



WMO/IOC/UNEP/ICSU  
GLOBAL CLIMATE OBSERVING  
SYSTEM (GCOS)

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**15th GRUAN Implementation-  
Coordination Meeting (ICM-15)**

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Session 5

Bern

11 March - 15 March 2024

## GRUAN Site Report for Ny-Ålesund

*(Submitted by Marion Maturilli)*

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### **Summary and Purpose of this Document**

Report from the GRUAN site Ny-Ålesund for the period January 2022 to December 2023.

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## 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. The CFH sonde program has been discontinued due to the restrictions to R23 cryogen, see last report. 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 contain all equipment changes. Operational processing as GNSS-PW-GDP is performed. Since November 2023, also raw data by the Ny-Ålesund lidar are provided to the GRUAN LC.

## Change and change management

Over the reporting period 2022-2023, no notable changes to the operation procedures have occurred for the Ny-Ålesund site. For the radiosondes RS41, the PP-string unwinder has been replaced by the biodegradable version (“BioTwine”) in 2023. All GRUAN data streams were retrieved in routine operation.

## Resourcing

Currently, the situation for the standard radiosonde program is stable.

## Operations

In the LC report for NYA in 2023, a distinct temperature jump of about 0.5 K between the radiosondes and the ground check in the shelter was identified for the month of June 2023. A similar observation is found in the LC report for 2022, for the period mid-May to mid-June. We only found out about the temperature jump with these LC reports, and still have to get to the bottom of the cause. It is potentially related to an electric problem of the temperature sensor in the shelter, with the plugs being affected by water entry during the melt period. The UTLS water vapor sounding program is still on hold due to the cryogen restrictions and according limitations to CFH instrumentation. It is planned to restart water vapor soundings once a suitable instrument is identified. For test purposes, we will be launching 2 Skydew sondes provided by LC.

## Covid-19

There were no limitations due to Covid-19 in the reporting period 2022/23.

## Site assessment and certification

The Ny-Ålesund GRUAN site was recertified in October 2022.

## GRUAN-related research

The Ny-Ålesund site is contributing to TT Sites, with Marion Maturilli actively contributing as co-chair of TT Sites.

Some publications by researchers at the Ny-Ålesund site:

- Viceto, C., I. Gorodetskaya, A. Rinke, M. Maturilli, A. Rocha, and S. Crewell (2022) Atmospheric rivers and associated precipitation patterns during the ACLOUD/PASCAL campaigns near Svalbard (May-June 2017): case studies using observations, reanalyses, and a regional climate model, *Atmospheric Chemistry and Physics*, 22 , pp. 441-463 doi:10.5194/acp-22-441-2022
- Bresson, H. , A. Rinke, M. Mech, D. Reinert, V. Schemann, K. Ebell, M. Maturilli, C. Viceto, I. Gorodetskaya, and S. Crewell (2022) Case study of a moisture intrusion over the Arctic with the ICOSahedral Non-hydrostatic (ICON) model: resolution dependence of its representation, *Atmospheric Chemistry and Physics*, 22 , pp. 173-196 . doi:10.5194/acp-22-173-2022
- Dahlke, S., A. Solbés, and M. Maturilli (2022) Cold Air Outbreaks in Fram Strait: Climatology, Trends, and Observations During an Extreme Season in 2020, *Journal of Geophysical Research-Atmospheres*, 127 (3), pp. 1-18 . doi:10.1029/2021JD035741
- Shestakova, A. , Chechin, D. , Lüpkes, C. , Hartmann, J. and Maturilli, M. (2022) The foehn effect during easterly flow over Svalbard , *Atmos. Chem. Phys.*, 22 , pp. 1529-1548 . doi:10.5194/acp-22-1529-2022

## WG-GRUAN interface

No request.

## Other archiving centers

Ozone sonde data and lidar data are archived at NDACC.

## Participation in campaigns

In the frame of the HALO-AC3 aircraft campaign (<https://halo-ac3.de>), radiosondes were increased to 6-hourly launches in the period 12 March to 15 April 2022. Furthermore, additional radiosondes were launched from Ny-Ålesund in the context of a campaign by the Korean Polar Institute (KOPRI), resulting in 2 radiosondes per day from 5 Oct to 9 Nov 2023.

## Future plans

In April/May 2024, we intend to launch 2 Skydew sondes provided by GRUAN LC, to broaden the latitudinal coverage of test flights with this instrument type.

Since 1993, AWI has run the radiosonde program in Ny-Ålesund, Svalbard, collaborating with the Norwegian Meteorological Institute (MET.NO) by directly handing over the data after each launch, so the data were submitted to the GTS by Norway, under Norwegian WMO station 01004. Recently, MET.NO initiated a discussion about deploying an auto-launcher system in Ny-Ålesund, as they want to increase the number of daily radiosonde launches in the long term. For now, AWI remains with manual radiosonde launches with regard to GRUAN. In winter 2023/24, we will support MET.NO by launching twice daily soundings during 2 winter months. However, work load for the station staff and personnel costs will be a future topic if more soundings are required on a regular basis, even more so if Norway establishes an auto-launcher system. We will remain in close contact with GRUAN LC and WG about any new developments in this respect.



# GRUAN Site Report for NyAlesund (NYA), 2022

Reported time range is Jan 2022 to Dec 2022

Created by the Lead Centre

Version from 2024-03-01

## 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 17, changes +5 / -2
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	0
NYA-RS-01	Ny-Aalesund Radiosonde Launch Site	Sounding Site	9	474

### 1.2 General comments from Lead Centre

#### 1.2.1 General

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

#### 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	78.5136 °N, 11.5212 °E, 49.1 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)

<b>Object</b>	<b>Value</b>
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

No comments from Lead Centre.



