# Humanity’s current energy use is putting us on the road to ‘climate ruin’

Presentation to

Lithgow Environment Group (LEG)

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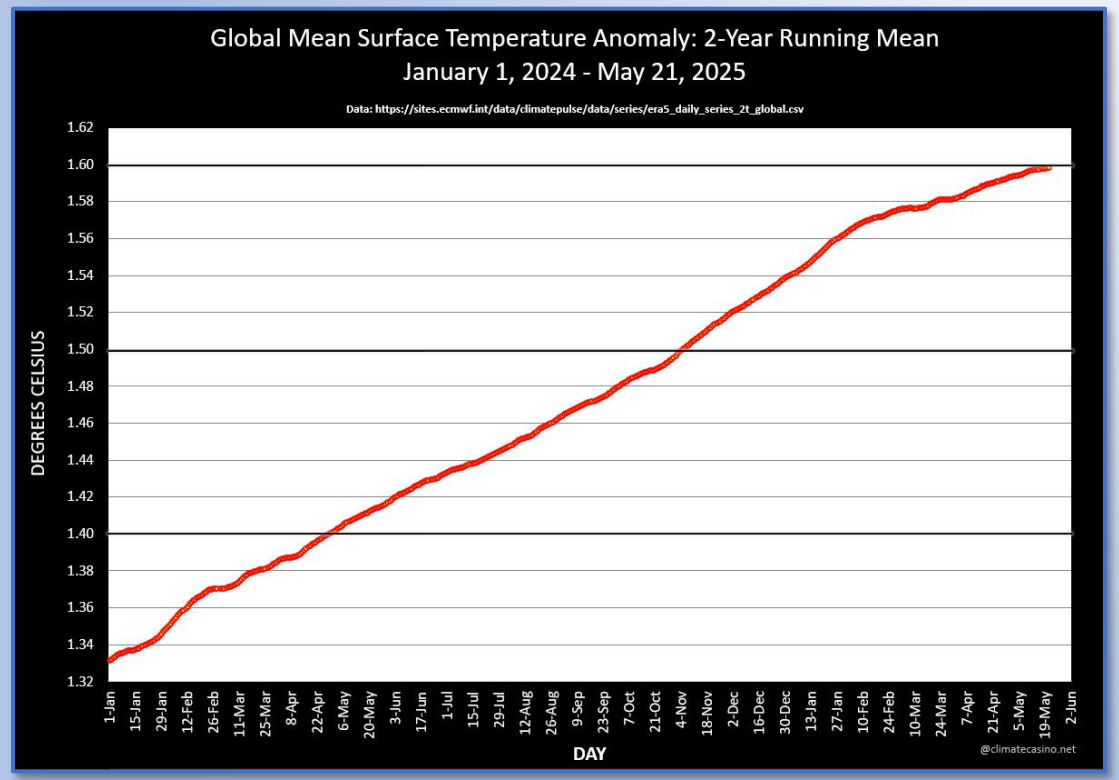
on 4 June 2025

# Earth System status: Where are we now?

- For all intents and purposes, 1.5 °C is here and now
- The world is warming at a rate of >0.1 °C per 3 years
- Daily atmospheric $CO_2$ concentrations are now exceeding 430 ppm
- Planet Earth's albedo is at a record low
- Global mean sea level rise is approaching 6 mm/year
- The rate of sea level rise is accelerating exponentially

