Arctic Oscillation and Polar Vortex Analysis and Forecasts

January 27, 2025

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 to neutral the next two weeks as pressure/geopotential height anomalies across the Arctic are currently mostly negative and are predicted to remain mostly mixed to negative over the next two weeks. The North Atlantic Oscillation (NAO) is currently positive with mostly negative pressure/geopotential height anomalies across Greenland and the NAO is predicted to be positive to possibly strongly positive the next two weeks as pressure/geopotential height anomalies are predicted to remain negative across Greenland.
- The next two weeks troughing/negative geopotential height anomalies across Greenland will support ridging/positive geopotential height anomalies across much of Europe with the exception of troughing/negative geopotential height anomalies across Northwestern Europe this week and the western Mediterranean next week. This pattern will support mostly normal to above normal temperatures across much of Europe the next two weeks with the exception of the United Kingdom (UK) this week under low heights and across France and Spain under northerly flow next week.
- The next two weeks ridging/positive geopotential height anomalies across Europe and Western Asia will deepen troughing/negative geopotential height anomalies first across Siberia this week and then in Central and pushing into East Asia next week. This pattern

favors widespread normal to above normal temperatures across much of Asia, with normal to below normal temperatures spreading across Siberia this week and then first pushing south into Central Aisa and the eastward into East Asia next week.

- The general pattern across North America this week is ridging/positive geopotential height anomalies centered in Western Canada and the Gulf of Alaska supporting troughing/negative geopotential height anomalies across Eastern Canada and the Southwestern and Eastern United States (US). The next week ridging will return to Alaska and the Gulf of Alaska spread across Western Canada and the Western US with more ridging across the Southeastern US. This pattern favors normal to above normal temperatures across Alaska, Western Canada and the Central and Southern US with normal to below normal temperatures across Eastern Canada, the Western and Northeastern US this week. However, next week below normal temperatures will become more spread out of Alaska across most of Canada and the Western and Northern US with normal to above normal temperatures limited to western Alaska, and the Southeastern US.
- This winter has been all about the polar vortex (PV) alternating among three different states: strong, a Canadian warming but most of all a stretched PV. This pattern looks to continue into February but which ones? Also still watching the battle between high latitude blocking and a strong PV, which has been at a stalemate all winter long. Could high latitude blocking be getting the upper hand as we enter the fourth quarter?

Plain Language Summary

What you see is what you get seems to be the theme of the weather this winter. Overall looks mild for Europe while I see more opportunities for cold in East Asia, Canada and the US heading into February. I also think that a realignment of the atmospheric circulation favors an Arctic outbreak into East Asia in early February. But overall, a couple of more stretched polar vortex events this winter that should bring more relative cold to different parts of the US in February as have seen all January (see **Figure**). Northern Europe has also been cold this month so far, but it does seem that the catalyst for the cold, Greenland blocking, shows no signs of returning for the foreseeable future. Unless we get a larger polar vortex disruption, which starting now needs to be at least considered a possibility.

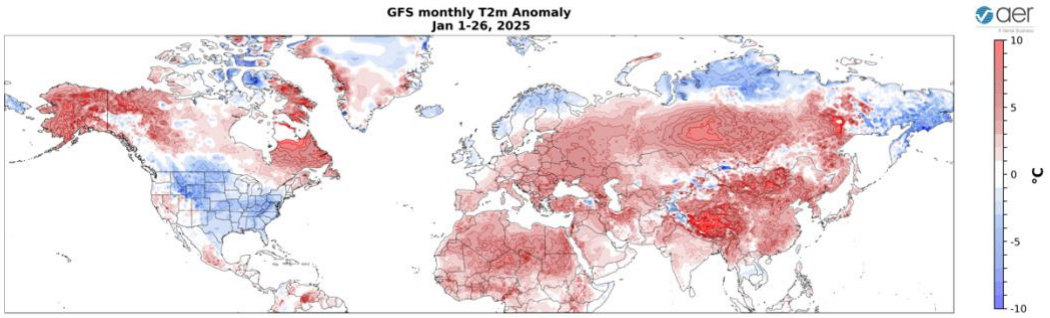


Figure. Estimate of the observed surface temperatures (°C; shading) from 1 January 2025 –

26 January 2025 based on GFS initializations and the GFS forecast from the 27 January 2025 forecast.

Impacts

What do they say, the more things change the more they stay the same. Another week where it feels like all I need to do is update the dates on the plots and text and hit publish. The winter of the stretched polar vortex (PV) goes on in a seemingly in an infinite loop of "lather, rinse repeat." The stretched PV events or periods have been punctuated by a more circular or strong PV and I think only once by a Canadian warming. One more stretched PVs are predicted by the end of January bringing the monthly total to four (about once a week) and the seasonal total since the end of November to eight. This last one looks to be the least impressive of all four mostly directed at Eastern Canada and New England allowing a warm-up elsewhere in the United States (US). One more stretched PV is predicted for the second week of February bringing nine for the season according to my count. The next two installments of the stretched PV can be seen in the latest PV animation in **Figure i**. The eighth stretched PV of the season on the 27-29th of January and then the ninth stretched PV 8-11th of February and should continue beyond that. In between the two stretched you can see the PV retract back to the Arctic on the North American side favoring an overall milder pattern for the US but especially the Eastern US.

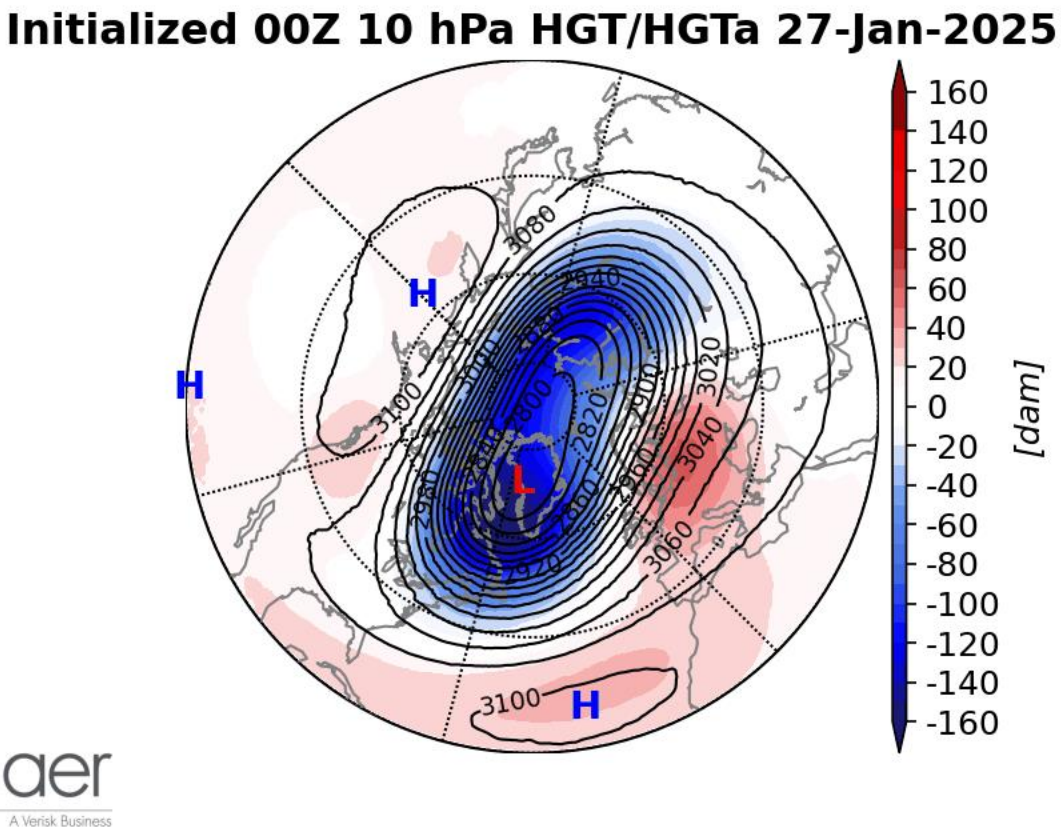


Figure i. Initialized 10 mb geopotential heights (dam; contours) and temperature anomalies (°C; shading) across the Northern Hemisphere for 27 January 2025 and forecasted from 28

January to 11 February 2025. The forecasts are from the 00Z 27 January 2025 GFS model ensemble.

Once again, I present the wave reflection diagnostics. Wave reflection is the physical underpinning of stretched PV events, and it has seemed it has occurred continuously throughout the month of January. During wave reflection, wave energy goes up over Asia, bouncing off the stratospheric PV and then downward over North America. The downward wave energy amplifies the ridge-trough wave over North America and determines the strength or amplitude of the North American wave and the axis or position (see **Figure ii**). Once again, the wave reflection seems to be nearly continuous for the next two weeks. Wave reflection is supportive of two more stretched PVs but the ridge trough axes shift westward with time. For the stretched PV this week the ridge is centered near 120°W and the trough 80-60°W (see **Figure iia**). While for the stretched PV the second week of February the ridge is centered near 160°W and the trough centered on 100°W (see **Figure iib**) but does look unusually broad. So, while the stretched PV brings cold mostly to far eastern North America this week (see **Figure 3**) as discussed in last week's blog, the cold is focused in western North America for the second week of February (see **Figure 9**).

