

WP2- NA2: Remote sensing of the vertical aerosol distribution
Deliverable D2.13: Minutes of the fourth workshop

ACTRIS

WP2 – NA2: Remote sensing of the vertical aerosol distribution

WP20 – JRA1: Lidar and sunphotometer

4th Joint Workshop

Université de Lille 1 Sciences et Technologies
Laboratoire d'Optique Atmosphérique (LOA)
28 – 31 October, 2014

Agenda

28 October 2014

14:30 – 19:00

Welcome and introduction

ACTRIS overview

WP2 NA2: Remote sensing of vertical aerosol distribution

WP2 infrastructure status

Task 2.1 Exchange of expertise, integration and outreach

Technical session

Task 2.2 Quality assurance

Hardware quality assurance overview

Task 2.3 Improvement of lidar techniques and data analysis

Overview of activities and achievements

Ideas for the implementation of quality assurance tests in the Single Calculus Chain

29 October 2014

9:00 - 16:00

WP20 JRA1: Lidar and sunphotometer – Improved instruments, integrated observations and combined algorithms

Task 20.1 Improved daytime capabilities of lidar instruments

Status report

Task 20.3 Integrated retrieval schemes for aerosol microphysical properties

Lidar-Radiometer Inversion Code (LIRIC): Development of new modules and evaluation of the solution uncertainties

Use of GRASP/GARRLIC Advanced Aerosols Retrievals for the processing of multi and single wavelength LIDAR data

Task 20.2 Integrated observation strategies

Results from stations and applications

Discussion

Task 20.2/20.3/2.1 Scientific presentations related to microphysical properties and instrument synergy

30 October 2014

9:00 – 19:00

WP2 NA2: Remote sensing of vertical aerosol distribution

Task 2.1 Exchange of expertise, integration and outreach (cont'd)

Scientific presentations from GALION

WP2 / WP20 Scientific presentations from EARLINET-ACTRIS

31 October 2014

9:00 – 13:00

WP2 NA2: Remote sensing of vertical aerosol distribution

Task 2.1 Exchange of expertise, integration and outreach (cont'd)

Results from stations, outreach and collaboration

Workshop conclusions

The 4th Joint Workshop of ACTRIS WP2 (NA2: Remote sensing of vertical aerosol distribution) and WP20 (JRA1: Lidar and sunphotometer – Improved instruments, integrated observations and combined algorithms) was held in Lille (France), from 28 to 31 October 2014 (see agenda), hosted by the Laboratoire d'Optique Atmosphérique (LOA) of Université Lille 1.

As planned in the project description of work, this last workshop of the series was open to representatives of other lidar networks. In particular, 12 guest experts of aerosol lidar networks and stations contributing to the GAW Aerosol Lidar Observation Network (GALION) participated actively in the workshop, which had a total attendance of 84 (see list at the end of the minutes), including one SME representative.

Because of the presence of the guest experts, the workshop was especially tailored to promote the interaction between them and the attending ACTRIS members, with an overview of ACTRIS, and in particular of WP2 and WP20 roles and achievements, and a dedicated GALION session.

All the presentations listed in the following are available on the [ACTRIS intranet](#).

**Note that you must be [logged in to the ACTRIS intranet](#)
first in order to use the interactive links below!**

The workshop starts with a [welcome and a brief presentation of LOA](#) by Philippe Goloub on behalf of the group hosting the workshop.

Adolfo Comerón gives an [introduction to the workshop](#), highlighting the presence of the GALION representatives, explaining the roles and the interplay of ACTRIS WP2 and WP20, and reviewing the agenda.

ACTRIS coordinator, Gelsomina Pappalardo, presents an overview of ACTRIS, its links to other European and international projects and initiatives, in particular to GALION, and its future prospects, highlighting the current and future contribution of EARLINET. For details, see the presentation

- [ACTRIS overview and the way forward](#) (Gelsomina Pappalardo; CNR)

WP2 NA2: REMOTE SENSING OF VERTICAL AEROSOL DISTRIBUTION

Adolfo Comerón presents the infrastructure status, highlighting its evolution from a network of 19 lidars where simple, backscatter ones were dominant, to an infrastructure of 28 instruments where the majority are advanced multiwavelength systems with two N₂ Raman channels meeting the so-called EARLINET standard of 3 elastic channels and 2 Raman ones, and where most of the instruments have depolarization measurement capability. Contributions to the ACTRIS database and example of products are also discussed, as well as deliverables forwarded to the Commission since the end of last workshop and those pending until the end of the project. Details are found in the presentation

- [WP2: Remote Sensing of Vertical Aerosol Distribution \(NA2\): Infrastructure status](#) (Adolfo Comerón; UPC)

With respect to the internal quality checks (see task 2.1 section), it is reminded that they must be forwarded to Volker Freudenthaler before 15 December 2014 for the corresponding deliverable (D2.13) to be ready in January 2015.

