

# Arctic Oscillation and Polar Vortex Analysis and Forecasts

February 14, 2022

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. With the start of 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 positive and is predicted to remain positive to strongly positive through early-March with mostly negative pressure/geopotential height anomalies across the Arctic especially the North Atlantic side of the Arctic and mixed pressure/geopotential height anomalies across the mid-latitudes. The North Atlantic Oscillation (NAO) is also positive and is predicted to remain positive as pressure/geopotential height anomalies are predicted to remain negative across Greenland the next two weeks.
- The next two weeks, troughing/negative geopotential height anomalies across Greenland will favor ridging/positive geopotential height anomalies and/or zonal flow coupled with normal to above normal temperatures across much of Europe including the United Kingdom (UK) with the possible exception of troughing/negative geopotential height anomalies coupled with normal to below normal temperatures across Scandinavia.
- The dominant pattern across Asia the next ten days is a quasi-omega block pattern across Northern Asia with troughing/negative geopotential height anomalies coupled with normal to below normal temperatures across Northwestern and Eastern Asia with ridging/positive geopotential height

anomalies coupled with normal to above normal temperatures across much of Siberia. However, at the end of the month the Siberian ridge will slide into East Asia setting a mild zonal flow across much of Asia.

- The general pattern across North America the next two weeks is ridging/positive geopotential height anomalies in the Gulf of Alaska helping to anchor troughing/negative geopotential height anomalies across much of Canada that extends into the Western United States (US). This pattern mostly favors normal to below normal temperatures in Alaska, much of Canada and increasingly in the Western US with normal to above normal temperatures across the Eastern United States.
- In the *Impacts* section I continue to discuss my expectations of another possible stretched polar vortex (PV) event (though my confidence is lower than previous events) in midst of a raging PV overall and the related weather of the Northern Hemisphere (NH) into early March.

### *Plain Language Summary*

As has been the case all winter the forecast remains challenging with the possible exception of Europe where all signs point to mild weather. Across the US the polar vortex initially favors colder west milder east but by next week, I do think that the orientation of the polar vortex (which produces northerly flow) could favor colder temperatures sliding into the Eastern US while Canada overall remains relatively cold. Looking for signs of a break in the strong polar vortex, some hints and suggestions but nothing solid as of yet.

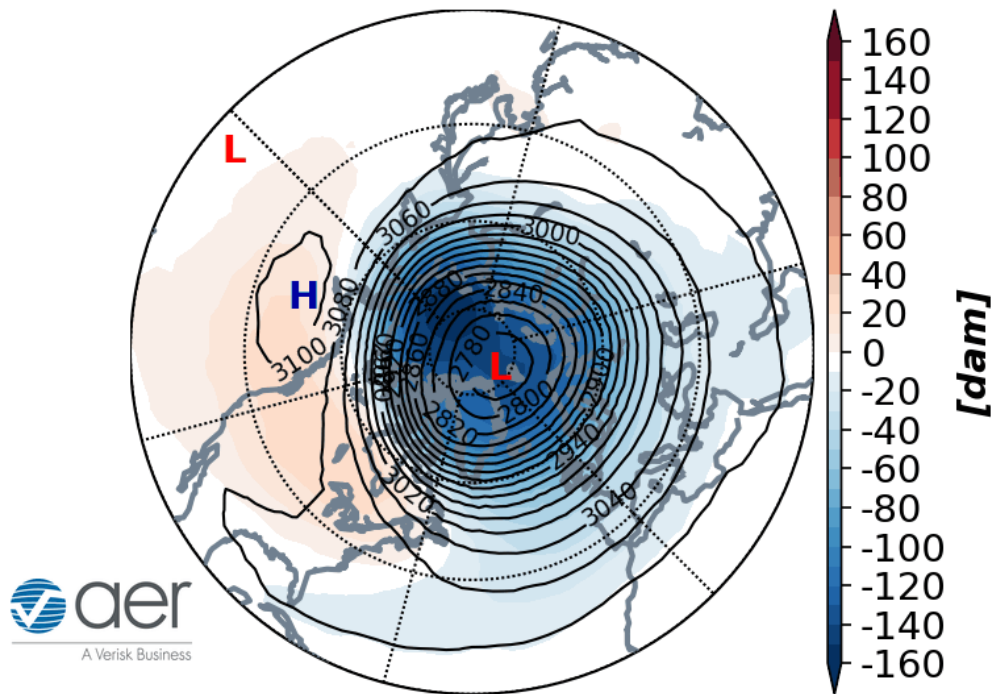
### *Impacts*

As I have discussed almost every week in the blog since the beginning of the year, my discussion focuses on the stretched stratospheric polar vortex (PV) and its influence on our weather. But to be honest this is a phenomenon that I have come to appreciate its important and impact on Asian and especially North American weather only relatively recently over the past four years (when [Marlene Kretschmer](#) visited me as a graduate student and did great work) and really since the Texas cold wave of February 2021. Therefore, there is much that I don't understand. The scant previous literature on the phenomenon discussed these events during weak PV periods and mostly following a sudden stratospheric warming (SSW). The PV has been just the opposite strong to near record strong all winter. Also, though there was with the early stretched PV events, of late there has been a total lack of Ural blocking/high pressure yet they seem to have continued. Furthermore, pretty much all year the stretched PV events occurred even though the overall vertical Wave Activity Flux (WAFz) from the troposphere to the stratosphere or poleward heat transport in the stratosphere was below normal. This is in contrast to stretched PV events from previous winters that I am familiar occurred with the WAFz was above normal at least for a short period.

I feel comfortable in saying that there have been four stretched PV events since the beginning of the year. I have discussed yet another and fifth event beginning the end of this week and as you can see from **Figure 13**, certainly the PV is taking on once again more of a stretched or oval appearance. But there are some important differences from previous events. First for the first four events the cold/negative stratospheric polar cap geopotential height anomalies (PCHs) were not coupled with the troposphere but for this next event the cold/negative stratospheric PCHs will be coupled with the troposphere. And so far, the diagnostics that I use to confirm a stretched PV event, WAF in the vertical and zonal directions so far do not show cleanly WAF reflection with upward over Siberia and downward over North America. Still, I am going to try to anticipate the weather in the coming weeks, but it is challenging, and I just don't have the experience from past event to feel confident in my predictions.

You can see the predicted stretched configuration to the PV this week and next week in **Figure 13**. But as I have been doing of late in the blog, I also include the polar vortex animation (see **Figure i**) for a more complete picture. The stretched configuration of the PV established yet again cross polar flow, which contributing to cold temperatures to remain in North America, especially Canada. But for this "stretched" event the northerly flow is directed towards the Western US and not the Eastern US. Instead, the Eastern US is under southwesterly flow in the stratosphere. So, I think the predicted tropospheric circulation is consistent with the stratosphere with troughing and colder temperatures in the Western US coupled with ridging and warmer temperatures in the Eastern US later this week.

## Initialized 00Z 10 hPa HGT/HGTa 14-Feb-2022



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**Figure i.** (a) Initialized 10 mb geopotential heights (dam; contours) and temperature anomalies ( $^{\circ}\text{C}$ ; shading) across the Northern Hemisphere for 14 February 2022 and forecasted from 15 February – 2 March 2022. The forecasts are from the 00Z 14 February 2022 GFS model ensemble.

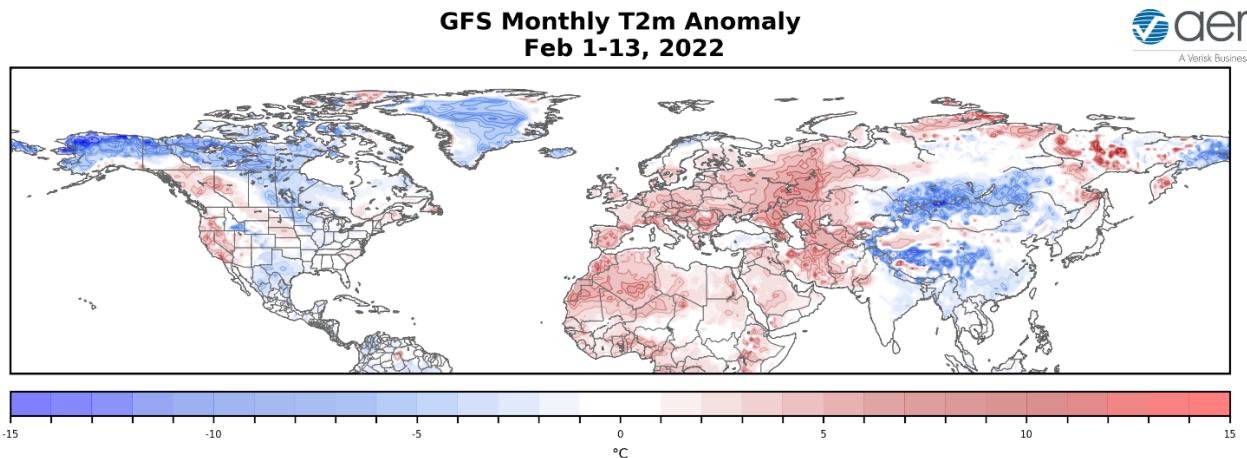
However next week the stretched PV or the long axis of the PV rotates with the northerly flow becoming increasingly directed at the Northeastern US. So even though the GFS forecasts below show persistently warm temperatures in the Eastern including the Northeastern US right through early March (see **Figures 6** and **9**) the predicted configuration and orientation of the PV suggest to me a return of relatively colder temperatures starting as early as sometime next week.

