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GLOBAL CLIMATE OBSERVING  
SYSTEM (GCOS)

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**14th GRUAN Implementation-  
Coordination Meeting (ICM-14)**

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Session 5

La Réunion

28 November - 02 December 2022

## 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 to December 2021.

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## Overview

The Ny-Ålesund site is contributing to GRUAN with its sounding program and according data streams for RS41, ECC and CFH. The daily radiosonde data and weekly ozone sonde data are promptly submitted to GRUAN LC, no problems are apparent. CFH sondes were launched in February and April 2021, the bi-monthly measurements have been on hold afterwards (see explanation in ‘Change and change management’). 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. In the future, Ny-Ålesund may contribute with lidar and microwave radiometer data streams once formal data products have been defined.

## Change and change management

Due to environmental aspects regarding the use of R23, we have put on hold the CFH program at Ny-Ålesund. The last CFH launch at Ny-Ålesund was done in April 2021. The EU regulation on F-gases will become stricter in the near future, see [https://ec.europa.eu/clima/eu-action/fluorinated-greenhouse-gases/eu-legislation-control-f-gases\\_en#review-of-the-eu-f-gas-r](https://ec.europa.eu/clima/eu-action/fluorinated-greenhouse-gases/eu-legislation-control-f-gases_en#review-of-the-eu-f-gas-r). R23 will become more difficult to obtain, but more important, due to its high Global Warming Potential (14800) we see a contradiction in emitting a climate-affecting substance in order to conduct climate research. In the Svalbard Environmental Protection Act (<https://www.regjeringen.no/en/dokumenter/svalbard-environmental-protection-act/id173945/>) that came into force in June 2021, it is regulated that “In activities in Svalbard, chemical and biotechnological products that may cause damage or nuisance to the environment shall be replaced with products that on the basis of an overall environmental assessment pose less risk to the environment. . .”. With the current lack of an alternative instrument, we now decided to launch the remaining CFH sondes only in combination with a GRUAN approved successor instrument. The redundant measurements in these dual soundings will allow to connect the new instrumentation to the existing time series of UTLS water vapor measurements. Although the interruption of regular CFH soundings will lead to a gap in the time series, we hope that the forced change management concept will be beneficial for the overall GRUAN goals.

Other than that, no changes to the operation procedures have occurred for the Ny-Ålesund site. All GRUAN data streams were retrieved in routine operation.

## **Resourcing**

Funding for the daily routine radiosounding is assured. Any additional soundings depend on extra funding, but so far no problems are encountered.

## **Operations**

For logistical reasons, it is impossible to recover even the large payloads after flight, as they land either in the ocean or on inaccessible ground. In Arctic climate conditions, the decomposition of any sounding material is decelerated, and there is a growing awareness of the public that the soundings result in waste being left in the environment. Requests in this regard have already been brought up to the station on several occasions. As for the justification of the sounding program to the public, we would appreciate a general statement from official side to back up our replies.

## **Covid-19**

Despite several COVID-19 cases at Ny-Ålesund, we were able to operate the full program.

## **Site assessment and certification**

The audit documents for recertification will be submitted in August 2022.

## **GRUAN-related research**

Ny-Ålesund Site Representative Marion Maturilli (MM) is supporting GRUAN as co-chair of TT Sites. In that role, based on a survey by TT Sites, she contributed to the GRUAN Report #5 on Cloud Observations. Beyond the Ny-Ålesund site, MM was involved in the radiosonde program on board RV Polarstern during the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) October 2019 to September 2020. The soundings were operated along GRUAN procedures, including ground check in a standard humidity chamber. The rawdata were thereafter processed by the GRUAN Lead Center, and the according MOSAIC-GDP is made available via the PANGAEA data repository, see <https://doi.pangaea.de/10.1594/PANGAEA.943870> (The data are subject to restriction according to the MOSAIC data policy until 31 Dec 2022. Individual access can be requested to MM. From 1 January 2023, the data will have public access.)

