ACTRIS
CCRES

Communication to
Cloud Remote Sensing National Facilities

- December 2025 -

SUMMARY

1. CCRES/CLU Workshops, Training and Consultancy

CCRES/CLU Training school in September 2025

A CCRES/CLU training school took place **from 2 to 5 September 2025, hosted at the Ludwig-Maximilians University in Munich, Germany**. The program is accessible here. 42 persons participated, from 11 countries and representing 18 Cloud Remote Sensing National Facilities. Further information on the event is available on ACTRIS CCRES website.

CCRES/CLU Autumn Workshop

Our CCRES/CLU autumn workshop took place **on October 22 in Evora, Portugal and online**, as part of the ACTRIS Week 2025. This workshop had a specific focus on **National Facilities activities, feedback, and queries,** presenting technical and scientific results, case studies or any point they would like to raise.

All the presentations can be found on the website.

In case of any question, please contact Elisa Villard (evillard@ipsl.fr).

Questions from the community

CCRES and CLU are working on the implementation of a platform allowing anyone from the community to ask and answer questions, in a **"forum-like" forma**t. We will come back to you with more information as soon as possible. Until the platform is ready, we use the following table to **communicate within the community on specific raised issues** : 🟩 Questions/Answers NFs .

2. CCRES Operational Services for NFs

Cloud radar calibration campaigns

After the CCRES DCR campaigns in Germany in Leipzig and Lindenberg (with 7 radars calibrated since early 2025), the BASTA-CCRES radar was deployed for about two months (late September to late November) in **Granada, Spain, to calibrate their two RPG radars** (35–94 GHz NEBULA and 94 GHz NEPHELE).

The campaign went smoothly, and an initial quick analysis of the data showed that there were likely **enough ice-cloud cases to apply the calibration-transfer method**.

The BASTA-CCRES is now back at the SIRTA observatory in Palaiseau. A **new absolute calibration** is planned for the end of the year, before its next deployment in early 2026 (around mid-January) for a **six-month campaign in Romania** to calibrate the radars from Bucharest, Cluj, and Galati stations.


From left to right : Maria José Granados-Muñoz (Granada station), Matheus Tolentino Da Silva (Granada station), and Jean-François Ribaud (CCRES-FR), with mobile reference BASTA-CCRES Doppler Cloud Radar in front.

Cloud radar calibration reports

Since the start of the CCRES transfer-calibration campaigns, **9 radars have been calibrated** over the past few months.

Version 1 of the final reports will be shared with the relevant NFs and sent to the CLU. Overall, the figure below highlights the **very good consistency among the cloud radars within the CCRES network.** This demonstrates the excellent quality of the work carried out by the different NFs in close collaboration with the respective radar manufacturers.
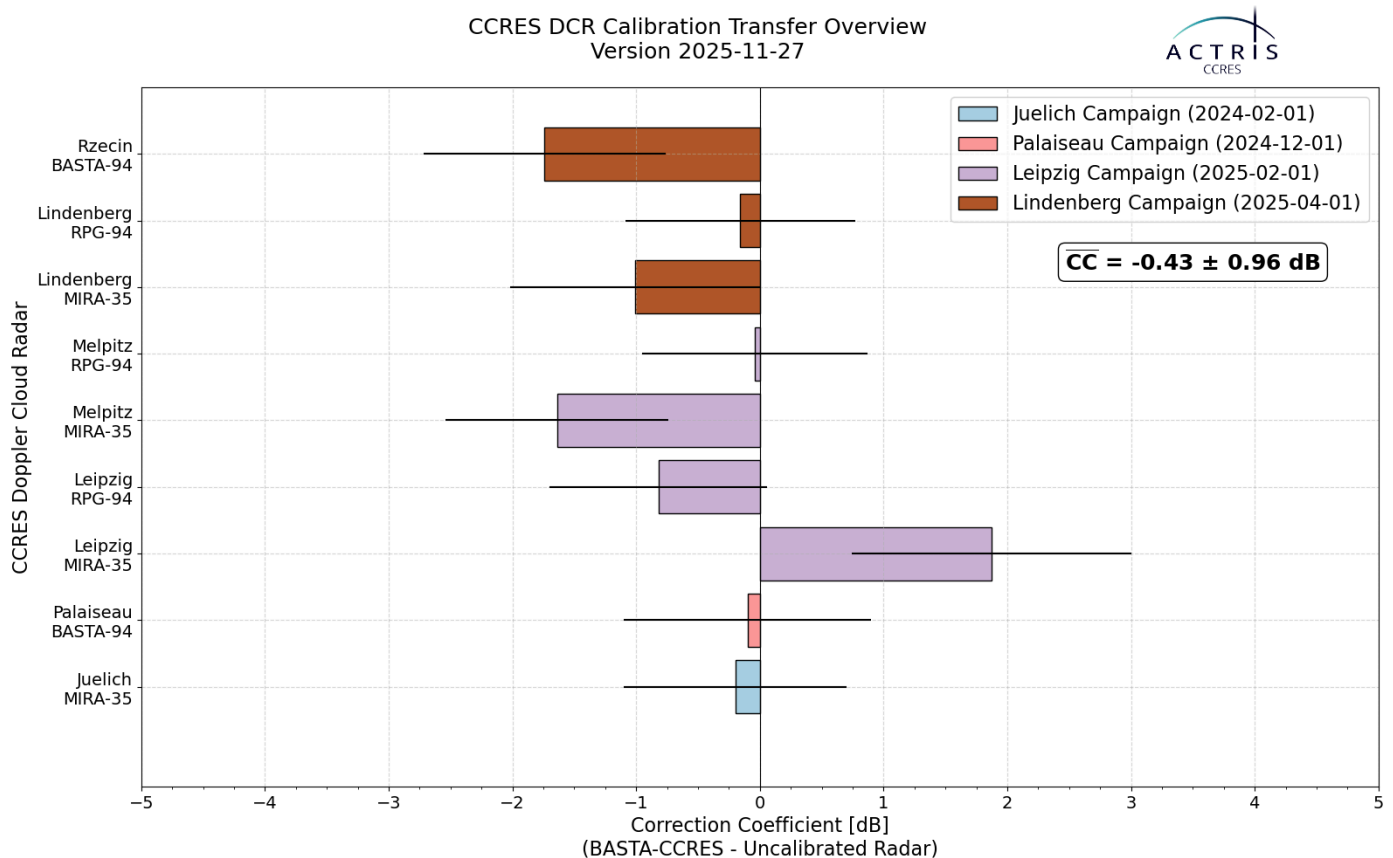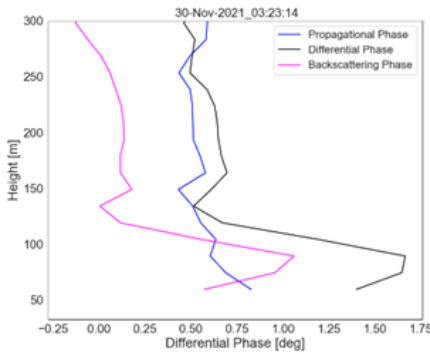

