



# Faith & Climate COP 29:

The importance of engaging faith communities in curbing climate change, and calling for world leaders to act



**15TH NOVEMBER 2024**  
**BIRKENHEAD TOWN HALL**  
6.00-8.00p.m.

Bringing people together to discuss the COP 29 Faith & Climate goals

Learn, discuss and explore how we can make a difference in our faith communities, working together and supporting each other to address climate change

Please pre-book <https://bit.ly/CWCOP29>



# Climate Change: How can we tell it's happening. Can it be reversed?

Andy Morse

Professor of Climate Impacts, University of Liverpool

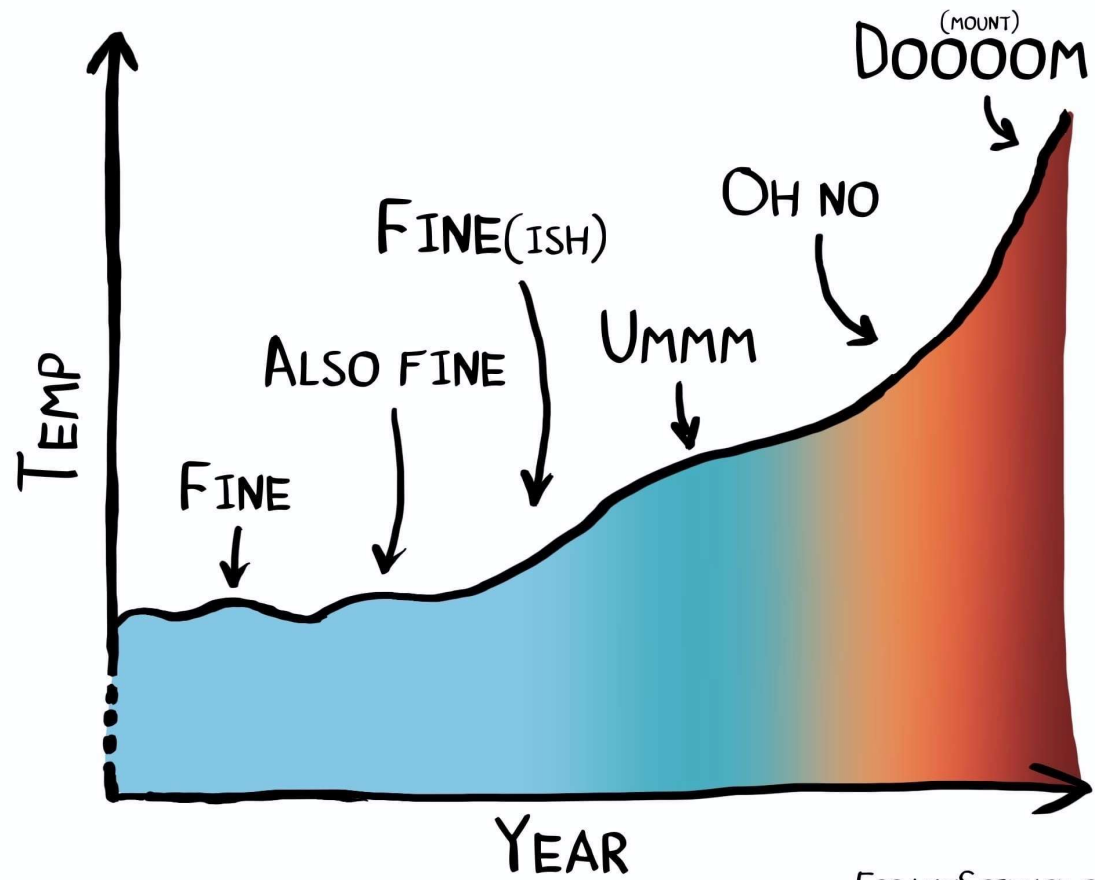
[A.P.Morse@liverpool.ac.uk](mailto:A.P.Morse@liverpool.ac.uk)

@AndyMorse @livuniwx

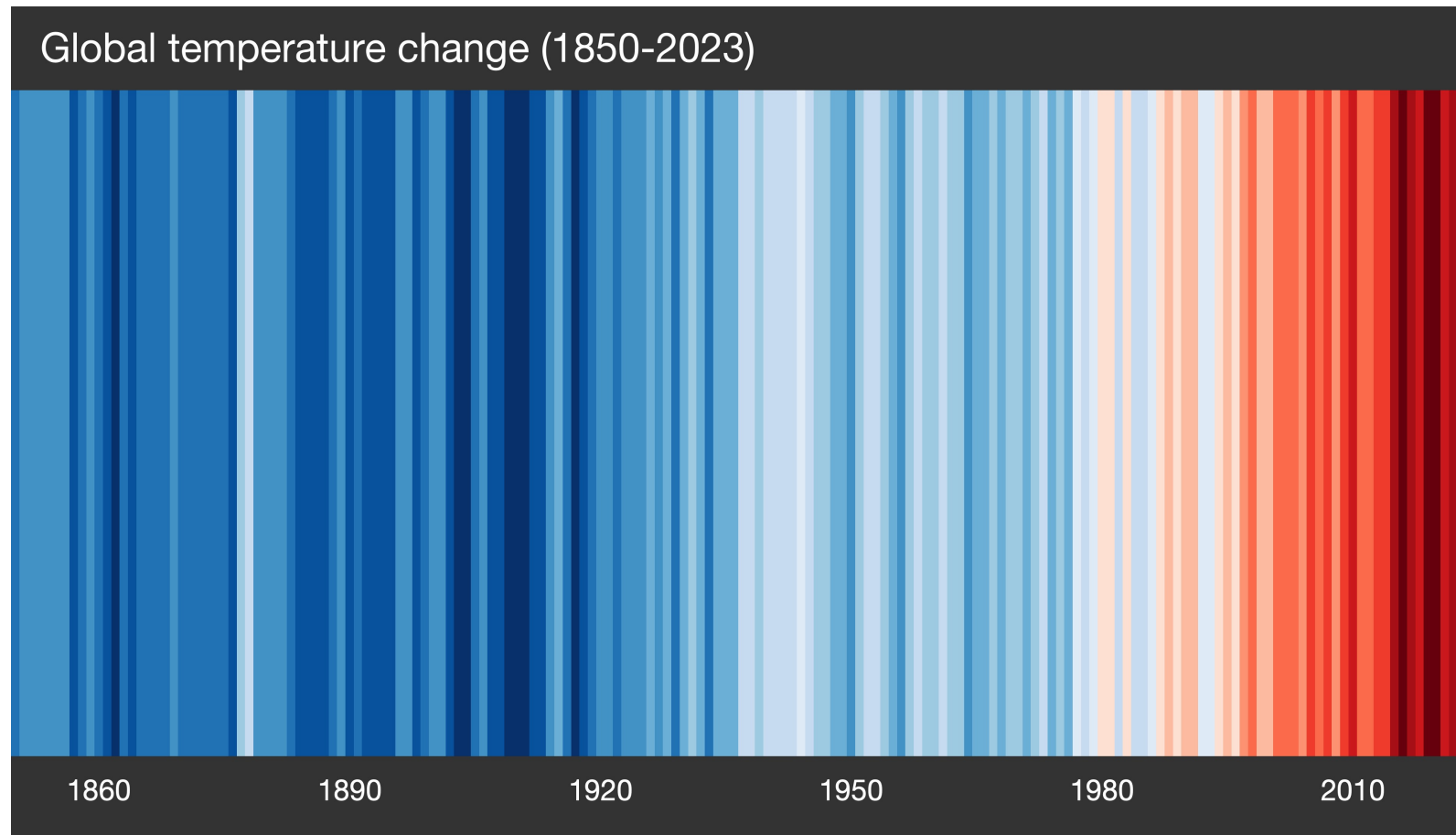
Future Earth Health : Knowledge Action Network

