



Microwave Radiometer operational services

(B. Pospichal, T. Marke)

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MWR Network Overview

- Data from up to 24 instruments are currently being processed operationally by **MWRpy** (<https://github.com/actris-cloudnet/mwrpy>) at CLU
- Two additional RPG instrument types (low humidity profilers) are now supported:
 - **LHUMPRO** (G-band + 90 GHz) at Jülich
 - **LHATPRO** (G-band + V-band) at Troll Station, Antarctica
- Radiometrics: product files (.csv, .los) can be uploaded (level 1 processing is missing)



Date span 2025-03-31 – 2025-03-31
File count 24
Total size 2.4 GB
Products MWR single pointing

This collection contains volatile files which may be updated in the future.

Results

Found 24 results

volatile

Data object	Date
MWR single pointing from Maïdo Observatory	2025-03-31
MWR single pointing from Mindelo	2025-03-31
MWR single pointing from Munich	2025-03-31
MWR single pointing from Ny-Ålesund	2025-03-31
MWR single pointing from Palaiseau	2025-03-31
MWR single pointing from Payerne	2025-03-31
MWR single pointing from Potenza	2025-03-31
MWR single pointing from Troll Station	2025-03-31
MWR single pointing from Warsaw	2025-03-31

LWP offset correction

Background:

- Necessary due to applied statistical retrieval algorithm
- Determined during clear sky scenes

Method update:

- Synergy with ceilometer data (Cloudnet format) in addition to TB variability for cloud / clear sky detection (modified Cloudnet method)
- Daily offset values are saved in calibration database to be used on following day(s) to help with overcast situations
- Distribution of values and dependencies can be evaluated for each site

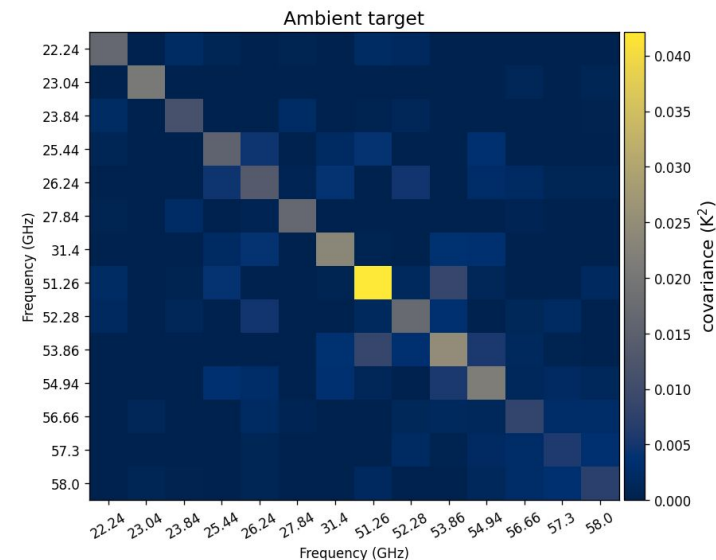
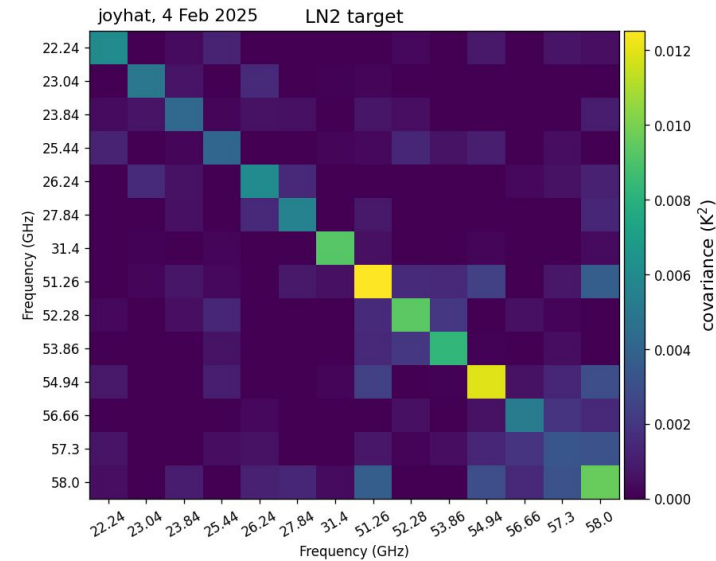
Resources for software and calibration

