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Session 3

GRUAN Site Report for Payerne

(Submitted by Giovanni Martucci)

Summary and Purpose of this Document

Report from the GRUAN site Payerne for the period January 2024 to December 2024.

Overview

PAY-RS-01/02

The Vaisala RS41 is the official operational radiosonde at Payerne. It is launched twice daily at 11 and 23 UTC. Automatic flights from the AS15 Autosonde system are launched every day at 23 UTC, weekend (11 and 23 UTC) and official holidays (11 and 23 UTC). An operator launches manual flights every working day at 11 UTC or in combination with an ozone sonde every Monday, Wednesday and Friday at 11 UTC. In 2024, 263 manual flights and 511 automatic flights, respectively, have been performed and the data sent to the LC.

PAY-GN-01

The Payerne GNSS data (Zenith Delay) are regularly streamed by SwissTopo the to the GFZ at Potsdam in daily 5-minute resolution RINEX files. Along with the Zenith Delay files, the meteorological data from the SwissMetNet station of Payerne are sent every day to GFZ in RINEX-M format. The GFZ puts the Zenith Delay data obtained from SwissTopo on an ftp server ftp.gfz-potsdam.de/GNSS/products/nrttrop/sinex_trop_GRUAN_EPOS8/wnnnn. The data flow includes then all necessary data in order to perform an operational processing of GNSS-PW-GDP.

PAY-LI-01

The PAY-LI-01 is an operational measurement programme that generates 30-minute profiles of water vapour, temperature and aerosol backscatter coefficients. These are obtained by integrating 30 1-minute Raman lidar RALMO raw profiles. In 2024, RALMO performed a total of 319 daily measurements, corresponding to 87.4% of the yearly data availability. The automatic stream of LI-01 raw data to the GRUAN LC was active throughout the reporting period (1 January to 31 December 2024).

Change and change management

No changes of the operational PAY-RS-01/02 during the reporting period.
No changes of the operational PAY-GN-01 during the reporting period.
No changes of the operational PAY-LI-01 during the reporting period.

Resourcing

MeteoSwiss has suffered significant financial cuts to its staff and operational budgets in 2024. These cuts will continue in 2025 and will not ease for the next four years.

Operations

The performance targets for data availability at levels of 1003010 hPa in 2024 have been met for PAY-RS-01/02. The time series of burst altitudes for 2024 are provided in sections 4.6 and 5.6 of the report gsr_PAY_2024.pdf. The LC assessment of this performance is '[...] very good performance in terms of burst altitude, which regularly ranges from 10 hPa to 5 hPa and above'. Payerne does not have an operational high-precision humidity measurement programme requiring R23 cryogenic gas. However, it has hosted the H20-Hub field campaign, which involved 10 CFH + PCFH flights in 2024, several of which were used for intercomparison of different cooling gases or materials other than R23.

Site assessment and certification

Re-certified in 2023.

GRUAN-related research

Participation in GRUAN TT4:

- Gonzague Romanens and Gianni Martucci, MeteoSwiss, are members of the GRUAN "Uncertainties estimation on TT4 experiment".
- Giovanni Martucci is member of the GRUAN TT Ancillary under the specific task of LIDAR activities.

List of publications:
Ruud Dirksen, Alexander Haefele, Frédéric P.A. Vogt, Michael Sommer, Christoph von Rohden, Giovanni Martucci, Gonzague Romanens, Christian Felix, Luca Modolo, Holger Vömel, Tzvetan Simeonov, Peter Oelsner, David Edwards, Tim Oakley, Tom Gardiner, and Mohd. Imran Ansari, *Report of WMOs 2022 Upper-Air Instrument Intercomparison Campaign*, Instruments and Observing Methods Report No. 143, World Meteorological Organization, 2024.

ChristinaAnna Papanikolaou, Alexandros Papayannis, Marilena Gidarako, Sabur F. Abdullaev, Nicolae Ajtai, Dimitris Balis, Daniele Bortoli, Juan Antonio Bravo-Aranda, Martine Collaud Coen, Benedetto de Rosa, Davide Dionisi, Kostas Eleftheratos, Ronny Engelmann, Athena A. Floutsi, Philippe Goloub, Juan Luís GerreroRascado, Julian Hofer, Qiaoyun Hu, Mika Komppula, Eleni Marinou, Giovanni Martucci, Ina Mattis, Konstantinos Michailidis, Constantino MuñozPorcar, Michail Mytilinaios, Doina Nicolae, Giovanni Giuliano, Alejandro RodrguezGómez, Vanda Salgueiro, Xiaoxia Shang, Iwona Stachlewska, Horaiu Ioan Ştefănie, Dominika Szczepanik, Thomas Trickl, and Hannes Vogelmann, *Kalliopi Artemis Voudouri: Large-Scale Network-Based Observations of a Saharan Dust Event across the European Continent in Spring 2022*, Remote Sens. 2024, **16**, 3350.

WG-GRUAN interface

No requests.

Other archiving centers

NDACC, EARLINET

Participation in campaigns

GCOS Swiss H20-Hub: In the framework of the H2O-Hub measurement campaigns in Payerne, has been conducted during August-September 2023 for a total of 8 scientific flights. The goal of the project us to derive humidity profiles from ground to space by combining two balloon-borne instruments PCFH and ALBATROSS and the Vaisala RS41 radiosondes and the Raman LIDAR RALMO.

