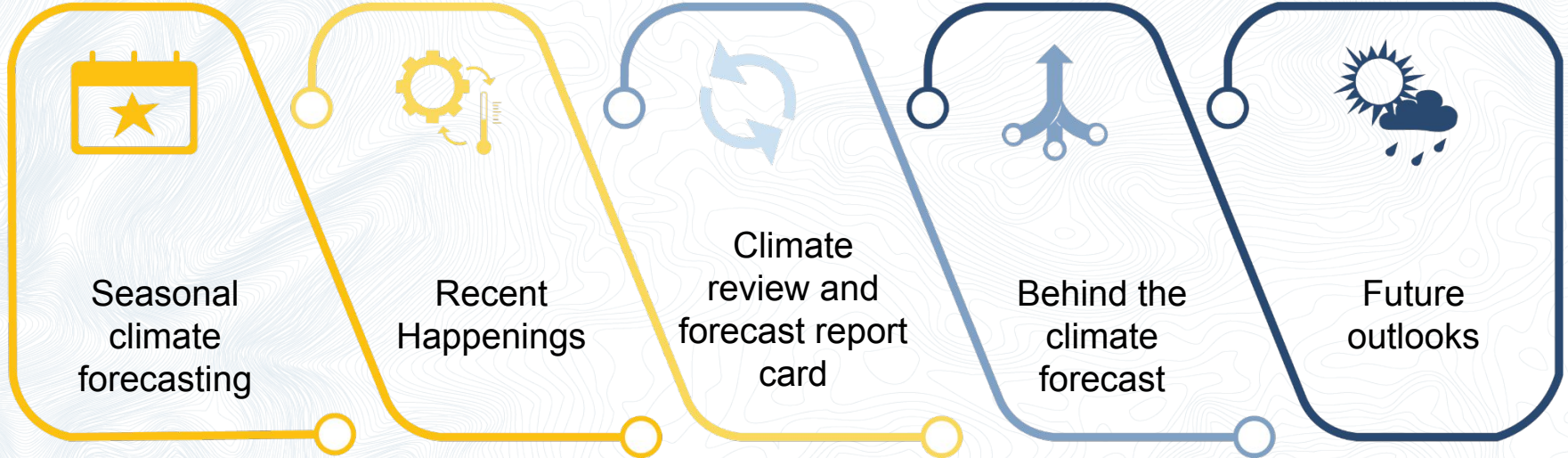




Alaska climate outlook briefing April 2025

Rick Thoman
ACCAP Climate Specialist
April 18, 2025





Seasonal
climate
forecasting

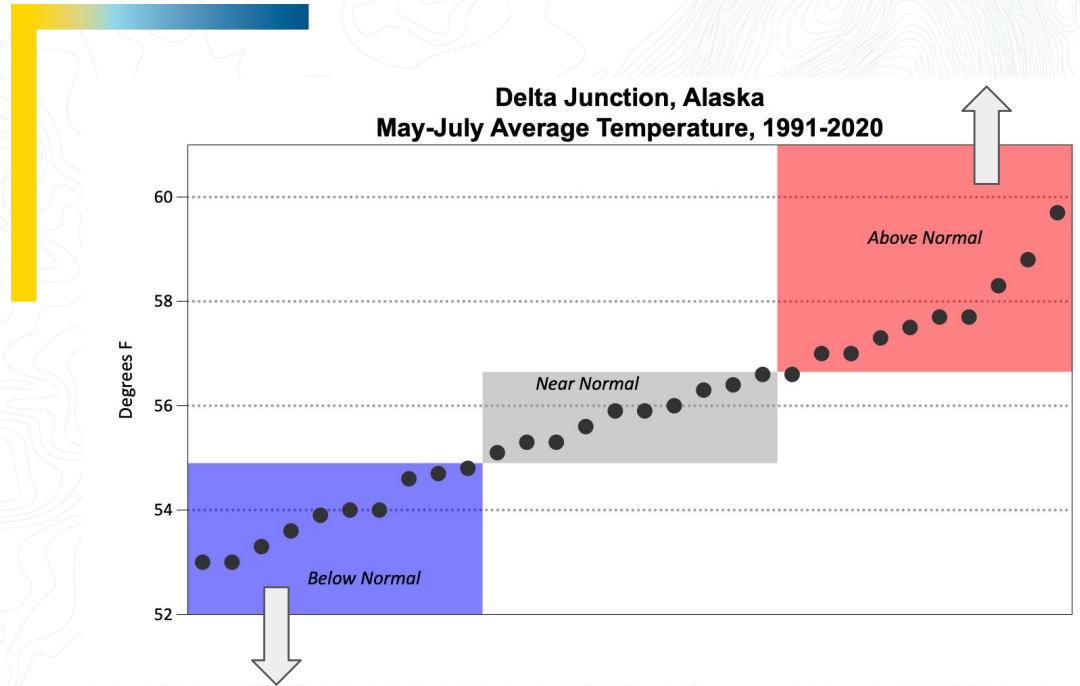


NOAA Center for Weather and Climate Prediction

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

- **Southcentral:** frequent snow, Anchorage
Mar 15-Apr 15: 23.5 inches snow, most since 2013
- **Western Alaska:** Persistently cold.
Kotzebue coldest Mar 15-Apr 15 since 1995,
Cold Bay record low Apr 13.
- **Bering Sea:** significant sea ice extent
increase early to mid April
- **Southeast:** mountain snowpack very low
Juneau southward.



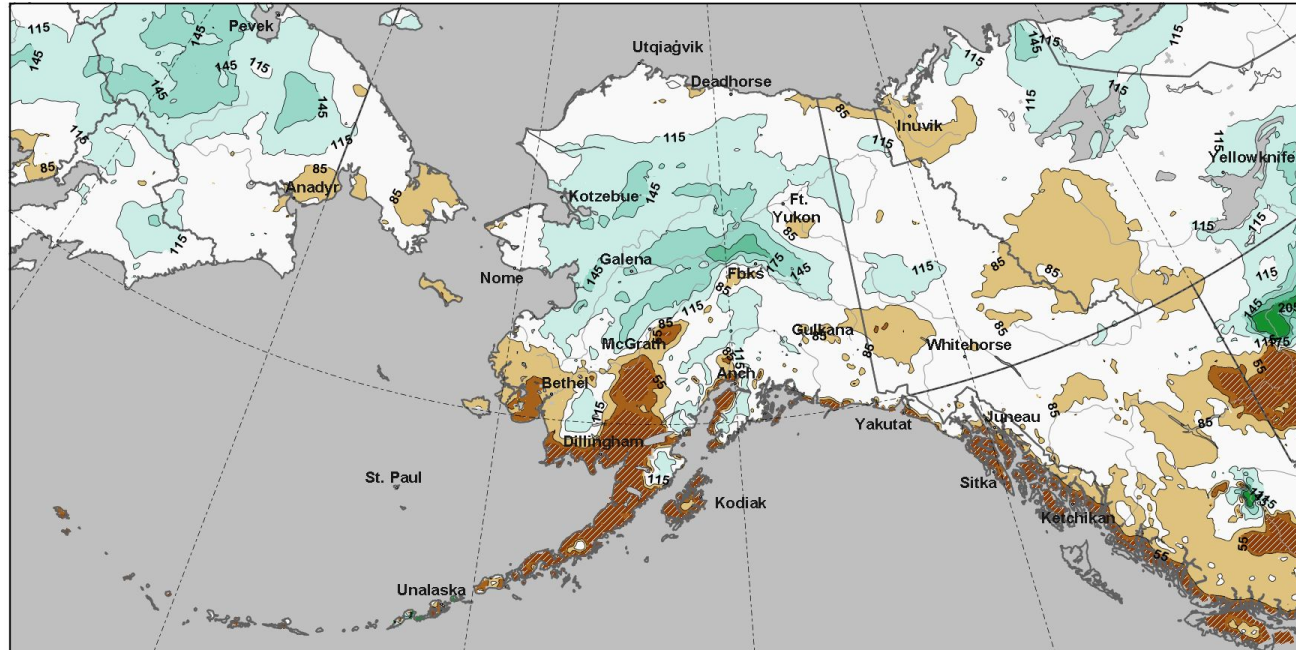
Mammatus clouds over Naknek

April 16, 2025
Photo by R. Thoman



Early April Snowpack

Snowpack Snow Water Equivalent: Percent of Median
April 6, 2025



Percent

Not shown where median SWE \leq 0.2cm



Climate Review

- What happened?
- How did climate outlooks perform?

