

40th NOAA ESRL GLOBAL MONITORING ANNUAL CONFERENCE 2012

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

Tuesday Afternoon, May 15, 2012 AGENDA

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

Page No.

- **Session 3** **Carbon Cycle - Quantification of Emissions** — Chaired by Tom Conway
- 13:00 - 13:15 Estimate of CH₄ Emissions from Oil and Gas Operations in the Uintah Basin Using Airborne CH₄ Measurements and LiDAR Wind Data 11
Anna Karion (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- 13:15 - 13:30 Quantifying California's Anthropogenic Greenhouse Gas Budget 12
Marc L. Fischer (Lawrence Berkeley National Laboratory, Berkeley, CA)
- 13:30 - 13:45 Urban Greenhouse Gas Emissions Monitoring in Davos, Switzerland, Before, During and After the 2012 World Economic Forum Annual Meeting 13
Thomas Lauvaux (The Pennsylvania State University, Department of Meteorology, University Park, PA)
- 13:45 - 14:00 Hourly, Daily, and Seasonal Patterns of Atmospheric CO₂ Along an Urbanization Gradient 14
Allison Dunn (Worcester State University, Worcester, MA)
- 14:00 - 14:15 Toward Simultaneous Multi-station Data Pre-processing for Inversions of Greenhouse Gas Emissions and Uptake in California 15
Elena Novakovskaia (Earth Networks, Inc., Germantown, MD)
- 14:15 - 14:30 Two Decades of Atmospheric O₂ Measurements and Their Implications 16
Ralph Keeling (Scripps Institution of Oceanography, University of California at San Diego, La Jolla, CA)

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

- **Session 4** **Aerosols** — Chaired by John Ogren
- 15:00 - 15:15 Long-term Trends in African Dust Transport to the Caribbean: African Sources, Changing Climate, and Future Scenarios 17
Joseph M. Prospero (Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Miami, FL)
- 15:15 - 15:30 Aerosols at Mauna Loa Observatory (MLO) – Spring 2001 Versus Spring 2011 18
Thomas A Cahill (University of California at Davis, Davis, CA)
- 15:30 - 15:45 Seasonal Variability in the Southeast U.S. Background Aerosol Direct Radiative Effect – An Initial Measurement-based Climatology from a Regionally-representative Location 19
James Sherman (Department of Physics and Astronomy, Appalachian State University, Boone, NC)
- 15:45 - 16:00 Climatology of Aerosol Optical Properties Over the High Arctic 20
Auomeet Saha (Université de Sherbrooke, Quebec, Canada)
- 16:00 - 16:15 The Cloud, Aerosol Backscatter and Polarization LiDAR at Summit, Greenland 21
Ryan Neely (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- 16:15 - 16:30 Isoprene Suppression of New Particle Formation in a Mixed Deciduous Forest 22
Shan-Hu Lee (Kent State University, Kent, OH)
- 16:30 - 16:45 Investigating Potential Biases in Aerosol Light Absorption Measurements 23
Christine Walsh (NOAA Earth System Research Laboratory, Lund University, Lund, Sweden)

- **17:00 - 20:00** **Poster Session in DSRC Cafeteria (GC-425) with appetizers & refreshments**

