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Session 3

GRUAN Site Report for Ny-Ålesund

(Submitted by Marion Maturilli)

Summary and Purpose of this Document

Report from the GRUAN site Ny-Ålesund for the period January 2024 to December 2024.

Overview

The Ny-Ålesund site is contributing to GRUAN with its sounding program and according data streams for RS41 and ECC. The daily radiosonde data and weekly ozone sonde data are promptly submitted to GRUAN LC, no problems are apparent. It had been found that during the ground check procedures, a few large outliers in SHC T and RH checks and in shelter check were visible. We have identified the source to be related to an electronic issue of the shelter, and meanwhile have tak-en steps to resolve the issue.

The program for regular stratospheric water vapor observations by CFH has been discontinued in 2021 due to the ban of cryogen R23. It is planned to restart the stratospheric H2O program by introducing Skeydew as regular instrument from May 2026. First test flight with Skydew was done in 2024.

Ny-Ålesund has an established dataflow of GNSS data to the GRUAN GNSS Processing Centre at GFZ, including manufacturer raw data, converted raw data (RINEX) and instrument logs that con-tain all equipment changes. Operational processing as GNSS-PW-GDP is performed.

Since November 2023, regular dataflow of lidar data to GRUAN LC has been established.

Change and change management

The program for regular stratospheric water vapor observations with CFH was discontinued in 2021 due to the ban of cryogen R23. We have considered various options involving dry ice or liquid nitrogen, and finally have decided to use the Peltier-cooled Skydew instrument for the regular measurement of stratospheric water vapor from 2026 onwards. An on-site test launch with Skydew was performed in May 2024.

Resourcing

We are more financially constrained than before and need to implement cost-saving measures. In doing so, we are prioritizing the preservation of data quality over quantity. After according tests in summer 2025, we will more regularly use smaller balloons during the summer months (TX500 instead of TX600) to reduce the use of helium. This measure will be limited to periods with meteorological conditions that allow the smaller balloons to still reach the 10 hPa level. Moreover, we have reduced the number of ozone sondes per year. We will keep the regular 1 ozone sonde per week, but the winter/spring period with an additional second ozone sonde per week will be shorter.

Operations

Located in a pristine environment, surrounded by a landscape officially protected as a nature reserve, our environmentally responsible behavior is being observed and evaluated from various perspectives. For this reason, we are pleased to use the RS41E model with biodegradable material for our radiosoundings since February 2025.

Site assessment and certification

Last recertification was October 2022.

GRUAN-related research

Currently, we are part of GRUAN Task Team Sites. Furthermore, we support GRUAN in regard to data publication with the PANGAEA data repository.

Some publications by researchers at the Ny-lesund site:

- Eggers, N., S. Gral and C. Ritter (2024): Assessment of Hygroscopic Behavior of Arctic Aerosol by Contemporary Lidar and Radiosonde Ob-servations, Remote Sensing, 16 (16), p. 3087. doi:10.3390/rs16163087

- Walbrl, A., J.Michaelis, S.Becker, H.Dorff, K.Ebell, I.Gorodetskaya, B.Heinold, B.Kirbus, M. Lauer, N.Maherndl, M.Maturilli, J.Mayer, H.Mller, R.A.Neggers, F.M.Paulus, J.Rttenbacher, J.E. Rckert, I.Schirmacher, N.Slttberg, A.Ehrlich, M.Wendisch and S.Crewell (2024): Contrasting extremely warm and long-lasting cold air anomalies in the North Atlantic sector of the Arctic during the HALO-(AC)3 campaign, Atmospheric Chemistry and Physics, 24 (13), pp. 8007-8029. doi:10.5194/acp-24-8007-2024

WG-GRUAN interface

No request.

Other archiving centers

Ozone sonde data and lidar data are archived at NDACC.

Participation in campaigns

Additional radiosondes at 23 UTC were launched from Ny-Ålesund in the context of a campaign by the Korean Polar Institute (KOPRI), resulting in 2 radiosondes per day from 1 to 31 October 2024.

Future plans

We are planning to restart the regular stratospheric water vapor sounding program, launching Skydew sondes every 2-3 months, starting May 2026.

