UC Center Sacramento

Climate Geoengineering: The Good, the Bad and the Ugly

Kate Ricke, UC San Diego

Wednesday
March 4th

12:00—1:00pm

UC Center Sacramento
1130 K Street
Room LL 22
Sac, CA 95814

Register by:
February 26th at:
uccs.ucdavis.edu

Lunch will be served

Tinkering with the Earth's radiation balance to counteract global warming may seem like a terrible idea, but in climate models it works remarkably well to counteract effects of rising greenhouse gases (GHGs) in the atmosphere. Experiments using sophisticated models show that when solar forcings are used to cancel GHG forcings, residual changes to temperature and precipitation are much smaller than before this geoengineering was applied – even regionally. Large volcanic eruptions from the recent past provide rare direct observational data to verify our models of analogous forcings.

Some negative side effects are known. Stratospheric geoengineering is technically feasible and inexpensive, but could lead to substantial destruction of stratospheric ozone. Earth's hydrological system responds differently to solar forcings than longwave forcings from GHGs, so geoengineering cannot simultaneously restore temperature and precipitation. Resulting changes in Earth's circulation produce heterogeneous regional effects. Geoengineering restores climates of some regions better than others, and different regions would likely prefer different amounts of geoengineering.

The biggest shortcomings of solar geoengineering may be in poor assumptions about which problems it could be used to address. Its effects are felt in the climate system much more rapidly than reductions of GHGs, but there is no evidence that even rapid cooling could counteract catastrophic climate change once a tipping point is reached. The effective use of geoengineering under the circumstances it's most needed could require the same type of foresight we have not been able to employ for emissions abatement.

Kate Ricke in an assistant professor at the School of Global Policy & Strategy and holds a joint appointment with the Scripps Institution of Oceanography. She is a climate change scientist who integrates tools from the physical and social sciences to analyze climate policy problems. Central to her work is accounting for uncertainty and heterogeneity—both in the effects of climate change and in preferences for how to address them. Ricke recently served as a research associate in the Sibley School of Mechanical and Aerospace Engineering at the Cornell University and a fellow at the Carnegie Institution for Science. Her current research includes topics ranging from the regional climate effects and international relations implications of solar geo-engineering to decadal climate variability's influence on international climate agreements. She's assessed uncertainty in phenomena, including ocean acidification's effects on coral reefs and the warming effect from an emission of carbon dioxide today.

For questions contact Brooke Miller-Jacobs at (916) 445-5161 or bmmillerjacobs@ucdavis.edu