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# Arctic Oscillation and Polar Vortex Analysis and Forecasts

***January 5, 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 neutral to slightly negative and is predicted to remain near neutral the next two weeks as pressure/geopotential height anomalies across the Arctic are currently mixed to mostly positive and are predicted to remain mostly mixed the next two weeks. The North Atlantic Oscillation (NAO) is currently negative as positive pressure/geopotential height anomalies dominate across Greenland, and the NAO is predicted to trend towards neutral the next two weeks as pressure/geopotential height anomalies are predicted to remain mostly positive but weaken 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 normal to below normal temperatures across much of Europe including the United Kingdom (UK) this week and then retreating to Northern and Eastern Europe with normal to above normal temperatures across Southern and Western Europe including the UK next week.
- The general pattern across Asia the next two weeks is ridging/positive geopotential height anomalies across Western Asia supporting troughing/negative geopotential height anomalies across Northern and Eastern Asia with. This pattern favors normal to above normal temperatures across much of Asia with the exception of Northern Siberia this week

with normal to below normal temperatures across Northern and Northeast Asia next week.

- The general pattern across North America this week is ridging/positive geopotential height anomalies in eastern North Ameirca with troughing/negative geopotential height anomalies across western North America. Then next week ridging/positive geopotential height anomalies in western North America and into the Gulf of Alaska will support deepening troughing/negative geopotential height anomalies across the interior North America. This patten will favor normal to below normal temperatures across Alaska, Western Canada and the Western United States (US) with normal to above normal temperatures across Eastern Canda and the Central and Eastern US. Then next week cold air will once again deepen in Western Canada and spread south and east towards the US.
- I have been discussing how the polar vortex (PV) can walk through three doors and therefore the weather. I stil favor "rinse, lather, repeat" or door number three but the momentum is in favor of door number two. My thoughts below.

## Plain Language Summary

Winter has held strong in Western and Central Siberia, Alaska, much of Canada and the Northeastern US (see **Figure**). In contrast winter has been mostly absent in Europe, Western, Central and Eastern Asia, Eastern Siberia and the Western and Southern US (see **Figure**). The forecast for the first half of January can quickly be summarized as an expansion of the cold across Europe thanks to Greenland blocking and a temporary break of the pattern across North America and then a re-establish fo the pattern in December (see **Figures 3, 6** and **9**). In a break from the entire polar vortex (PV) season so far, the PV is predicted to become circular and strong, which favors relatively mild temperatures mostly in North America while Greenland blocking keeps northern Eurasia cold. However 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). The jet stream seems to be evolving into a pattern that will keep the PV tap dancing in early January 2026 that delivers more cold. However the Jet Stream pattern is evolving to a favroable pattern for a larger PV disruption.

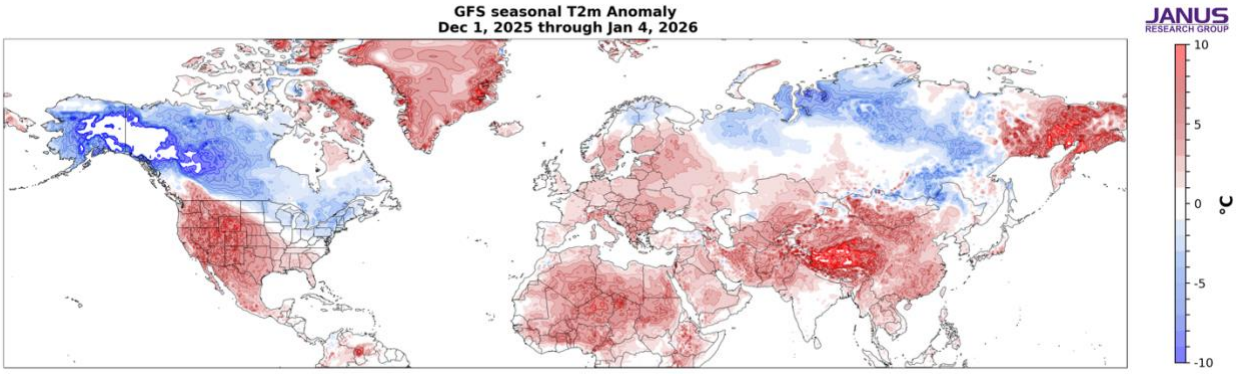


**Figure**. Estimate of the observed surface temperatures (°C; shading) from 01 Dec 2025 to 04 Jan 2026 based on GFS initializations and the GFS forecast from the 5 Jan 2026 run.

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## Impacts

Maybe many of you already realize but my X/Twitter account @judah47 was hacked and I have lost complete control of the account. I have created a new account @Snow_Cohen (with a profile picture of my best latte art) to make posts until I can gain access to my old account, though not feeling good that will actually happen. A very frustrating experience, seventeen years of cultivating an audience gone in an instant or one click.

Many critique me that I place to much emphasis on the polar vortex (PV), a criticism that I feel is mostly misplaced. I fully admit that the troposphere is the dog and the stratosphere/polar vortex is the tail and just as the dog clearly wags the dog so does the troposphere drive how the PV behaves. And every week I don't begin my discussion with the PV but rather the troposphere because I believe it all starts with the troposphere and it is the main driver of all that occurs in the atmosphere. However then the PV influences the troposphere/weather or even possibly - what happens with the PV reflects back to the troposphere. And just as it is often easier to gauge the mood of the dog, certainly if it is happy or not, by observing the tail rather than the dog, i.e., whether it is wagging or not, so to it is better to anticipate the weather by observing the PV rather than simply focusing on the troposphere.

Further, I think this winter provides a very clear example of this argument. Since the start of the winter the PV has almost been continuously disrupted as seen in the warm/positive polar cap geopotential height anomalies (PCHs) shown in **Figure 11** (mostly in the form of stretching) and temperatures have been persistently cold in East Asia (mostly Siberia) and parts of North America stretching from Alaska, Western Canada and into the Northeastern US see **Figure** above. The first meaningful strengthening of the PV all winter is ongoing and all the regions that experienced the persistent and often deep cold are predicted to now experience a dramatic warming (see **Figures 3** and **6**, though I am skeptical the warming will be as dramatic as currently predicted in at least in northwestern Canada but we shall see). Then with the next stretched PV next week, the cold is predicted to soon return to all the respective regions (see **Figure 9**).

Not sure that convinced anyone but I thought that it was a striking example why I do spend so much time focusing on the PV. I predicted the cold December weeks in advance based in part on the large PV disruption predicted by the models and in the blog. Then two weeks ago (and even earlier on X that I no longer can find) I highlighted the "bowling ball" look of the PV and since, the forecasts have gotten increasingly milder for the Northern Hemsiphere (NH) with the exception of Europe, which I would argue has been quasi independent of the behavior of the PV, at least until now.

After that very long wind-up, 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 i**). Initially, there are two dominant high latitude blocking high pressure centers one centered south of the Aleutians and the other centered over Greenland. Then for the remainder of this week, the high

latitudeblocking dampens or weakens significantly with no clear high pressure centers, consistent with the strong and circular PV (see **Figures ii** and **12a**). However then the models are predicting a re-emergence of the Alaskan blocking (see **Figures i, 5** and **8**), and also very importantly in my opinion blocking in the Barents-Kara Seas/Ural region as seen in in **Figures 5** and **8**, and even in **Figure i** but the Ural blocking is not as distinctive as over Alaska.

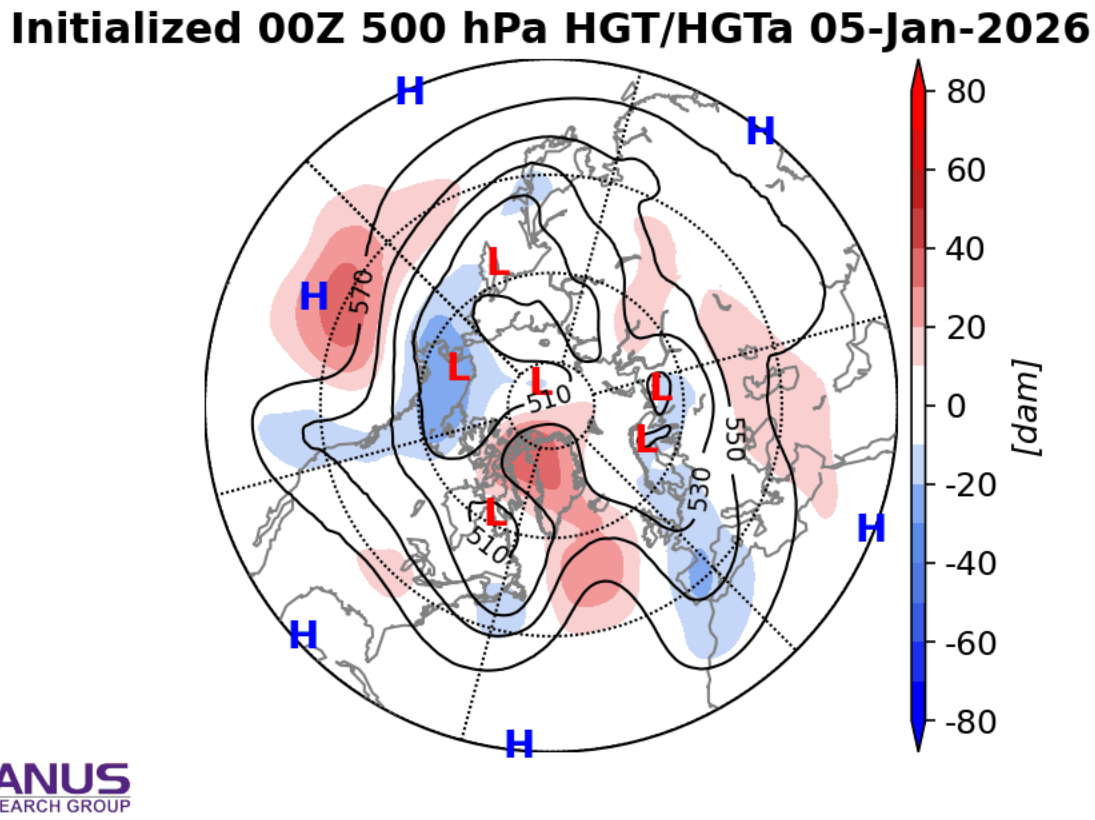


**Figure i.** Initialized 500 mb geopotential heights (dam; contours) and decameter anomalies (dam; shading) across the Northern Hemisphere for 05 Jan 2026 and forecasted from 06 Jan 2026 to 20 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS model ensemble.

