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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 Lamont

*(Submitted by Evan Keeler)*

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

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

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## **Overview**

The ARM Southern Great Plains (SGP) site near Lamont, Oklahoma operated three Vaisala MW41 manual launch systems during 2021. The systems are designated C1, S01, and S02. SGP normal operation conducts 4 flights per day, launching at 00Z, 06Z, 12Z, and 18Z. These flights are primarily conducted with the C1 system, however when the need arises for a dual flight the other systems will be used. All flight data is sent to the ARM Data Archive for processing and distribution.

## **Change and change management**

No major changes have been made to how the SGP conducts operations since 2020. The site continues its normal operational launches described above. The site is continuing its support of the JPSS/RIVAL program. In 2021 the site conducted flights for Phase 9 of the campaign. The 2021 system configuration remained consistent with the 2020 system configuration.

All ARM Vaisala sounding stations were upgraded to Vaisala MW41 software version 2.17 in 2021. There was no significant change to the operating environment, staffing, or hardware.

## **Resourcing**

In 2021 SGP continued launching RS-41 radiosondes without changes to the schedule. Resourcing needs have been identified for the SHC manufacturer-independent ground check.

In the spring of 2022 SGP began having difficulties acquiring the helium required for a 4/day launch schedule. The site had to reduce to 2/day due to the helium shortage.

## **Operations**

The operations at SGP deviate from GRUAN procedures in the burst height and the lack of a SHC manufacturer-independent ground check. Otherwise, the site experiences minimal operational difficulties.

## **COVID-19**

The SGP site experienced several disruptions due to the COVID-19 pandemic. Because the site has higher traffic than the other ARM sites more restrictions were put into place involving on-site personnel. Most of the disruptions involved a potential exposure of staff. When this happened, the site would sometimes have no staff available to launch balloons due to social distancing policies. There were a few instances earlier in 2021 when this could explain the lack of launches.

## Site assessment and certification

SGP has been certified and maintains that certification.

## GRUAN-related research

In 2021 the SGP site continued its support of the following field campaigns:

- ARM: Radiosonde Intercomparison & VALidation (RIVAL)
  - <https://armweb0-stg.ornl.gov/research/campaigns/sgp2017rival>
- ARM Radiosondes for Joint Polar Satellite System (JPSS) Validation Field Campaign
- <https://www.osti.gov/servlets/purl/1526023>

## WG-GRUAN interface

No areas of support have been identified for the WG-GRUAN interface.

## Other archiving centers

ARM data is placed only in the ARM Data Archive: <https://www.archive.arm.gov/discovery/>

## Participation in campaigns

All ARM field campaign information is available on the ARM website at: <https://www.arm.gov/research/campaigns>

Most supported field campaigns request radiosonde launches to support the targeted research.

The ARM radiosonde program is heavily involved in the TRACER campaign, supplying 4 Vaisala ground stations to the campaign.

The ARM program is also involved in the SAIL campaign with one Vaisala ground station.

## Future plans

The SGP site will continue to support the JPSS/RIVAL radiosonde launches in 2022. The SGP site will also continue launching 4 radiosondes per day operationally.

Instead of the 600g balloons, the ARM program will be investigating the acquisition of SHC manufacturer-independent ground check units. The SHCs have been placed in the FY23 budget request for the three fixed ARM sites (SGP, NSA, and ENA).

The SGP site will also be retiring its RS-92 capabilities after the RIVAL program is completed in 2022.



# GRUAN Site Report for Lamont (SGP), 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	Lamont
Unique GRUAN ID	SGP
Geographical position	36.6000 °N, -97.4900 °W, 320.0 m
Operated by	ARM   US DOE Atmospheric Radiation Measurement (ARM) Program
Main contact	Keeler, Evan
WMO no./name	74646 LAMONT
Operators	currently 1, changes +0 / -0
Sounding Site	1
GNSS	1

### 1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
SGP-GN-01	GNSS Site SGPO	GNSS	1	operational
SGP-RS-01	Balloon-Borne Sounding System (SONDE) at Lamont	Sounding Site	5	1436

### 1.2 General comments from Lead Centre

#### 1.2.1 General

ARM employs an automated procedure to transmit raw measurement data.