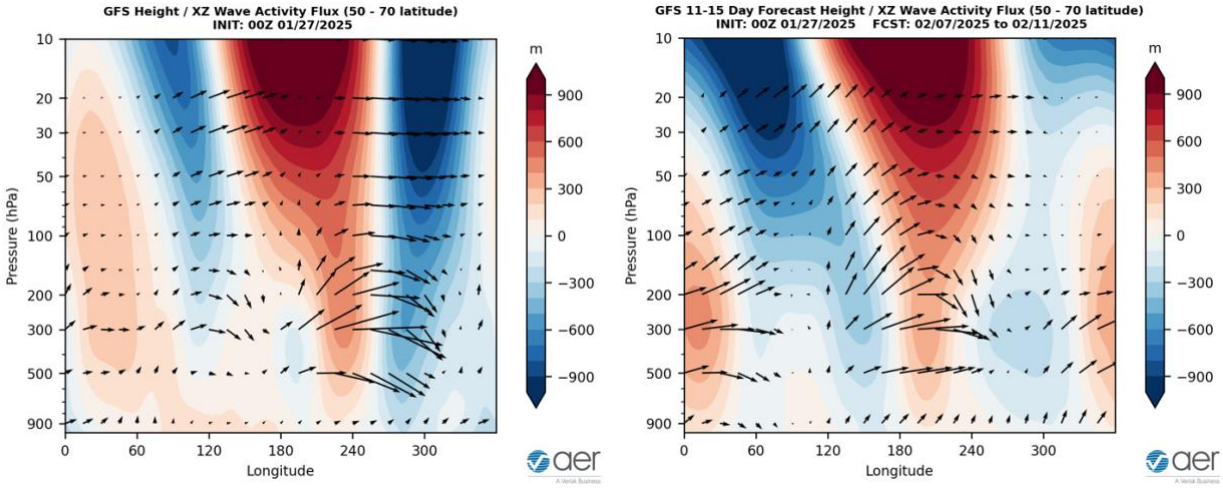


Figure ii. Longitude-height cross section of geopotential eddy height anomalies (shading) and wave activity flux (vectors) a) initialized for 27 January 2025 and b) forecasted for 07 February through 11 February 2025. The forecasts are from the 00Z 27 January 2025 GFS ensemble.

Stretched PVs is related to severe winter weather not only to North America but also East Asia. And from **Figure i**, you can see how the stretched PV in February first stretches or elongates into Asia the first week of February before subsequently stretching into North America the following week (see **Figure i**). And as can be seen in the animation of 500hPa geopotential heights shown in **Figure iii**, the high latitude blocking is predicted to strengthen across the Urals and west of the Dateline forcing a deepening trough in East Asia. This will favor East Asia for an Arctic outbreak for the first week of February (see **Figure 6**). However, as the high latitude blocking returns to

Alaska and Northwestern Canada the second week of February, troughing deepens across North America setting up the next Arctic outbreak into the US the second week of February (see **Figure 9**).

While wintry weather opportunities present themselves in the first half of February for East Asia, Canada and the US, the same cannot be said for Europe. The weather models are predicting the persistent Greenland troughing for the foreseeable future (see **Figure iii**). This should allow high pressure ridging over Europe and an overall milder pattern for at least the next two weeks (see **Figures 3, 6** and **9**). For now, I don't see much evidence for a return to colder weather, unless models push the European ridging further north into the Arctic. And for now, I don't see any signs of this scenario. The other possibility of a turn to cold would be a larger PV disruption like a Canadian warming or even a full-fledged sudden stratospheric warming. No robust signs of this either but not out of the question either (see below **Figure iv**).

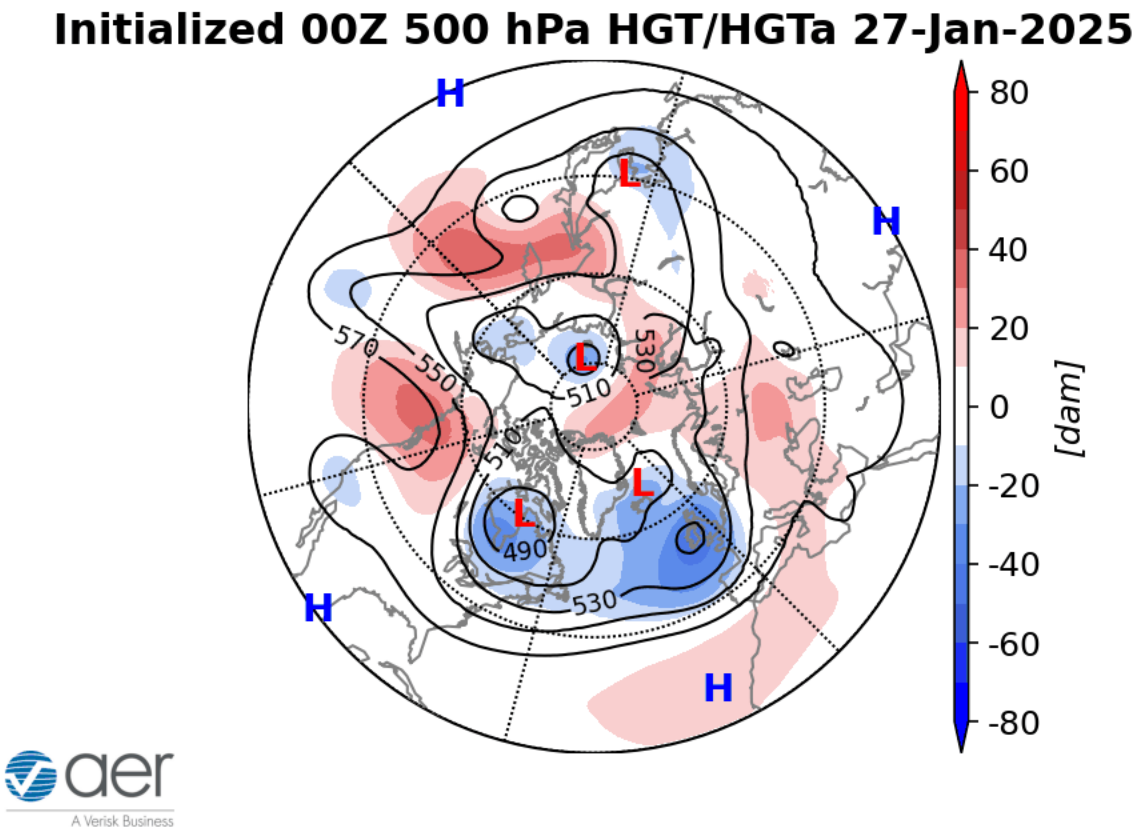


Figure iii. Initialized 500 mb geopotential heights (dam; contours) and decameter anomalies (dam; shading) across the Northern Hemisphere for 27 January 2025 and forecasted from 28 January to 11 February 2025. The forecasts are from the 00Z 27 January 2025 GFS model ensemble.

It has been a challenging forecast all winter and I don't expect the prediction game to get any easier heading into February. There are two major factors that are making the forecast of US temperatures heading into February especially challenging. The first is near record strong PV

predicted by the models (see **Figure 1**). Last week I discussed how I thought we should expect another stretched PV in early February though it was not evident in the ensembles. That issue is less relevant now that all the model forecasts show a stretched PV for the second week of February, though maybe a bit delayed. And based on the operational models the stretched PV could be the most robust of the winter. But just to add more gray hairs to my head both operational model runs from today, GFS and European are predicting another Canadian warming (see **Figure iv**). There is no consistency in any of the operational forecasts and as of yet no support from the ensembles, but the operational models were the first to predict a Canadian warming back in December.