Date of flight	Payload + RALMO
29.04.2024	PCFH + CFH +RS41
01.05.2024	PCFH + CFH +RS41
03.05.2024	CFH +RS41
06.05.2024	PCFH + CFH +RS41
17.06.2024	PCFH +RS41
18.06.2024	PCFH + CFH +RS41 + ALBATROSS
19.06.2024	CFH +RS41
26.06.2024	PCFH + CFH +RS41
12.09.2024	PCFH + CFH(R23) +CHF(O3)
19.09.2024	PCFH + CFH +RS41+ALBATROSS

COBALD

Payerne also continues the COBALD programme initiated in 2020. The nighttime COBALD flights have restarted in March 2022 and counted 8 flights in 2024.

Date of flight	Payload
11.01.2024	GRUAN RS41 + COBALD
20.02.2024	GRUAN RS41 + COBALD
04.04.2024	GRUAN RS41 + COBALD
30.04.2024	GRUAN RS41 + COBALD
26.06.2024	GRUAN RS41 + COBALD
05.07.2024	GRUAN RS41 + COBALD
27.08.2024	GRUAN RS41 + COBALD
16.10.2024	GRUAN RS41 + COBALD

Future plans

- Third and fourth phases of GCOS Swiss H20-Hub (March-June, August-October 2025)
- EUMETSAT - PAY-RS-01/02 CAL/VAL TBD end of 2025-start 2026

GRUAN Site Report for Payerne (PAY), 2024

Reported time range is Jan 2024 to Dec 2024
Created by the Lead Centre
Version from 2025-11-07

1 General GRUAN site information

Object	Value
Station name	Payerne
Unique GRUAN ID	PAY
Geographical position	46.8100 °N, 6.9500 °E, 491.0 m
Operated by	MSWISS | Office fédéral de météorologie et climatologie MeteoSuisse
Main contact	Martucci, Giovanni
WMO no./name	06610 PAYERNE
Operators	currently 13, changes +3 / -4
Sounding Site	2
Lidar	1
GNSS	1

1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
PAY-GN-01	GNSS Site PAYE	GNSS	1	operational
PAY-LI-01	Payerne Raman WV Lidar (RALMO)	Lidar	1	331
PAY-RS-01	Payerne Radiosonde Launch Site	Sounding Site	8	263
PAY-RS-02	Automatic Payerne Launch System (Autosonde)	Sounding Site	1	511

1.2 General comments from Lead Centre

No comments from Lead Centre.

2 System: GNSS Site PAYE (PAY-GN-01)

Object	**Value**
System name	GNSS Site PAYE
Unique GRUAN ID	PAY-GN-01
System type	GNSS (GN - GNSS)
Geographical position	46.8121 °N, 6.9439 °E, 548.7 m
Operated by	MSWISS | Office fédéral de météorologie et climatologie MeteoSuisse
Instrument contact	Martucci, Giovanni
Started at	-
Defined setups	1 (HOURLY)
Possible streams	-

2.1 Lead Centre comments

2.1.1 Dataflow

Dataflow of GNSS data to GRUAN LC in October 2018. The current dataflow only includes converted meteorological data (RINEX).

3 System: Payerne Raman WV Lidar (RALMO) (PAY-LI-01)

Object	**Value**
System name	Payerne Raman WV Lidar (RALMO)
Unique GRUAN ID	PAY-LI-01
System type	Lidar (LI - Lidar)
Geographical position	46.8100 °N, 6.9500 °E, 491.0 m
Operated by	MSWISS | Office fédéral de météorologie et climatologie MeteoSuisse
Instrument contact	Martucci, Giovanni
Started at	2013-09-01
Defined setups	1 (DEFAULT)
Possible streams	LIDAR

3.1 Lead Centre comments

3.1.1 Dataflow

The dataflow of Lidar data to GRUAN LC was started in October 2023.

3.2 GRUAN data products

3.2.1 Stream: LIDAR

Product	**Version**	**Soundings received**	**Available at LC**	**Distributed by NCEI**
LIDAR		331	331	

