

US geoengineers to spray sun-reflecting chemicals from balloon

Experiment in New Mexico will try to establish the possibility of cooling the planet by dispersing sulphate aerosols

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guardian.co.uk, Tuesday 17 July 2012 08.21 EDT



The field experiment in solar geoengineering aims to ultimately create a technology to replicate the observed effects of volcanoes that spew sulphates into the stratosphere. Photograph: Gallo Images/Getty Images

Two Harvard engineers are to spray sun-reflecting chemical particles into the atmosphere to artificially cool the planet, using a balloon flying 80,000 feet over Fort Sumner, New Mexico.

The field experiment in solar geoengineering aims to ultimately create a technology to replicate the observed effects of volcanoes that spew sulphates into the stratosphere, using sulphate aerosols to bounce sunlight back to space and decrease the temperature of the Earth.

David Keith, one of the investigators, has argued that solar geoengineering could be an inexpensive method to slow down global warming, but other scientists warn that it could have unpredictable, disastrous consequences for the Earth's weather systems and food supplies. Environmental groups fear that the push to make geoengineering a "plan B" for climate change will undermine efforts to reduce carbon emissions.

Keith, who manages a multimillion dollar geoengineering research fund provided by Microsoft founder Bill Gates, previously commissioned a study by a US aerospace company that made the case for the feasibility of large-scale deployment of solar geoengineering technologies.

His US experiment, conducted with American James Anderson, will take place within a year and involve the release of tens or hundreds of kilograms of particles to measure the impacts on ozone chemistry, and to test ways to make sulphate aerosols the appropriate size. Since it is impossible to simulate the complexity of the stratosphere in a laboratory, Keith says the experiment will provide an opportunity to improve models of how the ozone layer could be altered by much larger-scale sulphate spraying.

"The objective is not to alter the climate, but simply to probe the processes at a micro scale," said Keith. "The direct risk is very small."

While the experiment may not harm the climate, environmental groups say that the global environmental risks of solar geoengineering have been amply identified through modelling and the study of the impacts of sulphuric dust emitted by volcanoes.

"Impacts include the potential for further damage to the ozone layer, and disruption of rainfall, particularly in tropical and subtropical regions – potentially threatening the food supplies of billions of people," said Pat Mooney, executive director of the Canadian-based technology watchdog ETC Group. "It will do nothing to decrease levels of greenhouse gases in the atmosphere or halt ocean acidification. And solar geoengineering is likely to increase the risk of climate-related international conflict – given that the modelling to date shows it poses greater risks to the global south."

A scientific study published last month concluded that solar radiation management could decrease rainfall by 15% in areas of North America and northern Eurasia and by more than 20% in central South America.

Last autumn, a British field test of a balloon-and-hosepipe device that would have pumped water into the sky generated controversy. The government-funded project – Stratospheric Particle Injection for Climate Engineering (Spice) – was cancelled after a row over patents and a public outcry by global NGOs, some of whom argued the project was a "Trojan horse" that would open the door to full-scale deployment of the technology.

Keith said he opposed Spice from the outset because it would not have improved knowledge of the risks or effectiveness of solar geoengineering, unlike his own experiment.

"I salute the British government for getting out and trying something," he said. "But I wish they'd had a better process, because those opposed to any such experiments will see it as a victory and try to stop other experiments as well."

The Guardian understands that Keith is planning to use the Gates-backed fund to organise a meeting to study the lessons of Spice.

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