



The start of the NWS “Key Messages” concept at CPC: Background, process and examples

Jon Gottschalck¹, Johnna Infanti, Cory Baggett,
Scott Handel, Adam Hartman, Melissa Ou and Brad Pugh

¹Chief, Operational Prediction Branch
NOAA / NWS / Climate Prediction Center

Climate Prediction and Applications Science Workshop
May 9-11, 2023
Asheville, NC



Background



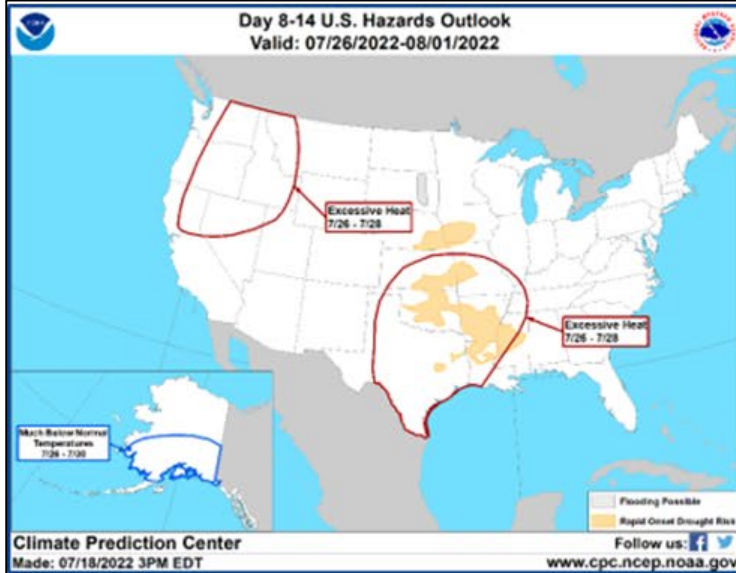
- ✓ Some NCEP centers such as NHC and WPC have for a few years been preparing “Key Messages” (KM) value-added products informed from official outlooks and information
- ✓ CPC initiated a group activity in 2022 to outline how the KM concept could be launched with respect to short-term climate events
- ✓ The objective of the activity is to provide impact-focused, concise, key information for potential upcoming events in a simple, easy to understand format
- ✓ CPC coordinates / collaborates closely with the NWS regions (*i.e.*, ROCs, regional CSPMs), WPC and other NWS core partners before releasing this product



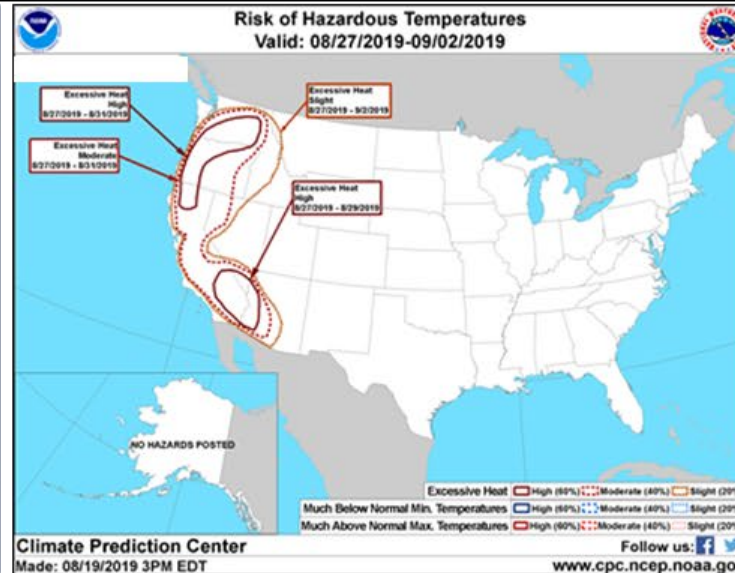
Focus for CPC Key Messages



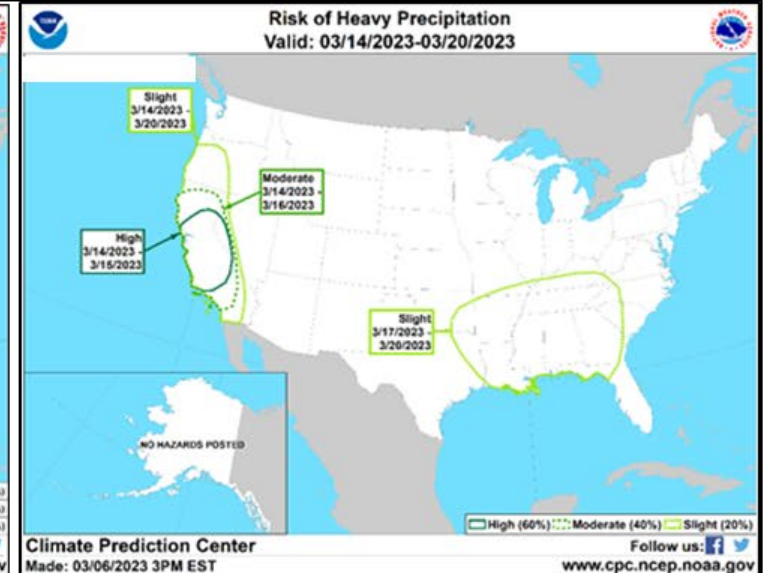
Week-2 U.S. Hazards Outlook (HAF)



Composite Map



Temperature Related




Precipitation Related

- (1) A high risk of hazardous conditions depicted in the HAF and so significant impacts are implied.
- (2) A moderate risk of hazardous conditions depicted in the HAF and significant impacts are expected depending on regional factors such as antecedent conditions, time of year, etc.

