



GLOBAL CHANGE RESEARCH PROGRAM

EPA REPORT PROVIDES AN ASSESSMENT OF POTENTIAL IMPACTS OF CLIMATE CHANGE ON U.S. REGIONAL AIR QUALITY

Issue

Future climate change may cause significant air quality degradation, according to the Intergovernmental Panel on Climate Change (IPCC). Poorer air quality may result from changes in regional weather patterns that alter the distribution of pollutants across the world and country; rising temperatures and shifts in cloud cover that affect the formation of pollutants such as ozone; and increasing emissions of pollutants from fires, dust, and vegetation.

A report by the U.S. EPA provides an assessment of the potential impacts of global climate change on regional U.S. air quality. The report synthesizes the results of new EPA intramural and extramural scientific research to draw initial conclusions about the possible sensitivity of U.S. ozone concentrations to future climate

change and identify gaps in our current understanding.

The report, released in April 2009 by EPA's Global Change Research Program, is entitled *Assessment of the Impacts of Global Change on Regional U.S. Air Quality: A Synthesis of Climate Change Impacts on Ground-Level Ozone*.

This assessment report focused primarily on the impact of climate change out to 2050 on ground-level ozone, a summertime pollutant in the United States. It assessed the impact of climate change alone, without considering changes in pollutant emissions from human activity. Possible changes in biogenic emissions from natural sources were considered. Future reports will focus on other regulated pollutants, including particulate matter (PM) and mercury, as well as on the combined effects of

both climate and human-caused emissions changes, to provide a more complete understanding of the range of possible impacts of global change on air quality.

The assessment provides scientific information on the potential additional challenges posed by climate change for regions to meet air quality standards for ozone. It does not address the question of whether such regulatory standards for particular pollutants such as ozone should change because of climate change.

Among the Global Change Research Program's long-term goals are:

- To provide an answer to the basic question, "Is global change something we will have to account for when moving forward with U.S. air quality policy?"

continued on back

GLOBAL CHANGE RESEARCH PROGRAM

continued from front

- To deliver to the air quality policy and management community an improved understanding of the behavior and complexities of the global change-air quality system and the strengths and limitations of the available scientific tools and methods.

This report provides an update of the progress that has been made toward these goals, with a principal focus on the application of coupled climate and atmospheric chemistry models to investigate potential future meteorological effects on air quality.

Conclusions

The report concludes that climate change by 2050 and beyond should be considered by air quality managers as they develop air pollution control strategies.

Key highlights are:

- Climate change has the potential to produce significant increases in ground-level ozone in many regions, particularly for the highest-ozone events.

The areas just below or not in compliance with the ozone standards should begin to consider the potential effects of climate change.

- Climate change has the potential to lengthen the ozone season, suggesting that air quality managers may need to extend the time over which they monitor ozone concentrations and be prepared to issue air quality alerts earlier in the spring and later in the fall.
- Climate change has the potential, in many regions of the U.S., to push ozone concentrations beyond the range of natural historical inter-annual variability.
- Climate change has the potential to increase emissions of ozone precursors, but significant uncertainties remain.
- The potential impact of climate change on PM is less well understood. Preliminary results show a range of increases and decreases in PM concentrations in different regions, and for different component chemical species in the same region.

Application and Impact

This report represents a significant advancement in our understanding of the possible impacts of climate change on regional air quality in the U.S. It is hoped that the information contained in this report will enhance our ability as a nation to protect air quality and human health, even as the climate changes.

REFERENCE

<http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?id=203459>

U.S. Environmental Protection Agency, 2009: *Assessment of the Impacts of Global Change on Regional U.S. Air Quality: A Synthesis of Climate Change Impacts on Ground-Level Ozone*. Washington, DC; EPA/600/R-07/094F.

CONTACT

Program Contact: Joel D. Scheraga, National Program Director, Global Change Research Program, EPA's Office of Research and Development, 202-564-3385. scheraga.joel@epa.gov

Technical Contact: Anne Grambsch, EPA's National Center for Environmental Assessment, 703-347-8521, grambsch.anne@epa.gov.

April 2009