In case of any question on DCR calibration transfer, please contact Jean-François Ribaud (jean-francois.ribaud@ipsl.fr), Felipe Toledo (felipe.toledo@latmos.ipsl.fr) and/or Jean-Charles Dupont (jean-charles.dupont@ipsl.fr).

DCR calibration with polarimetric self-consistency technique

A. Myagkov et al. (2020) introduced the self-consistency calibration technique, which exploits the **polarization capabilities of W-band cloud radars.** The objective of our research is to assess the suitability of this self-consistency calibration method and to identify the modifications required to make the approach more user-friendly and practical for operational applications. Using 94 GHz cloud radar observations from Cabauw, we first retrieved the propagational (K_{dp}) and backscattering (δ) components from the measured differential phase (φ) (**Figure 1**). This constitutes the first step of the **self-consistency methodology**. The second step involves the retrieval of differential attenuation (A_{dp}),

as shown in **Figure 2**. The third step is the calculation of the non-attenuated reflectivity (Z_0), presented in **Figure 3**, where both the attenuation and the calibration coefficient are initially assumed to be zero. We are currently working on the calculation of K_{dp} and A_{dp} using Z_0, δ, and the coefficients provided by A. Myagkov et al. (2020).
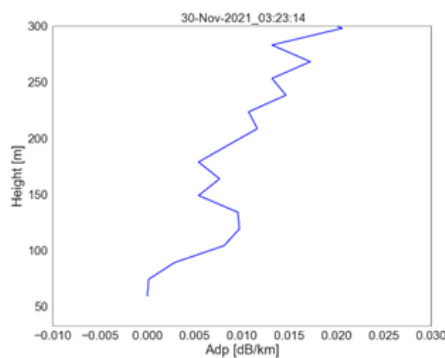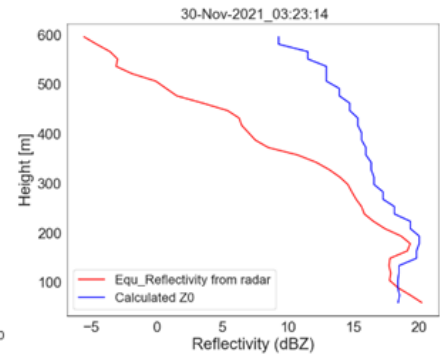

(Figure 1)　　　　　(Figure 2)　　　　　(Figure 3)

In case of any question, please contact Renju Nandan (R.Nandan@tudelft.nl).

Disdrometer calibration procedure in progress

Since September 2025, **a new calibration kit has been printed dedicated to the THIES LNM CLIMA disdrometer** and the preliminary results are encouraging. The datalogger system has been optimized (serial communication, power supply, program) to make the calibration easier and faster. See photo.

