



Alaska climate outlook briefing June 2024

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ACCAP Climate Specialist
June 21, 2024





Monthly feature:
Wildfire 2024



Climate
forecast 101



Climate
review and
forecast report
card



Behind the
climate
forecast



Future
outlooks



Monthly feature > **Wildfire 2024**

- Typical May wildfire
- Largest: McDonald Fire southeast of Fairbanks, 39,700 acres
- June 21st total: 79,300 acres
 - below normal relative to 1993-2023



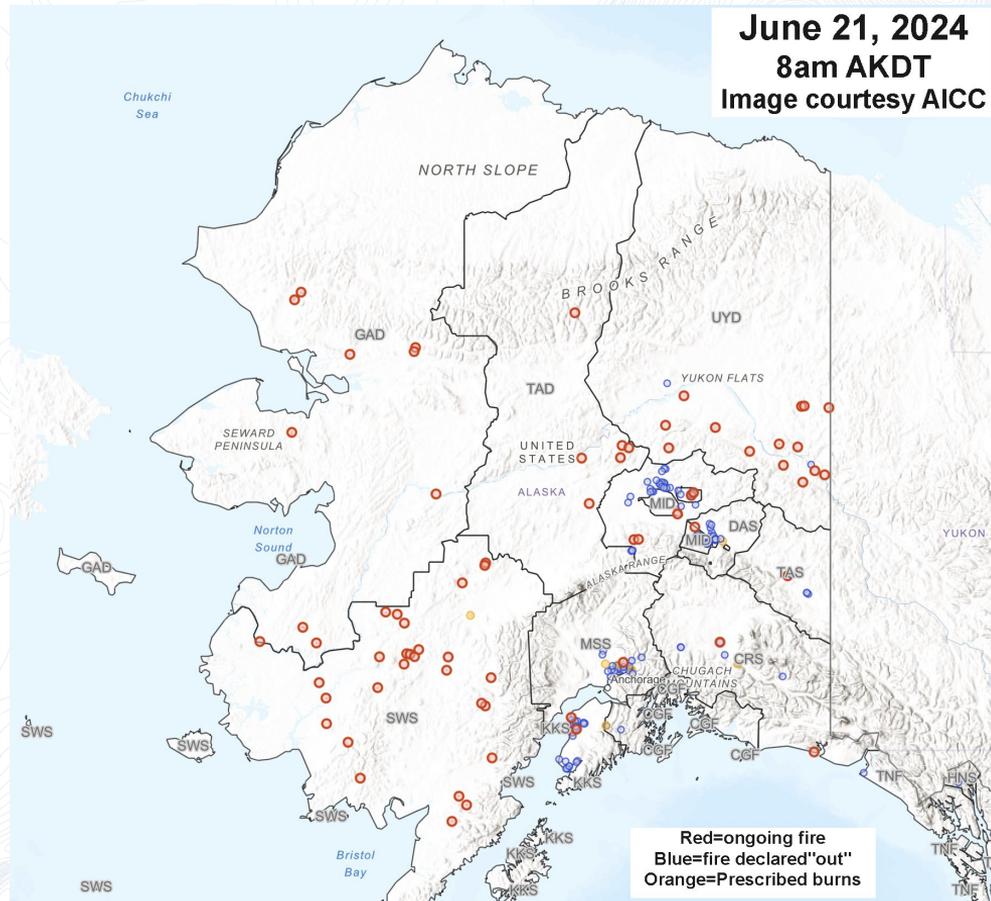
June 17th: McDonald Fire from
Ft. Wainwright

Credit: K. Hefington, BLM AFS

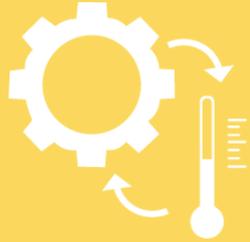


Monthly feature > Wildfire 2024

- More than 50 new fires this week, mostly in southwest Alaska
- Three large tundra fires northwest Alaska (more than 15,000 acres)



Climate forecast 101

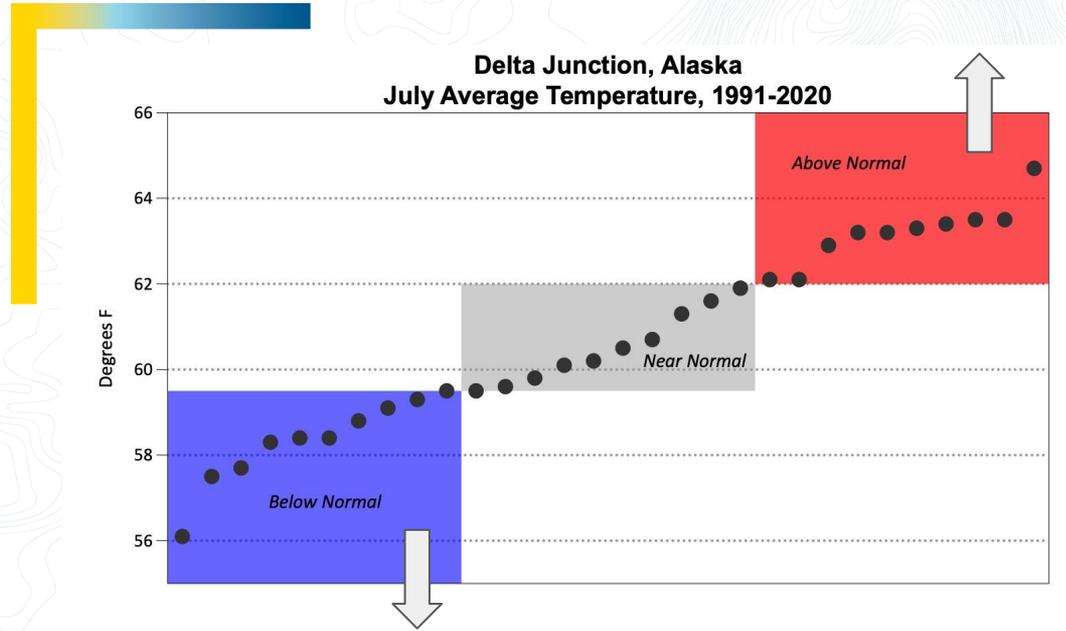


NOAA Center for Weather and Climate Prediction

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:





What's happened?

How did previous climate outlooks perform?



Notable May-June Happenings



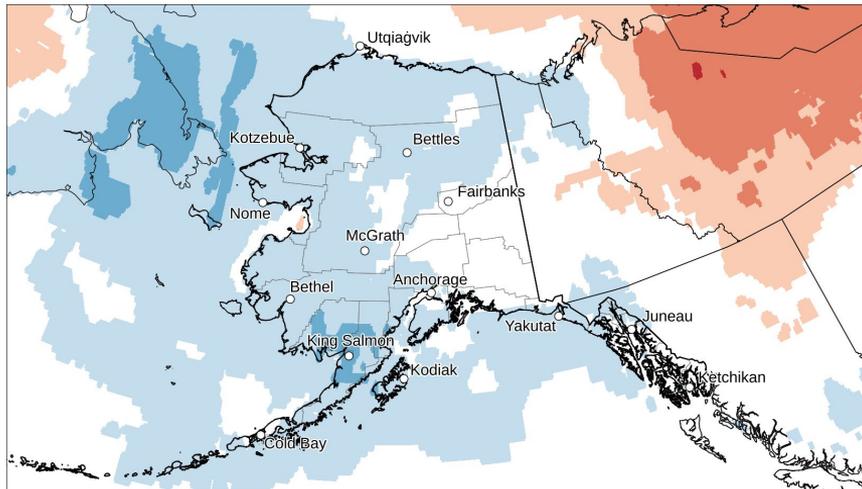
Shishmaref June 18, 2024

Credit: A. Kanooka

- **Southcentral:** June 14-15 warmest weather in a couple years.
- **Western Alaska:** Late season snow
 - June 4 YK Delta southward
 - June 17-18 Bering Strait
- **Central Interior:** Warmest start to June since 2004
- **North Slope:** Snow melt and river break-up mostly complete

