

NOAA GML GLOBAL MONITORING ANNUAL CONFERENCE 2022

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Times are in Mountain Daylight Time

Monday Afternoon, May 23, 2022 Agenda

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

11:30 **Conference Virtual Meeting Room Opens**

	Page No.
Session 1	
Carbon Cycle and Greenhouse Gases Day 1 Presentations — Chaired by <i>Aleya Kaushik</i>	
12:00 - 12:10 Welcome and Meeting Logistics <i>Ariel Stein (NOAA Global Monitoring Laboratory (GML))</i>	1
12:10 - 12:30 Monday Keynote Address: A Critical Decade for Climate Action <i>Ko Barrett (National Oceanic and Atmospheric Administration (NOAA), Office of the Under Secretary)</i>	2
12:30 - 12:45 Progress Toward A NOAA Greenhouse Gas Commercial Aircraft Program <i>Colm Sweeney (NOAA Global Monitoring Laboratory (GML))</i>	3
12:45 - 13:00 Surprisingly Few Surprises in Global Carbon Cycling <i>Benjamin Birner (Scripps Institution of Oceanography, University of California at San Diego)</i>	4
13:00 - 13:15 Increasing CO ₂ Seasonal Cycle Amplitude in the Arctic Proportional to Rising Atmospheric CO ₂ Levels <i>Lei Hu (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	5
13:15 - 13:30 CO ₂ Sources and Sinks as Seen by the OCO-2 Satellite: Flux Estimates across 2015-2020 Given by a Dozen Inversion Groups Participating in the OCO-2 V10 MIP <i>David Baker (Cooperative Institute for Research in the Atmosphere (CIRA), Colorado State University)</i>	6
13:30 - 13:45 CarbonWatchNZ: Regional to National Scale Inverse Modelling of New Zealand's Carbon Balance <i>Beata Bukosa (National Institute of Water and Atmospheric Research (NIWA), Wellington, New Zealand)</i>	7
13:45 - 14:00 Quantifying the Impacts of the COVID-19 Lockdown on Urban Emissions across the Salt Lake Valley <i>Derek V. Mallia (University of Utah)</i>	8
14:00 - 14:20 Coffee Break and Open Discussion	
14:20 - 14:40 Poster Lightning Talks	
14:40 - 16:00 Poster Session	
14:40 - 16:30 Open Discussion Room	

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Tuesday Afternoon, May 24, 2022 Agenda

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11:30	Conference Virtual Meeting Room Opens	
		Page No.
Session 2	Global Radiation and Aerosols Presentations — <i>Chaired by Joseph Sedlar</i>	
12:00 - 12:10	Welcome and Meeting Logistics <i>Joseph Sedlar (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	9
12:10 - 12:30	Tuesday Keynote Address: The Importance of Coordinated Observations of African Megacity Air Pollution <i>Vernon Morris (Arizona State University)</i>	10
12:30 - 12:45	A Dual-wavelength Photo-thermal Aerosol Absorption Monitor: Design, Calibration and Performance <i>Grisa Mocnik (University of Nova Gorica, Nova Gorica, Slovenia)</i>	11
12:45 - 13:00	Changes in Background Southeastern U.S. Aerosol Loading and Aerosol Optical Properties and Their Seasonality Based on 12 Years of Measurements at the NOAA/NASA Monitoring Sites at Appalachian State University <i>James Patrick Sherman (Appalachian State University, Department of Physics and Astronomy)</i>	12
13:00 - 13:15	The Kennaook/Cape Grim Particle Number Concentration (CN3) Record:1978-2020 <i>Melita Keywood (Commonwealth Scientific and Industrial Research Organisation (CSIRO), Oceans and Atmosphere, Aspendale, Australia)</i>	13
13:15 - 13:30	Regime-specific Cloud Vertical Overlap Characteristics from Radar and Lidar Observations at the ARM Sites <i>Kelly Balmes (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	14
13:30 - 13:45	A New Precipitation Gauge Wind Shield for the US Climate Reference Network <i>John Kochendorfer (NOAA Air Resources Laboratory Air Turbulence and Diffusion Division)</i>	15
13:45 - 14:00	Forcing for Multidecadal Brightening and Dimming Trends over Northern Hemisphere Continents <i>John Augustine (NOAA Global Monitoring Laboratory (GML))</i>	16
14:00 - 14:20	Coffee Break and Open Discussion	
14:20 - 14:40	Poster Lightning Talks	
14:20 - 16:00	Poster Session	
14:40 - 16:30	Open Discussion Room	
16:30 -18:30	eGMAC Virtual Happy Hour	

