



**Task Force on Hemispheric
Transport of Air Pollution**

Atmospheric Chemistry, Climate, and Transboundary Air Pollution: A Joint TF HTAP / NAS / AC&C Workshop

**9-13 June 2008
Washington, DC**

Task Force Co-Chairs

Terry J. Keating, PhD
U.S. EPA

André Zuber, PhD
European Commission

<http://www.htap.org>

**LRTAP Task Force on
Hemispheric Transport of
Air Pollution**

**IGAC-SPARC
Atmospheric Chemistry
& Climate Initiative**

This Workshop

**U.S. NAS/NRC Study of
The Significance of
International Transport
of Air Pollutants**

Some Acknowledgements

- **Task Force on Hemispheric Transport of Air Pollution**
 - U.S. Environmental Protection Agency
 - European Commission DG Environment
- **NAS/NRC Study of International Transport**
 - Environmental Protection Agency
 - National Oceanographic and Atmospheric Administration
 - National Aeronautics and Space Administration
 - National Science Foundation
- **Atmospheric Chemistry & Climate Initiative**
 - IGBP-IGAC
 - WCRP-SPARC
 - NOAA
 - FAA's Aviation–Climate Change Research Initiative
- **All of your participating organizations**

1979 Convention on Long-Range Transboundary Air Pollution (LRTAP)



UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

<http://www.unece.org/env/lrtap/>



Purpose and Participation in TF HTAP

- Created in December 2004 by the LRTAP Executive Body under the European Monitoring and Evaluation Programme (EMEP), the atmospheric science arm of the LRTAP Convention.
- Charged to improve the scientific understanding of intercontinental transport and hemispheric air pollution in the Northern Hemisphere.
- Pollutants of interest include ozone, fine particles, nitrogen and sulfur deposition, mercury, and persistent organic pollutants.
- The United States and the European Community are the Lead Parties.
- Participation is open to all interested experts. Countries (inside and outside the ECE region) are encouraged to nominate national focal points.

Policy-Relevant Science Questions

1. How does hemispheric transport affect air pollution?
2. How much do emissions in one country or region affect air pollution in another country or region?
3. How confident are we of the results and what is our best estimate of the uncertainties?
4. How will changes in emissions in one country or region affect air pollution in another country or region?
5. How may the source-receptor relationships change over the next 20 to 50 years due to changes in emissions?
6. How may the source-receptor relationships change due to climate change?
7. What efforts are needed to develop an integrated system of observation data and models?

Where We Have Been

<i>Dates</i>	<i>Locations</i>	<i>Partners</i>	<i>Topics Discussed</i>
2005	June	Brussels	Science Questions
2006	Jan	Washington	Model Intercomparison
	June	Moscow	Hg, POPs, CH ₄
	Oct	Beijing	Emissions and Projections
2007	Jan	Geneva	w/ WMO, GEO Observational Evidence
	May	Reading	Climate, HTAP 2007 Review
	Oct	Jülich	Model Intercomparison
2008	April	Rome	w/ UNEP Hg F&T Hg, POPs
	June	Washington	w/ NAS, AC&C Survey State of Science, Plan Cooperative Analyses

Major Work Areas

- **Emissions and Projections**
 - JRC/IES is developing an EDGAR-HTAP Inventory, incorporating data from the national and regional scale.

Major Work Areas

- **Emissions and Projections**
- **Integration of Observational Evidence**
 - NILU is developing a database of surface observations to support the assessment of intercontinental transport, including for use in model evaluation.
 - NASA is developing a database of relevant observations from aircraft campaigns and guidance on how to compare the observations to models.

Major Work Areas

- **Emissions and Projections**
- **Integration of Observational Evidence**
- **HTAP Multi-Model Experiments**
 - 35+ Models Participating To Date
 - Phased Experiments
 - SR: Source-Receptor Sensitivity Simulations
 - TP: Passive and Artificial Tracer Simulations
 - ES: Event Simulations (focusing on ICARTT observations)
 - Additional Pollutant Specific Investigations
 - Characterizing Uncertainties and Future Scenarios
 - Infrastructure
 - Data Server at FZ Juelich
 - Data Processing and Visualization Tools (HemiTAP) at JRC-IES
 - Wiki at FZ Juelich
 - Model descriptions using COST 728/732 Model Inventory
 - Standard naming convention built upon netCDF/CF convention

Structure of *HTAP 2010*

- **Part 1: Ozone, Aerosols, Deposition**
 - Update of 2007 Interim Report
- **Part 2: Mercury**
 - Building on UNEP F&T Partnership Report
- **Part 3: POPs**
 - Building on the Stockholm Convention Global Monitoring Report
- **Part 4: Synthesis**
 - “Summary for Policy Makers”
- **Executive Summary**
 - Official Document to the LRTAP Convention

Where We Are Going

<i>Dates</i>	<i>Locations</i>	<i>Partners</i>	<i>Topics Discussed</i>
2008 Oct	Hanoi	w/ EANET	Focus on Asia
2009 Feb	St Petersburg		<i>Emissions, Arctic?</i>
May	Paris	w/ TFMM	<i>Regional-Global, Climate-AQ</i>
Nov			<i>2010 Assessment Authors</i>
2010 Feb			<i>2010 Assessment Review</i>
Jun			<i>2010 Assessment Acceptance</i>

