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GLOBAL CLIMATE OBSERVING
SYSTEM (GCOS)

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**13th GRUAN Implementation-
Coordination Meeting (ICM-13)**

Session 1

Virtual

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GRUAN Site Report for Barrow, Alaska

(Submitted by Evan Keeler)

Summary and Purpose of this Document

Report from the GRUAN site Barrow, Alaska for the period January to December 2020.

Overview

The ARM Northern Slope of Alaska (NSA) site near Barrow, Alaska operated one Vaisala AS15 Autolauncher and one Vaisala MW41 manual launch systems during 2020. The systems are designated C1, S01, and S02. NSA conducts 4 flights per day, launching at 00Z, 06Z, 12Z, and 18Z. The NSA site has a cooperative agreement with the National Weather Service (NWS). The 00Z and 12Z launch data are provided to the NWS for incorporation into their operational network. These flights are primarily conducted with the AS15 autolauncher system, however when the need arises the manual systems will be used. All flight data is sent to the ARM Data Archive for processing and distribution.

Change and change management

One manual system was removed in order to support the upcoming TRACER campaign.

The site continues its normal operational launches described above. The site is continuing its support of the JPSS/RIVAL program. Phase 9 of the JPSS/RIVAL program began with the first coordinated launch at Barrow, AK with an overpass on October 7th, 2020.

The S02 system was removed in 2020 in order to support the upcoming TRACER campaign.

In 2020 Evan Keeler has replaced Donna Holdridge as the ARM manager for all Radiosonde operations.

In the Fall of 2020 all ARM computers were upgraded to windows 10. This involved replacing older PC hardware where needed.

All ARM Vaisala sounding stations were upgraded to software version 2.16 in 2020.

Resourcing

There are no resourcing issues to report at NSA. The NSA has installed a Hydrogen Generator managed by the NWS. This has been incorporated and approved for use in the Autosonde, eliminating the need for lifting gas deliveries to the remote site.

Operations

Starting on Oct 6th 2020 the Autosonde experienced an outage lasting until Dec 28th 2020. During this time the observers performed two launches a day using the manual S01 system.

COVID-19

Due to the fact that we utilize an AS15 Autosonde and launches are generally conducted automatically the site had minimal impact from COVID-19. However, the site did experience delays in maintenance as ARM typically has technicians travel to Barrow, AK from other locations.

Site assessment and certification

The certification of the NSA site is pending submission from ARM.

NSA does not use an SHC manufacturer-independent ground check unit. It is likely one will not be deployed at this site due to the incompatibility with Autolauncher operations.

GRUAN-related research

In 2020 the NSA site continued its support of the following field campaign with Lori Borg as the Principal Investigator:

- ARM Radiosondes for Joint Polar Satellite System (JPSS) Validation Field Campaign
 - <https://www.osti.gov/servlets/purl/1526023>

Support for JPSS continued through 2020 at NSA.

WG-GRUAN interface

The primary interaction between ARM and the GRUAN working group will be focused on expanding the capabilities of the SGP site.

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 will be heavily involved in the upcoming TRACER campaign, supplying 4 Vaisala ground stations to the campaign.

Future plans

The NSA site will continue to support the JPSS radiosonde launches. The NSA will also continue the 4 operational launches per day.

We are in the process of investigating upgrading the AS15 Autosonde to the AS41 Autosonde.

A deficiency has been noted across all of the ARM sites involving the burst height not consistently reaching 10mb. A request will be put forward in 2021 to ARM management to begin utilizing 600g balloons in place of the 350g balloons we currently use.

The pressure sensor drift will be investigated in 2021.



GRUAN Site Report for Barrow (BAR), 2020

Reported time range is Jan 2020 to Dec 2020
Created by the Lead Centre
Version from 2021-04-27

1 General GRUAN site information

Object	Value
Station name	Barrow
Unique GRUAN ID	BAR
Geographical position	71.3233 °N, -156.6158 °W, 8.0 m
Operated by	ARM US DOE Atmospheric Radiation Measurement (ARM) Program
Main contact	Keeler, Evan
WMO no./name	70027 BARROW/POINT BARROW
Operators	currently 0, changes +0 / -0
Sounding Site	2
GNSS	1

