

**MEASUREMENTS, MODELING, AND ANALYSES IN SUPPORT OF
AURA AND OTHER NASA SATELLITE OBSERVATIONS OF
THE EARTH'S ATMOSPHERE**

[NNH04ZYS004N](#)

(Updated: January 31, 2006)

This NRA solicited proposals contributing to measurements, modeling and data analysis research supported under the Atmospheric Composition focus area of NASA's Earth Science program. These include sub-orbital measurements of atmospheric parameters and constituents that are pertinent to the validation and scientific use of data products from satellite platforms with priority being given for activities that support, enhance, supplement, or complement data product validation for the instruments on the EOS Aura Satellite. Research supported by this NRA will be directed toward demonstrating successful use of data from satellite observing systems either alone or in conjunction with other kinds of data or models. The goals of this research are to answer the key science questions listed below in the areas of variability, forcing, response, consequences and prediction.

- *How is atmospheric composition changing?*
- *What trends in atmospheric constituents and solar radiation are driving global climate?*
- *How do atmospheric trace constituents respond to and affect global environmental change?*
- *What are the effects of global atmospheric chemical and climate changes on regional air quality?*
- *How will future changes in atmospheric composition affect ozone, climate, and global air quality?*

Investigations in the following categories were specifically solicited:

- *Validation of Aura observations*
- *Extension of Aura observations*
- *Models that use, predict or assimilate Aura observations*
- *Laboratory and related theoretical observations that are needed to improve the accuracy of Aura retrievals*
- *Investigations that contribute to measurements, modeling, and data analysis research supported under the Atmospheric Composition focus area*

Awardees were selected from a pool of 270 proposals. Because of the diverse nature

of topics covered under this NRA, the evaluation processes leading to these awards were conducted in a sequential fashion and selections were made over an extended period of time. Selections of proposals for the UAV instruments and utilization are pending.

There are five additional awardees for the UAV instruments and utilization.

Bui, Paul Ames Research Center

In Situ Meteorological and Turbulent Measurements on NASA High Altitude Aircrafts in Support of AURA Satellite Observations

Elkins, James National Oceanic and Atmospheric Administration

Trace Gas Measurements from Unpiloted Airborne Vehicles for Aura Validation

Gao, Ru-shan National Oceanic and Atmospheric Administration

Measurements of Ozone and Water Vapor onboard the Global Hawk Uninhabited Aerial Vehicle (UAV) in Support of Aura Validation, and Measurements of Water Vapor During TCSP in Costa Rica

Herman, Robert Jet Propulsion Laboratory

Water Vapor Measurements from Lightweight JPL Laser Hygrometers on WB-57F and High-Altitude UAV Platforms in Support of Aura Validation

Wilson, James University of Denver

In Situ Measurements of Aerosol Size Distributions and Collection of Particles for Analytical, Electron Microscopy: Payloads for High Altitude and Medium Altitude Platforms in AVE, TC4, INTEX-B and for the UAV

Alexander, M. Colorado Research Associates

Gravity Waves and Equatorial Waves in HIRDLS Data, with Investigations into Wave and Cloud Interactions

Allen, Dale University of Maryland College Park

Regional Modeling for AURA Validation in the Mid-Atlantic

Anderson, James Harvard University

In Situ Water Vapor and Total Water Measurements Using Photofragment Fluorescence and UV Absorption Detection in Support of AURA Collaborative Science

Anderson, James Harvard University

In Situ, Laser-Induced Fluorescence Measurements of HO_x in the Mid-To-Upper Troposphere and Lower Stratosphere: A Key Species in AURA Collaborative Science

Anderson, James Harvard University

Halogen Radicals, Global Ozone Change, and Climate/Chemistry Coupling: In Situ Measurements of IO, ClO, BrO, ClONO₂, and ClOOCl for AURA Collaborative Science

Anderson, James Harvard University

Complementary In Situ Measurements of Water Vapor and Its Isotopic Composition (H₂O, HDO, H₂¹⁸O) for AURA Collaborative Science: Measurements by ICOS (Integrated Cavity Output Spectroscopy) and LIF (Laser-Induced Fluorescence)

