



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

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**9th GRUAN Implementation-  
Coordination Meeting (ICM-9)**

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Session 7

Helsinki, Finland

12 - 16 June 2017

## GRUAN Site Report for Graciosa

*(Submitted by Douglas Sisterson)*

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

Report from the GRUAN site Graciosa for the period March 2016 to April 2017.

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## Overview

The ARM Climate Research Facility provides radiosonde data from the SGP (manually launched) and NSA Barrow (autosonde launcher) Sites and has provided data from the TWP Manus and Papua New Guinea (manually launched) before they were retired. Although the ARM Facility has radiosondes being manually launched from the OLI Oliktok and the ENA Site in the Azores, they are not being formally transmitted to GRUAN. In addition, ARM has manually launched radiosonde data from its mobile facilities that have not been transmitted to GRUAN.

## Change and change management

This year the ARM SGP Facility is upgrading the existing balloon borne sonde hardware from MW21/MW31 to the new MW41 systems. The existing four C1, S01, S02 and S03 systems were upgraded to the Vaisala MW41 software and put into service on April 12, 2017. The OLI Oliktok MW31 was upgraded to MW41 and put into service on May 19, 2017. A preconfigured system was shipped to NSA to replace their S01 MW21 system which will be installed this summer. We have yet to conduct the upgrade for ENA Azores, and mobile sites AMF1, and AMF2. A purchase order is in place and we will be scheduling a Vaisala upgrade of our NSA Autosonde before the end of FY 2017. Currently we continue to launch our supplies of RS92 radiosondes with the new MW41 software. We will transition to RS41 radiosondes once our current supplies are exhausted.

In addition, there is ongoing installation of the MAWS at each of the ARM Sites. MAWS have been operational at the SGP, NSA Barrow, and Oliktok sites. The MAWS at the ENA will be operational very soon. MAWS will be implemented at the mobile facilities for land-based deployments next year; no MAWS systems are planned for ship-based deployments.

## Resourcing

While there have been significant proposed budget cuts for the ARM Climate Research Facility for FY 2018, there is likely to be considerable pushback making the budget process lengthy with large uncertainty. It is safe to assume that there will be a reduction in resources, but the magnitude of the changes in funding remain unclear at this time.

## Operations

The ARM Facility senior management is considering the impacts of assuring that all ARM radiosondes reach 10 hPa. The budget impacts for purchasing 600-gram balloons, modification to the balloon launchers, and an increased amount of Helium have been provided. In addition, ARM is planning to

investigate the benefit increasing the burst height of its radiosondes with regard to the difference in the amount of integrated water vapour in the atmospheric column at the current and proposed heights of balloon bursts. The ARM Facility has approved the ordering of RS41 radiosondes for all of its Sites. Once the Vaisala automatic autosonde system is converted to launch the newer radiosondes, the first site to launch the RS41 radiosondes will be NSA Barrow. The radiosonde transition date has not been established but it is likely to occur by this fall.

The ARM Facility infrastructure is planning to submit a request to provide for a humidity check for the RS-92 sonde humidity reading at 100% RH prior to launch. If approved, the system would likely be tested and validated at the SGP Site before being established at the other ARM Sites.

## **Site assessment and certification**

The ARM Facility has submitted a formal proposal this year to have radiosondes certified at the SGP Site in consideration with GRUAN guidelines.

Currently the SGP Site is a GRUAN Candidate Site. The ARM Facility has never formally submitted an application for the SGP (or any other ARM Site) to be considered an official GRUAN Site. The ARM Facility intends to seek membership for the SGP and possibly the NSA Barrow Sites.

## **GRUAN-related research**

Lori Borg is the Principle Investigator of a Field Campaign proposal submitted to ARM: Radiosonde Intercomparison & VALidation (RIVAL). The proposal is under consideration and has been modified in scope keep within budget constraints. Final approval has not been provided at this time. Final approval is anticipated on or about July 10.

