Alaska climate outlook briefing November 2024

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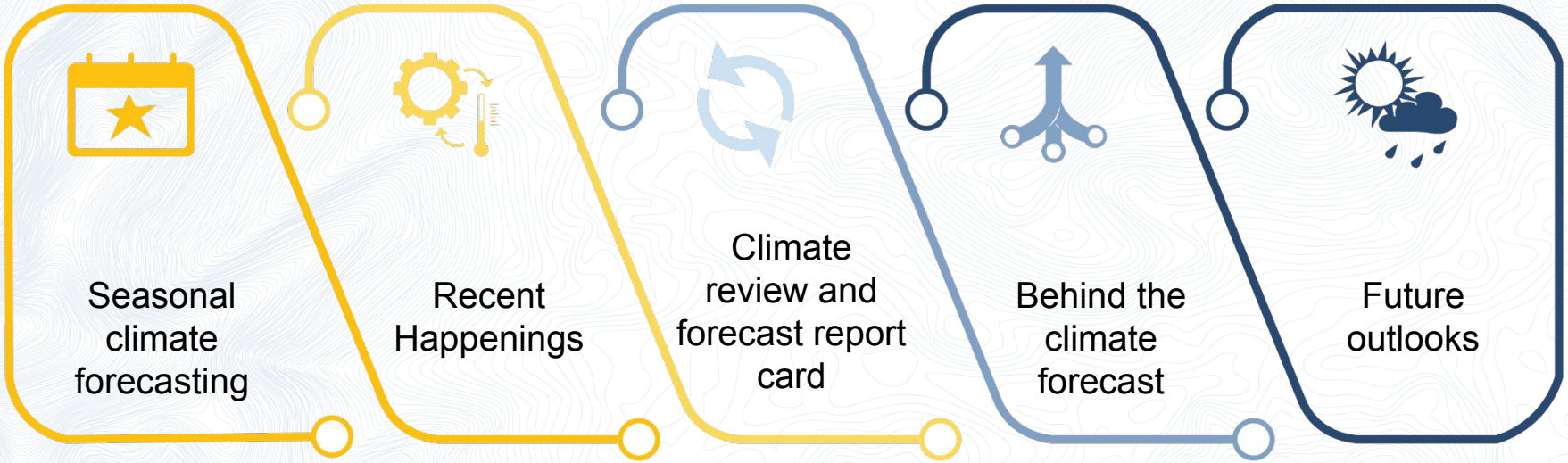
ACCAP Climate Specialist
November 22, 2024

ACCAP


Seasonal climate forecasting
Recent Happenings
Climate review and forecast report card
Behind the climate forecast
Future outlooks

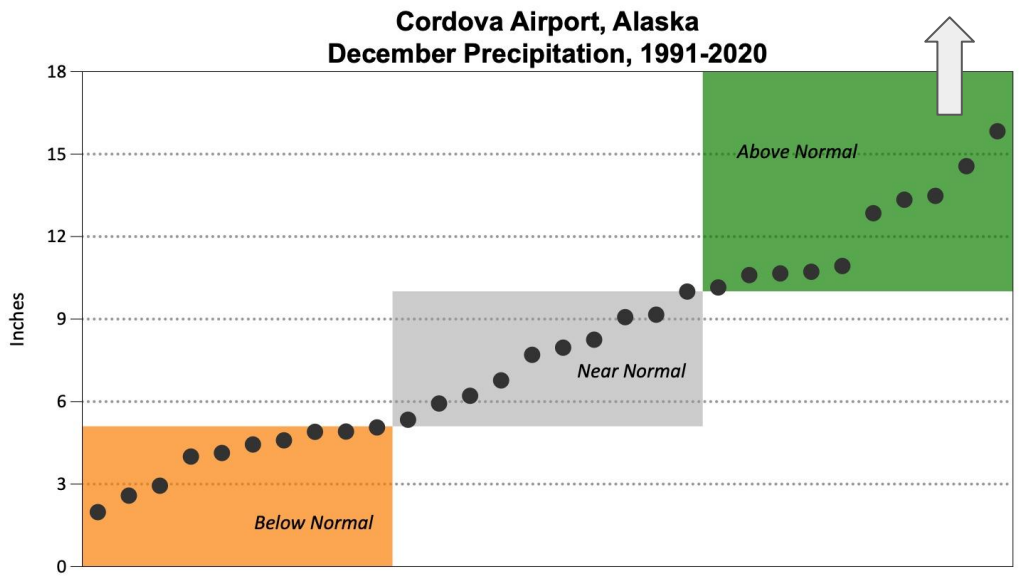
Seasonal climate forecasting

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 long-term normal (1991-2020)
- 3 categories
- Probabilistic
- Temperature
  - Centered on average
- Precipitation
  - Centered on median ➤ can significantly differ from “normal”
- Normals temperature and precip ranges for selected Alaska places at ACCAP climate graphics



Recent Happenings

- **Northwest Alaska**: Coastal flooding Oct 20-22
  - Kotzebue: Worst flooding in living memory
- **Fairbanks**: Slushmaggdon Oct 20-21
  - Thousands without power for days
- **Anchorage**: Oct 28-31, 21” snow
- **Kachemak Bay**: Nov 17 high tides with strong west winds ⟹ coastal damage

Kotzebue
October 21, 2024
Photo credit: NW Arctic Borough EM

Climate outlook report card

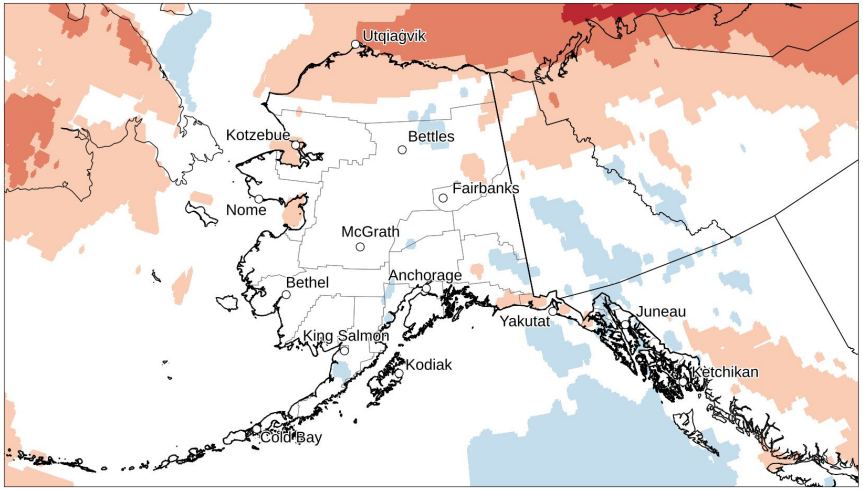
Climate Review

What happened?

How did previous climate outlooks perform?

Model- based regional analysis ➢ **Average temperatures**

Temperature Classification for Oct 2024



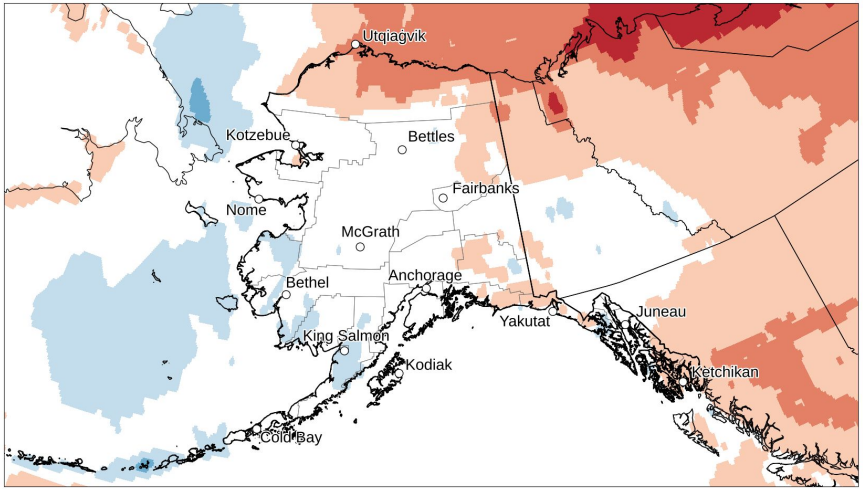
Source: ERA5 Reanalysis

Map by: Brian Brettschneider

Record	Much Below	Below	Near Normal	Above	Much Above	Record

Compared to 1991-2020 Base Period (Records Since 1940)

Temperature Classification for Aug-Oct 2024



Source: ERA5 Reanalysis

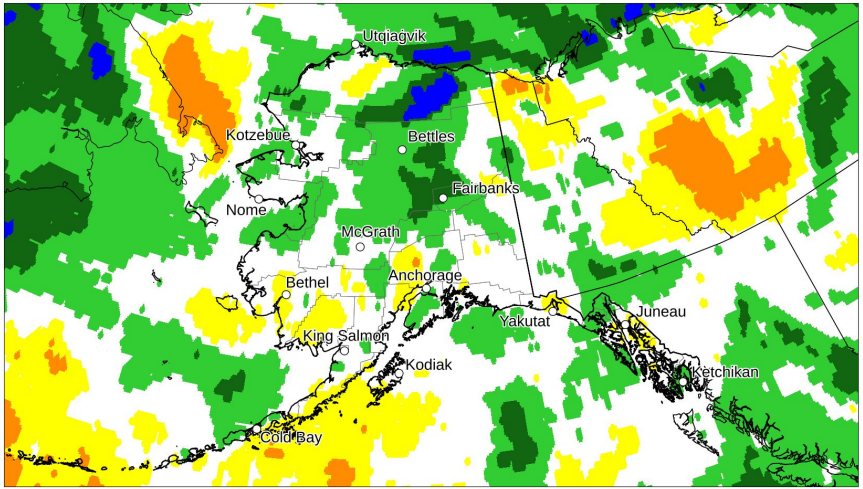
Map by: Brian Brettschneider

Record	Much Below	Below	Near Normal	Above	Much Above	Record

Compared to 1991-2020 Base Period (Records Since 1940)

Model- based regional analysis ➢ **Total precipitation**

Precipitation Classification for Oct 2024



Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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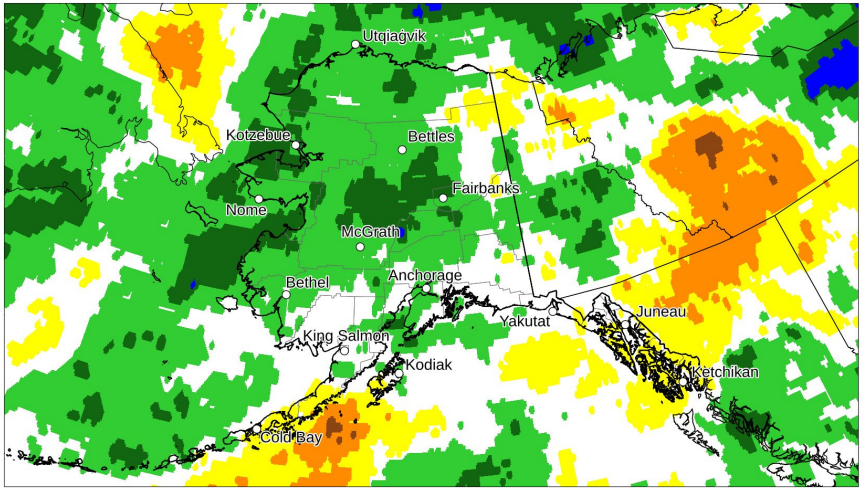
Precipitation Classification for Aug-Oct 2024



