



ATMO ACCESS
Access to Atmospheric Research Facilities



New developments at CLU

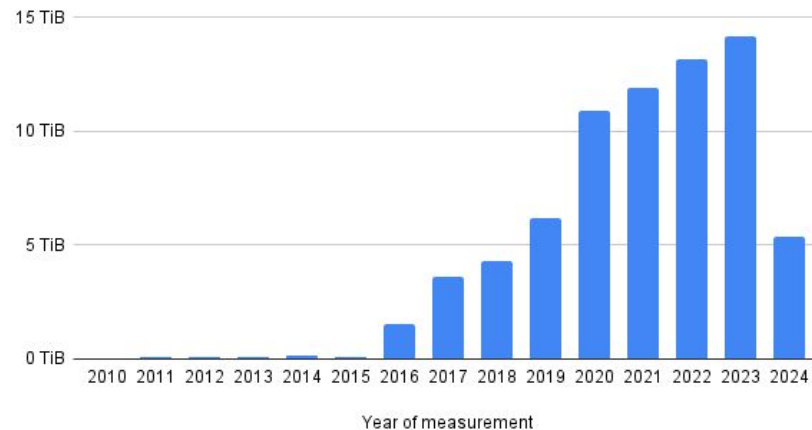
Ewan O'Connor, Simo Tukiainen,
Tuomas Siipola, Niko Leskinen

ACTRIS Data Centre – CLU unit
Finnish Meteorological Institute

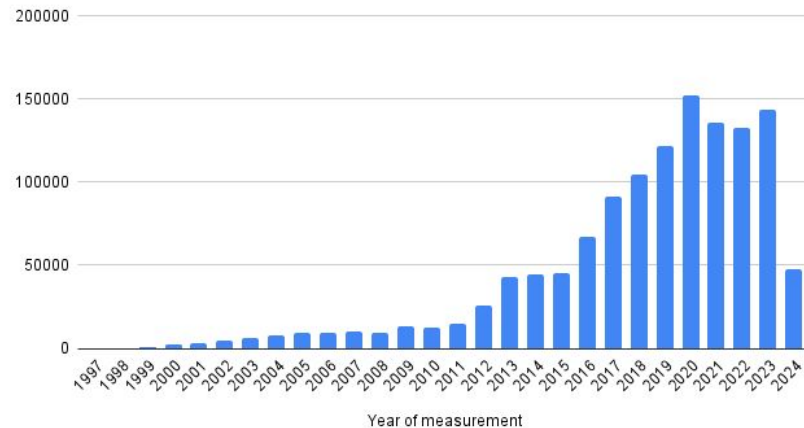
Cloudnet data volume

- ★ 1035 years of data
- ★ 1.3 M product files
- ★ 8.9 M raw files
- ★ 72 TiB of raw data
(72% RPG *.LV0 files)

Amount of raw data (72 TiB)

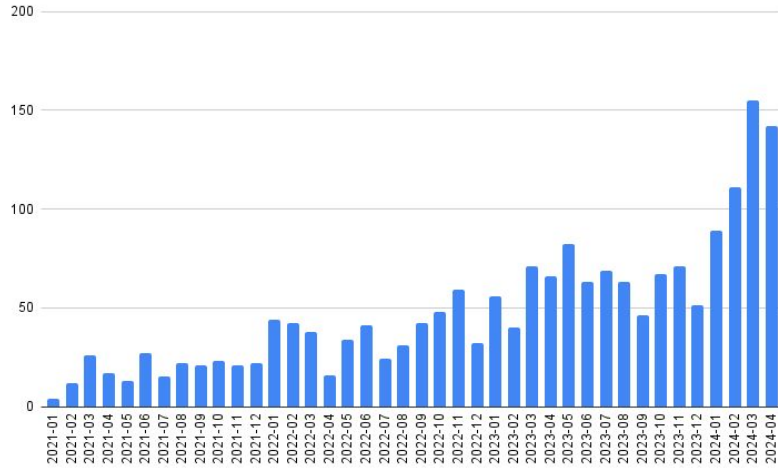


Number of product files (1.3M)