1.1 General information about GRUAN measurement systems

System	Name	Type	Setups	Measurements
BAR-GN-01	GNSS Site UTQI	GNSS	1	operational
BAR-RS-01	Balloon-Borne Sounding System (SONDE) at Barrow	Sounding Site	4	167
BAR-RS-02	Balloon-Borne Sounding System (SONDE) at Barrow	Sounding Site	3	1087

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 UTQI (BAR-GN-01)

Object	Value
System name	GNSS Site UTQI
Unique GRUAN ID	BAR-GN-01
System type	GNSS (GN - GNSS)
Geographical position	71.3229 °N, -156.6103 °W, 7.5 m
Operated by	ARM US DOE Atmospheric Radiation Measurement (ARM) Program
Instrument contact	Keeler, Evan
Started at	2017-07-28
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 July 2017. The current dataflow includes manufacturer raw data, converted raw data (RINEX), instrument logs, and processed data.

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

3 System: Balloon-Borne Sounding System (SONDE) at Barrow (BAR-RS-01)

Object	Value
System name	Balloon-Borne Sounding System (SONDE) at Barrow
Unique GRUAN ID	BAR-RS-01
System type	Sounding Site (RS - Radiosonde)
Geographical position	71.3233 °N, -156.6158 °W, 8.0 m
Operated by	ARM US DOE Atmospheric Radiation Measurement (ARM) Program
Instrument contact	Keeler, Evan
Started at	-
Defined setups	4 (ROUTINE, ROUTINE2, ROUTINE3, DUAL)
Possible streams	RS41, RS92

3.1 Lead Centre comments

3.1.1 General

This system is mainly used as back up in case there is a failure with the autolaunch system.

The ARM facility code is S01.

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		167	167	
RS41-GCA	001		167	
RS41-RAW	001		167	
RS41-EDT	001		167	
RS41-GDP-ALPHA	003		3	
RS41-GDP-BETA	001		167	
RS41-GDP-BETA	002		56	

