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Coordination Meeting (ICM-8)**

Session 7

Boulder, USA

25 April – 29 April 2016

GRUAN Station Report for Ny-Ålesund

(Submitted by Marion Maturilli)

Summary and Purpose of Document

Report from the GRUAN station Ny-Ålesund for the period March 2015 to March 2016.



GRUAN Station Report for Ny-Ålesund (NYA)

Reporting for the period Mar 2015 to Mar 2016

Date: 5 –Apr -2016

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Overview

The Ny-Ålesund dataflow for RS92 soundings is settled and certified, providing 1x daily radiosonde data to the GRUAN Lead Centre. Additional radiosonde profiles were provided for campaign periods with increased sounding activity.

Regarding management of change, the new radiosonde type RS41 is scheduled to become the next standard radiosonde at Ny-Ålesund. A first test campaign took place in July/August 2015. The receiving system, ground check installation and processing system have been set up permanently in February 2016. Since March 2016, once weekly dual soundings of RS92 and RS41 contribute to the GRUAN dataflow.

Furthermore, bi-monthly CFH launches were continued, providing profile data for 18 March, 7 May, 15 July, 9 September, and 11 November 2015, as well as 29 February 2016. Due to an accident of the launch personal, the launch scheduled for January 2016 had to be cancelled. All Ny-Ålesund CFH data are provided to the GRUAN Lead Centre.

Dataflow of GNSS data to GRUAN LC and the GRUAN GNSS processing centre at GFZ has started in September 2013. The Ny-Ålesund 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.

Once formal data products have been defined, the Ny-Ålesund site may contribute to GRUAN data streams with lidar data, microwave radiometer data and ozone sonde data.

Change and change management

With the arrival of the new overwintering team in April/May 2015, the operators have changed accordingly.

Changes in instruments/expendables regard the exchange of temperature sensors in the ground check procedures (GC25, weather hut) to keep the calibration standard. The according calibration sheets are sent to the GRUAN LC in a separate mail.

The radiosonde RS41 is scheduled to become the next standard radiosonde at Ny-Ålesund. After a technical test phase in summer 2015, the ground equipment and software have been set up in an operational state in February 2016. Dual launches with RS92 and RS41 are operated once per week since March 2016. Thus, the Ny-Ålesund data stream for RS41 has initiated with regular weekly RS41 soundings in March 2016. It is planned to keep the standard daily soundings with RS92 and have weekly dual launches with RS41 for the period of one year. Depending on the performance, this scheme will either continue for another year, or will be switched in spring 2017 to have the standard daily radiosounding with the RS41 plus weekly dual launches with RS92 for the period of at least

one year. In any case, it is planned to have weekly dual soundings with both sonde types for a period of at least 2 years.

Resourcing

Currently, there are no financial challenges. To tackle future challenges regarding the Ny-Ålesund CFH program, it will be helpful if CFH becomes a GRUAN data product as soon as possible.

Site assessment and certification

- already certified -

GRUAN-related research

In 2014, the MeteoMet EMRP project “Arctic Metrology Campaign” was performed in Ny-Ålesund, with special calibration devices transported on site for the calibration of sensors involved in the pre-launch ground check of radiosondes contributing to GRUAN. The experience of this pilot study brought closer together the observers’ and metrology community, growing the idea of a permanent Arctic Metrology Facility in a polar research station, to directly link metrological traceability to on site environmental measurements. The implementation of dedicated devices, specific calibration procedures, and uncertainty evaluations including quantities of influence are now subject of the EURAMET-EMRP proposal “Metrology in Key Climate Regions”, with the involvement of the GRUAN site Ny-Ålesund, scientists of the AWIPEV research base as well as other research structures in Ny-Ålesund.

Regarding the 23-year Ny-Ålesund radiosonde dataset, a manuscript on the homogenized data set and its indications for climate change has been submitted and is currently under review:

Maturilli, M., and M. Kayser: Arctic warming, moisture increase and circulation changes observed in the Ny-Ålesund homogenized radiosonde record. *Theoretical and Applied Climatology*, submitted June 2015

other GRUAN-related publications:

Maturilli, M., and C. Ritter: Surface Radiation during the Total Solar Eclipse over Ny-Ålesund, Svalbard, on 20 March 2015. *Earth System Science Data*, 2016, accepted

Merlone, A., C. Musacchio, A. Viola, V. Vitale, and M. Maturilli: Towards a calibration laboratory in Ny Ålesund. *Rendiconti Lincei*, submitted Jan. 2016