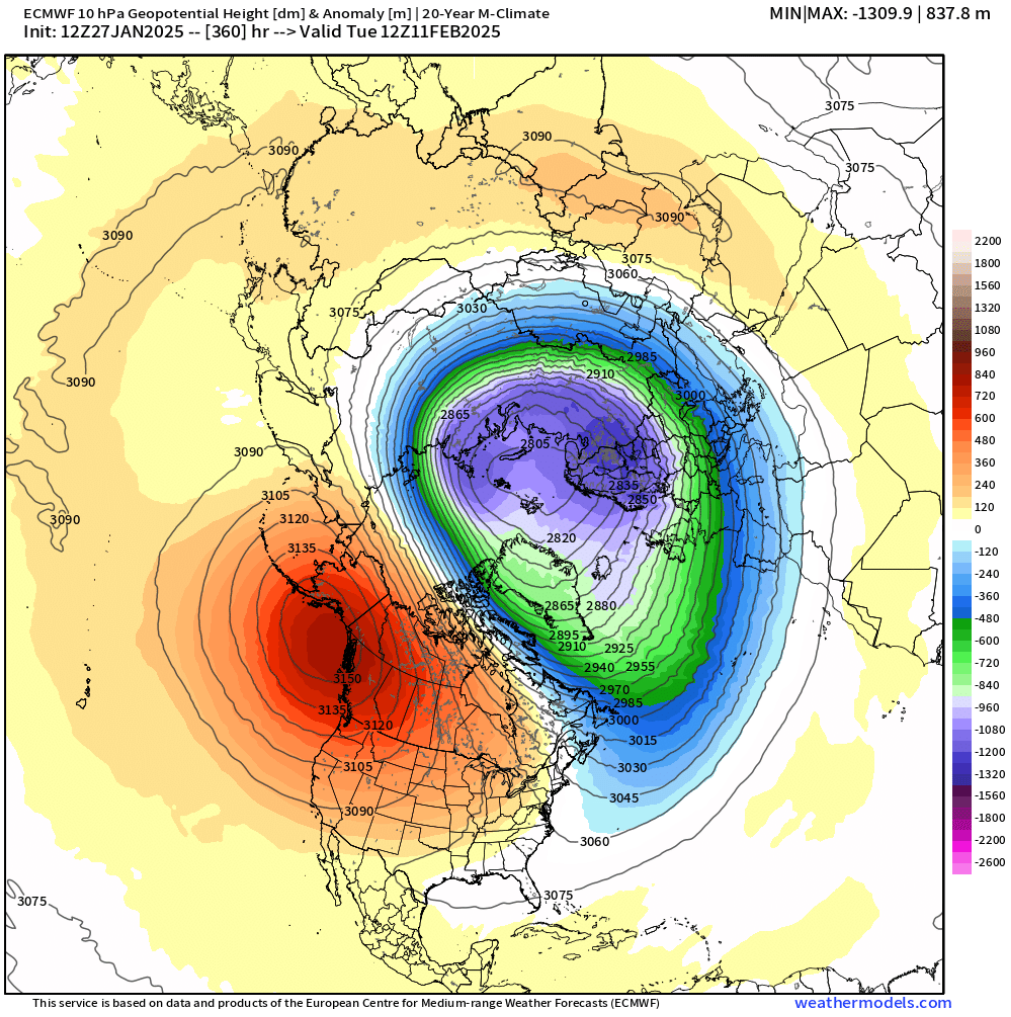


Figure iv. Forecasted 10 mb geopotential heights (dam; contours) and anomalies (meters; shading) across the Northern Hemisphere for 11 February 2025. The forecasts are from the 12Z 27 January 2025 ECMWF operational model. Plot taken from https://weathermodels.com.

I continue to believe that the tropospheric pattern is supportive of stretched PVs with predicted ridging across northwestern Eurasia (Scandi-Ural blocking) and Alaskan and Gulf of Alaska ridging (see **Figures 5** and **8**). In fact, the pattern is starting to look good enough to start

considering a larger PV disruption such as a Canadian warming or even a sudden stratospheric warming (again see **Figure iv**). Either larger PV disruption would shift the cold over Europe and/or Asia and away from North America.

The second complicating factor is the tropical convection. Tropical convection is currently supportive of cold in the Western US and mild in the Eastern US at least through mid-February (see **Figure 18**). The models might tease about cold air making its way into the Eastern US but then keep predicting the cold to shift into the Western US.

I do think that the stretched PV predicted for the second week of February will be supportive of cold in the Eastern US and I would expect the forecasts to turn colder with time. Though given the strong low pressure/heights over Greenland, Southeastern US ridging makes sense, and the cold would more easily push into the Northeastern US and not the Southeastern US as it did in January (see **Figure** in Plain Language summary).

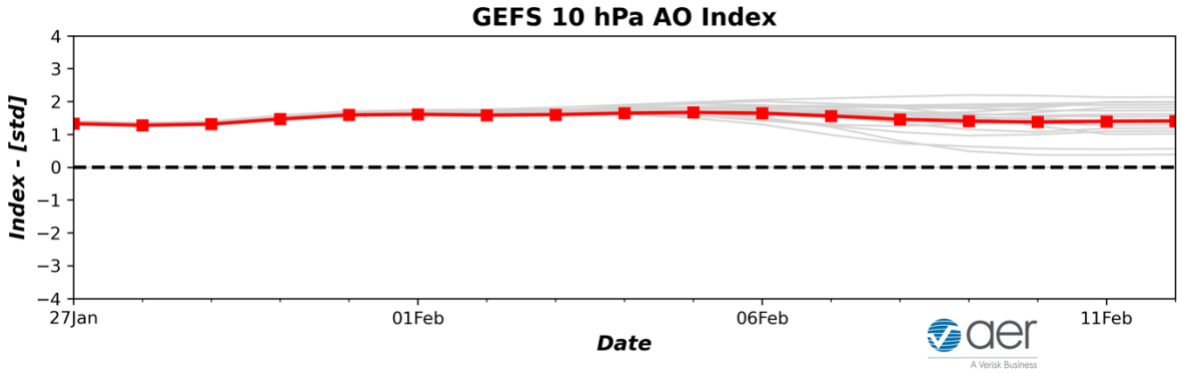
And it is not just me who is struggling as some serious wind shield wiper action with the model forecasts with every new model run. Both the GFS and ECMWF forecast flip warmer and colder in the Eastern US. Last night's run turned much milder while today's runs turned colder again. Not sure why the model forecasts are more volatile than usual.

I am also fond of saying the "trend is your friend." And the interannual trend in the US is for a cooling trend in the center of the US with warming along the US East Coast. So, we shall see if February follows that pattern.

Near-Term

This week

The AO is predicted to be mostly positive this week **(Figure 1**) with mixed to 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 mostly negative geopotential height anomalies across Greenland (**Figure 2**), the NAO is predicted to be positive this week.



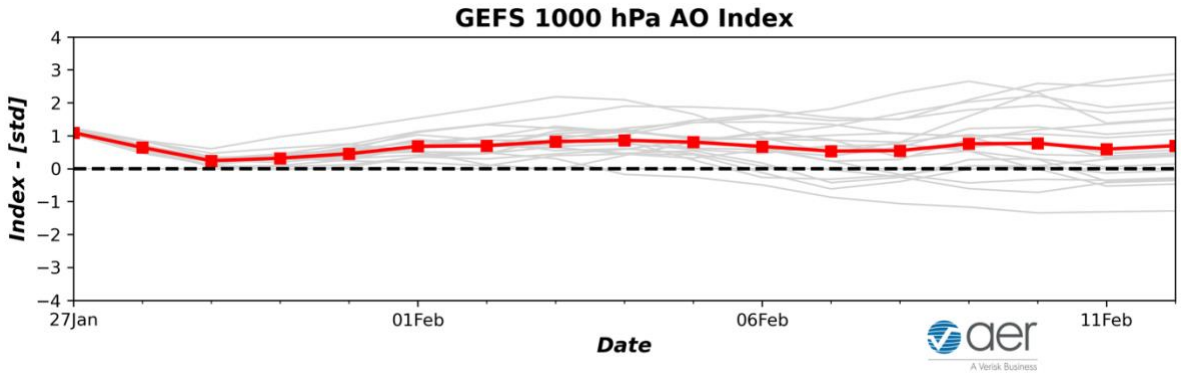


Figure 1. a) The predicted daily-mean AO at 10 hPa from the 00Z 27 January 2025 GFS ensemble. b) The predicted daily-mean AO at 1000 hPa from the 00Z 27 January 2025 GFS ensemble. Gray lines indicate the AO index from each individual ensemble member, with the ensemble mean AO index given by the red line with squares.

This week troughing/negative geopotential height anomalies across Greenland will extend all the way to across Northwest Europe while also supporting strengthening ridging/positive geopotential height anomalies across much of Europe (**Figures 2).** This pattern will favor widespread normal to above normal temperatures across Europe with normal to below normal temperatures mostly limited to Norway and the UK under low heights this period (**Figure 3**). This week the predicted pattern across Asia is widespread ridging/positive geopotential height anomalies across Western Asia forcing troughing/negative geopotential height anomalies across Siberia and extending into Northeast Asia (**Figure 2**). This pattern favors normal to above normal temperatures widespread across much of Asia with normal to below normal temperatures across Southwest Asia, much of Siberia and extending into Northeast Asia **(Figure 3**).

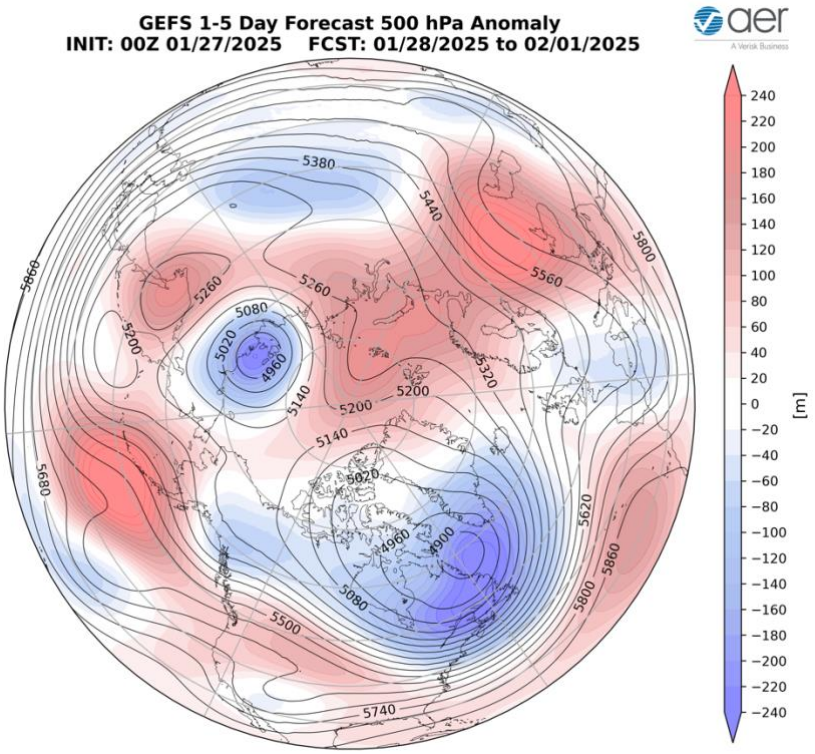


Figure 2. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 28 Jan to 01 Feb 2025. The forecasts are from the 00Z 27 January 2025 GFS ensemble.

