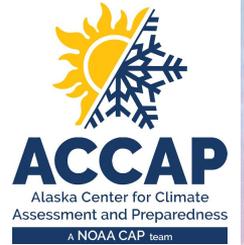
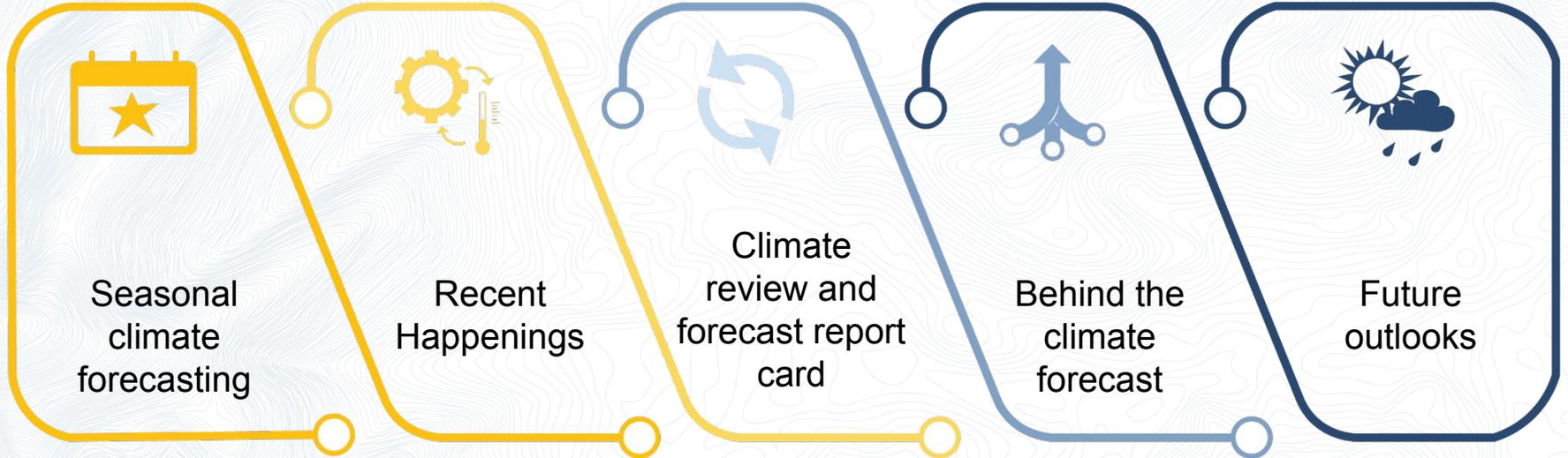




Alaska climate outlook briefing June 2025

Rick Thoman
ACCAP Climate Specialist
June 20, 2025





Seasonal
climate
forecasting

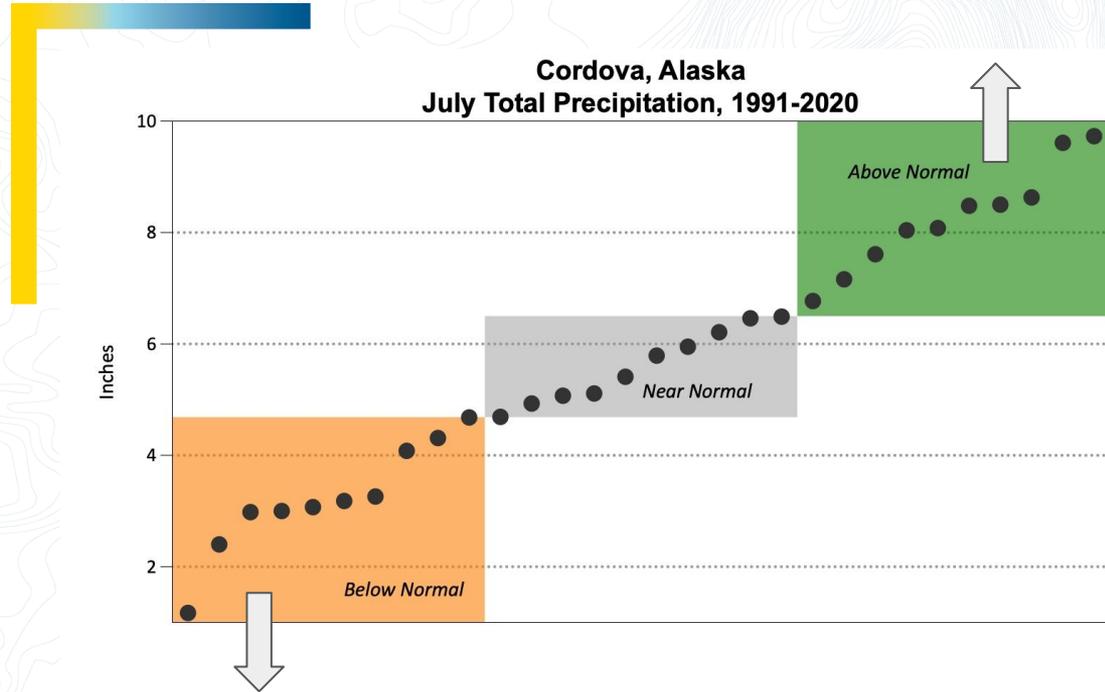


NOAA Center for Weather and Climate Prediction

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

- **Statewide:** Lack of warm weather in May
 - Prudhoe Bay: First time May temperature did not get above freezing
 - Alaska: Lowest May high temp since 1971
- **Southeast:** Heavy rains late May, landslides at Ketchikan
- **Interior:** Chilly early June then hot
 - Slow growing for gardens
 - Bettles: Latest measurable snow June 9
 - First Alaska Heat Advisory
- **North Slope:** snowmelt flooding June 13-17, Dalton Highway closed



Dalton Highway Mile 315 wash-out
June 14, 2025
Photo: Alaska DOT & PF

**Climate
outlook
report card**



Climate Review

- What happened?
- How did climate outlooks perform?



