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Session 6

GRUAN Station Report for Lamont

(Submitted by Douglas Sisterson)

Summary and Purpose of Document

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

Note: This document contains the station report from the site representative for all ARM sites.

GRUAN Station Report for ARM Climate Research Facility ARM Sites

Reporting for the period Feb 2013 to Feb 2014
Date: 05-MAR-2014
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Overview

Currently, the ARM Climate Research Facility Southern Great Plains (SGP), as well as all ARM fixed sites, are candidate GRUAN Sites. The ARM Sites currently provide Vaisala RS-92 radiosonde data from the SGP; the North Slope of Alaska (NSA) Site in Barrow, Alaska; and from the Tropical Western Pacfic (TWP) Manus Site in Papua New Guinea.

The Lidar data at the SGP and NSA Barrow Sites could be provided to the Lead Center.

None of the ARM Sites currently imploy the RSLaunchClient.

The Department of Energy ARM Program Managers announced in late January 2014 that it would be making substantive changes to the ARM Climate Research Facility to better serve the climate research communcity. The ARM Facility is now embarking on a reconfiguration strategy for even better observations of atmospheric processes to constrain high-resolution process models. Key elements of the new strategy include the creation of two "Super Sites" in the United States:

> **Southern Great Plains**—measurements at the SGP site in Oklahoma will be augmented to include additional scanning and profiling remote sensors and more detailed measurements of the land-atmosphere interface.
> **North Slope of Alaska**—aerial operations will link measurements from Barrow and Oliktok, and unmanned aerial systems will provide additional spatial information around Oliktok.

To support the expansion of the continental U.S. site in Oklahoma, operations at ARM sites in the Tropical Western Pacific (TWP) will end at Manus about December 2014 and Darwin about June 2015. Data obtained from these sites will remain available to the scientific community through the ARM Data Archive to support continuing research in tropical climate.

Future observations in the tropics or other climate regimes will continue to be supported through deployments of the ARM Mobile Facilities via the selection of field campaigns proposed by the science community.

This reconfiguration does not affect operations of the new ARM Eastern North Atlantic (ENA) site in the Azores or the mobile facilities. The ENA Site at Graciosa Island is a marine-influenced site that is expected to be fully completed by the end of 2014.

ARM leadership will work with the science community in the coming year to optimize this new measurement strategy at the Super Sites, with the continued goal of improving the understanding of atmospheric processes and the representation of those processes in climate models.

DOE sponsored a U.S./European Workshop on Climate Change Challenges and Observations in Novmeber, 2012. The Workshop identified high-level science questions that provided a framework for identifying measurement gaps and priorities. The ensuing discussions generated several common themes where progress could be made in closing these gaps. The joint workshop was a critical first step in enhancing the collaboration among climate research activities to better serve the international science community. Its findings will be useful for setting priorities within DOE and the participating European centers as well as establishing milestones for future collaborations. Many of the participants involved have ties to GRUAN.

Change and change management

To improve the quality of the RS-92 data, the ARM Program has procured Vaisala Metieorological Automated Weather Systems (MAWS) stations that will be installed at all ARM fixed sites and mobile facilities in 2014. This will provide consistency for surface data points for the ARM radiosonde data.

In addition, through an agreement between Argonne National Laboratory and the NOAA Nactional Climatic Data Center, funds have been provided to support Cryogenic Frostpoint Hygrometer (CFH) launches. Those funds have been used to implement CFH launches at the SGP Site using GRUAN recommended sondes and systems, with the first launch expected in March or early Arpil 2014. We anticipate 2 nighttime launches per month.

Although the ARM Program is undergoing changes over the next few years, it is anticipated that the SGP and NSA Barrow Sites will not change their current basline instrument locations. The SGP Supersite will now be managed by Nicki Hickmon at Argonne National Laboratory and Douglas Sisterson will be take on the instrument coordination and data quality managing role for the ARM Climate Research Facility.

In addition, there may be interest for the ARM ENA Site in the Azores to particiapte in GRUAN when the site becomes fully operational in 2014.

Resourcing

The US Department of Energy (DOE), Office of Science, Office of Biological and Environmental Research continues to provide resources to fund the ARM Climate Research Facility.

Site assessment and certification

Still under consideration.

GRUAN related research

The ARM Program has undertaken a major effort to harmonize the representation of intrument uncertainty for climate obsevations by ore than 300 instruments systems that provide over 2500 data streams the climate research community.

