WORKSHOP LILLE 2023 & GRASP Summer School

Workshop on recent advancements in remote sensing and modeling of aerosols, clouds and surfaces - GRASP ACE summer school

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Welcome to the Workshop Lille 2023 & GRASP ACE Summer School
Workshop on recent advancements in remote sensing and modeling of aerosols, clouds and surfaces
Workshop Objectives

The workshop aims to provide a framework for revision of advancements and perspectives in aerosol, clouds and Earth's surface observations, retrievals and modeling for climate and environmental studies.

It will focus on space- and ground-based remote sensing, aerosol circulation modeling, in situ observations and measurement synergy approaches. The workshop will include 15 minutes oral presentations and posters.

The sessions will cover the topics such as:
1. Inversion algorithms – achievements and new ideas to derive aerosol, clouds and surface properties
2. Achievements in aerosol, clouds and surface characterization
3. Modeling and inverse modeling of aerosol and clouds climatic effects
4. Measurements synergy approaches
5. In-situ observations and field campaigns
6. Future missions

Presentations on air quality, particularly using remote sensing are also welcome.

The workshop will take place from Monday to Thursday noon, it will then be followed by one and half days of GRASP ACE summer school focused on practical application of the GRASP inversion code for aerosol and surface properties retrievals from different remote sensing sensors.

The workshop will gather an international community of researchers and students. The total number of participants is limited to ~ 120 persons with majority by invitation and members of the GRASP ACE project (this project focuses on the synergy of different types of space observations, particularly lidar and polarimetric imager).

GRASP ACE Summer School Objectives

The GRASP ACE summer school will providing introduction and bases of the grasp code, as well as hands on GRASP code installation and inversions of different remote sensing instruments.
GRASP is a highly accurate aerosol retrieval algorithm that processes properties of aerosol- and land-surface-reflectance. To get familiar with GRASP documentation and the GRASP code installation please consult the GRASP open source code platform.

GRASP ACE is a project funded by European Commission in framework of HORIZON 2020.
ACE stands for Aerosol-Clouds-Ecosystems (ACE) NASA mission.
This project deals with reducing the uncertainties associated with the knowledge of aerosol microphysical vertical profiles worldwide through the use of new space-borne measurements.

Time	Day 1 - Mon, May 22, 2023	Day 2 – Tue, May 23, 2023	Day 3 – Wed, May 24, 2023	Day 4 – Thu, May 25, 2023	Day 5 – Fri, May 26, 2023
9 h 00 min		Plenary Presentation 9 h 00 min - 9 h 30 min	Plenary Presentation 9 h 00 min - 9 h 55 min		GRASP ACE Summer School 9 h 00 min - 10 h 30 min
9 h 30 min		Plenary Presentation 9 h 30 min - 10 h 00 min	Session 6: Aerosol characterization 9 h 55 min - 10 h 40 min	Session 7: Impacts of particles and crystals morphology and composition 9 h 30 min - 10 h 45 min	
10 h 00 min		Session 3: Inversion algorithms 10 h 00 min - 10 h 30 min			
10 h 30 min		Coffee Break 10 h 30 min - 11 h 00 min	Coffee Break 10 h 40 min - 11 h 00 min	Coffee Break 10 h 45 min - 11 h 15 min	Coffee Break 10 h 30 min - 11 h 00 min
11 h 00 min		Session 3: Inversion algorithms 11 h 00 min - 12 h 45 min	Session 6: Aerosol characterization 11 h 00 min - 12 h 30 min	Session 8: Surface-atmosphere and impacts 11 h 15 min - 12 h 30 min	GRASP ACE Summer School 11 h 00 min - 12 h 30 min
11 h 30 min					
12 h 00 min					
12 h 30 min					
13 h 00 min	Registration 13 h 15 min - 14 h 00 min	Lunch 12 h 45 min - 14 h 00 min			
13 h 30 min					
14 h 00 min	Opening / Welcome 14 h 00 min - 14 h 20 min	Session 4: Current space missions and programs 14 h 00 min - 15 h 45 min	Session 6: Aerosol characterization 14 h 00 min - 15 h 45 min	GRASP ACE Summer School 14 h 00 min - 16 h 00 min	GRASP ACE Summer School 14 h 00 min - 16 h 00 min
14 h 30 min	Plenary Presentation 14 h 20 min - 15 h 00 min				
15 h 00 min	Session 1: Aerosol trends, environment and climate 15 h 00 min - 16 h 15 min				
15 h 30 min		Coffee Break 15 h 45 min - 16 h 05 min			
16 h 00 min	Coffee Break 16 h 15 min - 16 h 35 min	Session 5: Characterization of clouds and aerosol 16 h 05 min - 17 h 35 min	Posters Session 15 h 45 min - 17 h 45 min	Coffee Break 16 h 00 min - 16 h 30 min	
16 h 30 min	Session 2: Upcoming and current space missions 16 h 35 min - 18 h 05 min			GRASP ACE Summer School 16 h 30 min - 18 h 00 min	
17 h 00 min					
17 h 30 min					
18 h 00 min					
18 h 30 min	Icebreaker 18 h 30 min - 20 h 00 min	City Guided Tour or Museum 18 h 45 min - 20 h 45 min	Banquet 18 h 45 min - 0 h 00 min Departure by buses		
19 h 00 min					
19 h 30 min					
20 h 00 min					
20 h 30 min					
21 h 00 min					
21 h 30 min					

