# Alaska climate outlook briefing May 2024

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

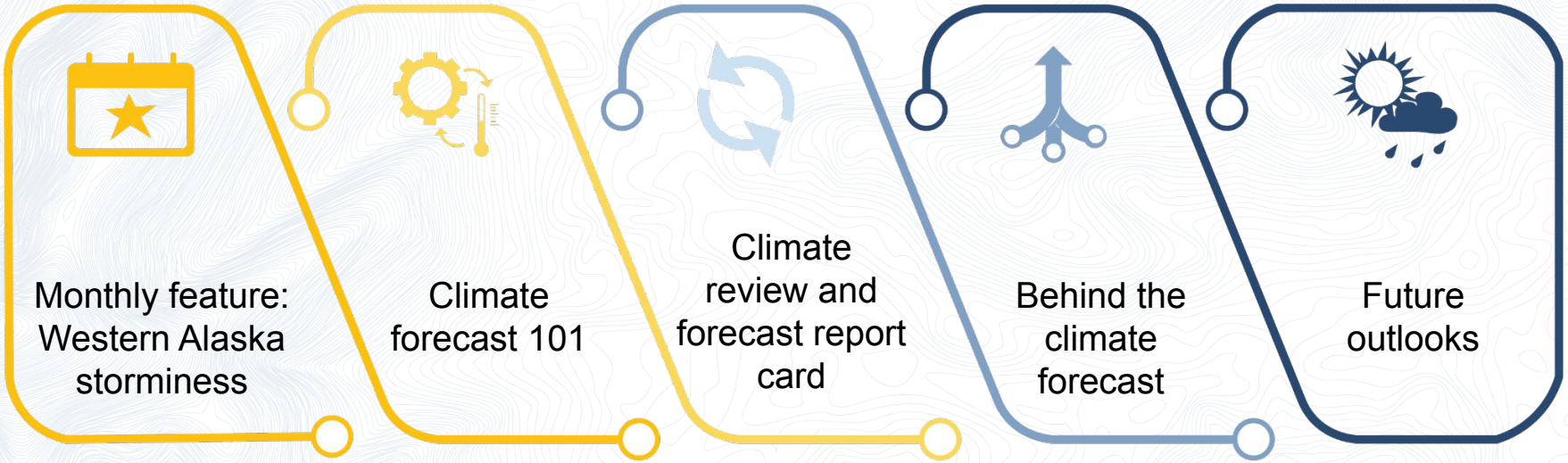
UAF
UNIVERSITY OF ALASKA FAIRBANKS

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

NATIONAL WEATHER SERVICE

World Climate Service

ACCAP


Monthly feature: Western Alaska storminess
Climate forecast 101
Climate review and forecast report card
Behind the climate forecast
Future outlooks

# Monthly feature ➢ **River Break-up Spring 2024**

Yukon and Tanana Rivers break-up mostly uneventful

- Tanana R. at Nenana April 27
- Yukon R. at Dawson, YT Apr 28 (4th earliest)
- Yukon R. at Eagle May 03

May 12 Yukon River at Tanana

Credit: Andrew Marks/Fresh Eyes on Ice

# Monthly feature ➤ **Lower Kusko Break-up Flooding**

May 9 flooding in Bethel neighborhood
Credit: MaryCait Dolan/KYUK

Flooding in

- Tuluksak, Kwethluk, Bethel, Oscarville, Napaskiak, Napakiak
- Bethel water level highest since 2005
- Ice jams and snowmelt

**Climate forecast 101**

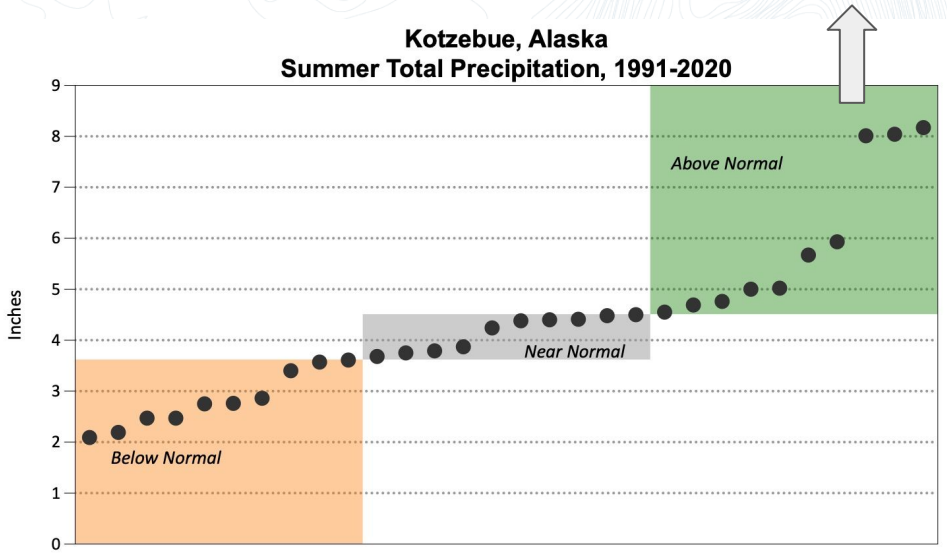
NOAA Center for Weather and Climate Prediction

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

# The basics

- Relation to 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:

https://www.flickr.com/photos/alaskaclimategraphics/albums/

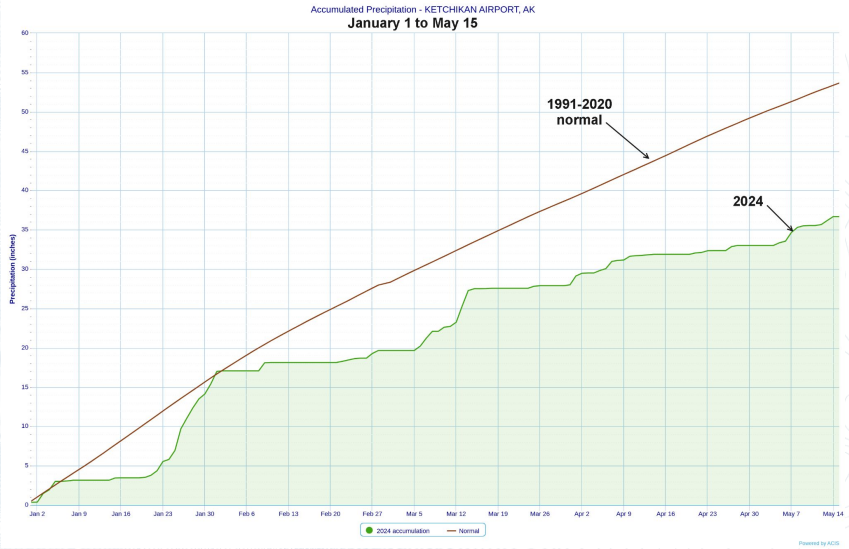


**Climate outlook report card**



# What's happened and how did previous climate outlooks perform?

# **Notable** April to May **Happenings**

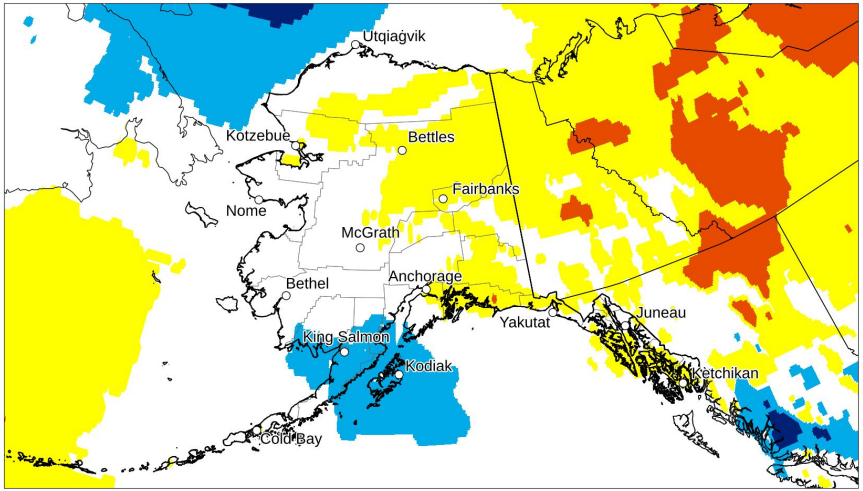



Ketchikan 2024 accumulated precipitation

- **Southern Southeast:** continued drier than normal
- **Western Alaska**: Coldest first half of May since 2013
- **Fairbanks**: Green-up May 4, ½-2 inches snow May 6, most snow after green-up since 1943
- **Anchorage**: very late season snow May 8th: widespread 1 to 5 inches

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

**Temperature Classification for Apr 2024**



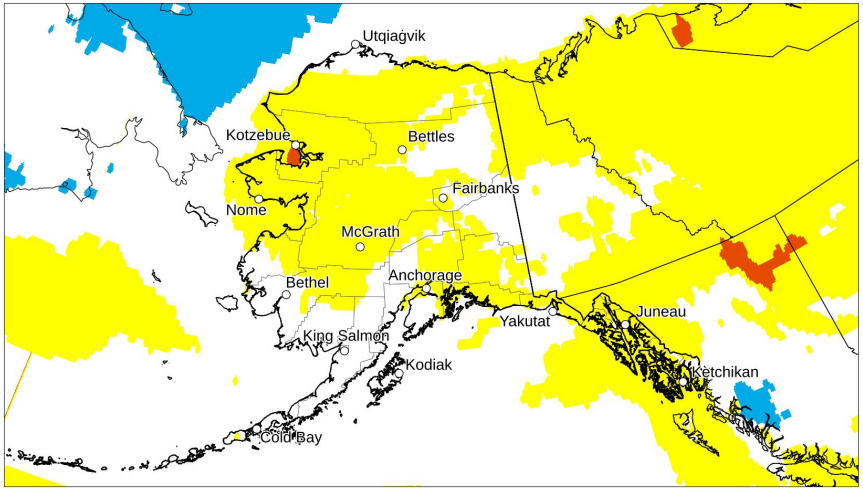

Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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

Compared to 1991-2020 Base Period

**Temperature Classification for Feb-Apr 2024**




Source: ERA5 Reanalysis

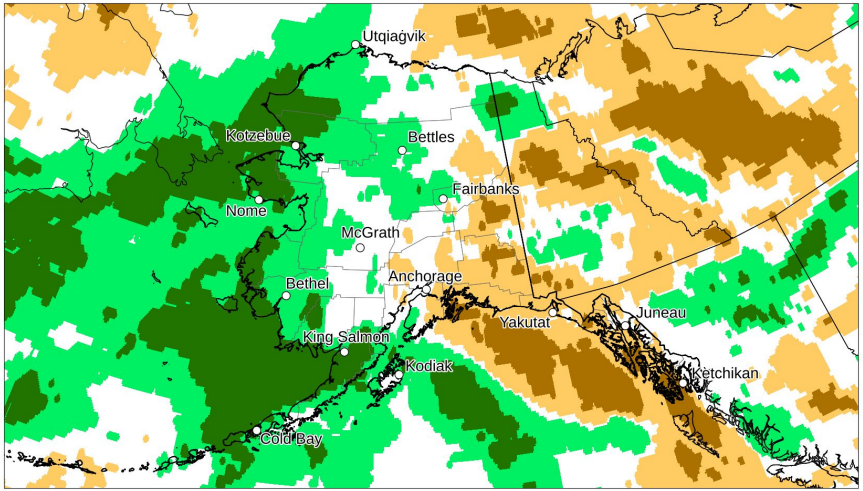
Map by: Brian Brettschneider

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

Compared to 1991-2020 Base Period

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

**Precipitation Classification for Apr 2024**



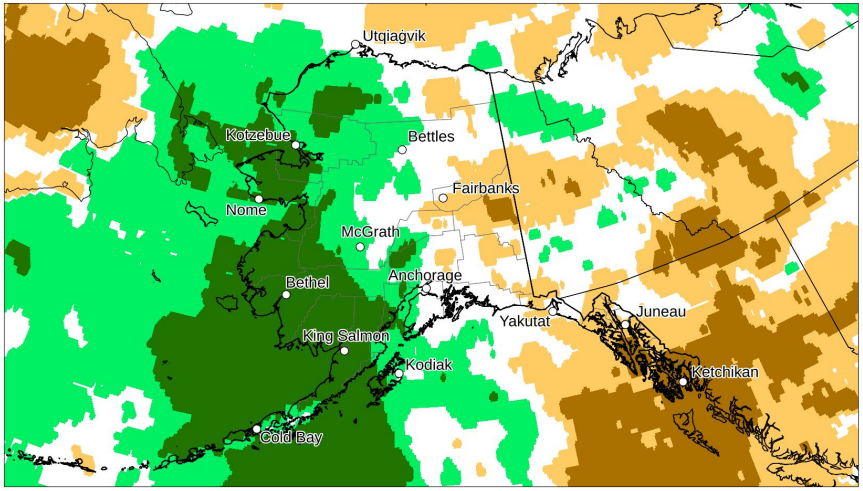

Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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