The question of will they or won't they couple seems to be answered. The cold/negative stratospheric PCHs are predicted to couple with the troposphere and it could last a while. The immediate impacts seem to be a positive to possibly strongly positive AO and a zonal flow across Eurasia with an overall mild to very mild temperature pattern. And as I have been saying for a few weeks the window of any meaningful winter weather in Europe is rapidly closing with the exception of Scandinavia simply



because of its northerly latitude and therefore it extends into the region of low geopotential heights. North America I believe is not as sensitive to the strength of the PV and the positive AO with the possible exception of the Eastern US. But the mild Eastern US forecast from the GFS is consistent with strong PV and positive AO. But as I discussed above, the orientation of the PV could offset that relationship.

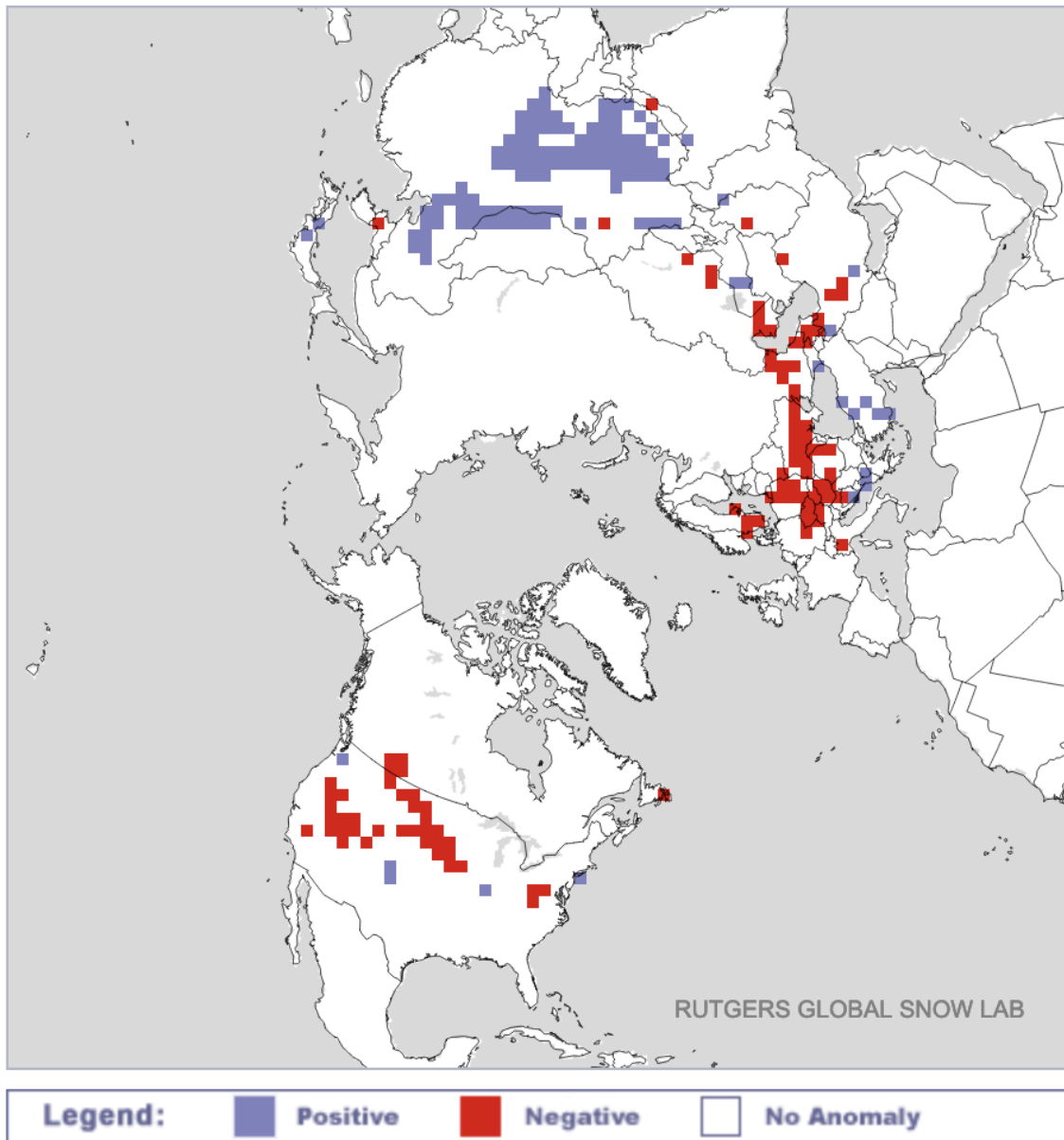
In **Figure ii**, I include the observed Northern Hemisphere (NH) surface temperature anomalies for February (through February 13<sup>th</sup>) and in **Figure iii** the NH snow cover extent anomalies observed on February 13<sup>th</sup>. I notice how the relative warm anomalies are coupled with below normal snow cover such as Europe and the Western US. But there is this odd couplet of below normal snow cover in the US and Canadian Plains and warm temperatures that almost seem to be an island onto themselves, and I think is a nice demonstration how snow cover can modulate surface temperatures.



**Figure ii.** Observed surface temperature anomalies (°C; shading) for the US averaged 1 – 13 February 2022 based on the daily initialized GFS.

But there is also an impressive anomaly couplet of the opposite sign. The most impressive positive snow cover anomaly this month is in China and that is coupled with below normal temperatures in Central to East Asia including China. Again, the presence of anomalous snow cover seems to contribute to the negative temperature anomalies. Certainly, seems timely for the Beijing Winter Olympics. I do think though it could have implications for the stratospheric PV and the weather across North America. I do believe that cold and snow anomalies in Central and East Asia can be precursors to a disruption of the PV and relatively colder temperatures in eastern North America. I think a good example of this sequence of events is January and February 2008. It is late in the PV season so something to watch but far from any kind of guarantee.

## Daily SCE Departure - February 13, 2022 (Day 44)

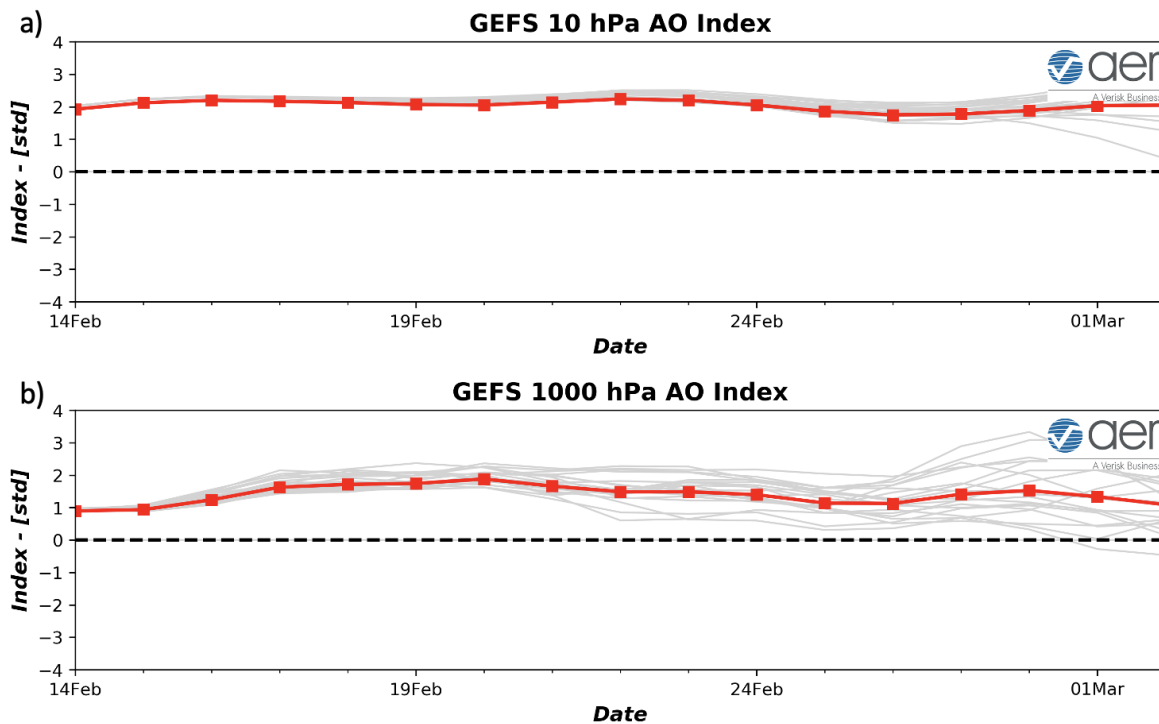


**Figure iii.** Observed snow cover extent anomalies for 13 February 2022. Figure taken from the Rutgers global snow lab <http://climate.rutgers.edu/snowcover/index.php>

A quick final note, the longer the PV remains strong, statistically the odds of a disruption increase, but admittedly I am not stating anything too profound. It is something to watch. There is more troughing predicted near the Dateline that is more favorable for disrupting the PV but no signs of Ural ridging and therefore I see few to no signs of a meaningful PV disruption into the foreseeable future.

