

pollution-climate interactions"

Dr. Daniel Jacob
Professor
Harvard University

Abstract:

Atmospheric aerosols are of considerable concern for a wide range of environmental issues from public health to climate change. Satellites can observe aerosol concentrations with high spatial and temporal resolution, but extracting quantitative aerosol information from satellite data is difficult. I will present a new method to retrieve aerosol optical depths and surface aerosol concentrations from the MODIS satellite sensor, and apply it to the United States as part of a broader observing system including surface sites and aircraft. I will show from this analysis that current models overestimate sulfate aerosol and underestimate organic aerosol in the US, and will discuss possible explanations. Anthropogenic sources of aerosols in the U.S. are presently decreasing in response to public health concerns, and I will use a general circulation model (GCM) to examine the implications for regional climate. Finally, I will show through correlations of U.S. aerosol concentrations with meteorological variables that climate change could have a significant effect on aerosol air quality.

The speaker:

Daniel Jacob's (<http://www-as.harvard.edu/people/faculty/djj/>) research interests lie in the chemical composition of the atmosphere, its perturbation by human activity, and the implications for climate change and life on Earth. His approaches include global modeling of atmospheric chemistry and climate, aircraft measurement campaigns, satellite data retrievals, and analyses of atmospheric observations. Dr. Jacob was ranked 16th "hottest research in the world" (2005) and "Highly Cited Researcher" (6th most cited author in Geosciences, 1991-2001) by the Institute for Scientific Information (ISI). He was past Chairs of NASA Earth Science Subcommittee, Community Climate System Model (CCSM) Advisory Board, NRC Committee on Radiative Forcing Effects on Climate, and Clean Air Task Force Advisory Board. As NASA Mission Scientist, Dr. Jacob led several aircraft missions including ARCTAS during the International Polar Year (IPY) in 2008. He was Lead Author for Chapter 7 of the 2007 IPCC Fourth Assessment Report and Author of the EPA Ozone Criteria Document (2005). Dr. Jacob received his Ph.D. in Environmental Engineering from Caltech in 1985. He is currently the Vasco McCoy Family Professor of Atmospheric Chemistry and Environmental Engineering at Harvard University, where he has been on the faculty since 1987.