

The background of the slide features a large, faded, light blue circular logo of the United States Environmental Protection Agency (EPA). The logo contains a stylized flower with three leaves and a central stem, surrounded by the text "UNITED STATES ENVIRONMENTAL PROTECTION AGENCY".

*Uncertainty in the
US EPA Assessment of the
Impact of Global Change on US Air Quality*

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ORD/NCEA/Global Change Research Program
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- **The Problem**
- **Our assessment strategy**
- **How to identify and quantify the uncertainties in our approach? (And other questions)**
- **A first step towards answering these questions: The workshop**
- **Status of our effort to date.**

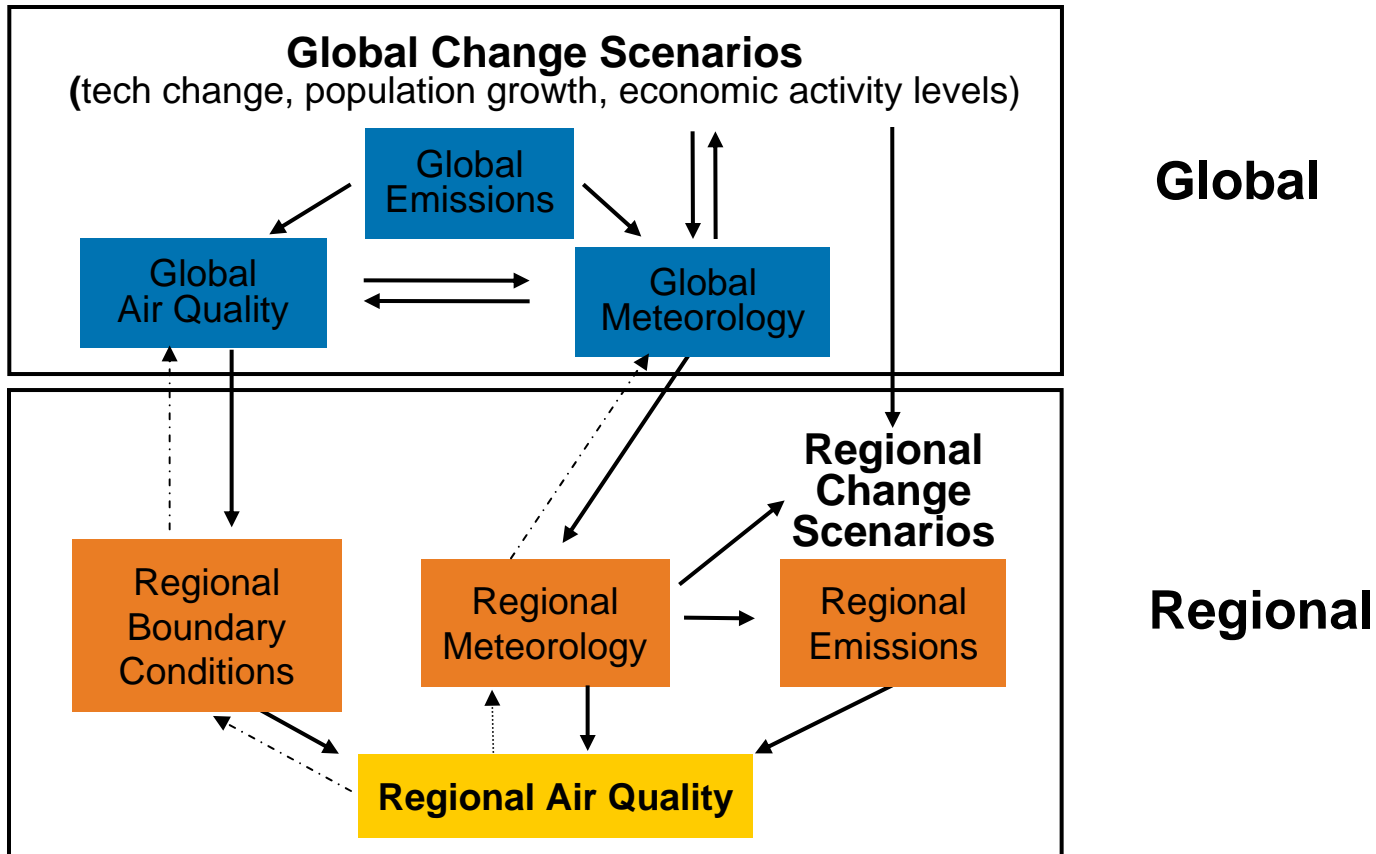


The Problem

