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Are we in the Midst of a Climate Crisis? – NO

Are our CO_2 Emissions Causing Climate Change? – NO

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Abstract

It is a simple and seductive argument: (1) we are burning fossil fuels and emitting CO_2 into the atmosphere; (2) CO_2 is a greenhouse gas; (3) the amount of CO_2 in the atmosphere is increasing; (4) the world is warming; (5) ergo, our emissions are causing this warming and climate change. We are told that the situation amounts to a climate crisis, and we need to reduce our emissions to save the planet. It is indeed a reasonable hypothesis that our emissions are causing the world to warm and the climate to change, but it is a hypothesis that fails on several counts. And the historical and geological records tell us clearly that we are not in a climate crisis. Far from it, the present-day climate is unusually cold.

Keywords: Climate change; climate crisis; CO_2; ocean warming.

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1. Is there a climate crisis?

Our politicians and the news media have belatedly woken to the fact that the climate is changing. Lacking any education on the history or geology of the subject, they are concerned that something unusual is happening and that humans must be responsible. Nothing could be further from the truth. The fact is climate change is normal. Let's look first at the last million years or so, and then in more detail at the last 145,000 years of that period.

Bi-polar glaciation has characterised the last million years of geological time, with average global lower atmospheric temperatures fluctuating between ca. 11 and 16°C. The temperature record shows a saw-tooth pattern (well publicised by Al Gore in his book) with very cold glacial periods sharply terminated by warmer so-called interglacial periods (strangely, the well-established term "interglacial period" seems inappropriate given that it occurs when Earth remains in a glacial period with polar ice caps). It is generally accepted that these saw-toothed cyclical patterns are explained by the eccentricity of Earth's orbit around the Sun, the main Milankovitch cycle, with the orbit changing from near circular to less circular over 100,000 years, affecting the amount of solar radiation Earth receives.

145,000 years ago, Earth was in the throes of the last but one intense glaciation. Much of the northern hemisphere was covered by kilometres-thick ice sheets, including all of Canada, much of Great Britain, and all of Scandinavia. Because of this huge build-up of ice, global sea levels were ca. 130 metres lower than today. In the southern hemisphere, the Alpine lakes and fiords of the South Island of New Zealand were filled with kilometres-thick glaciers, and in Australia, the former representative of the Great Barrier Reef would have been exposed as a 130 metres-high ridge of dead coral undergoing erosion in a colder ocean. Then there was a rapid increase of temperature into the previous "interglacial" period, so that 125,000 years ago, the London area had a warmer-than-today climate with hippos, lions, and elephants wandering around (the fossils are on display in London). These warmer temperatures caused sea levels to rise globally ca. 10 metres higher than today (witness the Florida Keys, which are the exposed and stranded remnants of the barrier reef of coral of that time). In Australia, with the higher sea levels and warmer temperatures, the Great Barrier Reef would have regrown, and in NZ, most of the glaciers would have melted, and the fiords and Alpine lakes filled with water.

During the last 100,000 years, a similar succession of events developed. Temperatures dropped slowly from the height of the last interglacial, and a very cold glaciation was developed by 20,000 years ago. Massive ice sheets again covered much of the northern hemisphere, sea levels had dropped by ca. 130 metres, the Alpine lakes and fiords of NZ were again filled with glaciers, and the former Great Barrier Reef left dead and exposed as a 130 metres-high ridge in a colder ocean. A rapid rise of temperature over the next 10,000 years resulted in the melting of the ice sheets and many glaciers, and the Great Barrier Reef re-grew again on the eroded stumps of the former reefs. Temperatures 8,000-6,000 years ago were slightly higher than today (it's called the Holocene climate optimum), and global sea levels were ca. 2 metres higher than today. In Europe, we can rely on history to know that Alpine glaciers have repeatedly advanced and retreated over the last few thousands of years, often revealing the remains of forests that grew in warmer times. The areas in which grapes can be grown have shifted repeatedly. Remember, too, that Hannibal took his elephants over the Alps (because it was warmer then!). Our modern warming is just one further small fluctuation in temperature, and our warmer temperatures today are still lower than the warmer temperatures reached 8,000 and 125,000 years ago, when sea levels were ca. 2 metres and 10 metres higher than today. Nothing unusual is happening today, and we remain in an unusually cold glacial period, with two polar ice caps.

