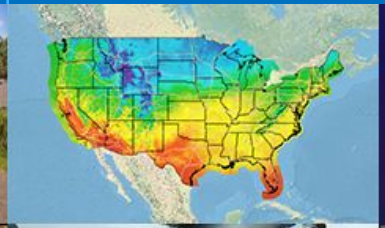
A Review Of The January 22, 2023 Snow Across The Ohio Valley

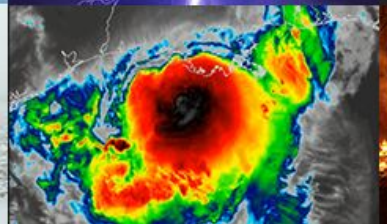
NATIONAL WEATHER SERVICE

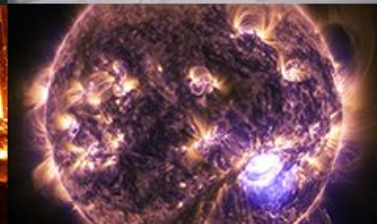
Douglas Kahn
NWS Cleveland Meteorologist



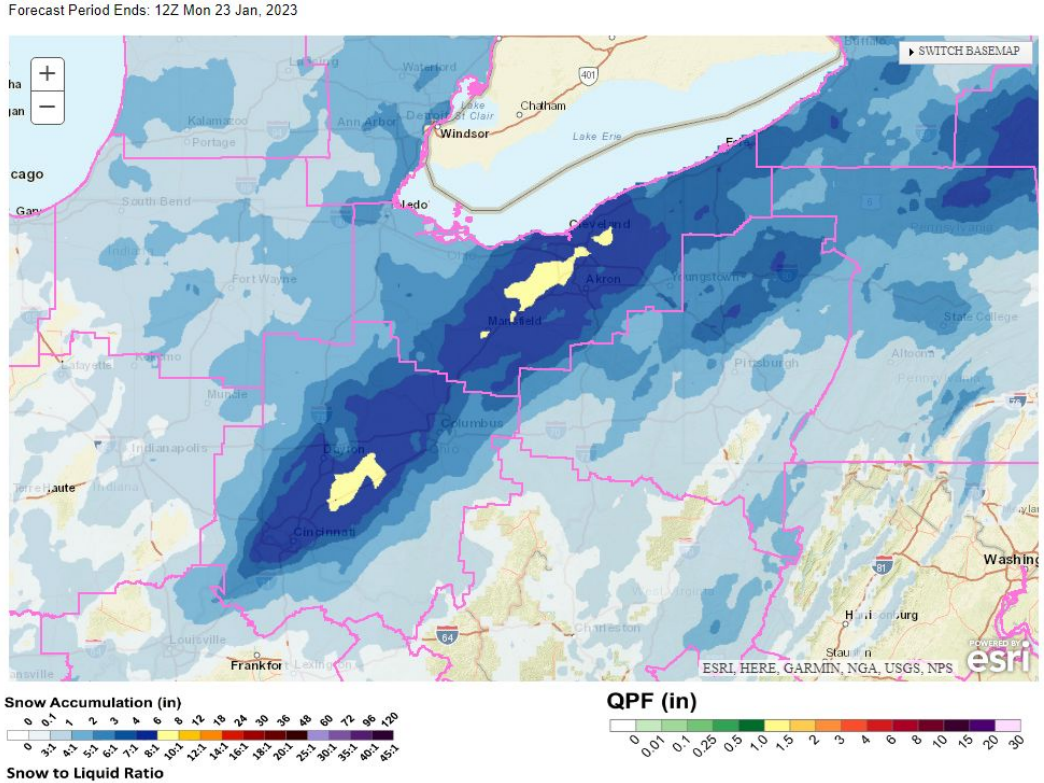






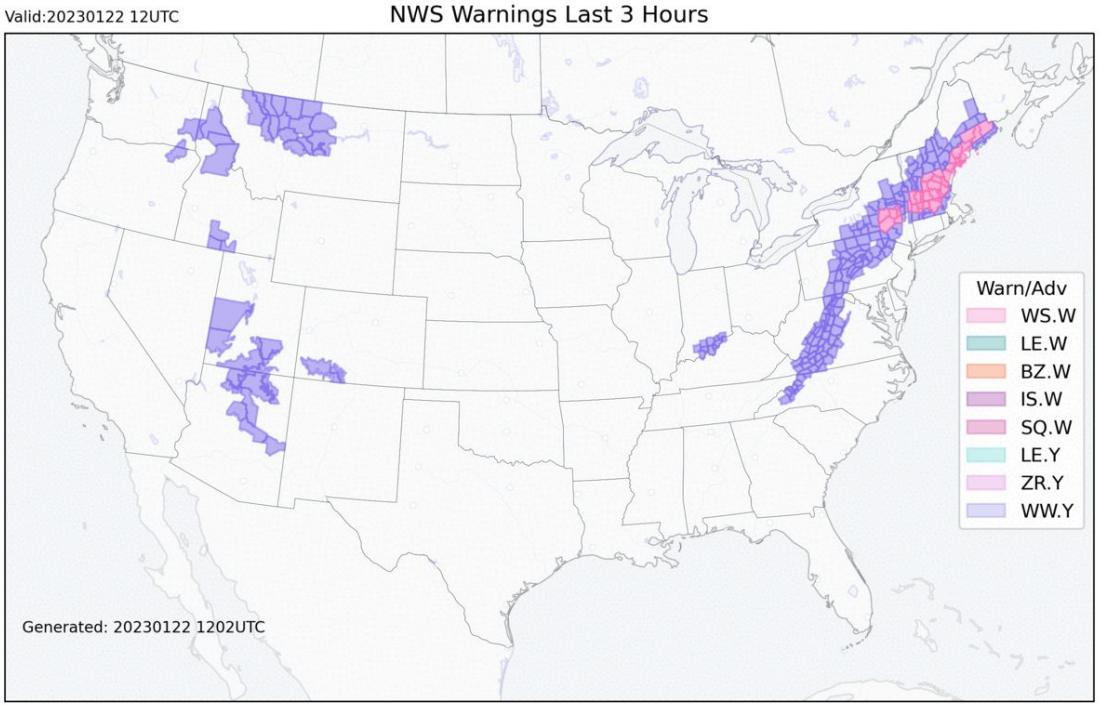
What Happened?

- 4 to 6 inches of wet snow across Ohio
- Last-minute advisories/warnings issued in the early morning of Jan 22, 2023
