

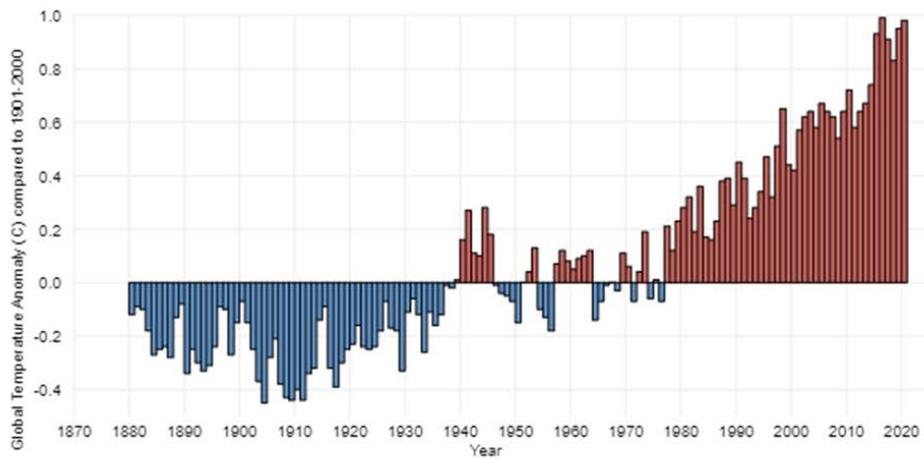
Causes and Effects of Climate Change: Global to Regional Indicators

Benjamin DeAngelo
Deputy Director, Climate Program Office

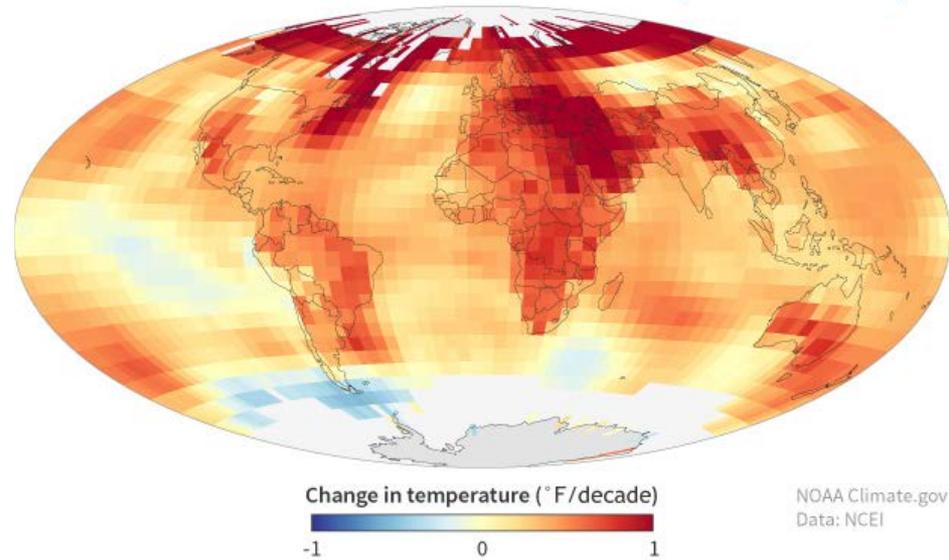
**Presentation for Special Meeting of Monroe County Board
of County Commissioners**
June 21, 2021



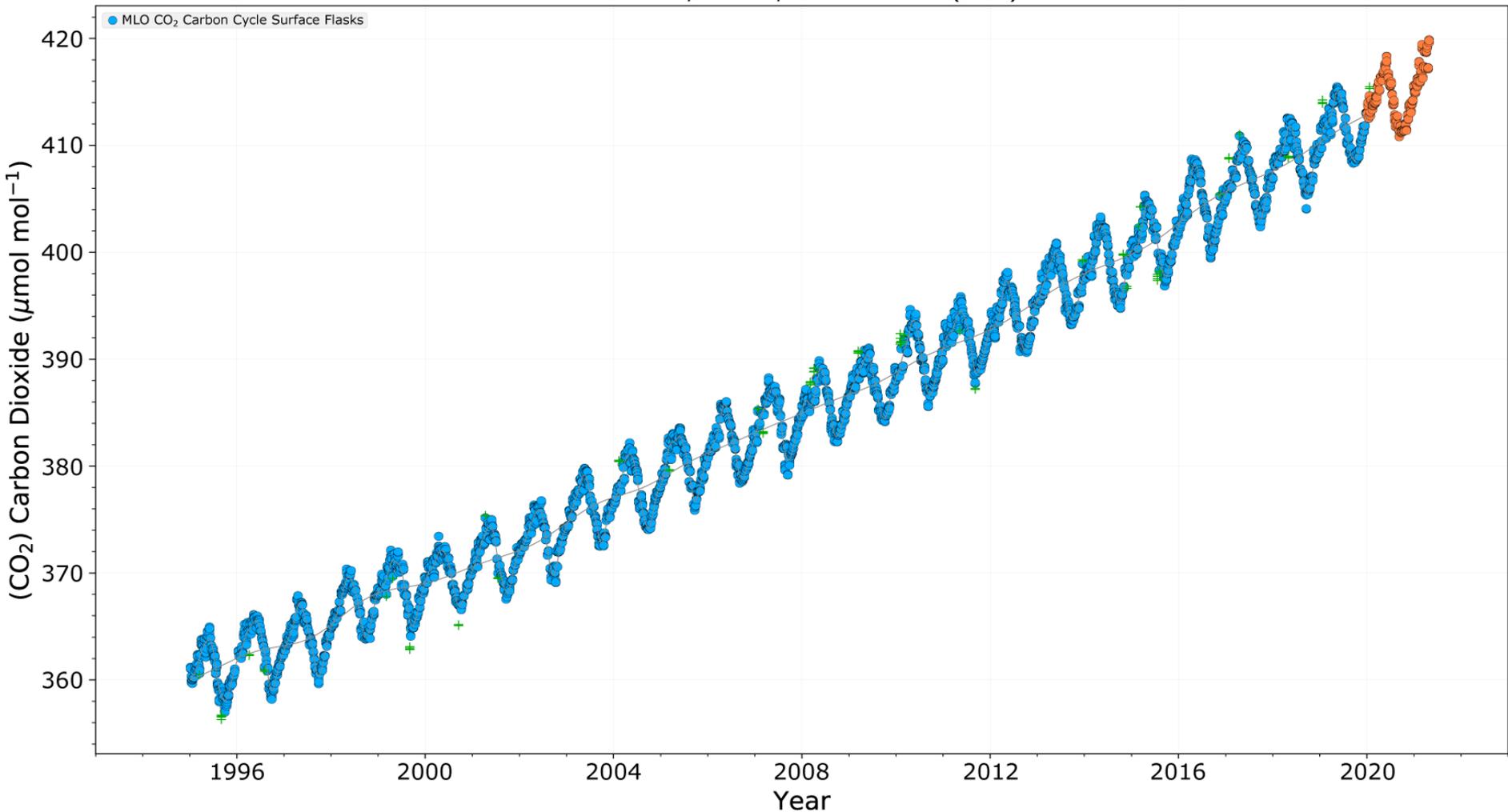
History of global surface temperature since 1880



