

Deliverable D2.7: Second report on technical upgrades and QA activities at EARLINET and Cloudnet stations

Ulla Wandinger, Ewan O'Connor, Volker Freudenthaler

Work package no	WP2
Deliverable no.	D2.7
Lead beneficiary	TROPOS
Deliverable type	<input checked="" type="checkbox"/> R (Document, report) <input type="checkbox"/> DEC (Websites, patent fillings, videos, etc.) <input type="checkbox"/> OTHER: please specify
Dissemination level	<input checked="" type="checkbox"/> PU (public) <input type="checkbox"/> CO (confidential, only for members of the Consortium, incl Commission)
Estimated delivery date	Month 24
Actual delivery date	30/04/2017
Version	
Comments	

This report summarizes the status of ACTRIS aerosol and cloud profiling stations during the second year of the ACTRIS-2 project. A map of EARLINET and Cloudnet stations is shown in Fig. 1. Station IDs are related to the full station names in Tab. 1. Reporting sheets summarizing the status of instrumentation, data delivery, upgrades, and performed quality checks of all EARLINET and Cloudnet stations are provided in Sec. 1 and 2, respectively. Sec. 3 gives an overview on the required QA tests for EARLINET stations.

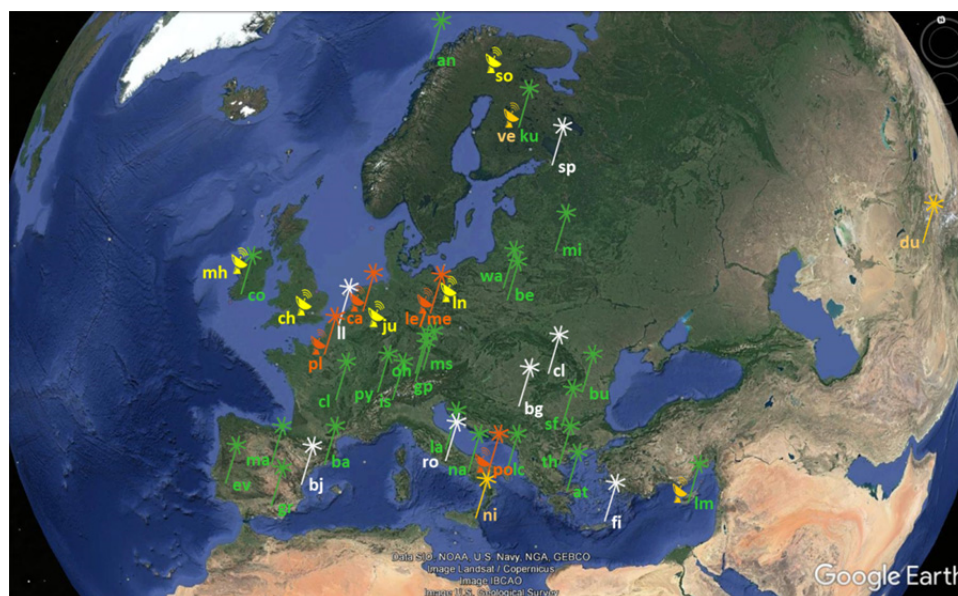


Fig. 1: Map of EARLINET and Cloudnet stations. Orange: combined EARLINET/Cloudnet stations, yellow: Cloudnet stations, green: permanent EARLINET stations, dark yellow: non-permanent stations, white: joining EARLINET stations.

Tab. 1: EARLINET and Cloudnet station IDs and full names

EARLINET permanent stations					
an	Andoya	at	Athens	ba	Barcelona
be	Belsk	bu	Bucharest	ca	Cabauw
cl	Clermont-Ferrand	co	Cork	ev	Evora
gp	Garmisch-Partenkirchen	gr	Granada	is	Ispra
ku	Kuopio	la	L'Aquila	lc	Lecce
le	Leipzig	lm	Limassol	ma	Madrid
mi	Minsk	ms	Maisach	na	Naples
oh	Obs. Hohenpeissenberg	pl	Palaiseau	po	Potenza
py	Payerne	sf	Sofia	th	Thessaloniki
wa	Warsaw				
EARLINET non-permanent stations					
du	Dushanbe	me	Melpitz	ni	Nicolosi and Catania
EARLINET joining stations*					
bg	Belgrade	bj	Burjassot	cj	Cluj-Napoca
fi	Finokalia	ll	Lille	ro	Rome Tor Vergata
sp	Sankt Petersburg				
Cloudnet stations					
ca	Cabauw	ch	Chilbolton	ju	Jülich
mh	Mace Head	le/lm	Leipzig/Limassol**	ln	Lindenberg
pl	Palaiseau	po	Potenza	so/ve	Sodankylä/Vehmasmäki**

* Stations which have applied for EARLINET but which are not yet fully integrated

** Same Cloudnet equipment applied at different locations

Section 1

EARLINET Station Reports

Period: April 2016 – March 2017

Summary

- **Regular observations:** Regular measurements following the EARLINET schedule have been performed at 26 out of 28 permanent stations and at one non-permanent station. However, several stations could not operate continuously during the reporting period, mainly because of technical problems (7 stations reported longer off-times due to laser failures), ongoing upgrades or operation of the systems in field experiments and intercomparison campaigns. One station is under reconstruction and one station was not operated because of lack of personnel.
- **QA tests:** Most of the active stations performed the QA tests (23 out of 28 permanent stations, one non-permanent station and three joining stations).
- **Data submission:** 19 out of 26 permanent stations performing regular measurements submitted the data to the database on a regular basis. The other stations still work on data quality or testing of SCC procedures.
- **Use of Single Calculus Chain (SCC):** The SCC is increasingly used in the network, but most stations are still in the testing phase. Eight stations reported regular use of the SCC, while 10 of the permanent stations and also some of the joining stations started familiarization and testing with the SCC. The LiCal Training Workshop in February 2017 helped many users to get started with the SCC.
- **Handbook of Instruments (Hol):** The Hol is up-to-date for 24 out of 28 permanent stations as well as for one non-permanent and four joining stations. Recent updates are reported as major reason for missing data in the Hol.
- **Upgrades:** Upgrades and modifications to systems were reported by 11 permanent stations. The upgrades comprise new measurement channels (rotational Raman, polarization), near-range receivers, and data acquisition. One station is under reconstruction and one system underwent an extensive testing after major upgrades.

Station **Andoya (an)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Measurements have been performed regularly in 2017. In 2016, test measurements after maintenance period were performed regularly to align and adjust the system.

Internal quality checks have been performed

Yes No

Comment:

Several rounds of quality checks have been performed, and some have been assessed by V. Freudenthaler during the period. (TNA-request submitted fall 2016)

Data have been regularly submitted to the database

Yes No

Comment:

Data from 2010-2013 have been uploaded. New measurements of satisfactory quality have been submitted after careful evaluation.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

All measurements evaluated with SCC.

Handbook of Instruments is up-to-date

Yes No Checked on: 2016/08/02

Comment:

New Excel-sheet sent to V. Freudenthaler. SCC-HOI also updated.

Upgrades and status changes during the reporting period, other comments

System has been undergoing major maintenance since 2013-04. Test measurements and adjustments in 2016 (whole year), with regularly performed covertests and Rayleigh Fit's. New measurements will be uploaded to the database after analysis of QA-tests submitted in March 2017 have been completed.