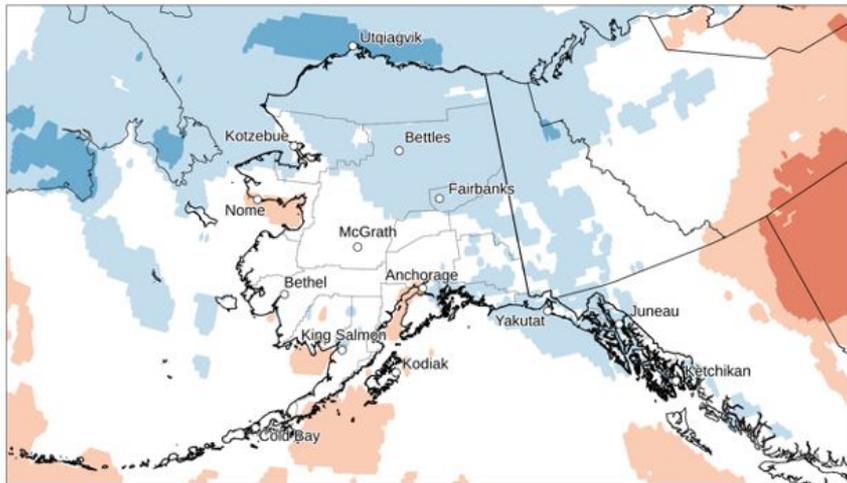
Looking SW from
Eielson VC

June 17, 2025

Photo credit: FAA

Model- based regional analysis > Average temperatures

Temperature Classification for May 2025



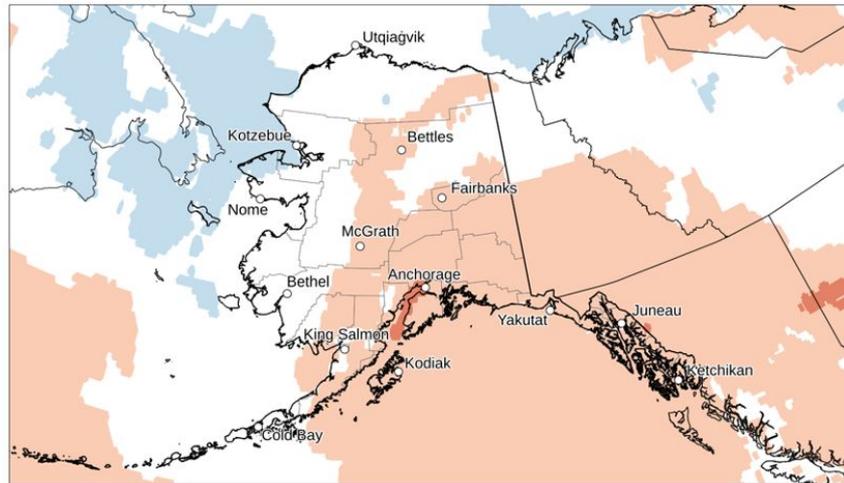
Source: ERA5 Reanalysis

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 Mar-May 2025



Source: ERA5 Reanalysis

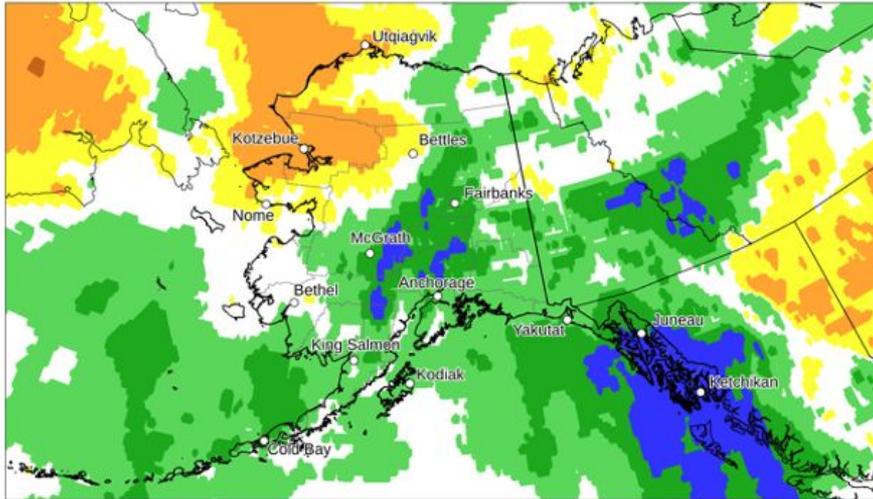
Map by: Brian Brettschneider

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 May 2025



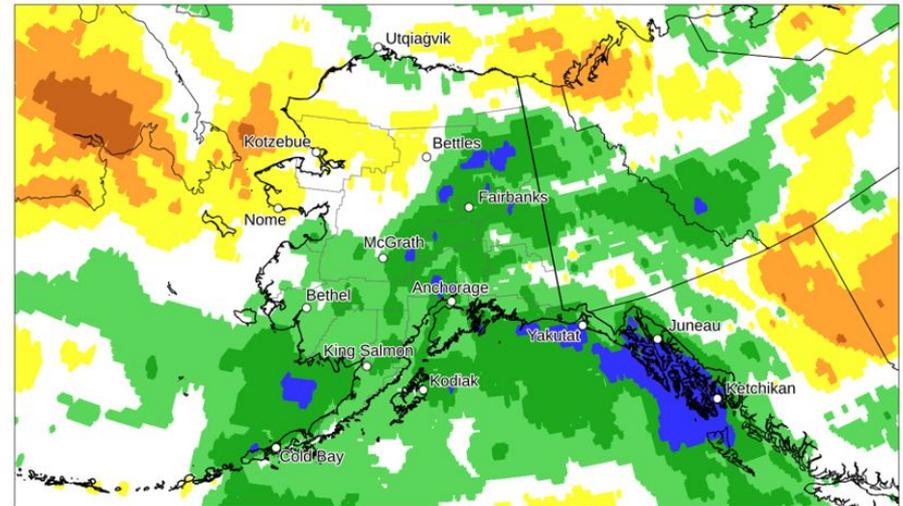
Source: ERA5 Reanalysis

Map by: Brian Brettschneider



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

Precipitation Classification for Mar-May 2025



