EXHIBIT 6

A Tutorial on Climate Change Science: The 4th National Climate Assessment

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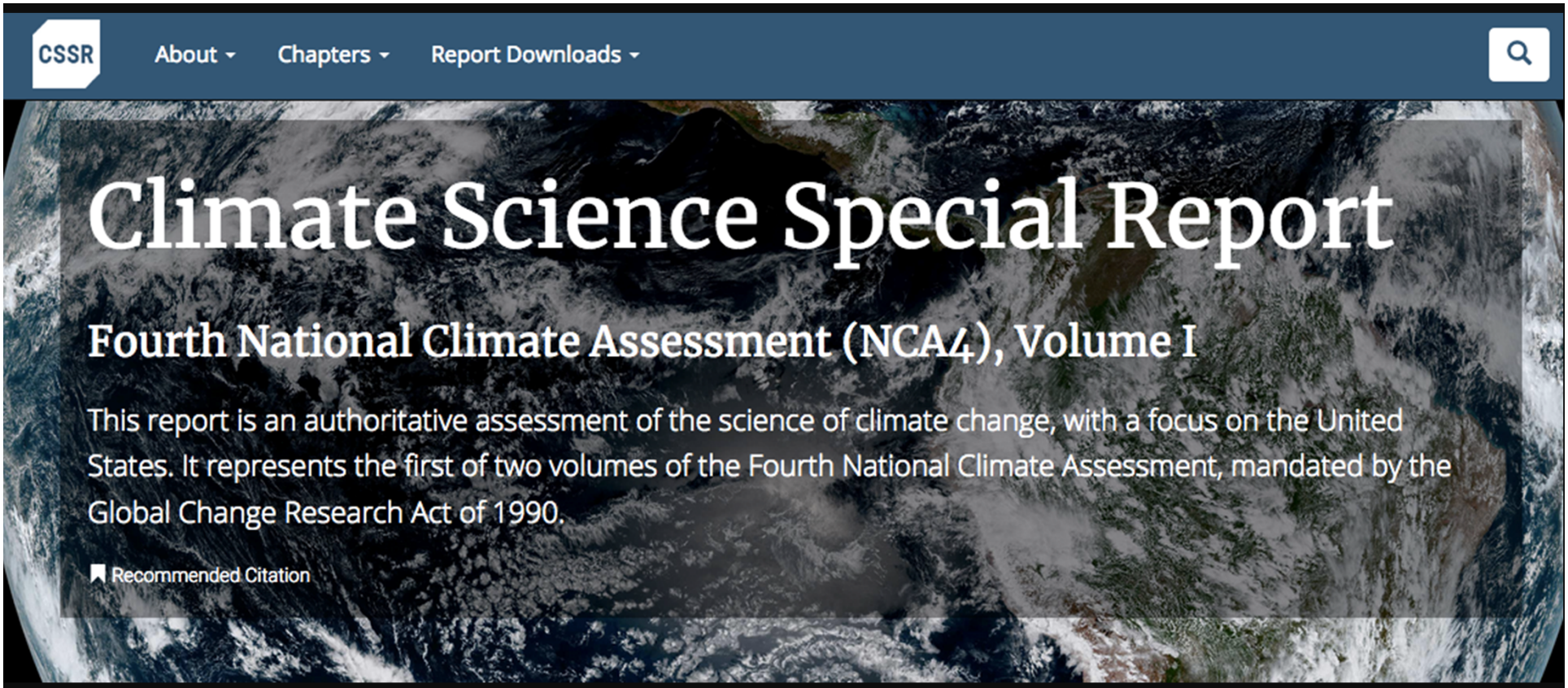
SF March 21, 2018



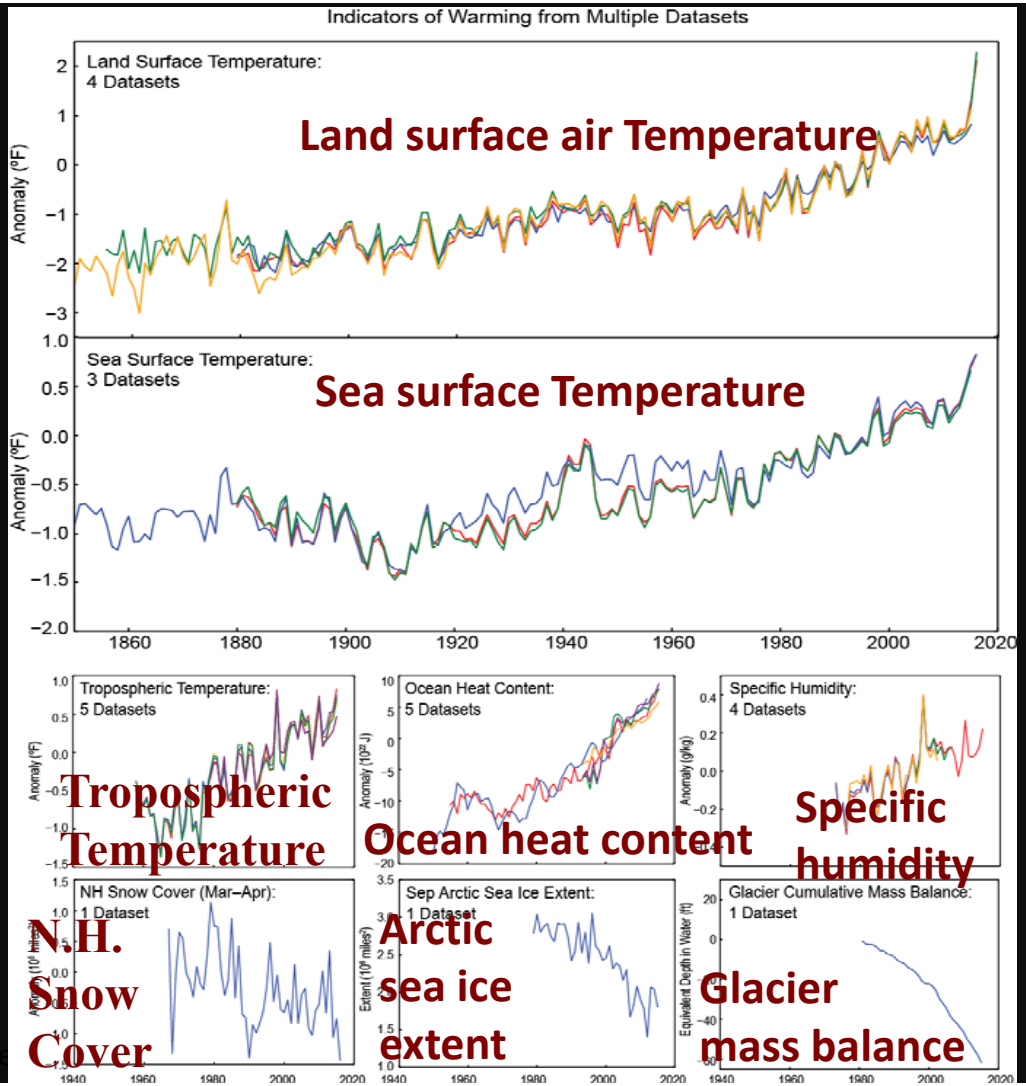
science2017.globalchange.gov

NCA Volume II on impacts expected to be published in Dec. 2018

The Science: The Bottom Line

- Our climate is changing,
  - It is happening now;
  - It is happening extremely rapidly;
- Severe weather is becoming more intense;
- Sea levels are rising;
- It is largely happening because of human activities and associated pollution;
- The climate will continue to change over the coming decades.

Many Different Observations Show a Changing Climate

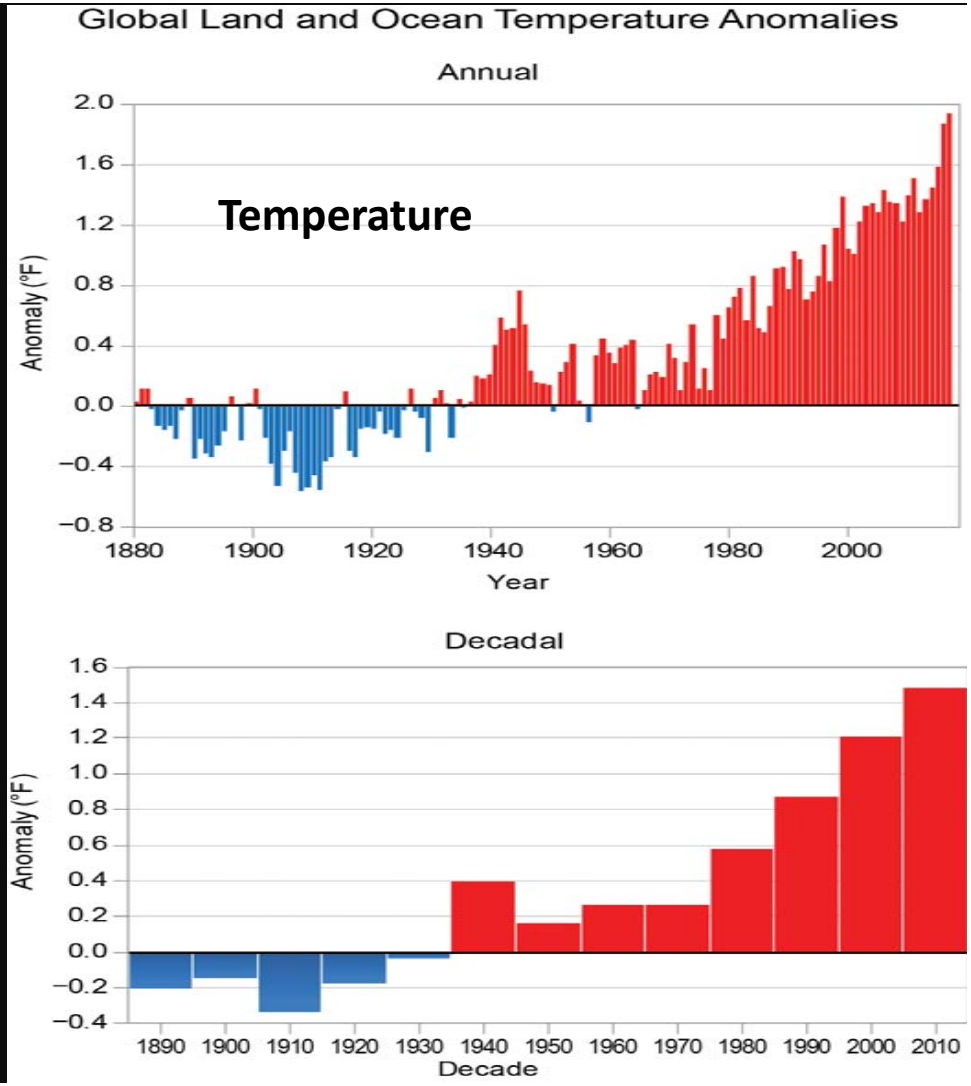


Global Annually-Averaged Temperature Record (NOAA, through 2016)

