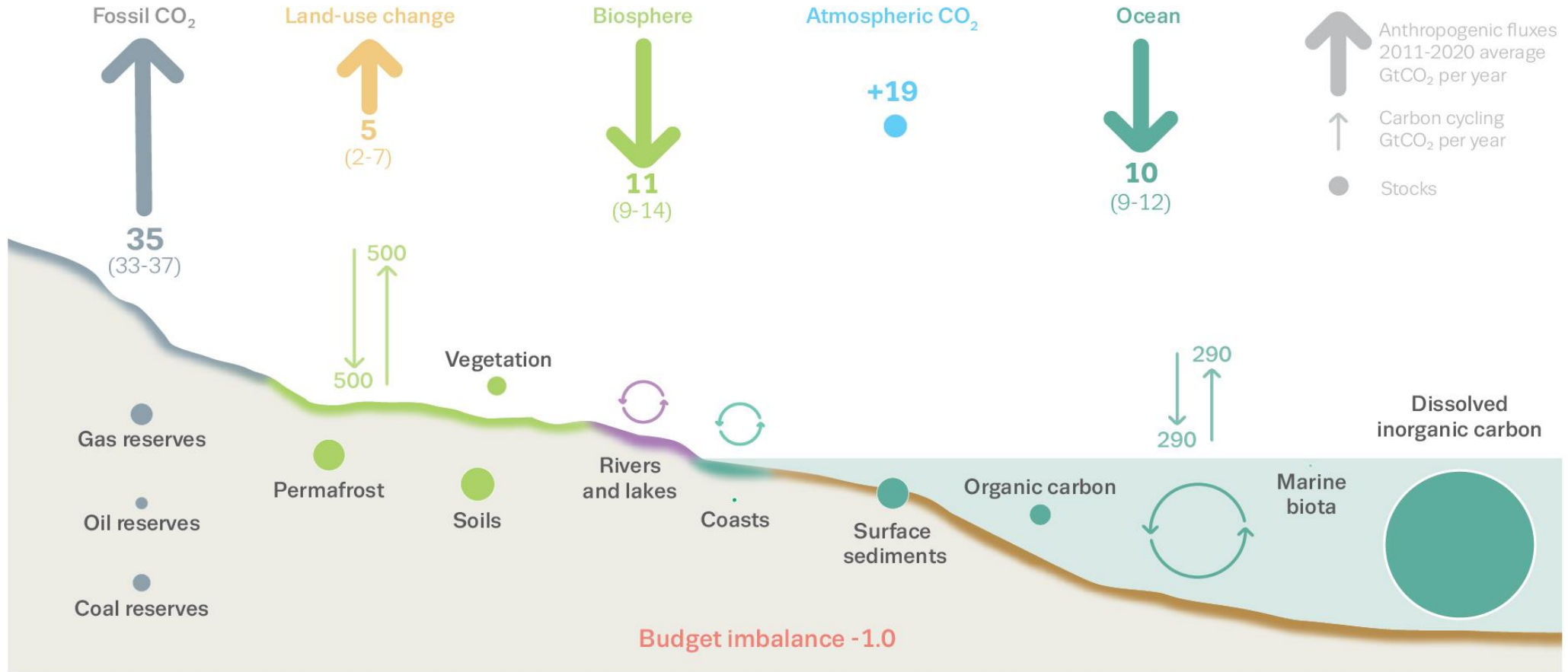




# GLOBAL CARBON **BUDGET** 2022

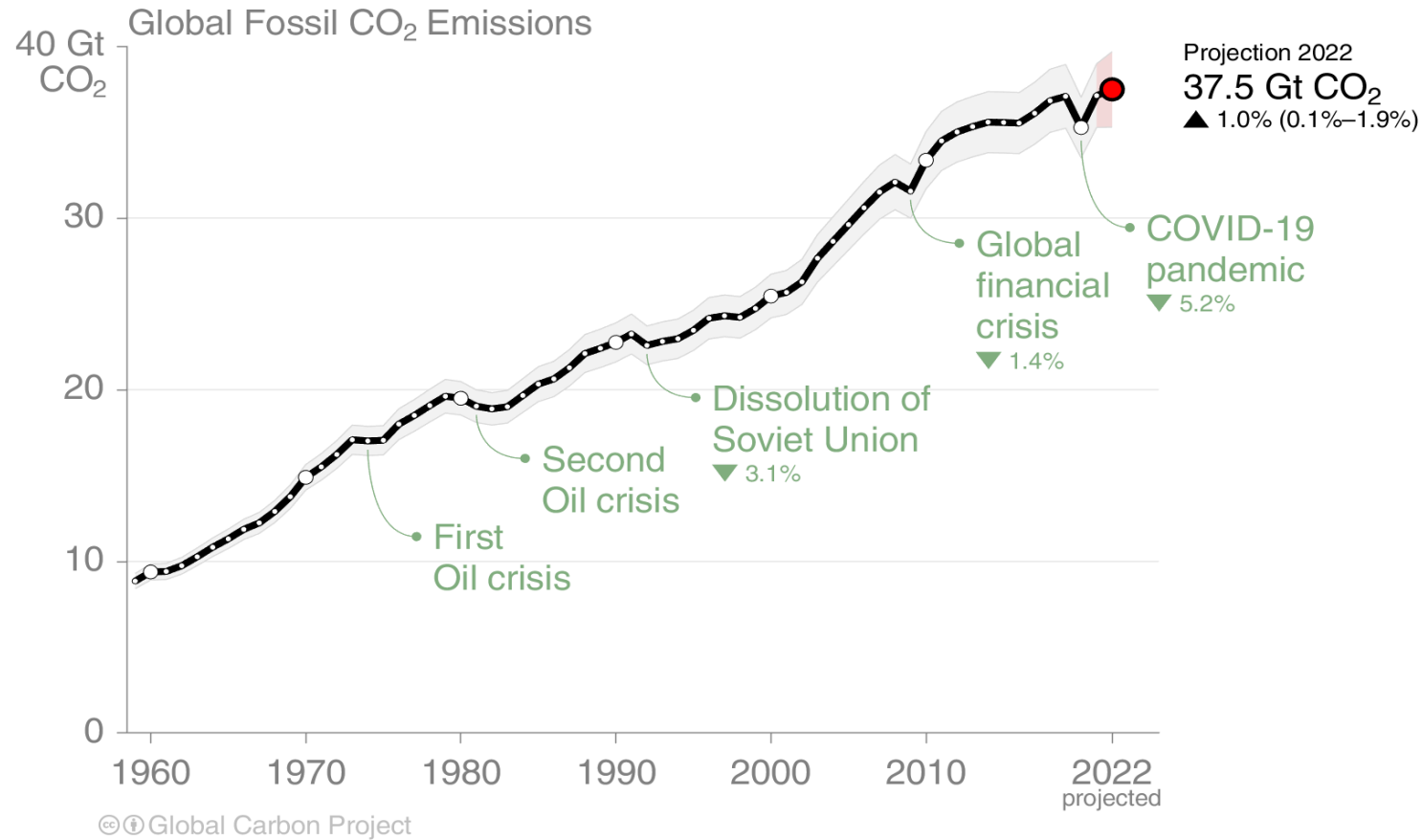
# Anthropogenic perturbation of the global carbon cycle



global annual average for the decade 2012–2021 (GtCO<sub>2</sub>/yr)

