Deliverable D7.2: Final Report on Access to AERONET-EUROPE Calibration Centre

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Comments	*This document acts as an update to the Intermediate Report on Access to AERONET-EUROPE Calibration Centre (D7.1) submitted on M24.* *The submission of the deliverable was delayed by a few months in order to include all data from the 3 sites.*

ACTRIS (www.actris.eu) is supported by the European Commission under the Horizon 2020 – Research and Innovation Framework Programme, H2020-INFRAIA-2014-2015, Grant Agreement number: 654109

Description of publicity

Permanent on line call is open at the ACTRIS/AERONET-Europe website. Advertising for AERONET-Europe Calibration facility is permanently published on the AERONET-USA website thus providing wide distribution since the website frequently accessed on a global scale.
Moreover, presentations, communications and posters presenting the infrastructure are made during workshops, conference (ESA workshops, etc. for example), during ACTRIS General Assemblies (Italy, 2016, Spain, 2017, Greece, 2018 and Germany, 2019) and several other conferences. NASA (Dr. Brent Holben) also redirects potential new users (in Europe at least) to AERONET-Europe facility. Websites of the three AERONET-Europe components advertise TNA offer. Link to ACTRIS website, brochure and poster are functional (http://loaphotons.univ-lille1.fr/ACTRIS/ ; http://www.aemet.izana.org/ ; http://goa.uva.es/).

Selection Procedure

After reception of submitted TNA proposals, proposals are sent by LOA by email to the selection panel for evaluation and approval. As some of the members of the selection panel are located in the USA, Canada, Switzerland, Spain and France, the selection procedure is therefore remotely performed. The selection of the proposal is based on four criteria 1) originality/scientific quality; 2) interest to the scientific community; 3) favourable geographical location of user site; and 4) available complementary instrumentation at the atmospheric station. Priority is also given to « new » users. In case of approval of the proposal, the user is informed by email and further information on user obligations and shipping instructions are given The choice of the relevant calibration facility (AE-LOA or AE-GOA) is made internally, depending on (i) the distance between the calibration centre and the user site, (ii) the instrument type, and (iii) weather conditions. Distinction must be made between first time and recurrent user. The calibration of reference instruments is provided at the Izaña platform (AE-IZA). The provision of access is made depending on the available capacity of the installations.

Selection panel: The members of the AERONET-Europe USP comprise the following international external experts: Stellios Kazadzis (WRC-Switzerland, PFR Network), Brent Holben (AERONET, USA/GSFC); Norman O'Neill (AERONET, Canada (AEROCAN)); Zhengqiang Li (IRSA/ CAS-China, SONET Network), and internal experts: Carlos Toledano (AERONET, UVA/GOA-Spain), Philippe Goloub (AERONET, LOA/CNRS-France). This list has been approved during the first meeting of the General Assembly.

Description of TNA

AERONET-Europe is supporting, mostly in Europe, long-term aerosol observation and monitoring efforts from a ground-based automatic sun/moon-photometer network. In particular, one of our objectives is that almost all relevant European AERONET sites will be covered by the facility. The activity is strongly contributing, at the European level, to several relevant integration/synergetic activities between LIDAR, photometer and in situ observation and with satellites and modelling. The main objectives are to provide calibration support to academic and private sectors. Most of the associated data being expected to contribute to AERONET network and to ACTRIS Data centre. To maximize the data quantity and quality, AERONET-Europe (WP7) is organizing to provide remote and physical trainings. Additional regular newsletters will be good communication vectors to disseminate information towards users. The calibration facility, partly supported through ACTRIS-2, is shaped/designed to support SMEs needs. CIMEL SME, as others, is benefiting from our infrastructure, expertise for network management, for instrument monitoring, for users training, feedback from the instrumentation in the field. Thanks to partnerships developed between academic research and industry within ACTRIS, a lunar photometer is expected to develop much more in the future and offer night-time observation capability. Additionally, our infrastructure aims at supporting the production of high quality AOD and radiances data requested by

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innovative software's solving inverse problems and being developed by CNRS and GRASP-SAS. The French and Spanish components of AERONET-Europe (WP7) are involved is several programs and projects (ESA, EUMETSAT) to secure the upgrade of the instrumentation and calibration facility, additionally to the dedicated national supports.

AERONET-Europe TNA activities (WP7)

AERONET-Europe has accepted a total of 401 TNA projects since the beginning of the project for a total quantity of 428 CAL provided, with the following breakdown for the entire duration of ACTRIS-2:

- - AE-LOA: 194 eligible projects, 205CAL provided
- - AE-GOA: 133 eligible projects, 137 CAL provided
- - AE-IZA: 74 eligible projects, 86 CAL provided

Scientific output

During the last 16 months, the activity of this infrastructure was good and yields, after 48 months, a slightly larger users number than the expected value. In term of access units, we provided 428 ua. Most of the users are recurrent users. However, there were few new users applying for calibration. As mentioned previously, the infrastructure is now offering additional lunar-calibration facility. The calibration methodologies and organization of this calibration at a network scale is a quite positive result for the company that produces and markets this instruments, since all new users/customers have now a solution for calibration and processing. The new CIMEL photometer, particularly with its new lunar capability is currently involved in various field campaigns, as for example, INTERACT II comparing various Lidar technologies and among them Raman LiDAR mostly used during night. Mid- 2016, close to 200 calitoo handheld sunphotometers have been manufactured, sold and distributed in and out of Europe. Innovation around GRASP activities that include both satellite and ground-based data processing and applications yields to creation of GRASP- SAS start up (http://www.grasp-open.com), in France.

All publications referring to AERONET-Europe are part of Open air database. All the ACTRIS related publications are listed on the ACTRIS website. During reporting period 3, 52 papers, including AERONET data corresponding to sites calibrated by AERONET Europe, have been published in good journal (ACP, AMT, ATM. ENV, APP. OPTICS, …). A short selection of 6 highlights is summarized below.

- **Inverse modelling applied to PARASOL data to derive aerosol emissions**

A new inverse modelling approach has been designed and applied to aerosol data retrieved from PARASOL. Analysis of the resulting retrieved emissions indicates 1.8 times overestimation of the prior Desert Dust on-line mobilization and entrainment model. For total BC and OC, the retrieved emissions show a significant increase of 209.9 %–271.8 % in comparison to the prior carbonaceous aerosol emissions. The model posterior simulation with retrieved emissions shows good agreement with both the AOD and AAOD PARASOL/GRASP products used in the inversion. The fidelity of the results is evaluated by comparison of posterior simulations with measurements from AERONET that are completely independent measurements and more temporally frequent than PARASOL observations *(Chen et al., ACP 2018).*

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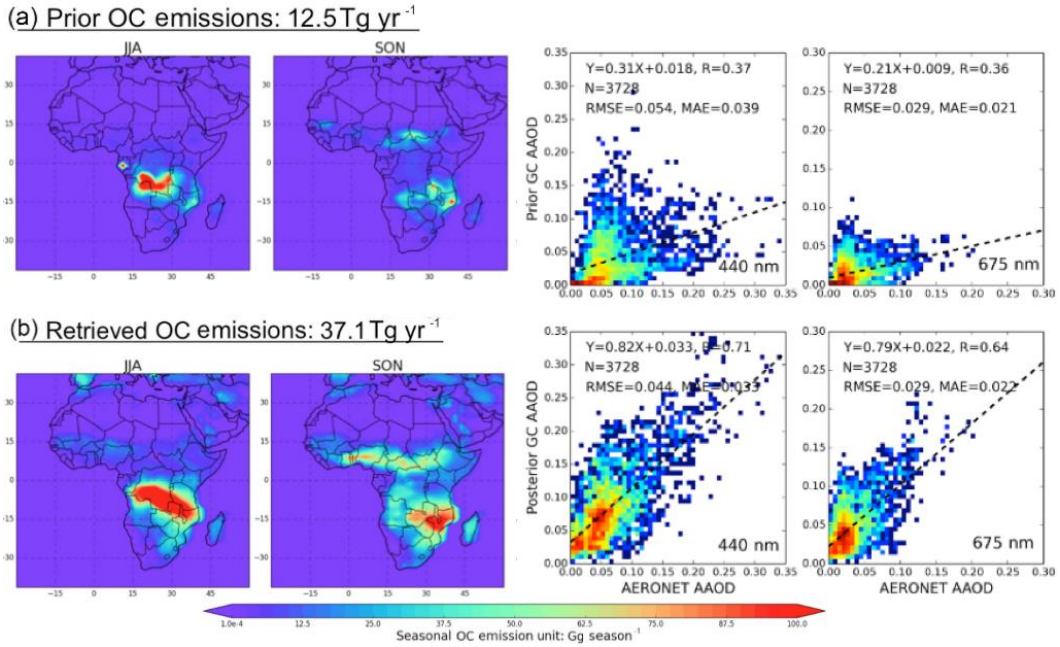

*Figure 1: **Left**: Spatial distribution of seasonal OC emissions:(a) prior model OC emissions using GFED3 and Bond inventories and (b) retrieved OC emissions. **Right**: Density scatter plots of 1-year GEOS-Chem-simulated AAOD using the prior emissions (a) or the posterior emissions (b) versus AERONET-measured AOD at 440, 675, 870 and 1020 nm at 28 sites. The AOD data were aggregated into 80 bins for both the x and y directions spanning the range from 0.0 to 3.5 for AOD at four wavelengths. The number of matched pairs (N), correlation coefficient (R), root-mean-square error (RMSE) and mean absolute error (MAE) are shown on each panel.*

- **Extreme aerosol event in the stratosphere**

Long-range-transported Canadian smoke layers in the stratosphere over northern France were detected by lidar and photometer systems operated at Lille AERONET/EARLINET/ACTRIS station in August 2017. The peaked optical depth of the stratospheric smoke layer exceeds 0.20 at 532 nm, which is comparable with the simultaneous tropospheric aerosol optical depth. The measurements of satellite sensors revealed that the observed stratospheric smoke plumes were trans- ported from Canadian wildfires after being lofted by strong pyro-cumulonimbus *(Hu et al., Atmos. Chem. Phys., 19, 1173–1193, 2019)*

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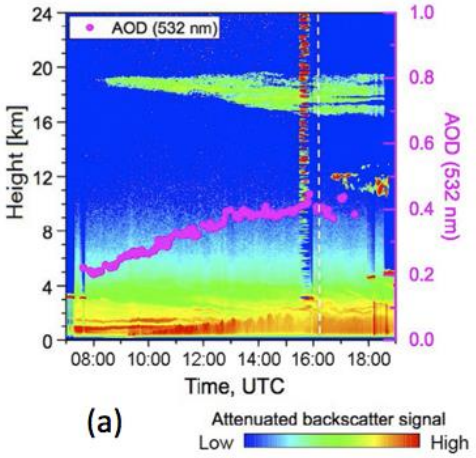

(b)

Lidar system	LILAS, Lille		
Date	24 August	29 August	
Time (UTC)	22:00–00:30	13:00–16:00	16:00–18:00
ΔL (km)	1.0	3.0	3.4
$\bar{\alpha}_{355}$ (km^{-1})	0.12	0.06	0.06
$\bar{\alpha}_{532}$ (km^{-1})	0.14	0.06	0.06
LR_{355} (sr)	35 ± 6	45 ± 9	41 ± 7
LR_{532} (sr)	54 ± 9	56 ± 12	54 ± 9
$PLDR_{355}$	0.23 ± 0.03	0.24 ± 0.04	0.24 ± 0.04
$PLDR_{532}$	0.20 ± 0.03	0.18 ± 0.03	0.19 ± 0.03
$PLDR_{1064}$	0.05 ± 0.01	0.04 ± 0.01	0.05 ± 0.01

Figure 2: (a) Lidar range-corrected signal and columnar AOD from the AERONET sun photometer at 532 nm on 29 August 2017 from LILAS in Lille. (b) Retrieved lidar ratios (LRs), particle linear depolarization ratios (PLDRs), layer thickness, and mean extinction coefficients from multi-wavelength lidar systems LILAS in Lille. $\bar{\alpha}$ is the mean extinction coefficient in the stratospheric smoke layer. ΔL is the thickness of the stratospheric smoke layer. The values after "±" represent the errors.