## **WG-GRUAN interface**

Assistance would be appreciated with regard to the ARM Facility Sites becoming member GRU-AN Sites. The ARM Program would prefer to seek membership via invitation by the WMO rather than applying directly to the GCOS Secretariat.

## **Items for ICM-9 plenary discussions**

There is current uncertainty about vendors for CFH launches. Understanding the GRUAN recommendations for CFH sondes and processing would be extremely useful. The SGP has been flying one CFH per month but automating the data processing has been a challenge because the vendor is required to be involved and their processing algorithms are not made openly available to its customers.

## **Future plans**

Anticipating potential reduction in budgets, the ARM Facility takes a conservative stance on spending. The Facility attempts to assure that there are sufficient funds to maintain effort to ensure completeness and quality of the measurements provided to the User. This usually translates into the delaying of procurements related to significant upgrades and/or changes to established instruments and operating procedures. Once an annual budget target has been established, prioritized procurements are aggressively pursued. Preliminary planning for ARM Facility budgets takes place in the May time frame, but budget guidance and final budget approvals are not done until September.



# GRUAN Station Report for Graciosa (GRA), 2016/17

Reported time range is Mar 2016 to Apr 2017

Created by the Lead Centre

Version from 2017-06-06

## 1 General GRUAN station information

Info	Value
Station name	Graciosa
Unique GRUAN ID	GRA
Geographical position	39.0911 °N, -28.0266 °W, 30.5 m
Operated by	ARM   US DOE Atmospheric Radiation Measurement (ARM) Program
Main contact	-
WMO no./name	-
Operators	current 0, change +0 / -0
Sounding Site	1

### 1.1 General information about GRUAN measurement systems

System	Type	Setups	Measurements	As scheduled
GRA-RS-01	Sounding Site	1	366	42.96 %

### 1.2 General comments from Lead Centre

#### 1.2.1 General

ARM site.

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.

It is strongly recommended that the site uses a manufacturer independent ground check, e.g. SHC, for the RS92 radiosonde.

## 2 System: Balloon-Borne Sounding System (SONDE) (GRA-RS-01)

Info	Value
System name	Balloon-Borne Sounding System (SONDE)
Unique GRUAN ID	GRA-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	39.0911 °N, -28.0266 °W, 30.5 m
Operated by	ARM   US DOE Atmospheric Radiation Measurement (ARM) Program
Instrument contact	Sisterson, Doug
Started at	2009-04-16
Defined setups	1 (ROUTINE)
Possible streams	RS92

### 2.1 Lead Centre comments

#### 2.1.1 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.)

### 2.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCDC
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#### 2.2.1 Stream: RS92