This week ridging/positive geopotential height anomalies spread across the Gulf of Alaska and Western Canada will support troughing/negative geopotential height anomalies across Eastern Canda and the Southwestern and Northeastern US. (**Figure 2**). This pattern favors normal to above normal temperatures across Western Canada and the Central US with normal to below normal temperatures across Alaska, Eastern Canada, the Western and Northeastern US (**Figure 3**).

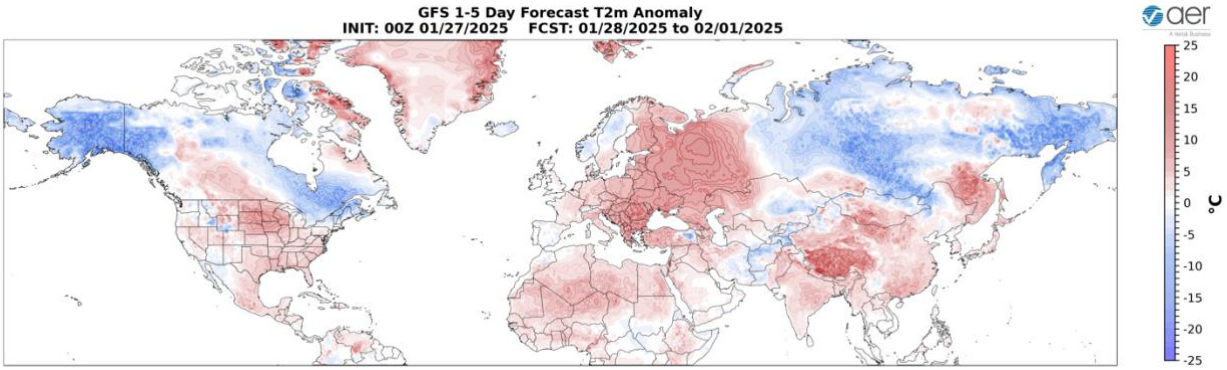


Figure 3. Forecasted surface temperature anomalies (°C; shading) from 28 Jan to 01 Feb 2025. The forecast is from the 00Z 27 January 2025 GFS ensemble.

Troughing and/or cold temperatures will support new snowfall in parts of Eastern Siberia, Central and Northeast Asia and the Tibetan Plateau while warm temperatures will support snowmelt in the Alps, the Baltics and Western Russia this week (**Figure 4**). Troughing and/or cold temperatures will support new snowfall across western Alaska, Western and Eastern Canada, the higher elevations of the Canadian West Coast, New England and possibly New Mexico while warm temperatures will support snowmelt in Western Canada, the Western US and the Ohio Valley this week (**Figure 4**).

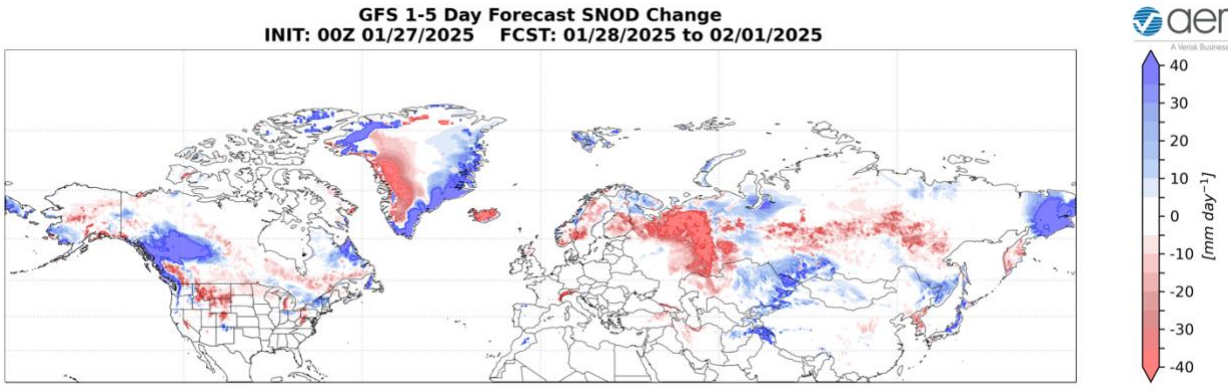


Figure 4. Forecasted snow depth changes (mm/day; shading) from 28 Jan 2025 to 01 Feb 2025. The forecast is from the 00Z 27 January 2025 GFS ensemble.

Near-Mid Term

Next week

With geopotential height anomalies remaining mostly negative across the Arctic and with mixed geopotential height anomalies across the mid-latitudes this period (**Figure 5**), the AO will likely be positive this period (**Figure 1**). With predicted mostly negative pressure/geopotential height anomalies across Greenland (**Figure 5**), the NAO will likely be positive this period as well.

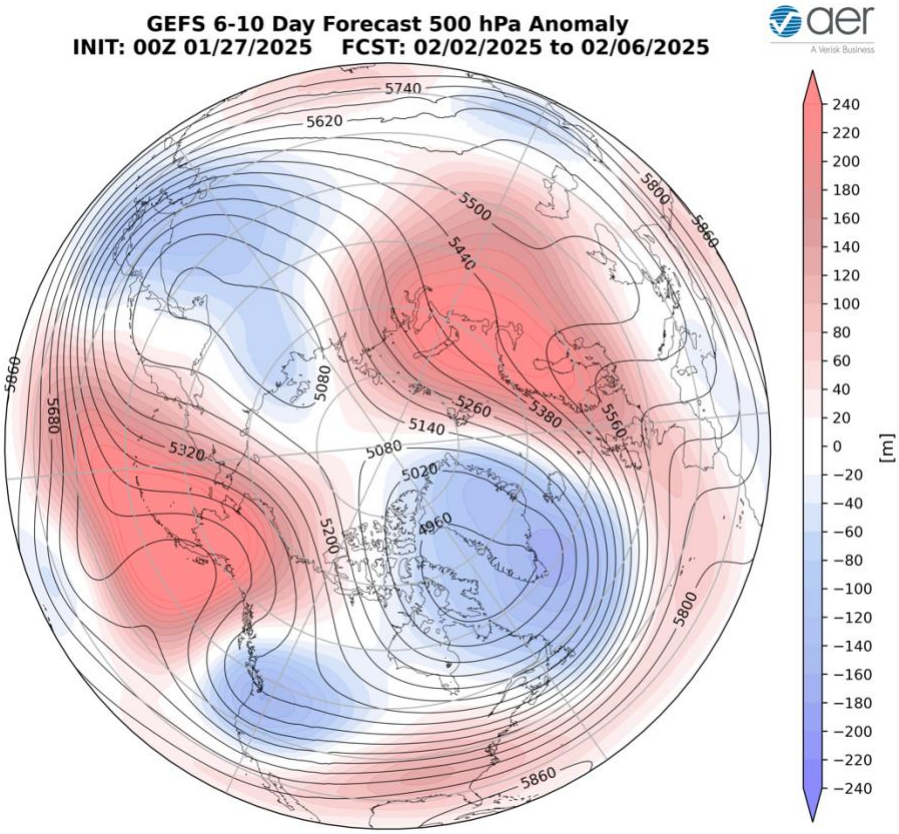


Figure 5. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 02 Feb to 06 Feb 2025. The forecasts are from the 00Z 27 January 2025 GFS ensemble.

Troughing/negative geopotential height anomalies across Greenland will continue to support ridging/positive geopotential height anomalies across much of Europe with the exception of troughing/negative geopotential height anomalies in the western Mediterranean this period (**Figure 5**). This pattern favors normal to above normal temperatures across much of Europe including the UK with normal to below normal temperatures limited to France and Spain under northerly flow this period (**Figure 6**). Ridging/positive geopotential height anomalies are predicted to dominate Asia forcing troughing/negative geopotential height anomalies across Siberia and into East Asia (**Figure 5**). This pattern favors widespread normal to above normal temperatures across Western

and Southern Asia with normal to below normal temperatures across much of Siberia and parts of Central and Northeast Asia this period (**Figure 6**).