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Wednesday Afternoon, May 25, 2022 Agenda

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10:00 - 11:00 Early Career Panel, Moderated by Xinyi Zeng

11:00 - 11:30 Early Career Panel Coffee Break

11:30 Conference Virtual Meeting Room Opens

	Page No.
Session 3 Ozone and Water Vapor Presentations — Chaired by Irina Petropavlovskikh	
12:00 - 12:10 Welcome and Meeting Logistics <i>Irina Petropavlovskikh (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	17
12:10 - 12:30 Wednesday Keynote Address: Can Data Foreshadow Policy? The Example of the Montreal Protocol <i>Tina Birmpili (Multilateral Fund Secretariat for the Implementation of the Montreal Protocol, United Nations Environment Programme, Montreal, Canada)</i>	18
12:30 - 12:45 The Efficacy of Long-term in Situ Measurement Programs in the Evaluation and Amelioration of Satellite Measurement Records: Stratospheric Water Vapor <i>Dale Hurst (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	19
12:45 - 13:00 Injection of Unprecedented Amounts of Water Vapor Into the Stratosphere by the Eruption of Hunga Tonga-Hunga Ha'apai <i>Holger Vömel (National Center for Atmospheric Research (NCAR), Earth Observing Laboratory)</i>	20
13:00 - 13:15 SAGE III/ISS: Continuing the Legacy of SAGE Data Products <i>Susan Kizer (Science Systems and Applications, Inc. (SSAI))</i>	21
13:15 - 13:30 SHADOZ's Silver Anniversary: 25 Years of Accomplishments from the Premier Tropical Ozone Network <i>Ryan M. Stauffer (NASA Goddard Space Flight Center (GSFC), Atmospheric Chemistry and Dynamics Laboratory)</i>	22
13:30 - 13:45 Tropical Tropospheric Ozone Distribution and Trends <i>Audrey Gaudel (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	23
13:45 - 14:00 Remote Sensing Study of Ozone, NO ₂ , and CO over India: some Contrary Effects of SARS-CoV-2 Lockdown in the Free Troposphere <i>Prajwal Rawat (Aryabhata Research Institute for observational sciencES (ARIES), Department of Science and Technology (DST), Atmospheric Science Division, Govt. of India, Nainital, India)</i>	24
14:00 - 14:20 Coffee Break and Open Discussion	
14:20 - 14:40 Poster Lightning Talks	
14:20 - 16:00 Poster Session	
14:40 - 16:30 Open Discussion Room	

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Thursday Afternoon, May 26, 2022 Agenda