Moreover, significant efforts have been made to **improve the quality of the output files** (metadata, technical variables, name) in order to be able to calibrate several disdrometers quickly and at the same place.
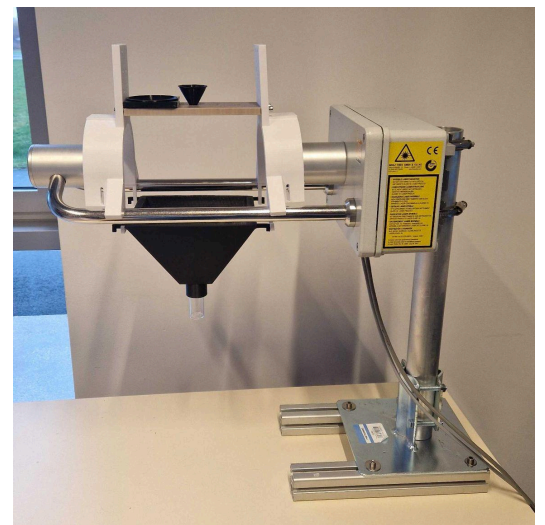
We will propose in March-April 2026 **to calibrate at the SIRTA Observatory several disdrometers that are operated by Cloud Remote Sensing National Facilities**. We have to finalize the standard procedures and we will contact you quickly to propose a possible schedule.

Several sensitivity tests have been conducted on Munich and SIRTA Parsivel2 disdrometers, and the results are in line with what we expected, which allows us to better understand and evaluate the operating limits of the sensors.

The plots below show **two sensitivity tests done on the SIRTA Parsivel2 disdrometer.** On the left, we quantify the impact of the distance between the sphere and the center of the laser beam (0, 0.5, 1 and 1.5cm) for the 4 sizes of metallic sphere (0.4, 2, 4 and 6mm). We note that Parsivel2 has difficulties to detect metallic spheres of 0.4mm for all the distance (<60% of detection) whereas a distance of 1cm to the laser beam center begins to have an impact on the 2mm sphere detection (85% of detection). On the right, we show the impact of the laser amplitude (the optical window is artificially soiled) on the metallic sphere detection. The performances of the Parisvel2 degrade as soon as the signal strength drops by 50% for all the sphere sizes.
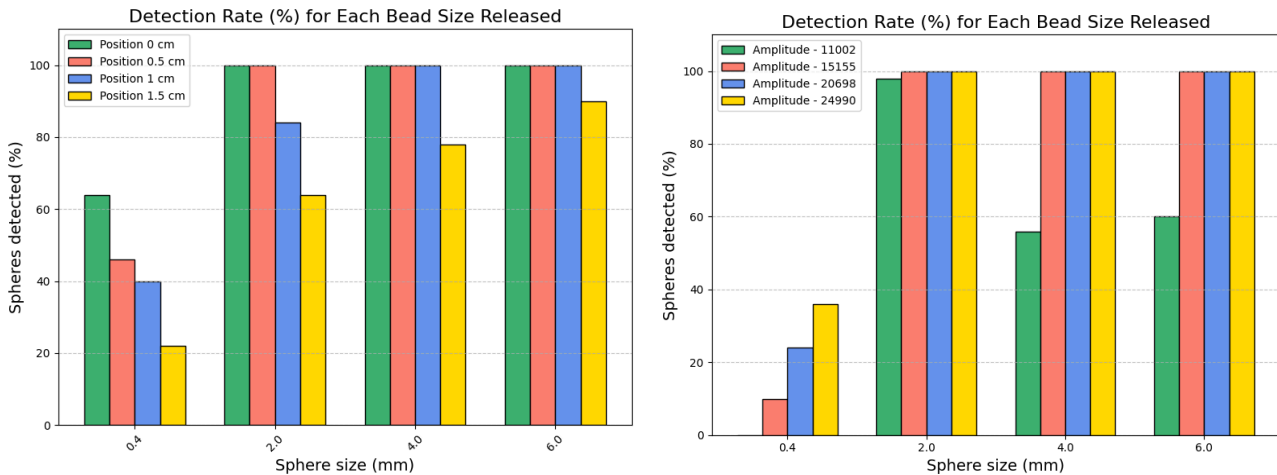
Results of tests conducted at SIRTA NF (CCRES-FR team IPSL)

In case of any question, please contact Jean-Charles Dupont (jean-charles.dupont@ipsl.fr) and Stefan Kneifel (stefan.kneifel@lmu.de).

Updated SOP for Microwave Radiometer

An updated version of the SOP for MWR operation is available on the CCRES website at this link. The main changes refer to calibration log files that need to be provided to CCRES for the monitoring of absolute calibrations and long-term stability of instrument noise. Another topic concerns operation under cold environmental conditions where it is recommended to cover the openings of the cooling system with foam material (see picture).

In case of any question, please contact Bernhard Pospichal and/or Tobias Marke (actris-ccres-mwr@uni-koeln.de).