- Biggest synoptic storm (in terms of snow amounts) of the winter season for the region
- Snow amounts not well-forecasted in days 2 & 3.
    - Slight improvement for day 1, but even hires models struggled to catch onto the magnitude of QPF/snow



NOHRSC 24-hour snowfall map ending Jan 23, 2023 12Z.

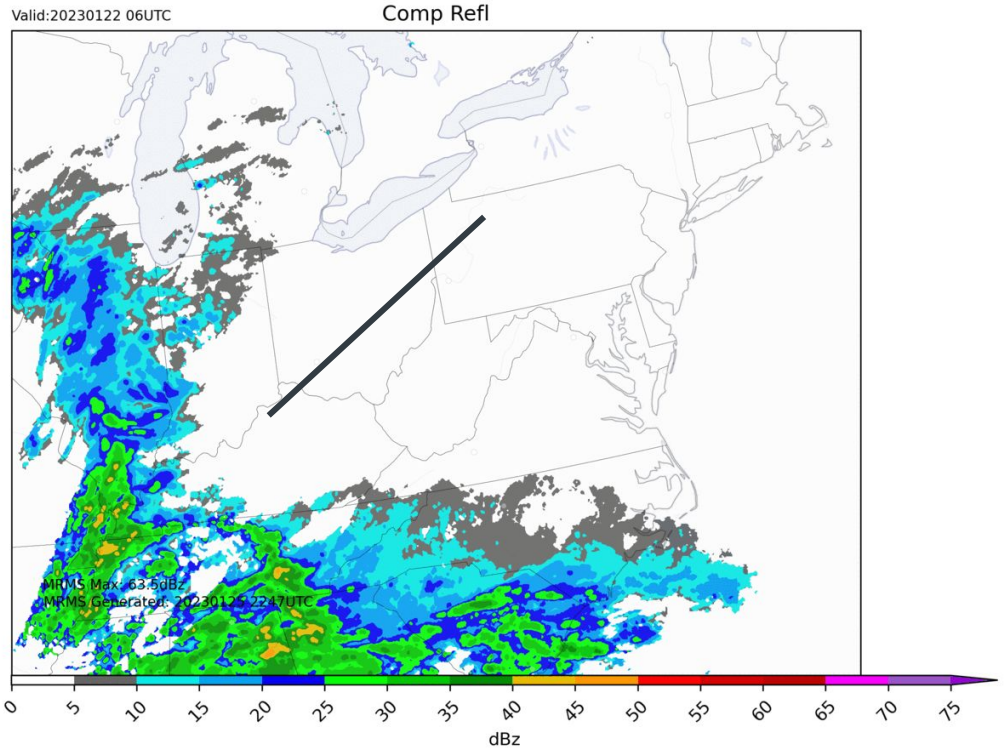
What Happened?



WWA Map Progression on Jan 22, 2023 from 13Z to 18Z. Note that snow had generally already begun to fall before headlines were issued.

What Happened?

