What's Up with WSUP

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What WSUP Has Now

- NBM forecast products from version 4.0 for CONUS, Alaska, Puerto Rico, Hawaii, and Oceanic domains
- GEFS Bias Corrected forecast products for CONUS, Alaska, and Tropical Pacific domains
- NBM component visualization for temperature, winds, sky cover, and precipitation at predefined points
- GEFS point visualization for temperatures (surface and some upper levels), RH, and precipitation
- Second slider for dProg/dt mode and categories in plan view
- dProg/dt mode in point visualization
- Optional wind barbs and contours with flexible zoom reveals available for NBM and GEFS

A More Detailed Look at Point Visualization

- Inspecting and interpreting data
  - Hovering techniques
  - Utilization of the wind rose and violin plots
- dProg/dt mode allows users to inspect components, members, and quantiles for a specific valid time. This allows users to see how the range of possible solutions is evolving.
- NBM quantiles are now available for maxT, minT, QPF at 00z, 06z, 12z, 18z

WSUP Next?

- More GEFS elements in WSUP point visualization and plan view
- “Likelihood to achieve” graphs (Greg Mann)
- NDFD for comparative purposes
- Weather-in-context (WPC)

What We're Working On

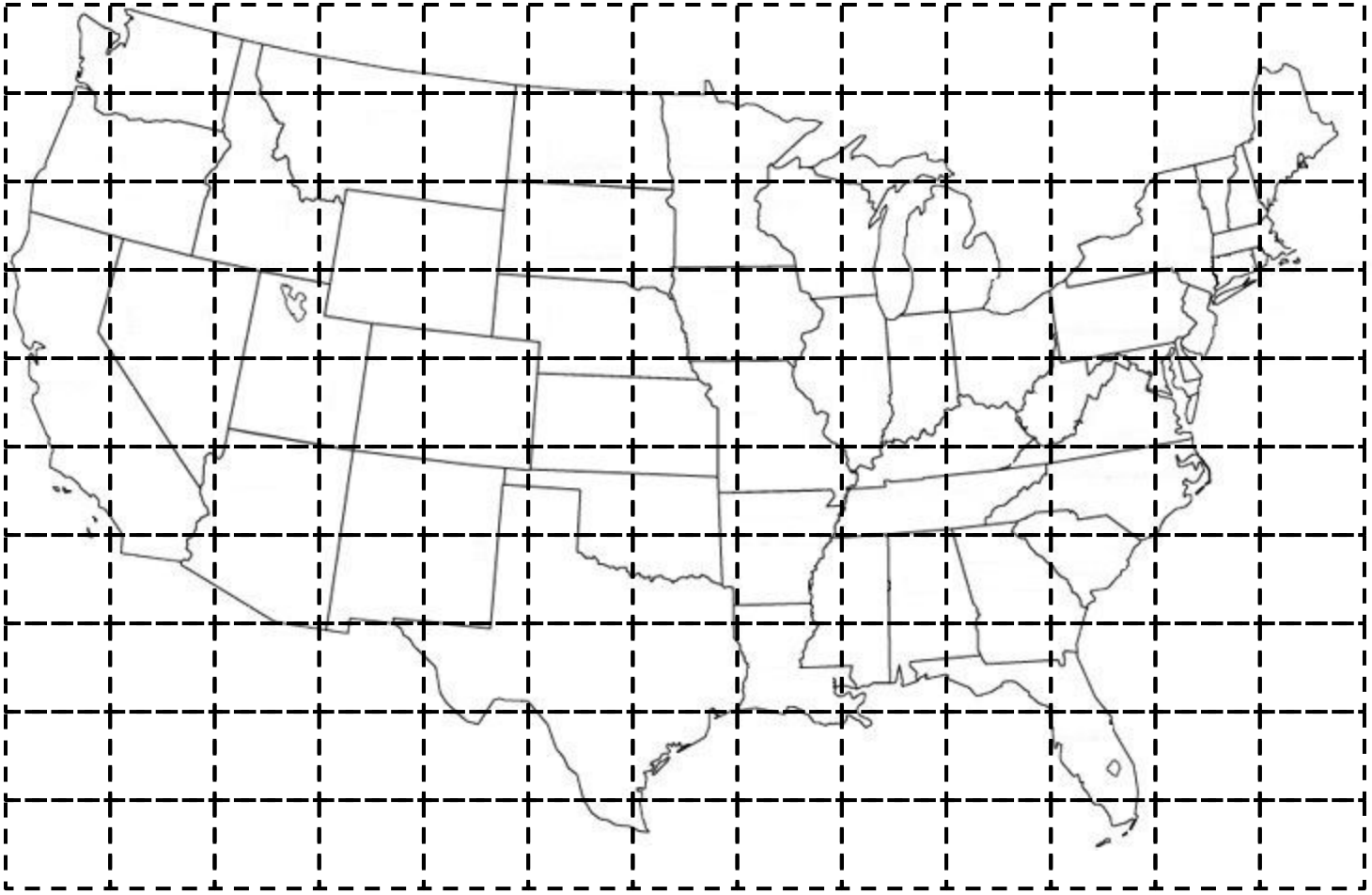
- NBM 1D at any grid point
  - Coordinated with NBM 1D Team (Travis Wilson, Ryan Walsh, William Rasch, Jebb Stewart, Rob Howlett, Dan Nietfeld, Drew Peterson) to obtain and interpret the NBM 1D visualization code.
  - Worked with internal MDL/WIAD developers Shane Mill, Jason Burks, and Steve Olson to utilize NWS instance of the Environmental Data Retrieval-Application programming interface (EDR-API) and backend datastore they developed that allows quick access to all the data in an n-dimensional array at a single geographical location
    - Developed by a partnership with MDL/WIAD and UKMET
  - The backend storage are Zarr datastores packed with the raw GRIB2 data organized by xarray and chunked to optimize a query that will return all weather elements from one lat/lon
  - GRIB2 data is processed such that the resulting datastore contains all the weather elements and valid times are organized into 128x128 pixel chunks. This is to reduce the amount of data needed to be read when querying for a single point.
    - Needed to balance processing time and query read speed
  - Will be available for all grid points in all NBM domains