RS92		366	366	
RS92-RAW	001		359	
RS92-RAW	002		361	
RS92-EDT	001		361	361
RS92-GDP	002		346	180

## 2.3 Data availability of data products

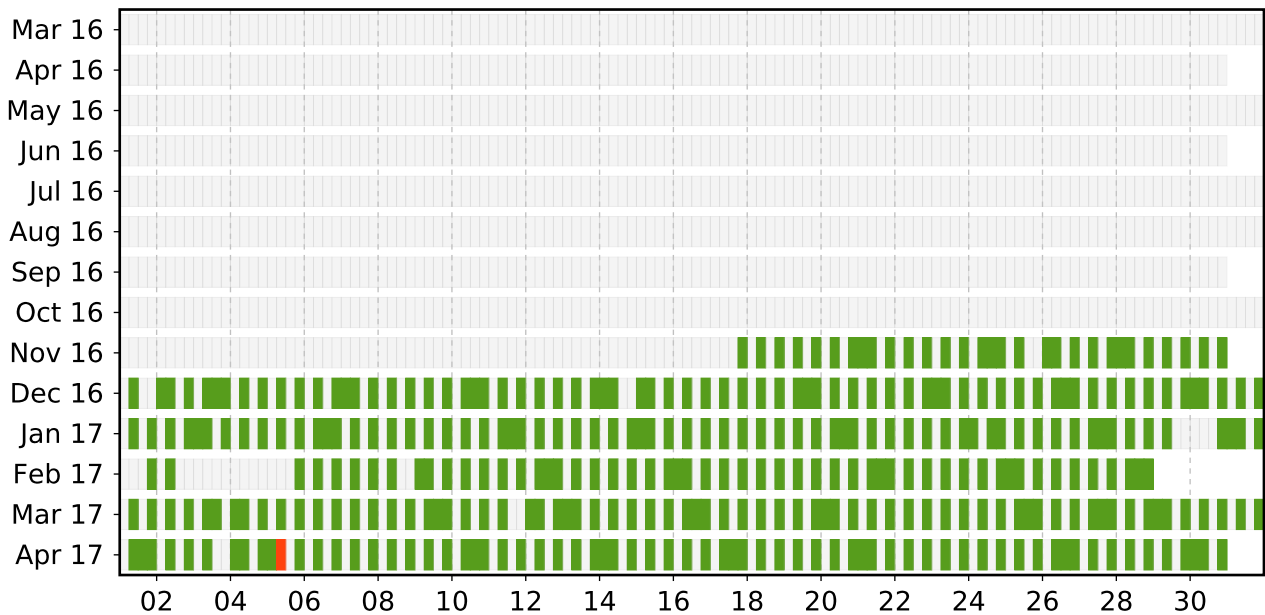
Available (green): All steps of processing have been successfully completed. The data file is available at NCEI (NCDC).

Unprocessed (yellow): The raw data file has been successfully converted to a GRUAN standardized raw data file format (NetCDF). The processing itself (e.g. extracting manufacturer data product or GRUAN data processing) is not done yet, or could not be completed. Reason may be missing raw data, or software bugs.

Failed (red): Raw data file could not be converted to a GRUAN standardized raw data file format (NetCDF). Reason may be a corrupt original raw data file, or software bugs.

### 2.3.1 Stream: RS92 (Product: RS92-EDT-001)

Schedule data availability of stream RS92





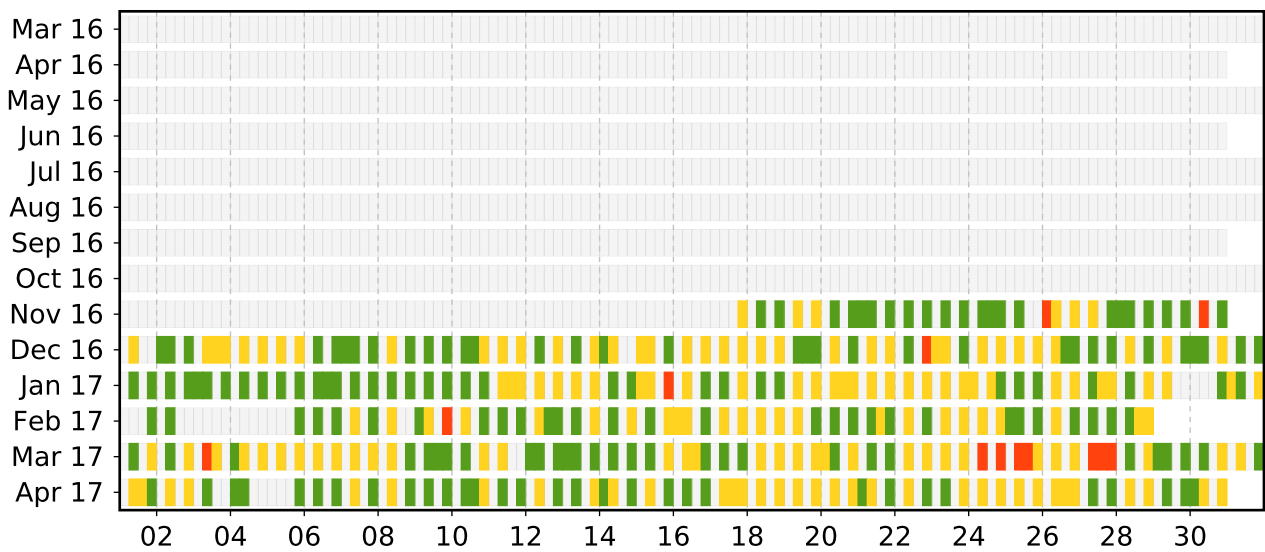
## 2.4 Data quality of current GRUAN data products

