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GLOBAL CLIMATE OBSERVING SYSTEM (GCOS)

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Session 1

GRUAN Site Report for Sodankylä

(Submitted by Rigel Kivi)

Summary and Purpose of this Document

Report from the GRUAN site Sodankylä for the period January to December 2020.

Overview

Manual and automatic radiosonde launches were performed. Data from both sounding systems have been submitted to the GRUAN archive. The manual sounding dataflow includes Vaisala RS41, Vaisala RS92-SGP, ECC ozonesonde, CFH water vapor, Intermet iMet-1. The data have been uploaded using the RsLaunchClient software. In addition, the GNSS dataflow at SODF is operational.

Change and change management

We had Ozonesonde launches using RS92 until August 2020. First ozone sounding with RS41 was on August 26, 2020. Within the Autosonde system change from RS92 to RS41 took place on March 30, 2017. The CFH launches involved iMet sondes and RS41 sondes. CFH, RS41 and RS92 comparison flights have been performed. There have been also parallel flights using manual and autosonde system.

Resourcing

Currently our budget funding is not covering all the research activities. External projects have provided partial support to perform the research flights.

Operations

Wintertime sondes have been launched using larger balloons. Therefore, balloon burst point has been relatively high regarding the wintertime soundings.

Covid-19

CFH soundings have been affected by the Covid-19 pandemic, due to restricted access to the sounding facility during the pandemic. However, we were able to perform ozonesonde flights on regular basis. RS41 launches were doubled to provide more radiosonde measurements during reduced aircraft operations. From March 27 until August 31 we added regular RS41 launches at 06 UT and 18 UT. From September until December 31 an additional sounding was made daily at 18 UT.

Site assessment and certification

Sodankylä site has been certified.

GRUAN-related research

GRUAN research is related to the work within the Radiosonde task team. This included the Autosonde assessment. Also results of stratospheric water vapor observations were reported.
References:

- Madonna, F., Kivi, R., Dupont, J.-C., Ingleby, B., Fujiwara, M., Romanens, G., Hernandez, M., Calbet, X., Rosoldi, M., Giunta, A., Karppinen, T., Iwabuchi, M., Hoshino, S., von Rohden, C., and Thorne, P. W.: Use of automatic radiosonde launchers to measure temperature and humidity profiles from the GRUAN perspective, Atmos. Meas. Tech., 13, 36213649, https://doi.org/10.5194/amt-13-3621-2020, 2020.
- Kivi, R., Dörnbrack, A., Sprenger, M., Vömel, H. (2020). Far-ranging impact of mountain waves excited over Greenland on stratospheric dehydration and rehydration. Journal of Geophysical Research: Atmospheres, 125, e2020JD033055. https://doi.org/10.1029/2020JD033055

WG-GRUAN interface

Letter of support from the Working Group on GRUAN would be useful.

Other archiving centers

Data have been submitted to NDACC, WOUDC, TCCON, NILU and project databases.

Participation in campaigns

We have performed rig soundings including CFH, RS41, RS92. In 2020 we have hosted ESA funded campaign FRM4GHG, which has included AirCore, FTS and in situ tower measurements in Sodankylä. Drone-based AirCore and SIF flights were performed in summer 2020.

Future plans

Research activities within GRUAN are expected to continue. There is a possibility to host research campaigns at the FMI Sodankylä site.

GRUAN Site Report for Sodankyla (SOD), 2020

Reported time range is Jan 2020 to Dec 2020
Created by the Lead Centre
Version from 2021-04-27

1 General GRUAN site information

Object	Value
Station name	Sodankyla
Unique GRUAN ID	SOD
Geographical position	67.3700 °N, 26.6300 °E, 179.0 m
Operated by	FMI | Ilmatieteen laitos
Main contact	Kivi, Rigel
WMO no./name	02836 SODANKYLÄ
Operators	currently 8, changes +0 / -0
Sounding Site	2
GNSS	1

1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
SOD-GN-01	GNSS Site SODF	GNSS	1	operational
SOD-RS-01	Sodankylä Radiosonde Launch Site	Sounding Site	4	27
SOD-RS-02	Automatic Sodankylä Launch System (AUTOSONDE)	Sounding Site	2	1173

1.2 General comments from Lead Centre

No comments from Lead Centre.

