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From The Sunday Times

August 30, 2009

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## Man-made volcanoes may cool Earth



The Anak Krakatau volcano

Jonathan Leake, Environment Editor

10 COMMENTS | RECOMMEND? (5)

THE Royal Society is backing research into simulated volcanic eruptions, spraying millions of tons of dust into the air, in an attempt to stave off climate change.

The society will this week call for a global programme of studies into geo-engineering — the manipulation of the Earth's climate to counteract global warming — as the world struggles to cut greenhouse gas emissions.

It will suggest in a report that pouring sulphur-based particles into the upper atmosphere could be one of the few options available to humanity to keep the world cool.

The intervention by the Royal Society comes amid tension ahead of the United Nations-sponsored climate talks in Copenhagen in December to agree global cuts in carbon dioxide

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emissions. Preliminary discussions have gone so badly that many scientists believe geo-engineering will be needed as a “plan B”.

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Ken Caldeira, an earth scientist at Stanford University, California, and a member of a Royal Society working group on geo-engineering, said dust sprayed into the stratosphere in volcanic eruptions was known to cool the Earth by reflecting light back into space.

“If I had a dollar for geo-engineering research I would put 90 cents of it into stratospheric aerosols and 10 cents into everything else,” said Caldeira.

The interest in so-called aerosols is linked to the eruption of Mount Pinatubo in the Philippines in 1991, the second largest volcanic eruption of the 20th century. The explosion blasted up to 20m tons of tiny sulphur particles into the air, cooling the planet by about 0.5C before they fell back to earth.

The Royal Society is Britain's premier science institution and its decision to take geo-engineering seriously is a measure of the desperation felt by scientists about climate change.

Brian Launder, a professor at Manchester University, who is also on the working group, recently said that without CO2 reductions or geo-engineering “civilisation as we know it will end within our grandchildren's lifetime”. “The only rational scheme is to reduce the sunlight reaching Earth and to reflect back more of it,” he said.

The world's population generates the equivalent of 50 billion tons of CO2 a year, a figure which is projected to reach 60-70 billion tons by 2030 on current trends.

Scientists warn that the planet could warm by 5C by 2100 and say emissions must fall to 20 billion tons a year by 2050 if a disaster is to be averted.

However, many researchers and policymakers regard this target as impossible.

The Royal Society report is expected to draw partly on research by Tim Lenton, professor of earth sciences at the University of East Anglia, who has just completed the first big comparison of different forms of geo-engineering.

“We estimate that 1.5-5m tons of sulphate particles could be released [artificially] into the stratosphere each year on a recurring basis,” said Lenton.

“This is quite a small amount, which makes it potentially economically viable, but it could reduce global temperature rise by up to 2C.”



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The study investigates several other proposals for geo-engineering, dividing them into two broad approaches. One approach involves reducing the sunlight reaching the Earth's surface — a premise that lies behind both aerosol release and the construction of mirrors in space.

Lenton regards the latter idea as “science fiction”, pointing out that any space sunshade would need a surface area of 1.8m square miles to be effective.

Another suggestion for cutting the light reaching the Earth is cloud-whitening, where salt water is sprayed into the air from thousands of ships, producing brighter clouds.

However, the Met Office has attacked this idea in its submission to the Royal Society, warning that it could cut rainfall in areas such as the Amazon and Africa.

Vicky Pope, head of climate change advice at the Met Office, said: “If humanity starts messing with the world's cloud systems it is bound to have major side effects, some of which will be dangerous.”

The other main approach to geo-engineering is to try to accelerate the rate at which CO2 is removed from the air by plants and ocean plankton, or through chemicals.

This is the basis of ideas such as ocean fertilisation, where nutrients such as iron are added to water to promote plankton growth. Plankton absorb CO2 as they grow and carry it down to the seabed when they die.

Such techniques would have relatively few adverse side effects but the disadvantage, the report will say, is that they would take far too long to make significant cuts in atmospheric CO2.

The same criticism applies to the idea of using giant artificial filters driven by nuclear power that chemically strip CO2 from the air.

John Shepherd, professor of earth system science at the National Oceanography Centre in Southampton, who chaired the Royal Society working party, is expected to warn of other problems. Any measures that are taken may have to be kept going for decades or even centuries.

