



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

Doc. 5.04  
(05.III.2024)

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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 Beltsville

*(Submitted by Belay B. Demoz)*

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

Report from the GRUAN site Beltsville for the period January 2022 to December 2023.

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## **Overview**

Beltsville is located at Howard University Beltsville Campus. BEL contributes to GRUAN weekly RS92-RS41, monthly CFH, monthly ozonesonde and GNSS data streams, as part of the GFZ expansion network. BEL continued this year the ozone sonde launch capability and has submitted the data to GRUAN. BEL has also started to work with SHADOZ on homogenization of the Ozone data. BEL contributes to NDACC network the water vapor and ozone data to the network as well as performs extra experimental testing of new CFH methods/instruments. In addition, Beltsville has been a primary participant in the multi-agency GRUAN group in the mid-Atlantic region called GMAC and a contributor to the Justification for High Ascent GRUAN Document.

## **Change and change management**

There has not been any modification to the standard work at the site.

## **Resourcing**

No change: We are still under the same funding scenario as in past. Where almost all funding is supplied by NOAA (Howard Diamond for CFH and NOAA-STAR for other perishables. Drs. Demoz, Sakai and Mr. Adrian Flores are the main scientists responsible for the day to day management of the GRUAN activity at Beltsville.

## **Operations**

So far, we have not had trouble with R23 and we have substituted hydrogen for Helium. We have not seen any appreciable degradation in the performance and we are mostly reaching the 10mb or better.

## **Covid-19**

No Impact from Covid-19 anymore.

## **Site assessment and certification**

Site is certified.

## **GRUAN-related research**

BEL is contributing to satellite and sites task teams. A student is working on collecting and homogenising the ozone data sets, together with the SHADOZ group at NASA-GSFC.

## **WG-GRUAN interface**

None at this time.

## **Other archiving centers**

Local, and NDACC

## **Participation in campaigns**

None to report

## **Future plans**

A major field work is planned summer 2024 in collaboration with DOE-ARM and several other groups.



# GRUAN Site Report for Beltsville (BEL), 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	Beltsville
Unique GRUAN ID	BEL
Geographical position	39.0500 °N, -76.8800 °W, 53.0 m
Operated by	HOWARD   Howard University
Main contact	Demoz, Belay
WMO no./name	-
Operators	currently 26, changes +0 / -0
Sounding Site	1
GNSS	1

### 1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
BEL-GN-01	GNSS Site HUBC	GNSS	1	operational
BEL-RS-01	Beltsville Radiosonde Launch Site	Sounding Site	8	62

### 1.2 General comments from Lead Centre

No comments from Lead Centre.

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## 2 System: GNSS Site HUBC (BEL-GN-01)

<b>Object</b>	<b>Value</b>
System name	GNSS Site HUBC
Unique GRUAN ID	BEL-GN-01
System type	GNSS (GN - GNSS)
Geographical position	39.0541 °N, -76.8775 °W, 25.3 m
Operated by	HOWARD   Howard University
Instrument contact	Demoz, Belay
Started at	2021-03-05
Defined setups	1 (HOURLY)
Possible streams	-

### 2.1 Lead Centre comments

#### 2.1.1 Dataflow

Dataflow of GNSS data to GRUAN LC and to the GRUAN GNSS processing centre at GFZ has started in May 2022. The current dataflow includes manufacturer raw data, converted raw data (RINEX), instrument logs, and processed data.

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

### 3 System: Beltsville Radiosonde Launch Site (BEL-RS-01)

Object	Value
System name	Beltsville Radiosonde Launch Site
Unique GRUAN ID	BEL-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	39.0520 °N, -76.8775 °W, 52.0 m
Operated by	HOWARD   Howard University
Instrument contact	Demoz, Belay
Started at	-
Defined setups	8 (RESEARCH, ROUTINE, OZONE, ROUTINE2, OZONE2, ROUTINE3, OZONE3, DUAL1)
Possible streams	CFH, ECC, RS41, RS92

#### 3.1 Lead Centre comments

##### 3.1.1 Dataflow

Operational dataflow of radiosonde measurement data to the GRUAN LC since August 2014. The dataflow includes radiosoundings with Vaisala RS41-SG, ECC Ozone and CFH. All data are transmitted using the RsLaunchClient.

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

##### 3.1.2 Data quality

It is appreciated that the GC-SHC for temperature is carried out. However, the check shows a constant and very uniform offset (~0.25 K). This suggests a check of the calibration of the reference sensor.

#### 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		12	12	
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##### 3.2.2 Stream: ECC

ECC		30	30	
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##### 3.2.3 Stream: RS41

RS41		61	61	
RS41-RAW	001		61	
RS41-EDT	001		61	
RS41-GDP	001		61	

##### 3.2.4 Stream: RS92

RS92		1	1	
RS92-RAW	002		1	
RS92-EDT	001		1	
RS92-GDP	002		1	

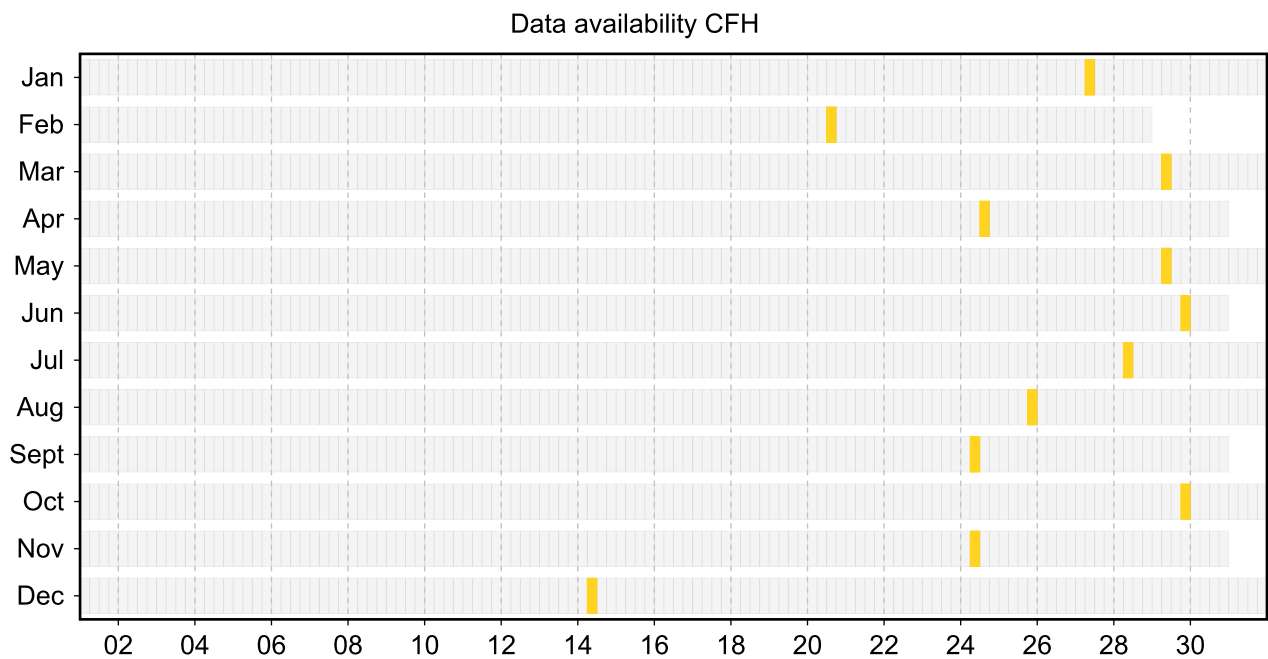
### 3.3 Availability of data products

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).

