



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

Doc. 7.11
(18.V.2017)

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

Session 7

Helsinki, Finland

12 - 16 June 2017

GRUAN Site Report for Payerne

(Submitted by Gonzague Romanens)

Summary and Purpose of this Document

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

Overview

MeteoSwiss is operating two types of flights

- **Operational flights:** The SRS-C34 radiosonde was in operation since January 2011. The first of February, 2017 MeteoSwiss switched its operational soundings from SRS-C34 to SRS-C50. Measurements are taken at UT00:00 and UT12:00. Data submission of the SRS-C34 GRUAN product using RsLaunchClient started on 1st of September 2014 and was sent on a regular basis until the transition to SRS-C50. Activation of data submission for SRS-C50 to GRUAN is foreseen, but the timetable for this is being re-evaluated considering the new resources situation at Payerne (see Resourcing).
- **Research flights:** Since January 2015, the Vaisala RS92-SGP is launched in parallel with SRS-C34 radiosondes every week, alternating one flight during the night and one flight during the day. Since February 1st, 2017, a SRS-C50 is also added to this payload. Vaisala RS41 may also be added on this multiple payload but not on a regular basis. During one night flight per month a Meteolabor SnowWhite / COBALD sensor is added to the GRUAN launch for research purposes in collaboration with ETHZ.

Furthermore GNSS data are measured regularly since several years in Payerne. All the information about our GNSS instrumentation and the data flow has been submitted to the responsible persons for the GNSS data acquisition within GRUAN.

The Raman LIDAR at Payerne is operational (24H/7D) and measures profiles of water vapour, aerosols and temperature with an average data availability of 50% since 2008. A procedure using the solar background measured by the LIDAR is used to calibrate automatically the water vapour and is now operational. A significant quality improvement is under way for the temperature channels. Plans are to submit data to NDACC and GRUAN in HDF format.

A microwave radiometer of type HATPRO is operated at Payerne since 2007. Data are currently not submitted to GRUAN.

Change and change management

The new SRS-C50 is now operated since February 1st 2017. New software called UMSS (Universal Measurement Software System) from the Swiss company Meteolabor is used for data acquisition and data processing. To document changes between SRS-C34 and SRS-C50, comparisons are done by adding these radiosondes to the GRUAN research flights. This comparison will be undertaken during at least one year.

Resourcing

In 2016, four operators were instructed to perform the GRUAN Research Flights to support the original GRUAN team of 2 experts. Procedures and regular trainings are performed to follow this instruction and harmonize the pre-launch steps (Ground check, SPRH-100, payload preparation).

Since end of May, 2017, Dr Rolf Philipona is not working at MeteoSwiss anymore. A new contact person will be designated and proposed to the GRUAN Lead Centre during the coming months.

Operations

Since January 1st a new Swiss ordinance would require us to use helium instead of hydrogen. We are currently working on an exception request.

Site assessment and certification

During the GRUAN ICM-7 meeting in Matera, Italy, in February 2015 the Payerne GRUAN site became GRUAN certified for its Vaisala RS92 launches. Our goal is now to get the new SRS-C50 GRUAN also certified.

GRUAN-related research

Jeannet P., G. Levrat, G. Romanens and R. Philipona, 2016. Pressure and geopotential altitude comparison between the SRS-400 and SRS-C34 radiosondes. MeteoSwiss Technical Report 256, ISSN: 2296-0058.

Kräuchi A. and R. Philipona, 2016. Return glider radiosonde for in situ upper-air research measurements. *Atmos. Meas. Tech.*, 9, 25352544, 2016. doi:10.5194/amt-9-2535-2016.

Leblanc T., R.J. Sica, J.A.E. van Gijsel, S. Godin-Beekmann, A. Haefele, T. Trickl, G. Payen, and F. Gabarrot, 2016. Proposed standardized definitions for vertical resolution and uncertainty in the NDACC lidar ozone and temperature algorithms Part 1: Vertical resolution. *Atmos. Meas. Tech.*, 9, 40294049, 2016. doi:10.5194/amt-9-4029-2016.

Leblanc T., R.J. Sica, J.A. E. van Gijsel, S. Godin-Beekmann, A. Haefele, T. Trickl, G. Payen, F. Gabarrot, and G. Liberti, 2016. Proposed standardized definitions for vertical resolution and uncertainty in the NDACC lidar ozone and temperature algorithms Part 2: Ozone DIAL uncertainty budget. *Atmos. Meas. Tech.*, 9, 40514078, 2016. doi:10.5194/amt-9-4051-2016.