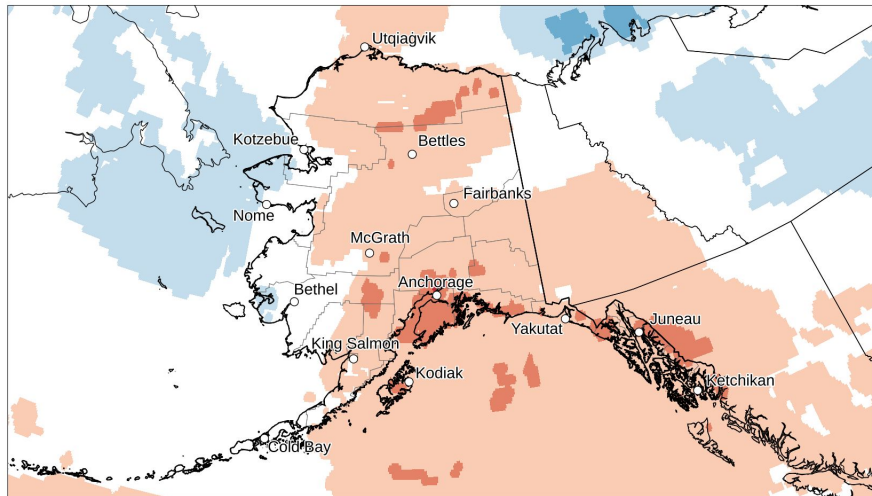


Sitka Sound
April 1, 2025

Photo credit: CeeJay
Johnson-Yellow Hawk

Model- based regional analysis > Average temperatures

Temperature Classification for Mar 2025



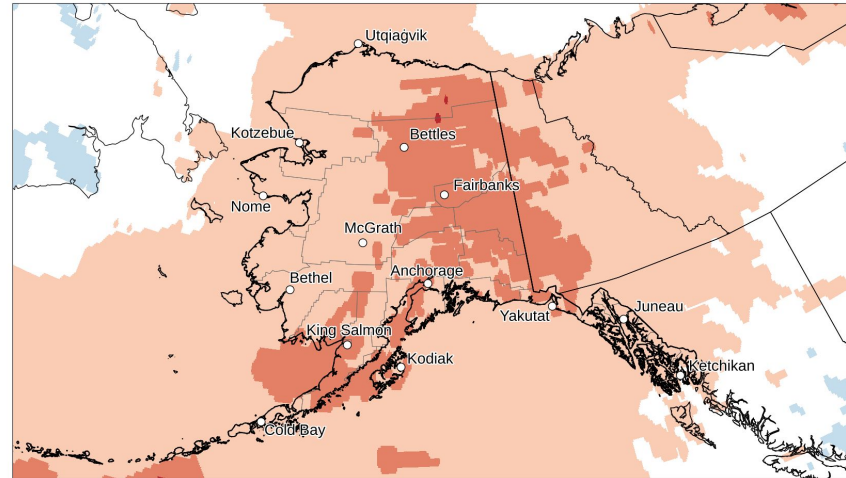
Source: ERA5 Reanalysis

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 Jan-Mar 2025



Source: ERA5 Reanalysis

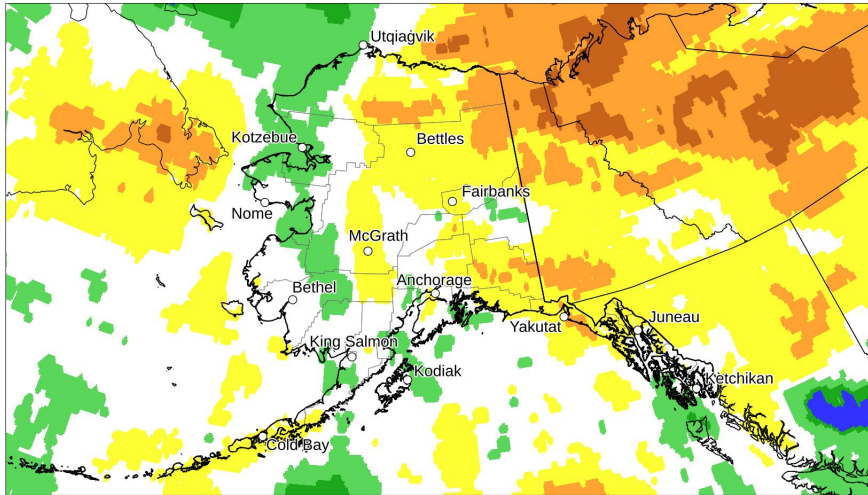
Map by: Brian Brettschneider

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 Mar 2025



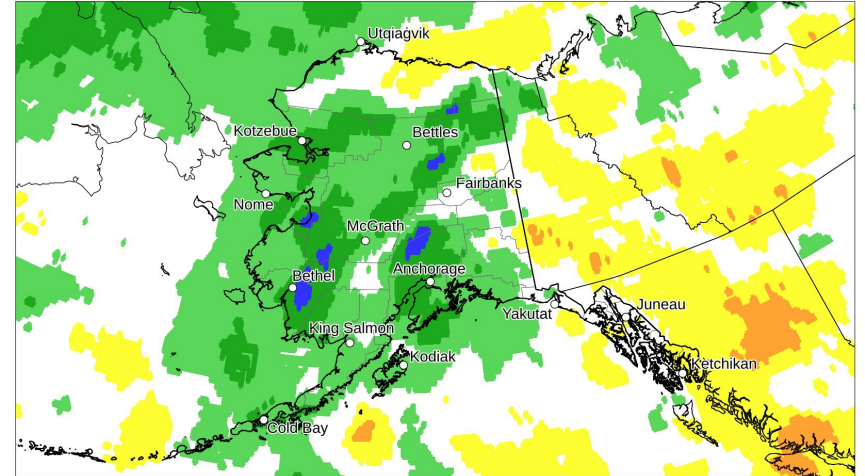
Source: ERA5 Reanalysis

Map by: Brian Brettschneider



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

Precipitation Classification for Jan-Mar 2025



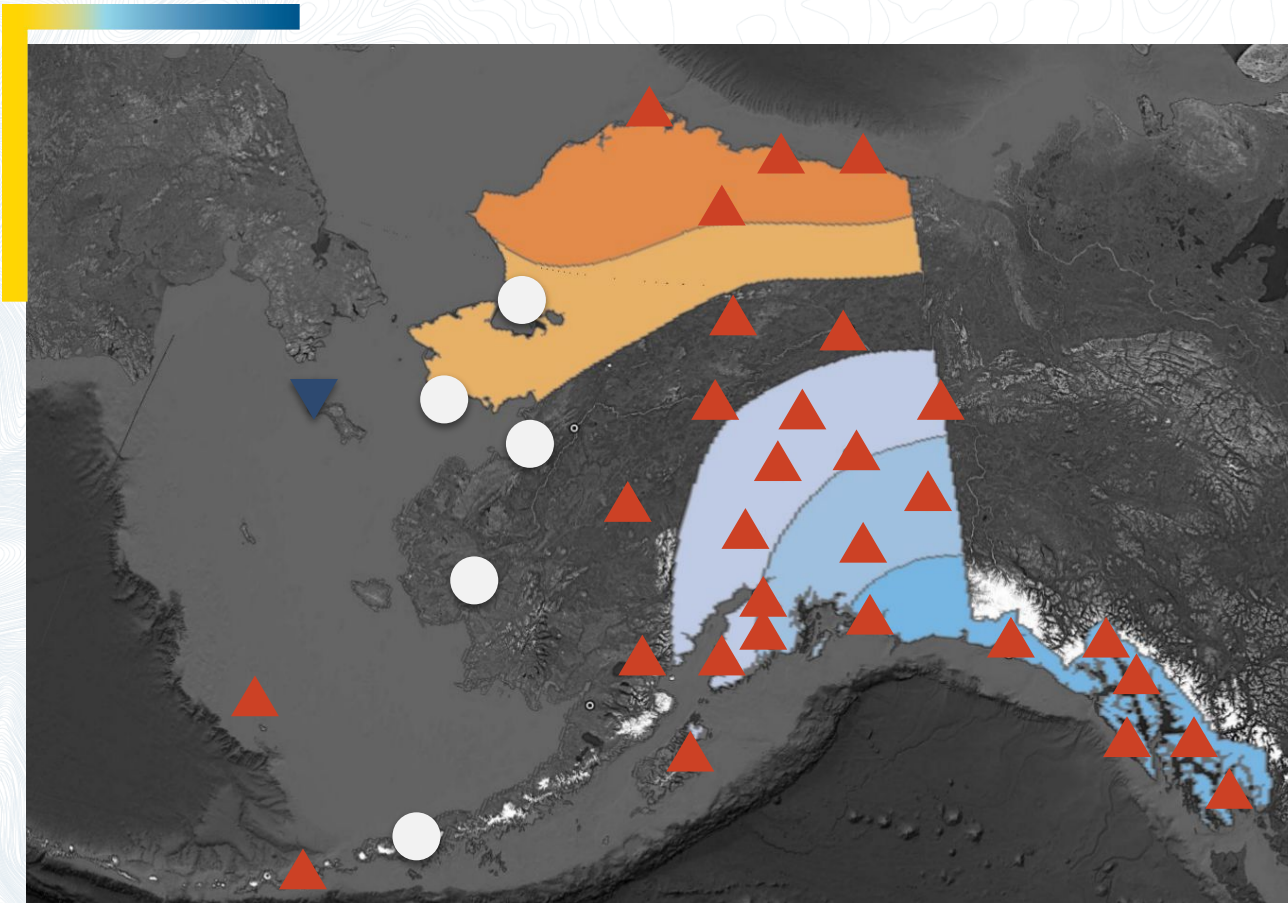
Source: ERA5 Reanalysis

