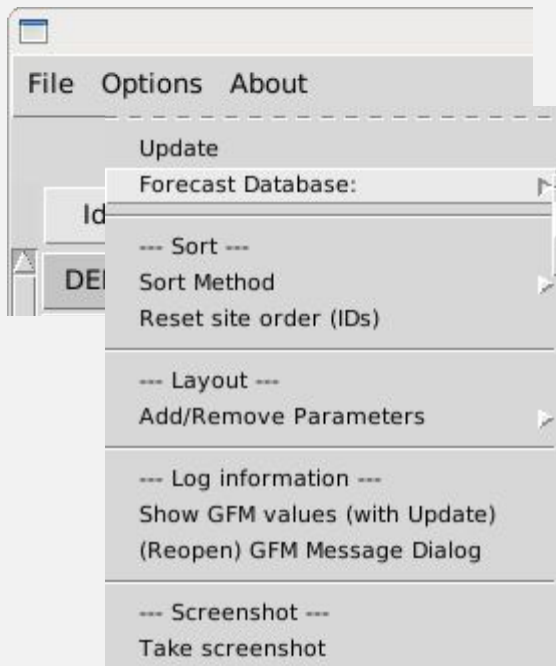
- *METAR observations (default)*
- *GFE gridded observational analysis*
- *Real-Time Mesoscale Analysis (RTMA)*

GFM Options



- **Update** -- This will update the GFM with the latest forecast and observational grids, although a update process is run every few minutes as defined in the GFM configuration file “time Interval” variable.
- **Forecast Type** -- Option allows choice between two GFE forecast data sources: *Fcst* (default), and *Official Forecast*. This can also be set by editing the *Forecast Database* variable in the configuration file.

GFM Options



--- Sort ---

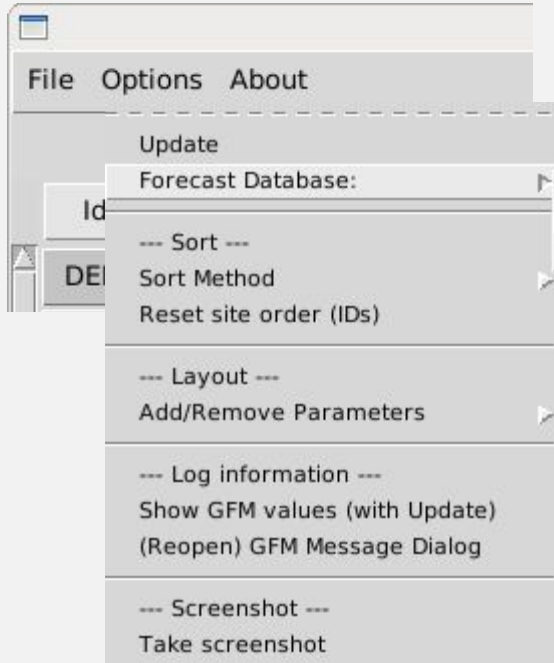
Sort method -- There are 3 sorting alternatives for ranking the obs/forecast pair values:

1. *Obs value*
2. *Forecast value*
3. *Alert Color*

--- Layout ---

Add/Remove Parameters -- Ability to interactively turn off/on the display of any parameter to display only a few parameters at a time as desired, e.g. to monitor temperature, dewpoint and RH. Includes a “Reset layout” option.

GFM Options



--- Log information ---

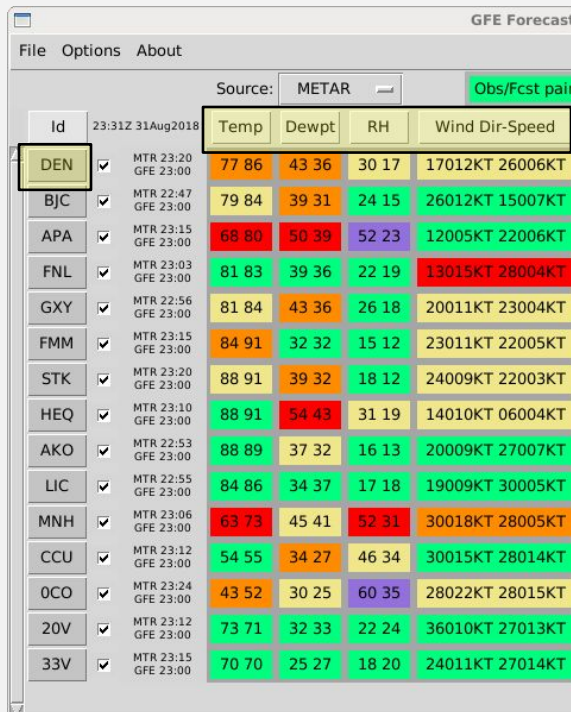
***Show GFM values (with Update)** -- Print site & weather element values in the GFM Message popup window.*

***(Reopen) GFM Message Dialog** -- Open the GFM Message popup window.*

--- Screenshot ---

***Take screenshot** -- Saves a png image file in /data/.*

GFM Options



Source: METAR Obs/Fcst pair

| Id | Temp | Dewpt | RH | Wind Dir-Speed |
|-----|-------|-------|-------|-----------------|
| DEN | 77 86 | 43 36 | 30 17 | 17012KT 26006KT |
| BJC | 79 84 | 39 31 | 24 15 | 26012KT 15007KT |
| APA | 68 80 | 50 39 | 52 23 | 12005KT 22006KT |
| FNL | 81 83 | 39 36 | 22 19 | 13015KT 28004KT |
| GXY | 81 84 | 43 36 | 26 18 | 20011KT 23004KT |
| FMM | 84 91 | 32 32 | 15 12 | 23011KT 22005KT |
| STK | 88 91 | 39 32 | 18 12 | 24009KT 22003KT |
| HEQ | 88 91 | 54 43 | 31 19 | 14010KT 06004KT |
| AKO | 88 89 | 37 32 | 16 13 | 20009KT 27007KT |
| LIC | 84 86 | 34 37 | 17 18 | 19009KT 30005KT |
| MNH | 63 73 | 45 41 | 52 31 | 30018KT 28005KT |
| CCU | 54 55 | 34 27 | 46 34 | 30015KT 28014KT |
| OCO | 43 52 | 30 25 | 60 35 | 28022KT 28015KT |
| 20V | 73 71 | 32 33 | 22 24 | 36010KT 27013KT |
| 33V | 70 70 | 25 27 | 18 20 | 24011KT 27014KT |

