Monthly feature: Wildfire 2024
Climate forecast 101
Climate review and forecast report card
Behind the climate forecast
Future outlooks
Monthly feature ➤ July Rain!

- Extreme Precipitation
  - Northwest Arctic Borough July 2-3rd: two to three inches rain lower Noatak valley
  - Nome: 5.44 inches July 1-15, highest any early July
  - Anchorage: 2.28 inches July 13-14, 7th highest two-day total on record (since 1953)

- Daily record precipitation in July
  - Utqiagvik, Kotzebue, Nome, Bethel, McGrath, Anchorage, Kenai, Cordova, Yakutat, Sitka, Juneau

- Fairbanks: wettest July since 2016
Why so wet?

Do look up

- Enhanced storm track across the Bering Sea
- High pressure aloft off Pacific NW coast steering storms toward SE Alaska
- Low pressure aloft North Slope
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
What’s happened?
How did previous climate outlooks perform?
Notable June-July Happenings

Besides Rain

- Late June: wildfire and smoke central Interior
  - First occurrence of ¼ mile visibility in smoke at Fairbanks airport since 2005

- Late June: widespread near record warmth
  - Especially overnight low temperatures

- July 7-8: southern Southeast brushed by Pacific NW heat dome
Model-based regional analysis ➤ Average temperatures

Temperature Classification for Jun 2024

Temperature Classification for Apr-Jun 2024

Source: ERA5 Reanalysis
Map by: Brian Brettschneider

Compared to 1991-2020 Base Period (Records Since 1950)
Model-based regional analysis ➤ Total precipitation

Precipitation Classification for Jun 2024

Source: ERA5 Reanalysis
Map by: Brian Bretschneider

Precipitation Classification for Apr-Jun 2024

Source: ERA5 Reanalysis
Map by: Brian Bretschneider

Record | Much Below | Below | Near Normal | Above | Much Above | Record
--- | --- | --- | --- | --- | --- | ---
Compared to 1991-2020 Base Period (Records Since 1950)
June 2024 temperature ➤ CPC outlook and observed

Non-EC skill score: +55
Percent correct: 70%
Mid-month outlook

Above normal
Near normal
Below normal
June 2024 precipitation ➤ CPC outlook and observed

Non-EC skill score: -50
Percent correct: 0%
Mid-month outlook

Above normal
Near normal
Below normal
Non-EC skill score: +14
Percent correct: 43%

April-June 2024 temperature ➤ CPC outlook & observed

- Above normal
- Near normal
- Below normal
April-June 2024 precipitation ➤ CPC outlook & observed

Non-EC skill score: 0
Percent correct: 33%

Above normal
Near normal
Below normal
Arctic wide sea ice

To July 17, 2024
Arctic sea ice volume

Sources:
Data from U. Wa./PIOMAS data
Graphics by Z. Labe, Princeton U.
Arctic sea ice thickness

Sources:
Data from U. Wa./PIOMAS data
Graphics by Z. Labe, Princeton U.
Mid-July sea ice comparison

Source: National Weather Service Alaska Region Sea Ice Program
Sea ice extent through the season

Chukchi Sea ice extent highest for mid-July since 2000

Sources:
Data NSIDC Sea Ice Index, Version 3. Through July 17, 2024.
Drought & wildfire status

Sources:
US Drought Monitor
Alaska Interagency Coordination Center

600,199 acres burned
5 fires > 25,000 acres
Global sea surface temperature departure from normal

ONI for Apr-Jun: +0.4
PDO for June 2024: -1.9

Sources: ONI from CPC
PDO Index from WCS
Upper ocean heat departure from average

Upper 300 meters of the ocean

Little change in Gulf of Alaska

Source: NOAA/CPC
Deep tropical convection
Via "outgoing longwave radiation"

Trade winds near average
Niño Region 3.4

850 mb wind anomalies
June 16-July 15, 2024

April-June Oceanic
Niño Index: +0.4
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

June 2024

July 2024

ENSO Alert System Status:
La Niña Watch
Statistical guidance ➤ using the past to predict the future

- Long term trends
- Optimum climate normals: Alaska trends the past 15 years
August half century trends ➤ Temperature

Total Change in August Average Temperature
1974-2023

Trend over 50 years

ACCAP
Alaska Center for Climate Assessment and Policy
International Arctic Research Center

Thiel-Sen regression
ERAS courtesy of ECMWF/Copernicus
August half century trends ➤ Precipitation

Percent Change in August Total Precipitation

1974-2023

Percent

-75 -45 -15 15 45 75 105

Trend over 50 years

Thiel-Sen regression

ERA5 courtesy of ECMWF/Copernicus
2009 to 2023 trends

Past 15 years compared to 1991-2020
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
August-October 2024 sea surface temperature ➤ NMME

Forecast
departure from normal

Skill
of the forecast

Negative PDO pattern
Experimental **sea ice forecast** ➤ CPC

Open water = Sea ice concentration less than 15%

Average of multiple model runs starting with late **June** data
August 2024 calibrated probability forecast ➤ NMME

Forecast from →

Temperature

Precipitation

May

June

July

NMME prob fcst TMP2m IC=202405 for lead 3 2024 Aug

NMME prob fcst TMP2m IC=202406 for lead 2 2024 Aug

NMME prob fcst TMP2m IC=202407 for lead 1 2024 Aug

NMME prob fcst Prate IC=202405 for lead 3 2024 Aug

NMME prob fcst Prate IC=202406 for lead 2 2024 Aug

NMME prob fcst Prate IC=202407 for lead 1 2024 Aug
August 2024 outlooks ➤ World Climate Service

Temperature

Precipitation

Bias Corrected, Skill Weighted CFS + ECMWF
Forecast from → May → June → July

Temperature

Precipitation
Temperature

August-October 2024 outlooks

World Climate Service

Precipitation

Bias Corrected, Skill Weighted CFS + ECMWF
August-October 2024 outlooks from June

Temperature
- Above: 45% (33%, 22%)
- Equal Chances: 37% (33%, 30%)
- Below: 22% (33%, 45%)

Precipitation
- Above: 33%
- Equal Chances: 33%
- Below: 33%
And the answer is...
CPC August 2024 outlooks

- **Temperature**
  - Above: 37% 33% 30%
  - Equal Chances: 33% 33% 33%
  - Below: 22% 33% 45%

- **Precipitation**
  - Above: 45% 33% 22%
  - Equal Chances: 33% 33% 33%
CPC August-October 2024 outlooks

Temperature
- Above: 37%, 33%, 30%
- Equal Chances: 30%, 33%, 37%
- Below: 22%, 33%, 33%

Precipitation
- Above: 37%, 33%, 33%
- Equal Chances: 33%, 33%, 33%
- Below: 45%, 33%, 30%
Upcoming ACCAP webinars

- July 31 ▶ Nancy Fresco: Spruce beetles under changing climate conditions
- August 16 ▶ NWS Alaska Climate Outlook Briefing

Email Rick Thoman rthoman@alaska.edu

Upcoming ACCAP webinars accap.uaf.edu/events