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Session 7

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 2021.

Overview

Research soundings as well as the automatic radiosonde launches were performed at the Sodankylä GRUAN site. 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 soundings and Intermet iMet-1 data. The data have been uploaded using the RsLaunch Client software. We have updated the RsLaunch Client software provided by the GRUAN Lead Centre. In addition to the balloon borne measurements, the GNSS dataflow at SODF is operational. Dataflow of GNSS data to GRUAN LC and the GRUAN GNSS processing centre at GFZ has started in February 2015 and has continued since then.

Change and change management

No major changes have taken place during the reporting period. However, we have frequently upgraded the Vaisala sounding system software to the most recent versions available. Until August 2020 we had ozonesonde launches using Vaisala RS92 system. Since then, the RS41 system has provided telemetry and radiosonde profile measurements. Our first ozone sounding with RS41 took place on August 26, 2020. Regarding the Autosonde system, change from RS92 to RS41 took place on March 30, 2017. The CFH launches in 2021 have involved both iMet sondes and RS41 sondes. CFH, RS41 and RS92 comparison flights have been performed. There have been also parallel flights with manual versus automated sonde system. The Autosonde performance has been reported by Madonna et al., (2020).

Resourcing

Currently our budget funding is not covering all the research activities. For example, the CFH launches are funded by external funding sources. Operations winter and springtime sondes have been launched using larger balloons. Therefore, balloon burst point of the cold season autosonde measurements has been relatively high compared to the other sonde launches.

Covid-19

In 2021 we were able to perform radiosonde and ozonesonde flights on regular basis. However, the CFH soundings have been affected by the Covid-19 pandemic, due to restricted access to the sounding facility during the pandemic. In 2021 we were able to perform less CFH soundings than before the Covid-19 pandemic.

Site assessment and certification

The Sodankylä site has been certified.

GRUAN-related research

GRUAN-related research includes participating in the Radiosonde task team activities, CFH and ozonesonde related studies, research activities involving balloon borne AirCore and FTIR instrument to measure CH_4 and other greenhouse gases. In early 2021 we started a new research project (WIFVOS) to measure profiles of water vapor isotopologues. Within the WIFVOS project a novel balloon borne instrument is being developed to measure water vapor isotopologues in the free troposphere. The balloon borne observations are used to improve remote sensing retrievals by ground based and space borne instruments.

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

FMI has performed rig soundings with CFH, RS41, RS92, iMet. We have also participated in Match ozonesonde campaign and in an AirCore campaign in August 2021, with a focus on high latitude methane measurements.

Future plans

Continuation of GRUAN research activities is foreseen. It is possible to host research campaigns at the FMI Sodankylä site.

GRUAN Site Report for Sodankyla (SOD), 2021

Reported time range is Jan 2021 to Dec 2021
Created by the Lead Centre
Version from 2022-11-15

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	22
SOD-RS-02	Automatic Sodankylä Launch System (AUTOSONDE)	Sounding Site	2	747

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 Dataflow

Sonde dataflow to the GRUAN LC is operational since October 2010.

Weekly soundings of ECC Ozone sonde are part of the dataflow. All soundings are submitted using RsLaunchClient.

