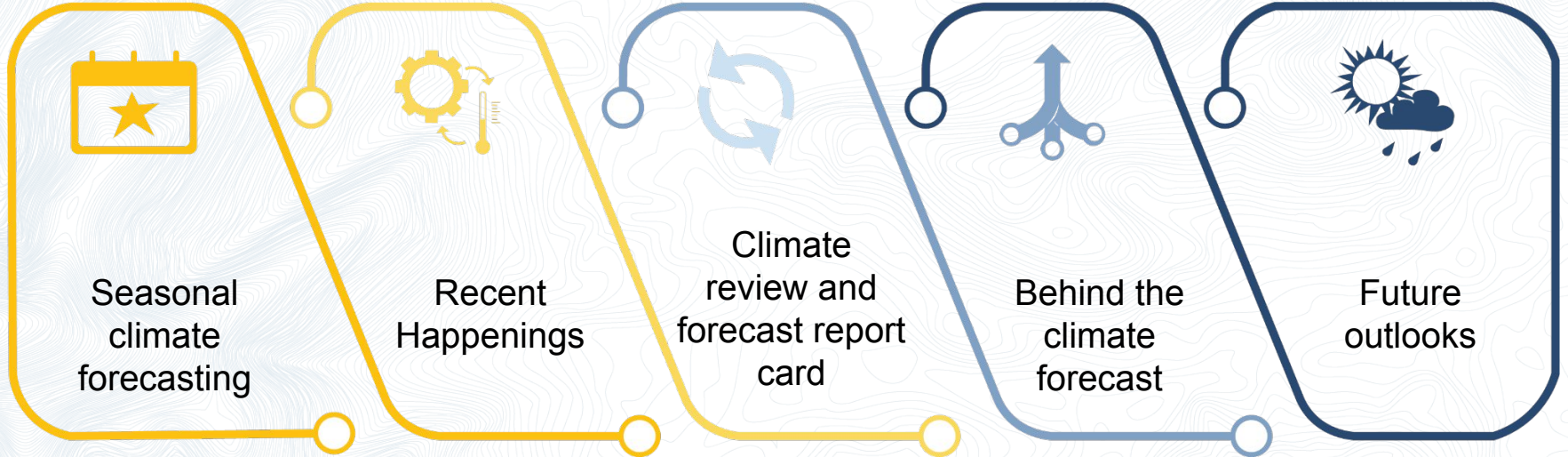




Alaska climate outlook briefing January 2025

Rick Thoman
ACCAP Climate Specialist
January 17, 2025





Seasonal
climate
forecasting

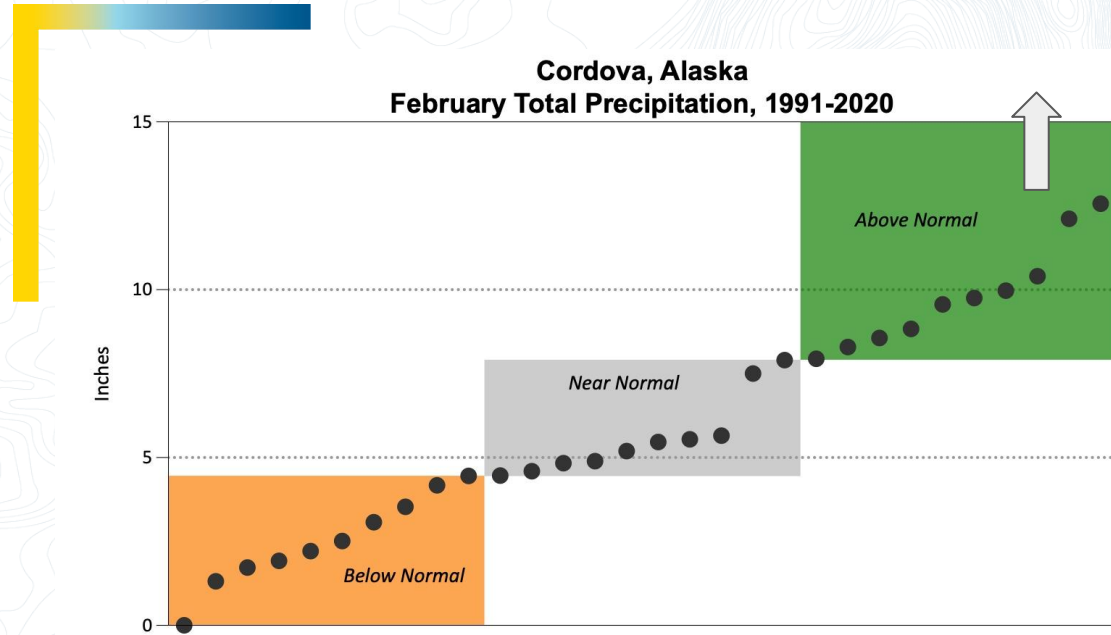


NOAA Center for Weather and Climate Prediction

Climate Prediction Center (CPC) ➤
primary NOAA/NWS forecast responsibility
for two weeks to a year in the future

The basics

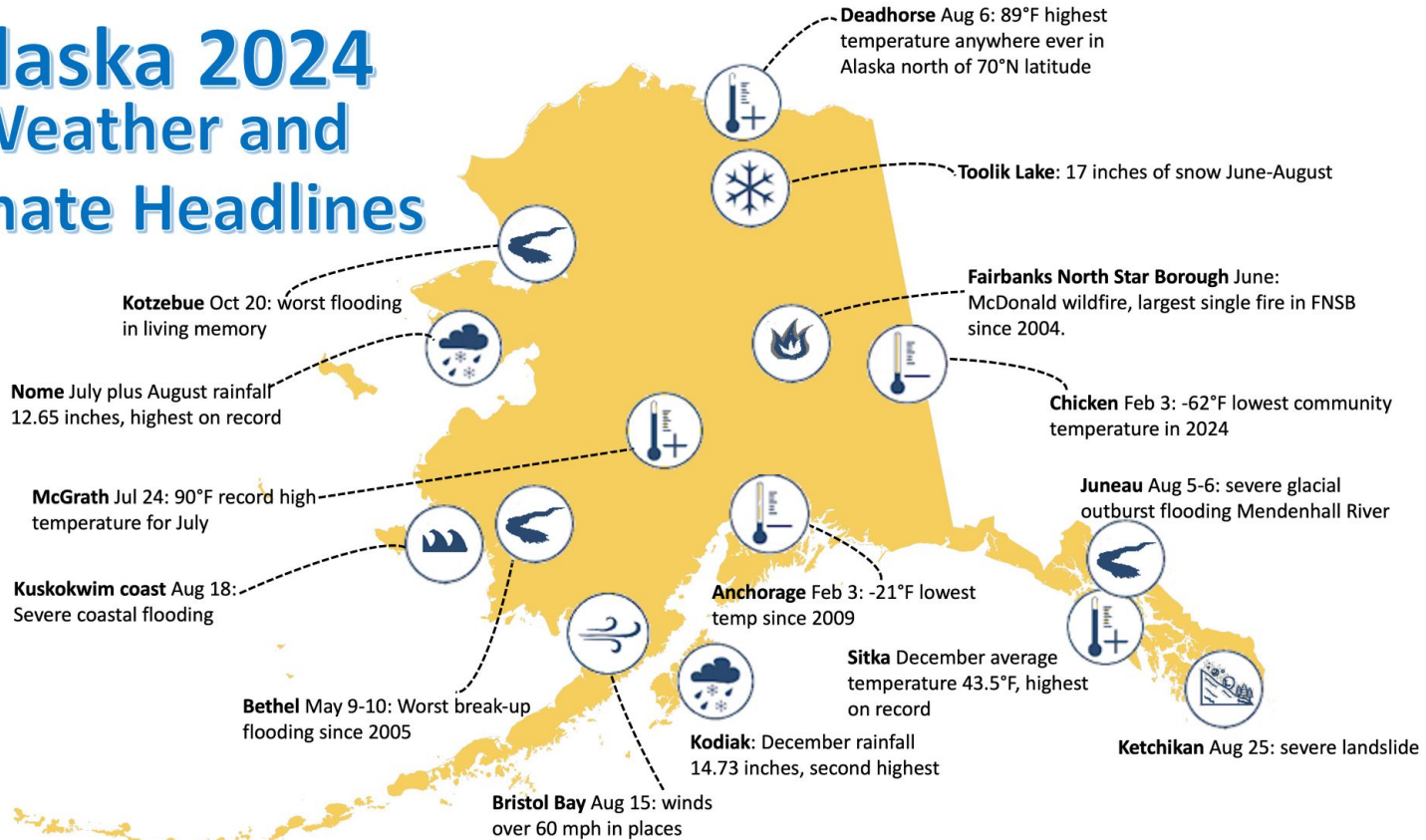
- Relation to long-term normal (1991-2020)
- 3 categories
- Probabilistic
- Temperature
 - Centered on average
- Precipitation
 - Centered on median > can significantly differ from “normal”
- Normals temperature and precip ranges for selected Alaska places at ACCAP climate graphics





2024 Headlines

Alaska 2024 Weather and Climate Headlines





Recent Happenings

- **Southcentral:** January 11-12
 - High winds, rain, snowmelt flooding
 - Loss of low elevation snowpack
- **Interior Alaska:** January 12-13
widespread record warmth
 - **Nenana** Jan 12: 53F was 1°F from monthly record
- **Western Alaska:** Snow drought Bristol Bay to Seward Peninsula



Anchorage Thaw
January 13, 2025

Photo credit: B. Brettschneider



Climate Review

- What happened?
- How did climate outlooks perform?