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

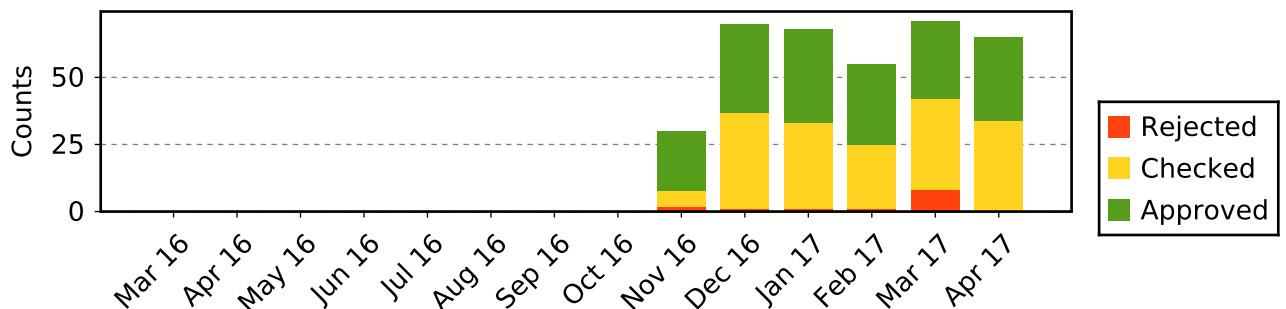
### 2.4.1 Stream: RS92 (Product: RS92-GDP-002)

Mar 16									
Apr 16									
May 16									
Jun 16									
Jul 16									
Aug 16									
Sep 16									
Oct 16									
Nov 16	30	22	6	2					6
Dec 16	70	33	36	1			7		34
Jan 17	68	35	32	1			1		32
Feb 17	55	30	24	1			1		23
Mar 17	71	29	34	8					34
Apr 17	65	31	34				1		33
	<b>359</b>	<b>180</b>	<b>166</b>	<b>13</b>			<b>10</b>		<b>162</b>

