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Week 1

Introduction to AI and Climate Change

W1 Lesson 1
Course Introduction

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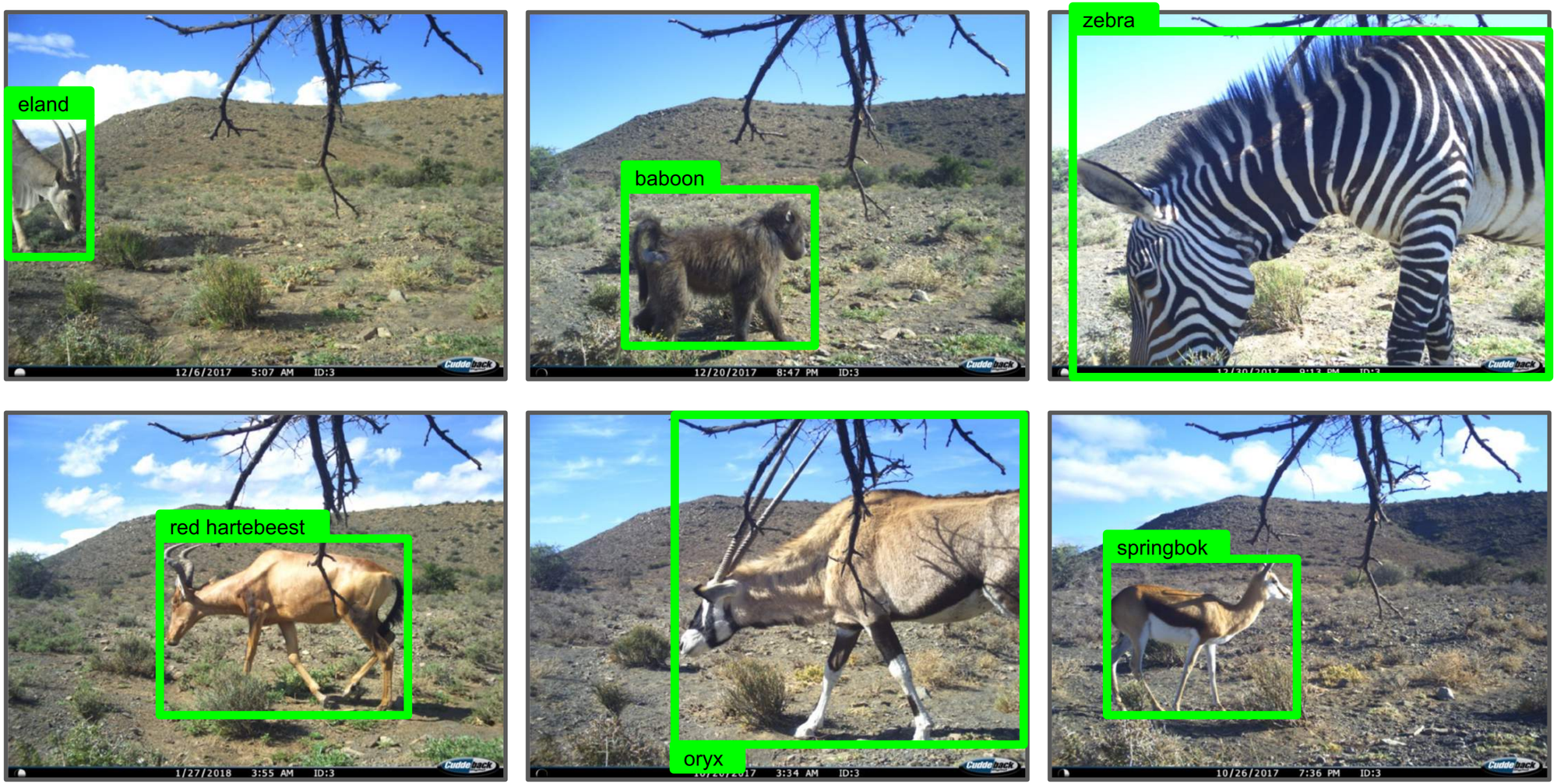
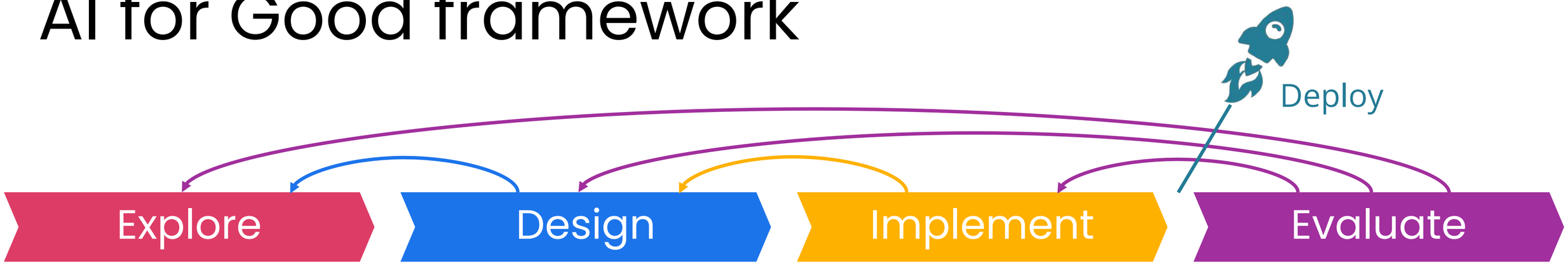
AI and Climate Change

Welcome to AI and Climate Change

AI and biodiversity monitoring



AI for Good framework



1. Engage stakeholders
2. Define the problem
3. Determine if AI could add value

1. Prototype your solution
2. Ensure data privacy
3. Design the user experience

1. Productionize AI models
2. Integrate the user experience
3. Test with end users

1. Measure project impact
2. Communicate results
3. Determine next steps

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AI and Climate Change

What is Climate Change?

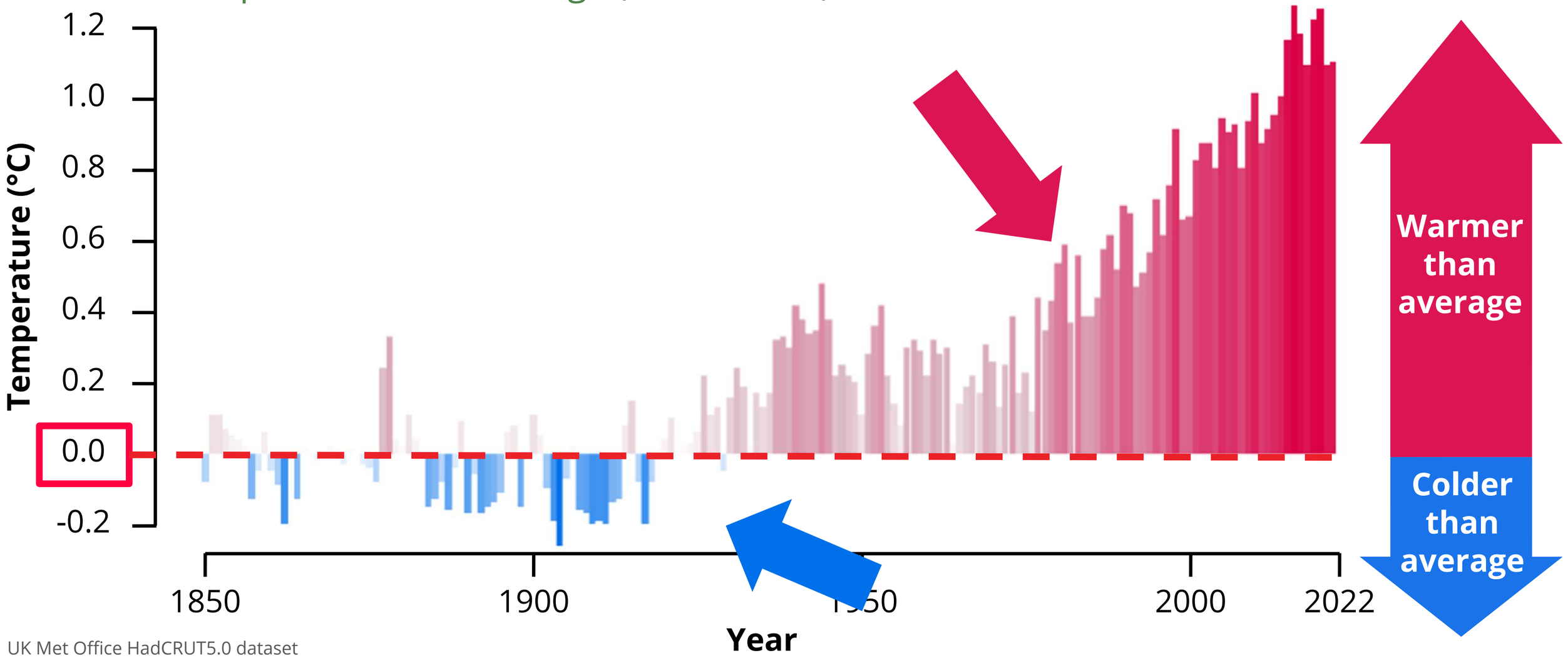
Extreme weather conditions

California, U.S.A., 2009.

West Yorkshire, England, 2019.

Global temperature change

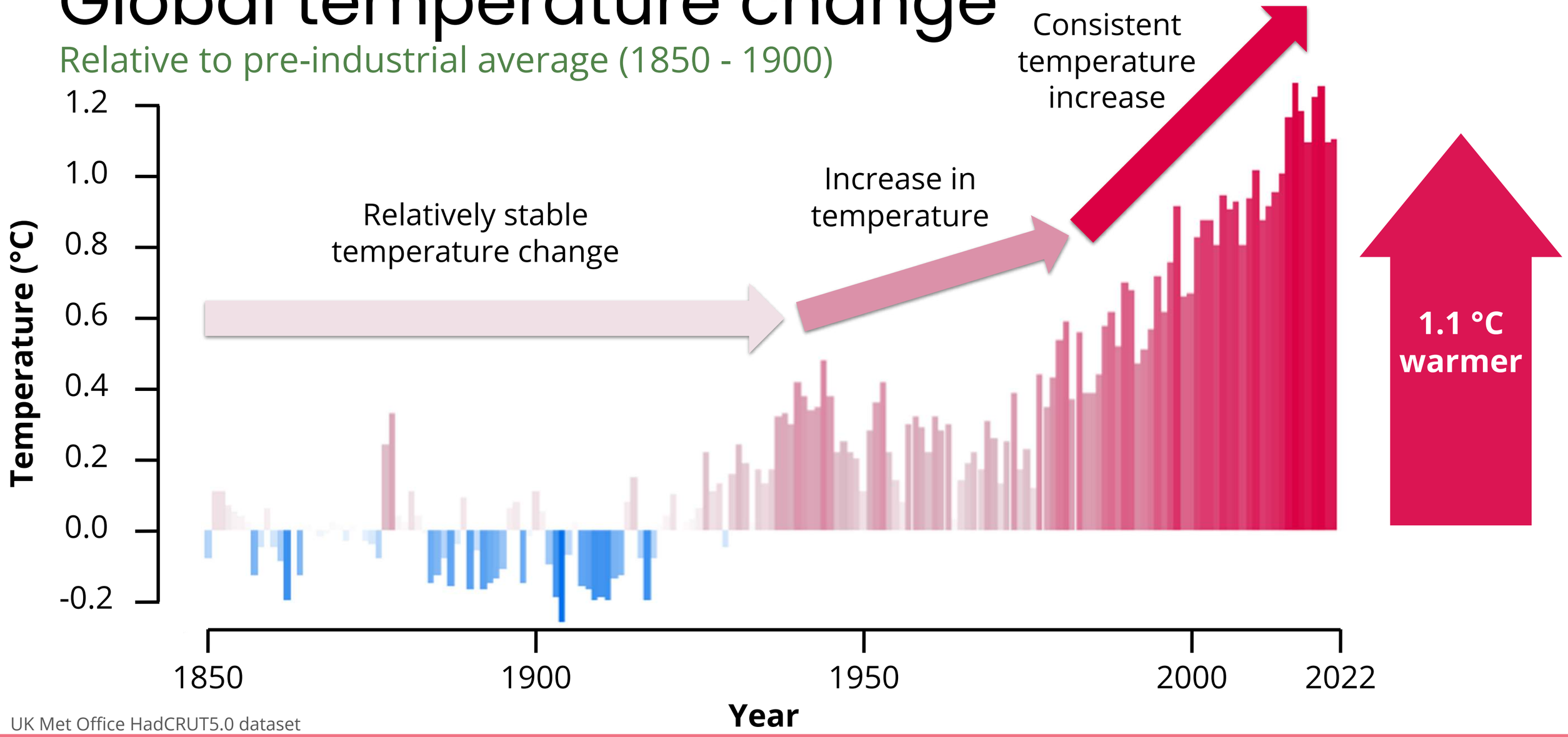
Relative to pre-industrial average (1850 - 1900)



