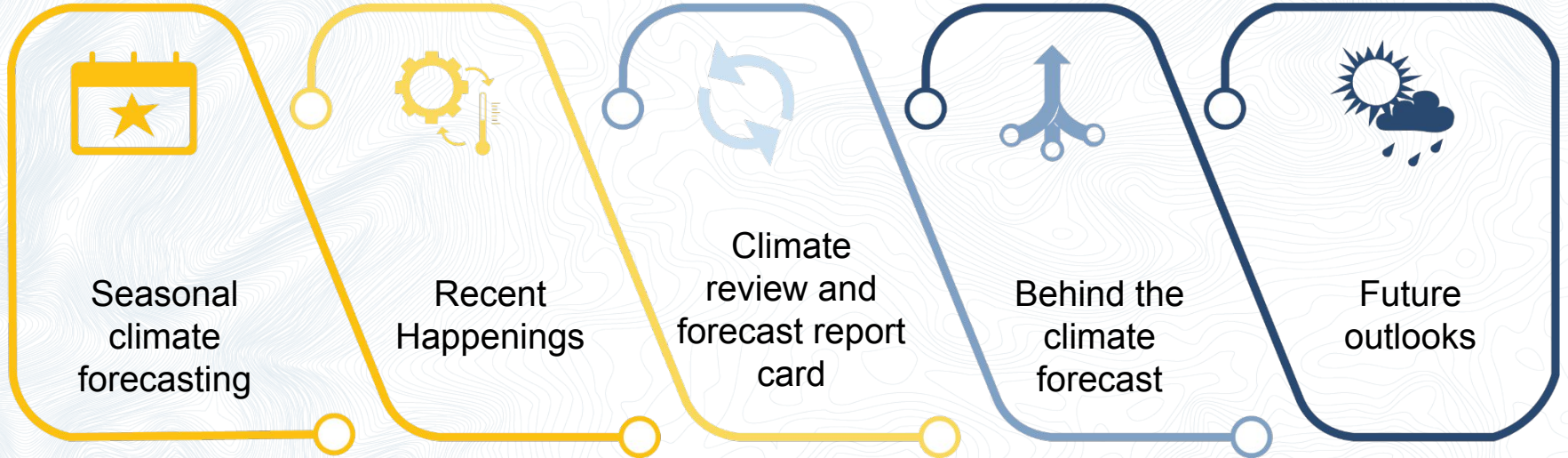




Alaska climate outlook briefing March 2025

Rick Thoman
ACCAP Climate Specialist
March 21, 2025





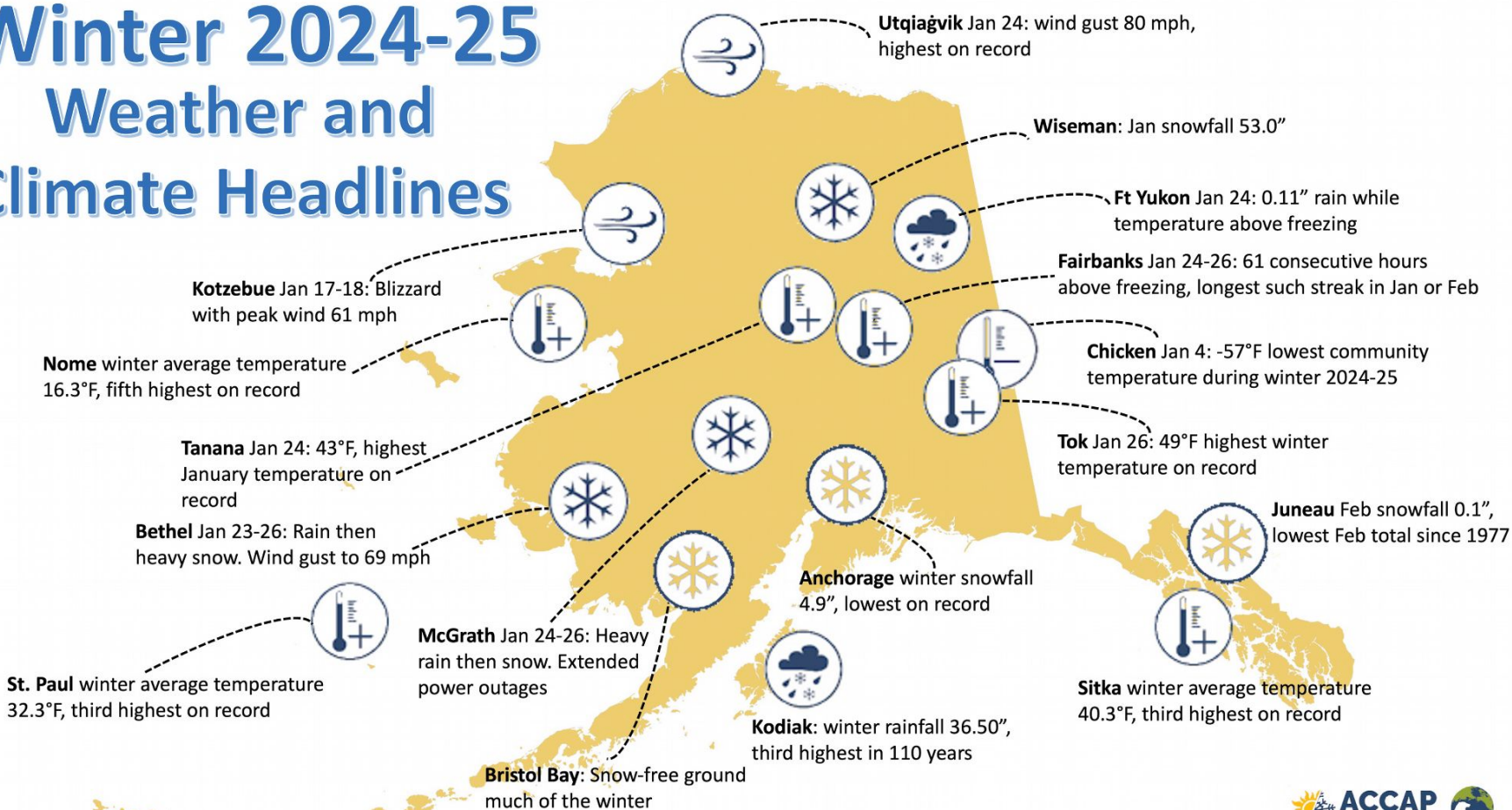
Seasonal
climate
forecasting



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

Winter 2024-25 Weather and Climate Headlines





Recent Happenings

- **Statewide:** Turn to cooler wx mid-March. Alaska state-wide temperature index on March 15 below zero first time in a month.
- **Anchorage and Kenai Peninsula:** Snow drought ends early March
- **Ketchikan/Metlakatla** March 15: 4 to 8 inches of snow, most of the winter



Brown Lake, Kenai Peninsula

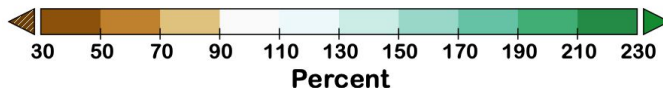
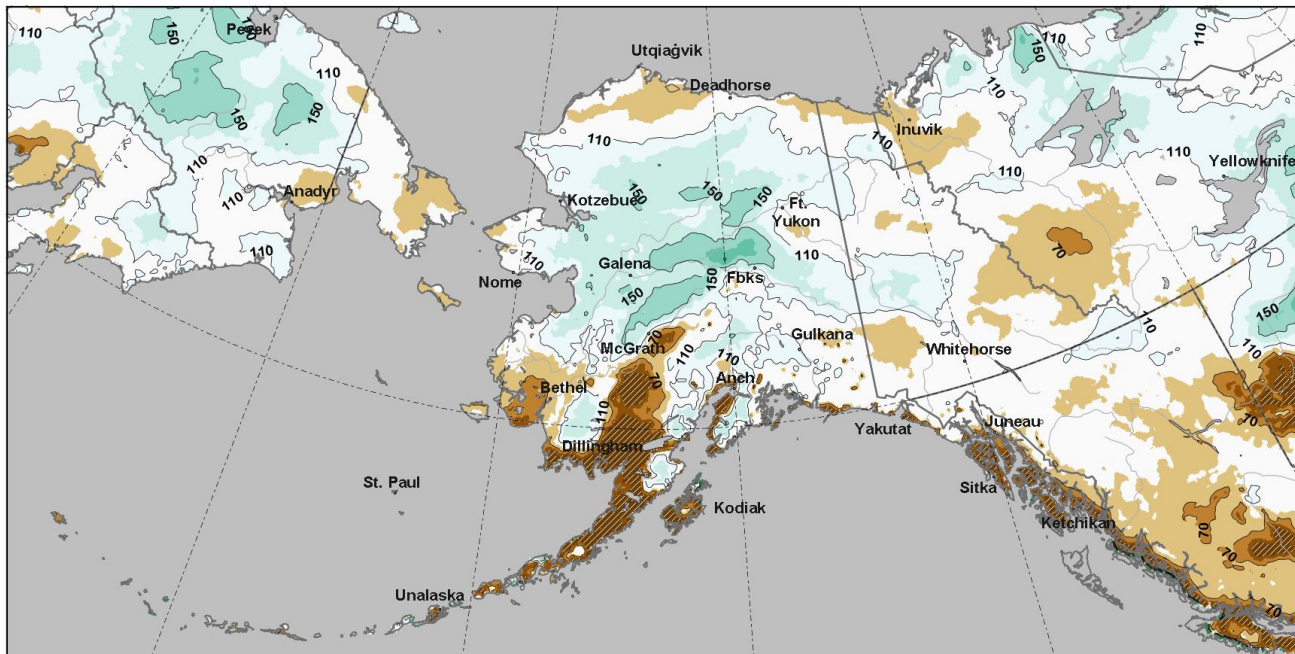
March 18, 2025

Photo Credit K. Griffin



Mid-March Snowpack

Snowpack Snow Water Equivalent: Percent of Median
March 13, 2025



Not shown where median SWE \leq 0.2cm



Climate Review

- What happened?
- How did climate outlooks perform?



