JANUS RESEARCH GROUP

Arctic Oscillation and Polar Vortex Analysis and Forecasts

January 19, 2026

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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The AO/PV blog is partially supported by NSF grant AGS: 1657748

Summary

- The Arctic Oscillation (AO) is currently negative and is predicted to remain negative the next two weeks as pressure/geopotential height anomalies across the Arctic are currently mostly positive and are predicted to remain mostly positive the next two weeks. The North Atlantic Oscillation (NAO) is currently positive with weak pressure/geopotential height anomalies dominate across Greenland, and the NAO is predicted to trend negative and remain negative the next two weeks as pressure/geopotential height anomalies are predicted to remain mostly positive across Greenland the next two weeks.
- Ridging/positive geopotential height anomalies across Greenland will support troughing/negative geopotential height anomalies across Europe the next two weeks. This pattern will favor a classical negative NAO pattern with normal to below normal temperatures across Northern Europe including the United Kingdom (UK) with normal to above normal temperatures across Southern Europe the next two weeks. However this week westerly flow will support normal to above normal temperatures across Western Europe including the UK.
- The general pattern across Asia the next two weeks is ridging/positive geopotential height anomalies stretching from Greenland to across the Eurasian sector of the Arctic including Eastern Siberia supporting troughing/negative geopotential height anomalies across much of Northern Asia with more ridging mostly confined to Southeast Asia. This pattern favors

widespread normal to below normal temperatures across much of Northern Asia with normal to above normal temperatures across Eastern Siberia and most of Southern Asia including the Tibetan Plateau.

- The general pattern across North America the next two weeks is ridging/positive geopotential height anomalies across Alaska and the Gulf of Alaska will support deep troughing/negative geopotential height anomalies across eastern Canada and the Eastern United States (US). This patten will support the next two weeks widespread normal to below normal temperatures stretching across most of Canda and Eastern US with the exceptions of normal to above normal temperatures across Alaska, and the Western US. However at the very end of January warm temperatures will spread across Canada and the Central US with normal to below normal temperatures limited to the Eastern US.
- I have been discussing how the polar vortex (PV) can walk through three doors and therefore the weather. I still favor "rinse, lather, repeat" or door number three but my uncertainty is increasing. My thoughts below.

Plain Language Summary

So far this winter, cold temperatures have dominated northern Scandinavia, much of Russia, Alaska, much of Canada and the Northeastern US (see **Figure**). In contrast mild temperatures have dominated Europe, Western, Central and Eastern Asia, Eastern Siberia, Northeast Canada and much of the US (see **Figure**). The forecast for the next two weeks can be summarized as an expansion of the cold after a mild start to the new year both across Eurasia mostly into Europe and even North America thanks to impressive high-laittude blocking (see **Figures 3** and **96**). The polar vortex (PV) was until in early January circular and strong, which favors relatively mild temperatures mostly in North America and Asia. However since then the PV has became stretched or more elongated and even strung out. I am still riding the "rinse, lather, repeat" PV and weather pattern for the foreseeable future. Basically, alternating stretched PVs (cold) and relaxation to a more circular PV (mild). We have one stretched PV ongoing currently and another one for late January. I still think that it is worth noting the predicted upcoming warm Arctic/cold continents pattern (see **Figures 3** and **6**). It is a stark and impressive example that doesn't occur that often.

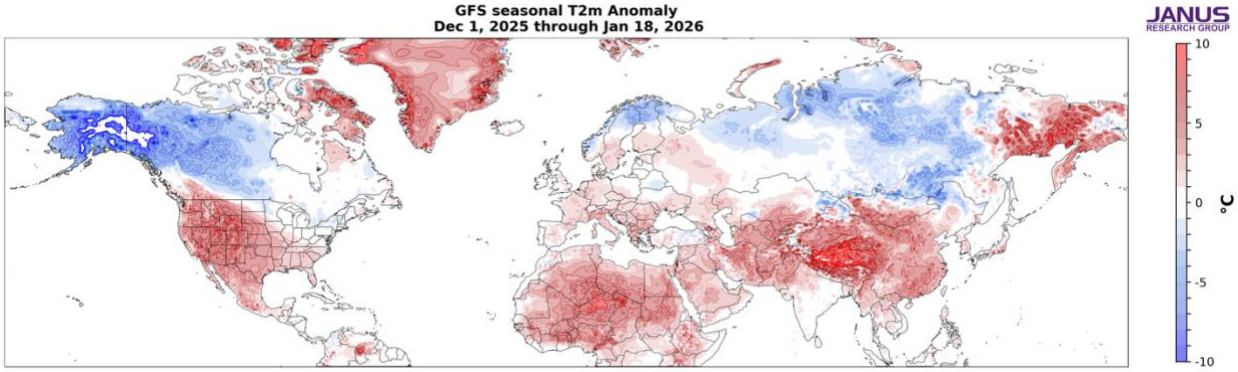

Figure. Estimate of the observed surface temperatures (°C; shading) from 01 Dec 2025 to 18 Jan 2026 based on GFS initializations and the GFS forecast from the 19 Jan 2026 run.

Impacts

The fact that I saw so many social posts about lack of snow in the US and and incredible amount of snow in Japan and recently Kamchatka, I decide to kick off this week's blog with our estimate (thank you Karl Pfeiffer!) of Northern Hemsiphere (NH) snowfall anomalies for the winter so far in **Figure i**. The plot confirms at least what I see on my social media posts with well above normal snowfall in general along the coast of East Asia but especially Japan and Kamchatka. But also includes much of Russia with a local maximum around Moscow, much of Canada, especially the higher elevations. I don't think my plot does it justice but much of the US and Europe are experiencing below normal snowfall with some exceptions and the Tibetan Plateau. Seems to me the snowfall anomalies this winter can be summarized as above normal at the higher latitudes and East Asia and below normal at lower latitudes, especially in the US.

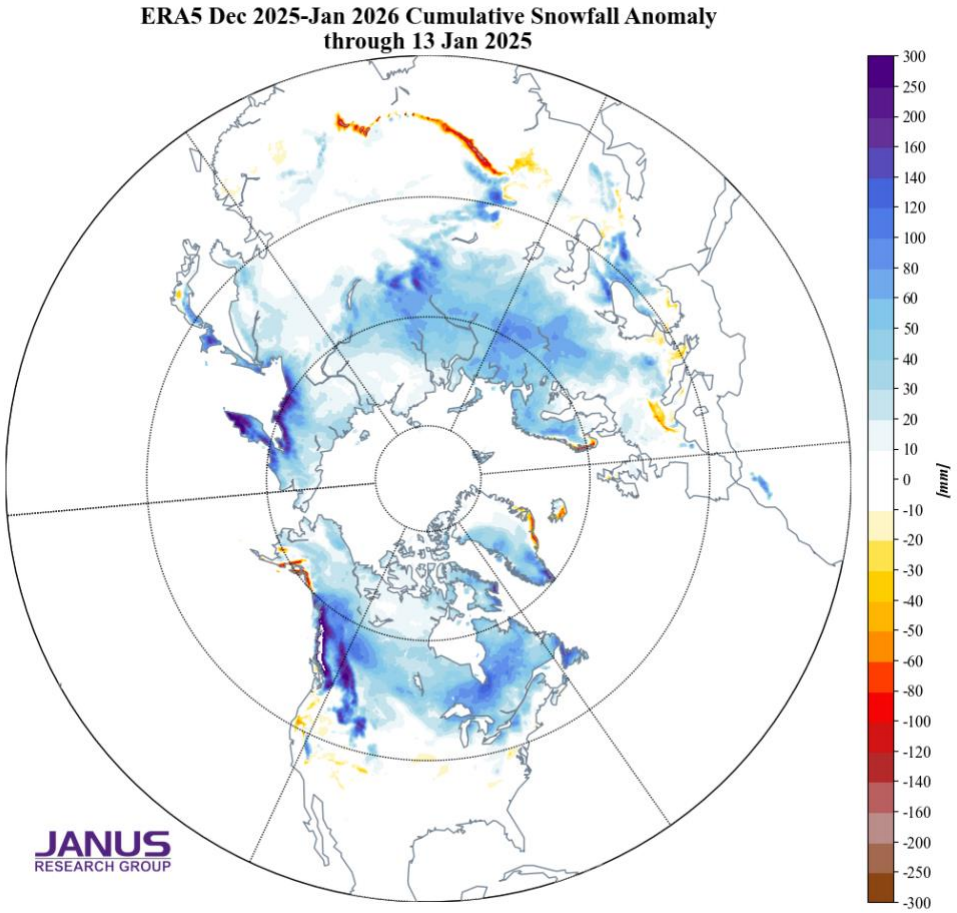

Figure i. Snowfall anomalies (°C; shading) from 1 Dec 2025 to 13 Jan 2026. The data based on ERA5 reanalysis.

Now on to the forecast. As my habit is this year, I first discuss the two-week forecast for the mid-tropospheric circulation, which helps set the table for what I am expecting with the PV and our weather. Once again, the mid-tropospheric circulation is characterized by low pressure

centered near the North Pole and high-pressure ridging floating around the mid- to high-latitudes (see **Figure ii**), though maybe less so than in previous weeks this winter given the strong high-latitude blocking predicted. Over most of the two weeks there are two dominant high latitude blocking high pressure centers one centered over Alaska and/or Eastern Siberia and the other centered over Greenland and/or the Barents-Kara Seas. These two high-latitude blocking centers shift around but otherwise persist for the next two weeks. These two blocking centers will support an impressive expansion of cold temperatures across Eurasia and North America with some of that cold likely to be extreme.