- **Variability of aerosol across the Atlantic Ocean as seen by an automatic mobile photometer**

Automatic Mobile Shipborne CE318-T measurements were conducted during two trans-Atlantic RV Polarstern cruises together with collocated PollyXT lidar and independent MICROTOPS II. The shipborne CE318-T has a special design to avoid contamination of sea-spray and achieved the goal of automatic measurement over the ocean during the entire 4-5 weeks periods of the two cruises. Good agreement was found between the different measurements. For nighttime measurements, deviations between the 532 nm AOD observed with PollyXT and the shipborne CE318-T was found to be less than 10%. *(Yin et al., AMT, 2019)*

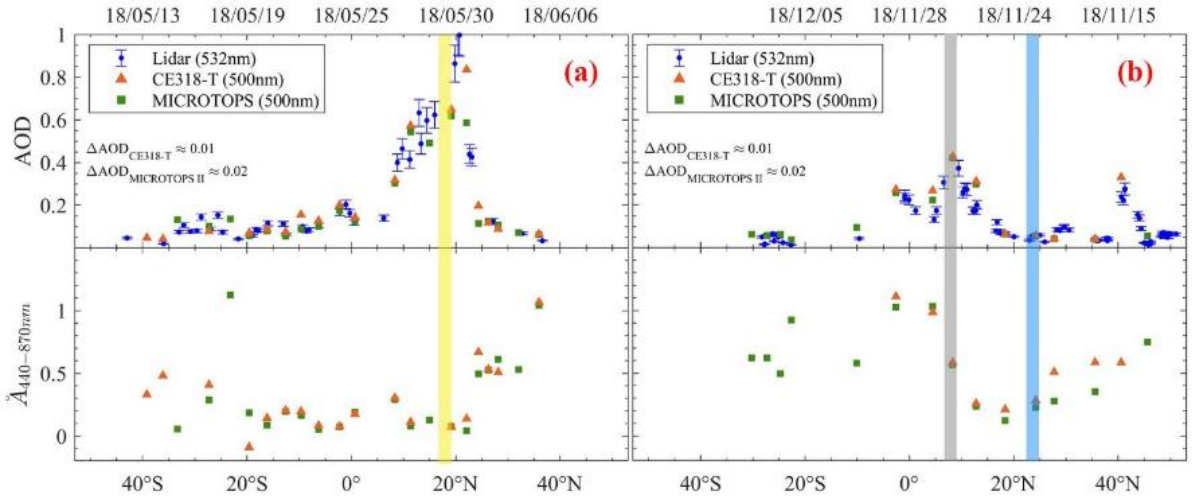

Figure 3: a) Latitudinal distribution of daily mean AOD measured with PollyXT lidar, MICROTOPS II and shipborne CE318-T. Panel (a) and (b) show the results from PS113 and PS116 campaigns, respectively. The three colored vertical strips indicate the three cases used in Sect. 3.1(yellow: Saharan dust, grey: diurnal

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measurements; blue pure marine condition. Uncertainty in shipborne CE318-T and MICROTOPS II observations are referred to the analysis of Smirnov et al. (2009) and Smirnov et al. (2011).

- **Aerosol Optical Depth inter-comparison campaign**

Results of the inter-comparison campaign reported in Kazadzis et al., 2018 (ACP); experienced an increase in both the number of instruments (total of 30) and international participating institutes (12 countries). In addition, analysis at four different wavelengths was performed for the first time. The CIMEL/AERONET, PFR/GAW sun photometers showed very good agreement.

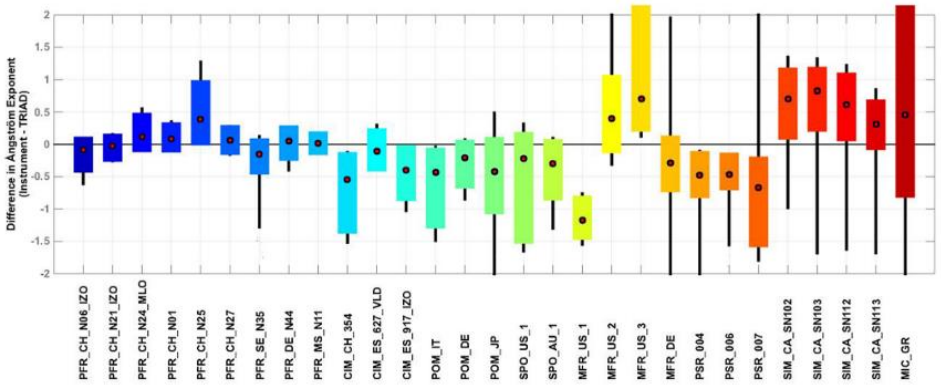

Figure 4: Difference in the Ångström exponent between each instrument and the WORCC triad. The boxes represent the 10th and 90thpercentiles, while the black lines represent the minimum and maximum values of the distribution excluding the outliers. Outliers (gray dots) are considered to be values outside the 10th and 90th percentiles by 4 times the width of the distribution at a 10 % level. Box colors are only used to differentiate between instruments

- **High altitude site**

This analysis shows that the high-altitude stations Mauna Loa and Izaña meet the GAW-PFR and AERONET network requirements in terms of uncertainty, i.e., 0.2–0.5 % in calibration factors or 0.002–0.005 in AOD (for airmass=1); *(Toledano, ACP, 2018)*

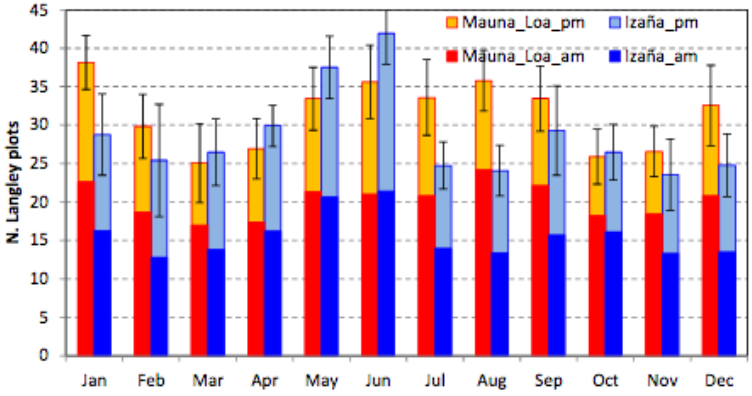

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Figure 5: Mean number of suitable Langley calibrations per month at Mauna Loa and Izaña based on GAW-PFR and AERONET data. Bars indicate±1 standard deviation for each month due to year-to-year variability. Morning ("am") and afternoon ("pm") Langley plot calibrations are given separately. The long-term operation and maintenance of reference instruments at these unique locations is shown to be key in accurate aerosol monitoring worldwide.

- **Evaluation of GARRLIC/GRASP aerosol profiles**

To validate the GARRLiC / GRASP algorithm, several studies and field campaign have been organized during ACTRIS-2, real measurements are inverted and the retrievals are compared to the results obtained from other independent methods, like LiDAR stand-alone retrieval with Single Calculus Chain (SCC), and various in situ observations. The following figure (a) and (b), extracted from Hu et al., 2018 (Ph. D Dissertation, December 2018), show aerosols and extinction and LIDAR ratio profiles retrieved/measured by this two independent methods. The Level 1 data inverted have been acquired during SHADOW-2 campaign in Senegal (2015/2016). Figure (c) show comparison of extinction profiles retrieved by GARRLIC and directly measured by the airborne photometer PLASMA developed by CNRS/LOA.

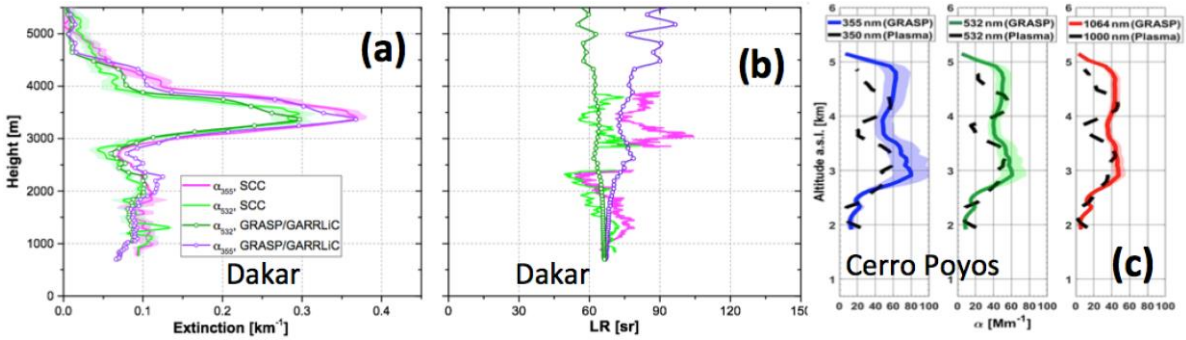

Figure 6: (a) et (b) comparison between GARRLIC retrievals and "3+2" inversion of the Single Calculus Chain (SCC) from EARLINET during SHADOW-2 campaign (Hu Q., Advanced characterization of aerosol properties through the combination of active/passive ground-based remote sensing and in situ measurements, 2018, University of Lille/ESA-IDEAS program); (c) Comparison between GARRLIC and airborne PLASMA sunphotometer profiles (PLASMA)- CHARMEX Campaign (Benavent et al., 2017, AMT).

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Overview of TNA projects in the past 24 months

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
AELOA_RO_TIM1-18	Romanian Atmospheric research 3D Observatory (RADO) of Timisoara	RP3	1	Starting with 2011, March, the Timisoara sun photometry station is part of the AERONET network and is located at the Politehnica University www.upt.ro, in the location of the Faculty for Mechanical Engineering (Bv M Viteazu 1, Timisoara), on the roof. of the tallest building (45.74N; 21.22E). The Instrument type is CE 318N EB S9. The sun photometer number in the network AERONET is 645. ! The measurements from sun photometer were used in research and educational activities. Until now, many valuable articles published in prestigious journals (e.g. Atmospheric Research, Energy Conversion and Management, etc.) have been written, a PhD thesis was fulfilled and other two are on going! Students from license cycle (Mechanical and Electric and Chemical engineers, but not only) and master level of Renewable Resources Engineering have access to the sun photometer data and currently use the data base for reporting and exercising or student projects,.! The instrument is also a member of the Romanian Atmospheric Research 3D Observatory (RADO) is a state-of-the-art facility at national level (and so far unique in SE Europe), dedicated to research and monitoring of atmospheric processes and compounds in the Planetary Boundary Layer and Free Troposphere.! Also, we have an accredited laboratory in accordance with standard ISO CEI 17025:2005, and it is fully equipped with the infrastructure required for air quality measurements, as well as highly qualified personnel. The mobile laboratory ensures the monitoring of CO, NO, NO2, O3, PM, THC, NMHC, CH4 and SO2 concentration, values required for a correct interpretation of pollution episodes (e.g. a project with the Timisoara City Hall, main industrial industrial entities from the western part of Romania such as Smithfiels, TRW, Continental, CONTITECH, etc.). The data offered by the sun fotometer is completing / enlarging our research and measurement possibility in this field for sure, and	Intercalibration