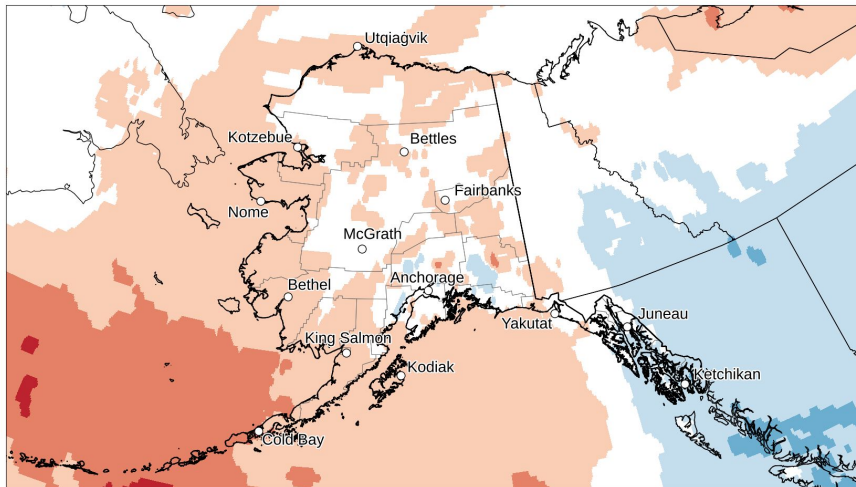
Iditarod Finish

March 14, 2025

Photo credit: Alaska Public Media

Model- based regional analysis > Average temperatures

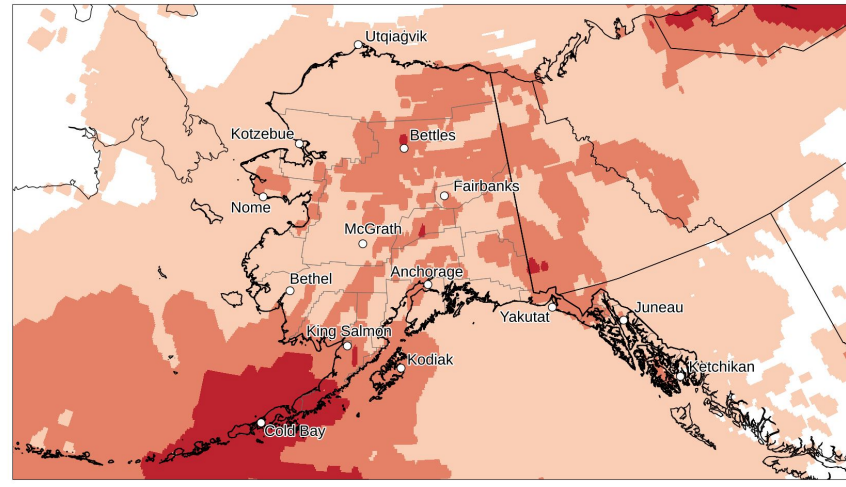
Temperature Classification for Feb 2025



Source: ERA5 Reanalysis

Map by: Brian Brettschneider

Temperature Classification for Dec-Feb 2024-25



Source: ERA5 Reanalysis

Map by: Brian Brettschneider

Record Much Below Below Near Normal Above Much Above Record

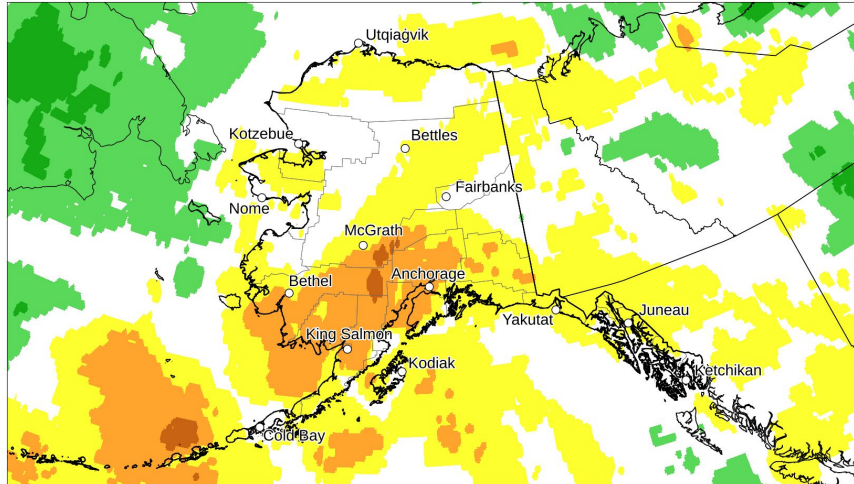
Compared to 1991-2020 Base Period (Records Since 1950)

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

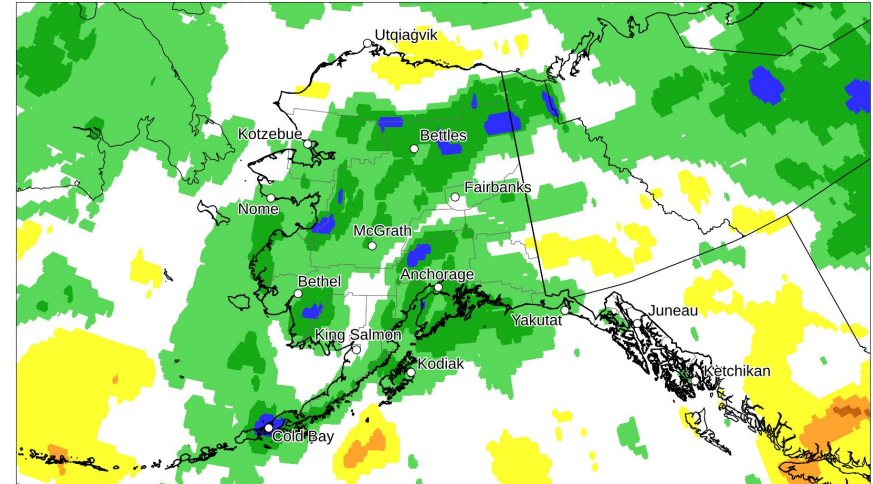
Precipitation Classification for Feb 2025



Source: ERA5 Reanalysis

Map by: Brian Brettschneider

Precipitation Classification for Dec-Feb 2024-25



Source: ERA5 Reanalysis

Map by: Brian Brettschneider

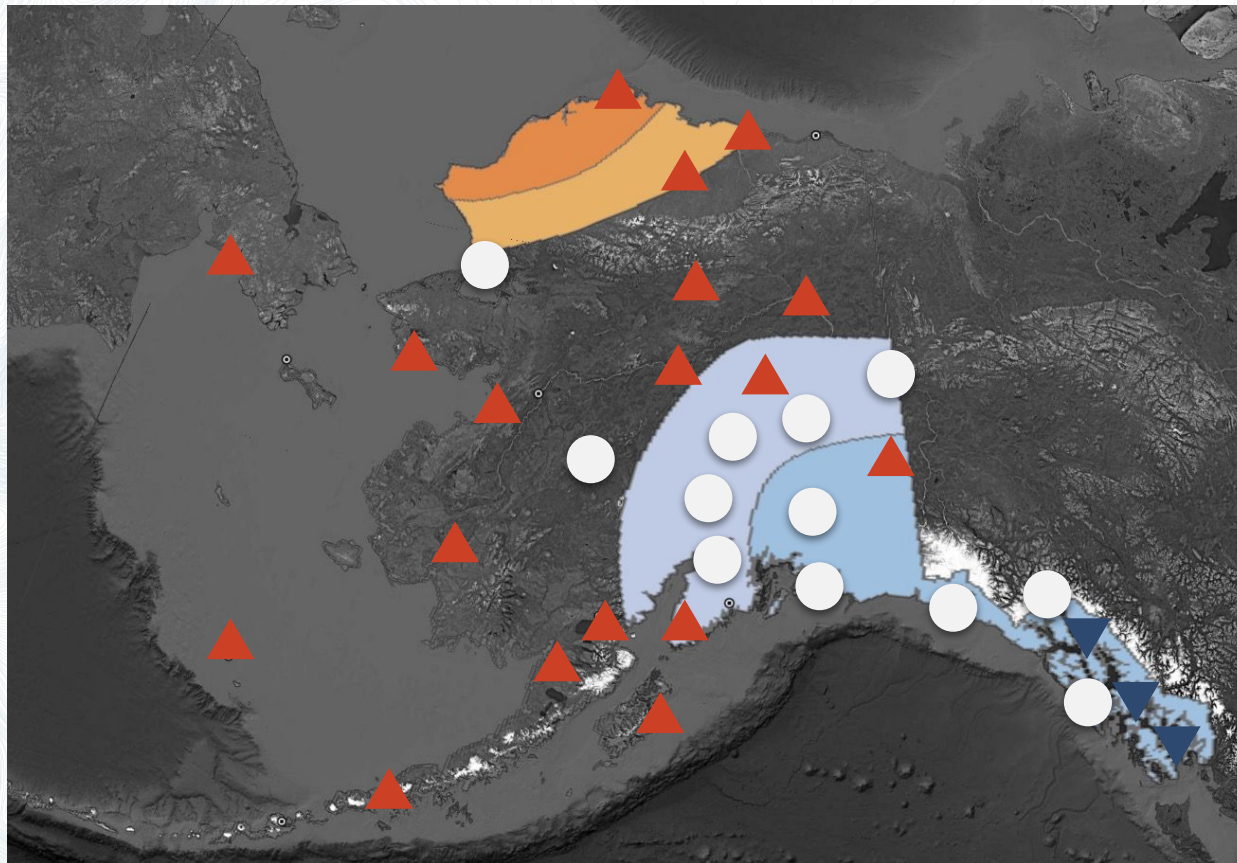
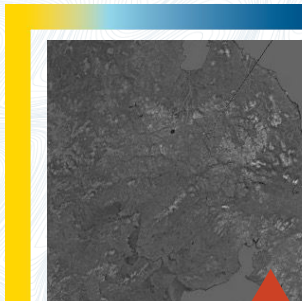


Compared to 1991-2020 Base Period (Records Since 1950)