Compared to 1991-2020 Base Period

**Precipitation Classification for Feb-Apr 2024**



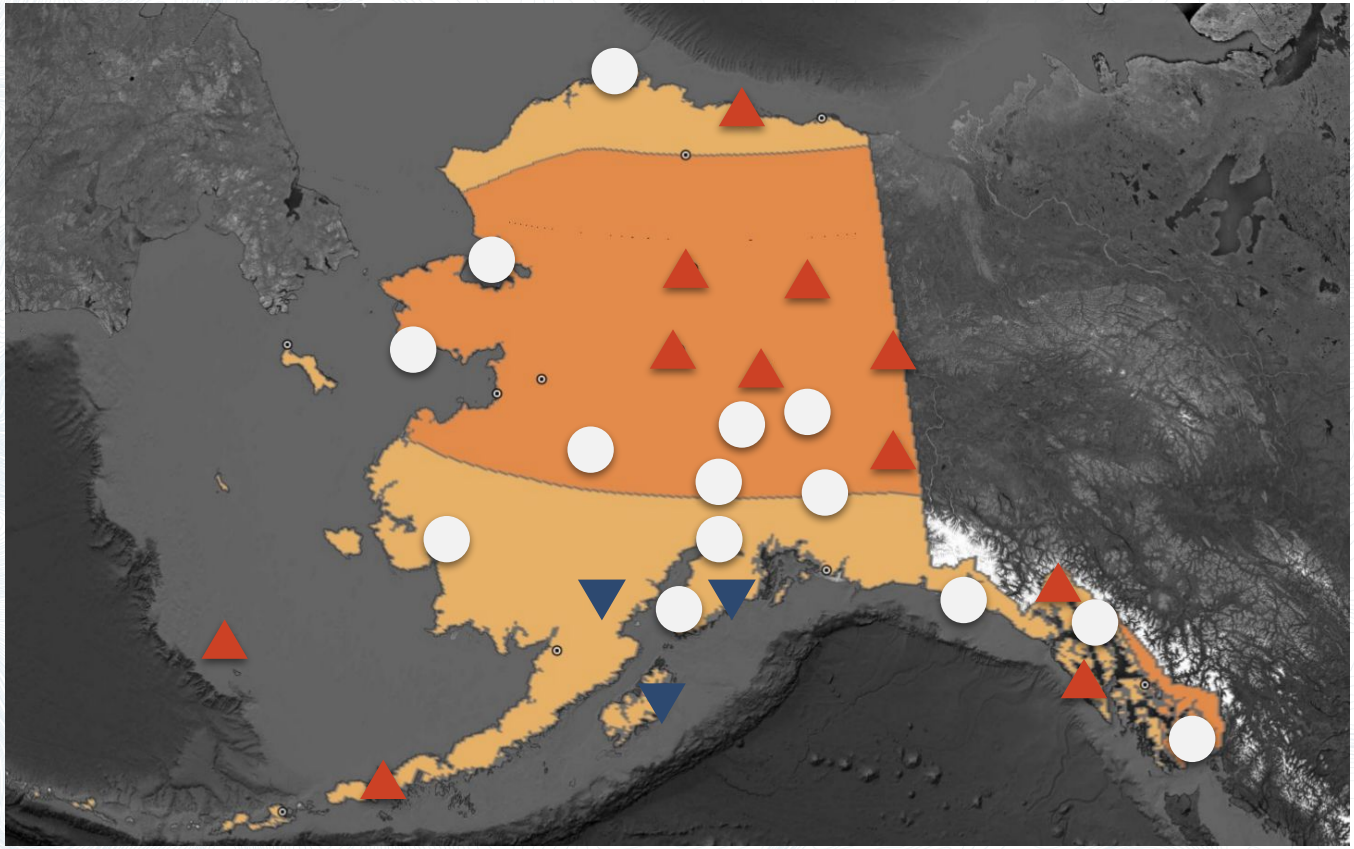

Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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