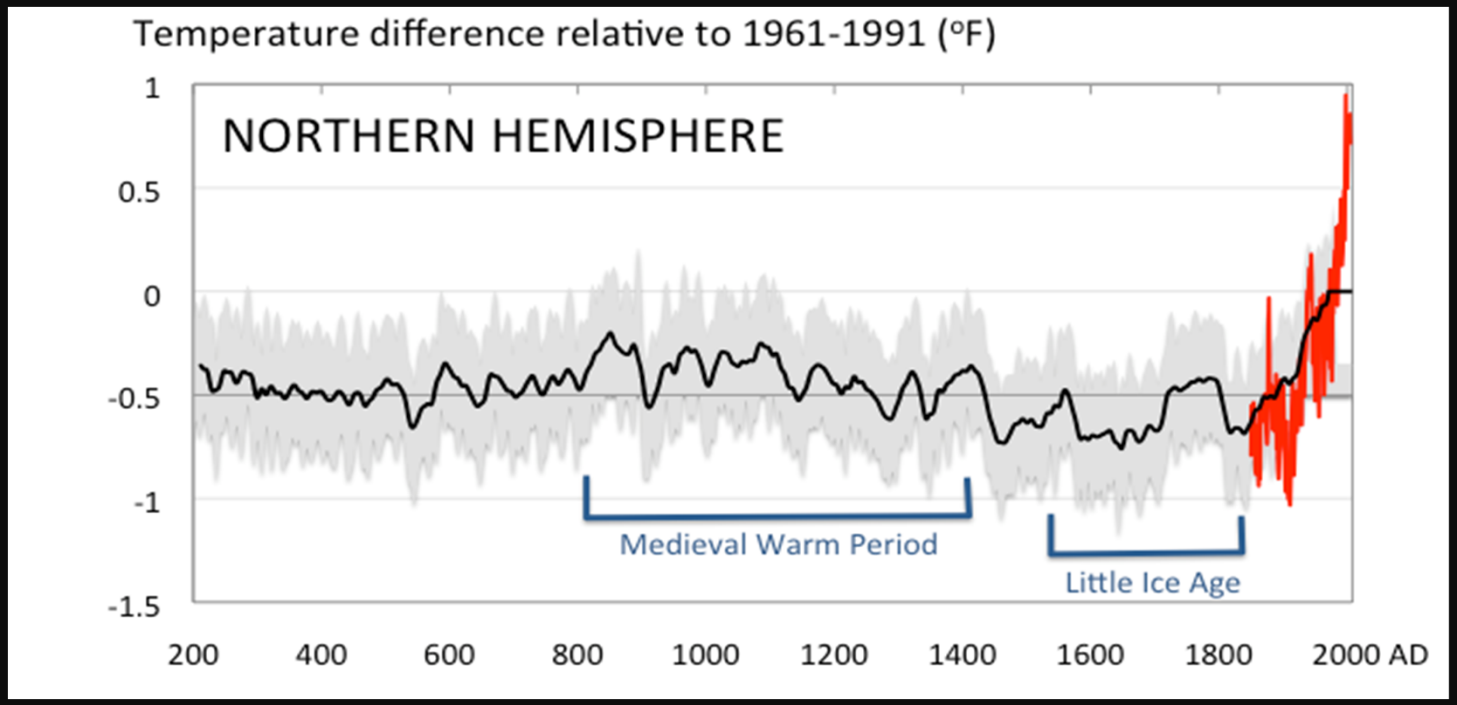
Globally, annually-averaged temperature has increased by 1.8 °F from 1901-2016

Date

Graphs are relative to 1901-1960



Conditions today appear to be unusual in the context of the last 2,000 years …



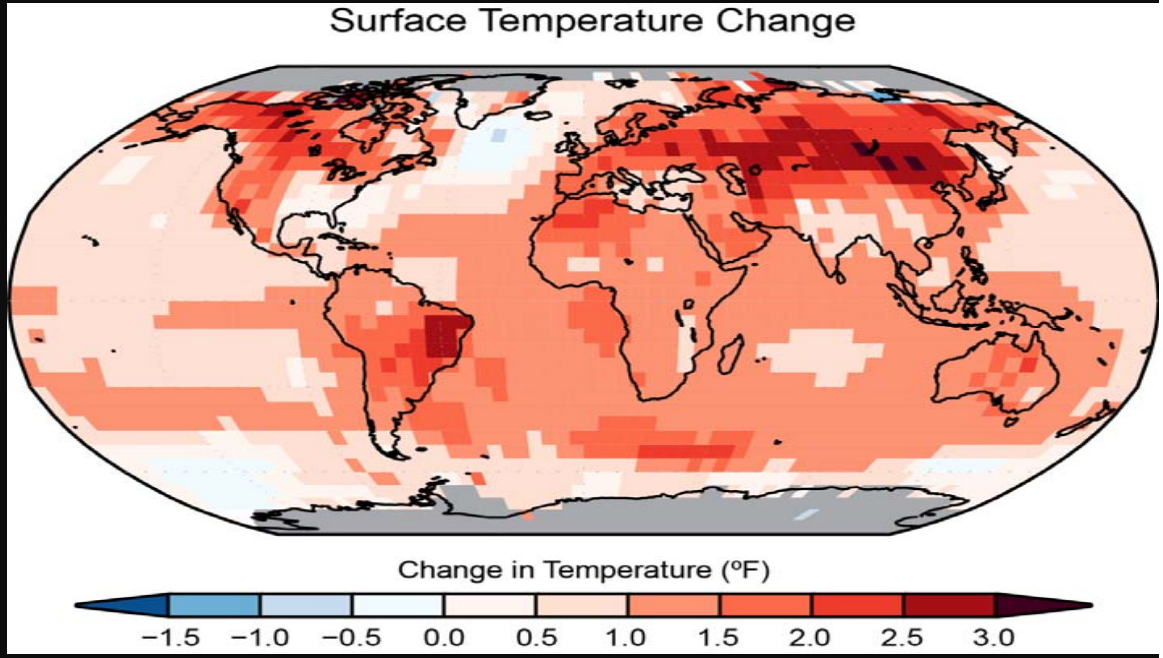
Updated from Mann et al., 2008 PNAS

Our Climate Continues to Change Rapidly

The global long-term warming trend continues.

2016 was the warmest year on record, 2015 is 2nd and far surpassed 2014, which is 3rd. 2017 is 2nd or 3rd warmest year on record.

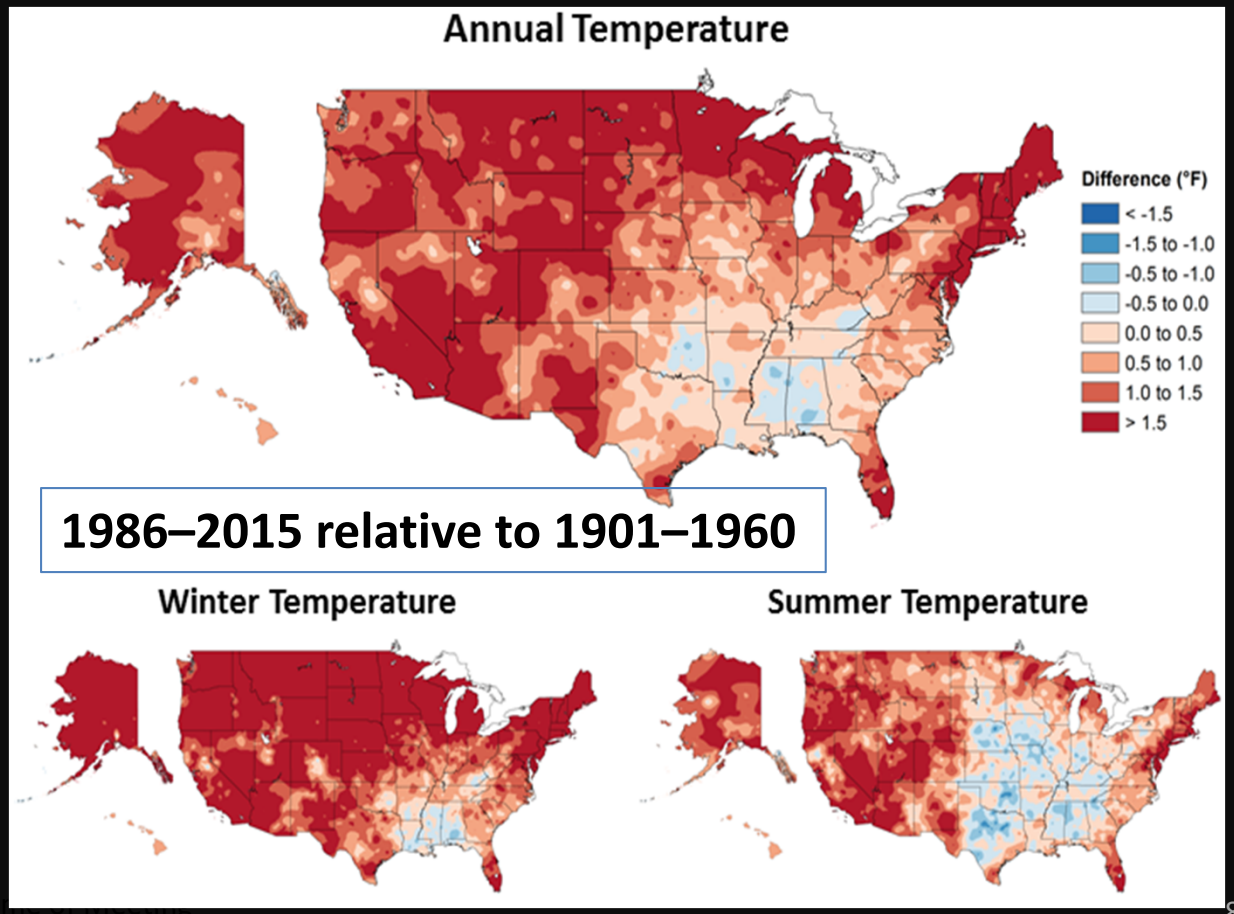
Seventeen of the last 18 years are the warmest years on record.



