

Arctic Oscillation and Polar Vortex Analysis and Forecasts

January 29, 2024

Dr. Judah Cohen from Atmospheric and Environmental Research (AER) embarked on an experimental process of regular research, review, and analysis of the Arctic Oscillation (AO) and Polar Vortex (PV). This analysis is intended to provide researchers and practitioners real-time insights on one of North America's and Europe's leading drivers for extreme and persistent temperature patterns.

During the winter schedule the blog is updated once every week. Snow accumulation forecasts replace precipitation forecasts. Also, there is renewed emphasis on ice and snow boundary conditions and their influence on hemispheric weather. In late Spring, we transition to a spring/summer schedule, which is once every two weeks. Snow accumulation forecasts will be replaced by precipitation forecasts. Also, there will be less emphasis on ice and snow boundary conditions and their influence on hemispheric weather

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Summary

- The Arctic Oscillation (AO) is currently positive and is predicted to remain positive this week and then turn neutral to negative next week as pressure/geopotential height anomalies across the Arctic are currently mostly negative and are predicted to trend more positive over the next two weeks. The North Atlantic Oscillation (NAO) is currently positive with negative pressure/geopotential height anomalies across Greenland and the NAO is predicted to trend towards neutral the next two weeks as pressure/geopotential height anomalies turn weak and mixed across Greenland.
- The next two weeks, troughing/negative geopotential height anomalies across Greenland will support mostly ridging/positive geopotential height anomalies across Western and Southern Europe with deepening troughing/negative geopotential height anomalies across Scandinavia. The zonal pattern will support normal to above normal temperatures

across much of Europe including the United Kingdom (UK) with the exception of normal to below normal temperatures across Scandinavia next week.

- The general predicted pattern across Asia the next two weeks is an omega block pattern with ridging/positive geopotential height anomalies centered over the Laptev Sea bookended by troughing/negative geopotential height anomalies across Northwestern and Northeastern Asia. This pattern favors widespread normal to above normal temperatures across Asia with normal to below normal temperatures regionally in Northwestern Russia and Northeastern Asia but mostly Southern Siberia.
- The general predicted pattern across North America this week is also an omega block pattern with troughing/negative geopotential height anomalies across Alaska and the Gulf of Alaska and along the United States (US) East Coast with ridging/positive geopotential height anomalies across the interior of North America. Then next week the pattern transitions to one of troughing/negative geopotential height anomalies in the Western US and ridging/positive geopotential height anomalies across the Eastern US. This pattern favors normal to above normal temperatures across much of Canada and United States (US) east of the Rockies with expanding normal to below normal temperatures starting in Alaska this week then spreading into Western Canada and the Western US next week.
- In the Impacts section I discuss the strong polar vortex (PV) coupled with a Canadian warming up top and a stretched polar vortex (PV) below with a possible second stretched PV in mid-February and the impacts to our weather.

Plain Language Summary

Continuing with the theme from last week, all winters do seem to have a unique theme of their own. Overall this winter, Ol' Man Winter has been showing his age across the Northern Hemisphere (NH) but there have been exceptions. Scandinavia, Northeast Asia/Eastern China and Alaska have had more persistent cold and plenty of snow. And it looks like that trend or theme will continue for the next two weeks. This repeating pattern is likely to reinforce temperature patterns observed so far this winter (see **Figure**).

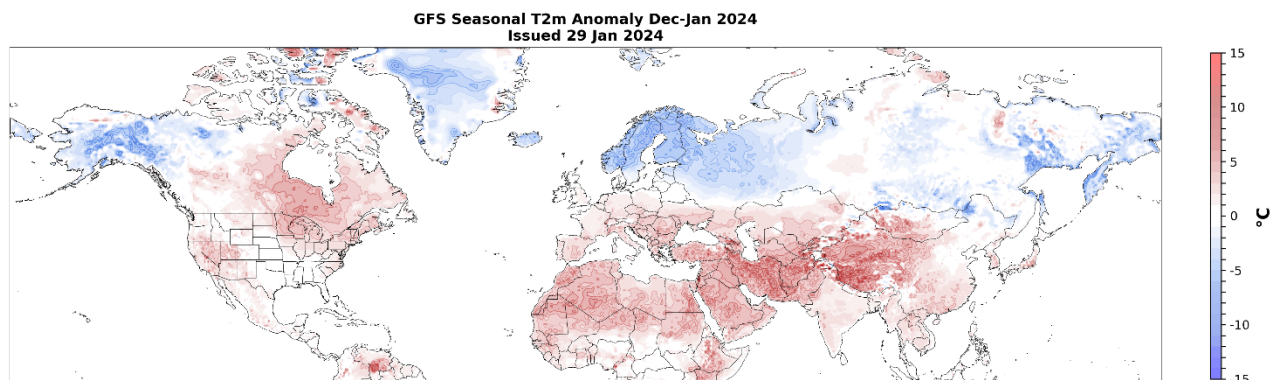


Figure. Estimate of the observed surface temperatures (°C; shading) from 1 December 2023 – 13 February 2024 based on GFS initializations and the GFS forecast from the 29 January 2024 forecast.

I am still anticipating a stretched polar vortex (PV) for mid-February. So at least in the near-term cold is likely across Alaska, the region most consistently cold so far this winter in North America. Cold is likely to return to eastern North America in mid-February, with the stretched PV. Winter continues strong in Northeast Asia and could also be reinforced with the stretched PV.

Impacts

For the first time in a long time, I do think that the forecast is relatively straightforward. In the short term we have a relatively strong tightly wound polar vortex (see **Figure 13a**) at least in the mid-stratosphere. This is supportive of an overall relatively mild pattern across the Northern Hemisphere (NH). Also, the polar vortex (PV) is near the Eurasian-Arctic Ocean coastline with ridging and relatively warm temperatures across Canada and Greenland reminiscent of a Canadian warming and consistent with the Canadian warming, the relatively warmest temperatures in the NH are predicted across Canada. However, in contrast to the Canadian warming in December which was coupled to a relatively weak PV, the Canadian warming is coupled with a relatively strong PV and I do think that limits the extent of relatively cold temperatures.

However, there are some exceptions this week. One is Alaska that is often cold when the PV is strong. Another is near the Urals due to proximity of the PV center above. But also, it is predicted to be relatively cold in the Canadian Maritimes and some of that cold air can backdoor its way into the Northeastern US. It is also predicted to be cold coupled with snowstorms in Eastern China (**Figures 3 and 4**). East Asia and eastern North America are often cold with a stretched PV which is occurring this week. But the stretched PV is shallow and shifted east across North America compared to most typical events but did occur in December as well. Another repeating theme of this winter.

Looking at the Wave Activity Flux in the vertical and zonal directions (shown as vectors in **Figure i**). The WAF vectors go upward and eastward near the Dateline and then are downward and eastward over the North Atlantic. This is east of more typical wave reflective events. So instead of ridging centered over the Dateline and Alaska the ridging is over Central Canada (orange shading centered at 110 to 100°W) and the trough is centered near 50 to 40°W (blue shading). Also the troughing does not extend into the mid-stratosphere, so the trough and associated cold air is shallower and east of what is observed in the average stretched PV (see for example Figure 5 from [Cohen et al. 2022](#)).

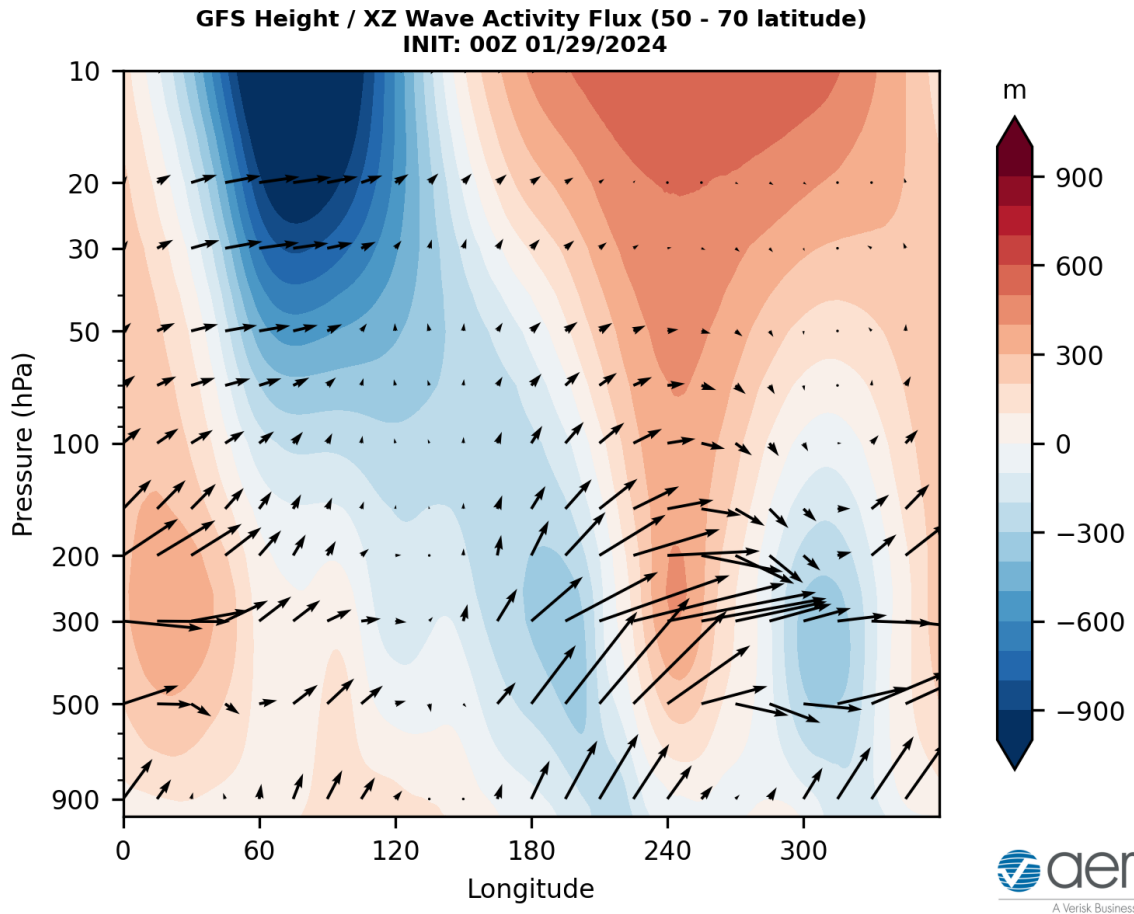


Figure i. Longitude-height cross section of geopotential eddy height anomalies (shading) and wave activity flux (vectors) initialized for 29 January 2024. The forecasts are from the 00z 29 January 2024 GFS ensemble.

