

23rd ILRC program

Jul 24 Monday

9:00 Opening Remarks

9:10-10:40

Session 10 Opening session

Session Chairs: Chikao Nagasawa* and Robert T. Menzies* (*ICLAS member)

Oral Presentations

- 10-1 **Active Remote Sensing and Climate Studies (Invited)** 3
Teruyuki Nakajima (Center for Climate System Research, The University of Tokyo)
- 10-2 **On Some Lidar Developments for Atmospheric Research (Invited)** 5
Osamu Uchino (Kobe Marine Observatory, Japan Meteorological Agency)
- 10-3 **A Review and Outlook for Lidar Science Including Space Programs (Invited)** 9
M. Patrick McCormick (Center for Atmospheric Sciences, Hampton University)

10:40-11:00 Coffee break

11:00-12:30

Session 20 Lidar technology

Session Chairs: Yuri Arshinov* and Takao Kobayashi

Oral Presentations

Lidar methods

- 20-1 **Background Aerosols and Multiple Field-of-View Lidar** 15
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- 20-2 **A Simple Multiple Scattering - Depolarization Relation of Water Clouds and Its Potential Applications** 19
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- 20-3 **Lidar Determination of Quartz Concentration in the Tropospheric Mineral Aerosols - Methodology and First Results** 23
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Lidar systems, Lidar components

- 20-4 **Polarization Lidar Using a Liquid Crystal Variable Retarder** 27
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- 20-5 **A 355-nm Rayleigh-Mie Lidar Using Two Michelson Interferometers as Spectral Analyzers for Multi-purpose Near-Field Measurements** 31
Nicolas Cezard, Agnès Dolfi-Bouteyre, Jean-Pierre Huignard, Pierre Flamant (French Aeronautics and Space Research Center (ONERA))

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- 20-6 **A New Lidar System for the Detection of Cloud and Aerosol Backscatter, Depolarization, Extinction, and Fluorescence** 35
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12:30-14:00 Lunch break

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Session 20 Lidar technology

Session Chairs: Bruce M. Gentry and Tomohiro Nagai

Oral Presentations

Lidar systems

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Chikao Nagasawa, Makoto Abo, Yasukuni Shibata (Department of System Design, Tokyo Metropolitan University)
- 20-9 **Meteorological Water Vapor Raman Lidar - Advances** 47
Todor S. Dineev, Yuri Arshinov, Sergei Bobrovnikov, I. Serikov, B. Calpini, H. van den Bergh, V. Simeonov (Air Pollution Laboratory (LPAS), Swiss Federal Institute of Technology (EPFL))
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Bing-Yi Liu, Zhi-Shen Liu, Zhi-Gang Li, Zhao-Ai Yan, Rui-Bin Wang, Zhao-Bin Sun (Ocean Remote Sensing Key Laboratory of the Ministry of Education of China, Ocean University of China)

15:15-15:30 Coffee break

15:30-16:45

Session 20 Lidar technology

Session Chairs: Gerhard Ehret* and Hiroaki Kuze

Oral Presentations

Lidar systems

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Education

2P-66 **Under Graduate Lidar Education at Georgia Tech.**

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L.L. West, A. K. Garrison, G. G. Gimmestad, D.W. Roberts, J. M. Stewart, J. W. Wood, A. L. Bowling (Georgia Institute of Technology)

17:00-19:00

Session PD1 Post deadline posters

Poster Presentations

PD1-1 **Combined Analog-to-Digital and Photon Counting Detection Utilized for Continuous Raman Lidar Measurements**

Diana Petty, Dave Turner (Pacific Northwest National Laboratory)

PD1-2 **Improving CALIPSO Lidar Retrievals of Surface Level Backscatter as a Proxy for PM2.5 Using MODIS Path Reflectance Constraints**

L. Charles, M. M. Oo, B. Hermann, B. Gross, F. Moshary, S. Ahmed (Optical Remote Sensing Laboratory, City College of New York)

PD1-3 **The RIVM Mobile Lidar – Design and Operation of a Versatile System for Measuring Atmospheric Trace Gases**

Stijn Berkhout, René van der Hoff, Dann Swart, Hans Bergwerff (National Institute for Public Health and the Environment (RIVM))

PD1-4 **A Compact, Rapidly Tunable Ce:LiCAF DIAL Transmitter for Airborne Ozone Measurements**

Coorg R. Prasad, Victor A. Fromzel, Wenhui Shi, Chris S. Wilks, Russell De Young (Science and Engineering Services, Inc.)