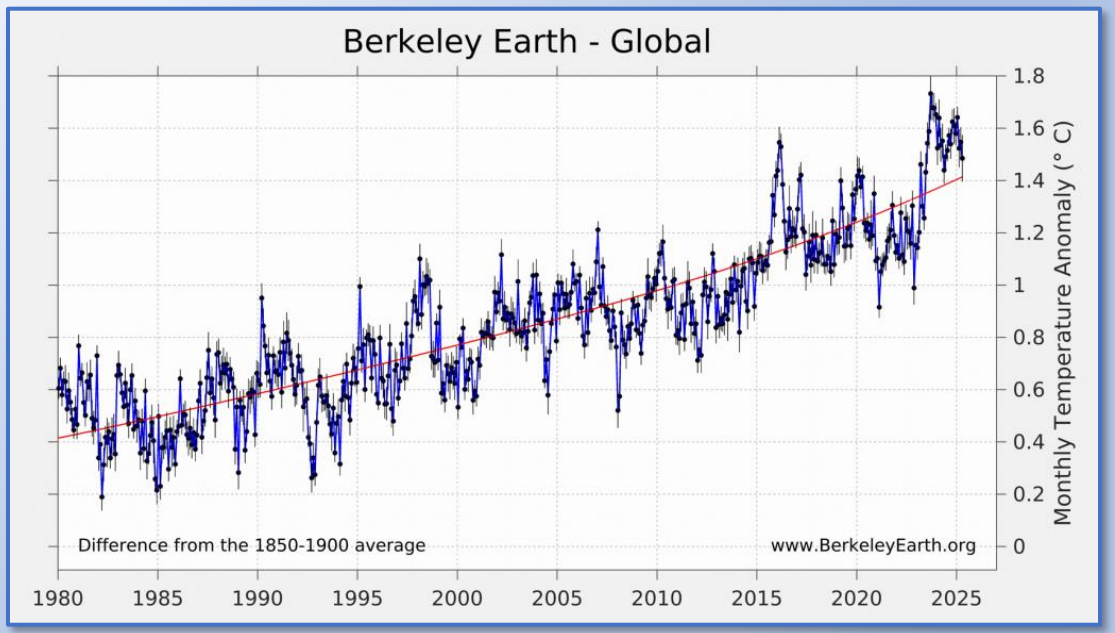
**This is primarily being driven by human activities and the resulting emissions of greenhouse gases, particularly from our energy systems, especially $CO_2$**

# +1.5 °C GMST anomaly is here and now




**The 2-year running mean, relative to the 1850-1900 baseline, using the Copernicus ERA5 dataset, has breached the +1.5 °C GMST anomaly threshold and is approaching the +1.6 °C GMST anomaly threshold.**

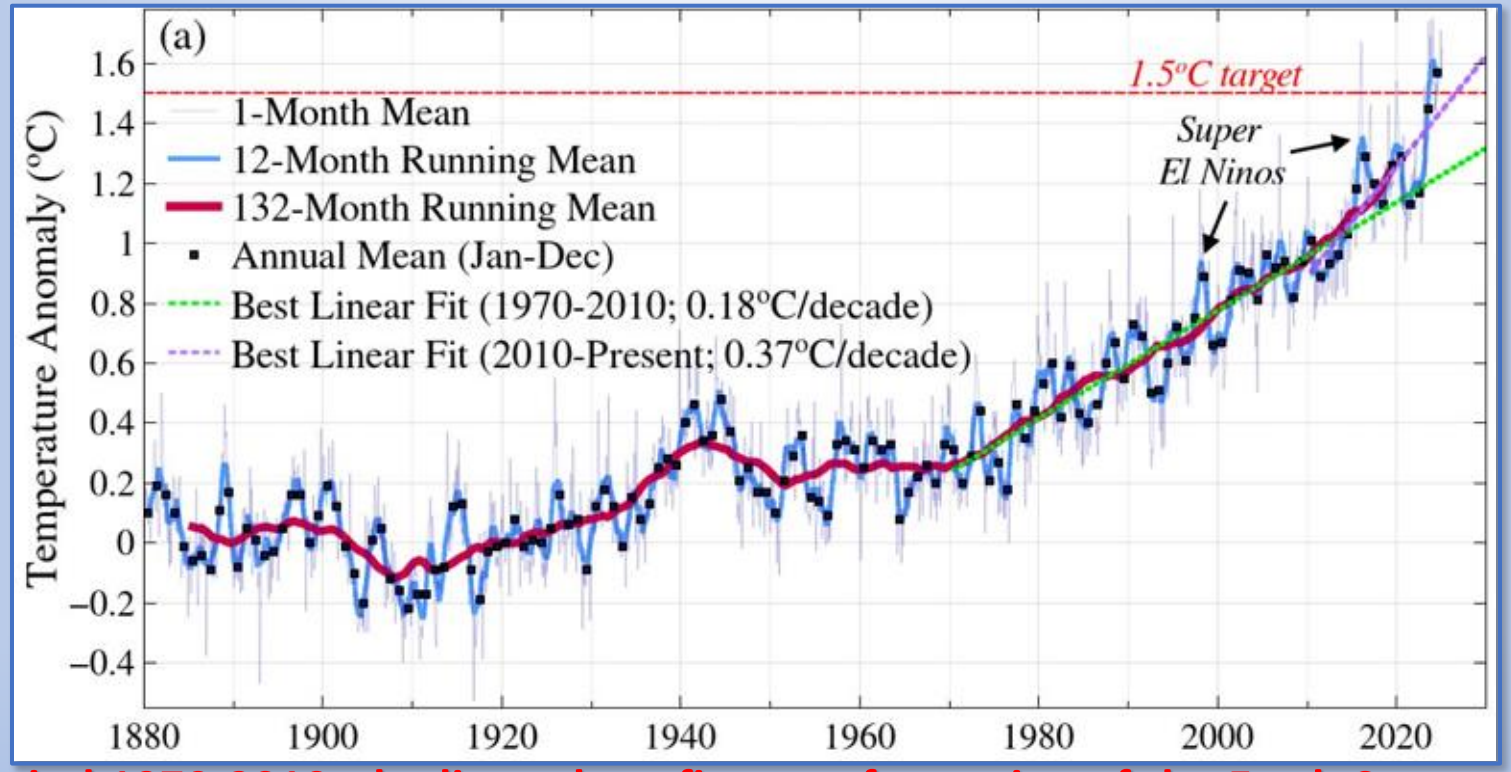
https://bsky.app/profile/climatecasino.net/post/3lptlybckak2u




