



WMO/IOC/UNEP/ICSU
GLOBAL CLIMATE OBSERVING
SYSTEM (GCOS)

Doc. 7.10
(13.IV.2018)

**10th GRUAN Implementation-
Coordination Meeting (ICM-10)**

Session 7

Potsdam, Germany

23 - 27 April 2018

GRUAN Site Report for Lauder

(Submitted by Richard Querel)

Summary and Purpose of this Document

Report from the GRUAN site Lauder for the period January to December 2017.



GRUAN Site Report for Lauder (LAU)

Reporting for the period January to December 2017

Date: 27-March-2018

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Overview

The upper-air balloon programme at Lauder consisting of radiosondes, ozonesondes, and NOAA frost-point hygrometers, are all being submitted to GRUAN. The GNSS receiver data are also being submitted to GRUAN. Lauder hosts a number of NDACC and WOUDC submitting instruments that could be brought into GRUAN once formal products are defined. We are working with the Invercargill GUAN site and are submitting their radiosonde data to the LC for GRUAN processing.

Change and change management

We still have a supply of RS92 radiosondes and OIF interface boards that we are slowly using up since the formal dual-sounding RS92-RS41 intercomparison ended. NIWA's ozonesonde processing software is being fully re-coded into Python, away from the prior QBASIC/Delphi/Perl/Python-hybrid that had evolved over time. This new processor is identical in output result, but now allows for easier implementation of discrete modules to deal with homogenization corrections and transfer functions. The system will be used to reprocess the entire Lauder ozonesonde timeseries as part of the ongoing homogenization effort being done by the ozonesonde community.

Resourcing

Lauder has 9 staff (4 full-time scientists, 4 full-time technicians, and 1 part-time maintenance person). Our current funding is stable, albeit shrinking in real terms. We have been successful in funding new instrumentation and hardware upgrades (i.e. two new HR125 Bruker FTS, three new MAXDOAS

spectrometers, etc.), but are not making any progress in trying to fund more personnel. There is sufficient work for an additional scientist and technician but no funding yet to support them.

Operations

No operational challenges. We are considering building a tall shed for filling our balloons out of the wind, but to-date it is a low priority.

Site assessment and certification

More information about the audit process is requested.

GRUAN-related research

- Radiosondes, ozonesondes, FPH, GNSS.
- Trial processing of a GRUAN ozonesonde product.

WG-GRUAN interface

Support letter encouraging on-going measurements

Items for ICM-10 plenary discussions

- Status of the RS92-MW41 processing
- More information about site audit / re-certification process. Lauder is due later this year.

Other archiving centers

GAW, NDACC, WOUDC, BSRN, TCCON

Participation in campaigns

- NDACC Dobson intercomparison in Melbourne (Lauder and Arrival Heights Dobson instruments)

- TIMTAM (MAXDOAS intercomparison in Melbourne (Feb.2017))
- SAGE III-ISS balloon launches during overpasses (ozonesondes + FPH when possible)

Future plans

RIVM group are coming to Lauder (tentatively October 2018) to install an upgrade to their stratospheric ozone lidar. NIWA has taken ownership of the hardware, and I am working with Thierry LeBlanc to see how well the current and historical lidar data can be processed with his GLASS software. The initial results are very encouraging and GLASS has worked well with the Lauder data.



GRUAN Site Report for Lauder (LAU), 2017

Reported time range is Jan 2017 to Dec 2017
Created by the Lead Centre
Version from 2018-04-06

1 General GRUAN site information

Object	Value
Station name	Lauder
Unique GRUAN ID	LAU
Geographical position	-45.0500 °S, 169.6800 °E, 370.0 m
Operated by	NIWA National Institute of Water & Atmospheric Research
Main contact	Querel, Richard
WMO no./name	93817 LAUDER UPPER AIR
Operators	currently 5, changes +0 / -0
Sounding Site	2
GNSS	1

1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
LAU-GN-01	GNSS Site LDRZ	GNSS	1	operational
LAU-RS-01	Radiosonde Launch Site (Lauder)	Sounding Site	6	55
LAU-RS-02	Radiosonde Launch Site (Invercargill)	Sounding Site	1	752

1.2 General comments from Lead Centre

1.2.1 General

In March 2014, the dataflow from Lauder has started.

In September 2016, an additional dataflow of daily operational sounding from Invercargill has started.

2 System: GNSS Site LDRZ (LAU-GN-01)

Object	Value
System name	GNSS Site LDRZ
Unique GRUAN ID	LAU-GN-01
System type	GNSS (GN - GNSS)
Geographical position	-45.0380 °S, 169.6840 °E, n m
Operated by	NIWA National Institute of Water & Atmospheric Research
Instrument contact	Querel, Richard
Started at	2012-05-01
Defined setups	1 (HOURLY)
Possible streams	-

2.1 Lead Centre comments

2.1.1 Dataflow

Measurements are recorded at station since May 2012.

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.

