# Cloud Remote Sensing Community Workshop

# Workshop Report

Thursday 26th October 2023

at the Conference Center of the Aquila Atlantis Hotel, Heraklion, Greece

# SUMMARY
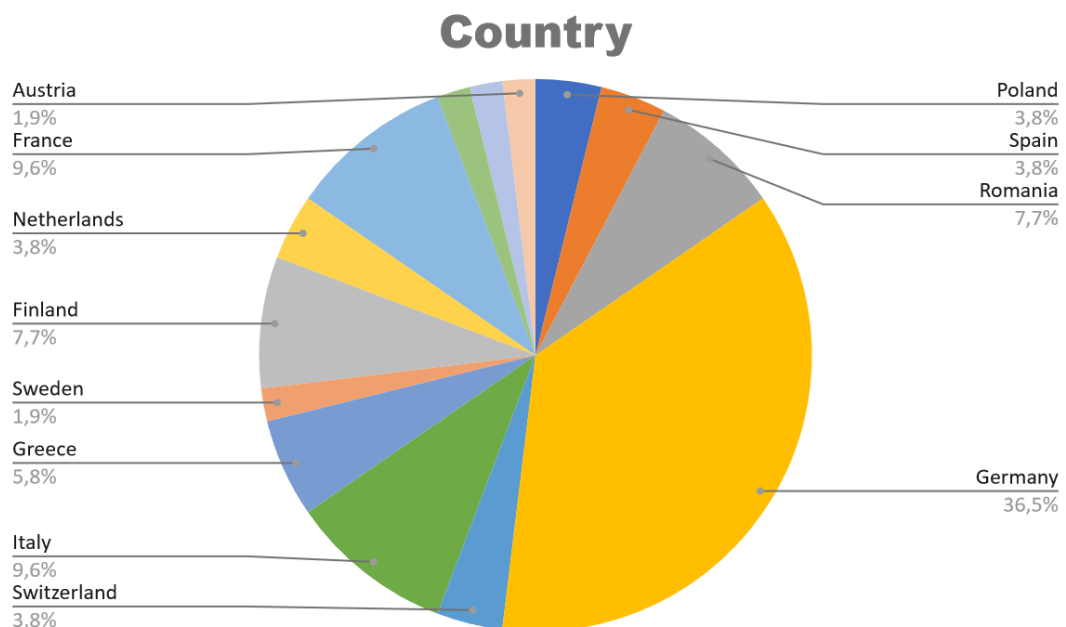
# I.    Participants

Large participation with 21 persons in presence and 25 online, from 17 different countries. 12 Cloud Remote Sensing NFs representatives were present.



| Country | NFs represented |
|---------|------------------|
|         |                  |

| | |
|---|---|
| **Poland** | Rzecin, Warsaw |
| **The Netherlands** | Cabauw |
| **Germany** | MOL-RAO, Joyce, München |
| **Italy** | CIAO, Lampedusa |
| **France** | SIRTA |
| **Romania** | RADO-Bucharest, RADO-Galati, RADO-Cluj |
| **Switzerland** | Payerne |
| **Greece** | PANGEA |
| **Finland** | Kenttärova, Hyytiälä |
| **UK** | Chilbolton |

# II.    Agenda

## Thursday 26th October 2023

| | | | |
|---|---|---|---|
| 09:00-09:15 | **SESSION 1**<br><br>Introduction and CRS workshop planning | Martial Haeffelin, Elisa Villard (IPSL) | 15' |
| 09:15-10:30 | **New CCRES services for NFs**<br><br>Update on MWR data processing and retrieval development | Tobias Marke (UCOL) | 15' |
| | Monitoring the cloud radar stability using disdrometers, preliminary results for 3 sites / 5 cloud radars and 5 disdrometers | Yanis Grit, J-C. Dupont (IPSL) | 15' |
| | Disdrometer and weather station SOPs | J-C. Dupont (IPSL), Lukas Pfitzenmaier (UCOL) | 15' |
| | Estimating radome and rain attenuation (with uncertainties) from disdrometer observations | D. Moisseev (UHEL) | 15' |
| | Radar Comparison | Ulrich Görsdorf (DWD) | 15' |
| 10:30-11:00 | **BREAK** | | |