Focus for CPC Key Messages

Week 2-4 Potential Pattern Change (PATC)

- (3) A pattern change is forecast with high confidence during the Week 2-4 target period
- That can either result in significant impacts or a change in regional operations
 - Such pattern changes may be indicated by the Week-2 or Week 3-4 T/P outlooks, 500-hPa heights outlooks or teleconnection indices



Hazardous Cold Temperatures Across the Northern Plains Next Week as High Pressure Builds over Greenland

Effective December 6, 2022 - December 12, 2022

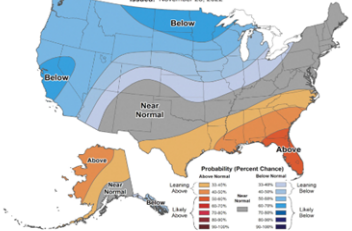
Issued November 28, 2022

Key Messages

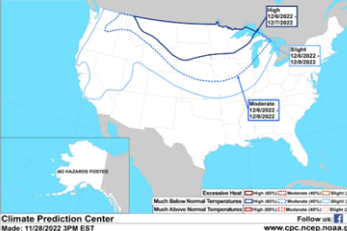
- Cold air is forecast to reinforce across the northern tier of the lower-48 states beginning on December 6th **(a and b)**.
- Sub-zero temperatures are expected across the Northern Plains and Upper Midwest.
- Timing:** The coldest temperatures are expected through December 8th, 2022; with the potential for additional cold air outbreaks through at least mid-December.
- Strong high pressure over Greenland is forecast to develop and remain in place through at least mid-December **(c)**. This pattern, referred to as a “blocking high”, is indicated by the purple line in panel c.
- The blocking high is associated with an anticipated shift to a negative North Atlantic Oscillation (NAO) **(d)**.
- While specific weather events are uncertain at this time, the negative NAO is typically associated with unsettled weather conditions, particularly across the eastern United States.

* For short-term forecasts (prior to December 6), visit www.wpc.ncep.noaa.gov.

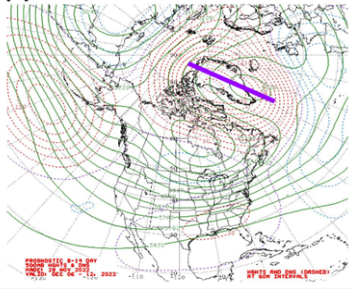
(a) 8-14 Day Temperature Outlook
Valid: December 6 - 12, 2022
Issued: November 28, 2022



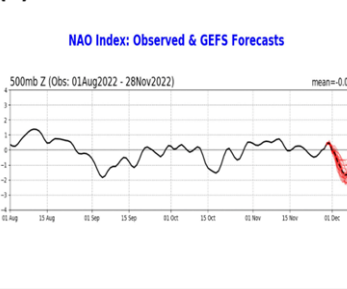
(b) Risk of Hazardous Temperatures
Valid: 12/06/2022-12/12/2022
****Experimental****




(c)



(d) NAO Index: Observed & GEFS Forecasts





Climate Prediction Center
www.cpc.ncep.noaa.gov

Key Messages are subject to change throughout the week given updates from forecast tools.



Process, Coordination and Audience



CPC KM Process and Launch Schedule:

- ✓ KM lead identified each week on the CPC OPB forecast schedule
- ✓ KM group meets at 11 AM ET Monday's with the HAF forecaster to discuss the preliminary HAF outlook thinking and a decision is made if a KM may be justified / needed
- ✓ CPC daily 1 PM forecast discussion – able to coordinate with regular participants as well as invite regional SMEs to help decide
- ✓ If so, the KM lead drafts content and the KM group reviews and finalizes draft at 1- 2 PM ET
- ✓ KM sent to partners for review and suggestions
- ✓ After feedback, KM modified and final staging / dissemination typically occurs between 3-4 PM ET after operational outlooks that informed the KM have already been released

Target audience:

- NWS (ROCs, WFOs)
- CPC core partners, state and local entities
- Other decision makers in the agriculture, energy, water resources, emergency management financial sectors
- Media, general public



CPC Key Message HAF – December 12, 2022



Bitterly Cold Temperatures Likely to Impact Much of the Lower 48 States Heading into the Holiday Season

Issued December 12, 2022

Effective December 20 - 26, 2022

KEY MESSAGES

Very cold Arctic air masses will envelop the nation during the week 2 period (a) including the busy holiday travel season.

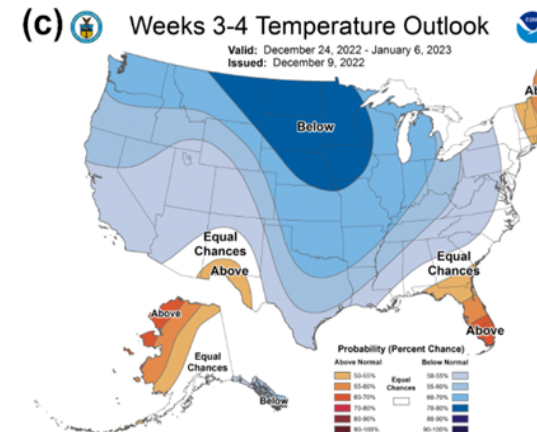
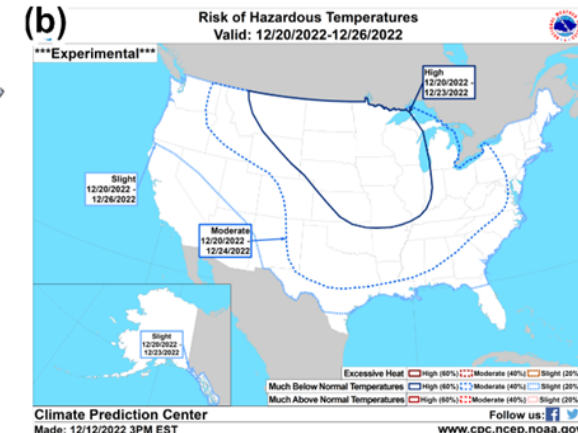
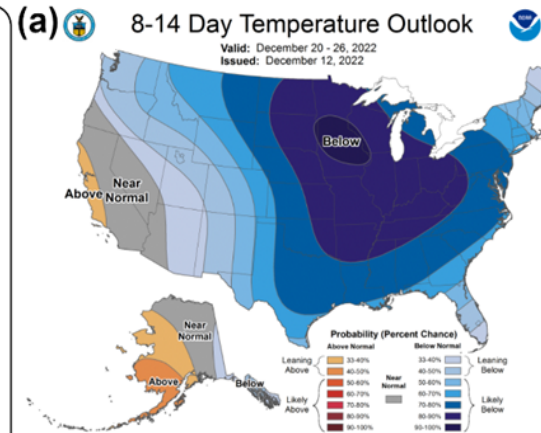
Temperatures in the negative teens are possible in the Northern Rockies and Northern Plains, with sub-zero temperatures reaching as far south as the Central Plains (b).