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

February 2025 temperature > CPC outlook and observed



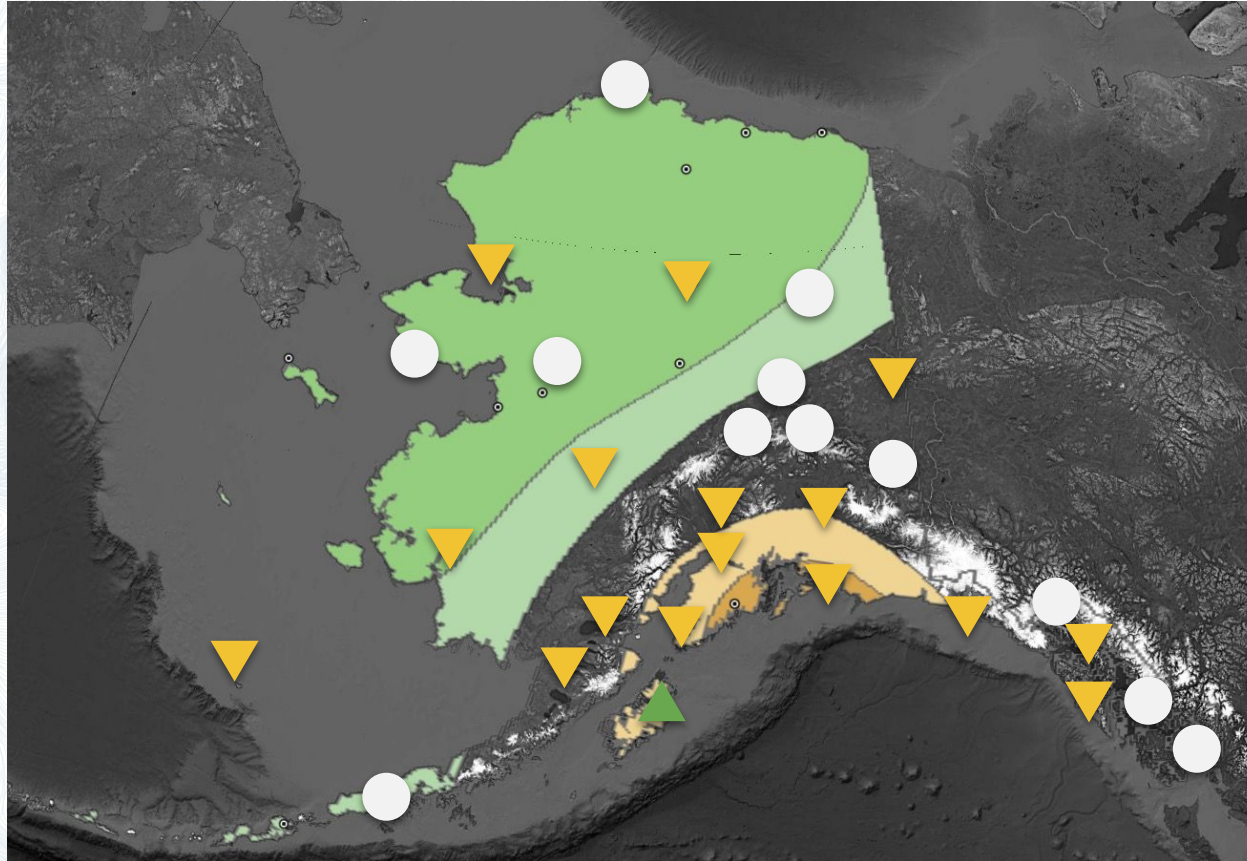
Non-EC skill score: -02

Percent correct: 32%

Mid-month outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

February 2025 precipitation > CPC outlook and observed



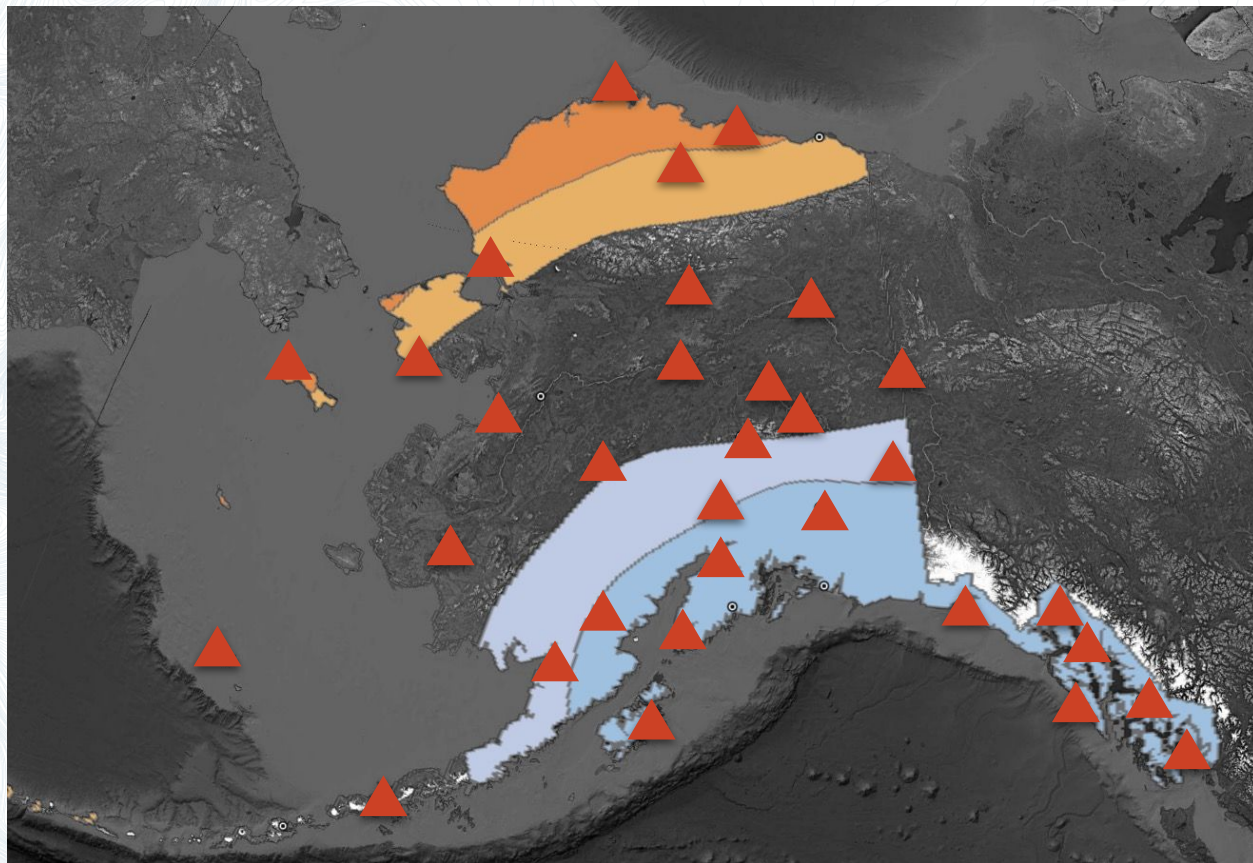
Non-EC skill
score: -15

Percent
correct: 23%

Mid-month
outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

December 2024-February 2025 temperature > CPC outlook & observed

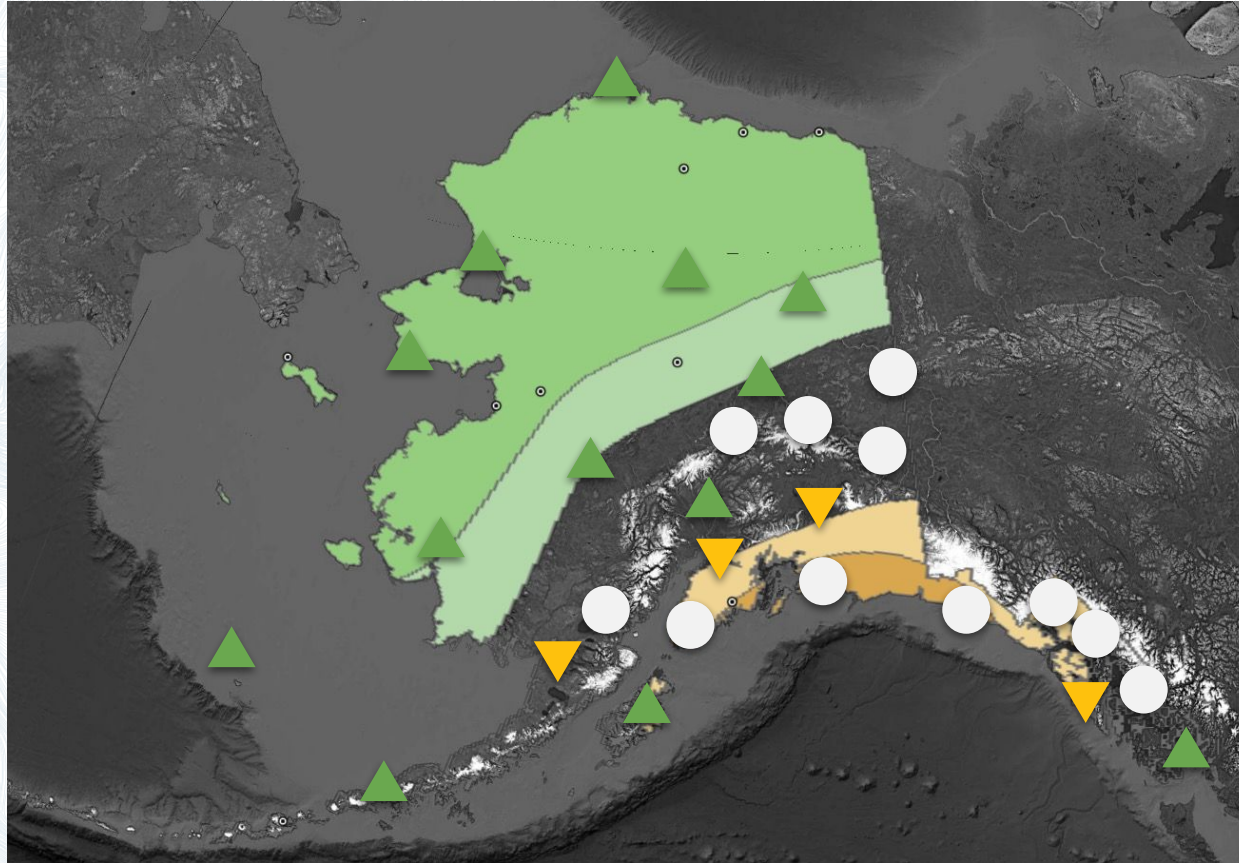


Non-EC skill
score: -7

Percent
correct: 29%

- ▲ Above normal
- Near normal
- ▼ Below normal

December 2024-February 2025 precipitation > CPC outlook & observed

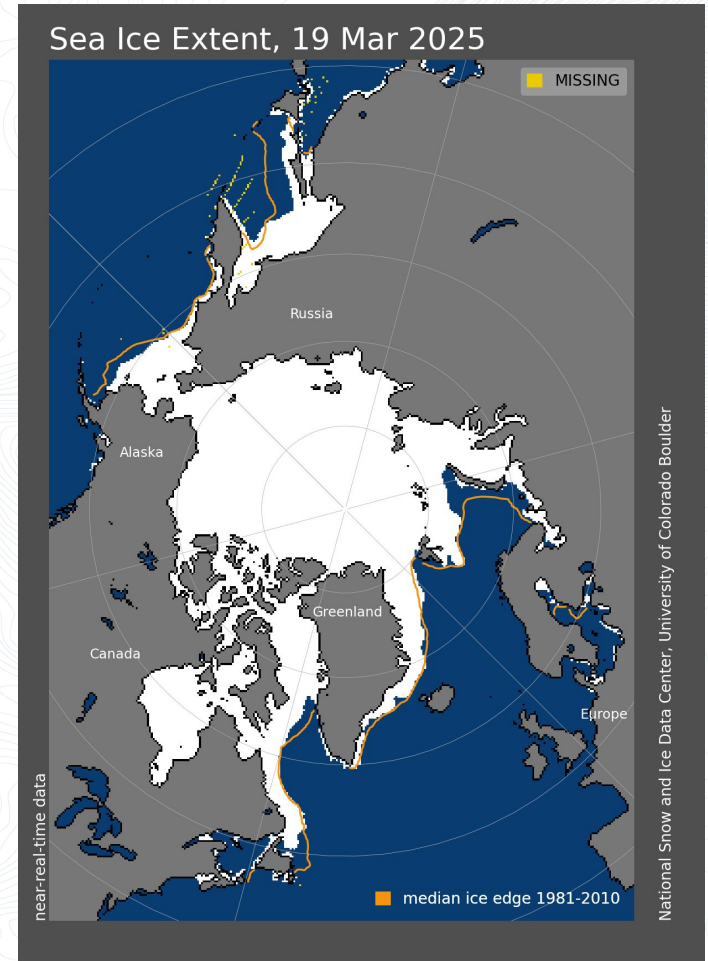
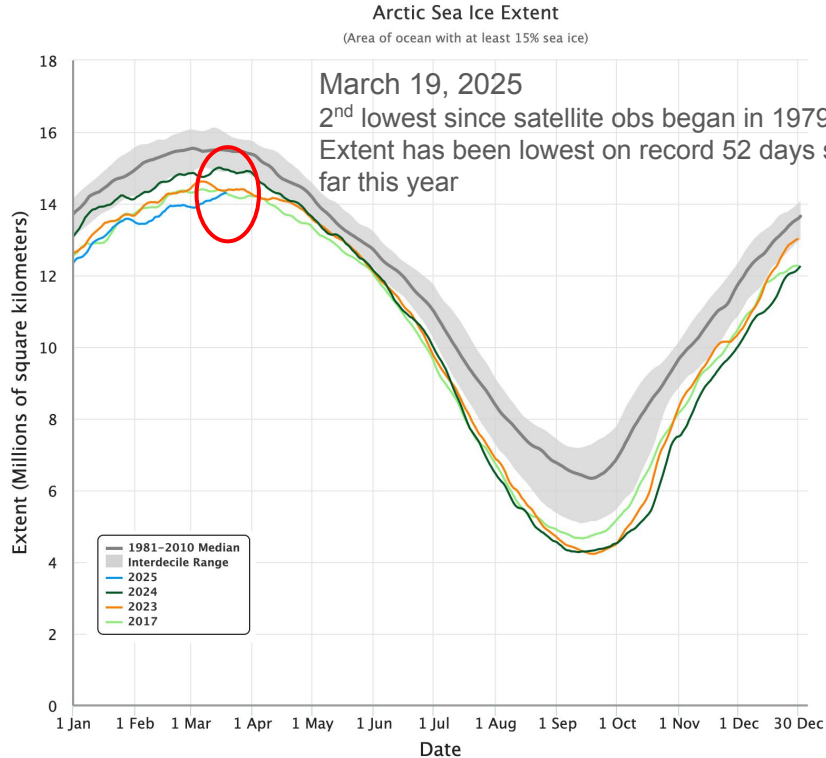