Atmospheric Chemistry & Climate Initiative

- Endorsed in March 2006 as a joint effort of
 - World Climate Research Program's Stratospheric Processes and their Role in Climate Project (WCRP/SPARC)
 - International Geosphere Biosphere Program's International Global Atmospheric Chemistry Project (IGBP/IGAC).
- Coordinated by
 - A. R. Ravishankara (SPARC SSG)
 - Phil Rasch (IGAC SSC Co-chair)
 - Sarah Doherty (IGAC SSC Executive Officer)
- The first phase is focused on improving process representation in chemistry-climate models and regional/global air quality models, ultimately as a contribution to future IPCC Assessments and WMO Ozone Assessments.
- Compliments ongoing activities under CCMVal, AeroCom, ACCENT-MIP, TF HTAP, ...

Activities in the First Phase

1. **Multidecadal Hindcast Simulations: Trends and Variability since 1980**
2. **What controls the distribution of aerosols and gases in the troposphere (with an initial emphasis on 5km to the tropopause)?**
3. **Cloud, Aerosol, and Chemical Interactions**
4. **Future scenarios: Sensitivities & Uncertainties**

NAS/NRC Study of The Significance of the International Transport of Air Pollutants

- Conducted by the
 - Board on Atmospheric Sciences and Climate
 - Board on Environmental Studies and Toxicology
- Sponsored by EPA, NOAA, NASA, NSF
- Expected Completion: Fall 2009

Scope of the Study

- Summarize the state of knowledge regarding:
 - the international flows of air pollutants into and out of the United States and across its various regions on continental and intercontinental scales
 - the impact of these flows on the achievement of environmental policy objectives related to air quality or pollutant deposition in the United States and abroad, including impacts on air quality and climate change
- The pollutants to be considered include ozone and its precursors, fine particles and their precursors, mercury, and persistent organic pollutants.
- The study will inform efforts by the United States government to develop domestic and international environmental policies and contribute to the TF HTAP's 2010 assessment.
- The study will not address local scale air pollution issues within shared international transboundary airsheds.

Charge Questions

1. How does international transport of air pollutants (including ozone, aerosols, mercury, and POPs) into the United States on continental and intercontinental scales affect air quality, pollutant deposition, and radiative forcing?
 - a. With respect to ozone and aerosols, how are exceedances of the National Ambient Air Quality Standards (NAAQS) for ozone and fine particles affected by changes in emissions in other countries?
 - b. With respect to mercury and POPs, how are pollutant deposition and U.S. population exposure affected by changes in emissions in other countries?
 - c. What is the level of confidence in these estimates?

Charge Questions

2. How are foreign emissions sources expected to change in the future and how might these changes affect achievement of environmental policy objectives in the United States related to air quality, pollutant deposition, and radiative forcing?
3. How does international transport of air pollutants out of the United States affect air quality, pollutant deposition, radiative forcing, and the achievement of related environmental policy objectives in other parts of the world?
4. What additional research, observations, analysis, and information management efforts, are needed to better understand and quantify the impacts and implications of the international transport of air pollutants?

Intro to NAS/NRC Study

Committee Members

Dr. Charles E. Kolb, Jr. (Chair)	Aerodyne Research, Inc.
Dr. Tami Bond	University of Illinois, Urbana-Champaign
Dr. Gregory R. Carmichael	The University of Iowa
Dr. Kristie L. Ebi	Exponent, Inc.
Dr. David P. Edwards	National Center for Atmospheric Research
Dr. Henry E. Fuelberg	Florida State University
Dr. Mae S. Gustin	University of Nevada, Reno
Dr. Jiming Hao	Tsinghua University
Dr. Daniel J. Jacob	Harvard University
Dr. Daniel A. Jaffe	University of Washington - Bothell
Dr. Sonia Kreidenweis	Colorado State University
Dr. Katharine S. Law	Centre National de la Recherche Scientifique
Dr. Michael J. Prather	University of California, Irvine
Dr. Staci L. Simonich	Oregon State University
Dr. Mark H. Thiemens	University of California, San Diego
Dr. Laurie Geller (Study Director)	NRC/BASC Staff

Objectives of This Workshop

- **Monday – Tuesday**
 - Review the state of science regarding air pollution transport across North America and the Northern Hemisphere
 - Primarily to inform the NAS/NRC Study
 - Taking stock of the work of the TF HTAP and other cooperative efforts
- **Wednesday-Friday**
 - Plan future cooperative analyses under the TF HTAP and AC&C

Schedule for *HTAP 2010*

- Invitation to participate Jan 2009
- Final plan and list of authors Mar 2009
- First Annotated Outline Jun 2009
- Revised Annotated Outline Sep 2009
- Internal Draft of Parts 1-3 Nov 2009
- First Review Draft of Parts 1-4,ES Jan 2010
- Major Review Meeting Feb 2010
- Revised Review Draft of Parts 1-4,ES Apr 2010
- Acceptance Meeting, Finalize ES Jun 2010
- Finalize Parts 1-4 Jul 2010
- Printing Aug 2010