3 System: Radiosonde Launch Site (Lauder) (LAU-RS-01)

Object	Value
System name	Radiosonde Launch Site (Lauder)
Unique GRUAN ID	LAU-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	-45.0500 °S, 169.6800 °E, 370.0 m
Operated by	NIWA National Institute of Water & Atmospheric Research
Instrument contact	Querel, Richard
Started at	-
Defined setups	6 (OZONE, FPH-OZONE, RS-ONLY, RS41-ONLY, RESEARCH, OZONE-2)
Possible streams	ECC, FPH, IMET-1, RS41, RS92

3.1 Lead Centre comments

3.1.1 Dataflow

Sonde dataflow to the GRUAN LC is operational since February 2014. This dataflow includes data from the Vaisala RS41-SG, RS92-SGP, ECC ozone sonde, FPH water vapour, and Internet IMET-1. All launches are transmitted using the RsLaunchClient.

Dual launches with RS92 and RS41 are performed since October 2015.

A GRUAN data product for the frostpoint hygrometer data is not yet available.

3.1.2 General

Ozone soundings are launched weekly. Research soundings using FPH, ECC, iMet-1, and Vaisala RS92 or RS41 are launched approximately once per month.

3.2 GRUAN data products

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

ECC		55	55	
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3.2.2 Stream: FPH

FPH		10	10	
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3.2.3 Stream: RS41

RS41		24	24	
RS41-RAW	001		24	
RS41-EDT	001		24	

3.2.4 Stream: RS92

RS92		31	31	
RS92-INT	001		31	
RS92-RAW	002		31	
RS92-EDT	001		31	
RS92-GDP	002		23	22

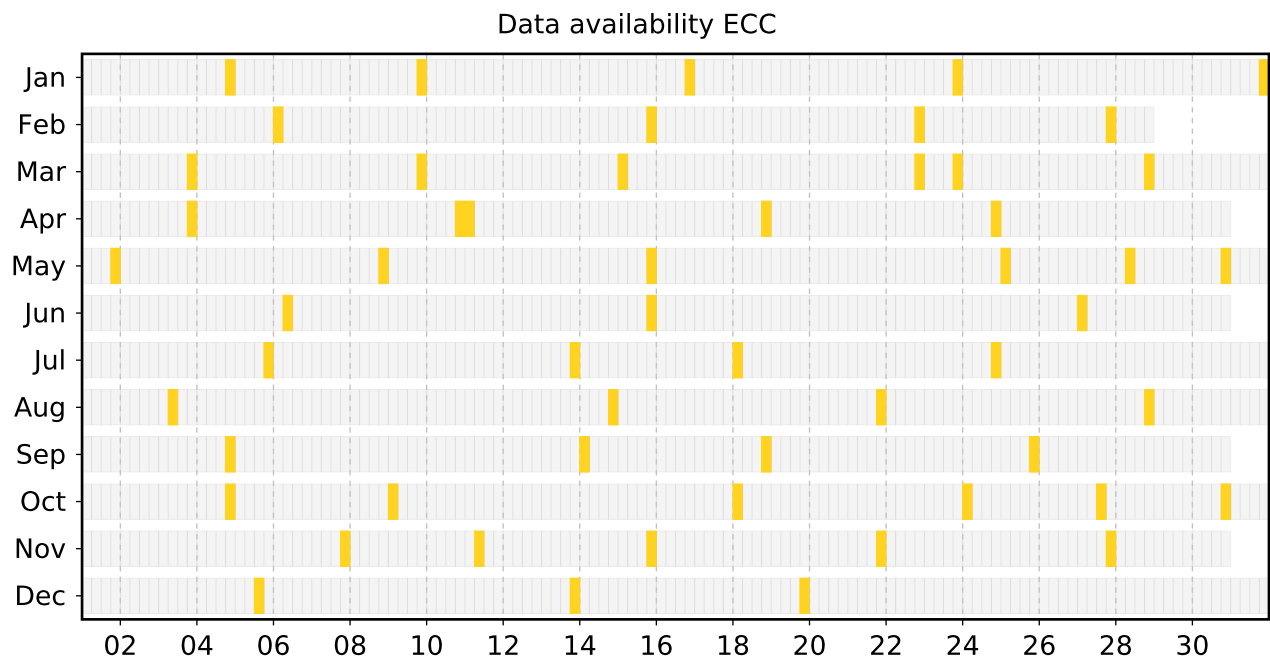
3.3 Data availability of data products

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).