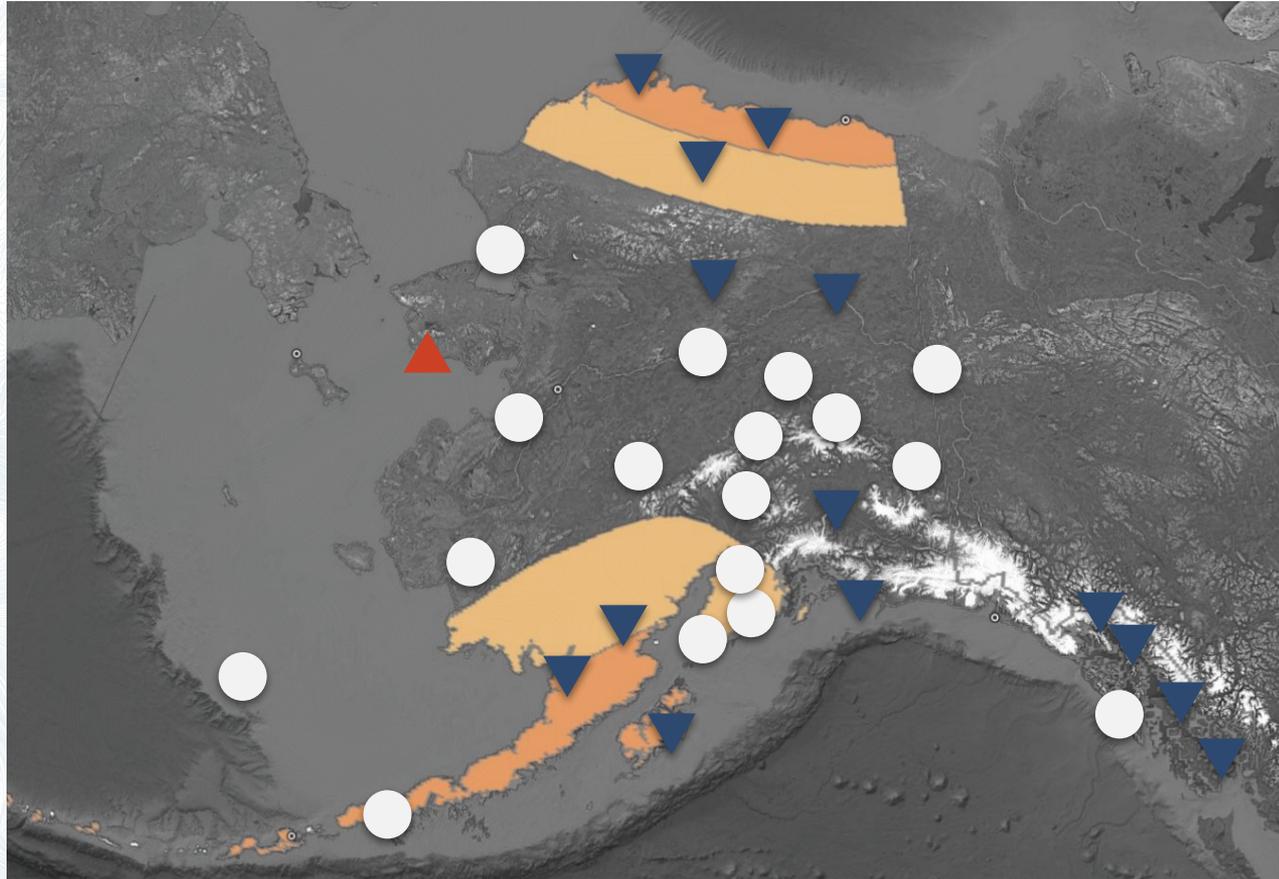
Source: ERA5 Reanalysis

Map by: Brian Brettschneider



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

May 2025 temperature > CPC outlook and observed



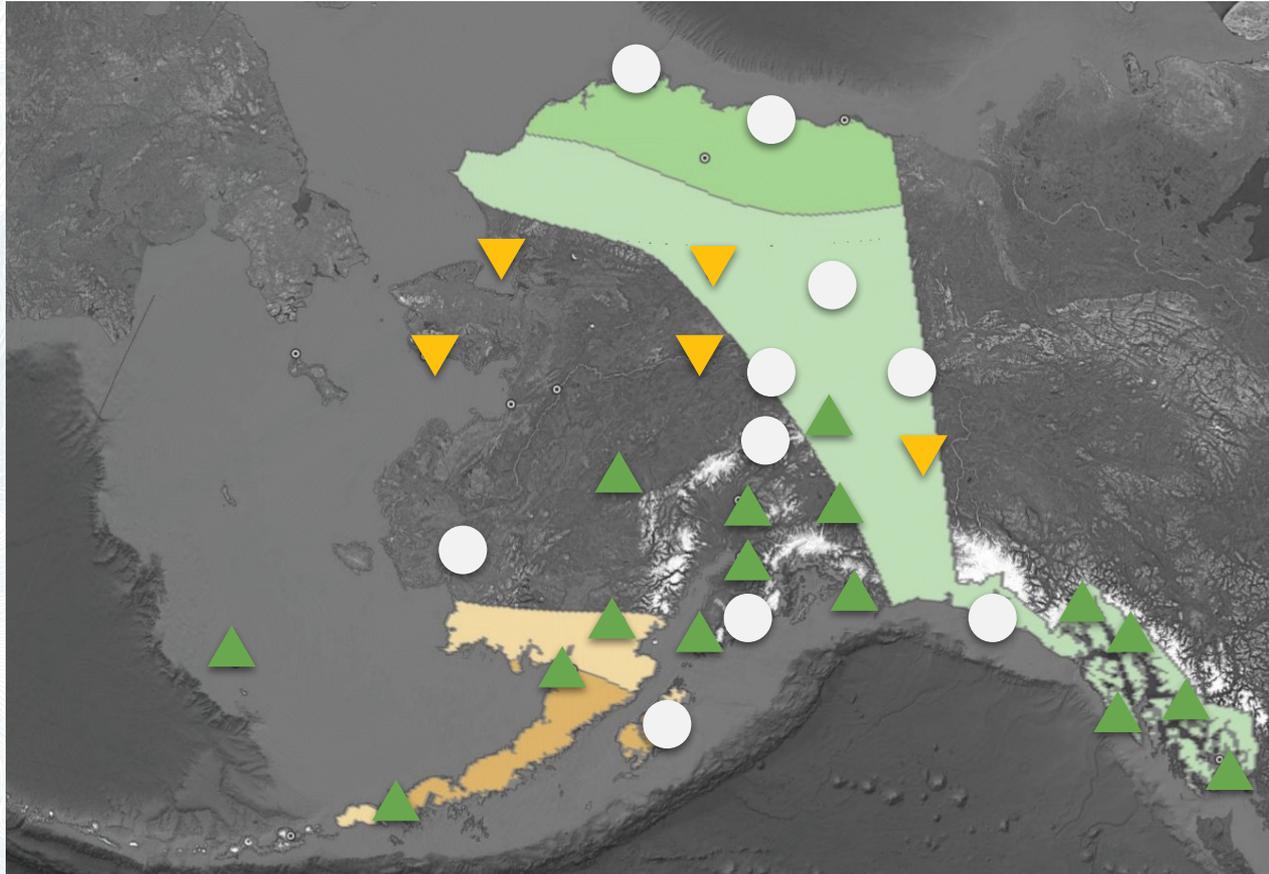
Non-EC skill
score: -50

Percent
correct: 0%

Mid-month
outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

May 2025 precipitation > CPC outlook and observed



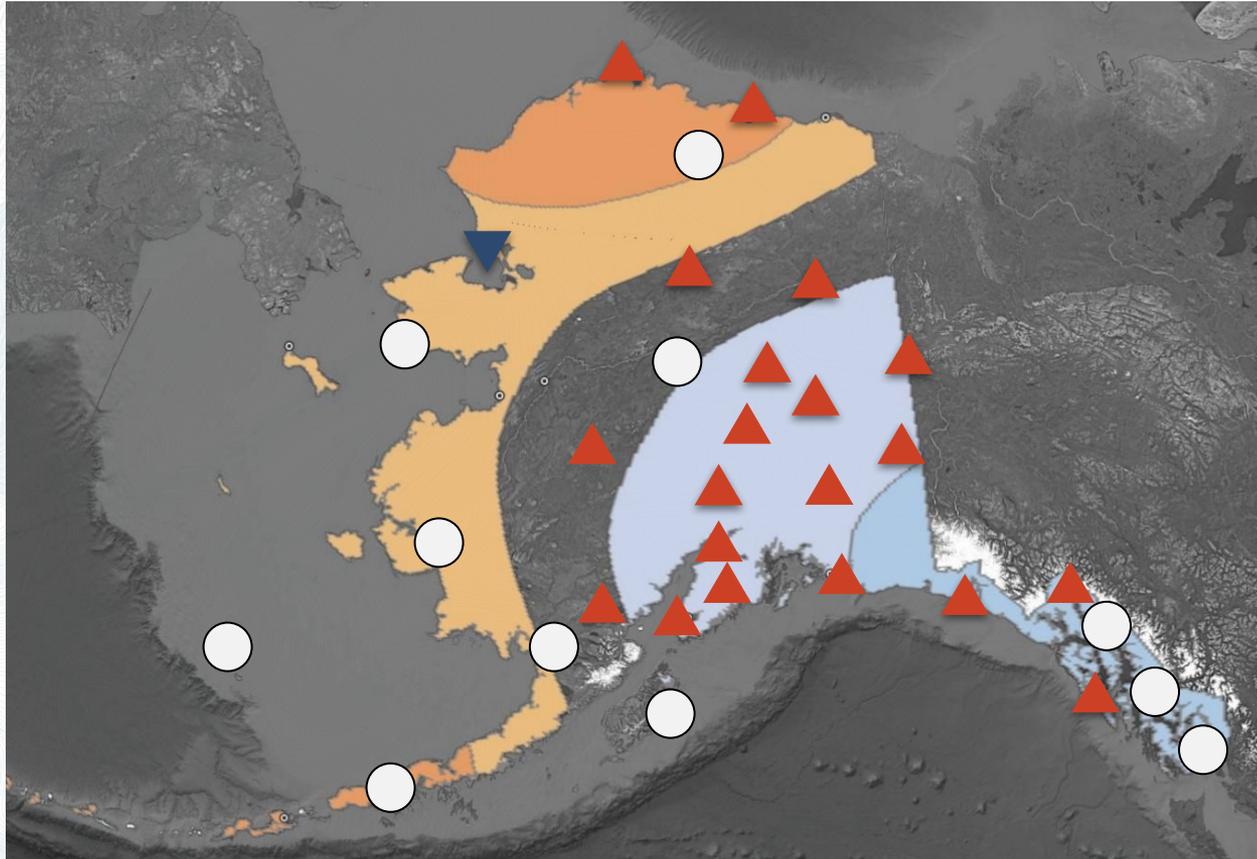
Non-EC skill
score: 0

Percent
correct: 33%

Mid-month
outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

March-May 2025 temperature > CPC outlook & observed

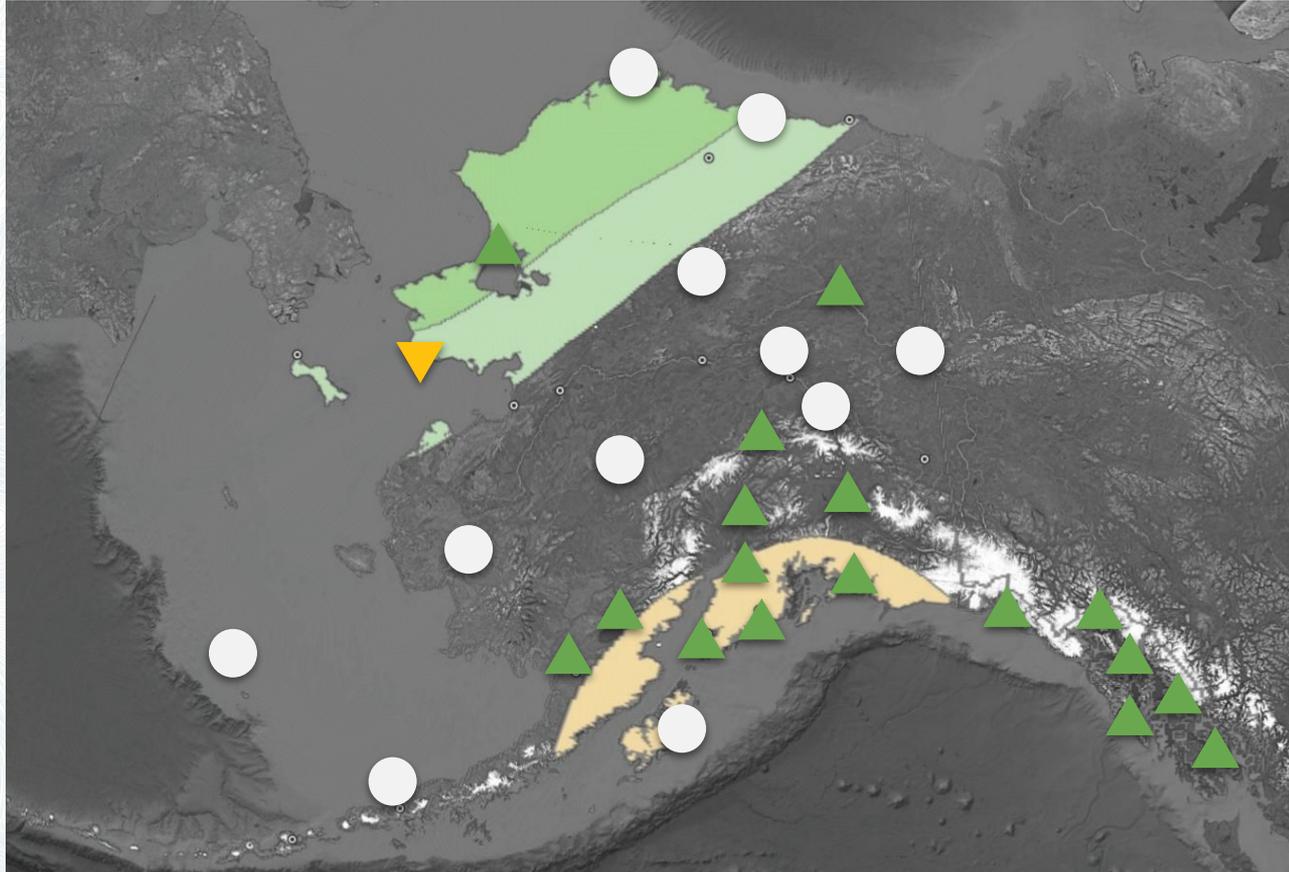
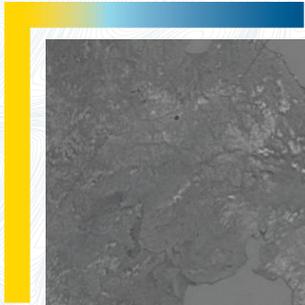