Schedule data quality of stream RS92



Data quality statistic of stream RS92



## 2.5 Instrument combinations of GRA-RS-01

<b>Count</b>	<b>Instrument combination</b>
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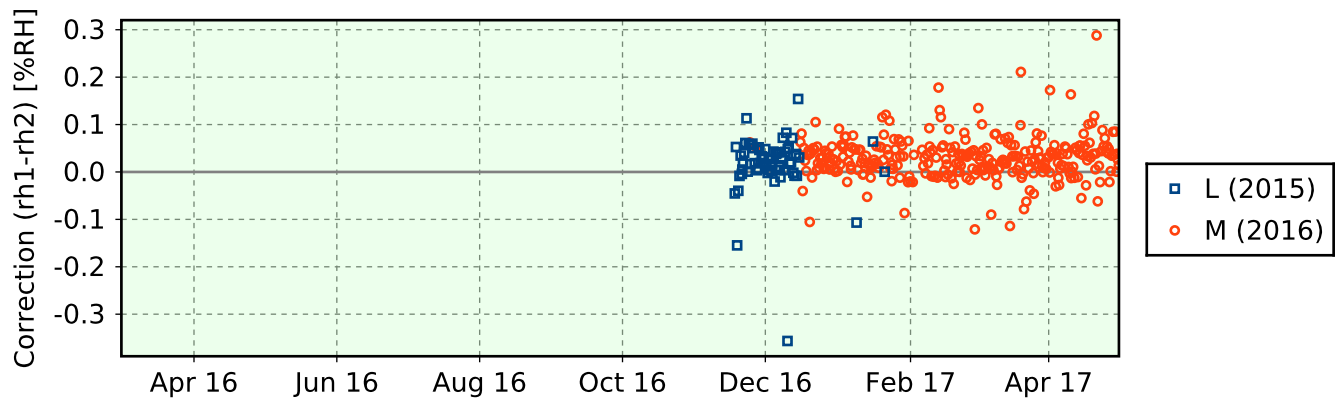