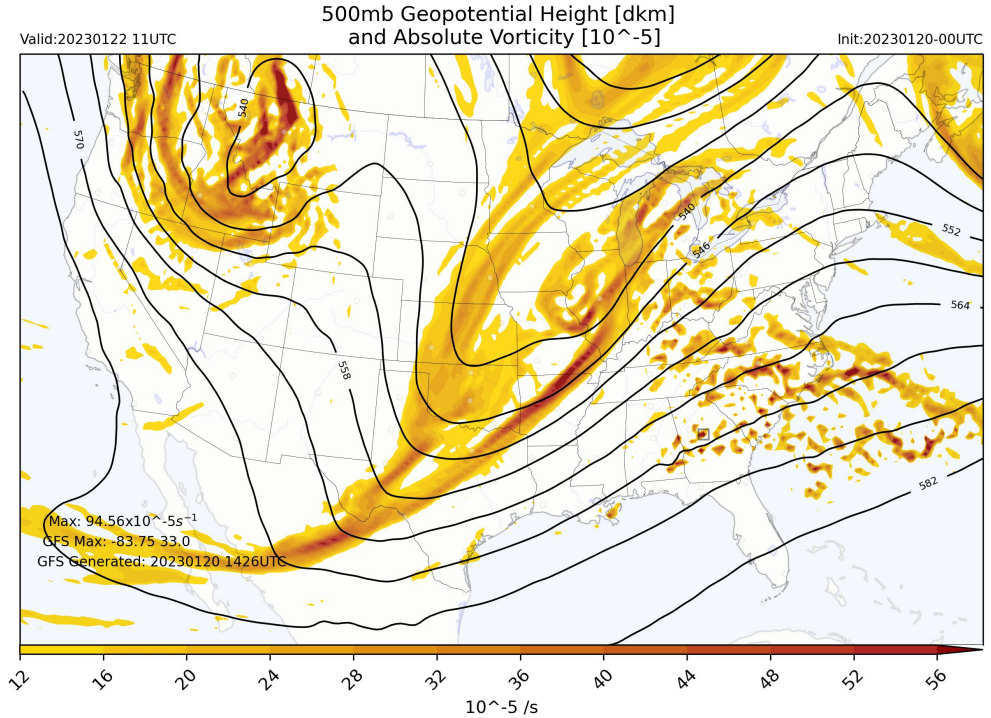
- Several hours of a narrow, moderately-heavy band of snow moving northeast across the Ohio Valley
- Reflectivity values were in the 30s to lower 40s at times
  - Higher values in the mid-40s most associated with bright-banding (note black line roughly denoting the rain/snow separation
- A majority of the snowfall fell within a 12-hour period.



Composite reflectivity from 1/22/23 6Z through 1/22/23 23Z.

Day 3 Forecast

- Potent shortwave embedded within a positive-tilted longwave trough moving east across the Midwest

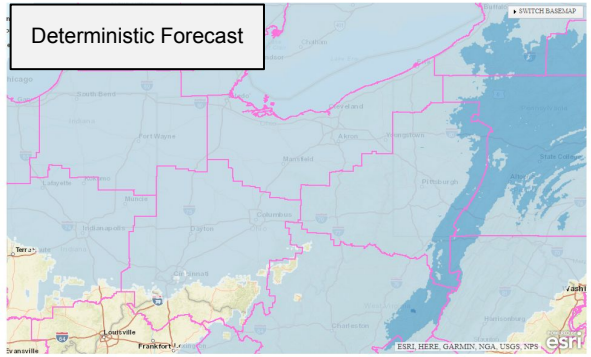


GFS 500 mb vorticity map, initialized 1/20/23 00Z, valid time 1/22/23 11Z.

Day 3 Forecast (NBM, 1Z cycle)

Forecast Period Ends: 12Z Mon 23 Jan, 2023

Deterministic Forecast



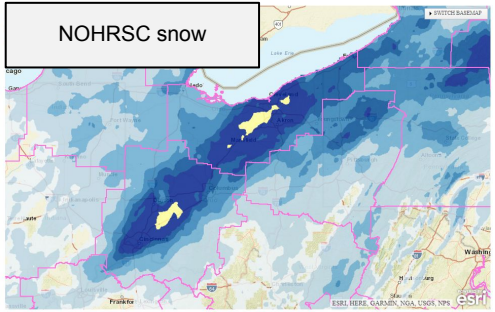
Snow Accumulation (in)

Snow to Liquid Ratio

QPF (in)

Forecast Period Ends: 12Z Mon 23 Jan, 2023

NOHRSC snow



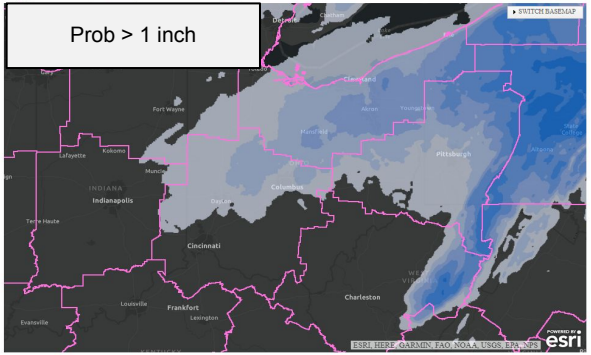
Snow Accumulation (in)

