

Carbon Reduction Challenge

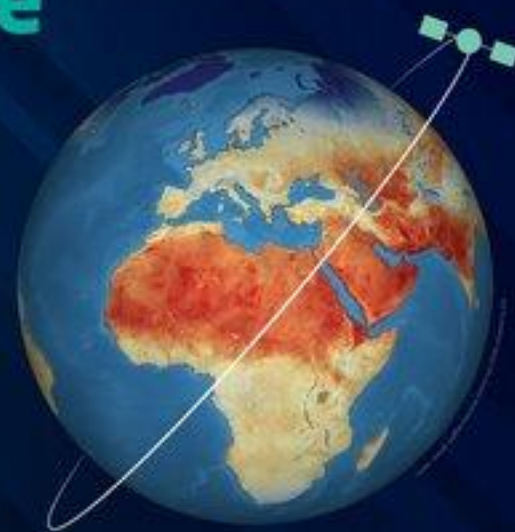
Climate Science Introduction

Summer 2026

Weather versus Climate



The difference between weather and climate is a matter of time



Weather

refers to short-term changes in the atmosphere. It can change minute-to-minute, hour-to-hour and day-to-day

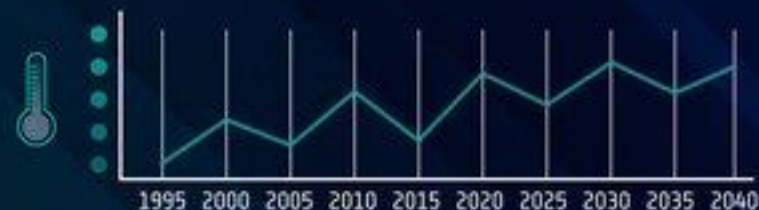


Climate

describes the average weather conditions in a specific area over a long period of time – 30 years or more

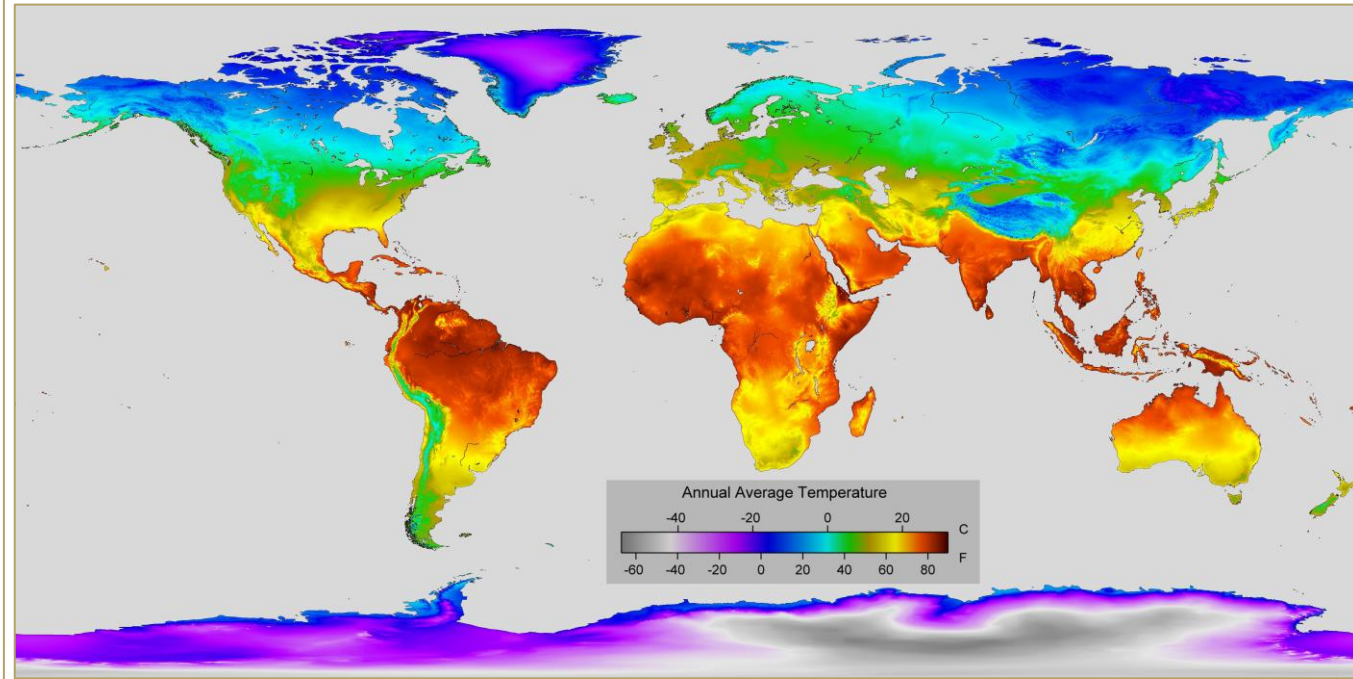
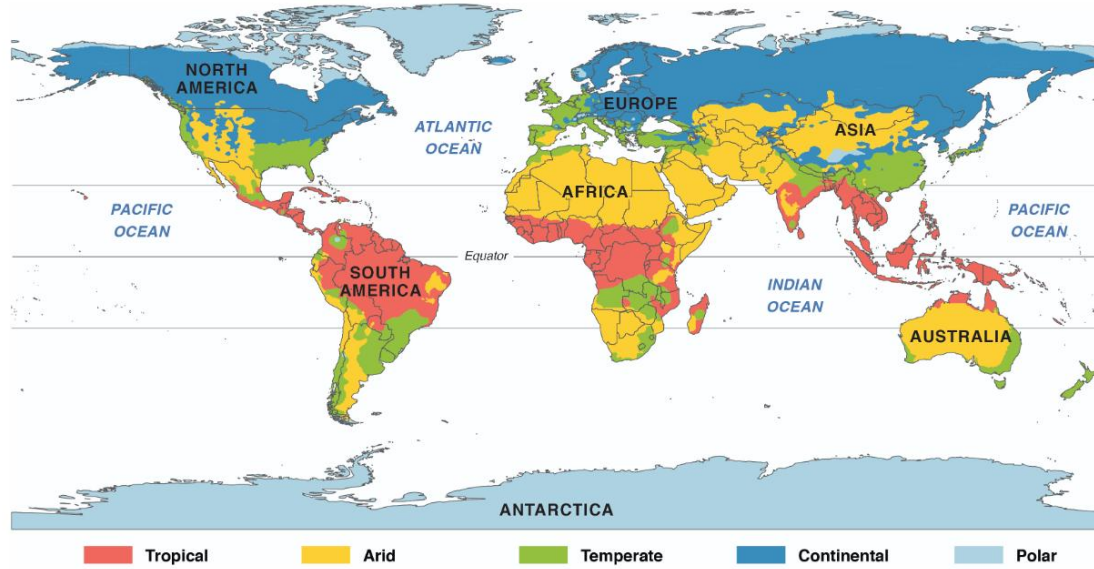


Satellites measure several aspects of Earth's weather as well as provide essential data over decades to monitor how our climate is changing



