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SYSTEM (GCOS)

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Coordination Meeting (ICM-11)**

Session 7

Singapore
20 - 24 May 2019

GRUAN Site Report for Ny-Ålesund

(Submitted by Marion Maturilli)

Summary and Purpose of this Document

Report from the GRUAN site Ny-Ålesund for the period January to December 2018.

Overview

In 2018, the Ny-Ålesund site contributed to the GRUAN radiosonde data stream by providing the daily radiosonde RS41 data via the RsLaunchClient. Due to campaign activities, the number of contributing radiosondes increased to four per day in the months of February-March (YOPP-SOP1), July-August-September (YOPP-SOP2), and November (ARCROSE2018). In regard of change management, dual soundings RS41-RS92 were launched once per week until the end of March, concluding two full years of weekly dual sounding. Furthermore, frostpoint hygrometers were launched bi-monthly, resulting in 6 CFH data sets transmitted to GRUAN during the reporting period 2018. The dataflow of Ny-Ålesund GNSS data to GRUAN LC and the GRUAN GNSS processing centre at GFZ is established and continues. Once formal data products have been defined, the Ny-Ålesund site may contribute to GRUAN data streams with lidar, microwave radiometer and ozone sonde data.

Change and change management

After two full years of weekly dual RS92-RS41 soundings as part of the change management from one radiosonde type (RS92) to another (RS41), the last dual sounding RS92-RS41 was launched and transmitted to GRUAN LC by end of March 2018. New operators for radiosonde launches were introduced both in the context of campaign activities and of the annual change of the station personnel. All operators have been trained on site, after receiving an introduction in the laboratory at the home institute in Potsdam, Germany.

Resourcing

Since Ny-Ålesund is not in a location where sonde recovery is realistic, the annual cost of CFH instruments is subject to internal discussion. Yet, we currently manage to continue with bi-monthly launches.

Operations

At Ny-Ålesund, stratospheric temperature in winter regularly reaches below -75°C as the polar vortex is shifted towards the European Arctic. In these conditions, even the balloons that were heated prior to the launch encounter problems reaching 10 hPa. We avoid the early burst by bathing the heated balloons in a kerosene-oil mixture, which to our experience keeps the balloon more flexible under the Arctic polar night conditions and allows to reach 10 hPa without problems. As R23 has a global warming factor of 12100 times that of CO_2 , it is highly desirable to substitute this cryogen for CFH operation in general, but particularly in the sensitive Arctic environment that undergoes a more rapid

warming than other parts of the globe. Due to the lack of other suitable cryogenic substances, we support the testing and improvement of a Peltier-cooled frostpoint hygrometer (see "Future Plans").

Site assessment and certification

Documents for site re-certification have been delivered and accepted in 2018.

GRUAN-related research

The Ny-Ålesund site contributes to

- GRUAN Task Team Site (Marion Maturilli)
- GRUAN Task Team GNSS-PW (Galina Dick, Jens Wickert)

Marion Maturilli contributed to the GRUAN Technical Document TD-7 on Multiple Payloads.

WG-GRUAN interface

Currently no support needed.

Items for ICM-11 plenary discussions

We are investing a lot of effort and money to retrieve the measurements with the necessary quality and handle the data over to the GRUAN LC. However, as a scientific institution it is in our interest to receive adequate citation when the Ny-Ålesund GRUAN data are used. So far, the RS92 data products do not have their own doi-numbers, but are supposed to be cited with reference to the publication by Dirksen et al. (2014). For the upcoming RS41 data product, I suggest to discuss a doi strategy similar to that in the Pangaea database (www.pangaea.de). Here, the data set of every site could have a doi-reference (with data authors being the GRUAN LC plus the station PI as co-author). It is possible to have a doi brace including the GRUAN RS41 dataset of all sites (with the same approach to authorship). As part of the metadata, the datasets can include the link to the publication on RS41 data processing. There are probably other ways to include the data providers, too. I suggest to discuss this issue for the upcoming data handling of the RS41 data product.

Other archiving centers

The Ny-Ålesund RS41 radiosonde data based on the manufacturer product are stored at www.pangaea.de (search term High resolution radiosonde measurements from station Ny-Ålesund). CFH data are archived at NDACC. (Also ozone sonde data and lidar data are archived at NDACC. Surface radiation data contribute to BSRN.)

Participation in campaigns

The Ny-Ålesund radiosonde programme participated in the Special Observing Periods (SOPs) for the Arctic in the frame of the Year of Polar Prediction (YOPP), February-March and July-August-September 2018. In addition, another intensive radiosounding campaign took place in November 2018 in collaboration with Japanese colleagues in the frame of the Arctic Research Collaboration for Observing System Experiment (ARCROSE). All of these activities comprised four daily radiosonde launches and had the goal to improve data assimilation systems for weather forecast and Earth system models. The campaign data are assumed to be valuable to the GRUAN community, since the higher temporal resolution of the consequent soundings may resolve atmospheric processes with shorter than daily time scale, e.g. vertical gravity wave propagation.

Future plans

While no specific campaigns are planned at Ny-Alesund for 2019, several activities are scheduled for the period February-March 2020:

- Within this third YOPP-SOP, the radiosonde launches will be increased to 4 per day.
- In a collaboration with Teresa Jorge and Tom Peter (ETH Zürich, Switzerland), we will host and support a test campaign for the newly developed Peltier-CFH (PCFH) at Ny-Ålesund. It is planned to have 4 dual soundings with CFH-PCFH, with the aim to support the development, validation and implementation of a GRUAN-worthy balloon-borne hygrometer for stratospheric water vapor.
- In collaboration with Kazutoshi Sato and Jun Inoue (NIPR, Japan), we will host and support a campaign employing 20 balloon-borne sensors for the detection of ice nucleating particles that are operated with the Japanese Meisei iMS100 radiosonde. It is planned to arrange dual flights with the Ny-Ålesund standard RS41 radiosonde to provide an according RS41 - iMS100 dual radiosonde data set.



