Tuesday Morning, May 21, 2019 Agenda

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

07:30  
Registration Opens in GC-402 - lunch orders and posters collected at registration table
07:45 - 08:30  
Morning Snacks - coffee, tea, fruit, bagels and donuts served

Session 1  
Welcome, Keynote Address & Highlights — Chaired by James H. Butler

08:30 - 08:45  
Welcome and Conference Overview
  James H. Butler (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))
08:45 - 09:15  
KEYNOTE: Placeholder - Waiting on Final Abstract Info
  Guy Brasseur (National Center for Atmospheric Research (NCAR), Distinguished Scholar)
09:15 - 09:30  
On the Unexpected Increase in CFC-11 Emissions, Are They Still on the Rise?
  Steve Montzka (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))
09:30 - 09:45  
Spatial/temporal Patterns in the Atmosphere: The Carbon Cycle Revealed
  Pieter Tans (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))
09:45 - 10:00  
Geoengineering for Climate Change: Nature Has Already Demonstrated the Process and Effects
  Russ Schnell (NOAA Global Monitoring Division)

10:00 - 10:30  
Morning Break & Group Photo on the Stage

Session 2  
Global Carbon Cycle — Chaired by Arlyn Andrews

10:30 - 10:45  
First IAGOS-CORE and IAGOS-CARIBIC Greenhouse Gas Observations from Commercial Airliners
  Christoph Gerbig (Max Planck Institute for Biogeochemistry (MPI-BGC), Jena, Germany)
10:45 - 11:00  
The SIO O\textsubscript{2} Program: Constraints on Long-term Carbon Cycle Changes Through Measurements of Atmospheric Oxygen
  Eric Morgan (Scripps Institution of Oceanography, University of California at San Diego)
11:00 - 11:15  
Regional Attribution of CO\textsubscript{2} Seasonal Amplification in Northern Hemisphere using a Tagged Tracer Transport Model
  Xin Lin (University of Michigan)
11:15 - 11:30  
The Prospects for Top-Down Atmospheric Flux Inventories for CO\textsubscript{2} and CH\textsubscript{4}
  David Crisp (NASA Jet Propulsion Laboratory, California Institute of Technology)
11:30 - 11:45  
Patterns and Controls on Trace Gas Fluxes of CO\textsubscript{2} and/or CH\textsubscript{4} in Marine and Terrestrial Habitats from Barrow, Alaska to Pago Pago, American Samoa
  Walter Oechel (San Diego State University, Global Change Research Group)
11:45 - 12:00  
Simulating International Drought Experiment Field Observations Using The Community Land Model
  Timothy W. Hilton (University of California at Merced)

12:00 - 13:00  
Catered Lunch - Outreach Classroom GB-124 (pre-payment of $12.00 at registration)
## Tuesday Afternoon, May 21, 2019 Agenda

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

<table>
<thead>
<tr>
<th>Session 3</th>
<th>Global Methane — Chaired by Lori Bruhwiler</th>
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</table>
| 13:00 - 13:15 | Recent Increases in the Burden of Atmospheric CH$_4$: Implications for the Paris Agreement  
Edward Dlugokencky (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD)) |
| 13:15 - 13:30 | Quantification of Methane Emissions and the Role of Satellites Moving from Global to Local Scales  
Sander Houweling (Vrije Universiteit Amsterdam, Department of Earth Sciences, Amsterdam, Netherlands) |
| 13:30 - 13:45 | Recent Acceleration of Methane Growth Rate: Leading Contributions from Tropical Wetlands and China  
Yi Yin (California Institute of Technology) |
| 13:45 - 14:00 | High Affinity Methanotrophs Are an Important Overlooked Methane Sink in Arctic and Global Methane Budget  
Youmi Oh (Purdue University) |
| 14:00 - 14:15 | Investigation of the Global Methane Budget Based on Improved Measurement Datasets and Prior Emission Information  
Xin Lan (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado) |
| 14:15 - 14:30 | Ground-truth Validation of VIIRS Nightfire for Gas Flaring Estimates  
Mikhail Zhizhin (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado) |