Temperature trends (change in ° F) for the period 1986-2015 relative to 1901-1960

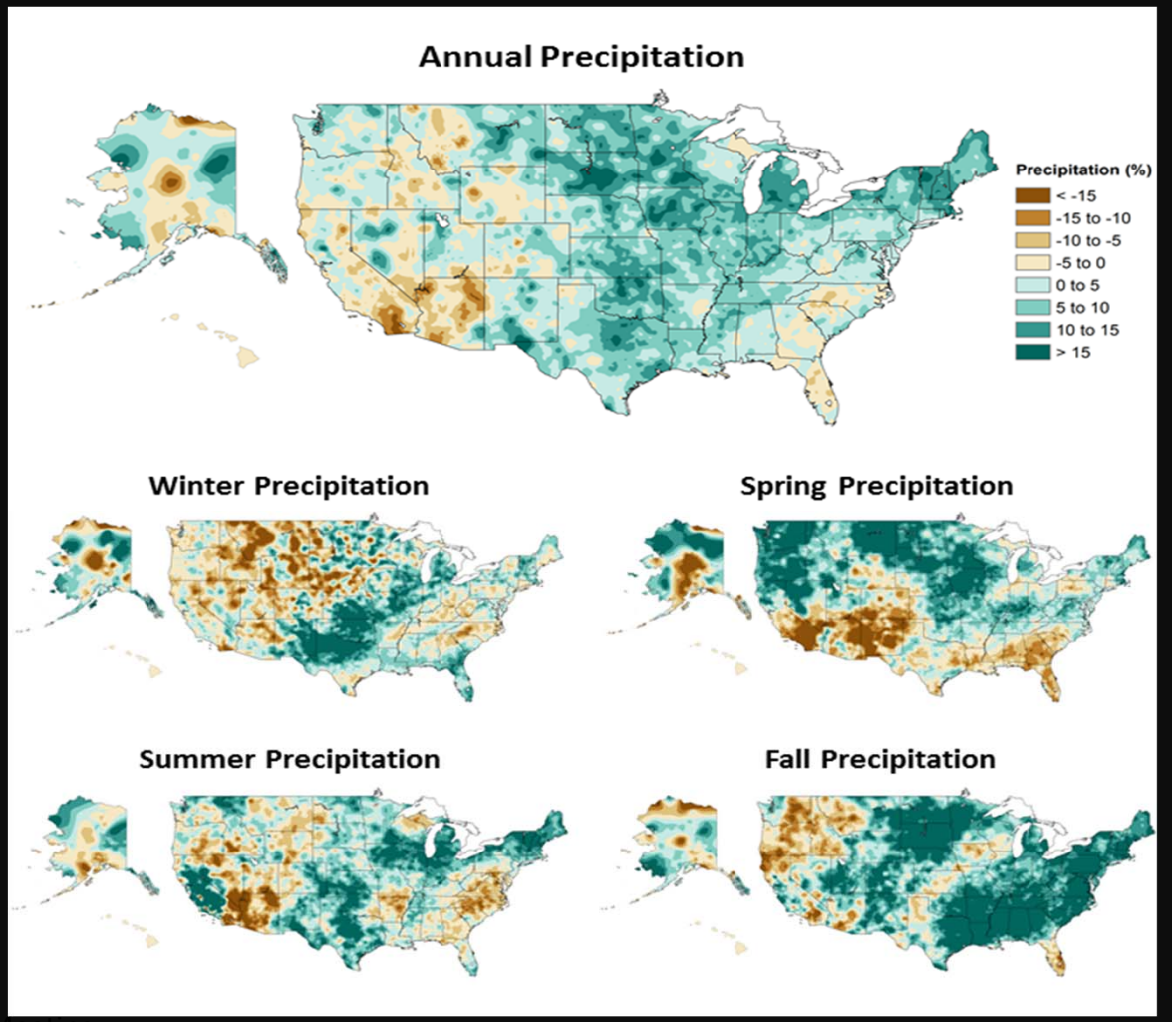
Observed U.S. Temperature Change

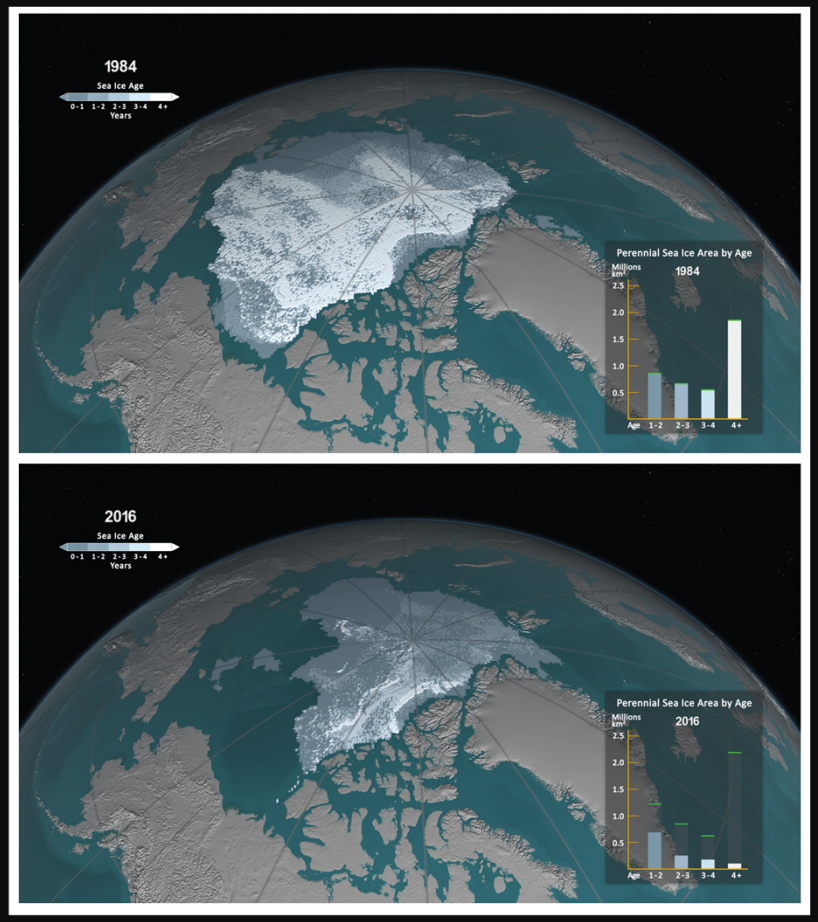
Over contiguous United States, annually-averaged temperature has increased by 1.8 °F from 1895-2016



Observed U.S. Precipitation Change

Annual precipitation has increased overall by 4 % in the United States.
It has decreased in much of the West, Southwest, and Southeast.





