

CW3E East Coast Atmospheric River Outlook: 8 Jan 2024

Two Low Pressure Systems to Bring Heavy Precipitation to East Coast

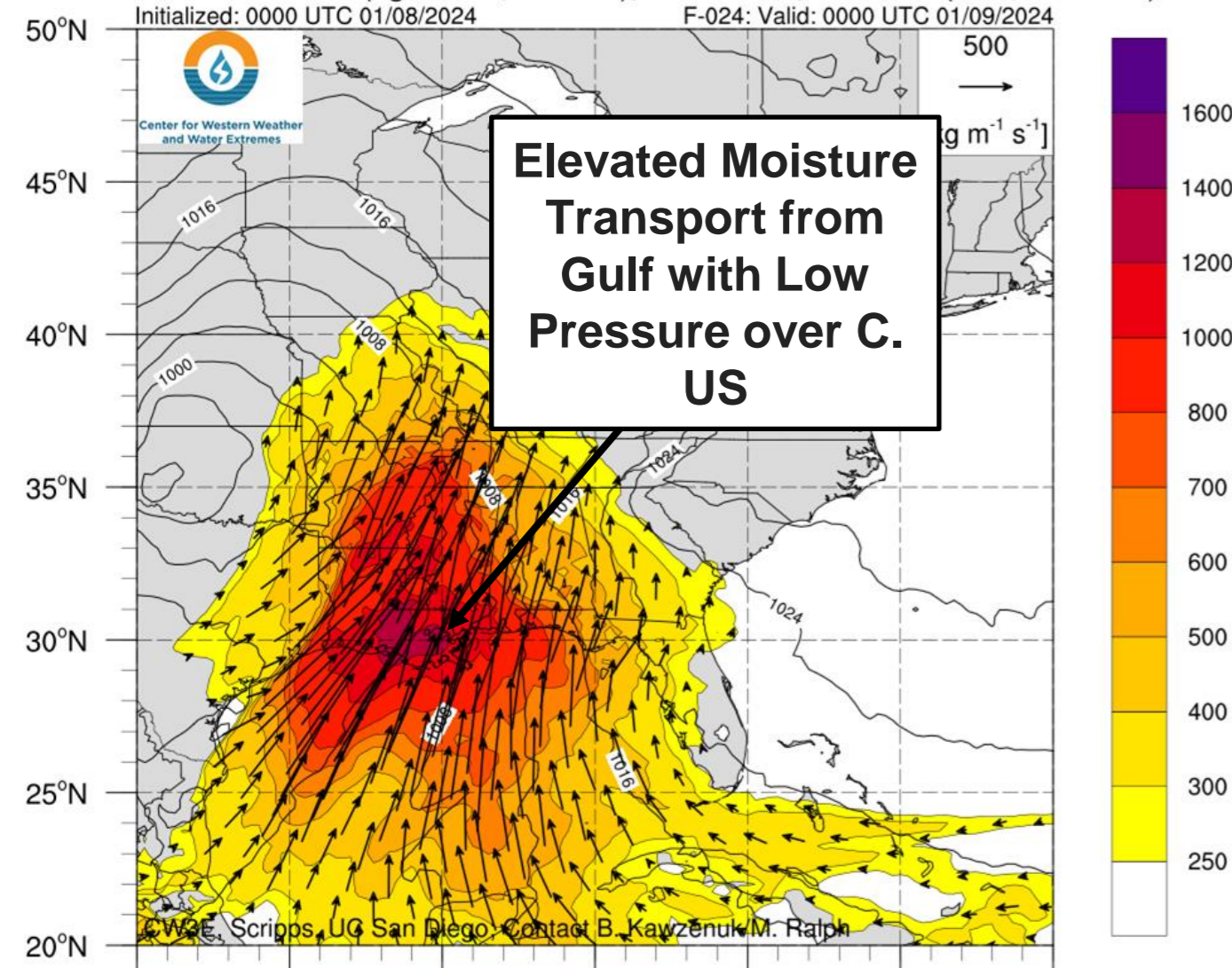
- Two low pressure systems and associated atmospheric rivers (AR) are forecast bring heavy precipitation to much of the Eastern and Midwest US this week.
- The first strong AR ($IVT > 1200 \text{ kg m}^{-1} \text{ s}^{-1}$ in the core) is forecast to form early Mon 8 Jan, progressing up the US East Coast through Wed 10 Jan before moving out to the Atlantic.
- The first system is forecast to bring heavy precipitation, a mix of rain and snow, to the Eastern US.
- Given the recent AR that impacted the eastern US, there is an increased threat of flooding throughout this event, with the Weather Prediction Center (WPC) Excessive Rainfall Outlook (ERO) forecasting a Moderate Risk (level 3 of 4, or 40% chance) for flooding for select areas through Tuesday Night.
- The second AR ($IVT > 1200 \text{ kg m}^{-1} \text{ s}^{-1}$ in the core) forms in the Gulf Thu 11 Jan, propagating through the East Coast out over the Atlantic by Fri 12 Jan.
- The NWS WPC is forecasting an additional 1+ inches of rainfall for the region as it progresses up the coast. This continues the threat for flooding throughout the region.

