



# Latin American Aerosol Measurements School: From measurements technologies to applications

22-27 June 2015

La Paz, Bolivia

Lectures: 1h30 (including questions)

Seminars (1h) (including questions)

## Day 0 – Sunday 21th (arrival day) – Ice breaker

Meeting at 18:00 at Hotel Calacoto: aerial city tour

## Day 1 – Monday 22th

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|---------------|---|
| 8:30 – 9:00   | Registration  |
| 9:00 – 10:00  | <b>Introduction to the course</b> - Marcos Andrade (LFA-UMSA, Bolivia)                                |
| 10:00 – 10:30 | Coffee break  |
| 10:30 – 12:00 | <b>Atmospheric aerosol and air quality: from research to regulation</b> - Paolo Laj (LGGE, France)    |
| 13:30 – 15:00 | <b>Aerosols in the climate system</b> - Olga Mayol (URP-RP, Puerto Rico)                              |
| 15:00 – 16:30 | <b>Aerosols emissions in the LAC region: Special focus on BC</b> - Laura Dawidowski (CNEA, Argentina) |
| 16:30 – 17:00 | Coffee break  |
| 17:00 – 18:00 | Student/young scientist presentations (10 min each)   |
- Sofia Caumo: *Biomarkers compounds of sugarcane burning in atmospheric particulate matter collected in São Paulo city, Brazil.*
  - Fabian Guerrero: *Particle size distribution from the combustion of Eucalyptus globulus, Nothofagus obliqua, Pinus radiata using a new controlled combustion chamber 3CE*
  - Germán Pérez Fogwill: *Two years of Black Carbon measurements at Marambio station in Antarctica*
  - Fernando Velarde: *Seasonal and diurnal behavior of particle number size distribution in the Central Andes lower free troposphere at mountain Chacaltaya (5240 masl)*
  - Andrea Orfanoz: *High resolution simulations of vertical stratification of pollutant over Santiago and its transport to Los Andes, Chile.*

## Day 2 – Tuesday 23th

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|---------------|---|
| 8:30 – 9:30   | <b>Terminology: what do we call BC?</b> – Paolo Laj (LGGE, France)                              |
| 9:30 – 11:00  | <b>Mechanical Properties &amp; Diameter Definitions</b> – Alfred Wiedensohler (TROPOS, Germany) |
| 11:00 – 11:15 | Coffee break  |
| 11:15 – 12:45 | <b>Sampling, Conditioning &amp; Losses</b> - Alfred Wiedensohler (TROPOS, Germany)              |
| 14:15 – 15:45 | <b>Optical Properties (Extinction, Scattering &amp; Absorption)</b> – Thomas Müller (TROPOS)    |



- 15:45 – 17:15 **Measuring scattering and extinction** - Alfred Wiedensohler (TROPOS, Germany)
- 17:15 – 17:30 Coffee break
- 17:30 – 18:30 **From data provision to data use, making data available** - Paolo Laj (LGGE, France)

### Day 3 – Wednesday 24th

- 8:30 – 12:30 *Joint session with Policy makers*
- 12:30 – 14:00 Lunch with policy makers
- 14:30 – 15:30 Student/young scientist presentations (10 min each)
- Ricardo Morales: *Road-side measurements of PM10 and PM2.5 during the “car-free day” in Bogotá, Colombia*
  - Maria Fernanda Sánchez: *Evaluation of the local atmospheric boundary layer behavior with lidar measurements*
  - Manuel Roca: *Analysis of local atmospheric boundary layer using radiosounding data*
  - Aurélien-Chauvigne: *A parallel study of aerosol optical properties on Boundary and Free Troposphere Layers at Chacaltaya, Bolivia and Puy-de-Dôme, France stations.*
  - Ana Maria Sanches: *GIS techniques applied for acquisition of ice cores for black carbon study in tropical glaciers.*
- 15:30 – 17:30 Poster session (including coffee break)
- 19:30 \* Dinner with all participants and lecturers (at Casa Grande) \*

