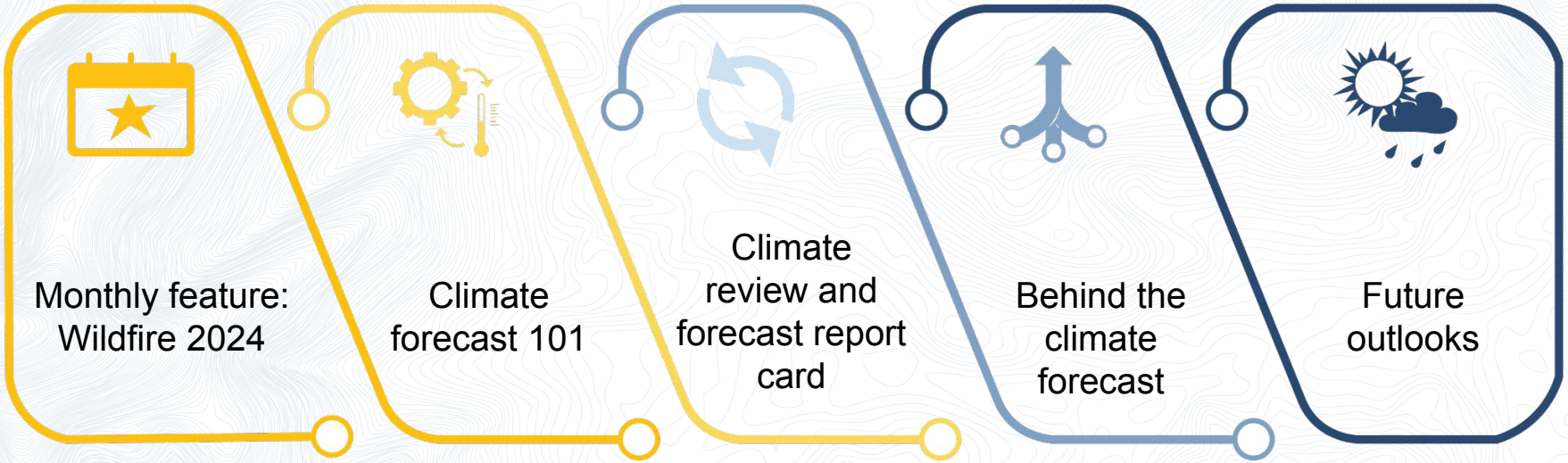
Alaska climate outlook briefing July 2024

Rick Thoman
ACCAP Climate Specialist
July 19, 2024

ACCAP


Monthly feature: Wildfire 2024
Climate forecast 101
Climate review and forecast report card
Behind the climate forecast
Future outlooks

Monthly feature ➢ **July Rain!**

- Extreme Precipitation
  - Northwest Arctic Borough July 2-3rd: two to three inches rain lower Noatak valley
  - Nome: 5.44 inches July 1-15, highest any early July
  - Anchorage: 2.28 inches July 13-14, 7th highest two-day total on record (since 1953)
- Daily record precipitation in July
  - Utqiaġvik, Kotzebue, Nome, Bethel, McGrath, Anchorage, Kenai, Cordova, Yakutat, Sitka, Juneau
- Fairbanks: wettest July since 2016

Nome July 4th parade

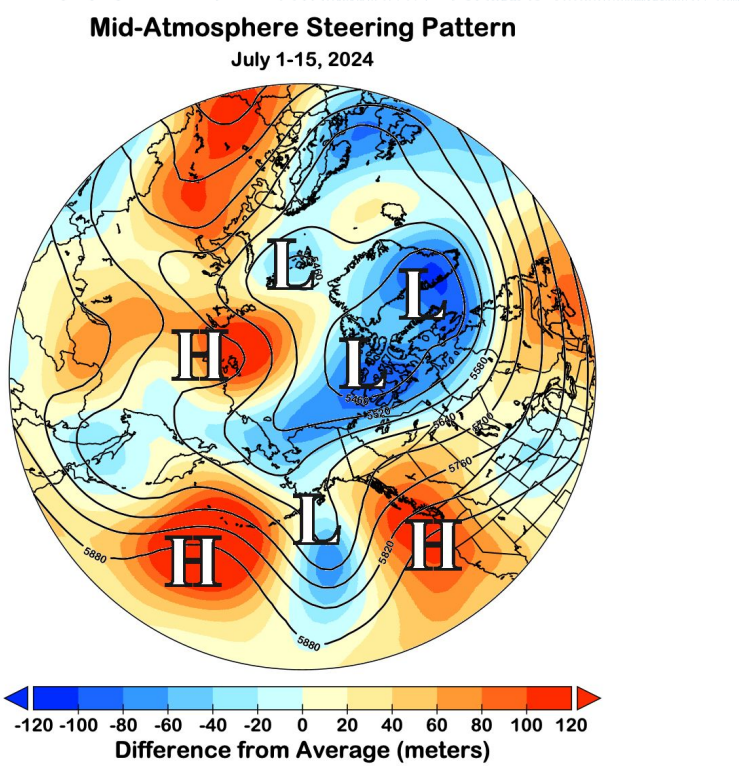
Credit: N. Hahn/Nome Nugget

Monthly feature ➤ **Rain**

Why so wet?

Do look up

- Enhanced storm track across the Bering Sea
- High pressure aloft off Pacific NW coast steering storms toward SE Alaska
- Low pressure aloft North Slope



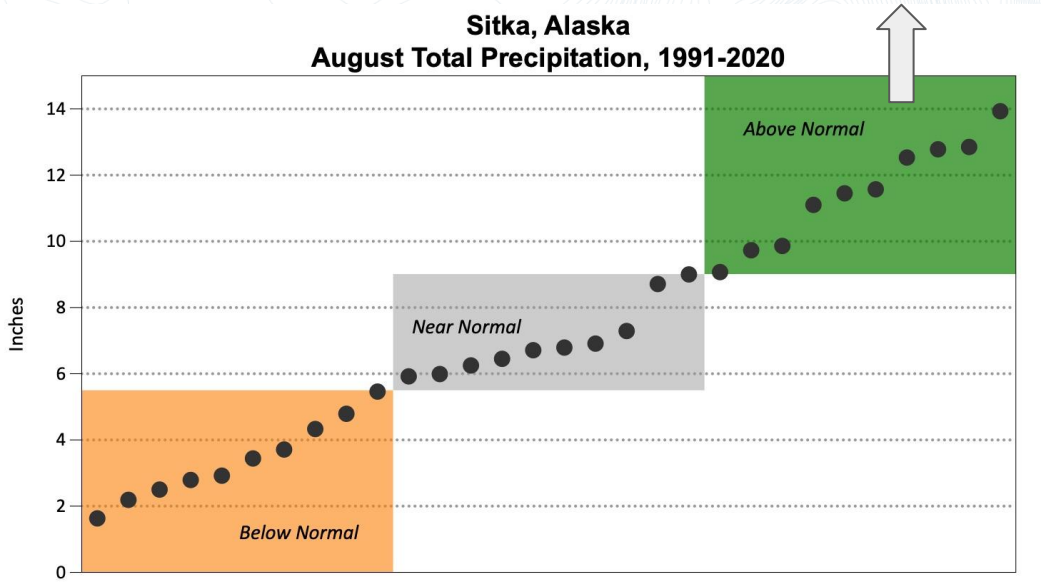
Climate forecast 101

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 ACCAP climate graphics

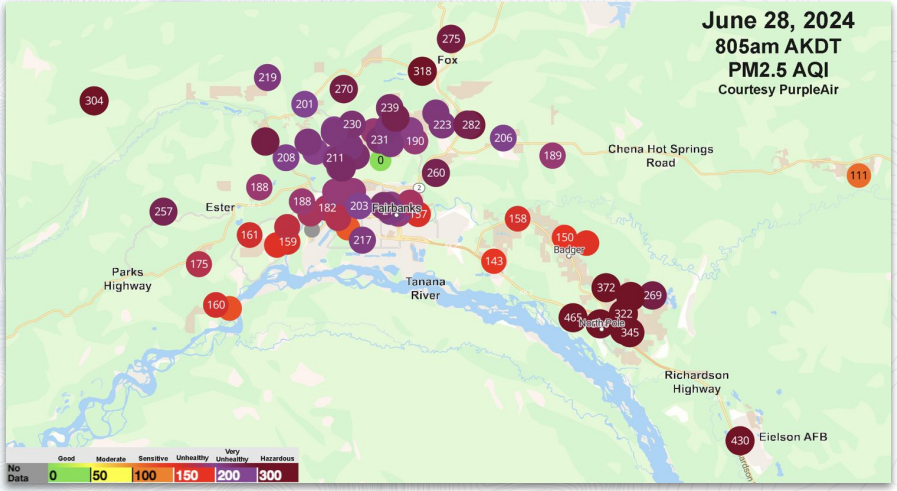


Climate outlook report card

What's happened?

How did previous climate outlooks perform?

Notable June-July **Happenings**

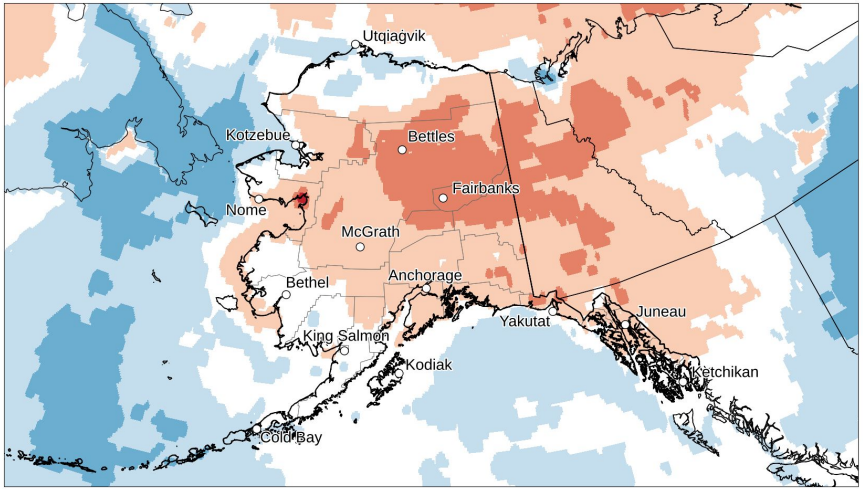


Besides Rain

- Late June: wildfire and smoke central Interior
  - First occurrence of ¼ mile visibility in smoke at Fairbanks airport since 2005
- Late June: widespread near record warmth
  - Especially overnight low temperatures
- July 7-8: southern Southeast brushed by Pacific NW heat dome

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

Temperature Classification for Jun 2024



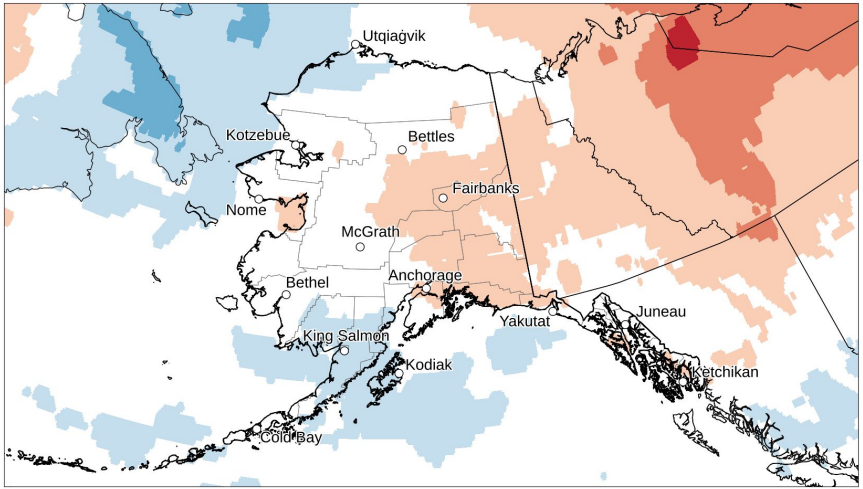
Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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

Compared to 1991-2020 Base Period (Records Since 1950)

Temperature Classification for Apr-Jun 2024



Source: ERA5 Reanalysis

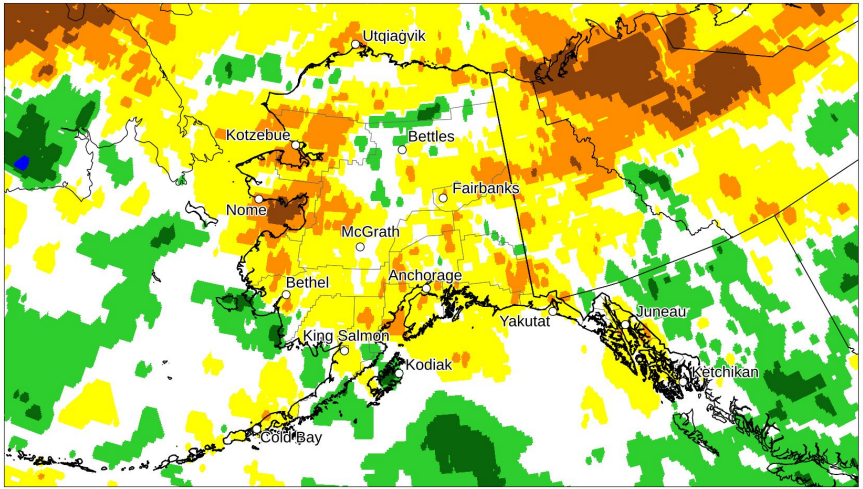
Map by: Brian Brettschneider

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

Compared to 1991-2020 Base Period (Records Since 1950)

