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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

Martin Lukacs

theguardian.com, Tuesday 17 July 2012 08.21 EDT

[Jump to comments \(303\)](#)

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

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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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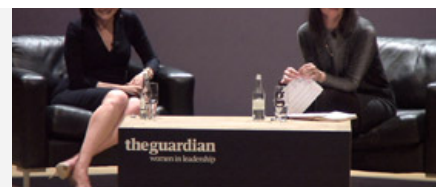
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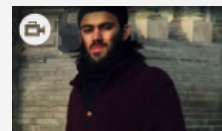
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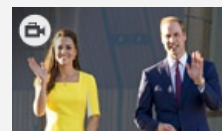
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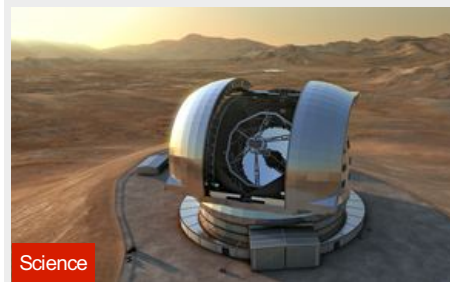
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303 comments. Showing conversations, sorted

[< Prev](#)[1](#) [2](#) [3](#) ... [7](#)[Next >](#)**guthier**

17 July 2012 1:29pm

So add a different pollutant to our atmosphere? You're joking!

Anything we do has an unexpected consequence. So if you solve one problem - up pops another. How about cutting back on emissions in the first place?

[Report](#)**412****Jukka Pelkonen**

17 July 2012 1:44pm

Many people believe that this is already being done secretly by spraying from commercial airplanes, so called chemtrails.

[Report](#)**135****conanthebikeman**

17 July 2012 1:45pm

Everything about this idea sounds wrong.

[Report](#)**163****7685Biggles**

17 July 2012 1:45pm

Response to [guthier](#), 17 July 2012 1:29pm

Too difficult, too late and too nasty for our political and financial elite to allow it. Much better (in their view) to have a new tech way of reducing the impact of harvesting all those oil dollars.
Geo-engineering = business as usual. Woohoo!

[Report](#)**74****hithlum**

17 July 2012 1:47pm

Only when it is clear there is absolutely no other alternative.

[Report](#)**18****Books**

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17 July 2012 1:48pm

Response to [guthier](#), 17 July 2012 1:29pm

How about cutting back on emissions in the first place?

Hahaha! What a ridiculous suggestion! Don't you know anything about the importance of large companies getting disgustingly rich at the expense of our planet and everyone on it?

Report



ireadnews

17 July 2012 1:49pm

35

One way or another we will have to learn the effects and effectiveness of this technology. Experimenting allows us to learn more about these activities, substances etc.

Geo-engineering may help, especially when countries such as the USA and China do not follow Kyoto protocol etc.

If we don't test this, then how will we know?

Report



lordmureth

17 July 2012 1:51pm

131

hmmmm. perhaps not the best idea. Say one of my cats was sick on the floor; the best way to clean it up would be to directly remove the sick and stop the cat going into that room again. This approach is more akin to finding another cat, giving it an enema, and hoping that the resulting mess will hide the sick...

Report



Altarboy

17 July 2012 1:51pm

72

It is July in England and it is cold and it has been raining constantly for weeks. It has been raining throughout Europe, Russia and Japan. Artificially lowering the temperature of the Earth does not seem an intuitive solution right now.

Report



DarkHarajuku

17 July 2012 1:51pm

163

These people are TERRORISTS.

Who is giving these people the mandate to do this!!!!

This could result in a global catastrophe.

Report



retrorik

17 July 2012 1:51pm

117

Madness..(the planet) it isn't yours to play with.