GRUAN Site Report for NyAlesund (NYA), 2024

Reported time range is Jan 2024 to Dec 2024
Created by the Lead Centre
Version from 2025-11-06

1 General GRUAN site information

Object	Value
Station name	NyAlesund
Unique GRUAN ID	NYA
Geographical position	78.9200 °N, 11.9400 °E, 5.0 m
Operated by	AWI | Alfred-Wegener-Institut für Polarforschung, part of: HELMHOLTZ | Helmholtz-Gemeinschaft
Main contact	Maturilli, Marion
WMO no./name	01004 NY-ALESUND II
Operators	currently 24, changes +4 / -0
Sounding Site	1
Lidar	1
GNSS	1

1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
NYA-GN-01	GNSS Site NYA2	GNSS	1	operational
NYA-LI-01	Koldewey Aerosol Raman Lidar (KARL)	Lidar	1	130
NYA-RS-01	Ny-Aalesund Radiosonde Launch Site	Sounding Site	9	396

1.2 General comments from Lead Centre

1.2.1 General

The program for regular stratospheric water vapor observations has been discontinued in 2021 due to the ban of cryogen R23.

New dataflow of Lidar raw data was started in November 2023.

1.2.2 Request

The site is kindly requested to select an alternative instrument for the measurement of stratospheric water vapor and to resume the measurement program.

2 System: GNSS Site NYA2 (NYA-GN-01)

Object	**Value**
System name	GNSS Site NYA2
Unique GRUAN ID	NYA-GN-01
System type	GNSS (GN - GNSS)
Geographical position	78.9303 °N, 11.8586 °E, 49.2 m
Operated by	GFZ | Deutsches GeoForschungsZentrum GFZ, part of: HELMHOLTZ | Helmholtz-Gemeinschaft
Instrument contact	Ramatschi, Markus
Started at	2000-03-13
Defined setups	1 (HOURLY)
Possible streams	-

2.1 Lead Centre comments

2.1.1 Dataflow

Dataflow of GNSS data to GRUAN LC and the GRUAN GNSS processing centre at GFZ was started in September 2013. The current dataflow includes manufacturer raw data, converted raw data (RINEX) and instrument logs, containing all equipment changes.

The operational processing as GNSS-PW-GDP is performed.

3 System: Koldewey Aerosol Raman Lidar (KARL) (NYA-LI-01)

Object	Value
System name	Koldewey Aerosol Raman Lidar (KARL)
Unique GRUAN ID	NYA-LI-01
System type	Lidar (LI - Lidar)
Geographical position	78.9000 °N, 11.9000 °E, 7.0 m
Operated by	AWI-POTSDAM | Forschungsstelle Potsdam, part of: AWI | Alfred-Wegener-Institut für Polarforschung, part of: HELMHOLTZ | Helmholtz-Gemeinschaft
Instrument contact	Ritter, Christoph
Started at	2001-01-01
Defined setups	1 (DEFAULT)
Possible streams	LIDAR

3.1 Lead Centre comments

3.1.1 Dataflow

Dataflow of Lidar data to GRUAN LC has started in November 2023.

