

Study finds mixed views on use of aerosols to limit climate change



Clouds.

Few members of the UK public are comfortable with the idea of injecting aerosols high into the atmosphere to help slow down climate change, a study has found.

People voiced concerns that this type of approach fails to address the basic problem of increasing greenhouse gas emissions. They are also nervous about any unintended consequences of such an action.

But most significantly, they say that injecting aerosols into the Earth's atmosphere raises problems of international governance and control: who would ultimately be responsible?

The findings are the result of the first UK public engagement study to explore the ethics and acceptability of so-called solar radiation management (SRM) technology, and a proposed field trial for a possible deployment mechanism.

SRM involves injecting reflective aerosols into the atmosphere in a bid to redirect a small percentage of the Sun's light and heat back into space to counteract climate change. This is meant to re-create the global-dimming effects of a volcanic eruption.

The technique is highly controversial, because we have no idea how interfering with the climate in this way might affect delicately-balanced ecosystems, or indeed, global weather patterns.

So much so, that the UK's Royal Society and the US Government Accountability Office among others recommend seeking the public's opinion on the acceptability of this type of research. The idea is to find out if there are aspects of this approach which scientists and other experts consider trivial, but which may prove unacceptable for non-experts.

In 2010, the Natural Environment Research Council ran workshops with around 30 people in three cities across the UK, called Experiment Earth, to discuss the moral, ethical and societal implications of SRM.

This latest study, published in *Nature Climate Change* built upon the findings of Experiment Earth, but focussed specifically on public reaction to a proposal for a small-scale test of a specific geoengineering technique to cool the Earth. The technique, called Stratospheric Particle injection for Climate Engineering (SPICE), was meant to explore the non-trivial challenge of how you might actually deliver aerosols 20 kilometres into the atmosphere.

'There's great value in doing research with the public,' says Dr Karen Parkhill, from the Understanding Risk Research Group at Cardiff University, co-author of the study. 'It's very important to get people's viewpoints, they have a right to be involved and researchers value the different knowledge they have.'

Rather than shoot aerosols into the sky, the scientists behind SPICE suggested running a field trial of a scaled-down one-kilometre pipe and balloon system to spray two bath-loads of fresh water into the atmosphere. This method involves attaching a pipe to a helium-filled balloon which carries it into the atmosphere to spray out a fine mist of particles. The Nature Climate Change study gathered public responses to this proposal.

Not many were happy with the idea of using aerosols to cool the planet. But everyone involved in the discussion groups was willing to entertain the idea that the small-scale test should be pursued. But only if certain conditions are met. These include making sure the technique is safe for anyone living nearby, and for the environment; and that those involved in SPICE were open and transparent about any experiments.

The SPICE team made sure that the tests would be safe for the local population and for the environment. The research councils supporting the project checked this at a so-called stagegate. The research councils and SPICE team also agreed that all results from SPICE would be published immediately according to normal academic practice.

'Generally, in terms of geoengineering and solar radiation management, our participants were not comfortable. But when it came to the test, people's discourse changed. People are prepared to let scientists do some innovative things that might lead to knowledge which could help with climate change,' says Professor Nick Pidgeon, Director of the Understanding Risk Research Group, who led the research.

The study comes in the wake of a paper by researchers at the UK's Met Office. This states that geoengineering could harm the world's poorest citizens the most. Techniques like SRM, which cool the planet unevenly, could have unforeseen and unwanted consequences that would outweigh any climate benefits, like causing droughts in Africa.

The Met Office study suggests that any geoengineering project should be regulated by global governance. This is something Pidgeon and his colleagues demonstrate that the UK public also want established before major innovation in this field goes ahead.

'One of the things I hope comes from doing this research is the idea of transparency in governance,' explains Parkhill. 'At every stage there should be a mechanism for communicating not just to the public but to other scientists, research councils and governments.'

The SPICE project is still active, but the test has now been postponed. Despite this, both Pidgeon and Parkhill think the research councils involved should be encouraged by this latest study as a method for promoting responsible innovation in research. 'Science is always part of society and this was a successful example of using public views in a way that wasn't disruptive of the research,' concludes Pidgeon.

More information: Pidgeon, N. et al. Deliberating stratospheric aerosols for climate geoengineering and the SPICE project, *Nature Climate Change* 3, 451-457 (2013), published online 14 April 2013, [doi:10.1038/nclimate1807](https://doi.org/10.1038/nclimate1807)

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