The Greenland blocking is predicted to persist setting up the "trifecta" of high latitude blocking as I discussed last week, simultaneous, Alaska, Greenland and Ural blocking that I believe can support widespread cold weather across the NH. But as I will discuss in greater detail below, the Ural blocking could also support a larger PV disruption.

As seen in **Figure ii** (and also **Figure 12a**) the PV has a more circular shape in appearance and is a sign of a relatively strong PV. But then next week we can once again see an elongation of the PV towards eastern North America or yet another stretched PV (also see **Figure 12b**) as I have been anticipating, mostly based on the Greenland blocking. As an aside the past two winters using Greenland blocking to anticipate PV stretches has been a handy new tool in the toolkit. But then the PV does something strange that looks like a cartwheel of sorts where the long axis rotates

360º. This seems to be a larger PV disruption than your average stretched PV and the warming over Canada is reminiscent of a Canadian warming. I did discuss this already last week but the siutation looks a bit complex and uncertain.

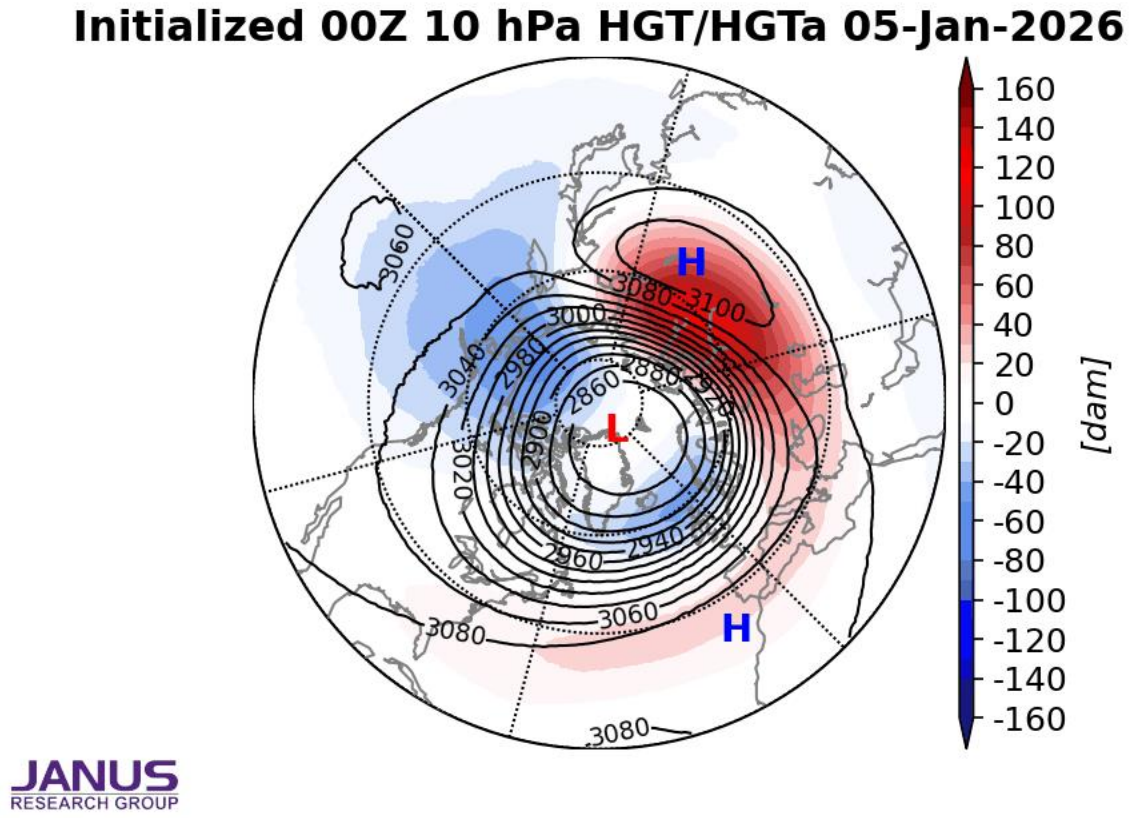


**Figure ii.** Forecasted average 10 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere for 05 Jan 2026 and forecasted from 06 Jan 2026 to 20 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS model ensemble.

And as I have been routinely doing, looking at the wave diagnostics in **Figure iii** continues to display wave reflection over the weekend and then again in mid-January. For both periods shown, 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 and could potentially amplify the standing wave over North America and deliver 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.

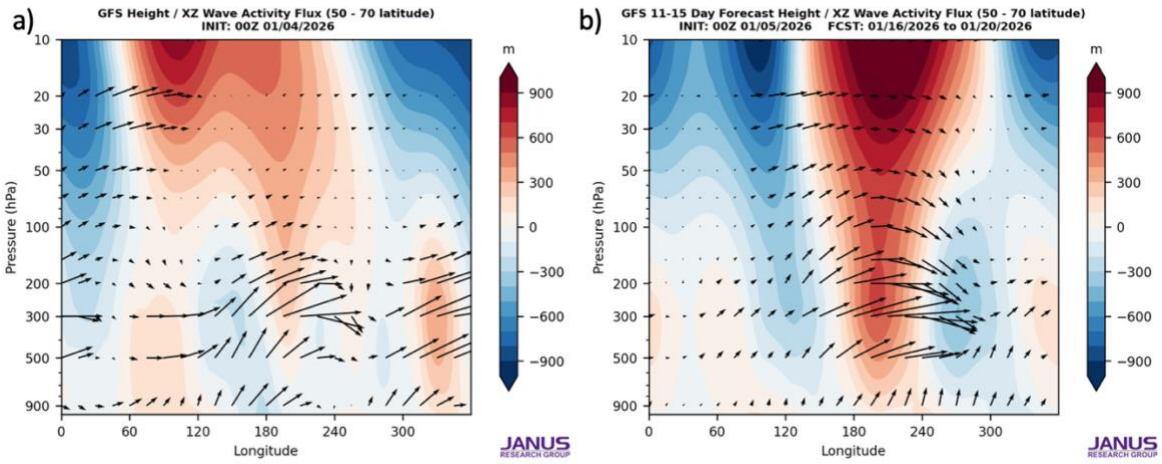


**Figure iii**. **a)** Observed Longitude-height cross section of geopotential eddy height anomalies (shading) and wave activity flux (vectors) for 04 January 2026 taken from the 00Z 04 January 2026 GFS operational. **b)** same as **a)** but forecast from 16 January through 20 January 2026. The forecast is from the 00Z 05 January 2026GFS operational.

I took the unsual step to show wave reflection from yesterday to make the point this last in a series of Arctic outbreaks from Alaska to the Northeatern US is once again tied with a stretched PV/wave reflection. There is no wave reflection evident the rest of this week (not shown) consistent with a more circular, stronger PV this week coupled with the dramatic warming across North America (**Figures 3** and **6**). Wave reflection (not shown) returns next week and gives rise the the return of Alaskan blocking as seen in **Figure i**. I don't show the predicted wave reflection for next week because in my opinion a stretched PV for next week is a high confident forecast and what is more challenging is what will happen the third week of January.

I believe we have the relatively strong PV this week (but nothing exceptional) coupled with what may just be the relatively mildest week of the winter for the NH. Then next week we have another stretched PV with cold returning to Siberia and North America consistent with a stretched PV (and persisting at least in parts of Europe). With the big question what comes next?

As anyone who has been reading the blog with any regularity by now knows, I have been doing my best Monty Hall from "Let's Make a Deal" impression. Not sure if readers find it annoying but I have found it very useful to summarize what I am anticipating but also what is possible. And I do believe that it has been a good way to predict the behavior fo the PV and subsequently our weather. I would appreciate any positive or negative feedback.

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 consistently 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 have another stretched PV next week to be followed by a PV "cartwheel," which is hard to interpret what exactly going on, a Canadian warming a possible SSW? I don't see an SSW just yet but a Canadian warming is possible. But I showed the wave diagnostics for the third week of January because I think that we are likely to see yet another stretched PV after next week's stretched PV with some kind of interruption between the two. So at least through the third week of January still riding the "rinse, lather, repeat" train.