UK Met Office HadCRUT5.0 dataset

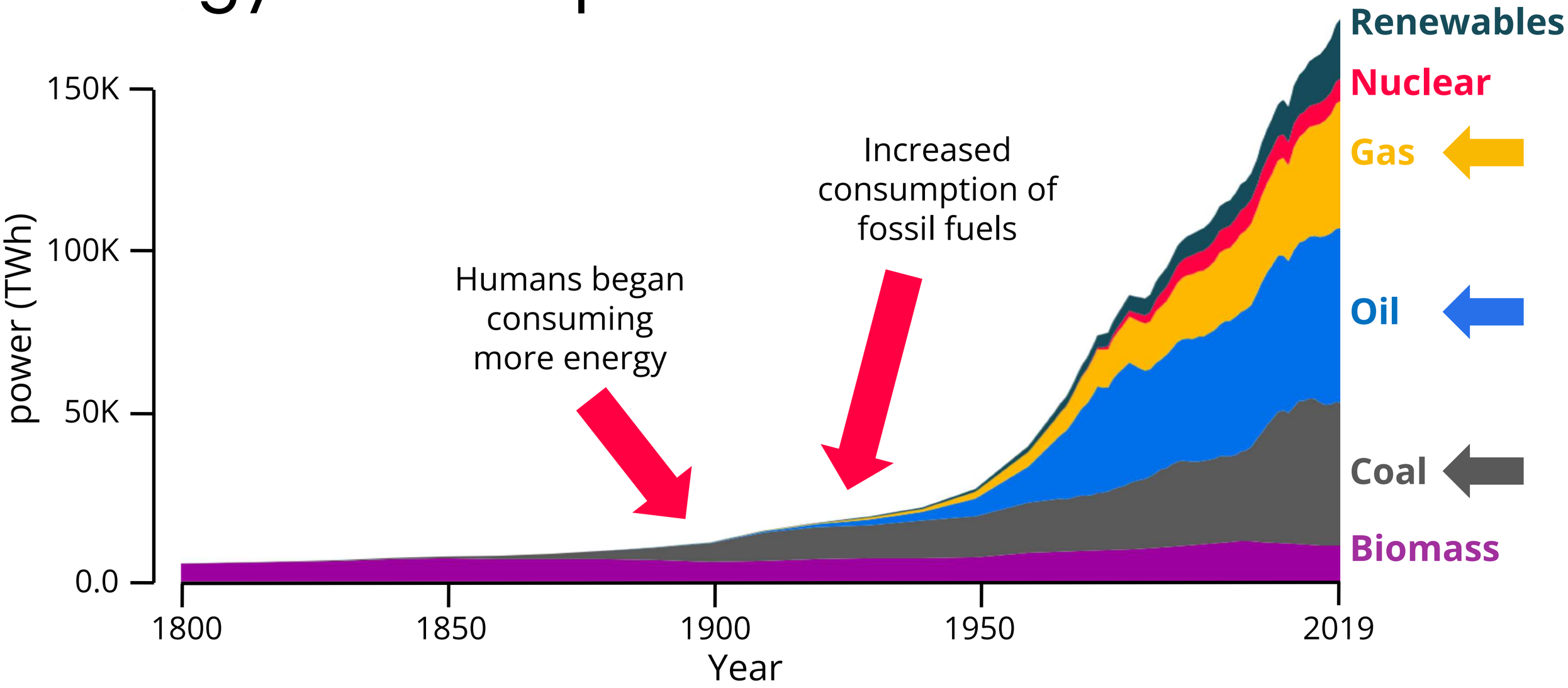
Global temperature change

Relative to pre-industrial average (1850 - 1900)