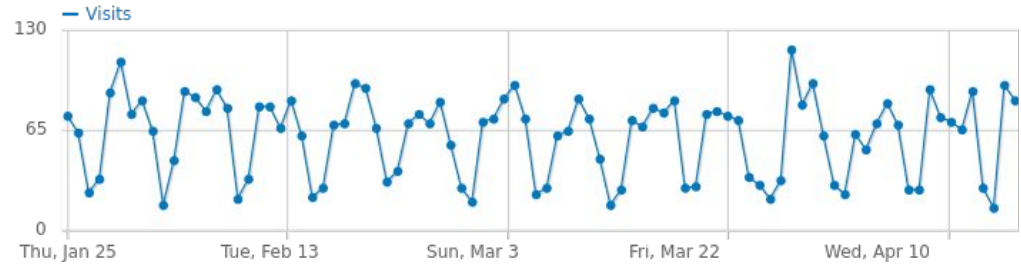


cloudnet.fmi.fi user statistics

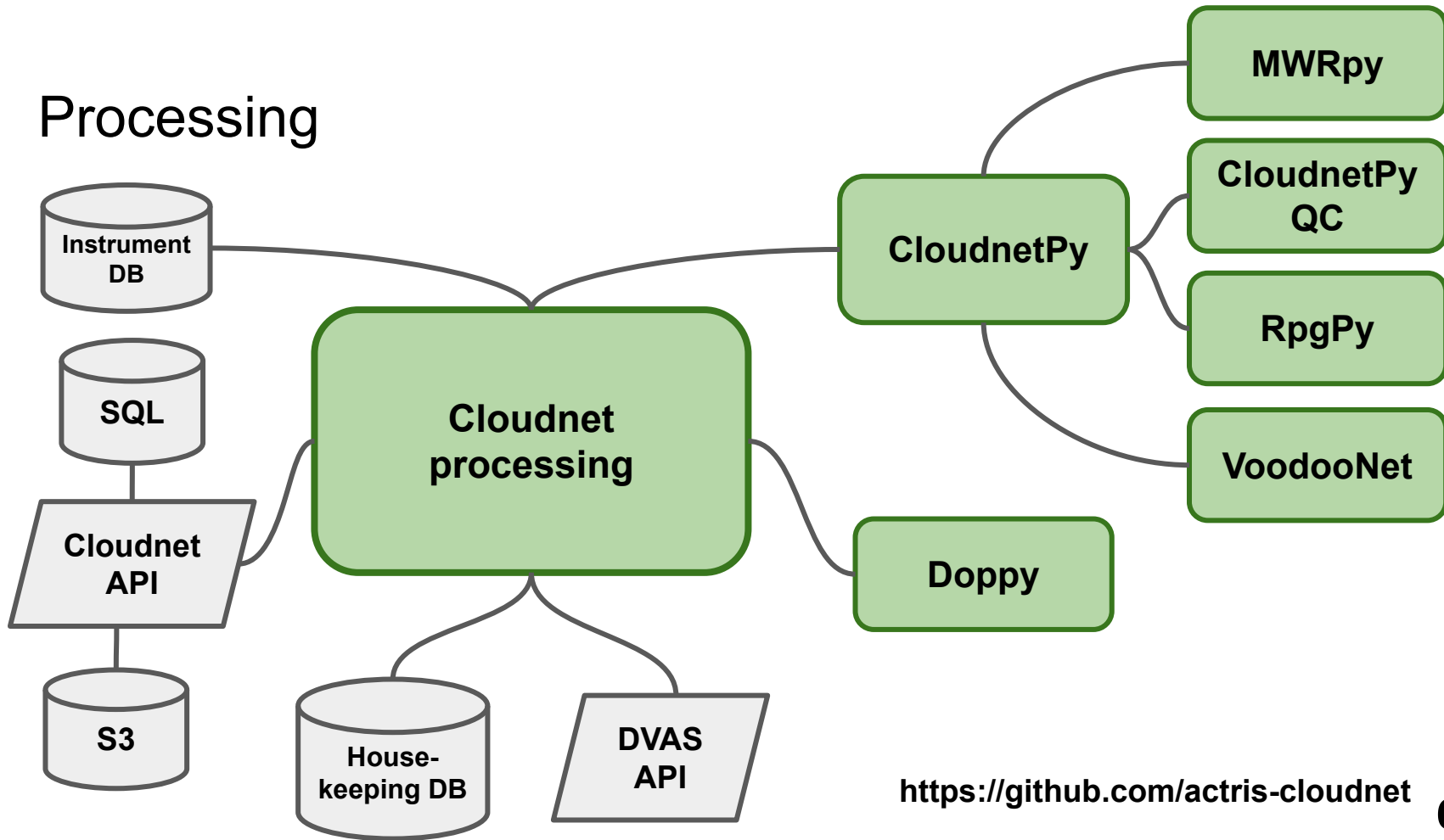
Monthly unique IPs downloading data



Daily data portal visits



Processing



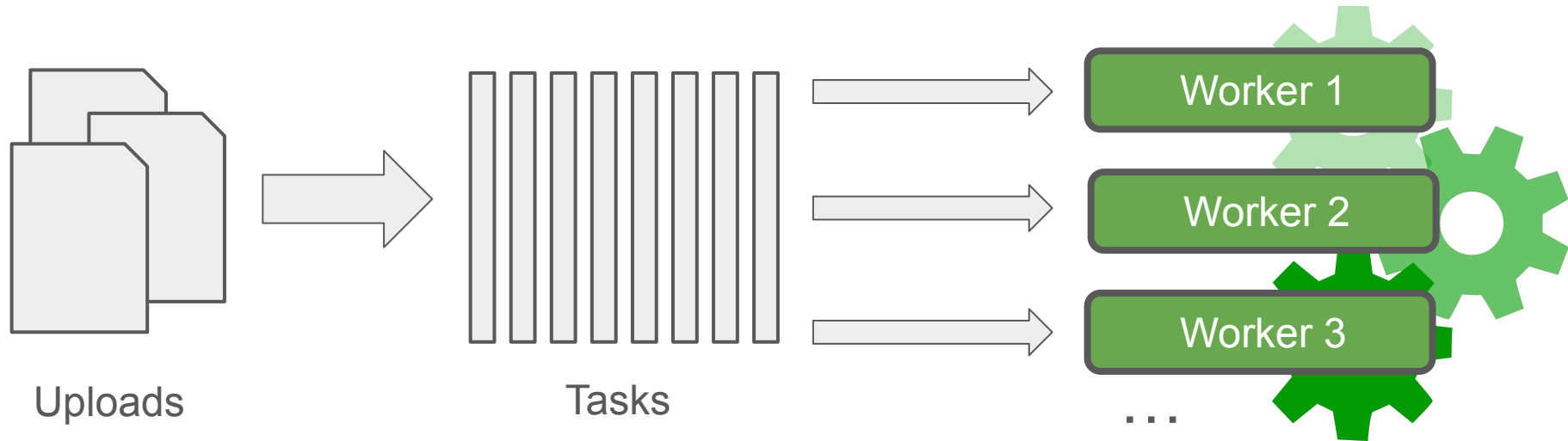