## 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

### 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.

#### 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
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#### 4.2.1 Stream: ECC

ECC		82	82	
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#### 4.2.2 Stream: RS41

RS41		474	474	
RS41-RAW	001		474	
RS41-EDT	001		474	
RS41-GDP	001		463	

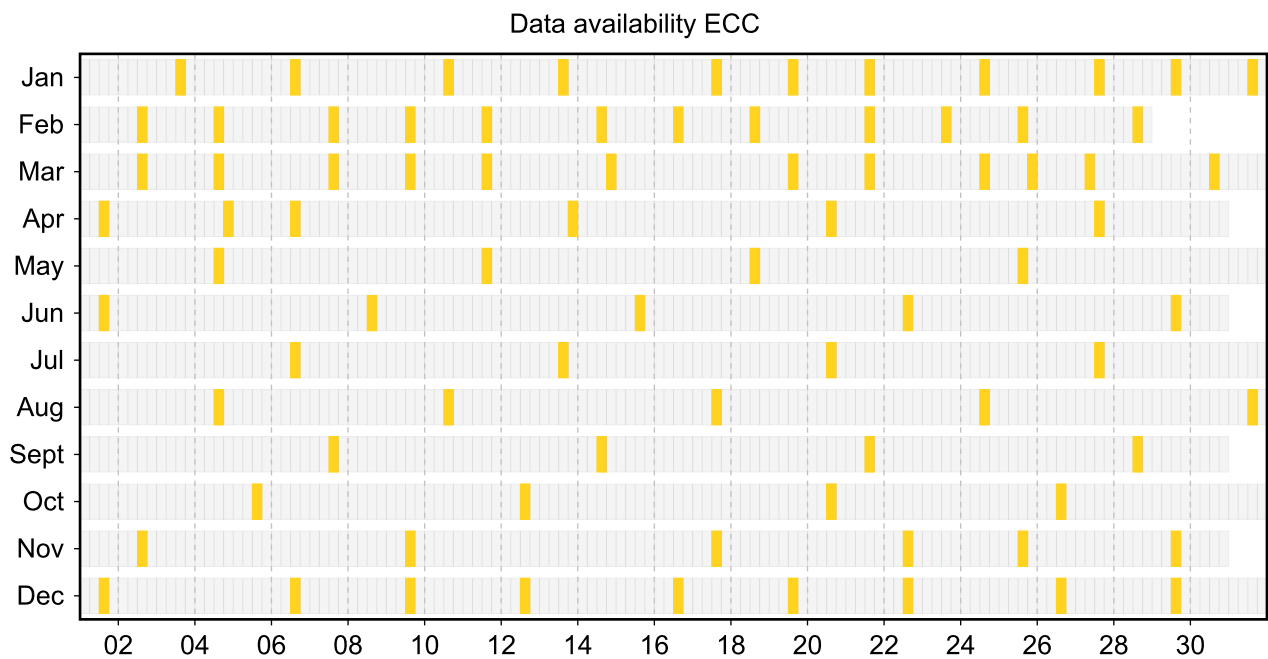
### 4.3 Availability of data products

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).

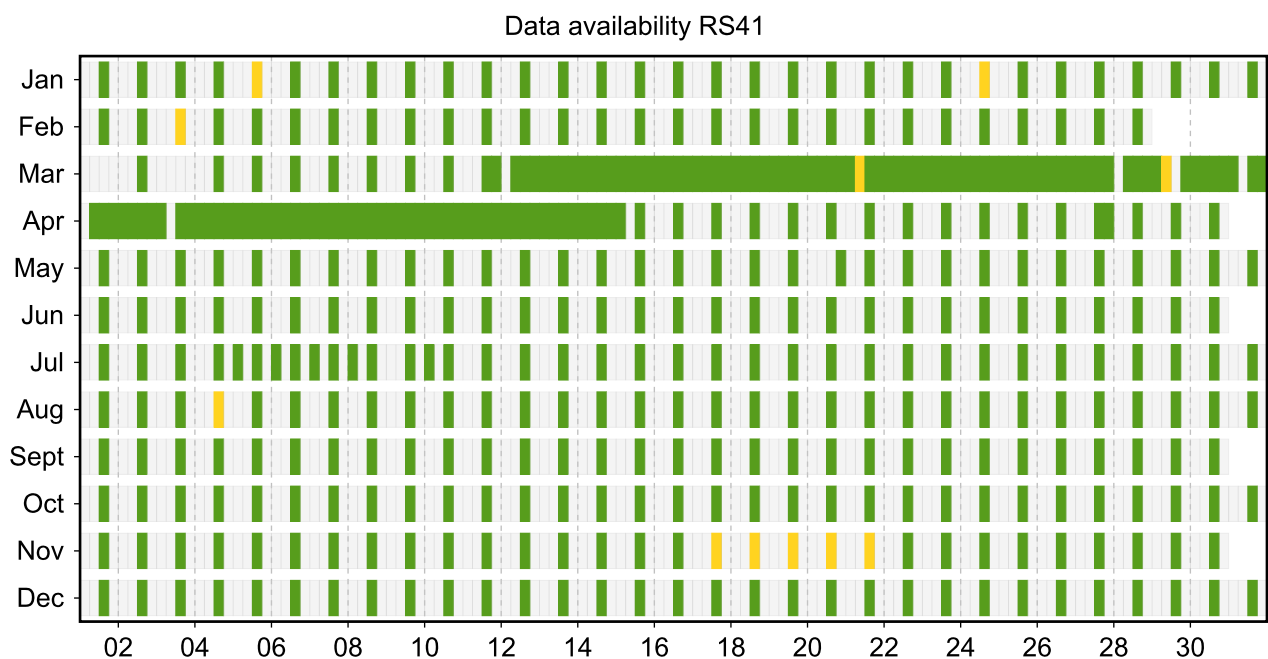
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software 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: RS41



