

Review of the Chemical Sciences Division, NOAA Earth System Research Laboratory

David Skaggs Research Center, 325 Broadway, Boulder, CO

March 30, March 31, April 1, 2015

Day 1: Monday, 30 March

0700 Breakfast (closed) for OAR AA Craig McLean, OAR DAA Steve Fine, and Review Panel
at the Best Western Plus Boulder Inn - buffet and private room

0745 Transport to ESRL (Transport provided for Review Panel; other guests carpool from hotel lobbies)
Allow sufficient time for security/badging for non-NOAA attendees

Welcome

DSRC GC-402

Chair: David Fahey

0815 Welcome and Introductions – David Fahey (Director, NOAA ESRL CSD)

0820 Welcome and Charge to Reviewers – Craig McLean (Assistant Administrator, OAR)

0825 Welcome; ESRL Organization Overview; Research at ESRL – Alexander E. MacDonald
(Director, NOAA ESRL)

0835 Overview of NOAA and OAR research planning and funding; Introduction of Review Panel –
Steven Fine (Deputy Assistant Administrator, NOAA OAR)

0850 The path to today's CSD – A.R. Ravishankara (Professor, Departments of Chemistry and
Atmospheric Science, Colorado State University, and former CSD Director)

0900 State of ESRL CSD – David Fahey (Director, NOAA ESRL CSD)

0950 Break (10 min)

THEME 1: Climate including the stratosphere

DSRC GC-402

Chair: Karen Rosenlof

1000 Opening talk: Climate and the stratosphere research overview – Karen Rosenlof (1-0)

Session 1 Topics

1015 Analysis of stratospheric ozone recovery – Birgit Hassler (1-1)

1020 Ozone depletion, climate change, and policy – John Daniel (1-2)

1025 Laboratory studies of replacement compounds for ozone depleting substances –
James Burkholder (1-3)

1030 Water vapor in the upper troposphere and lower stratosphere – Troy Thornberry (1-4)

1035 Improving the understanding of the stratospheric aerosol layer – Andrew Rollins (1-5)

1040 Climate studies using a combination of models and observations – Robert Portmann (1-6)

1045 Poster browsing (30 mins)

1115 Session discussion (15 mins)

1135 - 1240 **Lunch** (closed) for Review Panel, OAR HQ, and CSD management

DSRC GB-124

THEME 1: Climate including the stratosphere (continued)

DSRC GC-402

Chair: Karen Rosenlof

Session 2 Topics

- 1245 Stratospheric composition and impacts on circulation – Sean Davis (2-1)
- 1250 Constraining black carbon in the climate system – Joshua Schwarz (2-2)
- 1255 Aerosol, clouds, and precipitation in the climate system – Graham Feingold (2-3)
- 1300 Boundary layer clouds and climate change – Jan Kazil (2-4)
- 1305 Role of aqueous chemistry in organic aerosols – Barbara Ervens (2-5)
- 1310 Thin plankton layers in the ocean – James Churnside (2-6)

1315 Poster browsing (30 mins)

1345 Theme discussion - Climate including the stratosphere (30 mins)

1415 Break (10 mins)

THEME 2: Air Quality

DSRC GC-402

Chair: Thomas Ryerson

1425 Opening talk: Air quality research overview – Thomas Ryerson (3-0)

Session 3 Topics

- 1440 United States ozone trend analysis – Owen Cooper (3-1)
- 1445 Assessing global chemistry-climate model performance: Tropospheric O₃ – David Parrish (3-2)
- 1450 Satellite observations and air quality – Si-Wan Kim (3-3)
- 1455 State of understanding of secondary organic aerosol sources – Joost de Gouw (3-4)
- 1500 Nighttime atmospheric chemistry – Steven Brown (3-5)
- 1505 Observations and analyses to improve air quality forecast models – Stuart McKeen (3-6)

1510 Poster browsing (30 mins)

1540 Session discussion (15 mins)

1555 Break (10 min)

**Tour of CSD laboratory facilities (Review Panel group with CSD Director;
VIPs: OAR HQ and LO reps invited - in groups of six)**

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|--|---------------------|
| 1605 TOPAZ lidar | Block A parking lot |
| 1625 Kinetics/laser laboratory | DSRC 1A-204 |
| 1645 Water Vapor and Black Carbon Laboratory | DSRC 2A-302 |
| 1705 Aerosol instrumentation | DSRC 3A-113 |

Review Panel closed session

DSRC 3A114

1730-1830 Closed session in the CSD Collaboratory

1900 **Dinner** (closed) for Review panel, OAR HQ, ESRL, CSD management **Cantina Laredo, Boulder**

Day 2: Tuesday, 31 March

0700 Breakfast for Review Panel at the Best Western Plus Boulder Inn

0750 Transport to ESRL (Transport provided for Review Panel; other guests carpool from hotel lobbies)

THEME 2: Air Quality (*continued from previous day*)

