



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

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**7th GRUAN Implementation-  
Coordination Meeting (ICM-7)**

Session 8

Matera, Italy

23 February – 27 February 2015

## GRUAN Station Report for Beltsville

*(Submitted by Ricardo Kendi Sakai and Belay B Demoz)*

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### Summary and Purpose of Document

Report from the GRUAN station Beltsville for the period Mar 2014 to Jan 2015.

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## GRUAN Station Report for Beltsville

Reporting for the period Mar 2014 to Jan 2015

Date: 31-Jan-2015

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### Overview

The Howard University Beltsville Research site (HUBR), as a part of the Beltsville Center for Climate System Observation, is one of the GRUAN sites. The Beltsville site performs routine measurements of upper air sondes for GRUAN and elects to launch the sondes during the NPP overpass times at nighttime. It satisfies both GRUAN requirement and it serves as sonde-based satellite validation activities. The site has been launching state-of-the-art Vaisala GPS rawinsondes (RS92-SGP) coincident with the Suomi National Polar-orbiting Partnership satellite (NPP) satellite overpass to minimize the sonde-satellite mismatch errors and radiosonde quality issues. Data are being stored in the local computer, and send to GRUAN database through RsLaunchClient.

Since 2004, HUBR has operated an upper air ozone sonde station. The main objectives are understand summer pollution episodes to support Maryland Department of Environment (MDE) pollution monitoring, establishment of climatological statistics and application of these statistics and case studies for model formulation and optimization of satellite algorithms by HUBR collaborators, and quantification of the annual and inter annual variability of tropospheric O<sub>3</sub> (regional transport, stratospheric/tropospheric exchange, lightening, anthropogenic) and its impact on surface level air quality and air quality model predictability.

Recently, HUBR started its Cryogenic Frost Point Hygrometer (CFH) launches, in collaboration with the NDACC-related work of the NASA Goddard (NASA/GSFC) partners, to study upper tropospheric moisture and temperature variability. The reference flights will be done with the RS92-SGP launches. Since it is launched close to NPP overpass, it provides useful calibration/validation information regarding upper atmospheric water vapor measurements. Other current and future NASA satellite overpasses might be included in the future.

### Change and change management

Even though Dr. Belay Demoz has been the director of Joint Center for Earth System Technology at University of Maryland, Baltimore County (JCET, UMBC) since April 2014, he still coordinates GRUAN efforts at HUBR. Thus, there is no change in personnel. Dr. Sakai has been added as a primary Howard University Personnel.

On October 18, 2014, HUBR started to launch the CFH probes.

On October 30, 2014, new Vaisala ground station, MW41, was installed and operational in substitution to Vaisala MW31 system. A lengthy change-management was not possible because of a fire-experienced at the site prior to ICM6. The site is, however, ready, to implement any and all backward compatibility in discussions with LC.

On December 15, 2014, HUBR impose the ground check CG25 parameters (pressure  $\pm 1.5$  hPa, temperature  $\pm 1$  K, RH  $\pm 2$  %) provided from Dr. Michael Sommer to the MW41 software.

On January 4, 2015, the forecast balloon trajectory has been incorporated for launch decision to avoid premature radiosonde signal loss. If the balloon at 10 km high travels horizontally farther than  $1.5^\circ$  from origin, the launch would be cancelled.

### **Resourcing**

The site is the only a university site in GRUAN– very different from an operational, national site. As such, all the funding for GRUAN activities are derived from proposal and collaborations. This forces us to be open to collaborations with partners. The recent additions and growth in collaboration will be reflected in the certification document.

### **Site assessment and certification**

In the process of certification – and goal is to submit prior to the ICM7 meeting.

### **GRUAN related research**

Ozone summer pollution episodes and yearly climatology is a long-term goal we undertake in collaboration with the state of Maryland and NASA/GSFC – SHADOZ network.

Monthly CFH studies have commenced.

Highly collaborative work is progressing in satellite-sonde validation work with NESDIS/STAR and Tony Reale's group.

Wind lidar activities and lidar water vapour mixing ratio work is progressing in collaboration with NASA/GSFC. First-principle based calibration of Raman lidars has been published.