ARM is kindly requested to inform the Lead Centre of any (upcoming) changes in equipment, launch schedule, or procedures so that the metadata database can be kept up-to-date.

It is strongly recommended to use a manufacturer independent ground check (e.g. SHC) for the Vaisala radiosonde.

## 2 System: GNSS Site SGPO (SGP-GN-01)

<b>Object</b>	<b>Value</b>
System name	GNSS Site SGPO
Unique GRUAN ID	SGP-GN-01
System type	GNSS (GN - GNSS)
Geographical position	36.6041 °N, -97.4848 °W, 290.0 m
Operated by	ARM   US DOE Atmospheric Radiation Measurement (ARM) Program
Instrument contact	Keeler, Evan
Started at	-
Defined setups	1 (HOURLY)
Possible streams	-

### 2.1 Lead Centre comments

#### 2.1.1 Dataflow

Measurements are recorded at station since December 2018.

Dataflow of GNSS data to GRUAN LC and the GRUAN GNSS processing centre at GFZ has started in December 2018. 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: Balloon-Borne Sounding System (SONDE) at Lamont (SGP-RS-01)

Object	Value
System name	Balloon-Borne Sounding System (SONDE) at Lamont
Unique GRUAN ID	SGP-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	36.6100 °N, -97.4900 °W, 315.0 m
Operated by	ARM   US DOE Atmospheric Radiation Measurement (ARM) Program
Instrument contact	Keeler, Evan
Started at	-
Defined setups	5 (ROUTINE, DUAL, CFH, ROUTINE2, ROUTINE3)
Possible streams	CFH, RS41, RS92

#### 3.1 Lead Centre comments

##### 3.1.1 Dataflow

Dataflow is running fully automated from the ARM Archive to the GRUAN LC. Launch metadata are not checked manually. Equipment changes (e.g. balloon, unwinder, ...) are not recorded.

As a consequence it is essential that the Lead Centre is notified of all upcoming changes to be able to maintain a correct metadata record. (This comment applies to all ARM sites in GRUAN.)

Routine soundings are performed four times a day using Vaisala RS41-SGP. A few soundings with RS92 are performed.

A regular measurement program for the observation of stratospheric water vapor could not be performed using CFH (because of the pandemic). No data flow of CFH flights is established. An appropriate solution should be found in cooperation between site (instrument mentor) and LC.

##### 3.1.2 General

Recommended burst altitude of 10 hPa is not reached on a regular basis.



## 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		1403	1403	
RS41-RAW	001		1403	
RS41-EDT	001		1400	
RS41-GDP	001		1392	
RS41-GDP-BETA	002		691	
RS41-GDP-BETA	003		1188	

