

(Preliminary)

Air Pollution as a Climate Forcing: A Workshop
April 29 – May 3, 2002
Imin Conference Center, East-West Center, Jefferson Hall, Honolulu, Hawaii
AGENDA

Monday, April 29, 2002

8:00 AM: Arrival at East-West Center, Registration, Coffee

8:30 AM: Welcome [Lorenz Maggaard, Executive Associate Director, IPRC]

Kick-off Discussion: The Value of Cross-Disciplinary Dialogue Now

A. Air pollution and climate: workshop scope and objectives [Jim Hansen, NASA GISS and Columbia Univ.]

B. Environmental perspective: practical relevance of this science to decisions being made now about air quality regulations [Alan Lloyd, California Air Resources Board]

C. Investments in developing countries: practical relevance of this science to decisions being made now about investments in the developing world [Todd Johnson, World Bank]

Purpose of kick-off: initiate cross-disciplinary dialogue with the aim of making science presentations as relevant as possible – know the audience and their concerns.

9:15 AM: Gases: CH₄ and O₃ - how well can we quantify their trends and climate forcings?

Methane [Chair: Dick Derwent]

9:15 AM: Constraints on global CH₄ budget from measurements [Ed Dlugokencky]

9:35 AM: Methane sources and their trends [Elaine Matthews]

9:55 AM: Declining estimates of methane from rice [Hugo Denier van der Gon]
(is the global rice source of CH₄ only 30-40 Tg/year?)

10:15 AM: Break

10:35 AM: Potential reductions of direct methane sources [Paul Gunning & Dina Kruger]

10:55 AM: Air pollution trends [Markus Amann]

11:15 AM: “Air pollution” control over (indirect) methane emissions [Michael Prather]
(CO/NO_x equivalent CH₄ emissions; projections of future CH₄ level)

11:35 PM: Panel Discussion (Chair: Dick Derwent): Is it feasible to achieve a global warming success story with methane, i.e., can we achieve a real world scenario with decreasing CH₄?

12:05 PM: Lunch

Emissions mini-session and O₃ session

Emission Inventories - A Challenge: Our Uncertain Knowledge of Emissions

1:20 PM: Overview of gas and aerosol emissions [David Streets]
(Estimates and limitations of global emission data)

1:40 PM: Estimates of emissions in India [A.P. Mitra]

(Available measurements and data show significant differences with common assumptions)

2:00 PM: Estimates of emissions in China [Yuanhang Zhang]

(Available data for China)

2:20 PM: Estimates of emissions from Boreal biomass burning [Zhanqing Li]
(Boreal fires may contribute substantially to CO and O₃ emissions)

Ozone

2:40 PM: Factors controlling tropospheric O₃ and the coupling from regional to global scales [Daniel Jacob]

3:00 PM: Emissions of ozone precursors [Jos Olivier]

3:20 PM: Break

3:40 PM: Projections for future O₃ changes due to changes in precursor emissions and climate [Dick Derwent]

(Affects of higher temperatures, water vapor, circulation?)

4:00 PM: Ozone transport to and formation in the remote troposphere [Fred Fehsenfeld]

4:20 PM: Climatic implications of changes in ozone [Loretta Mickley]

(What was pre-industrial O₃ amount? What is today's O₃ climate forcing?)

4:40 PM: Recent changes of ozone in the Far East. [Hajime Akimoto]

5:00 PM: Panel Discussion (Chair: Michael Prather): is it feasible to halt the growth of global tropospheric O₃ or even achieve a reduction?

Tuesday, April 30, 2002

Day 2: Our Uncertain Knowledge of Aerosol Distributions and Their Effects

Global Aerosol Climatologies and Trends [Chair: Tami Bond]

8:30 AM: Global aerosol climatologies [Joyce Penner]

(What do aerosol models produce; address discrepancy with real world)

8:50 AM: Black carbon and organic carbon emissions, climatologies and trends [Catherine Lioussé]

(Can we define the pre-industrial to present change of the climate-crucial absorbing aerosols?)

9:10 AM: Global mixed aerosol fields [Frank Raes]

(How have aerosol mass and number density changed, pre-industrial to present?)

9:40 AM: Satellite information on global aerosol climatologies [Yoram Kaufman]

(Include "movie" illustrating apparent aerosol sources and intercontinental transport)

10:00 AM: Constraints on today's aerosol climatologies from AERONET stations [Brent Holben]

(Global map of inferred aerosol optical depths and single scatter albedos)

10:20 AM: Break

10:40 AM: Urban and biomass contributions to South American aerosols [Paulo Artaxo]

(Compare urban and biomass burning contributions to South American aerosols)

11:00 AM: Nitrates: the most important aerosol in Western Europe? [Harry ten Brink]

(Importance of nitrate for climate, health, acidification and eutrofication)

11:20 AM: How well can we apportion/speciate PM/BC by source in the U.S. and Europe? [Jamie Schauer]

(Contributions of transportation, power stations, forest fires, etc.)

