



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

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**7th GRUAN Implementation-
Coordination Meeting (ICM-7)**
Matera, Italy
23 February – 27 February 2015

Session 8

GRUAN Station Report for Lindenberg

(Submitted by Ruud Dirksen)

Summary and Purpose of Document

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



GRUAN Station Report for Lindenberg

Reporting for the period Mar 2014 to Jan 2015

Date: 4 February 2015

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Overview

Lindenberg contributes to the RS92 and the GNSS data streams.

Potential GRUAN data products are: CFH, DFM09, COBALD, RS41.

Change and change management

Preparations for the RS92/RS41 transition: RS41 was tested in the laboratory, RS92/RS41 twin soundings.

A ground check was developed for the CFH.

Resourcing

The head of the Lead Centre resigned and left last October. The recruitment procedure is not finished yet.

Site assessment and certification

Not applicable, site is GRUAN certified since 2013.

GRUAN related research

The Lead Centre aims to be a knowledge base for radiosounding and as such harbours a wide variety of facilities to test and characterise radiosondes. These facilities are in principle available to everyone within the radiosounding community, and several cooperations have taken place at the Lindenberg facilities. The laboratory experiments focus on the characterisation of error sources such as radiation error, as well as calibration accuracy and time lag of RH sensors. Within this framework the following radiosonde types were investigated: RS92 & RS41 (Vaisala), DFM09 (GRAW), M10 (Modem), RS11 & iMS-100 (Meisei).

Intercomparisons between various radiosonde types are routinely performed:

- RS92/DFM09 on a weekly basis
- RS92/CFH/DFM09 on a bi-weekly basis
- COBALD instrument is flown once per month, together with CFH/RS92/DFM09

Furthermore, the Lead Centre participated in the MORGANE validation campaign at La Reunion, by assisting and training the local staff in the preparation and operation of a CFH.

GRUAN processing and archiving of RS92 data takes place at the Lead Centre.

Publications:

Antón, M., D. Loyola, R. Roman, and H. Vömel, Validation of GOME-2/MetOp-A total water vapour column using reference radiosonde data from GRUAN network, *Atmos. Meas. Tech. Discuss.*, 7(9), 9573–9601, doi: 10.5194/amtd-7-9573-2014, 2014, URL <http://www.atmos-meas-tech-discuss.net/7/9573/2014/>.

Dirksen, R. J., et al., Reference quality upper-air measurements: GRUAN data processing for the Vaisala RS92 radiosonde, *Atmos. Meas. Tech.*, 7(12), 4463–4490, doi:10.5194/amt-7-4463-2014, 2014.

WG-GRUAN interface

Not applicable.

Items for ICM-7 plenary discussions

New/other measurement techniques for reference measurements.

Future plans

Continuation of the existing intercomparison program.

Further investigation of the RS41 radiosonde, both in flight and in the laboratory.

Participating in the MORGANE campaign at La Reunion.

Development of the GRUAN dataprocessor version 3.



GRUAN Station Report for Lindenberg (LIN), 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	Lindenberg
Unique GRUAN ID	LIN
Geographical position	52.2100 °N, 14.1200 °E, 98.0 m
Operated by	MOL Meteorologisches Observatorium Lindenberg, part of: DWD Deutscher Wetterdienst
Main contact	Dirksen, Ruud
WMO no./name	10393 LINDENBERG
Operators	current 15, change +1 / -1
Sounding Site	1
GNSS	2

1.1 General information about GRUAN measurement systems

System	Type	Setups	Measurements	As scheduled
LIN-GN-01	GNSS	1	0	0.00 %
LIN-GN-02	GNSS	0	0	not scheduled
LIN-RS-01	Sounding Site	3	1493	105.96 %

1.2 General comments from Lead Centre

1.2.1 General

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

1.2.2 GTS

This site regularly sends PTU measurements in the GTS (BUFR format, 2s resolution, 4 times per day).