Leblanc T., R.J. Sica, J.A.E. van Gijsel, A. Haefele, G. Payen, and G. Liberti, 2016. Proposed standardized definitions for vertical resolution and uncertainty in the NDACC lidar ozone and tem-

perature algorithms Part 3: Temperature uncertainty budget. *Atmos. Meas. Tech.*, 9, 40794101, 2016. doi:10.5194/amt-9-4079-2016.

R. J. Sica and A. Haeefele, Retrieval of water vapor mixing ratio from a multiple channel Raman-scatter lidar using an optimal estimation method, *Appl. Opt.* 55, 763-777 (2016)

WG-GRUAN interface

The collaboration with the GRUAN Lead Centre concerning the definition of a GRUAN product for the Meteolabor SRS-C50 is very fruitful. A timetable for SRS-C50 data submission to the GRUAN Lead Centre will be defined in the near future.

Items for ICM-9 plenary discussions

The compatibility of radiosounding automatization related to GRUAN requirements should be addressed.

Future plans

The MeteoSwiss RSA_PAY project (semi-automatization of the Payerne radiosounding site) is ongoing. Operationalisation is planned for 2018. The automated system will be used for night-time launches as well as during weekends.



GRUAN Station Report for Payerne (PAY), 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	Payerne
Unique GRUAN ID	PAY
Geographical position	46.8100 °N, 6.9500 °E, 491.0 m
Operated by	MSWISS Office fédéral de météorologie et climatologie MeteoSuisse
Main contact	Philipona, Rolf
WMO no./name	06610 PAYERNE
Operators	current 12, change +0 / -0
Sounding Site	1
Lidar	1
GNSS	1

1.1 General information about GRUAN measurement systems

System	Type	Setups	Measurements	As scheduled
PAY-GN-01	GNSS	0	not operational	not scheduled
PAY-LI-01	Lidar	1	0	not scheduled
PAY-RS-01	Sounding Site	6	653	71.60 %

1.2 General comments from Lead Centre

1.2.1 General

Good communications between station and GRUAN LC.

2 System: GNSS Site PAYE (PAY-GN-01)

Info	Value
System name	GNSS Site PAYE
Unique GRUAN ID	PAY-GN-01
System type	GNSS (GN - GNSS)
Geographical position	46.8121 °N, 6.9439 °E, 548.7 m
Operated by	MSWISS Office fédéral de météorologie et climatologie MeteoSuisse
Instrument contact	Philipona, Rolf
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: Payerne Raman WV Lidar (RALMO) (PAY-LI-01)

Info	Value
System name	Payerne Raman WV Lidar (RALMO)
Unique GRUAN ID	PAY-LI-01
System type	Lidar (LI - Lidar)
Geographical position	46.8100 °N, 6.9500 °E, 491.0 m
Operated by	MSWISS Office fédéral de météorologie et climatologie MeteoSuisse
Instrument contact	Martucci, Giovanni
Started at	2013-09-01
Defined setups	1 (TEST-1)
Possible streams	-

3.1 Lead Centre comments

3.1.1 Dataflow

No LIDAR dataflow to GRUAN LC as yet.

4 System: Radiosonde Launch Site (PAY-RS-01)

Info	Value
System name	Radiosonde Launch Site
Unique GRUAN ID	PAY-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	46.8100 °N, 6.9500 °E, 491.0 m
Operated by	MSWISS Office fédéral de météorologie et climatologie MeteoSuisse
Instrument contact	Philipona, Rolf
Started at	-
Defined setups	6 (ROUTINE, OZONE, RESEARCH, SRS-TEST, DUAL, ROUTINE2)
Possible streams	COBALD, ECC, RS41, RS92, SRS-C34, SRS-C50

4.1 Lead Centre comments

4.1.1 Dataflow

Dataflow to GRUAN LC running intermittently since September 2011. This dataflow includes streams of the Meteolabor SRS-C34, Vaisala RS92-SGP, and Vaisala RS41 (since August 2014). All launches are promptly recorded using the RsLaunchClient.

The dataflow of operational soundings are temporarily stopped since 1 February 2017, because sonde change from Meteolabor SRS-C34 to Meteolabor SRS-C50.

4.1.2 General

Change of operational sonde from Meteolabor SRS-C34 to Meteolabor SRS-C50 was on 1 February 2017.

