Alaska climate outlook briefing February 2024

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ACCAP
Alaska Center for Climate Assessment and Policy
A NOAA CAP/RISA Team

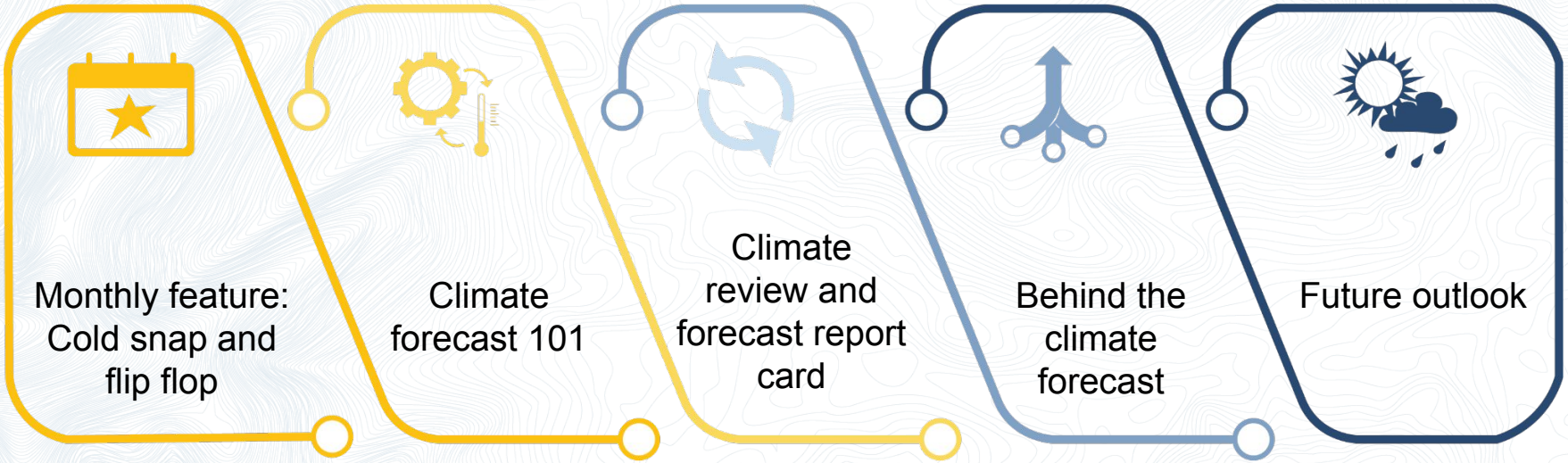
UAF
UNIVERSITY OF ALASKA FAIRBANKS

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

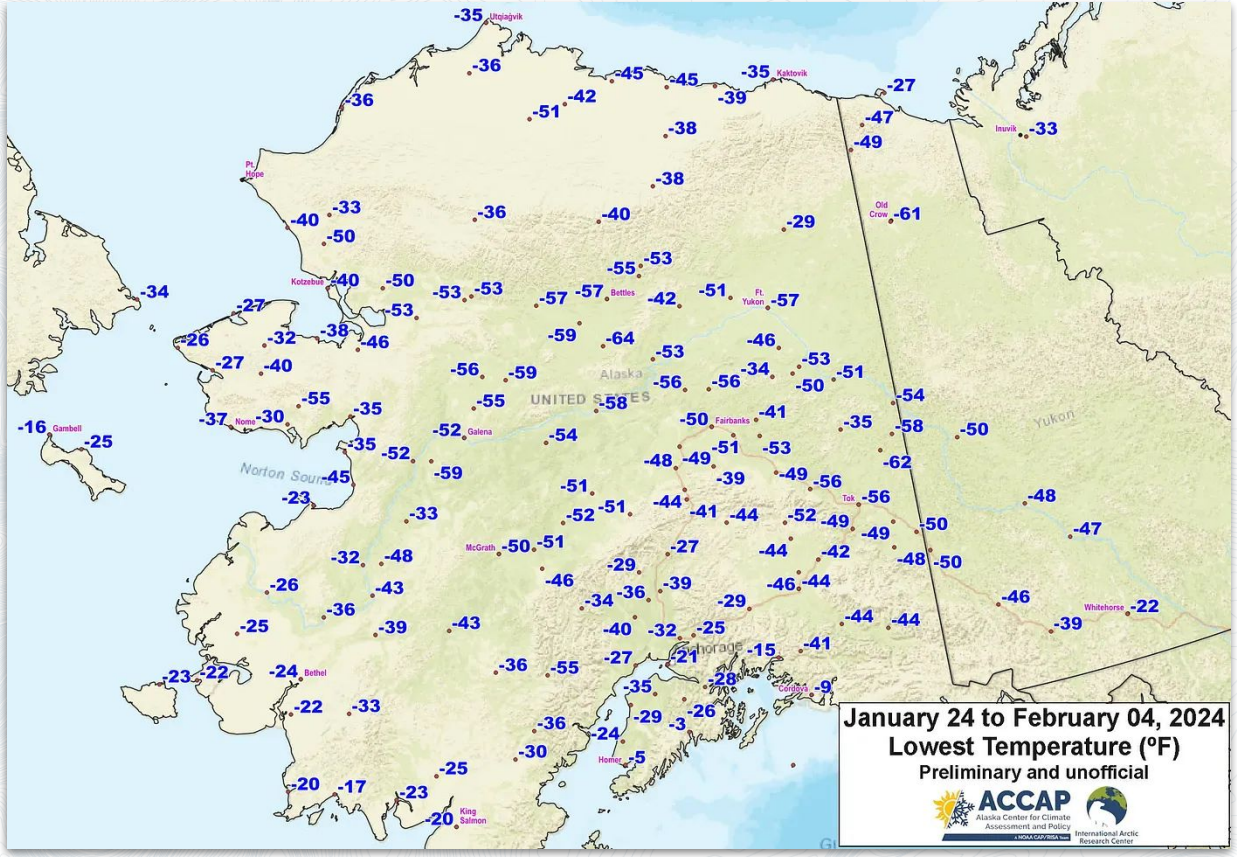
NATIONAL WEATHER SERVICE

World Climate Service

ACCAP

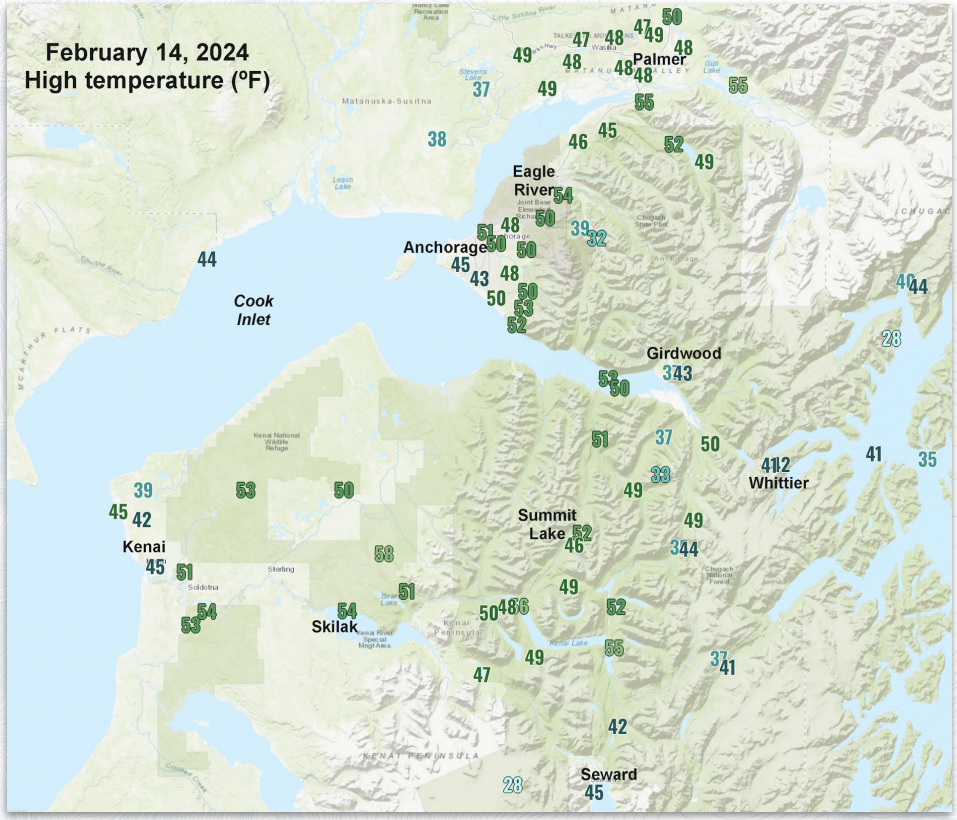

Monthly feature: Cold snap and flip flop
Climate forecast 101
Climate review and forecast report card
Behind the climate forecast
Future outlook

Monthly feature ➤ **cold snap**



- Most widespread Alaska cold since January 2012
- Late in the season
- Historically not impressive, only a few daily records set
- BUT…Bigger impacts because in this level of cold's now rare

Rebound 2024 ➢ **Mid February heat**



- **Delta Junction/Ft Greely** 51ºF ties February record
- **Nenana**: 52ºF highest February temp since 1943
- **Eielson AFB**: 50ºF
- **Utqiaġvik**: 32ºF
- **Kotzebue**: rain mixed with snow

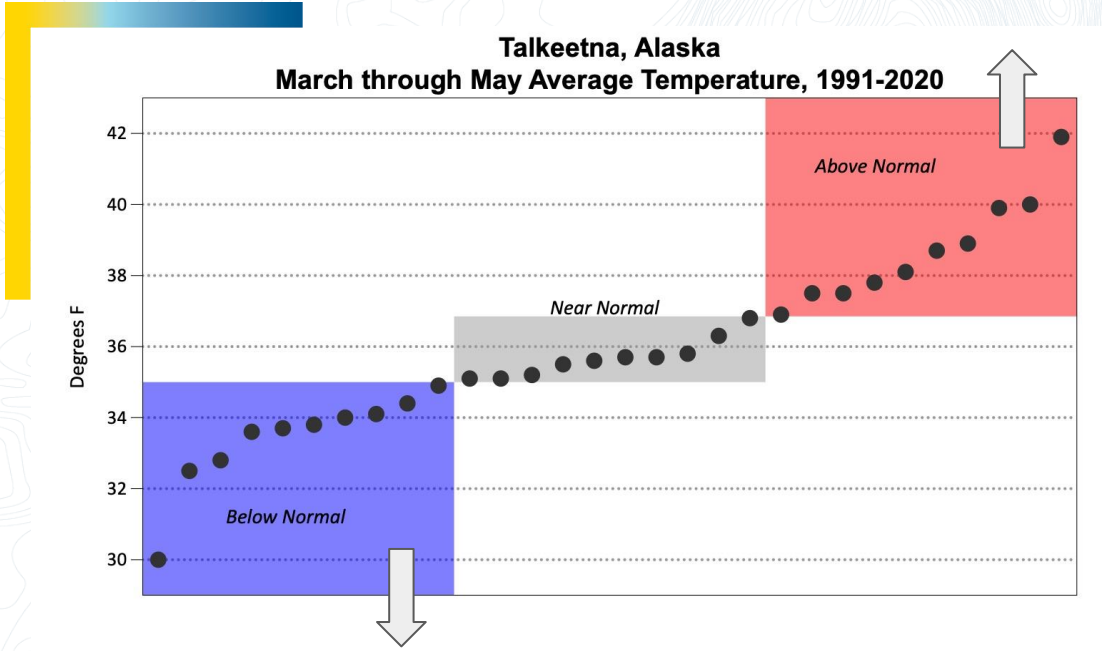
Climate forecast 101

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 longterm normal (1991-2020)
- 3 categories
- Probabilistic
- Traditional elements
  - Temperature
    - Centered on average
  - Precipitation
    - Centered on median ➤ can significantly differ from “normal”



Climate outlook report card

What happened and how did previous climate outlooks perform?

Notable January-February **Happenings**

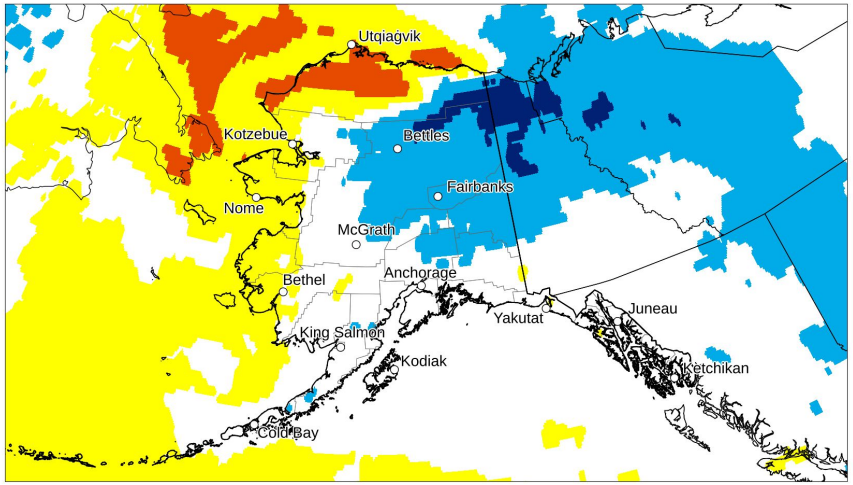
Roof collapse in Juneau

Photo credit: Photo by Mikko Wilson/KTOO

- **Juneau Airport**:
  - 76.4 inches snow in January, new record
  - 88.3 inches January 5 to February 4, 2nd highest 31-day total
- **Interior**: Temperature swings 80 to 110ºF Feb 3 to Feb 14
- **North Slope:** Top ten mildest January at Utqiaġvik and Prudhoe Bay