<https://github.com/actris-cloudnet>



Processing queue

Move from cron jobs to queue/worker architecture.

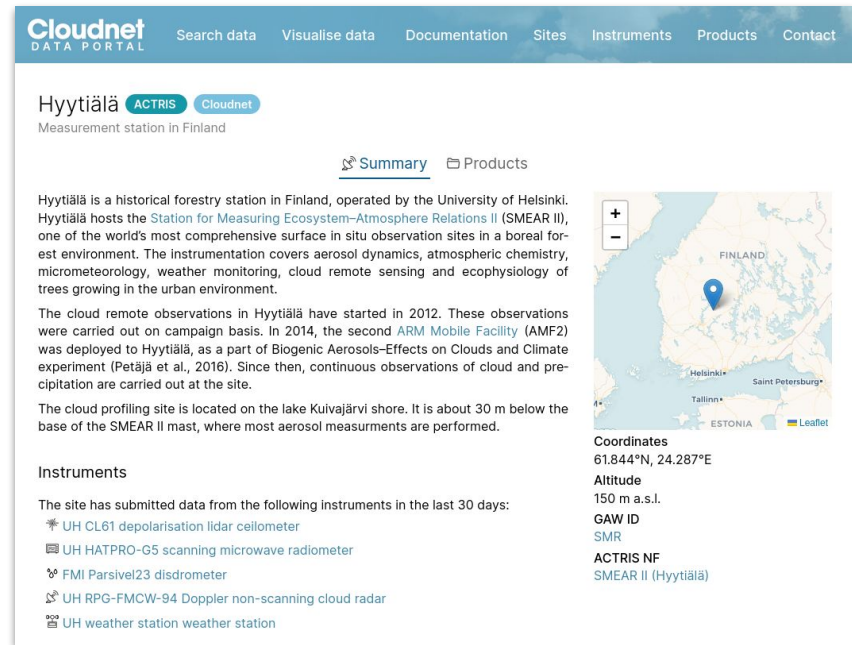
Processing is now more flexible and real-time.