PD1-5 **NASA Langley Airborne High Spectral Resolution Lidar Instrument Description**

David B. Harper, Anthony Cook, Chris Hostetler, John W. Hair, Terry L. Mack (NASA Langley Research Center)

PD1-6 **Depolarization Standoff Lidar for Discrimination of Biological Warfare Aerosols**

Hyo S. Lee, I. H. Hwang, Sangwoo Lee, Guangkun Li, Robert M. Setrino, Coorg R. Prasad (Science and Engineering Services, Inc.)

Chair persons:

(2P-1-13+PD1-1,2) Chikao Nagasawa* and Bruce M. Gentry

(2P-14-26+PD1-3) Yuri Arshinov* and Takao Kobayashi

(2P-27-39+PD1-4) Robert T. Menzies* and Tomohiro Nagai

(2P-40-52+PD1-5) Gerhard Ehret* and Hiroaki Kuze

(2P-53-66+PD1-6) Andreas Behrendt and Upendra Singh*

Jul 25 Tuesday

9:00-10:30

Session 30 Climate change (climatology, aerosol-cloud interaction, etc.)

Session Chairs: Edwin Eloranta and Takashi Shibata

Oral Presentations

Aerosols and clouds

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10:30-11:00 Coffee break

11:00-12:30

Session 30 Climate change (climatology, aerosol-cloud interaction, etc.)

Session Chairs: Jens Boesenberg* and Zhishen Liu

Oral Presentations

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Aerosols and clouds

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30-10 **canceled**

CO2 measurements

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Pierre H. Flamant (Laboratoire de Meteorologie Dynamique Institut Pierre Simon Laplace (LMD/IPSL), Ecole Polytechnique)
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12:30-14:00 Lunch break

14:00-15:15

Session 40 Upper atmosphere

Session Chairs: Chiao-Yao She and Takuya Kawahara

Oral Presentations

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Climate change (climatology, aerosol-cloud interaction, etc.)

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Session PD2 Post deadline posters

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- PD2-1 **Measurement of Thin Cloud Optical Properties Using a Combined Mie-Raman Lidar**
Yonghua Wu, Shuki Chaw, Barry Gross, Yu Zhao, Fred Moshary, Sam Ahmed (NOAA-CREST, City College of New York)

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- PD2-2 **Performance Estimates of the Phoenix Mars Scout Lidar System**
Cameron S. Dickinson, Thomas J. Duck (Dalhousie University, Department of Physics and Atmospheric Science)
- PD2-3 **Characterization of Error Sources for Airborne and Space-Based CO₂ DIAL Measurements**
Susan A. Kooi, Edward V. Browell, Syed Ismail, Michael E. Dobbs, Berrien Moore III, T. Scott Zaccheo (SAIC/NASA Langley Research Center)
- PD2-4 **NLC, Potassium Densities and Temperatures by Lidar and Falling Sphere at Spitsbergen, 78° N**
Josef Hoeffner (Institute of Atmospheric Physics (IAP))
- PD2-5 **Combination of Lidar and Radar Observations to Retrieve Microphysical Properties of Boundary Layer Clouds Using a New Analytical Approach**
Damien Josset, Jacques Pelon, Alain Protat, Martial Haeffelin (Service d'aeronomie/IPSL)
- PD2-6 **Long Range Transport of Forest Fire Smoke Aerosols**
T. J. Duck, B. Firanski, C. Dickinson, M. Coffin, A. Stohl (Dalhousie University, Department of Physics and Atmospheric Science)
- PD2-7 **Observation and Model Analysis of a Long-Range Transport Event of Asian Dust and Pollutants to Taiwan**
Chuan-Yao Lin, Z. Wang, W. N. Chen, S. Y. Chang, Charles C.K. Chou (Research Center for Environmental Changes)
- PD2-8 **Optical Properties of Lidar-Observed PSC on the Early Stage of PSC Formation over Dome Station, Antarctic**
Kouichi Shiraiishi, Masahiko Hayashi, Motowo Fujiwara, Tahashi Shibata, Yasunobu Iwasaka, Shinji Makiyama, Kentaro Murayama (Faculty of Science, Fukuoka university)
- PD2-9 **Characterization of Biomass Burning Aerosols from Microlidar and Co-Located Observations at Djougou (Benin) during AMMA/SOP 0**
J. Pelon, M. Mallet, A. Mariscal, S. Crewell, S. Victori, P. Goloub, J. Haywood (SA-LMD/IPSL, CNRS)
- PD2-10 **Cloud-Aerosols Spin-Off Products Relevant to Climate Monitoring to be Provided by the "ADM - ÆOLUS" ESA's Wind Mission: the L2A Data Processor and New Concept of**
Pierre H. Flamant (Laboratoire de Météorologie Dynamique Institut Pierre Simon Laplace (LMD/IPSL))

