



National Weather Service Overview

And

Climate Information and Communication

Sarah Spiegler and Erik Heden

Climate Section Credit:

Barb Mayes Boustead, Ph.D.

NWS/OCLO/Warning Decision Training Division



Erik Heden NWS Morehead City

Warning Coordination Meteorologist
Liaison between the community and the local
National Weather Service office. Conduct
community outreach and preparedness
activities.

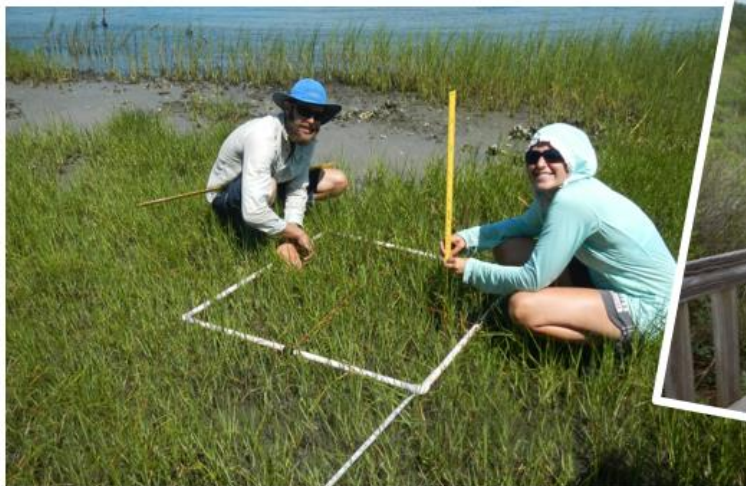


Morehead City

Sarah Spiegler
N.C. Sentinel Site Coop. Coordinator &
Marine Education Specialist

Focus Areas:

Leverages resources and provides information related to the impacts of sea level rise on coastal habitats and communities in North Carolina;
Hosts trainings, workshops and partner meetings.





Our Mission



The National Weather Service (NWS)

[Weather.gov](https://www.weather.gov) > About the NWS

About the NWS

National Program

About

Serving you in every community in the U.S. Check out who we are and what we do!

NWS Mission

Provide weather, water, and climate data, forecasts and warnings for the protection of life and property and enhancement of the national economy.

NWS Vision

A Weather-Ready Nation: Society is prepared for and responds to weather, water, and climate-dependent events.

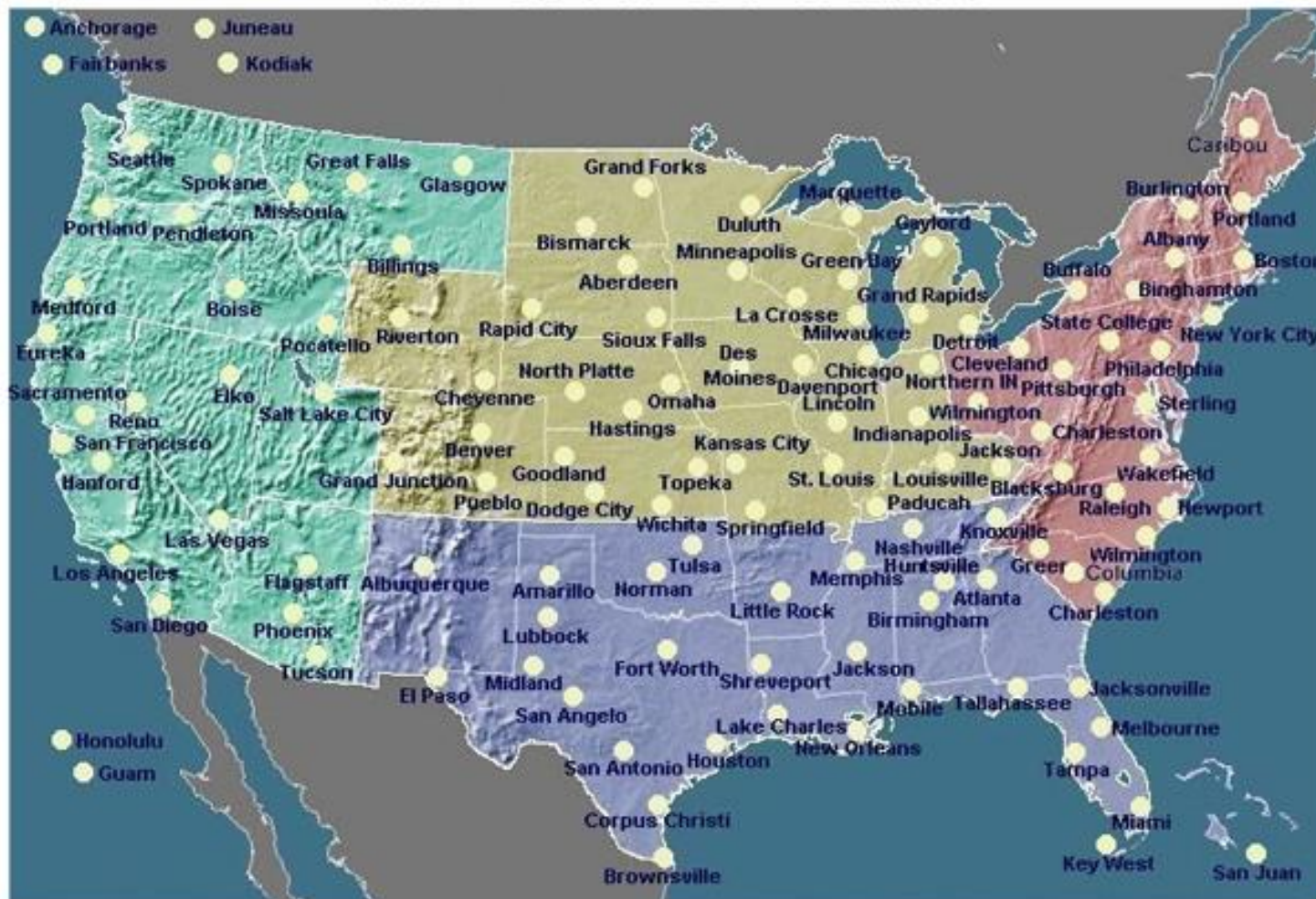
Weather-Ready Nation Story

Accurate weather forecasts do not always result in a good outcome. The National Weather Service (NWS) learned this difficult...[Read more](#)



Office Locations

National Weather Service Office Locations



Background topography courtesy Ray Stemer, Johns Hopkins University



Our Local Office



Eastern part of North
Carolina

Includes: Land areas,
inland rivers, sounds,
and adjacent ocean

Other parts of the
state covered by
other local offices
(Raleigh, Wilmington,
etc)





Open 24/7/365



Hurricane Florence

Staff here for 3 to 7 days

Our building is designed to withstand storms

We stay when the weather is bad





Our Website

weather.gov/newport



Weather
information from
past events,
current weather,
and forecast

Explore the website
and bookmark or
save what you like

Go in depth as
much as you need

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION


HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by "City, St" or ZIP code
Enter location ...
[Location Help](#)


News Headlines


- [The Fall 2019 Edition Of Our Newsletter, Carolina Skywatcher, Is Now Online!](#)

MY FORECAST
Morehead City NC



Overcast
49°F
9°C [Get Detailed info](#)

Today

Partly Sunny
High: 55°F


Tonight

Mostly Cloudy
Low: 43°F
[change location](#)

NWS Forecast Office Newport/Morehead City, Newport/Morehead City, NC
Weather Forecast Office

[Weather.gov](#) > Newport/Morehead City, NC

Current Hazards Current Conditions Radar Forecasts Rivers and Lakes Climate and Past Weather Local Programs


Click a location below for detailed forecast.





Watches, Warnings & Advisories

- [Coastal Flood Advisory](#)
- [High Surf Advisory](#)
- [Small Craft Advisory](#)
- [Hazardous Weather Outlook](#)

Last Map Update: Tue, Nov. 19, 2019 at 11:58:19 am EST

Tropical


Local Radar


Satellite

11/19/19 16:46Z GOES-East



7- Day Forecast

weather.gov/newport



Sky cover



High/low temperatures



Winds



Chance of precipitation

Detailed Forecast

Today	Mostly cloudy, with a high near 54. Light northwest wind.
Tonight	Mostly cloudy, with a low around 38. West wind 5 to 7 mph.
Wednesday	Sunny, with a high near 60. Northwest wind 7 to 9 mph.
Wednesday Night	Mostly clear, with a low around 38. Light north wind.
Thursday	Sunny, with a high near 60. Light and variable wind becoming northwest around 5 mph.
Thursday Night	Partly cloudy, with a low around 44.
Friday	Mostly sunny, with a high near 67.
Friday Night	Mostly cloudy, with a low around 48.
Saturday	A chance of showers. Mostly cloudy, with a high near 64. Chance of precipitation is 50%.
Saturday Night	A chance of showers. Mostly cloudy, with a low around 44. Chance of precipitation is 50%.
Sunday	Partly sunny, with a high near 58.
Sunday Night	Mostly clear, with a low around 39.
Monday	Sunny, with a high near 60.

Extended Forecast for New Bern NC

Today



Mostly Cloudy

High: 54 °F

Tonight



Mostly Cloudy

Low: 38 °F

Wednesday



Sunny

High: 60 °F

Wednesday
Night



Mostly Clear

Low: 38 °F

Thursday



Sunny

High: 60 °F

Thursday
Night



Partly Cloudy

Low: 44 °F

Friday



Mostly Sunny

High: 67 °F

Friday
Night



Mostly Cloudy

Low: 48 °F

Saturday



Chance
Showers

High: 64 °F



Weather Briefings

weather.gov/newport



Local forecast by "City, St" or ZIP code

Enter location ...

[Location Help](#)

News Headlines

- [Here's the Updated Skywarn Training Schedule!](#)
- [Here's a Summary on the March 2-5, 2018 Wind/Coastal Flood/Low Water Event.](#)
- [Summary on the Minor Winter Weather Event, March 12-13, 2018](#)

NWS Forecast Office Newport/Morehead City, Newport/Morehead City, NC

[Weather.gov](#) > Newport/Morehead City, NC

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Rivers and Lakes](#) [Climate and Past Weather](#) [Local Programs](#)

Click a location below for detailed forecast.



Last Map Update: Thu, Mar. 22, 2018 at 11:05:21 am EDT

[Watches, Warnings & Advisories](#)



[Radar](#)



[Current Weather](#)



[Rivers & Lakes](#)



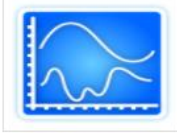
[Satellite](#)



[Weather Information Display](#)



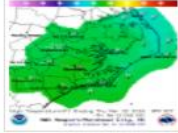
[Forecast Maps](#)



[Hour by Hour Forecast](#)



[Winter Weather](#)



[Map View](#)



[Surf Forecast/Rip Currents](#)



[Weather Hazard Briefing \(when applicable\)](#)



[Local Self-Briefing Pages](#)



[Forecaster Discussion](#)



[Marine](#)



[Text Products](#)



[Tropical](#)



[Skywarn](#)



[Submit Storm Reports](#)

[Follow us on Twitter](#)

[Follow us on Facebook](#)

[MHX RSS Feed](#)

Created prior to bigger events of severe weather

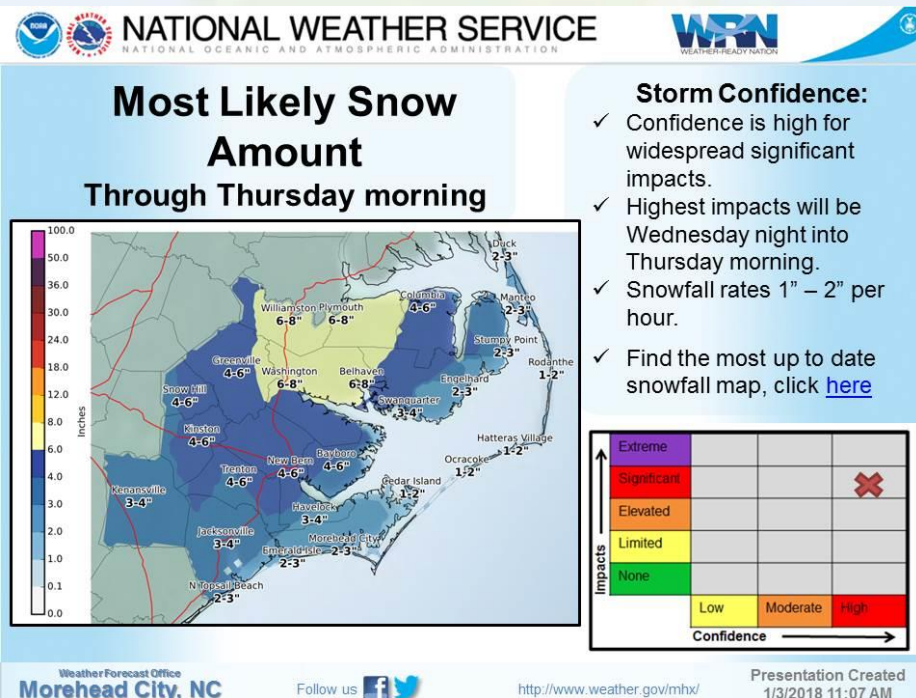
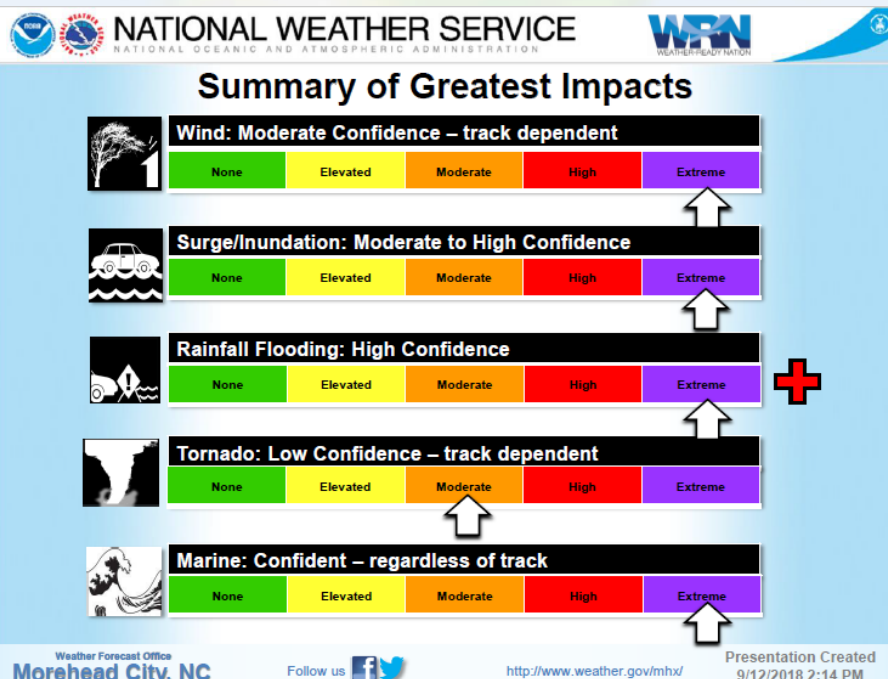


Weather Briefings

weather.gov/newport



January 2018 Winter Storm



Hurricane Florence Impacts



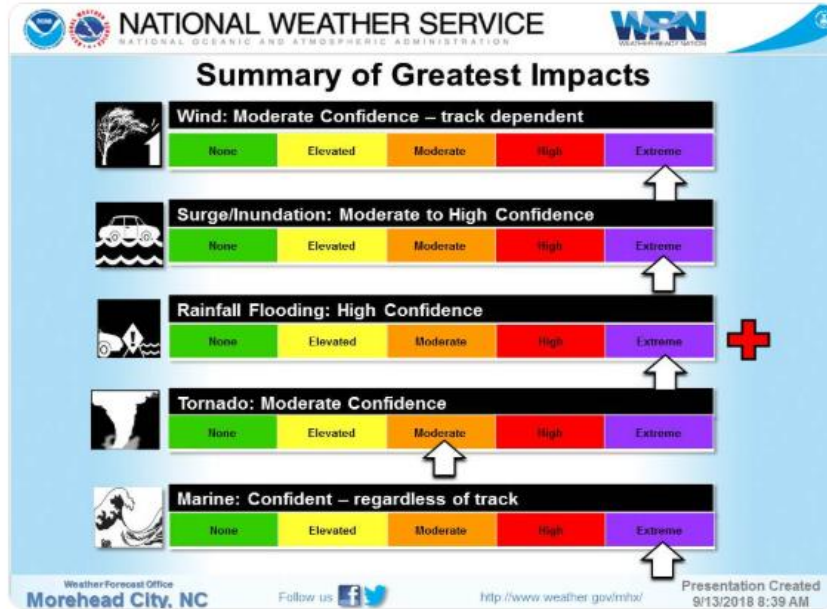
Social Media

Search NWS Morehead City



NWS Newport/Morehead
@NWSMoreheadCity

Category of the storm is only related to wind, it does not tell you about all of the impacts with a **#hurricane** like **#florence**. Our impacts have not changed with storm surge and catastrophic flooding. Do not let your guard down. weather.gov/media/mhx/Late...



8:44 AM - 13 Sep 2018

765 Retweets 1,078 Likes



40 765 1.1K



YouTube

Search



NATIONAL WEATHER SERVICE
Hurricane Florence Briefing #15
As of: 630 AM
Wednesday, September 12th 2018

What has Changed?

- Track has shifted a bit further south and west, and has slowed significantly near the coast
- Extreme rainfall amounts now are expected across southern coastal counties
- Major River Flooding Likely

Disclaimer: Do not use after 5 PM Wednesday 9/12/18
Next Briefing: By 600 PM Wednesday (9/12/18)

Hurricane Florence NWS Morehead City Wednesday 900 AM Briefing

2,895 views

13 0 SHARE SAVE



NWSMoreheadCity
Published on Sep 12, 2018

SUBSCRIBE 199

Hurricane Florence Lead Up



Mobile Forecasts


mobile.weather.gov



Quickly access
hourly forecasts,
radar, and more
from your local
office,
ANYWHERE in
the country

Can work like a
weather “APP” by
adding it to home
screen


Also works on PCs

 **National Weather Service**

Morehead City NC




Current Conditions

Beaufort Smith Field
Updated: 19 Nov 09:58 am EST


 **48 °F**
Wind NE 3 MPH
Dew Point 46 °F
(93% RH)

Overcast



Forecast
19 Nov 09:58 am EST

Today	Tonight	Wednesday
 Partly Sunny Hi 55°F	 Mostly Cloudy Lo 45°F	 Sunny Hi 58°F




Verizon 3:42 PM 50%
mobile.weather.gov

 **Hourly Forecast** 

Topeka KS

 **Tonight**  **Sunday Night**

SUN, FEB 26

6 am  30%	Chance Snow Temp: 34°F Wind: SSW @ 6 mph
7 am  30%	Chance Rain And Snow Temp: 35°F Wind: SSW @ 5 mph
8 am  30%	Chance Rain And Snow Temp: 36°F Wind: S @ 5 mph
9 am  30%	Chance Rain Temp: 37°F Wind: S @ 5 mph



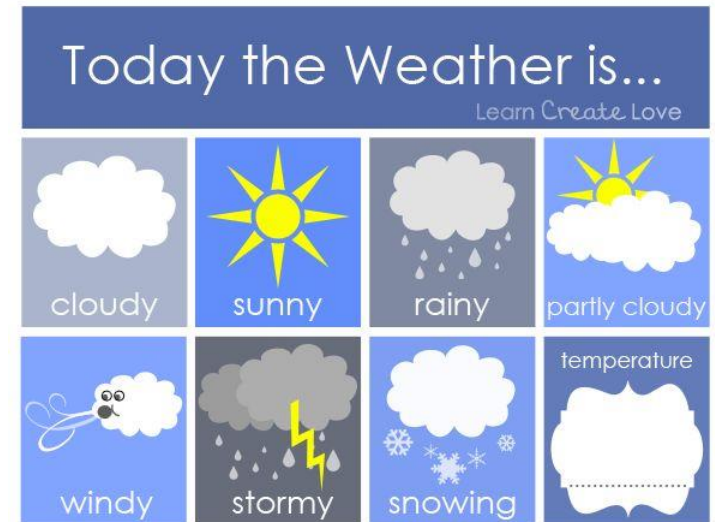
What Is Climate?