GRUAN Site Report for NyAlesund (NYA), 2018

Reported time range is Jan 2018 to Dec 2018

Created by the Lead Centre

Version from 2019-05-09

1 General GRUAN site information

Object	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	01004 NY-ALESUND II
Operators	currently 24, changes +8 / -0
Sounding Site	1
GNSS	1

1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
NYA-GN-01	GNSS Site NYA2	GNSS	1	operational
NYA-RS-01	Ny-Aalesund Radiosonde Launch Site	Sounding Site	8	880

1.2 General comments from Lead Centre

No comments available from Lead Centre.

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

Object	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: Ny-Aalesund Radiosonde Launch Site (NYA-RS-01)

Object	Value
System name	Ny-Aalesund 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	8 (ROUTINE, OZONE, FLASH, CFH, DUAL1, ROUTINE2, OZONE2, CFH2)
Possible streams	CFH, ECC, RS41, RS92

3.1 Lead Centre comments

3.1.1 Change management

Weekly dual launches of Vaisala RS92-SGP and RS41-SGP were performed from March 2016 to March 2018 and submitted to the GRUAN LC.

3.1.2 Dataflow

Sonde dataflow to the GRUAN LC is operational since April 2012.

Now, the dataflow includes streams of the Vaisala RS41-SGP, RS92-SGP, ECC Ozone sonde, CFH water vapour, and Internet IMET-1. All launches are promptly submitted using the RsLaunchClient.

3.2 GRUAN data products

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

CFH		6	6	
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3.2.2 Stream: ECC

ECC		68	68	
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3.2.3 Stream: RS41

RS41		880	880	
RS41-GCA	001		869	
RS41-RAW	001		879	
RS41-EDT	001		878	
RS41-GDP-ALPHA	002		679	

3.2.4 Stream: RS92

RS92		13	13	
RS92-GCA	001		9	
RS92-INT	001		13	
RS92-RAW	002		13	
RS92-EDT	001		13	
RS92-GDP	002		12	12

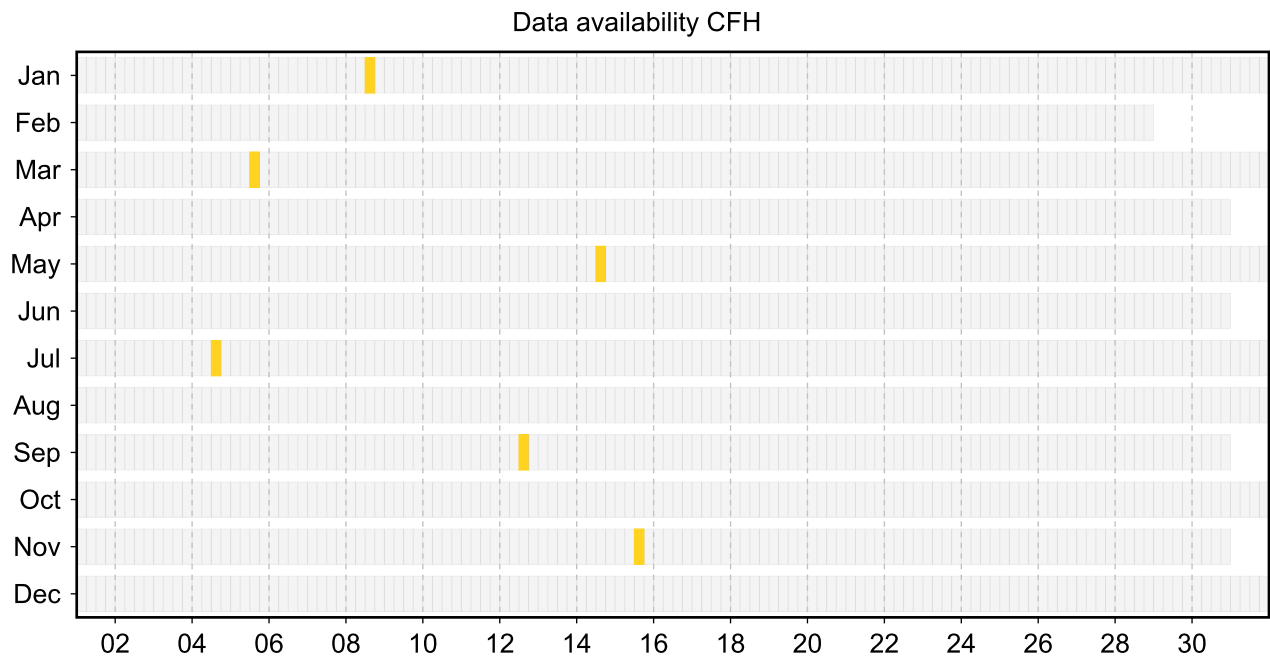
3.3 Data availability of data products

Available (green): All steps of processing have been successfully completed. The data file is available at LC (e.g. unapproved or uncertified GRUAN data products) and at NCEI (approved and certified GRUAN data products).