Source: ERA5 Reanalysis

Map by: Brian Brettschneider

Record	Much Below	Below	Near Normal	Above	Much Above	Record

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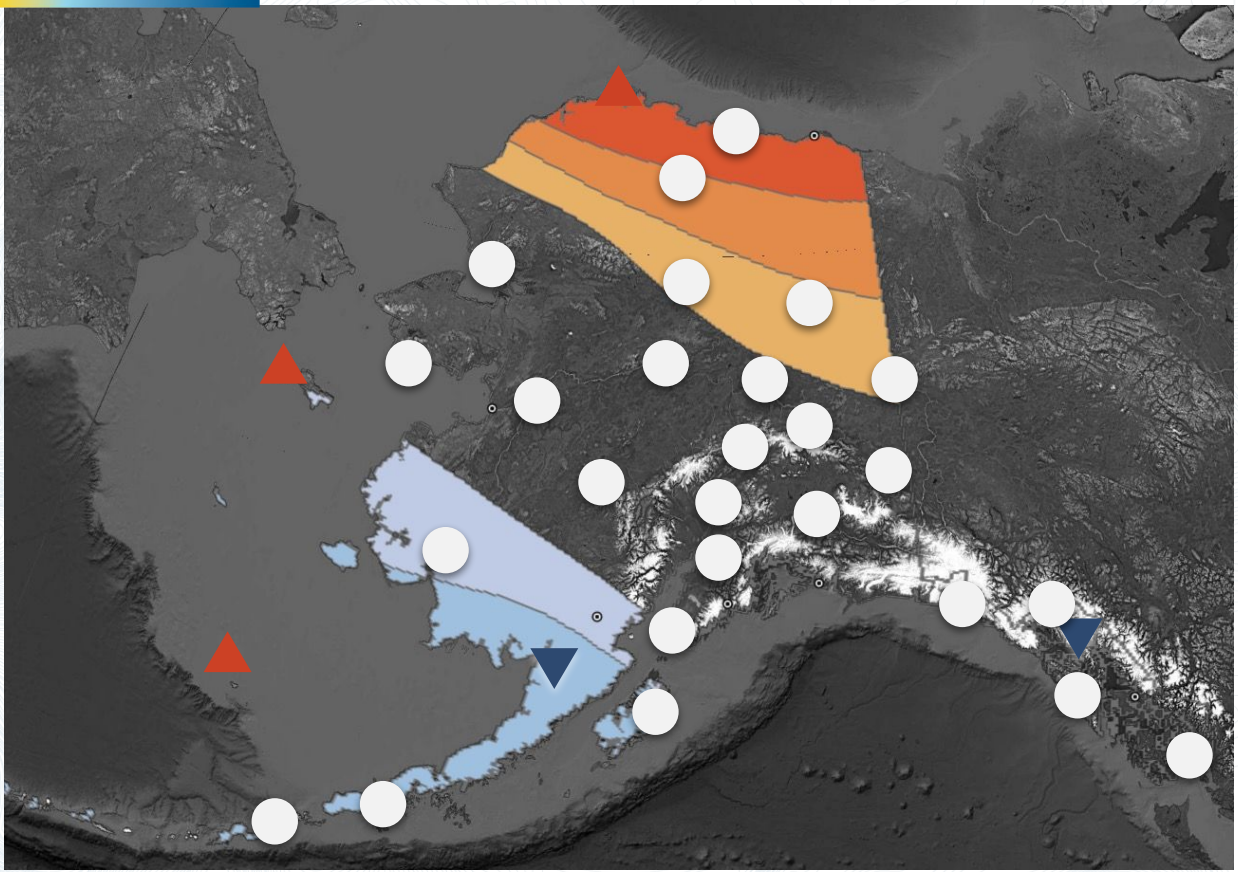
October 2024 temperature ➤ CPC outlook and observed