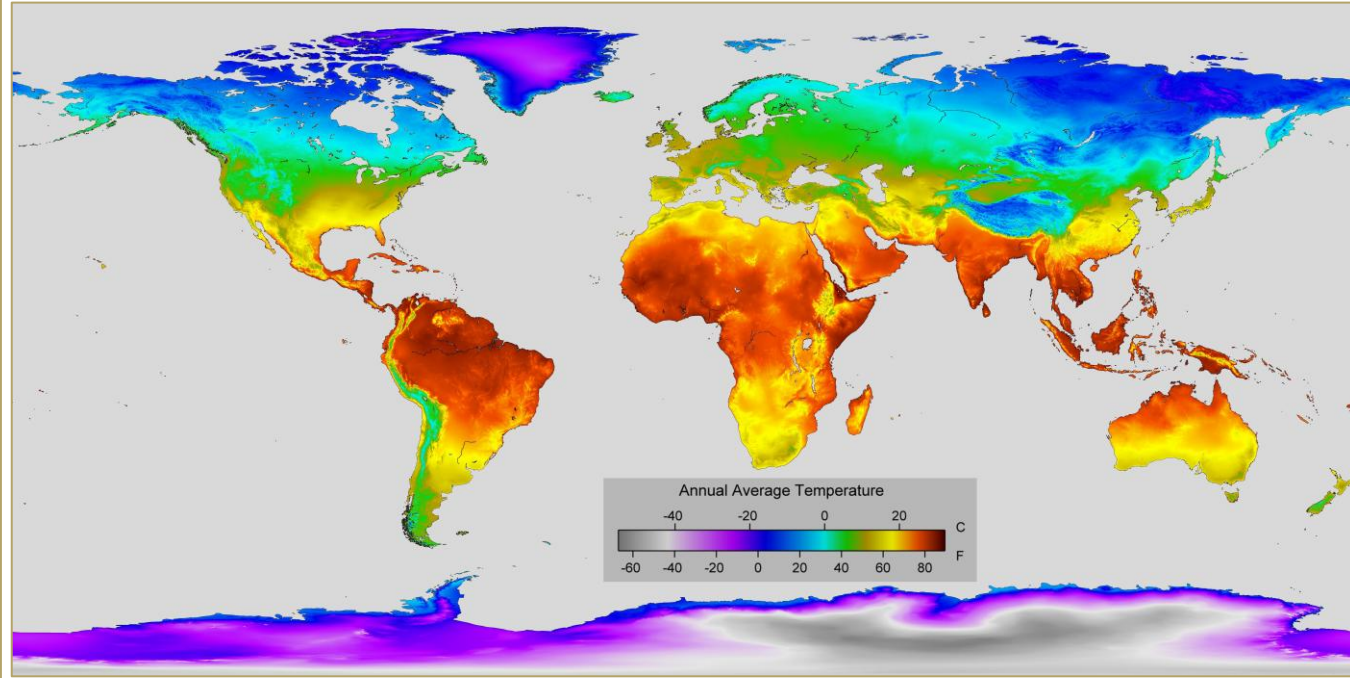
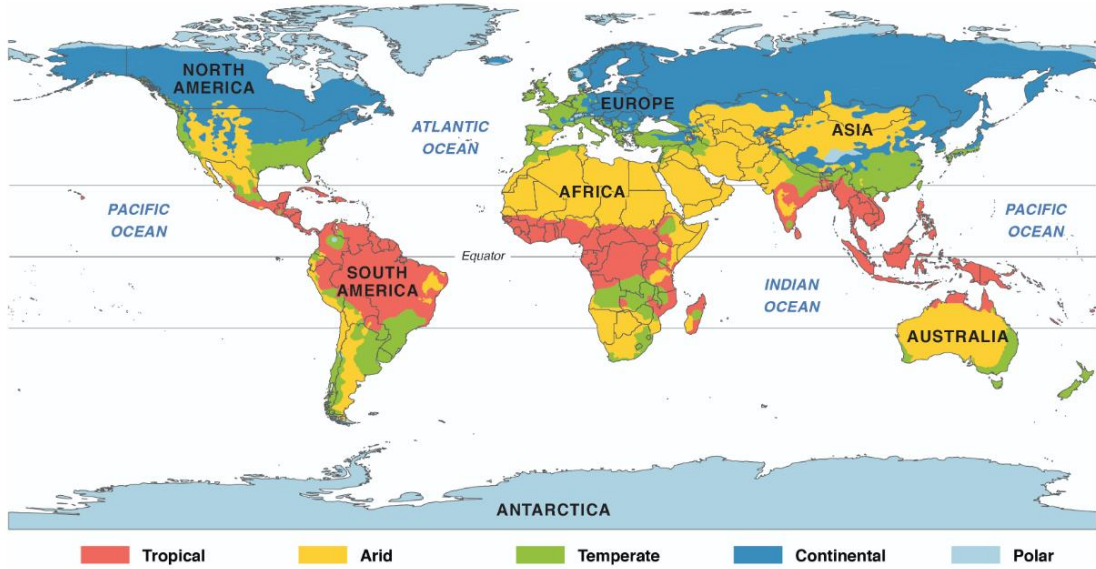
For more information, visit [space for our climate: www.esa.int/climate](http://spaceforourclimate.com)

Climate Zone Map



HOW DO WEATHER AND CLIMATE AFFECT OUR LIVES?
Climate Zone Map
Smithsonian Science for the Classroom™
© Smithsonian Institution
CREDIT: Emily Eng