RECENT TEMPERATURE TRENDS (1990-2019)

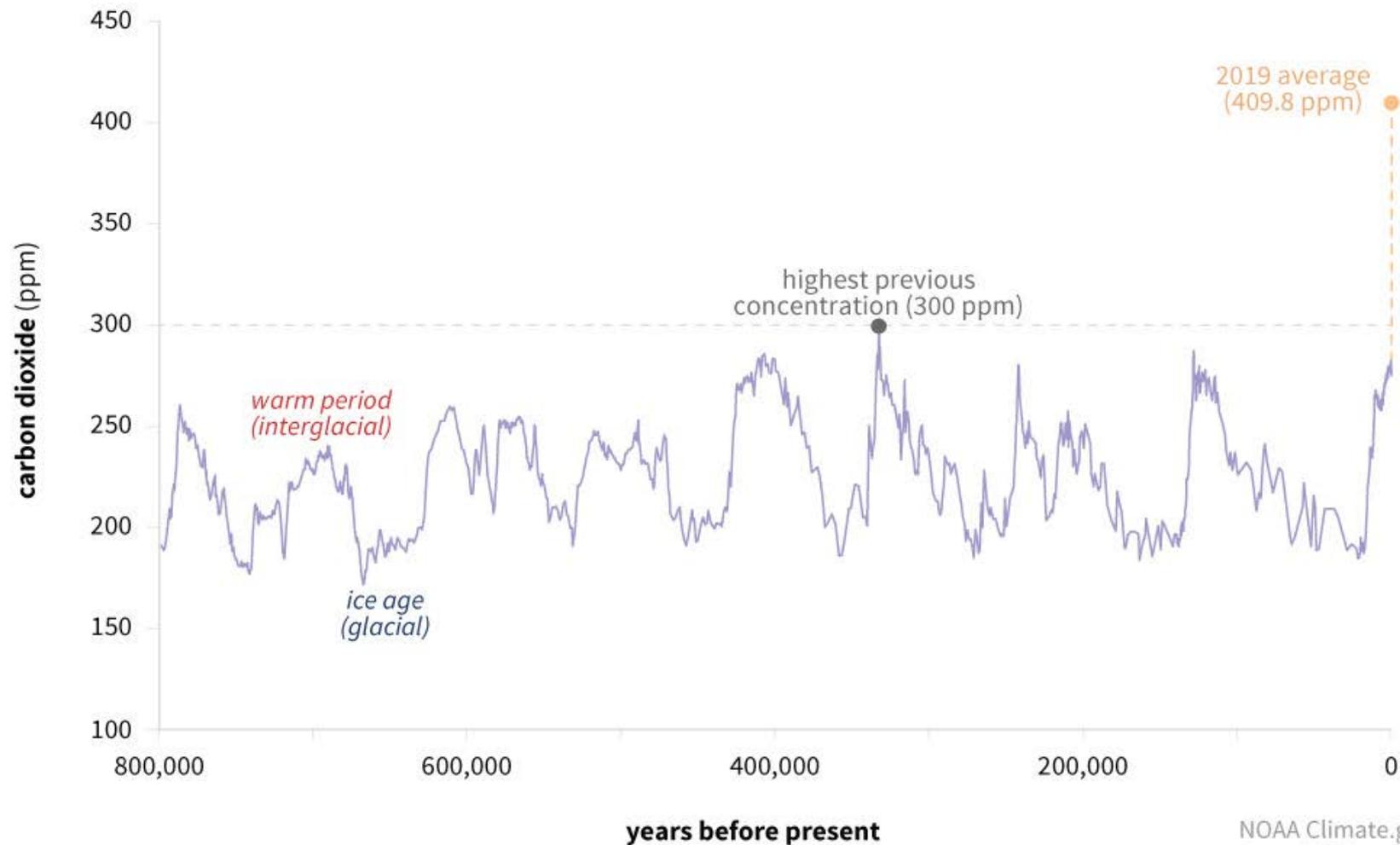


Mauna Loa, Hawaii, United States (MLO)



