



AVIATION CO₂ REDUCTIONS

ONLINE STOCKTAKING
PREVIEW

28 APRIL 2020

Damon Matthews

Professor and Research Chair in Climate Science and Sustainability
Concordia University, Montreal, Canada





Paris Agreement

“... emission pathways consistent with holding the increase in the global average temperature to **well below 2 °C** above pre-industrial levels and pursuing efforts to **limit the temperature increase to 1.5 °C**”

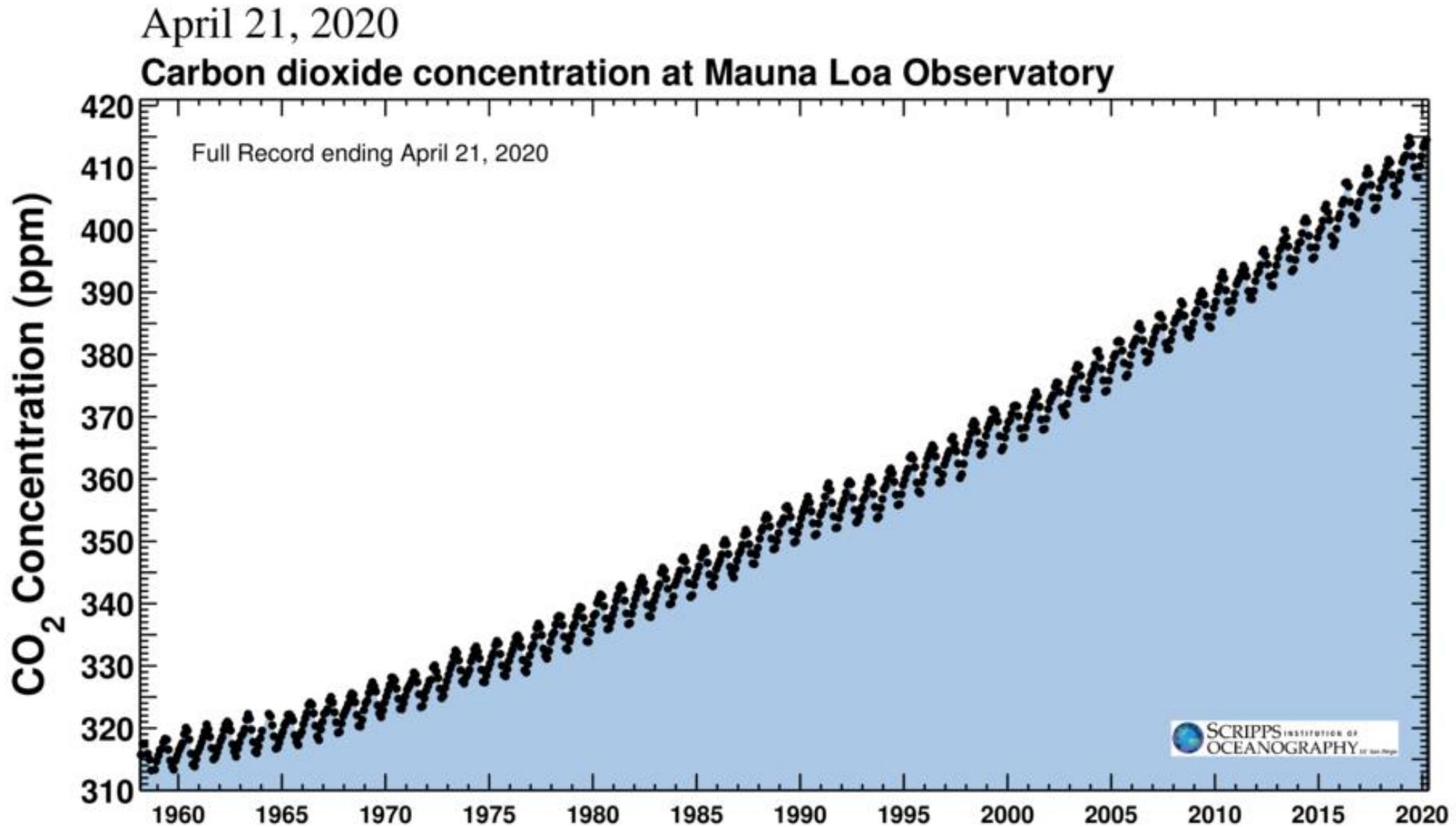
Global Warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

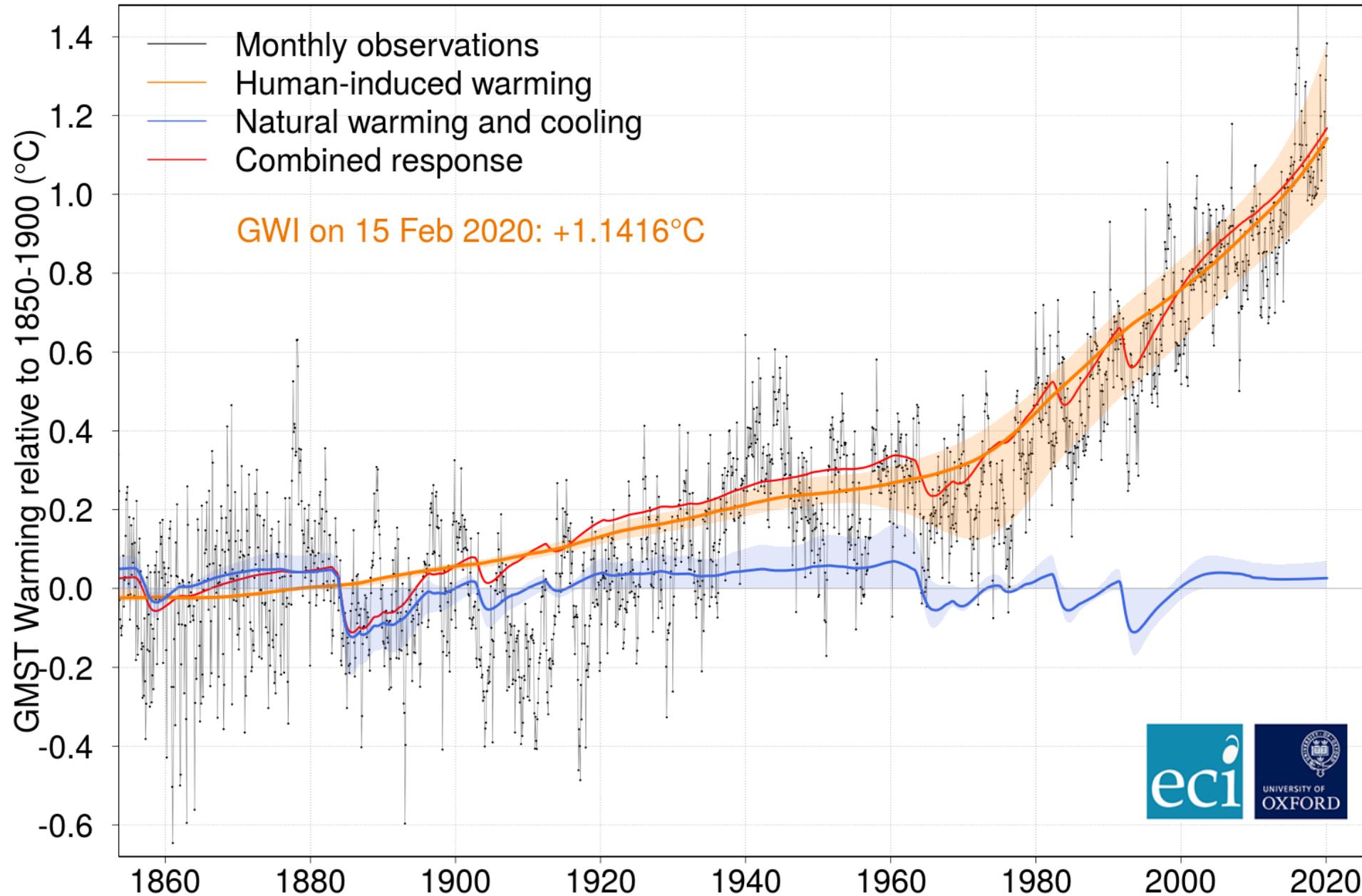


IPCC Special Report on Global Warming of 1.5°C (SR1.5)