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- **07:00** **Registration Opens in GC-402 – lunch orders collected at registration table**
- **07:30 - 08:15** **Morning Snacks – Coffee, tea, fruit, bagels & donuts served**
- Page No.
- **Session 5** **Keynote Address and Carbon Cycle - Networks** — Chaired by Arlyn Andrews
- 08:15 - 08:45 **KEYNOTE:** National Emissions Verification by Merging Earth System Measurements, Global Social Data and Earth System Models 24
 Ronald G. Prinn (Massachusetts Institute of Technology (MIT), Cambridge, MA)
- 08:45 - 09:00 Earth Networks Update on Global Greenhouse Gas (GHG) Monitoring Network 25
 Bob Marshall (Earth Networks, Inc., Germantown, MD)
- 09:00 - 09:15 Comparison of Primary Standards/Scales of Key Greenhouse Gases Between NOAA and NIST 26
 Jerry Rhoderick (National Institute of Standards and Technology (NIST), Gaithersburg, MD)
- 09:15 - 09:30 The Value of On-site Comparisons During WCC Audits for Methane, Carbon Dioxide and Carbon Monoxide 27
 Christoph Zellweger (EMPA, Laboratory for Air Pollution/Environmental Technology, Duebendorf, Switzerland)
- 09:30 - 09:45 *In Situ* CO₂ Monitoring Network Evaluation and Design: A Criterion Based on Atmospheric CO₂ Variability 28
 Yoichi Shiga (Department of Civil and Environmental Engineering, Stanford University, Stanford, CA)
- **09:45 - 10:15** **Morning Break**
- **Session 6** **Carbon Cycle - Large Scale Observations** — Chaired by John Miller
- 10:15 - 10:30 Variation of CO₂ Mole Fraction in the Lower Free Troposphere, in the Boundary Layer and at the Surface 29
 Laszlo Haszpra (Hungarian Meteorological Service, Budapest, Hungary)
- 10:30 - 10:45 The ODIAC - The Second Fossil Fuel CO₂ Emission Dataset for CarbonTracker 30
 Tomohiro Oda (Cooperative Institute for Research in Atmospheres, Colorado State University, Fort Collins, CO)
- 10:45 - 11:00 Global Monitoring: CARIBIC Aircraft Data for CO, Greenhouse Gases (GHGs), and Non-methane Hydrocarbons 31
 Carl Brenninkmeijer (Max Planck Institute for Chemistry, Mainz, Germany)
- 11:00 - 11:15 The Evolution of Atmospheric CO₂ Variations in a Coupled Carbon-climate Model 32
 Gretchen Keppel-Aleks (University of California, Department of Earth System Science, Irvine, CA)
- 11:15 - 11:30 Estimating North America Carbon Fluxes Through Lagrangian Inverse Modeling for CO₂ and OCS 33
 Huilin Chen (NOAA Earth System Research Laboratory, Boulder, CO)
- 11:30 - 11:45 AirCore: The Gold Standard for Satellite Evaluation 34
 Colm Sweeney (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- **11:45 - 13:00** **Catered Lunch Service – Outreach Classroom GB-124 (pre-payment of \$12.00 required at registration table)**

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- **Session 7** **Carbon Cycle - Large Scale Observations (continued)** — Chaired by Pieter Tans
 - 13:00 - 13:15 CO₂ Measurements from Space: The Japanese GOSAT and NASA OCO-2 Missions 35
David Crisp (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA)
 - 13:15 - 13:30 Assessing the Utility of Atmospheric CO₂ Observations from Space (ACOS) V2.10 Greenhouse Gases 36
Observing Satellite (GOSAT) Column CO₂ Retrievals by Comparing to Independent CO₂ Measurements
David Baker (Cooperative Institute for Research in Atmospheres, Colorado State University, Fort Collins, CO)

- **Session 8** **Atmospheric Radiation (Solar)** — Chaired by Robert Stone
 - 13:30 - 13:45 Ultraviolet (UV) Index Climatology of Nepal Himalaya Using Ozone Monitoring Instrument (OMI) Data 37
Rishi Ram Sharma (Norwegian University of Science and Technology (NTNU), Trondheim, Norway)
 - 13:45 - 14:00 Spectral and Broadband Albedos - Not an Easy Measurement 38
Joseph Michalsky (NOAA Earth System Research Laboratory, Boulder, CO)
 - 14:00 - 14:15 Possible Extraterrestrial Solar Radiation (ETR) Spectral Variations in the Ultraviolet and Visible: A Test for 39
Ground-based Instrumentation
Ellsworth G. Dutton (NOAA Earth System Research Laboratory, Boulder, CO)
 - 14:15 - 14:30 Radiative Forcing Efficiency of a Forest Fire Smoke Plume at the Surface and Top Of the Atmosphere (TOA) 40
John A. Augustine (NOAA Earth System Research Laboratory, Boulder, CO)

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

- **Session 9** **Ozone & Water Vapor** — Chaired by Samuel Oltmans
 - 15:00 - 15:15 Oxygenated Volatile Organic Compounds (OVOCs) in the Remote Marine Troposphere: Results from the 41
Cape Verde Atmospheric Observatory (CVAO)
Lucy J. Carpenter (Department of Chemistry, University of York, York, United Kingdom)
 - 15:15 - 15:30 Observations of Springtime Surface Ozone Depletion at Toolik Lake, Alaska (AK) 42
Brie VanDam (Institute of Arctic and Alpine Research (INSTAAR), University of Colorado, Boulder, CO)
 - 15:30 - 15:45 Comparison of Continuous Surface Ozone Measurements from Two Arctic Observatories 43
Laura C. Patrick (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
 - 15:45 - 16:00 Longstanding Discrepancies in Stratospheric Water Vapor Measurements Revisited During the 2011 44
Mid-latitude Airborne Cirrus Properties Experiment (MACPEX)
Dale Hurst (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
 - 16:00 - 16:15 How the Global Climate Observing System (GCOS) Reference Upper Air Network (GRUAN) Contributes to 45
Upper Air Climate Records
Holger Vömel (GRUAN Lead Center, Deutscher Wetterdienst, Lindenberg, Germany)
 - 16:15 - 16:30 The Role of the Network for the Detection of Atmospheric Composition Change (NDACC) Measurements in 46
Assessing Past Changes in the Vertical Distribution of Ozone
Michael J. Kurylo (Goddard Earth Sciences, Technology, and Research Program, Greenbelt, MD)
 - 16:30 - 16:45 Ozone Data for Climate Models: A Comparison of Three Datasets and Their Radiative Forcing 47
Birgit Hassler (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)