Non-EC skill
score: +35

Percent
correct: 57%

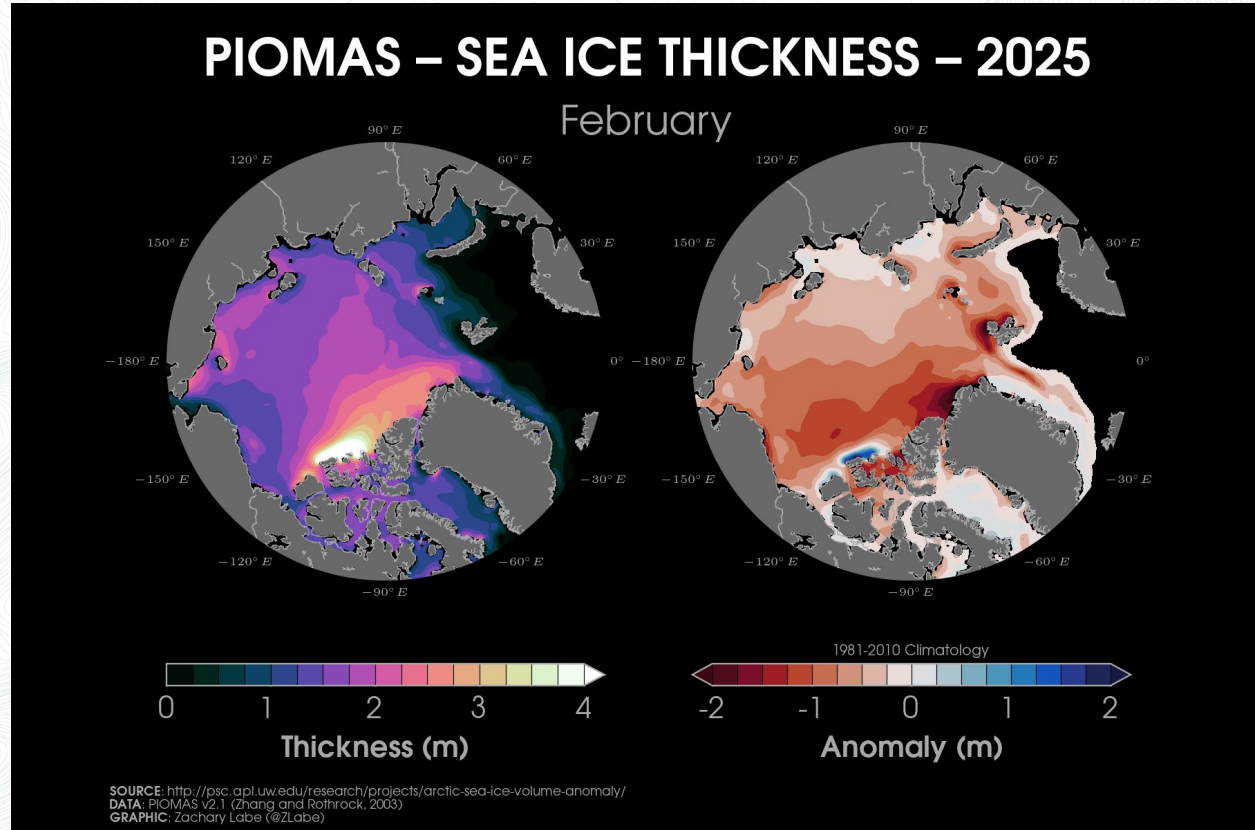
- ▲ Above normal
- Near normal
- ▼ Below normal

Arctic wide sea ice



Arctic sea ice thickness

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

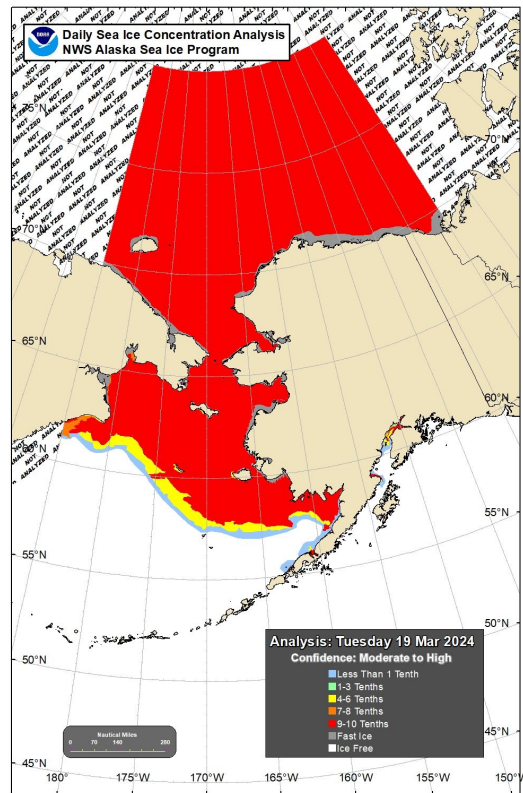
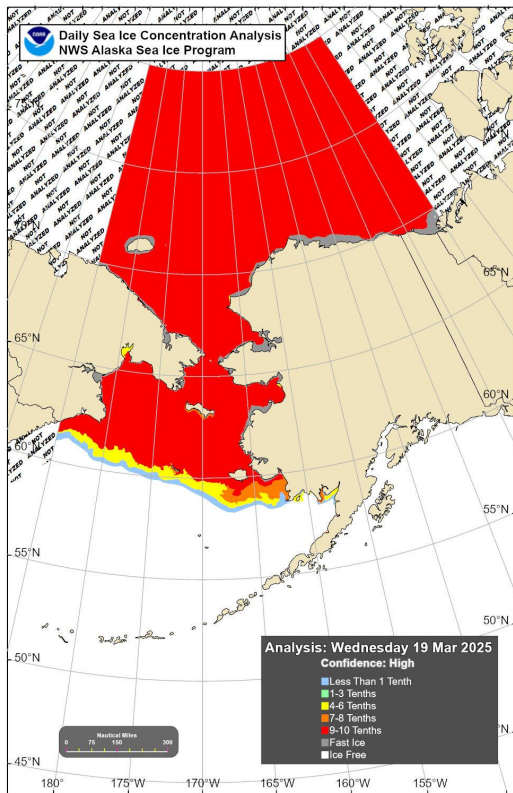


March 19, 2025

March 19, 2024

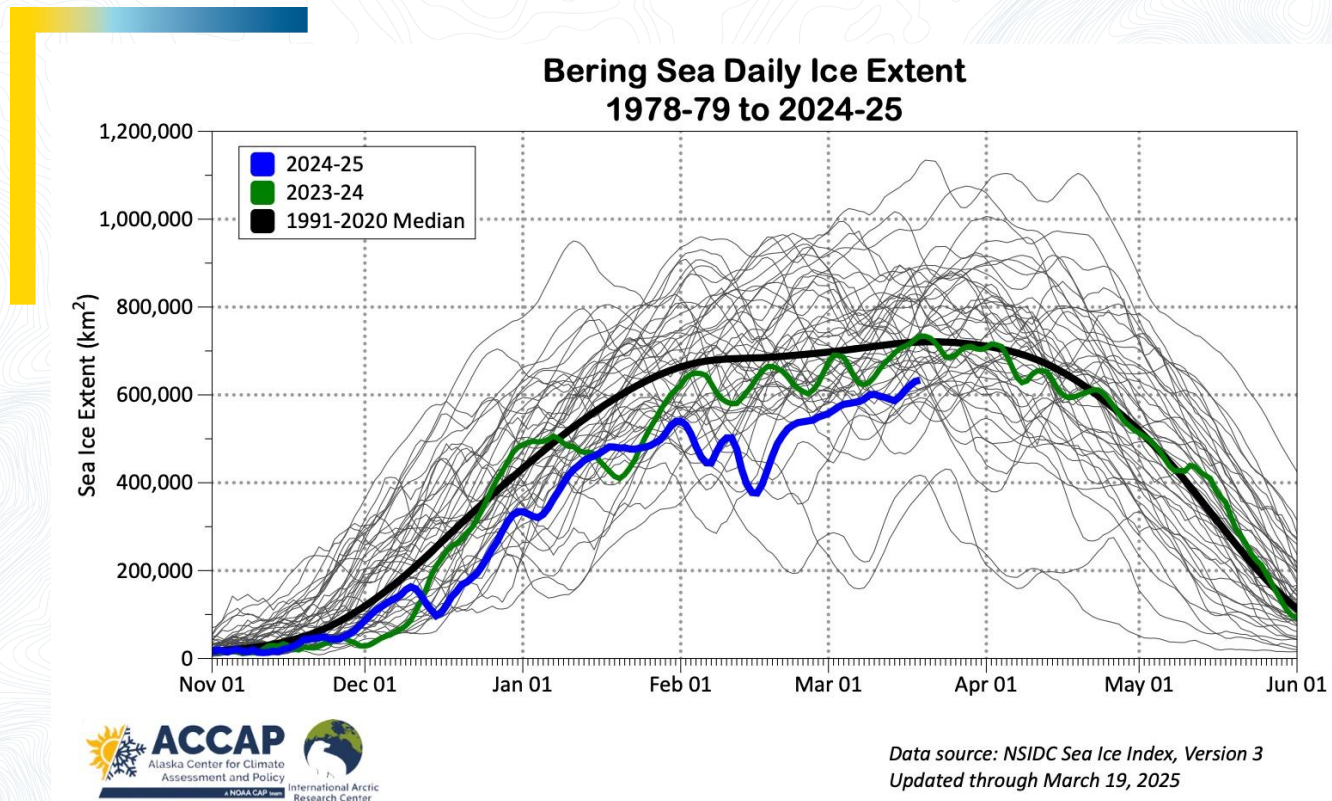
Mid-March sea ice comparison

Source: National Weather Service
Alaska Region Sea Ice Program

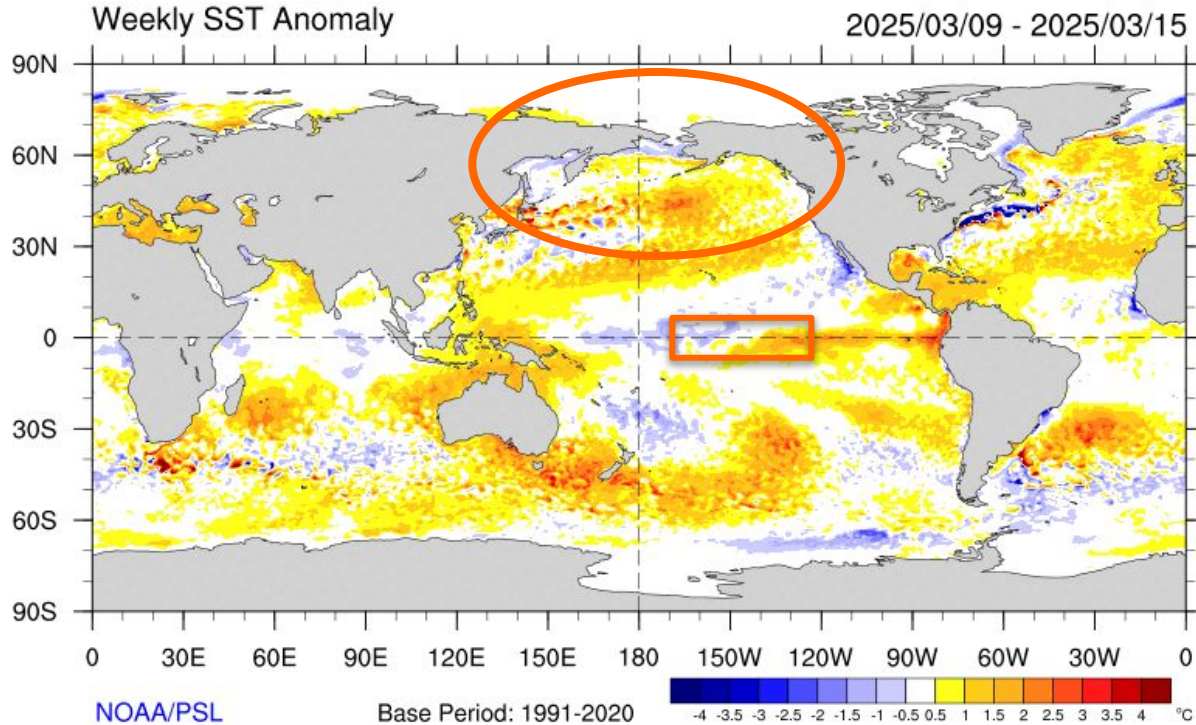


Sea ice extent through the season

Sources:
Data NSIDC Sea Ice Index,
Version 3.