Recently I have included the caveat with stretched PVs that still applies for the second week of January (I wrote this last as well), the models are always playing catch up and it is often much colder than first predicted by the models. Even today I look at the model forecasts and ask "where is the cold air east of the Rockies?" The models are starting to catch on to much colder weather heading into the fourth week of January but I think it could be colder than predicted east of the Rockies starting the end of next week, so something to watch.

In **Figure iv** I show the probabilities of the lowest temperature quintiles for the globe for the third week of January from our AI model in development and competing in AI Weather Quest from the ECMWF. Once again the region of highest probability of extreme cold includes much of Canada but also the Northern US. Gone are appreciable probabilities in Europe. Keep in mind this forecast only includes data up to last Thursday. I see that the dynamical models are only now coming around to this forecast or about four days behind our AI model. I was going to share the foercast over the weekend but was distracted with my X account drama.

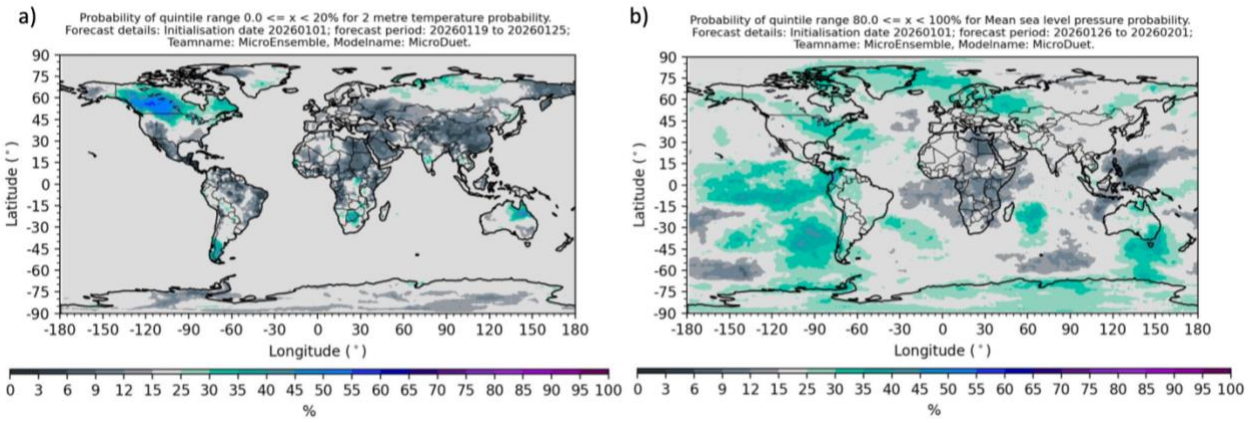


**Figure iv. a)** The predicted lowest quintile of temperatures across the globe for the week of 19 Jan through 25 Jan 2026. **b)** The predicted highest quintile mean sea level pressure across the globe for the week of 26 Jan through 01 Feb 2026. The forecasts are from our AI model initialized on 01 Jan 2026.

Yet again in my opinion the likelihood or probability of which door is chosen by the PV has changed again this week. The standings remain the same as last week but the momentum has shifted in my opinion. I have held that the consistent frontrunner or highest probability is door number three or 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.

The second most likely scenario based on current forecasts of the tropospheric circulation is door number two or an eventual SSW. If Ural blocking can persist and strengthen, this scenario becomes increasingly likely. I do think that the Ural blocking has become a more consistent feature in model forecasts. It is seen in **Figure 8** and can even be seen in **Figure iv** which shows the highest probability quintile of mean sea level pressure for the last week of January. We shall see if the momentum can carry into next week as well.

In past blogs and last week, I have discussed our polar vortex model. Last week it finally started to predict a weaker PV in late January. This week it has predicted a dramatically weaker PV for early February. The model is heavily flawed but does seem to indicate something has clearly changed and the predicted PV strength is now weak enough where it should be taken or considered seriously. Also I am struck by the weather model forecast of cold temperatures stretching across much of Northern Eurasia (**Figures 5** and **8**). This resembles to me the pattern that is most closely associated with the central date of an SSW. For example see Figure 4 from Kretschmer et al. 2018.

If we do get an SSW in early February this winter would resemble somewhat winter 2017/18. It did turn much colder in East Asia and Europe and record warm in the Eastern US in Febraury 2018. No two winters are alike but a template or analog worth keeping handy.

Least likely now and dropping fast in my opinion, is door number one or the runaway strengthening PV coupled with a lack of high latitude blocking and widespread mild temperatures across the mid-latitudes. Never say never, but I think this door is closed shit for now and is quickly being locked for the winter (December through February and not including March). **Figure 11** kind of suggests a stretgthening PV yet again in two weeks, but hard for me to see it with so much consistent high-latitude blocking; but humility is always warranted.

## Near-Term

### This week

The AO is predicted to be near neutral this week **(Figure 1**) with mostly mixed 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.

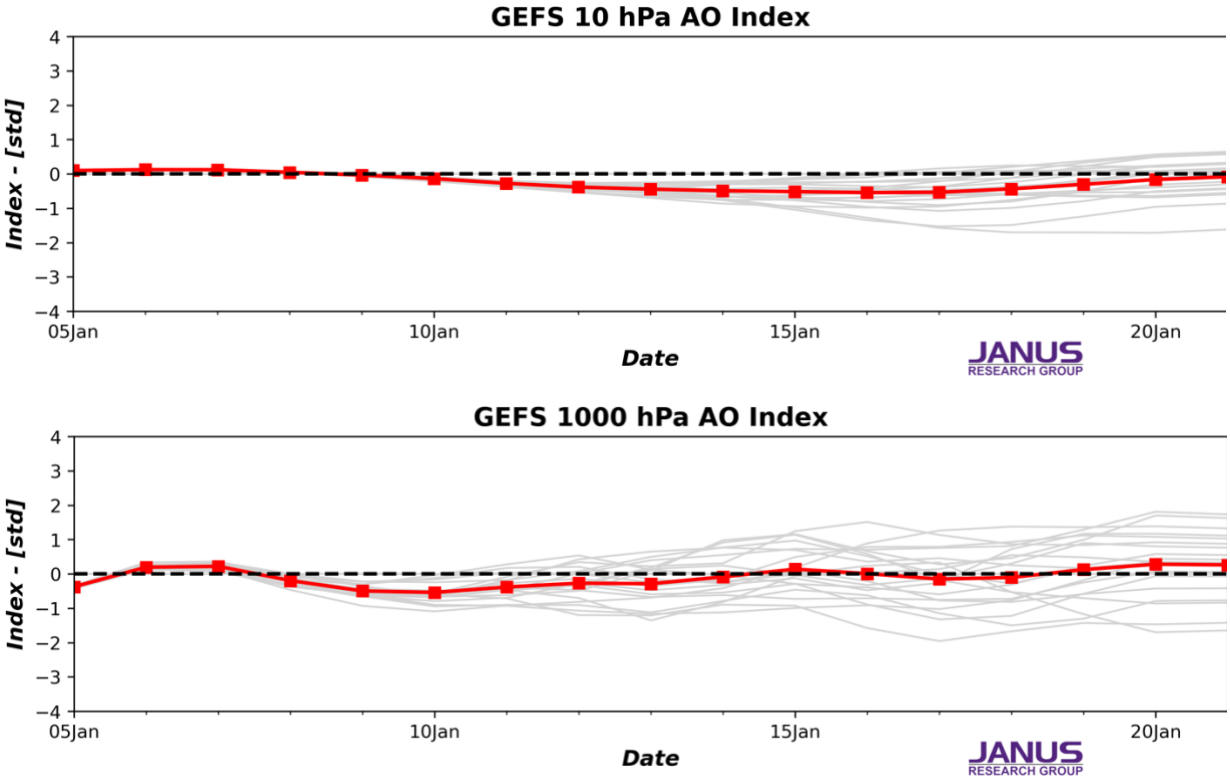


**Figure 1.** The predicted daily-mean AO at a) 10 hPa and b) 1000 hPa from the 00Z 05 Jan 2026 GFS ensemble. Gray lines indicate the AO index from each individual ensemble member, with the ensemble mean AO index given by the red line with squares.

Strong ridging/positive geopotential height anomalies centered on Greenland will support troughing/negative geopotential height anomalies across Europe (**Figure 2).** This pattern will support widespread normal to below normal temperatures across much of Europe including the UK with the exception of normal to above temperatuers across the Balkan States and Turkey this

week (**Figure 3**). This week the general pattern across Asia is ridging/positive geopotential height anomalies across Western Asia supporting troughing/negative geopotential height anomalies across Northern and Eastern Asia this week (**Figure 2**). This pattern favors normal to above normal temperatures widespread across much of Asia with normal to below normal temperatures limited to parts of Northern Siberia and Southeast Asia this week **(Figure 3**).