Non-EC skill score: -25

Percent correct: 17%

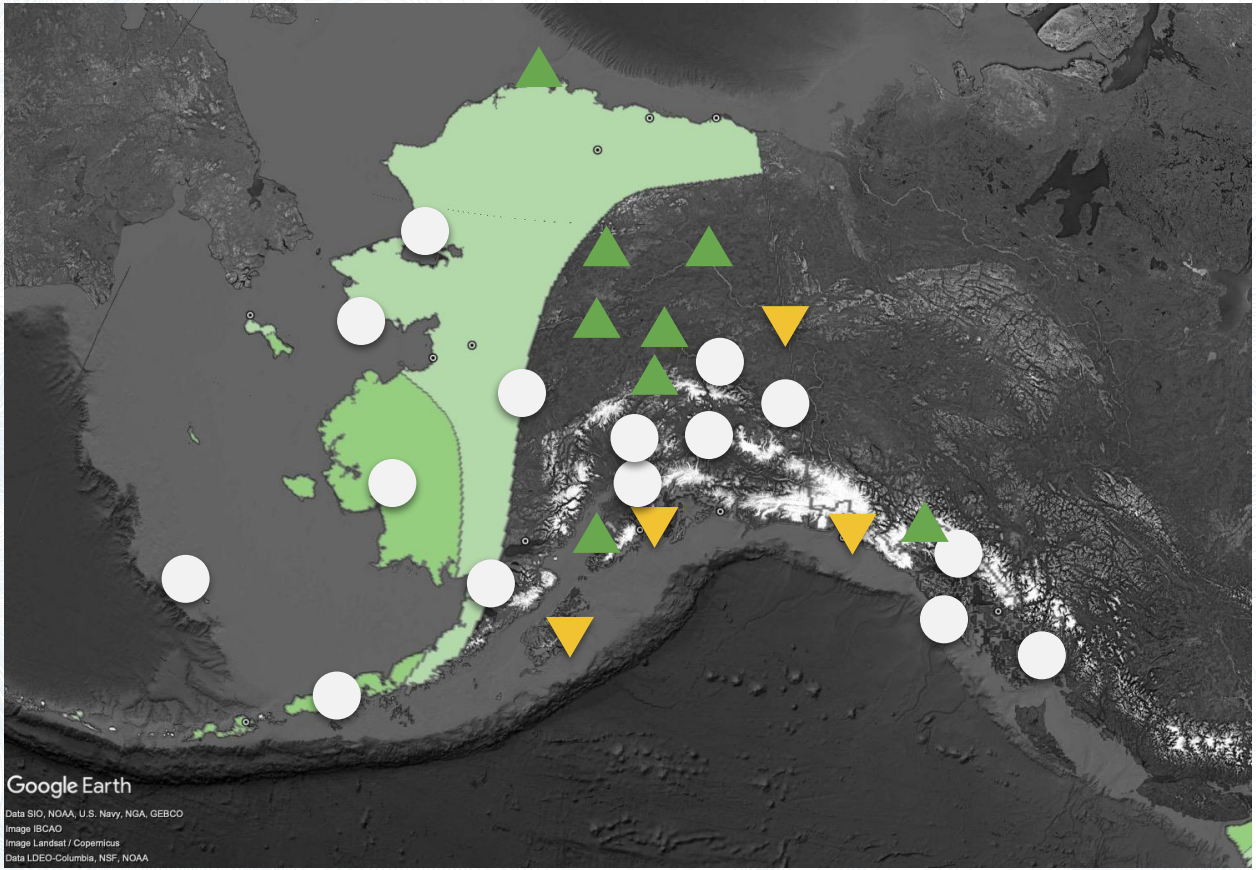
Mid-month outlook

Above normal

Near normal

Below normal

October 2024 precipitation ➤ CPC outlook and observed



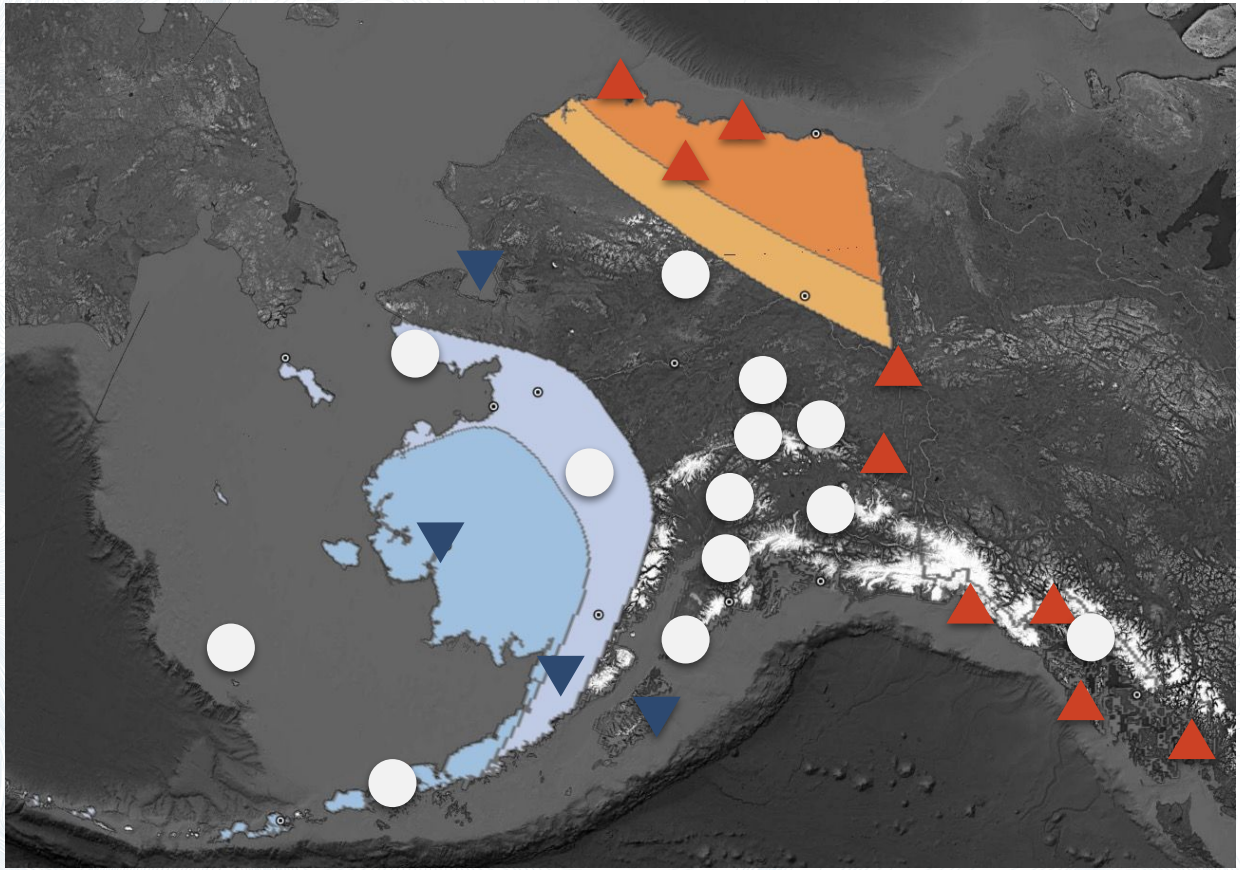
Non-EC skill score: -31

Percent correct: 13%

Mid-month outlook

- Above normal
- Near normal
- Below normal

August-October 2024 temperature ➤ CPC outlook & observed



Non-EC skill score: +33

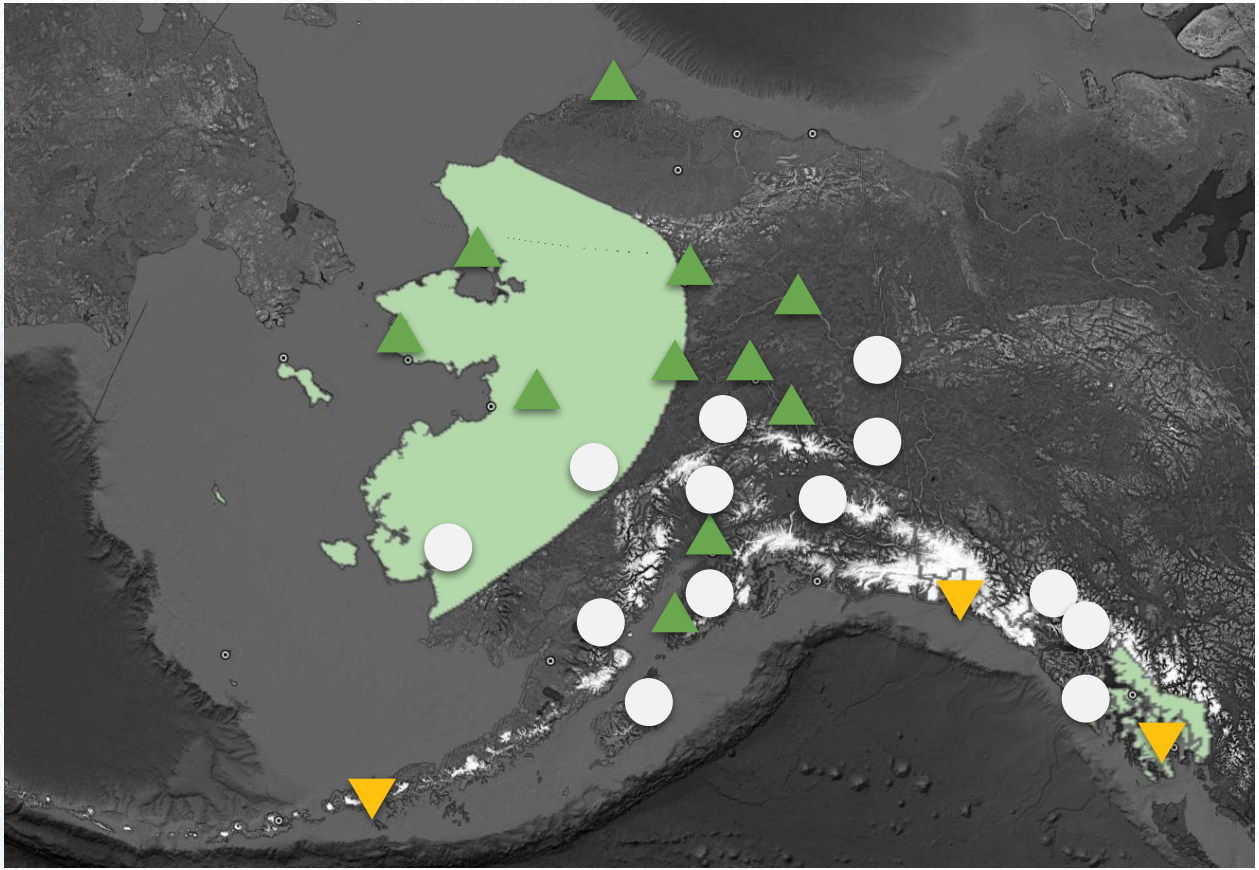
Percent correct: 56%

Above normal

Near normal

Below normal

August-October 2024 precipitation ➤ CPC outlook & observed



Non-EC skill score: +36

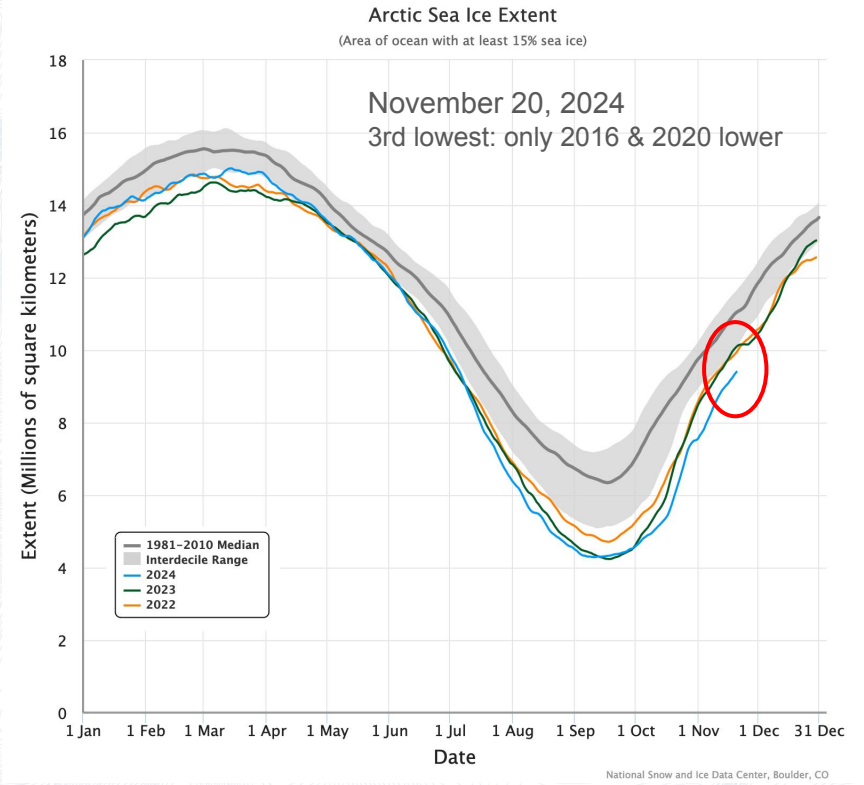
Percent correct: 57%

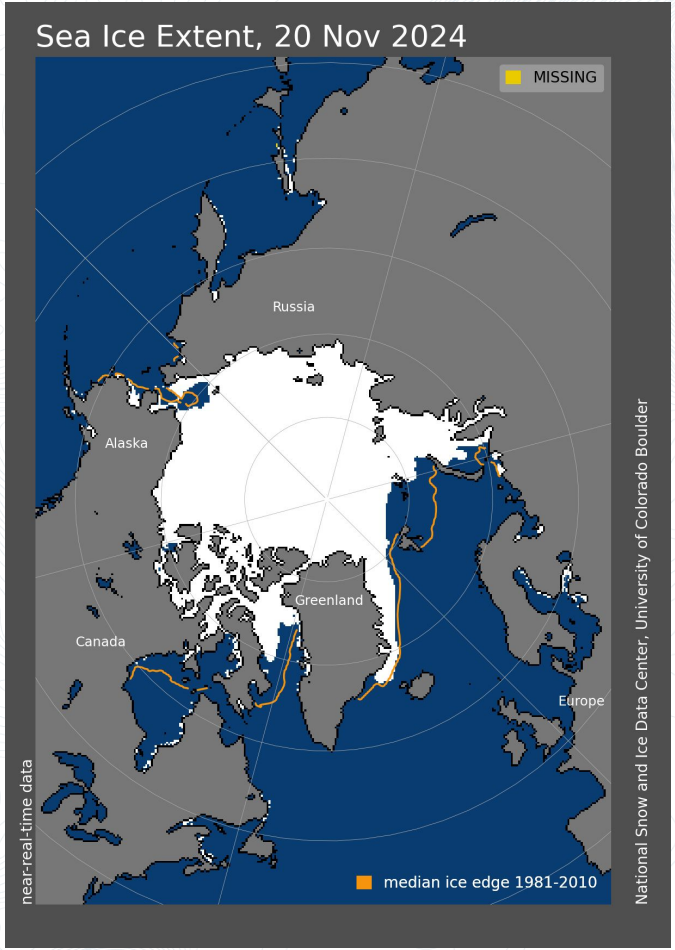
Above normal

Near normal

Below normal

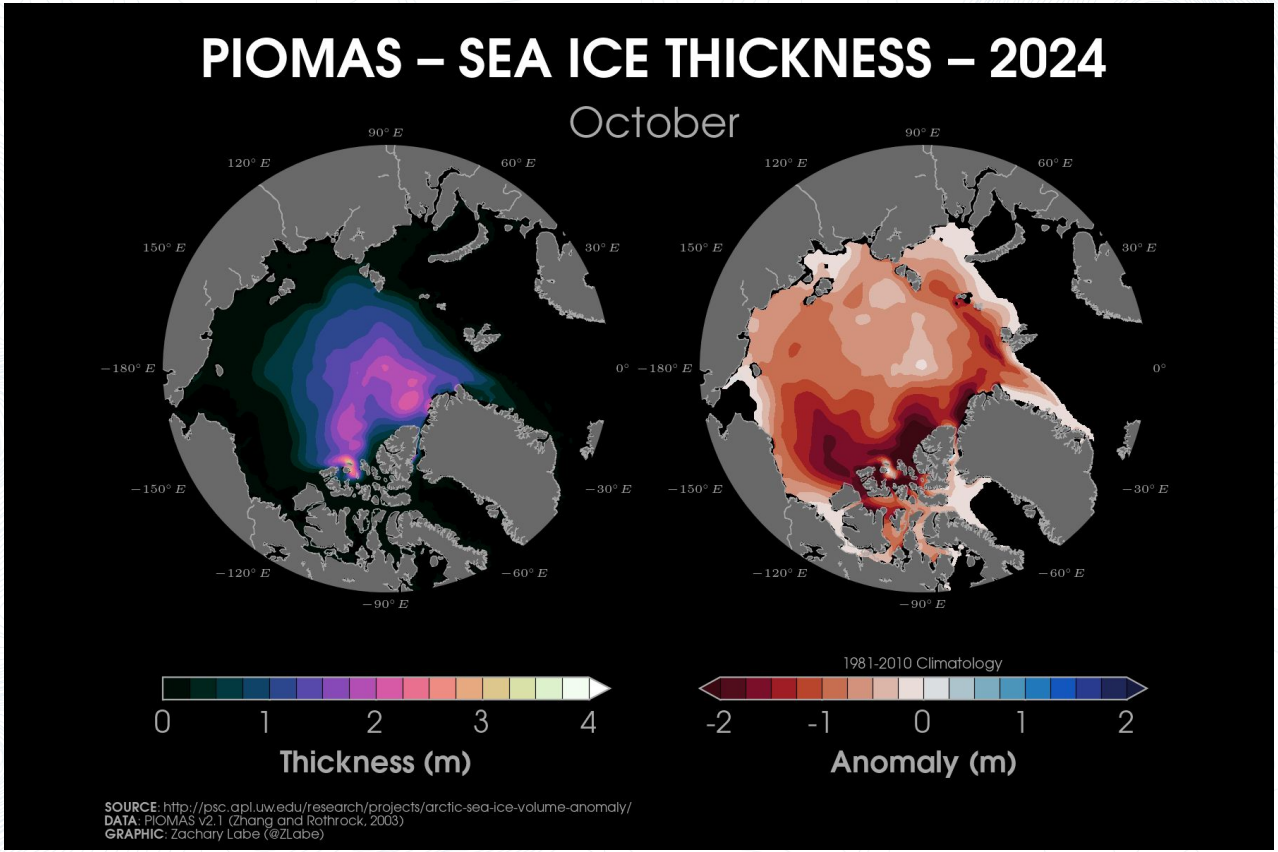
Arctic wide **sea ice**





Arctic sea ice **thickness**

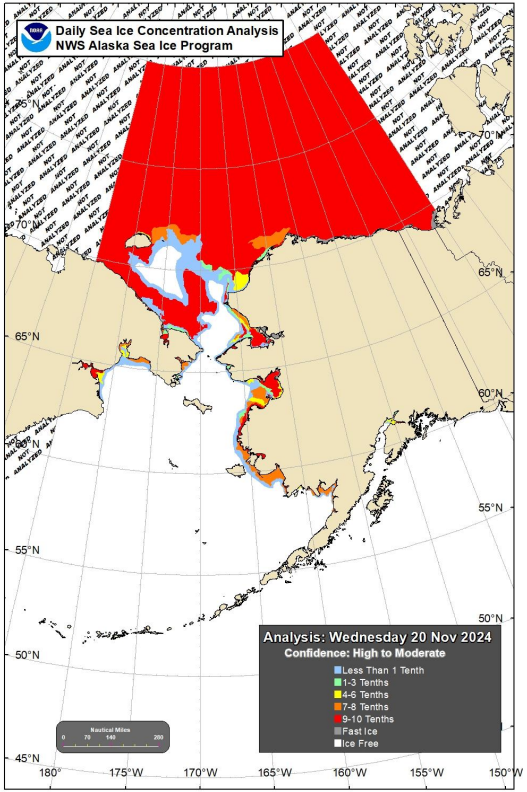
Sources:
Data from U. Wa./PIOMAS data
Graphics by Z. Labe, Princeton U.