[1] CAL: calibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				open for sure new correlation possibilities for the local, but not only, state of the air quality and possibility to use the solar energy, despite the polluting episodes occurring. The fotometer is included also in the ERRIS platform of research structures - http://erris.gov.ro/main/index.php?- available and ready to join projects and cooperation offers. As domain we indicate: Earth Sciences & Environment.	
AELOA_PL_RAC1-18	Calibration of CIMEL photometer from Raciborz station.	RP3	1	Recalibration as requested by AERONET.	Intercalibration
AELOA_IT_NAP1-18	Multiwavelength Raman Lidar and Sunphotometer to characterize aerosol layers in an urban area of the Mediterranean basin	RP3	1	The CNISM lidar station (Naples southern Italy, 40.838◦ N, 14.183◦ E, 118m a. s. l.) is equipped with a multiwavelenght Raman lidar system operating at 355, 532 and 1064 nm within EARLINET since 2000. It is involved in the study of environmental subject as air quality, pollutant transport and climatic change on a large scale. Thanks to its central location in the Mediterranean basin, the Naples lidar station is an optimal site for study optical and microphysical properties of different aerosols types both of natural and anthropogenic origin, also related to long-range transport phenomena. In particular, the city of Naples overlooks the sea and the transition between night and day circulation is typical of the sea-breeze circulation developing in the morning hours and related to the orography of surrounding area. As the sea breeze develops and propagates inland, aerosols are carried aloft and distinct aerosol layers develop. Due to the complexity of the aerosol content in this area, a characterization of the aerosol is particularly useful. The co-location of multiwavelength Raman lidar and Sun-photometer instruments is a promising approach to study aerosol optical and microphysical properties in the atmospheric layers and to have a more accurate information on atmospheric dynamics. The Naples EARLINET station was recently upgrated with instruments operative h-24: Elastic Lidar, Wind Lidar, Polar nephelometer, OPC. Moreover,available instrumentation is : Differential Mobility Analyzer(sizerange1-100nm and 3-1000nm), Electrical Low Pressure Impactor (6nn – 10 micron), Sequential Station for Particulate Matter, Scanning	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				electron microscopy with energy dispersive X-ray spectroscopy, Atomic Force Microscope, Raman spectrometer, Dynamic Light Scattering, UV-visible spectrophotometer.	
AELOA_BI_BUJ1-18	Advanced exploitation of Ground-based measurements for Atmospheric Chemistry and Climate applications – II (AGACC II), Bujumbura 2013	RP3	1	This study of African emissions, is mainly important because satellite observations indicate large uncertainties on these emissions and therefore a critical need exists for additional measurements, in particular from the ground. We therefore plan to install a MAXDOAS and CIMEL instruments in Bujumbura (Burundi), for the measurement of aerosol and several ozone precursors like glyoxal (OCHCHO), formaldehyde, and tropospheric nitrogen dioxide (NO2). The goal project is therefore to reduce a number of uncertainties regarding the direct contribution of the aerosol to the radiative forcing, by investigating sources of atmospheric aerosol, their chemical, physical and optical properties, and their impact on the Earth radiation budget. The project will also address the distinction between natural and anthropogenic aerosol. Using also the observations at Ile de La Réunion and Lagrangian dispersion modeling (FLEXPART), we will also study the transport from Africa to the Indian Ocean.	Intercalibration
AELOA_KG_IAO1-18	Climatic Effects of Central Asia Microscale Aerosols	RP3	1	LOA is collaborating for almost 5 years with KRSU, Bishkek, Kyrgyz-Russian Slavic University. The main goal of the research program is to develop methodology to study Climatic Effects of Central Asia Microscale Aerosols. Sunphotometer and Lidar observations are being performed. AERONET products will be used to analyse trends and variability of aerosol with support of international cooperation in the framework ITSC, Russia	Intercalibration
AELOA_ES_LAP1-18	Cherenkov Telescope Array North	RP3	1	Cherenkov Telescope Array (in construction) will be the world largest and most sensitive gamma ray observatory, consists of two parts - North and South. CTA will observe Cherenkov radiation emitted by secondary particles (air shower) after first interaction of incident gamma ray photon in upper layers of the atmosphere which immediate properties affects the shower development in a significant way. Therefore, atmospheric characterization of selected sites is extremely important for the project and while the CTA is build, atmospheric conditions will have to be monitored during the observations continuously.	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				Although the photometer cannot be used for aerosol measurements at the pointing directions of the CTA, it can be effectively used for cross-calibration of other instruments, such FRAM telescope, and a long term monitoring of aerosol concentration. Institute of Physics of AS CR participates on CTA telescope calibration and atmospheric characterization of both sites. Our institute operates one CE318-T photometer at the CTA south site since 2016 (integrated in AERONET) and the new photometer is intended to be installed at CTA north site at Roque de los Muchachos (La Palma).	
AELOA_ UK_WAT1-18	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at Watnall will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air quality or influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events.	Intercalibration
AELOA_RO_IAS1-18	Atmosphere Optics, Spectroscopy and Lasers Laboratory - LOASL	RP3	1	The main objective of the Atmosphere Optics, Spectroscopy and Lasers Laboratory - Iasi_LOASL station is to study the behaviour of various atmospheric phenomena by means fast laser optical emission spectroscopy techniques.	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				The goal is to extend the capability of ROSA and ESA scientific missions into the North-Eastern cross-border of pan European research. Our infrastructure, based on space-time resolved optical emissions spectroscopy techniques, will follow the standardization/compatibility and all quality assurance procedures of EARLINET, AERONET and ACTRIS II improving the quality of the measurements in the field of atmosphere chemical compound behavior and the UE space security. We analysing the climate pollution influence, current and future impacts of radiative effects resulting from different source emission. The technology used by us is based on the fast laser spectroscopy and introduces complementary approach to the classical methods as satellite measurements. Because of high temporal (2 ns) and spatial resolution (1.5 mm), trace particles detection up to 20 Km in altitude, our new techniques may solve some critical points in the atmosphere physics but also to characterization the influence of the certain perturbations like natural phenomena, human activity, etc all of these having a crucial influence over the climate change and the environment. Equipments: • Automatic Sun Sky Lunar photometer Cimel CE318-T • Automatic Sun Tracking Photometer Cimel CE 318 • VIS - LIDAR system (532 nm elastic backscatter LIDAR) • Detection And Ranging Laser Induced Optical Emission Spectroscopy (DARLIOES) • DUSTTRAK™ DRX Aerosol Monitor Model 8533 • HORIBA APOA-370 Ambient Ozone Monitor • ML® 9820 Carbon Dioxide Analyser • Weather station	
AELOA_DE_BER1-18	Aeronet station Berlin	RP3	1	The atmospheric correction method of hyperspectral remote sensing data estimates and subtracts the impact of the atmosphere on the signal measured	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				by the instrument on aircraft or satellite. Data products derived by remote sensing data are requiring elaborate data processing chains and thorough correction schemes. The timely synchronized characterization of the atmosphere in the vicinity of the targeted area is one of the most important parts. Rough approximations are commonly used to account for the status of the atmosphere. Aerosol properties and their vertical distribution are varying in space and time and have to be known to a certain accuracy. The comparison of the AC processors with ground based AERONET stations did show large discrepancies because of the high variation of aerosol loadings and this uncertainty can be reduced by simultaneous aerosol measurements. In most cases the vertical extinction profile of the atmosphere is unknown, only roughly approximated or neglected. In addition the polarization effects of aerosols are neglected. The WV retrieval of the AERONET stations is showing a good agreement with AC processors, but compared to GPS, microwave radar or balloon the AERONET stations have a bias and a total estimated uncertainty between 12-15%. More precise WV measurements would improve the uncertainties. This project is aiming to find a balance between measured, modelled, assumed or ignored parameters depending on the application and the acceptable predefined error estimations.	
AELOA_DE_FZJ1-18	FZJ-JOYCE CE318	RP3	1	of-the-art platform for cloud research currently set-up at Forschungszentrum Jülich (FZJ) in cooperation between Institute for Energy- and Climate Research of FZJ and University of Cologne, Institute of Geophysics and Meteorology. The main target is the investigation of cloud formation, cloud evolution and cloud/radiation interaction by remote sensing instruments combined with solar and terrestrial radiation measurements to improve the prediction of clouds and precipitation in weather and climate models. JOYCE is designed for long-term observations and also contributes to Transregio 32, a research programme implemented at DFG on exchange processes between soil, vegetation and the atmospheric boundary layer. Key instruments of JOYCE are a Doppler radar operating at 36 GHz for the observation of 3D cloud structures and a scanning microwave detector for the measurement of profiles of temperature, liquid and	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				gaseous water. These instruments are combined with a number of further active (Ceilometer, Doppler-Wind LIDAR, Micro rain radar) and passive instruments (infrared radiance interferometer, sun-photometer, total sky imager, solar- and terrestrial radiation sensors) for continuous observation of the state of the atmosphere. JOYCE is also closely linked to ongoing research of atmospheric photolysis processes through measurements of spectral actinic flux densities that are strongly influenced by clouds and aerosols. The provision of aerosol and cloud information from the remote sensing instruments will open the possibility to validate existing radiation transport models with onsite measurements. Quality assured sunphotometer measurements within the AERONET will strongly support these activities.	
AELOA_ ZA_DUR1-18	Investigating Aerosol Optical Properties inDurban South Africa	RP3	1	The scientific objectives of using the CIMEL sun photometer in Durban is to determine vertical aerosol optical depth microphysical and radiative properties, the Angstrom wavelengh exponent, particle volume size distribution, single scattering albedo, and the asymetry parameter together with the real and imaginary parts of the complex refractive index-for the region. Also, to make comparisons between measurmements from Durban with other AERONET sites in order to ascertain and compare pollutant levels from other regions. Additionnal objectives are to calculate aerosol radiative forcing using the CIMEL sun photometer for Durban, thereby determining the impact on climate change and to understand the dseasonal variation of aerosols in Durban. Important for Southern Africa, and Durnan in particular is to validate and compare aerosol optical depth gained from space born measurements with CIMEL sun photometer. Additionnally, the data gained from the instrument will be used to create air Trajectory models to determine the source,pathe and spatioal extent of aerosol particles.	Intercalibration
AELOA_ IT_POT1-18	Potenza_CIAO calibration	RP3	1	This instrument will be integrated into the CIAO (Cnr-Imaa Atmospheric Observatory) for enlarging its capability of providing complementary data on atmospheric aerosol. CIAO is an advanced atmospheric observatory, the unique one in the Mediterranean region equipped with multi-wavelength lidars, cloud	

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				radar, sunphotometers and radiosouding station. Adding a triple mode CIMEL has the unique potentiality of providing routinely h24 data of atmospheric aerosol optical depth. The quality of these data is essential for the reliability of the Observatory which is also an ACTRIS TNA site. The calibration performed on June 2016 would be also very timely because in that period a scientific campaign will be held at CIAO: INTERACT 2 campaign will last in May-September 2016 period for assessing the performance of automatic lidars and ceilometer in terms of sensitivity to different aerosol loadings and different cloud types, but also in term of stability over the time (including calibration issues). Having the first calibration in this period will assure the high quality of data for the above mentioned campaign. This instrument will be integrated into the CIAO (Cnr-Imaa Atmospheric Observatory) for enlarging its capability of providing complementary data on atmospheric aerosol. CIAO is an advanced atmospheric observatory, the unique one in the Mediterranean region equipped with multi-wavelength lidars, cloud radar, sunphotometers and radiosouding station. Adding a triple mode CIMEL has the unique potentiality of providing routinely h24 data of atmospheric aerosol optical depth. The quality of these data is essential for the reliability of the Observatory which is also an ACTRIS TNA site. The calibration performed on June 2016 would be also very timely because in that period a scientific campaign will be held at CIAO: INTERACT 2 campaign will last in May-September 2016 period for assessing the performance of automatic lidars and ceilometer in terms of sensitivity to different aerosol loadings and different cloud types, but also in term of stability over the time (including calibration issues). Having the first calibration in this period will assure the high quality of data for the above mentioned campaign.	
AELOA_ IE_COR1-18	Atmospheric extinction measurements using a Sun photometer and Raman lidar at University College Cork	RP3	1	The Raman lidar system (UCLID) at University College Cork, Ireland (51.9N, 8.4W), constitutes the most westerly station of the 'European Aerosol Research Lidar Network' (EARLINET, www.earlinet.org) in a marine environment. The (1+1) lidar system operates an elastic and an inelastic channel at 532 nm and 607 nm, respectively. Presently we are splitting the elastic backscatter detection into two	Intercalibration

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				polarization-dependent channels in order to enable depolarization measurements (IR channel is in preparation). In this context is it desirable to generate an instrumental synergy between the newly acquired Sun photometer and the Raman lidar. Since the Sun photometer measurements can provide information on the columnar aerosol optical depth and on aerosol optical properties such as Ångström exponents, the complementary data obtained from the AERONET retrieval algorithm can be used to facilitate and corroborate our retrieval procedures. Since quality assurance is a critical element in the philosophy of EARLINET, we are also striving for the best possible data quality for our suntracker photometer and would like to get the instrument calibrated through the ACTRIS TNA programme (note, Cork is an associated member of ACTRIS). Even if level 2 data products for fine and coarse mode distinction will be difficult to obtain in Cork due to the generally low aerosol loads over southern Ireland, we would benefit from level 1.5 data to consolidate our lidar measurements data and to establish Cork as a second AERONET station in Ireland. The distance between Mace Head and Cork is ~120 km.	
AELOA_IT_MIL1-18	A new AERONET station in North Italy (Garda Lake	RP3	1	The aerosol data collection performed within this project has multiple purposes. First, we aim to use the AERONET inversion products (micro-physical properties) for calibrating/validating remote sensing data of Lake Garda, the largest lake in Italy. Since 1999, Lake Garda is our test area for different research projects on water quality remote sensing (e.g. EC: FP4-SALMON, FP5-Hysens-Rosalma, Central Europe-EuLakes, FP7-GLaSS). Within this framework, (see Giardino et al., 2014; Bresciani et al. 2012; Bresciani et al. 2011a; Bresciani et al. 2011b; Guanter et al. 2010; Odermatt et al. 2010; Giardino et al. 2007a; Giardino et al. 2007b; Giardino et al. 2005 and Brivio et al. 2001), we use AERONET data for either corrects the images for the atmospheric effects or for validating the aerosol concentration estimated by radiative transfer codes. Second, AERONET data in Sirmione, combined with those gathered from other surrounding stations (e.g., Ispra, Modena and Venice) are used to assess the deposition of aerosols in the Lake Garda region within the regional project SINOPIAE (Regione Lombardia). Within this framework, we are particularly interested in study the effect of the	Intercalibration

