



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

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**14th GRUAN Implementation-  
Coordination Meeting (ICM-14)**

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Session 5

La Réunion

28 November - 02 December 2022

## GRUAN Site Report for Singapore

*(Submitted by Wong Shwei Lin)*

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### **Summary and Purpose of this Document**

Report from the GRUAN site Singapore for the period January to December 2021.

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## **Overview**

Current dataflow to GRUAN LC:

- Twice-daily RS41-SG radiosonde soundings
- Monthly ECC ozonesonde soundings
- Hourly GNSS and meteo data files

## **Change and change management**

MSS switched to MEISEI MGSP2 / iMS100 (sounding system / radiosondes) from Vaisala RS41-SG in Jul 2021. Fortnightly rig comparison soundings between iMS100 and RS41-SG commenced in September 2021

## **Resourcing**

High Helium prices globally and lower availability of Helium.

## **Operations**

Difficulties in regularly attaining the burst point at 10 hPa during evening (12UTC) launch. At present, early bursting rate is about 10 to 20%.

Currently the comparison soundings are not sent to GRUAN, with some difficulties encountered in setting up the RSLaunch program for this.

As a precaution, Ozone soundings are limited to one every 2-3 months, as local helium suppliers have warned the helium supply situation is tight.

## **Covid-19**

Split team arrangement limited the launches we can perform.

## **Site assessment and certification**

Radiosonde sounding program certified as of 13 May 2019.

## **GRUAN-related research**

NIL

## **WG-GRUAN interface**

Not at the moment

## **Other archiving centers**

NIL

## **Participation in campaigns**

NIL

## **Future plans**

To conduct semi regular iMS-100 comparisons with Graw DFM-09 in 2023.



# GRUAN Site Report for Singapore (SNG), 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	Singapore
Unique GRUAN ID	SNG
Geographical position	1.3404 °N, 103.8880 °E, 21.0 m
Operated by	MSS   Meteorological Service Singapore, part of: NEA   National Environment Agency
Main contact	Lin, Wong Shwei
WMO no./name	48698 SINGAPORE/CHANGI AIRPORT
Operators	currently 8, changes +0 / -0
Sounding Site	1
GNSS	1

### 1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
SNG-GN-01	GNSS site MSS1	GNSS	1	operational
SNG-RS-01	Singapore Radiosonde Launch Site	Sounding Site	7	714

### 1.2 General comments from Lead Centre

No comments from Lead Centre.

## 2 System: GNSS site MSS1 (SNG-GN-01)

Object	Value
System name	GNSS site MSS1
Unique GRUAN ID	SNG-GN-01
System type	GNSS (GN - GNSS)
Geographical position	1.2026 °N, 103.5316 °E, 36.1 m
Operated by	MSS   Meteorological Service Singapore, part of: NEA   National Environment Agency
Instrument contact	Lin, Wong Shwei
Started at	2017-04-17
Defined setups	1 (HOURLY)
Possible streams	-

### 2.1 Lead Centre comments

#### 2.1.1 Dataflow

Measurements are recorded at station since April 2017.

Dataflow of GNSS data to GRUAN LC and the GRUAN GNSS processing centre at GFZ has started in February 2019. The current dataflow includes manufacturer raw data, converted raw data (RINEX) and instrument logs, containing all equipment changes.

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

### 3 System: Singapore Radiosonde Launch Site (SNG-RS-01)

Object	Value
System name	Singapore Radiosonde Launch Site
Unique GRUAN ID	SNG-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	1.3404 °N, 103.8880 °E, 23.5 m
Operated by	MSS   Meteorological Service Singapore, part of: NEA   National Environment Agency
Instrument contact	Lin, Wong Shwei
Started at	-
Defined setups	7 (ROUTINE2, ROUTINE, OZONE, OZONE2, ROUTINE3, DUAL, OZONE3)
Possible streams	DFM-09, ECC, IMS-100, RS-11G, RS41

#### 3.1 Lead Centre comments

##### 3.1.1 Change management

Regularly twin soundings with RS41 and IMS-100 were performed and submitted to the GRUAN LC since September 2021.

##### 3.1.2 Dataflow

Sonde dataflow to the GRUAN LC is operational since April 2016.

The dataflow includes twice daily operational soundings of Vaisala RS41-SG until 26 July 2021. Since 27 July 2021, the Meisei IMS-100 is used as operation radiosonde. Sporadic soundings of ECC Ozone sonde are also part of the dataflow. All soundings are submitted using RsLaunchClient.