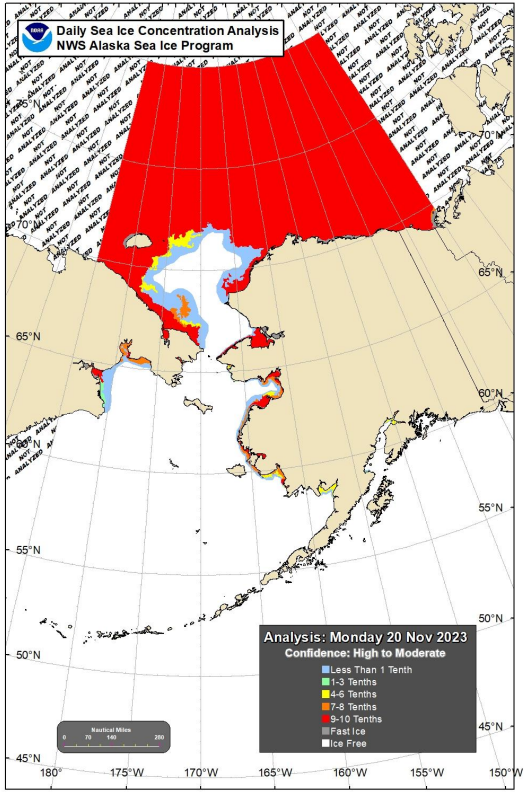
Mid-November sea ice comparison

Source: National Weather Service Alaska Region Sea Ice Program

November 20, 2024

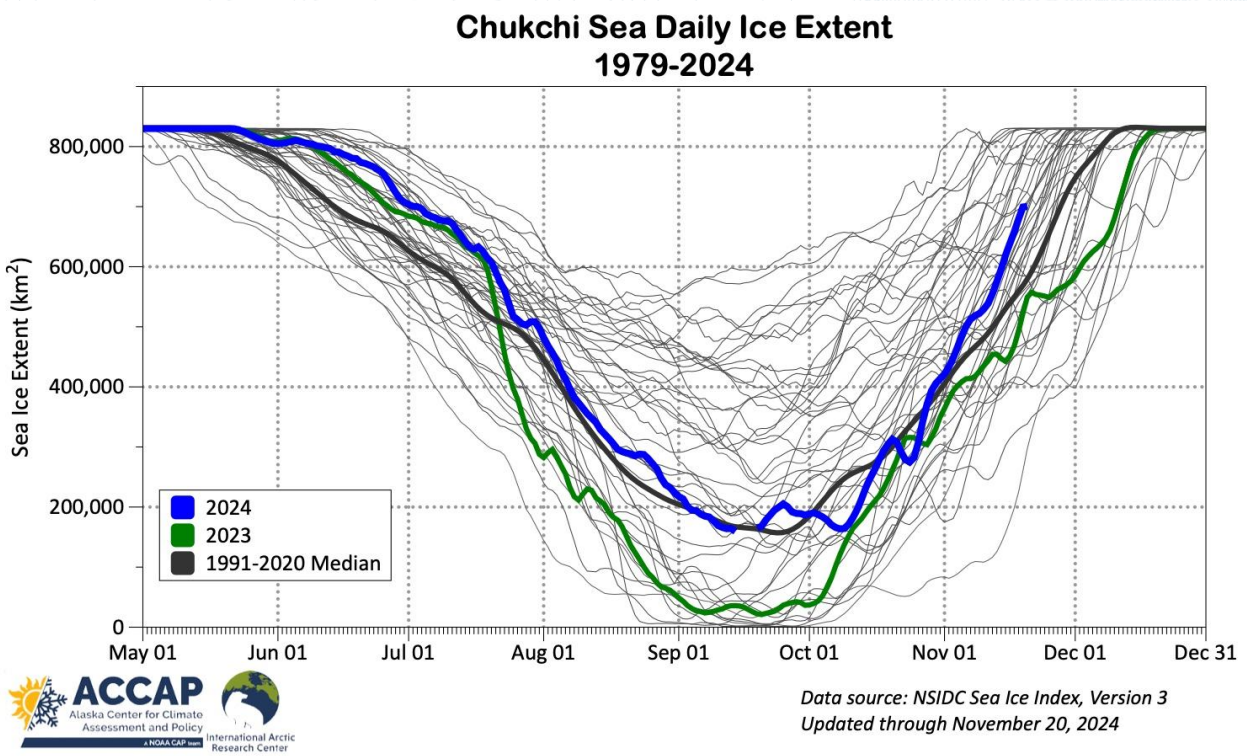


November 20, 2023

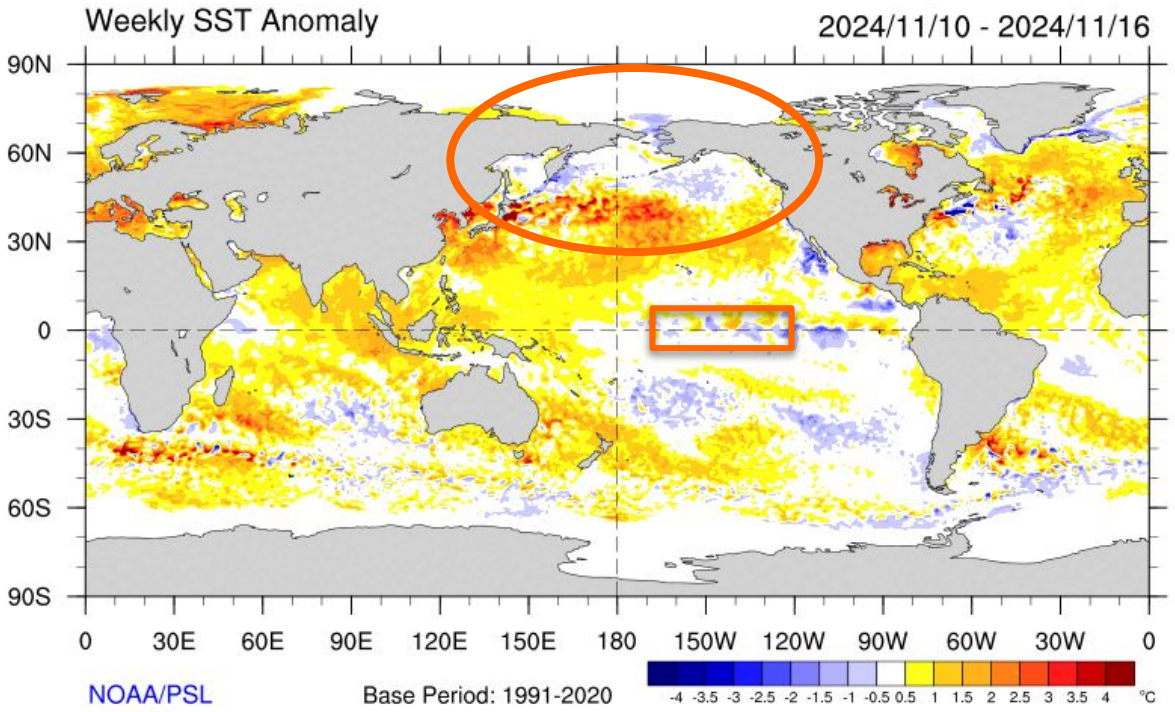


Sea ice extent **through the season**

Sources:
Data NSIDC Sea Ice Index, Version 3. Through September 25, 2024.



Global sea surface temperature departure from normal

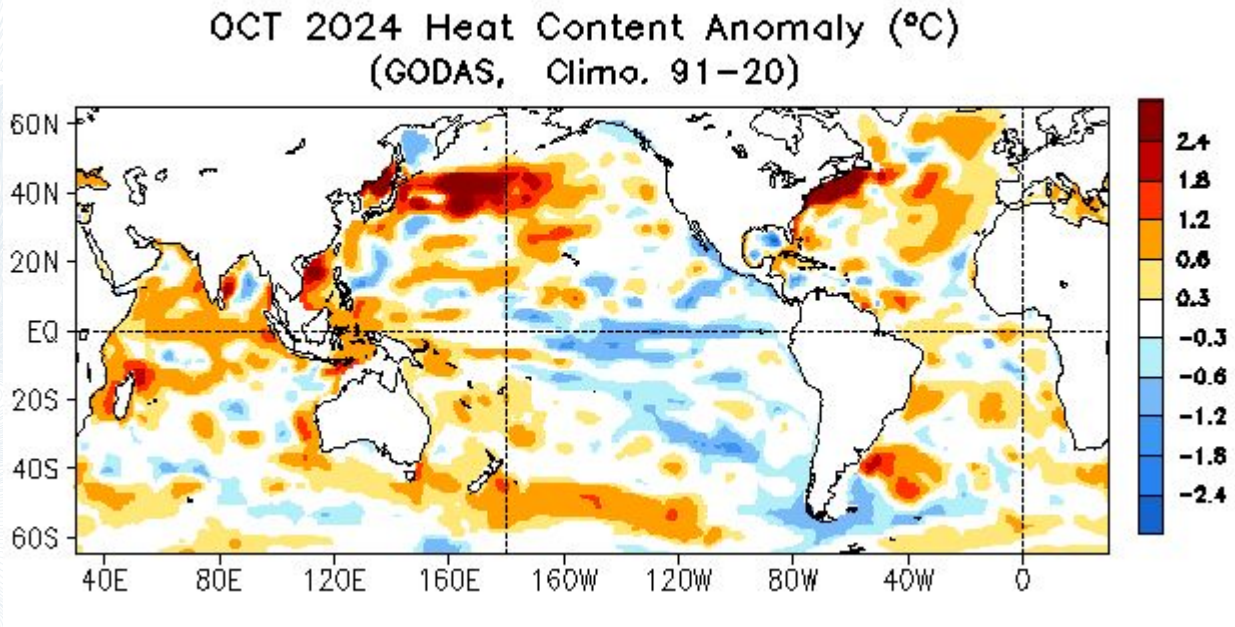


ONI for **Aug-Oct**: –0.2

PDO for **Oct** 2024: -2.4

Sources: ONI from CPC
PDO Index from WCS

Upper **ocean heat** departure from average



Upper 300 meters of the ocean

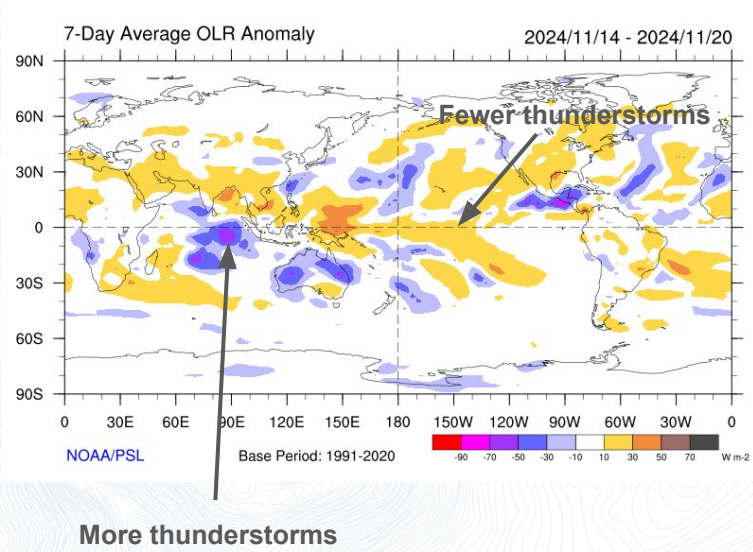
Slight cooling southern Gulf of Alaska

Source: NOAA/CPC

Tropical Pacific atmosphere

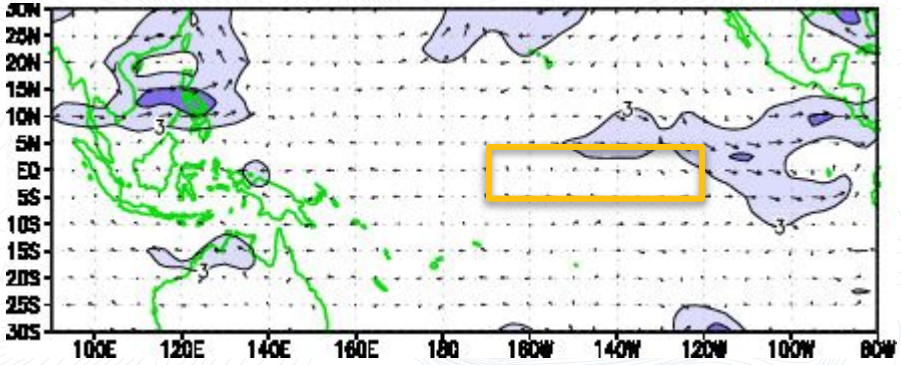
Aug-Oct Oceanic
Niño Index: -0.2

Deep tropical convection
Via “outgoing longwave radiation”