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				deposition of Saharan dust on phytoplankton growth (i.e. dust fertilization hypothesis) in (once more) Lake Garda.	
AELOA_SK_POP1-18	First aerosol measurements quality check in the ARC SHMI Poprad-GÃ¡novce	RP3	1	The aerological and solar radiation centrum (ARC) of the Slovak Hydrometeorological Institute (SHMI) organizes upper-air measurements, monitoring of total column ozone and spectral solar UV radiation by the Brewer ozone spectrophotometer, measurements of the long-wave and the short-wave radiation fluxes and is responsible for the solar radiation measurement quality control in Slovakia. The station is involved in the GAWO3 WMO project. The total column ozone and UV data are sent to the WOUDC Toronto and the observatory participates also in the EUBREWNET project. The radiation data have been regularly sent to the WRDC in St. Petersburg. Meteorological, aerological and air quality measurements performed at the observatory are shared in the frame of the WMO data exchange. The observatory cooperates with the national scientific organizations - the Comenius University and the Geophysical Institute of the SAS and participates also in some international activities (COST 726, COST 1207). The sun photometer CIMEL 318-NE DPS9 together with the CIMEL lidar CE 370-2 were installed at the station in November 2014 with aim to retrieve complex information on atmospheric aerosols. An aerosol parameters have not been monitored in Slovakia before and information on aerosols needed for modelling of the solar radiation used to be obtained from satellites or from the literature. Continuous monitoring of the aerosols is required also for the national climate monitoring programme. The on-line measurements of aerosol properties and its vertical profile (including the PBL thickness) will be directly utilised by the air traffic services provided by the SHMI.	Intercalibration
AELOA_DE_MAI1-18	Mainz AOD Monitoring	RP3	1	Long-term measurements of aerosol optical depth and aerosol properties as part of the AERONET network	Intercalibration
AELOA_IT_LEC1-18	Aerosol and Climate Studies	RP3	1	Study the aerosol effects on the Earth's climate through the characterization of the atmospheric aerosol properties, irradiance measurements of the solar and terrestrial radiation, and radiative transfer models.	Intercalibration
AELOA_IT_ROM1-18	The BAQUNIN super-site : Boundary-layer Air Quality-	RP3	1	The Scientific objectives related to the use of the AERONET - CIMEL photometer at the BAQUNIN super site are below described:	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
	analysis Using Network of INstruments.			1. Intercomparison between instruments. In the super site there are co-located a PREDE-POM sun-sky radiometer of SKYNET Network, an MFRSR, elastic and Raman lidars. It is planned the temporary installation of a PFR photometer of the GAW network, within a traceability program. All the instruments provide optical and physical aerosol characteristic at several common wavelengths in the VIS region, and columnar water vapor content. Concerning Ozone, the AERONET product can be compared against the spectrometers PANDORA (of PANDONIA network) and BREWER (of Brewer network) products. 2. Calibration and Validation activities of satellite products. The synergy of all the instruments makes the site suitable for the calibration and validation of products from ESA, NASA, and JAXA satellite missions. 3. Study of the atmospheric characteristics in a Urban area. The site is located in Rome down-town, affected by the traffic emissions, but also by frequent Saharan dust episodes. The monitoring performed by different kind of instrumentations offers a quantitative and qualitative information for a wide range of atmospheric parameters both in the boundary layer and in the entire atmospheric column.	
AELOA_RO_MAG1-18	#643 to Magurele	RP3	1	The project aims to cover the gap usually existent during the AERONET calibration period. The gap will be covered by performing a switch between several sun photometer instruments available in Romania. Since the summer period is usually the best for sun photometer measurements, we propose to use the calibrated #643 sun photometer (usually installed in Cluj) for the Bucharest_INOE site. During this period, the measurements performed at the Cluj site will be covered by an additional CIMEL instrument part of a different TNA. The project will have a positive impact on the temporal coverage of the Bucharest_INOE site. We intend to use this procedure also for following calibration activities within the AERONET framework	Intercalibration
AELOA_IT_MES1-17	Messina station #343, Italy	RP3	1	Recalibration within 12-month period as requested by AERONET.	Intercalibration
AELOA_AT_VIE1-17	Analyses of influence of aerosol optical depth on	RP3	1	The CIMEL sunphotometer is installed on the measurement platform of the university of Natural resources and life sciences (BOKU) in the 19th district of	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
	shortwave and longwave irradiance using high quality radiation data			Vienna, Austria. The institute of Meteorology is planning to install or has installed other radiation sensors on this platform. Among others a fish eye camera (to monitor cloudiness) and a UV + visible spectrometer are planned to be installed. The Austrian Weather Service is performing routine high quality shortwave (direct, diffuse, global) and longwave downward radiation measurements within the scope of the Austrian Radiation Network (ARAD). ARAD is a high quality (BSRN level) radiation network which includes 5 stations throughout Austria. One of these ARAD stations is installed in Vienna in the 19th district in a distance of approximately 1 km from the BOKU plattform at the same altitude. The data of the ARAD network are freely available for scientific purposes.The installation of the CIMEL sunphotometer represents a complement to the ARAD station and will allow to analyse in detail the fluctuations and trends of the measured radiation fluxes. Following questions will be answered: What are the aerosol optical depth fluctuations throughout the year? What are the typical optical aerosol characteristics for the location of Vienna? What is the magnitude of the water vapor column? How does the measured column water vapor fit with the radiosonde data (00 and 12 UTC)? What are the yearly fluctuations of the optical aerosol characteristics? How is the correlation with some synoptical situations? What is the influence of the aerosols on the radiation fluxes? Can we see seasonal diurnal fluctuations? At last on a longer time period trends will be analyzed. We will analyze whether we can detect possible changes in aerosol optical depth and in solar radiation fluxes. The above mentioned questions are vital for the domain of climatology and still represent actual topics of research which are related to the question of climate change. It is among others also connected with the monitoring of the radiation balance in the atmosphere and the influence of the different atmospheric components on the radiation fluxes.	

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AELOA_ES_BCN1-18	Calibration #74	RP3	1	"Due to its location in the Mediterranean basin, Barcelona is influenced by two major aerosol source regions: Europe and the Western Mediterranean Basin, as a major source of anthropogenic pollutants, and North Africa, as a principal source of natural dust. The African dust outbreaks occur mainly in spring and last summer-autumn. The local aerosol sources are mainly heavy traffic together with the re- suspension of the material available on the ground. Taking into account the above considerations, the composition of atmospheric aerosols in Barcelona station is a mixing of aerosols and the proportion of aerosols could vary as a function of local anthropogenic emissions, trade winds intensity, regional and local re-circulations, African dust contributions and sea spray.The Barcelona AERONET site is key localization for the detection of desert dust in the Eastern Iberian Peninsula and it is routinely used in the daily validation of the forecast products of the BSC-DREAM8b mineral dust model (http://www.bsc.es/projects/earthscience/DREAM/) and NMMB/BSC-Dust model (http://www.bsc.es/earth-sciences/mineral-dust/nmmbbsc-dust-forecast) Used in a regular way by the Sand and Dust Storm Warning Advisory and Assessment System (http:// sds-was.aemet.es/), SDS-WAS is a project of the WMO with the mission to enhance the ability of countries to deliver timely and quality sand and dust storm forecasts, observations, information and knowledge to end users. The Regional Center for Northern Africa, Middle East and Europe (hereafter RC NAMEE or RC), supports a network of research and operational partners in the region. Also, the activities of the Barcelona Dust Forecast Center (http://dust.aemet.es/). Additionally, Barcelona site is part of SolRad-Net (http://solrad-net.gsfc.nasa.gov/), MPLNet (mplnet.gsfc.nasa.gov/) and EARLINET (www.earlinet.org/) networks. "	Intercalibration
AELOA_ UK_RHY1-18	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at East Malling will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air pollution and influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events.	
AELOA_UK_EAS1-18	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at East Malling will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air pollution and influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size	Intercalibration

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				distribution, refractive index or phase function will be used to characterize such events.	
AELOA_CH_DAV1-18	Davos CIMEL Calibration	RP3	1	Re-Calibration within 12-month period as requested by AERONET PMOD hosts the World Optical depth Research and Calibration Centre of the World Meteorological Organization, acting as calibration facility for the AOD network of WMO Global Atmosphere Watch program. A permanent link between the PHOTONS and GAWPFR networks is maintained through co-location of a well calibrated Cimel instrument with PFR radiometers at Davos.	Intercalibration
AELOA_DE_PUN1-18	DACAPO-PESO	RP3	1	The project Dynamics, Aerosol, Cloud And Precipitation Observations in the Pristine Environment of the Southern Ocean (DACAPO-PESO) aims on profiling the aerosol and cloud properties, dynamics and precipitation of the atmosphere of the southern-hemispheric mid latitudes. The core instrumentation is comprised in the Leipzig Aerosol and Cloud Remote Observations System (LACROS) that will be deployed in Punta Arenas from November 2018 to December 2019. The suite of instruments includes 35- and 94-GHz cloud radar, 24-GHz micro rain radar, multi-wavelength polarization lidar PollyXT, disdrometer, microwave radiometer, Sun photometer and various radiation measurements. Goal is to obtain a dataset of the properties of clouds, aerosols and precipitation in the rather pristine region of the southern-hemispheric mid latitudes. Aerosol-cloud interaction is expected to be much stronger susceptible to changes in aerosol properties than the rather aerosol-burden northern-hemispheric mid latitudes. DACAPO-PESO is a joint initiative of TROPOS, Leipzig, Germany, and the University of Magallanes, Punta Arenas, Chile.	Intercalibration
AELOA_DE_BER2-18	Aeronet station Berlin	RP3	1	The atmospheric correction method of hyperspectral remote sensing data estimates and subtracts the impact of the atmosphere on the signal measured by the instrument on aircraft or satellite. Data products derived by remote	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				sensing data are requiring elaborate data processing chains and thorough correction schemes. The timely synchronized characterization of the atmosphere in the vicinity of the targeted area is one of the most important parts. Rough approximations are commonly used to account for the status of the atmosphere. Aerosol properties and their vertical distribution are varying in space and time and have to be known to a certain accuracy. The comparison of the AC processors with ground based AERONET stations did show large discrepancies because of the high variation of aerosol loadings and this uncertainty can be reduced by simultaneous aerosol measurements. In most cases the vertical extinction profile of the atmosphere is unknown, only roughly approximated or neglected. In addition the polarization effects of aerosols are neglected. The WV retrieval of the AERONET stations is showing a good agreement with AC processors, but compared to GPS, microwave radar or balloon the AERONET stations have a bias and a total estimated uncertainty between 12-15%. More precise WV measurements would improve the uncertainties. This project is aiming to find a balance between measured, modelled, assumed or ignored parameters depending on the application and the acceptable predefined error estimations.	
AELOA_DE_KEM1-18	MetPVNet	RP3	1	The German collaborative project MetPVNet addresses the challenge of the energy transition by improving satellite-based forecasts of radiation and photovoltaic yield, and thus the grid integration of solar power plants. Towards this goal, two field campaigns for collecting surface-based reference observations of relevant atmospheric parameters and radiative fluxes will be conducted in the vicinity of Kempten, Germany, in autumn 2018 and summer 2019. Global radiation will be collected together with PV yield on site at 20 solar power plants, while more comprehensive measurements will be carried out at two master sites, including spectrally resolved global radiation, direct and diffuse broadband radiative fluxes, and sun photometer observations for inferring aerosol properties.	Intercalibration

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AELOA_UA_MAR1-18	AERONET	RP3	1	Recalibration within 12-month period as requested by AERONET.	Intercalibration
AELOA_PL_STR1-18	AERONET CIMEL	RP3	1	Recalibration within 12-month period	Intercalibration
AELOA_CZ_BRN1-18	Brno Turany Airport	RP3	1	Brno Turany Airport is year-round calibration site for hyperspectral data from remote sensing. CIMEL (CE318NE) data are used to sun to estimation water vapor and AOT primarily.	Intercalibration
AELOA_UK_LOF1-18	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at East Malling will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air pollution and influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events	Intercalibration
AELOA_ IT_POT1-18	Potenza_CIAO calibration	RP3	1	This instrument will be integrated into the CIAO (Cnr-Imaa Atmospheric Observatory) for enlarging its capability of providing complementary data on atmospheric aerosol. CIAO is an advanced atmospheric observatory, the unique one in the Mediterranean region equipped with multi-wavelength lidars, cloud radar, sunphotometers and radiosouding station. Adding a triple mode CIMEL has the unique potentiality of providing routinely h24 data of atmospheric	Intercalibration