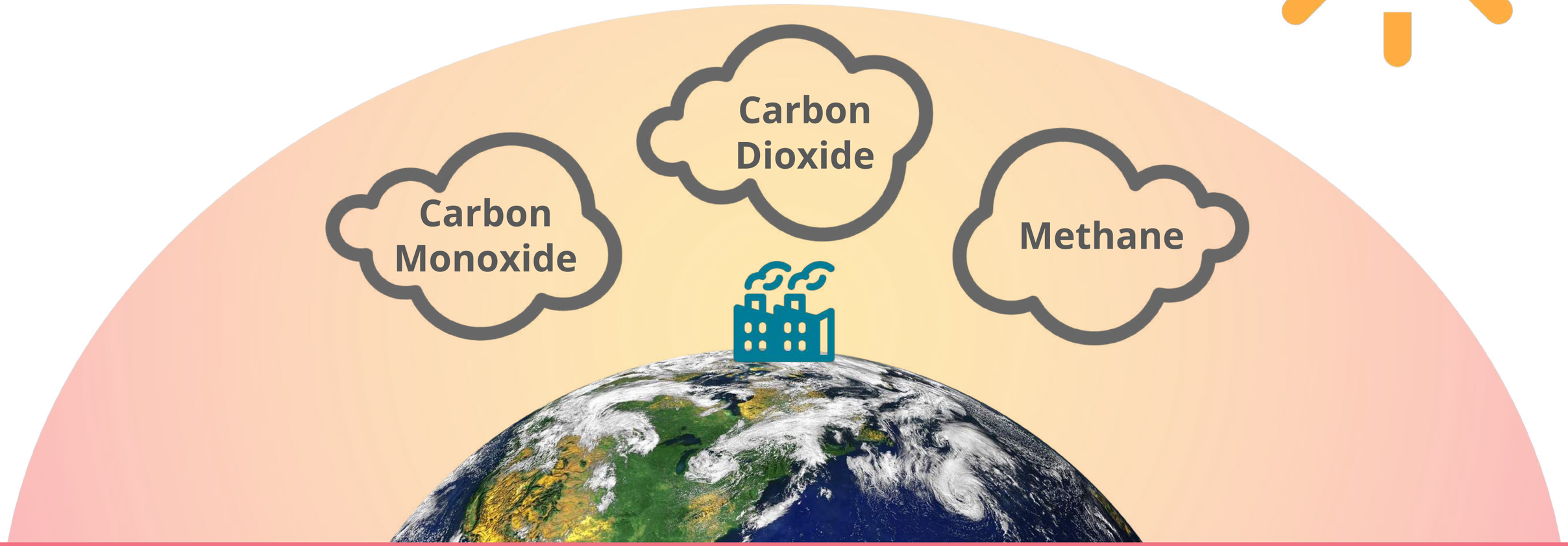
UK Met Office HadCRUT5.0 dataset

Energy consumption

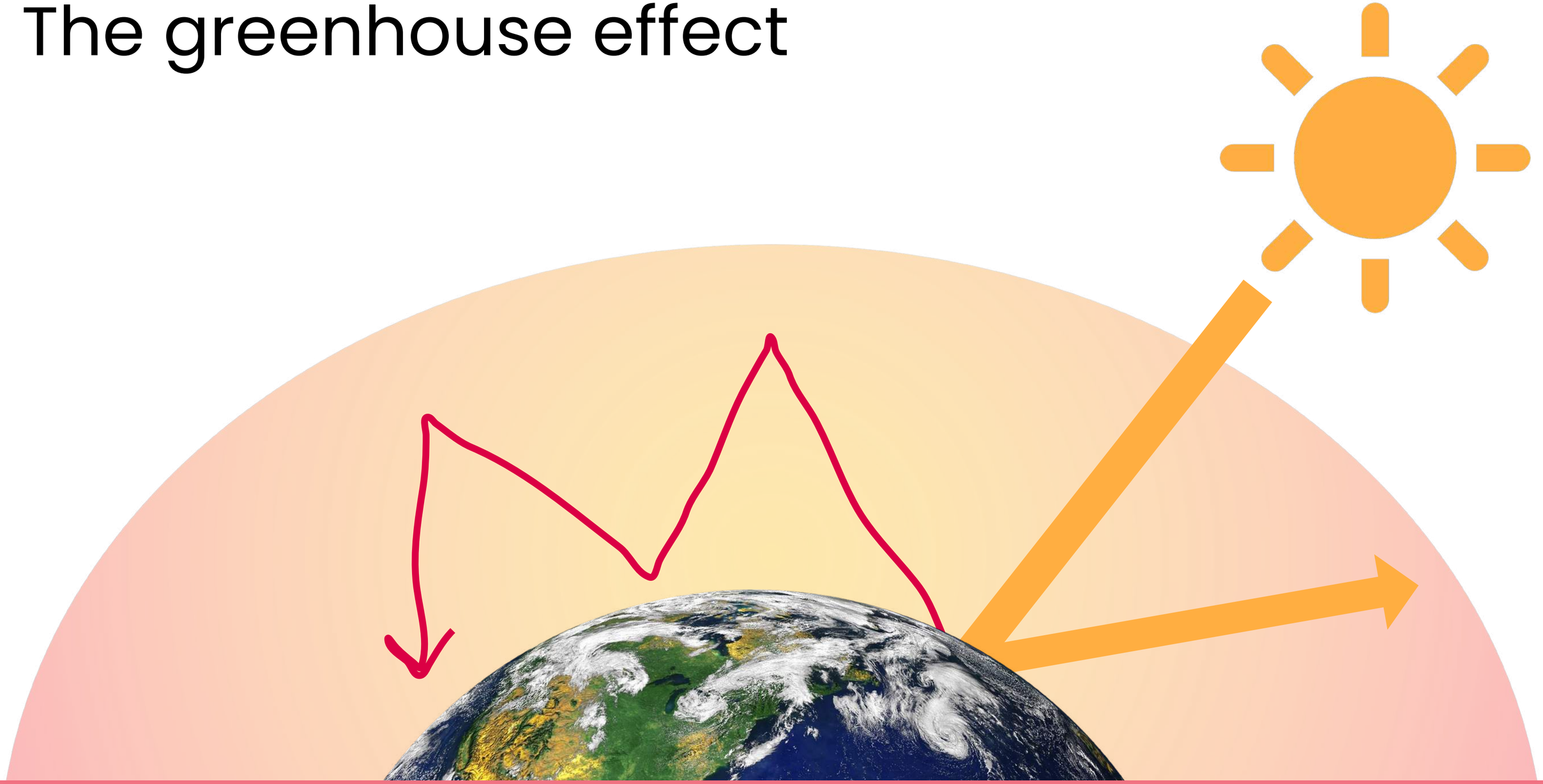


Vaclav Smil (2017) & BP Statistical Review of World Energy

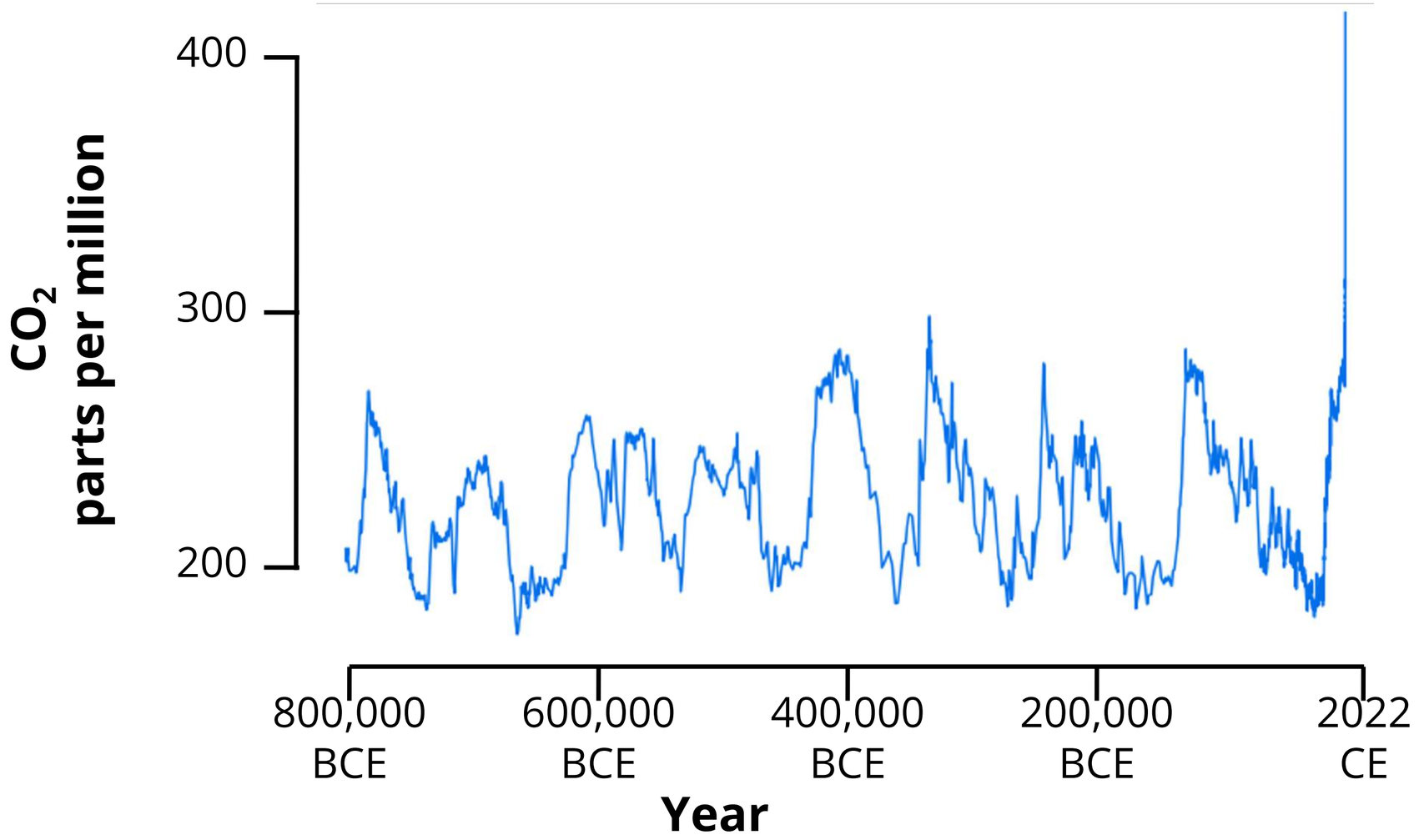
The greenhouse effect



The greenhouse effect



CO_2 concentration



National Oceanic and Atmospheric Administration (NOAA), Mauna Loa CO2

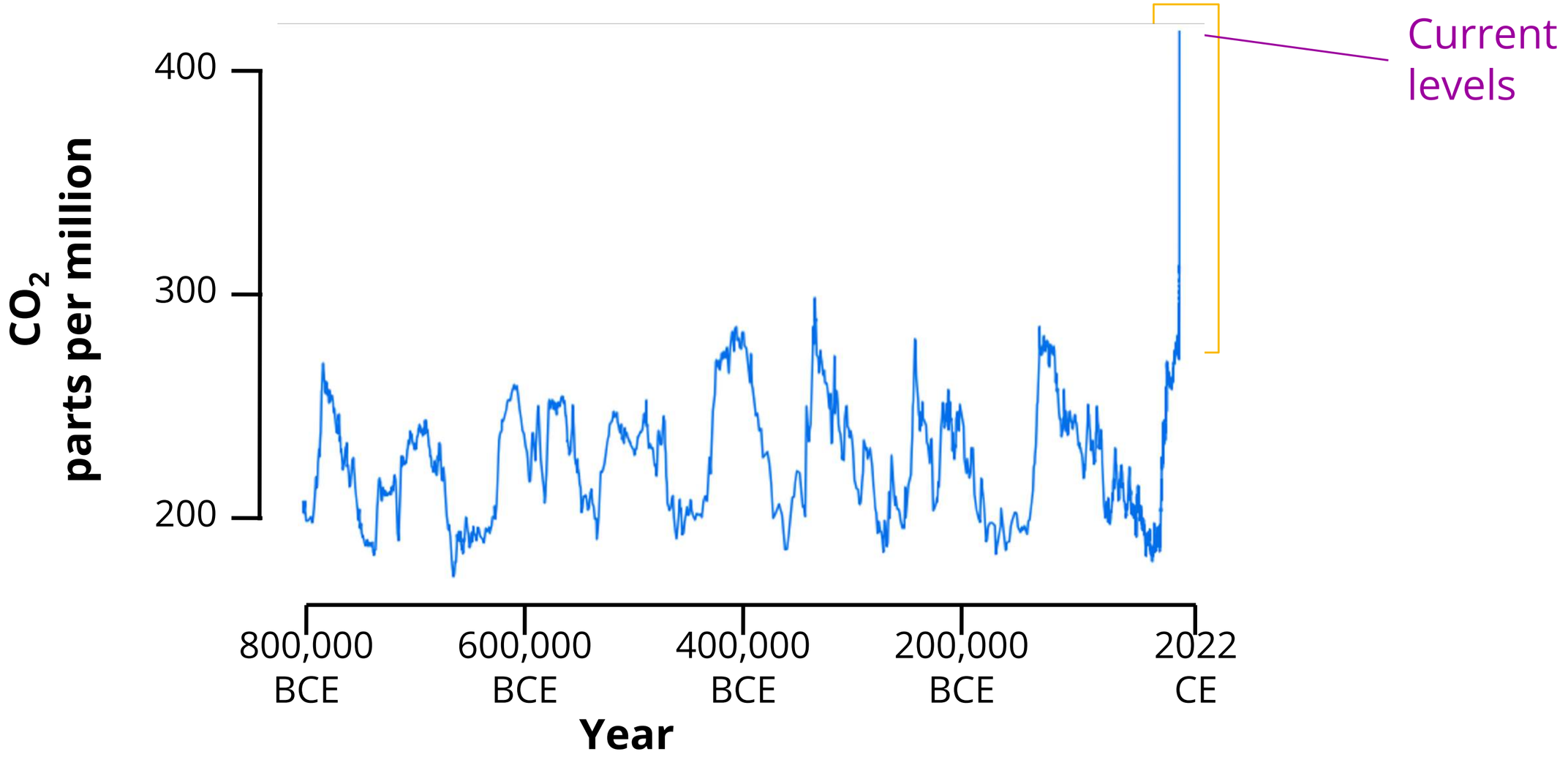
Measuring CO2 levels

NASA's Goddard Space Flight Center/Ludovic Brucker.

Each layer of the ice core marks its age

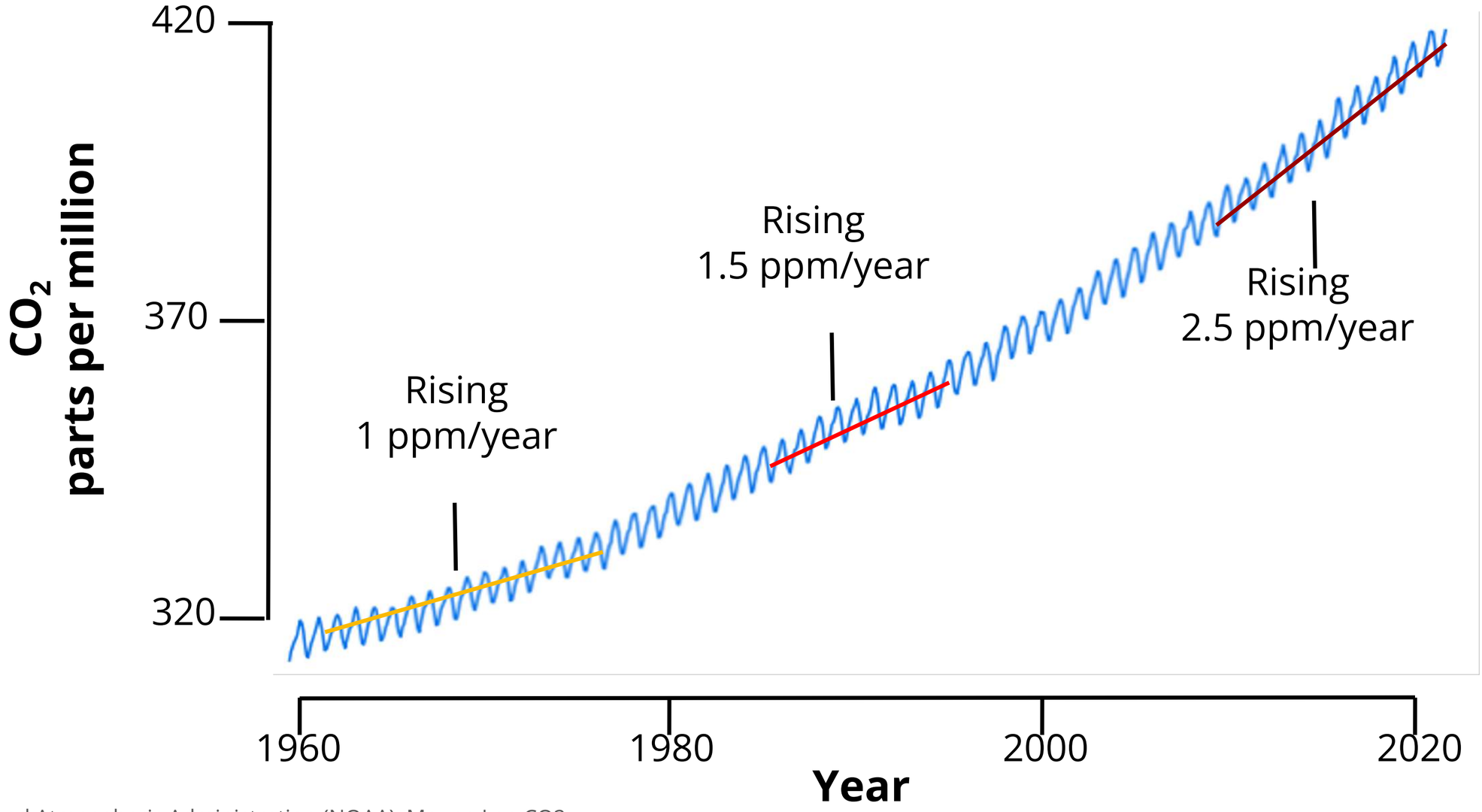
Scientists can measure greenhouse gases like CO2 by sampling the bubbles trapped in the ice core

CO_2 concentration



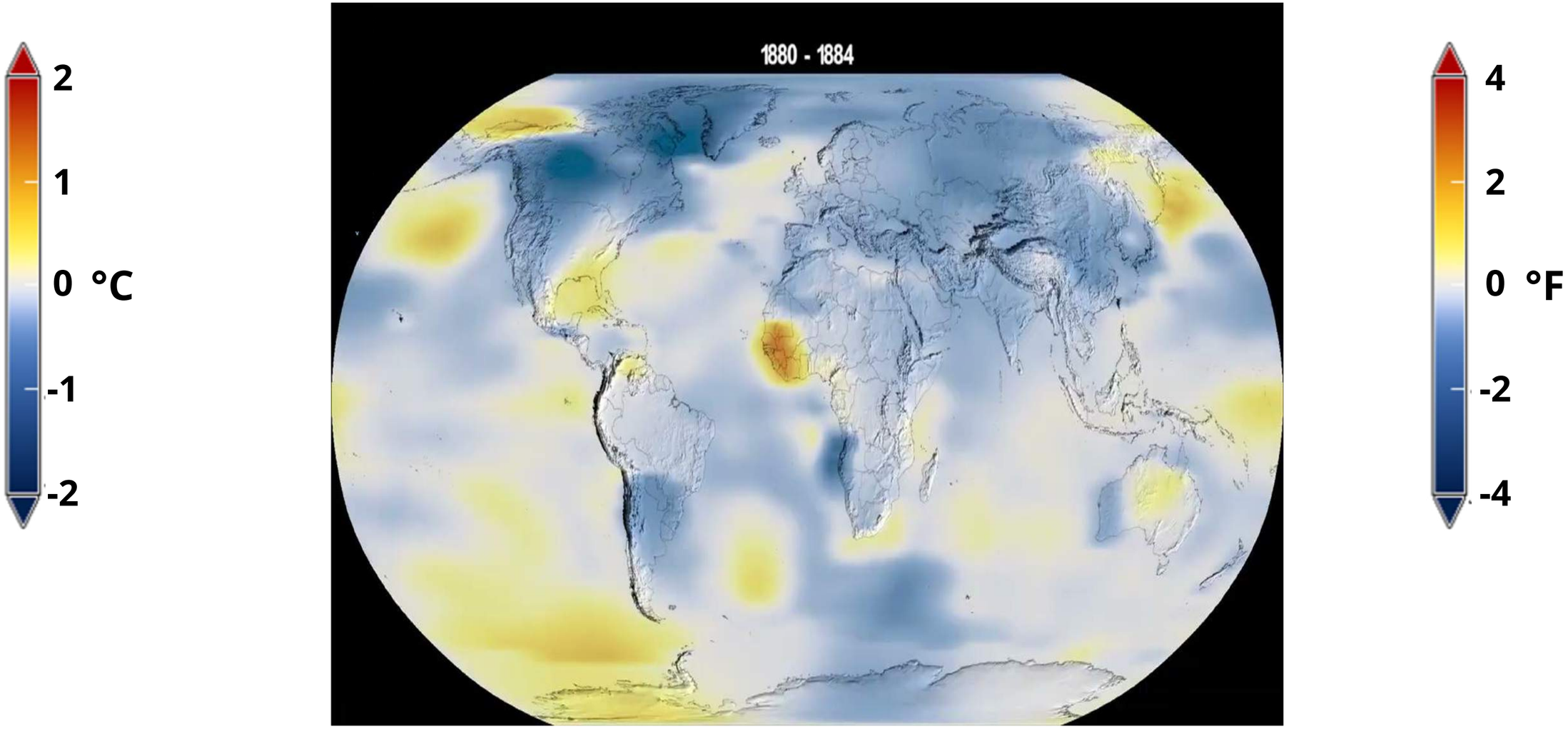
National Oceanic and Atmospheric Administration (NOAA), Mauna Loa CO2

CO_2 concentration



National Oceanic and Atmospheric Administration (NOAA), Mauna Loa CO2

Global temperature change 1880-2021



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Global Temperature Change

Consider potential bias in the data

- What might have changed over the past 140 years regarding temperature measurement around the globe?
- Has our ability to measure temperature improved?
- Are there variations in the distribution of temperature measurement locations?
- How might the historical wealth of societies introduce bias in the locations of temperature measurements?

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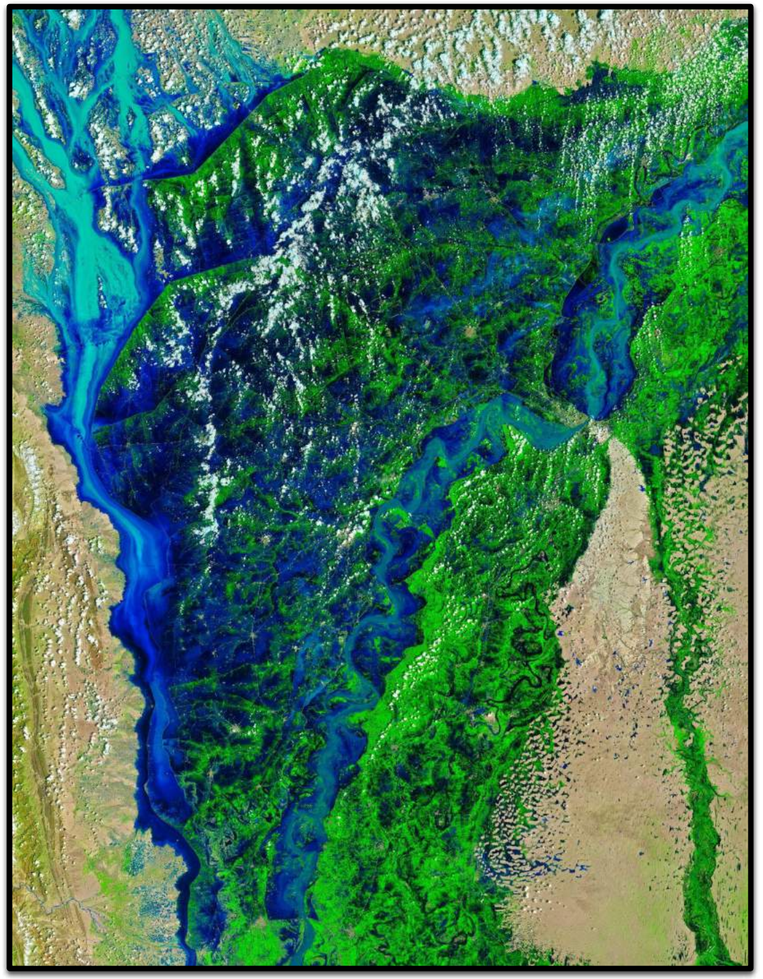
AI and Climate Change

