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Geo-engineering and the SPICE project field test

ISSUE

On 13 September 2011 a UK research council-funded project, the Stratospheric Particle Injection for Climate Engineering (SPICE), will formally announce at the British Science Festival its intention to perform field tests. Two articles[1] have already appeared in the Guardian raising alarm at this "government-funded" geo-engineering experiment.

LINES TO TAKE

- Our priority is to tackle the human causes of global warming at source by reducing human emissions of greenhouse gas emissions. Some impacts will be unavoidable and we will need to adapt to those.

- We recognise that some geo-engineering techniques *may* have a role to play in the future in supporting our mitigation efforts but current understanding of the risks, benefits, impacts, costs and feasibility of these techniques is at a very low level.

- We need to be clear that research is not a first step to deployment. Research increases understanding of the issue and allows rational discussion and evidence-based policy on geo-engineering to be developed.

- We need to understand all options available to us ahead of an emergency situation, that is, if "dangerous" climate change becomes imminent and mitigation measures are insufficient on their own.

- The SPICE field tests will not perform geo-engineering. The purpose of these tests is to assess the engineering feasibility of a potential delivery system only.

- The only geo-engineering research which DECC has funded is computer-modelling studies at the Met Office Hadley Centre to understand the environmental impacts of some of the highest profile geo-engineering techniques.

KEY POINTS

- The SPICE project aims to look at the impacts, efficacy, costs and feasibility of placing sulphate particles into the upper atmosphere in order to reduce global average temperature. An evaluation of delivery systems will be included as part of this project and small-scale field tests are planned to assess the cost and technical viability of sulphate injection to the stratosphere via large, tethered balloons. The intention is to spray water, and not sulphates, in these tests and no effect on the weather or climate is expected. EPSRC have confirmed that they do not plan to fund any experiments involving spraying sulphates or other particles into the atmosphere.

- A quote from the Erosion, Technology and Concentration (ETC) Group (a Canadian pressure group) in the Guardian article claims that the field test "shows the UK

[1] http://www.guardian.co.uk/environment/2011/aug/31/pipe-balloon-water-sky-climate-experiment
http://www.guardian.co.uk/commentisfree/2011/sep/02/giant-balloon-and-hosepipe-geoengineering

Government's disregard for UN processes", referring to the 2010 decision by Parties to the UN Convention on Biological Diversity to ban large-scale geo-engineering activities that may have an impact on biodiversity before adequate scientific understanding and regulatory mechanisms are in place. While further clarification is needed on the definition of "large-scale", it is thought that the SPICE field tests do not contravene this ban as they will be very limited in size and are not expected to have an effect on the atmosphere.

- The Guardian articles state that SPICE is "government-funded". The project is funded jointly by the Natural Environment Research Council (NERC) and the Engineering and Physical Sciences Research Council (EPSRC), which are non-departmental public bodies principally funded by the Department for Business, Innovation and Skills (BIS).

BACKGROUND

- Geo-engineering techniques can be broadly placed into two categories: Carbon Dioxide Removal (CDR) which seeks to remove carbon dioxide, and other greenhouse gases, directly from the atmosphere; and Solar Radiation Management (SRM) which aims to reflect a proportion of sunlight back out to space.

- The technique being investigated by the SPICE project in theory emulates the effects of a volcanic eruption which lead to cooling of the global average temperature. This SRM technique could potentially reduce global temperature quickly (over a few years). However, computer modelling studies of both volcano effects and stratospheric sulphate[2] suggest that there may be other unintended effects, including changes to rainfall patterns, that will not be evenly distributed across the globe and could lead to detrimental impacts, such as drought, in some regions. As with all SRM techniques, this would also not address ocean acidification which is a consequence of rising carbon dioxide levels in the atmosphere.

- NERC and the EPSRC, with support from the Science Media Centre, will be providing a formal press briefing on SPICE and the planned tests at the British Science Festival on 13 September. This briefing will describe the SPICE project and its aims, and will confirm that no geo-engineering will actually take place. NERC will also be releasing a podcast on the SPICE project on their Planet Earth website[3].

- The NERC and EPSRC are principally funded by BIS but prioritisation of an individual research council's spending within its allocation is not a decision for Ministers. This has been crucial to the international success of British science. The "Haldane principle" means that decisions on individual research proposals are best taken by researchers themselves through peer review. This involves evaluating the quality, excellence and likely impact of science and research programmes. The coalition Government support this principle as vital for the protection of academic independence and excellence.

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[2] For example, Jones et al. (2010): Geoengineering by stratospheric SO_2 injection: results from the Met Office HadGEM2 climate model and comparison with the Goddard Institute for Space Studies ModelE. *Atmospheric Chemistry and Physics*, 10, 5999-6006.

[3] http://planetearth.nerc.ac.uk/