Model- based regional analysis ➢ **Average temperatures**

Temperature Classification for Jan 2024



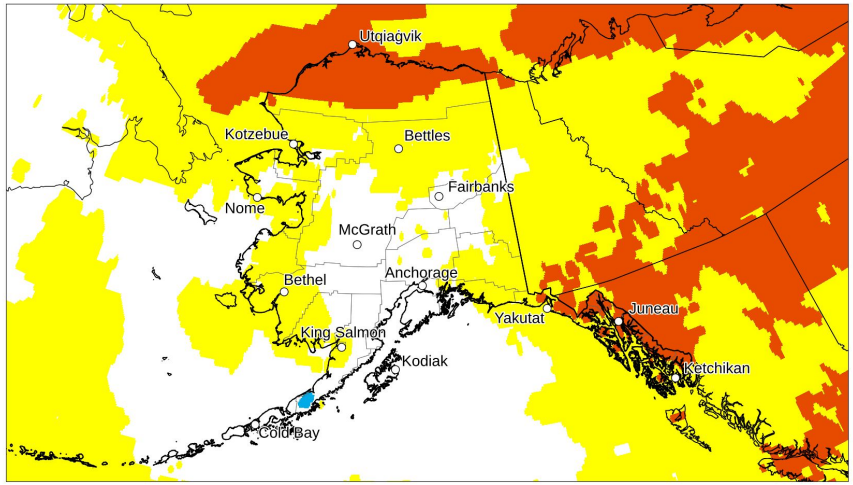
Source: ERA5 Reanalysis

Map by: Brian Brettschneider

Much Below | Below | Near Normal | Above | Much Above

Compared to 1991-2020 Base Period

Temperature Classification for Nov-Jan 2023-24



Source: ERA5 Reanalysis

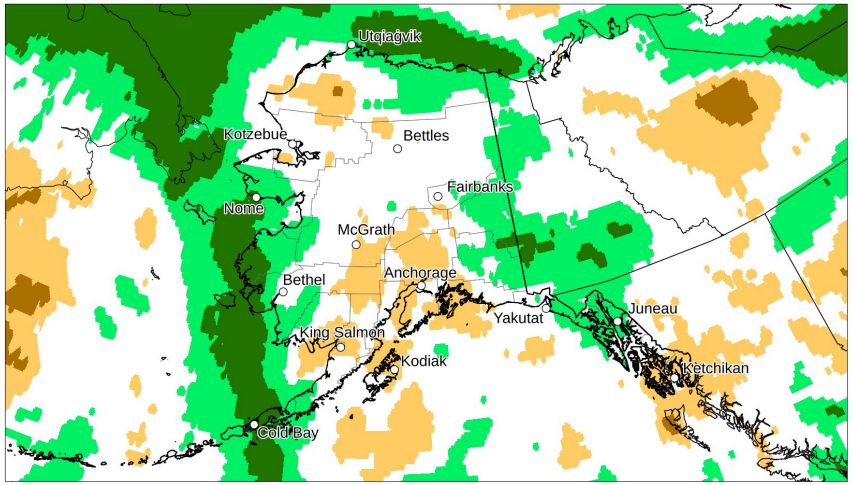
Map by: Brian Brettschneider

Much Below | Below | Near Normal | Above | Much Above

Compared to 1991-2020 Base Period

Model- based regional analysis ➢ **Total precipitation**

Precipitation Classification for Jan 2024



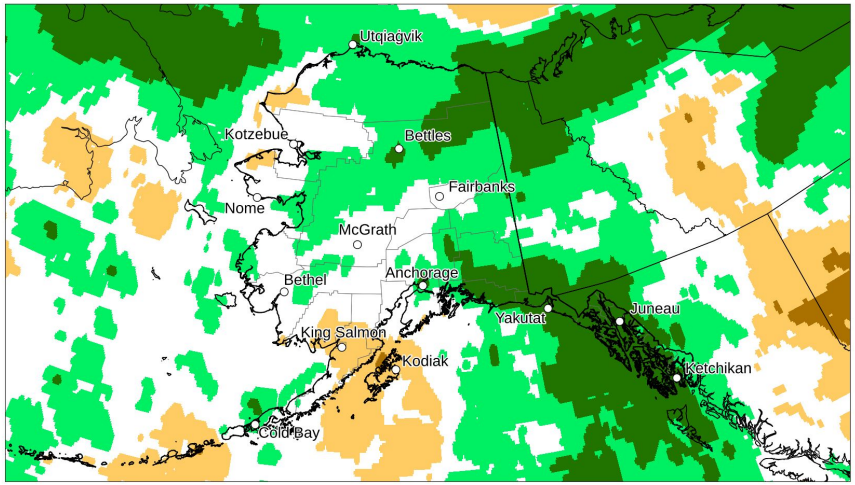
Source: ERA5 Reanalysis

Map by: Brian Brettschneider

Much Below | Below | Near Normal | Above | Much Above

Compared to 1991-2020 Base Period

Precipitation Classification for Nov-Jan 2023-24



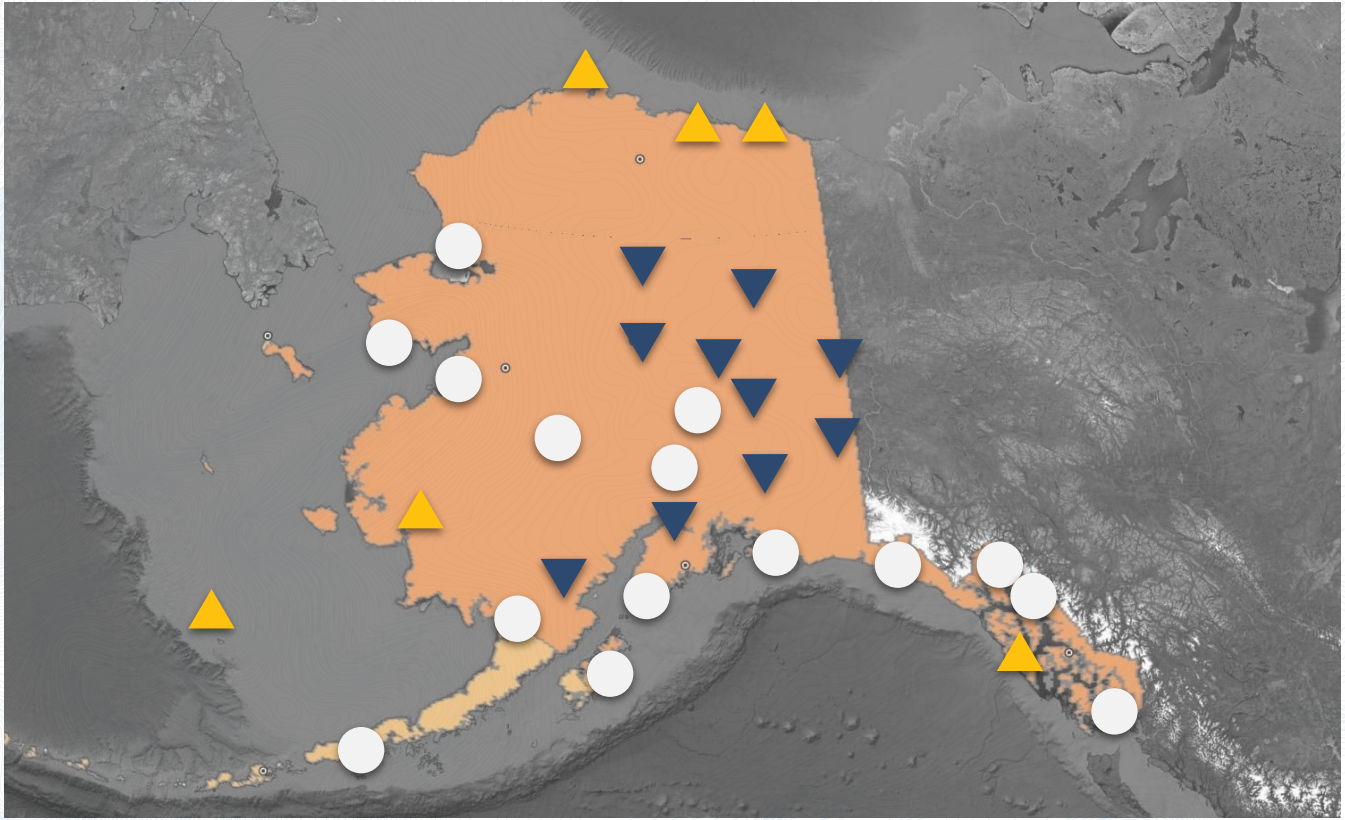
Source: ERA5 Reanalysis

Map by: Brian Brettschneider

Much Below | Below | Near Normal | Above | Much Above