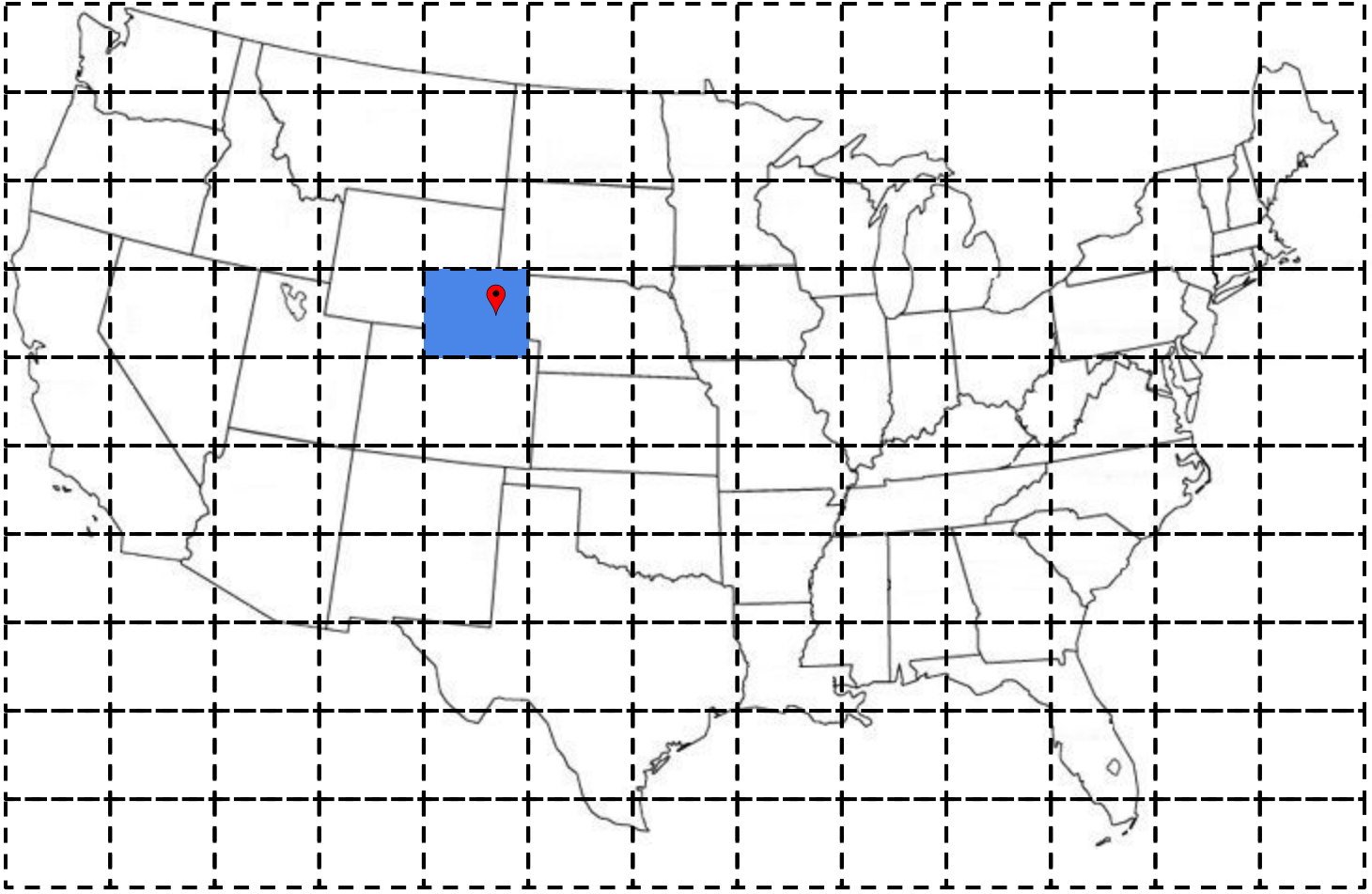
What We're Working On (cont.)