Monday, May 22nd, 2023

13:15 - 14:00
Registration
Coffee #1

Chairmans:
Michael King, University of Colorado, USA.
And **Oleg Dubovik**, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.

14:00 - 14:10
Opening
By **Oleg Dubovik,** LOA (Laboratoire d'Optique Atmosphérique), **CNRS (Centre national de la recherche scientifique) / Université de Lille**, France.

14:10 - 14:20
Welcome
By **Philippe Dubuisson,** LOA (Laboratoire d'Optique Atmosphérique), **CNRS (Centre national de la recherche scientifique) / Université de Lille**, France.

14:20 - 15:00
Aerosols and Global Climate Change
James Hansen, Columbia University Earth Institute, USA.
(online)

Session 1: Aerosol trends, environment and climate

15:00 - 15:15
Climate impact of atmospheric aerosols
By **Olivier Boucher**, Institut Pierre-Simon Laplace, France.

15:15 – 15:30
Fifty years of dust sources detection from satellite data
By **Paul Ginoux**, NOAA (National Oceanic and Atmospheric Administration), USA.

15:30 – 15:45
Aerosol and Climate in China: In-situ Observation, Remote Sensing and Understanding
By **Zhanqing Li**, University of Maryland, USA.

15:45 – 16:00
Toward a synergistic use of GEO-LEO satellite observations, atmospheric measurements, and models for air quality research and applications
By **Mian Chin**, NASA Goddard Space Flight Center, USA.

16:00 – 16:15
Advancements in observations of atmospheric aerosol absorption over the past 25 years
By **Jens Redemann,** University of Oklahoma, USA.

16:15 – 16:35
Coffee Break #2

Session 2: Upcoming and current space missions

Chairmans:
Jérôme Riedi, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.
And **Robert C. Levy**, NASA – Goddard Space Flight Center, USA.

16:35 – 16:50
The Atmosphere Observing System (AOS): Future Space-Based Observations for the Study of Coupled Aerosol-Cloud-Convection-Precipitation Interactions
By **Hal Maring**, NASA Headquarters, USA.

16:50 – 17:05
Overview of the Aerosol Remote Sensing in the Context of Operational Missions
By **Bertrand Fougnie**, EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites), Germany.

17:05– 17:20
Recent advances in retrieval of atmospheric aerosols based on satellite polarimeters
By **Zhengqiang Li**, Chinese Academy of Science (China).

17:20 – 17:35
Elucidation of the aerosol plume by integrated use of polarization and multi-channel observations, a feature of Japanese mission GCOM-C/SGLI
By **Sonoyo Mukai**, Kindai University, Japan.

17:35 – 17:50
Multi-Angle Polarimeter observations supporting the Copernicus Anthropogenic CO2 Monitoring (CO2M) Mission
By **Yasjka Meijer**, ESA (European Space Agency), Netherlands.
(online)

17:50 – 18:05
C3IEL and AOS/C2OMODO : two innovative missions for studying clouds from space
By Adrien Deschamps, CNES (Centre National d'Études Spatiales), France.

18:30 – 20:00
Icebreaker

Tuesday, May 23rd, 2023

Chairmans:
Didier Tanré, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.
And **Derimian Yevgeny**, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.