Non-EC skill
score: -38

Percent
correct: 8%

- ▲ Above normal
- Near normal
- ▼ Below normal

March-May 2025 precipitation > CPC outlook & observed

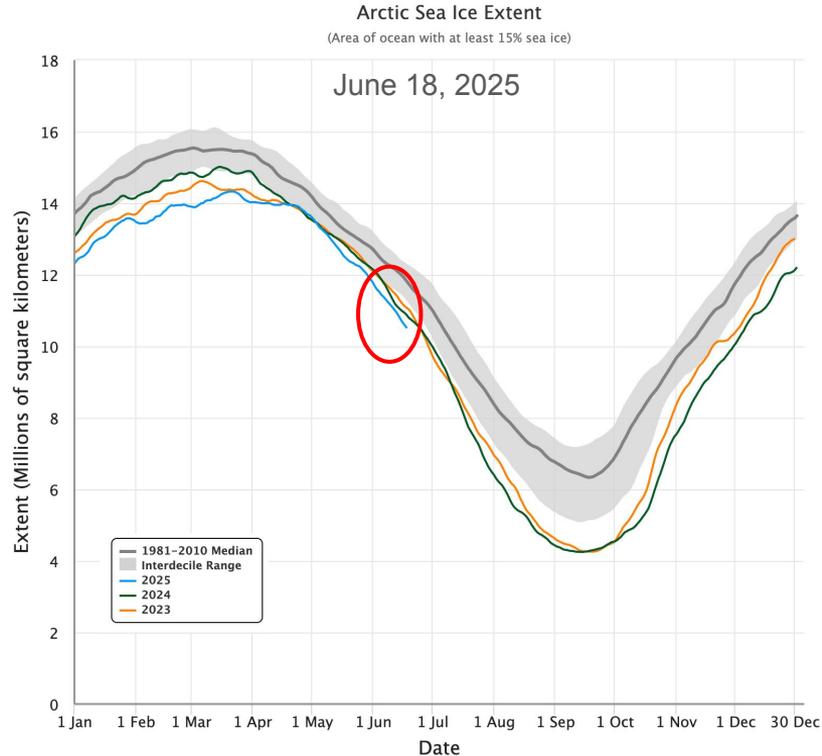


Non-EC skill
score: -23

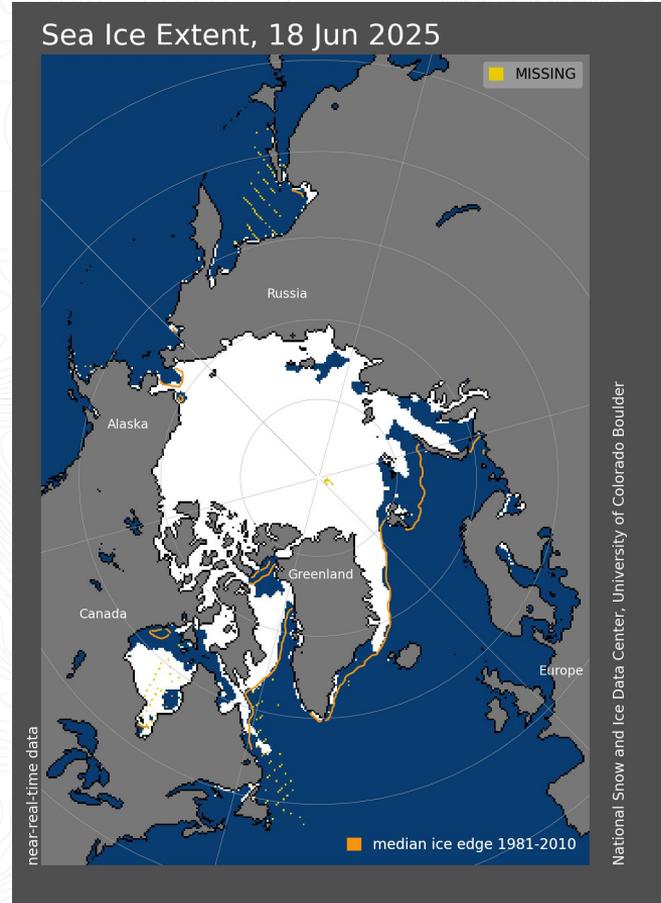
Percent
correct: 11%

- ▲ Above normal
- Near normal
- ▼ Below normal

Arctic wide sea ice

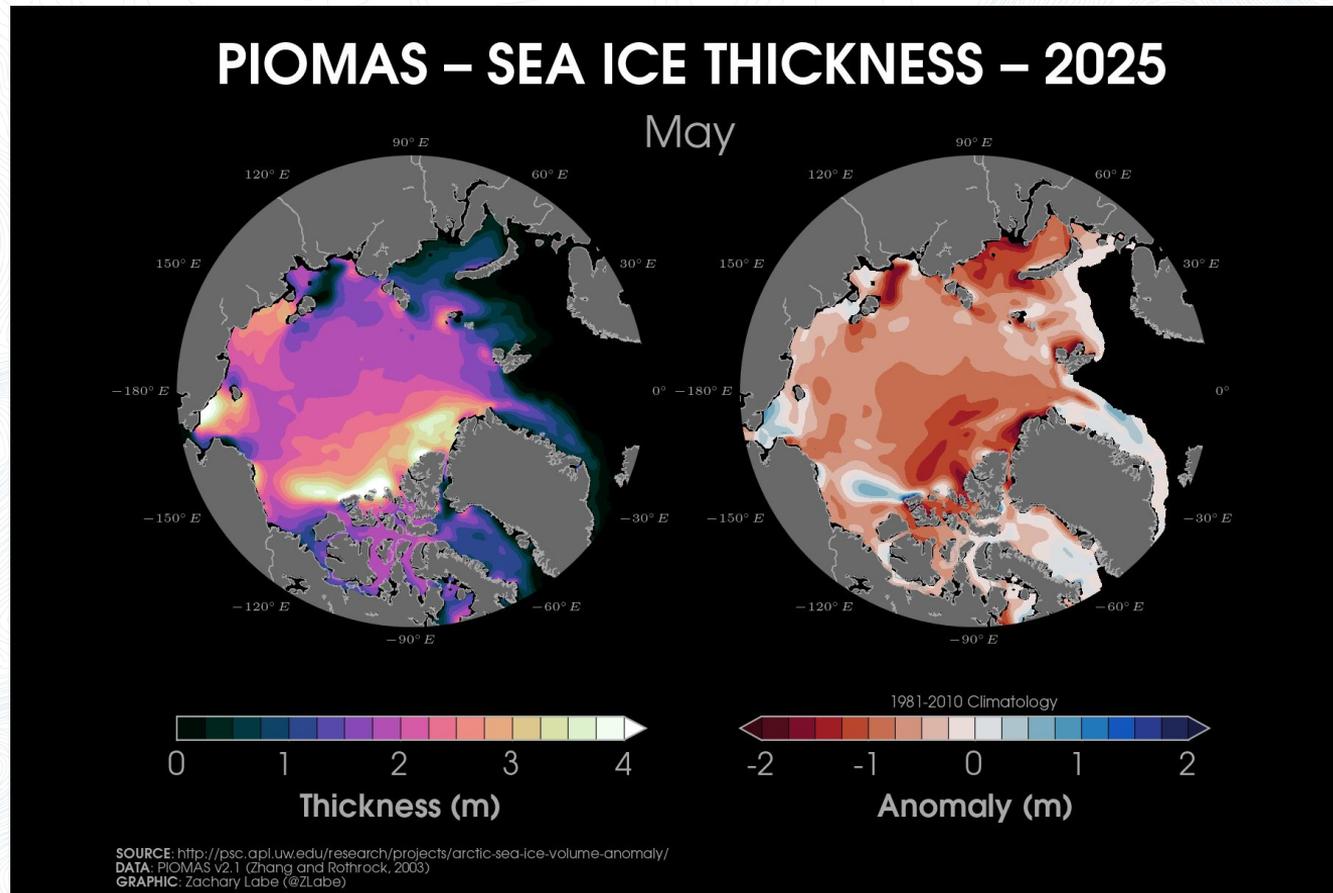


National Snow and Ice Data Center, Boulder, CO



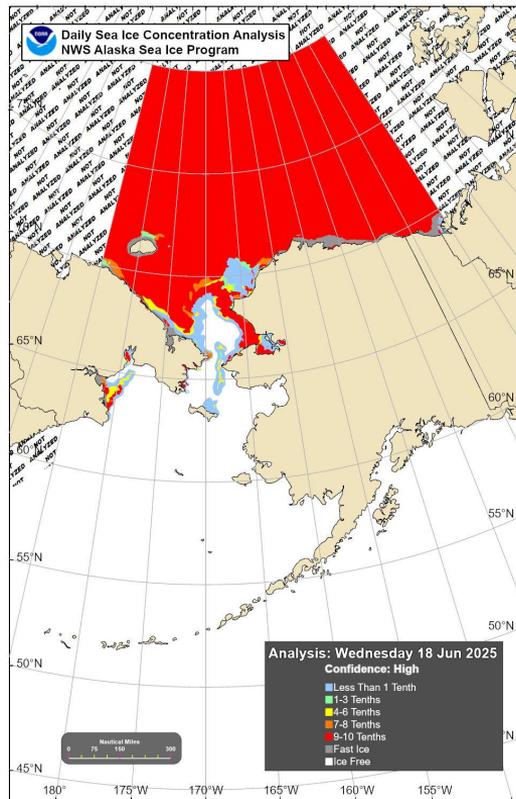
Arctic sea ice thickness

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

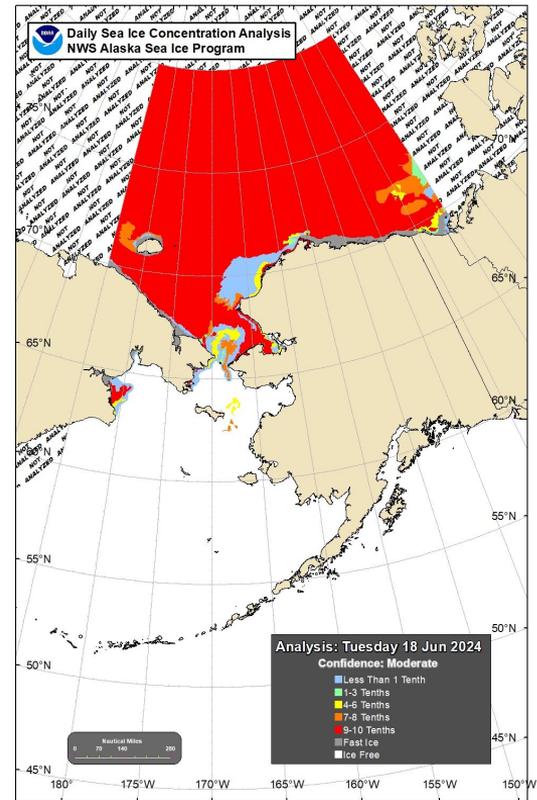


Mid-June sea ice comparison

June 18, 2025



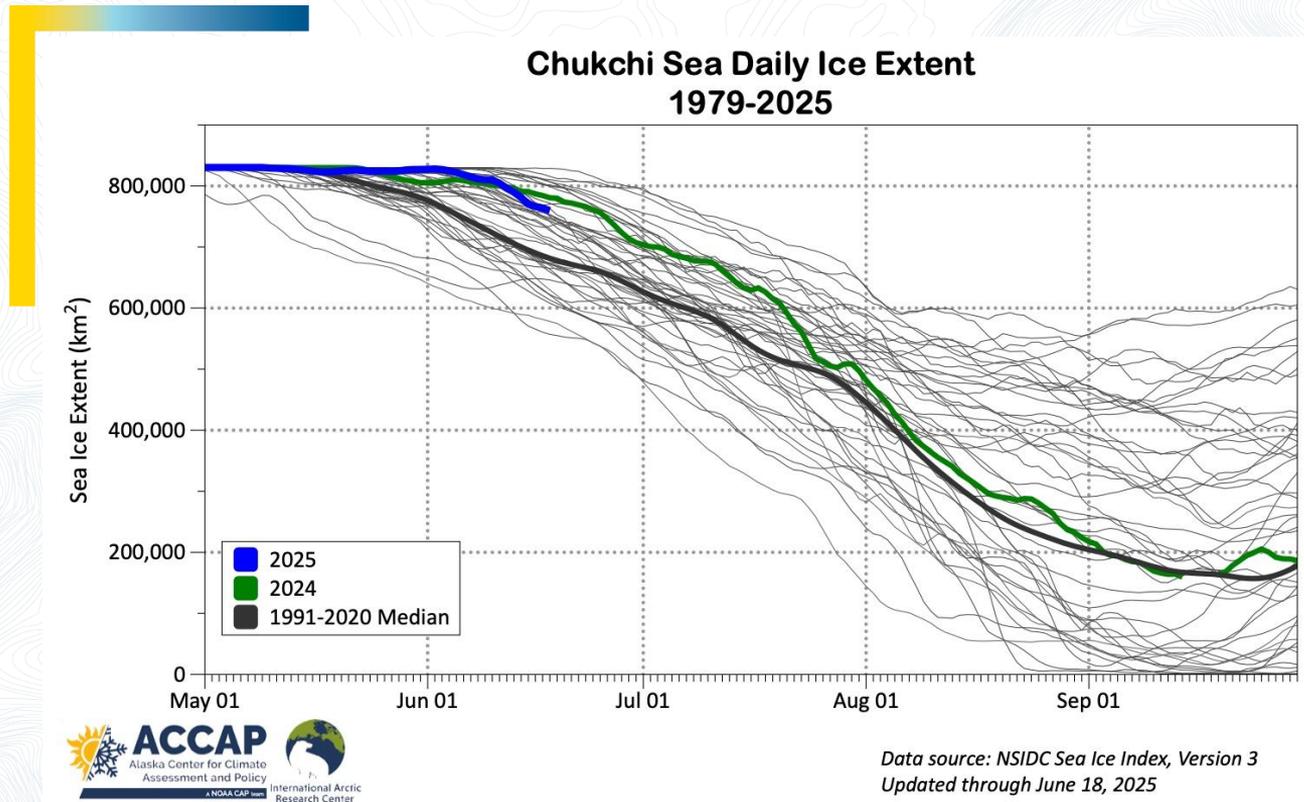
June 18, 2024



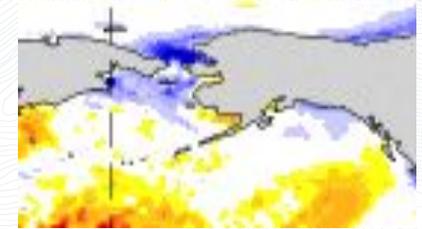
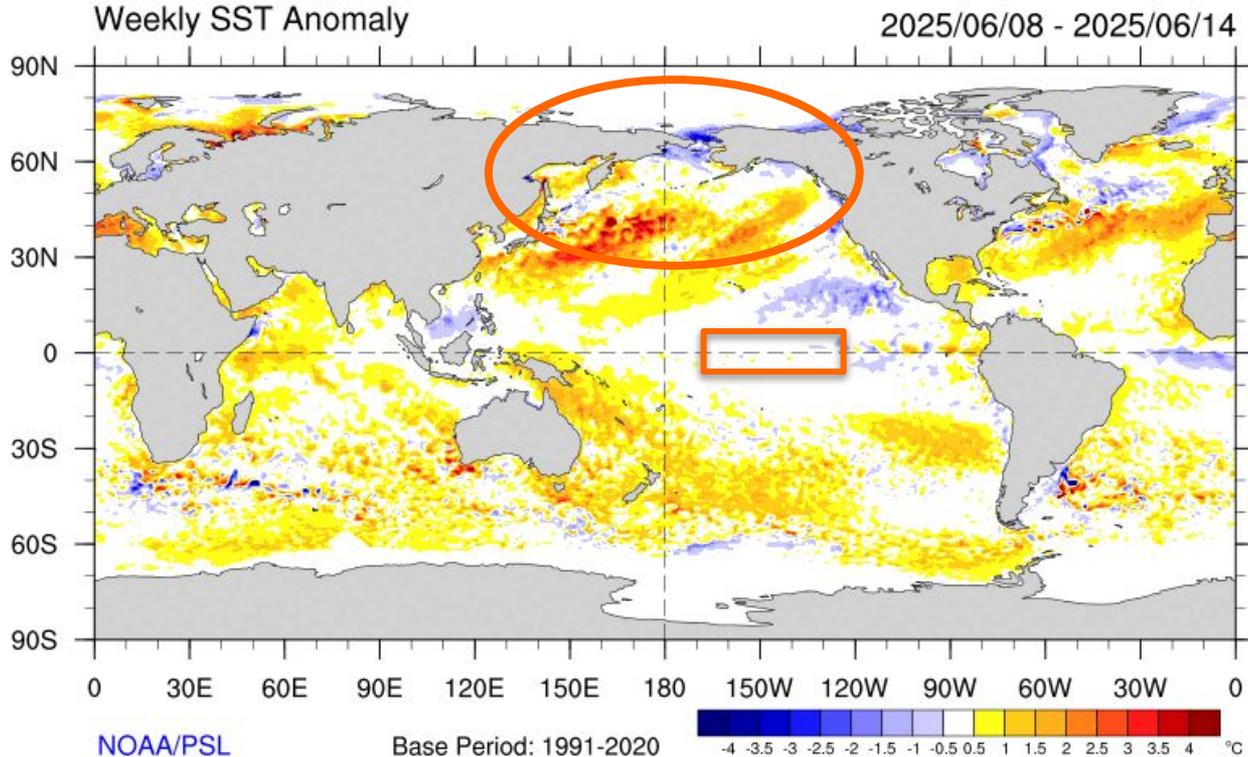
Source: National Weather Service
Alaska Region Sea Ice Program

Sea ice extent through the season

Sources:
Data NSIDC Sea Ice Index,
Version 3.



Global sea surface temperature departure from normal



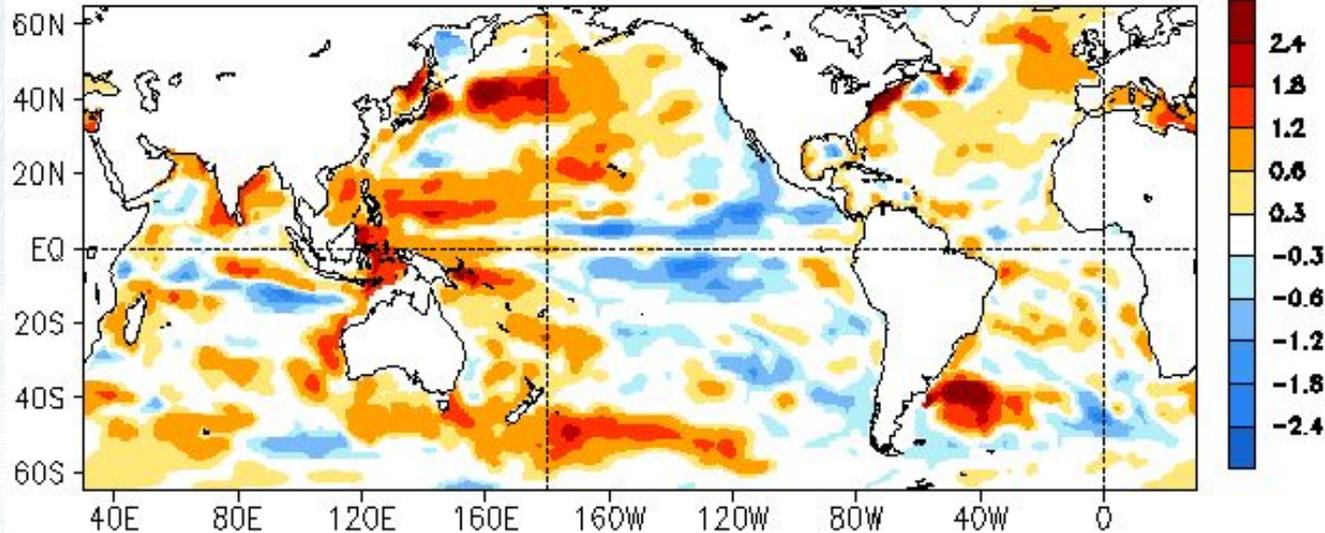
ONI for **Mar-May**: -0.1

PDO for **May 2025**: -0.8

Sources: ONI from CPC
PDO Index from WCS

Upper ocean heat departure from average

MAY 2025 Heat Content Anomaly (°C)
(GODAS, Clima. 91-20)



