

The image features a wide, flat green field in the foreground, leading to a distant horizon. The sky is filled with heavy, dark, and textured clouds, suggesting an approaching storm. A faint rainbow is visible on the left side of the horizon. The text "Climate Up Close." is centered in the upper half of the image in a white serif font. The period at the end of the text is a solid blue dot.

Climate
Up Close.

Our team



Nadir
Jeevanjee

Research Physical
Scientist at NOAA's
Geophysical Fluid
Dynamics Laboratory



Aaron
Match

Postdoctoral
Research Fellow
Cornell University



Nathaniel
Tarshish

HUCE Environmental Fellow
Harvard University



Andrew
Williams

Postdoctoral
Research Fellow
Princeton University

Support



Emma Ignaszewski
Communications strategy



Our tours

Nebraska
tour 2025

Chicago
tour 2023

Central
PA tour
2019

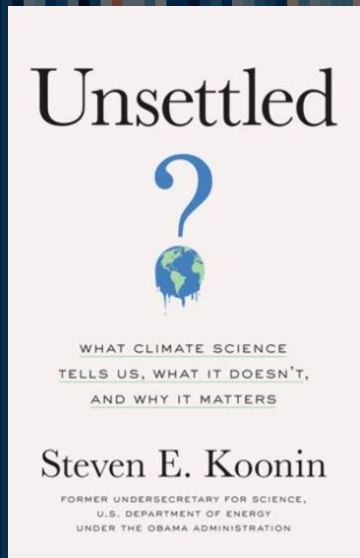
NH tour
2024

New
Jersey
tour 2022

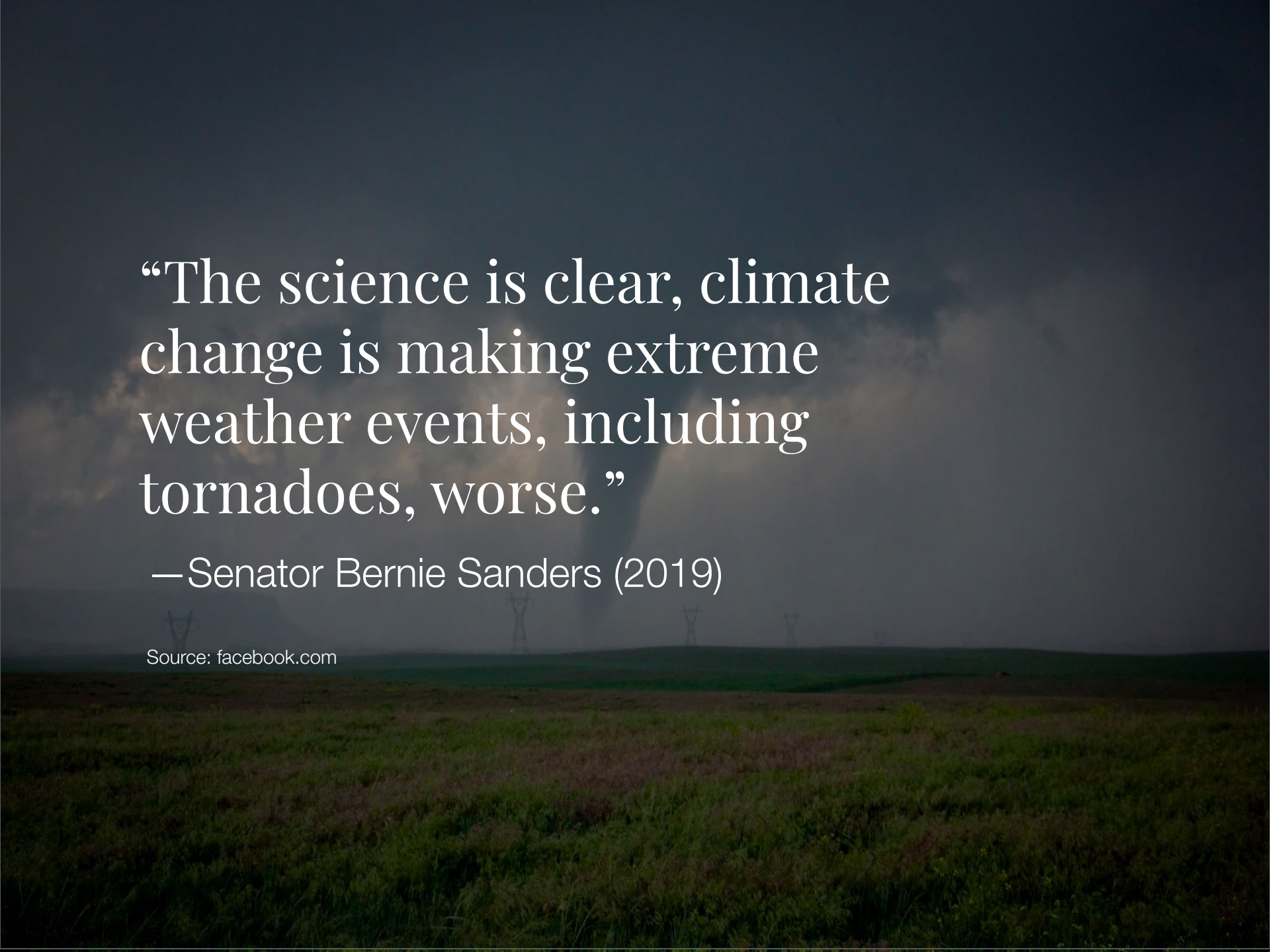
Philly
area tour
2020

Florida
tour 2022

“Heat waves in the U.S. are now no more common than they were in 1900.”



—From *Unsettled* by Steven Koonin, Physicist and former Undersecretary for Science at U.S. Department of Energy



“The science is clear, climate change is making extreme weather events, including tornadoes, worse.”

—Senator Bernie Sanders (2019)

Source: facebook.com



“We have to cut the emissions that are warming the planet and heading us inexorably toward several tipping points beyond which there is no reverse.”

—John Kerry (2023)

The Landscape of Climate Knowledge

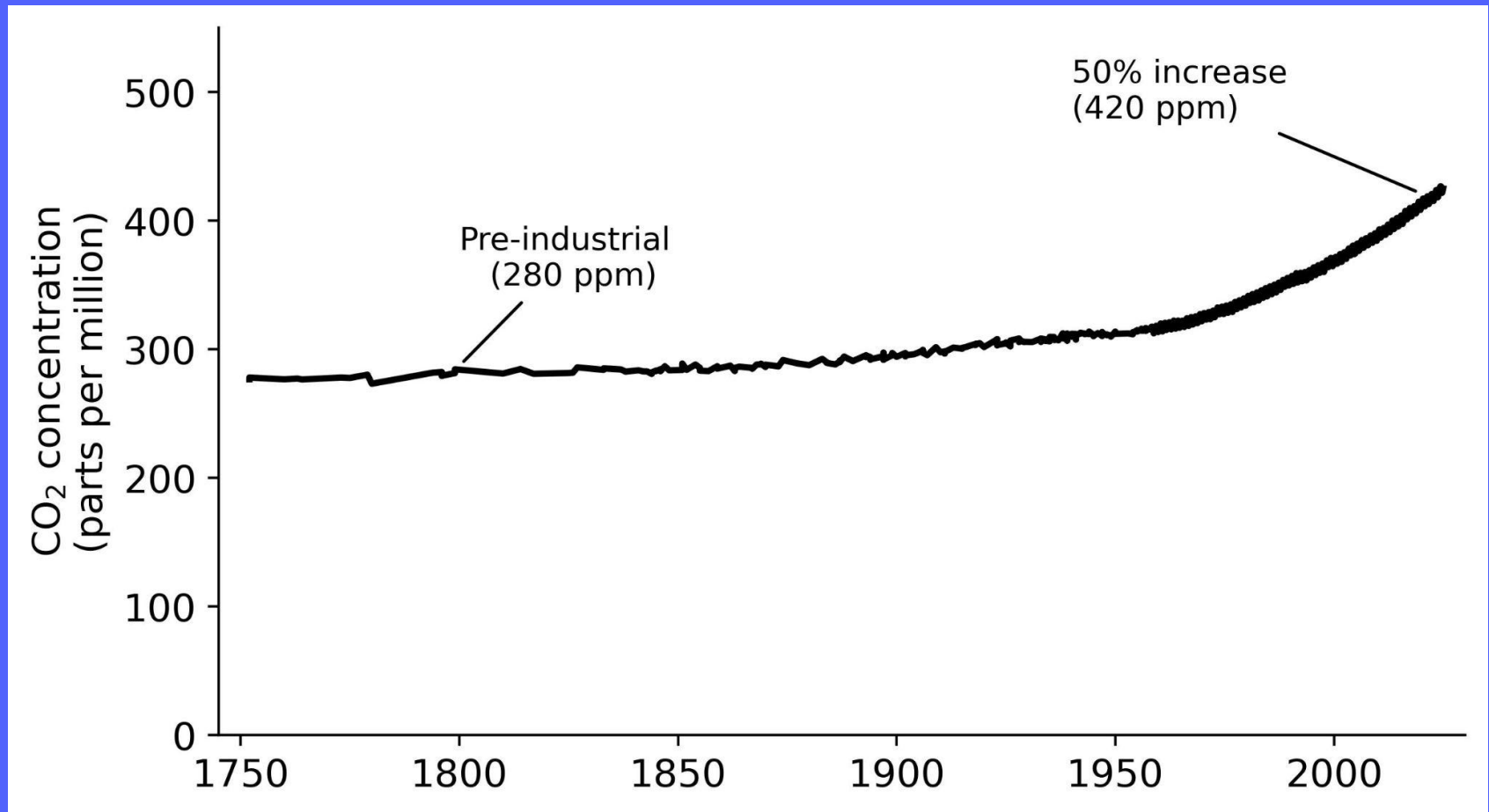
What's *settled*?

What's *uncertain*?

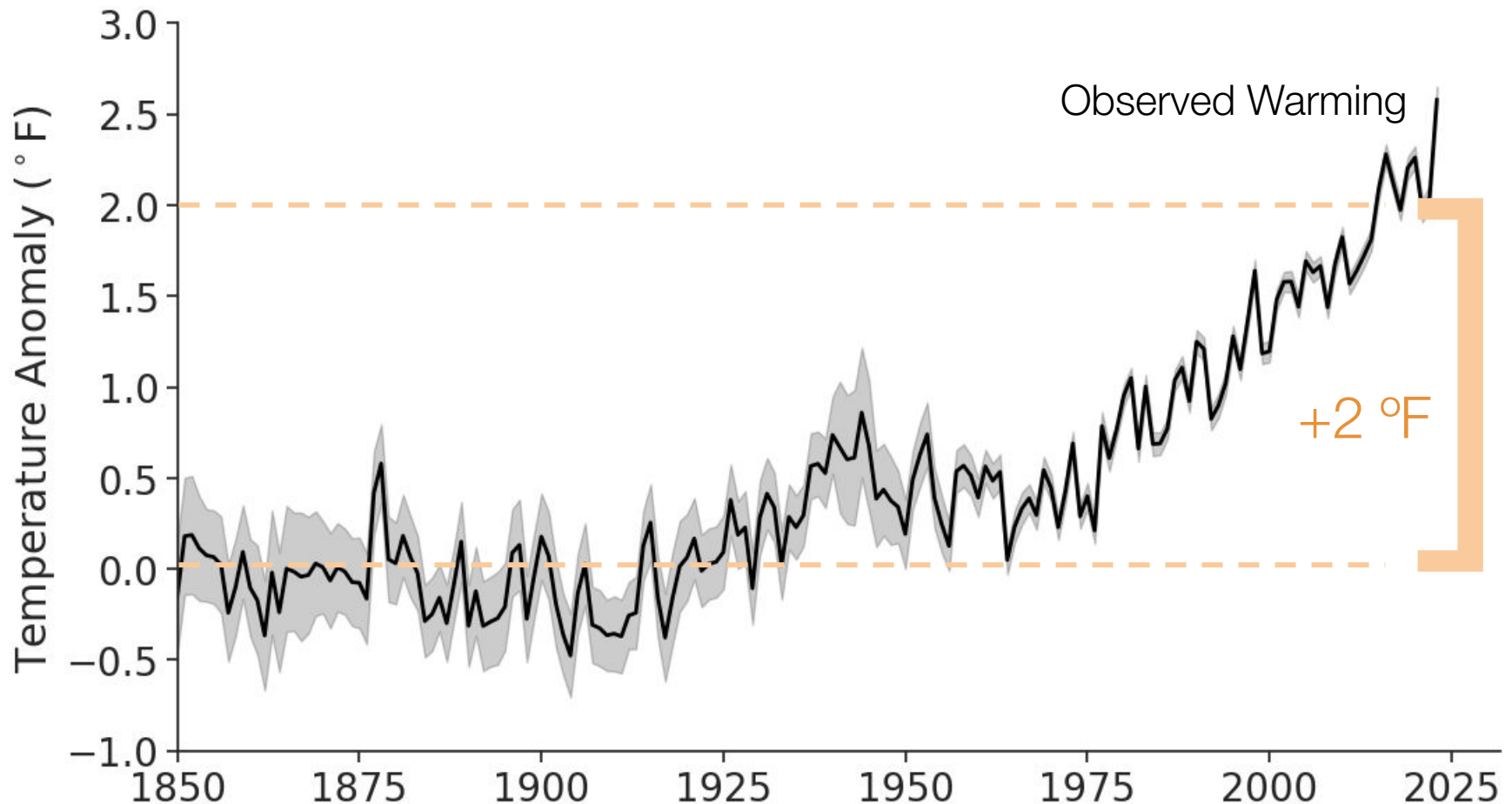




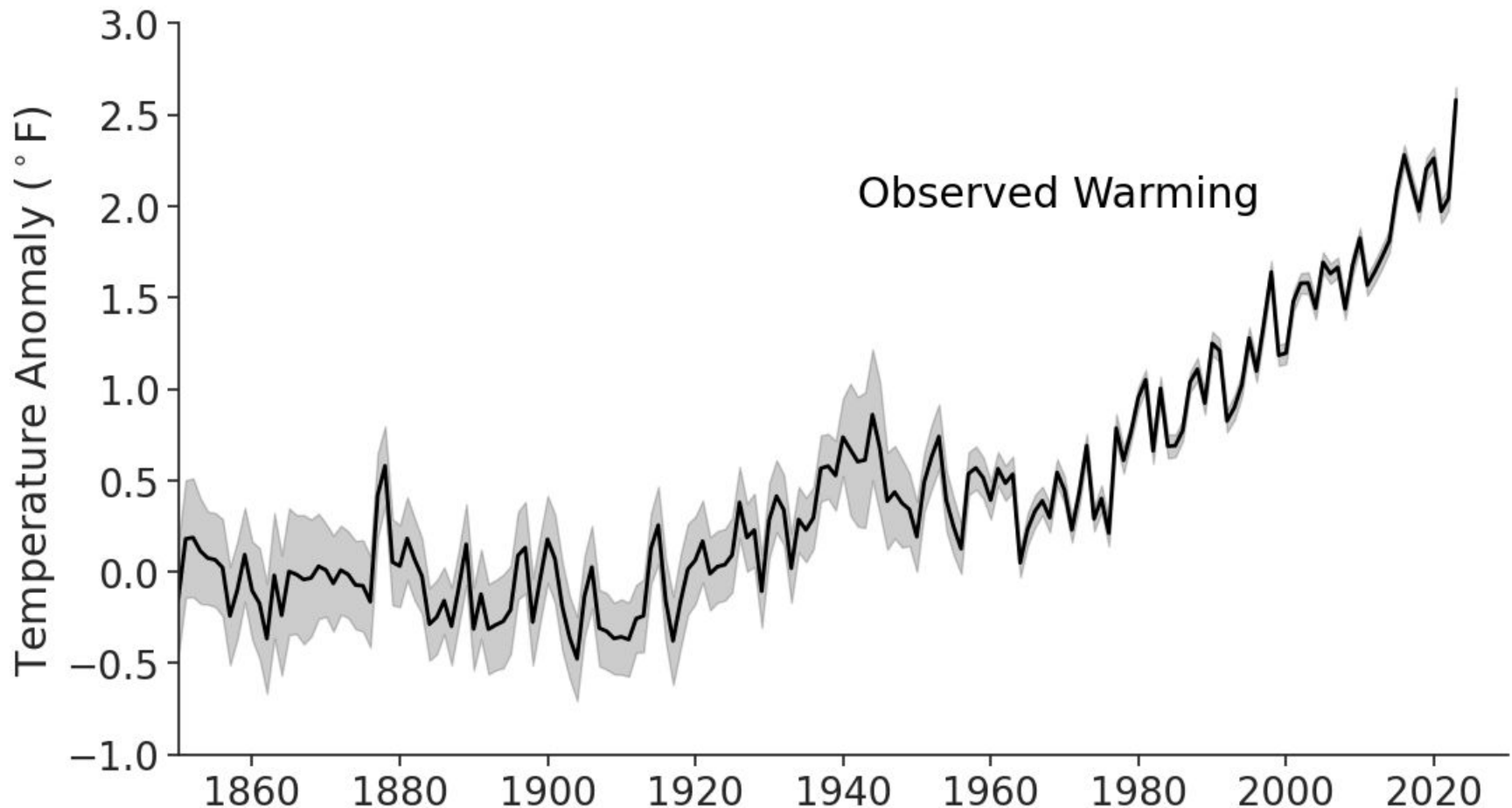
Atmospheric CO₂ concentrations are rising.