DSRC GC-402

Chair: Thomas Ryerson

Session 4 Special Topics: Focus on oil and gas development

0810 Overview: Air quality impacts from energy development – Thomas Ryerson (4-0)

0815 Area-wide emission flux measurements from aircraft – Michael Trainer (4-1)

0820 Oil and gas VOC emissions and chemistry – Jessica Gilman (4-2)

0825 Wintertime high ozone in an oil and gas development basin – James Roberts (4-3)

0830 Remote sensing to understand sources of high ozone – Christoph Senff (4-4)

0835 Air quality modeling to solve the mystery of high wintertime ozone – Ravan Ahmadov (4-5)

0840 Poster browsing (30 mins)

0910 Theme discussion - Air Quality (30 mins)

0940 Break (10 mins)

THEME 3: Air Quality – Climate Connections

DSRC GC-402

Chair: Daniel Murphy

0950 Opening talk: Air quality – climate connections research overview – Daniel Murphy (5-0)

Session 5 Topics

1005 Effect of composition on aerosol properties – Ann Middlebrook (5-1)

1010 Regional surface ozone: is it locally controlled? – Andrew Langford (5-2)

1015 Boundary layer structure and dynamics research – Robert Banta (5-3)

1020 Improving emissions understanding – Gregory Frost (5-4)

1025 Attributing and quantifying methane emissions in a megacity – Jeffrey Peischl (5-5)

1030 Ship emissions impacts on climate and air quality – Eric Williams (5-6)

1035 Poster browsing (30 mins)

1105 Theme discussion - Air quality - climate connections (30 mins)

1140 - 1250 **Lunch** (closed) Roundtable with Review Panel with CSD scientists

DSRC GB-124

Air Quality - Climate Connections: Developing New Research Tools and Methods 1 DSRC GC-402

Chair: Steven Brown

1300 Opening talk: New techniques, instruments, and methods overview – Steven Brown (6-0)

Session 6 Topics

1315 Climatology of stratospheric warmings – Amy Butler (6-1)

1320 New detectors for unmanned aerial systems (and GOAHEAD) – Ru-Shan Gao (6-2)

1325 Identifying atmospheric bioaerosol – Anne Perring (6-3)

1330 New cavity-enhanced detection methods for aerosols and gases – Rebecca Washenfelder (6-4)

1335 Future directions in laboratory studies – James Roberts (6-5)

1340 Poster browsing (30 mins)

1410 Session discussion - Air quality-climate connections: New tools and methods - 1 (15 mins)

1425 Break (10 min)

Air Quality - Climate Connections: Developing New Research Tools and Methods 2 DSRC GC-402

Chair: Steven Brown

Session 7 Topics

1435 Current and future aircraft missions – Joshua Schwarz (7-1)

1440 Airborne chemical measurements to assess offshore blowouts – Thomas Ryerson (7-2)

1445 Quantification of agricultural emissions – Andrew Neuman (7-3)

1450 Observing boundary layer dynamics for urban scale flux measurements – Alan Brewer (7-4)

1455 Wind profiling to support renewable energy development – Yelena Pichugina (7-5)

1500 Research to applications: CSD leadership and contributions in scientific assessments –
Christine Ennis (7-6)

1505 Poster browsing (30 mins)

1535 Theme discussion - Air quality-climate connections: New tools and methods - 1 & 2 (30 mins)

Review Panel closed session

DSRC GB-124

1605-1700 Closed session in the Outreach classroom

Concurrent meeting of CSD, OAR, and Line Office management

DSRC 2A-201

1605-1700 Closed session in the CSD Director's conference room

Tour of NOAA WP-3D aircraft deployed for SONGNEX

1700 Transit to NCAR/RAF hangar (Transport provided for Review Panel; other guests carpool;
directions provided by lunchtime Tuesday)

1900 **Dinner** (closed) for Review panel, invited guests

Via Toscana, Louisville

(Transport provided for Review Panel; other guests carpool;
directions provided by lunchtime Tuesday)

Day 3: Wednesday, 1 April

0700 Breakfast for Review Panel at the Best Western Plus Boulder Inn

0800 Transport to ESRL (Transport provided for Review Panel; other guests carpool from hotel lobbies)

Stakeholder telephone calls

DSRC GB-124

Concurrent closed sessions with Reviewers & phone assistants in Outreach classroom

0830 Dr. Paul Newman [Climate/stratosphere] NASA/GSFC, Greenbelt, MD

0850 Dr. Robert Haddad [Climate and Air Quality themes with special emphasis on Deepwater Horizon] NOAA/NOS/ORR, Silver Spring, MD