Station **Athens (at)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Measurements have been regularly performed (under clear sky conditions) except the first three months of the year 2017. This was due to the upgrade of our Raman channels at 387 and 607 nm, where the analog detection mode was added (in compliance with the guidelines provided by the intercomparison campaign with MUSA, performed on September-October 2016).

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Handbook of Instruments is up-to-date

Yes No Checked on: 2017/03/01

Comment:

Upgrades and status changes during the reporting period, other comments

Upgrade of the 387-607 nm Photon counting channels to Analog+Photon ones (compliance with the guidelines provided by the Athens Intercomparison Campaign performed on September-October 2016).

Station **Barcelona (ba)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

We are in the process of validating the SCC inversions of our measurements in order to be able to use the SCC and then upload SCC products to the database.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Handbook of Instruments is up-to-date

Yes No Checked on: 2016/12/15

Comment:

Upgrades and status changes during the reporting period, other comments

The UPC multi-wavelength system is equipped since beginning of 2016 with a 7th channel: cross-polarized component at 532 nm.

Station **Belsk (be)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data are submitted up to August 2016, data are being uploaded now through SCC

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Data are being evaluated with SCC now. See aforementioned point.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

Station **Bucharest (bu)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Only for testing purposes. After the cloud screening module will be implemented, the SCC will be the main processing tool for the Bu station.

Handbook of Instruments is up-to-date

Yes No Checked on: 2016/10/26

Comment:

New upgrades to the instrument required an updated version of the HOI.

Upgrades and status changes during the reporting period, other comments

During the reporting period, the lidar instrument had been upgraded: a new laser module was installed. New specs include:

- from 10 Hz to 20 Hz
- higher energy on IR and UV

Future upgrades include - optimized emitting optics (no beam expander) and motorized alignment mounts

Station **Cabauw (ca)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

In the first half year of 2016, regular measurements have been performed. After the intensive observation period in September 2016 (CINDI-2), there was lack of manpower.

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Preference for submitted data is given to campaign data (e.g. CINDI-2)

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

SCC configuration needs to be verified with in-house processing.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

None

Station **Clermont-Ferrand (cl)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Problems with NetCDF input files formatting, but should be resolved since the LicalTrain in February 2017 (one set has been successfully evaluated during the training), so data should be evaluated regularly for the next period.

Handbook of Instruments is up-to-date

Yes No Checked on: 15/03/2017

Comment:

Upgrades and status changes during the reporting period, other comments

The receiving box of our lidar was upgraded in October 2016. The first beamsplitter which separated the 355 nm with the 387/408nm was a bad quality highpass component : the diattenuation of this component was range dependent (due to an unappropriate bandpass at 355nm). So we have replaced it by a lowpass beamsplitter, which means we had to permute all the channels (thus, to redesign the receiving box).

New quality-check measurements was performed in November 2016, in accordance with this new configuration.

The laser broke down in June 2016. It has been sent to Quantel for maintenance and we received it in October. However, it still has a serious problem of energy because we could not afford the repairing last year. We should be able to buy a new laser (or a new laser head) for the next period.

Station **Cork (co)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

A total of 69 measurements were performed during this reporting period, 7 of which have yet to be analysed. Out of the 38 uploaded files, 50% were on the scheduled EARLINET times.
60% of measurements were unsuitable for upload due to technical issues or low cloud.
40% of the analysed data were uploaded to the EARLINET database as level 1.5 data.

Internal quality checks have been performed

Yes No

Comment:

Telecover tests, Rayleigh fit and depolarisation calibration tests sent for QA at the end of July 2016. Expected to send more up to date tests for QA in April.

Data have been regularly submitted to the database

Yes No

Comment:

37 datafiles (acquisition time 30 min) have been uploaded since the last reporting period. Only unpolarized (total) elastic backscatter values have been included so far. Depolarisation ratio values will be included in files once evaluated with SCC.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Will be used in due course. Up to now measurements have been processed with homemade software.

Handbook of Instruments is up-to-date

Yes No Checked on: 2016/03/16

Comment:

Upgrades and status changes during the reporting period, other comments

Technical issues with depolarisation channels found after QA assessment, issue resolved from end October 2016.

General progress has been delayed due to health issues and limited man-power.

Data acquisition PC failed in late February 2017, issue resolved as of 21st March 2017. System re-alignment and internal checks are in progress.

Station **Evora (ev)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

The measurements started regularly at the end of April, after the reparation of the laser head, and the scheduling was respected till the beginning of June, then the laser had still problems that were solved only at the beginning of February 2017 (system worked only 77 days during the considered period).

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

The problems with the laser heads (we have 2) are really serious. We received back the lasers we sent for reparation after almost 3 months and when at the end of 2016, we installed the one (L1) that was previously installed on the PAOLI system (aiming to maintain the optical alignment that was very good). After 2 days the electronic burned and we had to replace the laser with the other one (L2). The PAOLI performed measurements for 1 week and then the DAQ of the 1064 and 607R channels started to have problems (this was the 3rd time that that happened). Fortunately, TROPOS (Ronny) sent us very quickly 2 'old' Acquisition Cards and we were able to restart PAOLI in full configuration. Clearly there is a problem in the system: maybe the power unit or maybe the PMT box or the 1064 thermo-regulation module. In the last 3 year we replaced a lot of electronic components without knowing and understanding the reasons for the malfunctions.

We would like to ask for a complete revision of the POLLY and a full wiring scheme of the system, in order to understand and to be in condition to minimize the occurrence of future problems.

Station **Garmisch-Partenkirchen (gp)** Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

There have been several interruptions due to failures of the laser system that is meanwhile more than 22 years old.

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

All measurements for the only data-acquisition period May 2016 - July 2016 were evaluated and archived in near real time.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

313-nm channel is missing, but will be added soon: Thank you for reminding!

Upgrades and status changes during the reporting period, other comments

NDACC lidar is currently (2017) integrated into the ozone DIAL due to permanent damage of the lidar container and its components.

Station **Granada (gr)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

EARLINET scheduled measurements with MULHACEN (LR331-D400) and VELETA (LR111-ESS-D200) have been performed and additionally an intensive measurement period has been developed during SLOPE campaign. Since August 2016 the measurements with VELETA stopped due to technical failure (its laser will be reinstalled during the first half of 2017).

Internal quality checks have been performed

Yes No

Comment:

MULHACEN (LR331-D400) is under upgrade for implementing the rotational Raman channels. In this sense the checks will be performed as soon the set up of rotational Raman channels will be finished. VELETA (LR111-ESS-D200) quality checks will be performed after installation of the new laser head.

Data have been regularly submitted to the database

Yes No

Comment:

We are submitting data in batches including several months.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Not for this period. Regular measurements are processed with in-house software. Some members of the team have attended the 2nd LiCalTrain Workshop (Bucharest) and included some examples in the SCC. After upgrading MULHACEN channels will be included in the SCC and data will be processed with it.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

After upgrading MULHACEN the handbook will be updated.

Upgrades and status changes during the reporting period, other comments

Optical separation unit of MULHACEN has been upgraded in January 2017 to replace 387 nm by 353.9 nm and 607 nm by 531 nm.
VELETA old laser source will be replaced with a new one with the same specification in the first semester of 2017.

Station **Ispra (is)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Still working at implementing the SCC for the lidar system run in Ispra.
Final issues shall be solved within 1-2 weeks.
SCC outputs will be submitted by the end of April 2017.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Polarisation calibration measurements uploaded and evaluated.

Handbook of Instruments is up-to-date

Yes No Checked on: 2017/03/22

Comment:

Issues still occur.

