ATS/CIRA Colloquium

Roger A. Pielke, Sr.

Senior Research Scientist, University of Colorado CIRES/ATOC,
Professor Emeritus Department of Atmospheric Science at CSU

Climate Threats: A More Inclusive Assessment Is Needed

Hosted by Bill Cotton

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ATS room 101; Discussion will begin at 11:15am
Refreshments will be served at 10:45am in the weather lab

The natural causes of global, regional, and local climate variations and changes are important, but the human influences are also significant. However, the Intergovernmental Panel on Climate Change (IPCC) and other climate assessments have too narrowly focused on CO2 and a few other greenhouse gases in altering local, regional and global climate and their effects on multi-decadal predictability. Also, climate is much more than just global warming.

In reality, human forcings involve a diverse range of first-order climate forcings including the influence of human-caused aerosols on local, regional and global radiative heating, the effect of aerosols on clouds and precipitation, the influence of aerosol deposition (e.g. soot; nitrogen) on surface fluxes of heat and water, the effect of land cover/ land use change and management on weather, and the biogeochemical effect of added atmospheric CO2. Most, if not all, of these human influences on local, regional and global climate will continue to be of concern during the coming decades. These forcings are more spatially heterogeneous than added CO2 and thus could have a greater impact on atmospheric and ocean regional circulation patterns, and thus on the frequency and spatial extent droughts, floods, heat waves, etc. Even if CO2 (and other greenhouse gas) concentrations were stabilized at a low level, the challenge of addressing first-order human influences on the climate system would not be solved.

In my talk, I will present evidence for these other climate forcings, as well as provide examples that document the very limited skill of climate models to predict changes in global, regional and local climate. This limited, or absent, predictive skill necessarily restricts their value to provide quantitative accurate predictions of climate impacts to society and the environment in the future.

Fortunately, there is a more effective, alternative approach to plan for our future climate risks. Referred to as a contextual vulnerability assessment, this uses a bottom-up, resource-based framework to assess threats to societally and environmentally key resources of water, food, energy, human health and well-being, and ecosystem function. This inclusive bottom-up vulnerability concept requires the determination of the major threats to these resources from climate (including from added CO2), but also from other social and environmental issues. After these threats are identified, the relative risk from natural- and human-caused climate change (estimated, if desired, from global climate model (GCM) projections, as well as the historical, paleorecord, and worst case sequences of events) can be compared with other environmental and social risks in order to adopt the optimal mitigation and adaptation strategies.

Link to colloquium videos and announcement page: http://www.atmos.colostate.edu/dept/colloquia.php