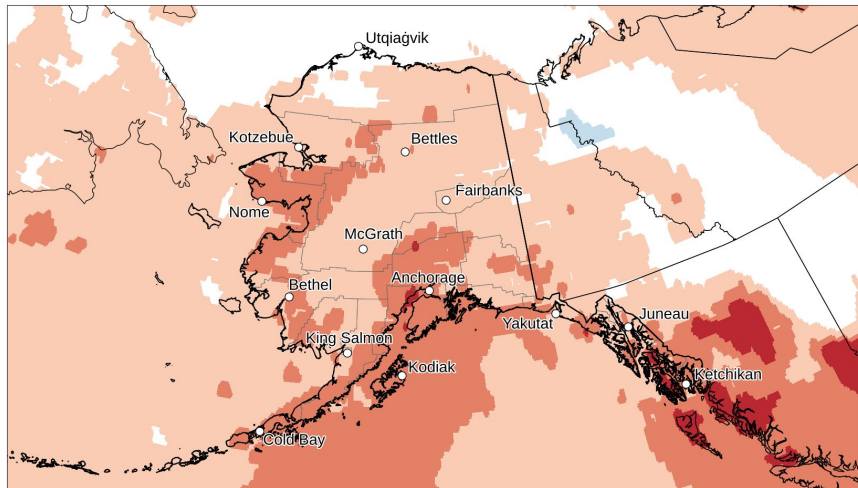
Nome

January 3, 2025

Photo credit: G. Sheffield

Model- based regional analysis > Average temperatures

Temperature Classification for Dec 2024



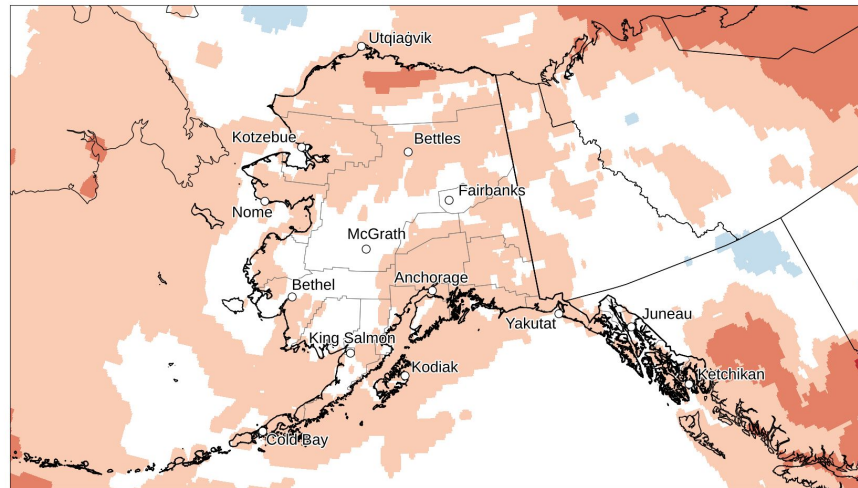
Source: ERA5 Reanalysis

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 Oct-Dec 2024



Source: ERA5 Reanalysis

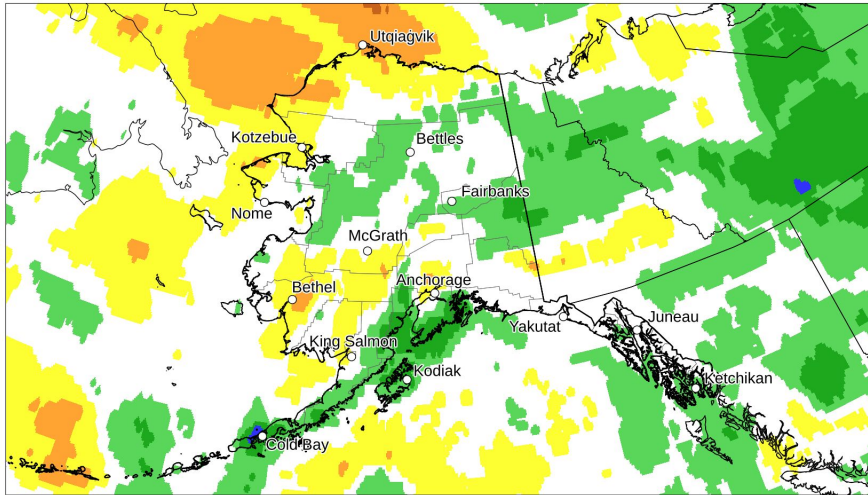
Map by: Brian Brettschneider

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 Dec 2024

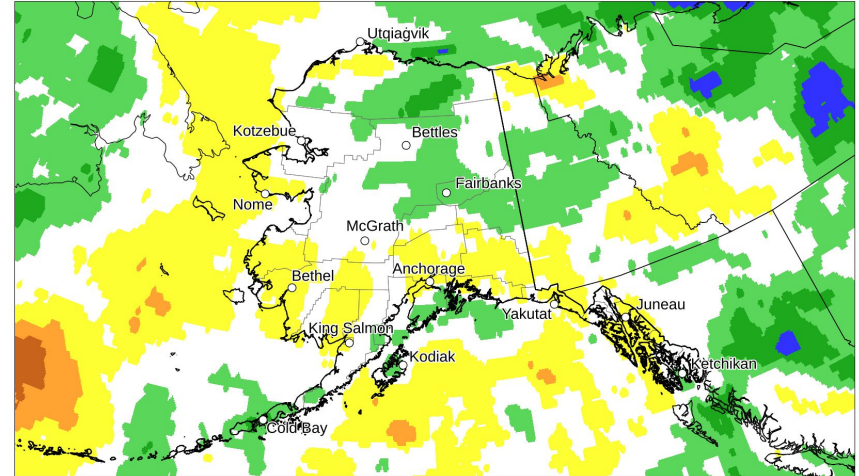


Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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