Upgrades and status changes during the reporting period, other comments

Station **Kuopio (ku)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Measurement have been performed regularly until 10 January 2017. After this the system was sent for maintenance and upgrade.

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Single cases have been tested.

Handbook of Instruments is up-to-date

Yes No Checked on: 2017/03/28

Comment:

Upgrades and status changes during the reporting period, other comments

After the on-going upgrade the system will have a second depol channel (355 nm), 2+2 near-field telescope (355 & 532 + 387 & 607) and improved height resolution (7.5 m). The HOI needs to be updated accordingly after the upgrade.

Station **L'Aquila (Ia)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Please see comments below.

Internal quality checks have been performed

Yes No

Comment:

Please see comments below.

Data have been regularly submitted to the database

Yes No

Comment:

Please see comments below.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Please see comments below.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Please see comments below.

Upgrades and status changes during the reporting period, other comments

We are still in the construction phase of the new multiwavelength lidar (3+2+dep).
First measurements are forecast in summer.

Station **Lecce (lc)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

We decided to use our home-made procedure since the used lidar ratios are based on simultaneously monitored AODs from Aeronet.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

Station **Leipzig (le)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

EARLINET Measurements have been performed with PollyXT_OCEANET, PollyXT_NOA, and MARTHA.

Internal quality checks have been performed

Yes No

Comment:

Telecover test for PollyXT_OCEANET is missing. It will be delivered as soon as the laser is repaired.
MARTHA: all QA tests performed and analyzed at TROPOS, but not submitted yet because optimization of system performance is still ongoing.

Data have been regularly submitted to the database

Yes No

Comment:

Most data from PollyXT_NOA

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Yes, but in the developers version only (parts have been transferred to the public one).
First new MARTHA data in the operational SCC!

Handbook of Instruments is up-to-date

Yes No Checked on: 2017/04/20

Comment:

PollyXT_OCEANET up to date. PollyXT_TROPOS was recently upgraded and updated HOI submitted. PollyXT_NOA was recently upgraded and updated HOI submitted. MARTHA up to date with respect to EARLINET, but not on the internal webpage (sent already last June).

Upgrades and status changes during the reporting period, other comments

MARTHA was upgraded with new depol channels for scientific cloud studies.
PollyXT_OCEANET was operated 2 months (Jan - Mar 2017) in Melpitz (me), 40 km away from Leipzig (non-permanent EARLINET station).
PollyXT_NOA has measured in Leipzig half a year and was upgraded with a 4-channel near-range receiver (before 2-channel) and installed in a new container.

Station **Limassol (Im)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Technical problems of the laser didn't allow us to follow the EARLINET measurements protocol. Some measurements were performed in summer 2016 during fire activity.

Internal quality checks have been performed

Yes No

Comment:

Performed, but not yet submitted under TNA.

Data have been regularly submitted to the database

Yes No

Comment:

Only few measurements were performed during the reporting period. Data published in literature have been submitted and published in the database.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

So far only in-house software is used for the analysis of the data. SCC netcdf files are available for evaluation with SCC.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

No changes have been made that influence the Hol.

Upgrades and status changes during the reporting period, other comments

Due to the laser failures, the laser finally was sent to the laser factory in August 2016 and was received back in February 2017.

Station **Madrid (ma)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

However, the submission to DB of data obtained in the last three months is still pending, because this year we are checking our data against some results from the nearest AERONET station (located at 500 m from CIEMAT) and those data are not yet available.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

We are planning to start soon the evaluation of our data with the SCC. In fact we have attended the Webex session of the 2nd LiCalTrain Workshop (Bucharest) that included some classes about SCC. Soon we will contact Giuseppe D'Amico.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

Station **Minsk (mi)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Regular measurements with MSTL-2 lidar system are carried out in Minsk.
MRL-Mobile system are used for seasonal measurements in the Antarctic.

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Regular measurements are processed with in-house software.

Handbook of Instruments is up-to-date

Yes No

Checked on: 2016/05/03

Comment:

Upgrades and status changes during the reporting period, other comments

To improve the quality of lidar data we designed the integrated analog photoreceiving modules with A / D converter, 16 bit, 20 MHz and developed new lidar operational software.

Station **Maisach (ms)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Lack of personnel

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

see above

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

see above

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

Station **Napoli (na)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Measurements were regularly performed in Napoli with MALIA lidar system following EARLINET measurement scheduling until 29 September. Since 30 September the laser system have had problems that required extraordinary maintenance. The laser problems are still not resolved but we are planning to restart with measurement in April 2017.

Internal quality checks have been performed

Yes No

Comment:

Internal quality check were not performed since in spite of several attempts to perform measurements of the Telecover tests in Naples, we had few opportunity to apply QA tools due to both technical problems and bad weather conditions.

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Regular measurement were processed using our software; we are planning to process our data with SCC as soon as possible.

Handbook of Instruments is up-to-date

Yes No Checked on: 2016/03/18

Comment:

Upgrades and status changes during the reporting period, other comments

Station **Obs. Hohenpeißenberg (oh)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

lastest telecover in Sep 2016, depol calibration with each measurement

Data have been regularly submitted to the database

Yes No

Comment:

Data of Jan-Oct 2016 were submitted, analysis of data since Oct 2016 is still ongoing.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Handbook of Instruments is up-to-date

Yes No Checked on: 2017/02/24

Comment:

Hol was not provided as xls-table, but Hol tables of SCC are filled basically.

Upgrades and status changes during the reporting period, other comments

no changes of the instrument

Station **Palaiseau (pl)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

65 days of measurements have been performed for the period.

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

IPRAL lidar system suffered from severe laser problems in 2016 that prevented us to have good internal quality check and make enough good measurements to be submitted.

However, some 2016 measurements need to be closely analyzed in 2017 and might fit data quality checks to be submitted as of February 2017 laser problems have been solved. +

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

We have been trained for SCC features during the latest Licel Training session organized in Bucharest in February 2017. HOI configuration is done and just need to be completed with latest correct optical specs. Preliminary IPRAL lidar data were successfully used for retrievals with different usecases.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

IPRAL lidar system suffered from severe laser problems in 2016 that prevented us to have good internal quality check and make enough good measurements to be submitted. Laser energy was periodically inconsistent and was sometimes completely degraded in August, October and December 2016. Corrective laser repairs were performed several times and internal quality checks were regularly realized to evaluate system performance. Latest complete laser corrective repair was performed on January 30, 2017. As of February 2017 laser problems have been solved, latest internal quality check signal of the 387 nm in far field telescope were questioned. Then some tests were performed to test Licel ADP module. After March 16, 2017 PMTs of 408 and 387 channel were exchanged. Following this modification, no problem neither on 387 nm nor 408 nm were observed.

Station **Potenza (po)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Except during the period 16 September 2016 - 29 January 2017, because of the lidar intercomparison campaign ATHLI16 and a necessary maintenance of the MUSA container after the system came back to Potenza.

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

All data analysed and submitted for the period until May 2015. A system has been now put in place for analysing and submitting data more regularly.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Handbook of Instruments is up-to-date

Yes No

Checked on: 2017/03/28

Comment:

Upgrades and status changes during the reporting period, other comments

No upgrades and status changes for MUSA during the reporting period.

Station **Payerne (py)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

From October 2016 till January 2017, the system underwent a significant upgrade and the measurements have been disrupted for almost the whole period. That's the time of the year when the internal quality check is normally performed.