Compared to 1991-2020 Base Period

January 2024 temperature ➤ CPC outlook and observed



Non-EC skill score: -26

Percent correct: 16%

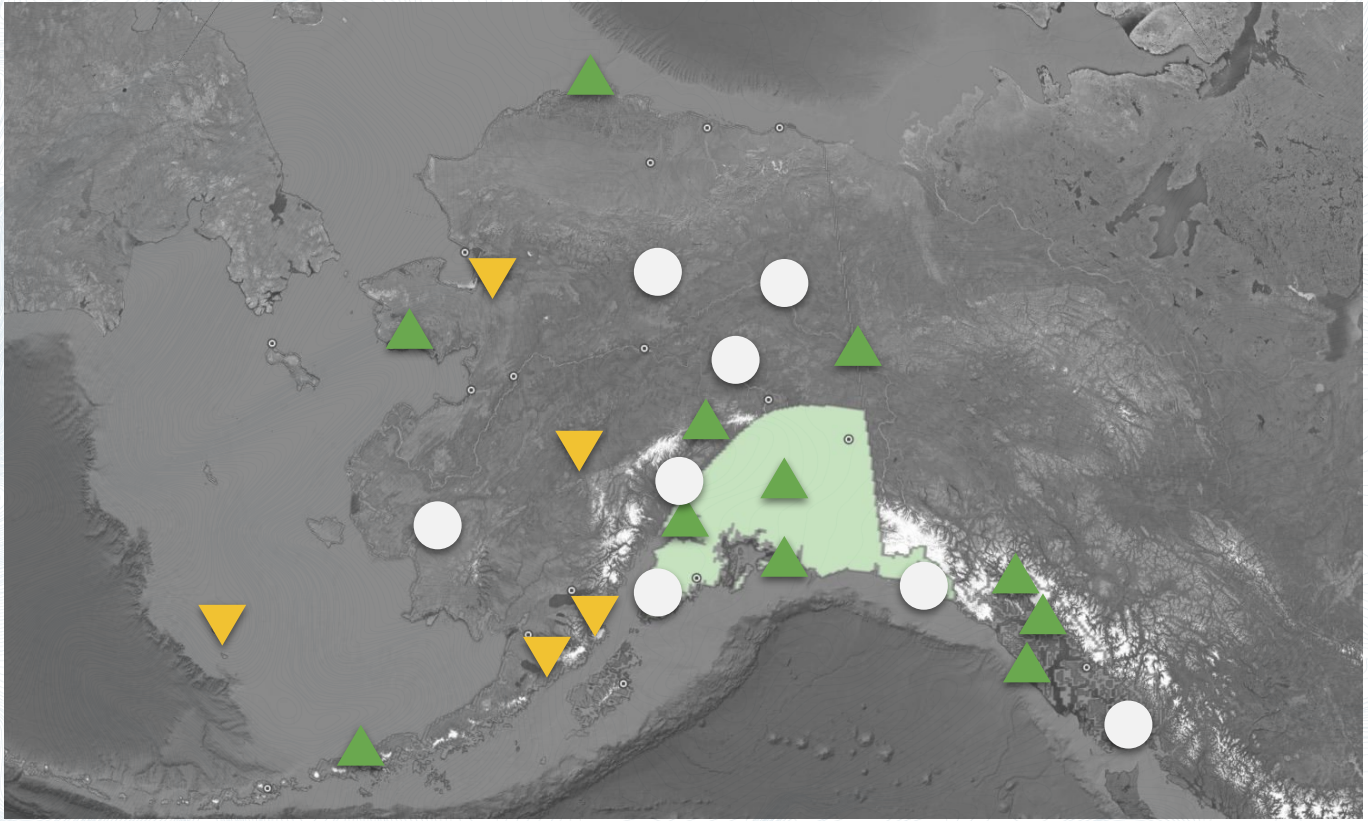
Mid-month outlook

Above normal

Near normal

Below normal

January 2024 precipitation ➤ CPC outlook and observed



Non-EC skill score: +40

Percent correct: 60%

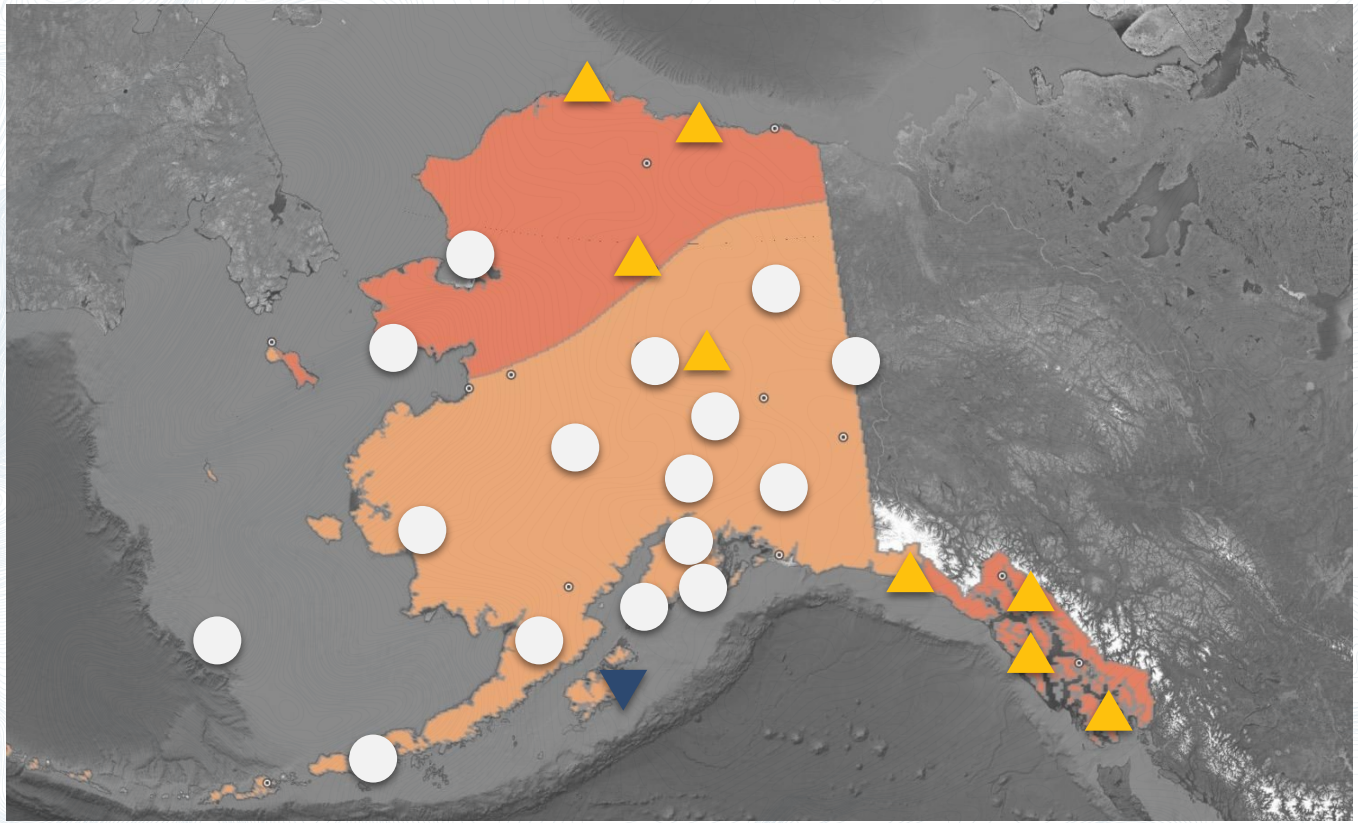
Mid-month outlook

Above normal

Near normal

Below normal

November 2023-January 2024 temperature ➤ CPC outlook & observed



Non-EC skill score: 0

Percent correct: 33%

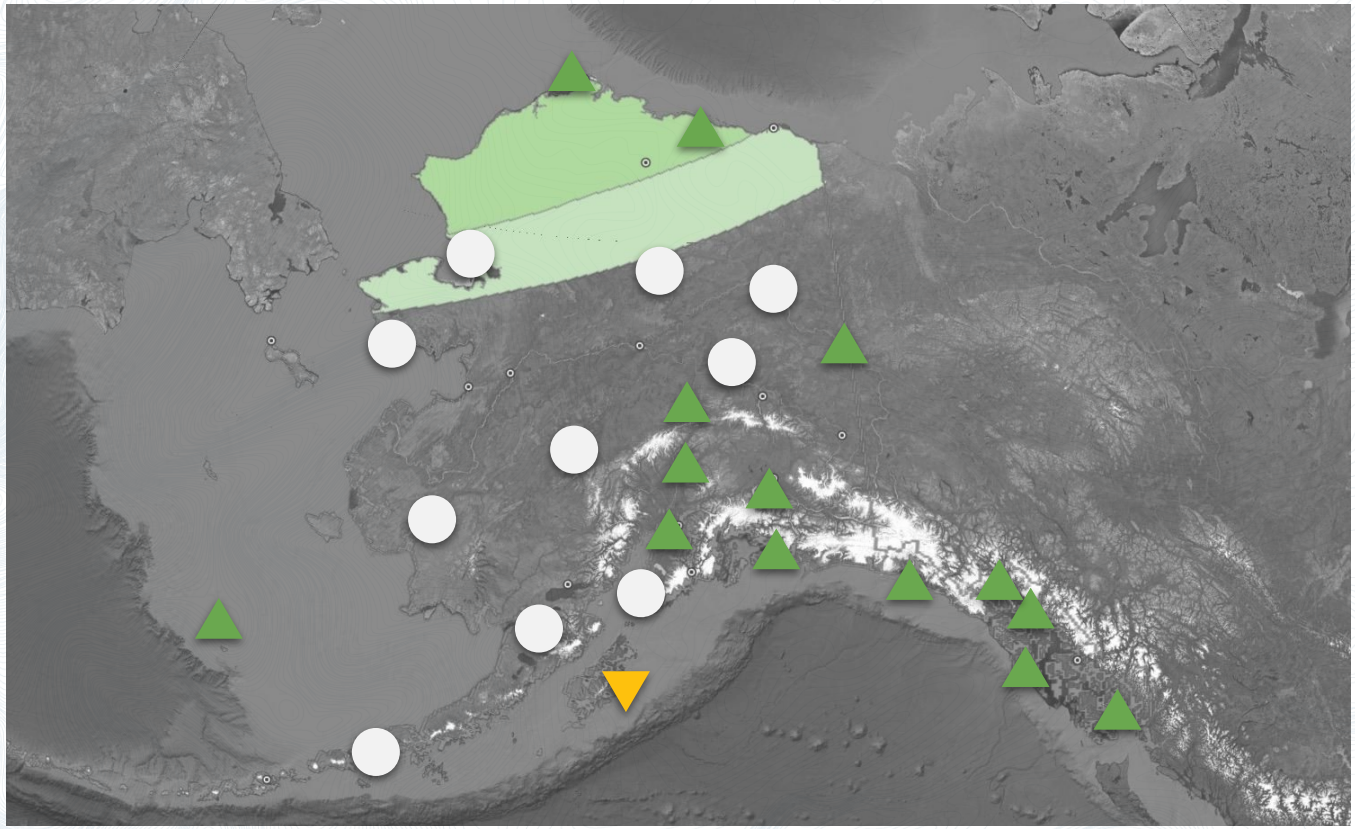
Mid-month outlook

Above normal

Near normal

Below normal

November 2023-January 2024 precipitation ➤ CPC outlook & observed



Non-EC skill score: +50

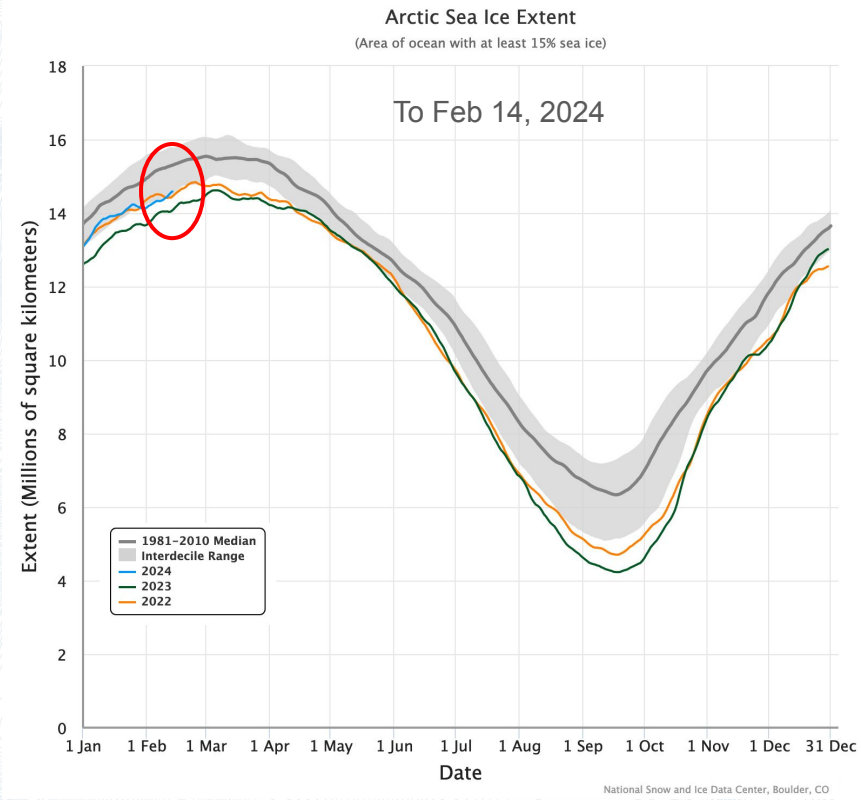
Percent correct: 67%

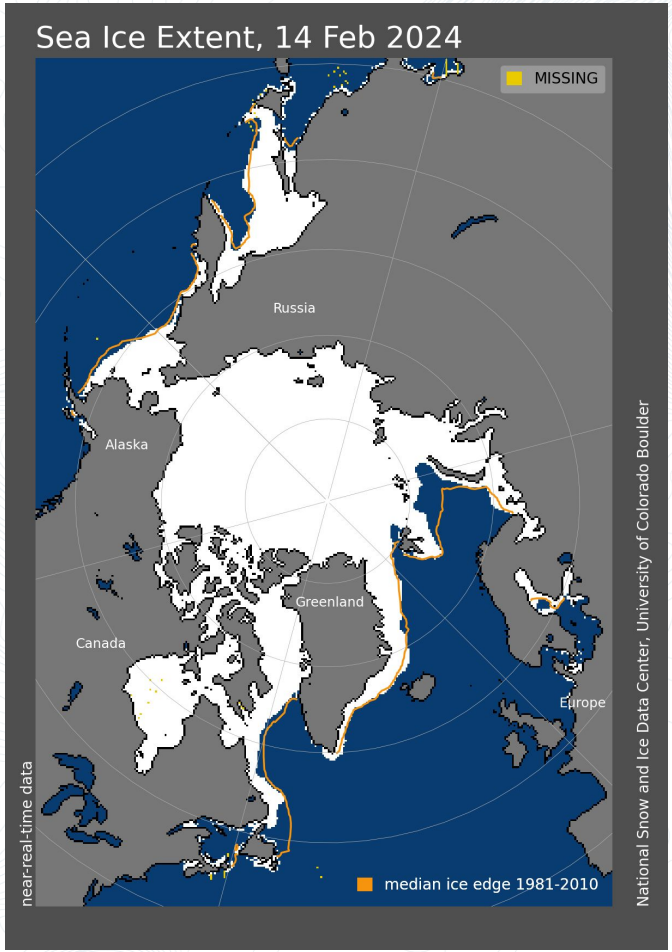
Above normal

Near normal

Below normal

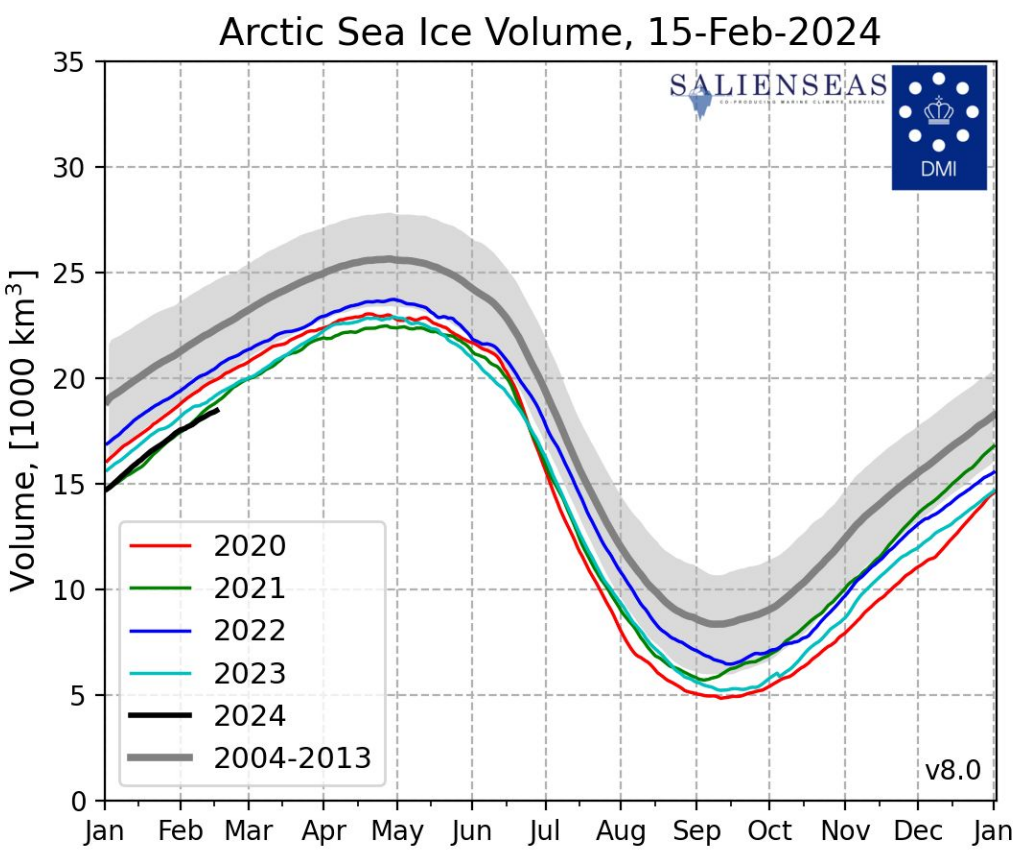
Arctic wide **sea ice**





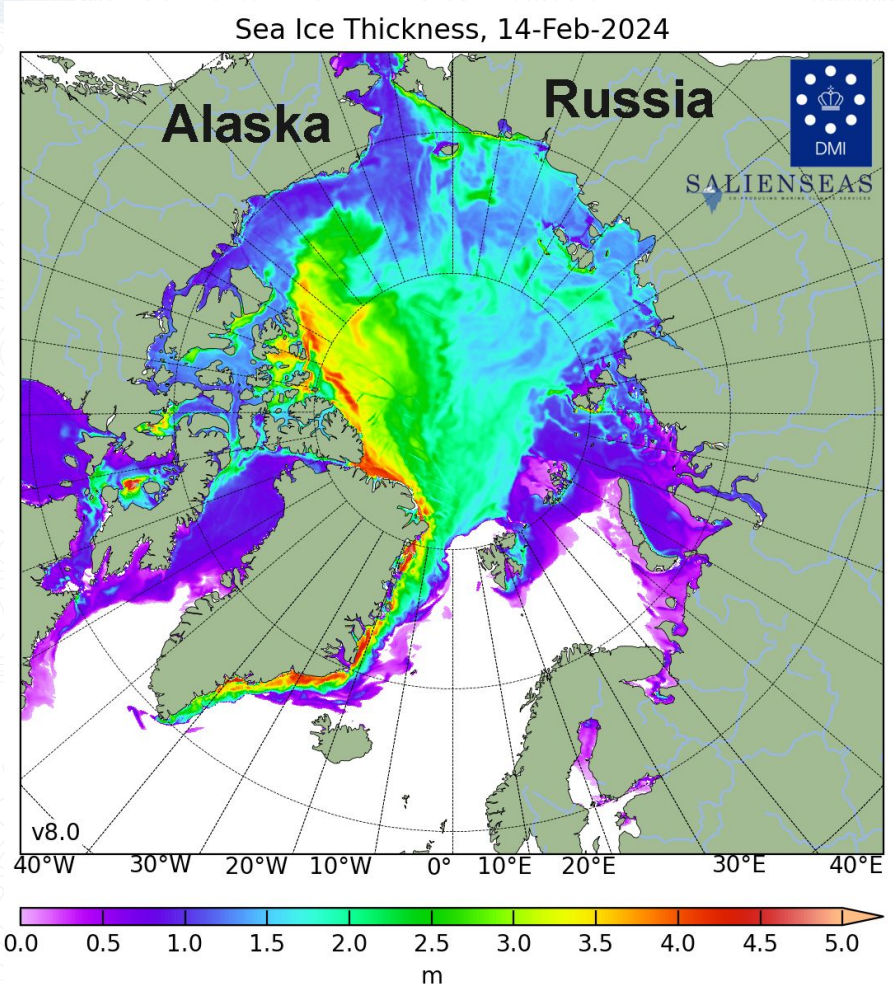
Arctic sea ice **volume**