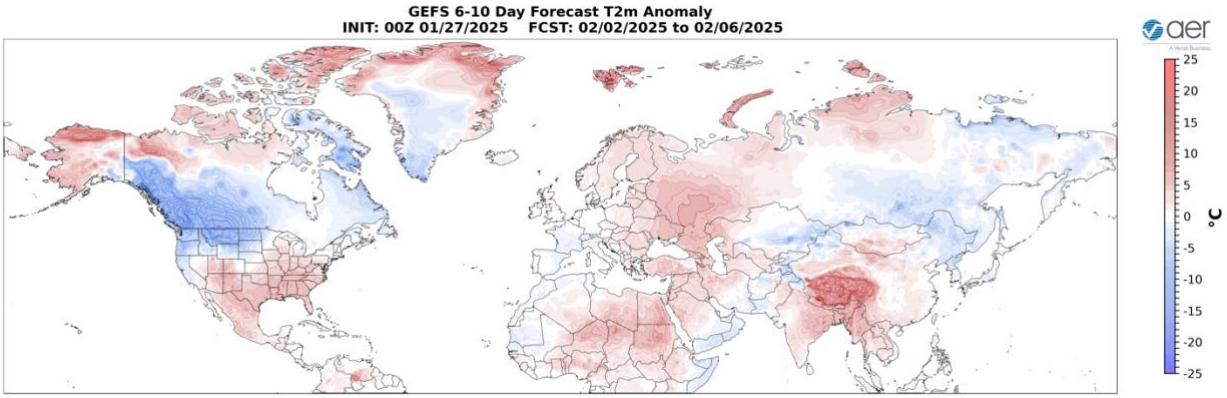


Figure 6. Forecasted surface temperature anomalies (°C; shading) from 02 Feb to 06 Feb 2025. The forecast is from the 00Z 27 January 2025 GFS ensemble.

An amplified pattern is predicted to return to North America with ridging/positive geopotential height anomalies predicted across the Gulf of Alaska and Alaska and the Southeastern US forcing troughing/negative geopotential height anomalies across much of Canada and the Western US this period (**Figure 5**). This pattern will favor normal to above normal temperatures across Alaska, much of Canada and the Southern and Eastern US with normal to below normal temperatures across much of Canada and the Western and Northeastern US (**Figure 6**).

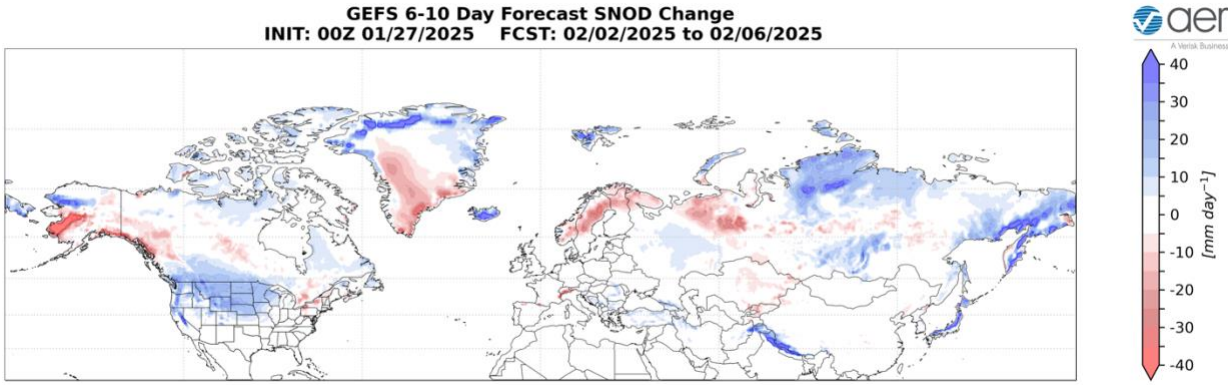


Figure 7. Forecasted snow depth changes (mm/day; shading) from 02 Feb to 06 Feb 2025. The forecast is from the 00Z 27 January 2025 GFS ensemble.

Troughing and/or cold temperatures will support new snowfall across Turkey, Siberia, Northeast Asia and the Tibetan Plateau while warm temperatures will support snowmelt in parts of Scandinavia, the Alps and Western Russia this period (**Figure 7**). Troughing and/or cold temperatures will support new snowfall across northern Alaska, Southern Canada, the Western US and the Central and Northern US Plains while warm temperatures will support snowmelt in southern Alaska, Western Canada and the Northeastern US this period (**Figure 7**).

Mid Term

Week Two

With predicted persistent mixed to negative geopotential height anomalies across the Arctic and mixed geopotential height anomalies across the mid-latitudes this period (**Figure 8**), the AO will likely remain neutral to positive this period (**Figure 1**). With predicted persistent negative pressure/geopotential height anomalies across Greenland (**Figure 8**), the NAO will likely remain positive this period.

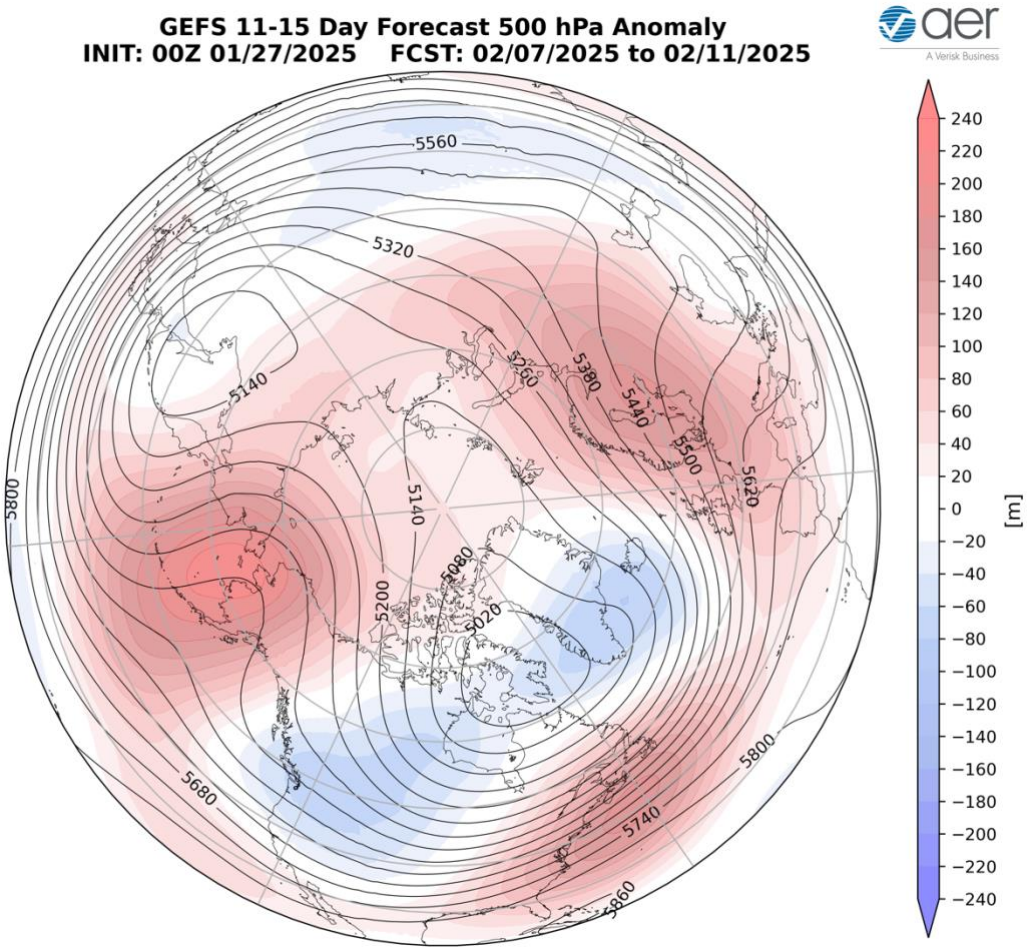


Figure 8. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 07 Feb to 11 Feb 2025. The forecasts are from the 00Z 27 January 2025 GFS ensemble.

Persistent troughing/negative geopotential height anomalies across Greenland is predicted to continue supporting ridging/positive geopotential height anomalies across Europe (**Figure 8**). This pattern should favor widespread normal to above normal temperatures across much of

Europe including the UK this period (**Figures 9**). The persistent ridging/positive geopotential height anomalies across Europe and Western Asia is predicted to persist supporting troughing/negative geopotential height anomalies across Northern and Eastern Asia this period (**Figure 8**). The predicted pattern favors widespread normal to above normal temperatures across much of Asia with normal to below normal temperatures limited to Southern Siberia and parts of Central and Northeast Asia this period (**Figure 9**).