- NBM 1D at any grid point
  - Space necessities:
    - Approximately 415 GB/NBM version/day for our datastores as compared to 575 GB/NBM version/day for the raw GRIB data
  - Data is saved on a Lustre instance mounted to the EDR-API instance
  - Data returned to user per click is <~1 MB for all weather elements (low bandwidth-friendly)
  - All-element data query returns in ~5 seconds

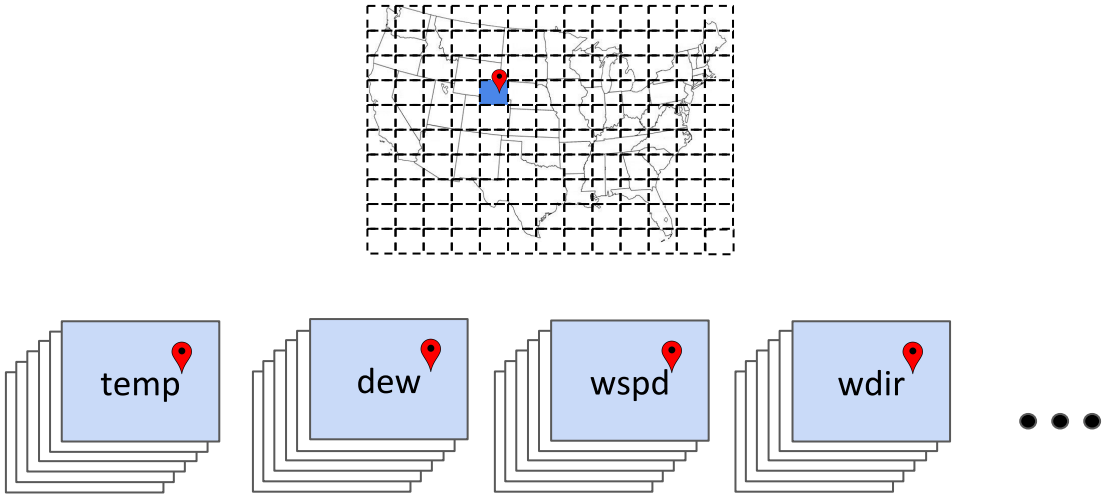
1D Query Optimization

Organize data into 128x128 pixel chunks





Zarr Datastore Details

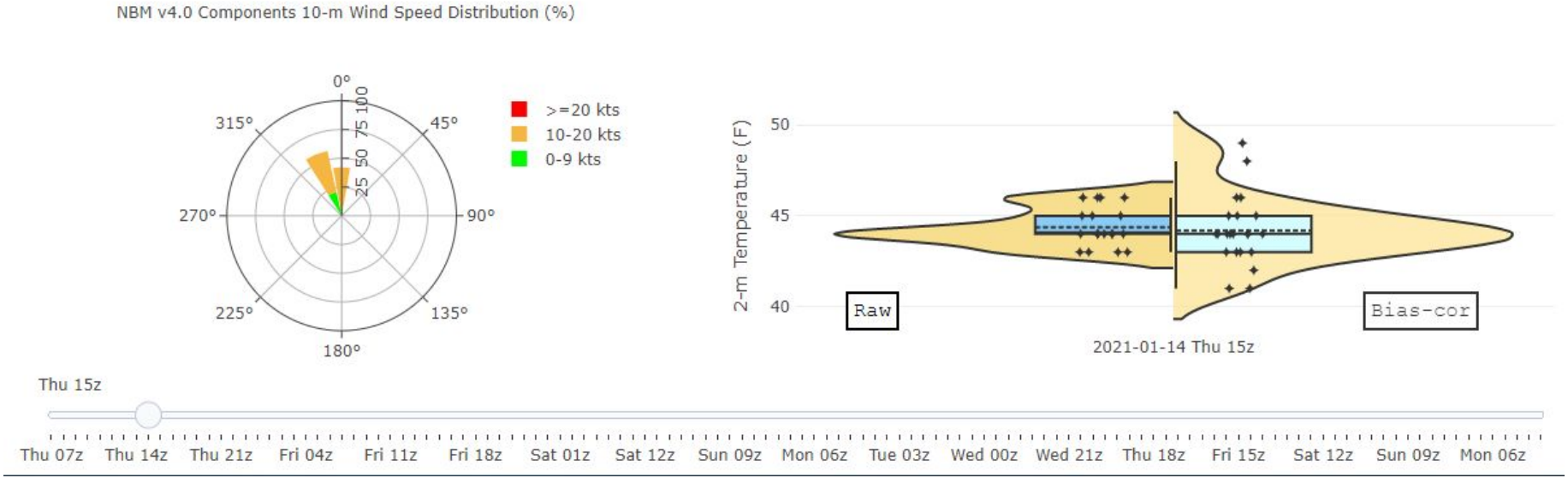


API returns JSON used for plotting

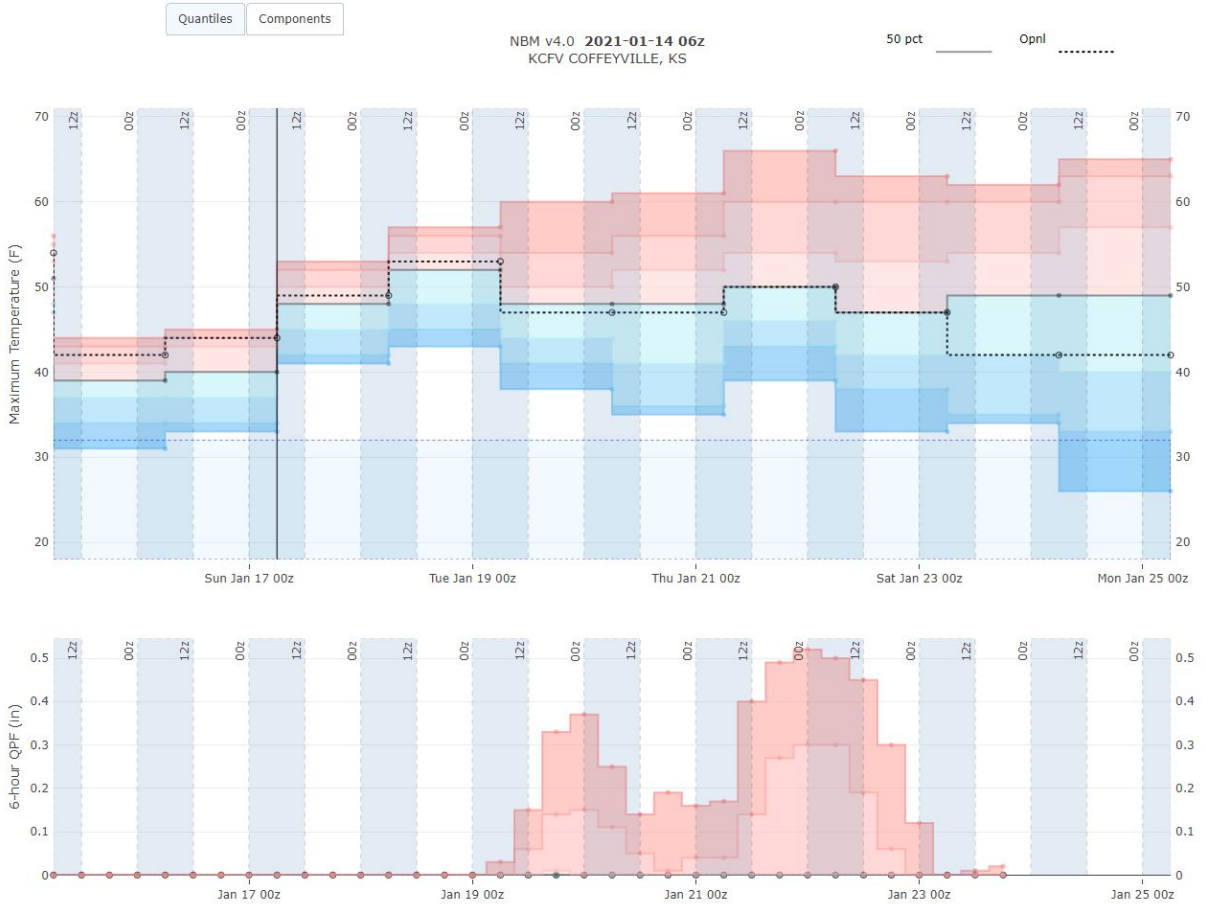
1D Demo

Backup

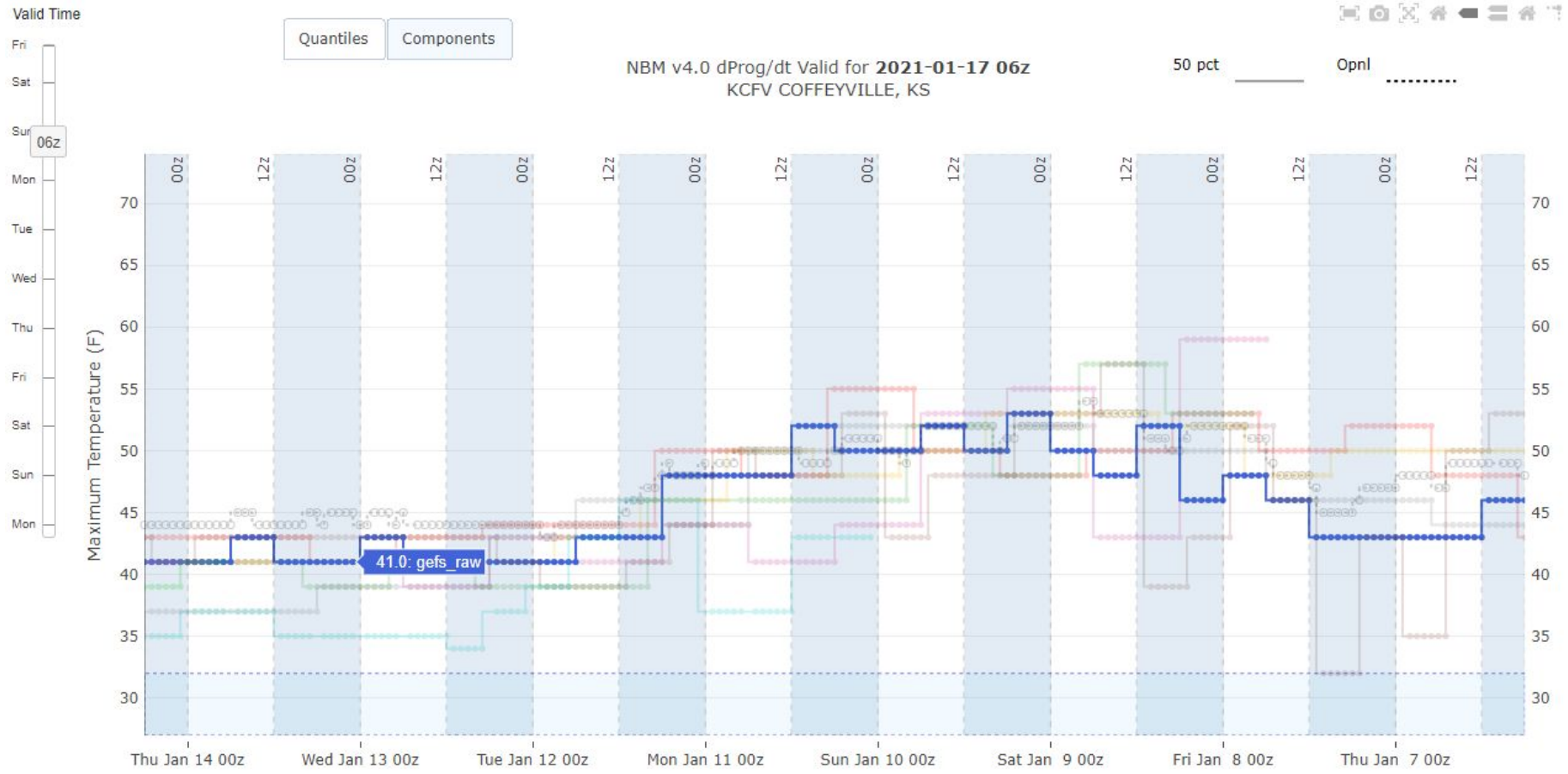
Wind Rose and Violin Plots



QMD Quantiles for Max T, Min T, and Precip



dProg/dt


Valid Time
Fri
Sat
Sun
06z
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Mon
Quantiles
Components
NBM v4.0 dProg/dt Valid for 2021-01-17 06z
KCFV COFFEYVILLE, KS
50 pct
Opnl
Maximum Temperature (F)
00z
12z
70
65
60
55
50
45
40
35
30
41.0: gefs_raw
Thu Jan 14 00z
Wed Jan 13 00z
Tue Jan 12 00z
Mon Jan 11 00z
Sun Jan 10 00z
Sat Jan 9 00z
Fri Jan 8 00z
Thu Jan 7 00z

dProg/dt of Quantiles