WG-GRUAN interface

- currently no request -

Items for ICM-8 plenary discussions

- status and time schedule of CFH data product
- development/discussion of alternatives for frost point hygrometers (regarding costs and environmental aspects of cryogen)

Future plans

We will assess the performance of the RS41 radiosonde from a polar perspective. During recent cold stratospheric winters, we had problems operating the RS92 with lithium batteries and had to rely on our remaining supply of water batteries. During the upcoming year of dual soundings we will investigate the performance of lithium-operated RS41 under polar conditions. The decision on the final switching to the new sonde type in Ny-Ålesund will depend on the outcome of these considerations.

The special location of the stations and the long term homogenised time series from radiosonde, GNSS, and VLBI makes it particularly interesting to analyse the temporal evolution of atmospheric water vapour for detecting climatic trends. An inter-comparison of the trends estimated from different data sets will be achieved.



GRUAN Station Report for NyAlesund (NYA), 2015

Reported time range is Nov 2014 to Feb 2016

Created by the Lead Centre

Version from 2016-04-18

1 General GRUAN station information

Info	Value
Station name	NyAlesund
Unique GRUAN ID	NYA
Geographical position	78.9200 °N, 11.9400 °E, 5.0 m
Operated by	AWI Alfred-Wegener-Institut für Polarforschung, part of: HELMHOLTZ Helmholtz-Gemeinschaft
Main contact	Maturilli, Marion
WMO no./name	-
Operators	current 14, change +4 / -0
Sounding Site	1
GNSS	1

1.1 General information about GRUAN measurement systems

System	Type	Setups	Measurements	As scheduled
NYA-GN-01	GNSS	1	0	not scheduled
NYA-RS-01	Sounding Site	5	511	104.93 %

1.2 General comments from Lead Centre

1.2.1 General

Good communications between station and GRUAN LC.

1.2.2 GTS

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

2 System: GNSS Site NYA2 (NYA-GN-01)

Info	Value
System name	GNSS Site NYA2
Unique GRUAN ID	NYA-GN-01
System type	GNSS (GN - GNSS)
Geographical position	78.5136 °N, 11.5212 °E, 49.1 m
Operated by	GFZ Deutsches GeoForschungsZentrum GFZ, part of: HELMHOLTZ Helmholtz-Gemeinschaft
Instrument contact	Ramatschi, Markus
Started at	2000-03-13
Defined setups	1 (HOURLY)
Possible streams	-

2.1 Lead Centre comments

2.1.1 Dataflow

Dataflow of GNSS data to GRUAN LC and the GRUAN GNSS processing centre at GFZ has started in September 2013. This 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: Radiosonde Launch Site (NYA-RS-01)

Info	Value
System name	Radiosonde Launch Site
Unique GRUAN ID	NYA-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	78.9230 °N, 11.9227 °E, 15.7 m
Operated by	AWI-POTSDAM Forschungsstelle Potsdam, part of: AWI Alfred-Wegener-Institut für Polarforschung, part of: HELMHOLTZ Helmholtz-Gemeinschaft
Instrument contact	Maturilli, Marion
Started at	-
Defined setups	5 (ROUTINE, OZONE, FLASH, CFH, DUAL1)
Possible streams	CFH, ECC, RS41, RS92

3.1 Lead Centre comments

3.1.1 Dataflow

Sonde dataflow to the GRUAN LC is operational since April 2012. This dataflow includes streams of the Vaisala RS92-SGP, ECC Ozone sonde, CFH water vapour, and Internet IMET-1. All launches are promptly submitted using the RsLaunchClient.

3.1.2 Data quality

GC25 ground check corrections are within expected limits.

A manufacturer independent additional ground check using the Standard Humidity Chamber (SHC) is used. The data are submitted to the Lead Centre.

In addition, the site performs an additional ground check at ambient conditions in a shelter prior to launch, which is recorded and submitted to the Lead Centre for further analysis.

3.1.3 General

A campaign with dual launches (RS41 and RS92) was held in July/August 2015.