As I wrote last week, Canadian warmings overwhelmingly transition to just two other PV phases - one is a larger sudden stratospheric warming but most commonly to a stretched PV. A Canadian warming can transition to other PV states (in the strong PV category) but it is significantly less likely. I don't see another SSW anytime soon (especially based on my observations expressed in the next paragraph) but the threshold for a stretched PV is much lower. Looking at the WAF plot and eddy geopotential heights for the 10-15 day forecast (see **Figure ii**), I think we will see a more typical stretched PV. One can make out the upper and eastward WAF vectors centered near 120°E (not the Dateline). The ridging over North America is 140 to 130°W (orange shading near Alaska) and the troughing (blue shading) and downward and eastward vectors are centered near 100°W in Western Canada (and not Greenland). Also, the troughing does now extend all the way to the mid-stratosphere. We are not there yet based on this forecast (no robust downward vectors yet) but I think that is coming soon.

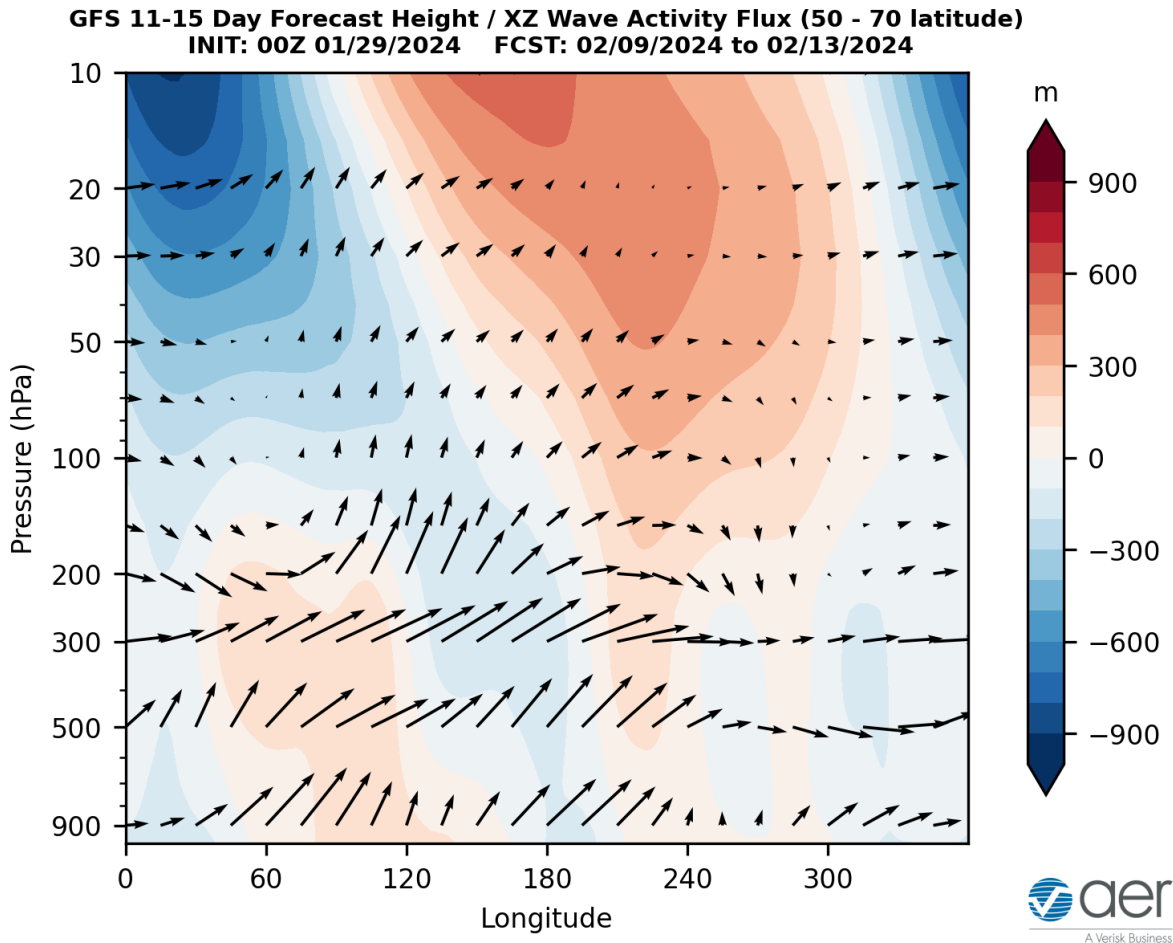


Figure ii. Longitude-height cross section of geopotential eddy height anomalies (shading) and wave activity flux (vectors) forecasted for 9 – 13 February 2024. The forecasts are from the 00z 29 January 2024 GFS ensemble.

But this stretched PV event is happening in slow motion and I think this is because the forcing is weak at best. Ideally the ridging across Eurasia would be centered near the Barents-Kara Seas/Urals and Scandinavia where it constructively interferes with the climatological standing wave. Now the ridging is predicted instead to be centered over Western Siberia and the Laptev Sea. It is as we describe with kosher food - pareve, not milk nor meat. I tweeted out this morning about the Omega blocks both in North America and Eurasia. For the maximum forcing the ridges of the omega blocks should be closer to the western edge of the two continents and not smack in the middle of the continents. Ridging on the eastern edges of the continents supports a strengthening PV as we saw earlier in January.

Look how great the forcing was in the [4 December 2023](#) blog (see **Figures iii, 2, 5 and 8**) compared to the forecasts below in **Figures 2, 5 and 8**. Here is the sea level pressure predicted

for the remainder of January in **Figure iii**. The ridging is centered over Western Siberia. So, there is some forcing but not as strong as in December and the whole stretched PV is unfolding slowly.

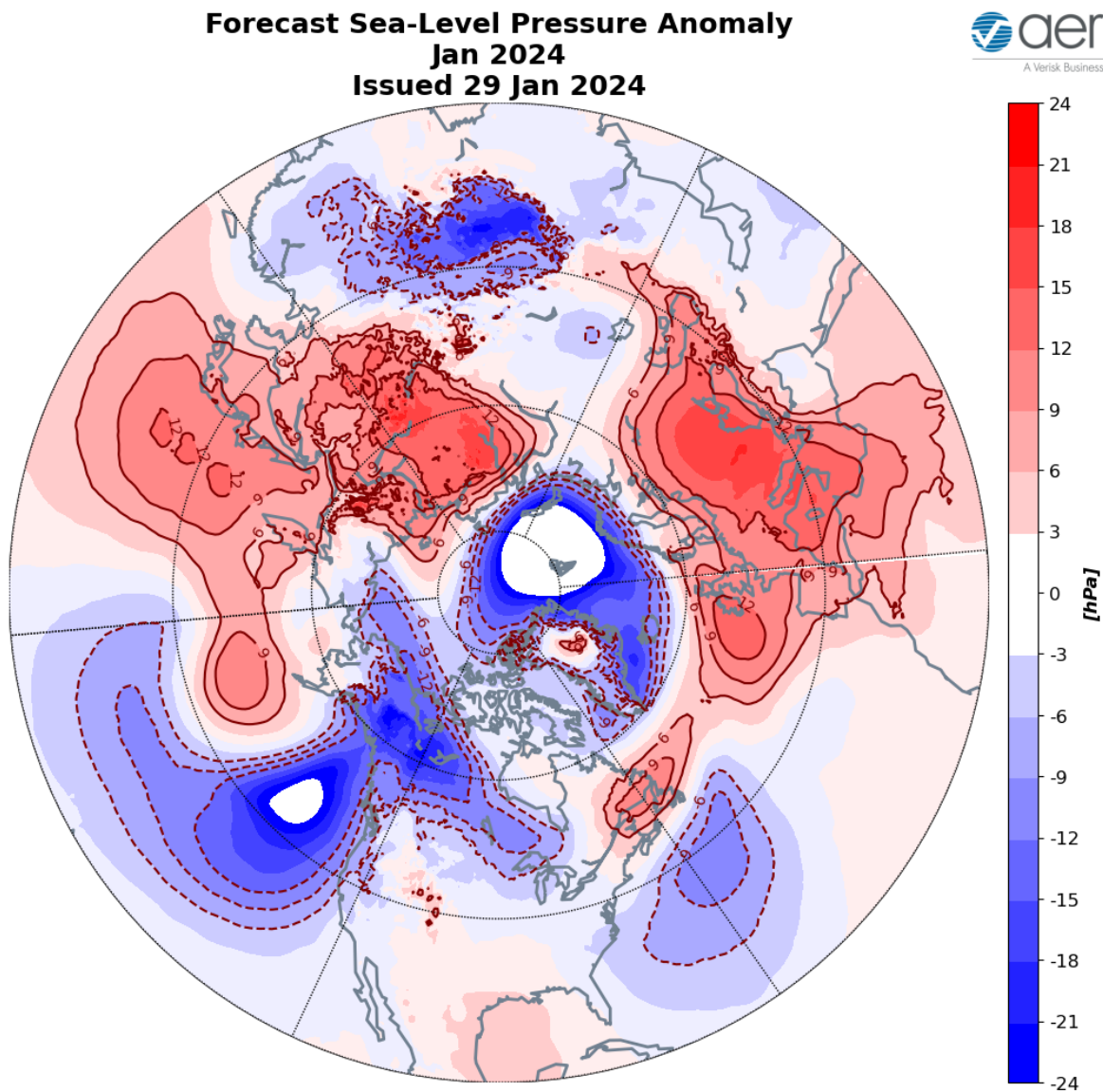


Figure iii. Predicted mean sea level pressure anomalies (hPa; shading) 29 – 31 January 2024. The forecasts are from the 00z 29 January 2024 GFS ensemble.

Also, like last week I want to end with the latest polar cap geopotential height anomalies (PCHs) for the North Atlantic only in **Figure iv**. Looking at the North Atlantic regional PCHs warm/positive PCHs can still be observed making its way down from the upper stratosphere associated with the major warming. This “drip” has made it to the mid-stratosphere this week and the warming over Greenland the polar stratosphere can be seen in **Figure 13a**. Then the warm/positive PCHs “drip” further into the troposphere next week. Since this is only the North Atlantic regional plot, it is strongly suggestive of the return of Greenland blocking, though for

now any evidence of this in the weather model forecasts is weak but stronger than a few days ago. It will turn colder in Scandinavia with the PV center edging closer to Scandinavia, but the addition of Greenland blocking would favor colder weather becoming more widespread across northern and Central Europe.