<https://futureearth.org/networks/knowledge-action-networks/health/>

# ONE PANEL GUIDE TO... GLOBAL WORLD TEMPERATURE

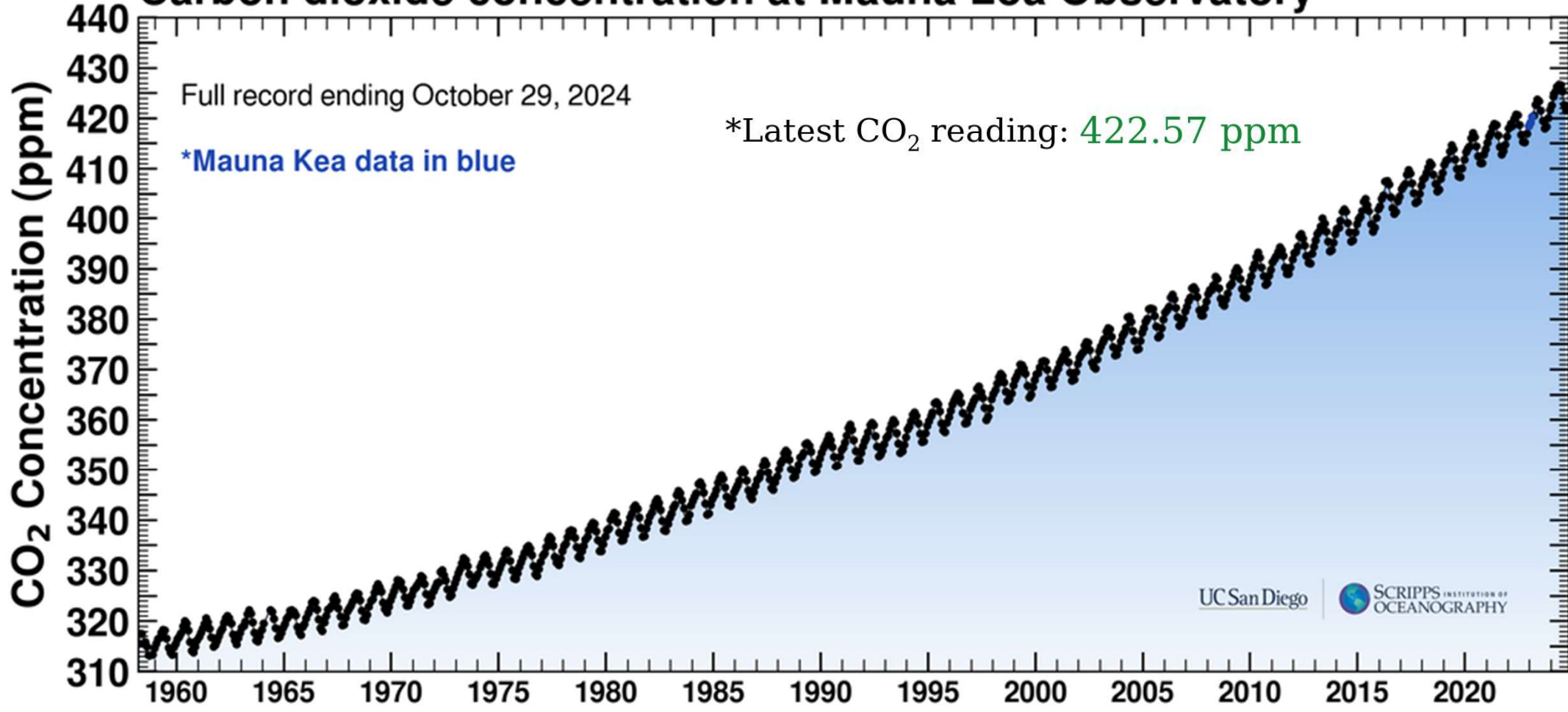


## Warming Stripes for GLOBE from 1850-2023



<https://showyourstripes.info/>

# Carbon dioxide concentration at Mauna Loa Observatory\*



<https://keelingcurve.ucsd.edu/>

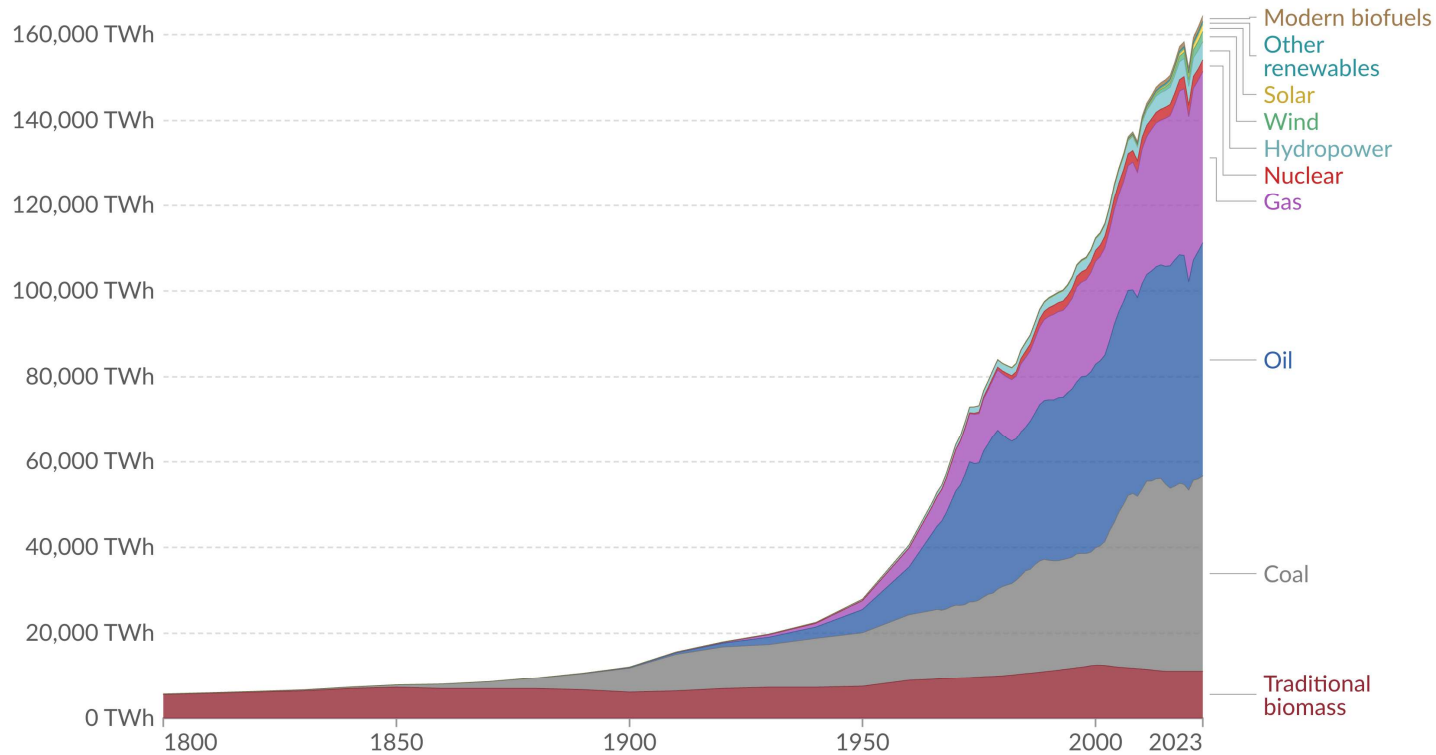
# Global direct primary energy consumption



Energy consumption is measured in terawatt-hours<sup>1</sup>, in terms of direct primary energy<sup>2</sup>. This means that fossil fuels include the energy lost due to inefficiencies in energy production.