Climate Zone Map

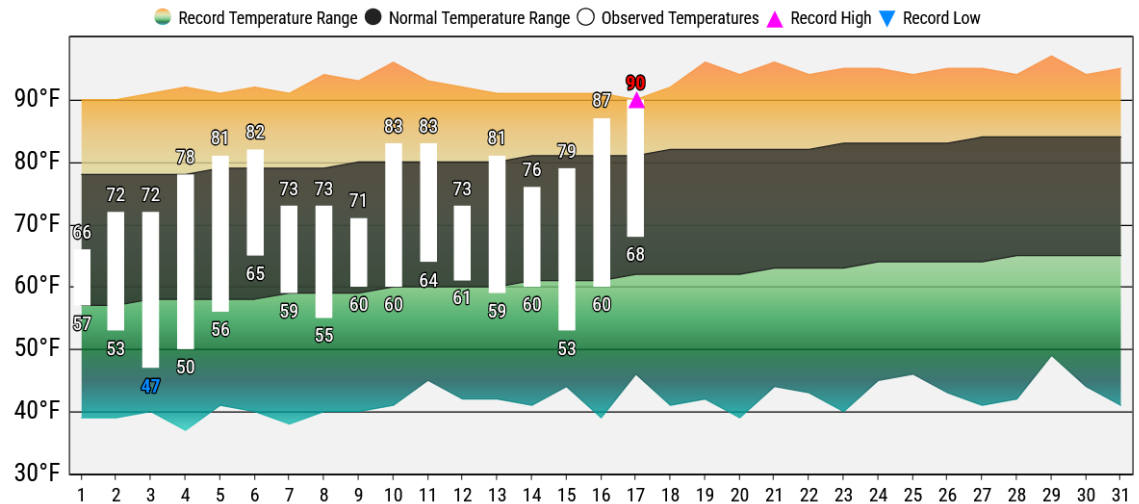


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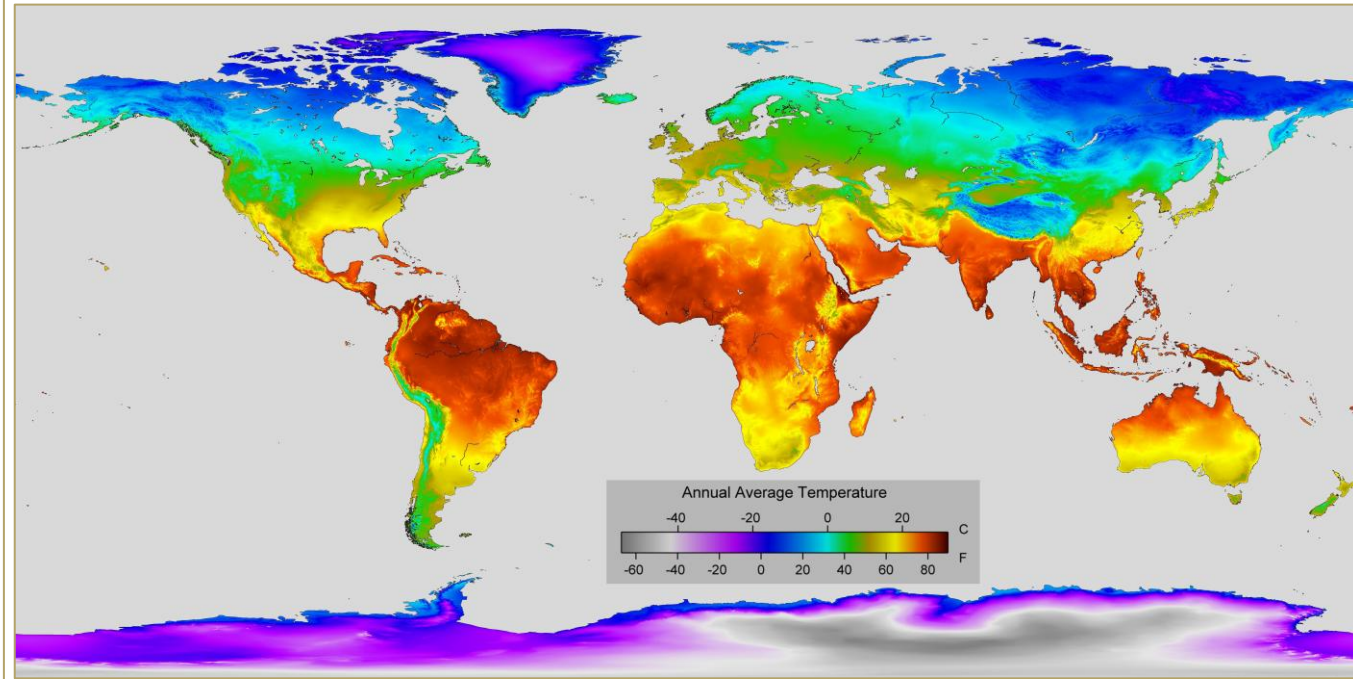
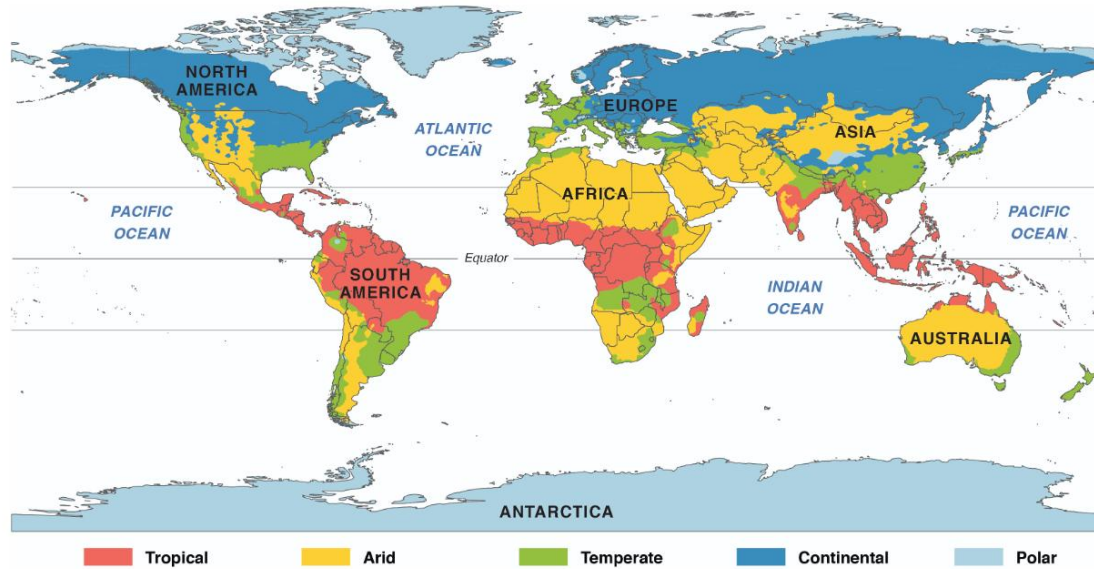