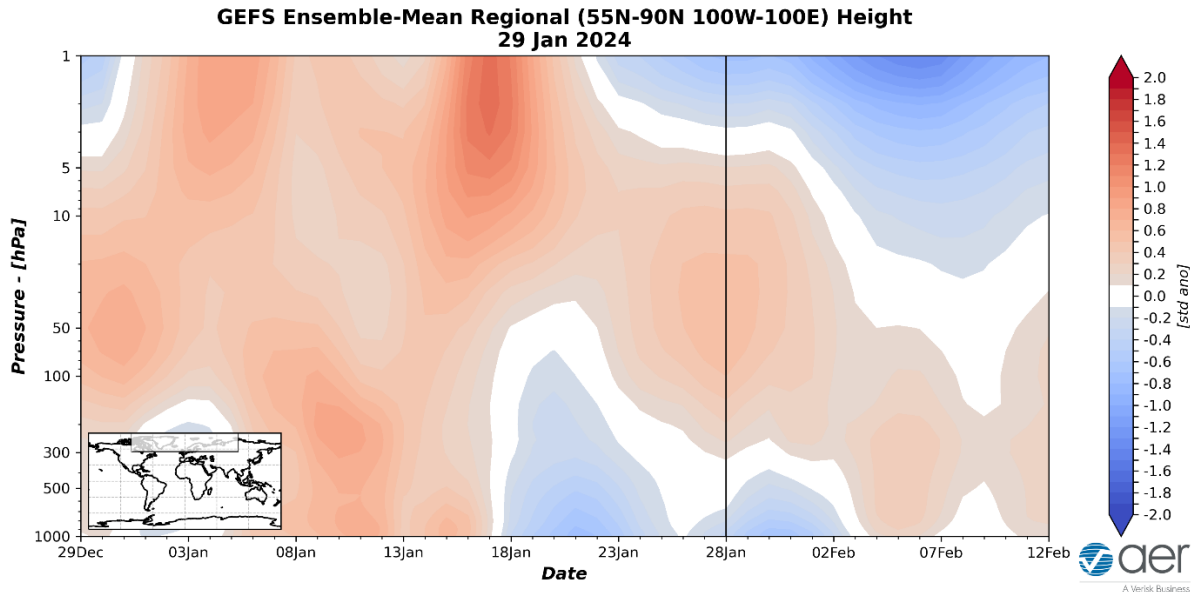


Figure iv. Observed and predicted daily polar cap height (i.e., area-averaged geopotential heights poleward of 60°N) standardized anomalies over the North Atlantic sector only (see insert). The forecast is from the 00Z 29 January 2024 GFS ensemble.

So, in summary, in the short-term mild in Europe and very mild for much of North America with the biggest exception being the North American Arctic including Alaska. Cold air is in China and Scandinavia where it has been all winter. If Greenland blocking does materialize more strongly than currently predicted, the cold across Northern Europe could deepen and become more widespread. More seasonable temperatures are predicted this week for the Northeastern US related to an ongoing stretched PV, which is shallower and shifted east compared to the average event. I do think that another stretched PV that is deeper and shifted westward closer to normal is likely in mid-February, with a return to more widespread cold in eastern North America to end the month.

I like to keep a tally or score of snowfall anomalies across the Northern Hemisphere as I did last week. Large areas of above normal snowfall continue to exist in Northern Asia, Scandinavia, the Baltics, Northern Canada but especially the east coast of Asia, Western Russia and Southeastern Alaska. Deficits exist in Western and Southern Europe, parts of the US, including the I95 corridor and especially the mountains of California and the Pacific Northwest (see **Figure v**). Based on the forecasts more positive snowfall anomalies could appear in Eastern China.

ERA5 Cumulative Snowfall Anomaly Nov 2023 - Jan 2024

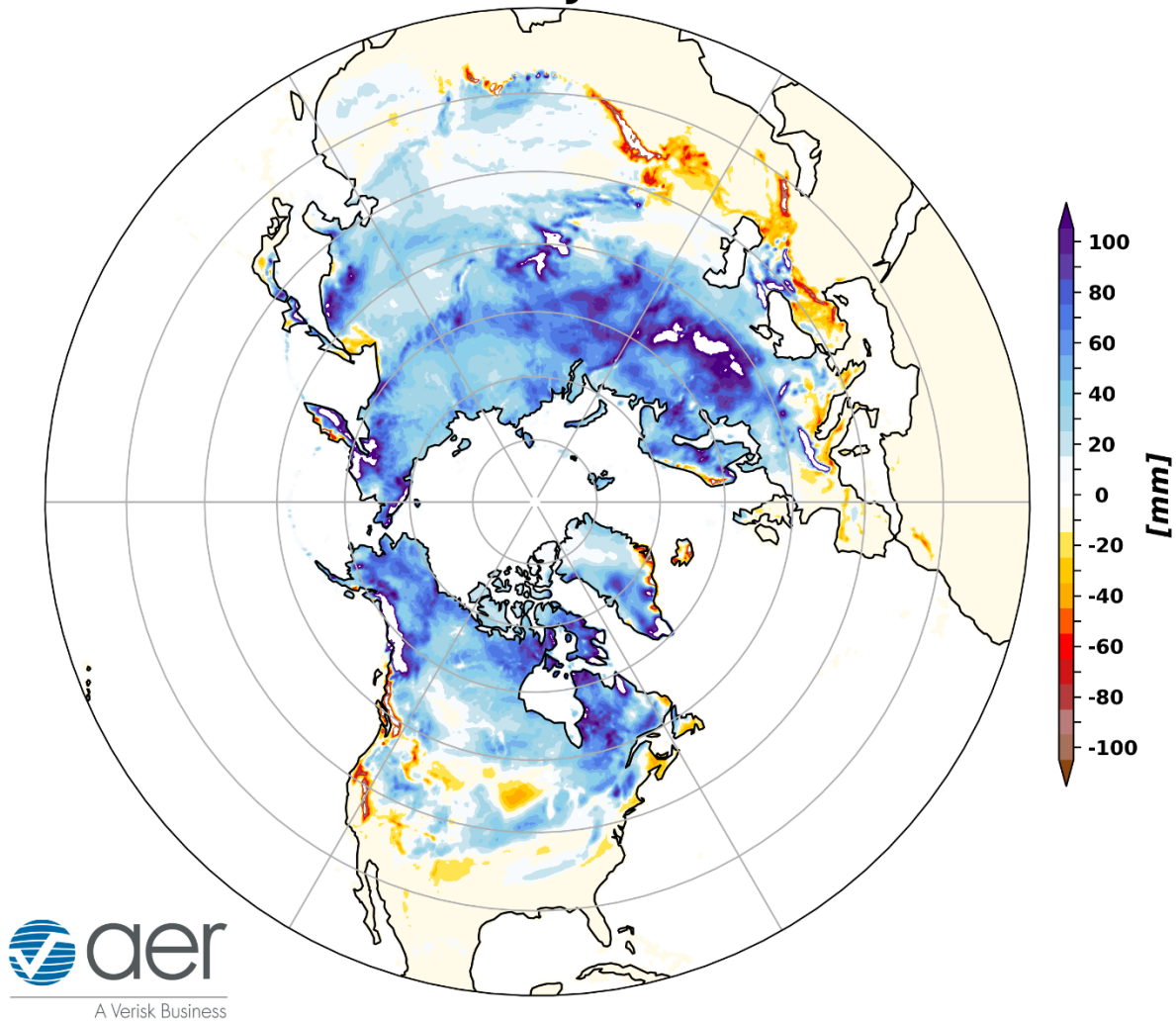


Figure v. Estimate of the observed snowfall anomalies (snow water equivalent in mm; shading) from 1 November 2023 – 23 January 2024 based on ERA5.

Near-Term

This week

The AO is predicted to be positive this week (**Figure 1**) with mostly negative geopotential height anomalies across the Arctic and with mixed geopotential height anomalies across the mid-latitudes of the NH (**Figure 2**). With predicted negative geopotential height anomalies across Greenland (**Figure 2**), the NAO is predicted to be positive this period.

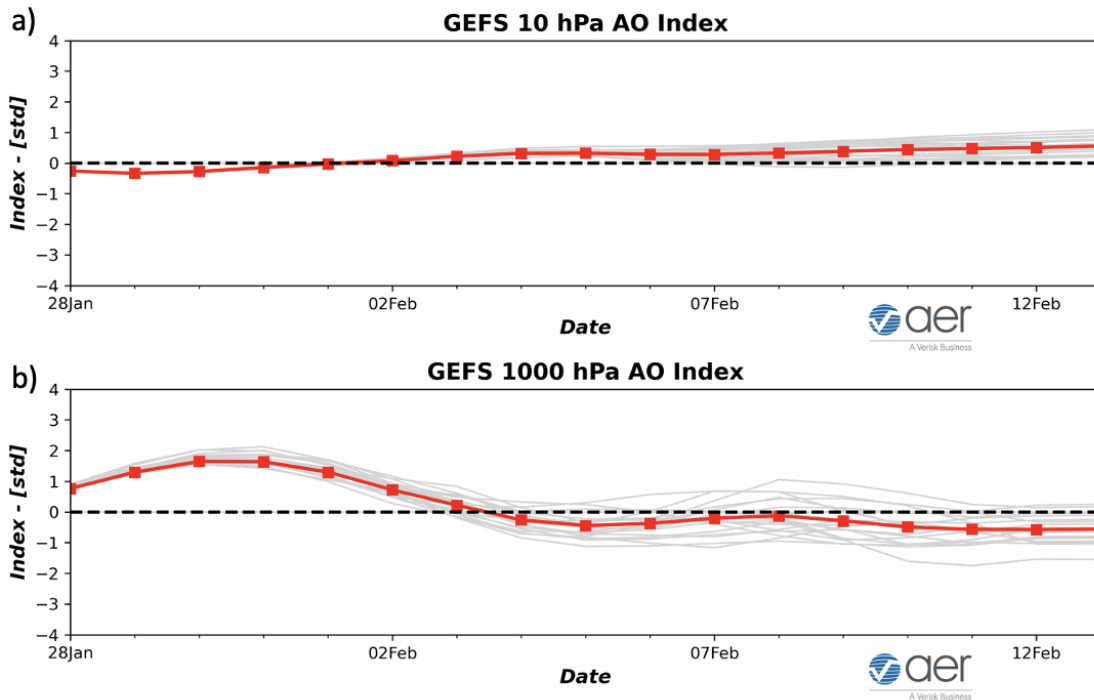


Figure 1. (a) The predicted daily-mean AO at 1000 hPa from the 00Z 29 January 2024 GFS ensemble. (b) The predicted daily-mean near-surface AO from the 00Z 29 January 2024 GFS ensemble. Gray lines indicate the AO index from each individual ensemble member, with the ensemble-mean AO index given by the red line with squares.