Primary energy consumption

<https://ourworldindata.org/grapher/global-primary-energy>



Data source: Energy Institute - Statistical Review of World Energy (2024); Smil (2017)

OurWorldinData.org/energy | CC BY

Note: In the absence of more recent data, traditional biomass is assumed constant since 2015.

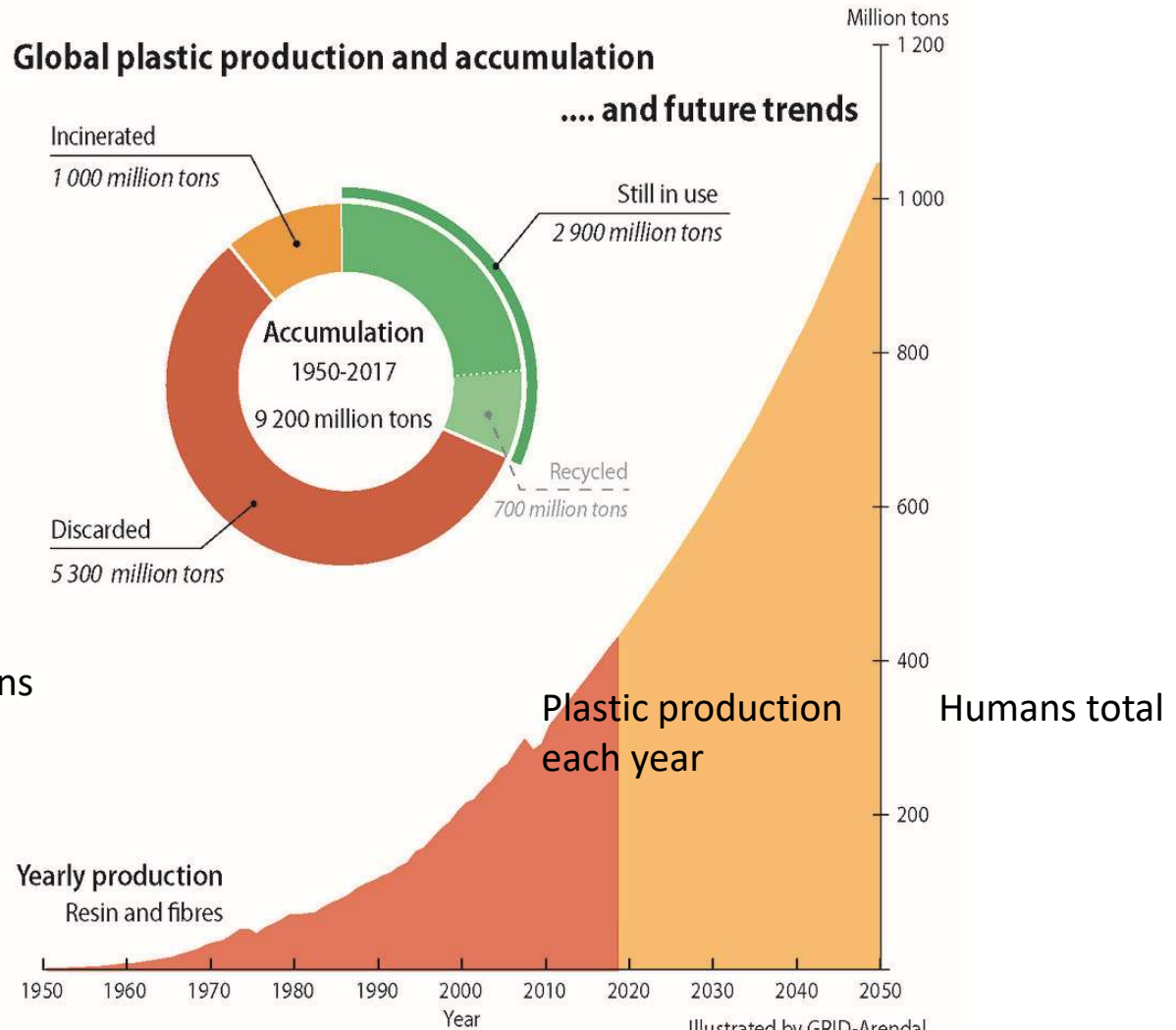
1. **Watt-hour:** A watt-hour is the energy delivered by one watt of power for one hour. Since one watt is equivalent to one joule per second, a watt-hour is equivalent to 3600 joules of energy. Metric prefixes are used for multiples of the unit, usually: - kilowatt-hours (kWh), or a thousand watt-hours. - Megawatt-hours (MWh), or a million watt-hours. - Gigawatt-hours (GWh), or a billion watt-hours. - Terawatt-hours (TWh), or a trillion watt-hours.

2. **Primary energy:** Primary energy is the energy available as resources – such as the fuels burnt in power plants – before it has been transformed.

## Global plastic production and accumulation

<https://www.grida.no/resources/15041>

Humans 390 million tons  
 Domesticated mammals 630 million tons  
 Wild land mammals 22 million tons  
 Wild sea mammals 40 million tons



UNEP (2021). From Pollution to Solution: A global assessment of marine litter and plastic pollution. Nairobi.

# WMO State of the Climate 2024 Update for COP29

11 November 2024

The WMO update for COP29 confirms that 2024 is set to be the warmest year on record.

January - September 2024 global average temperature 1.54 (+/- 0.13) °C above the pre-industrial 1850-1900 baseline.