Douglas Sisterson and Maria Cadeddu and other ARM Instrument Mentors are currently working with Fabio Madonna on a publication that demonstrates the usefulness of entropy and mutual correlation concepts for the studying the use of redundancy of in-situ and ground-based remote sensing instruments at four GRUAN Sites (inlcuding the ARM SGP Site).

WG-GRUAN interface

Nothing required at this time.

Items for ICM-6 plenary discussions

Nothing required at this time.

Future plans

Additional instruments will be added to the SGP Site, but the specific locations will be determined from input received at DOE sponsored Workshops, DOE Program Managers, and ARM Climate Research Facility senior manangment. Addtions to the SGP are expected to start in late 2014 and conitnue will into 2015. No additons of instrumentation are planned for the NSA Barrow Site in 2014.

GRUAN Station Report for Lamont (SGP), 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	Lamont
Unique GRUAN ID	SGP
Geographical position	36.6000 °N, -97.4900 °W, 320.0 m
Operated by	ARM | US DOE Atmospheric Radiation Measurement (ARM) Program
Main contact	Sisterson, Doug
WMO no./name	-
Operators	current 0, change +0 / -0
Sounding Site	1
GNSS	1

1.1 General information about GRUAN measurement systems

System	Type	Setups	Measurements	As scheduled
SGP-GN-01	GNSS	0	0	not scheduled
SGP-RS-01	Sounding Site	1	1342	91.92 %

1.2 General comments from Lead Centre

1.2.1 General

ARM site.

Ground check procedures for the Vaisala RS92 launches at the SGP site do not appear to follow standard operating procedures. It is requested, that the sonde preparation at SGP follow standard Vaisala protocol and use a well calibrated station pressure sensor as reference for the Vaisala RS92 sonde re-calibration.

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

ARM is using an automated routine to transmit data and raw data. ARM is requested to inform the Lead Centre of all upcoming changes in equipment, launch schedule or procedures to be able to update the metadata database.

1.2.2 GTS

This site regularly sends PTU measurements in the GTS (FM35 format, 4 times / later 2 times per day).

2 System: GNSS Site SG01 (SGP-GN-01)

Info	Value
System name	GNSS Site SG01
Unique GRUAN ID	SGP-GN-01
System type	GNSS (GN - GNSS)
Geographical position	36.6041 °N, -97.4848 °W, 290.0 m
Operated by	ARM | US DOE Atmospheric Radiation Measurement (ARM) Program
Instrument contact	Sisterson, Doug
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: Balloon-Borne Sounding System (SONDE) (SGP-RS-01)

Info	Value
System name	Balloon-Borne Sounding System (SONDE)
Unique GRUAN ID	SGP-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	36.6100 °N, -97.4900 °W, 315.0 m
Operated by	ARM | US DOE Atmospheric Radiation Measurement (ARM) Program
Instrument contact	Sisterson, Doug
Started at	-
Defined setups	1 (ROUTINE)
Possible streams	RS92

3.1 Lead Centre comments

3.1.1 Change management

The launch schedule was changed from four launches per day to two launches per day in October 2013. The site is requested to inform the GRUAN LC about all pending changes.

3.1.2 Dataflow

Dataflow is running fully automated from the ARM Archive to the GRUAN LC. Launch metadata are not checked manually. Equipment changes (e.g. balloon, unwinder, …) are not recorded.

As a consequence it is essential that the Lead Centre is notified of all upcoming changes to be able to maintain a correct metadata record. (This comment applies to all ARM sites in GRUAN.)

Additional launches from the 'ARM Radiosondes for NPOESS/NPP Validation' field campaign are currently not included in the dataflow.

3.1.3 Data quality

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

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

GC25 ground check corrections are NOT within expected limits.

The ground check correction does not appear to use a reference pressure sensor and the mean pressure correction is 0.00 ±0.15 hPa. A dedicated reference pressure sensor should be used to recalibrate the RS92 pressure sensor.

The use of a manufacturers independent ground check (e.g. SHC) is highly recommended.