Report



wesg

17 July 2012 1:52pm

53

They already do this on a global scale, but from planes and surface to air capabilities ie rockets, from simple experiments to large scale 'nation size' projects, much is for good causes, feeding the people and such, but much dirtiness is hidden behind this veil.... all for 'economic reasons' of course. - (you can find the statement - on almost all UN documents concerning weather modification - that the 'economic benefits' are most important.)

My guess is that they want balloons at fixed strategic locations to create a blanket. - highlander 2 much?

All this effort to change the weather and environment and for what reason? they tell us its to 'save the planet' when the reality is that its to cover up there mess, to mitigate the cost, and benefit politically from the risk. I hate to use the term but people really do need to open their eyes to this, this is a 50 year old + industry, geo-engineering is well beyond its theoretical stage, and is now a global effort by the multi-nationals and the international institutions we so dearly embrace to finally gain global controls on humanity. HARSH i know, but its the reality we face.

Report



sailthedarkenedseas

17 July 2012 1:54pm

This comment was removed by a moderator because it didn't abide by our



DarkHarajuku

17 July 2012 1:55pm

23

the sooner the human species to culled by 90% the better.

If this technology results in disaster maybe in the end it is a good thing. Hope i am long dead by that time though.

Report



Etienne Vieuxtemps

17 July 2012 1:56pm

32

Response to [Jukka Pelkonen](#), 17 July 2012 1:44pm

Many of those people have also been abducted by aliens. But it's still a bad idea. Add more crap to the stuff that's already causing warming. Brilliant idea. Maybe we should just buy the earth a hat.

Report



FredinSpain

17 July 2012 1:56pm

51

So the UK's plan to spray 150 litres of water into the atmosphere was cancelled because of a global outcry

Probably as much as an airliners leaves behind every mile in it's contrail.

Now the Yanks are going to spray 1000's of tonnes of sulphate which is obviously less risky, isn't it?

I wonder who makes the sulphate?

Report



damasene

17 July 2012 1:57pm

32

Response to [Jukka Pelkonen](#), 17 July 2012 1:44pm

Indeed. A shocking number of people.

Report



davidsouthafrican

17 July 2012 1:59pm

27

Response to [ireadnews](#), 17 July 2012 1:49pm

human history - specifically human over-population, anthropogenic climate change and anthropogenic mass extinction belie any confidence we should have in our ability to predict the consequences of our actions

We just aren't that bright- and we need to factor this observation into our plans.

taxation to curb over-consumption, and the consensualisation of the stop-at-two ethos, and ubiquitisation of access to fertility control technology to European standards for poor women globally, will address CO2 production.

But, hey, that would interrupt **business as usual**, and consumerism requires consumption.

This plan is just the astute invention of a new form of consumption

Report



snick

17 July 2012 1:59pm

38

We might as well all just give up now! Man thinks that he can control anything he wants. We are all in for a rude awakening.

Report



liner77

17 July 2012 1:59pm

This comment was removed by a moderator because it didn't abide by our [community standards](#). Replies may also be deleted. For more detail see [our FAQs](#).



ChairmanFelix

17 July 2012 1:59pm

19

It's bloody cold ... any way they could make it a little warmer?

Report



contractor000

17 July 2012 2:00pm

43

Well less warming is welcome - ask the good people of polynia.
So far so good.
And there's no doubt it works - there's plenty of evidence for that in recent history.

So what's the justification ? Presumably, some indication of what moderation can be achieved?

More importantly: This is only temporary.
What it means is that the whole of humanity then feels free to burn more coal, chop more trees, drive more cars, and eat more burgers - and ramp up the sulfate program to counterbalance this,

That means this will increase the global warming potential: The minute you switch off those sulfate hoses, the planet really fries.

Rather than developing geo-engineering and god-complexes, best just burn less fuel. Chop less trees.

And focus on renewables: That's a solution staring us in the face.

Report



xxxFred

17 July 2012 2:00pm

62

Response to [Altarboy](#), 17 July 2012 1:51pm

Just goes to show that you can't rely on intuition. The planet *is* warming. The unseasonably lousy summer we're having here is down to the jet stream having moved further south this year - very likely as a result of man-made climate change.