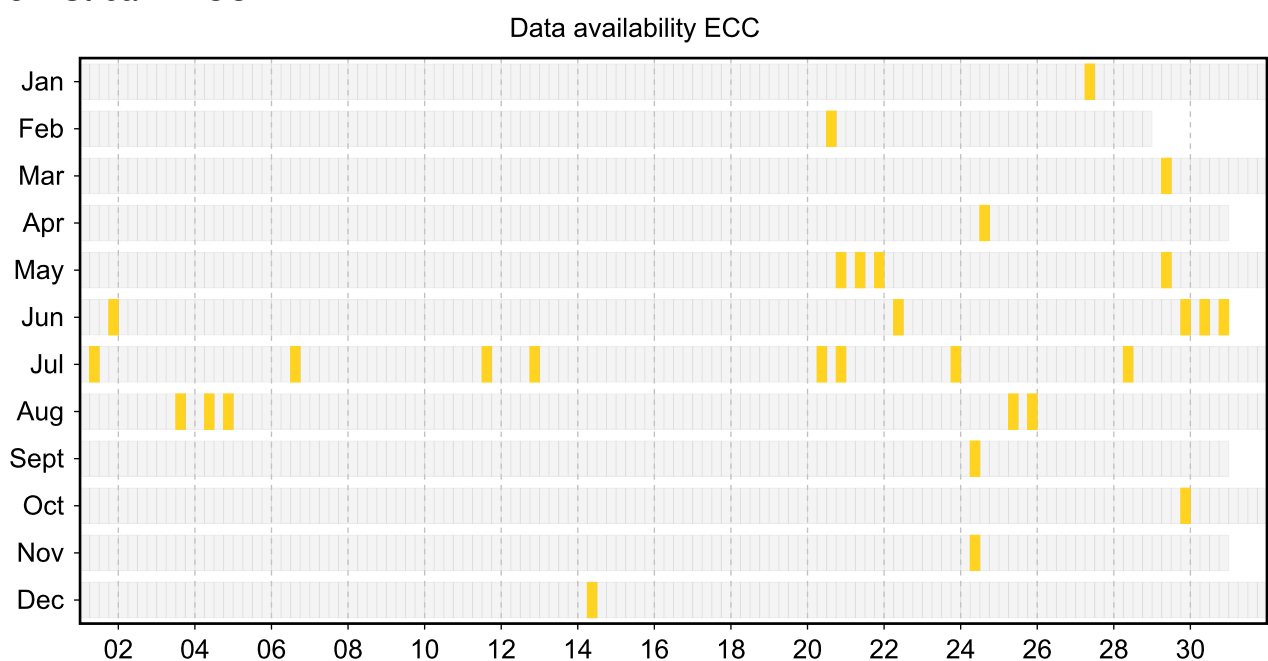
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software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