Latest CO₂ reading: **416.26 ppm**

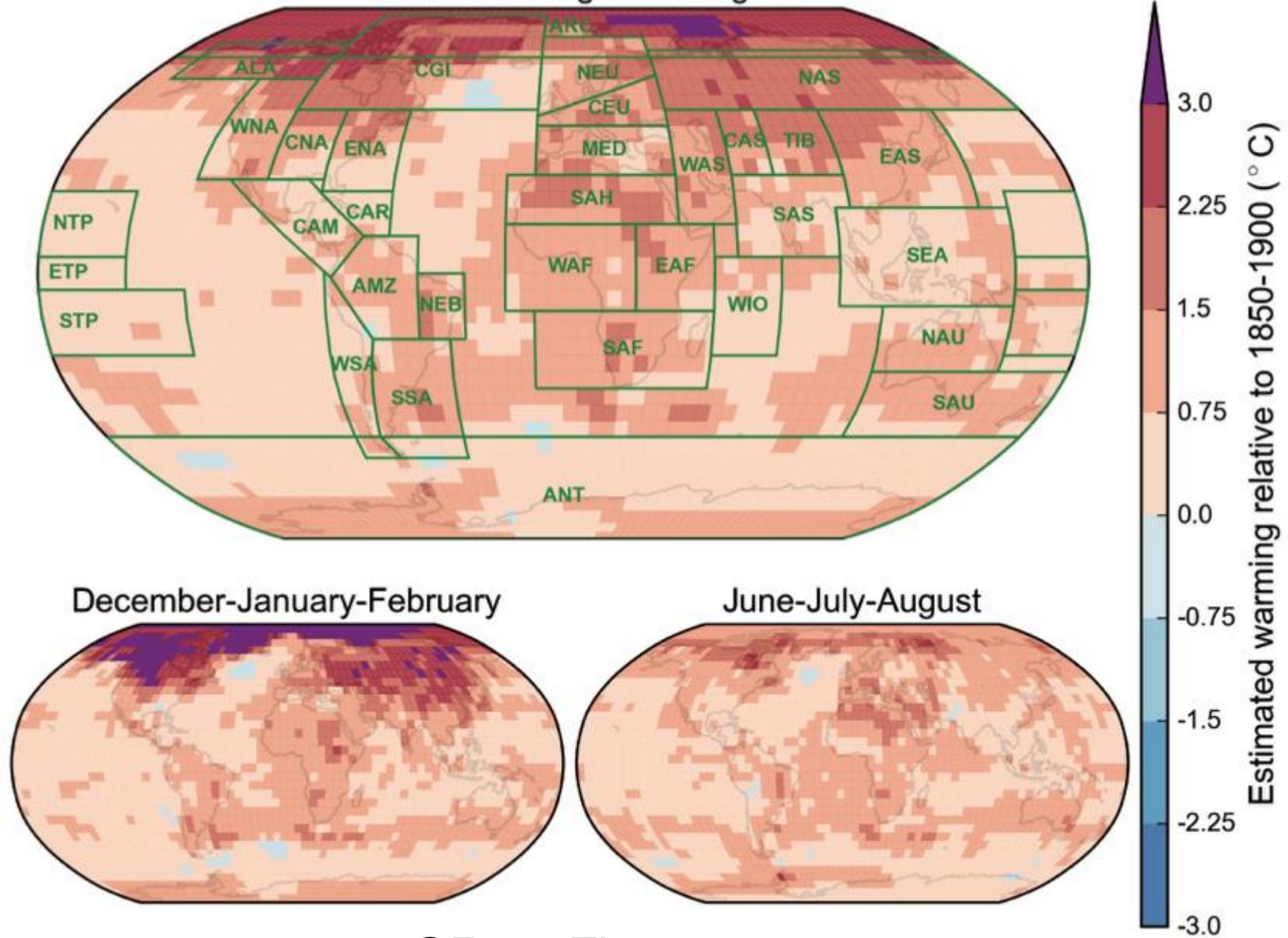


Global Warming Index (aggregate observations) - updated to Feb 2020

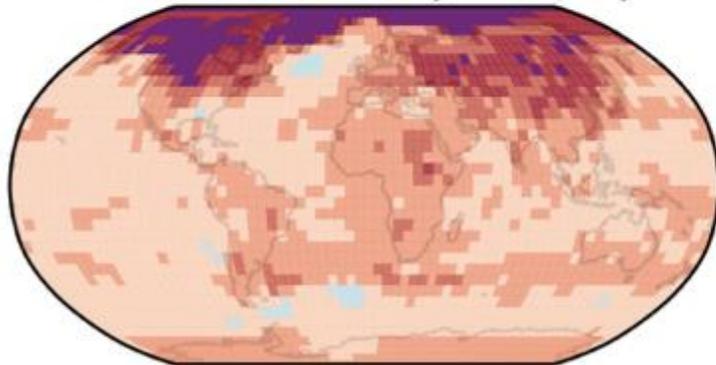


Regional warming in the decade 2006-2015 relative to preindustrial

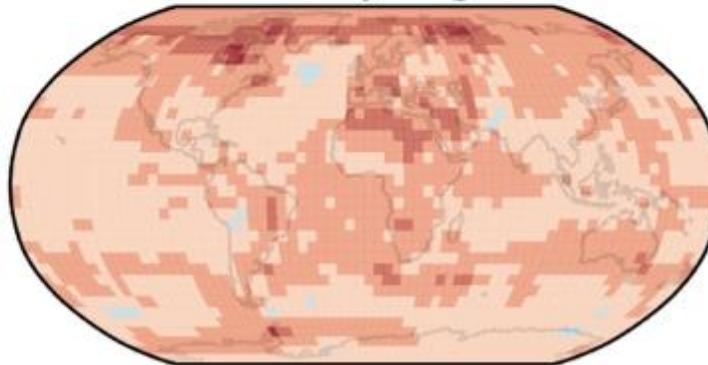