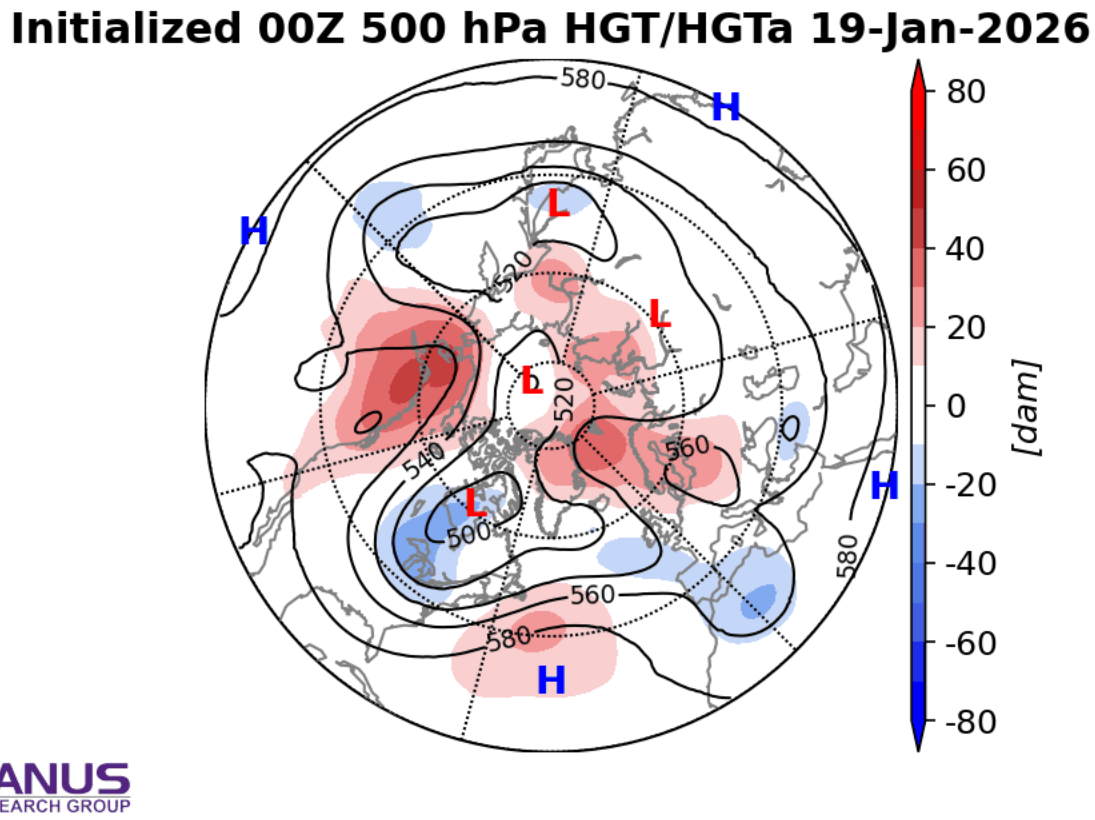

Figure ii. Initialized 500 mb geopotential heights (dam; contours) and decameter anomalies (dam; shading) across the Northern Hemisphere for 19 Jan 2026 and forecasted from 20 Jan 2026 to 03 Feb 2026. The forecasts are from the 00Z 19 Jan 2026 GFS model ensemble.

But blocking over Greenland is often a precursor for a stetched polar vortex (PV) while over the Barents-Kara Seas is also supportive of a stretched PV but possibly even a bigger PV disruption i.e., a sudden stratospheric warming (SSW). In contrast, the high latitude blocking in Eastern Siberia throws a wrench in the gears of trying to weaken the PV and in my opinion contributes uncertainty to what will happen to the PV in early February.

As seen in **Figure iii** (and also **Figure 12**) the PV has an elongated shape in appearance for much of the next two weeks in contrast to the more circular PV of early January. The PV has a "split" appearance this week, a character trait or signature of a more extreme stretched PV. I think the

more extreme nature of the stretched PV is consistent with the model forecasts of extreme cold in Canada and the US and even potential snowstorms.

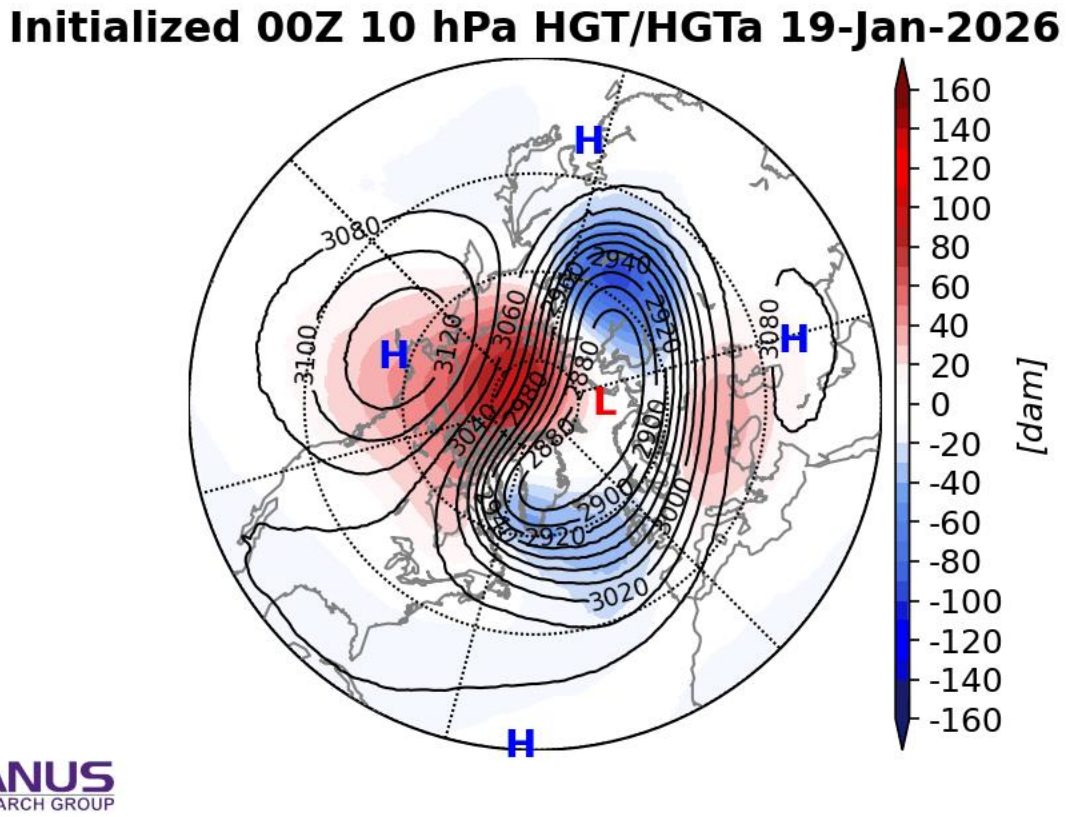

Figure iii. Forecasted average 10 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere for 19 Jan 2026 and forecasted from 20 Jan 2026 to 03 Feb 2026. The forecasts are from the 00Z 19 Jan 2026 GFS model ensemble.

As seen in **Figure iii** (and also **Figure 12b**) the PV for the most part maintains its elongated shape in appearance. But as I have been discussing the past few blogs the probability of a larger PV disruption has increased. Or PV forecast model strongly suggested the possibility of an SSW for early February and some of the weather model forecasts are suggesting something similar with even a possible PV split.

And as I have been routinely doing, looking at the wave diagnostics in **Figure iva** continues to display wave reflection this week. Once again, wave energy goes up and east over Asia, reflects off the stratospheric PV and then heads down and east over North America where the energy is re-absorbed amplifying the standing wave over North America and delivers cold air from the Arctic south, east of the Rockies. There is westward wave tilt with height over Asia and an eastward wave tilt with height over North America that is a classic signature of wave reflection.

Though the eastward tilt is less pronounced than in some previous events this winter. This signature of wave reflection is typical of stretched PVs.

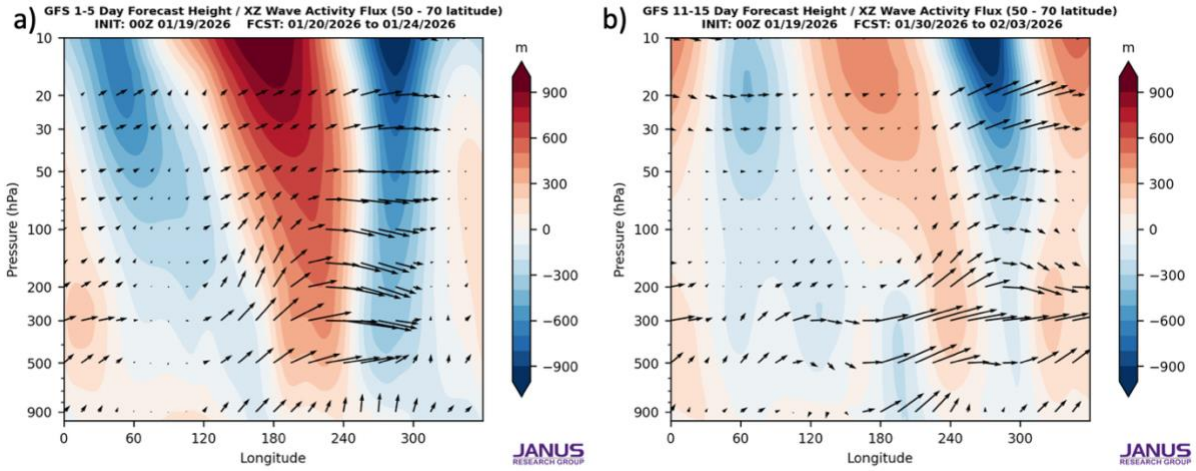

Figure iv. **a)** Predicted longitude-height cross section of geopotential eddy height anomalies (shading) and wave activity flux (vectors) for 20 January through 24 January 2026 **b)** same as **a)** but forecast from 30 January through 3 February 2026. The forecast is from the 00Z 19 January 2026 GFS operational.

However for the the second period shown in **Figure ivb** there is no obvious wave reflection. The model forecasts are showing much milder across much of North America heading into early February and this may be related to the lack of wave reflection. In addition though there seems to be a general weakening of the PV it clearly contracts further north. With the lack of southward extension of the PV as seen at the end of the animation of **Figure iii** compared to the beginning, cold air is no longer being transported south across North America. I question if it will get as mild across North America as predicted by the weather models, but they are all consistent in predicting a much milder pattern. One reason I question whether it will be as mild as the models predict is the concomitant Greenland blocking predicted. That suggests to me that at least in the Eastern US it may not be as mild as predicted.