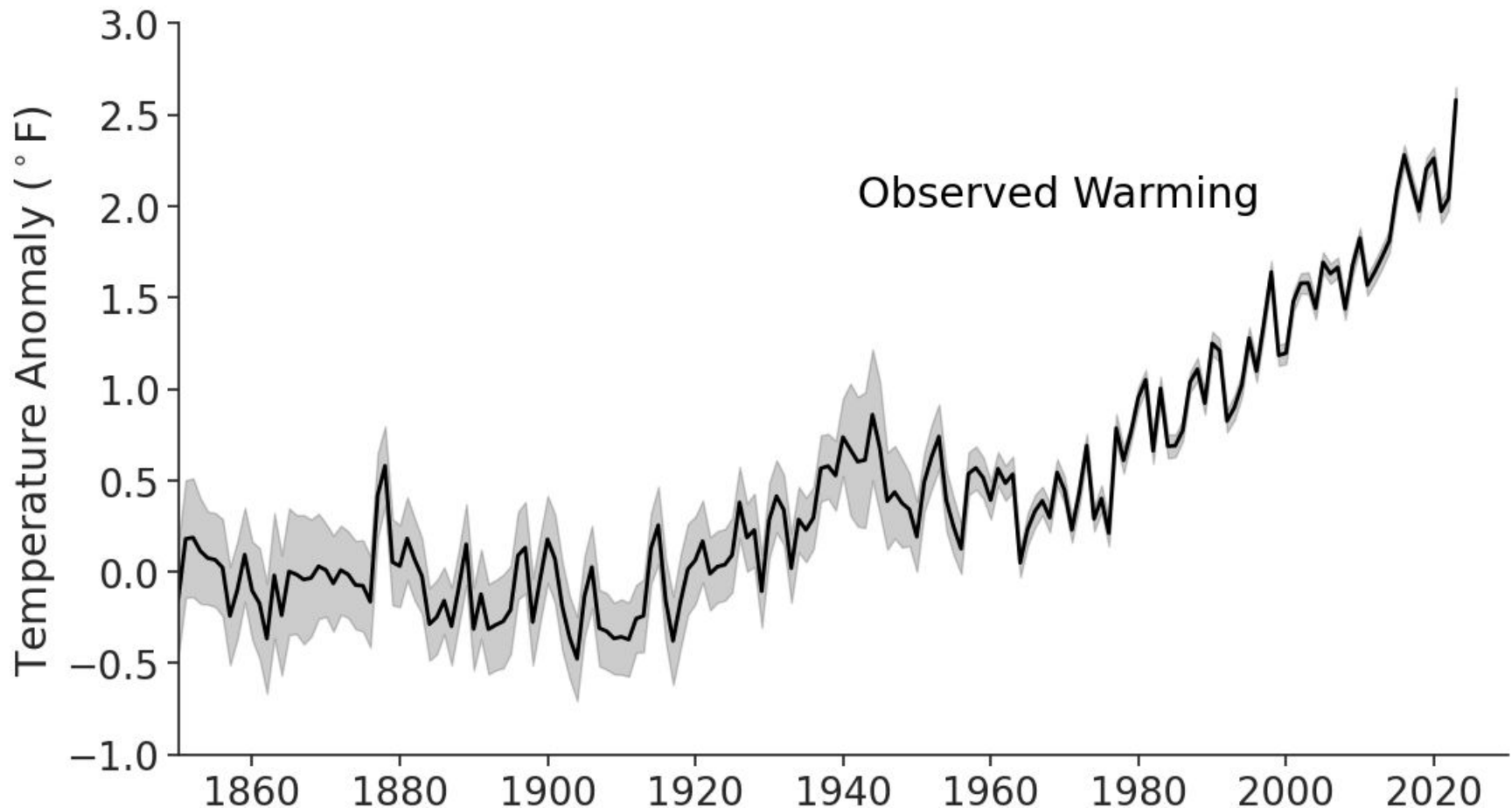
Global temperatures are rising.



Natural changes alone fail to account for the observed warming.

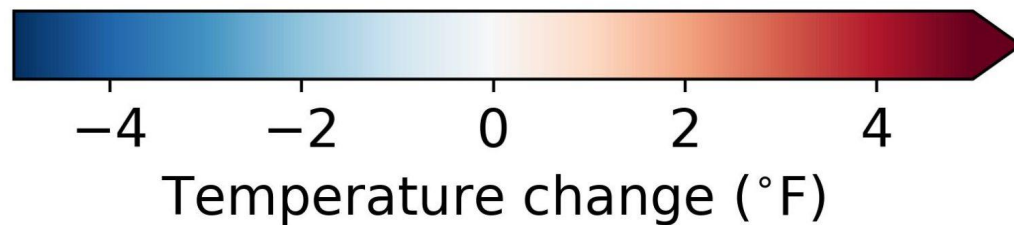
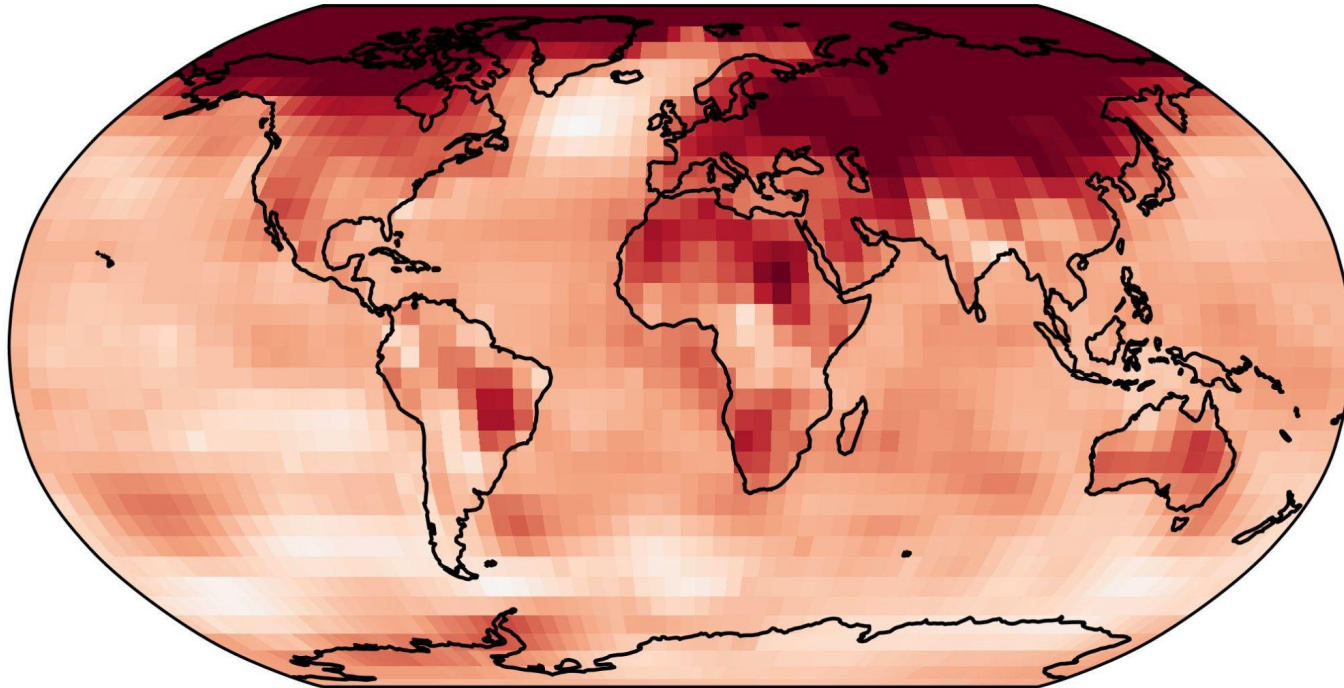


Adding in human changes,
we get a closer match.



Warming is *amplified* over land

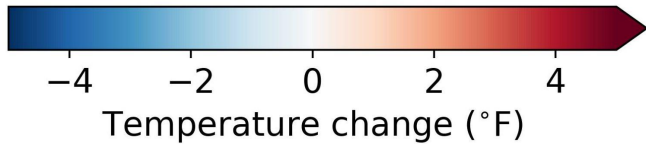
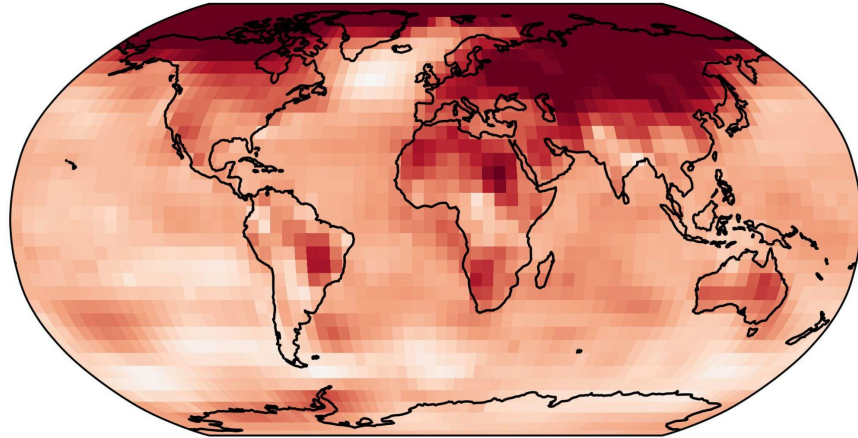
1950-2024



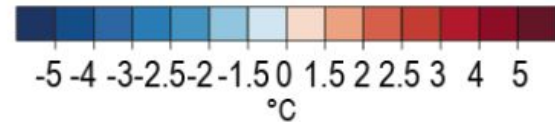
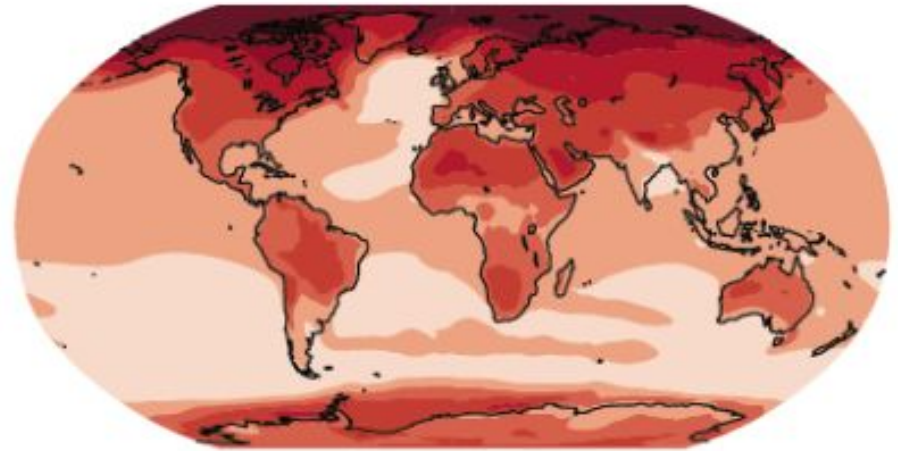
Top: Warming inferred by linear regression of HADCRUT5 (Met Office) over 1980-2023