Weather vs. Climate

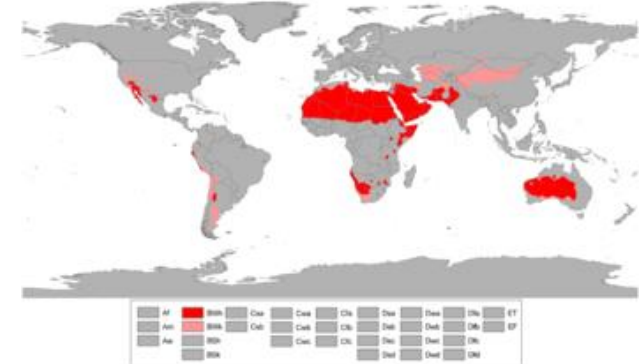
- **Weather**: temperature, wind, clouds, precipitation; what's happening outside right now
- **Climate**: average of weather conditions over a long time period



<https://www.worldatlas.com/articles/what-is-a-desert-climate.html>



<https://speechfoodie.com/weather-definition-for-kids/>

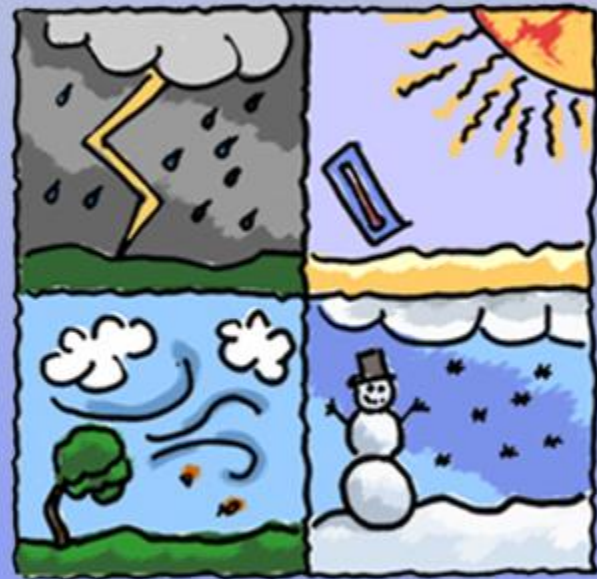


https://en.wikipedia.org/wiki/Desert_climate

Weather vs. Climate

Weather happens at a particular time and place.

Climate is regional and long-term.

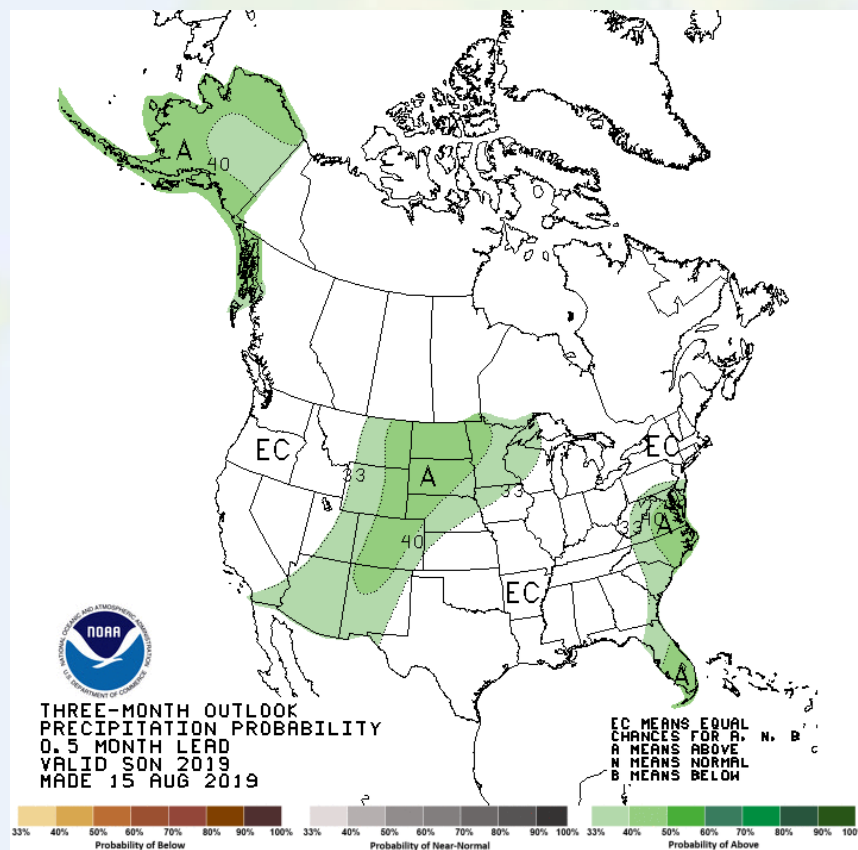
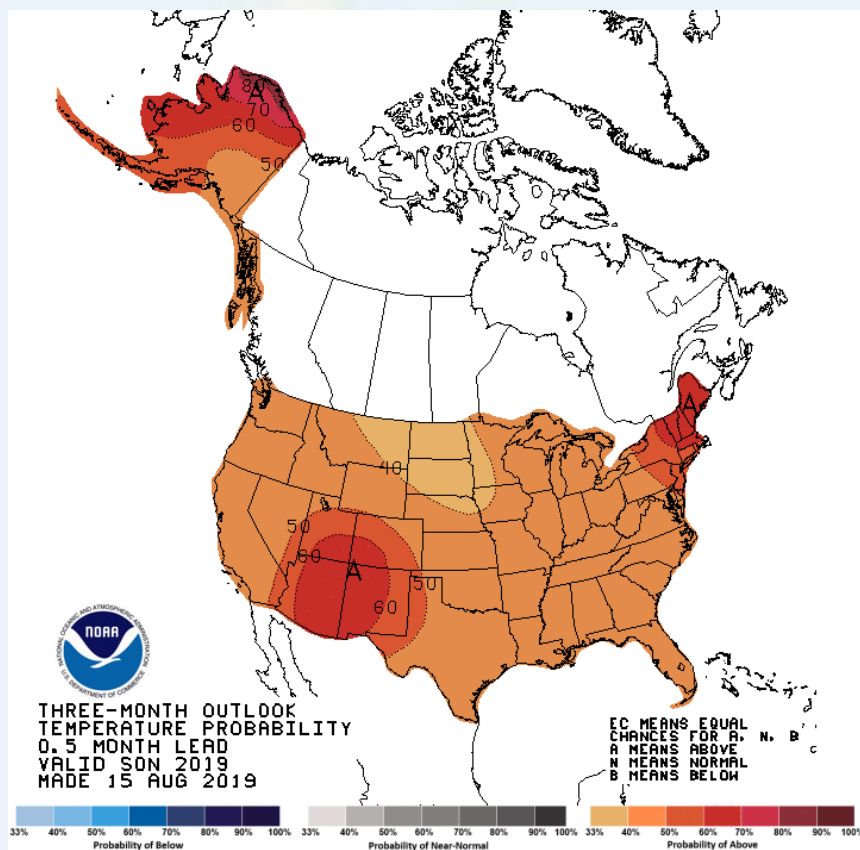


Is it news (weather) or history (climate)?



Climate Outlooks

- Not quite like weather prediction
 - ◆ In terms of odds (probabilities)
 - ◆ Averaged over longer periods of time (weeks to months)

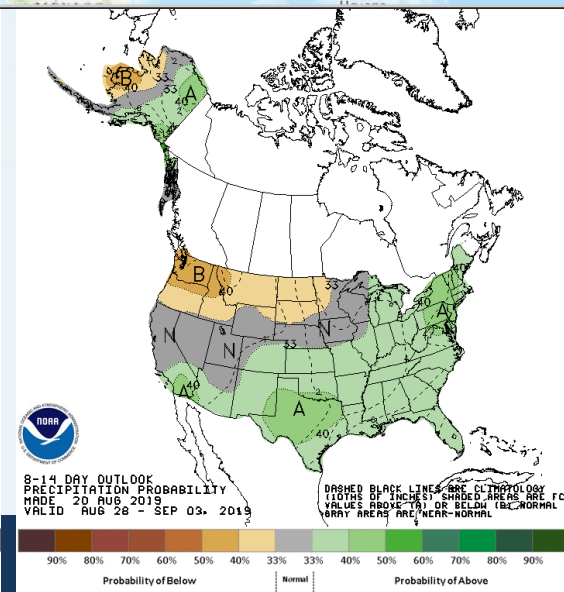
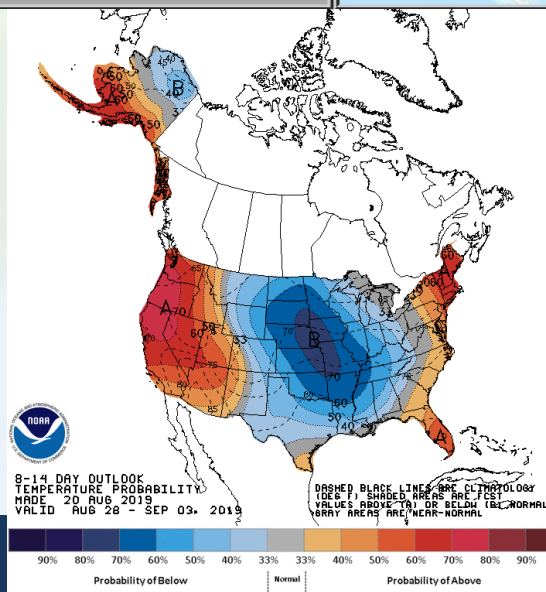
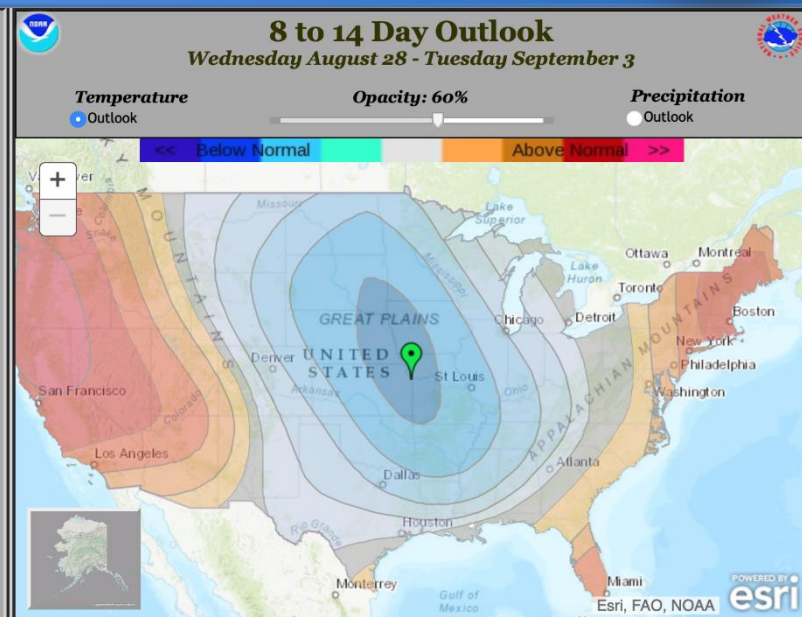
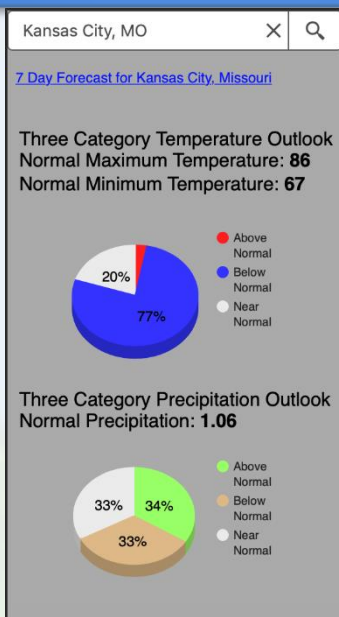




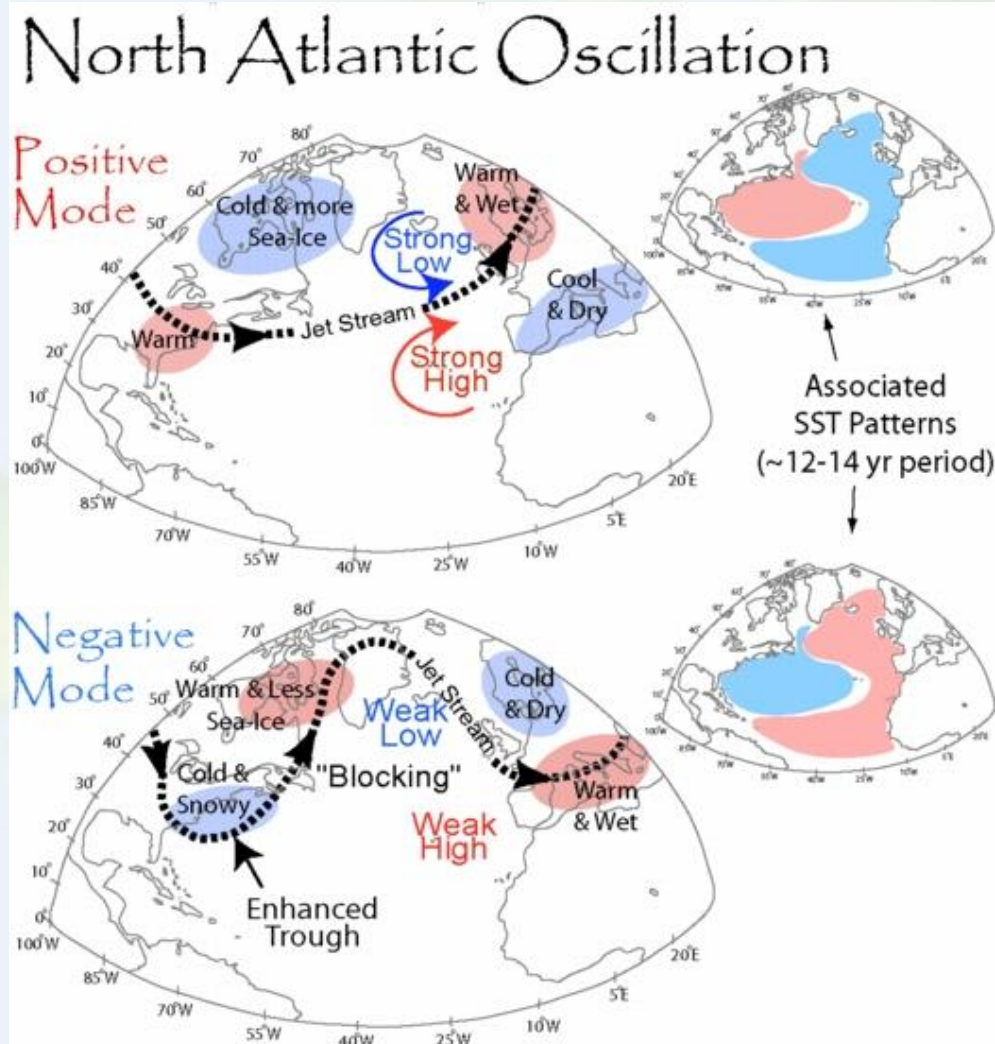
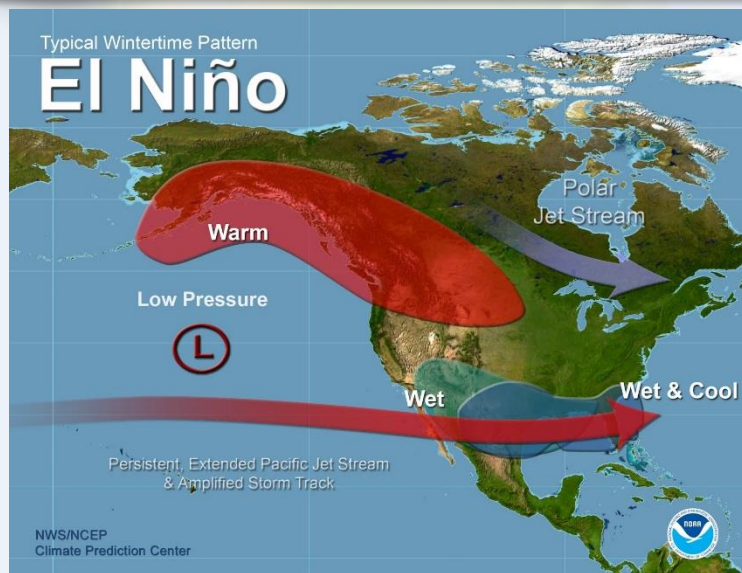
CPC Outlooks: 6- to 10-Day and 8- to 14-Day



- Predicting chances for *temperatures* and *precipitation* to fall in the *upper, middle, and lowest thirds*.
 - “40%” = 40-50% chance of that category (instead of the usual 33%)
- Issued every afternoon
 - Automated on weekends
- Mainly based on weather and climate models
- Interactive and static displays



Climate Variability: Influencing Seasons





Climate Change

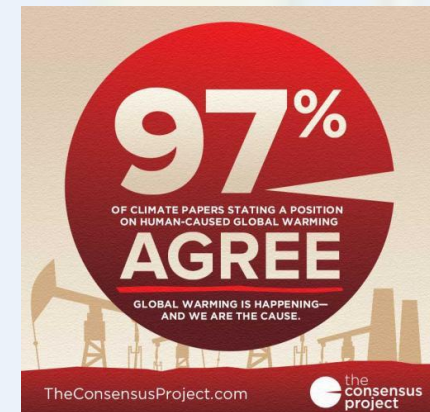
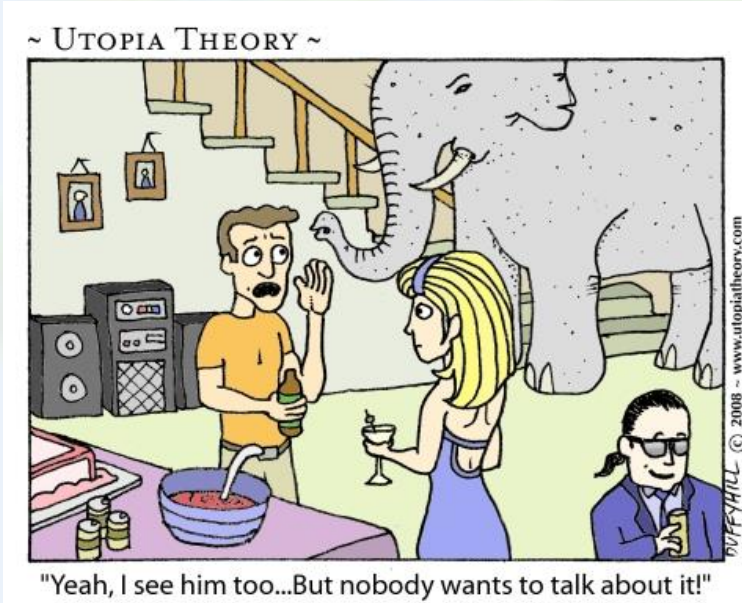
Climate Change

- Get comfortable with terminology

- ◆ The terms “climate change” and “global warming” are often used interchangeably
- ◆ Scientists prefer “climate change” because it describes the changes to the whole system, not just temperatures
- ◆ Many people still say “global warming”

- Be careful about your information sources!