### **WG-GRUAN interface**

Belay Demoz chairs the GRUAN sites task group and is a member of the GRUAN working group. David Whiteman, Belay Demoz, Mike Hicks are members of the GRUAN working.

Belay Demoz chairs the GRUAN sites task group

David Whiteman is a member of the scheduling task group and is contributing to the lidar studies group.

Mike Hicks and Jim Fitzgebons are members in the radiosonde task group.

Working group can help by providing direction to the overall planning and collaboration of the site with other organization in its vicinity: this include a planned proposal by NOAA/NWS to contribute in much more to GRUAN activity.

### **Items for ICM-7 plenary discussions**

Proposed collaboration with NWS-Sterling and other links that are being seeded by Howard University on GRUAN collaboration.

## **Future plans**

Use of the Standard Humidity Chamber, Dr. Schulz & Partner GmbH, model SPRH100 for radiosonde quality assurance.

Use of new vaisala radiosonde RS41, and intercomparison of RS92-SGP and RS41.





# GRUAN Station Report for Beltsville (BEL), 2014

Reported time range is Nov 2013 to Oct 2014

Created by the Lead Centre

Version from 2015-02-11

## 1 General GRUAN station information

Info	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	current 24, change +0 / -0
Sounding Site	1
GNSS	1

### 1.1 General information about GRUAN measurement systems

System	Type	Setups	Measurements	As scheduled
BEL-GN-01	GNSS	0	0	not scheduled
BEL-RS-01	Sounding Site	3	39	not scheduled

### 1.2 General comments from Lead Centre

#### 1.2.1 General

It is strongly recommended that the site use larger balloons, as most launches didn't reach the required height of 100 hPa.

It is recommended that the site uses a manufacturer independent ground check for the RS92 radiosonde. We have been informed that the site uses a Standard Humidity Chamber (or a similar setup) in the launch preparation, but these data are not submitted to the Lead Centre yet. Using the RsLaunchClient will allow proper submission of these data.

The site is requested to submit ECC ozone soundings with complete metadata matching an ECC ozone sonde and not to submit it as routine radiosounding.

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

<b>Info</b>	<b>Value</b>
System name	GNSS Site DCHU
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	-
Defined setups	-
Possible streams	-

### 2.1 Lead Centre comments

#### 2.1.1 Dataflow

No GNSS dataflow to GRUAN LC as yet.



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

Info	Value
System name	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	3 (RESEARCH, ROUTINE, OZONE)
Possible streams	CFH, ECC, RS92

#### 3.1 Lead Centre comments

##### 3.1.1 Dataflow

Data to the GRUAN LC are flowing since August 2014. This dataflow includes data from the Vaisala RS92-SGP. All launches are transmitted using the RsLaunchClient.

##### 3.1.2 Data quality

Two-thirds of measurements don't reach the minimal launch height at 100 hPa. These soundings aren't processed.

Most processed measurements pass GRUAN Quality Control routines with the 'checked' label, this is largely due to uncertainty inconsistencies in pressure and humidity.

Most GC25 ground check corrections are within expected limits. Occasionally the pressure corrections are outside the expected limits.

According to the metadata, an additional ground check in the SHC is not performed