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				aerosol optical depth. The quality of these data is essential for the reliability of the Observatory which is also an ACTRIS TNA site. The calibration performed on June 2016 would be also very timely because in that period a scientific campaign will be held at CIAO: INTERACT 2 campaign will last in May-September 2016 period for assessing the performance of automatic lidars and ceilometer in terms of sensitivity to different aerosol loadings and different cloud types, but also in term of stability over the time (including calibration issues). Having the first calibration in this period will assure the high quality of data for the above mentioned campaign. This instrument will be integrated into the CIAO (Cnr-Imaa Atmospheric Observatory) for enlarging its capability of providing complementary data on atmospheric aerosol. CIAO is an advanced atmospheric observatory, the unique one in the Mediterranean region equipped with multi-wavelength lidars, cloud radar, sunphotometers and radiosouding station. Adding a triple mode CIMEL has the unique potentiality of providing routinely h24 data of atmospheric aerosol optical depth. The quality of these data is essential for the reliability of the Observatory which is also an ACTRIS TNA site. The calibration performed on June 2016 would be also very timely because in that period a scientific campaign will be held at CIAO: INTERACT 2 campaign will last in May-September 2016 period for assessing the performance of automatic lidars and ceilometer in terms of sensitivity to different aerosol loadings and different cloud types, but also in term of stability over the time (including calibration issues). Having the first calibration in this period will assure the high quality of data for the above mentioned campaign	
AELOA_BE_BRU1-18	Advanced exploitation of Ground-based measurements for Atmospheric Chemistry and Climate applications â€“ II (AGACC II)	RP3	1	One of the objectives of the project (AGACC II) is: To advance our understanding of aerosol characteristics above Brussels and to estimate the aerosol direct radiative forcing above Brussels. Therefore the underlying objectives are -to retrieve more information regarding aerosol properties from remote sensing measurements with Brewer and MAXDOAS spectrometers; -to deploy a lidar ceilometer at Ukkel; -to combine the information from all instruments including those from the CIMEL sun photometer, for a more comprehensive evaluation of	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				the aerosol properties at Brussels; -to derive information about the aerosol sources by modeling with CHIMERE and backtrajectory studies. The second objective is to continue the measurements of the integrated water vapor.	
AELOA_BE_UTS1-18	AERONET			During the Belgian Antarctic Expedition 2011/2012, in February 2012, the aerosol observatory with all six aerosol instruments was the first time measuring simultaneously (aethalometer, sunphotometer, nephelometer, TEOM-FDMS, laser optical paticle counter, U-CPC) at Utsteinen. All instruments were operated successfully. The observations confirm the clean atmosphere in Antarctica, with low AOD values, low total number concentrations, very low BC and total aerosol mass concentrations. The size of the ambient aerosol seemed to be mostly restricted to particles below 1 micrometer, indicating no distinct influence by coastal or marine aerosol. The combination of U-CPC and LAS measurements allowed to derive the number of aerosol particles below 100 nm. The number in this size range appeared to be important, indicating new particle formation events, either of local origin, or transported to Utsteinen. For some days there was a diurnal cycle detectable for the size range below 100 nm. The total number of aerosol particles showed a diurnal cycle behaviour on many days and the overall number concentration declined towards end of February. The spectral dependency of the sunphotometer measurements point, however, to a distinct contribution of particles between 100 and 1000 nm size diameter or larger. However, the sunphotometer observations are done for the whole atmospheric column. In addition, a Brewer ozone spectrophotometer was installed successfully and did very good observations of the total ozone column and the UV irradiaton during summers 2010/11 and 2011/12. Total ozone observations are important to follow the evolution and location of the ozone hole during its refilling phase. During austral winter 2012, the aethalometer, the TEOM-FDMS, and partly the laser optical counter, did continuous measurements.	Intercalibration
AELOA_BY_VEC1-18	Lidar-sunphotometer synergy for aerosol characterization in Antarctic	RP3	1	Field investigation of atmospheric aerosols and thin clouds in Antarctica and their long term trends will be implemented by means of lidar and sun-photometer synergy for estimation of their effect on radiated fluxes formation in the Earth	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				atmosphere-surface system. The joint projet is supported by CNRS (support to international cooperation in the framework of agreement between CNRS and Belarussian academy of Science.	
AELOA_CH_DAV2-18	Davos CIMEL Calibration	RP3	1	Re-Calibration within 12-month period as requested by AERONET PMOD hosts the World Optical depth Research and Calibration Centre of the World Meteorological Organization, acting as calibration facility for the AOD network of WMO Global Atmosphere Watch program. A permanent link between the PHOTONS and GAWPFR networks is maintained through co-location of a well calibrated Cimel instrument with PFR radiometers at Davos.	Intercalibration
AELOA_RO_CLUJ1-18	Romanian Atmospheric research 3D Observatory - RADO	RP3	1	Recalibration within 12-month period as requested by AERONET. The CLUJ_UBB AERONET site is functioning since July 2010 as #643. The instrument is also a member of the Romanian Atmospheric research 3D Observatory (RADO) is a state-of-the-art facility at national level (and so far unique in SE Europe), dedicated to research and monitoring of atmospheric processes and compounds in the Planetary Boundary Layer and Free Troposphere. The current infrastructure is opened to developing new projects and ideas which explore all atmospheric-related phenomena, including the interactions of the Atmosphere with Land, Hydrosphere and Biosphere.	Intercalibration
AELOA_UK_STO1-18	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at Stornoway will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy,	Intercalibration

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				which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air pollution and influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events.	
AELOA_IL_HAI1-18	Aerosol and dust optical properties measured over the Eastern Mediterrainian site Haifa, Israel.	RP3	1	In combination with lidar profiles measured by a PollyXT lidar at the same site on the rooftop of the building of the Viterby Faculty of Electrical Engineering at the Technion aerosol types observed over this Mediterranean area shall be characterized. Besides Urban and marine aerosol also different types of mineral dust from the deserts around Israel, the deserts on the Arabian Peninsula as well as from the Sahara observed over the site. From these 2 year observations seasonal differences of the vertical aerosol distribution will be derived and related to typical meteorological systems of the area.	Intercalibration
AELOA_ IT_LAM1-19	Climate Observatory of Lamezia Terme ISAC	RP3	1	Measurements are essential to provide information on the actual state of the atmosphere, for climate monitoring, for Nowcasting purposes ,for assimilation into numerical weather prediction (NWP) systems and to improve our understanding of atmospheric processes and their role in the climate system. Actually, there is a strong need for complex observations suitable to develop, improve and validate parameterizations used in NWP and climate models and to provide ground-truth against which to compare atmospheric parameters derived from satellite data. Therefore, the focus is on measurements using a CIMEL sun-photometer to produce high quality aerosol column integrated properties such as AOD (Aerosol Optical Depth), optical and microphysical properties and many others derived-	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				radiative properties. This measurements are quite relevant and widely involved in our research activities regarding climate and air-quality fields. Our experimental field, in a strategical location, is located at the CNR-ISAC coastal site of Lamezia Terme in central Mediterranean Area, on the west coast of the Calabrian region ,the southernmost tip of the Italian peninsula situated in the central Mediterranean Basin. The site is placed at 600 m from the coastline in open position into one of three main planes of the region (38.88N and 16.24E 6m agl) and it is one of the CNR ISAC super-sites being a Climatological and Environmental Observatory recently included in the GAW (Global Atmospheric Watch-WMO) regional measurement station network. The focus is to compare and to integrate this measurements with other instruments into the our Observatory and to use for assimilation data into numerical forecast models.	
AELOA_TU_TUZ1-19	TUBITAK UZAY/Space Technologies Research Institute of turkey	RP3	1	The scientific objective of the project is the recalibration of the CIMEL CE318 Instrument within 12 month period as requested by AERONET. Our sun photometer model is CIMEL CE318-2 and #542 calibrated in Laboratoire d' Optique Atmosphérique. Th eInstrument was used in TUBOTAK Space Technologies Research Institute's building in Ankara and for the filel campaign in Tuz Guolu 5salt Lake) This year, th einstrument will be located in a new place in Ankara after calibration an will be located there till September and will provide date to AERONET for Central Anatolia. On September, the insturment will be used on site Tuz Golu 3. The Tuz Golu salt lake is one of the CEOS Landnet sits. During our measurmements at the site, the CIMEL date is used as input for calibration/validation purposes. COnsequently, the calibration of the instrument plays a bi grole accuracy of the calibration/validation work.	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
AELOA_PL_WAR-18	First measurements and maliabration of AERONET photometer in Warsaw	RP3	1	Since December 2017, measurements of CIMEL photometer are utilized to provide lidar data products for the EARLINET/AERONET site in Warsaw. These products are output for the ACTRIS Data Base. The CIMEL instrument must be regularly calibrated to provide high quality data products. The purpose to this TNA is the first-time calibration the CIMEL 359 instrument. Calibrated CIMEL data will be used in synergistic approaches to lidar-photometer instruments.	Intercalibration
AELOA_UK_RAM1-18	Rame Head AERONET site	RP3	1	UK contribution to the AERONET network. Coastally important site.	Intercalibration
AELOA_DE_LEI1-19	ACTRIS 2 - AERONET - Europe	RP3	1	Measurements of the aerosol optical thickness and the linear polarization by the dual polar sun photometer have been carried out over the continental European site Leipzig, in 2011-2012 during the MEGACITIES campaign in Guangzhou, China and is currently part of the SALTRACE campaign taking place in Barbados throughout summer 2014. Several dust outbreak episodes transported from the African continent have been covered by the measurements during SALTRACE on Barbados during the summer campaign 2013 and the winter campaign in early 2014. In 2015 the instrument was placed at the ACTRIS station Melpitz, near Leipzig.	Intercalibration
AELOA_GR_ANT1-19	CIMEL #440 permanent installation in Antikythera island	RP3	1	Antikythera is a Greek island lying on the edge of the Aegean Sea, between Crete and Peloponnese. Its land area is 20.43 square kilometers (7.89 square miles) and it lies 38 kilometers (24 miles) south-east of Kythera. It is the most distant part of the Attica region from its heart in the Athens metropolitan area. It is lozenge-shaped, 10.5 km (6.5 mi) NNW to SSE by 3.4 km (2.1 mi) ENE to WSW. It is notable for being the location of the discovery of the Antikythera mechanism and for the historical Antikythera wreck. The Antikythera island is a non-touristic destination, however is fully connected to the national power grid, while the telecommunications are excellent as there is LTE coverage across the island. The National Observatory of Athens (NOA) is establishing a Reference Atmospheric Station in Antikythera, aiming to study climatic, atmospheric and environmental parameters of the Eastern Mediterranean region. The Antikythera Station is a registered member of the European Aerosol Research Lidar Network (EARLINET) operating the PollyXT atmospheric lidar (3+2+2+1).	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				After the installation of the CIMEL sun-photometer it will be a member of the Aerosol Robotic Network (AERONET) as well. The activities of this aerosol remote sensing facility will be enhanced in the near future with a cloud remote sensing facility, under the Cloudnet (http://www.cloud-net.org/) and a BSRN radiation station. All the aforementioned facilities will operate in the framework of the European ACTRIS Research Infrastructure (https://www.actris.eu), following the respective QA/QC protocols and standards. Within the next 5 years, NOA will implement 3 large-scale experimental campaigns in Antikythera in the framework of the ERC project D-TECT.	
AELOA_MA_SAA1-19	Integrated modelling of the water cycle in semi arid watersheds based on ground and satellite data (SudMed project, Morocco site	RP3	1	Water is a strategic issue in the Mediterranean region, mainly because of the rarefaction of the resources facing the ever increasing demand and the problem of sharing water scarcity particularly in the semi-arid North Africa region. The main objective of this program is to develop methodologies which permit the integration of ground-based data, process models, and satellite data in order to document, understand and predict the evolution of a semi-arid heterogeneous region for a sustainable development. The part of the project around the photometer concerns atmospheric corrections of optical satellite data. The scientific community has demonstrated the benefit of high repetitivity and high resolution remotely sensed measurements in agriculture and hydrologic applications. Multitemporal images required fine atmospheric corrections before the analysis, monitoring and modeling of land surface functioning on large areas. Desert dusts affect the region mainly in summer. In the preparation of the Sentinel-2 space mission (launch scheduled in 2015, framework of the COPERNICUS program/ESA-EC), and the micro-satellite VENµS (scientific and technologic demonstrator, launch in 2016, cooperation between Israël and France), CESBIO with CNES has developed processing methods to cloud detection and atmospheric corrections. These algorithms are applied to satellite time series as SPOT, Formosat-2 and Landsat TM data to simulate capacities of SENTINEL-2 and VENµS. The results are validated on different sites with aerosol	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				and meteorological measurements, coupled to ground measurements on radiative balance, surface flux, soil moisture and vegetation.	
AELOA_RO_EFO1-19	Variability of the aerosols' microphysics and optical properties at North Eforie, Romania	RP3	1	The knowledge of aerosol microphysics and radiative properties provides the understanding of aerosols' role in the air quality and climate.! Therefore, the objectives of the project are:! - to have correct measurements of columnar aerosol using sun-photometer (so, care of calibration and maintenance of the sun-photometer);! - to determine the spectral aerosol optical depth (AOD) daily variation and parameters such as the coarse aerosol fraction (fc), fine (ff), Ångström exponent and single scattering albedo (SSA) in conjunction with meteorological parameters like the wind speed , temperature and humidity;! - to determine turbidity which characterizes the air masses and consequently air quality;! - to study the aerosols' effects;! - to determine surface radiative forcing of the aerosols, using optical properties;! - the intercomparison between aeerosol optical properties retrieved from satellite data and those from AERONET data base. ! ! Recalibration within 12-month period as requested by AERONET!	Intercalibration
AELOA_SK_POP1-19	First aerosol measurements quality check in the ARC SHMI Poprad-Gánovce	RP3	1	The aerological and solar radiation centrum (ARC) of the Slovak Hydrometeorological Institute (SHMI) organizes upper-air measurements, monitoring of total column ozone and spectral solar UV radiation by the Brewer ozone spectrophotometer, measurements of the long-wave and the short-wave radiation fluxes and is responsible for the solar radiation measurement quality control in Slovakia. The station is involved in the GAWO3 WMO project. The total column ozone and UV data are sent to the WOUDC Toronto and the observatory participates also in the EUBREWNET project. The radiation data have been regularly sent to the WRDC in St. Petersburg. Meteorological, aerological and air quality measurements performed at the observatory are shared in the frame of the WMO data exchange. The observatory cooperates with the national scientific organizations - the Comenius University and the Geophysical Institute of the SAS and participates also in some international activities (COST 726, COST 1207). The	Intercalibration