Annual average warming



December-January-February

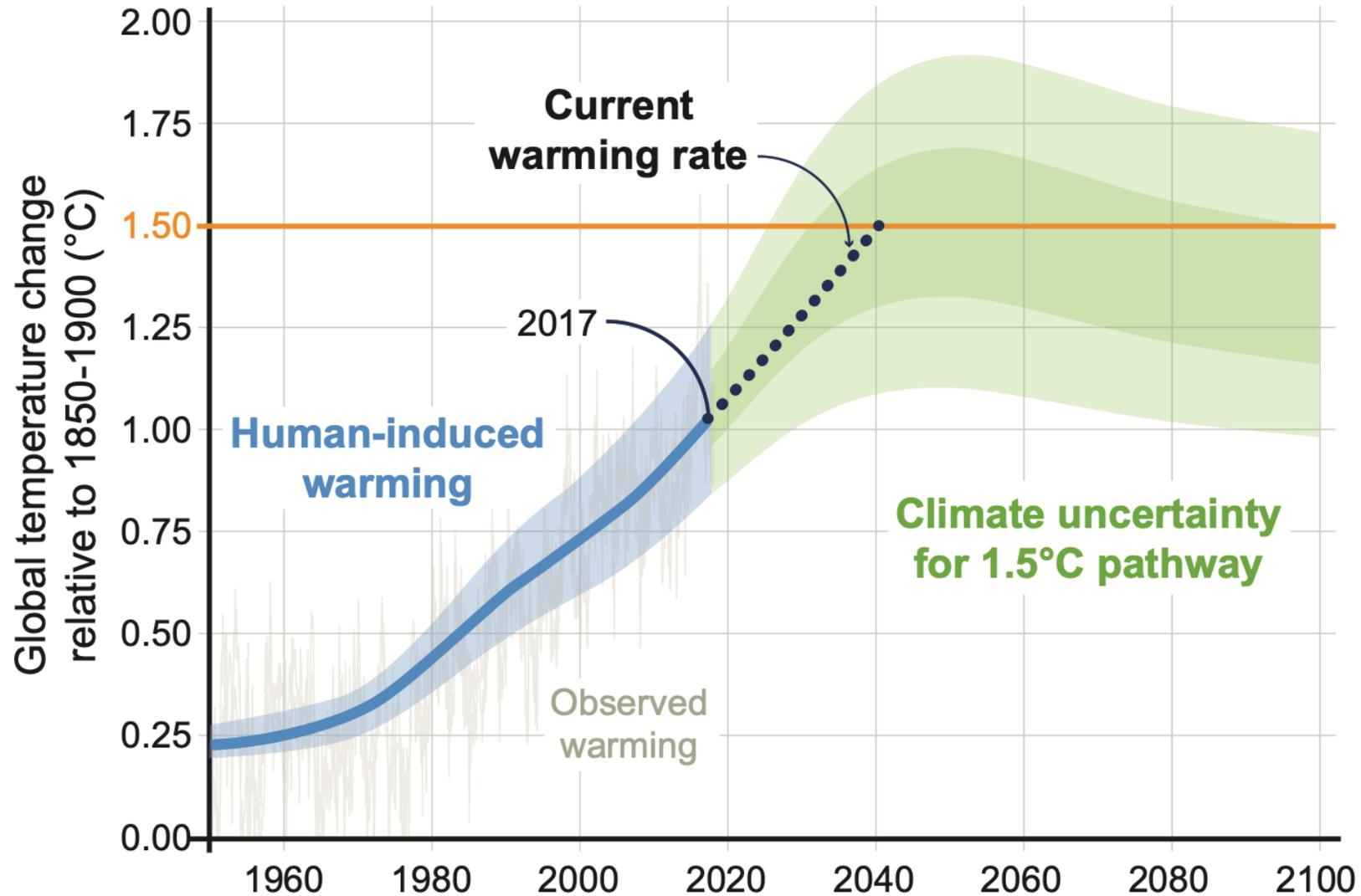


June-July-August



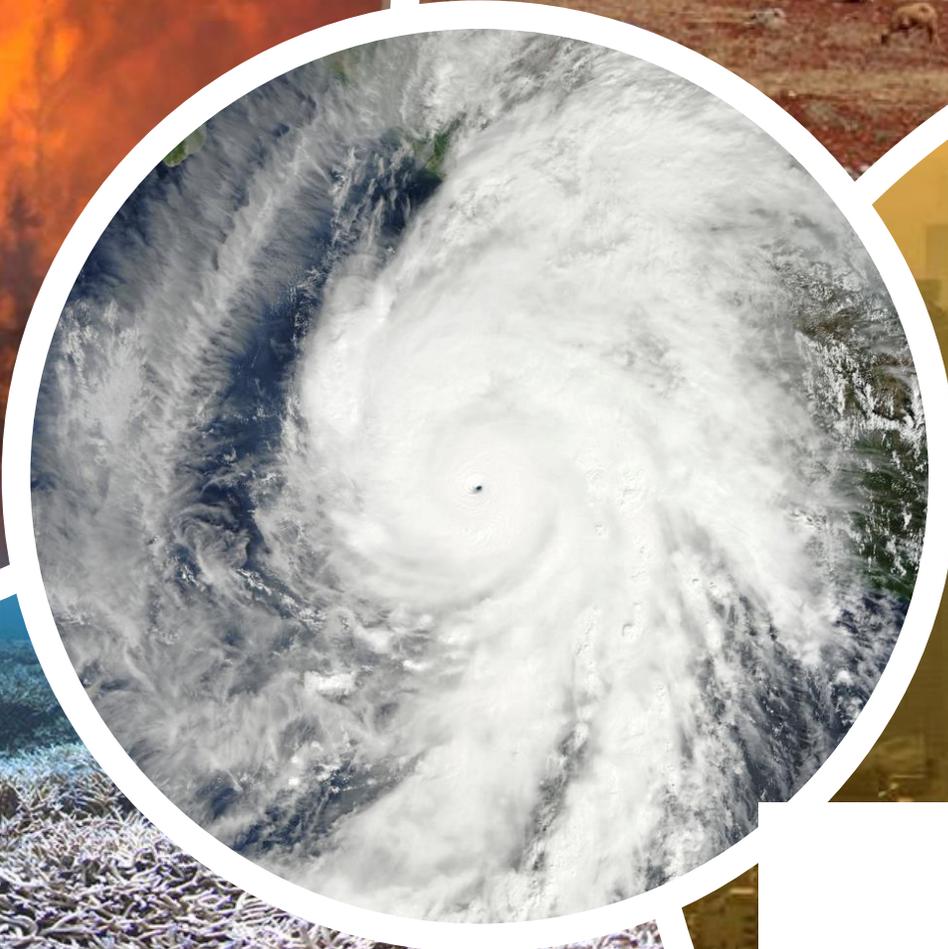
SR1.5 Figure 1.3

How close are we to 1.5°C?



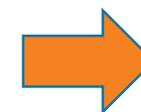
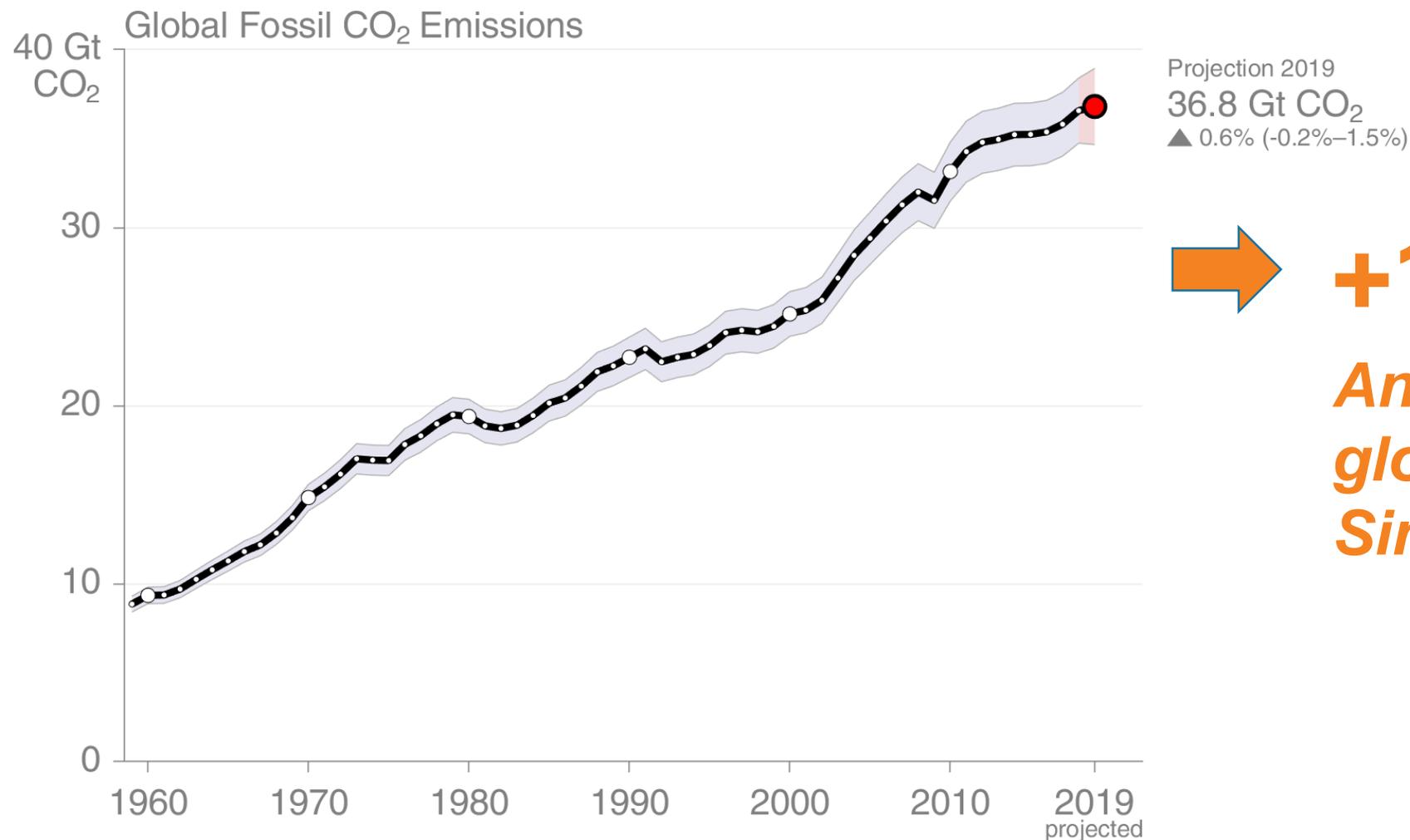
SR1.5 FAQ 1.2, Figure 1