Map by: Brian Brettschneider



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

March 2025 temperature > CPC outlook and observed



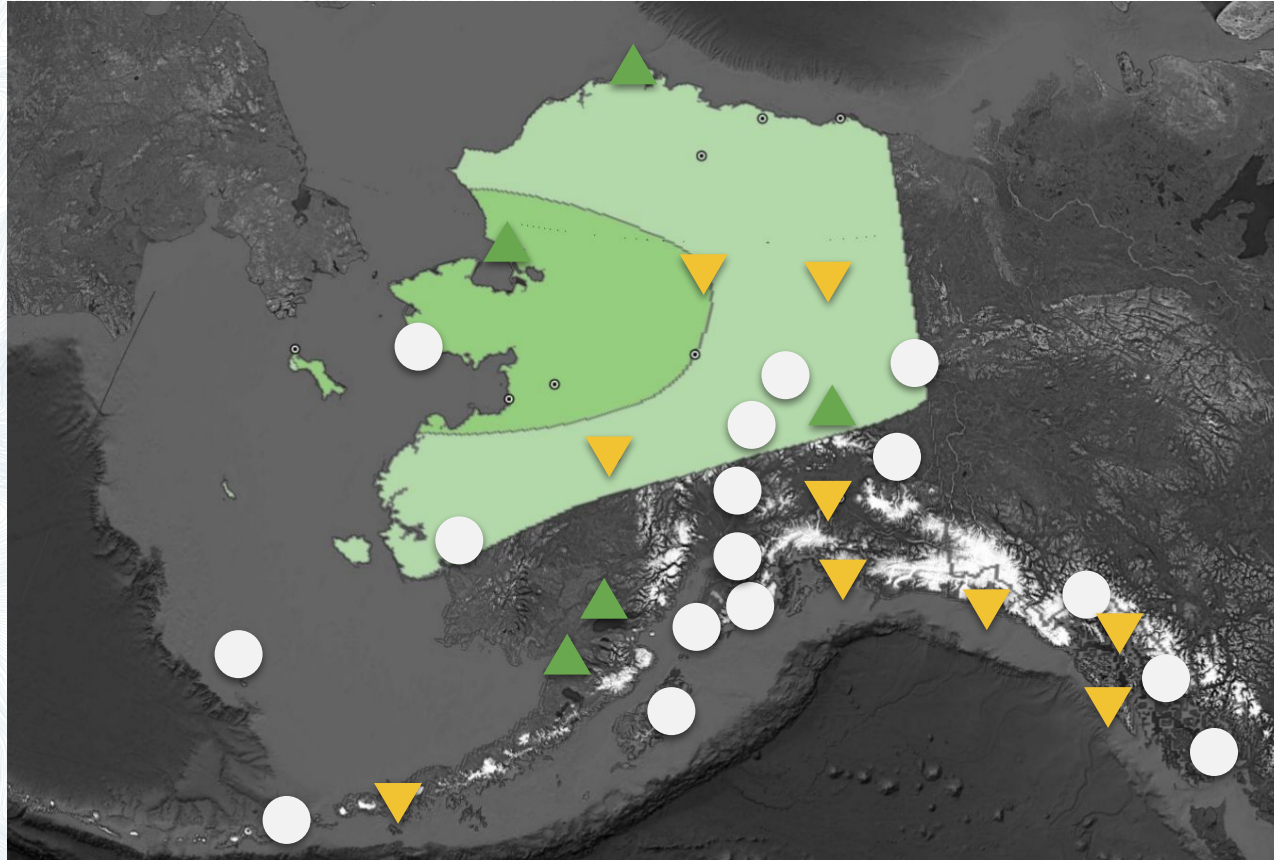
Non-EC skill score: -24

Percent correct: 17%

Mid-month outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

March 2025 precipitation > CPC outlook and observed



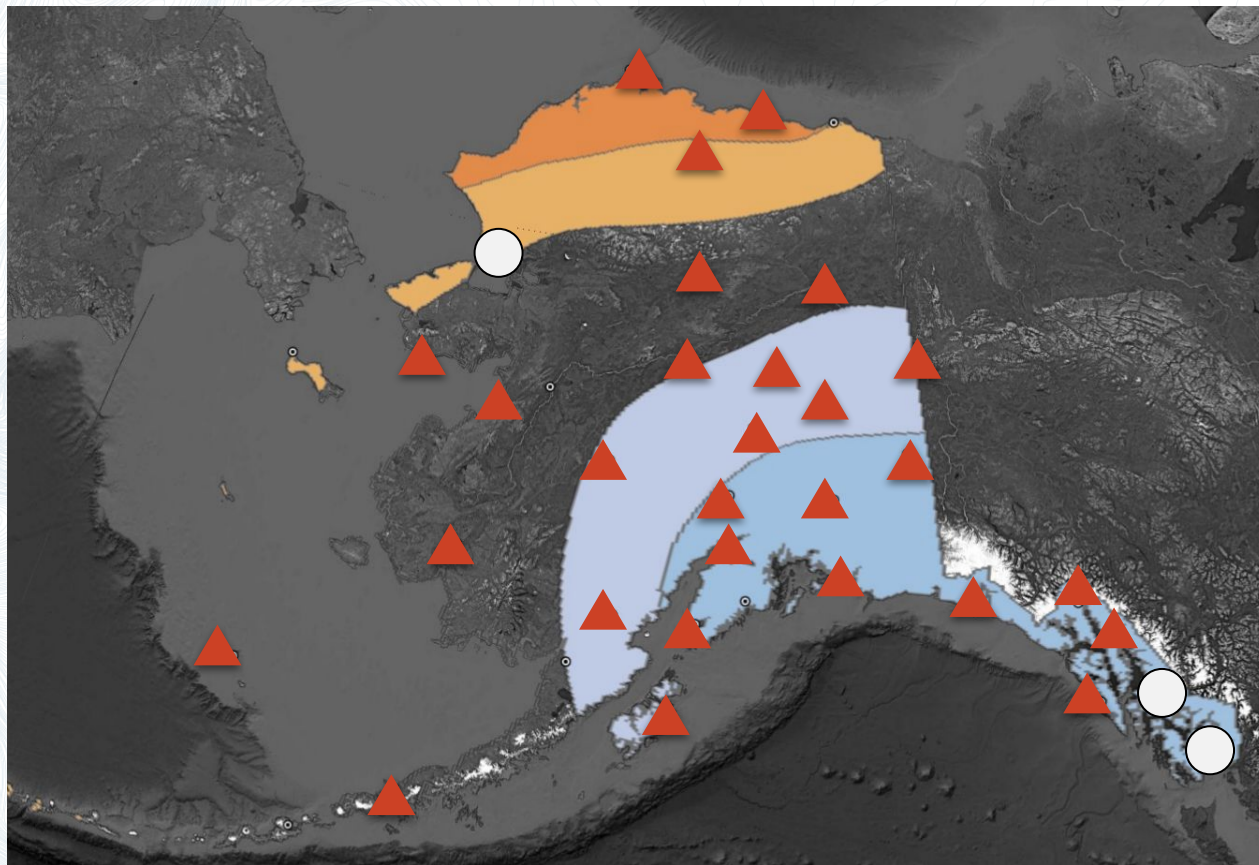
Non-EC skill
score: -9

Percent
correct: 27%

Mid-month
outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

January-March 2025 temperature > CPC outlook & observed

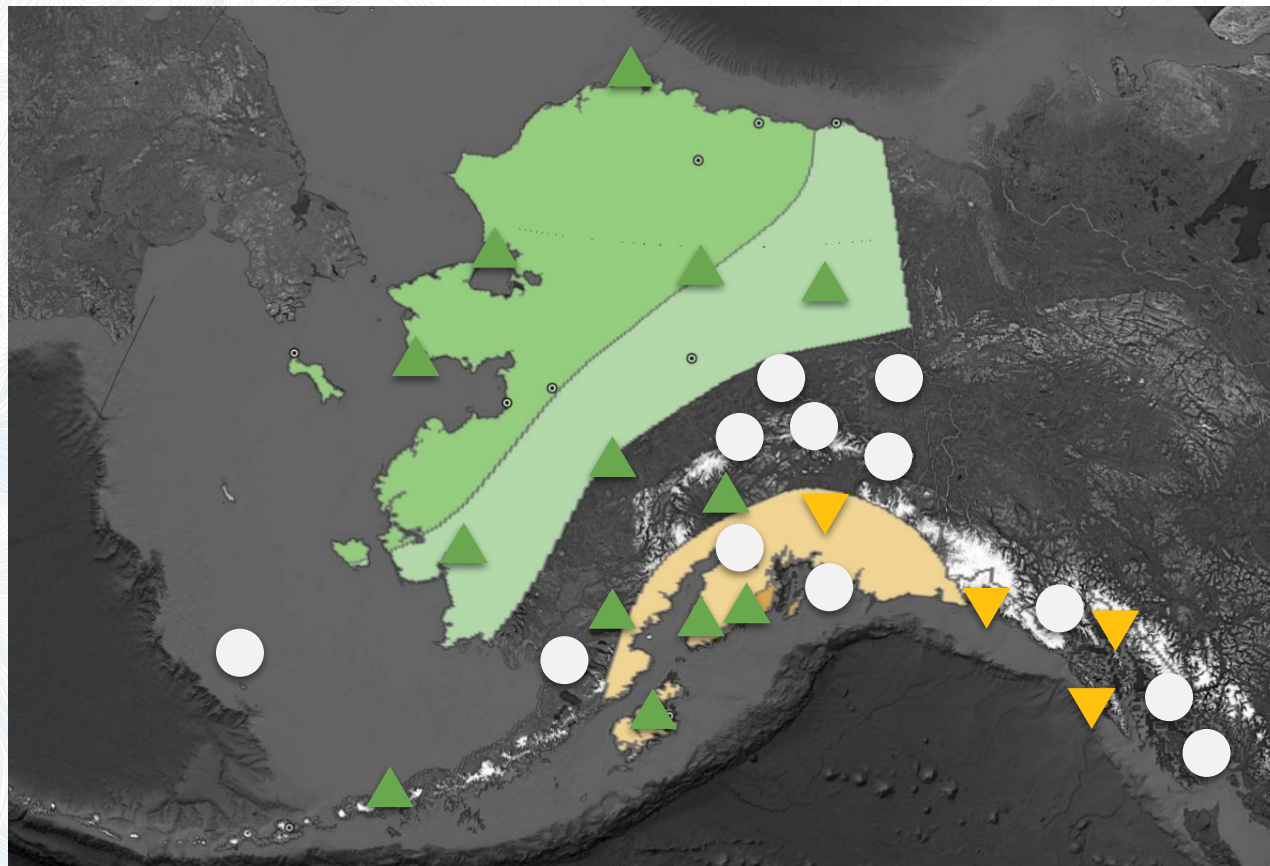


Non-EC skill
score: -29

Percent
correct: 14%

- ▲ Above normal
- Near normal
- ▼ Below normal

January-March 2025 precipitation > CPC outlook & observed