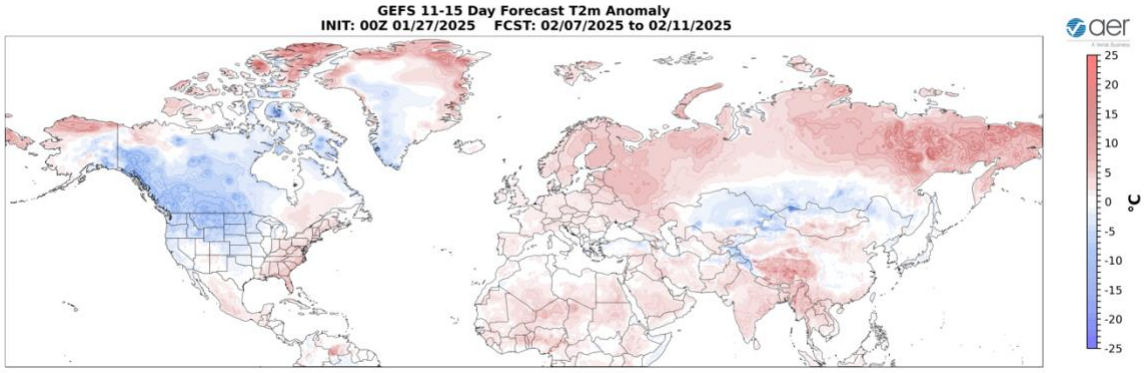


Figure 9. Forecasted surface temperature anomalies (°C; shading) from 07 Feb to 11 Feb 2025. The forecast is from the 00Z 27 January 2025 GFS ensemble.

Ridging/positive geopotential height anomalies near the Aleutians and Alaska will support troughing/negative geopotential height anomalies across much of Canada and the Western US with more ridging/positive geopotential height anomalies across the US East Coast this period (**Figure 8**). Below normal temperatures will continue to spread south and east out of eastern Alaska across much of Canada and into the Western and Central US with normal to above normal temperatures across western Alaska and the US East Coast this period (**Figure 9**).

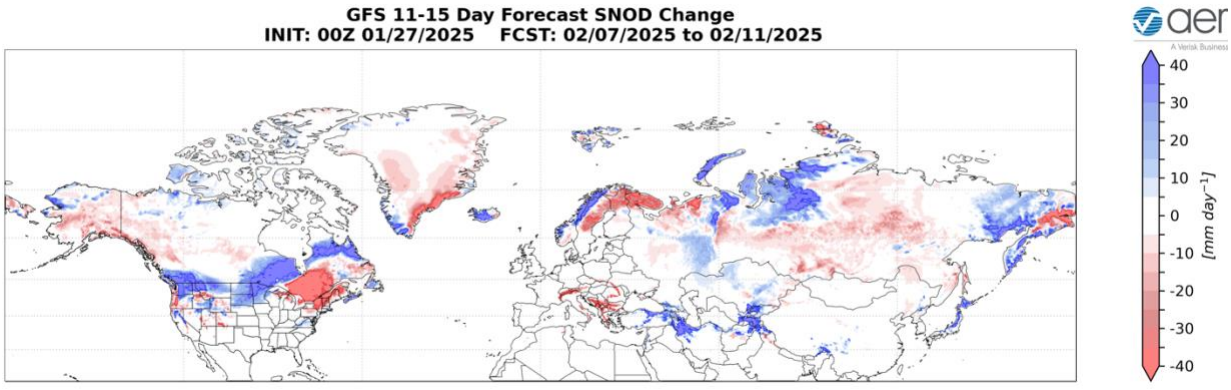


Figure 10. Forecasted snow depth changes (mm/day; shading) from 07 Feb to 11 Feb 2025. The forecast is from the 00Z 27 January 2025 GFS ensemble.

Troughing and/or cold temperatures will support new snowfall across Norway, parts of Siberia, the Caucuses, the Tibetan Plateau and Northeastern Asia while warm temperatures will support

snowmelt in Sweden, the Alps, the Balkans and Central Siberia this period (**Figure 10**). Troughing and/or cold temperatures will support new snowfall across Southwestern Canada, Ontario, Quebec and the Northwestern US while warm temperatures will support snowmelt in Southeastern Canada and the Northeastern US this period (**Figure 10**).

Longer Term

30–day

The latest plot of the polar cap geopotential height anomalies (PCHs) currently shows warm/positive PCHs in the troposphere with cold/negative PCHs in the stratosphere (**Figure 11**). The cold/negative PCHs from the stratosphere are predicted to persist and strengthen the next two weeks while the warm/positive PCHs in the troposphere are predicted to also mostly persist. The contrast between cold/negative PCHs in the stratosphere and warm/positive PCHs in the troposphere continues for yet another two weeks (**Figure 11**). For now, this suggests that the stratosphere and troposphere are mostly uncoupled. At least in the models, it looks like once again the strong PV is dominating high latitude blocking but to me the tropospheric pattern looks supportive of weakening the PV.

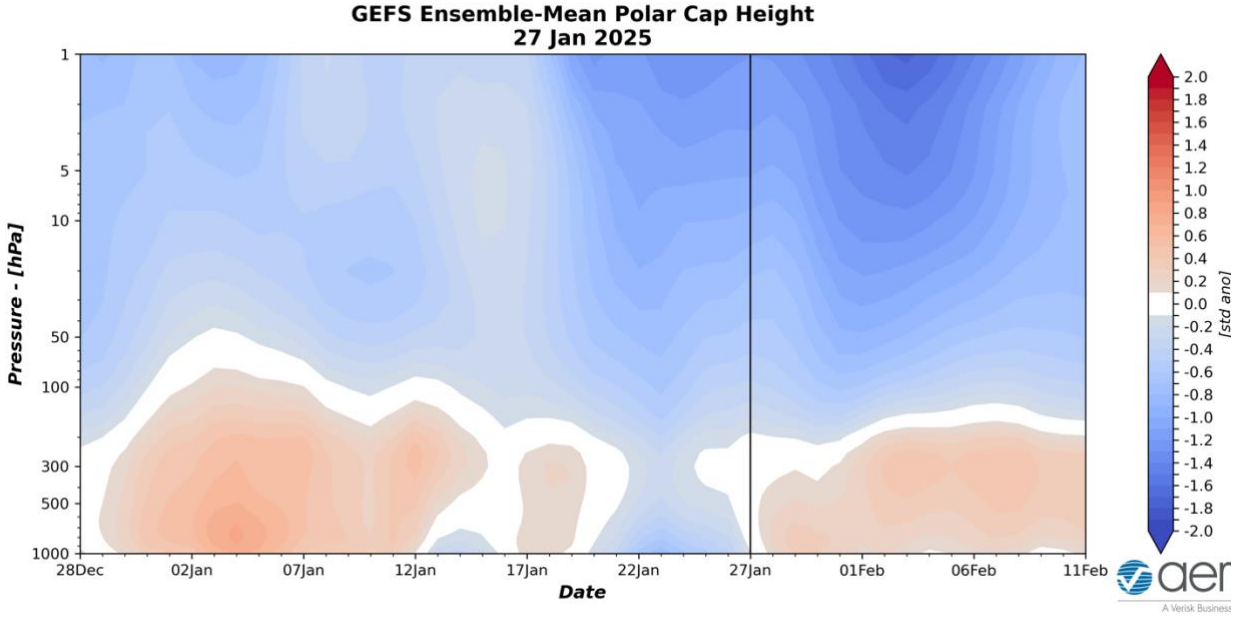


Figure 11. Observed and predicted daily polar cap height (i.e., area-averaged geopotential heights poleward of 60°N) standardized anomalies. The forecast is from the 00Z 27 January 2025 GFS ensemble.

The predicted weak but warm/positive and cold/negative PCHs in the lower troposphere the next two weeks (**Figure 11**) are consistent with the predicted near neutral surface AO this week and next week (**Figure 1**). I do wonder if maybe the GFS is a bit too zealous with the positive AO predictions given the lack of cold/negative PCHs in the troposphere. Still waiting to see if the warm/positive PCHs in the troposphere could force a larger polar vortex disruption or the

cold/negative PCHs in the stratosphere consistently couple to the surface. Still, lots of questions and no definitive signs.

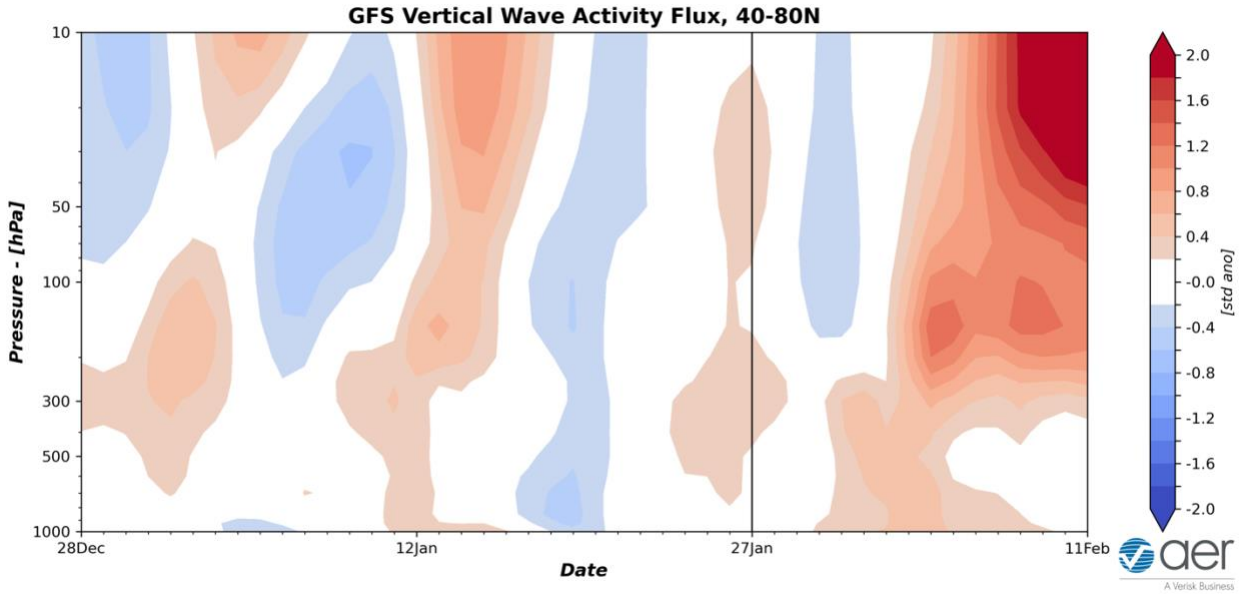


Figure 12. Observed and predicted daily vertical component of the wave activity flux (WAFz) standardized anomalies, averaged poleward of 40-80°N. The forecast is from the 00Z 27 January 2025 GFS ensemble.