Model- based regional analysis > Average temperatures

Temperature Classification for May 2024



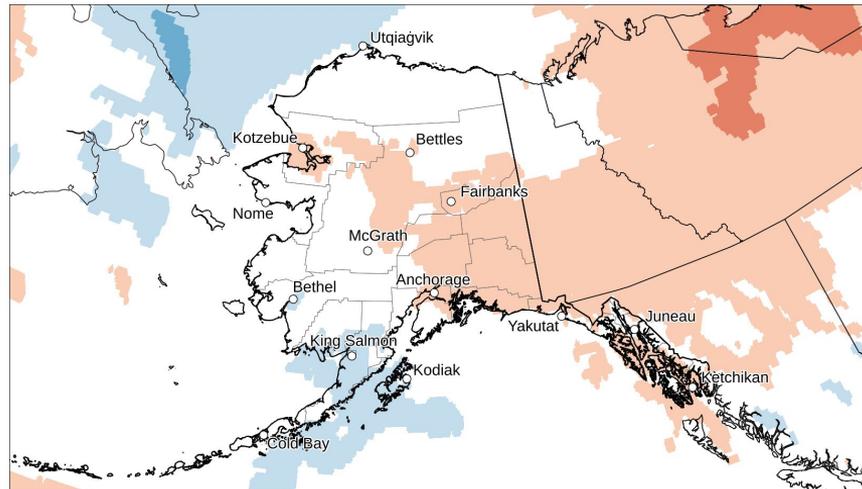
Source: ERA5 Reanalysis

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 Mar-May 2024



Source: ERA5 Reanalysis

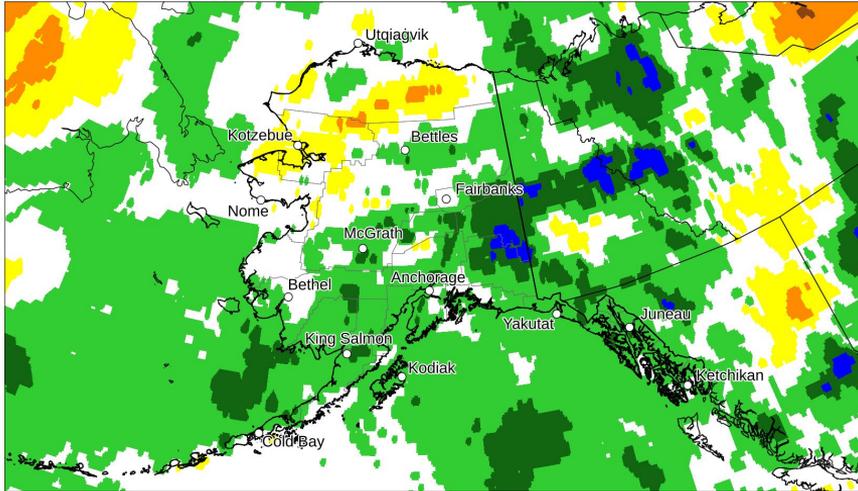
Map by: Brian Brettschneider

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 May 2024



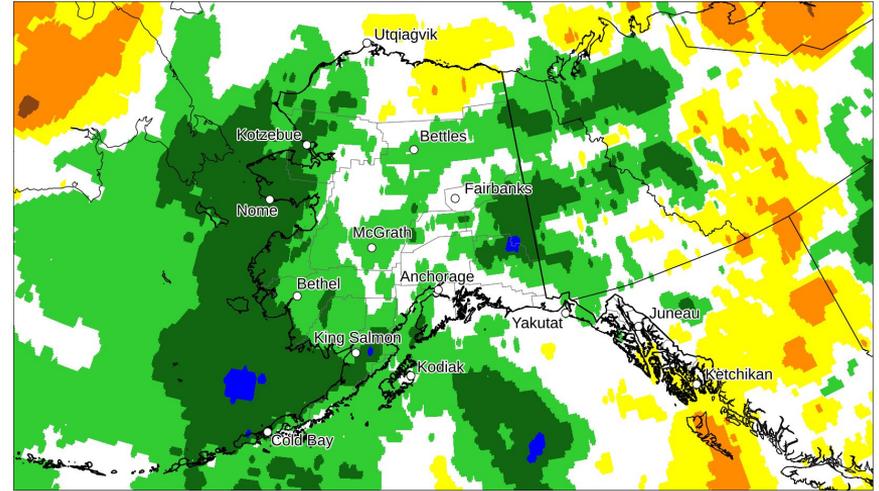
Source: ERA5 Reanalysis

Map by: Brian Brettschneider



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

Precipitation Classification for Mar-May 2024



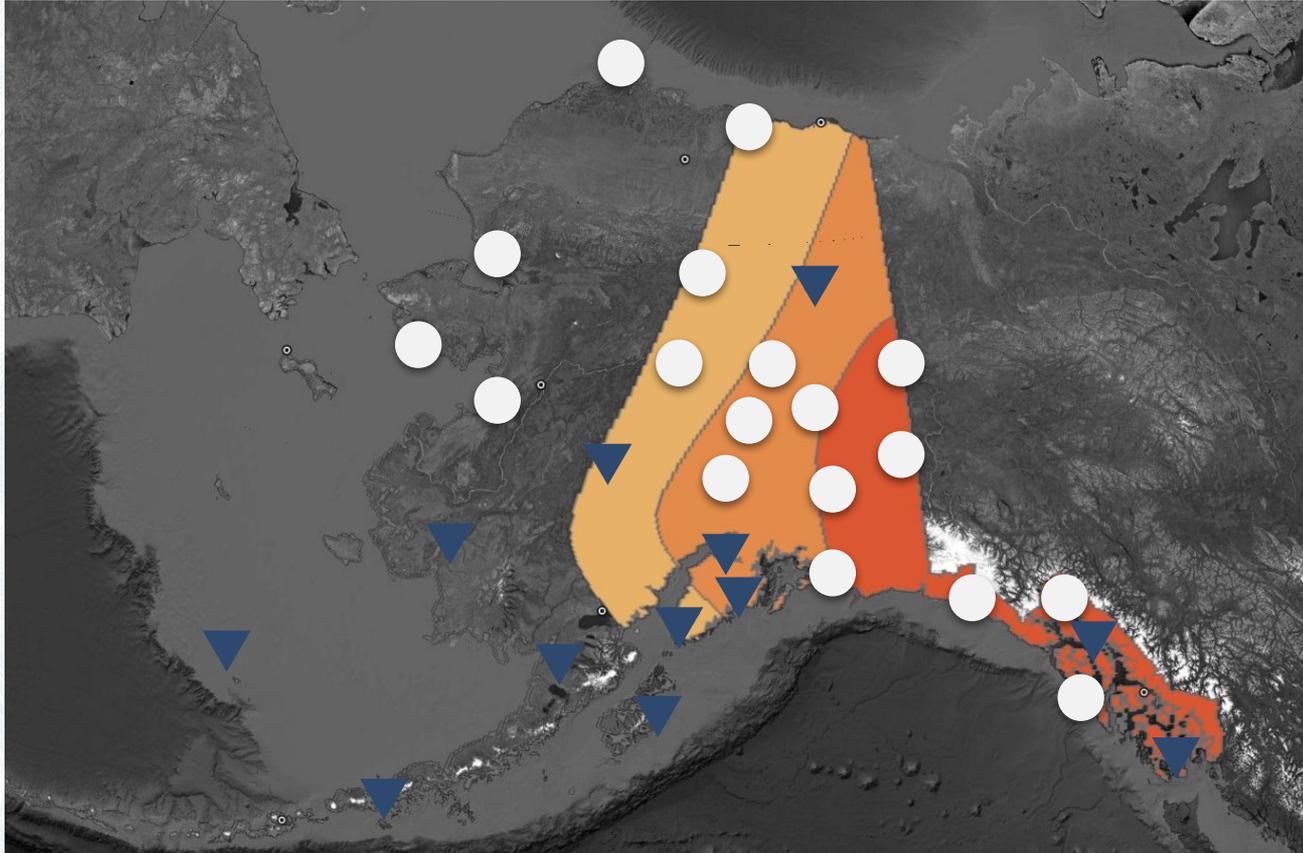
Source: ERA5 Reanalysis

Map by: Brian Brettschneider



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

May 2024 temperature > CPC outlook and observed



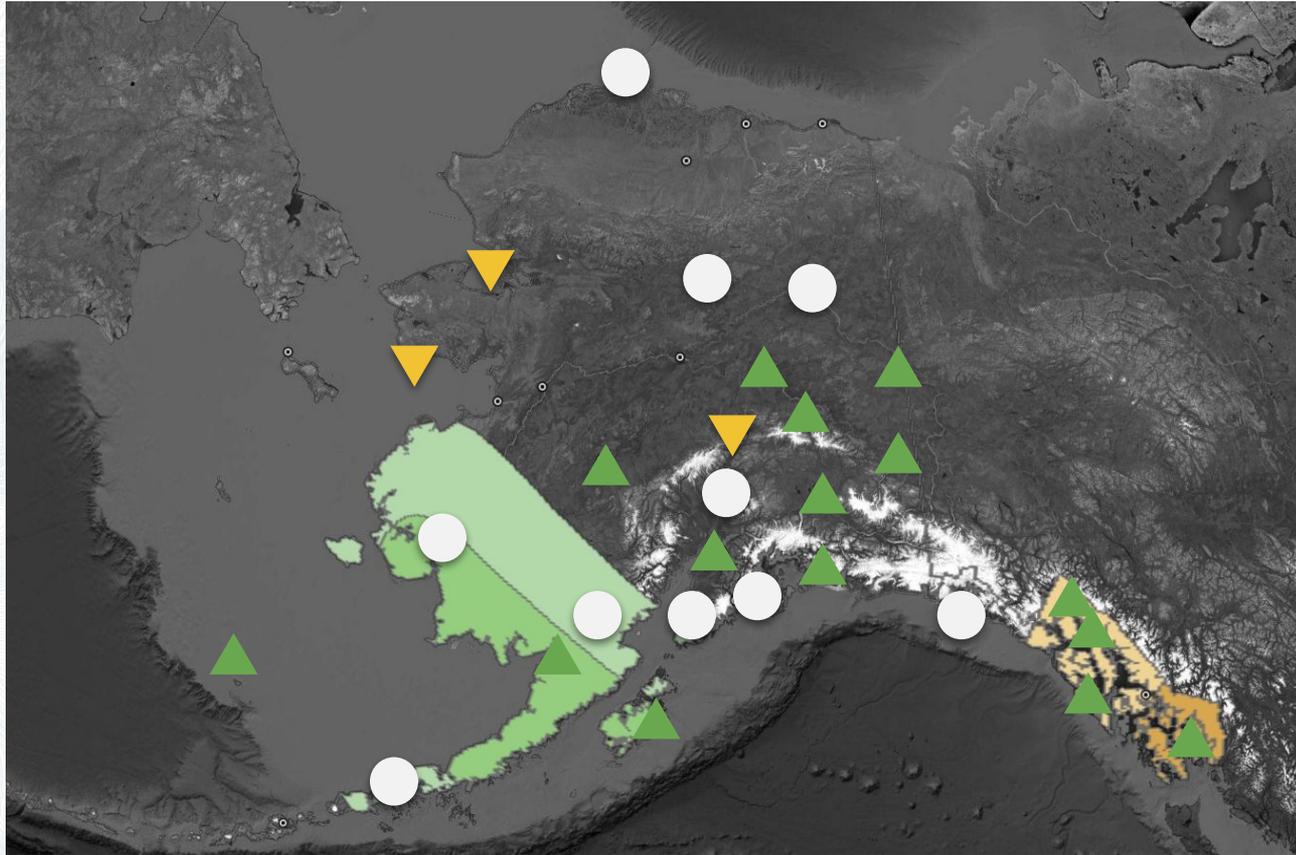
Non-EC skill
score: -50

Percent
correct: 0%

Mid-month
outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