09:00 - 09:30
Challenges and achievements in radiation studies: A path since 1988
By **Teruyuki Nakajima**, University of Tokyo (Japan)
(online)

09:30 - 10:00
Motivation behind the Development of Inversion Methods: Oleg Dubovik and his Influence
By **Michael King**, University of Colorado, USA.

Session 3: Inversion algorithms (Part 1)

10:00 – 10:15
The Dark Target retrieval of global aerosol properties: Past, present and future
By **Robert C. Levy**, NASA Goddard Space Flight Center, USA.

10:15 – 10:30
Overview of MAIAC aerosol-surface retrieval capabilities from Leo, Geo and L1 orbits
By **Alexei Lyapustin**, NASA Goddard Space Flight Center, USA.

10:30 – 11:00
Coffee Break #3

Session 3: Inversion algorithms (Part 2)

Chairmans:
Alexander Marshak, NASA Goddard Space Flight Center, USA.
And **Céline Cornet**, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.

11:00 – 11:15
Potential of using degree of linear polarization and/or polarized radiances in AERONET operational processing
By **Aliaksandr Sinyuk**, NASA Goddard Space Flight Center, USA.

11:15 – 11:30
MAIA Aerosol Retrieval: Algorithm Development and Test
By **Feng Xu**, University of Oklahoma, USA.

11:30 – 11:45
Lighting the dark: mapping aerosol transport at night from space
By **Jun Wang**, University of Iowa, USA.

11:45 – 12:00
Advancing retrieval techniques for polarimetric remote sensing of atmospheric aerosols
By **Fu Guangliang**, SRON (Space Research Organisation Netherlands), Netherlands.

12:00 – 12:15
Toward an Aerosol Retrieval based on Synergistic Measurements from the EPS-SG platform
By **Soheila Jafariserajehlou**, EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites), Germany.

12:15 – 12:30
Multi-instrument synergetic retrieval for aerosol/surface characterization and validation with GRASP algorithm
By **Pavel Litvinov**, GRASP-SAS (Generalized Retrieval of Atmosphere and Surface Properties), France.

12:30 – 12:45
Aerosol measurements from Ground and Space
By **J. Vanderlei Martins**, UMBC (University of Maryland, Baltimore County), USA.

12:45 – 14:00
Lunch #1

Session 4: Current space missions and programs

Chairmans:
Bertrand Fougnie, EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites), Germany.
And **Feng Xu**, University of Oklahoma, USA.

14:00 – 14:15
Current status of the spaceborne and in-situ observational elements of the Multi-Angle Imager for Aerosols (MAIA) mission
By **David J. Diner**, NASA / Jet Propulsion Laboratory, USA.

14:15 – 14:30
The PACE Postlaunch Airborne eXperiment (PACE-PAX)
By **Kirk Knobelspiesse**, NASA Goddard Space Flight Center, USA.

14:30 – 14:45
Polarimetric remote sensing of atmospheric aerosols using SPEXone/PACE: Instrument, retrieval, and data use
By **Otto Hasekamp**, SRON (Space Research Organisation Netherlands), Netherlands.

14:45 – 15:00
Maritime Aerosol Network as a component of AERONET in the context of aerosol optical depth studies over the oceans
By **Alexander Smirnov**, NASA Goddard Space Flight Center, USA.

15:00 – 15:15
New Algorithm Techniques for Improving Data Products from Backscatter Lidar Sensors
By **John Yorks**, NASA Goddard Space Flight Center, USA.
(online)

15:15 – 15:30
The importance of co-located aerosol observations for accurate retrievals of CO2 and CH4 for emission monitoring
By **Hartmut Boesch**, University of Bremen, Germany.

15:30 – 15:45
NewSpace: Exploring the Possibilities of Private Space Missions
By **Christian Federspiel**, Cloudflight GmbH, Austria.

Coffee Break #4 15:45 – 16:05

Session 5: Characterization of clouds and aerosol

Chairmans:
Philippe Dubuisson, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.
And **Albert Ansmann**, Leibniz Institute for Tropospheric Research, Germany.

16:05 – 16:20
EPIC onboard DSCOVR on clouds, aerosols and solar glints
By **Alexander Marshak**, NASA Goddard Space Flight Center, USA.