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				sun photometer CIMEL 318-NE DPS9 together with the CIMEL lidar CE 370-2 were installed at the station in November 2014 with aim to retrieve complex information on atmospheric aerosols. An aerosol parameters have not been monitored in Slovakia before and information on aerosols needed for modelling of the solar radiation used to be obtained from satellites or from the literature. Continuous monitoring of the aerosols is required also for the national climate monitoring programme. The on-line measurements of aerosol properties and its vertical profile (including the PBL thickness) will be directly utilised by the air traffic services provided by the SHMI.	
AELOA_DE_FZJ1-19	FZJ-JOYCE CE318 calibration 2019	RP3	1	JOYCE (Jülich Observatory for Cloud Evolution) is a new state-of-the-art platform for cloud research currently set-up at Forschungszentrum Jülich (FZJ) in cooperation between Institute for Energy- and Climate Research of FZJ and University of Cologne, Institute of Geophysics and Meteorology. The main target is the investigation of cloud formation, cloud evolution and cloud/radiation interaction by remote sensing instruments combined with solar and terrestrial radiation measurements to improve the prediction of clouds and precipitation in weather and climate models. JOYCE is designed for long-term observations and also contributes to Transregio 32, a research programme implemented at DFG on exchange processes between soil, vegetation and the atmospheric boundary layer. Key instruments of JOYCE are a Doppler radar operating at 36 GHz for the observation of 3D cloud structures and a scanning microwave detector for the measurement of profiles of temperature, liquid and gaseous water. These instruments are combined with a number of further active (Ceilometer, Doppler-Wind LIDAR, Micro rain radar) and passive instruments (infrared radiance interferometer, sun-photometer, total sky imager, solar- and terrestrial radiation sensors) for continuous observation of the state of the atmosphere. JOYCE is also closely linked to ongoing research of atmospheric photolysis processes through measurements of spectral actinic flux densities that are strongly influenced by clouds and aerosols. The provision of aerosol and cloud information from the remote sensing instruments will open the possibility to validate existing radiation	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				transport models with onsite measurements. Quality assured sunphotometer measurements within the AERONET will strongly support these activities.	
AELOA_ UK_LER1-19	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at Lerwick will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air quality or influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events.	Intercalibration
AELOA_UK_POR1-19	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at Lerwick will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air quality or influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events.	
AELOA_UK_GLA1-19	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at Lerwick will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air quality or influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events.	Intercalibration
AELOA_IT_ROM1-19	The BAQUNIN super-site : Boundary-layer Air Quality-analysis Using Network of INstruments.	RP3	1	The Scientific objectives related to the use of the AERONET - CIMEL photometer at the BAQUNIN super site are below described: 1. Intercomparison between instruments. In the super site there are co-located a PREDE-POM sun-sky radiometer of SKYNET Network, an MFRSR, elastic and Raman lidars. It is planned the temporary installation of a PFR photometer of the	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				GAW network, within a traceability program. All the instruments provide optical and physical aerosol characteristic at several common wavelengths in the VIS region, and columnar water vapor content. Concerning Ozone, the AERONET product can be compared against the spectrometers PANDORA (of PANDONIA network) and BREWER (of Brewer network) products. 2. Calibration and Validation activities of satellite products. The synergy of all the instruments makes the site suitable for the calibration and validation of products from ESA, NASA, and JAXA satellite missions. 3. Study of the atmospheric characteristics in a Urban area. The site is located in Rome down-town, affected by the traffic emissions, but also by frequent Saharan dust episodes. The monitoring performed by different kind of instrumentations offers a quantitative and qualitative information for a wide range of atmospheric parameters both in the boundary layer and in the entire atmospheric column.	
AELOA_UK_WAT1-19	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at Lerwick will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air quality or influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events.	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
AELAO_UK_CAM1-19	Met Office aerosol network	RP3	1	The eruption of Eyjafjallajökull in 2010 has triggered the rapid development of volcanic ash remote sensing activities at the Met Office. As a response, a Lidar – Sunphotometer network for near real time monitoring of volcanic ash will be set-up across the United Kingdom. The networks will consist of 9 fixed sites with a Lidar and Sunphotometer, as well as a mobile platform across the UK to ensure a spatial coverage. The station at Lerwick will be one of them. Additional calibration units and spares will help to ensure the operational service. The network will form an integral part of a wider volcanic ash response strategy, which will incorporate additional observations as well as dispersion models. One aim is a better characterisation of aerosol types using the combination of aerosol backscatter/extinction coefficient and depolarization ratio from Lidar as well Aerosol Optical Depth (AOD) and further products from the Sunphotometer. Furthermore events such as Sahara dust episodes, air quality or influence from sea salt aerosols will be monitored, as well as compared to models. Different parameters derived by AERONET inversions such as particle size distribution, refractive index or phase function will be used to characterize such events.	Intercalibration
AELOA_RO_TIM1-19	Romanian Atmospheric research 3D Observatory (RADO) of Timisoara	RP3	1	Starting with 2011, March, the Timisoara sun photometry station is part of the AERONET network and is located at the Politehnica University www.upt.ro, in the location of the Faculty for Mechanical Engineering (Bv M Viteazu 1, Timisoara), on the roof. of the tallest building (45.74N; 21.22E). The Instrument type is CE 318N EB S9. The sun photometer number in the network AERONET is 645. ! The measurements from sun photometer were used in research and educational activities. Until now, many valuable articles published in prestigious journals (e.g. Atmospheric Research, Energy Conversion and Management, etc.) have been written, a PhD thesis was fulfilled and other two are on going! Students from license cycle (Mechanical and Electric and Chemical engineers, but not only) and master level of Renewable Resources Engineering have access to the sun photometer data and currently use the data base for reporting and exercising or student projects,.! The instrument is also a member of the Romanian Atmospheric Research 3D Observatory (RADO) is a state-of-the-art	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
				facility at national level (and so far unique in SE Europe), dedicated to research and monitoring of atmospheric processes and compounds in the Planetary Boundary Layer and Free Troposphere.! Also, we have an accredited laboratory in accordance with standard ISO CEI 17025:2005, and it is fully equipped with the infrastructure required for air quality measurements, as well as highly qualified personnel. The mobile laboratory ensures the monitoring of CO, NO, NO2, O3, PM, THC, NMHC, CH4 and SO2 concentration, values required for a correct interpretation of pollution episodes (e.g. a project with the Timisoara City Hall, main industrial industrial entities from the western part of Romania such as Smithfiels, TRW, Continental, CONTITECH, etc.). The data offered by the sun fotometer is completing / enlarging our research and measurement possibility in this field for sure, and open for sure new correlation possibilities for the local, but not only, state of the air quality and possibility to use the solar energy, despite the polluting episodes occurring. The fotometer is included also in the ERRIS platform of research structures - http://erris.gov.ro/main/index.php?- available and ready to join projects and cooperation offers. As domain we indicate: Earth Sciences & Environment.	
AELOA_FR_LIL8_17	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
AELOA_FR_LIL1_18	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration
AELOA_FR_LIL3_18	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration
AELOA_FR_LIL3_18	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
AELOA_FR_LIL4_18	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration
AELOA_FR_LIL5_18	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration
AELOA_FR_LIL6_18	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer			Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[1]	Objectives	Description of work
AELOA_FR_LIL1_19	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration
AELOA_FR_LIL2_19	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its custumers.	Intercalibration
AELOA_FR_LIL3_19	Calibration of CIMEL CE318, CE318T, sun/sky/polar photometer	RP3	1	Since 25 years, Cimel has developed several instruments dedicated to atmosphere sciences that are used by leading scientific organisations in the world. In particular, Cimel's photometer CE318 equips the worldwide AERONET federation and has become the reference instrument for aerosol monitoring networks. All instruments are designed according to Cimel's philosophy resulting in high quality measurements with field proven reliability and very low maintenance requirements. Cimel provides direct support for installation, training and maintenance. CIMEL request access to AERONET-EUROPE calibration facility to provide high quality measurements and data to its customers.	Intercalibration

Acronym	Title	Reporting Period	Amount of access (CAL)[2]	Objectives	Description of work
AEGOA_FI_KUO1-18	Characterization of aerosol optical properties over Kuopio	RP3	**1**	FMI aims at providing long time series of quality data on atmospheric composition in a sparsely sampled environment in Northern Europe and the Arctic.	Intercalibration
AEGOA_FI_HEL1-18	Characterization of aerosol optical properties over Helsinki	RP3	**1**	Provide long time series of quality data on atmospheric composition in a sparsely sampled environment in Northern Europe and the Arctic; satellite calibration and validation.	Intercalibration
AEGOA_FI_SOD1-17	Ground-based AOD measurements in northern Finland	RP3	**1**	CIMEL is part of an instrument suite aimed at cloud studies: cloud radar, doppler lidar and in-situ measurements of aerosol and cloud properties and will therefore operate in cloud mode. Recalibration within 12-month period as requested by AERONET.	Intercalibration
AEGOA_MT_GOZ1-18	Gozo Aerosols	RP3	**1**	Monitoring of aerosols especially Etna emissions in the Central Mediterranean.	Intercalibration
AEGOA_NO_BIR1-18	Monitoring of greenhouse gases and aerosols at the Zeppelin Observatory, Svalbard, and Birkenes Observatory, Aust-Agder, Norway	RP3	**1**	National monitoring of climate gases and selected aerosol properties Since1991, in commission for the Norwegian Climate and Pollution Agency, NILU is running a programme for monitoring greenhouse gases on Svalbard. In 2010 the monitoring programme was extended to also include the new observations from Birkenes of the greenhouse gases CO2 and CH4 and selected aerosol observations relevant for the understanding of climate change. The AERONET; aerosol depth, measurements from Birkenes are now a part of this programme. Specific objectives are to provide continuous long-term measurements resulting in high quality data that can be used in trend analysis, provide results of aerosol observations of relevance to the understanding of climate change, and indicate source regions with high influence on the measurements. In addition, contribution to the general AERONET Earth-Observation validation data set is anticipated.	Intercalibration

[2] CAL: calibration

AEGOA_FI_HYY1-18	Ground-based aerosol monitoring at Hyytiala (Finland)	RP3	**1**	Provide long time series of quality data on atmospheric composition in a sparsely sampled environment in Northern Europe and the Arctic; satellite calibration and validation	Intercalibration
AEGOA_DE_KAR1-18	AERONET observations at Karlsruhe	RP3	**1**	We are using our AERONET station for the following purposes: 1. Validation of our comprehensive online coupled model system COSMO-ART. 2. Supplement to our 200 m tall meteorological tower that is in operation since more than 20 years. 3. Process studies in addition to ground based aerosol and visibility measurements. 4. Classification of the prevailing aerosol type in our area and to identify Saharan Dust outbreaks.	Intercalibration
AEGOA_PT_CAB1-18	AERONET in Portugal	RP3	**1**	Determine atmospheric aerosol optical depth on climatic scales * Characterize aerosol optical and microphysical properties according to air mass * Investigate differences in aerosol properties between coast and inland * Characterize thin cloud optical depths and microphysical properties * Fulfill AERONET objectives * Recalibration within 12-month period as requested by AERONET. * This instrument is used together with 2 other Cimel sun photometers (Aeronet numbers #143, #248) at 2 stations (Évora and Cabo da Roca). The instruments are rotating for calibration. Using 3 instruments for 2 stations has the effect of avoiding measurement gaps due to calibration. For details of the other 2 instruments, see the respective form.	Intercalibration

AEGOA_ES_ALB1-18	Western Mediterranean Aerosol	RP3	**1**	One of the main objectives of this project is the characterization of aerosol optical and physical properties over Mediterranean Sea; one of the more climatically sensitive regions of the world with regard to aerosol effects. To accomplish this objective, we propose to install sun photometer CIMEL in Alborán Islet in the western Mediterranean Sea (35º 56´ 42´´ N, 3º 2´ 12´´ W). The location of Alborán Islet between African and European continents and the no presence of local anthropogenic aerosol sources in the site can offer us an excellent opportunity to identify and characterize distinct aerosol types originated from the different sources surrounding the Mediterranean sea. This will help as to understand the extent to which continental aerosols, both natural and anthropogenic, can be transported over the Mediterranean and to characterize the meteorological processes that are responsible for such transport. In addition, the measured aerosol data can allow us to fill up a gap in the knowledge of aerosol properties over the Mediterranean Sea and permit as the validations of satellite aerosol product and aerosol transport models as well as the evaluation of the aerosol models currently used for atmospheric corrections.	Intercalibration
AEGOA_UK_POL1-18	Aerosol optical depth at POLWET research station	RP3	1	The objectives of the project are: - to establish wetlands monitoring system and create the dedicated EO-based information service as a platform. - the information service on special portal based on Earth Observation (EO) data, capable to generate in an operational way a set of products as geo-information maps and indicators for the Ramsar sites in Poland. These will be useful for appropriate sustainable wetlands management and conservation, by offering the products such as: land use/land use changes, changes of water surface, floods extend, moisture conditions, biomass development and changes - evaluation of operational value of EO-based products proposed for wetland management, considering feedback from end-users and validation activities	Intercalibration