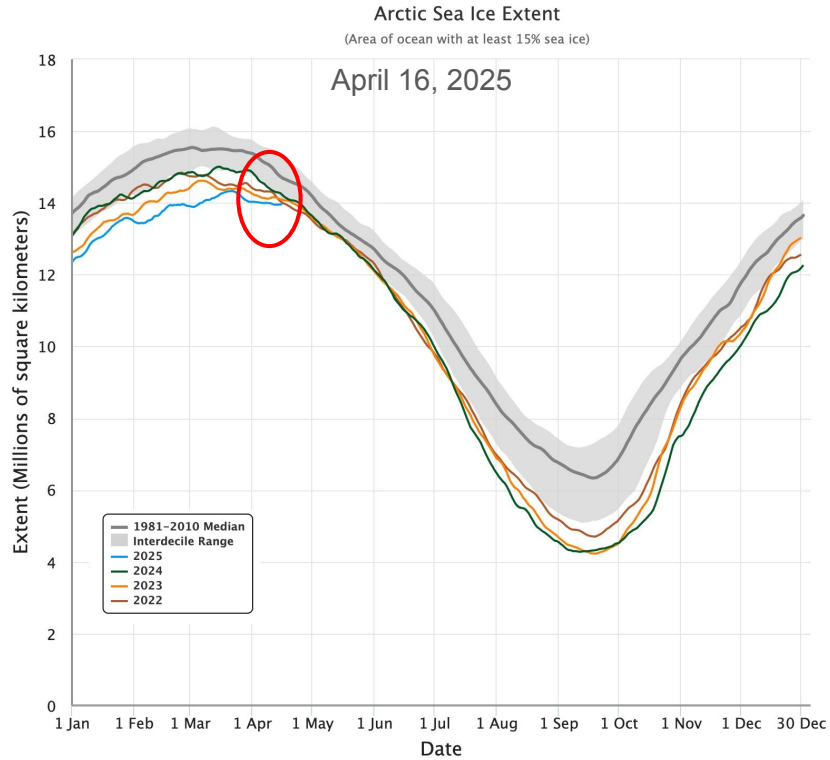


Non-EC skill
score: +19

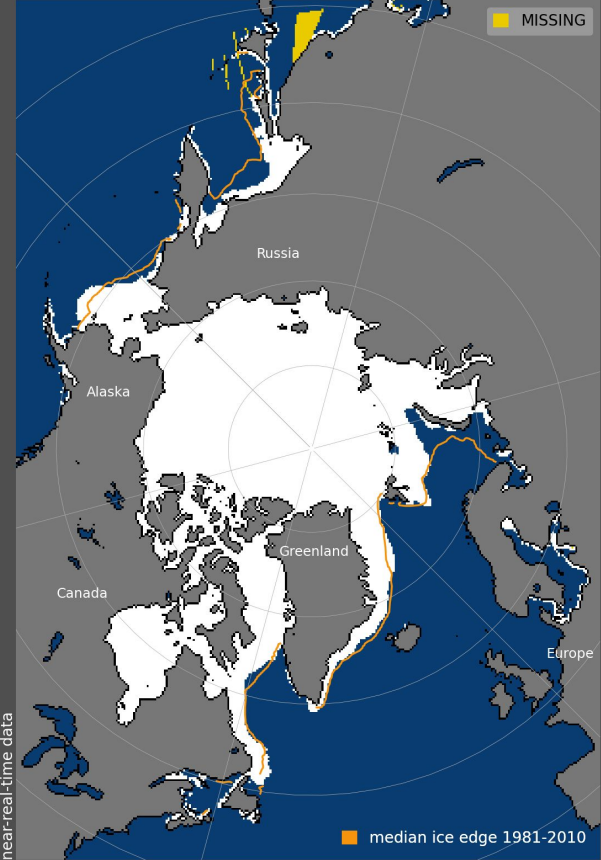
Percent
correct: 36%

- ▲ Above normal
- Near normal
- ▼ Below normal

Arctic wide sea ice

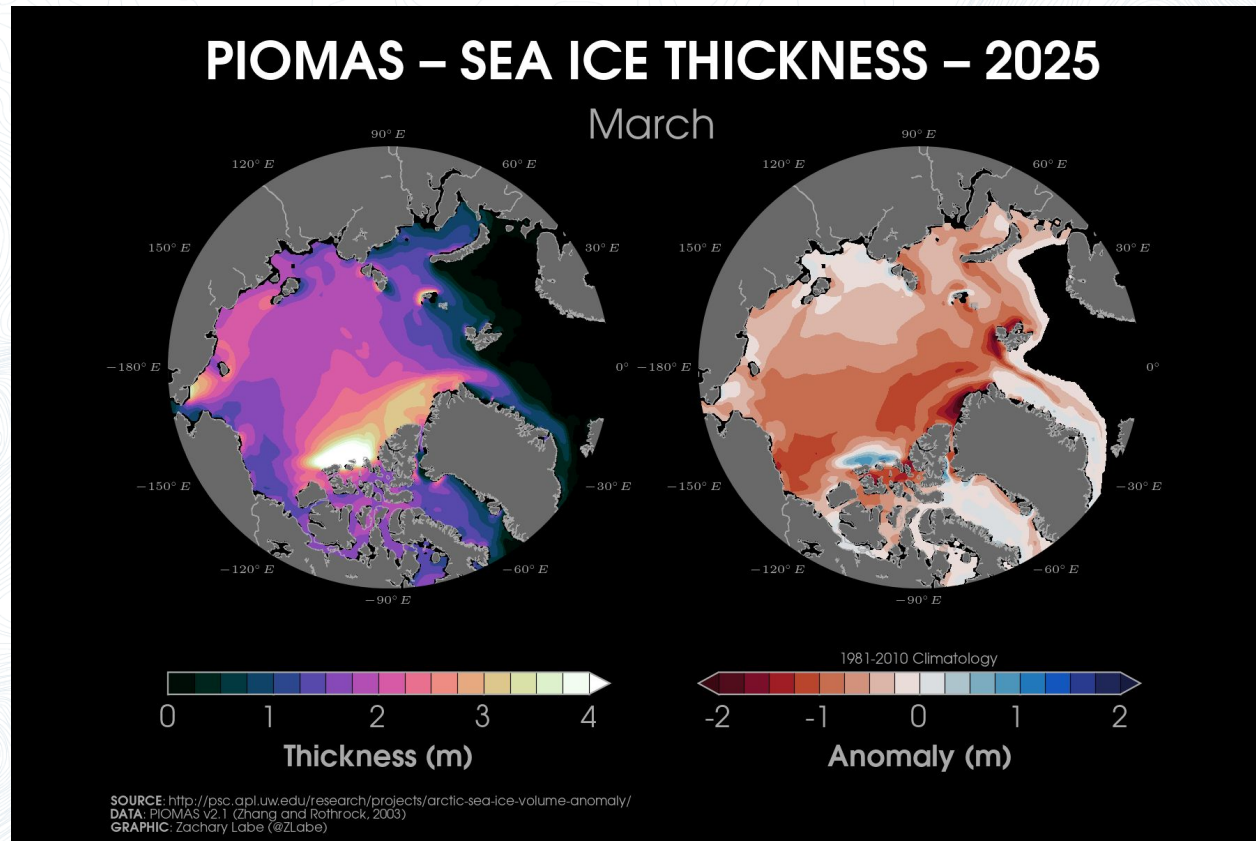


Sea Ice Extent, 16 Apr 2025



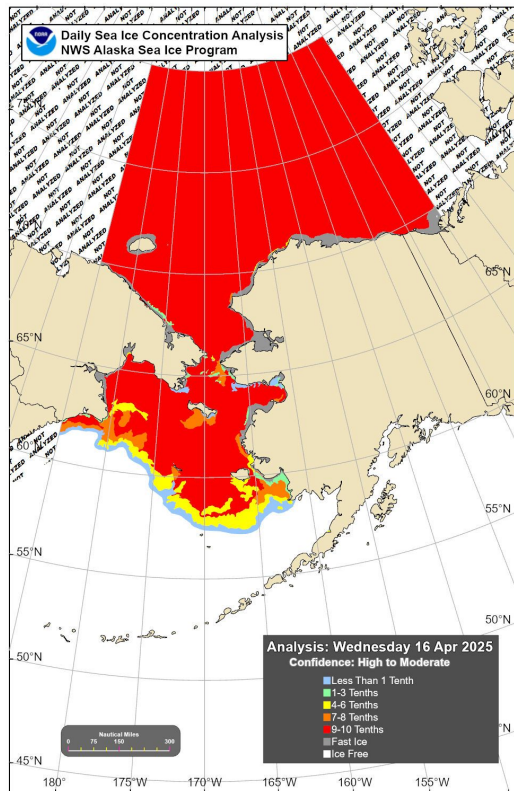
Arctic sea ice thickness

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

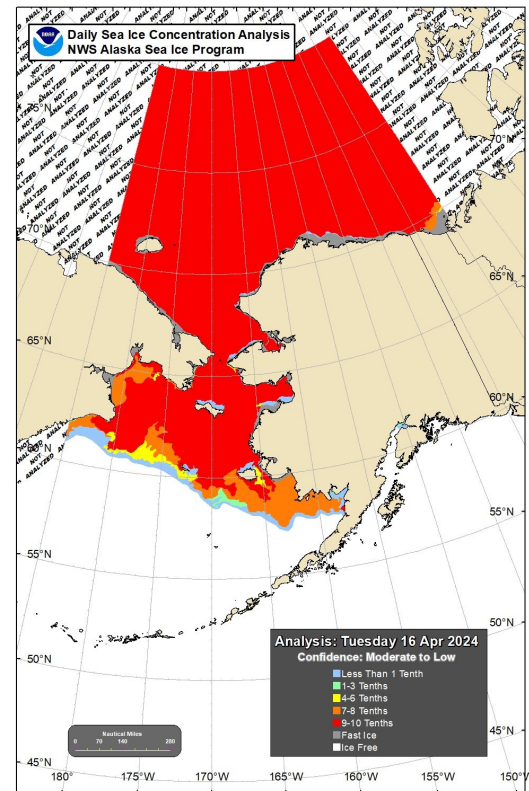


Mid-April sea ice comparison

April 16, 2025



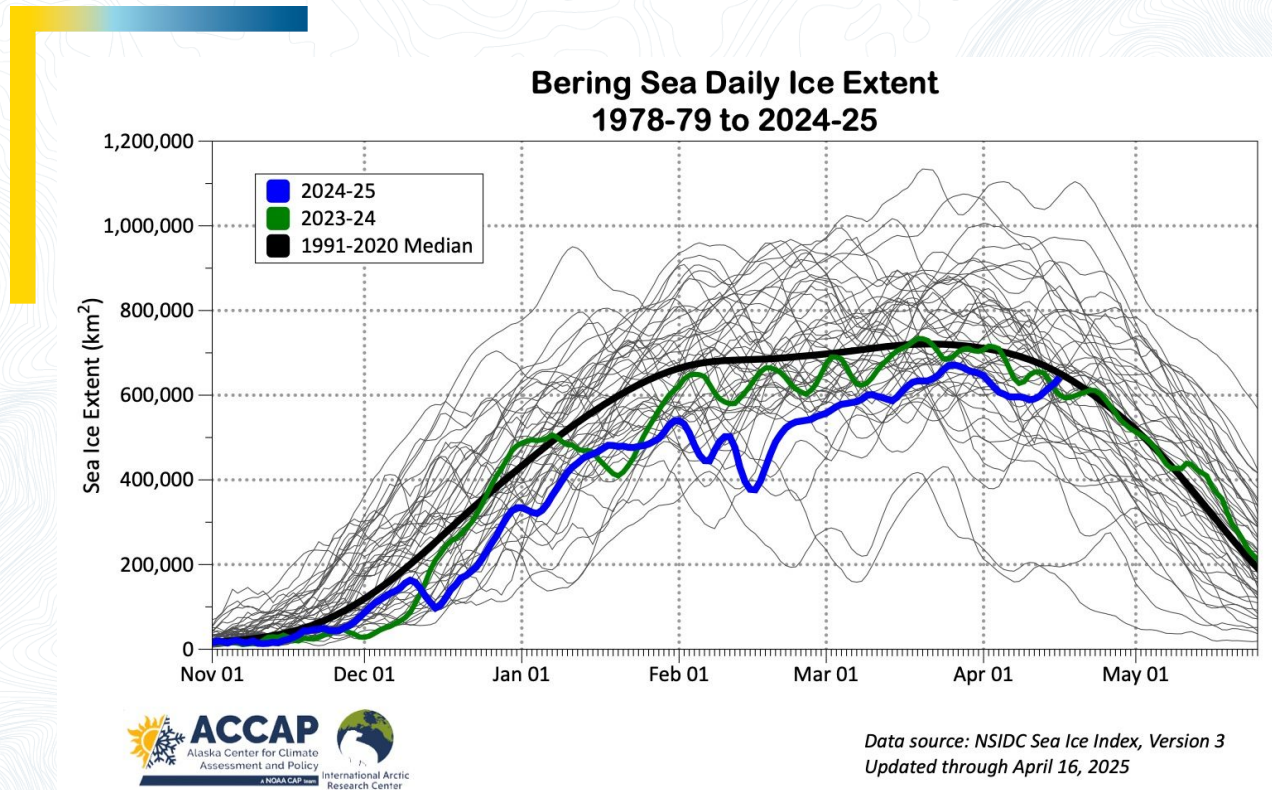
April 16, 2024



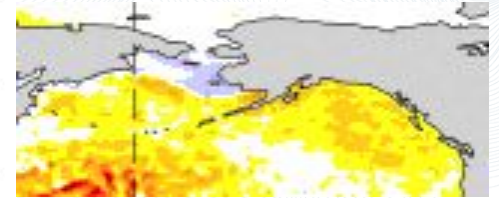
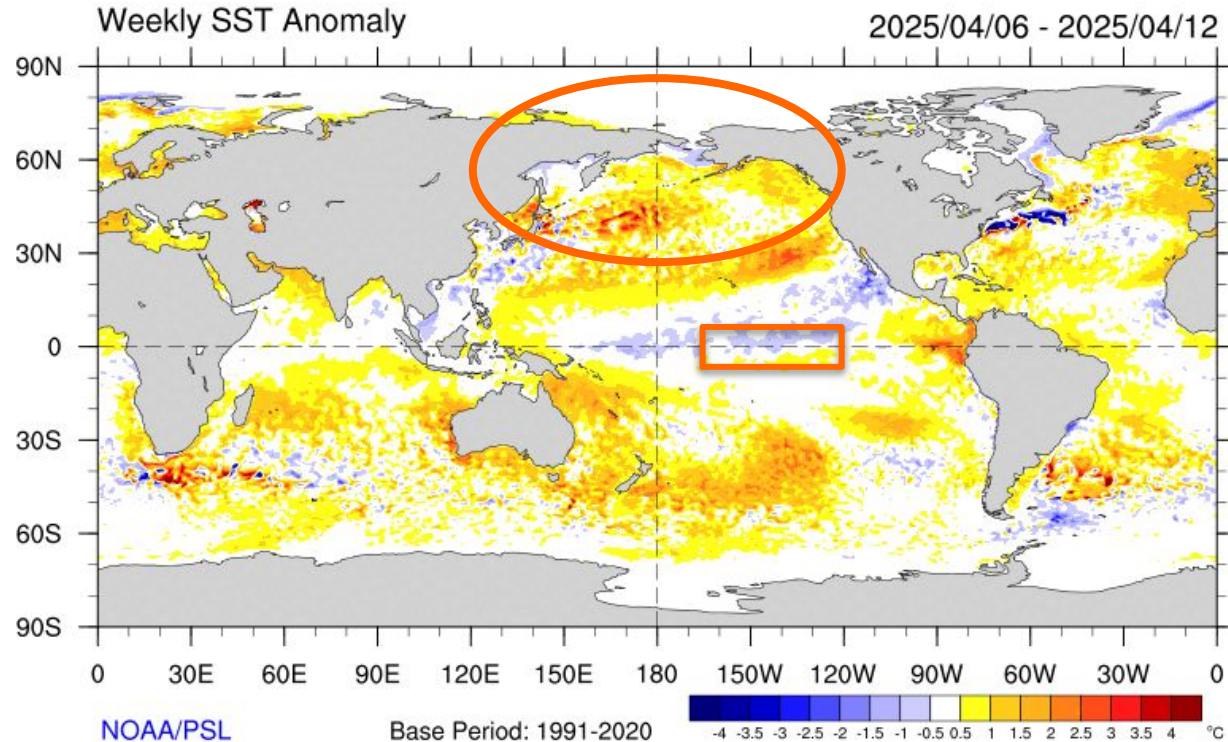
Source: National Weather Service
Alaska Region Sea Ice Program

Sea ice extent through the season

Sources:
Data NSIDC Sea Ice Index,
Version 3.



