



REPORT

VII Workshop on Lidar Measurements in Latin America

Pucón, Chile

November, 11 to 16, 2013



Participants

Lidar researchers and graduate students from Latin America and the rest of the world attended the workshop. The Latin America's attendees were 35 from Argentina (3), Brazil (9), Bolivia (2), Chile (13), Colombia (5) and Cuba (3). Eleven (11) attendees from the rest of the world came from Spain (3), Germany (1), Italy (1), Netherlands (1), United States (1), Mexico (1), Israel (1) and France (2). Also representatives from ASTRIUM, ESA and companies like LEOSPHERE and Local forestry companies participated in the workshop. The total of participants was 46, between them, 19 graduate students and the rest scientists and engineers.

Sponsors and Supporters

Sponsors were ASTRIUM SAS, the Center for Optics and Photonics – Universidad de Concepción (CEFOP), The Abdus Salam International Centre for Theoretical Physics (ICTP), European Space Agency (ESA), LICEL, QUANTEL-France, NASA, LEOSPHERE, American Optical Society (OSA) and Campbell. Additionally, the CEFOP contributed with communications services, and the design, construction, maintenance and hosting of the workshop web homepage. The Grupo de Óptica Atmosférica of the University of Valladolid, Spain, will provide the funding necessary for publishing the papers presented at the Workshop. The papers will be published in *Óptica Pura y Aplicada* (OPA) the journal of the Optical Society of Spain.

Oral Presentations and Posters

A total of 44 presentations took place, 24 as oral and 20 as posters presentations. An award committee selected the best student presentations in oral and poster sessions by day; each of one received an honored certificate. The individual evaluation of the members of the committee took place during the



sessions. A joint session of the award committee decided to award the Best Oral Presentations to MSc Daniel Nisperuza (GLEO- Universidad Nacional de Colombia Sede Medellín), for the presentation “Urban Mixing height in the tropical and mountain zone with tropospheric lidar using automated algorithm” and to Patricia Ferrini (IPEN/USP), for the presentation “Water Vapor Measurements and hygroscopic growth study over São Paulo metropolitan area using a Raman LIDAR”. The awards for the Best Poster Presentations to Cristófer Jimenez (CEFOP/UDEC) for his poster “Determination of humidity effect on aerosol backscatter profiles retrieved by a single channel Lidar system” .

The event

The event was divided in three parts:

1. Basic School on Lidar distributed as follow:
 - November 11th, 2013: Lidar Technique Introduction for students at beginner level
 - November 12th-13th, 2013: Operation and technical details of Lidar Systems for students at middle and advanced level.
2. November 14th-15th, 2013: The traditional workshop, with oral presentation and posters sessions by Lidar researchers and students from Latin America and the rest of the world attending the workshop.
3. A one-day tour to Pucón landscape surroundings, as a social activity

The Basic School on Lidar

The invited professors and distribution of basic school courses were as follow:

1. Lidar Technique Introduction for students at beginner level
 - Lecture 1. Dr. René Estevan
 - Lecture 2. Dr. Lucas Alados
2. Operation and technical details of Lidar Systems for students at middle and advanced level
 - Lecture 3. Dr. Álvaro Bastidas
 - Lecture 4. Dr. Albert Ansmann
 - Lecture 5. Dr. Massimo del Guasta
 - Lecture 6. Dr. Victoria Cachorro
 - Lecture 7. Dr. Eduardo Landulfo



Training courses were held at the auditorium of the Gran Hotel at Pucón, according the following program and schedule:

Day/Time	11/11/13	12/11/13	13/11/13
	Monday	Tuesday	Wednesday
9:00 -9:45	<i>Registration, Reception And Opening *</i>	Lecture 3c	Lecture 6
9:45 – 10:30	Lecture 1	Lecture 3d	Lecture 6 ^a
10:30 – 11:00	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>
11:00 – 11:45	Lecture 1b	Lecture 4	Lecture 7
11:45 – 12:30	Lecture 2	Lecture 4b	Lecture 7b
12:30 – 15:00	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>
15:00 – 15:45	Lecture 2b	Lecture 4c	Invited talk
15:45- 16:30	Lecture 3	Lecture 5	Lalinet Forum Discussion - part I
16:30 – 17:00	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>
17:00 – 17:45	Lecture 3b	Lecture 5b	Lalinet Forum Discussion - part II
17:45 – 18:30	Test – Panel Discussion	Test – Panel Discussion	

1. *Lidar Technique Introduction for students at beginner level*
 - Lecture 1. Dr. René Estevan. “Atmosphere: structure and properties”
 - Lecture 2. Dr. Lucas Alados. “Introduction to Lidar technique”

2. *Operation and technical details of Lidar Systems for students at middle and advanced level*
 - Lecture 3. Dr. Álvaro Bastidas. “Design of elastic Lidar system, overlap function and Wavelet method”
 - Lecture 4. Dr. Albert Ansmann. “Types of Lidars: elastic lidar, Raman, DIAL, temperature, and winds. Aerosol Lidar: optical properties, retrievals, and tropospheric applications”
 - Lecture 5. Dr. Massimo del Guasta. “Monitoring aerosols and clouds by means of automatic LIDARs, in-situ instruments, and models”
 - Lecture 6. Dr. Victoria Cachorro. “Lidar and other techniques, emphasis in photometer techniques”
 - Lecture 7. Dr. Eduardo Landulfo. “Hands On Aerosol Lidar Data: A Primer”