#### 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		9	9	
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##### 3.2.2 Stream: IMS-100

IMS-100		302	302	
IMS-100-BETA	002		276	

##### 3.2.3 Stream: RS41

RS41		417	417	
RS41-RAW	001		417	
RS41-EDT	001		417	
RS41-GDP	001		410	
RS41-GDP-BETA	002		346	
RS41-GDP-BETA	003		401	

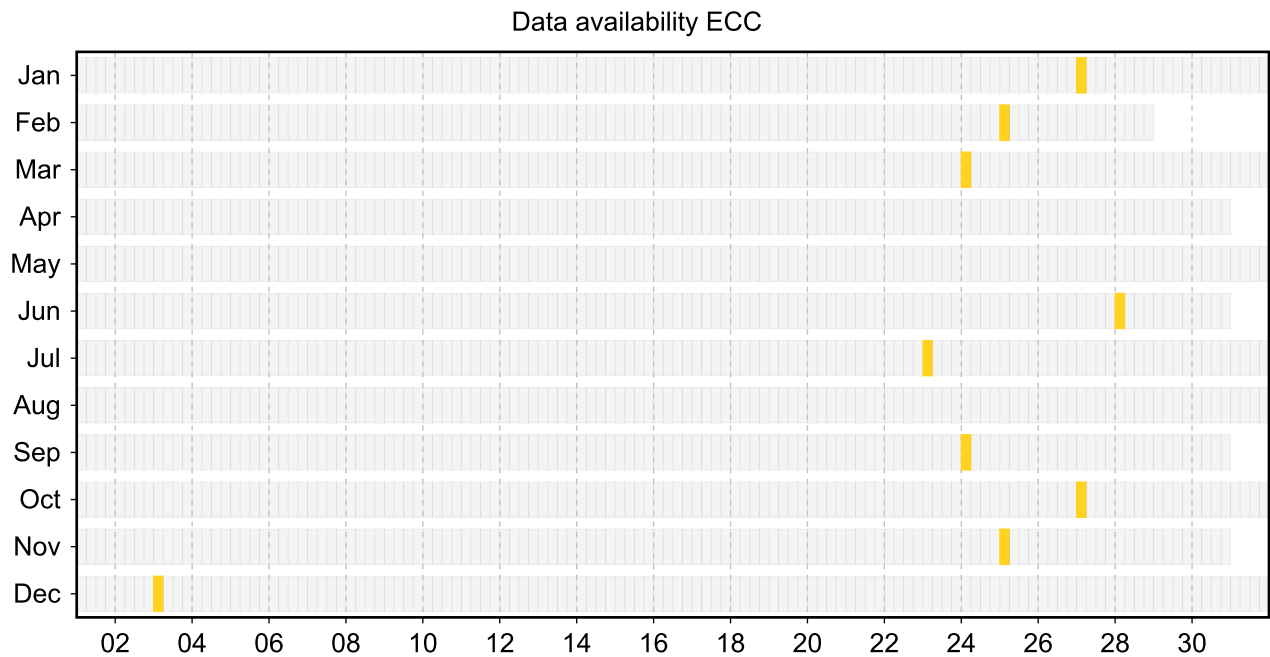
### 3.3 Availability of data products

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).

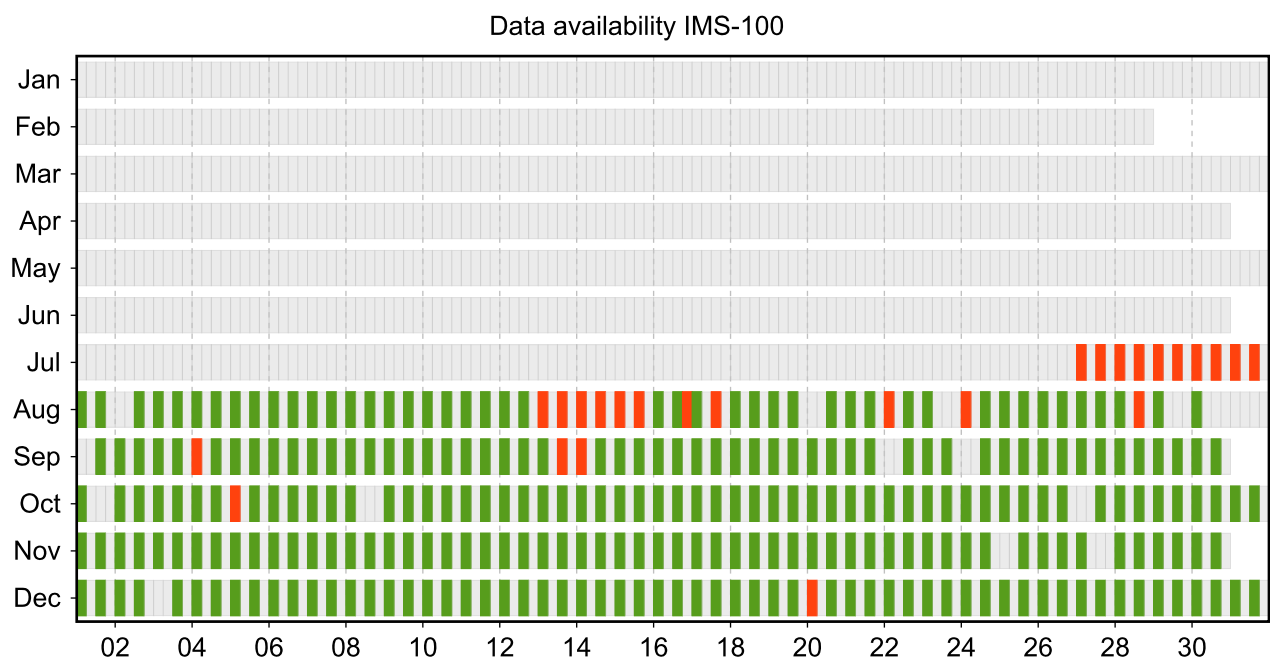
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software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