CW3E East Coast AR Outlook: 8 Jan 2024

GFS Init 12Z Tue 8 Jan 2024

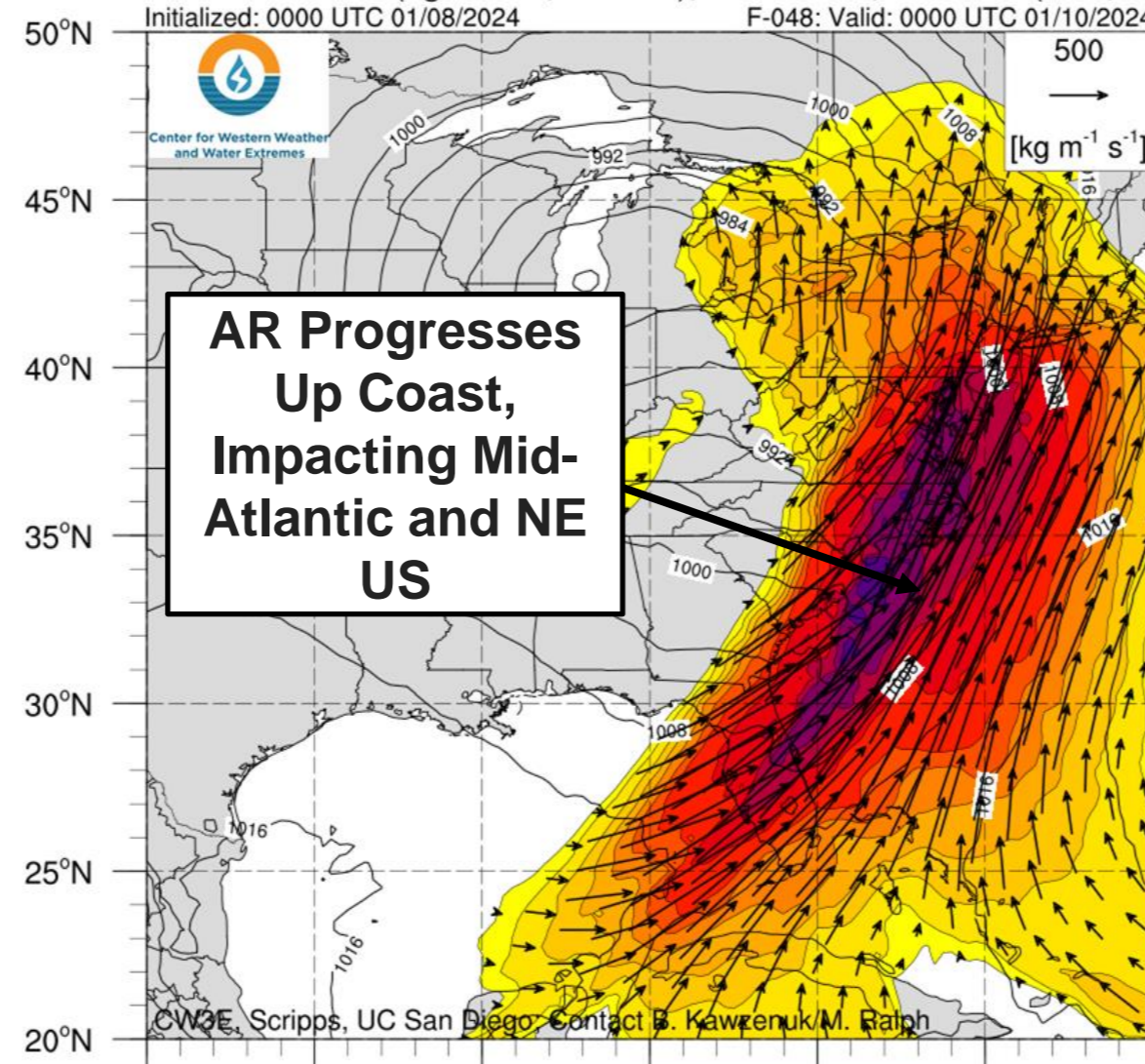
4PM PT Mon 08 Jan 2024

NCEP GFS IVT ($\text{kg m}^{-1} \text{s}^{-1}$; shaded), IVT Vector, and SLP (hPa; contours)
Initialized: 0000 UTC 01/08/2024 F-024: Valid: 0000 UTC 01/09/2024



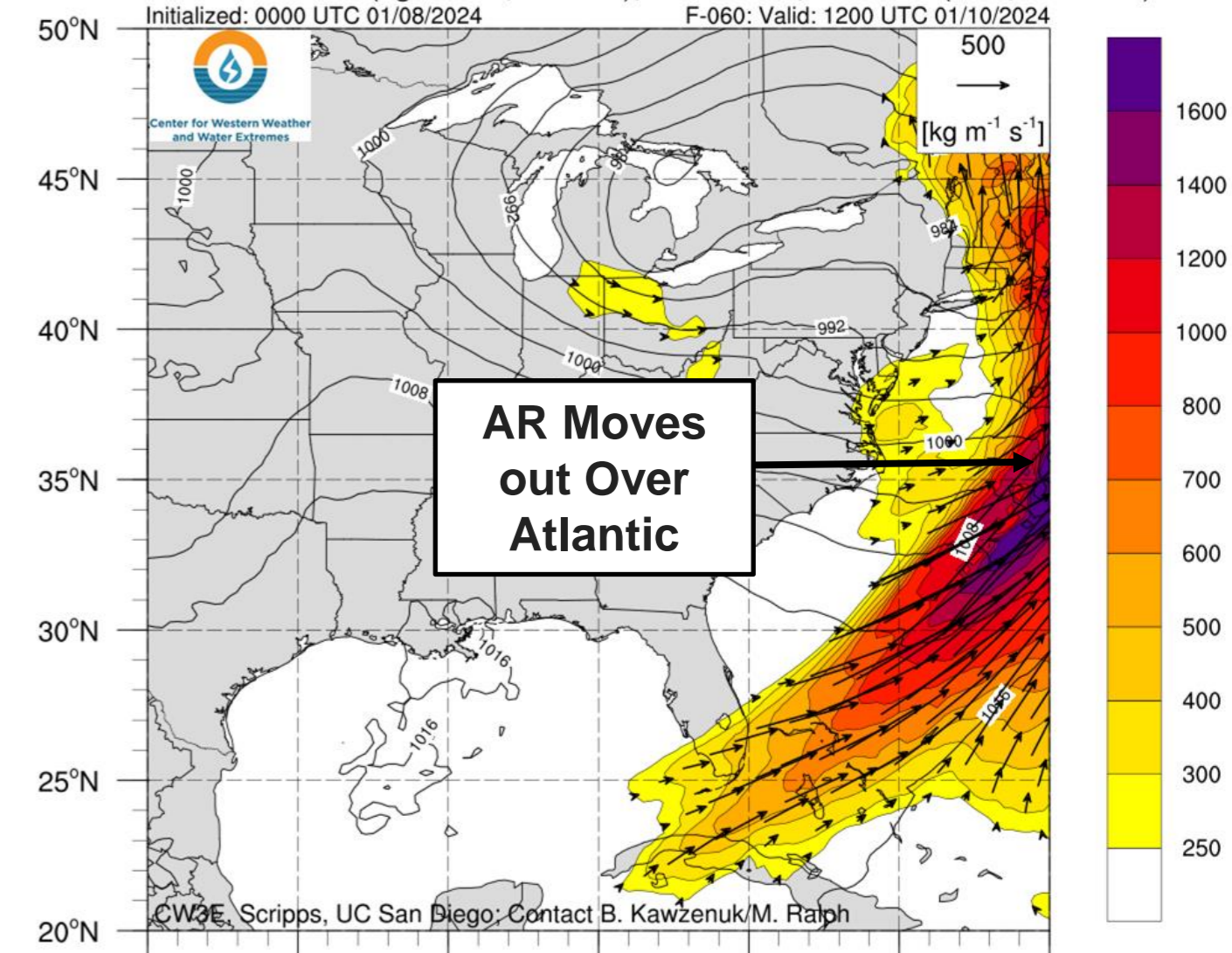
4PM PT Tue 09 Jan 2024

NCEP GFS IVT ($\text{kg m}^{-1} \text{s}^{-1}$; shaded), IVT Vector, and SLP (hPa; contours)
Initialized: 0000 UTC 01/08/2024 F-048: Valid: 0000 UTC 01/10/2024



4AM PT Wed 10 Jan 2024

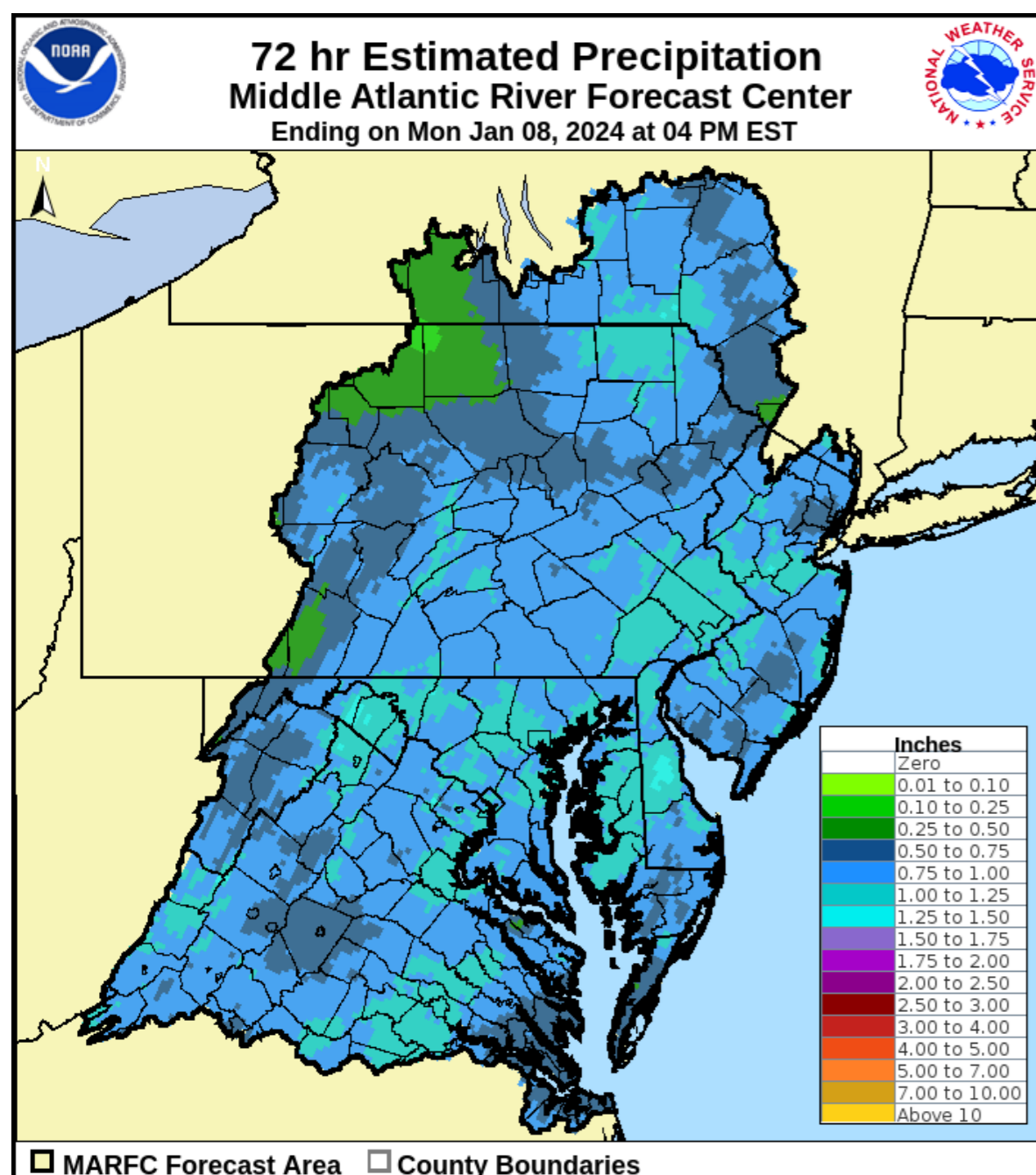
NCEP GFS IVT ($\text{kg m}^{-1} \text{s}^{-1}$; shaded), IVT Vector, and SLP (hPa; contours)
Initialized: 0000 UTC 01/08/2024 F-060: Valid: 1200 UTC 01/10/2024