Areas farther south and east, such as the Great Lakes, Ohio Valley, Mid-Atlantic, and Northeast are favored to have temperatures reach the single digits and teens. Well below freezing temperatures are also expected throughout the Southern Plains and Southeast.

Timing: Leading up to* and continuing from December 20, 2022 - December 26, 2022. The cold is expected to move southward then eastward as the Week-2 period progresses.

The upper level pattern is favorable to sending several bitterly cold Arctic air masses southward into the lower 48 states that may persist into week 3 (c).

* For short-term forecasts (prior to December 20), visit www.wpc.ncep.noaa.gov and weather.gov.



National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Climate Prediction Center
www.cpc.ncep.noaa.gov

***Key messages are subject to change due to changes in forecast information and tools.



CPC Key Message HAF/PATC – January 4, 2023



Hazardous Winds, Snow, and Rain Forecast to Continue over the West Coast, Possibly Exacerbating Flooding Risks

Effective January 12 - 16, 2023

KEY MESSAGES

Persistent mid-level low pressure anchored over the North Pacific led to a series of atmospheric rivers producing heavy low elevation and high elevation snow, high winds, and flooding along the West Coast over the past couple of weeks. This pattern is expected to continue throughout week-1 (January 5-11) and is likely during week-2 (January 12-18), as several more impactful atmospheric river events are expected.

Heavy rain is likely over much of the lower elevations of California. Heavy snow is likely over the higher elevations of northern California. High winds are likely over parts of coastal California and Oregon. Flooding is possible for parts of California (a).

Prolonged heavy rain and accumulated impacts from the recent storms has led to saturated soils and flooding across portions of the Western U.S. High chances of above normal precipitation along the West Coast (b) are expected to increase the risk of prolonged rain and the potential for shallow landslides in some areas. High winds lead to coastal erosion and may exacerbate localized flooding.

Timing: Hazardous conditions are expected to continue through January 12-16, 2023*.

* For short-term forecasts (prior to January 12), visit www.wpc.ncep.noaa.gov and weather.gov.



National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Climate Prediction Center



Reduced Risk of Atmospheric River Events over the West Coast Next Week

Effective January 19 - 25, 2023

KEY MESSAGES

Mid-level ridging is expected to develop and strengthen near the West Coast next week (January 19-25, 2023), leading to below normal precipitation over California. This pattern will potentially provide a welcome break to the heavy rain, snow, and high winds experienced over the past several weeks.

(a) The 8-14 Day 500-hPa heights for January 19-25 2023 indicate mid-level high pressure over the eastern Pacific and West Coast.

(b) The 8-14 Day Precipitation Outlook for January 19-25 2023 highlights increased chances of below normal precipitation over California and near normal precipitation over Oregon and Washington State.

Timing: Reduced risk of hazardous conditions is expected as early as January 19th, 2023*

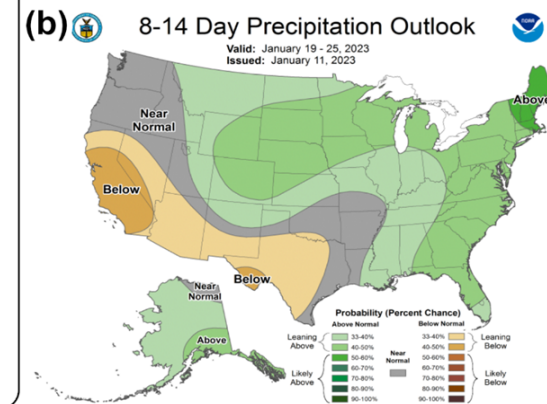
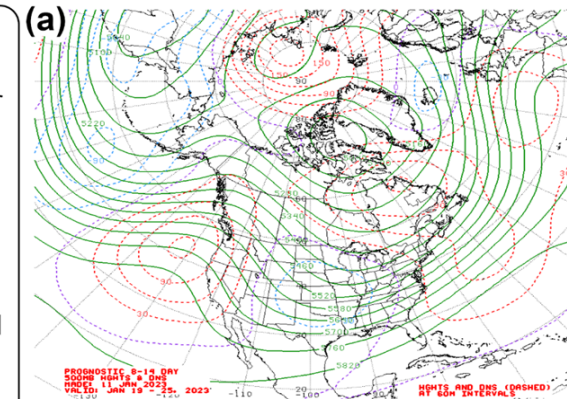
* For short-term forecasts (prior to January 19), visit www.wpc.ncep.noaa.gov and weather.gov.



National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Climate Prediction Center
www.cpc.ncep.noaa.gov

Issued January 4, 2023
Updated January 11, 2023



***Key messages are subject to change due to changes in forecast information and tools.



CPC Key Message PATC – February 24, 2023



Increased Potential for a Major Pattern Change Across the Eastern U.S., with Colder than Normal Conditions Continuing across the Western U.S.

Issued February 24, 2023

Effective March 11 - 24, 2023

KEY MESSAGES

A major pattern change leading to widespread colder than normal temperatures over the lower 48 is anticipated to occur.

Timing: By mid-March over the eastern U.S., ongoing across West.

Following an exceptionally warm January and February across the eastern U.S., there is increasing confidence in a major pattern change leading to colder than normal conditions. Across the western U.S., colder than normal conditions have been in place much of this winter and are expected to continue.

The Weeks 3-4 Temperature Outlook for March 11 - 24 shows enhanced probabilities of below normal temperatures across much of the lower 48.