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11:30	Conference Virtual Meeting Room Opens	
Session 4	Halocarbons and Other Trace Species Presentations — Chaired by Isaac Vimont	Page No.
12:00 - 12:10	Welcome and Meeting Logistics <i>Isaac Vimont (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	25
12:10 - 12:25	Improving Global Annual Emission Estimates for Long-lived Gases Derived from Atmospheric Data <i>Stephen A Montzka (NOAA Global Monitoring Laboratory (GML))</i>	26
12:25 - 12:40	Global Emissions of HCFC-141b Have Been Rising Since 2017 <i>Luke Western (University of Bristol, School of Chemistry, Bristol, United Kingdom)</i>	27
12:40 - 12:55	A Novel, Low-cost Analytical Method for Measuring High-resolution Vertical Profiles of Stratospheric Trace Gases <i>Jianghanyang Li (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	28
12:55 - 13:10	One Year of Aircraft Vertical Profile Measurements of CO ₂ , CH ₄ and CO in Tropical East Africa <i>Kathryn McKain (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	29
13:10 - 13:25	Long-term Measurements of CO ₂ , CH ₄ , and Isotopic Ratios of CO ₂ in the Western Pacific: Trends, Variations, and Implications <i>Chang-Feng Ou-Yang (National Central University, Department of Atmospheric Sciences, Chung-Li, Taiwan)</i>	30
13:25 - 13:40	City-scale Remote Sensing of CO ₂ and CH ₄ using Open-path Dual Comb Spectroscopy <i>Kevin Cossel (National Institute of Standards and Technology (NIST))</i>	31
13:40 - 14:00	Thursday Keynote Address: The Origins, Milestones, and Legacy of NOAA's Global Monitoring Laboratory <i>James H. Butler (Retired from NOAA Global Monitoring Laboratory (GML))</i>	32
14:00 - 14:20	Coffee Break and Open Discussion	
14:20 - 14:40	Poster Lightning Talks	
14:20 - 16:00	Poster Session	
14:40 - 16:30	Open Discussion Room	
16:30	Potluck in Boulder's Harlow Platts Community Park	

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Friday Afternoon, May 27, 2022 Agenda

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11:30	Conference Virtual Meeting Room Opens	
Session 5	Carbon Cycle and Greenhouse Gases Day 2 Presentations — Chaired by Lei Hu	
12:00 - 12:10	Welcome and Meeting Logistics <i>Lei Hu (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	33
12:10 - 12:30	Friday Keynote Address: Towards Near Real Time Global Greenhouse Gas Budgets <i>Philippe Ciais (Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Institut Pierre-Simon Laplace, Orme des Merisiers, France)</i>	34
12:30 - 12:45	Atmospheric CH ₄ : A Record Annual Increase in 2021 <i>Xin Lan (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	35
12:45 - 13:00	Revising Global Methane Soil Sink by Considering High Affinity Methanotrophy <i>Youmi Oh (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	36
13:00 - 13:15	Quantification of Oil and Gas Methane Emissions in the Delaware and Marcellus Basins Using a Network of Continuous Tower-Based Measurements <i>Zachary Barkley (The Pennsylvania State University, Department of Meteorology and Atmospheric Science)</i>	37
13:15 - 13:30	JAXA's Greenhouse Gases Monitoring Activities in Support of Carbon Cycle Science and Climate Monitoring <i>Hiroshi Suto (Japan Aerospace Exploration Agency, Tsukuba, Japan)</i>	38
13:30 - 13:45	First Ten-year CO ₂ monitoring Record at Mexico High-Altitude Global Climate Observatory in (MEX) at 4,465 M.a.s.l., Compared with Mauna Loa Observatory. (MLO) at 3,397 M.a.s.l. <i>Luis Roberto Acosta (Climate Institute México & América Latina, Mexico City, Mexico)</i>	39
13:45 - 14:00	Surface Ocean PCO ₂ from the Surface Carbon State Estimate (SCSE) <i>David Munro (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)</i>	40
14:00 - 14:05	2022 GMAC Closing Remarks <i>Ariel Stein (NOAA Global Monitoring Laboratory (GML))</i>	41
14:05 - 14:30	Open Discussion	

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Monday, May 23, 2022 Poster Session Agenda

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14:20 - 14:25 Poster Session Welcome and Logistics, Chaired by Bharat Rastogi