Global sea surface temperature departure from normal

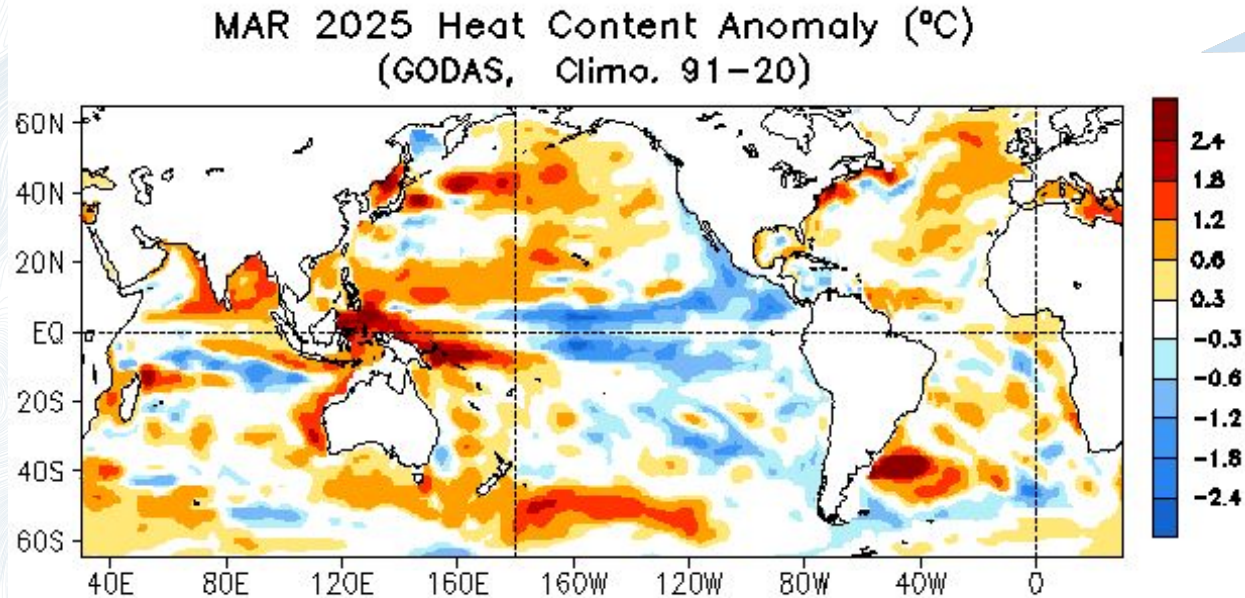


ONI for **Jan-Mar**: -0.4

PDO for **Mar 2025**: -0.1

Sources: ONI from CPC
PDO Index from WCS

Upper ocean heat departure from average



Little change near Alaska

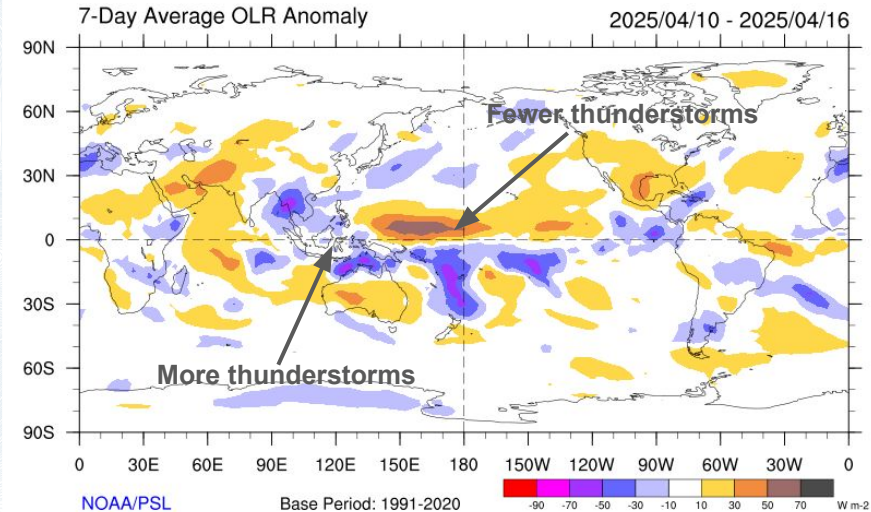
Upper 300 meters of the ocean

Source: NOAA/CPC

Tropical Pacific atmosphere

Jan-Mar Oceanic Niño Index: -0.4

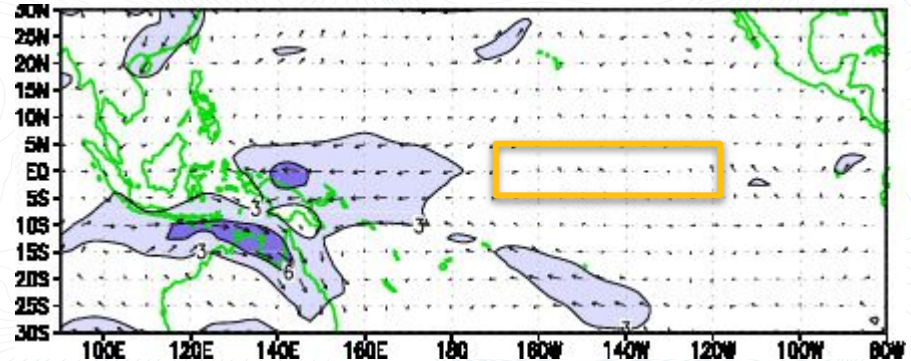
Deep tropical convection
Via “outgoing longwave radiation”



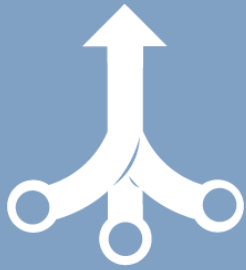
Near average trade winds
Niño Region 3.4



Trade winds
850 mb wind difference from average
Mar 15-Apr 14, 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

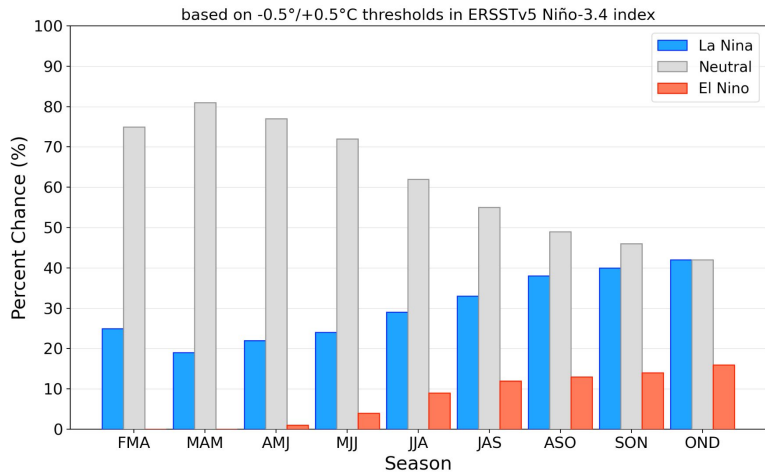
CPC Niño 3.4 forecasts > experts

March 2025

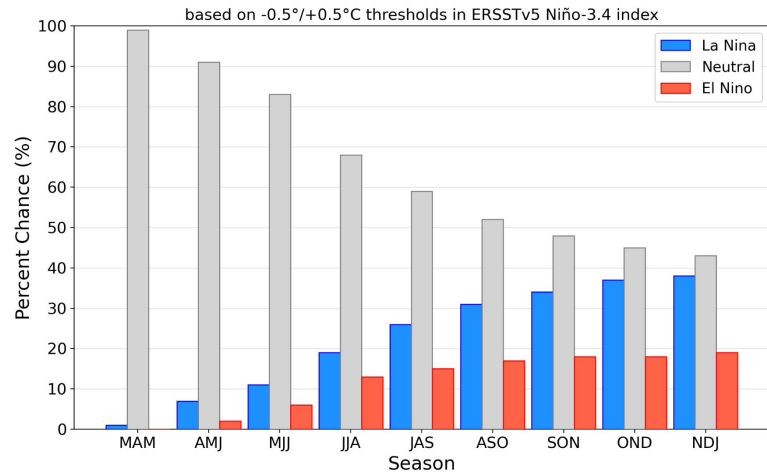
April 2025

ENSO Alert System Status:
Final La Niña Advisory

Official NOAA CPC ENSO Probabilities (issued March 2025)



Official NOAA CPC ENSO Probabilities (issued April 2025)



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

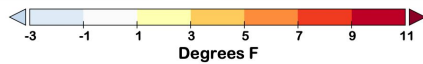
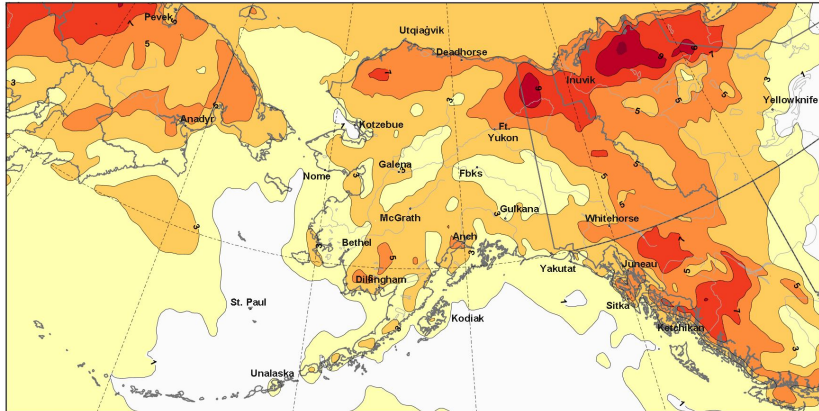
- Long term trends
- Optimum climate normals: Alaska trends the past 15 years

May half century trends

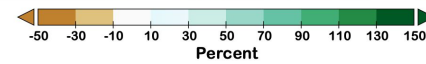
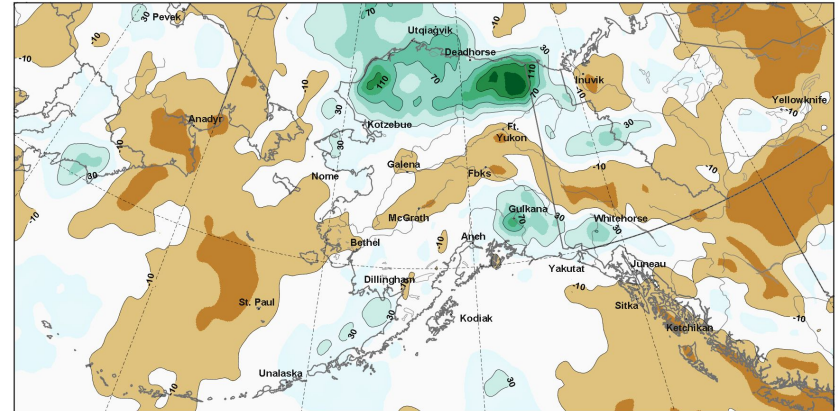
Temperatures