Trouching/negative geopotential height anomalies centered over Greenland will favor ridging/positive geopotential height anomalies across much of Europe with some weak trouching/negative geopotential height anomalies across Scandinavia and Southeastern Europe this week (**Figures 2**). **The pattern favors widespread normal to above normal temperatures across Europe including the UK with normal to below normal temperatures limited to Turkey (Figure 3).** Predicted ridging/positive geopotential height anomalies centered in the Laptev Sea and Western Siberia will be sandwiched by trouching/negative geopotential height anomalies across Western and Northeastern Asia this period (**Figure 2**). This pattern favors widespread normal to above normal temperatures across Asia with normal to below normal temperatures across parts of Central and Northeastern Asia including parts of Eastern China (**Figure 3**).

GEFS 1-5 Day Forecast 500 hPa Anomaly
INIT: 00Z 01/29/2024 FCST: 01/30/2024 to 02/03/2024

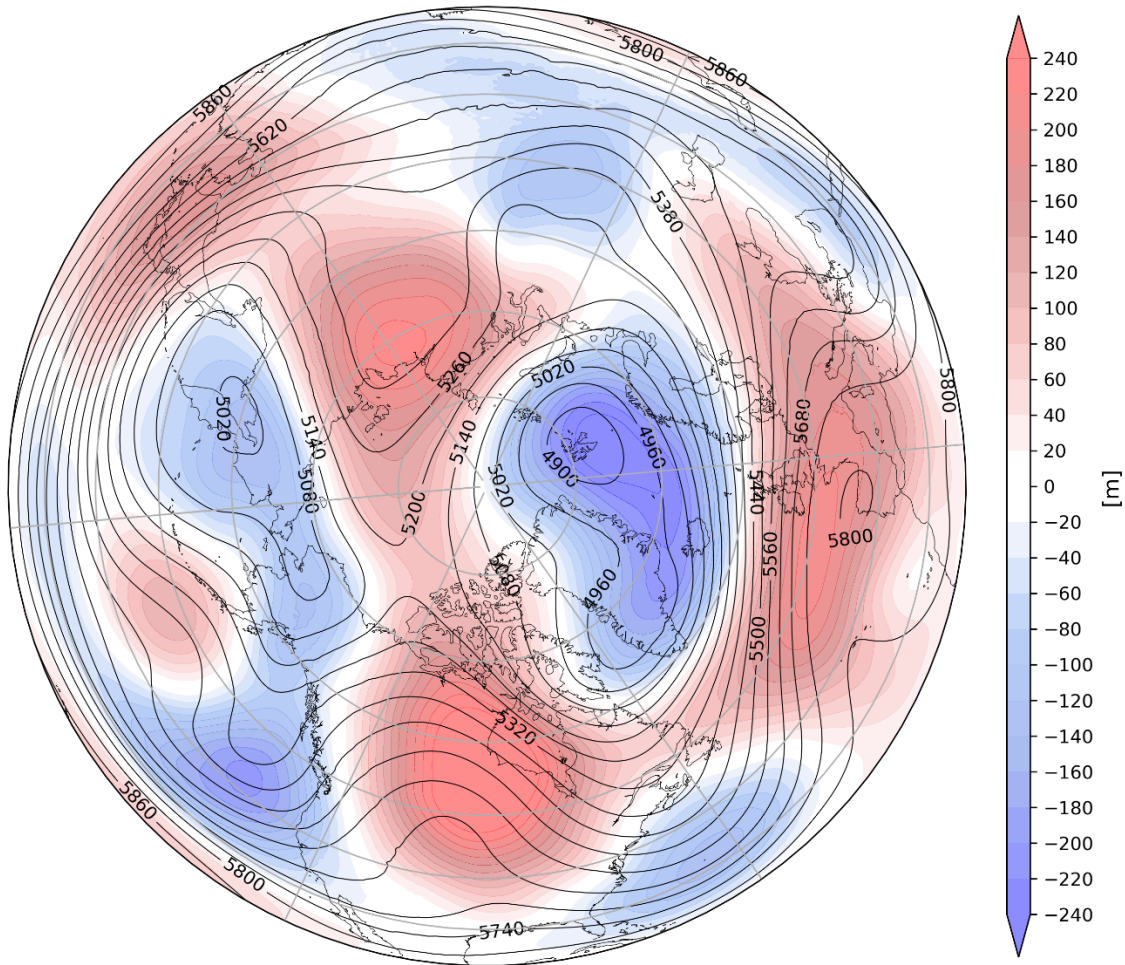


Figure 2. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 30 January – 3 February 2024. The forecasts are from the 00z 29 January 2024 GFS ensemble.

The pattern this week across North America is troughing/negative geopotential height anomalies across Alaska and the Gulf of Alaska with ridging/positive geopotential height anomalies centered in Central Canada with more troughing/negative geopotential height anomalies along the US East Coast (**Figure 2**). This pattern will favor normal to below normal temperatures across Alaska with normal to above normal temperatures widespread across Canada and much of the US (**Figure 3**).

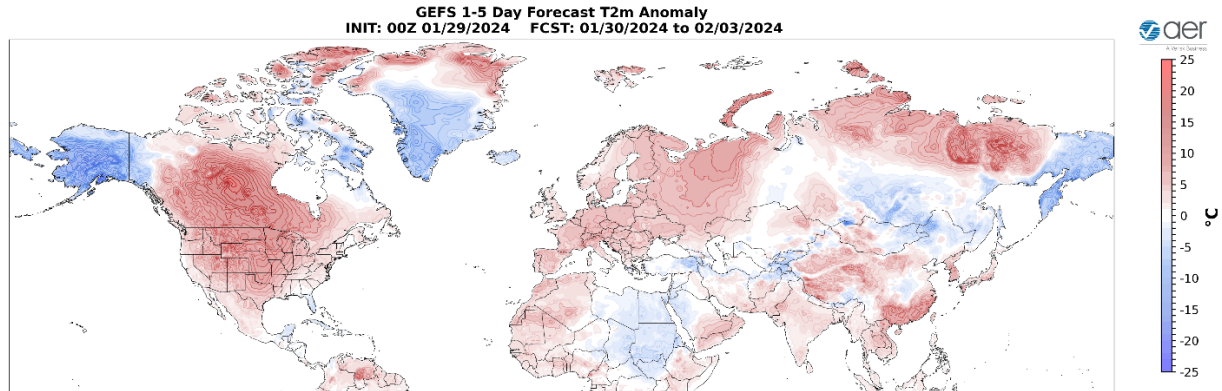


Figure 3. Forecasted surface temperature anomalies (°C; shading) from 30 January – 3 February 2024. The forecast is from the 00Z 29 January 2024 GFS ensemble.

Trouging and/or cold temperatures will support new snowfall across Norway, Central Asia, Eastern Siberia, Eastern China and the Tibetan Plateau while mild temperatures will support snowmelt across Sweden, Finland, Eastern Europe, Western Russia and Southern Siberia this week (**Figure 4**). Trouging and/or cold temperatures will support new snowfall across Southeastern Alaska and Northern and Eastern Canada, California and the Central Rockies while mild temperatures will support snowmelt across Southern Canada and the Northeastern US this week (**Figure 4**).

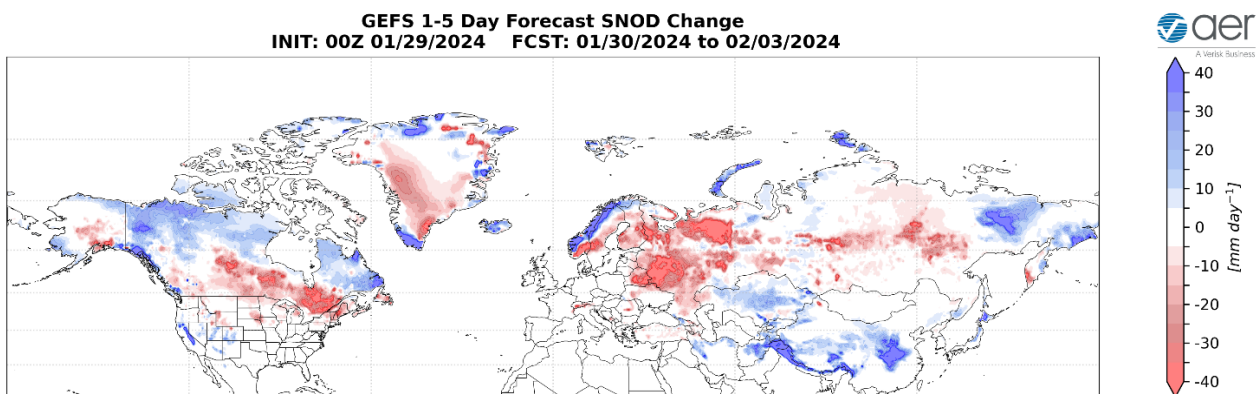


Figure 4. Forecasted snow depth changes (mm/day; shading) from 30 January – 3 February 2024. The forecast is from the 00Z 29 January 2024 GFS ensemble.

Near-Mid Term

Next week

With geopotential height anomalies becoming more mixed to possibly mostly positive across the Arctic and with mixed geopotential height anomalies across the mid-latitudes this

period (Figure 5), the AO will become neutral to negative this period (Figure 1). With pressure/geopotential height anomalies across Greenland also turning mixed (Figure 5), the NAO should approach neutral as well this period.