3.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI

3.2.1 Stream: LIDAR

LIDAR		130	130	

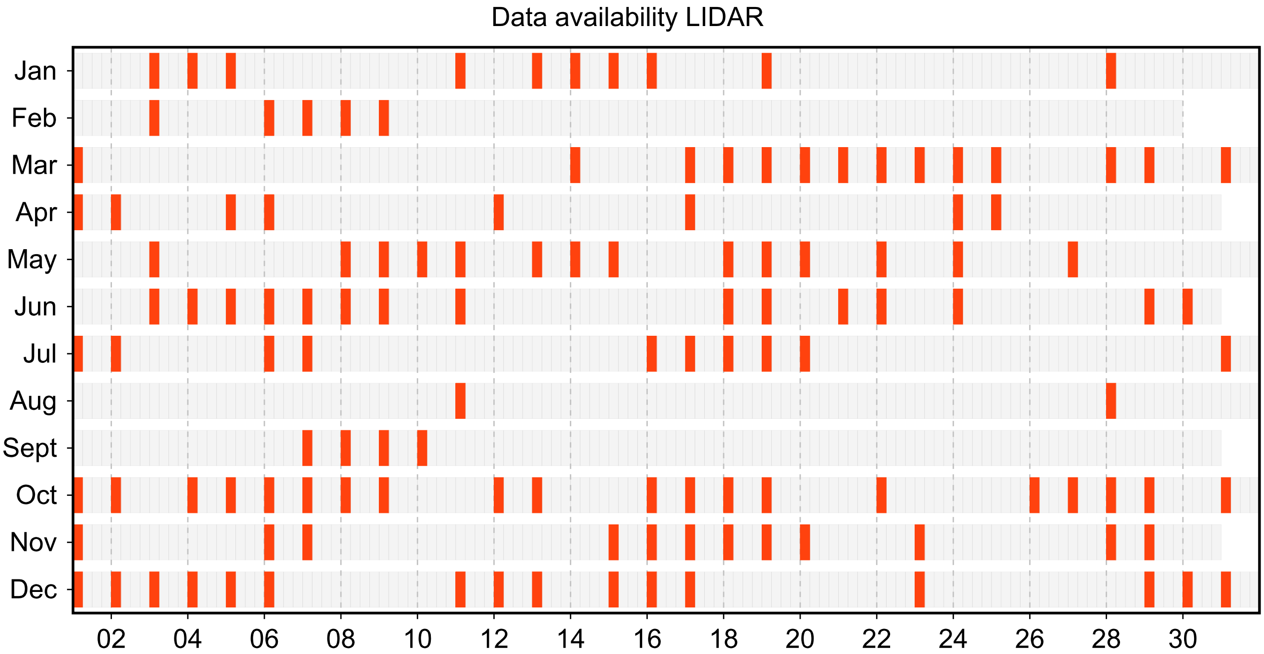
3.3 Availability of data products

Available (green): All steps of data processing have been successfully completed. The data product file is available at LC (e.g. files that didn't pass QA/QC or uncertified GRUAN data products) and/or at NCEI (a certified GRUAN data product file that did pass QA/QC).

Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software error.

Original (red): The original, manufacturer-produced, raw data file is available (e.g. MWX data file) but was not converted into a GRUAN-standardized raw data format (NetCDF). Reasons for this may be missing data conversion software, a software error, or a corrupt data file.

3.3.1 Stream: LIDAR



3.4 Instrument combinations of NYA-LI-01

Count	Instrument combination
130	LIDAR

4 System: Ny-Aalesund Radiosonde Launch Site (NYA-RS-01)

Object	Value
System name	Ny-Aalesund Radiosonde Launch Site
Unique GRUAN ID	NYA-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	78.9230 °N, 11.9227 °E, 15.7 m
Operated by	AWI-POTSDAM | Forschungsstelle Potsdam, part of: AWI | Alfred-Wegener-Institut für Polarforschung, part of: HELMHOLTZ | Helmholtz-Gemeinschaft
Instrument contact	Maturilli, Marion
Started at	-
Defined setups	9 (ROUTINE, OZONE, FLASH, CFH, DUAL1, ROUTINE2, OZONE2, CFH2, RESEARCH)
Possible streams	CFH, COBALD, ECC, FLASH, PCFH, RS-11G, RS41, RS92, SKYDEW

4.1 Lead Centre comments

4.1.1 Dataflow

Sonde dataflow to the GRUAN LC is operational since April 2012.

Currently, the dataflow includes streams of the Vaisala RS41-SGP and ECC Ozone sonde. All launches are promptly submitted using the RsLaunchClient.

4.1.2 Data quality

The humidity differences during the ground check in the shelter show significantly larger variation than in the SHC. This data set is very important for GRUAN to demonstrate the impact of the ground check environment to the quality of the check.

Few large outliers in SHC T and RH checks and in shelter check are visible. Please verify, if this difference is real. It is recommended not to launch a radiosonde that exhibits such a large difference.

4.1.3 General

There is very good performance in terms of burst altitude which is regularly 10 hPa to 5 hPa and higher.