Snow to Liquid Ratio

QPF (in)

Forecast Period Ends: 12Z Mon 23 Jan, 2023 | Forecast Hour: 84

Prob > 1 inch



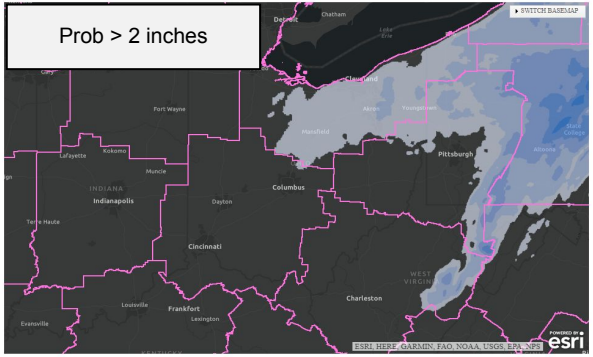
Probability

Change image opacity:

63%

Forecast Period Ends: 12Z Mon 23 Jan, 2023 | Forecast Hour: 84

Prob > 2 inches



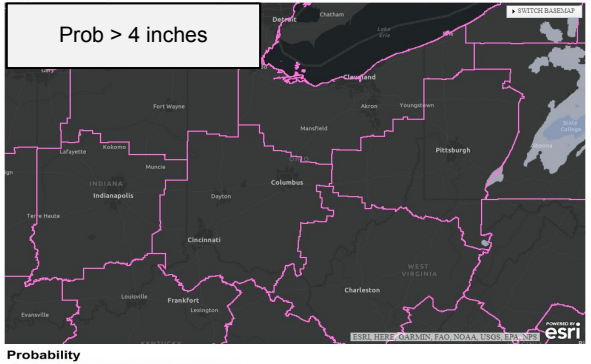
Probability

Change image opacity:

63%

Forecast Period Ends: 12Z Mon 23 Jan, 2023 | Forecast Hour: 84

Prob > 4 inches



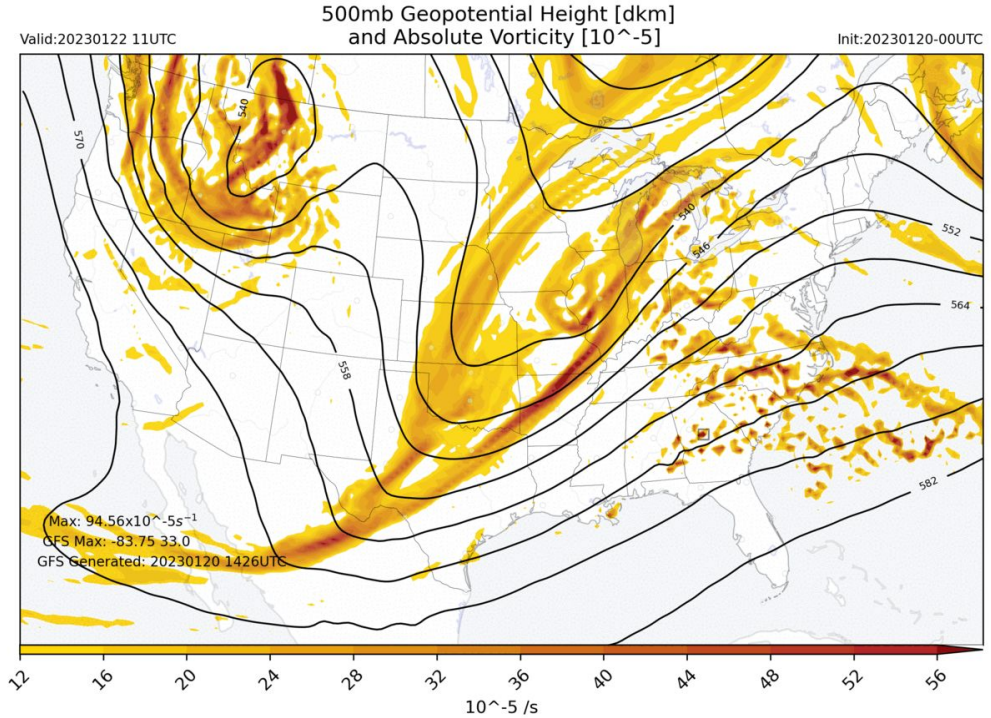
Probability

Change image opacity:

63%

Day 2 Forecast

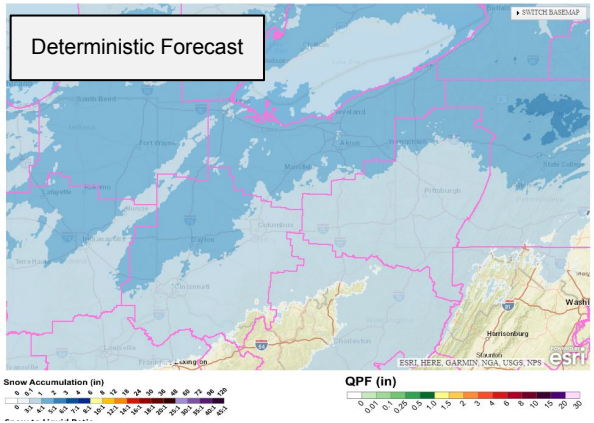
- Potent shortwave embedded within a positive-tilted longwave trough moving east across the Midwest
  - Note the gfs is trending slightly slower with the shortwave arrival.



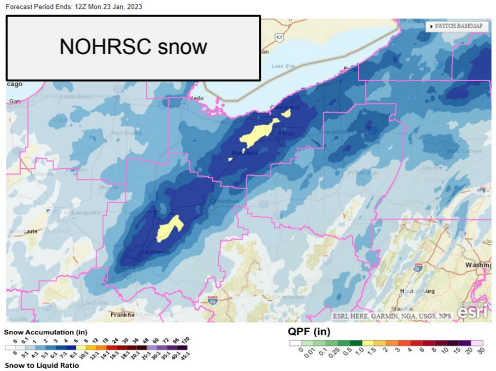
GFS 500 mb vorticity map loop, comparing initializations on 1/20/23 and 1/21/23, valid time 1/22/23 11Z.

Day 2 Forecast (NBM, 1Z cycle)