Compared to 1991-2020 Base Period

# **April 2024 temperature** ➤ CPC outlook and observed



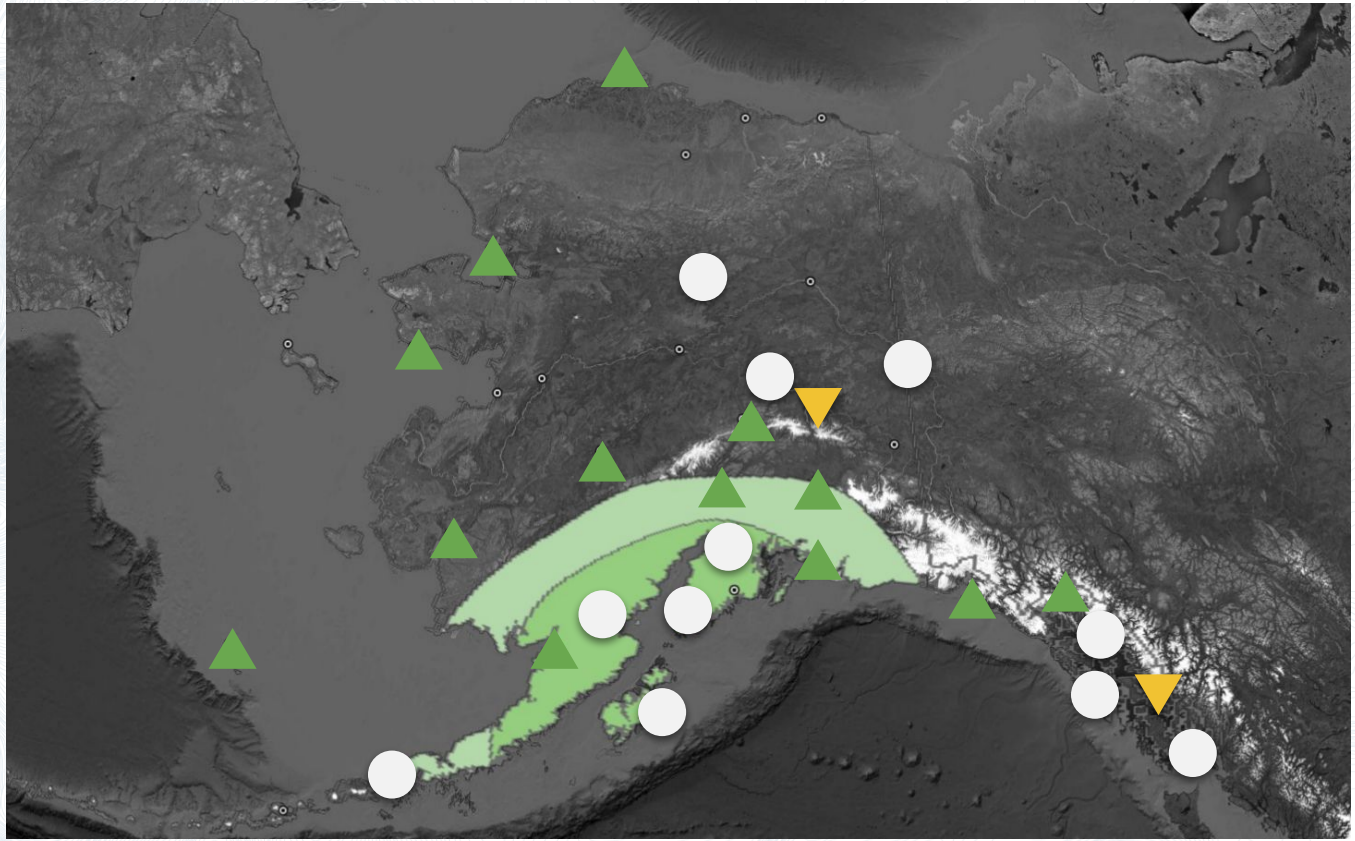
Non-EC skill score: +9

Percent correct: 39%

Mid-month outlook

- Above normal
- Near normal
- Below normal

# **April 2024 precipitation** ➤ CPC outlook and observed



Non-EC skill score: +25

Percent correct: 50%

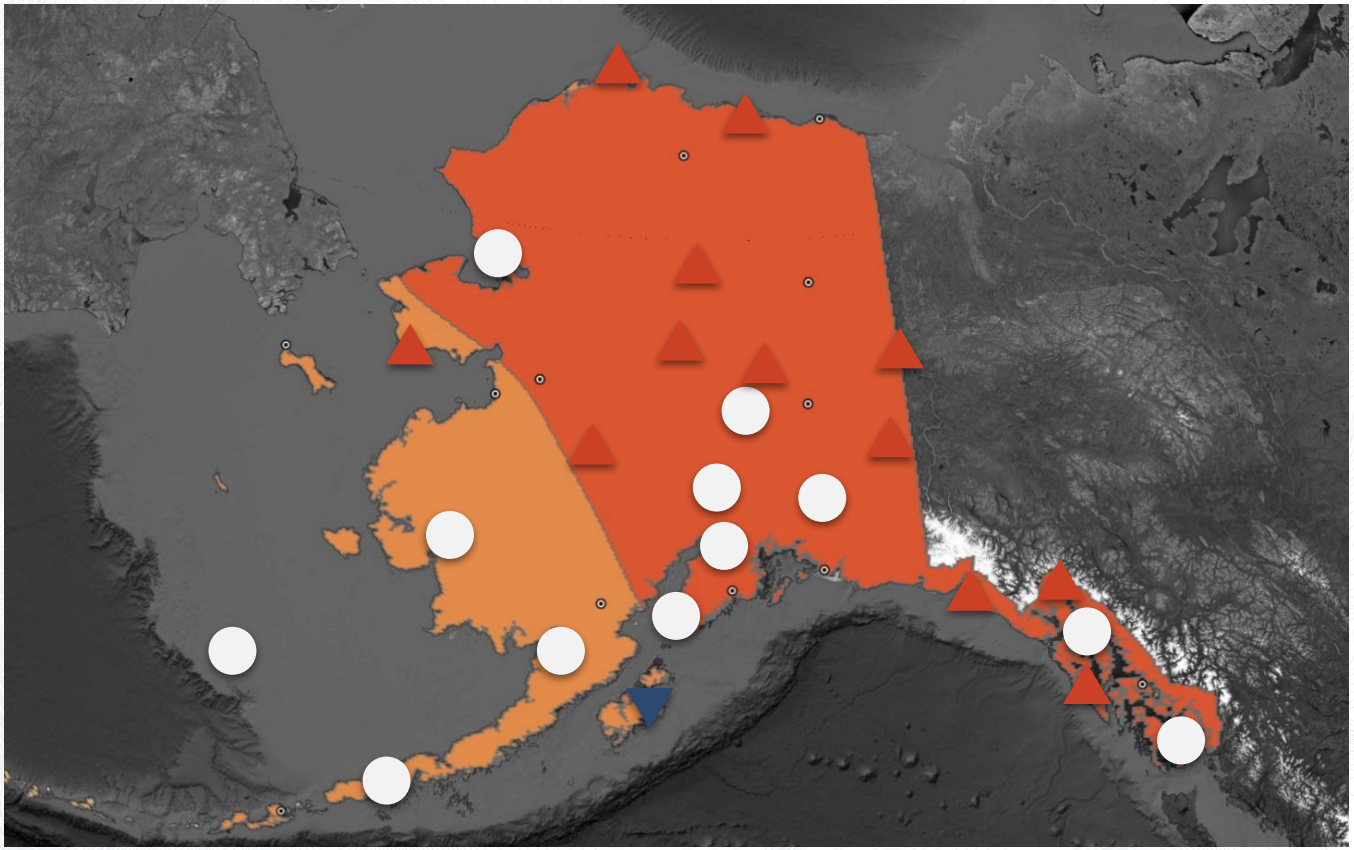
Mid-month outlook

Above normal

Near normal

Below normal

# **February-April 2024 temperature** ➤ CPC outlook & observed



Non-EC skill score: +28

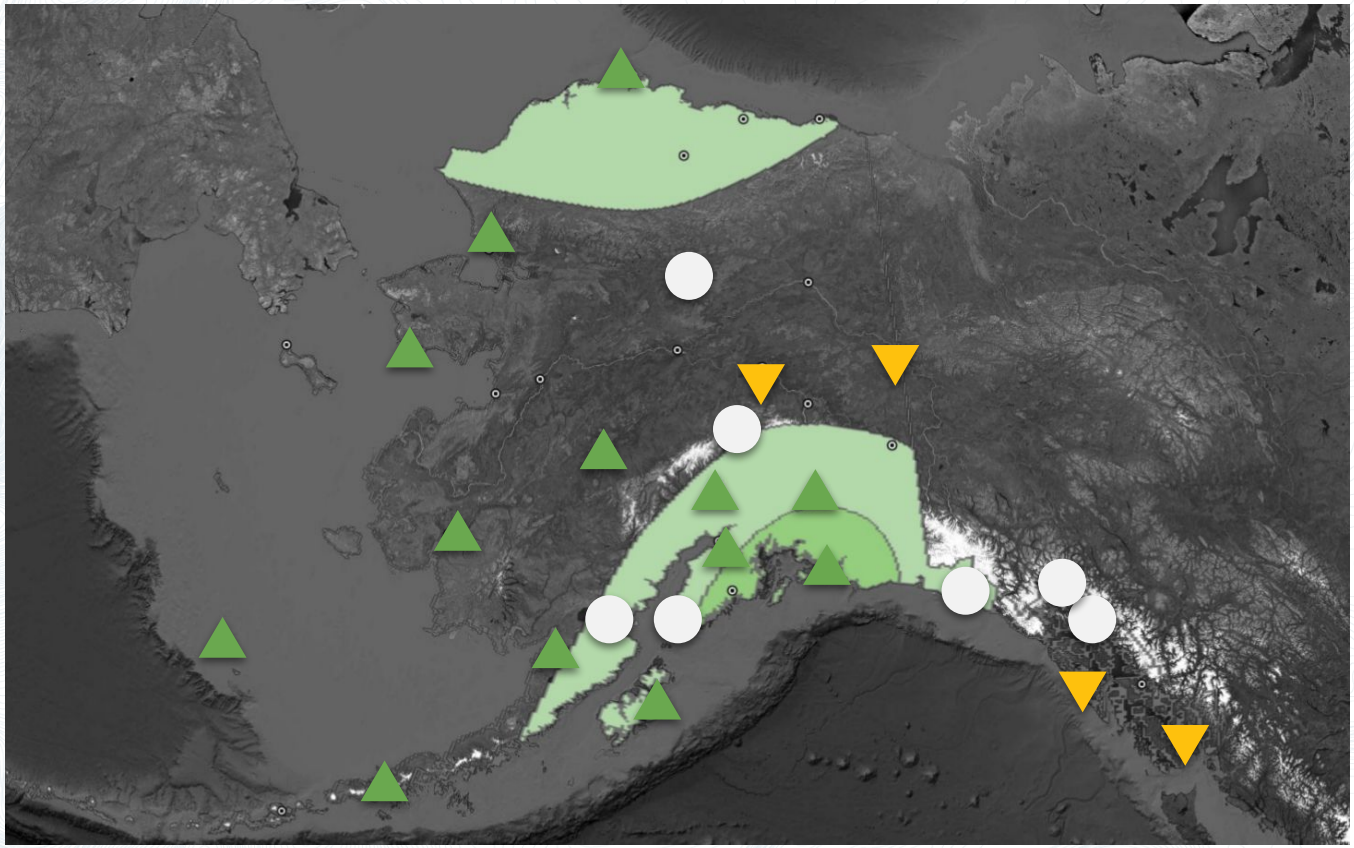
Percent correct: 52%

▲ Above normal

○ Near normal

▼ Below normal

# February-April 2024 precipitation ➤ CPC outlook & observed



Non-EC skill score: +18

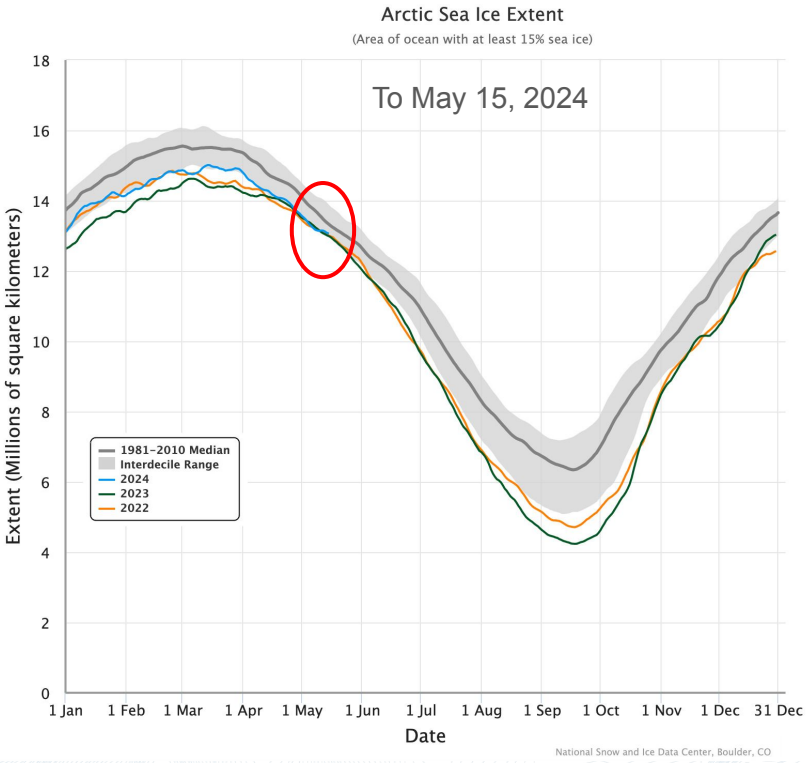
Percent correct: 45%

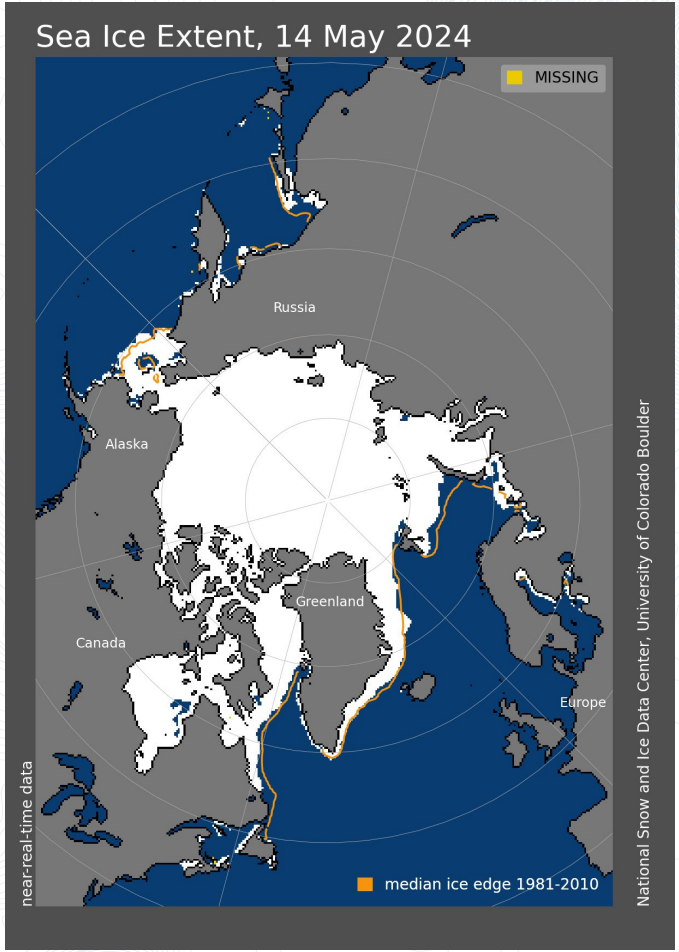
Above normal

Near normal

