

2010 NOAA ESRL GLOBAL MONITORING ANNUAL CONFERENCE

David Skaggs Research Center, Room GC-402
325 Broadway, Boulder, Colorado 80305 USA

Tuesday Morning, May 18th, 2010 AGENDA

(Only presenter's name is given; please refer to abstract for complete author listing)

- **07:00** **Registration Opens – lunch order fee and posters collected at registration table.**
- **07:30 -08:15** **Morning Breakfast – Coffee, tea, fruit, bagels & donuts served**

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- **Session 1** **Introduction and Carbon Cycle Gases Session 1 – Chaired by Russ Schnell**
 - 08:15 - 08:30 Welcome
 J. Butler (NOAA/ESRL).....-
 - 08:30 - 08:45 Have You Seen the Economic Recession in the Atmospheric CO₂ Record?
 P. Tans (NOAA/ESRL).....1
 - 08:45 - 09:00 New Results from the NOAA ESRL Collaborative Tall Tower Network for Monitoring Carbon Dioxide and Related Gases
 A. Andrews (NOAA/ESRL).....2
 - 09:00 - 09:15 Indianapolis Flux Project (INFLUX): Development, Improvement and Assessment of Methods to Quantify Greenhouse Gas Emissions at the Urban Scale
 P. Shepson (Purdue University).....3
 - 09:15 - 09:30 Detecting Saturation in the Ocean Carbon Sink
 A. Jacobson (University of Colorado/CIRES).....4
 - 09:30 - 09:45 Annual Migrations of North American Centroids of Carbon Emissions from Fossil Fuels - What Do They Reveal about Causes and Future Trends?
 J. Gregg (University of Maryland).....5

- **09:45 - 10:15** **Morning Break**

- **Session 2** **Carbon Cycle Gases Session 2 – Chaired by Pieter Tans**
 - 10:15 - 10:30 A Long-Term Perspective on Recent Increases in Atmospheric CH₄ Abundance
 E. Dlugokencky (NOAA/ESRL).....6
 - 10:30 - 10:45 Global Atmospheric Methane and Ethane: Updated Mixing Ratios and Trends (1984-2009)
 I. Simpson (University of California, Irvine).....7
 - 10:45 - 11:00 A 20th Century Atmospheric History of Ethane and Implications for the Methane Budget
 K. Verhulst (University of California, Irvine).....8
 - 11:00 - 11:15 Seasonal Variations in CH₄ and N₂O Emissions from Central California
 M. Fischer (Lawrence Berkeley National Laboratory).....9
 - 11:15 - 11:30 Measurement and Parameterization of Sea-Air Trace Gas Transfer Using Micrometeorological Techniques: A Decade of Progress
 J. Hare (University of Colorado/CIRES).....10
 - 11:30 - 11:45 ¹³C/¹²C Isotopic Constraints on Inter-Continental Transport of Fossil Fuel CO₂ & Black Carbon (BC) Aerosols
 L. Huang (Environment Canada).....11

- **11:45 - 13:00** **Catered Lunch Service – Outreach Classroom GB-124**
(pre-payment of \$10.00 required at registration table)

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- **Session 3** ***Carbon Cycle Gases Session 3 – Chaired by Arlyn Andrews***
 - 13:00 - 13:15 Radiocarbon (¹⁴C) Traces the Fossil and Biogenic Components of Total CO₂
 J. Miller (University of Colorado/CIRES).....12
 - 13:15 - 13:30 Inter-Annual Variability of CO and CH₄ Observations Interpreted by a Global Lagrangian
 Transport Model
 J. Klausen (Empa, Switzerland).....13
 - 13:30 - 13:45 Atmospheric CO₂ Observations from Space (ACOS): Preliminary Results from Greenhouse Gas
 Observing Satellite (GOSAT) Data Analysis
 D. Crisp (JPL, California Institute of Technology).....14
 - 13:45 - 14:00 7.5 Years of Atmospheric Infrared Sounder (AIRS) Mid-Tropospheric CO₂ -Validations and
 Applications
 E. Olsen (JPL, California Institute of Technology).....15
 - 14:00 - 14:15 A Sixteen-Year Record of Global Natural Gas Flaring Derived from Satellite Data
 C. Elvidge (NOAA/National Geophysical Data Center).....16
 - 14:15 - 14:30 Atmospheric Observations of Carbon Monoxide (CO) and Fossil Fuel CO₂ Emissions from a
 Medium Sized City: Sacramento, California
 J. Turnbull (NOAA/ESRL).....17