Global sea surface temperature departure from normal

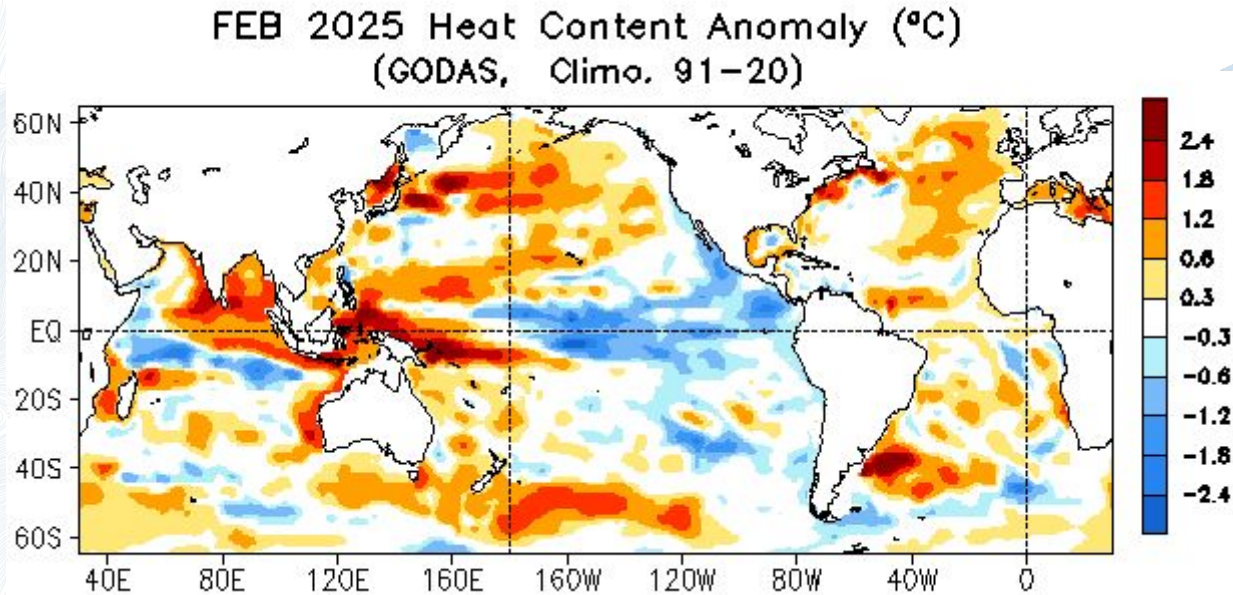


ONI for **Dec-Feb**: -0.6

PDO for **Feb 2025**: -0.6

Sources: ONI from CPC
PDO Index from WCS

Upper ocean heat departure from average



Some warming eastern Aleutians

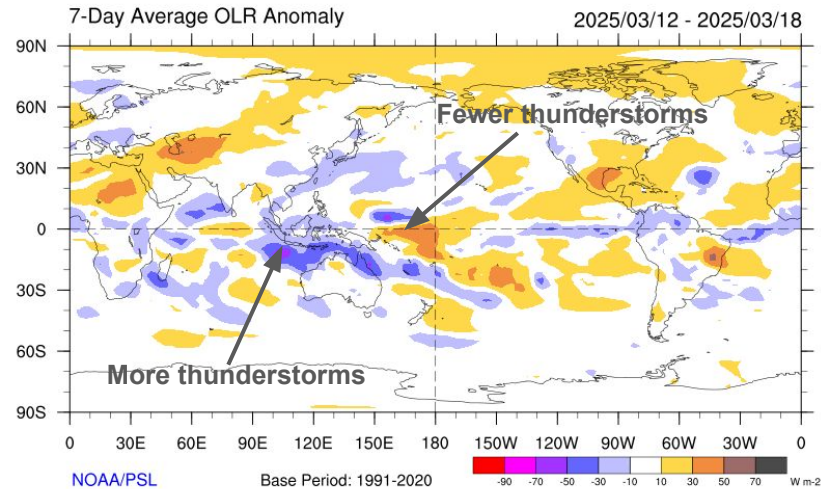
Source: NOAA/CPC

Upper 300 meters of the ocean

Tropical Pacific atmosphere

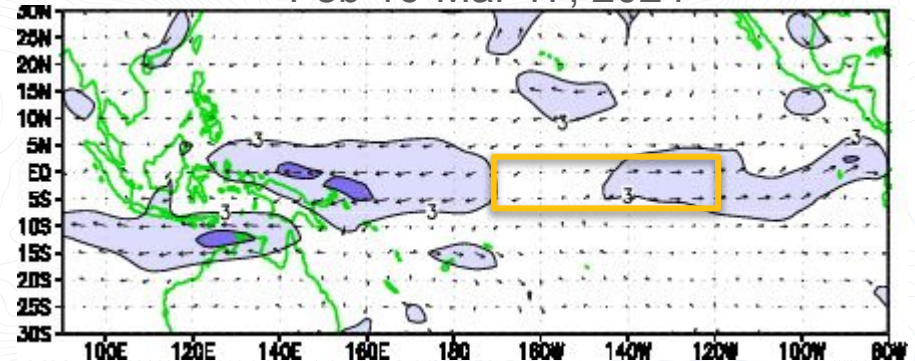
Dec-Feb Oceanic Niño Index: -0.6

Deep tropical convection
Via “outgoing longwave radiation”

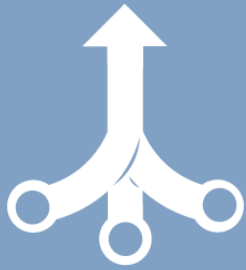


Near average trade winds
Niño Region 3.4

Trade winds
850 mb wind difference from average
Feb 16-Mar 17, 2024



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

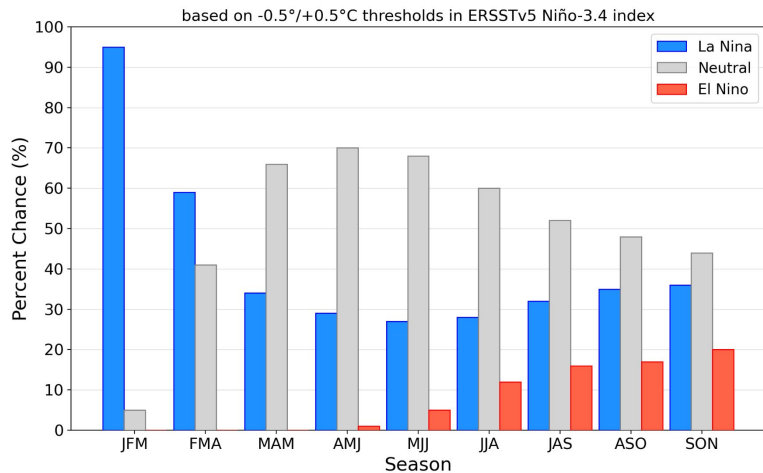
CPC Niño 3.4 forecasts > experts

February 2025

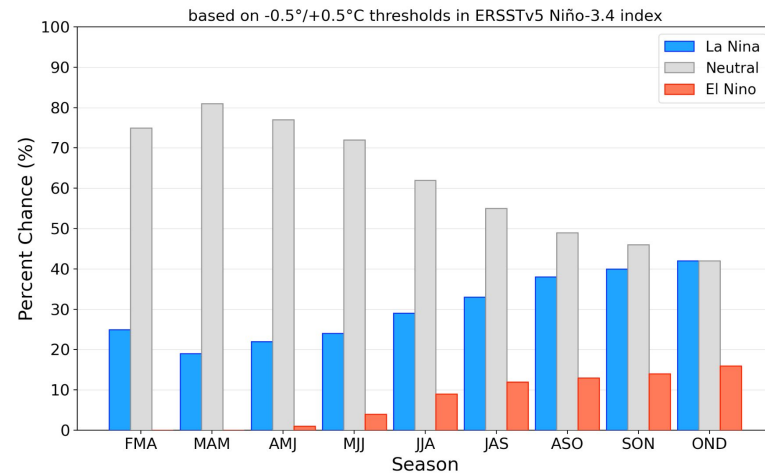
March 2025

ENSO Alert System Status:
La Niña Advisory

Official NOAA CPC ENSO Probabilities (issued February 2025)



Official NOAA CPC ENSO Probabilities (issued March 2025)



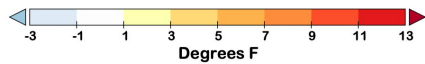
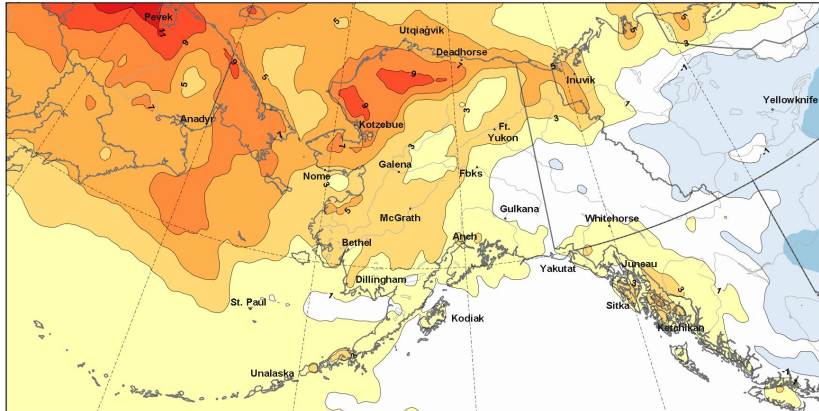
**Statistical
guidance** ➤
using the past
to predict the
future

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

April half century trends

Temperatures

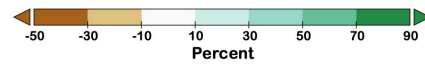
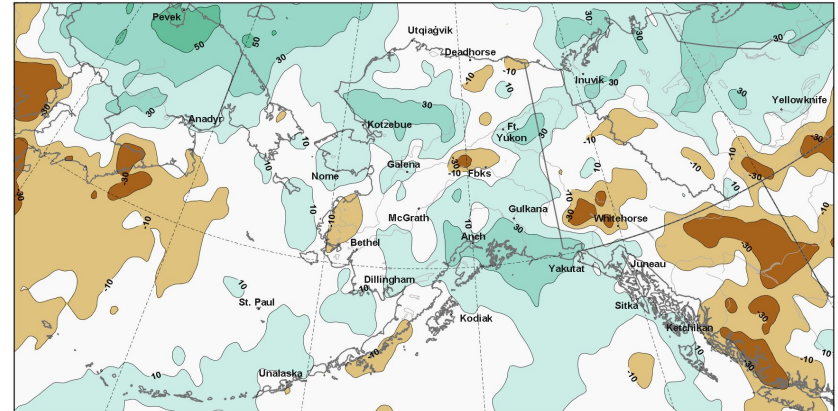
Total Change in April Average Temperature
1975 to 2024