### 3.2.2 Stream: RS92

RS92		33	33	
RS92-INT	001		33	
RS92-RAW	002		33	
RS92-EDT	001		32	
RS92-GDP	002		28	

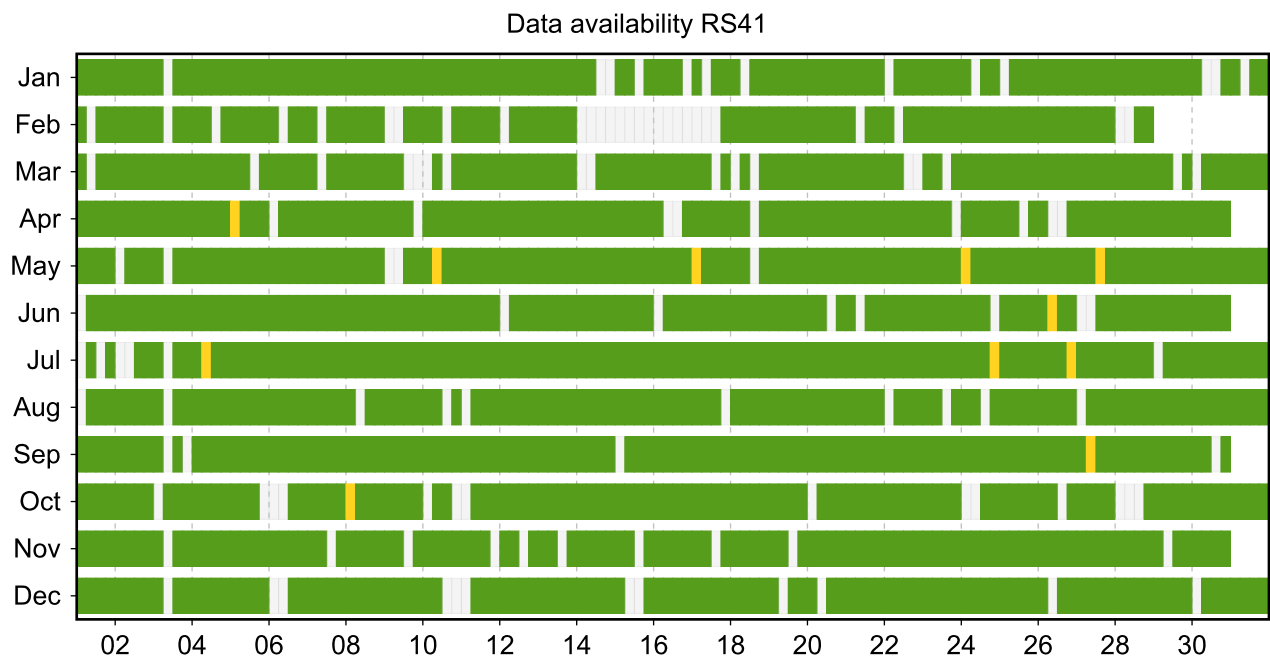
### 3.3 Availability of data products

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).

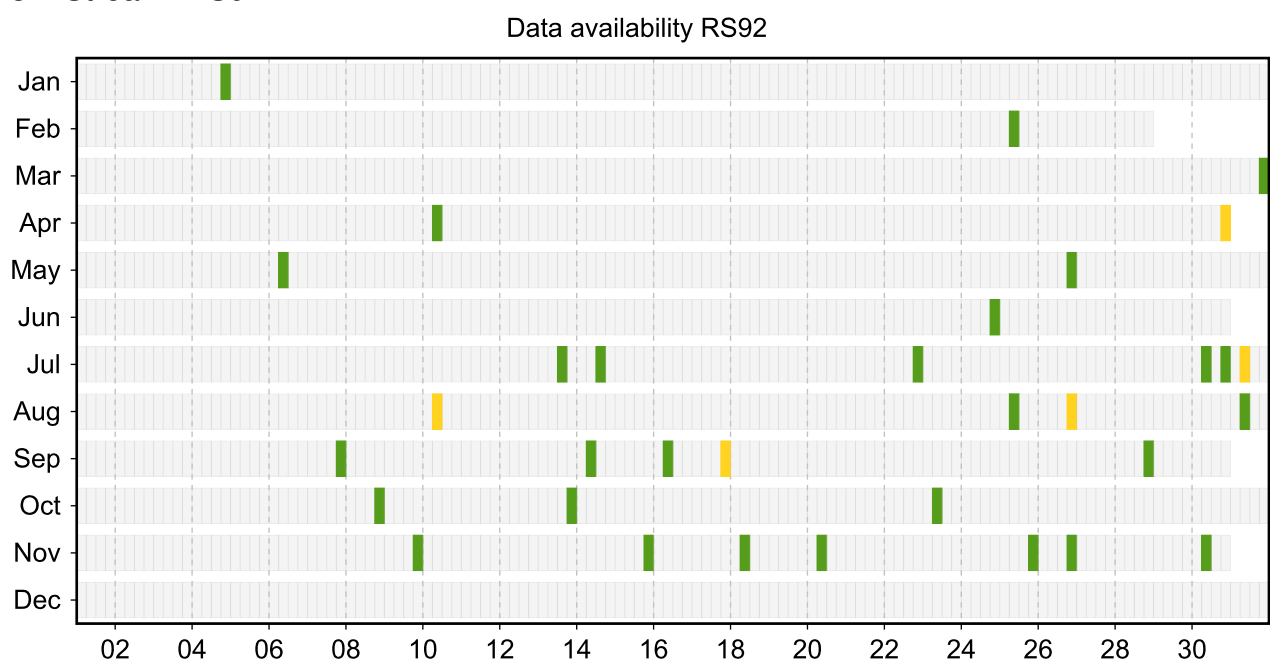
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software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