- **14:30 - 15:00** ***Afternoon Break***

- **Session 4** ***Halocarbons & Other Trace Species – Chaired by James Elkins***
 - 15:00 - 15:15 CHF₃ (HFC-23) Emission Trend Response to CHClF₂ (HCFC-22) Production and Recent
 Emission Abatement Measures
 B. Miller (University of Colorado/CIRES).....18
 - 15:15 - 15:30 Measurements of Greenhouse Gases and Halogenated Compounds at Gosan (Jeju Island, Korea)
 for Understanding Emissions in East Asia
 J. Kim (Seoul National University, South Korea).....19
 - 15:30 - 15:45 A Study of Ambient Mercury in the Marine Free Troposphere
 L. Krnavek (EPA).....20
 - 15:45 - 16:00 Measurement of Volatile Organic Compounds (VOCs) in Marine Air at Cape Grim Using Proton
 Transfer Reaction Mass Spectrometry (PTR-MS)
 S. Lawson (CSIRO, Australia).....21
 - 16:00 - 16:15 Nonmethane Hydrocarbons at the NOAA ESRL Cooperate Network Flask Sampling Sites and
 Their Use for Site and Atmospheric Transport Evaluation
 D. Helmig (University of Colorado/INSTAAR).....22
 - 16:15 - 16:30 Unique Transport Diagnostics from Airborne *In Situ* Trace Gas Measurements
 E. Ray (University of Colorado/CIRES).....23
 - 16:30 - 16:45 Preliminary Results from the First Atmospheric Study on the NASA Global Hawk Unmanned
 Aircraft Systems (UAS)
 J. Elkins (NOAA/ESRL).....24

- **17:00 - 20:00** ***Poster Session (DSRC Cafeteria) with appetizers & refreshments***

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- **07:00** **Registration Opens – lunch order fee and posters collected at registration table.**

- **07:30 - 08:15** **Morning Breakfast – Coffee, tea, fruit, bagels & donuts served**

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• Session 5 Keynote and Elements of Emerging Services – Chaired by James Butler	
08:15 - 08:45 Observations and Monitoring: The Challenge of Science to Services <i>T.R. Karl (NOAA/Climate Service and National Climatic Data Center)</i>	25
08:45 - 09:00 <i>Keynote Questions and Answers</i> <i>T.R. Karl</i>	-
09:00 - 09:15 Recent Increases in Global HFC-23 Emissions and the Contribution of HFCs and HCFCs to Radiative Forcing <i>S. Montzka (NOAA/ESRL)</i>	26
09:15 - 09:30 Top-Down Validation of European Halocarbon Emission Inventories <i>S. Reimann (Empa, Switzerland)</i>	27
09:30 - 09:45 Integrating Observations and Inventories to Improve Emission Estimates: A Framework for Global Synthesis <i>R. Duren (JPL, California Institute of Technology)</i>	28

- **09:45 - 10:15** **Morning Break**

• Session 6 Atmospheric Radiation – Chaired by Ellsworth Dutton	
10:15 - 10:30 Radiance Calibrated Night Lights Products That Reveal Unsaturated Urban Cores and Gas Flares <i>D. Ziskin (University of Colorado/CIRES)</i>	29
10:30 - 10:45 Downscaling of Advanced Microwave Scanning Radiometer (AMSR-E) Soil Moisture Using Thermal Sensors and a Physically-Based Model <i>C. Hsu (University of Colorado/CIRES)</i>	30
10:45 - 11:00 Decadal Variations in Surface Radiation Budget Observations: An Unexpected Trend for the U.S. <i>E. Dutton (NOAA/ESRL)</i>	31
11:00 - 11:15 A Ten-Month Comparison of All-Weather Pyrheliometers <i>J. Michalsky (NOAA/ESRL)</i>	32
11:15 - 11:30 A Characterization of Arctic Aerosols as Derived from Airborne Observations and Their Influences on the Surface Radiation Budget <i>R. Stone (University of Colorado/CIRES)</i>	33
11:30 - 11:45 Assessing the 'Full Spectral' Potential Radiative Impact of Arctic Aerosols: Dust, Smoke, Haze <i>G. Anderson (NOAA/ESRL)</i>	34

