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Greenbelt, USA
10 March – 14 March 2014

Session 6

GRUAN Station Report for Boulder

(Submitted by Dale Hurst)

Summary and Purpose of Document

Report from the GRUAN station Boulder for the period Feb 2013 to Feb 2014.

GRUAN Station Report for Boulder

Reporting for the period Feb 2013 to Feb 2014
Date: 21-Feb-2014
Primary author: Dale Hurst email: Dale.Hurst@noaa.gov

Overview

Currently only the weekly RS92 sounding data from Boulder are being processed into a GRUAN data product. We also regularly submit sounding data from ozonesondes (ECC) and the NOAA frost point hygrometers (FPH) when these instruments are part of the RS92 payload. It is envisioned that both the ECC and FPH data from Boulder will become GRUAN data streams in the near future. Other data streams available include GNSS-IPW from the Marshall Field Site balloon launching site near Boulder (and potentially the NOAA building in Boulder), Dobson and FTIR measurements of column ozone, and FTIR measurements of column water vapor, CO2 and methane. For more details of potential data streams see the "New Data Streams Survey" for Boulder that was submitted to the Lead Center last December.

Change and change management

The only appreciable change at Boulder has been a greatly reduced use of RS80 radiosondes and a greatly increased use of InterMet radiosondes for balloon soundings. Our supply of RS80 sondes is now nearly depleted.

Resourcing

The Global Monitoring Division within the Earth System Research Laboratory of NOAA continues to struggle to continue many long-term monitoring programs in the face of sustained federal budget cuts during years of rising equipment and personnel costs. The Boulder GRUAN site depends on funds from GMD (and hence the federal budget) to continue our weekly ozonesonde soundings and monthly FPH + ozonesonde soundings at Boulder, our similar sounding program at Hilo, Hawaii and our monthly FPH + ozonesonde soundings at Lauder, New Zealand. Financial support from GCOS has greatly assisted with our program's ability to continue at Lauder. Our ability to continue GRUAN-related activities at Boulder depends largely on the future of GMD's federal funding.

Site assessment and certification

The application for certification of the Boulder site was submitted to the Lead Center on September 30, 2013. To date no feedback on this application has been received by the Boulder site manager.

GRUAN related research

The NOAA FPH was part of the AquaVIT-2 water vapor measurement intercomparison campaign conducted last April at the AIDA environmental chamber in Karlsruhe, Germany. There were about 20 different instruments measuring chamber-controlled water vapor mixing ratios from less than 1 ppm to several thousand ppm over a wide range of chamber pressures. The results of this intercomparison have not yet been released by the referees.

A paper was recently published that compares stratospheric water vapor data retrievals from the Aura Microwave Limb Sounder (MLS) with in situ water vapor measurements by the NOAA FPH at Boulder, Hilo and Lauder. The reference is:

Hurst, D. F., A. Lambert, W. G. Read, S. M. Davis, K. H. Rosenlof, E. G. Hall, A. F. Jordan, and S. J. Oltmans, Validation of Aura Microwave Limb Sounder stratospheric water vapor measurements by the NOAA frost point hygrometer, *J. Geophys. Res. Atmos.*, *119,* doi:10.1002/2013JD020757, 2014.

Dale Hurst continues to serve as a member of the GRUAN working group, co-chair of the task team of site representatives and manager of the Boulder GRUAN site.

June Wang, Seth Gutman and John Braun continue to serve as members of the task team of GNSS-IPW measurements. June is also a member of the GRUAN working group and is intimately involved in the development of a GNSS-IPW data product for GRUAN.

James Hannigan is a member of the task team of ancillary measurements for his expertise in solar FTIR measurements of water vapor and trace gases.

WG-GRUAN interface

We appreciate the continued support of the Boulder GRUAN site through presentations and papers that include data from Boulder, especially those in easy view of ESRL management and NOAA administrators.

Items for ICM-6 plenary discussions

I would like to see some sort of code associated with each RS92 sounding that does not pass quality control, issued as soon as the sounding is processed. For example a three digit code for PTU where the first digit describes the problem (or success) of P, the second for T and the third for U. The code could automatically be sent by e-mail or appended to an existing report file kept on the NCDC or GRUAN ftp sites. This type of immediate feedback would be very helpful in knowing that there was a problem with the last RS92 flight and in trying to make the subsequent RS92 soundings a success.