**Berkeley Earth's *April 2025 Temperature Update* indicated 21 of the last 22 months have been above or within uncertainty of the 1.5 °C benchmark outlined by the Paris agreement. The 30-year LOESS running average has exceeded the +1.4 °C threshold, relative to the 1850-1900 baseline.**

https://berkeleyearth.org/april-2025-temperature-update/

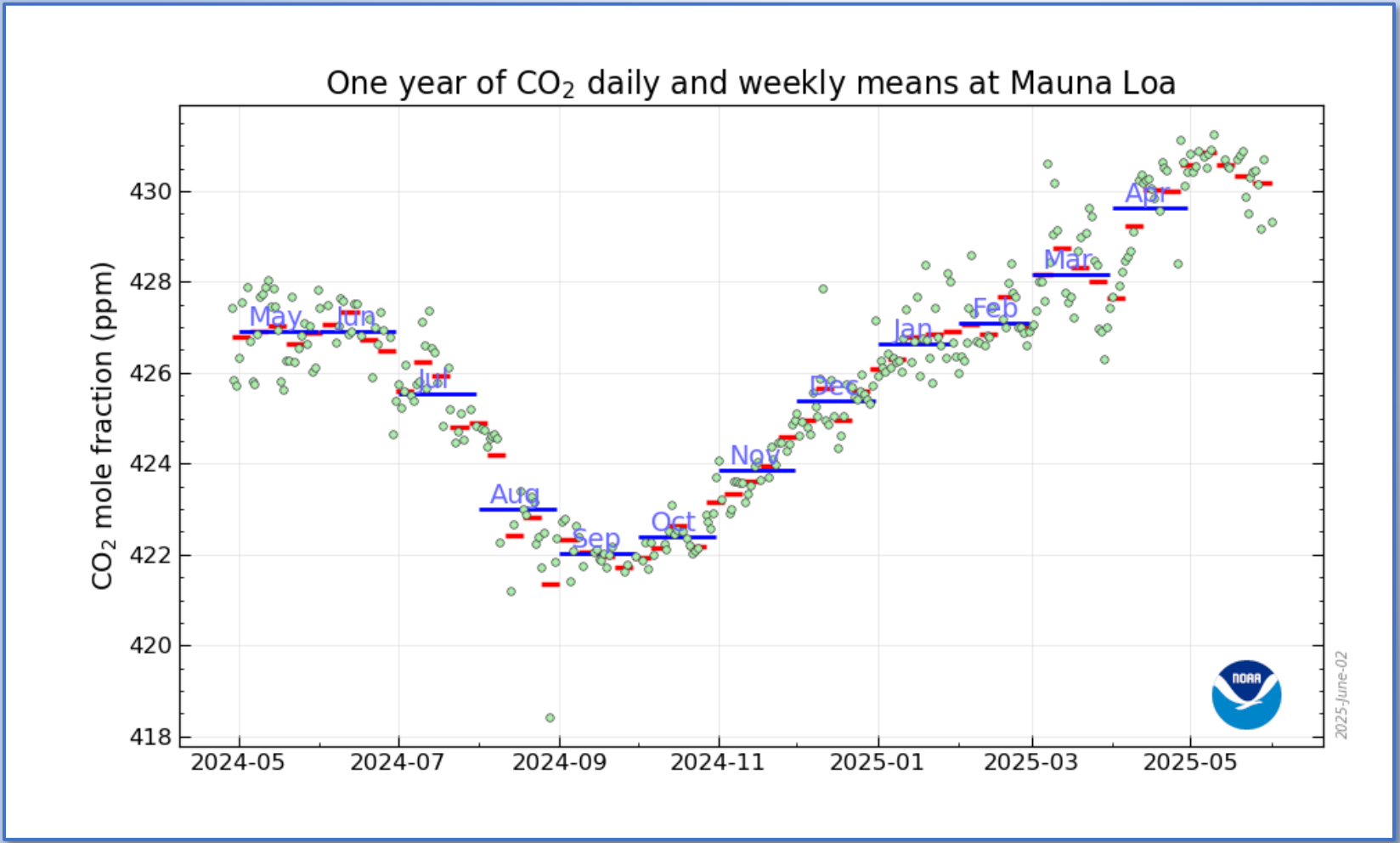
# World is warming at a rate of >0.1 °C per 3 years