Met Office research has suggested that if techniques such as sulphate aerosols were to be suddenly discontinued the Earth could experience a disastrous warming surge.



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#### YOUR COMMENTS

10 Comments (Displaying 1-10)

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**Neil Douglas wrote:**

The ice caps on Mars have receded and I'm pretty sure my car is not causing that. I think before following foolish scientist's ideas we should recognize solar cycles as the cause.

I don't want to wake up one day and hear the news that making man made volcanoes was a mistake and that the next ice age is on us.

August 30, 2009 10:00 PM BST

RECOMMEND? (3)

**Libby Philips wrote:**

I'll be writing to The Royal Society asking if they'll exclude Halifax in this business as I've hardly been warm all summer and I've filled my hot water bottle more nights than not. Neither have I seen much of the sun during the day.

Should this go ahead my central heating bill will be astronomical.

August 30, 2009 8:32 PM BST

RECOMMEND? (3)

**Laurence Tenney wrote:**

Why dust? How about introducing (much more reflective) H<sub>2</sub>O?

August 30, 2009 3:57 PM BST

RECOMMEND?

**ALBERTBRUCE BEST wrote:**

Where will you hide when the mountains begin to melt? How much heat will the nuclear explosions put into the mountain? How much radiation will humanity be exposed to in order to lower the temperature 2 degrees C ? It is bad enough when we destroy the planet several times with a nuclear war. But are you telling God that He screwed up the climate and that we are going to fix his errors with atom bombs. Capping all the oil wells in the world would be more effective...Muslim birth control would result...They could not afford multiple wives...and we would stop using our cars...a win-win situation...the emergency caused by the capped oil wells would cause us to develop solar energy and wind power. A friend of mine who smokes cigarettes told me that cattle produce more green house gasses than smokers...OK! outlaw smokers and cows...That makes more sense than pumping atom bombs into the mountains. Why do we get all bent out of shape about underground nuclear weapons testing A La North Korea...and allow our "scientists" to solve all the worlds problems by doing the same thing. What you you are proposing will hasten the prophecy that the mountains will melt with fervent heat...a very stupid idea.

August 30, 2009 12:36 PM BST

RECOMMEND?

**Dwight Vandryver wrote:**

On BBC News 24, the presenter tried to explain the effects and mechanisms of El Niño, but freely admitted that very little was known. The same could be said of La Niña, the Jet Stream, and other major climate systems.

Bearing in mind the paucity of knowledge about climate and its causes, any experimental tampering with the atmosphere is both dangerous and stupid.

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Backing ridiculous ideas like this one will bring the Royal Society into disrepute. Similarly, the Copenhagen convention will produce expensive and perilous schemes that no rational person, let alone governments, would adopt.

There is no escape from this planet: "if in doubt, don't" has to be the motto. It is far better that we take our chances with CO2 levels rising if we can't reduce them, as the level has been much higher in the past than now during the Earth's history, and it survived.

August 30, 2009 10:48 AM BST

RECOMMEND? (2)

**Alex No wrote:**

That's just great. We're going to be breathing in sulphur dust all the day. Be great for our health.

August 30, 2009 10:12 AM BST

RECOMMEND?

**Saul Holguin wrote:**

I find this article rather disturbing. We the people should do what we must: recycle, limit our waste, save water, make technological gadgets recycle- eable; also our government should enforce a strict discipline in people to be more involved and conscientious about missuse and waste of goods.

August 30, 2009 9:12 AM BST

RECOMMEND? (2)

**Mike Fitzpatrick wrote:**

Add something(sulphate) to jet fuel or jet exhaust, so the contrails would last longer. Wouldn't it reflect light back and shade the ground, some what.

August 30, 2009 8:42 AM BST

RECOMMEND? (1)

**John Smith wrote:**

Desperate times call for desperate measures but these are not times for crazy ones. If sunlight were blocked, what would be the effect on vegetation and therefore animals that feed on it?

August 30, 2009 12:10 AM BST

RECOMMEND? (2)

**Mord . wrote:**

easy...  
drill a very deep hole.  
chuck a few nukes down it at staged depths...  
stand very well back....  
and press the button!

Result: 1xDIY volcano

August 29, 2009 10:00 PM BST

RECOMMEND? (2)

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