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GLOBAL CLIMATE OBSERVING
SYSTEM (GCOS)

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**15th GRUAN Implementation-
Coordination Meeting (ICM-15)**

Session 5

Bern

11 March - 15 March 2024

GRUAN Site Report for Ross Island

(Submitted by Richard Querel)

Summary and Purpose of this Document

Report from the GRUAN site Ross Island for the period January 2022 to December 2023.

Overview

The first Antarctic GRUAN site, Ross Island, is actively submitting RS41 radiosonde data and a GNSS data stream for GRUAN processing. Both are on-line with established data flow to the Lead Centre (radiosondes) and GFZ (GNSS). The site is a distributed site spread across 5 km of Southern Ross Island, that includes Arrival Heights, Scott Base, and McMurdo station. Ross Island hosts several NDACC and WOUDC submitting instruments that could be brought into GRUAN once formal products are defined.

Change and change management

No changes to existing RS41 & GNSS data streams.

Resourcing

No changes to resourcing. Measurement programmes are stable with long-term support.

Operations

During 2022 and 2023, several FPH+ECC+POPS payloads were launched from Scott Base as part of a technical feasibility study and to monitor the arrival and evolution of water and aerosols from HT-HH. SHC usage for the routine McMurdo radiosondes stopped in early 2022 because of a damaged humidity chamber. The SHC was transported back to the U.S., then N.Z., repaired in N.Z., and then returned to McMurdo. The SHC ground-checks have resumed in January 2024. After the end of austral summer (approx. 24 February), the SHC checks will be limited to the 00Z radiosoundings during austral winter (thereby simplifying the operator steps required for the occasional 12Z launches during the winter flight periods).

The McMurdo-launched RS41 radiosondes use small balloons (200 gram), as their primary driver is to provide meteorological support for local aircraft operations and GTS submissions as a GRUAN site. Understandably, those balloons cannot reach high altitudes (typical burst height is ~ 40 hPa during summer and ~ 100 hPa during winter). There is currently no procedure (nor interest in) conditioning their balloons to attain higher altitudes during the winter period (by dipping in ATK for example). Balloons are currently filled with Helium. There have been discussions about a future on-site Hydrogen generation plant, but no funding requested yet.

Covid-19

Quarantining requirements for travel to Antarctica were lifted for the 2022/23 field season.

Site assessment and certification

N/A

GRUAN-related research

As mentioned above, over 2022 and 2023, six NOAA B2SAP (Balloon Baseline Stratospheric Aerosol Profiles) packages consisting of ECC+FPH+POPS instruments, were launched from Scott Base to help assess the technical viability of having AntarcticaNZ science technicians perform these launches more regularly on behalf of NIWA & NOAA. The launches were successful and had the additional benefit of measuring HT-HH effects as well. It was decided that routine launches of these more sophisticated payloads would need to be performed by NIWA personnel and so at this stage a routine programme is unlikely to proceed. However, NIWA personnel continue to travel to Antarctica yearly to train AntNZ staff and the option to launch balloons during these routine training trips is still being considered.

A new CIO microwave radiometer from U.S.NRL was installed at Scott Base in October 2023.

WG-GRUAN interface

Richard Querel is co-chair of TT-Sites since December 2022. Support letters from the Lead Centre are always helpful to demonstrate value to the institutes jointly collaborating in this Ross Island GRUAN site effort. Especially to help justify the value of the SHC ground-check for McMurdo radiosonde launches.

Other archiving centers

GUAN, GAW, NDACC, WOUDC, CAMS, LINZ

Participation in campaigns

Trial B²SAP payload launches at Scott Base mentioned above.

Future plans

A joint NIWA-NASA lidar deployment at Lauder and Ross Island is being planned.



GRUAN Site Report for Ross Island (ROS), 2022

Reported time range is Jan 2022 to Dec 2022

Created by the Lead Centre

Version from 2024-03-01

1 General GRUAN site information

Object	Value
Station name	RossIsland
Unique GRUAN ID	ROS
Geographical position	-77.8500 °S, 166.6500 °E, 10.0 m
Operated by	COOP-NIWA-USAP-ANZ Cooperation between NIWA and USAP and Antarctica New Zealand
Main contact	Querel, Richard
WMO no./name	-
Operators	currently 0, changes +0 / -0
Sounding Site	2
GNSS	1

1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
ROS-GN-01	GNSS site SCTB	GNSS	1	operational
ROS-RS-01	Ross Island Radiosonde Launch Site (McMurdo)	Sounding Site	1	523
ROS-RS-02	Ross Island Research Sonde Launch Site (Scott Base)	Sounding Site	1	2

1.2 General comments from Lead Centre

1.2.1 General

The GRUAN site Ross Island is a distributed site with three locations: McMurdo Station, Arrival Heights Research Laboratory, and Scott Base.

2 System: GNSS site SCTB (ROS-GN-01)

Object	Value
System name	GNSS site SCTB
Unique GRUAN ID	ROS-GN-01
System type	GNSS (GN - GNSS)
Geographical position	-77.5056 °S, 166.4529 °E, -18.9 m
Operated by	USAP United States Antarctic Program
Instrument contact	Querel, Richard
Started at	2019-01-01
Defined setups	1 (HOURLY)
Possible streams	-

2.1 Lead Centre comments

2.1.1 Dataflow

Dataflow of GNSS data to GRUAN LC and to the GRUAN GNSS processing centre at GFZ has started in March 2019. The current dataflow to GRUAN LC includes instrument logs, and processed data.

The operational processing as GNSS-PW-GDP is performed.