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

Precipitation Classification for Jun 2024



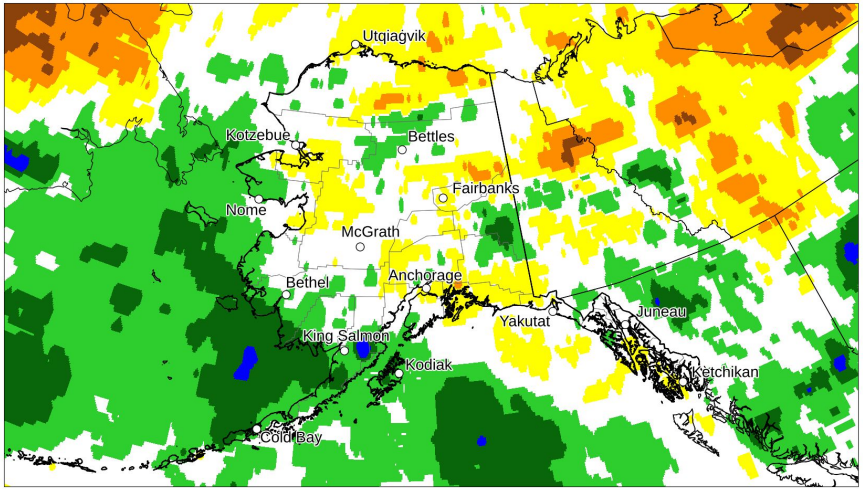
Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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

Compared to 1991-2020 Base Period (Records Since 1950)

Precipitation Classification for Apr-Jun 2024



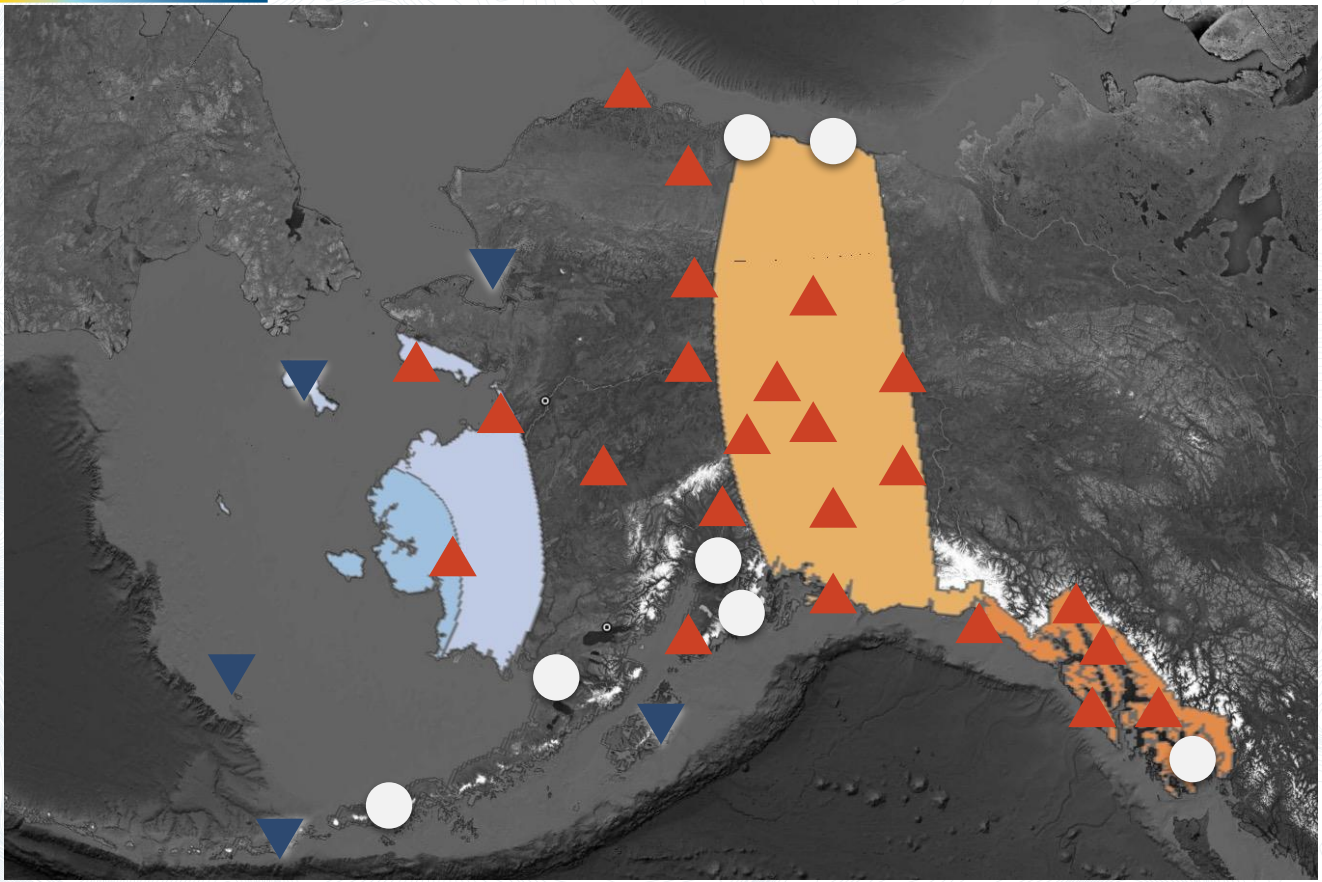
Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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

Compared to 1991-2020 Base Period (Records Since 1950)