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

<table>
<thead>
<tr>
<th>Session 4</th>
<th>Ozone and Water Vapor in the Stratosphere — Chaired by Irina Petropavlovskikh</th>
</tr>
</thead>
</table>
| 15:00 - 15:15 | NOAA Ozonesonde Sites from the Tropics to Mid-latitudes: Ozone Variability, Links to Meteorological Conditions, and Validation of NASA Chemical Models  
Ryan M. Stauffer (Universities Space Research Association (USRA) - NASA Postdoctoral Program (NPP)) |
| 15:15 - 15:30 | Drivers of Variations in the Vertical Profile of Ozone in the Greenland Sector of the Arctic  
Shima Bahramvash Shams (Laboratory of Atmospheric Research, Department of Civil and Environmental Engineering, Washington State University) |
| 15:30 - 15:45 | Twenty Years of Observed Tropospheric Ozone Increases Across the Northern Hemisphere  
Audrey Gaudel (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado) |
| 15:45 - 16:00 | The Alpha Jet Atmospheric EXperiment (AJAX): Past, Present and Future Airborne Measurements  
Emma L. Yates (NASA Ames Research Center, Atmospheric Science Branch) |
| 16:00 - 16:15 | The Importance of Temporally Comprehensive Vertical Ozone Measurements for the Evaluation of Ozone NAAQS Exceedances in California  
Seyedmorteza Amini (California Air Resources Board) |
| 16:15 - 16:30 | Observational-based Assessment of Contributions to Southwest U.S. Maximum Ozone Concentrations  
David D. Parrish (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado) |

<table>
<thead>
<tr>
<th>Session 5</th>
<th>Special Science on a Sphere Presentation — Chaired by</th>
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</table>
| 16:30 - 16:45 | HOLOSCENES Presented on Science on a Sphere  
Shilpi Gupta (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado) |

### 16:30 - 19:00 Poster Session (DSRC Cafeteria) with appetizers and refreshments
Wednesday Morning, May 22, 2019 Agenda

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

07:30  Registration Opens in GC-402 - lunch orders collected at registration table
07:45 - 08:30  Morning Snacks - coffee, tea, fruit, bagels and donuts served

Session 6  Halocarbons and Other Ozone Depleting Substances — Chaired by Bradley Hall
08:30 - 08:45  Western European Emissions of CFC-11 and CFC-12 Inferred from Atmospheric Observations and Inverse Modelling
Michela Maione (University of Urbino, Department of Basic Sciences and Foundations, Urbino, Italy)
08:45 - 09:00  What Science Have We Learned from Our Combined Airborne and Ground-based Measurements of Halocarbons and other Trace Atmospheric Species?
James W. Elkins (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))
09:00 - 09:15  The Stratospheric Quasi-Biennial Oscillation Influence on Trace Gases at the Earth’s Surface
Eric A. Ray (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)
09:15 - 09:30  Iodine Detection in the Lower Stratosphere
Rainer Volkamer (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)
09:30 - 09:45  Atmospheric History of Carbonyl Sulfide During the 20th century from Antarctic and Greenland Firn Air Measurements
Murat Aydin (University of California at Irvine, Department of Earth System Science)
09:45 - 10:00  Constraints on Ocean Heat Uptake from the Atmospheric Argon to Nitrogen Ratio
Benjamini Birner (Scripps Institution of Oceanography, University of California at San Diego)

10:00 - 10:30  Morning Break

Session 7  Changes in Surface Radiation, Clouds, and Aerosol Distributions — Chaired by Patrick Sheridan
10:30 - 10:45  Optical Properties of Black Carbon and Brown Carbon and Their Contribution to Aerosol Light Absorption
Sang-Woo Kim (Seoul National University, South Korea)
10:45 - 11:00  The Role of Ground-based Aerosol Networks in Evaluating Satellite-retrieved Aerosol Radiative Properties over Mountainous Regions
James Patrick Sherman (Appalachian State University, Department of Physics and Astronomy)
11:00 - 11:15  Evaluation of Novel NASA Aerosol Fire Products Over Extreme Fire Events in the Semi-arid Western U.S.
S. Marcela Loria-Salazar (University of Oklahoma)
11:15 - 11:30  Application of Solar Aureole for Atmospheric Monitoring
Pi-Huan Wang (Taksha Institute)
11:30 - 11:45  Developing Solar Forecasting Model Diagnostics of Cloud Impacts on Solar Variability
Laura Riihimaki (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)
11:45 - 12:00  The Aleutian Low – Beaufort Sea Anticyclone: A Climate Index for Predicting the Timing of Springtime Melt in the Pacific Arctic Cryosphere
Christopher J. Cox (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