As I have been doing for many weeks now, I will continue doing my best Monty Hall from "Let's Make a Deal" impression. The three doors are: door number one - the reflective layer in the stratosphere that gave rise to the stretched PV also protects the PV from subsequent upwelling energy from the troposphere and allows the PV to strengthen. The second door is, though there is short-term strengthening of the PV, high-latitude blocking resumes its assault on the PV and we see more stretched PVs and/or Canadian Warmings (that often transition to stretched PVs) until finally there is knockout punch and a true sudden stratospheric warming (SSW) either in January or February. And finally, the third scenario is that the stretched PVs just keep repeating for much of the winter punctuated or separated by a relatively strong PV and or Canadian warmings.

I have since the late fall favored door number three or what I like to call a “rinse, lather, repeat” PV and weather pattern for the foreseeable future. Basically, alternating stretched PVs and relaxation to a more circular PV and oscillating or alternating cold and mild periods for East Asia and or North America, that can feature some wild temperature swings. Eventually the pattern could transition to either door number one, persistently strong PV or door number two, a major SSW. We will experience one or two more stretched PVs for the remainder of January and I think again in early February and therefore still riding the “rinse, lather, repeat” train. But my uncertainty has grown over the past two weeks.

I have also been handicapping which door is gaining or losing momentum. I am still favoring door number three with number two next and finally door number one. However I am more uncertain than I have been all winter. Some model forecasts have been showing a much larger PV disruption in the form of a PV split and not a PV displacement, consistent with the strong wave-2 configuration in the mid-troposphere. I include as an example the forecast of the Canadian ensembles in **Figure v**. Though there may be some better examples showning up in the operational models, an ensemble forecast is much more impressive in my opinion.

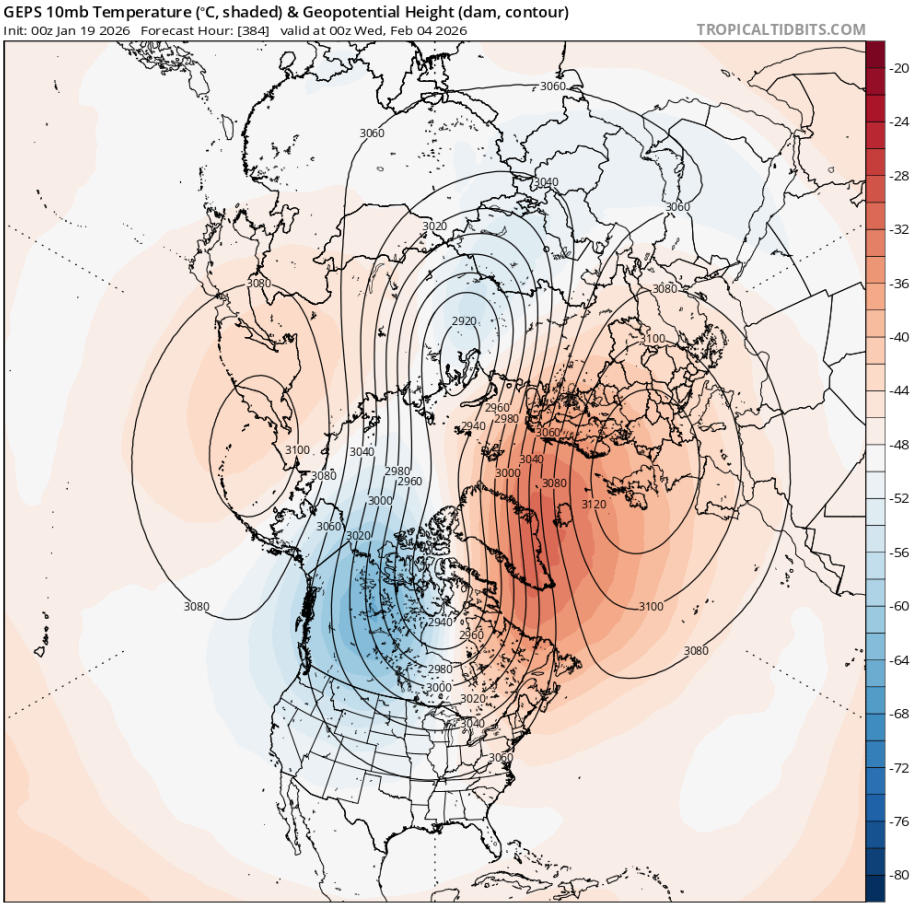

Figure v. Predicted 10 mb geopotential heights (dam; contours) and anomalies (meters) across the Northern Hemisphere averaged for 4 Feb 2026. The forecast is from the 0Z 19 January 2026

ECMWF operational ensemble. Plot taken from https://www.tropicaltidbits.com/analysis/models/.

What is a very different about the upcoming predicted PV disruption in early Febraury is that in the polar stratosphere the main warming is emanating out of North America and across the North Atlantic with strong high pressure settling over Europe (**Figures iii** and **v**). Typically the warming emanates out of Eurasia with the main high pressure center forming in the North Pacific. With PV splits you could also get a secondary warming in the North Atlantic. Maybe predicted increased storminess along the Easern Seaboard is responsible for the North America/North Atlantic warming, but regardless when I see an unusual event, which I think contributes to the forecast becoming more challenging.

Another reason why I am still not biting on a PV split is the predicted 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 vi**). I haven't really shown it this winter because it has so far not been remarkable and I have found the longitude-height cross section of geopotential eddy height anomalies and wave activity flux more informative given the repeated PV stretches. Anyway the WAF plot is still unremarkable and does not look to me like one that is going to produce an SSW. Instead the pulse of upward WAF this week followed by negative (downward) anomalies next week is more a signature of wave reflection or a stretched PV. Though in the cross section the wave reflection wasn't apparent either.

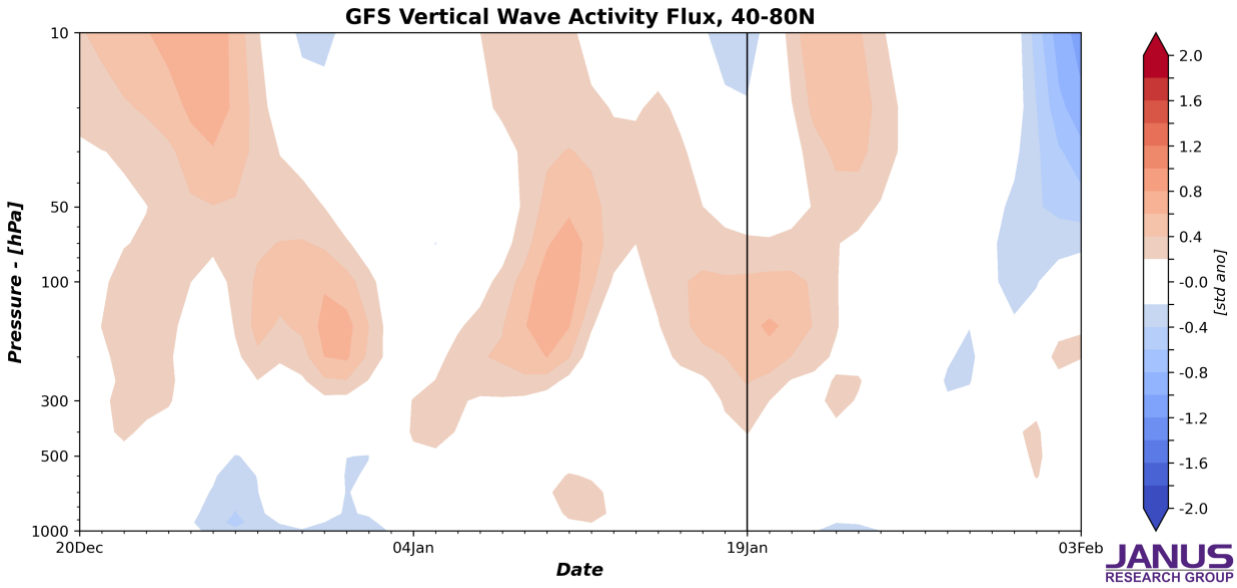

Figure vi. Observed and predicted daily vertical component of the wave activity flux (WAFz) standardized anomalies, averaged poleward of 40-80°N. The forecast is from the 00Z 19 January 2026 GFS ensemble.

In summary, holding the course with another stretched PV in early February after what might be a contraction of the PV that allows a milder pattern at least across North America. As an aside, it does

seem that the US is more sensitive to the behavior of the PV than Europe. Not much sign of a stretched PV in February in the weather models just yet, so I am waiting for confirmation. Regardless my uncertainty is increasing about the PV and weather in February. A larger PV disruption is possible. From a quick look of the EPS weeklies, that is what it is suggesting to me. But in the meantime some very impressive winter weather is likely to take place on a large scale across both Eurasia and North America for the remainder of January.

