Alaska climate outlook briefing January 2024

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A NOAA CAP/RISA Team

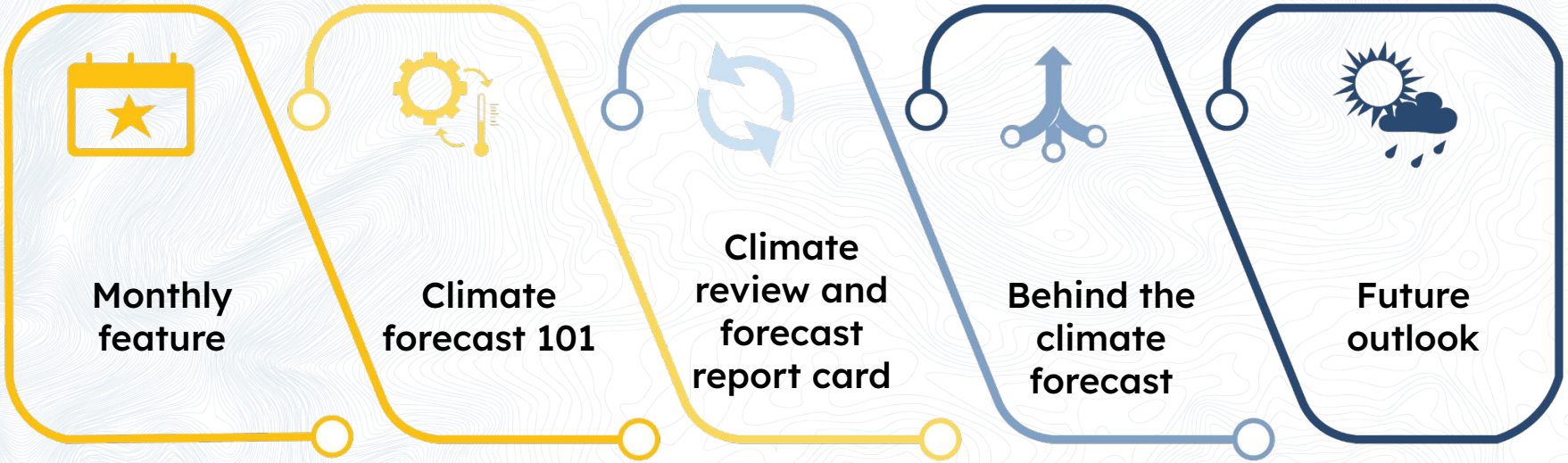
UAF
UNIVERSITY OF ALASKA FAIRBANKS

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

NATIONAL WEATHER SERVICE

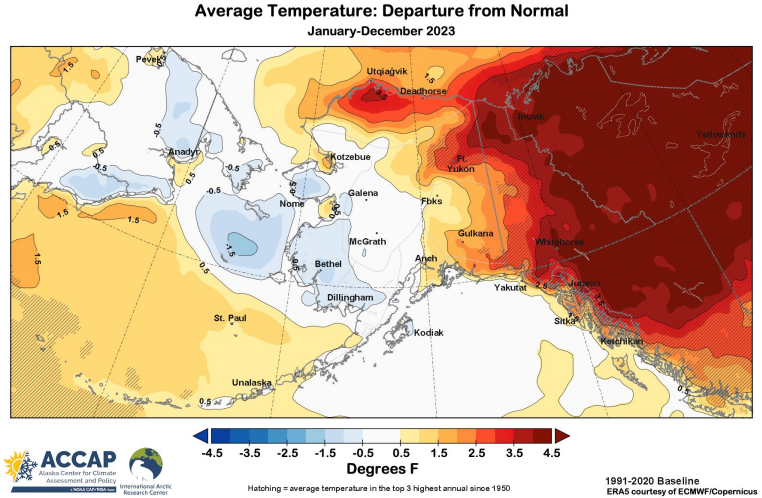
World Climate Service

ACCAP

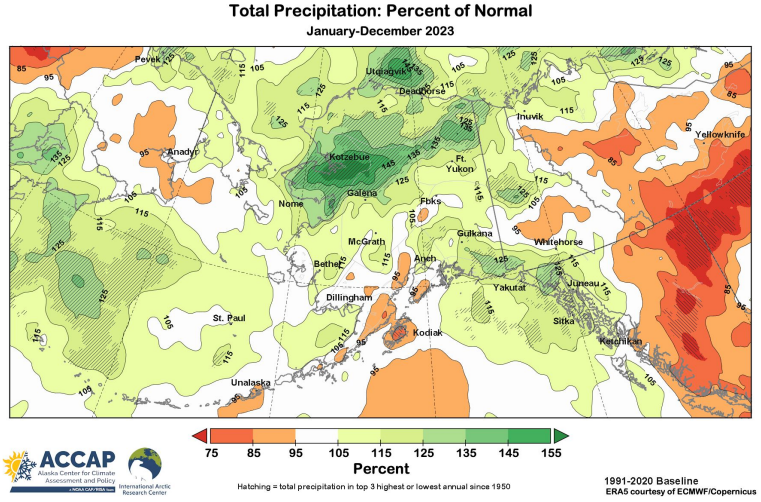

Monthly feature
Climate forecast 101
Climate review and forecast report card
Behind the climate forecast
Future outlook

Monthly feature

State-wide:
12th warmest year since 1940

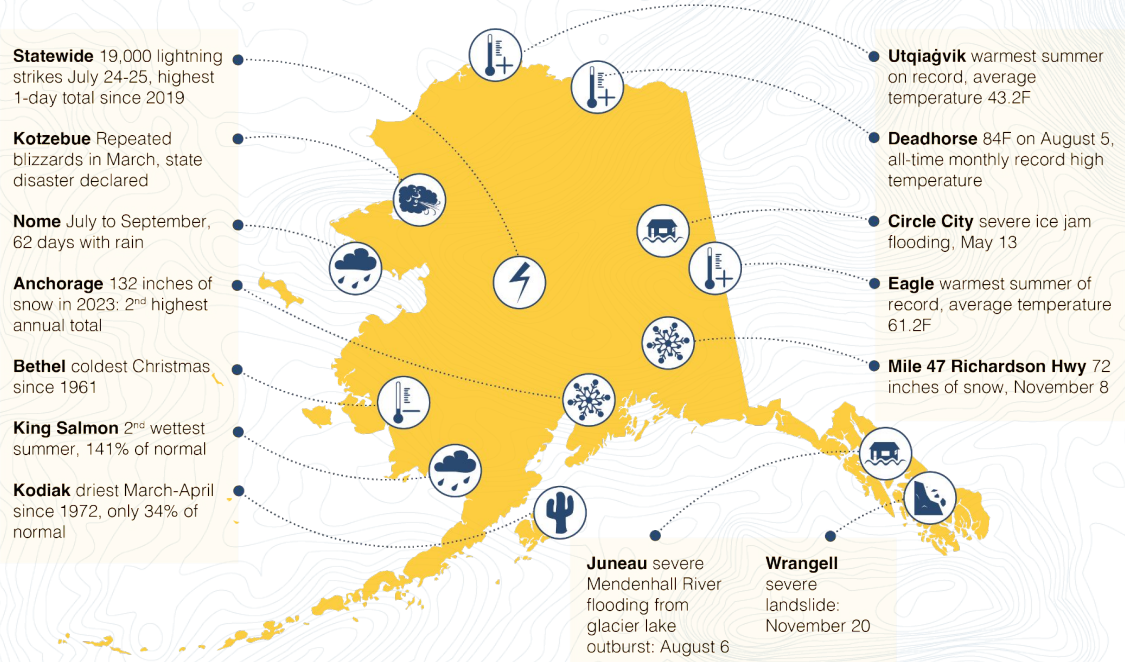


State-wide:
Wettest year since 1940



2023 weather & climate highlights

Alaska weather & climate headlines 2023



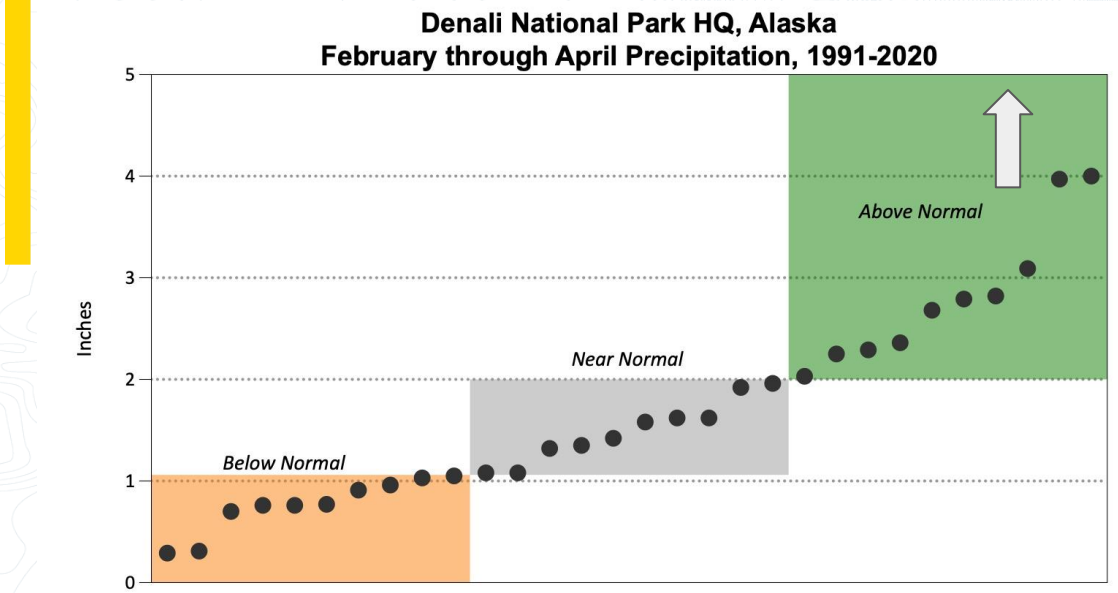
Climate forecast 101

NOAA Center for Weather and Climate Prediction

Climate Prediction Center (CPC) ➤ primary NOAA/NWS forecast responsibility for two weeks to a year in the future

The basics

- Relation to longterm normal (1991-2020)
- 3 categories
- Probabilistic
- Traditional elements
  - Temperature
    - Centered on average
  - Precipitation
    - Centered on median ➤ can significantly differ from “normal”



Climate outlook report card

What happened and how did previous climate outlooks perform?

Climate outlook report card

Notable December-January Happenings

- Southeast Alaska: heavy snow central and northern areas
  - Juneau Airport: 64.6 inches snow in two weeks, most ever
- Interior: cold weather finally arrives: first 40s and 50s below
- North Slope & western Alaska: very mild first half of January
  - Some places in “top ten warmest”

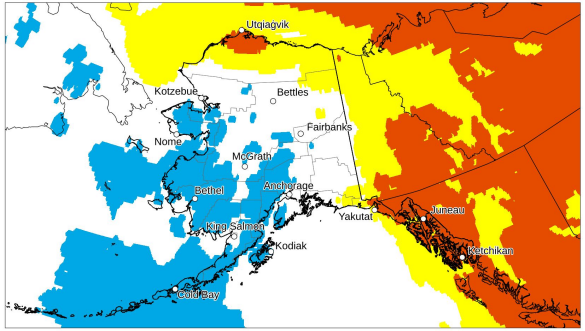
Digging out in Juneau
January 16, 2024
Image credit: Clarise Larson/KTOO

Model-based regional analysis

Average temperatures

Total precipitation

Temperature Classification for Dec 2023

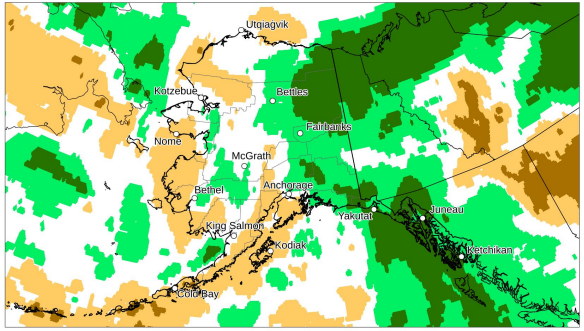


Source: ERA5 Reanalysis — Map by: Brian Brettschneider

Much Below | Below | Near Normal | Above | Much Above

Compared to 1991-2020 Base Period

Precipitation Classification for Dec 2023



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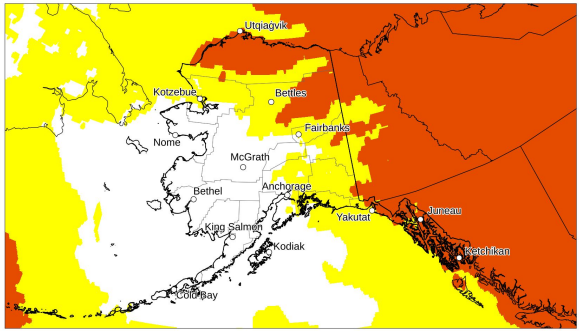
Temperature Classification for Oct-Dec 2023