12:00 - 13:00  Catered Lunch - Outreach Classroom GB-124 (pre-payment of $12.00 at registration)
Wednesday Afternoon, May 22, 2019 Agenda

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

**Session 8**  
**Regional Carbon Cycle Feedbacks and Observations** — Chaired by Kathryn McKain

13:00 - 13:15  
Airborne *in situ* Measurement of CO$_2$ and CH$_4$ in South Korea  
*Shanlan Li* (National Institute of Meteorological Sciences, Seogwipo-si, South Korea)  
35

13:15 - 13:30  
Trace Gas Observations from Small Research Aircraft over the Mid Atlantic States and Hebei, China  
*Russell R. Dickerson* (University of Maryland, Department of Oceanic and Atmospheric Science)  
36

13:30 - 13:45  
Characteristics and Mechanisms of Atmospheric CO$_2$ Variations during Summer Frontal Passages  
*Sha Feng* (The Pennsylvania State University, Department of Meteorology and Atmospheric Science)  
37

13:45 - 14:00  
The Potential for Public-transit Based Atmospheric Monitoring to Advance Air Quality and Atmospheric Chemistry Research and to Engage Urban Stakeholders  
*Logan E. Mitchell* (University of Utah)  
38

14:00 - 14:15  
Fire Emissions in California: Analysis of Airborne Measurements of Trace Gases from Thirteen Fires  
*Caroline Parworth* (NASA Ames Research Center, Atmospheric Science Branch)  
39

14:15 - 14:30  
Commissioning of High Precision *in situ* Measurements of N$_2$O and CO at Cape Grim  
*Elise-Andree Guerette* (Commonwealth Scientific and Industrial Research Organisation (CSIRO), Oceans and Atmosphere, Aspendale, Australia)  
40

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

**Session 9**  
**Regional Methane Monitoring** — Chaired by Gabrielle Petron

15:00 - 15:15  
Large Fugitive Methane Emissions from Urban Centers Along the U.S. East Coast  
*Genevieve Plant* (University of Michigan)  
41

15:15 - 15:30  
*Yu Yan Cui* (California Air Resources Board)  
42

15:30 - 15:45  
Optimization of Methane Emissions in the United States Gulf Region Using Aircraft-based Measurements Across Frontal Boundaries  
*Zachary Barkley* (The Pennsylvania State University, Department of Meteorology and Atmospheric Science)  
43

15:45 - 16:00  
Importance of Super-emitter Natural Gas Well Pads in the Marcellus Shale  
*Dana Caution* (University of Wyoming)  
44

16:00 - 16:15  
Characterization of Methane Emissions in Los Angeles with Airborne Hyperspectral Imaging  
*Katherine M. Saad* (The Aerospace Corporation)  
45

16:15 - 16:30  
Could O&G Wastewater Be a Significant Source of Air Toxics in the Northern Colorado Front Range?  
*Rachel Edie* (University of Wyoming)  
46

16:30  
**Closing Remarks - Dr. James Butler, Director (NOAA/ESRL Global Monitoring Division)**
Tuesday, May 21, 2019 Poster Session Agenda

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

2019 GMAC Poster Session - Carbon Cycle Greenhouse Gases

P-1  One-step Preparation of Gravimetric CO₂-in-air Standards
     Brad Hall (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))

P-2  Development of a New Flask-air Analysis System for the Global Greenhouse Gas Reference Network
     Andrew Crotwell (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-3  Laboratory Identification and Testing of Sources of Bias in Carbon Dioxide Measurements of Atmospheric Air Collected and Stored in Glass Flasks
     Don Neff (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-4  Tower in situ and Flask CO₂ Comparisons
     Jonathan Kofler (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-5  High Humidity-induced bias in Aircraft Network CO₂ Data Due to Water Condensation in Flasks
     Kathryn McKain (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-6  Stable Carbon Isotope Analysis of Airborne Particulate Matter Using a Carbon Aerosol Analyzer and a Cavity Ringdown Spectrometer
     Jonathan Bent (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-7  Standoff Measurements of CO₂ and H₂O in Boulder using DIAL And IPDA Techniques
     David Plusquellic (National Institute of Standards and Technology (NIST), Physical Measurement Laboratory, Quantum Electromagnetics Division)