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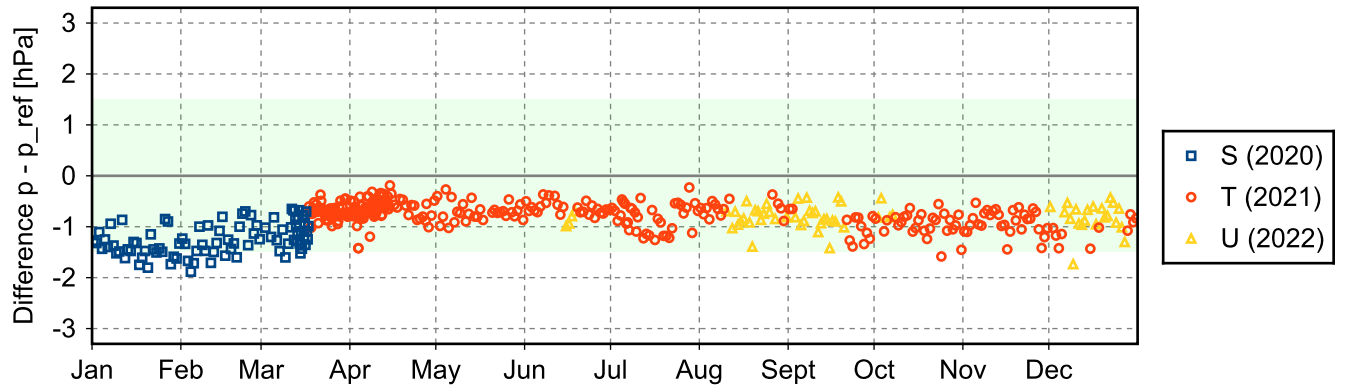
## 4.4 Instrument combinations of NYA-RS-01

<b>Count</b>	<b>Instrument combination</b>
82	ECC, RS41
392	RS41

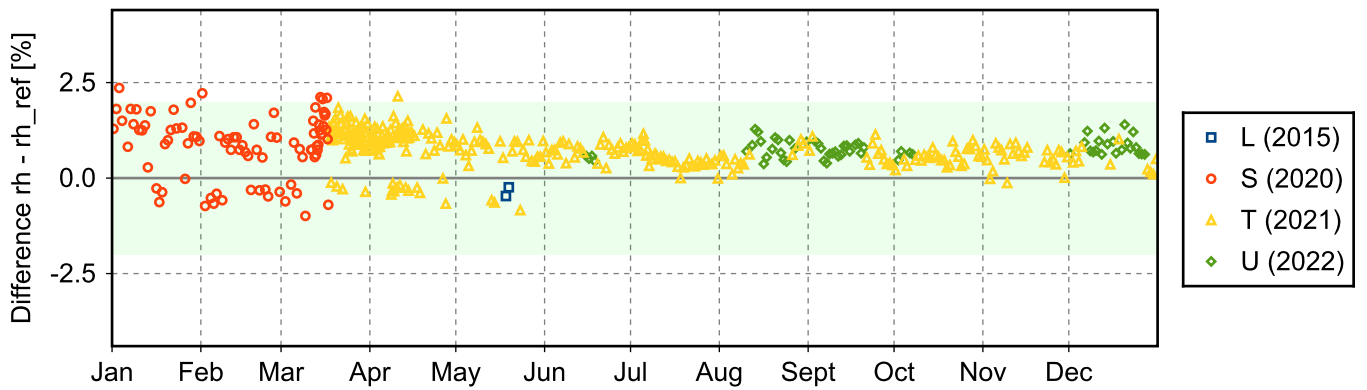
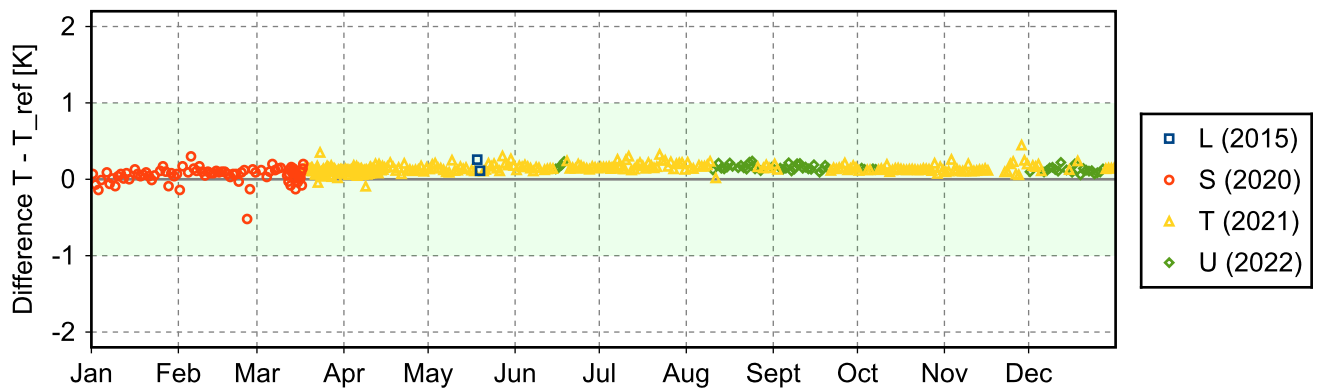
## 4.5 Instrument ground check