Chair persons:

- (3P-1-10+PD2-1,2) Jens Boesenberg* and Takashi Shibata
(3P-11-20+PD2-3,4) Edwin Eloranta and Zhishen Liu
(3P-21-30+PD2-5,6) Jun Zhou* and Andrew Cheng
(3P-31-41+PD2-7) J.B. Nee and Nobuo Sugimoto*
(4P-1-11+PD2-8) Chiao-Yao She, Takuya Kawahara and A. Hauchecorne
(4P-12-22+PD2-9,10) Philippe Keckhut and Takuji Nakamura

Jul 26 Wednesday

9:00-10:30

Session 50 Local, regional and global air quality (tropospheric chemistry, transport, etc.)

Session Chairs: Gelsomina Pappalardo* and Toshiyuki Murayama

Oral Presentations

- 50-1 **Feasibility Study of Adjoint Inverse Modeling of Asian Dust Using Lidar Network Observations (Invited)** 627
Itsushi Uno, Keiya Yumimoto, Nobuo Sugimoto, Atsushi Shimizu, Shinsuke Satake (Research Institute for Applied Mechanics, Kyushu University)
- 50-2 **Optical Properties of Asian Dust Measured by Raman Lidar at Taipei, Taiwan** 631
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11:00-12:00

Session 50 Local, regional and global air quality (tropospheric chemistry, transport, etc.)

Session Chairs: Adolfo Comeron* and J.B Nee

Oral Presentations

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- 50-7 **Aerosol Type Identification Using a UV- NIR-IR Lidar System** 651
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- 50-9 **Airborne Lidar Measurements of Ozone and Aerosol Distributions over North America and the Western Atlantic Ocean during the INTEX-NA Field Experiment** 659
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12:00-13:00 Lunch break

13:00-17:00

Excursion

18:00-19:00

ICLAS Open business meeting

19:30-20:30

Noh Attraction !!!

Jul 27 Thursday

9:00-10:15

Session 60 Lidar-networking strategy, networking technologies

Session Chairs: Raymond M. Hoff and Nobuo Sugimoto*

Oral Presentations

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I. Stuart McDermid, the NDACC Lidar Working Group (Table Mountain Facility, Jet Propulsion Laboratory, California Institute of Technology)
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- 60-4 **Building a Lidar Network in Latin America: Progress and Difficulties** 673
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10:15-10:45 Coffee break

10:45-12:30

Session 70 Meteorological processes, weather forecast (wind, water vapor, temperature, etc.)

Session Chairs: Pierre H. Flamant* and R. Michael Hardesty

Oral Presentations

- 70-1 **Continuous Ground-Based Water Vapour Profiling Using DIAL** 679
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- 70-2 **RAMSES - German Meteorological Service Raman Lidar for Atmospheric Moisture Sensing** 683
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- 70-3 **Wide-Range Vertical Sounding of Free-Tropospheric Water Vapor: The First Two Years of Operation of the Zugspitze Differential-Absorption Lidar** 687
Thomas Trickl, Hannes Vogelmann (Forschungszentrum Karlsruhe, Institut für Meteorologie und Klimaforschung)