1-5 day

The AO is predicted to be positive this week (**Figure 1**) as geopotential height anomalies are predicted to be negative across the Arctic especially the North Atlantic side of the Arctic with mixed geopotential height anomalies across the mid-latitudes of the NH (**Figure 2**). And with negative geopotential height anomalies predicted across Greenland (**Figure 2**), the NAO is also predicted to be positive this week (**Figure 1**).

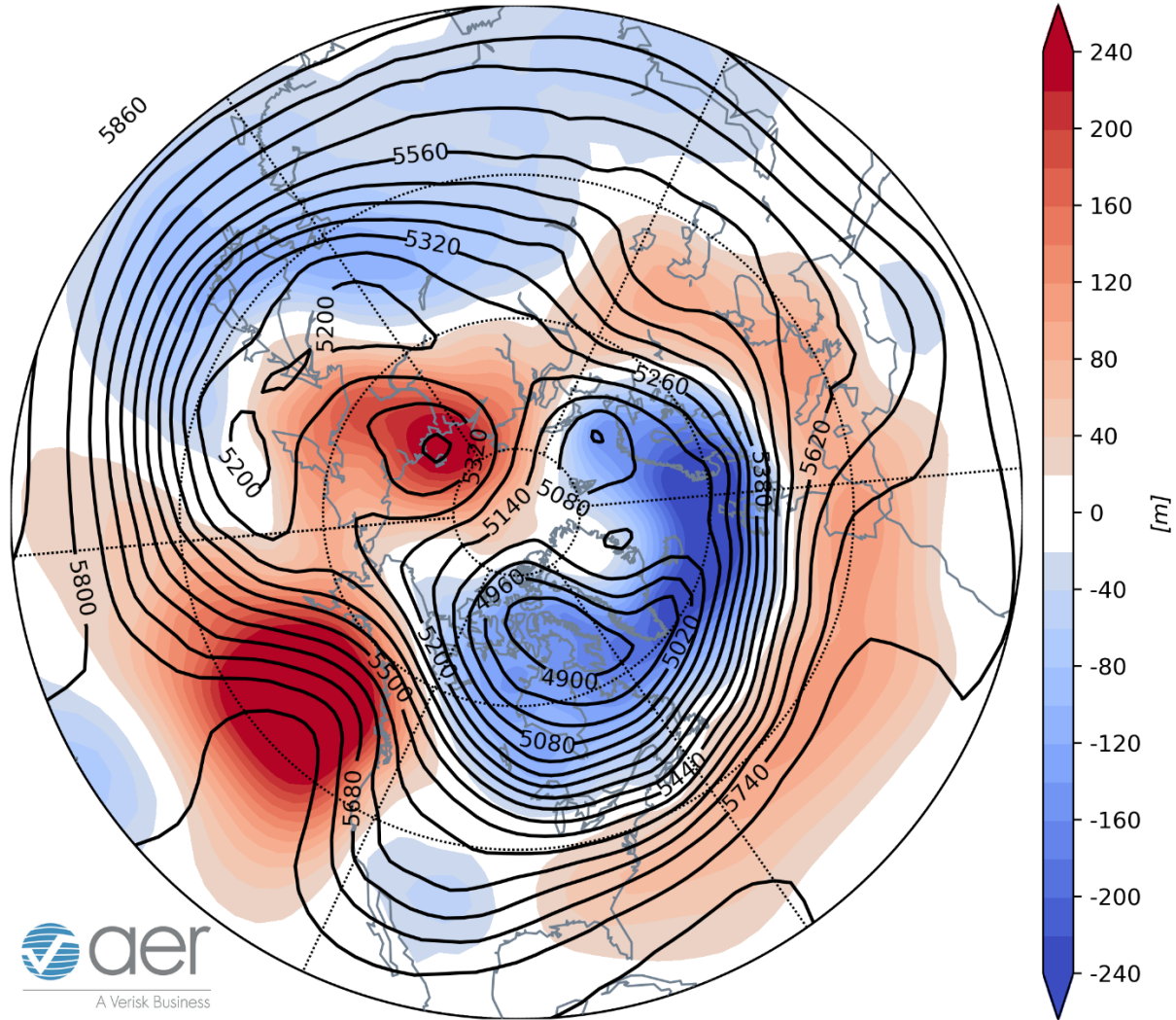


**Figure 1. (a)** The predicted daily-mean AO at 1000 hPa from the 00Z 14 February 2022 GFS ensemble. **(b)**The predicted daily-mean near-surface AO from the 00Z 14 February 2022 GFS ensemble. Gray lines indicate the AO index from each individual ensemble member, with the ensemble-mean AO index given by the red line with squares.

This week, troughing/negative geopotential height anomalies across Greenland will contribute to ridging/positive geopotential height anomalies across Central and Southern Europe with troughing/negative geopotential height anomalies across Northern Europe this period (**Figures 2**). **This pattern will result in normal to above normal temperatures across most of Europe with normal to above normal temperatures limited to Scandinavia and eastern Turkey (Figure 3).** This week, a quasi-omega block pattern is predicted across Asia with ridging/positive geopotential height anomalies dominating much of Siberia sandwiched by troughing/negative geopotential height anomalies in Northwestern Asia and Eastern Asia with more ridging/positive geopotential height anomalies across Southwestern Asia (**Figure 2**). This pattern favors widespread normal to above normal temperatures across much of Western and

Northern Asia with normal to below normal temperatures across Central and Eastern Asia including Eastern Siberia (**Figure 3**).

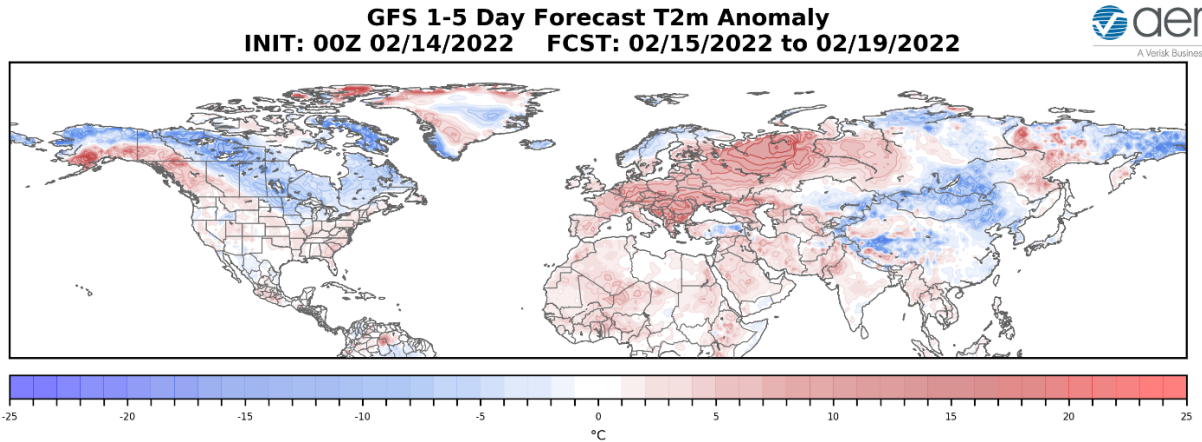
**GEFS 1-5 Day Forecast 500 mb GPH/GPH Anomaly**  
**INIT: 00Z 02/14/2022 FCST: 02/15/2022 to 02/19/2022**



**Figure 2.** Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 15 – 19 February 2022. The forecasts are from the 00z 14 February 2022 GFS ensemble.

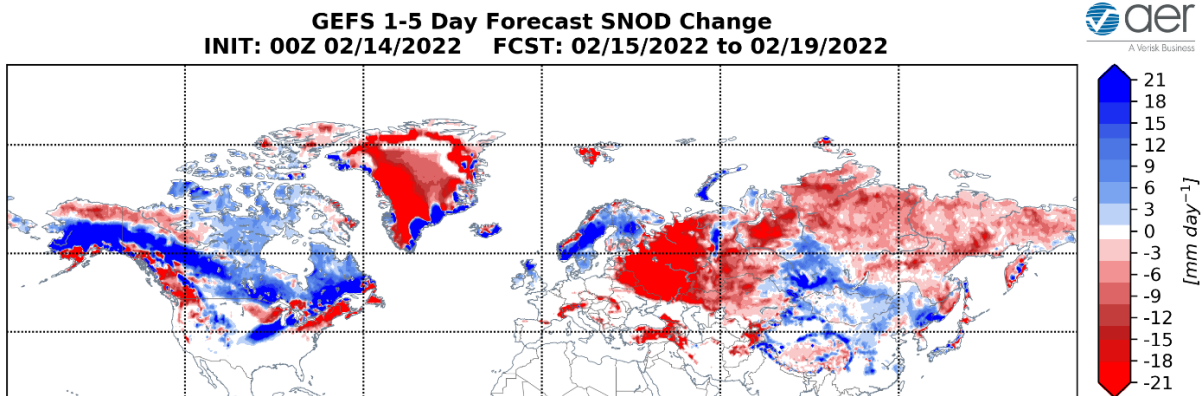
This week, the predicted pattern across North America is ridging/positive geopotential height anomalies in the Gulf of Alaska with downstream troughing/negative geopotential height anomalies across the interior of Canada and the US (**Figure 2**). This will favor normal to below normal temperatures across northern Alaska, much of Central and Eastern Canada and the Northeastern US with normal to above normal temperatures across southern Alaska, Western Canada and much of the Western and

Southern  
US (Figure 3).