Near-Term

This week

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

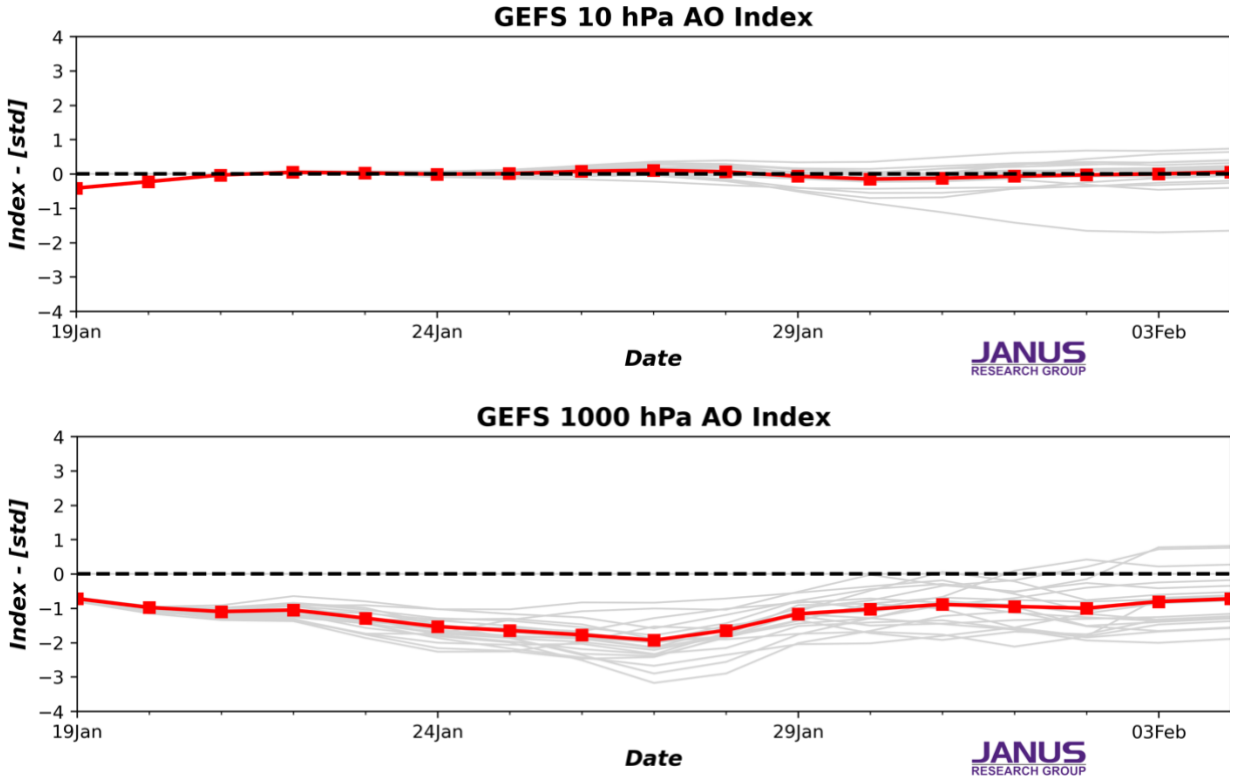

Figure 1. The predicted daily-mean AO at a) 10 hPa and b) 1000 hPa from the 00Z 19 Jan 2026 GFS ensemble. Gray lines indicate the AO index from each individual ensemble member, with the ensemble mean AO index given by the red line with squares.

Ridging/positive geopotential height anomalies centered on Greenland will support widespread troughing/negative geopotential height anomalies across Europe (**Figure 2).** This pattern will support normal to below normal temperatures across Northern and Eastern Europe, however a more maritime flow will support normal to above temperatures across Western and Southern

Europe including the UK this week (**Figure 3**). This week the general pattern across Asia is ridging/positive geopotential height anomalies stretching from Greenland across the Eurasian Arctic supporting troughing/negative geopotential height anomalies across Northern Asia with more ridging across Southcentral Asia this week (**Figure 2**). This pattern favors normal to below normal temperatures across much of Russia, Northeastern and Southwestern Asia with normal to below normal temperatures around the Tibetan Plateau and Eastern Siberia this week **(Figure 3**).

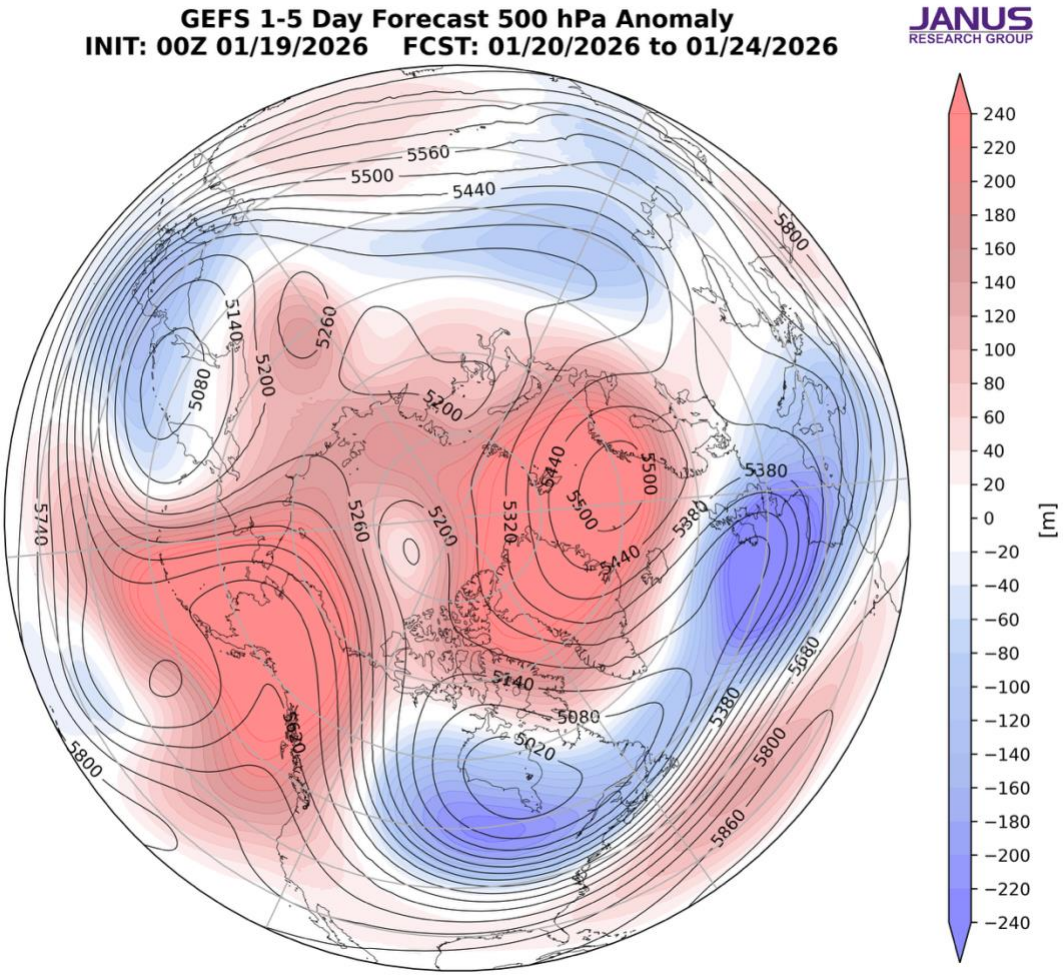

Figure 2. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 20 Jan 2026 to 24 Jan 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

This week strengthening ridging/positive geopotential height anomalies in the Gulf of Alaska and Alaska will support deep troughing/negative geopotential height anomalies across Eastern Canada and the Eastern US this week (**Figure 2**). This patten will favor normal to above normal temperatures across Alaska, Northwestern Canada and the Western US with normal to below normal temperatures across much of Canada and the Eastern US this week (**Figure 3**).

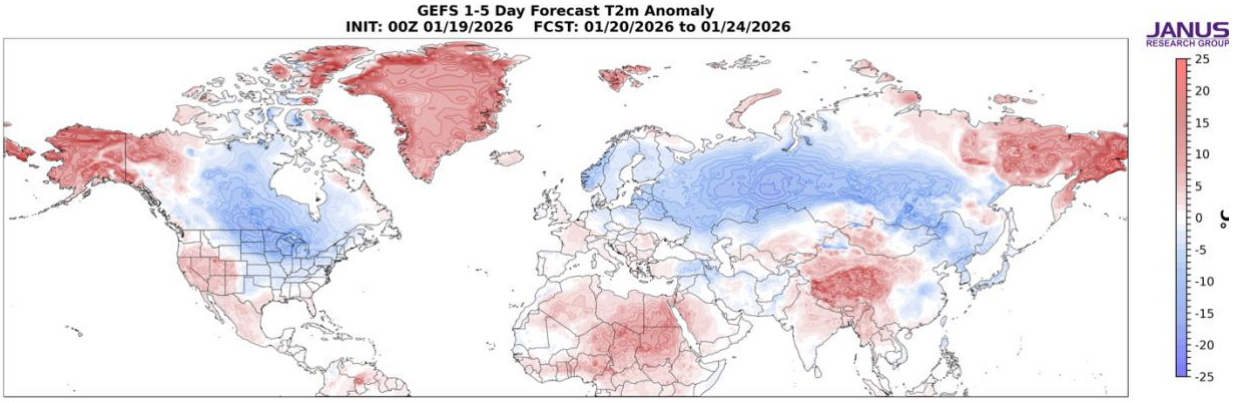

Figure 3. Forecasted surface temperature anomalies (°C; shading) from 20 Jan 2026 to 24 Jan 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

Troughing and/or cold temperatures will support new snowfall across southern Scandinavia, the Alps, parts of Siberia, Central and Northeast Asia and Japan while milder temperatures will support snowmelt across Southeastern Europe, Western Russia and parts of southern Siberia this week (**Figure 4**). Troughing and/or cold temperatures will support new snowfall across Central and Eastern Canada, the Great Lakes and parts of the Eastern US while milder temperatures will support snowmelt widespread across Alaska, Western Canada, and the higher elevations of the Western US this week (**Figure 4**).