#### 3.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCDC
RS92		39	39	
RS92-RAW	001		39	
RS92-GDP	002		15	3

##### 3.2.1 Stream: RS92

RS92		39	39	
RS92-RAW	001		39	
RS92-GDP	002		15	3

#### 3.3 Data quality of current GRUAN data products

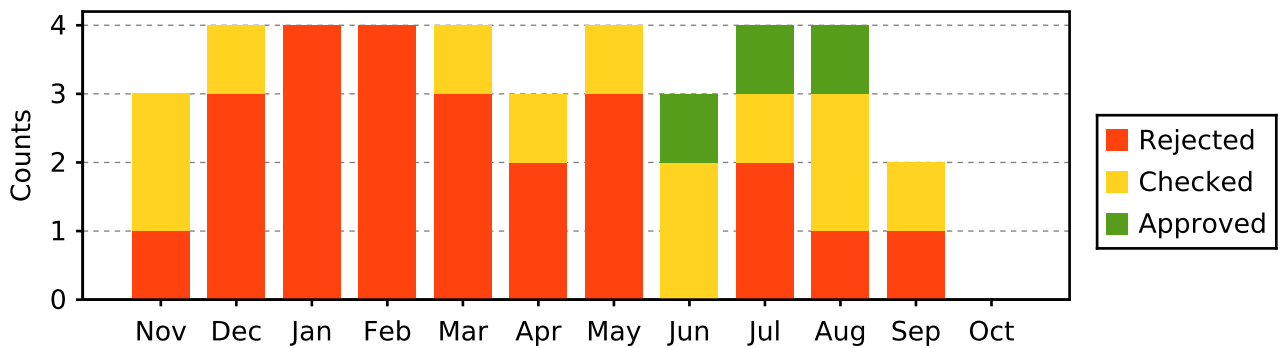
Month	Count	GRUAN Data Quality			Issues				
		Approved	Checked	Rejected	Meta-data	Process.	Press	Temp	RH
Nov 13	3		2	1			1		3
Dec 13	4		1	3					1

##### 3.3.1 Stream: RS92 (Product: RS92-GDP-002)

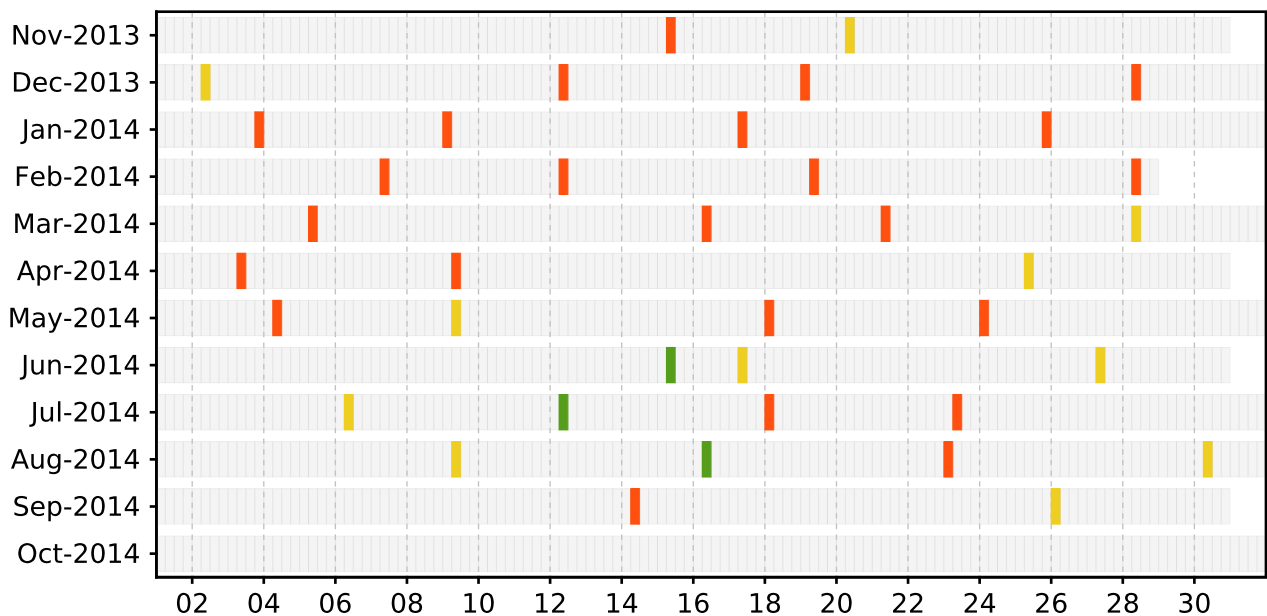
Nov 13	3		2	1			1		3
Dec 13	4		1	3					1

Month	Count	GRUAN Data Quality			Issues				
		Approved	Checked	Rejected	Meta-data	Process.	Press	Temp	RH
Jan 14	4			4					
Feb 14	4			4			2		1
Mar 14	4		1	3					1
Apr 14	3		1	2					1
May 14	4		1	3			2		1
Jun 14	3	1	2						2
Jul 14	4	1	1	2			1		1
Aug 14	4	1	2	1			1		2
Sep 14	2		1	1			1		1
Oct 14									
	<b>39</b>	<b>3</b>	<b>12</b>	<b>24</b>			<b>8</b>		<b>14</b>