**Why is 1.5°C
important?**

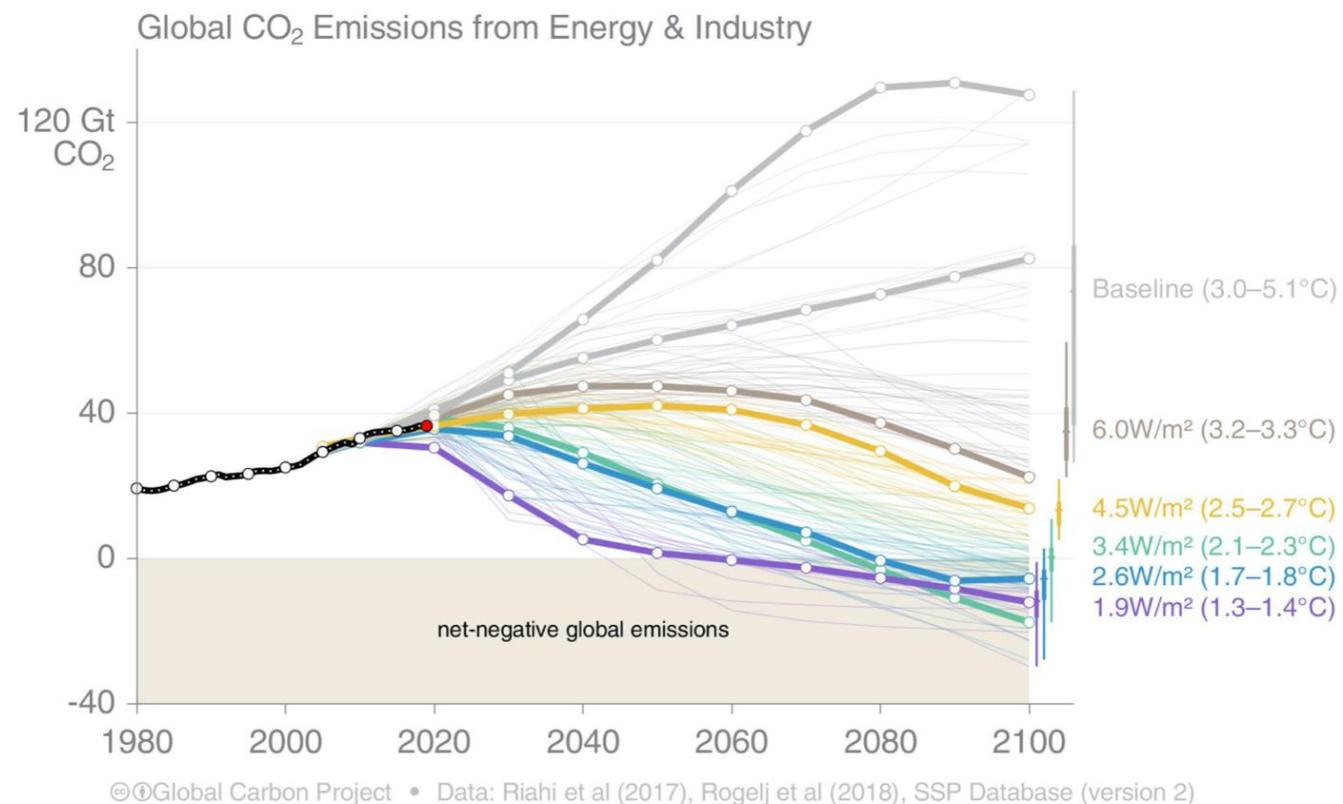
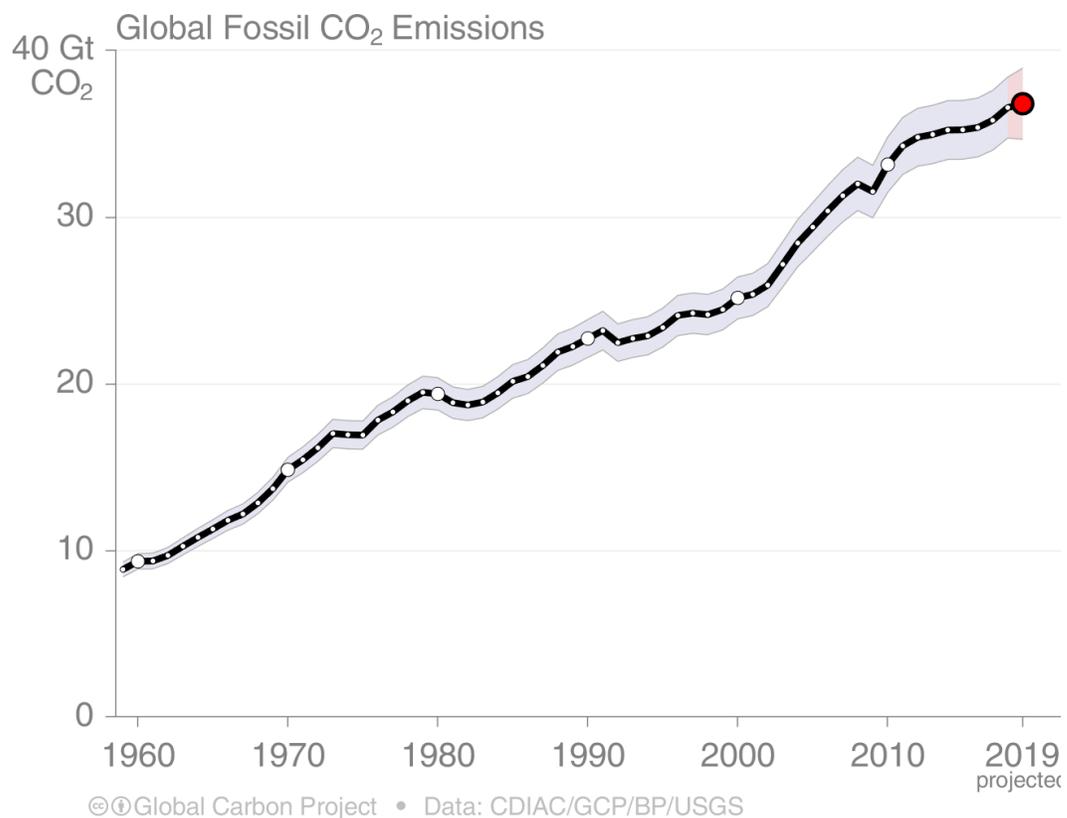
Global CO₂ emissions are still increasing