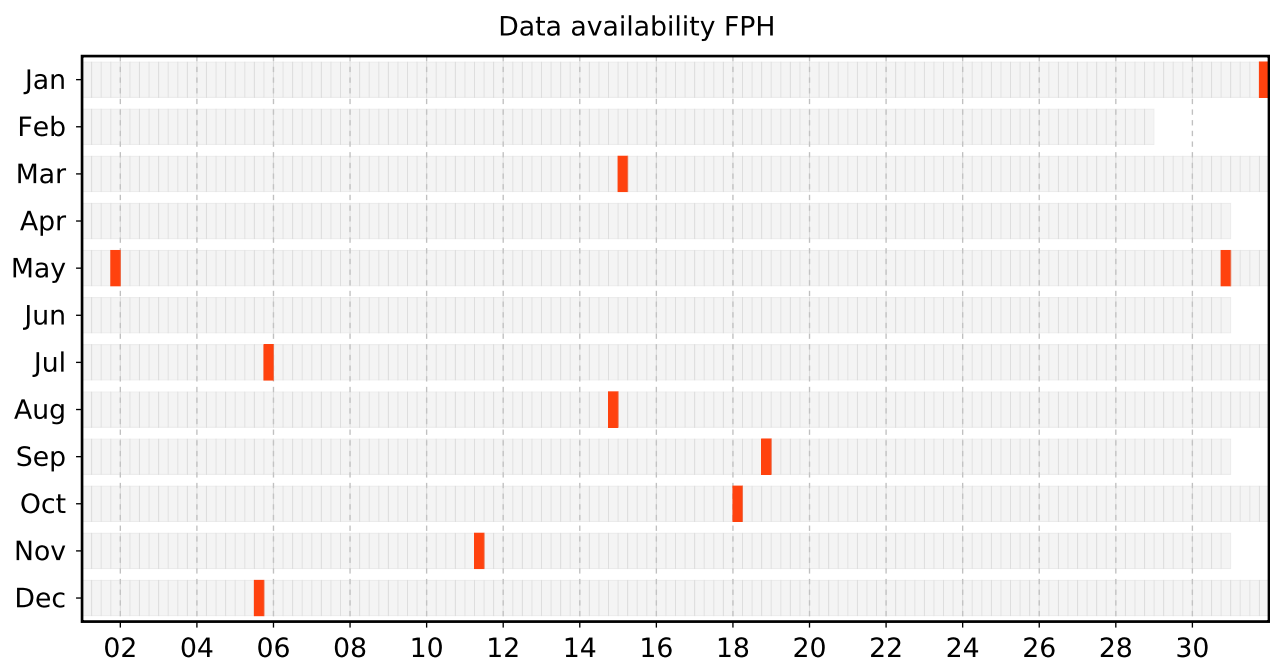
Unprocessed (yellow): The raw data file has been successfully converted to a GRUAN standardized raw data file format (NetCDF). The processing (e.g. GRUAN data processing) has not yet been done, or has not been completed. Reason may be a processing routine which does not yet exist, or software errors.