Absolute calibration

- **RPG files created during absolute calibrations (CovMatrix*.LOG) should be uploaded to CLU**
- Covariance matrix and additional parameters can be analyzed and monitored to characterize measurement uncertainties
- Check brightness temperatures before and after the calibration
<https://uni-koeln.sciebo.de/s/6par18cAQ34o3fj>

RPG software

- If you don't have the latest software version (10.00-6) running on your HATPRO, please update.
Software can be downloaded here:
<https://uni-koeln.sciebo.de/s/wjm6fIRjr3eX3j9>
- New software framework is under development



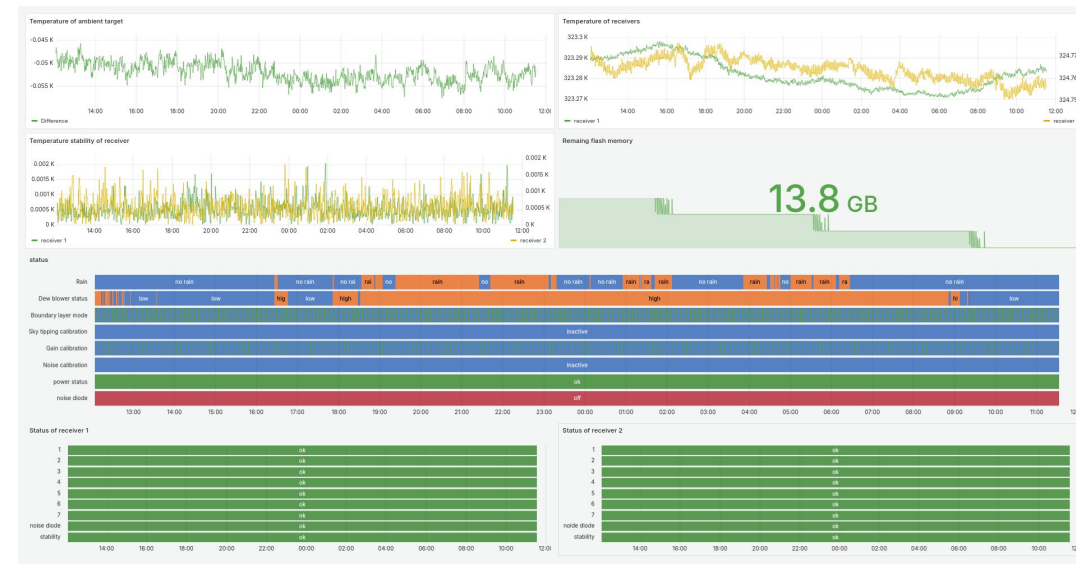
Spectral consistency check

- Part of **routine processing** (level 1)
- Compares retrieved and observed spectrum
- Detection of rain, interferences, and faulty channels

Housekeeping monitoring in Grafana

- Allowing efficient **instrument failures** detection
- Help with instrument maintenance
- Ensure long-term high quality geophysical data