Long-term warming measured over decades remains below 1.5° C

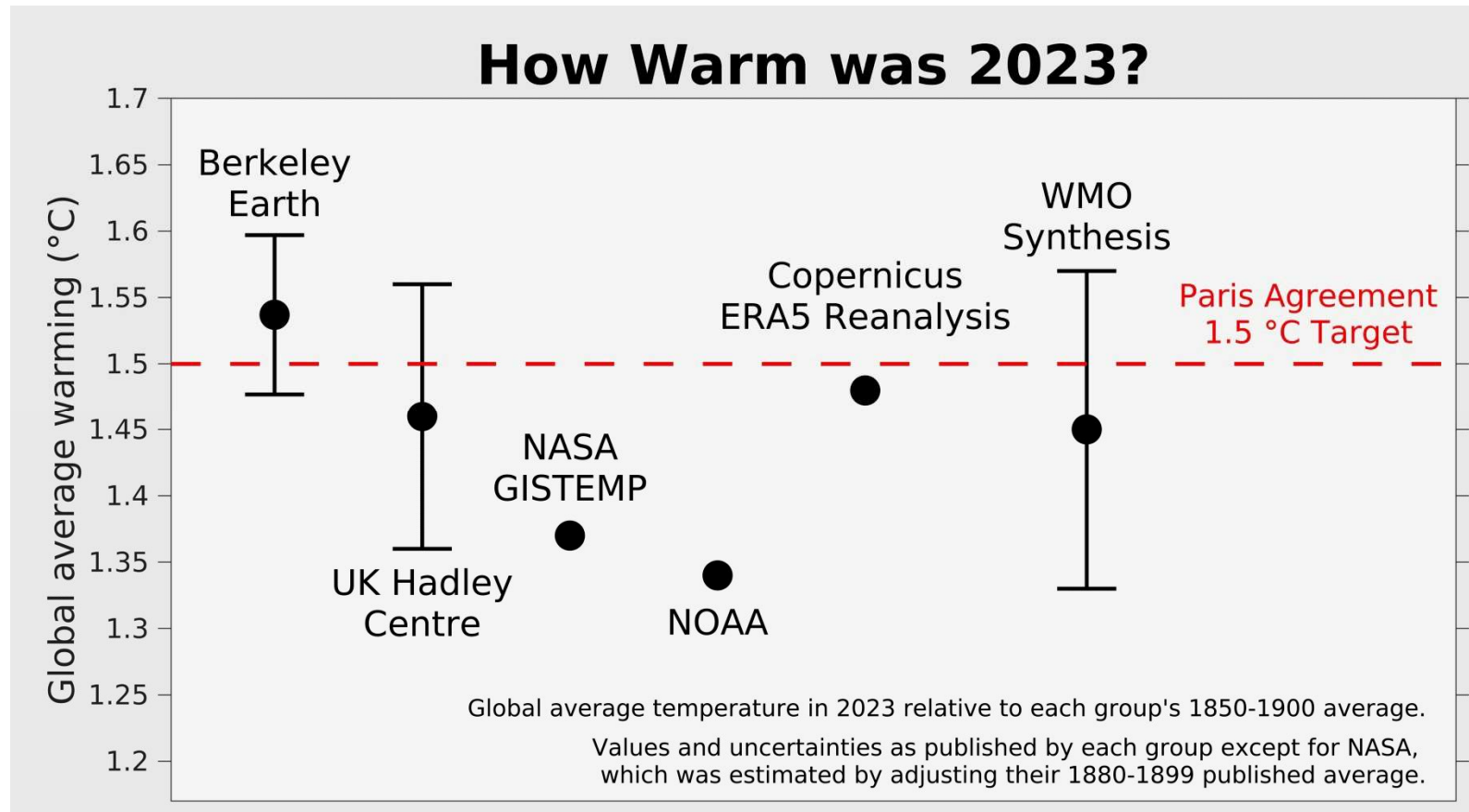
Past 10 years are warmest on record and ocean heat rises

Extreme weather and climate events lead to massive economic and human losses

<https://library.wmo.int/records/item/69075-state-of-the-climate-2024>

[@RARohde](#)

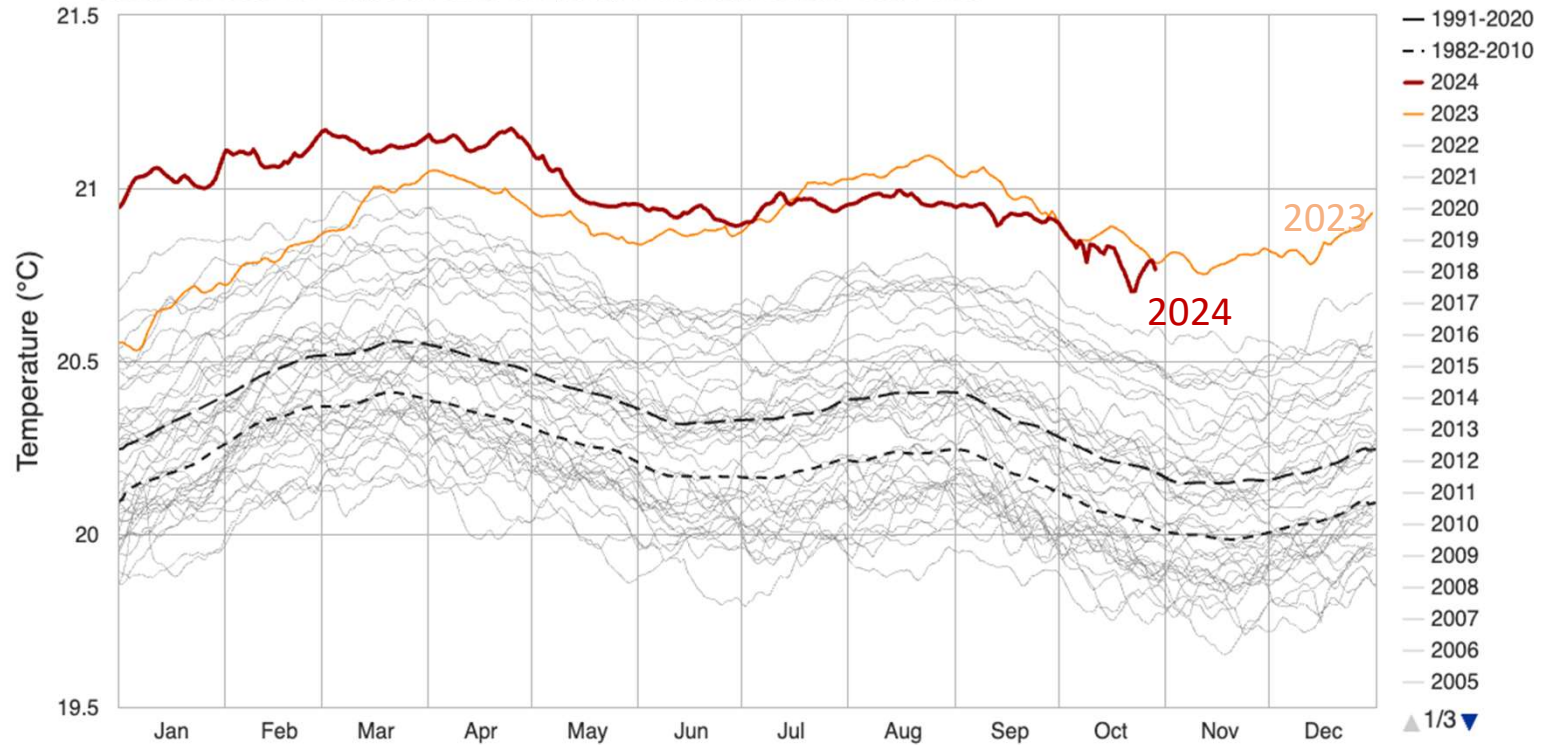
Robert Rohde <https://berkeleyearth.org/team/#robert-rohde>



## Sea Surface Temperatures 1981-2024 to date with 1982-2010, 1991-2020 mean

### Daily Sea Surface Temperature, World (60°S–60°N, 0–360°E)

Dataset: NOAA OISST V2.1 | Image Credit: ClimateReanalyzer.org, Climate Change Institute, University of Maine



- Ocean stores **91% excess heat energy** due to global heating.
- **Upper oceans** (to 700m depth) contain **63%** of the total global excess heat 1971-2010

NOAA, September 2023

<https://www.climate.gov/news-features/understanding-climate/climate-change-ocean-heat-content>

[https://climatereanalyzer.org/clim/sst\\_daily/](https://climatereanalyzer.org/clim/sst_daily/)

Figure SPM.10

# IPCC AR6 WG1 SPM

## Every tonne of CO<sub>2</sub> emissions adds to global warming

Global surface temperature increase since 1850–1900 (°C) as a function of cumulative CO<sub>2</sub> emissions (GtCO<sub>2</sub>)