Site page

New design for site landing page.

→ We need descriptions for the sites!
Should focus on the cloud remote sensing component, not the whole station or ACTRIS National Facility.



The screenshot displays the Cloudnet Data Portal interface for the Hyytiälä measurement station. The page features a blue header with navigation links: Search data, Visualise data, Documentation, Sites, Instruments, Products, and Contact. The main content area includes the station name 'Hyytiälä' with 'ACTRIS' and 'Cloudnet' tags, and a subtitle 'Measurement station in Finland'. There are links for 'Summary' and 'Products'. The text describes the station as a historical forestry station in Finland, operated by the University of Helsinki, and mentions the deployment of the second ARM Mobile Facility (AMF2) in 2014. A map of Finland shows the location of Hyytiälä near Helsinki. The page also lists coordinates (61.844°N, 24.287°E), altitude (150 m a.s.l.), GAW ID (SMR), and ACTRIS NF (SMEAR II (Hyytiälä)). A section titled 'Instruments' lists several instruments used at the station, including a depolarisation lidar, scanning microwave radiometer, disdrometer, Doppler non-scanning cloud radar, and weather station.

Cloudnet
DATA PORTAL

Search data Visualise data Documentation Sites Instruments Products Contact

Hyytiälä ACTRIS Cloudnet

Measurement station in Finland

[Summary](#) [Products](#)

Hyytiälä is a historical forestry station in Finland, operated by the University of Helsinki. Hyytiälä hosts the Station for Measuring Ecosystem–Atmosphere Relations II (SMEAR II), one of the world's most comprehensive surface in situ observation sites in a boreal forest environment. The instrumentation covers aerosol dynamics, atmospheric chemistry, micrometeorology, weather monitoring, cloud remote sensing and ecophysiology of trees growing in the urban environment.

The cloud remote observations in Hyytiälä have started in 2012. These observations were carried out on campaign basis. In 2014, the second ARM Mobile Facility (AMF2) was deployed to Hyytiälä, as a part of Biogenic Aerosols–Effects on Clouds and Climate experiment (Petäjä et al., 2016). Since then, continuous observations of cloud and precipitation are carried out at the site.

The cloud profiling site is located on the lake Kuljavjärvi shore. It is about 30 m below the base of the SMEAR II mast, where most aerosol measurements are performed.

Instruments

The site has submitted data from the following instruments in the last 30 days:

- UH CL61 depolarisation lidar ceilometer
- UH HATPRO-G5 scanning microwave radiometer
- FMI Parsivel23 disdrometer
- UH RPG-FMCW-94 Doppler non-scanning cloud radar
- UH weather station weather station

Coordinates
61.844°N, 24.287°E

Altitude
150 m a.s.l.

GAW ID
SMR

ACTRIS NF
SMEAR II (Hyytiälä)

<https://cloudnet.fmi.fi/sites>

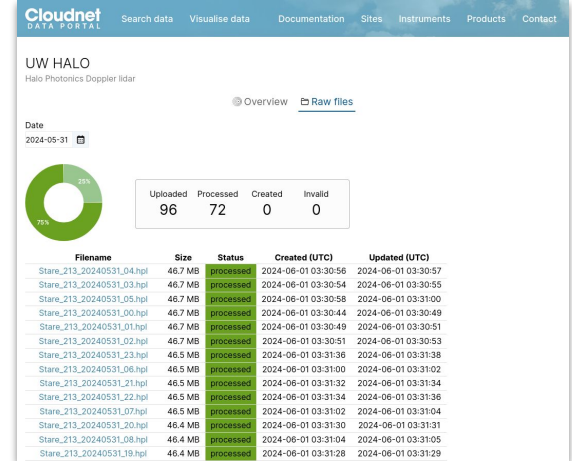
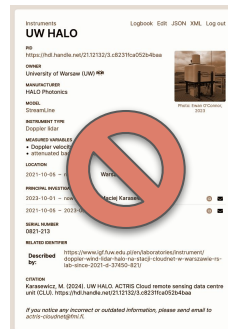
Instrument page

New page in the data portal for each instrument.

Visualise available products and status of submitted raw files.

Will replace PID landing page / InstrumentDB page in the future.