Precipitation Classification for Oct-Dec 2024

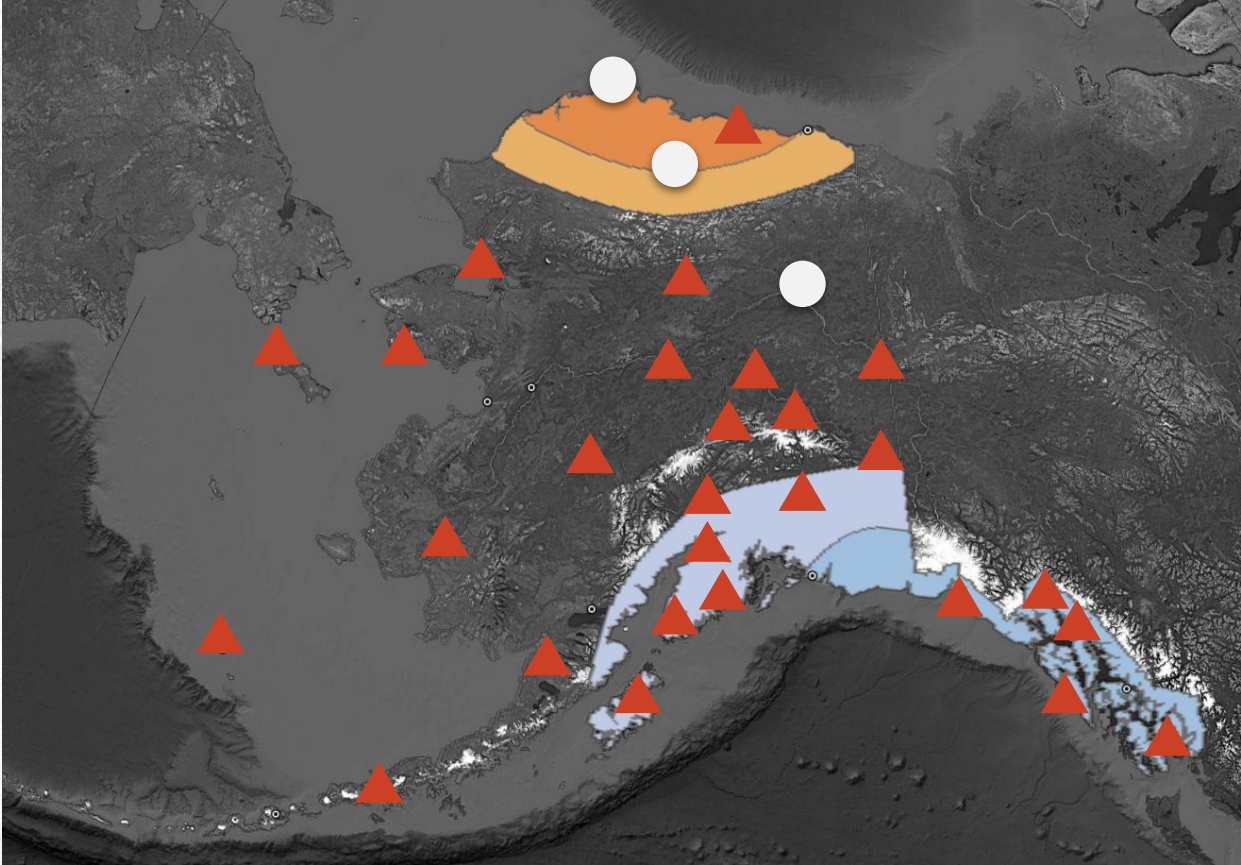


Source: ERA5 Reanalysis

Map by: Brian Brettschneider

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

December 2024 temperature > CPC outlook and observed



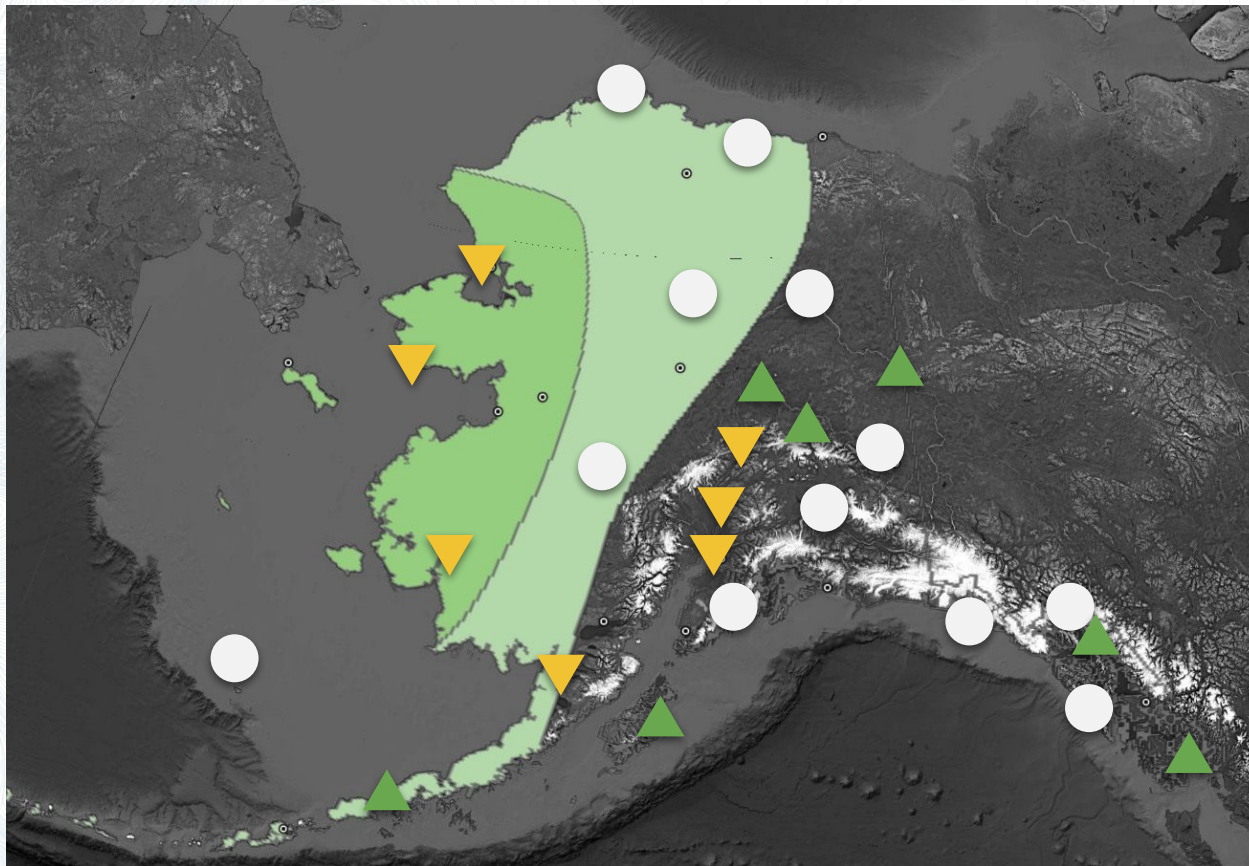
Non-EC skill score: -38

Percent correct: 8%

Mid-month outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

December 2024 precipitation > CPC outlook and observed



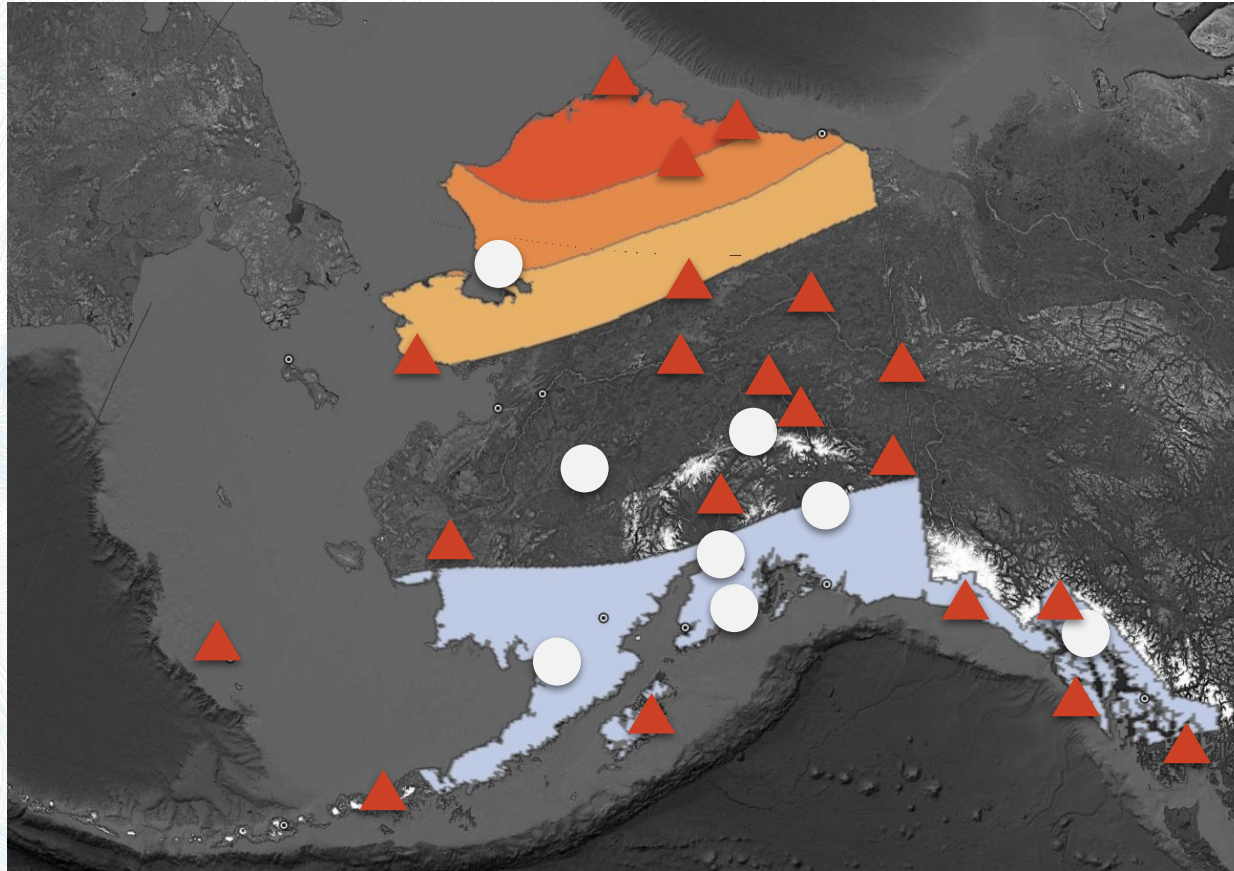
Non-EC skill
score: -35

Percent
correct: 10%

Mid-month
outlook

- ▲ Above normal
- Near normal
- ▼ Below normal

October-December 2024 temperature > CPC outlook & observed

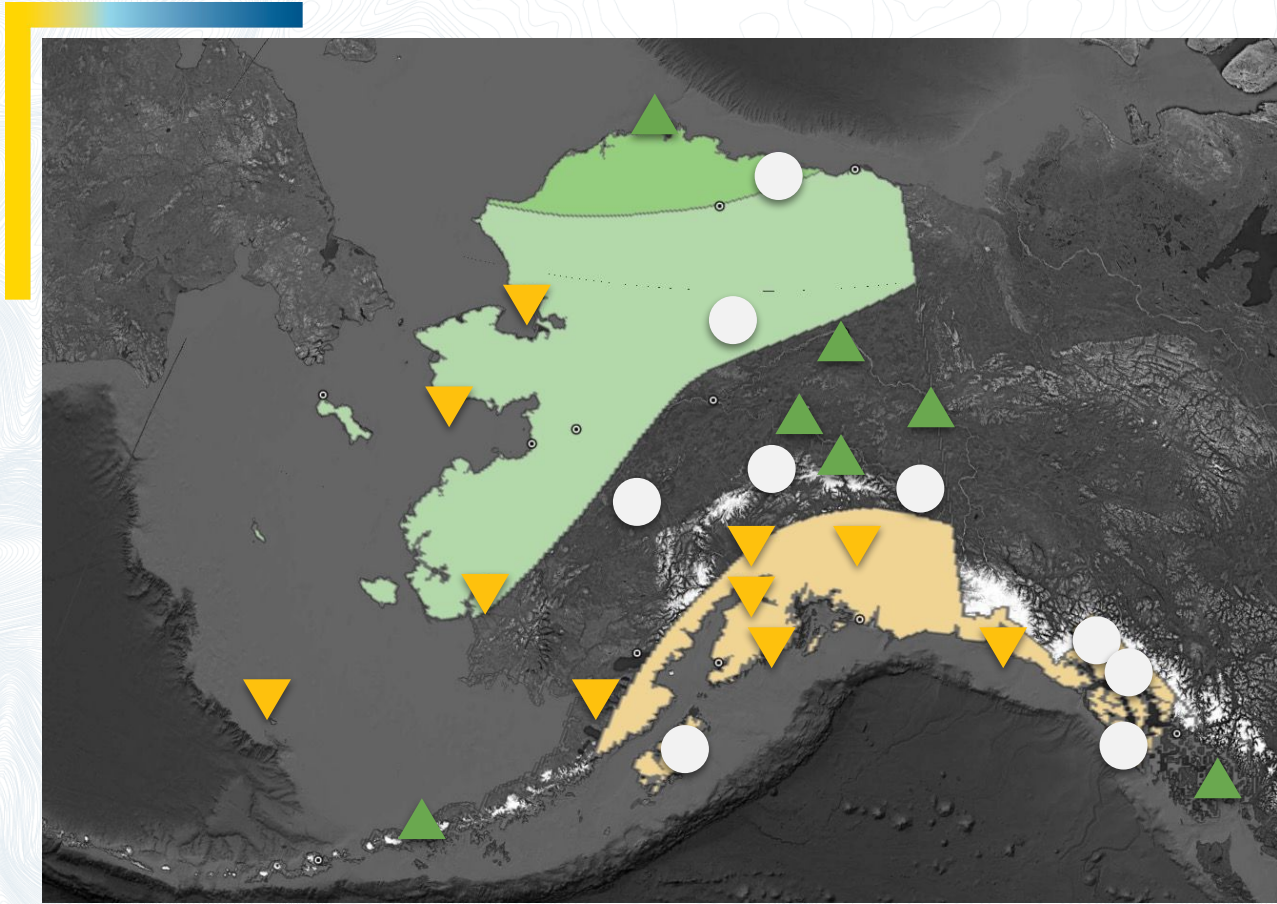


Non-EC skill
score: -4

Percent
correct: 31%

- ▲ Above normal
- Near normal
- ▼ Below normal