**Figure 3.** Forecasted surface temperature anomalies ( $^{\circ}\text{C}$ ; shading) from 15 – 19 February 2022. The forecast is from the 00Z 14 February 2022 GFS ensemble.

Trounging and/or cold temperatures are predicted to support new snowfall across Scotland, Scandinavia, Central and Eastern Asia and the Tibetan Plateau while mild temperatures promote snowmelt in Eastern Europe, Western and Northern Asia (Figure 4). Trounging and/or cold temperatures are predicted to support new snowfall across central Alaska, Northern and Eastern Canada and the US Great Lakes while mild temperatures promote snowmelt in Western Canada, the Western and the Northeastern US (Figure 4).



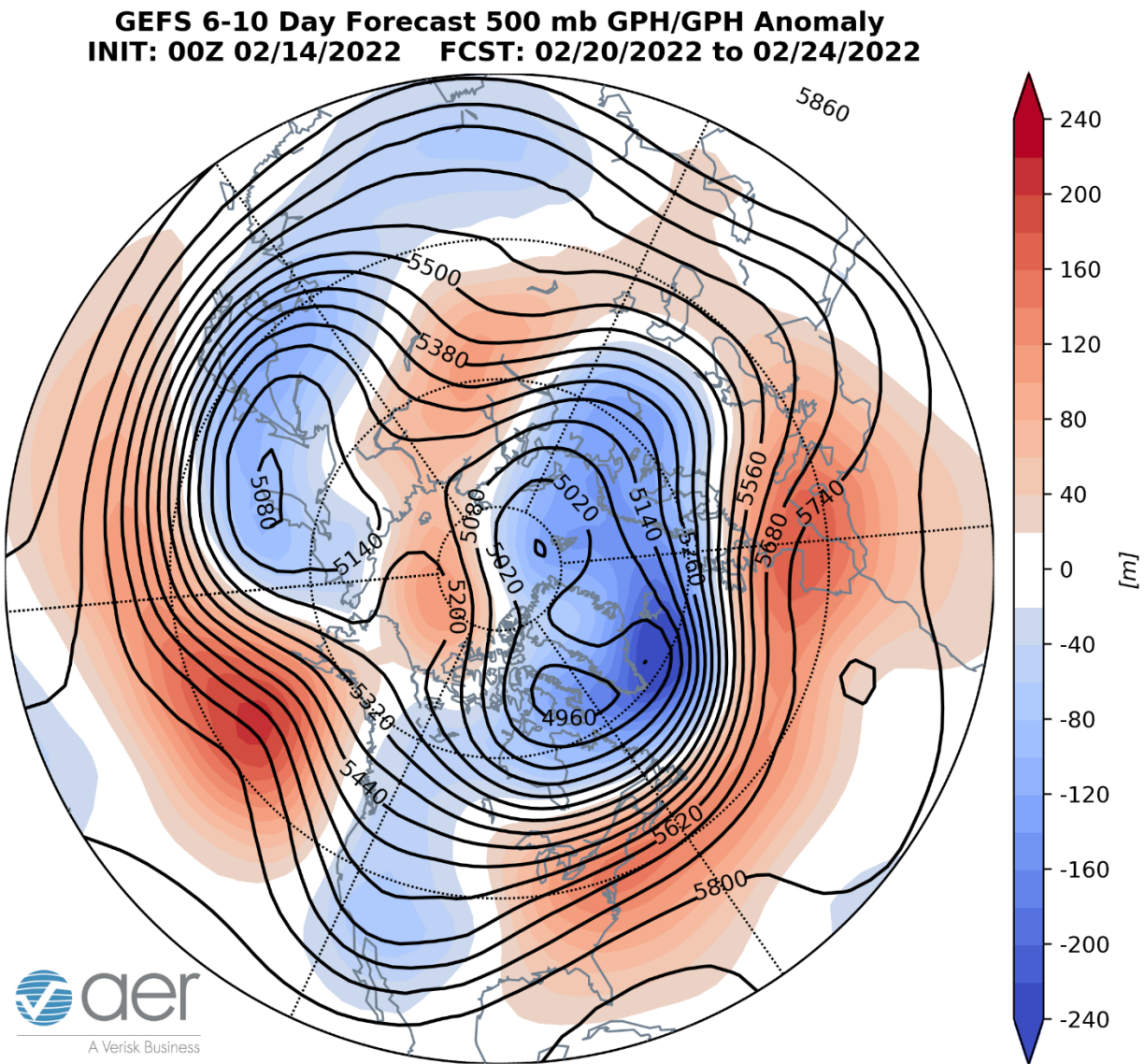
**Figure 4.** Forecasted snow depth changes (mm/day; shading) from 15 – 19 February 2022. The forecast is from the 00Z 14 February 2022 GFS ensemble.

Mid-Term

6-10 day

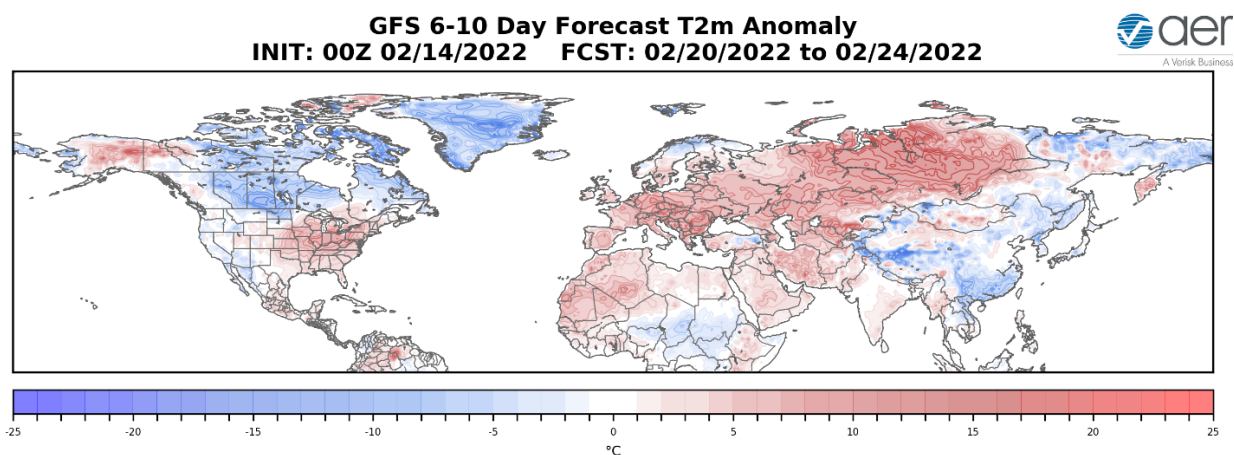


The AO is predicted to remain positive possibly strongly positive this period (**Figure 1**) with mostly negative geopotential height anomalies spread across the Arctic especially the North Atlantic side of the Arctic with mixed geopotential height anomalies across the mid-latitudes of the NH (**Figure 5**). And with negative geopotential height anomalies across Greenland (**Figure 5**), the NAO is predicted to remain positive this period.



**Figure 5.** Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 20 – 24 February 2022. The forecasts are from the 00z 14 February 2022 GFS ensemble.

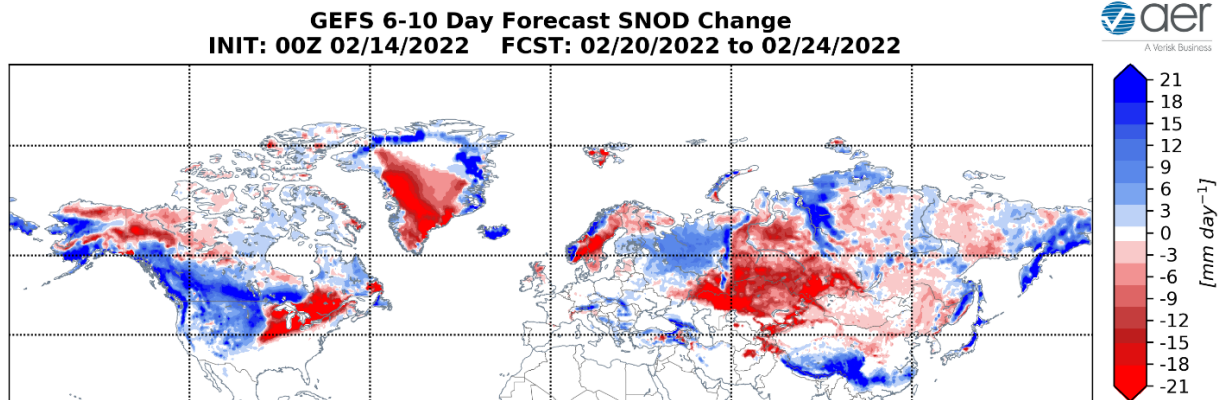
Persistent troughing/negative geopotential height anomalies across Greenland will support widespread ridging/positive geopotential height anomalies across Western and Southern Europe with troughing/negative geopotential height anomalies across Northern and Eastern Europe (**Figure 5**). This will result in normal to above normal temperatures across almost all of Europe including the UK with normal to below normal temperatures limited to Scandinavia due to low heights (**Figure 6**). Ridging/positive geopotential height anomalies are predicted to remain centered over Western Siberia with troughing/negative geopotential height anomalies on either side across Western and Eastern Asia this period (**Figure 5**). This pattern favors widespread normal to above normal temperatures across Asia with normal to below normal temperatures limited to parts of Central and Eastern Asia and Eastern Siberia (**Figure 6**).