Warming is *amplified* over land

1950-2024

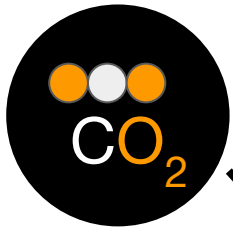


Climate models

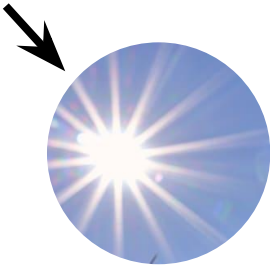


The Landscape of Climate Knowledge

Uncertain

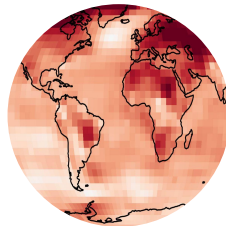


CO₂
Increase



Average
Temperature
Increase

Settled



More land
warming

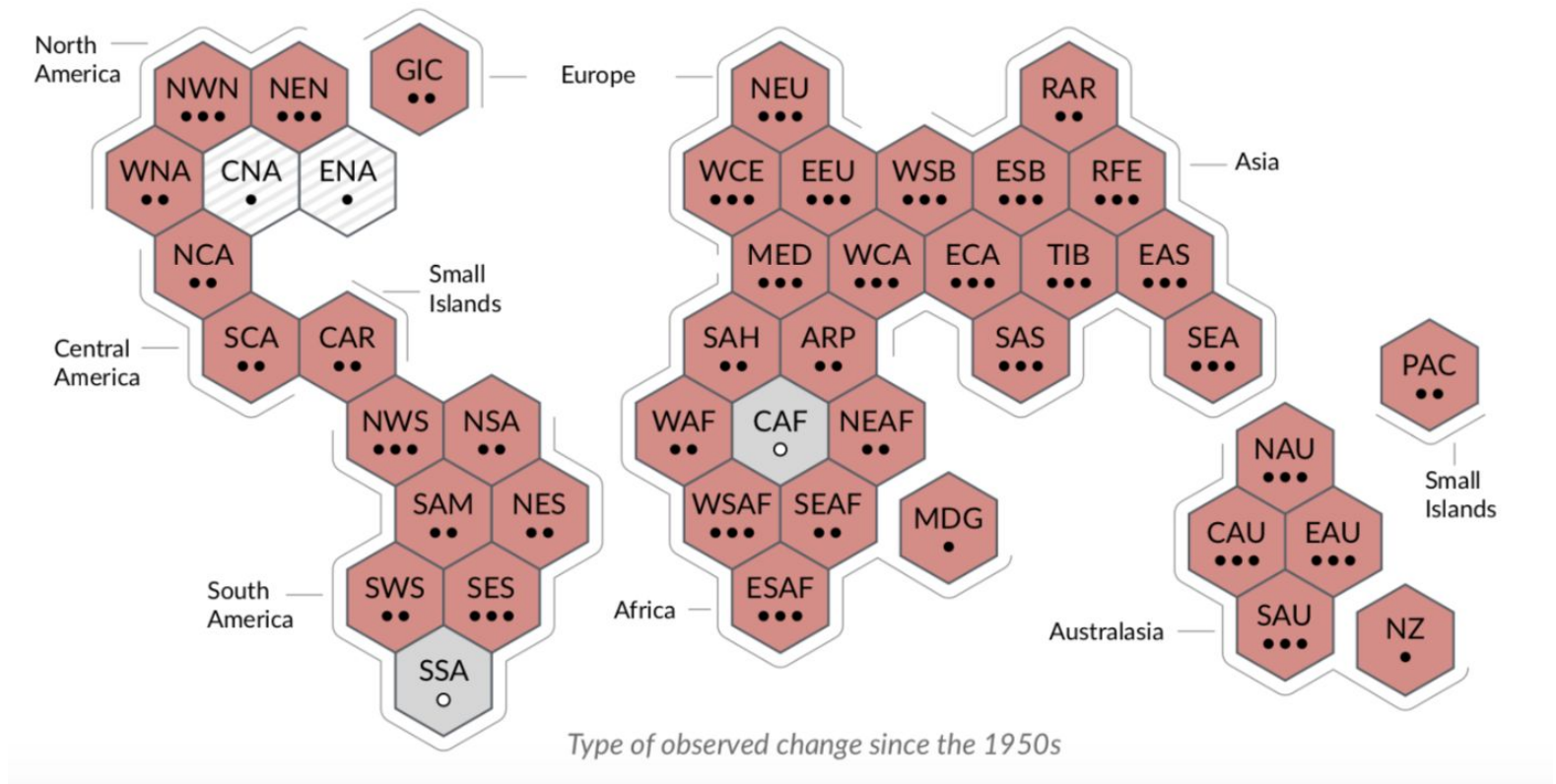
Which impacts of
warming are *settled*?

...heat waves?



**In most places, heat
waves have become
3°F hotter.**

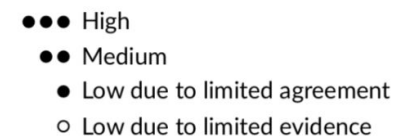
Heat waves are intensifying *globally*.



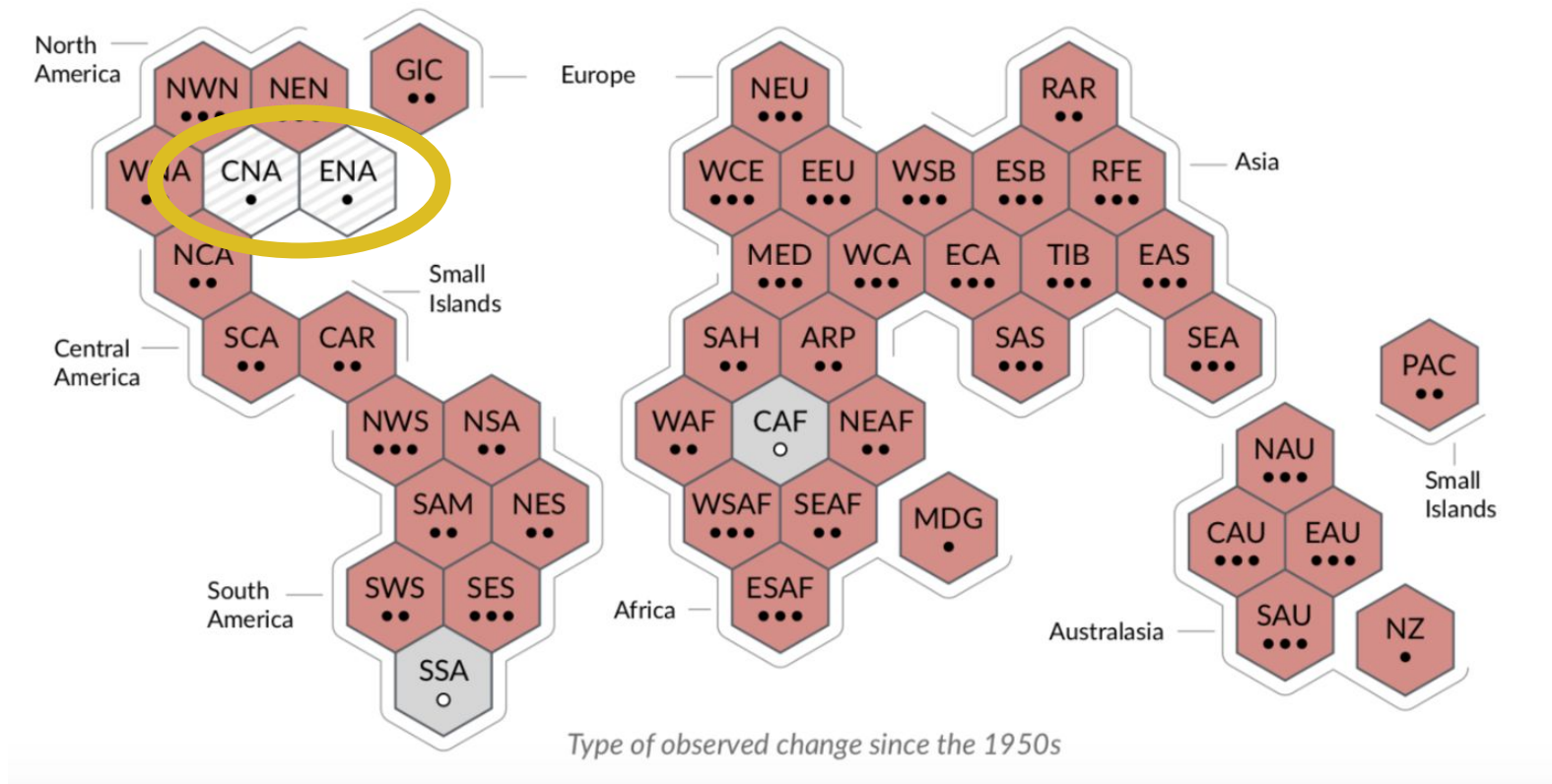
Type of observed change in hot extremes



Confidence in human contribution to the observed change



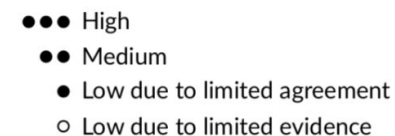
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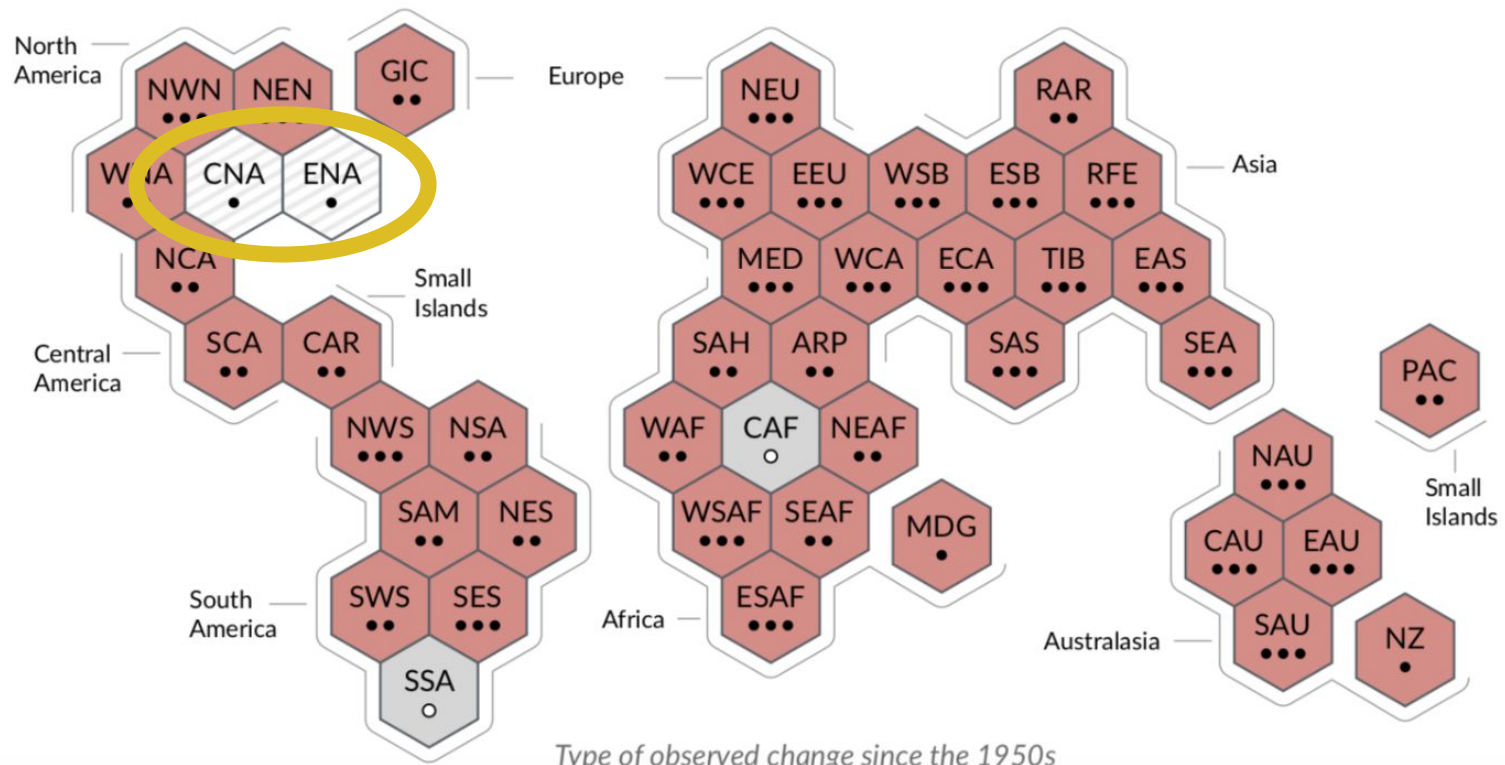
Type of observed change in hot extremes



Confidence in human contribution to the observed change



Heat waves are intensifying *globally*.



Unsettled



WHAT CLIMATE SCIENCE
TELLS US, WHAT IT DOESN'T,
AND WHY IT MATTERS

Steven E. Koonin

FORMER UNDERSECRETARY FOR SCIENCE,
U.S. DEPARTMENT OF ENERGY
UNDER THE OBAMA ADMINISTRATION

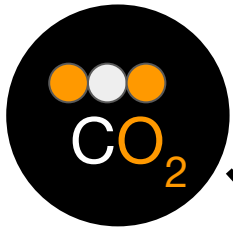
“Heat waves in the U.S. are now **no more common** than they were in 1900.”

—Steven E. Koonin, *Unsettled*

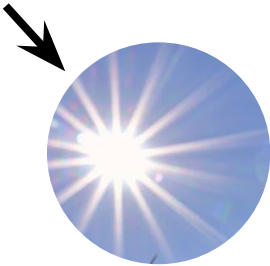
True regionally, but the *exception* rather than the rule.