2 System: GNSS Site SODF (SOD-GN-01)

Object	Value
System name	GNSS Site SODF
Unique GRUAN ID	SOD-GN-01
System type	GNSS (GN - GNSS)
Geographical position	67.4209 °N, 26.3890 °E, 299.7 m
Operated by	FMI | Ilmatieteen laitos
Instrument contact	Kivi, Rigel
Started at	-
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 February 2015. The current dataflow includes manufacturer raw data, converted raw data (RINEX) and instrument logs, containing all equipment changes.

Meteorological data is missing, therefore the operational processing as GNSS-PW-GDP cannot be performed at moment.

3 System: Sodankylä Radiosonde Launch Site (SOD-RS-01)

Object	Value
System name	Sodankylä Radiosonde Launch Site
Unique GRUAN ID	SOD-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	67.3700 °N, 26.6300 °E, 179.0 m
Operated by	FMI | Ilmatieteen laitos
Instrument contact	Kivi, Rigel
Started at	-
Defined setups	4 (RESEARCH, OZONE, ROUTINE2, OZONE2)
Possible streams	CFH, COBALD, RS41, RS80, RS92

3.1 Lead Centre comments

3.1.1 General

This is the manual launch site, used for ECC ozone sondes, CFH sondes and other manually released research sondes.

3.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI

3.2.1 Stream: ECC

ECC		27	27	

3.2.2 Stream: RS41

RS41		3	3	
RS41-GCA	001		3	
RS41-RAW	001		3	
RS41-EDT	001		3	
RS41-GDP-BETA	001		3	
RS41-GDP-BETA	002		3	

3.2.3 Stream: RS92

RS92		24	24	
RS92-RAW	001		24	
RS92-RAW	002		24	
RS92-EDT	001		24	
RS92-GDP	002		21	

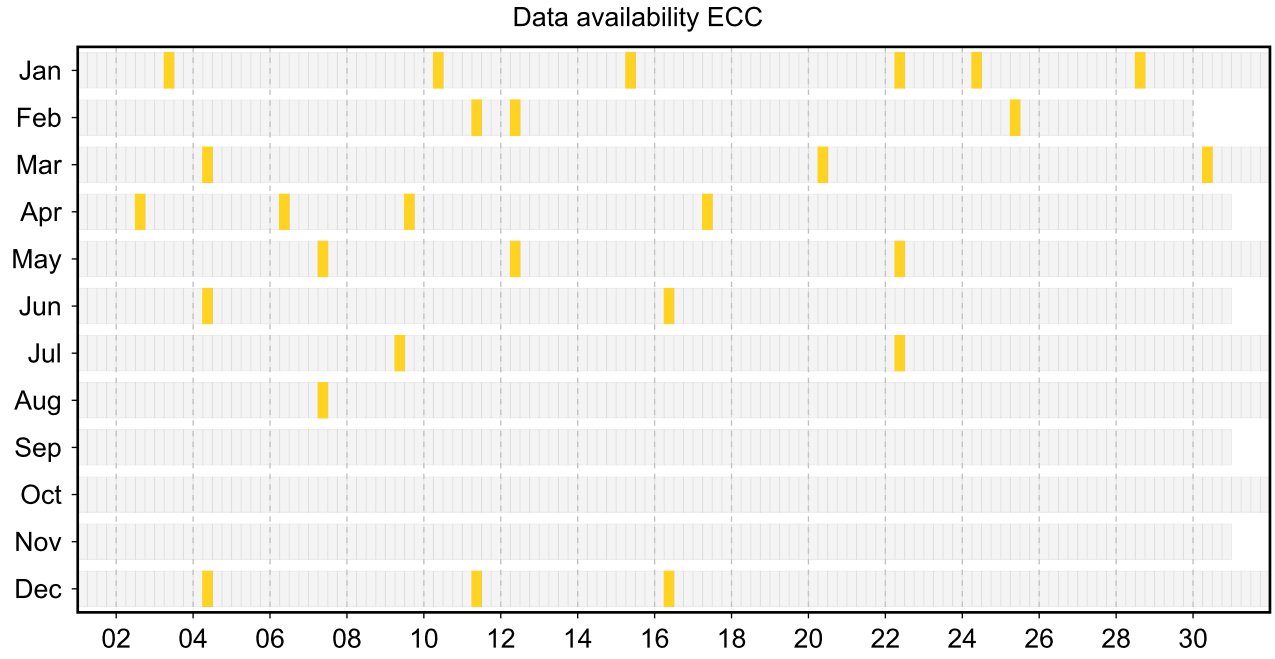
3.3 Availability of data products

Available (green): All steps of data processing have been successfully completed. The data product file is available at LC (e.g. files that didn't pass QA/QC or uncertified GRUAN data products) and/or at NCEI (a certified GRUAN data product file that did pass QA/QC).