# Global Fossil CO<sub>2</sub> Emissions

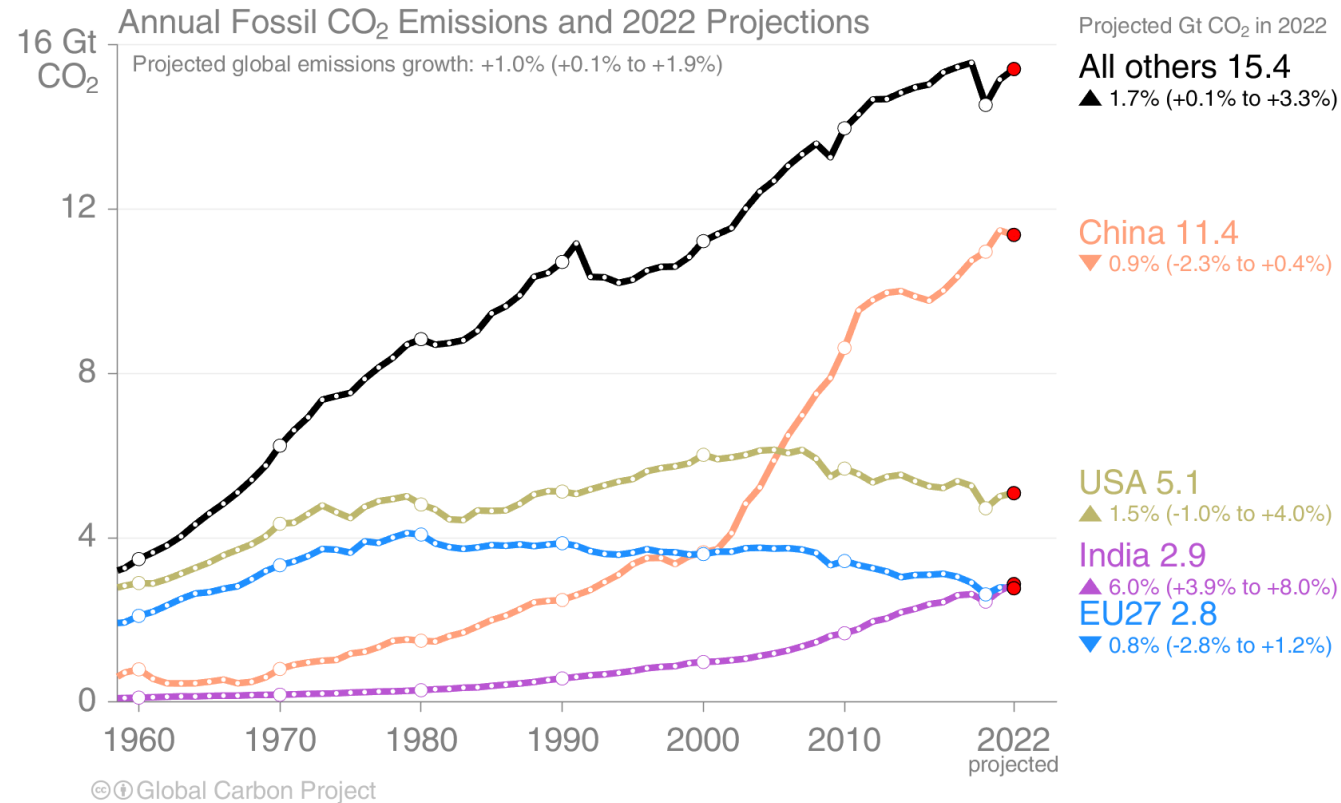
Global fossil CO<sub>2</sub> emissions have risen steadily over the last decades. Emissions are set to grow again in 2022. The rate of increase : from 3% per year in the 2000s, down to 0.5% per year in the past decade.



The 2022 projection is based on preliminary monthly data and modelling  
 When including cement carbonation, projected 2022 fossil emissions reach 36.6 GtCO<sub>2</sub>  
 Source: [Friedlingstein et al 2022](#); [Global Carbon Project 2022](#)

# Fossil CO<sub>2</sub> Emissions by country

Largest share of global fossil emissions : China (31%), USA (14%), India (8%), EU27 (8%).  
 In 2022 the largest increases are in India, Rest of World (primarily aviation), and the USA.  
 Emissions are projected to decline in China and the EU27



The 2022 projections are based on preliminary monthly data and modelling.