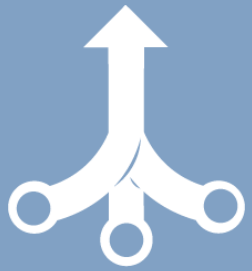


Near average trade winds
Niño Region 3.4

Trade winds
850 mb wind difference from average
Oct 21-Nov 19, 2024



Behind the climate forecast



El Niño/La Niña (ENSO) ➤ expert evaluation

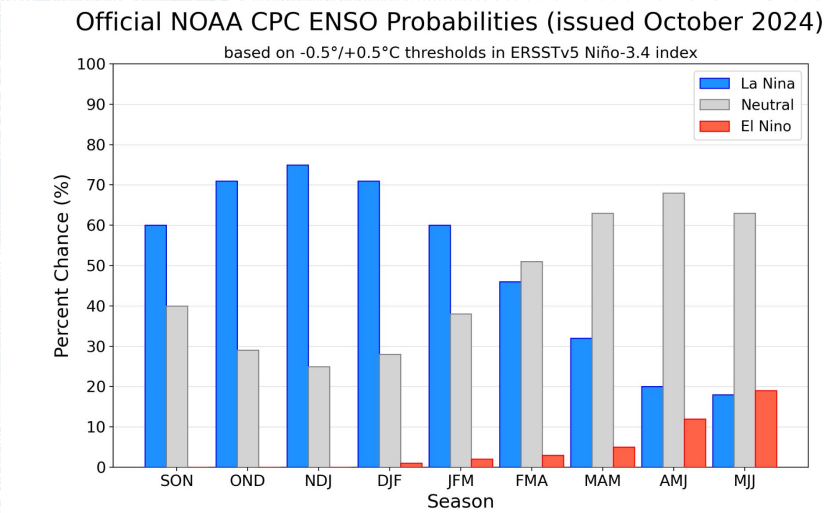
Statistical models ➤ using the past

Dynamical models ➤ All physics, all the time

- Sea surface temperatures
- Sea Ice
- Temperature and Precipitation

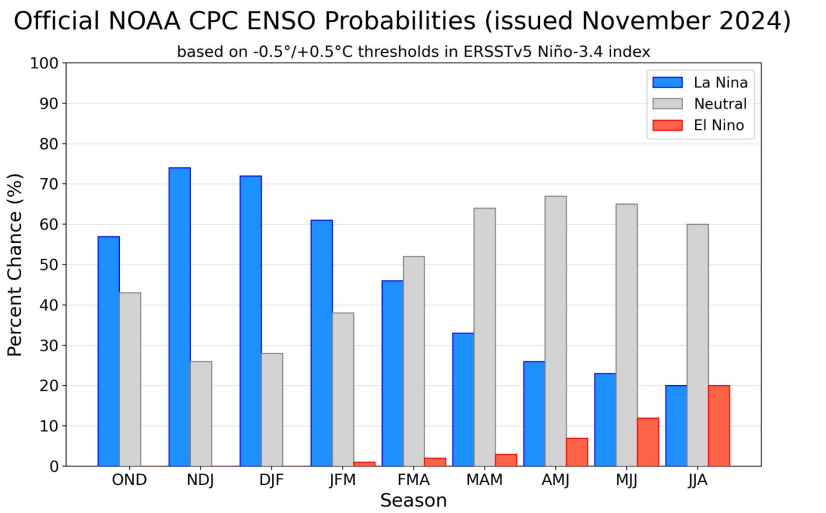
CPC **Niño 3.4 forecasts** ➤ experts

October 2024



November 2024

ENSO Alert System Status:
La Niña Watch

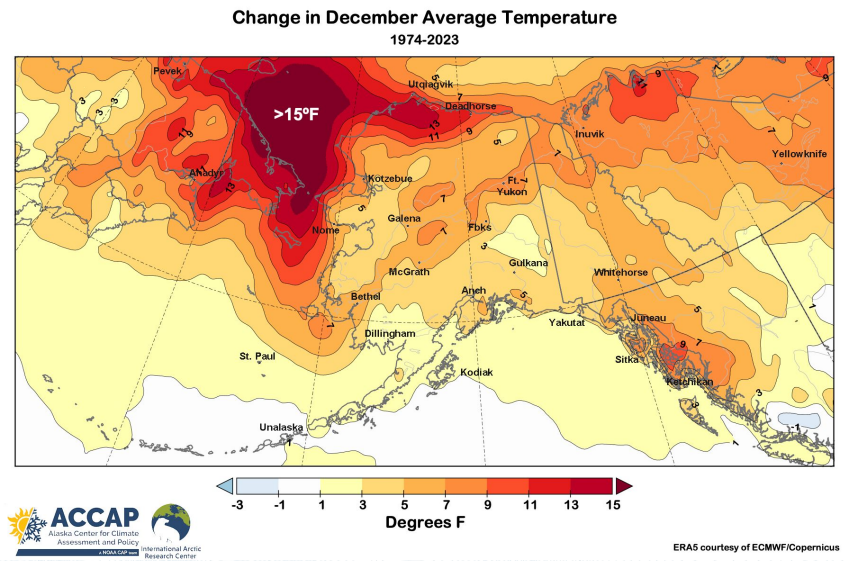


Statistical guidance ➤ using the past to predict the future

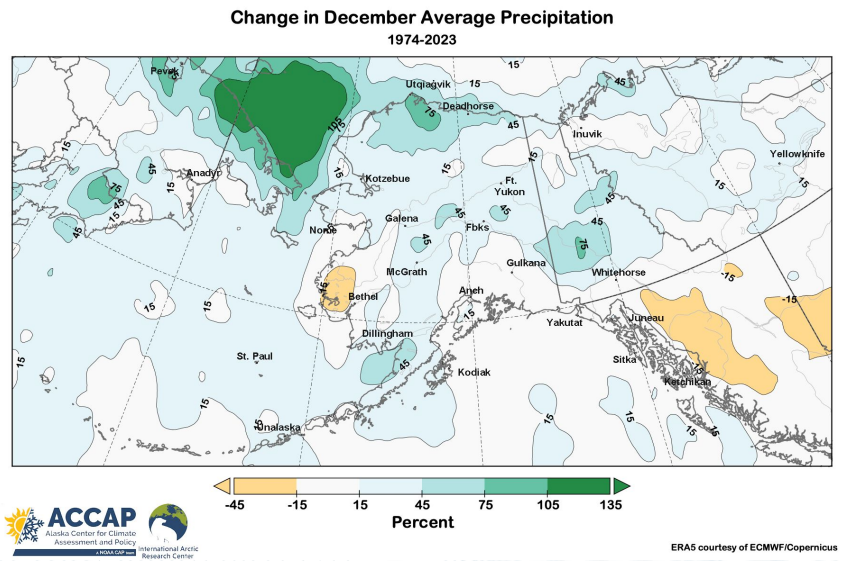
- Long term trends
- Optimum climate normals: Alaska trends the past 15 years
- La Niñas since 1976

December half century trends

Temperatures



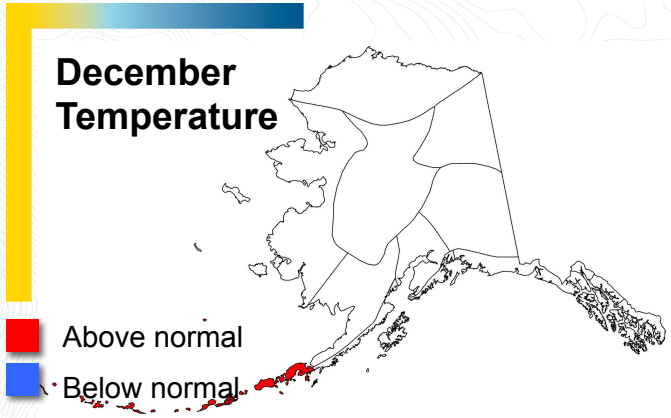
Precipitation

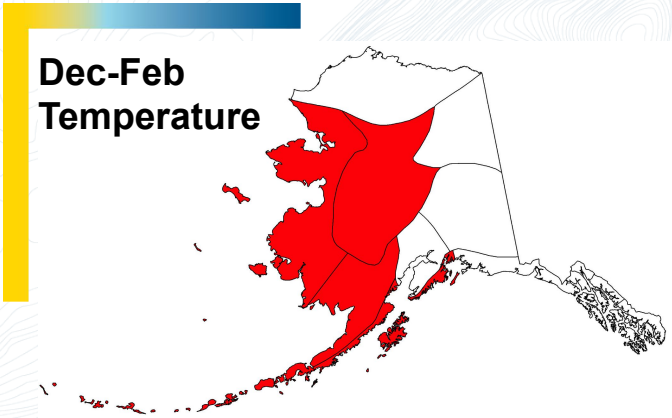


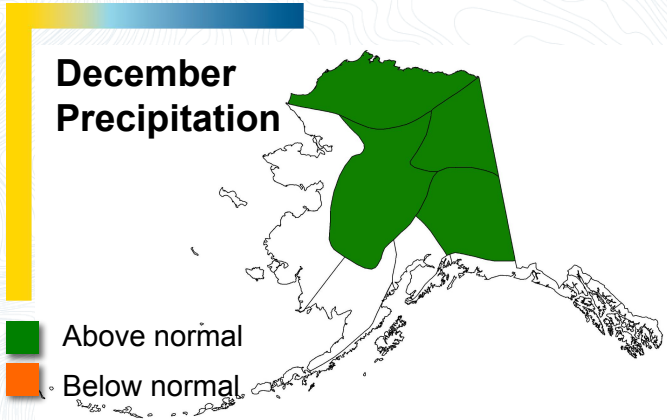
Trend over 50 years

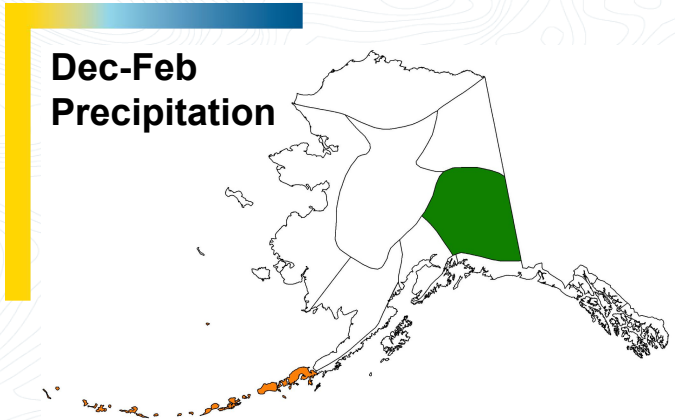
2009 to 2023 **trends**

Past 15 years compared to 1991-2020





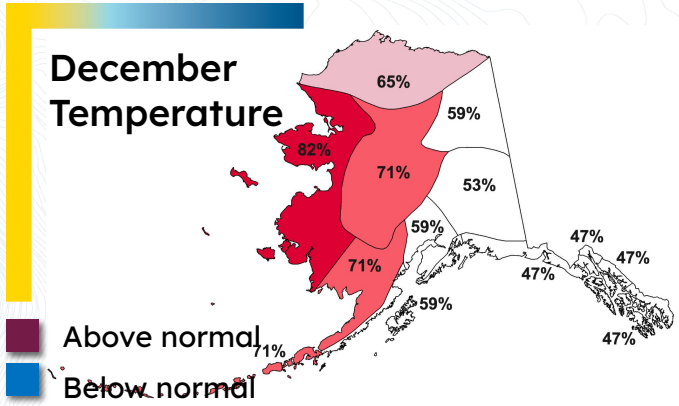


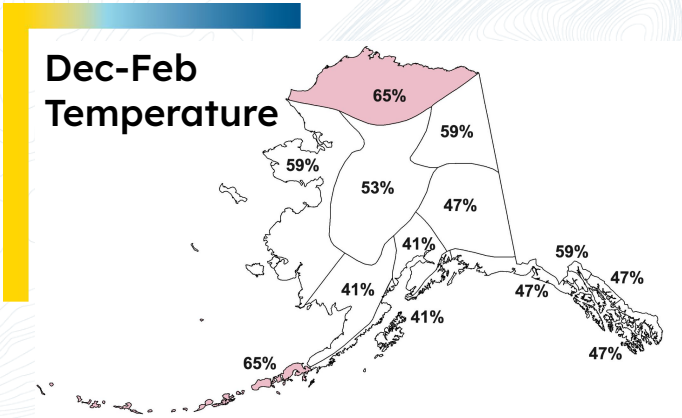


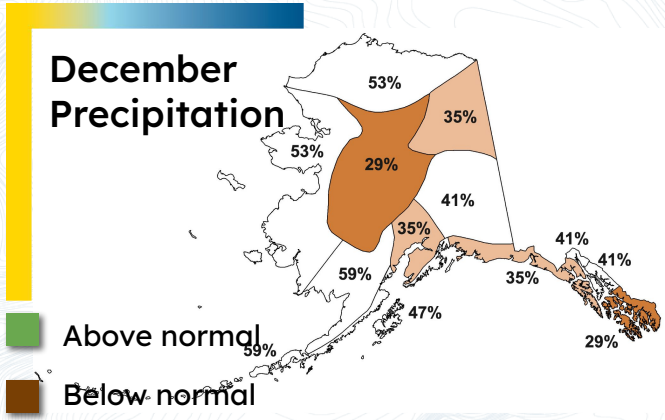
17 La Niña since 1976

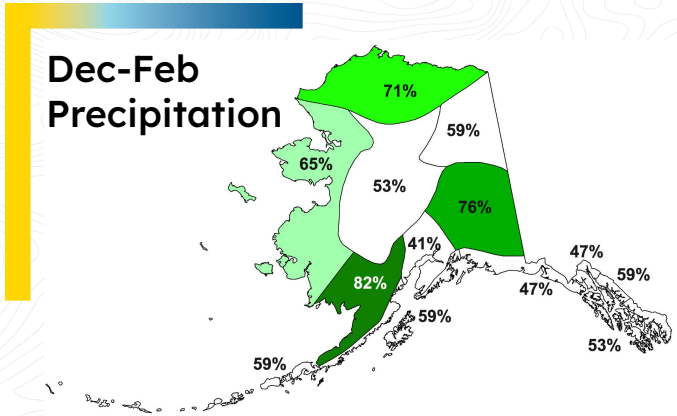
1983, 1984, 1988, 1995, 1998, 1999, 2000, 2005, 2007, 2009, 2010,2011, 2016, 2017, 2020, 2021, 2022