**Figure 6.** Forecasted surface temperature anomalies (°C; shading) from 20 – 24 February 2022. The forecasts are from the 00Z 14 February 2022 GFS ensemble.

Ridging/positive geopotential height anomalies are predicted to persist in the Gulf of Alaska this period helping to anchor troughing/negative geopotential height anomalies across Northern and Western Canada and the Western US (**Figure 5**). This will favor normal to above normal temperatures across Alaska, the West Coast of Canada and the Central and Eastern US with normal to below normal temperatures in Central and Eastern Canada and the Western US (**Figure 6**).





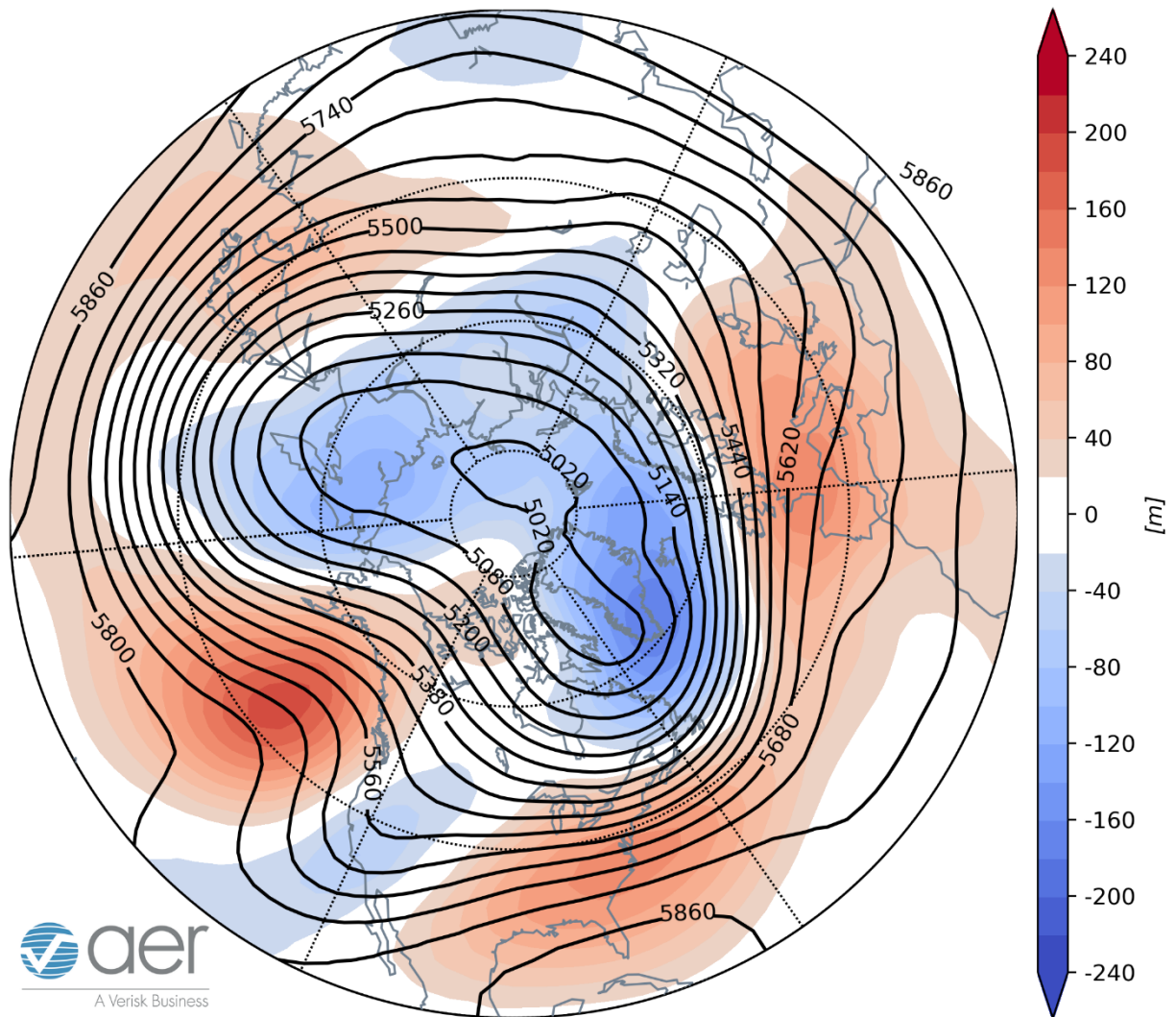
**Figure 7.** Forecasted snow depth changes (mm/day; shading) from 20 – 24 February 2022. The forecast is from the 00Z 14 February 2022 GFS ensemble.

Trouging and/or cold temperatures are predicted to support new snowfall across Norway, Northwestern Asia and the Tibetan Plateau while milder temperatures promote snowmelt across Sweden, Finland and Central Asia (**Figure 7**). Trouging and/or cold temperatures are predicted to support new snowfall across western Alaska, Western and Central Canada and the Northwestern US while milder temperatures promote snowmelt across eastern Alaska, Southeastern Canada and the US Great Lakes (**Figure 7**).

#### *11-15 day*

Negative geopotential height anomalies are predicted to remain widespread across the Arctic with mixed geopotential height anomalies across the mid-latitudes of the NH (**Figure 8**), therefore the AO should remain positive this period (**Figure 1**). With predicted mostly negative pressure/geopotential height anomalies across Greenland (**Figure 8**), the NAO is forecasted to remain positive this period.

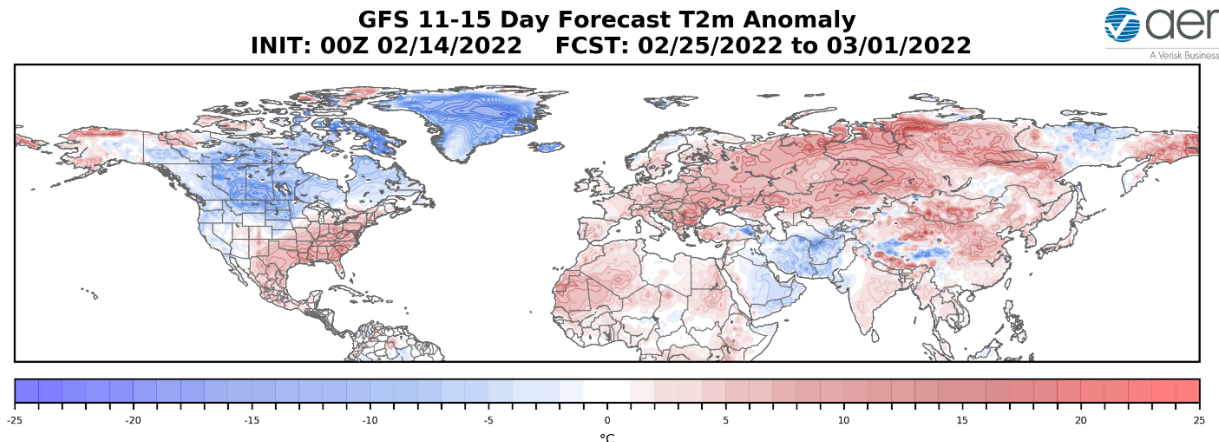
**GEFS 11-15 Day Forecast 500 mb GPH/GPH Anomaly**  
**INIT: 00Z 02/14/2022 FCST: 02/25/2022 to 03/01/2022**



**Figure 8.** Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere from 25 February – 1 March 2022. The forecasts are from the 00z 14 February 2022 GFS ensemble.

Persistent troughing/negative geopotential height anomalies across Greenland will continue to support ridging/positive geopotential height anomalies across much of Central and Southern Europe with troughing/negative geopotential height anomalies across Northern Europe this period (**Figure 8**). The resultant zonal flow pattern favors more normal to above normal temperatures across much of Europe including the UK with normal to below normal temperatures limited across northern Scandinavia due to low geopotential heights (**Figures 9**). With previous ridging/positive geopotential height anomalies centered over Western Siberia predicted to slide south into East Asia, will

favor more expansive troughing/negative geopotential height anomalies across Northern Asia favoring strong zonal flow across Asia this period (**Figure 8**). This pattern favors widespread normal to above normal temperatures across much of Asia with normal to below normal temperatures limited to Southwestern Asia this period (**Figure 9**).



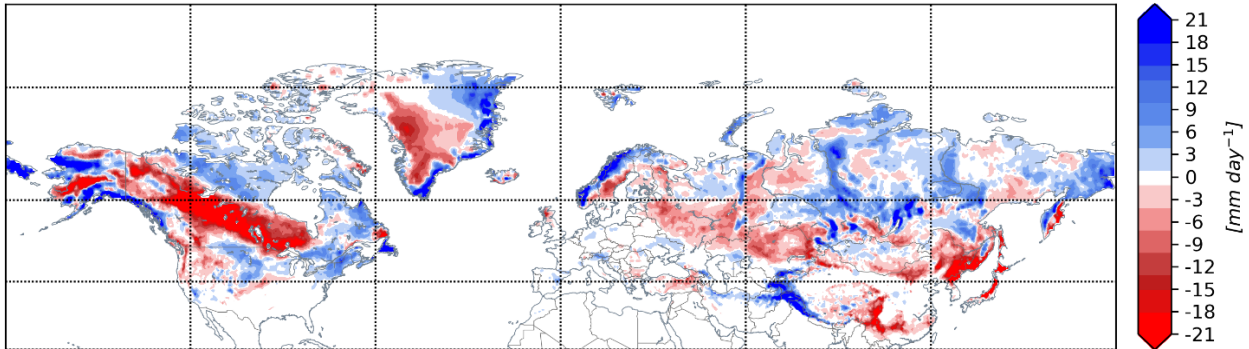
**Figure 9.** Forecasted surface temperature anomalies ( $^{\circ}\text{C}$ ; shading) from 25 February – 1 March 2022. The forecasts are from the 00z 14 February 2022 GFS ensemble.