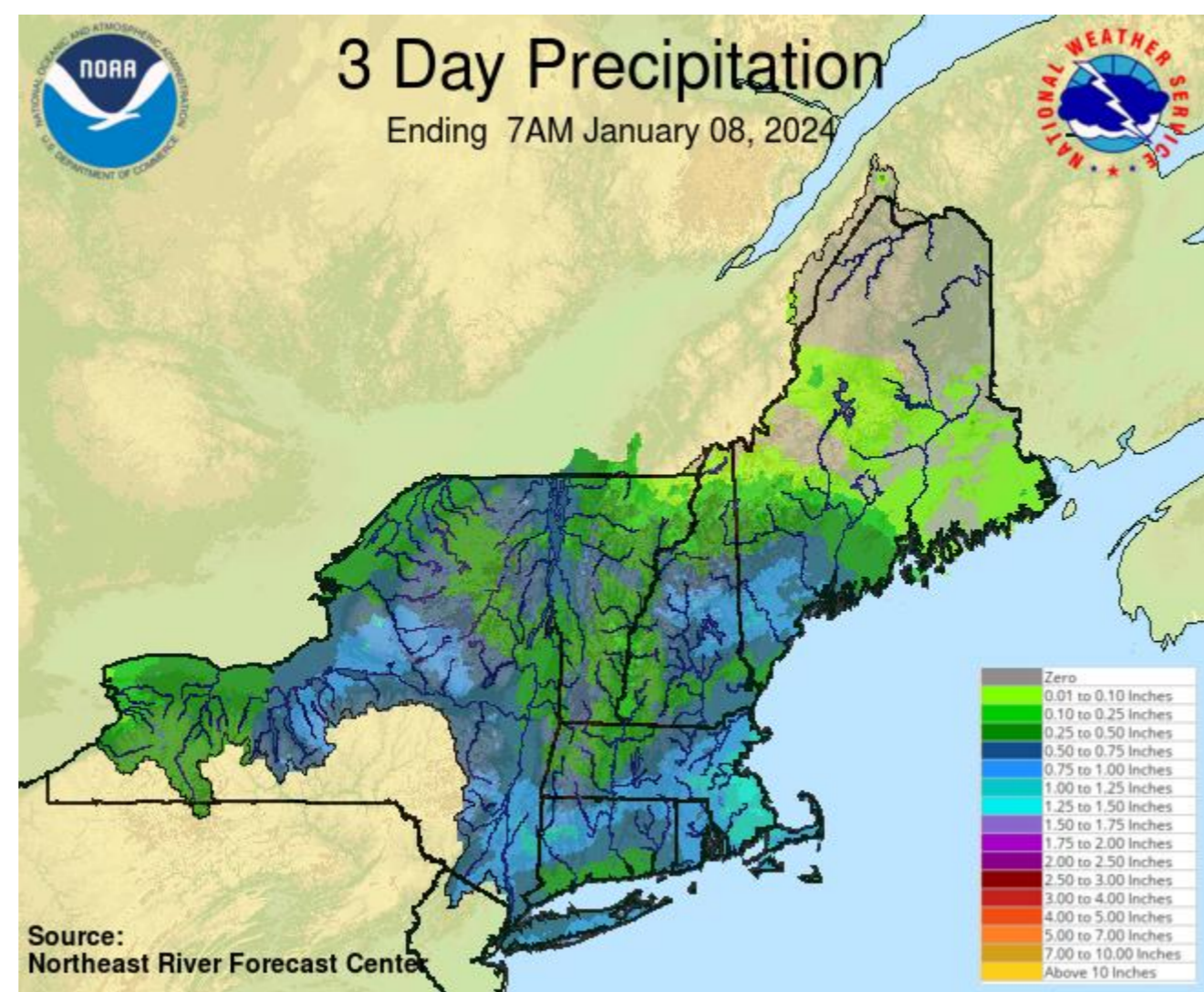
- The first event is associated with a stronger AR ($\text{IVT} > 1200 \text{ kg m}^{-1} \text{s}^{-1}$ in the core) and low pressure system. The AR progresses up the East Coast from Mon 8 Jan into Wed 10 Jan.
- The elevated moisture brought to the East Coast with this AR provides a source for heavy precipitation throughout the Eastern US.