Theil-Sen regression
ERA5 courtesy of ECMWF/Copernicus

Precipitation

Percent Change in April Average Precipitation
1975 to 2024





Theil-Sen regression
ERA5 courtesy of ECMWF/Copernicus

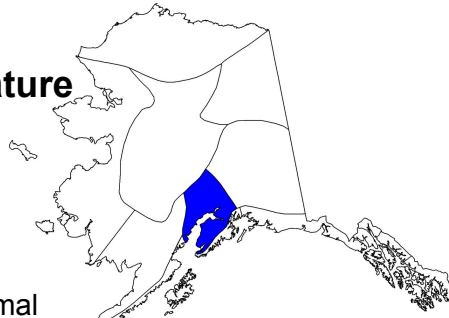
Change in the average
over 50 years

2010 to 2024 trends

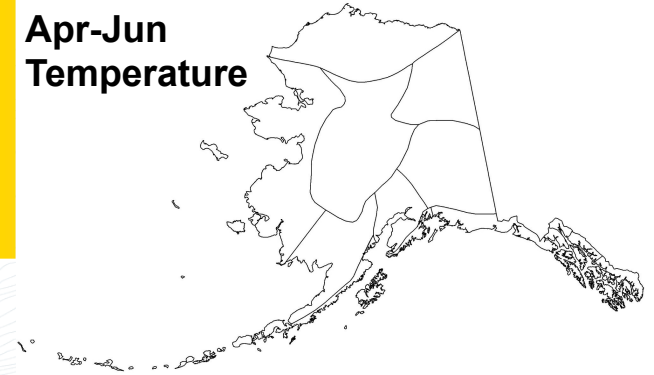
Past 15 years compared to 1991-2020

April Temperature



-  Above normal
-  Below normal

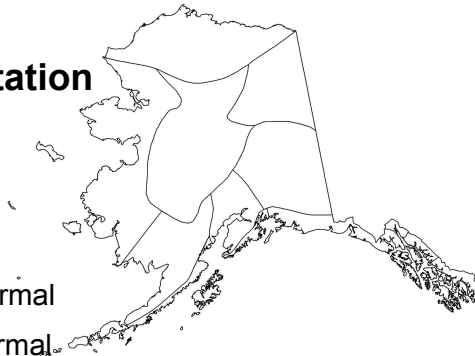


Apr-Jun Temperature

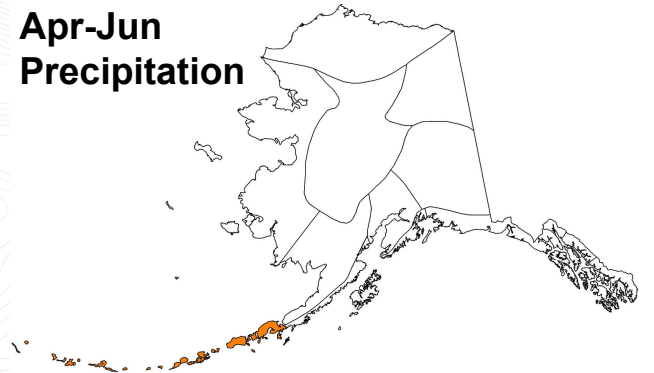


April Precipitation

-  Above normal
-  Below normal



Apr-Jun Precipitation



Dynamic model forecasts

Current suite of Dynamic Climate Models

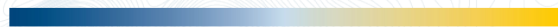
- CPC Experimental Sea Ice Ensemble
- World Climate Service Multi-Model Ensemble
- North American Multi-Model Ensemble (NMME)

What's being forecasted

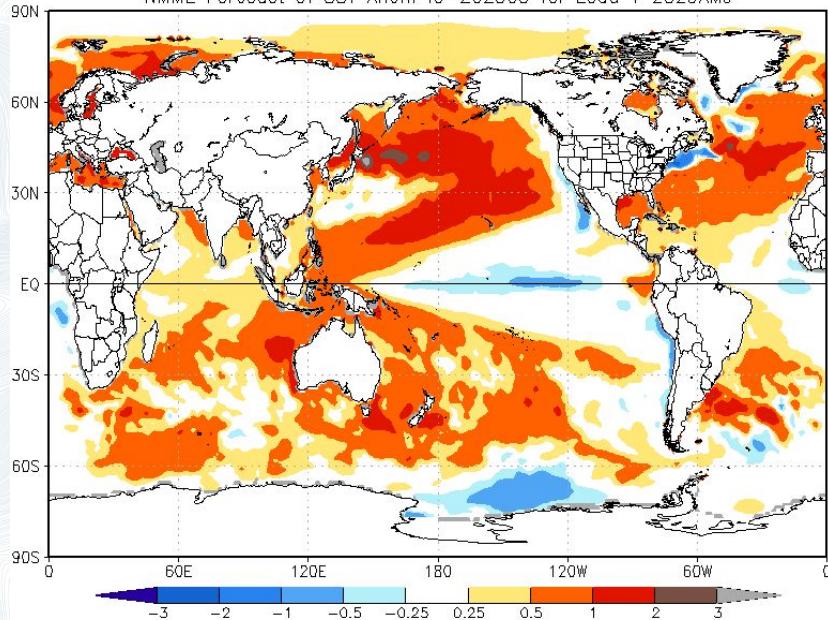
- Sea surface temperatures relative to normal
- Sea ice forecast
- Temperature and precip relative to normal

April-June 2025 sea surface temperature > NMME

Forecast
departure from normal



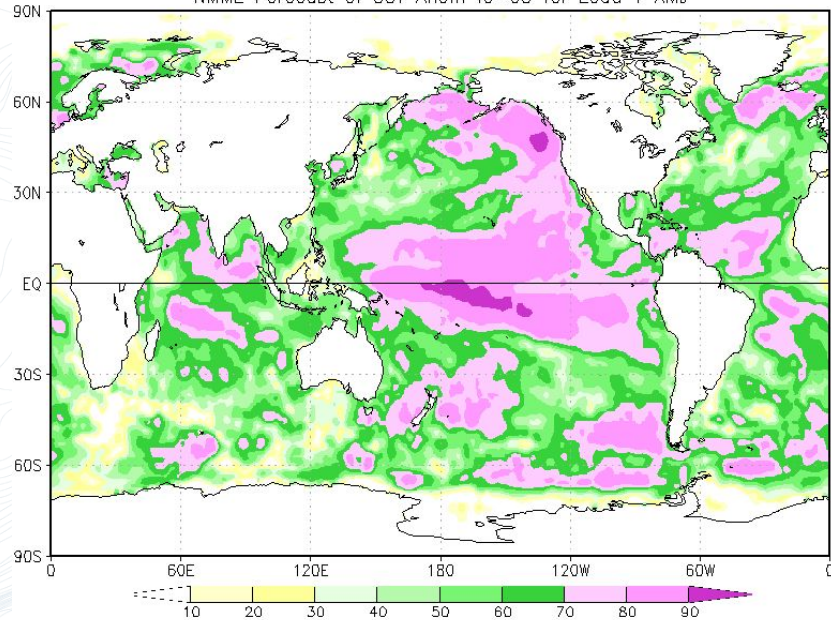
NMME Forecast of SST Anom IC=202503 for Lead 1 2025AMJ



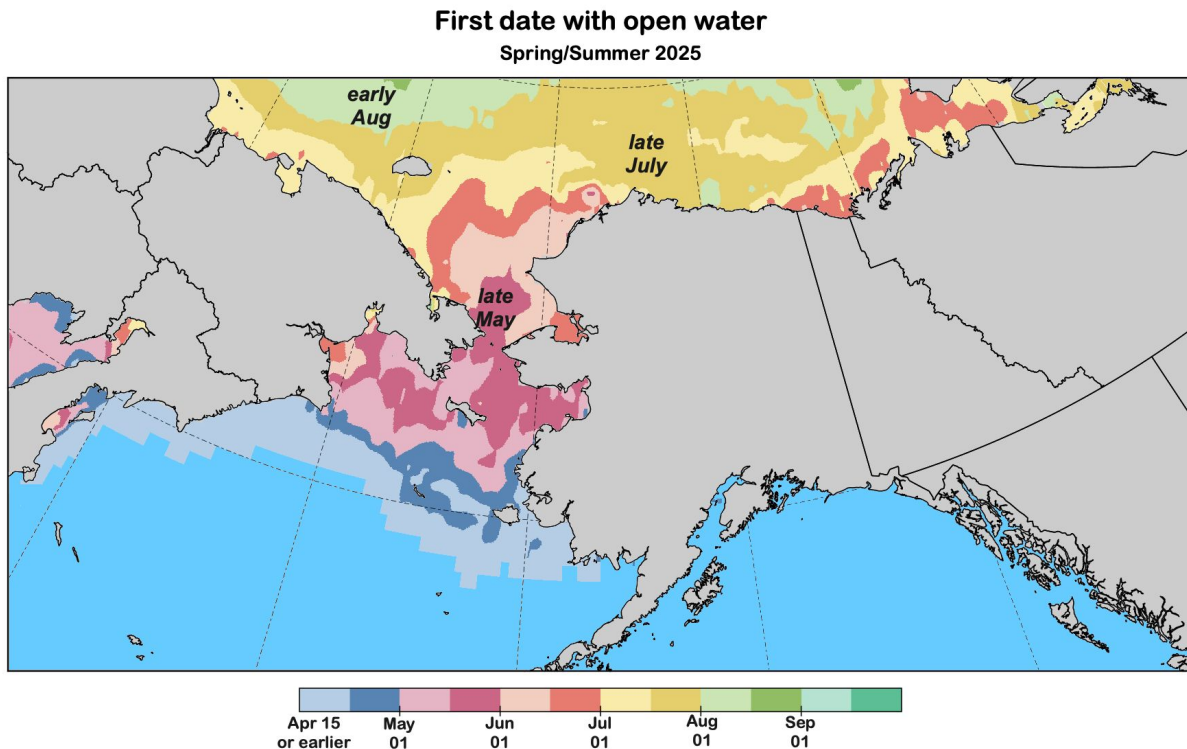
Skill
of the forecast



NMME Forecast of SST Anom IC=03 for Lead 1 AMJ



Experimental sea ice forecast > CPC



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

April 2025 calibrated probability forecast ➤ NMME

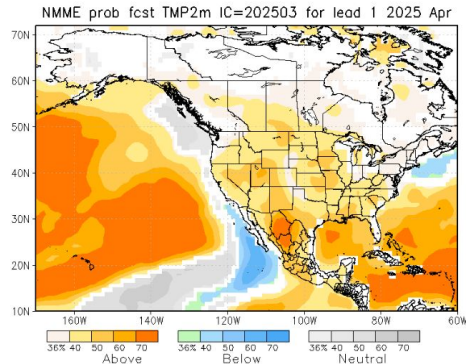
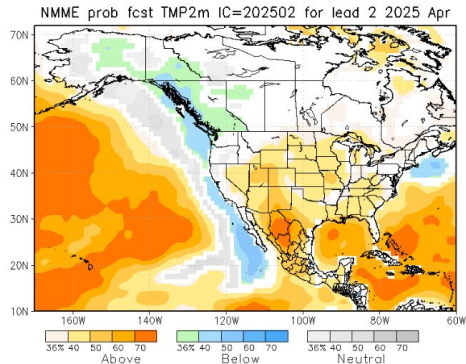
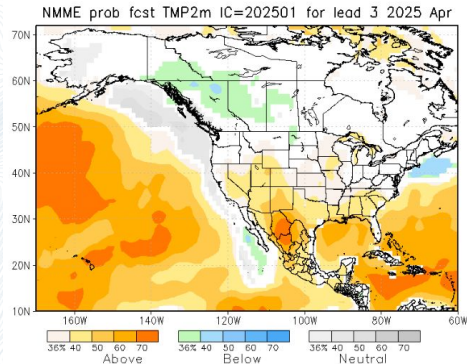
Forecast from →

January

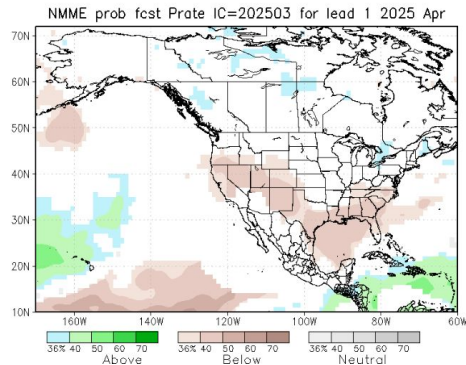
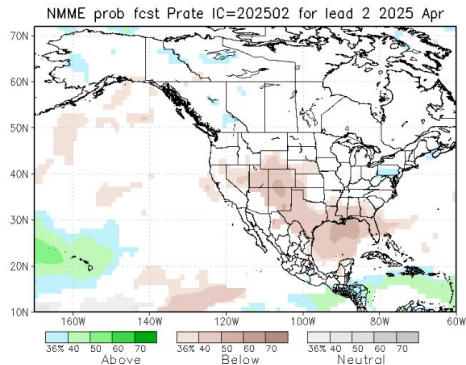
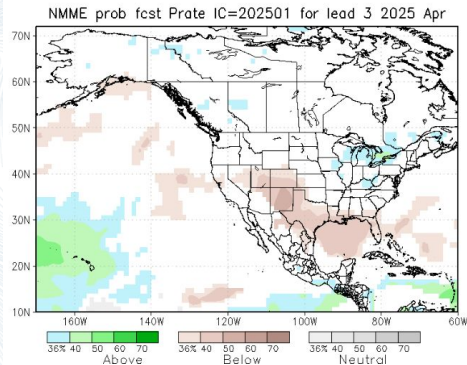
February