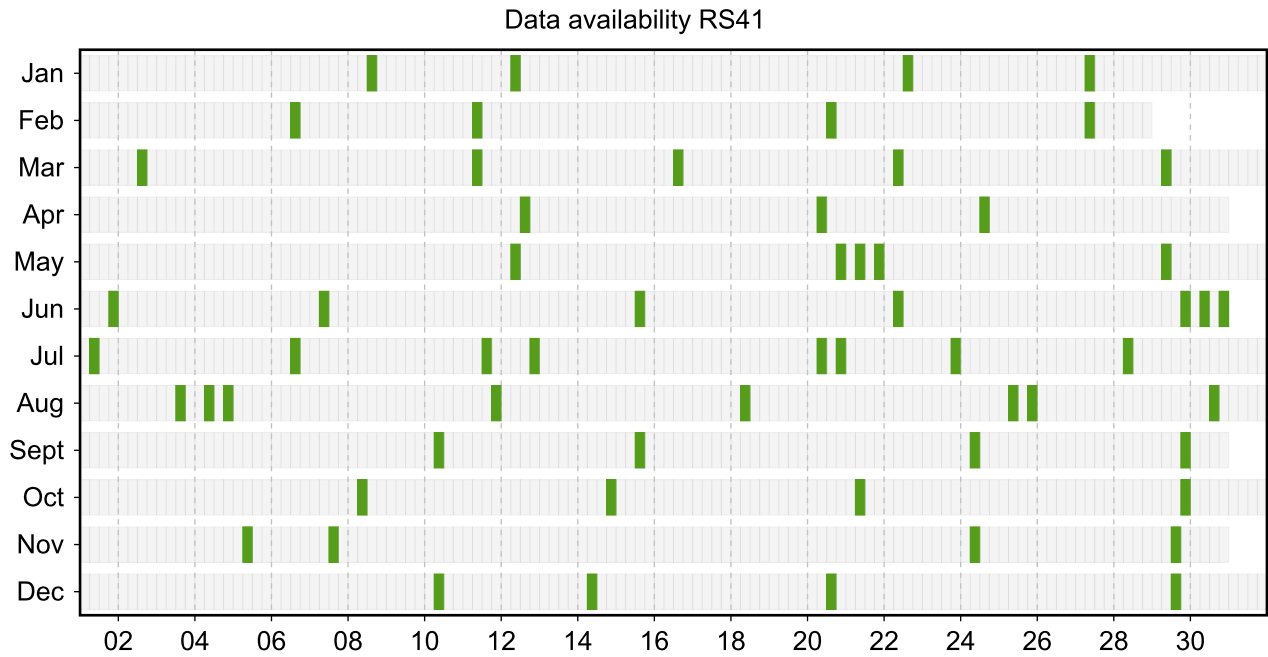


#### 3.3.2 Stream: ECC

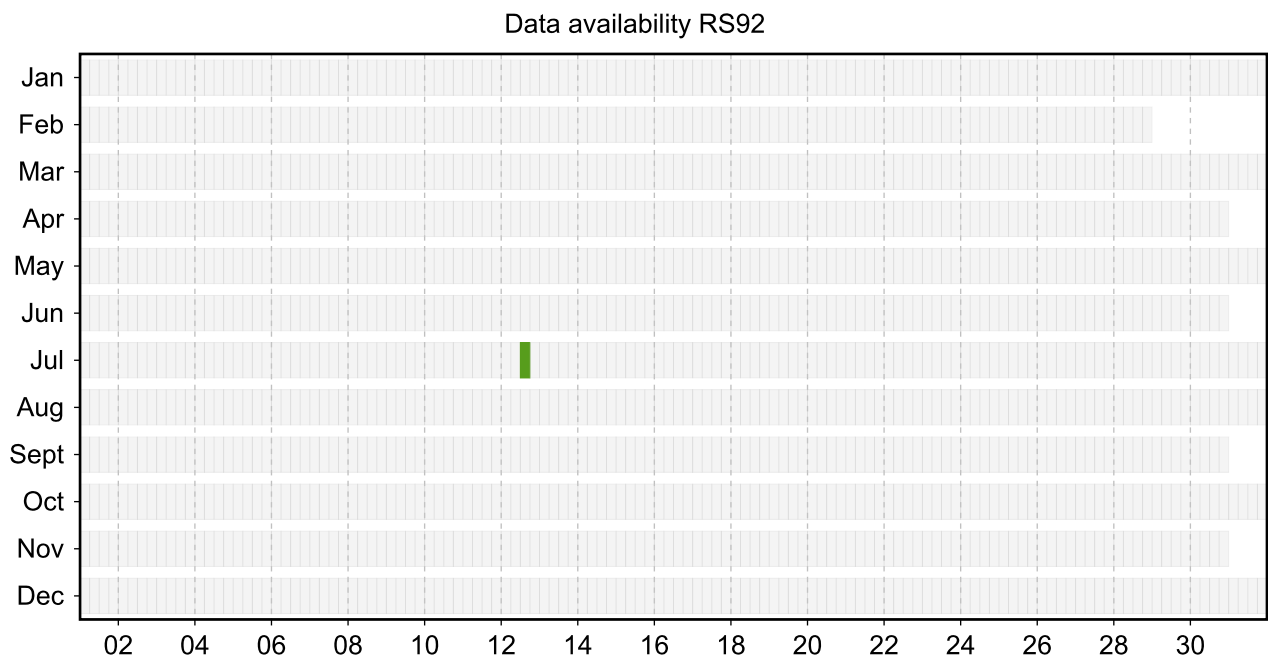




### 3.3.3 Stream: RS41



### 3.3.4 Stream: RS92



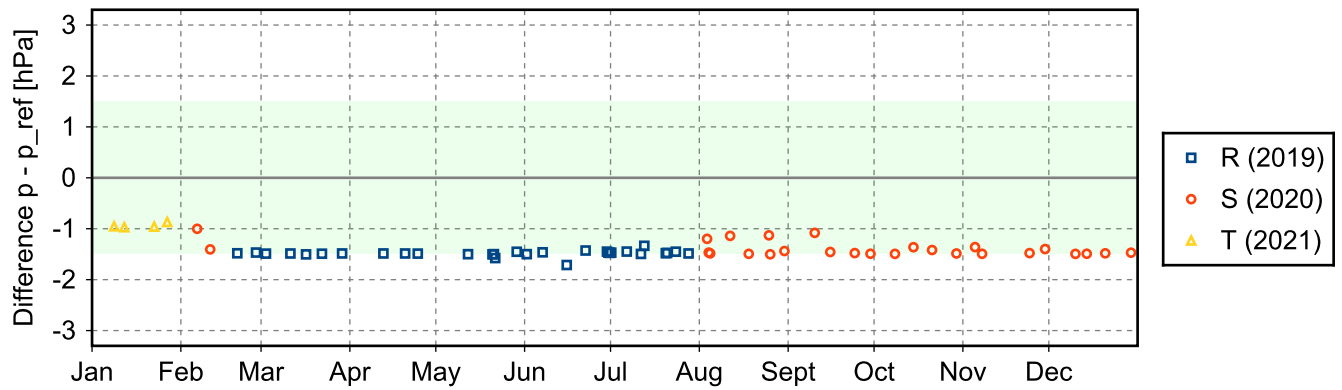
### 3.4 Instrument combinations of BEL-RS-01

Count	Instrument combination
12	CFH, ECC, RS41
18	ECC, RS41
31	RS41
1	RS92

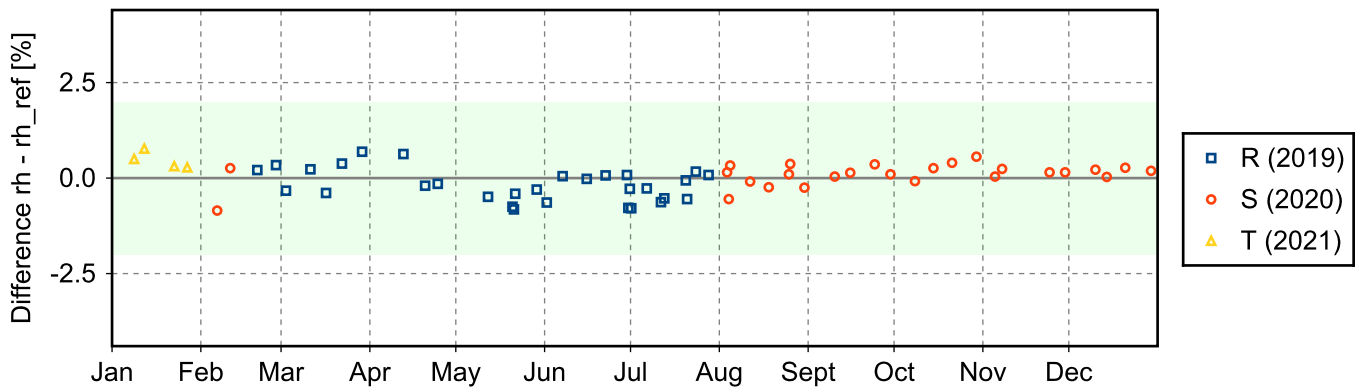
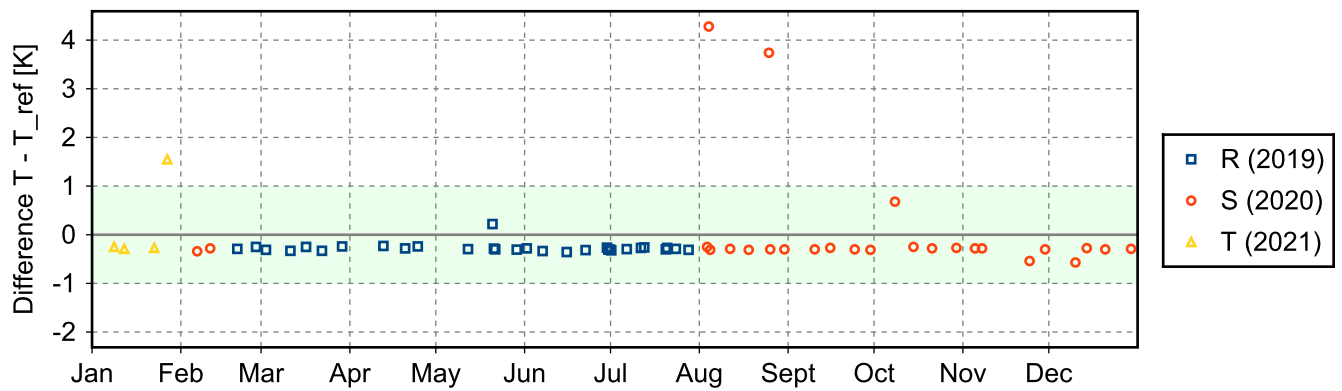
### 3.5 Instrument ground check