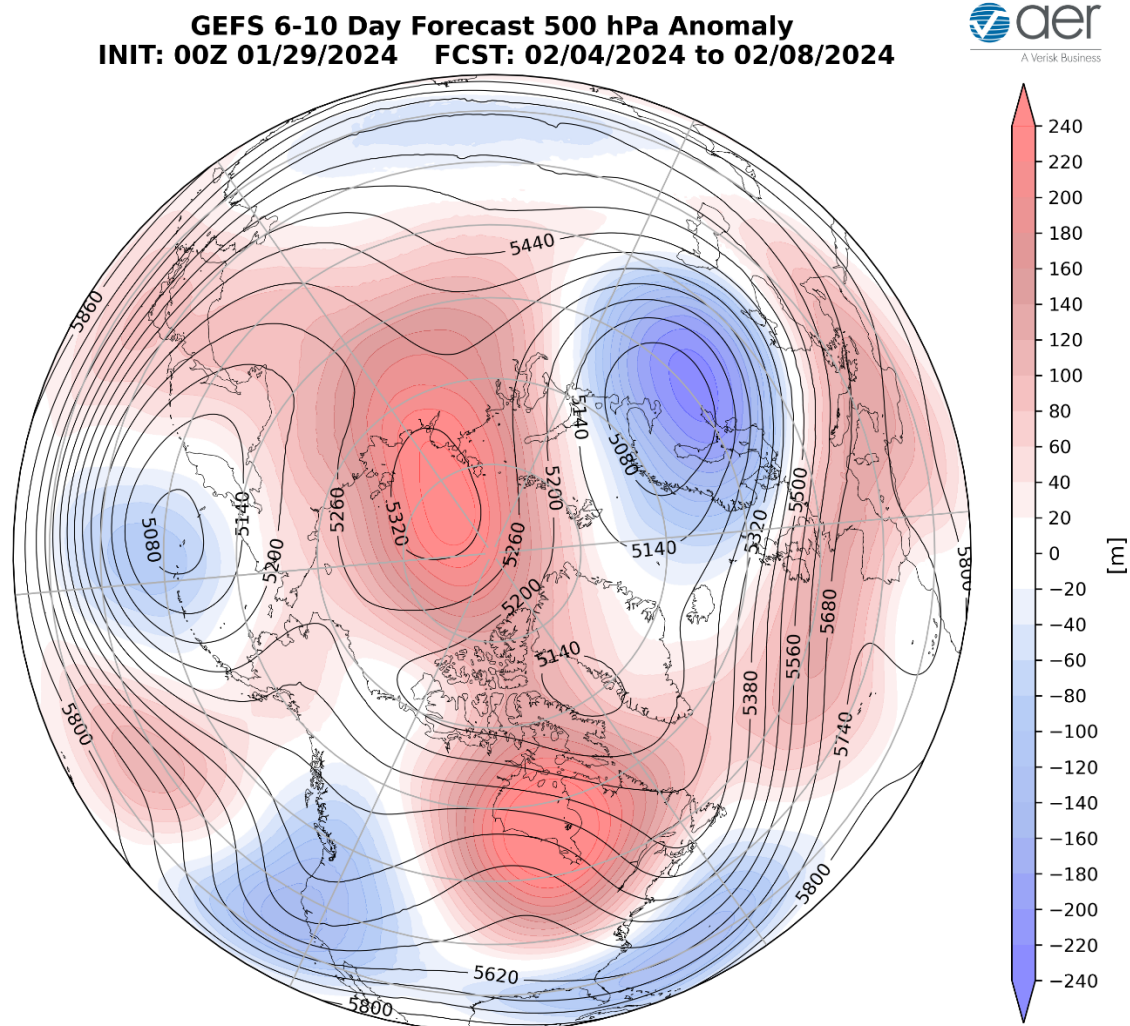


Figure 5. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 4 – 8 February 2024. The forecasts are from the 00z 29 January 2024 GFS ensemble.

Mostly a persistent pattern is predicted with deepening troughing/negative geopotential height anomalies across Scandinavia related to the PV entering the region overhead with ridging/positive geopotential height anomalies across Western and Southern Europe this period (Figure 5). This mostly zonal pattern will favor widespread normal to above normal temperatures across much of Europe including the UK with normal to below normal temperatures limited to Scandinavia (Figures 6). The omega block pattern across Asia is predicted to persist with troughing/negative geopotential height anomalies across Northeastern

and Northwestern Asia bookending ridging/positive geopotential height anomalies centered in Western Siberia and the Laptev Sea this period (**Figure 5**). This pattern favors widespread normal to above normal temperatures across Asia with normal to below normal temperatures limited to parts of Central Asia, Northeastern Asia and Eastern China this period (**Figure 6**).

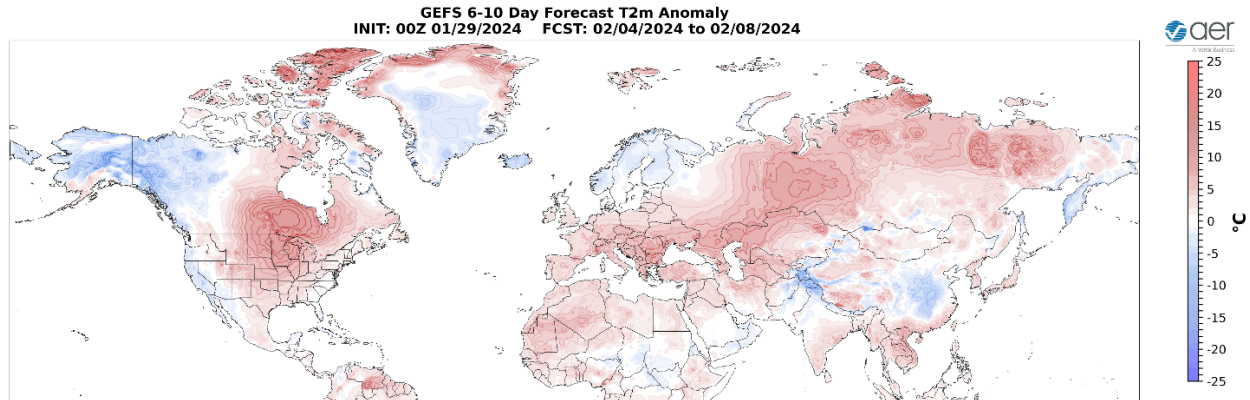


Figure 6. Forecasted surface temperature anomalies ($^{\circ}\text{C}$; shading) from 4 – 8 February 2024. The forecasts are from the 00z 29 January 2024 GFS ensemble.

The overall pattern of troughing/negative geopotential height anomalies across Alaska and the Gulf of Alaska will push east this period into Western Canada and the Western US forcing ridging/positive geopotential height anomalies across much of North America east of the Rockies this period (**Figure 5**). This pattern favors normal to above normal temperatures across much of Canada, and the US east of the Rockies with normal to below normal temperatures limited to Alaska, Western Canada and the Western US (**Figure 6**).

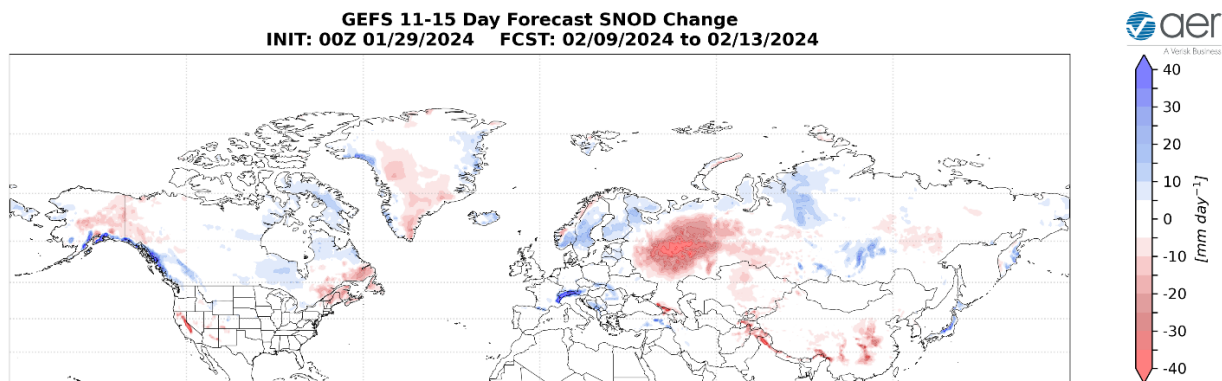


Figure 7. Forecasted snow depth changes (mm/day ; shading) from 4 – 8 February 2024. The forecast is from the 00Z 29 January 2024 GFS ensemble.

Trouching and/or cold temperatures will support new snowfall across Scandinavia, the Baltic States Eastern Siberia and eastern China while mild temperatures will support snowmelt in Western Russia, Central Asia and parts of Siberia this period (**Figure 7**). Trouching and/or cold temperatures will support new snowfall across western Alaska, Northern and Central Canada and the Western US while mild temperatures will support snowmelt in eastern Alaska, Western and Southeastern Canada this period (**Figure 7**).

Mid Term

Week Two

With mostly positive geopotential height anomalies across the Arctic and mixed geopotential height anomalies across the mid-latitudes this period (**Figure 8**), the AO will likely remain negative to neutral this period (**Figure 1**). With weak and mixed pressure/geopotential height anomalies across Greenland (**Figure 8**), the NAO should be close to neutral as well this period.

GEFS 11-15 Day Forecast 500 hPa Anomaly
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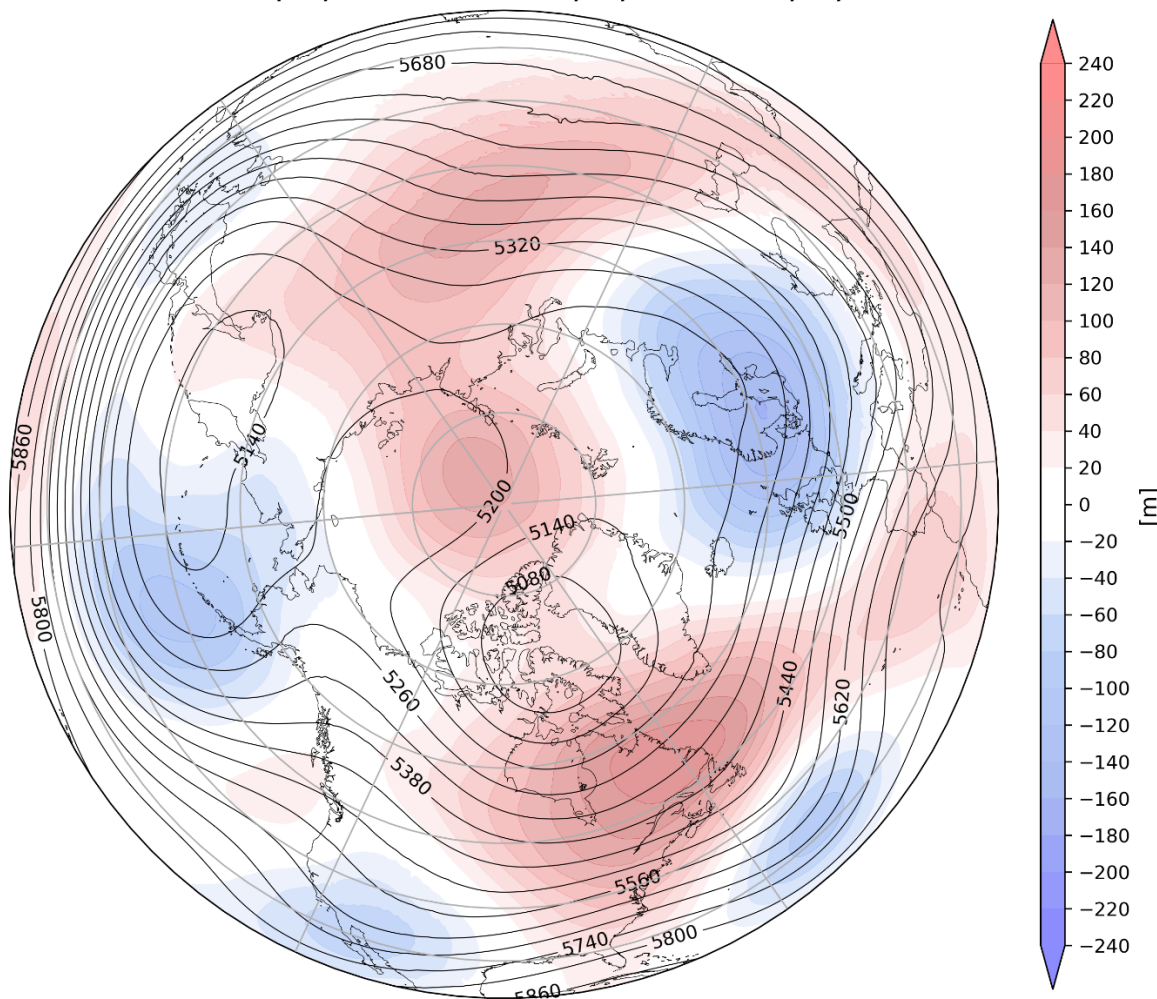


Figure 8. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 29 – 13 February 2024. The forecasts are from the 00z 29 January 2024 GFS ensemble.