2 System: GNSS Site LDB0 (LIN-GN-01)

Info	Value
System name	GNSS Site LDB0
Unique GRUAN ID	LIN-GN-01
System type	GNSS (GN - GNSS)
Geographical position	52.2096 °N, 14.1185 °E, 160.2 m
Operated by	GFZ Deutsches GeoForschungsZentrum GFZ, part of: HELMHOLTZ Helmholtz-Gemeinschaft
Instrument contact	Bisek, Krispin
Started at	2007-05-25
Defined setups	1 (HOURLY)
Possible streams	-

2.1 Lead Centre comments

2.1.1 Dataflow

Dataflow of GNSS data to GRUAN LC and to the GRUAN GNSS processing centre at GFZ has started in September 2013. The Lindenberg GNSS station is one of two test sites to implement the GNSS dataflow in GRUAN. The current dataflow includes manufacturer raw data, converted raw data (RINEX) and instrument logs, containing all equipment changes.

3 System: GNSS Site LDB2 (LIN-GN-02)

Info	Value
System name	GNSS Site LDB2
Unique GRUAN ID	LIN-GN-02
System type	GNSS (GN - GNSS)
Geographical position	52.2091 °N, 14.1209 °E, 159.5 m
Operated by	-
Instrument contact	Bisek, Krispin
Started at	-
Defined setups	-
Possible streams	-

3.1 Lead Centre comments

3.1.1 Dataflow

No GNSS dataflow to GRUAN LC as yet.

4 System: Lindenberg Launch Site (LIN-RS-01)

Info	Value
System name	Lindenberg Launch Site
Unique GRUAN ID	LIN-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	52.2100 °N, 14.1200 °E, 112.0 m
Operated by	MOL Meteorologisches Observatorium Lindenberg, part of: DWD Deutscher Wetterdienst
Instrument contact	Dirksen, Ruud
Started at	-
Defined setups	3 (RESEARCH, ROUTINE, OZONE)
Possible streams	CFH, ECC, RS41, RS80, RS92

4.1 Lead Centre comments

4.1.1 Dataflow

Sonde dataflow to the GRUAN LC operational since January 2008. This dataflow includes streams of the Vaisala RS92-SGP, ECC Ozone sonde, CFH water vapour, and Internet iMet-1. All launches are promptly recorded using the RsLaunchClient. The site is used as test bed for the RsLaunchClient.

4.1.2 Data quality

GC25 ground check corrections are largely within expected limits.

A manufacturer independent additional ground check using the Standard Humidity Chamber (SHC) is used for all radiosonde launches.

Very few metadata issues have been identified. Those that were found were corrected.

4.1.3 General

Routine soundings are performed four times per day. Ozone soundings are performed once per week. Research soundings using CFH, ECC, iMet-1, and Vaisala RS92 are launched twice per month. Graw radiosondes have been used as redundant sonde during weekly dual soundings. Various sonde combinations have been flown through the reporting period.

4.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCDC
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4.2.1 Stream: CFH

CFH		26	26	
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4.2.2 Stream: DFM09

DFM09		50	50	
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4.2.3 Stream: ECC

ECC		81	81	
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Product	Version	Soundings received	Available at LC	Distributed by NCDC
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4.2.4 Stream: IMET1

IMET1		25	25	
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4.2.5 Stream: RS11

RS11		6	6	
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4.2.6 Stream: RS92

RS92		1496	1496	
RS92-RAW	001		1487	
RS92-GDP	001		281	
RS92-GDP	002		1402	1366

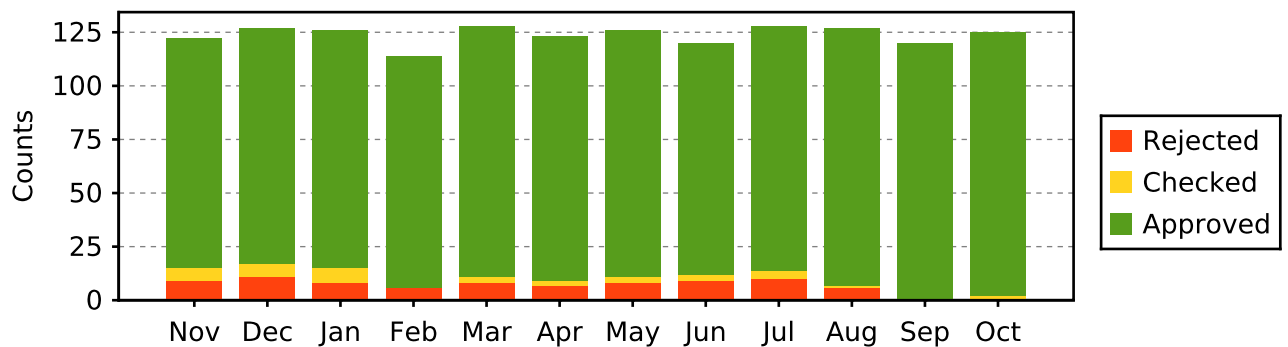
4.3 Data quality of current GRUAN data products