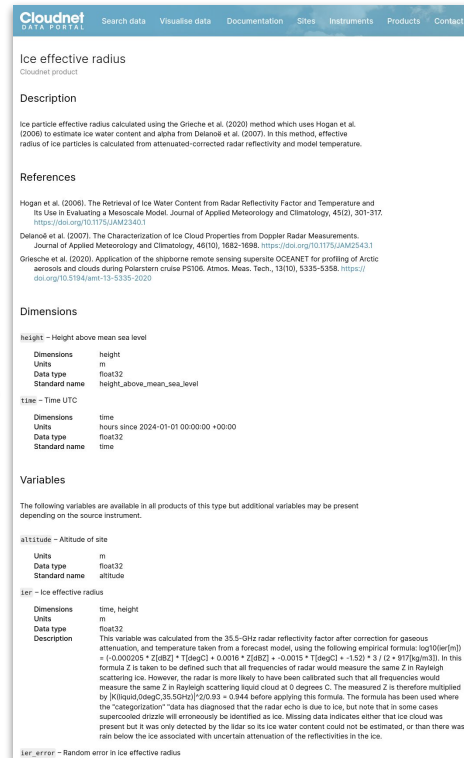
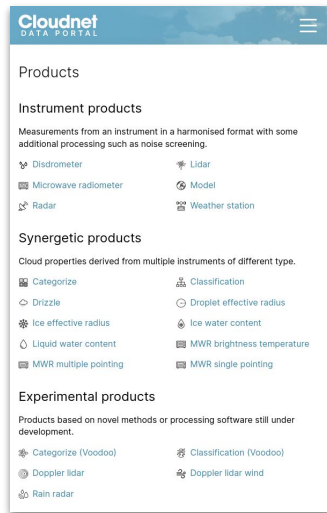
<https://cloudnet.fmi.fi/instruments>



Product page

Online documentation on available products in the portal:

- Description
- References
- Dimensions
- Variables



Product	
Type	☸ Ice effective radius
Timeliness	Real real-time (RRT)
Start time	2024-06-03 00:00:15 UTC
Stop time	2024-06-03 09:59:45 UTC
Location	Bucharest, Romania

<https://cloudnet.fmi.fi/products>

MWRpy

MWRpy products are now available in 7/20 sites.

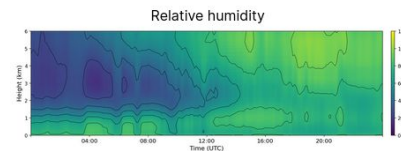
→ Sites need to send retrieval coefficients to us!

<https://github.com/actris-cloudnet/mwrpy>

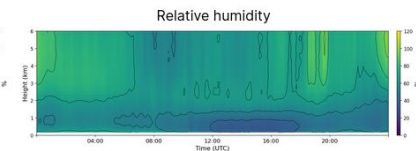
Visualisations for 3 June 2024

comparison view

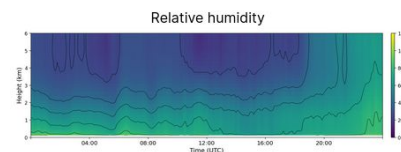
Cabauw MWR single pointing [↗](#) Volatile



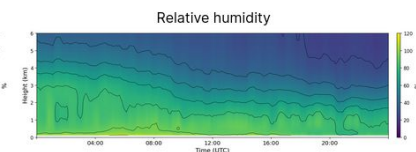
Hyytiälä MWR single pointing [↗](#) Volatile



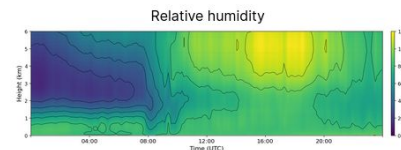
Jülich MWR single pointing [↗](#) Volatile



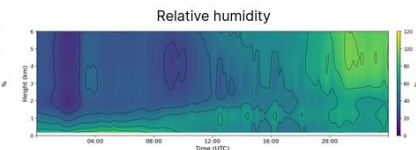
Lindenberg MWR single pointing [↗](#) Volatile



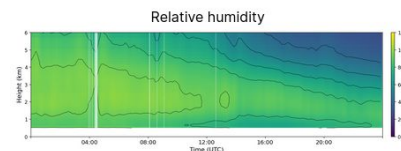
Lutjewad MWR single pointing [↗](#) Volatile



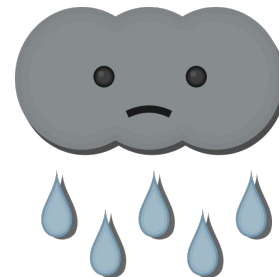
Palaiseau MWR single pointing [↗](#) Volatile



Payerne MWR single pointing [↗](#) Volatile



Weather station?