Persistent troughing/negative geopotential height anomalies across Greenland will continue to support ridging/positive geopotential height anomalies across much of Central and Southern Europe with troughing/negative geopotential height anomalies across Northern Europe this period (**Figure 8**). The resultant zonal flow pattern favors more normal to above normal temperatures across much of Europe including the UK with normal to below normal temperatures limited across northern Scandinavia due to low geopotential heights (**Figures 9**). With previous ridging/positive geopotential height anomalies centered over Western Siberia predicted to slide south into East Asia, will favor more expansive troughing/negative geopotential height anomalies across Northern Asia favoring strong zonal flow across Asia this period (**Figure 8**). This pattern favors widespread normal to above normal temperatures across much of Asia with normal to below normal temperatures limited to Southwestern Asia this period (**Figure 9**).

**Figure 10.** Forecasted snow depth changes (mm/day; shading) from 125 February – 1 March 2022. The forecast is from the 00Z 14 February 2022 GFS ensemble.

Troughing and/or cold temperatures are predicted to support possible new snowfall across Norway, Central Asia, the higher elevations of Europe, and the Tibetan Plateau while milder temperatures promote snowmelt across Eastern Europe and Eastern Asia

**GEFS 11-15 Day Forecast SNOD Change**  
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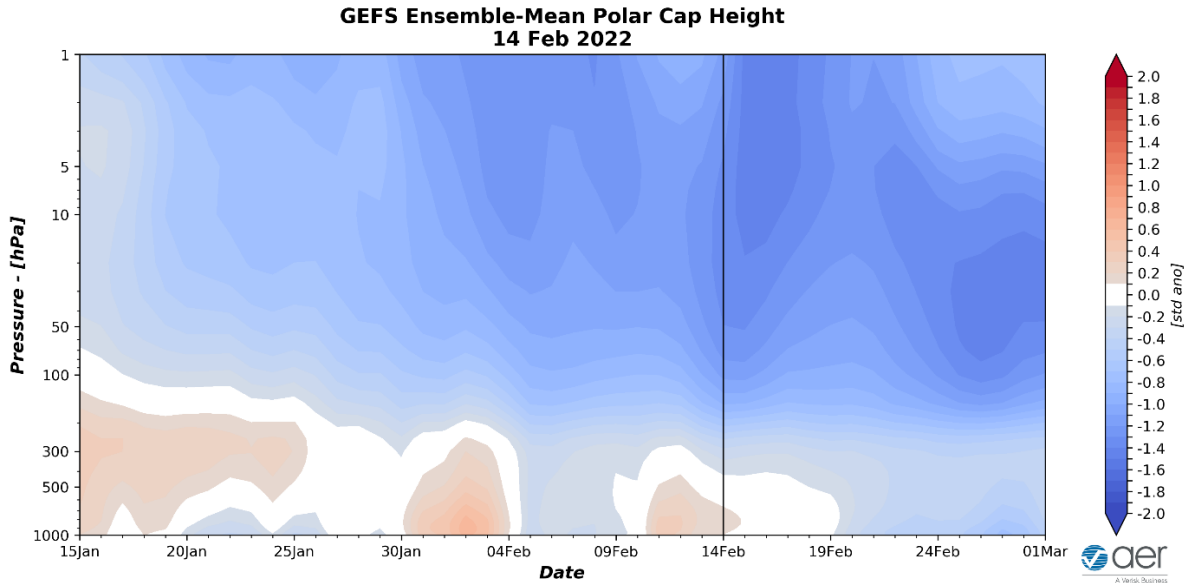


**(Figure 10).** Troughing and/or cold temperatures are predicted to support possible new snowfall across parts of Alaska, Northern and Eastern Canada and the Northeastern US while milder temperatures promote snowmelt across the Southern Alaska, Western and Central Canada and the Western US **(Figure 10)**.

*Longer Term*

*30-day*

The latest plot of the polar cap geopotential height anomalies (PCHs) currently shows cold/negative PCHs throughout the stratosphere and warm/positive PCHs in the troposphere **(Figure 11)**. The negative departures are predicted to deepen in the upper stratosphere this week and then the middle stratosphere next week while normal to slightly warm/positive PCHs in the troposphere are predicted to turn cold/negative **(Figure 11)**. This is evidence that next week the cold stratospheric PCHs are predicted to once again couple with the troposphere.

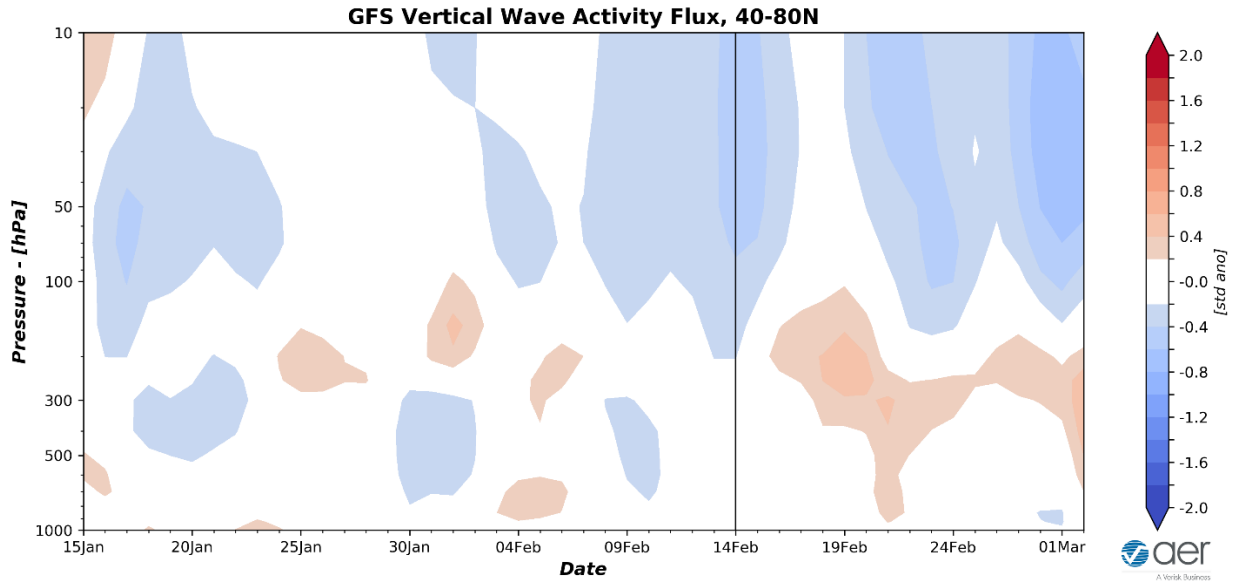


**Figure 11.** Observed and predicted daily polar cap height (i.e., area-averaged geopotential heights poleward of 60°N) standardized anomalies. The forecast is from the 00Z 14 February 2022 GFS ensemble.

The normal to below normal PCHs predicted in the lower troposphere for much of the next two weeks are consistent with the predicted positive surface AO during the same time period (**Figure 1**). Overall, the PCHs are indicating stratosphere-troposphere coupling in contrast to much of the latter half of December and January.

The vertical Wave Activity Flux (WAFz) from the troposphere to the stratosphere or poleward heat transport in the stratosphere is predicted to remain mostly below normal through early-March (**Figure 12**). The negative WAFz anomalies predicted the next two weeks will continue to support a relatively strong PV through early-March as suggested by the relatively cold stratospheric PCHs.