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

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

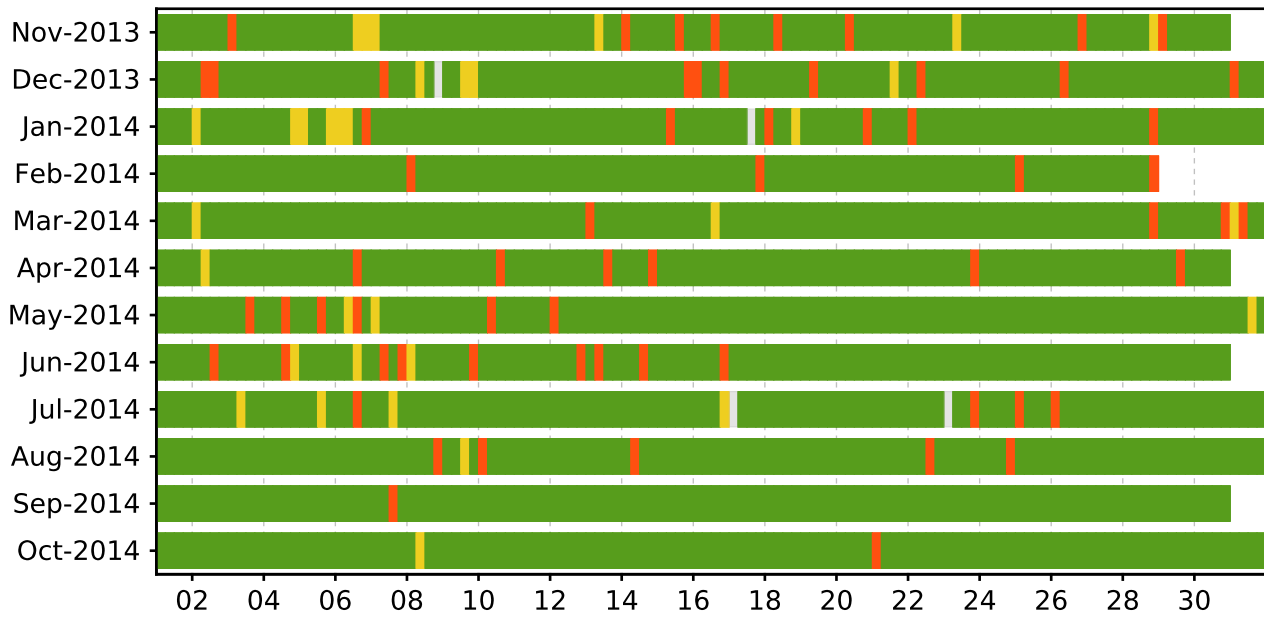
Nov 13	122	107	6	9	4		9	5	11
Dec 13	127	110	6	11	2		9	8	19
Jan 14	126	111	7	8	5		3	4	31
Feb 14	114	108		6	4		1	4	8
Mar 14	128	117	3	8	1		4	12	14
Apr 14	123	114	2	7	3		4	6	13
May 14	126	115	3	8	4		4	9	21
Jun 14	120	108	3	9	2		6	8	13
Jul 14	128	114	4	10	1		6	10	6
Aug 14	127	120	1	6	2		1	8	4
Sep 14	120	119		1			1	7	16
Oct 14	125	123	1	1	1			7	18
	1486	1366	36	84	29		48	88	174