0910 Ms. Cindy Newberg [Climate/stratosphere] USEPA, Washington, D.C.

0830 Mr. Durwood Zaelke, Esq. [Climate/stratosphere] IGSD, Washington, D.C.

0850 Dr. Gail Tonnesen [Air Quality theme] USEPA, Denver, CO

0910 Dr. Eileen McCauley [Climate and Air Quality themes] California Air Resources Board, Sacramento, CA

Summary, Wrap up and Q&A with Review Panel

DSRC GB-124

0930 Closed session for CSD Director, CSD Deputy Directors, OAR Management in the Outreach classroom

Review Panel closed session to begin writing

DSRC GB-124

1015 Closed session in the Outreach classroom

Review Panel Preliminary Report Out to CSD and OAR Management

DSRC GB-124

1200 Closed session in the Outreach classroom

1300 Adjourn

SUMMARY: talks and posters

Session 1: Climate including the stratosphere

- 1000 Opening talk: Climate and the stratosphere research overview – Karen Rosenlof (1-0)
- 1015 Analysis of stratospheric ozone recovery – Birgit Hassler (1-1)
- 1020 Ozone depletion, climate change, and policy – John Daniel (1-2)
- 1025 Laboratory studies of replacement compounds for ozone depleting substances – James Burkholder (1-3)
- 1030 Water vapor in the upper troposphere and lower stratosphere – Troy Thornberry (1-4)
- 1035 Improving the understanding of the stratospheric aerosol layer – Andrew Rollins (1-5)
- 1040 Climate studies using a combination of models and observations – Robert Portmann (1-6)

Session 2: Climate including the stratosphere (continued)

- 1245 Stratospheric composition and impacts on circulation – Sean Davis (2-1)
- 1250 Constraining black carbon in the climate system – Joshua Schwarz (2-2)
- 1255 Aerosol, clouds, and precipitation in the climate system – Graham Feingold (2-3)
- 1300 Boundary layer clouds and climate change – Jan Kazil (2-4)
- 1305 Role of aqueous chemistry in organic aerosol – Barbara Ervens (2-5)
- 1310 Thin plankton layers in the ocean – James Churnside (2-6)

Session 3: Air Quality

- 1425 Opening talk: Air quality research overview – Thomas Ryerson (3-0)
- 1440 United States ozone trend analysis – Owen Cooper (3-1)
- 1445 Assessing global chemistry-climate model performance: Tropospheric O₃ – David Parrish (3-2)
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- 1500 Nighttime atmospheric chemistry – Steven Brown (3-5)
- 1505 Observations and analyses to improve air quality forecast models – Stuart McKeen (3-6)

Session 4 Special Air Quality Topics: Focus on oil and gas development

- 0810 Overview: Air quality impacts from energy development – Thomas Ryerson (4-0)
- 0815 Area-wide emission flux measurements from aircraft – Michael Trainer (4-1)
- 0820 Oil and gas VOC emissions and chemistry – Jessica Gilman (4-2)
- 0825 Wintertime high ozone in an oil and gas development basin – James Roberts (4-3)
- 0830 Remote sensing to understand sources of high ozone – Christoph Senff (4-4)
- 0835 Air quality modeling to solve the mystery of high wintertime ozone – Ravan Ahmadov (4-5)

Session 5: Air Quality – Climate Connections

- 0950 Opening talk: Air quality – climate connections research overview – Daniel Murphy (5-0)
- 1005 Effect of composition on aerosol properties – Ann Middlebrook (5-1)
- 1010 Regional surface ozone: is it locally controlled? – Andrew Langford (5-2)
- 1015 Boundary layer structure and dynamics research – Robert Banta (5-3)
- 1020 Improving emissions understanding – Gregory Frost (5-4)
- 1025 Attributing and quantifying methane emissions in a megacity – Jeffrey Peischl (5-5)
- 1030 Ship emissions impacts on climate and air quality – Eric Williams (5-6)

Session 6: Air Quality - Climate Connections: Developing New Research Tools and Methods - 1

- 1300 Opening talk: New techniques, instruments, and methods overview – Steven Brown (6-0)
- 1315 Climatology of stratospheric warmings – Amy Butler (6-1)
- 1320 New detectors for unmanned aerial systems (and GOAHEAD) – Ru-Shan Gao (6-2)
- 1325 Identifying atmospheric bioaerosol – Anne Perring (6-3)
- 1330 New cavity-enhanced detection methods for aerosols and gases – Rebecca Washenfelder (6-4)
- 1335 Future directions in laboratory studies – James Roberts (6-5)

Session 7: Air Quality - Climate Connections: Developing New Research Tools and Methods - 2

- 1435 Current and future aircraft missions – Joshua Schwarz (7-1)
 - 1440 Airborne chemical measurements to assess offshore blowouts – Thomas Ryerson (7-2)
 - 1445 Quantification of agricultural emissions – Andrew Neuman (7-3)
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