Publications by researchers at the Ny-Ålesund site:

- Männel, B., F. Zus, G. Dick, S. Glaser, M- Semmling, K. Balidakis, J. Wickert, M. Maturilli, S. Dahlke, and H. Schuh (2021) GNSS-based water vapor estimation and validation during the MOSAiC expedition, *Atmospheric Measurement Techniques*, 14 (7), pp. 5127-5138. doi:10.5194/amt-14-5127-2021
- Inoue, J., Y. Tobo, K. Sato, T. Fumikazu, and M. Maturilli (2021) Application of cloud particle sensor sondes for estimating the number concentration of cloud water droplets and liquid water content: case studies in the Arctic region, *Atmospheric Measurement Techniques*, 14 , pp. 4971-4987. doi:10.5194/amt-14-4971-2021
- Crewell, S. , K. Ebell, P. Konjari, M. Mech, T. Nomokonova, A. Radovan, D. Strack, A.M. Triana-Gomez, S. Noël, R. Scarlat, G. Spreen, M. Maturilli, A. Rinke, I. Gorodetskaya, C. Viceto, T. August, and M. Schröder (2021) A systematic assessment of water vapor products in the Arctic: from instantaneous measurements to monthly means, *Atmospheric Measurement Techniques*, 14 (7), pp. 4829-4856 . doi:10.5194/amt-14-4829-2021

## **WG-GRUAN interface**

No request.

## **Other archiving centers**

The CFH data are archived at NDACC.

## **Participation in campaigns**

There was no specific campaign activity in 2021.

## **Future plans**

In March/April 2022, the radiosonde launch frequency will be increased to 6-hourly in the context of the HALO-AC3 aircraft campaign.



# GRUAN Site Report for NyAlesund (NYA), 2021

Reported time range is Jan 2021 to Dec 2021

Created by the Lead Centre

Version from 2022-11-15

## 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 13, changes +2 / -12
Sounding Site	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-RS-01	Ny-Aalesund Radiosonde Launch Site	Sounding Site	9	374

### 1.2 General comments from Lead Centre

No comments from 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 has 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: 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, RS-11G, RS41, RS92

#### 3.1 Lead Centre comments

##### 3.1.1 Dataflow

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

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

A regular measurement program for the observation of stratospheric water vapor was performed using CFH.

#### 3.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI
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##### 3.2.1 Stream: CFH

CFH		2	2	
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##### 3.2.2 Stream: ECC

ECC		67	67	
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##### 3.2.3 Stream: RS41