- **Assessing the future impact of global change on air quality across a continent with a variety of climatological regimes**
- **Modeling scheme must capture:**
 - Global scale influences on regional climate and atmospheric chemistry
 - Regional scale climate/meteorological diversity
 - Current and future emissions as a function of location and temporal variability



Global Change – Air Quality Assessment



Implemented via a cross-lab, modeling effort:

- NCEA: synthesis, assessment, and coordination
- NRMRL: technology change and emissions
- NERL: regional emissions and air quality modeling
- NCER: extramural research

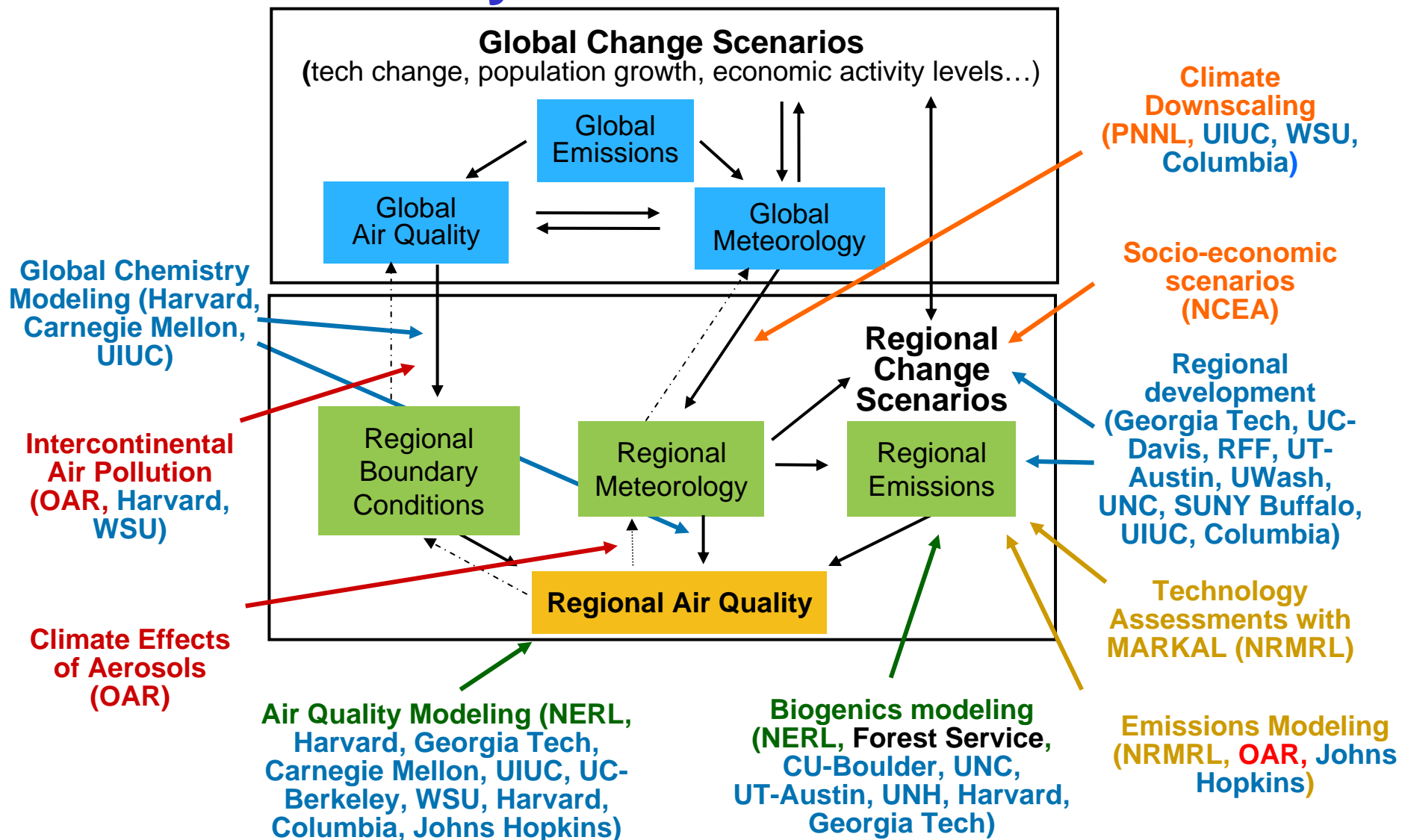
Anne Grambsch,
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RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Air Quality Assessment Framework