June 2024 temperature ➤ CPC outlook and observed



Non-EC skill score: +55

Percent correct: 70%

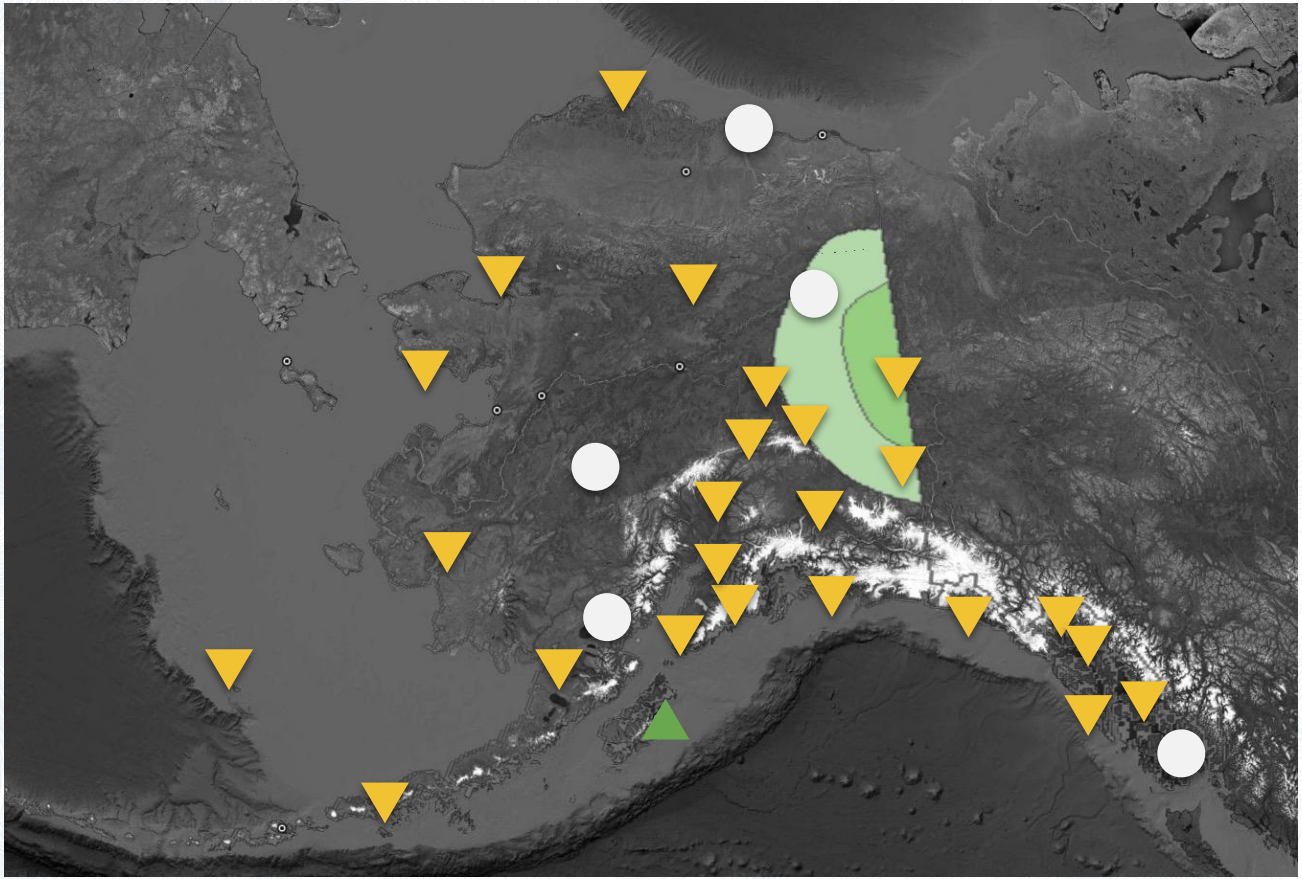
Mid-month outlook

Above normal

Near normal

Below normal

June 2024 precipitation ➤ CPC outlook and observed



Non-EC skill score: -50

Percent correct: 0%

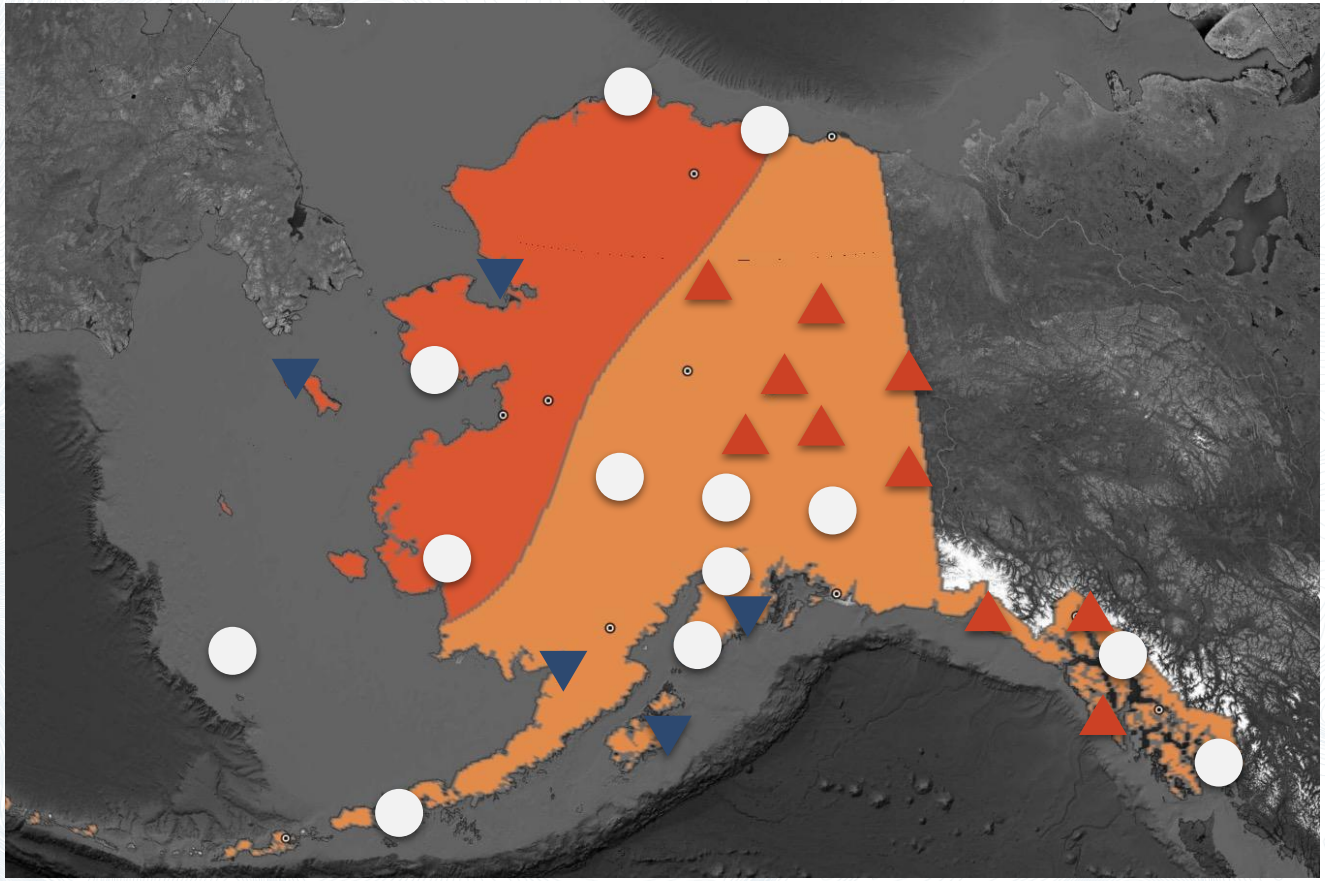
Mid-month outlook

Above normal

Near normal

Below normal

April-June 2024 temperature ➤ CPC outlook & observed



Non-EC skill score: +14

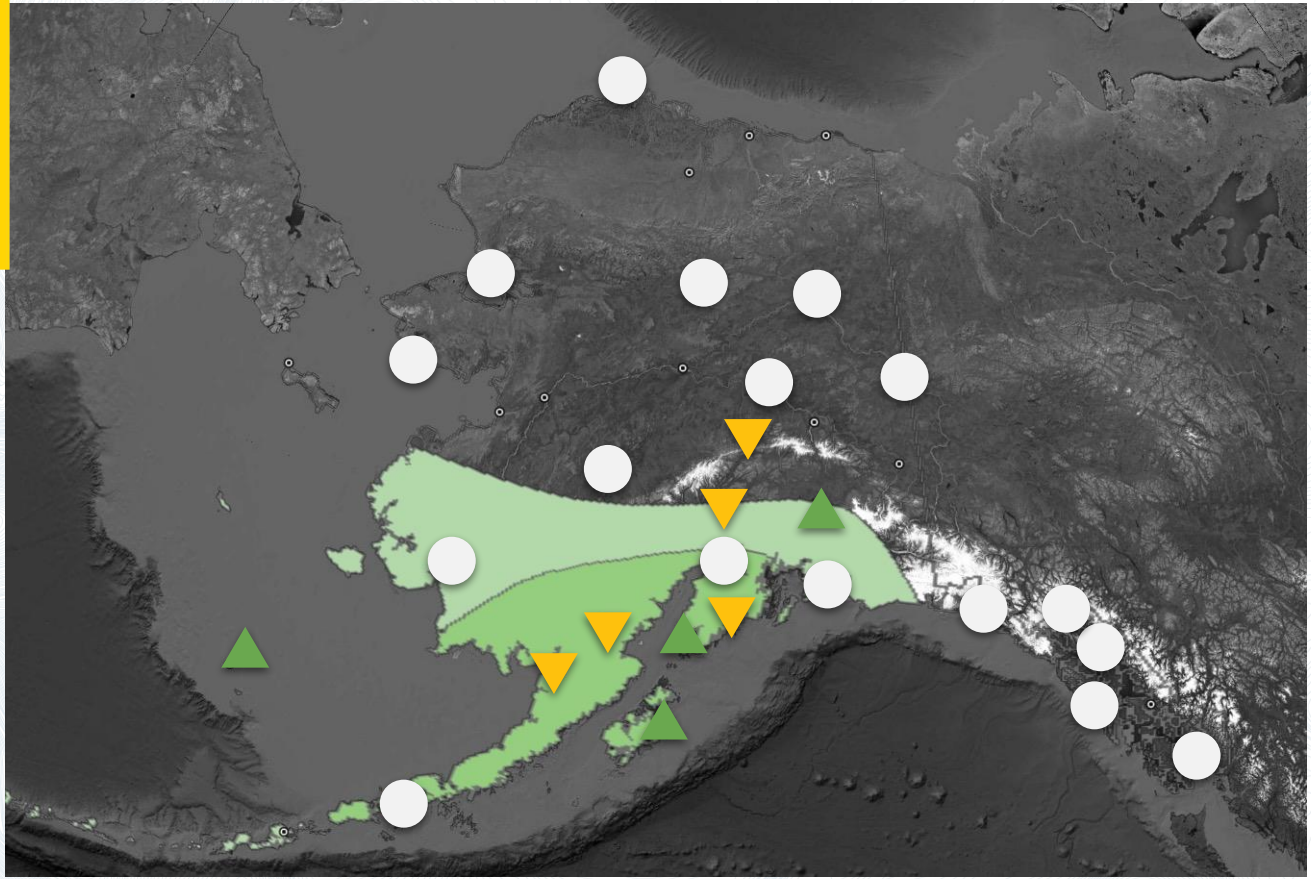
Percent correct: 43%

Above normal

Near normal

Below normal

April-June 2024 precipitation ➢ CPC outlook & observed



Non-EC skill score: 0

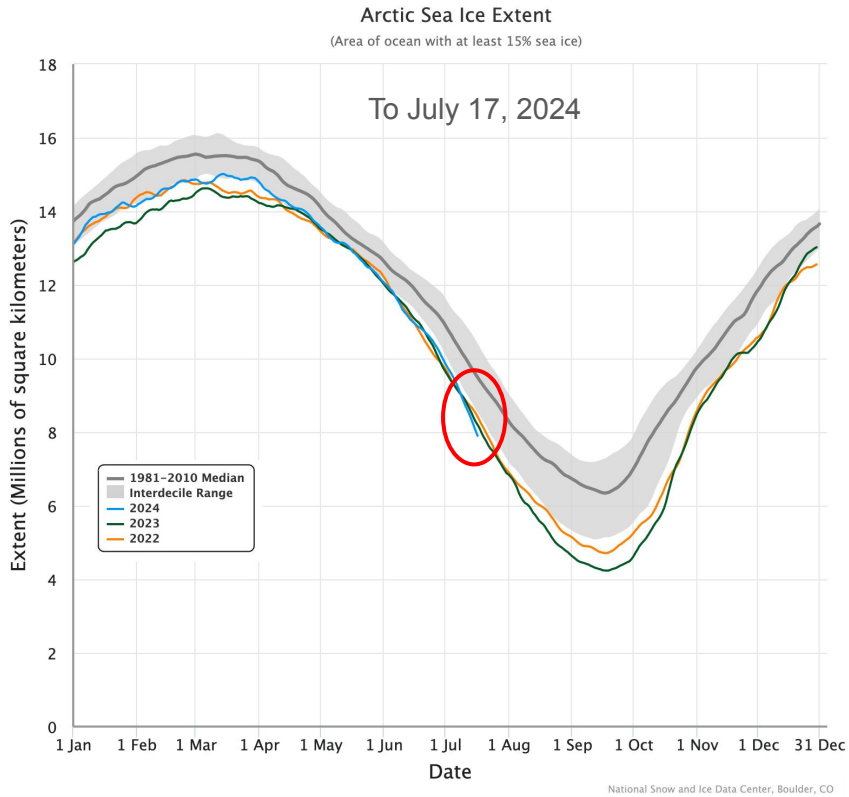
Percent correct: 33%

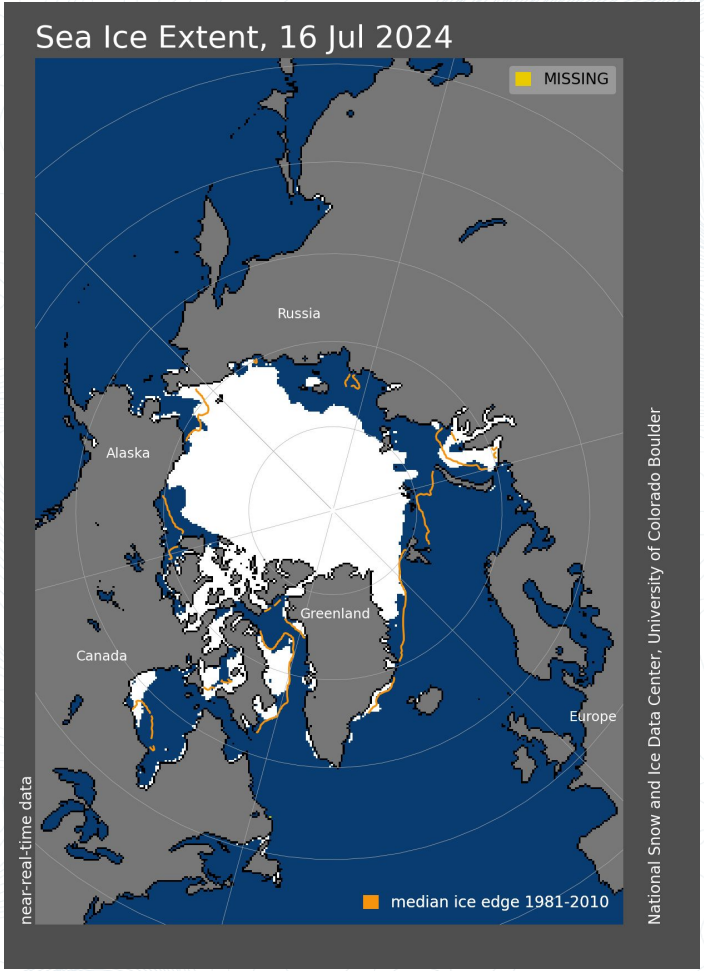
Above normal

Near normal

Below normal

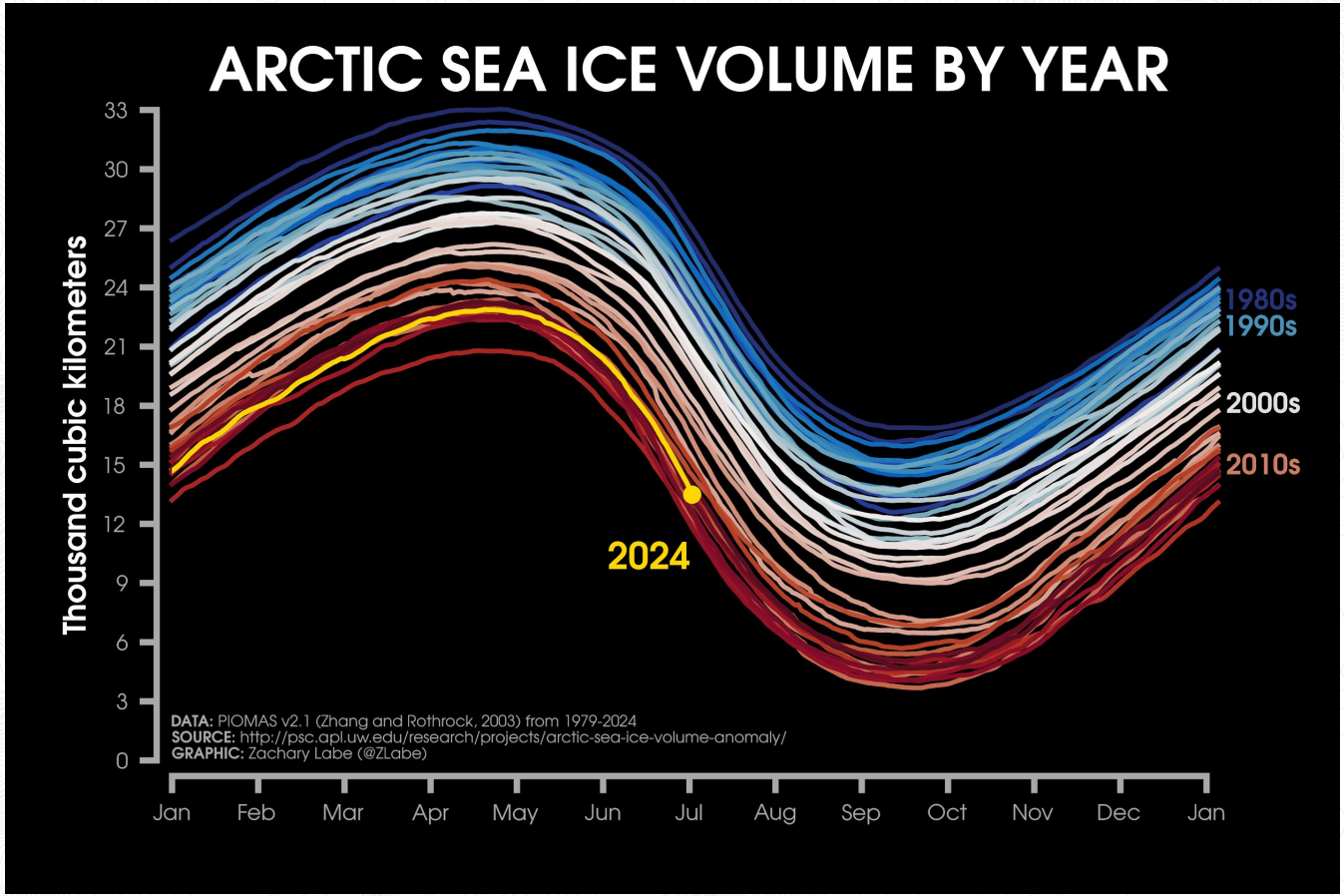
Arctic wide **sea ice**