P-8  Combining in situ and Satellite Observations of CO₂ in a Synthesis Inversion Framework for the U.S. Corn Belt
     Bharat Rastogi (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-9  Partitioning Sources of CO₂ Atmospheric Signal in an Urban Site Using Carbon Monoxide as a Tracer
     Wilson K. Gichuhi (Department of Chemistry, Tennessee Tech University)

P-10 Utilization of CH₄, CO₂ and CO:CO₂ Correlations in Deciphering Temporal Changes in Urban CH₄ and CO Emissions
    Lahira P. Gamage (School of Environmental Studies, Tennessee Technological University)

P-11 Utilizing Public Transit for Urban Atmospheric Monitoring in Denver, CO
    Isaac Vimont (National Research Council Post-Doc)

P-12 Creating an Emissions Map for Benzene Based on Fossil Fuel CO₂ emissions: "HESTIA Benzene"
    Isaac Vimont (National Research Council Post-Doc)

P-13 Characterization and Quantification of Benzene Emissions from a New Multi-well Pad in a Colorado Front Range Residential Community
    Ingrid Mielke-Maday (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-14 Measuring BTEX with a Commercial GC-PID System in an Oil and Gas Field
    Monica Madronich (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-15 Open-path Mid-infrared Dual Comb Spectroscopy for Measurement of Ambient Ethane and Propane
    Kevin Cossel (National Institute of Standards and Technology (NIST))

P-16 Continuous Methane Leak Detection in Oil and Gas: Recent Progress Toward a Regional Approach with Dual Frequency Comb Spectroscopy and Inversions
    Caroline Alden (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-17 Measurement Capabilities of the CU SOF Instrument: Separation of Methane Emissions from Agricultural and Natural Gas Sources & Developing Techniques to Quantify Wildfire Emissions
    Rainer Volkamer (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-18 Modeling Ground- and Aircraft-based Methane Monitoring Systems for Natural Gas Storage Facilities using LPDM-LES
    Alex Rybchuk (University of Colorado, Department of Mechanical Engineering)
Tuesday, May 21, 2019 Poster Session Agenda

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

2019 GMAC Poster Session - Carbon Cycle Greenhouse Gases (continued)

P-19  How Useful Are Carbon Stable Isotopes of Methane? Improvements in Analysis and Quality Controls at the INSTAAR Stable Isotope Lab
      
      Sylvia Englund Michel (Institute of Arctic and Alpine Research (INSTAAR), University of Colorado)

P-20  Sensitivity of the Isotopic Composition of Atmospheric Methane to Oxidant Fields in the GEOS Model
      
      Sarah Strode (Universities Space Research Association (USRA))

P-21  Quantification of Transport Error Using a Coupled Meteorological and Constituent Transport Model Within an Ensemble Kalman Filter (EnKF)
      
      Vikram Khade (University of Toronto, Department of Physics, Toronto, Canada)

2019 GMAC Poster Session - Halocarbons and Other Ozone Depleting Substances

P-22  Two Years of MAX-DOAS Data from Remote Tropical Marine Mountaintops
      
      Theodore K. Koenig (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-23  Improving the Sampling and Analysis of Atmospheric Carbonyl Sulfide (OCS) in the GMD Networks
      
      Benjamin R. Miller (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-24  SO\textsubscript{2} Profiles during the Kilauea Eruption
      
      Paul J. Walter (St. Edward's University)

2019 GMAC Poster Session - Ozone and Water Vapor

P-25  Optimizing Umkehr Ozone Profile Retrievals during the Mt. Pinatubo Volcanic Eruption
      
      Koji Miyagawa (Guest Scientist at NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))

P-26  South American Dobson Intercomparison Campaign for RA-III
      
      Glen McConville (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-27  New Volumetric Flow Rate Tests of Ozoneonde Pumps at Reduced Pressures
      
      Bryan Johnson (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))

P-28  Ozonesonde Observations at South Pole Station During the 2018 Ozone Hole
      
      Patrick Cullis (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-29  The Role of Convection in Tropical Ozone Variability Inferred from Profiles at NOAA’s SHADOZ Stations (1998-2017)
      