### 4.5.1 Stream: RS41

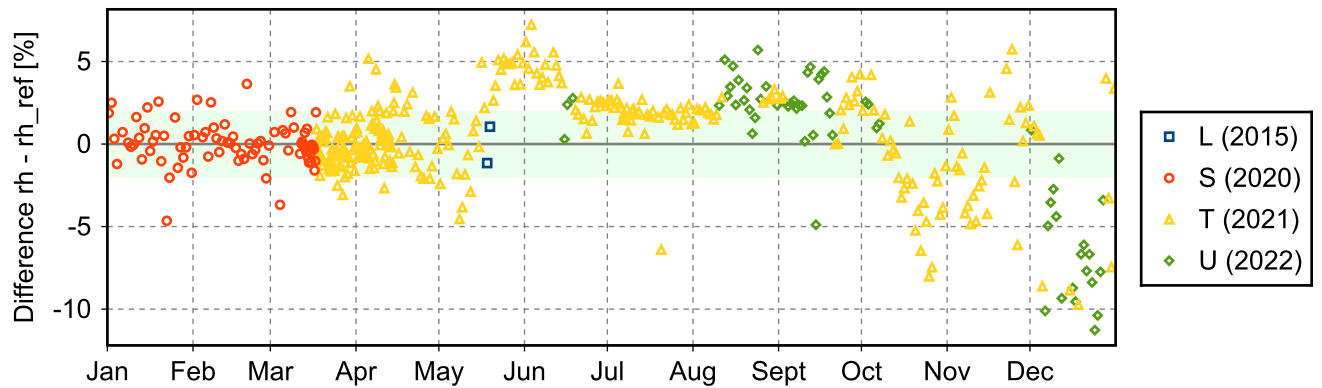
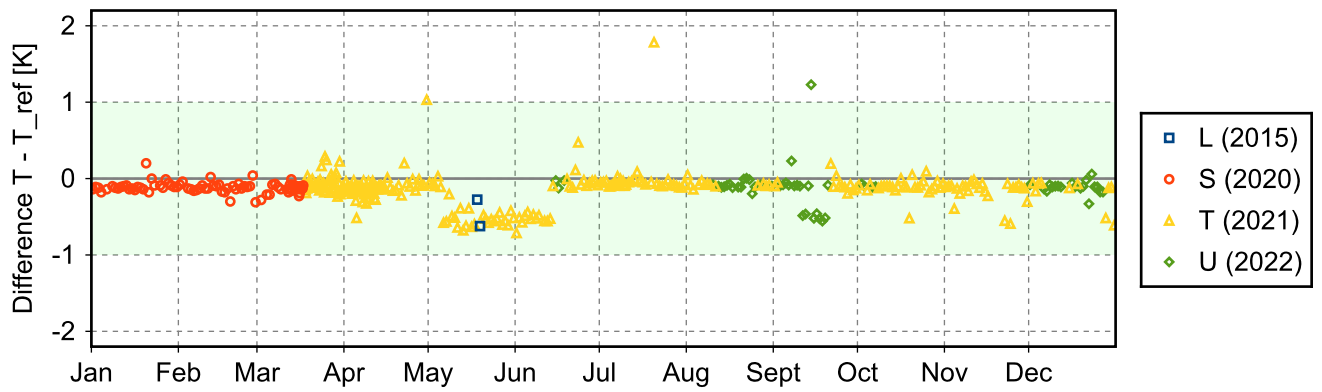
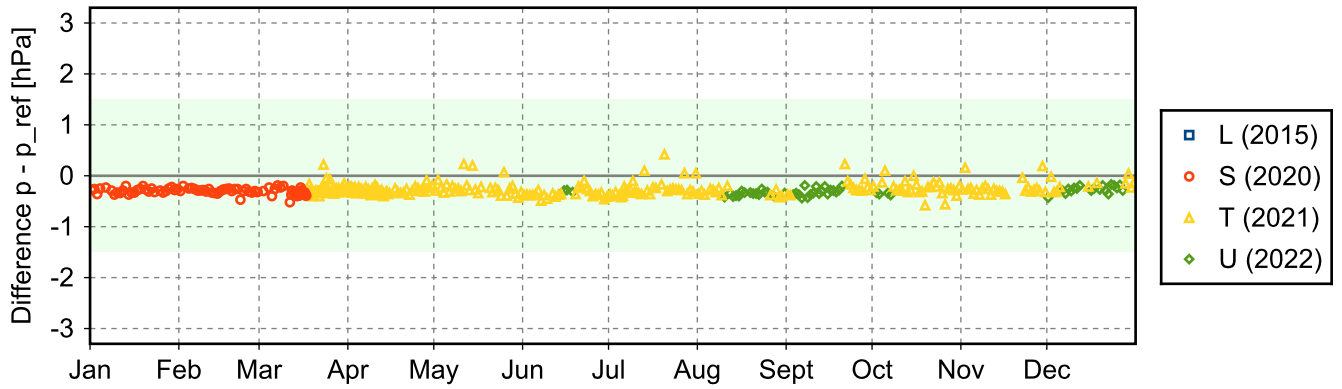
(1) GroundCheck: GC-RI41