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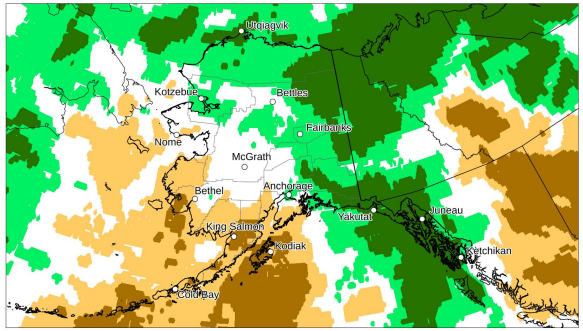
Precipitation Classification for Oct-Dec 2023



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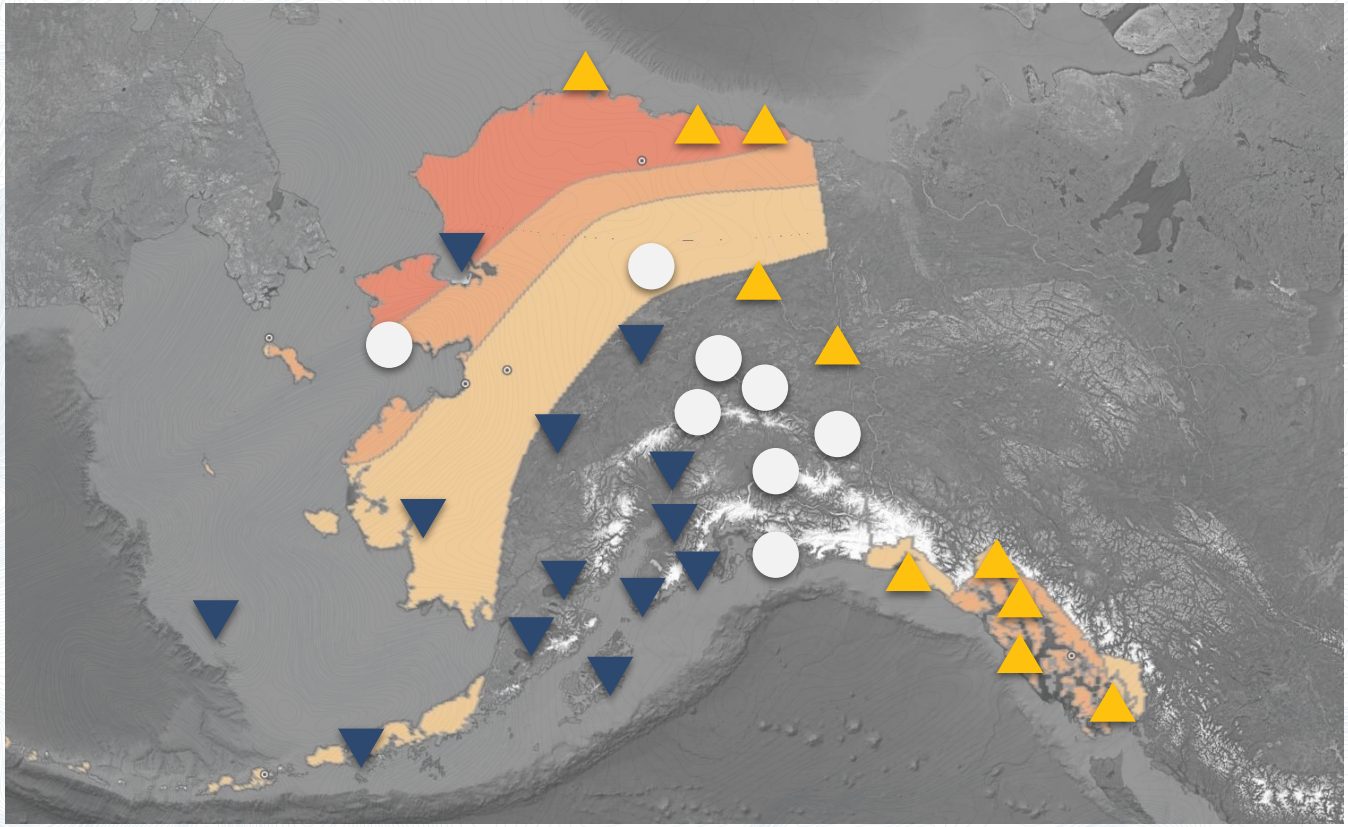
Much Below | Below | Near Normal | Above | Much Above

Compared to 1991-2020 Base Period

December 2023 temperature ➤ CPC outlook and observed



Non-EC skill score: +36

Percent correct: 57%

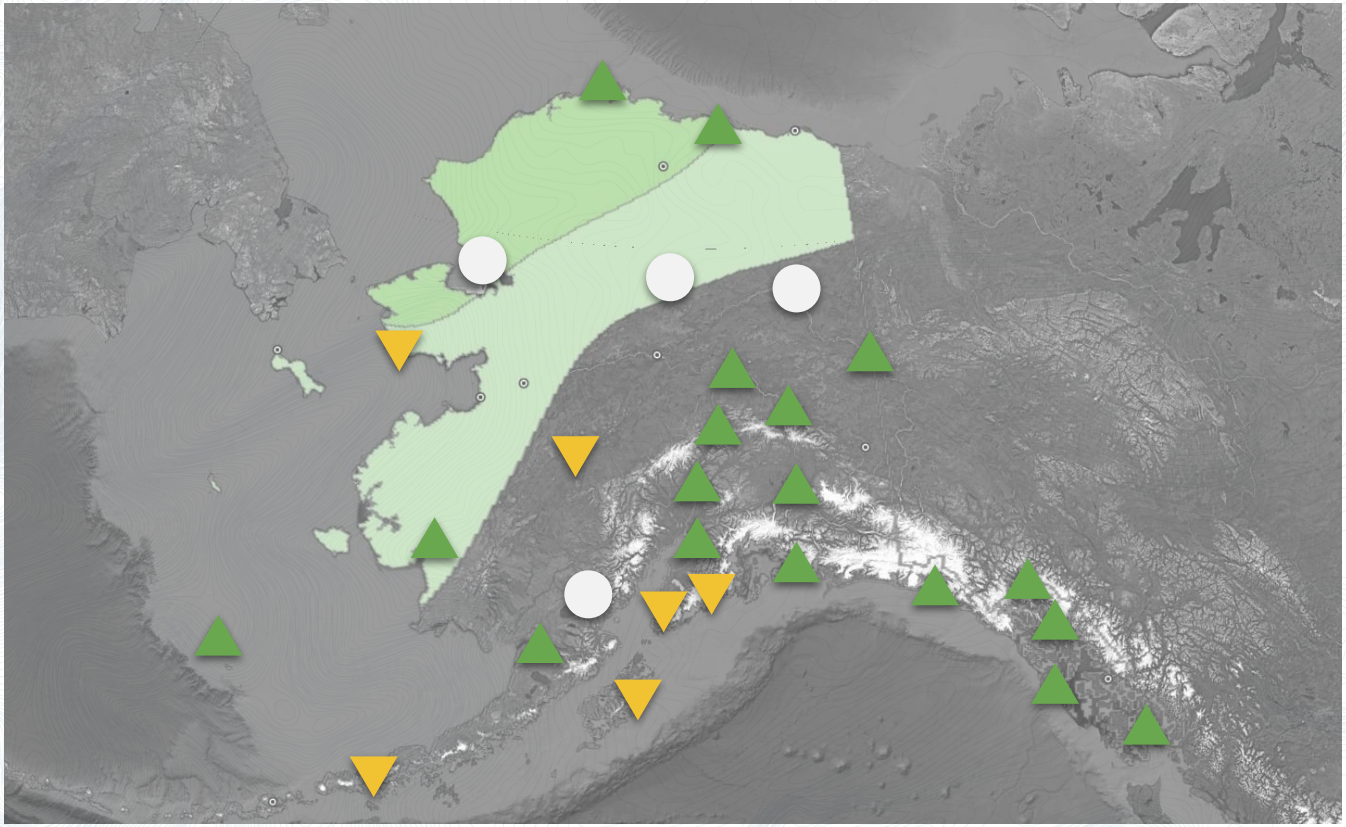
Mid-month outlook

Above normal

Near normal

Below normal

December 2023 precipitation ➤ CPC outlook and observed



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Mid-month outlook

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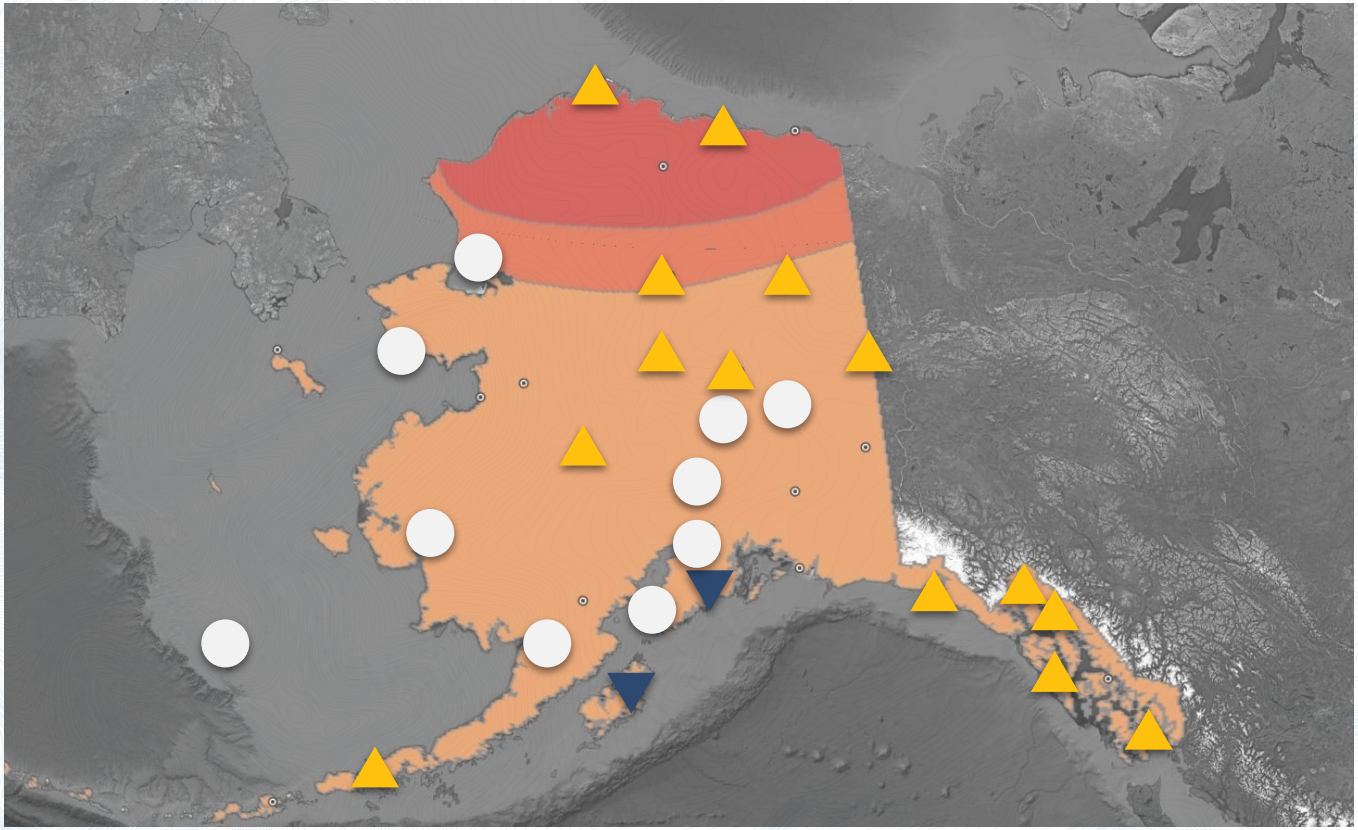
October-December 2023 temperature ➤ CPC outlook & observed