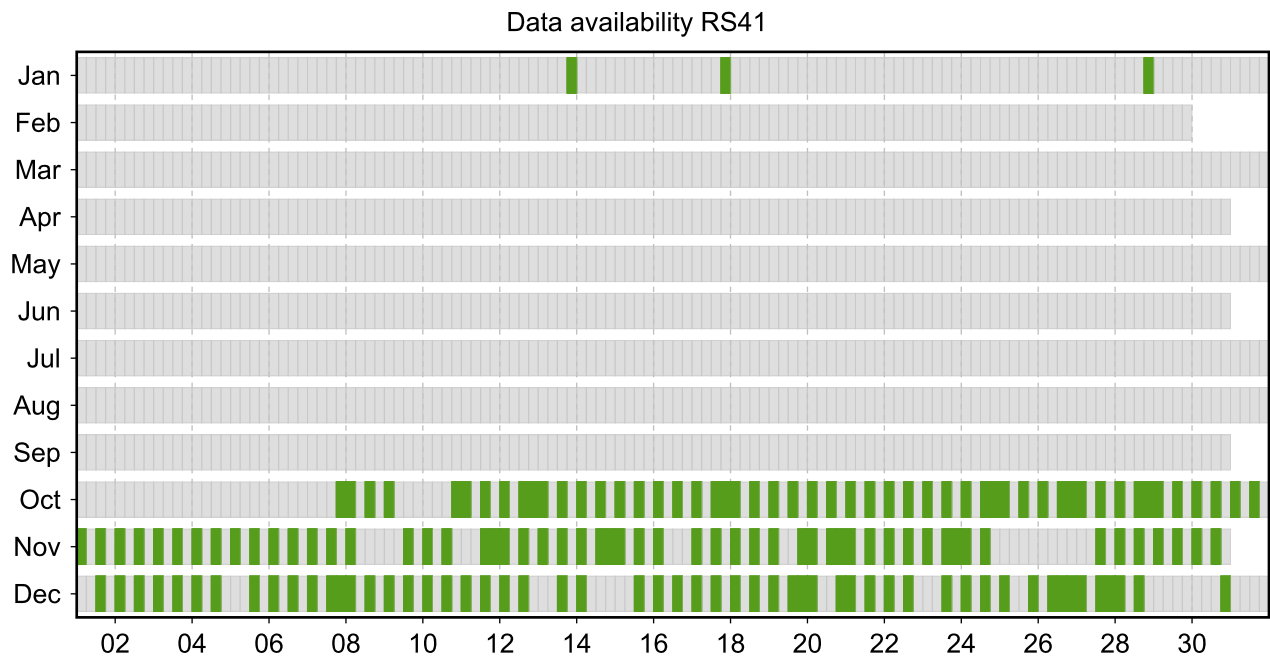
3.3 Availability of data products

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



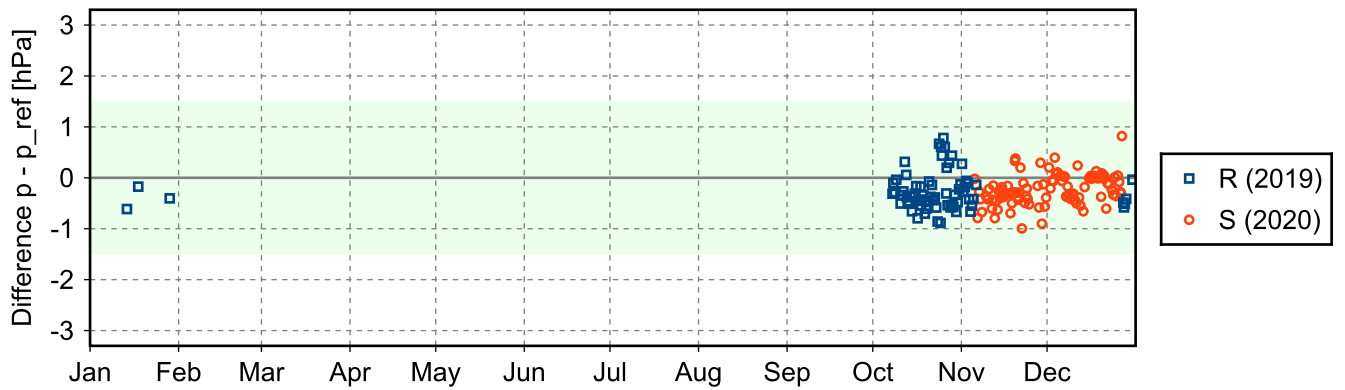
3.4 Instrument combinations of BAR-RS-01

Count	Instrument combination
167	RS41

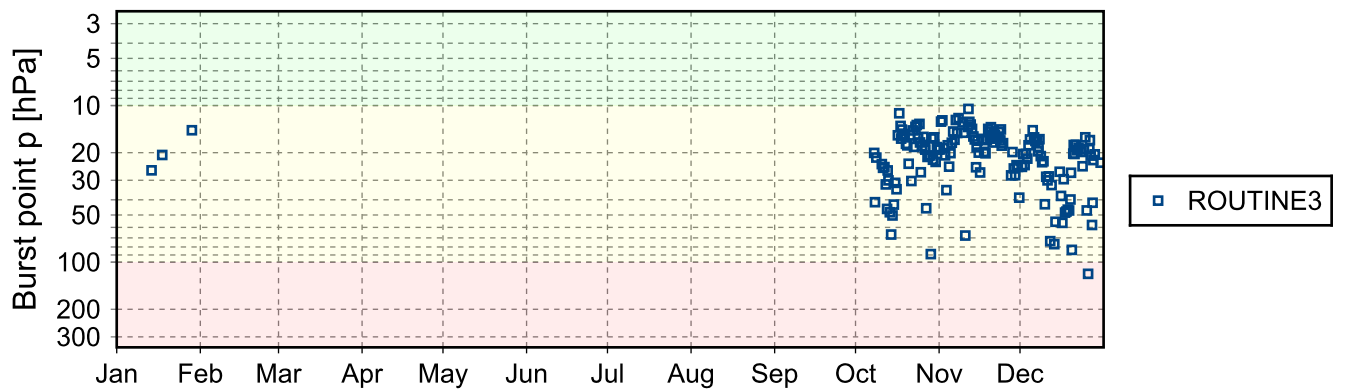
3.5 Instrument ground check

3.5.1 Stream: RS41

(1) GroundCheck: GC-RI41



3.6 Measurement events



4 System: Balloon-Borne Sounding System (SONDE) at Barrow (BAR-RS-02)

Object	Value
System name	Balloon-Borne Sounding System (SONDE) at Barrow
Unique GRUAN ID	BAR-RS-02
System type	Sounding Site (RS - Radiosonde)
Geographical position	71.3233 °N, -156.6158 °W, 8.0 m
Operated by	ARM US DOE Atmospheric Radiation Measurement (ARM) Program
Instrument contact	Keeler, Evan
Started at	2012-02-08
Defined setups	3 (AUTO1, AUTO2, AUTO3)
Possible streams	RS41, RS92

4.1 Lead Centre comments

4.1.1 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.)