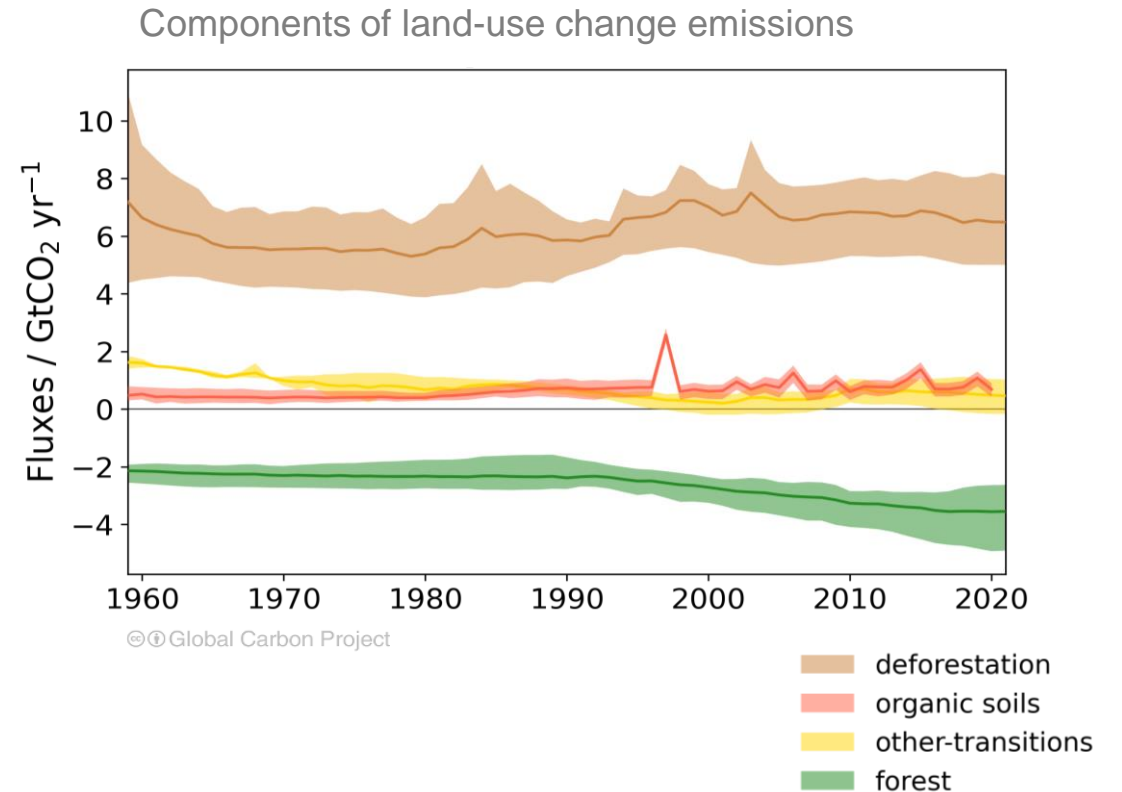
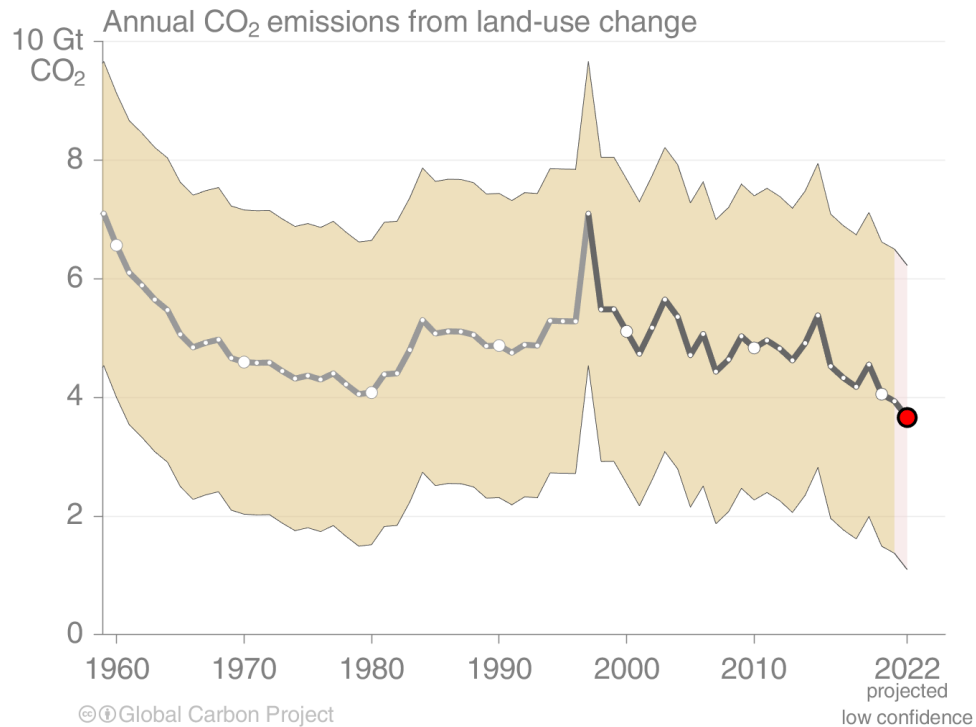
Source: [Friedlingstein et al 2022](#); [Global Carbon Project 2022](#)

# Land-use change CO<sub>2</sub> emissions

Land-use change emissions are projected to be 3.9 GtCO<sub>2</sub> in 2022, ten times less than fossil emissions.