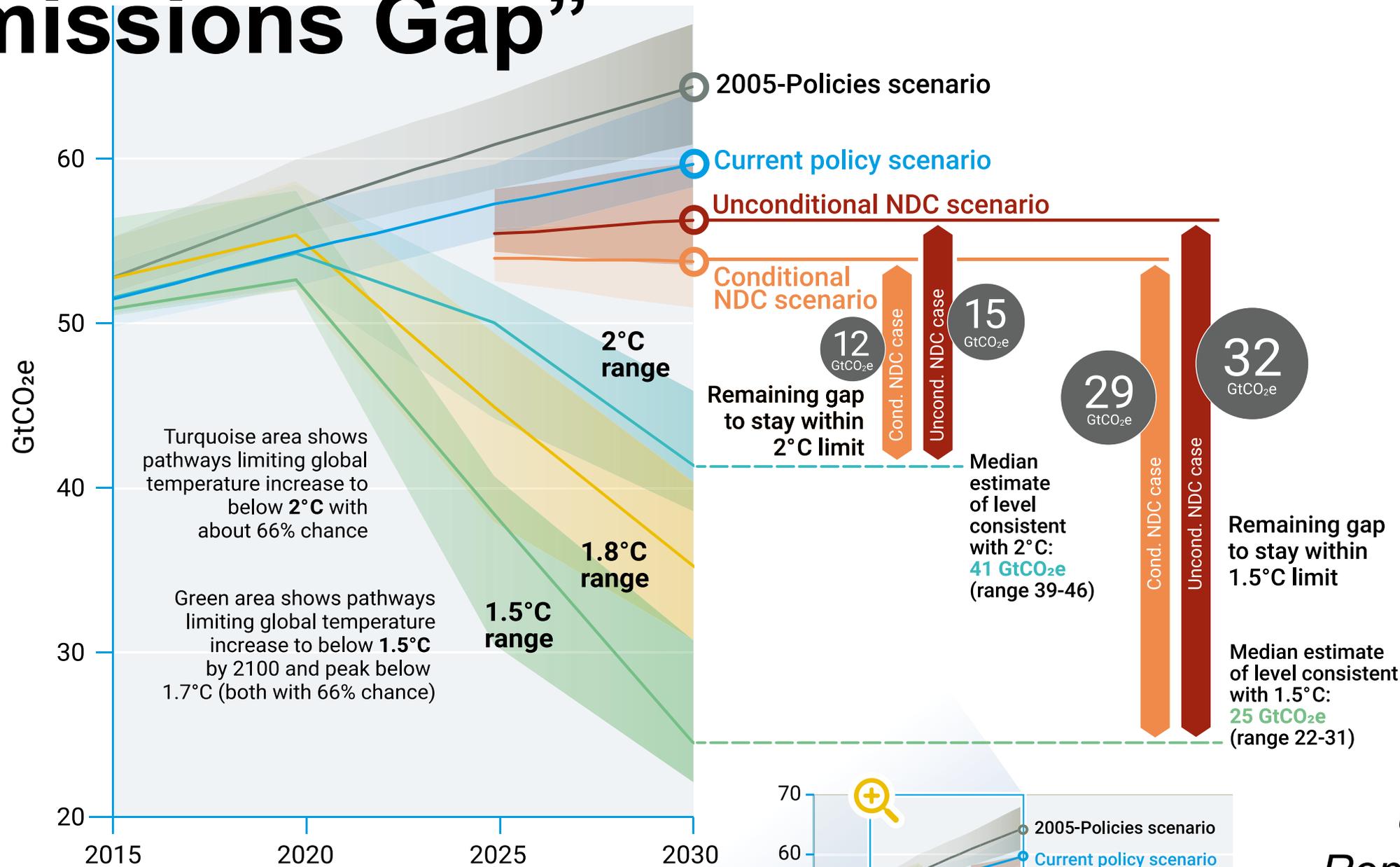
+1.15 °C

*Anthropogenic
global warming
Since 1850-1900*

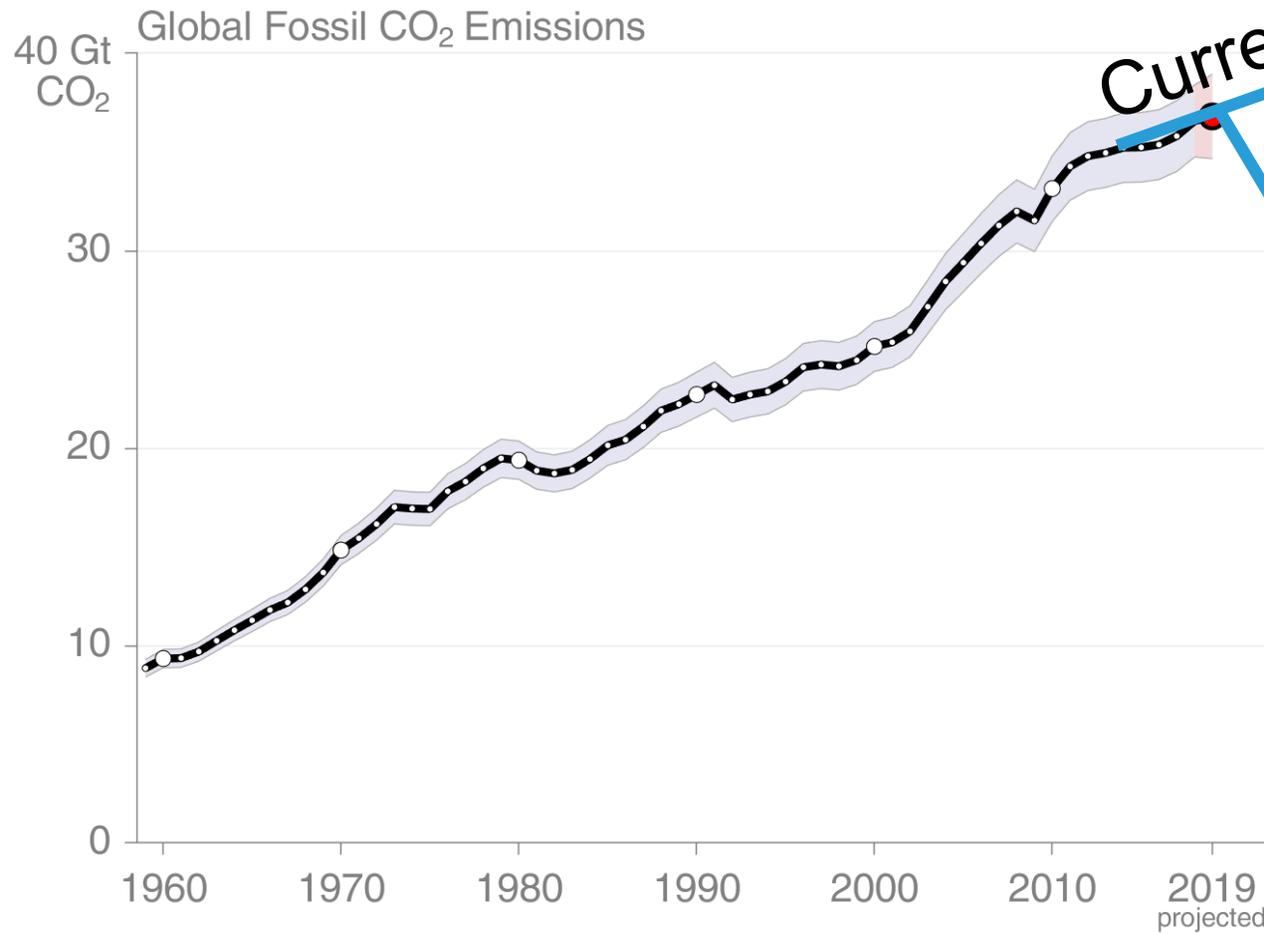
Current “business-as-usual” → 3-4°C



“Emissions Gap”



