The Geopolitical Risks of Climate Change

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In the last two lectures, we've talked about the impact of climate change on extreme weather, and the risks of global tipping points, like a collapse of the Atlantic Meridional Circulation, the Greenland Ice Cap or the Amazonian Biome. These tend to be the impacts of climate change that worry people the most. But not me.

I'm far more worried about the impact of much more modest levels of climate change on people – specifically, on how people interact with each other. If we have learned nothing else in recent years, it is that our ability to inflict harm on each other far, far outstrips pretty much all the natural disasters, even those on greenhouse steroids, that may come our way.

Mark Lynas once published a book called "Six Degrees", painting a picture of what six successive degrees of warming would look like. I remember at the time being asked whether I was worried about the prospect – and the honest answer was "not really" – not because I don't think a warming of six degrees would be catastrophic, but because I think we are much more likely to tear ourselves apart as temperatures climb past three degrees, so the impacts of six degrees of warming are entirely moot.

I point this out to people, and they nod and say "yes, that's obvious" – but very few seem to acknowledge the much more controversial implication. Which is that, if the geopolitical instability exacerbated by climate change is a bigger risk than the direct impacts of peak warming itself, then climate change "solutions" that exacerbate that geopolitical instability may not be worth contemplating – even if they reduce peak warming.

This worries people, because it sounds like the kind of argument put forward by those who want to delay climate action – I was hearing this a lot at CERAWeek, a kind of "Anti-COP" that happens every March in (of course), Houston, Texas: "Don't let climate and sustainability concerns destabilize energy supplies". And that is not what I'm talking about. Indeed, climate inaction may be one of the most destabilising options of all.

In this lecture I will talk about three very different traps we need to be careful not to fall into in climate policy: the first trap is allowing warming to continue because "the poor need energy". This makes no sense, because the poor are both disproportionately impacted by climate change and benefit the least from current use of fossil fuels. Continued dependence on fossil fuels at the level we are depending on them at the moment will ultimately exacerbates global inequalities, fuelling global instability.

The second trap is to slide into trying to fix the problem with solar geo-engineering – using technical fixes ranging from mirrors in space, through artificial volcanoes, to brightening of marine clouds to try and cool the planet as greenhouse gas concentrations continue to rise. This is a highly emotive issue, with many geo-engineering proponents insisting that we have no option but to embark on it and that sceptics (like myself) are imperilling everyone's future by getting in the way.

There are three very well-rehearsed scientific problems with solar geo-engineering: reflecting sunlight away does not act as a simple "anti-greenhouse-gas" – first, it is, at best, a palliative fix, with a number of side-

effects that we know about (and which I can therefore explain) and probably more that we don't. Proponents argue fiercely that, despite these side-effects, the alternative of unmitigated warming is much, much worse – and while discomforting, that is probably true, so the idea can't be dismissed out of hand.

The second scientific problem is the likely duration of any solar geo-engineering program large enough to have a significant impact. A lot of rather misleading claims get made about how solar geoengineering is just a temporary measure to "shave the peak" off global temperatures. It isn't. Any climatically significant geoengineering program would need to be kept in place for multiple generations. This leads to the third problem, "termination shock": rapid and disruptive warming in the event of a geoengineering program ending suddenly because whoever was doing it lost the will, or the right, to carry on.

These scientific challenges with solar geoengineering tend to get most of the attention because the physical climate science community is fascinated by these kinds of "what if" questions. But I will argue that the real reason we shouldn't even be contemplating solar geoengineering are not physical, but human: it would be massively destabilising. Some institution will need to implement and control whatever geoengineering technology is deployed – even if multiple countries contribute, the global geoengineering programme is ultimately the sum of all their efforts. And that institution will, inevitably, be held accountable for all the impacts of the geoengineering programme, real and imaginary.