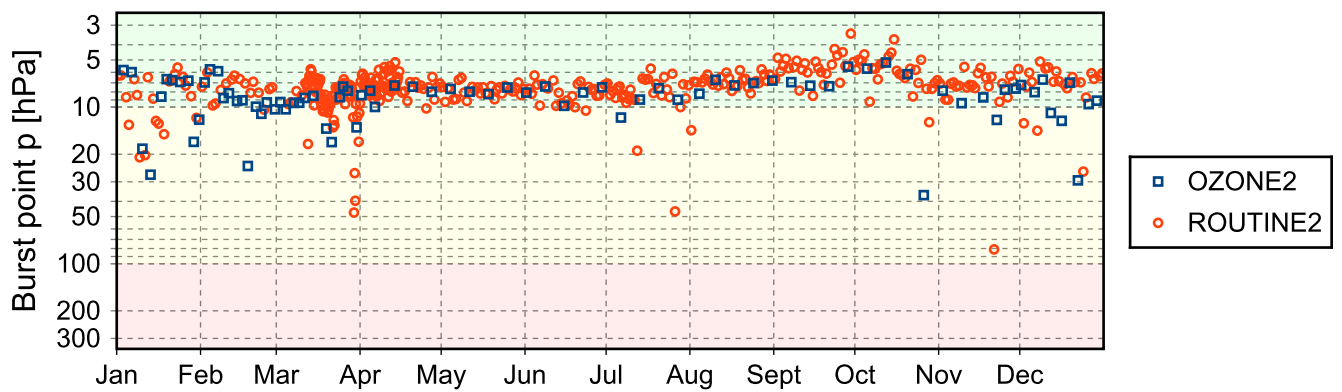
(2) GroundCheck: GC-SHC



(3) GroundCheck: GC-SHELTER



4.6 Measurement events





# GRUAN Site Report for NyAlesund (NYA), 2023

Reported time range is Jan 2023 to Dec 2023

Created by the Lead Centre

Version from 2024-03-01

## 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 17, changes +3 / -6
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	22
NYA-RS-01	Ny-Aalesund Radiosonde Launch Site	Sounding Site	9	403

### 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.

The reason of temperature difference jump (June) should be clarified and communicated with the Lead Centre.

## 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	78.5136 °N, 11.5212 °E, 49.1 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
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##### 3.2.1 Stream: LIDAR

LIDAR		22	22	
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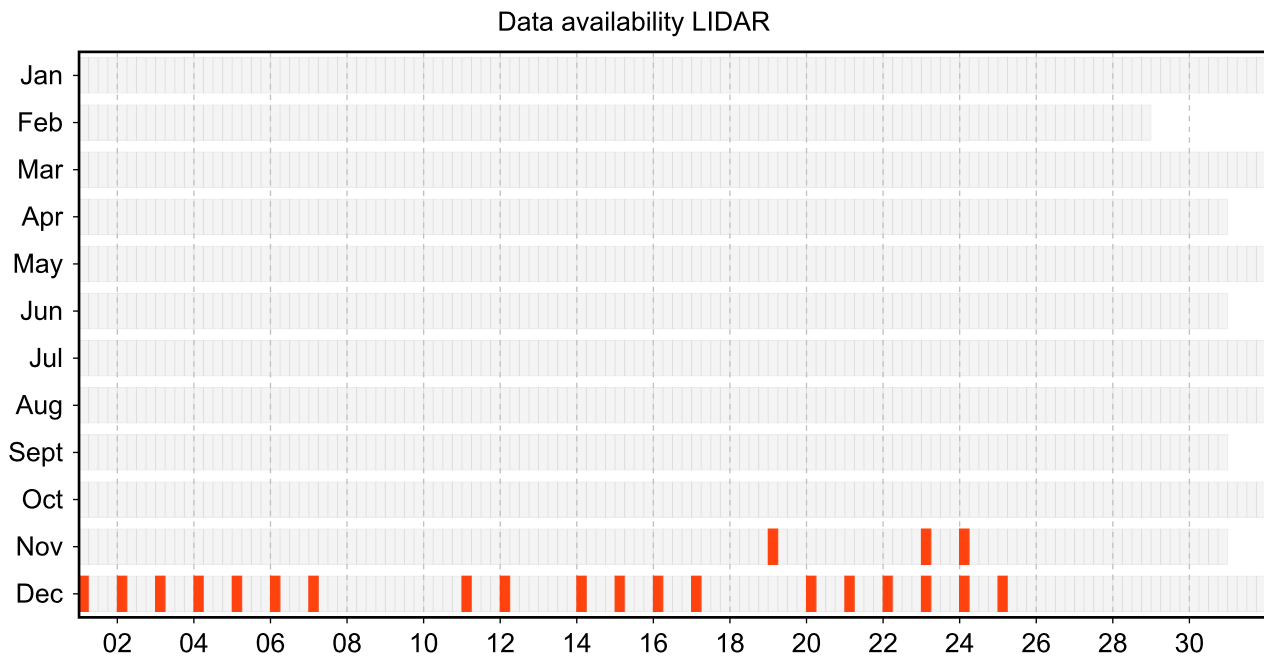
### 3.3 Availability of data products

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.

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#### 3.3.1 Stream: LIDAR



#### 3.4 Instrument combinations of NYA-LI-01

Count	Instrument combination
22	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

### 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 temperature differences during the ground check in the shelter show a significant jump during June. The reason of this should be clarified and communicated with the Lead Centre.