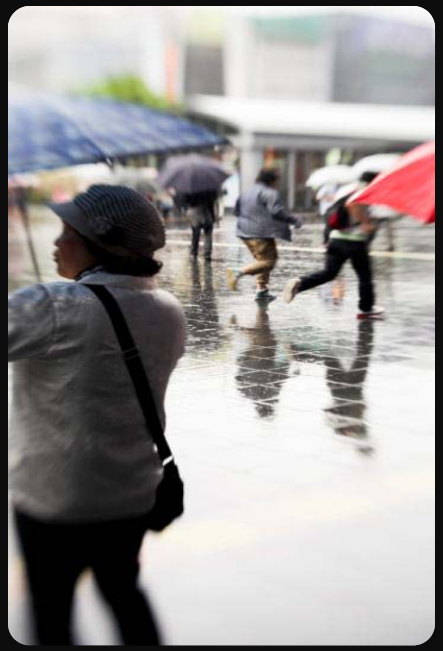
The Arctic is on the Front Lines of Climate Change

Stark examples of rapid changes:

- Temperature warming at 2x rate of rest of world.
- accelerated melting of multi-year sea ice cover
- mass loss from the Greenland Ice Sheet
- reduced snow cover
- permafrost thawing

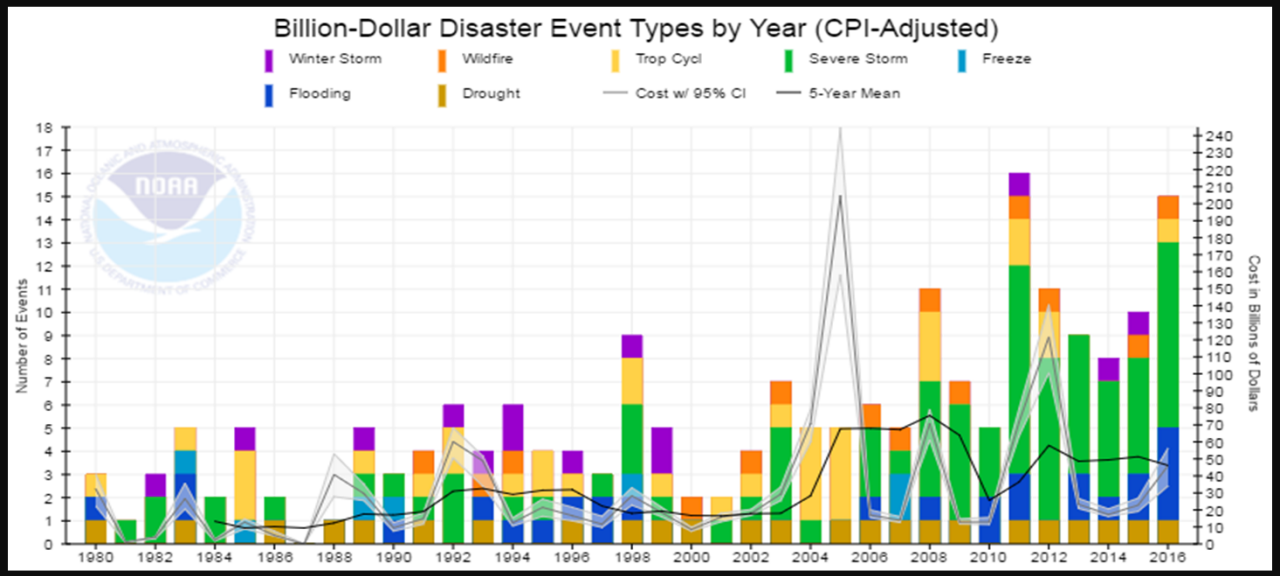
We are seeing changing trends in extreme weather and climate events



NOAA analyses show increasing effects of Severe Weather on U.S. economy: Total of $1.1 trillion since 1980

Every U.S. region has been affected by this growing trend.



Billion-dollar weather and climate disasters [redacted]0-2016 (accounts for inflation)

Similar trend globally

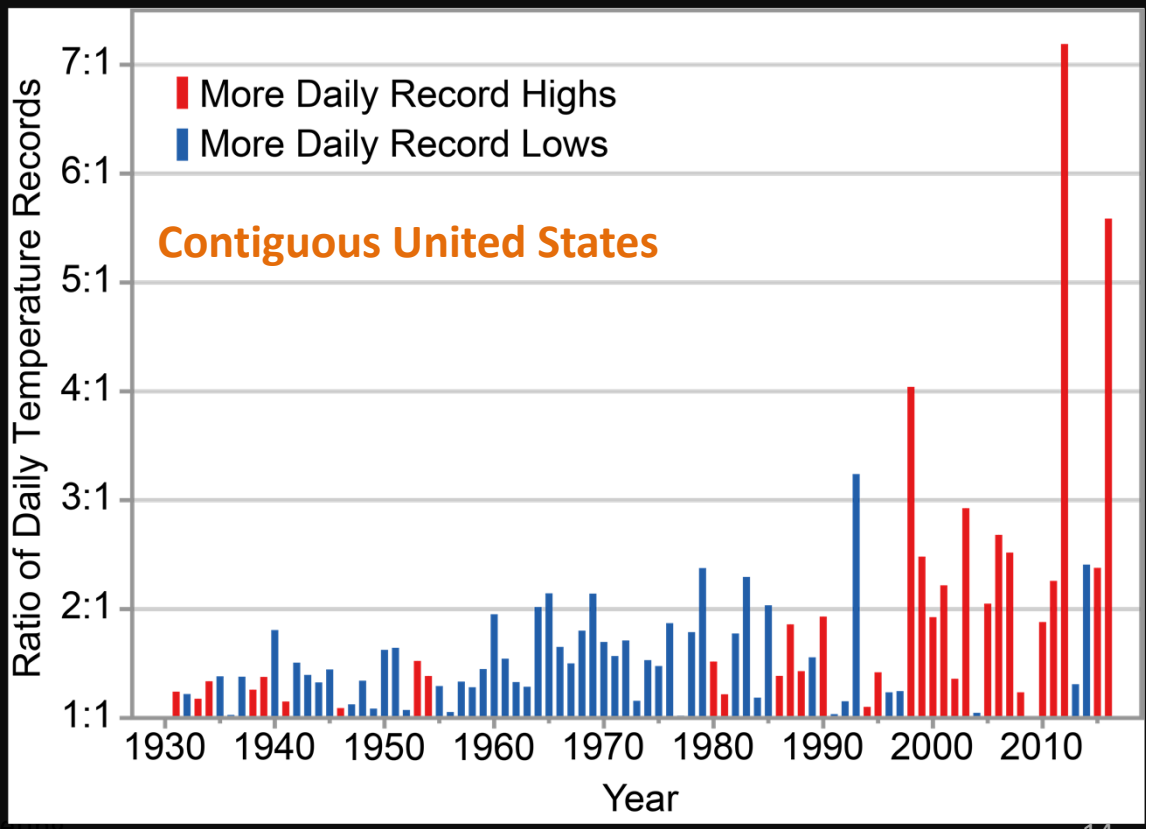
Extreme Events Show Important Trends Globally and in United States

- Heat waves are increasing
- Cold waves are decreasing.
- More precipitation coming as larger events.
- Increasing risk of floods (esp. in NE, MW).
- Increasing intensity of droughts (esp. in SW, SE).
- Incidence of large wildfires has increased (West, Alaska)
- Increasing intensity of Atlantic hurricanes.
- Tornado activity more variable – increase in outbreaks.
- Hail may be coming more intense.

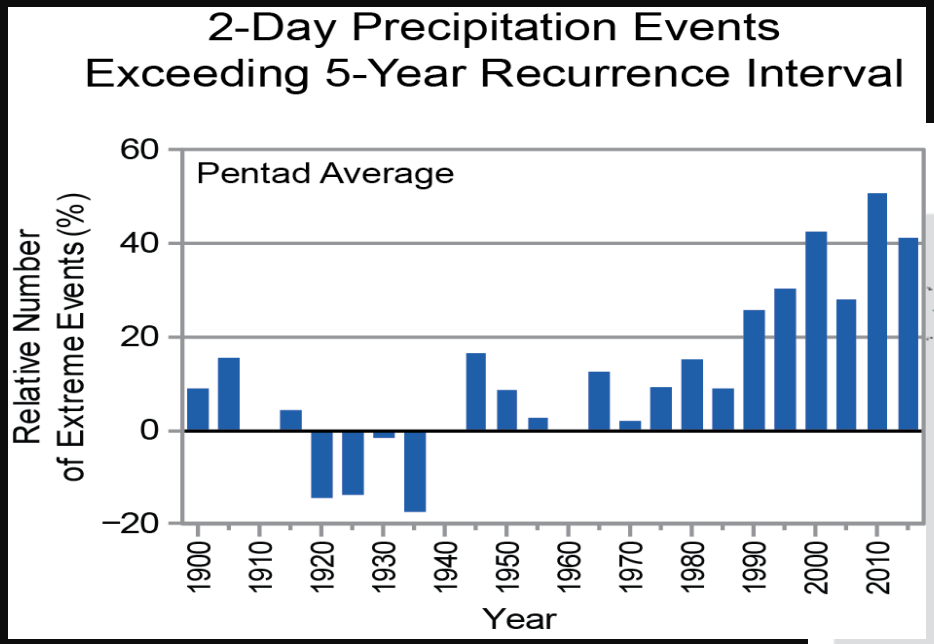
These trends are expected to continue.

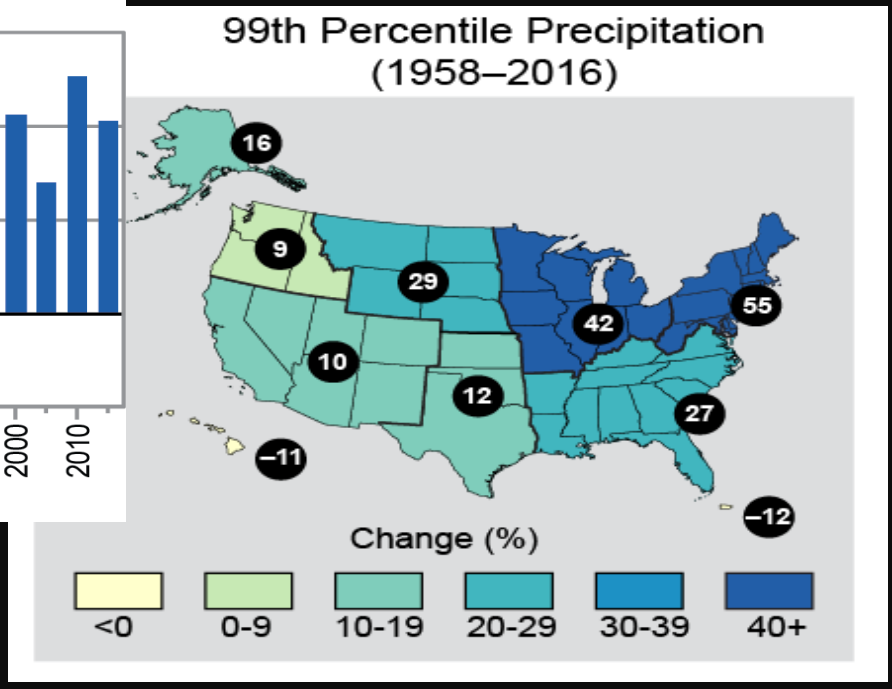
Record Warm Daily Temperatures Are Occurring More Often

The frequency and intensity of **extreme heat** events are increasing in most continental regions of the world, including the United States.