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• Ozone & Water Vapor

- P-1 Adoption of a New Data Processing Scheme for Dobson Data
Robert Evans (NOAA Earth System Research Laboratory, Boulder, CO)
- P-2 Highlights of the New Multi-spectral Brewer Umkehr Ozone Profile Retrieval
Irena Petropavlovskikh (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-3 Another Step Toward Stratospheric Ozone Recovery as Observed by Multiple Network for the Detection of Atmospheric Composition Change (NDACC) LiDARs and Satellite Instruments
Guillaume G. Kirgis (Jet Propulsion Laboratory, California Institute of Technology, Table Mountain Facility, Wrightwood, CA)
- P-4 Experimental Validation of a New Balloon-Borne Supercooled Liquid Sensor
Emrys Hall (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-5 SkySonde, a Weather Balloon Telemetry and Data Processing System
Allen Jordan (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-6 New Tether Ozonesonde System Developed for Uintah Basin Ozone Study in February, 2012
Bryan J. Johnson (NOAA Earth System Research Laboratory, Boulder, CO)
- P-7 Changes in Arctic Atmospheric Chemistry Linked to Ocean Sea Ice Changes
Samuel J. Oltmans (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-8 Ozone Tropospheric and Stratospheric Trends (1995-2011) at Six Ground-based FTIR Stations (28°N to 79°N)
James Hannigan (National Center for Atmospheric Research, Boulder, CO)

• Halocarbons & Other Trace Species

- P-9 Atmospheric Chemistry of Replacement Compounds: OH Reactivity of the (*E*)- and (*Z*)- CF₃CH=CHCF₃
Munkhbayar Baasandorj (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-10 Three Decades of Continuous Monitoring of Long-lived Halocarbons
Geoff Dutton (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-11 New High-frequency Measurements of CH₄, N₂O and SF₆ from a High-altitude Station in Darjeeling, Eastern Himalayas, India
Anita L. Ganesan (Center for Global Change Science, Massachusetts Institute of Technology, Cambridge, MA)
- P-12 Revision of the NOAA 2006 N₂O Scale
Brad Hall (NOAA Earth System Research Laboratory, Boulder, CO)
- P-13 Polyhalogenated Very Short Lived Substances (VSLS) in the Atlantic Ocean, and Their Linkages with Ocean Primary Production
Yina Liu (Texas A&M University, College Station, TX)
- P-14 The Atmospheric Distribution of Molecular Hydrogen (H₂) and Related Species Observed During the HIPPO Project
Eric Hintsa (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-15 Snapshot of Atmospheric Trace Gases “Pole to Pole” – Highlights from the HIPPO Whole Air Sampler
Benjamin R. Miller (NOAA Earth System Research Laboratory, Boulder, CO)
- P-16 Improving Our Understanding of Ozone-depleting Substances in the Upper Atmosphere
David J. Nance (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-17 A Study of the Behavior of Mg(ClO₄)₂ Drying Traps Used in Gas Chromatography-Mass Spectrometry (MS) Analysis of Flasks
Carolina Siso (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)

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• Carbon Cycle & Greenhouse Gases