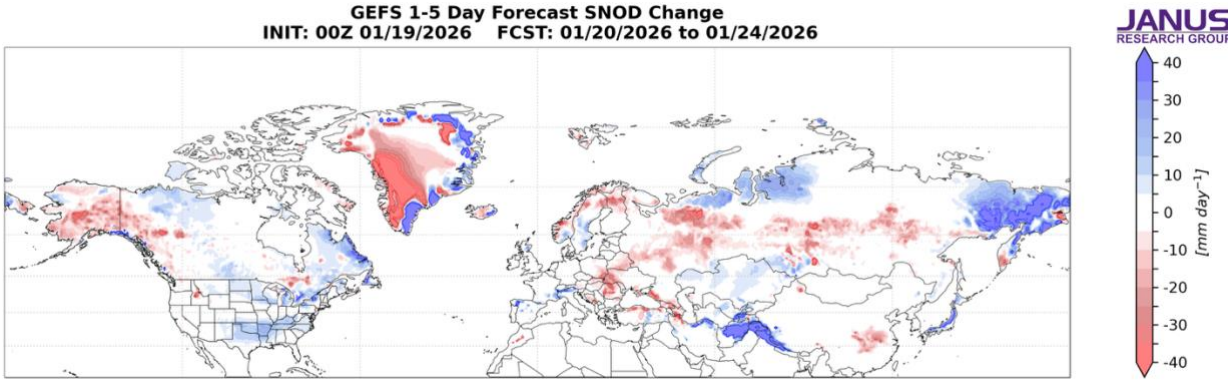

Figure 4. Forecasted snowfall (mm/day; shading) from 20 Jan 2026 to 24 Jan 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

Near-Mid Term

Next week

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

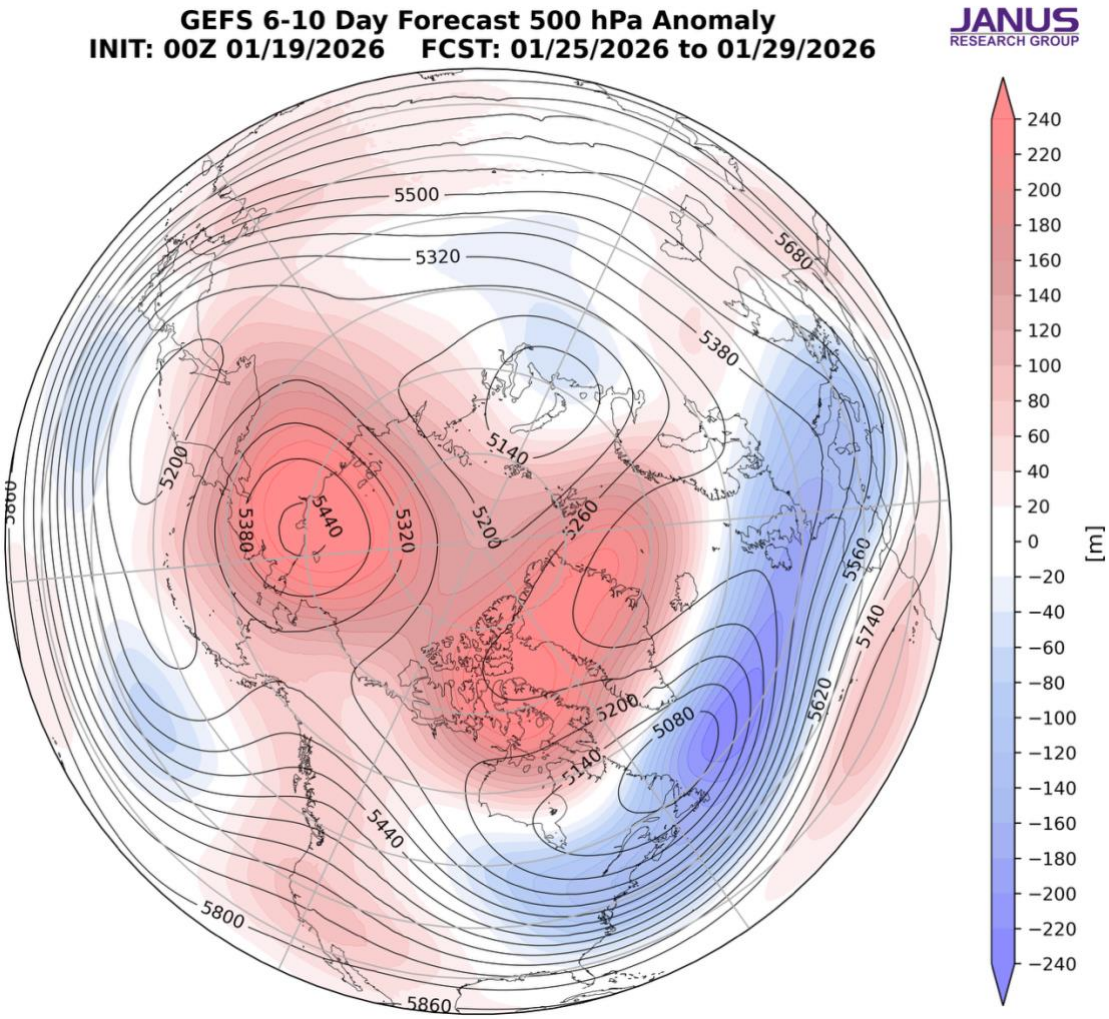

Figure 5. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 25 Jan to 29 Jan 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

Persistent ridging/positive geopotential height anomalies across Greenland will support troughing/negative geopotential height anomalies across much of Europe this period (**Figure 5**). The pattern will support normal to below normal temperatures across Northern Europe including the UK, however an a mostly westerly flow will support normal to above normal temperatures across Southern Europe this period (**Figure 6**). Across Asia

ridging/positive geopotential height anomalies centered across Greenland and Eastern Siberia will support troughing/negative geopotential height anomalies across Northern Asia with more ridging/positive geopotential height anomalies across Southeastern Asia (**Figure 5**). This pattern favors widespread normal to below normal temperatures widespread across much of Russia and into Northeastern Asia with normal to above normal temperatures across Eastern Siberia and Southern Asia this period (**Figure 6**).

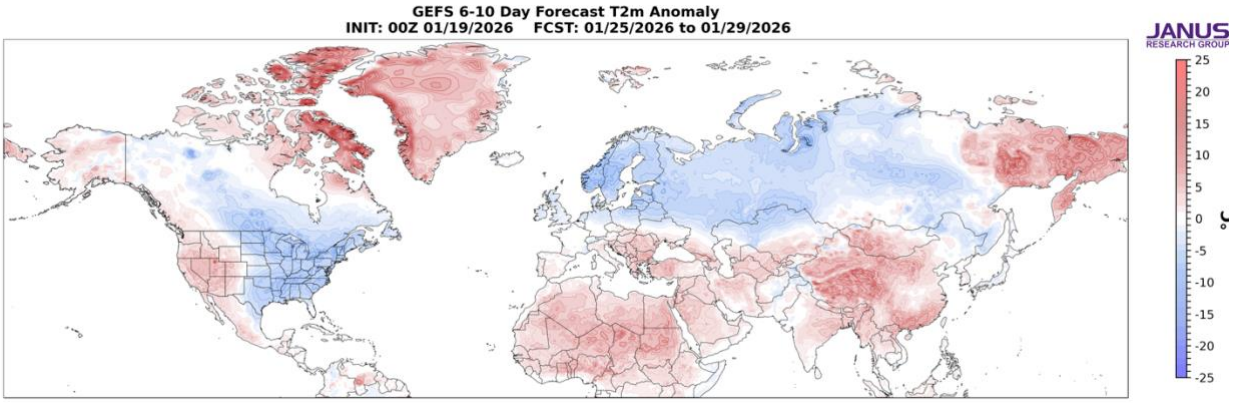

Figure 6. Forecasted surface temperature anomalies (°C; shading) from 25 Jan to 29 Jan 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

Persistent ridging/positive geopotential height anomalies across Alaska and western North America are predicted to will support troughing/negative geopotential height anomalies in Eastern Canada and the Eastern US this period (**Figure 5**). This pattern will favor normal to above normal temperatures across Alaska, and parts of Western and Northeastern Canada and the Western US with normal to above normal temperatures across most of Central and Southeastern Canada and the Eastern US (**Figure 6**).

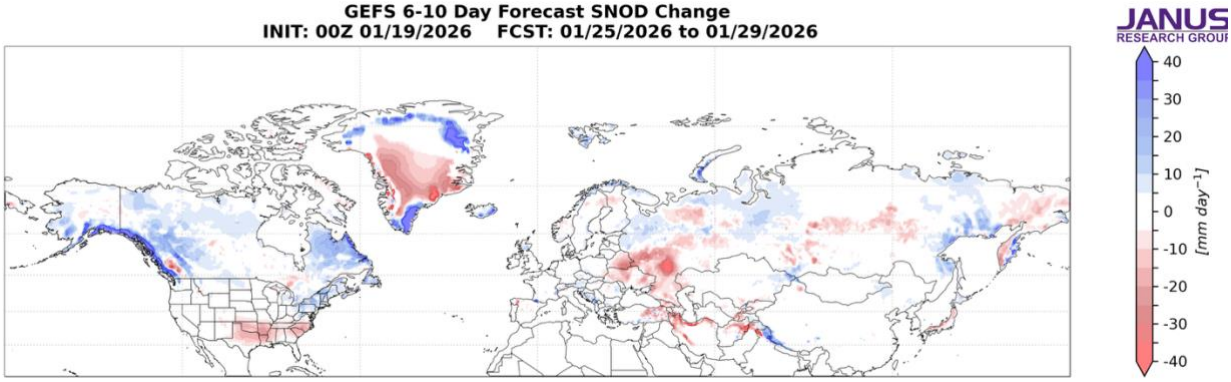

Figure 7. Forecasted snowfall rate (mm/day; shading) from 25 Jan to 29 Jan 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

Troughing and/or cold temperatures will support new snowfall in the Alps, parts of Siberia, Central Asia and Northeast Asia while milder temperatures will support snowmelt in Eastern Europe, parts of Southwestern Russia, the Caucusses and Central Asia this period (**Figure 7**). Troughing and/or cold temperatures will support new snowfall in southern Alaska, Western and

Eastern Canada and the Northeastern US while milder temperatures will support snowmelt in the Southeastern US this period (**Figure 7**).

Mid Term

Week Two

With predicted 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 this period (**Figure 1**). With predicted positive pressure/geopotential height anomalies across Greenland (**Figure 8**), the NAO will likely remain negative this period.