- **During the period 1970-2010, the linear best fit rate of warming of the Earth System GMST was 0.18 °C/decade, but post-2010, has accelerated to 0.37 °C/decade.**
- **On the current global warming trajectory (i.e. 0.37 °C/decade, or ~0.1 °C/3 years), the +2.0 °C GMST anomaly threshold is likely to be breached within the next 15 years, and the +3.0 °C threshold could be potentially breached as soon as the 2060s.**

http://www.columbia.edu/~jeh1/mailings/2025/2025GlobalTemperature.15April2025.pdf

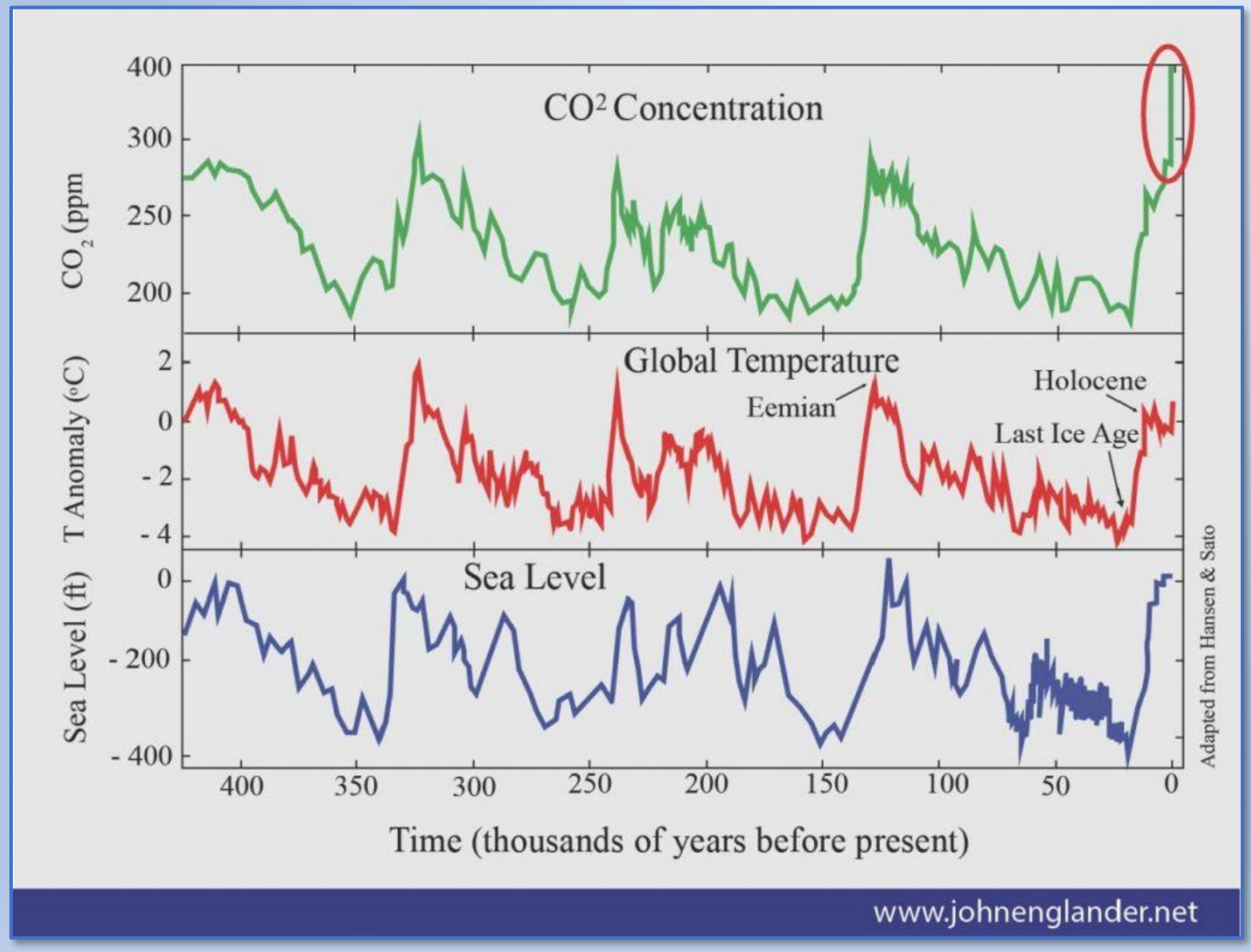
# Daily atmospheric $CO_2$ now exceeding 430 ppm