Percent years above average









Dynamic model forecasts

Current suite of Dynamic Climate Models

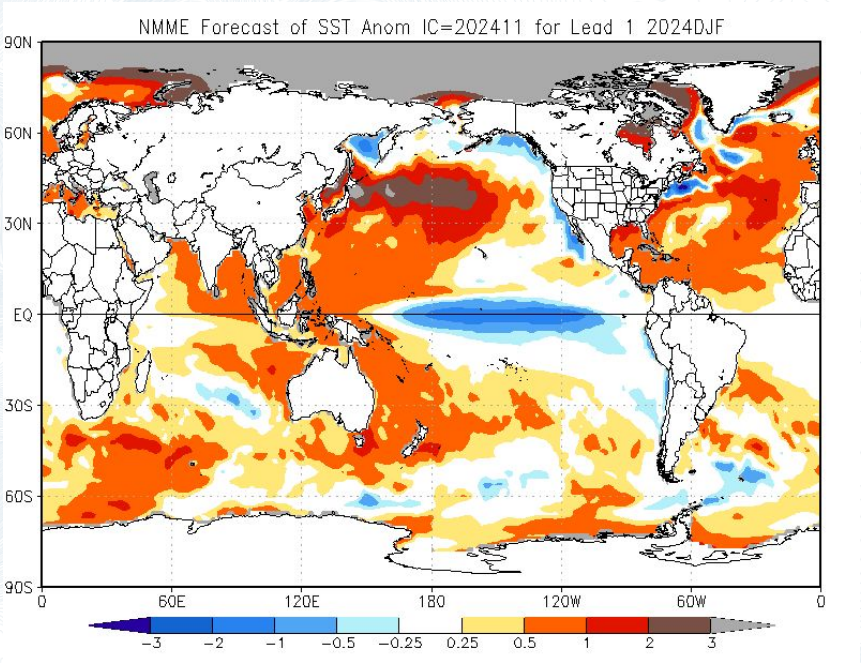
- CPC Experimental Sea Ice Ensemble
- World Climate Service Multi-Model Ensemble
- North American Multi-Model Ensemble (NMME)

What's being forecasted

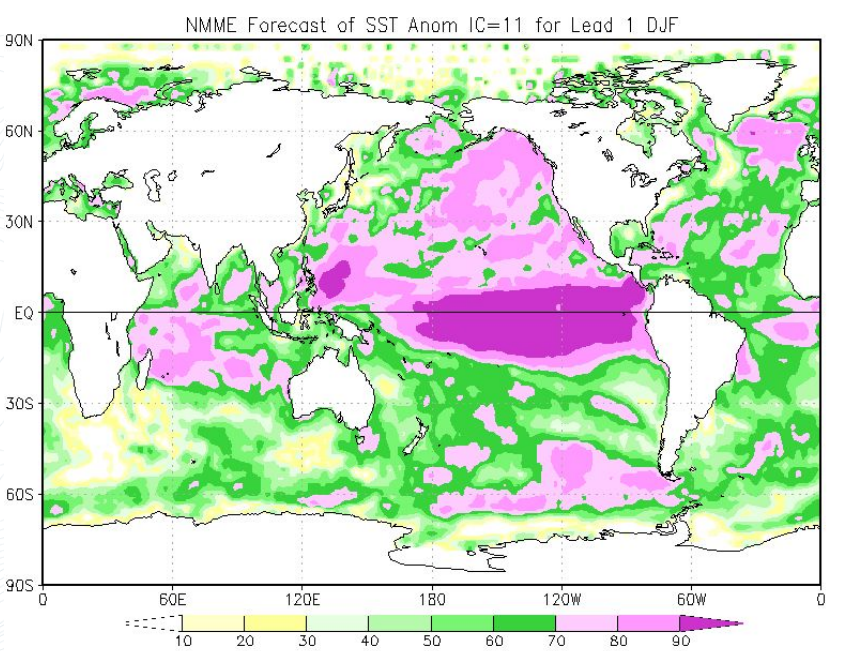
- Sea surface temperatures
- Sea ice forecast
- Temperature and precip relative to normal

December 2024-February 2025 **sea surface temperature** ➤ NMME

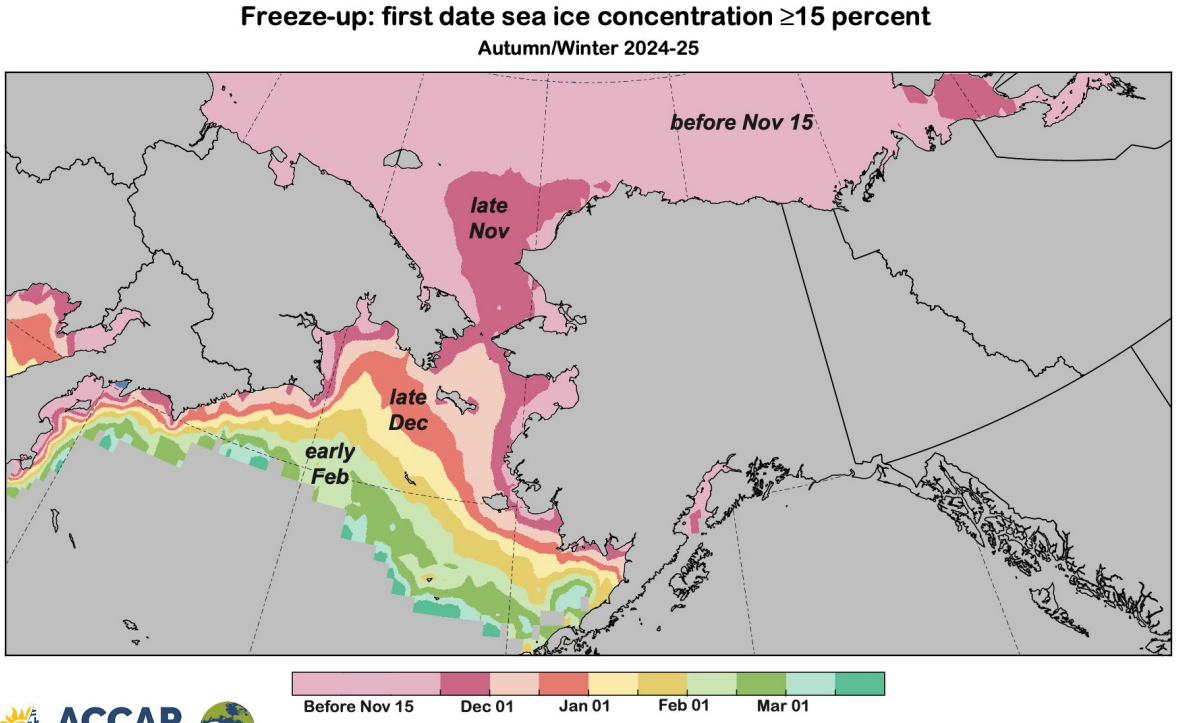
Forecast
departure from normal



Skill
of the forecast



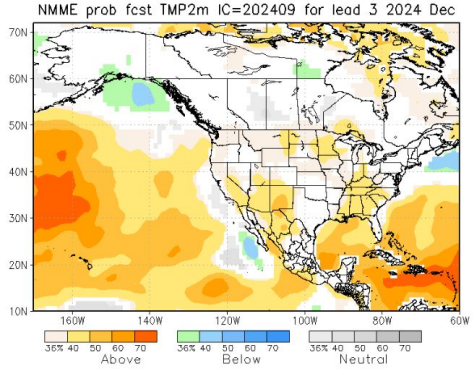
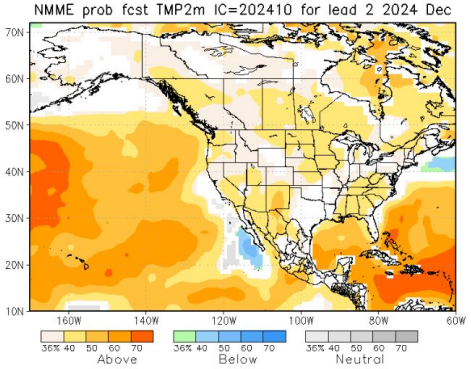
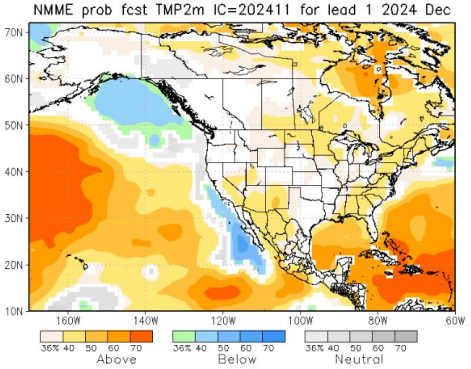
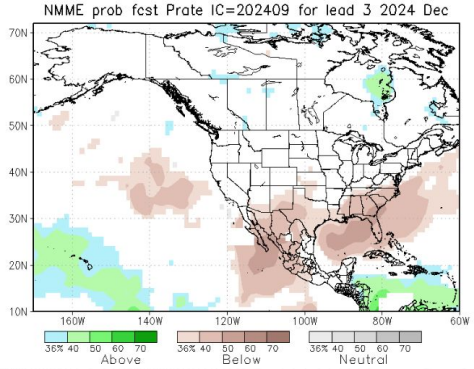
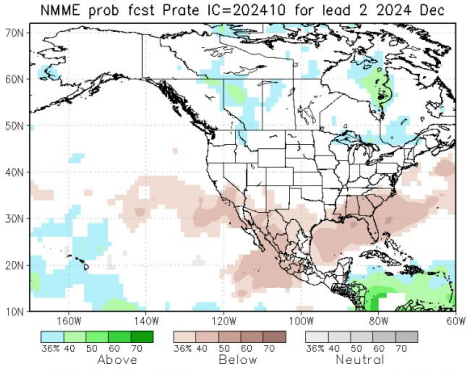
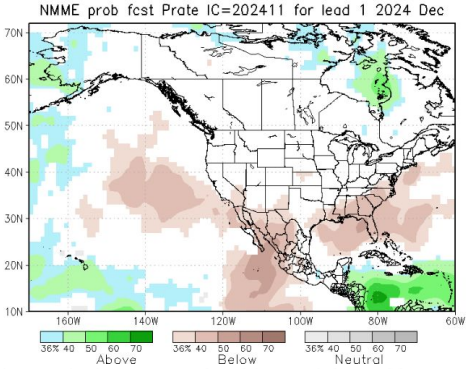
Experimental **sea ice forecast** ➤ CPC



Outlook is the 20-models average date of first occurrence of ice concentration 15 percent of higher