Data have been regularly submitted to the database

Yes No

Comment:

Only the period from October 2016 till January 2017 has been with very few data.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Data have passed the TQC and the PQC on February 2017.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

The 354-356 nm PRR signal has been improved (higher received power) at the end of 2016. The acquisition system software has been renewed and improved. The water vapour is now internally and automatically calibrated.

Station **Sofia (sf)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Measurement have not been performed in worse meteorological conditions - rain, thick smog etc.

Internal quality checks have been performed

Yes No

Comment:

A heavy reconstruction of the lidar was made in the end of 2015 and the beginning of 2016. We missed the good weather with clear sky, without clouds and smog in summer. We'll perform such checks in this spring.

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

For data evaluating we use a software system developed in the Institute of Electronics which works in MATLAB v.5.

Handbook of Instruments is up-to-date

Yes No Checked on: 2017/03/27

Comment:

The new lidar configuration of sf01 lidar is not described till now. We shall send information about the new Cu-Au-laser and the reconstructed acquisition channels at 3 wavelengths.

Upgrades and status changes during the reporting period, other comments

The Cu-Br-vapor laser of the lidar sf01 was replaced by a Cu-Au-vapor laser, which generates 3 wavelengths - at 510.6 nm, 578.2 nm and 627.8 nm. After the necessary restructuring of the lidar system, we started testing measurements of the atmospheric aerosol profiling at the three laser wavelengths. Next to instrument improvements, efforts were performed to set up an user-friendly product chain, reaching from speedily visualization of measurements to statistical and climatological products based on our observations. The termination of the task of lidar measurements visualization at three wavelengths gives a possibility to display more informative time-height diagrams (quick-looks) of lidar measurements (see <http://www.ie-bas.org/Departments/LidarData/Quicklooks.htm>).

Station **Thessaloniki (th)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data have been submitted till the end of 2016.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

The data uploaded to the database are processed with our operational algorithm. In parallel we also process the data with SCC but we don't use it operational yet.

Handbook of Instruments is up-to-date

Yes No

Checked on: 2017/03/17

Comment:

Upgrades and status changes during the reporting period, other comments

No upgrades during the reporting period. Problems with a mirror in the telescope prevented from analyzing the performed measurements in early 2016.

Station **Warsaw (wa)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Quasi-continuous observations with Polly-XT were performed in EARLINET measurement schedule, when possible. Low number of measurements during certain periods is due to problem with new laser head (13/04/2016 - 07/06/2016). From 14/04/2016 data are stored with NR and FR FOV.

Internal quality checks have been performed

Yes No

Comment:

Telecover test performed on 19/05/2015 is representative for entire period. Telecover test on 12/05/2016 is representative for (new laser head) operation period. Telecover was done for NF and FF detection. Rayleigh fits are available. Depolarization calibration (+/- 45deg) is performed twice a day.

Data have been regularly submitted to the database

Yes No

Comment:

Profiles evaluated for 2013 to 2015 are finalized in the data base. Profiles for 2016 are evaluated, they will be finalized by due date.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

We intend to contribute data to the SCC, however due to temporary lack of woman power (maternity leave) progress will be slowed down until 31/07/2017.

Handbook of Instruments is up-to-date

Yes No Checked on: 2017/03/31

Comment:

Upgrades and status changes during the reporting period, other comments

Station **Dushanbe (du)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Dushanbe is a non-permanent station. Measurements were performed until 31 August 2016. Then, PollyXT_TROPOS was transported back to Leipzig for upgrade.

Internal quality checks have been performed

Yes No

Comment:

In-house analysis at TROPOS was performed (no submission).

Data have been regularly submitted to the database

Yes No

Comment:

Data are under evaluation. So far, only one test case has been uploaded.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

No need so far. Work still in progress.

Handbook of Instruments is up-to-date

Yes No Checked on: 2017/04/20

Comment:

Upgrades and status changes during the reporting period, other comments

PollyXT_TROPOS was upgraded with a 4-channel near-range receiver after coming back from Tadjikistan and is now installed at Haifa, Israel. A new system is under development for permanent deployment at Dushanbe.

Station **Belgrade (bg)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Some measurements for internal database have been performed for specific case studies, e.g. dust intrusion episodes, but measurements are not regularly performed for official database since the measurements still are not completely quality assured.

Internal quality checks have been performed

Yes No

Comment:

Trigger delay measurements, telecover tests and Rayleigh fit have been performed with mentoring from Bucharest team. We have started communication with Volker, regarding the tests, and plan to send him the files within the next month.

Data have been regularly submitted to the database

Yes No

Comment:

Since quality checks and measurements have not been regularly performed, data are not being submitted to the database.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

The Belgrade lidar station has recently been registered in SCC. Two members of the Belgrade lidar team attended the 2nd LiCalTrain workshop in Bucharest, which included training on use of SCC for processing of lidar signal. We have evaluated our data using the SCC. Before the workshop data have been processed with Raymetrics software. Our own software is still being developed.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Information on Raman OD detection channel has to be clarified with Volker.

Upgrades and status changes during the reporting period, other comments

Station **Burjassot (bj)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

The laser has been out of order during the reporting period. We are currently working on a solution.

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

We had no measurements during the reporting period.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Most of the elements of the RMAN-510 are determined. However, we still lack information about some components of the receiving optics. We are already working on this issue.

Upgrades and status changes during the reporting period, other comments

The laser has been out of order during the reporting period. We are currently working on a solution.

Station **Cluj (cj)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Still working on the issue with airport permissions to make measurements.

Internal quality checks have been performed

Yes No

Comment:

Still working on the issue with airport permissions to make measurements.

Data have been regularly submitted to the database

Yes No

Comment:

Still working on the issue with airport permissions to make measurements.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Still working on the issue with airport permissions to make measurements.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Upgrades and status changes during the reporting period, other comments

Station **Finokalia (fi)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

The Finokalia station in Crete, Greece, has been equipped with a PollyXT lidar system since March 18, 2017.

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Measurements started just recently.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Measurements started just recently. Data will be evaluated with the SCC within this year.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

The PollyXT lidar system has been recently upgraded by the TROPOS institute in Leipzig. The HoI is currently being updated.

Upgrades and status changes during the reporting period, other comments

The EARLINET station of Finokalia, Crete, started its operation during the reporting period. The PollyXT lidar system was installed in Finokalia on 18 March 2017.

Station **Lille (II)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

The lidar was transported back to the lab at the end of March, 2016, after that the lidar system was under reparation (laser was broken) and maintenance. Polarized channel at 1064 nm was installed in December 2016 and after we tried to measure regularly on Monday, Thursday and when there were aerosol events, but during winter, cloud coverage and low boundary layer limited the performance of measurements.

Internal quality checks have been performed

Yes No

Comment:

Polarization calibration, Rayleigh check and telecover test were performed.

Data have been regularly submitted to the database

Yes No

Comment:

We are waiting to transfer the data processed by SCC to EARLINET database.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Some data from SHADOW campaign has passed the SCC old version, now we need to work more with the new version of the SCC. Our goal is to send products from SCC to the EARLINET database.

Handbook of Instruments is up-to-date

Yes No Checked on: 2016/12/01

Comment:

We modified LILAS in adding the 1064 nm polarisation since the beginning of December.

Upgrades and status changes during the reporting period, other comments

Polarization measurements at 1064 was installed by adding a Glan crystal and waveplate to the emitting module(like EARLINET Raman Lidar PollyXT: the neXT generation).

Station **Rome Tor Vergata (ro)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Data have been regularly submitted to the database

Yes No

Comment:

Data submission is in progress.

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

The use of SCC is in progress.