The Landscape of Climate Knowledge

Uncertain

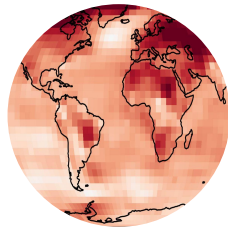


CO₂
Increase



Average
Temperature
Increase

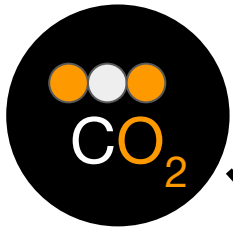
Settled



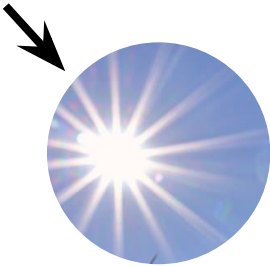
More land
warming

The Landscape of Climate Knowledge

Uncertain

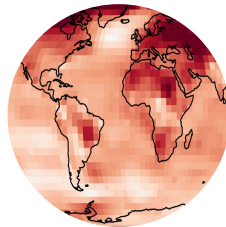


CO₂
Increase



Average
Temperature
Increase

Settled



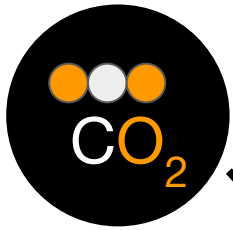
More land
warming



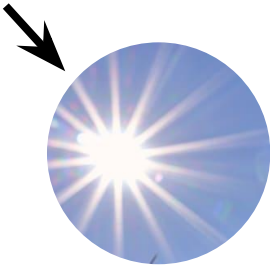
Heat
Waves

The Landscape of Climate Knowledge

Uncertain

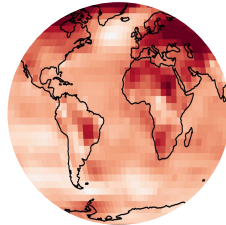


CO₂
Increase



Average
Temperature
Increase

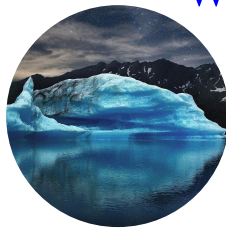
Settled



More land
warming

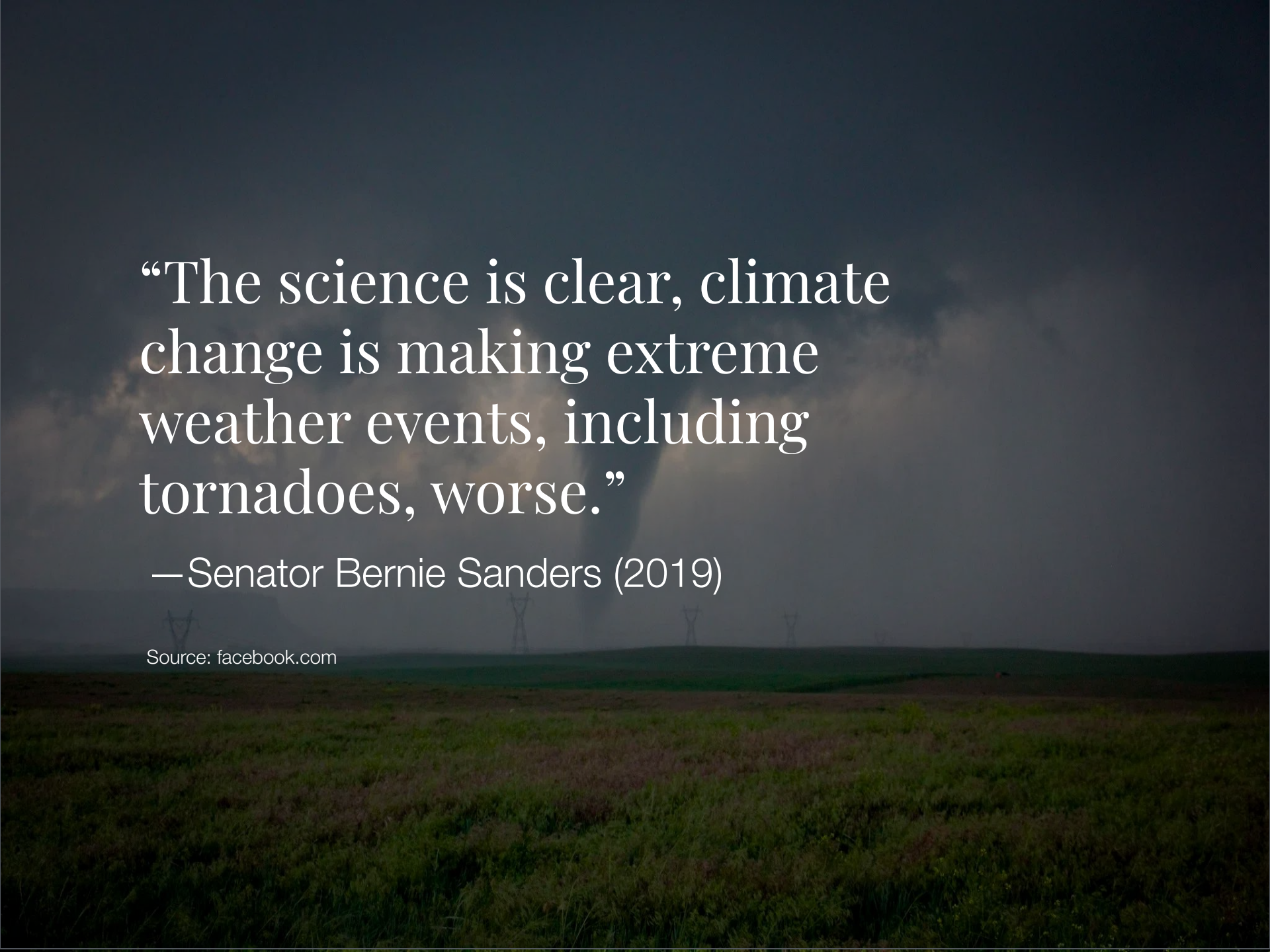


Heat
Waves



Gradual Sea
Level Rise





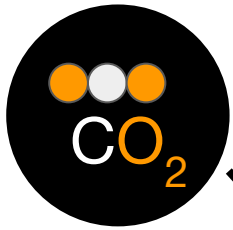
“The science is clear, climate change is making extreme weather events, including tornadoes, worse.”

—Senator Bernie Sanders (2019)

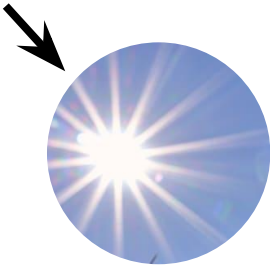
Source: facebook.com

The Landscape of Climate Knowledge

Uncertain

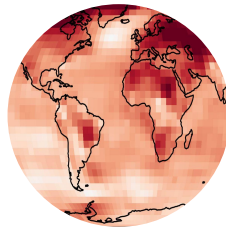


CO₂
Increase



Average
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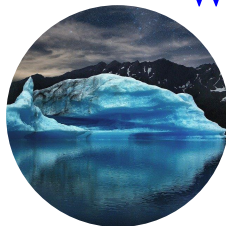
Settled



More land
warming



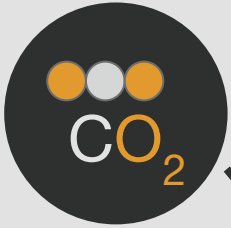
Heat
Waves



Gradual Sea
Level Rise

The Landscape of Climate Knowledge

Uncertain



Floods?



Tornadoes?



Tipping points?



Heat Waves



Gradual Sea Level Rise

Amplified land warming

Floods and climate change

Different types of floods are affected by global warming in different ways.

#1) Flash floods



Flash flooding in 2015
Salt Creek near Pioneers Park, Lincoln

#2) River floods



River flooding in 2019
Missouri River at Offutt Air Force Base

Flash floods result from heavy rain.



Flash flooding on Salt Creek in 2015
Near Pioneers Park, Lincoln

Flash floods result from heavy rain.

Theory and models: Heavy rain intensifies by 4% per °F.



Flash flooding on Salt Creek in 2015
Near Pioneers Park, Lincoln

Flash floods result from heavy rain.

Theory and models: Heavy rain intensifies by 4% per °F.

Observations: Many locations still have limited data.

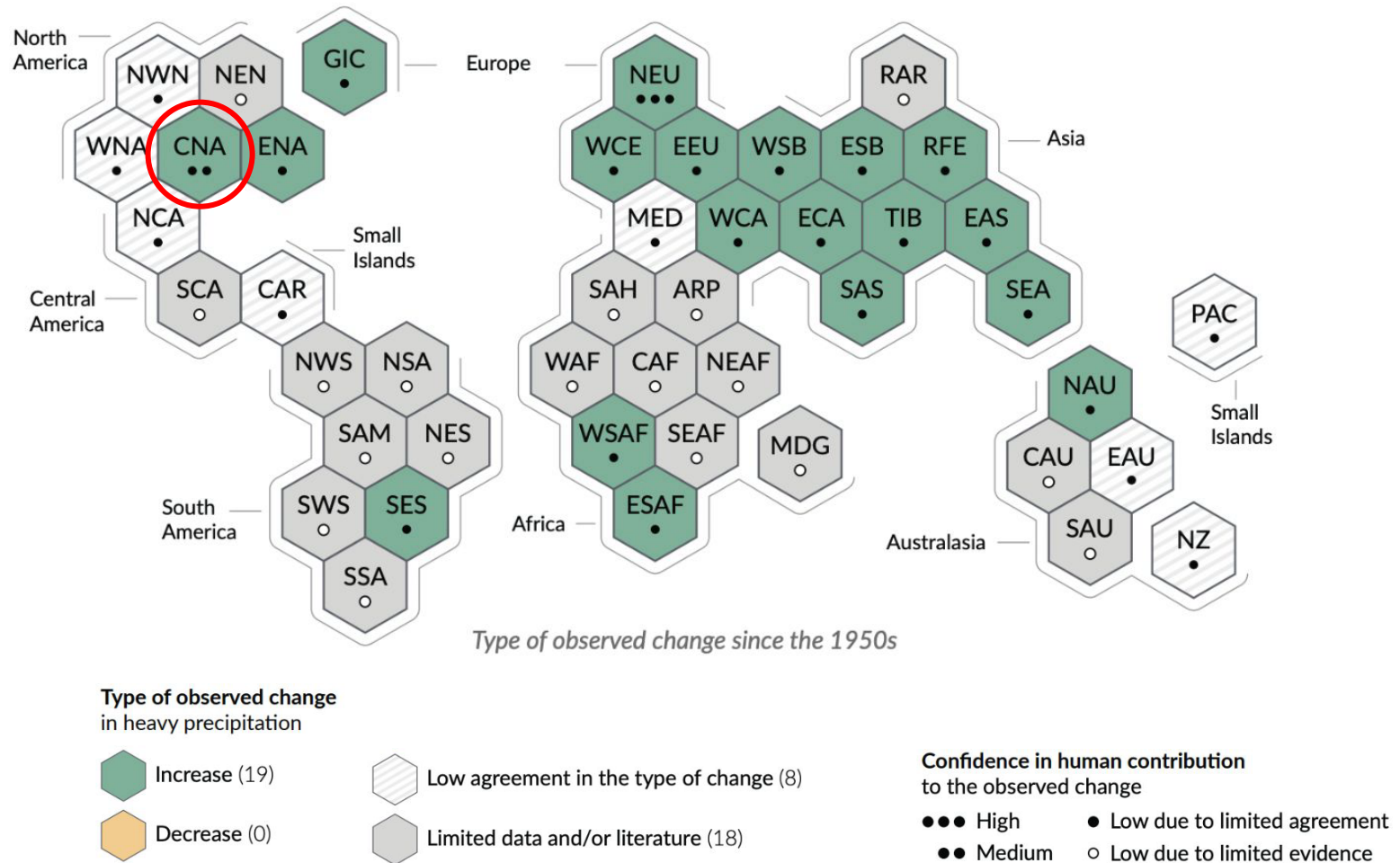


Flash flooding on Salt Creek in 2015
Near Pioneers Park, Lincoln

Flash floods result from heavy rain.

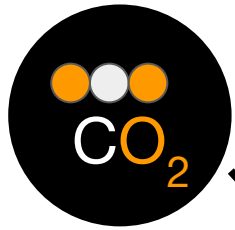
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The Landscape of Climate Knowledge

Uncertain



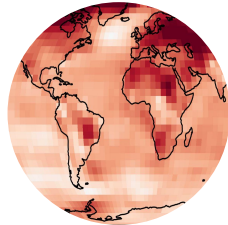
CO₂
Increase



Settled Average
Temperature
Increase



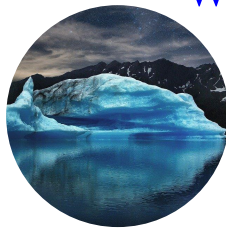
Heavy
rain &
flash
floods



More land
warming



Heat
Waves



Gradual Sea
Level Rise

River floods result from several factors:

Meteorological factors:

- heavy rain 
- frozen ground 
- preceding snow cover 

Local human factors:

- dams and levees
- increased runoff (e.g., from farms and cities)

“There is limited evidence and low agreement on observed climate change influences for river floods in North America.”
(IPCC)

The future of river flooding

Meteorological factors:

- heavy rain 
- frozen ground 
- preceding snow cover 

Local human factors:

?

“There is **medium confidence** that climate change will increase river floods over the USA and Canada.” (IPCC)

The Landscape of Climate Knowledge

Uncertain



Heavy
rain &
flash
floods



River
floods



Droughts

Gaps in
rainfall?

land management



Wildfires



evaporation

Settled

Tornadoes and climate change

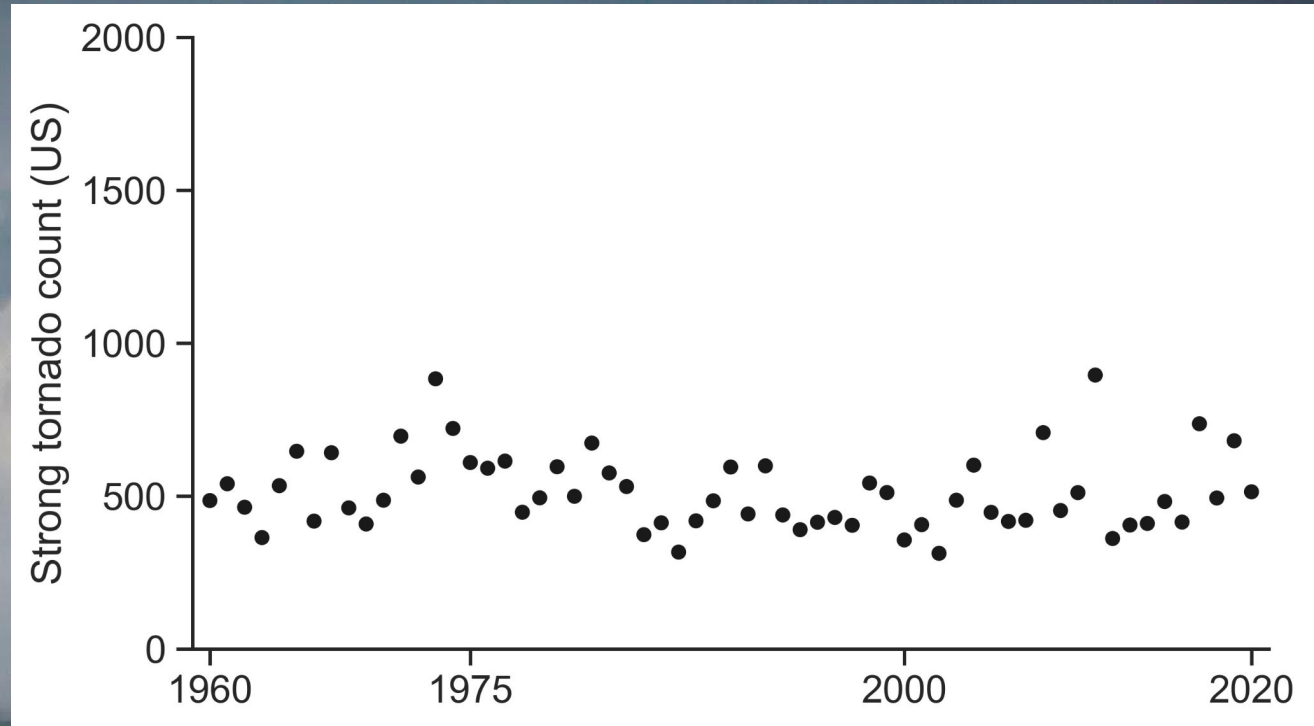
Theory?



Models?



Observed
trends?



No trend in strong tornadoes,
and poor data on weak ones.

The Landscape of Climate Knowledge

Uncertain



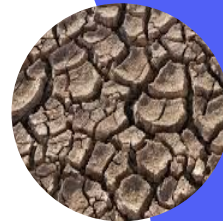
Tornadoes



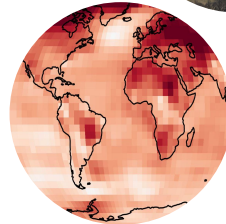
River floods



Heavy rain & flash floods



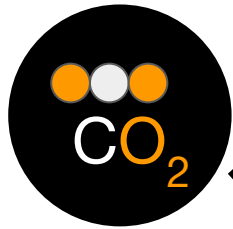
Droughts



More land warming



Average Temperature Increase



CO₂ Increase



Gradual Sea Level Rise



Wildfires



Heat Waves

Settled

Tipping points?