There is higher than normal confidence in this pattern change as a result of 1) robust circulation patterns in both the Tropics and the Arctic and 2) an ongoing sudden stratospheric warming event that can lead to cold air outbreaks. However, given the current forecast lead time, the eventual weather and potential impacts during this period remain uncertain at this time.

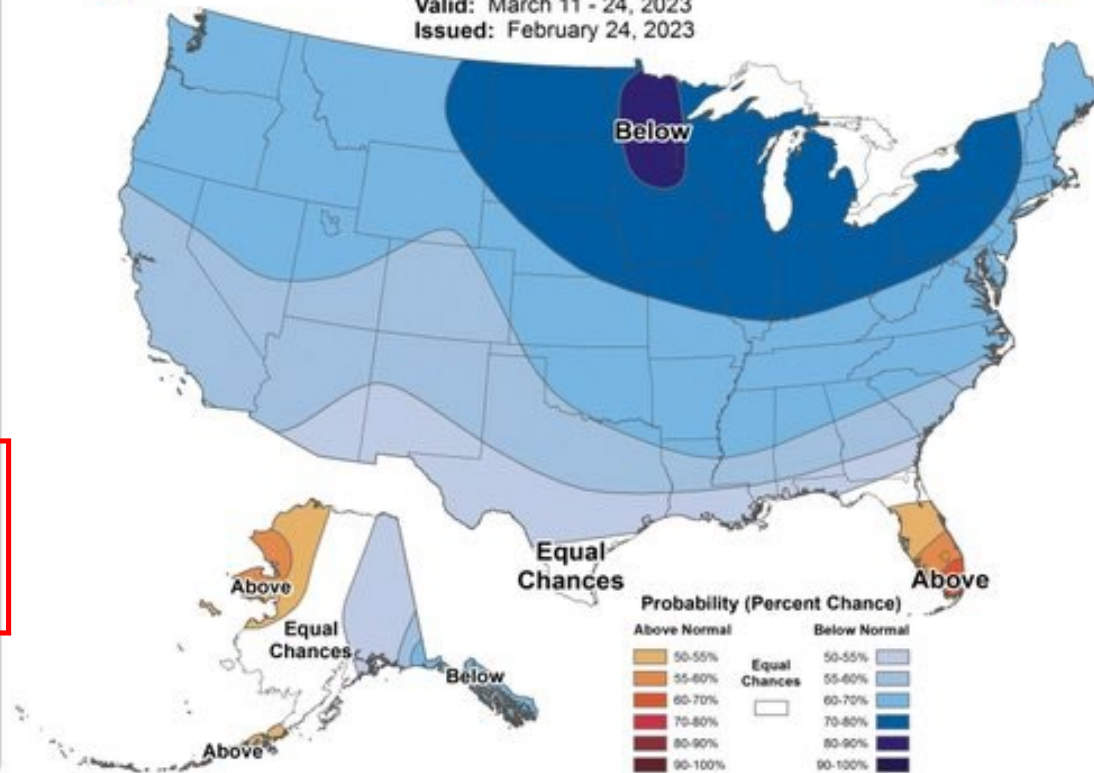
For more background information on sudden stratospheric warmings, please visit: <https://www.climate.gov/news-features/event-tracker/disrupted-polar-vortex-brings-sudden-stratospheric-warming-february>



Weeks 3-4 Temperature Outlook



Valid: March 11 - 24, 2023
Issued: February 24, 2023



National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Climate Prediction Center
www.cpc.ncep.noaa.gov

***Key messages are subject to change due to changes in forecast information and tools.



CPC Key Message PATC – February 24, 2023



NWS State College @NWSStateCollege

👉 Increased Potential for Major Pattern Change From Warm to Cold Across the Eastern U.S. by mid-March

📈 Temp Outlook: 60–80% chance of below normal temperatures in CPA

🌱 Risk to vegetation leafing-out much earlier than normal due to exceptionally mild Jan-Feb.

@NWSCPC @USANPN

5:31 AM · Feb 28, 2023 · 4,883 Views

10 Retweets 2 Quotes 35 Likes

NWS State College, PA Tweet February 28, 2023

Freeze Probability

On the 3-4 week time scale, the Climate Prediction Center is indicating a swing to colder than normal temperatures, so chance of frost could go up.

For the next few weeks, the most likely chance of frost is around March 5 (this map shows one model for one run)

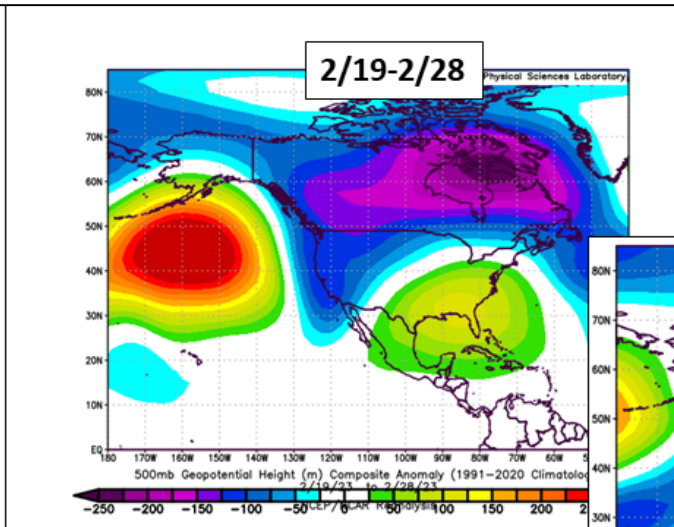
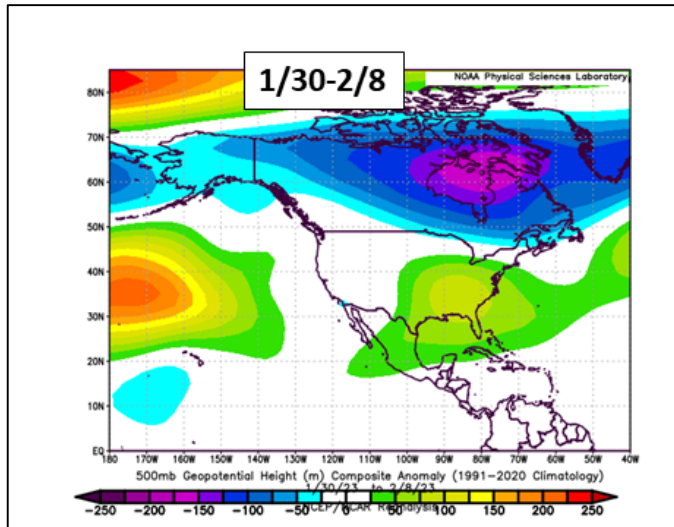
Southeast Climate Monthly Webinar February 28, 2023 Pam Knox (Agricultural Climatologist)