Many of our children, frightened by the supposedly soon-to-come climate disaster broadcast by climate alarmists and many of our politicians and journalists, are not aware of the huge amounts of climate change that have taken place over the last million years, as described above. Should we really be worried about modern sea level changes of a few centimetres when over the last million years sea levels have gone up and down repeatedly by 130 metres — perhaps ten times?

The long-established record of higher temperatures and sea levels than today in the current and the last interglacial are usually ignored or explained away by the climate alarmists, because they contradict their narrative that temperatures today are alarmingly high, and that sea levels are rising dangerously. They often dismiss the higher temperatures of 8,000 years ago as very localised, but the reality is that they were very real and widespread, especially within Arctic regions, as recently demonstrated by Walcott-George et al. (2026), who show that the present-day 500 metre-thick ice on Prudhoe Dome in NW Greenland was completely melted away 7,000 years ago, exposing the basement rocks. The highstands of sea level 8,000 years ago have been "explained away" by hydro-isostasy, but this explaining away is not at all credible. Glacio-isostasy is credible, and observable today. Credible, because the continents are much less dense than Earth's mantle, and are essentially floating on and in the mantle, which is increasingly plastic at depth. If the continents are loaded by kilometres-thick ice, they sink in the mantle, and now the ice has melted, they are slowly rising again (as demonstrated clearly by the gradual uplift today of Scandinavia). But using hydro-isostasy to explain away the Holocene sea-level highstands is, in my view, a fantasy. The idea is that the 130 metre rise in sea level due to ice melting caused ocean floors to subside by 2 metres, which would mean that the highstands do not represent a warmer than today period with a higher volume of sea water. But this stretches credibility. One can certainly imagine the less dense continental masses that are floating on the mantle to be like rafts of cork floating in water, and which can be weighed down by a superimposed load, and rise back up if the load is removed. But there are no such cork-like bodies in oceanic areas. Remember, the mantle is huge (84% of Earth's volume, and nearly 3,000 km thick). In the oceans, which may be as deep as 11 km, the dense mantle is covered uniformly by a ca. 7 km thick layer of less-dense basaltic crust, which is then covered by the ocean water. Draw for yourself a cross section through this with a mantle 3000 km thick, and you will struggle to find a pencil thin enough to represent 130 metres of water. How, possibly can this 130 metres of water weigh down the mantle, which is 3000 km thick and encompasses all of Earth (including under the continents, which are only 30 to 80 km thick – another thin pencil needed). If the water were to make the ocean floor subside by 2 metres, where does that material go? The context for this also needs to be mentioned. The convection of plastic mantle drives plate tectonics, and under mid-oceanic ridges, hot mantle is rising relatively rapidly (perhaps 500 metres since the last ice age), in the process releasing lots of CO_2 and forming new basaltic crust, which then moves sideways at the same rate of knots. The moving basaltic crust and underlying mantle sometimes just pushes continental masses in front of it (this is where the mid-Holocene highstands are preserved), but in other places the basaltic crust and underlying mantle plunge steeply down under the continent (subduction zones), dragging everything downwards and forming the deepest trenches (11 km) of the oceans. How the supposed 2 metre subsidence of all ocean floors since the last ice age can fit into this somewhat frenetic tectonic scenario is a mystery to me. I will instead stick to Occam's Razor, and say that there is clear evidence in northern climes of higher-than-today temperatures 8,000 - 6,000 years ago (Greenland) and 125,000 years ago (the London hippos), and that the resultant glacial melting led to higher-than-today volumes of water in the oceans, as evidenced by mid-Holocene sea-level highstands in stable tectonic areas, and by the now-high-standing Florida Keys coral reef that formed 125,000 years ago. Note, too, that the continents make up only 29% of Earth's surface, and that it was only a small fraction of that 29% that was covered by kilometres-thick ice sheets in the ice age. The amount of movement and the volume of material involved in the observed glacio-isostasy is therefore very small indeed, and easily accommodated locally without the need for global ocean-floor subsidence.

In terms of climate change, even more telling is the longer record revealed by geology. Although the geological record is never complete in any one place, and estimates of temperature rely on proxies, there is general agreement on much of the record (Fig. 1). All recent summaries, including those of Scotese et al. (2021) and Judd et al. (2024), show very clearly that Earth remains in a glacial period, and that the present-day climate is unusually cold. The average global lower atmospheric temperature today is between 14 and 15°C, and Scotese et al. (2021) show that the average global lower atmospheric temperature for most (63%) of the last 540 millions years (known as the Phanerozoic) was between 19 and 21°C, 5 or 6°C warmer than today. Fauna and flora developed and thrived during those much warmer times.