Handbook of Instruments is up-to-date

Yes No

Checked on: 2017/03/29

Comment:

Upgrades and status changes during the reporting period, other comments

The Rayleigh-Mie-Raman lidar of Rome - Tor Vergata has entered in EARLINET in May 2016. Since then, measurements have been regularly performed. Upgrades on data analysis, homogenization and harmonization are in progress to be EARLINET compliant.

Station **St. Petersburg (sp)**

Period: 01/04/2016 - 31/03/2017

Measurements have been regularly performed

Yes No

Comment:

Internal quality checks have been performed

Yes No

Comment:

Problems with telecover test

Data have been regularly submitted to the database

Yes No

Comment:

Data have been evaluated with the Single Calculus Chain

Yes No

Comment:

Completion of internal quality checks and handbook filling are awaiting.

Handbook of Instruments is up-to-date

Yes No Checked on:

Comment:

Collecting required parameters is in progress.

Upgrades and status changes during the reporting period, other comments

Section 2

Cloudnet Station Reports

Period: April 2016 – March 2017

Summary

- **Stations:** There have been significant gaps in continuous operation at a number of sites due to instrument requiring repair. Two sites have also not been in operation as their systems had been deployed in field experiments. There are new stations in construction/testing, and datasets from several long-term field experiments in review.
- **Calibration:** No standardised or regular calibration is performed for every instrument at every site.
 - Cloud radar - no absolute calibration except for Palaiseau (fixed target) and Chilbolton (intercomparison with calibrated S-band radar). Most sites monitor transmit pulse and noise.
 - Ceilometer - calibration performed. Some sites use intercomparison with Raman instruments. Cloud calibration technique at regular intervals implemented at some sites.
 - MWR - Almost all sites use standardised MWRNET/TOPROF procedures, with tip curves and liquid nitrogen. These procedures will be implemented at regular intervals and applicability of clear-sky LWP cross-check (Gaussiat et al., 2004) at all sites is being investigated.
- **Model data:** ECMWF model data are standard for most sites, but provision for 'local' model data is present (e.g., RACMO at Cabauw, COSMO-EU at Lindenberg). Since model/radiosonde data are necessary for Cloudnet operation, but not always available, GDAS data is now available for every site. HARMONIE (available from 3 Met Services) is being tested for sites within the respective domains, WRF is also being tested at Leipzig and Limassol.
- **Processing up to date, NRT and transfer:** NRT operation requires reliable NRT transfer of model or radiosonde data, which is now present. All sites have NRT capability (data for Mace Head, Palaiseau and Sodankylä processed at Cloudnet server), and most sites now run Cloudnet processing in NRT.
- **Manual QC inspection:** Data at each site has been inspected for data quality issues, but this is not yet routine at all sites.
- **Suitability for publication:** Data at each site are suitable for specific publications (e.g. those written by members of the station), but not yet for wider dissemination (used by those not familiar with the specific dataset).

Station **Cabauw (ca)**

Period: 01/04/2016 - 31/03/2017

Instrumentation

Date and method of last calibration

- | | |
|--|--|
| <input checked="" type="checkbox"/> Cloud Radar | No absolute calibration, daily reading power and system noise figure |
| <input checked="" type="checkbox"/> Ceilometer/Lidar | none |
| <input checked="" type="checkbox"/> Microwave Radiometer | Liquid Nitrogen calibrations: 11-may-2016, 31-oct-2016,10-mar-2017 |
| <input checked="" type="checkbox"/> Rain Gauge/Disdrometer | unknown |
| <input type="checkbox"/> Doppler Lidar | |
| <input checked="" type="checkbox"/> Other | Raman lidar Caeli, TARA and IDRA radar, windprofiler, 200 m tower with T,q,visibility and winds, GHG, surface and soil instrumentation |

Model data/radiosonde data available

Yes No

Comment:

Radiosonde one daily at De Bilt, daily RACMO model output

Cloudnet processing up to date

Yes No

Comment:

Older version with modifications for local instruments and database structure, not using CHM15k data yet

NRT operation

Yes No

Comment:

Cloudnet processing is run once daily with RACMO model input

Data transferred to server

Yes No

Comment:

Post processing and data quality control remains an issue to be solved before data will be transferred

Processed data manually inspected

Yes No

Comment:

Data suitable for publication

Yes No

Comment:

Absolute calibration of the cloud radar is uncertain

Upgrades and status changes during the reporting period, other comments

Two CHM15k ceilometers are operated now continuously on site.

Station **Chilbolton (ch)**

Period: 01/04/2016 - 31/03/2017

Instrumentation

Date and method of last calibration

- Cloud Radar
Calibration data collected early Mar 2017. Calibration against 3-GHz radar in Rayleigh scattering upper regions of thick cirrus.
- Ceilometer/Lidar
Performed monthly. Automatically select suitable optically thick strato-cumulus.
- Microwave Radiometer
Tip curves performed alternately with zenith measurements 24/7, applied every 3-6 months. Integrated water vapour and water vapour profile via comparison with Larkhill radiosonde. Performed monthly. No calibration for liquid water. +
- Rain Gauge/Disdrometer
Drop-counting raingauges calibrated using known flow rate of water. Other gauges routinely compared to drop-counting gauges.
- Doppler Lidar
As ceilometer/lidar. No calibration method for Doppler velocity.
- Other

Model data/radiosonde data available

Yes No

Comment:

Cloudnet processing up to date

Yes No

Comment:

NRT operation

Yes No

Comment:

Data transferred to server

Yes No

Comment:

Processed data manually inspected

Yes No

Comment:

Data suitable for publication

Yes No

Comment:

Requires further calibration and quality control to be applied before publication.

Upgrades and status changes during the reporting period, other comments

Cloudnet Training School in Limassol allowed processing to be set up locally at Chilbolton. Only minor further refinement required (e.g. processing of Radiometrics microwave radiometer data) before this processing takes over from that currently performed at FMI.

Station Jülich (ju)		Period: 01/04/2016 - 31/03/2017	
Instrumentation		Date and method of last calibration	
<input checked="" type="checkbox"/> Cloud Radar		last calibration 11/02/2015 with external target (sphere)	
<input checked="" type="checkbox"/> Ceilometer/Lidar			
<input checked="" type="checkbox"/> Microwave Radiometer		calibration with LN2 on 29/09/2016	
<input checked="" type="checkbox"/> Rain Gauge/Disdrometer			
<input checked="" type="checkbox"/> Doppler Lidar			
<input checked="" type="checkbox"/> Other		120 m mast (T, q, winds), MFRSR (Multi-Filter Rotating Shadowband Radiometer), AERI (Atmospheric Emitted Radiance Interferometer), Sun photometer	
Model data/radiosonde data available		Cloudnet processing up to date	
<input checked="" type="radio"/> Yes <input type="radio"/> No		<input checked="" type="radio"/> Yes <input type="radio"/> No	
Comment: GDAS1 model output used since 2016		Comment:	
NRT operation		Data transferred to server	
<input checked="" type="radio"/> Yes <input type="radio"/> No		<input checked="" type="radio"/> Yes <input type="radio"/> No	
Comment:		Comment:	
Processed data manually inspected		Data suitable for publication	
<input checked="" type="radio"/> Yes <input type="radio"/> No		<input checked="" type="radio"/> Yes <input type="radio"/> No	
Comment: Regularly by JOYCE Cloudnet mentor		Comment: The lack of a microwave radiometer for certain periods means that certain products will not be available or reliable	
Upgrades and status changes during the reporting period, other comments			
No Cloudnet products for 04/01/2017 - 31/03/2017 due to construction works and radar maintenance.			
Radar operation: 01/04/2016 - 04/01/2017, microwave radiometer operation 15/09/2016 - 01/12/2016, Doppler lidar operation: 01/04/2016 - 09/01/2017			
Ceilometer operation during whole reporting period (two instruments: Vaisala CT25K, Jenoptik CHM15)			