West Antarctic Ice Sheet collapse



“Poorly understood processes of instabilities, characterized by deep uncertainty” (IPCC)

Permafrost “carbon bomb”



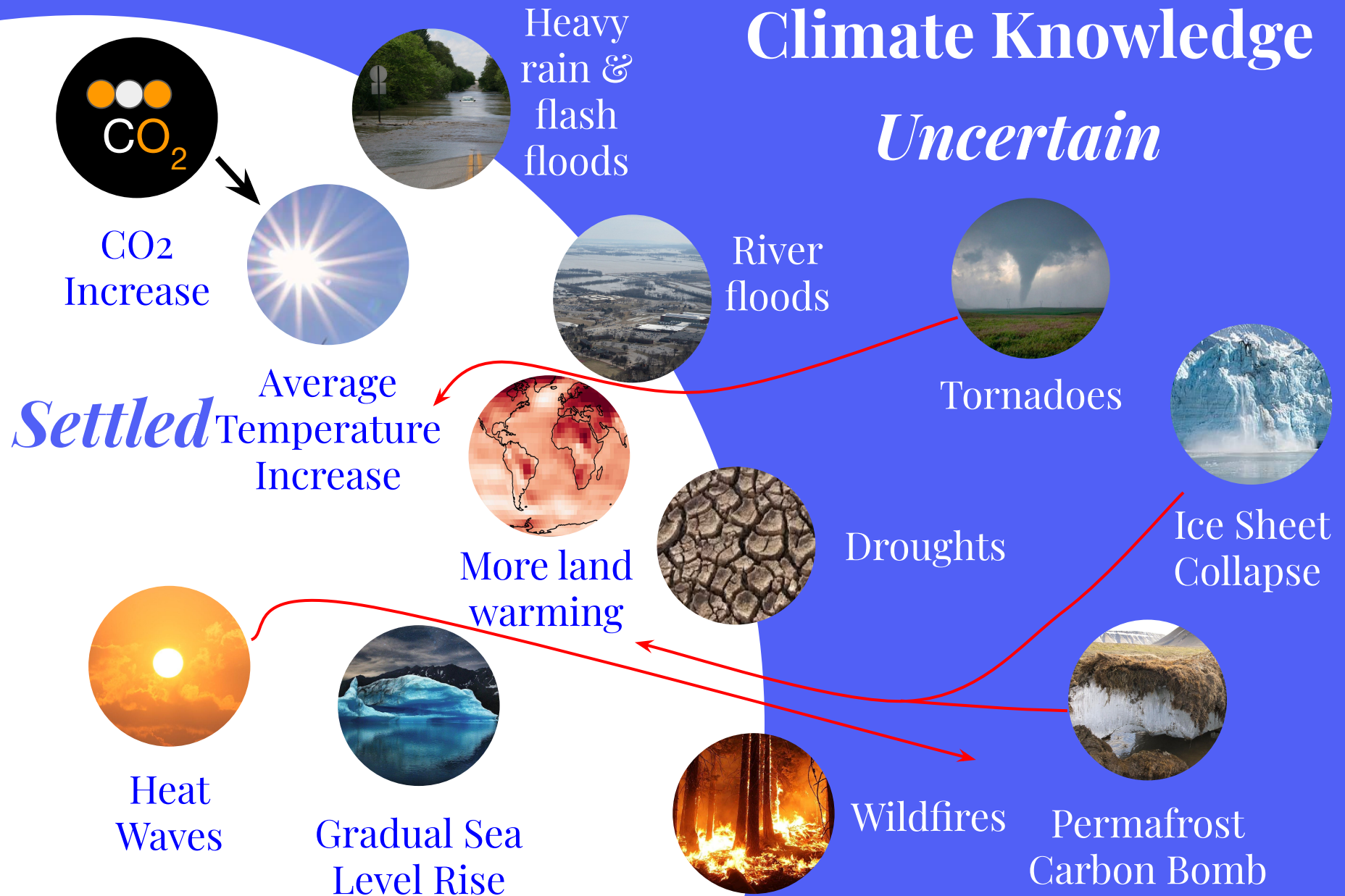
“Not enough to lead to a ‘runaway warming’ situation”. 1–7% effect. (IPCC)



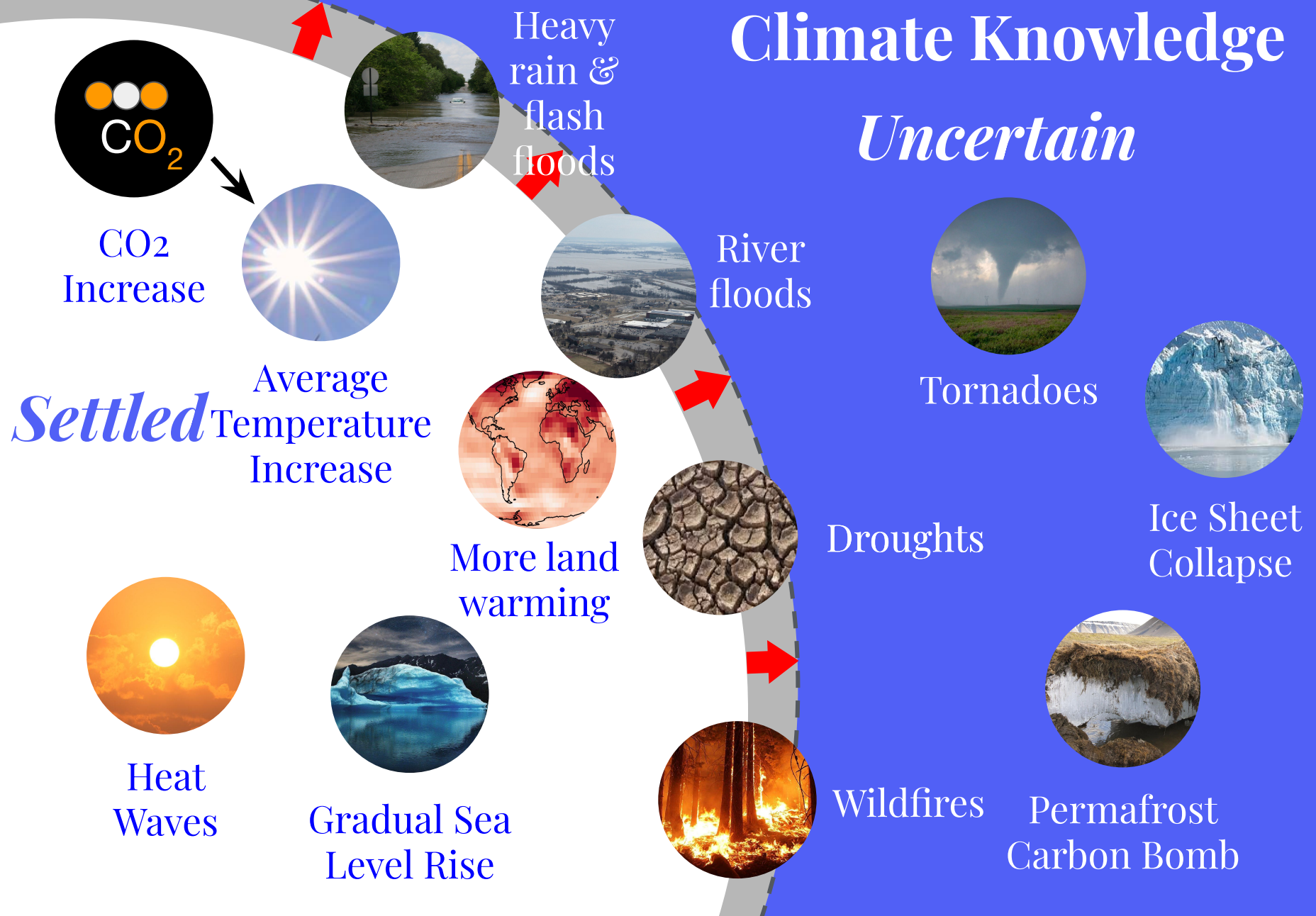
“We have to cut the emissions that are warming the planet and heading us inexorably toward several tipping points beyond which there is no reverse.”

—John Kerry (2023)

The Landscape of Climate Knowledge



The Landscape of Climate Knowledge

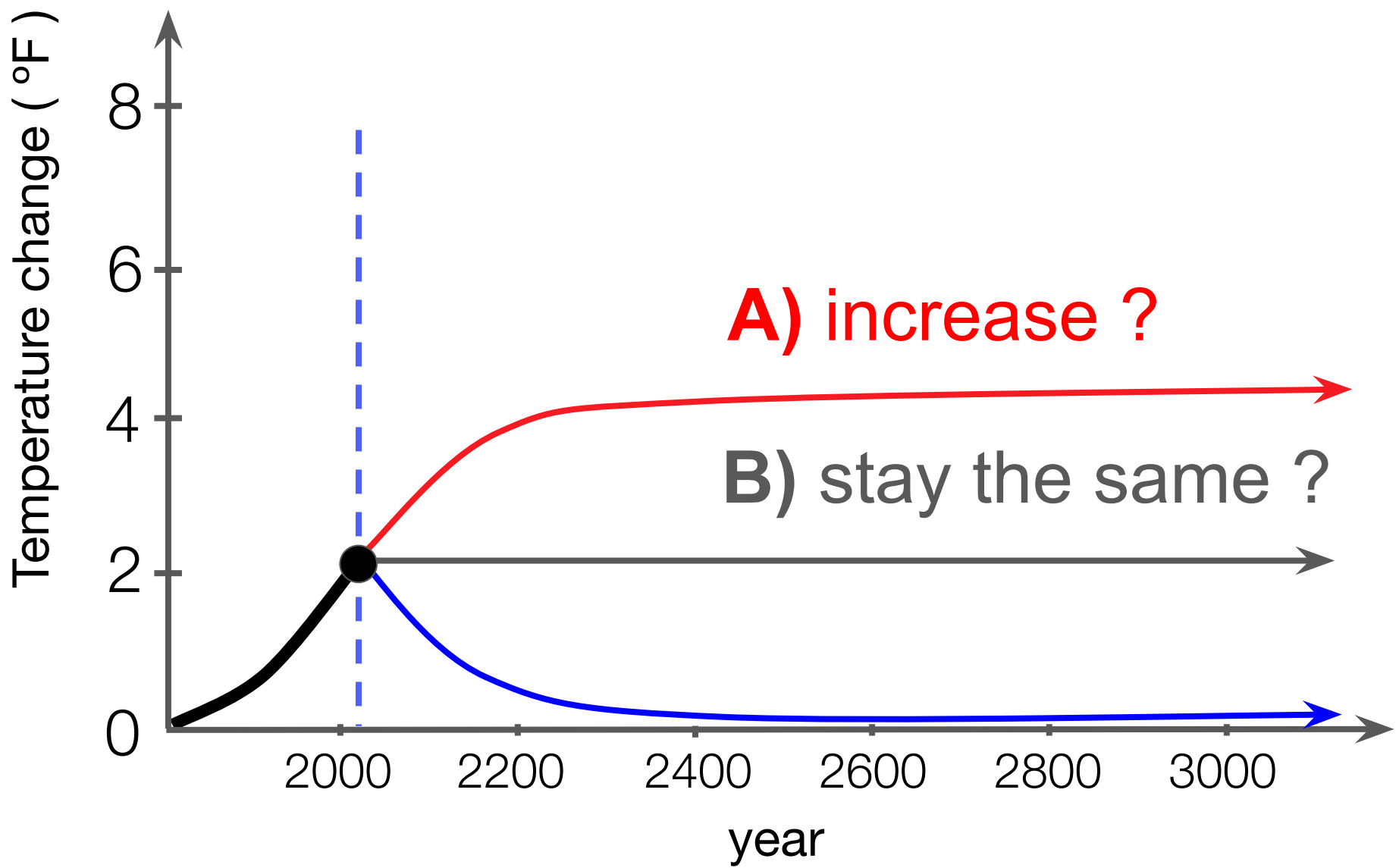


What does the
future hold?

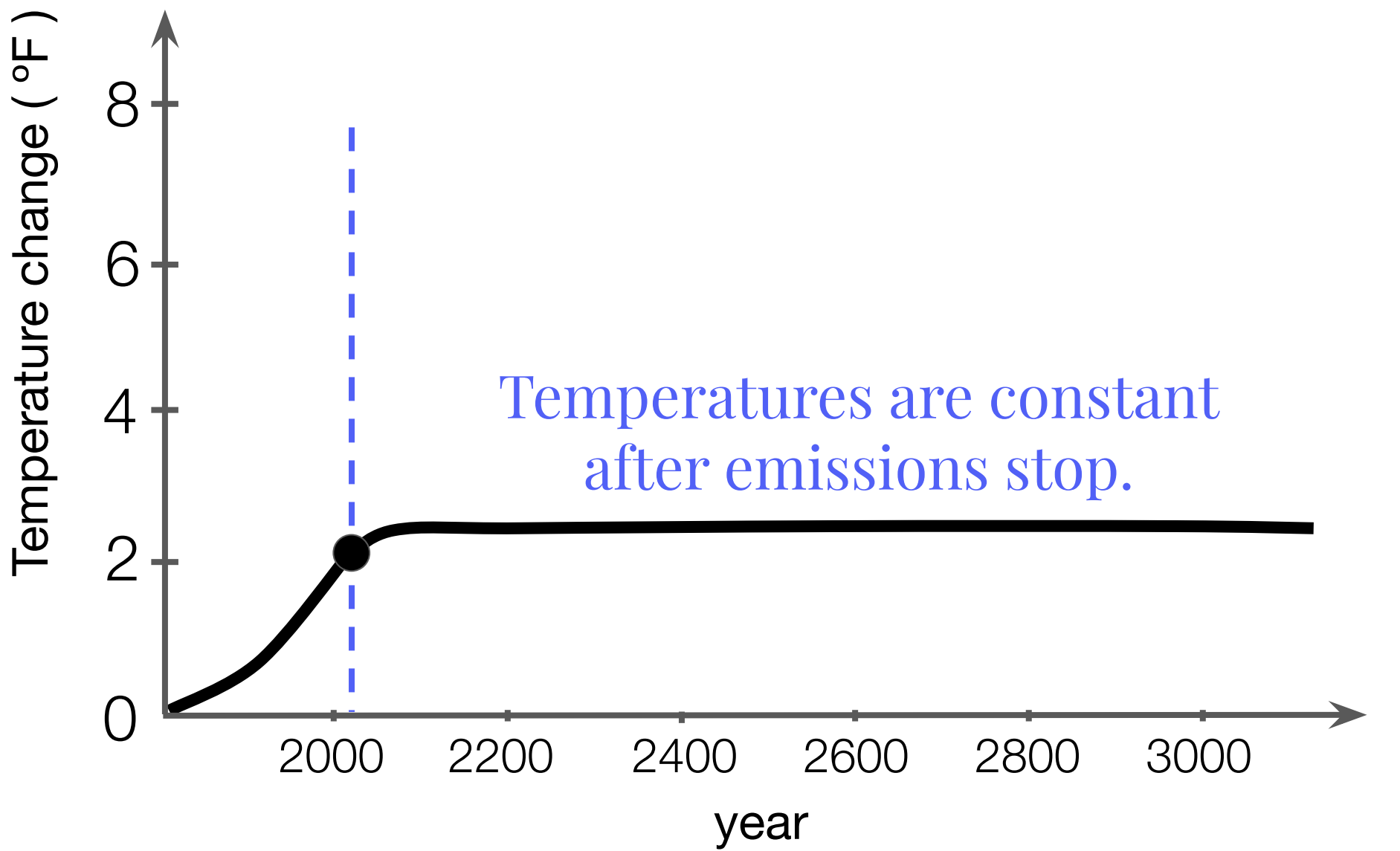


Q: If we stopped emitting CO₂ tomorrow, what would happen to global temperature?