Source:
Danish Meteorological Institute



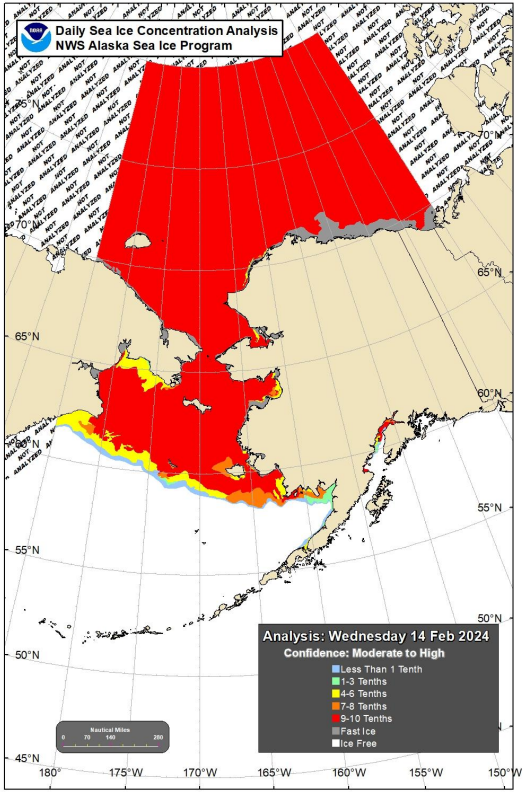
Arctic sea ice **thickness**

Source:
Danish Meteorological Institute

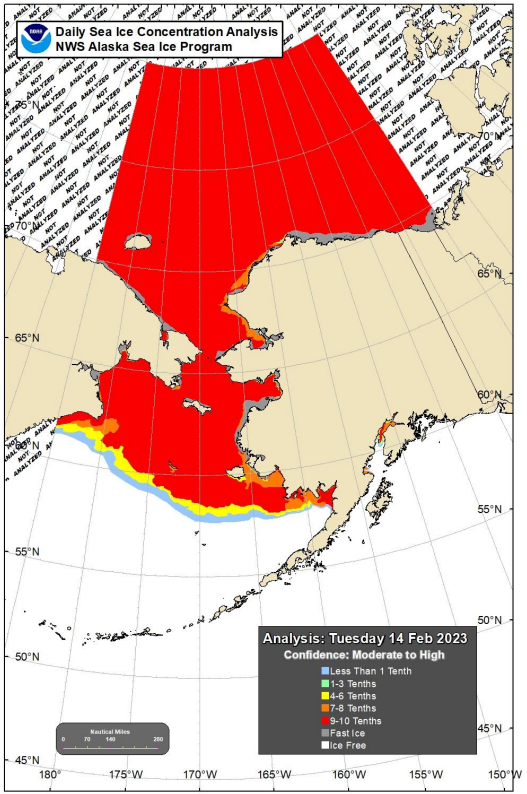


Mid-February sea ice comparison

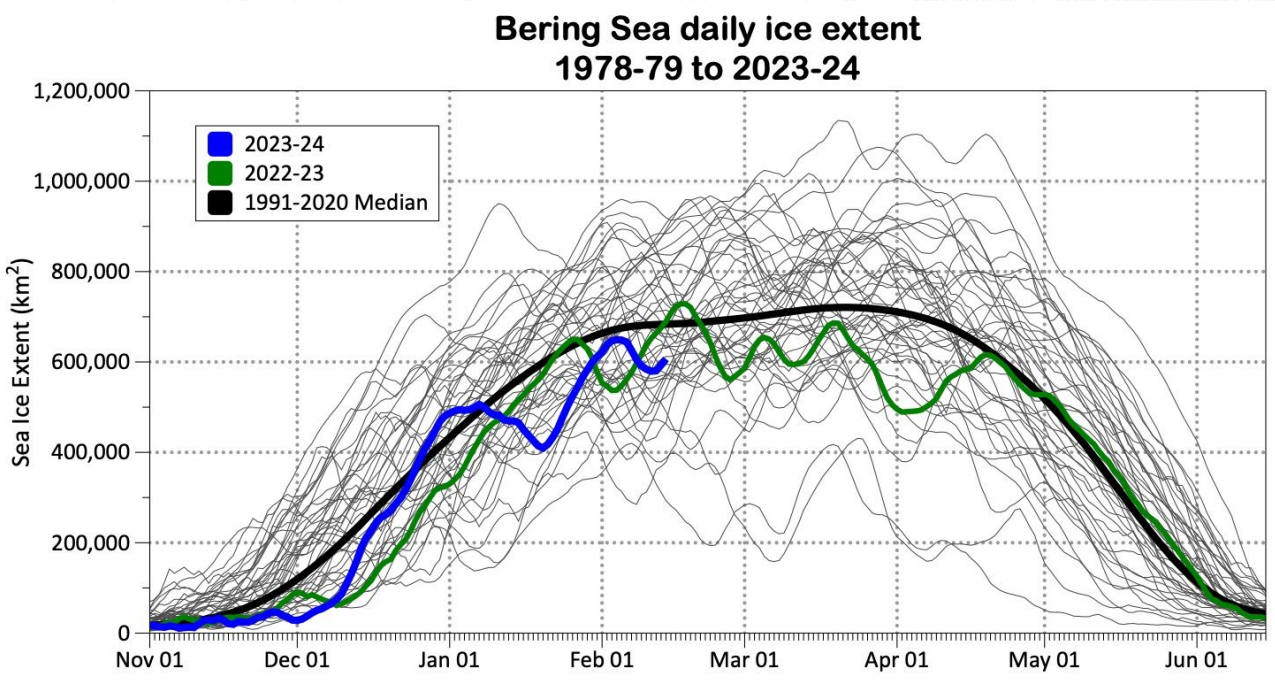
February 14, 2024



February 14, 2023

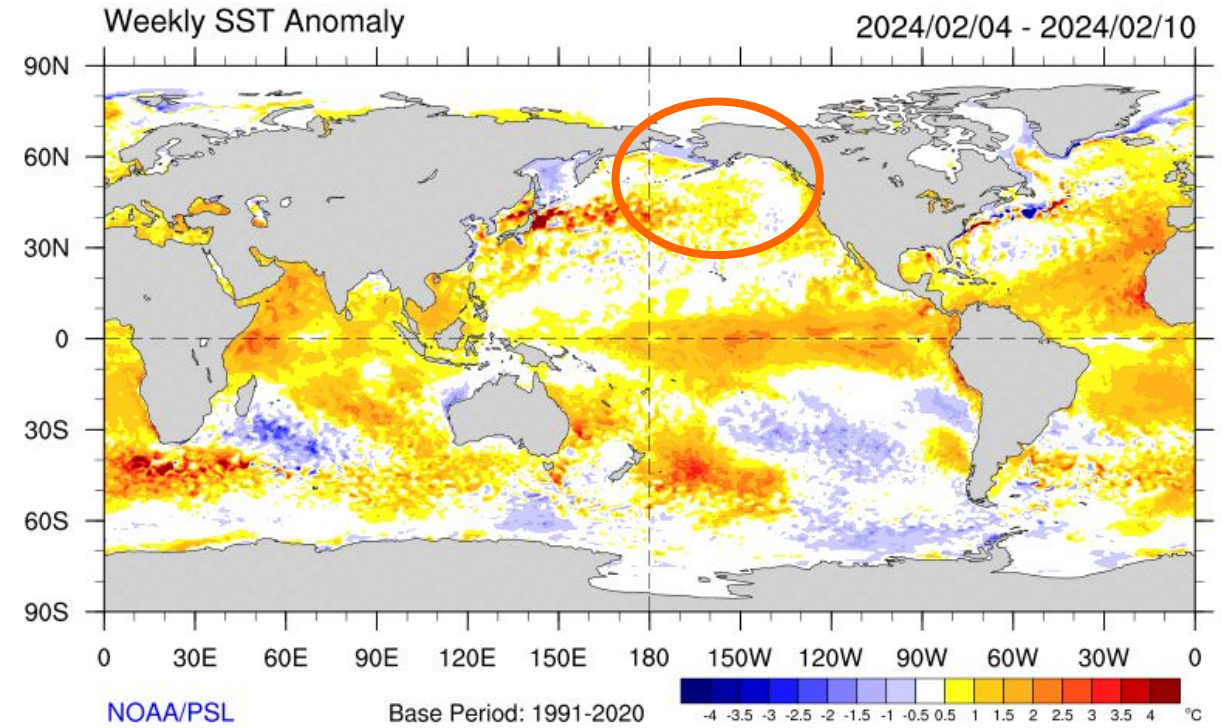


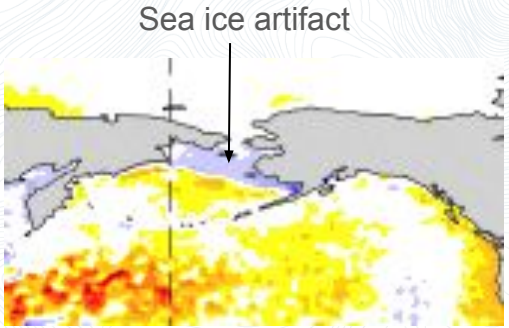
Sea ice extent **through the season**



Sources:
Data NSIDC Sea Ice Index, Version 3. Through Feb. 14, 2024.

Global sea surface temperature departure from normal

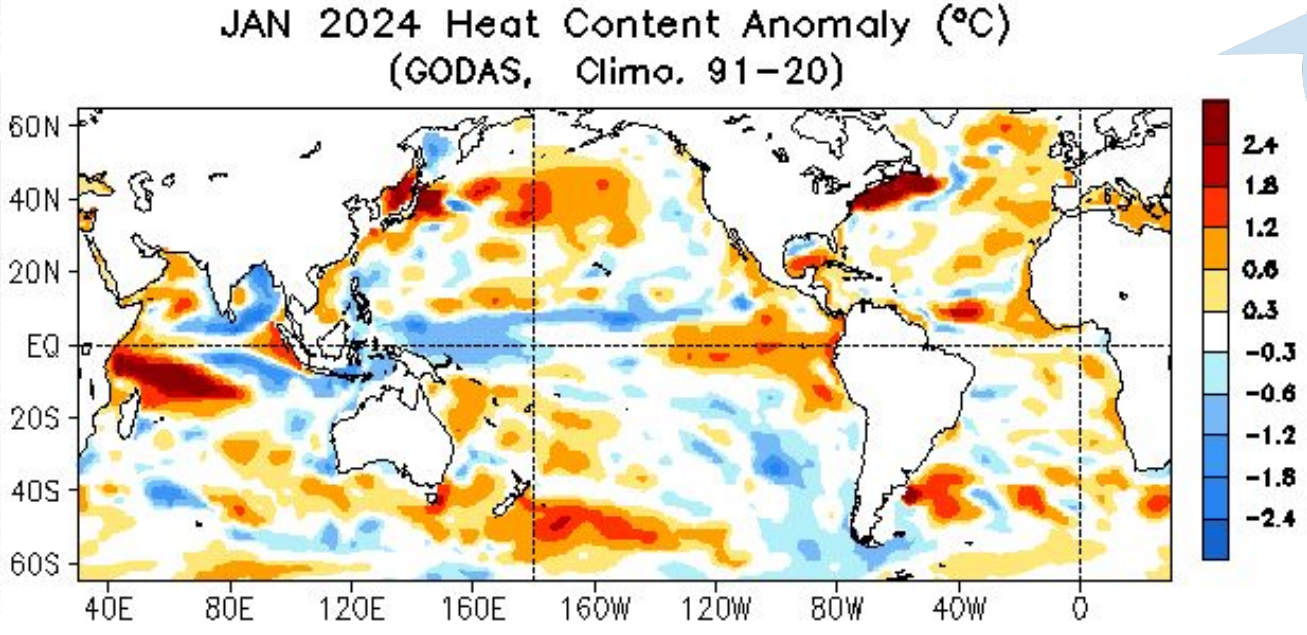




PDO for Jan 2024: -0.62

Sources: PDO Index from JMA

Upper **ocean heat** anomaly in upper 300 meters



Little change in Gulf of Alaska

Sources:
CPC

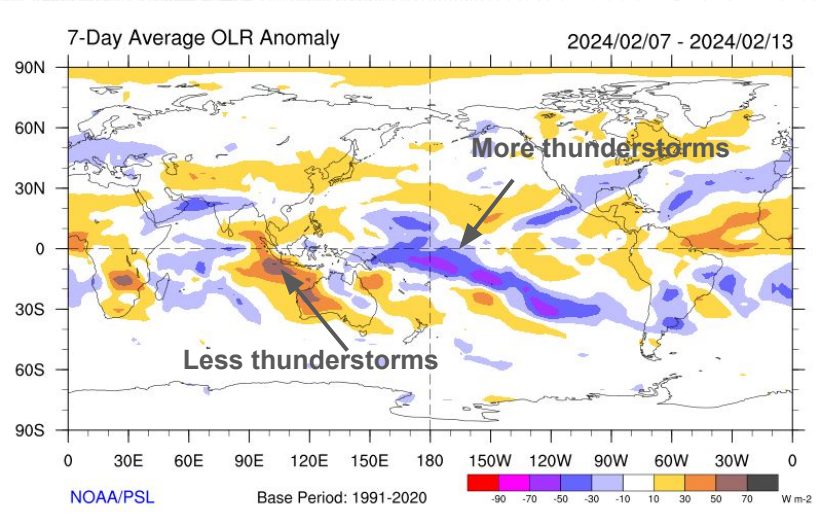
Tropical Pacific atmosphere

Nov 2023-Jan 2024 Oceanic Niño Index: +2.0

Only 4th El Niño past 50 years that strong

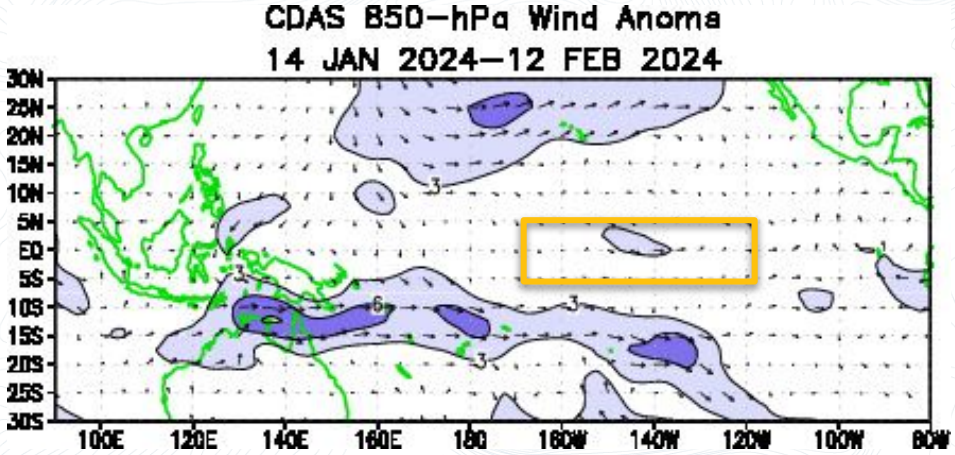
Deep tropical convection

Via “outgoing longwave radiation”