16:20 – 16:35
Airborne measurements for validating satellite-based above-cloud aerosol optical depth
By **Charles Gatebe**, NASA Ames Research Center, USA.

16:35 – 16:50
An observational study on the vertical development of shallow cumulus and congestus clouds and its sensitivity to aerosol concentrations
By **Bastiaan van Diedenhoven**, SRON (Space Research Organisation Netherlands), Netherlands.

16:50 – 17:05
A Study of the Interactions between ICE Algae and Springtime Arctic Clouds Using Cloud Microphysics Properties Derived from Synergistic MODIS and CALIPSO Measurements
By **Yongxiang Hu**, NASA Langley, USA.

17:05 – 17:20
The OCRA/ROCINN algorithm tandem for the retrieval of cloud properties from UVN missions GOME, SCIAMACHY, GOME-2, EPIC, TROPOMI, GEMS, Sentinel-4 and Sentinel-5: status and challenges
By **Victor Molina Garcia**, German Aerospace Center, Germany.

17:20 – 17:35
Satellite retrievals of the ice crystal number concentration: a challenging step towards better quantifying aerosol-cloud interactions
By **Odran Sourdeval**, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.

18:45 (Guided city tour)

Wednesday, May 24th, 2023

Chairmans:
Mian Chin, NASA Goddard Space Flight Center, USA.
And **Paul Ginoux**, NOAA (National Oceanic and Atmospheric Administration), USA.

9:00 – 9:20
The Old Guard Rises Again-The AERONET Cassoulet is reviewed
By **Brent Holben**, NASA Goddard Space Flight Center, USA.

9:20 – 9:40
Evolution of the AOD over the last 30 years
By **Didier Tanré**, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.

9:40 – 9:55
GRASP as a universal platform for atmospheric remote sensing: idea, realization, outcome and perspectives
By **Oleg Dubovik**, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.

Session 6: Aerosol characterization (Part 1)

9 :55 – 10:10
Mapping Aerosol Lidar Ratios for CALIPSO
By **Greg L. Schuster**, NASA Langley, USA.

10:10– 10:25
Wildfire smoke triggers cirrus formation: Lidar observations in the Arctic (MOSAiC expedition) and Eastern Mediterranean (Cyprus)
By **Albert Ansmann**, Leibniz Institute for Tropospheric Research, Germany.

10:25 – 10:40
Characterization of aerosol properties based on fluorescence lidar measurements
By **Igor Veselovskiy**, Prokhorov General Physics Institute, Russia.

Coffee Break #5 10:40 – 11:00

Session 6: Aerosol characterization (Part 2)

Chairmans:
Benjamin Torres, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.
And **Jens Redemann**, University of Oklahoma, USA.

11:00 – 11:15
Analysis of 8-year of multi-wavelength Raman-polarization lidar observations at ATOLL observatory, Hauts-de-France
By **Qiaoyun Hu**, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.

11:15 – 11:30
Depolarization and lidar ratio observations in Saharan dust and marine aerosol at 355, 532, and 1064 nm
By **Moritz Haarig**, Leibniz Institute for Tropospheric Research, Germany.

11:30 – 11:45
Remote sensing solutions for mobile atmospheric observations
By **Ioana Popovici**, CIMEL Électronique, France.

11:45 – 12:00
The extreme forest fires in California/Oregon in 2020: Aerosol optical and physical properties and comparisons of aged versus fresh smoke
By **Thomas F. Eck**, NASA Goddard Space Flight Center, USA.

12:00 – 12:15
High-altitude Airborne Remote Sensing of Wildfire Emissions
By **Olga Kalashnikova**, NASA / Jet Propulsion Laboratory, USA.

12:15 – 12:30
Influence of mountain topography on aerosols
By **Itaru Sano**, Kindai University, Japan.

12:30 – 14:00
Lunch #2

Session 6: Aerosol characterization (Part 3)

Chairmans:
Kirk Knobelspiesse, NASA Goddard Space Flight Center, USA.
And **Juan Cuesta**, Laboratoire Interuniversitaire des Systèmes Atmosphériques, France.

14:00 – 14:15
Innovative observation of the 3D distribution of aerosols from space
By **Juan Cuesta**, Laboratoire Interuniversitaire des Systèmes Atmosphériques, France.