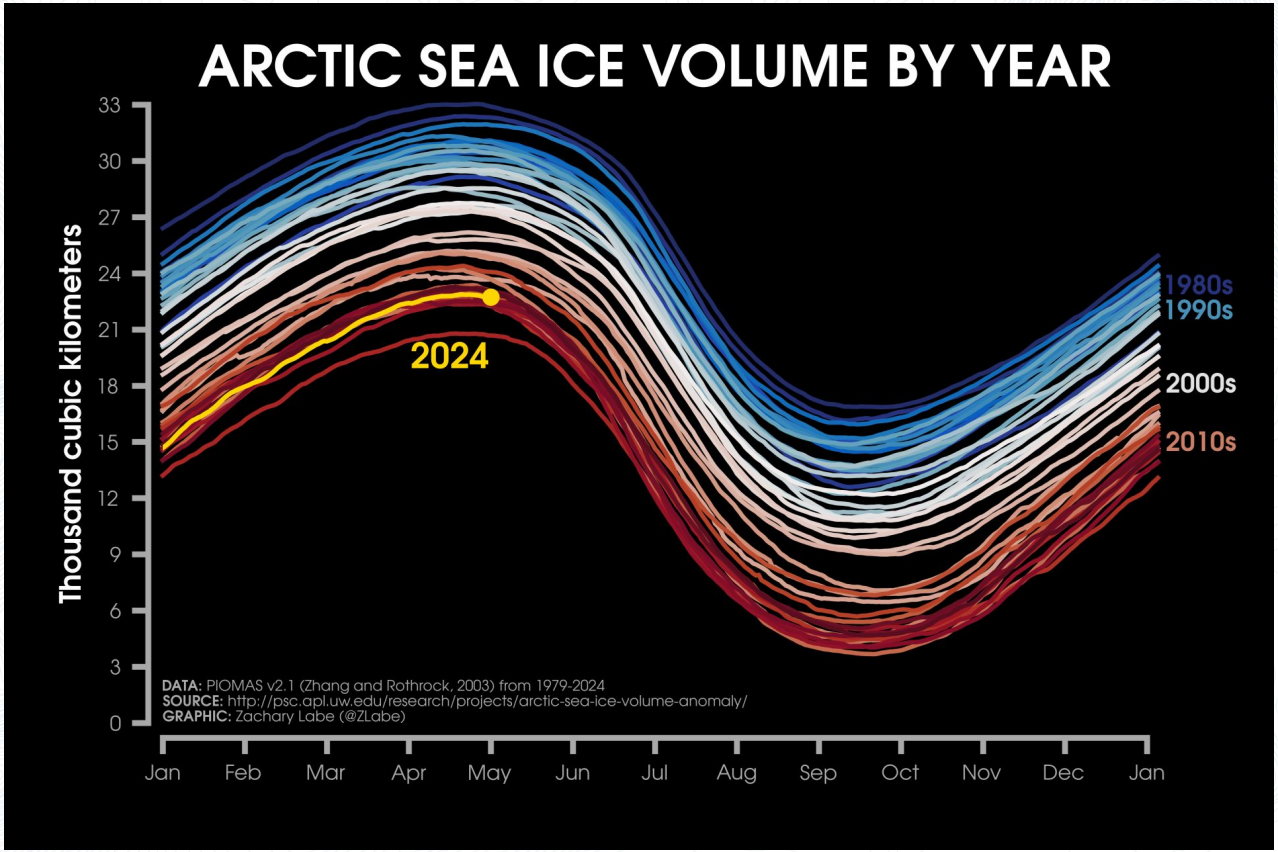
Below normal

# Arctic wide **sea ice**



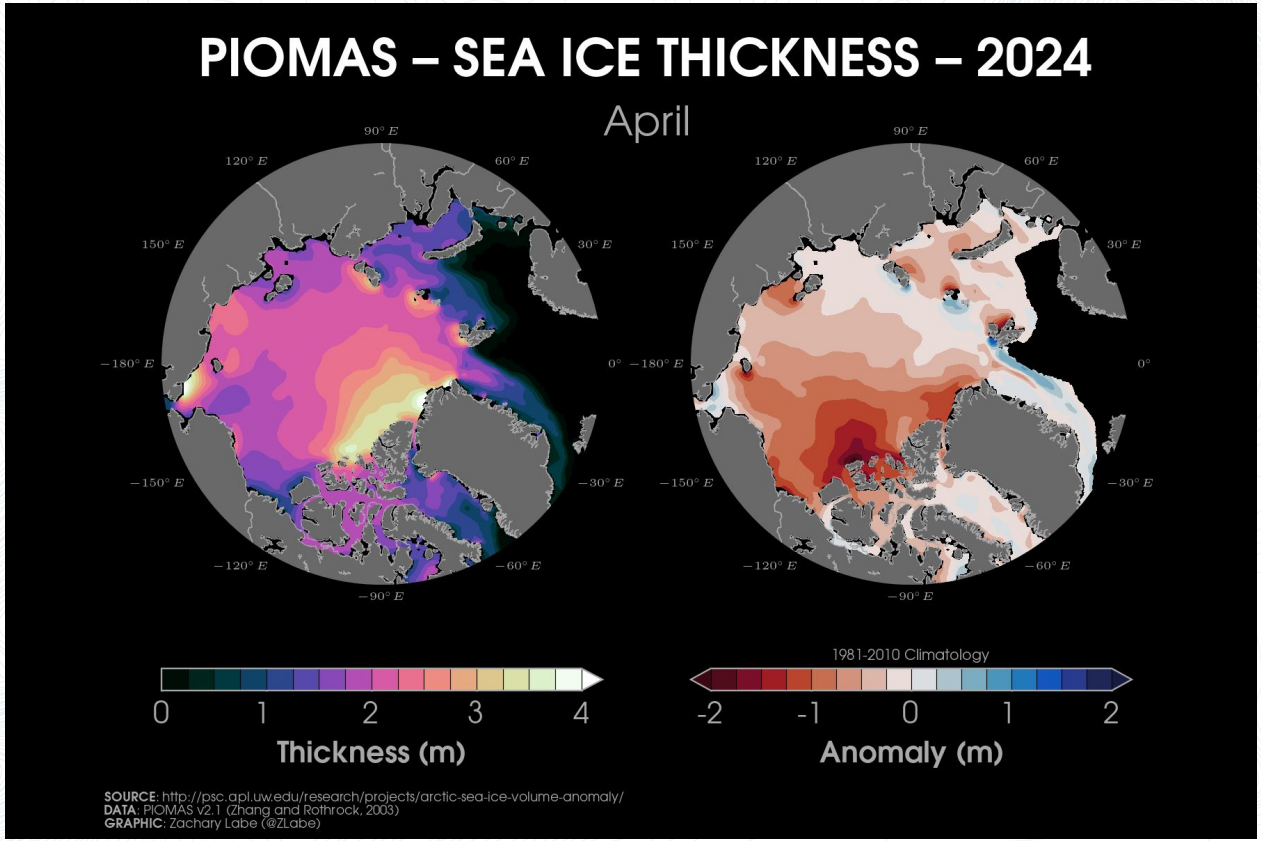



# Arctic sea ice **volume**




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

# Arctic sea ice **thickness**

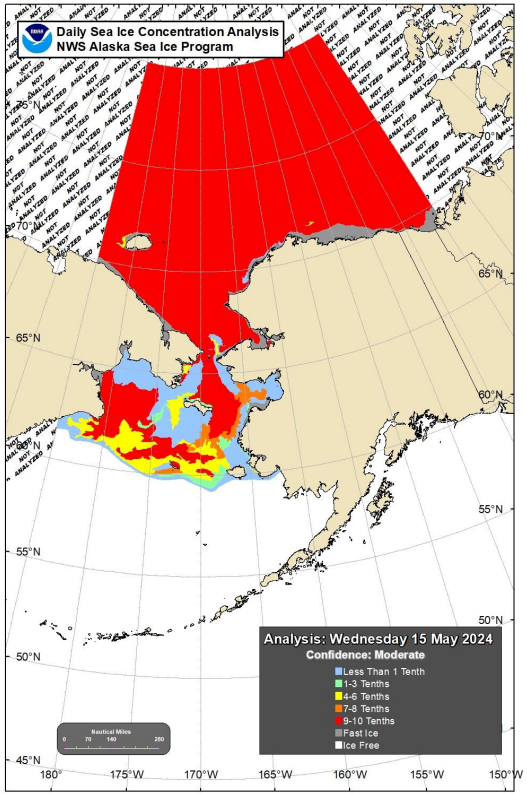



**Sources:**
Data from U. Wa./PIOMAS data
Graphics by Z. Labe, Princeton U.

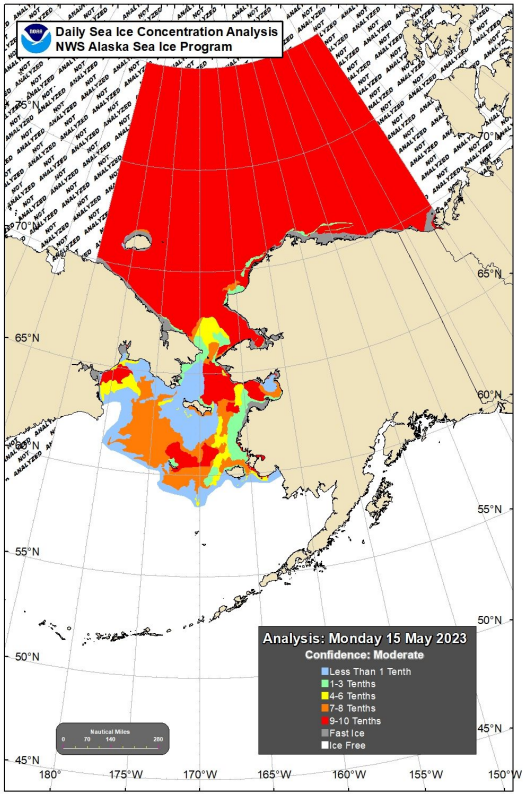
# **Mid-May** sea ice comparison

Source: National Weather Service Alaska Region Sea Ice Program

May 15, 2024

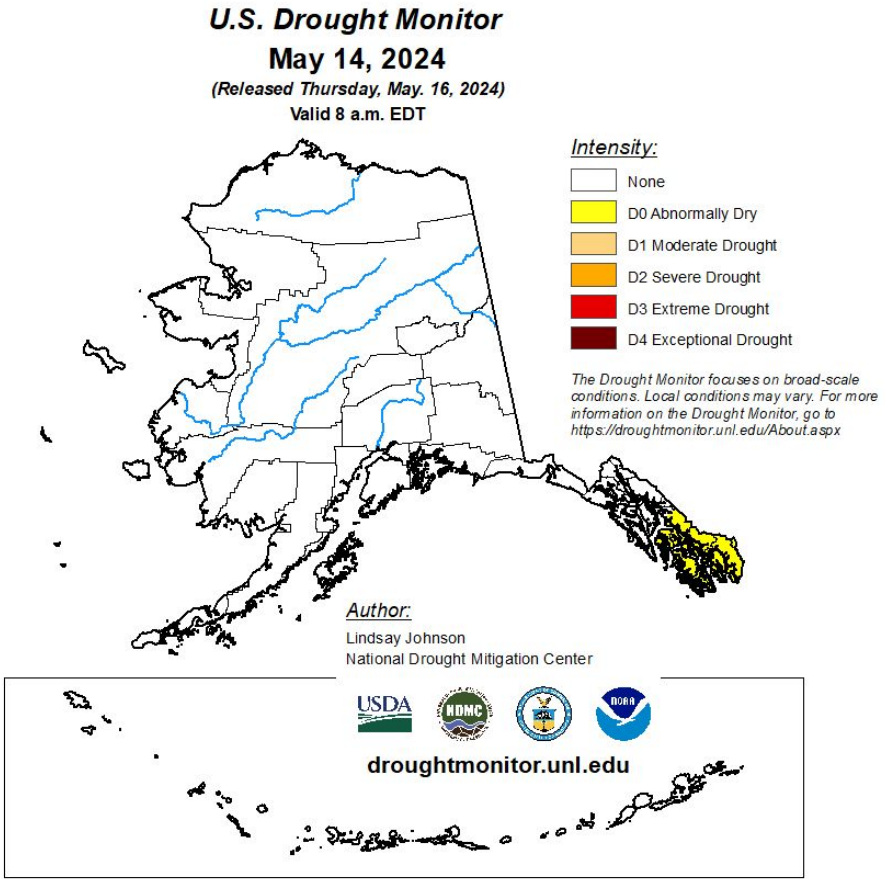



May 15, 2023



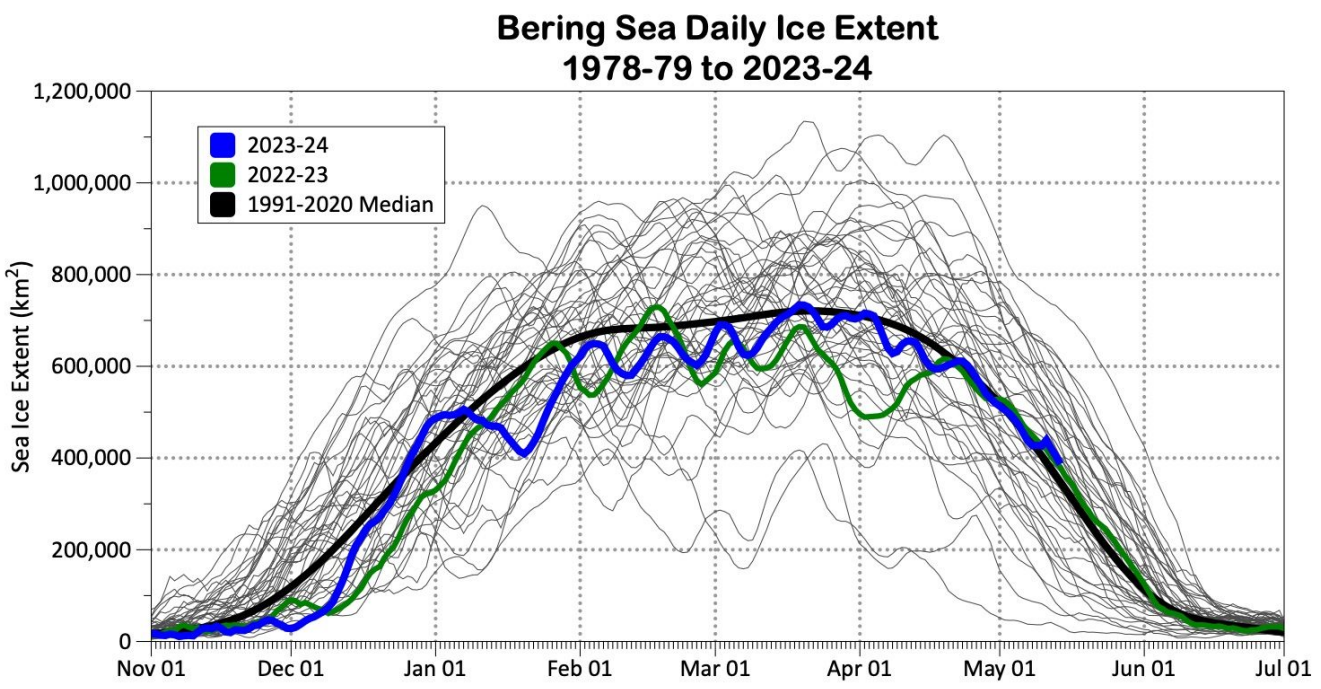
# Drought Analysis

Source:
US Drought Monitor

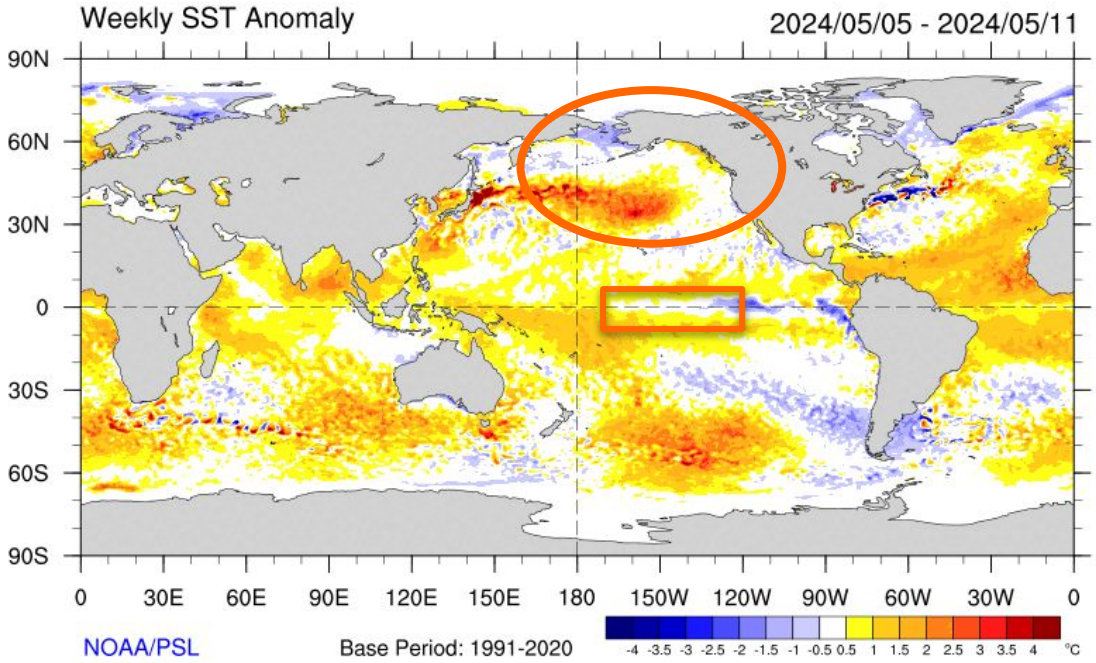


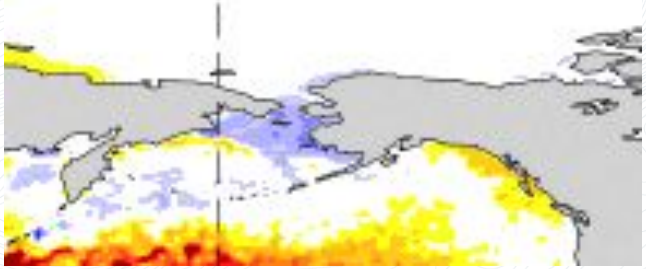
# Sea ice extent **through the season**

Sources:
Data NSIDC Sea Ice Index, Version 3. Through April 17, 2024.