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- **Session 7 Aerosols – Chaired by John Ogren**
 - 13:00 - 13:15 Detection of Aerosol Growth Rate Using a Mass Balance Model Constrained by Water Isotopes Measurements at Mauna Loa
 A. Bailey (University of Colorado/CIRES).....35
 - 13:15 - 13:30 Inclusion of Aerosol Impacts on Medium-Range Forecasts of Weather and Air Quality in the Flow-Following Finite Volume Icosahedral Model (FIM) Global Model
 G. Grell (University of Colorado/CIRES).....36
 - 13:30 - 13:45 Results from Initial-Year Aerosol Optical Property Measurements at the New NOAA ESRL Collaborative Aerosol Monitoring Station in Boone, North Carolina
 J. Sherman (Appalachian State University).....37
 - 13:45 - 14:00 Updated Aerosol Climatology for Cape Point, South Africa
 C. Labuschagne (South Africa Weather Service).....38
 - 14:00 - 14:15 The NOAA ESRL Airborne Aerosol Observatory: Climatology and Seasonal Variation of Aerosol Properties Over Central Illinois
 P. Sheridan (NOAA/ESRL).....39
 - 14:15 - 14:30 Climate Services, WMO and GAW Observations
 L. Jalkanen (WMO, Switzerland).....40

- **14:30 - 15:00 Afternoon Break**

- **Session 8 Ozone & Water Vapor – Chaired by Sam Oltmans**
 - 15:00 - 15:15 Enhanced Ozone Over Western North America from Biomass Burning in Eurasia During April 2008 as Seen in Surface and Profile Observations
 S. Oltmans (NOAA/ESRL).....41
 - 15:15 - 15:30 Ozone Profile Trends from Ground-Based and Satellite Data
 I. Petropavlovskikh (University of Colorado/CIRES).....42
 - 15:30 - 15:45 Using the Relationship Between Mean 500-Millibar (Mb) Heights and Mean Surface Ozone Concentrations in Colorado to Decompose Ozone Times Series and Evaluate the Impacts of Changes in Precursor Emissions
 P. Reddy (Colorado Dept. of Public Health & Environment).....43
 - 15:45 - 16:00 Profiles of the Water Vapor Isotope Composition for Determining Regional Water Sources and Trace Gas Exchange in the Boundary Layer
 D. Noone (University of Colorado/CIRES).....44
 - 16:00 - 16:15 The Complementarities of NDACC and GRUAN in Establishing Measurement Requirements for Water Vapor Trends Detection
 M. Kurylo (University of Maryland/Goddard Earth Science and Technology Center).....45
 - 16:15 - 16:30 The “Boulder Record”: 30 Years of Water Vapor Vertical Profiles Over Boulder, Colorado
 D. Hurst (University of Colorado/CIRES).....46
 - 16:30 - 16:45 Laboratory Evaluation of the Effect of Nitric Acid on Chilled Mirror Hygrometer Measurements in the Upper Troposphere (UT)/Lower Stratosphere (LS)
 T. Thornberry (University of Colorado/CIRES).....47

- **Closing Remarks – Dr. James H. Butler (NOAA/ESRL)**

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POSTER SESSION AGENDA

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Tuesday, May 18th, 2010: 17:00-20:00