Stabilizing climate requires net-zero emissions



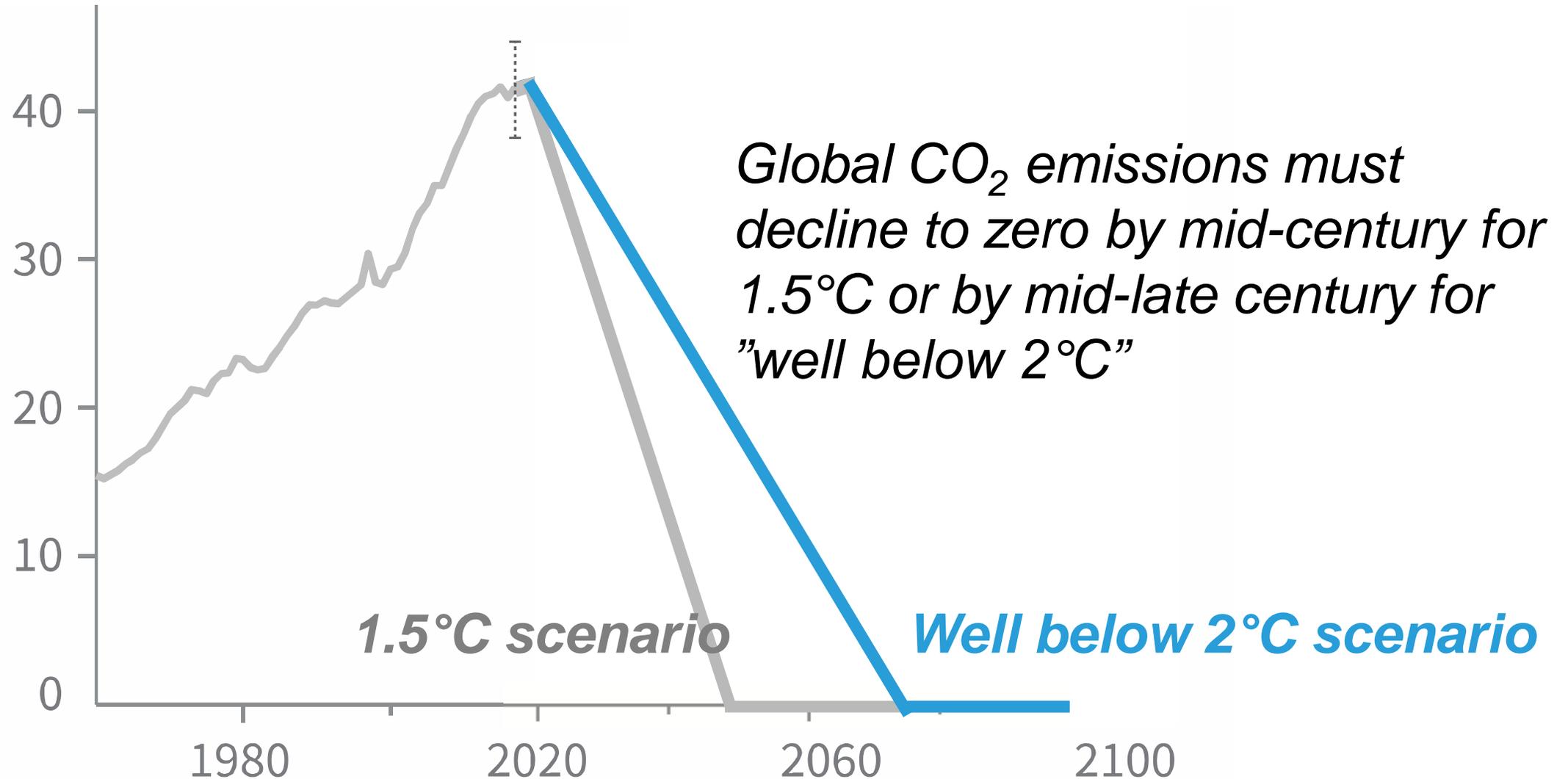
Current emissions trajectory
→ **could exceed 1.5°C in 10-15 years**