May 2024 precipitation > CPC outlook and observed



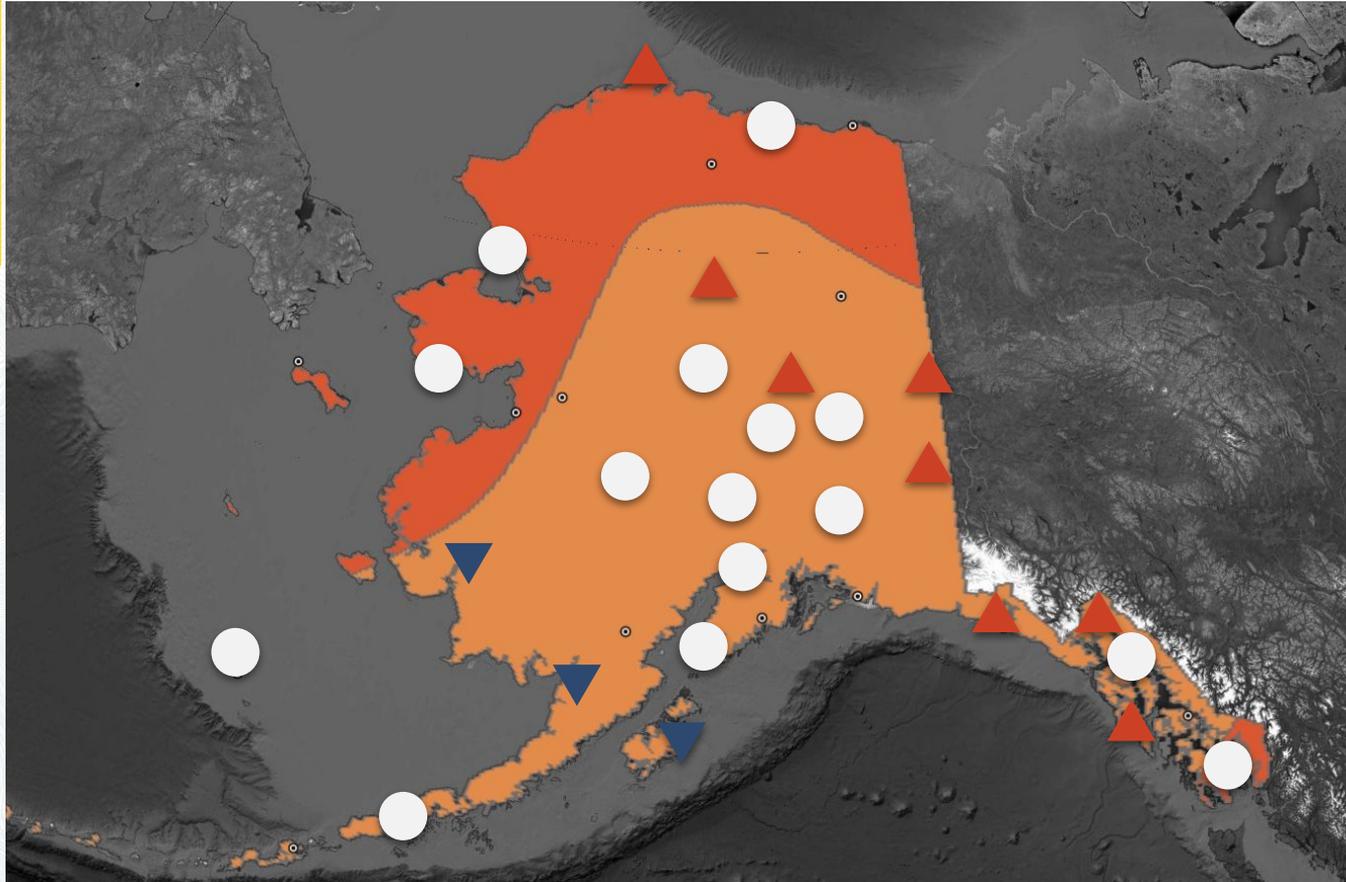
Non-EC skill
score: -05

Percent
correct: 30%

Mid-month
outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

March-May 2024 temperature > CPC outlook & observed

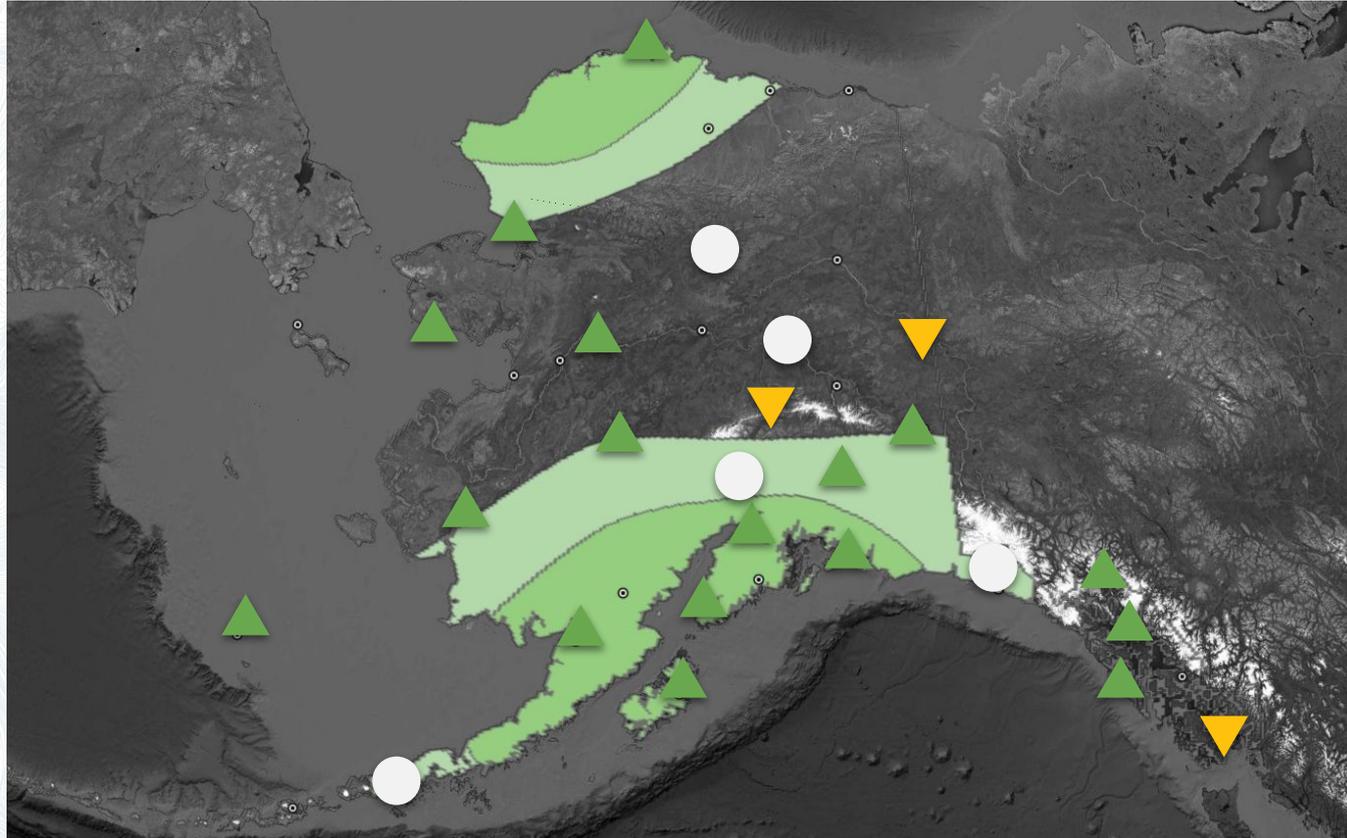


Non-EC skill
score: -07

Percent
correct: 29%

- ▲ Above normal
- Near normal
- ▼ Below normal

March-May 2024 precipitation > CPC outlook & observed

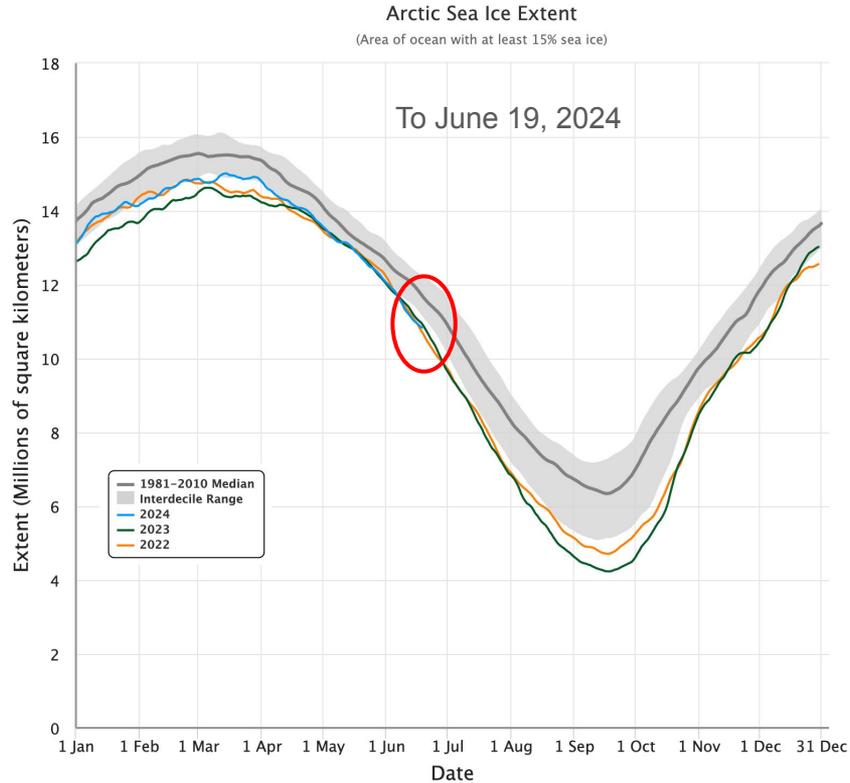


Non-EC skill
score: +56

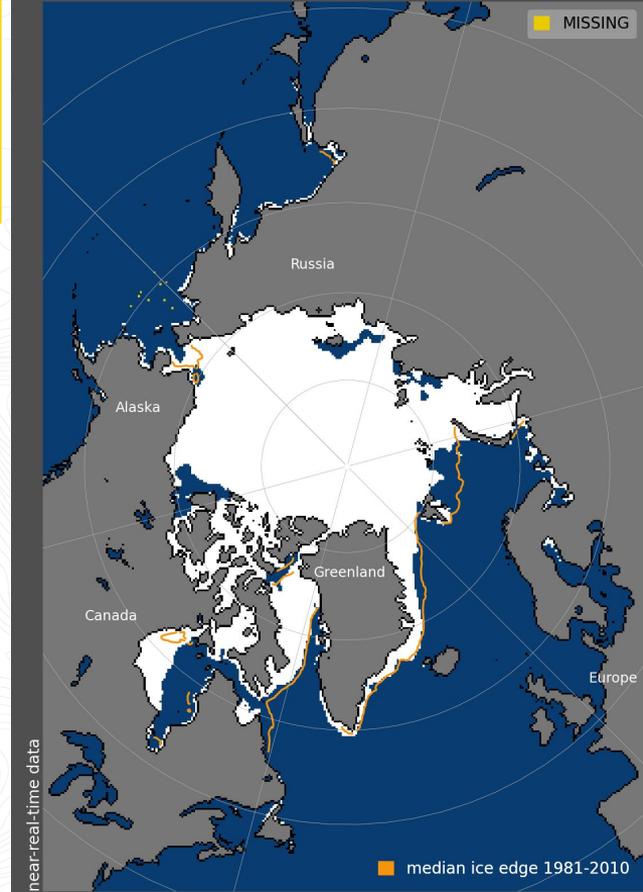
Percent
correct: 71%

- ▲ Above normal
- Near normal
- ▼ Below normal

Arctic wide sea ice

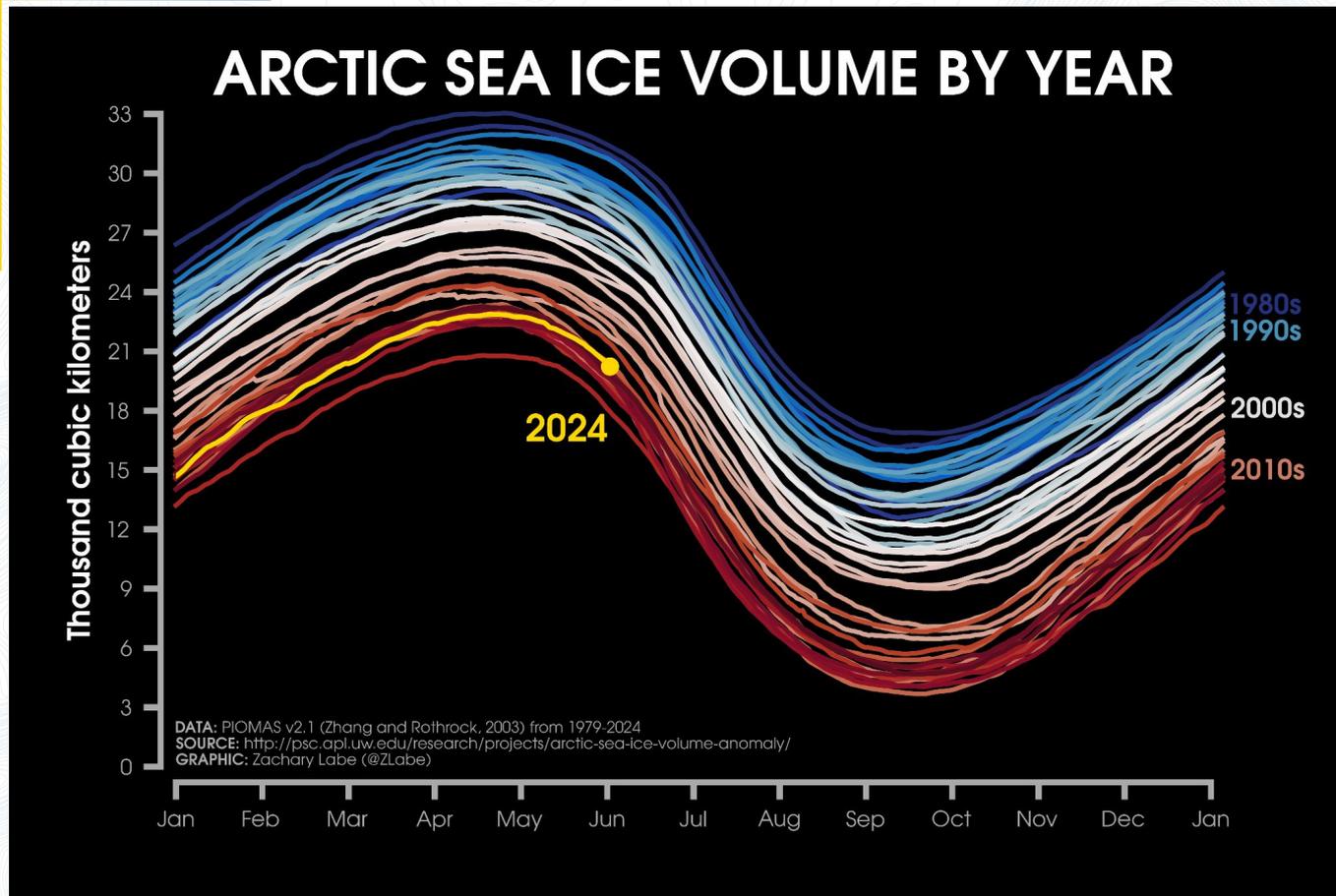


Sea Ice Extent, 19 Jun 2024



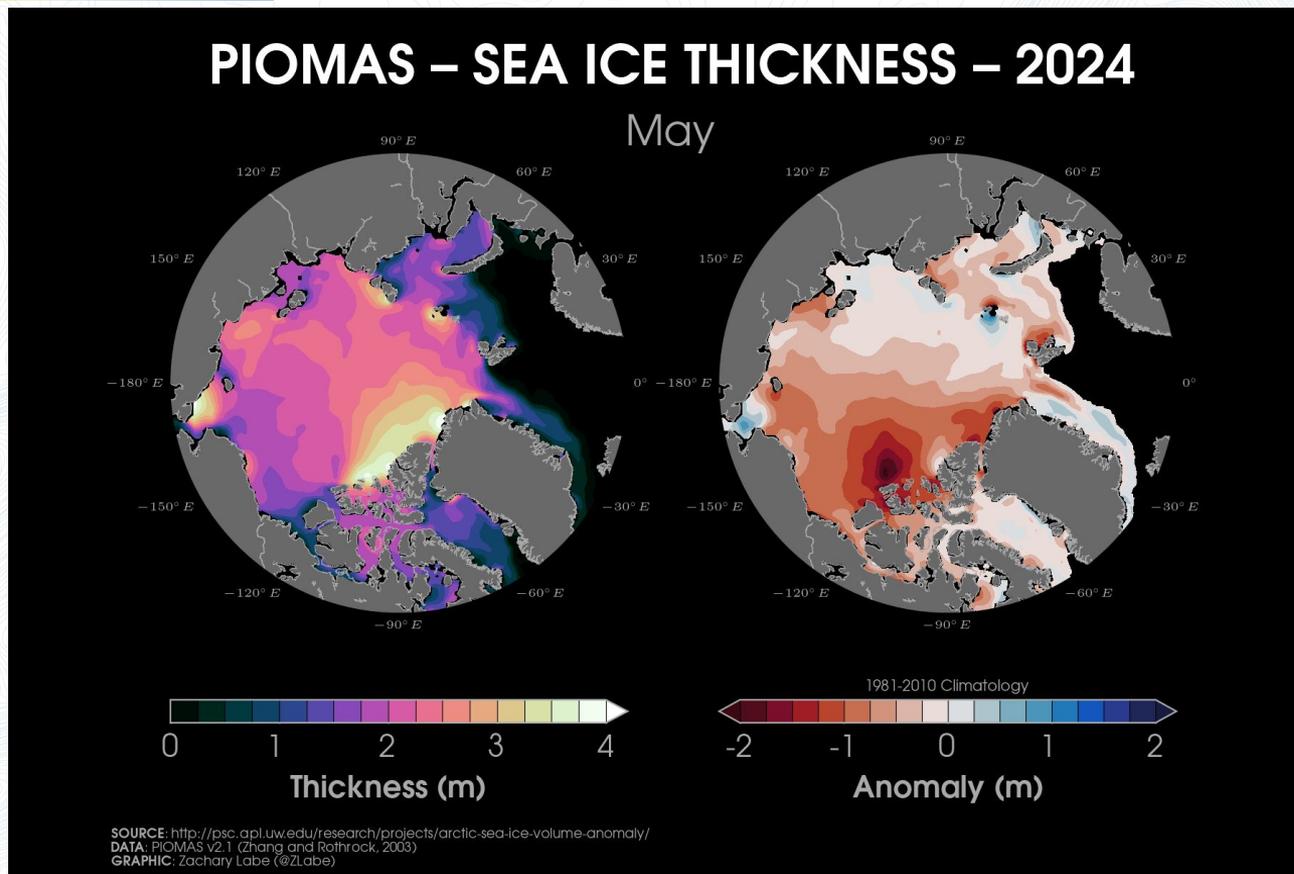
Arctic sea ice volume

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



Arctic sea ice thickness

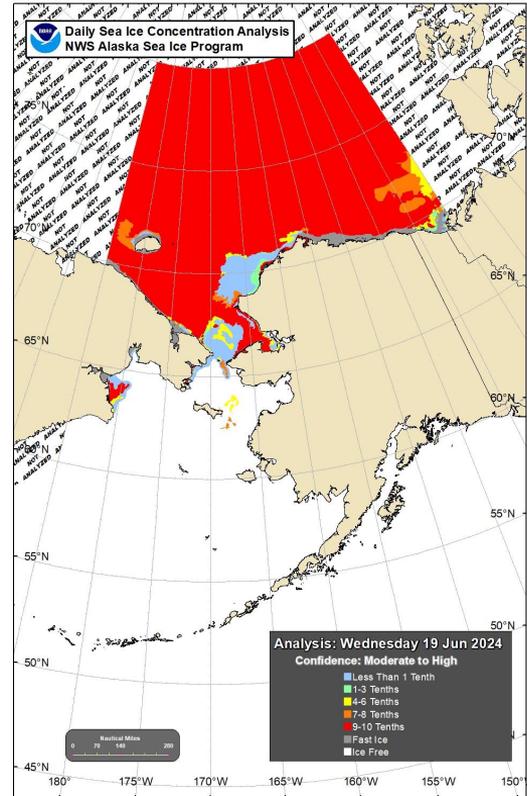
Sources:
Data from U.
Wa./PIOMAS data
Graphics by Z. Labe,
Princeton U.