Precipitation

Total Change in May Average Temperature
1975-2024



Percent Change in May Average Temperature
1975 to 2024

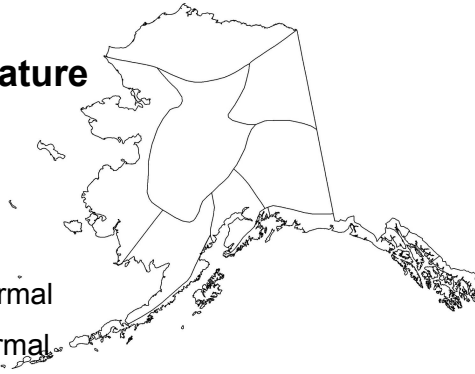
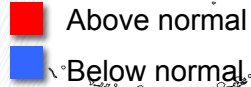


Change in the average
over 50 years

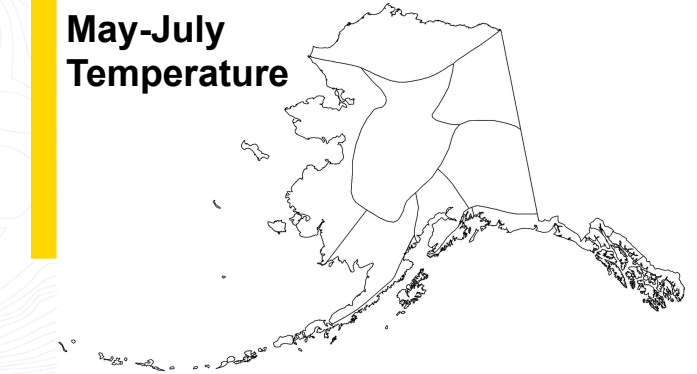
2010 to 2024 trends

Past 15 years compared to 1991-2020

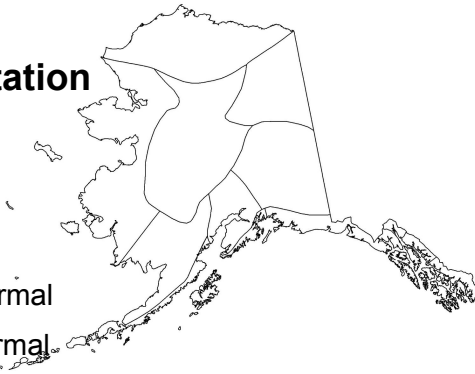
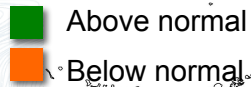
May Temperature



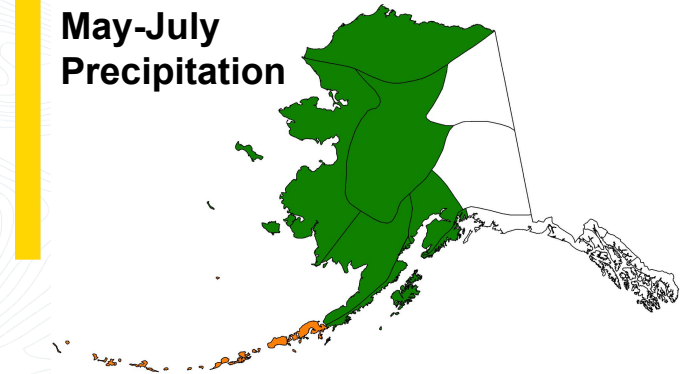
May-July Temperature



May Precipitation



May-July 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)

What's being forecasted

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

May-July 2025 sea surface temperature > NMME

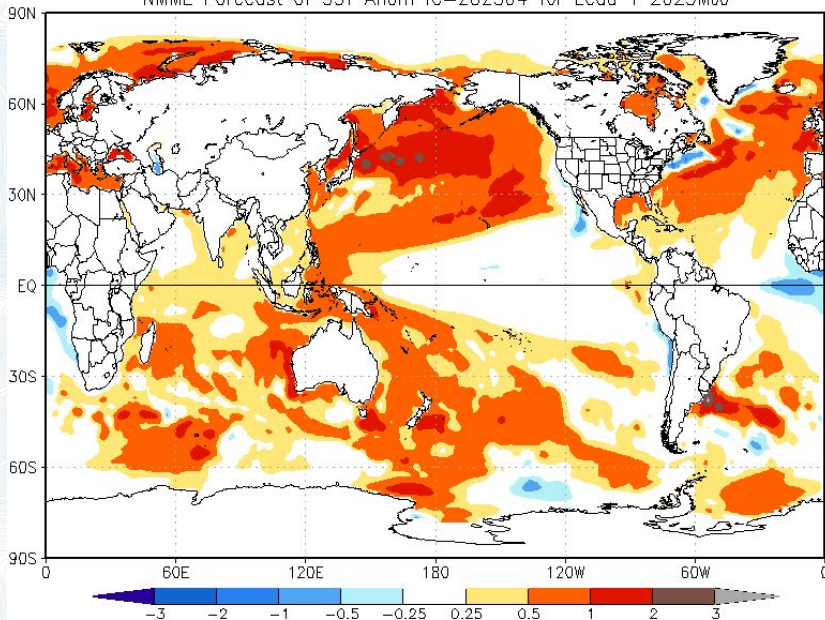
Forecast
departure from normal



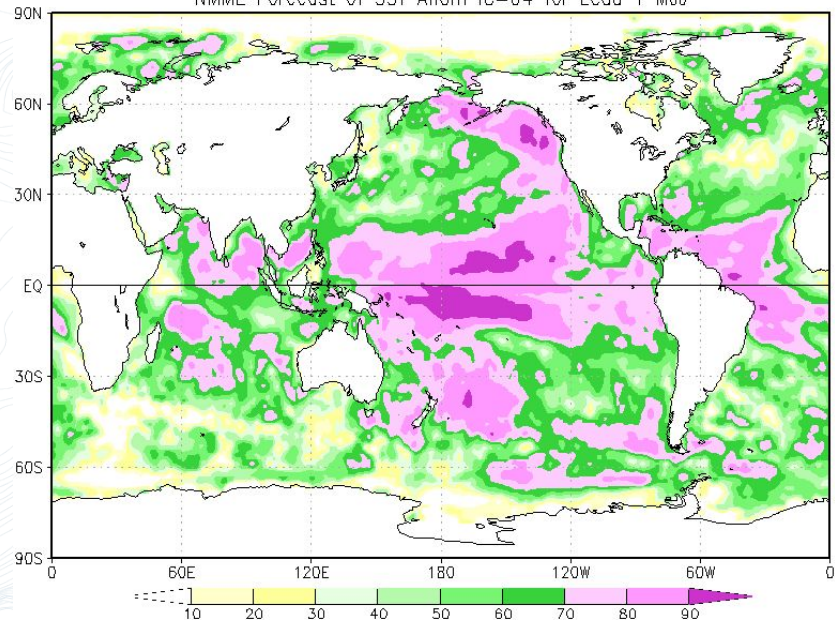
Skill
of the forecast



NMME Forecast of SST Anom IC=202504 for Lead 1 2025MJJ

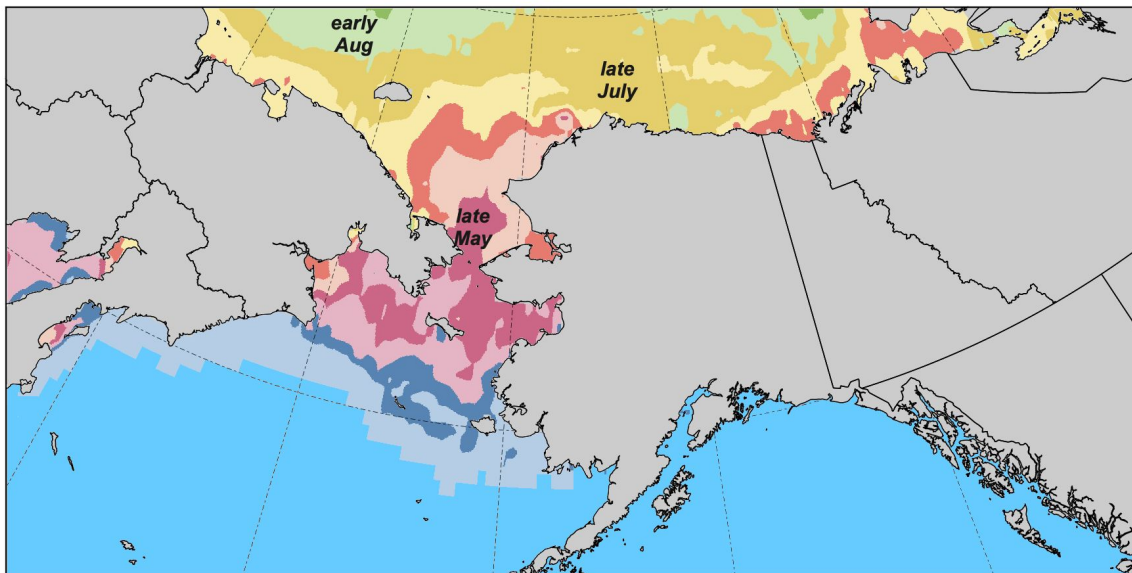


NMME Forecast of SST Anom IC=D4 for Lead 1 MJJ



Experimental sea ice forecast > CPC

First date with open water
Spring/Summer 2025



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

May 2025 calibrated probability forecast ➤ NMME

Forecast from →

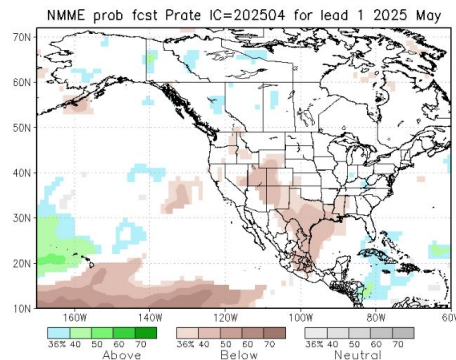
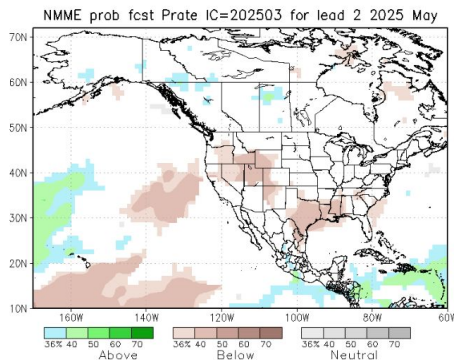
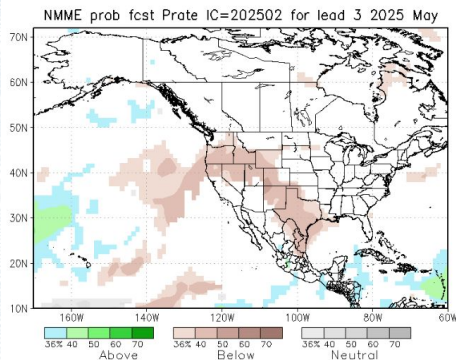
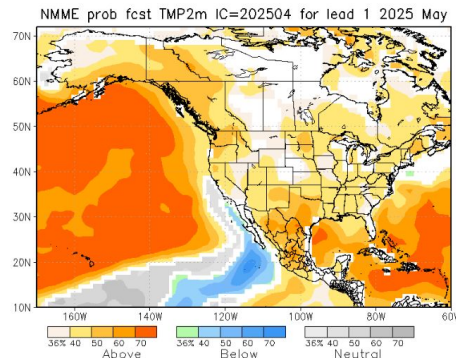
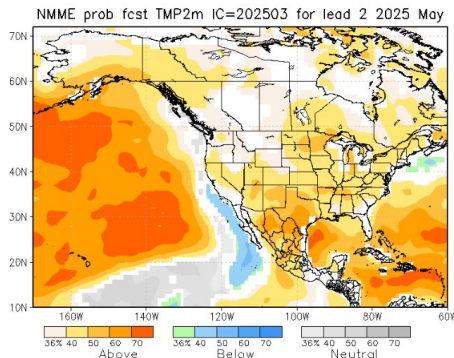
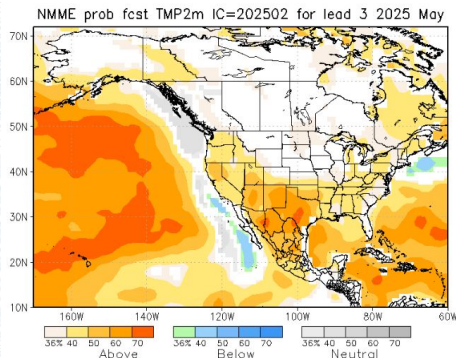
February