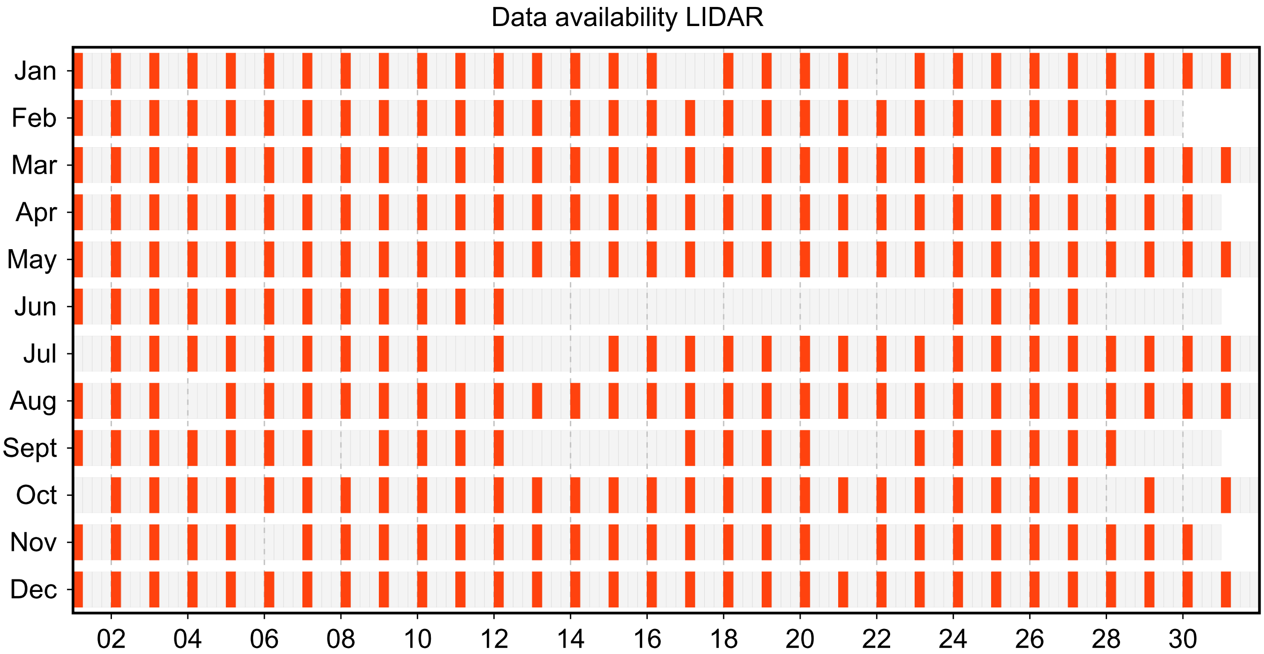
3.3 Availability of data products

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: LIDAR



3.4 Instrument combinations of PAY-LI-01

Count	Instrument combination
331	LIDAR

4 System: Payerne Radiosonde Launch Site (PAY-RS-01)

Object	Value
System name	Payerne Radiosonde Launch Site
Unique GRUAN ID	PAY-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	46.8133 °N, 6.9434 °E, 491.0 m
Operated by	MSWISS | Office fédéral de météorologie et climatologie MeteoSuisse
Instrument contact	Romanens, Gonzague
Started at	-
Defined setups	8 (ROUTINE, OZONE, RESEARCH, SRS-TEST, DUAL, ROUTINE2, ROUTINE3, OZONE2)
Possible streams	COBALD, ECC, FLASH, M10, RS41, RS92, SRS-C34, SRS-C50

4.1 Lead Centre comments

4.1.1 Dataflow

Dataflow to GRUAN LC was running intermittently since September 2011.

Currently, the dataflow includes streams of the operational sonde Vaisala RS41-SG, Modem M10, COBALD backscatter sonde, and ECC ozone sonde. Launches are promptly recorded using the GruanToolRsLaunch (gtRsl) or the RsLaunchClient (RLC).

4.1.2 General

This is the manual launching site.

There is very good performance in terms of burst altitude which is regularly 10 hPa to 5 hPa and higher.