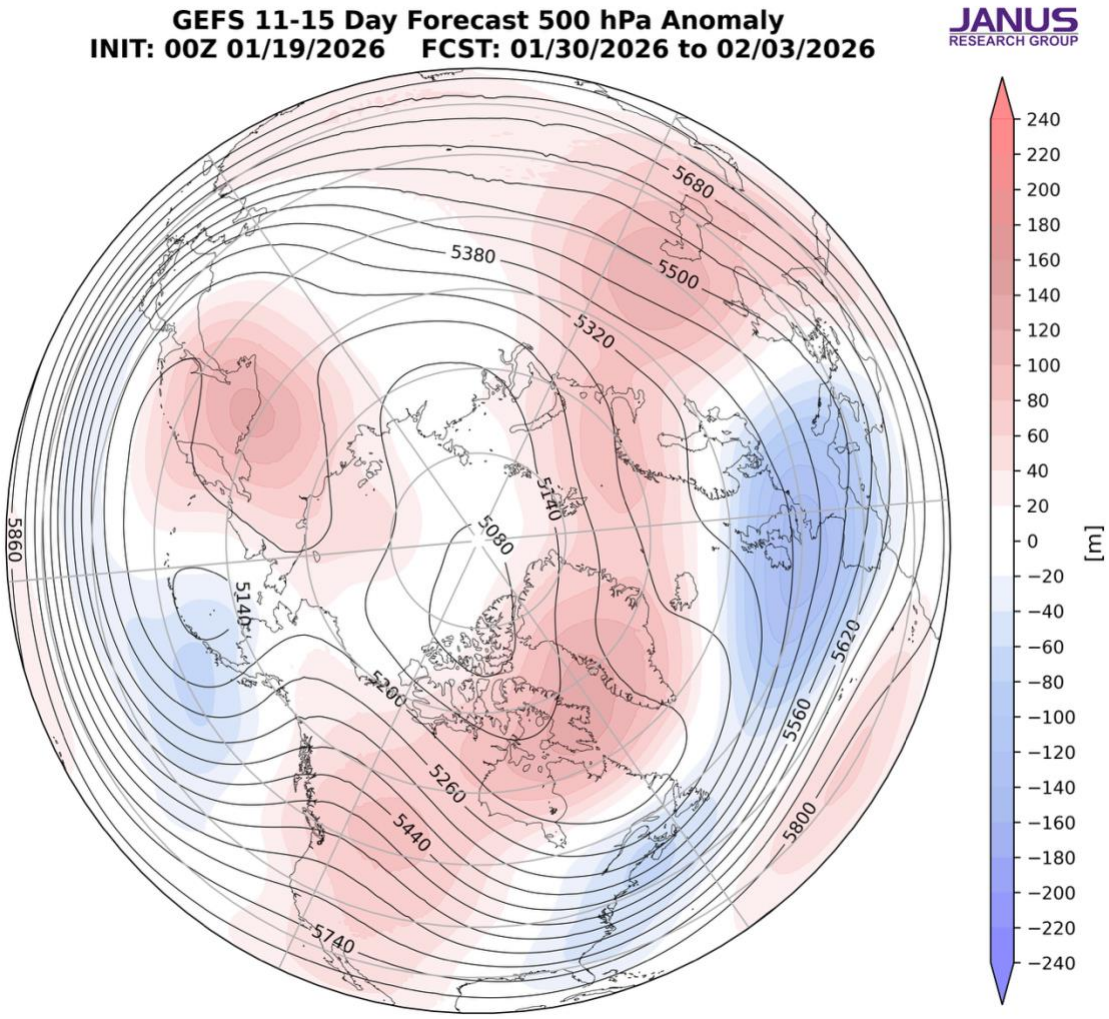

Figure 8. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 30 Jan to 03 Feb 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

Persistent ridging/positive geopotential height anomalies across Greenland and in the Barents-Kara Seas will continue to support troughing/negative geopotential height anomalies across much of Europe this period (**Figure 8**). This pattern should favor normal to below normal temperatures across Northern Europe including the UK while a milder southwesterly flow will support normal to above normal temperatures across Southern Europe this period (**Figures 9**). Yet again this period ridging/positive geopotential height anomalies centered in the Barents-Kara Seas and Easern Siberia will support troughing/negative geopotential height anomalies across Northern Asia with more ridging across Southwestern Asia (**Figure 8**). This pattern favors normal to below normal temperatures widespread across much of Russia with normal to below normal temperatures across Eastern Siberia and Southern Asia including the Middle East and the Tibetan Plateau this period (**Figure 9**).

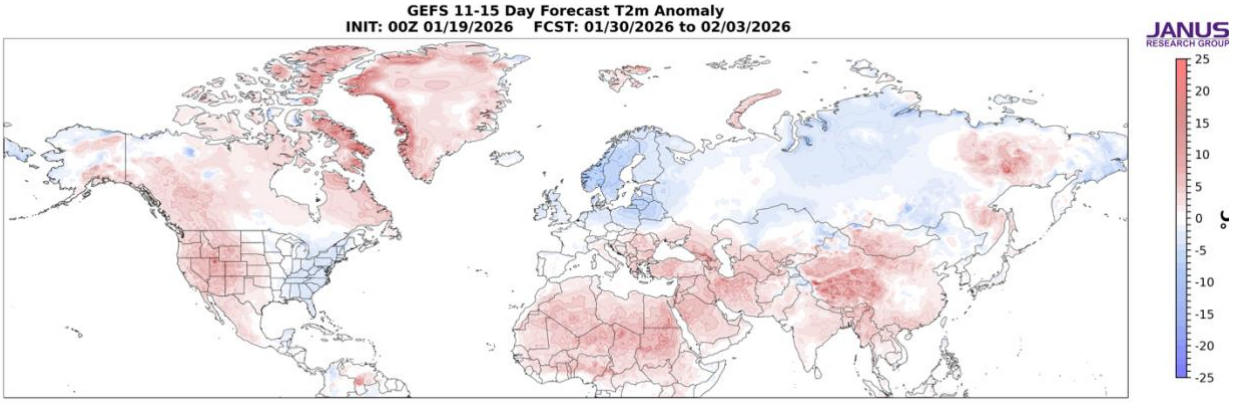

Figure 9. Forecasted surface temperature anomalies (°C; shading) from 30 Jan to 03 Feb 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

Ridging/positive geopotential height anomalies in Alaska and much of western North America will supporting downstream troughing/negative geopotential height anomalies across Southeasern Canada and the Eastern US this period (**Figure 8**). This pattern supports normal to above normal temperatures across Alaska, much of Canada and the Western US with normal to below normal temperatures limited to Southeastern Canda and Eastern US this period (**Figure 9**).

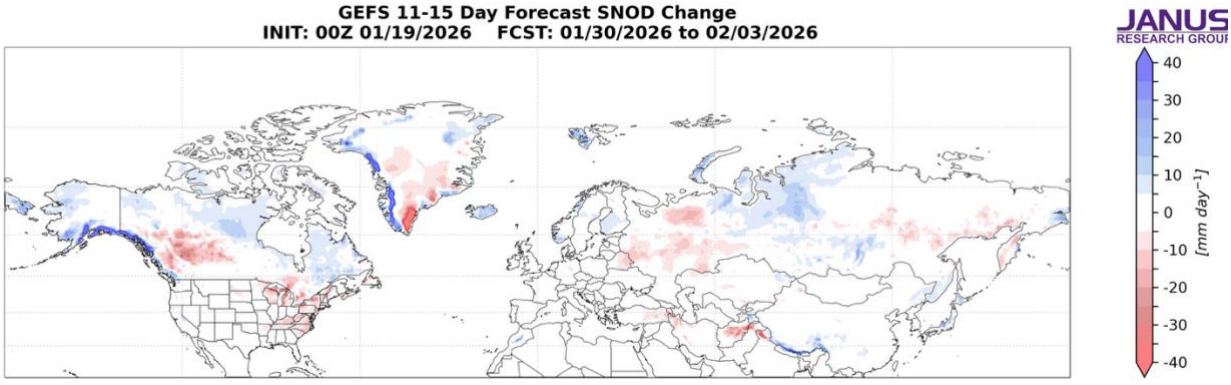

Figure 10. Forecasted snowfall (mm/day; shading) from 30 Jan to 03 Feb 2026. The forecasts are from the 00Z 19 Jan 2026 GFS ensemble.

Troughing and/or cold temperatures will support some possible new snowfall in parts of Scandinavia, Morocco, parts of Siberia and the Tibetan Plateau while milder temperatures will support snowmelt in parts of the Baltic States, Western Russia and Central Asia this period (**Figure 10**). Troughing and/or cold temperatures will support new snowfall in southern Alaska, the West Coastal mountains of Western Canada and much of Northern and Eastern Canada, while milder temperatures will support snowmelt in the Eastern US this period (**Figure 10**).

Longer Term

30–day

The most recent polar cap geopotential height anomalies (PCHs) show warm/positive PCHs in the mid to lower stratosphere and throughout the troposphere with cold/negative PCHs in the upper stratosphere (**Figure 11**). Then for the next two weeks cold/negative PCHs in the upper stratosphere are predicted to weaken while PCHs in the lower stratosphere and troposphere are predicted to persist in the tropsophere.

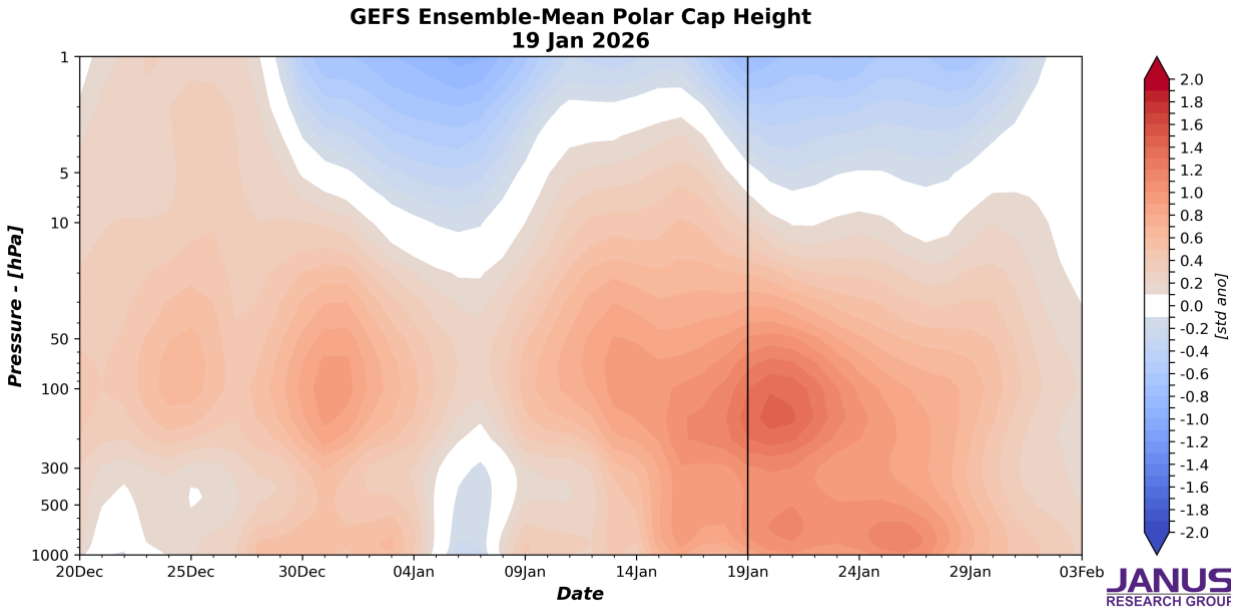

Figure 11. Observed and predicted daily polar cap height (i.e., area-averaged geopotential heights poleward of 60°N) standardized anomalies. The forecast is from the 00Z 19 Jan 2026 GFS ensemble.