Sorting Elements – Clicking on the element type (Temp, Dewpt, RH, Wind Dir-Speed, etc.) allows sorting from highest to lowest value or lowest to highest value.

METAR String -- The raw METAR (METAR KBOS 170153Z) can be displayed in a separate display window. Click on a station ID, for example 'BOS' to display the BOS METAR or SPECI as reported. On a rare occasion the METAR report string is missing or otherwise not available.



GFM Options

| Id | | Source: | Temp | Dewpt | RH | Wind Dir-Speed |
|-----|------------------|------------------------|-------|-------|-------|-----------------|
| DEN | 23:31Z 31Aug2018 | MTR 23:20 GFE 23:00 | 77 86 | 43 36 | 30 17 | 17012KT 26006KT |
| BJC | | MTR 22:47 GFE 23:00 | 79 84 | 39 31 | 24 15 | 26012KT 15007KT |
| APA | | MTR 23:15 GFE 23:00 | 68 80 | 50 39 | 52 23 | 12005KT 22006KT |
| FNL | | MTR 23:03 GFE 23:00 | 81 83 | 39 36 | 22 19 | 13015KT 28004KT |
| GXY | | MTR 22:56 GFE 23:00 | 81 84 | 43 36 | 26 18 | 20011KT 23004KT |
| FMM | | MTR 23:15 GFE 23:00 | 84 91 | 32 32 | 15 12 | 23011KT 22005KT |
| STK | | MTR 23:20 GFE 23:00 | 88 91 | 39 32 | 18 12 | 24009KT 22003KT |
| HEQ | | MTR 23:10 GFE 23:00 | 88 91 | 54 43 | 31 19 | 14010KT 06004KT |
| AKO | | MTR 22:53 GFE 23:00 | 88 89 | 37 32 | 16 13 | 20009KT 27007KT |
| LIC | | MTR 22:55 GFE 23:00 | 84 86 | 34 37 | 17 18 | 19009KT 30005KT |
| MNH | | MTR 23:06 GFE 23:00 | 63 73 | 45 41 | 52 31 | 30018KT 28005KT |
| CCU | | MTR 23:12 GFE 23:00 | 54 55 | 34 27 | 46 34 | 30015KT 28014KT |
| OCO | | MTR 23:24 GFE 23:00 | 43 52 | 30 25 | 60 35 | 28022KT 28015KT |
| 20V | | MTR 23:12 GFE 23:00 | 73 71 | 32 33 | 22 24 | 36010KT 27013KT |
| 33V | | MTR 23:15 GFE 23:00 | 70 70 | 25 27 | 18 20 | 24011KT 27014KT |

Toggle METAR On/Off – If a METAR is no longer valid, clicking the check box will turn the METAR On/Off.

Timing information --

The timestamp of the observation and forecast product time are printed to the left of the parameters. When the observation data is late there is a colored box around the pair see Figure 6, below.

- If the delay is over a **60 mins** for the METAR, the box is colored gray & for GFE Obs/RTMA, the box is yellow*
- If the delay is over a **90 mins** for the METAR, the box is colored orange.*

GFM Logging Info



```
GFM Messages
GFM Logging info.
GFM has started.
Configuration forecast database is Fcst
Error trap for missing forecast time, for site KCCU

GFM results for 00:34:59Z 30Aug2018

KDEN
[MTR 23:53, GFE 00:00]
[' T', (88, 86.8888888888888886)]
[' Td', (30, 25.6666666666666668)]
[' RH', (12.438302606905227, 10.774459510696067)]
[' Wind', (12.0, 6.2222222222222223)]
[' WindGust', (17.0, 15.111111111111111)]
[' Sky', (1, 0)]
[' Ceiling', (-30000, -30000.0)]
[' CloudBasePrimary', (250, 250.0)]
[' Visibility', (10.0, 10.0)]
[' Wx', ('NoWx', 'TS')]

KBJC
[MTR 23:45, GFE 00:00]
[' T', (86, 87.222222222222229)]

August 30 18 00:35:08 MDT  Clear  Close
```

Logging information --

To see additional logging information:

- *Use the Options menu choice, Log information. See Figure 7 for an image of the GFM Alert Popup.*
- *Show GFM values (with Update) -- Print site & weather element values in the GFM Message popup window. (Reopen)*
- *GFM Message Dialog -- Open the GFM Message popup window*
- *Or, edit the configuration file variable writeGFM and restart GFM and open GFM Alert popup. The debug options print data to the terminal window screen.*

Using GFM in Operations

Purpose:

Improves situational awareness of forecast performance

- ✓ Enhanced Short-Term SA
- ✓ Decision Support Services
- ✓ Fire Weather SA
- ✓ Digital Aviation Services

GFM Project VLab Resources

Thanks for your interest in the GFM Project

The VLAB page for the GFM Application:

<https://vlab.ncep.noaa.gov/redmine/projects/nwsscp/wiki/GfeForecastMonitor>