- ◆ Blogs, news commentators, politicians often (usually) not trained in climate
- ◆ Would you go to a dentist to get heart surgery?

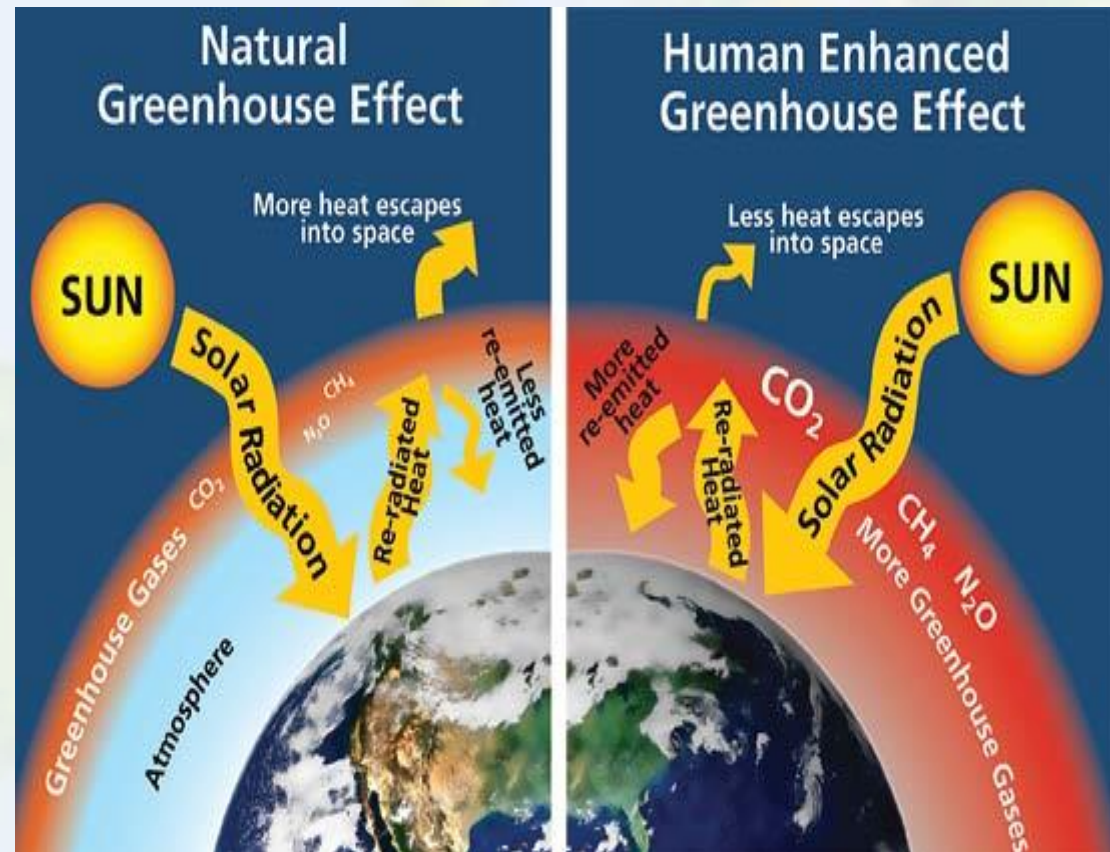




Climate and the Greenhouse Gases

Greenhouse Effect

- Greenhouse gases absorb heat (solar radiation)
 - ◆ Radiate heat back to Earth's surface
 - ◆ Major greenhouse gases include carbon dioxide (CO_2) and water vapor (H_2O)
 - ◆ Trace gases include methane, ozone, nitrous oxide, and CFCs
- Natural greenhouse effect is necessary for life on Earth
- Concern: Human activities are *enhancing* the greenhouse effect.

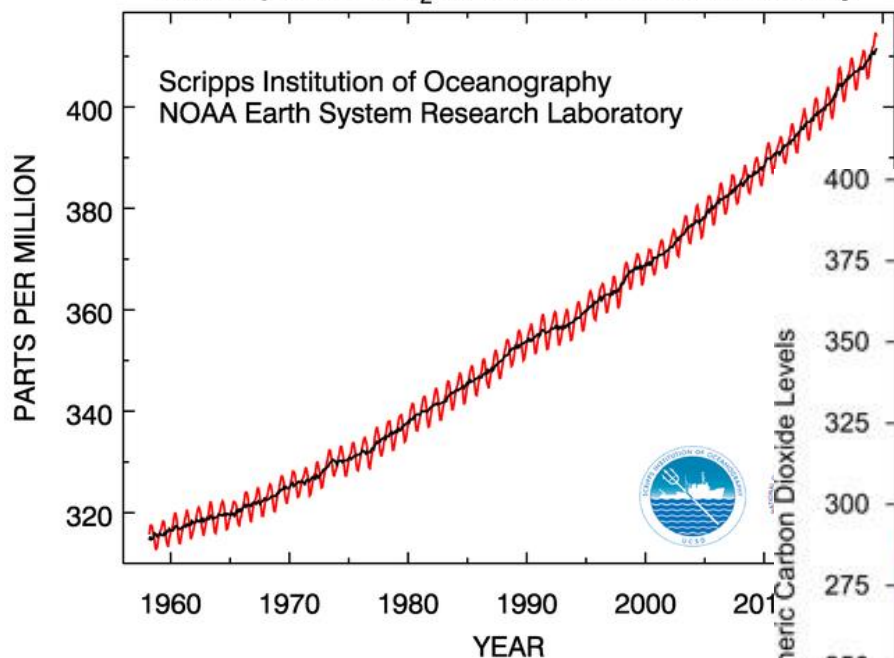




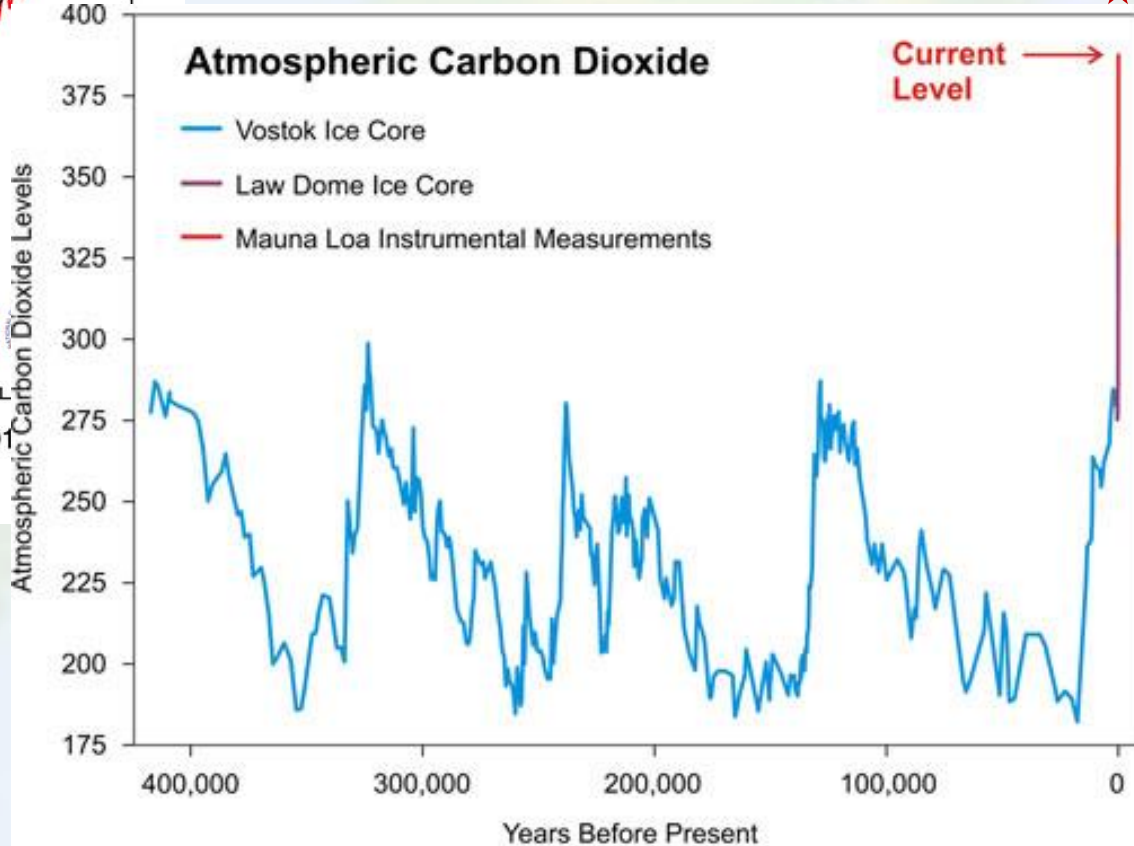
Carbon Dioxide Increasing Due to Human Activity