Little change near Alaska

Upper 300 meters of the ocean

Source: NOAA/CPC

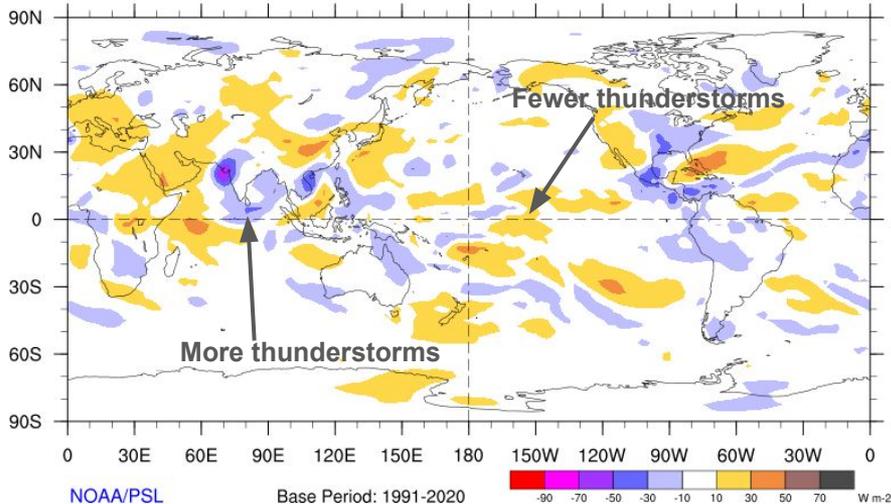
Tropical Pacific atmosphere

Mar-May Oceanic Niño Index: -0.1

Deep tropical convection
Via "outgoing longwave radiation"



7-Day Average OLR Anomaly 2025/06/11 - 2025/06/17

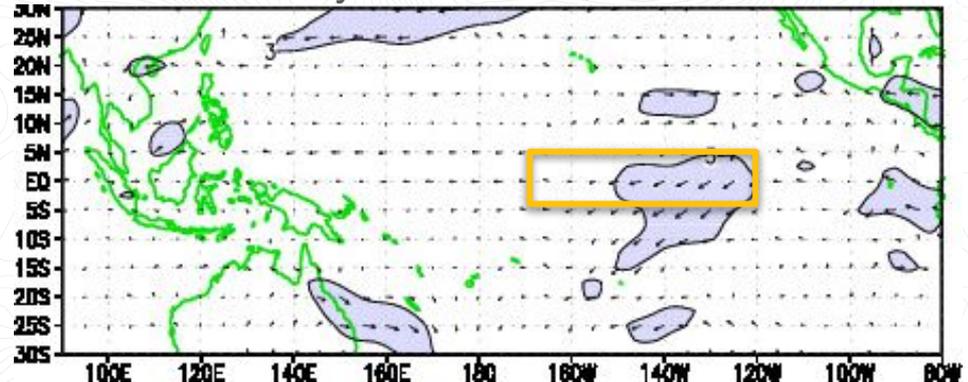


Slightly enhanced trade winds
Niño Region 3.4

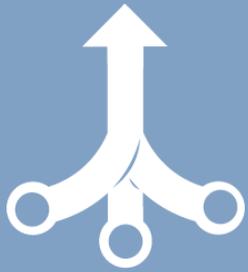


Trade winds

850 mb wind difference from average
May 18-June 16, 2025



Behind the
climate
forecast



El Niño/La Niña (ENSO) ➤ expert evaluation

Statistical models ➤ using the past

- Temperature and Precipitation

Dynamical models ➤ All physics, all the time

- Sea surface temperatures
- Sea Ice
- Temperature and Precipitation

CPC Niño 3.4 forecasts > experts

May 2025

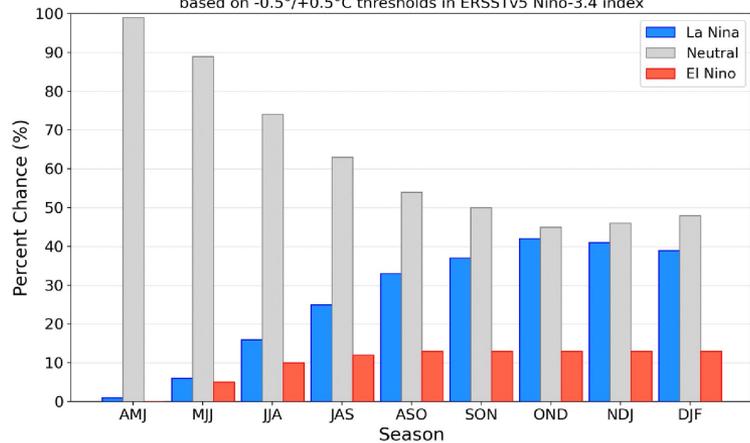
June 2025

ENSO Alert System Status:
None



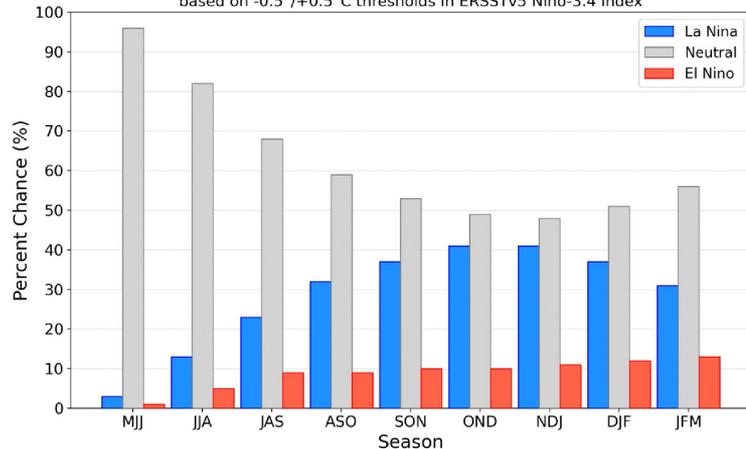
Official NOAA CPC ENSO Probabilities (issued May 2025)

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



Official NOAA CPC ENSO Probabilities (issued June 2025)

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



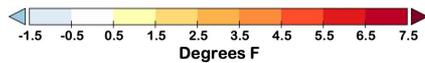
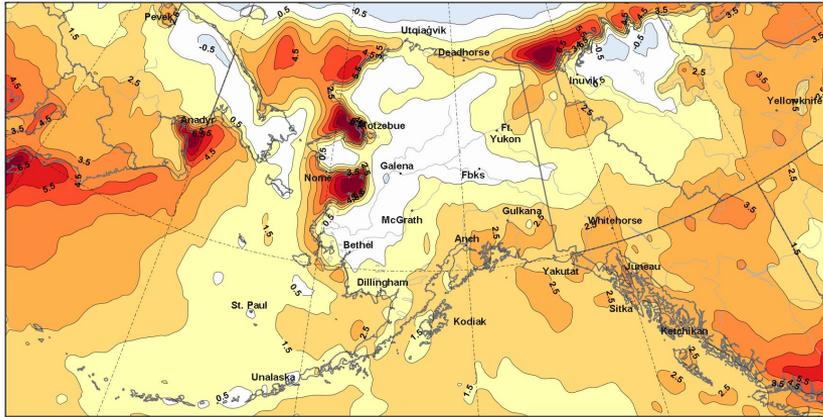
**Statistical
guidance** ➤
using the past
to predict the
future

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

July half century trends

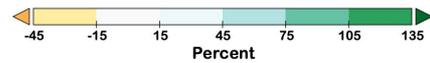
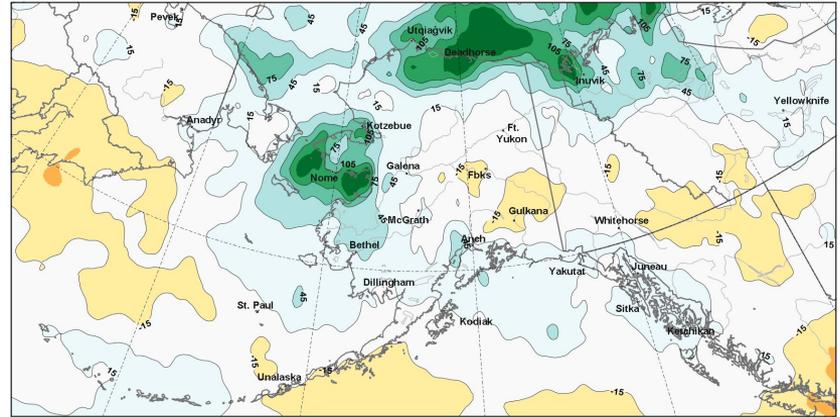
Temperatures

Total Change in July Average Temperature
1975-2024



Precipitation

Percent Change in July Total Precipitation
1975-2024



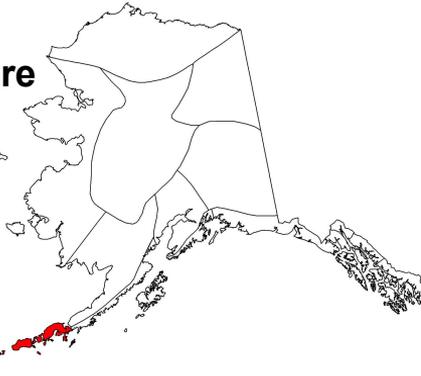
Change in the average
over 50 years

2010 to 2024 trends

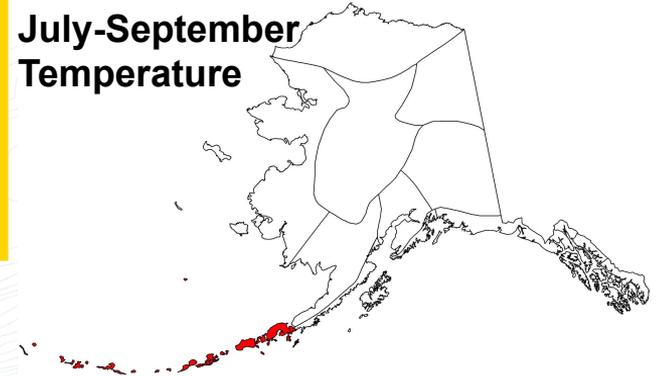
Past 15 years compared to 1991-2020

July Temperature

 Above normal
 Below normal

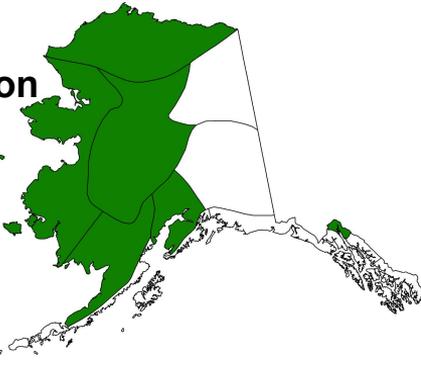


July-September Temperature



July Precipitation

 Above normal
 Below normal



July-September Precipitation



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)
 - Lost a model this month