October-December 2024 precipitation > CPC outlook & observed

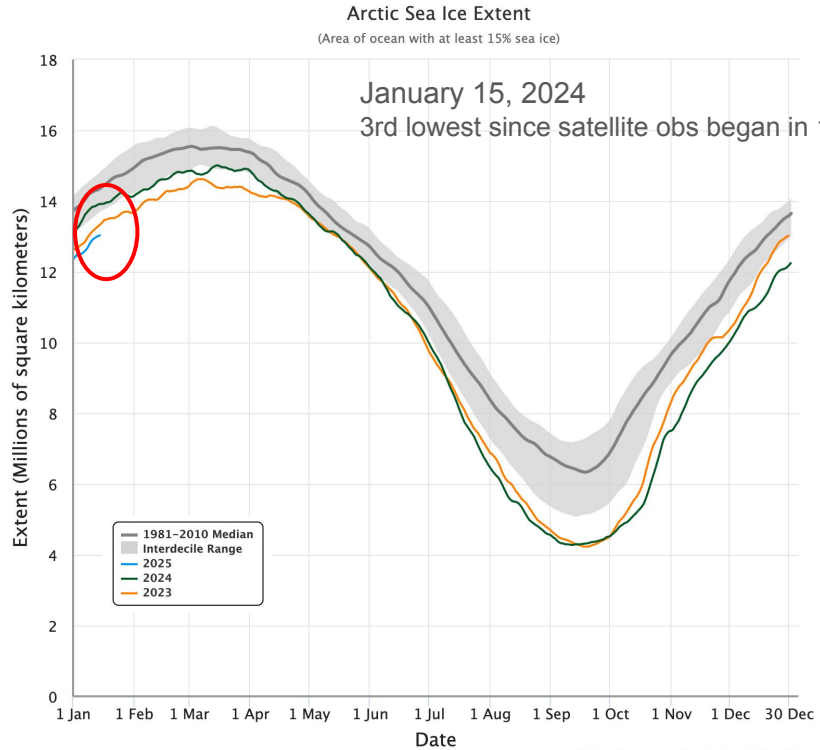


Non-EC skill score: +4

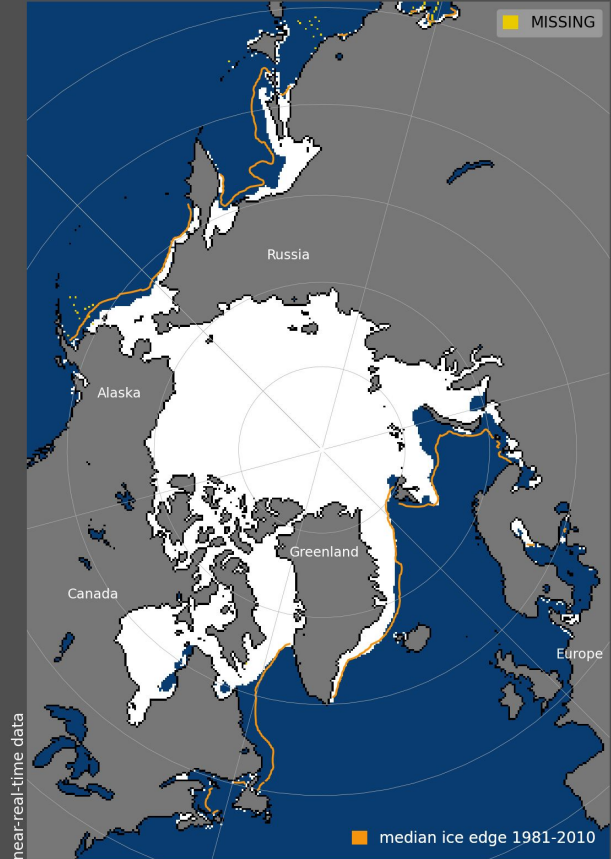
Percent correct: 36%

- ▲ Above normal
- Near normal
- ▼ Below normal

Arctic wide sea ice

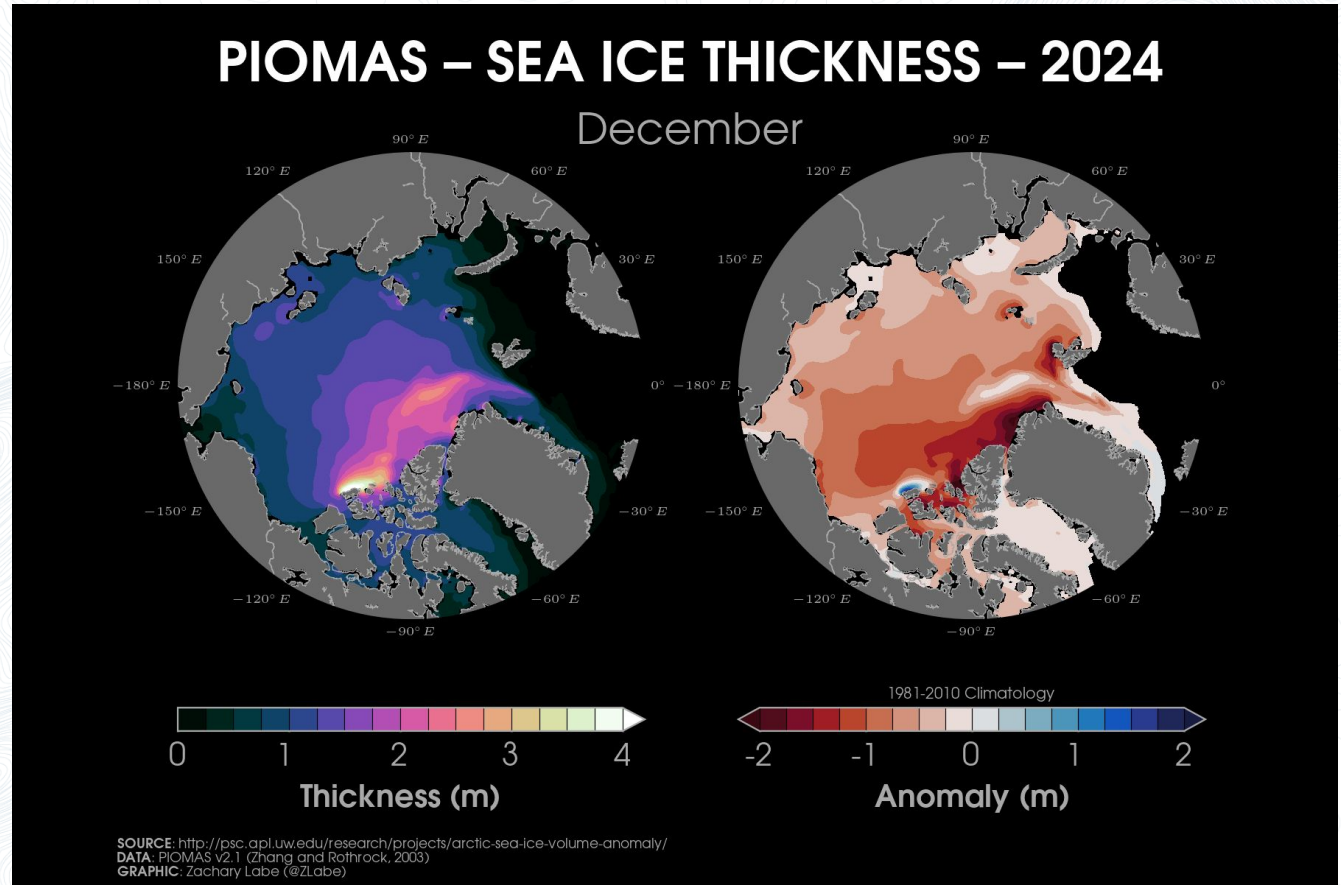


Sea Ice Extent, 15 Jan 2025



Arctic sea ice thickness

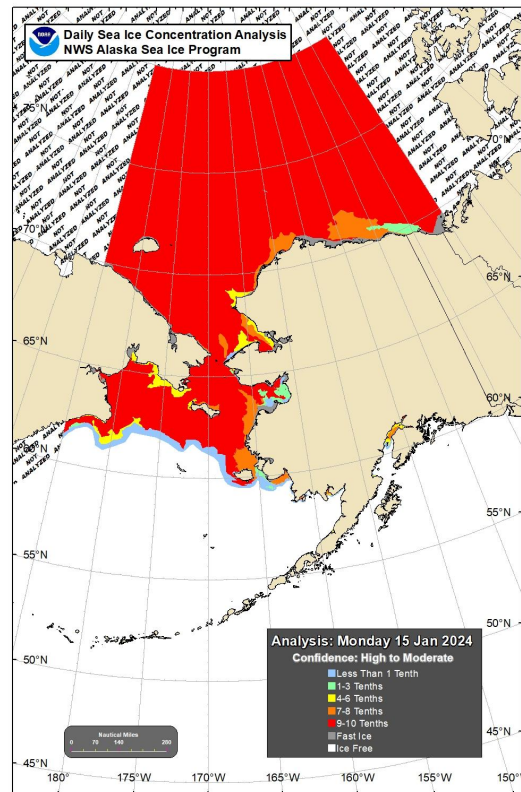
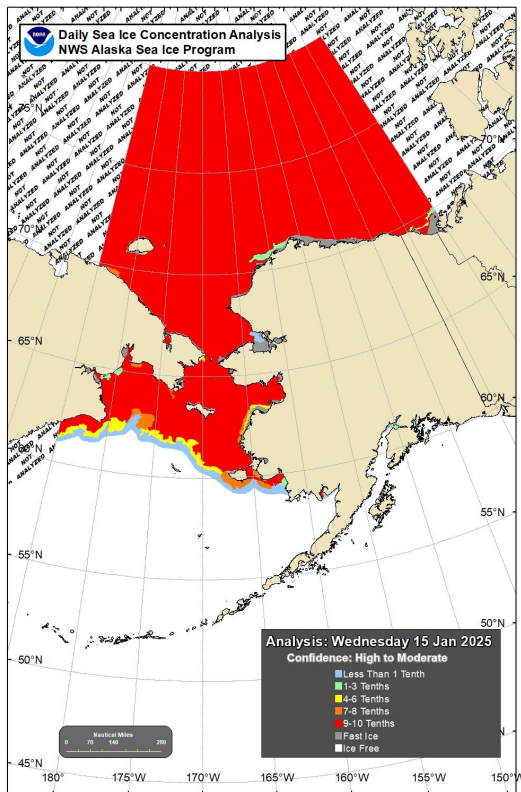
Sources:
Data from U.
Wa./PIOMAS data
Graphics by Z.
Labe/NOAA



January 15, 2025

January 15, 2024

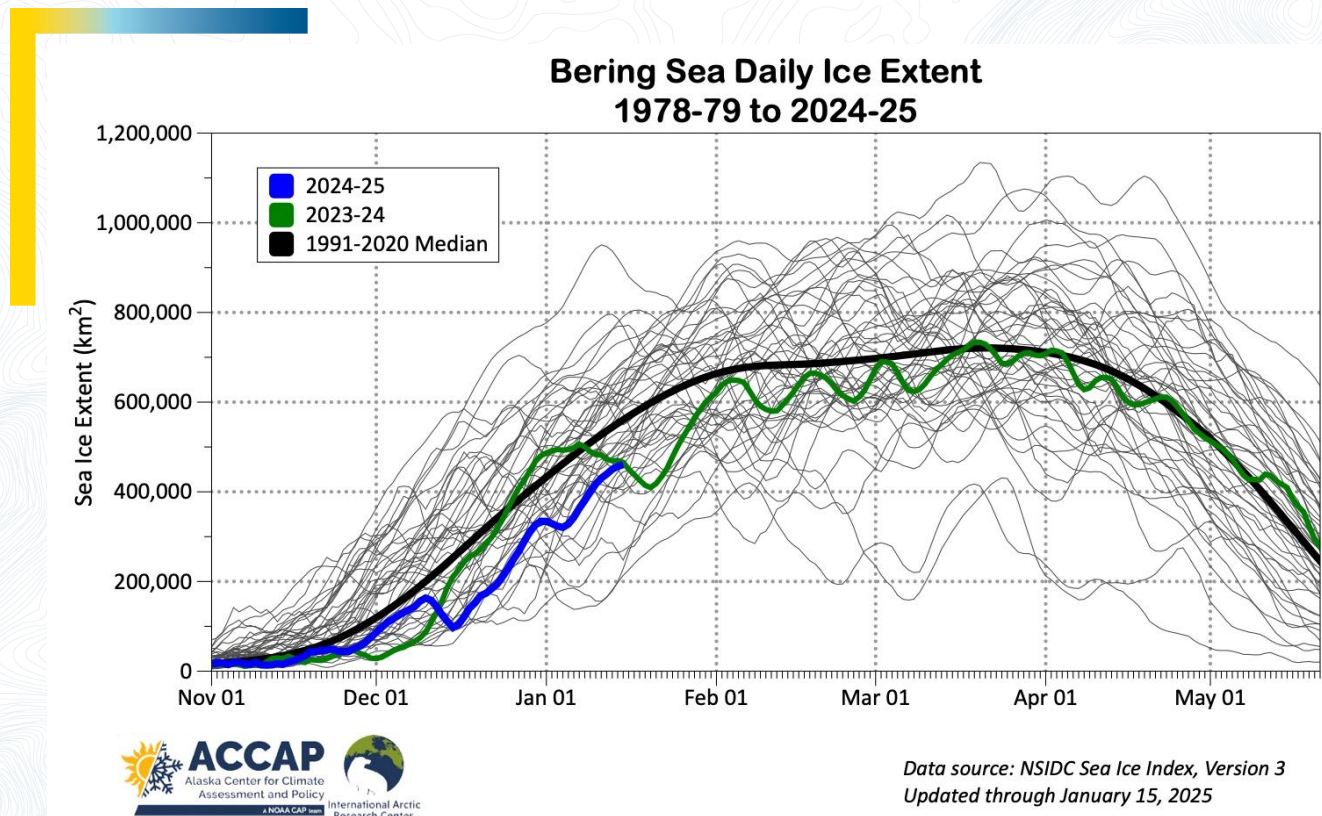
Mid-January sea ice comparison



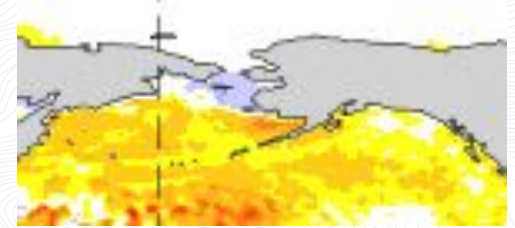
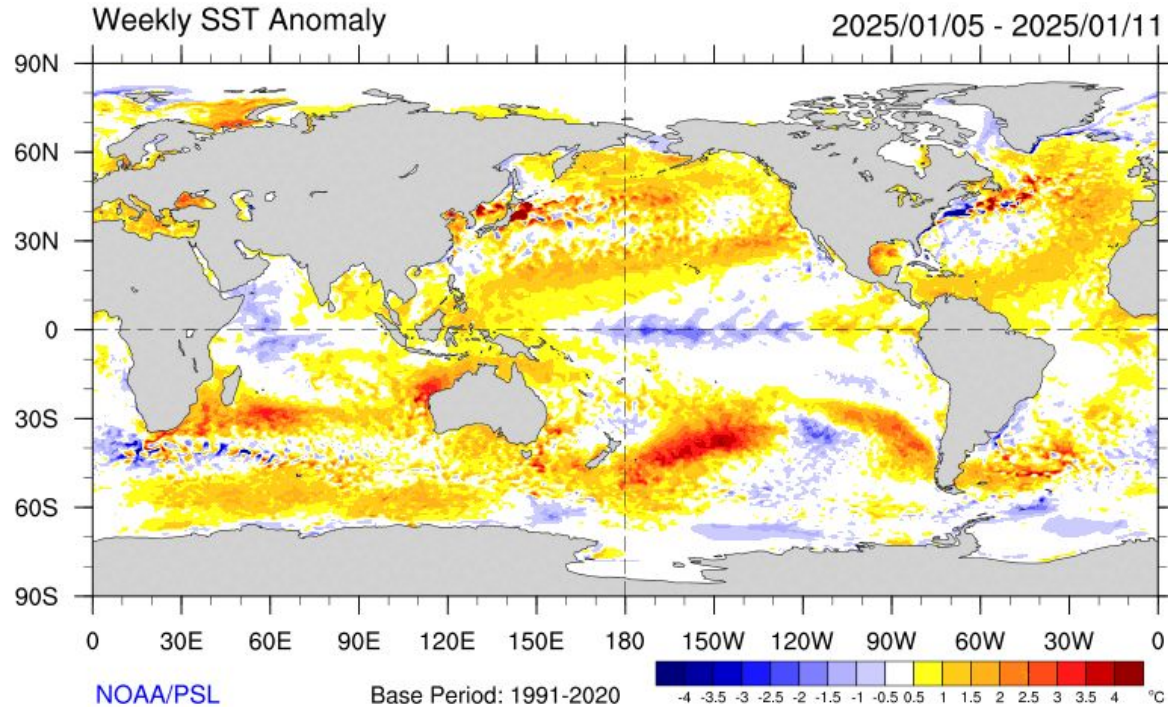
Source: National Weather Service
Alaska Region Sea Ice Program

Sea ice extent through the season

Sources:
Data NSIDC Sea Ice Index,
Version 3.