Impacts of Climate Change

Impacts of climate change



August 22, 2022

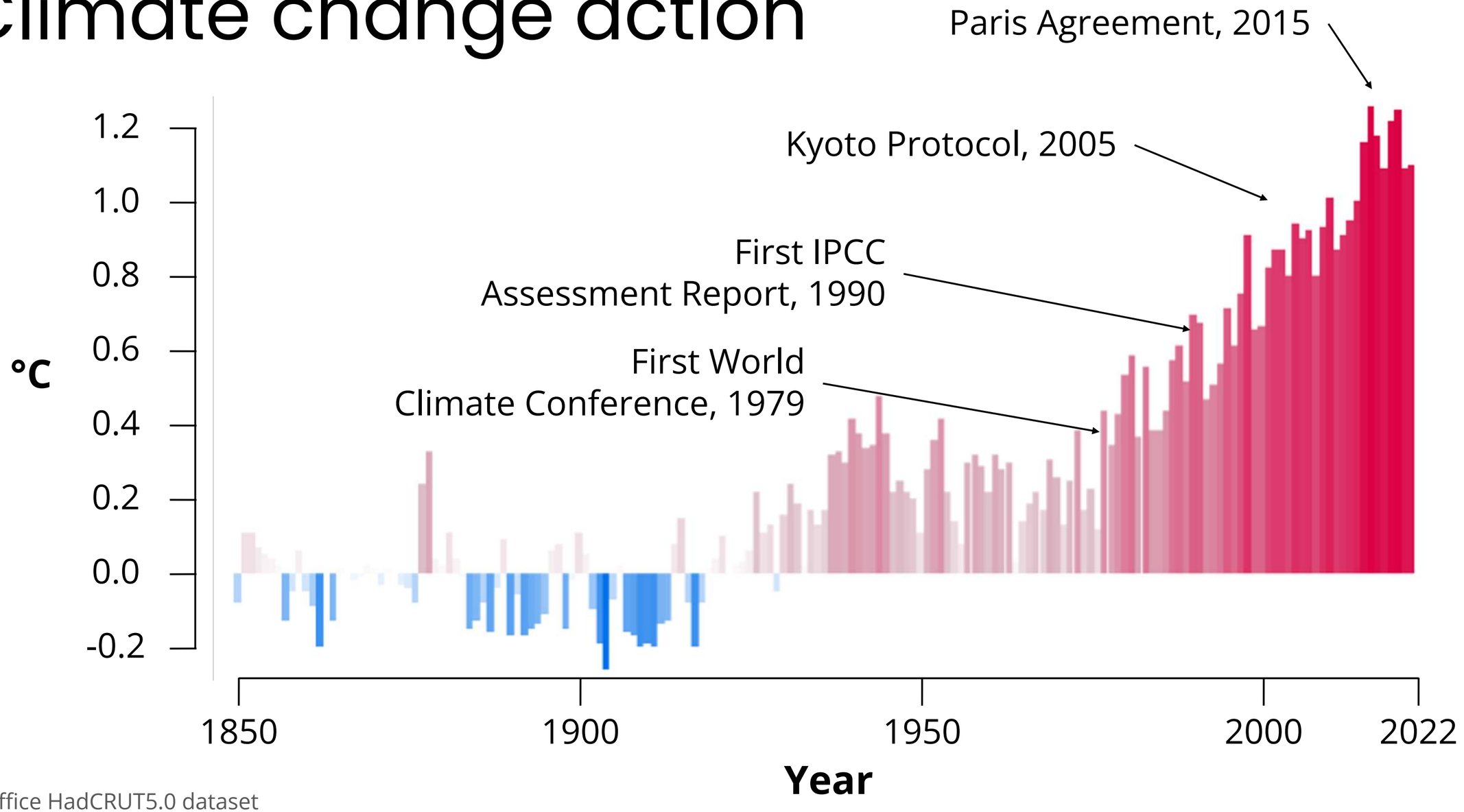
Devastating Floods in Pakistan. Nasa - Earth Observatory.

Impacts of climate change

Beautiful reef and orange fish in Okinawa sea. Hiroko Yoshii

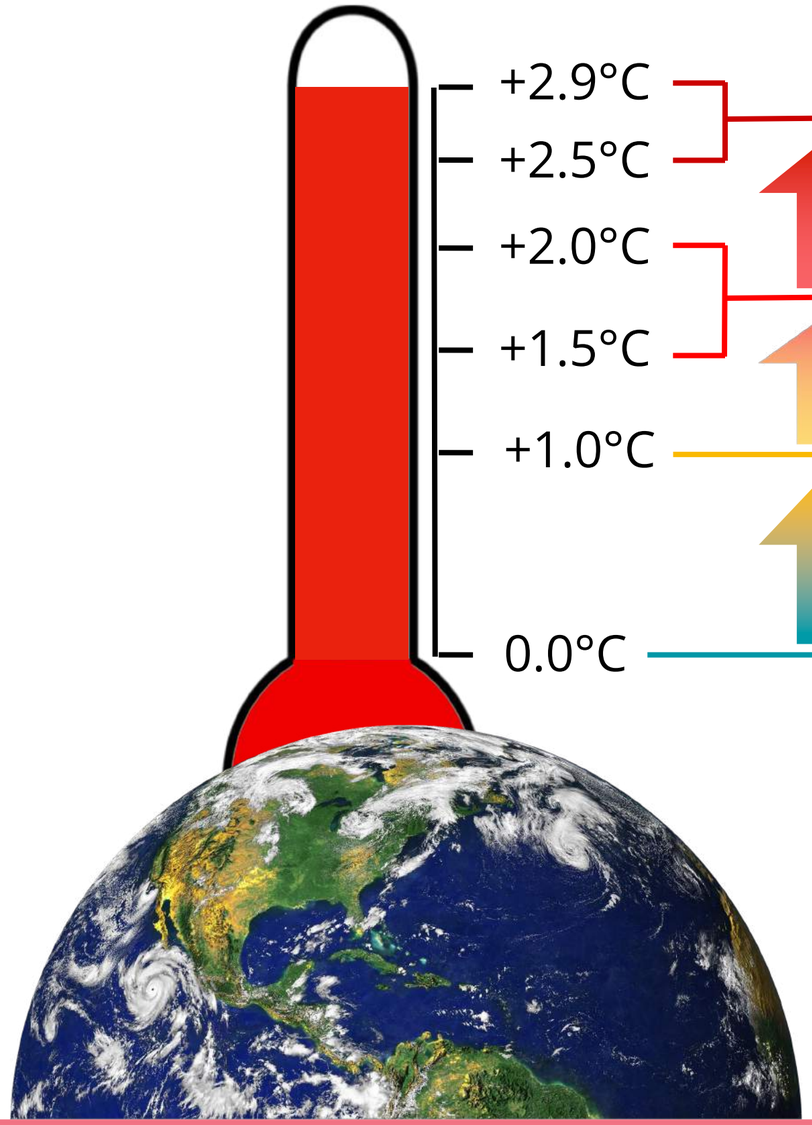
Bleached branching coral (Acropora sp.) at Heron Island, Great Barrier Reef. Author: J. Roff

Climate change action



UK Met Office HadCRUT5.0 dataset

The 1.5°C mark



+2.9°C
+2.5°C
+2.0°C
+1.5°C
+1.0°C
0.0°C

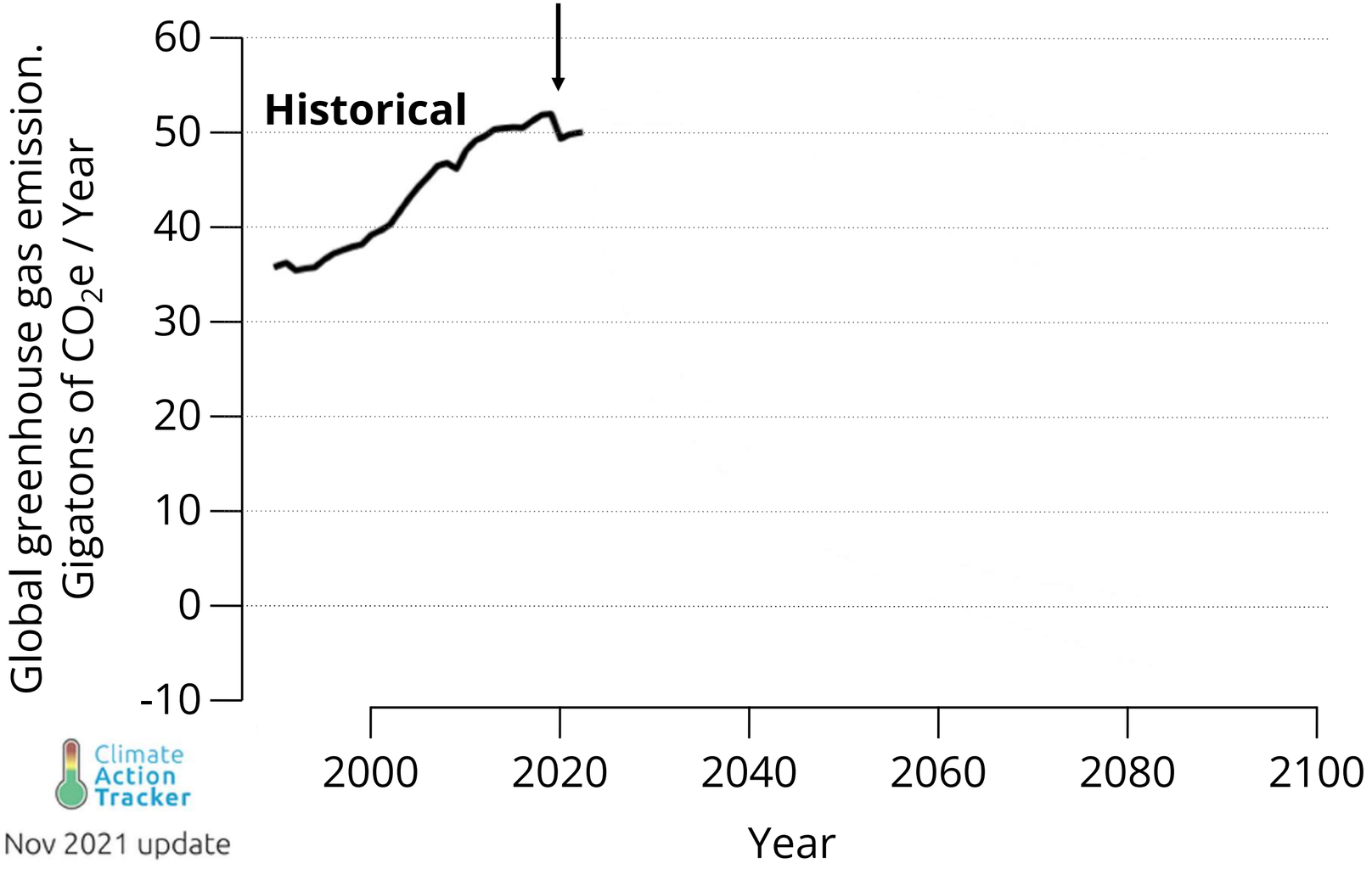
End of century (UN report)