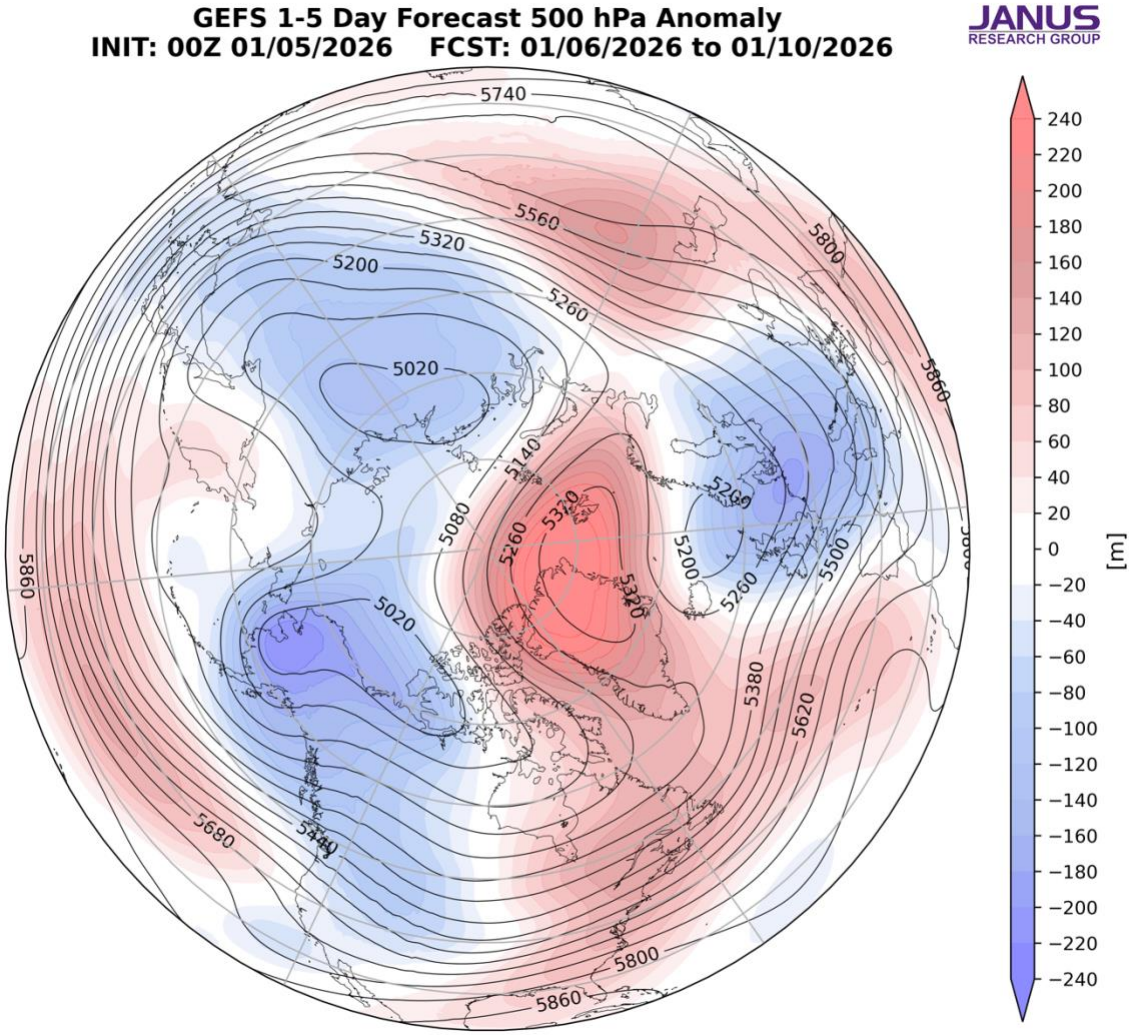


**Figure 2.** Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 06 Jan 2026 to 10 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

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

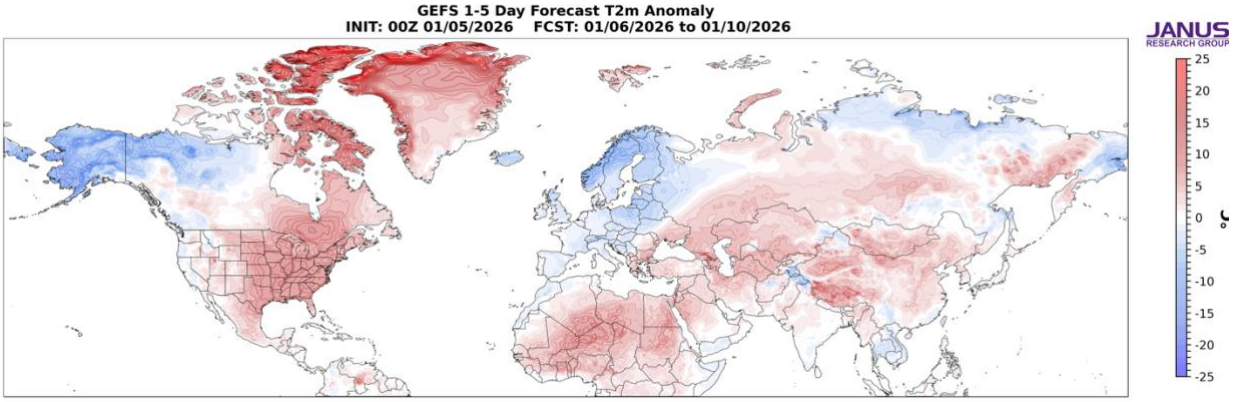


**Figure 3.** Forecasted surface temperature anomalies (°C; shading) from 06 Jan 2026 to 10 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

Troughing and/or cold temperatures will support new snowfall across Scotland, Scandinavia, Southern and Eastern Europe, the Alps, the Caucuses, Western Russia, parts of Siberia, Northeast Asia and Japan while milder temperatures will support snowmelt across Southwestern Russia and Central Asia this week (**Figure 4**). Troughing and/or cold temperatures will support new snowfall across much of Alaska, Northeastern Canada, the higher elevations of British Columbia and the Western US while milder temperatures will support snowmelt widespread across the the Canadian Plains, Southeastern Canada and the Northeastern US this week (**Figure 4**).

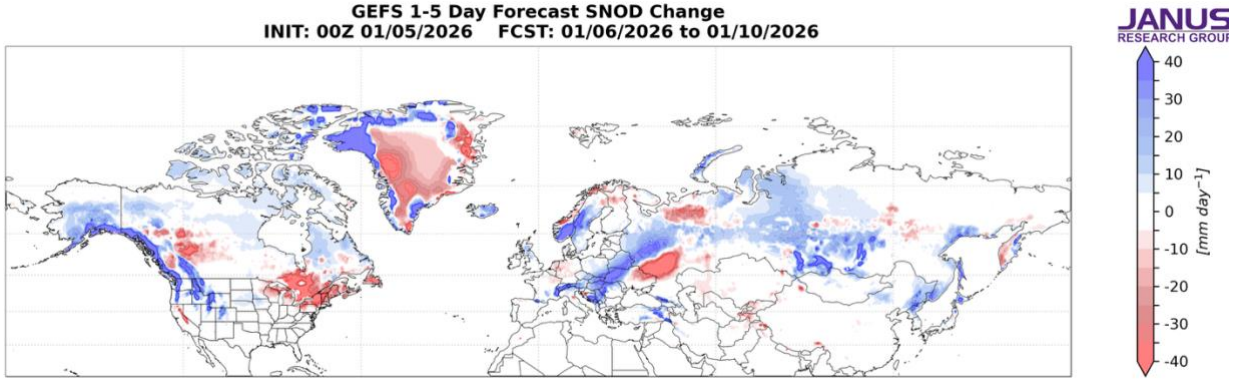


**Figure 4.** Forecasted snowfall (mm/day; shading) from 06 Jan 2026 to 10 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