14:15 – 14:30
Impact of Fine and Coarse Dust in the Middle East on Radiative Balance, Dust Deposition, and Solar Devices
By **Georgiy L. Stenchikov**, KAUST (King Abdullah University of Science and Technology), Saudi Arabia.

14:30 – 14:45
Impact of BBA on the radiative budget, cloud properties and climate over the Tropical Africa
By **Marc Mallet**, CNRM (Centre National de Recherches Météorologiques), France.

14:45 – 15:00
Using GRASP for polarimetric retrievals from AirMSPI and ground-based polarized nephelometer measurements
By **Michael Garay**, NASA / Jet Propulsion Laboratory, USA.

15:00 – 15:15
Columnar optical, microphysical and radiative properties of the 2022 Hunga Tonga volcanic ash plumes
By **Huizheng Che**, Chinese Academy of Meteorological Sciences, China.

15:15 – 15:30
Growth and global persistence of stratospheric sulfate aerosols from the 2022 Hunga Tonga-Hunga Ha′apai volcanic eruption
By **Marie Boichu**, LOA (Laboratoire d'Optique Atmosphérique), CNRS (Centre national de la recherche scientifique) / Université de Lille, France.

15:30 – 15:45
Aerosol climatology – from aerosol remote sensing measurements, models and deep learning
By **Camelia Talianu**, National Institute of Research and Development for Optoelectronic, Romania.

15:45 – 17:45
Poster Session and Coffee+ #6

18:45
Departure for dinner by buses

Thursday, May 25th, 2023

Session 7: Impacts of particles and crystals morphology and composition

Chairmans:
Alexei Lyapustin, NASA Goddard Space Flight Center, USA.
And **Brent Holben**, NASA Goddard Space Flight Center, USA.

09:30 – 09:45
Quantifying the Impact of Imperfect Particle Shape Assumptions on Synergistic Lidar and Polarimeter Aerosol Retrieval Performance
By **William Reed Espinosa**, NASA Goddard Space Flight Center, USA.

09:45 – 10:00
Light scattering by non-spherical and inhomogeneous particles: recent advancements and applications
By **Lei Bi**, Zhejiang University, China.

10:00 – 10:15
The mineralogy of coarse dust aerosols retrieved from its mid−infrared extinction spectra: a laboratory testbed study on dust from worldwide sources
By **Claudia DiBiagio**, Laboratoire Interuniversitaire des Systèmes Atmosphériques, France.

10:15 – 10:30
Aerosol component concentration derived by the GRASP algorithm from multi-angular polarimetric satellite observations
By **Lei Li**, Chinese Academy of Meteorological Sciences, China.

10:30 – 10:45
Database of the light scattering matrices for ice crystals of cirrus clouds for developing the inversion algorithms
By **Alexander Konoshonkin**, V.E. Zuev Institute of Atmospheric Optics, Russia.

10:45 – 11:15
Coffee Break #7

Session 8: Surface-atmosphere and impacts

Chairmans:
Zhanqing Li, University of Maryland, USA.
And **Pavel Litvinov**, GRASP-SAS (Generalized Retrieval of Atmosphere and Surface Properties), France.

11:15 – 11:30
Spectral Matching Atmospheric Correction Algorithm for Sentinel-3 Ocean Color Imagery
By **Robert Frouin**, University of California San Diego, USA.

11:30 – 11:45
From vegetation BRDF to BPDF: Vector remote sensing basic model and its application on vegetation chlorophyll retrieval
By **Yan Lei**, Institute of Remote Sensing and Geographic Information System, China.

11:45 – 12:00
Aerosol and Cloud Observations from Space with HARP CubeSat
By **Anin Puthukkudy**, UMBC (University of Maryland, Baltimore County), USA.

12:00 – 12:15
Enhancing PACE Multi-Angle Polarimeter Data Products: Deep Neural Networks for Aerosol and Ocean Color Retrievals
By **Gao Meng**, NASA Goddard Space Flight Center, USA.

12:15 – 12:30
Long-term monitoring of aerosol optical properties
By **Kazuma Aoki**, University of Toyama, Japan.

12:30 – 12:45
Spatial scale effects on surface-atmosphere radiative coupling
By **Yves Govaerts**, Rayference SRL, Belgium.

12:45 – 14:00
Lunch #3