Proponents of geoengineering recognise this problem, and have come up with initiatives to "include everyone" (especially developing countries) in geoengineering governance decisions. The Degrees initiative even sponsors scientists from developing countries specifically to work on geoengineering projects, to broaden "buy-in". But to suggest that developing countries might ever have a real say in solar geoengineering deployment seems naïve to the point of dishonesty: in the end, those with ultimate control, even if they are not the ones nominally implementing it, will be national governments with the most advanced space programmes and military capabilities. Right now, that means China and the USA. It's possible to imagine others, including India, Russia, Europe, a consortium of developing countries, or even a wealthy private individual (the "Greenfinger" scenario) embarking on a geoengineering programme, but impossible to imagine them continuing on a climatically significant scale without the consent of the "G2", or whatever the world's superpowers happen to be at the time (and, remember, an effective geoengineering programme would have to last longer than the historical duration of many superpowers).

What if the G2 disagree with each other over the "right" level of solar geoengineering? Would they come to blows over it? Again, proponents argue this is a risk worth taking because, with only two or a handful of rational decision-makers involved, it should be possible to agree on a level of geoengineering that is tolerable for everyone and demonstrably better than the alternative of no geoengineering at all. Perhaps. But the real problem is not these supposedly-rational folks-in-charge, but everyone else. If one or two superpowers have taken control of the world's weather, someone, somewhere, will blame those superpowers for an ongoing megadrought that is killing their relatives and compatriots. And from there is it only a short step to planes flying into tall buildings.

Over the past couple of years, there has been something of a sea-change in attitudes to solar geoengineering research, with governments and funding agencies quite suddenly much more interested in detailed modelling and even limited field trials. And, academics being who we are, when there is research funding on the table, someone is willing to take it. There is even a start-up offering to offset the impact of your CO2 emissions by releasing sulphur dioxide into the stratosphere – although, when we look at their numbers, it doesn't look particularly attractive even at face value. And one thing almost everyone seems to agree on is that uncontrolled geoengineering-for-sale is a very bad idea indeed.

I worry that this interest in partly fuelled by misleading rhetoric about climate tipping points. As we explained in the previous lecture, there is absolutely no evidence that we are sufficiently close enough to any global tipping point to justify starting down such an inevitably destabilising path as solar geoengineering. What is most worrying of all is that even those engaged in government-sanctioned geoengineering research barely acknowledge the issue of impact liability at all – or if they do, they shrug it

off as somebody else's problem ("I'm a scientist, not a tort lawyer").

Fortunately, the general public seems pretty uniformly suspicious of the idea of climate control in the name of the greater good, so the chances of a democracy embarking on serious geoengineering remain small. But it remains possible that research done in democracies might increase the chances of someone else deciding to have a go.

While I'm deeply sceptical about the value of global geoengineering research, there may be applications of solar radiation modification that do make sense, if they fall into the category of modification of local weather rather than global climate. Artificial clouds over to protect coral reefs from the worst effects of heatwaves, or reflective roofs in vulnerable cities, would both fall into this category. If these can be shown to work without serious side-effects, and unlike global geoengineering measures there is no reason to suppose they cannot be, then we may well, sadly, need to start implementing this kind of "extreme adaptation" measure as the world continues to warm.

While I get the impression that most people, with noisy exceptions, share my concerns about global solar geoengineering, my third example of a geopolitically destabilising climate policy will be more controversial. This is the drive for an immediate "fossil phase-out" policy that was widely adopted at COP28. While we clearly need to stop fossil fuels from causing global warming as soon as possible, attempting to phase out fossil fuel production and use entirely in the next 30 years would almost certainly be highly destabilising, given the number of countries, industries and communities that depend on them. Which brings me back to the overall message of these lectures – that we have to have a much greater emphasis on fixing fossil fuels. One day, we will stop using them. No one can predict when, but I am confident we will have to stop climate change before we stop using fossil fuels. So to insist that the only option is a fossil phase-out policy – and even to actively resist measures to neutralise their climate impact for fear of "legitimising" continued fossil fuel use – may be the most politically destabilising option of all.