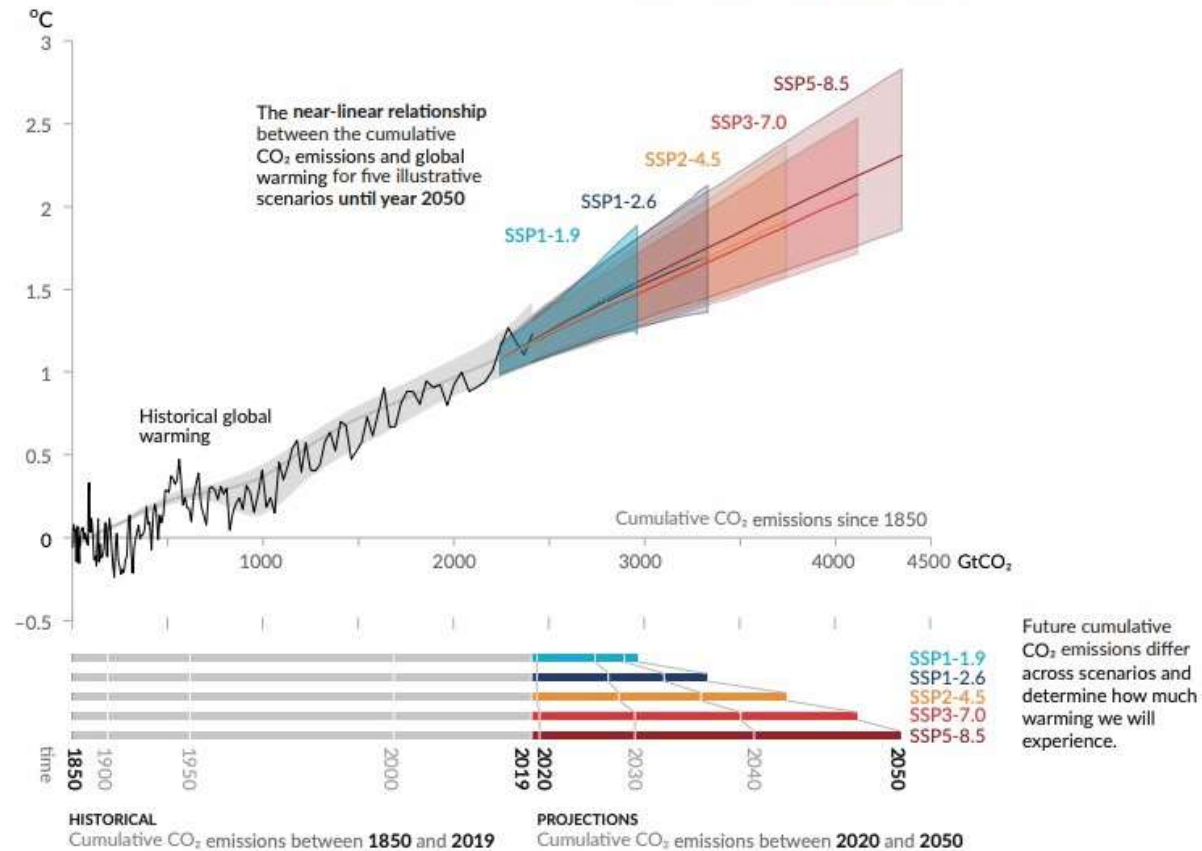


Figure SPM.10 | Near-linear relationship between cumulative CO<sub>2</sub> emissions and the increase in global surface temperature

Figure SYR SPM Fig 5 (part of)

# IPCC AR6 SYR SPM

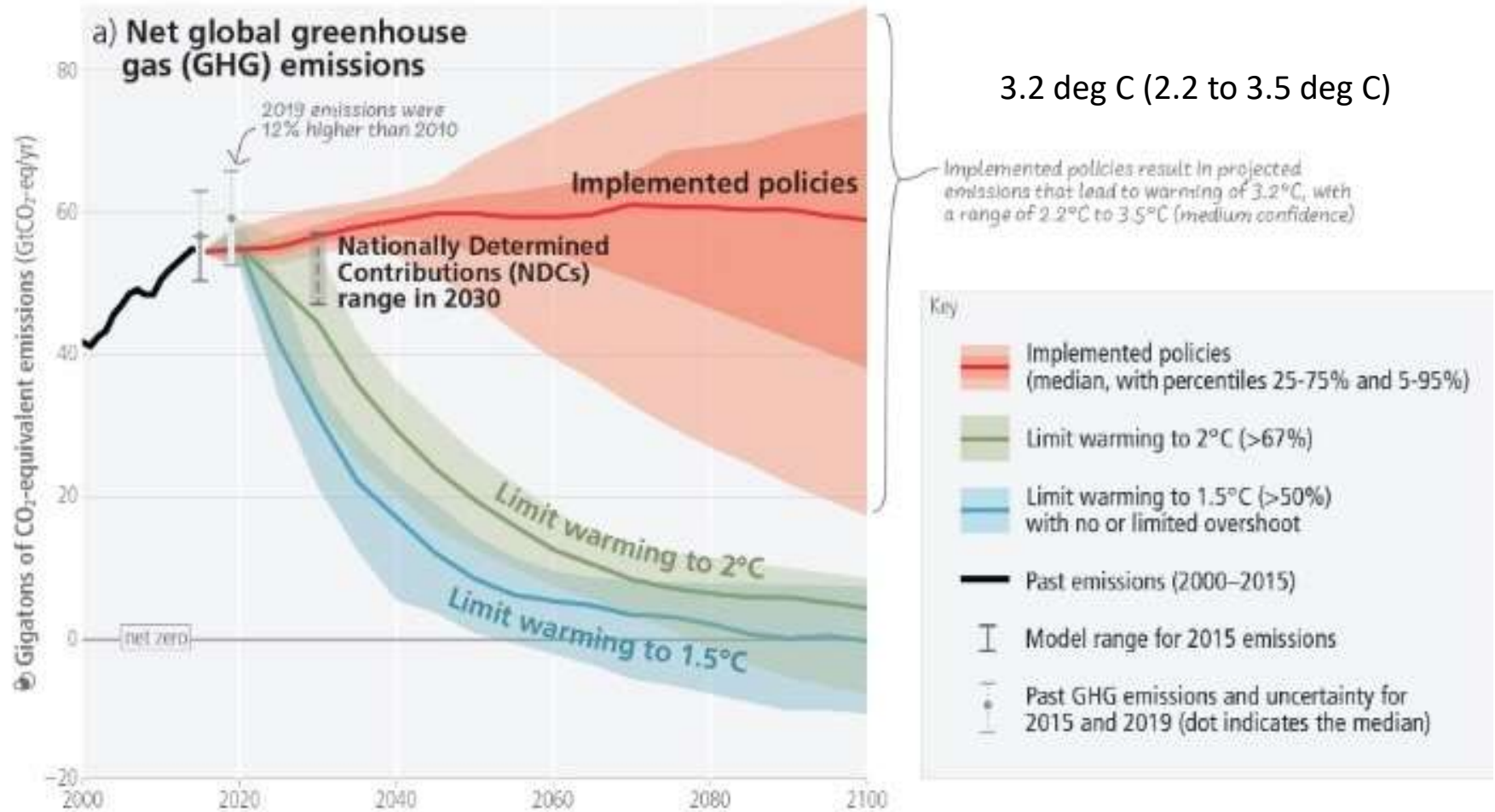
Net zero CO<sub>2</sub> and net zero GHG emissions can be achieved through strong reductions across all sectors