4.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI

4.2.1 Stream: COBALD

COBALD		7	7	

4.2.2 Stream: ECC

ECC		159	159	

4.2.3 Stream: M10

M10		16	16	
M10-RAW	001		14	
M10-GDP-BETA	001		14	

4.2.4 Stream: RS41

RS41		263	263	
RS41-RAW	001		263	
RS41-EDT	001		263	
RS41-GDP	001		262	

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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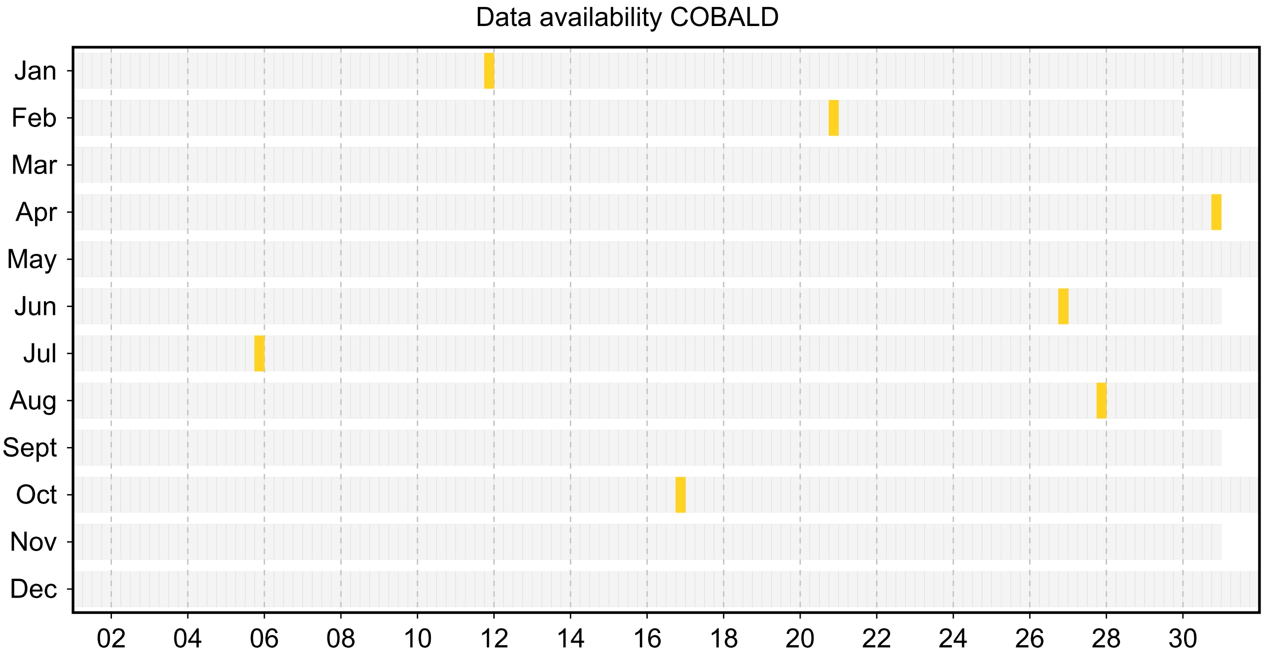
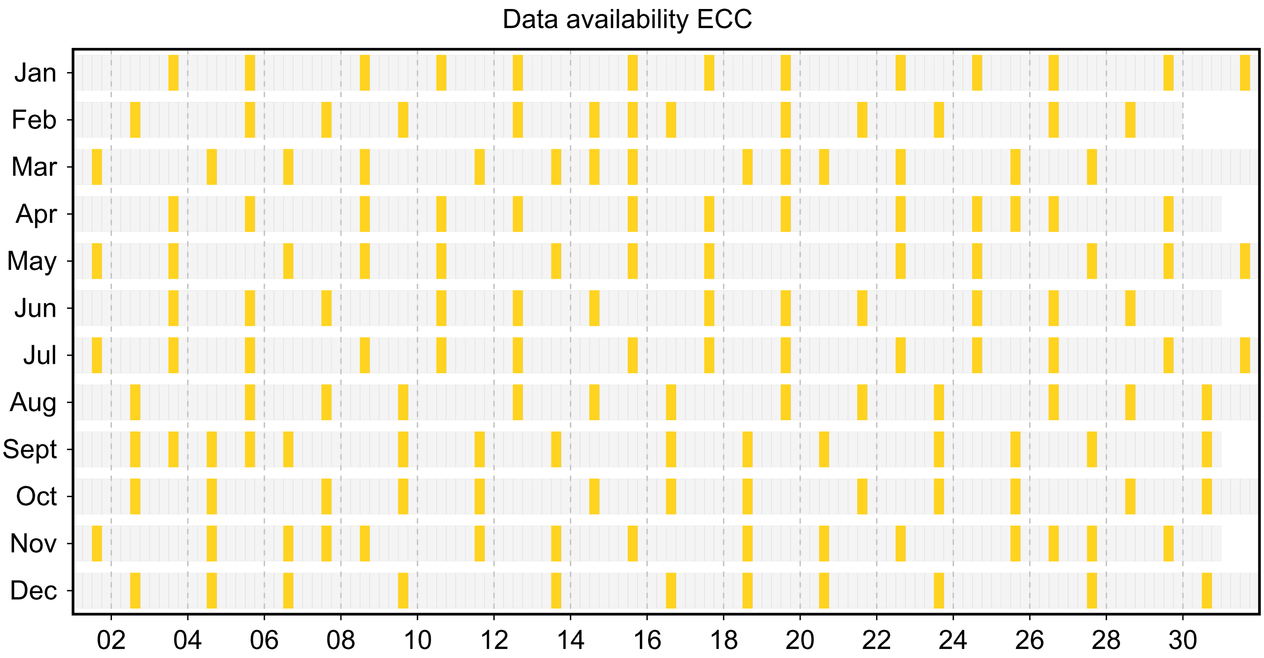
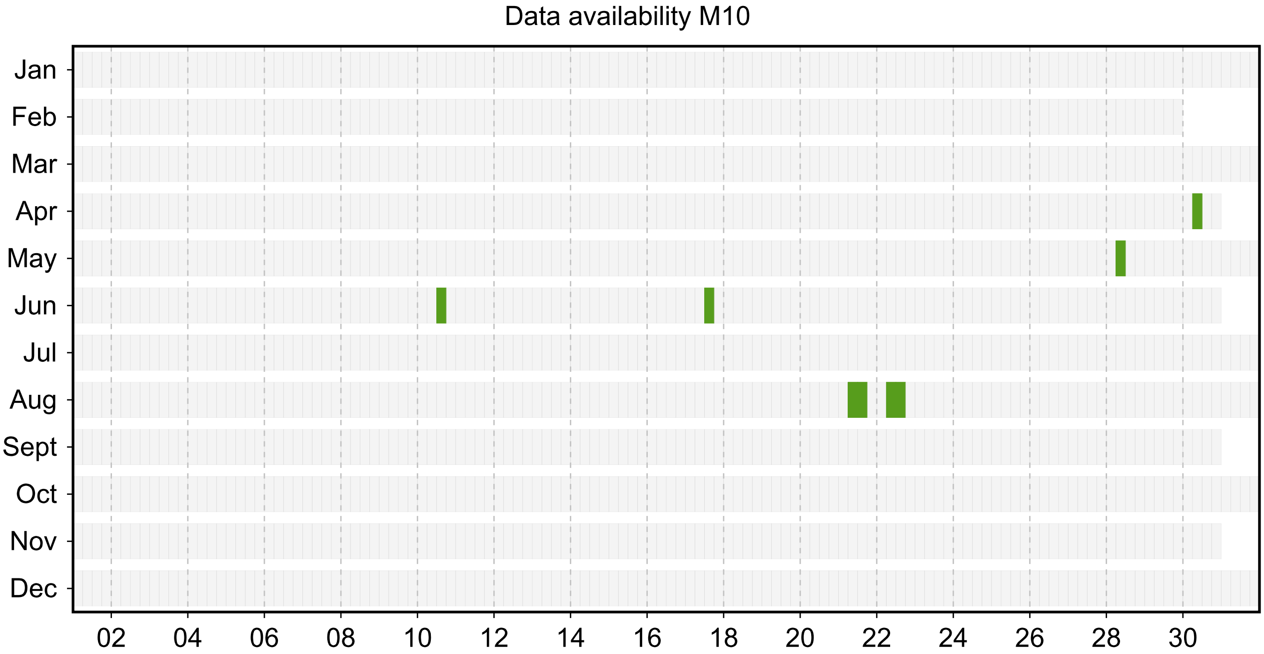
4.3.1 Stream: COBALD