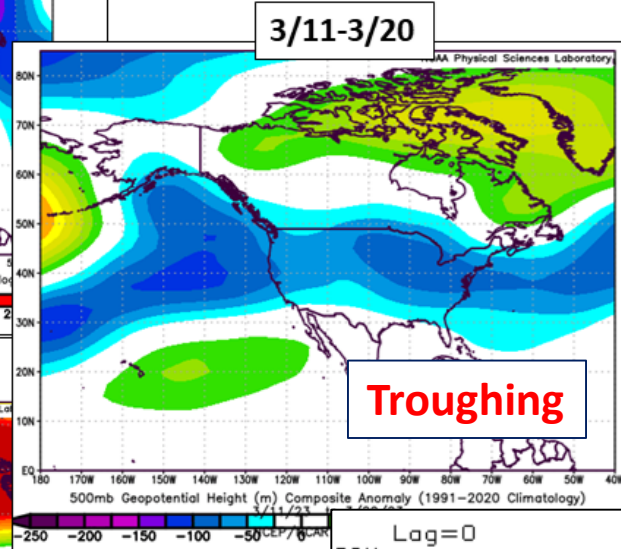
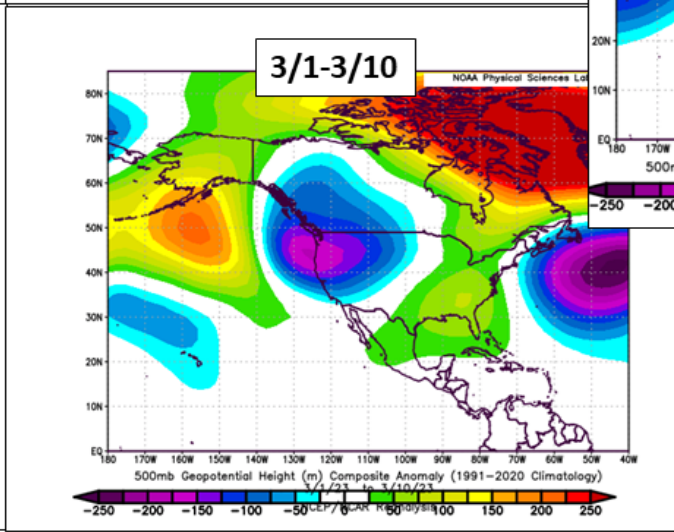
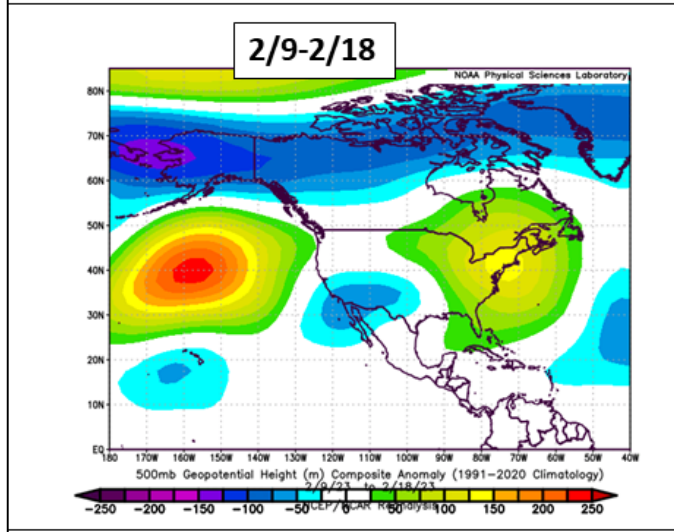
CPC Key Message PATC – February 24, 2023



10-day mean 500-hPa height anomalies from late January through mid-March 2023

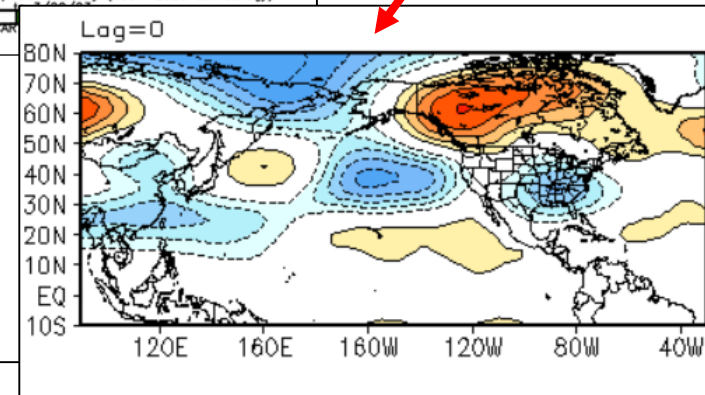


+departures (green → red)
-departures (blue → purple)



Trouching

MJO Phase 1
200-hPa Height
Composite
(FMA; no lag)