https://www.co2.earth/daily-co2

- The daily atmospheric $CO_2$ concentration at the NOAA Mauna Loa Observatory on 7 Mar 2025 was 430.60 ppm. This is the first daily mean reading above 430 ppm ever directly recorded at this location.
- The atmospheric $CO_2$ concentration has not been this high since the Pliocene Epoch, 5.33 to 2.58 million years ago. Global sea level was about 25 m higher then, compared with current sea level.

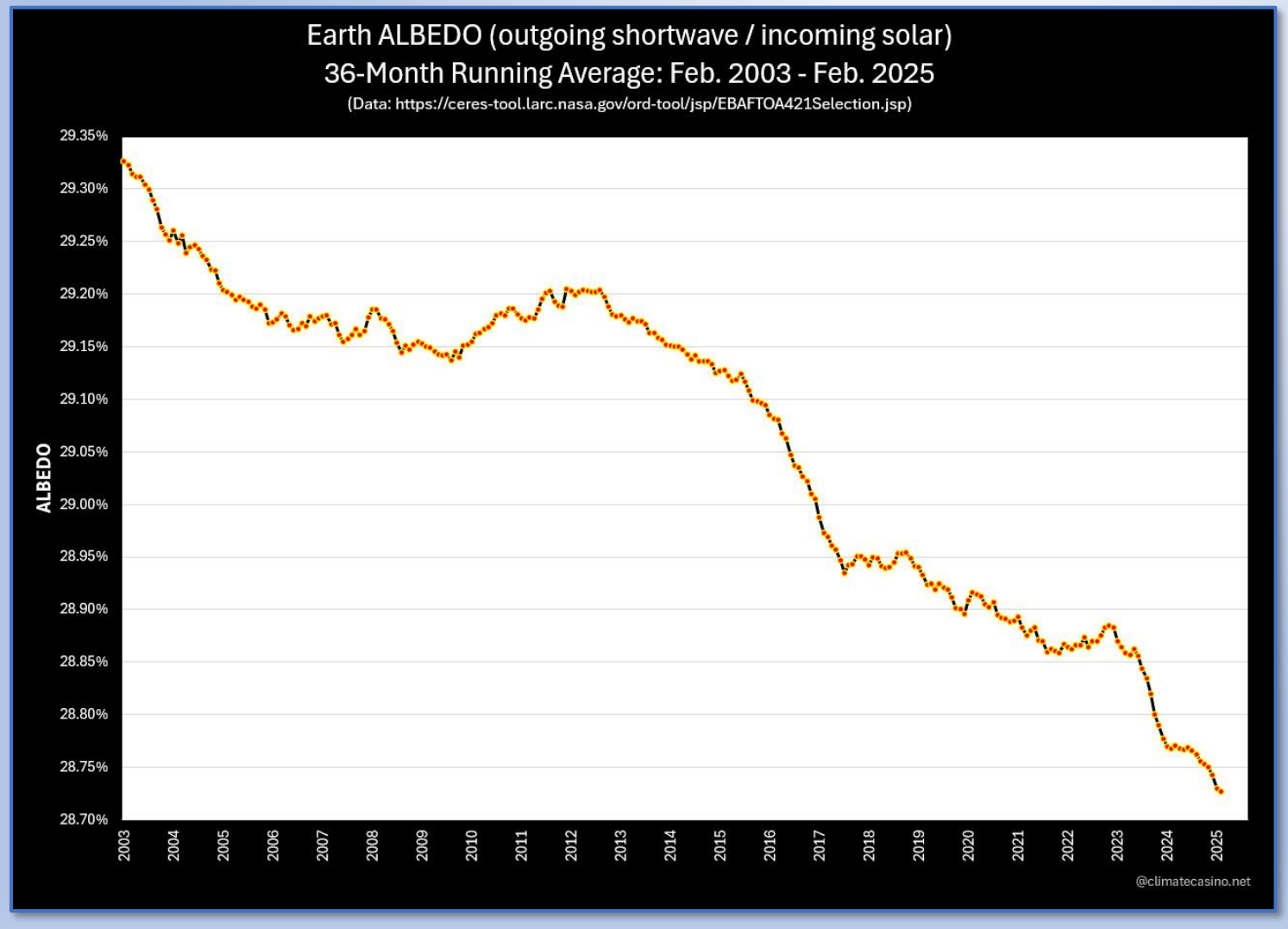
# 420,000-year history: temperature, $CO_2$, SLR