Having said that, I can't say the idea of man-made climate manipulation fills me with anything other than dread. Far, far too many possibilities for the Law of Unintended Consequences to raise its ugly head....

Report



lierbag

17 July 2012 2:00pm

91

And to think, we thought Al Qaeda were the deranged bad guys.

Report



Liam23

17 July 2012 2:02pm

9

Sadly, a bad idea whose time has come.

We seem to be getting closer and closer to a tipping point, with no sign of emission reduction.

This won't stop warming or acidification, but it may put off crossing a tipping point long enough for us to begin decarbonising our economy.

In short, it might buy us more time.

Report



dauidsouthafrican

17 July 2012 2:02pm

49

sulphate aerosols.... hmmm.... didn't this use to be known as the ingredient that produces acid rain?

Report



Sandrovic

17 July 2012 2:03pm

19

The experiment is in New Mexico.... where all these pesky UFOs keep buzzing their nuclear warheads and shooting down missile tests..... mmmmm..... I sometimes hope ETs exist because they are far more likely to be on the side of the common individual than our "elected governments".....

Report



KoryA25

17 July 2012 2:03pm

23

Response to [guthier](#), 17 July 2012 1:29pm

So add a different pollutant to our atmosphere? You're joking!

Anything we do has an unexpected consequence. So if you solve one problem - up pops another.

Sweeping generalization, no way to prove or disprove those claims at current. This is science. And in science, sometimes you have to put on your big girl panties and step into the unknown. This is a significant step forward for geoengineering. I applaud it.

Only thing we really need to worry about is the dulling of an otherwise blue sky. More particles in the atmosphere scatter light more effectively. If we pump enough of any particle, the sky is bound to become more pale.

As for cutting back on emissions, get off your computer you hypocrite. Or would you rather someone else make all the hard choices and do the work for you?

On a lighter note, because I don't want to end in such a negative fashion, props to Sir Arthur C Clarke, who I noticed is listed in your interests. Good choice, well done.

Report



Tasslehoff

17 July 2012 2:03pm

32

In other news doctors think that infecting their patients the flu virus is a viable treatment for hypothermia. The fever will counteract the effects of the hypothermia, why could possible go wrong?

Report



Liam23

17 July 2012 2:03pm

16

Response to [DarkHarajuku](#), 17 July 2012 1:55pm

the sooner the human species to culled by 90% the better.

Didn't you call the people conducting this test 'terrorists'? Get some perspective.

Report



ThomasChristopherKin

17 July 2012 2:04pm

3

They should magnify the sun's energy on some part of the ocean, distill the water super high up that rises as a result and trickle it via a very very long pipe to the top of some hills/mountains in areas needing the water. Meanwhile the movement of water down the pipe would go through turbines generating electricity.

Clean energy + a side effect of climate change mitigated against.

Report



lierbag

17 July 2012 2:04pm

56

I should add, no surprises from the same country which exploded nuclear weapons in the Earth's upper atmosphere, to see if it could disrupt the planet's magnetic field (the one making the globe habitable) for strategic advantage.

Report



wesg

17 July 2012 2:05pm

21

Response to [sailthedarkenedseas](#), 17 July 2012 1:54pm

<http://weathermodification.com/>

The type of seeding method, whether it's cloud top seeding or cloud base seeding, and the type of measurements required often determine the model of aircraft used for the mission. Weather Modification, Inc. has several types of aircraft available with a wide range of capabilities and cabin capacities. We can also provide operation and maintenance expertise.

Of course thats just one of many businesses that have sprung up. What some might call *"the commodification of weather modification"*

You might not be so quick to label people as nutters in the future.

Report



contractor000

17 July 2012 2:08pm

15

Response to [ireadnews](#), 17 July 2012 1:49pm

We **do** know: It works.