3 System: Ross Island Radiosonde Launch Site (McMurdo) (ROS-RS-01)

Object	Value
System name	Ross Island Radiosonde Launch Site (McMurdo)
Unique GRUAN ID	ROS-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	-77.8500 °S, 166.6300 °E, 10.0 m
Operated by	USAP United States Antarctic Program
Instrument contact	Querel, Richard
Started at	-
Defined setups	1 (ROUTINE)
Possible streams	RS41

3.1 Lead Centre comments

3.1.1 Dataflow

Sonde dataflow to the GRUAN LC is operational since December 2018.

3.1.2 Data quality

No SHC ground check data available after January 2022.

3.1.3 General

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

Recommended burst altitude of 10 hPa is not reached on a regular basis. During the dark winter months, the height of the burst point is significantly lower than during the rest of the year. This could be significantly improved by treating the balloons in an oil bath before launch.

3.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI
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3.2.1 Stream: RS41

RS41		523	523	
RS41-RAW	001		523	
RS41-EDT	001		523	
RS41-GDP	001		517	

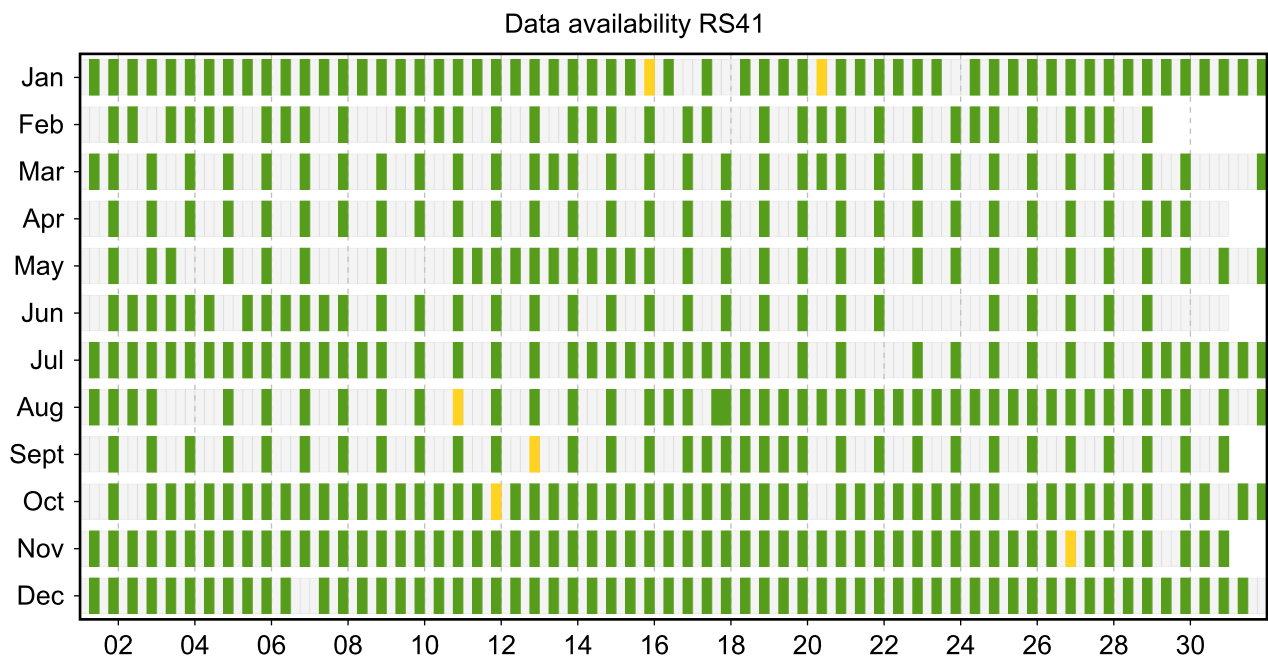
3.3 Availability of data products

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: RS41



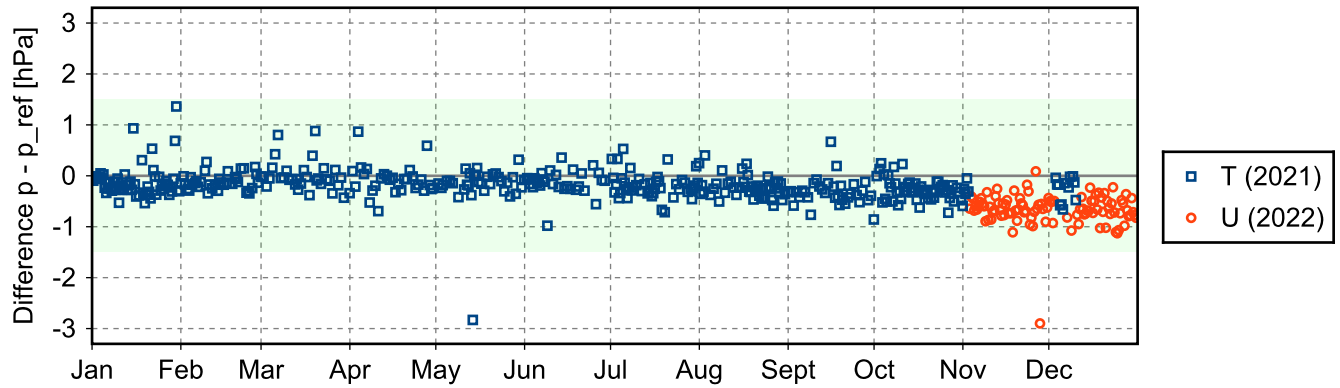
3.4 Instrument combinations of ROS-RS-01