# **Global sea surface temperature** departure from normal



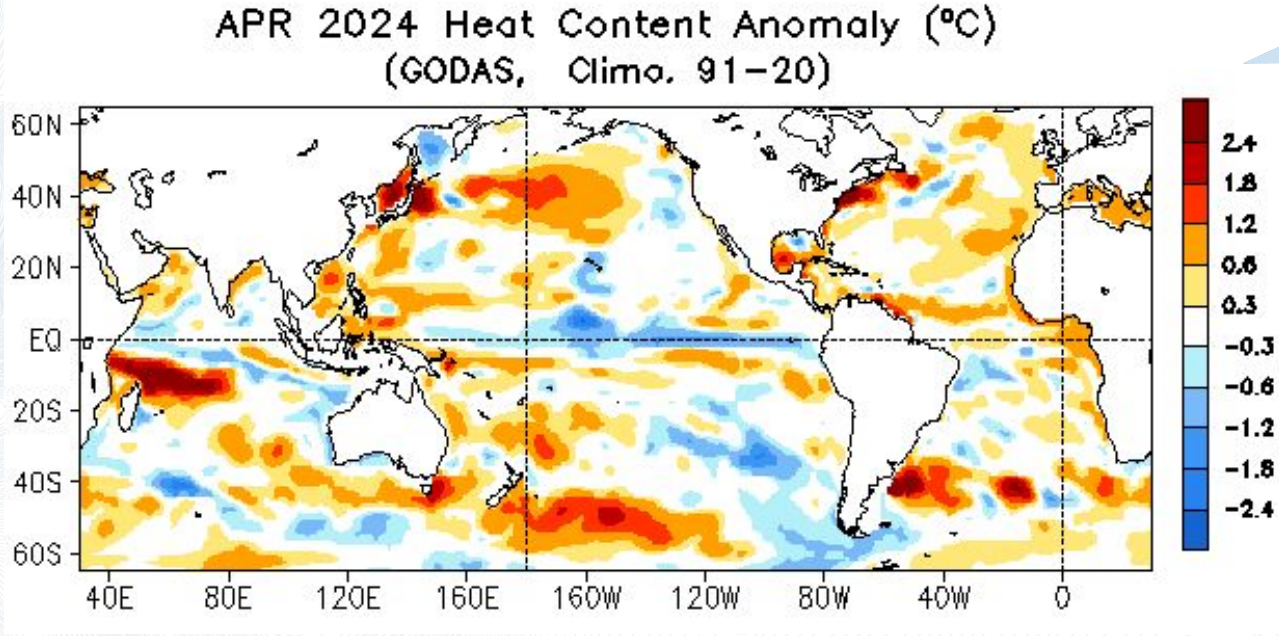



ONI for Feb-Apr: +1.1

PDO for **Mar** 2024: -0.41

Sources: ONI from CPC
PDO Index from JMA

# Upper **ocean heat** departure from average




Upper 300 meters of the ocean

Little change in Gulf of Alaska

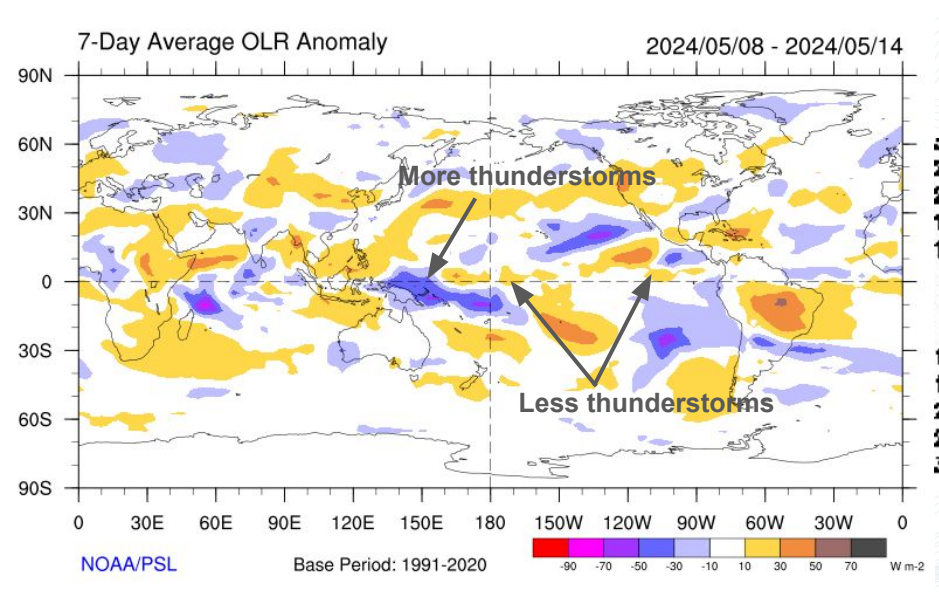
Sources:
CPC

# **Tropical Pacific** atmosphere

Feb-Apr Oceanic Niño Index: +1.1

## Deep tropical convection

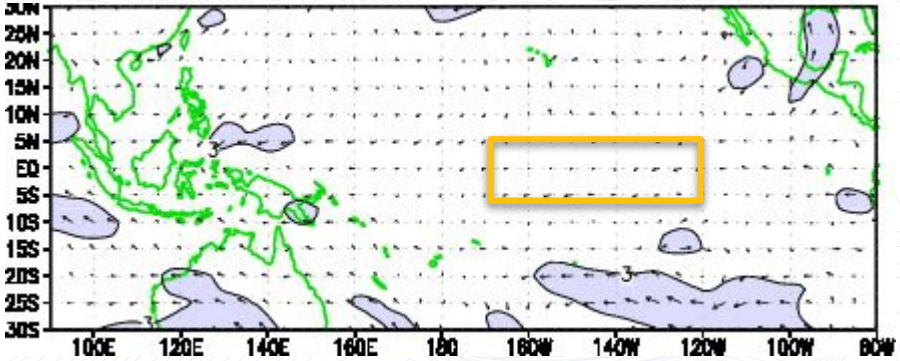
Via “outgoing longwave radiation”



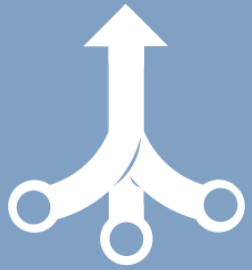

## Trade winds near average

Niño Region 3.4

850 mb wind anomalies
April 14-May 13, 2024



## 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

**April 2024**

Strong El Niño reached early autumn

5th highest since 1950 by ONI

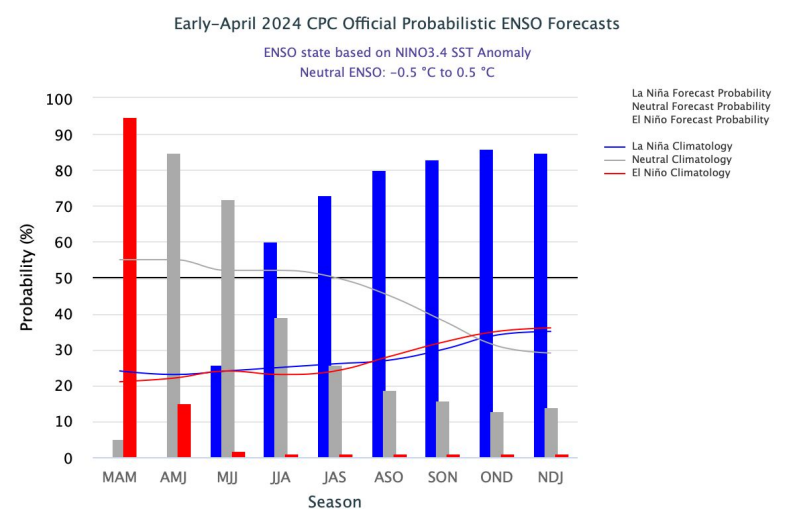
**May 2024**

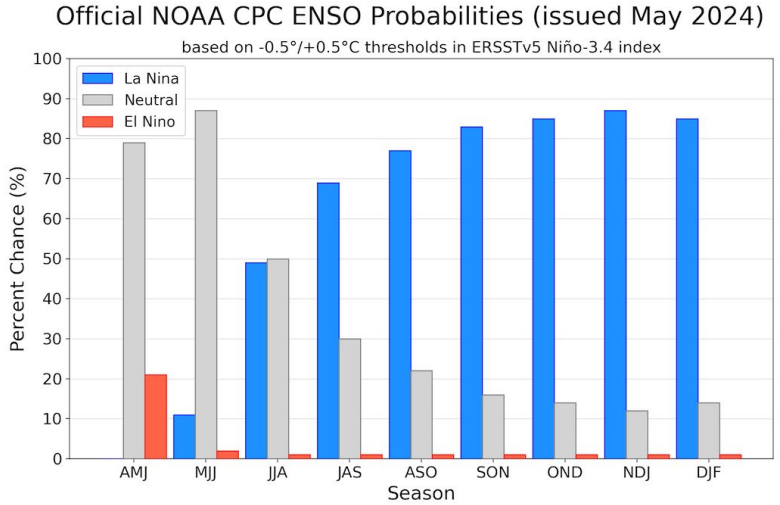
El Niño weakening rapidly

Mar-May very likely last season of El Niño

**ENSO Alert System Status:**

**El Niño Advisory & La Niña Watch**

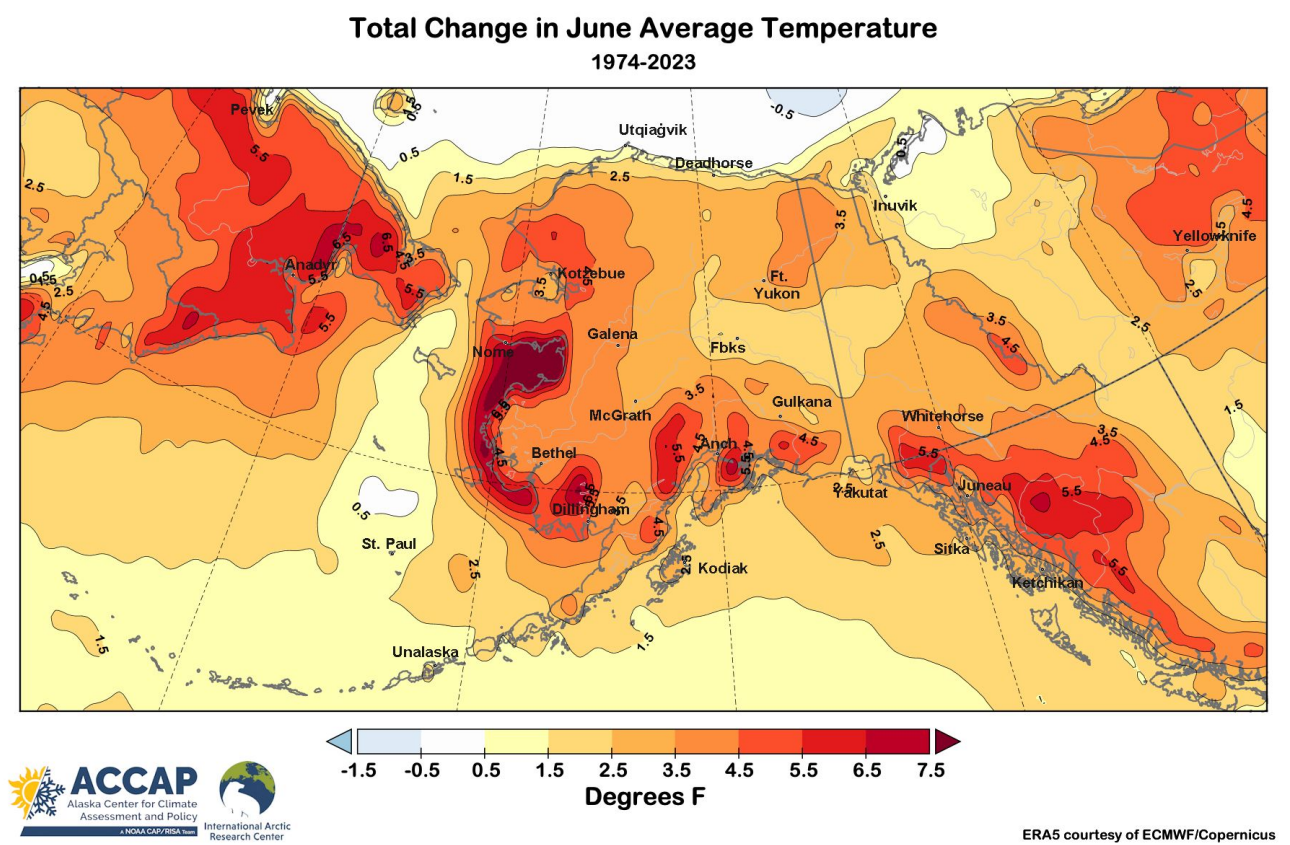


**Statistical guidance** ➤ using the past to predict the future

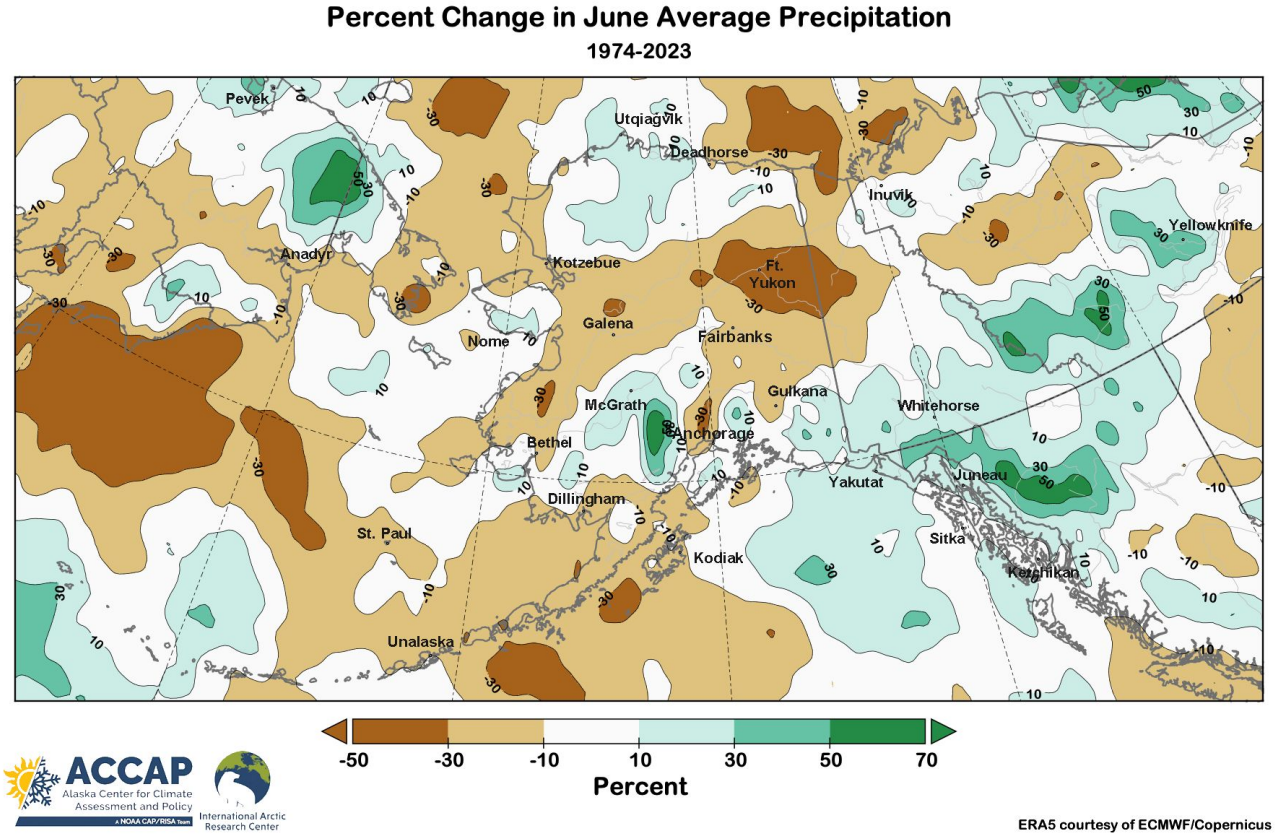
- Long term trends
- Optimum climate normals: Alaska trends the past 15 years
  - Update to new normals means OCN less informative next few years