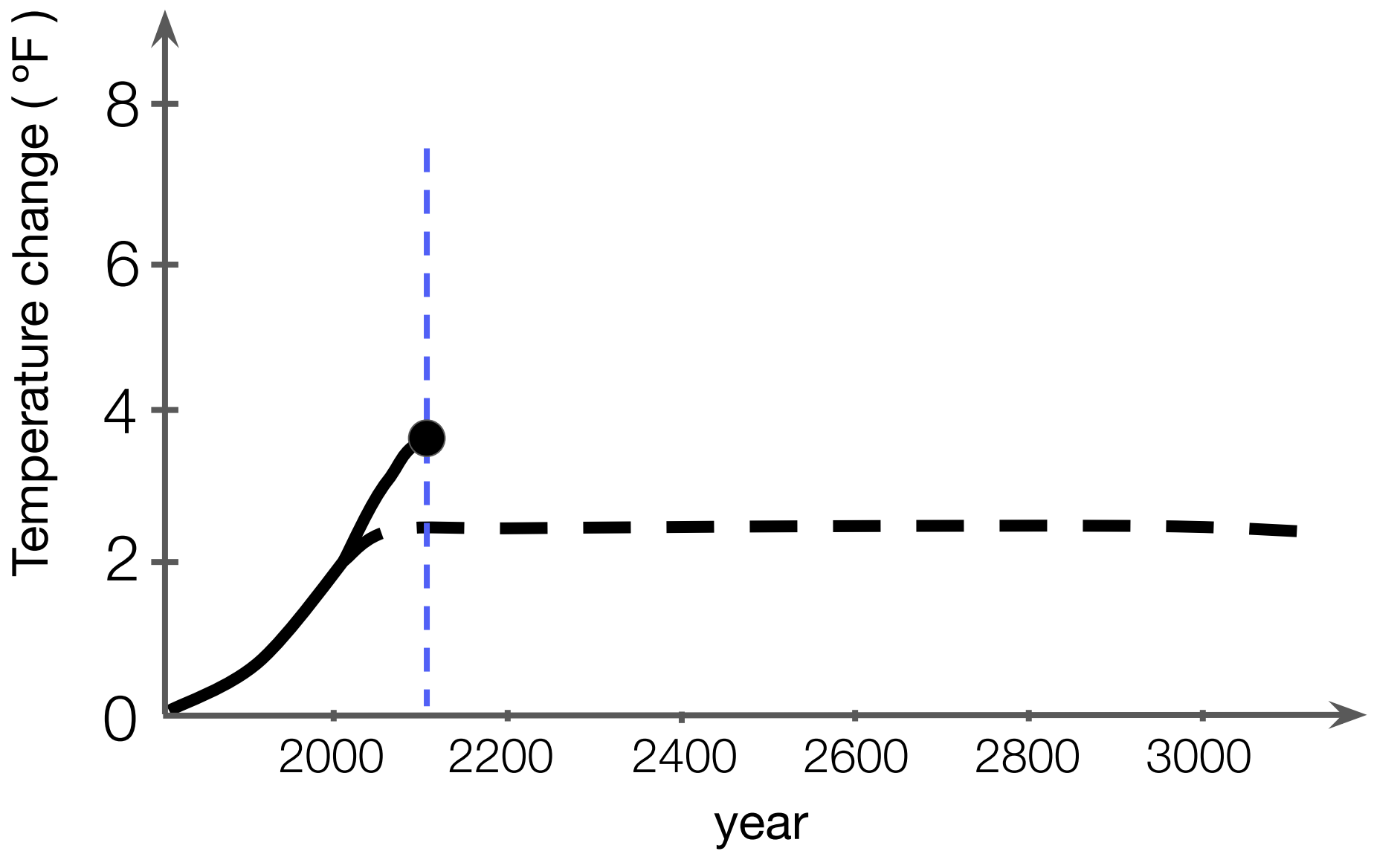
emissions stop
C) decrease ?



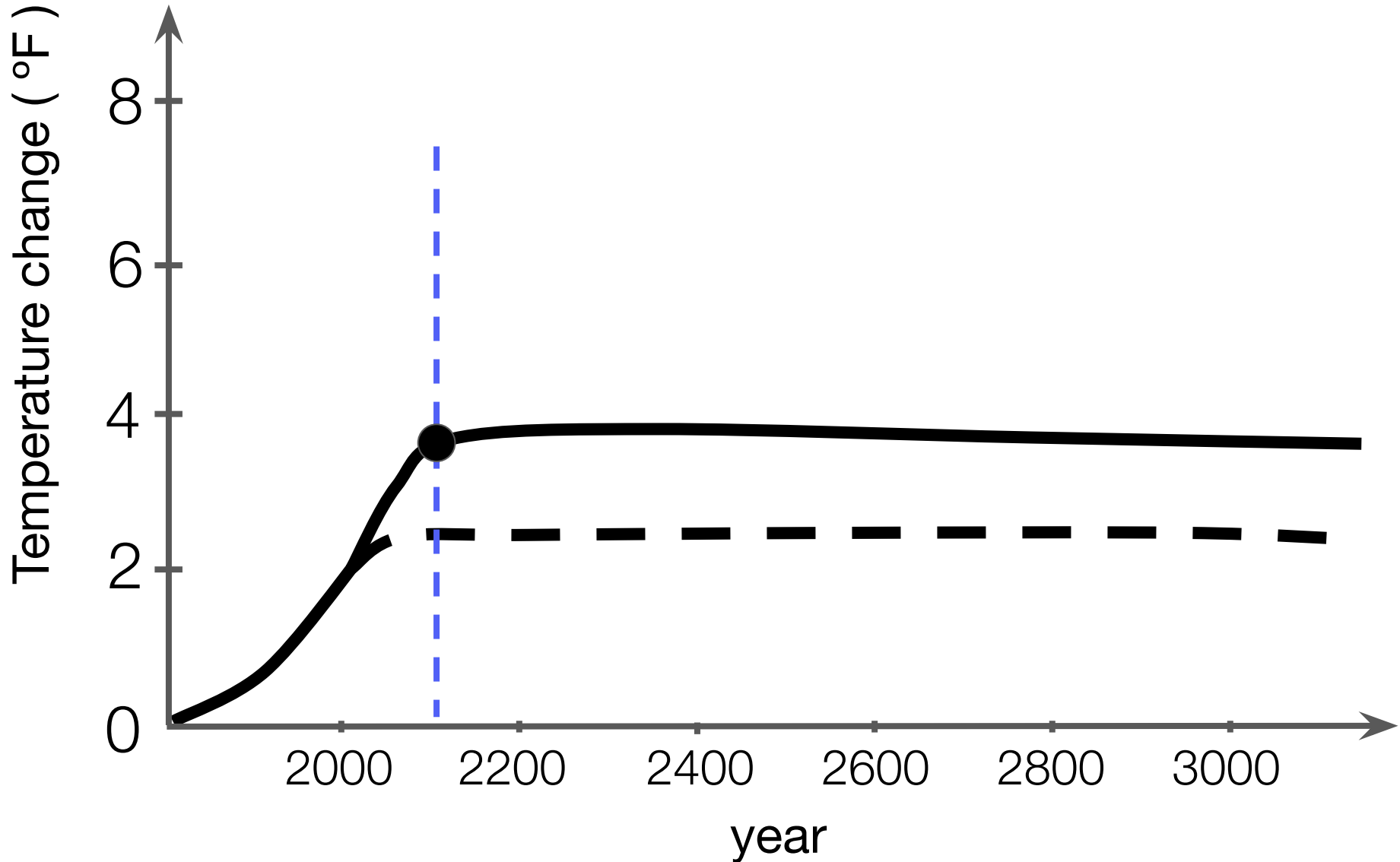
emissions stop



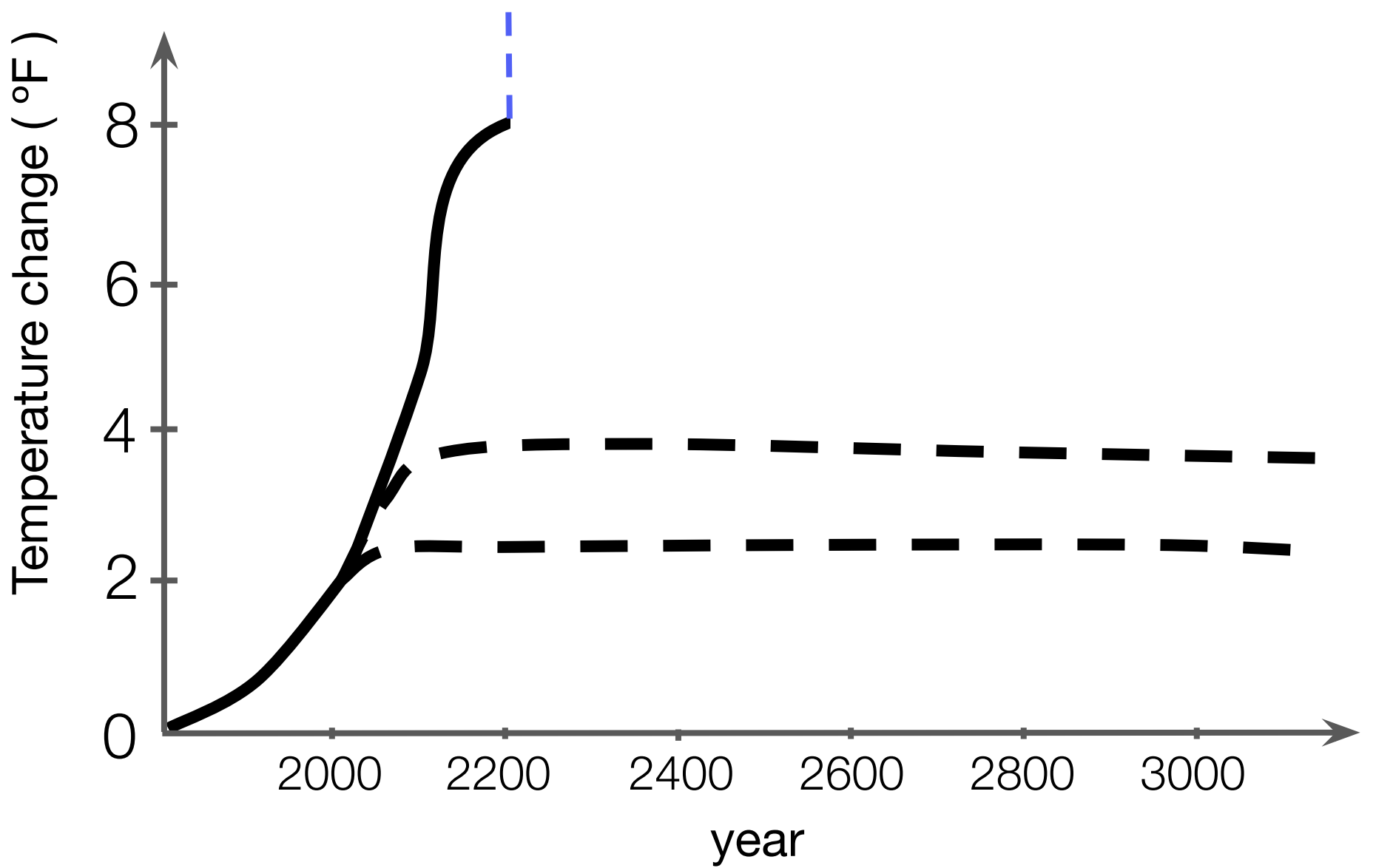
meet Paris target (+3.6 F)



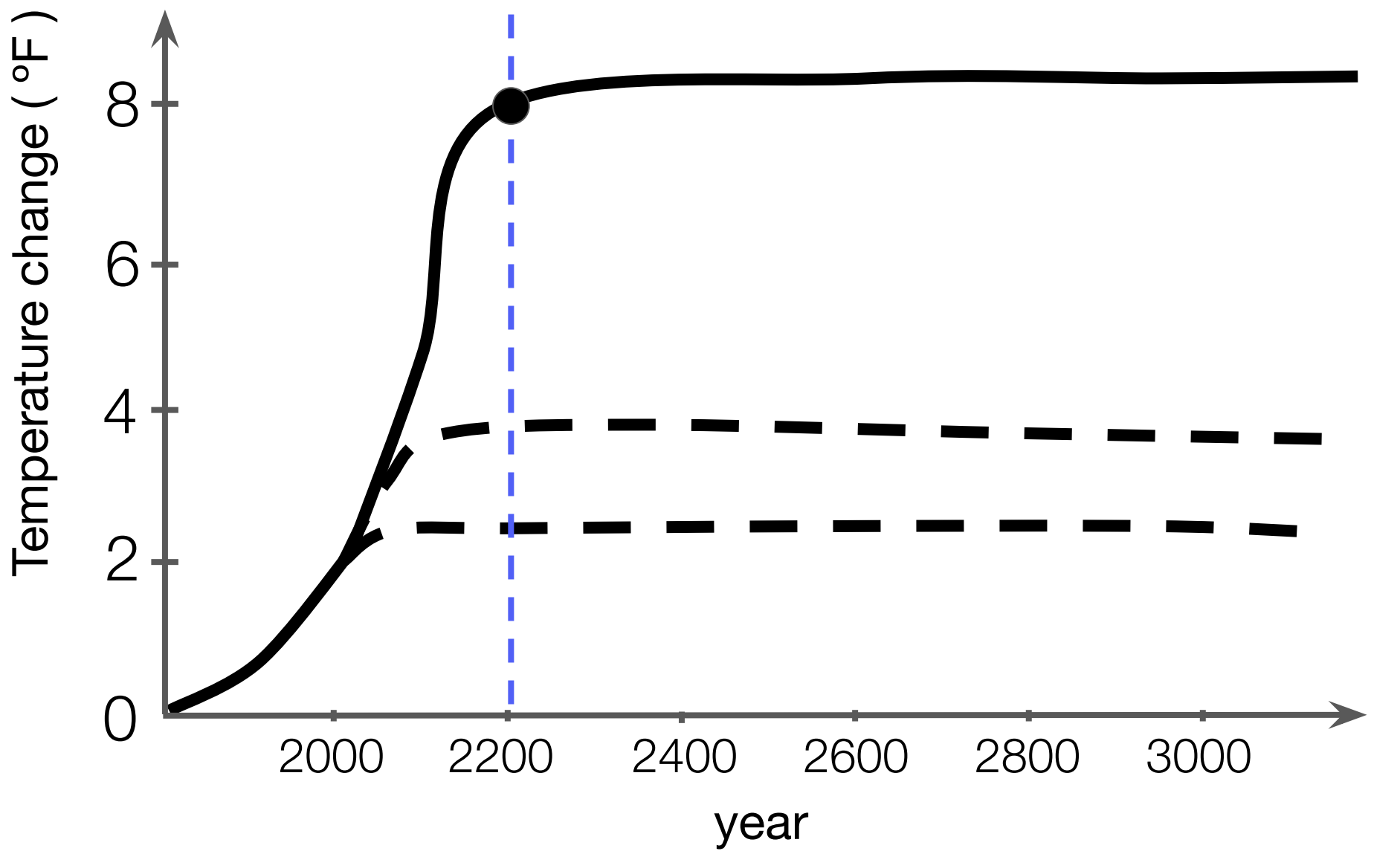
meet Paris target (+3.6 F)