Future plans

The Boulder site is trying to scrape though another year of inadequate federal funding without having to discontinue any measurement programs.

GRUAN Station Report for Boulder (BOU), 2013

Reported time range is Nov 2012 to Oct 2013
Created by the Lead Centre
Version from 2014-02-20

1 General GRUAN station information

Info	Value
Station name	Boulder
Unique GRUAN ID	BOU
Geographical position	39.9500 °N, -105.2000 °W, 1743.0 m
Operated by	GMD | Global Monitoring Division, part of: ESRL | Earth System Research Laboratory, part of: NOAA | National Oceanic and Atmospheric Administration
Main contact	Hurst, Dale F.
WMO no./name	-
Operators	current 5, change +0 / -0
Sounding Site	1
GNSS	1

1.1 General information about GRUAN measurement systems

System	Type	Setups	Measurements	As scheduled
BOU-GN-01	GNSS	0	0	not scheduled
BOU-RS-01	Sounding Site	4	36	not scheduled

1.2 General comments from Lead Centre

1.2.1 General

The site is requested to establish a frostpoint hygrometer GRUAN data product.

It is strongly recommended that the site uses a manufacturer independent ground check for the Vaisala radiosonde.

2 System: GNSS Site P041 (BOU-GN-01)

Info	Value
System name	GNSS Site P041
Unique GRUAN ID	BOU-GN-01
System type	GNSS (GN - GNSS)
Geographical position	39.9495 °N, -105.1943 °W, 1728.8 m
Operated by	GMD | Global Monitoring Division, part of: ESRL | Earth System Research Laboratory, part of: NOAA | National Oceanic and Atmospheric Administration
Instrument contact	Hurst, Dale F.
Started at	-
Defined setups	-
Possible streams	-

2.1 Lead Centre comments

2.1.1 General

No GNSS dataflow to GRUAN LC as yet.

3 System: Radiosonde Launch Site (Marshall) (BOU-RS-01)

Info	Value
System name	Radiosonde Launch Site (Marshall)
Unique GRUAN ID	BOU-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	39.9500 °N, -105.2000 °W, 1743.0 m
Operated by	GMD | Global Monitoring Division, part of: ESRL | Earth System Research Laboratory, part of: NOAA | National Oceanic and Atmospheric Administration
Instrument contact	Hurst, Dale F.
Started at	-
Defined setups	4 (RESEARCH, OZONE, FPH-OZONE, FPH)
Possible streams	FPH, IMET1, RS80, RS92

3.1 Lead Centre comments

3.1.1 Dataflow

Data to the GRUAN LC are flowing since April 2012. This dataflow includes data from the Vaisala RS92-SGP, ECC ozone sonde, FPH water vapour, Intermet IMET-1, and Vaisala RS80. All launches are transmitted using RsLaunchClient within a month after launch.

No GRUAN data product has yet been established for the frostpoint hygrometer data.

3.1.2 Data quality

Very few data processing issues (corrupt files or unknown issues).

One half of measurements pass GRUAN Quality Control routines with a 'checked' label, largely due to uncertainty inconsistencies in pressure and humidity.

GC25 ground check corrections are within expected limits.

An additional ground check like SHC (Standard Humidity Chamber) is not used (or not recorded in meta-data).

3.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCDC
3.2.1 Stream: ECC				
ECC		34	34	
3.2.2 Stream: FPH				
FPH		9	9	
3.2.3 Stream: IMET1				
IMET1		21	21	
3.2.4 Stream: RS80				
RS80		13	13	