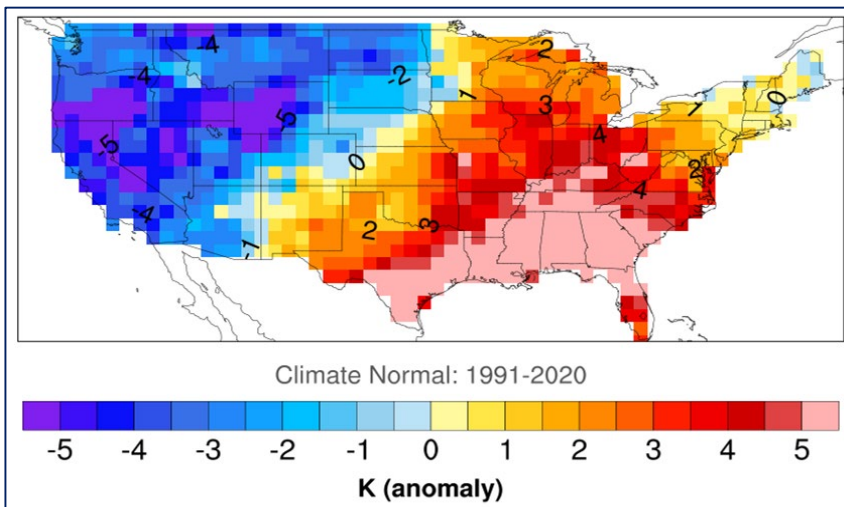




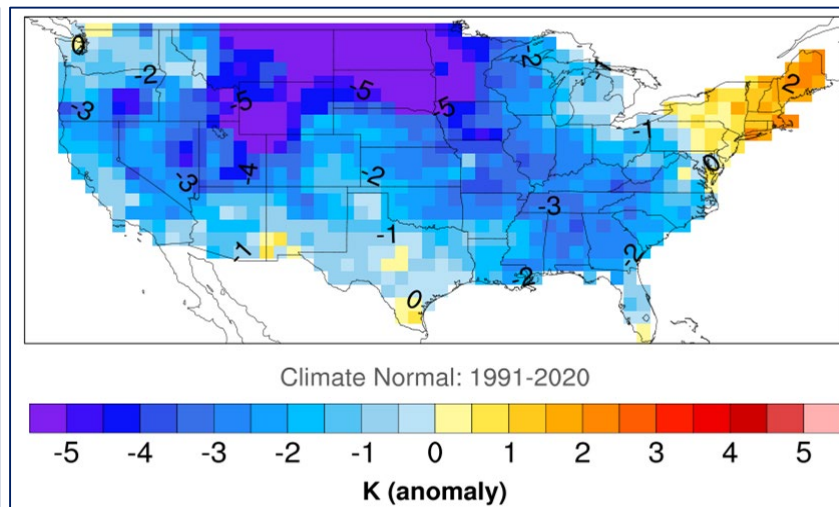
CPC Key Message PATC – February 24, 2023



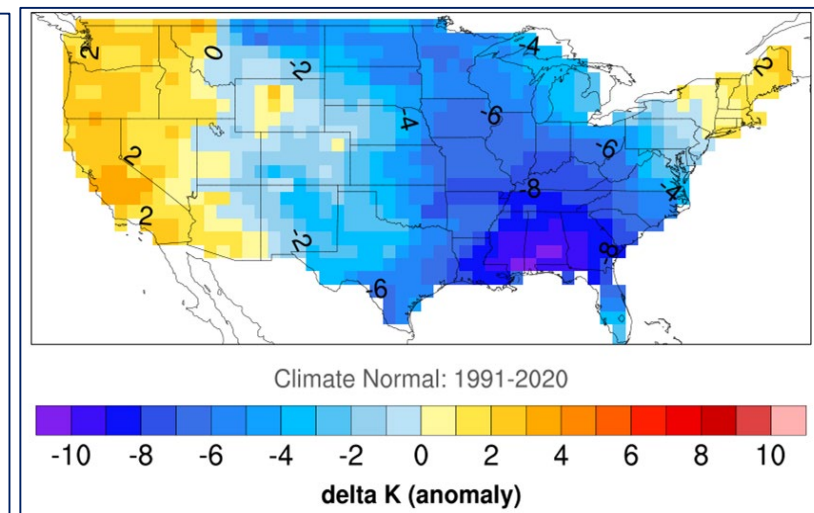
2-m Temperature Anomaly
14-day period beginning 20230225