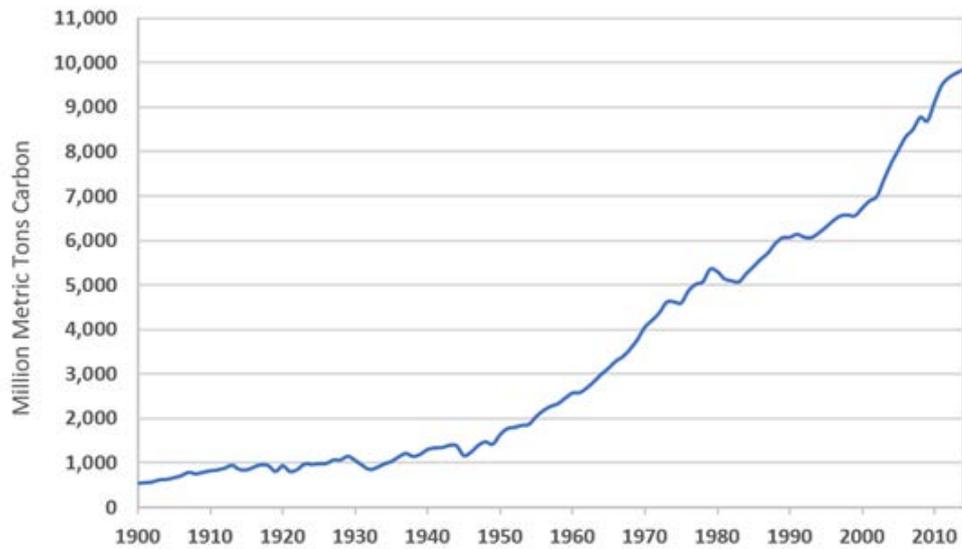
2021-May-24

CARBON DIOXIDE OVER 800,000 YEARS

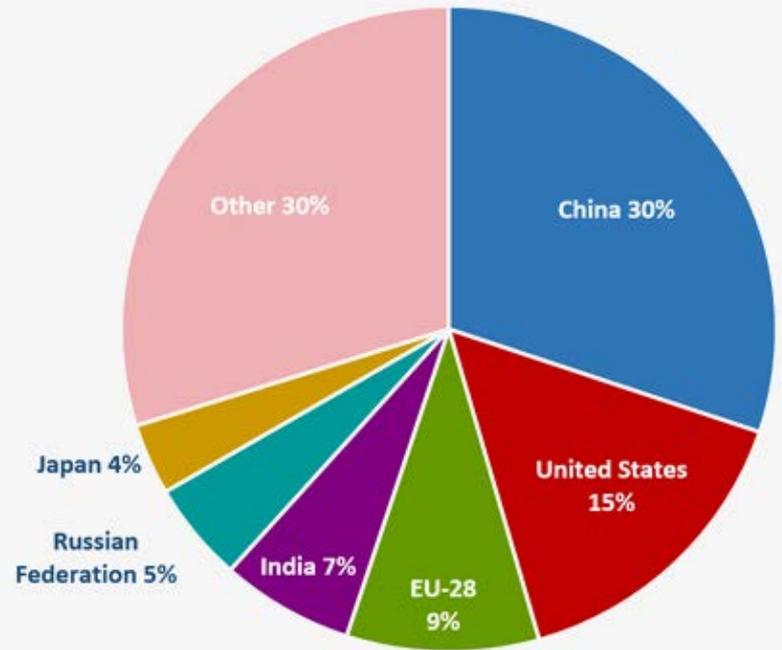


NOAA Climate.gov
Data: NCEI

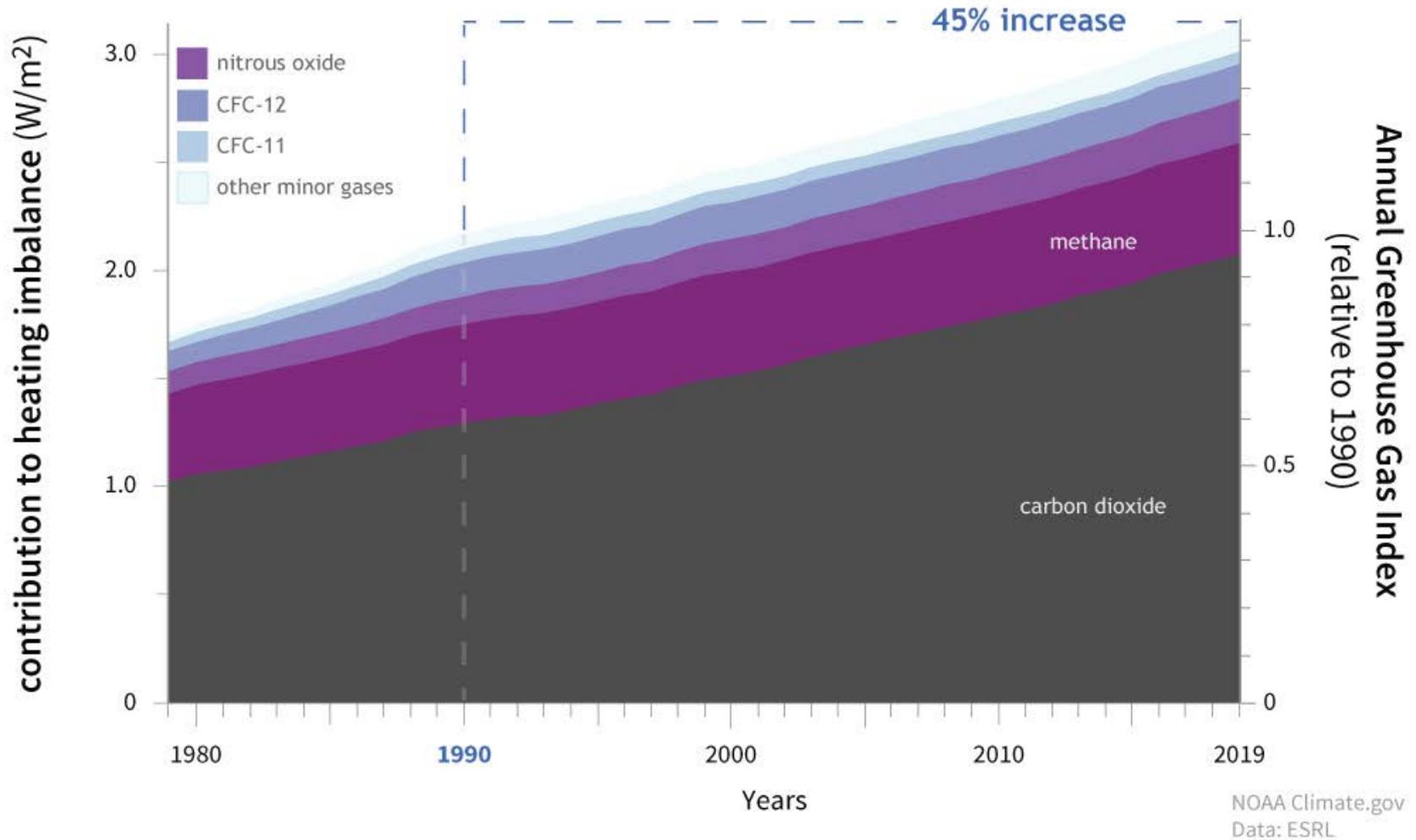
Global Carbon Emissions from Fossil Fuels, 1900-2014