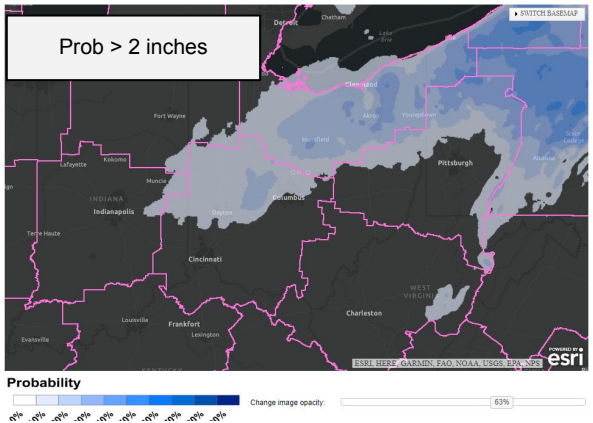
Deterministic Forecast



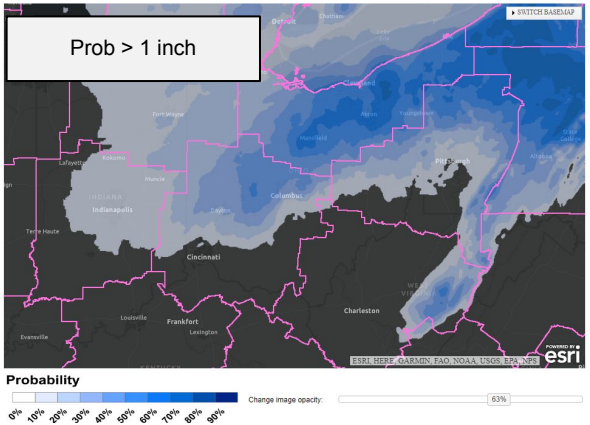
NOHRSC snow



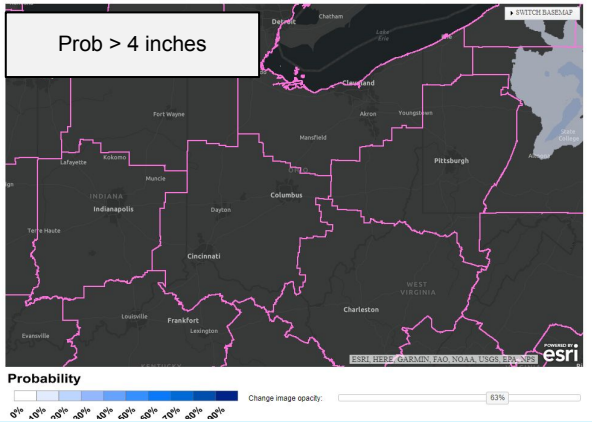
Prob > 2 inches



Prob > 1 inch

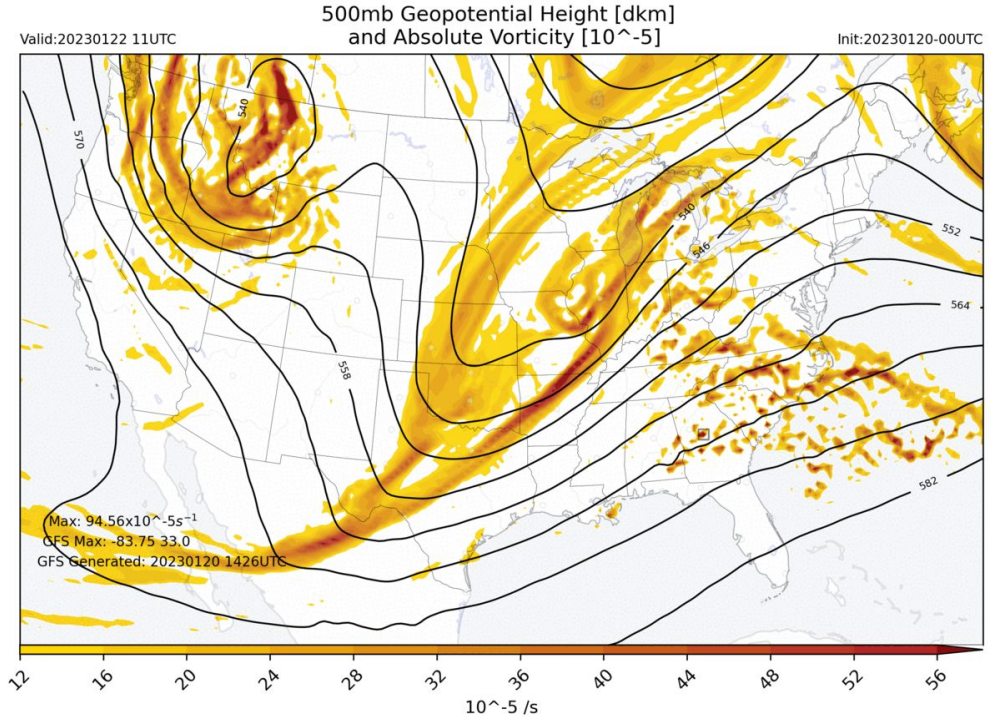


Prob > 4 inches



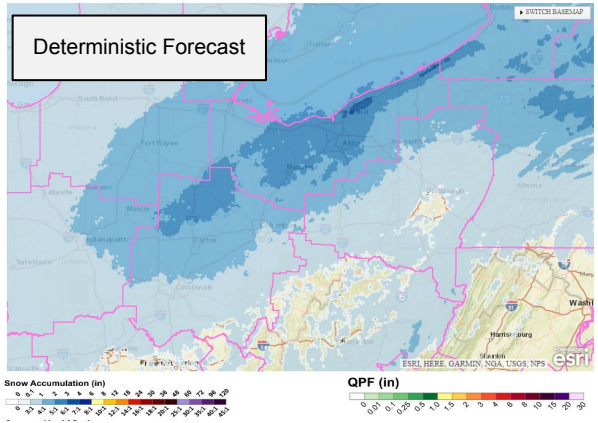
Day 1 Forecast

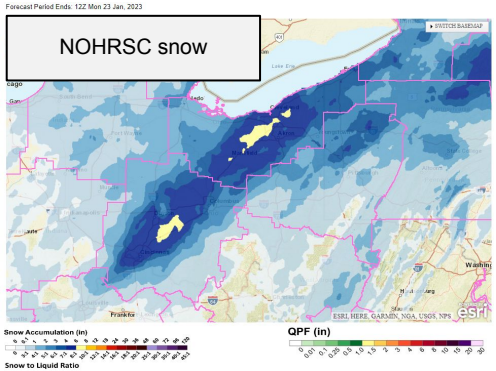
- Potent shortwave embedded within a positive-tilted longwave trough moving east across the Midwest
  - Note the gfs is continuing to trend slightly slower and stronger with the shortwave arrival.