Atmospheric CO₂ at Mauna Loa Observatory



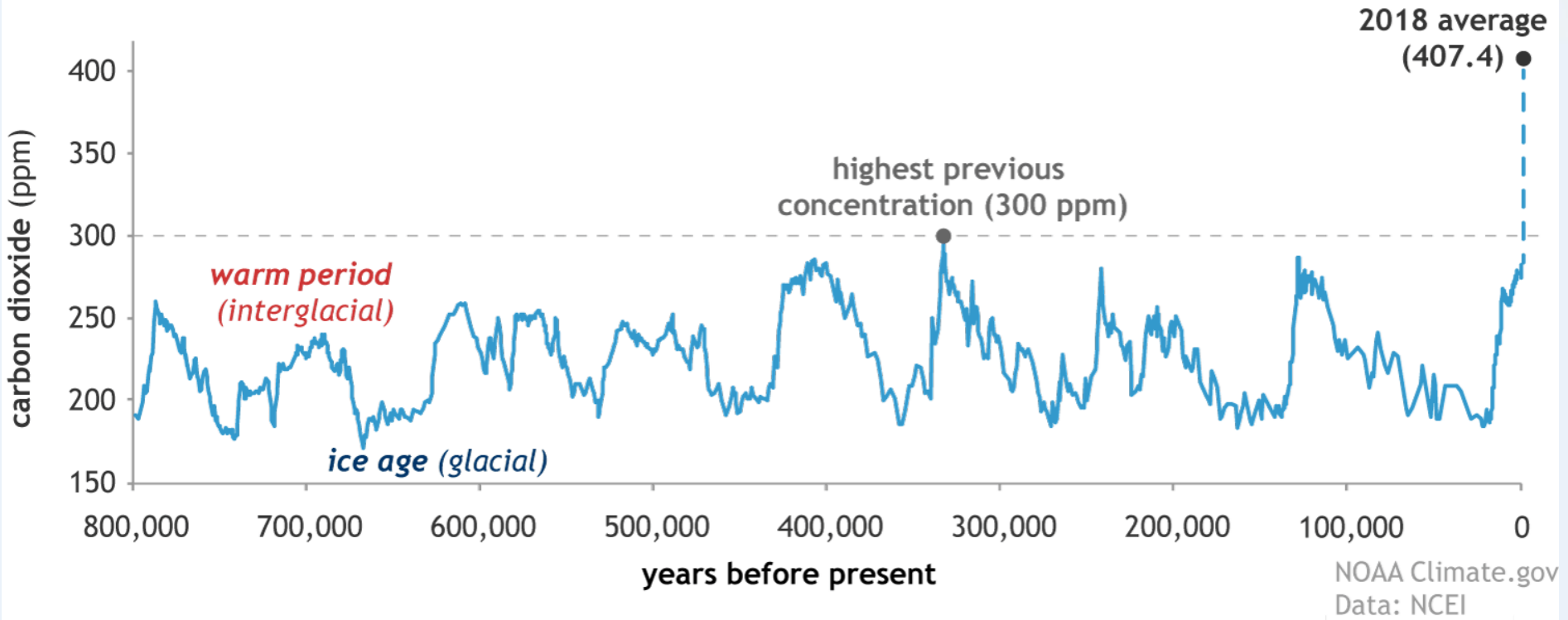
2019 peak: 411.6 PPM ★



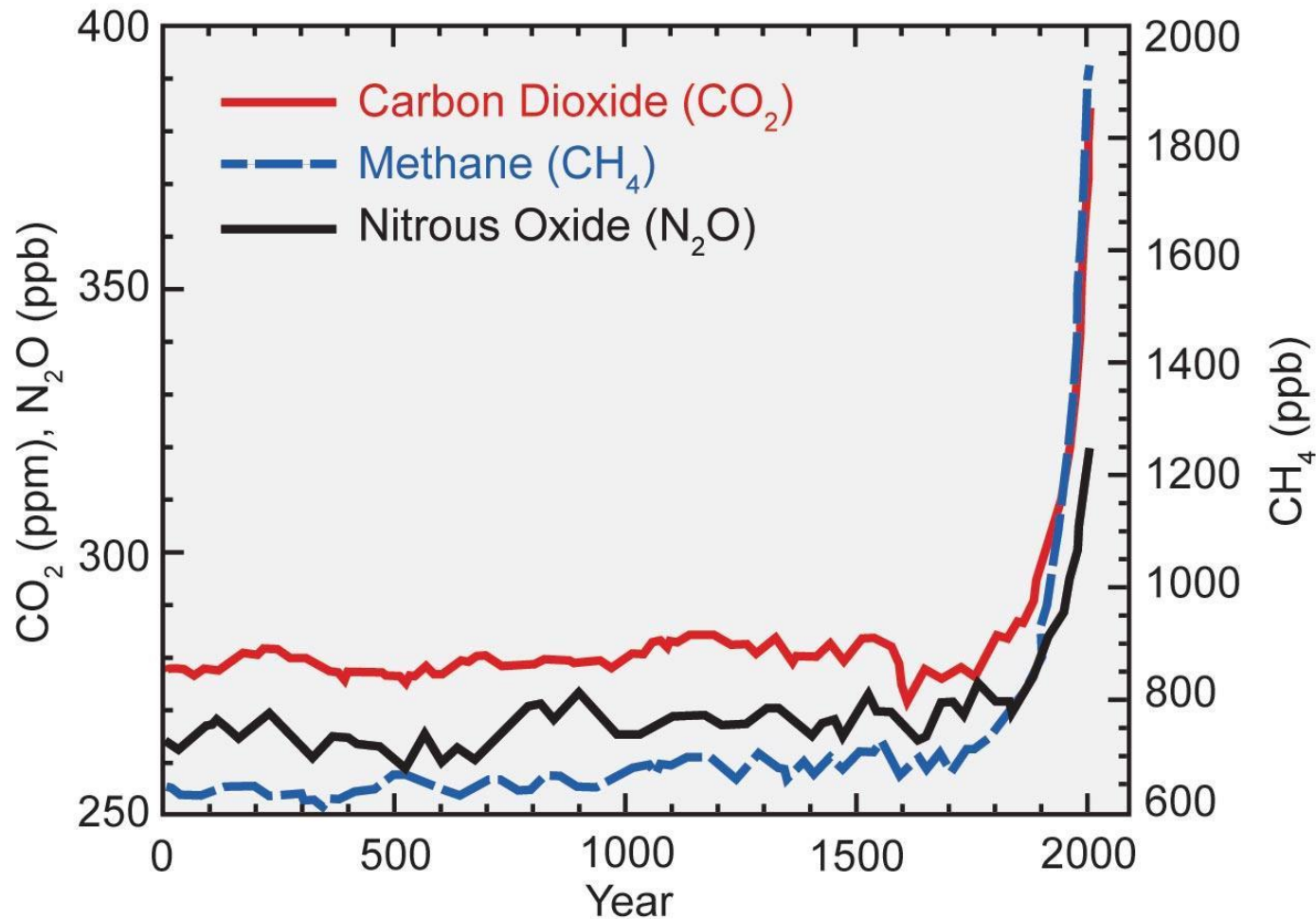


Carbon Dioxide Increasing

CO₂ during ice ages and warm periods for the past 800,000 years

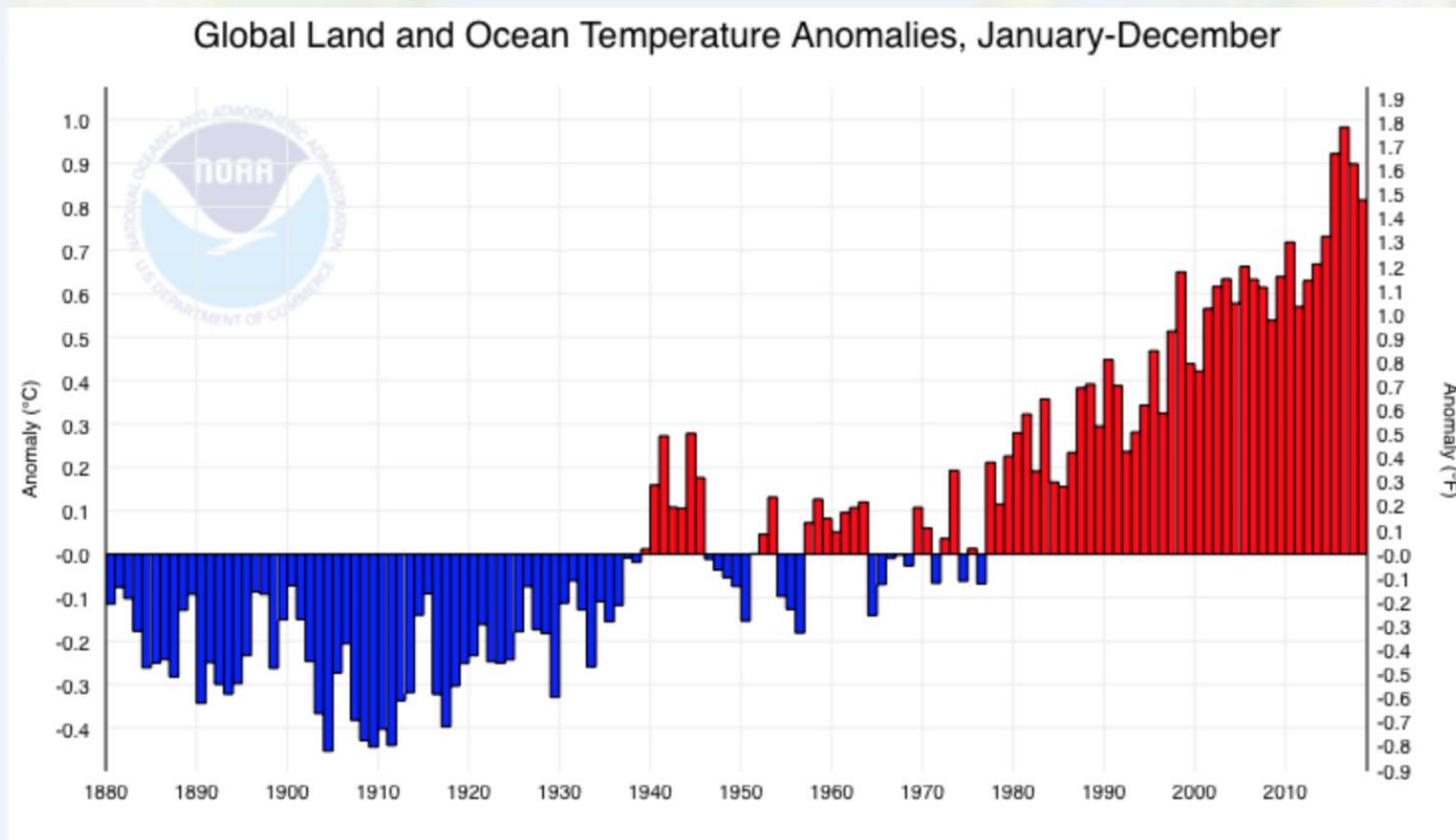


...And So Are Other Greenhouse Gases





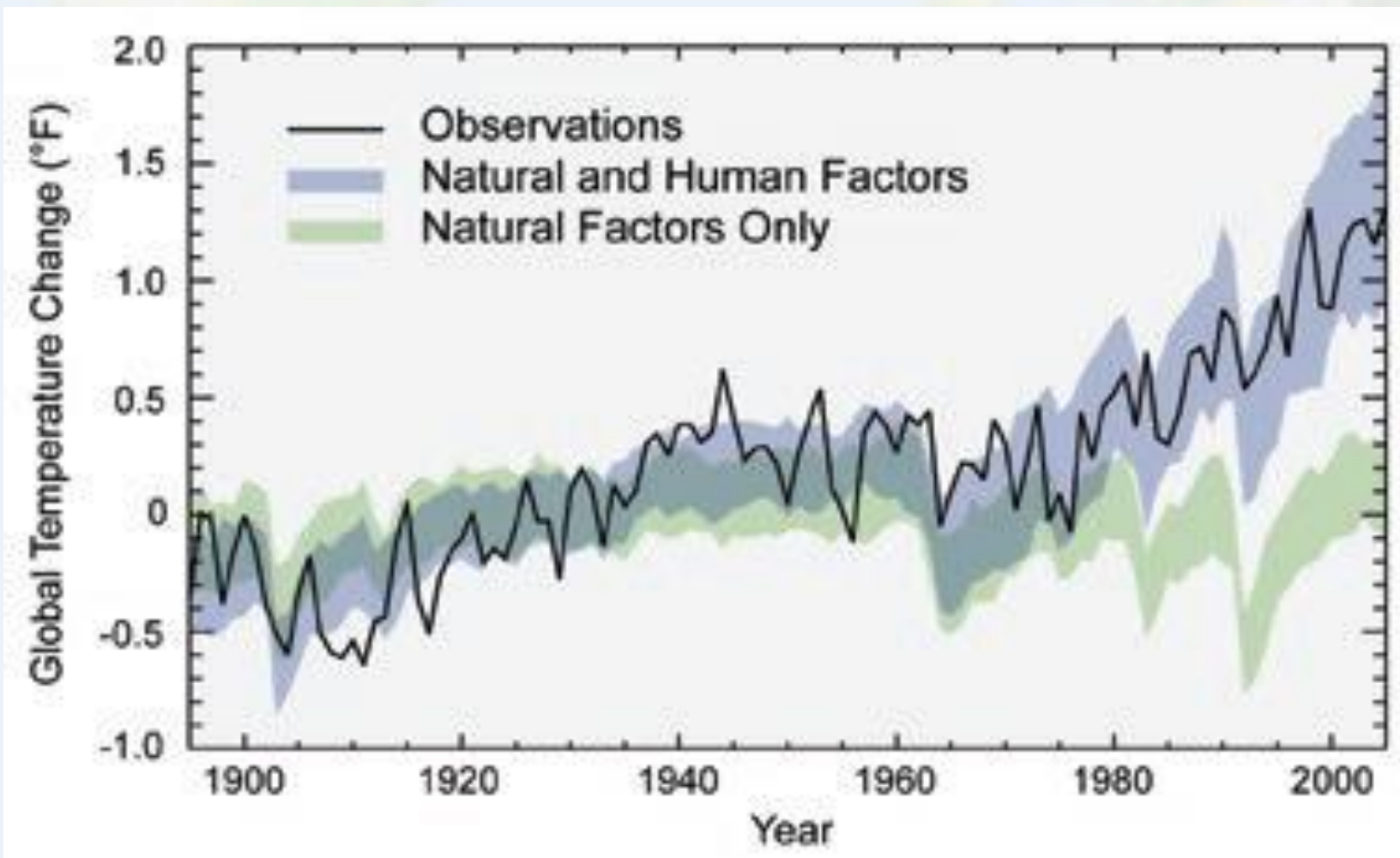
Global Temperatures Are Increasing



Most obvious **and most discussed** impact of climate change



...And Are Explained Only When Including Increased Greenhouse Gases



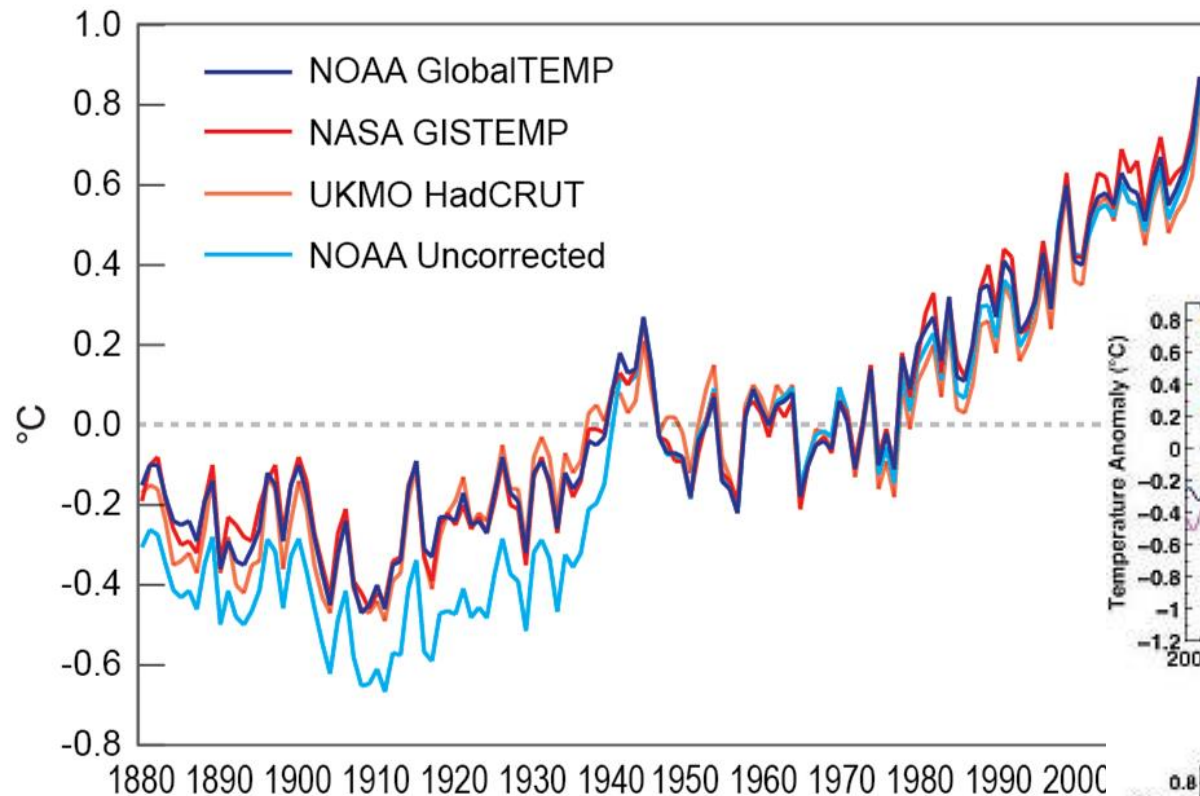
Source: IPCC



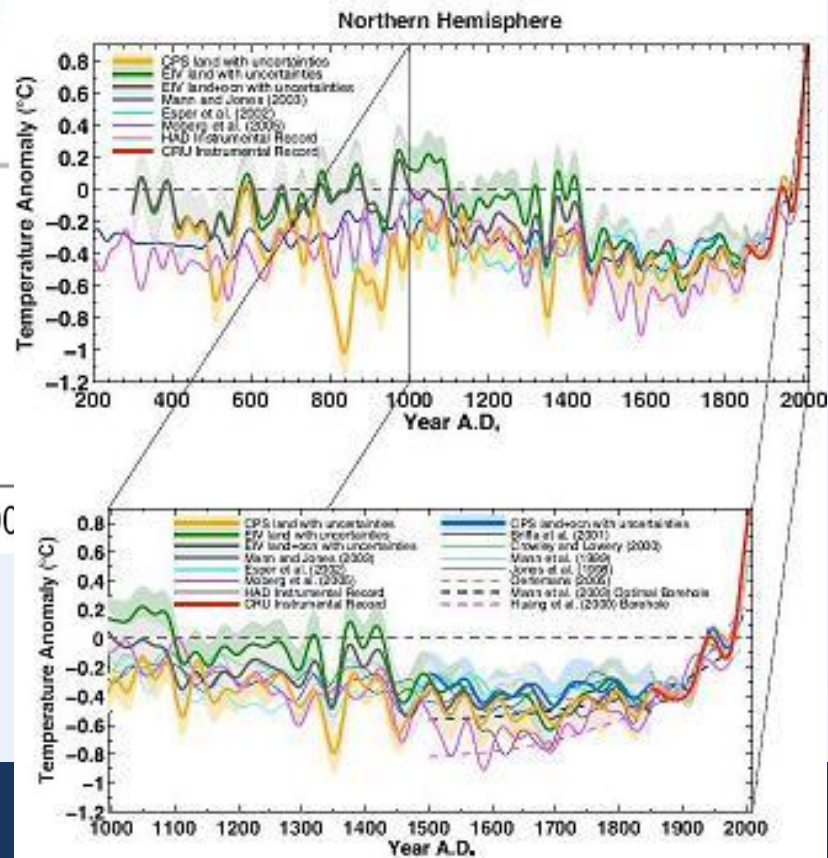
Global Temperature Analyses Agree



NASA, NOAA, MetOffice: relative to a common 1951 – 1980 base period



Right: Temperature over the past 1000-2000 years. Uncertainty increases farther back in time, when temperature reconstructions are based on “proxy” data (ice cores, tree rings, corals, lake sediments, glaciers, boreholes, stalagmites, etc.). Agreement improves with the instrumental records, beginning around 1850 A.D.





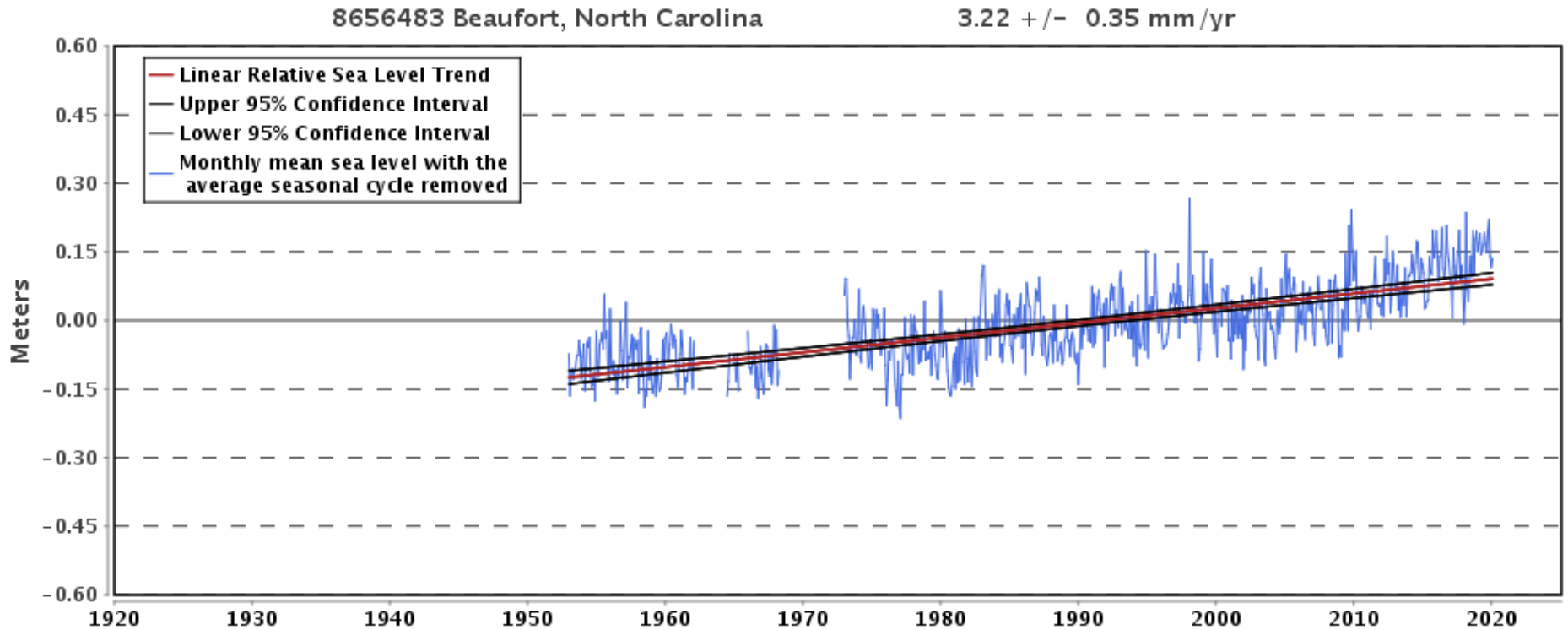
Symptoms of Climate Change

A photograph of a coastal area showing the effects of sea level rise. In the foreground, tall green grasses are partially submerged in water. A wooden dock extends into the water, with several pilings visible. In the background, a large, multi-story house is built on stilts, partially submerged. Other buildings and a parking lot are visible further back. The sky is blue with scattered white clouds.

Sea Level Rise

- Melting of glaciers
- Thermal expansion

Sea Levels are Rising



Relative Sea Level Trend: Beaufort, North Carolina

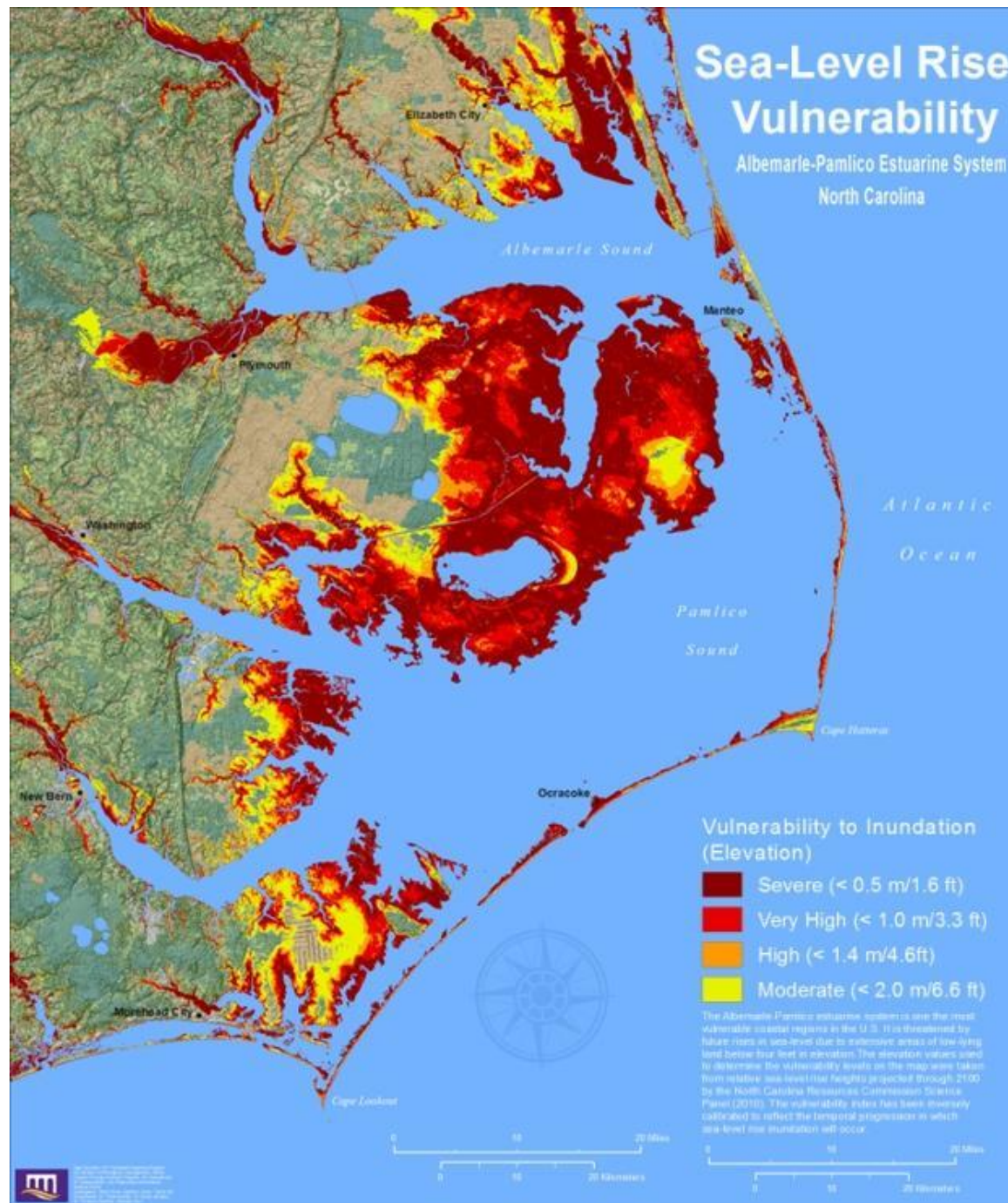
The relative sea level trend is **3.22 millimeters/year** with a 95% confidence interval of +/- 0.35 mm/yr based on monthly mean sea level data from **1953 to 2019** which is equivalent to a change of 1.06 feet in 100 years.