#### 3.5.1 Stream: RS41

(1) GroundCheck: GC-RI41

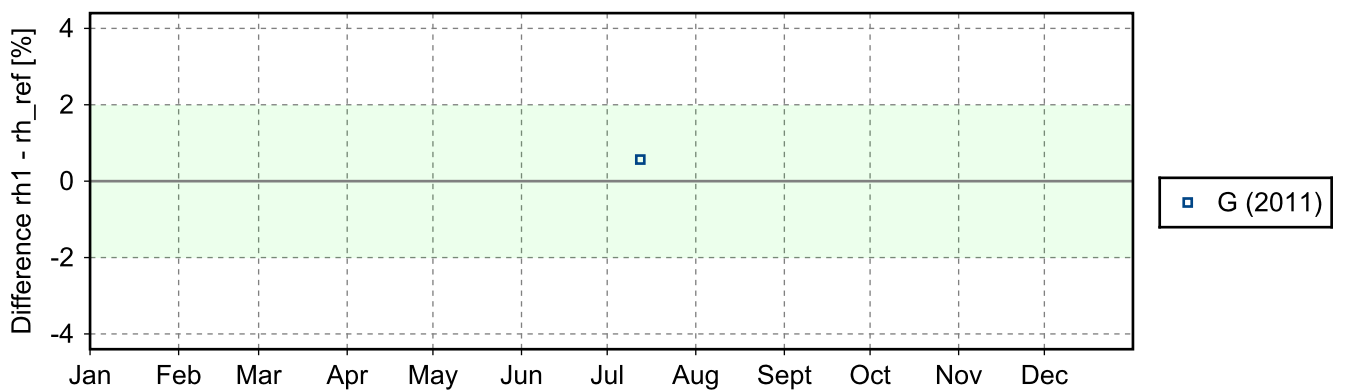
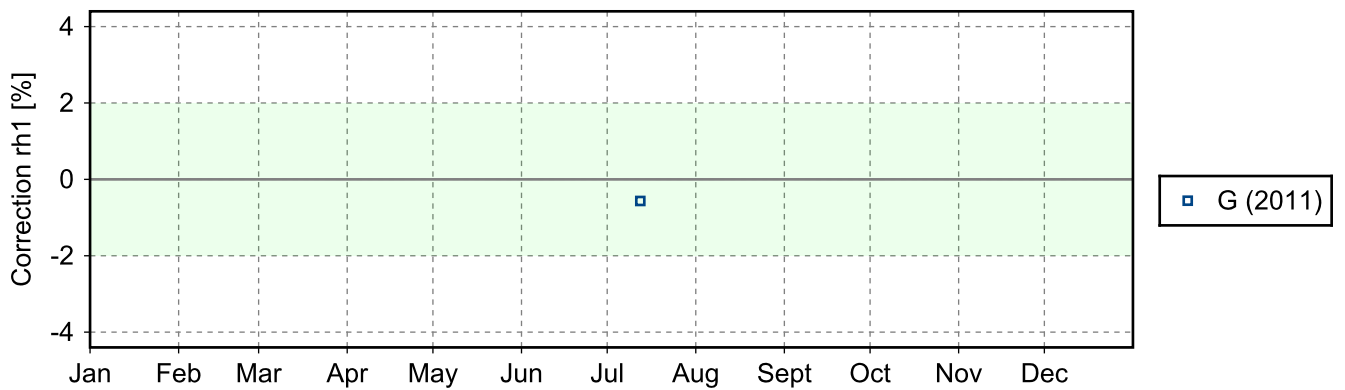
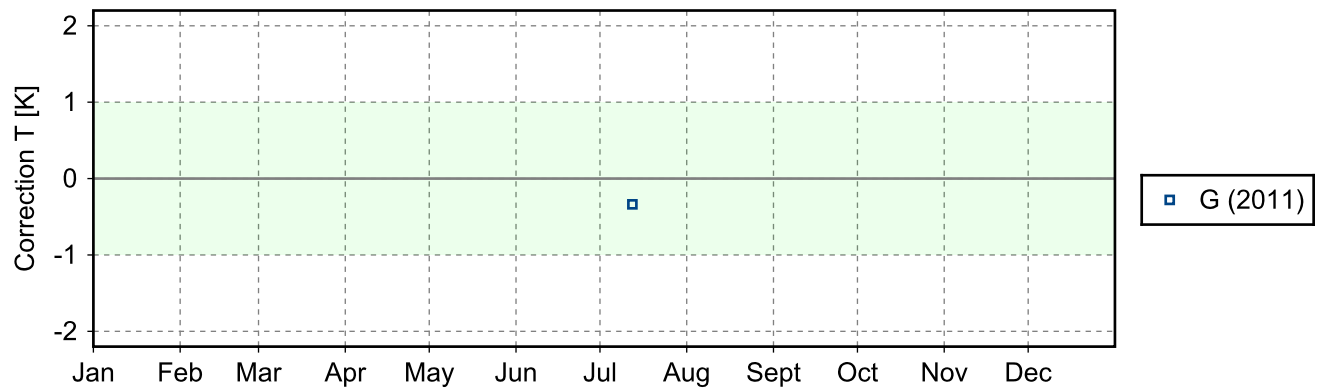
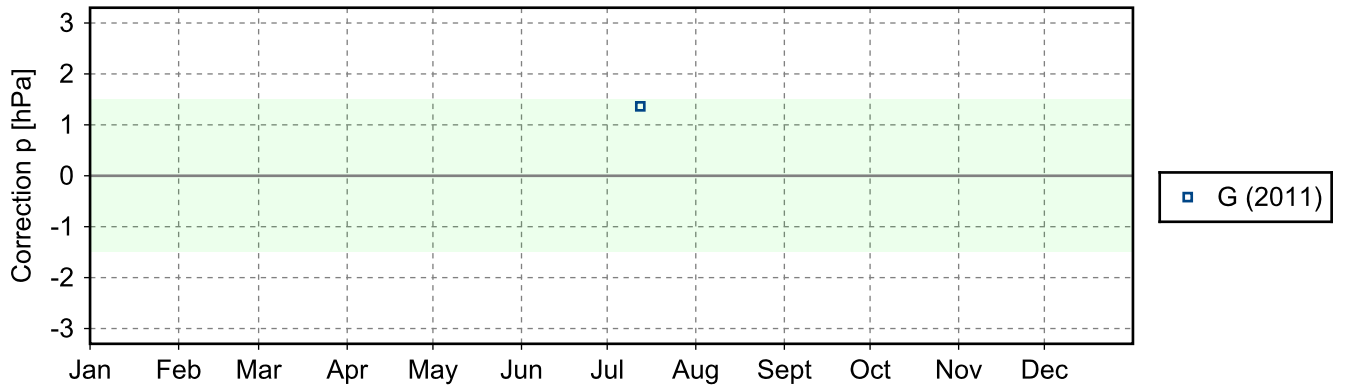