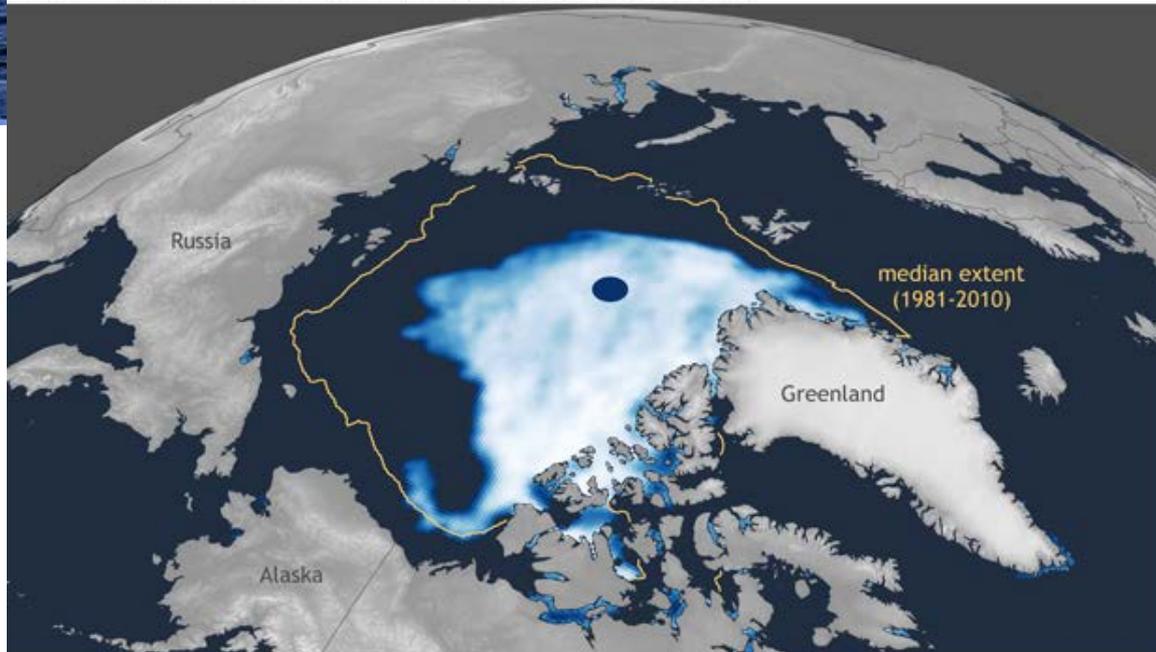
2014 Global CO₂ Emissions from Fossil Fuel Combustion and Some Industrial Processes



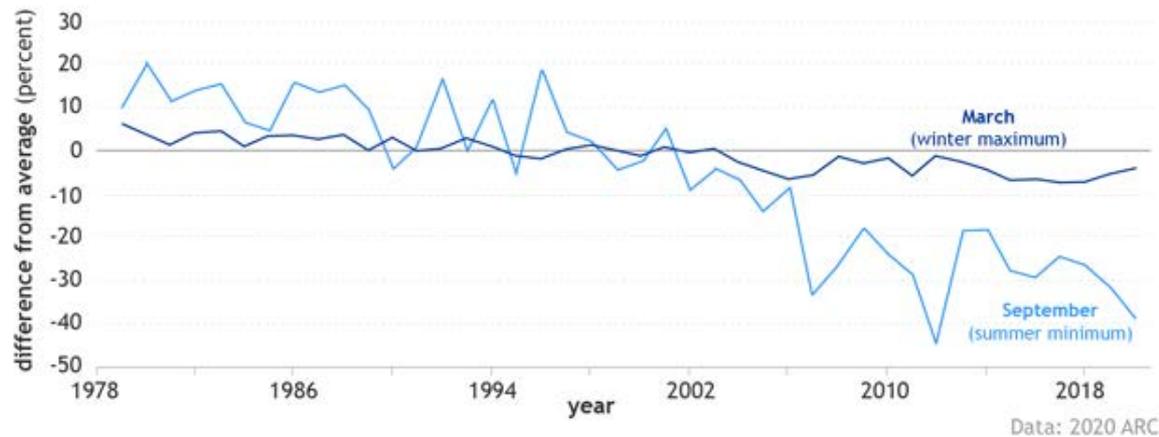
COMBINED HEATING INFLUENCE OF GREENHOUSE GASES



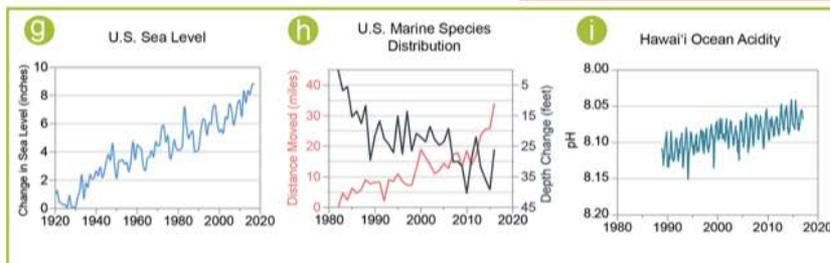
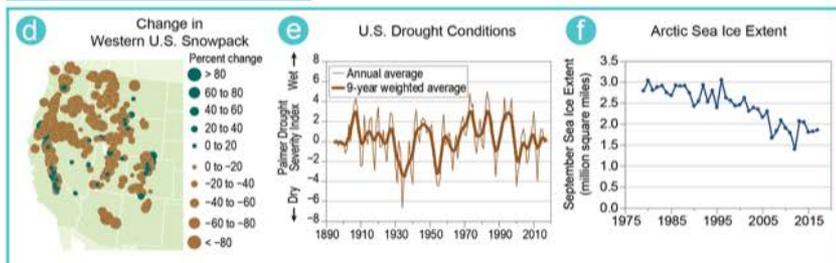
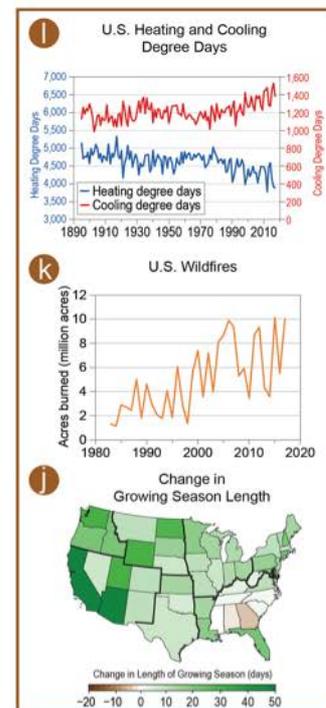
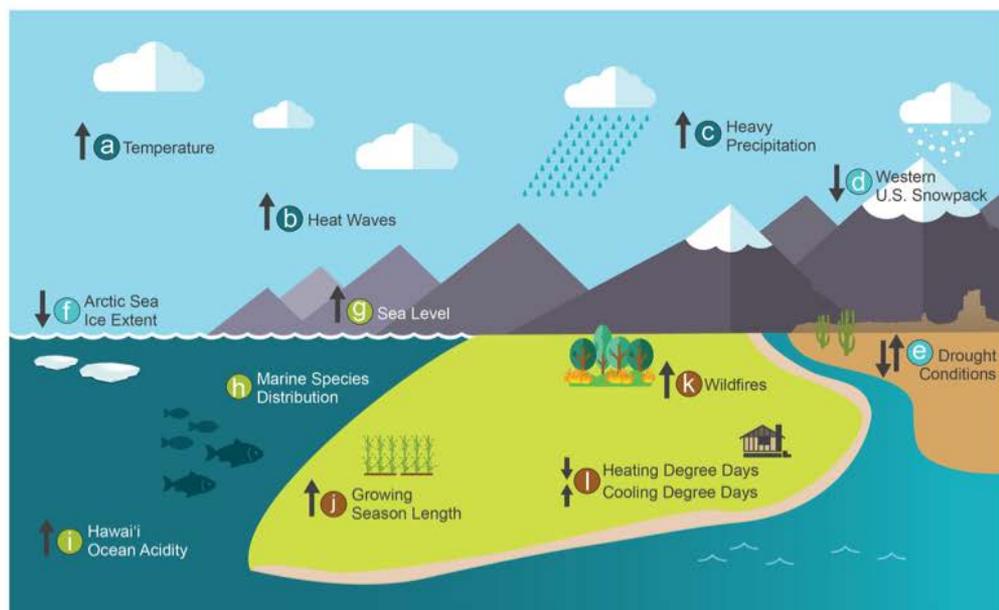
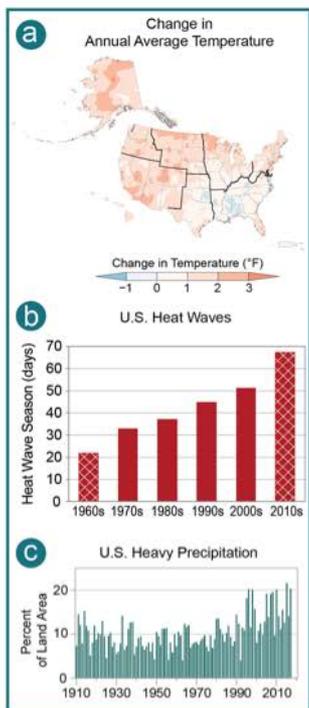
2020 ARCTIC SEA ICE MINIMUM WAS SECOND LOWEST ON RECORD



