ACTRIS
CCRES

Conclusions

Martial Haeffelin

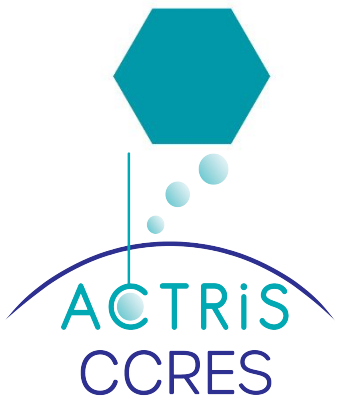*CCRES Workshop, SIRTA observatory – Nov 14-15th, 2022*

2023 Agenda / Events

- 12-14 Dec 2022 (Brussels): E-PROFILE annual meeting

- Feb 2023 (Helsinki): DL training (CCRES/PROBE)

- Spring 2023 (Online): CCRES workshop

- Date TBD (Loc TBD - ITC) NF hands-on training on instrument operation and calibration (CCRES/PROBE)

- July 2023 (Colorado) fog conference

- 3-8 Sept 2023 (Bratislava, Slovakia) EMS conference

- Fall 2023 (Location TBD): PROBE COST Action annual meeting

- Oct 2023 (Palaiseau): Multi-frequency radar calibration (transfer + DD) campaign
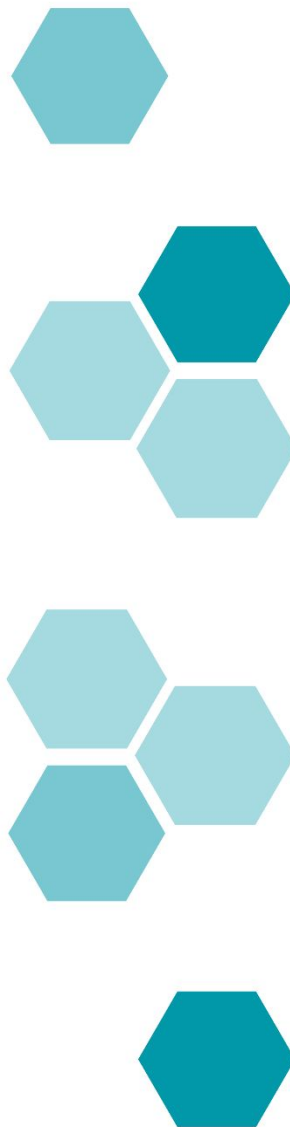
Future work planned for 2023

- Submission of data + HKD to CloudNet/CLU DC

- Start Labelling 1A

- See next slides presenting conclusions of breakout sessions:

    - ALC aerosol, cloud, and ABL profiling

    - MWR temperature profiling

    - DCR + DL 3-D wind profiling

    - DCR/DD/WS for DCR calibration monitoring

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ALC processing for CARS and CCRES products

Breakout session summary

CCRES Workshop, SIRTA – Nov 14-15th, 2022

Advanced ALC products

Cloud remote sensing data centre units (CLU)

- Cloud base height
- Liquid water content
- Target classification / drizzle / precipitation/ …

AERIS-ESPRI

- ABL heights (ABL testbed method demonstration)

Aerosol remote sensing data centre units (ARES)