3.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCDC

3.2.1 Stream: RS92

RS92		1342	1342	

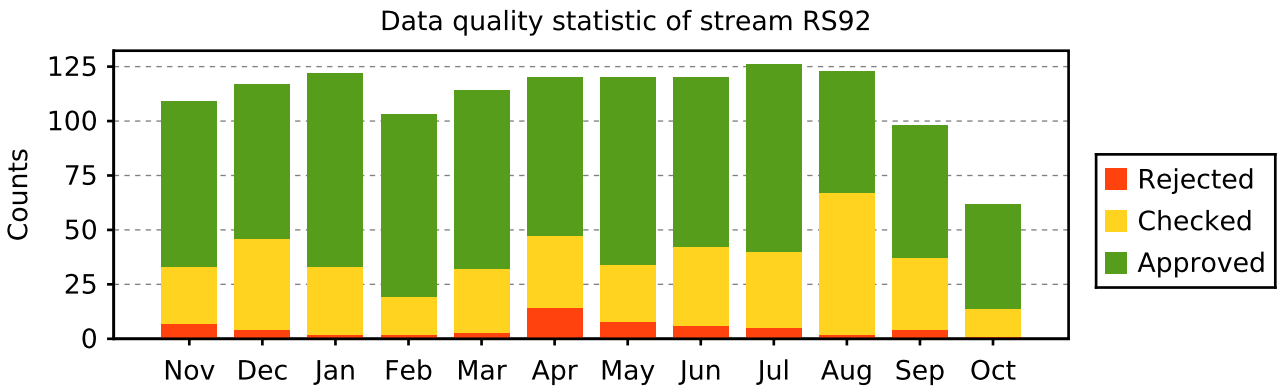
Product	Version	Soundings received	Available at LC	Distributed by NCDC
RS92-RAW	001		1334	
RS92-GDP	001		1305	
RS92-GDP	002		1276	890

3.3 Data quality of current GRUAN data products

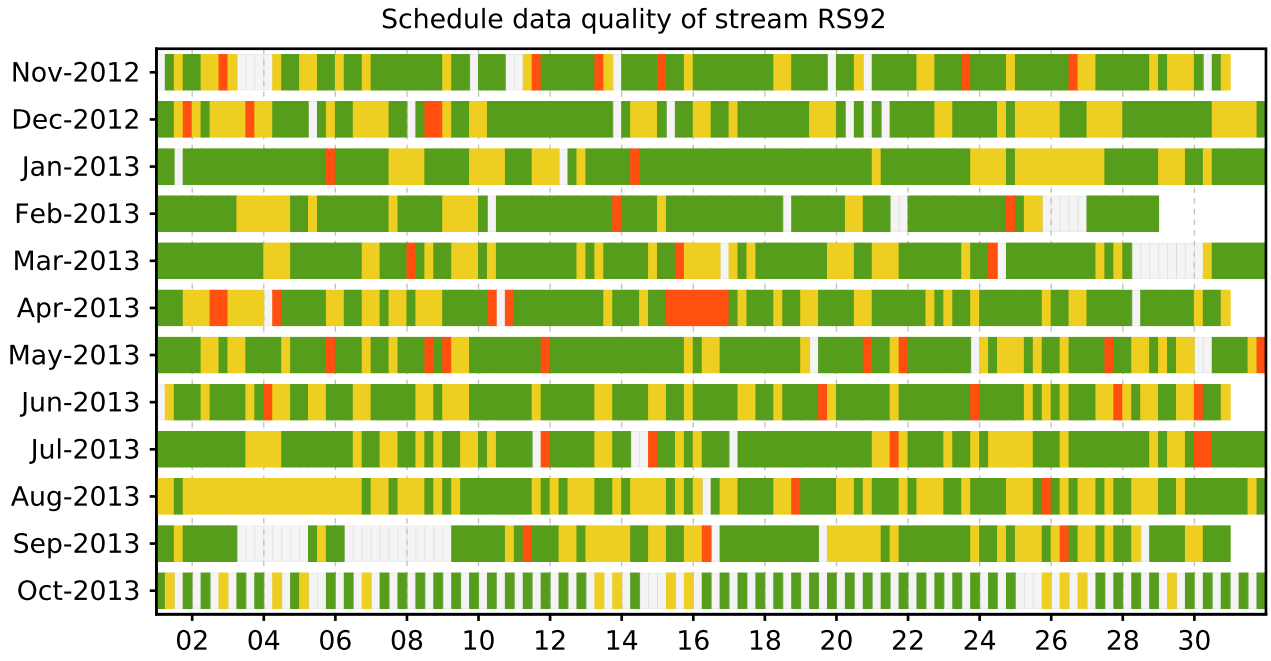
Month	Count	GRUAN Data Quality			Issues				
		Approved	Checked	Rejected	Meta-data	Process.	Press	Temp	RH