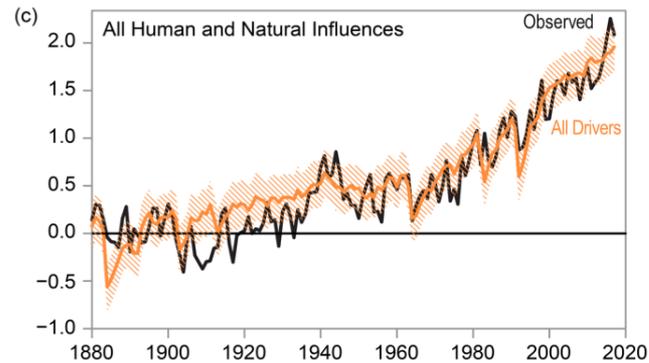
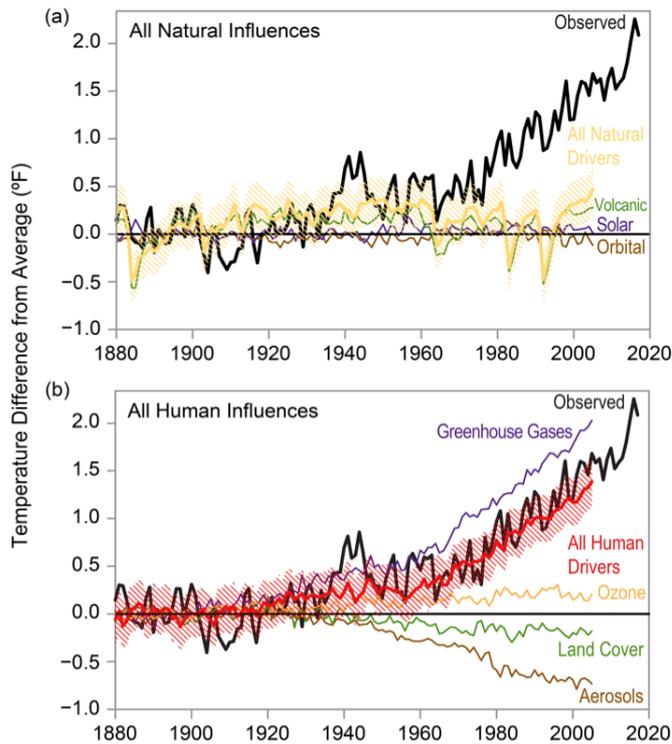
ARCTIC SEA ICE EXTENT OVER PAST 40 YEARS



