

Global warming tactic cools climate but won't help corals, say researchers

July 3 2009, by Christine Blackman

(PhysOrg.com) -- “Geoengineering” experiments proposed to reduce global warming by blocking sunlight with atmosphere-injected particles may cool the world but still leave carbon dioxide levels dangerously high, Stanford scientists say.

Sunlight-blocking particles would fail to solve the problems of [ocean acidification](#) and dying corals, two significant repercussions of climate change, according to a study by Ken Caldeira of Stanford University and the Carnegie Institution, Damon Matthews of Concordia University, and Long Cao of the Carnegie Institution. Atmospheric [carbon dioxide](#) dissolves in ocean water, making it more acidic and difficult for animals to build their shells or skeletons, especially corals.

Proponents of geoengineering have called for injecting small, reflective particles into the atmosphere to partially block sunlight and cool the earth, just as ash from an [erupting volcano](#) does. The resulting carbon-dioxide-rich climate would cause land plants to grow more vigorously, hold onto more carbon and release less to the ocean. But the difference would not be enough to fundamentally alter the plight of coral reefs, Caldeira said.

The researchers used computer models of the Earth's climate system and biosphere to simulate the effect of sunlight-reflecting particles on climate and [ocean chemistry](#). Such geoengineering methods “might be able to address some of the climate effects of carbon dioxide but they don't fundamentally address the chemical effects posed by carbon

dioxide,” Caldeira said.

“Instead of taking till 2050 until there’s no place left in the ocean where corals can survive, it might be 2053. The carbon cycle effects of the geoengineering might delay that outcome in the ocean by a few years but wouldn’t prevent those outcomes from occurring,” he said. The scientists’ work was published in *Geophysical Research Letters*.

Despite the limitations, Caldeira and many other scientists support geoengineering research. David Victor, director of the Program on Energy and Sustainable Development at Stanford, presents a case for studying and testing such tactics as emergency measures.

“Geoengineering could provide a useful defense for the planet—an emergency shield that could be deployed if surprisingly nasty climatic shifts put vital ecosystems and billions of people at risk,” Victor wrote in *Foreign Affairs* with colleagues from Carnegie Mellon University and the University of Maryland.

The paper, entitled *The Geoengineering Option*, presents methods for increasing the earth’s reflectivity, such as injecting particles in the atmosphere, as “the most promising method for rapidly cooling the planet.” The authors contend that injecting reflective materials into the atmosphere would be easy and cost-effective and could crudely offset warming.

Although these methods potentially interfere with weather patterns and fail to reduce carbon dioxide concentrations and [ocean acidification](#), Victor and colleagues call for a broad and solid foundation of geoengineering research. “The scientific academies in the leading industrialized and emerging countries—which often control the purse strings for major research grants—must orchestrate a serious and transparent international research effort funded by their governments,”

Victor and his colleagues wrote in the paper.

More information:

www.agu.org/pubs/crossref/2009/2009GL037488.shtml

Provided by Stanford University ([news](#) : [web](#))

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