- The chart shows the relative changes in global average temperature, $CO_2$ (carbon dioxide), and sea level over the last 420,000 years.
- Note that modern humans (aka *Homo sapiens*) have only been in existence on planet Earth for about the last 250 to 300 thousand years.
- During the last 300,000 years, there have been at least 3 cold glacial periods and at least 3 warmer interglacial periods, where the GMST ranged from as low as about 8 °C (during the coldest glacial periods) to about 16 °C (during the warmest interglacial period - the Eemian).

https://johnenglander.net/chart-of-420000-year-history-temperature-co2-sea-level/

# Planet Earth's albedo is at a record low




- **Planet Earth's albedo, the fraction of light that the planet's surface reflects, hit a record new low, for the 36-month running average, per the latest CERES satellite data.**

https://bsky.app/profile/climatecasino.net/post/3lnnuoku3b22a

# Global mean SLR is approaching 6 mm/year

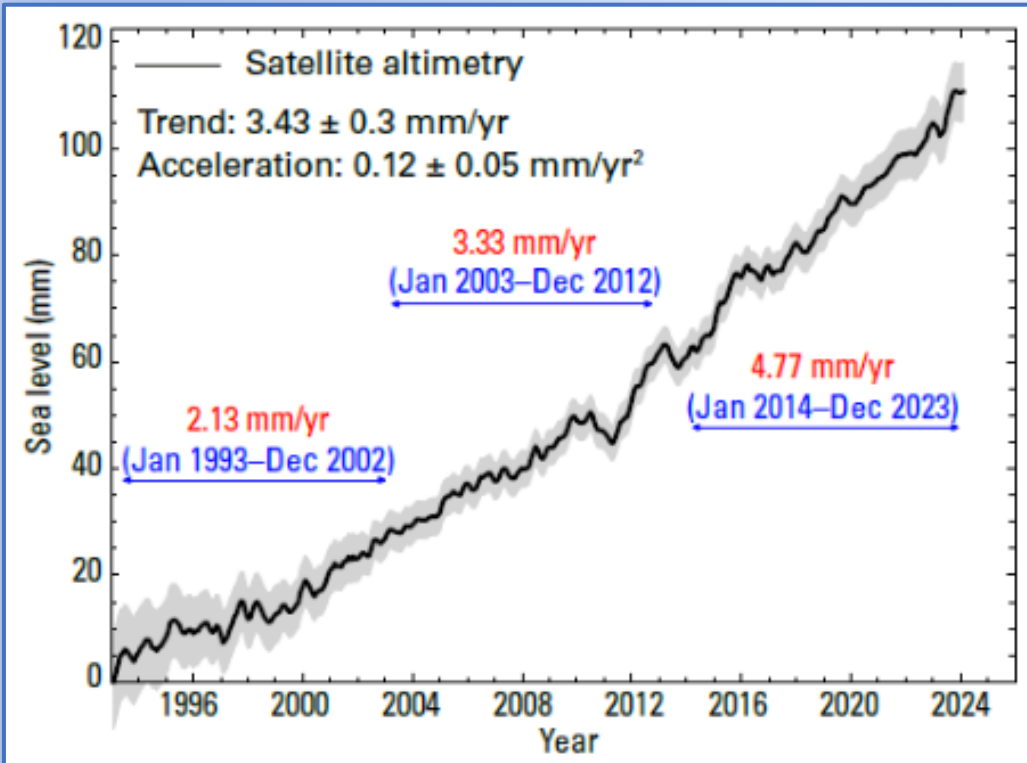



**Figure 6.** GMSL evolution between January 1993 and December 2023 based on satellite altimetry. The black line is the best estimate, and the grey shaded area indicates uncertainty. Red and blue annotations indicate the average rate of sea-level rise during three decades of the record as indicated.