# **June** half century trends ➤ **Temperature**




Trend over 50 years

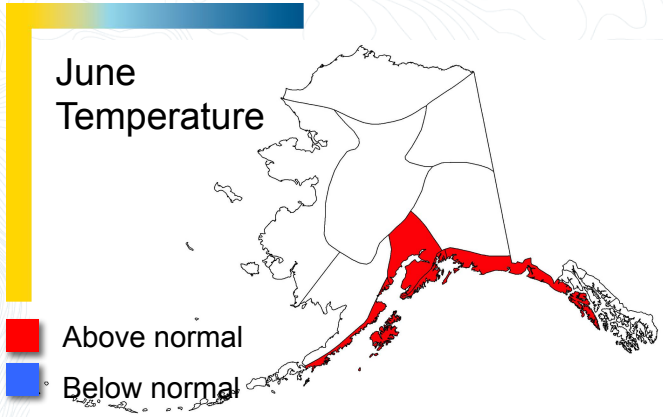
# **June** half century trends ➤ **Precipitation**

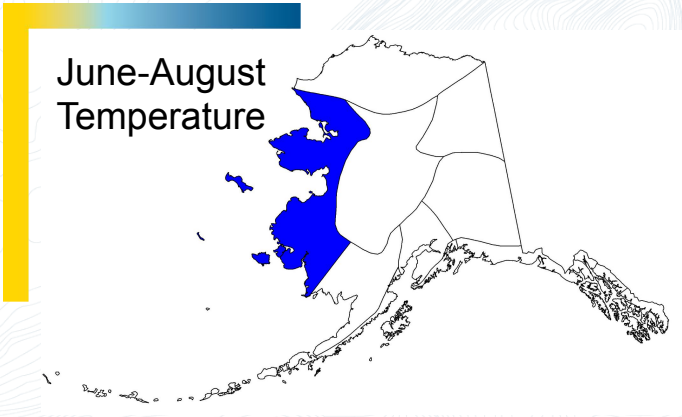


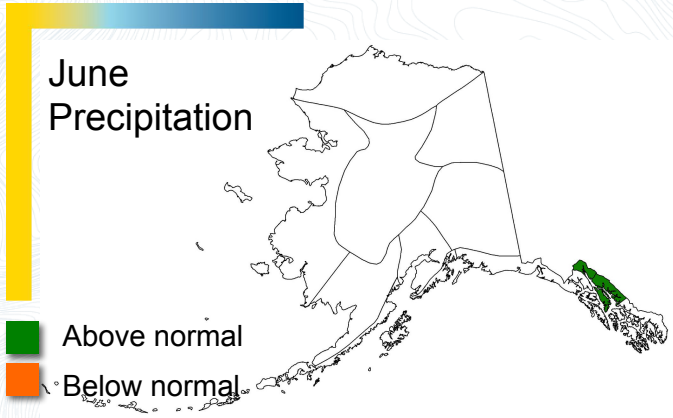

Trend over 50 years

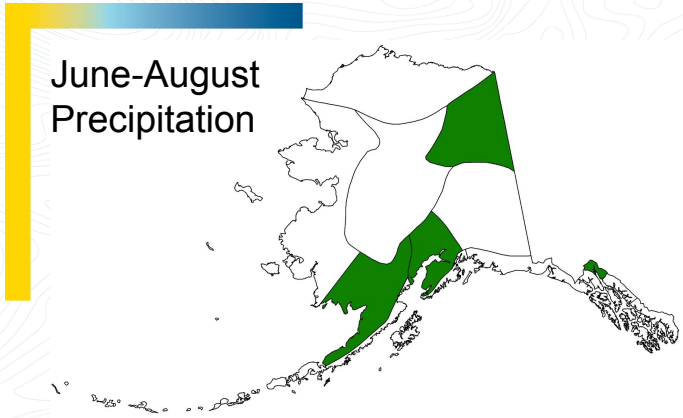
# 2009 to 2023 **trends**

Past 15 years compared to 1991-2020



# Dynamic model forecasts

**Current suite of Dynamic Climate Models**

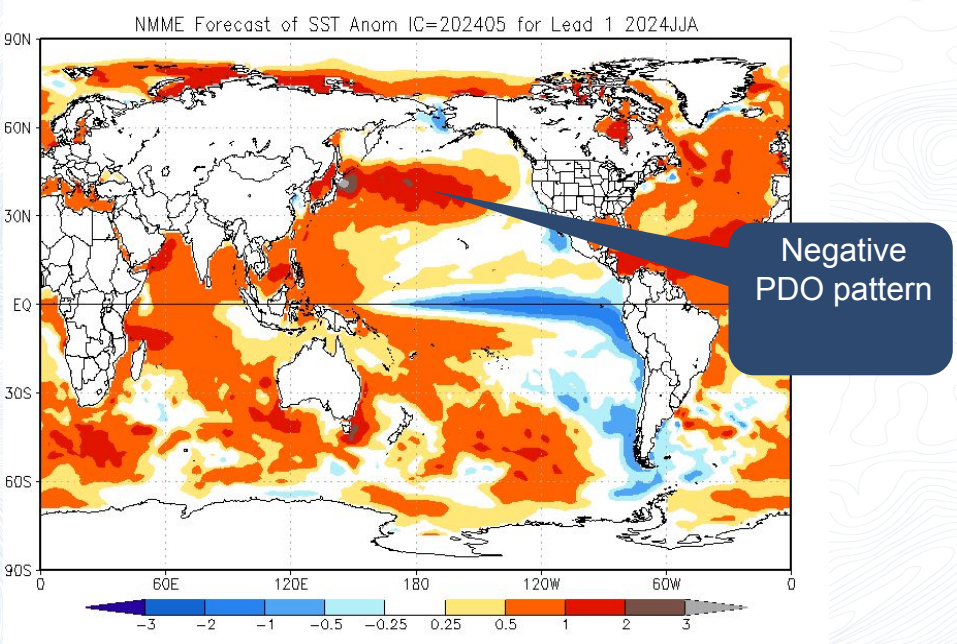
- CPC Experimental Sea Ice Ensemble
- World Climate Service Multi-Model Ensemble
- North American Multi-Model Ensemble (NMME)

**What's being forecasted**

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

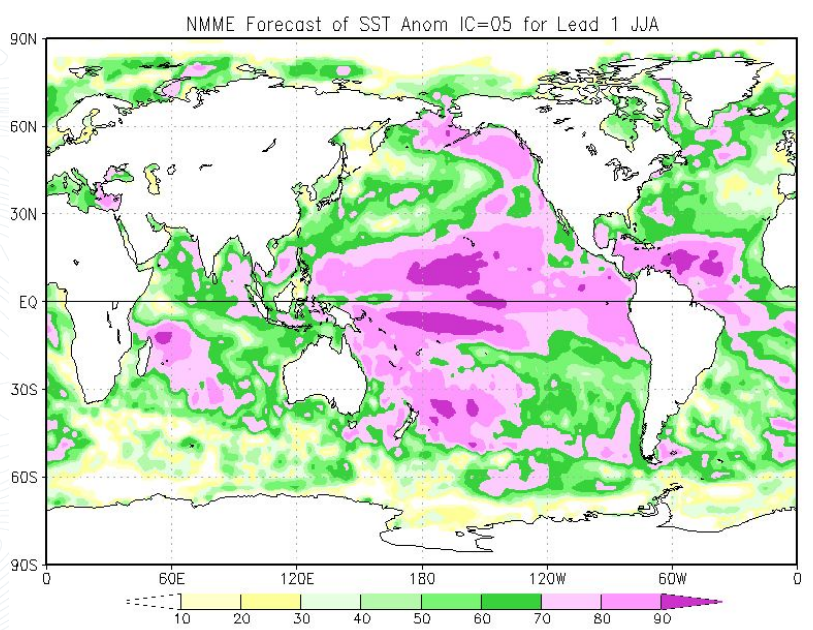
# June-August 2024 **sea surface temperature** ➤ NMME

**Forecast**
departure from normal

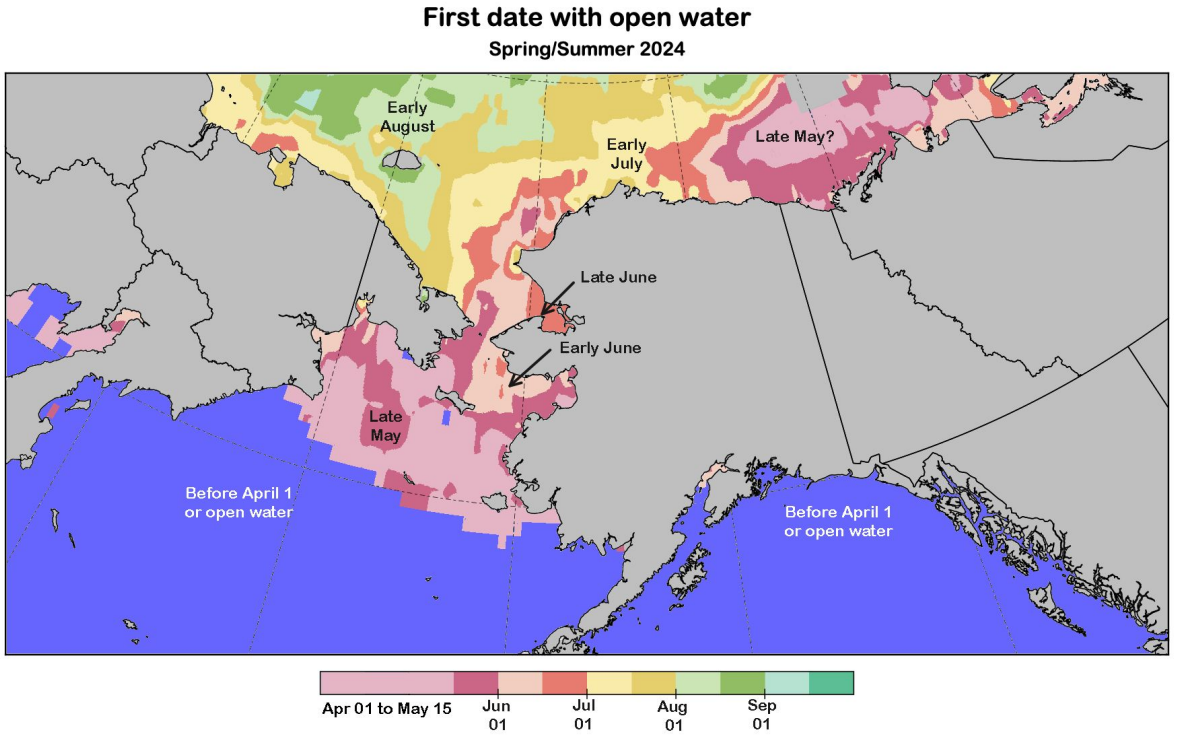



Negative PDO pattern

**Skill**
of the forecast



# Experimental **sea ice forecast** ➤ CPC



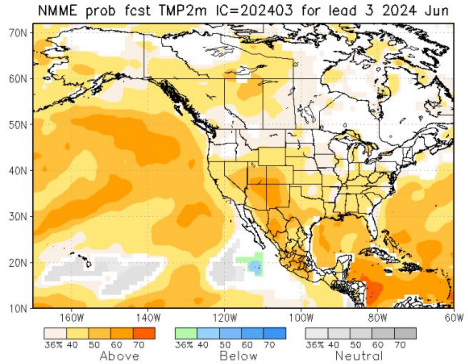

Open water=Sea ice concentration less than 15%

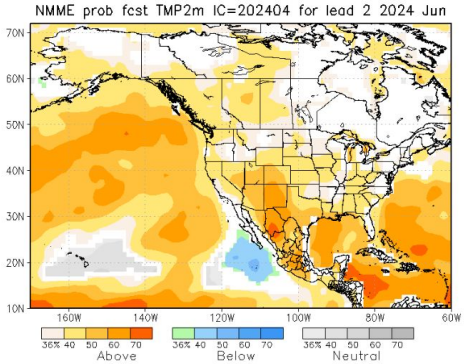
Average of multiple model runs starting with late April data

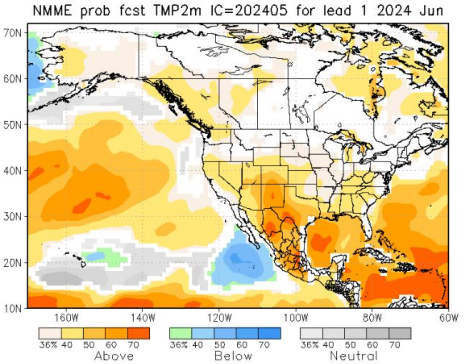
# June 2024 calibrated **probability forecast** ➤ NMME