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| 11:00-12:00 | **SESSION 2**<br><br>**Hands On/ Demonstrations**<br><br>Technical parameters monitoring for cloud remote sensing NFs<br><br>**New CCRES services for NFs (Ctnd)**<br><br>Discussion on scanning/non-scanning strategy for all instruments<br><br>ALC dark current, QA/QC procedures<br><br>MWR calibration | Marc-Antoine Drouin (LMD/IPSL)<br><br><br>Chris Walden (NCAS)<br><br>Alexander Geiss (LMU, CARS)<br><br>Bernhard Pospichal (UCOL) | 15'<br><br>15'<br><br>15'<br><br><br>15' |
| 12:00-12:30 | General discussion on new services<br><br>General CCRES SOPs discussion<br><br>Feedback from NFs | All | 30' |
| 12:30-13:30 | **LUNCH BREAK** | | |
| 13:30-15:00 | **SESSION 3**<br><br>Update from CLU database and Cloudnet features<br><br>Presentation of CLU data QC<br><br>Discussion on Working Groups | Simo Tukiainen, Ewan O'Connor (FMI)<br>All | 30'<br>30'<br>30' |
| 15:00-15:30 | **BREAK** | | |
| 15:30-16:00 | **SESSION 4**<br><br>**Hands On/ Demonstrations**<br><br>CRS NF Labelling: Steps 1A procedure | Martial Haeffelin (IPSL) | 30' |
| 16:00-17:00 | EarthCARE Cal/Val Activities | Lukas Pfitzenmaier (UCOL), Felipe Toledo (LATMOS/IPSL) | 60' |
| 17:00 | Concluding remarks | All | 15' |

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# III.   Presentations

All the presentations of the workshop can be downloaded here :

https://drive.google.com/drive/folders/1x0FyQO1qal2Da2xB2biKn2RgwRnNFnaD

# IV.   Minutes

Many topics have been discussed during the workshop and feedback has been shared among the NFs representatives. The actions to take afterwards are the following :

| TOPIC | ACTION | WHO | WHEN |
|---|---|---|---|
| MWR SOPs | update SOPs and calibration procedure for MWR on the CCRES Website (documents by B. Pospichal) | Elisa | in the upcoming days |
| EarthCARE Cal/Val SOPs | set a document for EarthCARE Cal/Val SOPs to share among the NFs concerned | Felipe and Lukas | before end of November |
| DD | finalize the DD SOPs | JC | |
| DSD | Provide the Python code for computing DSD uncertainties | Dmitri | |
| WG | send a questionnaire about ACTRIS Working Groups linked to Cloud Remote Sensing | Dmitri | in the upcoming days |
| WG | fill the questionnaire about WG : **Working Groups Survey** | Everyone | |
| Radar comparison | - finalize closure study between MIRA, MOLRAD94 and DD based on 2022 and 2023 datasets.<br>- Implement modelled droplet size distributions (Dmitri's method) | | |
| HKD | converge/discuss HKD implementation | | |

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|---|---|---|---|
| CLU Data Portal | - explain the processing logic in case of multiple instruments<br><br>- think about the status of "spare" instruments | CLU | |
| MWR | - Provide document for new LN2 calibration<br><br>- Invite to MWR workshop | Bernhard | |
| Labelling | - get an update on the labelling status from all NFs<br>- follow-up the labelling procedure of Granada | Elisa | |

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# SESSION 1
## 9:00 - 10:30
## New CCRES Services for NFs

- ## [Update on MWR data processing and retrieval development](#) Tobias Marke (U. Cologne)