Anderson, Bruce Langley Research Center

Measurements and Analysis of Aerosol Parameters in Support of INTEX and TC4

Apel, Eric National Center for Atmospheric Research

Deployment of a Fast-GC/MS System to Measure VOCs Aboard NASA Aircraft During INTEX-B

Atlas, Elliot University of Miami

Organic Trace Gas Studies in the UT/LS from Airborne and Balloonborne Whole Air Sampling and Related Global Modeling in Support of AURA Validation and Science

Avery, Melody Langley Research Center

In Situ Ozone Variability Measured by FASTOZ During the POLAR AVE Mission

Avery, Melody Langley Research Center

Measurement and Analysis of Ozone and Chemical Tracer Variability in the Upper Troposphere During the INTEX Missions: The Potential Impact of Fine-Scale Chemistry and Dynamics on Ozone Profile Retrievals from the AURA Satellite Instruments

Barnes, John National Oceanic & Atmospheric Administration

NASA/AURA Satellite Validation of Humidity, Aerosol, Temperature and Ozone Measurements Over Mauna Loa Observatory, Hawaii

Barrick, John Langley Research Center

Airborne In Situ Water Vapor, J(NO₂), and Supporting Meteorological/ Navigational Measurements

Blake, Donald University of California Irvine

Whole Air Sampling from Medium and Low Altitude Aircraft During TC4 Missions

Boering, Kristie University of California Berkeley

Stable Isotope Compositions of Long-Lived Trace Gases: Measurements, Modeling, and Analyses for AURA Validation and Science

Browell, Edward Langley Research Center

Ozone, Aerosol, and Cloud Investigations as Part of AVE and TC4

Browell, Edward Langley Research Center

Ozone, Aerosol, and Cloud Investigations as Part of INTEX-NA

Brown, Linda Jet Propulsion Laboratory

Laboratory Spectroscopy to Support Tropospheric Retrievals in the Tropics

Brune, William Pennsylvania State University

*OH, HO₂, RO₂, Naphthalene, and OH Reactivity Measurements for INTEX-B:
Validation of Atmospheric Oxidation Processes as Seen by AURA*

Brune, William Pennsylvania State University

Ground-Based In Situ, Column, and Lidar Measurements for AURA Validation

Bui, Paul Ames Research Center

*In Situ Meteorological and Turbulent Measurements on NASA High Altitude
Aircrafts in Support of AURA Satellite Observations*

Camy-Peyret, Claude Centre National de la Recherche Scientifique

LPMA and IASI-Balloon for AURA Validation

Cantrell, Christopher National Center for Atmospheric Research

*Measurements of Hydroperoxy (HO₂) and Organic Peroxy (RO₂) Radicals
During INTEX-B as an Extension of AURA Observations*

Carmichael, Greg The University of Iowa

*Regional Scale Analysis of Gas and Aerosol Distributions in Support of the
INTEX A and B Missions*

Carn, Simon University of Maryland Baltimore County

Validation of OMI L2 Sulfur Dioxide Retrievals over Volcanic and Anthropogenic Sources

Chance, Kelly Smithsonian Astrophysical Observatory

AURA Validation Combining In Situ Measurements and 3-D Chemistry and Transport Modeling

Chandra, Sushil University of Maryland Baltimore County

The Validation of AURA Ozone Measurements Using Cloud Slicing

Chatfield, Robert Ames Research Center

OMI-DOAS and OMI-TOMS Ozone Retrieval Checks and Meteorological Interpretation: Tropospheric Ozone Column Emphasis

Chatfield, Robert Ames Research Center

Reactivity of Organics and Radical Production in Continental Plumes and the Distant Mid-Troposphere

Chin, Mian Goddard Space Flight Center

An Integrated Approach of Supporting AURA Validation, Enhancing the Quality of AURA Aerosol Retrieval, and Analyzing AURA Data

Chu, D. Allen University of Maryland Baltimore County

Forecast and Analysis of Aerosol Distribution and Transport Using MODIS Near Real Time and Geostationary Satellite Measurements and Trajectory Model for INTEX-B