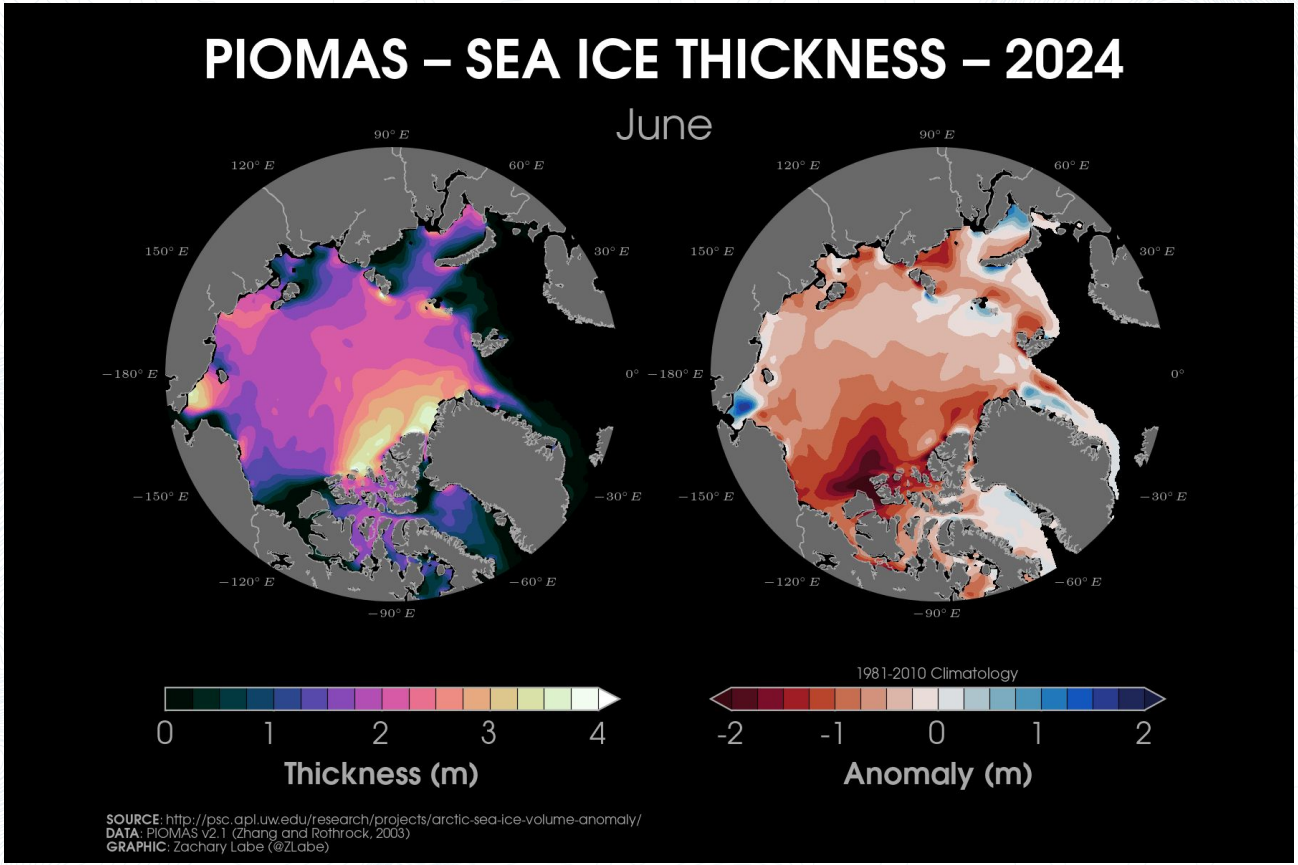
Arctic sea ice **volume**

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



Arctic sea ice **thickness**

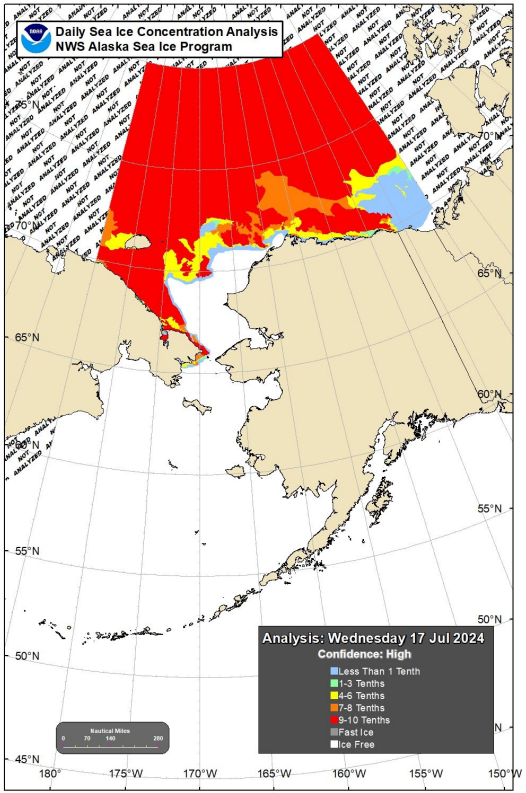
Sources:
Data from U. Wa./PIOMAS data
Graphics by Z. Labe, Princeton U.



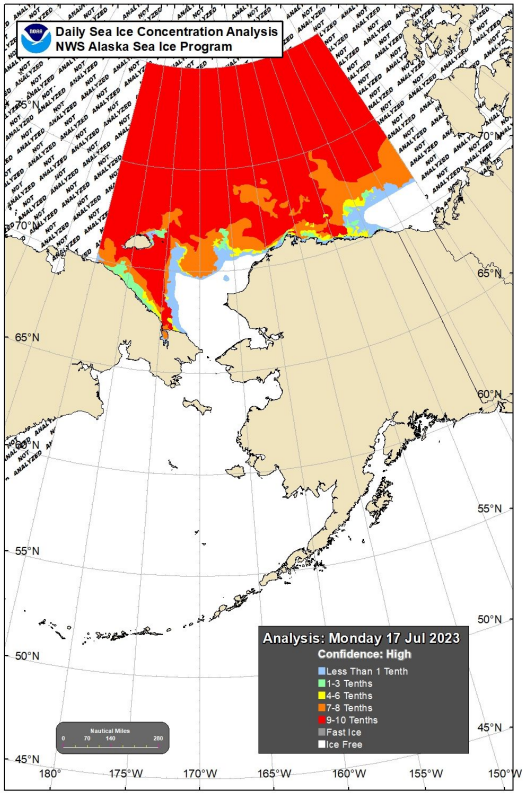
Mid-July sea ice comparison

Source: National Weather Service Alaska Region Sea Ice Program

July 17, 2024

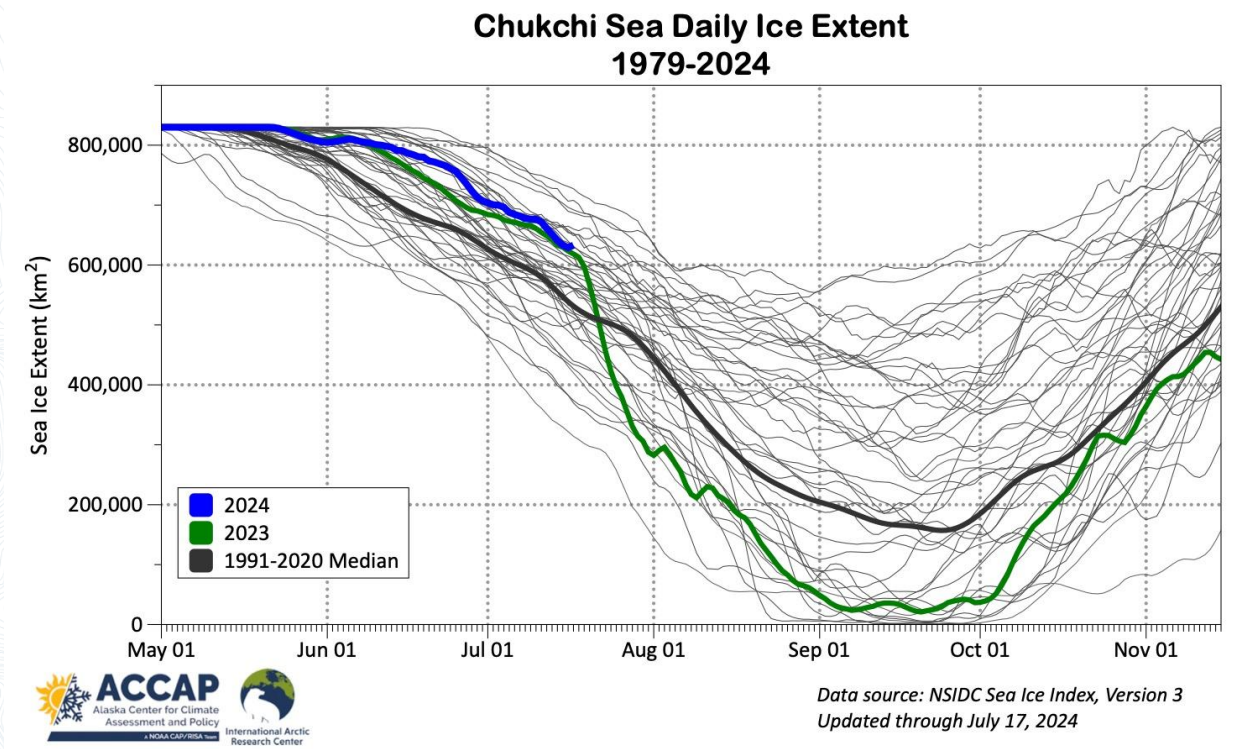


July 17, 2023



Sea ice extent **through the season**

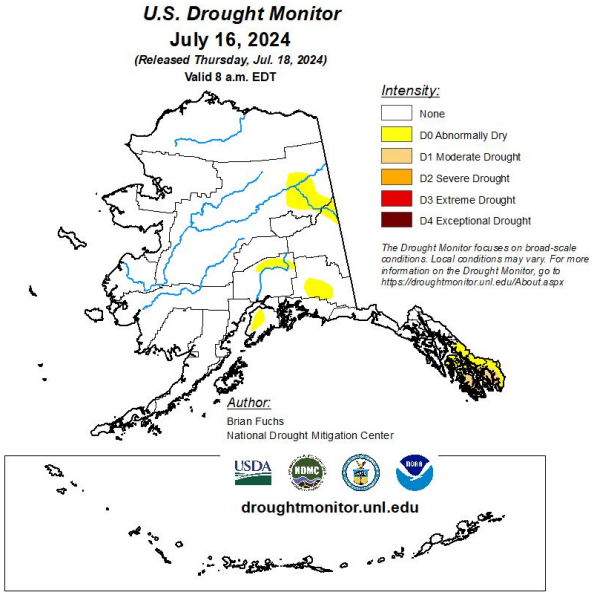
Sources:
Data NSIDC Sea Ice Index, Version 3. Through July 17, 2024.

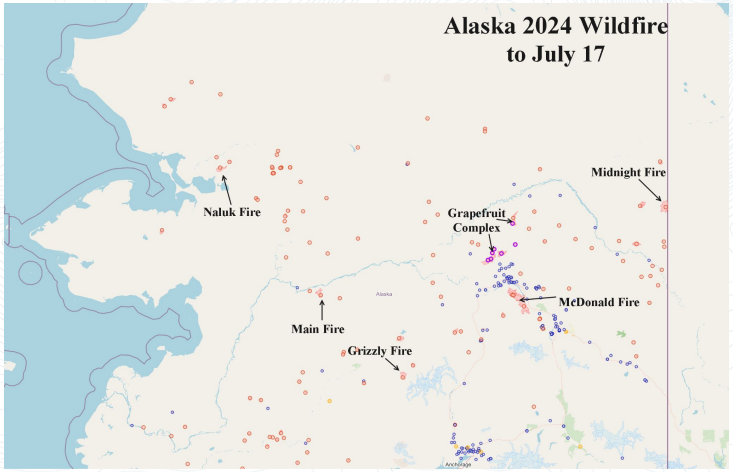


Chukchi Sea ice extent highest for mid-July since 2000

Drought & wildfire status

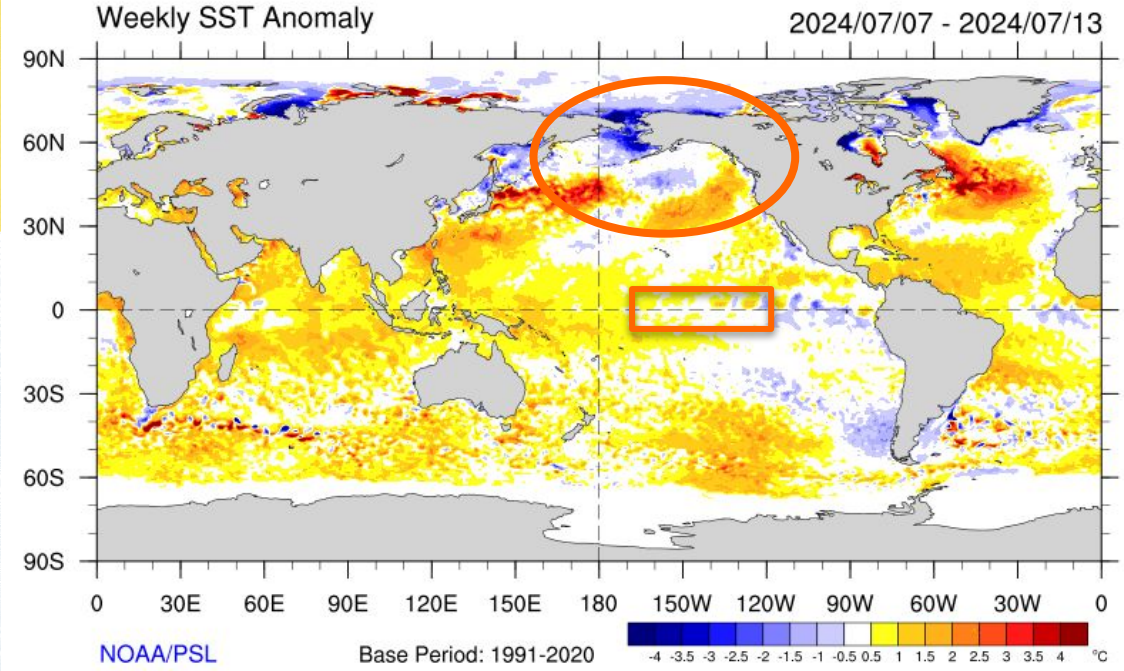
Sources:
US Drought Monitor
Alaska Interagency Coordination Center