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: ECC

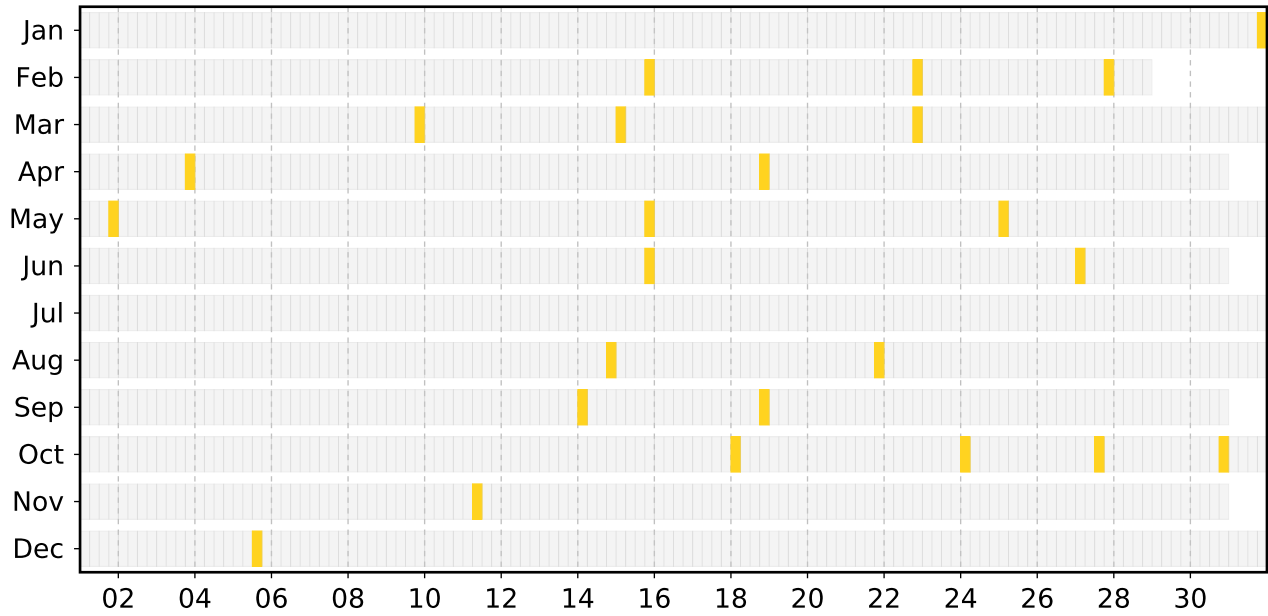


3.3.2 Stream: FPH



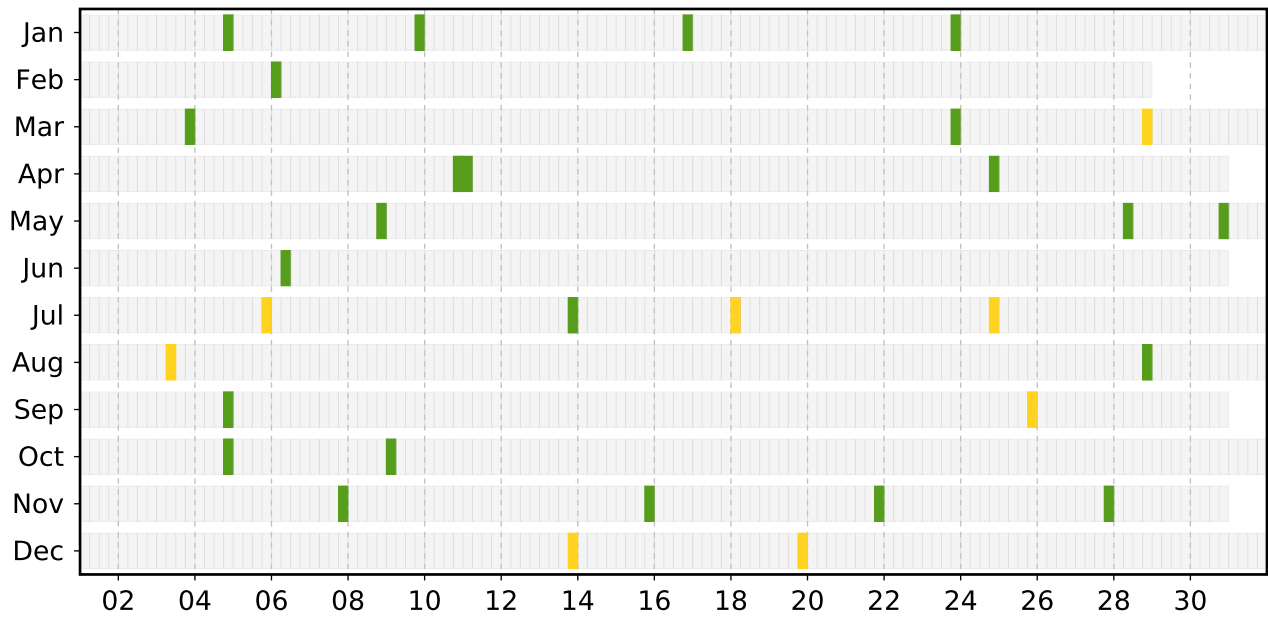
3.3.3 Stream: RS41

Data availability RS41



3.3.4 Stream: RS92

Data availability RS92



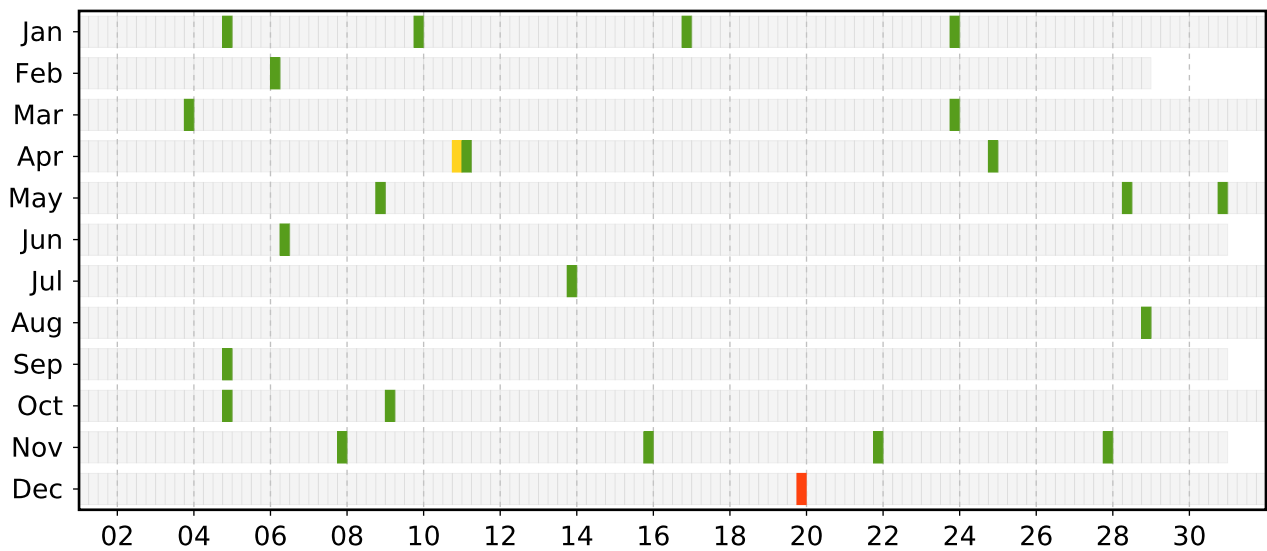
3.4 Data quality of current GRUAN data products