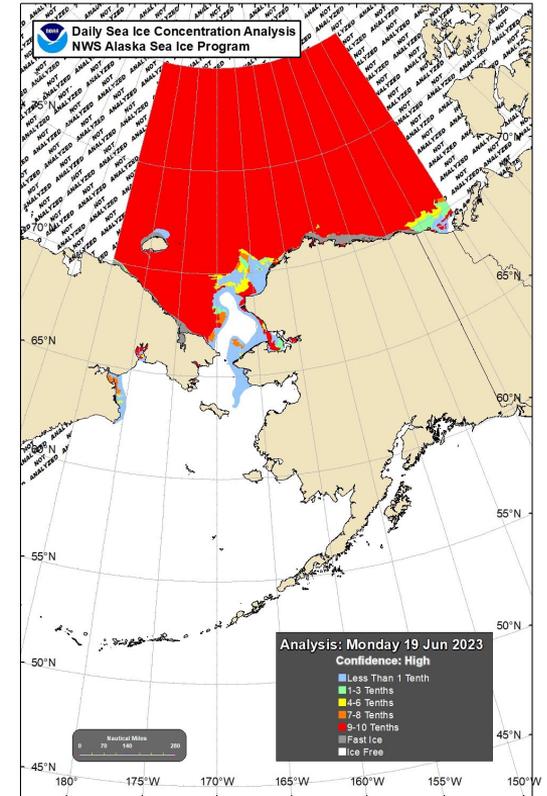
Mid-June sea ice comparison

Source: National Weather Service Alaska Region Sea Ice Program

June 19, 2024

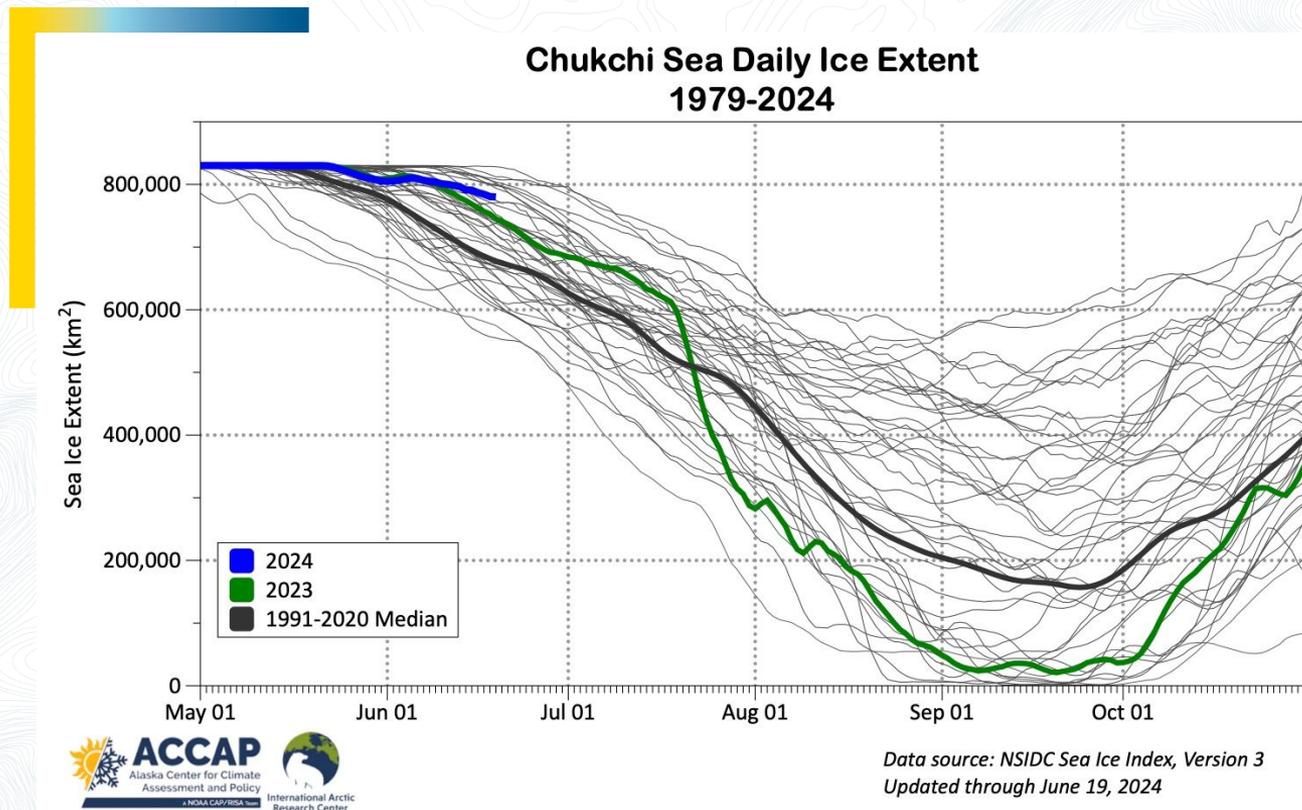


June 19, 2023



Sea ice extent through the season

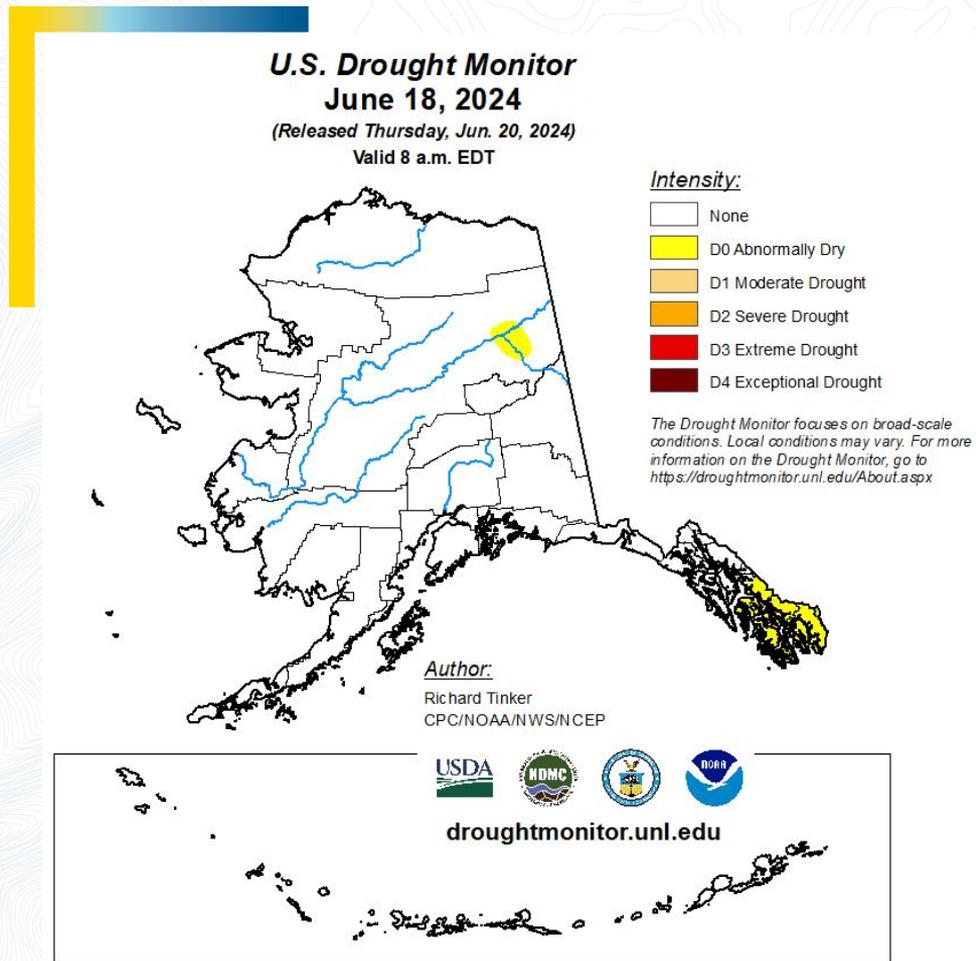
Sources:
Data NSIDC Sea Ice Index,
Version 3. Through June
19, 2024.



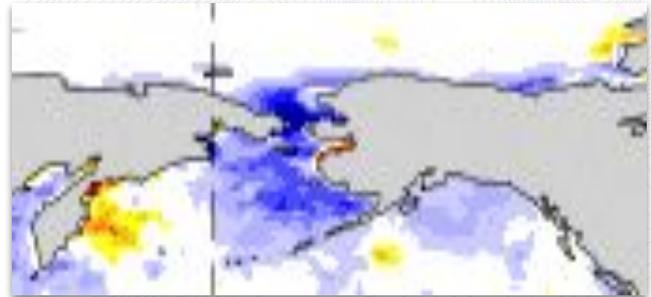
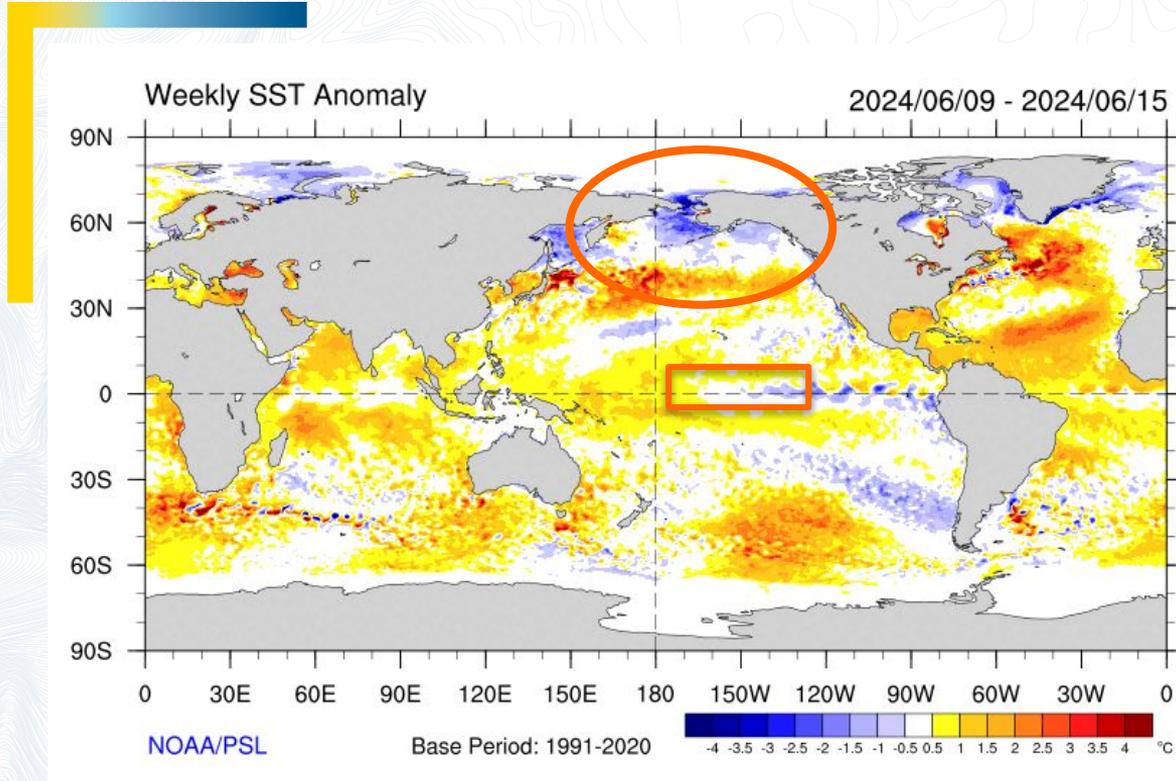
Chukchi Sea ice extent highest for
mid-June since 2000