Data quality statistic of stream RS92



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

Schedule data quality of stream RS92



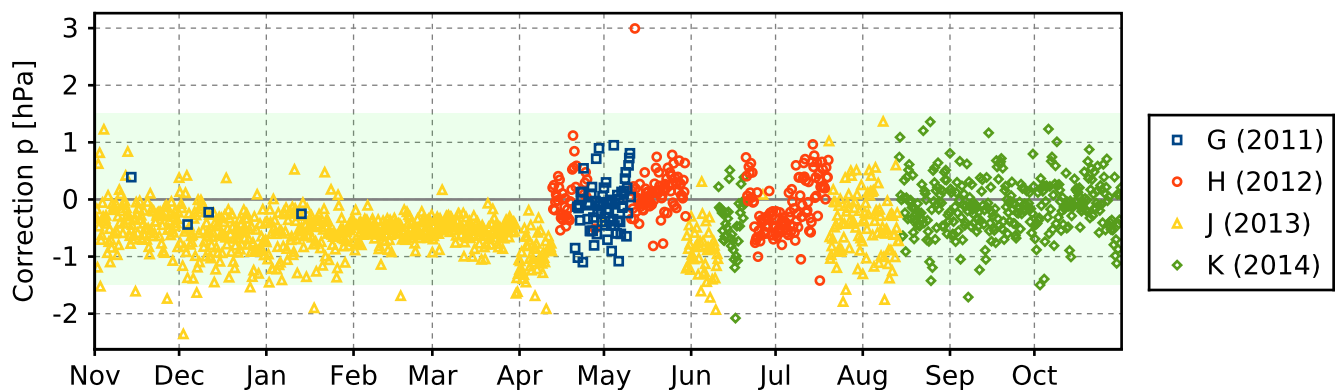
4.4 Instrument combinations of LIN-RS-01