RS41		374	374	
RS41-RAW	001		374	
RS41-EDT	001		374	
RS41-GDP	001		371	
RS41-GDP-BETA	002		188	
RS41-GDP-BETA	003		321	



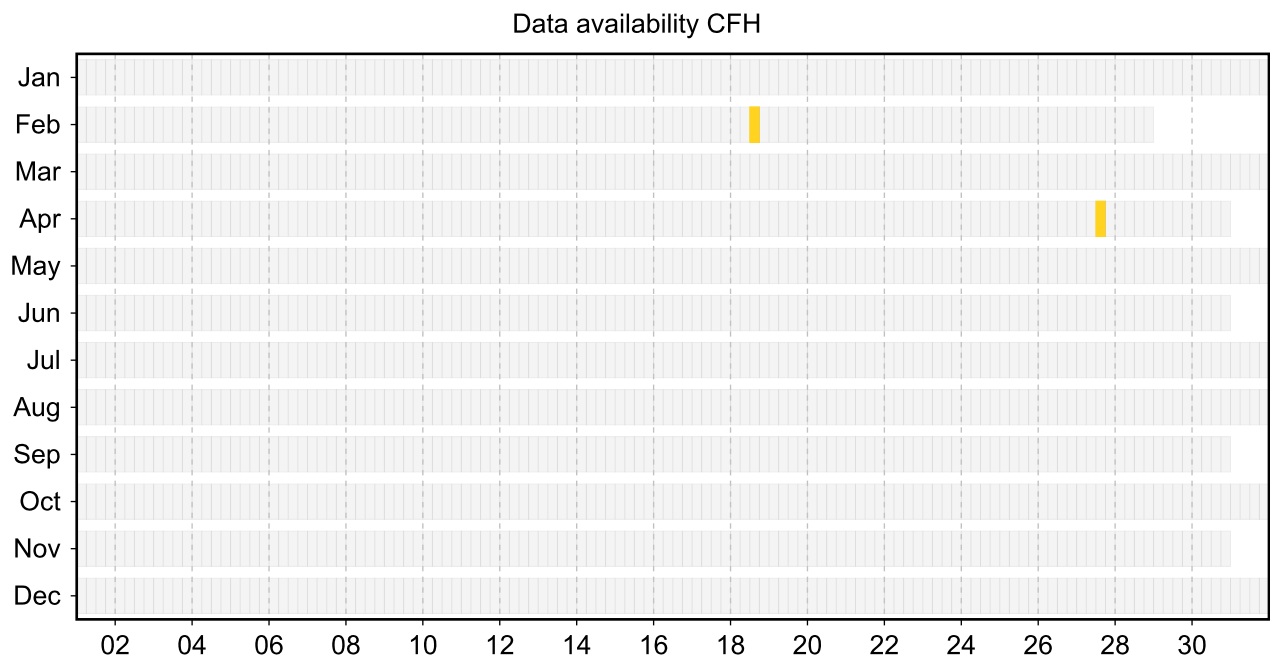
### 3.3 Availability of data products

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).

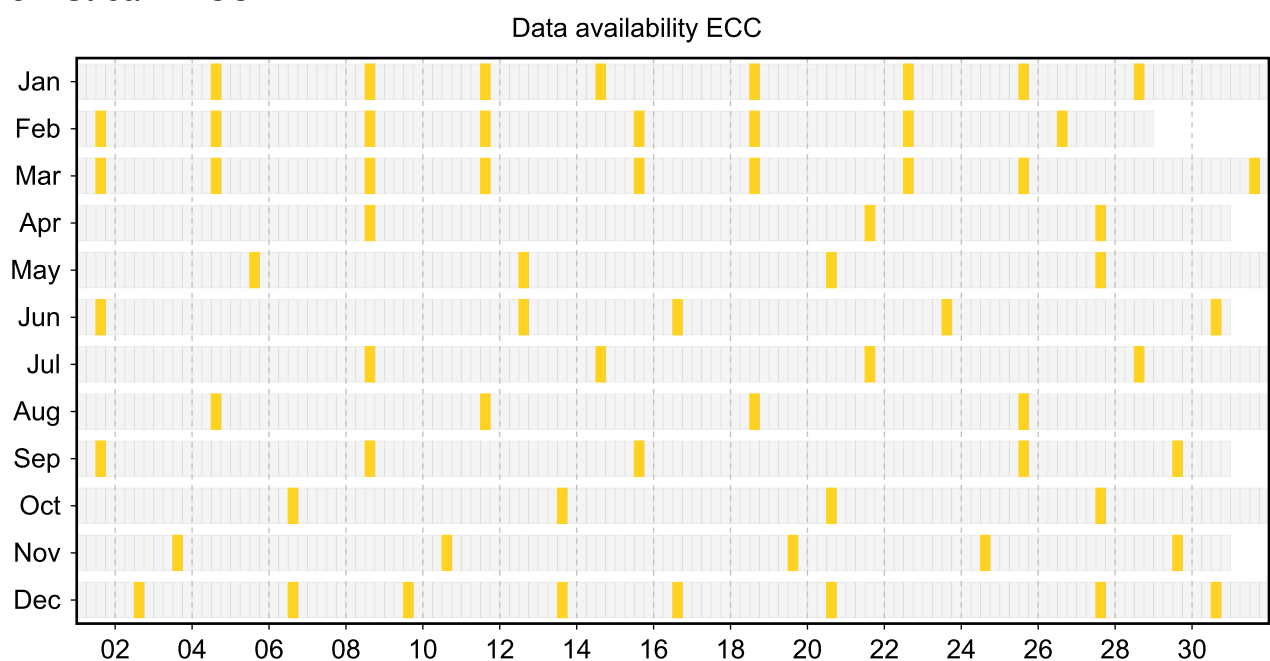
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software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