• Carbon Cycle

- P-1 Empirical Estimates of Interannual Changes in Air-Sea CO₂ Fluxes
G. Park (NOAA/Atlantic Oceanographic and Meteorological Laboratory)
- P-2 AirCore: An Innovative Atmospheric Sampling System
A. Karion (University of Colorado/CIRES)
- P-3 Comparison of Simulated and Observed ¹³CO₂ at North American Sites
C. Alden (University of Colorado/INSTAAR)
- P-4 The Influence of Hydrological Changes on the ¹⁸O Content of Atmospheric CO₂
N. Buenning (University of Colorado/CIRES)
- P-5 Modeling the Synoptic Atmospheric Interaction with Anthropogenic and Biospheric CO₂ Emissions
D. Chan (Environment Canada)
- P-6 A Simplified Estimate of Contribution to Change of CO₂ Concentration by the Statistical Method
H.-C. Lim (Korean Meteorological Administration, South Korea)
- P-7 Novel Analyzer for Real-Time N₂O and CO Measurements in Air
R. Provencal (Los Gatos Research)
- P-8 Quantifying Canada's Natural and Anthropogenic Methane Budgets Using Atmospheric Observations & Modeling: Progress and Limitations
D. Worthy (Environment Canada)
- P-9 Diagnosing the Bayesian Balance in Atmospheric Inversions
A.R. Jacobson (University of Colorado/CIRES)
- P-10 Evaluating CarbonTracker (CT) Performance During the North American Carbon Program Mid-Continent Intensive Campaign
G. Petron (NOAA/ESRL)
- P-11 Aura TES Measurements Related to the Carbon, Nitrogen and Water Cycles and Their Impact on Air Quality and Climate
J. Worden (JPL, California Institute of Technology)
- P-12 How Well Could Satellite Data Constrain Degree-Resolution Carbon Fluxes?
D. Baker (Colorado State University/CIRA)
- P-13 Application of Extractive Fourier Transform Infrared Spectroscopy with Cryogenic Preconcentration: Preliminary Laboratory Results
P.I. Buckley (University of Alabama)
- P-14 Spatial and Temporal Variations of Atmospheric Methane and Carbon Dioxide Observed in Environment Canada, Canada's Greenhouse Gas (GHG) Measurement Network
E. Chan (Environment Canada)
- P-15 Seasonal Variations in CH₄ and N₂O Emissions from Central California
M.L. Fischer (Lawrence Berkeley National Laboratory)
- P-16 Temporal variations in CO₂ in Air in Pasadena, California
S. Newman (California Institute of Technology)
- P-17 Records of Northern Hemisphere Atmospheric Carbon Monoxide Back to ~1950 AD from Greenland Firn Air
V.V. Petrenko (University of Colorado/INSTAAR)
- P-18 Using Tropospheric Emission Spectrometer CO₂ Observations for Inverse Modeling Estimates of Carbon Fluxes
S. Kulawik (JPL, California Institute of Technology)

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POSTER SESSION AGENDA (continued)

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• Carbon Cycle (continued)

- P-19 Potential New Methods for Examining Regional Sources and Sinks of Carbon
E. Weatherhead (University of Colorado/CIRES)
- P-20 Creating a Global CO₂ Grid from Nighttime Lights Imagery
T. Ghosh (University of Colorado/CIRES)
- P-21 Boundary Resolution of CO₂ Using Infrared (IR) and Near Infrared (NIR) Measurements
D. Lafont (JPL, California Institute of Technology)
- P-22 The Atmospheric and Terrestrial Mobile Laboratory (ATML)
B. Zak (Sandia National Laboratories)

• Ozone

- P-23 Instantaneous Radiative Kernels for Tropospheric Ozone: Satellite Observations and Model Evaluation
H.M. Worden (National Center for Atmospheric Research)
- P-24 The Measurements of Humidity in the Atmosphere and Validation Experiments (MOHAVE) 2009 Campaign
M. Kurylo (University of Maryland/Goddard Earth Science and Technology Center)
- P-25 Determination of Dobson Spectral Characteristics, a New Method
G. McConville (University of Colorado/CIRES)
- P-26 The Radiative Heating in Underexplored Bands Campaign (RHUBC): Evaluating Water Vapor Spectroscopy
J. Delamere (Atmospheric and Environmental Research, Inc.)
- P-27 On the Reproducibility and Stability of Water Vapor in Stainless Steel Gas Cylinders
B. Hall (NOAA/ESRL)
- P-28 Balloon-borne Ozone-sonde Measurements at South Pole in 2009: Ozone Hole 7th lowest in 24-year record
B.J. Johnson (NOAA/ESRL)
- P-29 Some Results of Surface and Tropospheric Ozone Measurements in Mongolia
D. Oyunchimeg (Climate Change and Environmental Research Center, Institute of Meteorology and Hydrology, Mongolia)
- P-30 Trace Gases Measurement Results of Russian-Mongolian Expedition in the Arid and Semi-Arid Region of Mongolia
D. Oyunchimeg (Climate Change and Environmental Research Center, Institute of Meteorology and Hydrology, Mongolia)
- P-31 Influence of Transport by the Nocturnal Jet on Ozone Levels in Central Texas
L.C. Patrick (University of Colorado/CIRES)
- P-32 Ozone Depleting Substances, Emissions and Trends Derived by Long-Term Continuous Measurements at a European Site
M. Maione (University of Urbino, Italy)

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POSTER SESSION AGENDA (continued)

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• **Halocarbons and Other Trace Species**

