

Solar Geo-Engineering: A Dangerous Distraction

Written by Sandrine Birkeland

As global temperatures continue to rise, with 2023 set to be the hottest year ever recorded, different discourses about solutions to climate issues are gaining prominence. One type of discourse that is emerging more and more in academia are talks concerning solar geo-engineering, also known as solar radiation management. This is different from carbon removal techniques, another category of geo-engineering which is already used in different parts of the world. Solar geo-engineering refers to different hypothetical technologies attempting to offset the effects of increased greenhouse gas concentrations in the atmosphere by reflecting a small percentage of the sun's light and heat back into space. This editorial will explore the dangers of solar geo-engineering in our future.

The way solar geo-engineering would function can be visualised on the image below. Most often it is proposed that aeroplanes or balloons would shoot aerosols into the stratosphere in order to achieve the desired reflection of some of the sun's light and heat back into space. This would lead to a cooling of the planet. This method is even mentioned within an IPCC report. Given this process and given that solar geo-engineering would need to be deployed at a global scale, the effect of this technology would be on the entire climate system of the Earth.

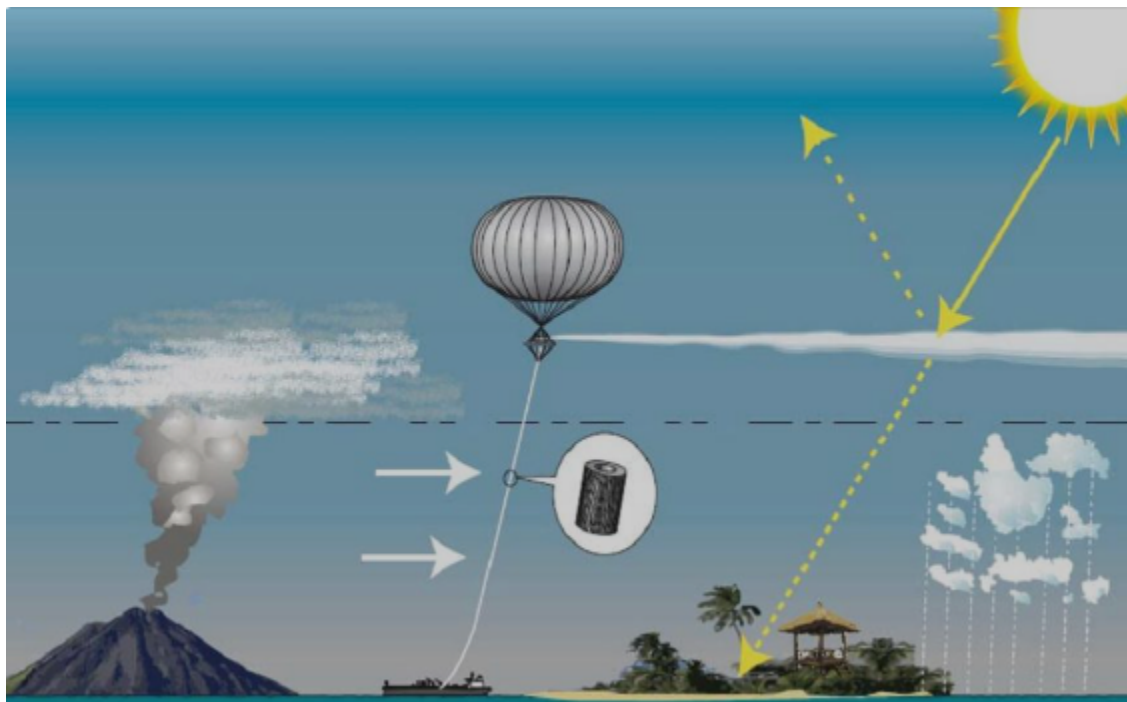


Illustration of the functioning of solar geo-engineering technologies. Source: Hugh Hunt, 2011.