Vertical Wave Activity Flux (WAFz) from the troposphere to the stratosphere or poleward heat transport in the stratosphere has been relatively quiet this season (**Figure 12**). However, the alternating positive (red) and negative (blue) WAFz anomalies is predicted to continue for another two weeks and is characteristic of wave reflection associated with stretched PVs (**Figure 12**). Today's plot does show a strong pulse of WAFz the second week of February. For now I question of the GFS is overly aggressive with this very strong pulse but something to watch as the pattern is supportive of a larger PV disruption in my opinion.

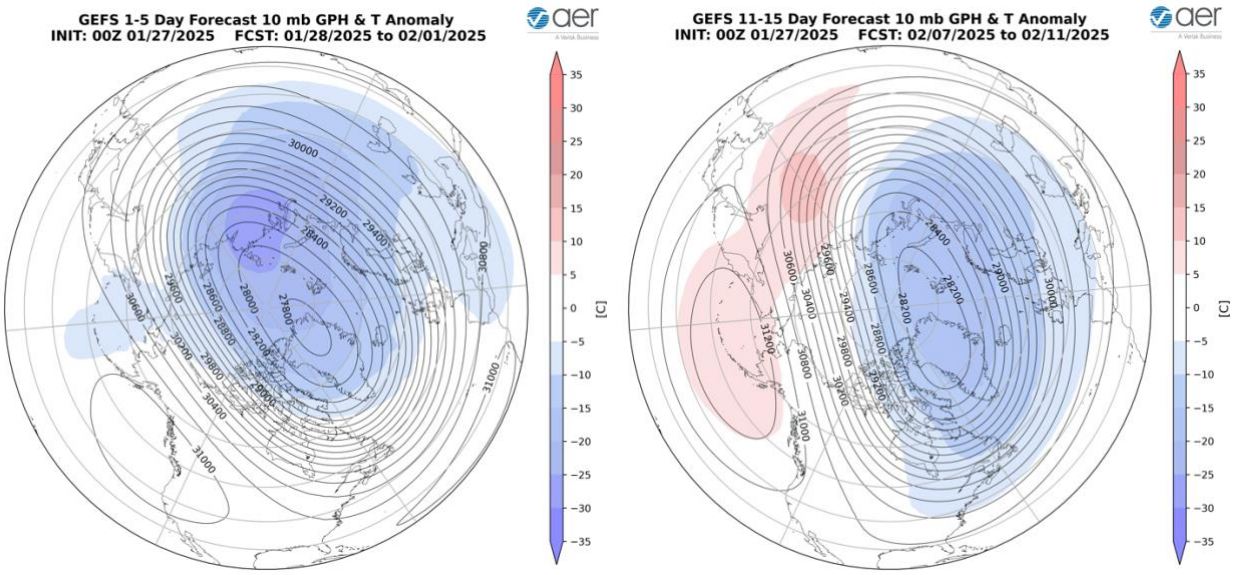


Figure 13. (a) Forecasted 10 mb geopotential heights (dam; contours) and temperature anomalies (°C; shading) across the Northern Hemisphere for 28 Jan to 01 Feb 2025. (b) Same as (a) except forecasted averaged from 07 Feb to 11 Feb 2025. The forecasts are from the 00Z 27 January 2025 GFS model ensemble.

This week the polar vortex (PV) is predicted to move across the northeastern tip of Greenland and become more elongated in shape with relatively coldest temperatures across the Arctic in the polar stratosphere (**Figure 13a**). This is consistent with a yet another stretched PV (for those keeping score at home, the eighth of the season according to my count). Though it is directed mostly at Eastern Canada and the Northeastern US. The next week the PV is predicted to be centered over Greenland yet again to become more elongated in shape with relatively coldest temperatures across the North Atlantic side of the Arctic in the stratosphere (**Figure 13b**). This event looks more robust of the two. For those keeping score at home, the ninth of the season. The stratospheric AO in **Figure 1** this week continues to show that despite the repeated stretched PVs, overall, the PV remains strong and possibly record strong, and any cold air outbreaks should remain brief with each individual stretched PV event, on the order of a week or so.

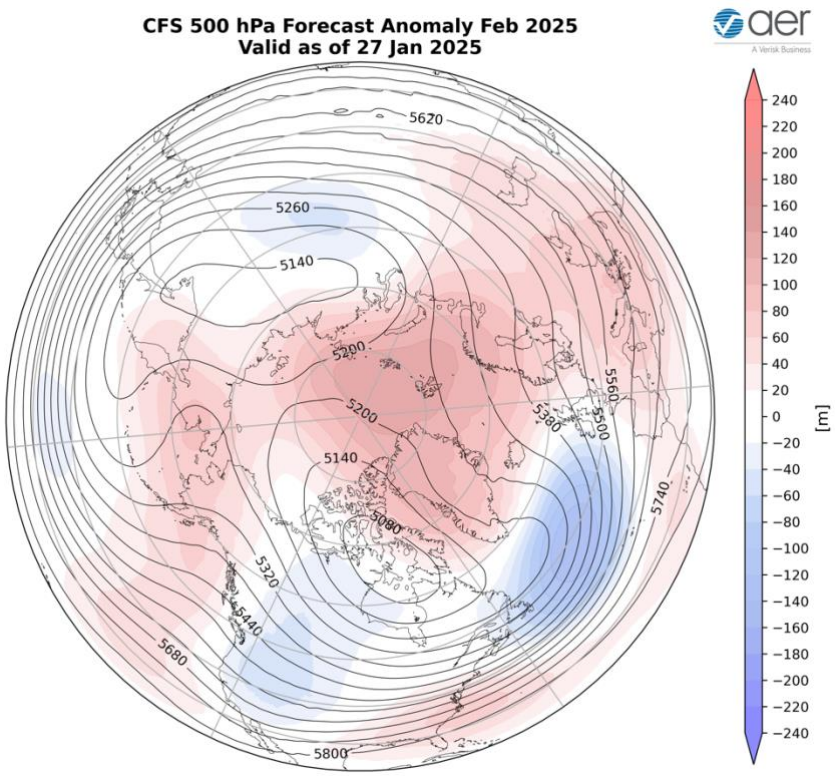


Figure 14. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere for February 2025. The forecasts are from the 00Z 27 January 2025 CFS.

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 on Eastern Europe, the Barents-Kara Seas, Greenland, centered in the Gulf of Alaska, Alaska and into Eastern Siberia and the Southeastern US with troughing across Northern and Eastern Asia, Western Canada, Baffin Bay and the Western US (**Figure 14**). This pattern favors seasonable to relatively warm temperatures across Europe, Western and Southern Asia, Eastern Siberia and the Southeastern US with seasonable to relatively cold temperatures across Western and Central Siberia, Northeast Asia, Alaska, much of Canada but especially Western Canada and the Western and Northern US but especially the Plains (**Figure 15**).

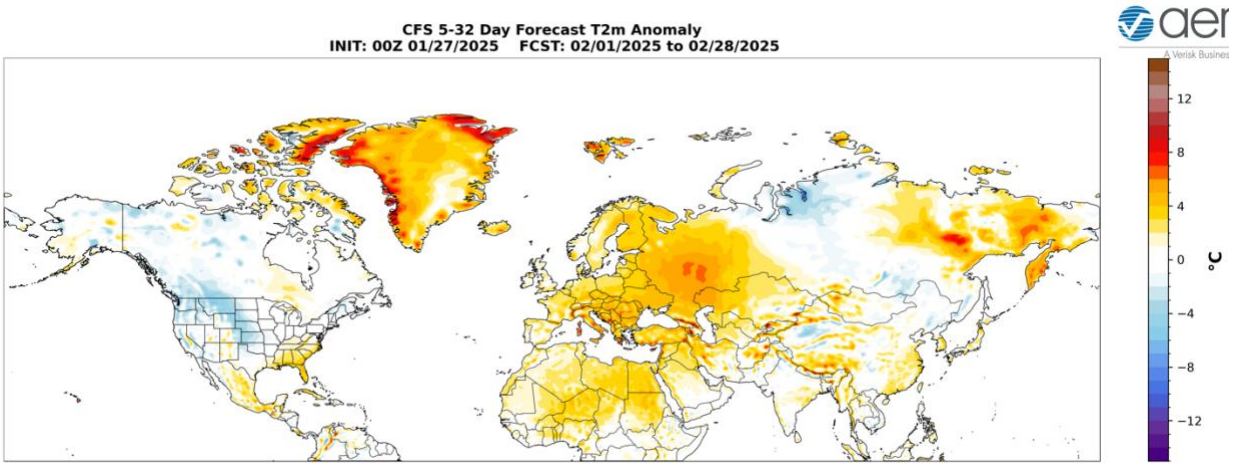


Figure 15. Forecasted average surface temperature anomalies (°C; shading) across the Northern Hemisphere for February 2025. The forecasts are from the 00Z 27 Jan 2025.