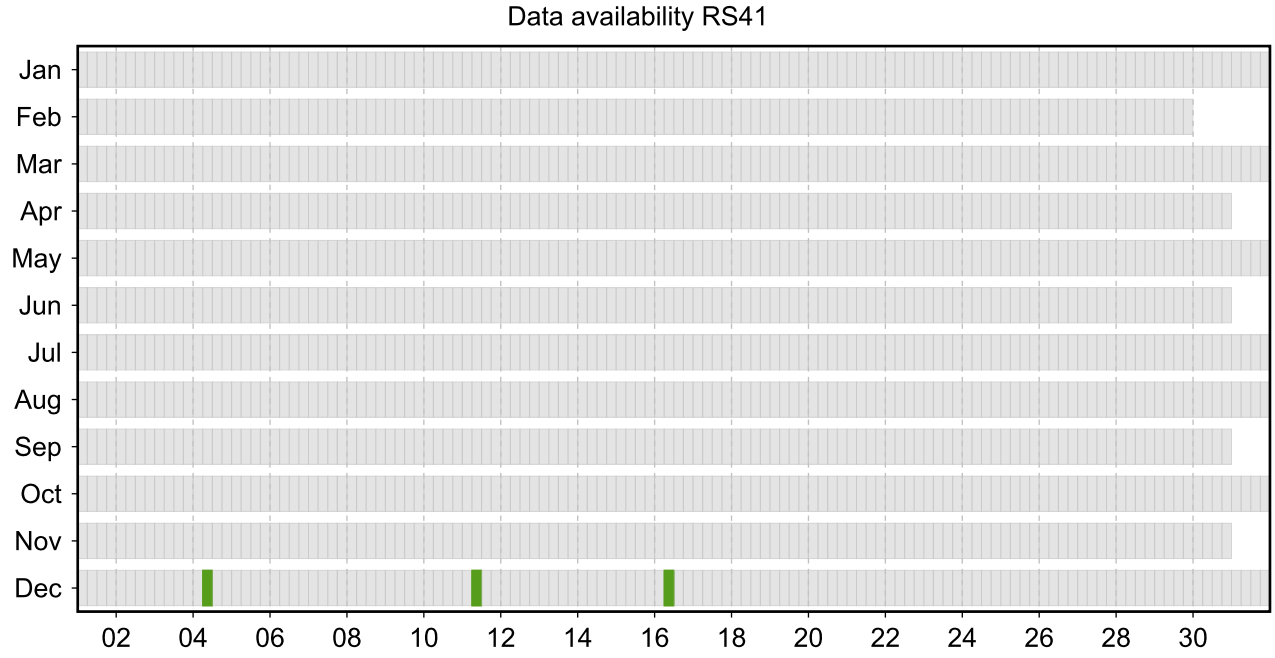
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software error.

Original (red): The original, manufacturer-produced, raw data file is available (e.g. MWX data file) but was not converted into a GRUAN-standardized raw data format (NetCDF). Reasons for this may be missing data conversion software, a software error, or a corrupt data file.