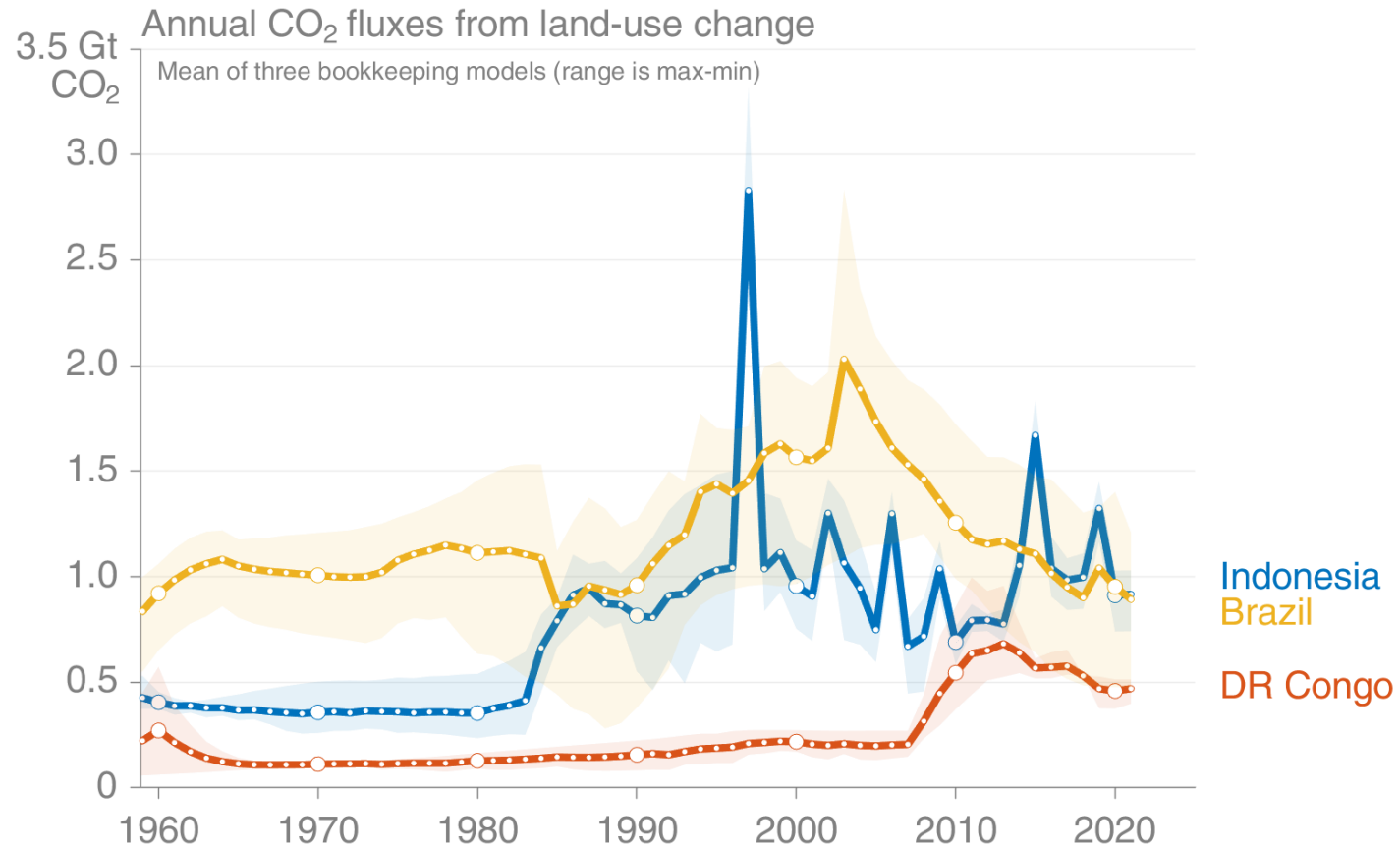
There is a small but uncertain decline in the past two decades.

Regrowth through re/afforestation counterbalance approximately half the deforestation emissions.



# Land-use change CO<sub>2</sub> emissions

Indonesia, Brazil, the Democratic Republic of the Congo combined contribute 58% of the global land-use change CO<sub>2</sub> emissions.