Multiple observations show signs of a changing climate

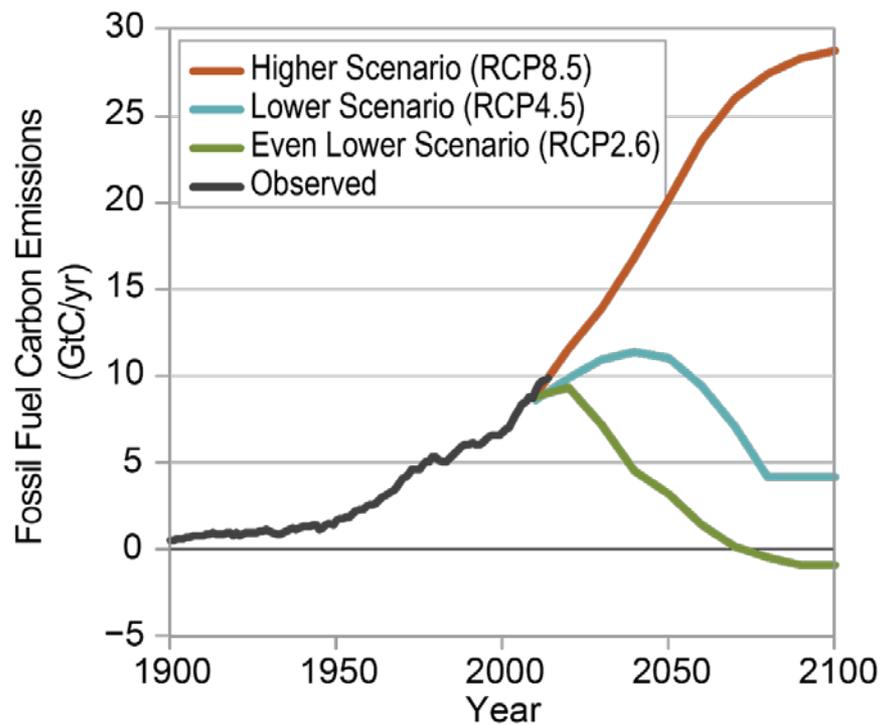


Attribution of Change

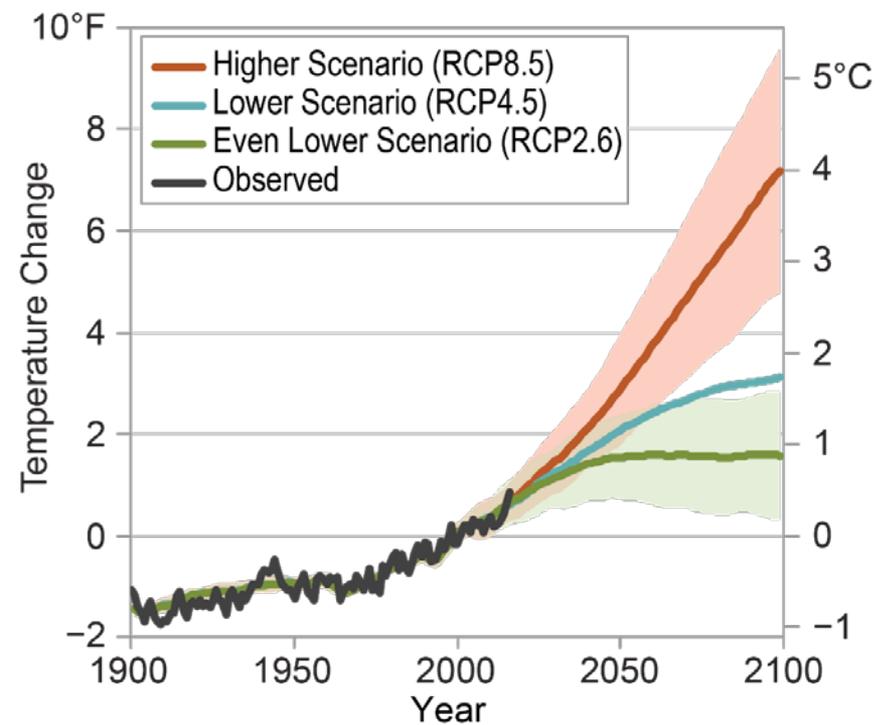


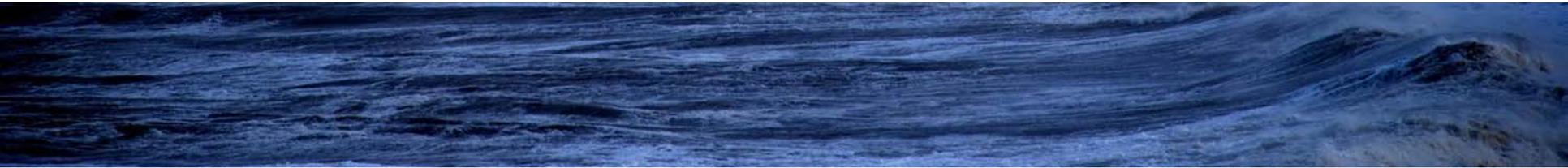
Climate will Continue to Change: NCA4 future projections primarily based on widely-used scenarios

Global Carbon Emissions

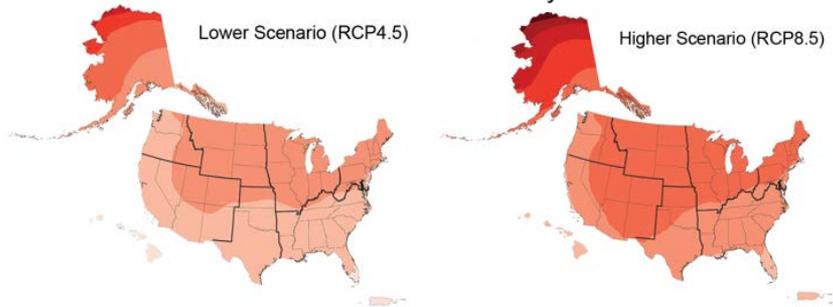


Global Average Temperature Change

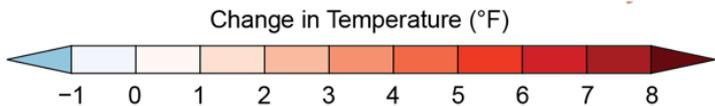
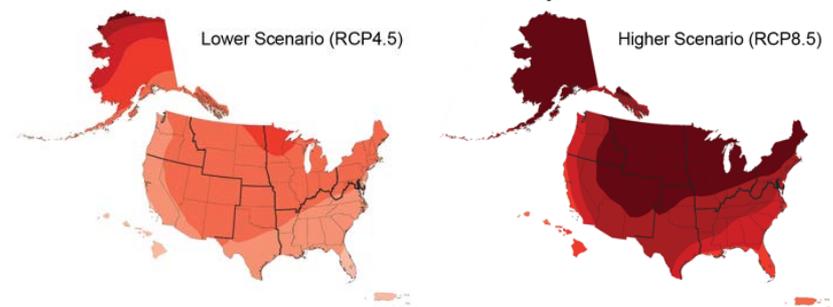




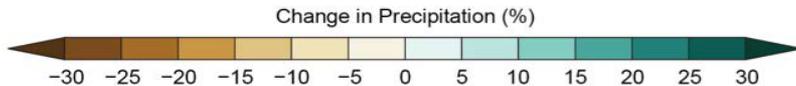
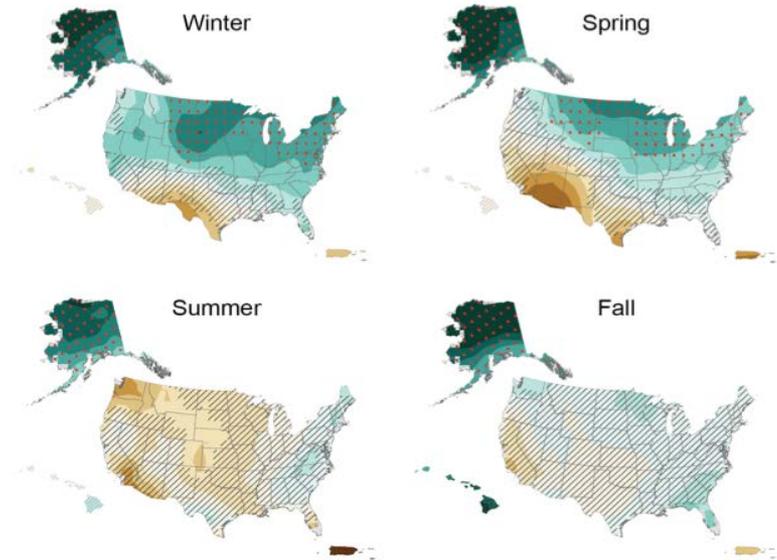
Mid-21st Century