Alerting system needs to be set up



MWR receiver stability in ReOBS

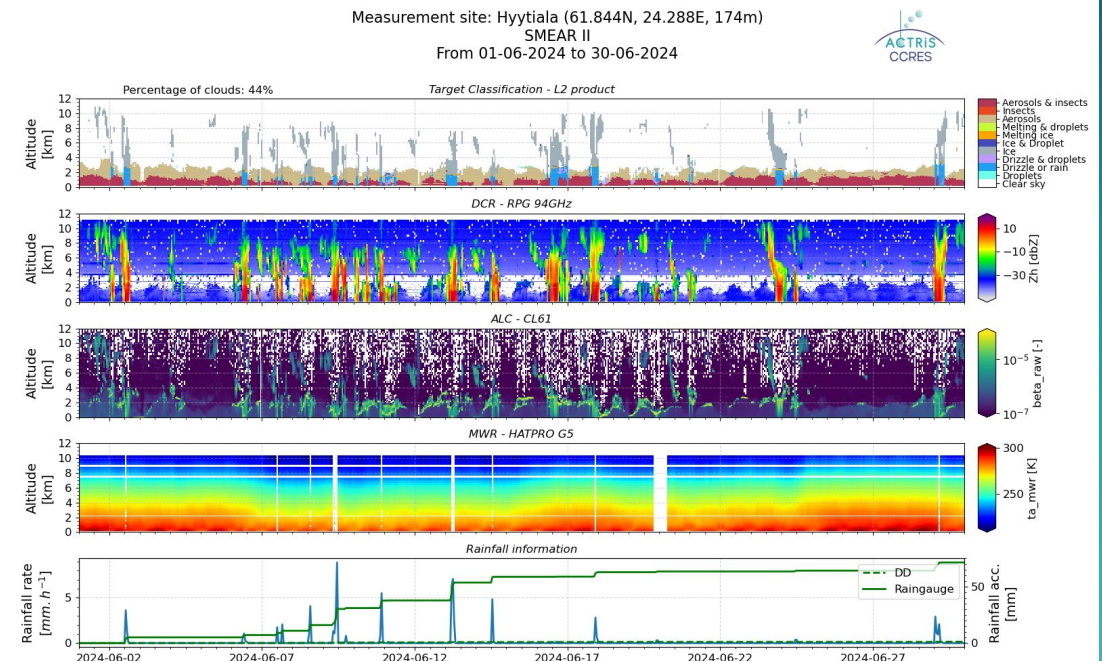
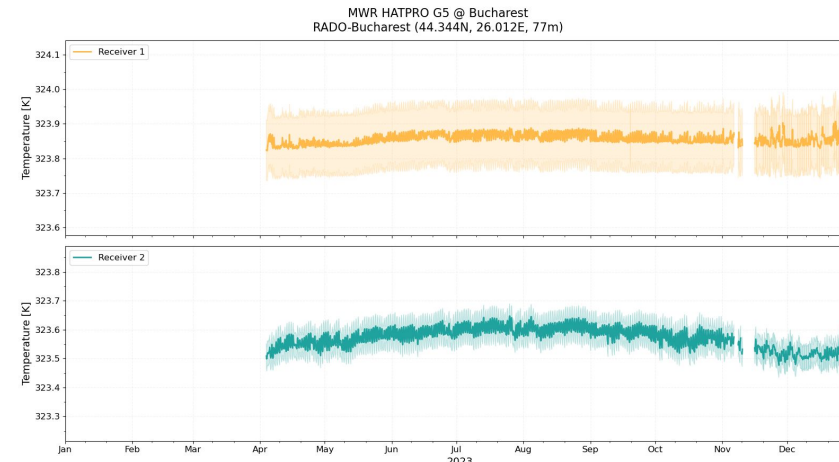
Long-term monitoring for information on data quality and instrument status (maintained by IPSL;
<https://ccres.aeris-data.fr/en/data-visualization-mwr/>)

Monthly reports

Assessment of:

- data availability for each instrument
- instrument status and geophysical data quality

Will help in labelling procedure (see presentation on labelling operational services)