3. Labelling process

Update on labelling step 1a

Cape Verde Finland La Réunion

Cloud Remote Sensing National Facilities : Labelling status
- 📍 ACTRIS CRS Labelling in progress
- 📍 ACTRIS CRS Labelling initiated
- 📍 ACTRIS CRS candidate
- 📍 Other CRS station

Cloud Remote Sensing NFs map

Stations initially accepted for labelling step 1a: AGORA (Spain), Cabauw (Netherlands), CARO Limassol (Cyprus), CIAO-Potenza (Italy), CVAO (Cape Verde), JOYCE (Germany), Lampedusa (Italy), Maïdo (La Réunion), MOL-RAO (Germany), München (Germany), Payerne (Switzerland), RADO-Bucharest (Romania), RADO-Cluj (Romania), RADO-Galati (Romania), SIRTA (France), SMEAR II (Finland).

Stations in process to enter labelling step 1a : Pallas (Finland), Rzecin (Poland), Warsaw (Poland).

Stations to enter the process in 2026 : Leipzig (Germany), Melpitz (Germany), Karlsruhe (Germany).

Mobile stations

The labelling process for mobile stations will be finalised by ACTRIS Head Office in the coming weeks. It will be centralised for all components and not managed by CCRES, even if our Topical Centre will be involved in the auditing and evaluation of the stations. More information will be provided soon.

NFs instrument diversity

The map below shows instruments of stations initially accepted for labelling or in progress.

NF Instrument diversity
v 10.2025
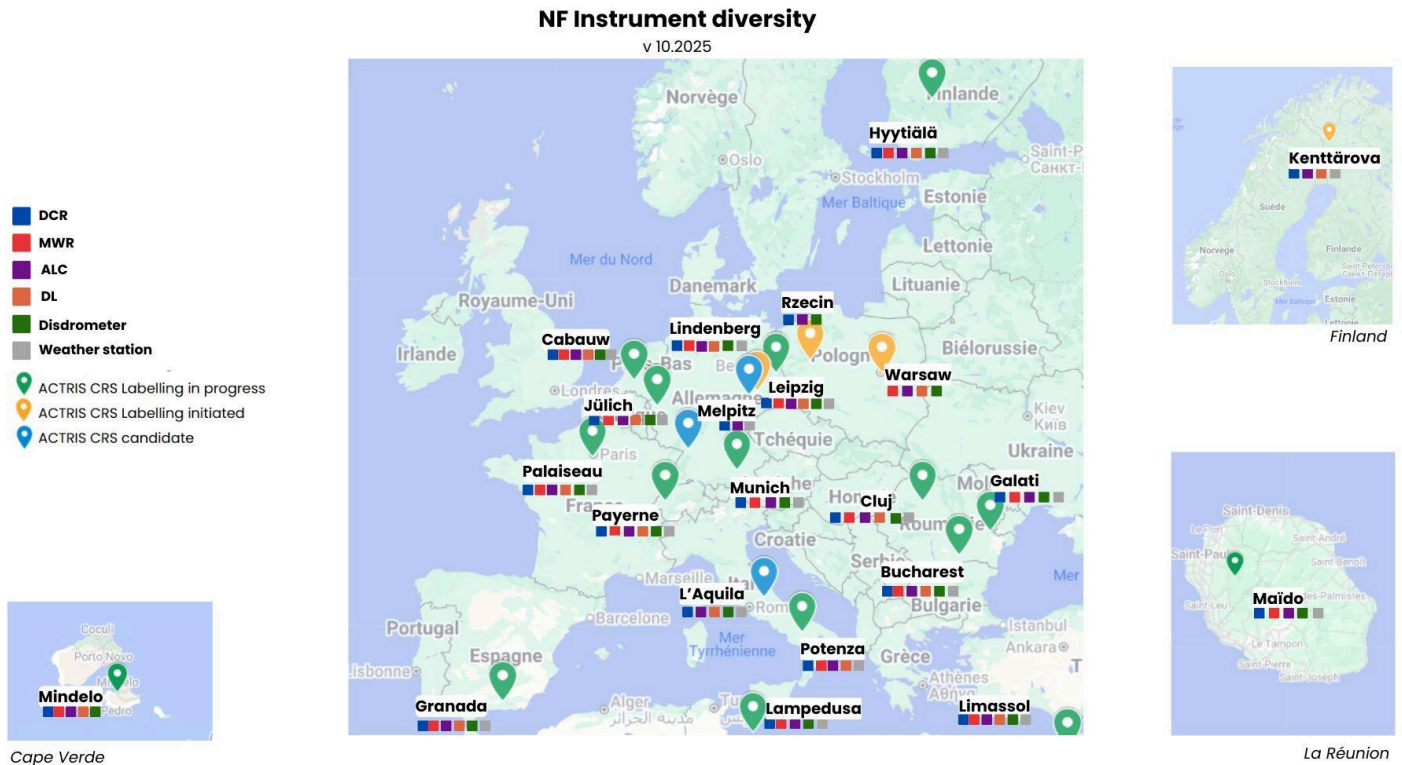
All information about CRS stations instruments can be found on this map : NF instrument diversity

- **Reminder for labelling** : One disdrometer (OTT Parsivel2 or Thies LNM for example) is mandatory for the NF labelling, as well as a weather station and a rain gauge. Please see CCRES requirements for these instruments in the SOPs resources at the end of this newsletter.