### Day 4 – Thursday 25th

- 8:30 – 9:30 **From Absorption to black carbon** – Thomas Müller (TROPOS, Germany)
- 9:30 – 10:30 **Calculating Aerosol Radiative Forcing** –Mike Bergin (Duke University, USA)
- 10:30 – 10:45 Coffee break
- 10:45 – 12:15 **Instruments: Aethalometer**, Grisa Mocnik, Magee (Slovenia)
- 13:45 – 15:15 **Black carbon and air quality health impacts** - Hans-Christen Hansson (ACES, U. Stockholm, Sweden)
- 15:15 – 16:15 **Source apportionment studies: inorganic PM components**– Noemí Pérez (IDAEA, Spain)
- 16:15 – 16:30 Coffee break
- 16:30 – 18:00 **Melting glaciers with BC deposits** - Patrick Ginot (OSUG-LGGE-IRD, France)

### Day 5 – Friday 26th

- 8:30 – 10:00 **Measuring chemical composition** – Radovan Krejci (ACES, U. Stockholm, Sweden)
- 10:00 – 11:00 **Instruments: ECOC**, Bob Cary (Sunset Lab., USA)
- 11:00 – 11:15 Coffee break
- 11:15 – 12:15 **Practical exercises**
- 13:45 – 15:45 **Practical exercises**
- 15:45 – 16:45 Invited speaker: **Mercury in the atmosphere** – Aurélien Dommergue (LGGE, France)
- 16:45 – 17:00 Coffee break



17:00 – 18:00

Invited speaker: **Physical and chemical properties of aerosols from Amazonia** – Paulo Artaxo (USP, Brazil)

### **Day 6 – Saturday 27th - Visit to Chacaltaya GAW Station**

7:30 Departure from Hotel Calacoto

9:30 Arrival to Chacaltaya and visit to the station

12:30 Lunch and departure

15:00 Group 1: Arrival to Hotel Calacoto by cablecar.

Group 2: Arrival to Tiahuanaco archeological site (1.5 h visit)

19:00 Group 2: Arrival to Hotel Calacoto

Mount Chacaltaya (5240masl) is the most complete GAW station in the Andes. Working at high-altitude poses challenges but also has great advantages in terms of regional monitoring. In the visit at the station, the general instrumental setup will be explained, as well as the operational scheme of the station. Other instruments than the presented at the session will be explained.

We kindly ask the participants to read the safety manual (see link below) before going to the station and bring sunglasses (factor 4 if possible), warm clothes and sunscreen (SPF or higher if possible).

[http://www.chacaltaya.edu.bo/uploads/2/2/6/2/22626008/guidelines\\_mountain.pdf](http://www.chacaltaya.edu.bo/uploads/2/2/6/2/22626008/guidelines_mountain.pdf)

After visiting Chacaltaya, those willing to visit the archeological site of Tiwanaku need to book their space. The school will provide the bus, but the entrance fee would be up to each one.



## Joint session with stakeholders and policy makers

(Convener: Dr. Francesco Zaratti, LFA-UMSA)

9:00 – 10:30	<b>Opening talks from representatives of the Academy, Government, International Collaboration and Civil Society (20 minutes each)</b>
	<b>Questions and comments</b>
11:00 – 11:30	Coffee break
11:30 – 12:30	<b>General discussion</b>
12:30 – 14:30	<b>Lunch</b>

### Institutions invited:

- Academia:** Consorcio internacional de la Estación GAW de Chacaltaya (UMSA); UCB; UPB; CEUB; DIPGIS (UMSA)
- Gobierno:** Ministerios de Agua y MA, Ministerio de Salud, Ministerio de Planificación, Viceministerio de Ciencia y Tecnología; Autoridad de la Madre Tierra, Autoridad Forestal; ATT; GAMLPZ; GAMEA.
- Cooperación Internacional:** Swiss Contact, IRD de Francia, Alemania, Italia, UK, EEUU, Japón, Corea, China, Suecia, Suiza, Dinamarca; BM, BID, CAF; OPS; PNUD.
- Sociedad Civil:** LIDEMA, FAN; CEDLA; Fundación Tierra; Fund. Jubileo; Reacción Climática; Encuentro de la sociedad civil frente al cambio climático.