Product	Version	Soundings received	Available at LC	Distributed by NCDC

3.2.5 Stream: RS92

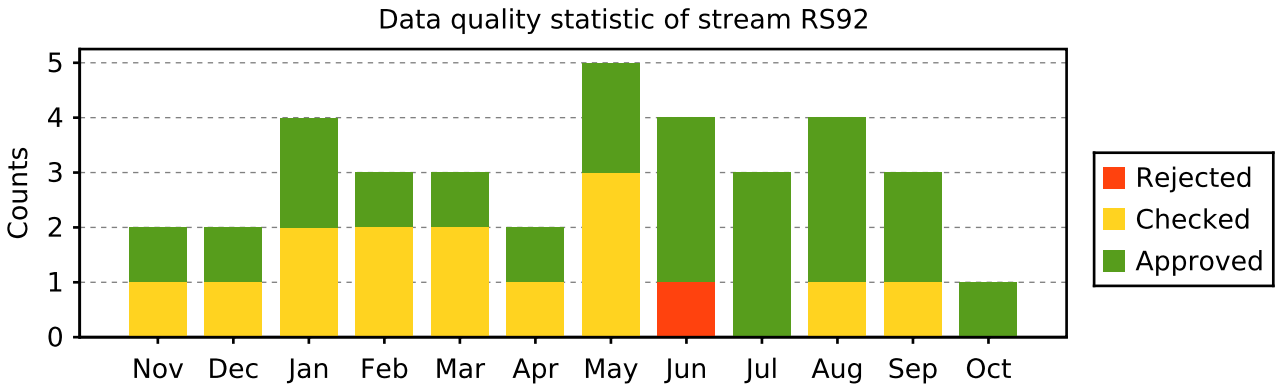
RS92		36	36	
RS92-RAW	001		36	
RS92-GDP	001		27	
RS92-GDP	002		35	21

3.3 Data quality of current GRUAN data products

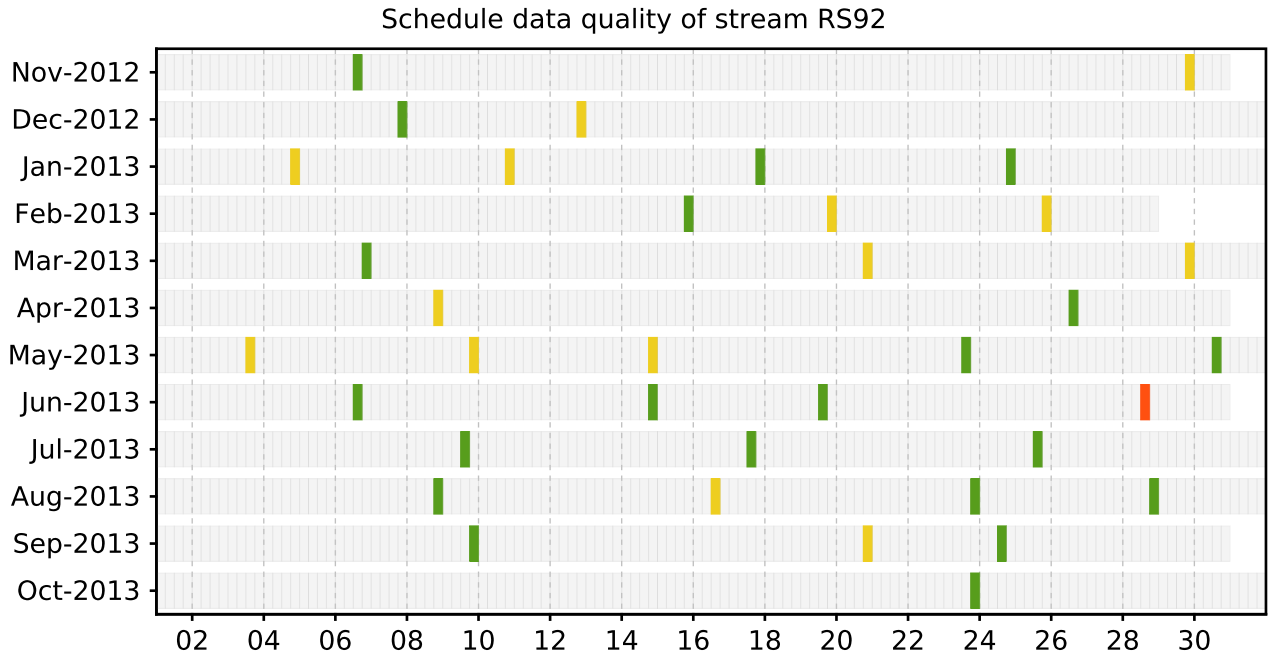
Month	Count	GRUAN Data Quality			Issues				
		Approved	Checked	Rejected	Meta-data	Process.	Press	Temp	RH

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

Nov 12	2	1	1						1
Dec 12	2	1	1						1
Jan 13	4	2	2				1		1
Feb 13	3	1	2				2		
Mar 13	3	1	2				2		2
Apr 13	2	1	1				1		
May 13	5	2	3						3
Jun 13	4	3		1			1		
Jul 13	3	3							
Aug 13	4	3	1				1		
Sep 13	3	2	1					1	
Oct 13	1	1							
	36	**21**	**14**	**1**			**8**	**1**	**8**