- Aerosol optical and microphysical properties
- Mass concentrations
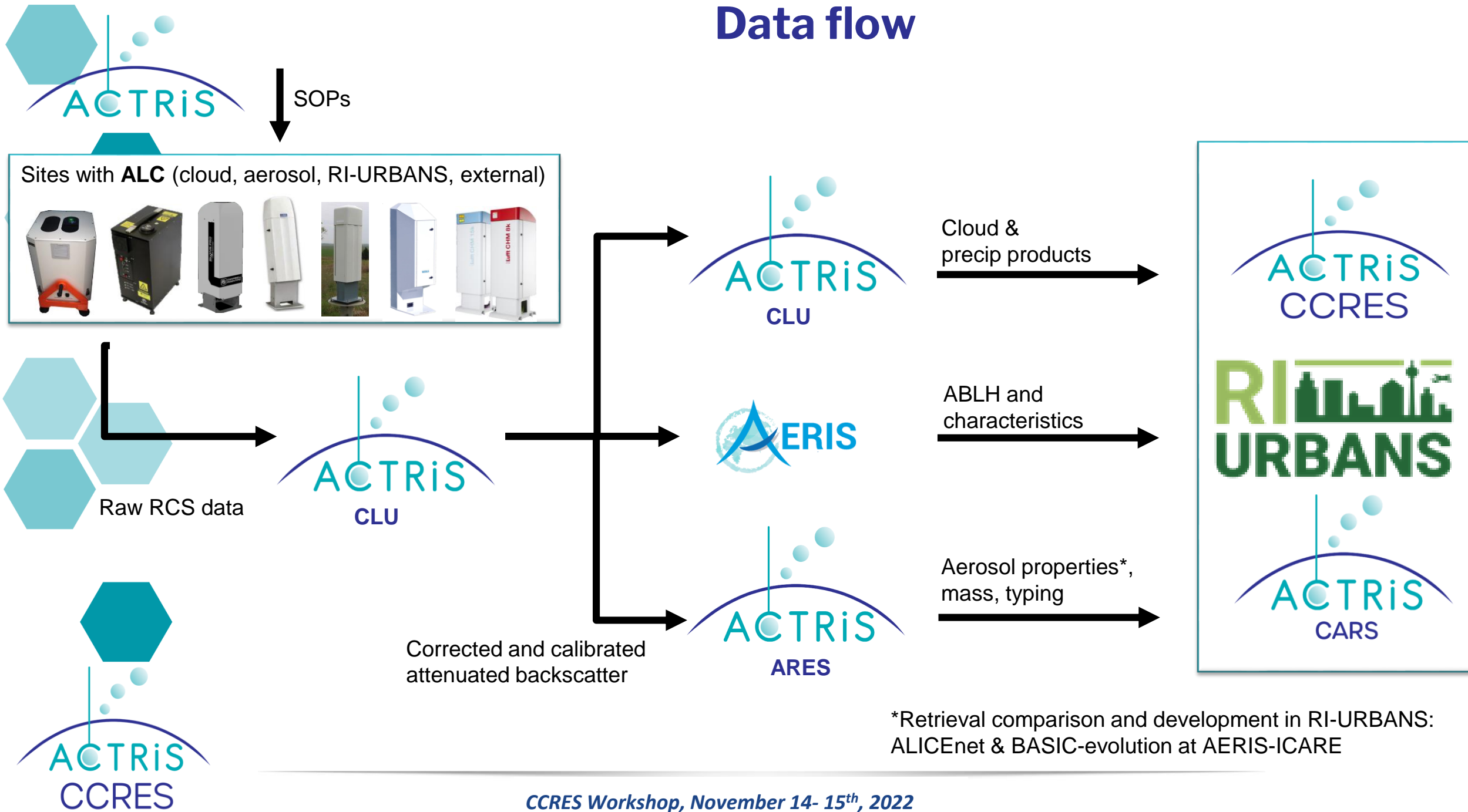- Aerosol typing

RCS → attenuated backscatter @ CLU

- CHM overlap: robust method available
- Vaisala near-range and background: assess against 'cone' measurements
- Rayleigh calibration: ALICEnet, SCC approach
- Liquid cloud method (CL31, CL51): several implementations
- Next: corrections and calibrations for Cimel, miniMPL, Campbell sensors

	Overlap	Near-range artefacts	background	Water vapour	Calibration
Lufft CHM15k, CHM8k	automatic method → python				Rayleigh → python
Vaisala CL31, CL51		Automatic method → python	Automatic method → python, check against cone measurements	To be discussed	Liquid cloud
Vaisala CL61		To be checked		Necessary?	Rayleigh
Cimel CE376					
Droplet MT miniMPL					
Campbell SkyVUE PRO				tbd	

Data flow

SOPs

Sites with **ALC** (cloud, aerosol, RI-URBANS, external)

Raw RCS data

CLU

Corrected and calibrated attenuated backscatter

CLU

ARES

Cloud & precip products

ABLH and characteristics

Aerosol properties*, mass, typing

CCRES

RI-URBANS

CARS

*Retrieval comparison and development in RI-URBANS: ALICEnet & BASIC-evolution at AERIS-ICARE

CCRES Workshop, November 14- 15th, 2022

Strategy

Working groups: corrections and calibrations

- CHM overlap: IPSL + CLU +E=PROFILE
- Vaisala near-range and background: plans at LMU and FMI to assess against 'cone' measurements
- Rayleigh calibration: ALICEnet, CARS/LMU, IPSL, KNMI, …
- Liquid cloud method (CL31, CL51): discussion between IPSL, E-PROFILE, FMI, Uni Cologne, …
- Next: corrections and calibrations for Cimel, miniMPL, Campbell sensors