14:25 - 14:40 Poster Lightning Talks

Carbon Cycle and Greenhouse Gases Poster Block 1: 14:40 - 15:20

- P-1 Comparison of Atmospheric Observations to High-resolution Fossil Fuel and Biogenic CO₂ Flux Models for Auckland, New Zealand
Timothy W. Hilton (GNS Science, National Isotope Centre, Lower Hutt, New Zealand)
- P-2 Analyzing Long-term East Asia CH₄ Emission Changes Inferred from CH₄/CO₂ Mole Fraction Ratios Based on Observation and Modelling at Anmyeondo, South Korea between 2010-2020
Samuel Takele Kenea (National Institute of Meteorological Sciences, Innovative Meteorological Research Department, Seogwipo-si, South Korea)
- P-3 Biogas as a Replacement for Fossil Fuels to Reduce CO₂ Emission Rate
Md Abu Bakkar Siddik (College of Civil Engineering, Nanjing Forestry University, Nanjing, China)
- P-4 Advancing Understanding of Plant-Drought Responses in North American Ecosystems using Carbon Isotopic Discrimination in the Simple Biosphere Model
Aleya Kaushik (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

Carbon Cycle and Greenhouse Gases Poster Block 2: 15:20 - 16:00

- P-5 Misrepresentation of the Temperature Sensitivity of Ecosystem Respiration in Terrestrial Biosphere Models Revealed by Atmospheric CO₂ Observations
Wu Sun (Carnegie Institution for Science, Department of Global Ecology)
- P-6 Abstract Withdrawn: Western USA Ecosystem Response to Prolonged Drought and Susceptibility to Fire
Ian Baker (Colorado State University)
- P-7 The NOAA High-altitude Operational Returning-Uncrewed System (HORUS) for Atmospheric Observing
Bianca Baier (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)
- P-8 MLO 2.0: A Contingency Plan in the Making
Darrien Reichler (Department of Defense Skillbridge Program Servicemember)

14:40 - 16:30 Open Discussion Room

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14:20 - 14:25 Poster Session Welcome and Logistics, Chaired by Hagen Telg

14:25 - 14:40 Poster Lightning Talks

Global Radiation and Aerosols Poster Block 1: 14:40 - 15:20

- P-9 Linking *In Situ* and Lidar Aerosol Measurements for Air Quality Nowcasting
Darrel Baumgardner (Droplet Measurement Technologies)
- P-10 Aerosol Optical Properties Calculated from Size Distributions, Filter Samples and Absorption Photometer Data at Dome C, Antarctica
Aki Virkkula (Finnish Meteorological Institute, Helsinki, Finland)
- P-11 Measuring and Interpreting Particulate Mass Concentration using the Tapered Element Oscillating Microbalance (TEOM) at Appalachian State University
Ethan Barber (Appalachian State University, Department of Physics and Astronomy)
- P-12 Celebrating 30+ Years of the Network for Detection of Atmospheric Composition Change (NDACC)
Irina Petropavlovskikh (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)

Global Radiation, Aerosols, and Ozone Poster Block 2: 15:20 - 16:00

- P-13 Balloon-based SO₂ Measurements during the Hunga Tonga Eruption
Paul Walter (St. Edward's University)
- P-14 Impact of Meteorology on Baseline Ozone in the Western United States
Matthew Ninneman (University of Washington Bothell)
- P-15 Spatiotemporal Characteristics of the NMHCs and Their Contribution in Situ Tropospheric Ozone Production: First Results from the Central Himalayan
Mahendar Rajwar (Aryabhatta Research Institute for observational sciencES (ARIES), Department of Science and Technology (DST), Atmospheric Science Division, Govt. of India, Nainital, India)
- P-16 Bias in O₃ Measurements in Smoky Air When using some UV Instruments
Dan Jaffe (University of Washington)

14:40 - 16:30 Open Discussion Room

16:30 - 18:30 eGMAC Virtual Happy Hour

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Wednesday, May 25, 2022 Poster Session Agenda

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14:20 - 14:25 Poster Session Welcome and Logistics, Chaired by Peter Effertz