Drought Analysis

Source:
US Drought Monitor



Global sea surface temperature departure from normal

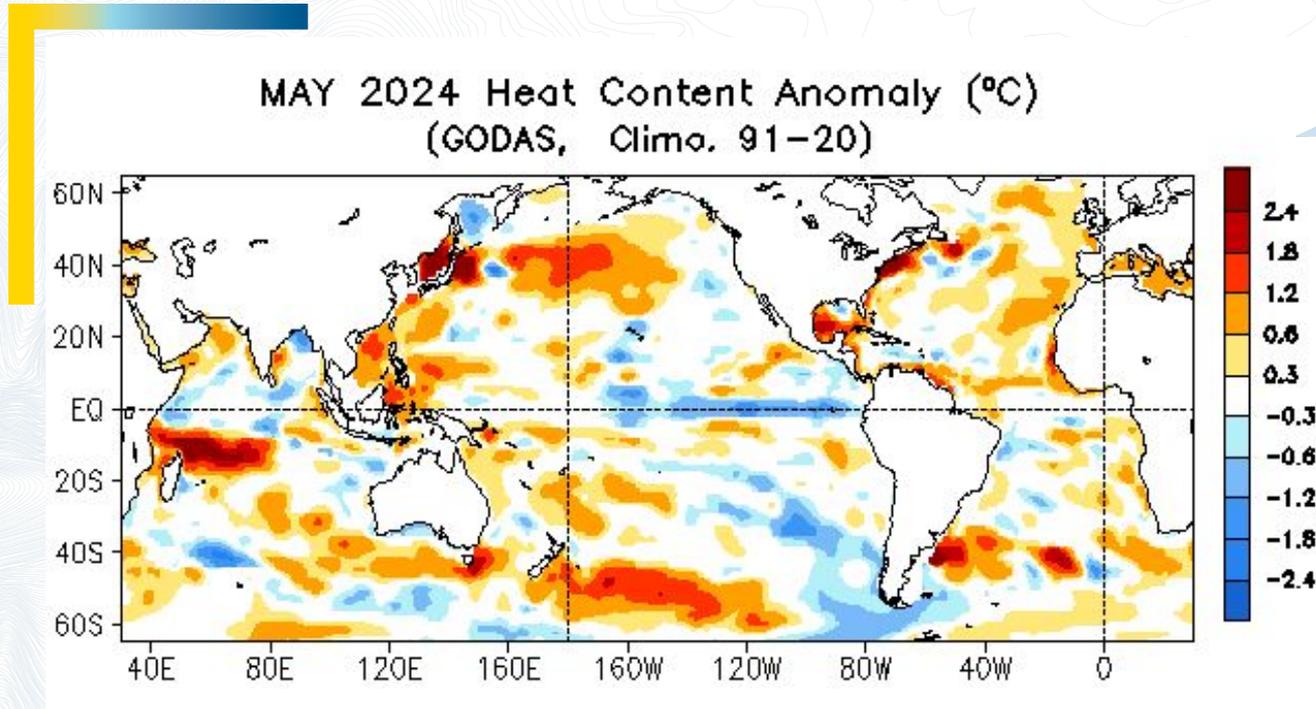


ONI for Mar-May: +0.7

PDO for **May** 2024: -1.8

Sources: ONI from CPC
PDO Index from WCS

Upper ocean heat departure from average



Little change in
Gulf of Alaska

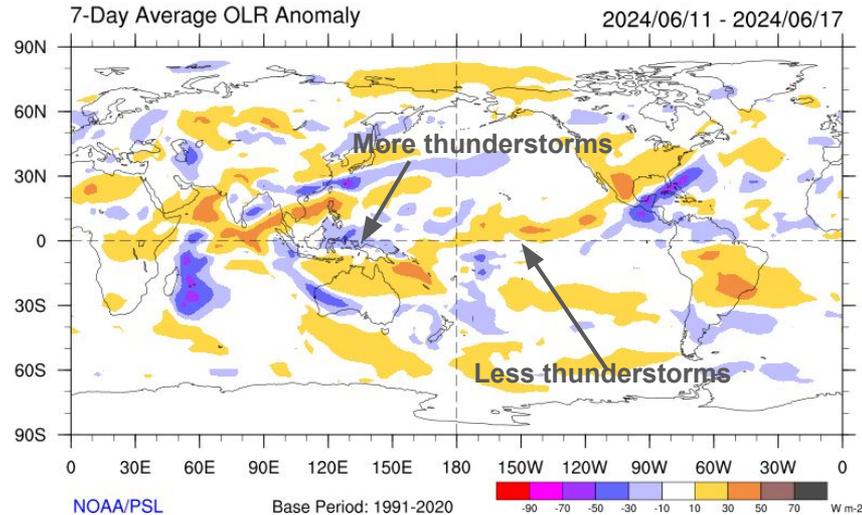
Sources:
CPC

Upper 300 meters of the ocean

Tropical Pacific atmosphere

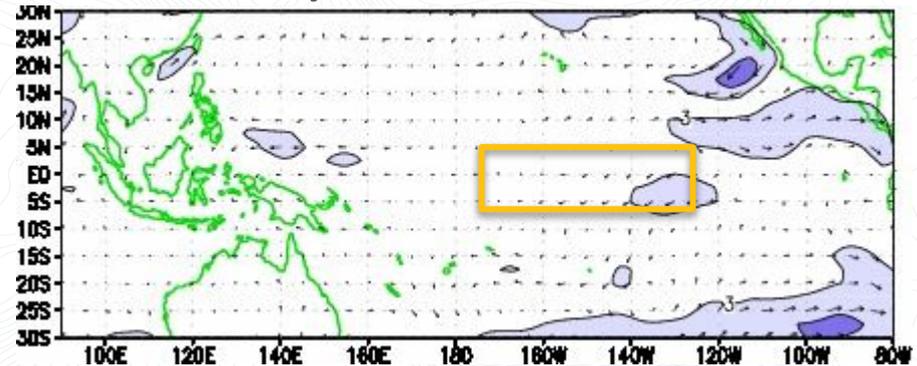
March-May Oceanic
Niño Index: +0.7

Deep tropical convection
Via “outgoing longwave radiation”

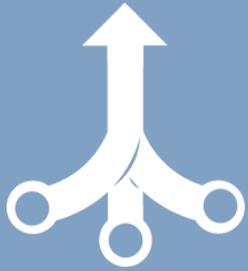


Trade winds near average
Niño Region 3.4

850 mb wind anomalies
May 19-June 17, 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

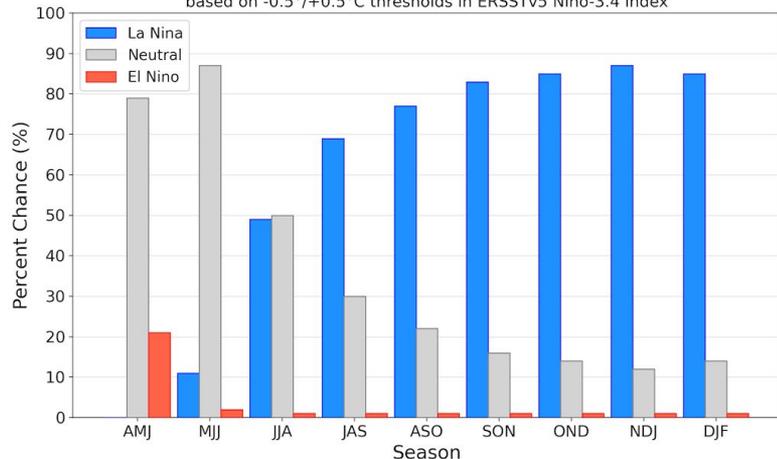
May 2024

Strong El Niño reached early autumn
5th highest since 1950 by ONI



Official NOAA CPC ENSO Probabilities (issued May 2024)

based on $-0.5^{\circ}/+0.5^{\circ}\text{C}$ thresholds in ERSSTv5 Niño-3.4 index



June 2024

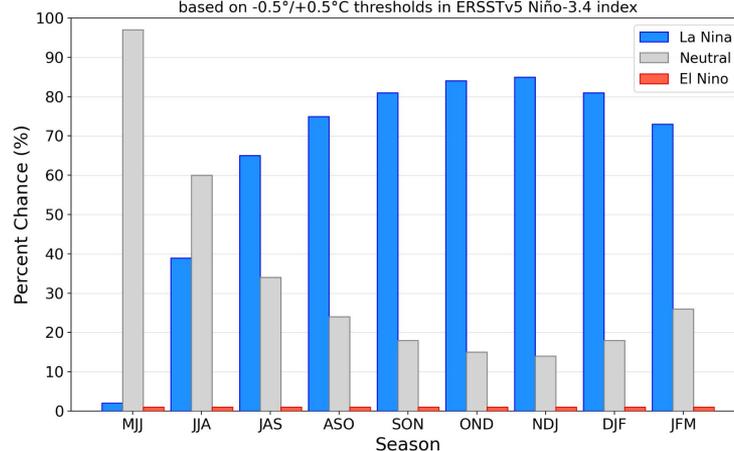
El Niño weakening rapidly
Mar-May very likely last season of El Niño

ENSO Alert System Status:
2023-24 El Niño Advisory ended
& La Niña Watch



Official NOAA CPC ENSO Probabilities (issued June 2024)

based on $-0.5^{\circ}/+0.5^{\circ}\text{C}$ thresholds in ERSSTv5 Niño-3.4 index



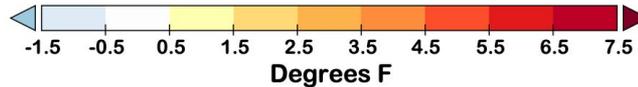
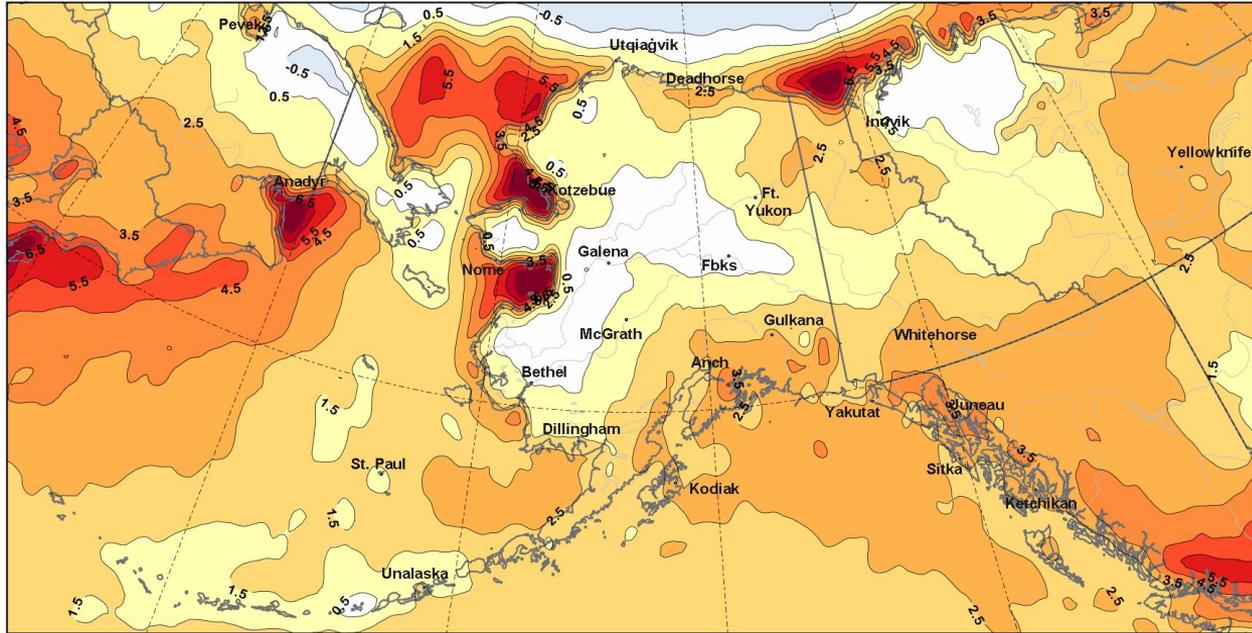
**Statistical
guidance** ➤
using the past
to predict the
future

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

July half century trends ➤ Temperature

Total Change in July Average Temperature
1974-2023

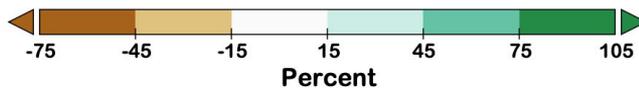
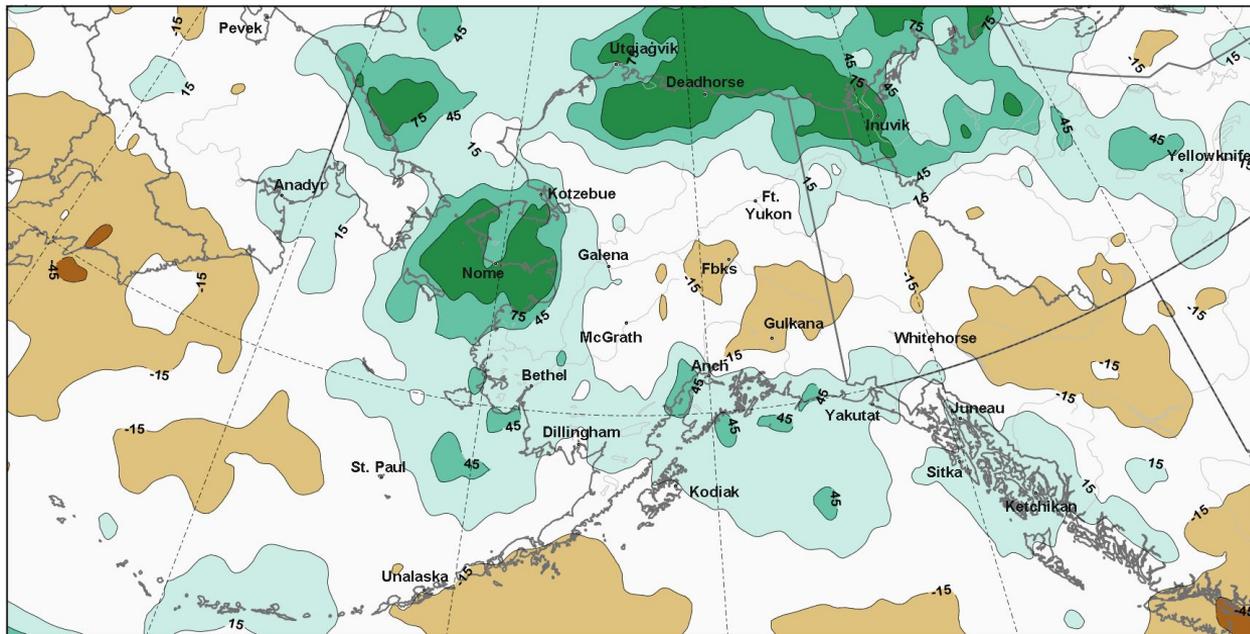
Trend over 50
years