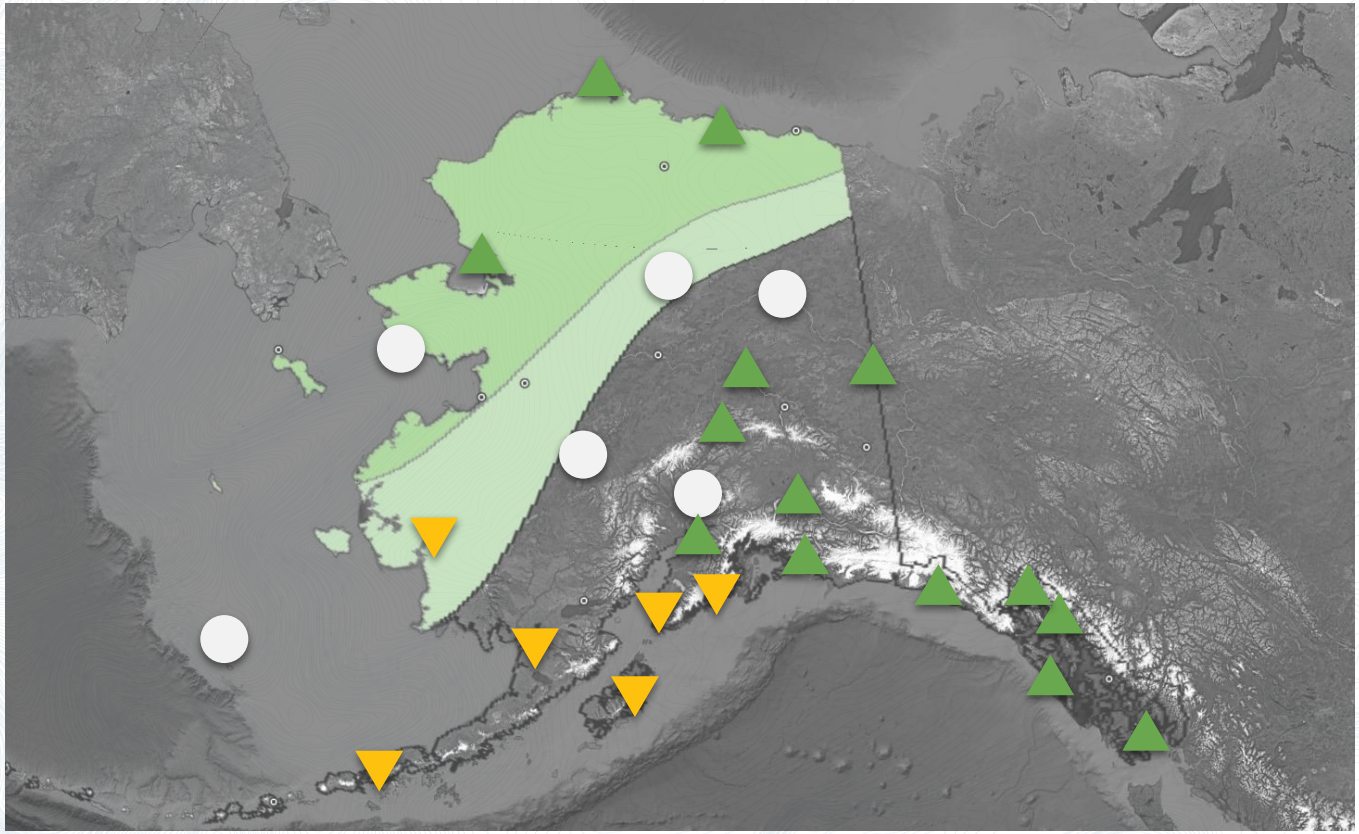
Non-EC skill score: +25

Percent correct: 50%

Mid-month outlook

- Above normal
- Near normal
- Below normal

October-December 2023 precipitation ➤ CPC outlook & observed



Non-EC skill score: +25

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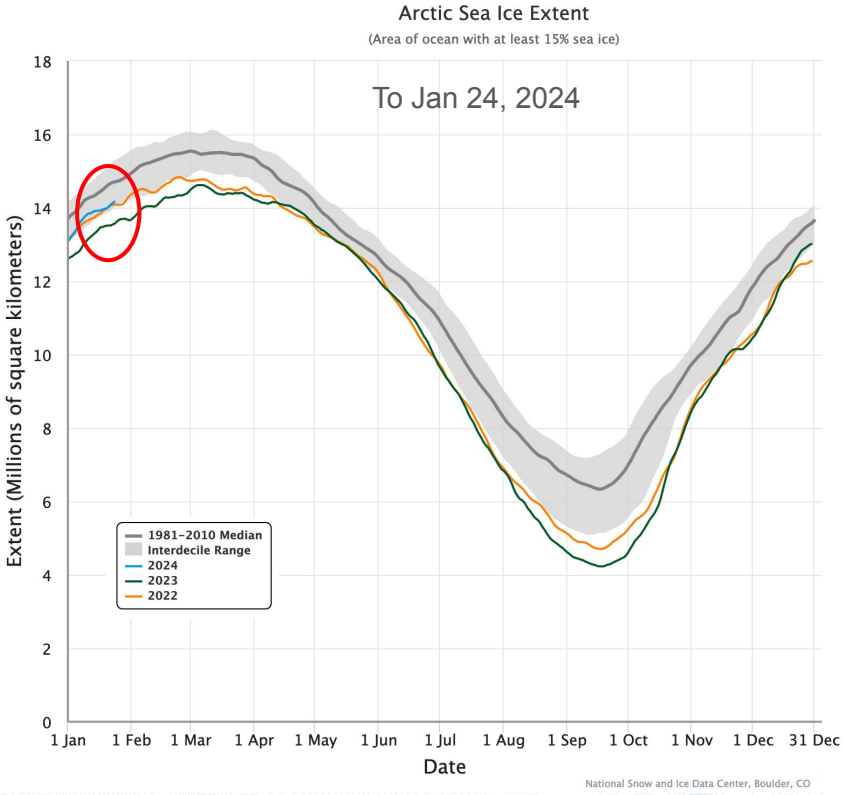
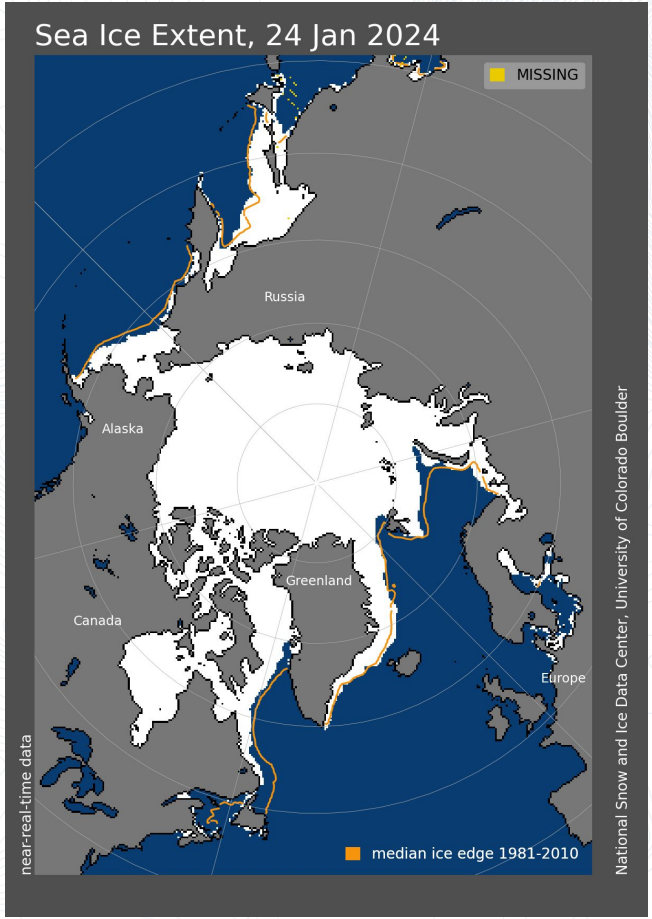
Above normal

Near normal

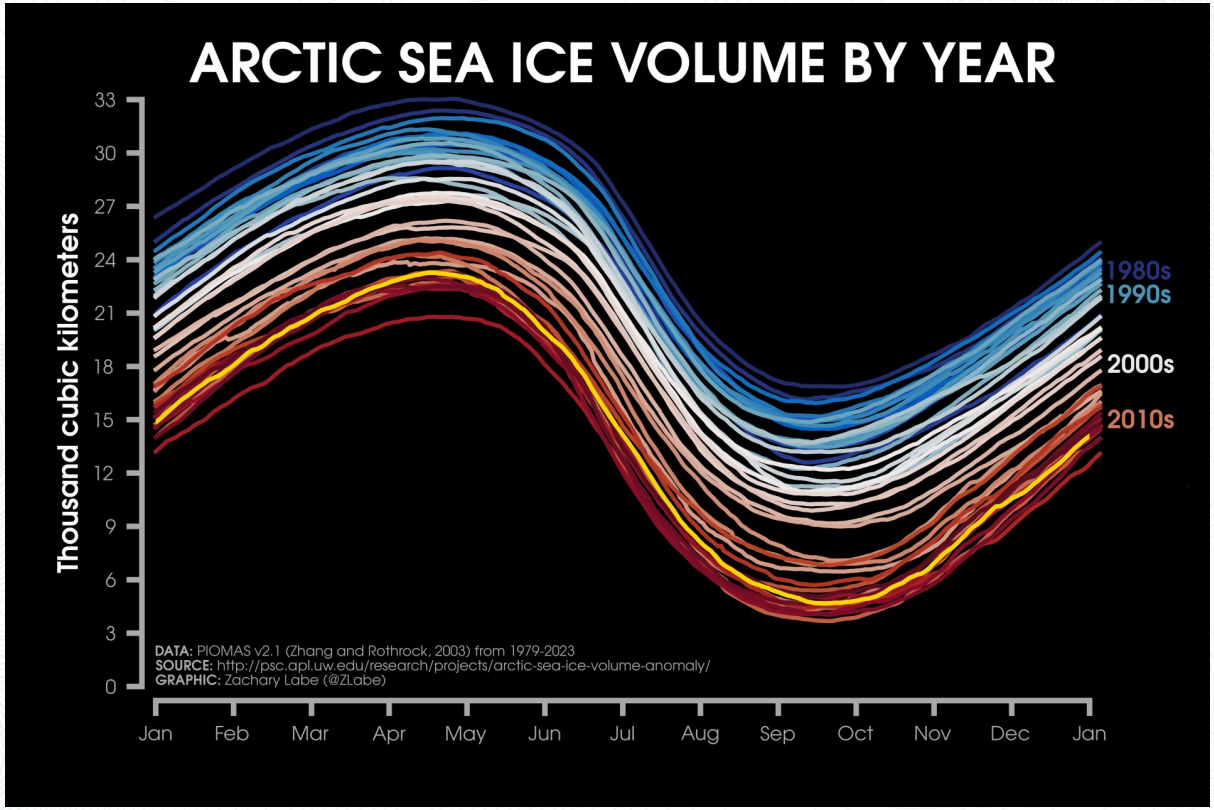
Below normal

Arctic wide sea ice





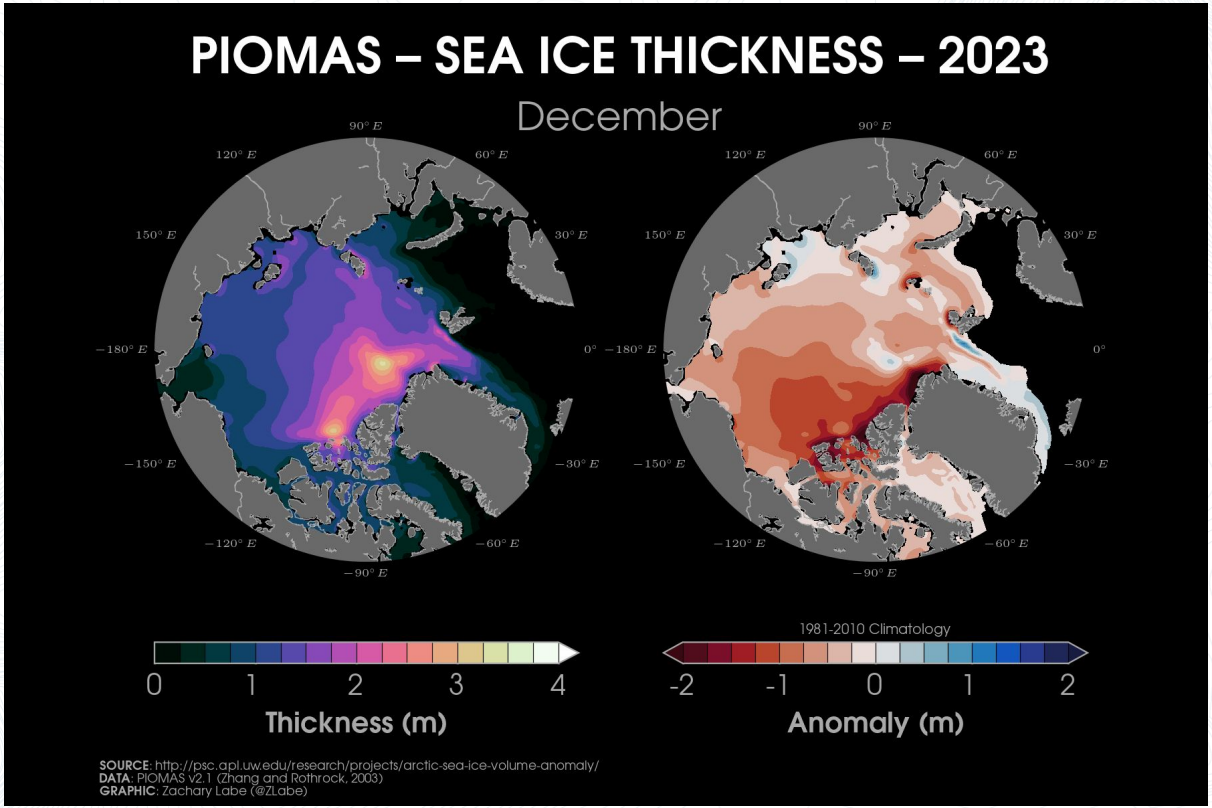
Arctic sea ice **volume**



Sources:
Data from U. Wa./PIOMAS data
Graphics by Z. Labe, Princeton U.