Global sea surface temperature departure from normal

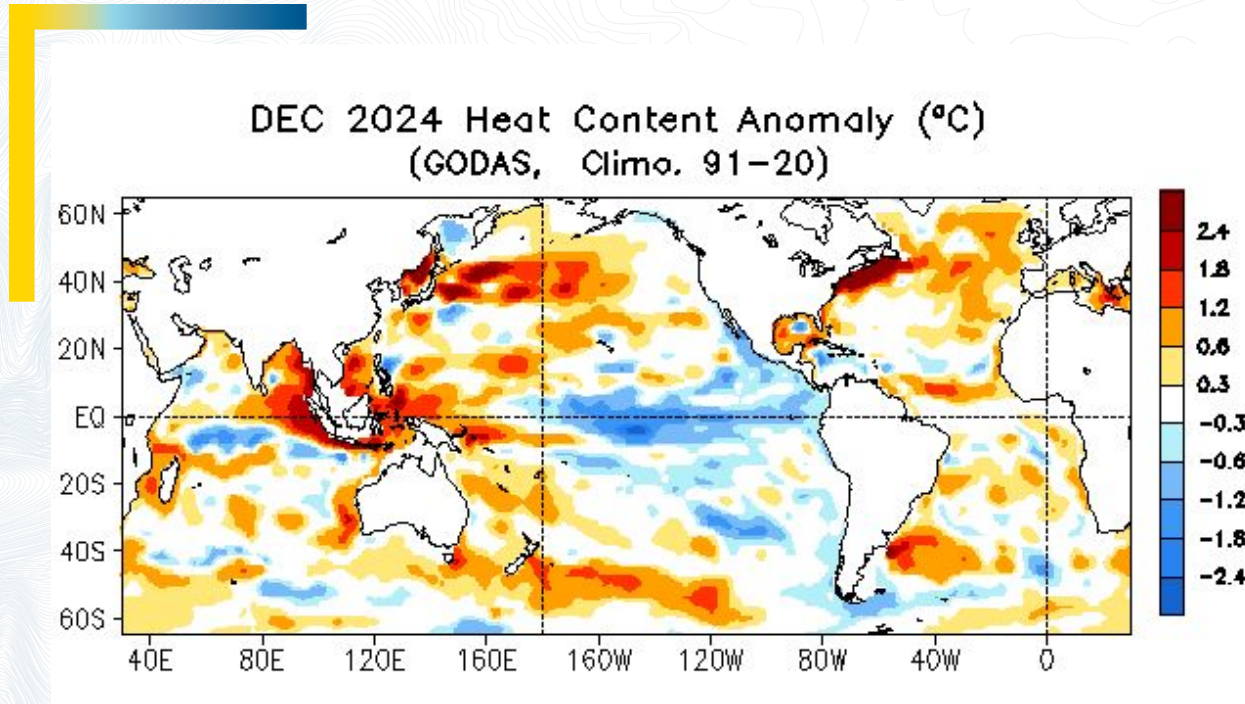


ONI for **Oct-Dec**: -0.4

PDO for **Dec 2024**: -2.1

Sources: ONI from CPC
PDO Index from WCS

Upper ocean heat departure from average



Very slight warming in the Gulf of Alaska

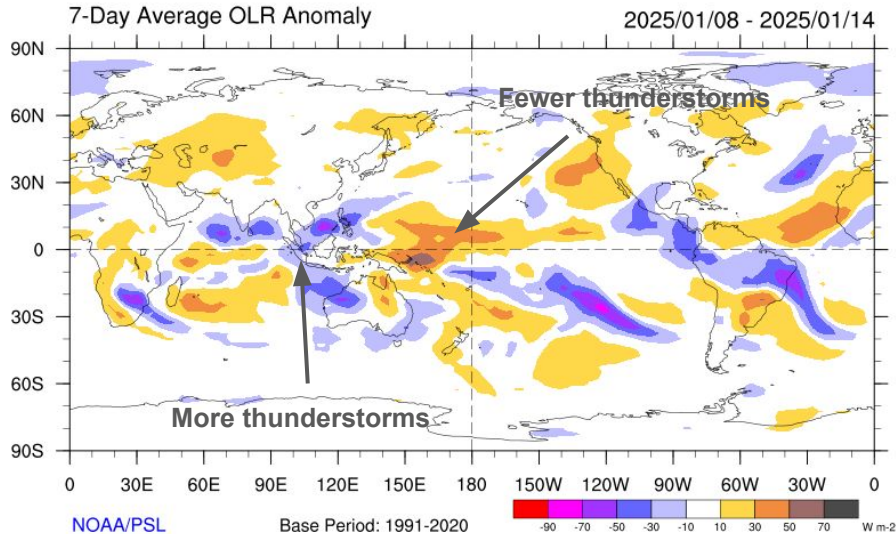
Source: NOAA/CPC

Upper 300 meters of the ocean

Tropical Pacific atmosphere

Oct-Dec Oceanic Niño Index: -0.4

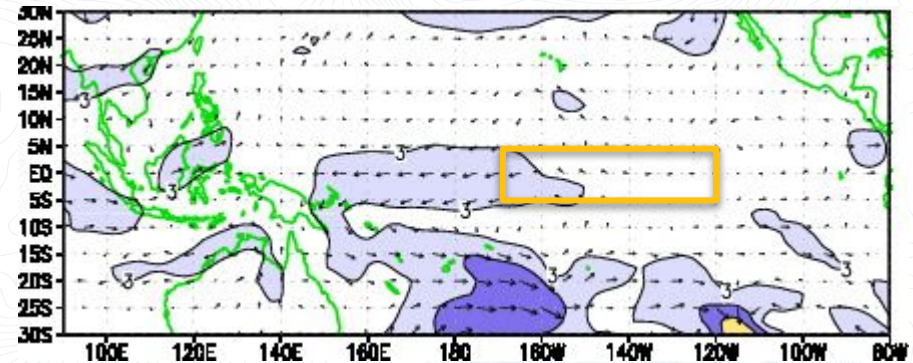
Deep tropical convection
Via “outgoing longwave radiation”



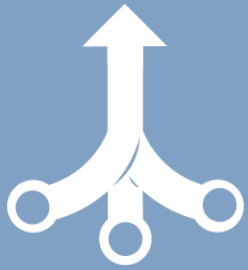
Above average trade winds
Niño Region 3.4



Trade winds
850 mb wind difference from average
Dec 15-Jan 13, 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

December 2024

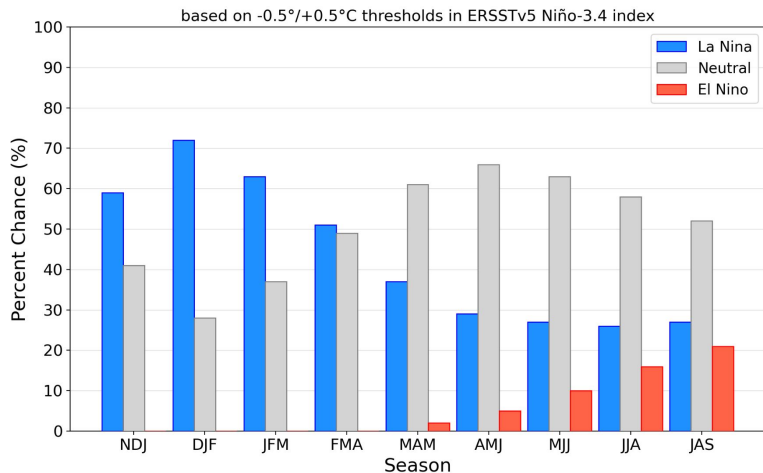
January 2025

ENSO Alert System Status:

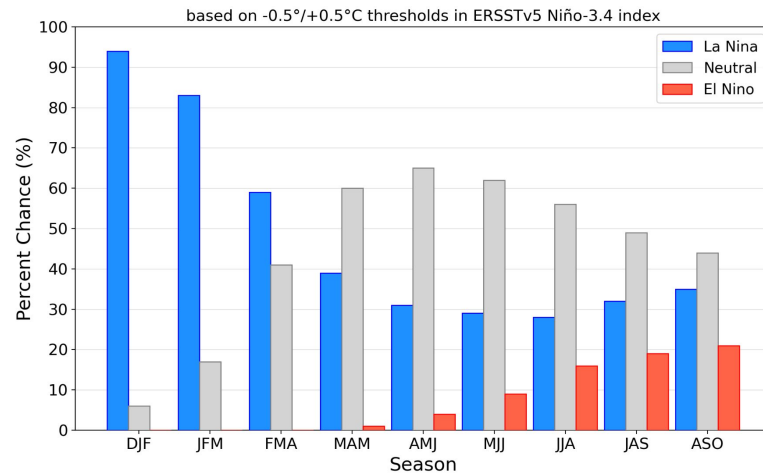
La Niña Advisory



Official NOAA CPC ENSO Probabilities (issued December 2024)



Official NOAA CPC ENSO Probabilities (issued January 2025)



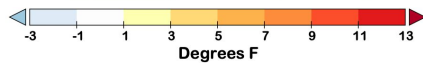
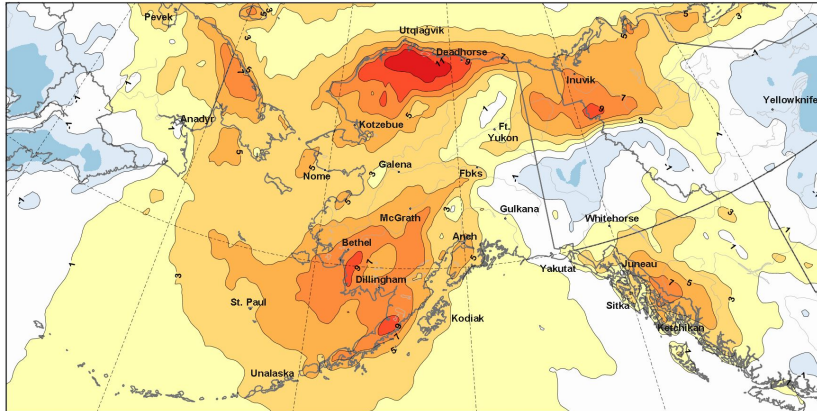
**Statistical
guidance** ➤
using the past
to predict the
future

- Long term trends
- Optimum climate normals: Alaska trends the past 15 years
- La Niñas since 1976

February half century trends

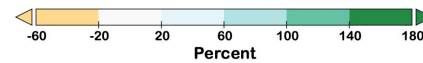
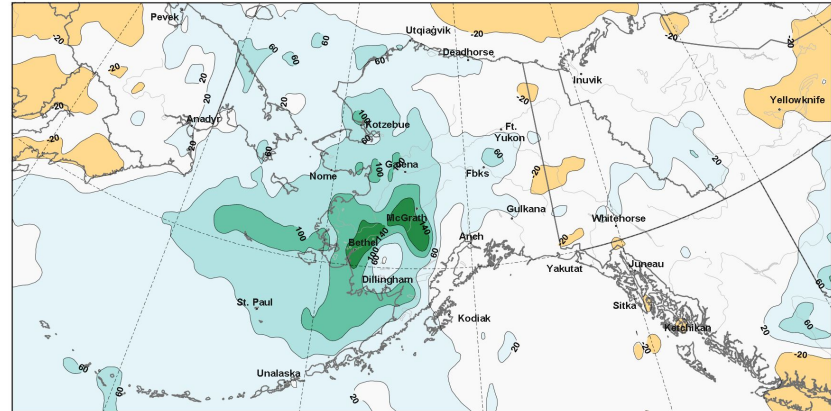
Temperatures

Total Change in February Average Temperature
1975-2024



Precipitation

Percent Change in February Average Precipitation
1975-2024

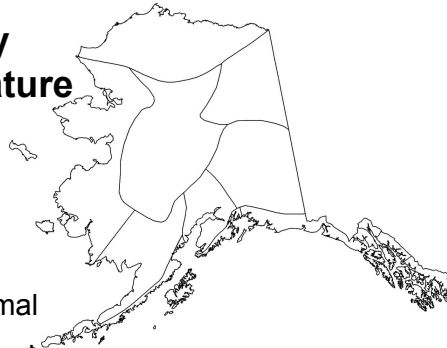
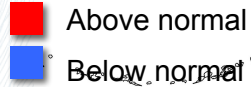


Change in the average
over 50 years

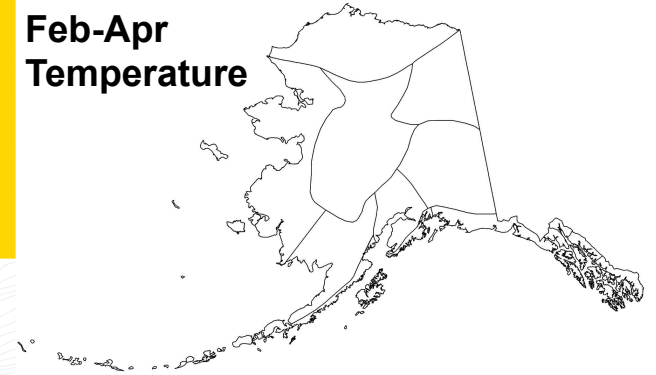
2010 to 2024 trends

Past 15 years compared to 1991-2020

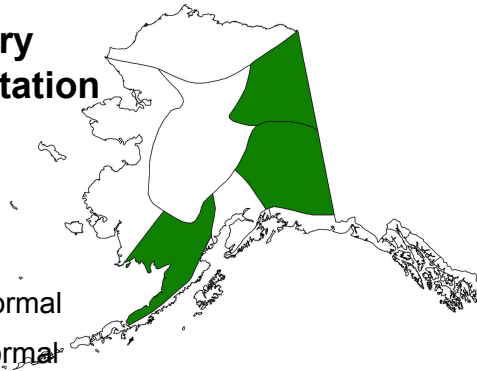
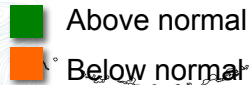
February Temperature