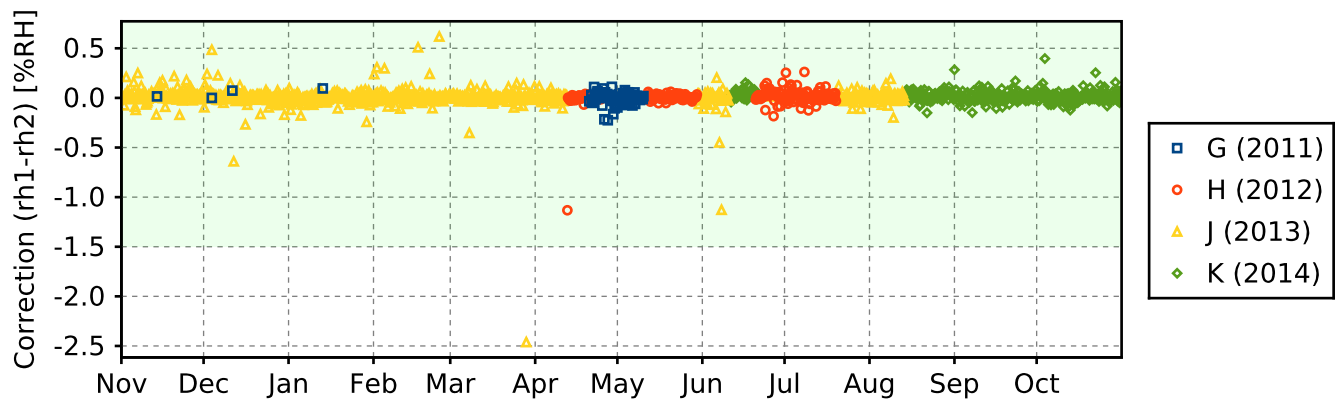
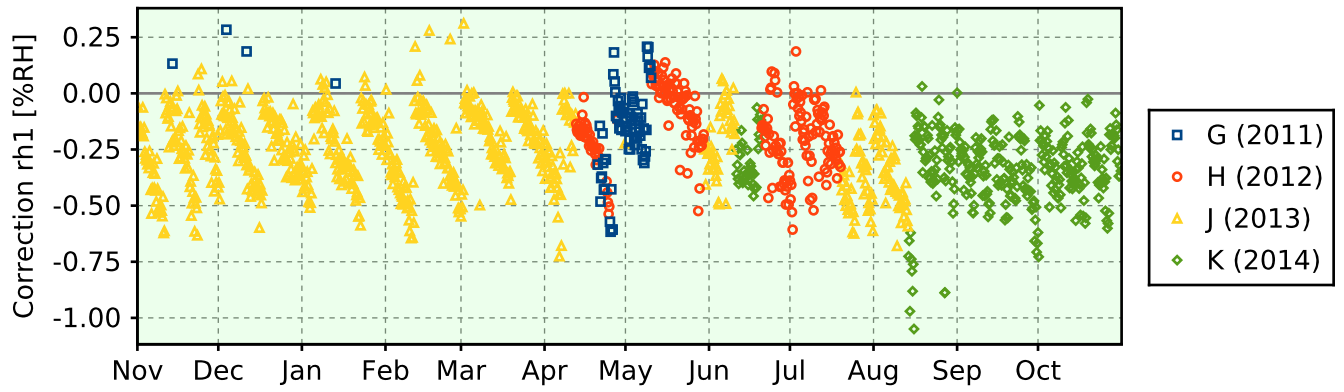
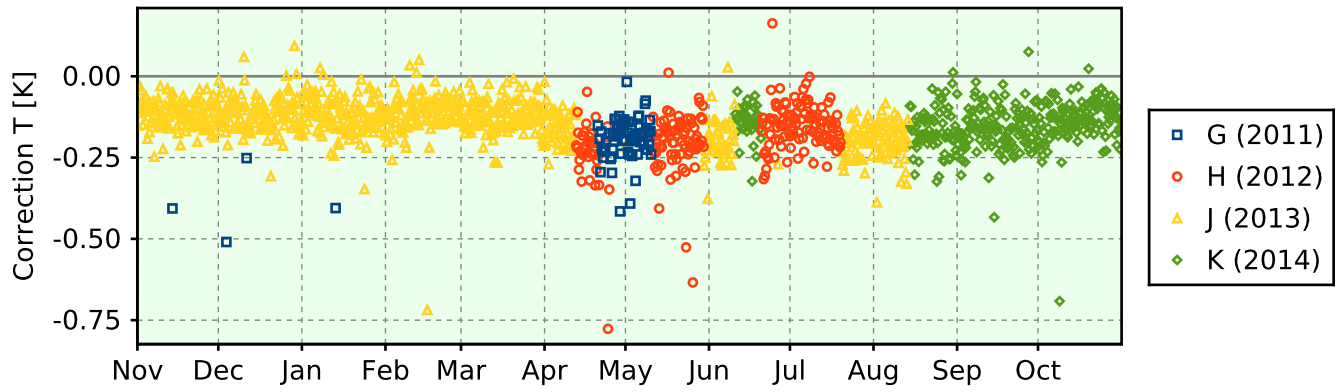
Count	Instrument combination
1	CFH, DFM09, ECC, IMET1, RS11, RS92
19	CFH, DFM09, ECC, IMET1, RS92
3	CFH, DFM09, ECC, IMET1, 2x RS92
1	2x CFH, DFM09, ECC, IMET1, RS92
1	CFH, IMET1, RS92
26	DFM09, RS92
57	ECC, RS92
5	RS11, RS92
1380	RS92