## Near-Mid Term

### Next week

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

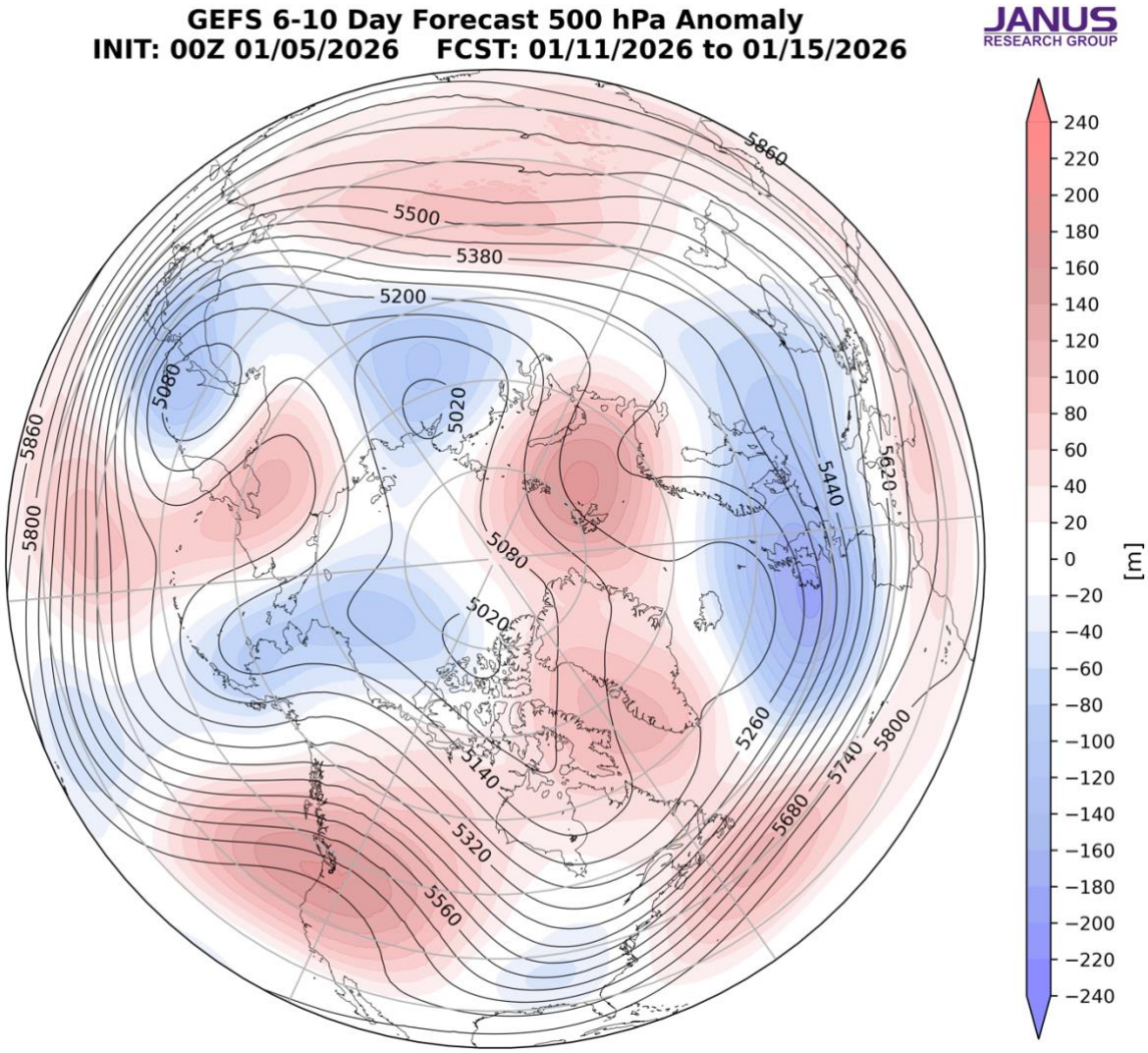


**Figure 5**. Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 11 Jan to 15 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

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

and Eastern Europe, however an increasing westerly flow will support normal to above normal temperatures across Western and Southern Europe including the UK this period (**Figure 6**). Across Asia ridging/positive geopotential height anomalies centrted in the Barents-Kara Seas will support troughing/negative geopotential height anomalies across Northern Asia with more ridging/positive geopotential height anomalies across Southern and Central Asia (**Figure 5**). This pattern favors normal to above normal temperatures widespread across much of Asia but especially Central Asia and Mongolia with normal to below normal temperatures across Northern Asia this period (**Figure 6**).

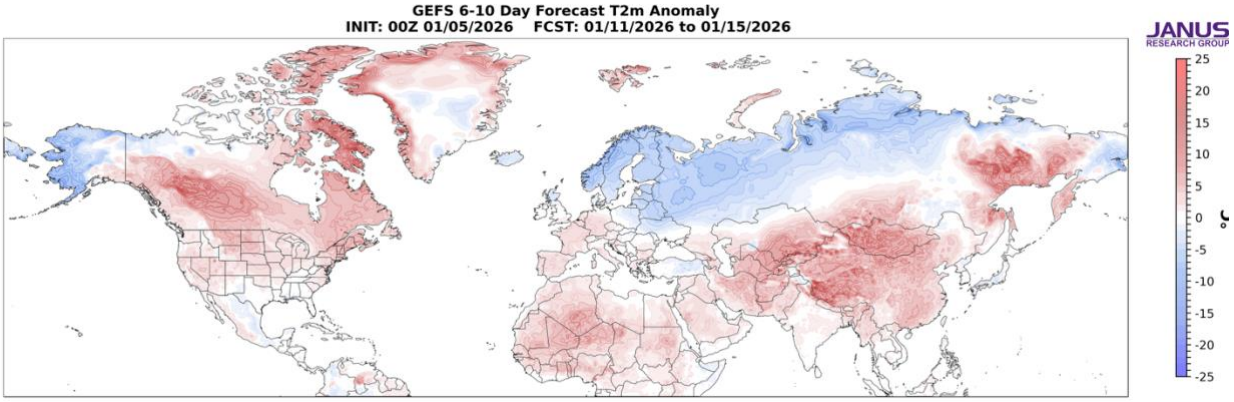


**Figure 6.** Forecasted surface temperature anomalies (°C; shading) from 11 Jan to 15 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

Once again ridging/positive geopotential height anomalies are predicted to return to western North America will support troughing/negative geopotential height anomalies in Eastern Canada and the Eastern US with more troughing in Alaska this period (**Figure 5**). This pattern will favor normal to below normal temperatures across Alaska, and parts of th Southwestern US with normal to above normal temperatures across most of Canada and much of the US (**Figure 6**).

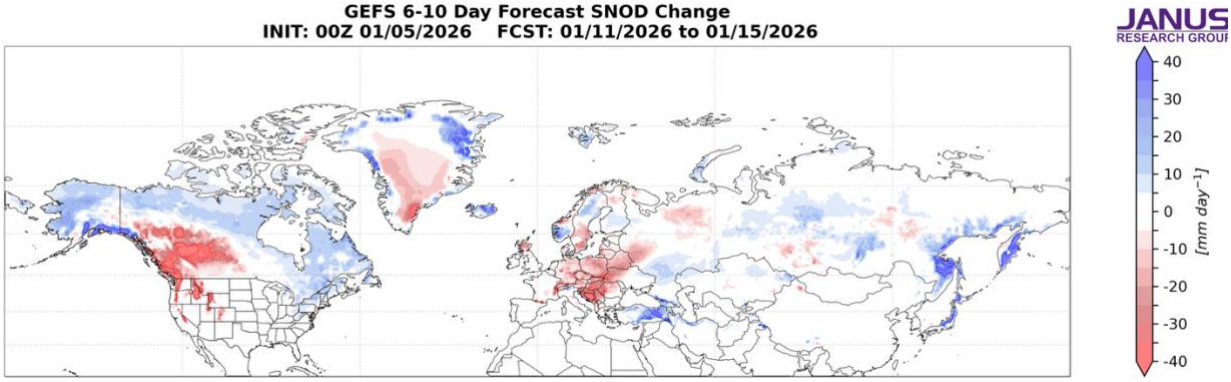


**Figure 7.** Forecasted snowfall rate (mm/day; shading) from 11 Jan to 15 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

Troughing and/or cold temperatures will support new snowfall in Scandinavia, Turkey, parts of Siberia and Northeast Asia while milder temperatures will support snowmelt in Central and

Eastern Europe, parts of Northwest Russia and Southern Siberia this period (**Figure 7**). Troughing and/or cold temperatures will support new snowfall in Alaska, the coastal mountains of Western Canada, much of Northern and Eastern Canada and the Northeastern US while milder temperatures will support snowmelt in Western Canada and the higher elevations of the Western US this period (**Figure 7**).