4.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCDC
---------	---------	--------------------	-----------------	---------------------

4.2.1 Stream: COBALD

COBALD		7	7	
--------	--	---	---	--

4.2.2 Stream: RS41

RS41		6	6	
RS41-RAW	001		6	
RS41-EDT	001		6	6

4.2.3 Stream: RS92

RS92		38	38	
RS92-RAW	001		38	
RS92-RAW	002		38	
RS92-EDT	001		38	38
RS92-GDP	002		38	28

4.2.4 Stream: SRS-C34

SRS-C34		653	653	
---------	--	-----	-----	--

4.3 Data availability of data products

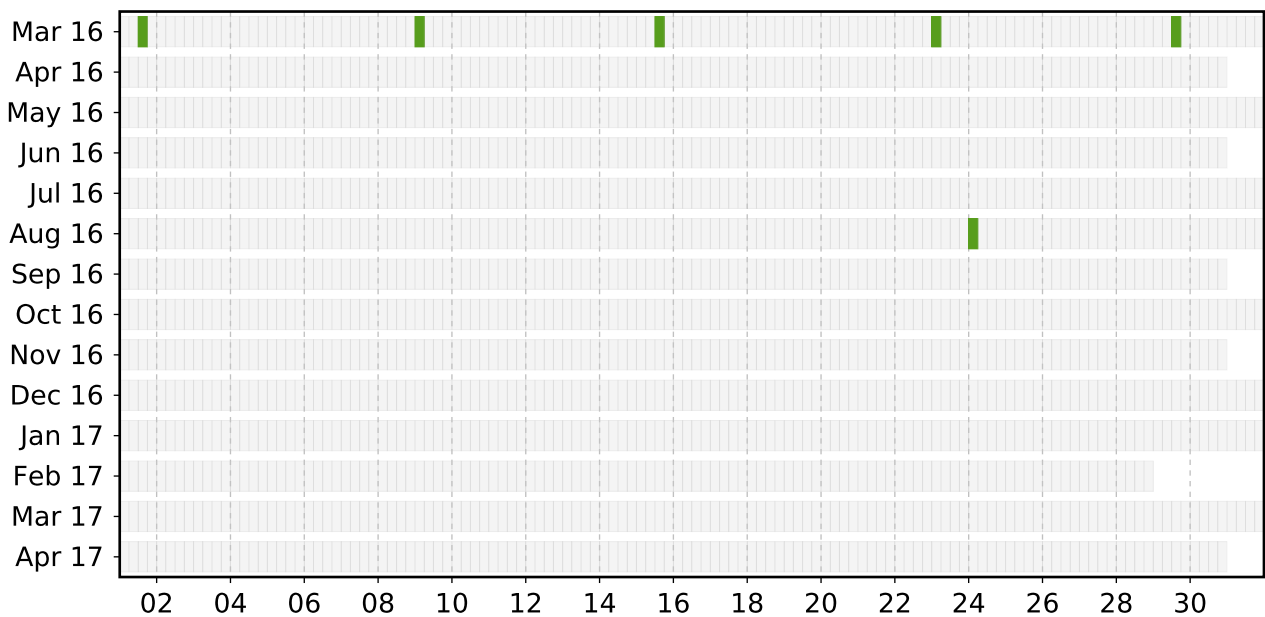
Available (green): All steps of processing have been successfully completed. The data file is available at NCEI (NCDC).

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.

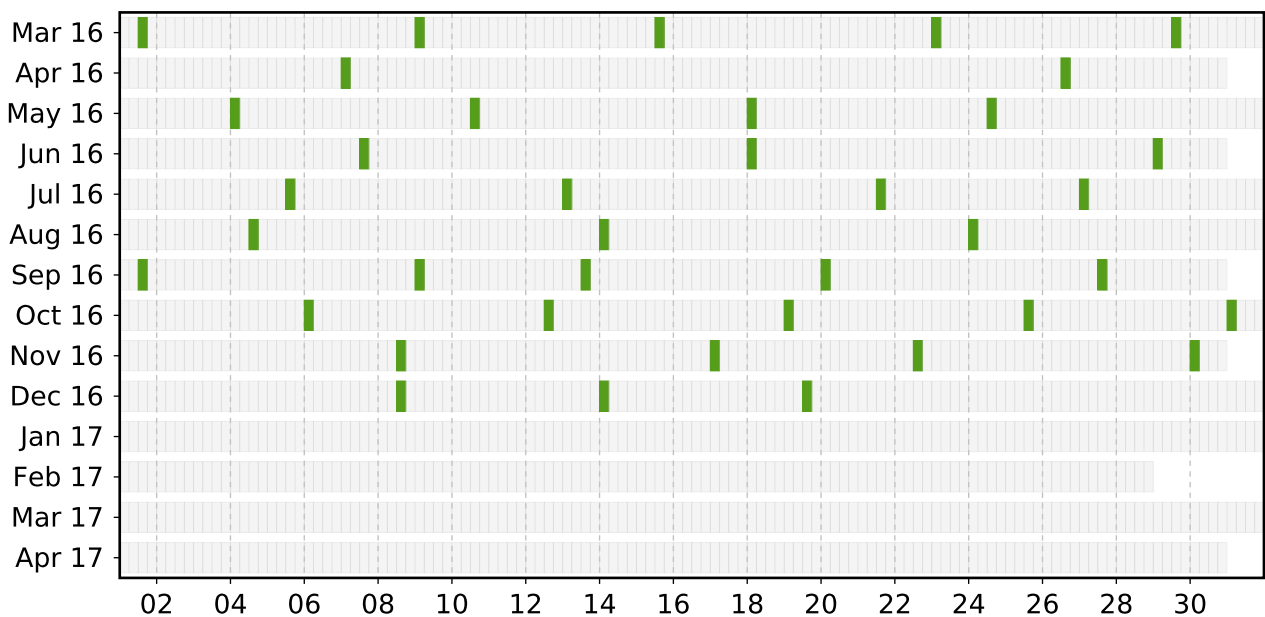
4.3.1 Stream: RS41 (Product: RS41-EDT-001)