What's being forecasted

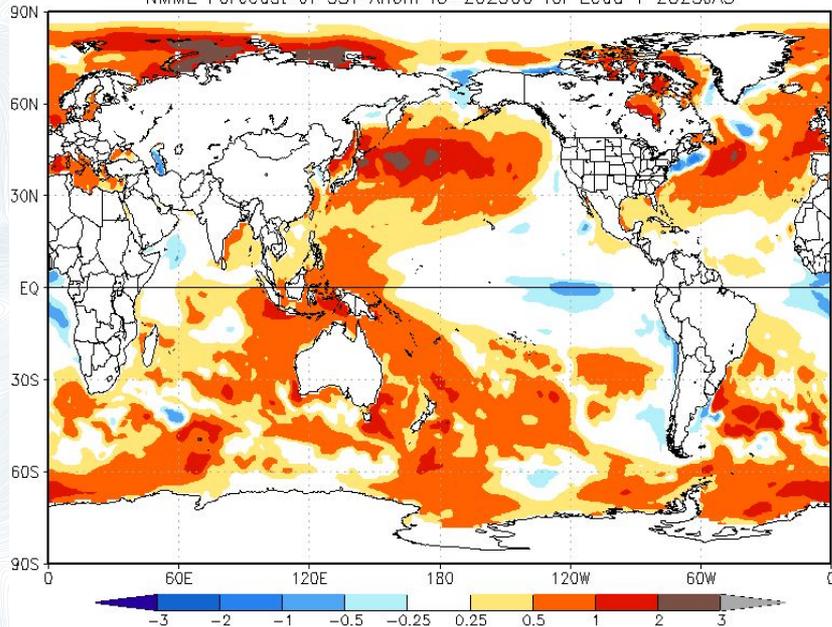
- Sea surface temperatures relative to normal
- Sea ice forecast
- Temperature and precip relative to normal

July-September 2025 sea surface temperature ➤ NMME

Forecast
departure from normal



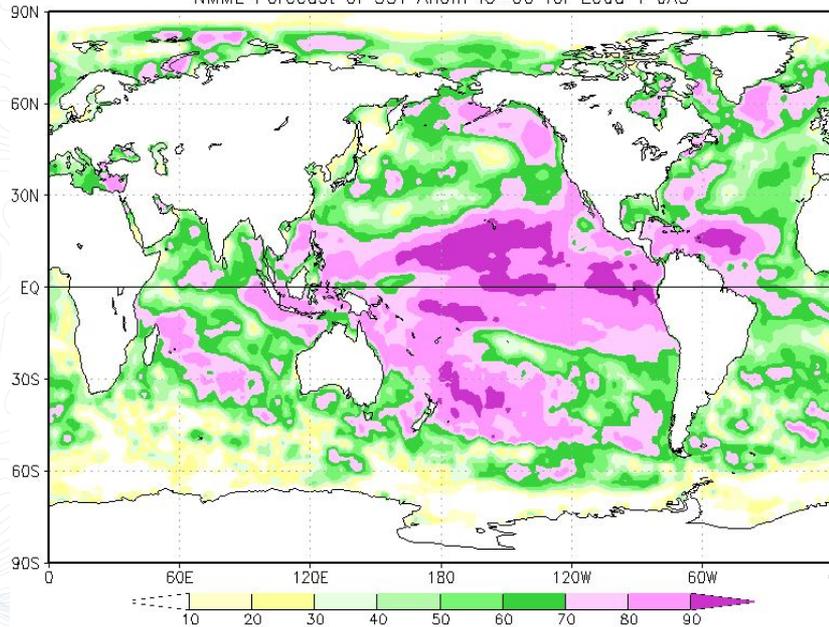
NMME Forecast of SST Anom IC=202506 for Lead 1 2025JAS



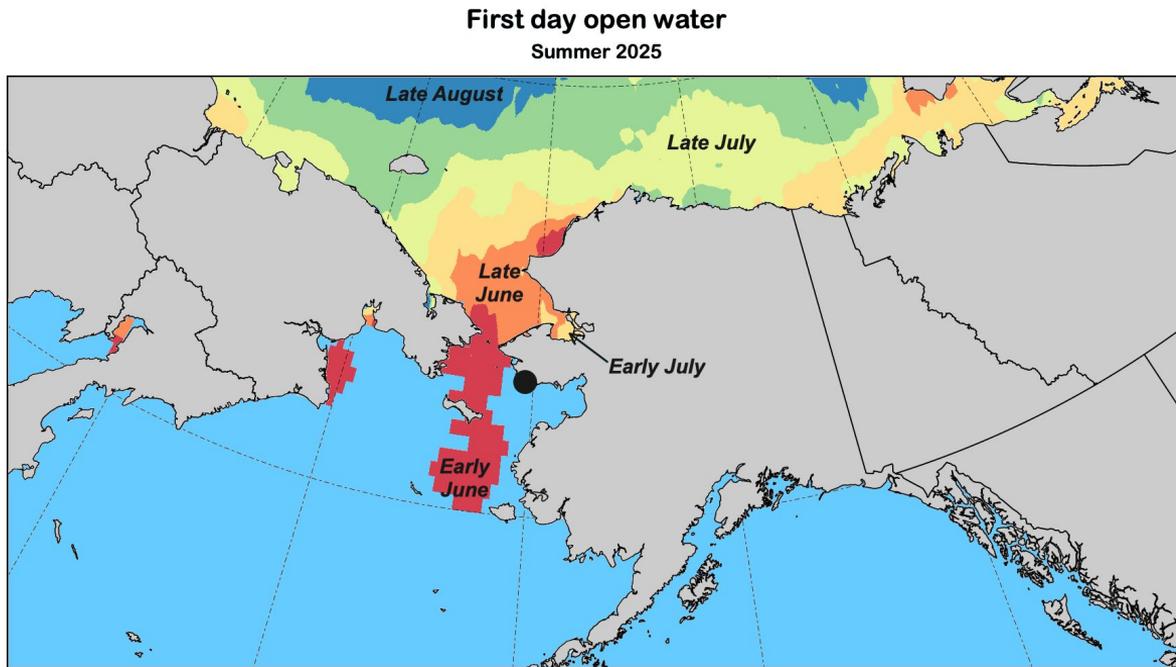
Skill
of the forecast



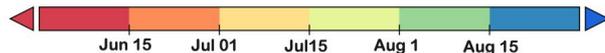
NMME Forecast of SST Anom IC=06 for Lead 1 JAS



Experimental sea ice forecast > CPC



The 20-models
average of first date
with open water
From data though late May



July 2025 calibrated probability forecast ➤ NMME

Forecast from →



Temperature

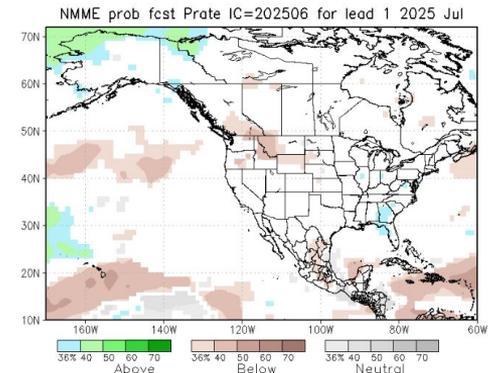
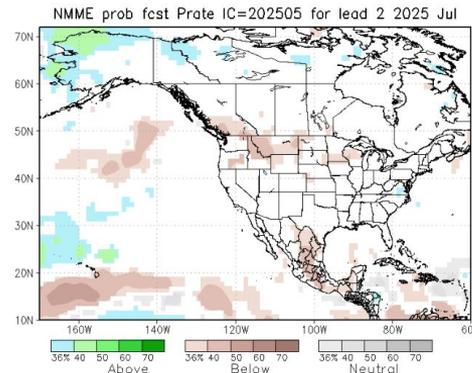
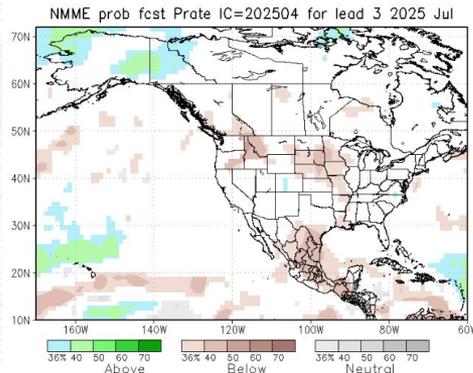
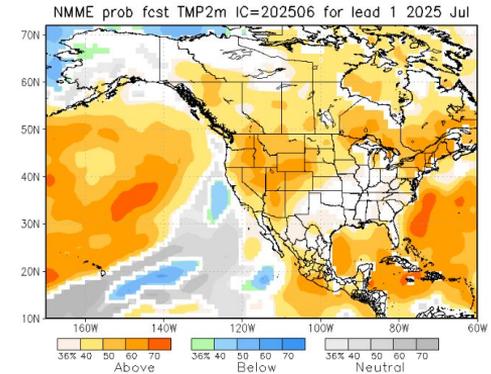
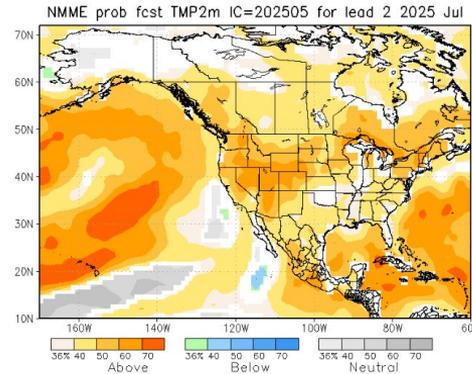
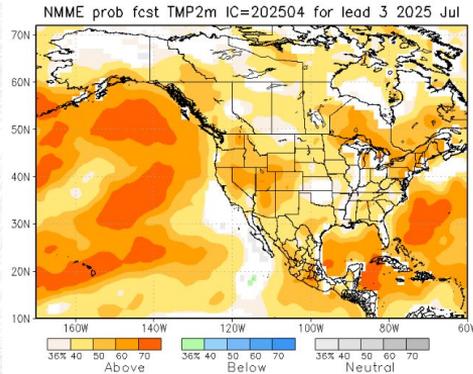


Precipitation

April

May

June



July 2025 outlooks > World Climate Service

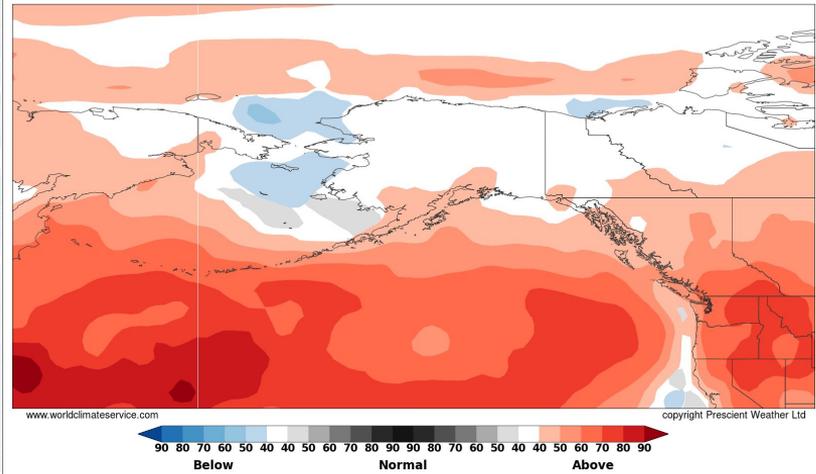
Temperature



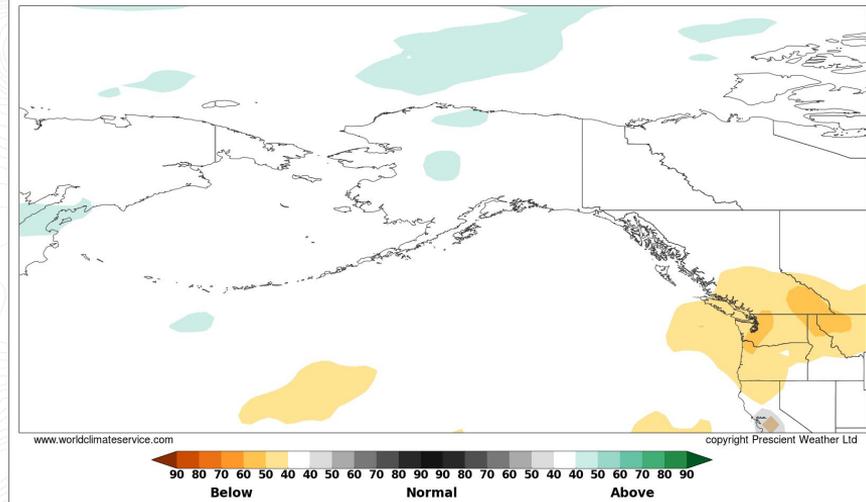
Precipitation



Multi-Model T2m Probability Above/Normal/Below
Forecast Valid July 2025
Initialized June 2025 1991-2020 Climatology