- Update on the **current status of NFs instruments** :

		DCR	MWR	Ceilometer	Doppler Lidar	Disdrometer	Weather Station
Cyprus	CARO (Limassol)	Metek MIRA35	Rpg HATPRO G5	Lufft CHM15k	Halo Streamline	OTT Parsivel2	Weather station
Italy	CIAO (Potenza)	Metek MIRA35	Rpg HATPRO G5	Vaisala CL51	Halo Streamline	OTT Parsivel2	Vaisala AWS310
Germany	CVAO	Metek MIRA35	Rpg HATPRO G5	PollyXT	Halo Streamline	OTT Parsivel2	Vaisala WXT536
Spain	Granada	Rpg DCR94	Rpg HATPRO G2	Lufft CHM15k	Halo Streamline	OTT Parsivel2	Campbell CR1000X
Germany	JOYCE	Metek MIRA35	Rpg HATPRO G5	Lufft CHM15k	Halo Streamline	OTT Parsivel2	Weather station
Germany	KLOCX	Rpg DCR94	RPG HATPRO G5	Vaisala CL31	Halo Streamline	OTT Parsivel2	Vaisala WXT536
Germany	LACROS	Rpg DCR94	RPG HATPRO G5	Lufft CHM15k	Halo Streamline	OTT Parsivel2	Vaisala WXT536
Italy	Lampedusa	Metek MIRA35	Rpg HATPRO G5	Lufft CHM15k		Thies LPM	Vaisala AWS310
Germany	Melpitz Research Station	Rpg DCR94		Lufft CHM15k			Weather station
Germany	MOL-RAO	Metek MIRA35	Rpg HATPRO G5	Lufft CHM15k	Halo Streamline	Thies LPM	Weather station
Germany	München	Metek MIRA35	Rpg HATPRO G5	Lufft CHM15k		OTT Parsivel2	Weather station
Sweden	NORUNDA	Rpg DCR94		Vaisala CL51		OTT Parsivel2	
Norway	Ny Alesund	Rpg DCR94	Rpg HATPRO G2	Vaisala CL51		OTT Parsivel2	
France	OPAR	BASTA94	Rpg HATPRO G5	Campbell CS135		OTT Parsivel2	MetConnectONE
Finland	Pallas/Kenttärova	Rpg DCR94	Rpg HATPRO G5	Vaisala CL61	Halo Streamline	OTT Parsivel2	Weather station
Switzerland	Payerne(PAY)	Rpg DRC94	Rpg HATPRO G5	Lufft CHM15k	Vaisala WLS200S	Thies LPM	Weather station
Romania	RADO-Bucharest	Metek MIRA35/RPG	Rpg HATPRO G5	Lufft CHM15k	Halo Streamline	OTT Parsivel2	Weather station
Romania	RADO-Cluj	Rpg DCR94	Rpg HATPRO G5	Lufft CHM15k	Halo Streamline	OTT Parsivel2	Thies Clima
Romania	RADO-Galati	Rpg DCR94	Rpg HATPRO	Lufft CHM15k		OTT Parsivel2	Weather station
Netherlands	Ruisdael	Rpg DCR94	Rpg HATPRO G5	Lufft CHM15k	Vaisala WLS200S	OTT Parsivel2	Weather station
Poland	Rzecin	BASTA94		Lufft CHM15k		OTT Parsivel2	
France	SIRTA	Latmos BASTA94	Rpg HATPRO G5	Lufft CHM15k	Vaisala WLS400S	OTT Parsivel2	Weather station
Finland	SMEAR II/Hyytiälä	Rpg DCR94	Rpg HATPRO G5	Vaisala CL61	Halo Streamline	OTT Parsivel2	Weather station
Italy	UNIAQ/CETEMPS	Rpg DCR94		Vaisala CL51	Vaisala WLS100S	Thies LPM	WXT536 (Vaisala)
Poland	Warsaw		Rpg HATPRO G2	PollyXT	Halo Streamline	OTT Parsivel2	

If your instruments are not listed in this table or if you see any error, please inform Elisa Villard (evillard@ipsl.fr).