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- 70-4 **A Comparison between Airborne Lidar Depolarization and In-Situ Ice Crystal Measurements from Cirrus Clouds** 691
Clive R. Cook, James Whiteway, Paul Connolly (Department of Earth and Space Science & Engineering, York University, Toronto)
- 70-5 **The Benefits of Lidar for Meteorological Research: The Convective and Orographically-Induced Precipitation Study (COPS)** 695
Andreas Behrendt, Volker Wulfmeyer, Christoph Kottmeier, Ulrich Corsmeier (Institute of Physics and Meteorology, University of Hohenheim)
- 70-6 **Scanning Rotational Raman Lidar at 355 nm for the Measurement of Tropospheric Temperature Fields** 699
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- 70-7 **Synergetic Application of a Ground-Based Raman Lidar and an Airborne Spectrometer to Study the Evolution of a Cirrus Cloud** 703
Paolo Di Girolamo, Tiziano Maestri, Rolando Rizzi, Donato Summa, Filomena Romano (DIFA, Università degli Studi della Basilicata)

12:30-14:00 Lunch break

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Session 70 Meteorological processes, weather forecast (wind, water vapor, temperature, etc.)

Session 80 Hydrosphere, cryosphere, vegetation and crustal dynamics applications and others

Session Chairs: Thomas Trickl and Arnold Apituley*

Oral Presentations

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- 70-10 **Local Easterly Wind “Kiyokawa-Dashi” Observed by Coherent Doppler Lidar in Japan during the Summer 2004** 713
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Session 80 Hydrosphere, cryosphere, vegetation and crustal dynamics applications and others

- 80-1 **High Accuracy Optical 3-D Shape Measurement Using a Frequency-Shifted Feedback Laser** 719
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- 80-2 **Laser-Induced Fluorescence for Assessment of Cultural Heritage** 723
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R.L.M. Chan, O.S.M. Lee, A.Y.S. Cheng (Laboratory for Atmospheric Research, Dept. of Physics and Materials Science, City University of Hong Kong,)
- 5P-3 **Three-Year Systematic Aerosol Lidar Ratio Measurements over Athens, Greece (2003-2006)** 741
A. Papayannis, G. Tsaknakis, R.E. Mamouri, G. Chourdakis, G. Georgoussis (National Technical University of Athens)
- 5P-4 **Comparison between AERONET and Lidar Measurements during an Aerosol Event in Buenos Aires, Argentina** 743
L. Otero, P. Ristori, B. Holben, Eduardo Quel (CEILAP (CITEFA - CONICET))
- 5P-5 **Lidar and AERONET Measurements in Rio Gallegos, Patagonia Argentina** 747
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- 5P-8 **Two Case-Studies of Boundary Layer Development Effect on the Ground Level Ozone Concentration over an Urban Area** 757
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Session 6P Lidar-networking strategy, networking technologies

Poster Presentations

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- 6P-2 **European Aerosol Research Lidar Network -Advanced Sustainable Observation System (EARLINET-ASOS) Plans for Quality Assurance** 855
Volker Freudenthaler, Christine Böckmann, Jens Bösenberg, Gelsomina Pappalardo (Ludwig-Maximilians-Universität)
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Anatoly Chaikovskiy, A. Bril, S. Denisov, N. Balashevich (Institute of Physics, National Academy of Sciences of Belarus)

16:00-18:00

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Poster Presentations

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- 7P-2 **Small Scale Cloud Dynamics as Studied by Synergism of Time Lapsed Digital Camera and Elastic Lidar** 867
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- 7P-3 **Boundary Layer Water Vapor Variations Observed by Raman Lidar at the ARM SGP Site** 871
Kyoko Taniguchi, Zhien Wang (Department of Atmospheric Science, University of Wyoming)
- 7P-4 **Low Altitude Ice-Cloud Measurement by In-Line Type Micro Pulse Lidar** 875
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- 7P-5 **Water Vapor Lidar System and Measurements at the JPL Table Mountain Facility** 877
I. Stuart McDermid, Thierry Leblanc, Robin A. Aspey (Table Mountain Facility, Jet Propulsion Laboratory)
- 7P-6 **1.06 μ m Aerosol Doppler Lidar for Wind Measurement** 879
Dongsong Sun, Jun Zhou, Huanling Hu, Jianwen Liu, Qingmei Wang (Anhui Institute of Optics & Fine Mechanics)
- 7P-7 **Lidar Studies of Gravity Mountain Waves over Vitosha Mountain** 881
Georgi V. Kolarov, Ivan V. Grigorov (Institute of Electronics - Bulgarian Academy of Sciences)