Extreme Precipitation Events are Increasing in Frequency and Intensity





Increasing Trends in Wildfires

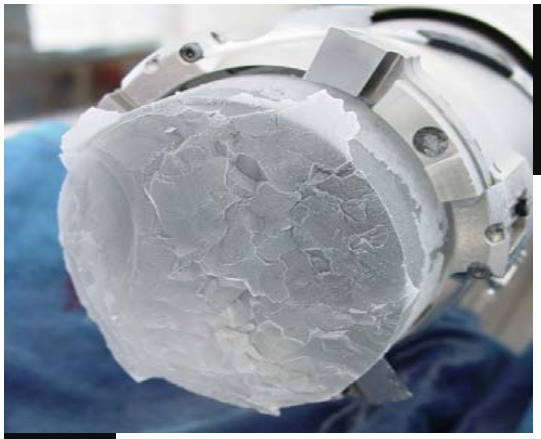
- More than 9.2 million U.S. acres burned in 2017.
- The U.S. fire season is about 3 months longer than 40 years ago.
- The average fire is much bigger & hotter than before.
- In Alaska, even the tundra is experienc eing wildfires.

July 2017

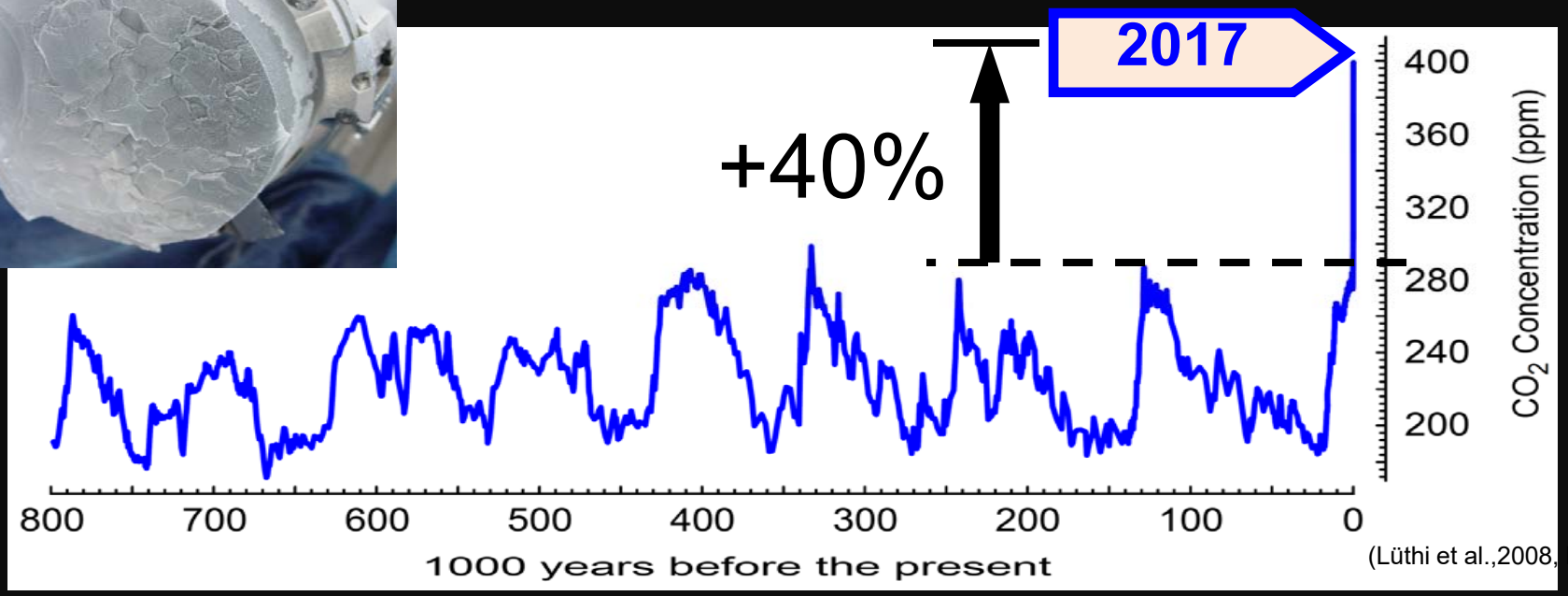

Montana Sept 2017

What is Causing Observed Changes in Climate

- **Many lines of evidence demonstrate that human activities are primarily responsible for the observed climate changes.**
- **There are no credible alternative explanations supported by the extent of the observational evidence.**
  - Solar output changes and natural variability can only contribute marginally to observed climate changes.
  - There are no natural cycles in the observational record that can explain the observed changes in climate.

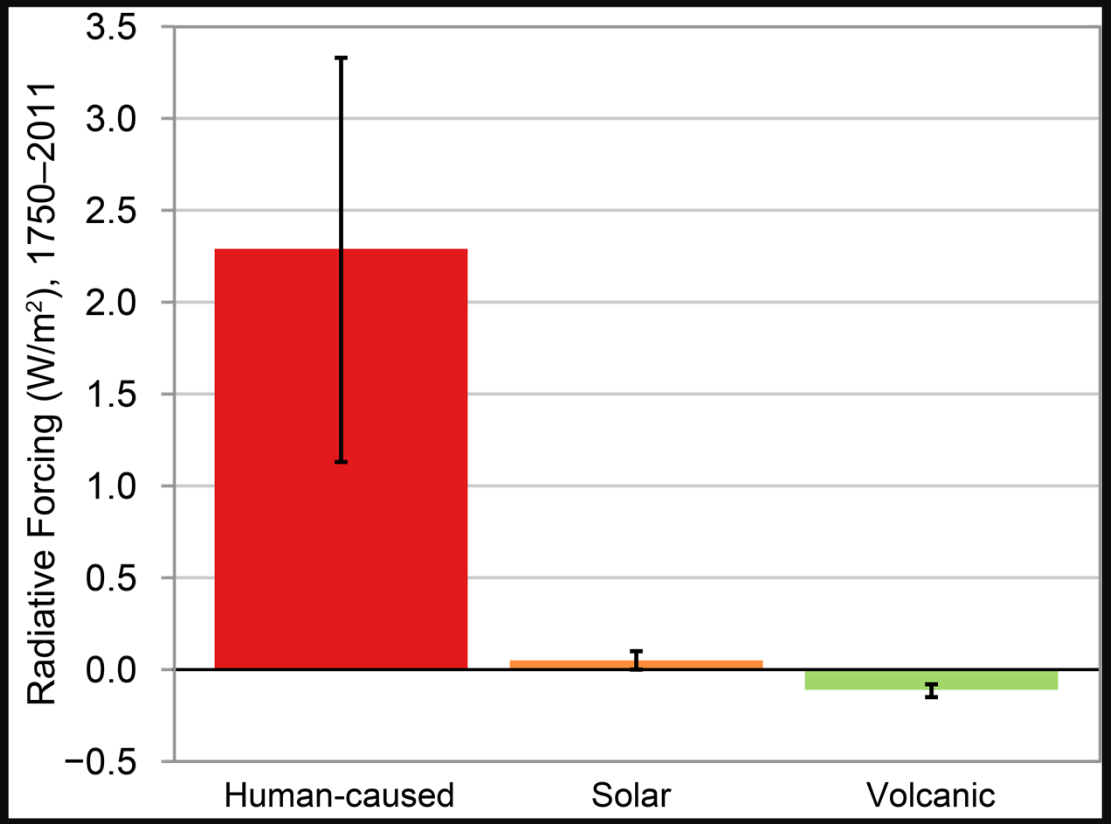


CO2: Ice Core from Antarctica



The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years.

Human Activities Driving Climate Change

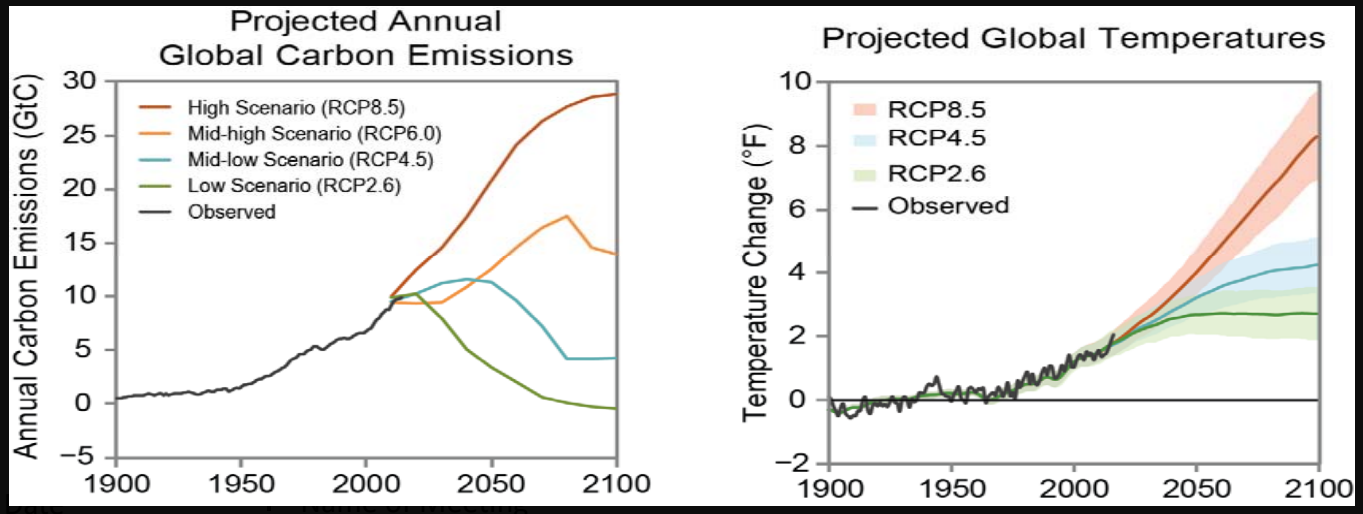


Contributions to radiative forcing on climate since 1750

It is extremely likely (> 95% certainty) that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century.