Count	Instrument combination
523	RS41

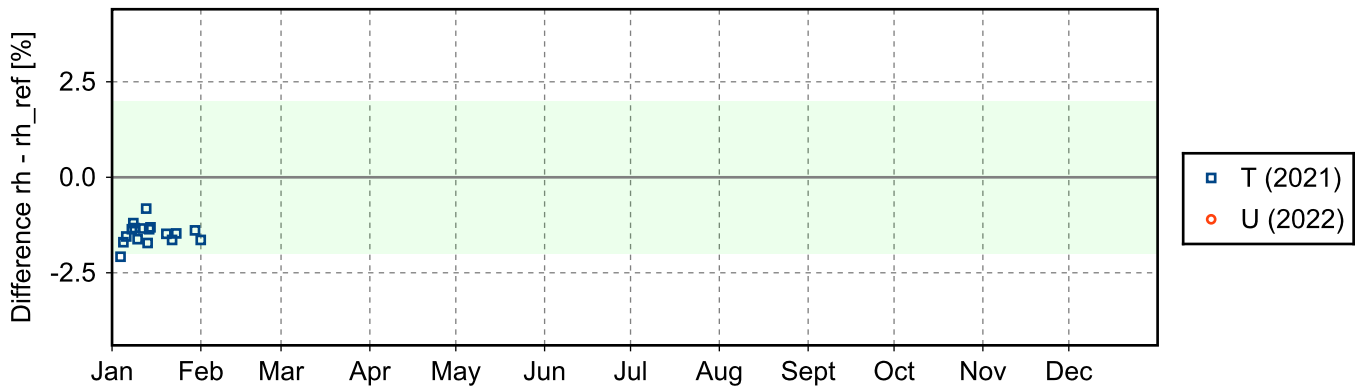
3.5 Instrument ground check

3.5.1 Stream: RS41

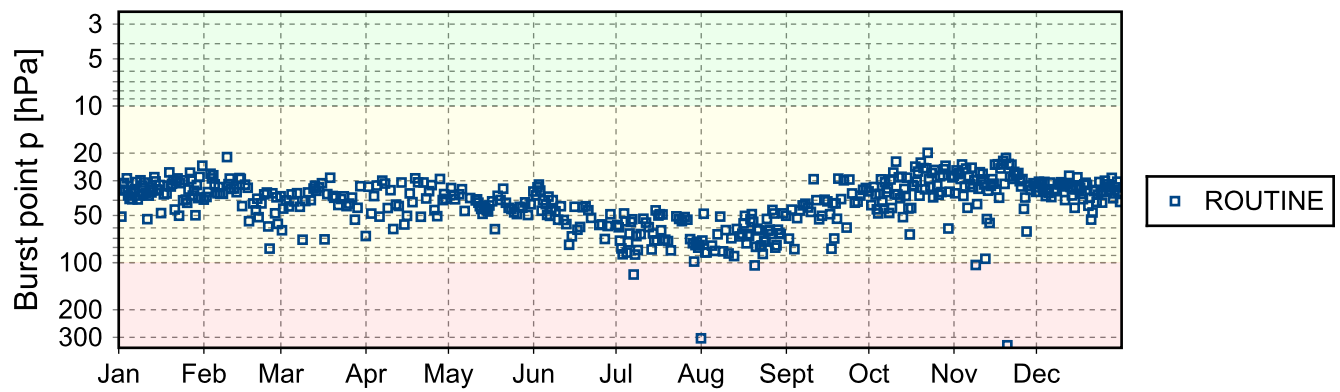
(1) GroundCheck: GC-RI41



(2) GroundCheck: GC-SHC



3.6 Measurement events



4 System: Ross Island Research Sonde Launch Site (Scott Base) (ROS-RS-

Object	Value
System name	Ross Island Research Sonde Launch Site (Scott Base)
Unique GRUAN ID	ROS-RS-02
System type	Sounding Site (RS - Radiosonde)
Geographical position	-77.8491 °S, 166.7682 °E, 10.0 m
Operated by	NIWA National Institute of Water & Atmospheric Research
Instrument contact	Querel, Richard
Started at	-
Defined setups	1 (RESEARCH)
Possible streams	ECC, FPH, IMET-1, IMET-4, POPS

4.1 Lead Centre comments

4.1.1 General

This launch site is only used for special research soundings.

4.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI
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4.2.1 Stream: ECC

ECC		2	2	
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4.2.2 Stream: FPH

FPH		2	2	
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4.2.3 Stream: IMET-1