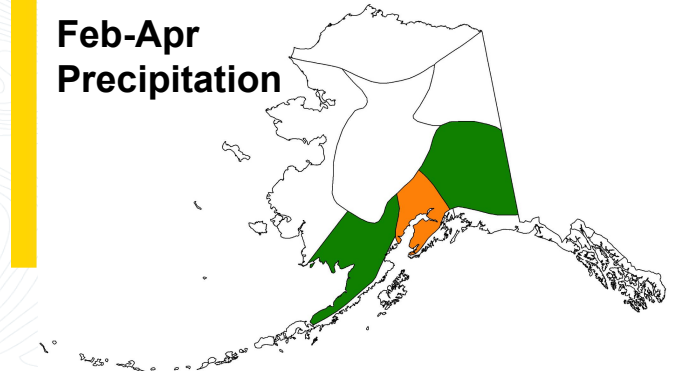
Feb-Apr Temperature



February Precipitation



Feb-Apr Precipitation



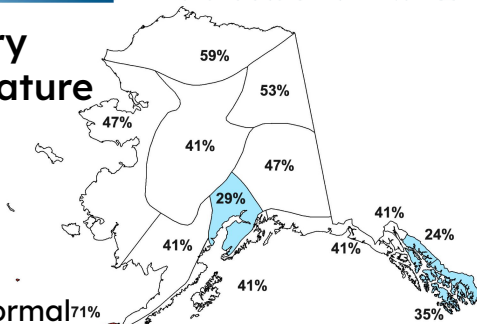
17 La Niña since 1976

1983, 1984, 1988, 1995, 1998, 1999, 2000, 2005, 2007, 2009, 2010, 2011, 2016, 2017, 2020, 2021, 2022 (these are the start years)

Percent years above average

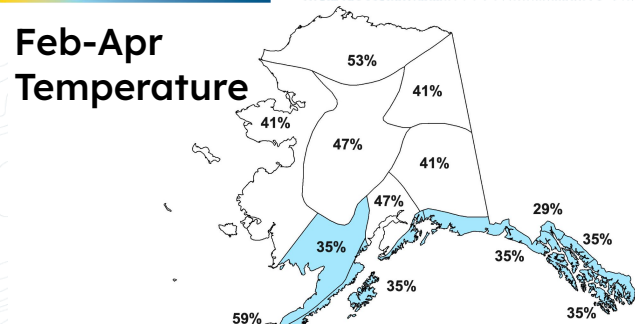
February Temperature

■ Above normal 71%
■ Below normal



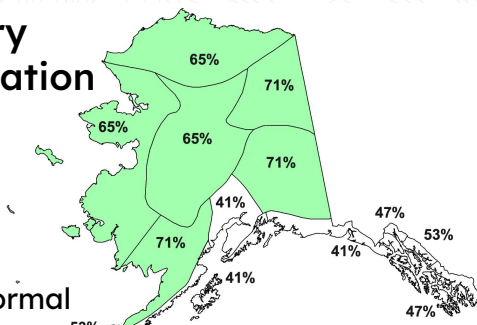
Feb-Apr Temperature

■ Above normal 71%
■ Below normal



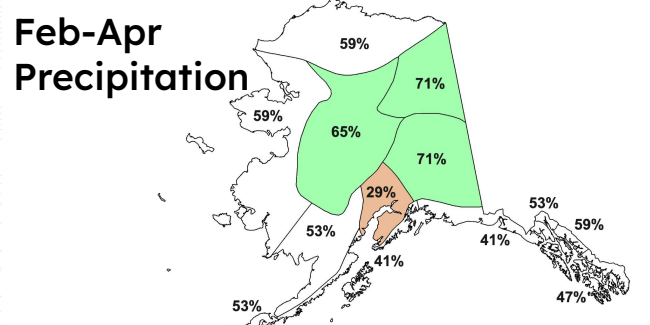
February Precipitation

■ Above normal 71%
■ Below normal



Feb-Apr Precipitation

■ Above normal 71%
■ Below normal



Dynamic model forecasts

Current suite of Dynamic Climate Models

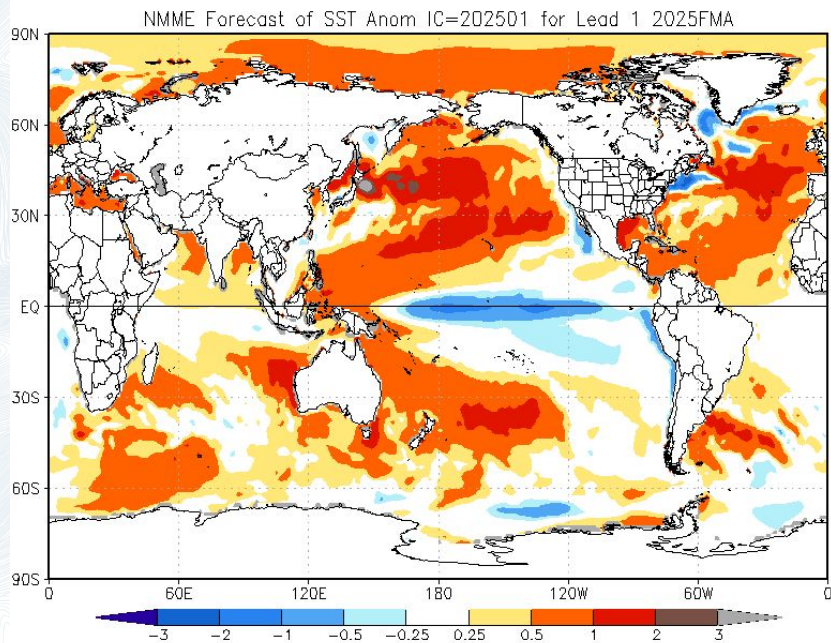
- CPC Experimental Sea Ice Ensemble
- World Climate Service Multi-Model Ensemble
- North American Multi-Model Ensemble (NMME)

What's being forecasted

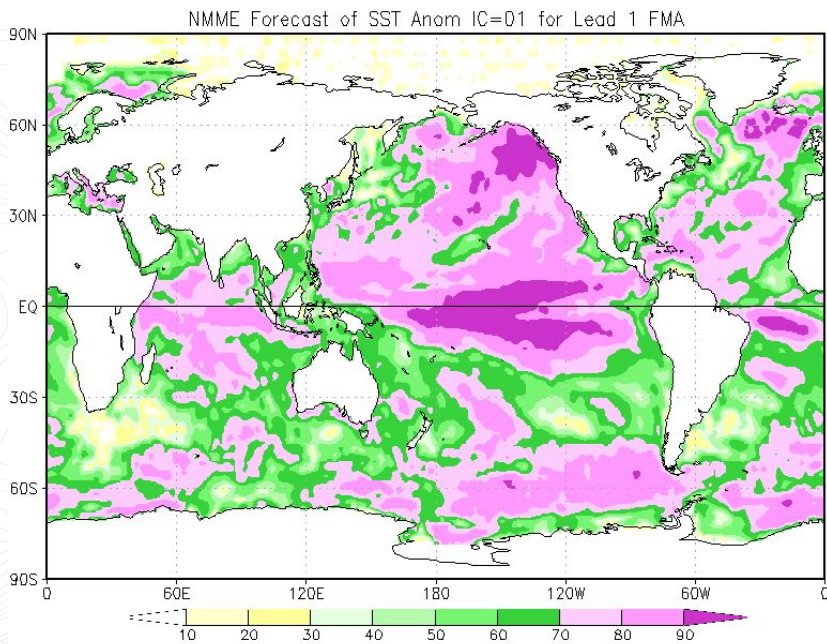
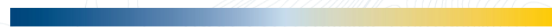
- Sea surface temperatures relative to normal
- Sea ice forecast
- Temperature and precip relative to normal

February-April 2025 sea surface temperature > NMME

Forecast
departure from normal

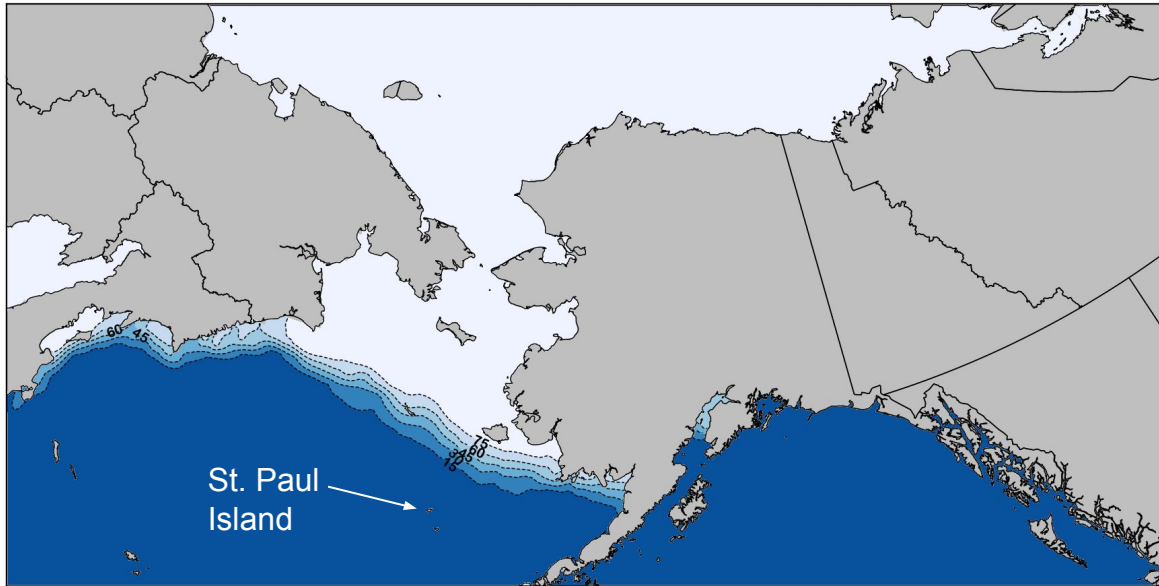


Skill
of the forecast

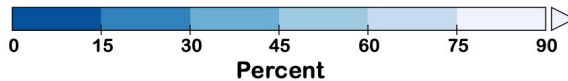


Experimental sea ice forecast > CPC

Forecast Sea Ice Concentration
February 2025



St. Paul
Island



The 20-models average daily sea ice concentration in February 2025

February 2025 calibrated probability forecast ➤ NMME

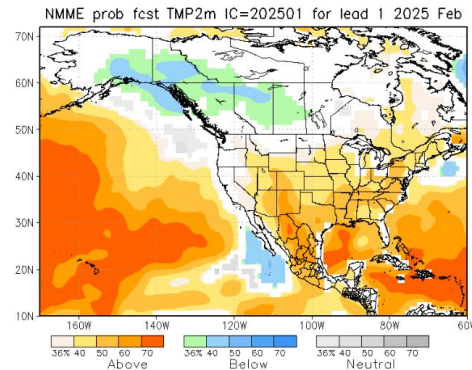
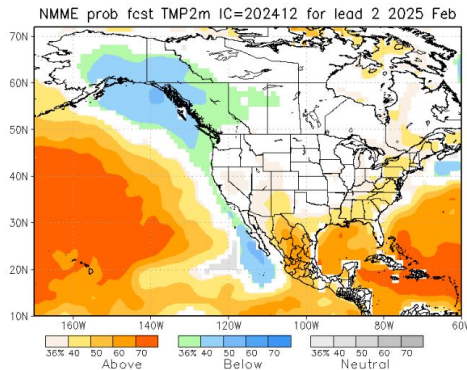
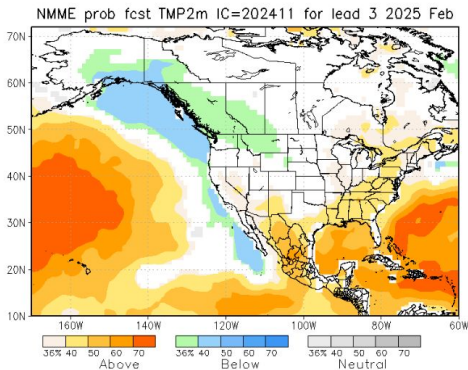
Forecast from →