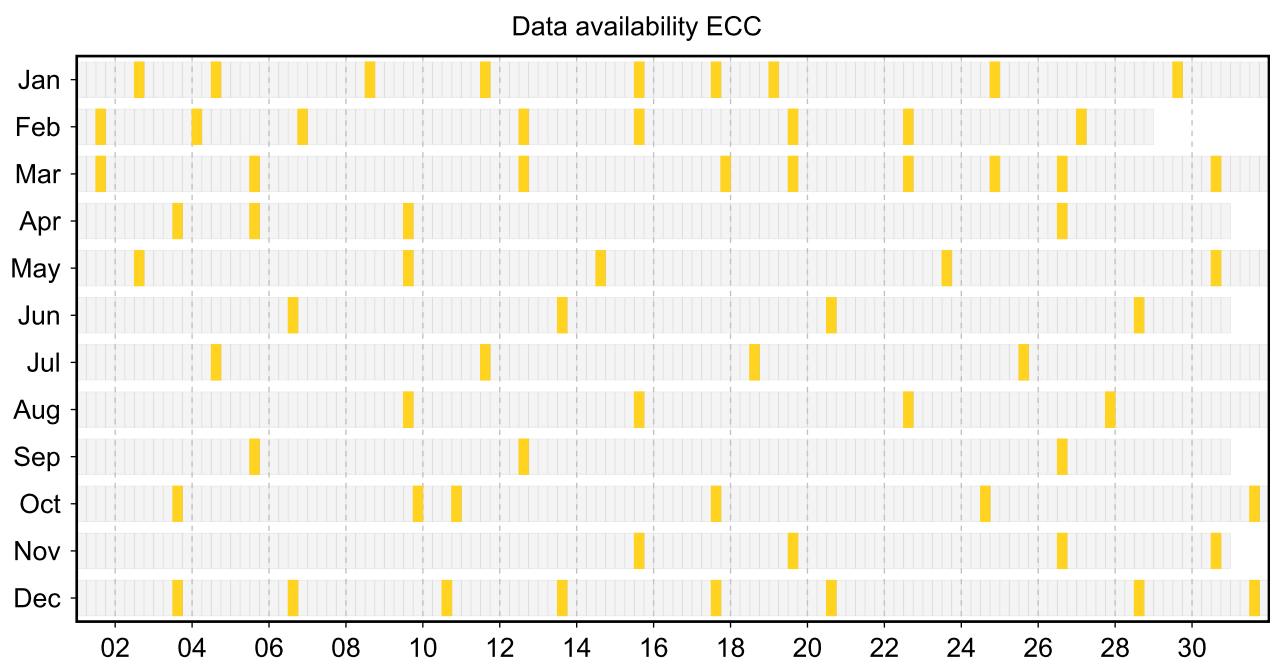
Unprocessed (yellow): The raw data file has been successfully converted to a GRUAN standardized raw data file format (NetCDF). The processing (e.g. GRUAN data processing) has not yet been done, or has not been completed. Reason may be a processing routine which does not yet exist, or software errors.

Original (red): The original raw data file is available (e.g. MWX). The raw data file was not converted to a GRUAN standardized raw data file format (NetCDF). Reason may be a converting routine which does not yet exist, or a corrupt original raw data file, or software errors.