The current operational radiosonde is the Vaisala RS41.

RS92 data were not processed because of invalid data files.

4.1.2 Data quality

The reference pressure sensor seems to drift.

4.1.3 General

This is the autolauncher system.

The ARM facility code is C1.

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

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		1082	1082	
RS41-GCA	001		1057	
RS41-RAW	001		1082	
RS41-EDT	001		1056	
RS41-GDP-ALPHA	003		412	
RS41-GDP-ALPHA	004		352	
RS41-GDP-BETA	001		1053	
RS41-GDP-BETA	002		132	

4.2.2 Stream: RS92

RS92		5	5	
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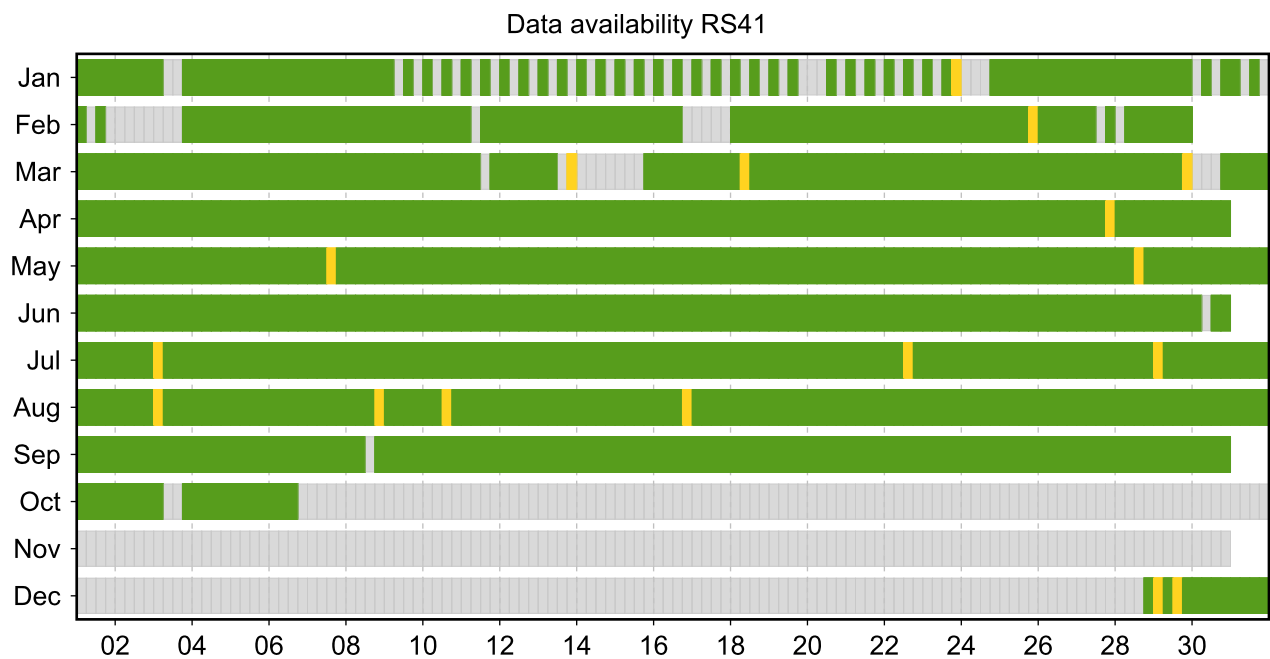
4.3 Availability of data products

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).