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Antecedent Conditions

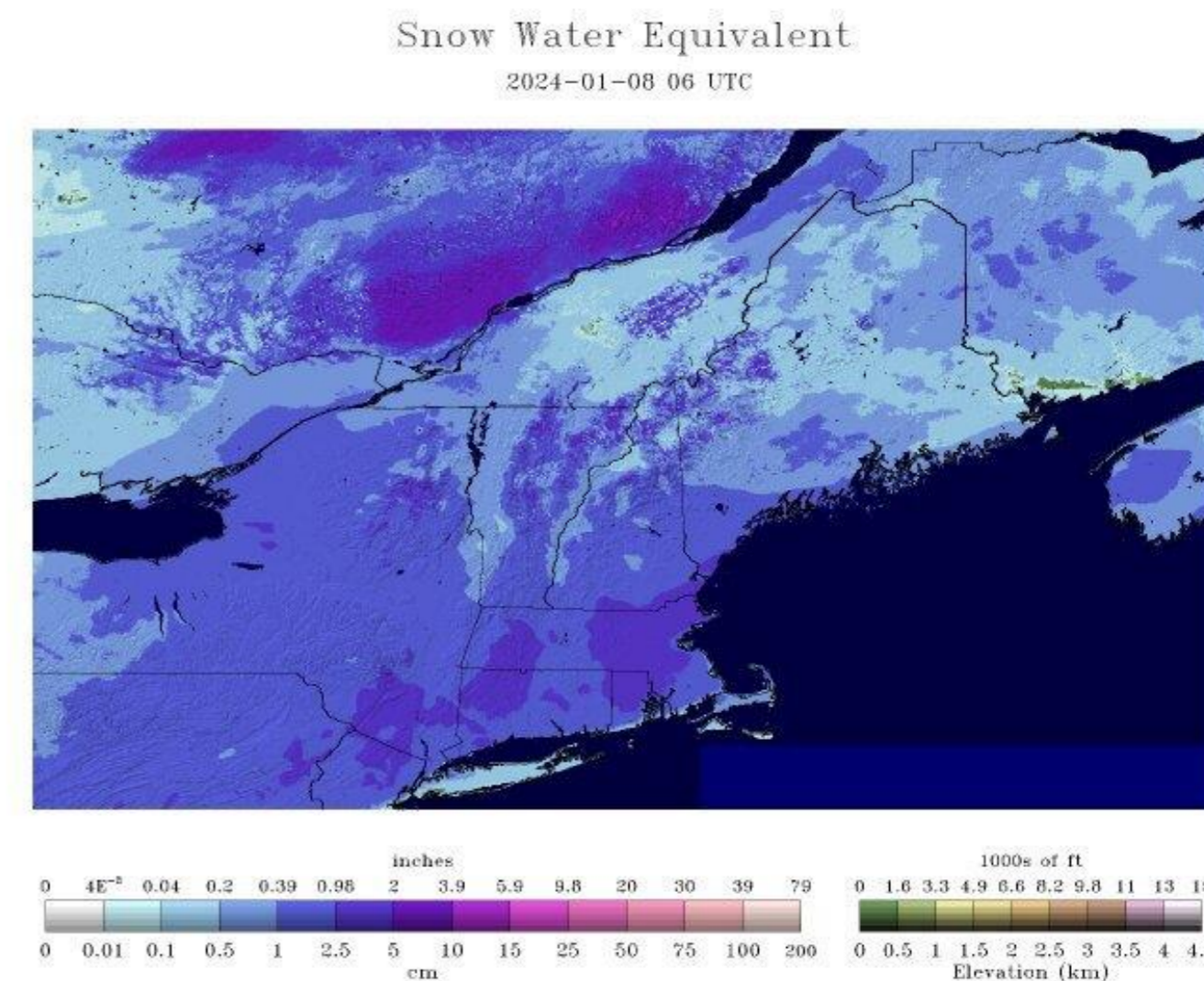


Source: MARFC; https://www.weather.gov/marfc/Multisensor_Precipitation



Source: NERFC; <https://www.weather.gov/nerfc/ObservedPrecipitation>

National Snow Water Analysis
OFFICE OF WATER PREDICTION
OWP

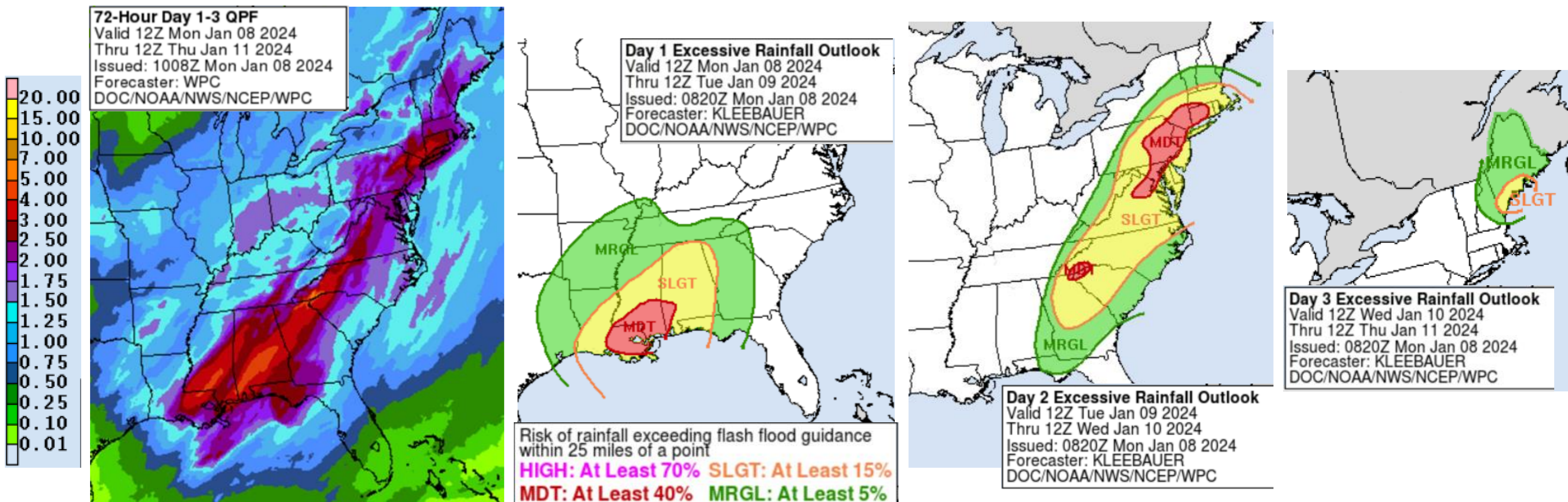


Source: OWP; <https://www.noahsc.noaa.gov/nsa/>

- The previous event that impacted the East Coast on Sat 6 Jan brought widespread precipitation and snowfall.
- Given the antecedent conditions, the forecasted heavy rainfall poses a flooding threat to the regions that received well over an inch of rain as well as rain-on-snow flooding concerns to areas throughout the Northeast.