3.3.1 Stream: CFH



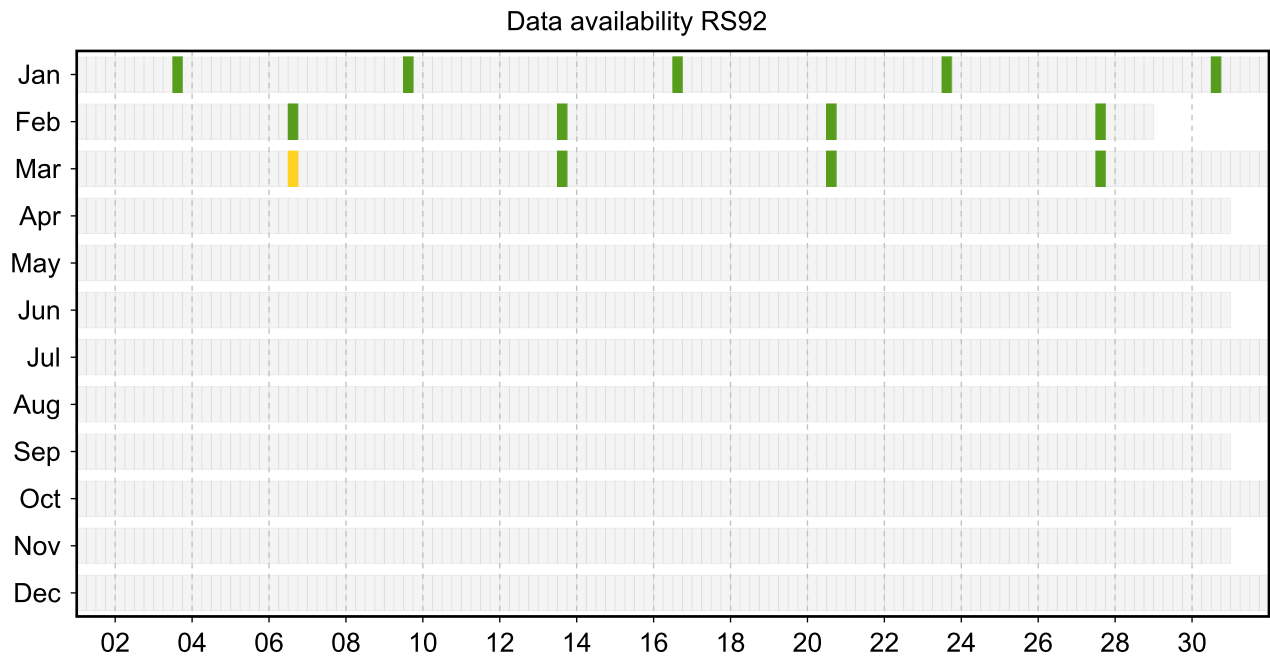
3.3.2 Stream: ECC



3.3.3 Stream: RS41



3.3.4 Stream: RS92



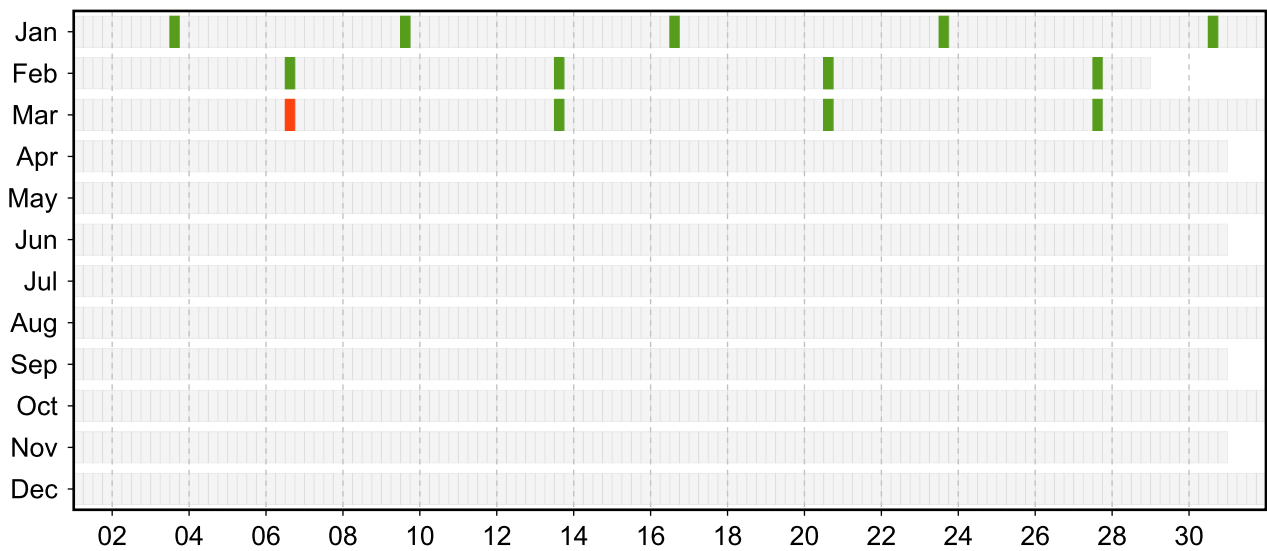
3.4 Data quality of current GRUAN data products

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

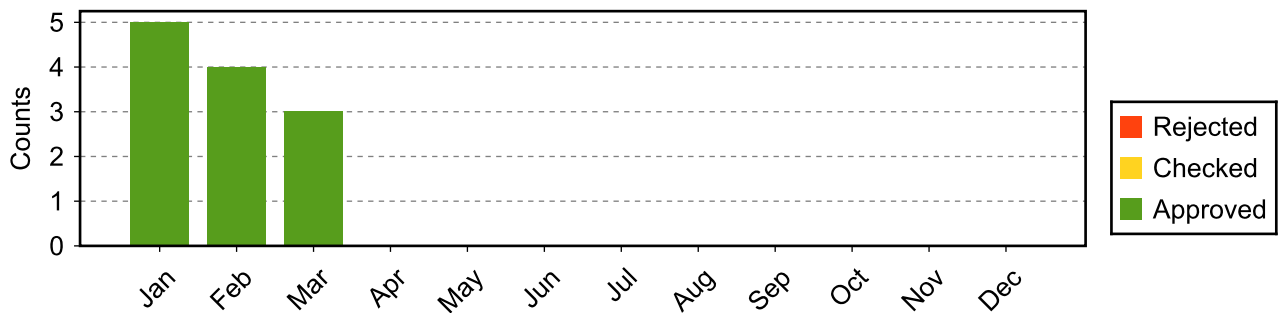
3.4.1 Stream: RS92 (Product: RS92-GDP-002)

Jan	5	5							
Feb	4	4							
Mar	3	3							
Apr									
May									
Jun									
Jul									
Aug									
Sep									
Oct									
Nov									
Dec									
Sum	12	12							

Data quality of stream RS92



Data quality statistic of stream RS92



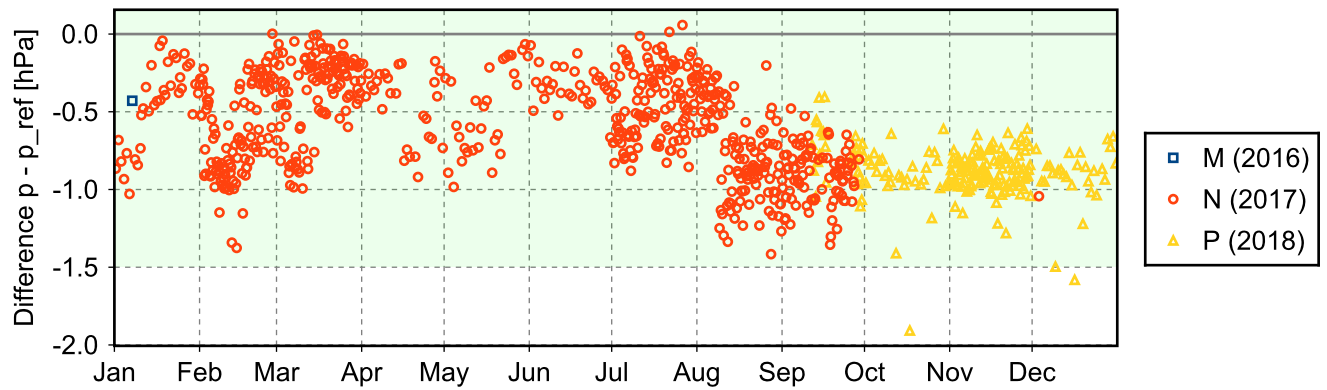
3.5 Instrument combinations of NYA-RS-01