3.2 GRUAN data products

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

CFH		8	8	
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3.2.2 Stream: ECC

ECC		123	123	
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3.2.3 Stream: RS41

RS41		20	20	
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3.2.4 Stream: RS92

RS92		511	511	
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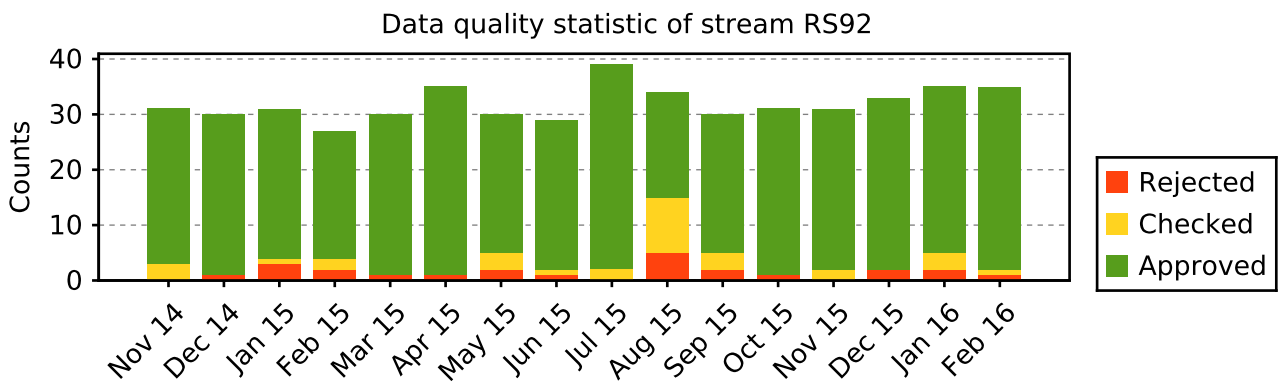
Product	Version	Soundings received	Available at LC	Distributed by NCDC
RS92-RAW	001		511	
RS92-GDP	002		487	456

3.3 Data quality of current GRUAN data products

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

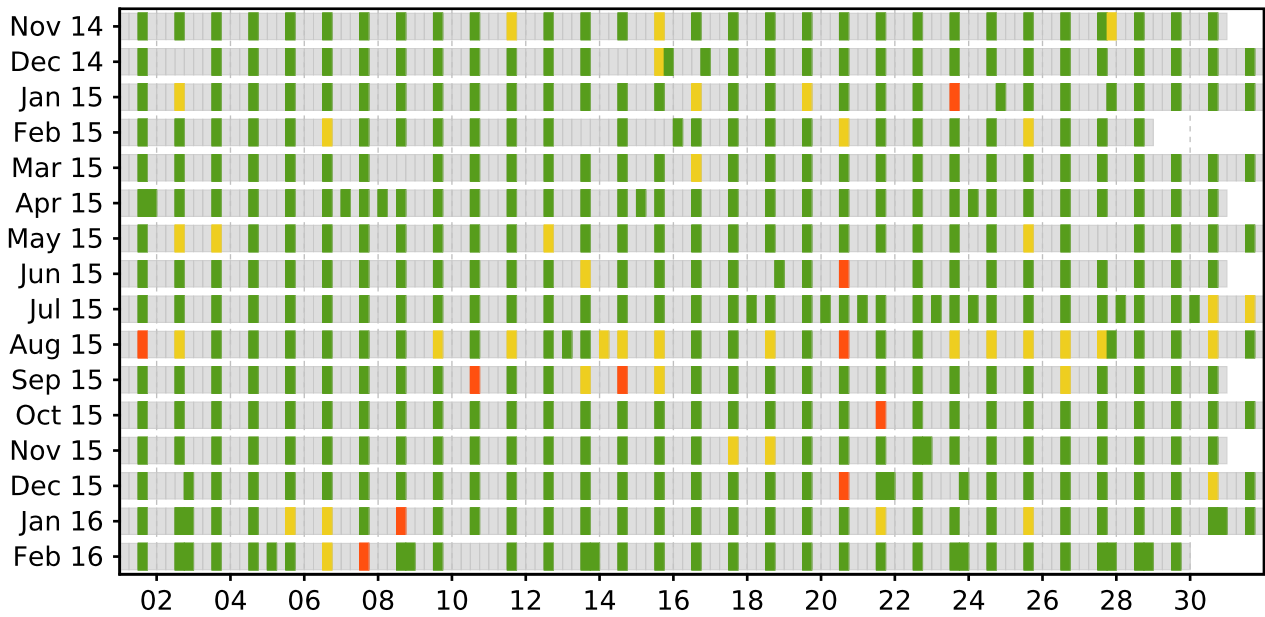
3.3.1 Stream: RS92 (Product: RS92-GDP-002)