Month	Count	GRUAN Data Quality			Issues				
		Approved	Checked	Rejected	Meta-data	Process.	Press	Temp	RH



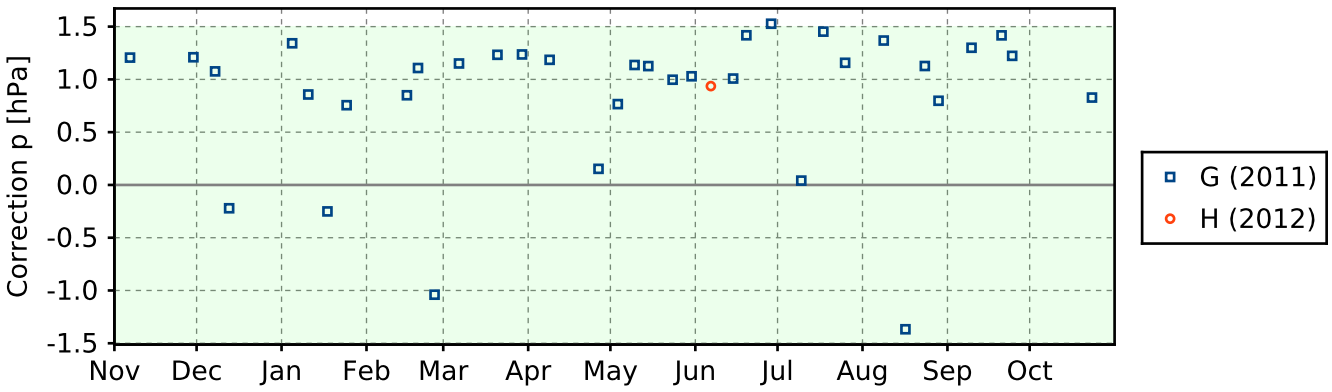
3.4 Instrument combinations of BOU-RS-01

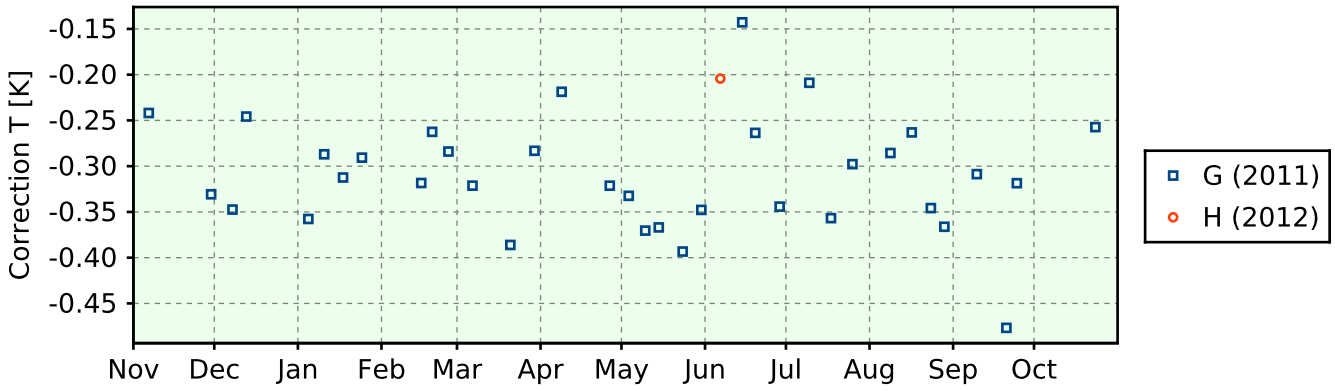
Count	Instrument combination
7	ECC, FPH, IMET1, RS92
2	ECC, FPH, RS80, RS92
14	ECC, IMET1, RS92
11	ECC, RS80, RS92
2	RS92