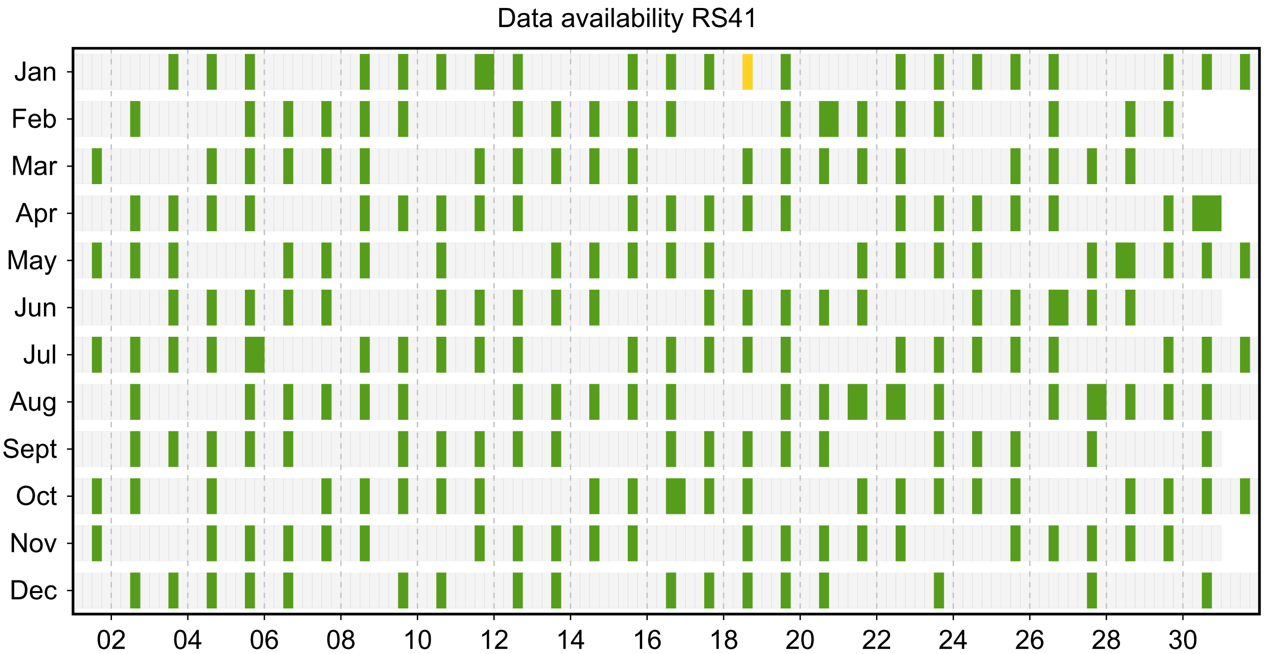
4.3.2 Stream: ECC



4.3.3 Stream: M10



4.3.4 Stream: RS41



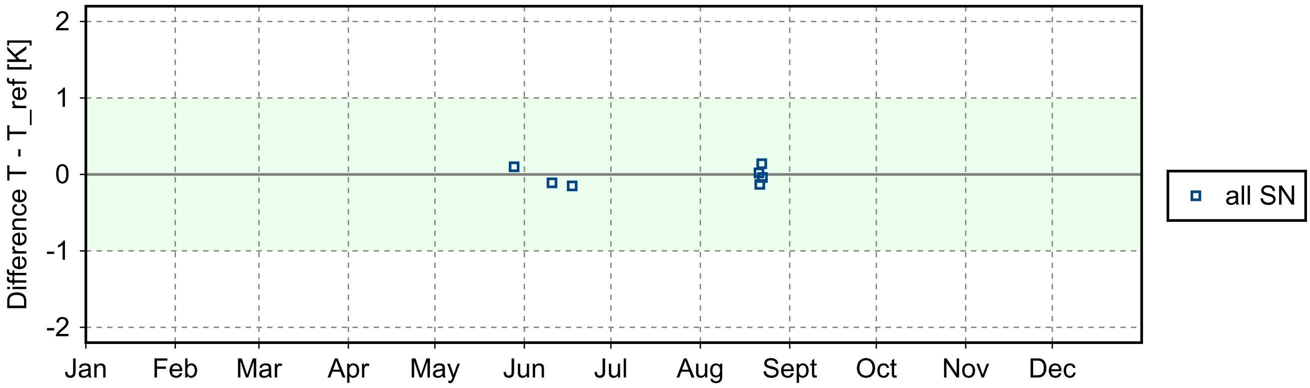
4.4 Instrument combinations of PAY-RS-01

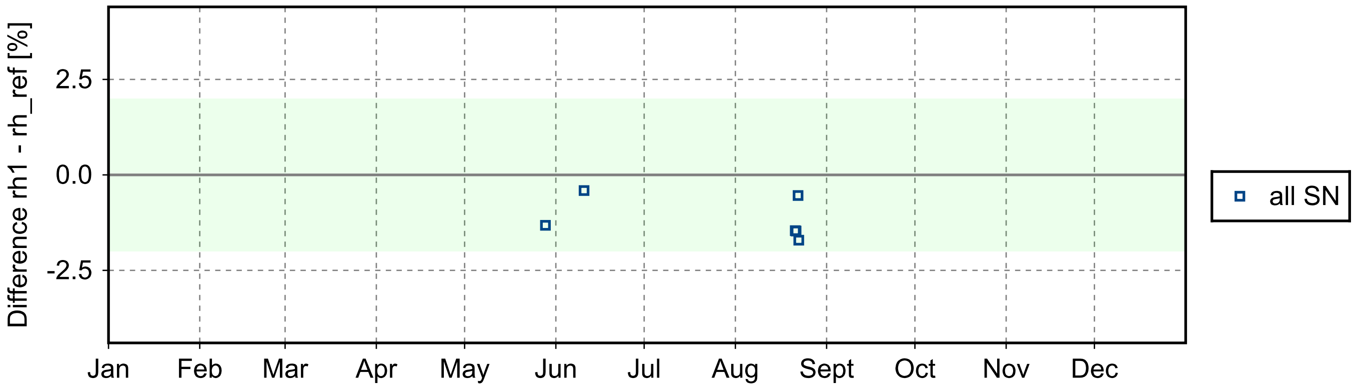
Count	Instrument combination
7	COBALD, RS41
159	ECC, RS41
8	2x M10, RS41
89	RS41