Working groups: corrections and calibrations

- ABL height retrievals: ABL testbed at AERIS-ESPRI + partners
- Aerosol properties + mass: RI-URBANS, CARS/LMU, ALICEnet, ICARE, …
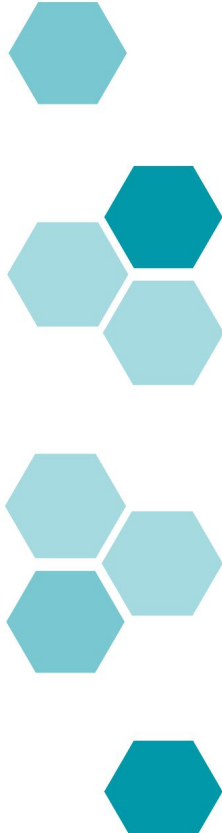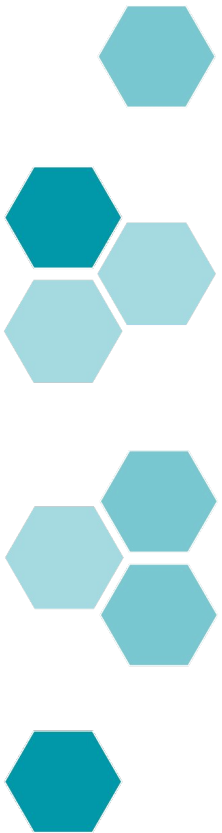- Aerosol typing: RI-URBANS, CARS/LMU, ALICEnet …

New mailing list: please join!

https://listes.ipsl.fr/sympa/info/actris_alc

Thank you

MWR Data Processing and
Quality Control

CCRES Meeting, SIRTA, France – November, 14-15, 2022

CCRES MWR Central Facility - Status & Updates

- **Python based processing software under development**
  - started with operational test run for Jülich
  - more stations will follow soon

- **In the process of acquiring 2 additional RPG MWRs**
  - low humidity (90 / 183 GHz)
  - replacement for operational MWR (G5 K / V Band)

- **Organized workshop on MWR operation and calibration in Jülich** (Bernhard Pospichal, Tobias Marke, Lukas Pfitzenmaier, Rainer Haseneder-Lind, Tobias Böck)

Discussion Points

- **Implementation of MWR processing software into CloudnetPy**

  (processing chain can run using existing retrieval coefficients)

- **Setup of centralized calibration database**

  (storage of absolute calibration LOG files)

- **HKD monitoring**

  (define variables to be monitored and alert settings)

- **ACTRIS conformity**

  (data levels, vocabulary)

- **Data visualization**
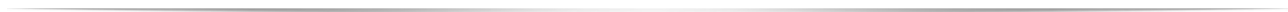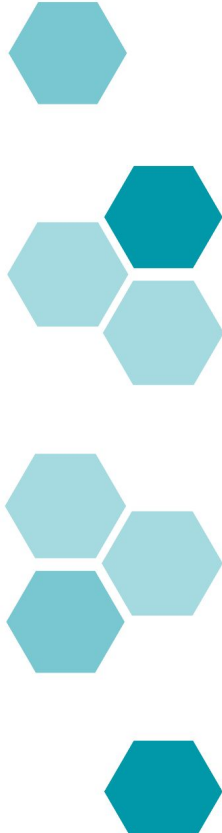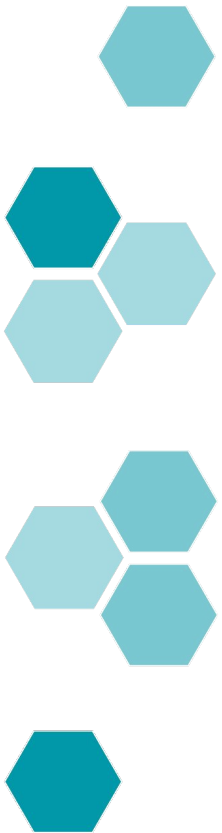
  (dynamic quicklooks)

Next steps

- **Test and implement processing software; request retrieval coefficients**

- **Start raw data transfer from pilot stations** (SIRTA, JOYCE, Lindenberg, …)