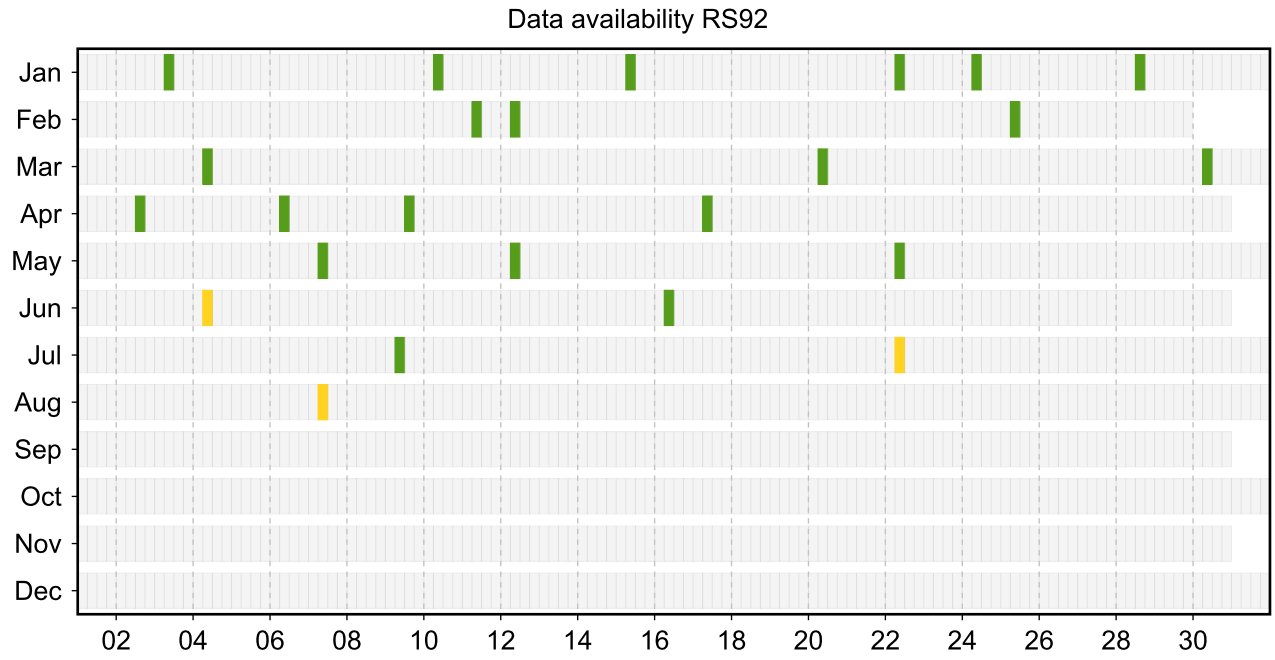
3.3.1 Stream: ECC



3.3.2 Stream: RS41



3.3.3 Stream: RS92



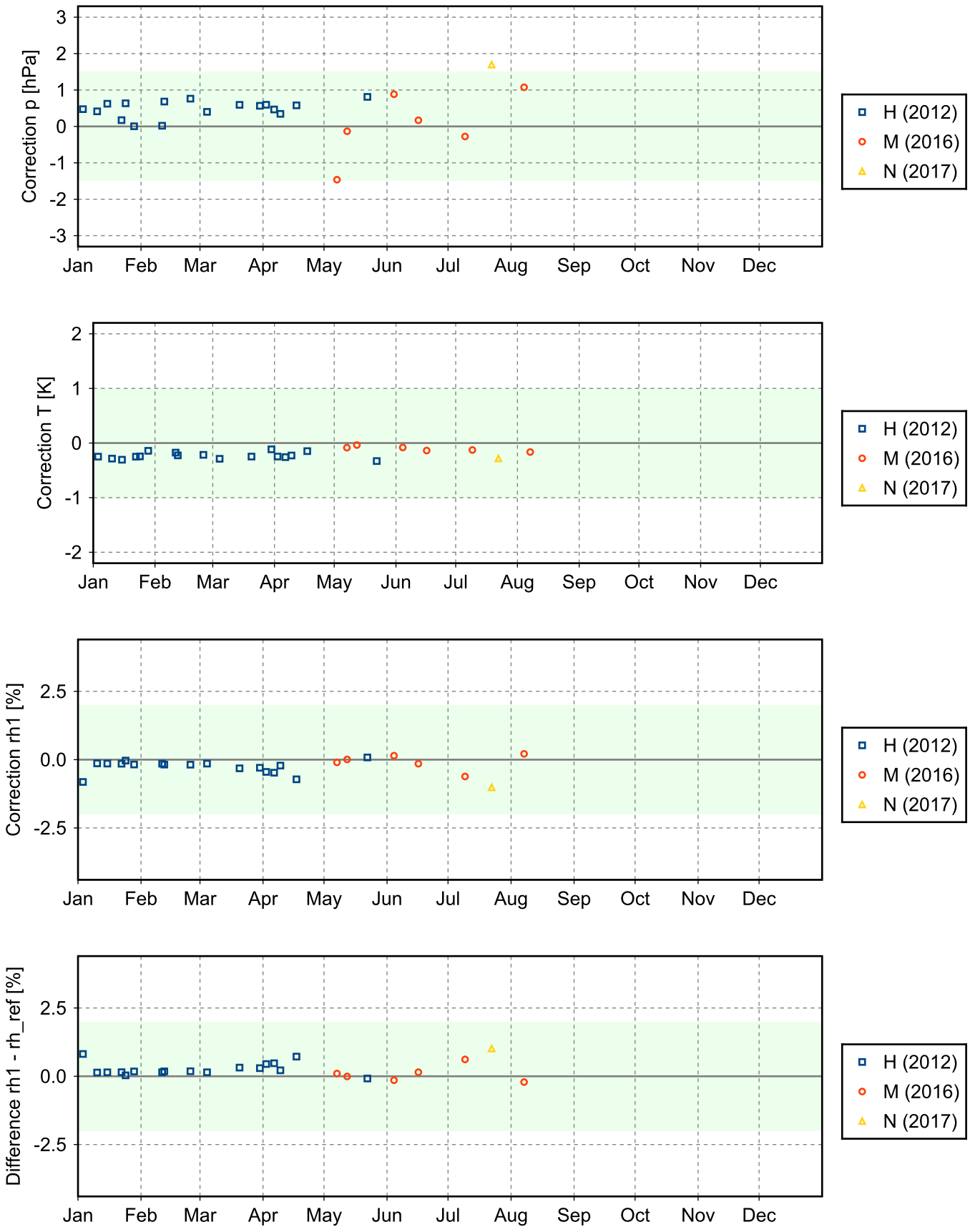
3.4 Instrument combinations of SOD-RS-01