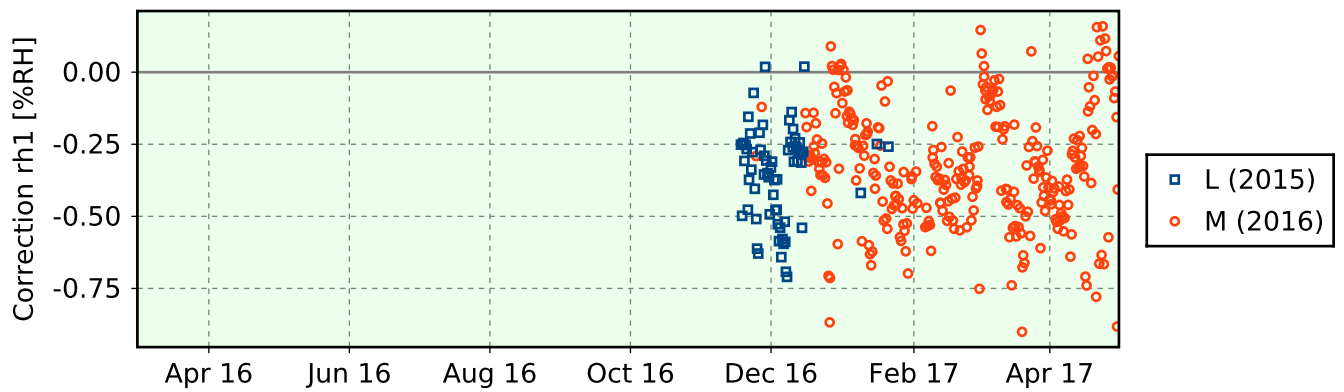
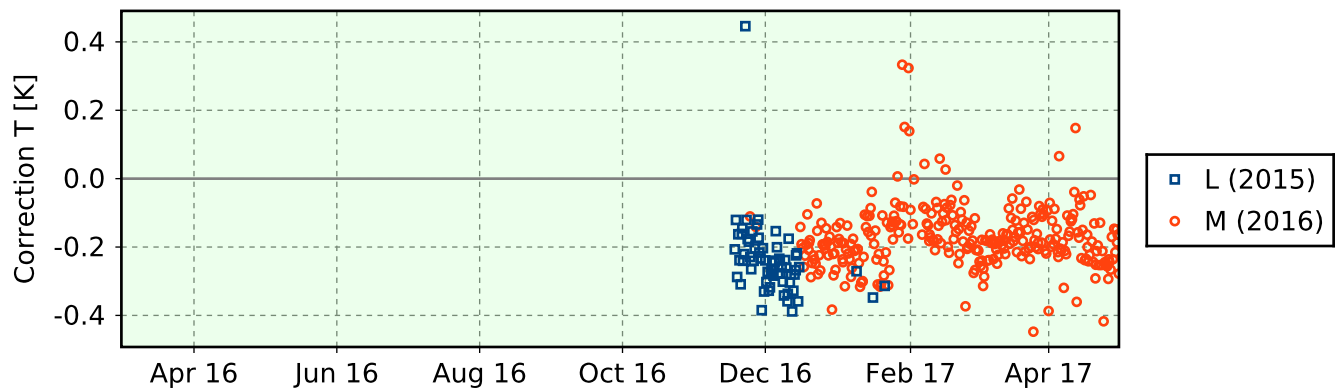
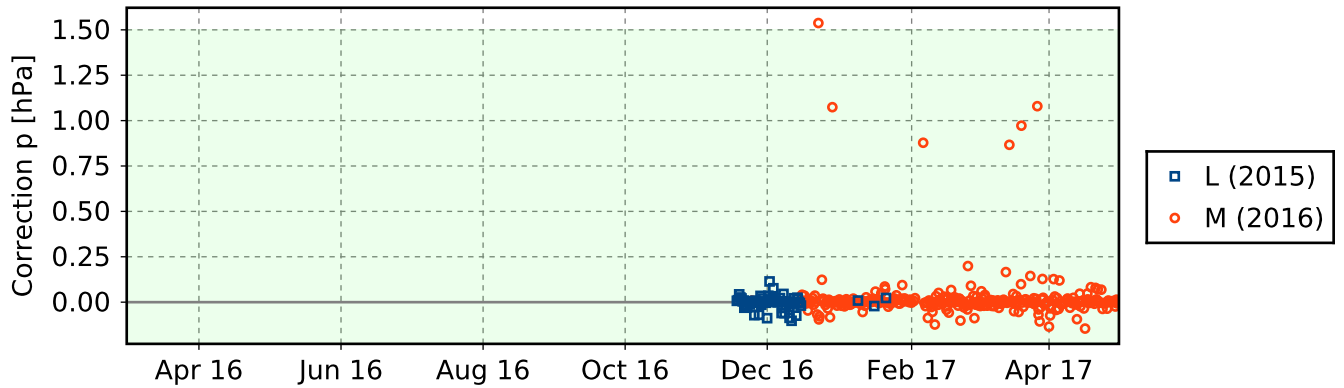
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366	RS92
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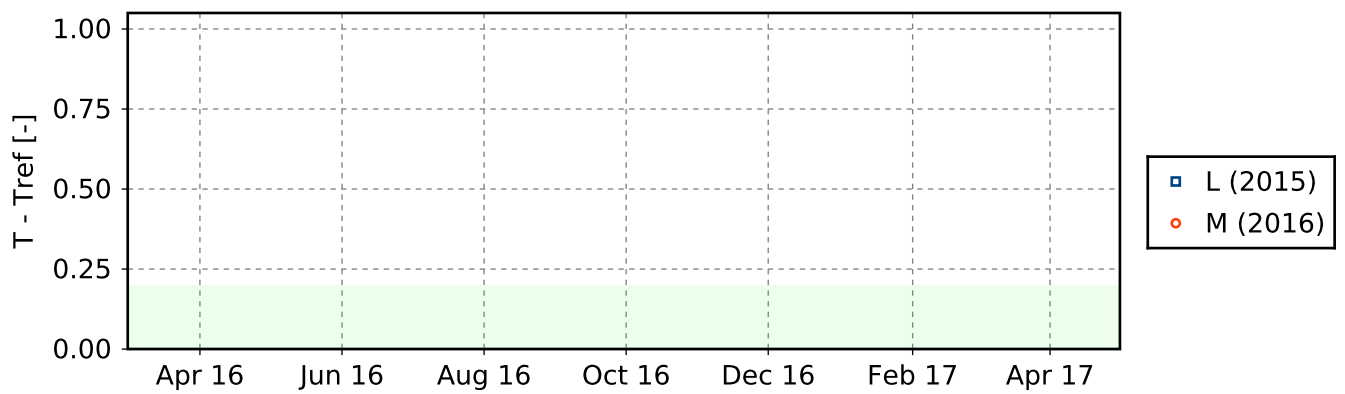
