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Physics > Physics and Society

Title: Climate Engineering Responses to Climate Emergencies

Authors: [J. J. Blackstock](#), [D. S. Battisti](#), [K. Caldeira](#), [D. M. Eardley](#), [J. I. Katz](#), [D. W. Keith](#), [A. A. N. Patrinos](#), [D. P. Schrag](#), [R. H. Socolow](#), [S. E. Koonin](#)

(Submitted on 29 Jul 2009 ([v1](#)), last revised 31 Jul 2009 (this version, v2))

Abstract: Despite efforts to stabilize CO₂ concentrations, it is possible that the climate system could respond abruptly with catastrophic consequences. Intentional intervention in the climate system to avoid or ameliorate such consequences has been proposed as one possible response, should such a scenario arise. In a one-week study, the authors of this report conducted a technical review and evaluation of proposed climate engineering concepts that might serve as a rapid palliative response to such climate emergency scenarios.

Because of their potential to induce a prompt (less than one year) global cooling, this study concentrated on Shortwave Climate Engineering (SWCE) methods for moderately reducing the amount of shortwave solar radiation reaching the Earth. The study's main objective was to outline a decade-long agenda of technical research that would maximally reduce the uncertainty surrounding the benefits and risks associated with SWCE. For rigor of technical analysis, the study focused the research agenda on one particular SWCE concept--stratospheric aerosol injection--and in doing so developed several conceptual frameworks and methods valuable for assessing any SWCE proposal.

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