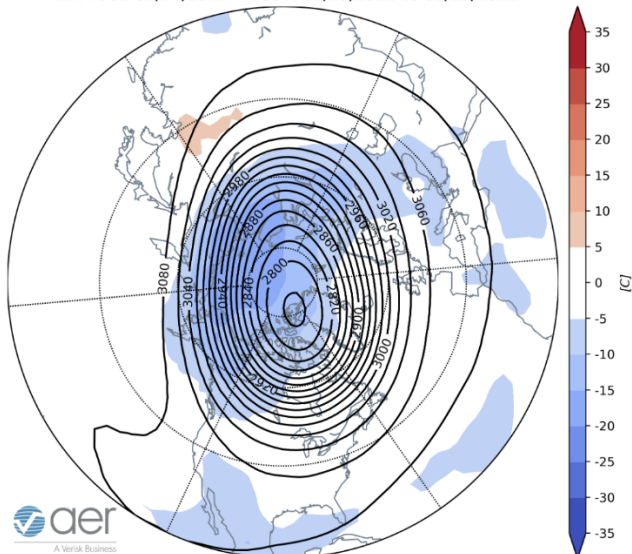




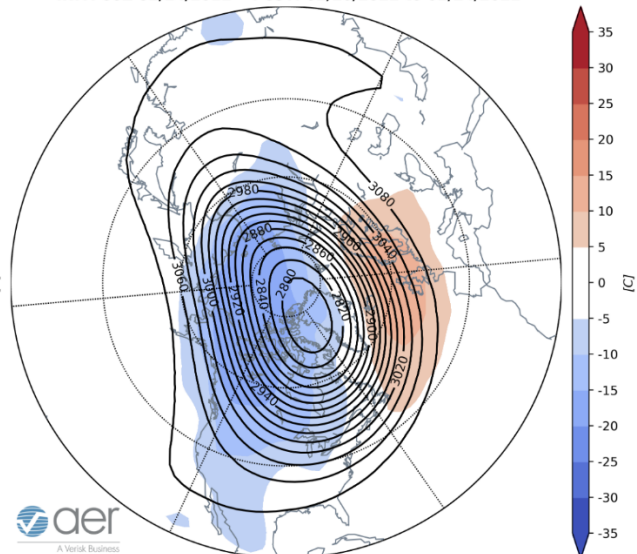
**Figure 12.** Observed and predicted daily vertical component of the wave activity flux (WAFz) standardized anomalies, averaged poleward of 40-80°N. The forecast is from the 00Z 14 February 2022 GFS ensemble.

Though zonally averaged WAFz has remained weak, a fourth stretched stratospheric PV since early January seems to have just ended with the PV becoming more circular in shape and centered between the North Pole and Greenland with ridging centered near the Aleutians (not shown). However, the more circular configuration of the PV is predicted to stretch or take on a more oval shape this week (**Figure 13a**) and into next week (**Figure 13b**). However, the PV perturbation is relatively minor, allowing the PV to remain relatively strong resulting in a current positive stratospheric AO (**Figure 11**).

**a) GEFS 1-5 Day Forecast 10 mb GPH & T Anomaly**  
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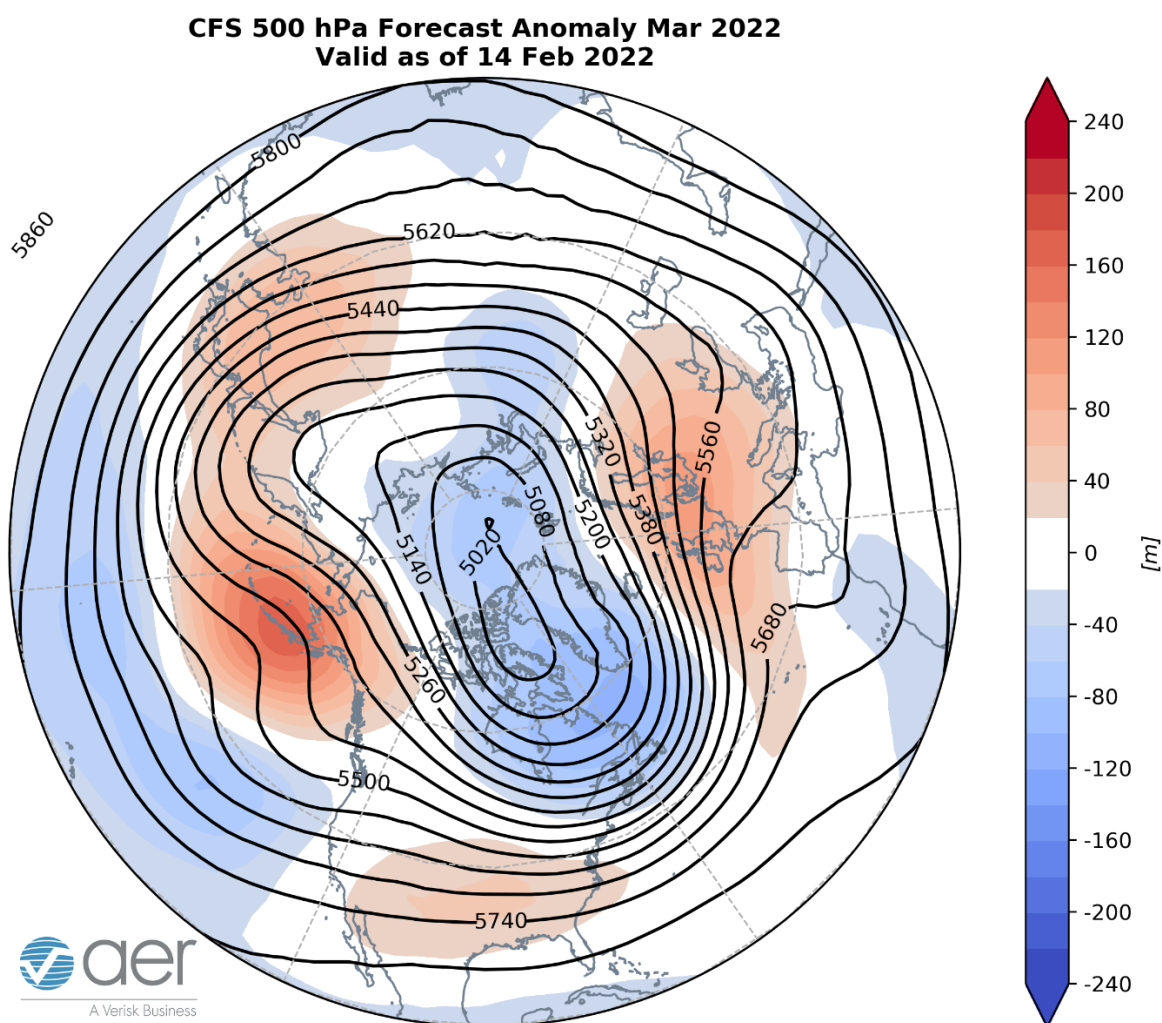


**b) GEFS 6-10 Day Forecast 10 mb GPH & T Anomaly**  
INIT: 00Z 02/14/2022 FCST: 02/20/2022 to 02/24/2022



**Figure 13.** (a) Forecasted 10 mb geopotential heights (dam; contours) and temperature anomalies ( $^{\circ}\text{C}$ ; shading) across the Northern Hemisphere averaged from 15 – 19 February 2022. (b) Same as (a) except forecasted averaged from 20 – 24 February 2022. The forecasts are from the 00Z 14 February 2022 GFS model ensemble.

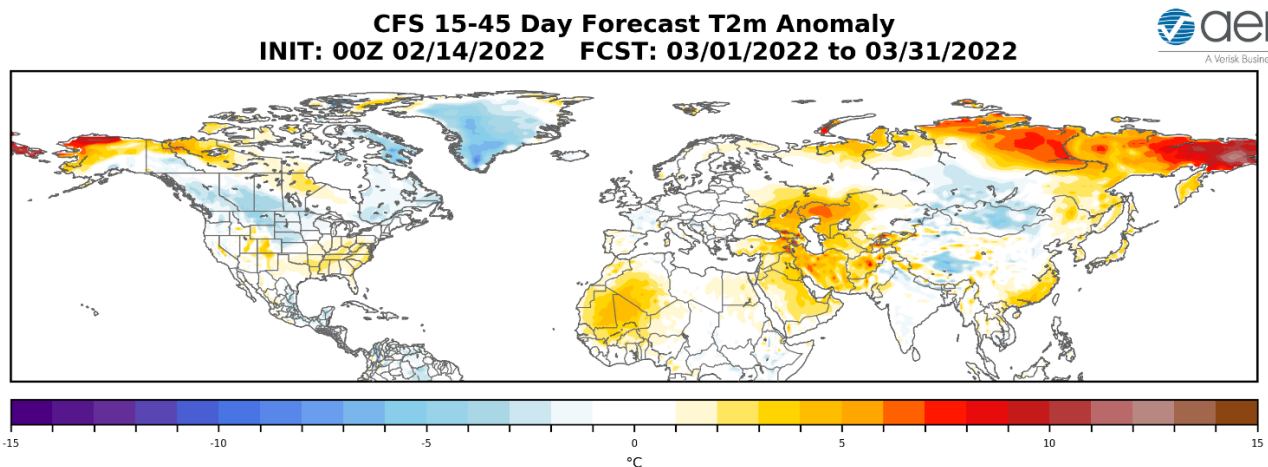
The below normal WAFz is predicted to allow the PV to strengthen and become quite strong with the PV remaining centered close to the North Pole with a persistent positive stratospheric AO the next two weeks (**Figure 11**). However cross polar flow is predicted from Siberia to western North America with new warming propagating from North America towards Europe (**Figure 13**). The strengthening stratospheric PV coupling again with the surface favors a relatively mild period across the US towards the end of February and into early March but could be offset by another PV stretched event.



**Figure 14.** Forecasted average 500 mb geopotential heights (dam; contours) and geopotential height anomalies (m; shading) across the Northern Hemisphere for March 2022. The forecasts are from the 00Z 14 February 2022 CFS.