Climate will Continue to Change

- Globally climate is expected to continue to change over this century and beyond.
- The magnitude of climate change depends primarily on the additional amount of greenhouse gases emitted globally, and on the sensitivity of Earth's climate to those emissions.



Global Temperature and Other Changes in Climate Depend on Future Emissions

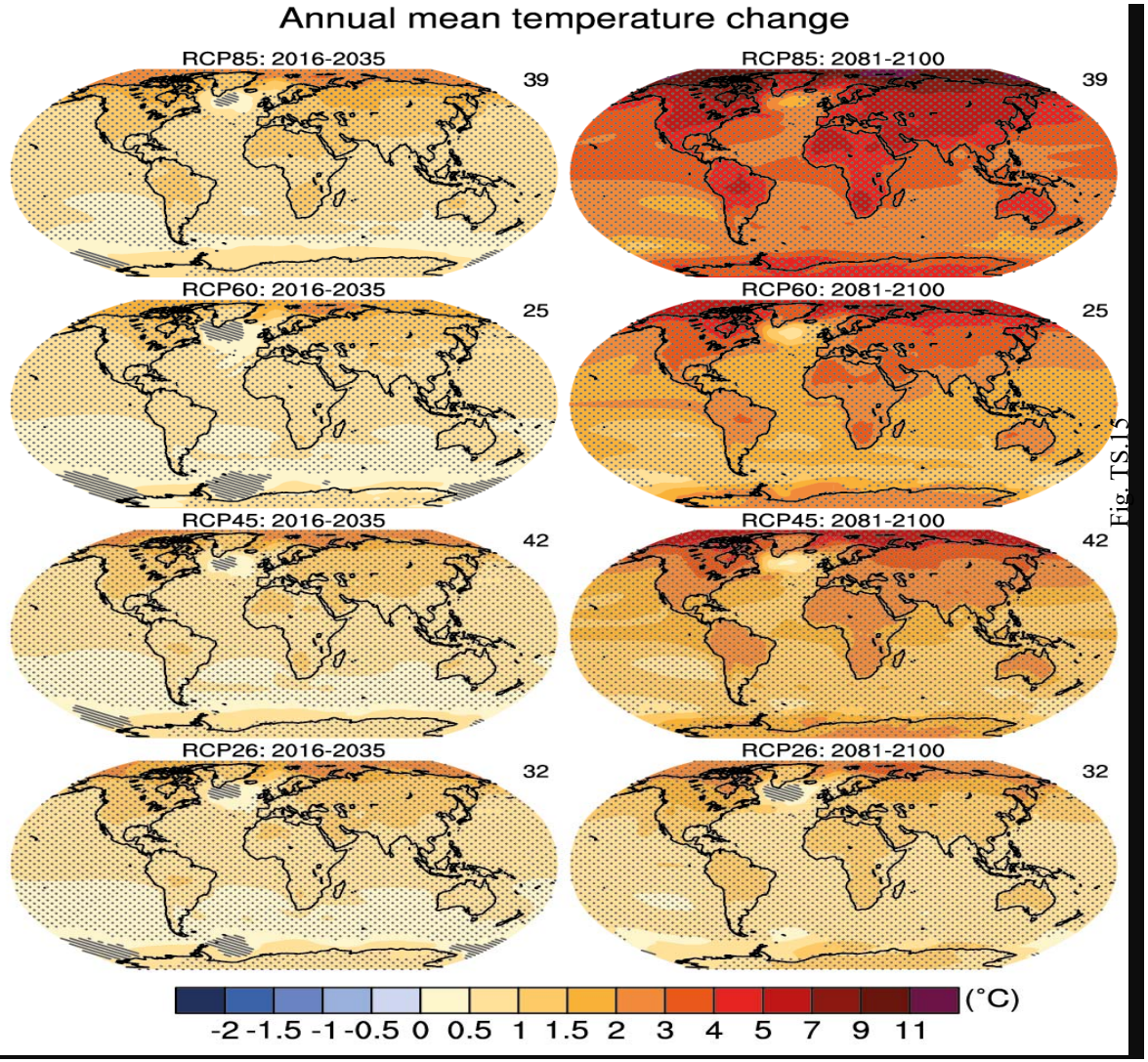
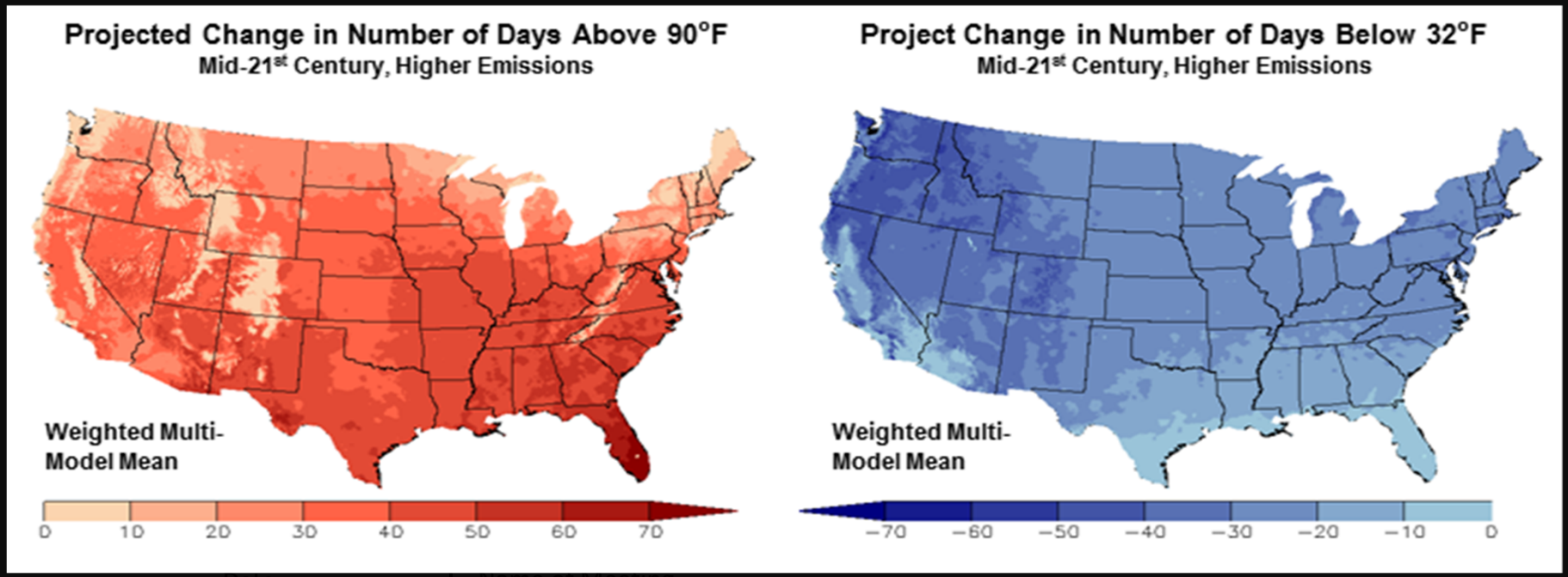


Fig. TS.15

Projected Changes: Number of Days with T>90°F and T<32°F for 2036-2065 (relative to 1976-2005) for a High Emissions Scenario