March

April

Temperature

Precipitation

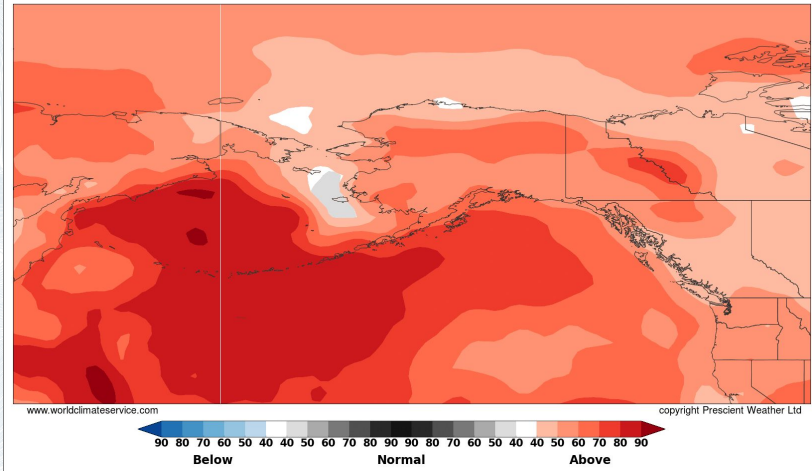


May 2025 outlooks > World Climate Service

Temperature



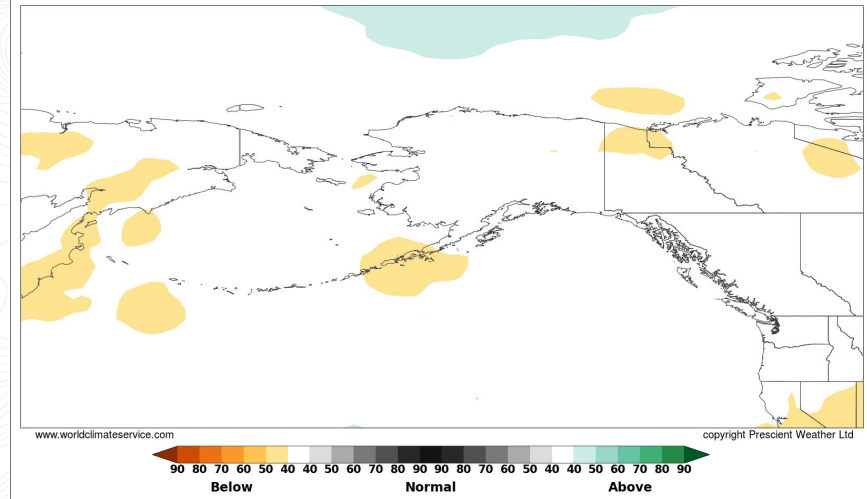
CFSv2 T2m Probability Above/Normal/Below
Forecast Valid May 2025
Initialized April 2025 1991-2020 Climatology



Precipitation



CFSv2 Precipitation Probability Above/Normal/Below
Forecast Valid May 2025
Initialized April 2025 1991-2020 Climatology



Bias Corrected, Skill Weighted CFS + ECMWF

May-July 2025 calibrated probability forecast > NMME

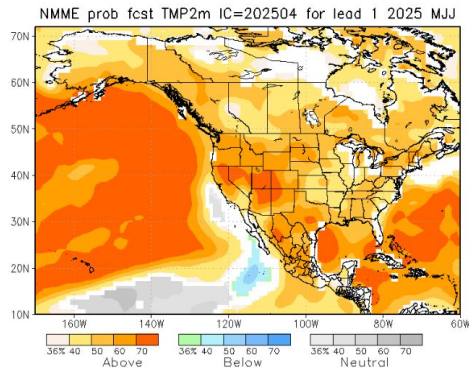
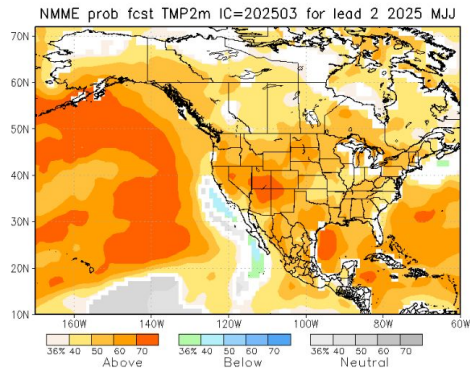
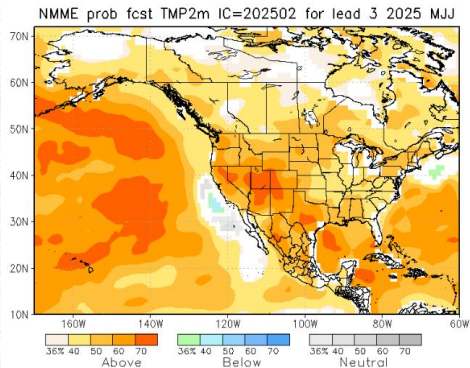
Forecast from →

February

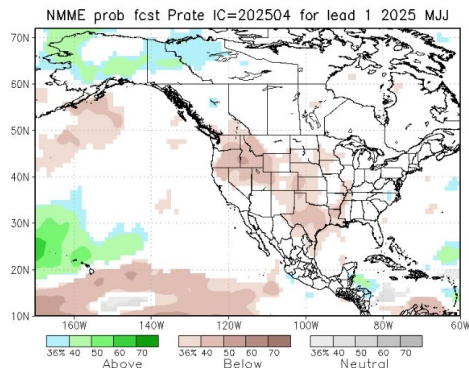
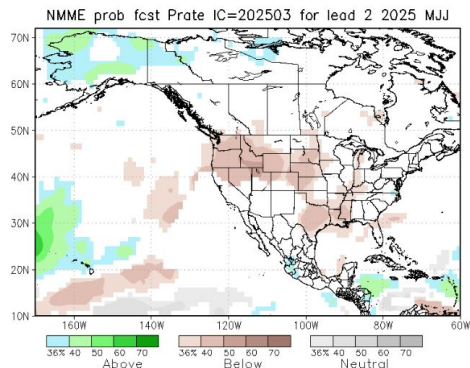
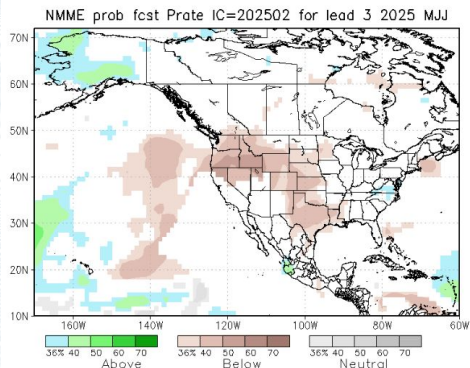
March

April

Temperature



Precipitation

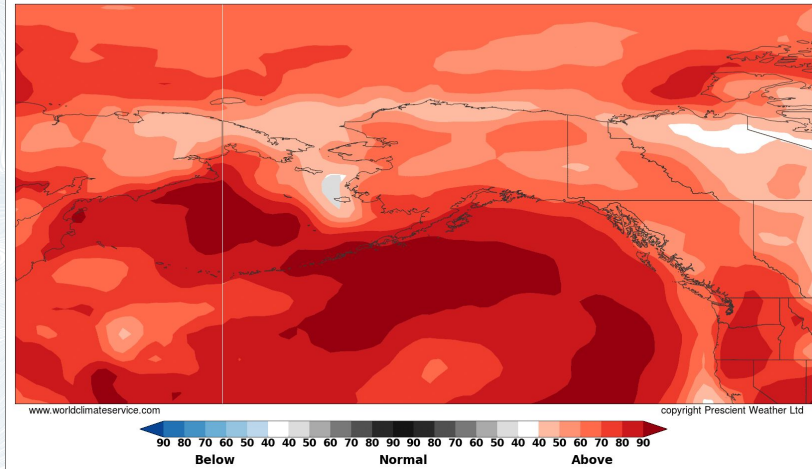


May-July 2025 outlooks ➤ World Climate Service

Temperature



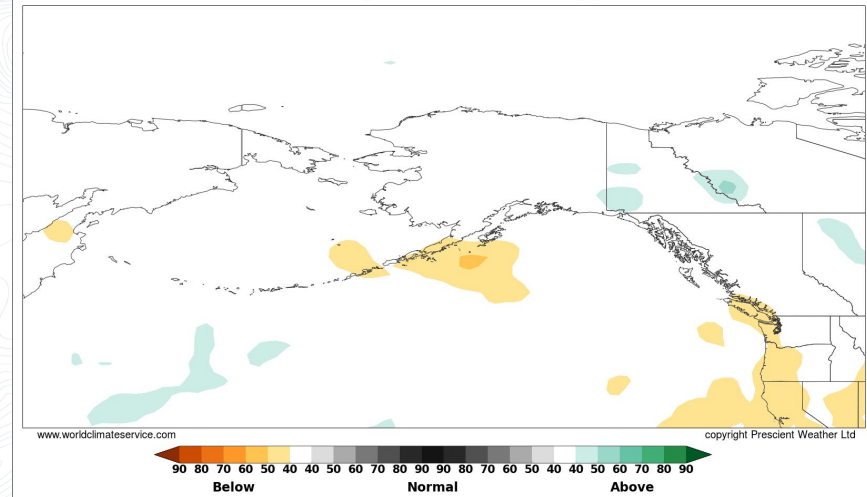
CFSv2 T2m Probability Above/Normal/Below
Forecast Valid May 2025 - Jul 2025
Initialized April 2025 1991-2020 Climatology