Labelling step 1b

Latest information on labelling step 1b and step 1c was delivered during our autumn workshop in Evora :
Labelling step 1b _ updates

A **"to-do" list** has been shared with the National Facilities which provides recommendations on check-ups, maintenance and calibration of the instruments, summarizing the SOPs, including the frequency of the expected actions. It is not yet finalised so anyone in the community is welcome to provide comments : W CCRES_NF_to-do_list_SOPs.docx

A **detailed procedure for labelling step1b validation** is being prepared and will be shared at the beginning of 2026. It will include a logbook that will be developed by the CLU, allowing CCRES and CLU to **track the actions performed by the NF**, as well as a conformity matrix to summarize the state of readiness of the NF for the step1b and share their status to the NFs who will be able to comment the matrix.

Several stations are **now ready to apply** for this second step of the labelling process and a report on the availability and quality of data over the past years will be edited in the coming weeks. The **NFs will then be proposed for approval to the ACTRIS Research Infrastructure committee** (if all requirements have been met), and subsequently to the General Assembly in June 2026.

If you have any questions, please contact Jean-François Ribaud (jean-francois.ribaud@ipsl.fr).

4. EarthCARE Cal/Val campaign

EarthCARE was successfully **launched on May 29, 2024**. Read more about the mission at this link : EarthCARE launched to study the role of clouds and aerosols in Earth's climate (European Space Agency). Global information about the mission is available on the ESA website and **updated SOPs** for NFs participating in EarthCARE Cal/Val are available here.

The data needed for the Cal/Val activities are transferred to the ESA server via the CLU Data Centre. As a facility PI involved in EarthCARE, please **make sure that you follow the Satellite Cal/Val SOPs and that your data are uploaded to CLU**.

In the first week of December 2025, the **first EarthCARE science and validation workshop** was held in Tokyo, Japan. Lukas Pfitzenmaier (U. Cologne) and Nathan Feuillard (LATMOS/IPSL) presented their results conducted together with Felipe Toledo Bittner and the ACTRIS CCRES team **using the ACTRIS cloud radars to evaluate EarthCARE CPR level 1 and level 2 measurements - reflectivity and Doppler velocity**. The data comparison is done statistically, based on work from Protat et al., 2009, and Kollias et al., 2019.

The methods used were already presented in the last CCRES-CLU workshop and at the September training school: workshop presentation, training school presentation. To summarize, we modified the well-known method for comparing reflectivity by **statistically testing the ground and CPR data**. This allows us to exclude height ranges where the data are statistically not comparable within selected boundaries, in order to reduce uncertainties in the comparisons. An open version of the presentation and the poster from the EarthCARE workshop can be found here: reflectivity validation poster, doppler velocity validation presentation .

The results presented at the workshop for the reflectivity comparisons are shown in the next figure. It shows the EarthCARE-ACTRIS bias for the eight radars that were calibrated by CCRES. In this figure, each point (with its error bar) is the bias between the space and ground radars. The figure shows a remarkable mean bias between the EarthCARE CPR and the ACTRIS cloud radars that is less than 0.1 dB. Note that the CPR / ground bias uncertainty is sensitive to number of overpasses compared and scene characteristics. The current analysis shows that this method requires overpasses collected during about 9-12 months to reach stable bias estimations.

ACTRIS sites bias.
Period: 2024-07-20-2025-10-31.
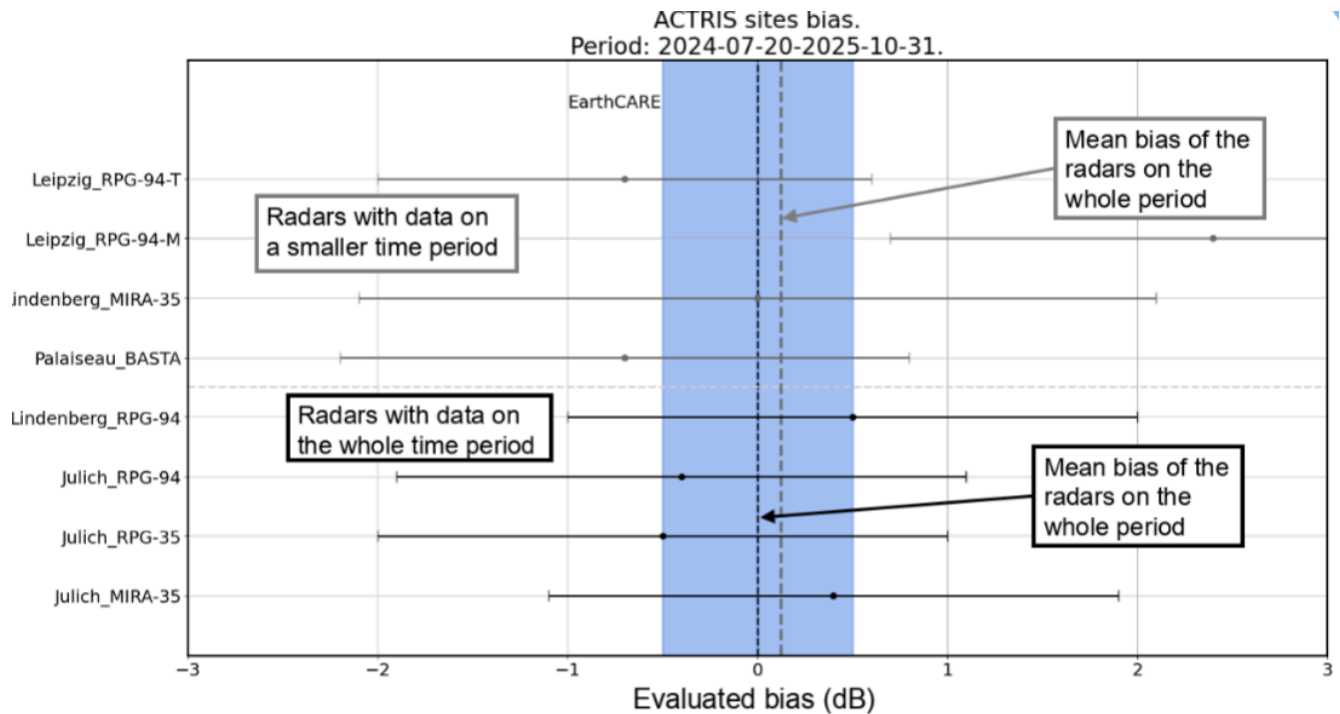
For the Doppler velocities comparisons, the results are presented in depth in the presentation mentioned above. The Doppler velocities measured by EarthCARE and ACTRIS are statistically close to each other.