- **Retrieval development plans / first ideas**
    - Retrieval derivation with ERA5 input / compare to radiosonde based retrievals
    - Include passive channel of cloud radar (89 GHz)
    - Statistical retrieval method (Neural Network including auxiliary information)
    - Tests regarding shifts in center frequency / bandwidth (V-band)
    - Spectral consistency retrieval for off-zenith angles
    - MWR + IRT synergy retrieval for LWP

- **Work on data quality assessment strategy (+ documentation) for labelling**

Thank you

Summary Breakout session
Wind profiles from DCR and DL

CCRES Workshop Palaiseau 14-15 Nov 2022

Wind profiles in ACTRIS

- 3D wind vector can be derived from DCR + DWL at ACTRIS stations

- **Doppler lidar VAD scan**
  - zenith angle 15°, every 15 minutes
  - 10 degrees angular resolution, spatial resolution 30 m
- **Cloud radar VAD scan**
  - zenith angle 8°, every 30 minutes
  - ~5 degrees angular resolution, spatial resolution 30 m
- ➢ **combined product based on both datasets at JOYCE continuously since 2020**

Discussion / Next steps

- Which stations can/want to implement that? Need a scanning DCR + DWL

- Which scan strategies? Which scan frequency? Every 15/30/60 min?

- Guidelines for scans will be developed (scan angles, scan types – VAD vs. 3 beams?)
  SOPs for DCR and DWL need to be adapted

- More data analysis – how good is the method in rain?

- Currently code is only available for JOYCE (mix between IDL / Python), needs to be adapted for general applicability

- Add Radar Wind Profiler (not an ACTRIS instrument)?
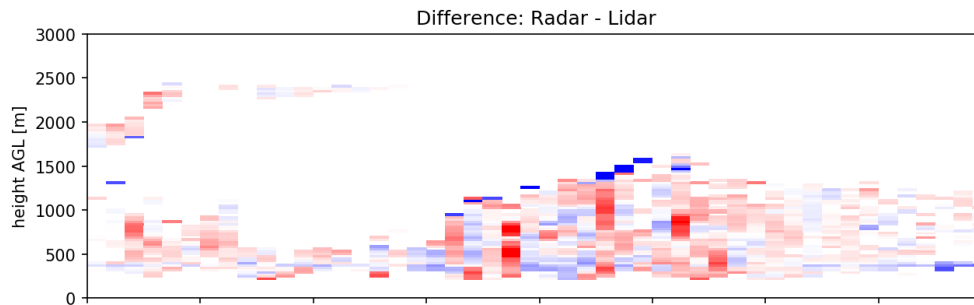- Dual wavelength radar scans for insect detection?

Example day – wind speed boundary layer
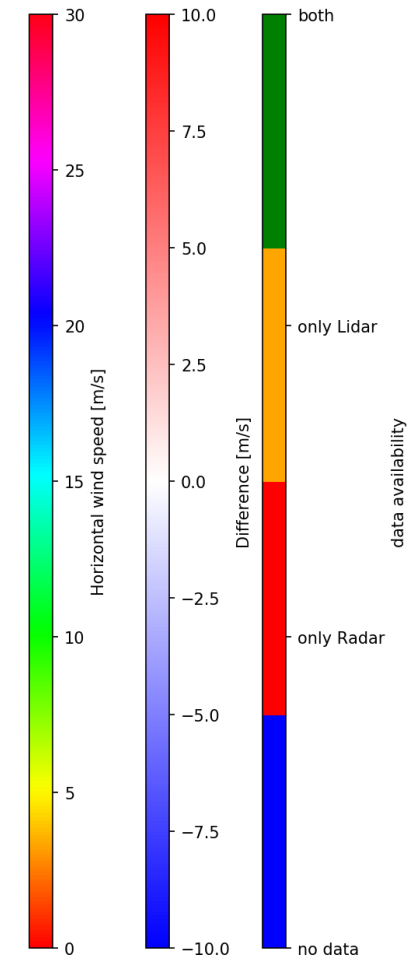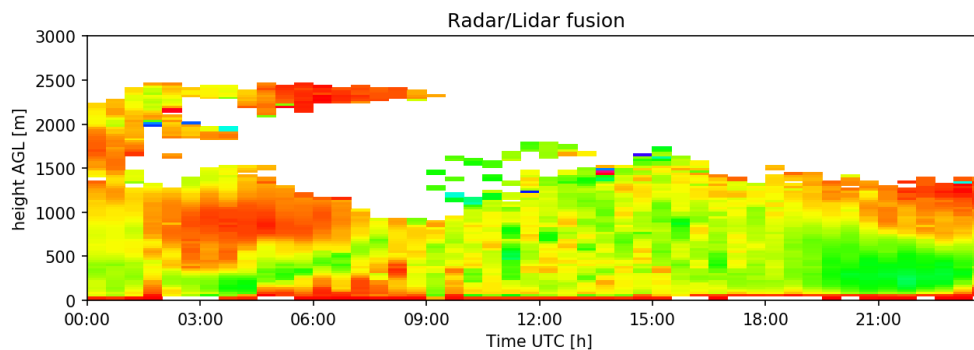
data overview 2022-08-28