4.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI

4.2.1 Stream: ECC

ECC		64	64	

4.2.2 Stream: PCFH

PCFH		1	1	

4.2.3 Stream: RS41

RS41		404	404	
RS41-RAW	001		404	
RS41-EDT	001		404	
RS41-GDP	001		402	

4.2.4 Stream: SKYDEW

SKYDEW		1	1	

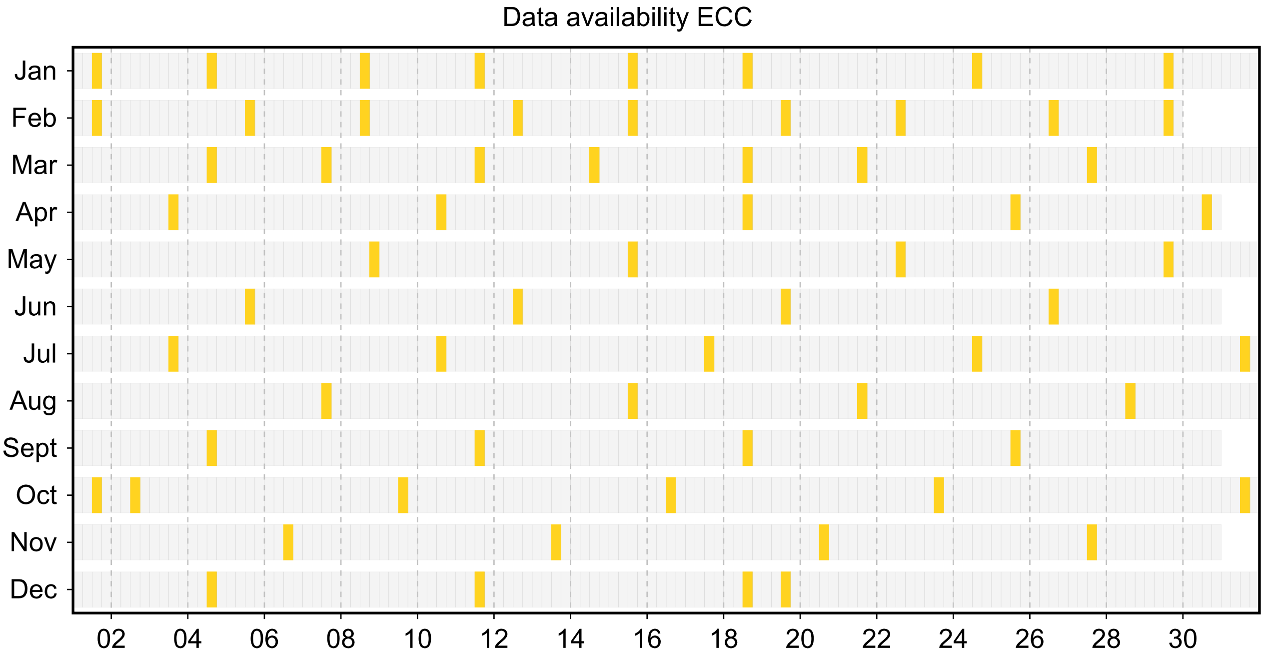
4.3 Availability of data products

Available (green): All steps of data processing have been successfully completed. The data product file is available at LC (e.g. files that didn't pass QA/QC or uncertified GRUAN data products) and/or at NCEI (a certified GRUAN data product file that did pass QA/QC).

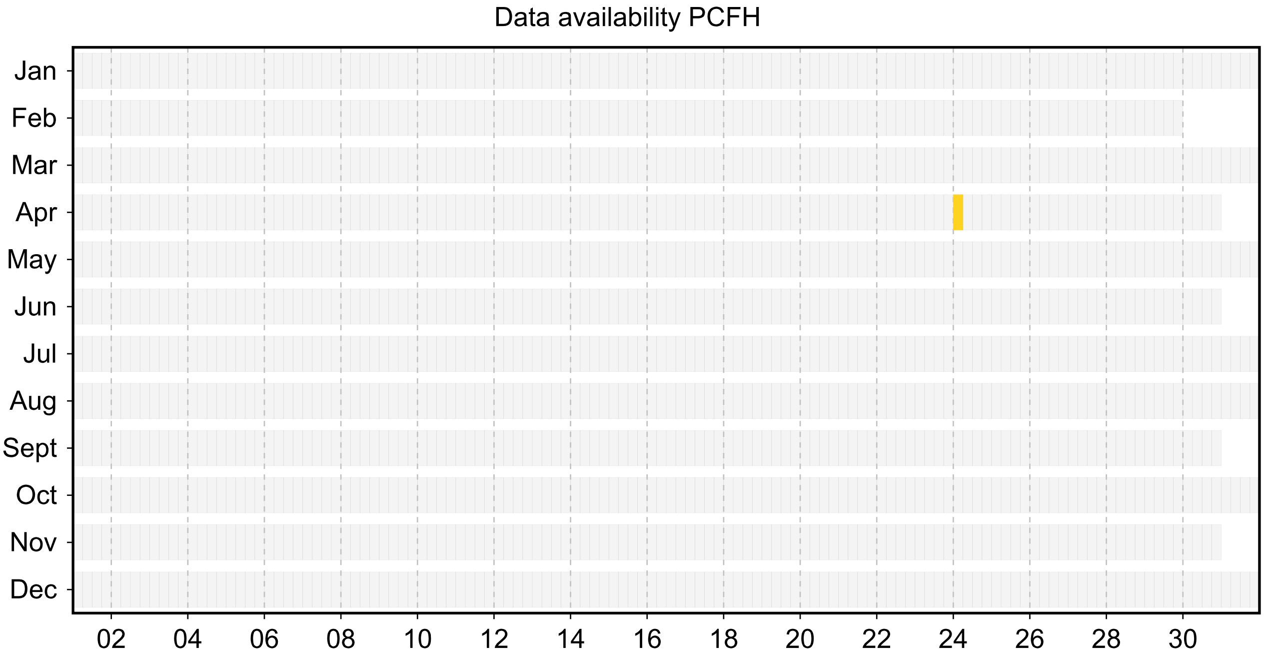
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software error.