AEGOA_ES_GRA1-18	Vertical Profiling of microphysical properties of the atmospheric aerosol.	RP3	**1**	The aim of this project is to contribute to the advancement of the atmospheric aerosol research, in particular on those aspects that require additional improvement in order to increase our knowledge on its radiative forcing contribution. For this purpose a complete observational program is proposed in order to extend existing monitoring capabilities to the spectral dependence of the aerosol absorption, the vertical profiling of aerosol microphysical properties. These profiles will be used for the computation of radiative forcing and changes in the atmospheric heating rates. One of the various objectives of this project is to make continuous measurements of aerosol physical and optical parameters by Sun Photometer CIMEL at Sierra Nevada mountain in South-Eastern Spain (37º 6´ N, 3º 28´ W, 1830 m asl). This high altitude background station is about 15 km from Granada experimental station (located in the valley, 680 m a.s.l) where different instruments are operated. The simultaneous measurements over both stations can allow us to follow the change in the aerosol properties in the atmospheric column with low cost compared to aircraft measurements and studying the aerosol properties of anthropogenic particles injected by mountain-valley breeze winds into the lower free troposphere . In addition, high mountain site measurements can permit identifying the natural and anthropogenic sources of aerosols transported over long distances (i.e. desert dust, biomass burning smoke from large fires, regional-scale hazes of combustion aerosols, anthropogenic particles). Furthermore, aerosol data obtained at Sierra Nevada station can be used as constraints for Lidar measurements made at Granada station and for evaluating the microphysical aerosol properties at high altitude retrieved from Lidar measurements.	Intercalibration

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AEGOA_FI_KUO2-18	ACTRIS	RP3	**1**	At Kuopio we aim at astudying atmospheric fine particles and their effects on climate and health. In particular, remote sensing techniques are used to analyze satellite data on atmospheric aerosols. Furthermore, we study the impact of atmospheric particles on radiative transfer as a part of international AERONET and SolRad -Net â€“networks, and we develop a global UV radiation monitoring and forecasting system. Particles at different heights of the troposphere are examined with lidar measurements.	Intercalibration
AEGOA_ES_ARA1-18	Long term monitoring of aerosol properties over SW Spain	RP3	**1**	El Arenosillo was the first AERONET site operating in the Iberian Peninsula, providing routine monitoring of atmospheric aerosols. The Cimel data series now available at El Arenosillo allows an accurate and complete analysis of the aerosol optical depth in the area of study and a first climatological approach. The column data will be also compared to the surface aerosl properties obtained with in situ techniques at El Arenosillo station. The frequent desert dust events over this area are of special interest for this column-in situ comparison.	Intercalibration

AEGOA_ES_MON1-18	Aerosol optical properties at a continental background station	RP3	**1**	The main objective of the data determined from the photometer measurements is the determination of the aerosol columnar properties in a continental background environment with special interest in the long-range transport, especially the Saharan dust outbreaks. The short-term objective is the characterization of the aerosol properties under different air mass origins. In fact this task is currently in progress and we have presented some results in international congresses. We are also analyzing the influence of the planetary boundary layer on the aerosols affecting the station. The medium-range objectives are the comparison of the columnar properties with in-situ measurements performed by different instruments belonging to the Institute of Environmental Assessment and Water Research (IDAEA-CSIC). Moreover, the chemical properties would be compared with the optical and physical ones. The long-term objectives of the station are the climatological characterization of the aerosol properties according to the season and the air masses. Therefore, precise and periodic calibrations of the instruments are fundamental to achieve reliable climatologies and possible trends.	Intercalibration

AEGOA_NO_AND1-18	Aerosol characterization at high latitude using lidar and Cimel sun-photometer 2014	RP3	**1**	Aerosol characterization at high latitude using lidar and Cimel sun-photometer As part of a long-term strategy, Alomar has in the last seven years established instruments for making measurements in the troposphere. The focus is mainly to study aerosol dynamics and characterization, using instruments such as lidar and sun-photometer. The location of Alomar observatory makes it ideal both as a reference station for almost unpolluted, clean air coming from the north and north-west, and as a site to look at anthropogenic aerosol plumes that are transported from mid-latitudes and into the Arctic region. The Cimel sun-photometer (part of AERONET and RIMA) and the Alomar Troposphere lidar (part of the European Aerosol Lidar Network, EARLINET) will provide continuous long-term measurements of aerosols in the Arctic that can have relevance to the understanding of climate change. By combining the two remote sensing techniques we hope to enhance the science output. Both Cimel and Troposphere lidar will also be part of proposals for calibration and validation of the ESA/EU satellites ADM-Aeolus and Sentinel 5P in 2014. To obtain quality assured data it is of course crucial to have the Cimel sun-photometer calibrated routinely.	Intercalibration

AEGOA_ES_TAM1-18	Saharan Air Layer Analysis and Monitoring (SALAM)	RP3	**1**	In 2006 the Tamanrasset-Izaña "GAW-Twining" SALAM (Saharan Air Layer Air Mass characterization) project was initiated. This is part of a cooperation program between the "Office National de la Météorologie" (ONM, Algeria) and the former INM (now AEMET). In September 2006 was installed the AERONET and PHOTONS / RIMA Tamanrasset-INM Cimel station (see http://aeronet.gsfc.nasa.gov/cgi-bin/type_one_station_opera_v2_new?site=Tamanrasset_INM&nachal=2&level=1&place_code=10) Tamanrasset station is located in a strategic site, in the core of the Sahara. This project has the following objectives: 1. Monitoring and characterization of the Saharan Air Layer near dust sources. 2. Validation of regional and global dust models. 3. Validation of satellite-based dust measurements over high reflectivity ground conditions. 4. Enhance the dust early warning system in Northern Africa. Concerning the last objective this station is now also part of the Project "Sand and Dust Storm Early Warning System in the Magreb Region" (SDS-Africa).	Intercalibration
AEGOA_ES_IZO1-18	Global Atmospheric Watch (GAW) Izana	RP3	**1**	The Izaña Atmospheric Observatory is a Global Atmospheric Watch (GAW) station of global importance (see http://gaw.empa.ch/gawsis/reports.asp?StationID=7). Optical properties with the AERONET Cimel sunphotometer is part of the long-term aerosol GAW program. AOD and Alfa are routinely compared with GAW Precision Filter Radiometer (GAW-PFR) managed by the World Radiation Center (WRC). Izana is an AERONET station. See http://aeronet.gsfc.nasa.gov/cgi-bin/type_one_station_opera_v2_new?site=Izana&nachal=2&level=3&place_code=10	Intercalibration

AEGOA_ES_TEI1-18	Saharan dust characterization in Tenerife: vertical distribution with lidar and photometer	RP3	**1**	The privilegded location of the site, on top of the Teide mountain (3570m a.s.l) provides unique oportunity to analyze aerosol properties, in particular Saharan dust, at different heights from Sun photometers: Santa Cruz (at sea level), La Laguna (568m a.s.l.), Izana (2391m a.s.l.) and now Teide are four AERONET sites, all located in Tenerife island (Canary Islands, Spain). The aim of the project is to characterize the Saharan dust transported over the island at different heights, i.e., optical and microphysical properties derived from inversion of Sun/sky radiance data. Those data will be compared to the oprational Lidar observations in Santa Cruz. Finally, it would be possible to performed combined Lidar-sun photometer retrievals and investigate the performance of the inversion procedure in view of the available in situ aerosol measurements carried out by AEMET in Santa Cruz and Izana sites.	Intercalibration
AEGOA_ES_IZO2-18	Global Atmospheric Watch (GAW) Izana	RP3	**1**	The Izaña Atmospheric Observatory is a Global Atmospheric Watch (GAW) station of global importance (see http://gaw.empa.ch/gawsis/reports.asp?StationID=7). Optical properties with the AERONET Cimel sunphotometer is part of the long-term aerosol GAW program. AOD and Alfa are routinely compared with GAW Precision Filter Radiometer (GAW-PFR) managed by the World Radiation Center (WRC). Izana is an AERONET station. See http://aeronet.gsfc.nasa.gov/cgi-bin/type_one_station_opera_v2_new?site=Izana&nachal=2&level=3&place_code=10	Intercalibration

AEGOA_ES_IZO3-18	Global Atmospheric Watch (GAW) Izana	RP3	**1**	The Izaña Atmospheric Observatory is a Global Atmospheric Watch (GAW) station of global importance (see http://gaw.empa.ch/gawsis/reports.asp?StationID=7). Optical properties with the AERONET Cimel sunphotometer is part of the long-term aerosol GAW program. AOD and Alfa are routinely compared with GAW Precision Filter Radiometer (GAW-PFR) managed by the World Radiation Center (WRC). Izana is an AERONET station. See http://aeronet.gsfc.nasa.gov/cgi-bin/type_one_station_opera_v2_new?site=Izana&nachal=2&level=3&place_code=10	Intercalibration
AEGOA_ES_IZO4-18	Global Atmospheric Watch (GAW) Izana	RP3	**1**	The Izaña Atmospheric Observatory is a Global Atmospheric Watch (GAW) station of global importance (see http://gaw.empa.ch/gawsis/reports.asp?StationID=7). Optical properties with the AERONET Cimel sunphotometer is part of the long-term aerosol GAW program. AOD and Alfa are routinely compared with GAW Precision Filter Radiometer (GAW-PFR) managed by the World Radiation Center (WRC). Izana is an AERONET station. See http://aeronet.gsfc.nasa.gov/cgi-bin/type_one_station_opera_v2_new?site=Izana&nachal=2&level=3&place_code=10	Intercalibration
AEGOA_ES_ARE1-18	Long term monitoring of aerosol properties over SW Spain	RP3	**1**	El Arenosillo was the first AERONET site operating in the Iberian Peninsula, providing routine monitoring of atmospheric aerosols. The Cimel data series now available at El Arenosillo allows an accurate and complete analysis of the aerosol optical depth in the area of study and a first climatological approach. The column data will be also compared to the surface aerosl properties obtained with in situ techniques at El Arenosillo station. The frequent desert dust events over this area are of special interest for this column-in situ comparison.	Intercalibration

AEGOA_AT_VIE1-18	Characterization of the aerosol distribution over Vienna (Aero-V)	RP3	1	Combining CIMEL/AERONET-measurements with our already existing measurements, three main objectives will be studied: - Determine the aerosol load and its seasonal cycle over Vienna, retrieve microphysical and optical aerosol properties and connect the ground-based aerosol measurements with the erosol properties in the atmospheric column. - Perform measurements in the framework of the ERC Starting Grant A-LIFE (Absorbing aerosol layers in a changing climate: aging, lifetime and dynamics, 10/2015-09/2020) where an airborne field experiment focussing on mixtures of absorbing aerosols will be performed in Cyprus (April/May 2017). The combination with other remote sensing and in-situ techniques in the framework of A-LIFE will provide synergies for retrievals. - Determine the contributions of different aerosol species to light absorption.	Intercalibration

AEGOA_CH_PAY1-18	Combination of sun-sky-lunar photometer and lidar measurements for aerosol hygroscopic studies	RP3	1	The measurements of column-integrated physical and optical aerosol properties from this instrument will allow a better characterization of the aerosol over our station. In addition, we aim to combine lidar and sun-photometer measurements in order to retrieve profiles of microphysical properties. The combination of simultaneous information about the aerosol vertical structure provided by the lidar system and the columnar properties provided by the sun photometer has proven to be a promising synergetic tool for this purpose (Chaikovsky et al, 2012, Lopatin et al., 2013). All these measurements will be used in the SNF Ambizione project titled "Study of aerosol hygroscopic effect on optical and microphysical properties by means of remote sensing techniques". The general objective of this project is to contribute to the advancement of the atmospheric aerosol research, in particular on those aspects related with the aerosol hygroscopicity and their effect on the scattering of the radiation. The response of specific aerosol properties to variations in relative humidity is critical to determine the influence of the aerosol on climate. We also expect that the instrument becomes part of the AERONET network. The presence of Switzerland in this network is very scarce, with only one station located in the Eastern part of Switzerland (at Davos). In this sense, this new instrument would fill the lack of aerosol information in the western of Switzerland.	Intercalibration