May 2026 (MTD) Weather Stats at Atlanta, GA

DAILY HIGHS AND LOWS with normal and record temperatures

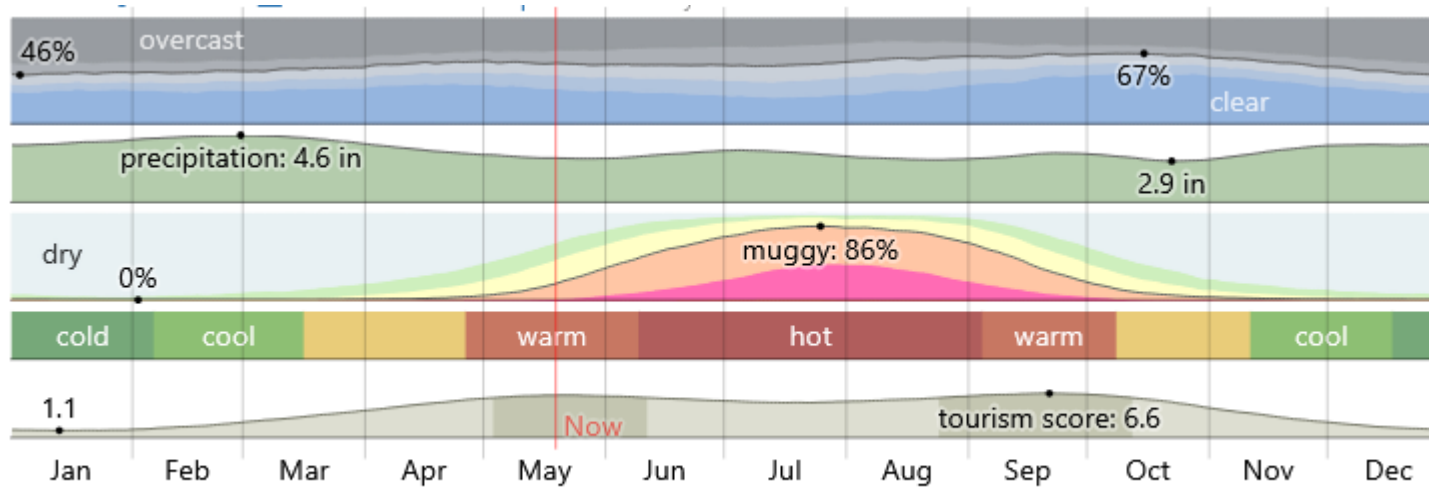


Climate Zone Map



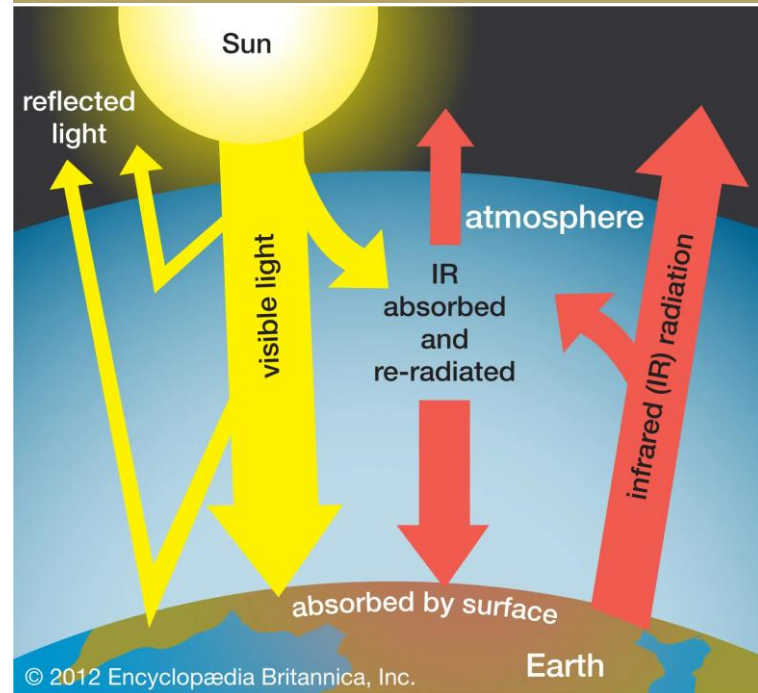
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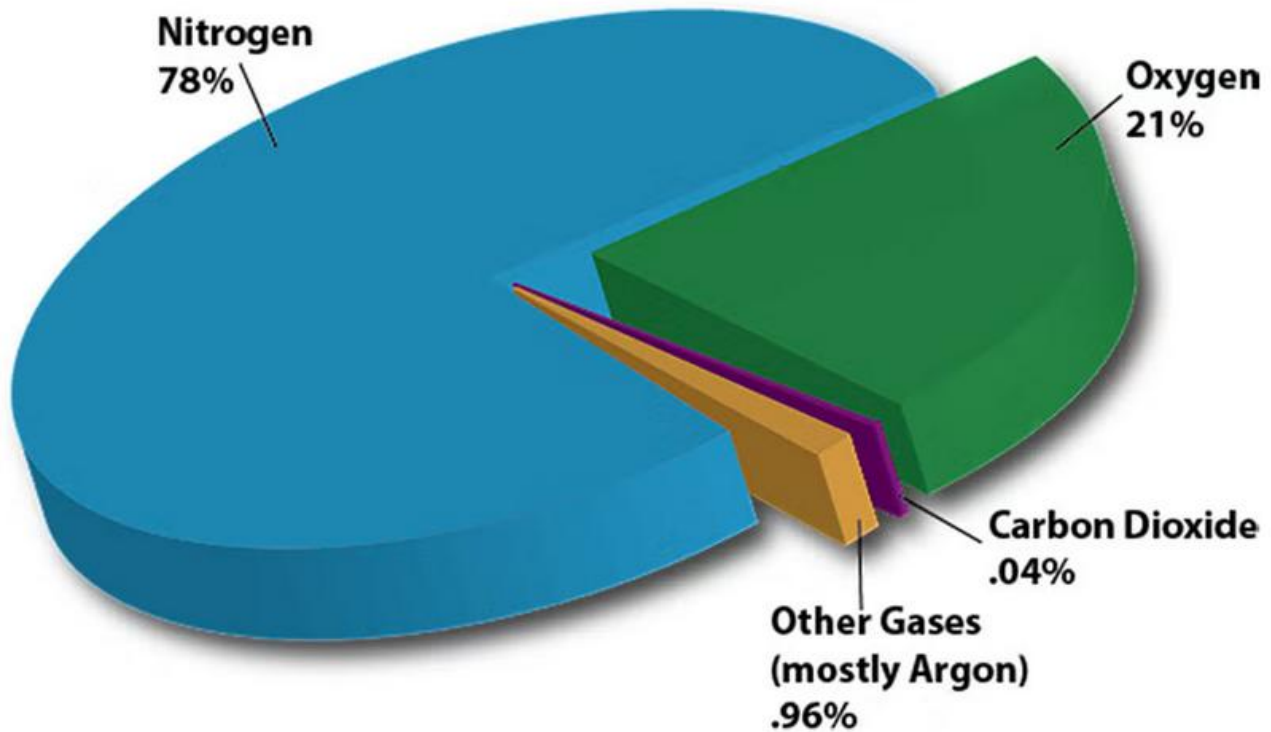


Atlanta weather by month. Click on each chart for more information.
https://weatherspark.com/y/15598/Average-Weather-in-Atlanta-Georgia-United-States-Year-Round#google_vignette