Paris agreement goal

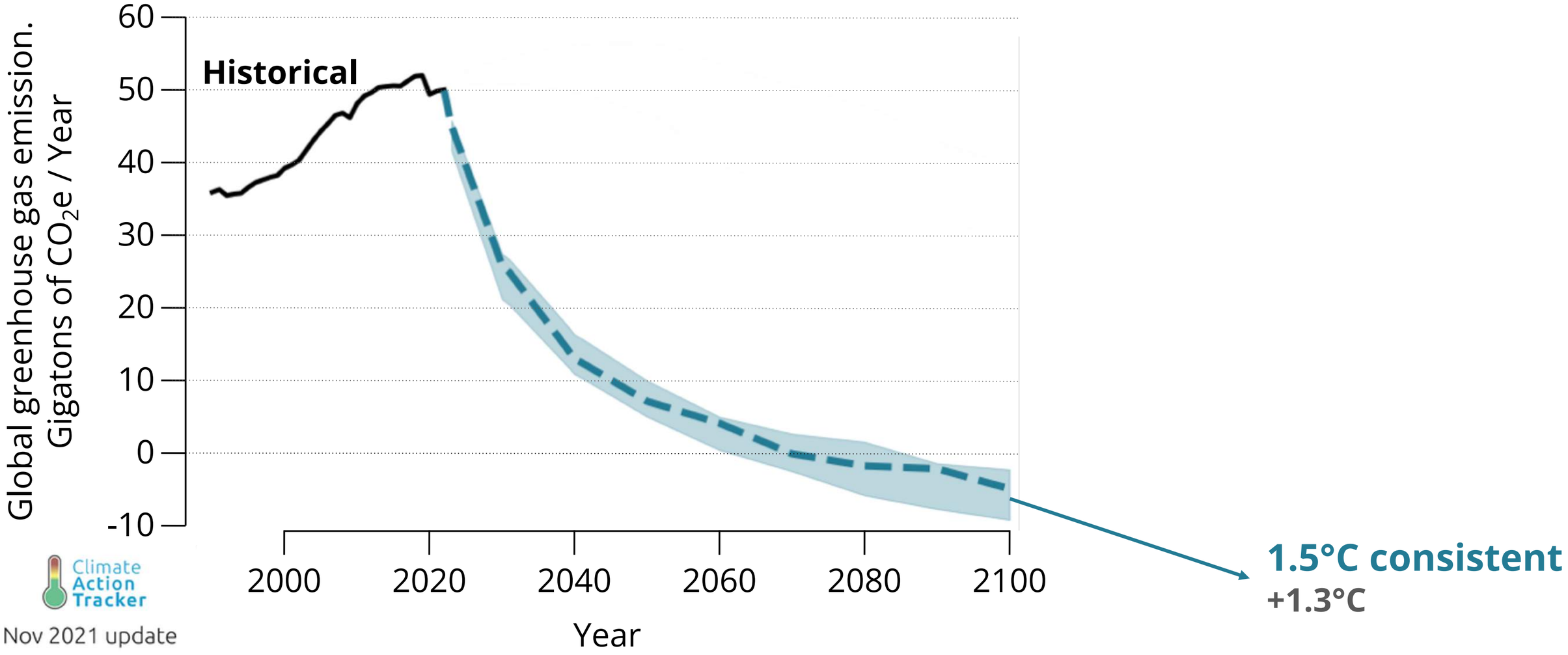
We are here

Pre-industrial average

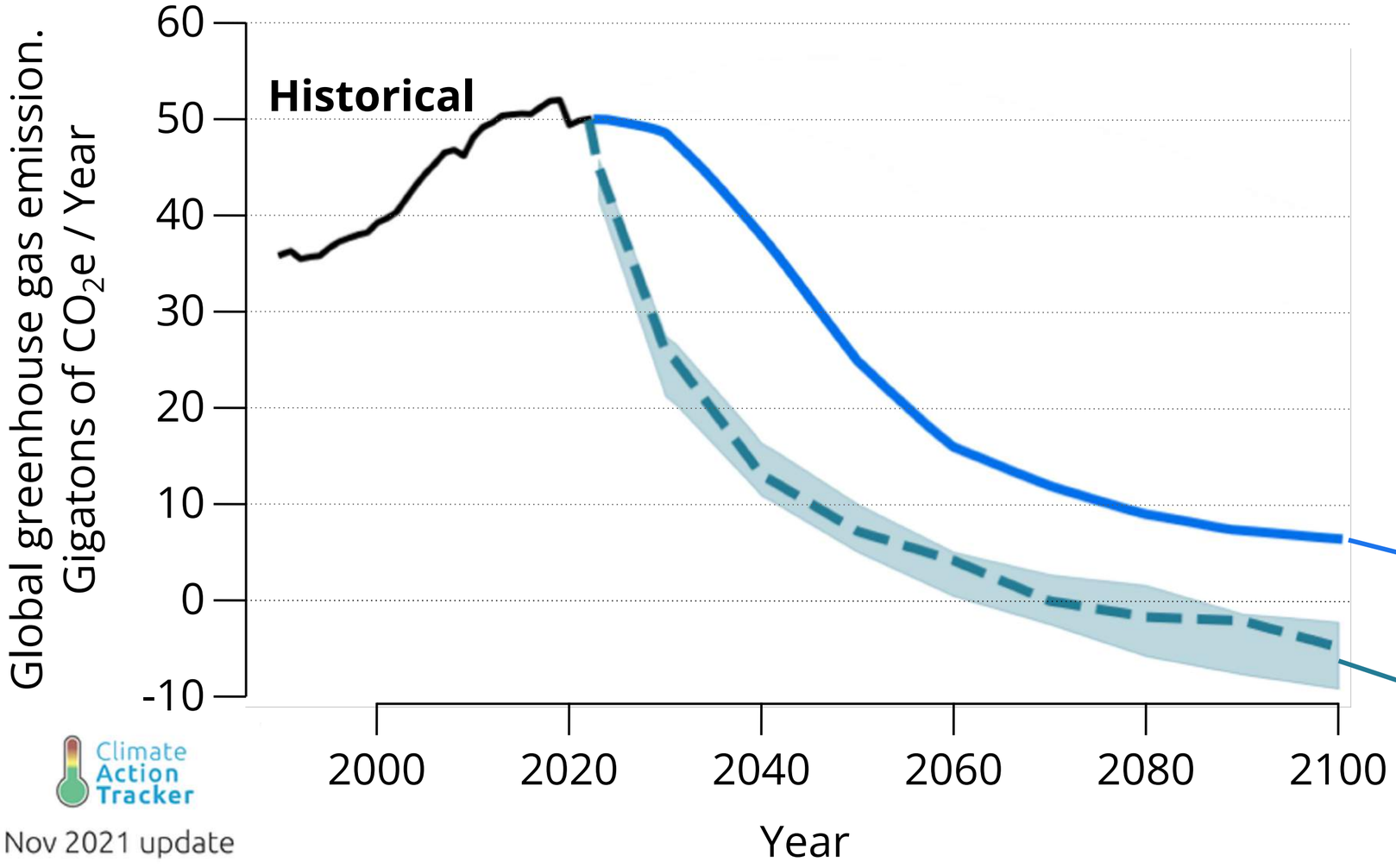
2100 warming projection



2100 warming projection



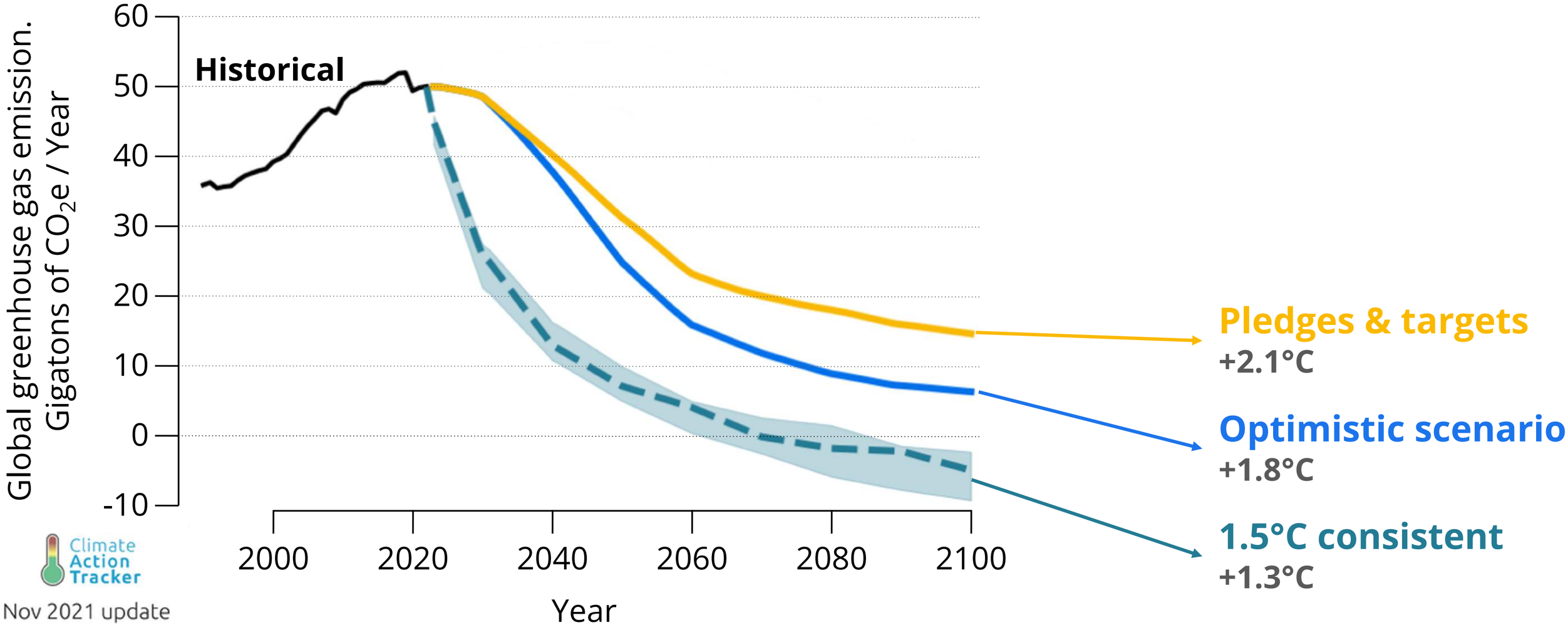
2100 warming projection



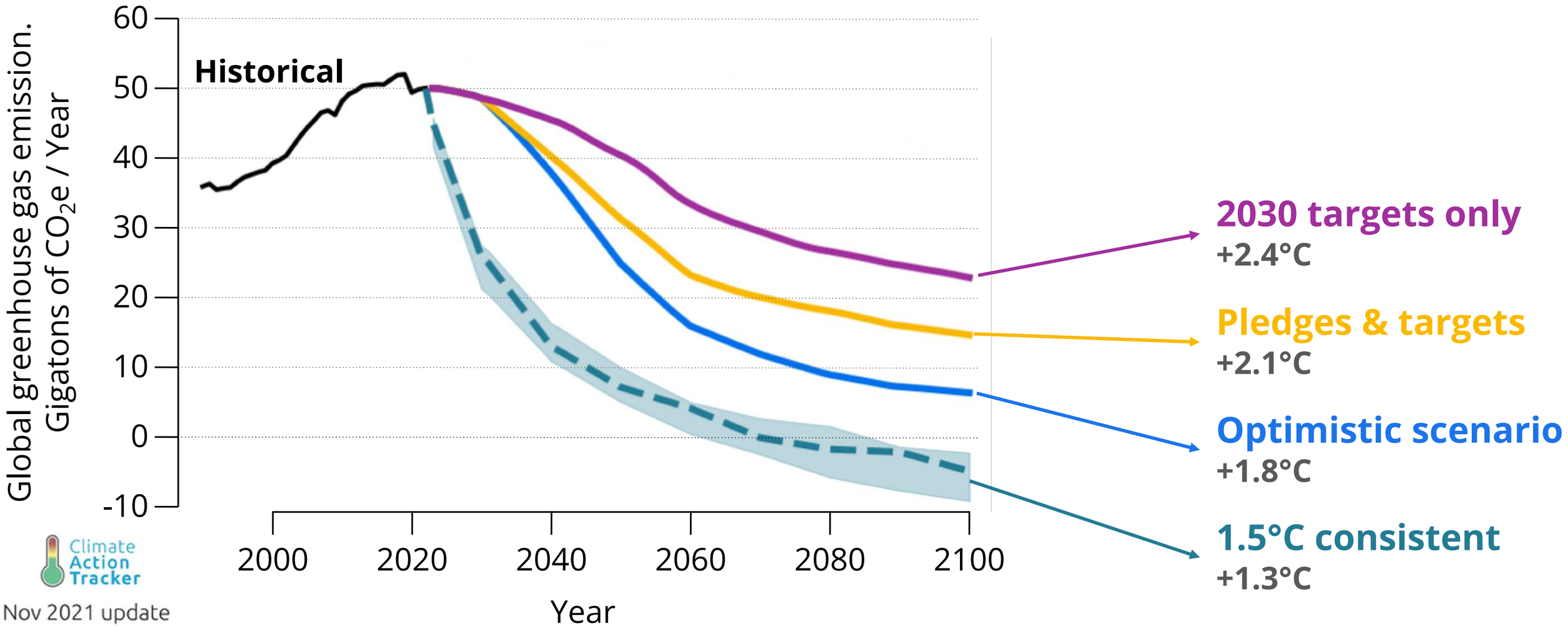
Optimistic scenario
+1.8°C

1.5°C consistent
+1.3°C

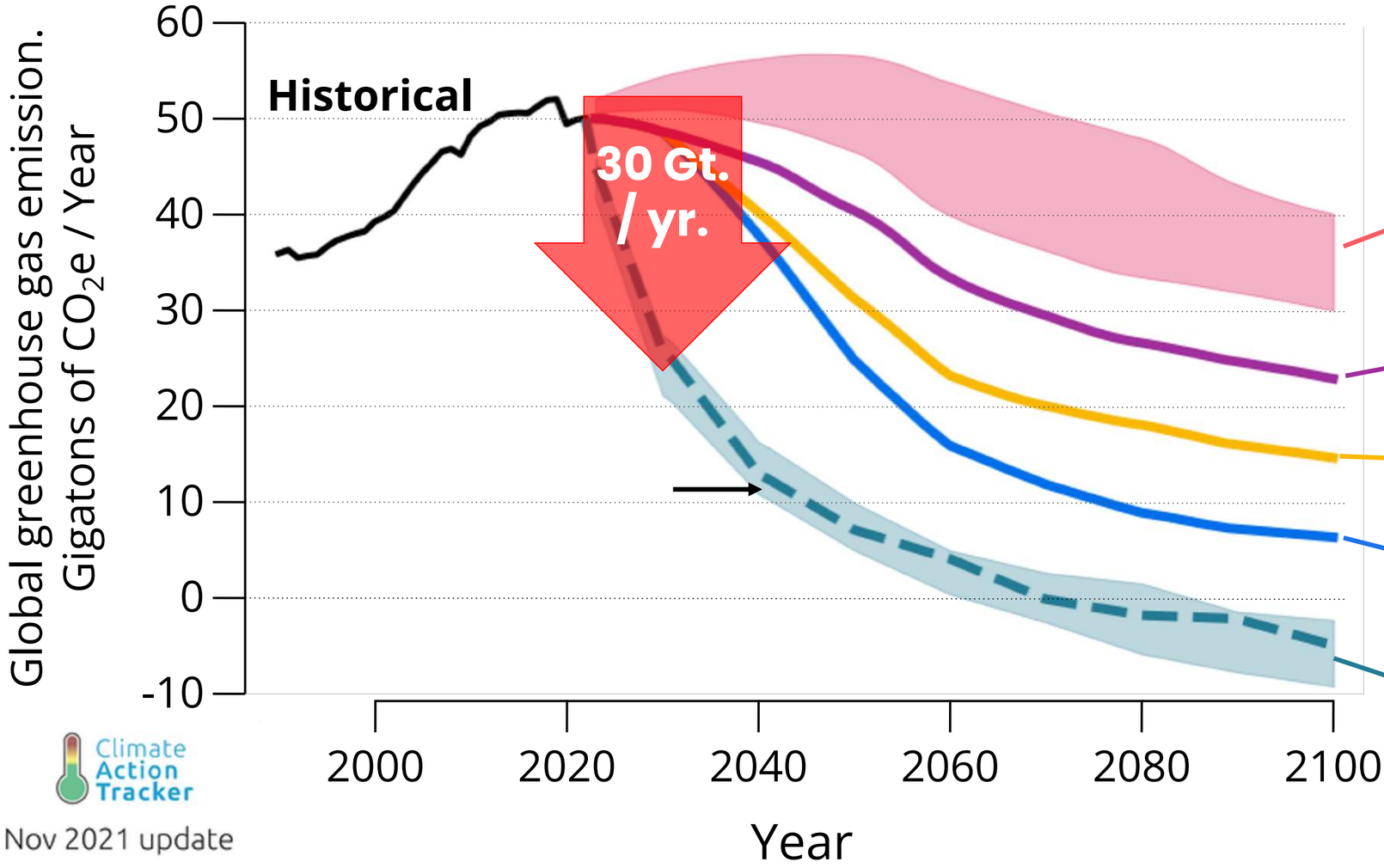
2100 warming projection



2100 warming projection



2100 warming projection



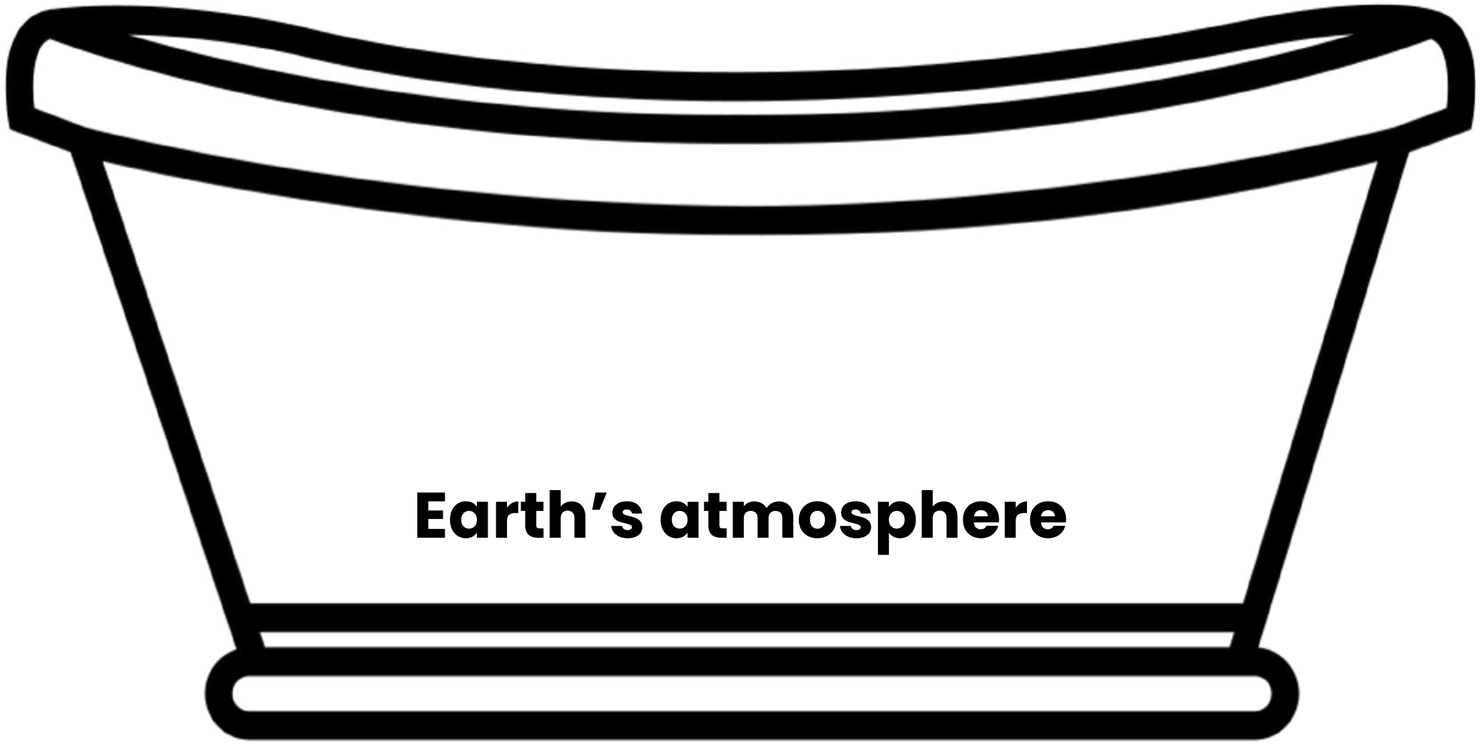
Current policies
+2.5 - 2.9 °C

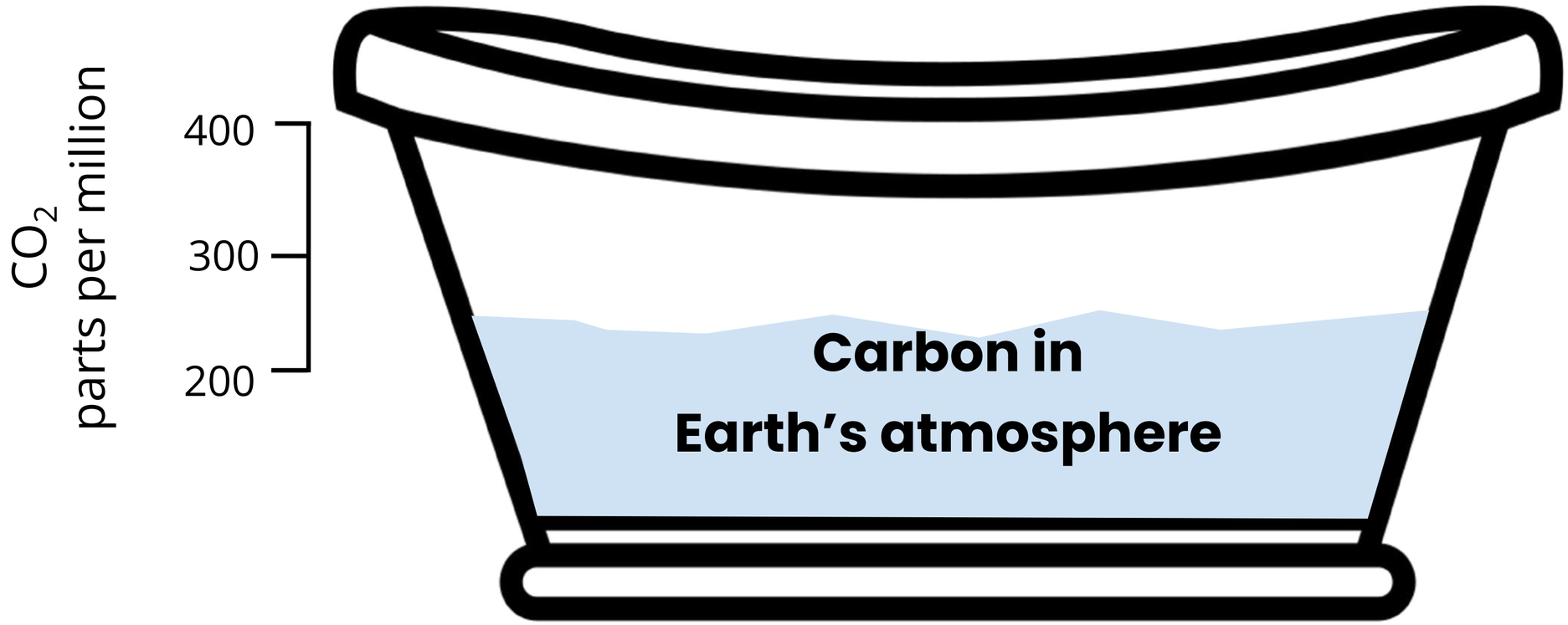
2030 Targets only
+2.4°C

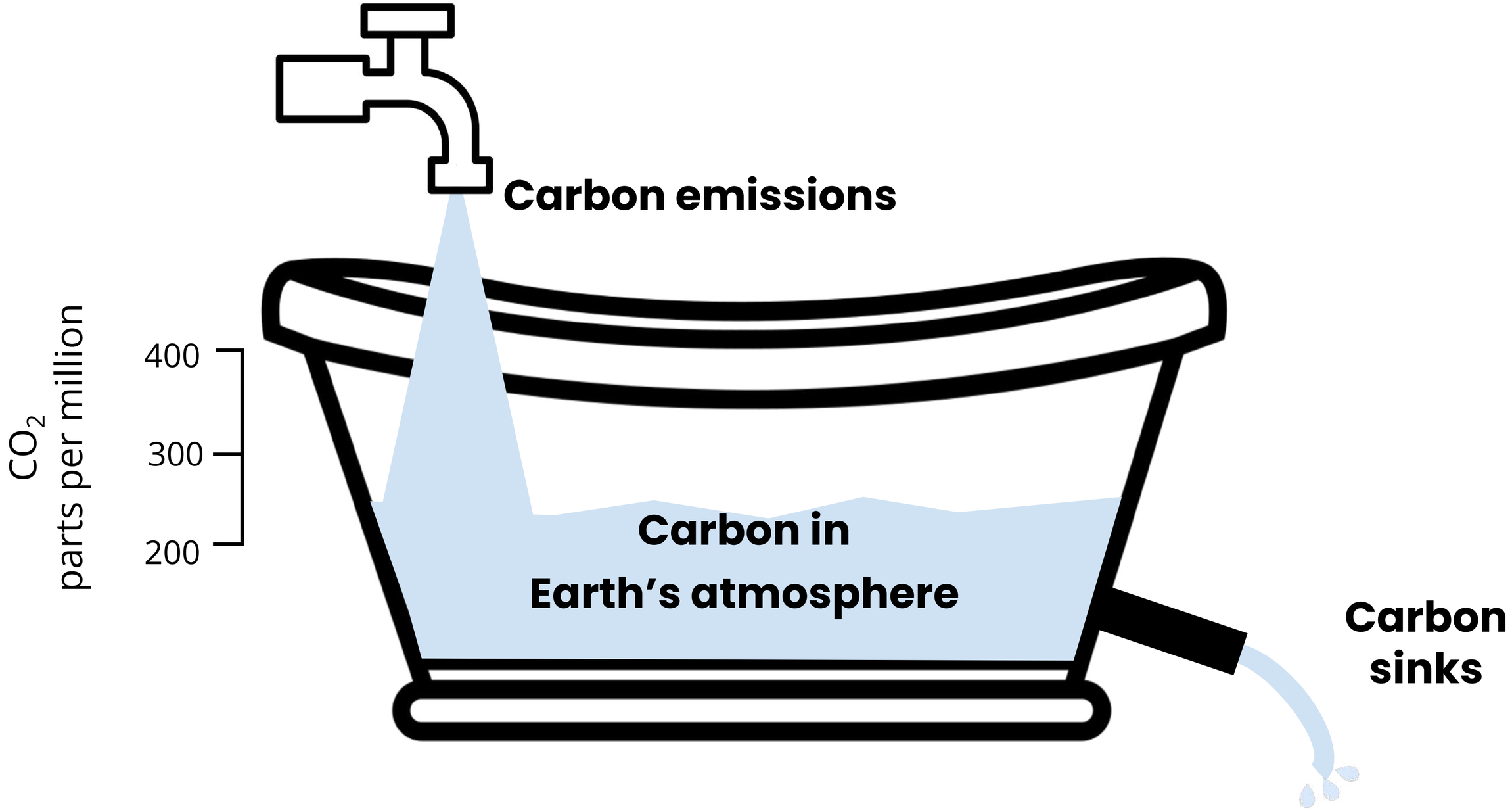
Pledges & targets
+2.1°C

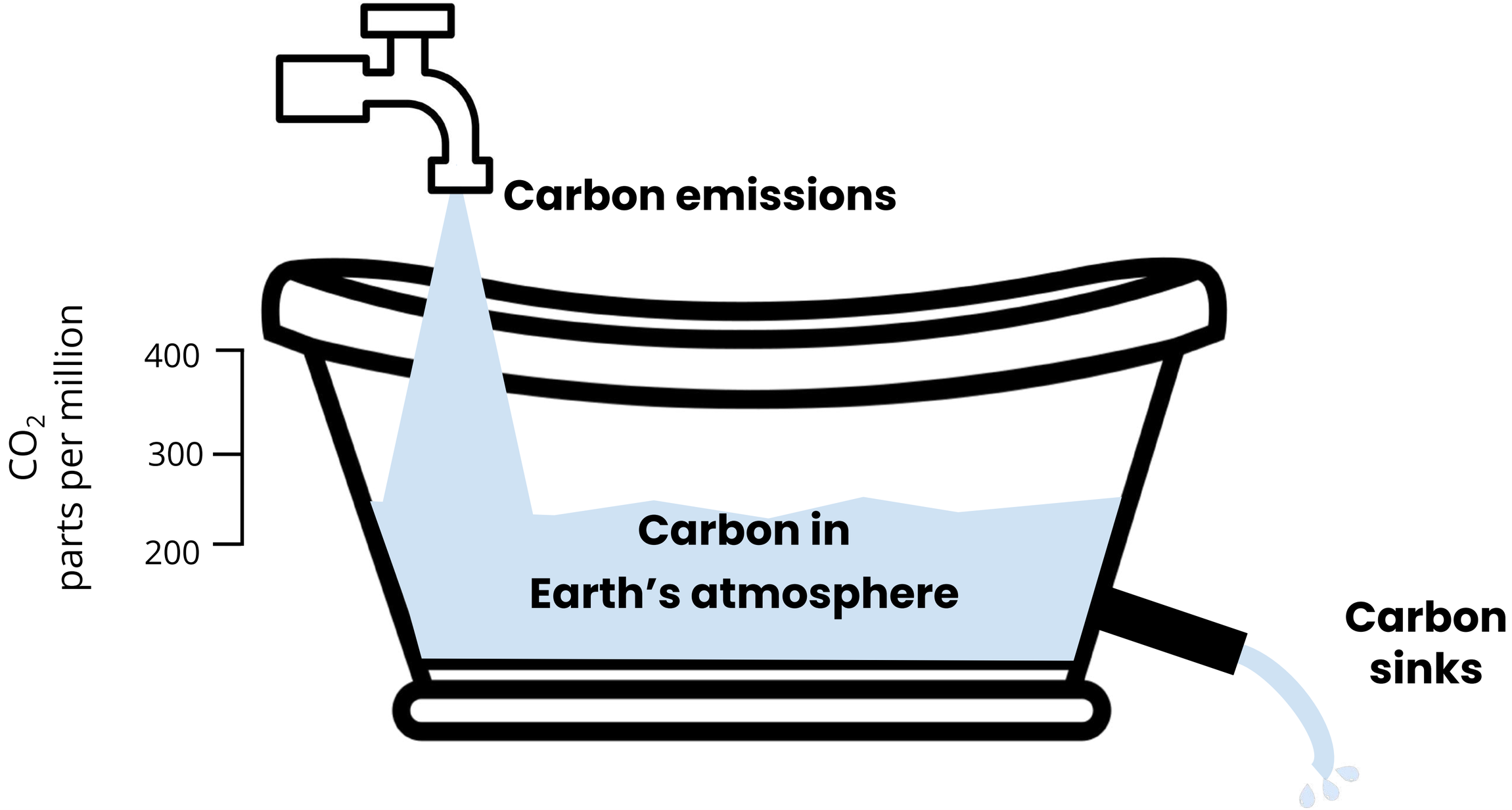