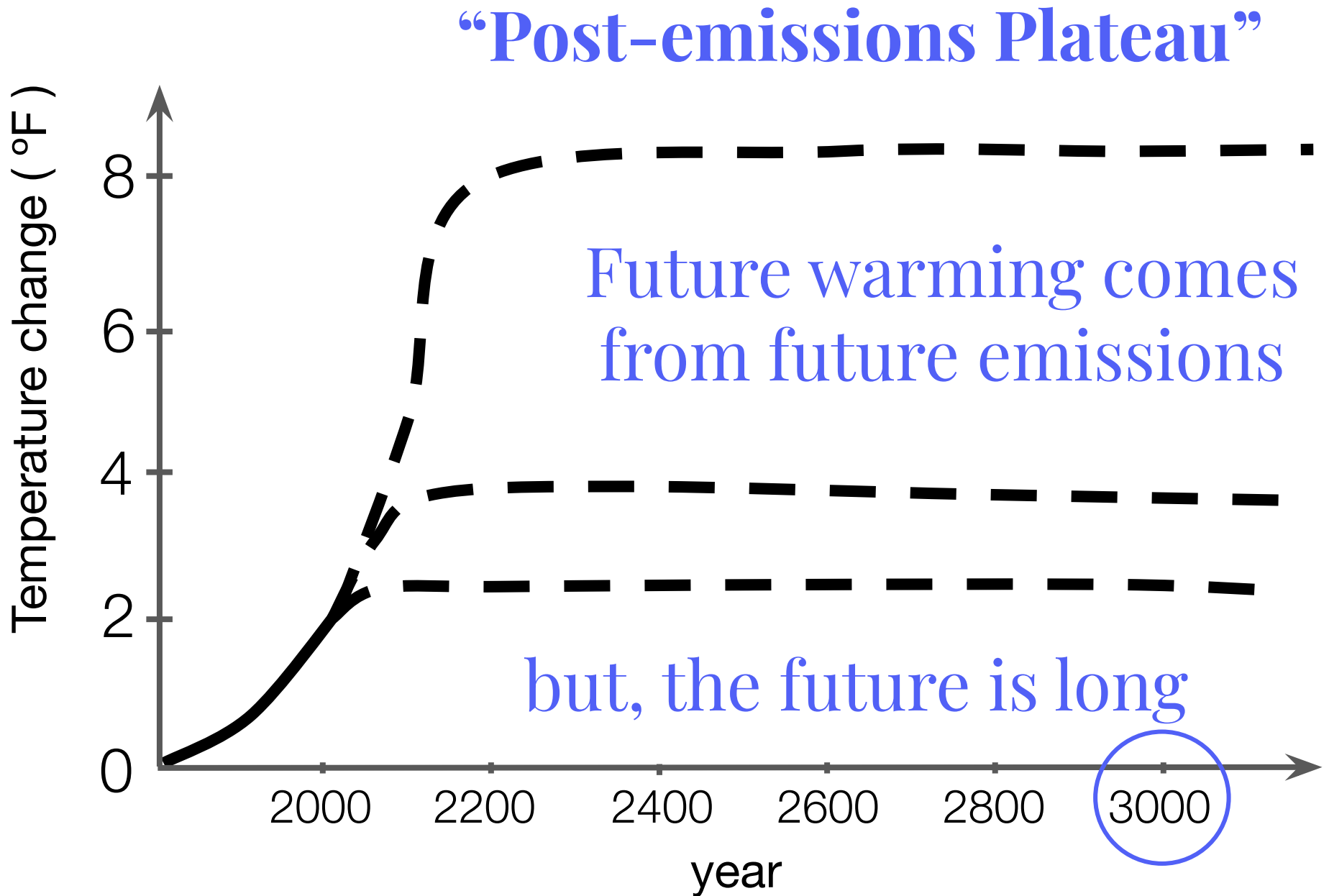


unabated emissions



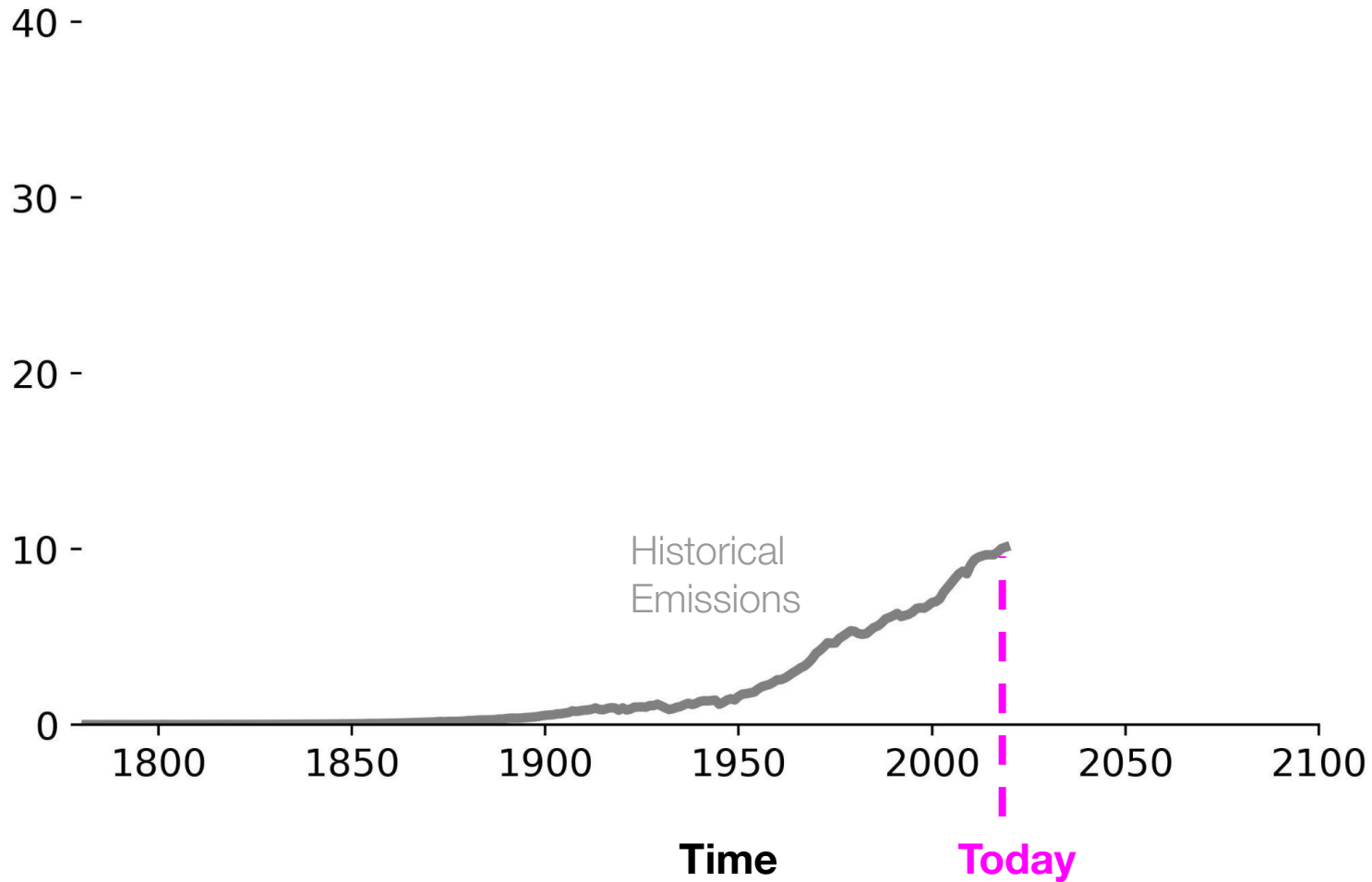
unabated emissions





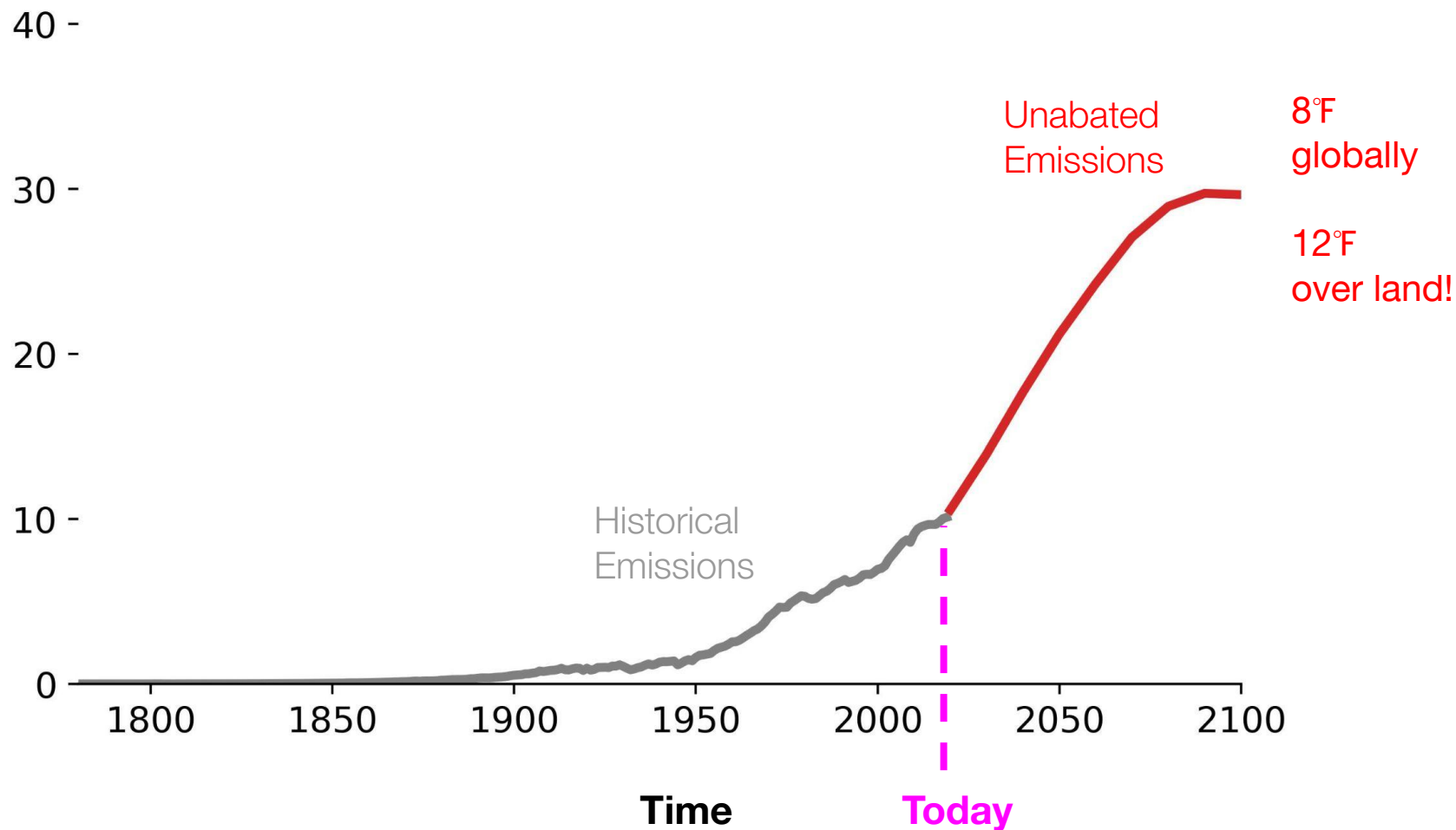
What do emissions scenarios look like?

**Annual Emissions
(gigatons carbon/year)**



What do emissions scenarios look like?

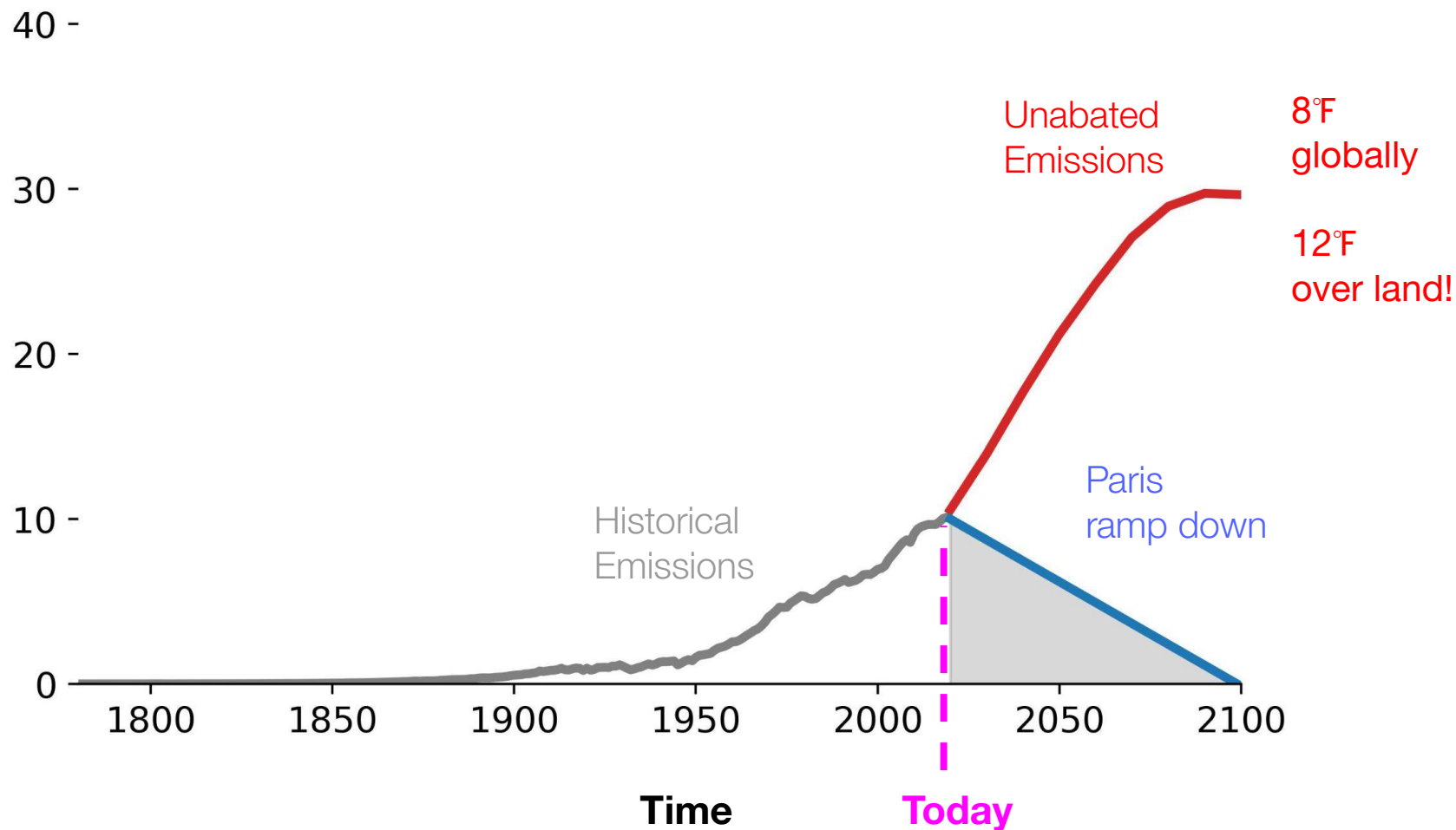
Yearly Emissions (gigatons carbon)