Forecast from → March April May

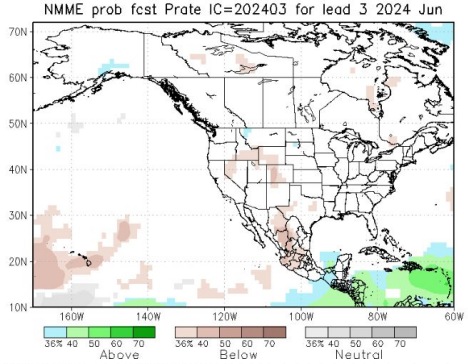
Temperature

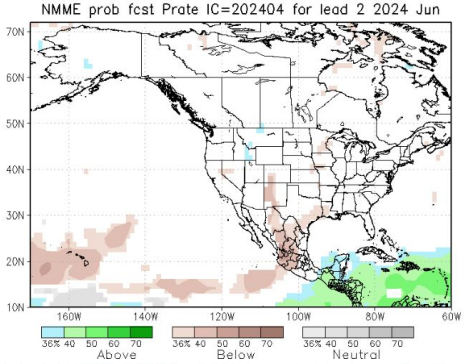


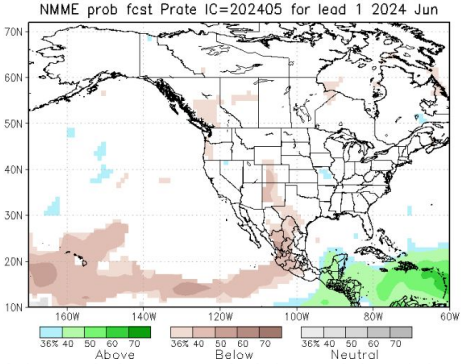




Precipitation

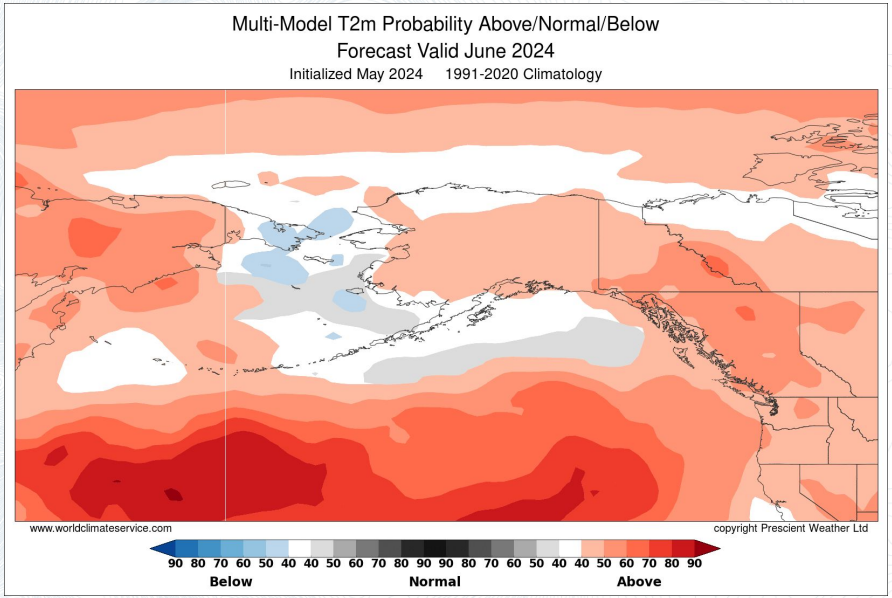


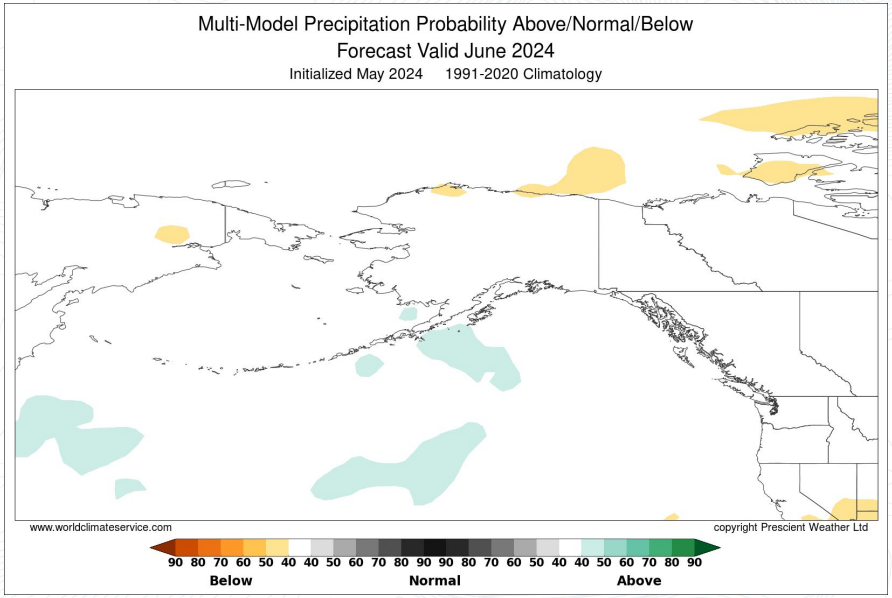



# June 2024 outlooks ➤ **World Climate Service**

## Temperature




## Precipitation

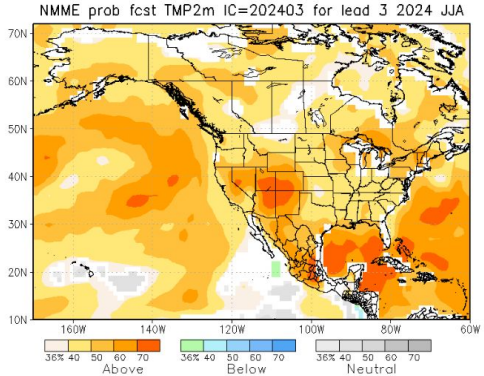


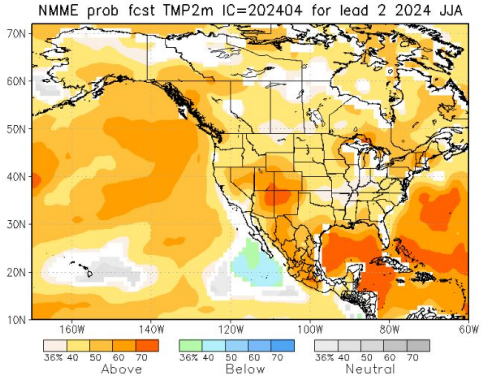

Bias Corrected, Skill Weighted CFS + ECMWF

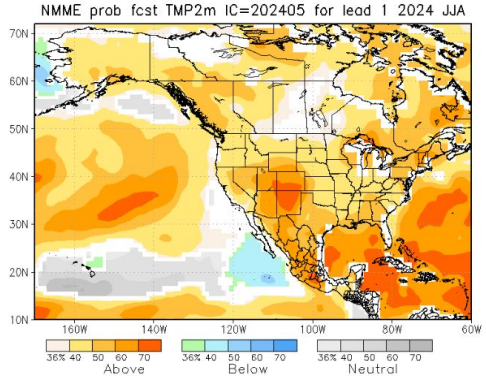
# June-August 2024 calibrated **probability forecast** ➤ NMME