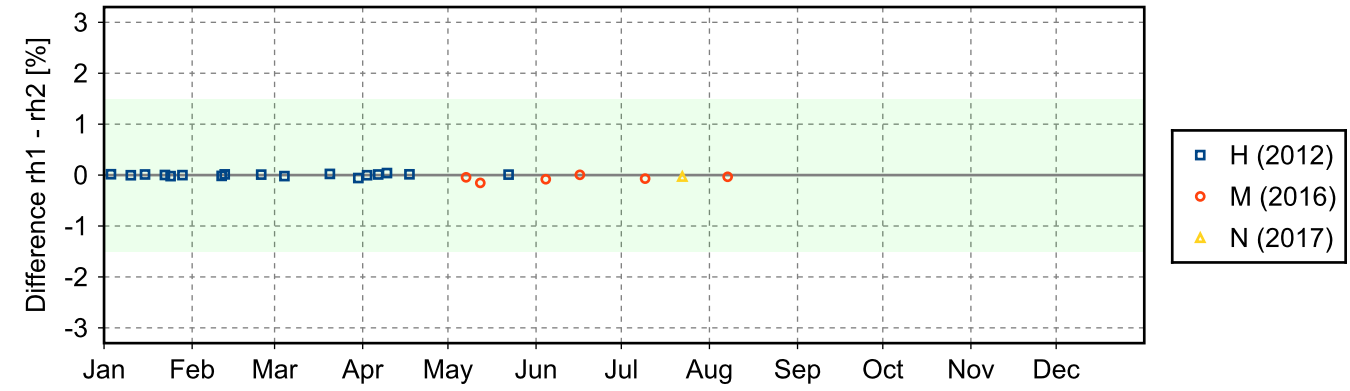
Count	Instrument combination
3	ECC, RS41
24	ECC, RS92