Clarke, Antony University of Hawaii

*Measurement and Analysis of Aerosol Physio-Chemistry and Optical Properties
in Support of AURA and the NASA INTEX (A, B) Missions*

Clerbaux, Cathy Institut Pierre Simon Laplace/Centre National de la Recherche Scientifique/Université Pierre et Marie Curie

French/Belgium Scientific Contribution to Tropospheric Studies Using the AURA Sensors

Coffey, Michael National Center for Atmospheric Research

Airborne Measurements of Upper Troposphere/Lower Stratosphere Column Amounts Using Infrared Fourier Transform Spectroscopy to Validate EOS AURA Remote Sensors

Coffey, Michael National Center for Atmospheric Research

Ground-Based Observations from the NDSC Site at Thule, Greenland for Validation of the Remote Sensors on AURA

Cohen, Ronald University of California Berkeley

Measurements of NO₂, SumPNs, SumANs, HNO₃ and for AURA Validation

Considine, David Langley Research Center

Lagrangian Chemical Transport Modeling in Support of the NASA AURA Validation Effort

Crawford, James Langley Research Center

Analysis and Modeling in Support of INTEX Research Objectives and Deployment of Phase B

da Silva, Arlindo Goddard Space Flight Center

Towards an A-Train Aerosol Assimilation System: Combined Assimilation of OMI/MODIS Data with Real-time Radiance Monitoring

De Lucia, Frank Ohio State Univeristy

Millimeter and Submillimeter Spectroscopy of Molecules of Atmospheric Importance

Dessler, Andrew University of Maryland College Park

Validation of AURA Measurements of Water Vapor and Odd-Chlorine Species by Comparisons to UARS and In Situ Constraints and Climatologies

Dibb, Jack University of New Hampshire

Nitric Acid Measurements Onboard the DC-8 as Part of the AURA Validation Experiment

Dibb, Jack University of New Hampshire

Measurement of Nitric Acid, Fine Aerosol Sulfate, and Selected Tracers Associated With Bulk Aerosol From the DC-8 During INTEX Phase B

Diskin, Glenn Langley Research Center

Aircraft Measurements and Analysis of H₂O(v), CO, CH₄ and N₂O In Support of the INTEX-B AND TC4 Campaigns, and Instrumentation for UAV Missions

Diskin, Glenn Langley Research Center

Aircraft Measurements of H₂O(v), N₂O, CH₄ and CO In Support of the Polar AURA Validation Experiment (P-AVE)

Drouin, Brian Jet Propulsion Laboratory

Millimeter and Submillimeter Spectroscopy in Support of AURA and Upper Atmospheric Research

Eckermann, Stephen Naval Research Laboratory

Global Forecasting, Modeling, Analysis and Validation of Fine-Scale Dynamics and Trace Species Observed from EOS AURA

Edwards, David National Center for Atmospheric Research

Terra/MOPITT Measurements of Tropospheric Carbon Monoxide and Data Analysis in Support of INTEX-NA

Elkins, James National Oceanic & Atmospheric Administration

Chemically Important Trace Gases for AURA Validation

Elkins, James National Oceanic & Atmospheric Administration

AURA Validation of Important Tracers with an In Situ Airborne Gas Chromatograph

Elkins, James National Oceanic & Atmospheric Administration

Trace Gas Measurements from Unpiloted Airborne Vehicles for AURA Validation

Fahey, David National Oceanic & Atmospheric Administration

Measurements of HCl, HNO₃, O₃, and CH₄ in the Upper Troposphere and Lower Stratosphere in Support of AURA Validation

Fishman, Jack Langley Research Center

The Development of Tropospheric Ozone Data Sets Using Measurements from OMI and Other AURA Instruments

Fried, Alan National Center for Atmospheric Research

INTEX-A Data Analysis and DC-8 Measurements of Formaldehyde by Absorption Spectroscopy During INTEX-B and the Winter TC4 Field Campaigns

Fromm, Michael Computational Physics Inc.