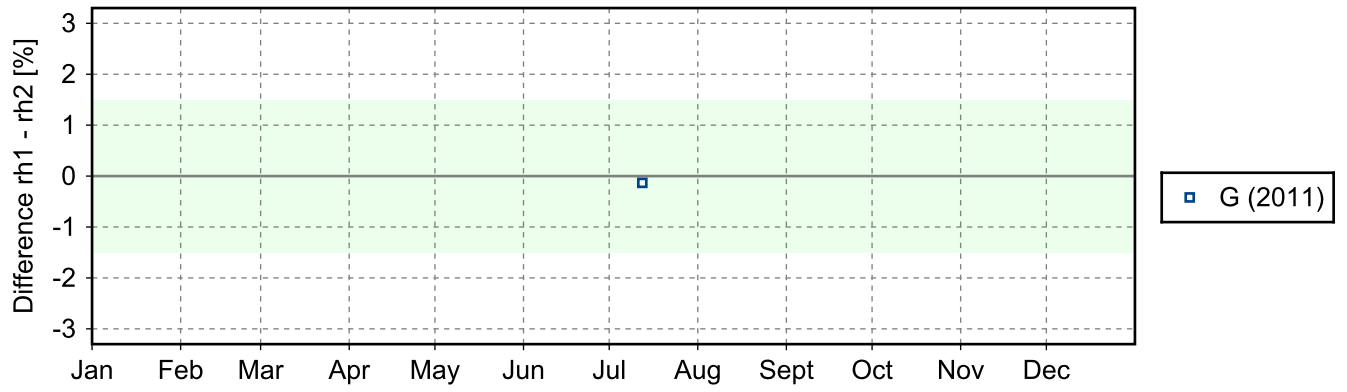
(2) GroundCheck: GC-SHC



#### 3.5.2 Stream: RS92

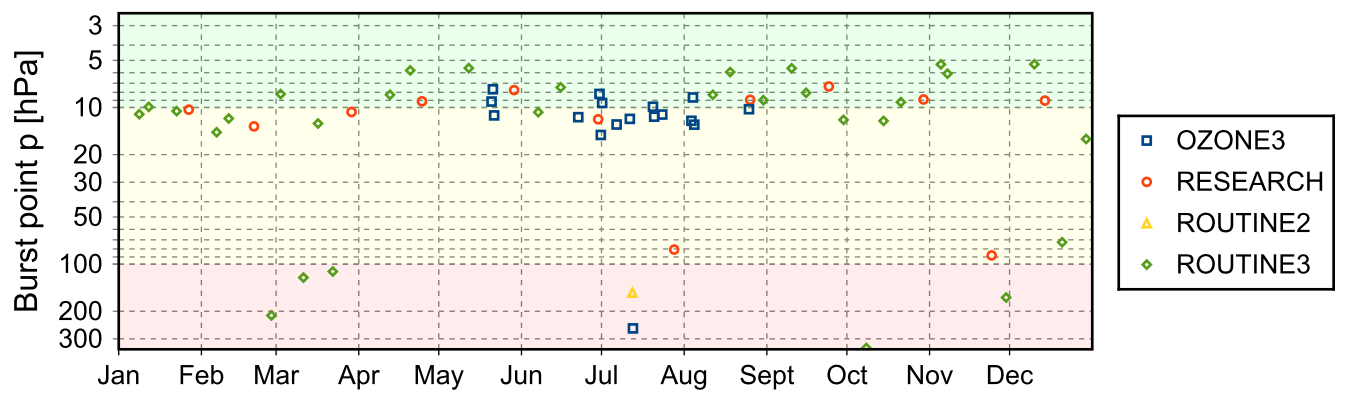
(1) GroundCheck: GC-GC25





(2) GroundCheck: GC-SHC

3.6 Measurement events





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Created by the Lead Centre

Version from 2024-03-01

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WMO no./name	-
Operators	currently 26, changes +0 / -0
Sounding Site	1
GNSS	1

### 1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
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BEL-RS-01	Beltsville Radiosonde Launch Site	Sounding Site	8	72

### 1.2 General comments from Lead Centre

No comments from Lead Centre.

## 2 System: GNSS Site HUBC (BEL-GN-01)

<b>Object</b>	<b>Value</b>
System name	GNSS Site HUBC
Unique GRUAN ID	BEL-GN-01
System type	GNSS (GN - GNSS)
Geographical position	39.0541 °N, -76.8775 °W, 25.3 m
Operated by	HOWARD   Howard University
Instrument contact	Demoz, Belay
Started at	2021-03-05
Defined setups	1 (HOURLY)
Possible streams	-

### 2.1 Lead Centre comments

#### 2.1.1 Dataflow

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#### 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		12	12	
-----	--	----	----	--

##### 3.2.2 Stream: ECC

ECC		43	43	
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##### 3.2.3 Stream: RS41

RS41		71	71	
RS41-RAW	001		71	
RS41-EDT	001		71	
RS41-GDP	001		71	

##### 3.2.4 Stream: RS92

RS92		1	1	
RS92-RAW	002		1	
RS92-EDT	001		1	

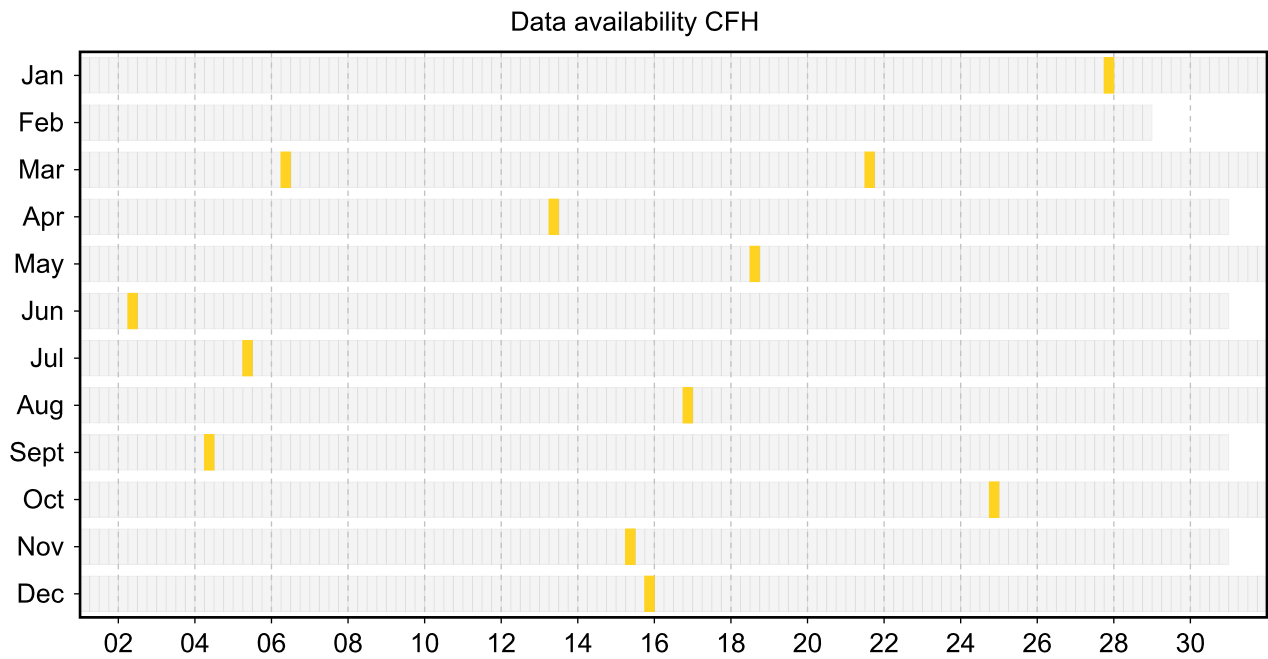
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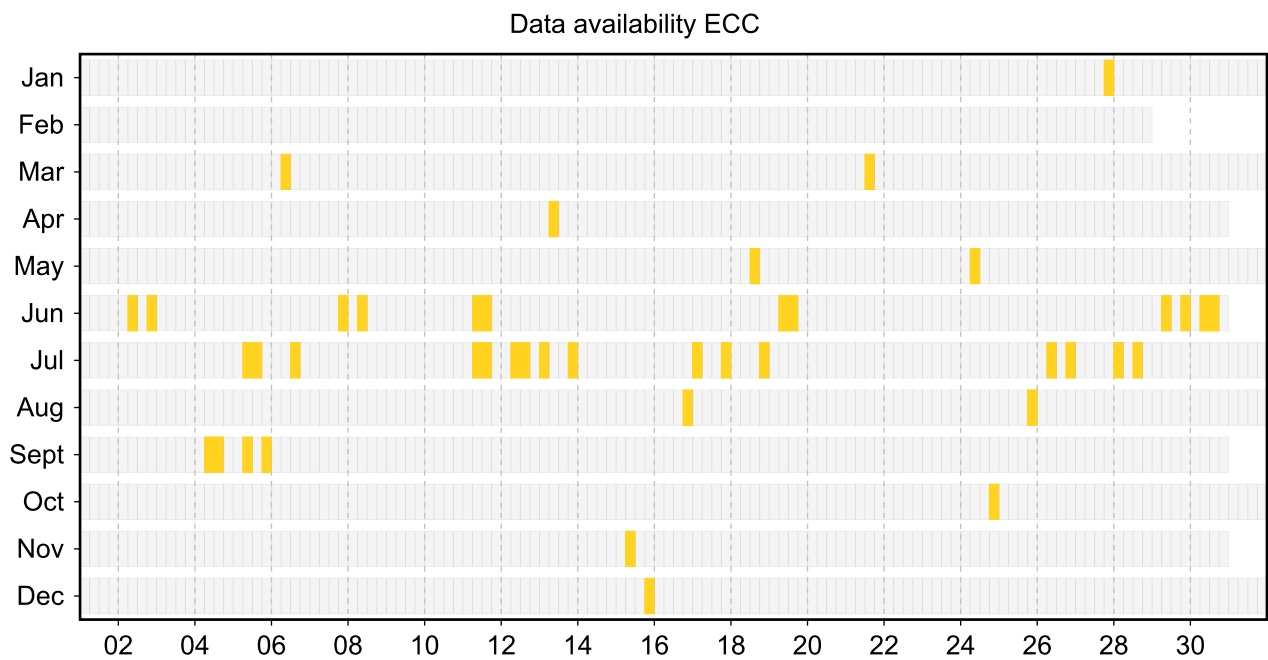
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#### 3.3.1 Stream: CFH