July half century trends ➤ Precipitation

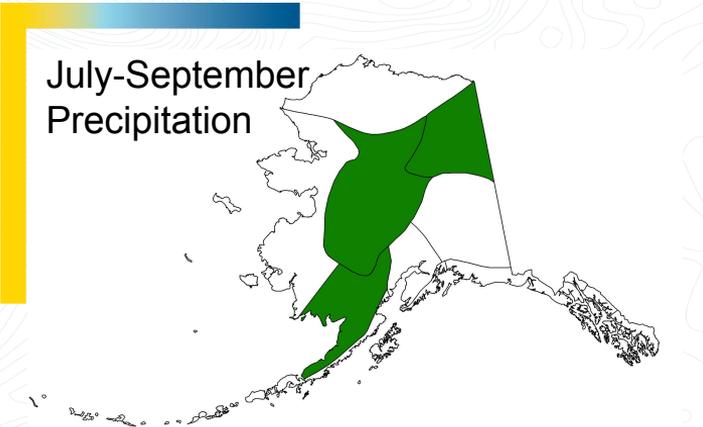
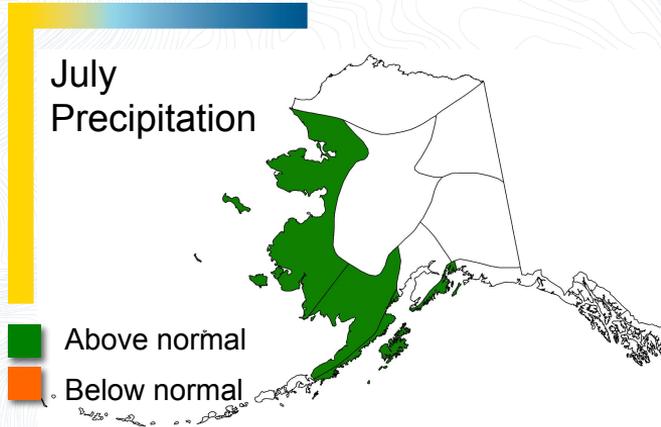
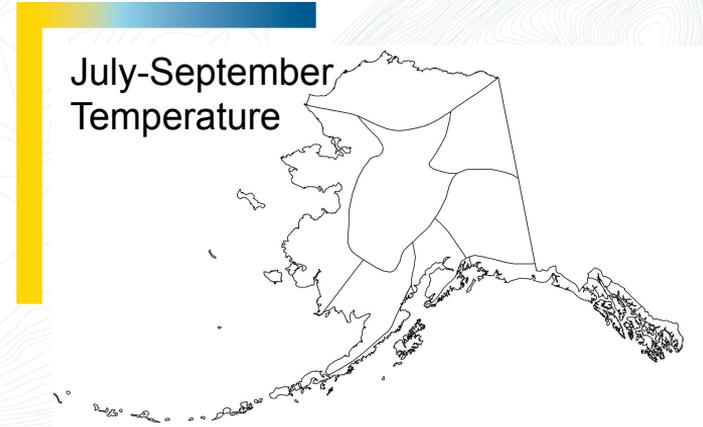
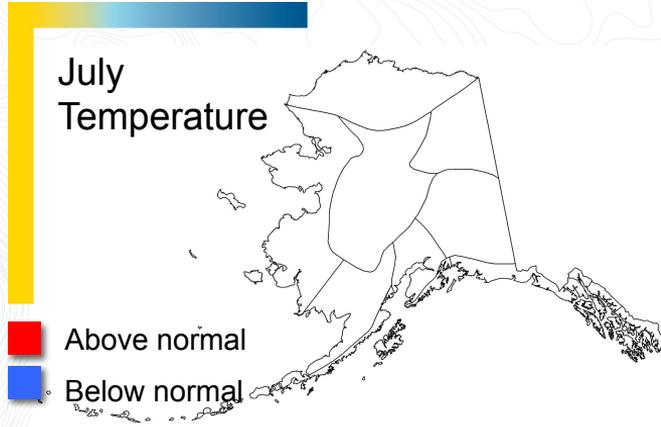
Percent Change in July Total Precipitation
1974-2023

Trend over 50
years



2009 to 2023 trends

Past 15 years compared to 1991-2020



Dynamic model forecasts

Current suite of Dynamic Climate Models

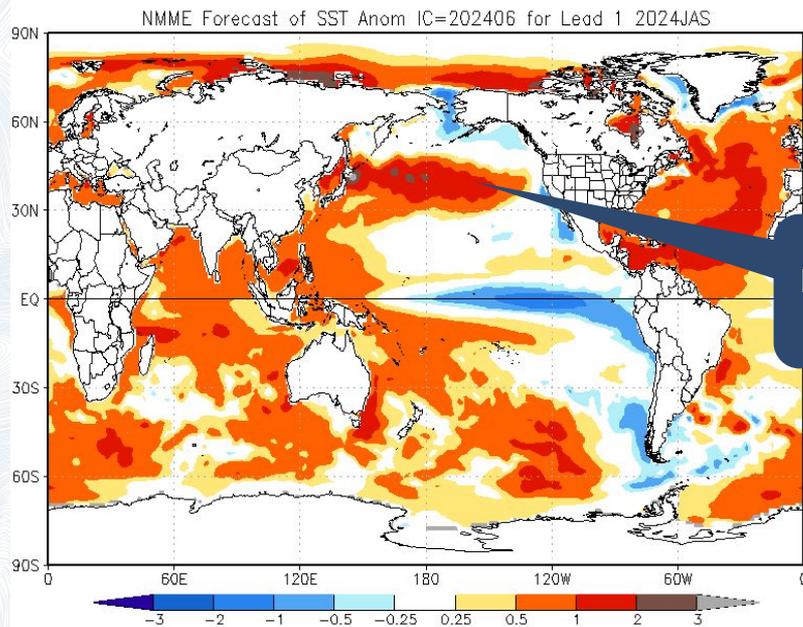
- CPC Experimental Sea Ice Ensemble
- World Climate Service Multi-Model Ensemble
- North American Multi-Model Ensemble (NMME)

What's being forecasted

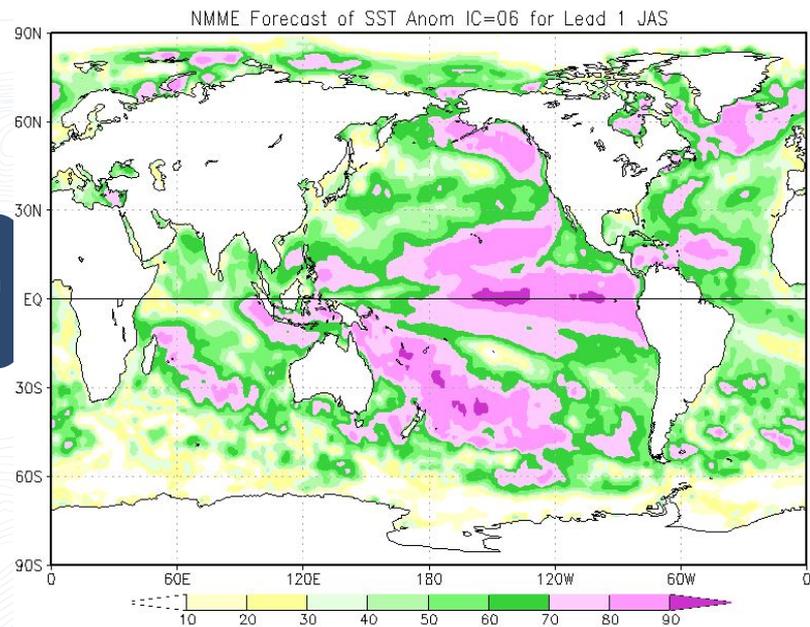
- Sea surface temperatures
- Sea ice forecast
- Temperature and precip relative to normal

July-September 2024 sea surface temperature ➤ NMME

Forecast
departure from normal

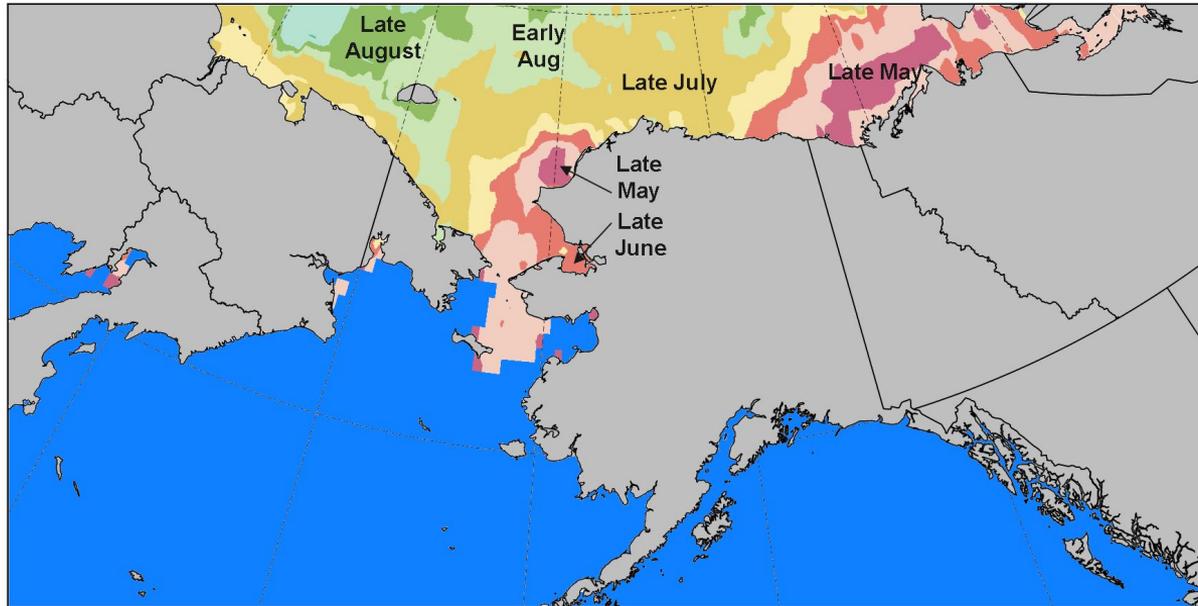


Skill
of the forecast



Experimental sea ice forecast > CPC

First date with open water
Spring/Summer 2024



Open water=Sea ice concentration less than 15%

Average of multiple model runs starting with late May data

July 2024 calibrated probability forecast ➤ NMME

Forecast from →

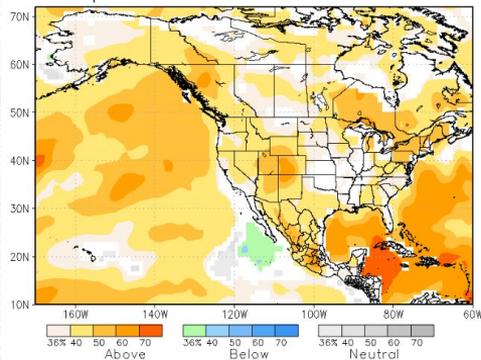
April

May

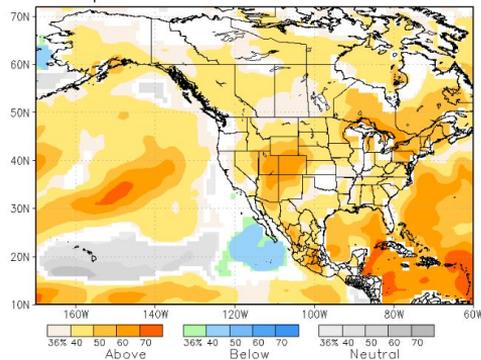
June

Temperature

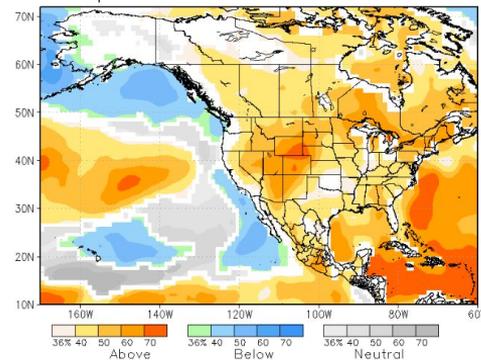
NMME prob fcst TMP2m IC=202404 for lead 3 2024 Jul