IMET-1		2	2	
IMET-1-RAW	001		2	

4.2.4 Stream: POPS

POPS		2	2	
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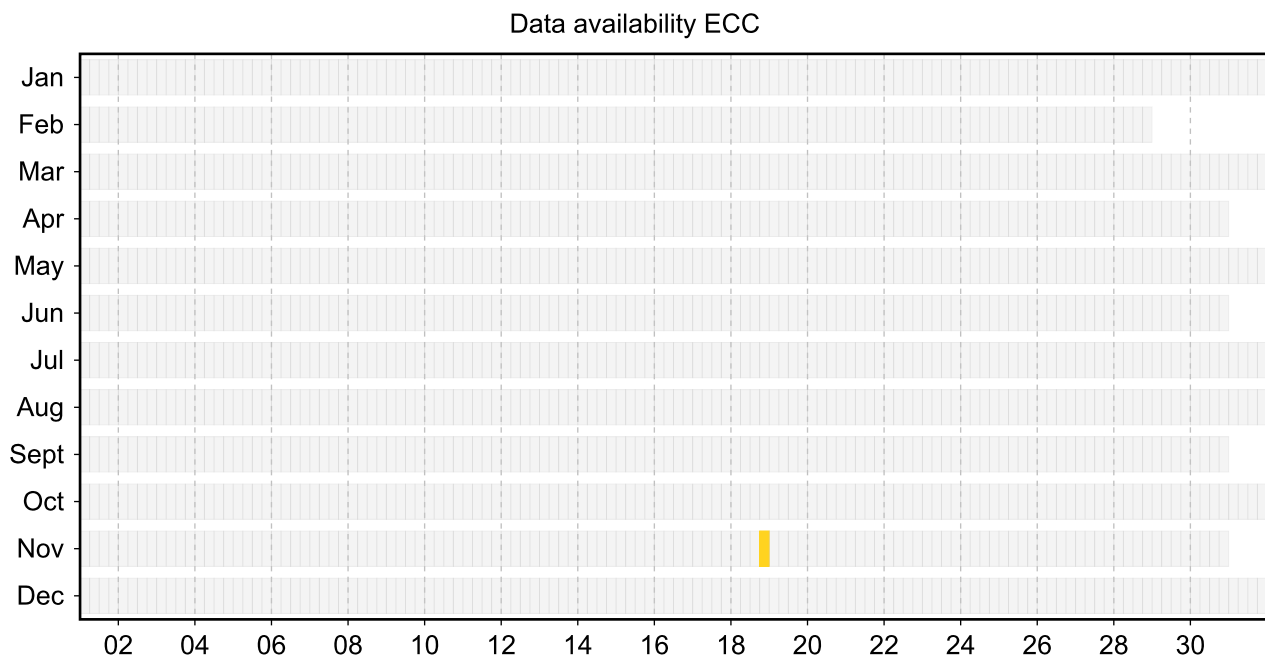
4.3 Availability of data products

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).

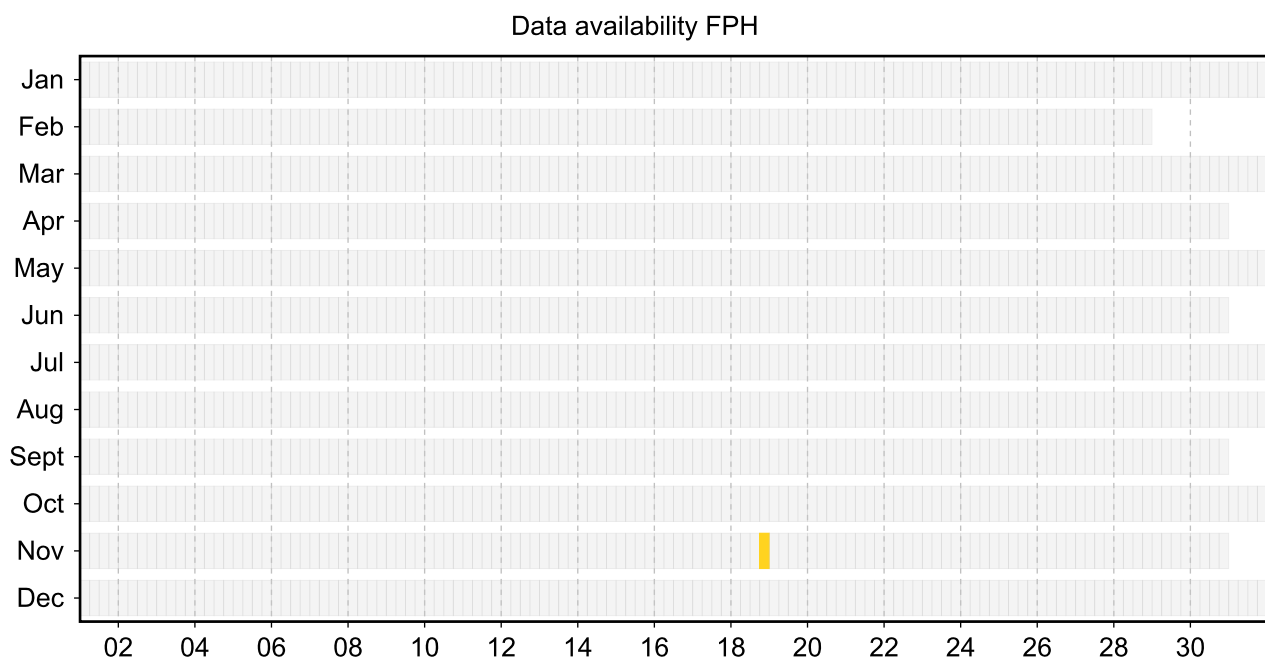
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4.3.1 Stream: ECC