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

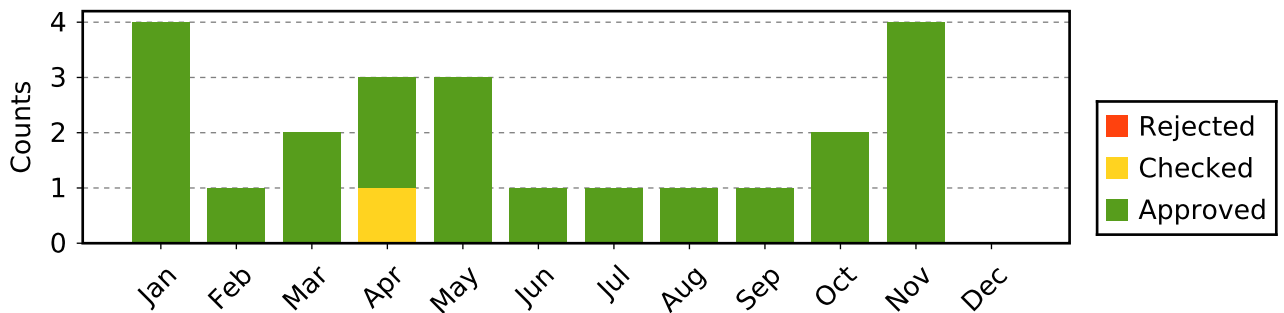
3.4.1 Stream: RS92 (Product: RS92-GDP-002)

Month	Total	Approved	Checked	Rejected	Meta-data	Process.	Press	Temp	RH
Jan	4	4							
Feb	1	1							1
Mar	2	2							1
Apr	3	2	1				1		1
May	3	3							
Jun	1	1							
Jul	1	1							
Aug	1	1							
Sep	1	1							
Oct	2	2							
Nov	4	4							
Dec									
Sum	23	22	1				1		3

Data quality of stream RS92



Data quality statistic of stream RS92



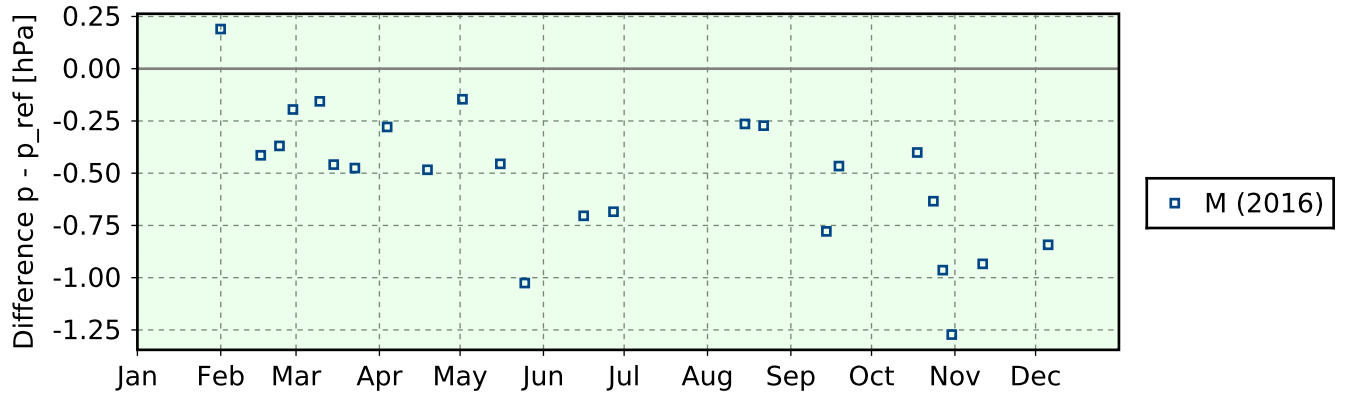
3.5 Instrument combinations of LAU-RS-01

Count	Instrument combination
8	ECC, FPH, RS41
2	ECC, FPH, RS92
16	ECC, RS41
29	ECC, RS92