*Source:* AVISO altimetry

- **According to the IPCC's *AR6 WGI*, the average rate of sea level rise (SLR) was 1.3 mm/year between 1901 and 1971, increasing to 1.9 mm/year between 1971 and 2006.**
- **Per the World Meteorological Organization report titled *State of the Global Climate 2023*, in Figure 6, the global mean rate of SLR was 4.77 mm/year for the decadal period Jan 2014 to Dec 2023, with an acceleration rate of 0.12 ± 0.05 mm/year².**
- **Global sea level rose faster than expected in 2024, mostly because of ocean thermal expansion. According to a NASA-led analysis, last year's rate of rise was 0.23 inches (0.59 centimetres) per year.**
- **Josh Willis, a sea level researcher at NASA's Jet Propulsion Laboratory in Southern California said:**

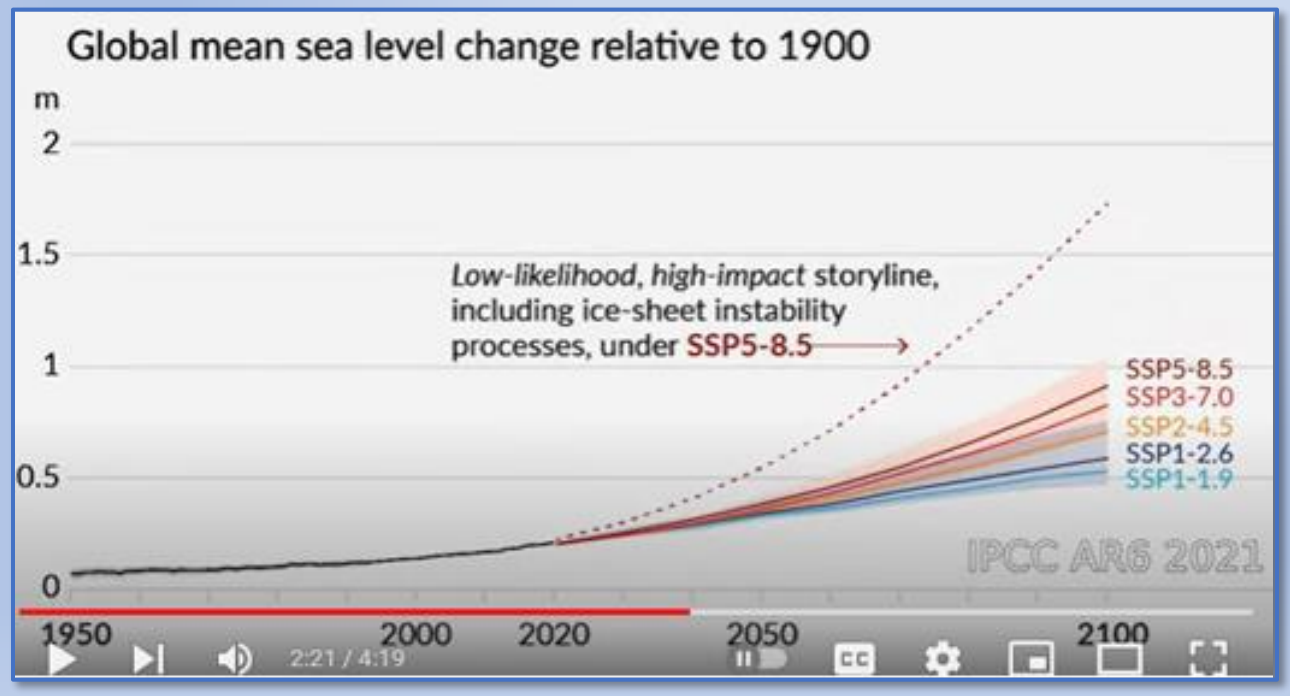
  ***"Every year is a little bit different, but what's clear is that the ocean continues to rise, and the rate of rise is getting faster and faster."***

https://sealevel.nasa.gov/news/282/nasa-analysis-shows-unexpected-amount-of-sea-level-rise-in-2024

# Sea level rise is increasing exponentially

**In the *YouTube* video titled *sea level rise - is Greenland beyond its tipping point?*, published 29 Jul 2024, duration 04:19, glaciologist Professor Dr Jason Box, from the Geological Survey of Denmark and Greenland, said from time interval 0:01:50:**

> **"*Now if climate continues warming, which is more than likely, then the loss commitment grows. My best guess, if I had to put out numbers; so by 2050, 40 centimetres above 2000 levels; and then by the year 2100, 150 centimetres, or 1.5 metres above the 2000 level, which is something like four feet. Those numbers follow the dashed-red curve on the IPCC's 6th Assessment, which represents the upper 5-percentile of the model calculations, because the model calculations don't deliver ice as quickly as is observed. If you take the last two decades of observations, the models don't even reproduce that until 40 years from now*."** https://youtu.be/8jpPXcqNXpE?t=110




