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Global Response to Global Warming: Geoengineering with Stratospheric Aerosols

JONATHAN KATZ, Washington University

Despite efforts to stabilize the atmospheric CO_2 concentration, it is possible that the climate system could respond abruptly with unanticipated catastrophic consequences. Intentional intervention ("geoengineering") has been proposed to avoid or ameliorate such consequences has been proposed. One contemplated intervention would be the injection of artificial aerosols into the stratosphere to reduce the amount of shortwave (visible and near-IR) Solar radiation reaching the surface of the Earth. Natural volcanic injections of sulfate aerosols are known to produce short-lived (about a year) cooling, providing a "proof of principle". Artificial production and injection of aerosols involves a number of poorly understood physical and chemical processes, as well as a choice of aerosol material and injection method. I will outline some of these technical issues and unanswered questions.