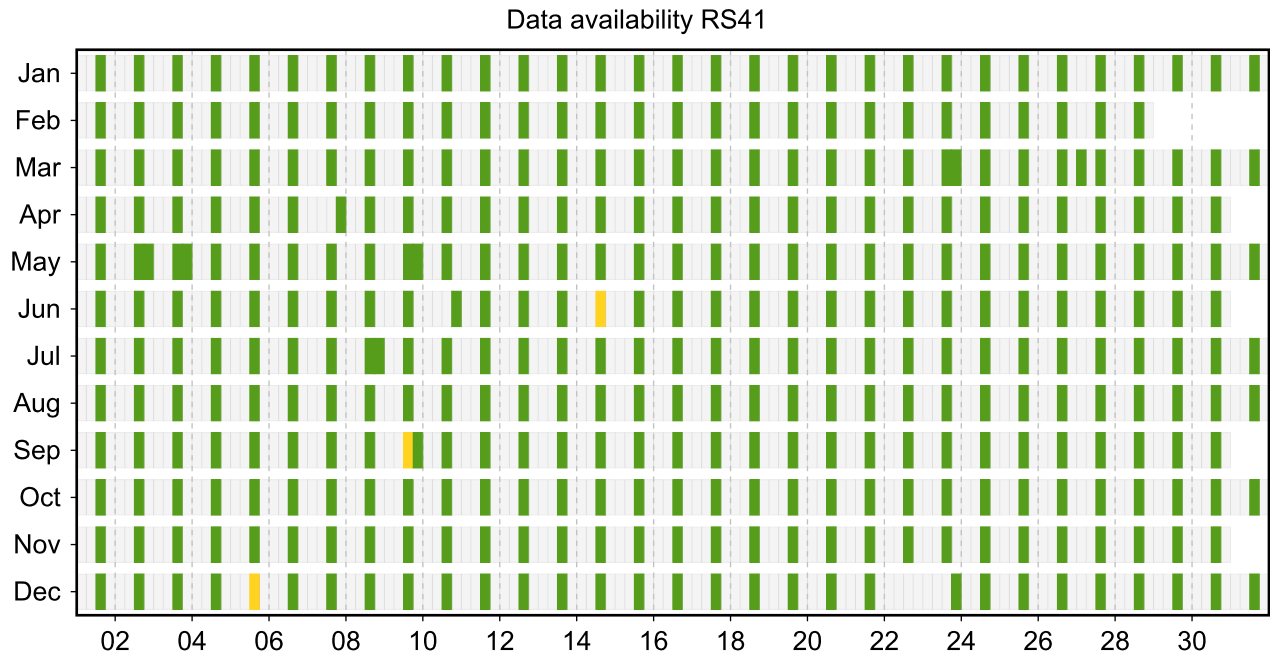
#### 3.3.1 Stream: CFH



#### 3.3.2 Stream: ECC



3.3.3 Stream: RS41



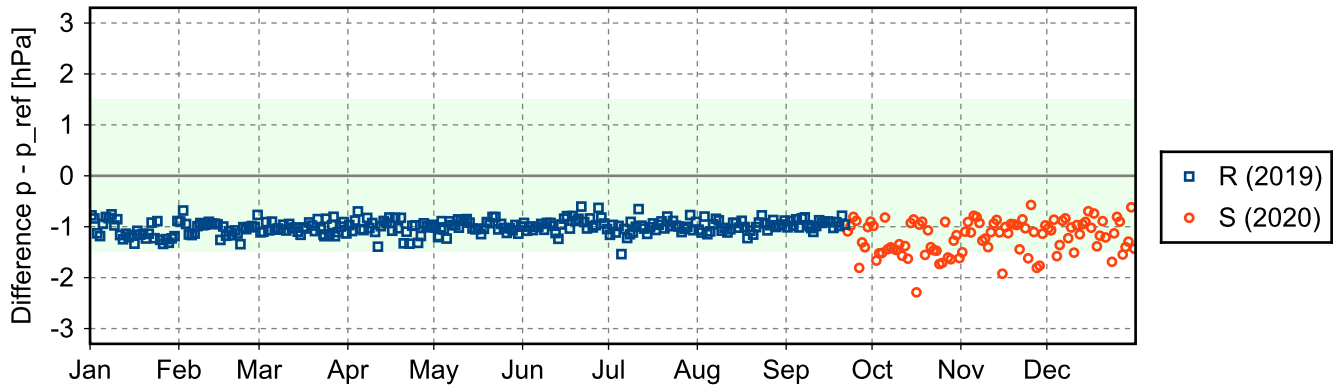
3.4 Instrument combinations of NYA-RS-01