4.5 Instrument ground check

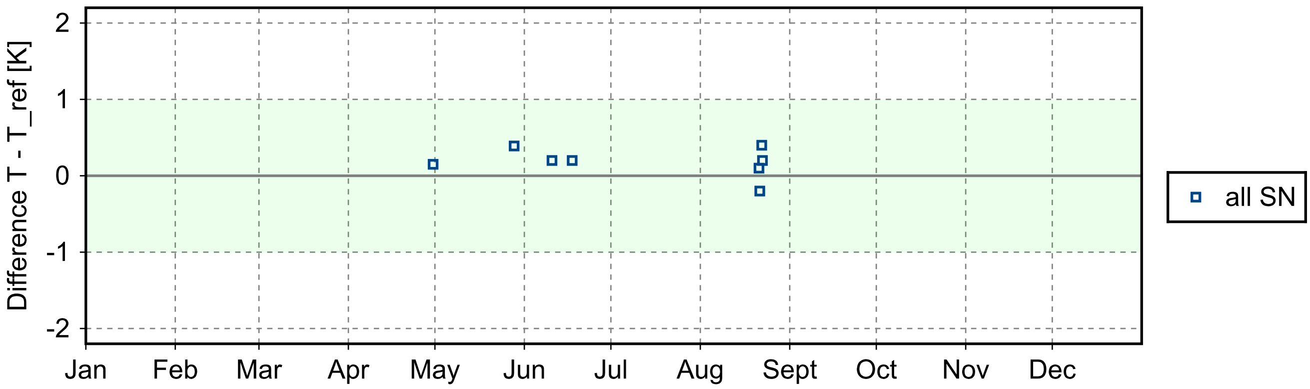
4.5.1 Stream: M10

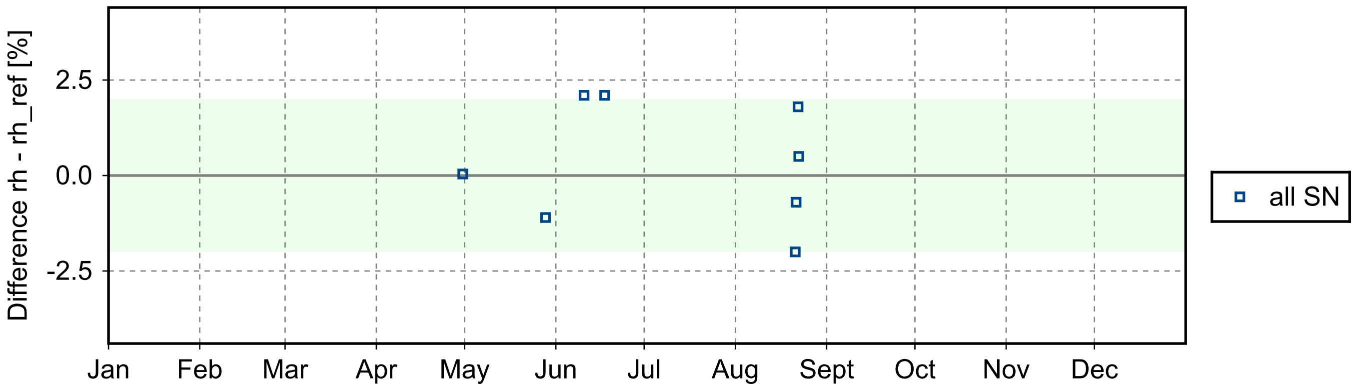
(1) GroundCheck: GC-SHC





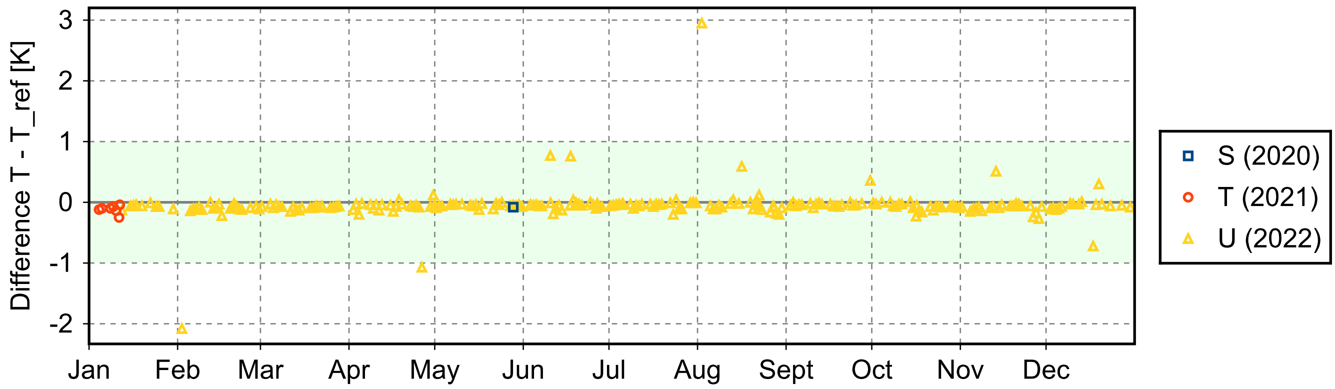
(2) GroundCheck: GC-TU(room)