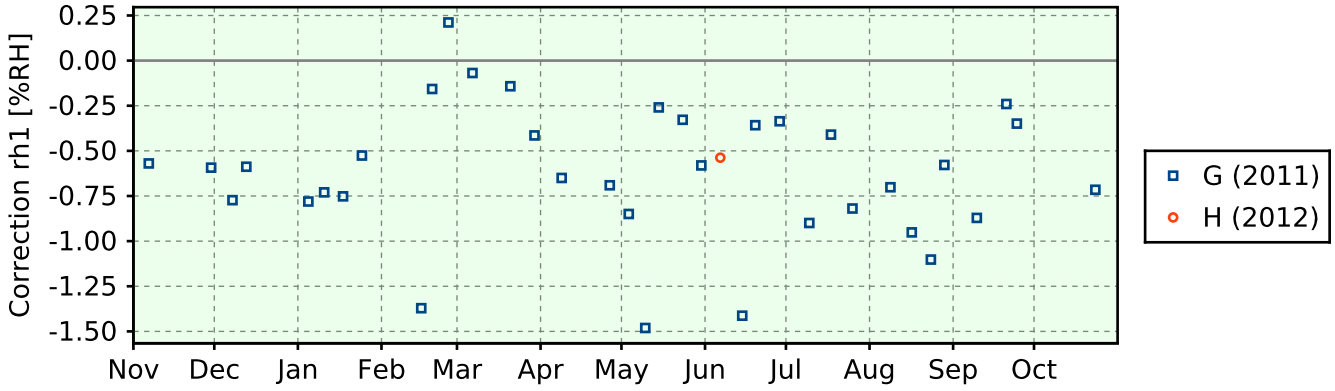
3.5 Instrument ground check

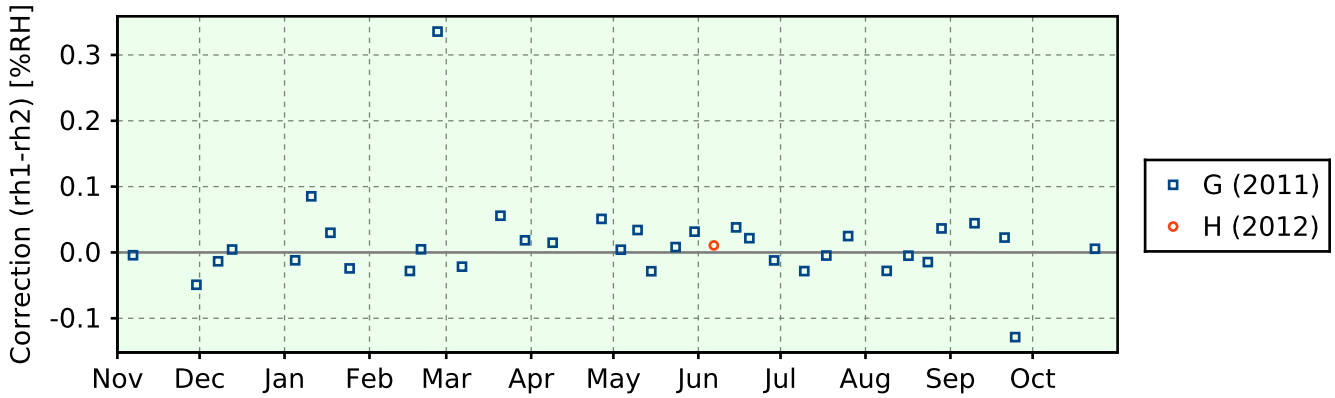
3.5.1 Stream: RS92

3.5.1.1 GroundCheck: GC25

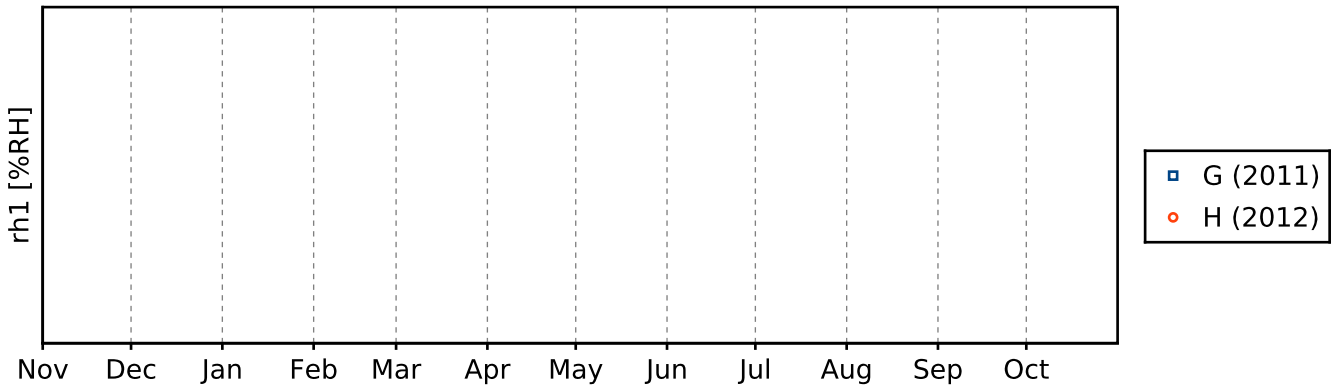


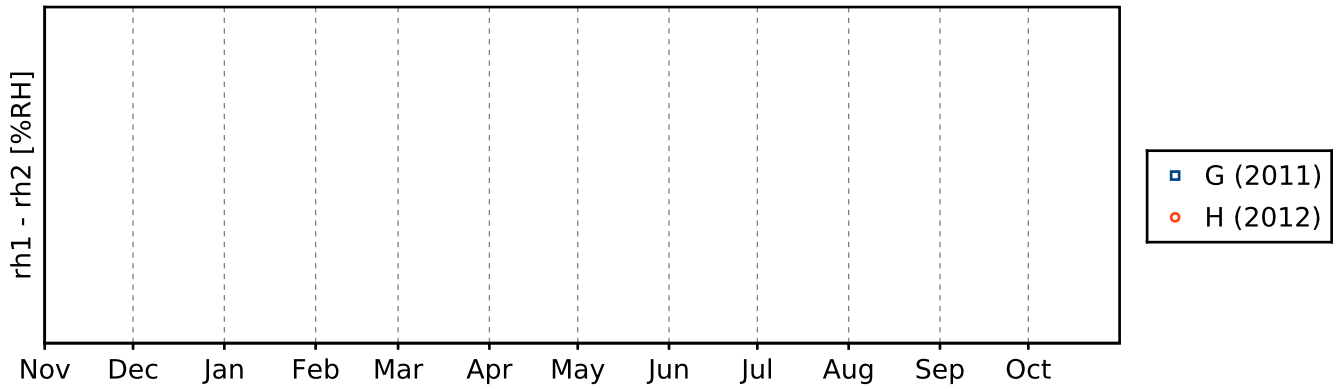


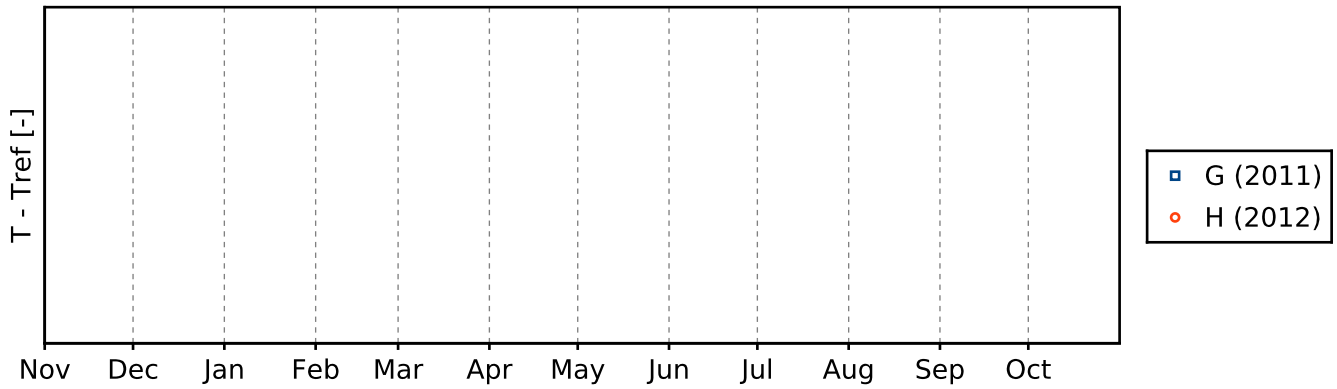




3.5.1.2 GroundCheck: SHC




rh1 - rh2 [%RH]
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
G (2011)
H (2012)


T - Tref [-]
Nov
Dec
Jan
Feb
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Jun
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Aug
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Oct
G (2011)
H (2012)