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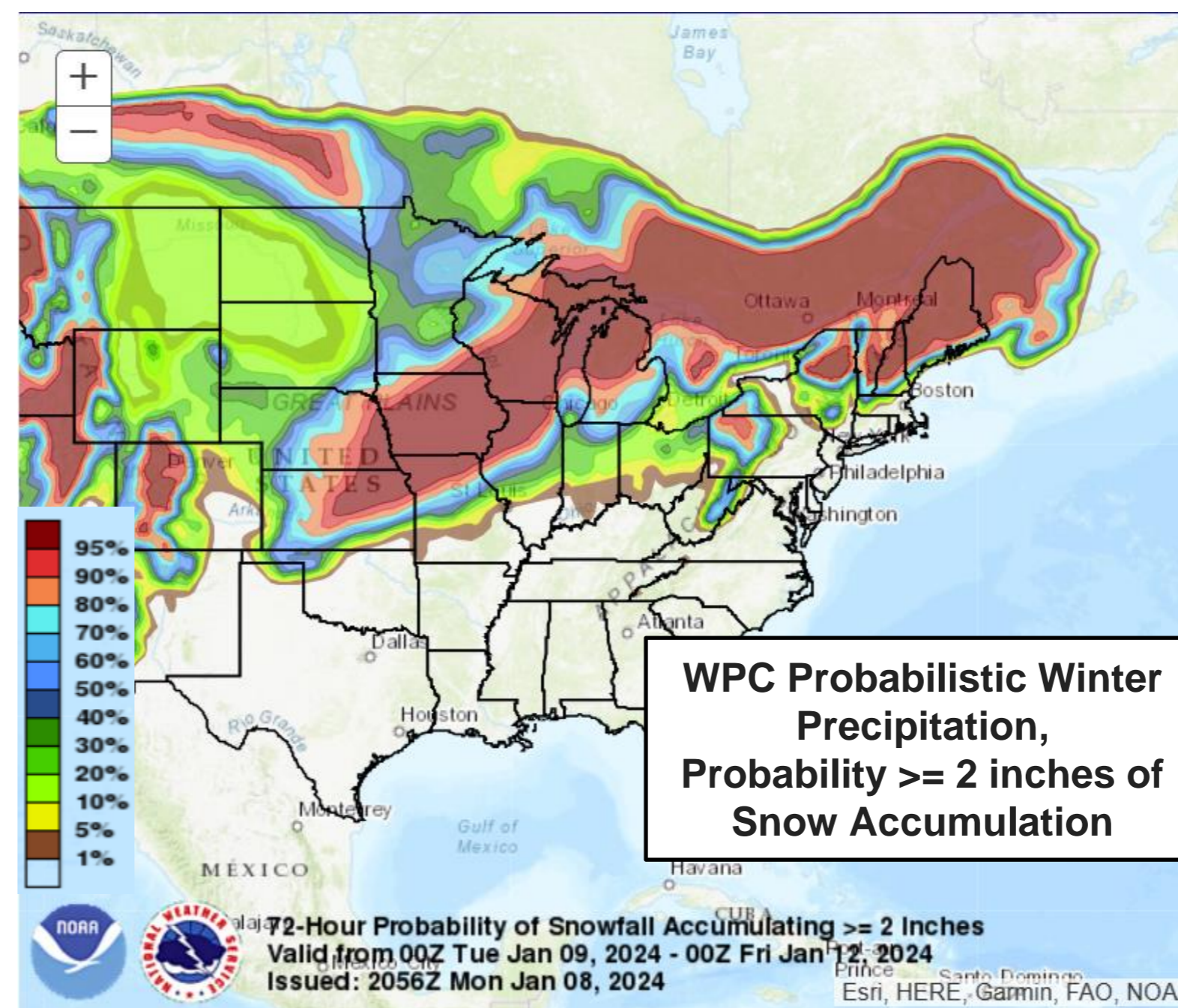
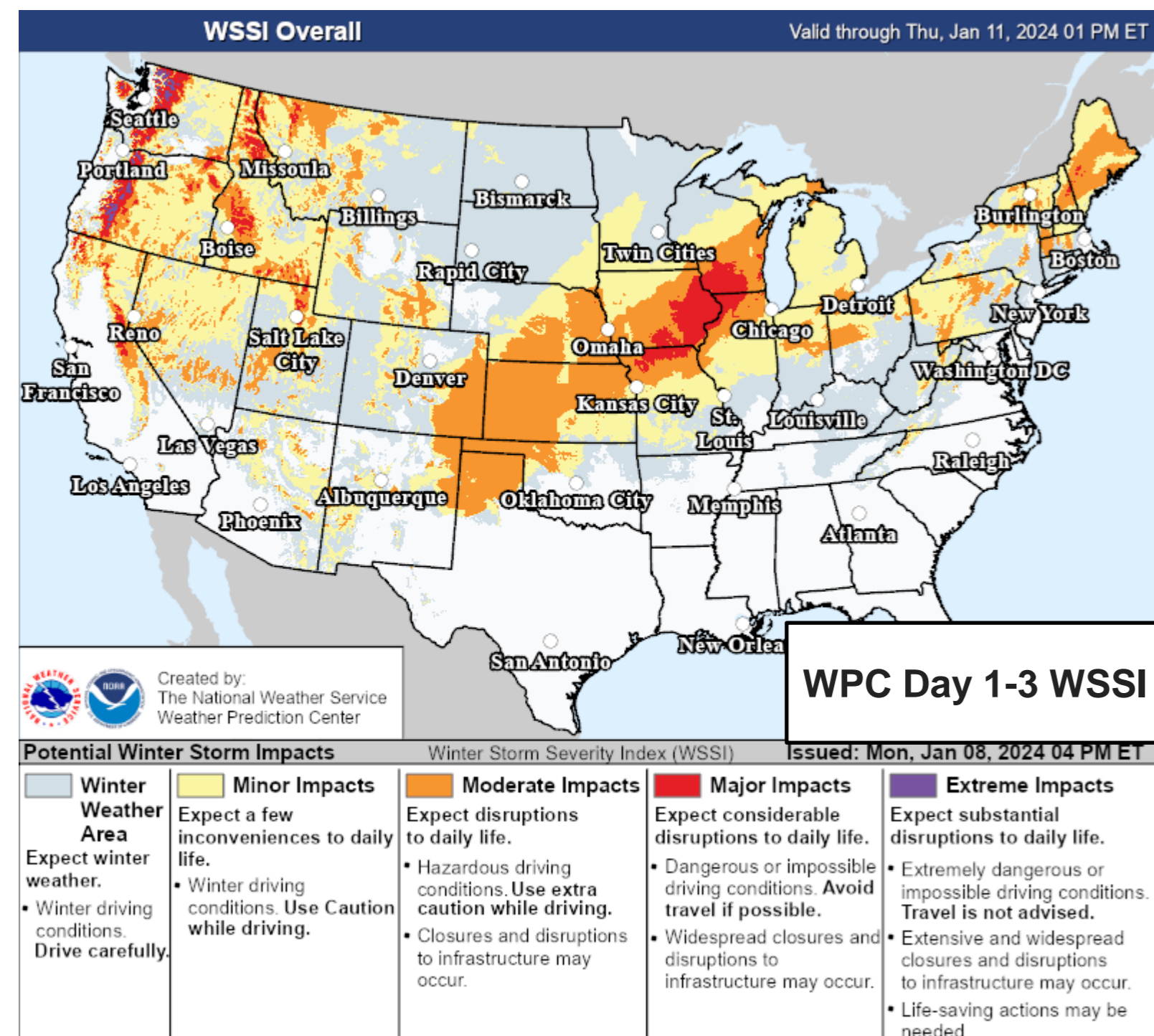
WPC Day 1-3 QPF and Days 1-3 Excessive Rainfall Outlook



- Precipitation is forecast to exceed 1.5 inches for much of the Eastern Seaboard, with the highest precipitation totals above 3 inches in the Southeastern US and NYC Metro regions.
- The WPC ERO indicates a Moderate Risk (level 3 of 4, or at least a 40% chance) for rainfall to exceed flash flood guidance for S. LA and MS on Day 1 and the Charlotte Metro, Mid-Atlantic and NYC Metro regions on Day 2.

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First Event WPC Winter Weather



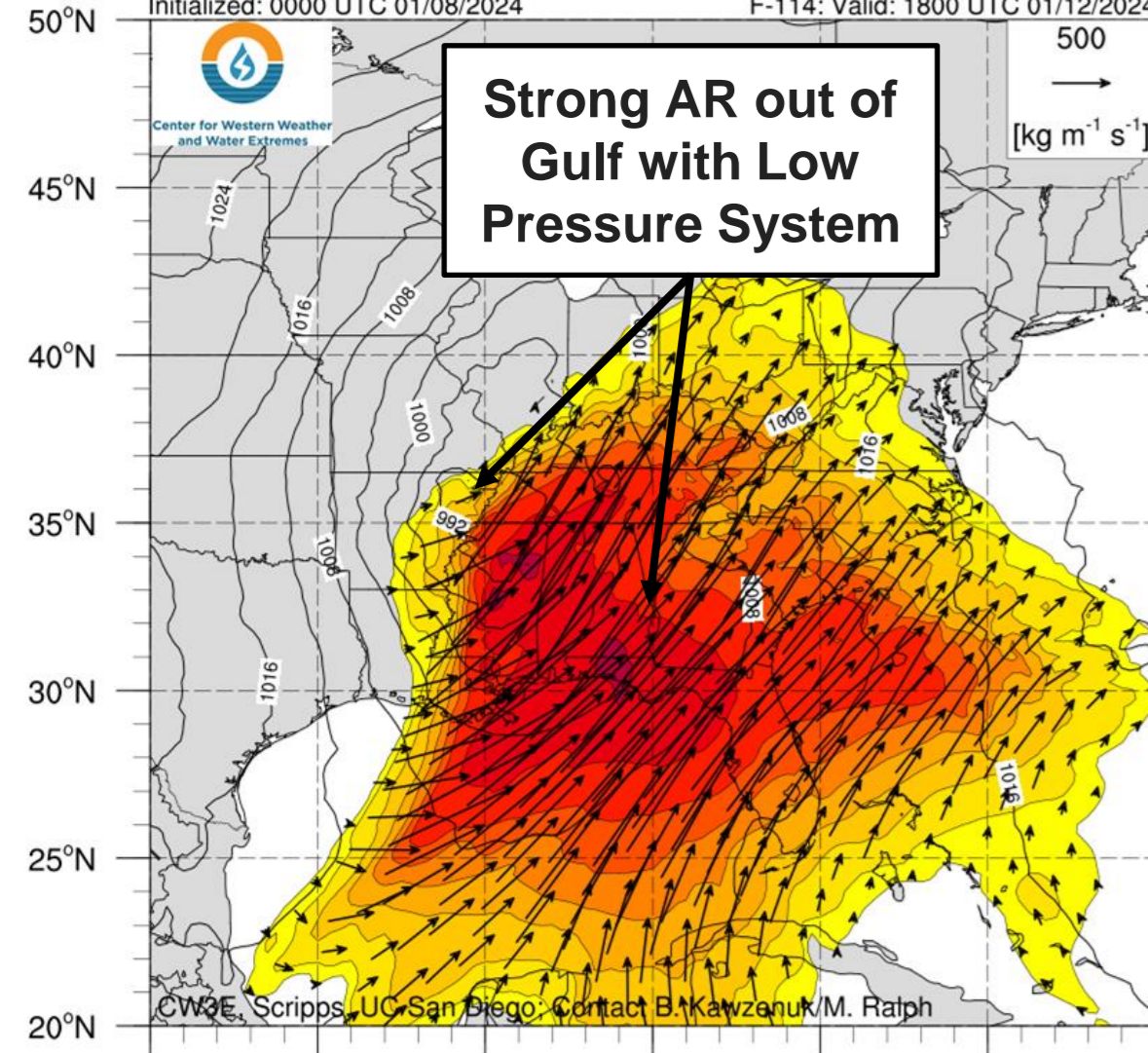
- WPC's Winter Storm Severity Index is indicating **Moderate Impacts** to be expected throughout the Midwest and in northern New England with this event.
- WPC's probabilistic winter precipitation product is forecasting high probabilities of snowfall accumulations \geq 2 inches in the regions expected to receive moderate winter storm impacts.