Count	Instrument combination
6	CFH, ECC, RS41
62	ECC, RS41
799	RS41
13	RS41, RS92

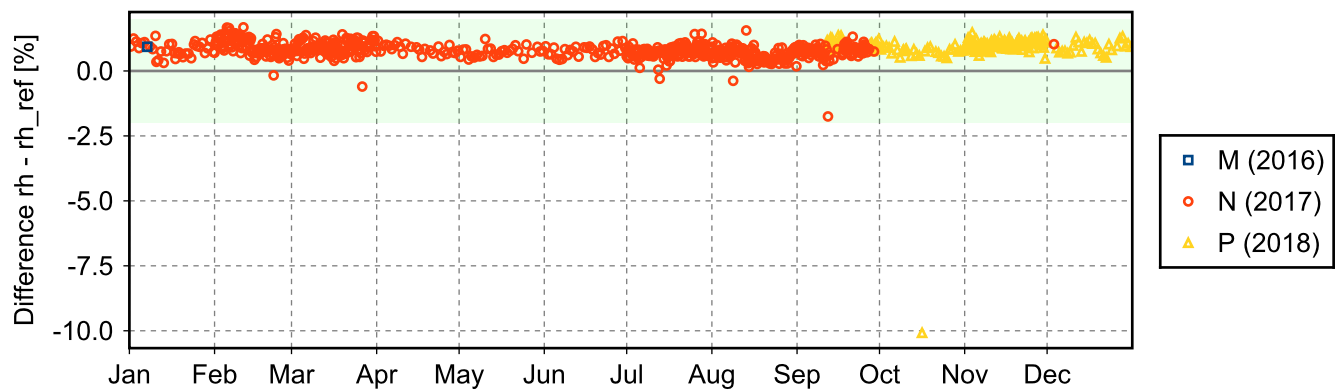
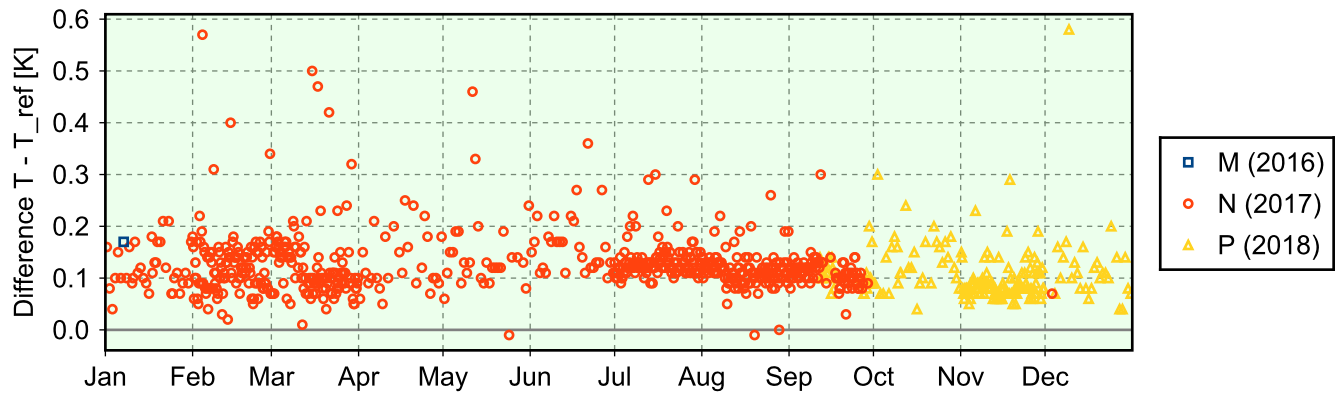
3.6 Instrument ground check