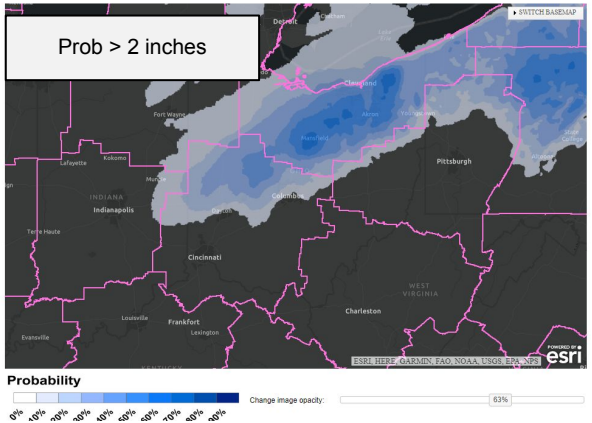


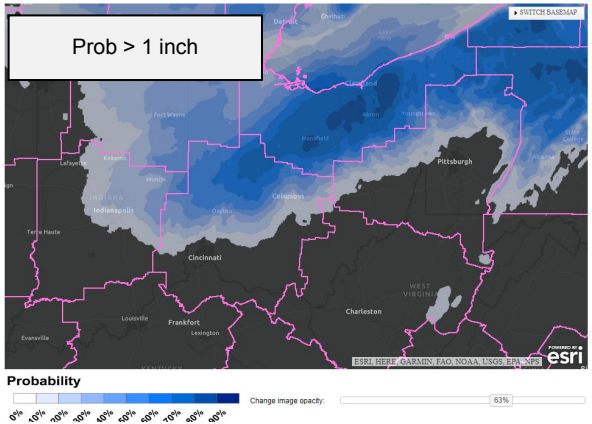
GFS 500 mb vorticity map loop, comparing initializations on 1/20/23, 1/21/23, and 1/22/23, valid time 1/22/23 11Z.

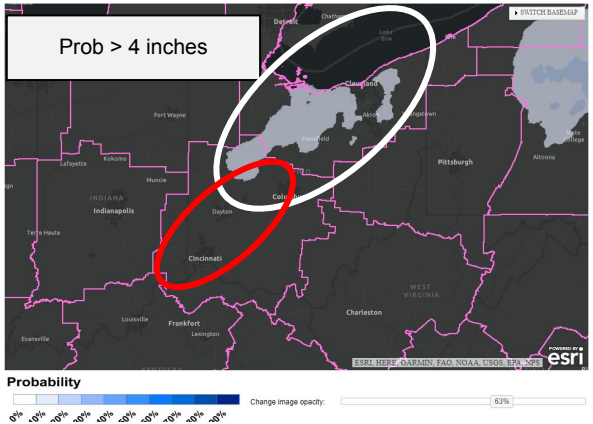
Day 1 Forecast (NBM, 1Z cycle)







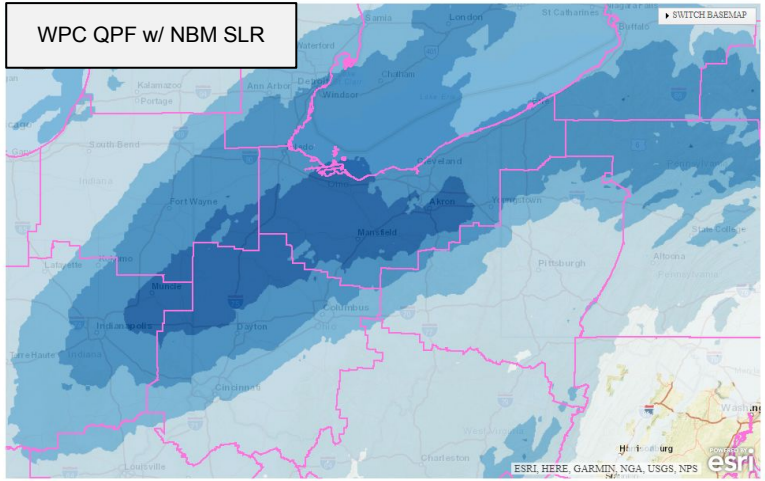




WPC QPF/Snow With NBM SLR (Day 1)

Forecast Period Ends: 12Z Mon 23 Jan, 2023

WPC QPF w/ NBM SLR



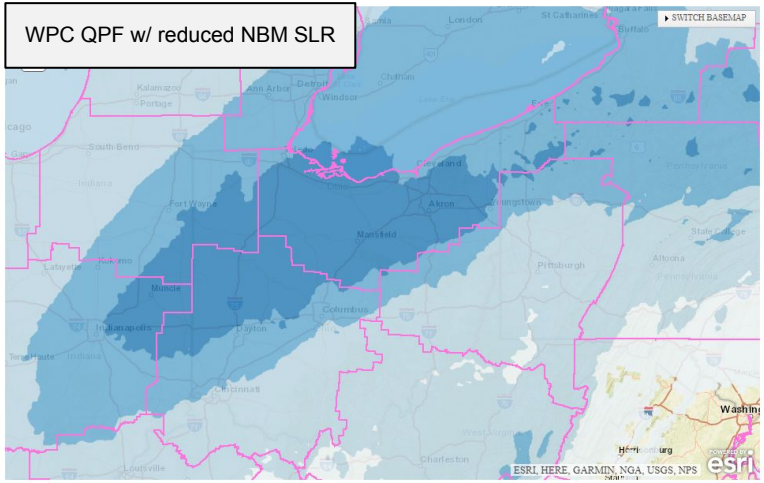
Snow Accumulation (in)