The question might be *"can we emit as much as volcanoes do?"* - the answer there is also known, because we've seen human industries having a significant cooling effect in the early eighties.

So the question is - *To do ? Or not to do ?*

Report



freedomflower

17 July 2012 2:08pm

31

We're gonna break it am't we.

Sorry Planet Earth, you got the short straw.

You got to be home and comfort for Humans and we are not being kind to you.

Sorry...

Report



davidpostlelondon

17 July 2012 2:08pm

2

Those boffins eh?

Report



DarkHarajuku

17 July 2012 2:08pm

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Flamenca

17 July 2012 2:10pm

12

Anything really rather than using strict family planning.... you can't but laugh at this species.

Report



DarkHarajuku

17 July 2012 2:10pm

8

Response to DarkHarajuku, 17 July 2012 1:55PM
the sooner the human species to culled by 90% the better.

Didn't you call the people conducting this test 'terrorists'?
Get some perspective.

=====

ok maybe i am being a little over the top. When world population is under control and reduced maybe a lot of the worlds problems will resolves themselves.

o90% cull is a bit excessive. 50% would be better :)

Report



KoryA25

17 July 2012 2:14pm

2

Response to DarkHarajuku, 17 July 2012 2:10pm

By definition the world population is under control, albeit growing.

When the population becomes too great for the earth's resources we will see a negative population growth (read as mass starvation) and the world population will remain stable. Neither growing, nor decreasing.

Report



AlPanto

17 July 2012 2:14pm

5

And what could possibly go wrong with this? I have been known to emit sulphurous fumes into the atmosphere myself on occasions.

Report



Liam23

17 July 2012 2:15pm

41

Response to DarkHarajuku, 17 July 2012 2:10pm

o90% cull is a bit excessive. 50% would be better :)

A cull is when you deliberately kill members of a population to reduce their numbers. Mass murder is usually considered excessive regardless of the percentage.

Report





contractor000

17 July 2012 2:15pm

7

Response to [freedomflower](#), 17 July 2012 2:08pm

That's nice, I like the empathy with the planet. But heating up a few degrees? The planet don't care.
The only thing we're affecting is life, and the main harm we should be considering is ourselves.

We may render ourselves extinct, but there'll always be life hanging around somewhere.

I'd say: Sorry, humanity - in a few short generations, we may wipe ourselves out.

Report



AnthonyPapagallo

17 July 2012 2:16pm

15

we need Klaatu to turn up now and say 'your Planet?'

Report



allochthonous

17 July 2012 2:17pm

15

This seems to me to be a dangerous road to go down, not least because how (relatively) inexpensive it is - plenty of governments and even individuals could afford to engage in solar geoengineering. If it turns out to have unforeseen consequences, how do you legislate against it, and who pays for the damage? How do you prevent the "weaponisation" of weather (imagine the damage that could be done by depriving certain areas of rain for long periods)? I have a horrible feeling that this is inevitable, but the consequences could potentially be catastrophic, and governments who fund such experiments need to be prepared for this.

Report



adman1982

17 July 2012 2:18pm

4

good in principle but disastrous in practise!

Report



epinoa

17 July 2012 2:20pm

3

Or create a Venus effect and keep the rays in.

Report



deshepherd

17 July 2012 2:21pm

4

Response to [guthier](#), 17 July 2012 1:29pm

Anything we do has an unexpected consequence. So if you solve one problem - up pops another.

If this actually works the you may be right emissions control to prevent acid rain has lead to a significant reductions of production of sulphate emissions which in turn may be leading to warming. So solving the acid rain problem may have just created another. N.b. I have read that one of the reasons why warming at the moment may be lower than predicted is that the Chinese are building lots of coal fired power stations!

Report



DarkHarajuku

17 July 2012 2:24pm

11

So there must be global consensus for these governments to do this as the ramifications are global

Report



Internationalised

17 July 2012 2:28pm

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