March

Temperature



Precipitation

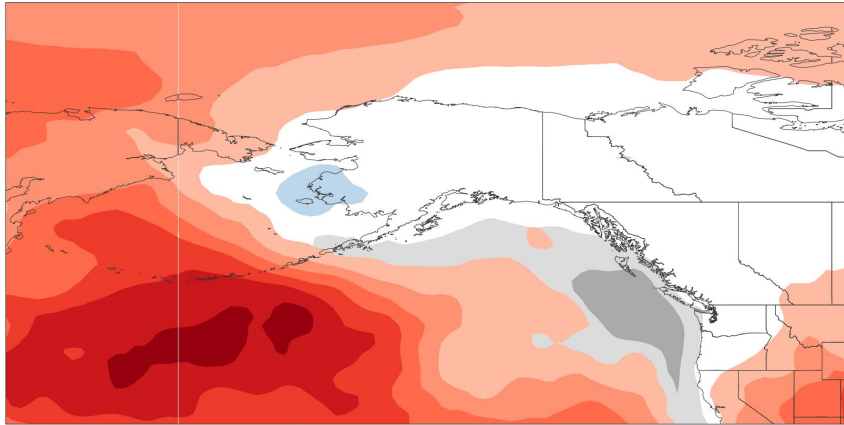


April 2025 outlooks ➤ World Climate Service

Temperature

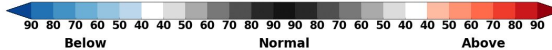


Multi-Model T2m Probability Above/Normal/Below
Forecast Valid April 2025
Initialized March 2025 1991-2020 Climatology



www.worldclimateservice.com

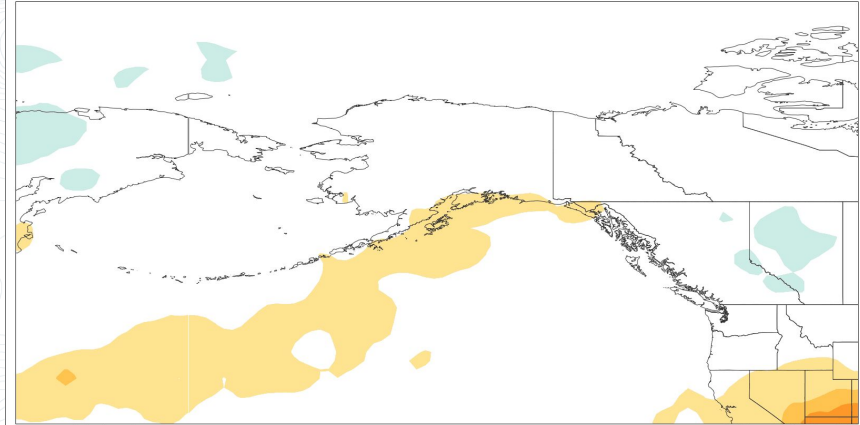
copyright Prescient Weather Ltd



Precipitation

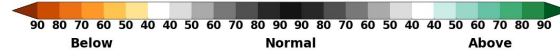


Multi-Model Precipitation Probability Above/Normal/Below
Forecast Valid April 2025
Initialized March 2025 1991-2020 Climatology



www.worldclimateservice.com

copyright Prescient Weather Ltd



Bias Corrected, Skill Weighted CFS + ECMWF

April-June 2025 calibrated probability forecast ➤ NMME

Forecast from →

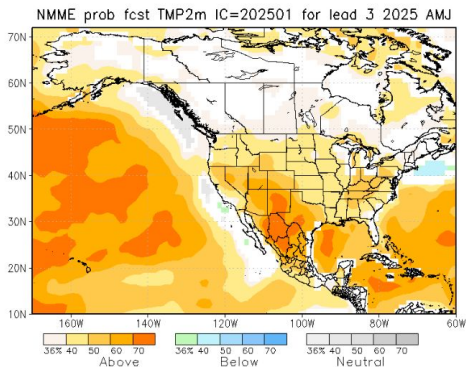


Temperature

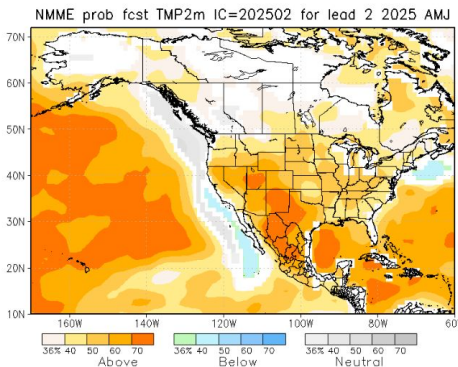


Precipitation

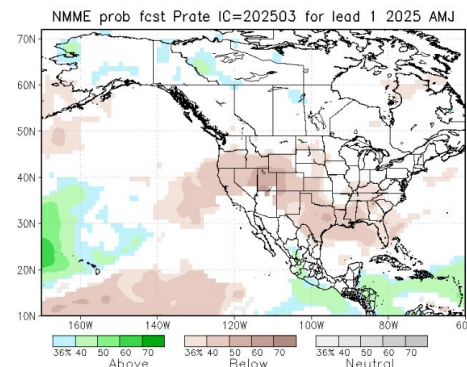
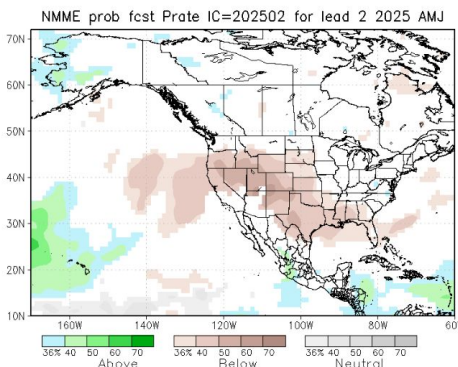
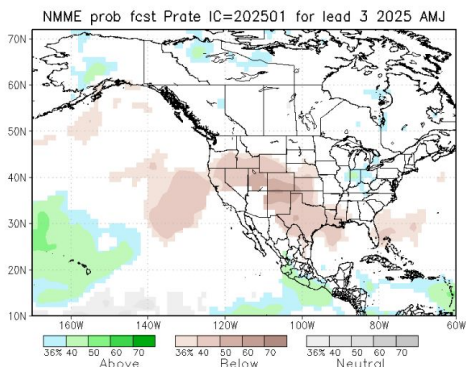
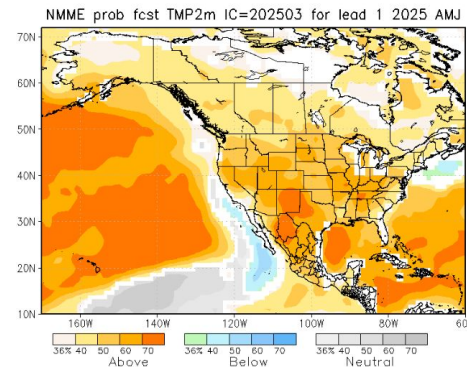
January



February



March

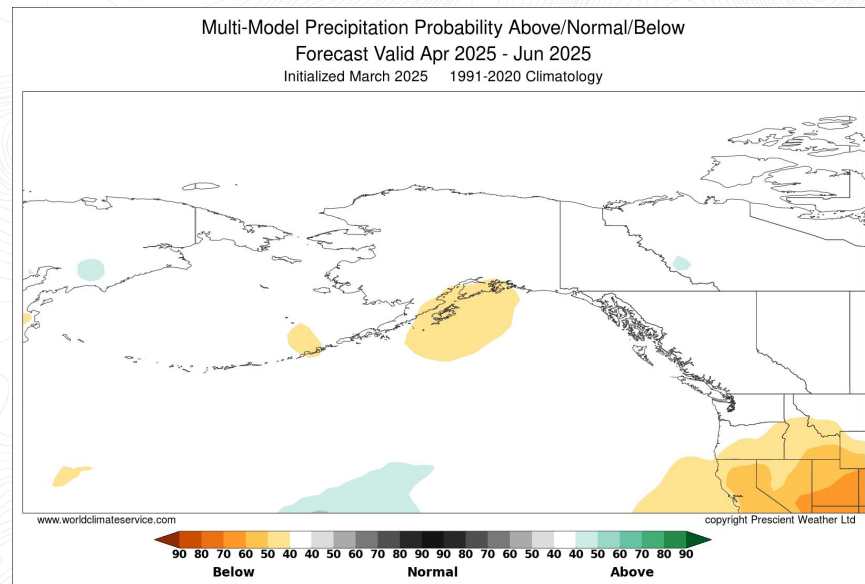
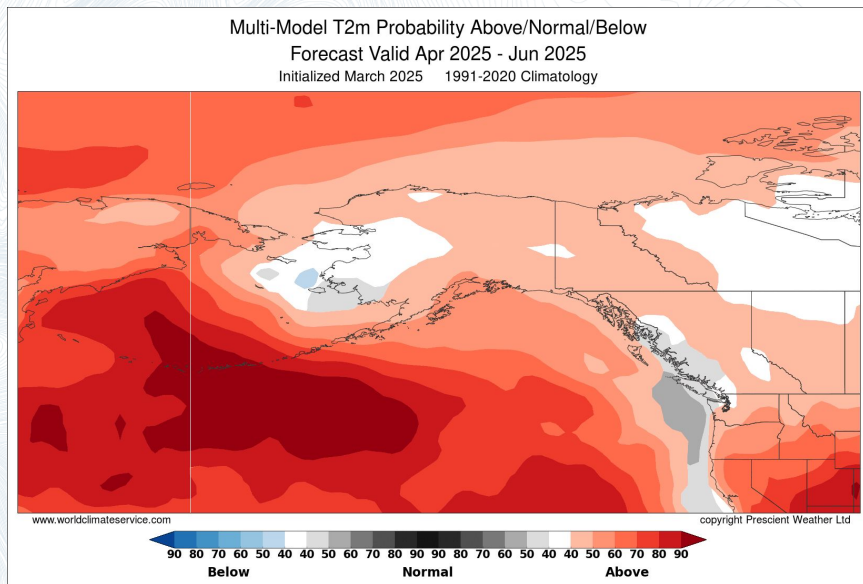
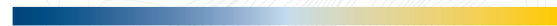