Required emissions trajectory
→ **to meet goals of the Paris Agreement**

© Global Carbon Project • Data: CDIAC/GCP/BP/USGS



To meet the Paris climate goal

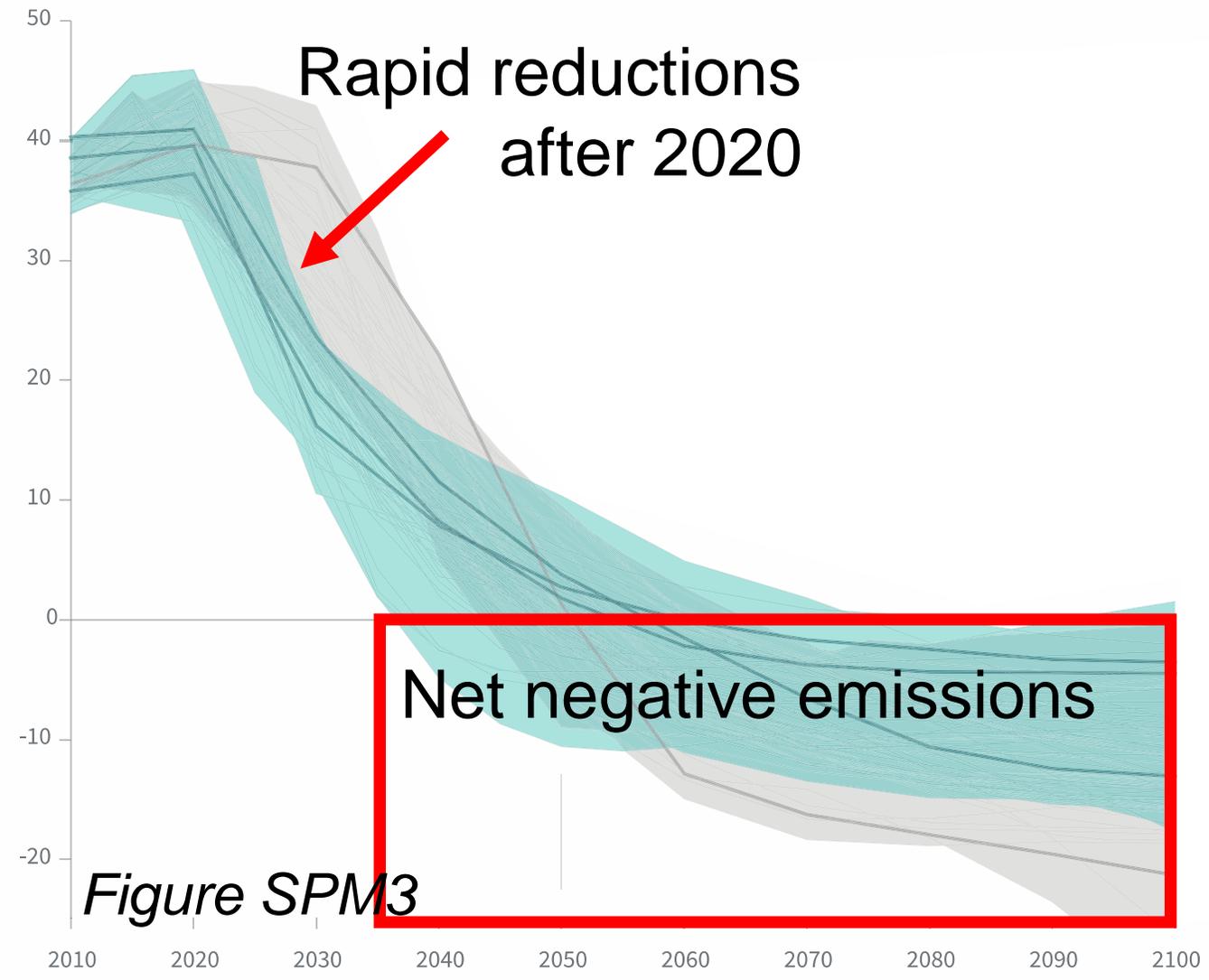


Pathways to 1.5°C

Global total net CO₂ emissions

From IPCC Special Report on Global Warming of 1.5°C

Billion tonnes of CO₂/yr



Pathways to 1.5°C

Global total net CO₂ emissions

From IPCC Special Report on Global Warming of 1.5°C

Billion tonnes of CO₂/yr

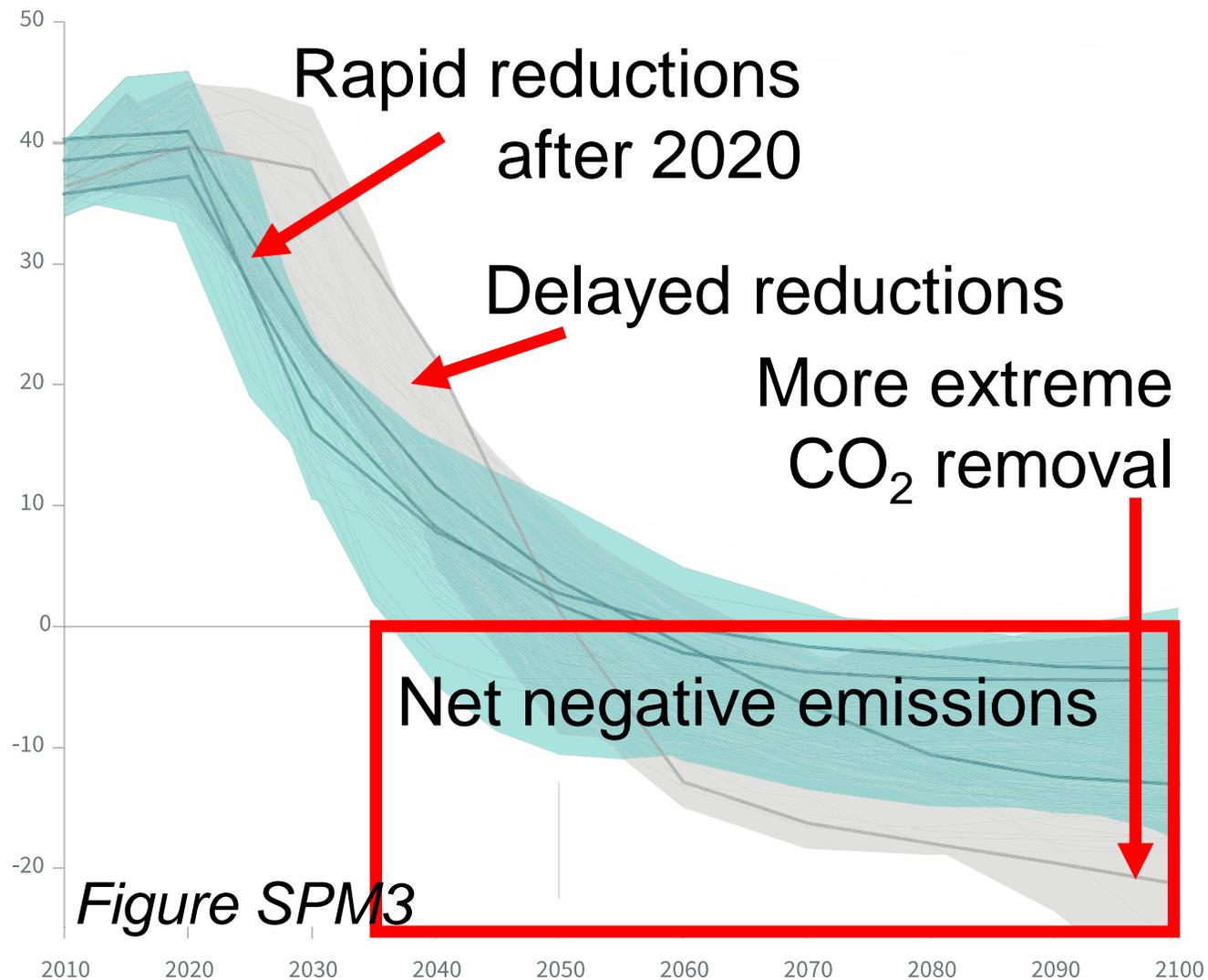


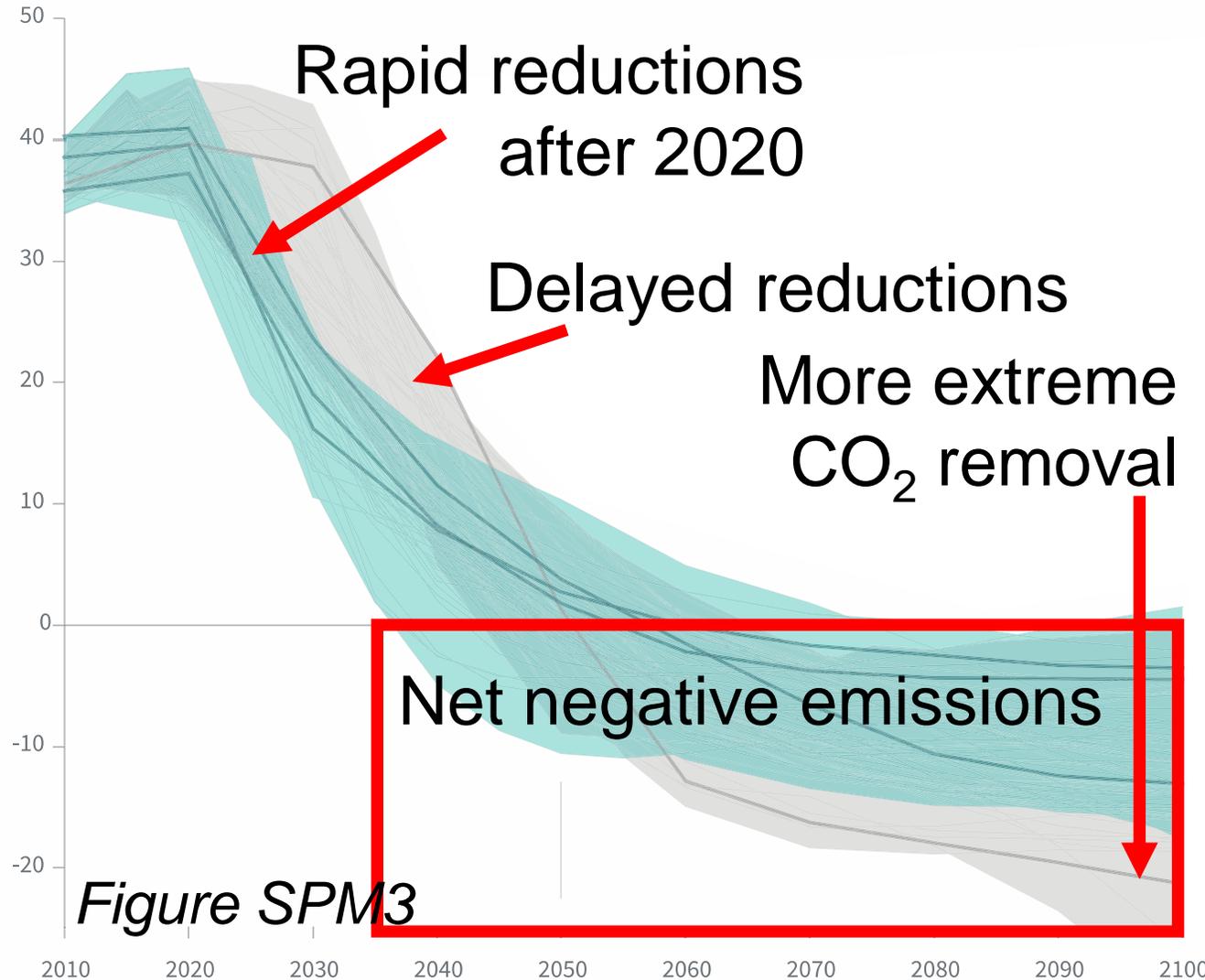
Figure SPM3

Pathways to 1.5°C

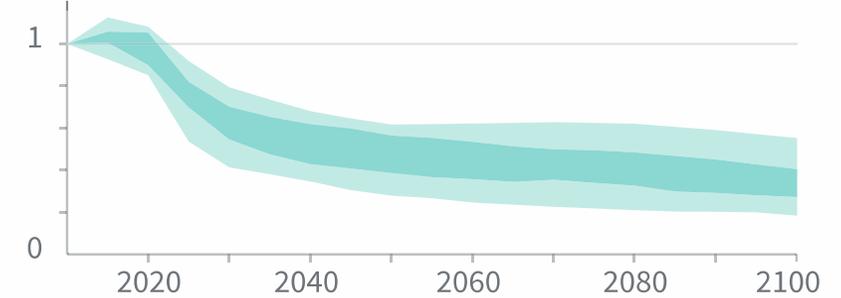
Non-CO₂ emission reductions are also critical!

Global total net CO₂ emissions

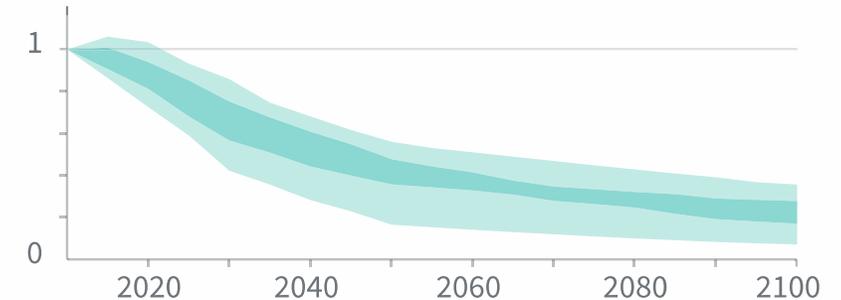
Billion tonnes of CO₂/yr



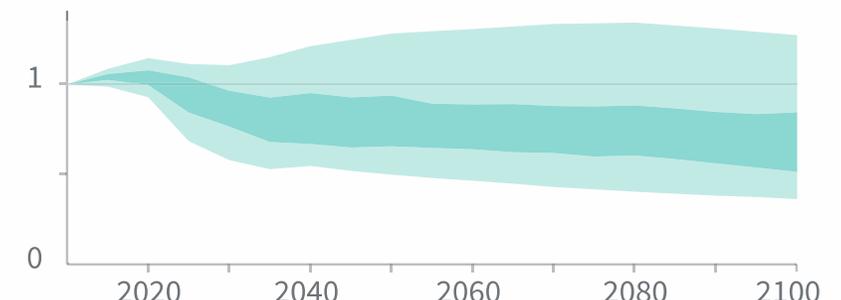
Methane emissions



Black carbon emissions

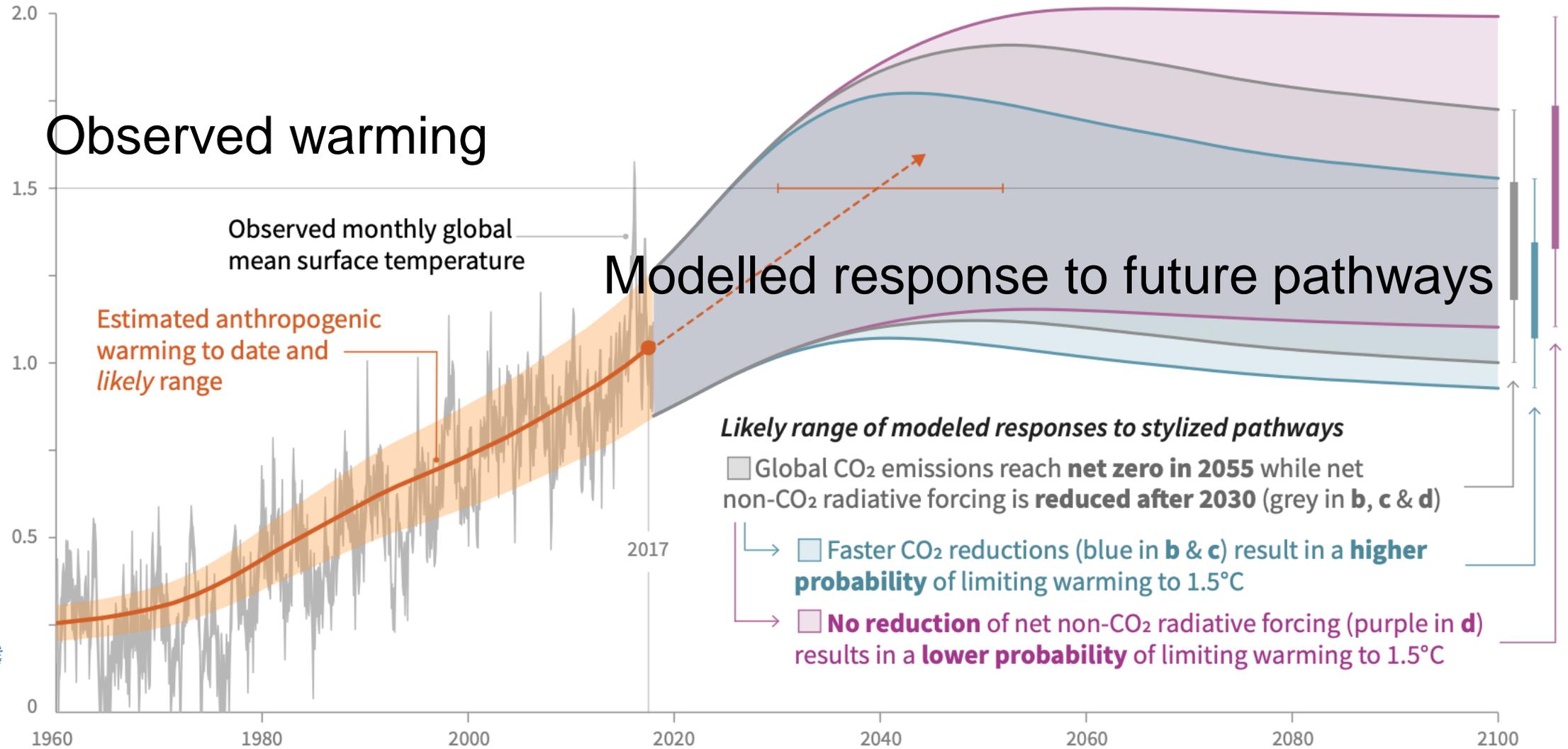


Nitrous oxide emissions



Cumulative emissions of CO₂ and future non-CO₂ radiative forcing determine the probability of limiting warming to 1.5°C

Global warming relative to 1850-1900 (°C)



Conclusions

- **Limiting global warming to 1.5°C would avoid catastrophic impacts**
 - We are already seeing some dangerous impacts at 1°C
 - > 1.5°C would cause accelerating global climate damages
- **Meeting the goals of the Paris Agreement will require rapid near-term emissions reductions**
 - **1.5°C scenarios:** net zero CO₂ emissions before 2050 + substantial reductions of other greenhouse gas emissions
 - **"Well below 2°C" scenarios:** net zero CO₂ emission after 2050 + reductions of other greenhouse gas emissions
- **Total CO₂ emissions determine future warming**
 - Slower reductions now will require faster reductions later, and likely more extreme negative emissions

Thank You