2-m Temperature Anomaly
14-day period beginning 20230311



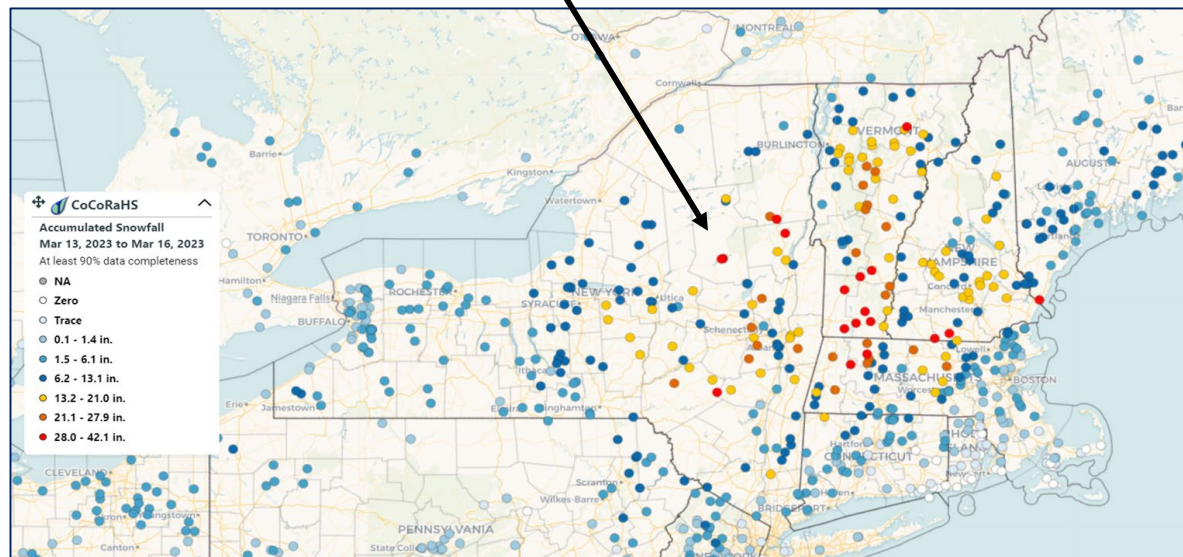
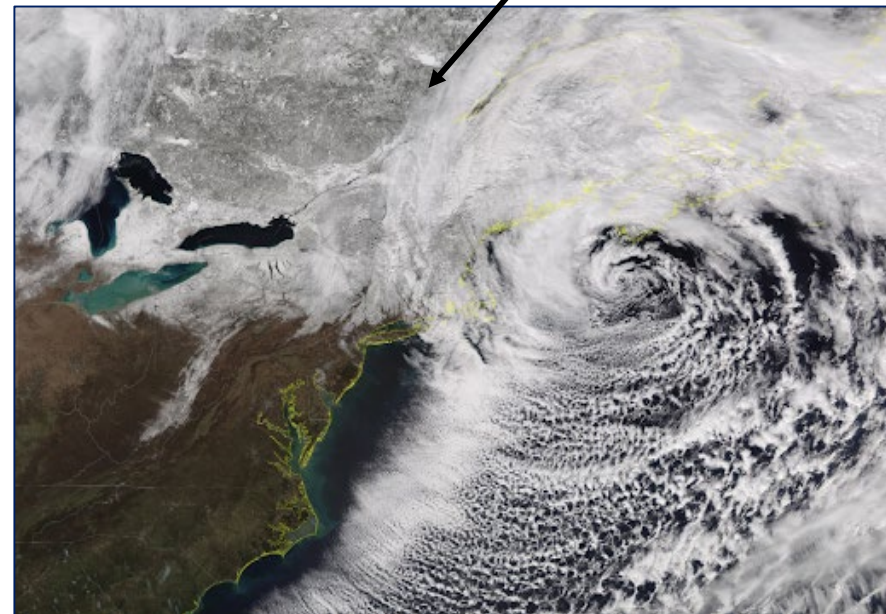
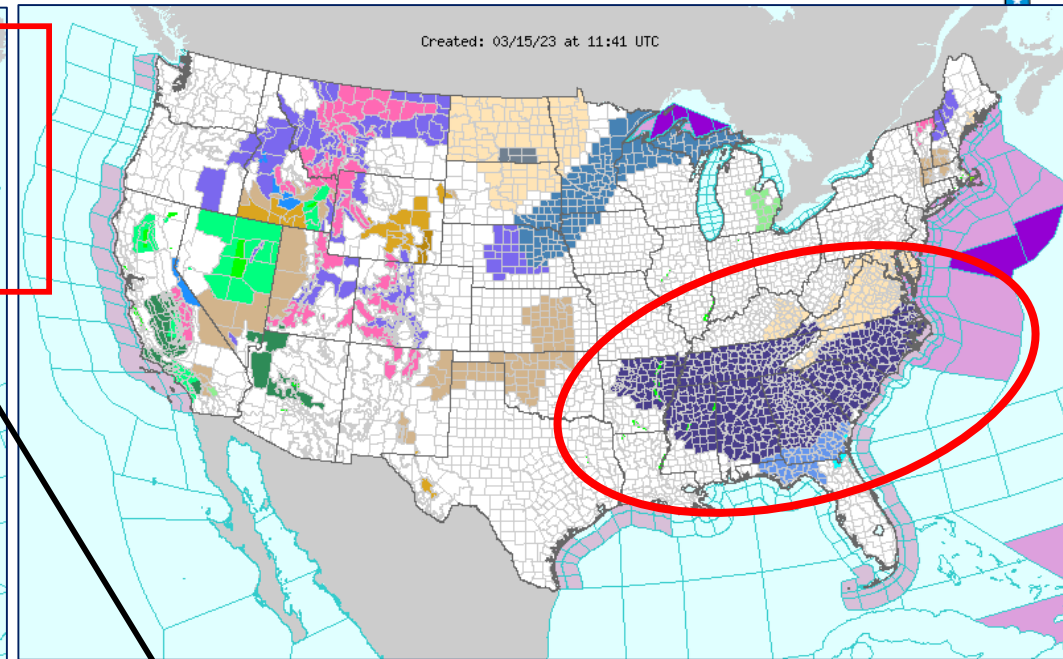
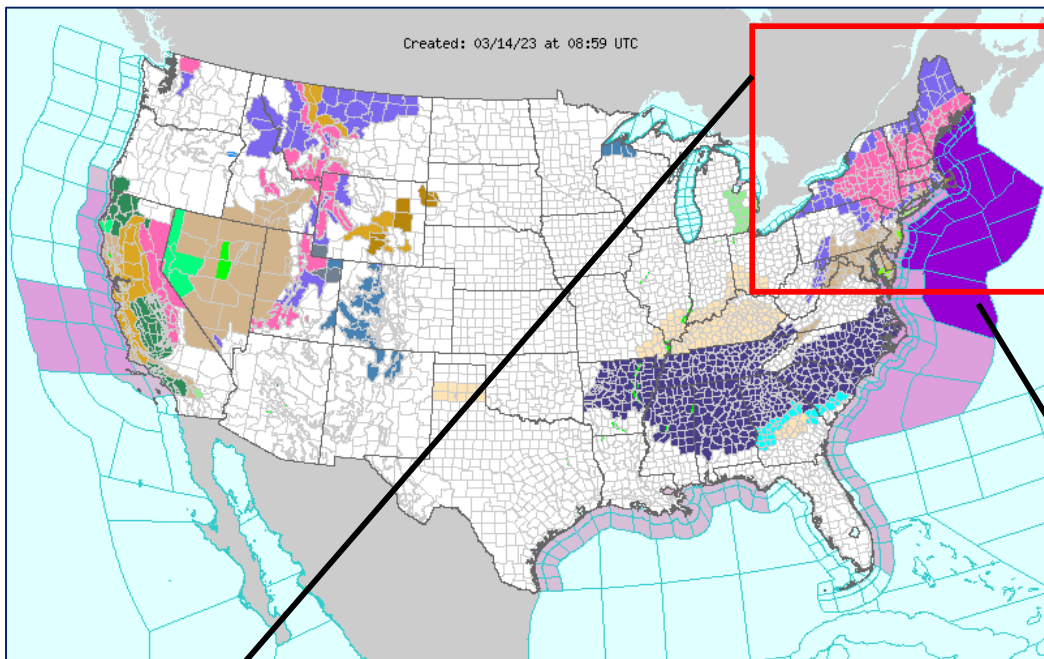
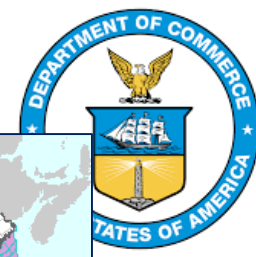
2-m Temperature Anomaly Change
Week 3-4 minus Week 1-2 beginning 20230225



