



Institute Lecture

The Earth's Changing Climate System: Past to Future

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Thursday, 17th March, 2011; Time: 6:00 PM, Venue: L-1, Lecture Hall Complex

Abstract

The Earth's climate system has undergone changes over a diverse range of space and timescales. Observations over the 20th century reveal that several climate variables of direct interest to society have undergone substantial changes e.g., temperature, rainfall, sea-level. What are these changes and how well do we understand them? This presentation will discuss how the mathematical modeling of the climate system composed of the atmosphere, oceans, and land is employed to obtain a fundamental scientific understanding. Numerical simulations together with observations enable us to analyze the agents and mechanisms that force changes in climate. We will explore the degree to which the observed phenomena and changes in temperature and rainfall that have occurred over the different continents can be explained on the basis of the known science. The detection and explanation of climate changes from the past to the present establish the foundation for making credible predictions of climate in the future e.g., forecasting the extremes in climate over the 21st century. We will also discuss the strengths and weaknesses in the state-of-the-science, as well as the unresolved issues and challenges.

About the speaker

Dr. Ramaswamy is Director of the Geophysical Fluid Dynamics Laboratory located in Princeton (New Jersey, USA) where he joined as a Research Scientist in 1987. During his tenure at GFDL, he has come to be considered one of the leaders in climate modeling in the world. His career has been devoted to advancing our understanding of atmospheric physics in climate, incorporating this knowledge in climate models, and using complex climate models in conjunction with observations to understand the role of natural and human-influenced factors in climate change. Dr. Ramaswamy also holds the rank of Professor in the Atmospheric and Oceanic Sciences Faculty at Princeton University, where he teaches a course in Atmospheric Physics and mentors graduate students and postdoctoral researchers. He is a native of Kanpur where he attended Methodist High School before going on to obtain Bachelor's and Master's degrees in Physics from Delhi University. He obtained a Ph.D. in Atmospheric Science from the State University of New York at Albany, and later was a Fellow in the Advanced Study Program at the National Center for Atmospheric Research (Colorado). At GFDL, he directs one of the premier climate science modeling centers of the world, with the mission to construct advanced numerical models for understanding climate and climate change, and for making projections of climate in the future. His published research includes over 130 papers on climate in refereed journals. He has been extensively involved as an Author on the major climate science assessments of the Intergovernmental Panel for Climate Change (IPCC). He has played a leading role in the US Global Change Research Program reports and has served on the World Climate Research Program. Dr. Ramaswamy is a Fellow of the American Geophysical Union (AGU) and American Meteorological Society (AMS), and is a recipient of other honors and awards including being a co-recipient of the 2007 Nobel Peace Prize awarded to the IPCC.

All interested are welcome.

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