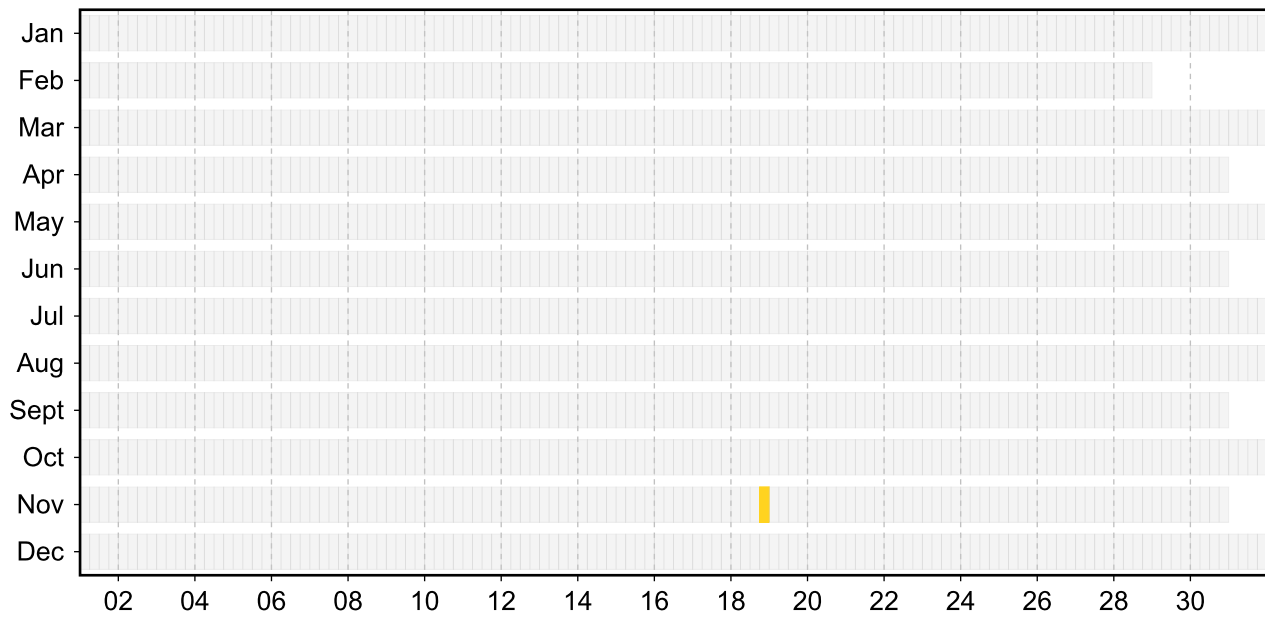


4.3.2 Stream: FPH



4.3.3 Stream: IMET-1

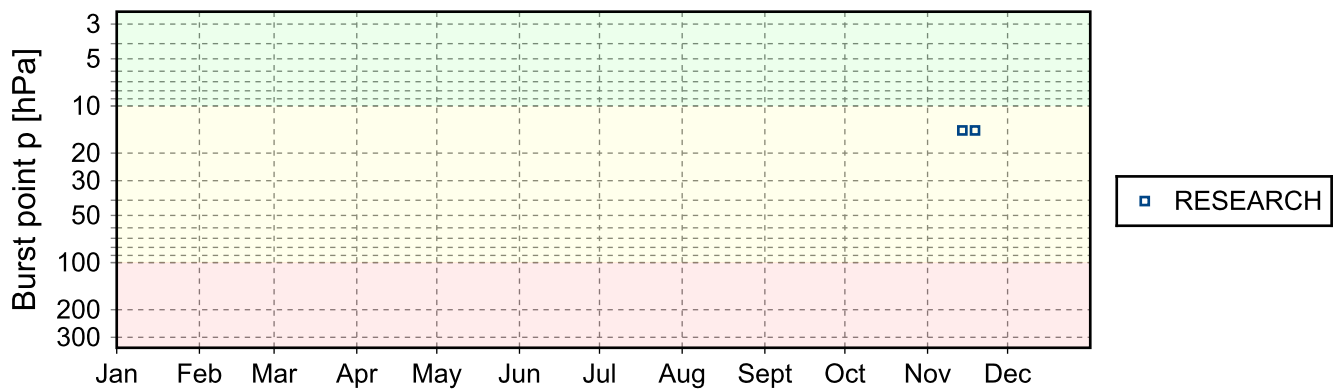
Data availability IMET-1



4.4 Instrument combinations of ROS-RS-02

Count	Instrument combination
2	ECC, FPH, IMET-1, POPS

4.6 Measurement events





GRUAN Site Report for Ross Island (ROS), 2023

Reported time range is Jan 2023 to Dec 2023

Created by the Lead Centre

Version from 2024-03-01

1 General GRUAN site information

Object	Value
Station name	RossIsland
Unique GRUAN ID	ROS
Geographical position	-77.8500 °S, 166.6500 °E, 10.0 m
Operated by	COOP-NIWA-USAP-ANZ Cooperation between NIWA and USAP and Antarctica New Zealand
Main contact	Querel, Richard
WMO no./name	-
Operators	currently 0, changes +0 / -0
Sounding Site	2
GNSS	1

1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
ROS-GN-01	GNSS site SCTB	GNSS	1	operational
ROS-RS-01	Ross Island Radiosonde Launch Site (McMurdo)	Sounding Site	1	493
ROS-RS-02	Ross Island Research Sonde Launch Site (Scott Base)	Sounding Site	1	4

1.2 General comments from Lead Centre

1.2.1 General

The GRUAN site Ross Island is a distributed site with three locations: McMurdo Station, Arrival Heights Research Laboratory, and Scott Base.

2 System: GNSS site SCTB (ROS-GN-01)

Object	Value
System name	GNSS site SCTB
Unique GRUAN ID	ROS-GN-01
System type	GNSS (GN - GNSS)
Geographical position	-77.5056 °S, 166.4529 °E, -18.9 m
Operated by	USAP United States Antarctic Program
Instrument contact	Querel, Richard
Started at	2019-01-01
Defined setups	1 (HOURLY)
Possible streams	-

2.1 Lead Centre comments

2.1.1 Dataflow

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Object	Value
System name	Ross Island Radiosonde Launch Site (McMurdo)
Unique GRUAN ID	ROS-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	-77.8500 °S, 166.6300 °E, 10.0 m
Operated by	USAP United States Antarctic Program
Instrument contact	Querel, Richard
Started at	-
Defined setups	1 (ROUTINE)
Possible streams	RS41

3.1 Lead Centre comments

3.1.1 Dataflow

Sonde dataflow to the GRUAN LC is operational since December 2018.