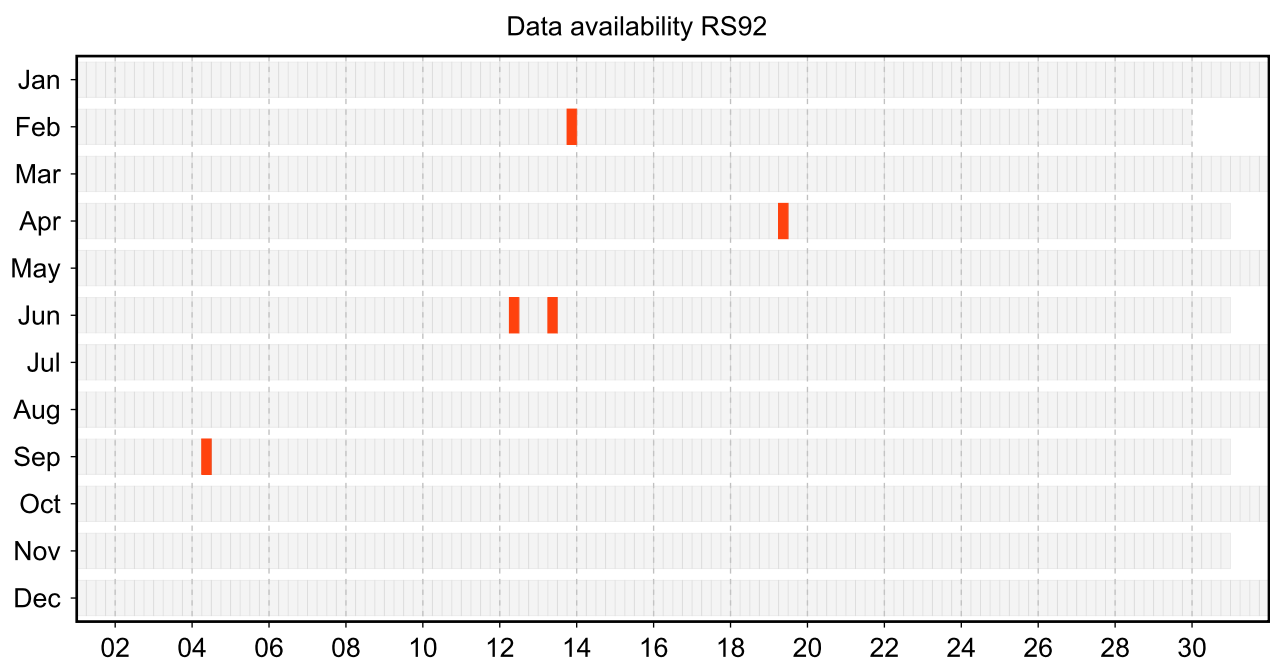
Unprocessed (yellow): The manufacturer-produced file with raw measurement data has been successfully converted into a GRUAN-standardized raw data format (NetCDF). The GRUAN data processing has not been performed or was aborted. Reasons for this may be a still missing GRUAN data processor or a processing-software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

4.3.1 Stream: RS41



4.3.2 Stream: RS92



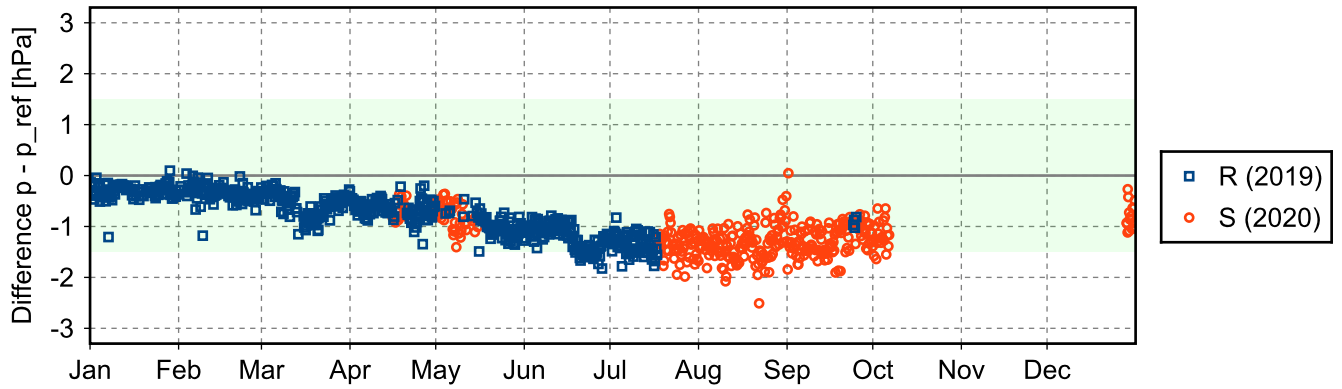
4.4 Instrument combinations of BAR-RS-02

Count	Instrument combination
1082	RS41
5	RS92

4.5 Instrument ground check

4.5.1 Stream: RS41

(1) GroundCheck: GC-RI41



4.6 Measurement events