Multi-Model Precipitation Probability Above/Normal/Below
Forecast Valid July 2025
Initialized June 2025 1991-2020 Climatology



Bias Corrected, Skill Weighted CFS + ECMWF

July-September 2025 calibrated probability forecast ➤ NMME

Forecast from →



Temperature

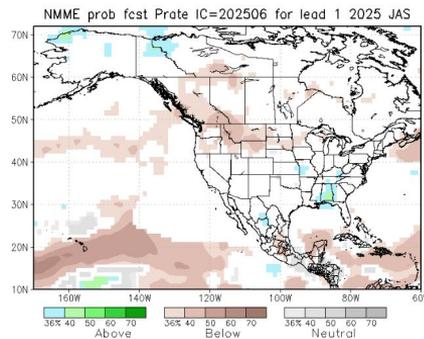
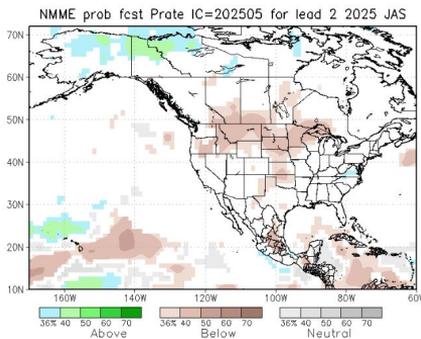
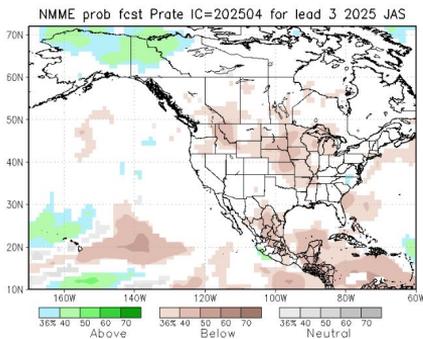
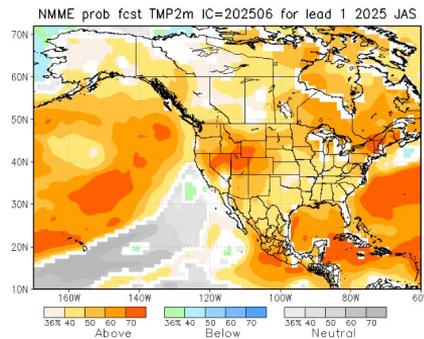
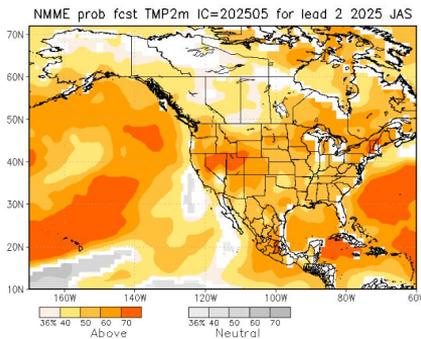
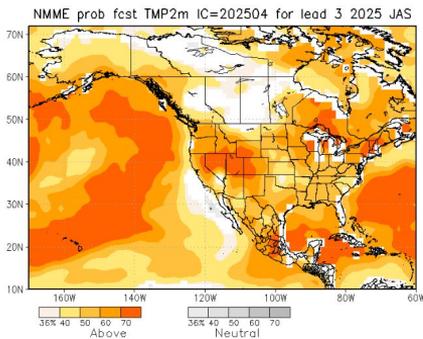


Precipitation

April

May

June

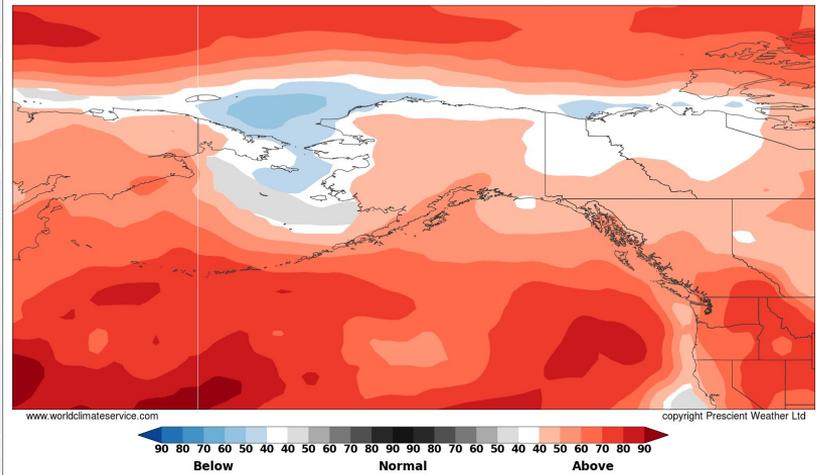


July-September 2025 outlooks > World Climate Service

Temperature



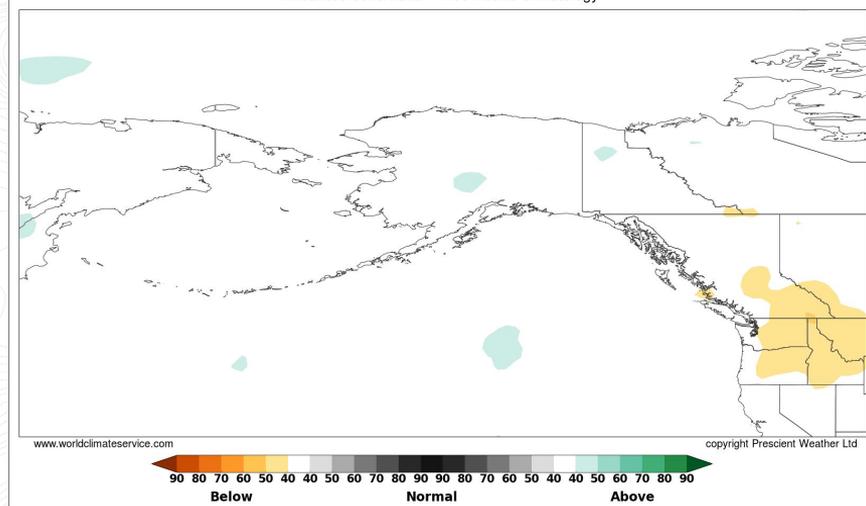
Multi-Model T2m Probability Above/Normal/Below
Forecast Valid Jul 2025 - Sep 2025
Initialized June 2025 1991-2020 Climatology



Precipitation



Multi-Model Precipitation Probability Above/Normal/Below
Forecast Valid Jul 2025 - Sep 2025
Initialized June 2025 1991-2020 Climatology

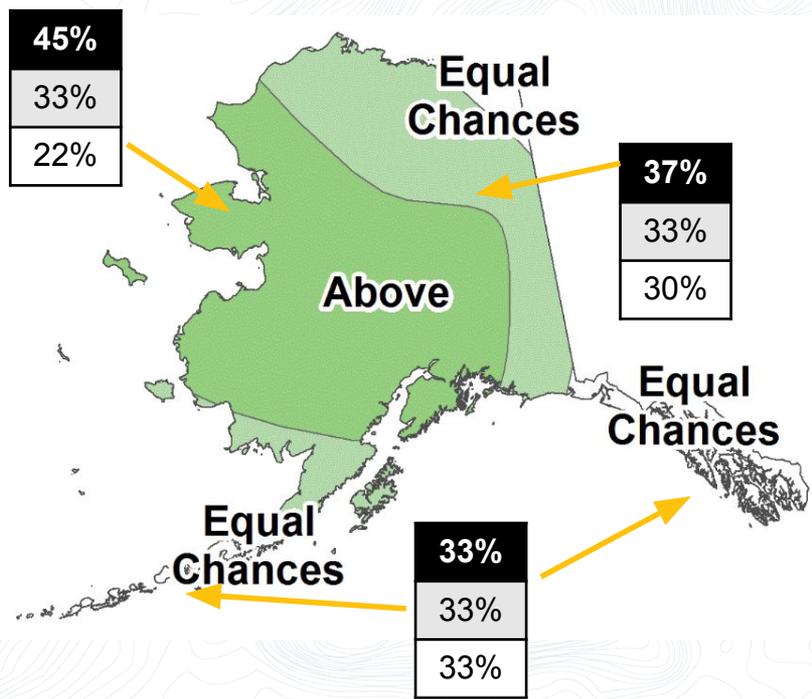
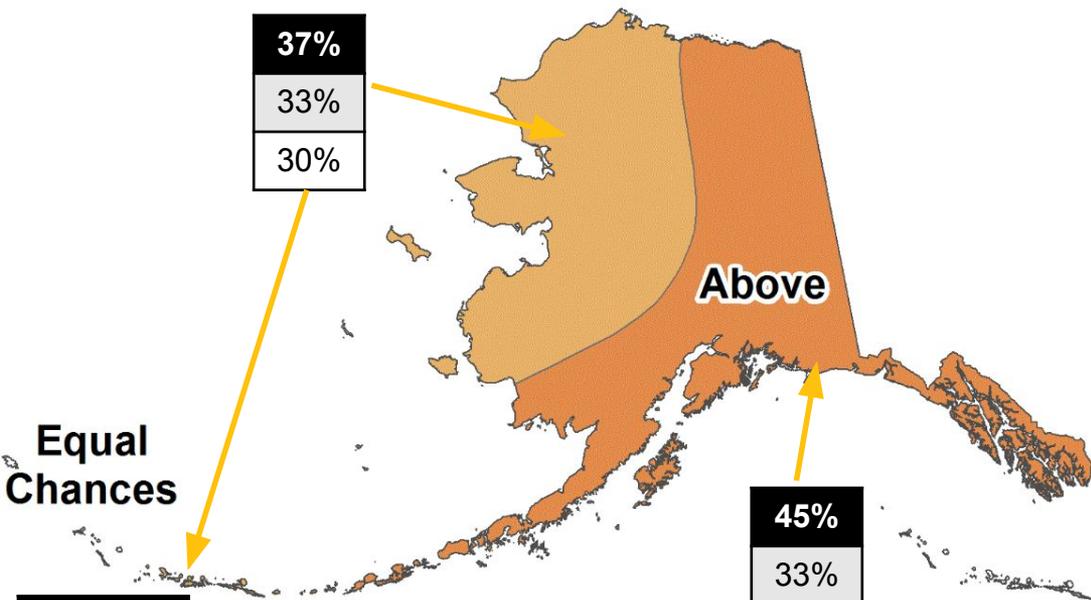