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

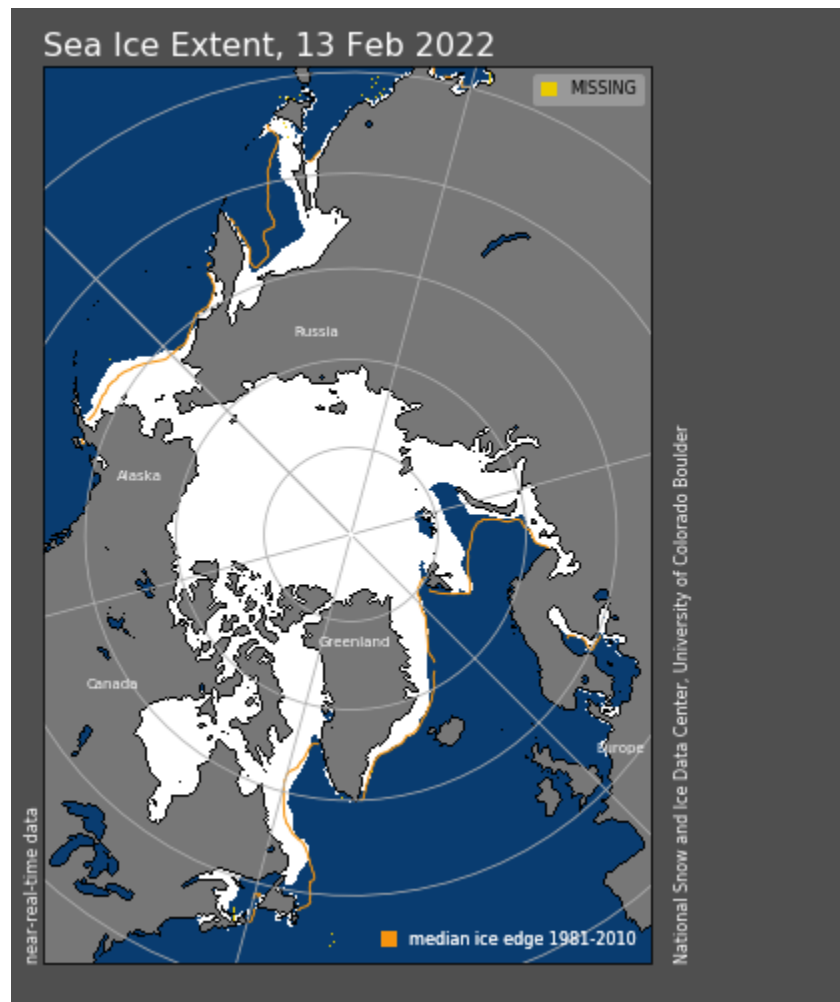


**Figure 15.** Forecasted average surface temperature anomalies ( $^{\circ}\text{C}$ ; shading) across the Northern Hemisphere for March 2022. The forecasts are from the 00Z 14 February 2022 CFS.

### *Surface Boundary Conditions*

#### Arctic Sea ice

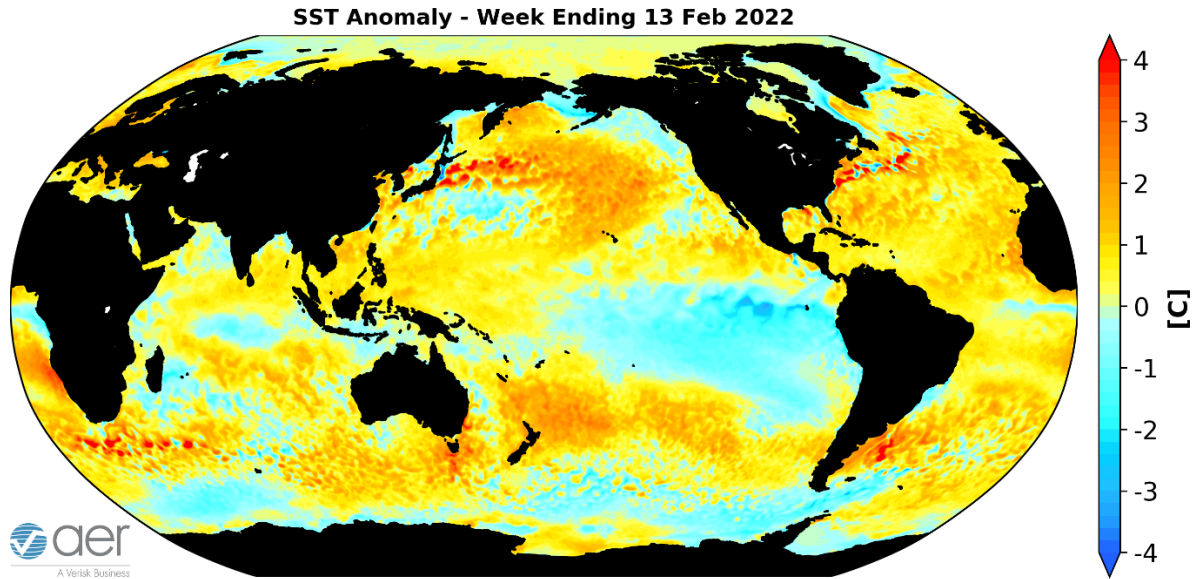
Arctic sea ice growth has stalled and remains below normal mostly in Sea of Okhotsk and recently in the Barents Sea. Overall sea ice is relatively extensive compared to recent winters, though it remains relatively thin. In the Barents-Kara Seas extent is actually above normal. Below normal sea ice in the Barents-Kara seas favors cold temperatures in Central and East Asia, however this topic remains controversial. Recent research has shown that the regional anomalies that are most highly correlated with the strength of the stratospheric PV are across the Barents-Kara seas region where low Arctic Sea ice favors a weaker winter PV. Low sea ice in the Chukchi, Beaufort and Bering seas may favor colder temperatures across North America but has not been shown to weaken the PV.



**Figure 16.** Observed Arctic Sea ice extent on 13 February 2022 (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).

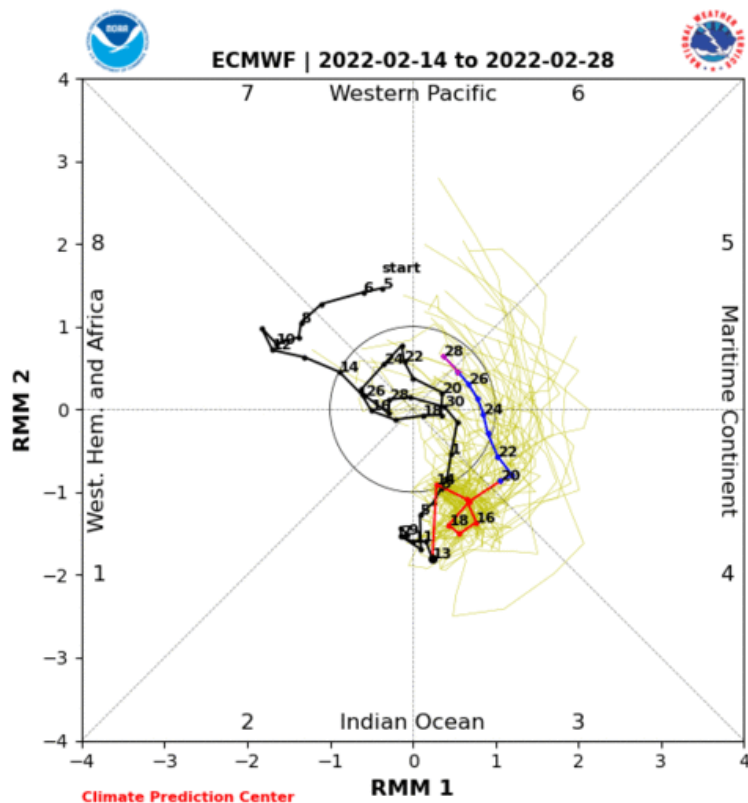
### *SSTs/El Niño/Southern Oscillation*

Equatorial Pacific Sea surface temperatures (SSTs) anomalies are below normal and we continue to observe weak to possibly moderate La Niña conditions (**Figure 17**) and La Niña conditions are expected into the spring. Observed SSTs across the NH remain well above normal especially in the central North Pacific (west of recent years), the western North Pacific and offshore of eastern North America though below normal SSTs exist regionally especially in the North Pacific. Not my expertise but the SST pattern in the North Pacific are strongly resembling a negative Pacific Decadal Oscillation (PDO) pattern that favors colder temperatures across northwestern North America and milder temperatures across southeastern North America.



**Figure 17.** The latest weekly-mean global SST anomalies (ending 13 February 2022). Data from NOAA OI High-Resolution dataset.

Currently the Madden Julian Oscillation (MJO) is on the border of phases two and three (**Figure 18**). The forecasts are for the MJO to eventually enter phase four and then weaken where no phase is favored. MJO phases two and three favor ridging in the Gulf of Alaska with downstream troughing across the interior of North America consistent with the forecasts and is likely influencing the weather across North America. But admittedly this is outside of my expertise.



**Figure 18.** Past and forecast values of the MJO index. Forecast values from the 00Z 14 February 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: <http://www.atmos.albany.edu/facstaff/roundy/waves/phasediags.html>

## Get Detailed Seasonal Weather Intelligence with sCast

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

Dr. Cohen’s detailed monthly seasonal forecast, sCast, is also available for purchase. sCast provides a monthly 30-60-90-180-day outlook into temperature and precipitation, solar flux and wind anomalies across the globe, and regional population weighted cooling and heating degree forecasts for the US.

Our sCast principal engineer, [Karl Pfeiffer](#), can help you use sCast and other AER seasonal forecast products to deliver important, long-lead time weather intelligence to your business. Please reach out to Karl today!