**Short summary with the main information that are useful for the NFs (links, …) :**
- Data processing software MWRpy implemented in Cloudnet framework and maintained in Cloudnet's github repository ([https://github.com/actris-cloudnet/mwrpy](https://github.com/actris-cloudnet/mwrpy))
- First experimental products and plots available ([cloudnet.fmi.fi](http://cloudnet.fmi.fi))
- Station operators can start uploading raw files (binary files) to CLU
- RPG retrieval coefficients can be applied until ACTRIS retrievals are developed (already stored in CLU calibration database)

**Future / upcoming developments :**
- Calibration LOG files are planned to be monitored and stored in CLU calibration database
- Define procedure for the long term quality assessment for ACTRIS labelling step 1b
- Implement observation minus background monitoring for quality control
- Retrieval development

**Actions :**
- discuss implementation with CLU

- ## [Monitoring of Cloud radar stability with disdrometer](#) Yanis Grit, J-C. Dupont (IPSL)

**Short summary with the main information that are useful for the NFs (links, …) :**
- small size truncation
- RPG - Gate 3 (not use Gate 1)
- include evaporation effect to correct for droplet size / differences between DCR - DD
- DD measurement uncertainty by Dmitri -> define better cases
- compute bias and St dev as a function of rain rate

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**Future / upcoming developments :**

**Actions :**

- **[Estimating radome and rain attenuation (with uncertainties) from disdrometer observations](link) Dmitri Moisseev (UHEL)**

**Short summary with the main information that are useful for the NFs (links, …) :**
- Dmitri : attenuation due to rain from DD - choice of

- multiple droplet size distribution ($\gamma$ distribution) retrieved from DD measurements → uncertainties

- could be used to derive DD-based reflectivity uncertainties

- Radome age -> longer time to recover after rain and larger radome attenuation. Can be used as a flag to indicate that radome change is needed

**Future / upcoming developments :** Finalise the Python code for computing DSD uncertainties

**Actions :** Deliver the code to Yanis

- **[Radar comparison](link) Ulrich Görsdorf (DWD)**

**Short summary with the main information that are useful for the NFs (links, …) :**
- Mira-MRR comparison → used to monitor relative stability of radar calibration

- MIRA vs MOLRAD94 (Jorquera et al. 2023 method). After maintenance/repair of MIRA by Metek (> May 2023), bias between the two radars is near 0 dBZ., before the repair, Mira underestimated the value of Ze by about 3.5 dB compared to MOLRAD94

- if MOLRAD94 Ze measurements are assumed to be unbiased, the MIRA Ze bias is consistent with disdrometer calibration results (see Yanis Grit et al.)

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**Future / upcoming developments :**

**Actions :**
- finalize closure study between MIRA, MOLRAD94 and DD based on 2022 and 2023 datasets.
- Implement modelled droplet size distributions (Dmitri's method)

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# SESSION 2
# 11:00 - 12:30
# Hands On/Demonstrations

- ## HKD Marc-Antoine Drouin (LMD/IPSL)

**Short summary with the main information that are useful for the NFs (links, …) :**

- presentation on work done on identification of HouseKeeping Data (HKD)
- presentation of POC to visualise HKD using grafana
  - 2 services will be made available through grafana

    - access to all history of HKD

    - automatic alerting based on thresholds defined by PIs

**Future / upcoming developments :**

- training on use of Grafana

**Actions :**

- make the services available as soon as possible even without all functionalities implemented.

## New CCRES Services for NFs

- ## Scanning/non-scanning strategy Chris Walden (NCAS)

**Short summary with the main information that are useful for the NFs (links, …) :**

50% zenith pointing

- dwells centred on hour/half hour

- silence driver for dwelling

- standard/nominal operation:

  - derogation for campaigns

  - MWR BL scans

  - E-PROFILE requests BL scans over 10min

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**Future / upcoming developments :**

**Actions :**

- ## ● [ALC (CARS)](#) Alexander Geiss (LMU, CARS)

**Short summary with the main information that are useful for the NFs (links, …) :**

- CARS-ALC unit test bed

- Dark noise/ dark current

- Optical termination hood

- dark measurement of CL51 is temp. dependant but also other dependences

- telecover test

**Future / upcoming developments :**

**Actions :**

- ## ● [MWR SOPs](#) Bernhard Pospichal (UCOL)

**Short summary with the main information that are useful for the NFs (links, …) :**

- new calibration target : PT-V2 (as precise as PT-V1, but much easier to handle - less weight, less liquid nitrogen needed).