Holger Linné announces that the next volume of EARLINET database will be released through the CERA database in spring 2015. This volume will include all data from 2000 - 2012. To allow this publication date, the database will be locked for a few days in the 5th week of 2015 (January 26-31). All new or changed data to be included in this volume must be submitted before 26 January 2015 to the database. Do not forget to set these data to public in order to include them in the publication process. Please check for correctness of the data, since this time we will not apply an intense check of the data as we did for the first volume. If in doubt about the file correctness, please contact the editors (Lucia Mona, Ulla Wandinger, Gelsomina Pappalardo, or Holger Linné)

Three new lidar stations, Belgrade, Lille and Saint Petersburg, and their status are presented. Respective information for the Belgrade and Lille stations is found in the presentations

- *Raman Lidar Belgrade* (Zoran Mijic, Institute of Physics, Belgrade)
- *Lille EARLINET station* (Philippe Goloub, Thierry Podvin, LOA)

For the Saint Petersburg station, please refer to the presentation “*The first results of atmosphere lidar sounding in St. Petersburg*” of the technical session.

Task 2.2 Quality assurance

Volker Freudenthaler gives an overview of the internal quality assurance procedures implemented for the ACTRIS lidar systems in the presentation

- *Internal quality checks* (Volker Freudenthaler, LMU),

where he also reports the status of the 3rd round of submissions and reminds the due date for the deliverable corresponding to the 4th round (January 2015).

Adolfo Comerón points out that detailed documentation of the internal quality tests can be freely accessed on the ACTRIS website at http://www.actris.net/Portals/97/Publications/quality%20standards/lidar/QA-InternalCheckups_version_121017b.pdf. He suggests that an automated procedure be implemented to update this documentation whenever new versions are available on the password-protected source page hosted in a University of Munich server.

Task 2.3. Task 2.3 Improvement of lidar techniques and data analysis for aerosol characterization

Giuseppe D’Amico gives an overview of the lidar Single Calculus Chain (SCC) and of the extended set of products (particle linear depolarization ratio, automatic layer detection, cloud masking) and features (web graphic interface). Details can be found in the presentation

- *Task 2.3: Improvement of lidar techniques and data analysis for aerosol characterization* (Giuseppe D’Amico, CNR-IMAA; Holger Baars, TROPOS; Ina Mattis, DWD; Ioannis Binietoglou, INOE; Volker Freudenthaler, LMU)

The advantages and drawbacks of non-physical-based (morphological) and physical-based thresholds for cloud masking are discussed. Basics and preliminary results are presented of a pattern-recognition K-nearest-neighbours (KNN) algorithm for cloud masking implemented in the SCC and still in experimental phase. Ed Eloranta makes the case for physically-based approaches on grounds that they are not instrument-dependent.

Giuseppe D'Amico presents ideas for the implementation of quality assurance tests in the SCC, outlined in the presentation

- *Ideas for the implementation of the quality assurance tests in the SCC* (Giuseppe D'Amico, IMAA-CNR; Volker Freudenthaler, LMU; Holger Baars, TROPOS; Ina Mattis, DWD)

In the discussion Ed Eloranta warns against biasing results by rejecting negative values in atmospheric optical coefficients. Open issues are criteria for rejecting data and how “bad” results from internal checkup tests (in particular from telecover) should be handled.

Task 2.1. Exchange of expertise

Technical session

Practical problems and solutions, as well as new system developments and upgrades are discussed around the following presentations:

- *Software technique for automatic lidar measurements management* (Patrick Fréville, OPGC)

A state-machine-based automated control is presented to increase the longevity of laser optical subsystems and the time between maintenance actions. Ed Eloranta warns against thermal stability problems if not sufficient time is allowed when the laser is switched on again after a stop.