3.1.2 Data quality

No SHC ground check data available.

3.1.3 General

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

Recommended burst altitude of 10 hPa is not reached on a regular basis. During the dark winter months, the height of the burst point is significantly lower than during the rest of the year. This could be significantly improved by treating the balloons in an oil bath before launch.

3.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI
---------	---------	--------------------	-----------------	---------------------

3.2.1 Stream: RS41

RS41		493	493	
RS41-RAW	001		493	
RS41-EDT	001		493	
RS41-GDP	001		487	

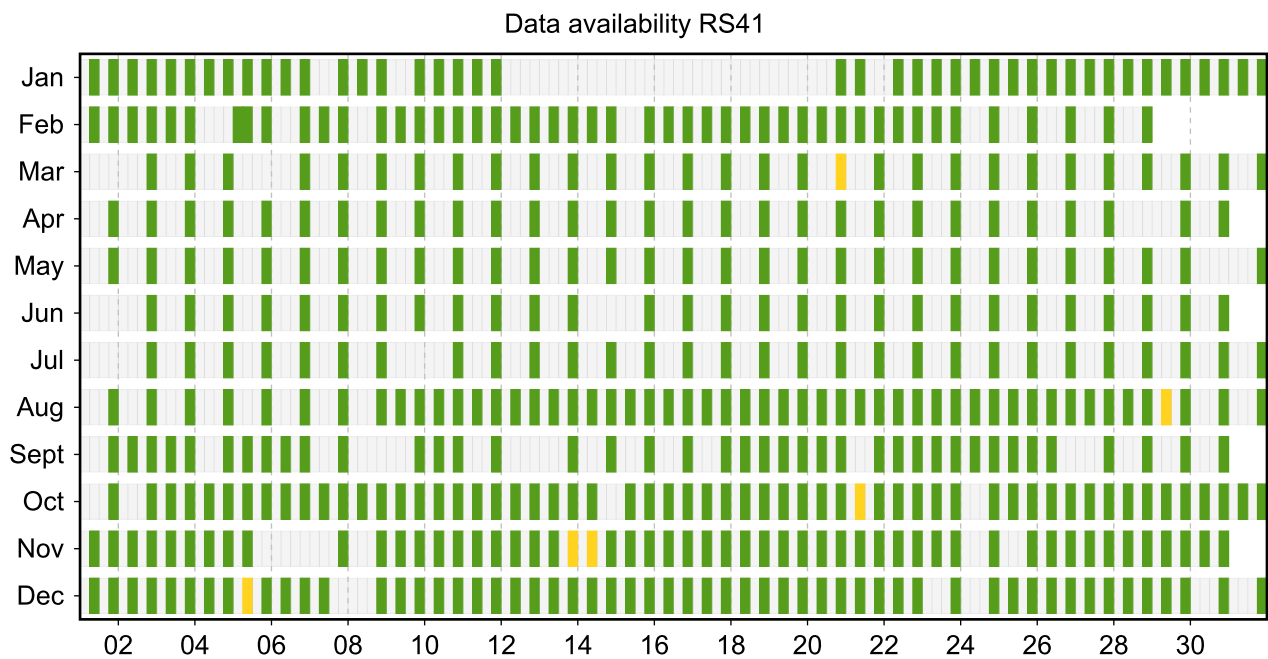
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3.3.1 Stream: RS41



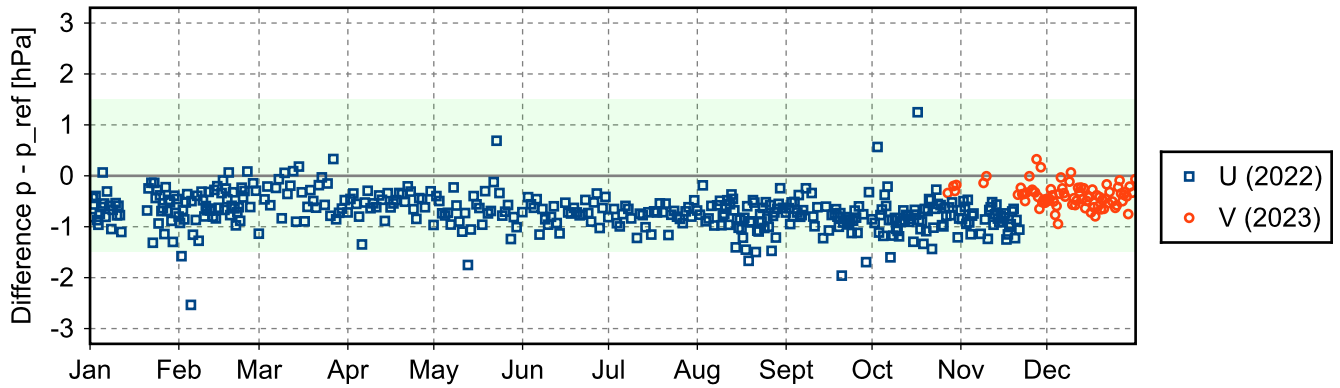
3.4 Instrument combinations of ROS-RS-01