Nov 14	31	28	3				3		7
Dec 14	30	29		1					1
Jan 15	31	27	1	3			2		5
Feb 15	27	23	2	2			3		4
Mar 15	30	29		1			1		10
Apr 15	35	34		1			1		2
May 15	30	25	3	2			5		
Jun 15	29	27	1	1			1		1
Jul 15	39	37	2				2		1
Aug 15	34	19	10	5			13		2
Sep 15	30	25	3	2			3		9
Oct 15	31	30		1					6
Nov 15	31	29	2				2		8
Dec 15	33	31		2					11
Jan 16	35	30	3	2			4		17
Feb 16	35	33	1	1			1		14
	511	456	31	24			41		98



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

Schedule data quality of stream RS92



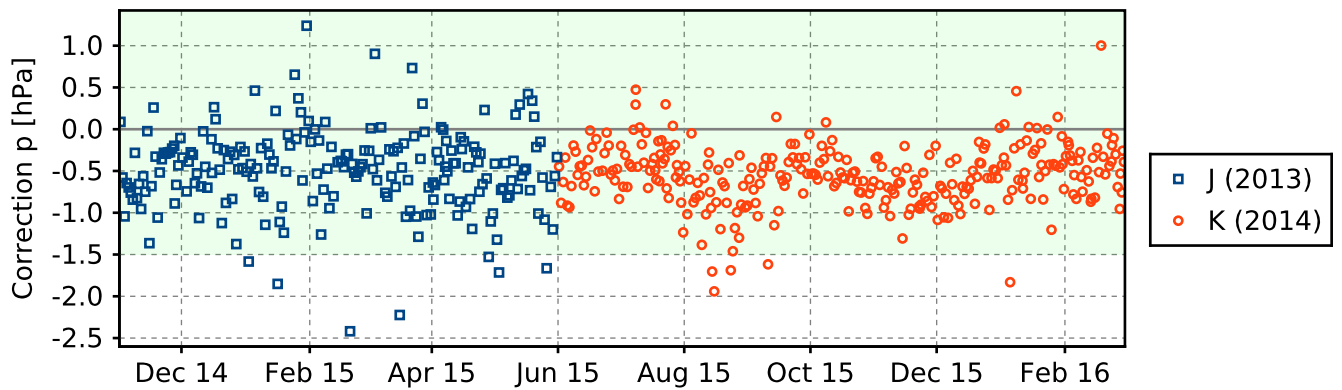
3.4 Instrument combinations of NYA-RS-01