Precipitation

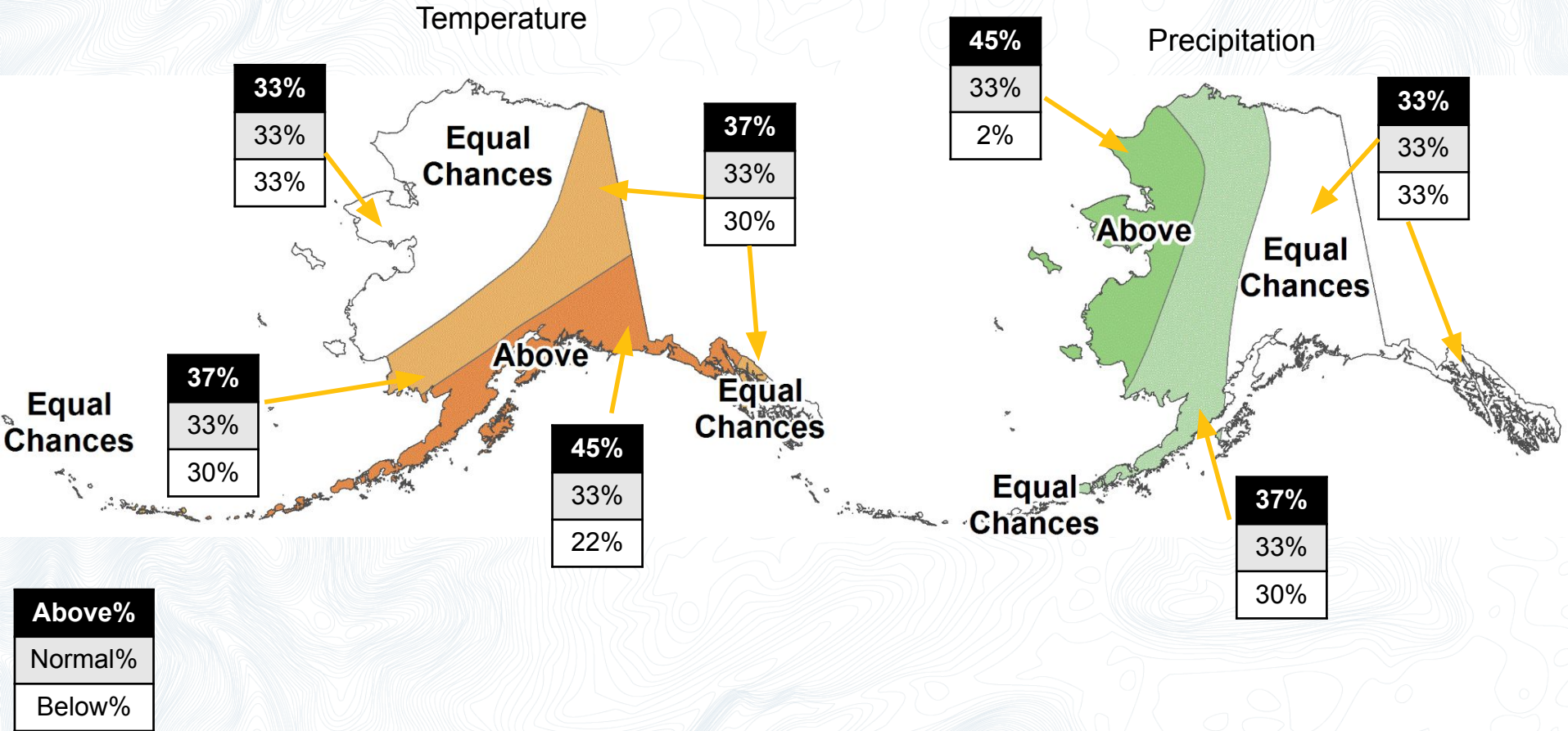


CFSv2 Precipitation Probability Above/Normal/Below
Forecast Valid May 2025 - Jul 2025
Initialized April 2025 1991-2020 Climatology



Bias Corrected, Skill Weighted CFS + ECMWF

May-July 2025 outlooks from **March**

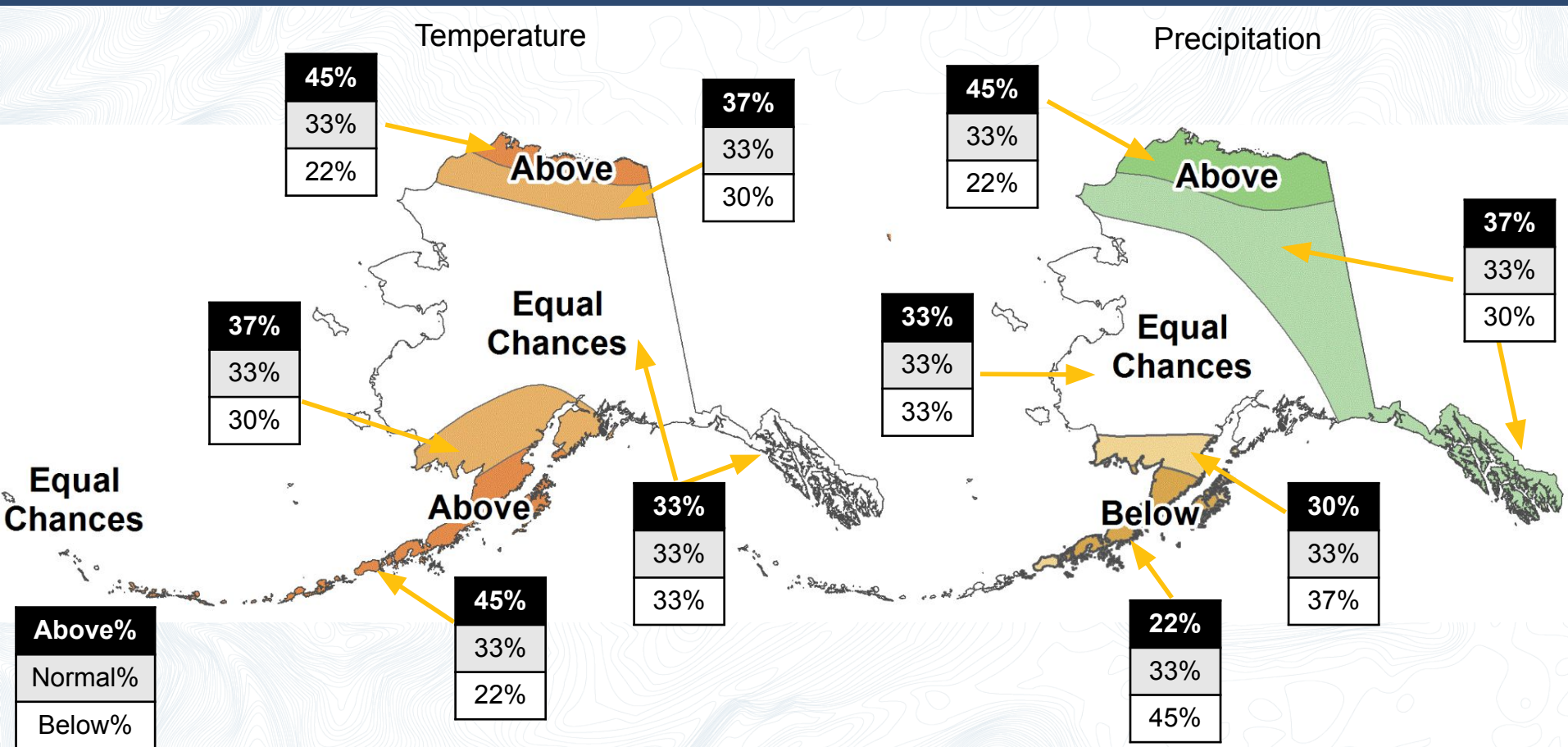


Future
outlook

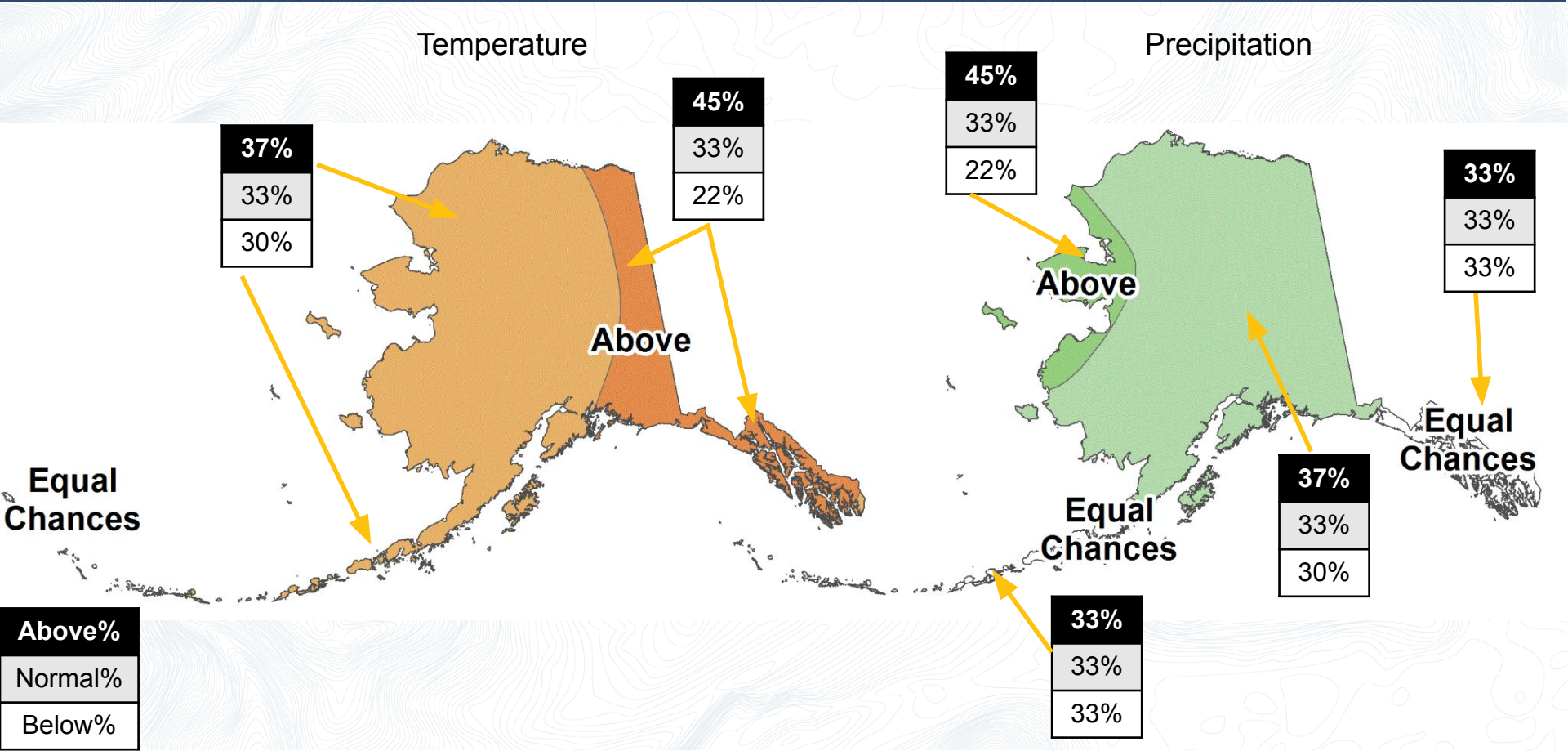


And the answer is...

CPC May 2025 outlooks



Summer 2025 outlook



Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- April 22 ▶ *Annual Alaska River Breakup outlook webinar*
- April 30 ▶ *Annual Green-up outlook*
- May 16 ▶ *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