The predicted warm/positive PCHs in the lower troposphere this week (**Figure 11**) are consistent with the predicted negative AO this week (**Figure 1**). Then next week the forecast of strengthening warm/positive PCHs in the lower troposphere (**Figure 11**) could further deepen the negative AO next week (**Figure 1**).

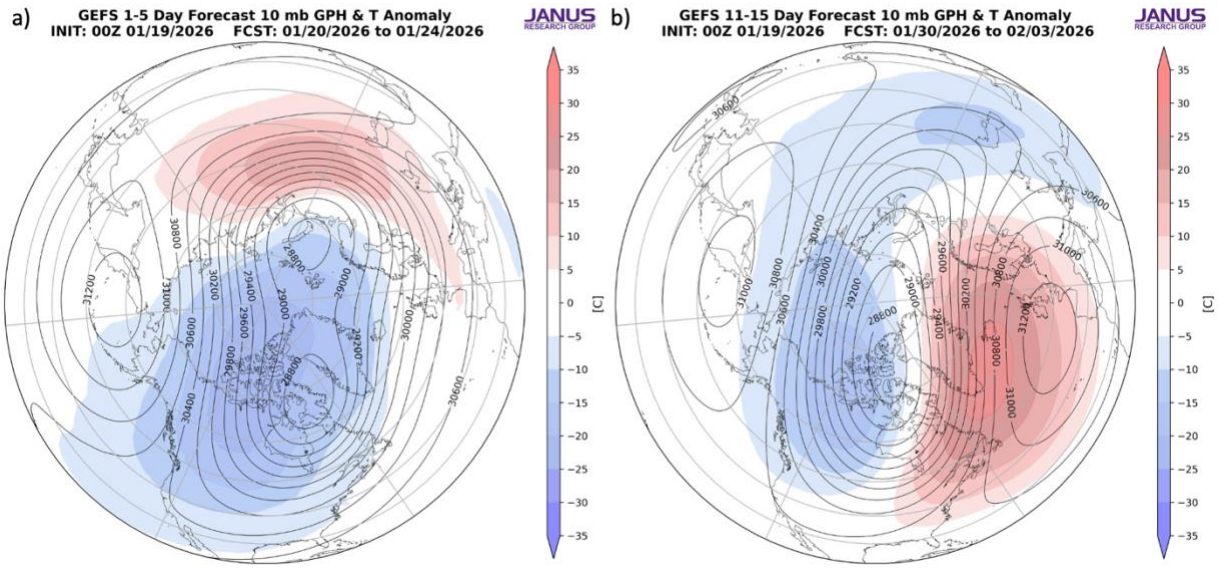

Figure 12. (a) Predicted 10 mb geopotential heights (dam; contours) and temperature anomalies (°C; shading) across the Northern Hemisphere averaged for 20 Jan to 24 Jan 2026. (b) Same as (a) except forecasted averaged from 30 Jan to 03 Feb 2026. The forecasts are from the 00Z 19 January 2026 GFS model ensemble.

This week the polar vortex (PV) is predicted to be elongated in shape from the Urals to eastern North America with two PV centers with one center over the Barents-Kara Seas and the other center over Baffin Bay with relatively cold temperatures focused from the Barents-Kara Seas across much of North America and with high pressure centered near the Dateline and relatively warm temperatures across Europe and Asia in the polar stratosphere (**Figure 12a**). This is not a split PV but rather the elongated shape in appearance, signals yet another stretched PV that favors relatively cold in Asia and North America east of the Rockies. Then during the late January and into early February the PV center is predicted to consolidate over Baffin Bay with high pressure centered over Kamatchatka with cold temperatures over the Pacific side of the Arctic and Western Canada with relatively warm temperatures over the North Atlantic in the polar stratosphere (**Figure 12b**). This once again resembles a stretched PV configuration, however some models are predicting a bigger PV disruption. The stratospheric AO in **Figure 1** this week is predicted to remain close to neutral the next wo weeks.

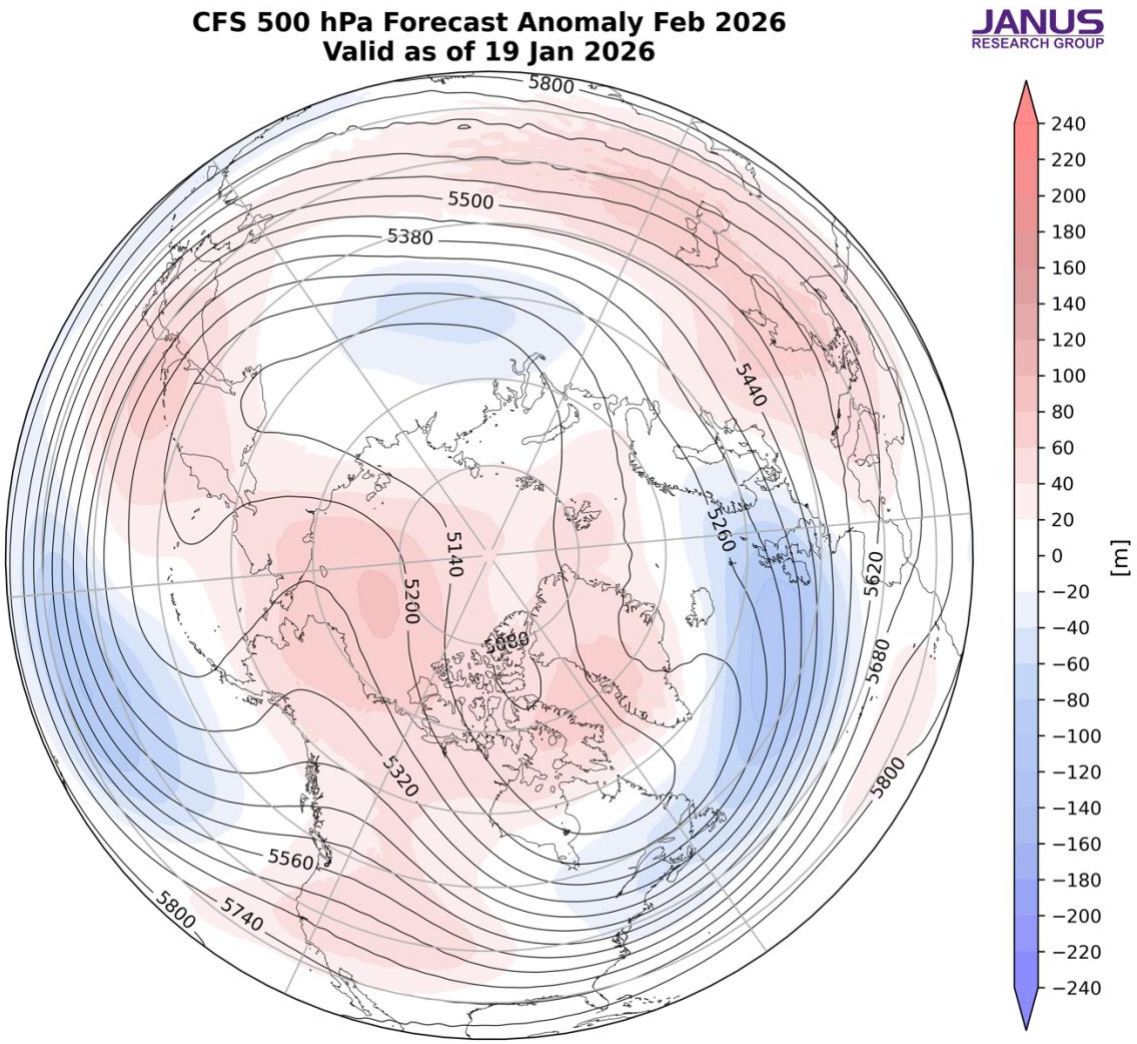

Figure 13. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere for February 2026. The forecasts are from the 00Z 19 Jan 2025 CFS.

I include in this week's blog the monthly 500 hPa geopotential heights (**Figure 13**) and surface temperatures for February (**Figure 14**) from the Climate Forecast System (CFS; the plots represent yesterday's four ensemble members). I do want to emphasize unless I say otherwise, I find the CFS forecasts of low confidence and most often don't match my own thinking. The forecast for the troposphere is ridging widespread across the Arctic including Greenland, Western Asia, western North America including Alaska and into eastern Siberia with troughing across Europe, Northern and Eastern Asia, Eastern Canada and the Eastern US (**Figure 13**). This pattern favors seasonable to relatively warm temperatures across Europe, Western, Southern and Central Asia, including the Middle East, eastern China the Tibetan Plateau, Pakistan and Afghanistan, Eastern Siberia, Alaska, much of Canada and the Western US with seasonable to relatively cool temperatures across Siberia into Northeast Asia, Southeastern Canada and the Eastern US (**Figure 14**).