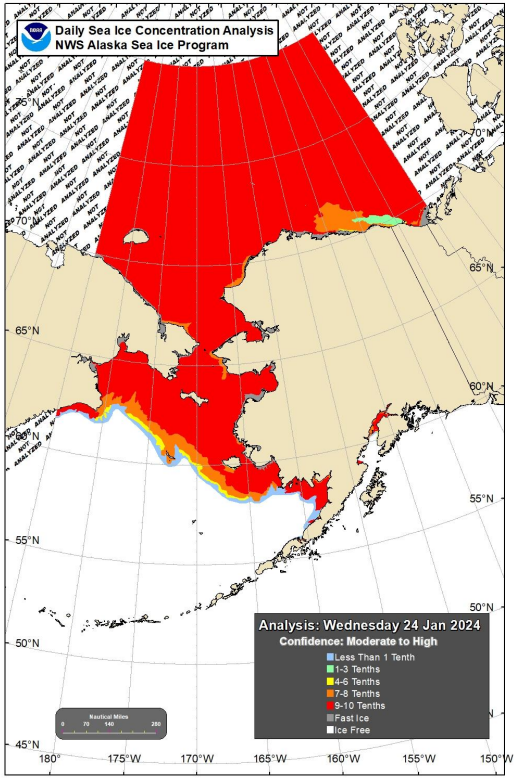
Arctic sea ice **thickness**

Sources:
Data from U. Wa./PIOMAS data
Graphics by Z. Labe, Princeton U.

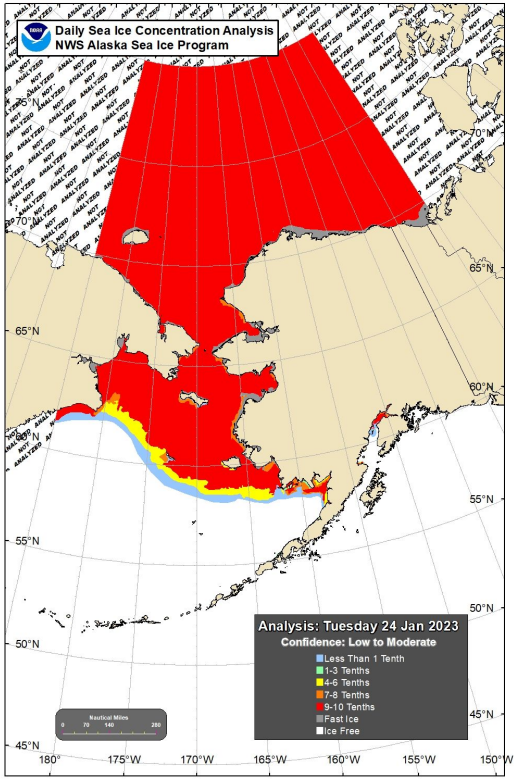


Late January **sea ice comparison**

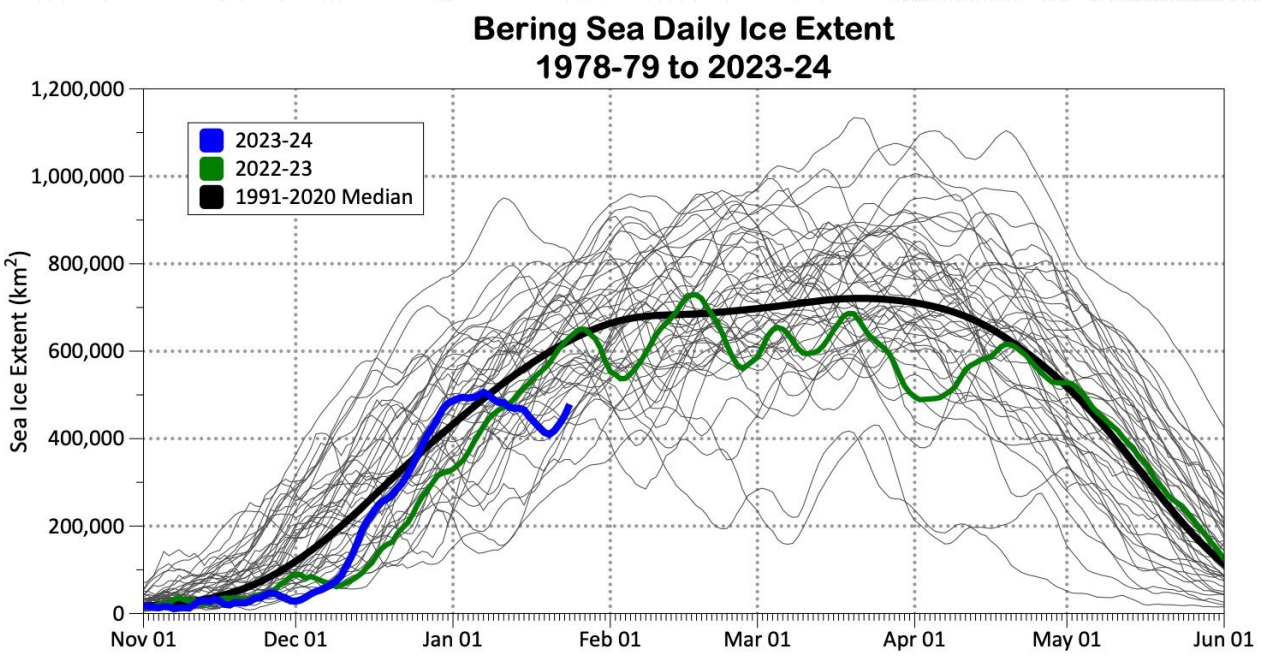
January 24, 2024



January 24, 2023

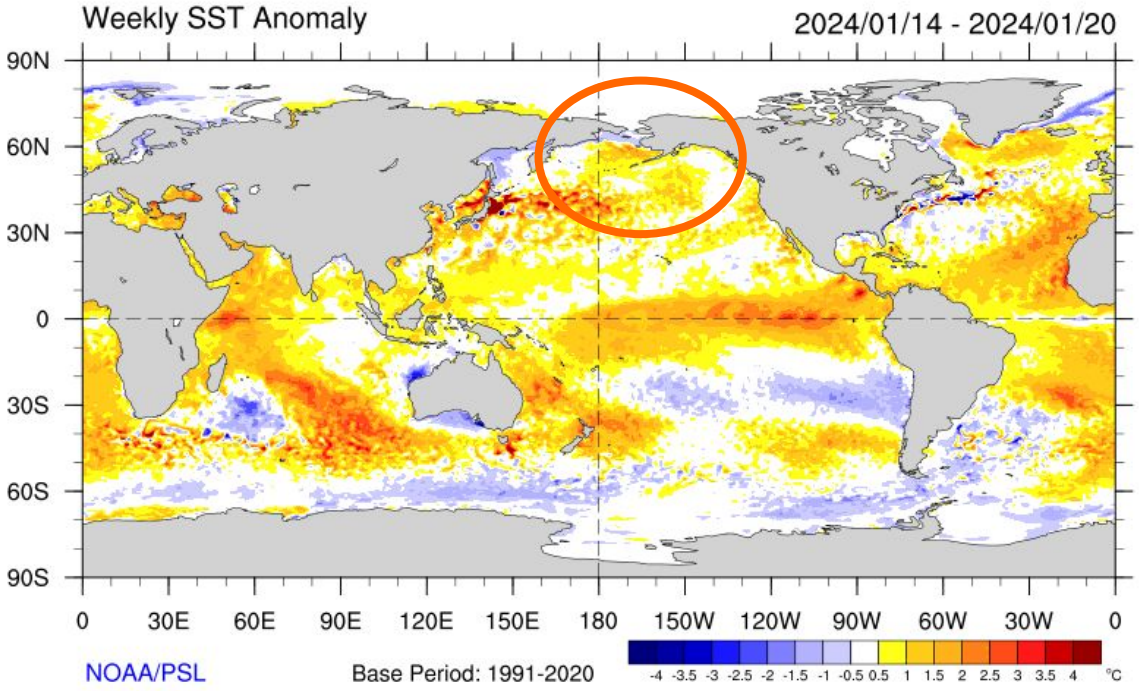


Sea ice extent through the season

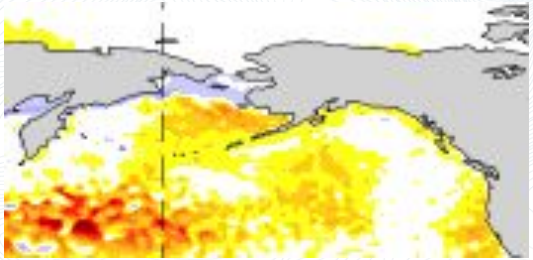


Sources:
Data NSIDC Sea Ice Index, Version 3. Through Jan. 24, 2024.

Global **sea surface temperature** departure from normal

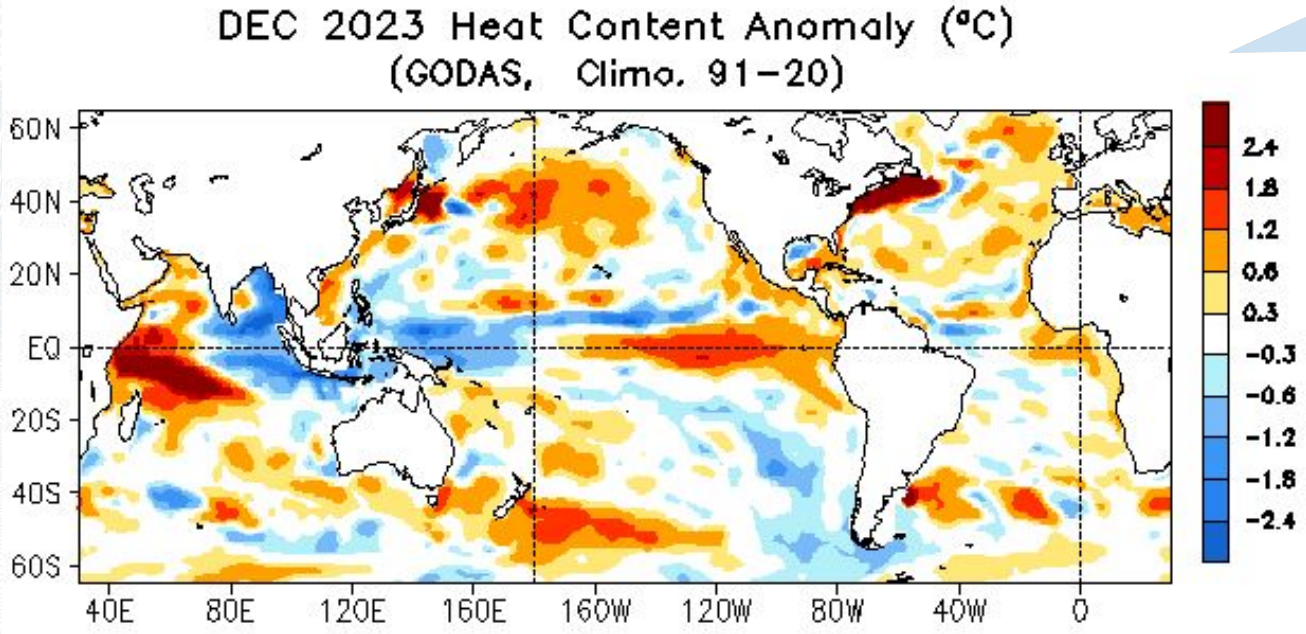


PDO for Dec 2024: -1.02



Sources: **PDO Index from JMA**

Upper **Ocean heat** anomaly in upper 300 meters



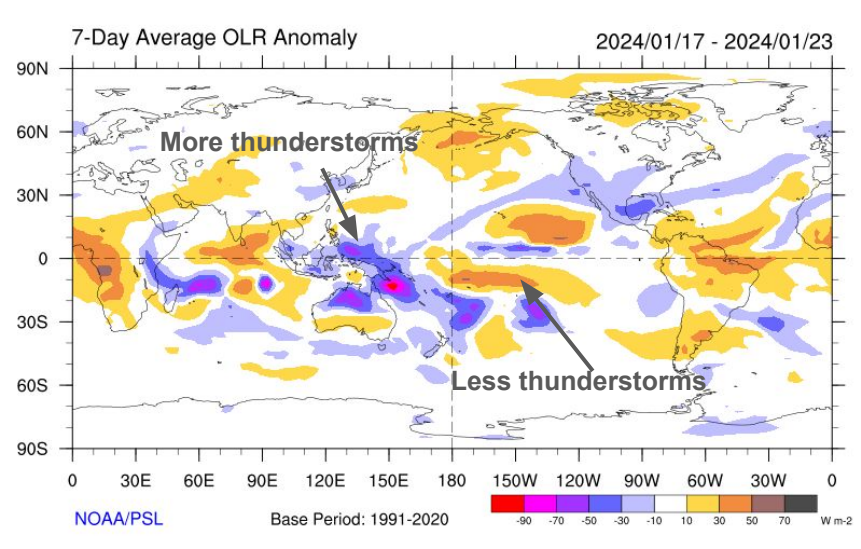
Slight warming in Gulf of Alaska

Sources:
CPC

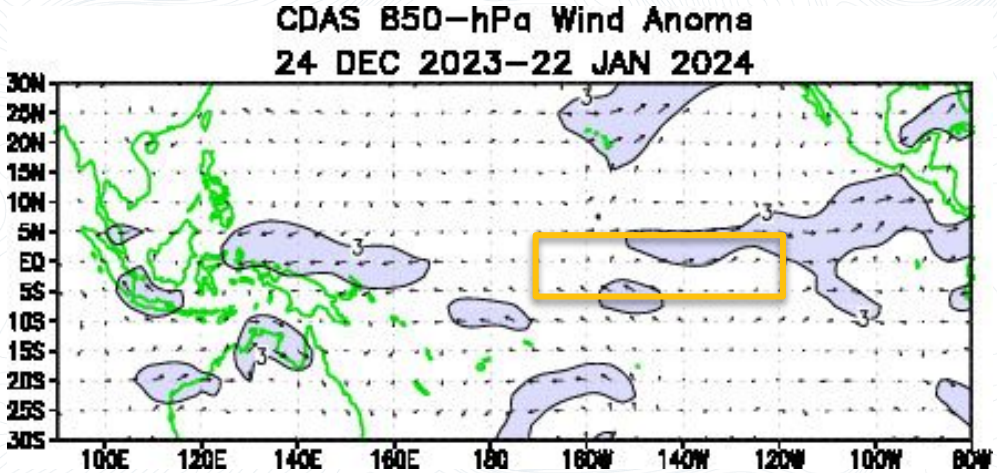
Tropical Pacific **atmosphere**

Oct-Dec 2023
Oceanic Niño
Index: +1.9

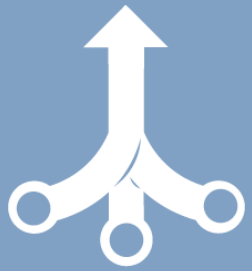
Deep tropical convection
Via “outgoing longwave radiation”