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- 7P-8 **Raman Lidar Measurement of Water Vapor Profile in Alaska** 883
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- 7P-9 **Validation of a Ground-Based Water Vapor Raman Lidar System in Athens, Greece** 885
R.E. Mamouri, A. Papayannis, I. Biniotoglou, G. Chourdakis, G. Georgoussis (National Technical University of Athens)
- 7P-10 **Rotational Raman Lidar Measurements for the Characterization of a Dry Stratospheric Intrusion Event** 887
Paolo Di Girolamo, Donato Summa, Domenico Sabatino, Rossella Ferretti, Claudia Faccani (DIFA, Università degli Studi della Basilicata)
- 7P-11 **UV Raman Lidar Measurements of Relative Humidity for the Characterization of Aerosol and Cloud Microphysical Properties** 891
Paolo Di Girolamo, Donato Summa, Domenico Sabatino (DIFA, Università degli Studi della Basilicata)
- 7P-12 **Simultaneous High-Resolution Observation of Scattering Layers with a Raman/Mie Lidar and the MU Radar/Frequency Interferometric Imaging Technique** 893
Tomoaki Takai, Takuji Nakamura, Hubert Luce, Gernot Hassenpflug, Mamoru Yamamoto, Toshitaka Tsuda (Research Institute for Sustainable Humanosphere, Kyoto University)
- 7P-13 **Observation of Water Vapor with a Portable Raman Lidar --- Continuous Monitoring and Field Experiment over the Forest and at the Volcano---** 897
Takuji Nakamura, Naohiro Sugimoto, Toshitaka Tsuda, Makoto Abo, Takeshi Hashimoto, Akihiko Terada (Research Institute for Sustainable Humanosphere, Kyoto University)
- 7P-14 **A Case Study of Cold Air Parcel Event Passing Tokyo Observed with Rayleigh-Mie Raman Lidar** 901
Xiaoquan Song, Dengxin Hua, Zhishen Liu, Takao Kobayashi (Ocean Remote Sensing Institute, Ocean University of China)

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Session 8P Hydrosphere, cryosphere, vegetation and crustal dynamics applications and others

Poster Presentations

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Masahiro Ohishi, Fumio Ohtomo, Masaaki Yabe, Mituru Kanokogi, Takaaki Saito, Yasuaki Suzuki, Chikao Nagasawa (General Engineering & Quality Assurance Division, R&D laboratory, Topcon Corporation)
- 8P-2 **Measuring Plankton Distributions with an Airborne Lidar** 911
James H. Churnside (NOAA Earth System Research Laboratory)
- 8P-3 **Retrieval of Hydrosol Characteristics with MFOV Raman Lidar** 915
Aleksy V. Malinka, Eleonora P. Zege (B.I. Stepanov Institute of Physics, National Academy of Sciences of Belarus)
- 8P-4 **Blue-Green Algae Monitoring by a Fluorescence Lidar -Observation at Lake Suwa-** 919
Kengo Takano, Yasunori Saito, Miki Tagawa, Fumitoshi Kobayashi, Takuya D. Kawahara, Ho-Dong Park (Faculty of Engineering, Shinshu University)

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- 8P-5 **Laser-Induced Fluorescence (LIF) Lidar for Plant Monitoring** 921
Yasunori Saito, M. Hara, Fumitoshi Kobayashi, Takuya D. Kawahara (Faculty of Engineering, Shinshu University)
- 8P-6 **Advances in Shallow Water Measurements with Optech Shoals Bathymeter** 923
Eric Yang, Paul E. LaRocque, Gary Guenther, Wayne Szameitat, David Reid, Chris Singh, Wenbo Pan, Karen Francis, John F. Hahn, Allan I. Carswell (Optech Incorporated)