UK net zero by 2050, 68% reduction by 2030

<https://commonlibrary.parliament.uk/research-briefings/cbp-9888/>

AR6 Synthesis Report

<https://www.ipcc.ch/report/sixth-assessment-report-cycle/>



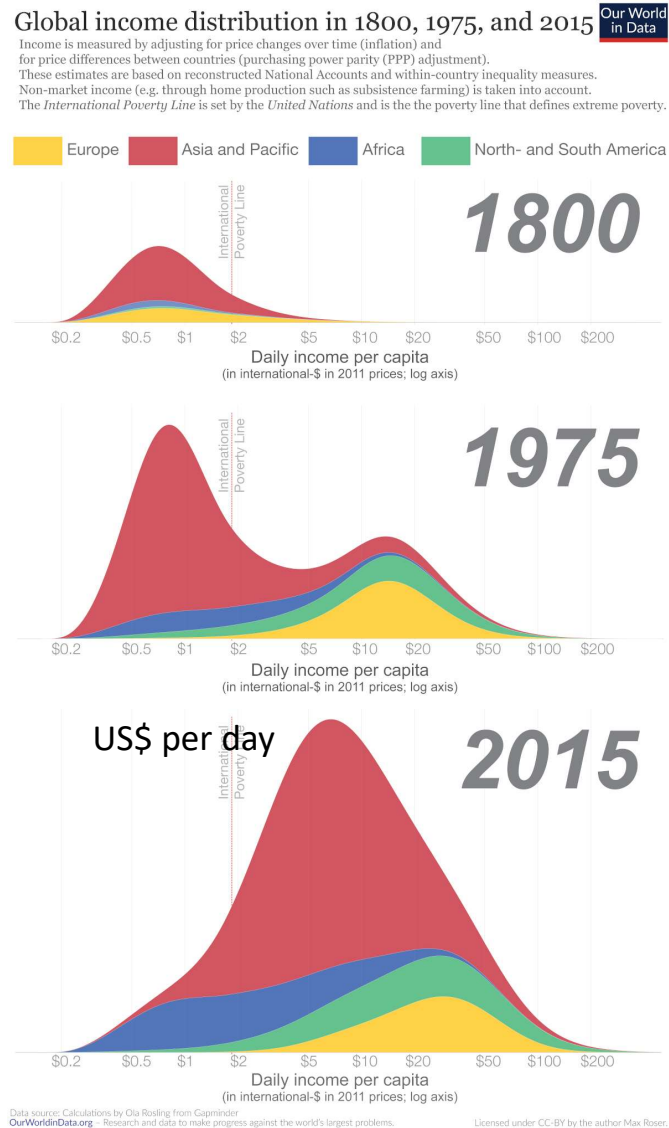
Reduction in abject poverty globally has resulted from the use of fossil fuels

Ending extreme poverty has a negligible impact on global greenhouse gas emissions. Wollburg et al. 2023 Nature.

<https://doi.org/10.1038/s41586-023-06679-0>

Values adjusted for inflation and as PPP

[Visualizing Global Income Distribution Over 200 Years - Visual Capitalist](#)



## Summarizing

- Humans have caused climate change. **Natural causes cannot explain the particularly rapid warming seen over the last century**, UN's climate body, the Intergovernmental Panel on Climate Change (IPCC).
- Temperatures will **stop rising in a few years or decades** (net zero emissions)—takes centuries for them to fall back to pre-industry levels. [climate.mit.edu](https://climate.mit.edu)
- We can **slow and then stabilize global warming** – move to net zero carbon as quickly as possible.
- We need to reduce over consumption and waste. **Fight inequality but with zero net carbon solutions**. Can we replace material greed with fulfilment in other ways?
- Climate Change a really simple guide <https://www.bbc.co.uk/news/science-environment-24021772>

# And Finally

<https://www.bbc.co.uk/programmes/m0024vv1>

Tuesday 12 November  
2024

14:15 BBC Radio 4.

Then on BBC Sounds.

<https://www.bbc.co.uk/sounds/m0024vv1>

The screenshot shows the BBC Radio 4 website interface for the program 'The Mosquito'. At the top, it says 'RADIO 4 Drama on 4' with navigation links for 'Home', 'Episodes', and 'Podcast'. The main banner features a close-up image of a mosquito with the BBC logo and the title 'THE MOSQUITO'. Below the banner, it states 'This programme will be available shortly after broadcast' with a '4' icon. The program title 'The Mosquito' is displayed in large white text, followed by a description: 'A new satire from award winning writer Anita Sullivan, set at a fictional COP conference, with a talking Mosquito. Developed with leading climate scientists.' The broadcast date '12 November 2024' and duration '44 minutes' are also shown. On the right side, there is a 'On radio' section showing the broadcast time 'Tue 12 Nov 2024 14:15' on 'BBC RADIO 4'. Below that, a 'More episodes' section lists 'PREVIOUS Life and Time Part Two: Forty Minutes' and 'NEXT If It Kills Me', with a link to 'See all episodes from Drama on 4'.



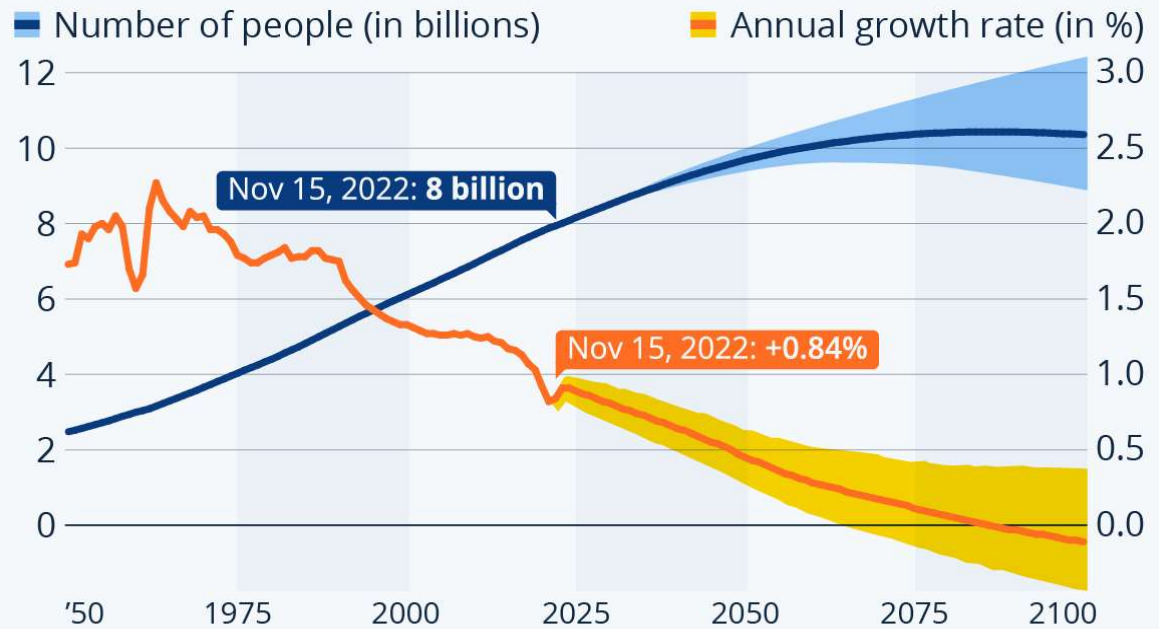
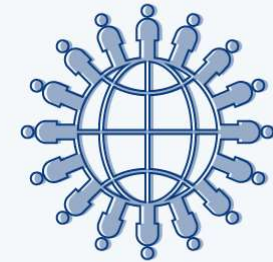
<https://www.statista.com/chart/28744/world-population-growth-timeline-and-forecast/>

Country	Annual Tons of Carbon Emissions per Capita 2022
USA	14.6
UK	5
Kenya	0.4

**USA/Kenya = 36.5**

# World Population Reaches 8 Billion

(Forecast) number of people on Earth and annual growth rate of the world population



