Deliverable D2.16: Second report on NA2 user support activities

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Work package no	**WP2**
Deliverable no.	**D2.16**
Lead beneficiary	**UGR**
Deliverable type	☑ R (Document, report)
	☐ DEC (Websites, patent fillings, videos, etc.)
	☐ OTHER: please specify ....
Dissemination level	☑ PU (public)
	☐ CO (confidential, only for members of the Consortium, incl Commission)
Estimated delivery date	**Month *46***
Actual delivery date	*27/02/2019*
Version	1
Comments	

1. Introduction

This deliverable reports user support activities carried out in WP2 from month 31 (November 2017) to month 46 (February 2019), and, for completeness, those planed in months 47 and 48 (end of the project).

User support in the context of this report is understood as any activity aimed to improving the amount of aerosol and cloud profiling data and their quality, as well as to the implementation of field campaigns and to the incorporation of new profiling stations meeting the required quality standards to the infrastructure. Outreach by providing support to users external to the project is also considered.

Although formally assigned to task 2.4 (Exchange of expertise, support to campaigns and new users), support to users exceeds the limits of this task and is interspersed through the development of other tasks in WP2 and other work packages. In particular, a crucial part of the support to users of lidar stations is implemented through WP6 (Lidar calibration centre) and task 2.1; for cloud profiling stations, support is also provided in tasks 2.2.1 and 2.2.2. Data quality-check interactive tools developed as part of WP10 (ACTRIS Data Centre) also provide useful feedback to lidar stations.

This report aims to summarize all these supporting activities. To avoid unnecessary repetition, whenever necessary the reader is directed to deliverables of other tasks or work packages containing more detailed information.

2. Annual workshops and General Meetings

A part of support to users has been effected through the exchange of expertise occurring in the annual workshops of WP2, two of which (the 3rd and 4th ACTRIS WP2 workshops) have been held within this reporting period.

The 3rd ACTRIS-2 WP2 workshop was held in Delft, The Netherlands, from 13 to 17 November 2017, hosted by TU Delft, with an attendance of 85 in-situ participants and a few more remote participants. The workshop included two formal science sessions to present results from ACTRIS-2 activities on remote sensing of aerosols and on the synergies between remote sensing of clouds, aerosols and trace gases. Moreover, twenty-two posters were on display for the whole workshop duration to foster exchanges between the participants during the session breaks. Breakout specialized sessions were organized within the workshop to deal with lidar technical issues, the joint Cloudnet-EARLINET processing chain, and the future Centre for Cloud Remote Sensing Centre (CCRES) and Centre for Aerosol Remote Sensing (CARS), which will be Topical Centres when ACTRIS becomes a long-term research infrastructure. In addition to discussing, reviewing progress and defining actions along the work package tasks, attention was also paid to the connections with the ACTRIS Preparatory Phase Project (ACTRIS-PPP), running in parallel and preparing the transition from a research infrastructure run on projects to a permanent infrastructure of the European Research Area. For detailed information, including the presentation materials and posters, the reader is referred to the minutes of the workshop (deliverable D2.10).

The 4th ACTRIS-2 WP2 workshop took place at Hatfield, United Kingdom, from 19 to 23 November 2018, hosted by the University of Hertfordshire, with an in-situ attendance of 81 participants. As this workshop was the last one specifically for WP2 within ACTRIS-2, special attention was paid to the work to be done until the end of the project and to discussing about the optimization of the expertise developed in ACTRIS-2 for future activities, in particular for the enhancement of the capabilities of the future ACTRIS-ERIC long-term scientific infrastructure. In this respect, the workshop participants were also informed on the progress of the ACTRIS Preparatory Phase Project running until the end of 2019 and a breakout session on the Topical Centre for Aerosol Remote Sensing (CARS) of the future ACTRIS-ERIC was held for people involved in its implementation. Twenty-three posters related to scientific and technical results

and activities promoted by ACTRIS-2 were also displayed for discussion among the participants. In addition, a session was devoted to short presentations of ongoing and planned research activities.

Exchange of expertise has also been facilitated through science sessions in the ACTRIS-2 General Meetings. Within the reporting period, one General Meeting has been held in Nafplio, Greece, from 17 to 20 April 2018, which counted with science sessions, both oral and poster, addressing, among the other ACTRIS-2 topics, those of WP2. In addition, a specific WP2-NA2 side meeting was organized on the morning of 20 April. An ACTRIS-2 Final Event is planned in Darmstadt, Germany, from 1 to 4 April 2019, which will also favor exchange of expertise by allowing participants to meet and by favoring discussion in the sciences sessions (oral and poster) organized within it.

3. Lidar, radar, and sun-photometer field campaigns

Within the reporting period, direct intercomparison between lidar reference systems and EARLINET lidar instruments was provided through task 2.1 in collaboration with WP6 in the following campaigns:

1. 16–23 June 2018: Intercomparison of EMORAL and PollyXT systems of the University of Warsaw against LMU POLIS-6;

2. 16–27 July 2018: Ispra lidar campaign (ISPLI18) comparing the EC Joint Research Centre's EARLINET ADAM system against the MUSA mobile reference system of CNR-IMAA;

3. 17–27 September 2018: Thessaloniki lidar campaign (THELI18) comparing the Aristotle University of Thessaloniki lidar system against the reference MUSA mobile system of CNR-IMAA;

4. IC18 chain of intercomparison campaigns and expert visit by Volker Freudenthaler with the POLIS-6 mobile reference system of LMU to
   a. SIRTA (Palaiseau) for direct comparison of IPRAL system against POLIS-6 (14–26 September 2018);
   b. UPC (Barcelona) for direct comparison of UPC MLR system against POLIS-6 (26 September – 5 October 2018);
   c. Expert visit to inspect the Leosphere R-MAN system at University of Valencia and assess its future return to operation after replacement of the laser (8–11 October 2018);
   d. IISTA-CEAMA-Universidad de Granada (Granada) for direct intercomparison of MUHACEN and VELETA systems against POLIS-6 (12 – 28 October 2018).