Late 21st Century



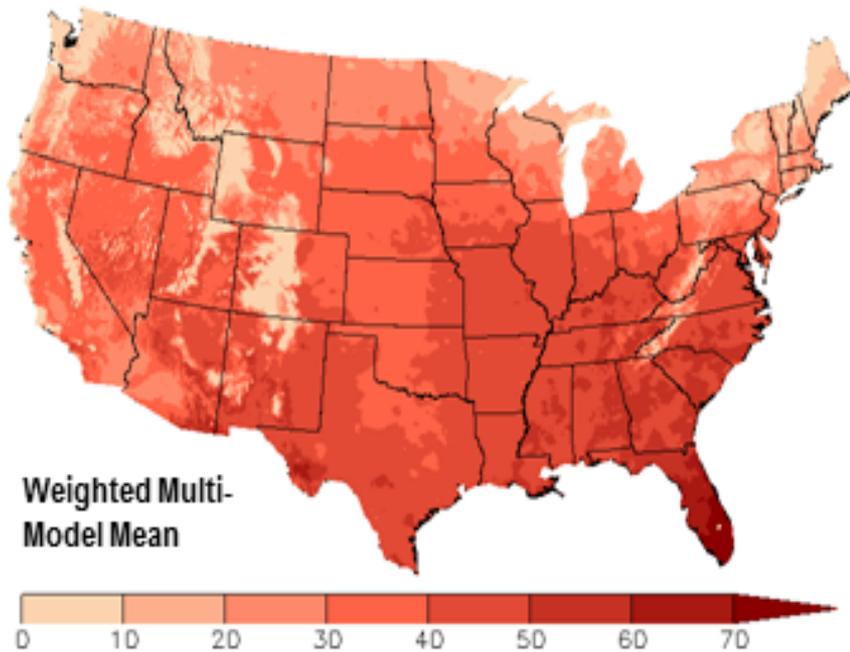
Late 21st Century, Higher Scenario (RCP8.5)



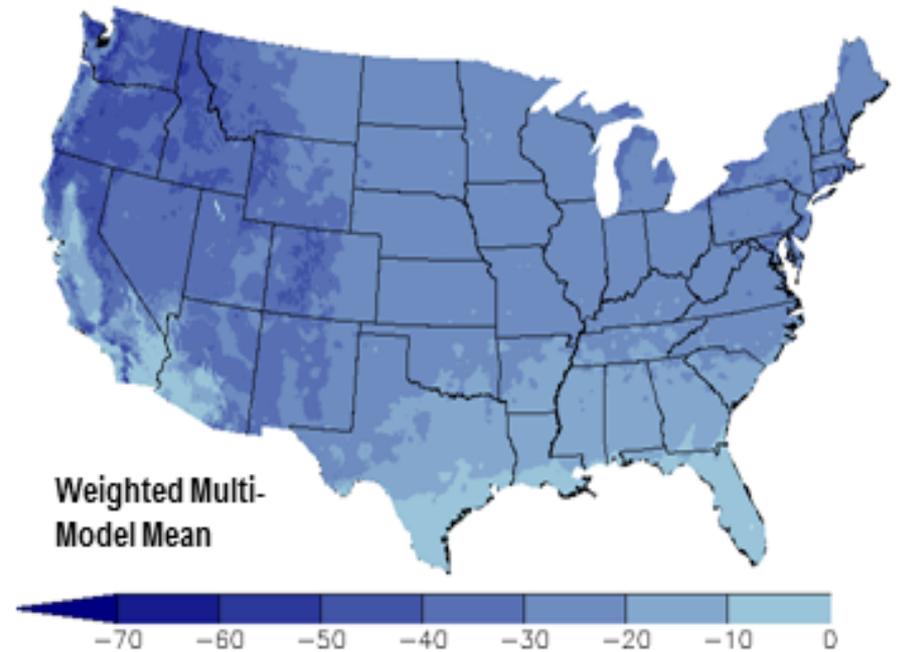
Areas with red dots show where projected changes are large compared to natural variations; areas that are hatched show where changes are small and relatively insignificant.

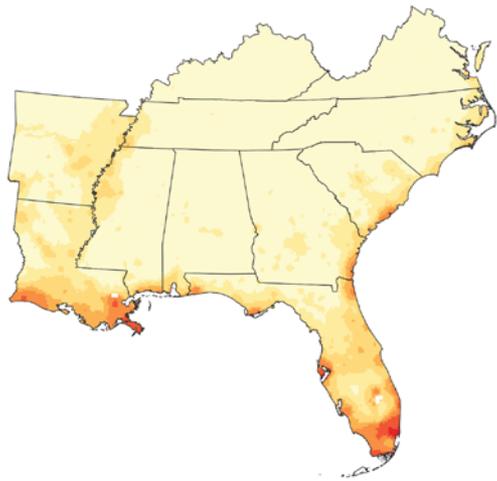
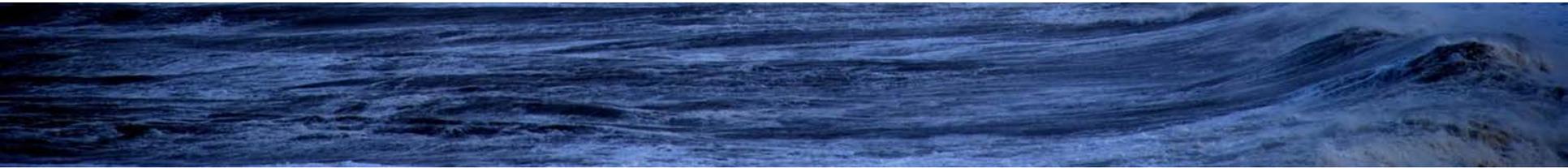
Projected Changes in Number of Days $>90^{\circ}\text{F}$ and $<32^{\circ}\text{F}$ for 2036-2065 relative to 1976-2005 for a High Emissions Scenario