Forecast from → March April May

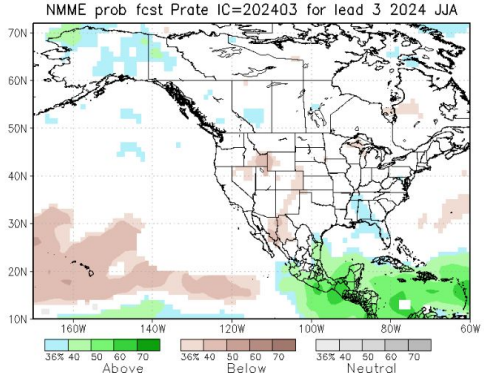
Temperature

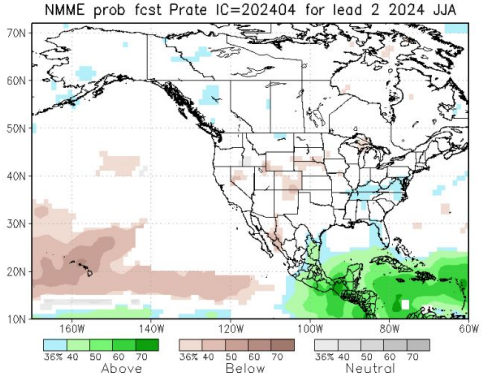


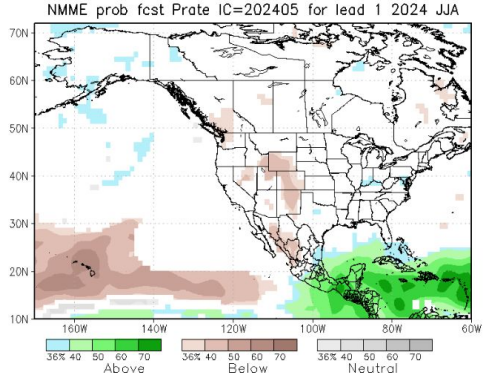




Precipitation

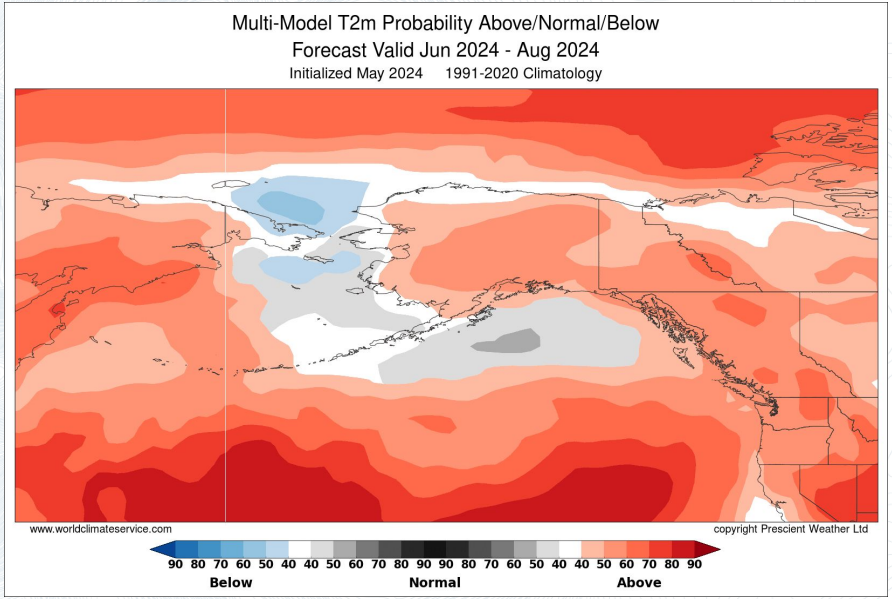


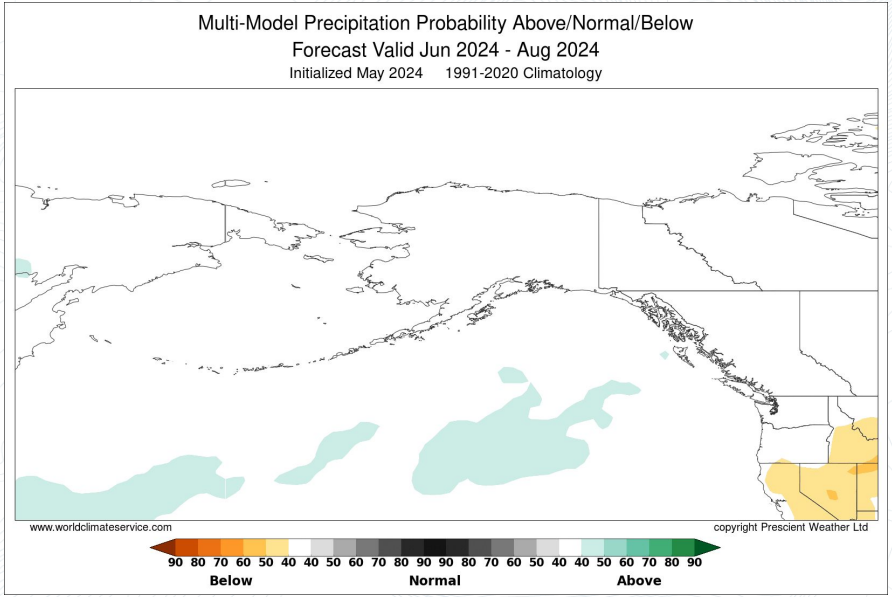



# June-August 2024 outlooks ➤ **World Climate Service**

## Temperature

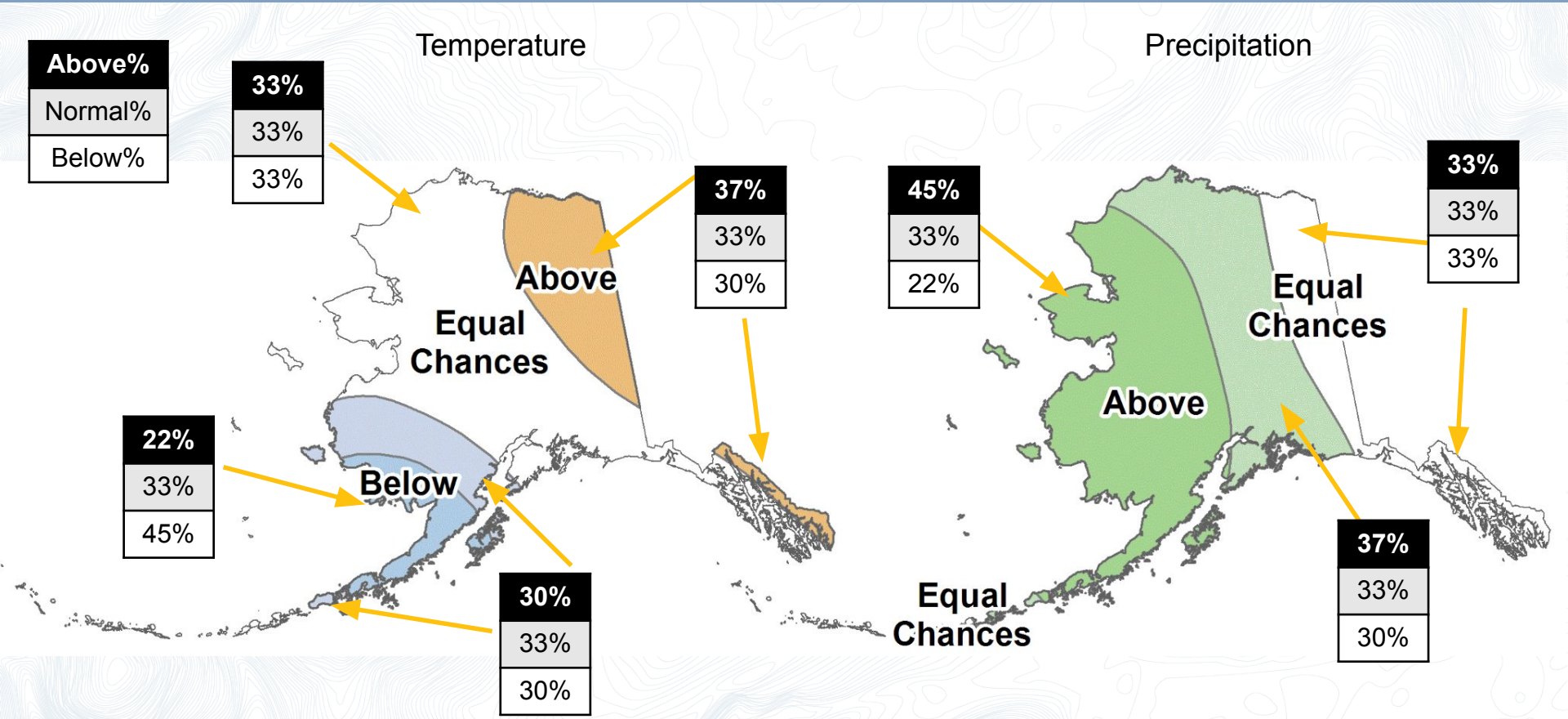



## Precipitation




Bias Corrected, Skill Weighted CFS + ECMWF

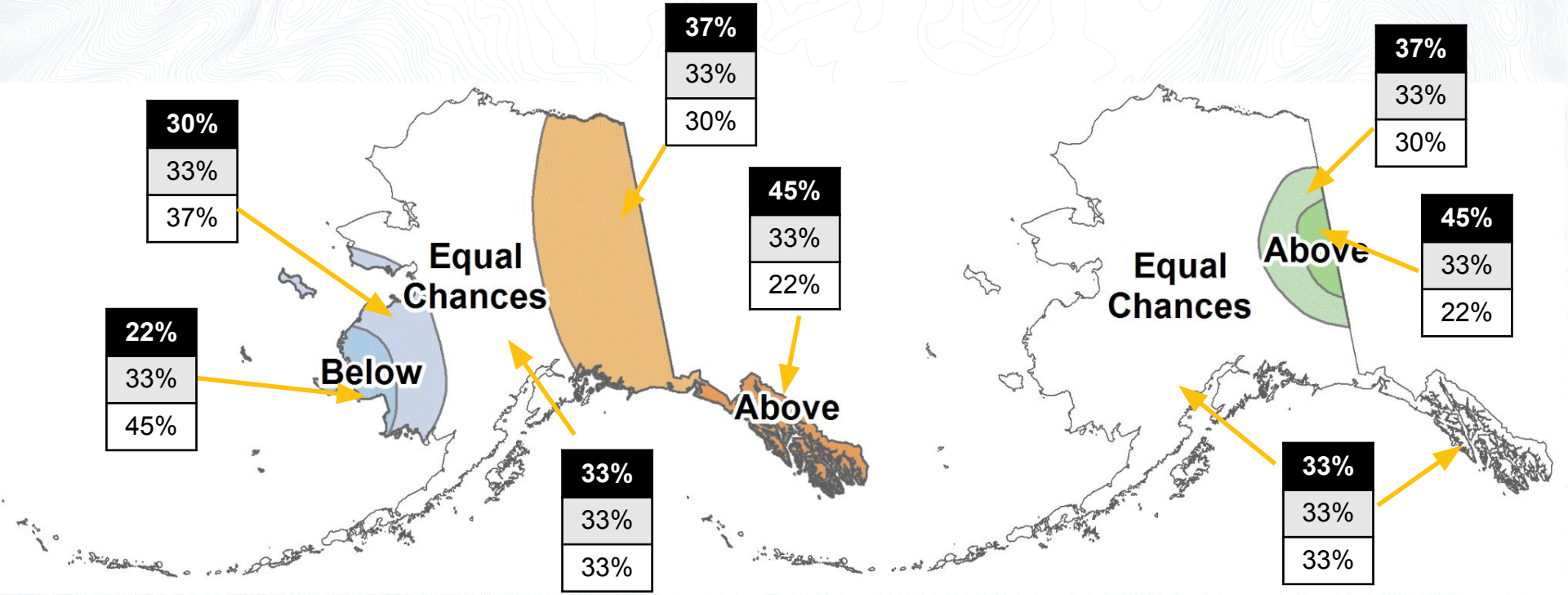
# June-August 2024 outlooks from **April**



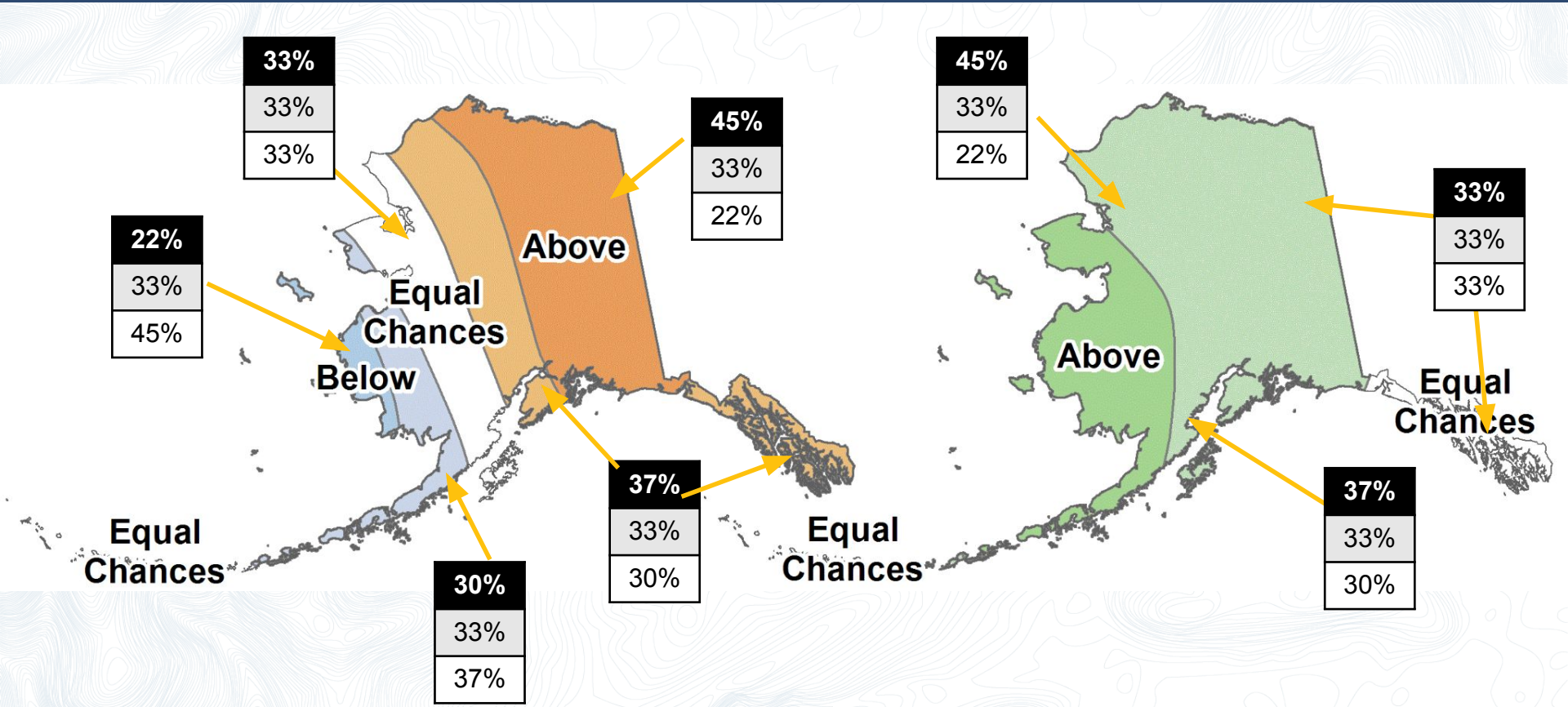
Future outlook

And the answer is...

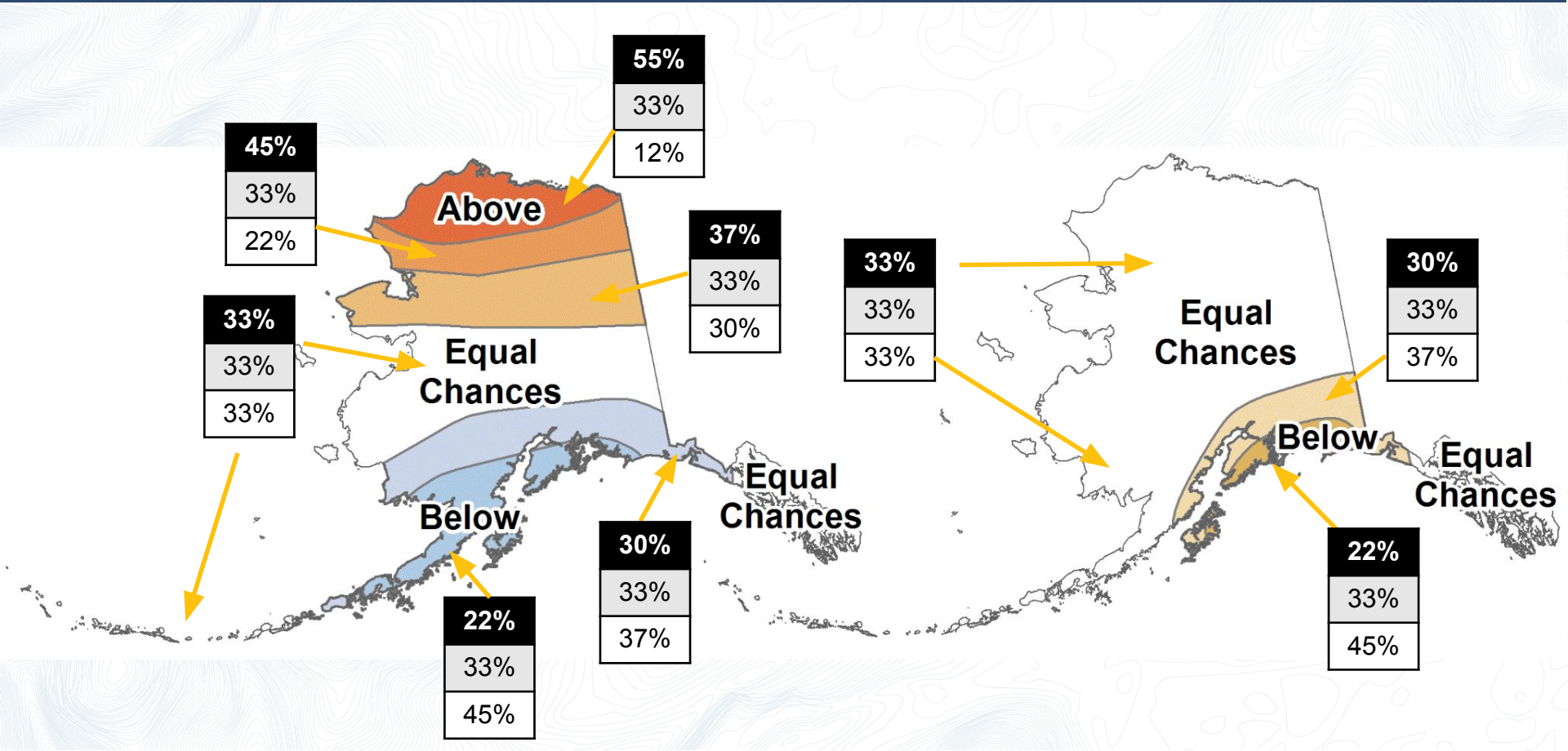
# CPC **June** 2024 **outlooks**



# CPC **June-August** 2024 **outlooks**



# Autumn 2024 outlook



# Upcoming ACCAP webinars

**Upcoming ACCAP webinars** accap.uaf.edu/events

- May 29 ▸ VAWS: Multi-satellite Water Vapor Products at the Weather Climate Interface
- June 11 ▸ Alaska Extreme Weather Events

**Email Rick Thoman** rthoman@alaska.edu

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

International Arctic Research Center

UAF University of Alaska Fairbanks

ACCAP is housed at the International Arctic Research Center on the University of Alaska Fairbanks Troth Yeddha' Campus