Greenhouse Gas Effect



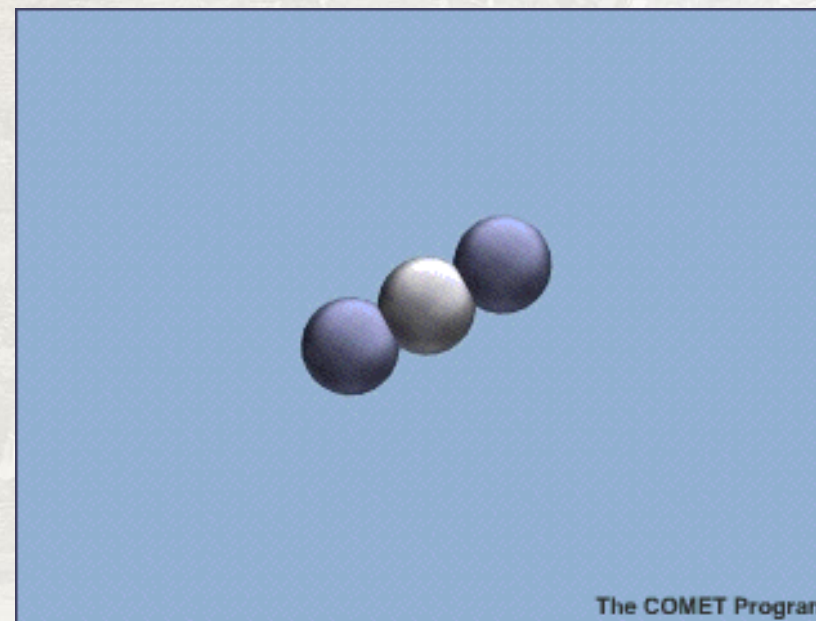
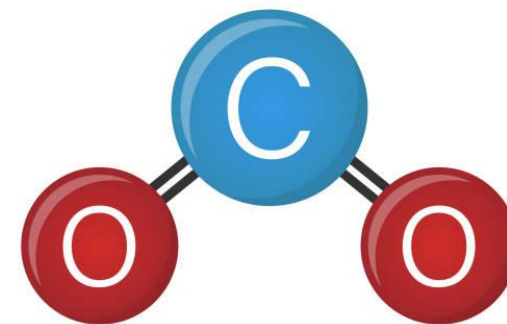
- Greenhouse gases in the atmosphere trap heat, specifically longwave infrared radiation, leaving Earth.
- The average temperature on Earth would be $\sim 0^{\circ}\text{F}$ (-18°C) without greenhouse gases, as compared to Earth's long term average of $\sim 59^{\circ}\text{F}$ (15°C) as calculated by NASA



UCAR

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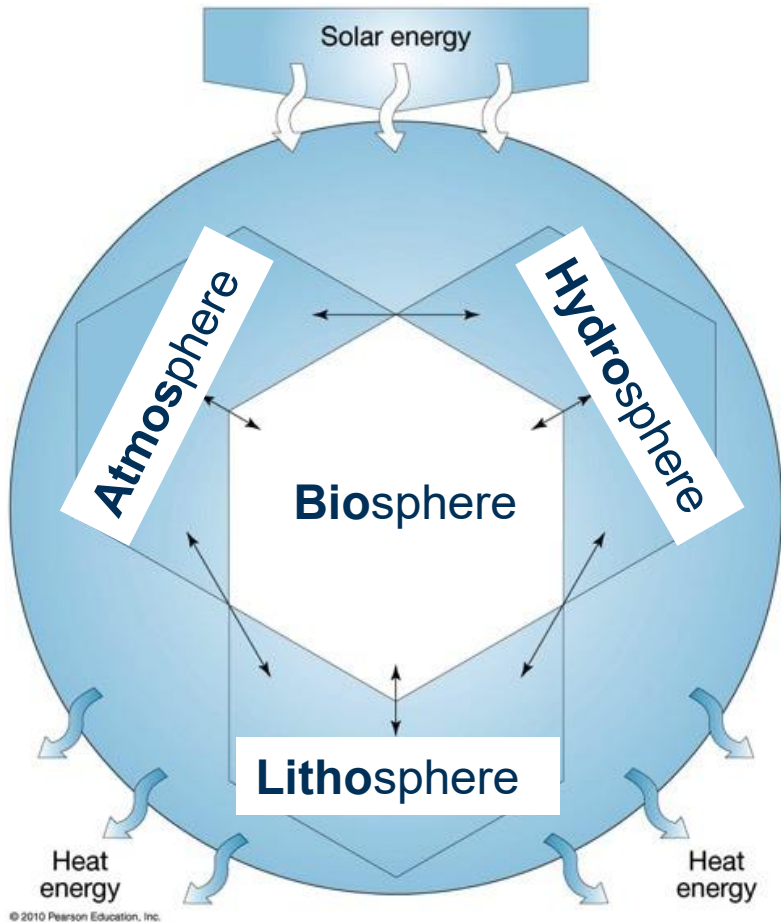
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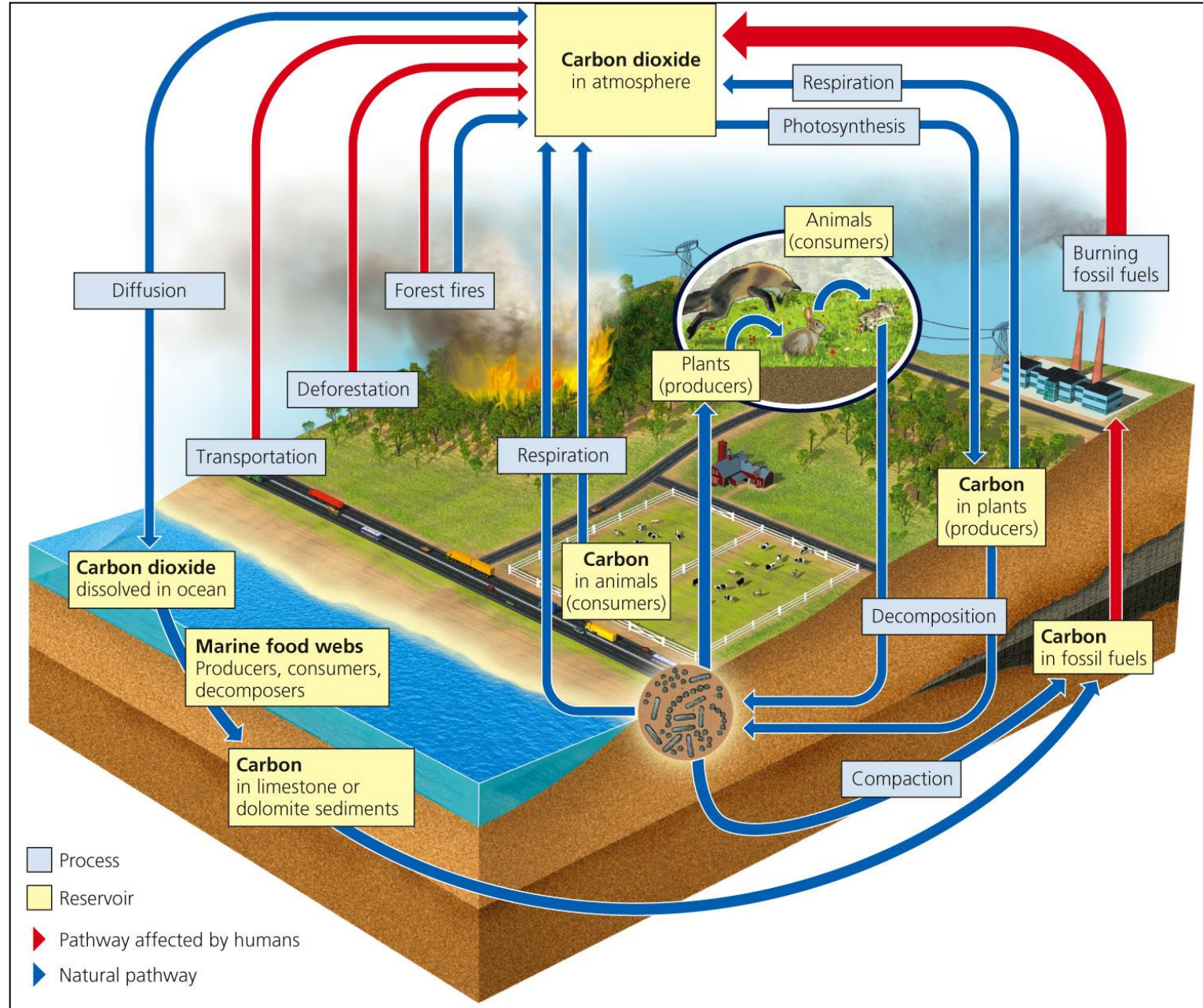
Greenhouse Gases Include:

- Water Vapor H_2O
- Carbon Dioxide CO_2
- Methane CH_4
- Nitrous Oxide N_2O
- Chlorofluorocarbons

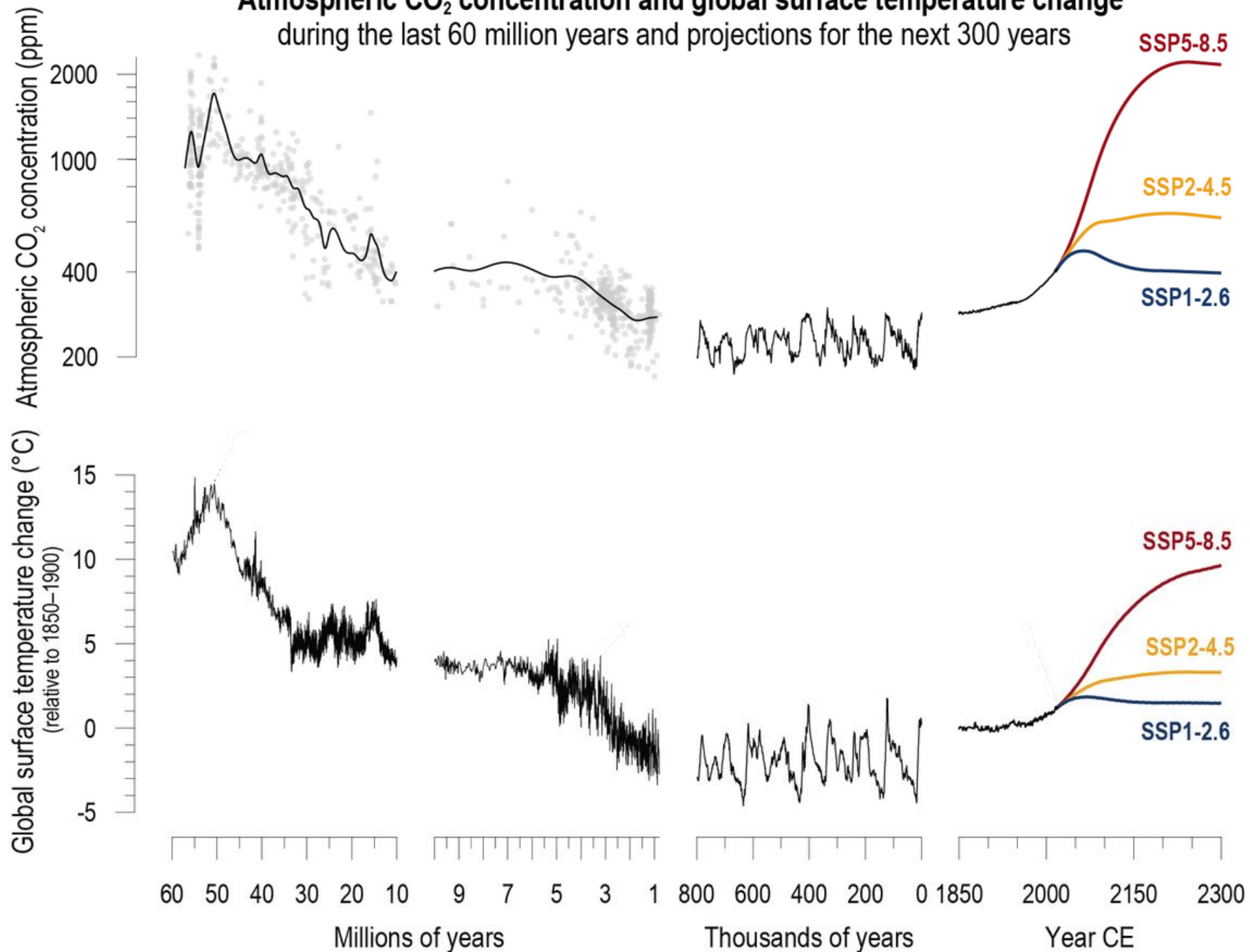
Need to think of the Earth as a system with pathways and places of storage



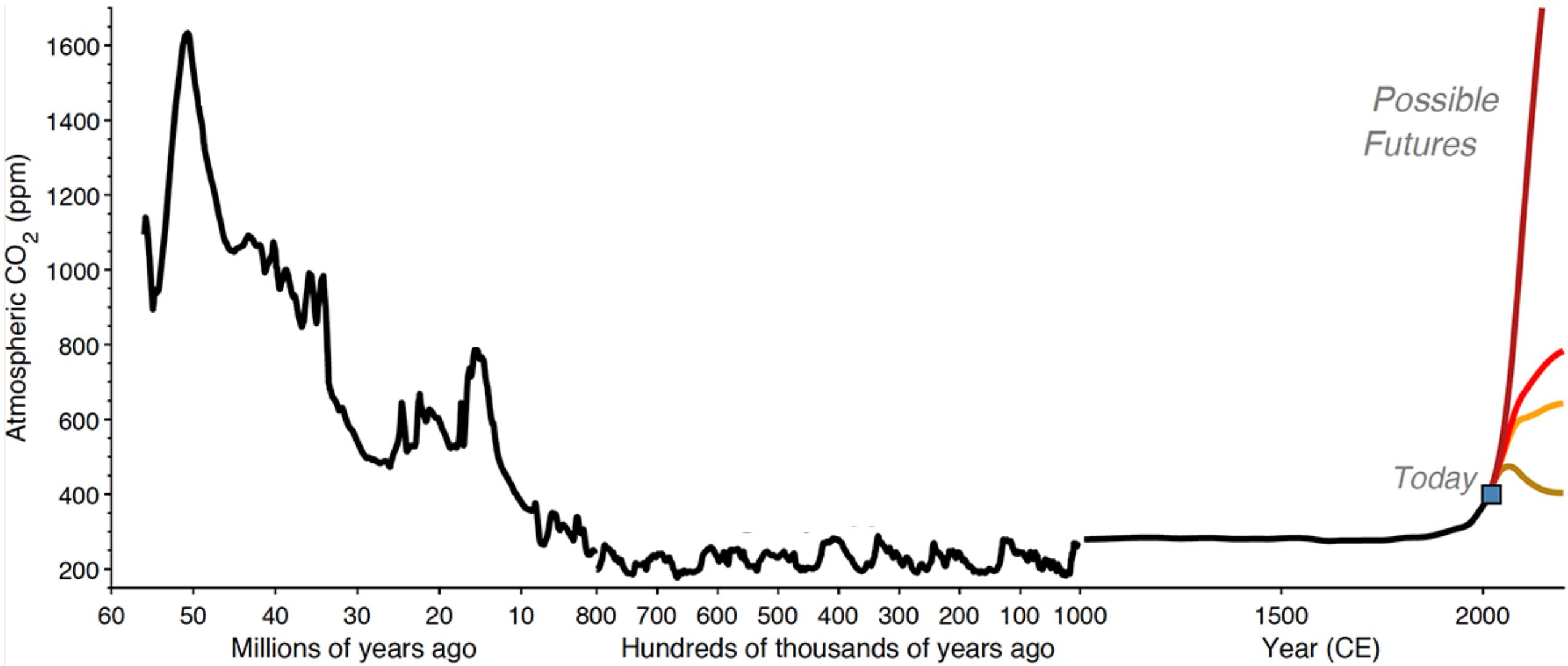
© 2010 Pearson Education, Inc.