April-June 2025 outlooks ➤ World Climate Service

Temperature

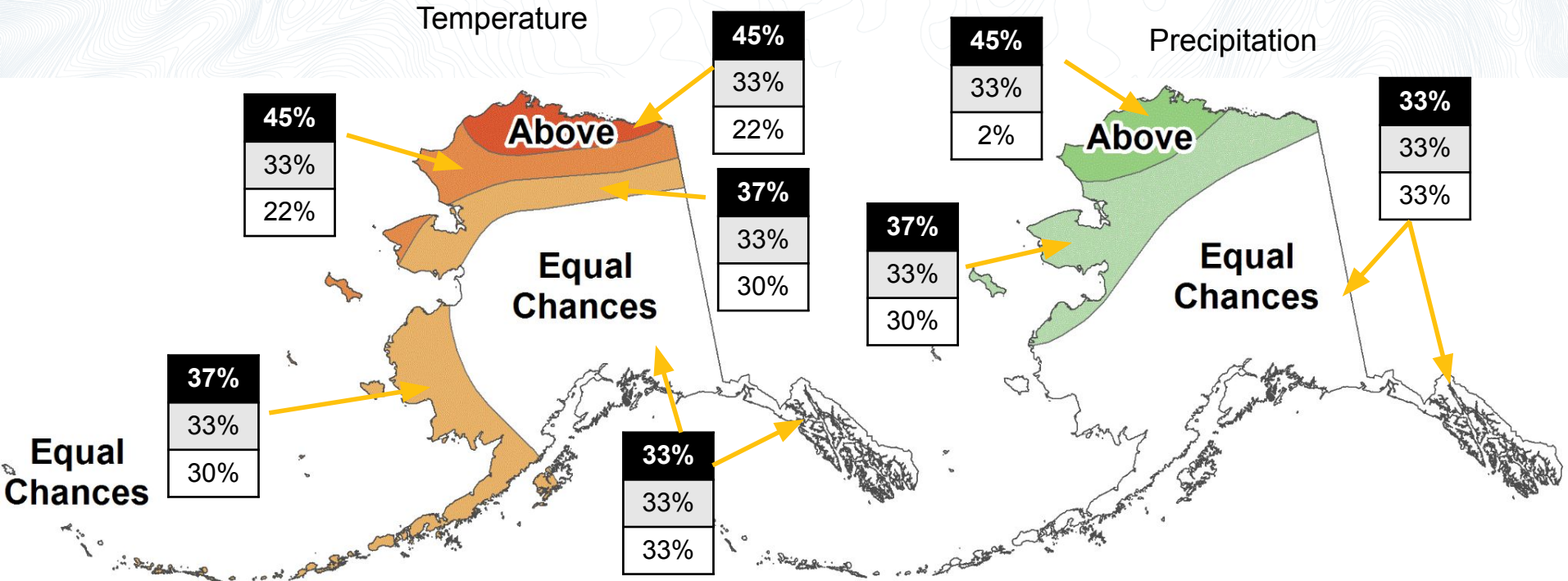


Precipitation



Bias Corrected, Skill Weighted CFS + ECMWF

April-June 2025 outlooks from February



Above%
Normal%
Below%

Future
outlook

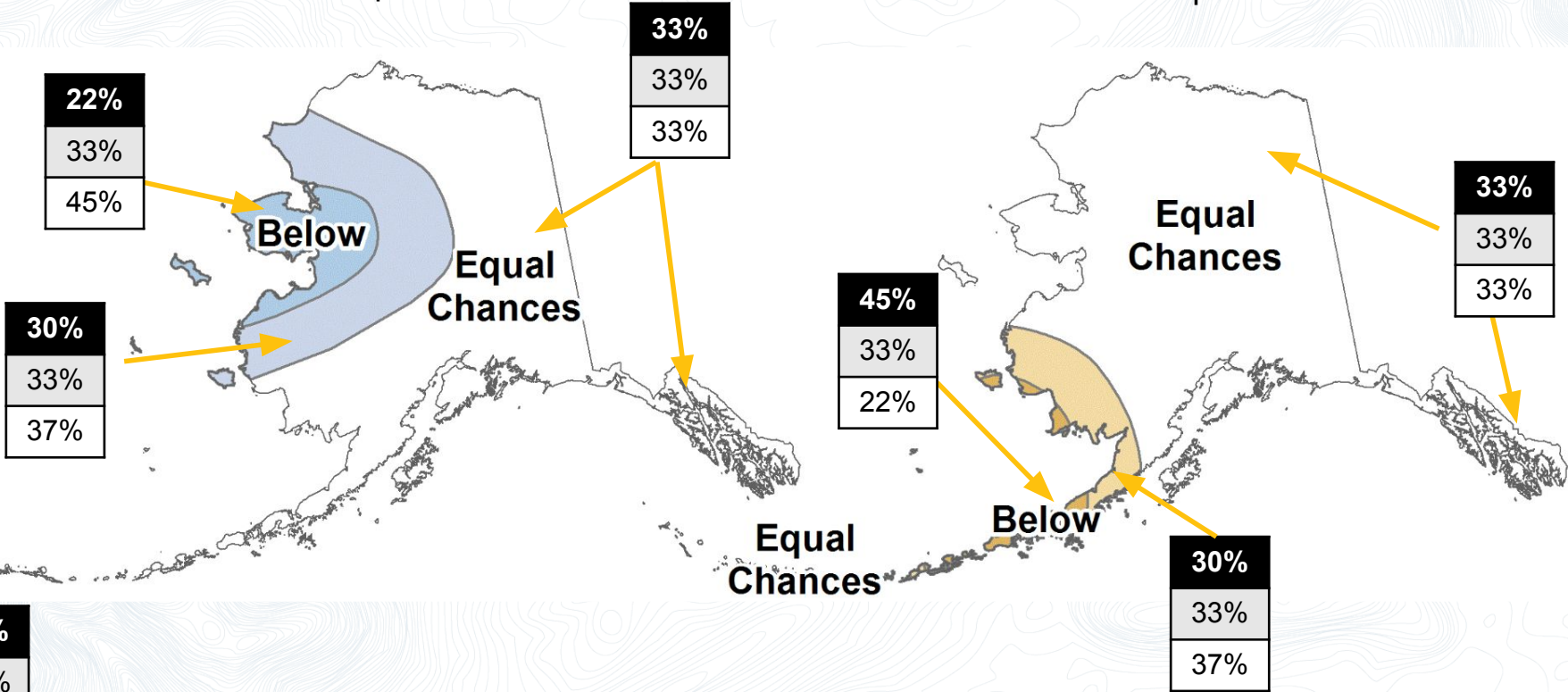


And the answer is...

CPC April 2025 outlooks

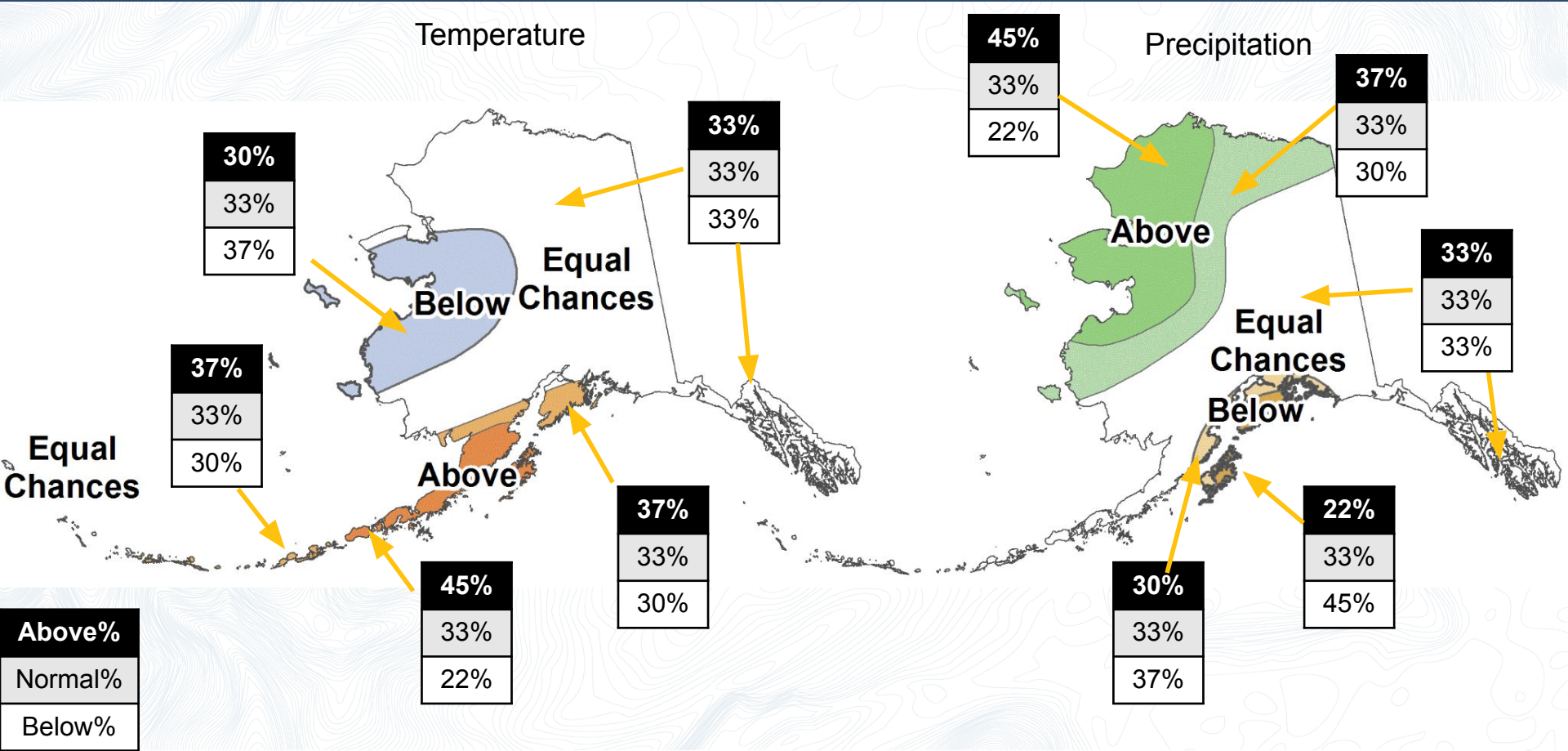
Temperature

Precipitation

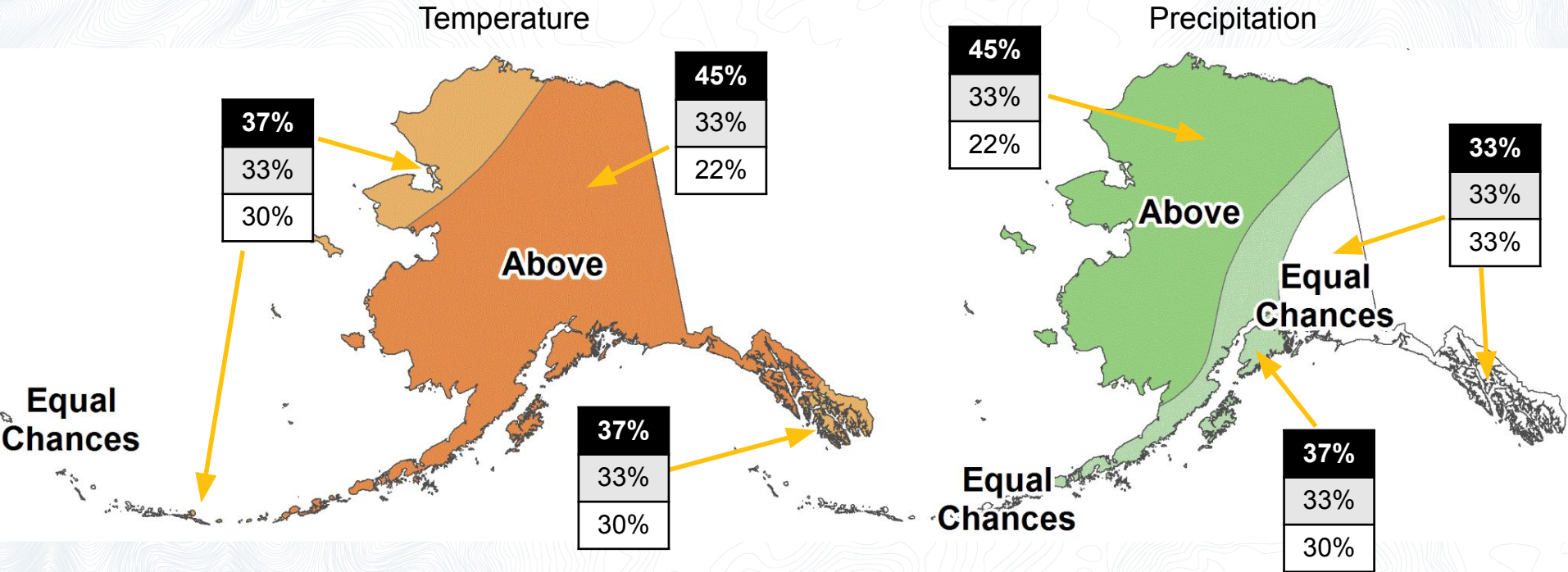


Above%
Normal%
Below%

CPC April-June 2025 outlooks



Summer 2025 outlook



Above%
Normal%
Below%

Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- March 26 ▶ *VAWS: Fire weather in Alaska and the NWS IMET program*
- April 18 ▶ *April NWS Climate Outlook Briefing*
- April 22 ▶ *Annual Alaska River Breakup 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