Schedule data availability of stream RS41



4.3.2 Stream: RS92 (Product: RS92-EDT-001)

Schedule data availability of stream RS92



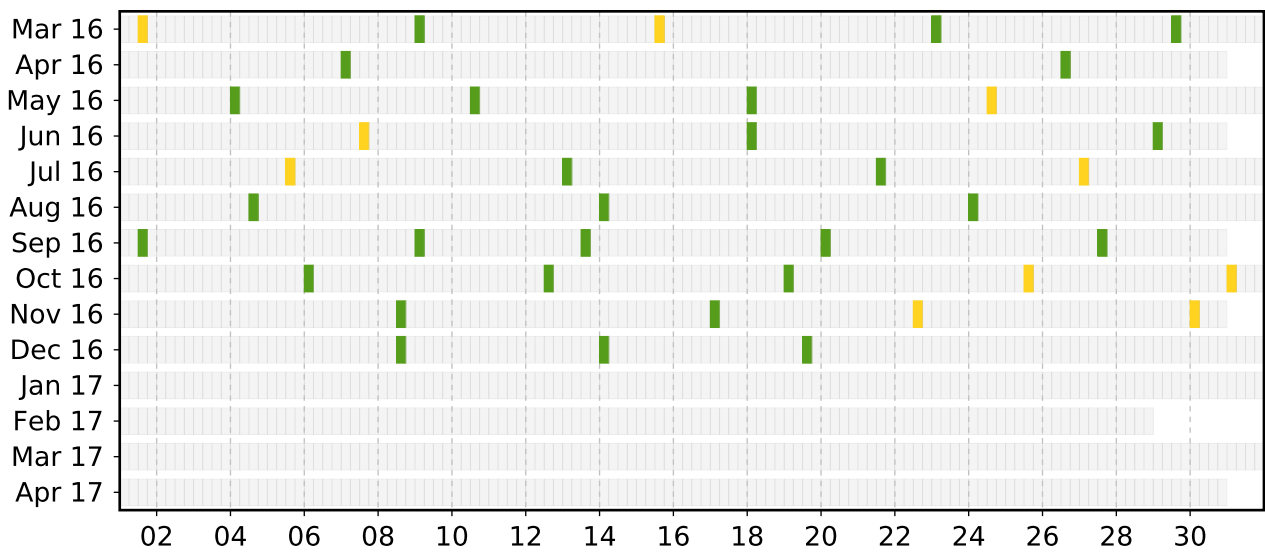
4.4 Data quality of current GRUAN data products

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

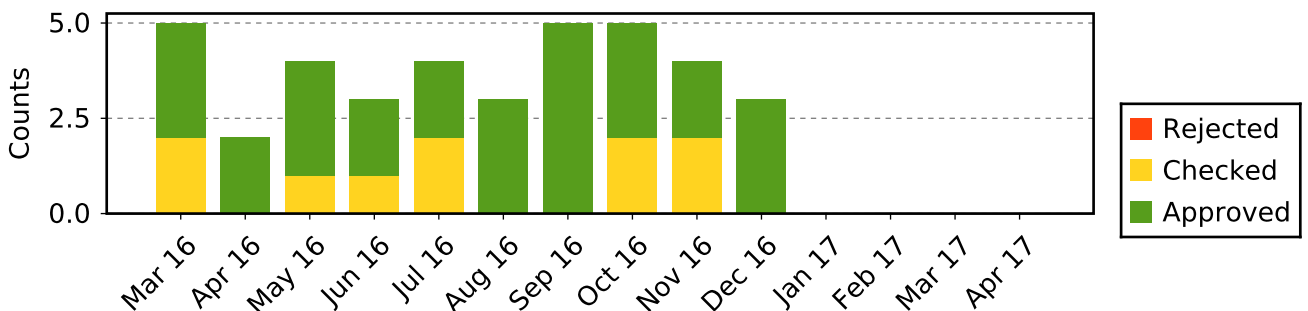
4.4.1 Stream: RS92 (Product: RS92-GDP-002)