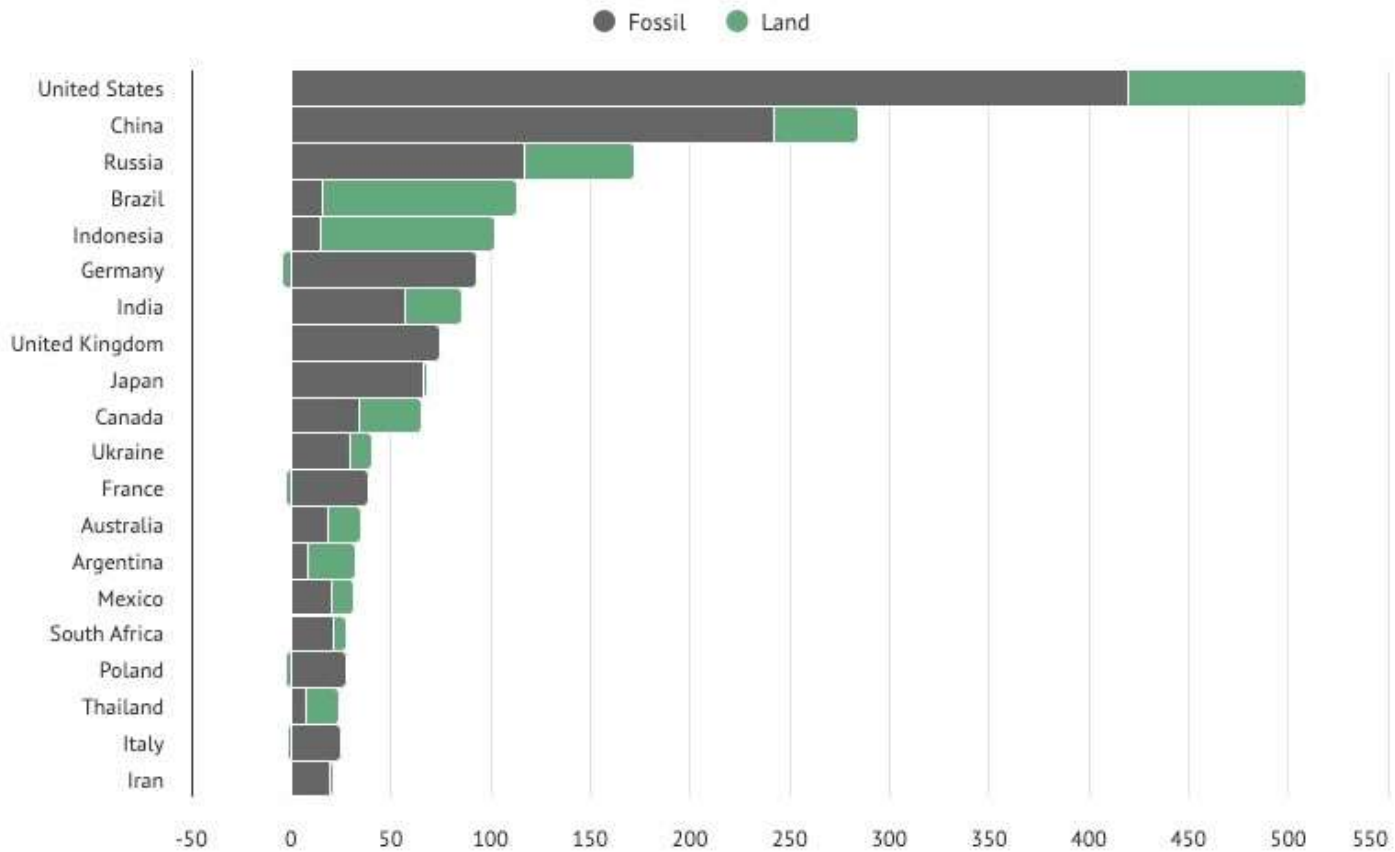
Forecast from 2022 according to the medium scenario with moderate fertility  
Source: UN Population Division