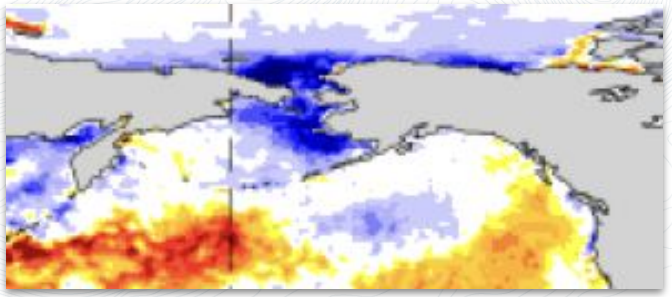




600,199 acres burned
5 fires > 25,000 acres

Global sea surface temperature departure from normal



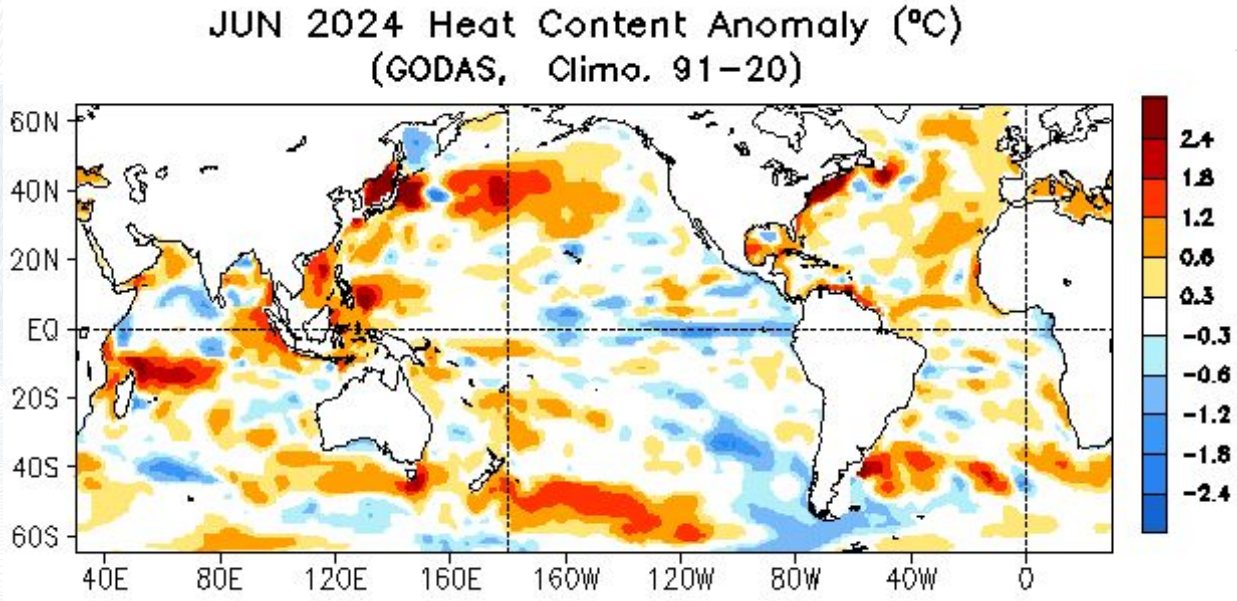


ONI for Apr-Jun: +0.4

PDO for **June** 2024: -1.9

Sources: ONI from CPC
PDO Index from WCS

Upper **ocean heat** departure from average



Upper 300 meters of the ocean

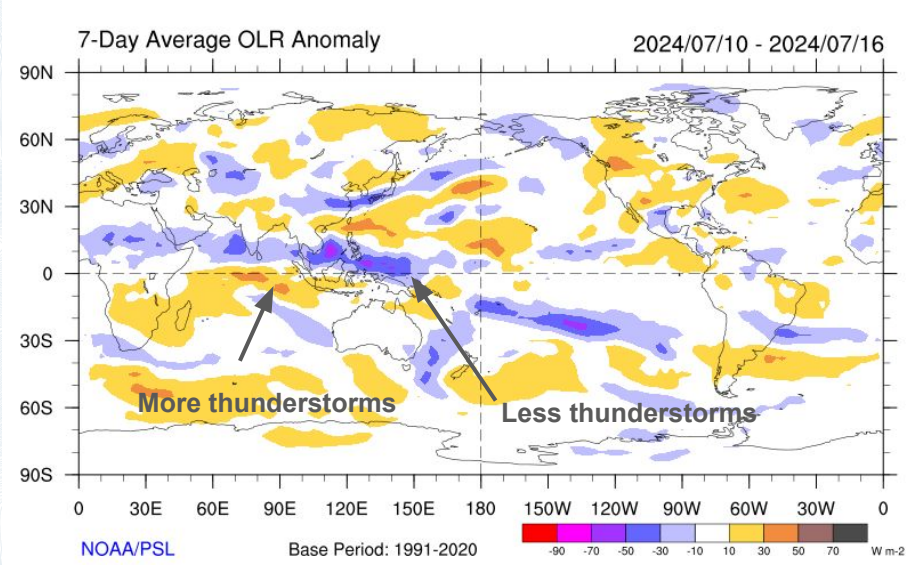
Little change in Gulf of Alaska

Source: NOAA/CPC

Tropical Pacific atmosphere

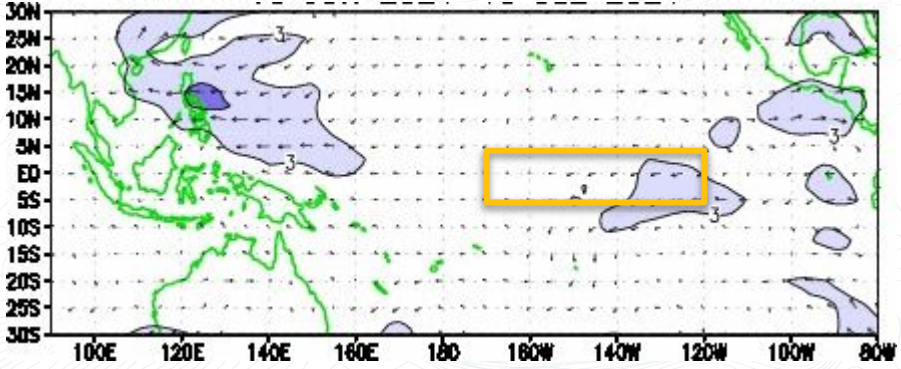
April-June Oceanic Niño Index: +0.4

Deep tropical convection
Via “outgoing longwave radiation”

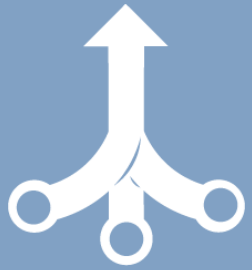


Trade winds near average
Niño Region 3.4

850 mb wind anomalies
June 16-July 15, 2024



Behind the climate forecast



El Niño/La Niña (ENSO) ➤ expert evaluation

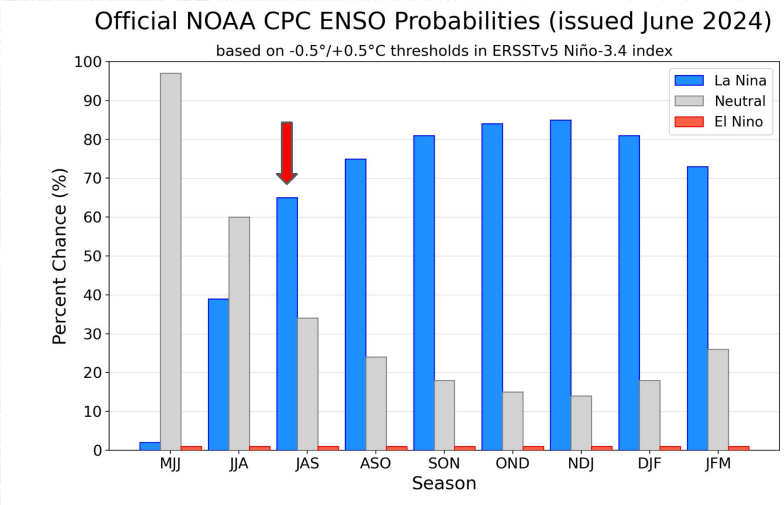
Statistical ➤ using the past

Dynamical models ➤ All physics, all the time

- Sea surface temperatures
- Temperature & precipitation
- Sea ice

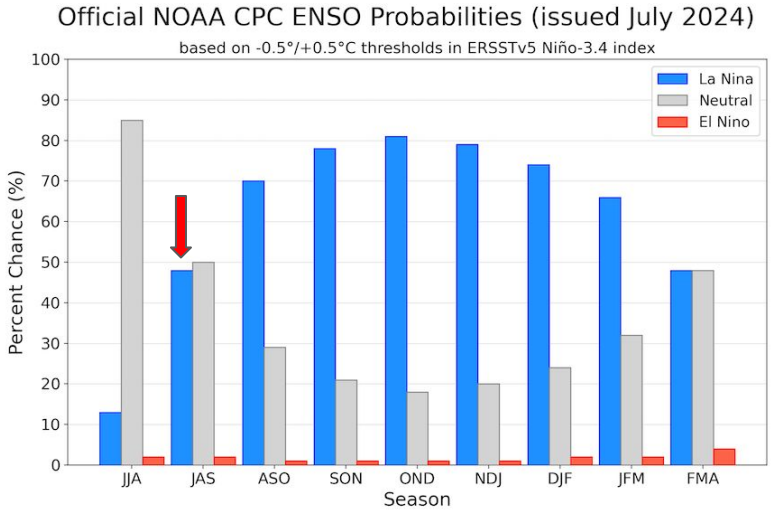
CPC **Niño 3.4 forecasts** ➤ experts

June 2024



July 2024

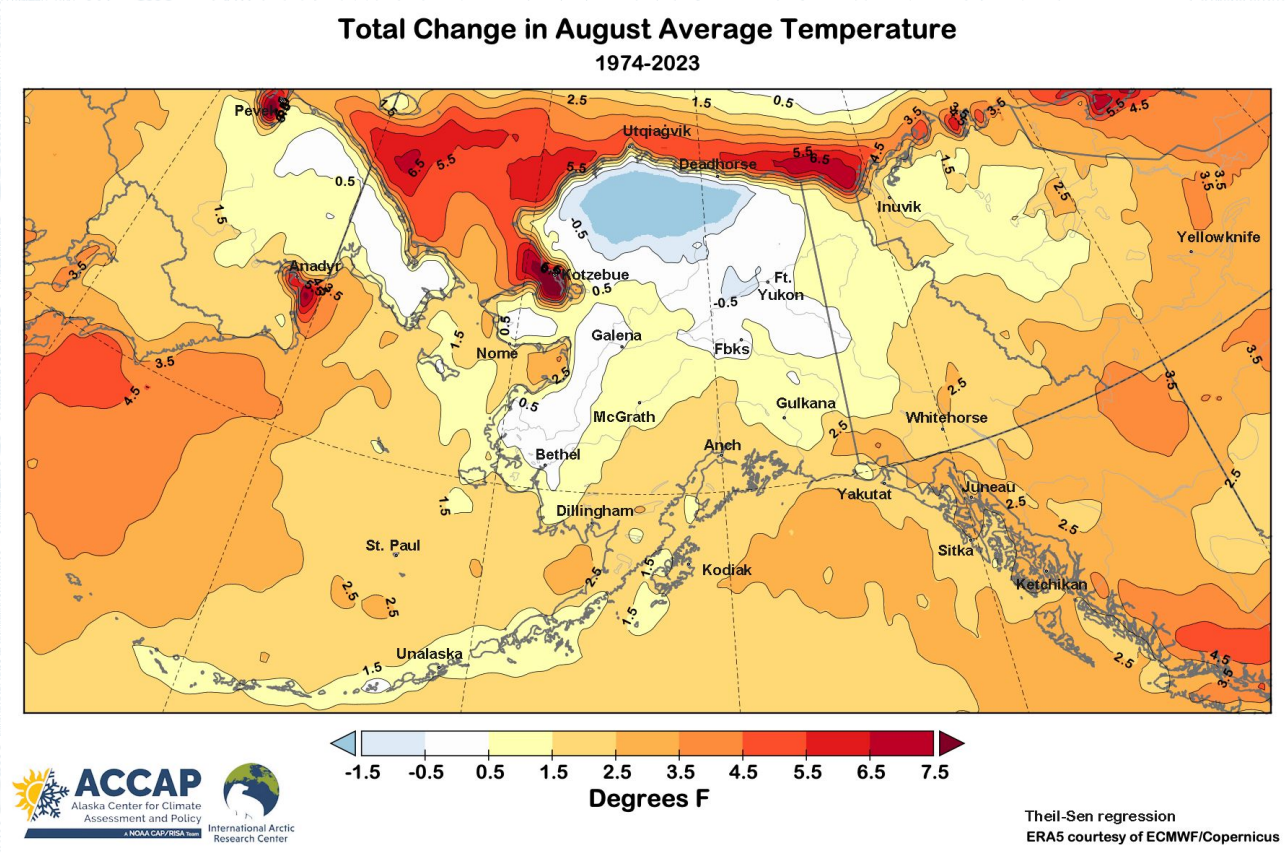
ENSO Alert System Status:
La Niña Watch



Statistical guidance ➤ using the past to predict the future

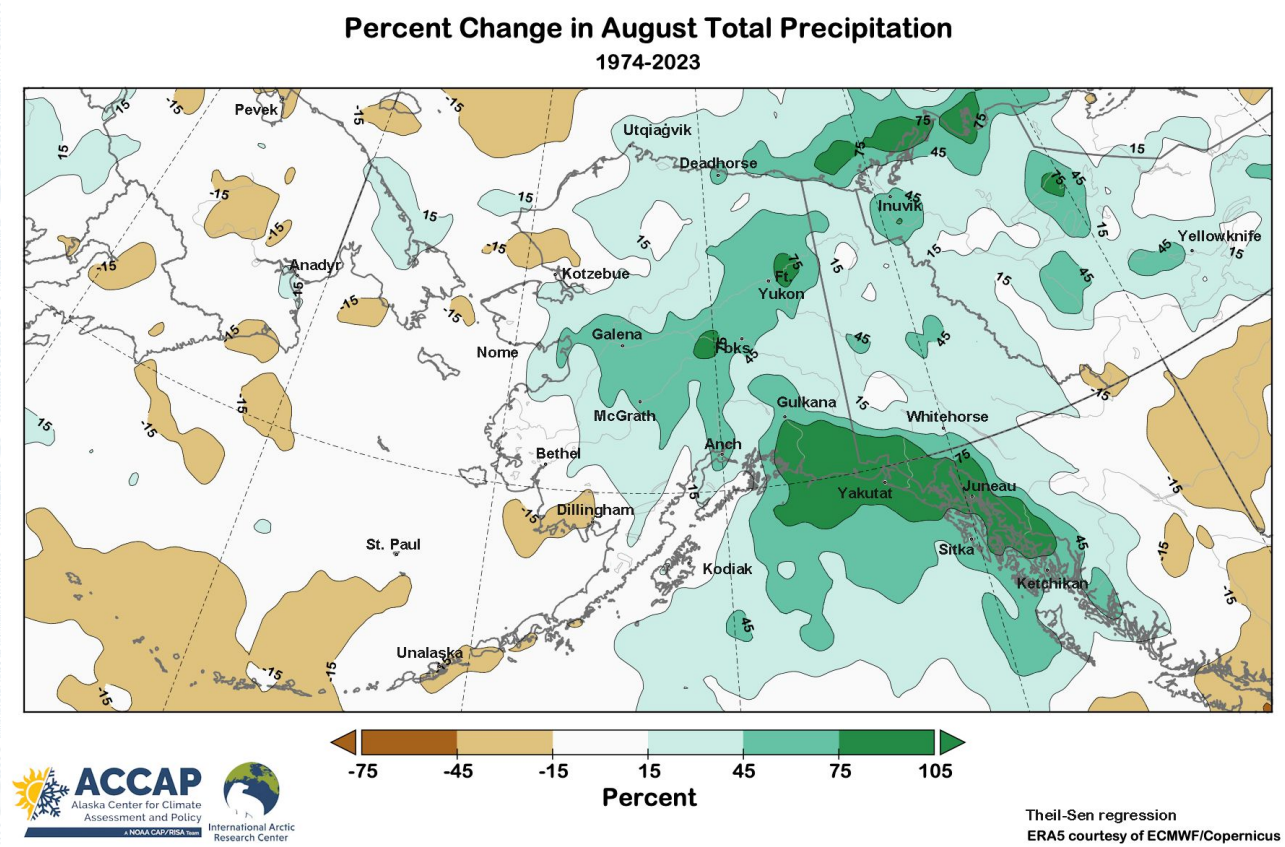
- Long term trends
- Optimum climate normals: Alaska trends the past 15 years