Snow to Liquid Ratio

QPF (in)

Forecast Period Ends: 12Z Mon 23 Jan, 2023

WPC QPF w/ reduced NBM SLR

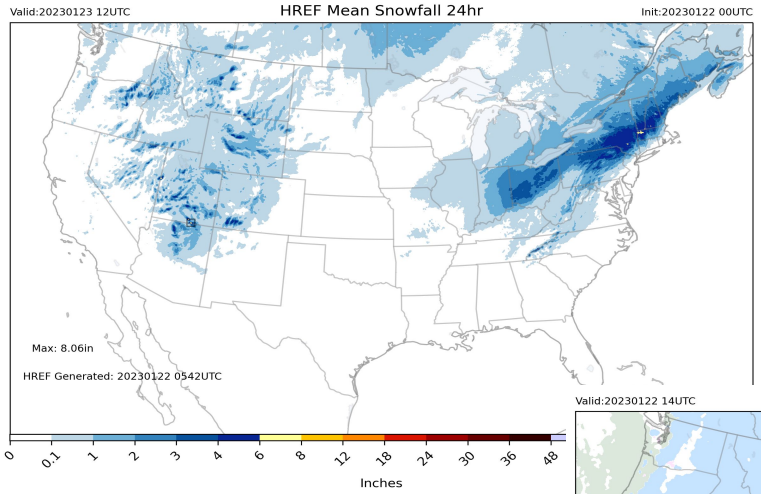


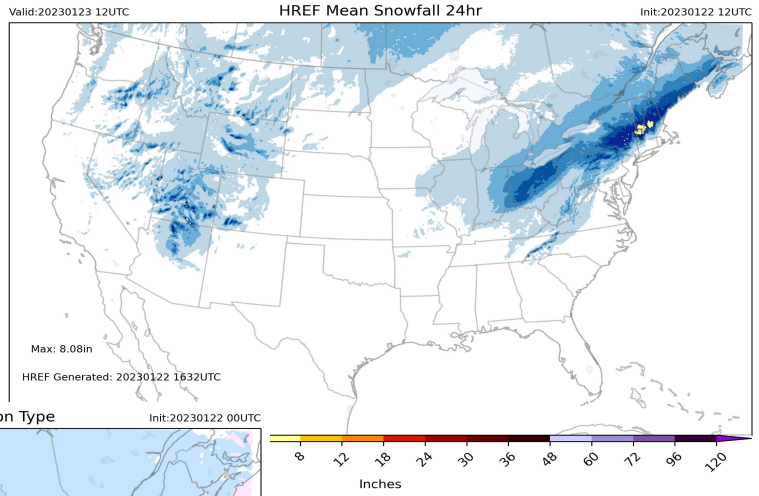
Snow Accumulation (in)

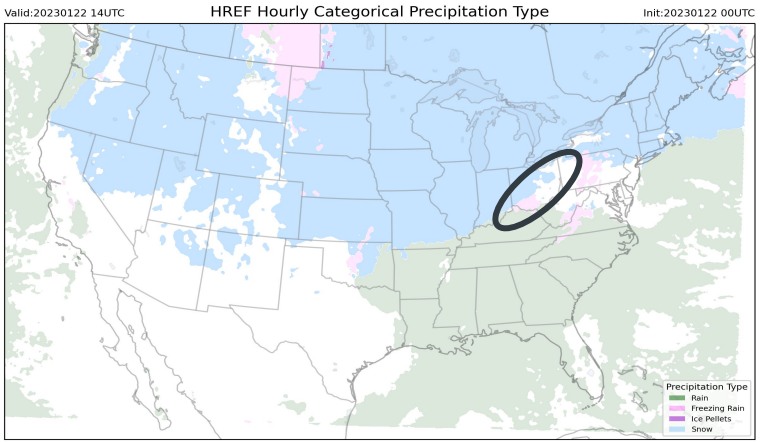
Snow to Liquid Ratio

QPF (in)

Other Miscellaneous Models







Summary

- An axis of 4 to 6 inches of wet and heavy snow fell from Southwest to Northeast Ohio.
- Last-minute advisories/warnings were issued in the early morning of Jan 22, 2023.
- Global model guidance struggled with forecasting Ptype (rain vs snow) and thus overall snow amounts, evident by a lack in NBM snow amounts for the day 3 period.
- Snow amounts increased slightly as hires/HREF guidance was ingested into the NBM snowfall forecast for days 2/1.
- There was moderate confidence in at least 2 inches of snow across North-Central and Northeast Ohio, but low confidence across Southwest Ohio.
- There was low confidence in receiving 4 inches of snow across the entire area.
    - Could a greater than 3 (>3) inch threshold in thee NBM have provided more confidence?

- Overall, a difficult event to forecast in terms of headlines and potential impacts.