3.5 Instrument ground check

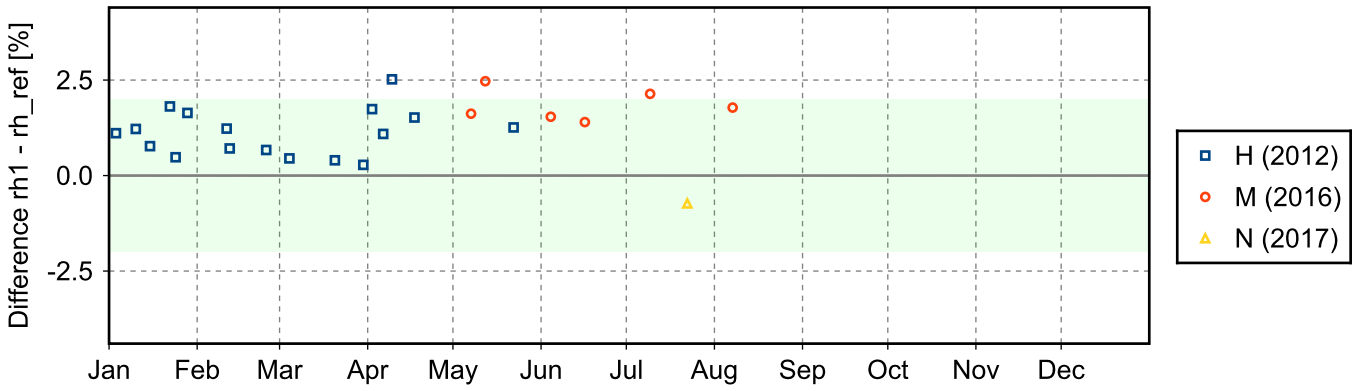
3.5.1 Stream: RS92

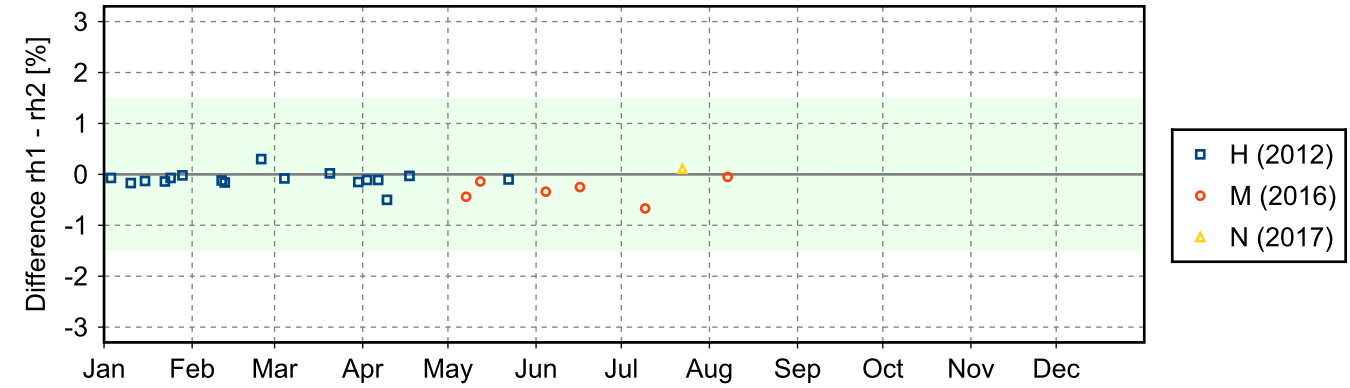
(1) GroundCheck: GC-GC25



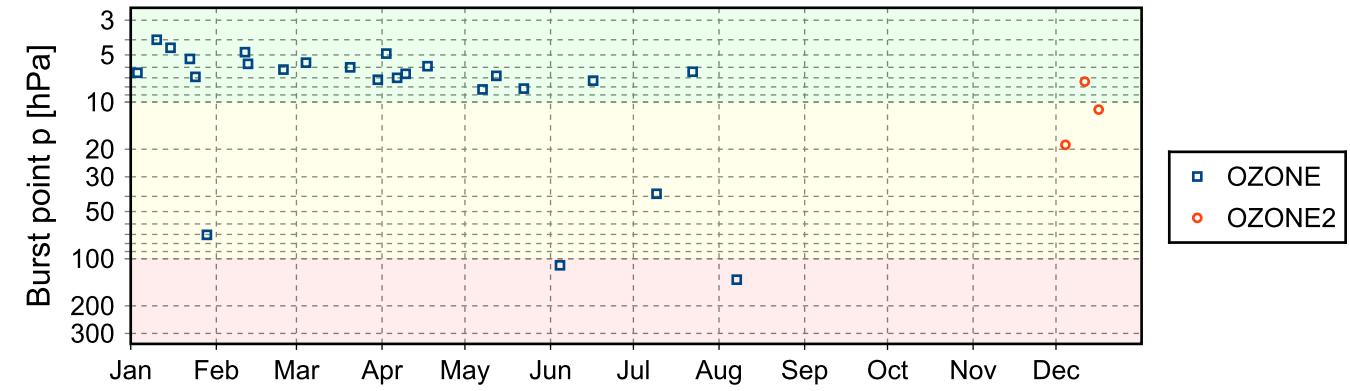


(2) GroundCheck: GC-SHC





3.6 Measurement events



4 System: Automatic Sodankylä Launch System (AUTOSONDE) (SOD-RS-02)

Object	Value
System name	Automatic Sodankylä Launch System (AUTOSONDE)
Unique GRUAN ID	SOD-RS-02
System type	Sounding Site (RS - Radiosonde)
Geographical position	67.3663 °N, 26.6313 °E, 179.0 m
Operated by	FMI | Ilmatieteen laitos
Instrument contact	Kivi, Rigel
Started at	2008-01-01
Defined setups	2 (ROUTINE, ROUTINE3)
Possible streams	RS41, RS92