https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8656483

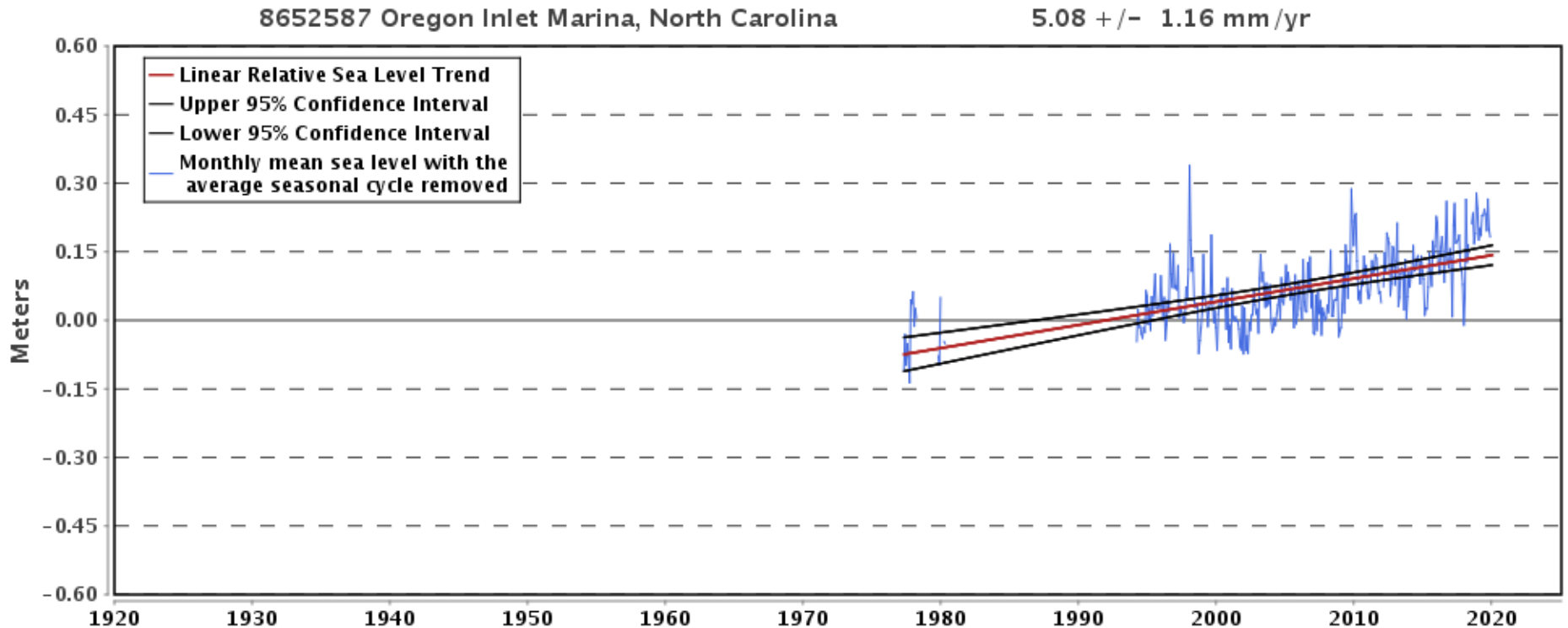


Sea-Level Rise Vulnerability

Albemarle-Pamlico Estuarine System
North Carolina



Sea Levels are Rising

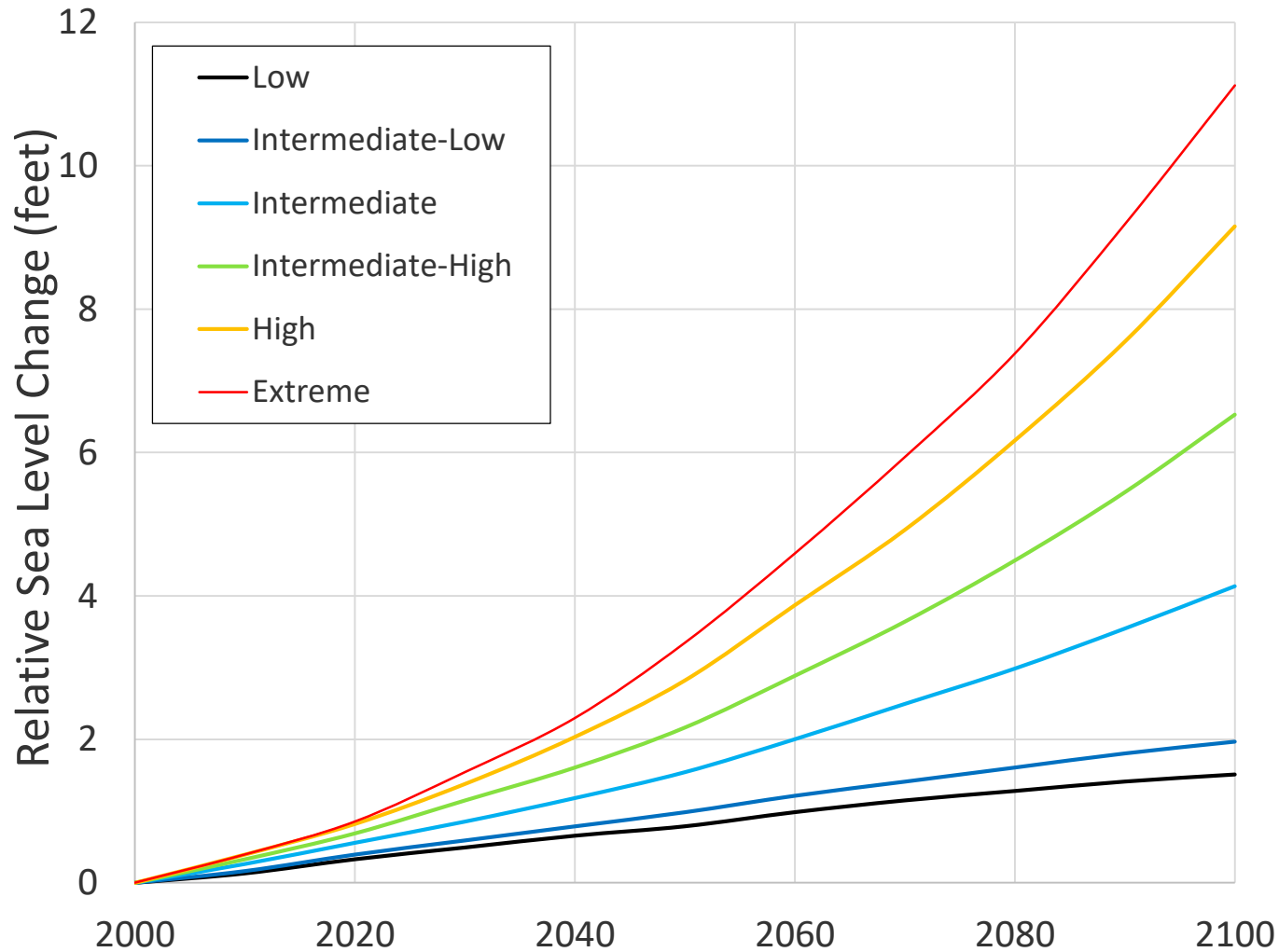


Relative Sea Level Trend: Oregon Inlet, NC

The relative sea level trend is **5.08 millimeters/year** with a 95% confidence interval of **+/- 0.35 mm/yr** based on monthly mean sea level data from **1977 to 2019** which is equivalent to a change of 1.67 feet in 100 years.

https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8652587

Projected Increase in Mean Sea Level

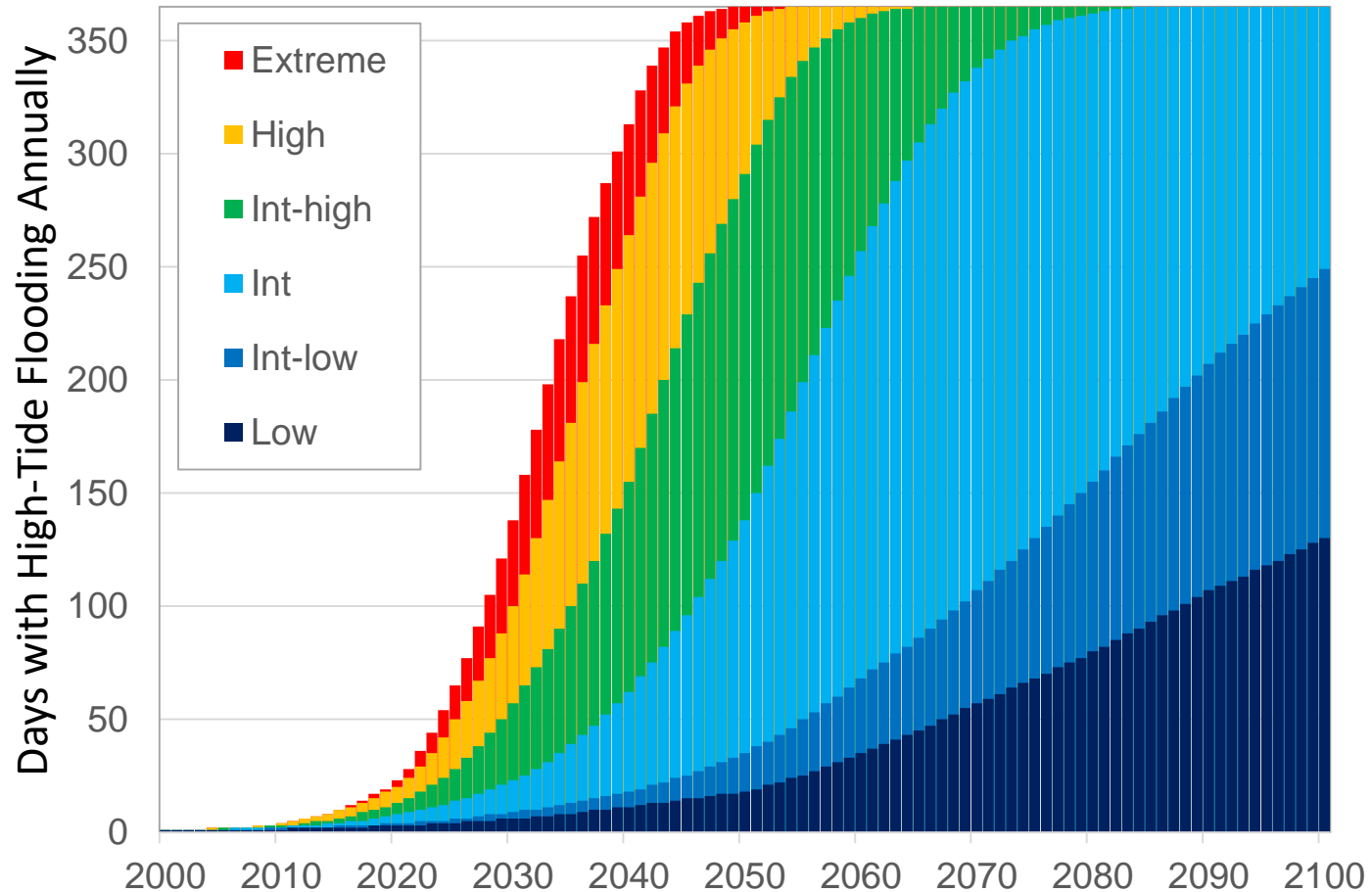


Relative sea level change scenarios for **Beaufort, NC** associated with 6 different sea level rise scenarios. The low and extreme scenarios represent the minimum and maximum of plausible future sea level rise.

Data source: NOAA Technical Report NOS CO-OPS 083; Site: 2295.



Projected Days of Future Flooding with Sea Level Rise in Beaufort, NC



Projected future days of **minor flooding** based on derived levels at Beaufort, NC under different sea level-rise scenarios.

Data source: NOAA Technical Report NOS CO-OPS 086.



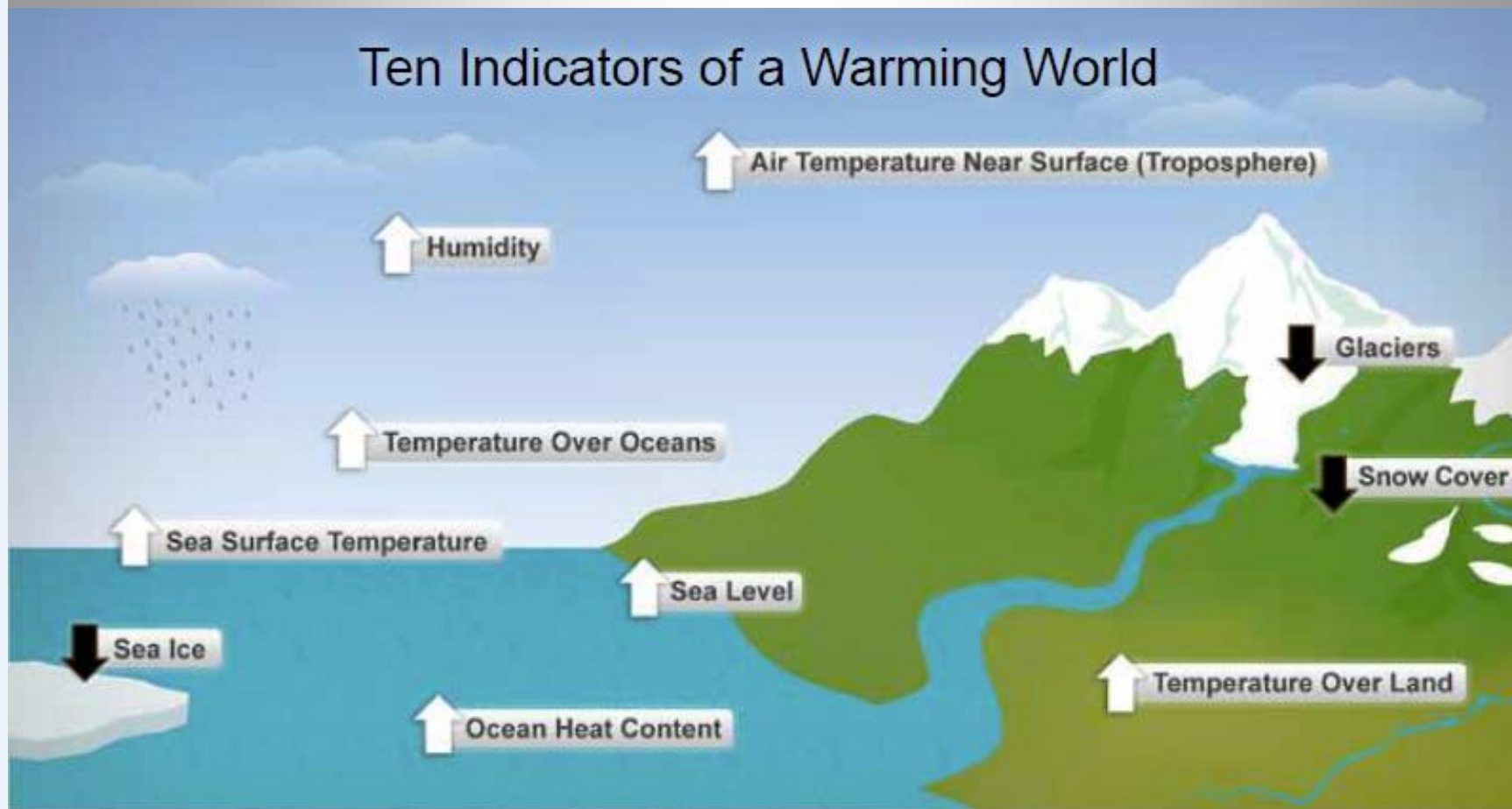


Six of the seven highest precipitation events on record in North Carolina have occurred within the last 20 years.

<https://sph.unc.edu/sph-news/north-carolina-tropical-cyclone-driven-coastal-flooding-is-worsening-with-climate-change-population-growth/>

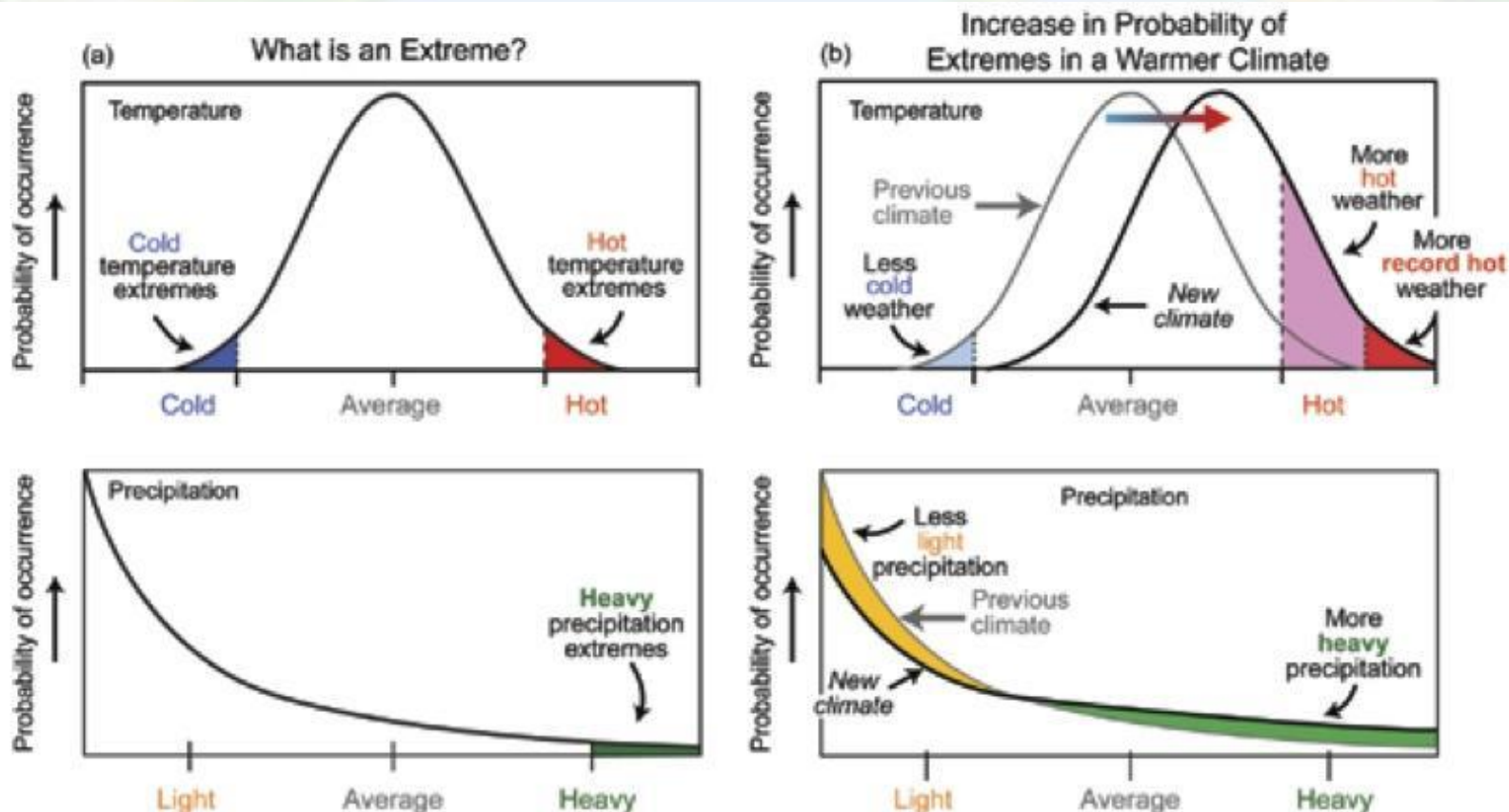
The stratosphere (up here!) is cooling

Ten Indicators of a Warming World



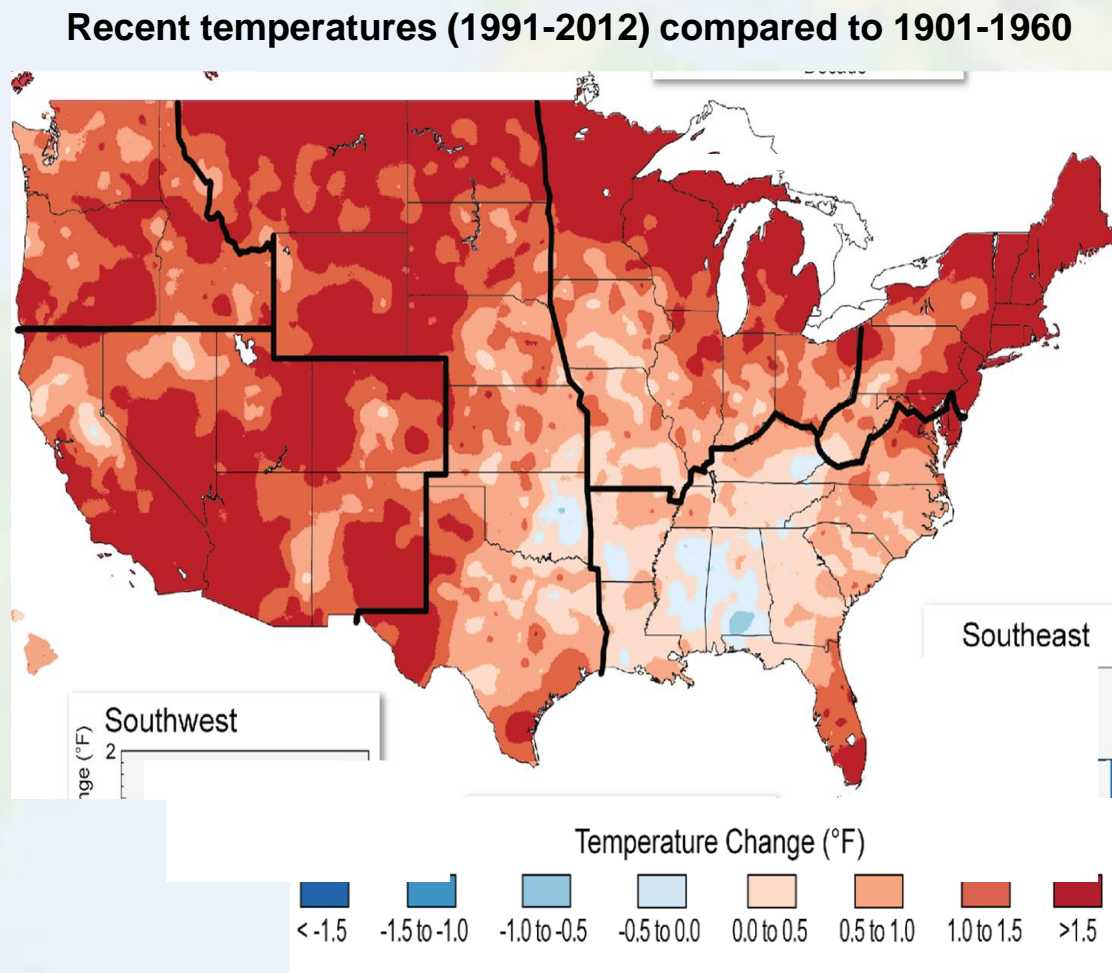
Seven of these indicators would be expected to increase in a warming world and observations show that they are, in fact, increasing. Three would be expected to decrease and they are, in fact, decreasing.