Projected Change in Number of Days Above 90°F
Mid-21st Century, Higher Emissions



Project Change in Number of Days Below 32°F
Mid-21st Century, Higher Emissions





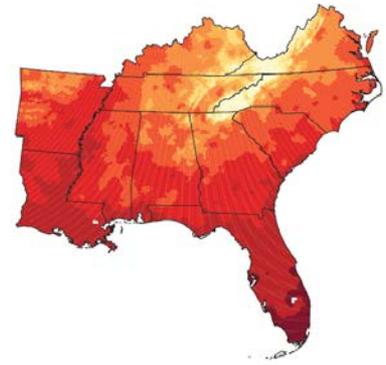
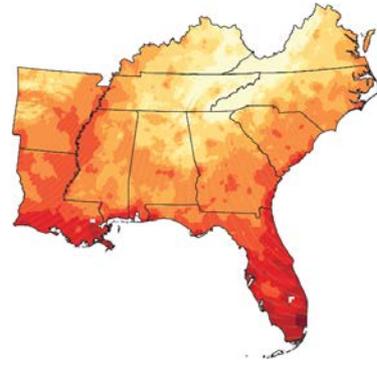
Number of Nights with a Minimum Temperature Greater than 75°F



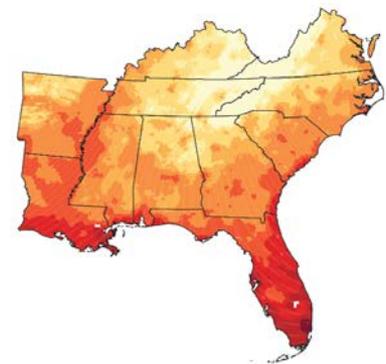
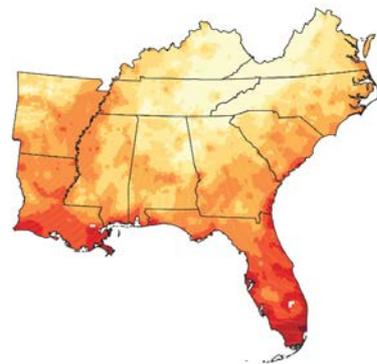
Mid-21st Century

Late 21st Century

Higher Scenario (RCP8.5)



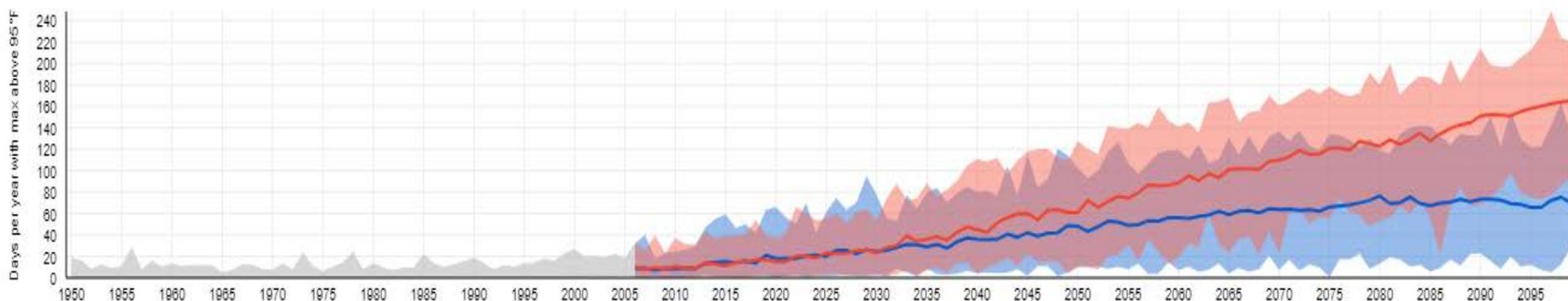
Lower Scenario (RCP4.5)



Number of Nights with a Minimum Temperature Greater than 75°F



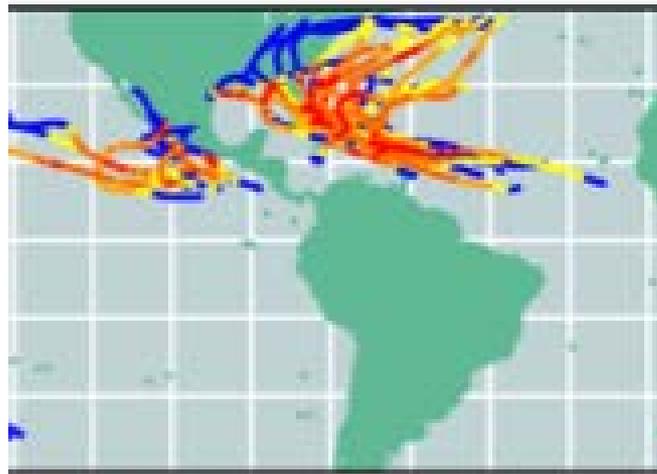
Monroe, CO, FL: Days above 95°F observed and projected under 2 future emission scenarios



Source: Climate Explorer, Climate Resilience Toolkit,
<https://crt-climate-explorer.nemac.org/>

Tropical Cyclones

Present-day simulation
244 Cat 4-5 storms

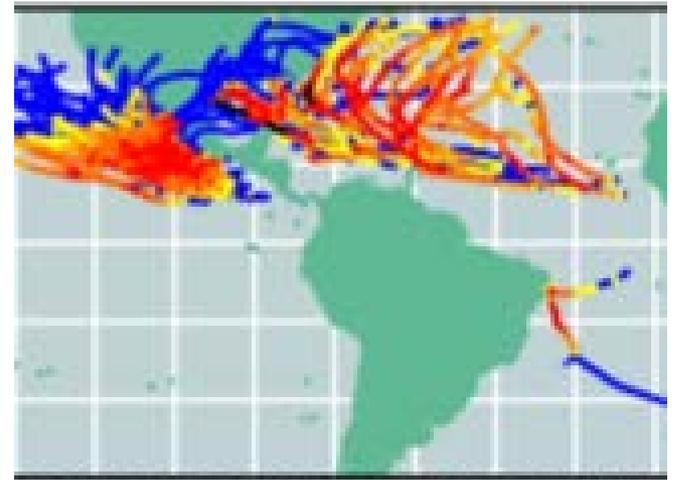


120°W 90°W 60°W 30°W

Storm Category

- TS
- HR1
- HR2
- HR3
- HR4
- HR5

RCP4.5 Late 21st
century
313 Cat 4-5 storms



120°W 90°W 60°W 30°W