Darrell Winner EPA/ORD/NCER



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

How to identify and quantify the uncertainties in our approach?

- **Necessary process**
 - **Good science and an our obligation to our clients**
 - **As a continuing assessment, we need to identify the aspects of the framework that may need strengthening**
- **So, we surveyed:**
 - **Our fellow members of the intramural assessment team**
 - **Multiple sources of uncertainty**
 - **The literature**
 - **No apparent list of “best practices” for quantifying uncertainty in complex, model-based assessments in the literature**

With the right group of experts, could we design a set of best practices for this (and other) complex impacts assessment(s)?



Another big question:

- **How do we effectively communicate the overall uncertainty to our clients** and stakeholders**?**
 - ...without losing our audience by overloading them with too much scientific detail.
 - ...without diminishing the value of our more robust findings.

**** EPA/Office of Air and Radiation; State and Local air quality managers**



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Our approach (1)

- **Identify and bring together the appropriate cross-section of experts, stakeholders and clients who could contribute to devising:**
 - A set of guiding principles for tracking and quantifying uncertainty in complex, model-based assessments of global change impacts.
 - A set of guiding principles for communicating these uncertainties to stakeholders and clients.
 - A strategy for assessing/discussing the uncertainty in the findings of the GCAQ assessment at its current stage, i.e. for the 2007 interim report.



The Workshop Participants

- **Subject experts (e.g., climate modeling, atmospheric chemistry)**
- **Theory experts (e.g., quantifying and communicating uncertainty)**
- **The scientists doing the research upon which the assessment would be based**
- **The EPA clients/stakeholders**



Our Approach (2)

- **Provide a wide array of advance reading materials, including:**
 - Framing questions
 - A white paper developed for the workshop by Chris Weaver and Steve Hanna introducing the available methods for determining model-based uncertainties.
- **Formulate interdisciplinary teams, composed of assessment science experts, uncertainty experts, stakeholders and clients**
- **Equip each team with:**
 - A participants' guide that articulated the objectives for the working group – identical across all three groups
 - An expert in uncertainty to lead the group in achieving the objectives
 - A professional facilitator to assist the leader in keeping the group focused on the objectives.



Participants' Guide

- **Three discussion topics**
- **Goals for each discussion topic**
- **Introductory text**
- **Discussion questions**

Workshop agenda:

- **Initial plenary**
- **Two working group sessions**
- **Closing plenary and large group discussion**



Status of our effort

- **Workshop report is now complete.**
 - Record of the discussions prepared by ERG, the workshop contractor.
- **While consensus sets of guiding principles could not be formulated in the time frame available, numerous useful suggestions arose from the group effort.**
 - Recurring themes
- **The report will require analysis to resolve all of the common themes.**
- **This analysis will be presented as part of the GCAQ 2007 interim report, and elsewhere.**



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15 ORD/NERL colleagues

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Client/Stakeholders

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