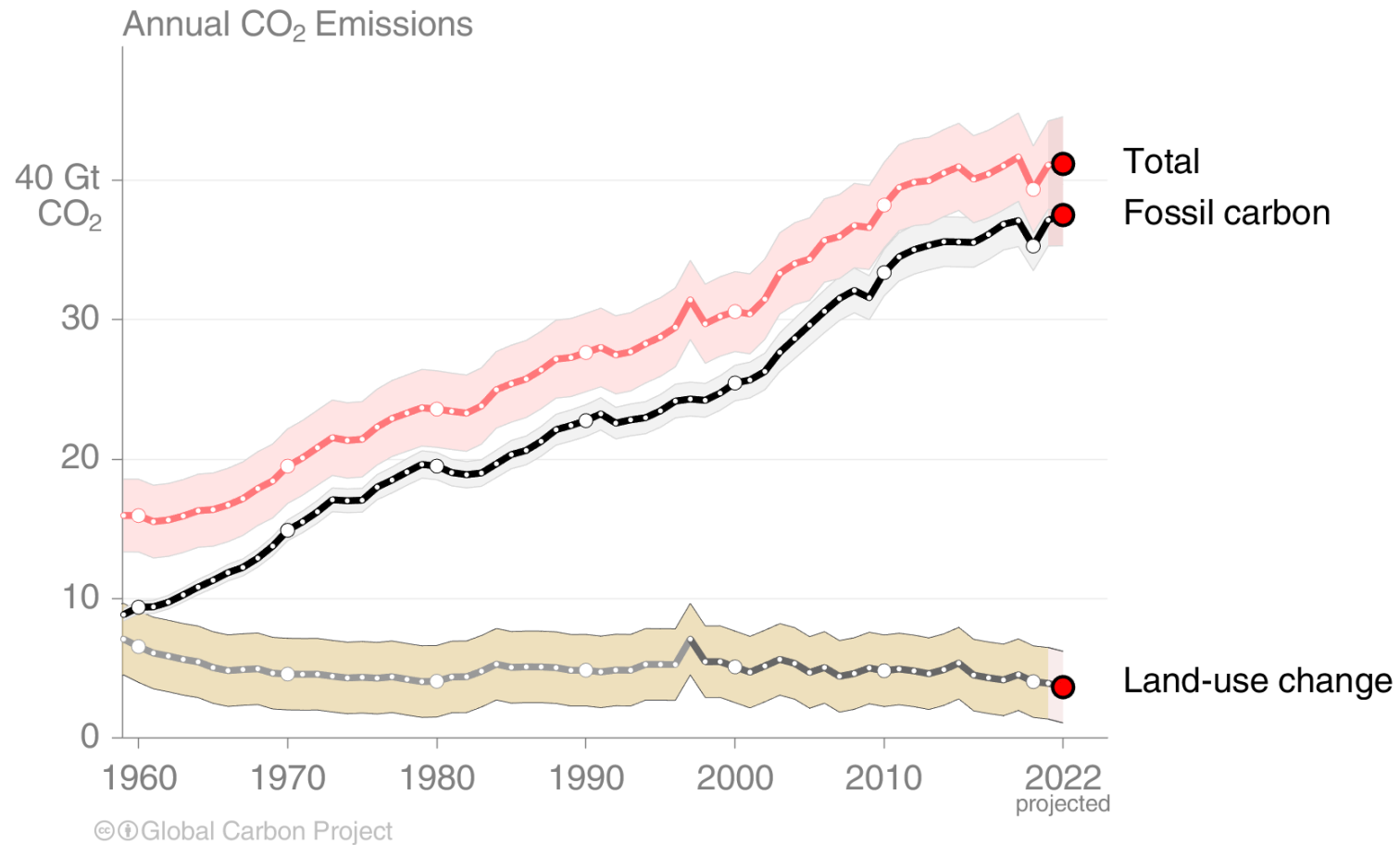
© Global Carbon Project

The peak in Indonesia in 1997 was the Indonesian peat fires  
 Estimates from three bookkeeping models

Source: [Friedlingstein et al 2022](#); [Global Carbon Project 2022](#)