- *The first results of atmosphere lidar sounding in Saint Petersburg* (Irina Melnikova, Dmitry Samulenkov, Maxim Sapunov, Vladislav Donchenko, Saint Peterburg State University)

The status of the new EARLINET Saint Petersburg station, as well as its details, first results and additional equipment at the station, are presented.

- *Three wavelength lidar on combined Cu&Au vapor laser (at 510.6, 578.2 and 627.8 nm) for atmospheric studies* (Ivan Grigorov, Dimitar Stoyanov, IE-BAS)

The upgrade of the EARLINET Sofia station with the addition of a Cu&Au vapour laser and its associated elastic channels is presented.

- *IPSL High Performance Lidar IPRAL deployed at SIRTAs observatory: technical challenges, development status, and algorithms* (Christophe Pietras, SIRTAs)

The new 3+2+1+depolarization at 355 nm system, to be operative at SIRTAs in 2015, is presented.

- *First telecover tests* (Ina Mattis, DWD; presented by Frank Wagner)

An example of the telecover test applied to a CHM15k Nimbus ceilometer is shown.

- *Calibration of ceilometers* (Frank Wagner, DWD; Maxime Hervo, MeteoSwiss; Ina Mattis, DWD; Thomas Kanitz, S. Bohlmann, H. Baars, TROPOS)

Several methods to determine the instrument constant and keep track of its fluctuations are discussed and tested.

GALION session

In this interactive session, guest experts from GALION networks and contributing stations presented progress on their systems and networking activities. Details can be found in the presentations:

- *High Spectral Resolution Lidar Measurements of Atmospheric Extinction* (Edwin Eloranta, University of Wisconsin at Madison)

An overview is given of the operating principles of high spectral resolution lidar, and of the development, deployable, mobile and airborne systems built by the group of University of Wisconsin. Details of the construction and results of the development system at the Madison GALION contributing station are discussed.

- *Operating an autonomous LIDAR network across Canada: challenges and successes* (Kevin Strawbridge, Environment Canada)

Characteristics and results from the 2+1+1 δ autonomous systems of CORALnet and details of the tropospheric O₃ / 3+2+1 δ aerosol system under development at Environment Canada are presented.

- *Current status of the Asian Dust and aerosol lidar observation network (AD-NET)* (Nobuo Sugimoto, Tomoaki Nishizawa, Atsushi Shimizu, Ichiro Matsui, Yoshitaka Jin, NIES, Japan; presented by Tomoaki Nishizawa)

The geographical extent (Japan, China, Mongolia and Thailand) of AD-Net, the characteristics of its lidars, and results derived from their operation are presented, as well as the evolution towards more sophisticated instruments, the connections with the EarthCARE mission and the assimilation of data into models.

The next presentations provide the historical perspective, the current status, and the progress of the Latin American aerosol lidar network LALINET / ALINE:

- *ALINE-LALINET: Preparing for the next stratospheric volcanic eruption. GOAC: Status and perspectives* (Juan Carlos Antuña, GOA Camagüey, Cuba)

The possible role of LALINET in case of a volcanic eruption injecting ashes in the stratosphere, as well as the history, status and perspectives of the Camagüey lidar station are discussed.

- *LALINET activities 2013-2014* (Eduardo Landulfo, Fábio Lopes, IPEN, Brazil)

The current status of the network infrastructure, scientific drives and outreach, future expansion and further steps for the network consolidation are presented.

- *The first ALINE intercomparison exercise on lidar inversion algorithms: towards a data processing standard* (Henrique Barbosa, University of São Paulo, and other LALINET members)

Results are reported of the intercomparison of algorithms from different LALINET groups working on data acquired in a campaign involving 4 lidars measuring at different locations and on synthetic data used in EARLINET for algorithm intercomparison. The need is recognized for quality checks on the instruments, as well as on the algorithms. Volker Freudenthaler reminds the availability of the documentation he has developed for the internal quality checks.

The two following presentations report the characteristics of the LALINET lidar stations of Medellín (Colombia) and Concepción (Chile), co-located instruments, examples of results from their operation and collaborations within and outside LALINET.