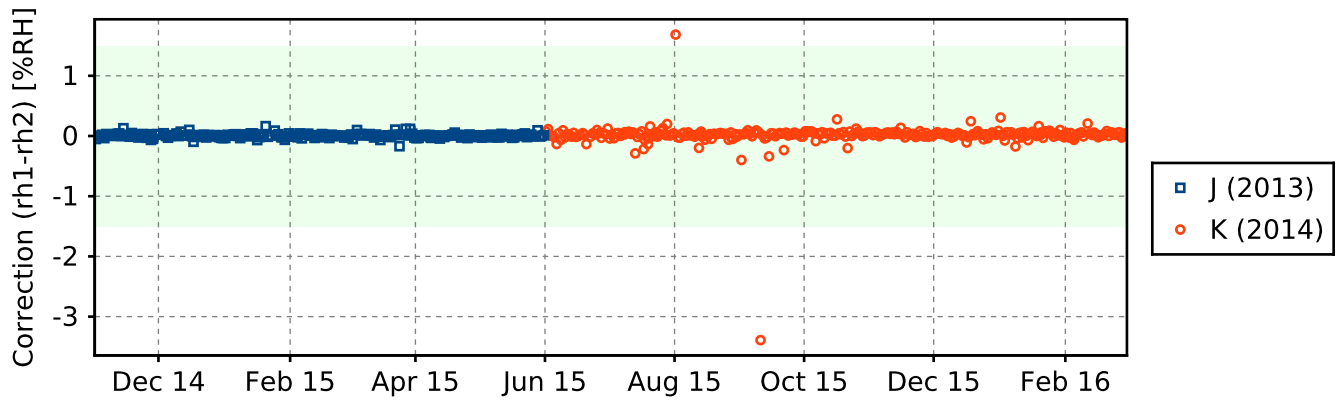
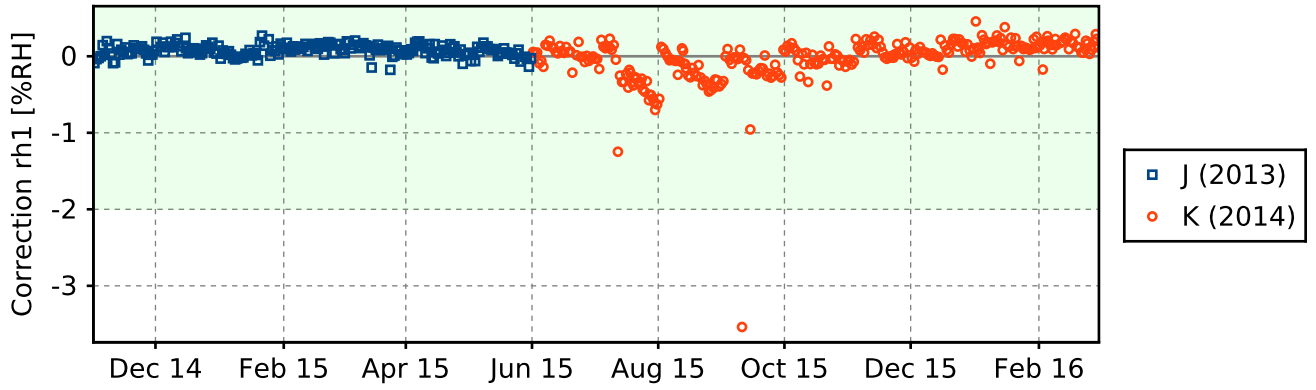
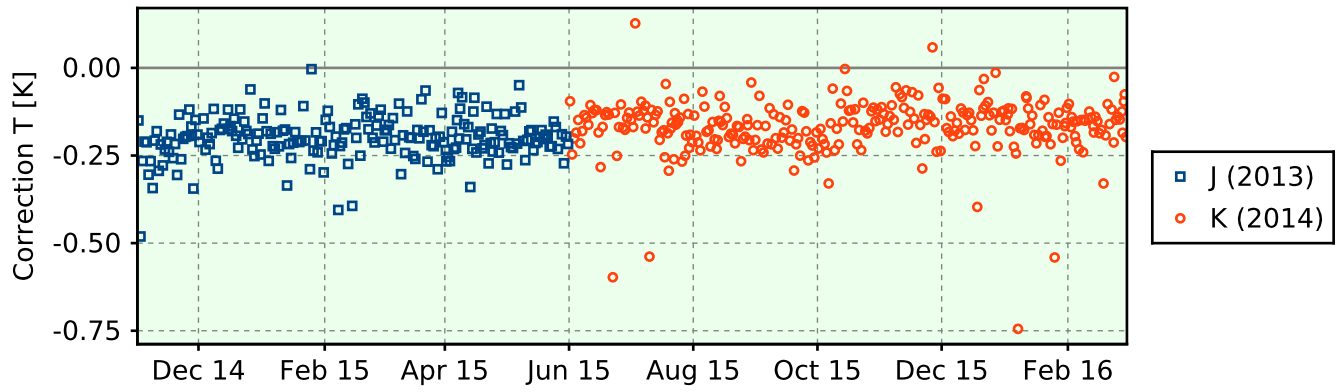
Count	Instrument combination
8	CFH, ECC, RS92
4	2x ECC, RS41, RS92
107	ECC, RS92
16	RS41, RS92
376	RS92