Optimistic scenario
+1.8°C

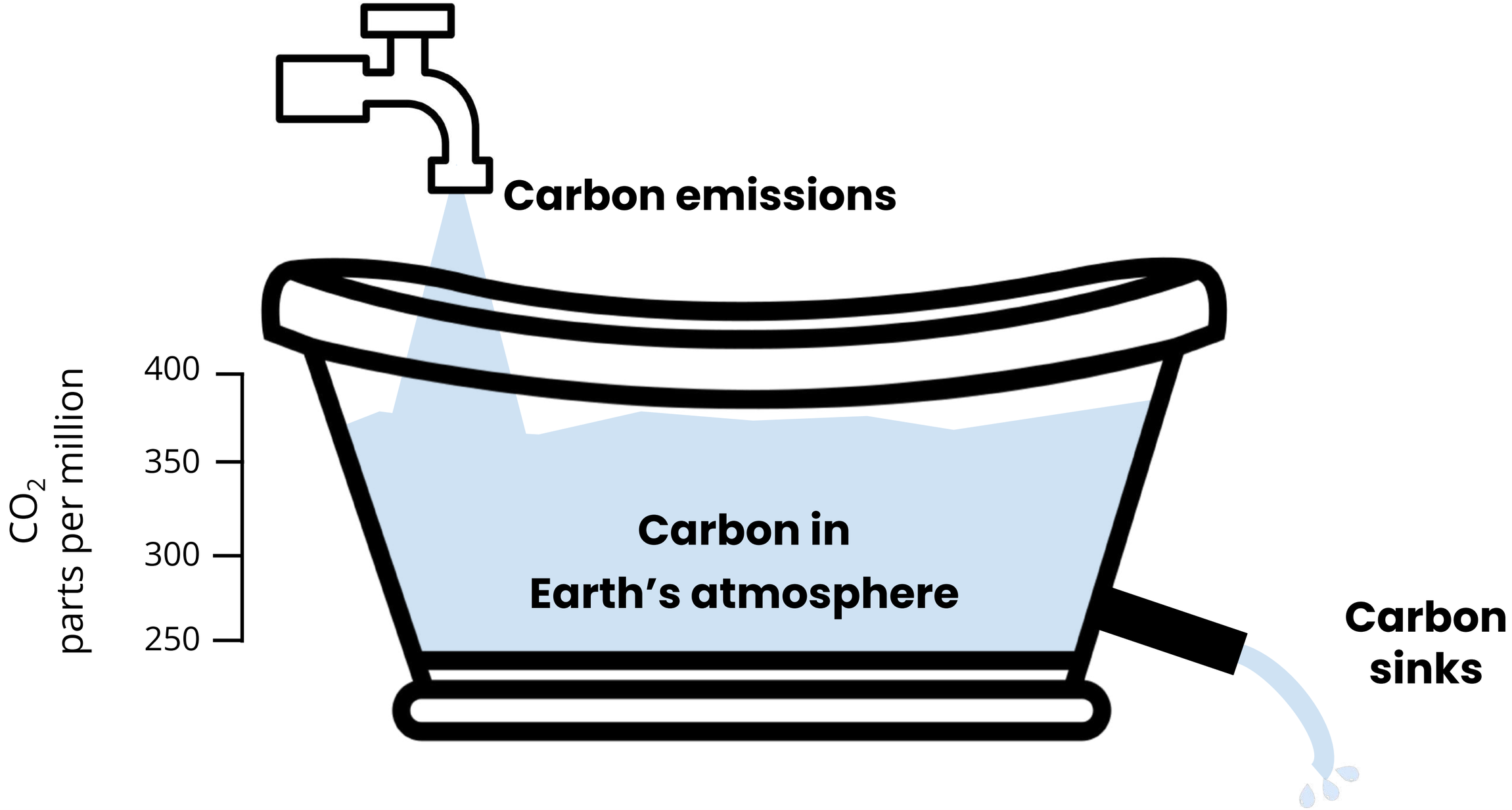
1.5°C consistent
+1.3°C


Earth’s atmosphere


CO_2
parts per million
400
300
200
Carbon in
Earth's atmosphere


Carbon emissions
CO_2 parts per million
400
300
200
Carbon in Earth's atmosphere
Carbon sinks


Carbon emissions
CO_2 parts per million
400
300
200
Carbon in Earth's atmosphere
Carbon sinks


Carbon emissions
CO_2 parts per million
400
350
300
250
Carbon in
Earth's atmosphere
Carbon
sinks

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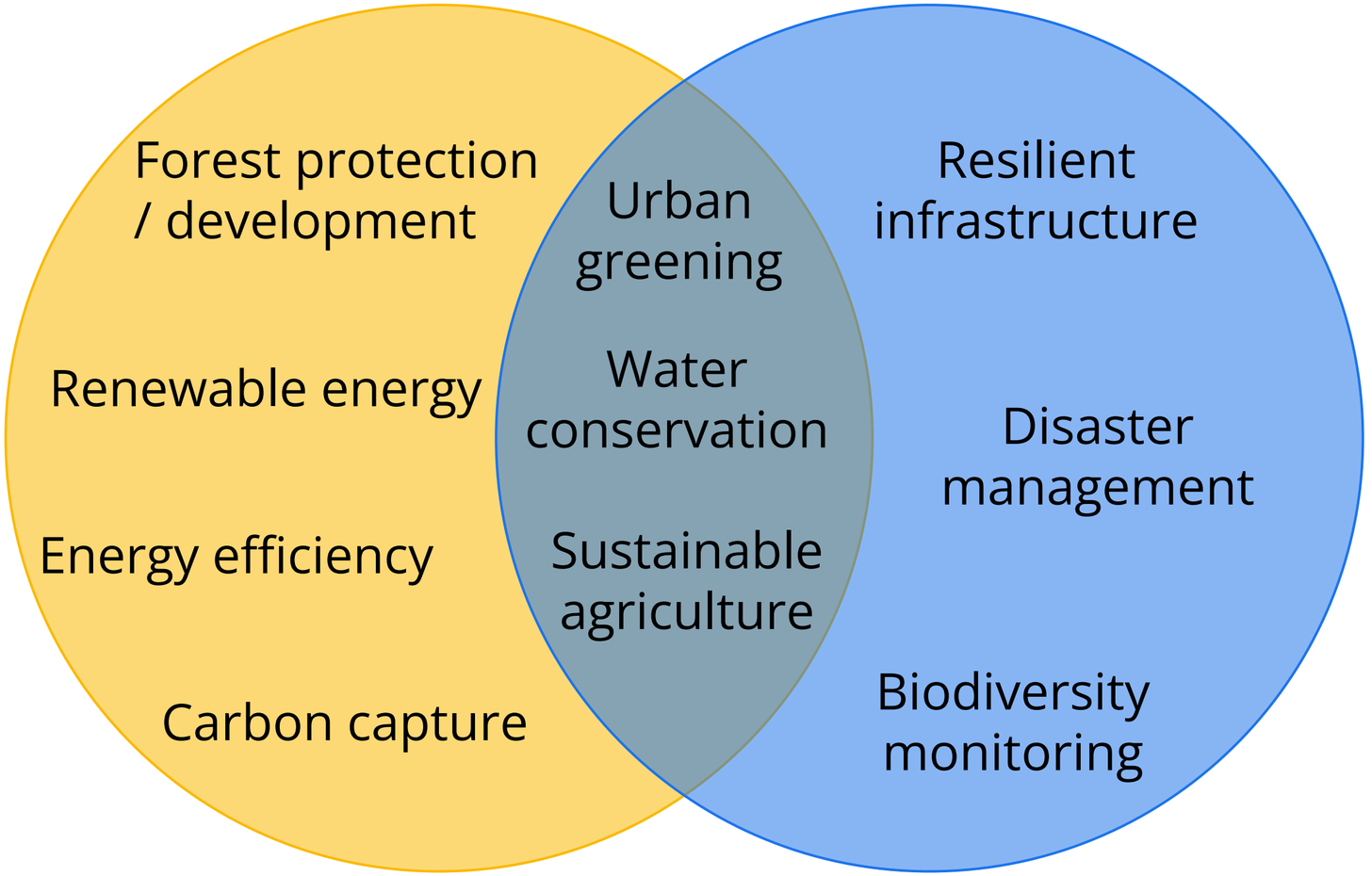
AI and Climate Change

AI and Climate Change

Climate resilience

Mitigation
Reducing climate change



Adaptation
Adapting to climate change

AI and climate resilience