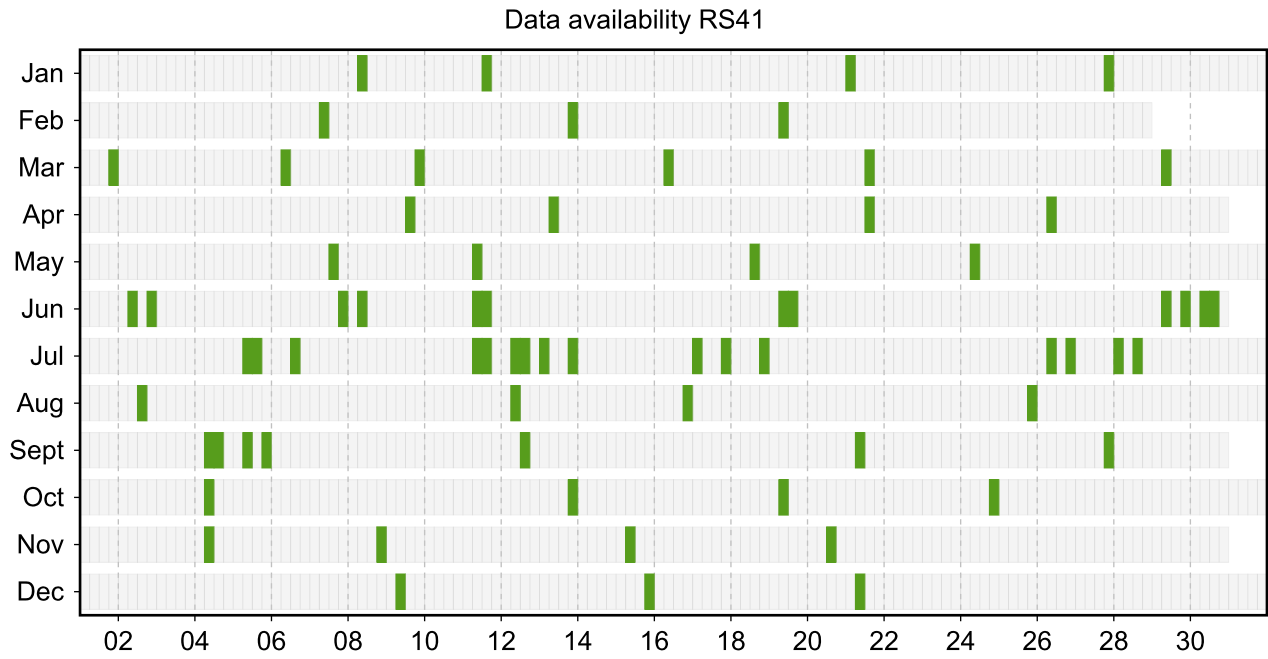


#### 3.3.2 Stream: ECC

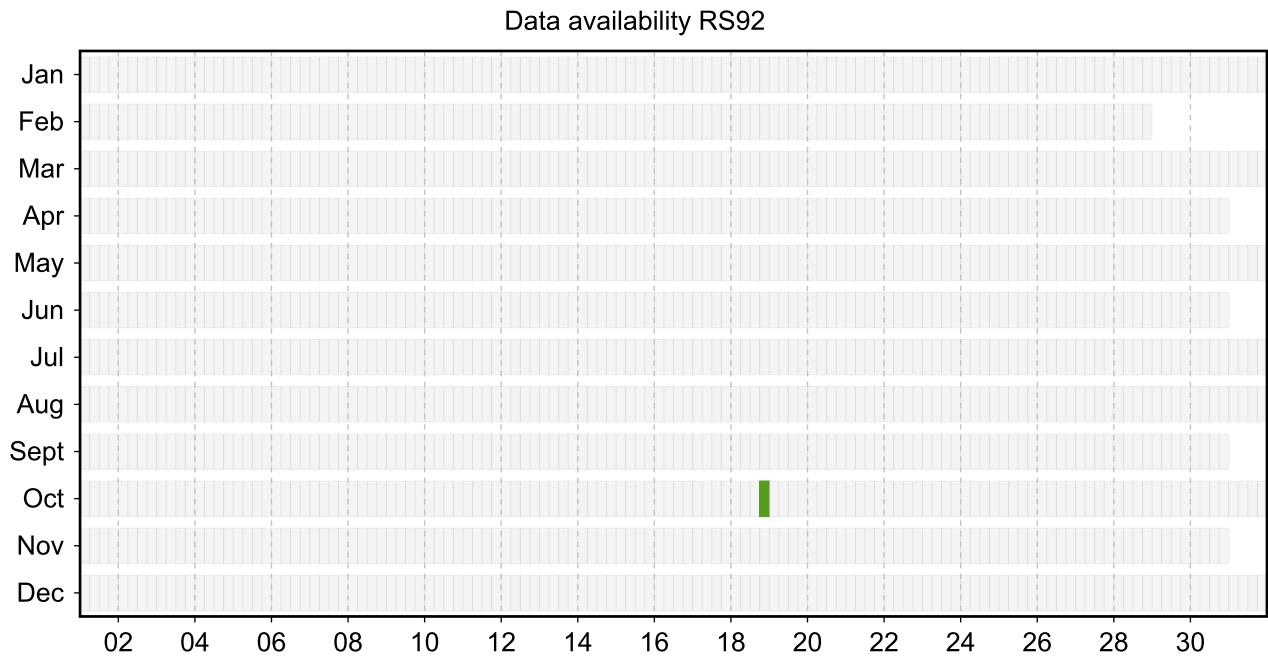




### 3.3.3 Stream: RS41



### 3.3.4 Stream: RS92



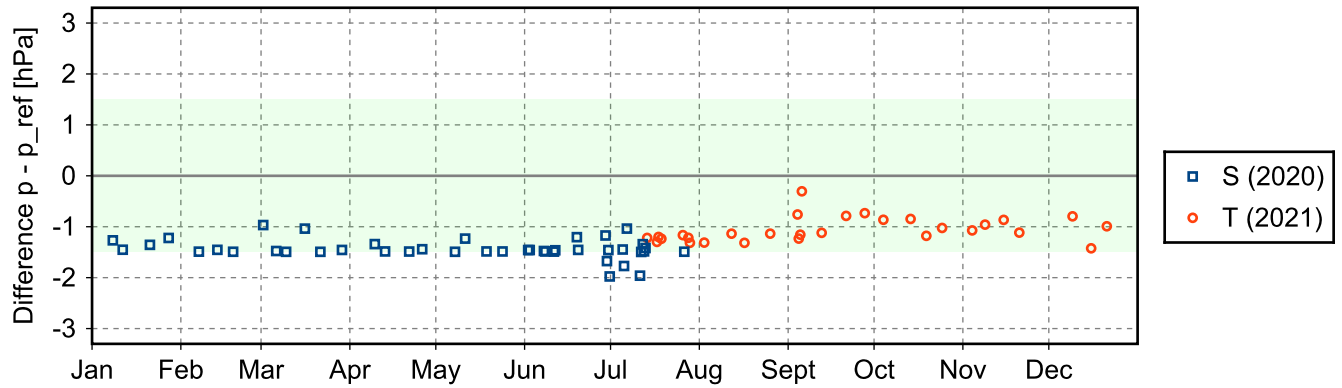
### 3.4 Instrument combinations of BEL-RS-01