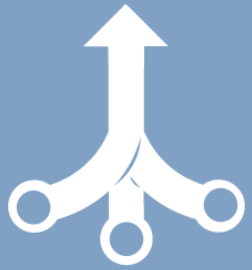


Trade winds weaker

than average, Niño Region 3.4



Behind the climate forecast



El Niño/La Niña (ENSO) ➤ expert evaluation

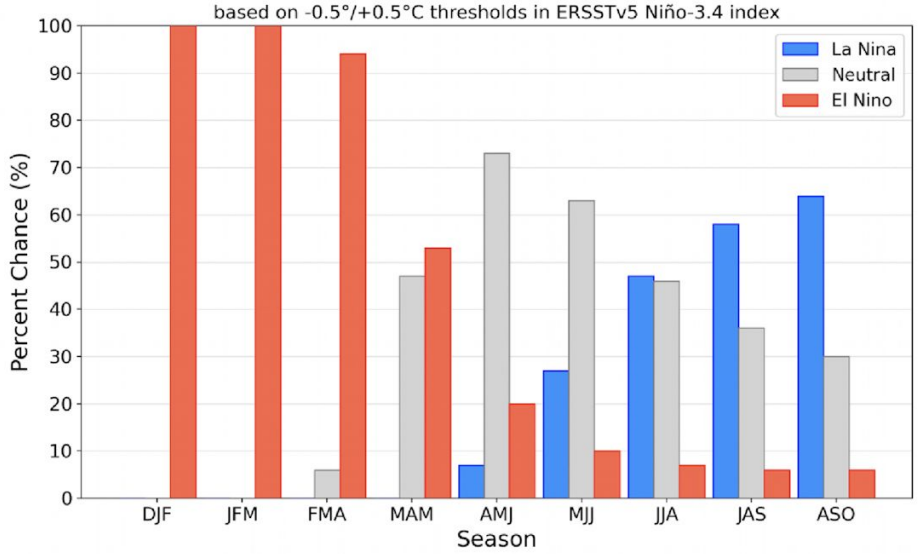
Statistical ➤ using the past

Dynamical models ➤ All physics, all the time

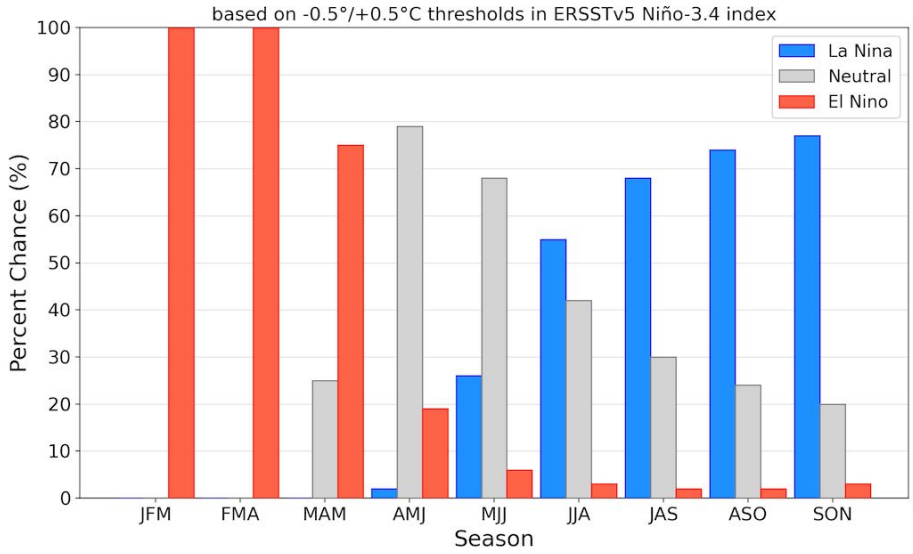
- Sea surface temperatures
- Temperature & precipitation
- Sea ice

CPC **Niño 3.4 forecasts** ➤ experts

January 2024
Strong El Niño reached early autumn (ASO)



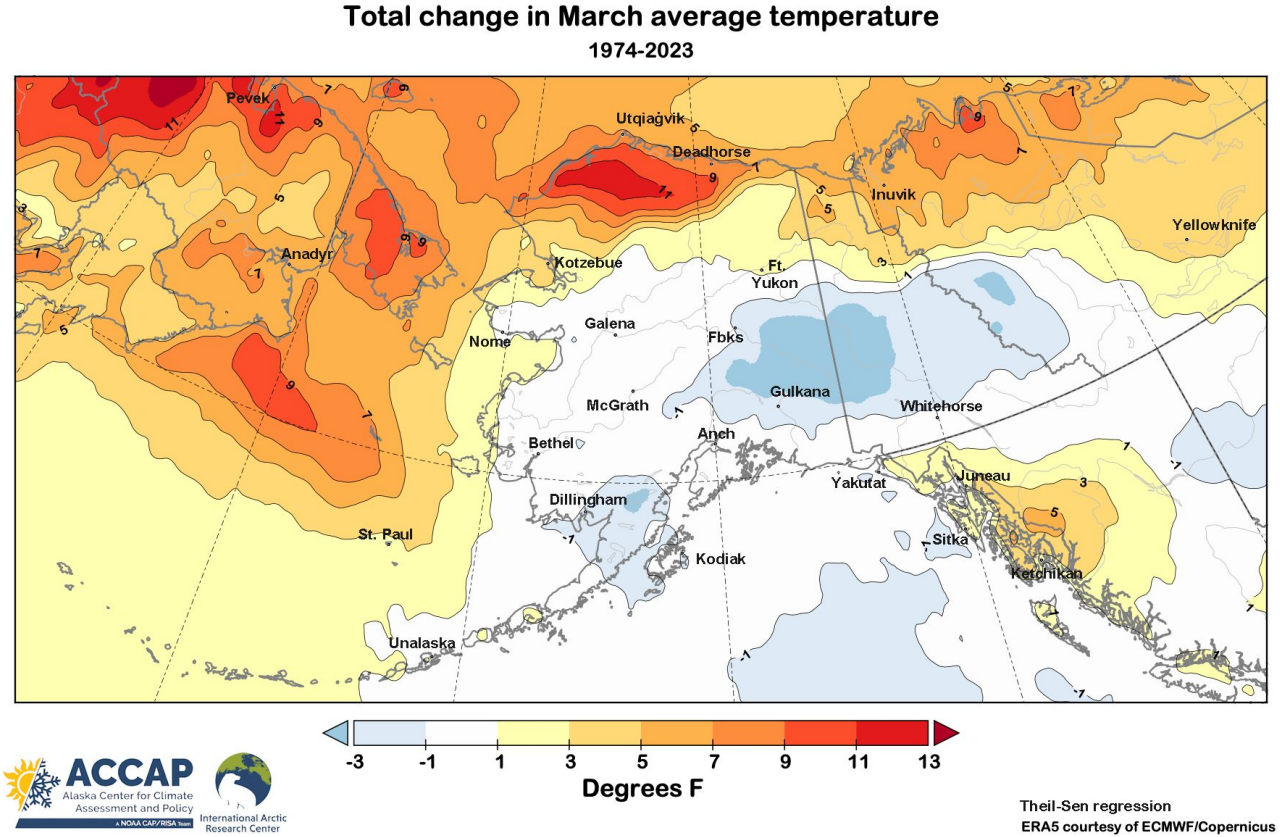
February 2024
El Niño weakening rapidly next few months 2024
ENSO Alert System Status: El Niño Advisory



Statistical guidance ➤ using the past to predict the future

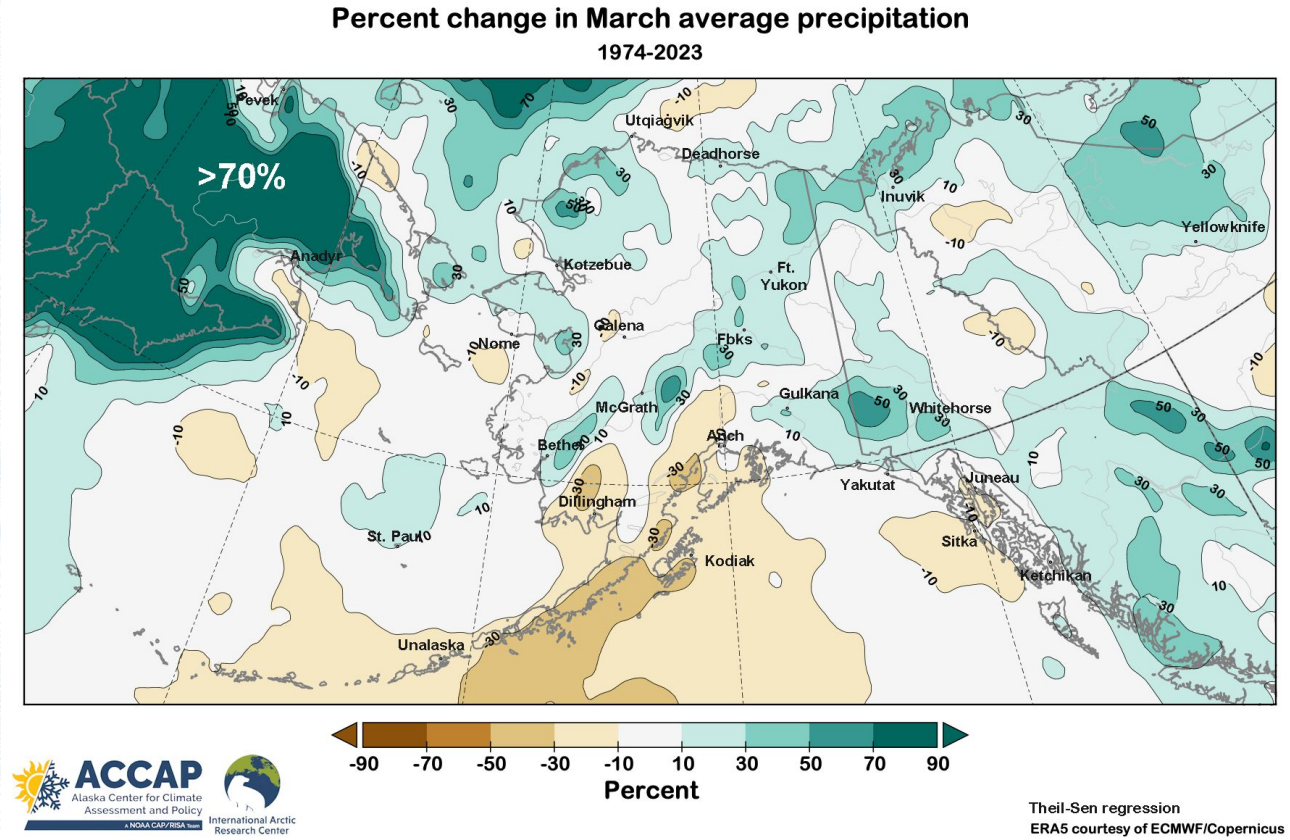
- Long term trends
- Optimum climate normals: Alaska trends the past 15 years
  - Update to new normals means OCN less informative next few years
- Past El Niño events

March half century trends ➤ **Temperature**



Trend over 50 years

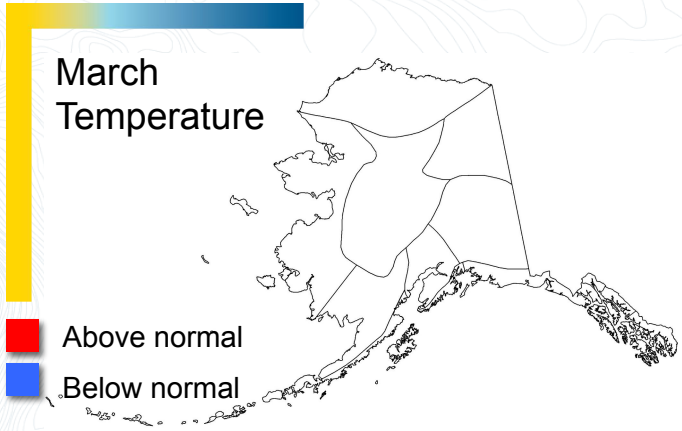
March half century trends ➤ **Precipitation**