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.

#### 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
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#### 4.2.1 Stream: ECC

ECC		63	63	
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#### 4.2.2 Stream: RS41

RS41		403	403	
RS41-RAW	001		403	
RS41-EDT	001		401	
RS41-GDP	001		402	

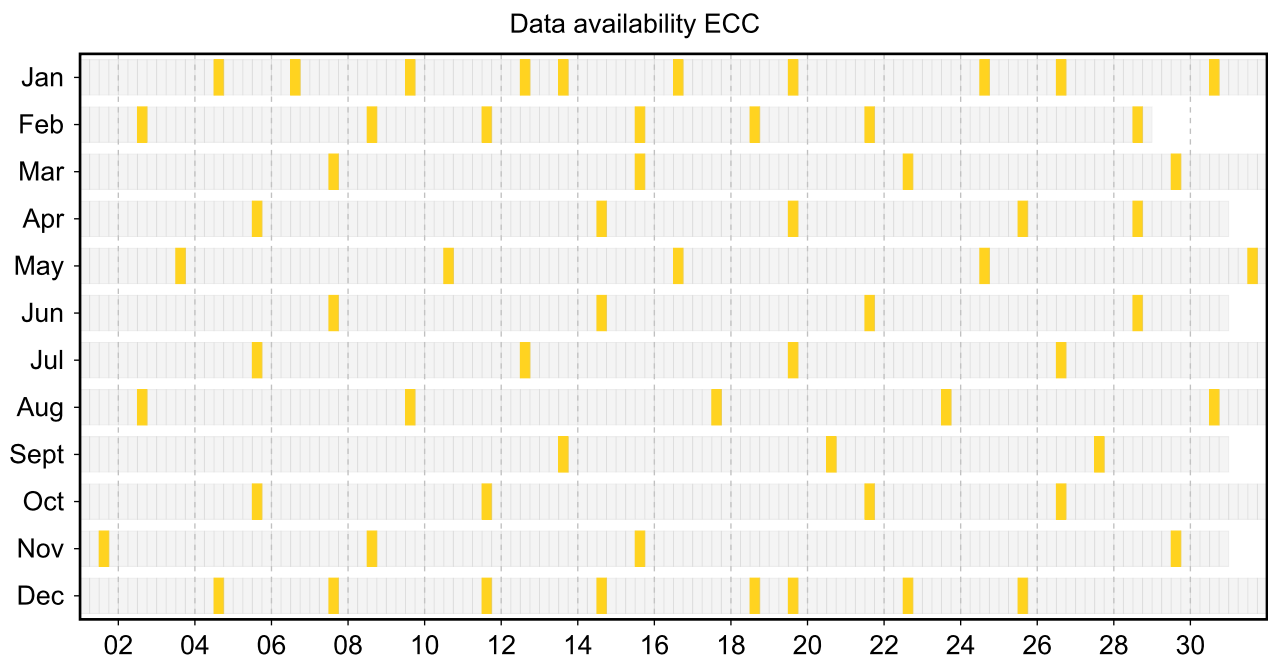
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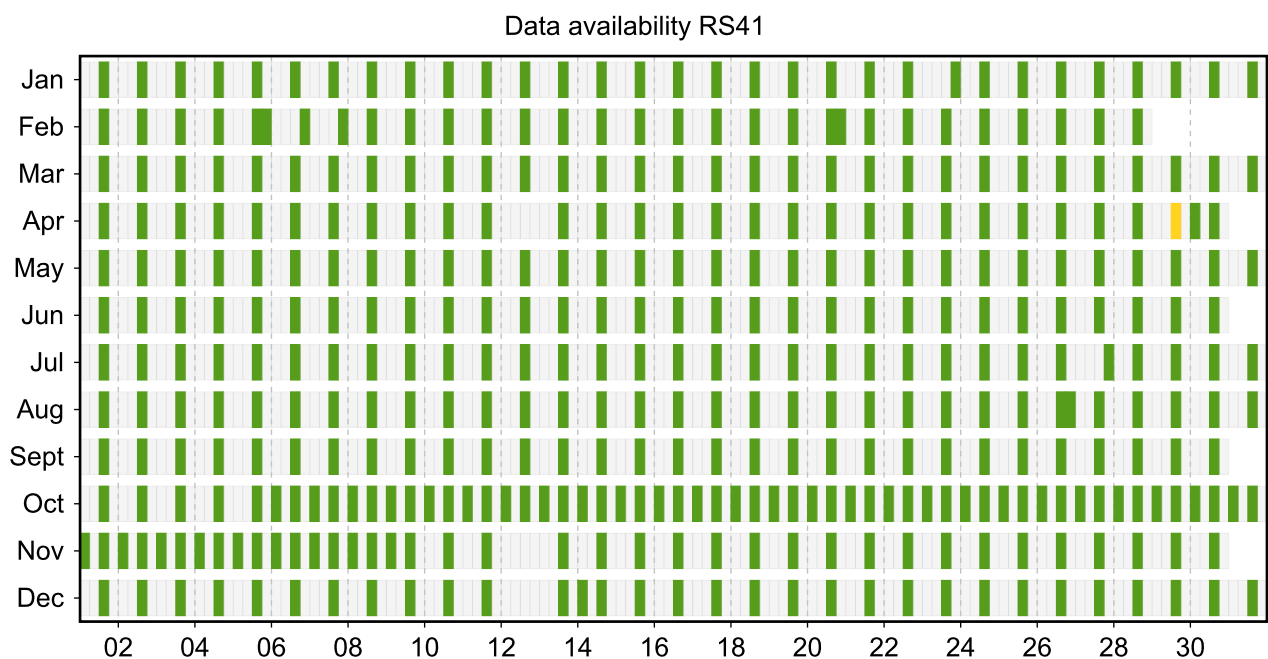
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#### 4.3.1 Stream: ECC