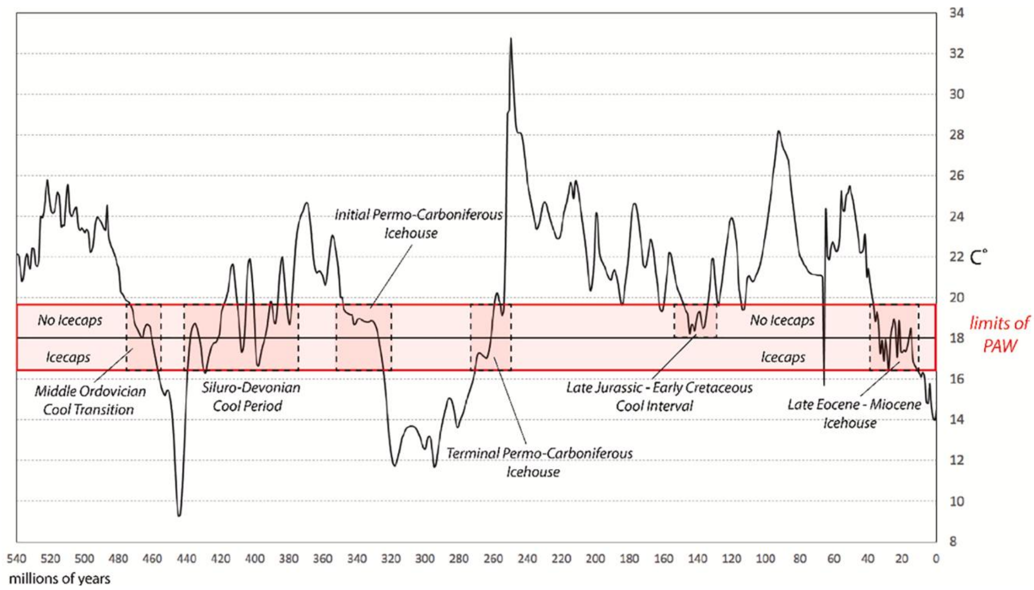

Figure 1. A compilation of average global lower atmospheric temperature estimates for the Phanerozoic, reproduced with permission from Scotese et al. (2021 Fig. 23). The very cold present-day (0 million years) temperature is between 14 and 15°C, and the highest temperature shown is ca. 33°C. Because of the horizontal scale, the details of the last 1 million years are not shown, but within that time, temperatures fluctuated ca. 10 times within the range 11-15°C ± 1°C. At temperatures below 18°C ice caps exist, and above 18°C ice caps will not exist. The pink area shows the likely temperatures of post anthropogenic warming, as predicted in the models of climate scientists.

During the Phanerozoic, there have been three very cold periods: the present day, at the end of the Paleozoic, and in the Ordovician (Fig. 1). There is a possible geological explanation for these three cold periods that involves plate tectonics. Today's glacial period corresponds to the isolation of the large continent Antarctica over the south pole, and the development of the circum-Antarctic ocean current (which developed as Drake Passage was opened). This situation (produced by plate tectonics) means that warm ocean currents cannot reach Antarctic. At the same time, the Arctic Ocean is almost completely surrounded by continental masses (only small incursions from the warmer Atlantic are possible), allowing the northern ice cap to survive. At the end of the Paleozoic, all continental masses had joined together to form the supercontinent Pangea, which happened to be stuck over the south pole, and a glaciation developed. In the Ordovician, all continental masses came together to surround a southern polar ocean, which would have frozen because of the lack of any warming ocean currents.

We still have much to learn about climate change, and its causes can be debated, but what is patently clear is (1) climate change is normal, (2) Earth is abnormally cold today, and (3) for most of the Phanerozoic (when advanced life forms were developing), temperatures have been very much warmer than today, and fauna and flora thrived.

We are certainly not in the midst of a climate crisis, but the cancel culture practised by many in the media (and sadly also scientists) means that our children and societies will continue to suffer until this message gets through.