August half century trends ➤ **Temperature**



Trend over 50 years

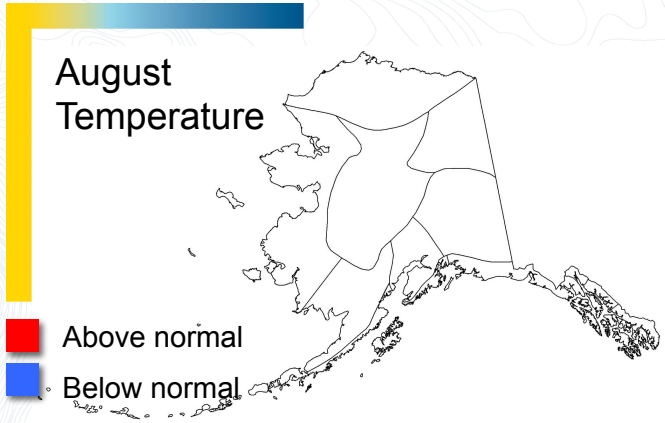
August half century trends ➤ **Precipitation**

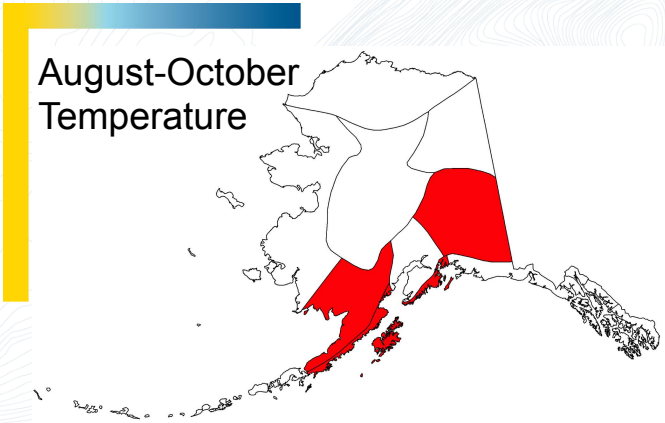


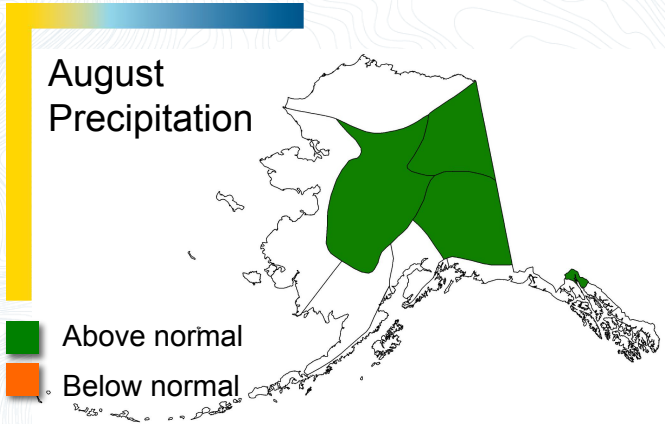
Trend over 50 years

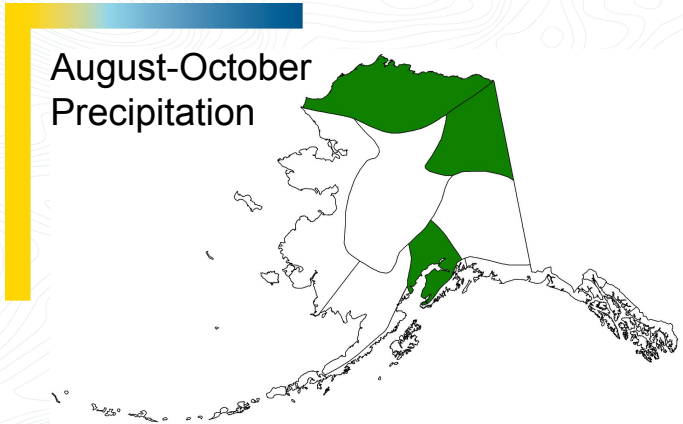
2009 to 2023 **trends**

Past 15 years compared to 1991-2020









Dynamic model forecasts

Current suite of Dynamic Climate Models

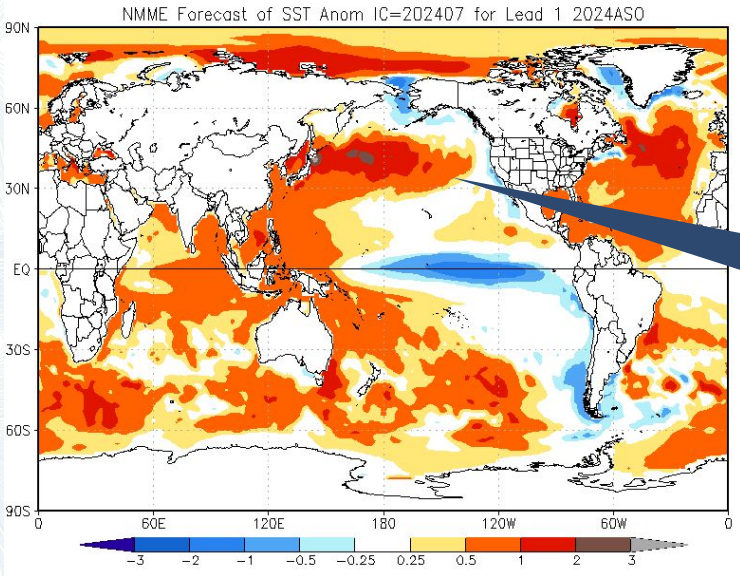
- CPC Experimental Sea Ice Ensemble
- World Climate Service Multi-Model Ensemble
- North American Multi-Model Ensemble (NMME)

What's being forecasted

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

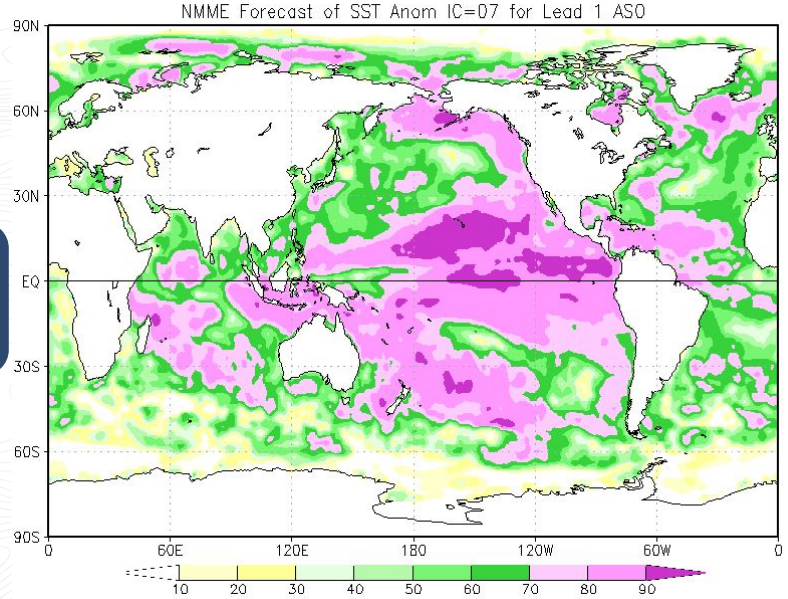
August-October 2024 **sea surface temperature** ➤ NMME