Data quality statistic of stream RS92



Schedule data quality of stream RS92



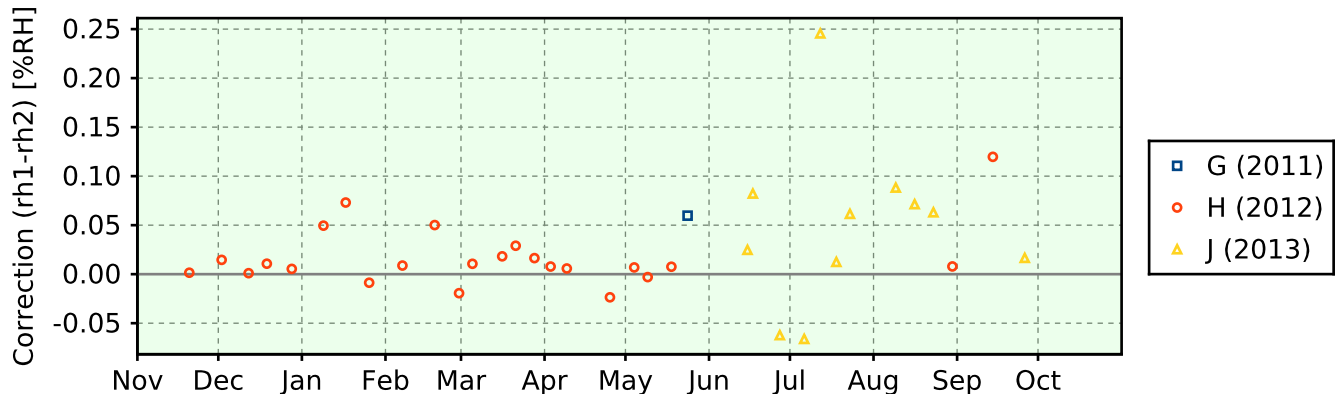
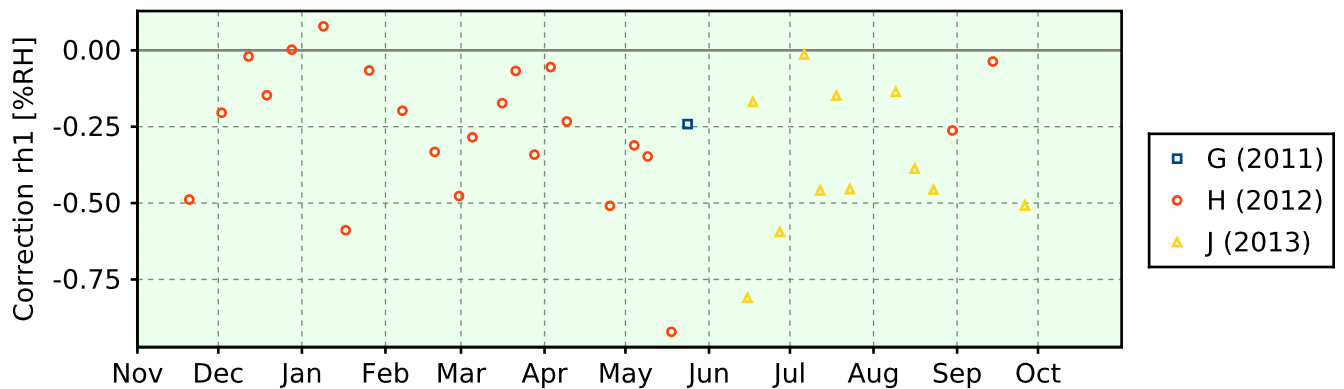