This leads us to one problematic aspect of research about solar geo-engineering. There are huge uncertainties about the effects of solar geo-engineering simply due to the logistics of performing scientific experiments: experiments cannot be performed on a global scale, only at a local scale. Thus any potential experiment would be vulnerable to huge uncertainties about the actual effects of solar geo-engineering use on a planetary scale. Some researchers have for instance found that solar radiation management would impact precipitation patterns globally, something that would especially be dangerous for countries relying on the monsoon. All these uncertainties and the range of potential negative effects render it difficult to argue that solar geo-engineering would in any way be a “solution” to the climate crisis or even part of the “solution”.

Further, arguably one of the biggest dangers of deployment of solar geo-engineering is that once we start its deployment, this would require that we continue deploying the technology eternally. This is because the minute you stop, intense catastrophic heating would return to the planet. Hence, human civilizations would need to use these technologies eternally. Such continuous deployment risks facing a range of barriers, for instance geopolitical barriers.

This leads to another frequent criticism: that solar radiation management poses a range of governance issues. Given that the technology can only be deployed at a global scale, this requires global political consensus on its usage. Governance scientists have argued that the present state of geopolitics means it would be highly unlikely for this technology to be governed fairly on a planetary scale. Instead, if such technologies were to be developed, the more powerful nations could likely decide to deploy these technologies without the consent of other countries, and especially without the consent of less powerful countries who are most vulnerable to climate change’s impacts and to the impacts of solar radiation management. It is important here to mention that the Global North - the countries who are most responsible for the climate crisis and whose historical colonisation of the Southern parts of the world have been argued to be at the root of the environmental and ecological problems we face today - theorised and created this hypothetical “solution”. This is problematic as it would be desirable that those least responsible for the current situation would have a bigger say in ways to resolve the climate crisis. This is also because these less powerful nations are already suffering the worst impacts of the climate crisis and therefore have a different awareness of their needs and of climate change’s impacts.

Why are these discourses about solar geo-engineering gaining more traction, given all these arguments against the technology? Illustrating the increase in attention toward solar geo-engineering, an initiative spreading awareness and research on SRM in the Global South was in 2021 selected at the Paris Peace Forum Awards as one of the ten Scale-Up projects, this implies there will be increasing funding and research on solar radiation management. Further, the US National Academies of Science in 2021 recommended in a report that the US government develop and fund new solar geo-engineering research. One part of the reason for this increasing support is the widespread belief that technology can do and fix everything. Even the Paris Agreement has been argued to rely on hypothetical technological fixes, given that present national commitments would lead to over 3 degrees of global warming of the planet. Another reason is that further research and support of solar radiation geo-engineering enables the continued extraction of fossil fuels and pushes significant climate action to the future. It is a

distraction that enables the status quo to continue, despite the UN head António Guterres having made the statement in 2022 that the continued extraction of fossil fuels is incompatible with the future of humanity. The energy spent on researching the future use and impact of solar geo-engineering could instead be used for immediate actions to reduce carbon emissions.



Solar geo-engineering would mimic the effect of a volcano by pumping gas into the sky that turns into aerosols, which then reflects part of the sun's heat. Source: ISS/NASA.

Regarding governance, a step that can be taken by governmental bodies is a ban on further research on solar geo-engineering. A ban on research can at first seem like a radical step to take. Nonetheless, the infinite uncertainties due to the fact the technology would be playing with the entire climate system of the Earth, and the hugely problematic governance and thereby justice concerns, justify stopping further research. Additionally, further development in research only makes it more likely that these technologies be developed. And once the technology is developed, it is only a small step away from some powerful national government making the decision to deploy solar radiation management without consulting other nations. Such a ban on research and funding of research has already been demanded by hundreds of scientists.

Finally, there are things we can do as individuals to prevent this dangerous technology from being used. The Earth's ecosystem belongs to all living beings, and we all have a moral right to have a say in what is done to it. One important step individuals can take is to help raise awareness of this issue amongst those around us. Spreading awareness of solar geo-engineering's dangers is important especially as the present conversation on solar geo-engineering is mainly occurring within academia. Some environmental movements are addressing this issue, such as the Dutch group "Critical Youth on Solar Geo-engineering". Raising awareness and increasing critical international conversations on solar geo-engineering can put

pressure on policy-makers to create stricter rules around research on and development of solar geo-engineering technologies.

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