How the Averages Affect the Extremes



Recent Temperature Trends

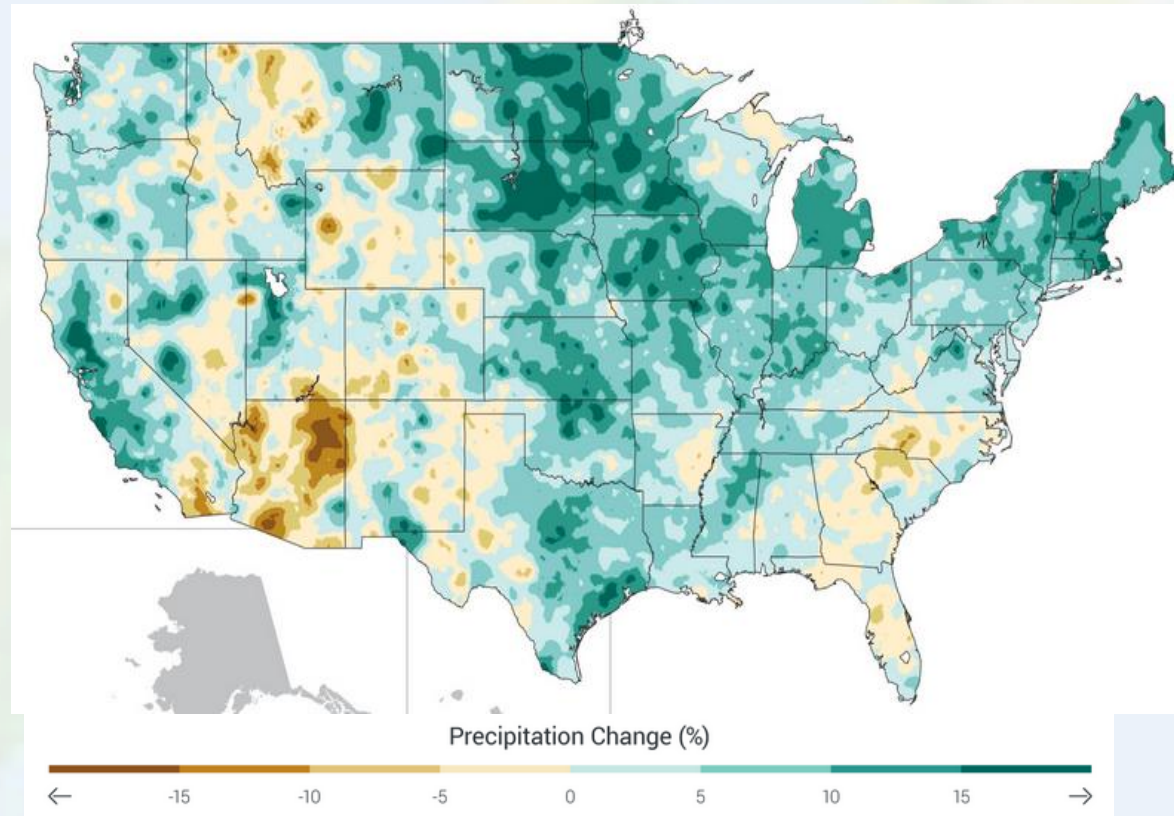
- Temperatures have warmed over the last century across the region.
- The warming is strongest during winter and for northern tier states.



Recent Precipitation Trends

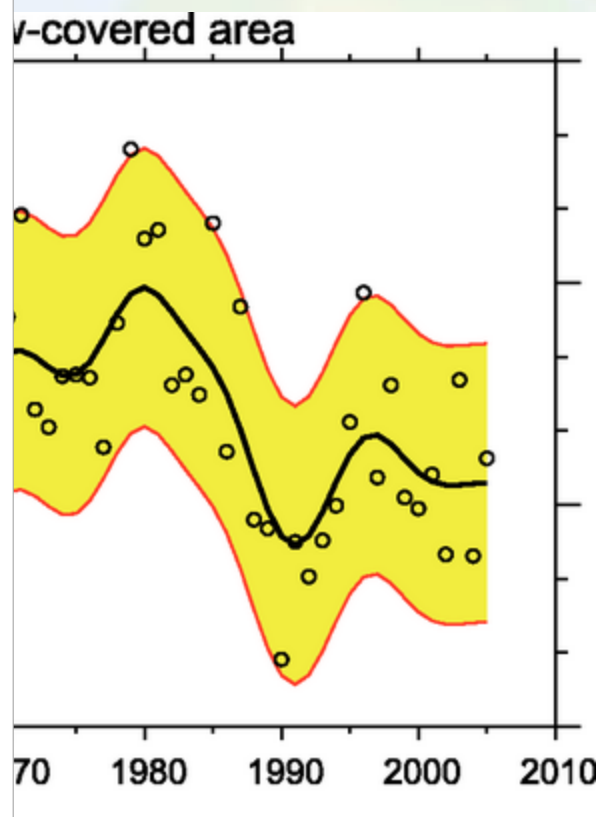
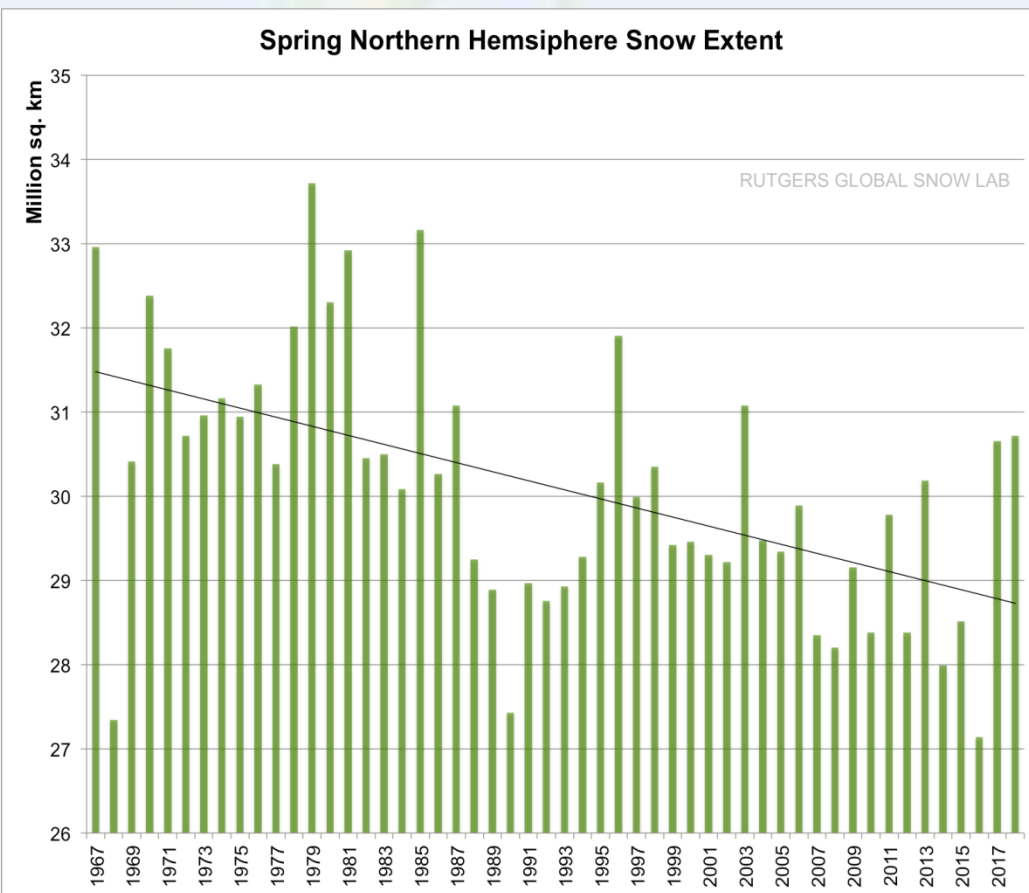
- Wetting in the north.
- Drying in the west and south.

Recent precipitation (1991-2012) compared to 1901-1960



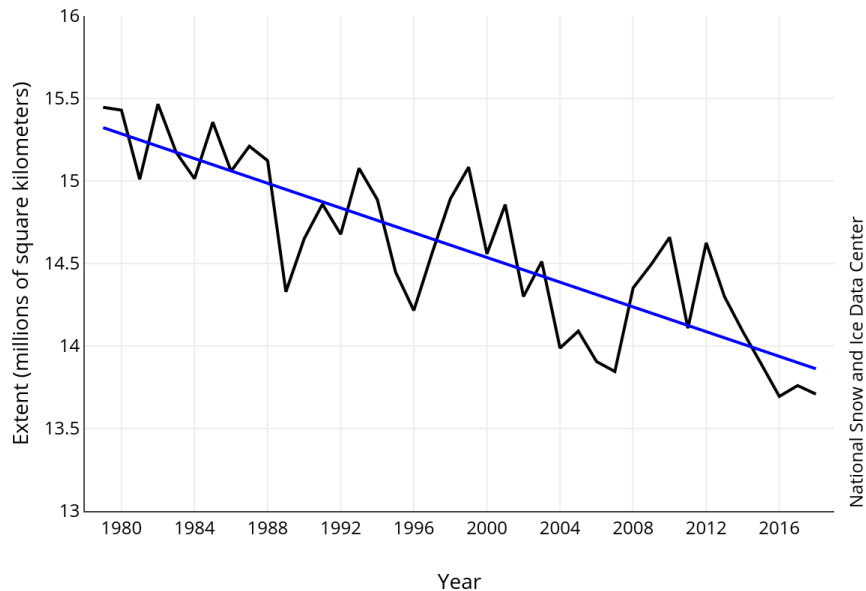
Snow Is Melting Early

- In 2014, snow melt occurred 20–30 days earlier over North America than the 1998–2010 average.

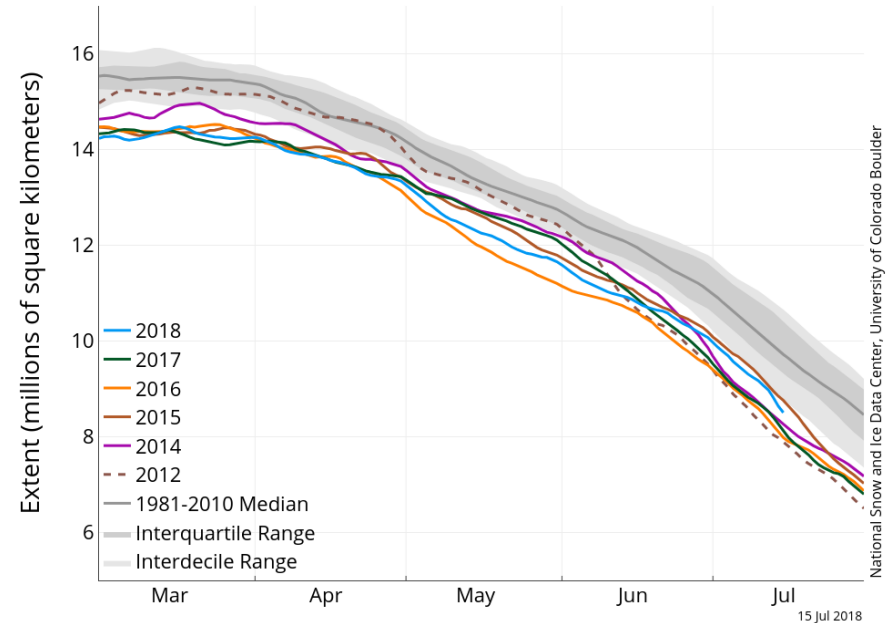


Arctic Sea Ice Is Melting

Average Monthly Arctic Sea Ice Extent
April 1979 - 2018



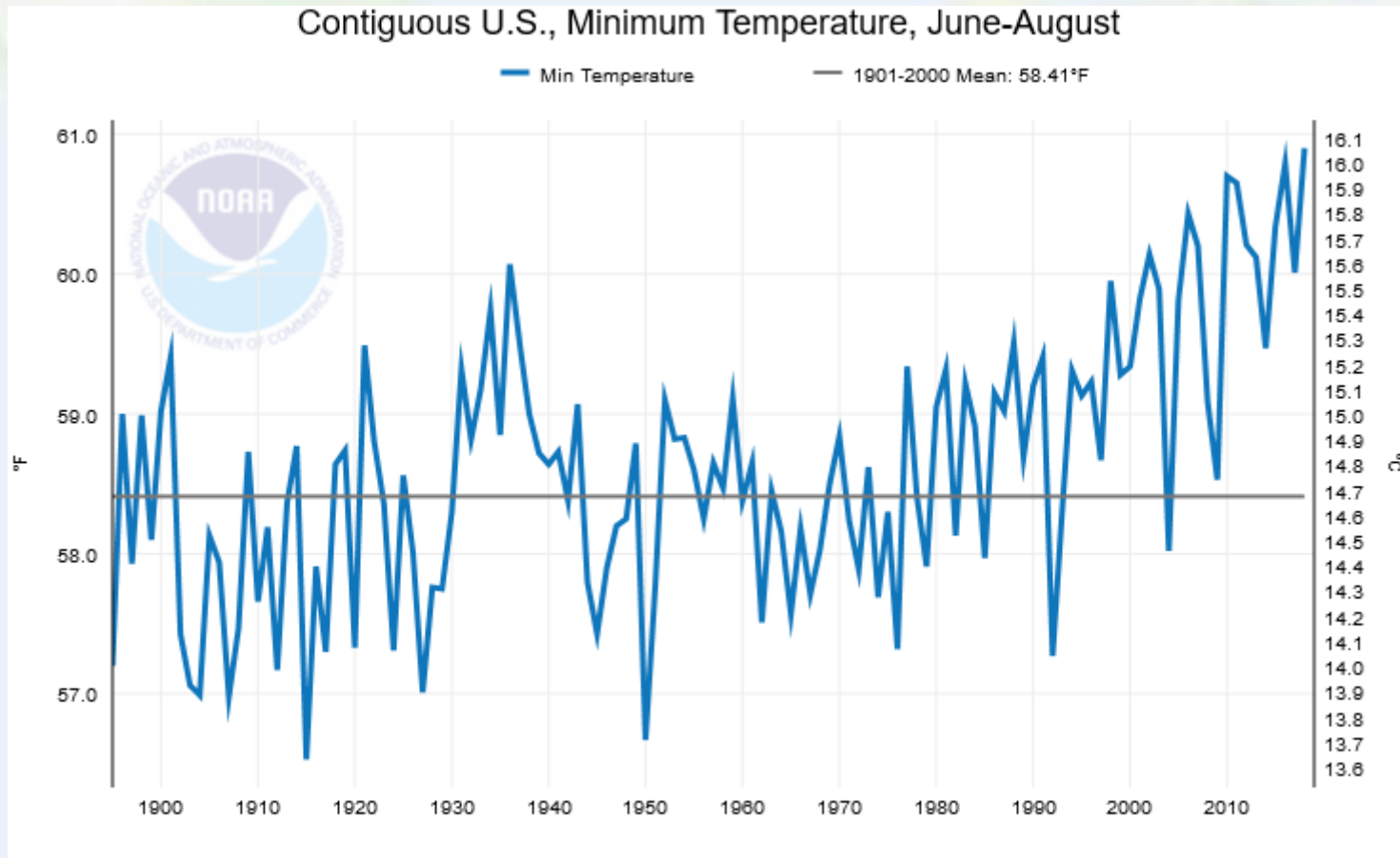
Arctic Sea Ice Extent
(Area of ocean with at least 15% sea ice)



- 10 lowest minimum sea ice extents are the last 10 years.
- Multi-year ice is decreasing (ice is thinning).
- September Arctic sea ice extent is declining at a rate of -13.3% per decade.



Big Heat Is Increasing



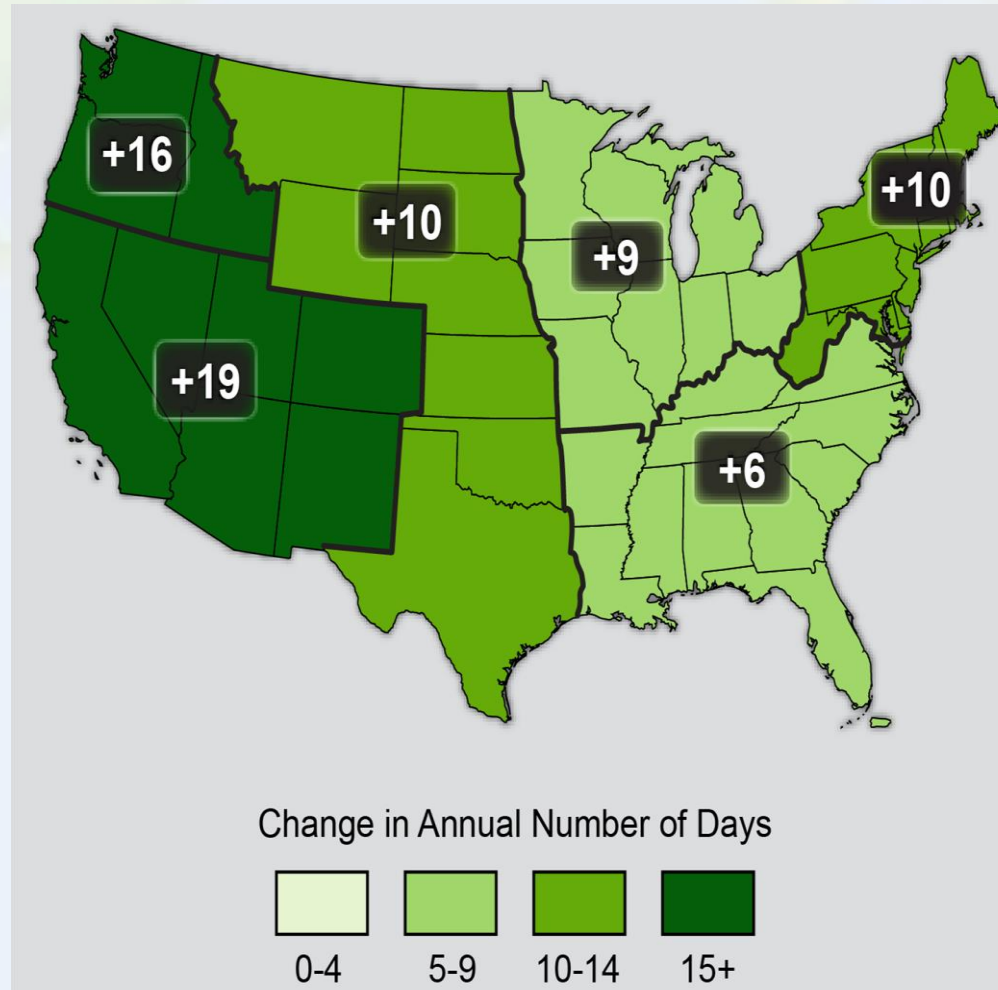
(Big Cold is generally decreasing)