14:25 - 14:40 Poster Lightning Talks

Ozone and Water Vapor Poster Block 1: 14:40 - 15:20

- P-17 50 Years of Balloon-borne Ozone Profile Measurements at Uccle, Belgium
Roeland Van Malderen (Royal Meteorological Institute of Belgium, Brussels, Belgium)
- P-18 Updated Trends of the Stratospheric Ozone Vertical Distribution at Select NOAA Global Monitoring Laboratory Dobson Monitoring Stations Based on the LOTUS Regression Model
Peter Effertz (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)
- P-19 Working Towards Replacing the NOAA FPH Cryogen (R23) with Dry Ice and Alcohol (DIA)
Emrys Hall (Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado)
- P-20 Observations of the Lower Stratospheric Environment from Solar Balloons in the Southwest US
Erika Roesler (Sandia National Laboratories)

Ozone and Water Vapor Poster Block 2: 15:20 - 16:00

- P-21 The Effects of the IUP Ozone Cross-section in Umkehr Retrievals and Temperature Correction
K. Miyagawa (Guest Scientist at NOAA Global Monitoring Division (GML))
- P-22 South Pole Station Ozonesondes: Variability in the 2019-2021 Springtime Antarctic Ozone Holes
Bryan Johnson (NOAA Global Monitoring Laboratory (GML))
- P-23 Southern Hemisphere Additional Ozonesondes (SHADOZ) Project Update: 2022 Archive and Outreach Activities
Debra Kollonige (Science Systems and Applications, Inc. (SSAI))
- P-24 Harmonization and Evaluation of Ground-based Instruments for Free-Tropospheric Ozone Measurements by TOAR-II Focus Working Group "HEGIFTOM"
Roeland Van Malderen (Royal Meteorological Institute of Belgium, Brussels, Belgium)

14:40 - 16:30 Open Discussion Room

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Thursday, May 26, 2022 Poster Session Agenda

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14:20 - 14:25 Poster Session Welcome and Logistics, Chaired by Matthew Gentry

14:25 - 14:40 Poster Lightning Talks

Halocarbons and Other Trace Species Poster Block 1: 14:40 - 15:20

- P-25 Uncertainty, Stability and Traceability in Global Monitoring of Atmospheric Composition and the Role of WMO/GAW Central Calibration Facilities – Reality and Plans
Herman G.J. Smit (Institute for Energy and Climate Research, Troposphere IEK-8, Research Center Juelich, Juelich, Germany)
- P-26 New System to Measure Carbonyl Sulfide in Air Samples from Baring Head and Fiordland National Park, New Zealand
Peter Sperlich (National Institute of Water and Atmospheric Research (NIWA), Wellington, New Zealand)
- P-27 Mapping Methane Sources in the Baltimore-Washington, DC Area Using an Instrumented Mobile Platform
Xinrong Ren (NOAA Air Resources Laboratory (ARL))

Halocarbons and Other Trace Species Poster Block 2: 15:20 - 16:00

- P-28 Evaluation of MOPITT and TROPOMI Carbon Monoxide Retrievals using AirCore *in Situ* vertical Profiles
Sara Martínez-Alonso (National Center for Atmospheric Research (NCAR), Atmospheric Chemistry Observations and Modeling Laboratory)
- P-29 Progress Towards Diagnosis of North American CO₂ and CH₄ Fluxes with the Expanded *In Situ* Measurement Network
Natasha Miles (The Pennsylvania State University, Department of Meteorology and Atmospheric Science)
- P-30 Analysis of Source Distribution of High GHGs and CO Events using Airborne and Surface Observations in Korea
Sunran Lee (National Institute of Meteorological Sciences, Innovative Meteorological Research Department, Seogwipo-si, South Korea)
- P-31 Laboratory Validation of a Laser Absorption Spectrometer for Balloon-borne Measurements of UTLS Water Vapor
Simone Brunamonti (Swiss Federal Laboratories for Materials Science and Technology (Empa) Laboratory for Air Pollution and Environmental Technology, Dübendorf, Switzerland)

14:40 - 16:30 Open Discussion Room

16:30 Potluck in Boulder's Harlow Platts Community Park