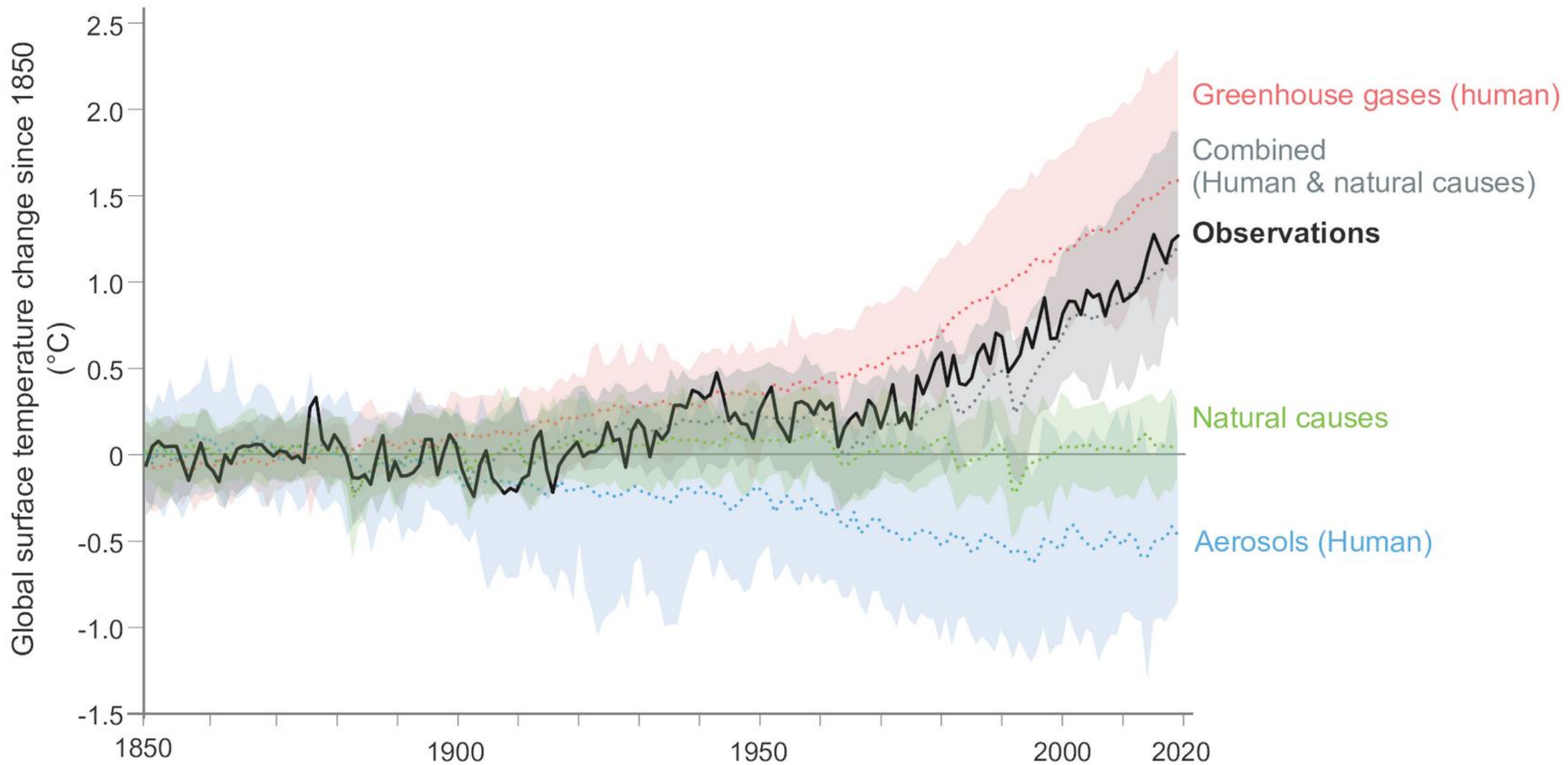
Atmospheric CO₂ concentration and global surface temperature change during the last 60 million years and projections for the next 300 years



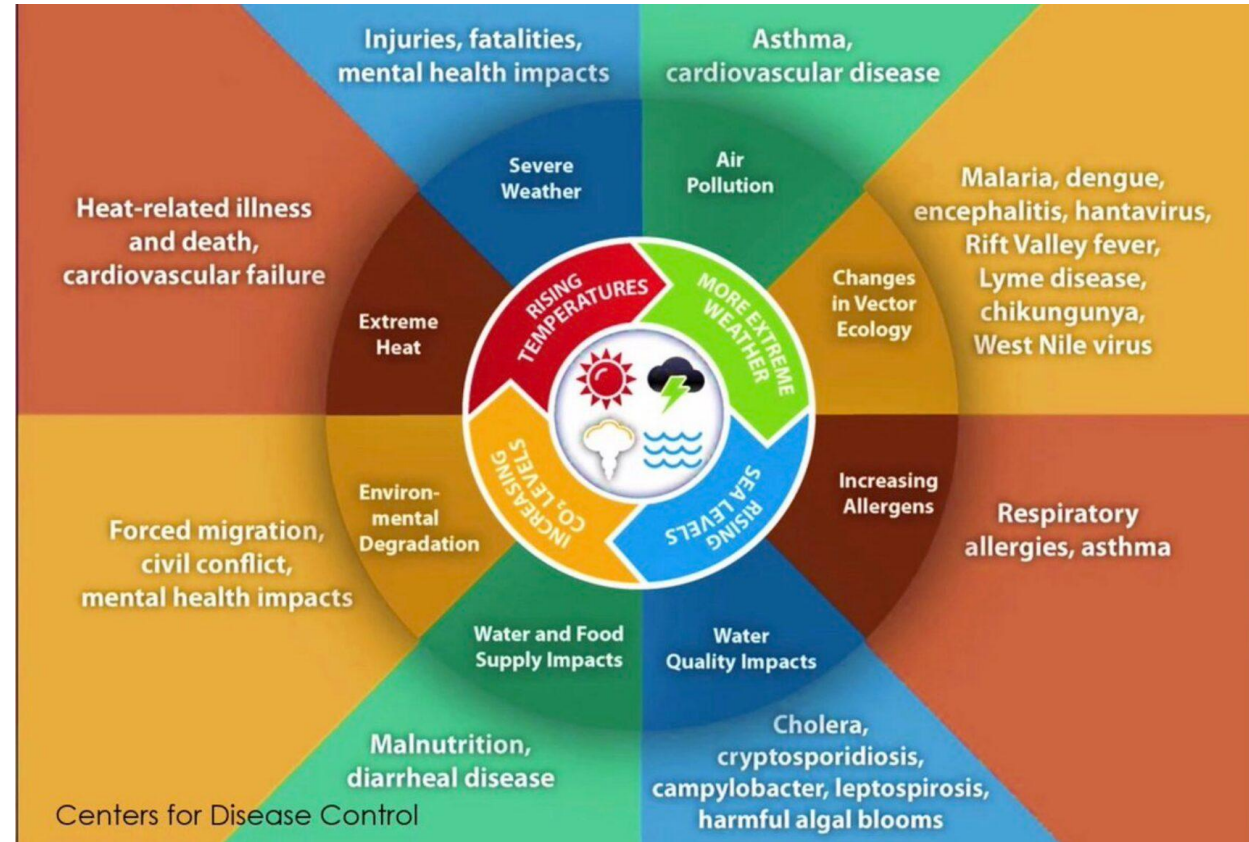
Modified from Figure TS.1 in IPCC, 2021: Technical Summary