11:40 AM: What relevant information is provided by GAW stations, ice cores? [Urs Baltensperger]

(Do these long-term records constrain time dependence of aerosol amounts?)

12:00 PM: Panel Discussion (Chair: Tami Bond): Aerosol climatologies and trends: What are the key uncertainties? How can we reduce them?

12:30 PM: Lunch

Aerosol Climate Forcing [Chair: Greg Carmichael]

1:40 PM: Reflective aerosols [John Seinfeld]

(How large is predicted forcing by sulfates, nitrates, organic aerosols?)

2:00 PM: Absorbing aerosol: what does it comprise? [Tica Novakov]

(What is causing absorption, where does it come from, and how is it changing?)

2:20 PM: Global black carbon emission inventories [Tami Bond]

(Are there missing sources?)

2:40 PM: Absorption by black carbon aerosols [Mark Jacobson]

(How large is black carbon forcing?)

3:00 PM: Break

Aerosol Indirect and Regional Climate Effects

3:20 PM: Indirect aerosol climate forcing [Leon Rotstajn]

(Review understanding; can composition-dependence be addressed?)

3:40 PM: Some insights on air pollution and climate from ACE-Asia [Barry Huebert]

(Evidence from ACE-Asia about interactions between pollution and natural aerosols.)

4:00 PM: Evidence for regional climate effects in China [Yunfeng Luo]

(Aerosol properties, radiative forcing, and regional climate effects in China)

4:20 PM: Estimates of regional climate effects in India [A. Jayaraman]

(Aerosol forcings inferred from INDOEX and estimated regional effects)

4:40 PM: Climate model simulations of regional effects of aerosols [Surabi Menon]

(Aerosol direct and indirect effects on regional climate)

5:00 PM: Panel Discussion (Chair: Greg Carmichael): Aerosol indirect and regional climate effects: what is needed to improve our understanding?

(Could cooling from decreased BC emissions counter warming due to decreased sulfates? Can we estimate the regional climate effects of increased/reduced aerosol amounts?)

Wednesday, May 1, 2002

Day 3: Technology: What technologies are available now and will be in the future (10-year and 50-year time-frames) to reduce aerosols, methane, ozone precursors and CO₂?

Part 1: Stationary Source Control and Demand-Side Management [Chair: Terry Surles]

Background

8:30 AM: Overview of potential emission reductions [Terry Surles]

(Summarize global emissions and trends from Days 1 and 2, stationary source contribution, CO₂ sequestration)

Power Generation and Industrial Sources

8:45 AM: Potential emission reductions from fuel switching and advanced generation [Jarad Daniels & Robert Kripowicz]

(CNG, "clean" coal, combined heat and power, distributed generation, fuel cells, cost-effectiveness)

9:10 AM: Potential emission reductions from nuclear energy [Yoshinobu Okabe]

(current and planned generation, cost-effectiveness)

9:35 AM: Potential avoidable emissions from renewables [Hub Hubbard]

(photovoltaic, wind, biomass, hydroelectric, geothermal)

10:00 AM: Break

10:20 AM: Potential avoidable emissions from demand-side management [Mark Levine]

(energy efficiency, load shifting, distributed generation, information infrastructure, cool roofs)

10:45 AM: Potential avoidable emissions from third world residential energy use [Rufus Edwards/Kirk Smith]

Part 2: Mobile Source Control and Emission Control Case Studies [Chair: Alan Lloyd]

Background

11:10 AM: Overview of regulatory efforts [Alan Lloyd]

(H₂ and fuel cells, summary of air pollution control efforts in California, U.S., Europe, Asia, and other areas)

Mobile Sources

11:25 AM: Current emissions and technologies for reductions [Michael Walsh]

(vehicle emissions in the East and West, trends and plans, new technology options, cleaner fuels and after-treatment options for existing vehicles, costs)

11:50 AM: Climate forcing implications of potential technology changes [Tim Wallington]

(likely vehicle contributions -- CO₂, NO_x, VOC, soot, N₂O, and R-134a/CFC-12 – to climate change, technology options to reduce emissions, and the broad business perspective)

12:15 AM: Particle emissions [Matti Maricq]

(elemental carbon, organic carbon, and particle size distribution data from current gasoline and diesel vehicles, alternative fuels, and after-treatment)

12:30 PM: Lunch

1:30 PM: Energy future [Pat Takahashi, former director of Hawaii Natural Resources Institute]

Case Studies of Air Pollution Emission Controls

1:55 PM: India [Sudhir Singhal]

2:20 PM: Japan [Yasuhiro Daisho]

2:45 PM: Europe [Axel Friedrich]

3:10 PM: Break

3:25 PM: Hawaii [Maurice Kaya]

3:50 PM: New York [Peter R. Smith]

4:15 PM: California [Michael Scheible]

4:40 PM: Panel Discussions:

Panel 1: Are technologies available and practicable for reduction of relevant global air pollution (especially black carbon, ozone, and ozone precursors including methane, carbon monoxide, NO_x, VOCs), and what are the "co-benefit" implications for CO₂?

Panel 2: What are real world expectations based on the case studies for different states and countries? Are there discrepancies with Panel 1 conclusions?