- *LALINET Medellín Station, Colombia: Overview of the aerosol remote sensing activities* (Alvaro Bastidas, Colombia National University at Medellín)

- *Tropospheric aerosol observations at newest and southern Pacific ALINE station* (Elena Montilla, CEFOP-UdeC, Chile)

The aerosol lidar activities and developments carried out in Argentina by CEILAP-CITEDEF- CONICET within LALINET and in collaboration with other organizations are presented in

- *Lidars for Aerosol Research in Argentina: Role of the existing aerosol lidar network on the creation of the regional atmospheric environmental risk management system* (Pablo Ristori, Lidia Otero, Sebastián Papandrea, Eduardo Quel, Lucas Bali, CEILAP- CITEDEF- CONICET, Argentina)

The session closes with a presentation of the worldwide Micro-Pulse Lidar Network, including products, instruments, result examples, validation, planned developments and prospects:

- *The NASA Micro-Pulse Lidar Network (MPLNET)* (Judd Welton, NASA GSFC)

In the general discussion, the need to promote lidar technology and to reach areas still uncovered by GALION federated networks and stations is stressed. GALION working groups should also be reactivated by promoting telecon meetings or small working group meetings. Gelsomina Pappalardo will take care of updating the GALION website.

Ed Eloranta draws the attention to activities carried out at NCAR (contact person: Scott Spuler).

The list of EARLINET members linking with other networks is reviewed: Ulla Wandinger is acting as contact with AD-Net, while Giuseppe d'Amico and Volker Freudenthaler are doing it with LALINET. In this respect, Volker Freudenthaler suggests implementing remote seminars and telecons to intensify the link with LALINET.

WP2-WP20 scientific presentations from EARLINET-ACTRIS session

In this session scientific results fostered by ACTRIS WP2 and WP20 work packages are discussed around the following presentations:

- *EARLINET: long-term observations of aerosol profiles on continental scale* (Lucia Mona)
- *Dust: a catalyst for new ideas and research. The Cyprus case* (Rodanthi-Elisavet Mamouri, Argyro Nisantzi, Diofantos Hadjimitsis, CUT; Albert Ansmann, TROPOS)
- *Experimental assessment of the lidar polarizing sensitivity in aerosol typing studies* (Livio Belegante, INOE; Juan Antonio Bravo-Aranda, IISTA-CEAMA-UGR; Volker Freudenthaler, LMU; Doina Nicolae, Anca Nemuc, INOE; Lucas Alados-Arboledas, IISTA-CEAMA-UGR; Aldo Amodeo, Giuseppe D'Amico, Gelsomina Pappalardo, CNR-IMAA; Ronny Engelmann, Holger Baars, Ulla Wandinger, TROPOS; Alexandros Papayannis, Panos Kokkalis, NTUA; Sérgio N. Pereira, Cento de Geofísica de Évora)
- *Preliminary results for aerosol typing using artificial neural network* (Doina Nicolae, Camelia Talianu, Jeni Vasilescu, INOE)

- *Application of lidar depolarization for studying mineral dust entrainment in the planetary boundary layer* (J.A. Bravo-Aranda, G. Titos, M. J. Granados-Muñoz, J. L. Guerrero-Rascado, IISTA-CEAMA-UGR; F. Navas-Guzmán, IISTA-CEAMA-UGR-University of Bern; A. Valenzuela, H. Lyamani, F. J. Olmo, IISTA-CEAMA-UGR; J. Andrey, INTA; L. Alados-Arboledas, IISTA-CEAMA-UGR)
- *PBL height retrieval over Barcelona from EARLINET and Micro-Pulse lidars, and WRF mesoscale meteorological model* (Robert Banks, José María Baldasano, BSC; Francesc Rocadenbosch, Michaël Sicard, Adolfo Comerón, UPC)
- *Aerosol fluxes in the cloudy PBL from synergetic measurements of an aerosol lidar and a Doppler lidar* (A. Argyrouli, NTUA; M. Komppula, FMI; K. Bougiatioti, S. Solomos, A. Papayannis, P. Kokkalis, G. Tsaknakis, NTUA; presented by Mikka Kompula)

Session on results from station, outreach and collaboration

In this session activities resulting from the outreach of ACTRIS WP2 and WP20 work packages are presented:

- *Pre-operational lidar network in Italy* (Giuseppe D'Amico, Aldo Amodeo, Gelsomina Pappalardo, CNR-IMAA)

A pre-operational network of Raman lidars to track Saharan dust events, volcanic activity and forest fires, including some EARLINET stations, is presented.