3.6 Instrument ground check

3.6.1 Stream: RS41

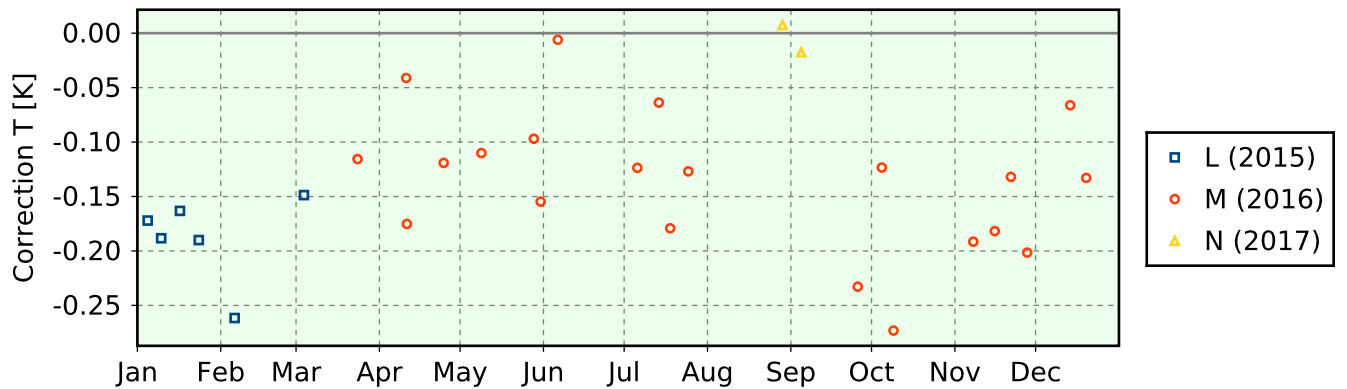
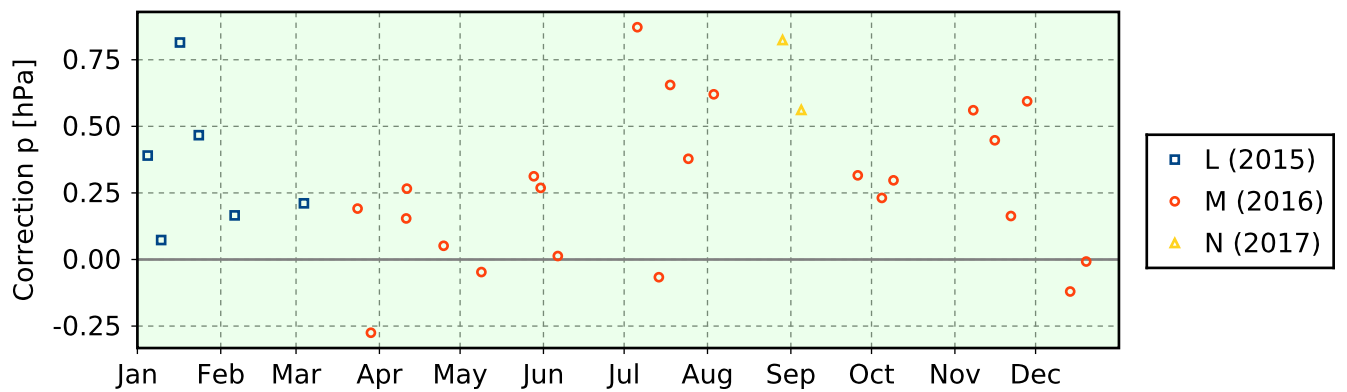
(1) GroundCheck: GC-RI41

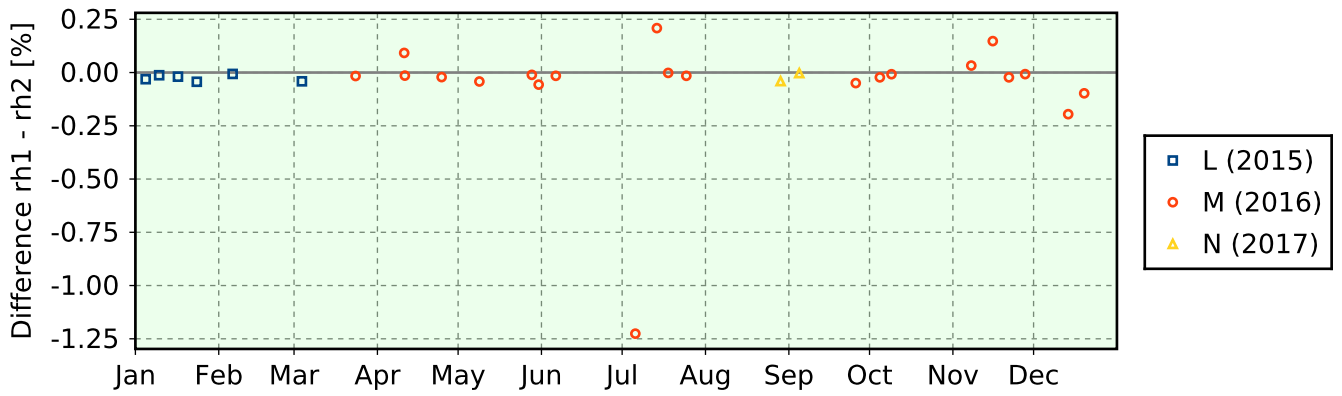
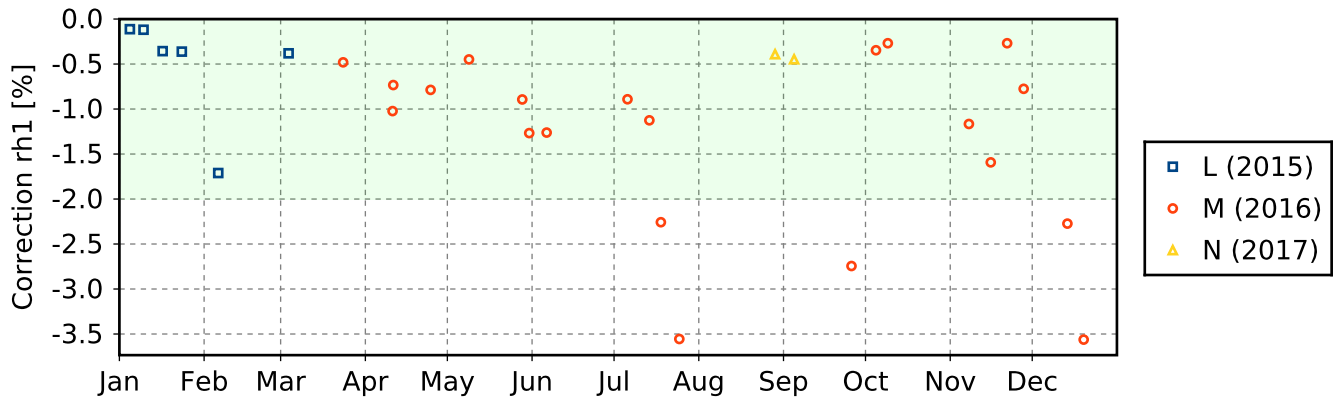