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

Nov 12	109	76	26	7		1	5	3	24
Dec 12	117	71	42	4			7	1	43
Jan 13	122	89	31	2			2		33
Feb 13	103	84	17	2				1	18
Mar 13	114	82	29	3			5	2	27
Apr 13	120	73	33	14		2	8	2	31
May 13	120	86	26	8			7	3	25
Jun 13	120	78	36	6			4	1	36
Jul 13	126	86	35	5			6		33
Aug 13	123	56	65	2			44		35
Sep 13	98	61	33	4		1	12		25
Oct 13	62	48	13	1		1	6		10
	1334	**890**	**386**	**58**		**5**	**106**	**13**	**340**



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



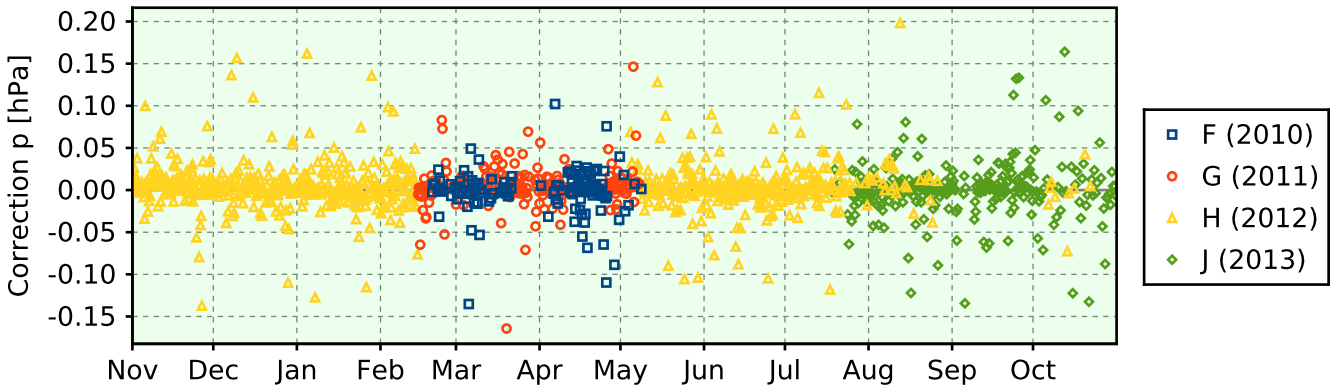
3.4 Instrument combinations of SGP-RS-01