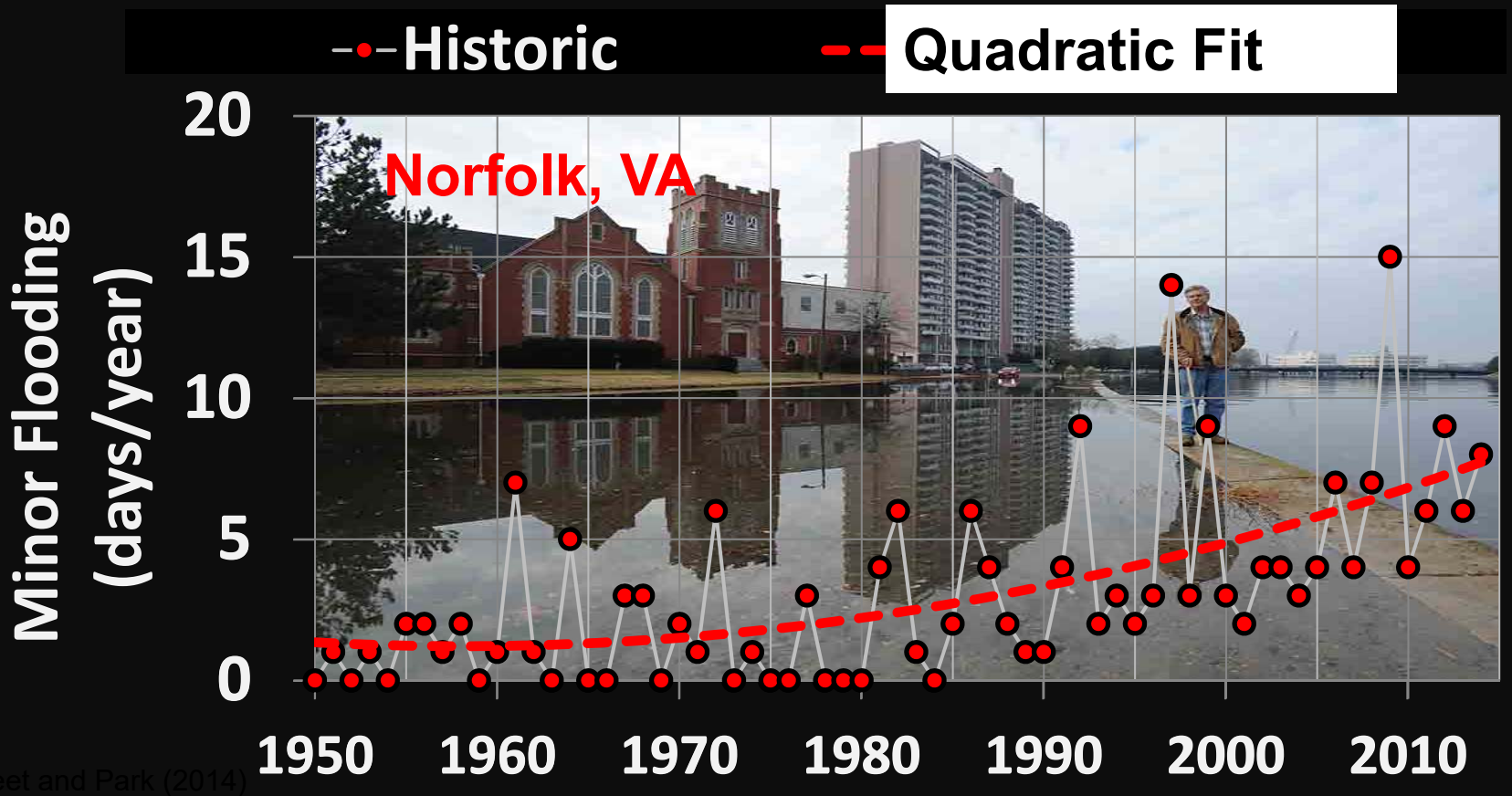
WIDESPREAD
OBSERVED IMPACTS

The CHANGING OCEAN

- Sea levels have risen 7-8 inches since 1900
- Sea Level Rise Now Highest Rate in at least 2800 years
- Acidification of the Oceans
- Changing ocean circulation

ipcc
INTERGOVERNMENTAL PANEL ON climate change

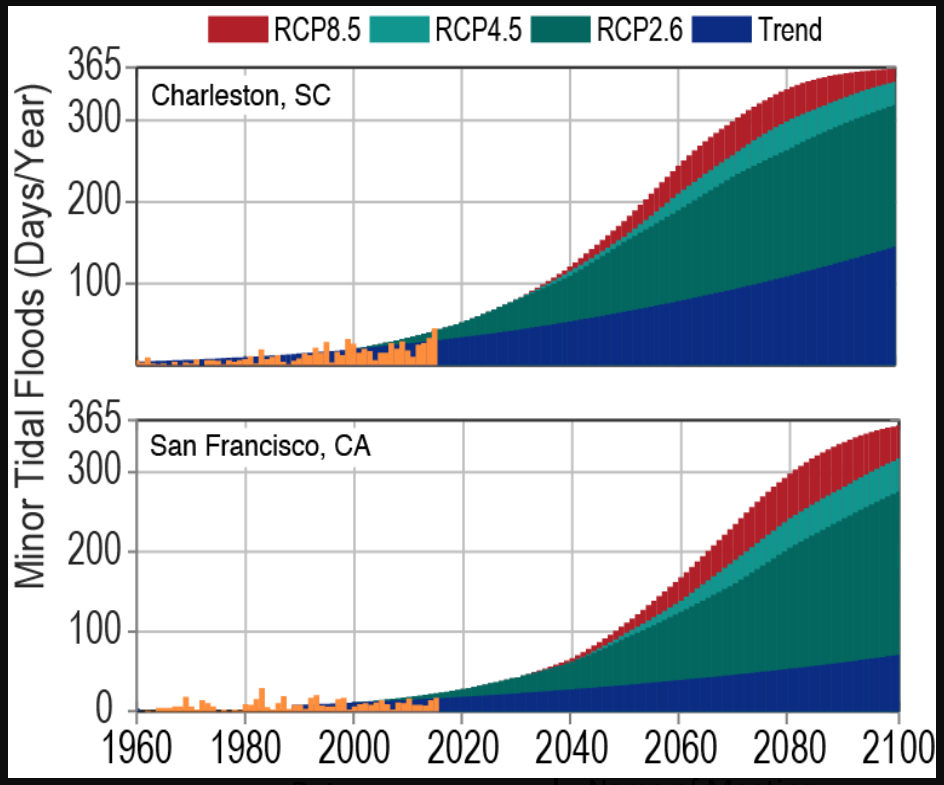
An Accelerating Trend of Tidal Flooding



Sweet and Park (2014)

From Sweet et al. (2013)

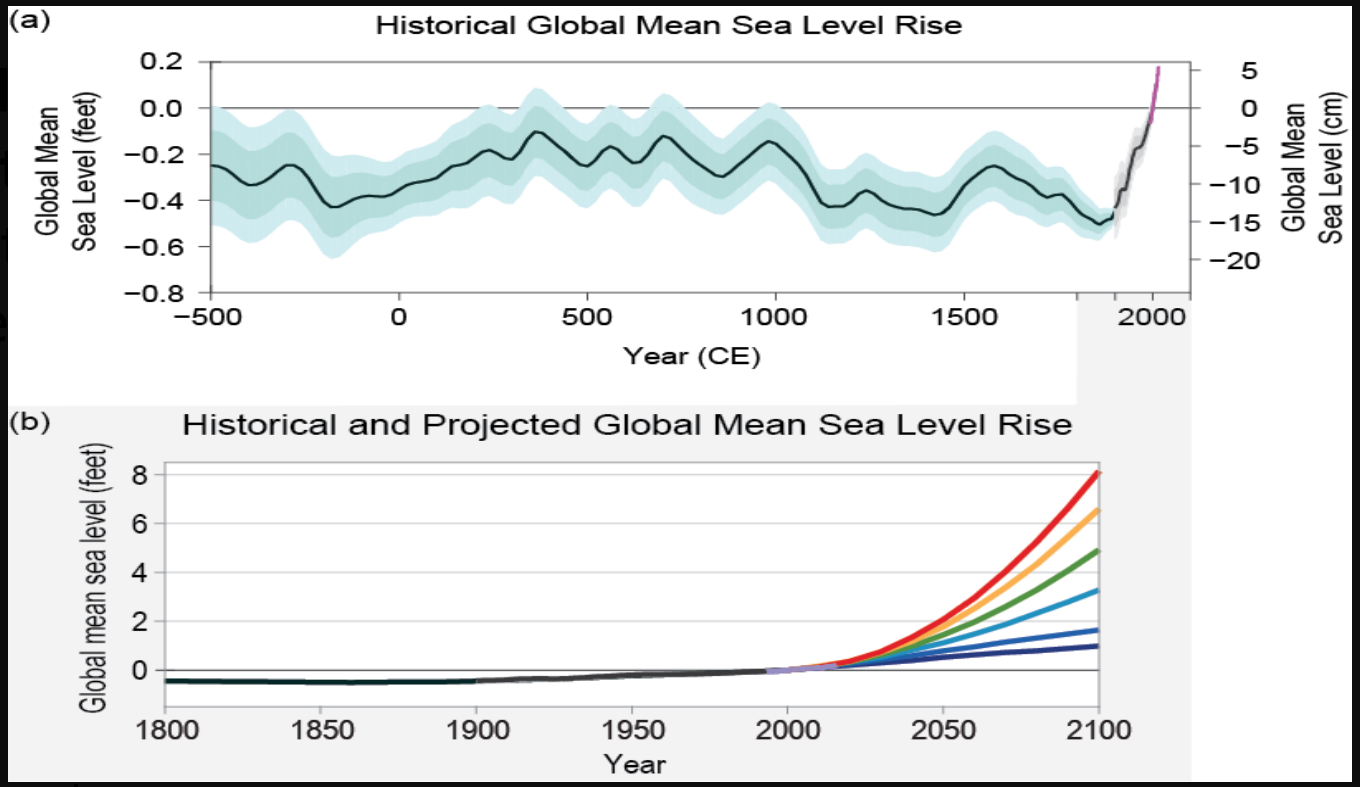
"Nuisance Flooding" is Increasing Across the United States