November

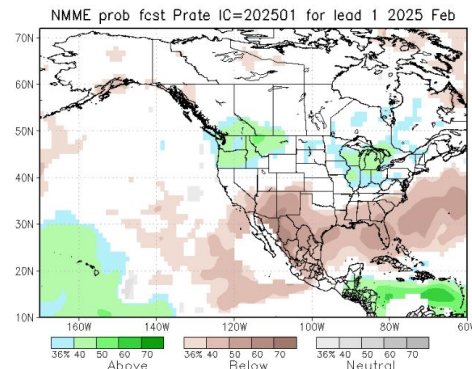
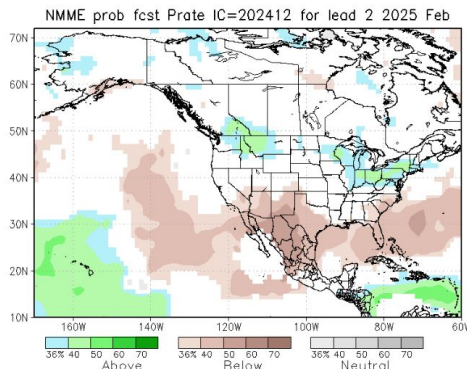
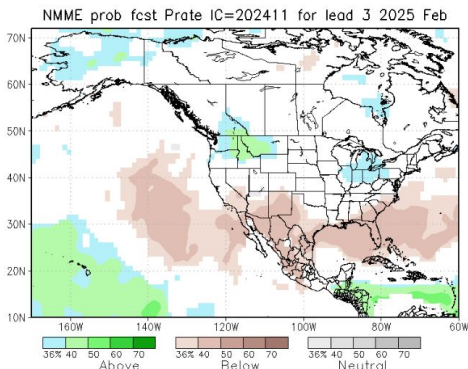
December

January

Temperature



Precipitation

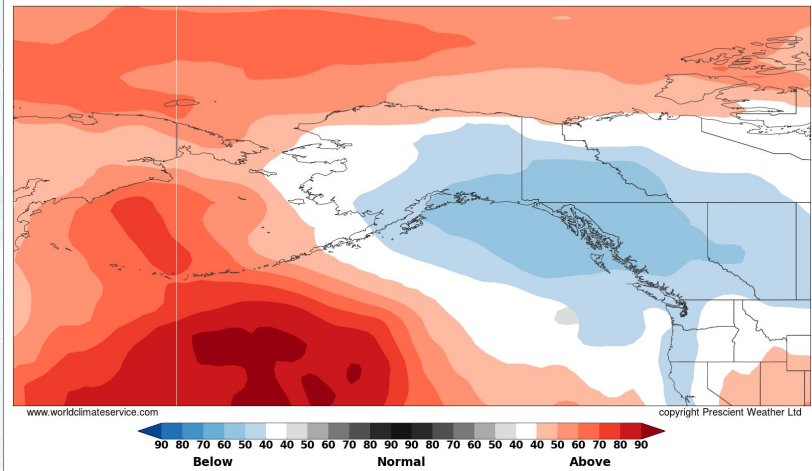


February 2025 outlooks ➤ World Climate Service

Temperature



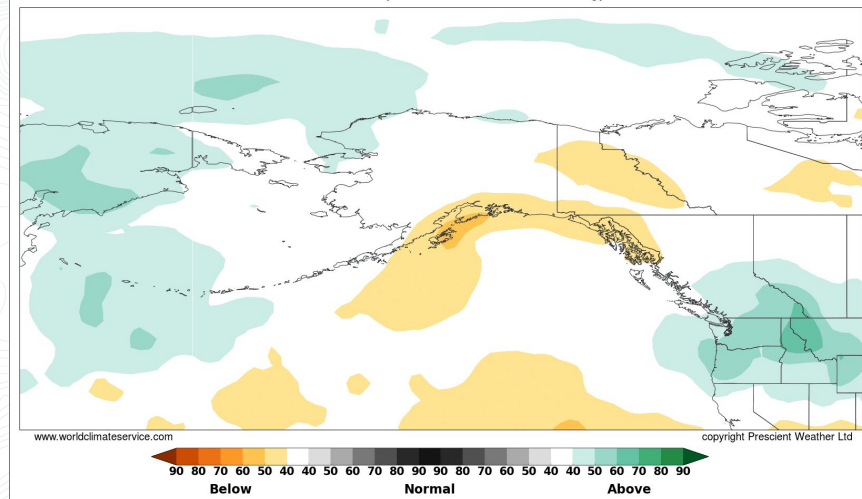
Multi-Model T2m Probability Above/Normal/Below
Forecast Valid February 2025
Initialized January 2025 1991-2020 Climatology



Precipitation



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



Bias Corrected, Skill Weighted CFS + ECMWF

February-April 2025 calibrated probability forecast ➤ NMME

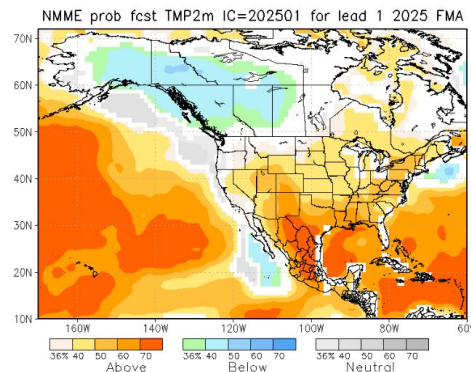
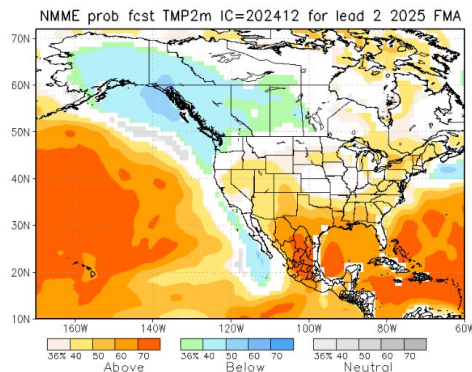
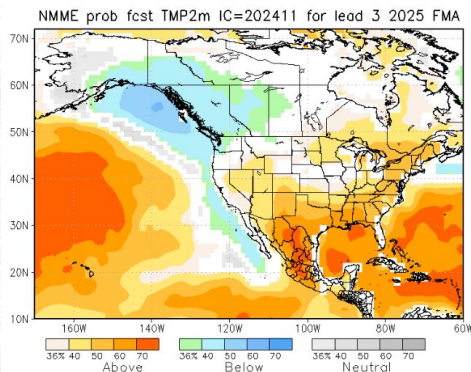
Forecast from →

November

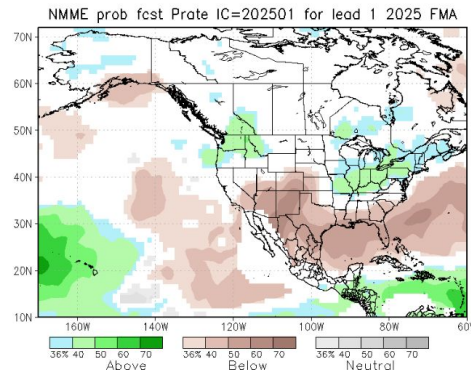
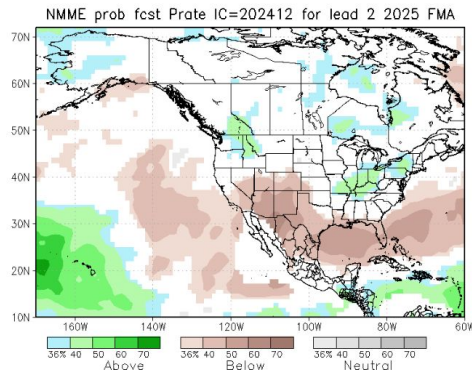
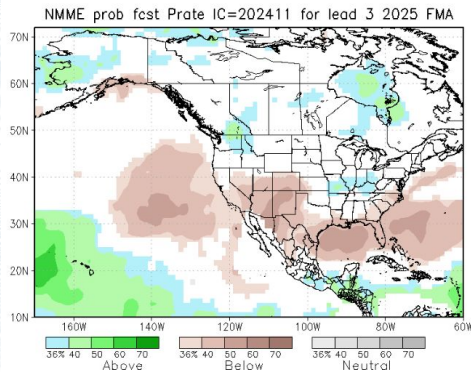
December

January

Temperature



Precipitation

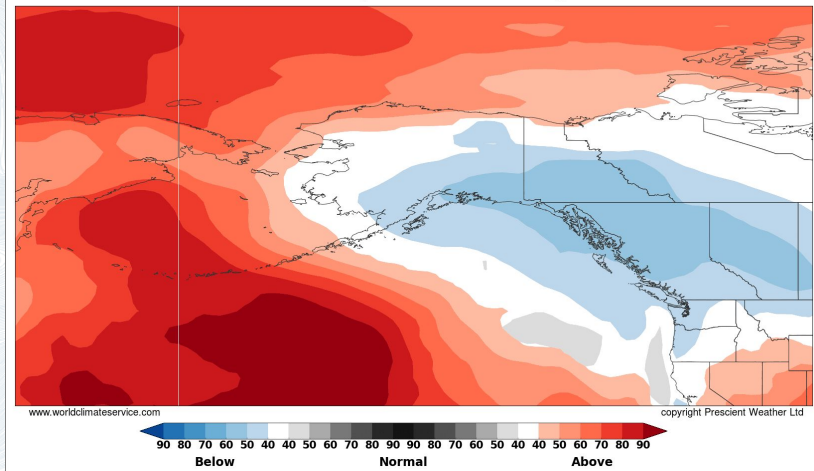


February-April 2025 outlooks ➤ World Climate Service

Temperature



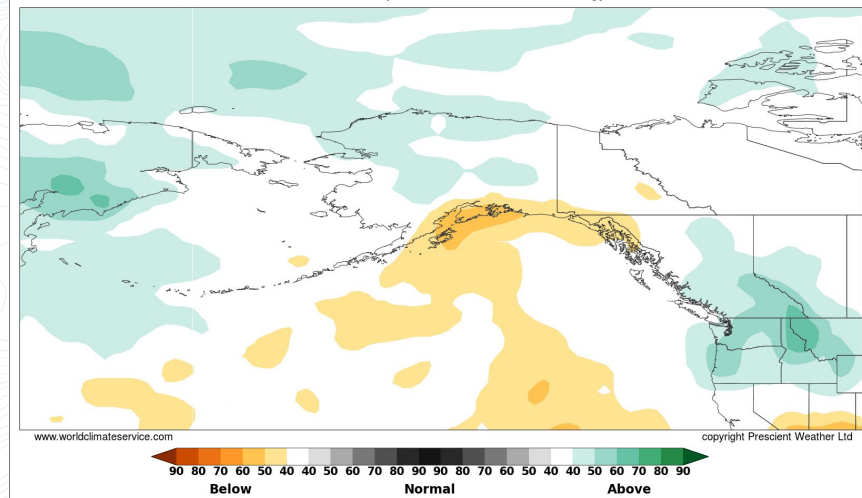
Multi-Model T2m Probability Above/Normal/Below
Forecast Valid Feb 2025 - Apr 2025
Initialized January 2025 1991-2020 Climatology



Precipitation

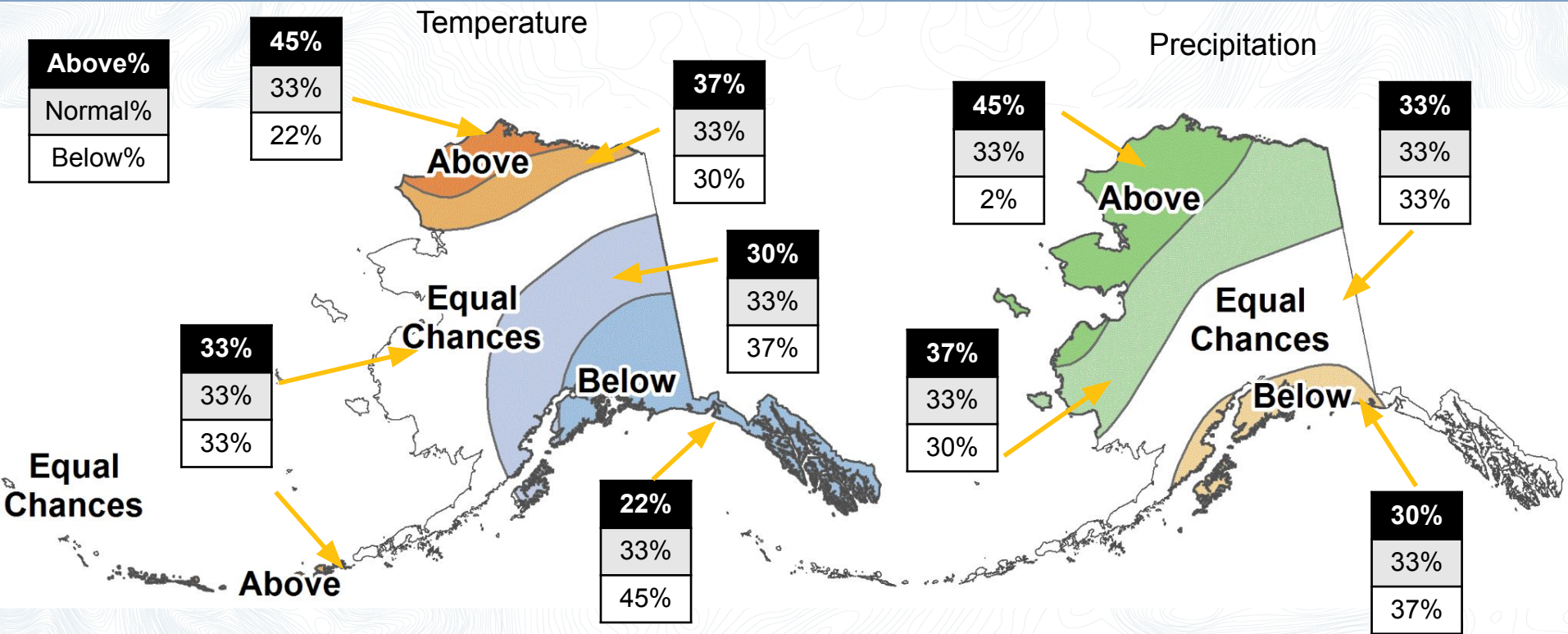


Multi-Model Precipitation Probability Above/Normal/Below
Forecast Valid Feb 2025 - Apr 2025
Initialized January 2025 1991-2020 Climatology