5 weather stations, 5 file formats 26+ sites, 26+ formats?

- Unclear fields, wrong units, typos, local time, different resolutions, measurements at multiple heights, multiple rain gauges, ...

What fields are needed? Can we agree on a common file format?

```
"TOA5","CR1000XSeries","CR1000X","23644","CR1000X.Std.05.01","CPU:AGORA_UGR.CR1X","54351","meteo"  
"TIMESTAMP","RECORD","air_t_Avg","rh_Avg","pressure_Avg","wind_speed_avg","wind_dir_avg","wind_dir_std",  
rain_Tot"
```

```
"TS","RN","degC","%", "hPa","m/s","Deg","Deg","mm"
```

```
"", "", "Avg", "Avg", "Avg", "WVc", "WVc", "WVc", "Tot"
```

```
"2024-04-21 00:00:00",5319,12.7,100,937.7554,0,0,0,0
```

```
# y m d minute AaRNRT/mm AaNRT/mm BaRT/mm BaNRT/mm AbRNRT/mm AbNRT/mm BbRT/mm BbNRT/mm  
Pa/kPa Ta/dsC RH/pcnt WD/ds WS/(m/s)
```

```
2024 5 23 0 0.000 0.000 477.938 477.945 0.000 0.000 984.585 984.596 100.86  
5.50 87.00 155.35 0.39
```

```
"Read time (UTC+2)","Temp 2m (C)","Humidity 2m (%)","Temp 10m (C)","Temp 20m (C)","Temp -5cm (C)","Dew  
point temp (C)","Wind speed (m/s)","Wind speed max/3h (m/s)","Wind speed 10min (m/s)","Wind dir (deg)","Wind  
dir 10min (deg)","Pressure (hPa)","Pressure s.l. (hPa)","PPFD (umol/m2s)","Error code 1 (code)","Error code 2  
(code)","Snow depth (cm)","Humidity 20.6m (%)","Cloud base height (10m)","Cloud layer1 height (10m)","Layer1  
cloudiness (1/8)","Cloud layer2 height (10m)","Layer2 cloudiness (1/8)","Cloud layer3 height (10m)","Layer3  
cloudiness (1/8)","Precipitation (?)"
```

```
2024-05-22 00:10:00,-0.8,61,1.7,1.8,0.6,-7.4,1.2,1.5,1.1,61,53,9830,10271,6.0,,37,48,416,389,4,582,7,,0,0,0
```

```
# Date created : 2024-05-28
```

```
# Version : 01
```

```
# File contains 1-min average standard ground weather data calculated from 5s wind data (speed and direction) at 10 m AGL
```

```
# and from 5s weather data (temperature, humidity, pressure, precipitation) all at 2 m AGL from meteoairsoft station
```

```
# Location : SIRTA (48.7N, 2.2E), zone 1
```

```
# Created by : Christophe Boitel
```

```
# For information concerning those files, contact email : sirtascience (at) ipsi.polytechnique.fr
```

```
#
```

```
# Col. 1 : Date Time (yyyy-mm-ddThh:mm:ssZ)
```

```
# Col. 2 : Wind speed (m/s)
```

```
# Col. 3 : Wind direction (degrees)
```

```
# Col. 4 : Air temperature (°C)
```

```
# Col. 5 : Relative humidity (%)
```

```
# Col. 6 : Pressure (hPa)
```

```
# Col. 7 : Precipitation rate (mm/min)
```

```
# Col. 8 : 24-hr cumulated precipitation since 00UT (mm)
```

```
#
```

```
# 01 02 03 04 05 06 07 08
```

```
#
```

```
2024-05-27T00:00:00Z 0.00 nan 13.04 86.69 999.94000 0.00
```

Multiple instruments

Which instruments to select in synergetic products?

- Prioritise ACTRIS labelled instruments?
- How to choose between instruments of same type?
- What if data is missing?