Original (red): The original, manufacturer-produced, raw data file is available (e.g. MWX data file) but was not converted into a GRUAN-standardized raw data format (NetCDF). Reasons for this may be missing data conversion software, a software error, or a corrupt data file.

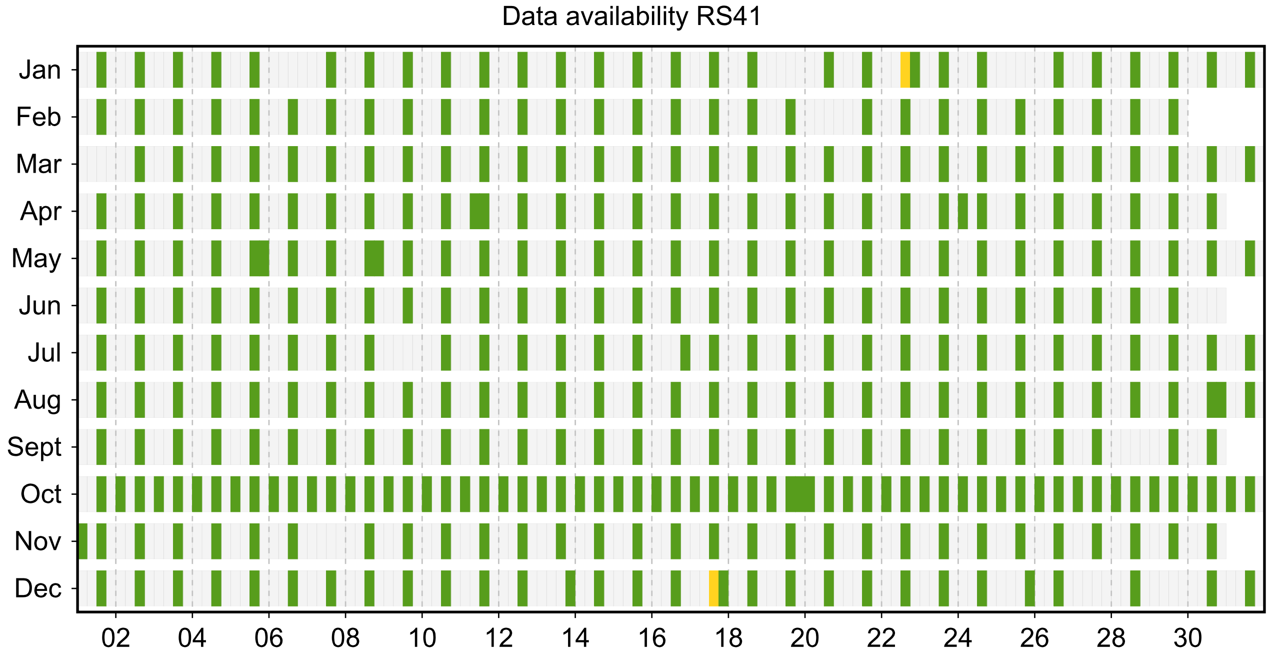