availability
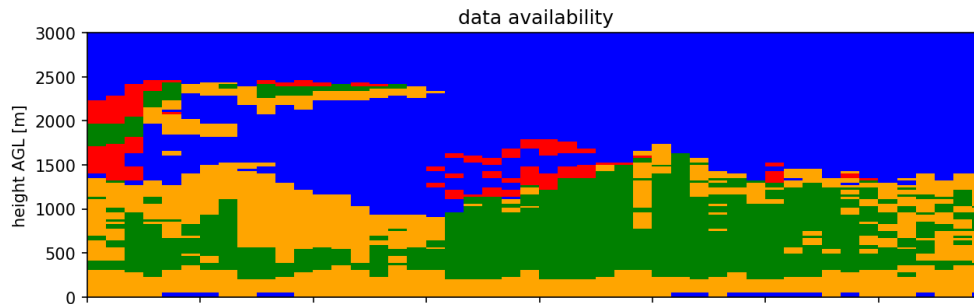
difference radar-lidar

fusion

Thank you
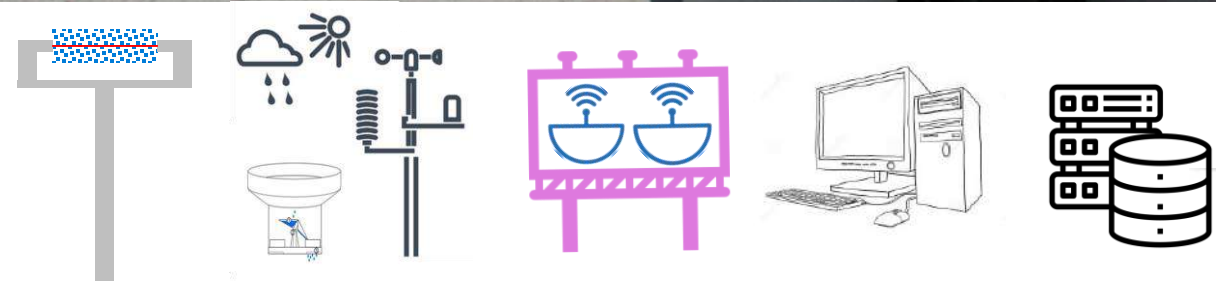
Monitoring of stability of DCR reflectivity using disdrometers

JC. Dupont, MA. Drouin, JF. Ribaud, A. Gibek (IPSL)
J. Delanoe, F. Toledo (LATMOS)
L. Pfitzenmaier (U. Koln), G. Ghiggi (EPFL), M. Schleiss (TU. Delft)

1

Take home message for DisDrometer

- **Instrumental / technical set-up** : follow the SOP requirement available on the CCRES web site (distance, orientation, axe)

- **Main configuration rules** : 1min sampling, UTC time zone, record all the variables + status

- **Acquisition mode recommandation** : either manufacturer software or ASD software (unlimited licence for ACTRIS-cloud site ?!) to record real-time data in ascii file.

- **Calibration** : inside/outside calibration, create a working group to follow the discussion to see what we have to do for CCRES network (frequency of calibration?, where?

Take home message for Weather Station

- **Instrumental / technical set-up** : follow the SOP requirement available on the CCRES web site (distance, orientation, axe, tipping bucket rain gauge and see the OTT pluvio²)

- **Main configuration rules** : 1min sampling, UTC time zone, record temperature, relative humidity, wind speed and direction, and rain rate

- **Calibration** : every 6 months for tipping bucket rain gauge (detect rain event and follow the stability of the disdrometer in comparing the rain rate)

- **PID** : One for the Weather Station.