2. Weather extremes

The news media and politicians regularly blame any extreme weather on climate change. But they are wrong. They should refer themselves to the latest report of the Intergovernmental Panel on Climate Change (IPCC 2021) where it is shown in Table 12.12 that the IPCC has not been able to detect, as yet, any increase in most extreme weather events. Of course, the IPCC models suggest that some extreme weather events might increase in frequency or intensity in the future, but I will show below that the climate models lack a firm basis. In the meantime, ignore the proclamations of the UN and climate alarmists who spread misinformation.

3. The potency of CO_2 as a greenhouse gas

There has never been agreement on how potent CO_2 is as a greenhouse gas. If the climate sensitivity (CS) of CO_2 were 1, a doubling of the amount of CO_2 in the atmosphere would increase the temperature by 1°C, but if the CS were 4, a doubling would increase the temperature by 4°C. The problem is that estimates of CS have varied substantially from less than 1 to more than 6. The IPCC (2013) acknowledges that the value of the longer-term equilibrium climate sensitivity (ECS) could be anywhere between 1 and 6, and the shorter-term transient climate sensitivity (TCS) could be anywhere between 1.5 and 4.5. How then can we possibly give any credence to climate science models that use particular values of CS to predict how climate will change as CO_2 in the atmosphere increases? The simple and seductive hypothesis that our emissions are responsible for climate change, simply remains a hypothesis, even at the first step.

4. Our emissions in relation to the entire ocean–atmosphere system

The IPCC has very usefully provided quantitative information on our total emissions since industrialization, and the total amount of carbon in the atmosphere–ocean system. The figures are very revealing. There is 50 times as much carbon in the oceans as in the atmosphere, and this ratio of 50 to 1 must represent some complex state of dynamic equilibrium between the oceans and the atmosphere (controlled fundamentally by Henry's Law). The IPCC (2022) noted the following: 1 ppm CO_2 in the atmosphere = 7.82 $GtCO_2$, and therefore 420 ppm (the approximate amount of

CO_2 in the atmosphere at that time) = 3284.4 $GtCO_2$. Given that there is 51 times more carbon than this in the global atmosphere–ocean system, the total amount of CO_2 in the global system is ca. 167504.4 $GtCO_2$. CO_2 emissions per year (including methane, which rapidly changes to CO_2) are currently equivalent to ca. 54 $GtCO_2$ (53 $GtCO_2$ in 2019; IPCC 2021, 2022 Fig. SPM.1), the equivalent of 6.91 ppm in the atmosphere, and emissions since the start of industrialisation total ca. 2500 $GtCO_2$ (IPCC 2022).

Clearly our total emissions are completely trivial relative to the entire amount of carbon in the ocean–atmosphere system, and indeed, the IPCC acknowledges that almost all our emissions should have dissolved in the oceans to maintain that 50 to 1 ratio. If that had been the case, the amount of CO_2 in the atmosphere since industrialisation should only have risen by 6.3 ppm, not by the more than 140 ppm that has actually been recorded (from 280 ppm to more than 420 ppm). The IPCC says this is the result of a rate of solution of CO_2 in the water at the atmosphere–ocean interface that is too slow to maintain equilibrium overall, and therefore our emissions are retained in the atmosphere, perhaps for thousands of years before they are fully absorbed. Then, the IPCC uses this retention of CO_2 in the atmosphere to explain global warming. However, this explanation is implausible. First of all, CO_2 dissolves very easily in water, and the ocean–atmosphere interface is a very dynamic one, with waves, spray, and winds facilitating the process of absorption. Secondly, clouds are made of water droplets, which always absorb CO_2 from the atmosphere, and send that CO_2 to the surface of the oceans and into rivers in the form of acid rain (all rain is acid because of this dissolved CO_2). No reason therefore for our emissions of CO_2 to be retained long-term in the atmosphere. Thirdly, and most importantly, another factor, the warming of the oceans, has not been taken into account.

5. The warming of the oceans

It has been well established by NOAA that the oceans have warmed recently (Fig. 2, NOAA data referred to by Laffoley and Baxter 2016), with a sharp rise in temperature starting ca. 1905, pausing from 1945 to 1975, then rising again sharply until today. Henry's Law dictates that a warming ocean must release CO_2 into the atmosphere to maintain the dynamic equilibrium between the carbon contents of the oceans and atmosphere. No wonder, therefore, that some of our emissions are being retained in the atmosphere. They are being retained because of buffering due to the release into the atmosphere of CO_2 from the oceans. In other words, our emissions may not be the fundamental reason for most of the increase in CO_2 in the atmosphere: the release of CO_2 from the warming oceans may be.