Station Leipzig (le)		Period: 01/04/2016 - 23/09/2017	
Instrumentation		Date and method of last calibration	
<input checked="" type="checkbox"/>	Cloud Radar	continuous system-internal calibration only (Mira-35)	
<input checked="" type="checkbox"/>	Ceilometer/Lidar	23/09/2016 using EARLINET (Sun-photometer/Raman method)	
<input checked="" type="checkbox"/>	Microwave Radiometer	no liquid-N2 calibration performed (done in 01/2016)	
<input checked="" type="checkbox"/>	Rain Gauge/Disdrometer	none, frequent checking for alignment of disdrometer	
<input checked="" type="checkbox"/>	Doppler Lidar	none, permanent checking for horizontal alignment	
<input type="checkbox"/>	Other		
Model data/radiosonde data available		Cloudnet processing up to date	
<input checked="" type="radio"/> Yes <input type="radio"/> No		<input checked="" type="radio"/> Yes <input type="radio"/> No	
Comment: ECMWF data only available until 13/04/2016 Currently, only GDAS1 data available		Comment:	
NRT operation		Data transferred to server	
<input checked="" type="radio"/> Yes <input type="radio"/> No		<input checked="" type="radio"/> Yes <input type="radio"/> No	
Comment: Delay of approx. 09-33 hours. GDAS1 data of previous day arriving at 7:30 UTC of the next day.		Comment:	
Processed data manually inspected		Data suitable for publication	
<input checked="" type="radio"/> Yes <input type="radio"/> No		<input checked="" type="radio"/> Yes <input type="radio"/> No	
Comment:		Comment:	
Upgrades and status changes during the reporting period, other comments			
<ul style="list-style-type: none"> - At Leipzig, the equipment of the Leipzig Aerosol and Cloud Remote Observations System (LACROS) of TROPOS, Leipzig, Germany was operated until 23 Sep 2017. - LACROS moved to Limassol, Cyprus for CyCARE campaign; measurements started on 18 Oct 2017 (see Limassol reporting sheet). - Using Raman lidar PollyXT as standard lidar in the Cloudnet processing chain. Jenoptik CHM-15kx available as backup. - Data gaps in 04/2016 and 06-07/2016 are due to maintenance work applied to the cloud radar Mira-35 (installation of SLDR mode, implementation of C-based IQ processing, testing of different operational modes). 			

Station **Lindenberg (In)**

Period: 01/04/2016 - 31/03/2017

Instrumentation

Date and method of last calibration

- Cloud Radar
- Ceilometer/Lidar
- Microwave Radiometer
- Rain Gauge/Disdrometer
- Doppler Lidar
- Other

MWP-3039A, LN2-calibration 21.11.16, 14.02.17, 16.03.17
TIP-calibration: 01.12.16, 30.03.16

Model data/radiosonde data available

Yes No

Comment:
COSMO/ICON-EU

Cloudnet processing up to date

Yes No

Comment:

NRT operation

Yes No

Comment:
once a day

Data transferred to server

Yes No

Comment:

Processed data manually inspected

Yes No

Comment:

Data suitable for publication

Yes No

Comment:

The comments below concerning data quality are to be considered.

Upgrades and status changes during the reporting period, other comments

Radar: 16.11. - 24.11.16 firmware upgrade, new radar server: xcrl, new control (v2.6.1.3) and data client (v2.6.1.1), upgrate of IDL-routines, adjustment of radar constant by 2 dBz (taking into account the finite bandwidth loss)

Radiometer: TP/WVP-3001 power supply failure (26.10.16), replacement by MWP-3039A in December 2016, MWP data gap between 26.10. and 30.11., LWP data quality questionable between 1. Dec. 2016 and 14.02.

No cloudnet products available for:

- 4.5., 24.8. - 27.8. (failed cloud radar)
- 16.11. - 24.11. (radar firmware upgrade)
- 28.2, 30.3., 6.4.,13.4, 25.-27.6., 31.7., 14.9., 14./15.10., 2.11.5.11., 30./31.12. (failed Cloudnet processing)

Station **Limassol (lm)**

Period: 18/10/2016 - 31/03/2017

Instrumentation

Date and method of last calibration

- | | |
|--|---|
| <input checked="" type="checkbox"/> Cloud Radar | continuous system-internal calibration only (Mira-35) |
| <input checked="" type="checkbox"/> Ceilometer/Lidar | 31/03/2017 using EARLINET (Sun-photometer/Raman method) |
| <input checked="" type="checkbox"/> Microwave Radiometer | 20/10/2016 using liquid-N2 method, MWR-PRO processing |
| <input checked="" type="checkbox"/> Rain Gauge/Disdrometer | none, check for horizontal alignment of disdrometer on 18/10/2016 |
| <input checked="" type="checkbox"/> Doppler Lidar | none, permanent checking for horizontal alignment |
| <input type="checkbox"/> Other | |

Model data/radiosonde data available

Yes No

Comment:

Currently, only GDAS1 data available

Cloudnet processing up to date

Yes No

Comment:

NRT operation

Yes No

Comment:

Delay of approx. 09-33 hours. GDAS1 data of previous day arriving at 7:30 UTC of the next day.

Data transferred to server

Yes No

Comment:

Processed data manually inspected

Yes No

Comment:

Data suitable for publication

Yes No

Comment:

Upgrades and status changes during the reporting period, other comments

- At Limassol, the equipment of the Leipzig Aerosol and Cloud Remote Observations System (LACROS) of TROPOS, Leipzig, Germany is operated during the CyCARE campaign.
- Using Raman lidar PollyXT as standard lidar in the Cloudnet processing chain. Jenoptik CHM-15kx available as backup.

Station **Mace Head (mh)**

Period: 01/04/2015 - 31/03/2016

Instrumentation

Date and method of last calibration

- | | |
|--|---|
| <input checked="" type="checkbox"/> Cloud Radar | None |
| <input checked="" type="checkbox"/> Ceilometer/Lidar | None |
| <input checked="" type="checkbox"/> Microwave Radiometer | Liquid nitrogen calibration, 29/11/2016 |
| <input type="checkbox"/> Rain Gauge/Disdrometer | |
| <input checked="" type="checkbox"/> Doppler Lidar | None |
| <input type="checkbox"/> Other | |

Model data/radiosonde data available

Yes No

Comment:

No radiosondes available.

Cloudnet processing up to date

Yes No

Comment:

Last processed data available for 04/03/2017.

NRT operation

Yes No

Comment:

Data transferred to server

Yes No

Comment:

The unprocessed data is transferred in NRT.

Processed data manually inspected

Yes No

Comment:

Data suitable for publication

Yes No

Comment:

There is no data quality screening in place. There are gaps in the data set.

Upgrades and status changes during the reporting period, other comments

The radar was for repair from November 2016 to January 2017.