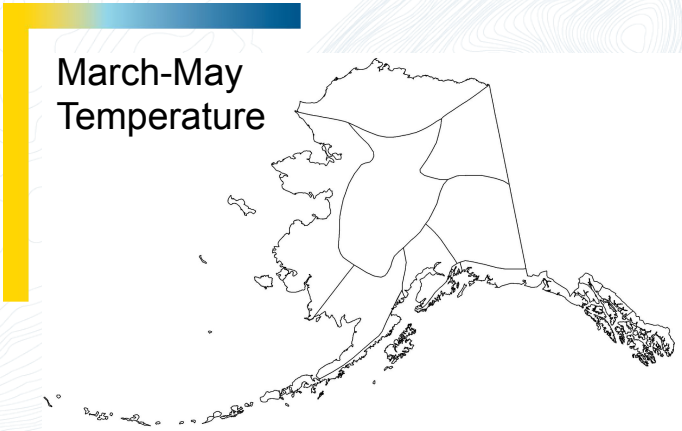


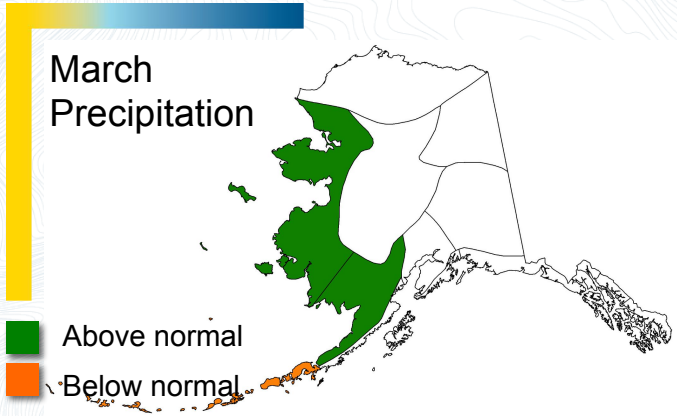
Trend over 50 years

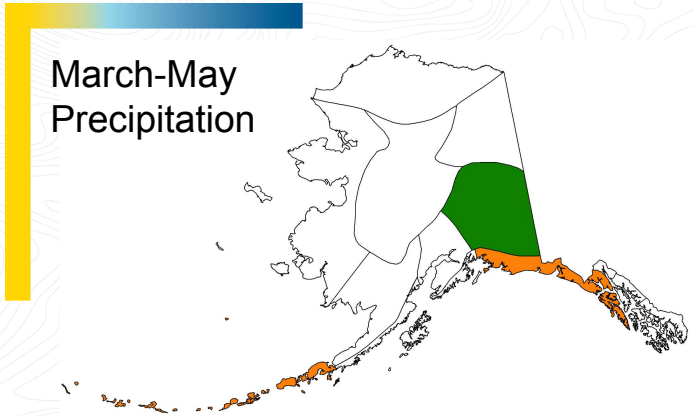
2009 to 2023 **trends**

Past 15 years compared to 1991-2020



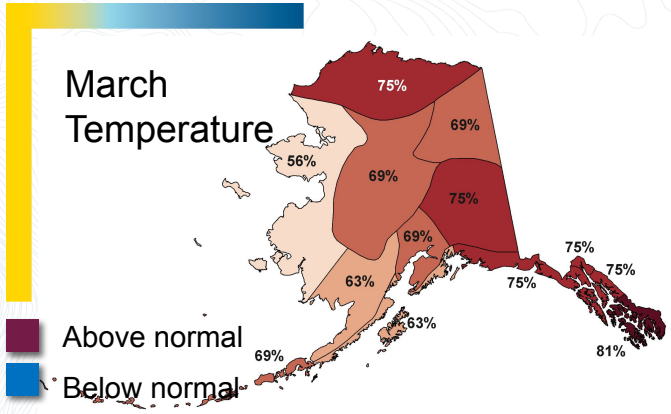


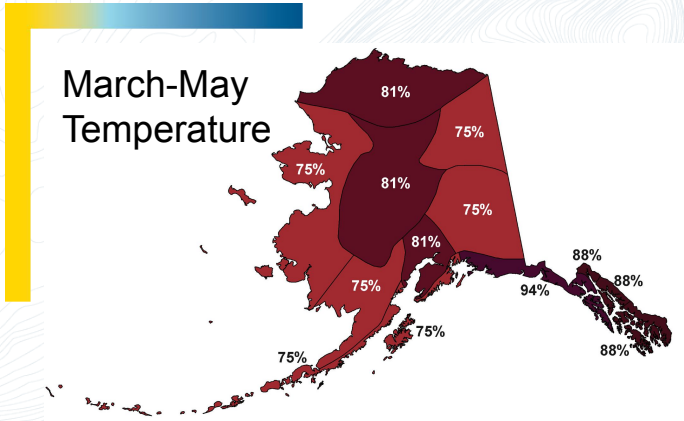


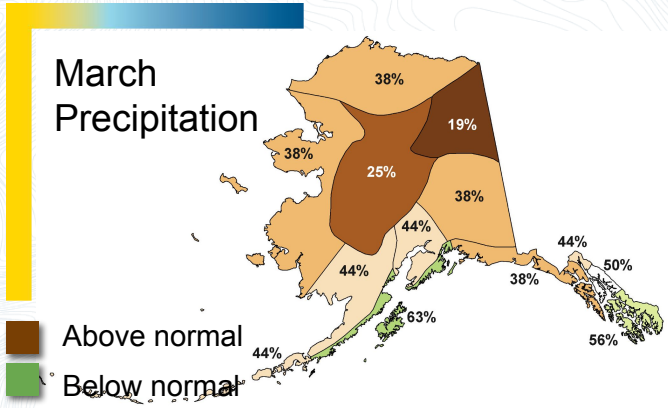


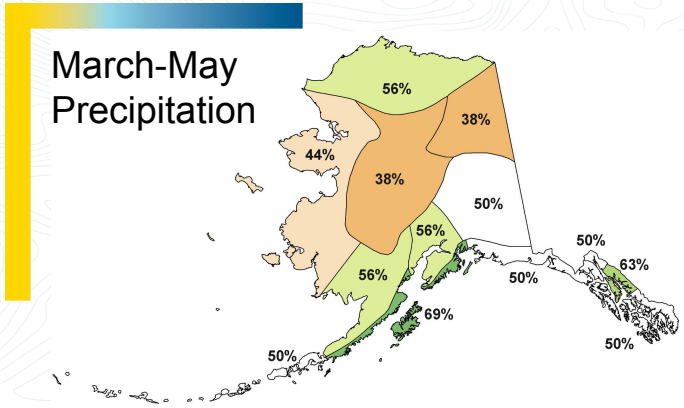
16 El Niño since 1976

Percent years above average









Dynamic model forecasts

Current suite of Dynamic Climate Models

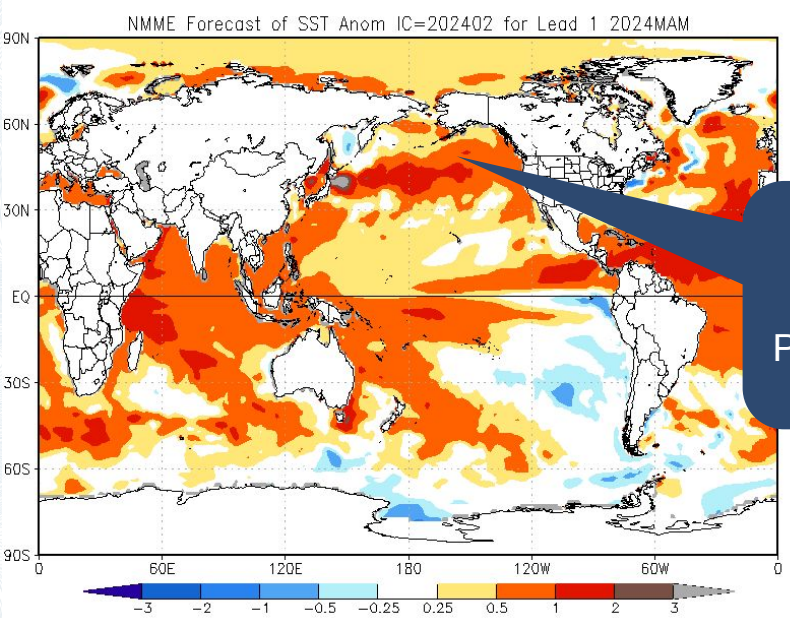
- CPC Experimental Sea Ice Ensemble
- World Climate Service Multi-Model Ensemble
- North American Multi-Model Ensemble (NMME)

What's being forecasted

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

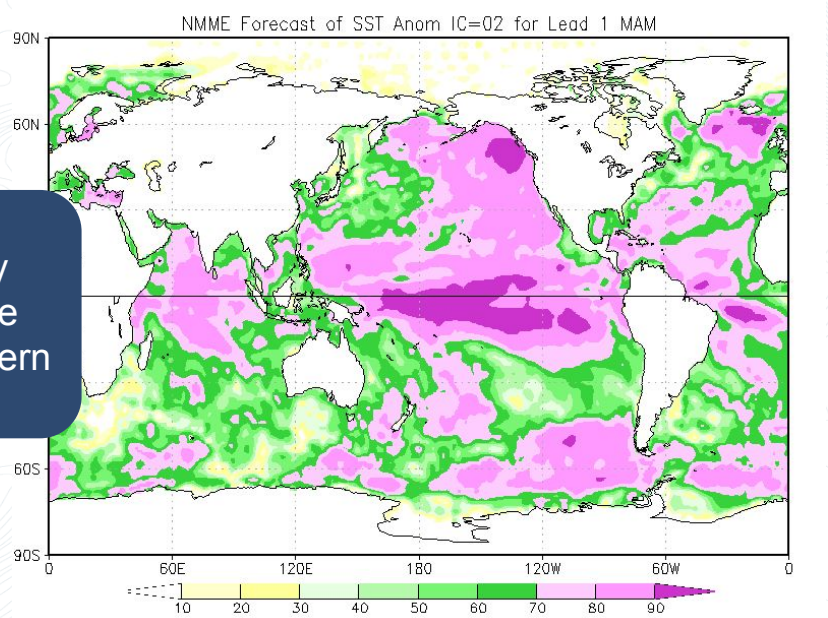
March to May 2024 **sea surface temperature** ➤ NNME

Forecast
departure from normal

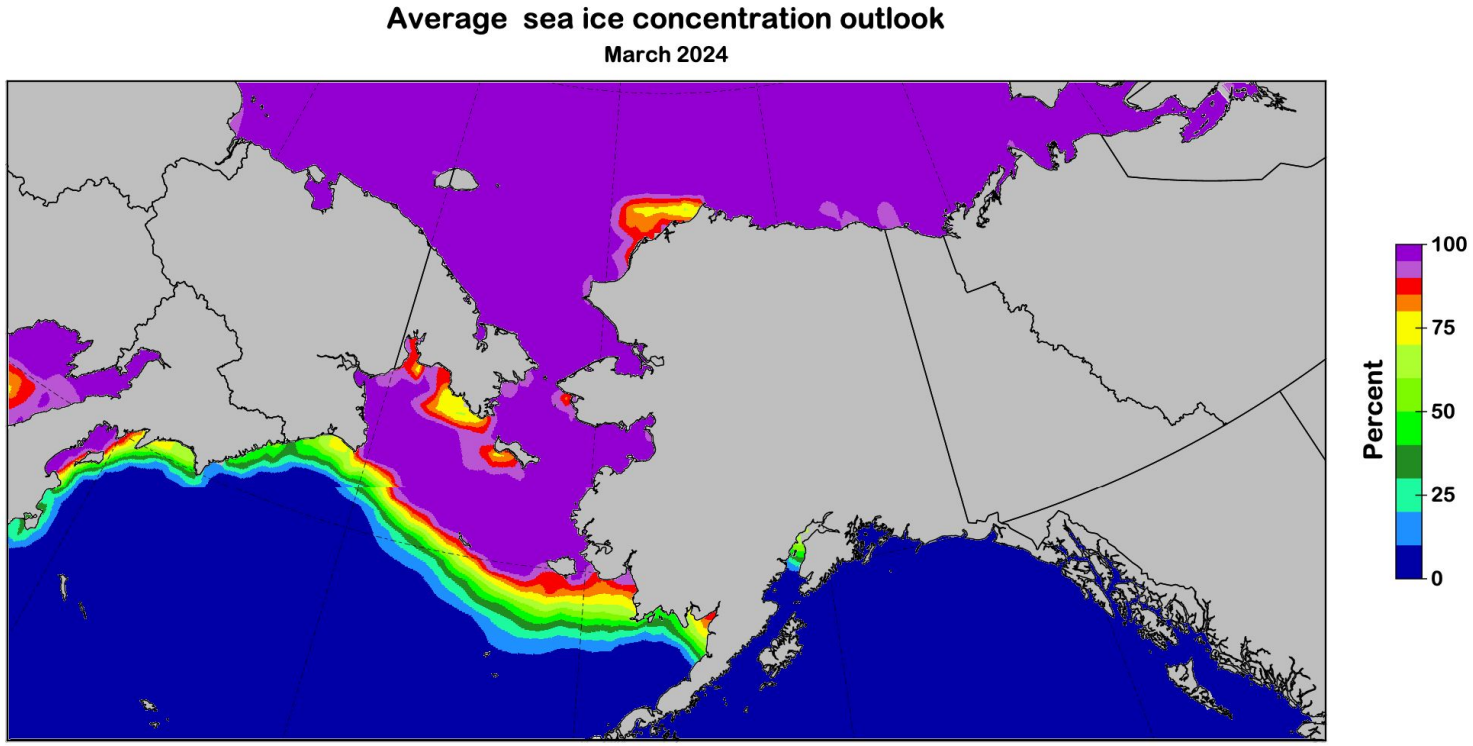


Weakly negative PDO pattern

Skill
of the forecast



Experimental **sea ice forecast** ➤ CPC

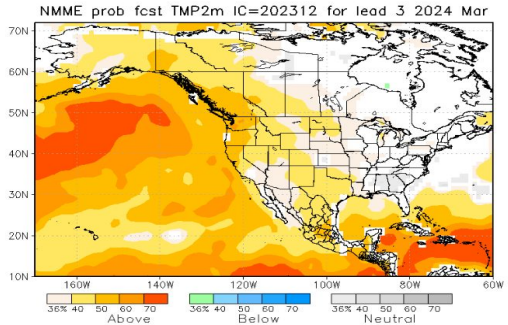


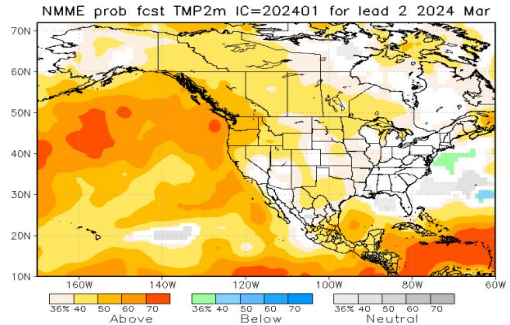
Late January outlook

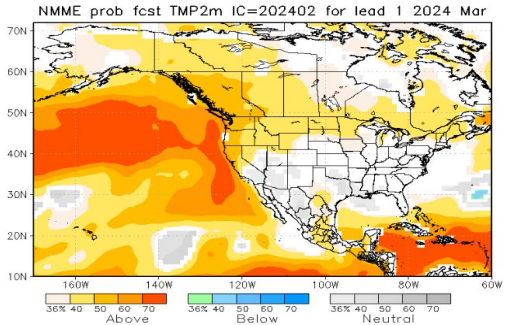
March 2024 calibrated **probability forecast** ➤ NNME