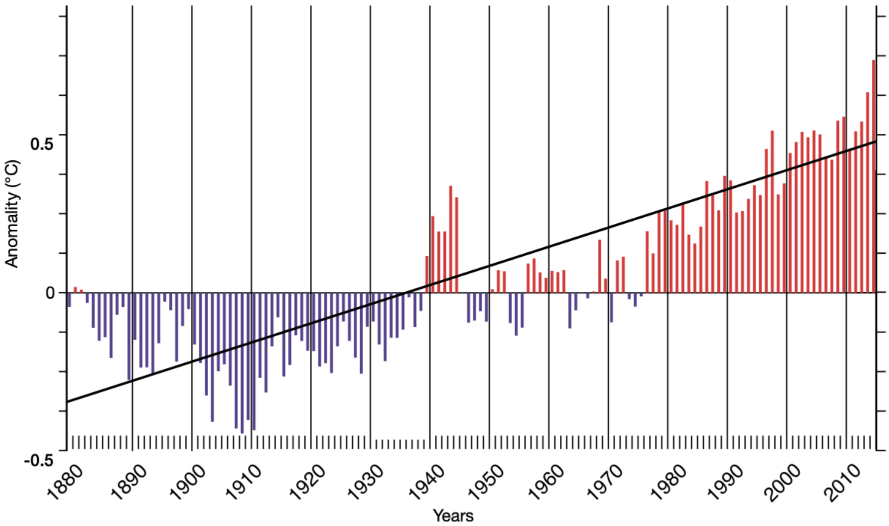

Figure 2. NOAA data on annual global sea surface temperature anomalies from 1880 to 2015 with superimposed linear trend (base period 1951-1980), red positive, blue negative.

This provides a much simpler and realistic explanation of recent global warming. The oceans are warming, and the shape of the warming curve is remarkably similar to the shape of the warming curve for the atmosphere (Fig. 3, Humlum 2025a), which also shows a pause in warming from 1945 to 1975. The oceans are significantly warmer than the atmosphere (sea surface global average of ca. 19°C compared to the lower atmosphere's 14 or 15°C), and the oceans contain an enormous amount of heat energy relative to the atmosphere, and hot water can heat air readily.

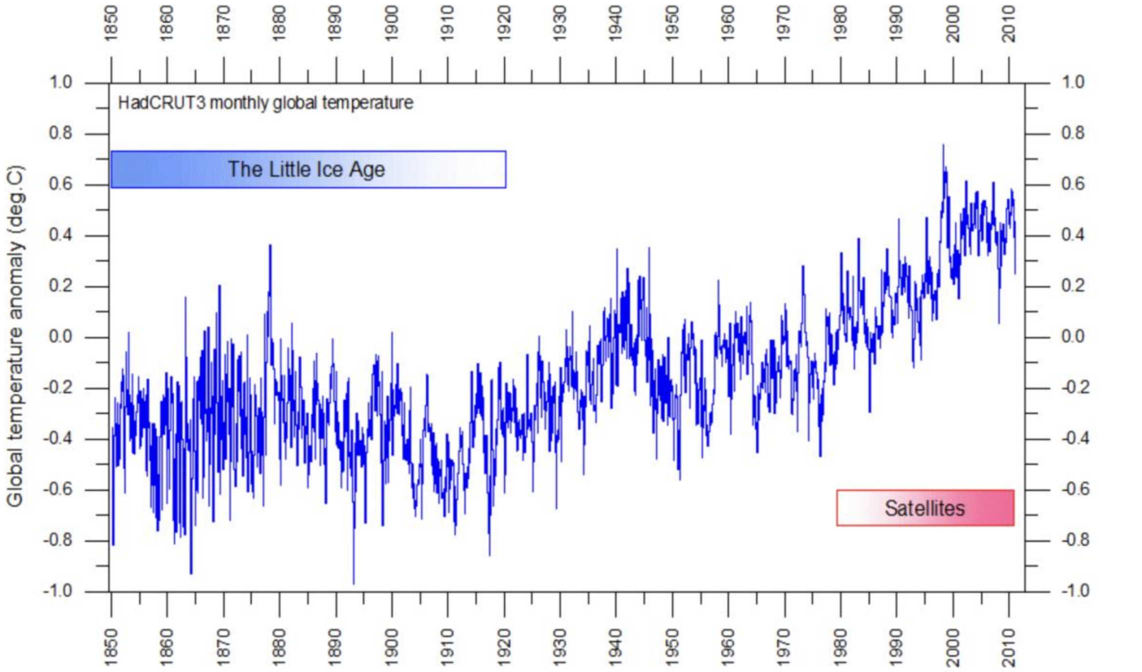

Figure 3. Global monthly average surface air temperatures since 1850 according to Hadley CRUT, a cooperative effort between the Hadley Centre for Climate Prediction and Research and the University of East Anglia's Climatic Research Unit (CRU), UK. The blue line represents the monthly values. Taken from the climate4you.com website.