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GFS Init 12Z Tue 8 Jan 2024

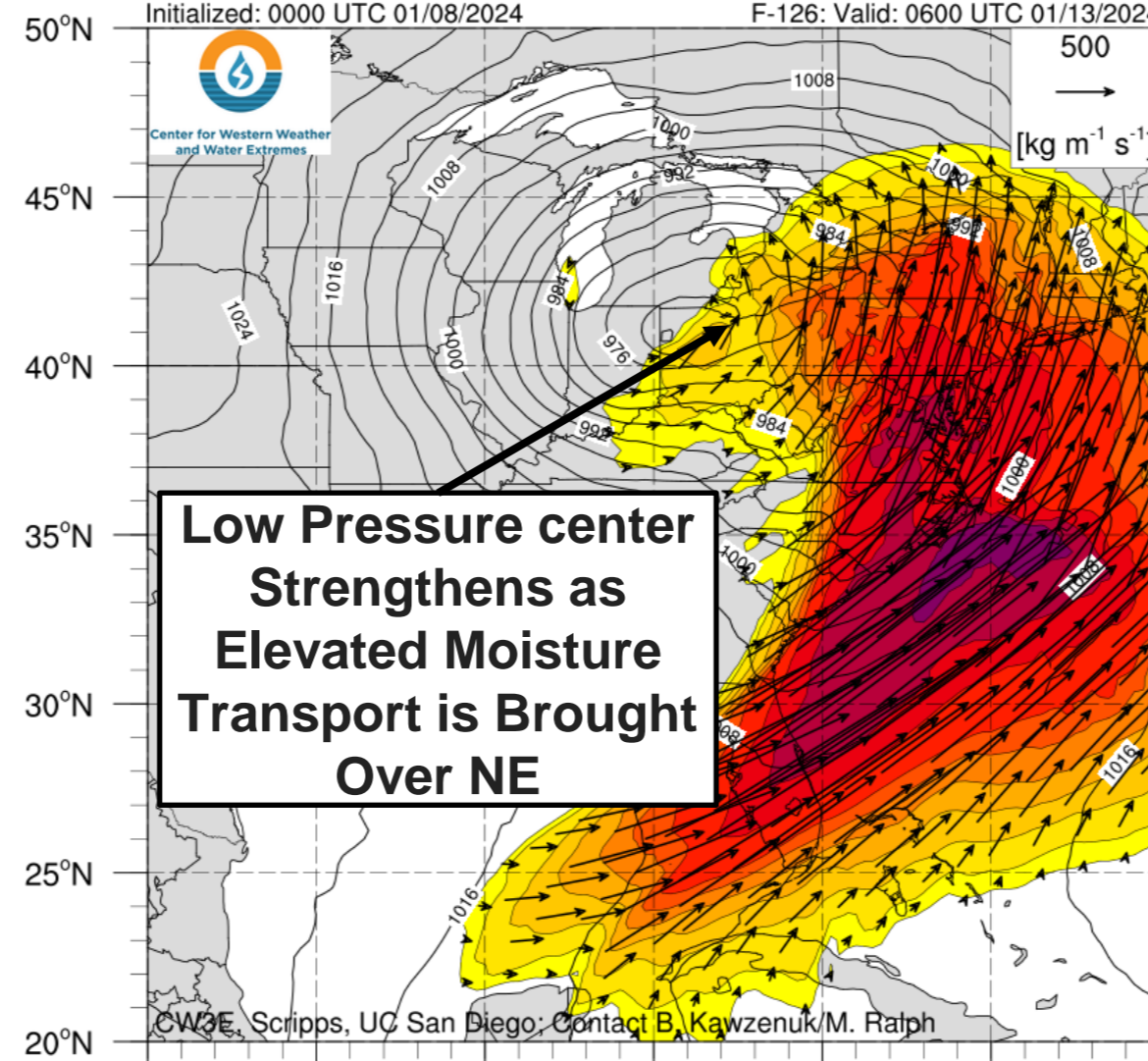
10AM PT Fri 12 Jan 2024

NCEP GFS IVT ($\text{kg m}^{-1} \text{s}^{-1}$; shaded), IVT Vector, and SLP (hPa; contours)
Initialized: 0000 UTC 01/08/2024 F-114: Valid: 1800 UTC 01/12/2024