AI in disaster management

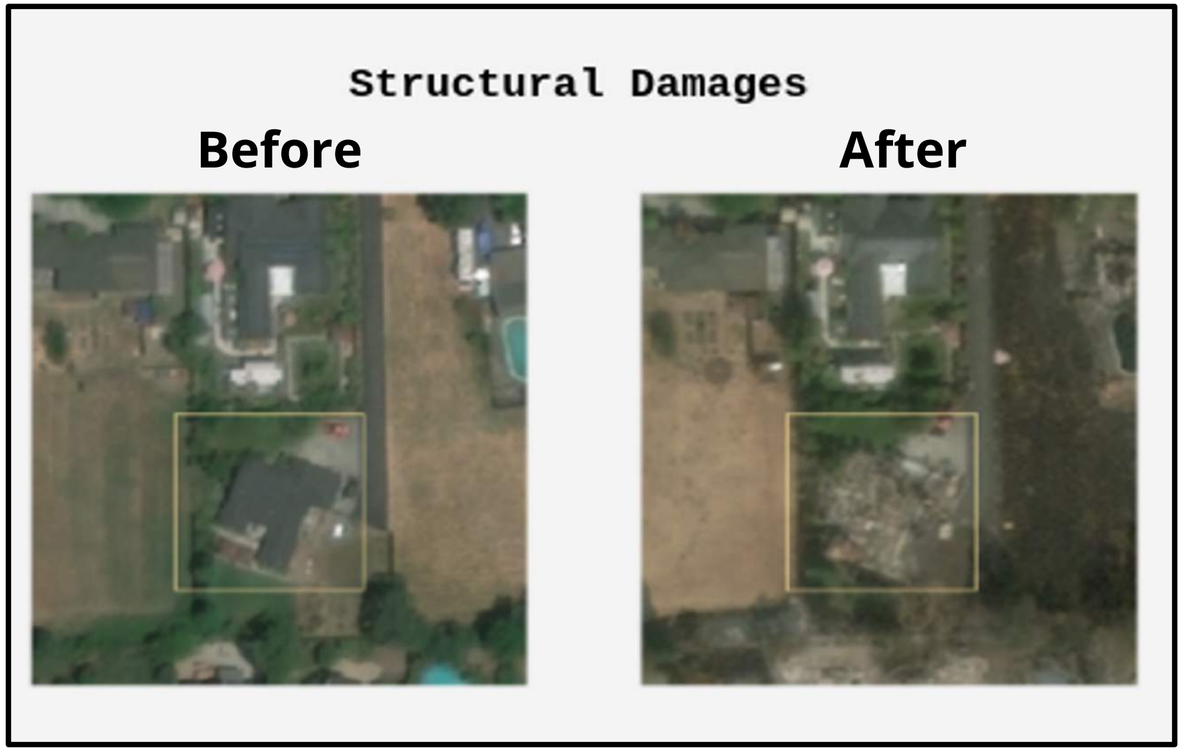
Haitian Kreyol

Moun kwense nan Sakre Kè nan Pòtoprens

English

People trapped in Sacred Heart Church, PauP

Translation



Damage assessment

AI and climate resilience

AI in biodiversity monitoring

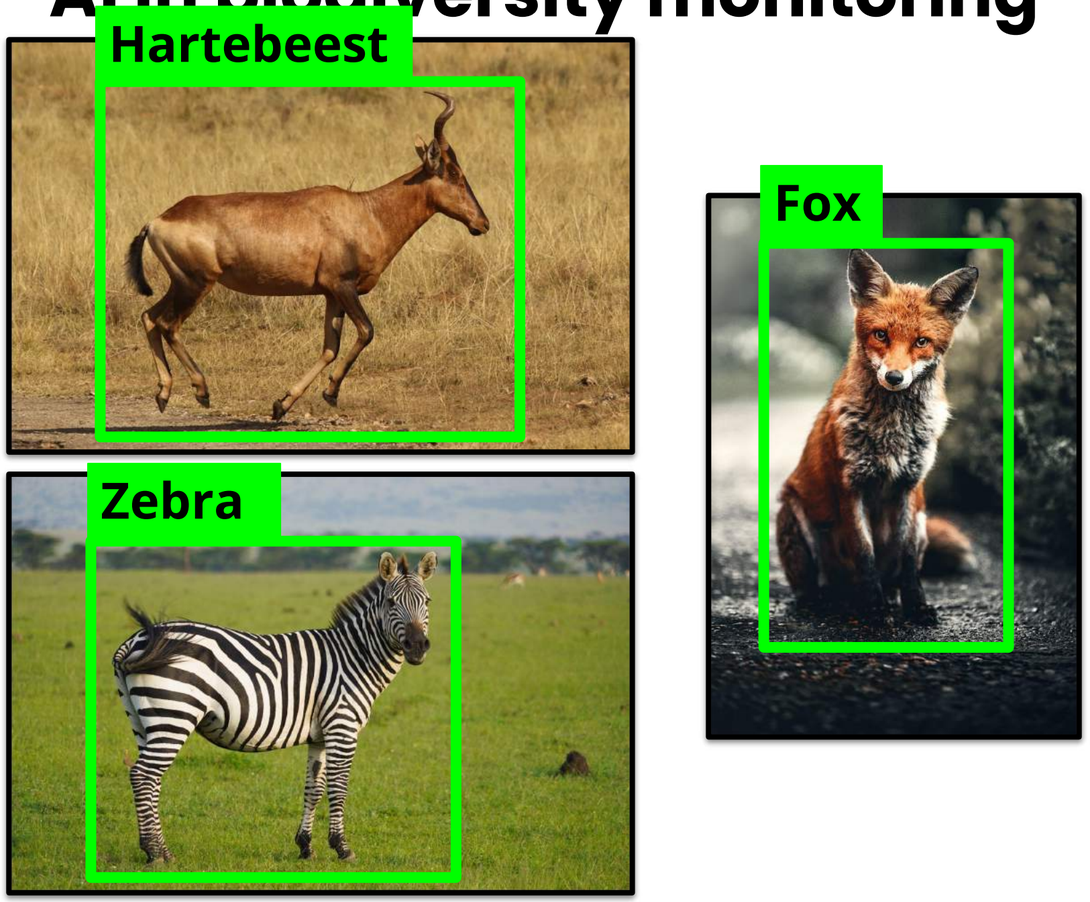


Image recognition

AI and climate resilience

AI and renewable power

Wind and solar power forecasting

Planning new solar installations

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AI and Climate Change

Use of Satellite Imagery for Siting Renewable Energy Sources

AI for Good lab at Microsoft

- Microsoft video: Use of Satellite Imagery for Siting Renewable Energy Sources (Caleb and Anthony)