Workshop on Lidar Measurements

Oral presentations and posters sessions on Lidar topics and remote sensing applications were presented within follow main topics:

Lidar technologies and methods (LTM)	A
Synergy between lidar and others instruments (SLOI)	B
Lidar Networking (LNT)	C
Lidar applications in environmental sciences (LAES)	D
Remote Sensing applications (RSA)	E
Regional and international cooperation in lidar technologies (RICLT)	F

All presentations and posters were held at the auditorium of the Gran Hotel at Pucón, according to the following program:

Day/Time	14/11/13			15/11/13			16/11/13
	Thursday			Friday			Saturday
9:00 – 9:15	C 1			D2			<i>Social Activities</i>
9:15 – 9:30	D 1			D 3			
9:30 – 9:45	A 1			D 4			
9:45 – 10:00	A 2			D 5			
10:00 – 10:15	A 3			E1			
10:15 – 10:30	A 4			E2			
10:30 – 11:00	<i>Coffee Break</i>			<i>Coffee Break</i>			
11:00 – 11:15	A 5			E 3			
11:15 – 11:30	B 1			E 4			
11:30 – 11:45	B 2			E 5			
11:45 – 12:00	B 3			E 6			
12:00 – 12:15	B 4			F1			
12:15 – 12:30	C 2			F 2			
12:30 – 15:00	<i>Lunch</i>			<i>Lunch</i>			
15:00 – 16:30	Poster Session 1			Poster Session 2			
	PA	PB	PC	PD	PE	PF	
17:30- 20:0				<i>Social Activities</i>			



Distribution of participants by country:

Country	Attendees	Oral Presentations	Poster Presentations	Graduate Students
Argentina	3	1	2	1
Brazil	9	9	4	6
Bolivia	2	1	1	1
Chile	13	3	3	6
Colombia	5	1	3	4
Cuba	3	2	2	1
France	2			
Germany	1	1		
Israel	1			
Italy	1	1		
Mexico	1	1		
Netherlands	1	2		
Spain	3	2	4	
United States	1		1	
TOTAL	46	24	20	19

Discussion Session

As in the previous workshops the Discussion Session was an important component of the workshop. Conducted by Dr. Eduardo Landulfo jointly with Dr. Elena Montilla, the exchanges were focused in five main subjects. They were:

1. The ALINE Network Future
2. GALION network
3. Structure of next WLMLA
4. Publication of Papers in the journal *Optica Pura y Aplicada*
5. VIII WLMLA (2015)

Regarding to ALINE Network Future, preliminary results of the first attempt of Lidar measurements were presented by Dr. Henrique Barbosa and discussed by the attendees, based on these discussion, establishment of systematic measurements, analysis protocols and policy of data management are needed for the Network. To achieve the first consolidated step as Lidar Network, the Center of Optics and Photonics (CEFOP), Universidad de Concepción, has offered financial support to held the first workshop of ALINE Inversion algorithm intercomparison at March 2014 in Concepcion (Chile). To keep the work dynamic of the Network, Dr. Eduardo Landulfo has proposed to make skype video conferences between Leader groups one time per



month. To get financial support for ALINE Network activities, a project would be submitted to the IAI (<http://www.iai.int/>) and the WMO (http://www.wmo.int/pages/summary/projects_en.html).

In the topic of GALION network, Dr. Eduardo Landulfo informed that two hours of Lidar measurements at each Monday has to be reported to GALION, according to the agreement signed. Besides, Dr. Landulfo requested to all ALINE members update the information of each Lidar station in GAWSIS web page.

About the structure of next WLMLA, several opinions and suggestions on organization were presented to reach a general consensus: one day of the next workshop would be dedicated to a basic and advanced Lidar school, focus on inversion algorithm and specific Lidar measurements procedures. Two days focus on practical school and two days more for oral presentations. About the poster presentation, the consensus was to make it along the workshop week.

Regarding to the publication of the conference papers in the *Óptica Pura y Aplicada* (OPA) the journal of the Optical Society of Spain. It was announced that Dr. Angel de Frutos, leader of the Grupo de Óptica Atmosférica of the University of Valladolid, Spain, will provide the funding necessary for publishing the papers presented at the Workshop. November 30th was established like a dateline for submission of final versions to LOC, and December 15th will be the submission to OPA of the Papers.

Finally, the last topic was the hosting of the VIII Workshop on Lidar Measurements in Latin America, in spite of the ILRC was postponed to 2015, all the members of ALINE and attendees of VII WLMLA decided to keep 2015 as the year of the next WLMLA. The site proposal were Cuba by Dr. René Estevan, head of GOAC, CMPC and Colombia by Dr. Álvaro Bastidas. Finally, the international organizing committee decided that the Next VIII WLMLA (2015) will be held in Cuba and, the IX WLMLA (2017) will be held at Medellín (Colombia).