Count	Instrument combination
493	RS41

3.5 Instrument ground check

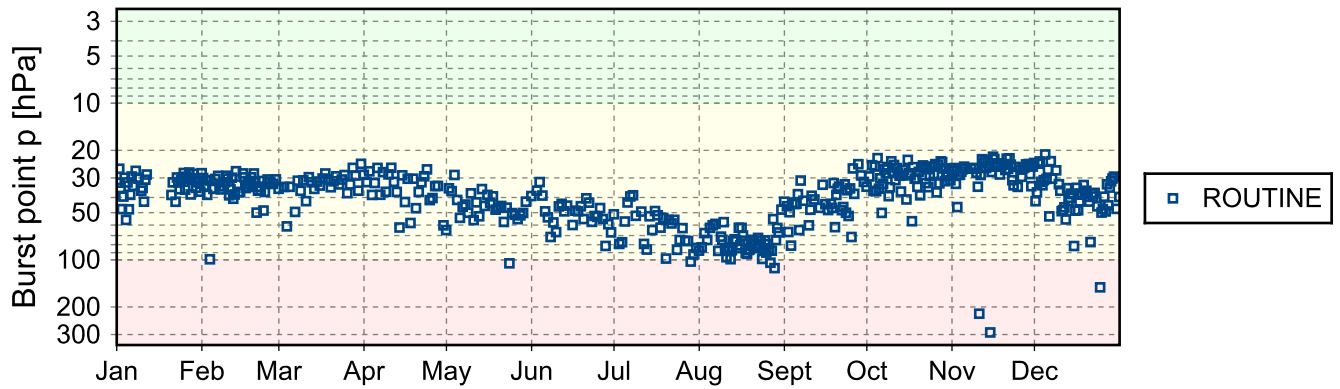
3.5.1 Stream: RS41

(1) GroundCheck: GC-RI41



(2) GroundCheck: GC-SHC

3.6 Measurement events



4 System: Ross Island Research Sonde Launch Site (Scott Base) (ROS-RS-

Object	Value
System name	Ross Island Research Sonde Launch Site (Scott Base)
Unique GRUAN ID	ROS-RS-02
System type	Sounding Site (RS - Radiosonde)
Geographical position	-77.8491 °S, 166.7682 °E, 10.0 m
Operated by	NIWA National Institute of Water & Atmospheric Research
Instrument contact	Querel, Richard
Started at	-
Defined setups	1 (RESEARCH)
Possible streams	ECC, FPH, IMET-1, IMET-4, POPS

4.1 Lead Centre comments

4.1.1 General

This launch site is only used for special research soundings.

4.2 GRUAN data products

Product	Version	Soundings received	Available at LC	Distributed by NCEI
---------	---------	--------------------	-----------------	---------------------