## About the lecturers

### Prof. Dr. Alfred Wiedensohler

Head of the Department “Experimental Aerosol & Cloud Microphysics” at the Leibniz Institute for Tropospheric Research. He also leads the World Calibration Center for Aerosol Physics in the frame of the WMO-GAW program. He is Professor at the University of Leipzig, Institute of Meteorology and Guest Professor at the Peking University, Dept. of Environmental Science and Engineering, Beijing, China. Presently, he is “Editor-In-Chief” of the international journal “Atmospheric Environment”. He published more than 300 peer-reviewed articles in the field of atmospheric science, aerosol physics and instrumentation. He received the award “Highly Cited Researcher” from Thomson Reuters in 2014.

### Paolo Laj, PhD

Director of Laboratoire de Glaciologie and Géophysique de l'Environnement of University of Grenoble-Alpes and CNRS, in France. He is the chair of the Scientific Expert Group on Aerosol of WMO and guest Professor at the University of Helsinki in Finland. His work mainly deals with observation of aerosol properties in particular from remote areas. He published more than 100 peer-reviewed articles in the field of atmospheric science, aerosol/cloud interaction and instrumentation.

### Radovan Krejci, PhD

Senior researcher at Department of Applied Environmental Science and Analytical Chemistry, Stockholm University, Sweden. His work in a field of atmospheric science focuses especially on physical and chemical properties of atmospheric aerosols and clouds and processes controlling their behavior and evolution. He has published more than 60 peer review articles.

### Olga L. Mayol-Bracero, PhD

Professor in the Department of Environmental Science at the University of Puerto Rico – Río Piedras, a member of the International Commission on Atmospheric Chemistry and Global Pollution (iCACGP) and a former member of the International Global Atmospheric Chemistry (IGAC) scientific steering committee. Her research activities include the identification of sources influencing tropical regions, the role of organic aerosols in cloud condensation nuclei properties and the impact of aerosols on climate and ecosystems. She has been involved in large aerosol field projects such as INDOEX, LBA EUSTACH, LBA CLAIRE, LBA SMOCC, RICO, ICE-T and Fennec. Presently, she is the PI of the NSF funded project Puerto Rico African Dust and Cloud Study (PRADACS) and the manager of Cape San Juan Atmospheric Aerosols Observatory. She is author of over 30 peer-reviewed publications.

### Marcos Andrade, PhD

One of the founders of the Laboratory for Atmospheric Physics (LFA) at UMSA. He has worked extensively in total ozone and ultraviolet radiation subjects in Bolivia. Member of the International Commission on Atmospheric Chemistry and Global Pollution (iCACGP) and a part of the implementation group of the Americas Working Group of the International Global Atmospheric Chemistry (IGAC). PI of the Chacaltaya GAW station and currently the director of the LFA. At present, working in subjects related to atmospheric composition in the Andes with special emphasis in aerosol and gas transport to the region and evaluation of climate models in Bolivia.

### Griša Močnik, PhD

Director of research and development of Aerosol d.o.o. – the developer and producer of the Aethalometer, the instrument for measurement of black carbon. He has been a principal investigator,



researcher and scientific advisor in numerous development and research projects in the field of aerosol instrumentation and laser devices. His work is mostly focused on the development of filter based instrumentation for research of aerosol optical properties and application of this instrumentation – in particular measurement of black carbon and other light absorbing carbonaceous aerosols. His current research includes source apportionment of carbonaceous aerosol for local studies and in context of long range transport; vertical profiles of primary combustion products; and methods for emission measurements. He served as a member of the United Nations ECE expert group on Black Carbon.

**Noemi Perez, PhD.**

Post-doctoral researcher at the Institute of Environmental Assessment and Water Research, Spanish National Research Council (IDAEA-CSIC) in Barcelona, Spain. Her work focuses mainly on atmospheric geochemistry and air quality studies, and is responsible for aerosol monitoring at the ACTRIS-GAW site Montseny. She has been involved in more than 20 national and international research projects and contracts, which have produced more than 40 peer-review scientific publications.

**Paulo Artaxo, PhD. (invited speaker)**

Professor of environmental physics at the University of São Paulo. He has worked on aerosol properties in Amazonia for the last 30 years, studying aerosol optical properties, composition and effects on clouds and precipitation. He also studied urban aerosols with source apportionment studies on several urban areas in Brazil, including São Paulo. He is the chairman on the LBA (The Large Scale Biosphere Atmosphere Experiment in Amazonia) Science Steering Committee and helps in the coordination of several large experiments in Amazonia such as GoAmazon, ATTO Tower, AMAZE, NGEE-Tropics and others.