Count	Instrument combination
12	CFH, ECC, RS41
31	ECC, RS41
28	RS41
1	RS92

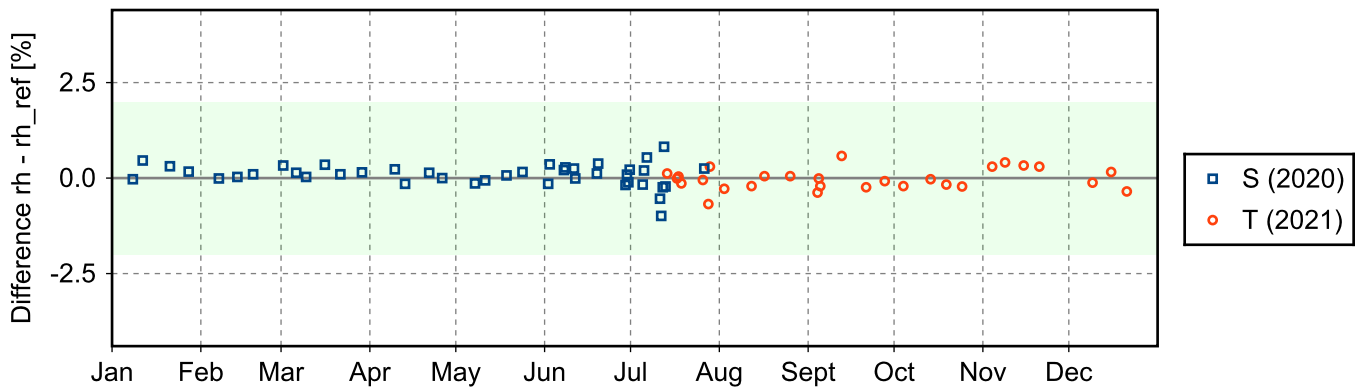
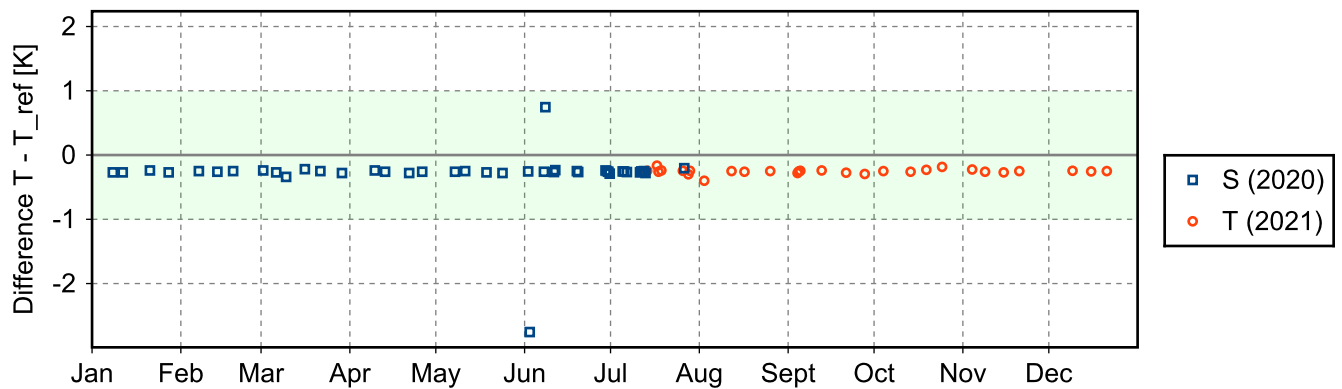
### 3.5 Instrument ground check

#### 3.5.1 Stream: RS41

(1) GroundCheck: GC-RI41

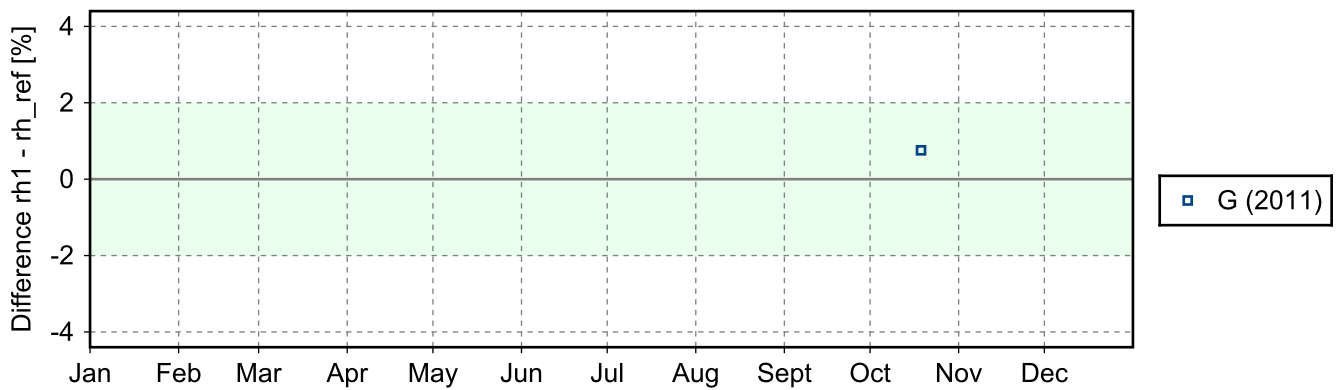
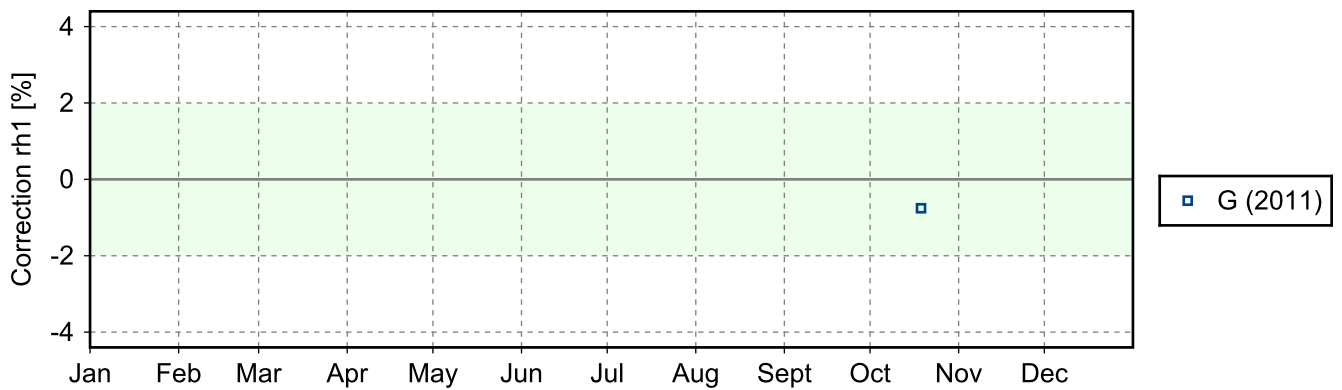
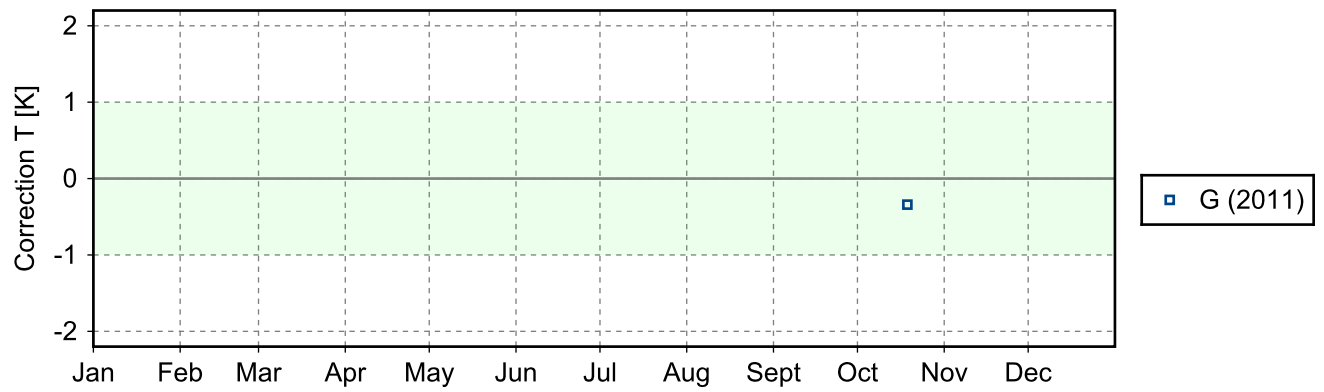
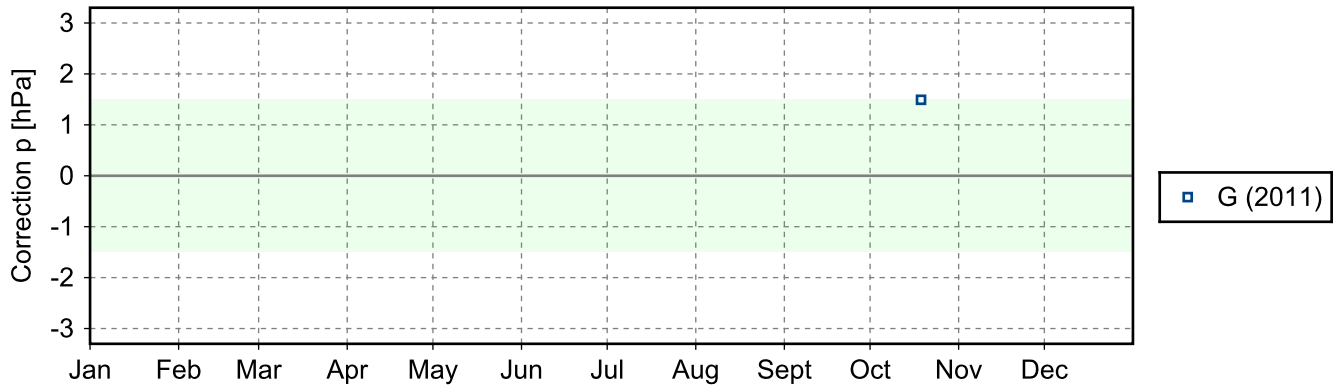