3.6.1 Stream: RS41

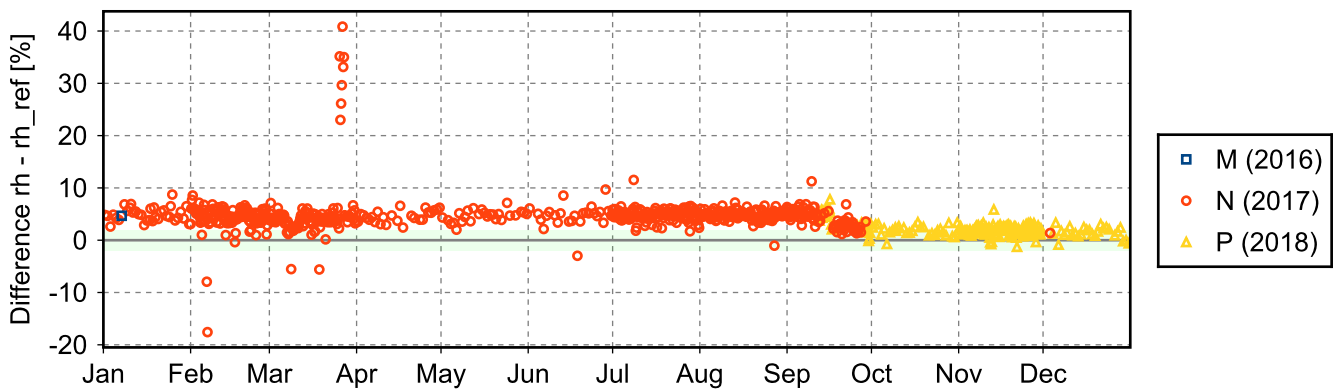
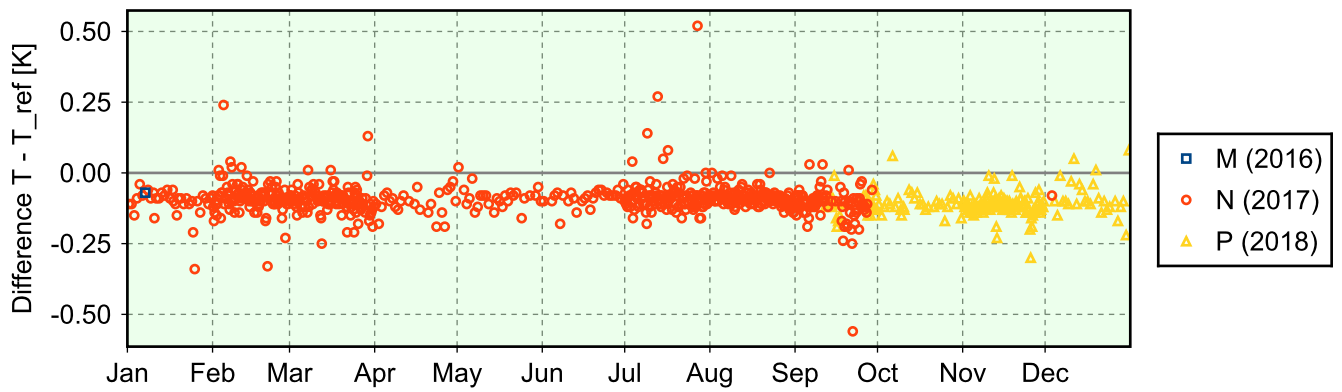
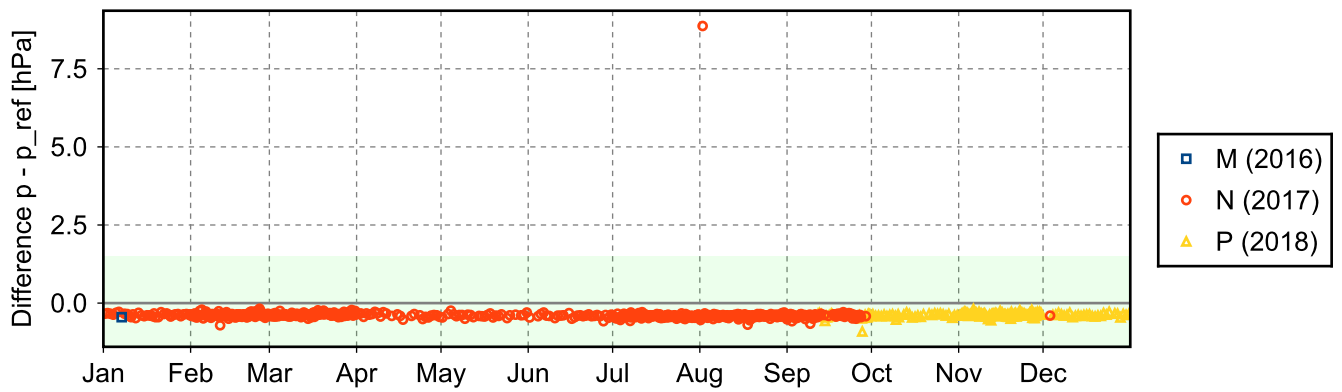
(1) GroundCheck: GC-RI41