16:00-18:00

Session 9P Space-borne lidars, space applications, space program

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- 9P-1 **Lightweight Multiplexed Telescope System for Spaceborne Lidars** 929
Geary Schwemmer, Bruce Gentry, Brent Bos, Caner Cooperrider, Richard Rallison (Science and Engineering Services, Inc.)
- 9P-2 **Validation of CALIPSO Lidar (CALIOP) Calibration** 933
Zhaoyan Liu, Yongxiang Hu, Mark Vaughan, John Reagan, Chris Hostetler, David Winker, William Hunt, Kathleen Powell, Charles Trepte, Matthew McGill (National Institute of Aerospace)
- 9P-3 **canceled**
- 9P-4 **On Orbit Receiver Performance of the Geosciences Laser Altimeter System (GLAS) on ICESat** 941
Xiaoli Sun, James B. Abshire, James D. Spinhirne, Jan F. McGarry, Peggy L. Jester, Donghui Yi, Stephen P. Palm, Redgie S. Lancaster (NASA Goddard Space Flight Center)
- 9P-5 **Validation of ECMWF Global Forecast Model Parameters Using the Geoscience Laser Altimeter System (GLAS) Atmospheric Channel Measurements** 945
Stephen P. Palm, Angela Benedetti, James Spinhirne (Science Systems and Applications, Inc.)
- 9P-6 **Evaluation of Cloud-Top Detection by Satellite-Borne Pseudo-Random Noise Continuous Wave Backscatter Lidar** 949
Valentin Mitev, Renaud Matthey, João Pereira do Carmo (Observatory of Neuchâtel, rue de l'Observatoire)
- 9P-7 **Off-Axis Beam Angle Dependence of Intensity Fluctuation** 953
Masahiro Toyoda (National Institute of Information and Communications Technology)
- 9P-8 **Goddard Technology Efforts to Improve Space Borne Laser Reliability** 957
William S. Heaps (NASA Goddard Space Flight Center)
- 9P-9 **Contamination-Induced Degradation of Space-Borne Lidars** 961
Yngve Lien, Elmar Reinhold, Martin Endemann, Denny Wernham, Errico Armandillo (European Space Agency)
- 9P-10 **African Dust over Ocean and Continent by Coupling Active and Passive Spaceborne Sensors** 965
Sebastien Berthier, Patrick Chazette, Jacques Pelon, F. Dulac, F. Thieuleux, C. Moulin (Service d'Aeronomie du CNRS)

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- 9P-11 **Validation of Satellite Remote Sensed Cloud Properties Using Combined Lidar and Radar Measurements** 969
Robert E. Holz, Tiziano Maestri, Edwin W. Eloranta, Daniel H. DeSlover, Matthew McGill (University of Wisconsin)
- 9P-12 **Feasibility Study of Microwave Modulation DIAL System for Global CO₂ Monitoring** 973
Shumpei Kameyama, Shinichi Ueno, Yoshihito Hirano, Nobuo Sugimoto, Toshiyoshi Kimura (Mitsubishi Electric Corporation)
- 9P-13 **Compact, Engineered, 2-Micron Coherent Doppler Wind Lidar Transceiver** 977
Michael J. Kavaya, Upendra N. Singh, Grady J. Koch, Jirong Yu, Farzin Amzajerdian, Bo C. Trieu, Mulugeta Petors (NASA Langley Research Center)
- 9P-14 **Lidar on the PHOENIX Mars Mission** 981
James A. Whiteway, Thomas J. Duck, Allan I. Carswell, Clive R. Cook, Cameron Dickenson, Leonce Komguem, Michael Daly, John F. Hahn, Peter A. Taylor (Department of Earth and Space Science & Engineering, York University)
- 9P-15 **Identification of Stationary States Using Logarithmic Averages** 985
John F. Hahn, Sergey Pashin, Marius Irmia, Kevin Shortt, Vladimir Podoba, Tatiana Razoumikhina, Allan I. Carswell (Optech Incorporated)

Chair persons:

- (5P-1-12) Toshiyuki Murayama and Anatoli Chaikovsky
(5P-13-24) Adolfo Comeron* and Choo Hie Lee
(5P-25-33+ 6P-1-3) Raymond M. Hoff and Gelsomina Pappalardo*
(7P-1-10) Pierre H. Flamant* and R. Michael Hardesty
(7P-11-14, 8P-1-6) Thomas Trickl and Arnold Apituley*
(9P-1-8) Kohei Mizutani and Edward V. Browell
(9P-9-15) Stuart Young* and Yoshihito Hirano

