**If you’re a long-term viewer of the channel then you’ll no doubt have seen the various videos in which I’ve attempted to decipher the latest available scientific research data from the bottom of our planet, all the way down there in the frozen desert that we call Antarctica.**

**When I first started talking about climate change in twenty-seventeen, Antarctica was generally regarded as the rock-solid big brother to the Arctic region, where all the really interesting climatic carnage was taking place.**

**But, in recent years our oceanographers and climatologists appear to have been growing increasingly alarmed at what they’re witnessing in the waters approaching, surrounding and flowing beneath the vast southern icy wasteland.**

**I think I must have seen more research papers and articles about Antarctica during the last twelve months or so than possibly any other environmental issue.**

**And the general consensus seems to be**

**Fucking hell!**

**So, do we simply keep watching, Nero-like, while the planet’s largest store of fresh water starts to give way at a terrifyingly accelerating pace, or do we put our thinking caps on and start coming up with possible strategies to slow things down a bit?**

**Well, there’s an international scientific debate going on right now about that very dichotomy, and most experienced researchers are urging our policy makers to move urgently towards option two. The question is, how?**

**Hello and welcome to Just Have a Think**

**Here’s a selection of those publications I just mentioned. It’s an awful lot of reading matter I don’t mind telling you!**

**Many of the papers are focussed on the infamous Thwaites Glacier, also known as the Doomsday Glacier. I’ve talked about this thing several times over the years, but nevertheless it never hurts to have a quick recap, does it? So here goes.**

**Antarctica may look like one big blob of continent sized ice, but underneath all that, it’s actually two quite distinct entities. The East Antarctica ice sheet sits on top of solid bedrock. At some points the ice sheet is almost five kilometres thick, and it’s been incredibly stable for a very long time indeed – some of the ice has been there for millions of years.**

**By stark contrast West Antarctica is a series of islands that dip below the water line. That means the ice sheet over here is perched relatively precariously between land and sea.**

**And it’s in this part of the continent that we find some of the largest glaciers on the planet, including Thwaites glacier, which is roughly the size of Florida, or Great Britain.**

**If we go back three years to a video I made about the latest research available at that time, we’re reminded that those researchers had discovered warm water erosion at the grounding line of the glacier, which is the bit where its front floating ice sheet joins up to the mainland, and there was speculation that one day in the reasonably distant future the Doomsday Glacier may disappear completely. The consequence of that would be roughly a metre of sea level rise that would engulf coastline communities comprising about a quarter of a billion human beings.**

**And because Thwaites Glacier and other similar sized ice sheets act a bit like corks in a bottle, once they go, there’s not really anything to stop the whole of the West Antarctic ice sheet starting to gradually slip into the water as well. That wouldn’t be a quick process on a human scale, but it would be lightning fast on the geological timeline and the consequence would be more like five metres of sea level rise.**

**That would wipe out huge swathes of many of the world’s richest and most heavily populated cities, including New York, Miami, London, Shanghai, and Tokyo, not to mention swamping places like Bangladesh with salt water that would destroy the livelihoods of tens of millions of people.**

**And that would be really very bad indeed, wouldn’t it?**

**Then, just in the last twelve months, we’ve learnt that global ocean surface temperatures have reached levels of warming that scientists described as “off the charts”. Those warm waters have been barrelling down into the Antarctic region causing all sorts of disruption and damage wherever they go, and nobody appears to be absolutely sure what’s causing it. The recent strong El Nino event in the South Pacific will undoubtedly have played some role, but it is apparently not anywhere near influential enough to account for all of the temperature increase. Which leaves scientists scratching their heads a bit. And that can’t be good, can it?**

**So, back to that International Debate that I mentioned earlier then.**

**Two somewhat conflicting papers were published in the Spring and Summer of twenty-twenty-four that appear to have polarised opinion still further.**