Frost-Free Season Is Lengthening



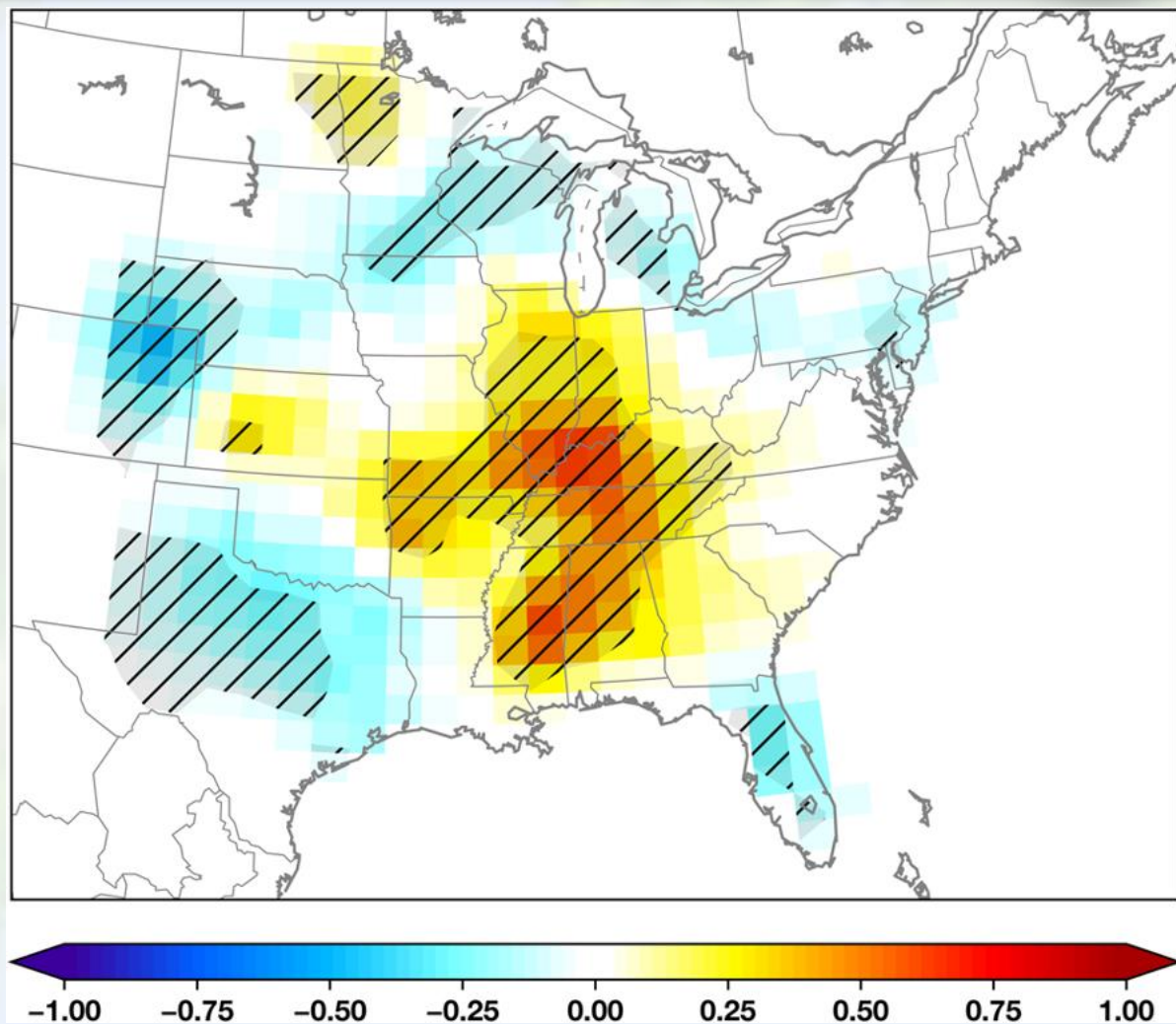
Recent length (1991-2012) compared to 1901-1960



Tornado Trends

1979-2017

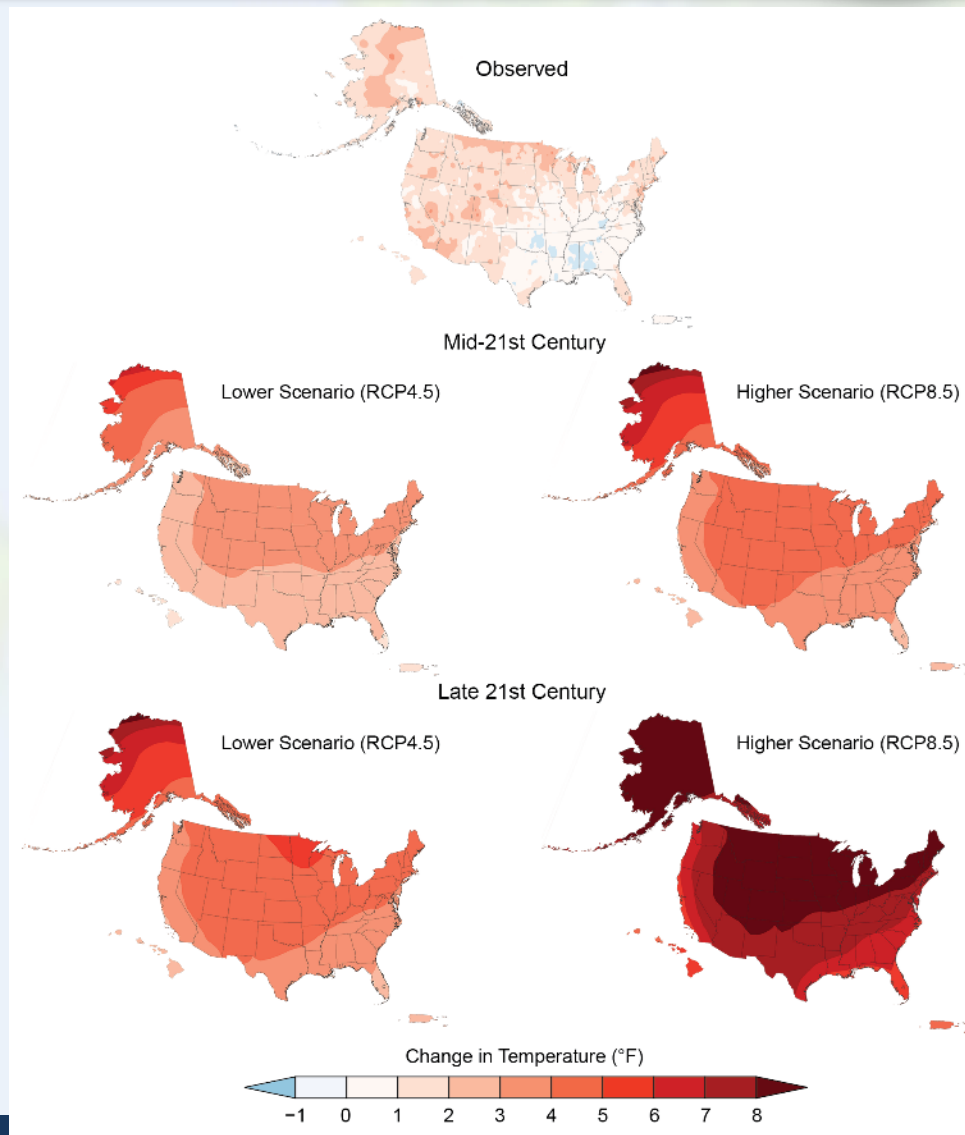
- Shifts in where tornadoes occur



Gensini and Brooks 2018

Projected Temperature Change

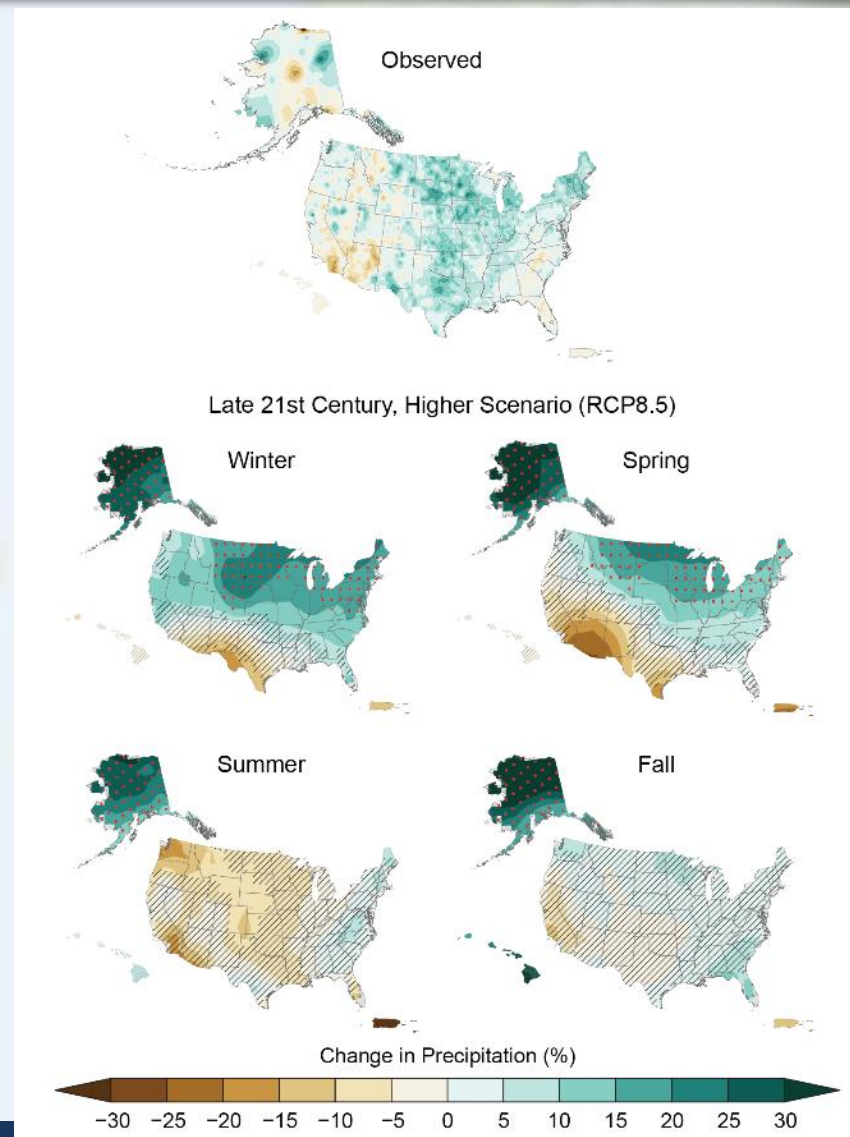
- Average temperatures will warm across the region, annually and for all seasons
- Warm temperature extremes will continue to occur more frequently than cold extremes
- Uncertainty lies in greenhouse gas emissions scenarios



Top: 1986-2016 temperatures, compared to 1901-1960
 Middle: Projected annual average temperature change in 2036-2065, compared to 1986-2015
 Bottom: Projected annual average temperature change in 2070-2099, compared to 1986-2015

Projected Precipitation Change

- Wetting trend north, especially winter and spring.
- Drying trend south, especially winter and spring.
- Drying trend in the central US in the summer.



Top: 1986-2016 precipitation, compared to 1901-1960
 Middle: Projected annual precipitation change in 2036-2065, compared to 1901-1960
 Bottom: Projected annual precipitation change in 2070-2099, compared to 1901-1960
 Red dots: changes large compared to natural variability
 Hatched: changes are small and relatively insignificant



Takeaway Messages



- It's real.
- It's us.
- Experts agree.
- It's mostly bad.
- It's not too late to fix it.

Adapted from Ed Maibach, George Mason University's Center for Climate Change Communication



Climate Tools



Climate.gov

Global Climate Dashboard



Global Climate Dashboard

▼ Climate Change

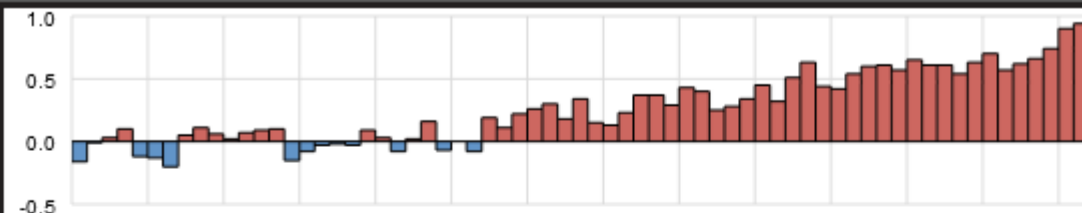
► Climate Variability

► Climate Projections

Global Average Temperature (°C)

The temperature near Earth's surface is rising: the bars show each year's average temperature compared to the 20th century average.

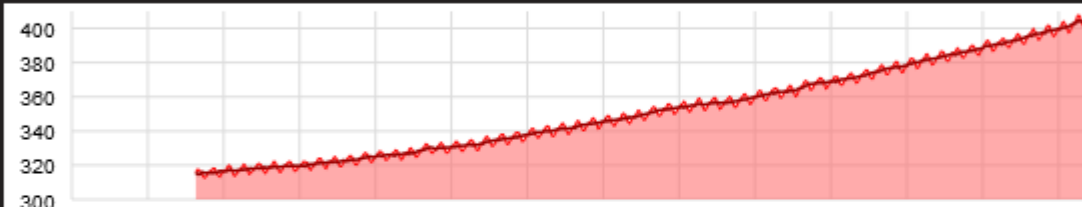
[learn more >>](#)



Carbon Dioxide (ppm)

The amount of carbon dioxide in the atmosphere has risen by 25% since 1958, and by about 40% since the Industrial Revolution.

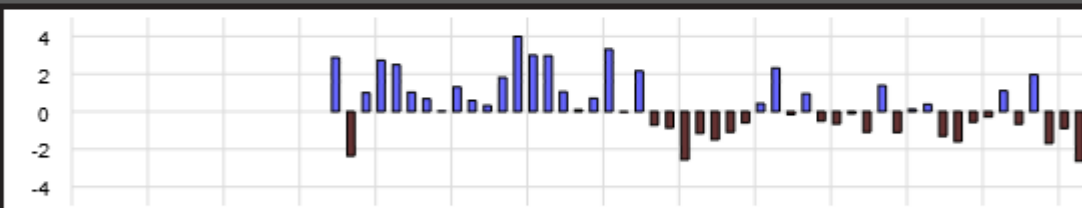
[learn more >>](#)



Spring Snow Cover (million km²)

Snow is melting earlier: each bar shows spring snow cover in the Northern Hemisphere compared to the long-term average.

[learn more >>](#)



1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

← Earlier

Later →



Temperature



Carbon Dioxide



Snow



Sea Level



Arctic Sea Ice



Ocean Heat



Sun's Energy



Glaciers



Heat-Trapping Gases



Climate Resilience Toolkit



U.S. Climate
Resilience
Toolkit

Steps to Resilience

Case Studies

Tools

Expertise

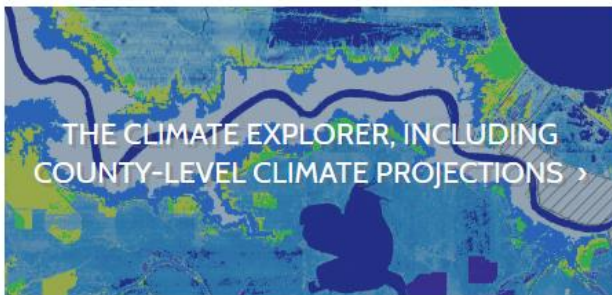
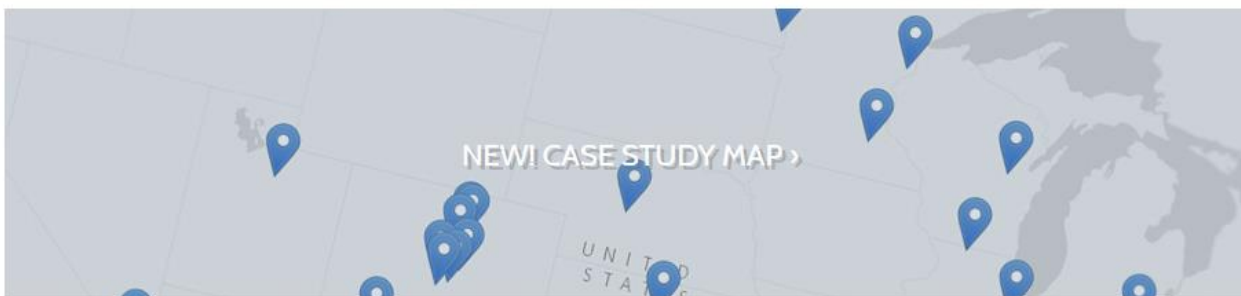
Regions

Topics

Search




FEATURED





Nags Head Case Study



**U.S. Climate Resilience Toolkit**


Steps to Resilience Case Studies Tools Expertise Regions Topics


Search


Building Resilience in the OBX

In North Carolina's Outer Banks, the coastal Town of Nags Head is vulnerable to flooding from heavy rain events, hurricanes, tropical storms, nor'easters, and storm surge. To add insult to injury, vulnerability is increasing with sea level rise. Town managers and residents recognized the need to build the town's resilience and moved forward to prioritize and plan.

Case Studies > Building Resilience in the OBX >

 SHARE


 TWEET

 PRINT

Nags Head can't ignore the rising sea

Dare County, in North Carolina's Outer Banks—known colloquially as “the OBX”—is a dynamic barrier island chain that juts out into the Atlantic Ocean. The Town of Nags Head, located in the northern portion of the Outer Banks, is a unique coastal community steeped in culture, history, and rich in natural resources. Residents are resilient: they enjoy the setting, and they've become accustomed to the winds, storms, and other coastal hazards that shape their environment.

More than 11 miles long, Nags Head boasts the longest



Steps to Resilience

This content supports the highlighted step.

- 1 Explore Hazards
- 2 Assess Vulnerability & Risks
- 3 Investigate Options
- 4 Prioritize & Plan**
- 5 Take Action

Tools

[Vulnerability, Consequences, and Adaptation Planning Scenarios \(VCAPS\)](#) >
[NOAA Tides & Currents](#) >

Nags Head can't ignore the rising sea

- Adaptation to coastal hazards, including sea level rise, is an important step to becoming resilient




NC King Tides Project



Snap the shore *See the future*

- Volunteer precipitation observation network
- Use standard, low-cost tools
- Report observations online
- Data used by weather, water, and climate experts
- Provides access to educational webinars, materials

The screenshot shows the CoCoRaHS website interface. At the top, it says 'COMMUNITY COLLABORATIVE RAIN, HAIL & SNOW NETWORK' and 'Because every drop counts'. Below this is a navigation bar with links like Home, States, View Data, Maps, My Data, My Account, Admin, and Logout. A welcome message reads: 'Welcome to CoCoRaHS! "Volunteers working together to measure precipitation across the nation."'.

On the left is a 'Main Menu' with links: Home, About Us, Join CoCoRaHS, Contact Us, Donate. Below that is a 'Resources' section with links: FAQ, Links, Education, Training Slide Shows, Training Videos, Concept Maps. Further down are links for Volunteer Coordinators, Hail Pad, Distribution/Setup, Help Needed, and Printable Forms. At the bottom left are links for The CoCoRaHS Message of the Day, Data Analysis, CoCoRaHS Blog, Web Groups, State Newsletters, and State Climate Series. A 'Sponsors' section lists 'Links' and 'CoCoRaHS Store'.