Persistent and deepening troughing/negative geopotential height anomalies across Scandinavia with ridging/positive geopotential height anomalies across Western and Southern Europe are predicted to persist this period (**Figure 8**). This pattern should favor normal to above normal temperatures widespread across most of Europe with the exceptions of normal to below normal temperatures across Scandinavia and the UK this period (**Figures 9**). The omega block pattern across Asia is predicted to still persist with troughing/negative geopotential height anomalies across Northeastern and Northwestern Asia bookending ridging/positive geopotential height anomalies centered in Western Siberia and the Laptev Sea yet again this period (**Figure 8**). The predicted pattern favors widespread normal to above normal temperatures across Asia with normal to below normal temperatures limited to Northwestern Russia, Eastern Siberia and Eastern China this period (**Figure 9**).

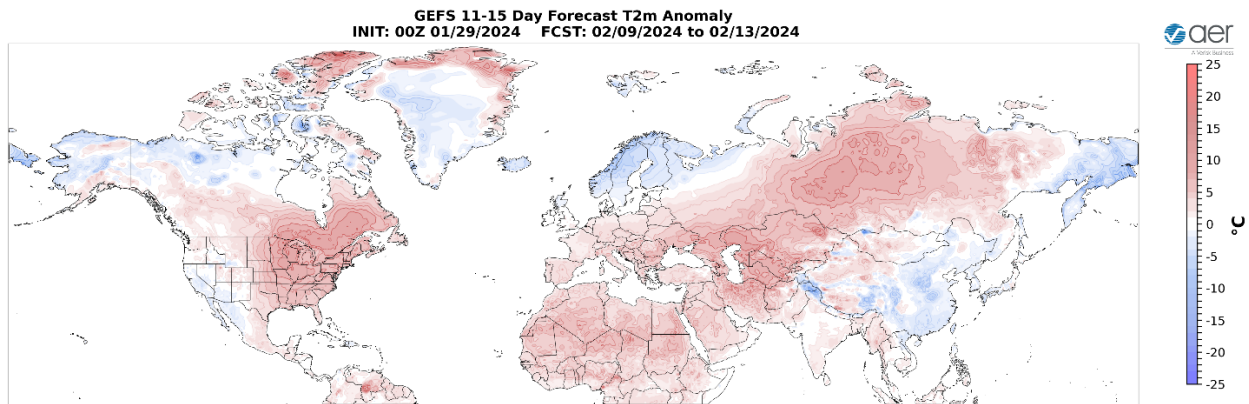


Figure 9. Forecasted surface temperature anomalies (°C; shading) from 9 – 13 February 2024. The forecasts are from the 00z 29 January 2024 GFS ensemble.

Trouthing/negative geopotential height anomalies in the Gulf of Alaska is predicted to move into the Western US with ridging/positive geopotential height anomalies dominating eastern North America this period (**Figure 8**). This pattern favors widespread normal to above normal temperatures Canada and the US east of the Rockies with normal to below normal temperatures across parts of Alaska and Western Canada and the Western US this period (**Figure 9**).

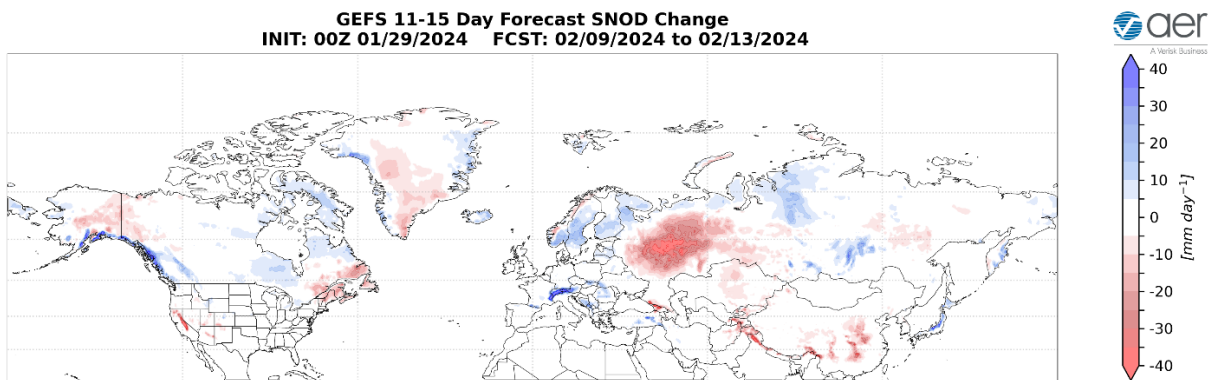


Figure 10. Forecasted snow depth changes (mm/day; shading) from 9 – 13 February 2024. The forecast is from the 00Z 29 January 2024 GFS ensemble.

Trouthing and/or cold temperatures will support new snowfall across Scandinavia, the Baltics, the Alps, the Tibetan Plateau and Western Siberia while mild temperatures will support snowmelt in Western Russia and China this period (**Figure 10**). Trouthing and/or cold temperatures will support new snowfall across southeastern Alaska, the West Coast of Canada and Eastern Canada. Mild temperatures will support snowmelt in California, Southeastern Canada and New England this period (**Figure 10**).

Longer Term

30-day

The latest plot of the polar cap geopotential height anomalies (PCHs) currently shows warm/positive PCHs throughout the lower stratosphere and upper troposphere with cold/negative PCHs in the upper stratosphere and the lower troposphere (**Figure 11**). Warm/positive in the lower stratosphere are predicted to descend throughout the troposphere while in the stratosphere become increasingly cold/negative as the PV strengthens (**Figure 11**).

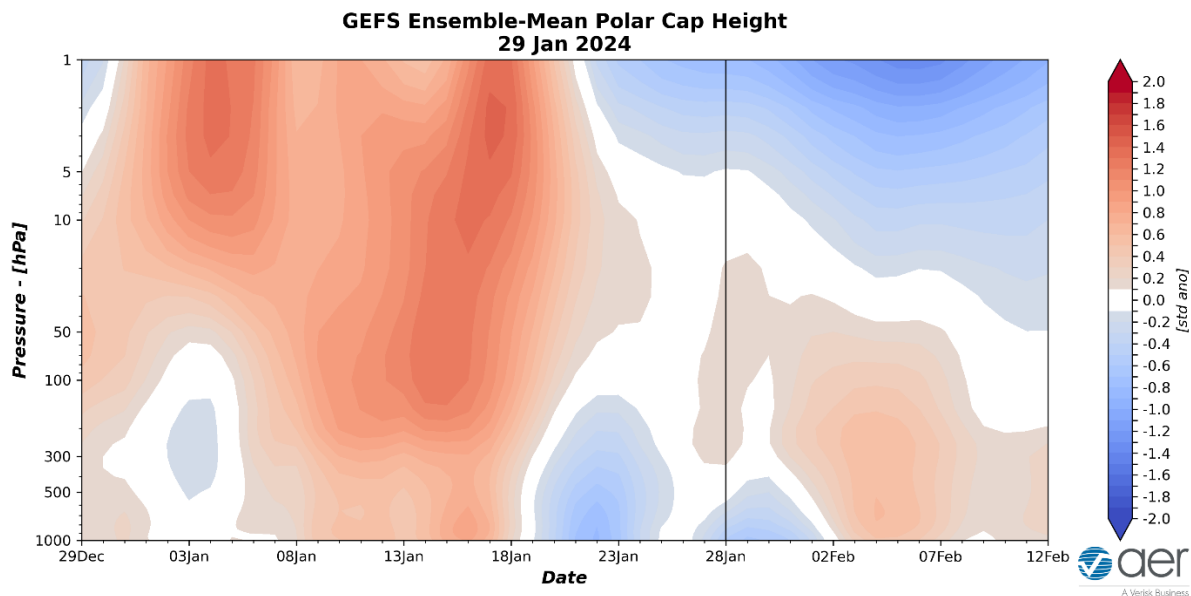


Figure 11. Observed and predicted daily polar cap height (i.e., area-averaged geopotential heights poleward of 60°N) standardized anomalies. The forecast is from the 00Z 29 January 2024 GFS ensemble.

The predicted cold/negative PCHs in the lower troposphere this week (**Figure 11**) are consistent with the predicted positive surface AO this week (**Figure 1**). Then next week the predicted warm/positive PCHs in the lower troposphere related to descending warm/positive PCHs (**Figure 11**) are consistent with the predicted surface AO becoming neutral to negative.