- P-18 Atmospheric Network Design in Europe
Elena Novakovskaia (Earth Networks, Inc., Germantown, MD)
- P-19 Monitoring Patterns and Anomalies Using the Dense GHG Network in the Northeastern U.S.
Elena Novakovskaia (Earth Networks, Inc., Germantown, MD)
- P-20 Emissions from Oil and Natural Gas Operations in Northeastern Utah
Gabrielle Pétron (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-21 NOAA Mobile Laboratory Measures Oil and Gas Emissions
Jonathan Kofler (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-22 Evaluating New High-frequency, High-precision Measurements of $\delta^{13}\text{C-CH}_4$ and $\delta\text{D-CH}_4$ for Top-down Emissions Estimation
Matthew Rigby (School of Chemistry, University of Bristol, Bristol, United Kingdom)
- P-23 The Identification and Quantification of Greenhouse Gas Point Source Emissions Using Cavity Ring-down Spectroscopy, Complementary to Other Techniques
Graham Leggett (Tiger Optics LLC, Warrington, PA)
- P-24 Interannual Variability of Carbon Monoxide Emission Estimates Over South America from 2006 to 2010
T. Röckmann (Institute for Marine and Atmospheric Research, Utrecht University, Utrecht, Netherlands)
- P-25 Temporal and Spatial Variability of the Stable Isotopic Composition of Atmospheric Molecular Hydrogen
Thomas Röckmann (Institute for Marine and Atmospheric Research, Utrecht University, Utrecht, Netherlands)
- P-26 Decadal Trends in ^{18}O of Atmospheric CO_2
Bruce H. Vaughn (Institute of Arctic and Alpine Research (INSTAAR), University of Colorado, Boulder, CO)
- P-27 The Monitoring Network of the MPI for Biogeochemistry, Jena for Atmospheric Greenhouse Gases, Oxygen and Their Isotopic Signatures
Martin Heimann (Max Planck Institute (MPI) for Biogeochemistry, Jena, Germany)
- P-28 Stable Isotopic Measurements of Carbon Monoxide in Air: Work In Progress
Isaac Vimont (Institute of Arctic and Alpine Research (INSTAAR), University of Colorado, Boulder, CO)
- P-29 Twenty Years Measuring CO in the Troposphere: What Have We Learned and Where Do We Go?
Paul Novelli (NOAA Earth System Research Laboratory, Boulder, CO)
- P-30 Linking Carbon Isotopes of Methane to International Standards – Can We Close the Loop on Calibration?
Jason P. Winokur (Institute of Arctic and Alpine Research (INSTAAR), University of Colorado, Boulder, CO)
- P-31 Methane Fluxes to the Atmosphere from Deepwater Hydrocarbon Sources
Lei Hu (Texas A&M University, College Station, TX)
- P-32 Toward a Combined Data-fusion Atmospheric Inversion System at Continental Scale: Structure of Flux Errors and Atmospheric Regional Variability Over North America
Thomas Lauvaux (The Pennsylvania State University, Department of Meteorology, University Park, PA)
- P-33 Seasonal Variation of the Global Carbon Fluxes Using CarbonTracker
Kyungna Kim (National Institute of Meteorological Research / Korea Meteorological Administration, Seoul, Korea)
- P-34 Studies of Carbon Isotopic Ratios in Atmospheric Methane and Some of It's Sources in India
D.Kameswara Rao (Physical Research Laboratory, Ahmedabad, India)
- P-35 INFLUX: Model-data Comparison and the Detection Limit of the Observational Network
Laura McGowan (The Pennsylvania State University, Department of Meteorology, University Park, PA)
- P-36 Isoflux Inversion Progress Report: Towards Building a Regional Bayesian Inversion for $\delta^{13}\text{C}$ of Terrestrial CO_2 Fluxes
Caroline Alden (Institute of Arctic and Alpine Research (INSTAAR), University of Colorado, Boulder, CO)

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• **Carbon Cycle & Greenhouse Gases (continued)**

- P-37 Single-Photon LiDAR for Measuring & Monitoring Forest Carbon Fluxes
Phil DeCola (Sigma Space Corporation, Lanham, MD)
- P-38 ICOS-ATC Lab Test for GHG Instrumentation: Presentation and First Results
Benoit Wastine (Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Orme des Merisiers, France)
- P-39 Improving and Extending a CO₂ Observation Network in the Pacific Northwest
Andres Schmidt (Oregon State University, Corvallis, OR)
- P-40 University of Washington (UW)-NOAA Cooperation at the Mt. Bachelor Observatory (MBO)
Dan Jaffe (University of Washington, Department of Atmospheric Sciences, Seattle, WA)
- P-41 Synoptic Process and Higher Values of CO₂
Oyunchimeg Dugerjav (Institute of Meteorology and Hydrology, Ulaanbaatar, Mongolia)