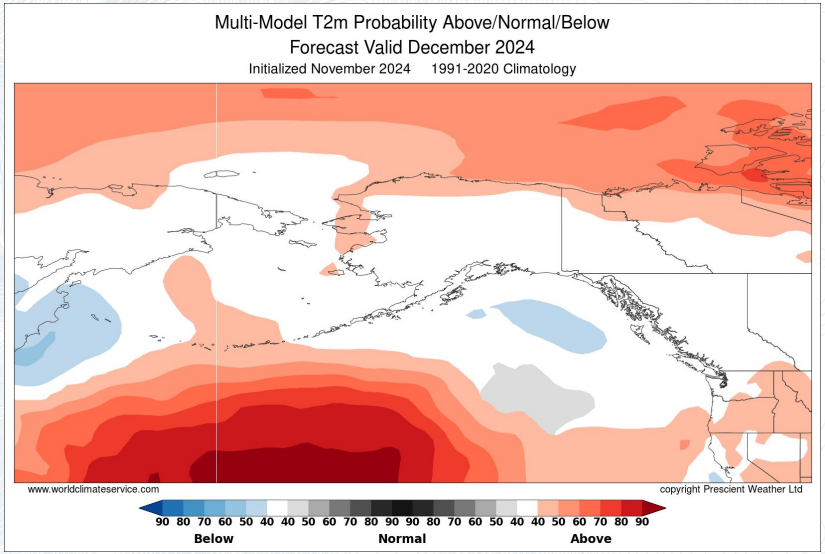
December 2024 calibrated **probability forecast** ➤ NMME

Forecast from →

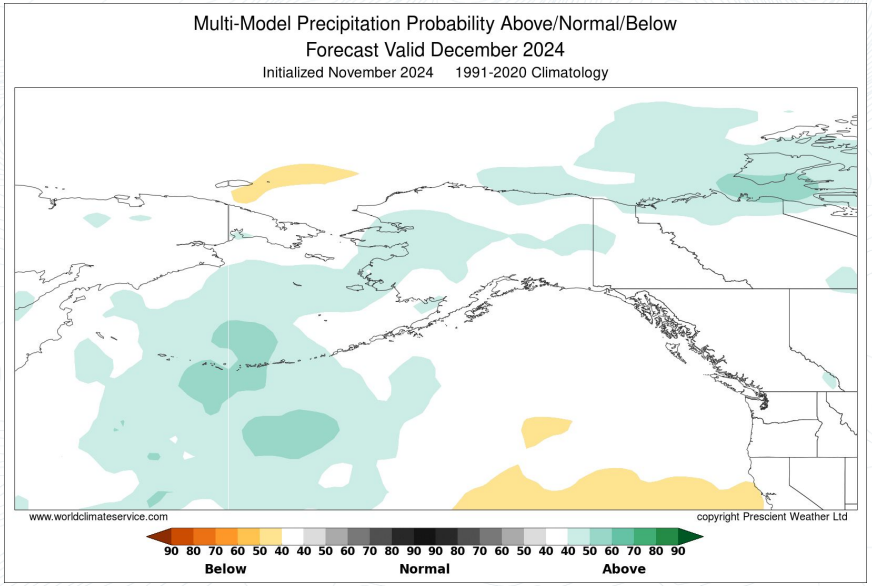
	September	October	November
Temperature			
Precipitation			

December 2024 outlooks ➤ **World Climate Service**

Temperature



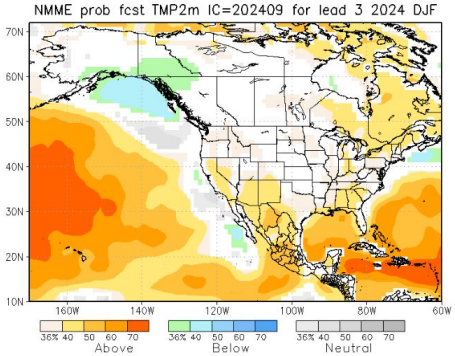
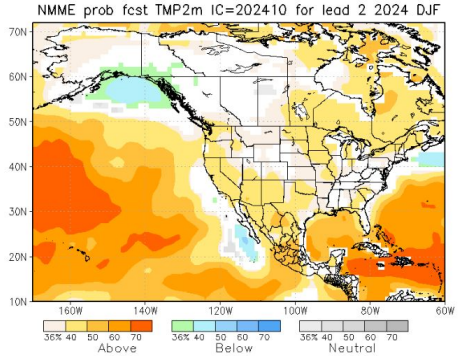
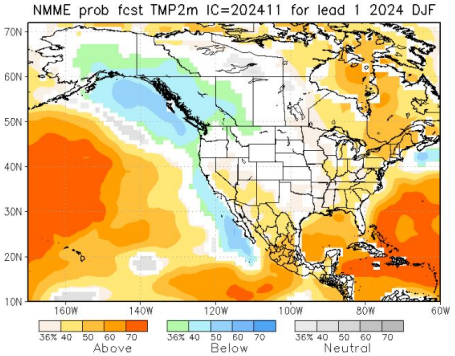
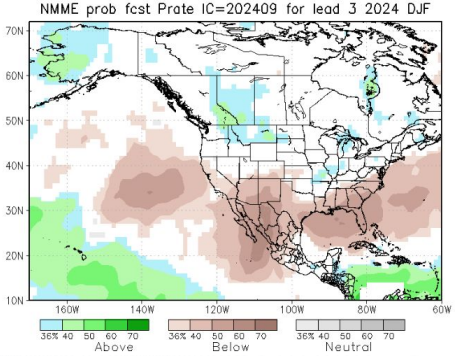
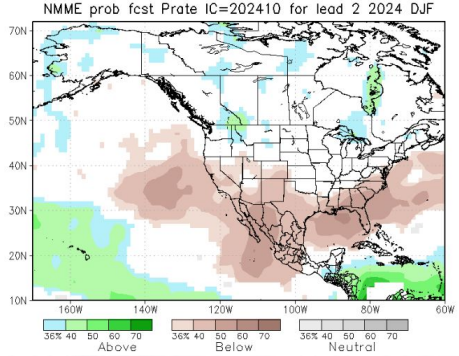
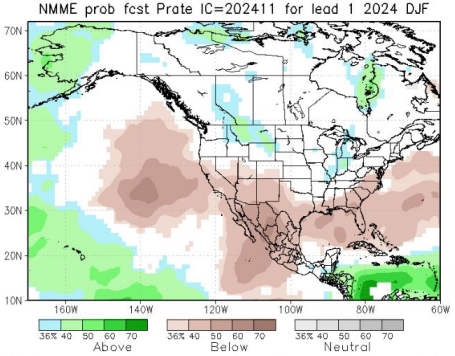
Precipitation



Bias Corrected, Skill Weighted CFS + ECMWF

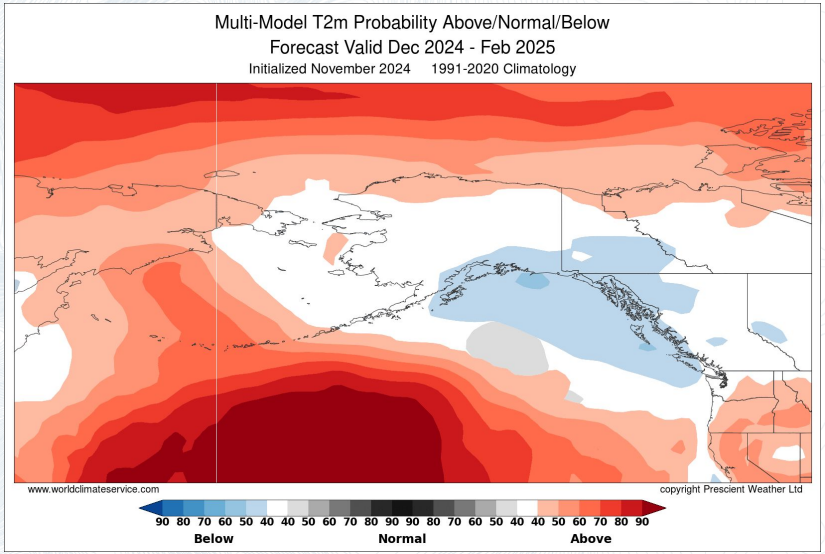
December 2024-February 2025 calibrated **probability forecast** ➤ NMME

Forecast from →

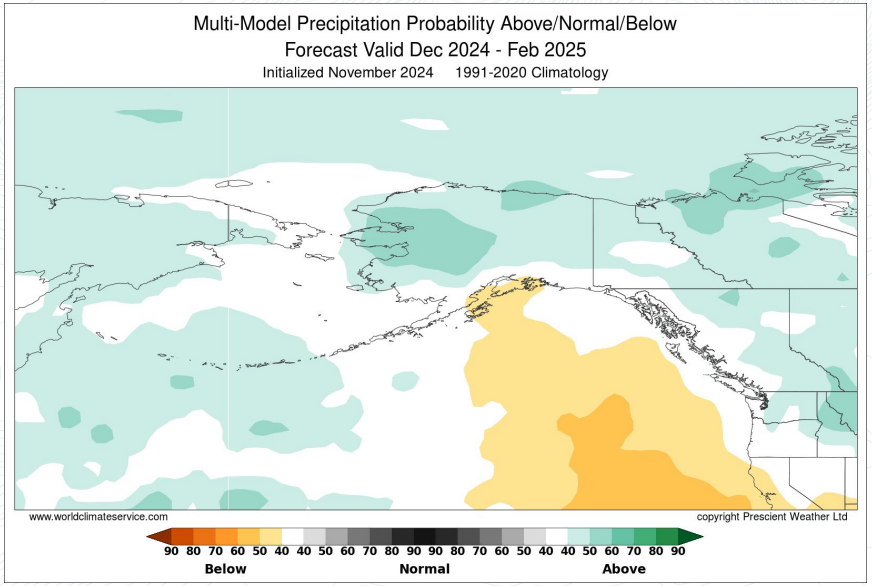
	September	October	November
Temperature			
Precipitation			