Take home message for **ASCII to netCDF conversion**

- **Disdrometer**:
  - **Use disdroDB API :** need people to take over the effort and maintain the DISDRODB project
  - **Or develop a new code** : to be discussed (reader, data and metadata naming)
- **Weather station :** development in progress (reader, data and metadata naming)
- **CLU Data Center** : the place to be for these ASCII to netCDF converters.

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Take home message for DCR-CC monitoring

- **Z-DD processing**:
  - ➢ Input data : L0-DD netcdf file, output L1-DD netcdf file
  - ➢ Version 1 is OK to apply the methodology to JOYCE dataset into local server.
  - ➢ Version 2 will be installed at CLU-DC

- ▪ **CLU-DC** : Merge L1-DD/L0-WS/L0-DCR into one unique netcdf file and transfer it to **AERIS-DC**

- ▪ **AERIS-DC :** DCR-CC monitoring algo to produce
  - ✓ QuickLook
  - ✓ Alert
  - ✓ Flags

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Example of automatic Real-Time Quick-Look available for NF
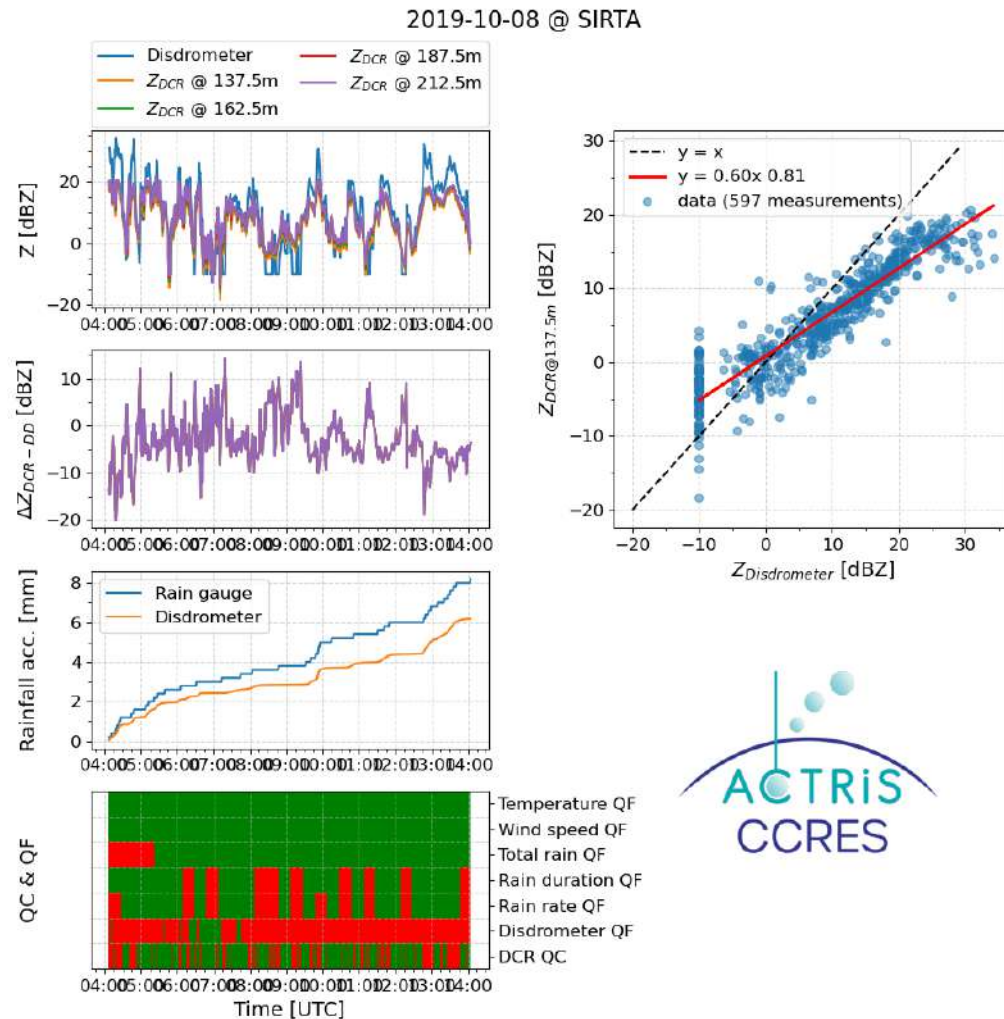
- Analyse the time shift between DCR and DD (link to the drop fall velocity) ;
- Analyse the evaporation process between surface and the 1st DCR gate

Thank you