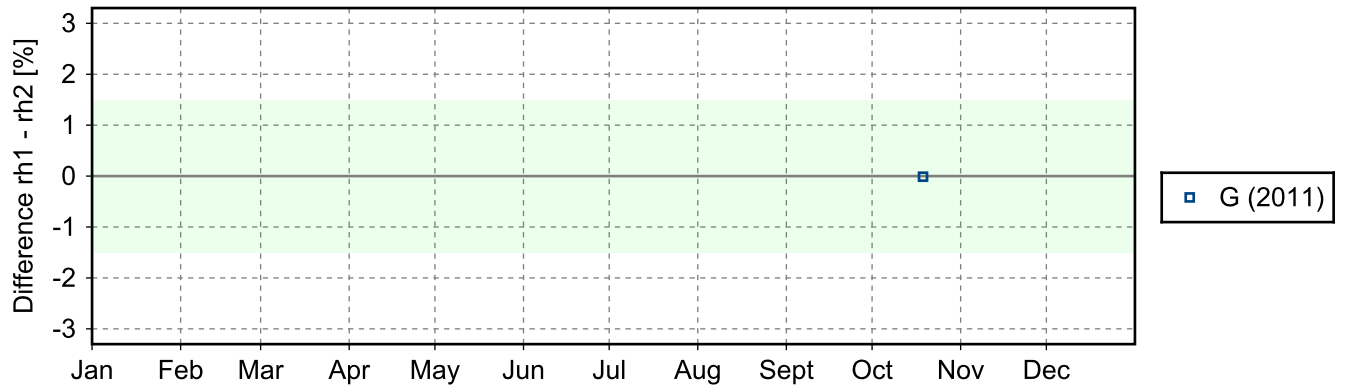
(2) GroundCheck: GC-SHC



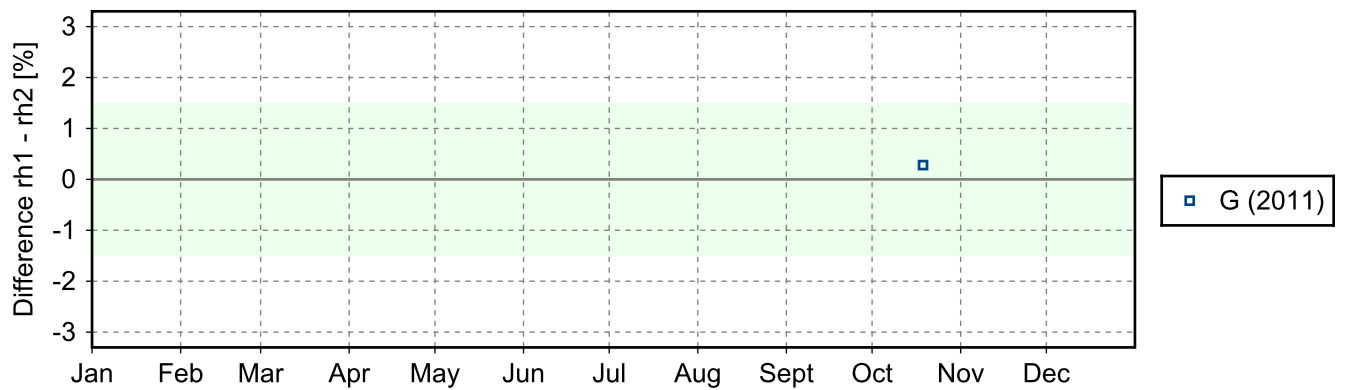
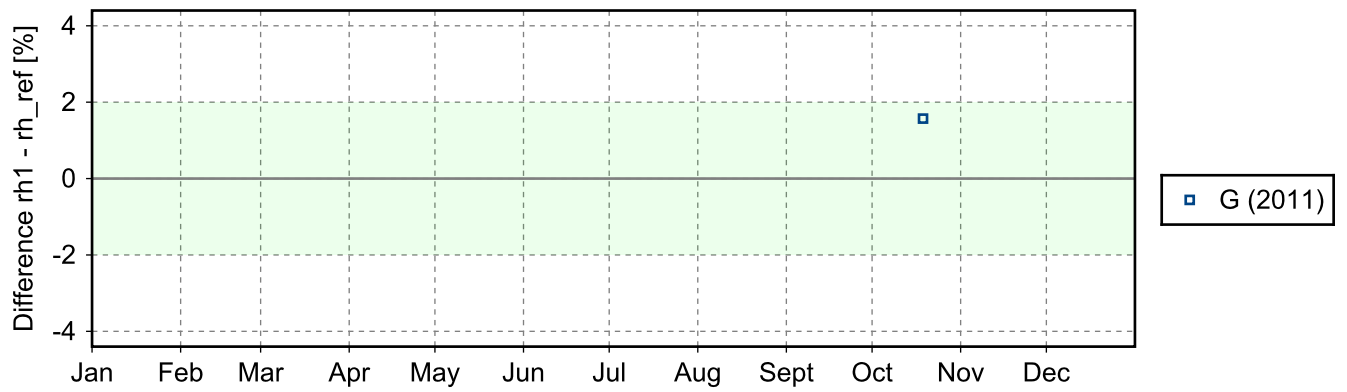
#### 3.5.2 Stream: RS92

(1) GroundCheck: GC-GC25





(2) GroundCheck: GC-SHC



3.6 Measurement events