#### 3.3.2 Stream: RS92



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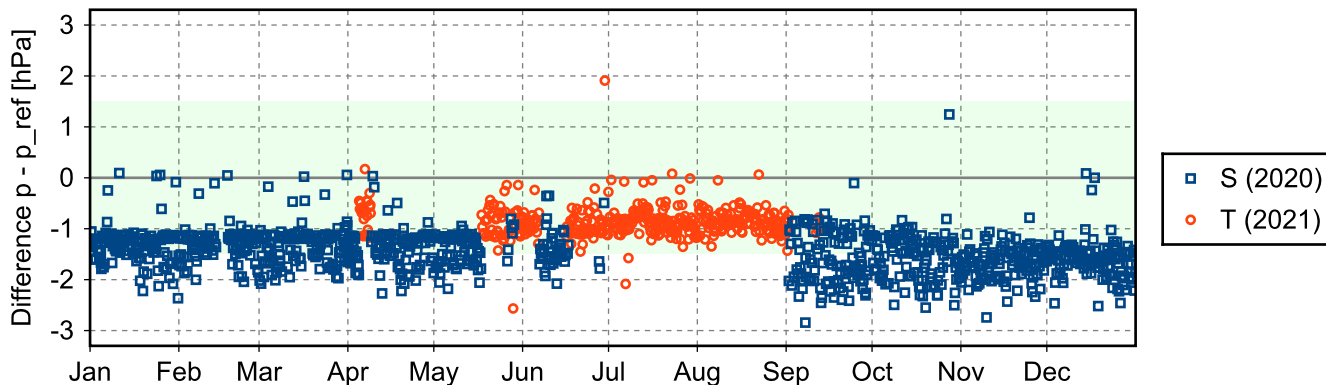
### 3.4 Instrument combinations of SGP-RS-01