Mar 16	5	3	2					2	2
Apr 16	2	2							
May 16	4	3	1					1	
Jun 16	3	2	1					1	
Jul 16	4	2	2					1	1
Aug 16	3	3							1
Sep 16	5	5							
Oct 16	5	3	2						2
Nov 16	4	2	2					1	1
Dec 16	3	3							
Jan 17									
Feb 17									
Mar 17									
Apr 17									
Total	38	28	10					6	7

Schedule data quality of stream RS92



Data quality statistic of stream RS92



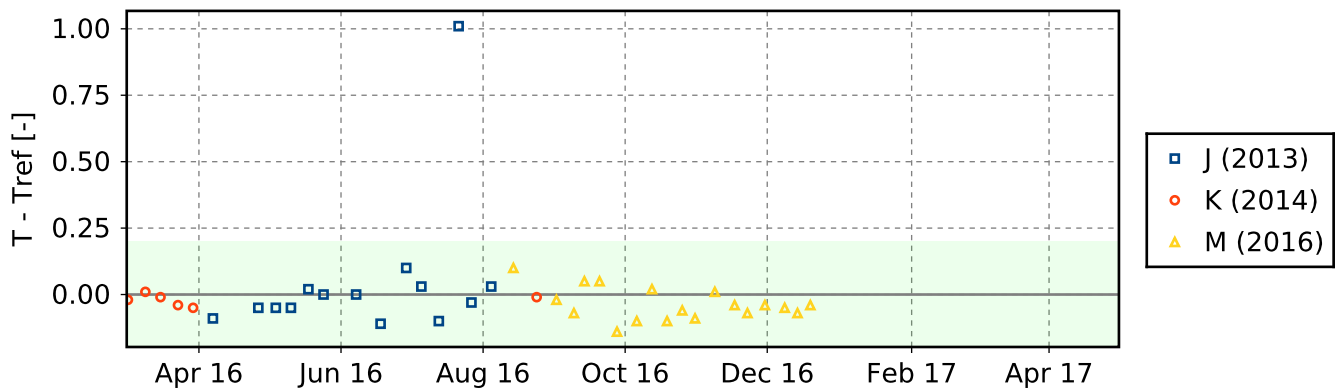
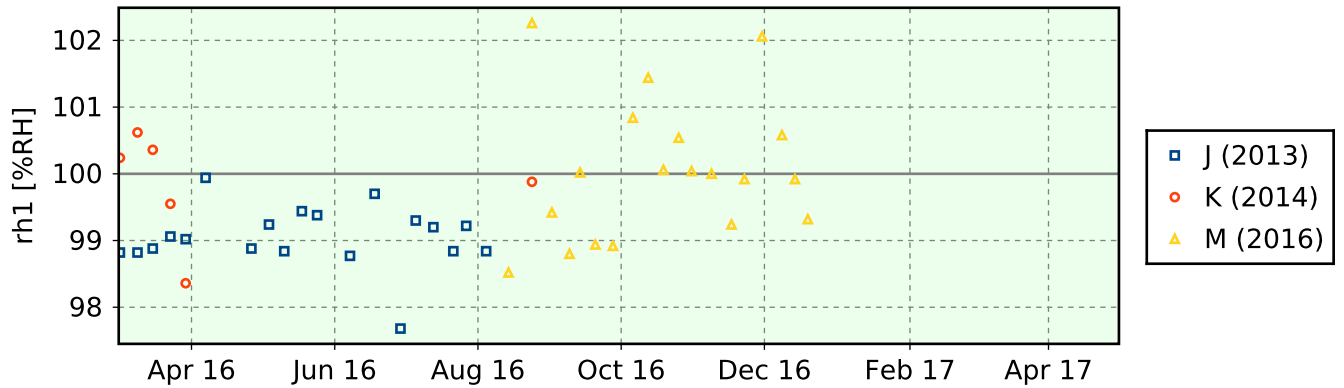
4.5 Instrument combinations of PAY-RS-01

Count	Instrument combination
2	COBALD, RS41, RS92, SRS-C34
5	COBALD, RS92, SRS-C34
4	RS41, RS92, SRS-C34
27	RS92, SRS-C34
615	SRS-C34