- *Planning for a remote EARLINET station in Crete: first PollyXT measurements in the framework of the CHARADMexp ESA campaign* (Vassilis Amiridis, Eleni Marinou, Alexandra Tsekeri, Panos Kokkalis, NOA; Ronny Engelmann, Holger Baars, Ulla Wandinger, TROPOS; Nikos Mihalopoulos, NOA)

The results of a campaign focusing on the characterization of marine and marine-dust mixture aerosols at the Finokalia site, involving a PollyXT lidar like the one that will be installed permanently at the site in the summer 2015 and likely join EARLINET, are presented.

- *Optical properties of free tropospheric aerosols retrieved from data of the multi-instrumental site CO-PDD (Clermont-Ferrand, France)* (Aurélien Chauvigné, Karine Sellegri, OPGC; Maxime Hervo, OPGC-MeteoSwiss; Nadège Montoux, Patrick Fréville, OPGC; Philippe Goloub, LOA)

Results combining lidar and sunphotometer data from the Cézeaux campus in Clermont-Ferrand and in-situ data from Puy de Dôme are presented.

- *The MeteoSwiss LIDAR and ceilometer aerosol and water vapor measurements at Payerne and at the Kleine Scheidegg* (G. Martucci, Y. Poltera, A. Haeefe, M. Hervo, MeteoSwiss)
- *EPROFILE and TOPROF: Projects towards an operational European ceilometer network – Current Status* (Frank Wagner, Ina Mattis, DWD; the EPROFILE team and the TOPROF team)

The status of TOPROF, backed by COST Action ES1303, and EUMETNET's EPROFILE networks, both addressing, among other activities, ceilometer networks, is reviewed.

- *Last results and improvements in LEOSPHERE LIDAR product range* (Mélody Lardier-Renaudier, Laurent Sauvage, LEOSPHERE)

Latest products and results on Raman and Doppler lidars are presented by ACTRIS associated partner SME.

WP20 JRA1: LIDAR AND SUNPHOTOMETER – IMPROVED INSTRUMENTS, INTEGRATED OBSERVATIONS AND COMBINED ALGORITHMS

WP20 leader, Ulla Wandinger, reviews the work package activities and deliverables since the last workshop, and the achievements of its tasks. In particular she invites all the interested stations to contribute to the database of task 20.2 (Integrated observation strategies) at http://lidar.space.noa.gr/lidar_db/. Details can be found in the presentation

- *WP20-JRA 1: Lidar and sunphotometer. Improved instruments, integrated observations and combined algorithms* (Ulla Wandinger, TROPOS)

Task 20.1. Improved daytime capabilities of lidar instruments

Fabio Madonna reviews the goals and achievements of the task. In particular he discusses specific techniques to implement observations using the pure rotational Raman spectrum, concluding that probably configurations using two grating spectrometers are the best option, followed by configurations using a grating spectrometer and razor edge filter. Details can be found in the presentation

- *Daytime lidar capabilities: possible steps towards its improvement within the network* (Fabio Madonna, Aldo Amodeo, CNR-IMAA; Ulla Wandinger, TROPOS; Ilya Serikov, MPI)

Task 20.2. Integrated observation strategies

Results and applications of the LIRIC and GARRLiC packages combining lidar and sunphotometer measurements are presented by several stations contributing to the task:

- *Application of GARRLiC on dust and dust/marine cases* (Alexandra Tsekeri, NOA; Anton Lopatin, IPNASB; Eleni Marinou, NOA; Ronny Engelmann, Holger Baars, TROPOS; Vassilis Amiridis, Stavros Solomos, NOA; Ulla Wandinger, TROPOS; Oleg Dubovik, LOA)

Results obtained at the Finokalia site are presented. In the discussion it is suggested that some inconsistencies observed could arise from the presence of haze instead of the assumed marine aerosol.

- *The potential of LIRIC to evaluate aerosol concentration profiles from an air quality model* (Nikos Siomos, Maria Filioglou, Natasa Poupkou, Natalia Liora, Spyros Dimopoulos, Dimitris Melas, Dimitris Balis, AUTH; Anatoli Chaikovsky, IPNASB)
- *Evaluation of dust transport models on a continental scale using LIRIC algorithm* (Ioannis Biniotoglou, INOE; S. Basart, D. Nicolae, P. Burlizzi, A. Comerón, M. Sicard, C. Muñoz, A. Rodriguez, A. Papayannis, A. Argyrouli, P. Kokkalis, D. Balis, N. Siomos, M. Filioglou, L. A. Arboledas, M. J. Granados-Munos, J. L. Guerrero-Rascado, J. A. Bravo-Aranda, A. Chaikovsky, S. N. Pereira, V. Carrasco, M. R. Perrone, M. Posyniak, J. Wagner, G. Pappalardo, G. D'Amico, E. Terradellas, J. M. Baldasano, S. Nikcovic)