## Mid Term

### Week Two

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

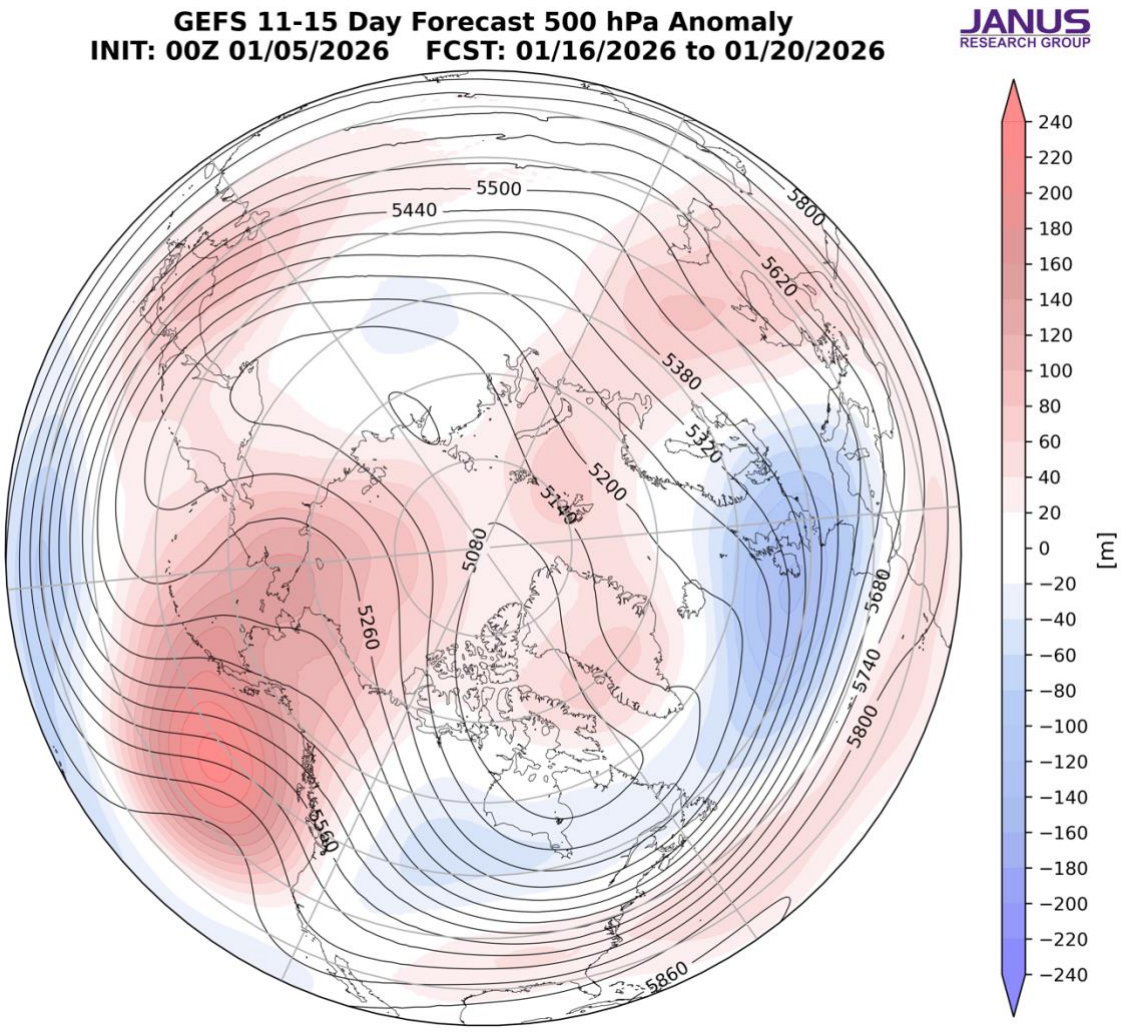

**Figure 8.** Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 16 Jan to 20 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

Persistent ridging/positive geopotential height anomalies across Greenland 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 and Eastern Europe including the UK while a milder westerly flow will support normal to above normal temperatures across Western and Southern Europe this period (**Figures 9**). Yet again this period ridging/positive geopotential height anomalies across Western Asia will support troughing/negative geopotential height anomalies across Northern with more ridging across Southern Asia (**Figure 8**). This pattern favors normal to above normal temperatures widespread across Southern and Central Asia, Mongolia and Eastern Siberia with normal to below normal temperatures across Northern Asia this period (**Figure 9**).

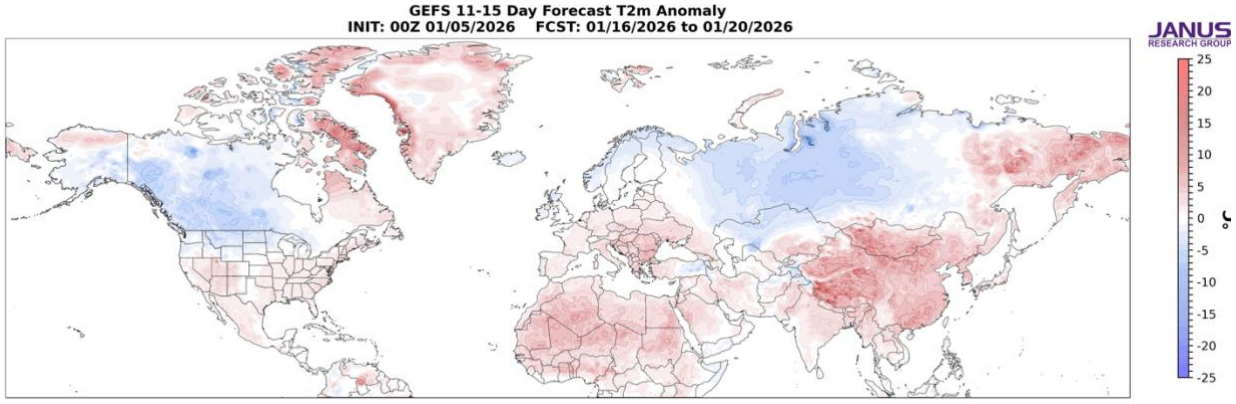


**Figure 9.** Forecasted surface temperature anomalies (°C; shading) from 16 Jan to 20 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

Strenghtening ridging/positive geopotential height anomalies centered previously centered in the Western US will slide west now into the Gulf of Alaska and Alaska supporting downstream troughing/negative geopotential height anomalies stretching from Western Canada and into the Western US with more ridging across Eastern Canada and the Eastern US this period (**Figure 8**). This pattern supports normal to below normal temperatures across southern Alaska, much of Western and Central Canada and the Northwestern US Plains with normal to above normal temperatures across Eastern Canda and much of the Southern and Eastern US this period (**Figure 9**). I consider this period of high uncertainty and use any forecast with caution.

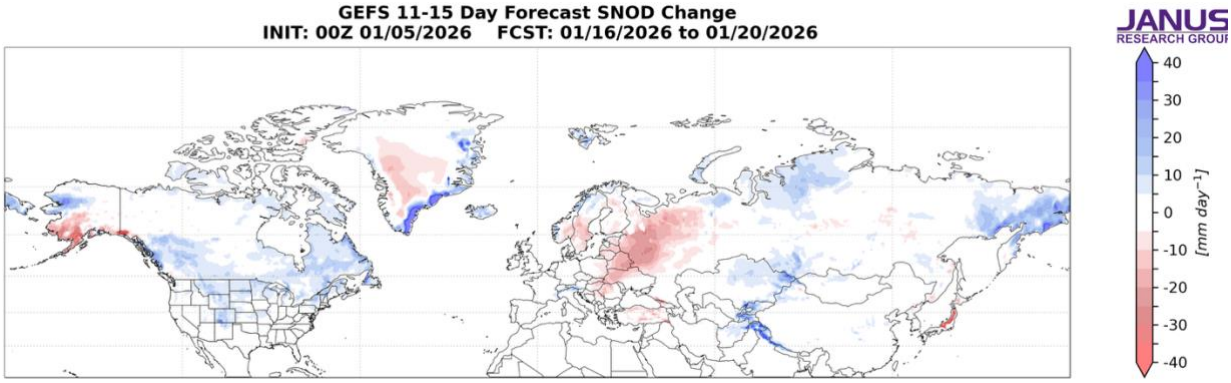


**Figure 10.** Forecasted snowfall (mm/day; shading) from 16 Jan to 20 Jan 2026. The forecasts are from the 00Z 05 Jan 2026 GFS ensemble.

Troughing and/or cold temperatures will support some possible new snowfall in parts of Siberia and parts of Central Asia while milder temperatures will support snowmelt in parts of Scandinavia, Eastern Europe the Caucuses and Japan this period (**Figure 10**). Troughing and/or cold temperatures will support new snowfall in northwestern Alaska, much of Southern Canada, the higher elevations of the Western US, the Northern Plains and the Northeastern US while milder temperatures will support snowmelt in Southeestern Alaska this period (**Figure 10**).

## Longer Term

### 30–day

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

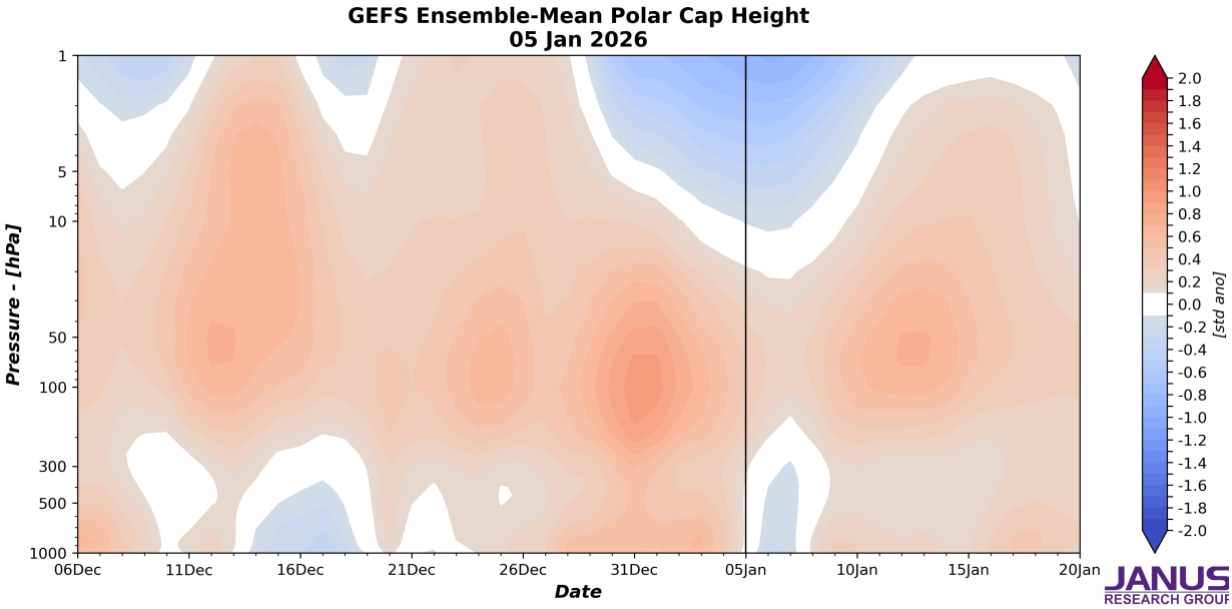


**Figure 11.** Observed and predicted daily polar cap height (i.e., area-averaged geopotential heights poleward of 60°N) standardized anomalies. The forecast is from the 00Z 05 Jan 2026 GFS ensemble.