At the end of the session several attendees acknowledged the quality of the organization of the workshop. A general consensus was to praises the LOC and in particular to CEFOP for the work they have done for organizing the workshop and making it successful.



VII WLMLA Organizing committee

International committee

- Eduardo Landulfo, (Chair) IPEN, Brazil
- Carlos Saavedra, (Co-Chair) CEFOP, U. de Concepcion, Chile
- René Estevan, GOAC, Cuba
- Eduardo Quel, CEILAP, Argentina
- Henrique Barbosa, U. de Sao Paulo, Brazil
- Ricardo Forno, LFA-UMSA, Bolivia
- Alvaro Bastidas, UNALMED, Colombia
- Riad Bourayou, IPEN, Brazil
- Angel de Frutos, U. de Valladolid, Spain
- Barclay Clemesha, INPE, Brazil
- David N. Whiteman, GSFC-NASA, USA
- Errico Armandillo, ESA-EU

National committee

- Elena Montilla-Rosero, (Chair) PhD in Physics, Researcher CEFOP, Associate Professor Department of Physics, University of Concepción.
- Rolando Hernández, (Co-chair) Ph.D in Physics, Associate Professor Department of Physics, University of Concepción, Director of Technology Development CEFOP.
- Antonieta Silva, Ph.D Physics student, University of Concepción.
- Cristófer Jiménez, Degree in Physics, University of Concepción.

Financial and economical report

The administration of the funds was in charge of Administration Secretary of the Center for Optics And Photonics (CEFOP). The list of institutions that sponsored the VII WLMLA is:

Name	Amount (USD \$)
ICTP	3960 (3000 €)
ESA	2610 (2000 €)
LEOSPHERE	1900 (1500 €)
LICEL	1900 (1500 €)
NASA	3000 USD (Travel Grants)
OSA	2000
QUANTEL	1280 (1000 €)
ASTRIUM	27000 (20000 €)
CAMPBELL	2560 (6000 BRL)
CEFOP	5000



People Granted for the VII WLMLA

A total of 29 students, young researchers and researchers were supported by LOC. Two travel grants were assigned directly from GSFC-NASA and, Brazilian students and researchers were granted with air ticket directly by Campbell.

- **EIGHTEEN (18) FULL GRANTS** = Air Tickets to Temuco (Chile) + Temuco-Pucón Transfer + Hotel + Registration Fees

1.	Ricardo Forno	Bolivia	NASA
2.	Ma. José Sanchez	Bolivia	NASA
3.	René Estevan	Cuba	ICTP + LOC VII WLMLA
4.	Boris Barja	Cuba	ICTP + LOC VII WLMLA
5.	Jorge Rosas	Cuba	ICTP + LOC VII WLMLA
6.	Álvaro Bastidas	Colombia	LOC VII WLMLA
7.	Felipe Araujo	Brazil	LOC VII WLMLA
8.	Diego Alves	Brazil	LOC VII WLMLA
9.	Daniel Nisperuza	Colombia	LOC VII WLMLA
10.	Dairo Alegría	Colombia	LOC VII WLMLA
11.	Mauricio Múnera	Colombia	LOC VII WLMLA
12.	Andrés Bedoya	Colombia	LOC VII WLMLA
13.	Ezequiel Pawelko	Argentina	LOC VII WLMLA
14.	Antonieta Silva	Chile	LOC VII WLMLA
15.	Cristofer Jimenez	Chile	LOC VII WLMLA
16.	Rodrigo Fuentes	Chile	LOC VII WLMLA
17.	Brenda Acevedo	Chile	LOC VII WLMLA
18.	Jorge Tapia	Chile	LOC VII WLMLA

- **FOUR (4) HALF GRANTS** = Air tickets Santiago/Temuco + Hotel + Registration Fees

1.	Yasmine Bennouna	Spain	LOC VII WLMLA
2.	Lucas Alados	Spain	LOC VII WLMLA
3.	Massimo del Guasta	Italy	LOC VII WLMLA
4.	Victoria Cachorro	Spain	LOC VII WLMLA

- **NINE (9) LIVING EXPENSES** = Hotel + Registration Fees

1.	Fabio Lopes	Brazil	LOC VII WLMLA
2.	Gregory da Arruda Moreira	Brazil	LOC VII WLMLA
3.	Patricia Ferrini	Brazil (Only Hotel)	LOC VII WLMLA
4.	Pablo Ristori	Argentina	LOC VII WLMLA
5.	Marcia Talita	Brazil	LOC VII WLMLA
6.	Eduardo Landulfo	Brazil	LOC VII WLMLA
7.	Marcos Avendaño	Chile	LOC VII WLMLA
8.	Renata Da Costa	Brazil (Only Hotel)	LOC VII WLMLA
9.	Elian Wolfram	Argentina (Only Registration Fees)	LOC VII WLMLA



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Group Photo at Pucón (Chile), Villa Rica Volcano View