**In May, a group of researchers from the University of California, Irvine and the University of Waterloo deployed high-resolution satellite imagery and combined it with hydrological data from the region. Their published paper appears to reinforce evidence for the warm water erosion phenomenon that we just looked at, concluding that this worrying trend will likely accelerate the destabilization of Thwaites Glacier and the consequent catastrophic loss of ice that would follow.**

**But then in August, an entirely different group of boffins, this time from Dartmouth College and the University of Edinburgh published their own paper which challenged the so-called Marine Ice Cliff Instability, or MICI hypothesis. The general thrust of the MICI argument is that because retreating glaciers form very high ice cliffs, which by their very nature are pretty unstable and prone to collapse, then that represents yet another potential reinforcing feedback loop that could add to the accelerating carnage. But the data that the UK team teased out led them to the assertion that the thinning of the Doomsday Glacier might actually be helping to stabilize those wobbly edifices.**

**So why is that then?**

**Well, the paper’s authors explain that they ran computer models of various different scenarios to see what would happen in each version. In one model they focussed on the grounding line of the Thwaites Glacier, which is that thing we looked at earlier, and forced it to retreat into Thwaites deeper basin, exposing one of those ice cliffs. What the model showed was that the rapid thinning and an increase in velocity actually reduced the calving rate, which is where big lumps of ice drop off the front of the glacier. And it was that reduction in calving that tended to stabilise the ice cliffs, with the conclusion that the whole thing is much less vulnerable than previously thought and that model projections should be re-evaluated.**

**It’s the sort of thing that might reasonably lead ordinary folks like you and me to wonder when the science types will finally make their bloody minds up so we can crack on with addressing the problem. Which leads us nicely to the current ongoing debate about possible solutions.**

**Any direct human intervention in a region designed to force the system in a different direction must come under the umbrella of geoengineering. And if you’re someone who keeps up with climate science you will know that the mere mention of that word is considered by many to be tantamount to sacrilege. The two main objections appear to be firstly that any such intervention would be entirely unprecedented, and given that we apparently can’t even give an accurate assessment of what’s actually going on right now right under our noses, it’s entirely likely that our assessment of the future consequences of our interventionist actions will be similarly or perhaps even more fatally flawed. The second objection is that any geoengineering tinkering, whether it’s in an effort to slow down warming in our atmosphere or slow down glacial erosion, or whatever it may be, can only really represent a metaphorical sticking plaster on a malignant cancer that will continue to spread regardless. It might make the patient look a bit more presentable in the short term, but in the long term it offers absolutely nothing at all towards actually resolving the underlying malaise. Opponents of geoengineering argue that if policymakers are steered towards those sorts of short-term placatory measures, then their focus will inevitably get diverted from addressing the real issue at hand.**

**Proponents of geoengineering point out that we are well past the point where slowing down annual greenhouse gas emissions will be sufficient to bring atmospheric and oceanic warming back within safe parameters for life on earth as we know it, and that our only available option now is radical global scale interventions to try to reverse the damage we’ve done, because, in their view, we now have no choice. We’re screwed anyway, they argue, so we’ve got nothing to lose by giving it a go, have we?**

**One of the biggest challenges in any global geoengineering strategy is just the sheer scale of our various planetary systems, which as the name suggest are literally the size of a planet. How do we, for example deal with an entire ocean’s worth of warm water moving from north to south towards a landmass that’s almost twice the size of Australia?**

**One idea is to construct an eighty-kilometre wide, one hundred metre high underwater curtain to protect the West Antarctic Ice sheet from the warm water influx.**

**Now I try very hard not to offer scathing commentary in my little weekly missives, and I am certainly not a qualified oceanographer, but like you, I have seen water before and I’ve spotted it’s tendency to flow past things and find the course of least resistance on its relentless journey to a destination.**

**There are also questions of cost, of materials, of who builds the thing (assuming it’s even technically possible), and who would govern it and maintain it if it ever did get built. None of which appear to have any plausible answers.**