(2) GroundCheck: GC-SHC

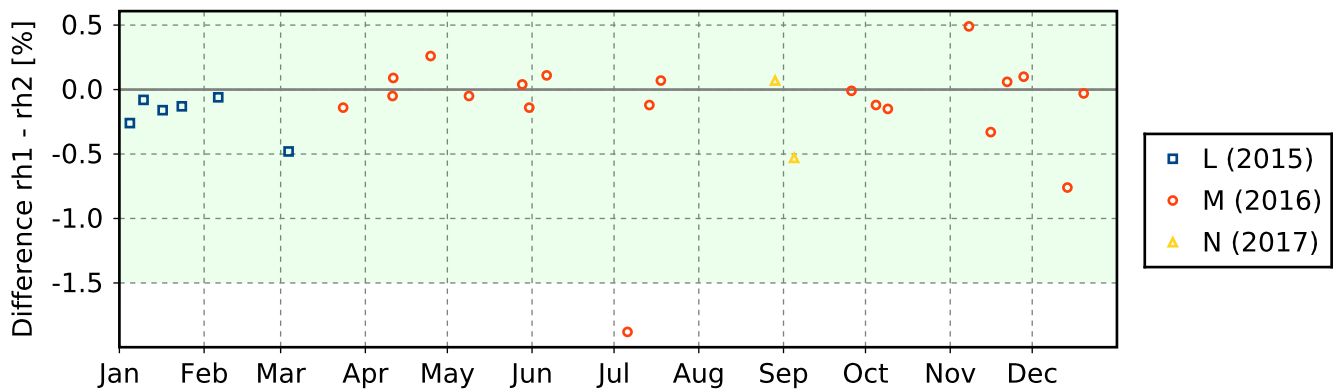
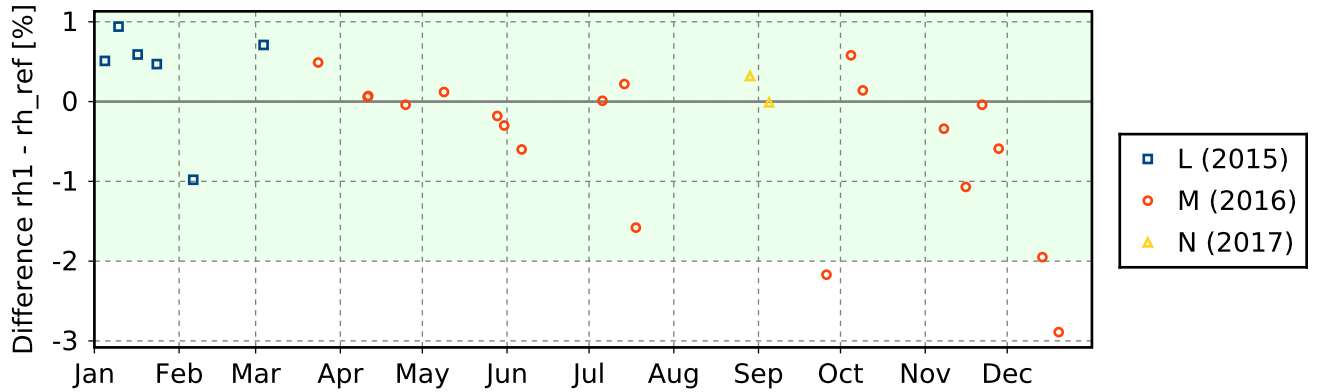
3.6.2 Stream: RS92