Example from Lindenberg:

Lidar

- Lufft CHM 15k
- Vaisala CL61
- HALO StreamLine

Microwave radiometer

- RPG HATPRO-G5
- Radiometrics MP-3000A

Cloud radar

- METEK MIRA-35
- RPG-FMCW-94-DP

Disdrometer

- OTT Parsivel²
- Thies LPM

Upcoming ACTRIS data portal

Developed by [NILU](#).

Search Cloudnet data alongside other ACTRIS data.

Release is scheduled Autumn 2024.

Data Search

Number of data objects matching your search: 14668

Variable matrix

Facility types

Variables

Facilities

Timeliness

Start date

End date

Clear search

Advanced Search

Map

Showing 1 to 10 of 14668 rows | 10 rows per page

<input type="checkbox"/>	Title	Matrix	Variables	Facility	Instruments	Start Time	End Time	Inspect	Download
<input type="checkbox"/>	Particle_number_size_distribution at Melpitz	aerosol particle phase	aerosol particle number size distribution	Melpitz	particle size spectrometer	2004-07-22 03:00:00	2007-01-01 01:00:00		
<input type="checkbox"/>	Particle_number_size_distribution at Neumayer	aerosol particle	aerosol particle number size	Neumayer	particle size spectrometer	2011-01-01 03:00:00	2012-12-31 03:00:00		

Classification data derived from cloud remote sensing measurements at Galați

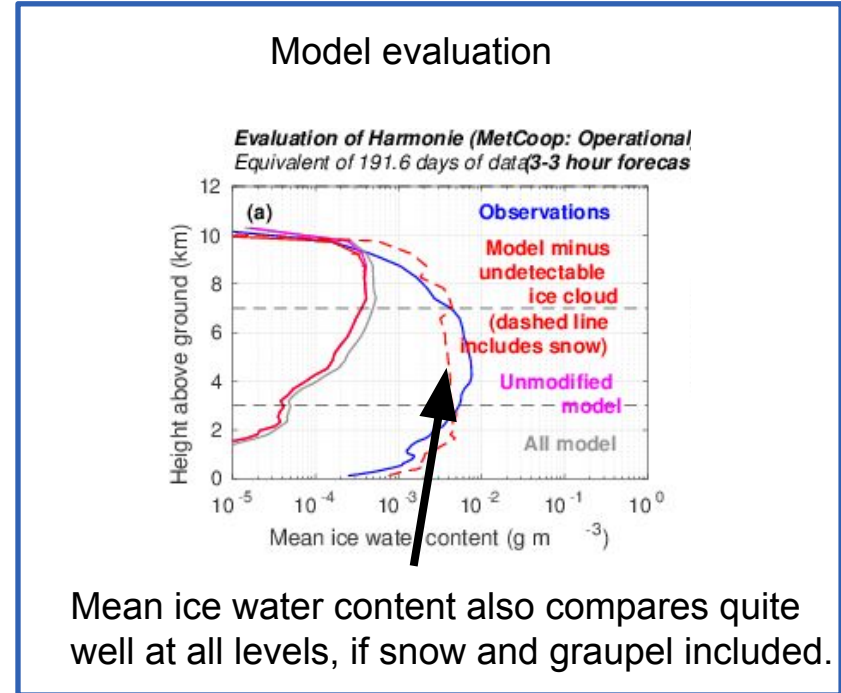
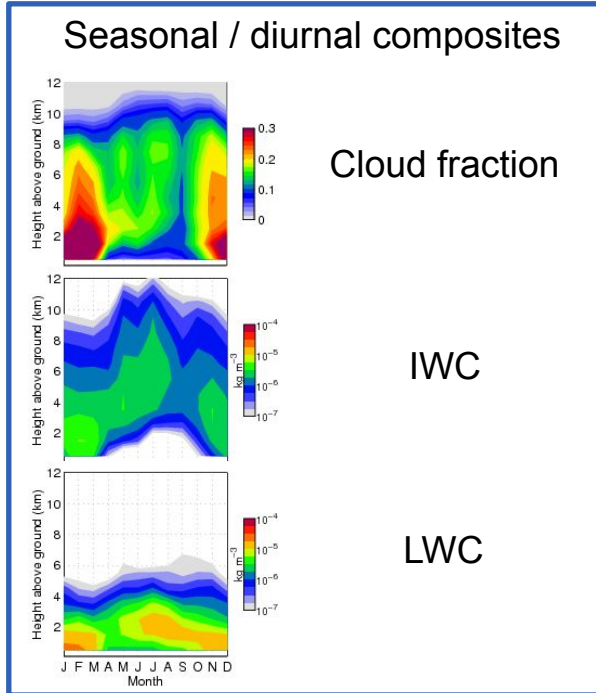
[Documentation](#) [Code example](#) [Download](#)