NMME prob fcst TMP2m IC=202405 for lead 2 2024 Jul

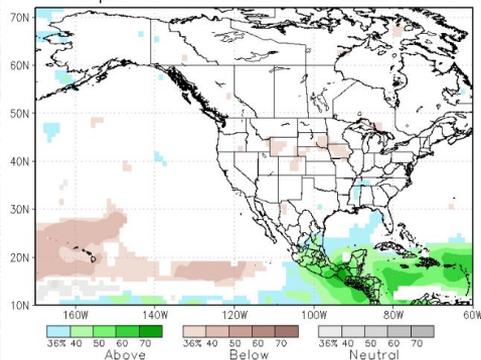


NMME prob fcst TMP2m IC=202406 for lead 1 2024 Jul

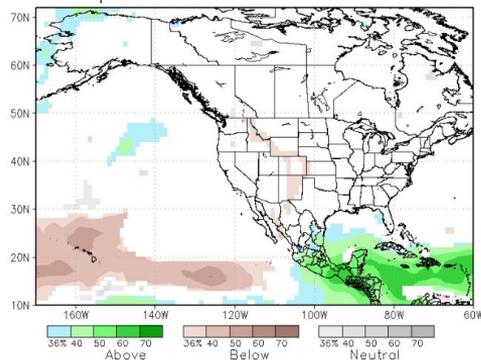


Precipitation

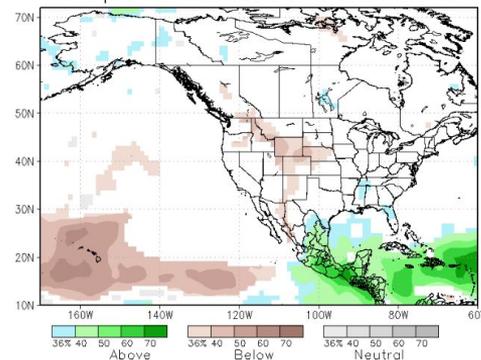
NMME prob fcst Prate IC=202404 for lead 3 2024 Jul



NMME prob fcst Prate IC=202405 for lead 2 2024 Jul



NMME prob fcst Prate IC=202406 for lead 1 2024 Jul

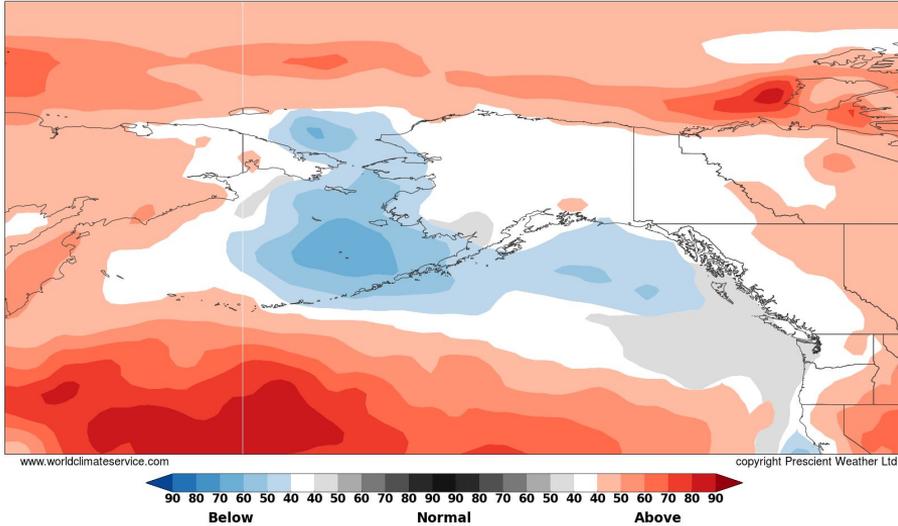


July 2024 outlooks ➤ World Climate Service

Temperature



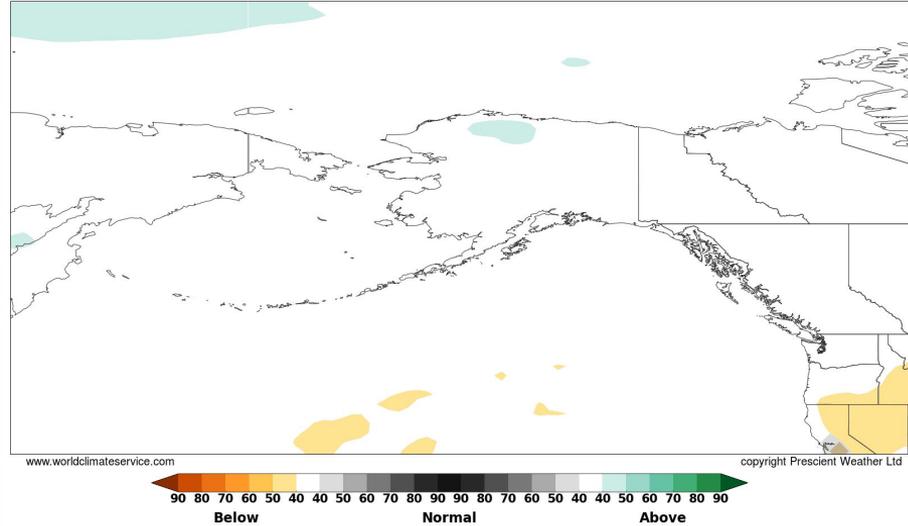
Multi-Model T2m Probability Above/Normal/Below
Forecast Valid July 2024
Initialized June 2024 1991-2020 Climatology



Precipitation



Multi-Model Precipitation Probability Above/Normal/Below
Forecast Valid July 2024
Initialized June 2024 1991-2020 Climatology



Bias Corrected, Skill Weighted CFS + ECMWF

July-September 2024 calibrated probability forecast

NMME

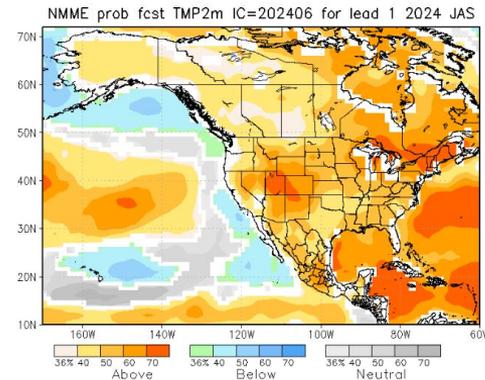
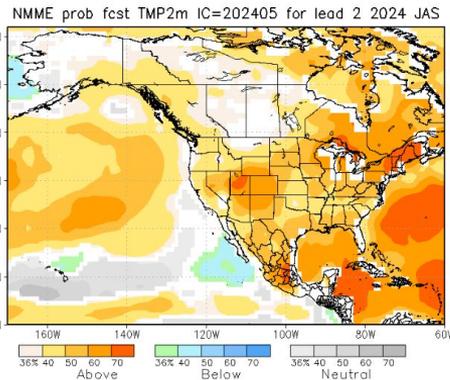
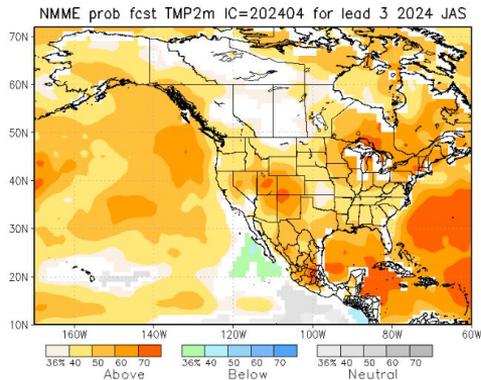
Forecast from →

April

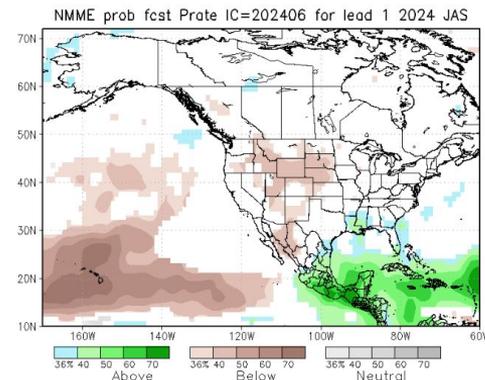
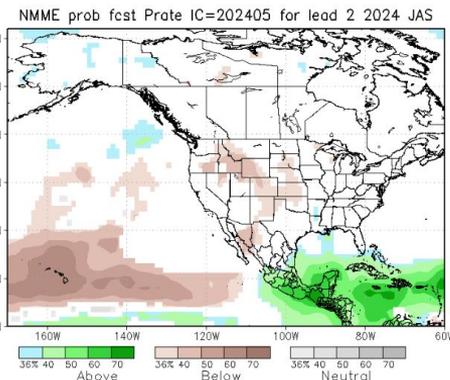
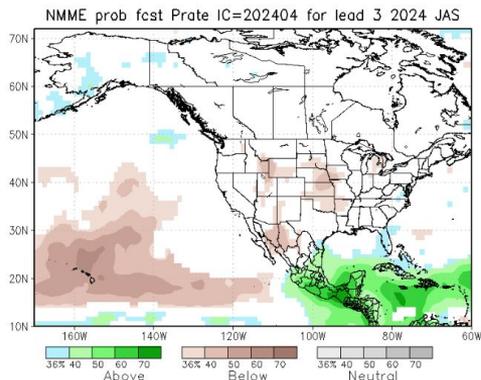
May

June


Temperature




Precipitation



July-September 2024 outlooks ➤ World Climate Service

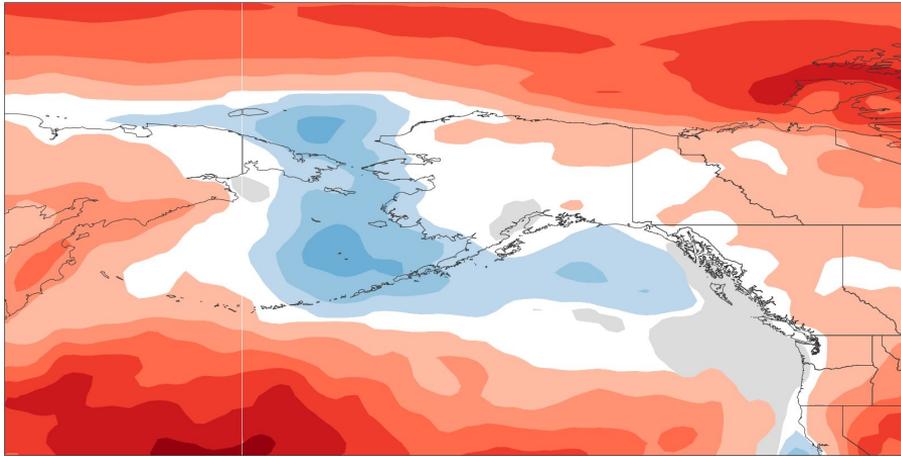
Temperature



Precipitation



Multi-Model T2m Probability Above/Normal/Below
Forecast Valid Jul 2024 - Sep 2024
Initialized June 2024 1991-2020 Climatology

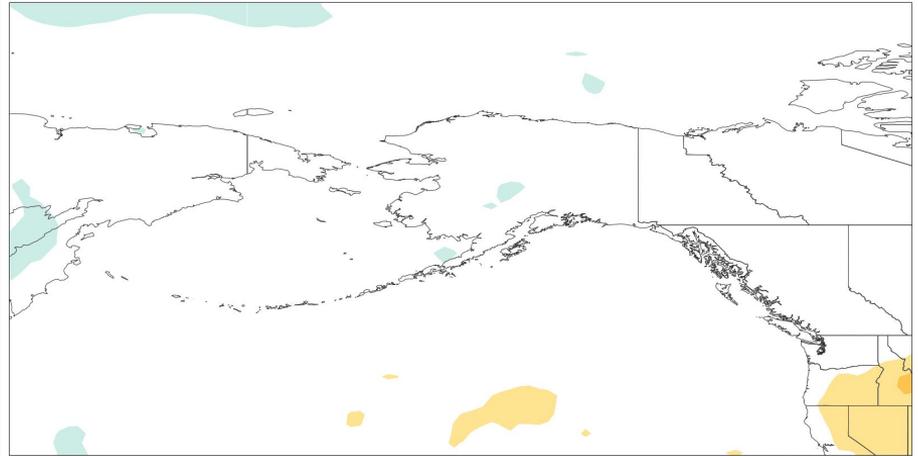


www.worldclimateservice.com

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Multi-Model Precipitation Probability Above/Normal/Below
Forecast Valid Jul 2024 - Sep 2024
Initialized June 2024 1991-2020 Climatology