AEGOA_DE_HOH1-18	Sun photometer measurements of aerosol properties at Hohenpeissenberg observatory	RP3	**1**	Hohenpeissenberg Meteorological Observatory (MOHP) is a GAW global station and part of the GAW-PFR AOD network. It is a regional Dobson calibration center and has long time series of ozone measurements with sondes and lidar as well as with Brewer and Dobson spectrometers. Additionally, the observatory will be equipped with a multi-wavelength Ramanlidar for aerosol profiling soon. We plan to participate with this aerosol lidar in EARLINET. MOHP is also responsible for the analysis of aerosol profiles from the DWD ceilometer network (55 Jenoptik CHM15k instruments distributed over Germany) for volcanic ash observations / warnings. With an AERONET instrument at MOHP we could provide data for studies on * the relationship between AOD, vertical aerosol profiling (ceilometer, lidar), and aerosol concentrations at ground level (from GAW in-situ measurements) * combination of multi-wavelength Ramanlidar with sun photometer for a discrimination of different aerosol types (e.g, between volcanic ash and sulfate aerosol, like in Ansmann et al. 2011) * use of the AERONET sun photometer data for the calibration of the DWD ceilometers around MOHP * use of the AERONET microphysical products for the estimation of volcanic ash concentrations from the data of the Raman lidar at MOHP or from the ceilometer network. * comparison between AERONET and GAW-PFR data * combination of AERONET and EARLINET data for combined retrievals of microphysical aerosol properties (we could provide data for ACTRIS WP20) * model validation	Intercalibration
AEGOA_MT_GOZ2-18	Gozo Aerosols	RP3	**1**	Monitoring of aerosols especially Etna emissions in the Central Mediterranean.	Intercalibration

AEGOA_NO_NYA1-18	AWI: Year-round observation of atmospheric aerosols in the Arctic	RP3	**1**	The objective is to monitor aerosol optical properties during both summer and winter periods, using solar and lunar observations to derive aerosol optical depth. During summer, the sky radiances will also allow the use of inversion procedures to retrieve advanced optical and microphysical properties of the aerosol. The instrument will be located at the german base of the Alfred Wegener Institute (AWI), co-located with the aerosol lidar KARL, thus allowing combined retievals of lidar+photometer using algorithms like GRASP.	Intercalibration
AEGOA_PT_EVO1-18	AERONET in Portugal	RP3	**1**	Determine atmospheric aerosol optical depth on climatic scales * Characterize aerosol optical and microphysical properties according to air mass * Investigate differences in aerosol properties between coast and inland * Characterize thin cloud optical depths and microphysical properties * Fulfill AERONET objectives * Recalibration within 12-month period as requested by AERONET. * This instrument is used together with 2 other Cimel sun photometers (Aeronet numbers #143, #248) at 2 stations (Évora and Cabo da Roca). The instruments are rotating for calibration. Using 3 instruments for 2 stations has the effect of avoiding measurement gaps due to calibration. For details of the other 2 instruments, see the respective form.	Intercalibration
AEGOA_FI_HEL2-18	Characterization of aerosol optical properties over Helsinki	RP3	**1**	Provide long time series of quality data on atmospheric composition in a sparsely sampled environment in Northern Europe and the Arctic; satellite calibration and validation.	Intercalibration
AEGOA_FI_SOD1-18	Ground-based AOD measurements in northern Finland	RP3	**1**	CIMEL is part of an instrument suite aimed at cloud studies: cloud radar, doppler lidar and in-situ measurements of aerosol and cloud properties and will therefore operate in cloud mode. Recalibration within 12-month period as requested by AERONET.	Intercalibration
AEGOA_DE_LIN1-18		RP3	**1**		Intercalibration

AEGOA_UK_OXF1-18	Observatory of Lake Responses to Environmental Change	RP3	1	Measurements from Cimel CE 318-2 automatic tracking sun photometer over Loch Leven will be used to build a match up database with current ESA and NASA EO missions. The database will be used for climate change and atmospheric radiation budget modeling, satellite validation studies, global and regional aerosol transport modeling, atmospheric correction and water color observations.	Intercalibration
AEGOA_DE_TAB1-18	Effect of aerosols on solar energy utilization	RP3	**1**	Short and medium term objectives: Aerosol properties are very relevant for the calculation of direct irradiance, which is the resource for concentrating solar power (CSP) plants. The uncertainties of aerosol data cause uncertainties in the calculation of DNI which has to be reduced. Providing measurements to the community increases these Aerosols are the most relevant atmospheric scatterers beside clouds. Thus they are relevant for circumsolar radiation. The exact understanding of circumsolar radiation is required for performance analysis of CSP. Long term objectives: For the analysis of the atmospheric boundary layer LIDAR systems can be used. For the calibration of LIDAR instruments sun photometric measurements will be used. Analyis of the influence of aerosols on irradiometer calibration using the sun as light source.	Intercalibration

AEGOA_UK_CHI1-18	Transnational Access to AERONET-EUROPE Calibration Service	RP3		The sunphotometer is part of the suite of atmospheric measurement instruments and operates continuously for monitoring aerosol, water vapour and cloud at the NERC Chilbolton Facility for Atmospheric and Radio Research at STFC Chilbolton Observatory in the southern UK. Firstly, aerosol optical depth measured by the sunphotometer is used with lidar measurements at similar wavelengths to derive the lidar ratio and hence give information on aerosol type. In addition, a Grimm Technik Environmental Dust Monitor has recently been installed at the site, giving aerosol size data at ground level. This provides an excellent opportunity to perform a long-term intercomparison in aerosol size distribution between the sunphotometer and the new Dust Monitor, which will greatly enhance aerosol measurements and improve retrievals not only at Chilbolton, but also other sites in the ACTRIS network. Secondly, measurements of integrated water vapour from the sunphotometer are routinely compared with those from a co-located microwave radiometer, giving a long-term intercomparison of the performance of the 2 instruments. Thirdly, radiance measurements taken from the sunphotometer are used for retrieving cloud properties. As planned in a new COST action entitled “TOPROF - Towards Operational ground based PROFiling with ceilometers, Doppler lidars and microwave radiometers for improving weather forecasts”, we will calibrate solar background light in ceilometers’ data against sunphotometer radiance and then provide novel cloud property retrievals. Since the success of cloud retrievals highly depend on the uncertainty in radiance measurements, reliable calibrations of the sunphotometer are essential.	Intercalibration

AEGOA_NO_BIR2-18	Monitoring of greenhouse gases and aerosols at the Zeppelin Observatory, Svalbard, and Birkenes Observatory, Aust-Agder, Norway	RP3	**1**	National monitoring of climate gases and selected aerosol properties Since1991, in commission for the Norwegian Climate and Pollution Agency, NILU is running a programme for monitoring greenhouse gases on Svalbard. In 2010 the monitoring programme was extended to also include the new observations from Birkenes of the greenhouse gases CO2 and CH4 and selected aerosol observations relevant for the understanding of climate change. The AERONET; aerosol depth, measurements from Birkenes are now a part of this programme. Specific objectives are to provide continuous long-term measurements resulting in high quality data that can be used in trend analysis, provide results of aerosol observations of relevance to the understanding of climate change, and indicate source regions with high influence on the measurements. In addition, contribution to the general AERONET Earth-Observation validation data set is anticipated.	Intercalibration
AEGOA_ES_ARE2-18	Long term monitoring of aerosol properties over SW Spain	RP3	**1**	El Arenosillo was the first AERONET site operating in the Iberian Peninsula, providing routine monitoring of atmospheric aerosols. The Cimel data series now available at El Arenosillo allows an accurate and complete analysis of the aerosol optical depth in the area of study and a first climatological approach. The column data will be also compared to the surface aerosl properties obtained with in situ techniques at El Arenosillo station. The frequent desert dust events over this area are of special interest for this column-in situ comparison.	Intercalibration
AEGOA_FI_MAR1-18	Long term monitoring of aerosol properties over Marambio (Antarctica)	RP3	1	Antarctic stations have very low AOD values throughout the season, representative for AOD background values comparable to measurements at high-altitude stations. It is intended to monitor this variable and compare to the co-located GAW-PFR station.	Intercalibration

AEGOA_IT_LAM1-18	Aerosol optical properties measurements at Lampedusa island	RP3	1	Lampedusa island represents an "open sea" observational site, ideal to carry out measurements aimed at studying the evolution of the atmospheric composition, and the impact of various contituents, such as ozone, water vapour, aerosols and clouds, on the radiative budget. The Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) maintains the Station for Climate Observations in Lampedusa since 1997. Greenhouse gases concentrations, shortwave (UV, visible, and the whole solar interval) and longwave irradiances, columnar ozone and water vapour, aerosol optical depth, cloud cover, meteorological parameters, temperature and humidity profiles are routinely measured. The fresh calibration of Cimel sunphotometer will ensure the availability of high quality measurements of aerosol properties for long-term observations.	Intercalibration
AEGOA_ES_ARE3-18	Long term monitoring of aerosol properties over SW Spain	RP3	1	El Arenosillo was the first AERONET site operating in the Iberian Peninsula, providing routine monitoring of atmospheric aerosols. The Cimel data series now available at El Arenosillo allows an accurate and complete analysis of the aerosol optical depth in the area of study and a first climatological approach. The column data will be also compared to the surface aerosl properties obtained with in situ techniques at El Arenosillo station. The frequent desert dust events over this area are of special interest for this column-in situ comparison.	Intercalibration
AEGOA_ES_CEN1-18	Aerosol monitoring at the BSRN station at CENER	RP3	1	The sun photometer is located on the roof of the main building of CENER, on the top of a platform near to the BSRN station. The main objective is to monitor the aerosol properties so that they can be related to solar radiation studies.	Intercalibration

AEGOA_ES_TEI1-19	Saharan dust characterization in Tenerife: vertical distribution with lidar and photometer	RP3	**1**	The privilegded location of the site, on top of the Teide mountain (3570m a.s.l) provides unique oportunity to analyze aerosol properties, in particular Saharan dust, at different heights from Sun photometers: Santa Cruz (at sea level), La Laguna (568m a.s.l.), Izana (2391m a.s.l.) and now Teide are four AERONET sites, all located in Tenerife island (Canary Islands, Spain). The aim of the project is to characterize the Saharan dust transported over the island at different heights, i.e., optical and microphysical properties derived from inversion of Sun/sky radiance data. Those data will be compared to the oprational Lidar observations in Santa Cruz. Finally, it would be possible to performed combined Lidar-sun photometer retrievals and investigate the performance of the inversion procedure in view of the available in situ aerosol measurements carried out by AEMET in Santa Cruz and Izana sites.	Intercalibration
AEGOA_MT_GOZ3-18	Gozo Aerosols	RP3	**1**	Monitoring of aerosols especially Etna emissions in the Central Mediterranean.	Intercalibration
AEGOA_FI_SOD1-19	Ground-based AOD measurements in northern Finland	RP3	**1**	CIMEL is part of an instrument suite aimed at cloud studies: cloud radar, doppler lidar and in-situ measurements of aerosol and cloud properties and will therefore operate in cloud mode. Recalibration within 12-month period as requested by AERONET.	Intercalibration
AEGOA_FI_KUO1-19	ACTRIS	RP3	**1**	At Kuopio we aim at astudying atmospheric fine particles and their effects on climate and health. In particular, remote sensing techniques are used to analyze satellite data on atmospheric aerosols. Furthermore, we study the impact of atmospheric particles on radiative transfer as a part of international AERONET and SolRad -Net â€“networks, and we develop a global UV radiation monitoring and forecasting system. Particles at different heights of the troposphere are examined with lidar measurements.	Intercalibration

AEGOA_FI_HEL1-19	Characterization of aerosol optical properties over Helsinki	RP3	**1**	Provide long time series of quality data on atmospheric composition in a sparsely sampled environment in Northern Europe and the Arctic; satellite calibration and validation.	Intercalibration

Acronym	**Title**	**Reporting Period**	**Amount of access (CAL)**[3]	**Objectives**	**Description of work**
AEIZA_CH_BEI1-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIIZA_CH_BEI2-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_SP_VAL1-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_SP_VAL2-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_FR_LIL1-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_FR_LIL2-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_CH_BEI3-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration

[3] CAL: calibration

Acronym	Title	Reporting Period	Amount of access (CAL)[3]	Objectives	Description of work
AEIZA_FR_TOU1-18	Absolute Calibration of Sunphotometer	RP3	5	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_SP_VAL3-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_SP_VAL4-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_FR_LIL3-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_FR_LIL4-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROPE	Absolute calibration
AEIZA_CH_BEI4-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROP	Absolute calibration
AEIZA_SP_VAL5-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROP	Absolute calibration
AEIZA_SP_VAL6-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROP	Absolute calibration
AEIZA_FR_LIL5-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROP	Absolute calibration

Acronym	Title	Reporting Period	Amount of access (CAL)[3]	Objectives	Description of work
AEIZA_FR_LIL6-18	Absolute Calibration of Sunphotometer	RP3	1	calibration of reference instrument for GOA operation in AERONET-EUROP	Absolute calibration