(2) GroundCheck: GC-SHC

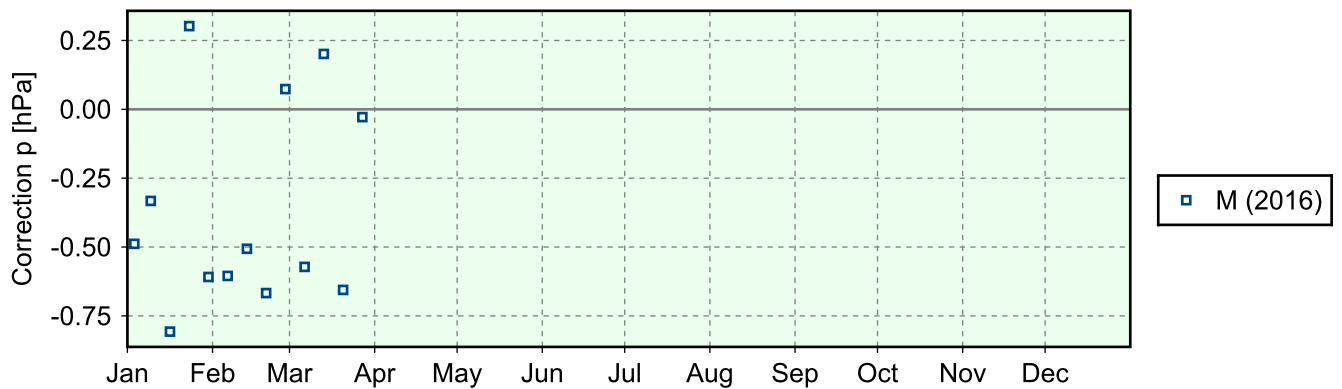


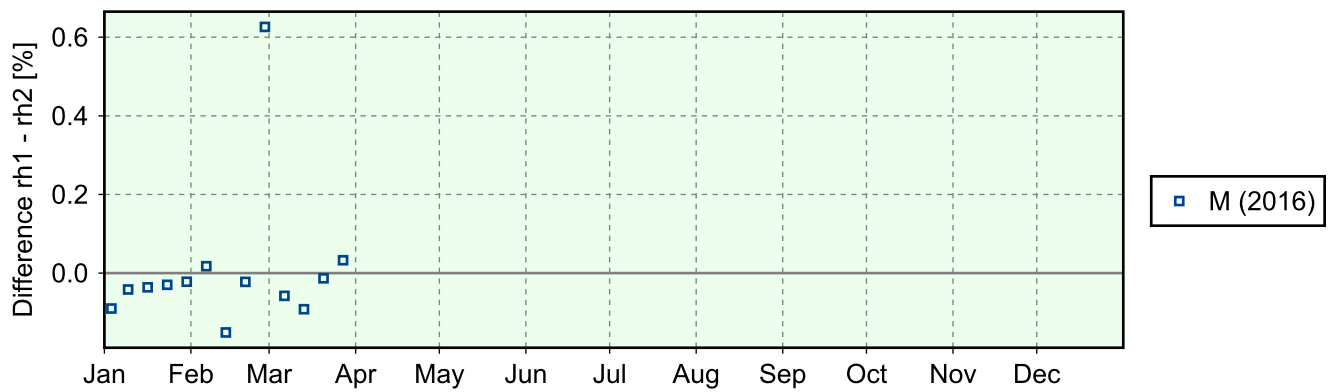
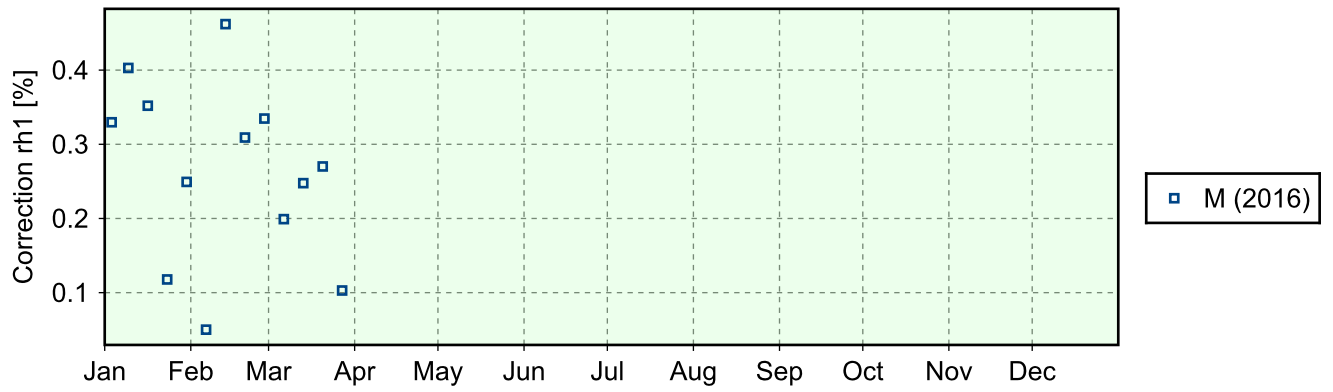
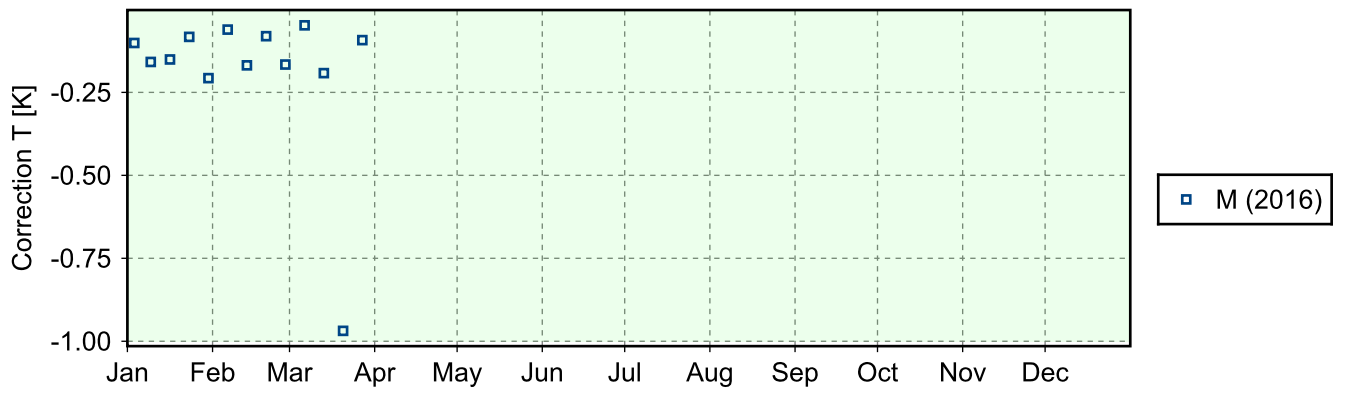
(3) GroundCheck: GC-SHELTER