Quality Control / Labeling

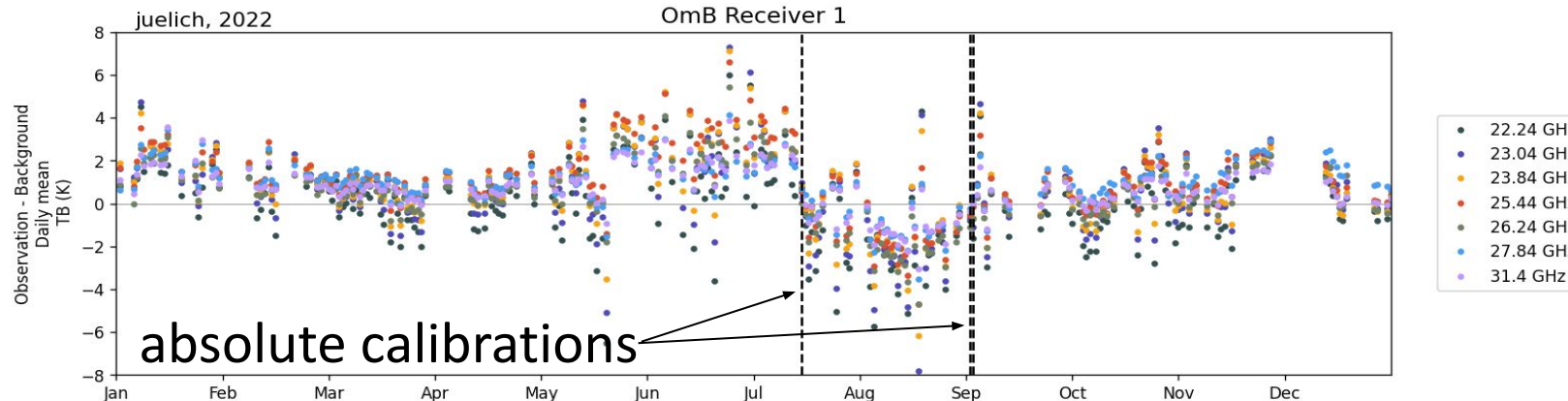
Observation minus background analysis (for clear sky cases)

Purpose: Identifying faulty calibrations or larger drifts/jumps in brightness temperatures

Requires radiative transfer calculations based on model data available in Cloudnet (IFS, ..)

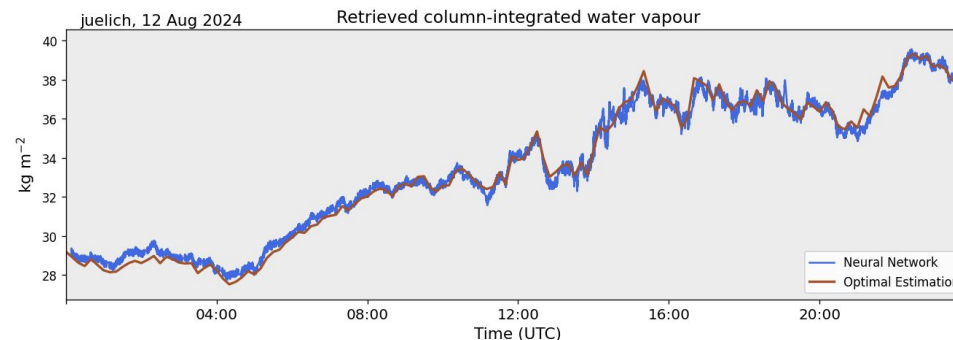
More details and an assessment of MWR **uncertainties** can also be found in [Böck et al. 2025](#) (in discussion)

Radiative transfer infrastructure and analysis exist, but need to be implemented in Cloudnet



Outlook - Retrieval Development

- Currently: RPG **.RET** retrieval files are used (need to be send to CLU)
- Planned retrieval setup:
 - **Statistical retrieval** (Neural Network including auxiliary information)
 - Training with **ERA5 climatology** (comparison with radiosondes)
 - Rosenkranz 2024 absorption model for radiative transfer
 - MWR + IRT **synergy retrieval** for LWP
 - Include **89 GHz channel** of cloud radar / radiometer for improvements in LWP
- Retrieval development could benefit from inter-comparison exercises of statistical and physical retrievals (E-PROFILE, PANAME, TEAMx)





Thank you !