4.3.1 Stream: ECC



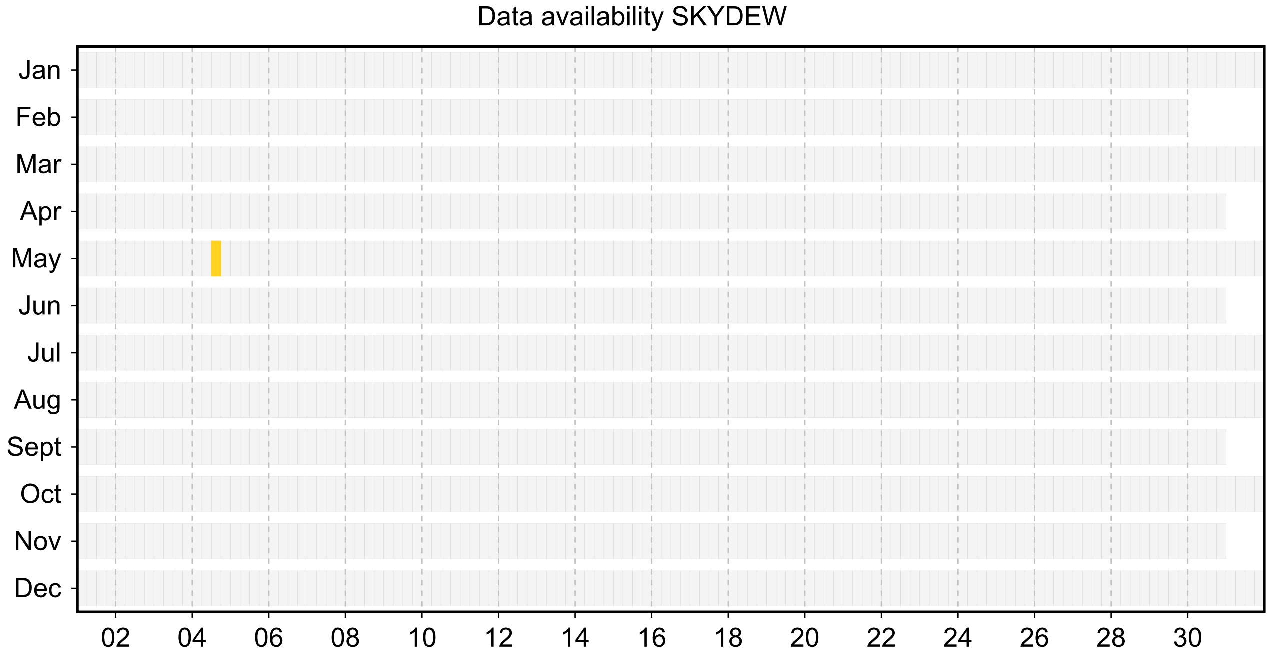
4.3.2 Stream: PCFH



4.3.3 Stream: RS41



4.3.4 Stream: SKYDEW



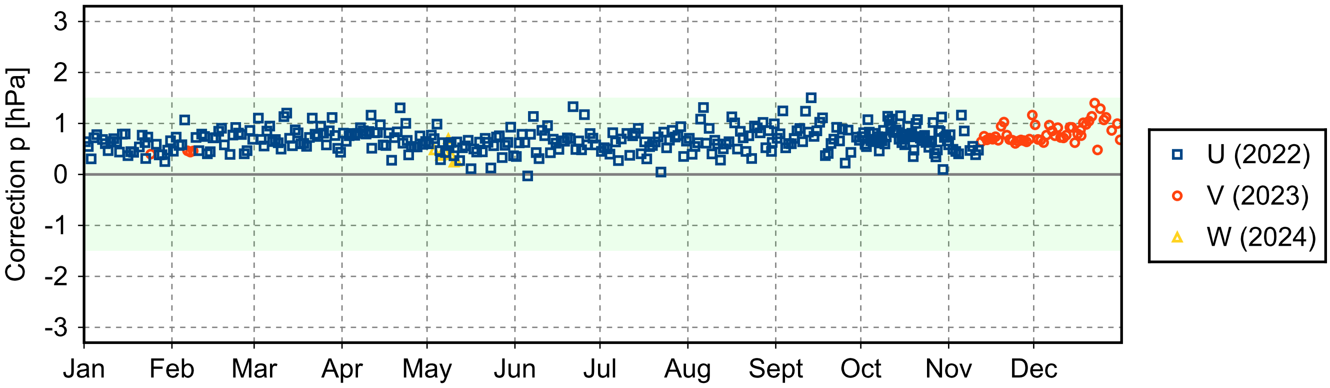
4.4 Instrument combinations of NYA-RS-01

Count	Instrument combination
64	ECC, RS41
1	PCFH, RS41
322	RS41
8	2x RS41
1	RS41, SKYDEW