Boundary Forcings

Arctic Sea Ice

Sea ice growth continues relatively slowly with negative anomalies in the Barents-Kara Seas, the Sea of Okhotsk and the Labrador Sea (see **Figure 16**). The lack of sea ice in the that favors a weak PV and colder temperatures across the interior of the NH continents. The influence of sea ice on remote weather is likely waning.

Figure 16. Observed Arctic sea ice extent on 26 January 2025 (white). Orange line shows climatological extent of sea ice based on the years 1981-2010. Image from the National Snow and Ice Data Center (NSIDC). URL: https://nsidc.org/sea-ice-today

SSTs/El Niño/Southern Oscillation

Equatorial Pacific sea surface temperatures (SSTs) anomalies are below normal, between the Dateline and the South America coast, indicating that a La Niña event has emerged but is focused more near the Dateline rather than close to the South American coast (**Figure 17**) and weak La Niña conditions are expected through the end of winter. Observed SSTs across the NH remain well above normal especially in the central North Pacific centered on the Dateline and the western North Pacific, much of the North Atlantic and offshore of the Canadian Maritimes though below normal SSTs exist regionally especially in the South Pacific. I have wondered if the warmer SSTs this year relative to recent years along the west coast of North America is favoring the cold air further to the east this winter compared to the past decade and this was certainly true in January.

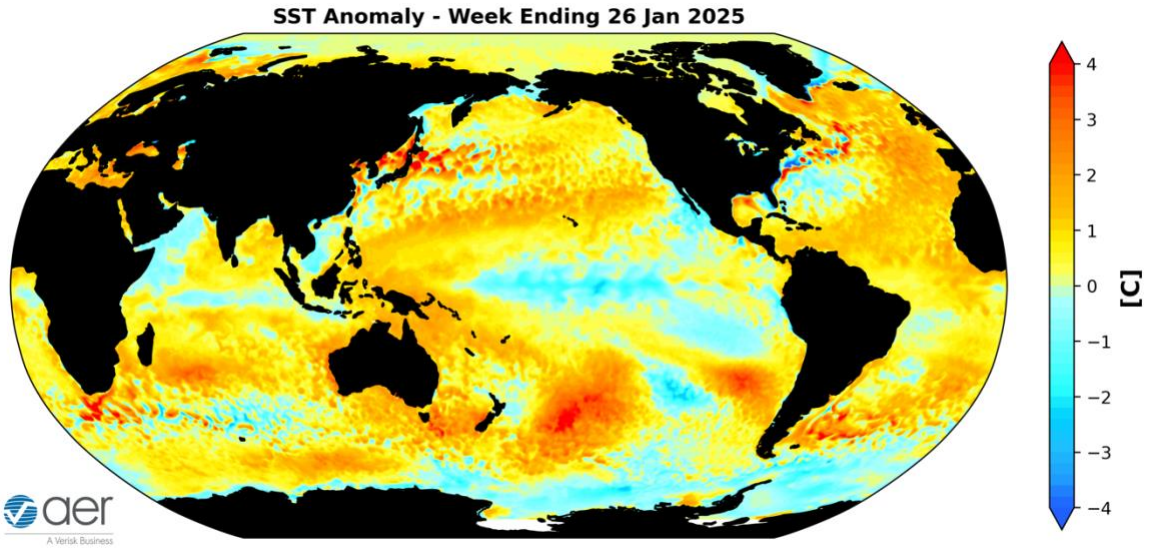


Figure 17. The latest daily-mean global SST anomalies (ending 26 Jan 2025). Data from NOAA OI High-Resolution dataset. Source https://psl.noaa.gov/map/clim/sst.shtml

Madden Julian Oscillation

Currently the Madden Julian Oscillation (MJO) is in phase four (**Figure 18**). The forecasts are for the MJO to weaken where no phase is favored and then possibly emerge in phases six and seven. Phases four, six and seven favor troughing in the Western US and ridging in the Eastern US. Therefore, it seems that the MJO may be having some influence on North American weather the next couple of weeks. But admittedly this is outside of my expertise.

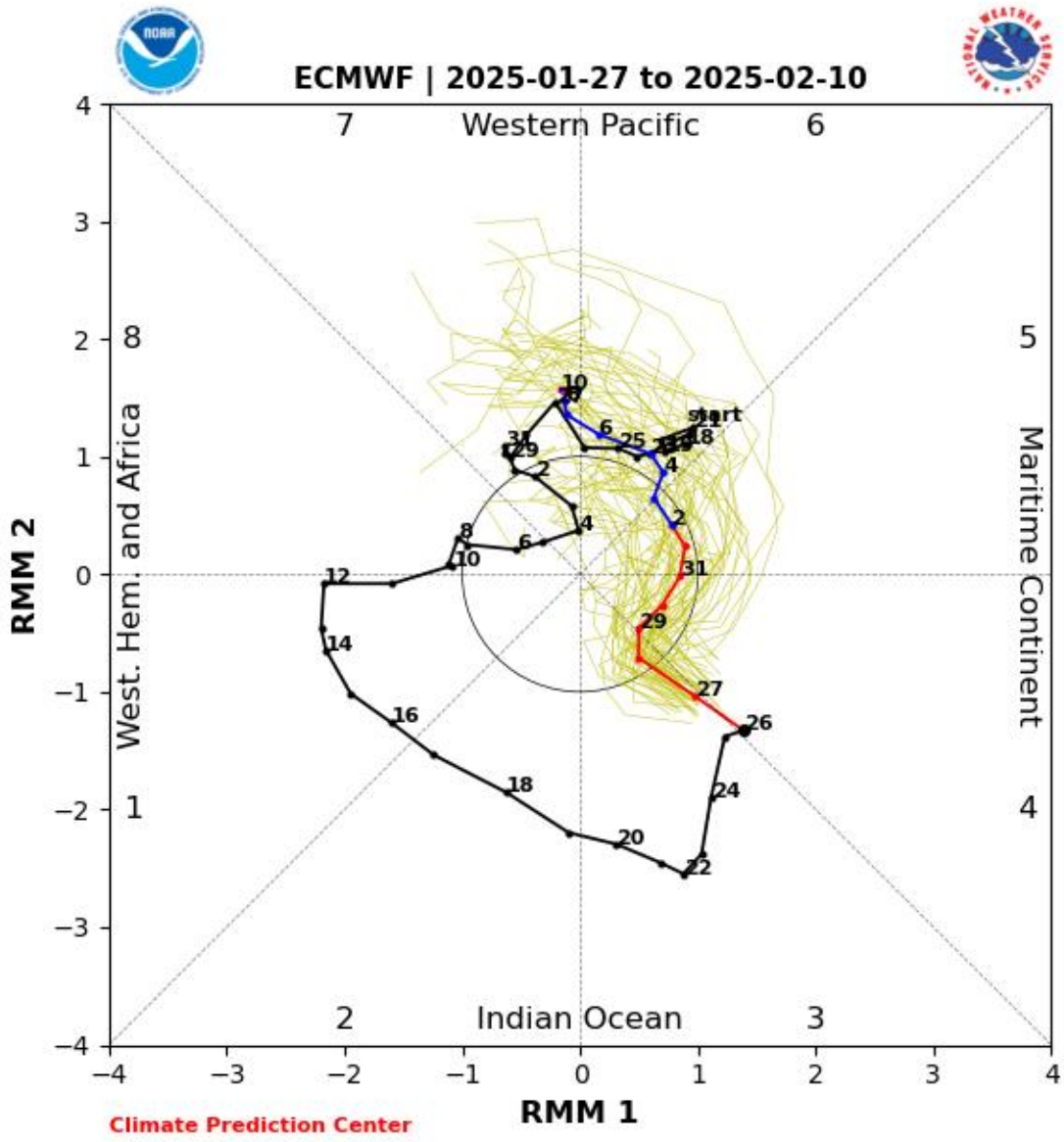


Figure 18. Past and forecast values of the MJO index. Forecast values from the 00Z 27 January 2025 ECMWF model. Yellow lines indicate individual ensemble-member forecasts, with the green line showing the ensemble-mean. A measure of the model 'spread' is denoted by the gray shading. Sector numbers indicate 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/ecmf.shtml

Atmospheric and Environmental Research

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