A statistical comparison is presented between LIRIC retrievals from ten EARLINET / AERONET stations scattered over Europe and four dust forecast models (BSC-DREAM8bV2, NMMB/BSC-Dust, DREAMABOL, and DREAM8-NMME-MACC) included in WMO's SDS-WAS. It is concluded that the vertical dust structure is well represented in all models and that these tend to perform better for strong transport events. Nevertheless more data are needed for reliable results and an invitation is made to provide more data to the task 20.2 database.

- *Analysis of microphysical properties at EARLINET stations: spatial and temporal evolution during summer 2012 operational exercise* (María José Granados-Muñoz, Francisco Navas-Guzmán, Juan Luis Guerrero-Rascado, José Antonio Bravo-Aranda, IISTA-CEAMA-UGR; I. Biniotoglou, S. N. Pereira, M. Sicard, L. Belegante, D. Nicolae, A. Papayannis, G. D'Amico, K. Schepanski, J.M. Baldasano, U. Wandinger, A. Chaikovsky, G. Pappalardo, C. Muñoz, A. Rodríguez, A. Comerón and L. Alados-Arboledas)

LIRIC is used to retrieve profiles of aerosol fine and coarse (spherical and spheroid in many cases) modes. Somewhat concurrently with the previous presentation, it is found that models tend to underestimate the aerosol load.

- *Separation of aerosol fine- and coarse-mode radiative properties: Effect on the mineral dust longwave, direct radiative forcing* (Michaël Sicard, Santi Bertolín, Constantino Muñoz, Alejandro Rodríguez, Francesc Rocadenbosch, Adolfo Comerón)

More details can be found in the Geophysical Research Letters publication with doi 10.1002/2014GL060946.

- *Lidar ratios and aerosol microphysical properties by multi wavelength lidar and sun photometer measurements over the Central Mediterranean* (Maria Rita Perrone, P. Burlizzi, F. De Tomasi, Università del Salento)

The methodology presented can be used for large databases, but it is only suited for non-mixed types of aerosol.

- *Vertical profiles of aerosol optical and mass properties in the frame of the HYGRA_CD Campaign: A case study* (A. Papayannis, P. Kokkalis, A. Argyrouli, NTUA; G. Tsaknakis, S. Solomos, L. Illic, S. Nicovic, S. Kazantzis, E. Remoundaki, and V. Amiridis)

It is found that the agreement between the Serbian DREAM model and LIRIC-based mass retrievals is quite satisfactory.

- *Vertical profiling of mineral dust microphysical properties using remote sensing and airborne in situ techniques* (María José Granados-Muñoz, J. L. Guerrero-Rascado, J. A. Bravo-Aranda, F. Navas-Guzmán, G. Titos, H. Lyamani, A. Valenzuela, A. Cazorla, F. J. Olmo, IISTA-CEAMA-UGR; M. Mallet, and L. Alados-Arboledas; presented by Juan Luis Guerrero-Rascado)

In the discussion it is pointed out that observed discrepancies between LIRIC-based results and airborne in-situ ones may be due to the dry measurement condition and to the cut-off size of the airborne optical particle counter.

- *Retrieval of particle microphysics from multiwavelength lidar measurements during forest fire smoke episode* (I. Veselovskii, Physics Instrumentation Center; D. N. Whiteman, NASA GSFC; M. Korenskiy, A. Suvorina, A. Kolgotin, A.

Lyapustin, Physics Instrumentation Center; Y. Wang, M. Chin, H. Bian, D. Pérez-Ramírez, NASA GSFC)

The case is made for reliable measurements of the extinction coefficients at 532 nm and 355 nm for the microphysical inversion, and for using the pure rotational Raman spectrum to improve the extinction coefficient measurements at 532 nm. Manufacturer ALLUXA can provide suitable interference filters to separate the rotational Raman spectrum from the elastic return at 532 nm.