<b>Count</b>	<b>Instrument combination</b>
1403	RS41
33	RS92

### 3.5 Instrument ground check

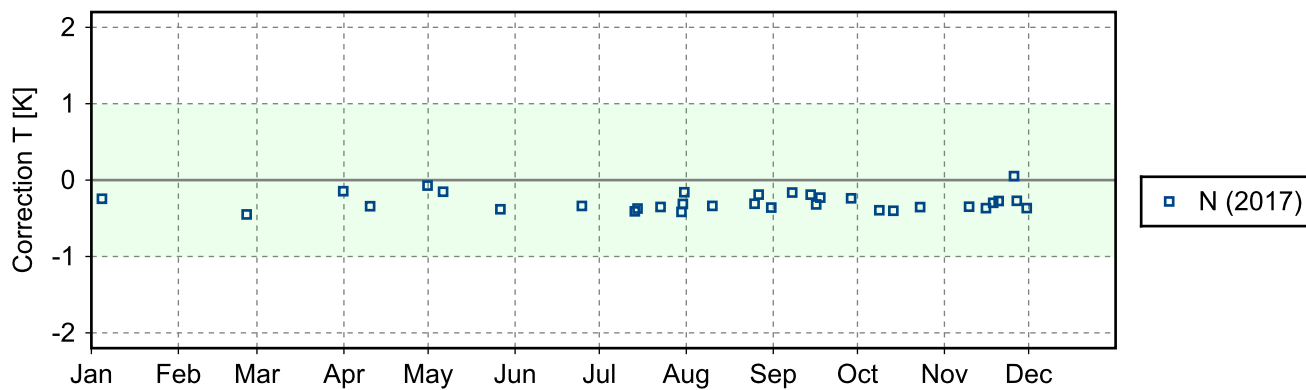
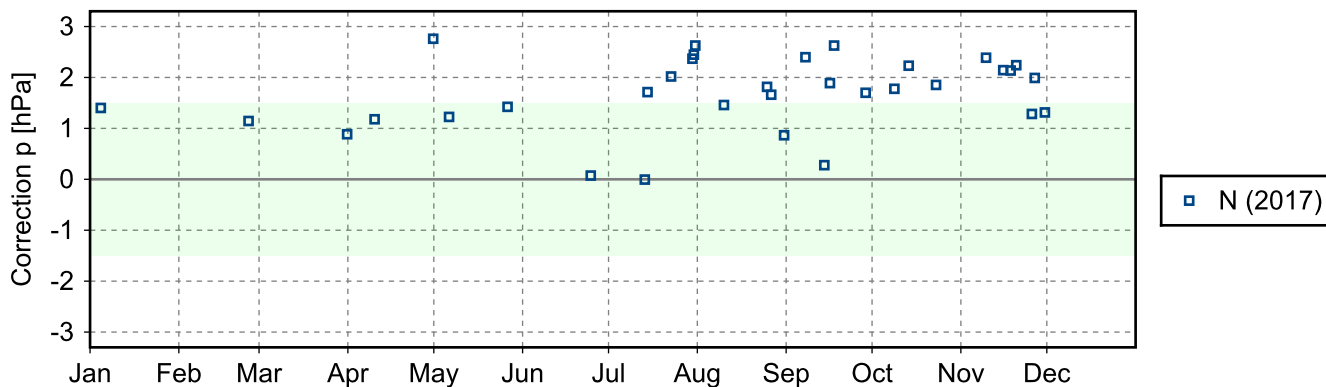
#### 3.5.1 Stream: RS41