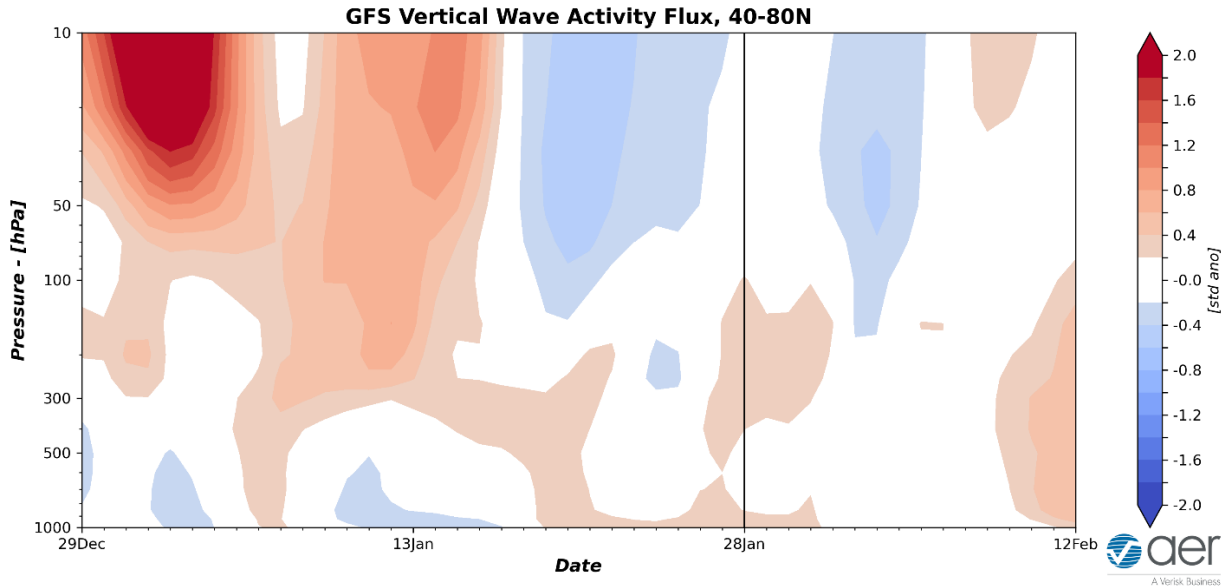


Figure 12. Observed and predicted daily vertical component of the wave activity flux (WAFz) standardized anomalies, averaged poleward of 40-80°N. The forecast is from the 00Z 29 January 2024 GFS ensemble.

Also shown in **Figure 1** is the stratospheric AO. The stratospheric AO is currently slightly negative but is predicted to trend towards neutral and then positive for much of the next two weeks. This is consistent with increasingly cold/negative stratospheric PCHs in the mid-stratosphere. The forecast of cooling PCHs in the stratosphere signals a strengthening PV.

Vertical Wave Activity Flux (WAFz) from the troposphere to the stratosphere or poleward heat transport in the stratosphere has been active since mid-November and peaked the first week of January and is now much less active (**Figure 12**). The predicted quieter WAFz activity for much of the next two weeks (**Figure 12**), should result in a strengthening PV, at least temporarily. Another pulse of WAFz predicted in mid-February and could signal at least another minor PV disruption.

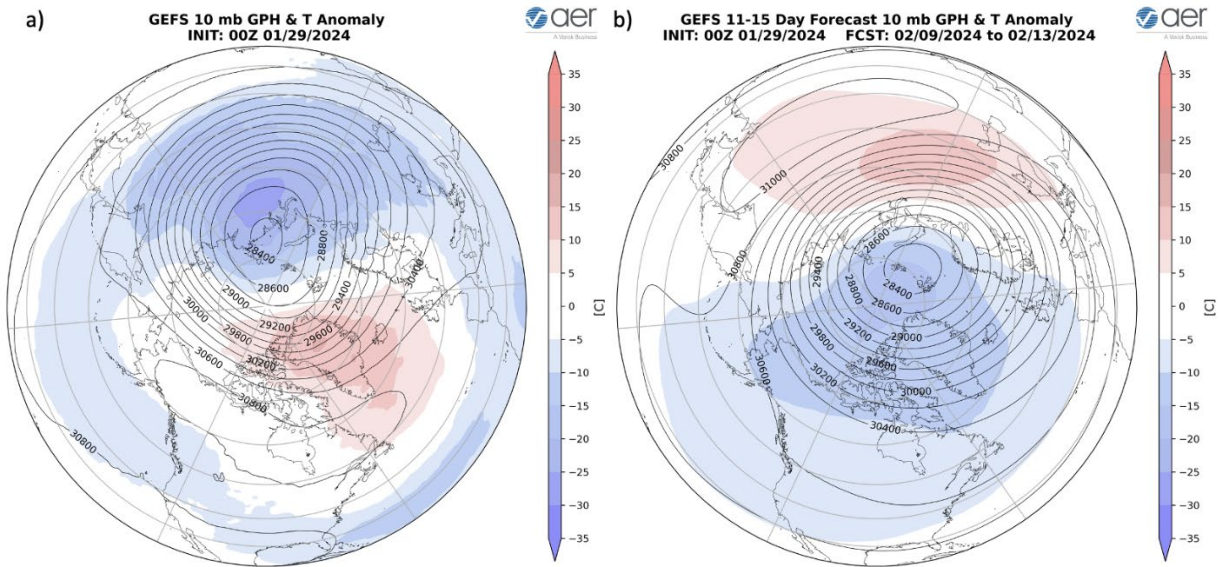


Figure 13. (a) Initialized 10 mb geopotential heights (dam; contours) and temperature anomalies ($^{\circ}\text{C}$; shading) across the Northern Hemisphere for 29 January 2024 . (b) Same as (a) except forecasted averaged from 9 – 13 February 2024. The forecasts are from the 00Z 29 January 2024 GFS model ensemble.

This week the polar vortex (PV) is relatively circular in shape with the PV center shifted south of the North Pole centered over the Laptev Sea with ridging across Canada and relative warm temperatures centered on Greenland in the polar stratosphere (**Figure 13a**). This PV configuration is consistent with a strong PV that favors overall milder temperatures across the continents of the NH. However, the ridging over Canada coupled with warming also resembles a Canadian warming that has amplified the warming in Canada at the surface. This configuration of the PV is predicted to mostly persist over the next two weeks with the PV edging ever so slowly closer to Scandinavia (**Figure 13b**). However, the ridging and warming in the polar stratosphere is predicted to shift into Asia. This is looking to me like the beginnings of another stretched PV event.

**CFS 500 hPa Forecast Anomaly Feb 2024
Valid as of 29 Jan 2024**

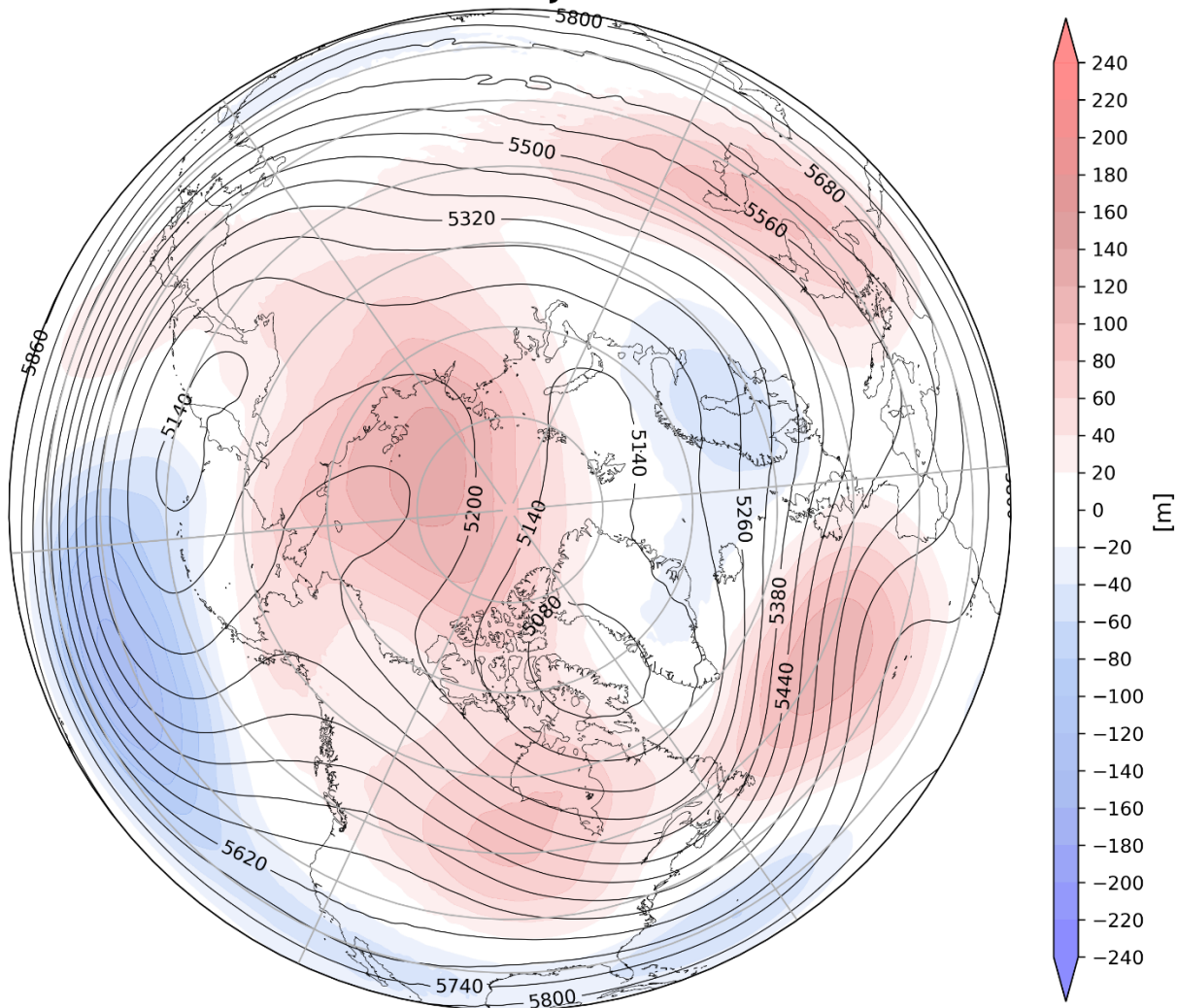


Figure 14. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere for February 2024. The forecasts are from the 00Z 29 January 2024 CFS.