Station **Palaiseau (pl)**

Period: 01/04/2016 - 31/03/2017

Instrumentation

Date and method of last calibration

- | | |
|--|--|
| <input checked="" type="checkbox"/> Cloud Radar | BASTA FMCW, last calibration summer 2016 |
| <input checked="" type="checkbox"/> Ceilometer/Lidar | Vaisala CL31 / Luft CHM15K, last calibration spring 2016 |
| <input checked="" type="checkbox"/> Microwave Radiometer | HATPRO, last calibration RPG December 2016 |
| <input checked="" type="checkbox"/> Rain Gauge/Disdrometer | |
| <input checked="" type="checkbox"/> Doppler Lidar | Leosphere WLS70, last calibration spring 2015 |
| <input checked="" type="checkbox"/> Other | IPRAL multiwavelength lidar, surface turbulent heat fluxes (sensible and latent) |

Model data/radiosonde data available

Yes No

Comment:

Twice a day radiosonde, MODEM M10 sensor, at Trappes Meteo-France site (20 km from SIRT).

Cloudnet processing up to date

Yes No

Comment:

NRT operation

Yes No

Comment:

Data transferred to server

Yes No

Comment:

Processed data manually inspected

Yes No

Comment:

Data suitable for publication

Yes No

Comment:

Upgrades and status changes during the reporting period, other comments

Station **Potenza (po)**

Period: 01/04/2015 - 31/03/2016

Instrumentation

Date and method of last calibration

- | | |
|--|---|
| <input checked="" type="checkbox"/> Cloud Radar | None |
| <input checked="" type="checkbox"/> Ceilometer/Lidar | CT25K: cloud calibration (15/01/2015); CHM15k calibration on MUSA EARLINET Reference lidar profiles (15/01/2015) |
| <input checked="" type="checkbox"/> Microwave Radiometer | TIP (30/01/2016); LN2 (30/01/2016) |
| <input checked="" type="checkbox"/> Rain Gauge/Disdrometer | Next maintenance calibration from VAISALA on July 2017 |
| <input type="checkbox"/> Doppler Lidar | |
| <input checked="" type="checkbox"/> Other | 1) VAISALA MILOS 520 Automatic Weather Station for surface variables (pressure, temperature, humidity, wind, visibility and rain gauge). Next maintenance calibration from VAISALA on July 2017.
2) Novatel GPS antenna/receiver for integrated precipitable water vapour (IPWV)
3) Orion Allsky Camera for a 180° "fisheye" view of the day and night sky. |

Model data/radiosonde data available

Yes No

Comment:

- 1) ECMWF model data not available from April 2016;
- 2) NCEP Global Data Assimilation System not available from November 2016.
- 3) GRUAN regular radiosondes performed once per week.

Cloudnet processing up to date

Yes No

Comment:

- 1) The processing of level 1 (observational data) and level 2 (meteorological products) is missing since July 2015.
- 2) Radar data missing since July 2015 because of a radar maintenance. Radar data available again since April 2016.

NRT operation

Yes No

Comment:

Data transferred to server

Yes No

Comment:

Processed data manually inspected

Yes No

Comment:

Not routinely, only for periods used for specific studies or publications; consistency check with other instruments performed as well.

Data suitable for publication

Yes No

Comment:

We currently use data for publication; radar calibration might increase data quality.

Upgrades and status changes during the reporting period, other comments

Radar maintenance: July 2015 - March 2016.
Radar involved in the ACTRIS JRA1 PRETECT campaign 1-30 April 2017.
HALO wind lidar operation by end of 2017.

Station **Sodankylä (so)**

Period: 01/04/2016 - 31/03/2017

Instrumentation

Date and method of last calibration

- | | |
|--|------------------------------|
| <input type="checkbox"/> Cloud Radar | |
| <input checked="" type="checkbox"/> Ceilometer/Lidar | Cloud calibration 01/05/2016 |
| <input type="checkbox"/> Microwave Radiometer | |
| <input type="checkbox"/> Rain Gauge/Disdrometer | |
| <input checked="" type="checkbox"/> Doppler Lidar | Cloud calibration 01/10/2015 |
| <input type="checkbox"/> Other | |

Model data/radiosonde data available

Yes No

Comment:

Cloudnet processing up to date

Yes No

Comment:

NRT operation

Yes No

Comment:

Data transferred to server

Yes No

Comment:

Processed data manually inspected

Yes No

Comment:

Data suitable for publication

Yes No

Comment:

Upgrades and status changes during the reporting period, other comments

Cloudnet station was operating at two campaigns during this period (both in Finland) - Vehmasmäki (until Oct 2016) together with PollyXT, and Hyytiälä (from Dec 2016) together with a 5 GHz (C-band) weather radar converted for making cloud observations. See reports for these stations.

Doppler lidar suffered mini-UPS failure on 31 Dec 2016, with damage to internal scanner because of prolonged exposure to cold temperatures without internal heating. Instrument sent to manufacturer for repair.

Station **Vehmasmäki (ve)**

Period: 01/04/2016 - 31/03/2017

Instrumentation

Date and method of last calibration

- | | |
|--|--|
| <input checked="" type="checkbox"/> Cloud Radar | |
| <input checked="" type="checkbox"/> Ceilometer/Lidar | Cloud calibration 01/05/2016 (Vaisala CL51) |
| <input type="checkbox"/> Microwave Radiometer | |
| <input type="checkbox"/> Rain Gauge/Disdrometer | |
| <input checked="" type="checkbox"/> Doppler Lidar | Cloud calibration 01/10/2015 |
| <input checked="" type="checkbox"/> Other | Polly XT and 300+m mast with T,p,q and winds |

Model data/radiosonde data available

Yes No

Comment:
Using GDAS dataset

Cloudnet processing up to date

Yes No

Comment:

NRT operation

Yes No

Comment:

Data transferred to server

Yes No

Comment:

Processed data manually inspected

Yes No

Comment:
Additional processing added to identify clutter due to tall mast

Data suitable for publication

Yes No

Comment:
The lack of a microwave radiometer means that certain products will not be available or reliable.

Upgrades and status changes during the reporting period, other comments

Campaign Cloudnet station, operating Jan-Oct 2016 for this campaign.

Section 3

EARLINET QA Tests

Period: April 2016 – March 2017

The following table for the reporting period 2016/17 shows a list of all the channels of all active lidar systems, which are supposed to deliver lidar signal products to the EARLINET data base and which have to be quality assured every year with the QA measurements RF (Rayleigh fit), TC (telecover), and Dark (dark measurement for analog channels). A detailed description of these tests is provided in Deliverable D2.5. The left column of the table indicates station ID (see Tab. 1) and system name in case of several instruments at the same station. Tests that were delivered to LiCal for external inspection are marked in green. Grey boxes indicate not necessary QA measurements for lidar systems which did not deliver data to the EARLINET data base within the reporting period. The right-most column contains not so common channels and 1064-nm dark measurements in case no other analog channels are present. The channel/signal names are composed of the wavelength (in nm) and a two to four character short-cut with the following meaning:

1st character

f__ = far-range telescope signal

n__ = near-range telescope signal

x__ = single-telescope signal

d__ = depolarization-telescope signal

2nd character

t = total signal (no depolarization measurement)

p = parallel signal

c = cross signal

3rd character (optional)

__a = analogue signal

__p = photon counting signal

__g = analogue and photon counting glued signal (e.g. LICEL)

4th character (optional)