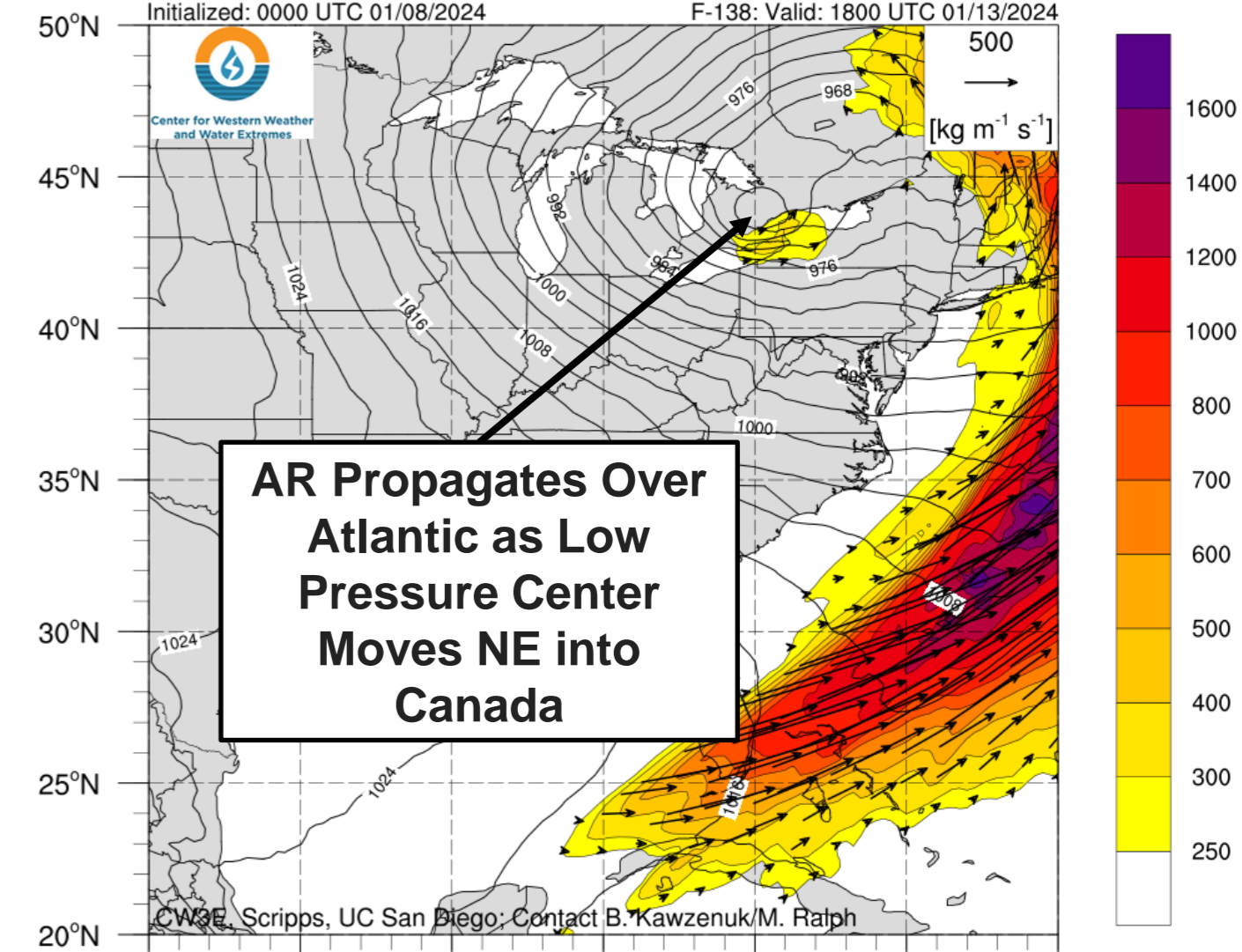
10PM PT Fri 12 Jan 2024

NCEP GFS IVT ($\text{kg m}^{-1} \text{s}^{-1}$; shaded), IVT Vector, and SLP (hPa; contours)
Initialized: 0000 UTC 01/08/2024 F-126: Valid: 0600 UTC 01/13/2024



10AM PT Sat 13 Jan 2024

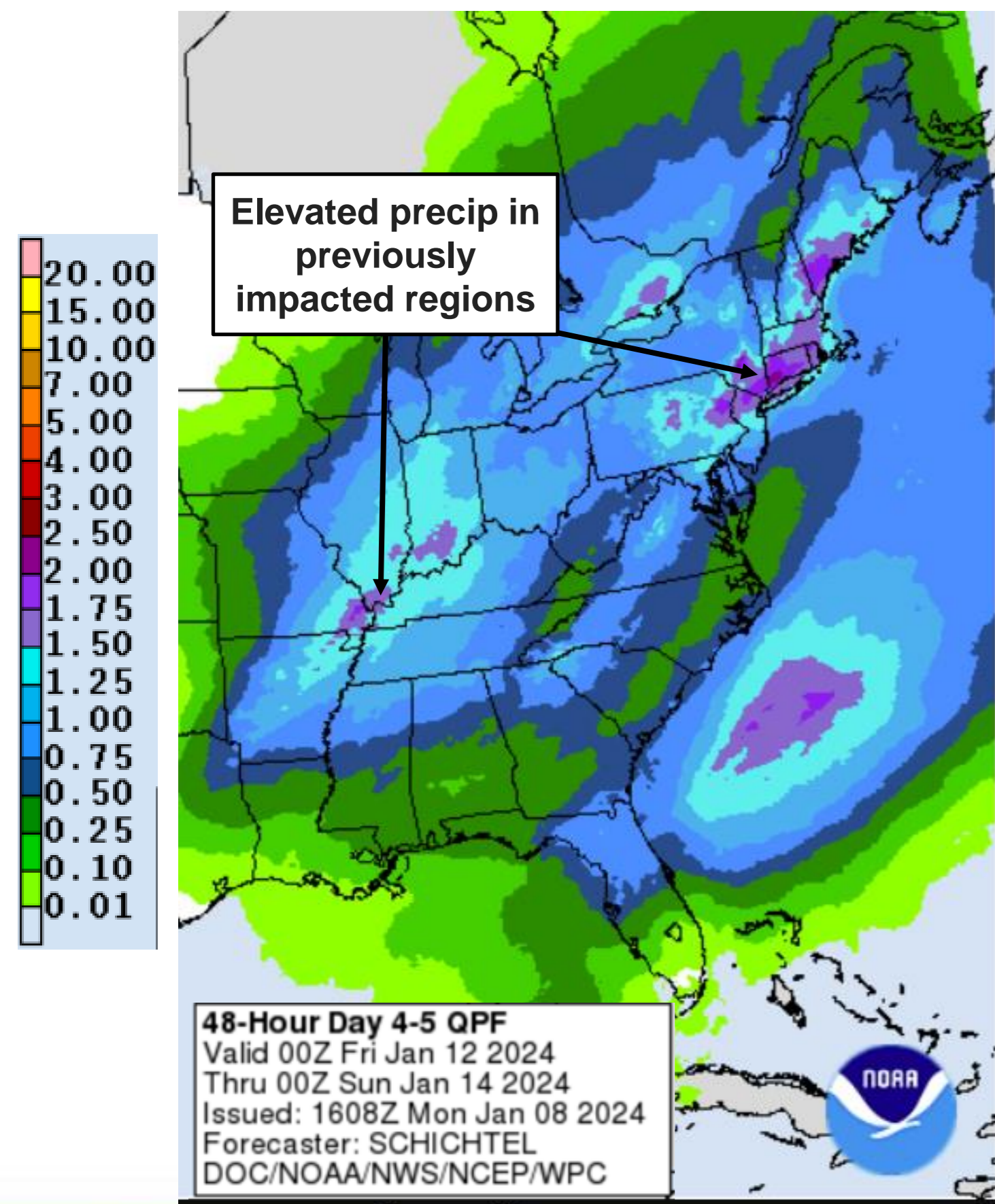
NCEP GFS IVT ($\text{kg m}^{-1} \text{s}^{-1}$; shaded), IVT Vector, and SLP (hPa; contours)
Initialized: 0000 UTC 01/08/2024 F-138: Valid: 1800 UTC 01/13/2024



- A second strong AR and low pressure system are expected to impact the Eastern US Fri 12 Jan through Sat 13 Jan.
- This is expected to provide more heavy precipitation to the region following two heavy precipitation events earlier in the week, presenting further hazards.