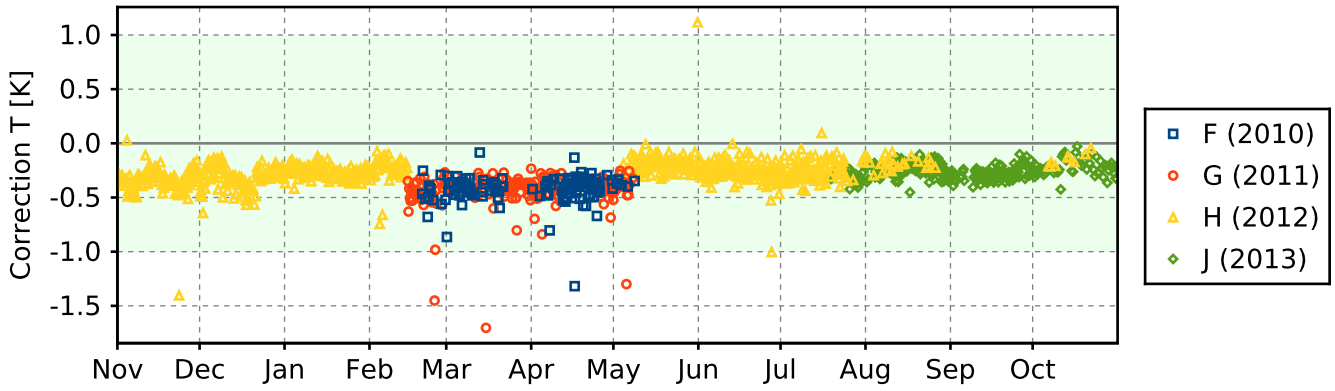
Count	Instrument combination
1342	RS92

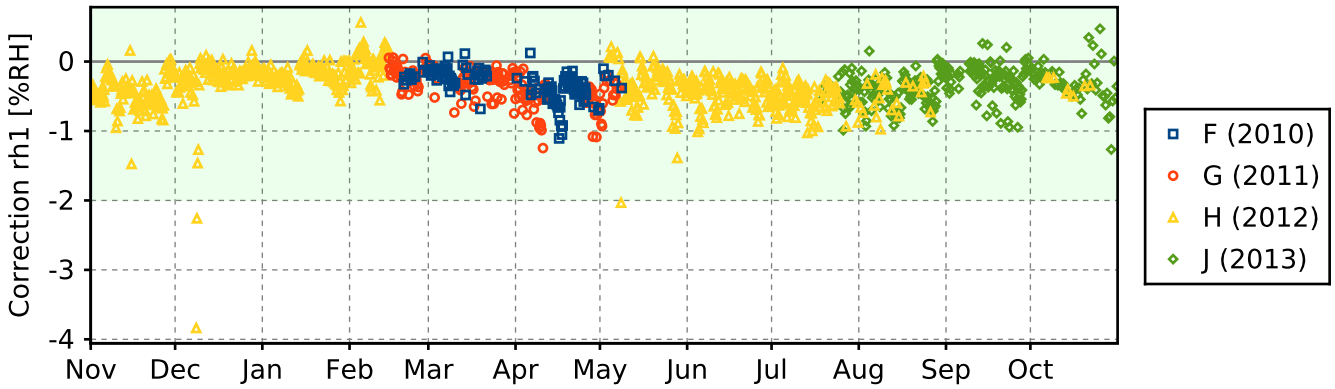
3.5 Instrument ground check

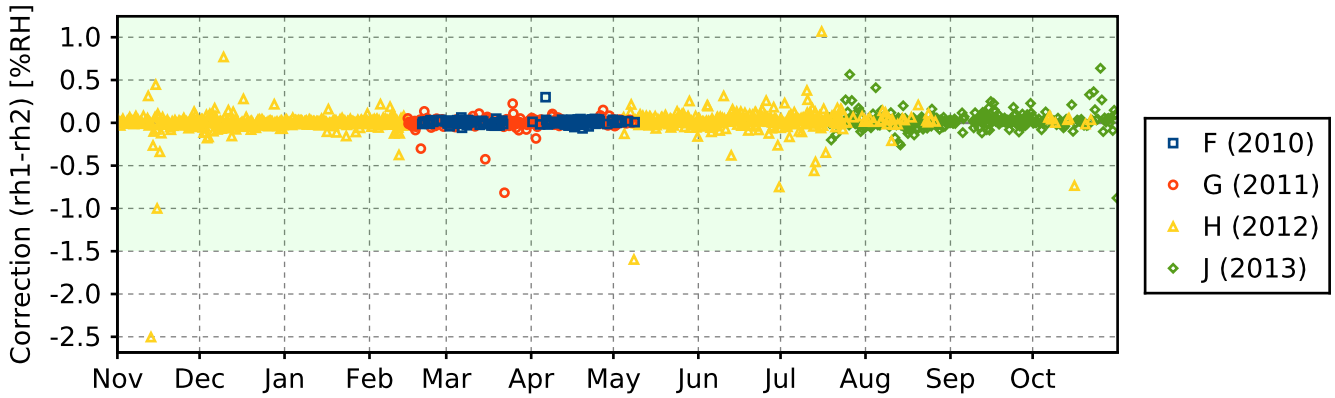
3.5.1 Stream: RS92

3.5.1.1 GroundCheck: GC25

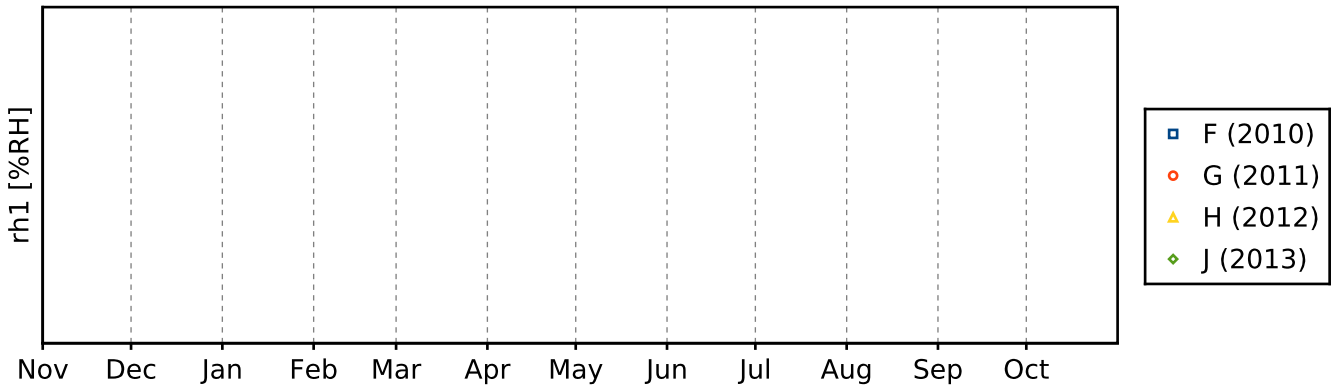


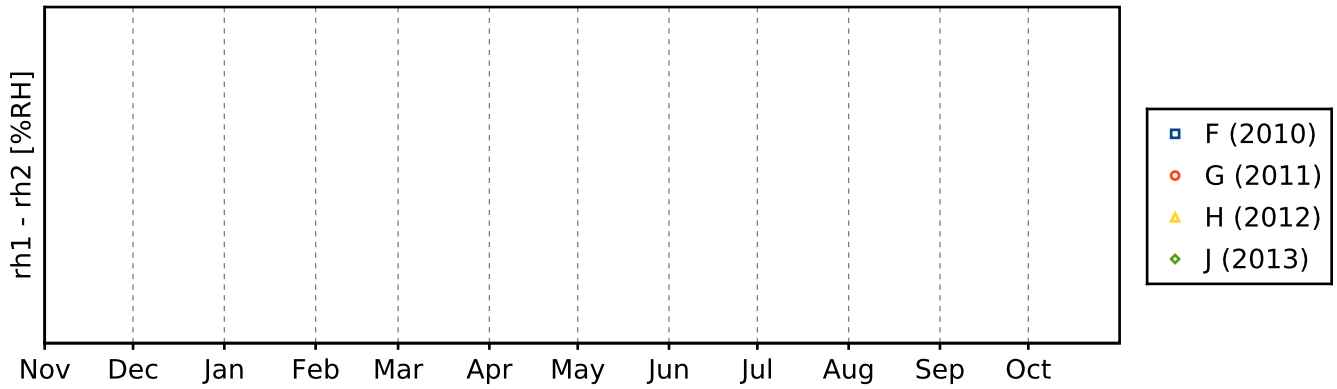