The El Nino phenomenon provides a simple example of how quickly and significantly a warming ocean can heat the atmosphere. The east to west trade winds in the Pacific push water to the west, and drag up deep cold oceanic water along the South American coast, which is then pushed to the west. When the trade winds are strong, a large amount of cold water is pushed west cooling the Pacific (La Nina). El Nino occurs when the east to west trade winds in the Pacific are less intense, less cold water is pushed west, and the Pacific warms. Each El Nino is marked by a sharp rise in global lower atmospheric temperatures, usually an increase in ca. 1°C over two or three years. If these local perturbations in the Pacific Ocean can cause atmospheric temperatures to rise significantly on a global scale, then clearly, what happens in our oceans have very direct, immediate, and important effects on the atmosphere.

Strangely, climate scientists, disturbed by the relatively small amount of heating of the atmosphere compared to what was predicted in most of their models, have claimed that some of the warming in the atmosphere due to our emissions has been lost to the oceans, causing the oceans to warm. This, again, is extremely implausible. How can heat be transferred from relatively cold air to relatively hot water?

What, then, is causing the recent warming of the oceans? Several possibilities present themselves, including volcanic activity (the amount of heat transfer from the 65,000 kms of mid-ocean ridges is possibly variable, and certainly not yet satisfactorily studied and measured) and Milankovitch cycles (there are three, which interfere with each other in not fully understood ways to change the amount of heat reaching Earth from the Sun).

Perhaps the simplest way of explaining the recent warming of the oceans is by direct heating by the rays of the Sun. We know that the Sun is capable of heating the oceans down to depths of more than 100 metres (depending on water clarity and other issues), and a plausible reason for an increase in this direct heating by the Sun is a loss of cloud cover, which has been documented for the last 25 years (Tselioudis et al. 2025). Unfortunately good data on earlier cloud cover does not exist.

We may not be sure why the oceans are warming, but warming they are. The oceans are huge in volume and mass relative to the atmosphere, and water has a huge and almost unique heat capacity allowing the oceans to store huge amounts of heat. Our climate is therefore much more likely to be controlled by the oceans than the atmosphere, and climate scientists therefore need to pay less attention to the atmosphere, and more to the oceans.

6. The future

My prediction is that, as long as Antarctica is hemmed in by the circum-Antarctic oceanic current and the Arctic Ocean is hemmed in by continental masses, we will remain abnormally cold. The modern warming is a transient and very minor phenomenon, and the long-term probability is slow cooling for tens of thousands of years, at the end of which we will have sunk into the depths of another intense glaciation. At that time, the tropics will retain average lower atmospheric temperatures of ca. 30°C, but most of the world will be very much colder and lose much of its ability to grow crops, and Canada, Britain, and Scandinavia will be covered by kilometre-thick ice sheets, and completely uninhabitable. Sea levels will have dropped again by 130 metres. CO_2 levels in the atmosphere will drop (absorbed by the cooling oceans), and the real possible disaster scenario is that if CO_2 levels drop below 150 ppm most plants will not survive, which means in turn that most animals will not survive. Burning fossil fuels like mad to avoid that will not work. It would only add CO_2 to the oceans, which will continue to absorb atmospheric CO_2 as the water cools.

In the short term, we can forget about our emissions. They are irrelevant to climate change. We can continue to burn fossil fuels for a while, but in the medium term we will have to change our habits, because fossil fuels are a finite resource, and we can't just use them all up. Uranium and thorium nuclear power plants seem the most likely medium-term solution to our energy problems. Who knows whether fusion power or something else will ever come to pass?

Finally, Humlum (2025b) has approached the subject of recent climate change in a rather different way from me in this essay, but we come to the same conclusion. To quote from Humlum: *there is no observational evidence for any global climate crisis. Our world should consider focusing on much more pressing problems.*

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