

The Faculty of Science and  
the Bolin Centre for Climate Research  
invite to the Bolin lecture 2013:

Future Development of Climate and Earth System Models  
for Scientific and Policy Use

**Warren M. Washington**  
National Center for Atmospheric Research



In 2010, Dr. Washington was awarded the National Medal of Science by President Obama.

**When?** 17 May. 14:00-15:30

**What?** Lecture and mingel

**Where?** Stockholm University, Aula Magna

**How?** Register by sending an e-mail to Lina Enell, [lina.enell@su.se](mailto:lina.enell@su.se)  
before 6 of May.

Observe that the lecture will be held in english.

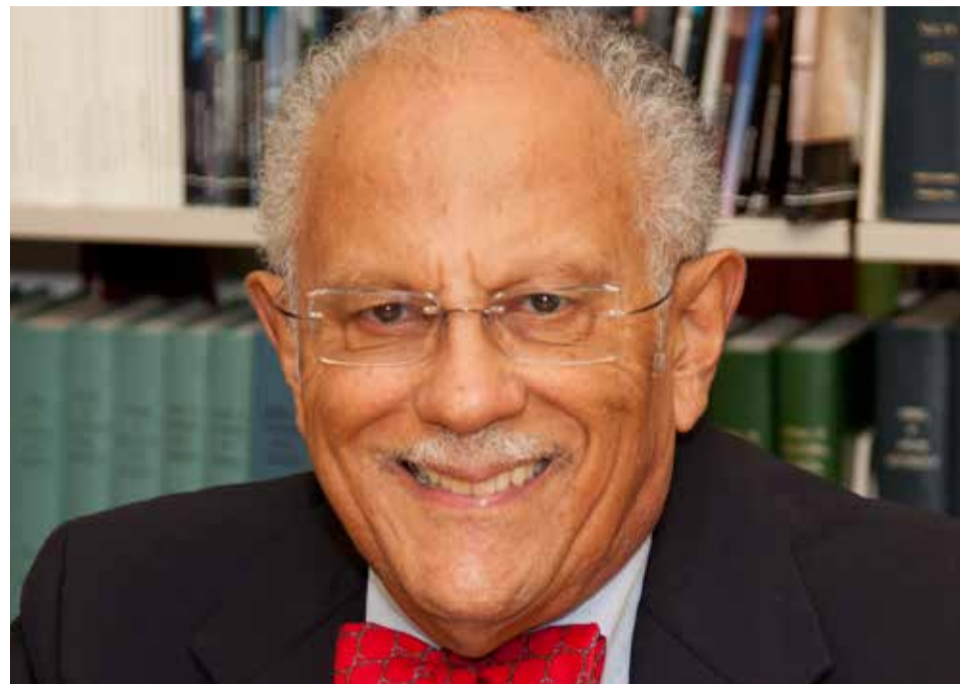
The Bert Bolin Lecture on Climate Research is given annually in May to commemorate professor Bert Bolin and his pioneering work for climate research at Stockholm University and internationally. The speaker is selected among prominent scientists within climate research by the Faculty of Science.

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## Who is Warren M. Washington?

WARREN M. WASHINGTON is a senior scientist, former head of the Climate Change Research Section and former director of the Climate and Global Dynamics Division at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado.

His expertise is in atmospheric and climate research. He has engaged in research for nearly 50 years, and he has given advice, testimony, and lectures on global climate change. Dr. Washington has been a member the President's National Advisory Committee on Oceans and Atmosphere and has had presidential appointments under the Carter, Reagan, Clinton, and Bush administrations. More recently, he served on the National Science Board as a member and as its chair. He has more than 150 publications and co-authored with Claire Parkinson a book that is considered a standard reference on climate modeling, *An Introduction to Three-Dimensional Climate Modeling*, and an autobiography, *Odyssey in Climate Modeling, Global Warming, and Advising Five Presidents*. Dr. Washington has many awards, including being a member of the National Academy of Engineering, the American Meteorological Society (former president), the American Philosophical Society, and the American Academy of Arts and Sciences. Dr. Washington has honorary degrees from Oregon State University and Bates College. He is also Principal Investigator and Chief Scientist for the University for Atmosphere



ric Research and U. S. Department of Energy Cooperative Agreement that carries out climate research. In 2010, he was awarded the National Medal of Science by President Obama, the nation's highest science award. Dr. Washington earned a B.S. in physics and a M.S. in meteorology from Oregon State University and a Ph.D. in meteorology from Pennsylvania State University. He has served on a number of National Research Committees of the National Academies, and is currently serving as chair of the Committee to Advise the U.S. Global Change Research Program.

## Lecture Summary:

The development of climate and Earth system models has been regarded primarily as the making of scientific tools to study the complex nature of the Earth's climate. These models have a long history starting with very simple physical models based on fundamental physics in the 1960s. Over time they have become much more complex with atmospheric, ocean, sea ice, land/vegetation, biogeochemical, glacial and ecological components. The policy use aspects of these models did not start in the 1960s and 1970s as decision making tools but were used to answer fundamental scientific questions such as what happens when the atmospheric carbon dioxide concentration increases or is doubled. They gave insights into the various interactions and were extensively compared with observations. It was realized that models of the earlier time periods could only give first order answers to many of the fundamental policy questions. As societal concerns about climate change rose, the policy questions of anthropogenic climate change became better defined; they were mostly concerned with the climate impacts of increasing greenhouse gases, aerosols, and land cover change. In the late 1980s, the United Nations set up the Intergovernmental Panel on Climate Change to perform assessments of

the published literature with the leadership of Bert Bolin. Thus, the development of climate and Earth system models became intimately linked to the need to not only improve our scientific understand but also answering fundamental policy questions. In order to meet this challenge, the models became more complex and realistic so that they could address these policy oriented science questions such as rising sea level.

The presentation will discuss the past and future development of global climate and Earth system models for science and policy purposes. Also to be discussed is their interactions with economic integrated assessment models, regional and specialized models such as river transport or ecological components. As an example of one development pathway, the National Science Foundation and U.S. Department of Energy supported Community Earth System Model will be featured in the presentation. Computational challenges will also be part of the discussion along with new results on future climate change projections.