Using AURA and Other Satellites to Assess Atmospheric Impact of UTLS Pyro-Convection

Fu, Rong Georgia Institute of Technology

Statistical Characterization of Atmospheric Water Vapor Transports Using AURA and Other Measurements in Support of AURA Model Validation and Data Assimilation

Fuelberg, Henry Florida State University

Analysis of Data from INTEX-A and B in Support of AURA and Aqua Validation

Godin-Beekmann, Sophie Centre National de la Recherche Scientifique

Validation of AURA Ozone Measurements and Study of Stratospheric Ozone Budget Using AURA Sensors and High Resolution Chemical Modelling

Goldman, Aaron University of Denver

Quantitative Analysis of Ground-Based Infrared Atmospheric Spectra

Harvey, Lynn University of Colorado

Dynamical Effects on Ozone Trends

Heikes, Brian University of Rhode Island

INTEX-NA Analysis and INTEX-B Measurement of H₂O₂, CH₃OOH and CH₂O on the Medium or Low Altitude Sub-Orbital Platform

Herman, Robert Jet Propulsion Laboratory

Water Vapor Measurements from Lightweight JPL Laser Hygrometers on WB-57F and High-Altitude UAV Platforms in Support of AURA Validation

Herman, Jay Goddard Space Flight Center

Measurements of Traces Gases (NO₂, SO₂, HCHO, O₃) and Aerosol Properties, and UV Irradiance for AURA Validation Using Overlapping Spectral Measurements from Four Different Instruments

Hitchman, Matthew University of Wisconsin Madison

Natural Climate Variability and Transport Processes in the Upper Troposphere Lower Stratosphere

Ho, Shu-Peng National Center for Atmospheric Research

Satellite and Ground-Based Validation of TES Tropospheric CO Products

Hoff, Raymond University of Maryland Baltimore County

Simultaneous Validation of OMI and Calipso Using Ground-Based Lidar, Aeronet, and Satellite Optical Depth Measurements

Hsu, N. Christina Goddard Space Flight Center

Aerosol Product Intercomparisons for MODIS and OMI with the Ground-Based SMART-COMMIT and GSFC Shadowband (UV-MFRSR) and CIMEL Facilities to Improve Radiative Forcing Estimates for Dust and Smoke

Huey, L. Gregory Georgia Institute of Technology

CIMS Measurements of HO₂NO₂, SO₂, and PANs from NASA Aircraft During AURA Validation Activities

Jackman, Charles Goddard Space Flight Center

Odd Nitrogen Variability and AURA Measurement Validation

Jacob, Daniel Harvard University

Data Assimilation, Validation, and Analysis of AURA Observations to Improve Understanding of Tropospheric Ozone

Jacob, Daniel Harvard University

Mission Design and Chemical Forecasting for Intex-B, and Post-Mission Data Analysis for INTEX-A and B

Jensen, Eric Ames Research Center

Combining AURA and Other NASA Satellite Observations, In Situ Measurements, and Model Simulations to Investigate Clouds, Aerosols, and Water Vapor in the Tropical Tropopause Region

Jimenez, Jose-Luis University of Colorado Boulder

INTEX-B: Real-Time Size and Composition Aerosol Measurements on the NASA DC-8, and Integrated Data Analysis

Joseph, Everette Howard University

Intensive and Long Duration Ground-Based AURA Validation at Howard University Atmospheric Research Site in Beltsville Maryland

Jost, Hans-Jurg Ames Research Center

Multi-Instrument Study of Effects of Boreal Forest Fires on the Global Upper Troposphere and Lower Stratosphere

Jucks, Kenneth Smithsonian Astrophysical Observatory

Validation of Upper Tropospheric and Stratospheric Profiles for MLS, TES, and HIRDLS Primary and Secondary Species Using the FIRS-2 Balloon-Borne Spectrometer

Keckhut, Philippe Service d'Aéronomie

AURA Validation Within the Project WALIDNet Water Vapor Raman Lidar Efforts within the Network for the Detection of Stratospheric Changes

Li, Qinbin Jet Propulsion Laboratory

*An Integrated Global 3-D Model Analysis of Aircraft and Satellite Observations
in Support of AURA Validation*

Liu, Hongyu National Institute of Aerospace

*Constraints from AURA Observations on the Impact of Convection and Lightning
on Upper Tropospheric Chemistry*