The predicted warm/positive PCHs in the lower troposphere this week (**Figure 11**) are consistent with the predicted neutral to slightly positive AO this week (**Figure 1**). Then next week the forecast of warm/positive PCHs into the lower troposphere (**Figure 11**) should favor a near neutral to even possibly negative AO next week (**Figure 1**).

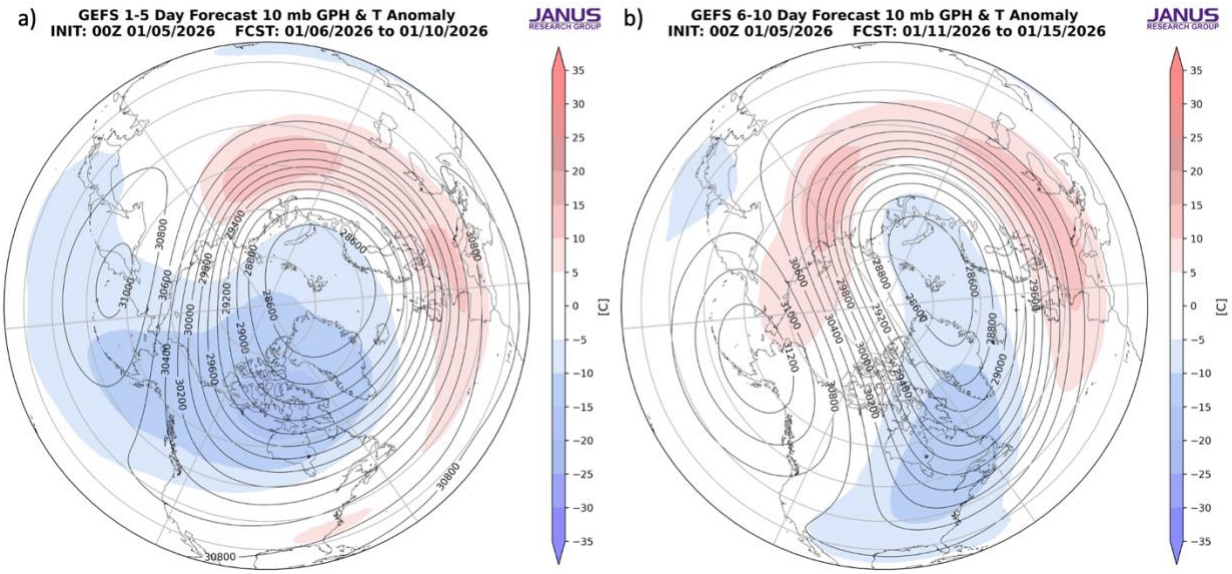


**Figure 12.** (a) Predicted 10 mb geopotential heights (dam; contours) and temperature anomalies (°C; shading) across the Northern Hemisphere averaged for 06 Jan to 10 Jan 2026. (b) Same as (a) except forecasted averaged from 11 Jan to 15 Jan 2026. The forecasts are from the 00Z 05 January 2026 GFS model ensemble.

This week the polar vortex (PV) is predicted to be circular in shape with the PV center near Svalbard with relatively cold temperatures focused from Alaska to Hudson Bay and with high pressure centered near Kamachatka and relatively warm temperatures across Europe and Western Asia in the polar stratosphere (**Figure 12a**). The semi-circular shape in appearance, signals a streonger PV. Then during the second week of January the PV center is predicted to still be centered over Svalbard and high pressure centered over Alaska with cold temperatures over eastern North America and Greenland with relatively warm temperatures remaining over Europe and Western Asia but extedning into the Arctic in the polar stratosphere (**Figure 12b**). This once again resembles a stretched PV configuration but in general the PV is starting to look increasingly disrupted. The stratospheric AO in **Figure 1** this week is predicted to remain somewhat positive then neutral and then back to negative next week, signaling a strong PV this week then once again a weakening PV.

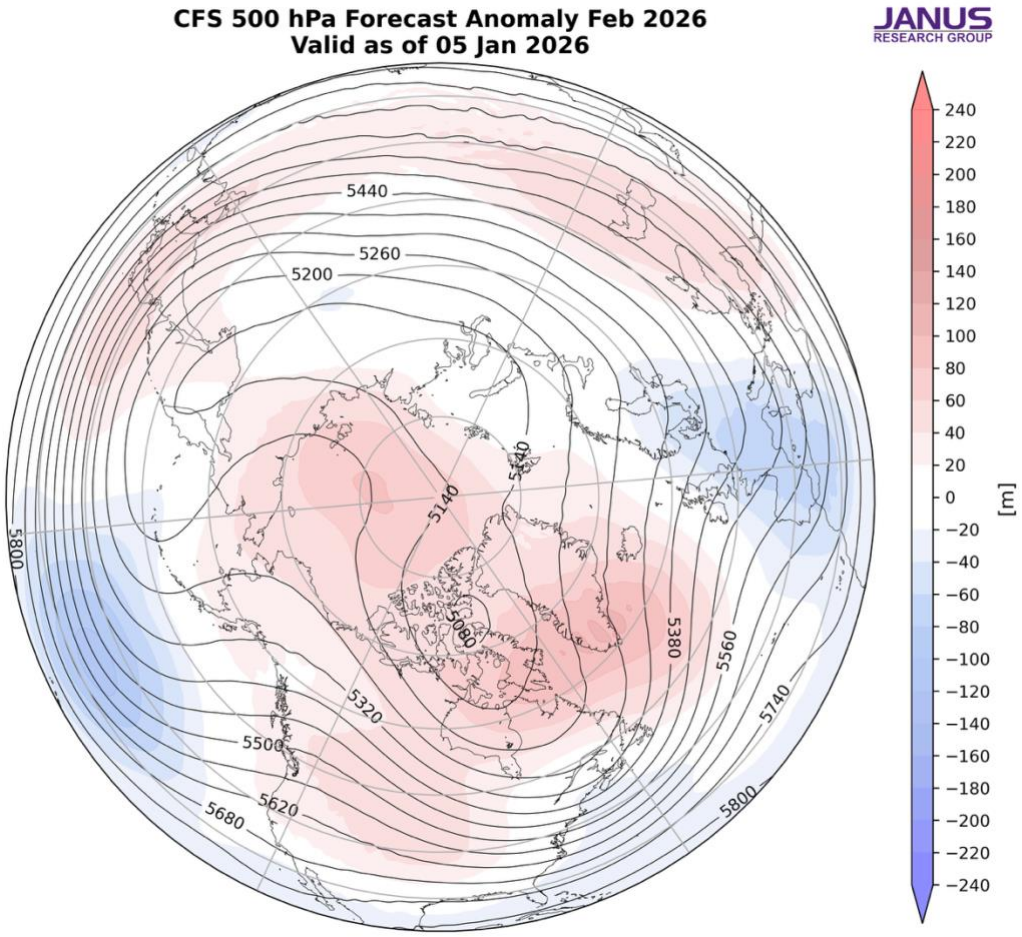


**Figure 13.** Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere for February 2026. The forecasts are from the 00Z 05 Jan 2025 CFS.

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 centered over Baffin Bay and southern Greenland, the Soutern Asia, western North America and into the Arctic 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 Southeastern Europe, Southern and Central Asia, including the Middle East, eastern China the Tibetan Plateau, Pakistan and Afghanistan, Eastern Siberia, Western Canada and the Western US with seasonable to relatively cool temperatures across Western and Northern Europe, Northern Asia into Northeast Asia, Alaska Southeastern Canada and the Northeastern US (**Figure 14**).

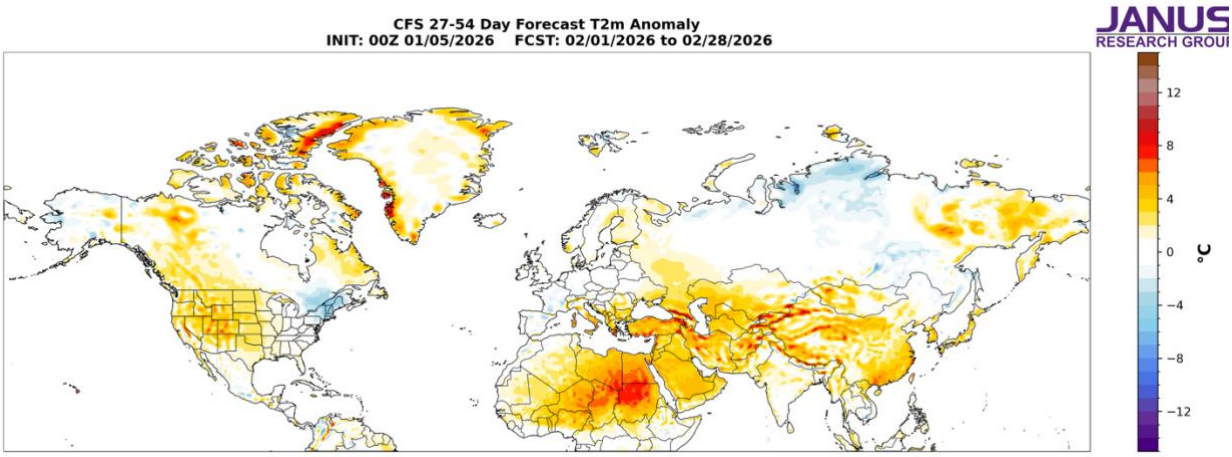


**Figure 14.** Forecasted average surface temperature anomalies (°C; shading) across the Northern Hemisphere for February 2026. The forecasts are from the CFS 00Z 05 Jan 2025.