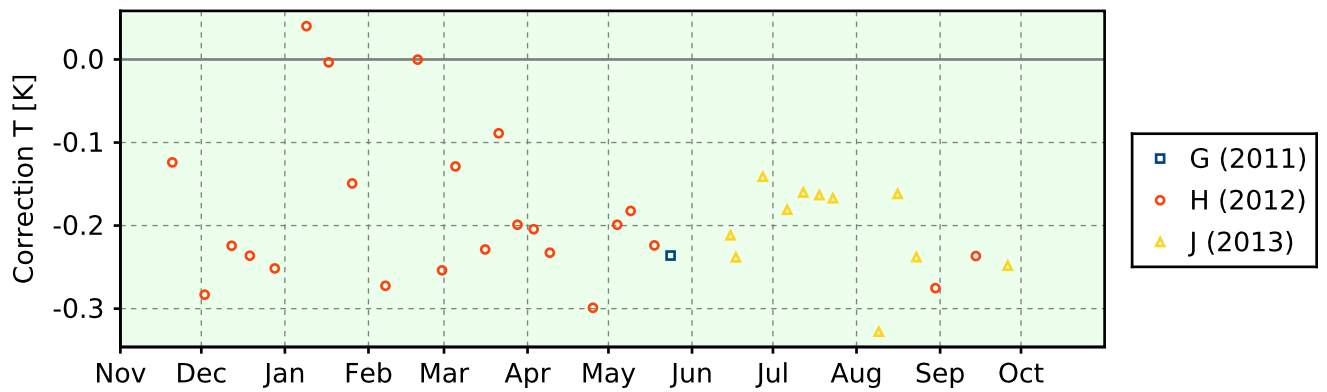
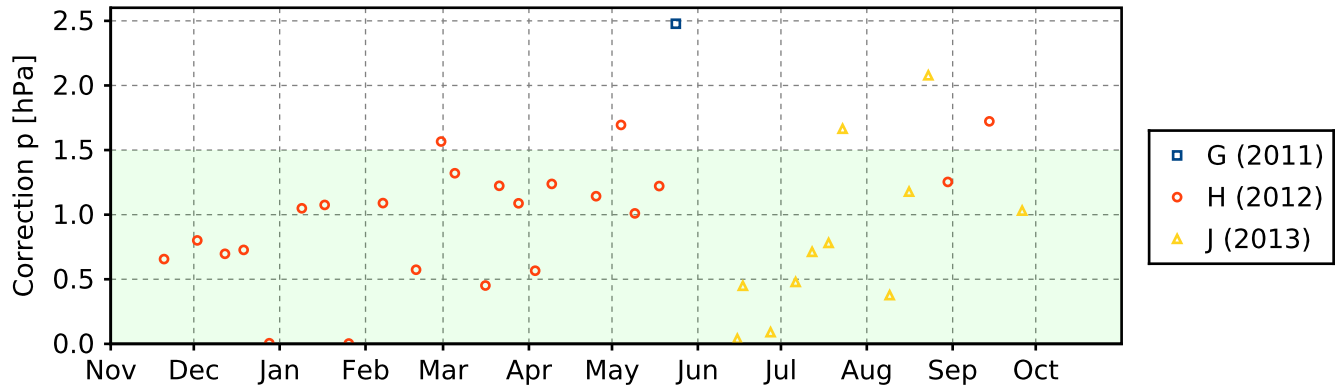
### 3.4 Instrument combinations of BEL-RS-01