Count	Instrument combination
2	CFH, ECC, RS41
65	ECC, RS41
307	RS41

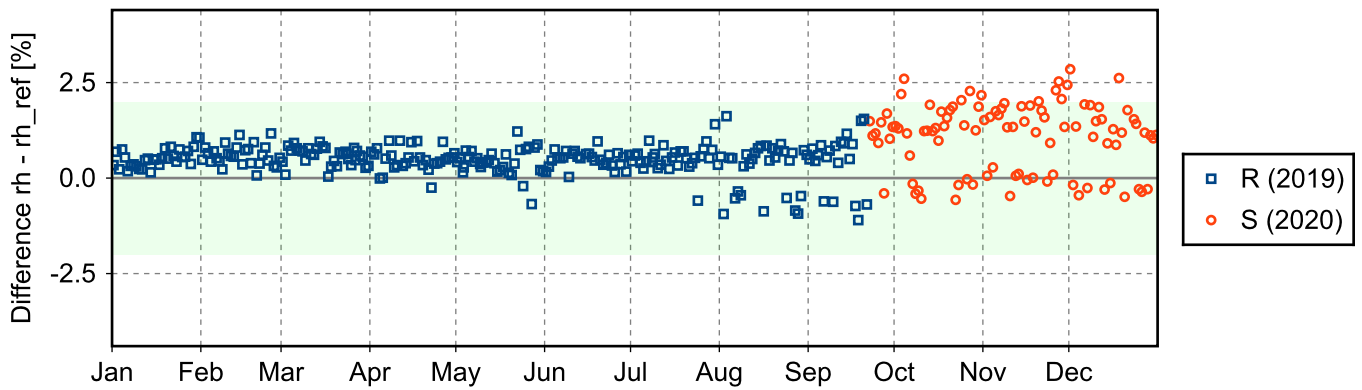
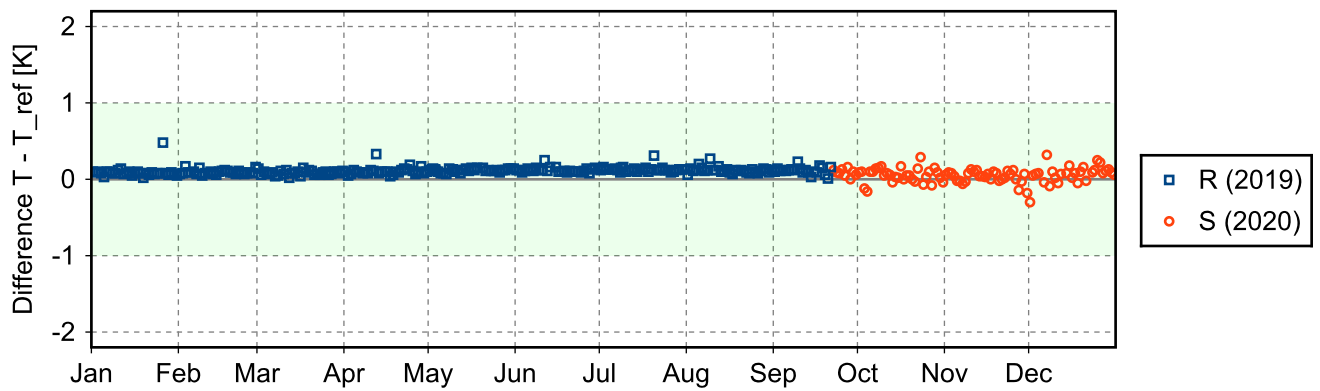
### 3.5 Instrument ground check