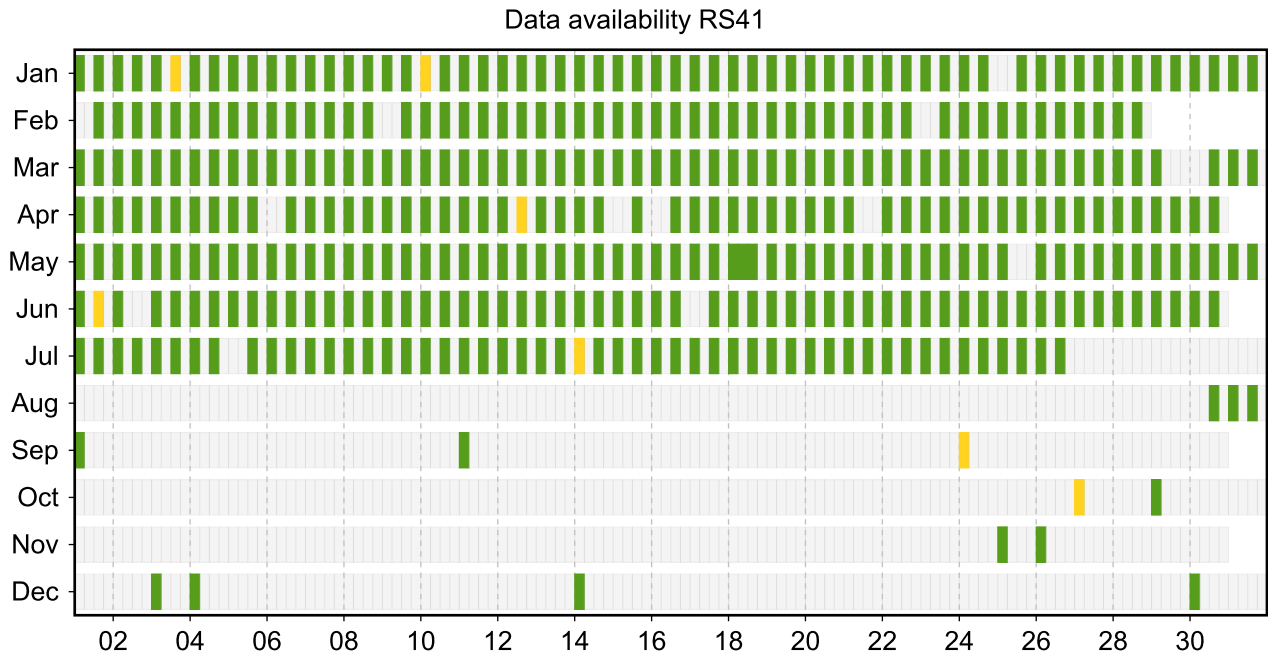


#### 3.3.2 Stream: IMS-100





3.3.3 Stream: RS41



3.4 Instrument combinations of SNG-RS-01

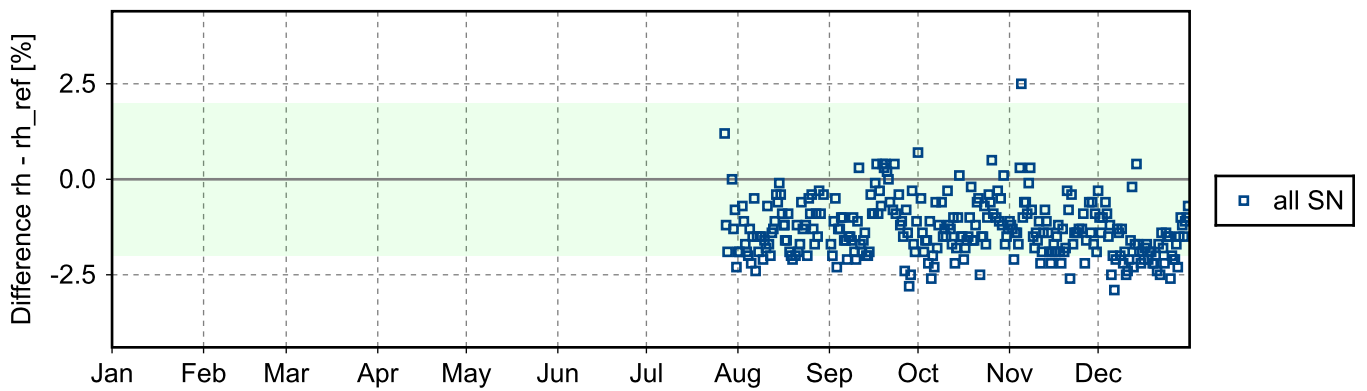
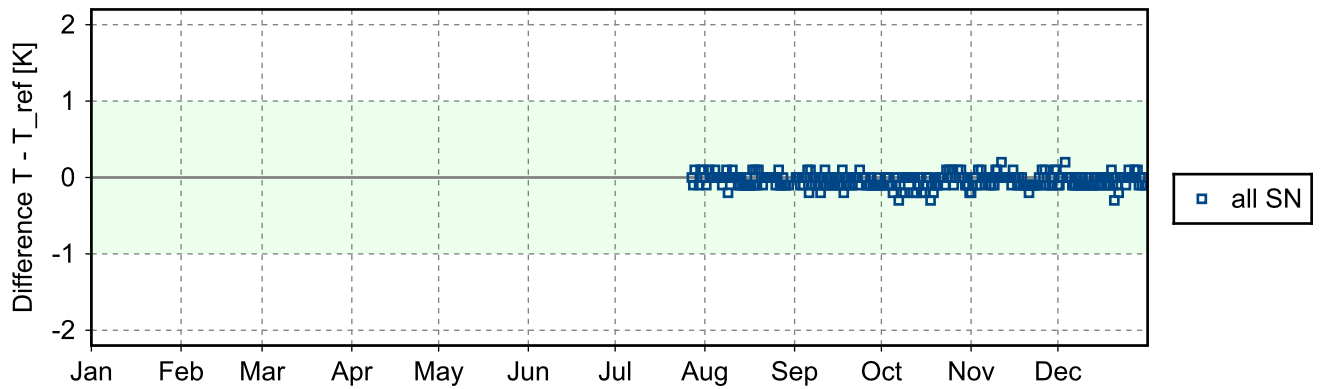
Count	Instrument combination
9	ECC, RS41
297	IMS-100