We can conclude that ACTRIS CRS stations, CCRES and CLU were ready in time to provide calibrated and quality-controlled Cloud Radar measurements to evaluate the CPR cloud radar. Moreover, our latest results on the reflectivity comparisons with EarthCARE show that the calibrated ACTRIS CRS stations observe the same reflectivities and Doppler velocities as EarthCARE's CPR. This is a great indicator, showing the quality of the calibrations performed by CCRES.

In general, if you want to stay up to date and view nice pictures, https://www.earthcarescience.net/home is the webpage to visit. It provides a brief background on the Satellite Mission, as well as nice illustrative examples of what was found and measured.

In addition, here are more News about EarthCARE and satellites:
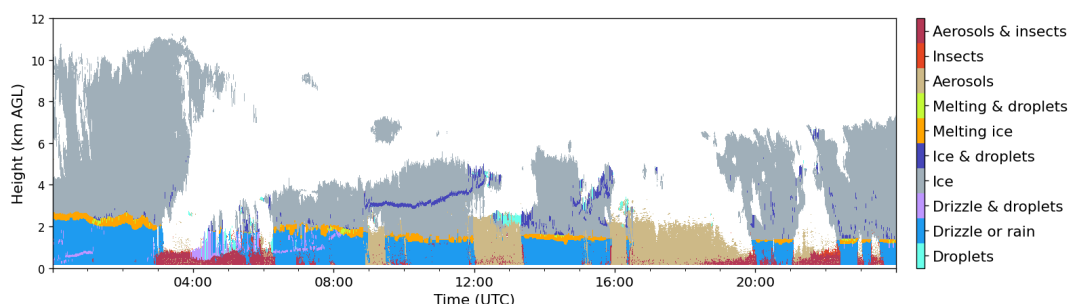- The **Best Practice Protocol for the Validation of Aerosol, Cloud, and Precipitation Profiles (ACPPV) is now available** to the public. The protocol outlines state-of-the-art practices, methods, and tools for validating Atmospheric Satellite Profiles using ground-based and airborne measurements. It also includes a section with gaps and open questions in validation. If you are now interested, please have a look at the following link:
  Marinou, E., & Amiridis, V. (2025, May 14). Best Practice Protocol for the Validation of Aerosol, Cloud, and Precipitation Profiles (ACPPV). Zenodo. https://doi.org/10.5281/zenodo.15400055.
- **Explore a fascinating piece of science communication related to EarthCARE and cloud and aerosol profiling.** I strongly recommend watching this YouTube video: https://www.youtube.com/watch?v=6VsrIXwVg3Q. ESA and Jamie Perera, an artist and

composer, collaborated to transform real EarthCARE measurements into sound. The YouTube video is a demonstration of a single orbit, including some visualisation. ESA plans to make the sound available near real-time soon. You will be able to listen today to what the satellite measured yesterday. So stay tuned for the EarthCARE radio :-)

If you have any questions, please contact Lukas Pfitzenmaier (l.pfitzenmaier@uni-koeln.de) and Nathan Feuillard (nathan.feuillard@latmos.ipsl.fr).

5. CLU Data Centre updates

- Add **support for Vaisala DIAL Atmospheric Profiler DA10** in Lindenberg.

- Add **experimental validation products for EarthCARE overpasses** by comparing the CPR Level 1B data with Orbital-Radar simulations derived from the Cloudnet radar data, and by **evaluating the CPR Level 2A target classification against the Cloudnet target classification.** These experimental products are available from the Cloudnet data portal: https://cloudnet.fmi.fi/search/data?experimental=true&product=cpr-tc-validation,cpr-validation&dateFrom=2024-01-01

- **New site** added to Cloudnet: TROPOS campaign in Invercargill, New Zealand.