The characteristics of the intercompared systems can be found in the Single Calculus Chain Handbook of Instruments (https://scc.imaa.cnr.it/hoi/station/, login required).

With respect to radar cloud profiling, support has been provided in the framework of the following campaigns:

1. University of Cologne activities in the ongoing continuous CONCORD campaign in Ny-Ålesund in the framework of the "ArctiC Amplification: Climate Relevant Atmospheric and SurfaCe Processes and Feedback Mechanisms (AC)[3]" project;

2. October 2016 – March 2018 (extended): Cyprus Aerosol, Clouds and pRecipitation Experiment (CyCARE) employing TROPOS' LACROS suite of remote sensing instruments with participation of Cyprus University of Technology;

3. May 2018: Radar calibration experiment at SIRTA (Palaiseau), with participation of SIRTA ACTRIS Cloudnet station, Modem 95-GHz radar from Météo-France, LATMOS 95-GHz BASTA-Mini radar, and 95-GHz RPG radar from University of Granada;

4. Shipborne Cloudnet observations of Arctic clouds during Arctic Ocean 2018 (Oden icebreaker, August – September 2018).

Another cloud radar calibration campaign in the framework of activities to set up the Centre for Cloud Remote Sensing (CCRE) of the future ACTRIS-ERIC will take place at SIRTA from 15 March to 15 April 2019, with participation of, at least, partners from United Kingdom, The Netherlands, Germany, and France.

Cloudnet has also provided support for the setting up of new stations at Iquique (Chile) and Granada, as well as to the Cloudnet mobile station on TROPOS' LACROS mobile suite of instruments in its installation at Punta Arenas (Chile) for the one-year DACAPO-PESO campaign starting in November 2018.

In what concerns sun photometers, a validation of the shipborne CIMEL CE318-T took place in a multi-instrument campaign involving a GUVis shadowband radiometer, a Microtops photometer, and the PollyXT-OCEANET lidar on board the Polarstern research vessel in its cruise from Punta Arenas to Bremerhaven in May–June 2018.

4. Training schools and seminars

The following activities with trainees and instructors of ACTRIS-2 WP2 have been carried out in the reporting period:

1. Hyytiälä Winter School 2018: Advanced Analysis of Atmosphere-Surface Interactions and Feedbacks (5–16 March 2018), organized by the University of Helsinki at the Hyytiälä Forestry Field Station in Southern Finland, with the contribution, among other organizations and projects, of ACTRIS;

2. Single Calculus Chain (SCC) Winter School, Potenza, 4–6 December 2018, with 36 participants of Aristotle University of Thessaloniki, Babes-Bolyai University, Cyprus Unversity of Technology, ENEA, Federal University of Rio Grande do Norte (Natal, Brazil), IE-BAS, INOE, Institute of Physics Belgrade, IPEN (São Paulo, Brazil), IPSL-CNRS, ISAC-CNR, National Technical University of Athens, NOA, TROPOS, University of Evora, University of Granada, University of Magallanes (Punta Arenas, Chile), Univesity of Naples, University of Salento, University of Valencia, University of Warsaw, and UPC .

In addition, the 2nd Cloudnet Training School, organized by TROPOS, LMU, DLR, ESA and the Lepizig Institute for Meteorology, will be held from 11 to 15 March 2019 at LMU in Munich.

5. Quality assurance and data quality control

Lidar stations are required to send annually through the Lidar Remote Quality Assurance (LiReQA) virtual facility of WP6 the results of a series of internal quality checks, after which they receive feedback on possible hardware problems revealed by the tests; for more details concerning quality assurance within this reporting period, the reader is referred to deliverables D2.11 and D2.17. Moreover, support on lidar components and subsystems can be requested by both internal and external users by responding to the periodic calls of WP6 Lidar Component Test Laboratory (LiCoTest).

Cloudnet stations receive support on the utilization of the Cloudnet processing chain, which has to be tailored for the station configuration (see deliverable D2.2). Progress on radar calibration procedures is reported in deliverable D2.12. In this respect, a cloud calibration radar workshop, organized by IPSL, was held in Paris on 29 and 30 November 2018 with 32 participants of 18 research institutions (CNR-IMAA, DLR, DWD, ENEA, FMI, INOE, IPSL, KIT, KNMI, LMD, NCAS, OPGC, SMHI, STFC, Stony Brook University, TROPOS, TU Delft, and University of Cologne) and 3 manufacturers (METEK, Meteomodem, RPG). See also deliverables D2.11 and D2.17 for more information on quality assurance for Cloudnet stations.

Support to lidar and radar stations is also provided by feedback from the data quality control procedures (implemented or in development) that help in detecting issues at both hardware and processing levels (see also deliverable D10.11).

6. Documentation and on-line support

See deliverable D2.9 for a list of links to documentation and on-line support related to aerosol profiling. For cloud profiling see the information found at http://devcloudnet.fmi.fi/.