Loewenstein, Max Ames Research Center

*High Resolution in Situ Profiles of CO, CH₄, and N₂O in Support of AURA
Instrument Validation and TC4 Science Objectives*

Logan, Jennifer Harvard University

*Validation Support for TES Products for Ozone, CO, and HNO₃, and Analysis of
Data from AURA and Aircraft Missions*

Mahoney, Michael Jet Propulsion Laboratory

*Microwave Temperature Profiler (MTP) Support for AVE, UAV, TC4 and INTEX-
NA*

Manney, Gloria Jet Propulsion Laboratory

*Interannual Variability in the Extratropical Stratosphere: Transport, Trend, and
Tropospheric Implications*

Margitan, James Jet Propulsion Laboratory

Balloon UV Photometer Measurements of Ozone

Mauldin, Roy National Center for Atmospheric Research

*Measurements of OH, H₂SO₄, HNO₃, MSA, HNO₃, and NH₃ During NASA's
Intercontinental Chemical Transport Experiment (INTEX)-B as an Extension of
AURA Observations*

May, Randy MayComm Instruments LLC

UTLS Balloon H2O Sondes in Support of MLS, TES and HIRDLS Observations from the AURA Satellite

McDermid, Iain Jet Propulsion Laboratory

Ground-Based Lidar Measurements at Table Mountain, CA, and Mauna Loa, HI, in Support of AURA Validation and the Network for the Detection of Stratospheric Change

McGee, Thomas Goddard Space Flight Center

Measurements of Stratospheric Ozone, Temperature and Aerosol Profiles Using the AROTAL Lidar Instrument on a Medium Altitude Aircraft

McGee, Thomas Goddard Space Flight Center

Mobile, Ground-Based Lidar Profile Measurements of Ozone, Temperature, Water Vapor, and Aerosols

McGill, Matthew Goddard Space Flight Center

Cloud Physics Lidar Measurements in Support of AURA and A-Train Validation

McMillan, Wallace University of Maryland Baltimore County

AIRS Trace Gas Retrievals from INTEX-A and for INTEX-B: Mission Planning, Analysis and Satellite Validation

Merrill, John University of Rhode Island

Ozonesonde Profiles and Analysis for AURA Validation

Moody, Jennie University of Virginia

Providing a Synoptic/Dynamic Context for INTEX Aircraft Observations and AURA Data Validation

Morris, Gary Valparaiso University

Non-Coincident Validation of Trace Species Measured by AURA Using Trajectory Mapping and Statistical Analysis

Mount, George Washington State University

Ground Based Measurements of Trace Gases Using MAXDOAS in Clean and Polluted Environments in Support of the AURA Satellite Observations

Murcray, Frank University of Denver

Infrared Measurements of Atmospheric Constituents in Support of Satellite Measurements of the Earth's Atmosphere

Nedoluha, Gerald Naval Research Laboratory

Ground-Based Measurements of Water Vapor in the Middle Atmosphere

Newchurch, Michael University of Alabama in Huntsville

Validation of OMI-Derived Tropospheric Ozone Using the SAM Method

Newman, Paul Goddard Space Flight Center

Meteorological and Modeling Support for AURA Validation Campaigns

Notholt, Justus University of Bremen

Atmospheric Constituent Measurements using Airborne Sub-Millimeter Radiometry

Olsen, Mark Goddard Space Flight Center

Model Investigations of Upper-Troposphere/Lower-Stratosphere Water Vapor and Transport into the Stratosphere

Oltmans, Samuel National Oceanic & Atmospheric Administration

Ozone Vertical Profile Measurements with Ozonesondes as Part of SHADOZ for Validation and Improvement of AURA Ozone Products

Parrish, Alan University of Massachusetts Amherst

Continued Ground-based Microwave Observations of Ozone: Research and Validation of AURA Measurements

Pawson, Steven Goddard Space Flight Center

Meteorological and Constituent Forecasting in Support of Field Missions and Validation Experiments

Pfister, Leonhard Ames Research Center

Meteorological Analysis and Modeling for AURA

Pickering, Kenneth University of Maryland College Park

Validation of OMI Tropospheric NO₂ Column Amounts in Regions Dominated by Lightning NO_x Production