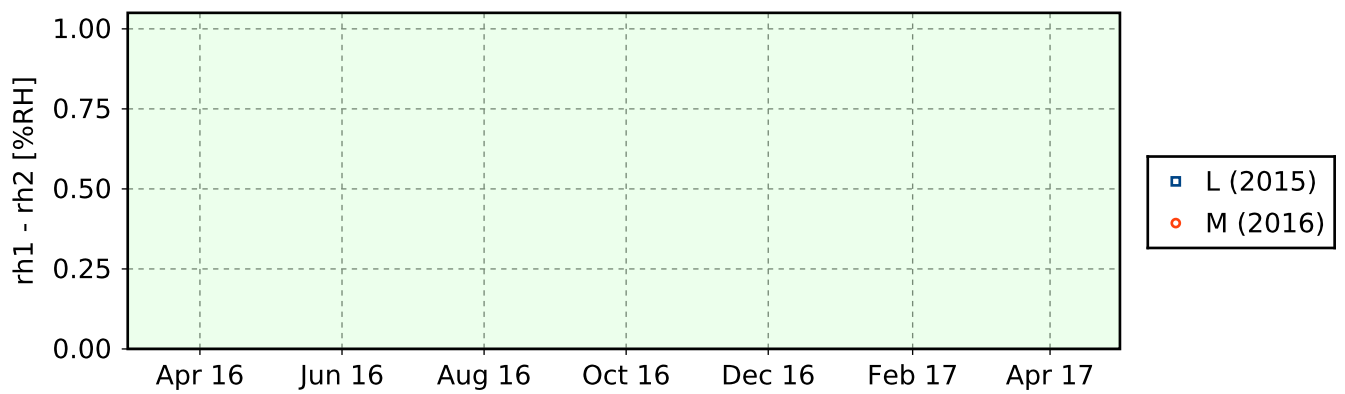
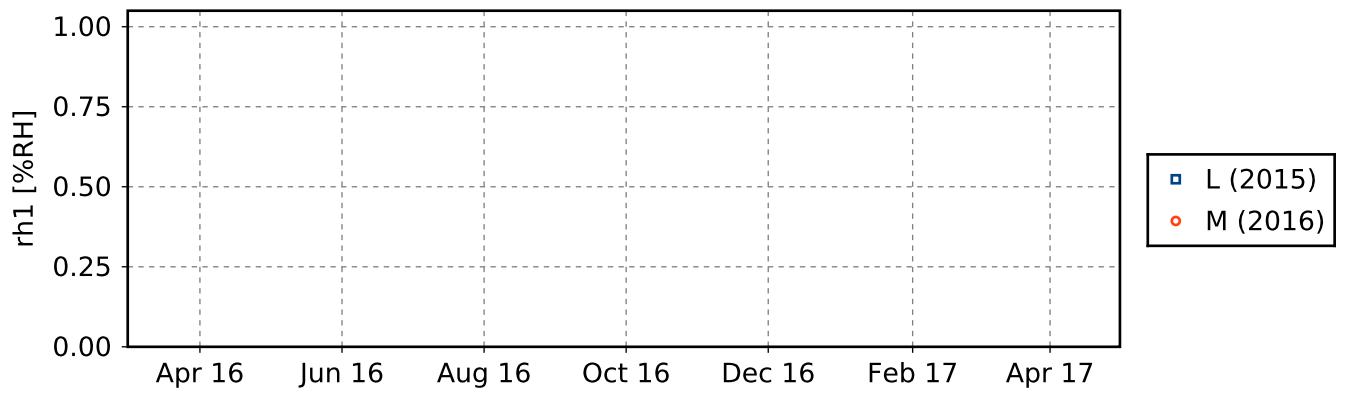
## 2.6 Instrument ground check

### 2.6.1 Stream: RS92

#### 2.6.1.1 GroundCheck: GC25



2.6.1.2 GroundCheck: SHC



2.7 Measurement events

2.7.1 Stream: RS92