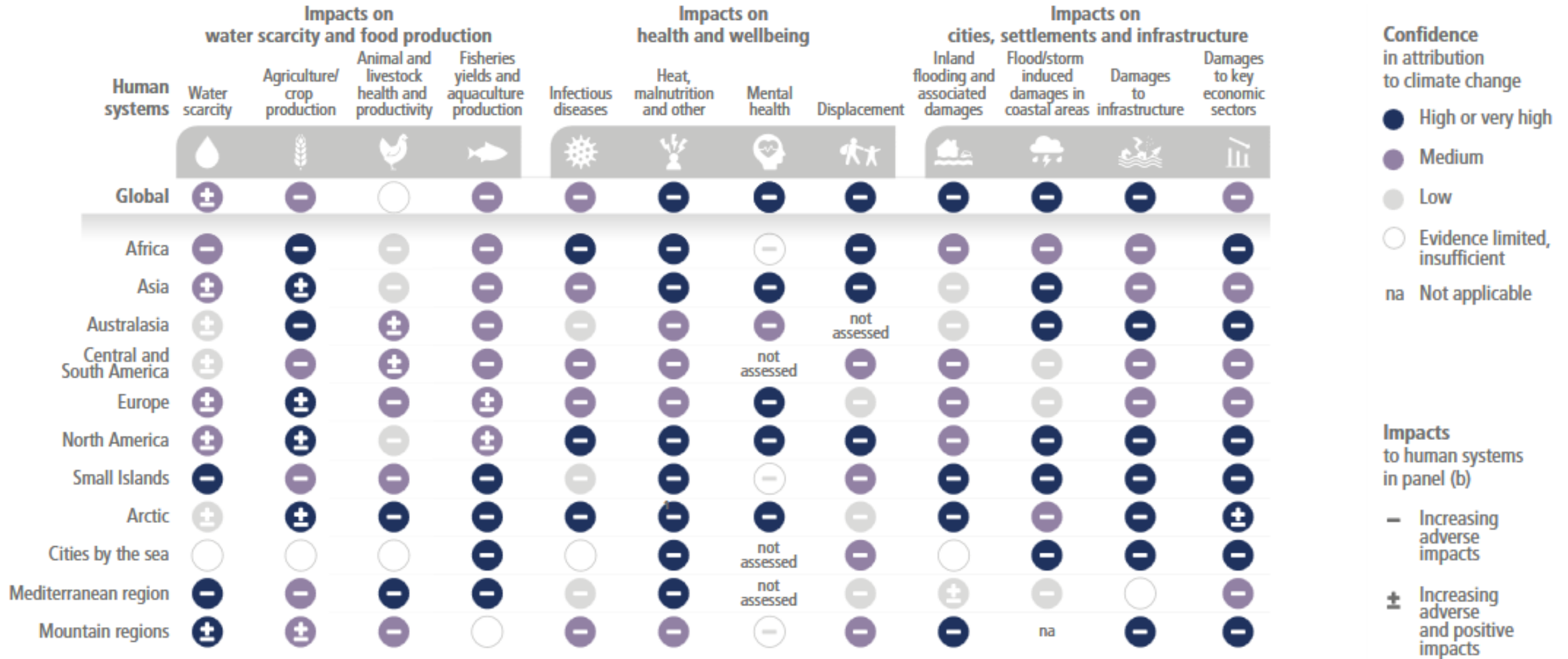
Observed warming (1850-2019) is only reproduced in simulations including human influence.



WMO Climate Risks, Extreme Events and Related Impacts



(b) Observed impacts of climate change on human systems



Confidence in attribution to climate change

- High or very high
- Medium
- Low
- Evidence limited, insufficient
- na Not applicable

Impacts to human systems in panel (b)

- Increasing adverse impacts
- ± Increasing adverse and positive impacts

The Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.

IPCC-64

VACANCIES



National Oceanic and Atmospheric Administration
U.S. Department of Commerce



National Centers for Environmental Information
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

The New York Times

Climate and Environment

CLIMATE CENTRAL

CLIMATEWATCH



WORLD METEOROLOGICAL ORGANIZATION



PROJECT DRAWDOWN

DRAWDOWN GA



WORLD RESOURCES INSTITUTE

Inside Climate News



Climate Action Tracker



United Nations

Climate Action

Buildings
Deploy Clean Cooking



Highly Recommended

Buildings & Industry
Deploy Alternative Insulation Materials



Highly Recommended

Buildings & Industry
Deploy Alternative Refrigerants



Highly Recommended

Buildings & Electricity
Use Heat Pumps



Highly Recommended

Electricity
Deploy Offshore Wind Turbines



Highly Recommended

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Highly Recommended

Electricity
Deploy Utility-Scale Solar PV



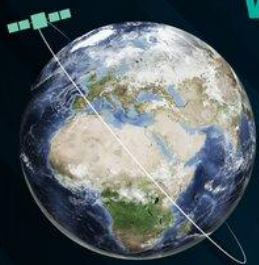
Highly Recommended

Industry, Materials & Waste
Improve Cement Production:
Alternative fuels

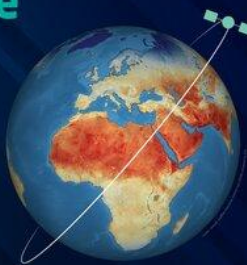


Highly Recommended

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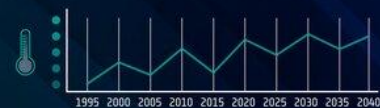


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