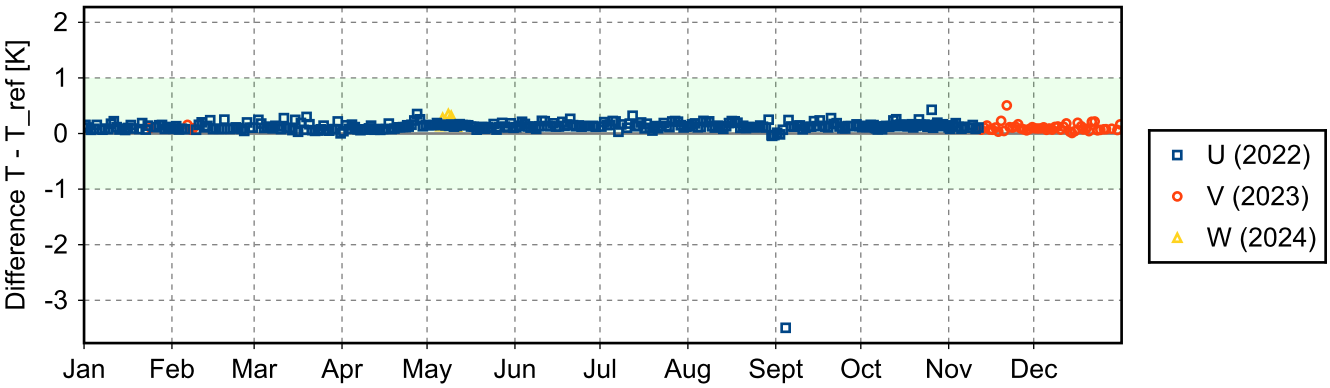
4.5 Instrument ground check

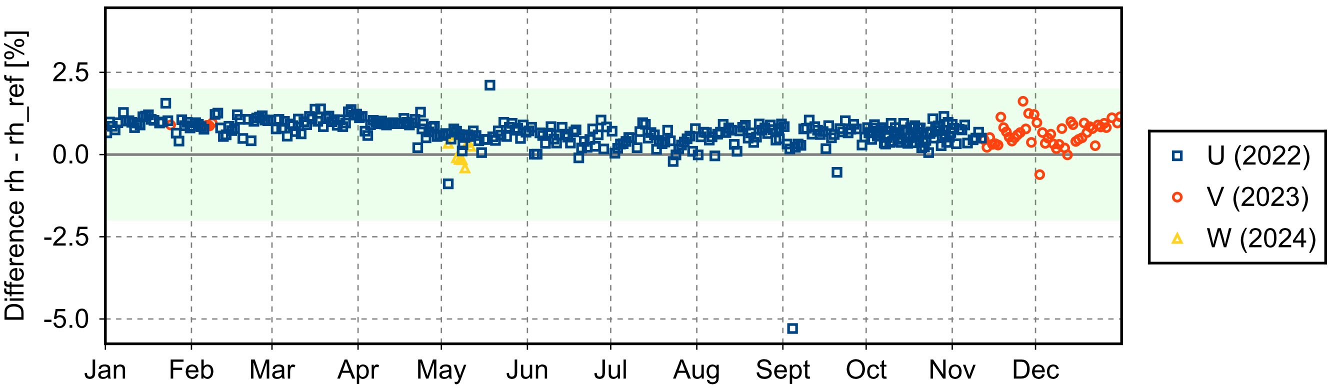
4.5.1 Stream: RS41

(1) GroundCheck: GC-RI41

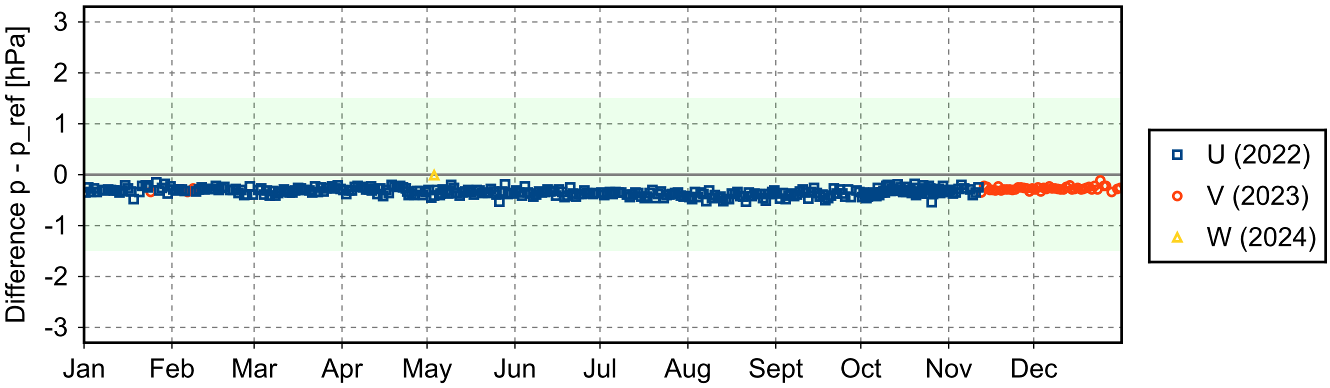