#### 4.3.2 Stream: RS41



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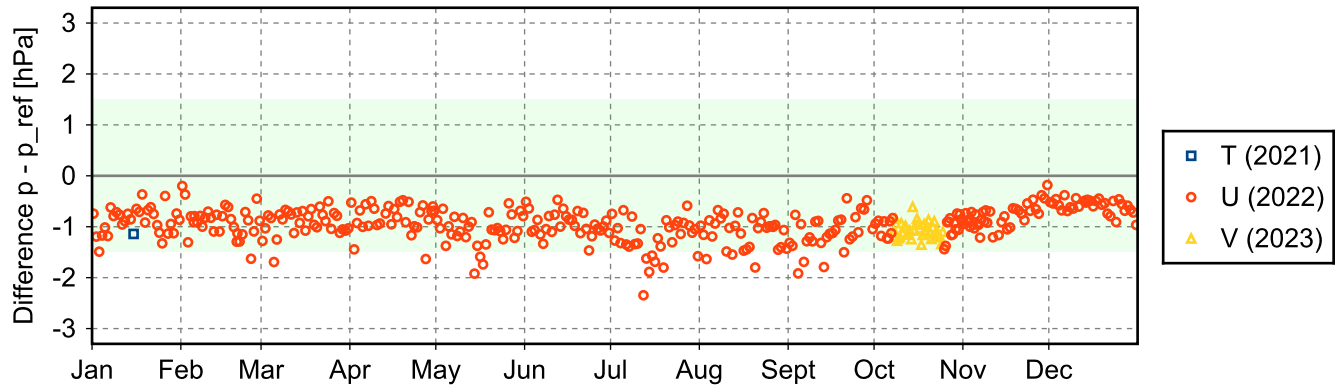
## 4.4 Instrument combinations of NYA-RS-01

<b>Count</b>	<b>Instrument combination</b>
63	ECC, RS41
340	RS41

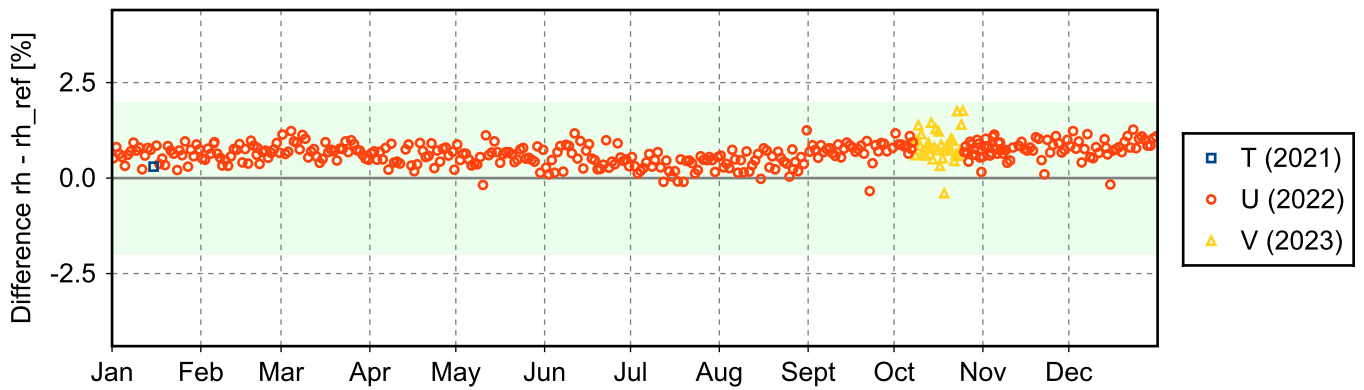
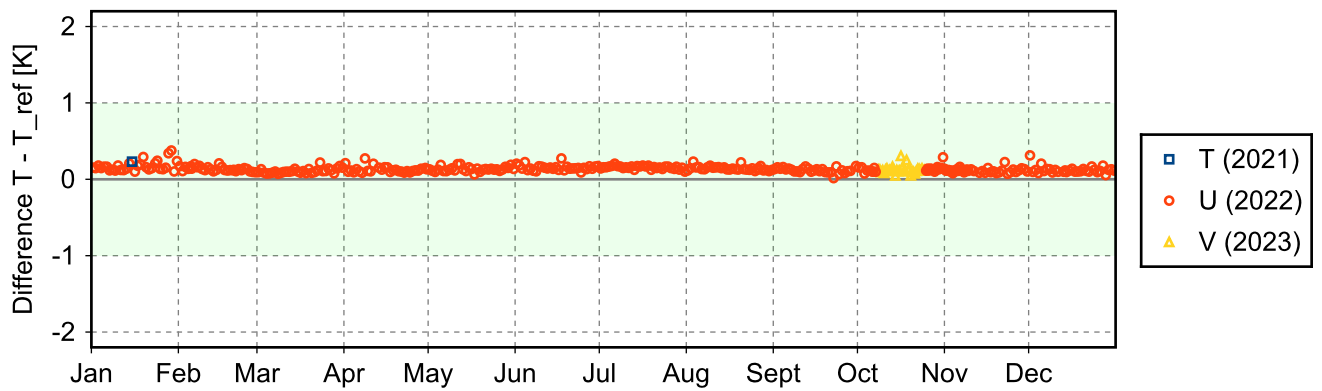
## 4.5 Instrument ground check