3.5 Instrument ground check

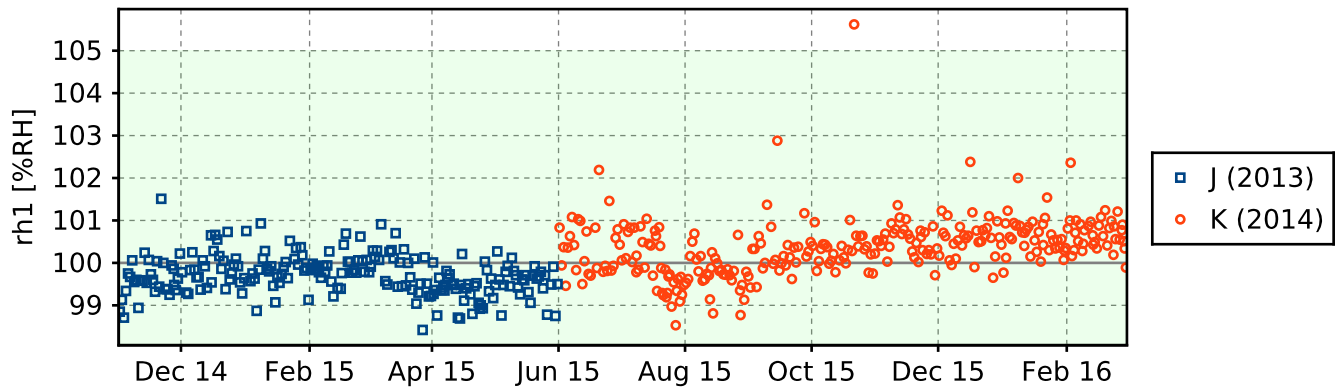
3.5.1 Stream: RS92

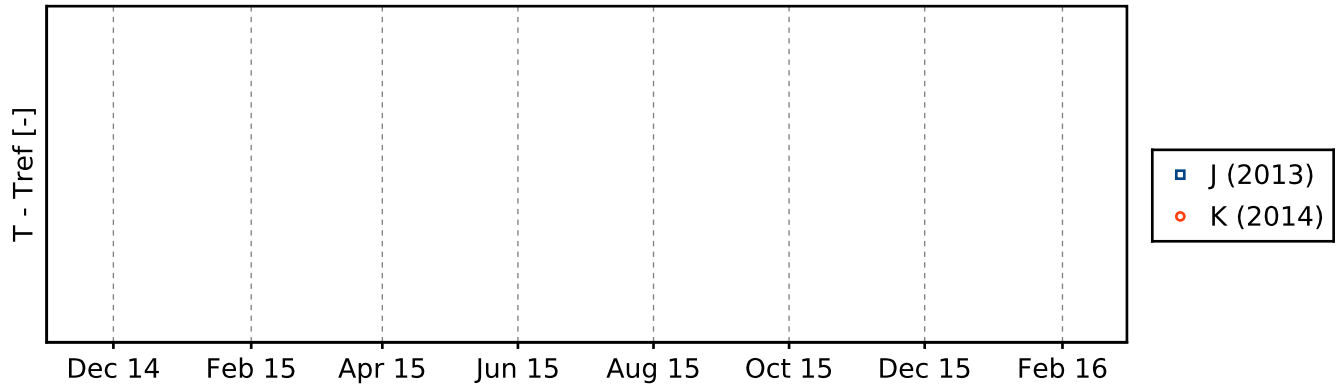
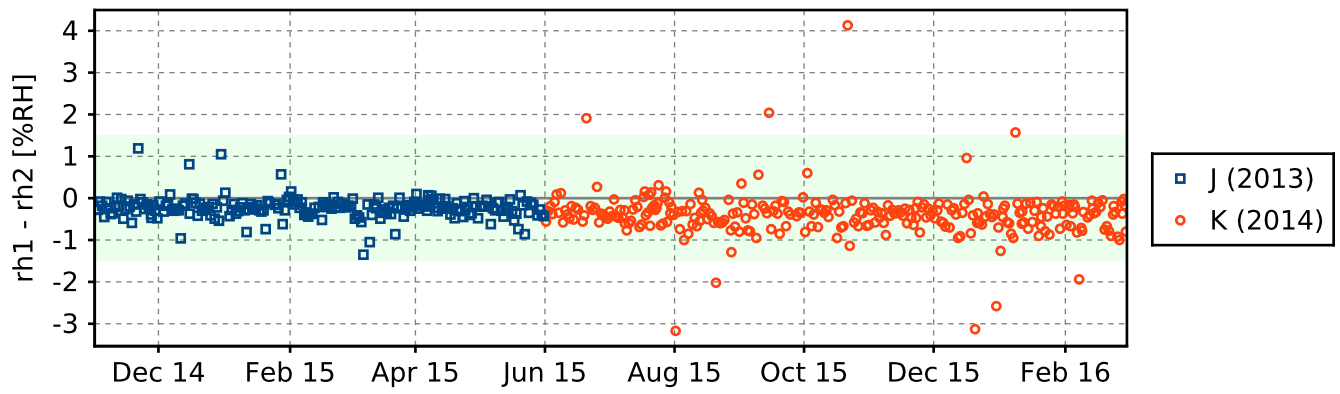
3.5.1.1 GroundCheck: GC25





3.5.1.2 GroundCheck: SHC





3.6 Measurement events

3.6.1 Stream: RS92