4.6 Instrument ground check

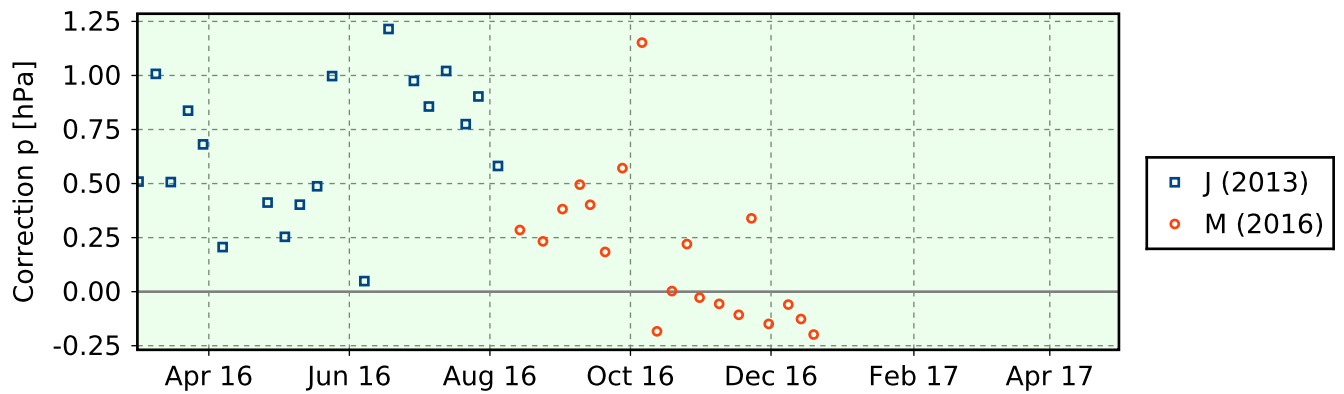
4.6.1 Stream: RS41

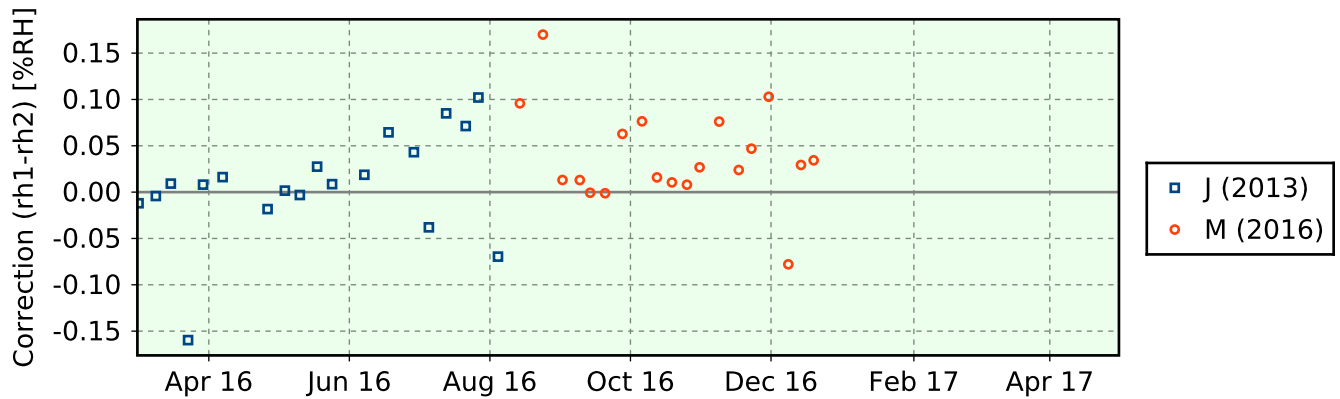