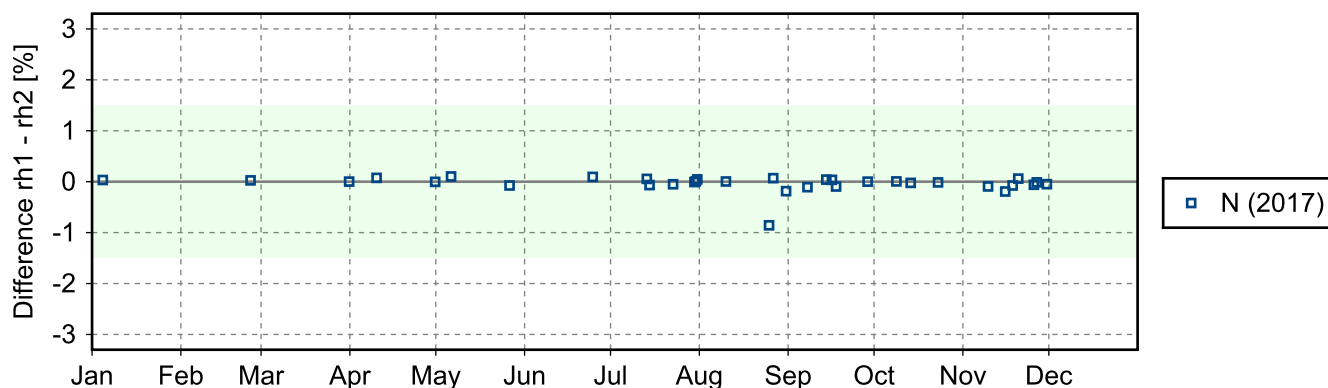
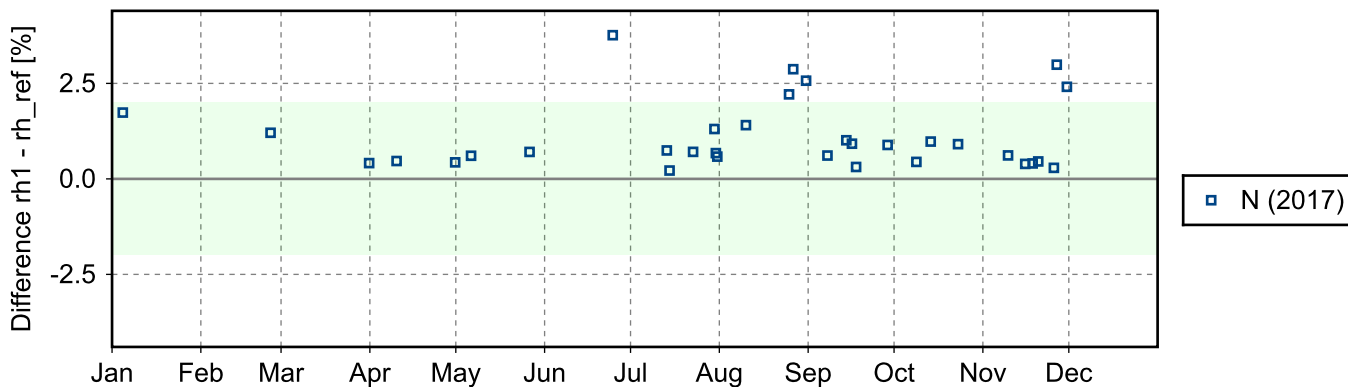
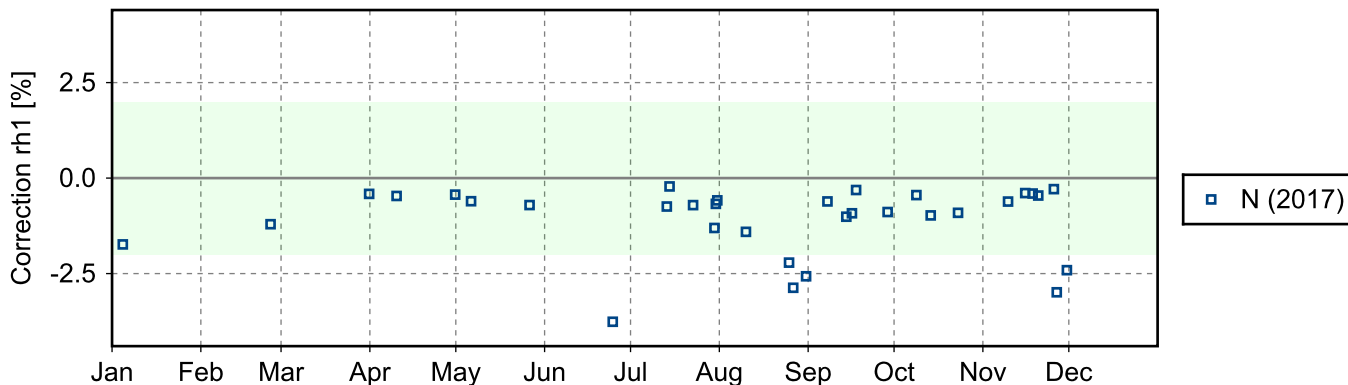
(1) GroundCheck: GC-RI41



#### 3.5.2 Stream: RS92

(1) GroundCheck: GC-GC25





### 3.6 Measurement events