Trade winds weaker
than average, Niño Region 3.4



Behind the climate forecast



El Niño/La Niña (ENSO) ➤ expert evaluation

Statistical ➤ using the past

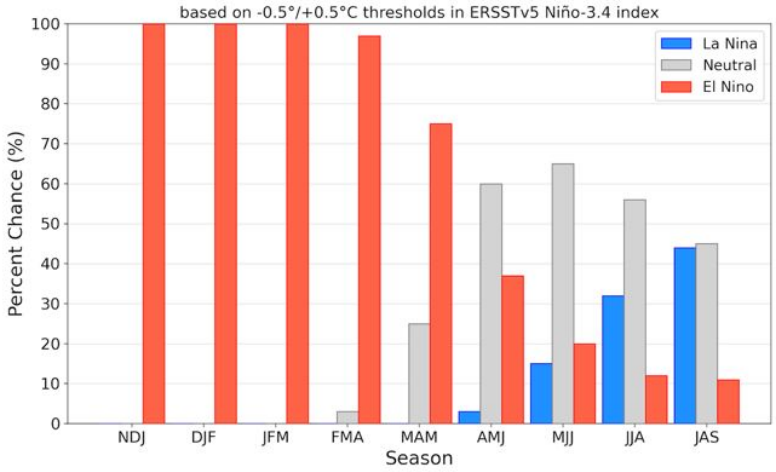
Dynamical models ➤ All physics, all the time

- Sea surface temperatures
- Temperature & precipitation
- Sea ice

CPC **Niño 3.4 forecasts** experts

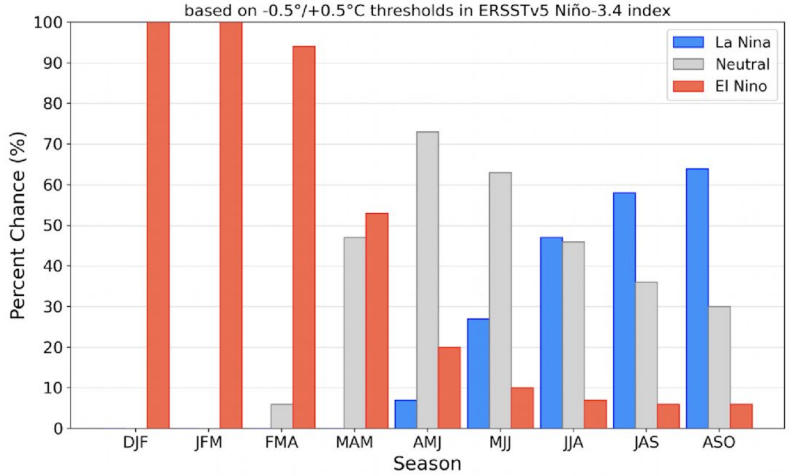
- **Strong El Niño** reached early autumn (ASO)
- El Niño **expected to weaken** rapidly but continue into spring 2024

December 2023



January 2024

ENSO Alert System Status: **El Niño Advisory**

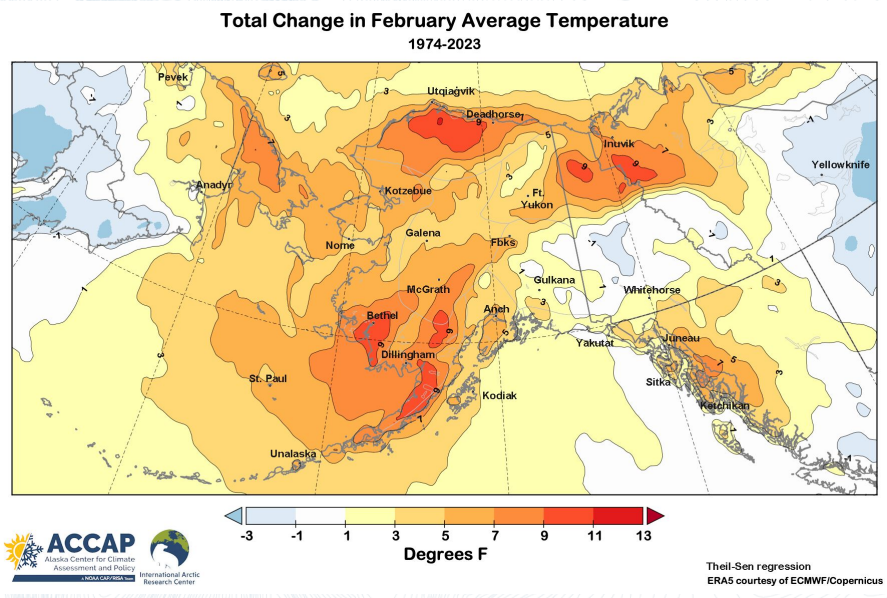


Statistical guidance using the past to predict the future

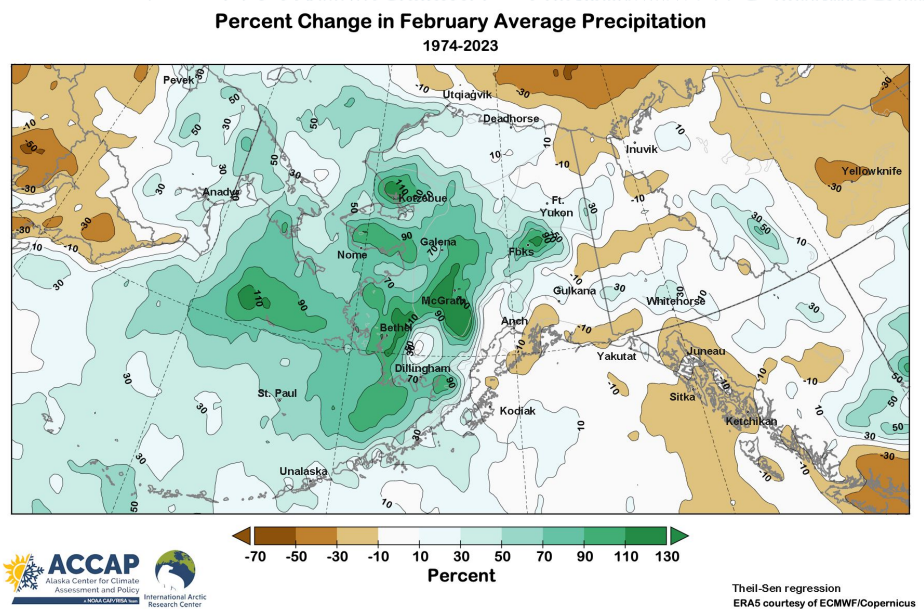
- Long term trends
- Optimum climate normals: Alaska trends the past 15 years
  - Update to new normals means OCN less informative next few years
- Past El Niño events