I include in this week's blog the monthly 500 hPa geopotential heights (**Figure 14**) and surface temperatures for February (**Figure 15**) from the Climate Forecast System (CFS; the plots represent yesterday's four ensemble members). The forecast for the troposphere is ridging centered south of Iceland, Siberia, the Laptev Sea, Alaska and Western Canada with troughing in Northern Europe, Northeast Asia, south of the Aleutians and the Eastern US (**Figure 14**). This pattern favors seasonable to relatively warm temperatures across Southern Europe, Western and Northern Asia, Alaska, much of Canada and the Western US with seasonable to relatively cold temperatures across Northern Europe, Northeast Asia but especially China and the Southern and Eastern US (**Figure 15**)

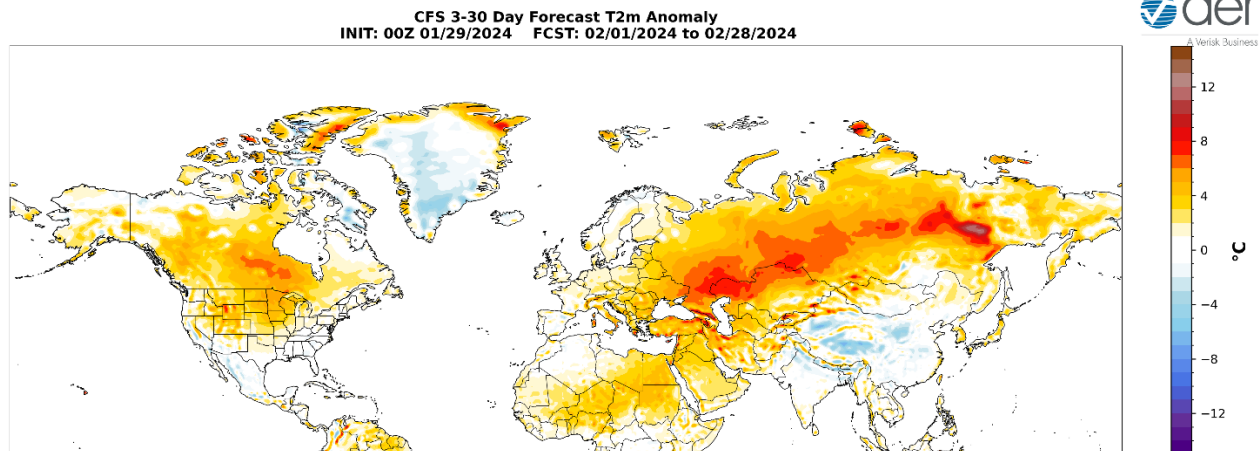


Figure 15. Forecasted average surface temperature anomalies ($^{\circ}\text{C}$; shading) across the Northern Hemisphere for February 2024. The forecasts are from the 00Z 29 January 2024 CFS.

Arctic sea ice extent

Arctic sea ice extent stayed mostly steady this week. I continue to expect that the negative sea ice anomalies will remain focused in the North Atlantic sector, which is currently the case. Though sea ice extent is also slightly below normal as well is in the Bering Sea. Blocking in the Barents-Kara sea region is critical for weakening the PV that favorable for widespread and meaningful cold in Northern Eurasia and eastern North America, which can persist for weeks.

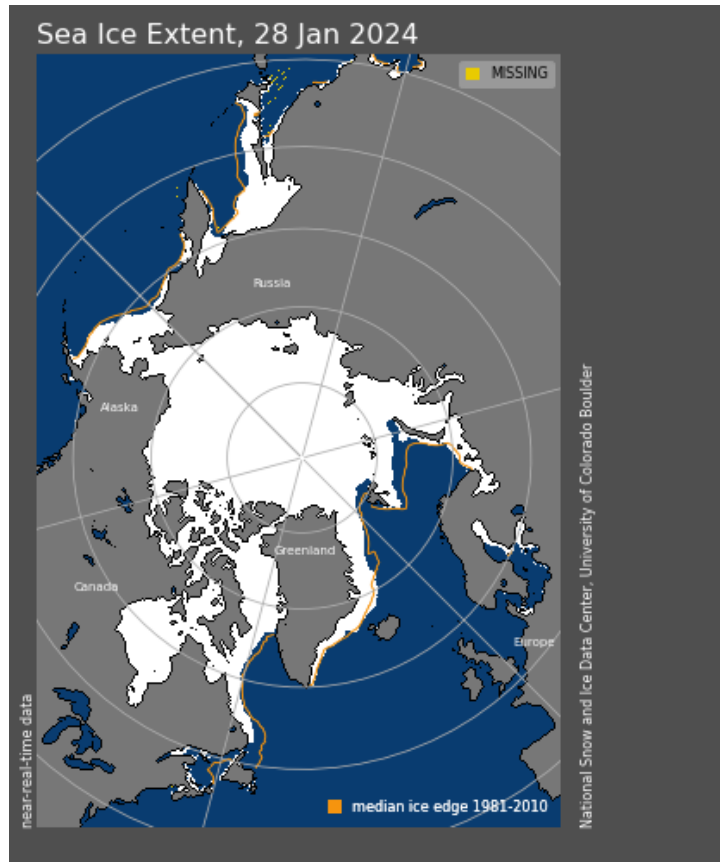


Figure 16. Observed Arctic sea ice extent on 28 January 2024 (white). Orange line shows climatological extent of sea ice based on the years 1981-2010. Image courtesy of National Snow and Ice Data Center (NSIDC). Snow and Ice Data Center (NSIDC).

SSTs/El Niño/Southern Oscillation

Equatorial Pacific sea surface temperatures (SSTs) anomalies are well above normal, especially along the South America coast, indicating that and El Niño remains strong (**Figure 17**) and El Niño conditions are expected through the end of the winter. Observed SSTs across the NH remain well above normal especially in the central North Pacific (west of recent years), the western North Pacific, the eastern North Atlantic and offshore of eastern North America though below normal SSTs exist regionally especially in the South and North Pacific and the North Atlantic.

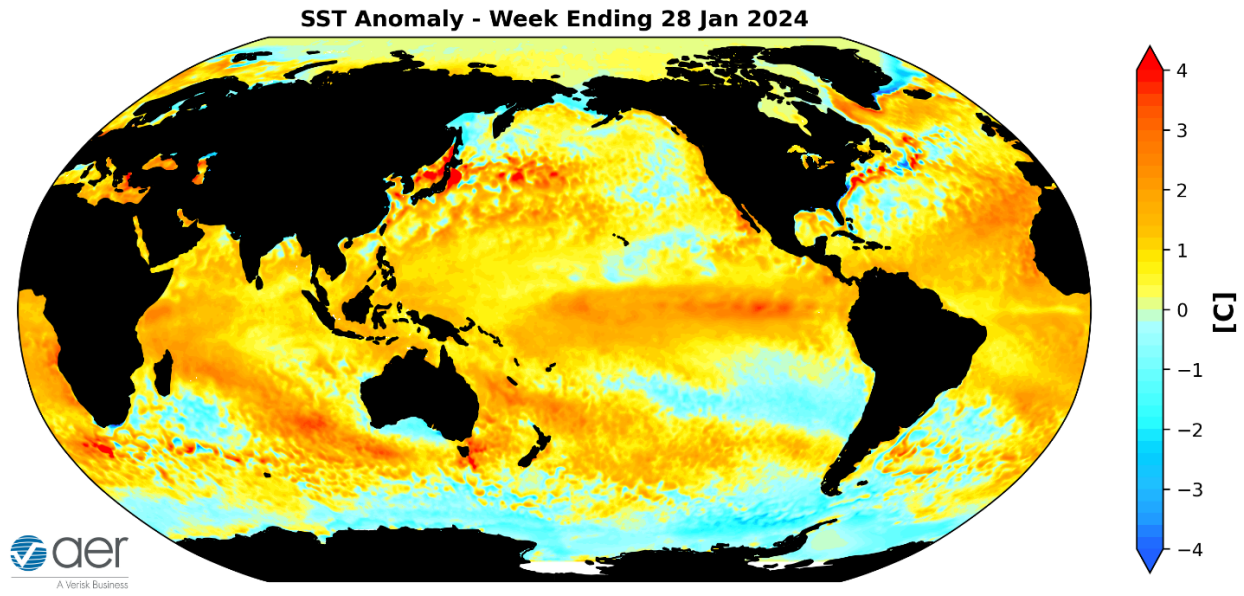


Figure 17. The latest weekly-mean global SST anomalies (ending 28 January 2024).
Data from NOAA OI High-Resolution dataset.

Madden Julian Oscillation

Currently the Madden Julian Oscillation (MJO) is in phase seven (**Figure 18**). The forecasts are for the MJO to stall in phase seven. Phase seven favors ridging in Alaska forcing troughing in western North America with more ridging in the Eastern US. Therefore it seems that the MJO may be having some mixed influence on the weather across North America weather this week and next week. But admittedly this is outside of my expertise.

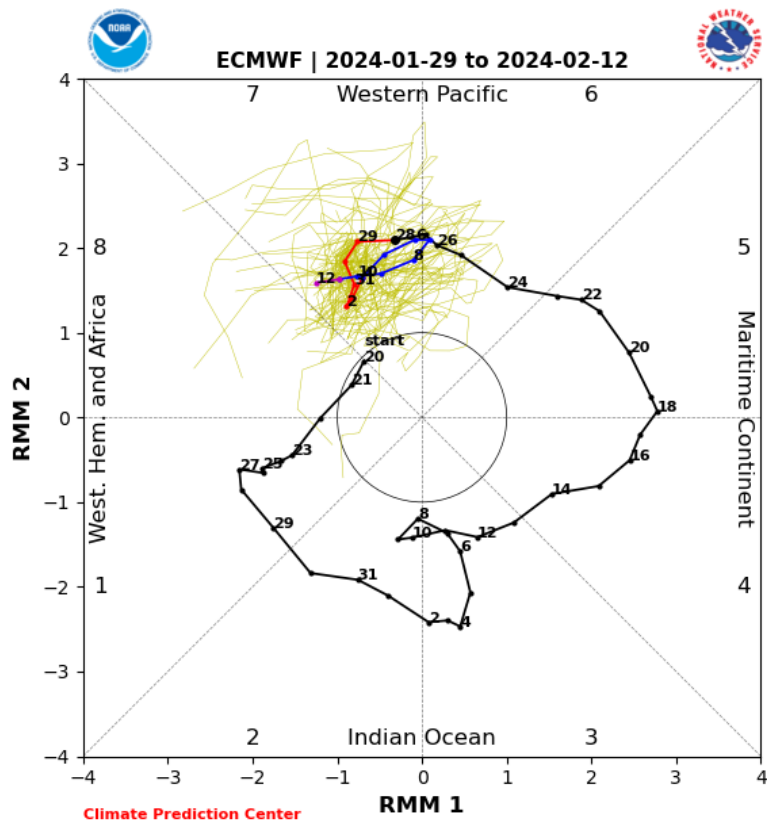


Figure 18. Past and forecast values of the MJO index. Forecast values from the 00Z 29 January 2024 ECMWF model. Yellow lines indicate individual ensemble-member forecasts, with the green line showing the ensemble-mean. A measure of the model “spread” is denoted by the gray shading. Sector numbers indicate the phase of the MJO, with geographical labels indicating where anomalous convection occurs during that phase. Image source:

https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/CLIVAR/clivar_wh.shtml

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We appreciate your taking the time to read the public Arctic Oscillation blog from Dr. Judah Cohen and the AER Seasonal Forecasting team.

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