Forecast from → December January February

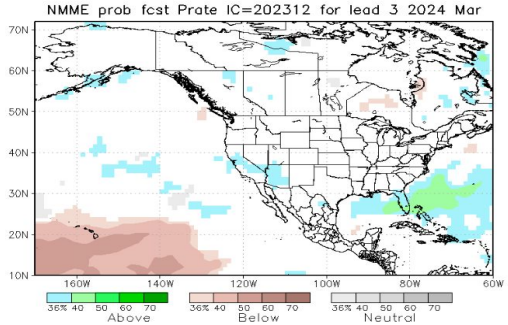
Temperature

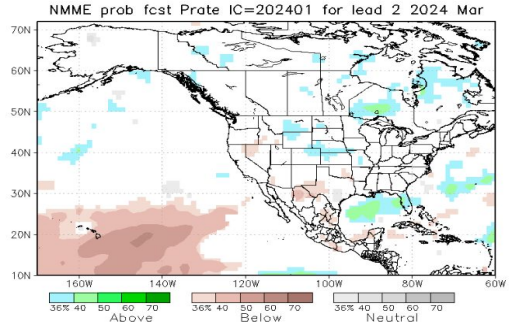


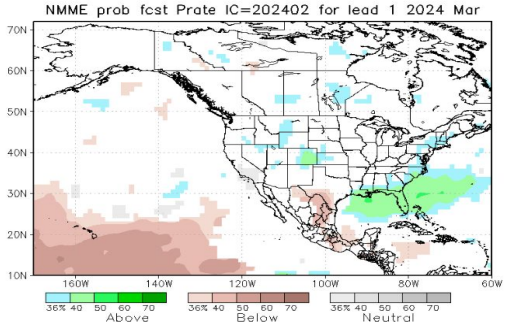




Precipitation

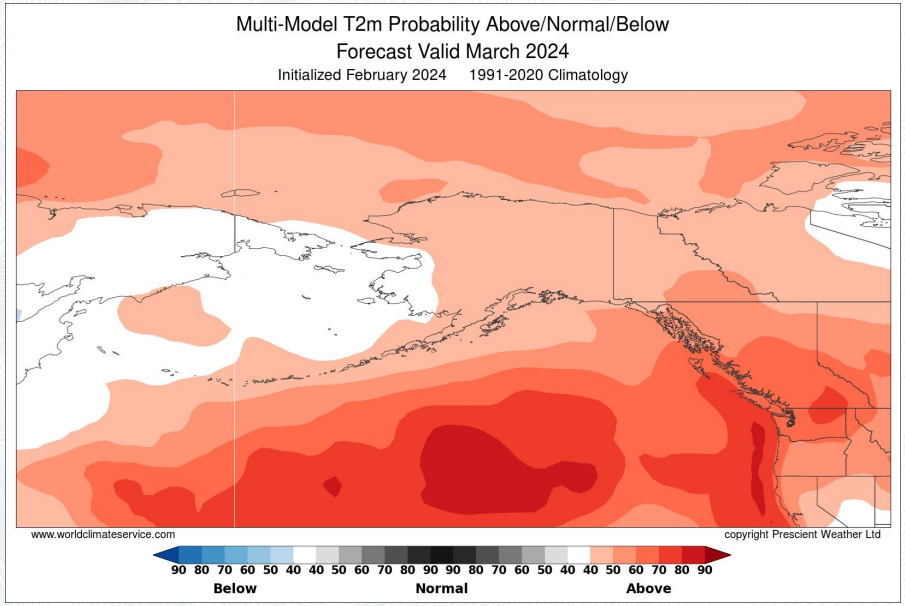




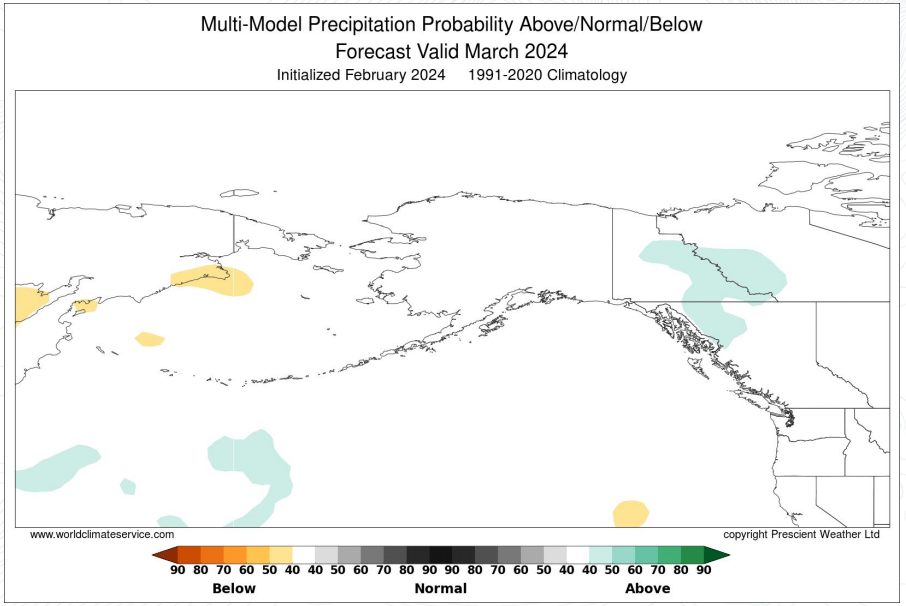


March 2024 outlooks ➤ **World Climate Service**

Temperature



Precipitation

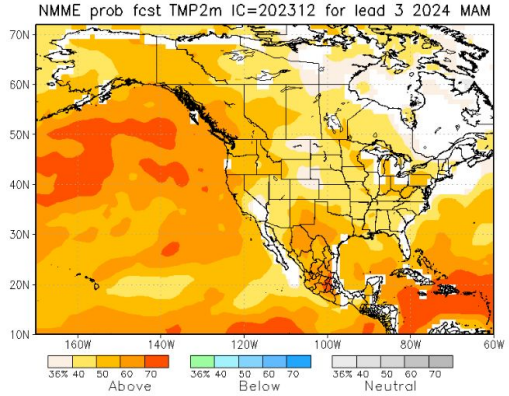


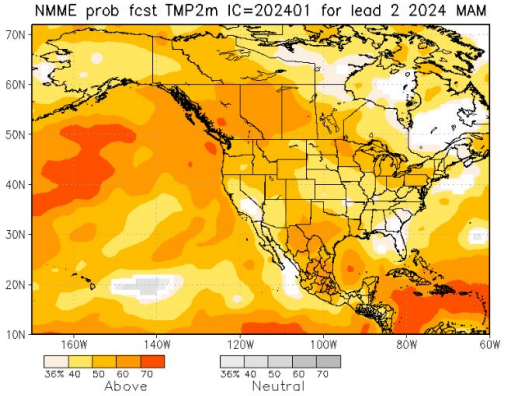
Bias Corrected, Skill Weighted CFS + ECMWF

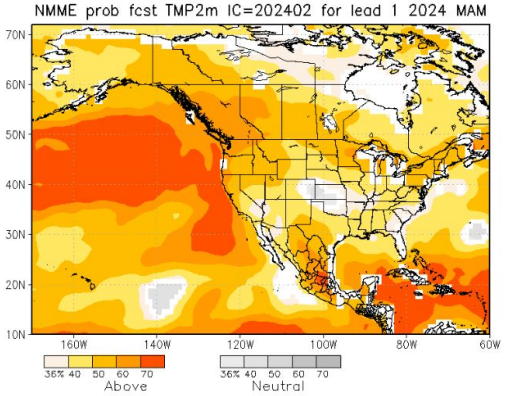
March-May 2024 calibrated **probability forecast** ➤ NNME