- P-33 Long-Lived Halocarbons and Other Atmospheric Trace Species Trends
G. Dutton (University of Colorado/CIRES)
- P-34 HOCl and Cl₂ in the Remote Marine Atmosphere
M. Lawler (University of California, Irvine/Department of Earth Science)
- P-35 Abiotic and Biogeochemical Signals in the Seasonal Cycles of Atmospheric Nitrous Oxide
C. Nevison (University of Colorado/INSTAAR)
- P-36 Hydrocarbon and Terpene Gas Standards Research and Development to Assist in Atmospheric Measurements
J. Rhoderick (National Institute of Standards and Technology)

• **Solar Radiation**

- P-37 Hyperspectral Infrared Imager (HyspIRI) - A Sensor Optimized for Tracking Earth Surface Processes for Climate Analysis
C. Elvidge (NOAA/National Geophysical Data Center)
- P-38 Variability of Spectral Albedo at Table Mountain, Colorado
G. Hodges (University of Colorado/CIRES)
- P-39 Explaining the Seasonal Variation of MultiFilter Rotating Shadowband Radiometer (MFRSR) *in situ* Calibrations and Effects on Aerosol Optical Depth (AOD)
J.A. Augustine (NOAA/ESRL)
- P-40 The Role of Ultraviolet (UV) Solar Radiation in Erythema and Vitamin D Synthesis Central Illinois
K. Lantz (University of Colorado/CIRES)
- P-41 The Current Configuration of An Automated Cleaning System Coupled With Modified Ventilation Design at the Kwajalein BSRN Site in the Republic of the Marshall Islands
D. Nelson (NOAA/ESRL)
- P-42 Photosynthetically Active Radiation (PAR) Attenuation in the Atmosphere in North China
J. Bai (Laboratory for Middle Atmosphere & Global Environmental Observation/Institute of Atmospheric Physics, China)
- P-43 The Antarctic Ultraviolet (UV) Monitoring Program: A New NOAA ESRL Effort
P. Disterhoft (University of Colorado/CIRES)

• **Aerosols**

- P-44 Climatology of Aerosol Radiative Properties in the Free Troposphere
E. Andrews (University of Colorado/CIRES)
- P-45 Lidar Observations of Aerosols Above American Samoa
J.E. Barnes (NOAA/ESRL)
- P-46 Nighttime Aerosol Optical Properties Obtained From Lunar Photometry
T.A. Berkoff (University of Maryland/Goddard Earth Science and Technology Center)
- P-47 Overview of the Physical and Radiative Properties of Atmospheric Particles at Cape San Juan, Puerto Rico (CPR) Station
O.L. Mayol-Bracero (Institute for Tropical Ecosystems Studies, University of Puerto Rico)
- P-48 Impact of Ocean Ice Extent and Atmospheric Transport on Biogenic Aerosol Sulfur in the Arctic
S. Sharma (Environment Canada)

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• *Observatories, Cooperative Measurements and Global Databases*

- P-49 Development of Greenhouse Gas Observations Network within Integrated Carbon Observing System (ICOS) - Finland
Y. Viisanen (Finnish Meteorological Institute, Finland)
- P-50 Measurement System for Aerosol, Methane and Carbon Dioxide Concentrations and Fluxes at Tiksi Observatory in Northeast Siberia
T. Laurila (Finnish Meteorological Institute, Finland)
- P-51 Year-Round Major Ion Measurements at Greenland Environmental Observatory, Summit (GEOSummit)
R. Bales (University of California, Merced)
- P-52 The Global Ocean Observing System for Climate Studies
R. Lumpkin (NOAA/Atlantic Oceanographic and Meteorological Laboratory)
- P-53 Characterizing the Atlantic Meridional Overturning Circulation
R. Lumpkin (NOAA/Atlantic Oceanographic and Meteorological Laboratory)
- P-54 Recovery Act-Funded Additions to the U.S. Department of Energy's Atmospheric Radiation Measurement Climate Research Facilities on the North Slope of Alaska
M. Ivey (DOE/Sandia National Laboratories)
- P-55 The Global Atmosphere Watch (GAW) Station Information System – GAWSIS
J. Klausen (Empa/Materials Science and Technology, Switzerland)
- P-56 The Development of the Sir Crispin Tickell High-Altitude Global Climate Observatory in Mexico (MEX)
L.R. Acosta (Climate Institute, Mexico)