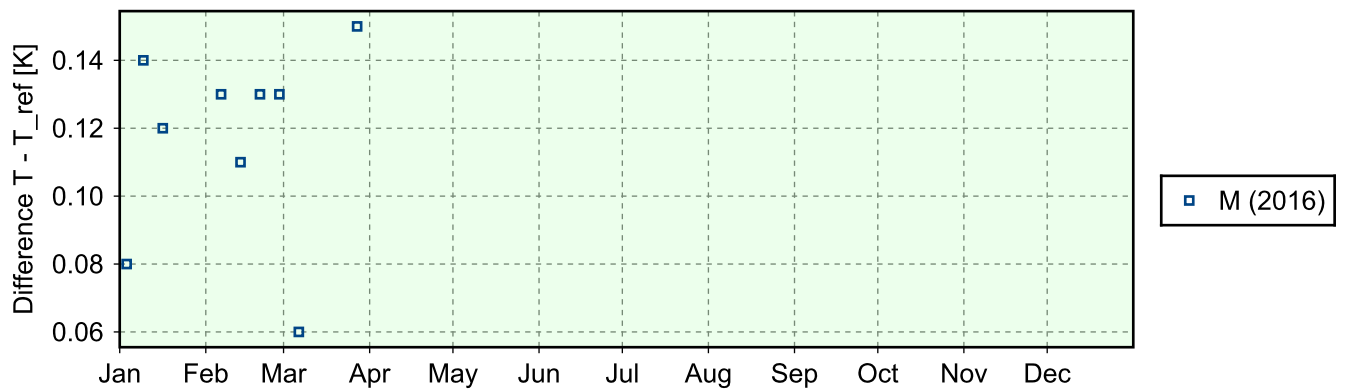
3.6.2 Stream: RS92

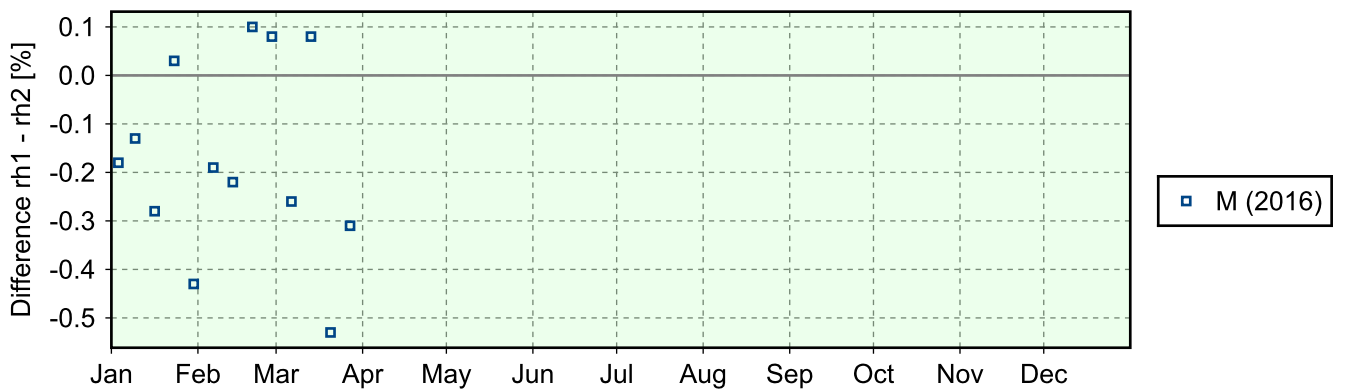
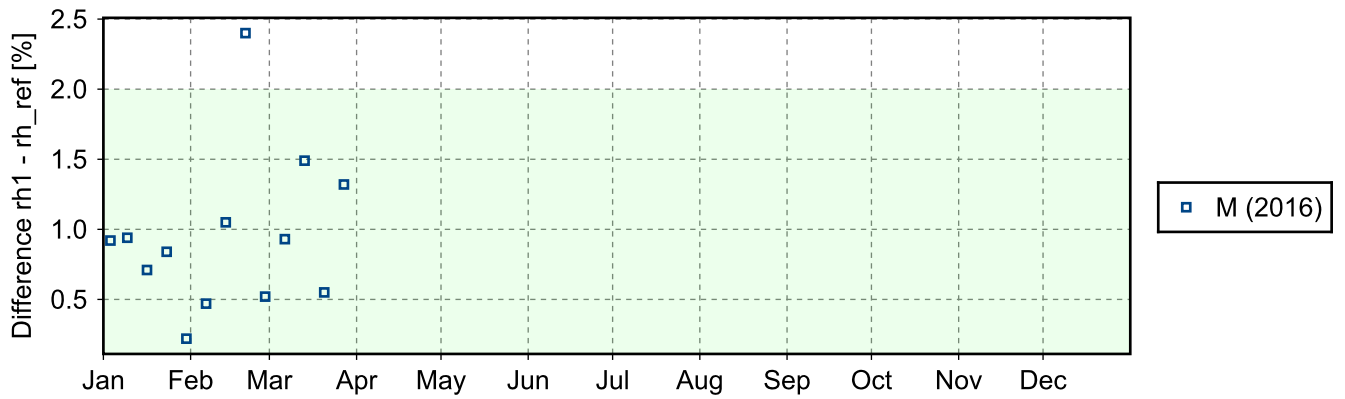
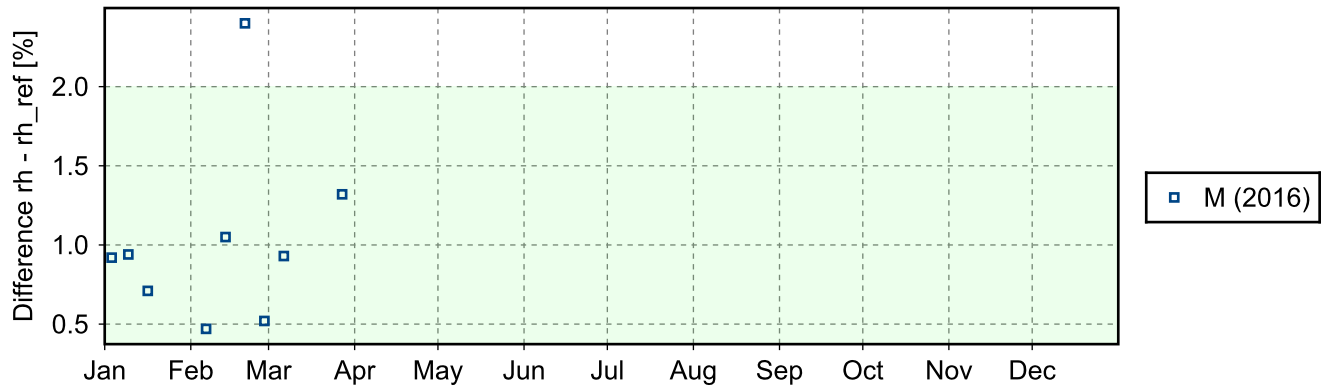
(1) GroundCheck: GC-GC25





(2) GroundCheck: GC-SHC





(3) GroundCheck: GC-SHELTER

3.7 Measurement events