• **Aerosols**

- P-42 Impact of Aerosols on Climate Changes in the 20th Century
Sungbo Shim (National Institute of Meteorological Research / Korea Meteorological Administration, Seoul, Korea)
- P-43 Developing Useable Black Carbon Information – Case Studies from the IASOA Network
Sandy Starkweather (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-44 Soot Surveys in the Air and Snow During PAMARCMIP 2011 and DOSA Campaigns
Sangeeta Sharma (Environment Canada, Toronto, Ontario, Canada)
- P-45 Seasonal & Annual Variations in Aerosol Elemental Carbon (EC) Observations Over Canada: Constraints on Changes of Fossil Fuel Emissions
Lin Huang (Atmospheric Science Technology Directorate/ STB, Environment Canada, Toronto, Ontario, Canada)
- P-46 Aerosol Optical and Radiative Properties Measured at Mt. Lulin During Biomass Burning Seasons
Neng-Huei Lin (Department of Atmospheric Sciences, National Central University, Chung-Li, Taiwan)
- P-47 Aerosol Optical Properties from the Himalayan Foothills Site During Ganges Valley Aerosol Experiment (GVAX)
Anne Jefferson (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-48 An Inexpensive Method for Estimating Particle Pollution
Michael M Seltzer (Fairview High School, Boulder, CO,)
- P-49 A Field-deployable Polar Nephelometer
John E. Barnes (NOAA Earth System Research Laboratory, Mauna Loa Observatory, Hilo, HI)
- P-50 Assessing the Importance of Contact Ice Nucleation
Yi-wen Huang (Massachusetts Institute of Technology (MIT), Cambridge, MA)
- P-51 How Does the Nature of Rain Affect the Climate? Black Carbon – Rain Interaction Over Eastern Himalaya, India
Abhijit Chatterjee (Bose Institute, Department of Science and Technology, West Bengal, India)

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• Observatories, Global Cooperative Measurements, & Instrumentation

- P-52 Recent Science from the Cape Verde Atmospheric Observatory (CVAO)
James Lee (National Centre for Atmospheric Science, University of York, York, United Kingdom)
- P-53 Ten Years of Observations of Ozone-depleting Substances at Monte Cimone (Italy) for Deriving Trends and Regional Emissions.
Michela Maione (University of Urbino, Department of Basic Sciences and Foundations, Urbino, Italy)
- P-54 Comparison of Surface Measurements of Equivalent Black Carbon at Four Arctic Stations
Taneil Uttal (NOAA Earth System Research Laboratory, Boulder, CO)
- P-55 The Tiksi, Russia Hydrometeorological International Facility for Atmospheric, Terrestrial and Ocean Observations: First Measurements and Future Plans
Alexander Makshtas (Arctic and Antarctic Research Institute, St. Petersburg, Russian Federation)
- P-56 Atmospheric Data Management at ICOS Atmospheric Thematic Center: Collection, Processing, Archiving and Access
Lynn Hazan (Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Orme des Merisiers, France)
- P-57 The ICOS Atmospheric Network and Atmospheric Thematic Center (ATC)
Michel Ramonet (Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Orme des Merisiers, France)
- P-58 Measurements of Trace Gases at Lulin Atmospheric Background Station (LABS) and Dongsha Island (DSI), Taiwan
Chang-Feng Ou Yang (Department of Chemistry, National Central University, Chung-Li, Taiwan)

• Atmospheric Radiation (Solar)

- P-59 Atmospheric Radiation Measurement Program Data Quality Office Overview
Kenneth Kehoe (University of Oklahoma, Norman, OK)
- P-60 Nocturnal Aerosol Optical Depth Measurements Using a Lunar Photometer
Robert S. Stone (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-61 Surface Fluxes and Boundary-layer Measurements in Arctic at the Eureka (Canada) and Tiksi (Russia) Climate Observatories
Andrey Grachev (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-62 Maps of Isolines of Ultraviolet (UV)-B Dose at the Republic of Panama
Alfonso Pino Graell (Laboratory of Atmospheric Physics of the University of Panama, El Cangrejo, Republic of Panama)
- P-63 High Arctic Ultraviolet (UV) Radiation Levels in the Spring of 2011 Caused by Unprecedented Chemical Ozone Loss
Germar Bernhard (Biospherical Instruments, San Diego, CA,)
- P-64 The Antarctic, Boulder, and Mauna Loa Ultraviolet (UV) Monitoring Program Update
Patrick Disterhoft (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-65 NEUBrew - The NOAA/Environmental Protection Agency (EPA) Brewer Spectrophotometer Ultraviolet (UV)-Ozone Monitoring Network Update
Patrick Disterhoft (Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO)
- P-66 NOAA/GMD Participation in the Eleventh International Pyrheliometer Comparison (IPC-XI) September 26-October 15 2010 World Radiation Center (WRC) Davos, Switzerland
Don Nelson (NOAA Earth System Research Laboratory, Boulder, CO)