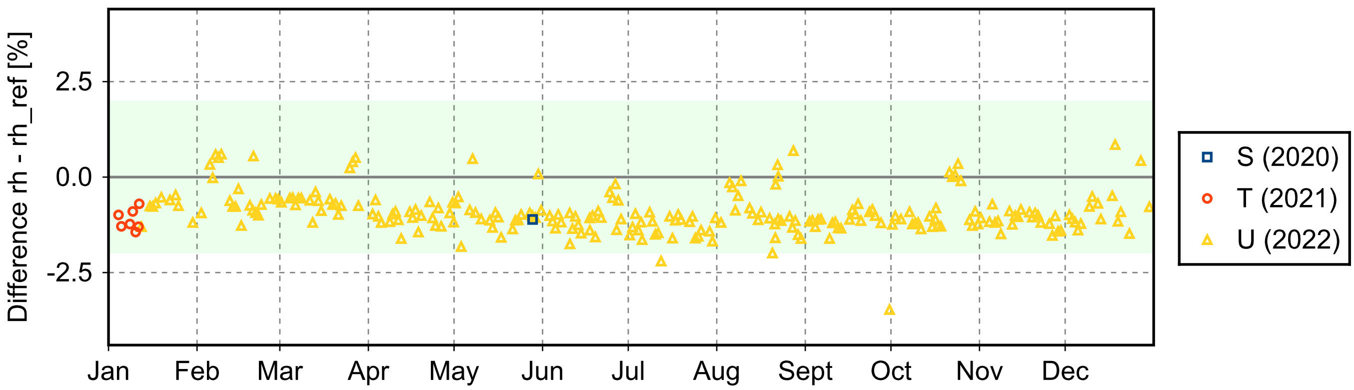




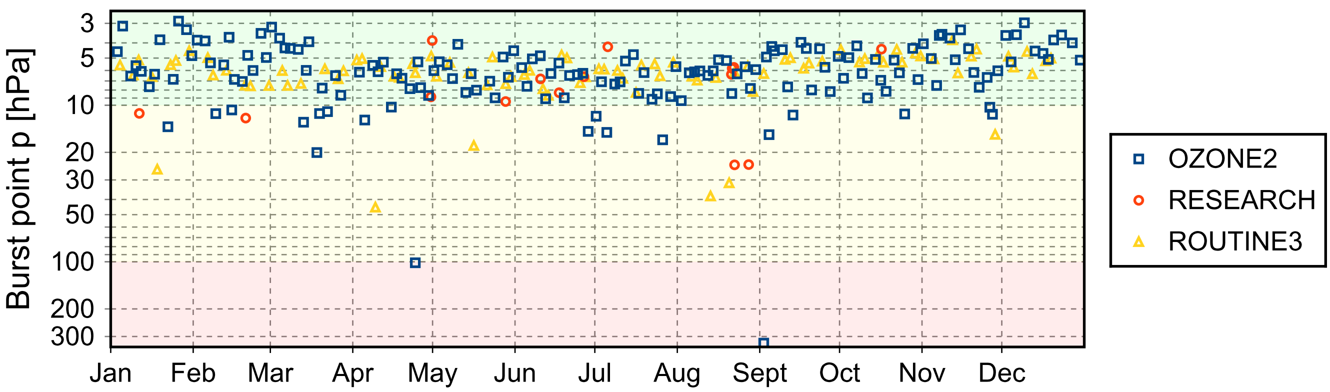
4.5.2 Stream: RS41

(1) GroundCheck: GC-SHC





4.6 Measurement events



5 System: Automatic Payerne Launch System (Autosonde) (PAY-RS-02)

Object	Value
System name	Automatic Payerne Launch System (Autosonde)
Unique GRUAN ID	PAY-RS-02
System type	Sounding Site (RS - Radiosonde)
Geographical position	46.8133 °N, 6.9434 °E, 490.0 m
Operated by	MSWISS | Office fédéral de météorologie et climatologie MeteoSuisse
Instrument contact	Romanens, Gonzague
Started at	2018-03-19
Defined setups	1 (AUTO1)
Possible streams	RS41

5.1 Lead Centre comments

5.1.1 Dataflow

Dataflow of auto launcher system to GRUAN LC is running since October 2018. This dataflow includes stream of the operational sonde Vaisala RS41-SG (since March 2018). All launches are promptly recorded using the GruanToolRsLaunch (gtRsl).

5.1.2 General

This is the autolauncher system.

There is very good performance in terms of burst altitude which is regularly 10 hPa to 5 hPa and higher.

5.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI

5.2.1 Stream: RS41

RS41		511	511	
RS41-RAW	001		511	
RS41-EDT	001		511	
RS41-GDP	001		510	

5.3 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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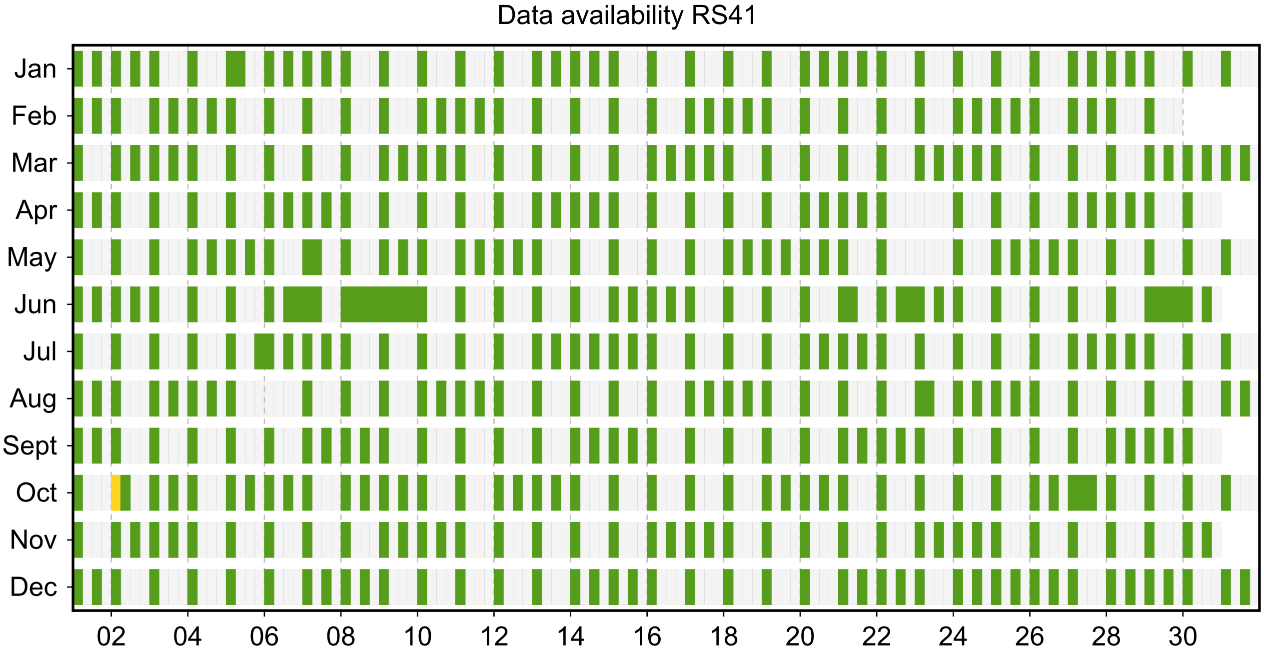
5.3.1 Stream: RS41



5.4 Instrument combinations of PAY-RS-02

Count	Instrument combination
511	RS41

5.6 Measurement events