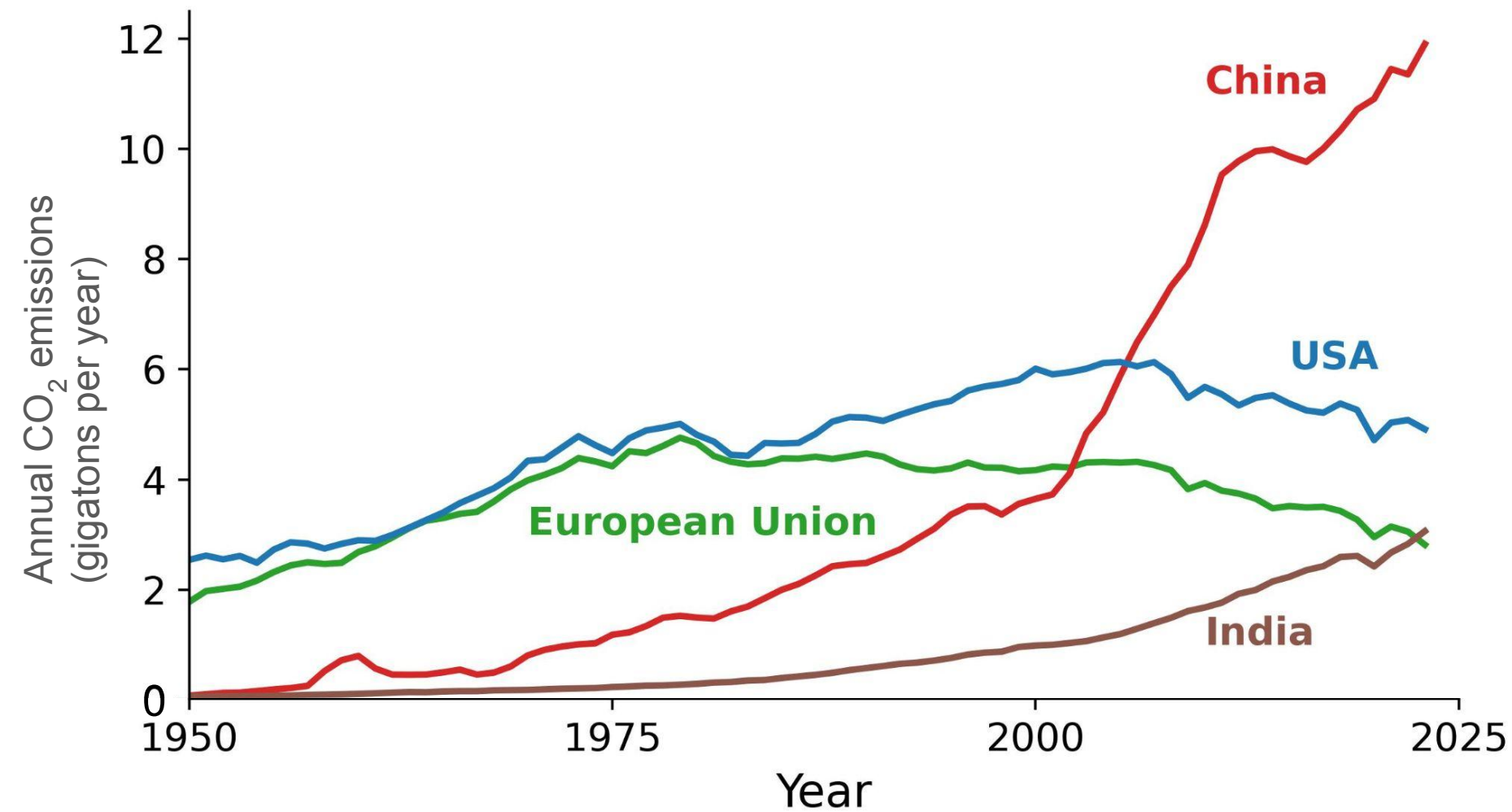
Source: Future unabated emissions are [SSP5-8.5](#).
Global temperature estimate at 2100 for SSP5-8.5 is from Table 4.2 of IPCCAR6WGI Ch. 4

What do emissions scenarios look like?

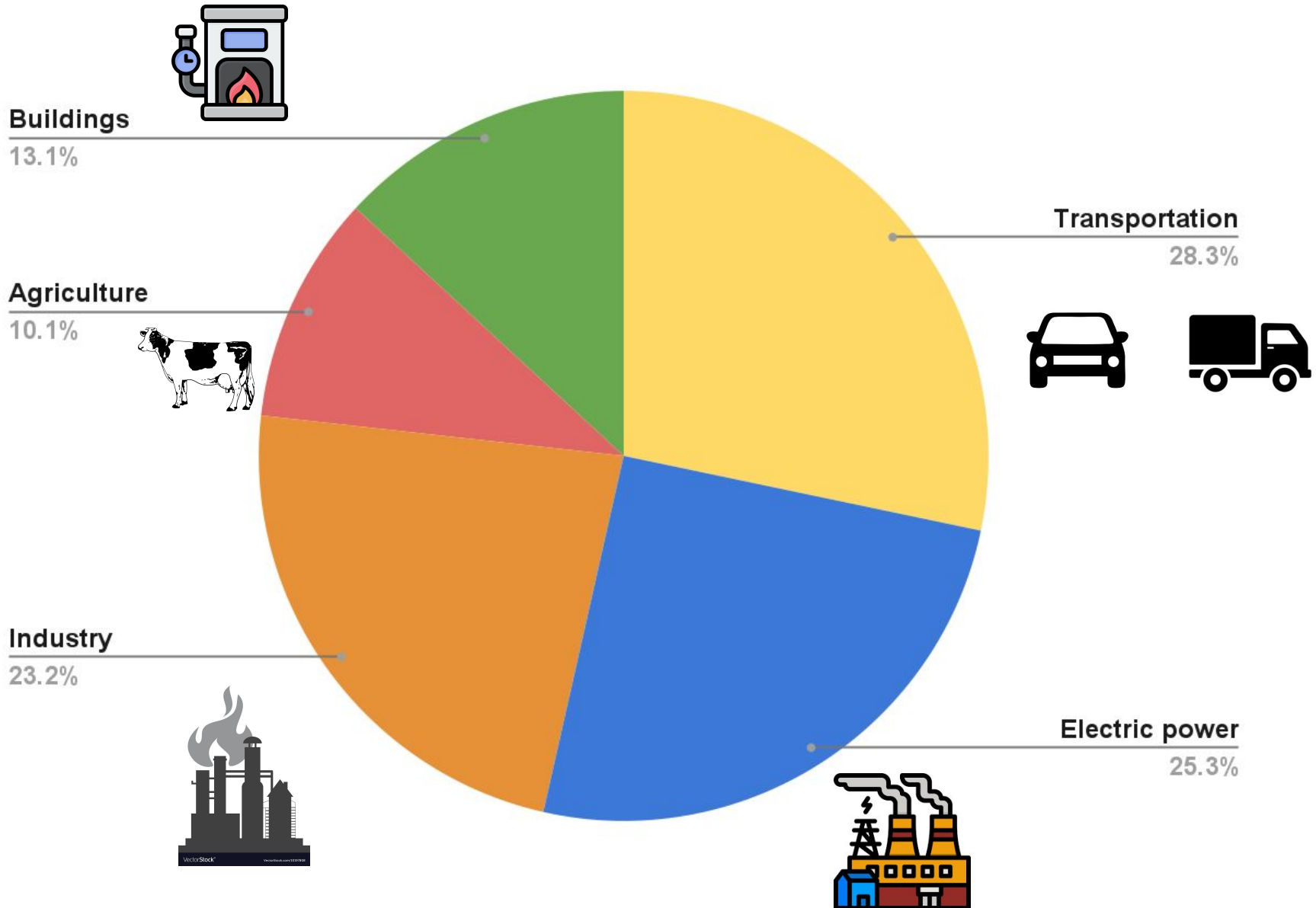
Yearly Emissions (gigatons carbon)



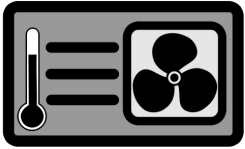
Source: Future unabated emissions are [SSP5-8.5](#).
Global temperature estimate at 2100 for SSP5-8.5 is from Table 4.2 of IPCCAR6WGI Ch. 4



U.S. CO₂-eq emissions



U.S. CO₂-eq emissions



Buildings

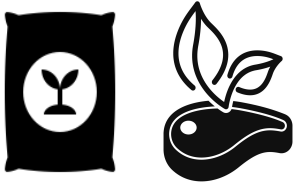
13.1%

Heat pumps 16%

Induction stoves 4%

Agriculture

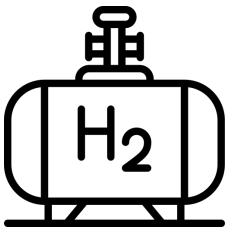
10.1%



<1% of
meat sales

Industry

23.2%



<1% of
industrial
heat

Transportation

28.3%

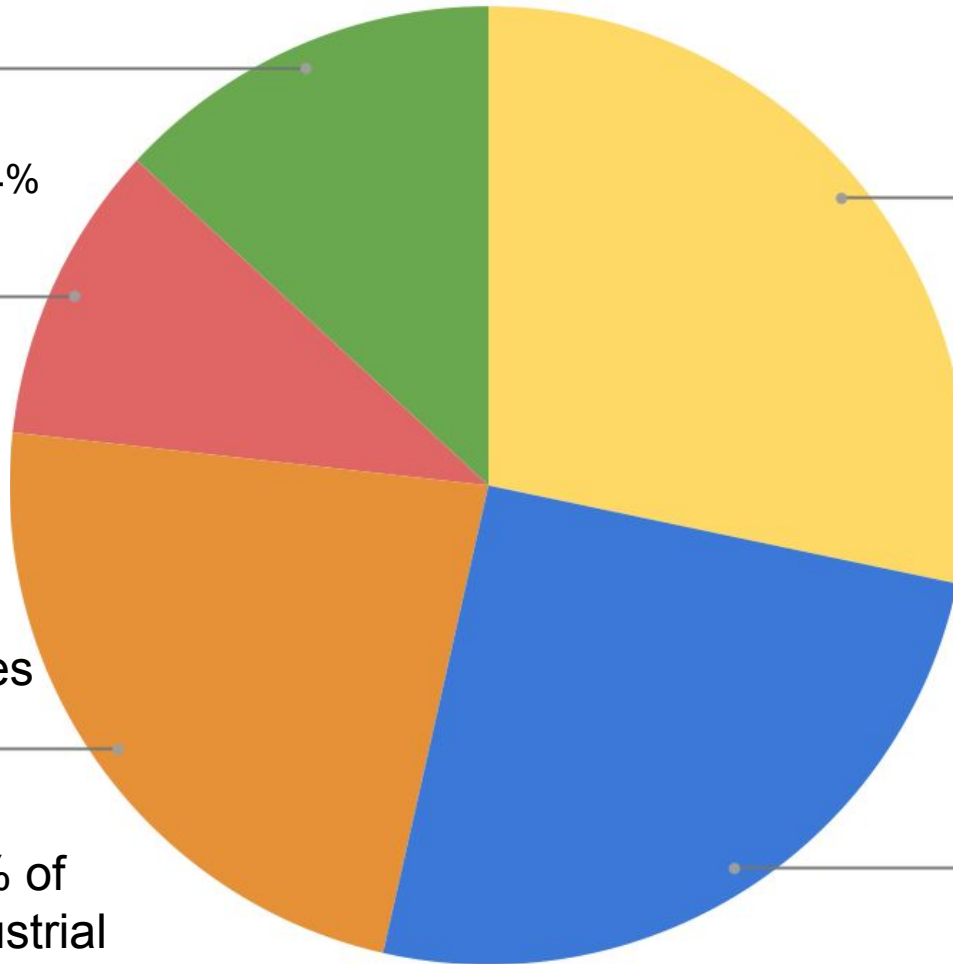
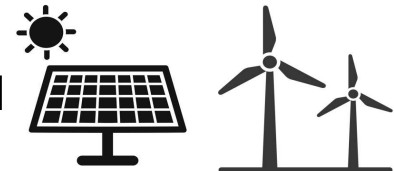


1% of fleet
7% of sales

Electric power

25.3%

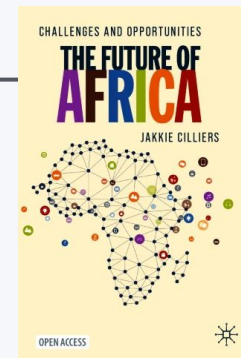
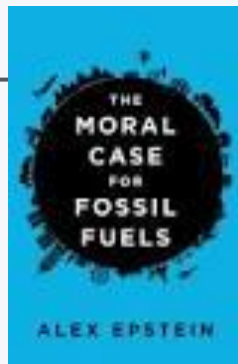
14% of grid



Policy choices depend on science *and* values

Should emerging economies rely on fossil fuels or renewables?

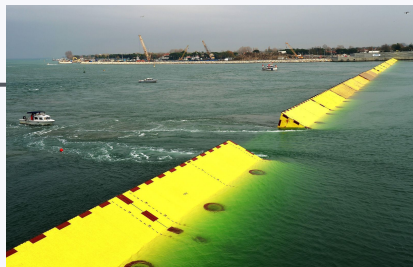
Fossil
fuels



Renewables

Should we prioritize adaptation or mitigation?

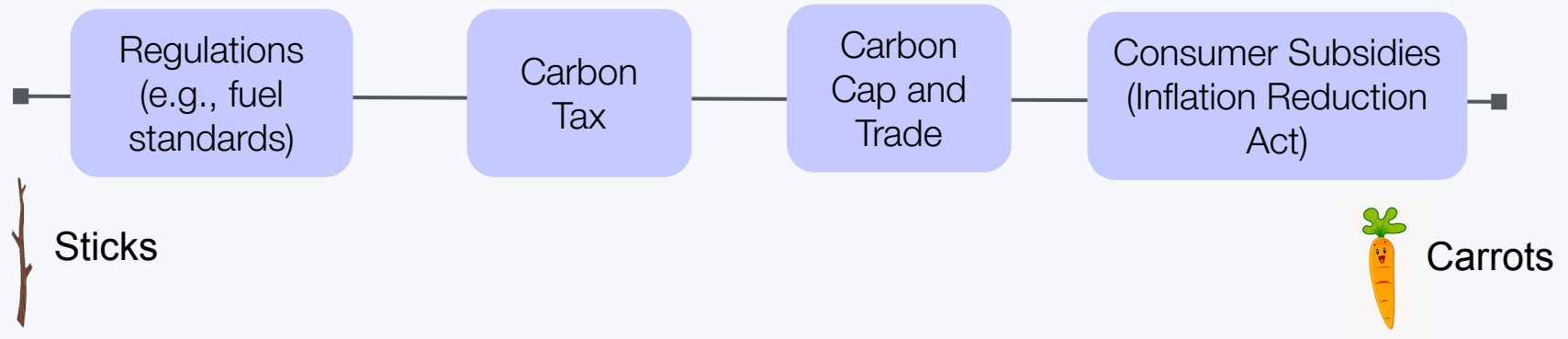
Adaptation



Mitigation

Policy choices depend on science *and* values

Mitigation policy: carrots vs. sticks?



Should we “geoengineer” to offset global warming?





See us in Nebraska! Learn more at www.climateupclose.org

Thursday **6/26** 6:30 pm RDG Planning and Design | Sponsored by Green Omaha Coalition
1302 Howard Street, Omaha, NE 68102

Friday **6/27** 7 pm Saint Paul United Methodist Church
1144 M St, Lincoln, NE, 68508

Saturday **6/28** 10:30 am Unitarian Church of Lincoln
6300 A Street, Lincoln, NE, 68510

1:30 pm Pioneers Park Nature Center | Sponsored by Spring Creek
Prairie Audubon Center
Free with registration preferred: springcreek.audubon.org/events/climate-close
3201 S. Coddington Ave, Lincoln NE 68522

8 pm Branched Oak Observatory
Free with registration required: tinyurl.com/ClimateUpCloseAtBOO
14300 NW 98th Street Raymond, NE 68428 | Followed by stargazing until 11pm

Sunday **6/29** 9 am First Unitarian Church of Omaha
3114 Harney St, Omaha, NE 68131 | Co-sponsored by Second Unitarian Church of Omaha

1 pm Site-1 Brewing | Sponsored by UNMC Science Cafe
2566 Farnam St, Omaha, NE 68131

4 pm Countryside Community Church | Sponsored by Trifaiith
13130 Faith Plz, Omaha, NE 68144

Help us build conversations that
meet people where they are on
climate science.

We are a 100% volunteer
organization.



All donations go towards covering the travel expenses of Climate Up Close scientists on the road. We will provide you with an expense report, so you can see exactly how your donation enabled our outreach efforts.

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