Forecast
departure from normal

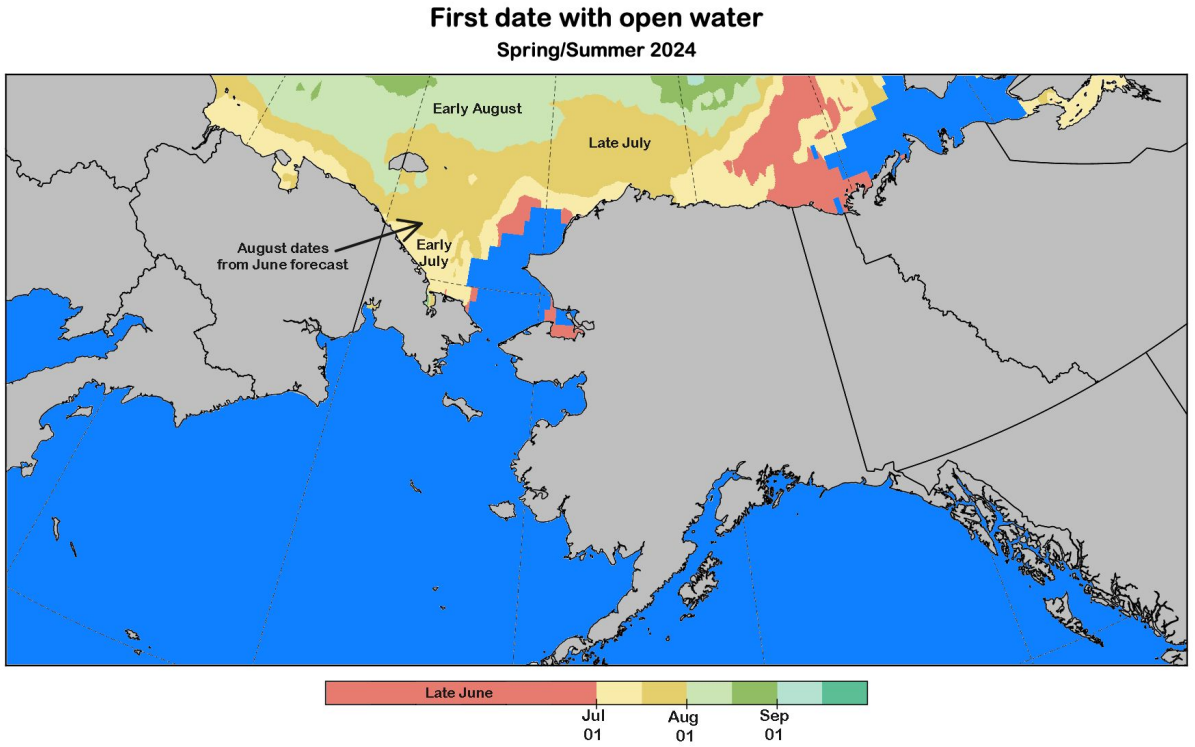


Negative PDO pattern

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 **June** data

August 2024 calibrated **probability forecast** ➤ NMME

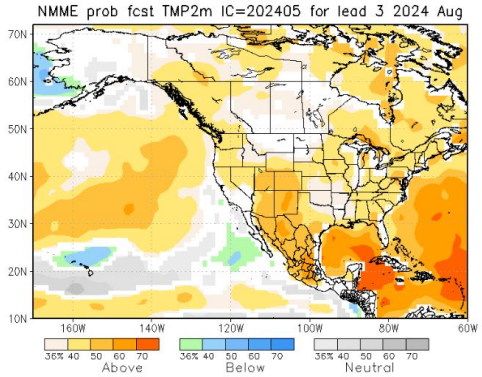
Forecast from →

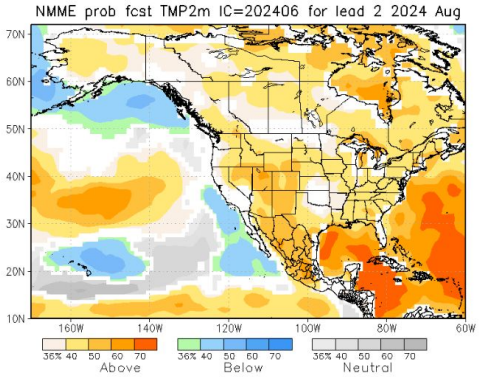
May

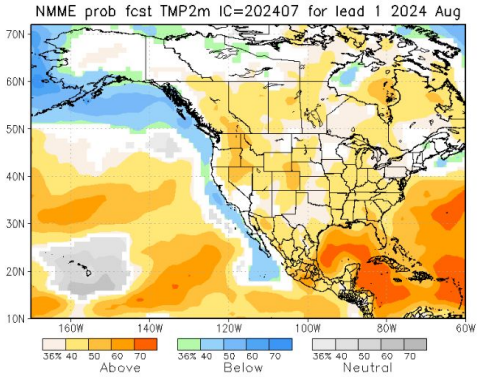
June

July

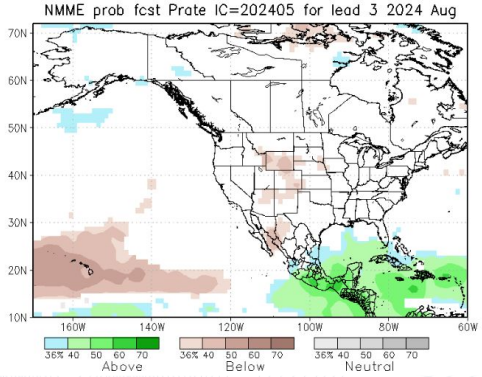
Temperature

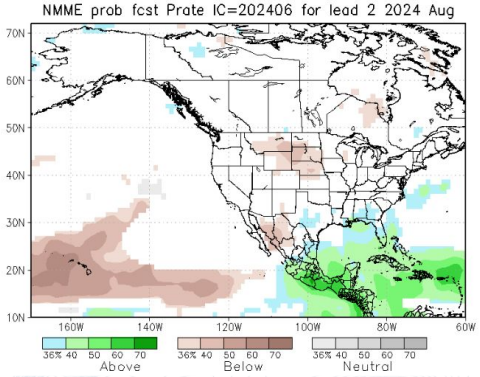


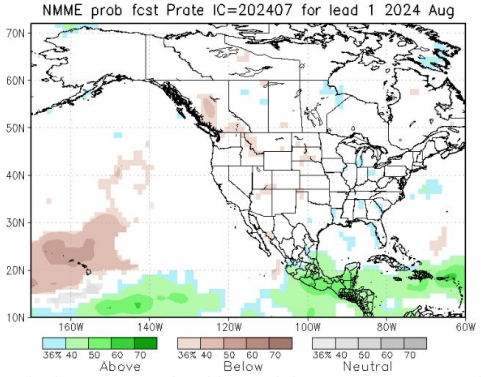




Precipitation

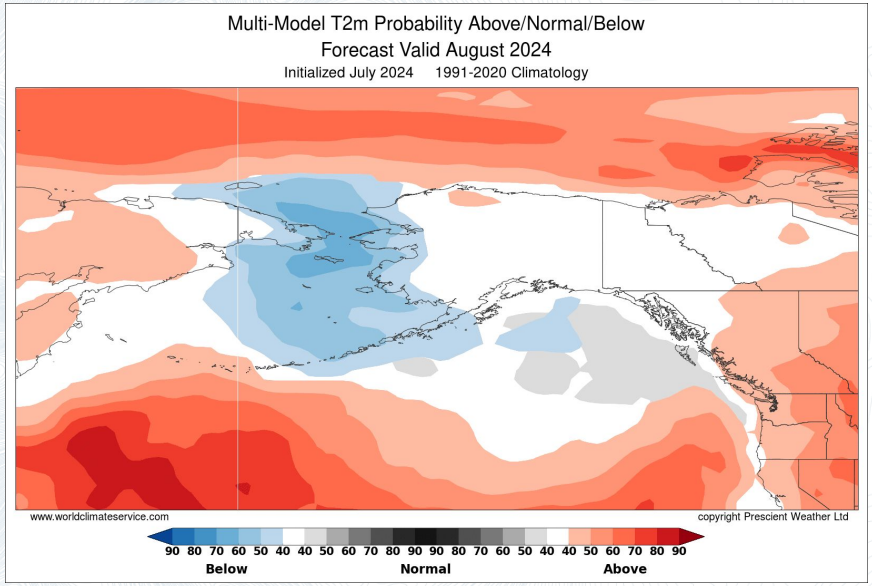




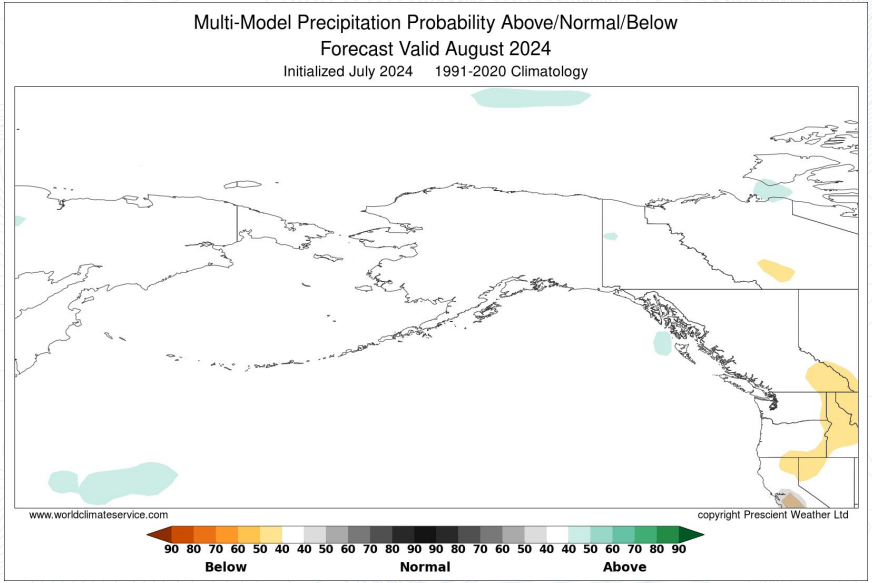


August 2024 outlooks ➤ **World Climate Service**

Temperature



Precipitation

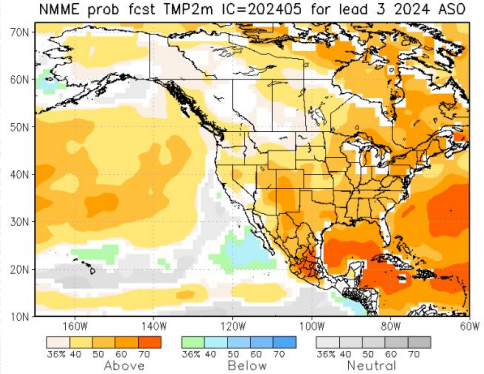


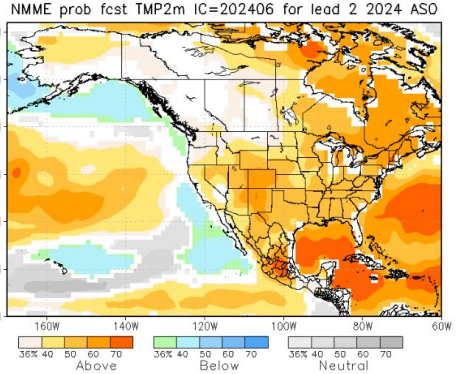
Bias Corrected, Skill Weighted CFS + ECMWF

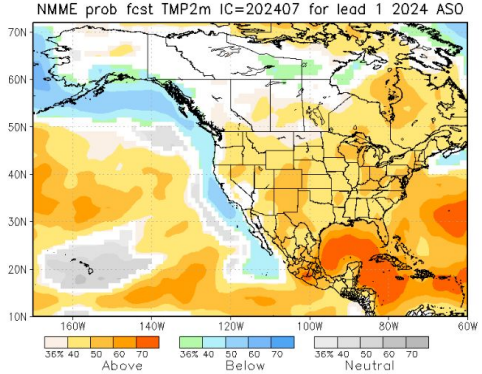
August-October 2024 calibrated **probability forecast** ➤ NMME