Product Information	Citation & Acknowledgements
Variable(s) hydrometeor type classification	Licence CC-BY-4.0
Product type Observation	Constantin, D., Rosu, A., O'Connor, E. & Voiculescu, M. (2024). Classification data from Galați on 6 February 2023. ACTRIS Cloud remote sensing data centre unit (CLU). https://hdl.handle.net/21.12132/1_a738093416494d4f
Instrument type(s) cloud radar, lidar, microwave radiometer	Citation We acknowledge ACTRIS and Finnish Meteorological Institute for providing the data set which is available for download from https://cloudnet.fmi.fi . We acknowledge ECMWF for providing IFS model data.
Timeliness Scheduled	Acknowledgement
Start time 2023-02-06 00:00:15	
End time 2023-02-06 23:59:44	
Framework(s) ACTRIS, CLOUDNET	
Matrix Cloud phase	
Facility Information	Data Quality Information
Facility name Galați, RO	Compliance ACTRIS compliant
Facility type Observation platform, fixed	
Coordinates 45.435, 28.037	
File Information	

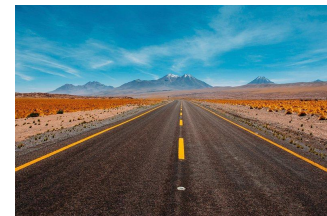
Roadmap for future developments



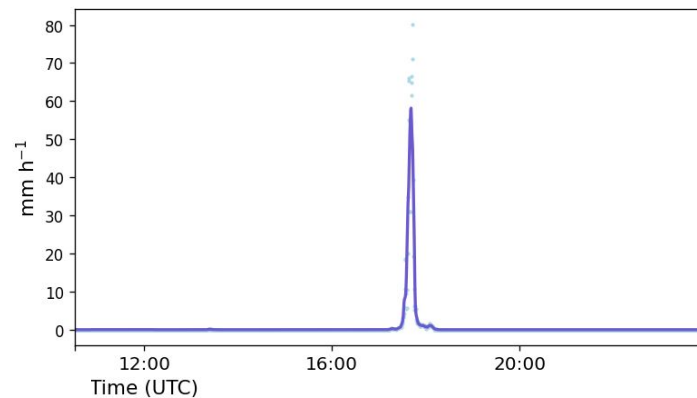
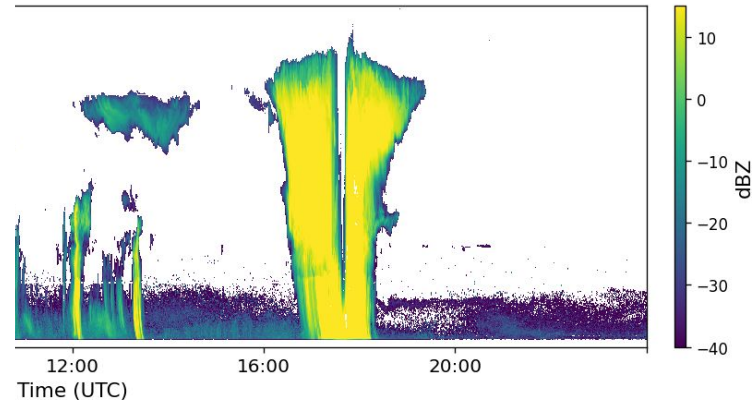
- Level 3 / model evaluation



Roadmap for future developments



- Improved methods
 - Target categorization updates
 - ML target categorization
- New classification ‘bits’ for attenuation
 - Rain
 - disdrometer at surface and rain-reflectivity retrieval (Mom and Moisseev)
 - Melting level
 - retrieval in testing (Li and Moisseev, 2019)
 - Radome
 - blower, sky noise
 - Flag complete attenuation



Roadmap for future developments



- Level 3 / model evaluation
- Improved methods (e.g. ML classification)
- New products (e.g. Doppler lidar)
- New instruments (e.g. MiniMPL)
- Instrument calibration in production
- Landing pages for campaigns? Now we only have “campaign sites”.
- Multiple instrument combinations on the same site (e.g. to generate multiple classification products)