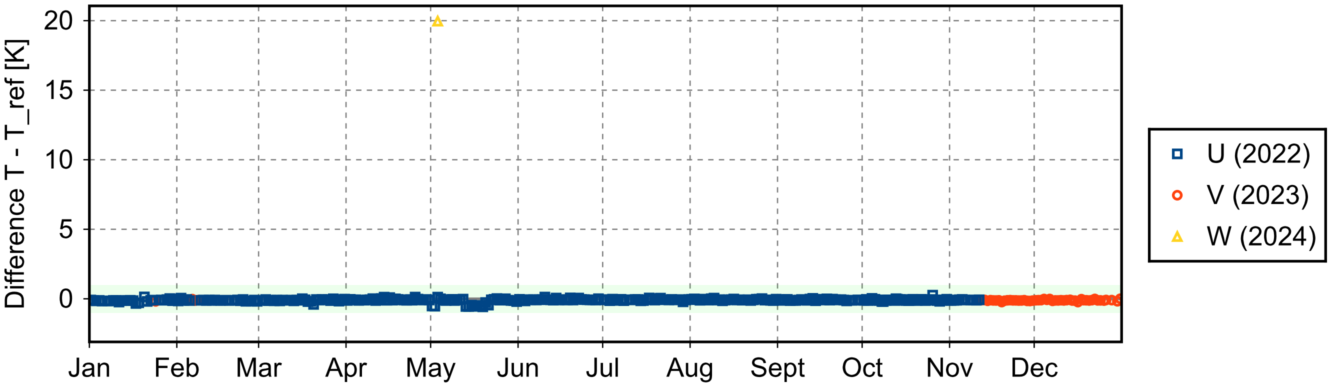
(2) GroundCheck: GC-SHC

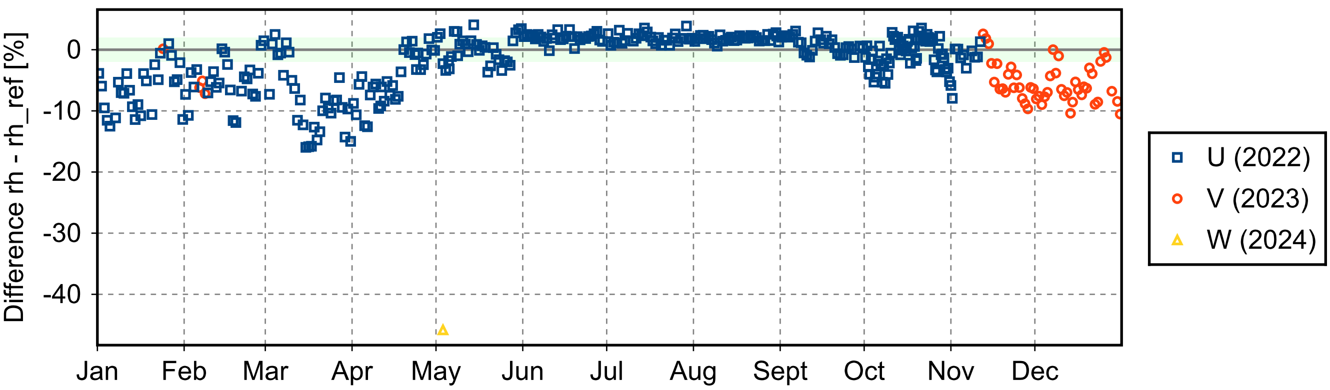




(3) GroundCheck: GC-SHELTER







4.6 Measurement events