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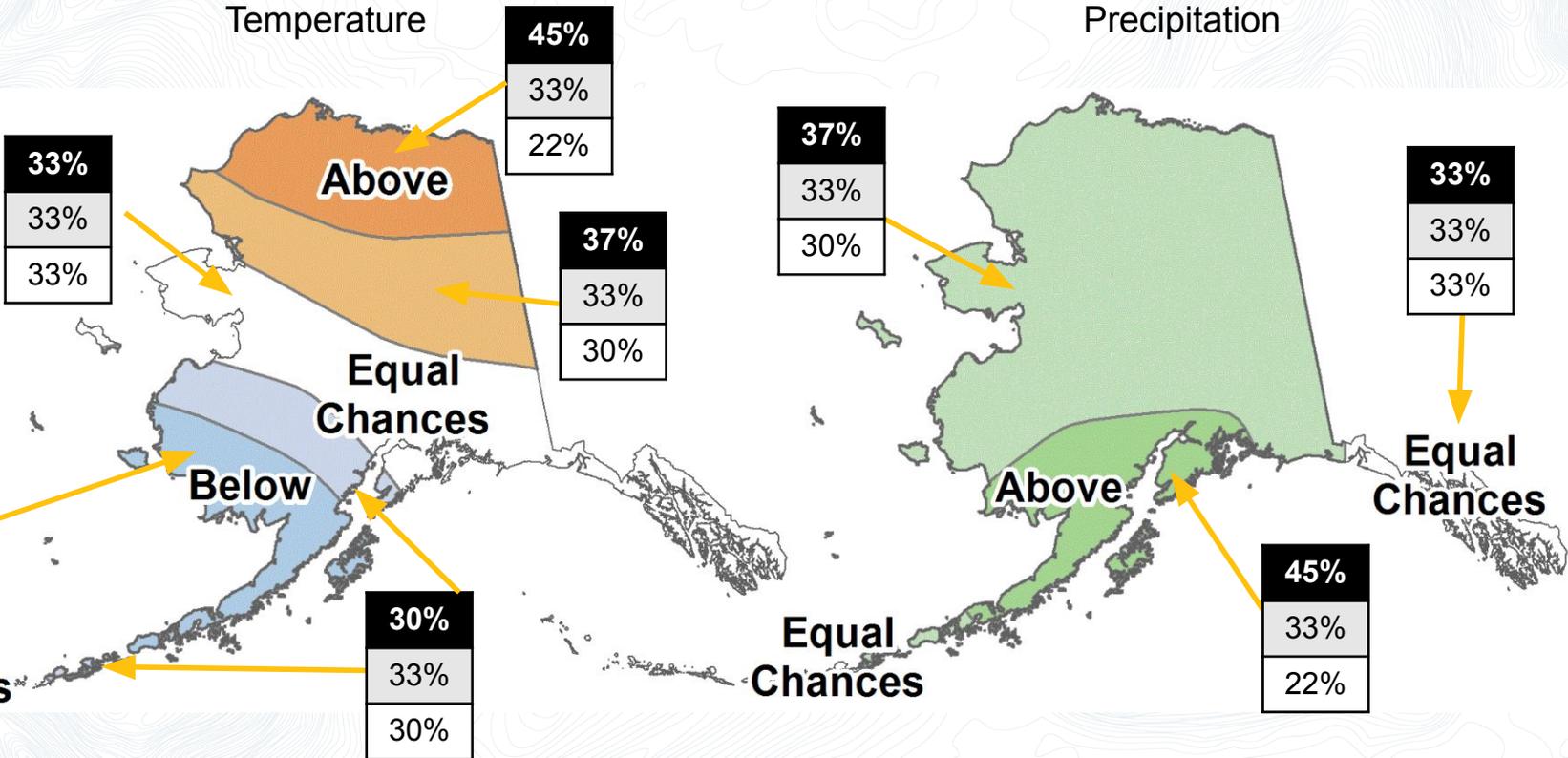
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Bias Corrected, Skill Weighted CFS + ECMWF

July-September 2024 outlooks from **May**

Above%
Normal%
Below%

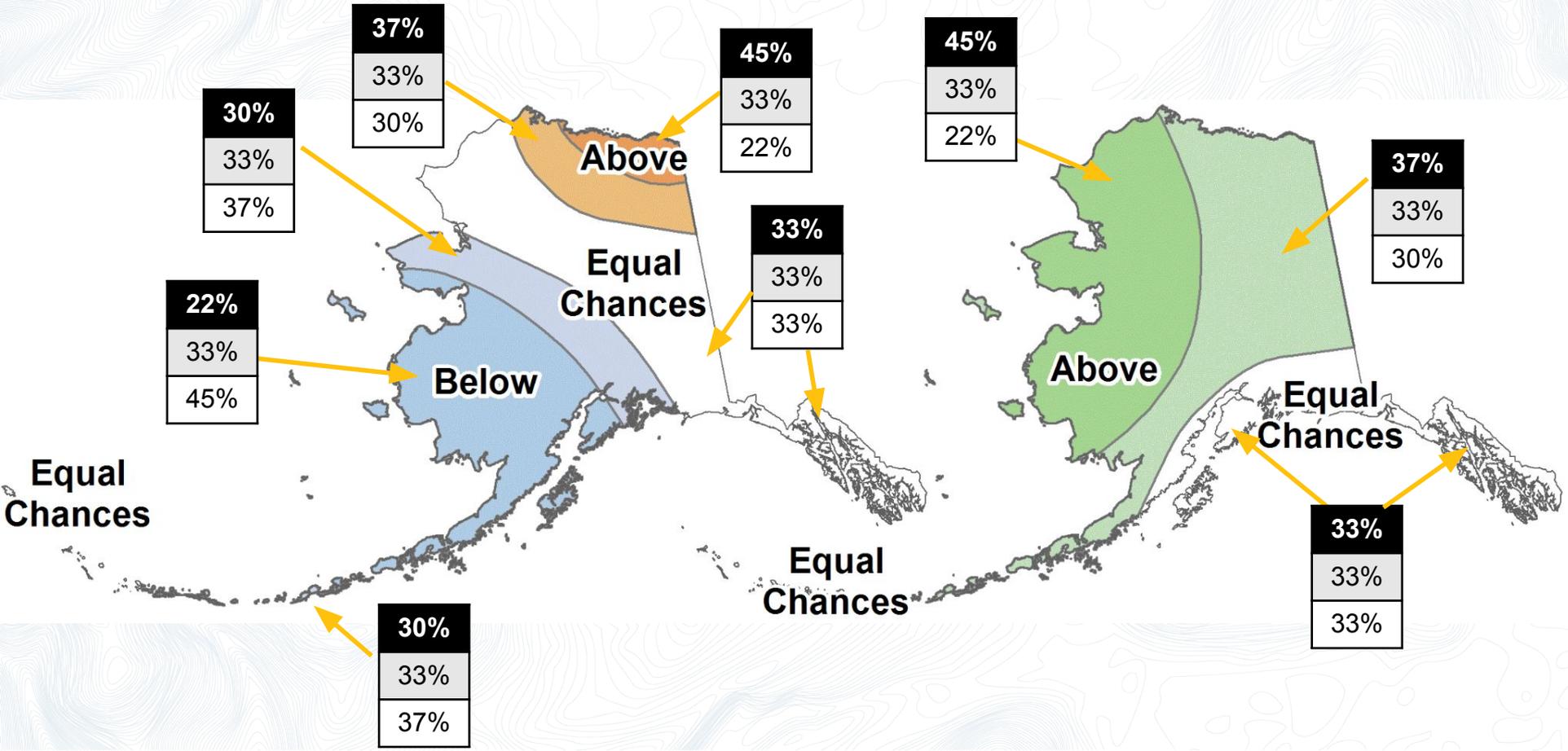


Future
outlook

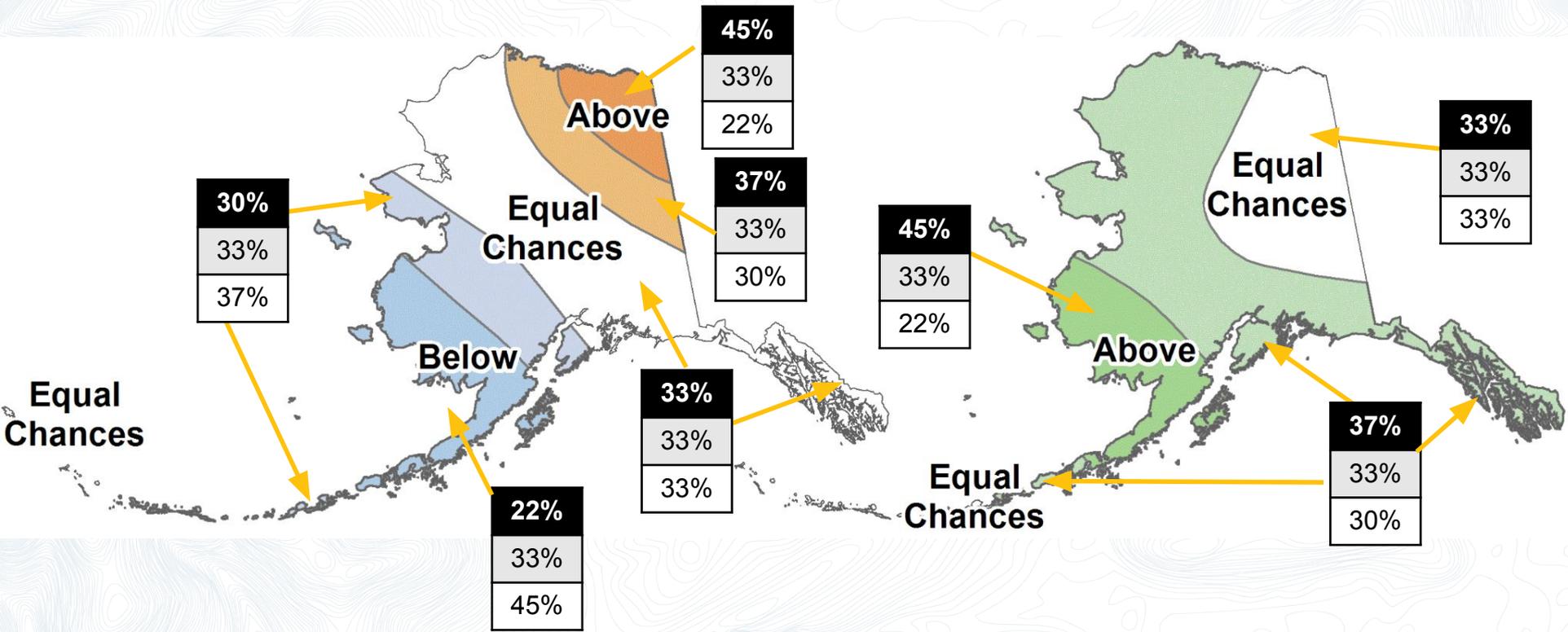


And the answer is...

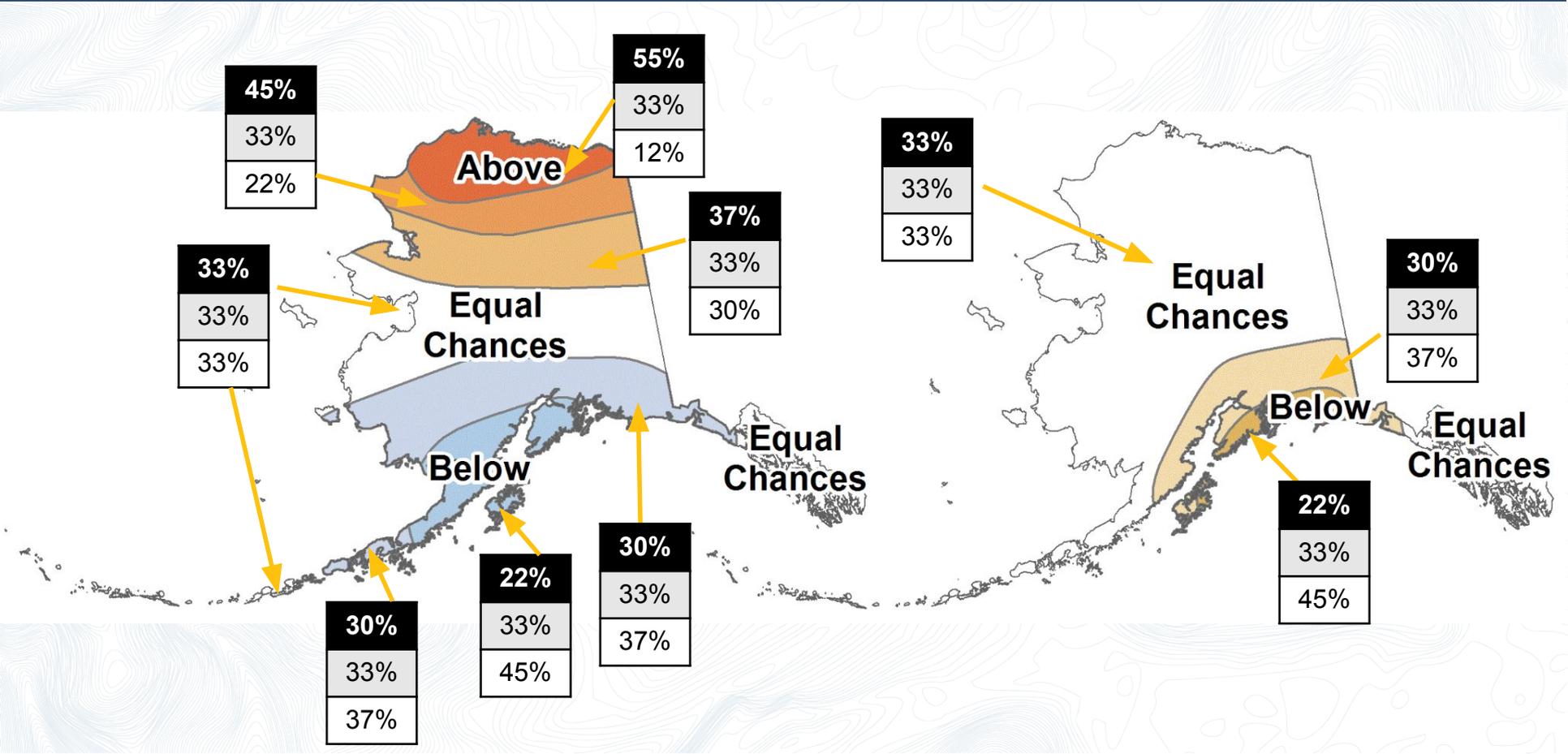
CPC July 2024 outlooks



CPC July-September 2024 outlooks



Autumn 2024 outlook



Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- July 19 ▶ NWS Alaska Climate Outlook Briefing
- July 31 ▶ Nancy Fresco: Spruce beetles under changing climate conditions

Email Rick Thoman rthoman@alaska.edu



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