Bias Corrected, Skill Weighted CFS + ECMWF

July-September 2025 outlooks from **May**

Temperature

Precipitation



Future
outlook

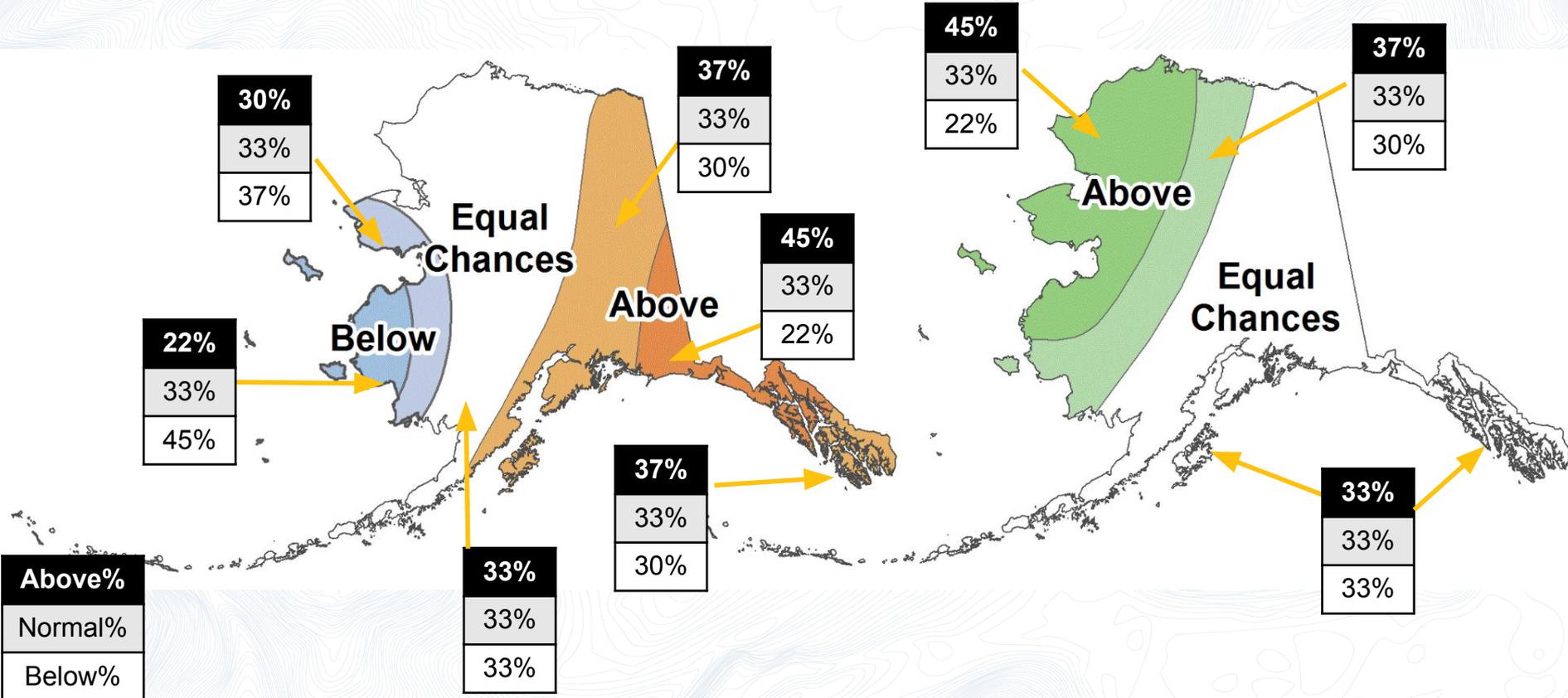


And the answer is...

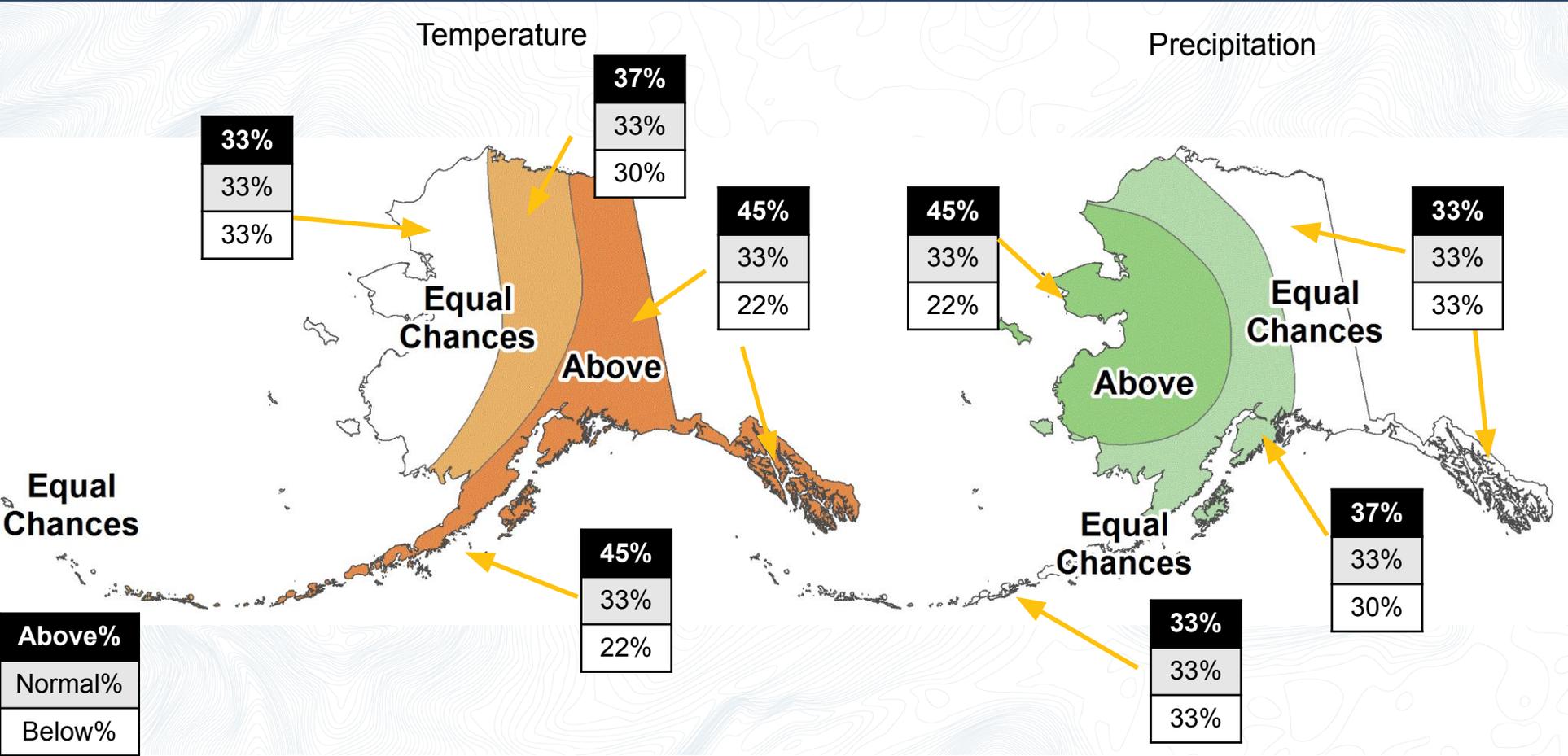
CPC July 2025 outlooks

Temperature

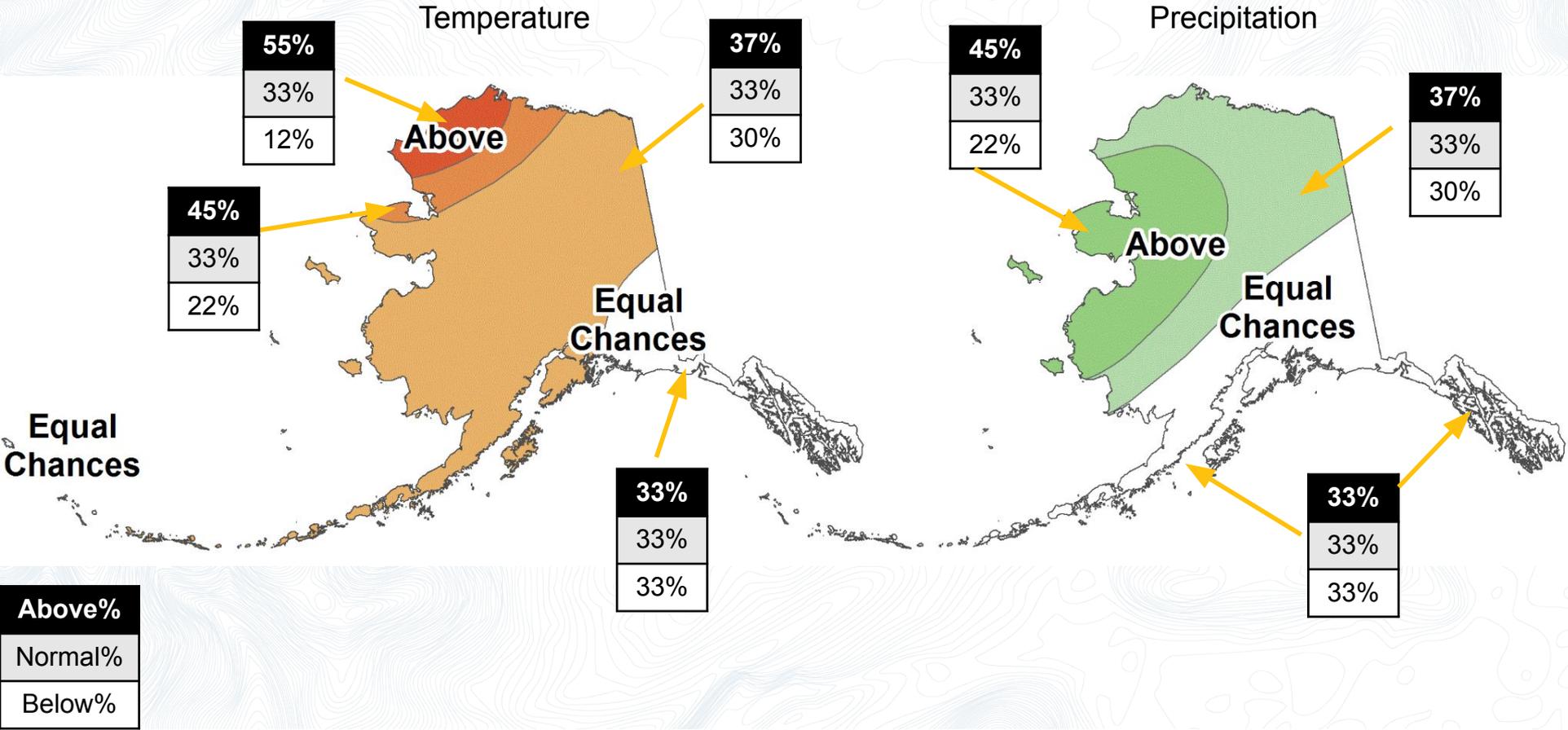
Precipitation



CPC July-September 2025 outlooks



Autumn 2025 outlook

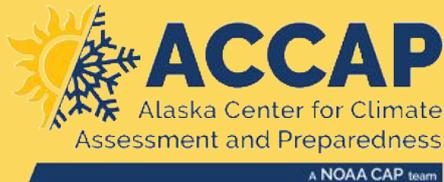


Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- July 18 ▶ NWS climate outlook webinar

Email Rick Thoman rthoman@alaska.edu



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