February half century trends

Temperature
trend over 50 years



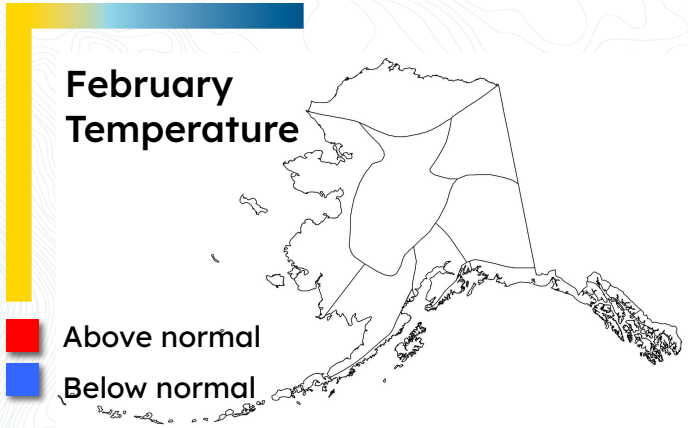
Precipitation
trend over 50 years



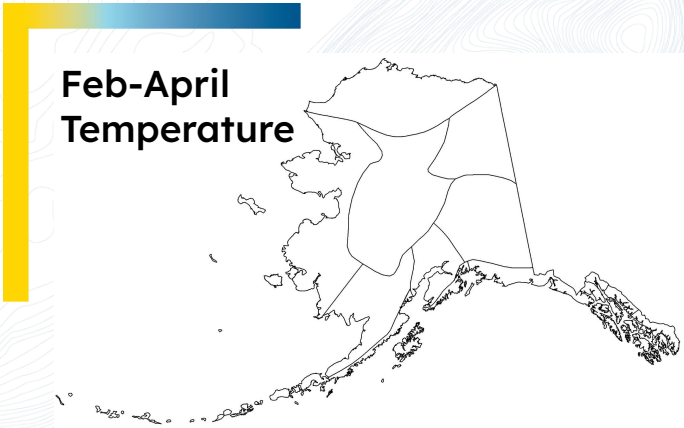
2009 to 2023 **trends**

Past 15 years compared to 1991-2020

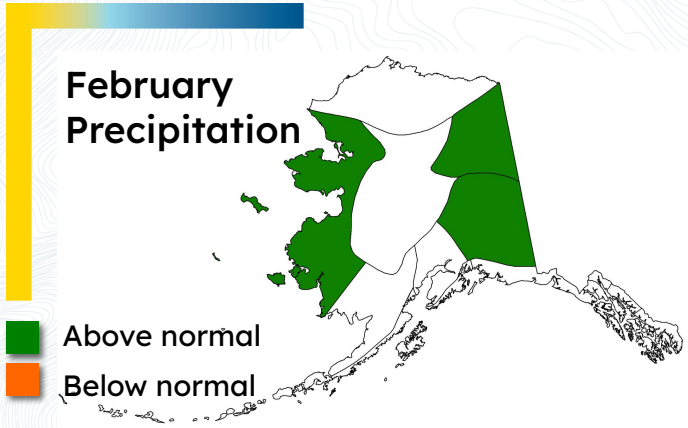
February Temperature



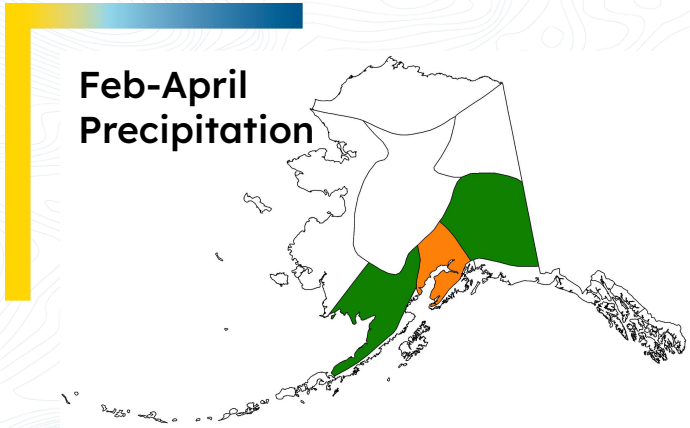
Feb-April Temperature



February Precipitation

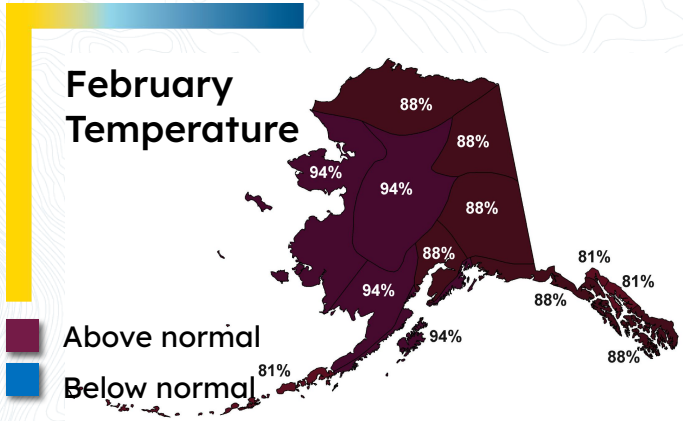


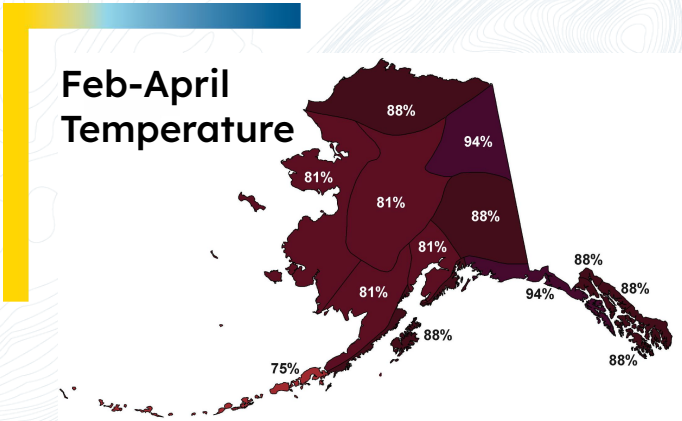
Feb-April Precipitation

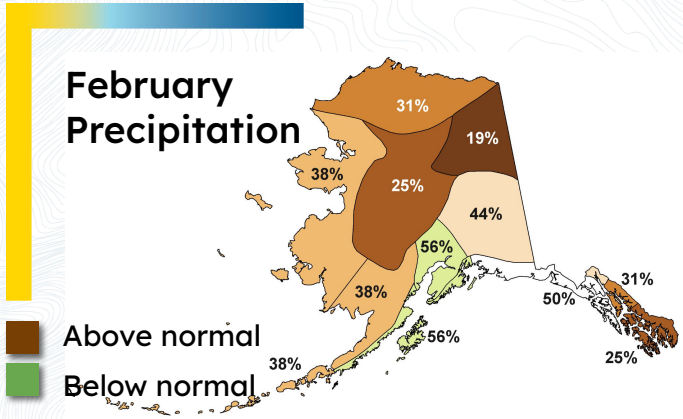


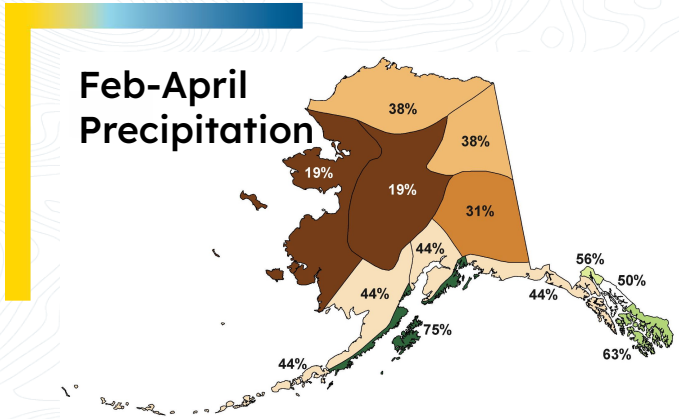
16 El Niño since 1976

Percent years above average









Dynamic model forecasts

Current suite of Dynamic Climate Models

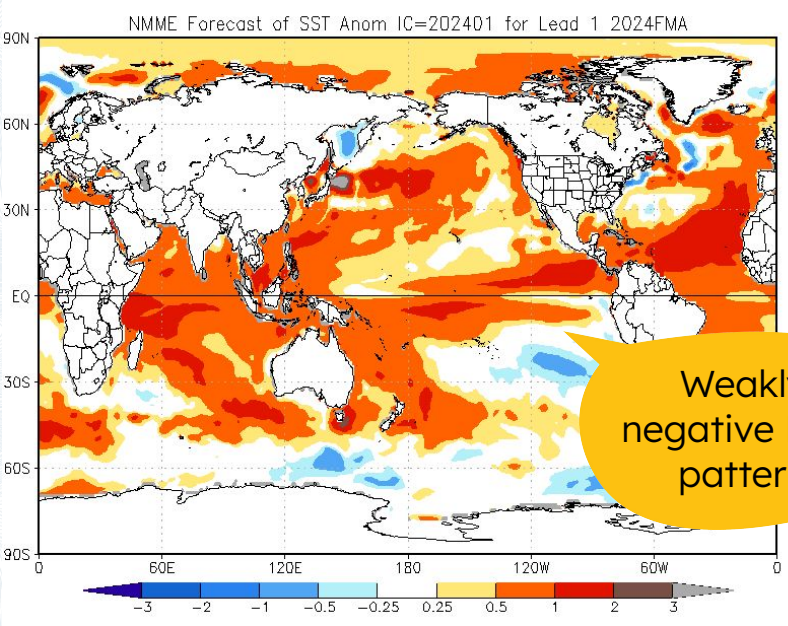
- CPC Experimental Sea Ice Ensemble
- World Climate Service Multi-Model Ensemble
- North American Multi-Model Ensemble (**NMME**)

What's being forecast

- Sea surface temperatures
- Sea ice forecast
- Temperature and precip relative to normal

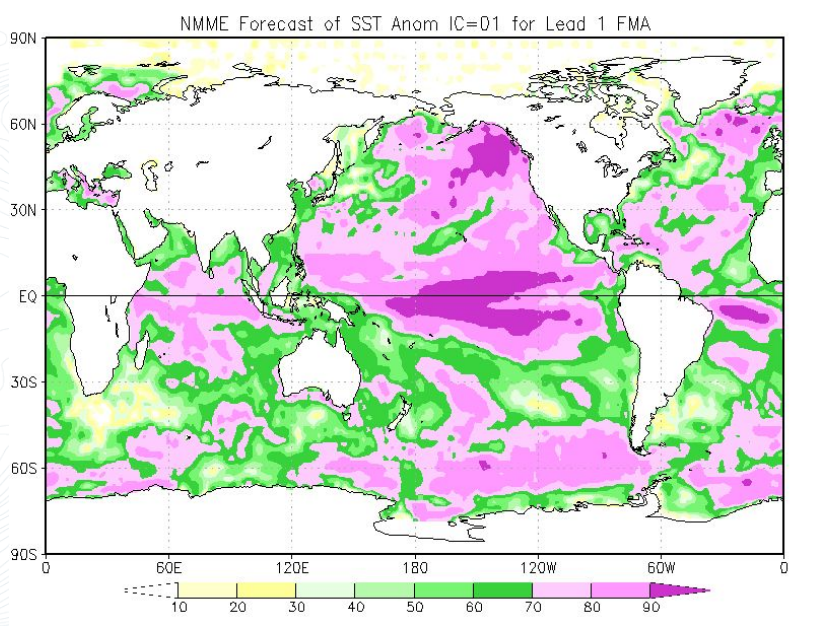
February-April 2024 **sea surface temperature** ➤ **NNME**

Forecast
departure from normal

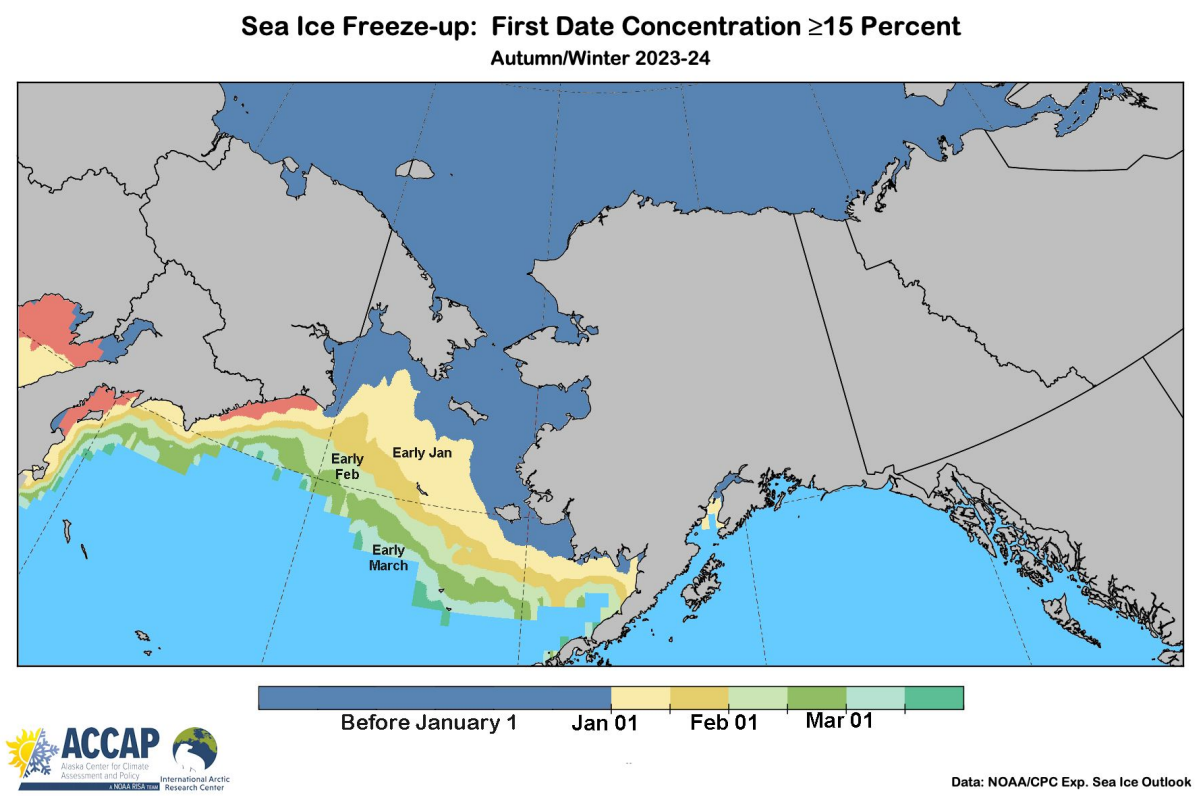


Weakly negative PDO pattern

Skill
of the forecast



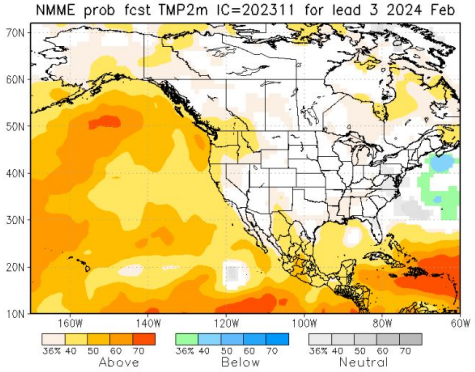
Experimental **sea ice forecast** ➤ CPC (late December outlook)

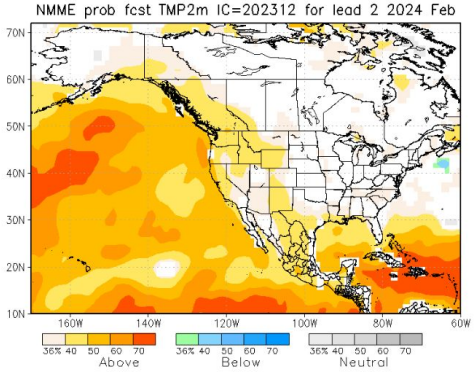


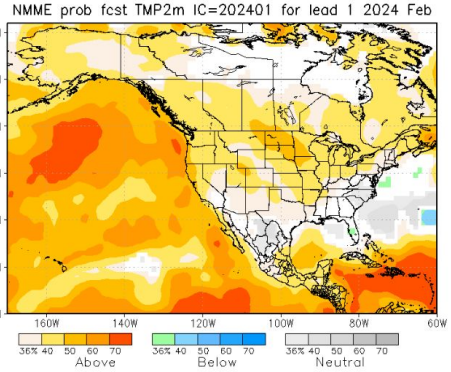
February 2024 calibrated **probability forecast** ➤ **NNME**