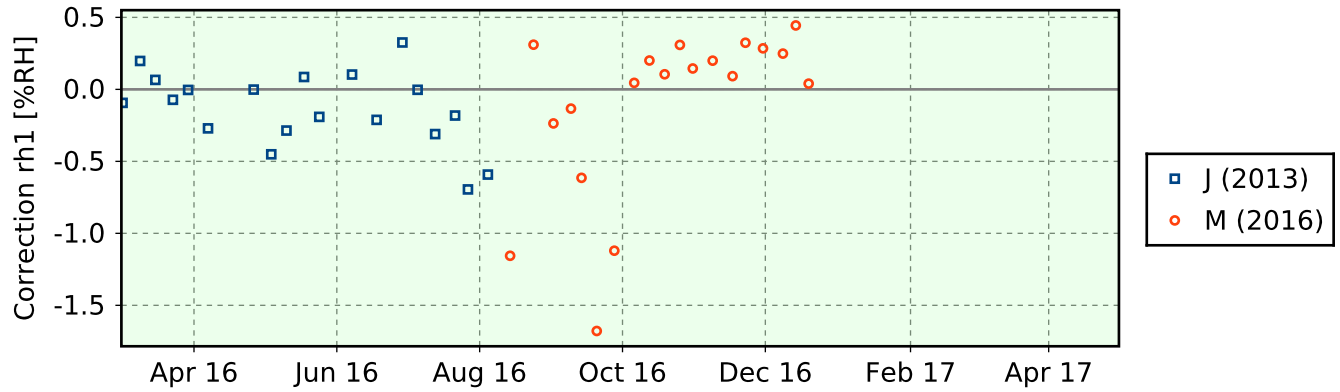
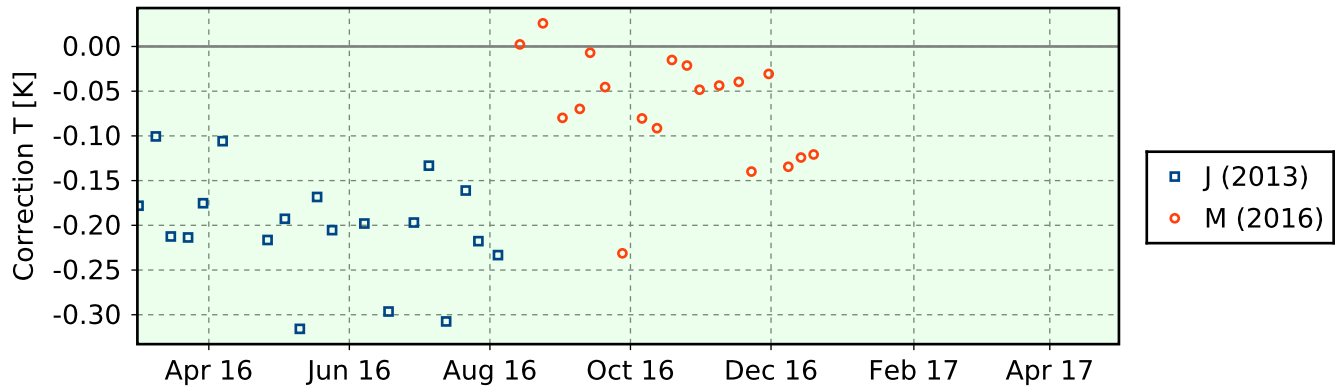
4.6.1.1 GroundCheck: SHC