## The countries with the largest cumulative emissions 1850-2021

Billions of tonnes of CO2 from fossil fuels, cement, land use and forestry

Cumulative emissions

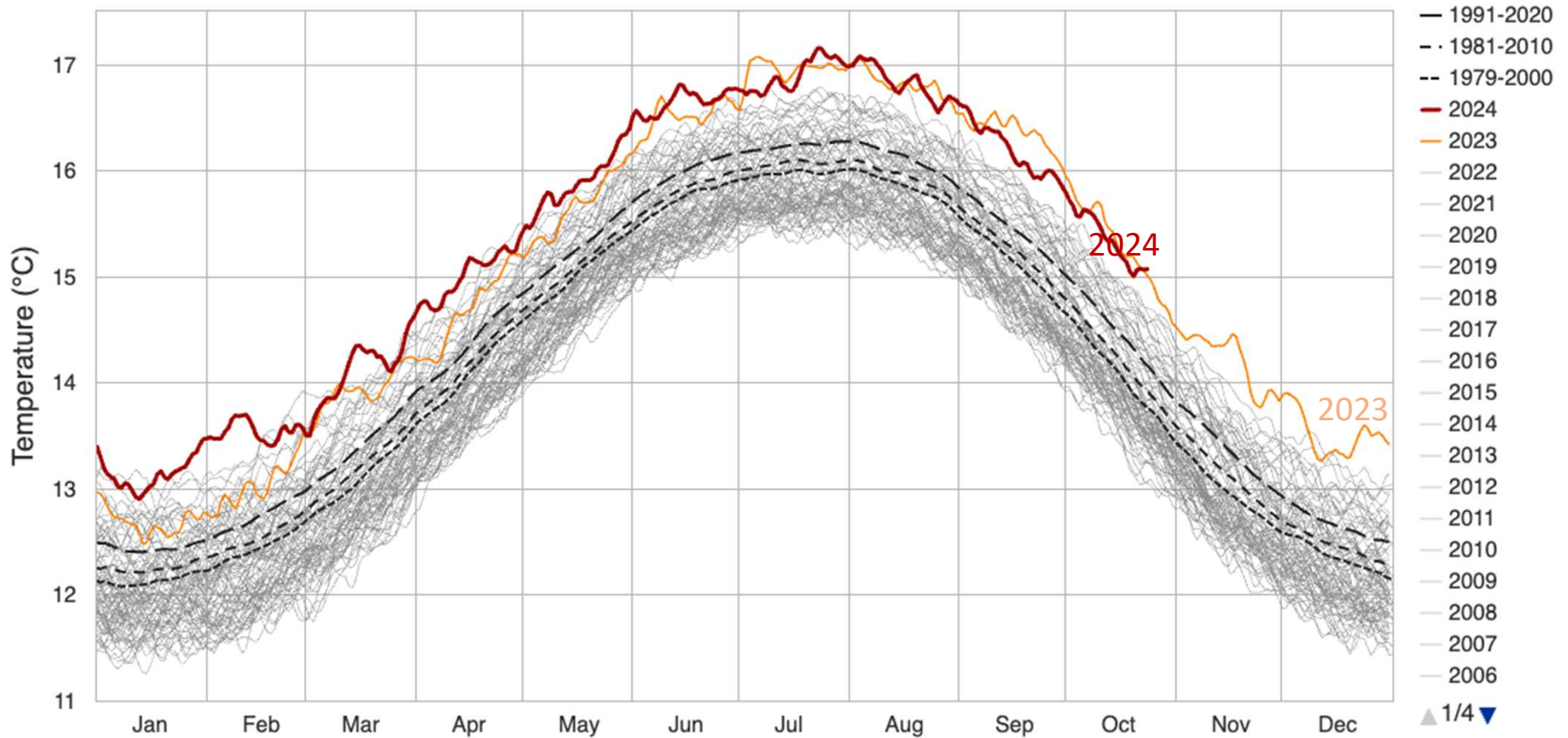


<https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/>

# Surface Air Temperatures 1981-2023 with 1982-2010, 1991-2020 mean

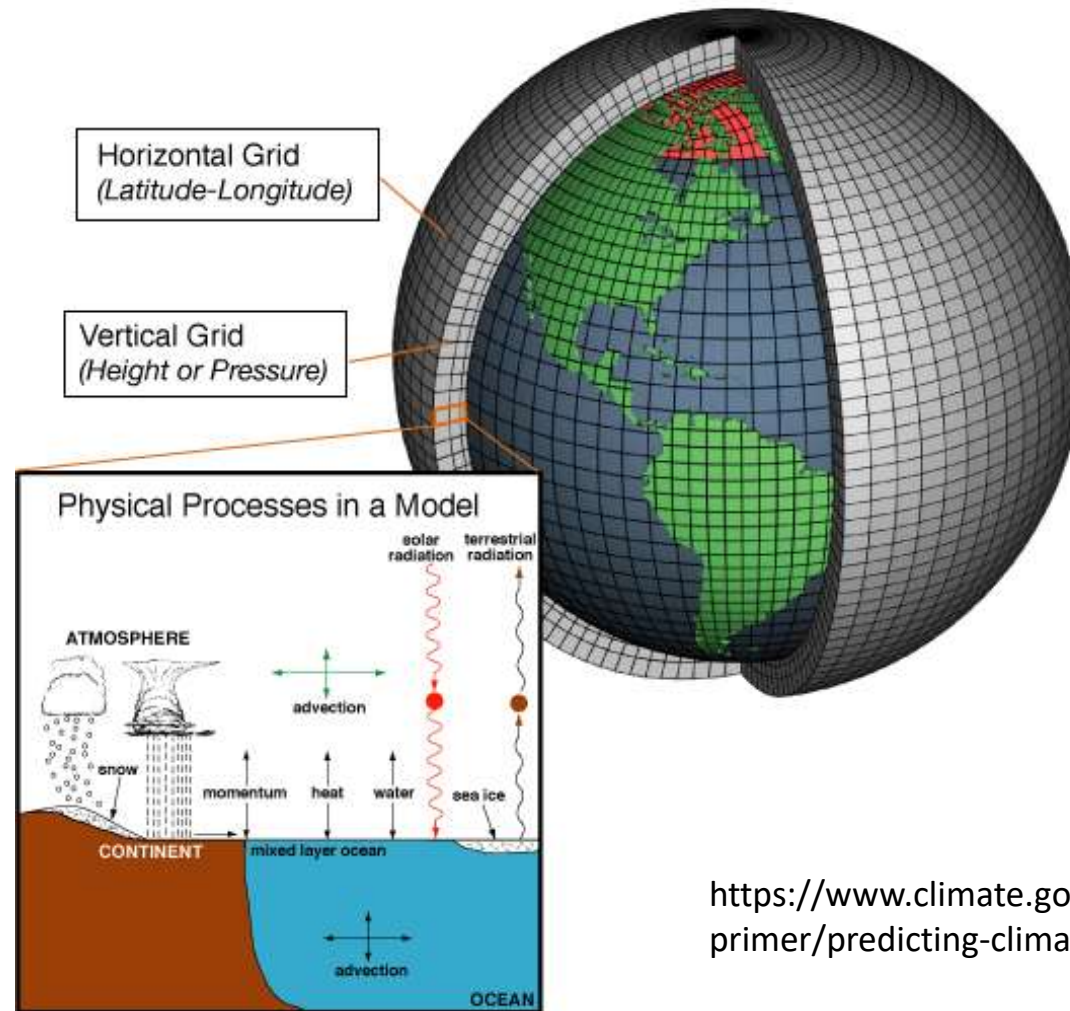
## Daily Surface Air Temperature, World (90°S–90°N, 0–360°E)

Dataset: ECMWF Reanalysis v5 (ERA5) downloaded from C3S | Image Credit: ClimateReanalyzer.org, Climate Change Institute, University of Maine



[https://climatereanalyzer.org/clim/t2\\_daily/?dm\\_id=world](https://climatereanalyzer.org/clim/t2_daily/?dm_id=world)

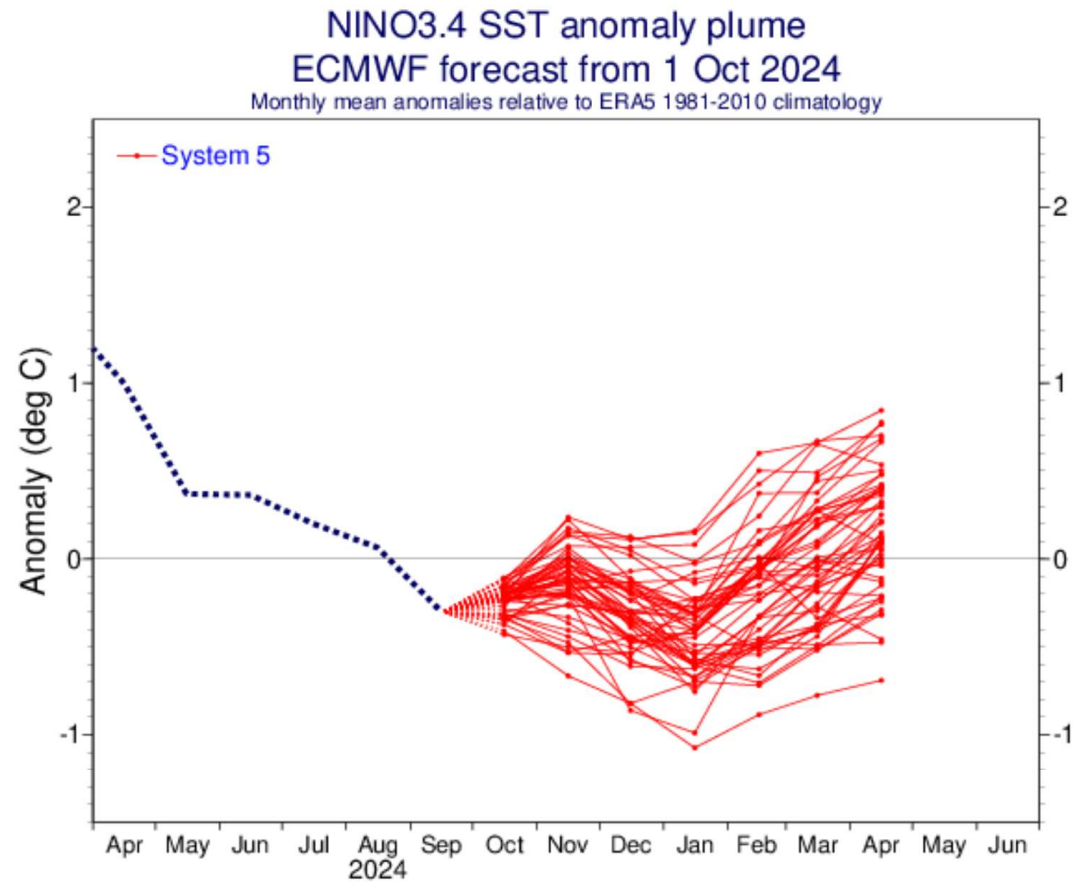
## Modeling the Climate System – from weather to climate



<https://www.climate.gov/maps-data/climate-data-primer/predicting-climate/climate-models>

# El Niño is coming back maybe soon?

Nino Plumes – Long Range Forecast – SEAS5



[https://charts.ecmwf.int/products/seasonal\\_system5\\_nino\\_plumes?base\\_time=202410010000&nino\\_area=NINO3-4](https://charts.ecmwf.int/products/seasonal_system5_nino_plumes?base_time=202410010000&nino_area=NINO3-4)

ECMWF