Forecast from → **November** **December** **January**

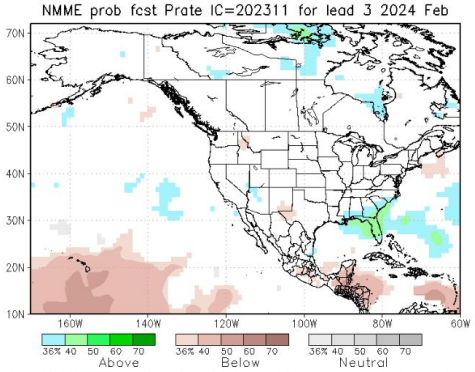
Temperature

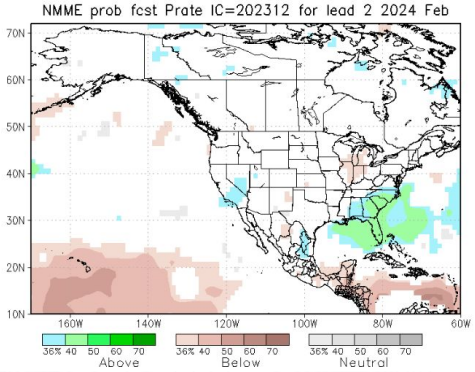


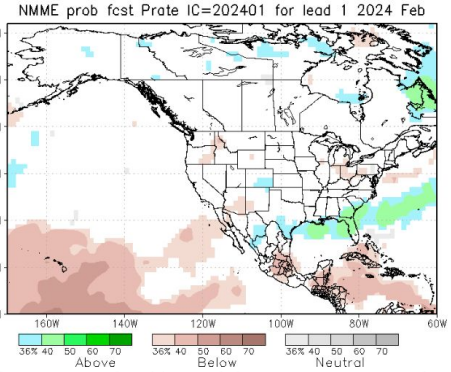




Precipitation

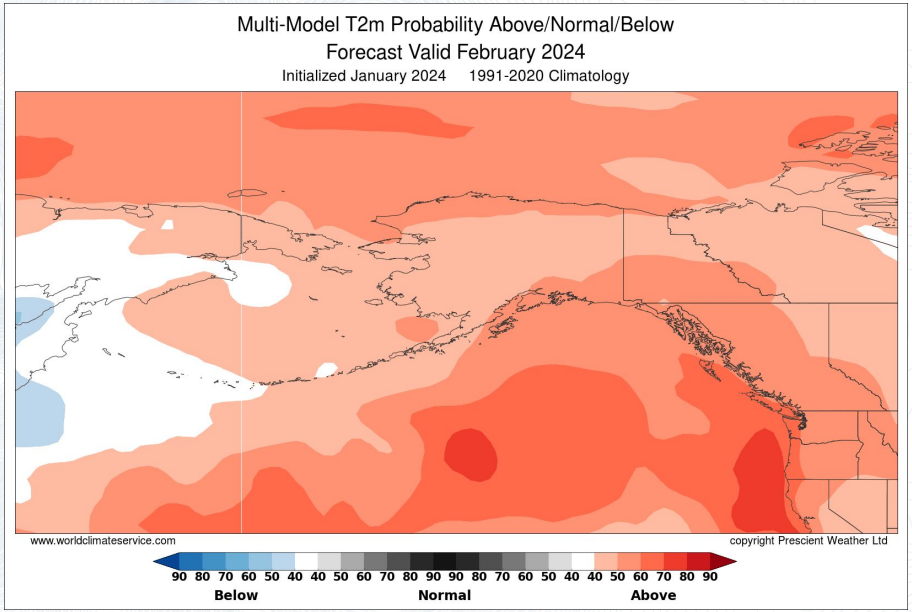




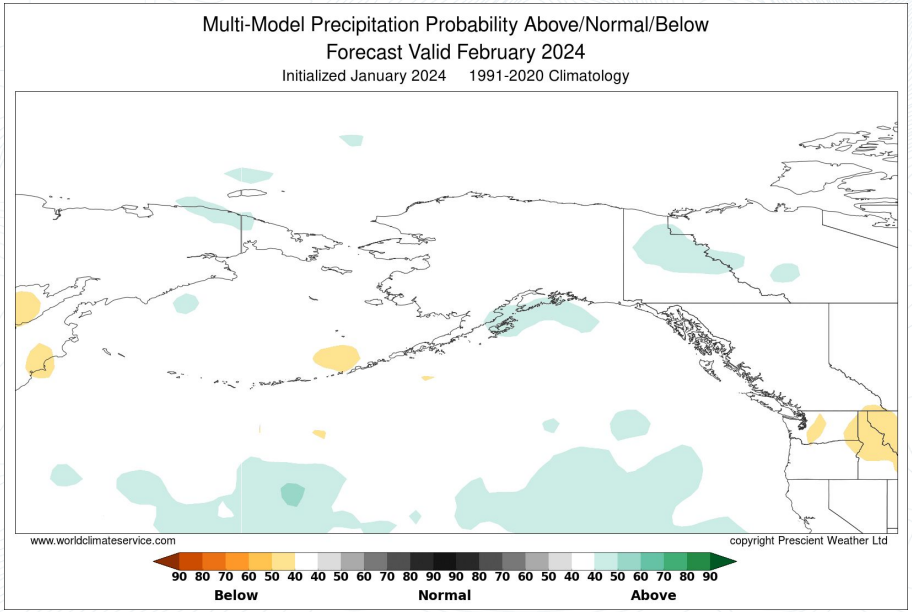


February 2024 **outlooks** ➤ **World Climate Service**

Temperature



Precipitation

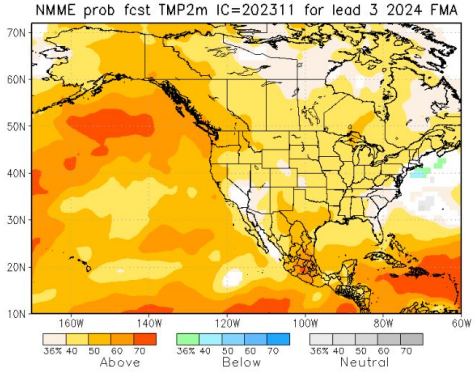


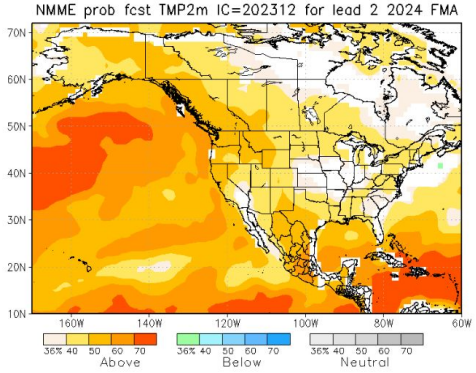
Bias Corrected, Skill Weighted CFS + ECMWF

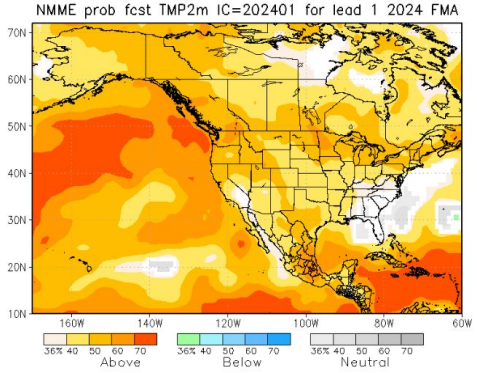
Feb-April 2024 calibrated **probability forecast** ➤ **NNME**