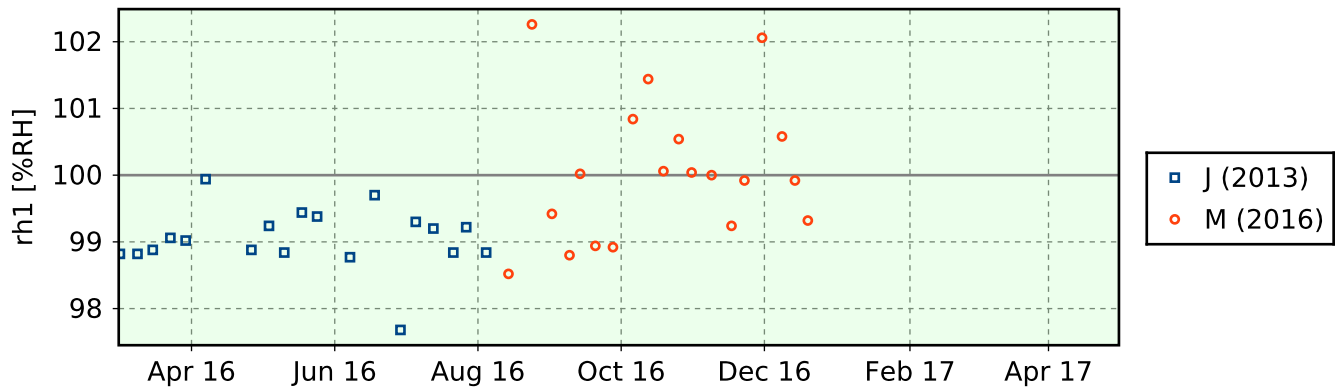
4.6.1 Stream: RS92

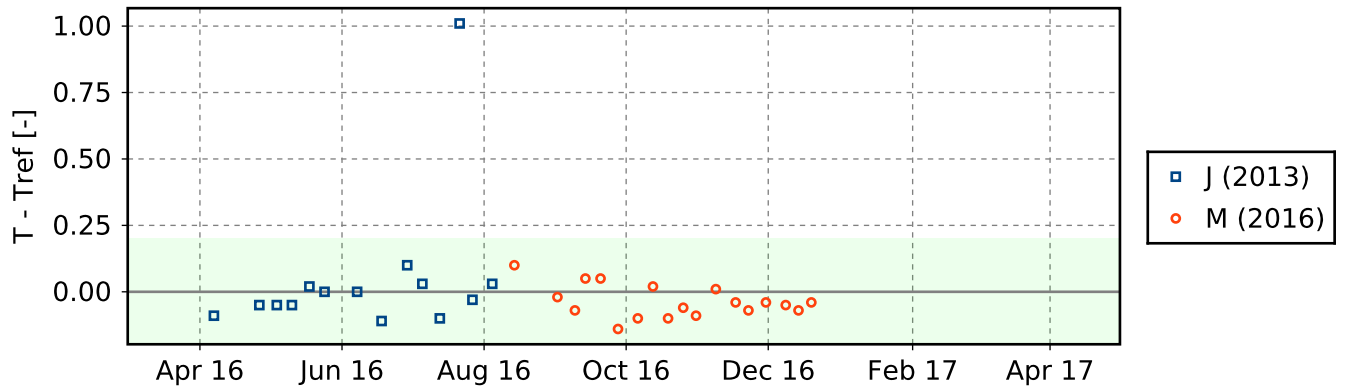
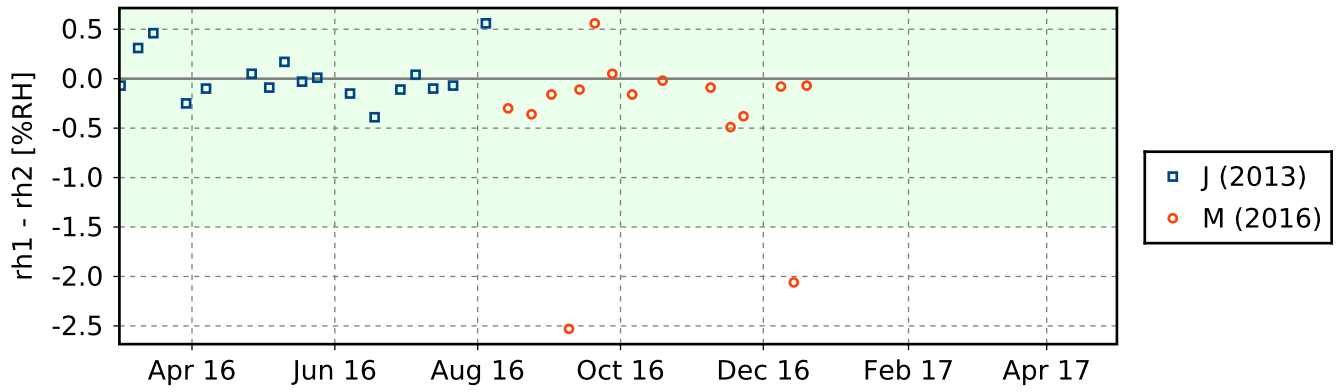
4.6.1.1 GroundCheck: GC25





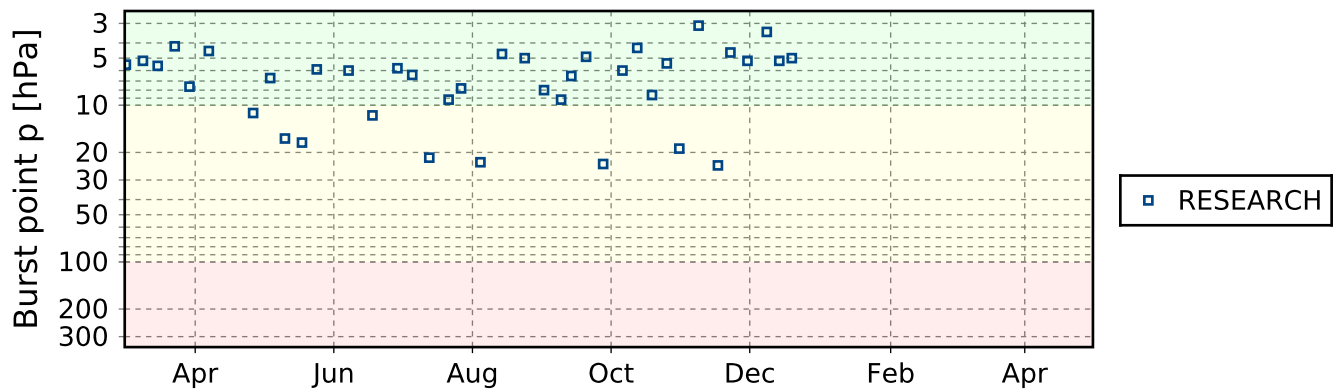
4.6.1.2 GroundCheck: SHC





4.7 Measurement events

4.7.1 Stream: RS41



4.7.1 Stream: RS92