- We are still **missing most of the site descriptions.** Please send a description by email (actris-cloudnet@fmi.fi). For example, see Hyytiälä : https://cloudnet.fmi.fi/site/hyytiala.

If you have any questions, please contact Ewan O'Connor (Ewan.Oconnor@fmi.fi).

6. Calendar

- January -July 2026 **: BASTA CCRES calibration campaign** in Bucharest, Galati and Cluj (Romania)
- April 20-24th 2026 : **ACTRIS Science Conference**, Oslo (Norway)
- April 27-30th 2026 : **18th Specialist Meeting on Microwave Radiometry & Remote Sensing of the Environment** in L'aquila (Italy)
- May 3 - 8th 2026 : **EGU**, Vienna (Austria)
- July 5 - 10th 2026 ; **ILRC** (Hiroshima, Japan)
- August 24 - 28th 2026 : **ERAD 2026**, Belgrade (Serbia)

- Sept. 21 - 25th 2026 : **EUTMETSAT Meteorological Satellite Conference**, Darmstadt (Germany)
- Oct. 6 - 8th 2026 : **Meteorological Technology World Expo co-located with WMO TECO conference,** Amsterdam (The Netherlands)
- Nov. 3 - 4th 2026 : **E-Profile ET Meeting**, Toulouse (France)

7. List of abstracts submitted for consideration at the 2026 ACTRIS science conference that we are aware of

- Atmospheric stability and transport processes in the urban boundary layer from ground-based remote sensing profile observations – a heatwave case study ; Kotthaus et al
- Thermodynamic and cloud profile variability and statistics over Europe based on ACTRIS cloud remote sensing high-quality data ; Haeffelin et al
- Applicability of self-consistency calibration method for polarimetric cloud radar ; Nandan and Unal
- Cal/Val of the EarthCARE Cloud Profiling Radar using the ACTRIS Cloud Radar Network ; Toledo et al
- Atmospheric processes in the natural or controlled atmospheres, including aerosol-cloud-climate interactions ; Granados-Muñoz et al
- Identification of ice particle types using radar and ceilometer depolarisation observations ; Moissev et al
- Investigating the Venturi Effect in Urban Airflows Using Doppler Lidar ; Janicka et al
- Life-cycle Analysis of Low Clouds and Fog in a Mountainous Region ; Vuellers et al
- Characteristics and vertical distribution of clouds and precipitation measured at the ENEA Lampedusa station in 2024–2025 derived from Cloudnet retrieval ; Pace et al
- Vertical Structure and Seasonal variability of hydrometeors at different Cloudnet stations, Nemuc et al

8. Resources

CCRES website for operational services

A **website** has been implemented by CCRES to provide a platform for National Facilities to access **operational services**. Facilities can now **monitor the stability of operations and data quality**, and **track instrument parameters** of their station, while accessing **documentatio**n about CCRES operational services, **SOPs, codes** and available tools on the interface. https://ccres.aeris-data.fr/
CCRES Newsletters are available on this website as well.

General information about ACTRIS and CCRES units, communication, procedures and news can still be found on the ACTRIS website at this address : https://www.actris.eu/topical-centre/ccres

Cloudnet data portal (https://cloudnet.fmi.fi/) provides access to **all ACTRIS Cloud Remote Sensing data.** It hosts **data processing and curation service** for ground-based cloud remote sensing measurements.

NF instrument diversity : online resources

An **interactive map** showing the stations status and their instruments is available on **ACTRIS CCRES website,** as well as on **OpenStreetMap** : click on the layers and filters on the left in order to view instruments diversity, or click on a station to get to know the details about its instruments.

Presentation of CCRES and CLU at conferences

A short **presentation of CCRES and CLU** is available **at this link.** It can be **used for conferences** involving Cloud Remote Sensing community related activities. Please inform us (evillard@ipsl.fr) when CCRES is mentioned at an event, or in any publication you have been involved in.

Labelling process

The procedure for labelling is explained further in detail in this document presented during our last workshop : 📄 **3. CCRES_CLU workshop_Evora_Labelling_process.pdf**

SOPs

SOPs : At this link, you can find the Standard Operating Procedures for each instrument**.**

EarthCARE Cal/Val

Presentations from the different workshops to which CCRES participated are available **here.**

Housekeeping data

The training session on HKD monitoring was organised in May 2024,, here is the presentation : **Grafana training session**
Last updates were presented during our May 2025 workshop and are available here
📄 5. CCRES_CLU workshop May2025_Housekeeping_Data.pdf
Documentation and access to Grafana are accessible on **CCRES operational services website**.

Workshop material

All CCRES workshops presentations are available **here.**

Publications

CCRES publications are available **here.**