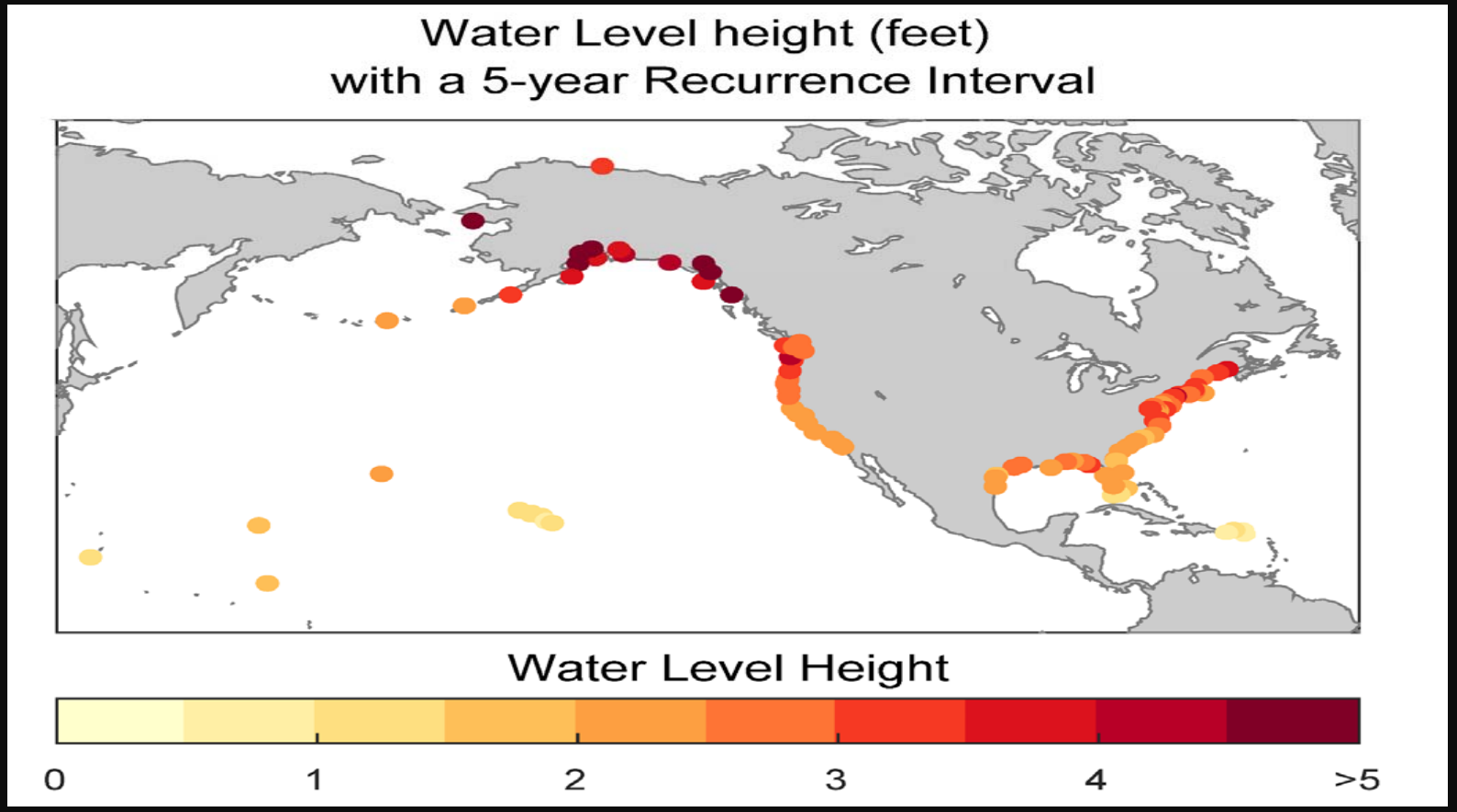
Past and Projected Changes in Global Sea Level

Best SLR estimate is another 1-4 feet by 2100.

But could be as large as 8 feet.

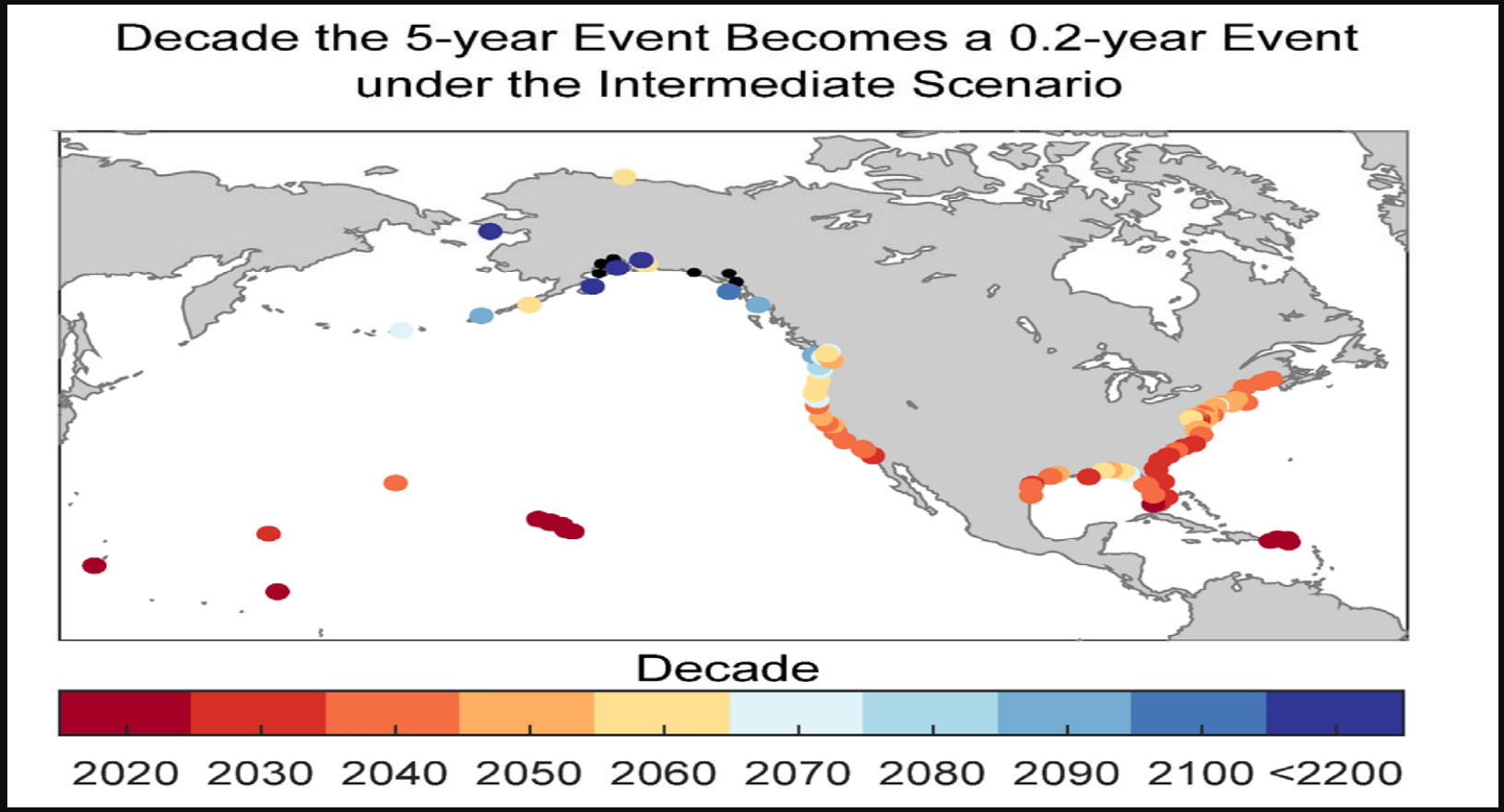


Future SLR: Coastal Flooding



Sweet et al. (2017): CSSR Chapter 12

Future SLR: Coastal Flooding



Sweet et al. (2017): CSSR Chapter 12

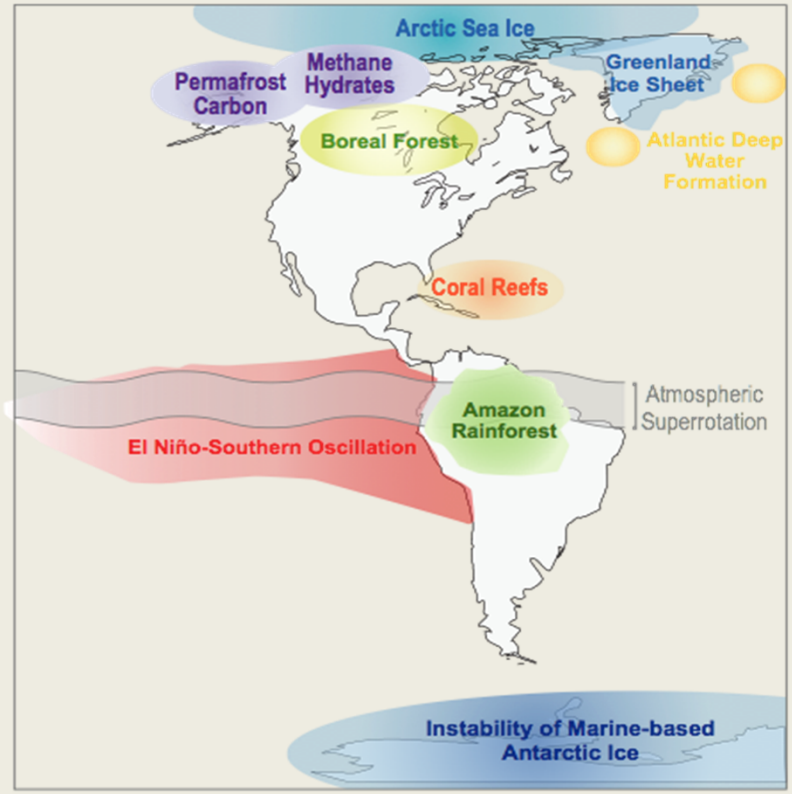
Future SLR: Coastal Flooding

With only about 1.1 foot of additional local SLR, coastal flooding with moderate impacts that today trigger NOAA coastal flood warnings will increase 25-fold at majority of locations.

Under the Intermediate Scenario, this occurs by about 2040 (+/- 5 years) on average.

Sweet et al. (2017): CSSR Chapter 12

Potential Surprises: There is a Significant Possibility for Unanticipated Changes



- **Tipping elements** within the Earth system exhibit **critical thresholds**, sometimes called "**tipping points**".
- They have the potential to enter into self-amplifying cycles that commit them to shifting from their current state into a new state
- State shifts can occur abruptly; or they may be locked in rapidly but take decades or centuries to play out