The main content area features a '2011 RAIN GAUGE CALENDARS' section with a 'Click here to order' button. Below this is a map of the United States showing precipitation data for 2/9/2011. A legend on the right indicates precipitation amounts in inches (xxx) for the USA. The legend categories are: 0.00-0.09, 0.10-0.19, 0.20-0.29, 0.30-0.39, 0.40-0.49, 0.50-0.59, 0.60-0.69, 0.70-0.79, 0.80-0.89, 0.90-0.99, 1.00-1.09, 1.10-1.19, 1.20-1.29, 1.30-1.39, 1.40-1.49, 1.50-1.59, 1.60-1.69, 1.70-1.79, 1.80-1.89, 1.90-1.99, 2.00-2.09, 2.10-2.19, 2.20-2.29, 2.30-2.39, 2.40-2.49, 2.50-2.59, 2.60-2.69, 2.70-2.79, 2.80-2.89, 2.90-2.99, 3.00-3.09, 3.10-3.19, 3.20-3.29, 3.30-3.39, 3.40-3.49, 3.50-3.59, 3.60-3.69, 3.70-3.79, 3.80-3.89, 3.90-3.99, 4.00-4.09, 4.10-4.19, 4.20-4.29, 4.30-4.39, 4.40-4.49, 4.50-4.59, 4.60-4.69, 4.70-4.79, 4.80-4.89, 4.90-4.99, 5.00-5.09, 5.10-5.19, 5.20-5.29, 5.30-5.39, 5.40-5.49, 5.50-5.59, 5.60-5.69, 5.70-5.79, 5.80-5.89, 5.90-5.99, 6.00-6.09, 6.10-6.19, 6.20-6.29, 6.30-6.39, 6.40-6.49, 6.50-6.59, 6.60-6.69, 6.70-6.79, 6.80-6.89, 6.90-6.99, 7.00-7.09, 7.10-7.19, 7.20-7.29, 7.30-7.39, 7.40-7.49, 7.50-7.59, 7.60-7.69, 7.70-7.79, 7.80-7.89, 7.90-7.99, 8.00-8.09, 8.10-8.19, 8.20-8.29, 8.30-8.39, 8.40-8.49, 8.50-8.59, 8.60-8.69, 8.70-8.79, 8.80-8.89, 8.90-8.99, 9.00-9.09, 9.10-9.19, 9.20-9.29, 9.30-9.39, 9.40-9.49, 9.50-9.59, 9.60-9.69, 9.70-9.79, 9.80-9.89, 9.90-9.99, 10.00-10.09, 10.10-10.19, 10.20-10.29, 10.30-10.39, 10.40-10.49, 10.50-10.59, 10.60-10.69, 10.70-10.79, 10.80-10.89, 10.90-10.99, 11.00-11.09, 11.10-11.19, 11.20-11.29, 11.30-11.39, 11.40-11.49, 11.50-11.59, 11.60-11.69, 11.70-11.79, 11.80-11.89, 11.90-11.99, 12.00-12.09, 12.10-12.19, 12.20-12.29, 12.30-12.39, 12.40-12.49, 12.50-12.59, 12.60-12.69, 12.70-12.79, 12.80-12.89, 12.90-12.99, 13.00-13.09, 13.10-13.19, 13.20-13.29, 13.30-13.39, 13.40-13.49, 13.50-13.59, 13.60-13.69, 13.70-13.79, 13.80-13.89, 13.90-13.99, 14.00-14.09, 14.10-14.19, 14.20-14.29, 14.30-14.39, 14.40-14.49, 14.50-14.59, 14.60-14.69, 14.70-14.79, 14.80-14.89, 14.90-14.99, 15.00-15.09, 15.10-15.19, 15.20-15.29, 15.30-15.39, 15.40-15.49, 15.50-15.59, 15.60-15.69, 15.70-15.79, 15.80-15.89, 15.90-15.99, 16.00-16.09, 16.10-16.19, 16.20-16.29, 16.30-16.39, 16.40-16.49, 16.50-16.59, 16.60-16.69, 16.70-16.79, 16.80-16.89, 16.90-16.99, 17.00-17.09, 17.10-17.19, 17.20-17.29, 17.30-17.39, 17.40-17.49, 17.50-17.59, 17.60-17.69, 17.70-17.79, 17.80-17.89, 17.90-17.99, 18.00-18.09, 18.10-18.19, 18.20-18.29, 18.30-18.39, 18.40-18.49, 18.50-18.59, 18.60-18.69, 18.70-18.79, 18.80-18.89, 18.90-18.99, 19.00-19.09, 19.10-19.19, 19.20-19.29, 19.30-19.39, 19.40-19.49, 19.50-19.59, 19.60-19.69, 19.70-19.79, 19.80-19.89, 19.90-19.99, 20.00-20.09, 20.10-20.19, 20.20-20.29, 20.30-20.39, 20.40-20.49, 20.50-20.59, 20.60-20.69, 20.70-20.79, 20.80-20.89, 20.90-20.99, 21.00-21.09, 21.10-21.19, 21.20-21.29, 21.30-21.39, 21.40-21.49, 21.50-21.59, 21.60-21.69, 21.70-21.79, 21.80-21.89, 21.90-21.99, 22.00-22.09, 22.10-22.19, 22.20-22.29, 22.30-22.39, 22.40-22.49, 22.50-22.59, 22.60-22.69, 22.70-22.79, 22.80-22.89, 22.90-22.99, 23.00-23.09, 23.10-23.19, 23.20-23.29, 23.30-23.39, 23.40-23.49, 23.50-23.59, 23.60-23.69, 23.70-23.79, 23.80-23.89, 23.90-23.99, 24.00-24.09, 24.10-24.19, 24.20-24.29, 24.30-24.39, 24.40-24.49, 24.50-24.59, 24.60-24.69, 24.70-24.79, 24.80-24.89, 24.90-24.99, 25.00-25.09, 25.10-25.19, 25.20-25.29, 25.30-25.39, 25.40-25.49, 25.50-25.59, 25.60-25.69, 25.70-25.79, 25.80-25.89, 25.90-25.99, 26.00-26.09, 26.10-26.19, 26.20-26.29, 26.30-26.39, 26.40-26.49, 26.50-26.59, 26.60-26.69, 26.70-26.79, 26.80-26.89, 26.90-26.99, 27.00-27.09, 27.10-27.19, 27.20-27.29, 27.30-27.39, 27.40-27.49, 27.50-27.59, 27.60-27.69, 27.70-27.79, 27.80-27.89, 27.90-27.99, 28.00-28.09, 28.10-28.19, 28.20-28.29, 28.30-28.39, 28.40-28.49, 28.50-28.59, 28.60-28.69, 28.70-28.79, 28.80-28.89, 28.90-28.99, 29.00-29.09, 29.10-29.19, 29.20-29.29, 29.30-29.39, 29.40-29.49, 29.50-29.59, 29.60-29.69, 29.70-29.79, 29.80-29.89, 29.90-29.99, 30.00-30.09, 30.10-30.19, 30.20-30.29, 30.30-30.39, 30.40-30.49, 30.50-30.59, 30.60-30.69, 30.70-30.79, 30.80-30.89, 30.90-30.99, 31.00-31.09, 31.10-31.19, 31.20-31.29, 31.30-31.39, 31.40-31.49, 31.50-31.59, 31.60-31.69, 31.70-31.79, 31.80-31.89, 31.90-31.99, 32.00-32.09, 32.10-32.19, 32.20-32.29, 32.30-32.39, 32.40-32.49, 32.50-32.59, 32.60-32.69, 32.70-32.79, 32.80-32.89, 32.90-32.99, 33.00-33.09, 33.10-33.19, 33.20-33.29, 33.30-33.39, 33.40-33.49, 33.50-33.59, 33.60-33.69, 33.70-33.79, 33.80-33.89, 33.90-33.99, 34.00-34.09, 34.10-34.19, 34.20-34.29, 34.30-34.39, 34.40-34.49, 34.50-34.59, 34.60-34.69, 34.70-34.79, 34.80-34.89, 34.90-34.99, 35.00-35.09, 35.10-35.19, 35.20-35.29, 35.30-35.39, 35.40-35.49, 35.50-35.59, 35.60-35.69, 35.70-35.79, 35.80-35.89, 35.90-35.99, 36.00-36.09, 36.10-36.19, 36.20-36.29, 36.30-36.39, 36.40-36.49, 36.50-36.59, 36.60-36.69, 36.70-36.79, 36.80-36.89, 36.90-36.99, 37.00-37.09, 37.10-37.19, 37.20-37.29, 37.30-37.39, 37.40-37.49, 37.50-37.59, 37.60-37.69, 37.70-37.79, 37.80-37.89, 37.90-37.99, 38.00-38.09, 38.10-38.19, 38.20-38.29, 38.30-38.39, 38.40-38.49, 38.50-38.59, 38.60-38.69, 38.70-38.79, 38.80-38.89, 38.90-38.99, 39.00-39.09, 39.10-39.19, 39.20-39.29, 39.30-39.39, 39.40-39.49, 39.50-39.59, 39.60-39.69, 39.70-39.79, 39.80-39.89, 39.90-39.99, 40.00-40.09, 40.10-40.19, 40.20-40.29, 40.30-40.39, 40.40-40.49, 40.50-40.59, 40.60-40.69, 40.70-40.79, 40.80-40.89, 40.90-40.99, 41.00-41.09, 41.10-41.19, 41.20-41.29, 41.30-41.39, 41.40-41.49, 41.50-41.59, 41.60-41.69, 41.70-41.79, 41.80-41.89, 41.90-41.99, 42.00-42.09, 42.10-42.19, 42.20-42.29, 42.30-42.39, 42.40-42.49, 42.50-42.59, 42.60-42.69, 42.70-42.79, 42.80-42.89, 42.90-42.99, 43.00-43.09, 43.10-43.19, 43.20-43.29, 43.30-43.39, 43.40-43.49, 43.50-43.59, 43.60-43.69, 43.70-43.79, 43.80-43.89, 43.90-43.99, 44.00-44.09, 44.10-44.19, 44.20-44.29, 44.30-44.39, 44.40-44.49, 44.50-44.59, 44.60-44.69, 44.70-44.79, 44.80-44.89, 44.90-44.99, 45.00-45.09, 45.10-45.19, 45.20-45.29, 45.30-45.39, 45.40-45.49, 45.50-45.59, 45.60-45.69, 45.70-45.79, 45.80-45.89, 45.90-45.99, 46.00-46.09, 46.10-46.19, 46.20-46.29, 46.30-46.39, 46.40-46.49, 46.50-46.59, 46.60-46.69, 46.70-46.79, 46.80-46.89, 46.90-46.99, 47.00-47.09, 47.10-47.19, 47.20-47.29, 47.30-47.39, 47.40-47.49, 47.50-47.59, 47.60-47.69, 47.70-47.79, 47.80-47.89, 47.90-47.99, 48.00-48.09, 48.10-48.19, 48.20-48.29, 48.30-48.39, 48.40-48.49, 48.50-48.59, 48.60-48.69, 48.70-48.79, 48.80-48.89, 48.90-48.99, 49.00-49.09, 49.10-49.19, 49.20-49.29, 49.30-49.39, 49.40-49.49, 49.50-49.59, 49.60-49.69, 49.70-49.79, 49.80-49.89, 49.90-49.99, 50.00-50.09, 50.10-50.19, 50.20-50.29, 50.30-50.39, 50.40-50.49, 50.50-50.59, 50.60-50.69, 50.70-50.79, 50.80-50.89, 50.90-50.99, 51.00-51.09, 51.10-51.19, 51.20-51.29, 51.30-51.39, 51.40-51.49, 51.50-51.59, 51.60-51.69, 51.70-51.79, 51.80-51.89, 51.90-51.99, 52.00-52.09, 52.10-52.19, 52.20-52.29, 52.30-52.39, 52.40-52.49, 52.50-52.59, 52.60-52.69, 52.70-52.79, 52.80-52.89, 52.90-52.99, 53.00-53.09, 53.10-53.19, 53.20-53.29, 53.30-53.39, 53.40-53.49, 53.50-53.59, 53.60-53.69, 53.70-53.79, 53.80-53.89, 53.90-53.99, 54.00-54.09, 54.10-54.19, 54.20-54.29, 54.30-54.39, 54.40-54.49, 54.50-54.59, 54.60-54.69, 54.70-54.79, 54.80-54.89, 54.90-54.99, 55.00-55.09, 55.10-55.19, 55.20-55.29, 55.30-55.39, 55.40-55.49, 55.50-55.59, 55.60-55.69, 55.70-55.79, 55.80-55.89, 55.90-55.99, 56.00-56.09, 56.10-56.19, 56.20-56.29, 56.30-56.39, 56.40-56.49, 56.50-56.59, 56.60-56.69, 56.70-56.79, 56.80-56.89, 56.90-56.99, 57.00-57.09, 57.10-57.19, 57.20-57.29, 57.30-57.39, 57.40-57.49, 57.50-57.59, 57.60-57.69, 57.70-57.79, 57.80-57.89, 57.90-57.99, 58.00-58.09, 58.10-58.19, 58.20-58.29, 58.30-58.39, 58.40-58.49, 58.50-58.59, 58.60-58.69, 58.70-58.79, 58.80-58.89, 58.90-58.99, 59.00-59.09, 59.10-59.19, 59.20-59.29, 59.30-59.39, 59.40-59.49, 59.50-59.59, 59.60-59.69, 59.70-59.79, 59.80-59.89, 59.90-59.99, 60.00-60.09, 60.10-60.19, 60.20-60.29, 60.30-60.39, 60.40-60.49, 60.50-60.59, 60.60-60.69, 60.70-60.79, 60.80-60.89, 60.90-60.99, 61.00-61.09, 61.10-61.19, 61.20-61.29, 61.30-61.39, 61.40-61.49, 61.50-61.59, 61.60-61.69, 61.70-61.79, 61.80-61.89, 61.90-61.99, 62.00-62.09, 62.10-62.19, 62.20-62.29, 62.30-62.39, 62.40-62.49, 62.50-62.59, 62.60-62.69, 62.70-62.79, 62.80-62.89, 62.90-62.99, 63.00-63.09, 63.10-63.19, 63.20-63.29, 63.30-63.39, 63.40-63.49, 63.50-63.59, 63.60-63.69, 63.70-63.79, 63.80-63.89, 63.90-63.99, 64.00-64.09, 64.10-64.19, 64.20-64.29, 64.30-64.39, 64.40-64.49, 64.50-64.59, 64.60-64.69, 64.70-64.79, 64.80-64.89, 64.90-64.99, 65.00-65.09, 65.10-65.19, 65.20-65.29, 65.30-65.39, 65.40-65.49, 65.50-65.59, 65.60-65.69, 65.70-65.79, 65.80-65.89, 65.90-65.99, 66.00-66.09, 66.10-66.19, 66.20-66.29, 66.30-66.39, 66.40-66.49, 66.50-66.59, 66.60-66.69, 66.70-66.79, 66.80-66.89, 66.90-66.99, 67.00-67.09, 67.10-67.19, 67.20-67.29, 67.30-67.39, 67.40-67.49, 67.50-67.59, 67.60-67.69, 67.70-67.79, 67.80-67.89, 67.90-67.99, 68.00-68.09, 68.10-68.19, 68.20-68.29, 68.30-68.39, 68.40-68.49, 68.50-68.59, 68.60-68.69, 68.70-68.79, 68.80-68.89, 68.90-68.99, 69.00-69.09, 69.10-69.19, 69.20-69.29, 69.30-69.39, 69.40-69.49, 69.50-69.59, 69.60-69.69, 69.70-69.79, 69.80-69.89, 69.90-69.99, 70.00-70.09, 70.10-70.19, 70.20-70.29, 70.30-70.39, 70.40-70.49, 70.50-70.59, 70.60-70.69, 70.70-70.79, 70.80-70.89, 70.90-70.99, 71.00-71.09, 71.10-71.19, 71.20-71.29, 71.30-71.39, 71.40-71.49, 71.50-71.59, 71.60-71.69, 71.70-71.79, 71.80-71.89, 71.90-71.99, 72.00-72.09, 72.10-72.19, 72.20-72.29, 72.30-72.39, 72.40-72.49, 72.50-72.59, 72.60-72.69, 72.70-72.79, 72.80-72.89, 72.90-72.99, 73.00-73.09, 73.10-73.19, 73.20-73.29, 73.30-73.39, 73.40-73.49, 73.50-73.59, 73.60-73.69, 73.70-73.79, 73.80-73.89, 73.90-73.99, 74.00-74.09, 74.10-74.19, 74.20-74.29, 74.30-74.39, 74.40-74.49, 74.50-74.59, 74.60-74.69, 74.70-74.79, 74.80-74.89, 74.90-74.99, 75.00-75.09, 75.10-75.19, 75.20-75.29, 75.30-75.39, 75.40-75.49, 75.50-75.59, 75.60-75.69, 75.70-75.79, 75.80-75.89, 75.90-75.99, 76.00-76.09, 76.10-76.19, 76.20-76.29, 76.30-76.39, 76.40-76.49, 76.50-76.59, 76.60-76.69, 76.70-76.79, 76.80-76.89, 76.90-76.99, 77.00-77.09, 77.10-77.19, 77.20-77.29, 77.30-77.39, 77.40-77.49, 77.50-77.59, 77.60-77.69, 77.70-77.79, 77.80-77.89, 77.90-77.99, 78.00-78.09, 78.10-78.19, 78.20-78.29, 78.30-78.39, 78.40-78.49, 78.50-78.59, 78.60-78.69, 78.70-78.79, 78.80-78.89, 78.90-78.99, 79.00-79.09, 79.10-79.19, 79.20-79.29, 79.30-79.39, 79.40-79.49, 79.50-79.59, 79.60-79.69, 79.70-79.79, 79.80-79.89, 79.90-79.99, 80.00-80.09, 80.10-80.19, 80.20-80.29, 80.30-80.39, 80.40-80.49, 80.50-80.59, 80.60-80.69, 80.70-80.79, 80.80-80.89, 80.90-80.99, 81.00-81.09, 81.10-81.19, 81.20-81.29, 81.30-81.39, 81.40-81.49, 81.50-81.59, 81.60-81.69, 81.70-81.79, 81.80-81.89, 81.90-81.99, 82.00-82.09, 82.10-82.19, 82.20-82.29, 82.30-82.39, 82.40-82.49, 82.50-82.59, 82.60-82.69, 82.70-82.79, 82.80-82.89, 82.90-82.99, 83.00-83.09, 83.10-83.19, 83.20-83.29, 83.30-83.39, 83.40-83.49, 83.50-83.59, 83.60-83.69, 83.70-83.79, 83.80-83.89, 83.90-83.99, 84.00-84.09, 84.10-84.19, 84.20-84.29, 84.30-84.39, 84.40-84.49, 84.50-84.59, 84.60-84.69, 84.70-84.79, 84.80-84.89, 84.90-84.99, 85.00-85.09, 85.10-85.19, 85.20-85.29, 85.30-85.39, 85.40-85.49, 85.50-85.59, 85.60-85.69, 85.70-85.79, 85.80-85.89, 85.90-85.99, 86.00-86.09, 86.10-86.19, 86.20-86.29, 86.30-86.39, 86.40-86.49, 86.50-86.59, 86.60-86.69, 86.70-86.79, 86.80-86.89, 86.90-86.99, 87.00-87.09, 87.10-87.19, 87.20-87.29, 87.30-87.39, 87.40-87.49, 87.50-87.59, 87.60-87.69, 87.70-87.79, 87.80-87.89, 87.90-87.99, 88.00-88.09, 88.10-88.19, 88.20-88.29, 88.30-88.39, 88.40-88.49, 88.50-88.59, 88.60-88.69, 88.70-88.79, 88.80-88.89, 88.90-88.99, 89.00-89.09, 89.10-89.19, 89.20-89.29, 89.30-89.39, 89.40-89.49, 89.50-89.59, 89.60-89.69, 89.70-89.79, 89.80-89.89, 89.90-

Thanks for Your Interest!



erik.heden@noaa.gov
sespiegl@ncsu.edu

www.weather.gov/moreheadcity