#### 3.5.1 Stream: RS41

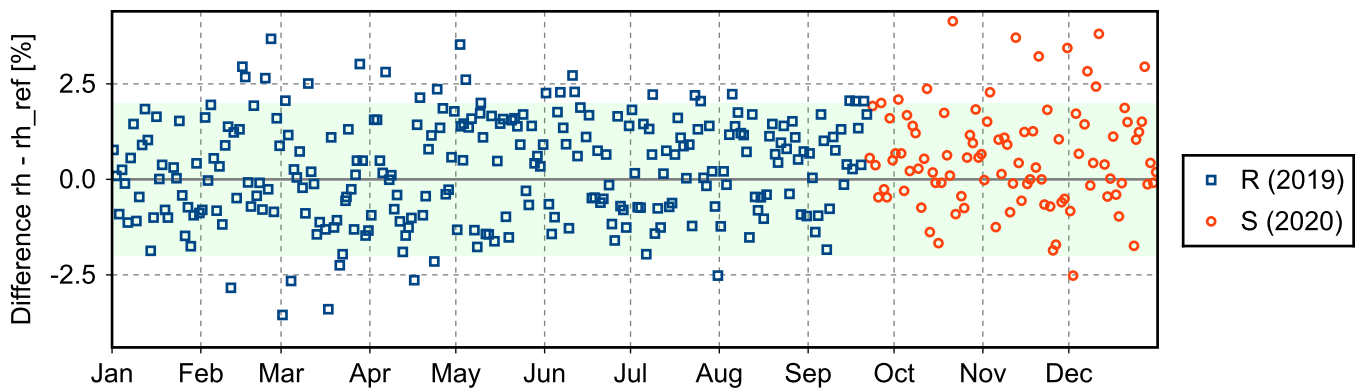
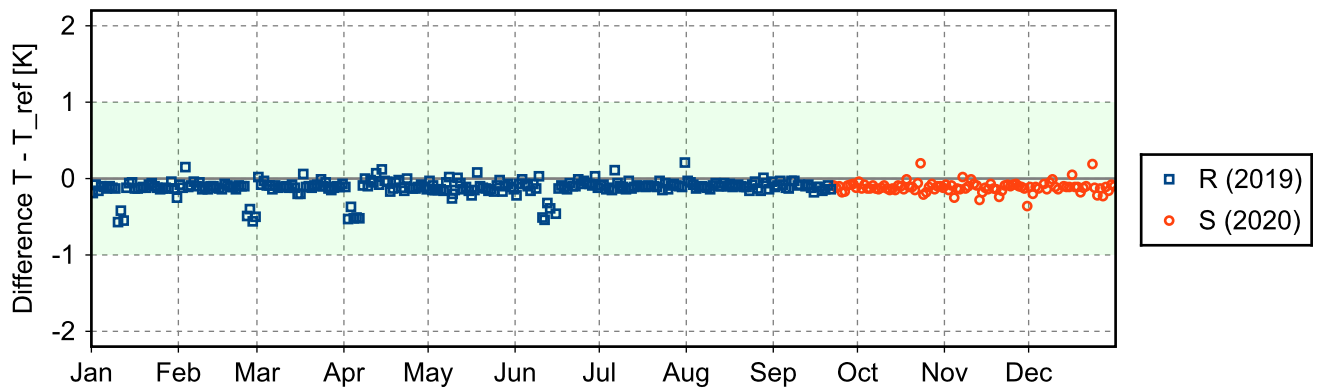
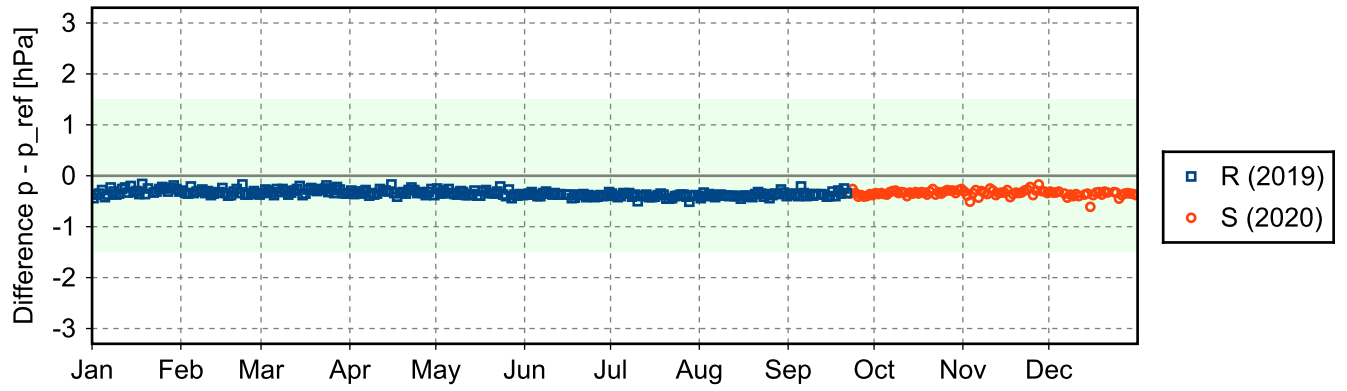
(1) GroundCheck: GC-RI41



(2) GroundCheck: GC-SHC



(3) GroundCheck: GC-SHELTER



3.6 Measurement events