4.5 Instrument ground check

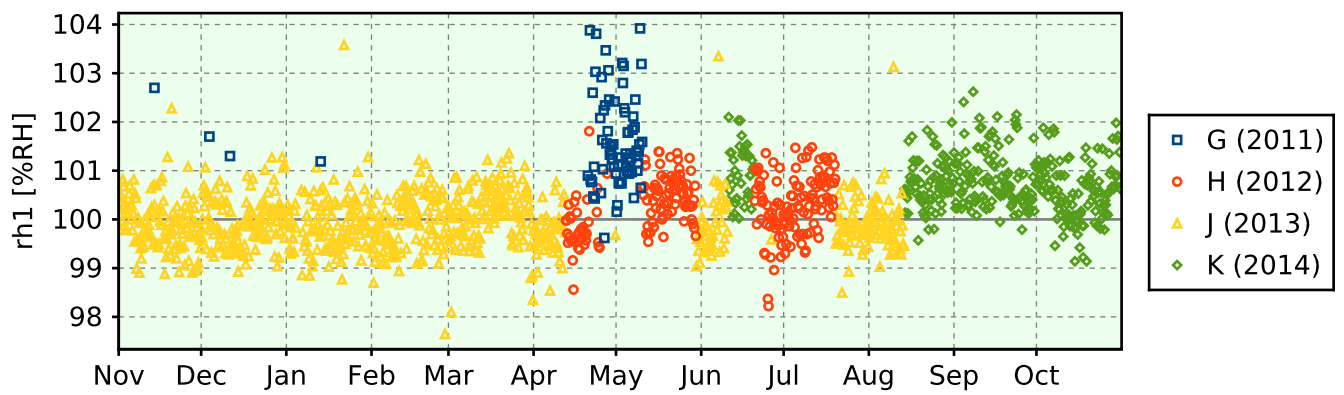
4.5.1 Stream: RS92

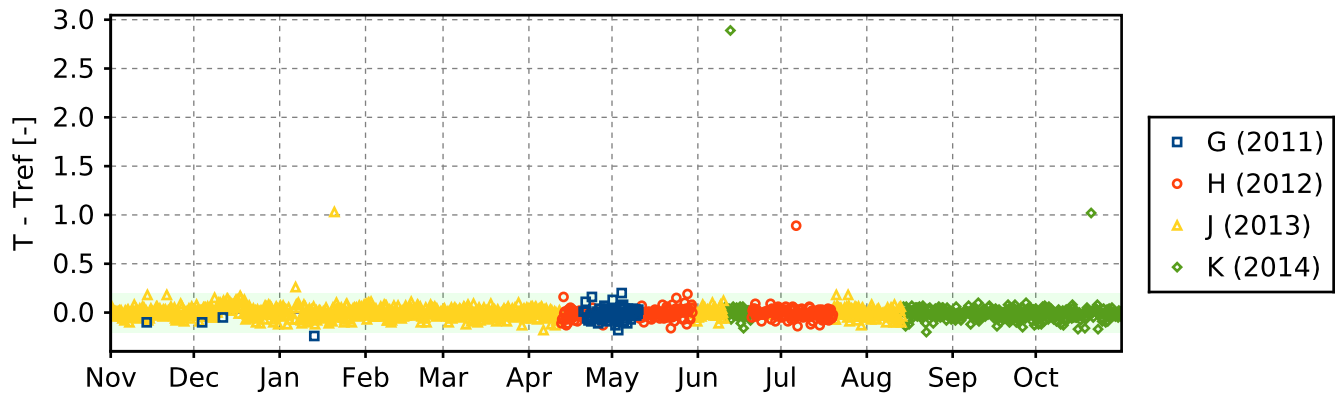
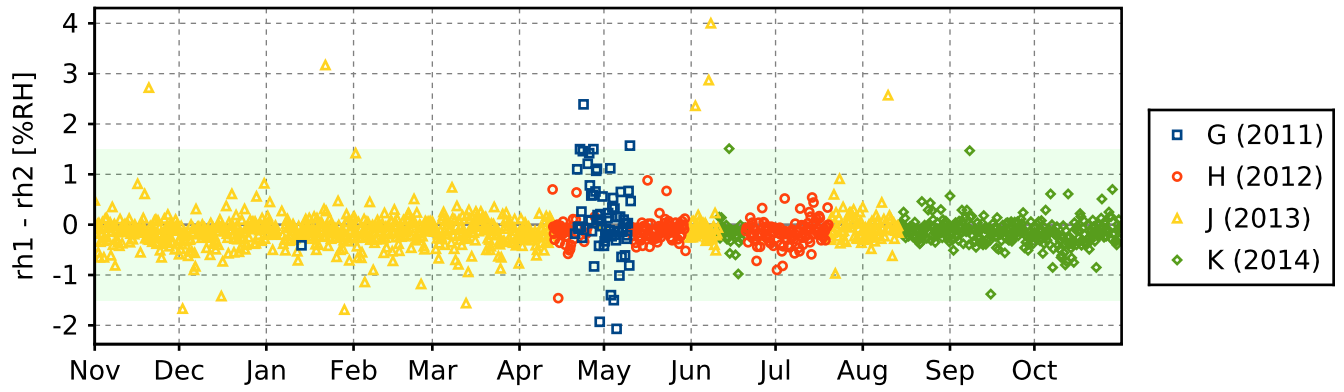
4.5.1.1 GroundCheck: GC25





4.5.1.2 GroundCheck: SHC





4.6 Measurement events

4.6.1 Stream: RS92