- be sure to change software version only after CCRES recommendation, CCRES tests new versions

- Hatpro v965 is recommended for use with all instruments after G3

- New document with guidelines for liquid nitrogen calibration

**Future / upcoming developments :**

- Start labeling step 1b, long-term monitoring of instrument performance

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**Actions :**

- Provide document for new LN2 calibration

- Invite to MWR workshop

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# SESSION 3
# 13:30 - 15:00
## CLU Data Portal

● <u>CLU Data Portal</u> **Simo Tukiainen, Ewan O'Connor (FMI)**

**Short summary with the main information that are useful for the NFs (links, …) :**

- instrument log book needed by NFs

- need more precise SOPs for disdrometers to harmonise data acquisition + define the telegram

    -> code from TU-Delft (Andre) and TROPOS (Patric)

- weather station -> see proposed format from CLU

- instrument PiDs


**Future / upcoming developments :**

- CLU will implement log book soon


**Actions :**

- CLU should explain the processing logic in case of multiple instruments

- need to think about status of "spare" instruments

- WG dedicated on QC


## Discussion


● **Discussion on Working Groups**

**Short summary with the main information that are useful for the NFs (links, …) :**

- WG cloud-aerosol interactions

- remote sensing of urban environments? (WWRP urban)

- ABL characterizations from multiple instruments

- DCR WG - Doppler Spectra

- Model intercomparison:

    - NWP

    - Togtbed LES

**Future / upcoming developments :**

**Actions :**
- contact the CRS community to create WG **(Dmitri)**
- fill the  questionnaire **Working Groups Survey** **(everyone)**

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# SESSION 4
## 15:30 - 17:15
## Hands On/Demonstrations

● **Labelling Martial Haeffelin (IPSL)**

**Short summary with the main information that are useful for the NFs (links, …) :**
- labelling interface : https://actris-nf-labelling.out.ocp.fmi.fi/
- templates :
  https://drive.google.com/drive/u/1/folders/1o2ZfDC20fX6Ey07GEk5MdOvL8NNve09m
- Conformity Matrix : When the NF adds and/or modifies information, it is
  asked that the NF changes the colour of the cell to orange.
- instruments PiD : if there is no, fill this form

**Future / upcoming developments :**
- next stations to enter the lab process (Jan. 2024) : Chilbolton, RADO-Cluj, Warsaw

**Actions :**

- get an update on the labelling status from all NFs
- follow-up the labelling procedure of Granada

# EarthCARE Cal/Val

● **[EarthCARE](#) Lukas Pfitzenmaier (UCOL), Felipe Toledo (LATMOS/IPSL)**

**Short summary with the main information that are useful for the NFs (links, …) :**

- FRM4RADAR: small 94 GHz Radar network to develop Cal/Val procedures for EarthCare. QA and QC methods to bring Radar measurements closer to the FRM concept

- ACPV: ESA project to develop guidelines for the best practice for Aerosol, Cloud and Precipitation product Cal/Val for satellites. Also define gaps in Cal/Val options

- GIVE : German initiative to validate 7 German institutes EarthCARE

- points to discuss some SOP development within CCRES for Satellite Cal/Val

**Future / upcoming developments :**

- CCRES will develop an SOP for Satellite Cal/Val with the focus on the upcoming EarthCARE mission

**Actions :**

- Couple list of operations of DCR + DD for EC-Cal/Val **(Lukas, Felipe)**

# END OF WORKSHOP