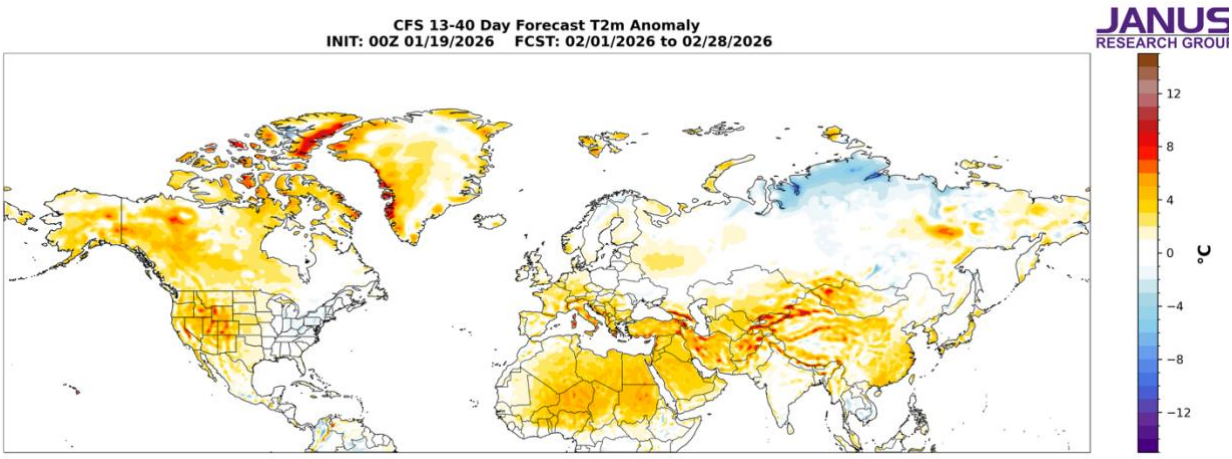

Figure 14. Forecasted average surface temperature anomalies (°C; shading) across the Northern Hemisphere for February 2026. The forecasts are from the CFS 00Z 12 Jan 2025.

Boundary Forcings

Arctic Sea Ice

I am and will continue to watch Arctic sea ice. Current conditions are shown in **Figure 15**. It has been shown that less sea ice in the North Atlantic sector of the Arctic weakens the polar vortex while less sea ice in the North Pacific sector strengthens the polar vortex. Arctic sea ice anomalies continue to show a strong focus or weighting of negative anomalies towards the North Atlantic sector relative to the North Pacific sector and this is a robust signal of an overall weaker PV this winter. The negative anomalies are distributed between the Eurasian sector, i.e., Barents Kara Seas and the North American sector, now mostly in Baffin Bay (see **Figure 15**). Therefore, I do think that low sea ice in the Barents-Kara Seas has supported the strong Barents-Kara Seas blocking this January but low sea ice near Greenland could be supporting blocking in the region as well. Negative sea ice anomalies have also appeared in the Bering Sea and the Sea of Okhotsk and could be a result of but also supporting blocking in the region.

Figure 15. Arctic sea ice cover extent for 18 Jan 2026. White depicts ice covered areas and the orange contour the climatological extent of Arctic sea ice for the date. Plot taken from: https://nsidc.org/sea-ice-today

SSTs/El Niño/Southern Oscillation

Equatorial Pacific sea surface temperatures (SSTs) anomalies are below normal, along the equatorial Pacific (**Figure 15**) consistent with La Niña conditions for much of the winter but current forecasts show some uncertainty but for now mostly favor weak La Niña conditions this winter. Observed SSTs across the NH remain well above normal especially in the North

Pacific and much of the North Atlantic, though below normal SSTs exist regionally especially in the South Pacific. The very warm SSTs in both ocean basins could be supporting the predicted mid-ocean ridging in both basins.

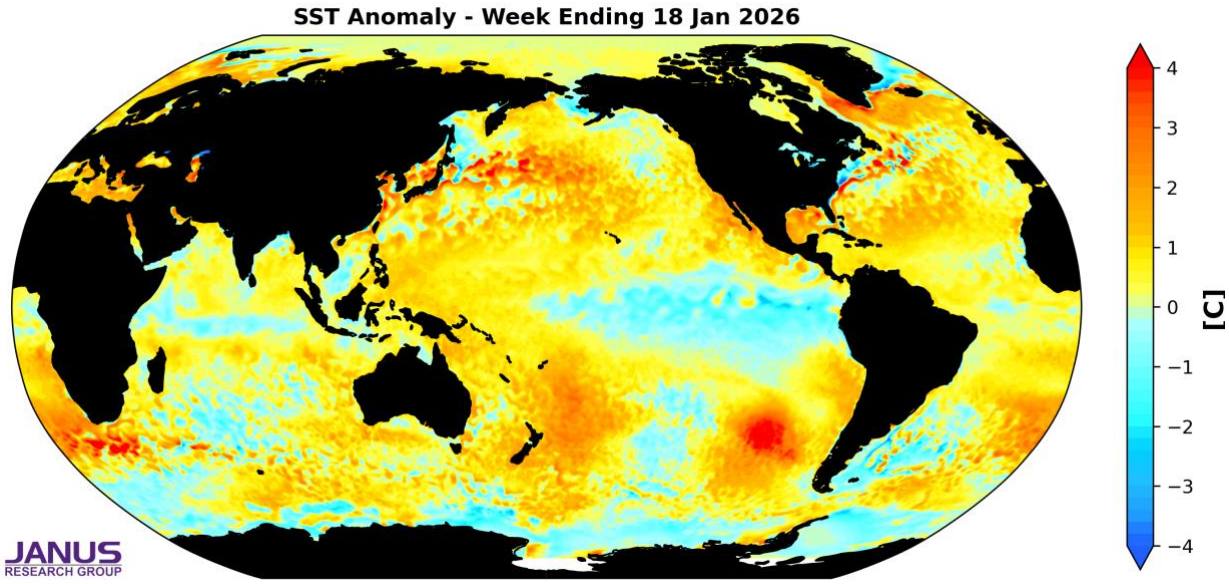

Figure 16. The latest daily-mean global SST anomalies for week ending 18 Jan 2025.

Madden Julian Oscillation

Currently the Madden Julian Oscillation (MJO) is currently in phase six (**Figure 17**) and the forecasts are for the MJO to quickly move to phase seven, eight and one (**Figure 17**). Phase six favors ridging across the US with troughing in Canada but phases seven and eight favor the opposite with ridging in Canada and troughing in the US. Therefore, it seems that the MJO could eventually have some influence on North American weather in the next two weeks. But admittedly this is outside of my expertise.

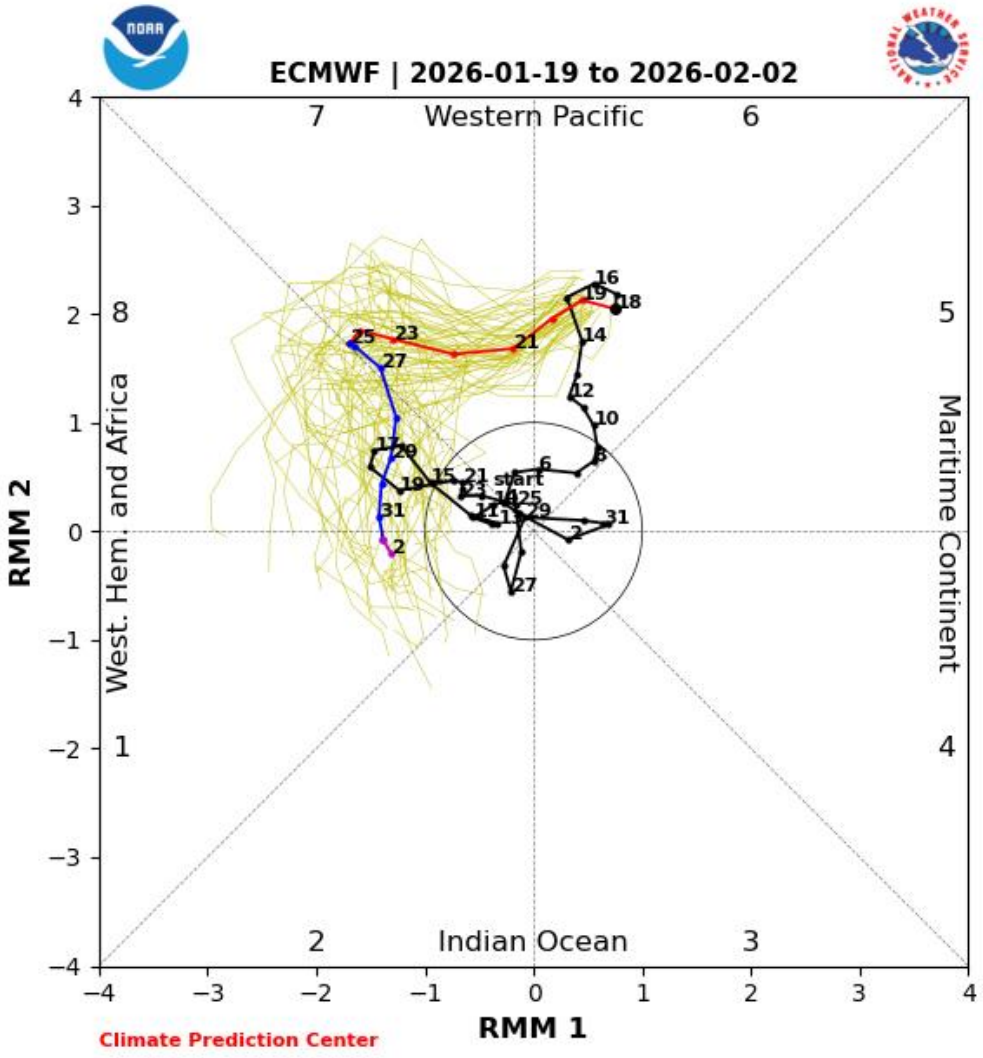

Figure 17. Past and forecast values of the MJO index. Forecast values from the 00Z 19 Jan 2026 ECMWF model. Yellow lines indicate individual ensemble-member forecasts, with the green line showing the ensemble-mean. A measure of the model 'spread' is denoted by the gray shading. Sector numbers indicate 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

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