Count	Instrument combination
39	RS92

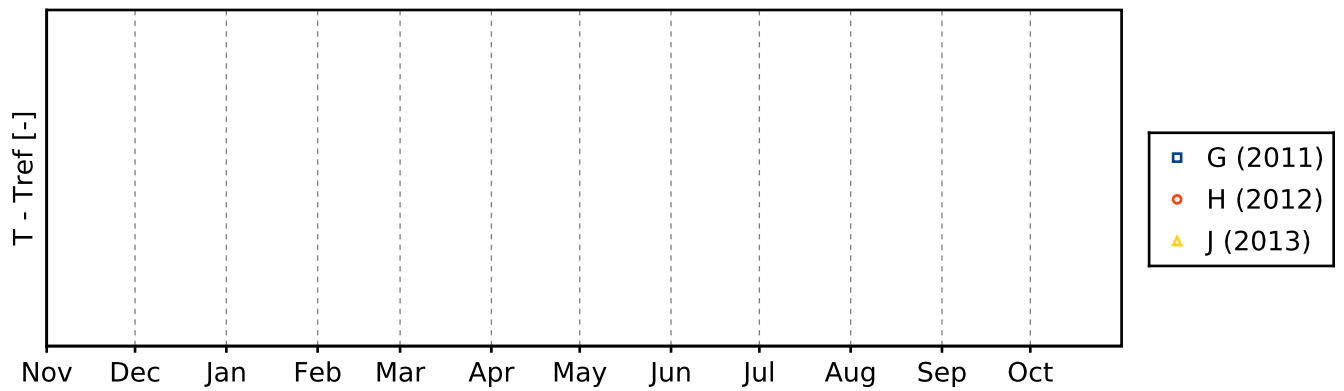
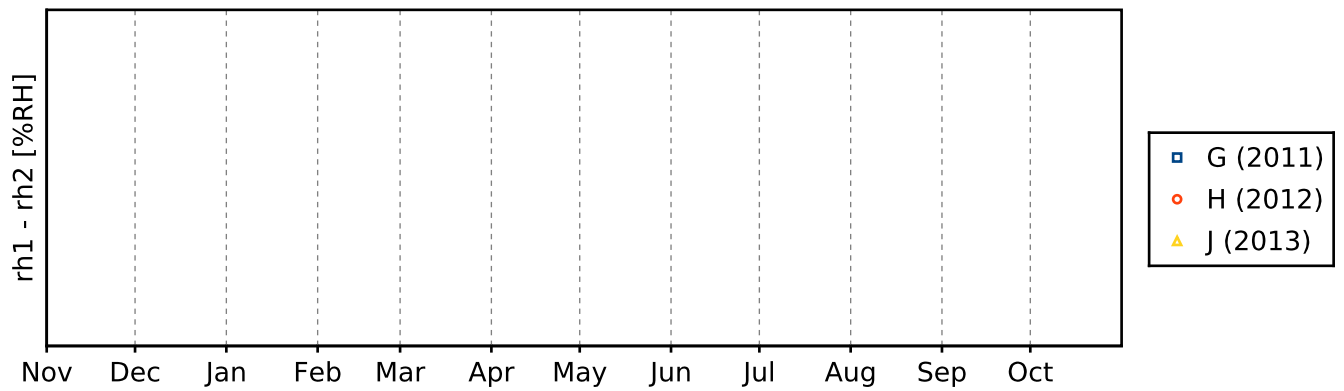
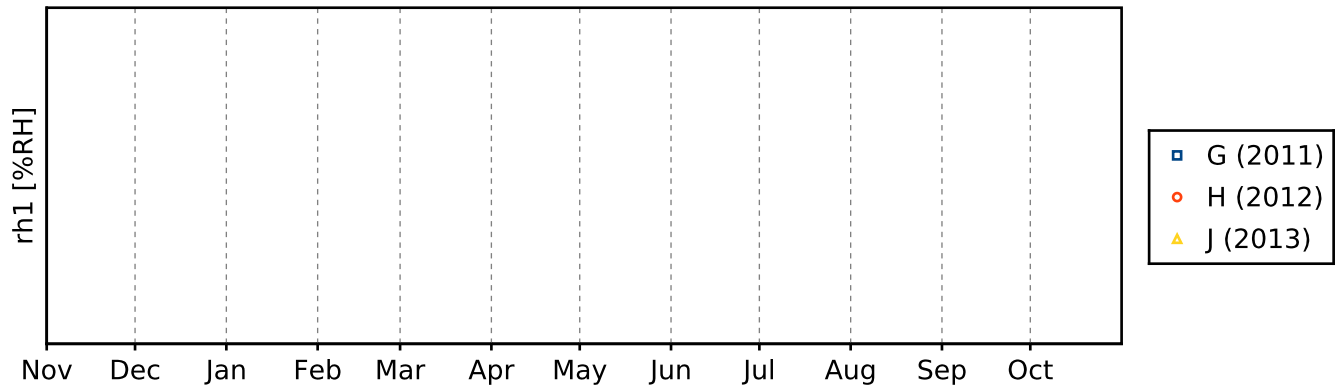
### 3.5 Instrument ground check

#### 3.5.1 Stream: RS92

##### 3.5.1.1 GroundCheck: GC25



3.5.1.2 GroundCheck: SHC



3.6 Measurement events

3.6.1 Stream: RS92