Forecast from → December January February

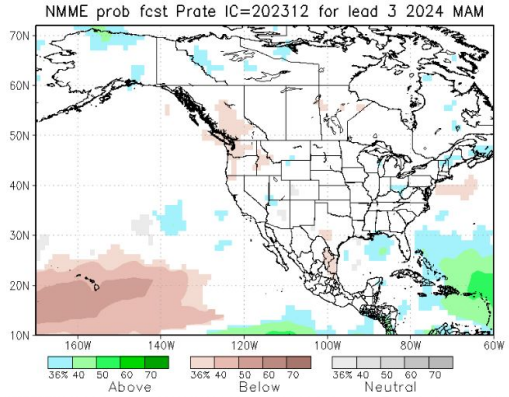
Temperature

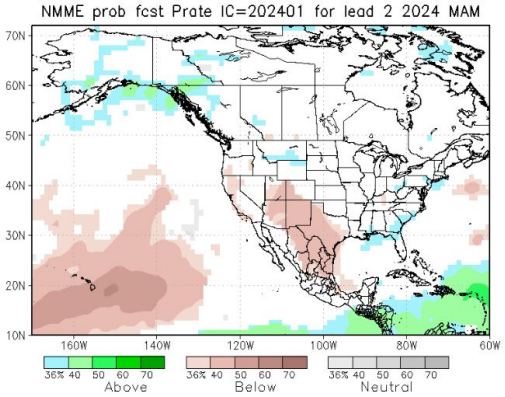


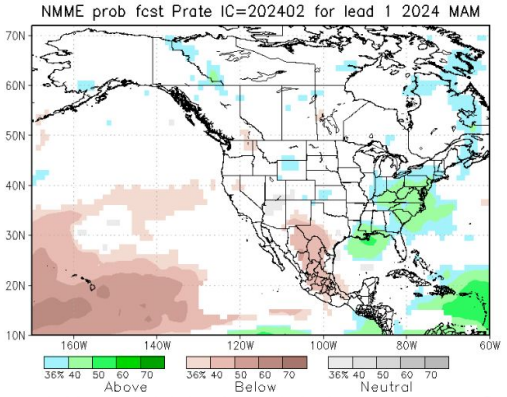




Precipitation

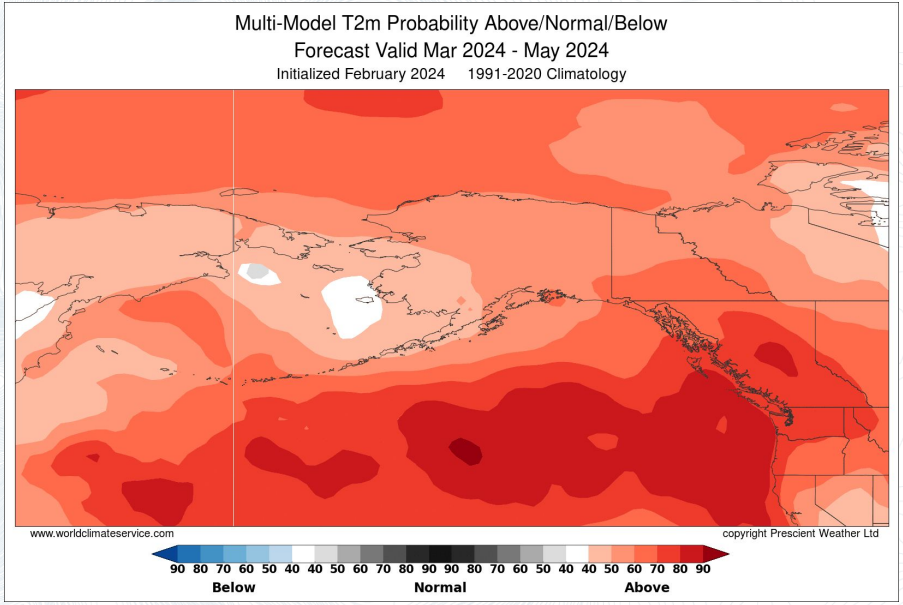




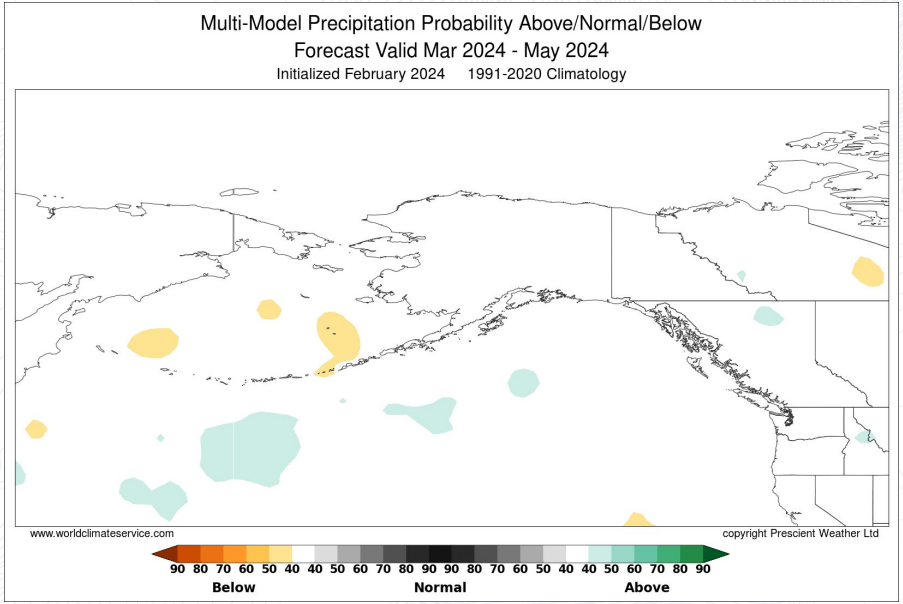


March-May 2024 outlooks ➤ **World Climate Service**

Temperature

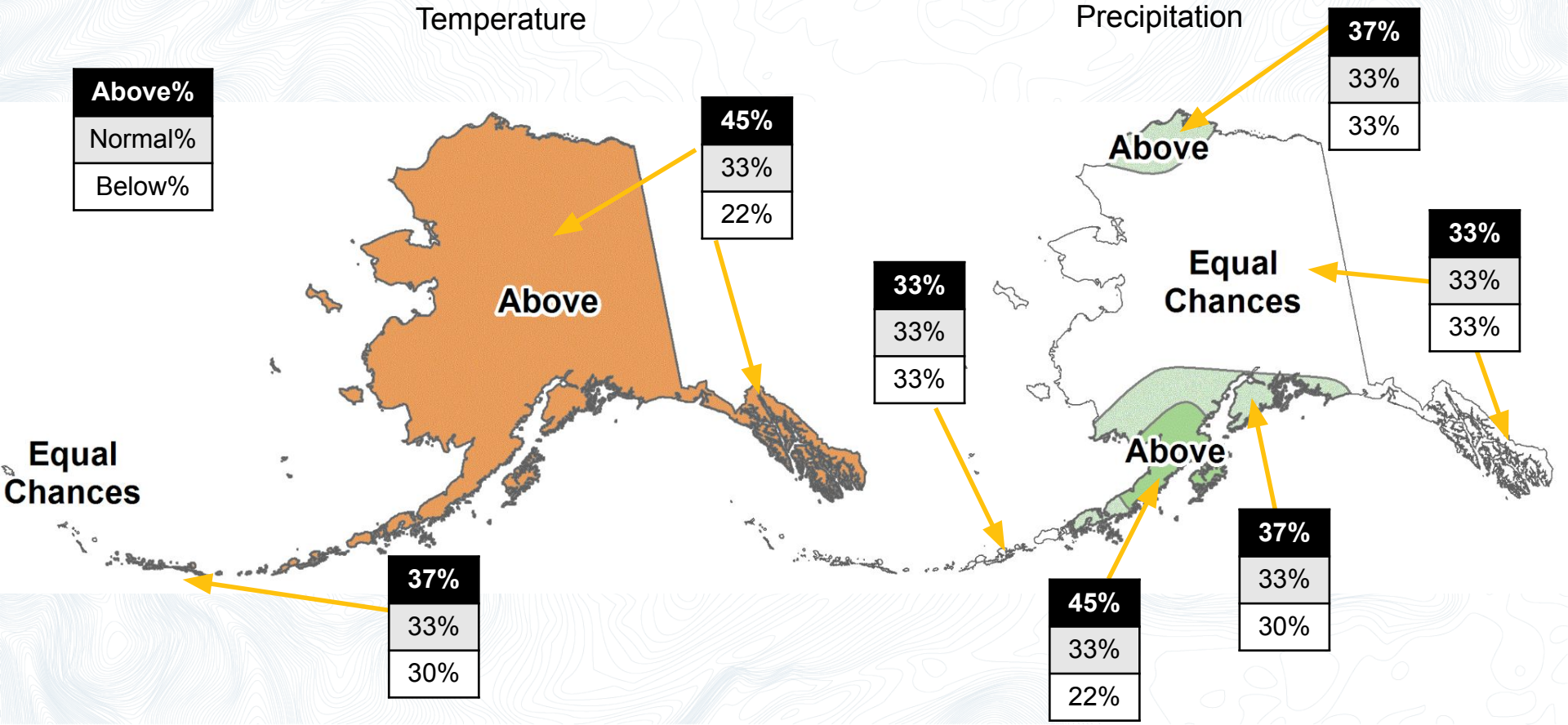


Precipitation



Bias Corrected, Skill Weighted CFS + ECMWF

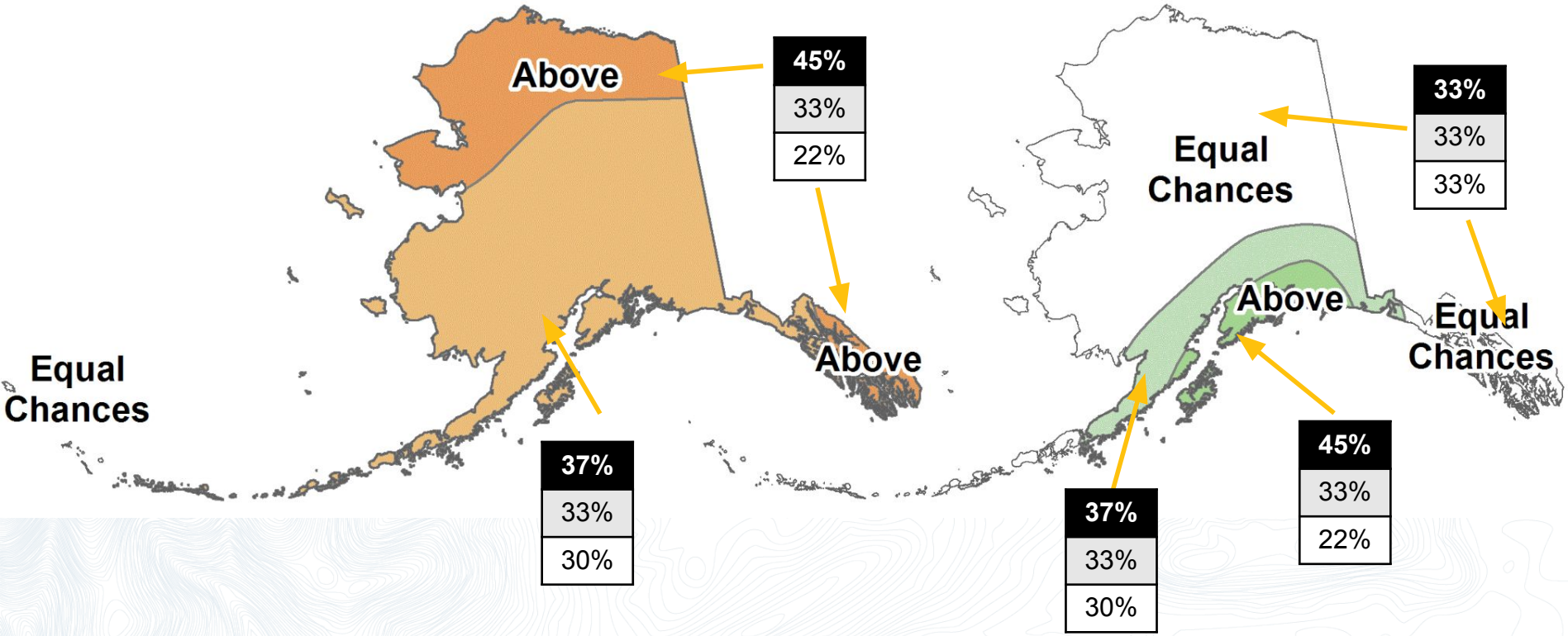
March-May 2024 outlooks from **January**



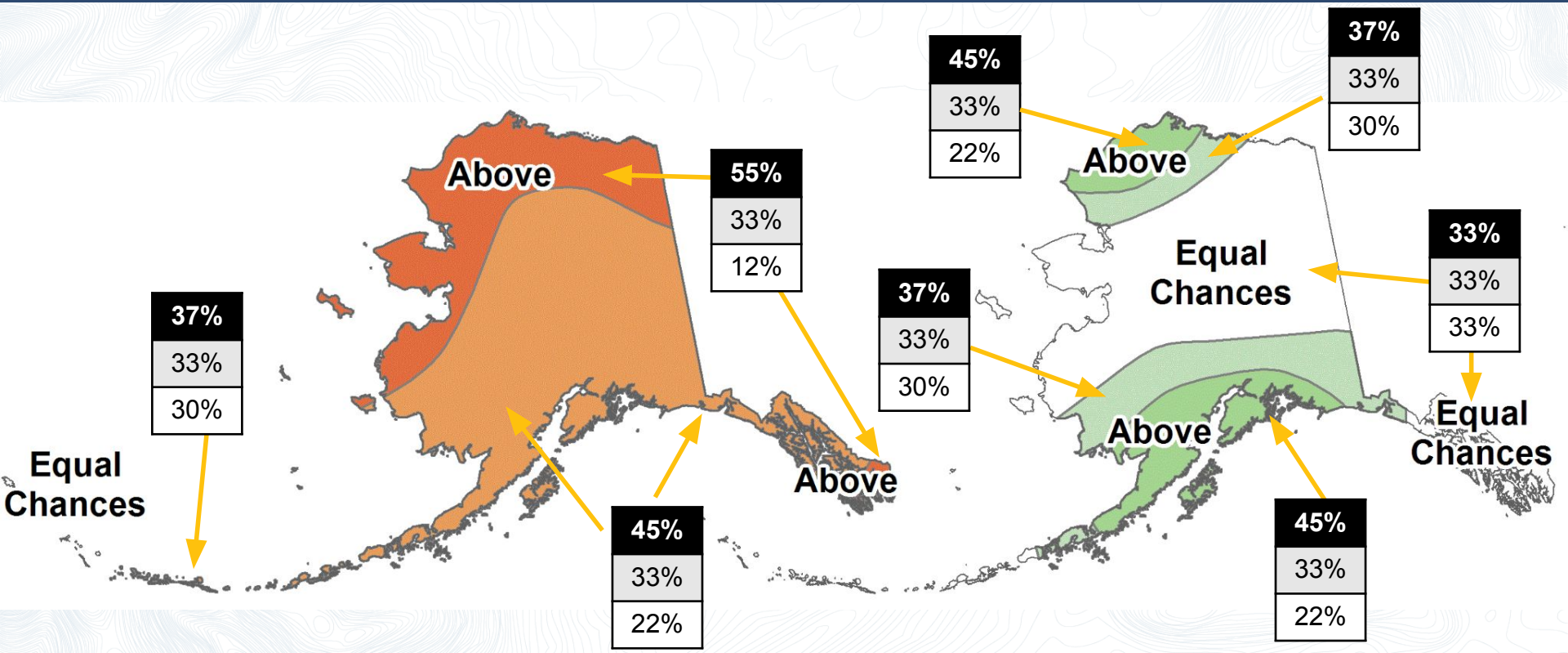
Future outlook

And the answer is...

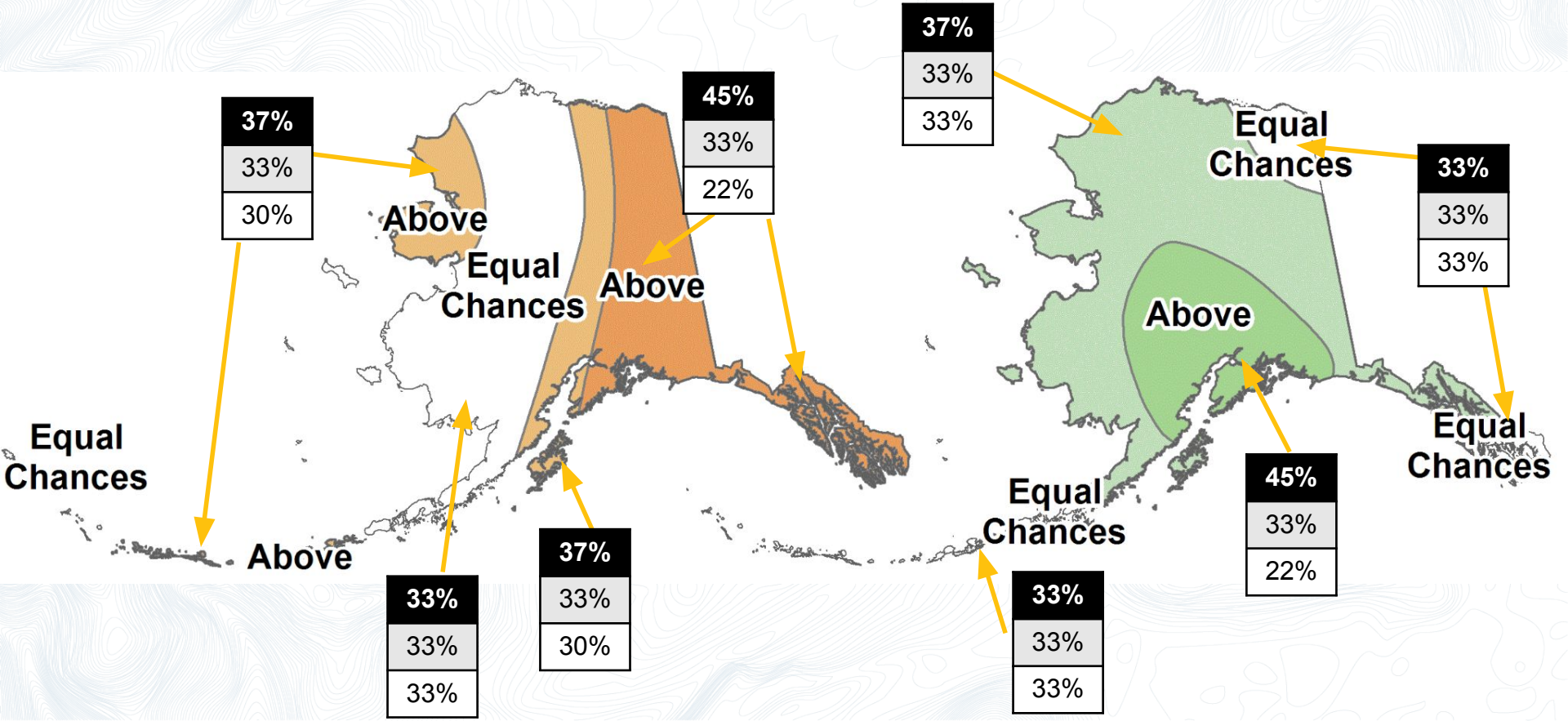
CPC **March** 2024 **outlooks**



CPC **March-May** 2024 **outlooks**



First look at **Summer 2024**



Upcoming ACCAP webinars

Upcoming ACCAP webinars accap.uaf.edu/events

- February 27 ▸ Southeast Alaska Precipitation
- March 22 ▸ NWS Climate Outlook Briefing

Email Rick Thoman rthoman@alaska.edu

TUE
27

February 27 @ 11:00 am to 12:00 pm AKST

Extreme Precipitation in Southeast Alaska: Visualizing Climate Modeling with a Storymap

Speakers: Zav Grabinski and Richard Lader, International Arctic Research Center Learn about the latest precipitation models for southeast Alaska in a visually captivating format. These models, a product of the...

ACCAP Alaska Center for Climate Assessment and Policy
A NOAA CAP/RISA Team

International Arctic Research Center

UAF UNIVERSITY OF ALASKA FAIRBANKS

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