Pickering, Kenneth University of Maryland College Park

Flight Planning Products for INTEX-B, Analysis, and AURA Validation

Pickett, Herbert Jet Propulsion Laboratory

Balloon OH Measurements for Validation and Extension of AURA Observations

Pierce, Robert Langley Research Center

Multi-Scale Chemical Forecasting and Assimilation Studies in Support of AURA Validation and Science During INTEX-NA

Plusquellic, David National Institute of Standards & Technology

Infrared and Far-Infrared Spectroscopic Studies of Atmospheric Molecules

Pommereau, Jean Pierre Center National de la Recherche Scientifique

AURA Validation and Scientific Studies in the Tropical UT/LS Using SAOZ UV-VIS Spectrometer, SDLA Tuneable Diod Laser and Envisat-Gomos

Randel, William National Center for Atmospheric Research

Studies of Stratosphere-Troposphere Coupling Using High Vertical Resolution Satellite Data

Revercomb, Henry University of Wisconsin Madison

Aircraft-Based Validation of TES Radiances and Tropospheric Ozone

Ricaud, Philippe Laboratoire d'Aérodynamique

Validation of the MLS Measurements with the Microwave Instrument SMR Aboard the Odin Satellite

Rinsland, Curtis Langley Research Center

Tropospheric and Stratospheric Correlative Measurements and Science Studies in Support of AURA: ACE Science Studies

Rinsland, Curtis Langley Research Center

Science Studies Utilizing NDSC Long-Term Trend Observations: An Extended Set of Products for AURA Validation

Rosenlof, Karen National Oceanic & Atmospheric Administration

Flight Planning and Pressure/Temperature Measurements in Support of AURA Validation on the WB-57F High Altitude Aircraft

Russell, Philip Ames Research Center

Airborne Sunphotometry in INTEX-B: Measurements and Analyses for AURA/A-Train Validation and Radiative Effect Studies

Salawitch, Ross Jet Propulsion Laboratory

Photochemical Control of Stratospheric Ozone: Model Simulations and Analyses in Support of AURA Validation

Sander, Stanley Jet Propulsion Laboratory

Ground-Based Remote Sensing Of Atmospheric Composition By UV-Visible High Resolution Spectroscopy

Schmidlin, Francis Wallops Flight Facility

Validation of NASA Remote Measurements and the In Situ Study of Upper Atmosphere Structure and Its Interaction with Constituents

Shetter, Richard University Corporation for Atmospheric Research

Airborne Actinic Flux and Direct Beam Irradiance Measurements in Support of AURA Instrument Validation and INTEX-NA Science

Shiotani, Masato Kyoto University

Soundings of Ozone and Water in the Equatorial Region/Pacific Mission (SOWER/Pacific): Investigation of Dehydration Processes in the Tropical Tropopause Layer During the Boreal Winter

Singh, Hanwant Ames Research Center

*Bay Area Environmental Research Institute (BAERI) Moffett Field, CA 94035
INTEX-A and B Mission Science and Field Deployment: Measurement of Oxygenated and Tracer Chemicals, Satellite Validation, and Integrated Data Analysis*

Smith, Mary Ann Langley Research Center

Laboratory Spectroscopy of O3 and CH4 for Tropospheric Remote Sensing

Smith, Mary Ann Langley Research Center

Laboratory Spectroscopy of CO2 for AURA and AQUA Validations

Solomon, Philip State University of New York Stony Brook

Ground Based ClO Profile Measurements and Analysis in Support of AURA and the Determination of Long-Term Changes in Stratospheric Active Chlorine

Stachnik, Robert Jet Propulsion Laboratory

Balloon Based Submillimeterwave Measurements of Stratospheric and Upper Tropospheric Gases for AURA Validation

Stajner, Ivanka Goddard Space Flight Center

Validation of AURA Ozone Data Through Assimilation

Strawa, Anthony Ames Research Center

Climatic Studies of Thin Cirrus Coupled with the Validation of AURA Detection of Upper Tropospheric and Stratospheric Clouds Using Solar Occultation Data