4.2.1 Stream: ECC

ECC		4	4	
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4.2.2 Stream: FPH

FPH		2	2	
-----	--	---	---	--

4.2.3 Stream: IMET-1

IMET-1		4	4	
IMET-1-RAW	001		4	

4.2.4 Stream: POPS

POPS		2	2	
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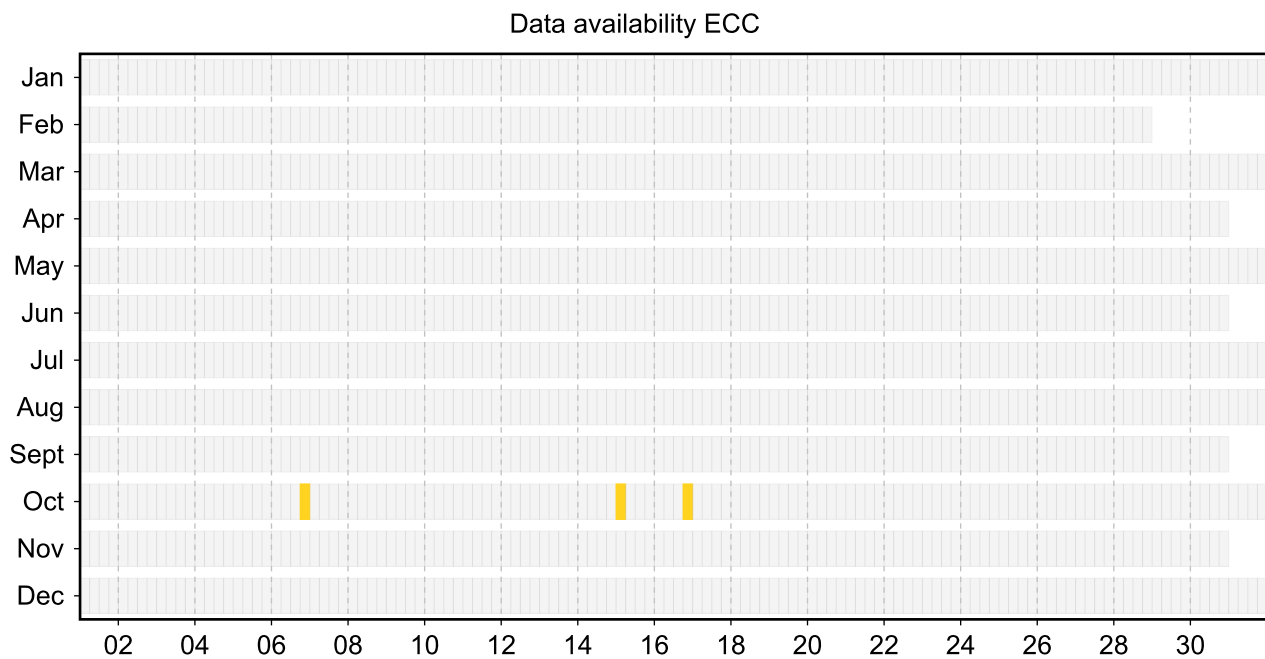
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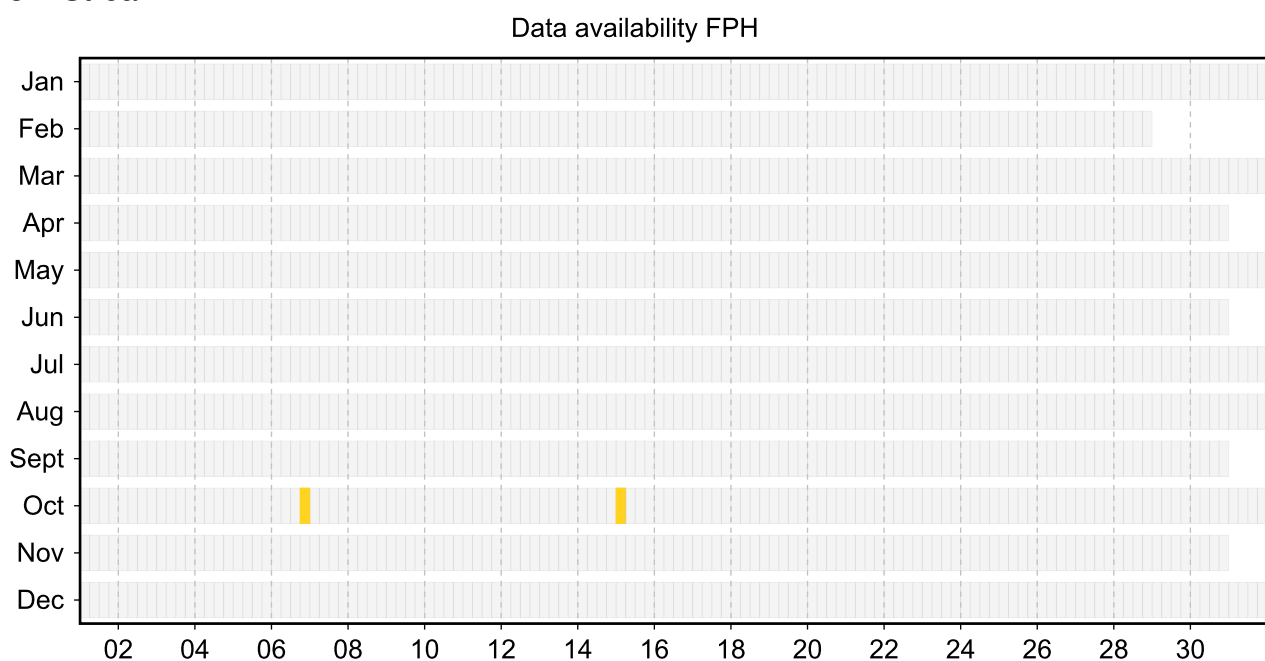
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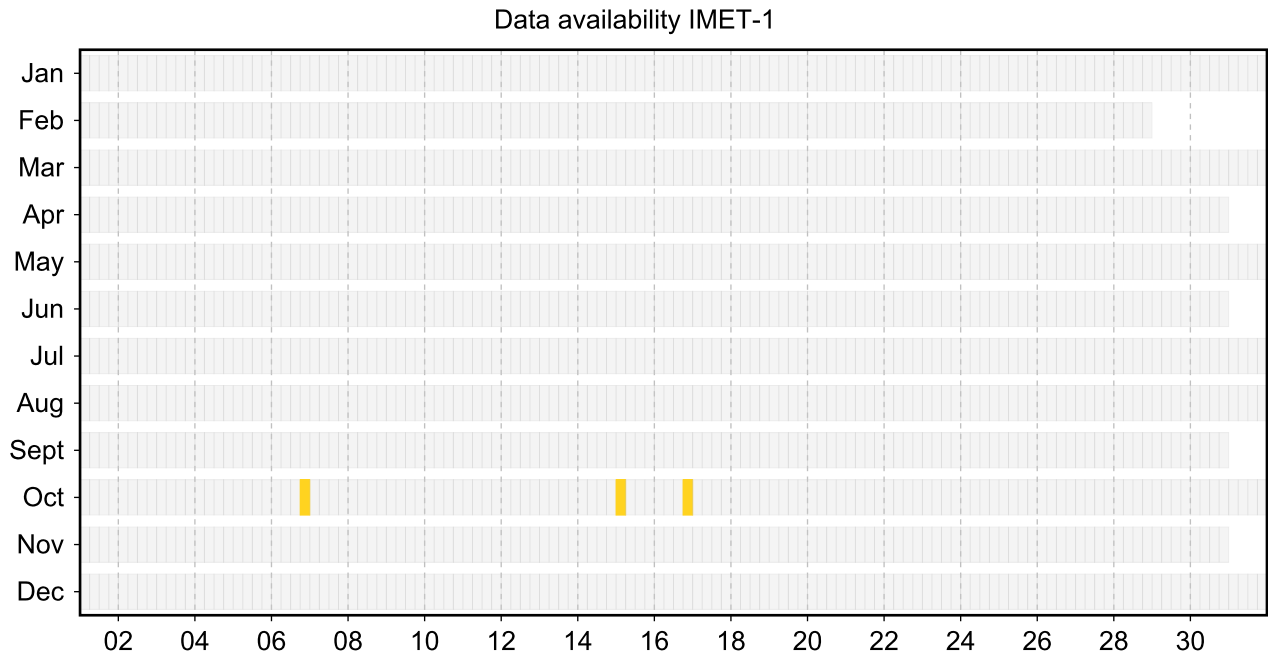
4.3.1 Stream: ECC



4.3.2 Stream: FPH



4.3.3 Stream: IMET-1



4.4 Instrument combinations of ROS-RS-02

Count	Instrument combination
2	ECC, FPH, IMET-1, POPS
2	ECC, IMET-1

4.6 Measurement events