**I would not be at all surprised to see the rate of global mean sea level rise (SLR) accelerate further, from 5.9 mm/year in 2024 to 10 mm/year sometime in the 2030s, and double further to 20 mm/year before 2050. That likely equates to 40 to 50 cm of SLR relative to the year-2000 baseline by 2050, and multi-metre (i.e. ≥2 m) SLR before 2100. One metre of SLR would be catastrophic for many coastal cities.**

# What are the consequences for us?

*Figure 12: Planetary solvency risk impact and likelihood definitions (illustrative)*

| Rating | Financial impact | Non-financial impact | | | |
|---|---|---|---|---|---|
| | GDP losses | Human mortality | Climate | Nature | Societal |
| Extreme | ≥50% | ≥50%<br>> 4 billion deaths | 3°C or more by 2050.<br>Multiple climate tipping points triggered, tipping cascade. | Breakdown of several critical ecosystem services and Earth systems.<br>High level of extinction of higher order life on Earth. | Significant socio-political fragmentation worldwide and/or state failure with rapid, enduring, and significant loss of capital and systems identity.<br>Frequent large scale mortality events. |
| Catastrophic | ≥25% | ≥25%<br>>2 billion deaths | 2°C or more by 2050.<br>High number of climate tipping points triggered, partial tipping cascade. | Breakdown of some critical ecosystem services and Earth systems.<br>Major extinction events in multiple geographies.<br>Ocean circulation severely impacted. | Severe socio-political fragmentation in many regions, low lying regions lost.<br>Heat and water stress drive involuntary mass migration of billions.<br>Catastrophic mortality events from disease, malnutrition, thirst and conflict. |
| Decimation | ≥10%<br>>$10 trillion annual losses | ≥10%<br>> 800 million deaths | Global warming limited to 2°C by 2050.<br>Several climate tipping points triggered. | Severe reduction in several critical ecosystem services.<br>Major extinction events in some geographies.<br>Frequent global food and water crises. | Severe socio-political fragmentation in regions exposed to climate and/or nature impacts.<br>Failure of vulnerable states and mass mortality events in impacted areas. |
| Severe | ≥5%<br>>$5 trillion annual losses | ≥5%<br>> 400 million deaths | Global warming limited to 1.5°C by 2050 following overshoot.<br>Some proximate climate tipping points | Some impacts to critical ecosystem services.<br>Ongoing species extinction.<br>Regular global food and | Some socio-political fragmentation in most vulnerable states, where adaptation has been limited.<br>Fragile states exposed to climate risks see mass migration and mortality events from heat, water stress and |

https://actuaries.org.uk/news-and-media-releases/news-articles/2025/jan/16-jan-25-planetary-solvency-finding-our-balance-with-nature/

**The University of Exeter's Institute and Faculty of Actuaries (IFoA) published their report on 16 Jan 2025 titled *Planetary Solvency–finding our balance with nature: Global risk management for human prosperity*.**

**The IFoA report is suggesting without immediate policy action to change course, Catastrophic (i.e. ≥25% GDP loss and ≥25% human mortality) or Extreme (i.e. ≥50% GDP loss and ≥50% human mortality) impacts by year-2050 are eminently plausible.**

**Humanity is on a collision course towards a +3 °C GMST anomaly, or more; a world beyond any past human experience. Large-scale depopulation would be likely.**

**We're on the road to "climate ruin."**

# What's REQUIRED to avoid civilisation collapse?

- **Zero emissions at emergency speed: within a decade — not 2050 — is the crucial time frame.**
- **The Earth is already too hot, so eliminating fossil fuels is not enough and large-scale atmospheric carbon drawdown is vital.**
- **A safe means of immediate cooling is critical to protect people & nature.**

**Burning more carbon-based substances is 'civilisation suicide'!**

# Something to ponder…

**Where will Australia's affordable, reliable, sufficient-for-our-needs energy come from in the coming years/decades?**

- **Not from coal – 60% of the currently operating coal-fired generator units in the NEM are 40 years or older, and they won't be operating by 2035**
- **Not from gas – the Australian east coast gas 2P reserves-to-production is less than 17 years – see the AEMO's *Gas Statement of Opportunities - March 2025*, Figure 27. Gas will only get scarcer and more expensive**
- **Not from nuclear – any operating nuclear power generator unit is 20+ years away in Australia AFTER the nuclear bans are repealed! See my Submission (#066) to the Australian Parliament House of Representatives Select Committee on Nuclear Energy.**

**If sufficient vocal people keep objecting to wind farms, solar farms, pumped-hydro energy systems, battery energy storage systems, and power lines, then what will keep the 'lights on' in the years and decades to come?**