## 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 could be helping to support Ural/Scandinavian blocking but low sea ice near Grenaldn could be supporting blocking in the region as well.

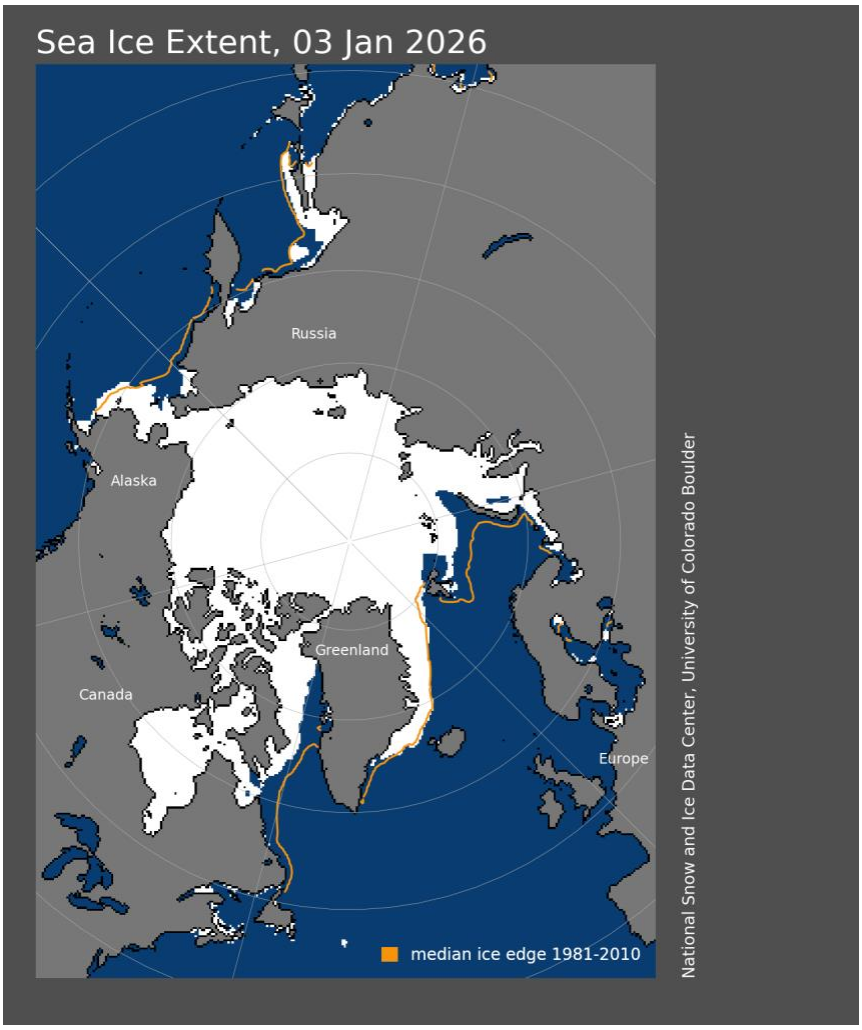


**Figure 15.** Arctic sea ice cover extent for 03 Jan 2026. White depicts ice covered areas and the orange contour the climatological extent of Arctic sea ice for the date. Plot taken from: https://nsidc.org/sea-ice-today

**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.

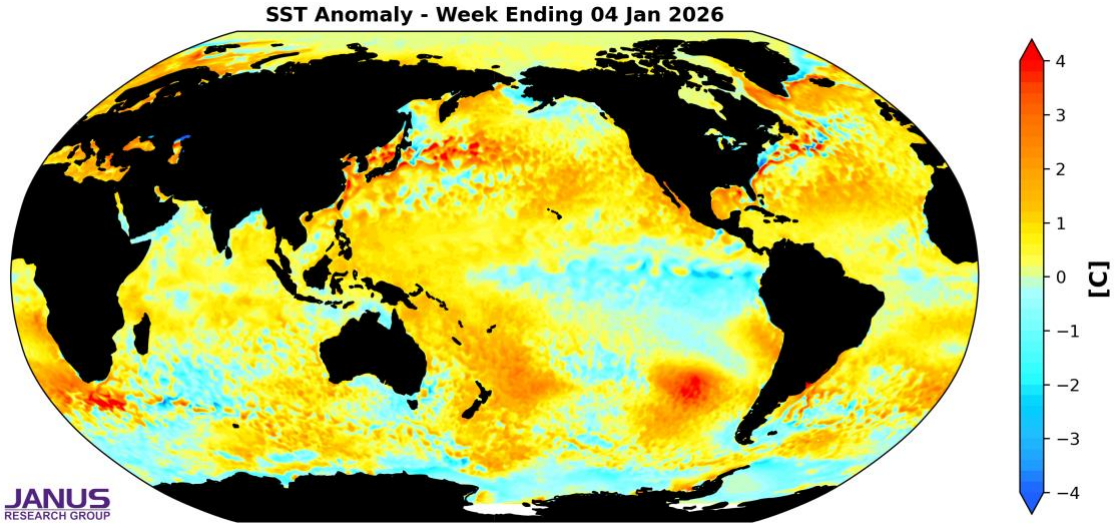


**Figure 16**. The latest daily-mean global SST anomalies for week ending 04 Jan 2025.

## Madden Julian Oscillation

Currently the Madden Julian Oscillation (MJO) is currently weak where no phase is favored (**Figure 17**) and the forecasts are for the MJO to remain weak where no phase is favored over until mid-month when it could emerge in phase seven (**Figure 17**). Therefore, it seems that the MJO is having little influence on North American weather in the next two weeks. But admittedly this is outside of my expertise.

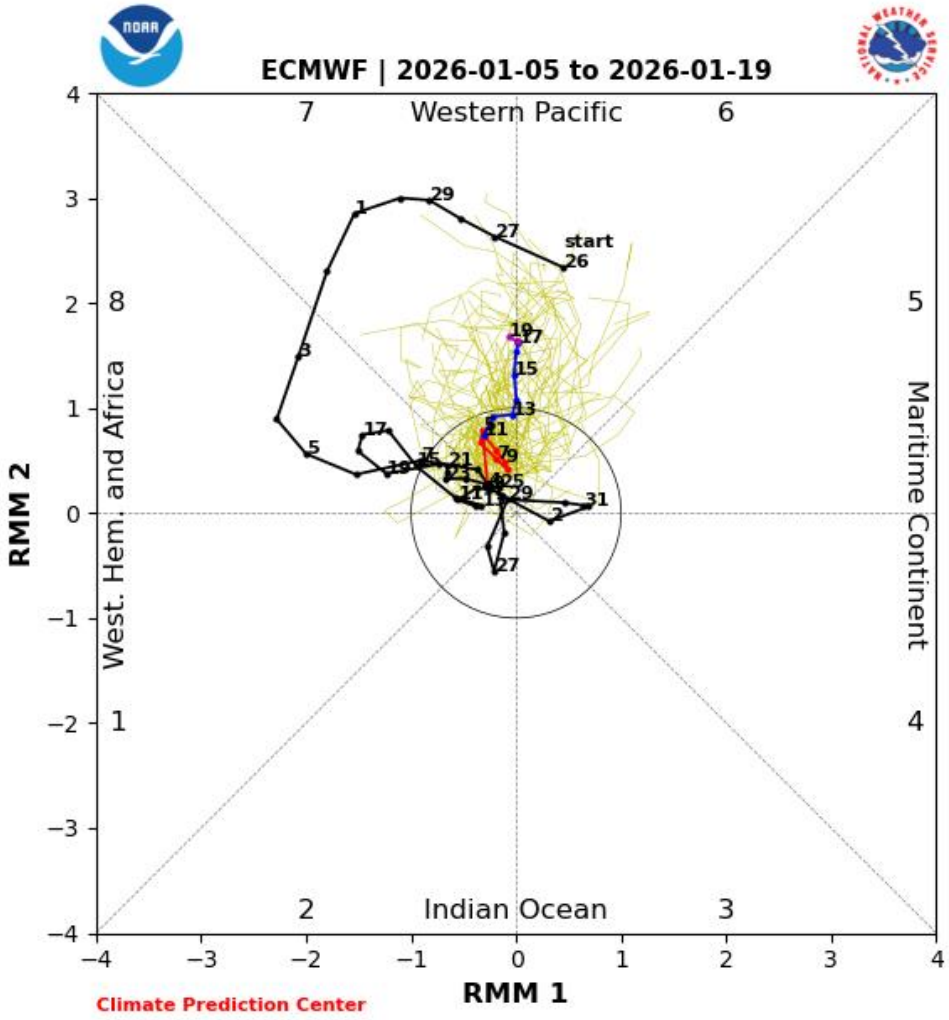


**Figure 17**. Past and forecast values of the MJO index. Forecast values from the 00Z 05 Jan 2026 ECMWF model. Yellow lines indicate individual ensemble-member forecasts, with the green line showing the ensemble-mean. A measure of the model 'spread' is denoted by the gray shading. Sector numbers indicate 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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