Strow, L University of Maryland Baltimore County

Cross-Validation of TES with AIRS: Radiances and Radiative Transfer

Tan, David Georgia Institute of Technology

NO, NO2, and HCHO Measurements on INTEx B and Data Analysis for INTEx A

Thomason, Larry Langley Research Center

Combined AURA/SAGE Investigations: Validation, Aerosol, and UT/LS Process Studies

Thompson, Anne Goddard Space Flight Center

SHADOZ (Southern Hemisphere Additional Ozonesondes) 2005-2007 Data Collection for AURA Validation

Thompson, Anne Goddard Space Flight Center

Ground-Based AURA Validation with Mid-Atlantic Regional Validation Affiliates (MARVA) and FAVOR (Facility for AURA Validation and Observations Regional)

Thompson, Anne University of Maryland College Park

Tropospheric Ozone Budgets from Sondes and AURA During INTEX (2004, 2006)

Tipping, Richard University of Alabama Tuscaloosa

Theoretical Calculations of the Non-Resonant Absorptions in the Millimeter/Sub-Millimeter, IR, and Visible Regions for H₂O-H₂O, H₂O-N₂, H₂O-O₂ and Dry Air

Toon, Geoffrey Jet Propulsion Laboratory

MkIV Balloon Flights in Support of AURA Validation

Toon, Brian University of Colorado Boulder

Use of AURA Data, Solar Occultation Satellite Data, and Models to Learn More About Polar Stratospheric Clouds, Tropical Stratospheric Clouds and Subvisible Cirrus; Theory Team Participation in Tropical Field Programs to Support AURA

Toth, Robert Jet Propulsion Laboratory

Infrared Laboratory Spectroscopy in Support of Atmospheric Measurements

Vay, Stephanie Langley Research Center

Airborne CO₂ Measurements and Analyses for the INTEX-NA and TC4 Mission Series

Voemel, Holger University of Colorado Boulder

South East Asian and Central American Monsoon Project (SEA CAMP): Water Vapor and Ozone Soundings in Support for AURA Observations

Warner, Juying University of Maryland Baltimore County

Validation of TES Tropospheric CO and O₃ and OMI Tropospheric O₃ with AIRS Validated Products

Waugh, Darryn Johns Hopkins University

Quantifying Stratospheric and Upper Tropospheric Transport and Its Impact on Chemical Composition

Weber, Rodney Georgia Institute of Technology

On Line Measurements of Bulk Inorganic and Organic Fine Particle Composition for INTEX-NA Phase B Airborne Measurements

Webster, Christopher Jet Propulsion Laboratory

ALIAS In Situ Aircraft WB-57 Measurements of Total Water H₂O, CO, HCl, CH₄, N₂O, HCN, SO₂ and Water Isotopes for AURA Validation

Webster, Christopher Jet Propulsion Laboratory

ALIAS-II Balloon Profiles (0-35 km) of HCl, CO, CH₄ and N₂O for AURA Validation

Wennberg, Paul California Institute of Technology

Retrieval of H₂O, HDO, and Convective Tracers from ACE: Validation and Synergistic Science in Collaboration with AURA

Wennberg, Paul California Institute of Technology

Atmospheric Acids, Nitrates, and Peroxides: INTEX-B and TC4 -Guam

Whiteman, David Goddard Space Flight Center

AURA Water Vapor Calibration/Validation Activities Within the NDSC Using the Scanning Raman Lidar and Radisoondes

Whiteman, David Goddard Space Flight Center

Validation of AURA Water Vapor, Ozone, Aerosol and Pollution Measurements Using Radiosonde, Raman Lidar and Associated Instruments at the Howard University Atmospheric Research Site in Beltsville Maryland

Wilson, James University of Denver

In Situ Measurements of Aerosol Size Distributions and Collection of Particles for Analytical, Electron Microscopy: Payloads for High Altitude and Medium Altitude Platforms in AVE, TC4, INTEX-B and for the UAV

Wofsy, Steven Harvard University

High Accuracy Continuous Airborne Measurements of CO₂, CO, CH₄, and N₂O in AVE and TC4, and Analysis Using the Stochastic Time-Reversed Lagrangian Tracer (STILT) Model