6:00 PM: Reception at Waikiki Aquarium (2777 Kalakaua Avenue)

Thursday, May 2, 2002

Day 4: What are the effects of specific aerosols and gases on human health, agriculture and managed ecosystems? What estimates can we make of the magnitude of these effects?

Human Health

Part I – The Effects of Aerosols and Key Gases (Chair Dan Greenbaum, Health Effects Institute)

Aerosols

8:30 AM: Introduction to the Session – Overview of current PM hypotheses/understanding and summary of carbon aerosol effects on health [Dan Greenbaum]

9:00 AM: Summary of sulfate health effects [George Thurston, New York University]

9:30 AM: Health effects of gases (NO_x, Ozone, Others?) [Ira Tager, University of California, Berkeley]

10:00 AM: Break

10:15 AM: Panel Discussion: How well can we differentiate the health effects of specific air pollutants?

Human Health Part II – Estimating the Magnitude of Impact (Chair – Kirk Smith, University of California, Berkeley)

10:45 AM: Introduction and health effects of air pollution from household fuels (Kirk Smith)

11:15 AM: Estimating the global disease burden of ambient air pollution – The WHO Assessment (Ross Anderson, St. George's Medical School, London)

Case Studies of Effects in Developing Countries

[note: some information on India will be provided in other talks, as Dr. Chhabra is unable to attend]

11:45 AM: Energy options and Health Impact in Shanghai, China [Bingheng Chen, Shanghai]

12:05 PM: Case Studies of Mutual Health Benefits and Greenhouse Gas Reductions in Latin America
[Luis Cifuentes]

12:30 PM: Lunch

1:30 PM: Panel Discussion – What do we know and what do we need to know to estimate these effects (i.e. the “bar chart” for aerosol and gases health effects)

2:30 PM: Break

Effects of air Pollution on Agriculture and Managed Ecosystems

2:50 PM: Effect of aerosols on agriculture [Mike Bergin]

3:20 PM: Effect of ozone on agriculture [Denise Mauzerall]

Hans Martin Seip has provided a brief written summary of effects on forests and other natural ecosystems. We would like speakers to comment briefly on non-agriculture impacts, including an indication of economic impact.

Friday, May 3, 2002

Day 5: Interactions, Implications, Recommendations, and Summary.

The focus of Day 5 will be on identifying and discussing:

- (1) areas of scientific consensus,*
- (2) practical actions that follow from the consensus,*
- (3) priorities for research and actions that will improve the state-of-the-science.*

8:30 AM: Session 1: Summary of Conclusions from Days 1-4 [Chair: Dan Albritton]

Each panel will include a Rapporteur, a small number of scientists such that both East and West are represented, an appropriate person from sponsoring agencies.

Rapporteur presents brief summary/reflection of issues and conclusions from his session. Panel discusses the following questions:

- 1) What do we know?*

a) For what changes in air quality (or technology) is there a consensus as to the sign (or magnitude) of the impact on climate forcing, human health, and other environmental endpoints of interest (i.e., what can we agree on?).

b) What practical actions (including emissions inventory development, ambient monitoring, technical capacity building, control strategies, etc.) does this consensus suggest would be useful in helping to mitigate the impacts of interest (i.e., what can we do about it?).

2) What do we want to know?

a) What are the key scientific questions that need to be addressed to reduce our uncertainty about the sign or magnitude of the impacts of changes in air quality on climate, human health, and the environment (i.e., where are the big holes in our knowledge)?

b) What practical actions or research activities are likely to provide the greatest reduction in uncertainty with respect to our understanding of these linkages for the resources invested (i.e., what will give us the biggest bang for the buck)?

8:40 AM: Ozone and Methane [chair: Michael Prather]

9:30 AM: Aerosols [chair: Tami Bond]

10:20: Break

10:40: Technology [chair: Terry Surles]

11:30: Health Effects [chair: Dan Greenbaum]

12:15: Lunch

Session 2: Investments with Multiple Payoffs

Invited presentations that highlight practical actions or research investments that have multiple benefits with respect to improving air quality, mitigating climate change, and advancing the state of knowledge.

1:30 PM: Cross-cutting research implications - emission inventories, long-term monitoring, intensive field campaigns, connections to health community... [Greg Carmichael]

1:55 PM: Local air pollution control... [Art Williams]

2:20 PM: Capacity building (to address air quality and climate concerns) in developing countries [C.S. Kiang]

2:45 PM: Multi-pollutant strategies and integrated assessment [Terry Keating, U.S. EPA]

3:10 PM: Break

3:30 PM: Session 3: Regional and Sponsor Perspectives

Representatives of the different countries participating in the workshop and the meeting sponsors (East-West Center, International Pacific Research Center, Hewlett Foundation, CARB/CEC, EPA, NASA, NOAA, NSF) briefly summarize what messages they are taking home from this meeting and what next steps they believe are necessary.

4:30 PM: Session 4: Conclusion

Organizers discuss the next steps with respect to workshop proceedings, summaries, and recommendations.