**So, you’ll have to forgive me for suggesting that this idea is totally barking mad.**

**Here's another one.**

**How about we pump seawater up onto the surface of the ice and convert it into snow using wind turbines. The resultant Increase in ice mass would theoretically stabilize ice sheets as result of the additional snow cover.**

**Did I mention that Antarctica was almost twice the size of Australia? I’m sure I did.**

**So, how much infrastructure would be required here, and how much energy would be needed to produce it and ship it to site. And what impact would it all have on local ecosystems?**

**I don’t know. And to the best of my knowledge, nor does anyone else.**

**OK, so maybe we send lots of remotely operated robotic vehicles, or ROVs down to the ocean floor where they will construct three-hundred metre high mounds of some sort of impervious material not previously known to humankind, that will sit directly in front of each glacier, thus overcoming the planetary scale forces of nature pushing the glaciers forward, effectively pinning them in place and solving the problem for good.**

**I’m not going to bother discussing the relative physics of a continent sized ice sheet versus a bunch of three-hundred-metre-high man-made bollards, because I suspect you can work that out for yourselves. But even if those physics did somehow stack up then it’s worth reminding ourselves that Antarctica is one of the harshest environments on Earth, with average winter temperatures of about minus sixty degrees Celsius and wind speeds that can top two hundred kilometres an hour. And it’s perpetually dark for 6 months of each year, and it’s absolutely nowhere near civilisation, which means the logistical challenges of simply keeping human beings alive there are enormous, let alone transporting material and maintaining a constant workflow. And we also have to go back to our unintended consequences again, don’t we? Like altered ocean currents and ecosystem disruption.**

**Perhaps a quick and easy fix would simply be to scatter highly reflective materials like silica beads all over the ice surface to increase its albedo, reduce heat absorption and slow down the melting… of a continent..twice the size of Australia.**

**This one was first proposed for the Artic region at the other end of the planet, but why not give it go down here as well?**

**Assuming we have that quantity of silica beads available to us and can find some way of transporting them there and applying them successfully, which…you know…but assuming it was technologically and logistically feasible, then that’d mean we have a continent covered in silica beads, which is not something that NATURE has tried before is it?**

**As this recent article from The Debrief points out, even among geoengineering advocates, there is currently no consensus. The folks at The Debrief interviewed John Moore from the Artic Centre at the University of Lapland, and he told them that**

 **“It will take 15 to 30 years for us to understand enough to recommend or rule out any interventions.”**

**So, the debate rumbles on, and in the meantime planet warming greenhouse gas emissions continue to increase year on year as we collectively ignore the existential peril we’re plunging ourselves and every other species on the planet into.**

**You’ll no doubt have seen the almost universally scathing commentary on the latest COP climate summit held recently in one of the world’s largest petrostates. I normally cover these events, but I won’t bother this year because the whole grotesque circus was an utterly pointless exercise in mass delusion.**

**Anyway, I won’t go on because I’ll start ranting and you’ll get even more bored than you probably already are. But honestly, unless we properly phase out the combustion of fossil fuels and divert at least a trillion dollars EVERY year to help developing nations construct renewable energy systems and protect their citizens from the worst ravages of extreme weather events, then we have only a very slim chance of leaving a liveable world to our grandkids and their descendants. And I think that is unforgivable.**

**You’ll have your own views of course, and as usual the place to leave your thoughts is in the comments section below. But that’s it for this week. A big thank you to all the folks who make this channel possible via their support on the Patreon platform, and who allow me to make independent content without bothering you with ads and sponsorship messages. Don’t forget to jump over to Patreon dot com forward slash just have a think to find out how you can join them and have a look at all the exclusive perks you can get there, including free membership. And if you found this video useful then you really can hugely support me by hitting the subscribe button on YouTube and clicking on all notifications. It won’t cost you a penny to do that and it’s just a simple click away, either down there or on that icon there.**

**Most important of all though, thanks very much for watching! Have a great week if you can, and remember to just have a think.**

**See you next week.**