3.1.2 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		22	22	

3.2.2 Stream: RS41

RS41		22	22	
RS41-RAW	001		22	
RS41-EDT	001		22	
RS41-GDP	001		22	
RS41-GDP-BETA	002		12	
RS41-GDP-BETA	003		17	

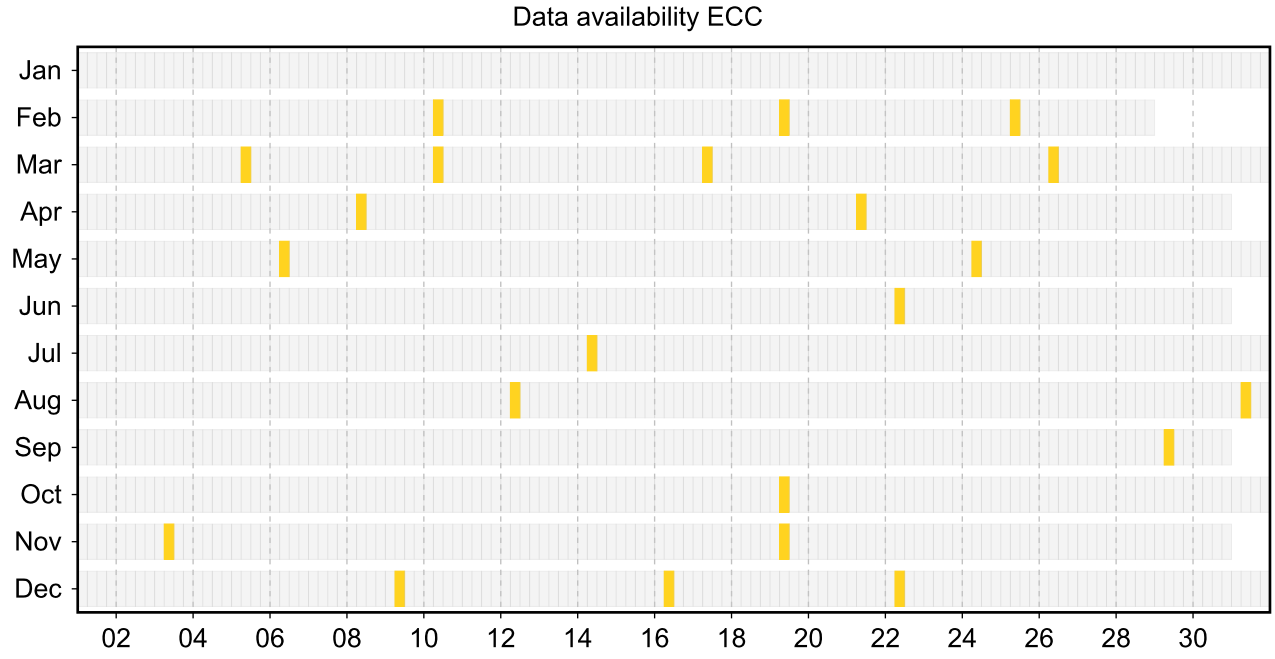
3.3 Availability of data products

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).

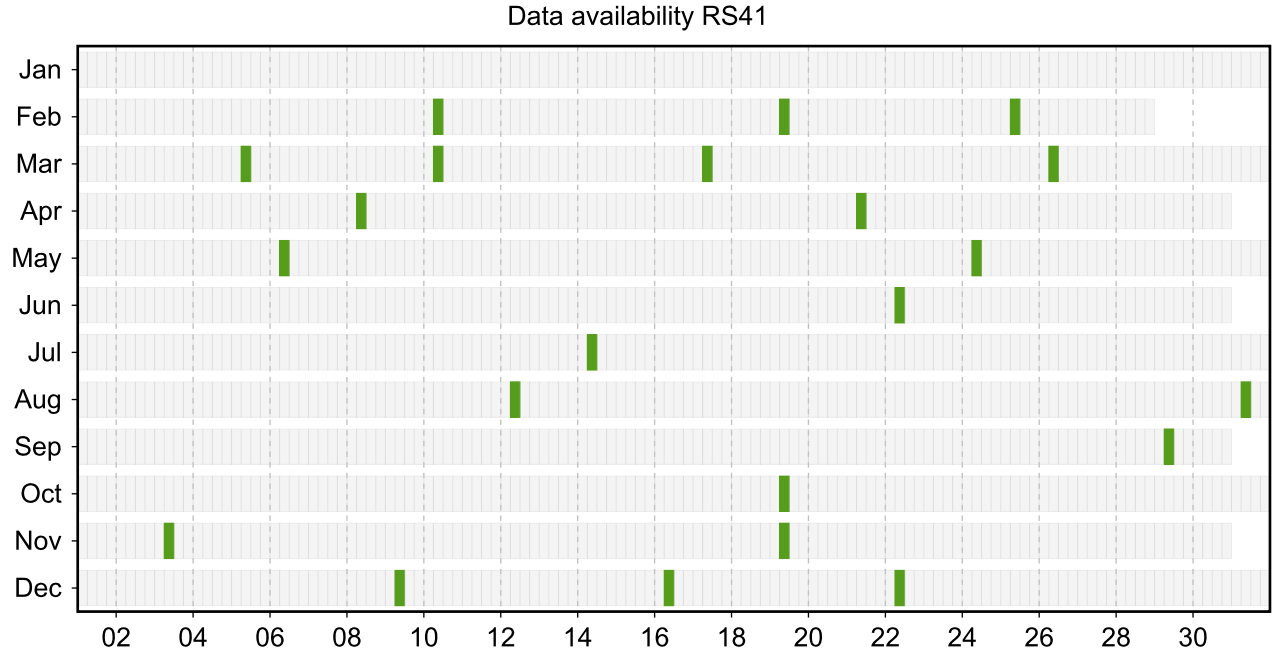
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software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