December 2024-February 2025 outlooks ➤ World Climate Service

Temperature

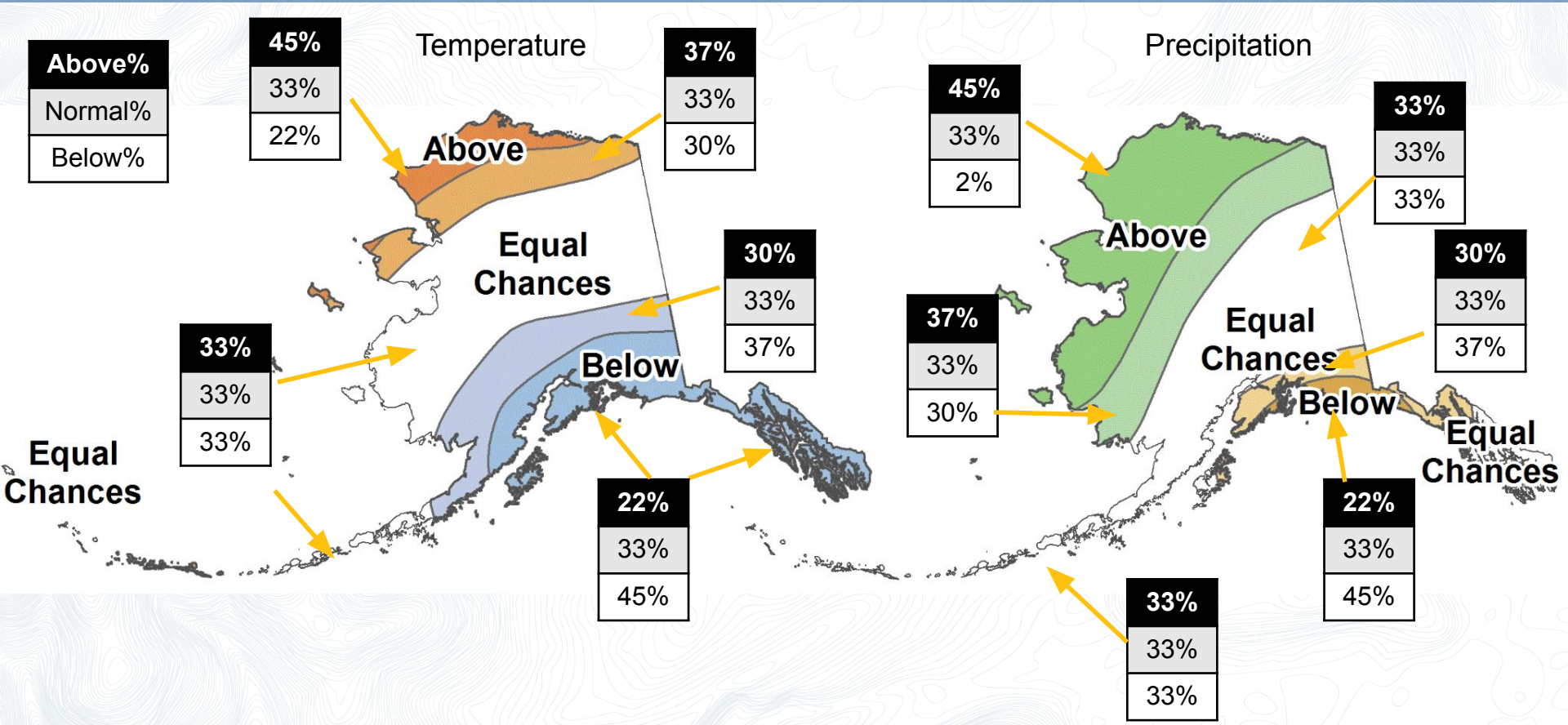


Precipitation



Bias Corrected, Skill Weighted CFS + ECMWF

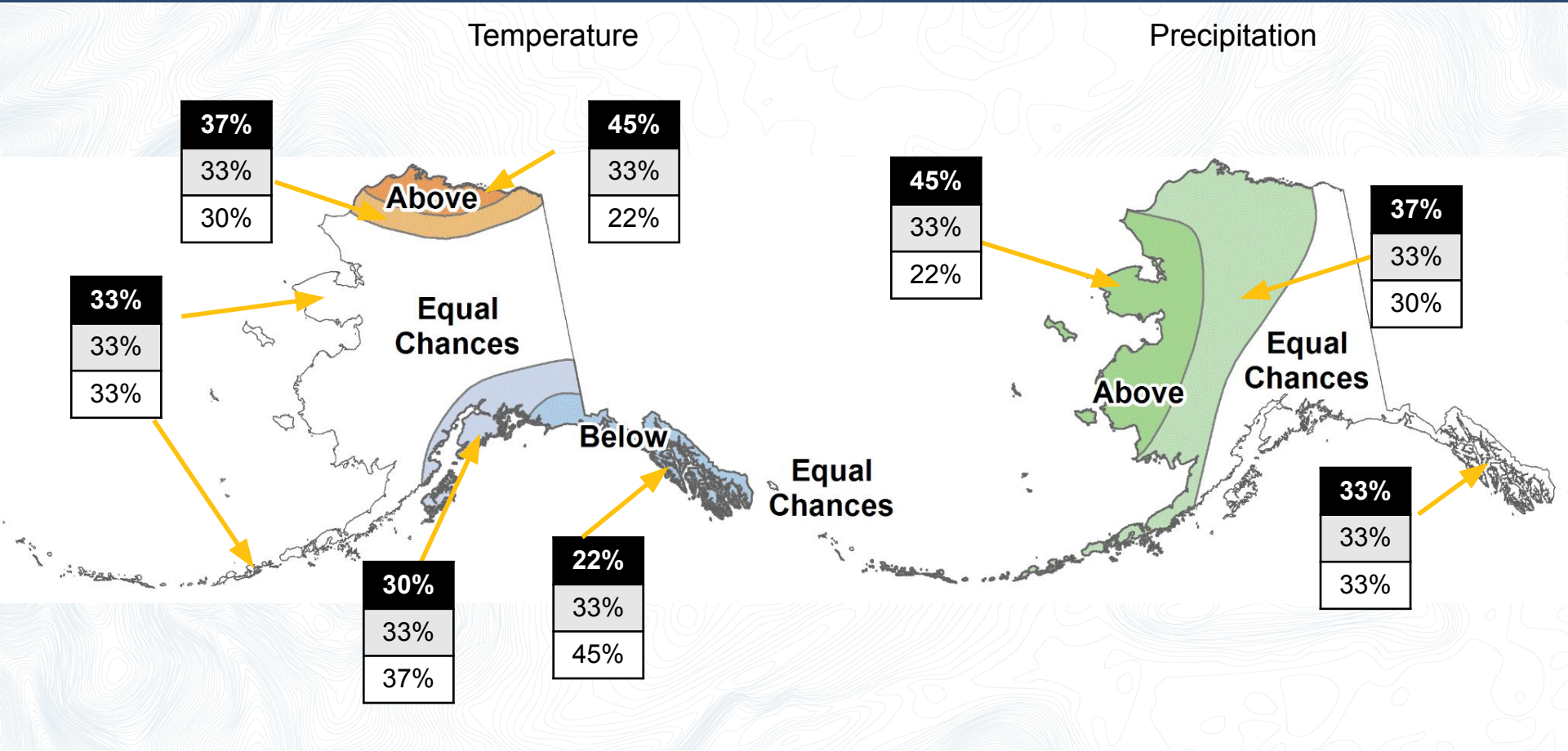
December 2024-February 2025 outlooks from **October**



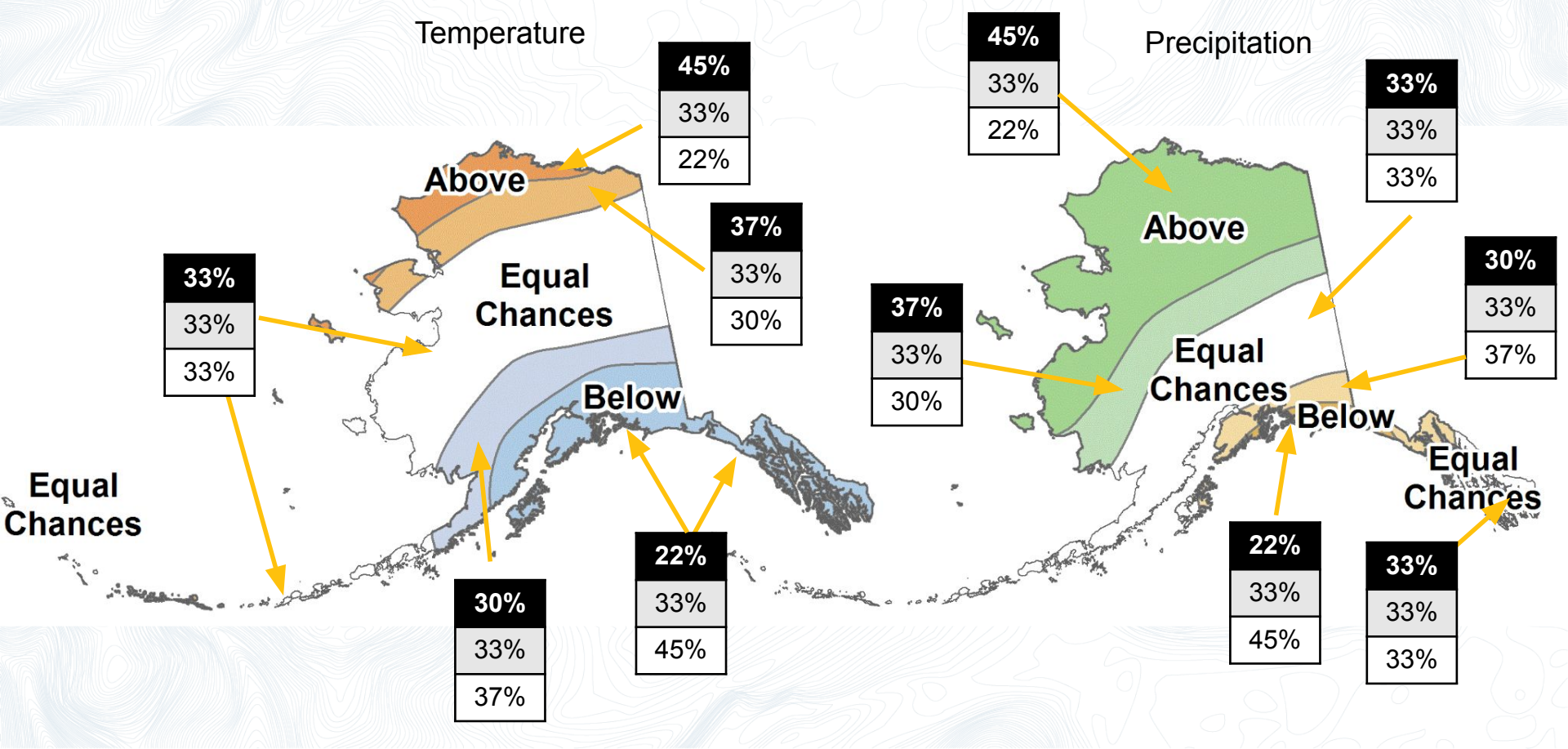
Future outlook

And the answer is...

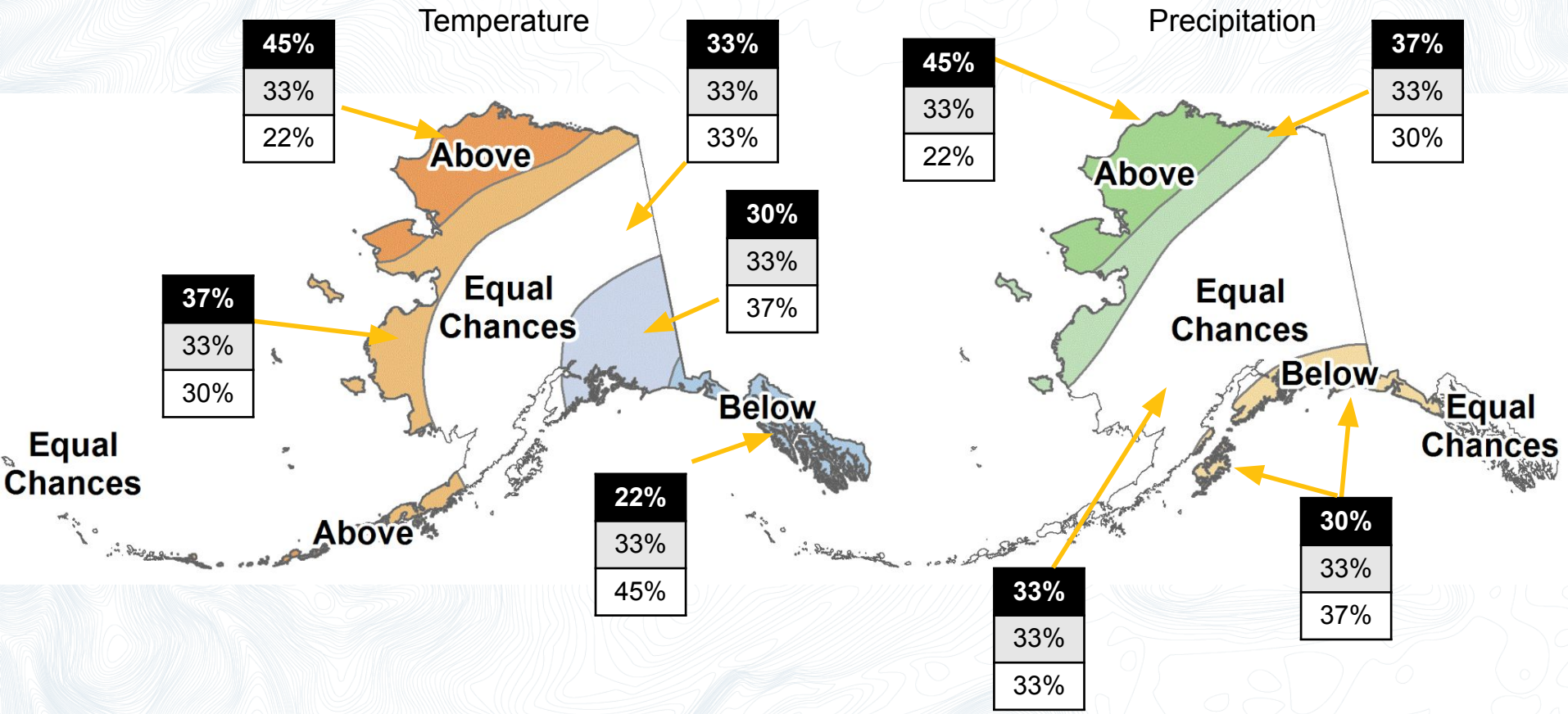
CPC **December** 2024 **outlooks**



CPC December 2024-February 2025 **outlooks**



Spring 2025 outlook



Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- December 18 ▸ *Supporting USCG and R/V Norseman II through Satellite Imagery*
- December 20 ▸ *NWS Alaska Climate Outlook Briefing*

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A NOAA CAP team

International Arctic Research Center

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