4.1 Lead Centre comments

4.1.1 Dataflow

Dataflow to GRUAN LC is operational since January 2011. Currently a weekly delivery to GRUAN LC is implemented.

4.1.2 General

This is the auto-launcher data stream.

Routine soundings using Vaisala RS41-SG are performed two times per day.

4.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI
4.2.1 Stream: RS41				
RS41		1173	1173	
RS41-GCA	001		1160	
RS41-RAW	001		1169	
RS41-EDT	001		1165	
RS41-GDP-ALPHA	003		216	
RS41-GDP-ALPHA	004		314	
RS41-GDP-BETA	001		1155	
RS41-GDP-BETA	002		211	

4.3 Availability of data products

Available (green): All steps of data processing have been successfully completed. The data product file is available at LC (e.g. files that didn't pass QA/QC or uncertified GRUAN data products) and/or at NCEI (a certified GRUAN data product file that did pass QA/QC).

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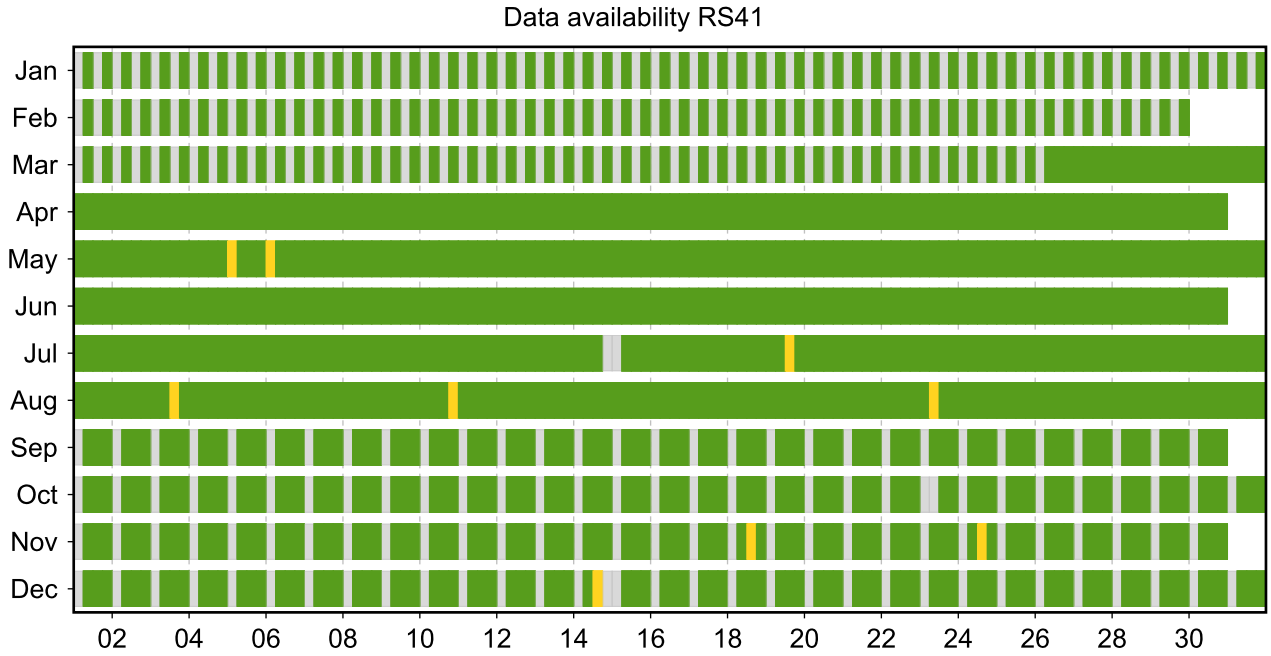
4.3.1 Stream: RS41



4.4 Instrument combinations of SOD-RS-02

Count	Instrument combination
1173	RS41

4.6 Measurement events