Significant change in temperature in the East from the February 25-March 10 to March 11-24 periods



CPC Key Message PATC – February 24, 2023





CPC Key Message PATC – February 24, 2023



Impacts of Recent Conditions on Agriculture



Sunny Hill Farm,
NC Georgia

- Many areas in full bloom hit by multiple frosts
- Peach loss of early varieties in central GA estimated at near 100%, overall about 60% loss, may get some late blooms due to lack of winter chill
- Commercial blueberries in SE Georgia did not get as cold as the farm to the right but losses still estimated at up to 70%
- Early-planted corn lost leaves but growing point below ground in many cases, so should grow out of it
- Many farmers opted to wait until late in month to plant due to chance of frost and cold temps (good choice!)
- Drought in FL has resulted in widespread irrigation, pasture issues
- Vidalia onion yields predicted to be down due to December frost, official pack date April 17

Southeast Climate Monthly Webinar

March 28, 2023, Pam Knox (Agricultural Climatologist)

“...a lot of people asking whether it was ok to plant... we could look ahead and see that the pattern shift to a cooler climo was coming... so I said, well, you better hold off...”

KM Availability

KMs are released on Twitter and Facebook as well as on the CPC website

Climate News

- **Hazardous Winds, Snow, and Rain Forecast to Continue over the West Coast, Possibly Exacerbating Flooding Risk**
- **La Niña is expected to continue into the winter, with equal chances of La Niña and ENSO-neutral during January-March 2023. In February-April 2023, there is a 71% chance of ENSO-neutral (08 Dec 2022)**
- **NOAA Issues Winter Outlook (20 Oct 2022)**
- **47th Climate Diagnostics and Prediction Workshop Announcement (15 Apr 2022)**

Click on product title to go to product page. Move cursor over product parameter name to display the graphic -- click to enlarge. Links to these same products are also available below.

6-10 Day Outlook (Interactive) Temperature Precipitation	One Month Outlook (Interactive) Temperature Precipitation
8-14 Day Outlook (Interactive) Temperature Precipitation	Three Month Outlook (Interactive) Temperature Precipitation
Week 3-4 Outlooks Temperature Exp. Precipitation	8-14 Day U.S. Hazards Outlook Composite Probabilistic: Temp Precip Snow Wind
U.S. Drought Information Monitor Monthly Outlook Seasonal Outlook	Global Tropics Hazards Outlook Weeks 2 and 3

8-14 Day Temperature Outlook
Valid: January 11 - 17, 2023
Issued: January 3, 2023

8-14 Day Precipitation Outlook
Valid: January 12 - 18, 2023
Issued: January 4, 2023

Key Messages are provided on the CPC Home Page under "Climate News" (when active) Any updates and the date of the update are also noted under "Climate News"

Key Messages are also released on Twitter and Facebook for greater uptake

NWS Climate Prediction Center
@NWSCPC

Official Twitter account for the National Weather Service Climate Prediction Center. Details: weather.gov/twitter

College Park, MD

382 Following 30.8K Followers

Not followed by anyone you're following

NOAA NWS Climate Prediction Center
31K followers • 3 following

Posts About Photos Videos

Intro
Official Facebook Page for the National Weather Service Climate Prediction Center. Details: weather.gov

Are you #WeatherReady for the Winter? Check out our latest weather safety graphics, videos, social media posts, and more at: weather.gov/wrn/winter_safety #WeatherReady #ClimateSmart

cpc.ncep.noaa.gov
[@NWSCPC](https://twitter.com/NWSCPC)
facebook.com/NWSCPC/



KM Positive Outcomes



- ✓ Social media posts have been seen and re-shared by many others including local level government, WFOs, and local media meteorologists
- ✓ CPC increased communication/coordination with all CONUS NWS regions and were included on NWS ROC coordination calls
- ✓ Good collaboration among centers allowed clear messaging. CPC incorporated guidance and inputs from multiple centers beyond NWS WR, including WPC and the NWC
- ✓ CPC aided NWS WR with media talking points on climate factors contributing to KM generated events and longer term forecasts



Summary



- ✓ As part of CPC IDSS initiatives, KMs are released for the Week 2 hazards period and at times beyond
- ✓ A number of KMs have been released to date and have received positive feedback
- ✓ KMs released for high impact events when confidence is higher than normal and KMs can be issued for other timescales when it is warranted and justified (PATC situations)
- ✓ Future goals include formalization of procedures, continued communication with regional partners, and iterative improvements to KMs



Thank you for your time and attention
Jon.Gottschalck@noaa.gov



Recently Completed and Ongoing Work



- ✓ Automation of the KM workflow (generation and dissemination) which includes updates and email notifications for collaboration
- ✓ Development of a Standard Operating Procedure (SOP) for KMs which documents internal procedures and workflow and are “living” documents for updates
- ✓ Incorporating feedback and lessons learned from partners into subsequent KMs and applying strategies to increase engagement with partners
- ✓ Working to incorporate CPC content into the National IDSS Briefing Template
- ✓ Further collaboration with WPC for messaging of events that span WPC and CPC forecast responsibilities is warranted, (*i.e.* events that are anticipated prior to day 6 and continue into and through Week-2)
- ✓ KMs would benefit from standardization of language when messaging hazards risk (likely, could, probable, *etc.*)