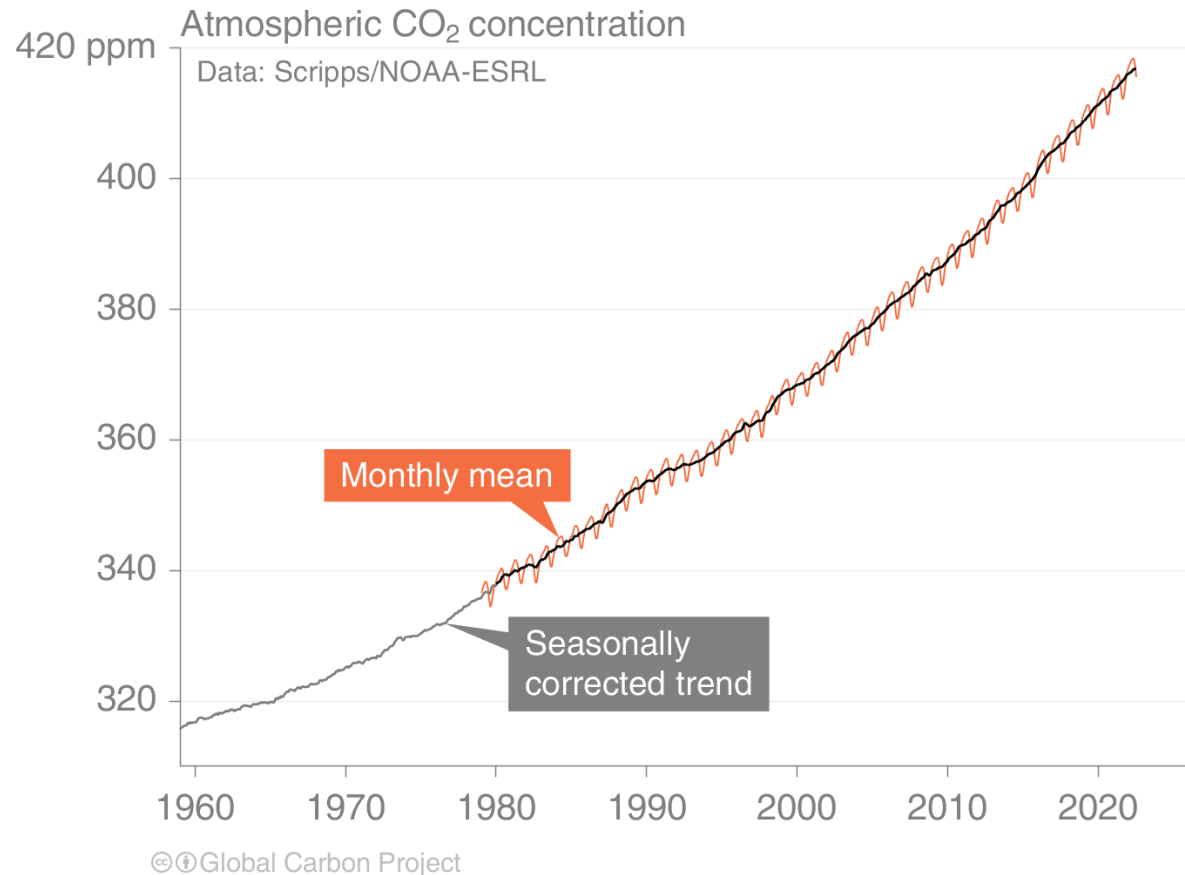
# Total global CO<sub>2</sub> emissions

Global total CO<sub>2</sub> emissions of **40.6 GtCO<sub>2</sub>** are projected for 2022.  
 Total CO<sub>2</sub> emissions remain high, approximately flat since 2015, but this trend is uncertain.



# Atmospheric CO<sub>2</sub> concentration

The global CO<sub>2</sub> concentration increased from ~277 ppm in 1750 to **417.2** ppm in 2022 (up 51%)  
 Atmospheric CO<sub>2</sub> is the main driver of climate change