5	IMS-100, RS41
403	RS41

### 3.5 Instrument ground check

#### 3.5.1 Stream: IMS-100

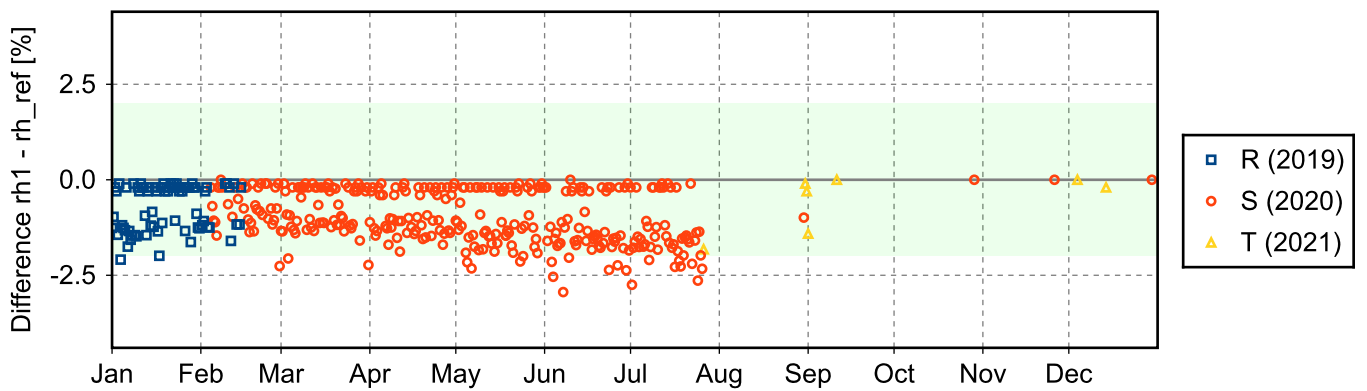
(1) GroundCheck: GC-TU

(2) GroundCheck: GC-TU(room)



#### 3.5.2 Stream: RS41

(1) GroundCheck: GC-SHC



### 3.6 Measurement events