___l = rotational Raman lower wavelengths

___h = rotational Raman higher wavelengths

___r = rotational Raman high and low wavelengths

___c = high spectral resolution Mie signals/center line

01.04.16 – 31.03.17

2016

The channels are listed as mentioned in the HOI

an	RF	355xt			387xt		532xc	532xp	607xt	1064xt	1064xt-dark
	TC	355xt			387xt		532xc	532xp	607xt	1064xt	
at	RF	355xt			387xt	532xt			607xt	1064xt	1064xt-dark
	TC	355xt			387xt	532xt			607xt	1064xt	
ba UPC_MRL	RF	355xt			387xt	532xt			607xt	1064xt	1064xt-dark
	TC	355xt			387xt	532xt			607xt	1064xt	532depcal
be	RF	355xt				532xt				1064xt	
	TC	355xt				532xt				1064xt	
	Dark	355xt				532xt				1064xt	
bu	RF	355xt			387xt		532xc	532xp	607xt	1064xt	1064xt-dark
	TC	355xt			387xt		532xc	532xp	607xt	1064xt	532depcal
ca near tele	RF	355nt			387nt	532nt			607nt	1064nt	1064nt-dark
	TC	355nt			387nt	532nt			607nt	1064nt	
ca far tele	RF	355ft			387ft	532ft			607ft	1064ft	1064ft-dark
	TC	355ft			387ft	532ft			607ft	1064ft	
ca dep tele	RF						532dc	532dp			532depcal
	TC						532dc	532dp			
cl	RF		355xc	355xp	387xt						355depcal
	TC		355xc	355xp	387xt						
co	RF					532xt			607xt		532depcal
	TC					532xp	532xc		607xt		
ev	RF	355xt			387xt	532xt	532xc		607xt	1064xt	
	TC	355xt			387xt	532xt	532xc		607xt	1064xt	532depcal
fi	RF	355xt	355xc		387xt	532xt	532xc		607xt	1064xt	355depcal
	TC	355xt	355xc		387xt	532xt	532xc		607xt	1064xt	532depcal
gp HSRL	RF	355xt				532xt				1064xt	532xtac
	TC	355xt				532xt				1064xt	532xtac
	Dark	355xt				532xt				1064xt	532xtac
gp HSRL	RF	313fta	313nta								313nta-dark
	TC	313fta	313nta								313fta-dark
gr LR321	RF	355xt			387xt		532xc	532xp	607xt	1064xt	1064xt-dark
	TC	355xt			387xt		532xc	532xp	607xt	1064xt	532depcal
gr LR111	RF		355xc	355xp	387xt						
	TC		355xc	355xp	387xt						355depcal
hh ARL2 near	RF	355nt			387nt	532nt			607nt	1064nt	1064nt-dark
	TC	355nt			387nt	532nt			607nt	1064nt	
hh ARL2 far	RF	355ft			387ft	532ft			607ft	1064ft	1064ft-dark
	TC	355ft			387ft	532ft			607ft	1064ft	
hh ARL2 dep	RF						532xc	532xp			
	TC						532xc	532xp			
is ADAM	RF	355xt			387xt		532xc	532xp	607xt	1064xt	1064ft-dark
	TC	355xt			387xt		532xc	532xp	607xt	1064xt	532depcal
ku	RF	355xt			387xt	532xt	532xc		607xt	1064xt	triggerdelay
	TC	355xt			387xt	532xt	532xc		607xt	1064xt	532depcal
la	RF	351xt			382xt						
	TC	351xt			382xt						
lc	RF	355xt			387xt	532xt			607xt	1064xt	1064ft-dark
	TC	355xt			387xt	532xt			607xt	1064xt	
le MARTHA	RF	355xt			387xt	532xt	532xc	532xp	607xt	1064xt	
	TC	355xt			387xt	532xt	532xc	532xp	607xt	1064xt	532depcal
le PollyXT_ift	RF	355xt	355xc		387xt	532xt	532xc		607xt	1064xt	355depcal

2016

	TC	355xt	355xc		387xt	532xt	532xc		607xt	1064xt	532depcal
le PollyXT_lacros	RF	355xt	355xc		387xt	532xt	532xc		607xt	1064xt	355depcal
	TC	355xt	355xc		387xt	532xt	532xc		607xt	1064xt	532depcal
le PollyXT_sea	RF	355xt	355xc		387xt	532xt	532xc		607xt	1064xt	355depcal
	TC	355xt	355xc		387xt	532xt	532xc		607xt	1064xt	532depcal
ll LILAS	RF		355xc	355xp	387xt		532xc		607xt	1064xt	355depcal
	TC		355xc	355xp	387xt		532xc		607xt	1064xt	532depcal
	Dark									1064xt	
lm	RF						532xc	532xp	607xt	1064xt	1064xt-dark
	TC						532xc	532xp	607xt	1064xt	532depcal
ma	RF	355xt			387xt	532xt			607xt	1064xt	
	TC	355xt			387xt	532xt			607xt	1064xt	
	Dark	355xt				532xt				1064xt	
mi MSTL-2	RF	355xt			387xt		532xc	532xp	607xt	1064xt	
	TC	355xt			387xt	532xt	532xc	532xp	607xt	1064xt	532depcal
	Dark	355xt					532xc	532xp		1064xt	
mi LMR-mob	RF	355xt			387xt	532xt	532xc		607xt	1064xt	
	TC	355xt			387xt	532xt	532xc		607xt	1064xt	532depcal
	Dark	355xt				532xt	532xc			1064xt	
mu POLIS	RF		355xc	355xp	387xt		532xc	532xp	607xt		355depcal
	TC		355xc	355xp	387xt		532xc	532xp	607xt		532depcal
ms MULIS	RF	355xt			387xt		532xc	532xp	607xt	1064xt	
	TC	355xt			387xt		532xc	532xp	607xt	1064xt	532depcal
	Dark	355xt					532xc	532xp		1064xt	
na MALIA high	RF	355xt			387xt		532xc	532xp	607xt		532depcal
	TC	355xt			387xt		532xc	532xp	607xt		
na MALIA low	RF	355xt					532xc	532xp			532depcal
	TC	355xt					532xc	532xp			
	Dark	355xt					532xc	532xp			
oh	RF	355xt			387xt	532xt	532xc		607xt	1064xt	
	TC	355xt			387xt	532xt	532xc		607xt	1064xt	532depcal
py	RF	356xt			387xt						358xtgr
	TC	356xt			387xt						358xtgr
pl IPRAL	RF	355xt	355xc		387xt			532xt	607xt	1064xt	1064xt-dark
	TC	355xt	355xc		387xt			532xt	607xt	1064xt	355depcal
po MUSA	RF	355xt			387xt		532xc	532xp	607xt	1064xt	1064xt-dark
	TC	355xt			387xt		532xc	532xp	607xt	1064xt	532depcal
po PEARL	RF	355xt			387xt	532xt	532xc	532xp	607xt	1064xt	1064xt-dark
	TC	355xt			387xt	532xt	532xc	532xp	607xt	1064xt	532depcal
sf-CuBr	RF					510xt			578xt		
	TC					510xt			578xt		
sf-Cu&Au	RF					510xt			628xt		
	TC					510xt			628xt		
sf-NdYAG	RF						532xt			1064xt	1064xt-dark
	TC						532xt			1064xt	532xt-dark
th	RF	355xt			387xt	532xt	532xc	532xp	607xt	1064xt	
	TC	355xt			387xt	532xt	532xc	532xp	607xt	1064xt	532depcal
	Dark	355xt			387xt	532xt	532xc	532xp	607xt	1064xt	
wa	RF	355xt			387xt	532xt	532xc		607xt	1064xt	
	TC	355xt			387xt	532xt	532xc		607xt	1064xt	532depcal

Legend	done	n.a.	not necessary	partial	RF = Rayleigh fit	TC = telecover
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updatetd 29.04.17