### 4.5.1 Stream: RS41

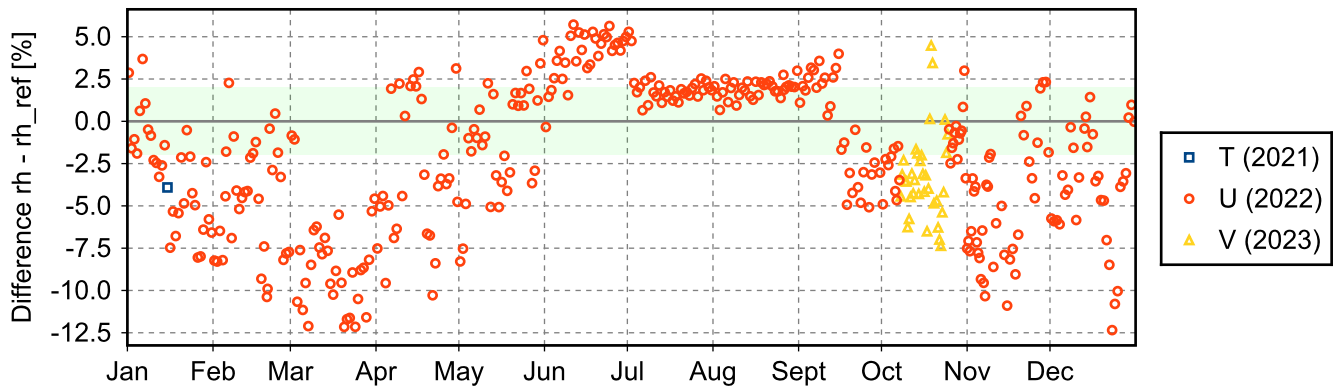
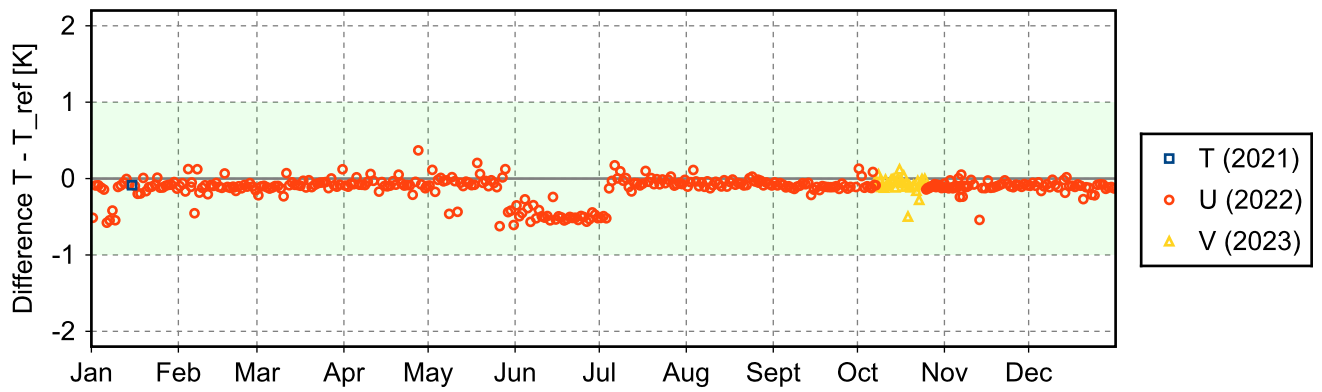
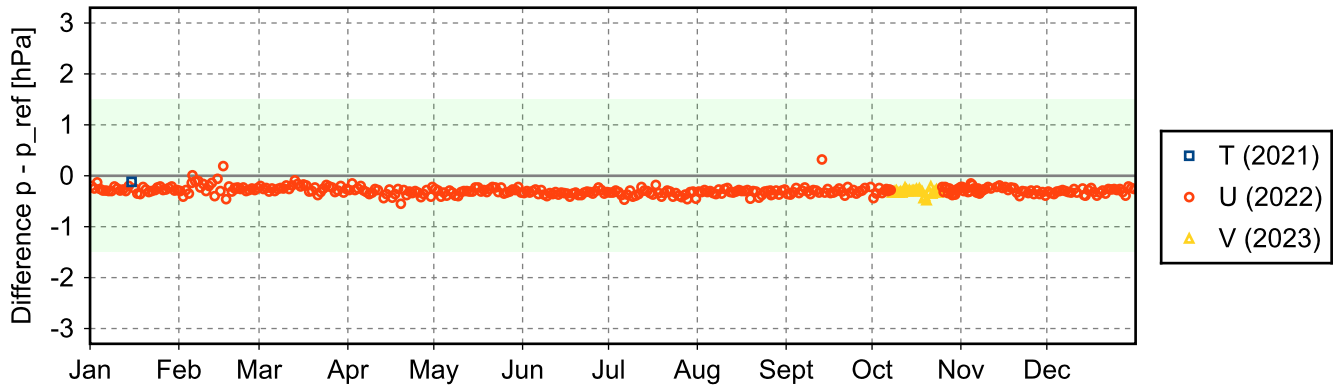
(1) GroundCheck: GC-RI41



(2) GroundCheck: GC-SHC



(3) GroundCheck: GC-SHELTER



4.6 Measurement events