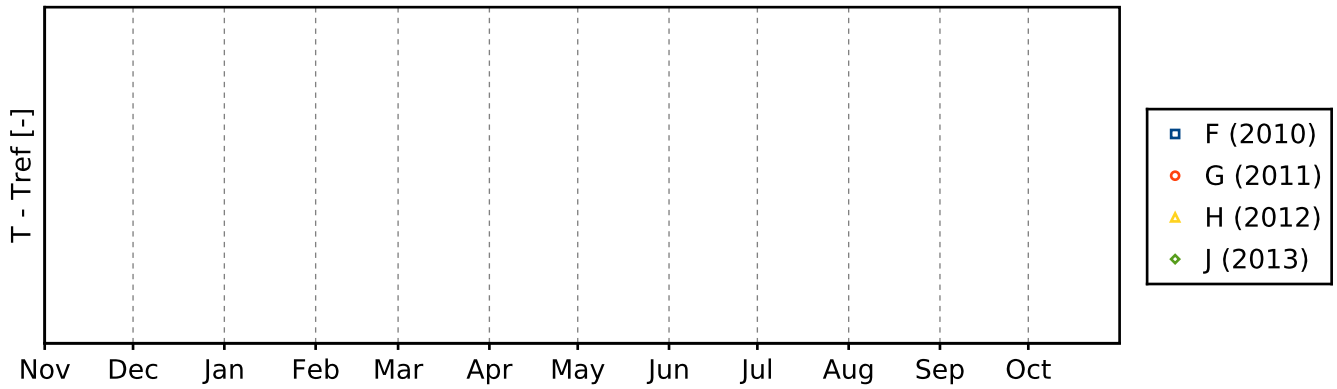




3.5.1.2 GroundCheck: SHC




rh1 - rh2 [%RH]
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
F (2010)
G (2011)
H (2012)
J (2013)


T - Tref [-]
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
F (2010)
G (2011)
H (2012)
J (2013)