Forecast from → May June July

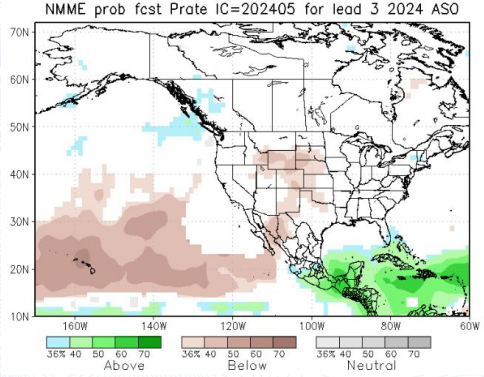
Temperature

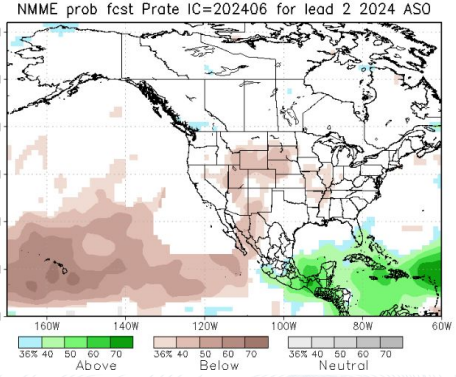


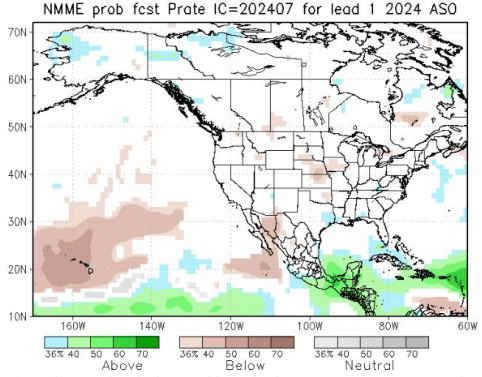




Precipitation

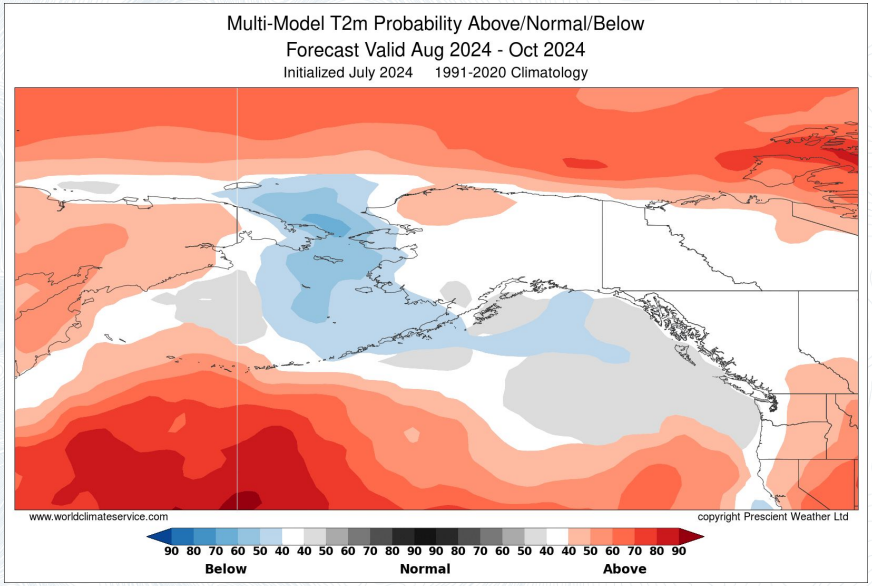




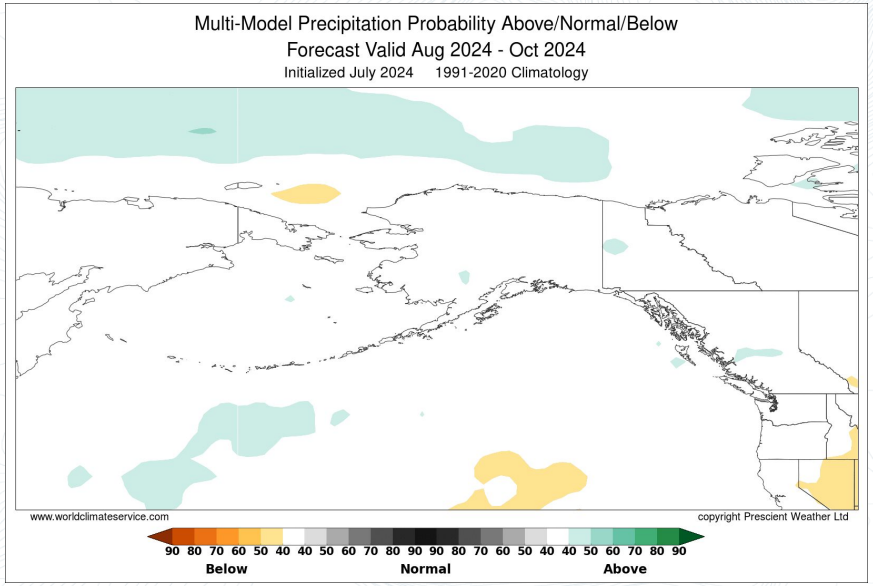


August-October 2024 outlooks ➤ **World Climate Service**

Temperature

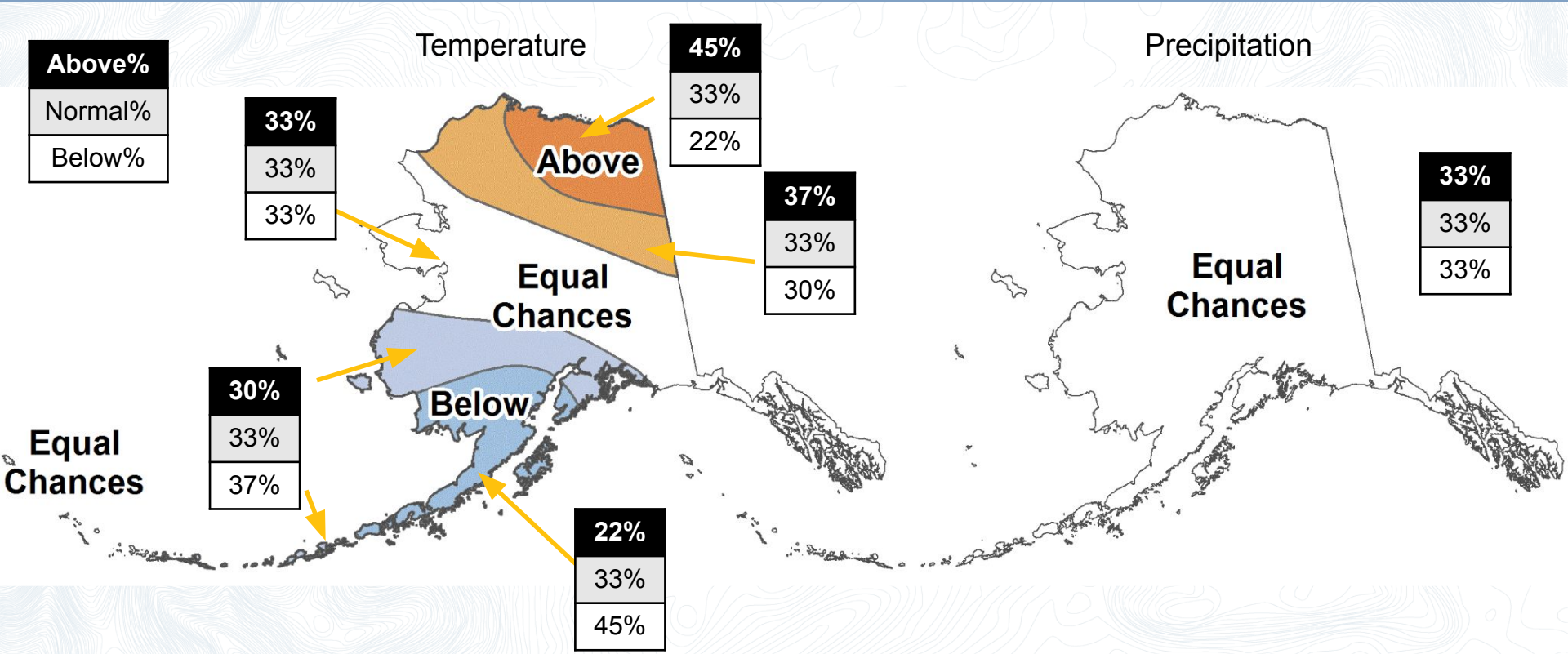


Precipitation



Bias Corrected, Skill Weighted CFS + ECMWF

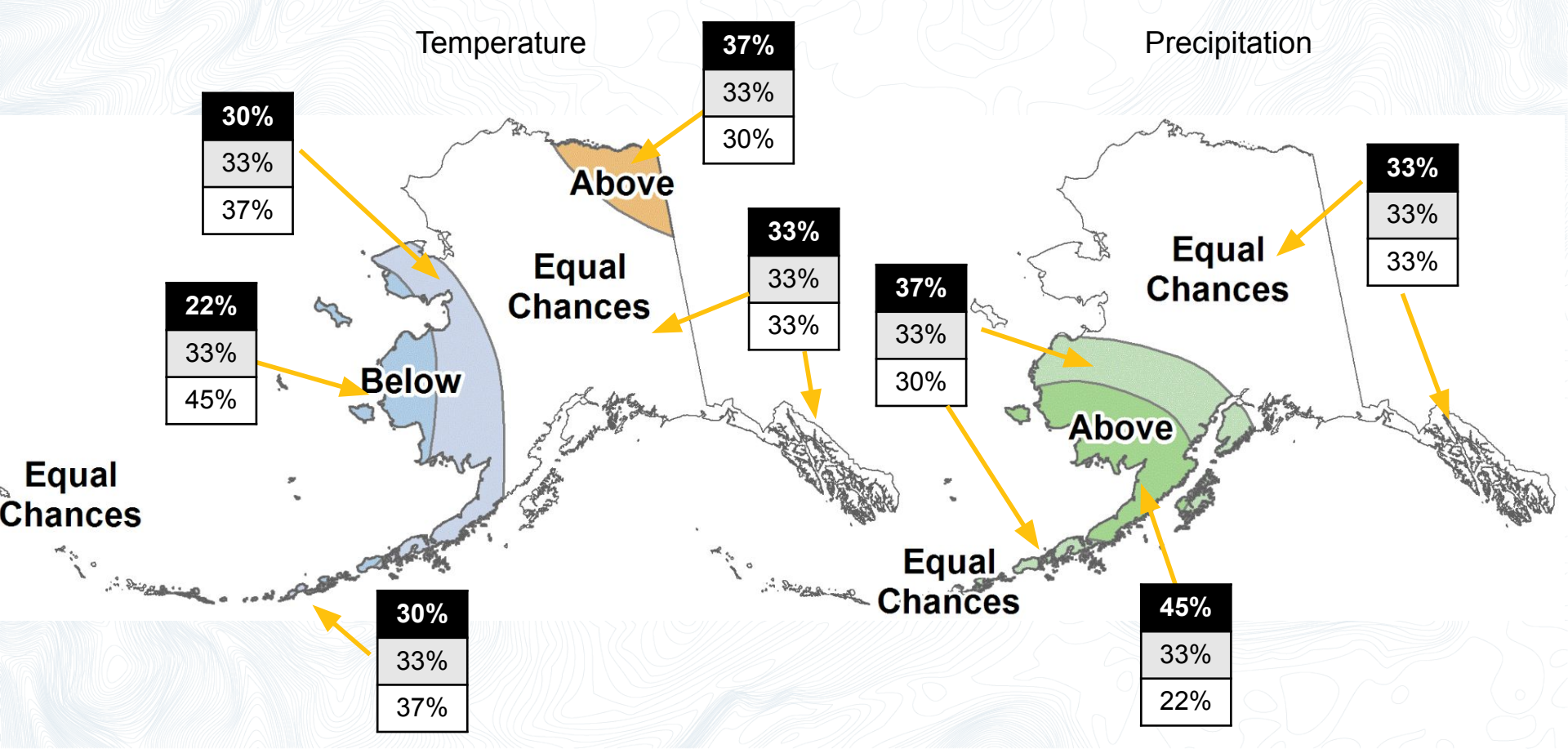
August-October 2024 outlooks from **June**



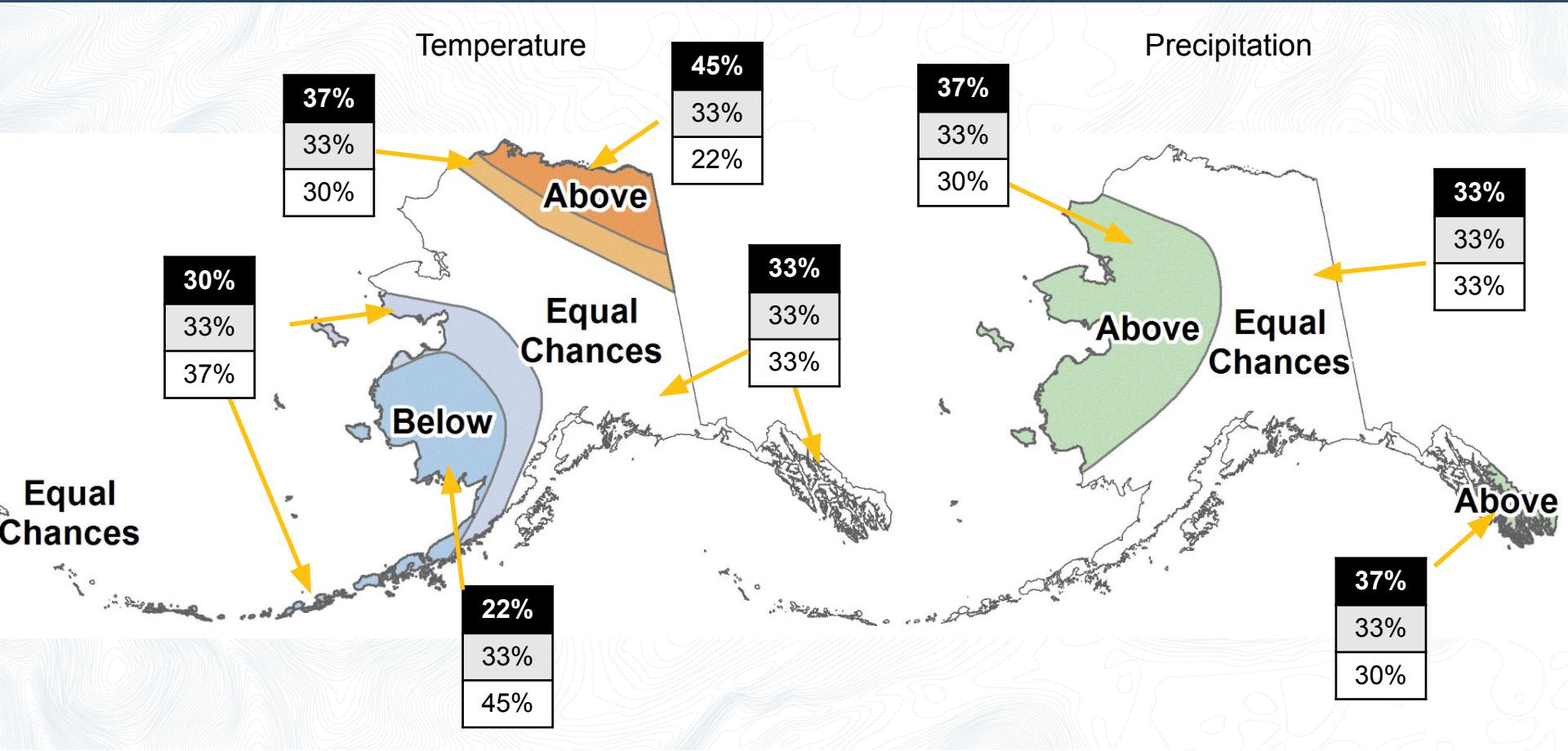
Future outlook

And the answer is...

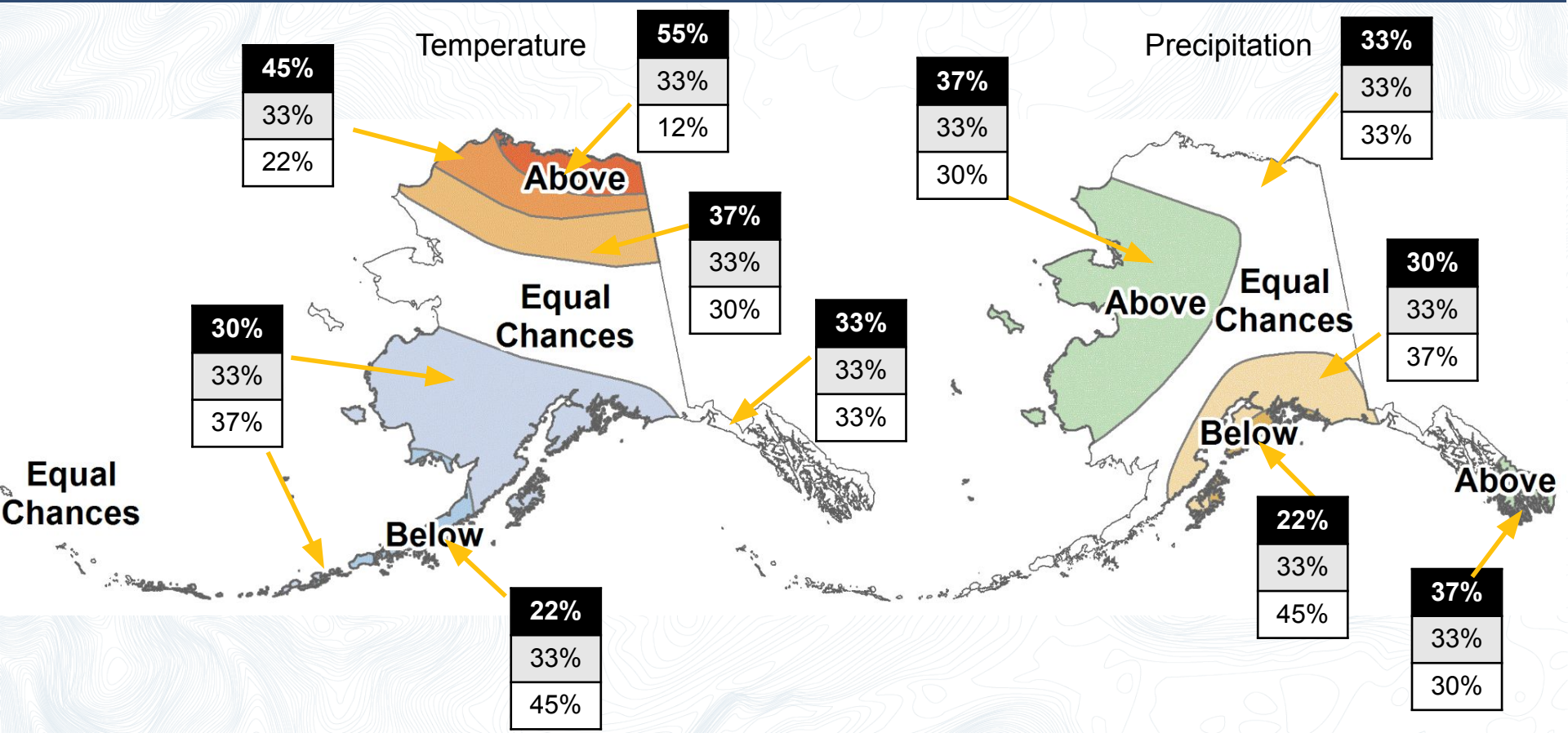
CPC **August** 2024 **outlooks**



CPC **August-October** 2024 **outlooks**



Autumn 2024 outlook



Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- July 31 ▸ Nancy Fresco: Spruce beetles under changing climate conditions
- August 16 ▸ NWS Alaska Climate Outlook Briefing

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