3.4 Instrument combinations of SOD-RS-01

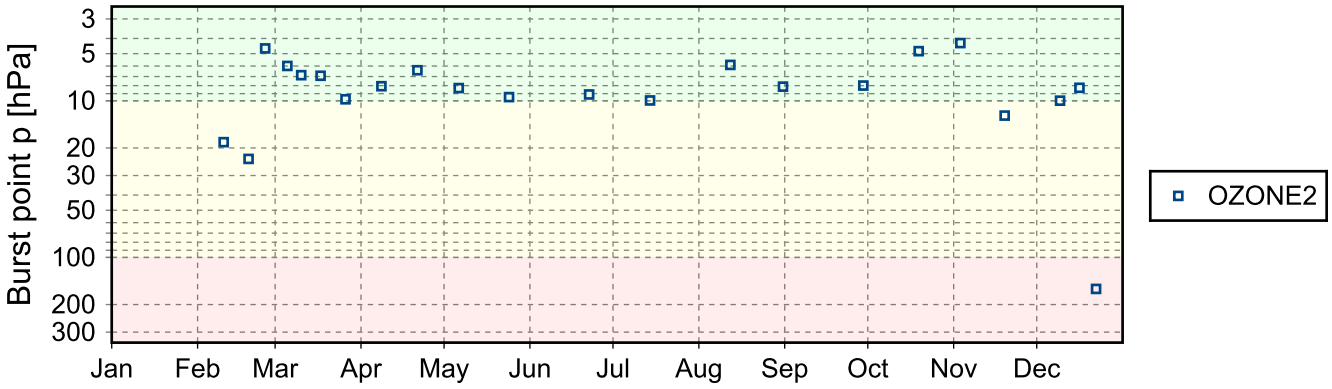
Count	Instrument combination
22	ECC, RS41

3.5 Instrument ground check

3.5.1 Stream: RS41

(1) 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.

4.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI

4.2.1 Stream: RS41

RS41		747	747	
RS41-RAW	001		746	
RS41-EDT	001		744	
RS41-GDP	001		739	
RS41-GDP-BETA	002		375	
RS41-GDP-BETA	003		594	

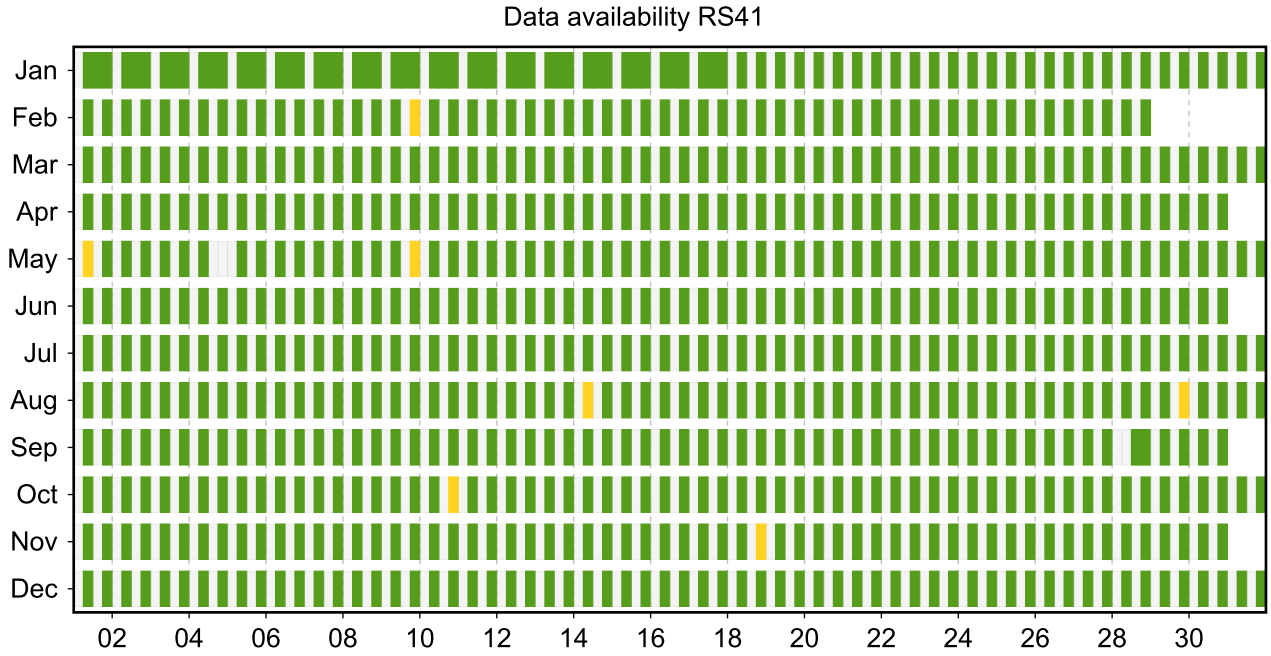
4.3 Availability of data products

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).

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.

4.3.1 Stream: RS41



4.4 Instrument combinations of SOD-RS-02

Count	Instrument combination
747	RS41

4.6 Measurement events