Task 20.3. Integrated retrieval schemes for aerosol microphysical properties

Anatoli Chaikovsky explains the structure of the LIRIC software and its latest features, with emphasis on the operation when Raman channels are available, including a practical demonstration showing the effects of noise and non-linearity. Details can be found in the presentation

- *Lidar-Radiometer Inversion Code (LIRIC): Developing of new modules and evaluation of the solution uncertainties* (Anatoli Chaikovsky, IPNASB; Oleg Dubovik, Tatsiana Lapyonak, Yan Grudo, LOA; Anton Lopatin, Sergei Denisov, Yana Karol, IPNASB)

Philippe Goloub reports on progress in the GARRLiC software, using as examples results obtained from lidar and sunphotometer data from the Lille station. For details, see the presentation

- *Use of GRASP/GARRLiC Advanced Aerosols Retrievals for the processing of multi and single wavelength LIDAR data. Application to Lille observations* (P. Goloub, V. Bovchaliuk, O. Dubovik, T. Podvin, LOA; A. Lopatin, IPNASB, T. Lapyonak, D. Tanré, L. Blarel, LOA; I.Vesselovsky, PIC; A. Mortier, MET Norway; B. Torres, C. Deroo, F. Ducos, D.Fuertes, LOA)

WP20 discussion

A call is made to LIRIC and GARRLiC users to provide feedback to the developers and to be aware of the current limitations of the algorithms.

Making use of depolarization information is identified as a need to distinguish different types of aerosol in the column. In this respect, LIRIC is already using this information and this capability is being implemented into GARRLiC.

MISCELLANEOUS

Doina Nicolae informs about the **MULTIPLY** project, carried out under contract for ESA by a consortium led by INOE, to develop and test an airborne $3\beta+2\alpha+3\delta$ high spectral resolution lidar.

Matthias Wiegner announces the “**Lidar and applications**” session convened by him, Doina Nicolae, Vassilis Amiridis and Rodanthi-Elisavet Mamouri at the EGU 2015 General Assembly (Vienna, 12-17 April 2015, <http://www.egu2015.eu>). The deadline for submitting abstracts (300 -500 words) is 7th of January 2015. Presentations from the ACTRIS / EARLINET community are most welcome. It is suggested that it can be combined with an EARLINET General Assembly organized as a splinter meeting.

Gelsomina Pappalardo announces that, although it is not mandatory by the contract, there will be a final ACTRIS General Assembly in March 2015 in Rome.

GENERAL CONCLUSIONS

WP2 and WP20 are progressing according to expectations and they have contributed significantly to ACTRIS integration, at least in what respects the aerosol part.

ACTRIS advanced lidars are contributing to ceilometer networks, acting as calibration facilities.

See also discussions and conclusions reported in these minutes for the different tasks and sessions.

ACKNOWLEDGEMENTS

GALION guests are thanked for their active participation in the workshop.

Thanks are given to Philippe Goloub, Anne Priem and the LOA team for the effort in organizing the workshop.

Adolfo Comerón expresses his acknowledgement for the task of Mrs. Teresa Pons and Mrs. Irene Jorge in helping to arrange the travel of guest participants.

AGREEMENTS AND ACTIONS

No.	Agreement	Task	Work packages involved
1	Users of LIRIC and GARRLiC to provide feedback to developers.	20.2	WP20

Table 1. Agreements table

No.	Action	Task	Work packages involved	Deadline
1	Perform 4th year mandatory quality check-up tests and forward results to Volker Freudenthaler (stations not having done so yet)	2.2.2	WP2	15 December 2014
2	Submit 2011 and 2012 data (checked for errors) to the EARLINET database	2.1	WP2	7 January 2015

Table 2. Actions table

List of participants

(the asterisk (*) identifies the participating GALION experts)

	Family name	First name	Email	Institution
1	Acheson	Karen	k.acheson@umail.ucc.ie	University College Cork,Ireland
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3	Abrahamsen	Malin	malin@andoyaspace.no	Andoya Space Center, Norway
4	Amiridis	Vassilis	vamoir@noa.gr	Foundation for Research and Technology, NOA,Athens,Greece
5	Ansmann	Albert	albert@tropos.de	Institute for Tropospheric Research, Leipzig,Germany
6	Antuña *	Juan Carlos	anadelia@caonao.cu	Meteorological Center of Camagüey, Cuba
7	Apituley	Arnoud	apituley@knmi.nl	KNMI, The Netherlands
8	Baldasano	Jose M.	jose.baldasano@upc.edu	UPC, Barcelona, Spain
9	Bali *	Juan Lucas	lucasbl3@yahoo.com.ar	CEILAP-CITEFA Argentina
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