(1) GroundCheck: GC-GC25

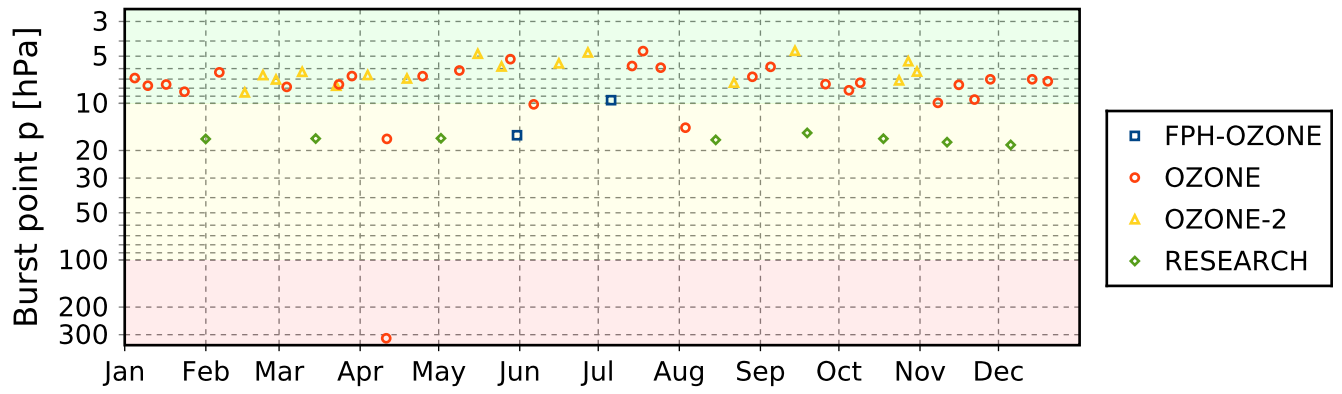




(2) GroundCheck: GC-SHC



3.7 Measurement events



4 System: Radiosonde Launch Site (Invercargill) (LAU-RS-02)

Object	Value
System name	Radiosonde Launch Site (Invercargill)
Unique GRUAN ID	LAU-RS-02
System type	Sounding Site (RS - Radiosonde)
Geographical position	-46.4180 °S, 168.3305 °E, 2.0 m
Operated by	MET-SERVICE-NZ Meteorological Service of New Zealand Limited
Instrument contact	Querel, Richard
Started at	2016-07-01
Defined setups	1 (ROUTINE)
Possible streams	RS41

4.1 Lead Centre comments

4.1.1 Dataflow

Sonde dataflow of co-located site Invercargill to the GRUAN LC is operational since September 2016. This dataflow includes all twice daily operational soundings using the Vaisala RS41-SG.

4.1.2 General

Operational soundings using Vaisala RS41-SG are launched approximately twice daily since September 2016.

4.2 GRUAN data products

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

RS41		752	752	
RS41-RAW	001		751	
RS41-EDT	001		751	

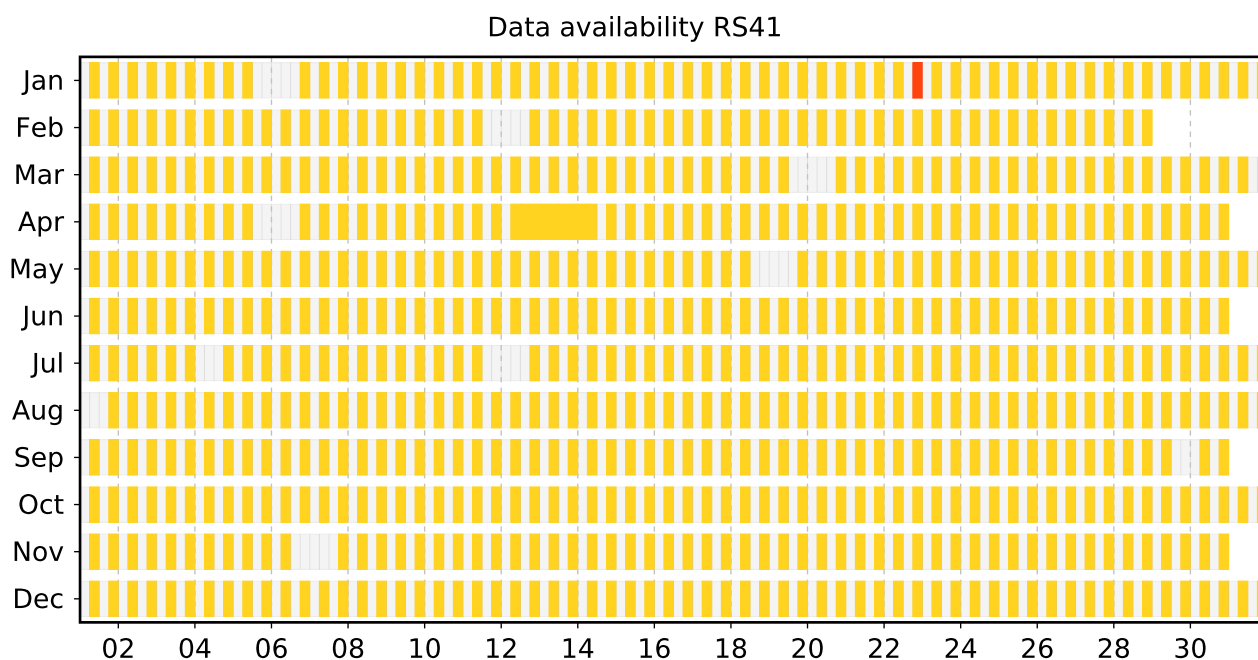
4.3 Data availability of data products

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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.

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4.3.1 Stream: RS41



4.5 Instrument combinations of LAU-RS-02

Count	Instrument combination
752	RS41

4.6 Instrument ground check

4.6.1 Stream: RS41

(1) GroundCheck: GC-SHC

4.7 Measurement events