18:30-20:30

Banquet

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Jul 28 Friday

9:00-10:45

Session 90 Space-borne lidars, space applications, space program

Session Chairs: Patrick McCormick* and Kohei Mizutani

Oral Presentations

- 90-1 **Initial Results from CALIPSO (Invited)** 991
David M. Winker, Jacques Pelon, M. Patrick McCormick (NASA Langley Research Center)
- 90-2 **Summary of Global Results from the GLAS Satellite Lidar (Invited)** 995
James D. Spinhirne, Stephen P. Palm, William D. Hart, Dennis L. Hlavka (NASA - Goddard Space Flight Center)
- 90-3 **Geoscience Laser Altimeter System (GLAS) on the ICESat Mission: On-Orbit Measurement Performance** 999
James B. Abshire, Xiaoli Sun, Haris Riris, J. Marcos Sirota, J. F. McGarry, Steve Palm, Donghui Yi, Peter Liiva (NASA - Goddard Space Flight Center)
- 90-4 **Performance of the GLAS Laser Transmitter in Space** 1003
Anthony W. Yu, Robert S. Afzal, Joseph L. Dallas, Anthony Melak, Alan Lukemire, Luis Ramos-Izquierdo, William Mamakos (NASA Goddard Space Flight Center)
- 90-5 **Treatment of Multiple-Scattering Effects in Extinction Retrievals in Complex Atmospheric Scenes Proved by CALIPSO** 1007
Stuart A. Young, David M. Winker, Mark A. Vaughan, Kathleen A. Powell, Ralph E. Kuehn (CSIRO Atmospheric Research)

10:45-11:00 Coffee break

11:00-12:45

Session 90 Space-borne lidars, space applications, space program

Session Chairs: Edward V. Browell and Stuart Young*

Oral Presentations

- 90-6 **Progress with ADM-Aeolus, the Spaceborne Doppler Wind Lidar ADM (Invited)** 1011
Peter Dubock, Martin Endmann, Paul Ingmann (European Space Agency)
- 90-7 **Particle Backscatter and Extinction Profiling with the Spaceborne HSR Doppler Wind Lidar ALADIN** 1015
Albert Ansmann, Paul Ingmann, Olivier Le Rille, Dulce La jas, Ulla Wandinger (Leibniz Institute for Tropospheric Research)
- 90-8 **The Use of Circular Polarization in Space-Based Lidar Systems: Considerations for the EarthCARE Lidar** 1019
David Patrick Donovan (Royal Netherlands Meteorological Institute (KNMI))
- 90-9 **Solar Radiance and Albedo of Clouds from Space Lidar** 1023
C. Martin. R. Platt, Steven D. Miller, William H. Hunt (Colorado State University)

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- 90-10 **Combined 2 μ m DIAL and Doppler Lidar: Application to the Atmosphere of Earth or Mars** 1027
Upendra N. Singh, Grady J. Koch, Syed Ismail, Michael J. Kavaya, Jirong Yu, Sidney A. Wood, G. David Emmitt (NASA Langley Research Center)
- 90-11 **The JPL Carbon Dioxide Laser Absorption Spectrometer** 1031
Gary D. Spiers, Sven Geier, Mark W. Phillips, Robert T. Menzies (Jet Propulsion Laboratory)

12:45-14:00 Lunch break

14:00-15:30

Session 90 Space-borne lidars, space applications, space program

Session Chairs: Upendra Singh* and Yoshihito Hirano

Oral Presentations

- 90-12 **Global Environment Monitoring System in JAXA (Invited)** 1033
Toshiyoshi Kimura (EORC, JAXA)
- 90-13 **Development of Conductively Cooled 2micron Laser Oscillators** 1037
Kohei Mizutani, Toshikazu Itabe, Shoken Ishii, Tetsuo Aoki, Kazuhiro Asai, Atsushi Sato, Hirotake Fukuoka, Takayoshi Ishikawa, Toshiyoshi Kimura (National Institute of Information and Communications Technology)
- 90-14 **Development of Lidar for Deep Space Mission HAYABUSA** 1039
Takahide Mizuno, Katsuhiko Tsuno, Eisuke Okumura, Michio Nakayama (Institute of Space and Astronautical Science JAXA)
- 90-15 **The ESA EarthCARE Mission: Mission Concept and Lidar Instrument Pre-Development (Invited)** 1041
Arnaud Hélière, Jean-Loup Bézy, Alain Lefebvre, Wolfgang Leibbrandt, Chun-Chi Lin, Tobias Wehr, Toshiyoshi Kimura, Hiroshi Kumagai (European Space Agency, Directorate of Earth Observation Programmes)

15:30-16:00

Closing session