      Anne M. Thompson (NASA Goddard Space Flight Center (GSFC), Atmospheric Chemistry and Dynamics Laboratory)

P-30  OCTAV-UTLS (Observed Composition Trends and Variability in the UTLS) SPARC Activity - Jet-relevant Data Analyses of NOAA Ozoneonde Records
      
      Irina Petropavlovskikh (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-31  Measured and Modeled Ozone Distributions over the Atlantic and Pacific Oceans from the ATom Mission
      
      Eric Hintsa (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-32  Comparison of Vertical Distribution of Ozone Profiles between Ozonesondes and the GMI Merra II Model
      
      Emrys Hall (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-33  Stratospheric Aerosol and Gas Experiment III on the International Space Station (SAGE III/ISS) Science Data Products: Preliminary Validation Results
      
      Susan Kizer (Science Systems and Applications, Inc. (SSAI))

P-34  Seasonal Trends in Observed Surface Ozone Conditions in the Arctic
      
      Audra McClure-Begley (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)
Tuesday, May 21, 2019 Poster Session Agenda

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**2019 GMAC Poster Session - Surface Radiation, Clouds, and Aerosol Distributions**

P-35 Overview and Selected Results from the NOAA Federated Aerosol Network
   Patrick Sheridan (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))

P-36 An Overview of the Effect of Water Uptake on Aerosol Particle Light Scattering: Observations, Evaluation of Proxies, and
   Comparison with Global Models
   Elisabeth Andrews (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-37 Seasonal Dependence of Column-averaged and Near-surface Aerosol Optical Properties Measured at Appalachian State University
   (APP)
   Taylor Foote (Appalachian State University, Department of Physics and Astronomy)

P-38 Variability of Aerosol Optical Properties at Mauna Loa and its Characteristics According to Source Regions
   Jong-Uk Park (Seoul National University, South Korea)

P-39 Case Study of Air Quality during Winter Season over Northeastern Pakistan during 2007 to 2015
   Muhammad Zeeshan Shahid (College of Earth & Environmental Sciences University of the Punjab, Lahore, Pakistan)

P-40 34-year Trends in Aerosol Chemistry in Relation to Aerosol Acidity at Alert, NU, Canada
   Sangeeta Sharma (Environment and Climate Change Canada, Toronto, Canada)

P-41 Variation of Carbonaceous Aerosols in Foggy Days in and Around Special Episodic Events
   Pallavi Saxena (University of Delhi, Hindu College, Department of Environmental Sciences, Delhi, India)

P-42 Two Centuries of Volcanic Aerosols Derived from Lunar Eclipse Records, 1805-2019
   Richard A. Keen (University of Colorado, Emeritus, Department of Atmospheric and Oceanic Sciences)

P-43 Holographic Cloud Particle Imager (HCPI) for Unmanned Aircraft Systems (UASs)
   Daniel R. McAdams (Radiation Monitoring Devices, Inc.)

P-44 The De-Icing Comparison Experiment (D-ICE): A Study of Broadband Radiometric Measurements Under Icing Conditions in the
   Arctic
   Christopher J. Cox (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

P-45 The Need for a Surface Energy Budget Network and Increased Surface Radiation Measurements to Improve Weather and Climate
   Forecasting
   John A. Augustine (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))

**2019 GMAC Poster Session - Other**

P-46 Curating a Multi-agency Set of Federal Climate Indicators
   Laura Stevens (North Carolina State University (NCSU))

P-47 The New Barrow Atmospheric Baseline Observatory
   Brian Vasel (NOAA Earth System Research Laboratory, Global Monitoring Division (GMD))

P-48 Opportunity to Plan and Develop a Comprehensive U.S. Arctic Research Infrastructure Network Hub at Oliktok Point, Alaska
   Jasper Hardesty (Sandia National Laboratories)

P-49 Soil Respiration Response To *Adenostoma Sparsifolium* Microsites Among Seasons in Semiarid Shrubland
   Jessica Montes (San Diego State University, Global Change Research Group)

P-50 The Acquisition of Fog in Montane California Chaparral: Ecosystem Inputs and Use by Plants
   Breahna Gillespie (San Diego State University, Global Change Research Group)

P-51 A Bibliometric Analysis of GMD Publications, 2010-2018
   Sue Visser (FedWriters)