Bias Corrected, Skill Weighted CFS + ECMWF

February-April 2025 outlooks from December

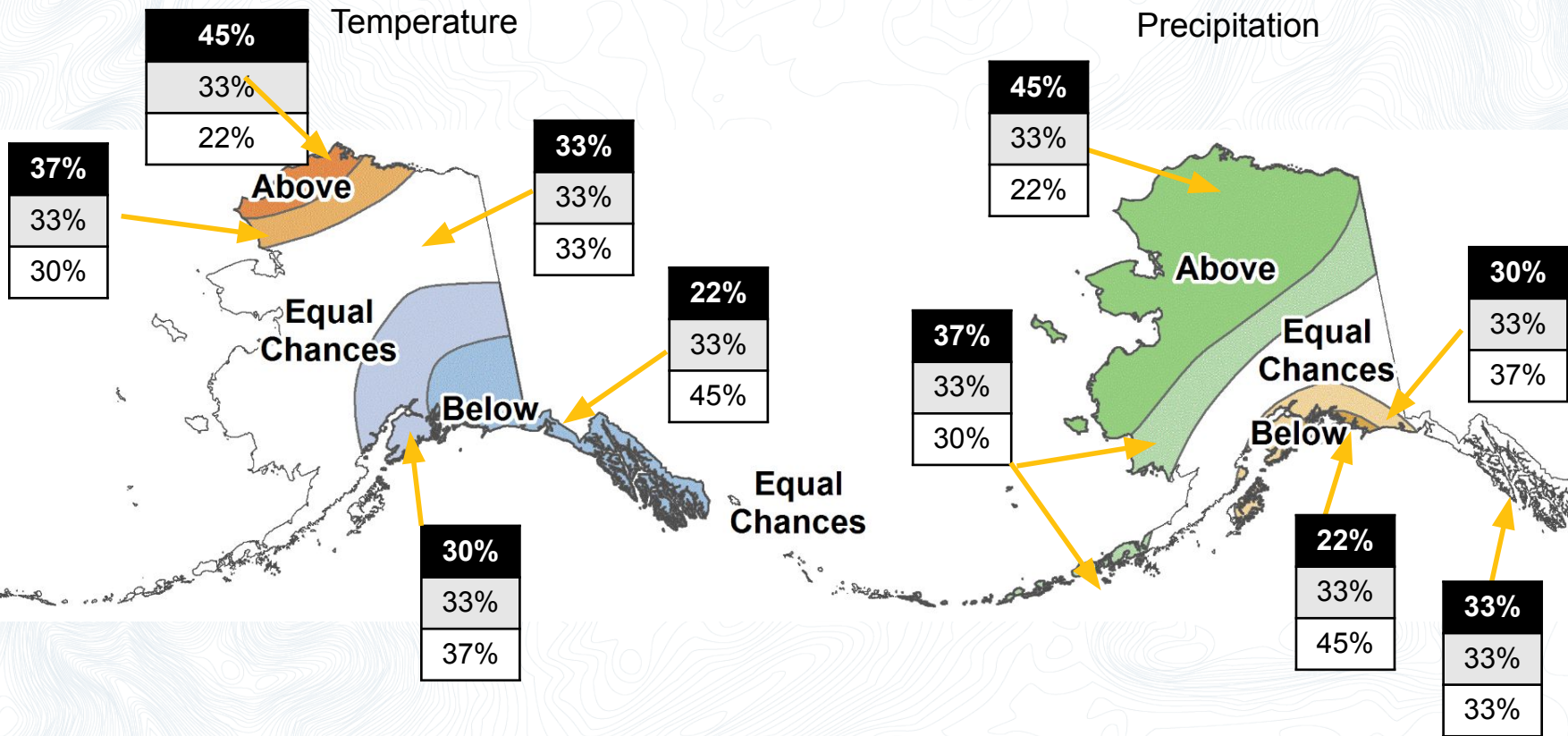


Future
outlook

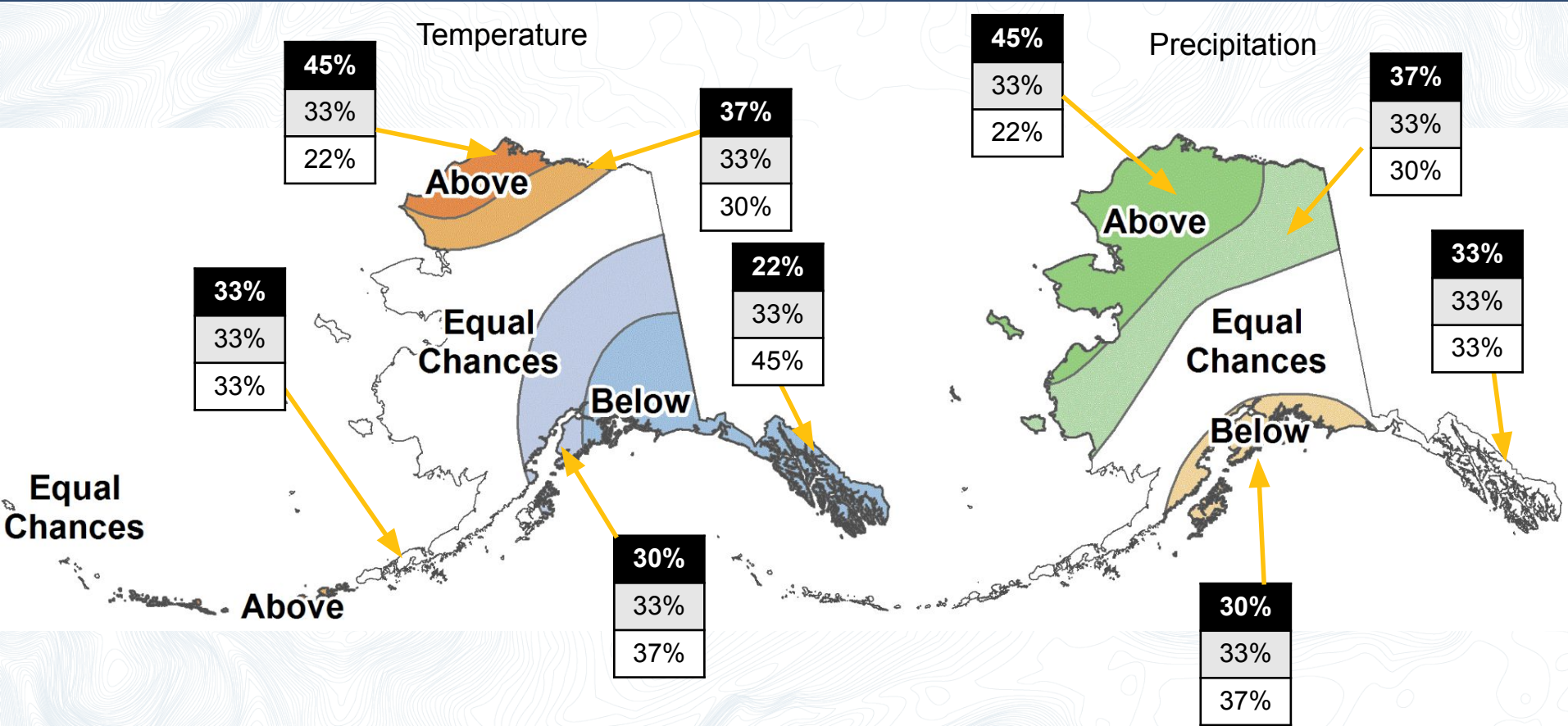


And the answer is...

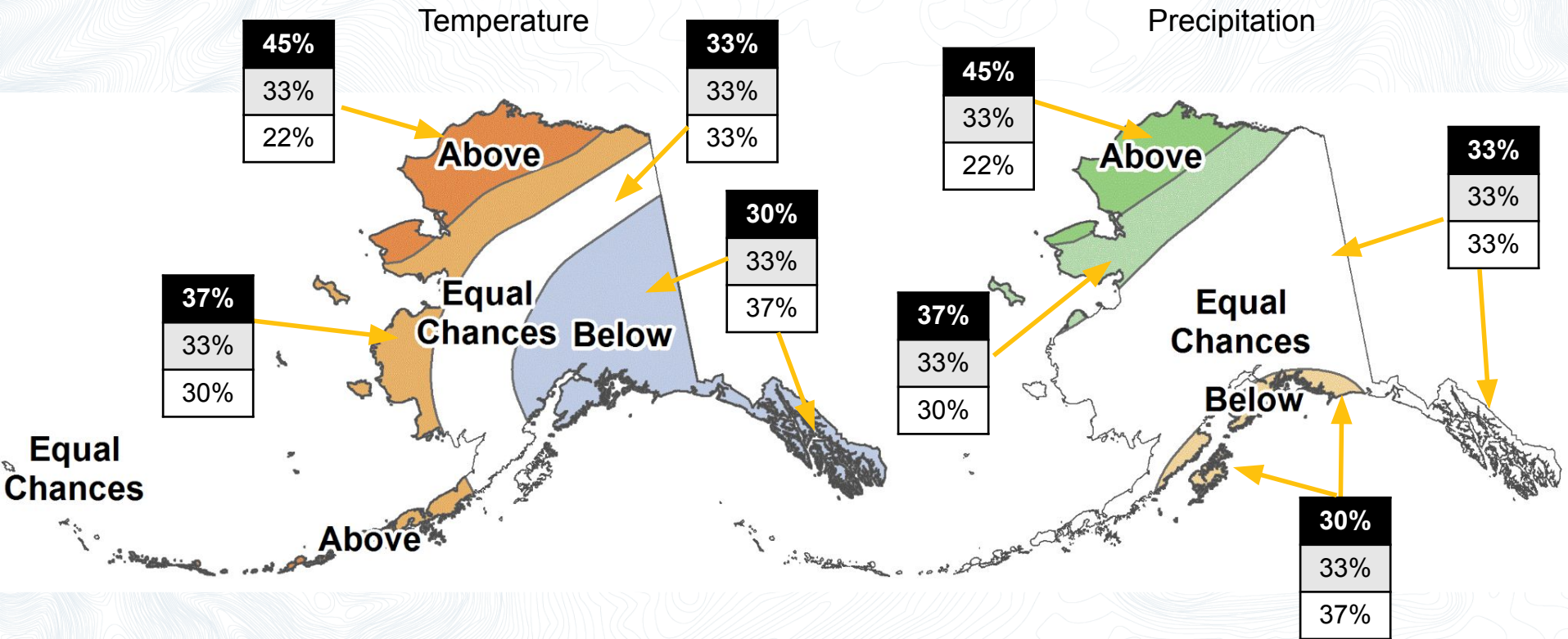
CPC February 2025 outlooks



CPC February-April 2025 outlooks



Spring 2025 outlook



Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- January 21 ▶ *Alaska Changing Environment 2.0*
- January 22 ▶ *VAWS: water vapor, blowing snow and sea spray*
- January 29 ▶ *2024 Arctic Report*
- February 21 ▶ *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