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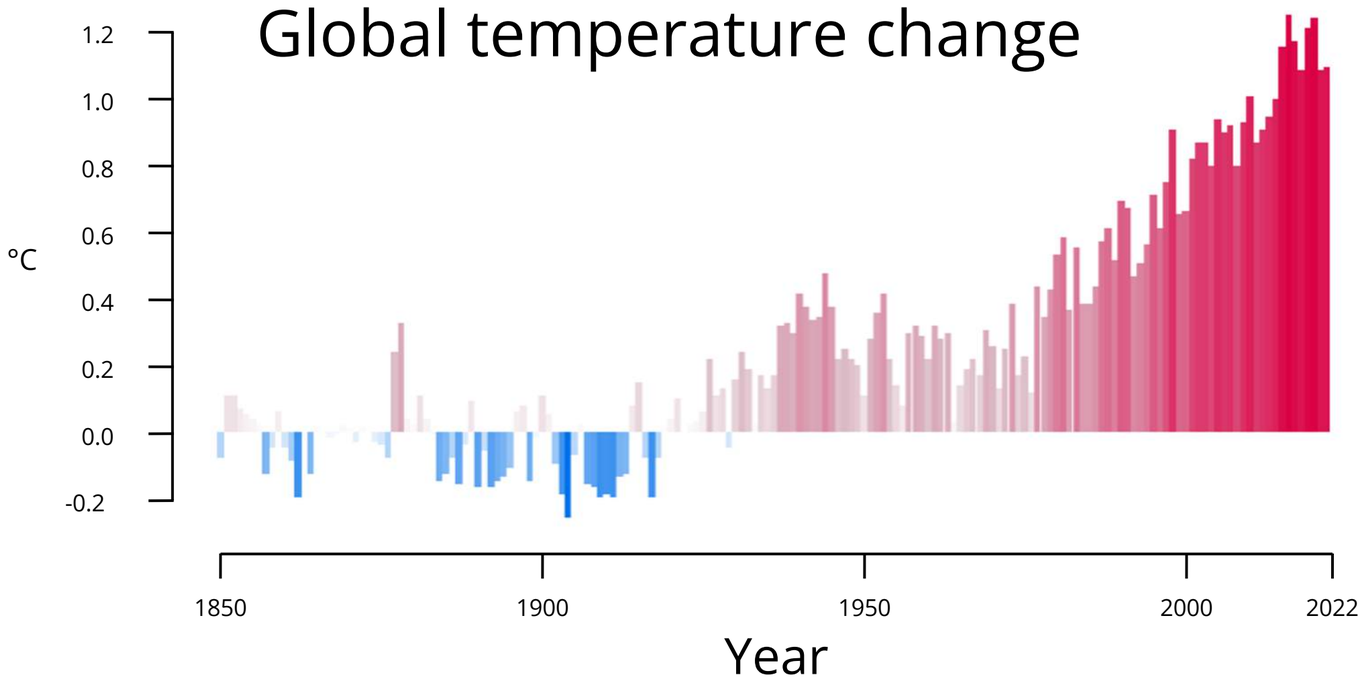
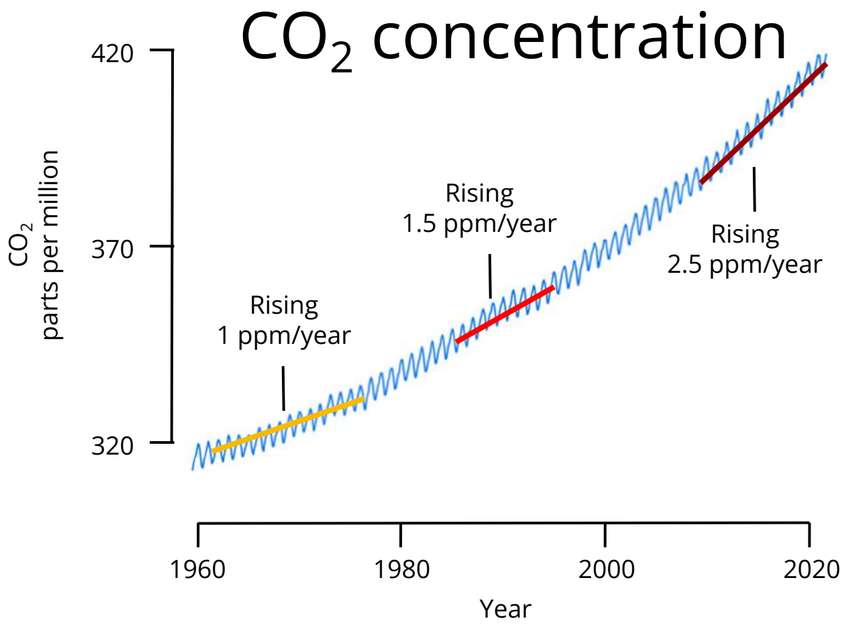
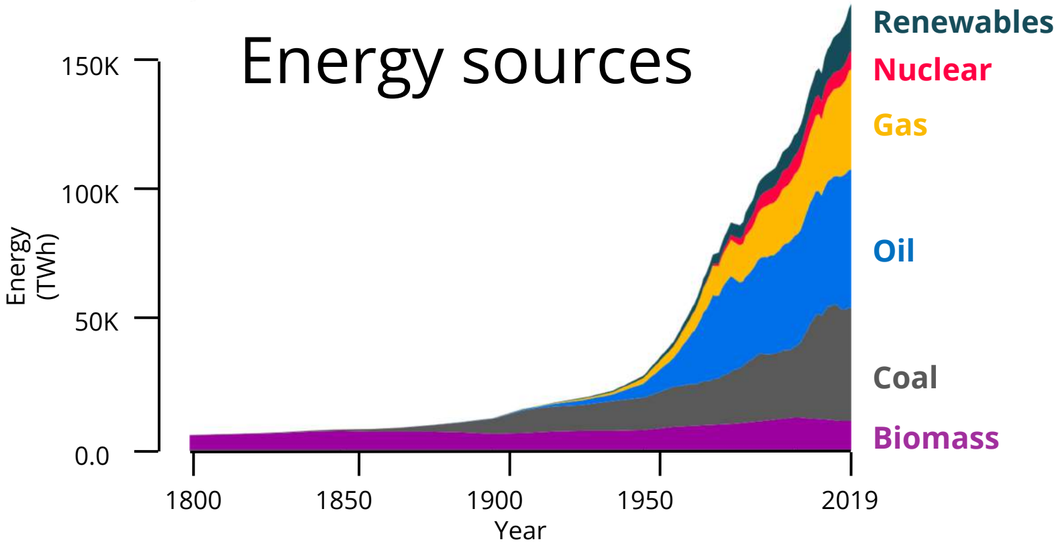
AI and Climate Change

Week 1 Summary

Week 1 summary







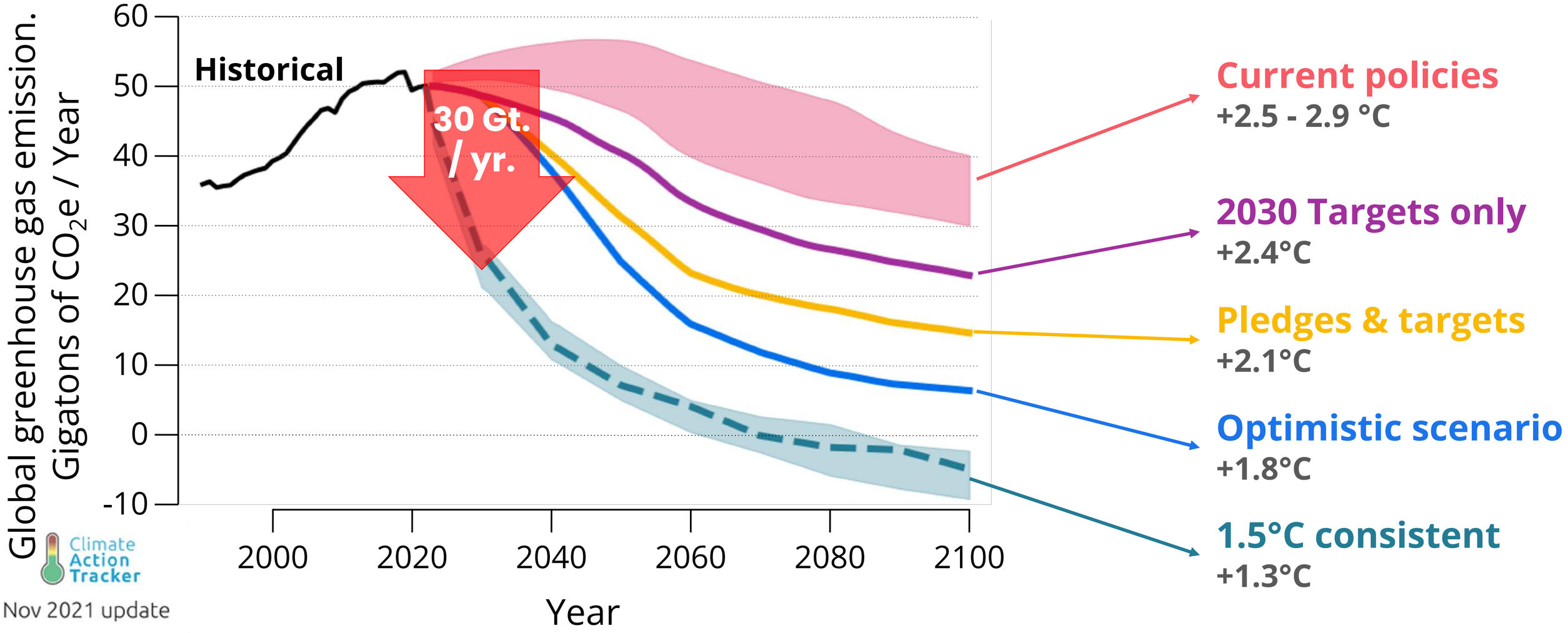
Week 1 summary

Floods

Droughts

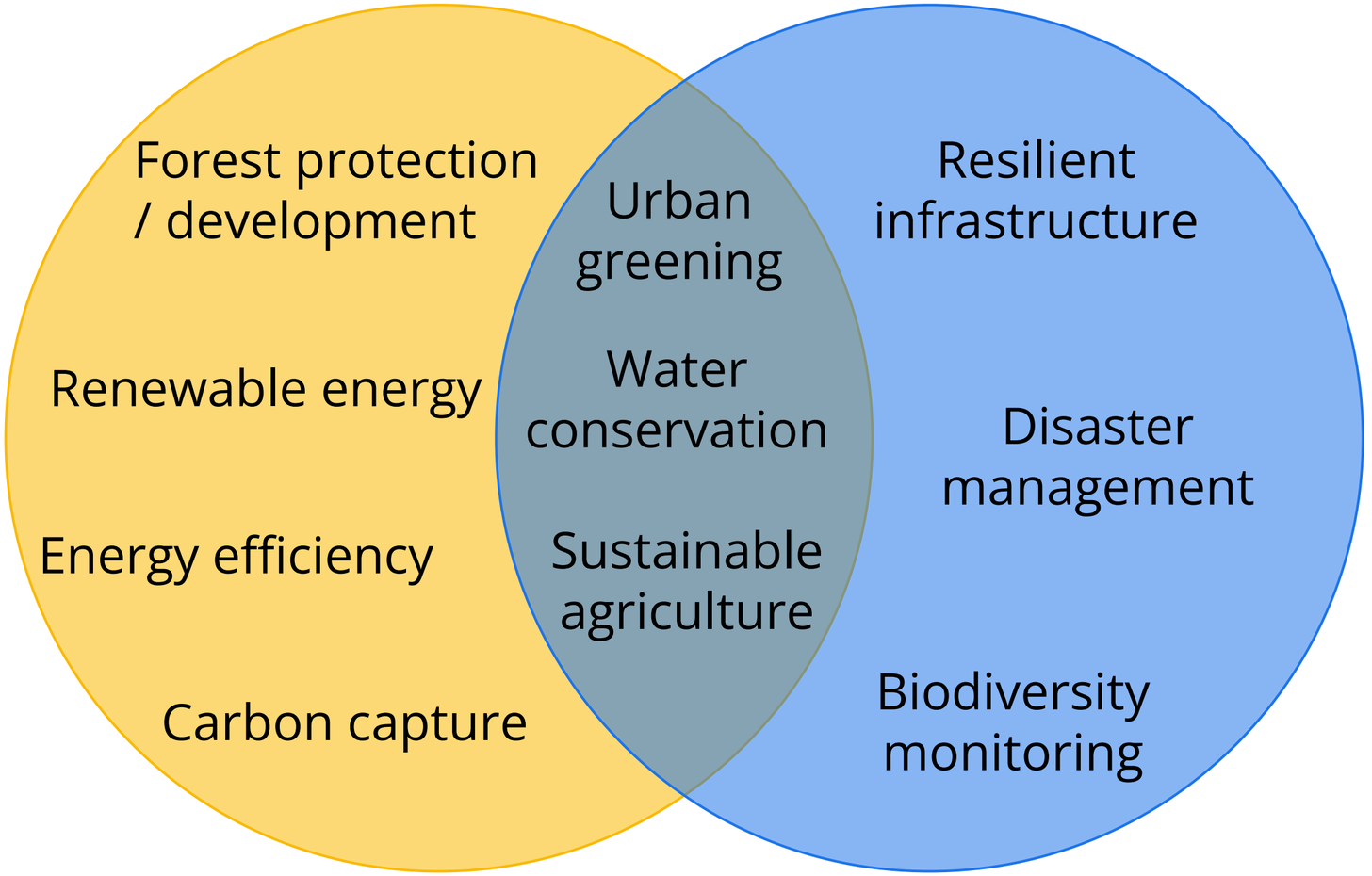
Biodiversity loss

Week 1 summary



Week 1 summary

Mitigation
Reducing climate change



Adaptation
Adapting to climate change

- Predicting wind power
- Disaster management
- Biodiversity monitoring