Forecast from → **November** **December** **January**

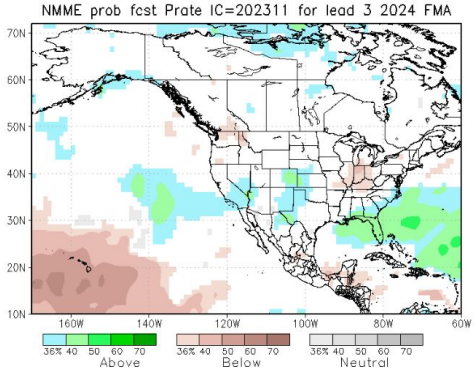
Temperature

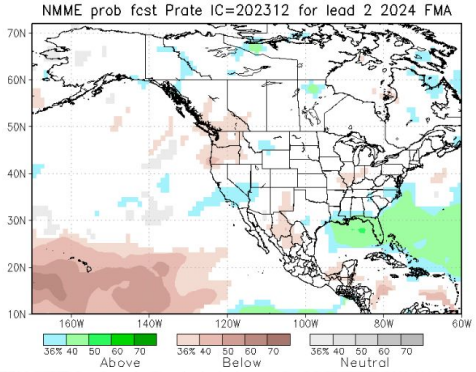


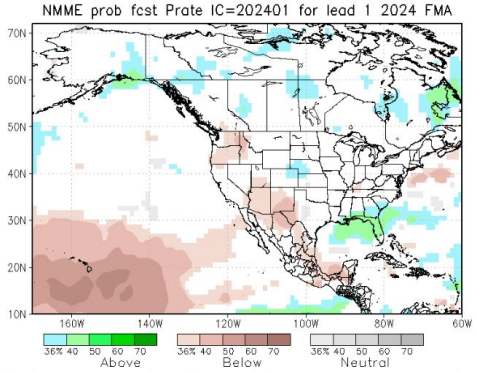




Precipitation

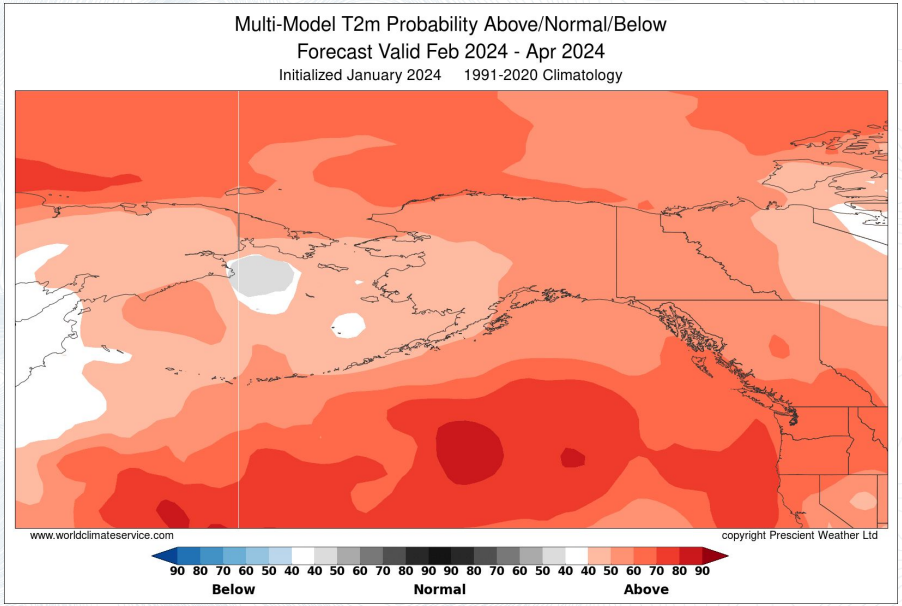




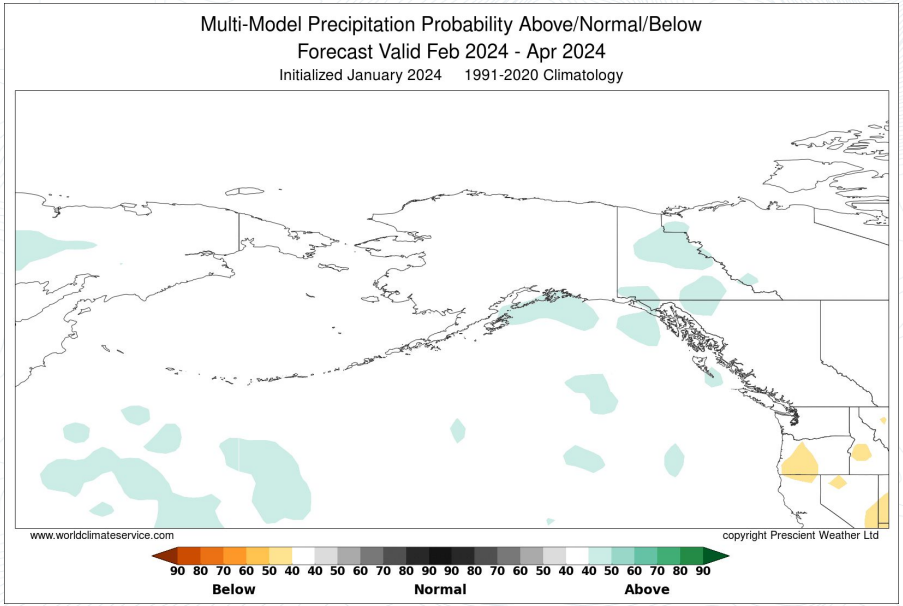


Feb-April 2024 **outlooks** ➤ **World Climate Service**

Temperature

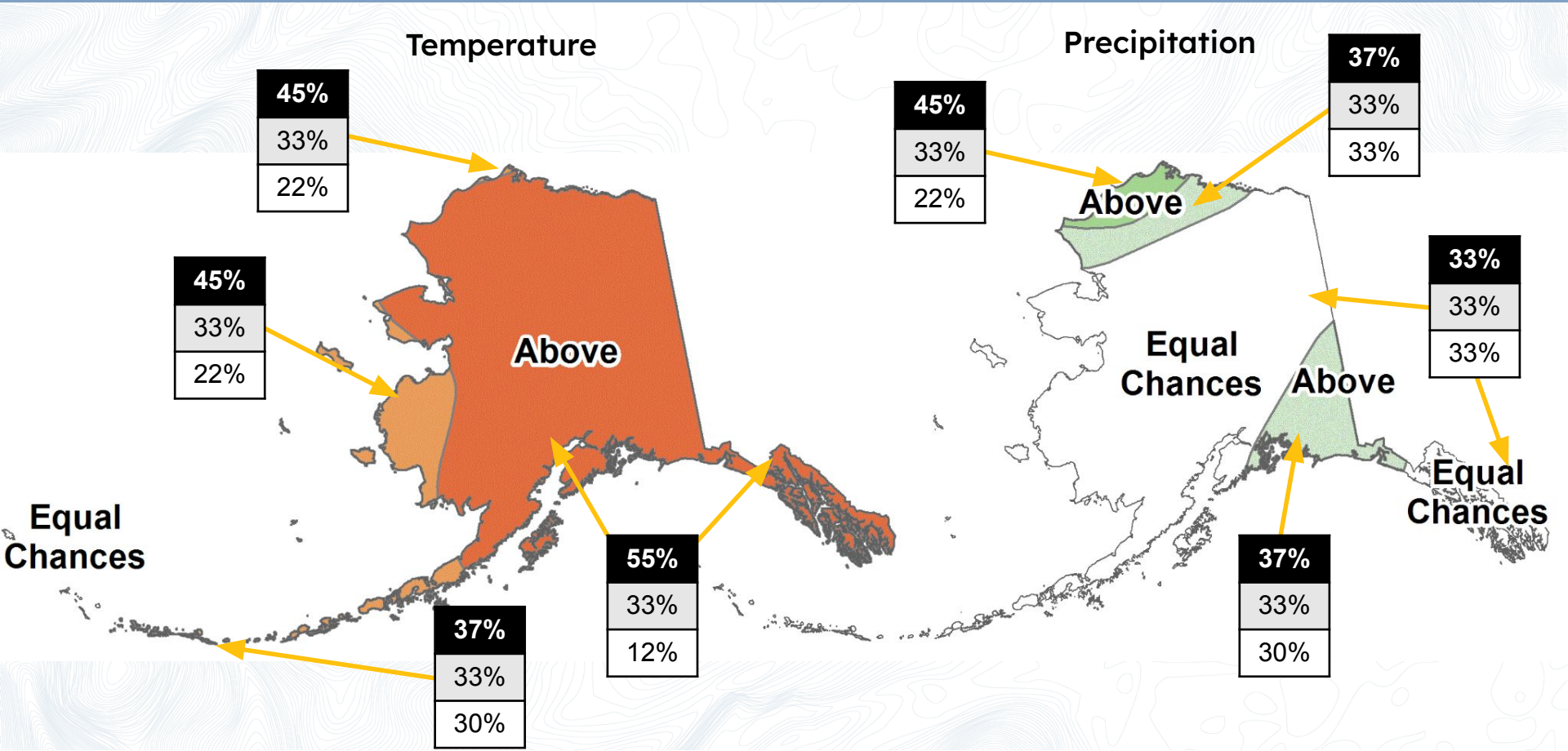


Precipitation



Bias Corrected, Skill Weighted CFS + ECMWF

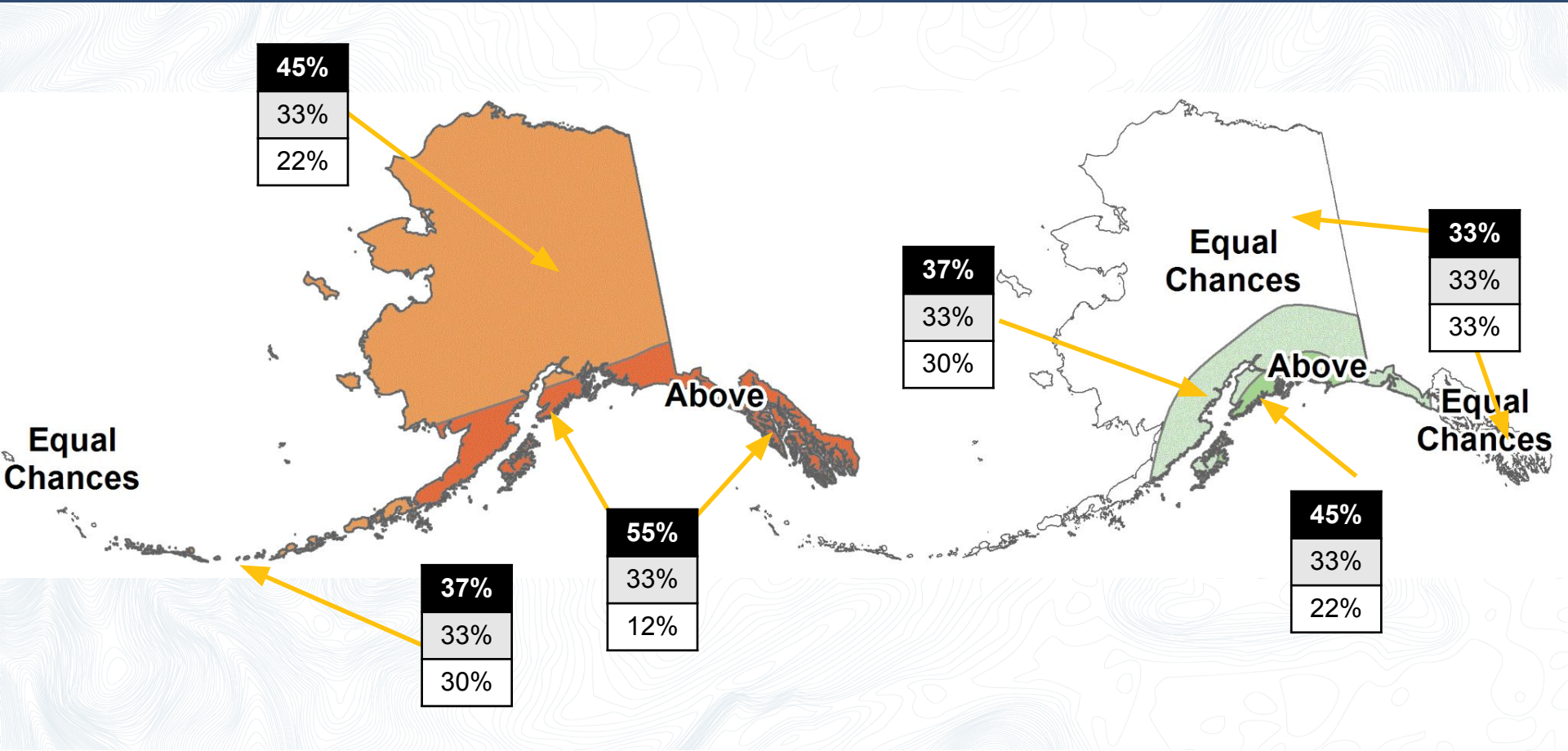
Feb-April 2024 **outlooks from December**



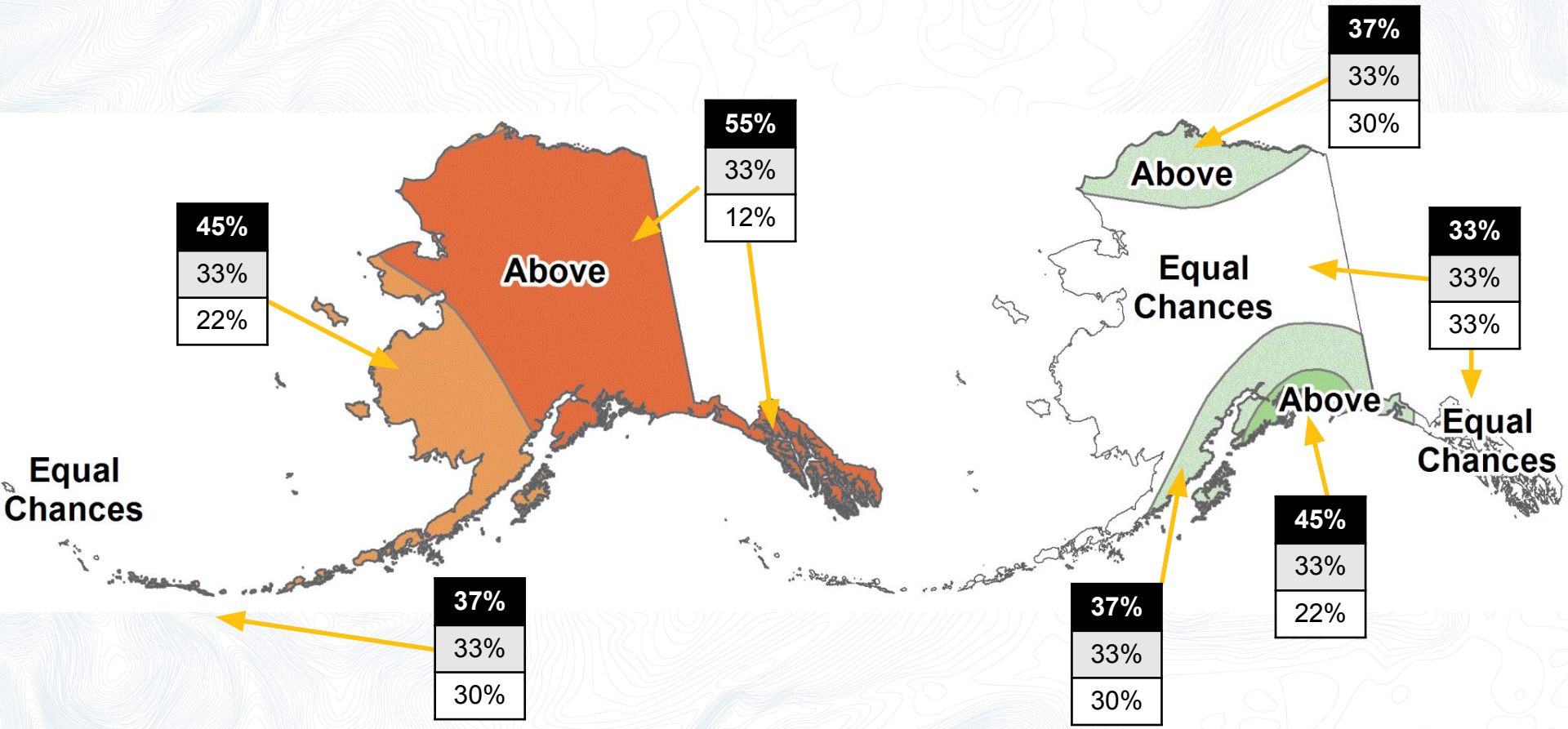
Future outlook

And the answer is...

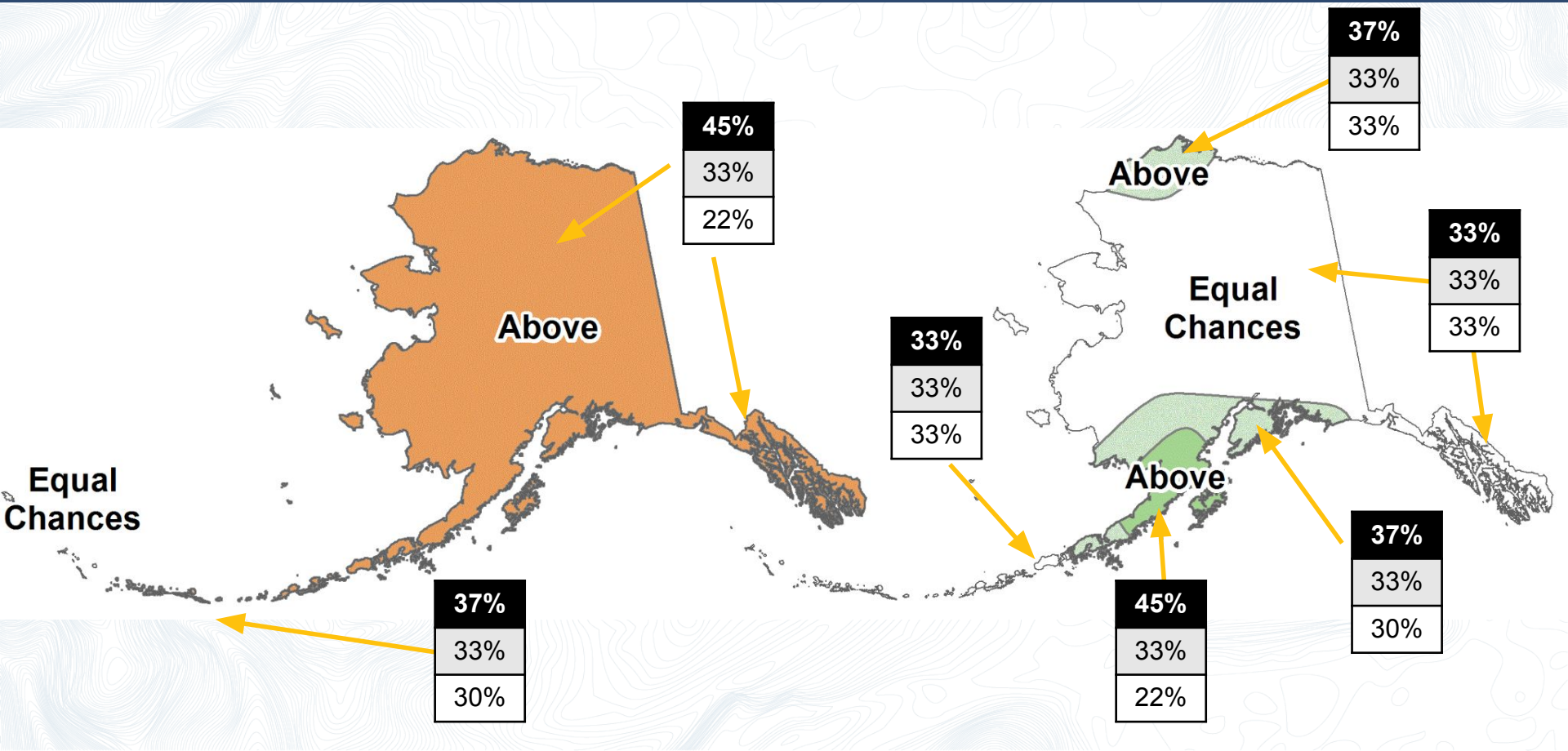
CPC **February** 2024 **outlooks**



CPC **February-April** 2024 **outlooks**



Look ahead **Spring 2024**



Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- **February 16** ▸ NWS Climate Outlook Briefing

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ACCAP Alaska Center for Climate Assessment and Policy
A NOAA CAP/RISA Team

International Arctic Research Center

UAF UNIVERSITY OF ALASKA FAIRBANKS

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