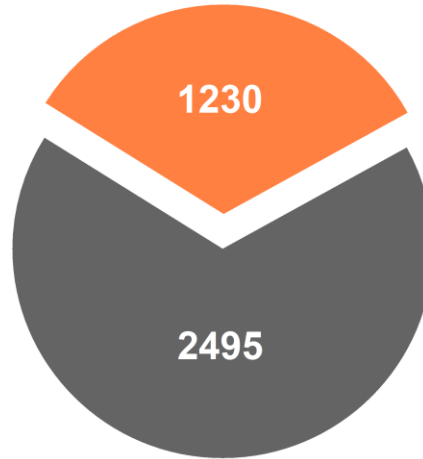
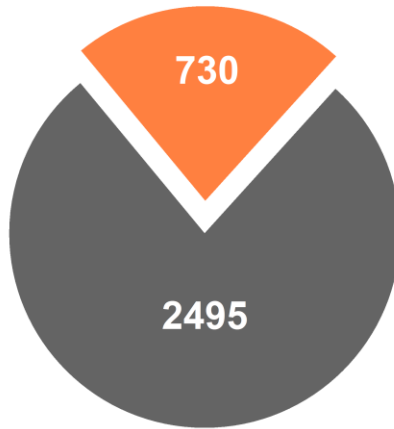
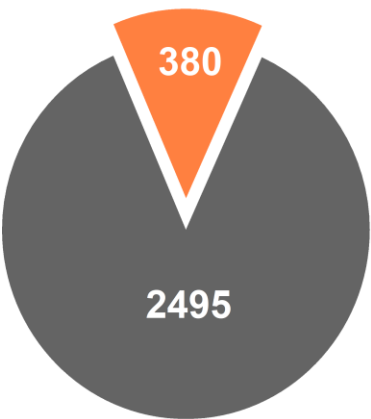
# Remaining carbon budget

The remaining carbon budget for a 50% chance to limit global warming to 1.5°C, 1.7°C and 2°C has reduced to an equivalent of **9, 18 and 30** years from 2023 (at 2022 emissions levels)

**1.5°C**  
(50% likelihood)

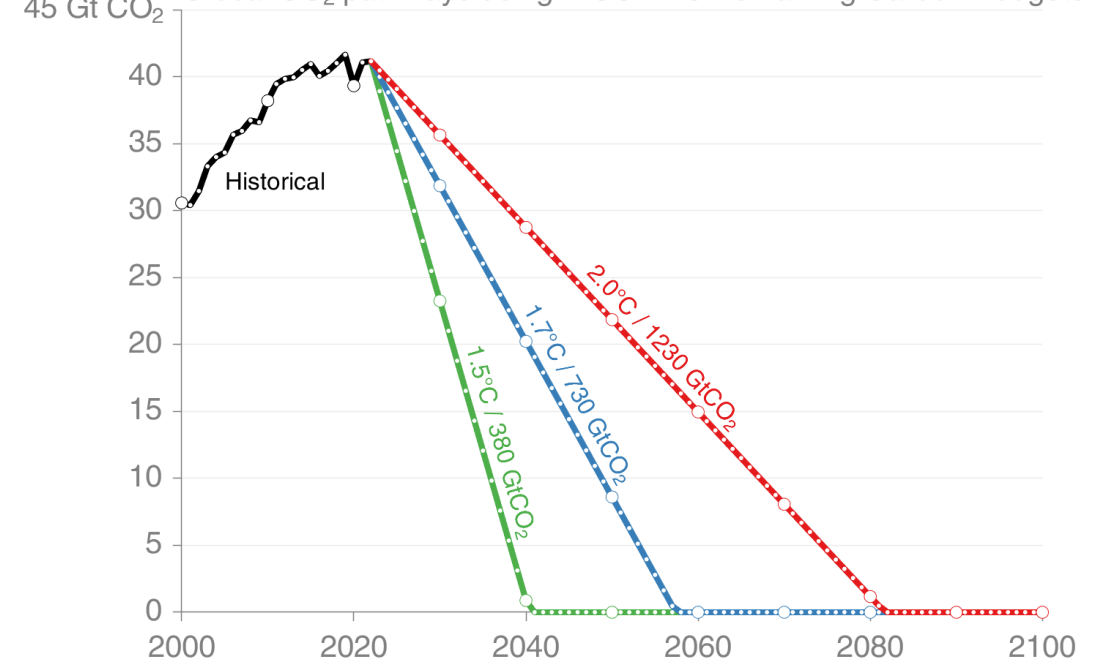
**1.7°C**  
(50% likelihood)

**2°C**  
(50% likelihood)



Gt CO<sub>2</sub> ■ Remaining ■ Consumed

Global CO<sub>2</sub> pathways using IPCC AR6 Remaining Carbon Budgets



© Global Carbon Project

Quantities are subject to additional uncertainties e.g., future mitigation choices of non-CO<sub>2</sub> emissions.

Source: IPCC AR6 WG1; [Friedlingstein et al 2022](#); [Global Carbon Budget 2022](#)

# Acknowledgements

The work presented in the **Global Carbon Budget 2022** has been possible thanks to the contributions of **hundreds of people** involved in observational networks, modeling, and synthesis efforts.

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<https://essd.copernicus.org/articles/14/4811/2022/>

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