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Climate scientists convene global geo-engineering summit

Meeting in California in March will discuss possible field trials of schemes that would tackle climate change by reflecting sunlight or fertilising the ocean with iron

David Adam, environment correspondent
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Scientists are to hold a high-level summit to discuss how the world could take emergency measures such as blocking out the sun to slow dangerous global warming.

Experts from around the world have been invited to attend the meeting in March in California, which will examine possible field trials of so-called geo-engineering schemes, such as pumping chemicals into the air and oceans to combat climate change.

The move follows the failure of the recent Copenhagen climate talks to set meaningful carbon reduction targets, and comes amid mounting concern that such controversial techniques may be the only way to curb rising temperatures.

Mike MacCracken, a global warming expert at the Climate Institute in Washington DC, who is organising the conference's scientific programme, said: "Most of the talk about these geo-engineering techniques say they should be saved until we get to an emergency situation. Well the people of the Arctic might say they are in an emergency situation now."

He added: "It is hard to see how mitigation [carbon cuts] can save the Arctic and losing the Arctic is a tremendous risk, not just for the region but for the rest of the world. So are there other ways to save it?"

Without significant cuts in greenhouse gas emissions, scientists say global average temperatures could rise by 4C within many of our lifetimes, which could devastate wildlife and threaten the water and food supplies of hundreds of millions of people.

Geo-engineering techniques, such as filling the sky with shiny dust to reflect sunlight, could curb such temperature rises without the need to restrict greenhouse gas emissions. The meeting aims to assess risks and benefits, establish ground rules for research and plan experiments that would be needed before a full scale geo-engineering attempt.

Calls for such research have increased as pessimism grows about the likely course of global warming.

In an influential report last year, the Royal Society, Britain's premier scientific academy, concluded that geo-engineering methods that block out the sun "may provide a potentially useful short-term back-up to mitigation in case rapid reductions in global temperature are needed". The society stressed that emissions reductions were the primary solution, but recommended international research and development of the "more promising" geo-engineering techniques.

Bob Watson, chief scientist at the Department for Environment, Food and Rural Affairs, told the Guardian in November he backed such research. "We should at least be looking at it. I would see what the theoretical models say, and ask ourselves the question: how can we do medium-sized experiments in the field," Watson said. "I think it should be a real international effort, so it isn't just the UK funding it."

MacCracken said: "If there is going to be funding for this kind of research and you are someone in the UK government, then what kind of safeguards do you want to have in place that nothing can go wrong? Because if something does go wrong then you could be up before parliament or worse."

He added: "We also have to be mindful about how we communicate these ideas to the public because some of them can sound a little like Doctor Strangelove."

He said the March meeting was based on a landmark gathering of scientists involved in research with genetically modified (GM) organisms in 1975, which established voluntary guidelines to protect the public, and paved the way for breakthroughs such as the mass production of synthetic insulin in GM bacteria. The geo-engineering conference will take place at the same Asilomar centre, on the Monterey Peninsula.

Some scientists have criticised the upcoming conference because its funding is being arranged by a US group called the Climate Response Fund, which promotes geo-engineering research, and is run by Margaret Leinen, a marine biologist. Leinen's son, Dan Whaley, runs a firm called Climos, a company set up to profit from geo-engineering by selling carbon credits generated by fertilising ocean plankton with iron. Leinen was formerly chief scientific officer with Climos, but told Science magazine she has taken all possible steps to avoid a conflict of interest, and no longer holds a position, shares or intellectual property in the firm.

MacCracken said one aim of the conference was to judge which techniques could work on a global scale, which could count against ocean iron fertilisation. "We don't want to go out and test approaches that could not be scaled up enough to be useful. Would we risk doing anything in the ocean that would only have a small effect? Almost certainly not."

The push towards geo-engineering research has not pleased everyone. A recent report (pdf) for the Swedish Society for Nature Conservation by the ETC group called geo-engineering an act of "geo-piracy" and warned that the "the world runs a serious risk of choosing solutions that turn out to be new global problems".

There are also concerns about how to regulate geo-engineering and whether its techniques could be developed and unleashed by a single nation, or even a wealthy individual, without wide international approval.

The House of Commons science and technology committee will tomorrow open an inquiry into the regulation of geo-engineering, with [David MacKay](#), chief scientist at the Department of Energy and Climate Change, among those due to give evidence.

From artificial trees to giant space mirrors: Possible geo-engineering solutions

Stratospheric aerosols

Spray shiny sulphur compounds into the high atmosphere to reflect sunlight. Relatively cheap and easy to do, though the chemicals gradually fall back to earth. The most likely option, though possible side effects include changes to global rainfall.

Ocean fertilisation

Dump iron into the sea to boost plankton growth and soak up carbon dioxide from the atmosphere. Hard to do on a significant scale, and doubts about how deep the plankton would sink have raised doubts about how long the carbon would be secured.

Cloud whitening

Fleets of sailing ships strung across the world's oceans could spray seawater into the sky to evaporate and leave behind shiny salt crystals to brighten clouds, which would then reflect sunlight back into space. Could be turned off at any time, but might interfere with wind and rain patterns.

Space mirrors

A giant orbiting sunshade in space to block the sun. More likely to be a collection of millions or even trillions of small mirrors rather than a giant orbiting parasol. Very expensive and impractical with current technology.

Artificial trees

Devices that use a chemical process to soak up carbon dioxide from the air. Technically possible but very expensive on a meaningful scale.

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