CW3E East Coast AR Outlook: 8 Jan 2024

WPC Day 4-5 QPF and Day 5 Excessive Rainfall Outlook

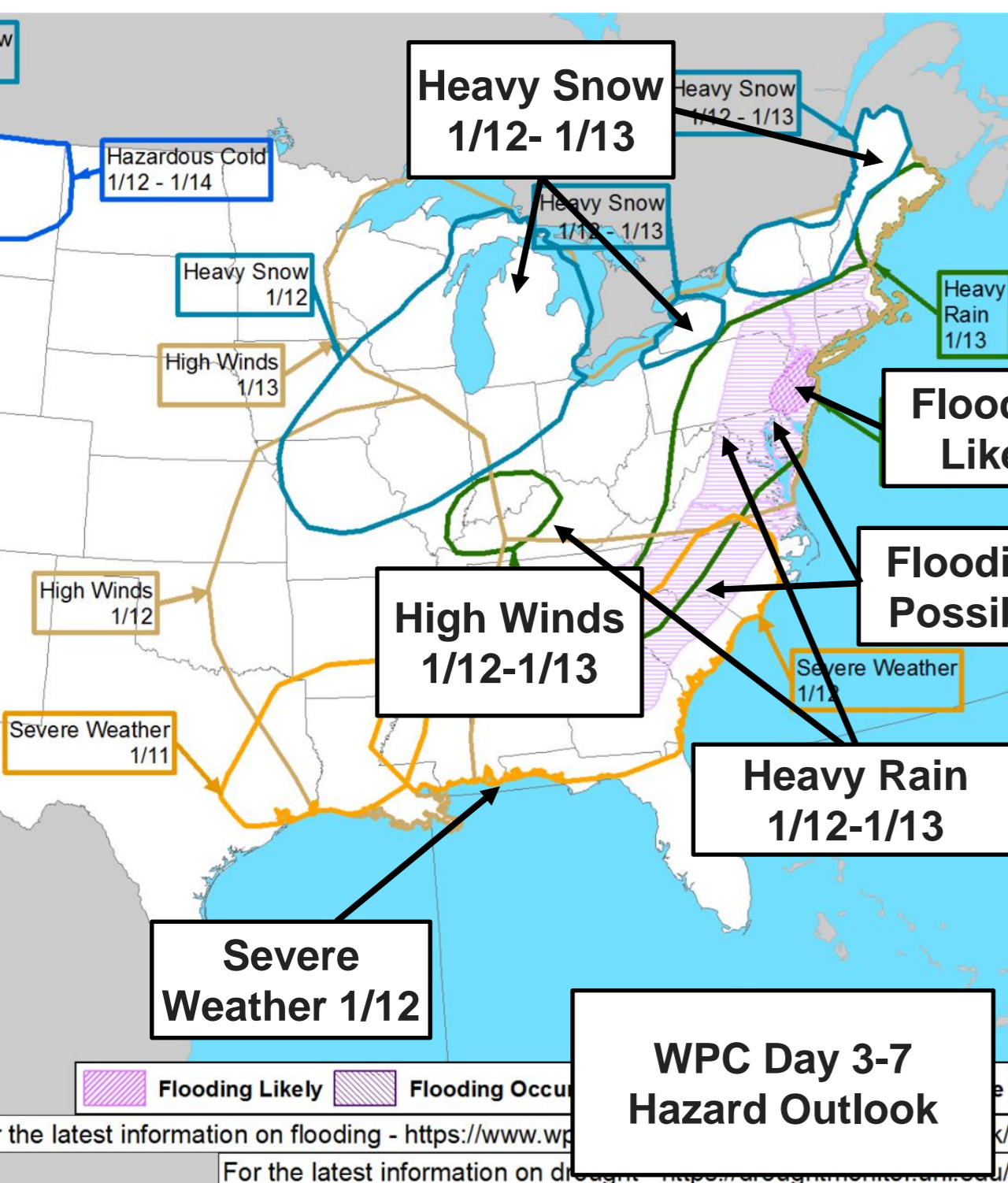


Source: WPC; <https://www.wpc.ncep.noaa.gov/index.shtml#page=www>

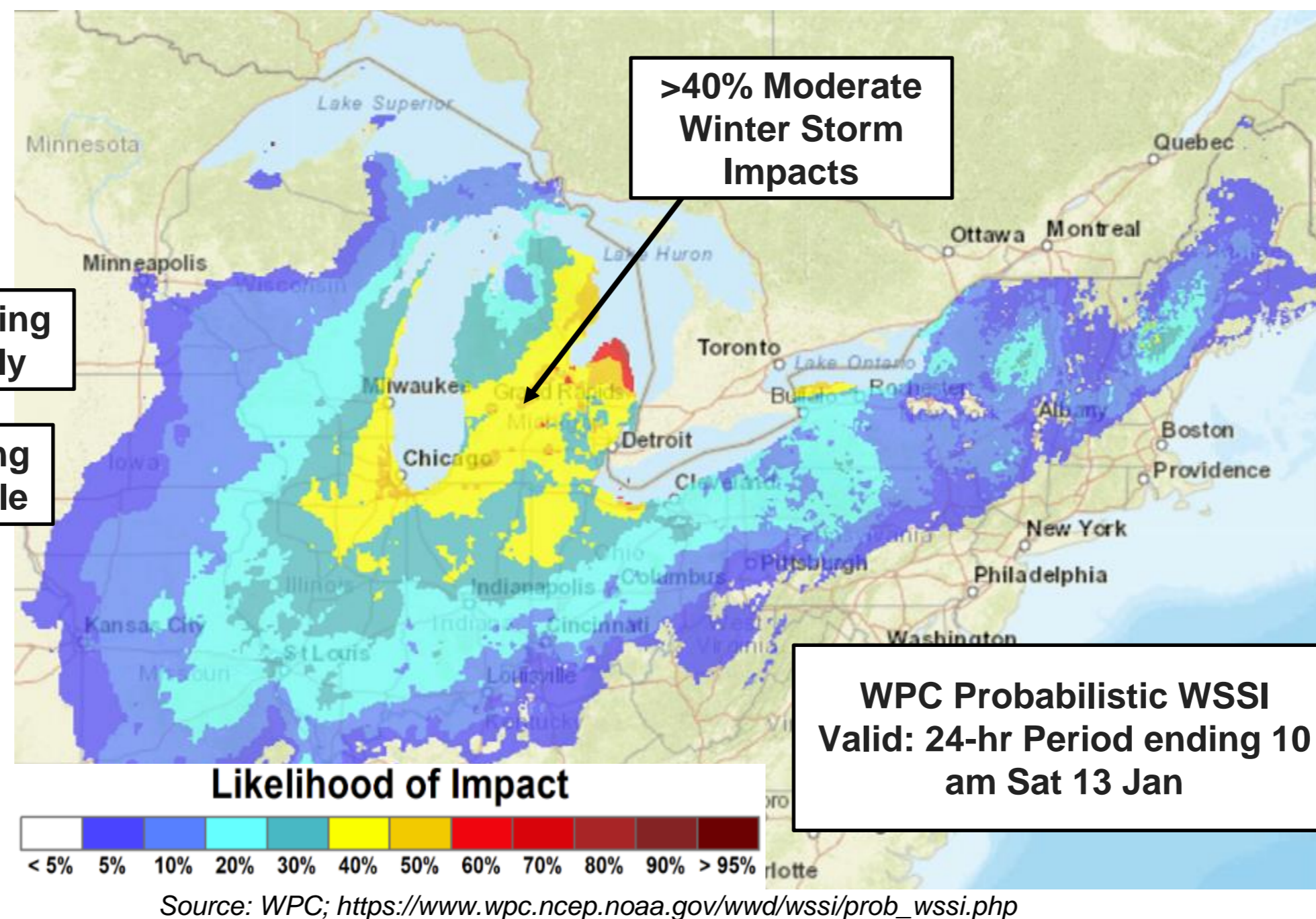
- Precipitation is forecast to exceed 1.5 inches in the Midwest, New England, NE PA and N NJ for during the duration of this event through days 4 and 5.
- The WPC ERO indicates a Slight Risk (level 2 of 4, or 15% chance) for rainfall to exceed flash flood guidance for part of the NE which is forecast to also receive heavy rainfall with the first event.

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Second Event WPC Impact Forecasts



Source: WPC; <https://www.wpc.ncep.noaa.gov/threats/threats.php>



- For the second AR, WPC's Day 3-7 Hazards Outlook is highlighting moderate risks of **severe weather** along the Gulf Coast and SEUS Coast; **heavy snow** in the Midwest, Great Lakes, and N. New England; **heavy rain** in the Mid-Atlantic, New England Coast and Midwest; **high winds** throughout the Eastern US, and **likely flooding** in the Delaware River Basin.
- WPC's probabilistic WSSI is forecasting > 40% chance for moderate impacts throughout Michigan and along the coast of the Great Lakes.