

# SnowEx 2020 Reynolds Creek Experimental Watershed Snow Products, Version 1 Technical Reference

## 1 INTRODUCTION

### 1.1 DATA SET OVERVIEW

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This data set contains SWE data collected from the Reynolds Creek Experimental Watershed on 23 January 2020 and 23 February 2020 as part of the NASA SnowEx20 field campaign. Also available are raw point clouds of the snow surface from terrestrial laser scans (TLS) and RGB imagery from Unoccupied Aerial System (UAS) flights collected between 15 November 2018 and 23 February 2020. Real-time kinetic GNSS data is also provided for georeferencing the TLS point clouds and UAS imagery.

### 1.2 File Information

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#### 1.2.1 Format and Naming Convention

The data are available in 18 multi-file granules formatted as a compressed .tgz files. There are six categories of files:

- SWE data: (1) multi-file granule named
  - SNEX20\_RC\_FED\_Sampler\_SWE\_20200124\_20200227\_v01.tgz
- Processed TLS data: (4) multi-file granules, which use the following naming convention
  - SNEX20\_RC\_TLS\_Processed\_YYYYMMDD\_v01.tgz
- Raw TLS data: (4) multi-file granules, which use the following naming convention
  - SNEX20\_RC\_TLS\_Raw\_YYYYMMDD\_v01.tgz
- TLS project data: (4) multi-file granule, which use the following naming convention
  - SNEX20\_RC\_TLS\_Project\_data\_YYYYMMDD\_v01.tgz
- UAS survey data (3) multi-file granules, which use the following naming convention
  - SNEX20\_RC\_UAS\_Surveys\_YYYYMMDD\_v01.tgz
- GNSS-GPS data: (1) multi-file granule named
  - SNEX20\_RC\_GNSS-GPS\_20200123-20200226\_v01.tgz

## 1.2.2 File Contents

See Appendix A for a summary of the contents of each multi-file granule.

## 1.3 Spatial Information

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### 1.3.1 Coverage

Northernmost Latitude: 43.0712° N

Southernmost Latitude: 43.0624° N

Easternmost Longitude: 116.7488° W

Westernmost Longitude: 116.7603° W

### 1.3.2 Geolocation

This data set conforms to the WGS 84 / UTM zone 11N coordinate reference system ([EPSG 32611](#)).

## 1.4 Temporal Information

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### 1.4.1 Coverage

15 November 2012 to 23 February 2020

## 2 ACKNOWLEDGEMENTS

Special thanks to Hans-Peter Marshall.

# APPENDIX A – FILE CONTENTS

Representative examples of the contents of each category of multi-file granules can be found below:

## SWE data

```
tar -tvf SNEX20_RC_FED_Sampler_SWE_20200124_20200227_v01.tgz
Federal_Sampler_SWE/
Federal_Sampler_SWE/RME_20200227_SnowEx_SWE.csv
Federal_Sampler_SWE/RME_20200124_SnowEx_SWE.csv
```

## Processed TLS data

```
running tar -tvf SNEX20_RC_TLS_Processed_20190318_v01.tgz
20190318/
20190318/ScanPos002 - SINGLESCANS - 190318_221532.las
20190318/Reg_results_GCS_WGS84_UTM11N.xlsx
20190318/20190318_ScanPos002_Reg_results_GCS.csv
20190318/ScanPos001 - SINGLESCANS - 190318_194555.las
20190318/20190318_ScanPos001_Reg_results_GCS.csv
```

## Raw TLS data

```
running tar -tvf SNEX20_RC_TLS_Raw_20181115_v01.tgz reveals:
2018-11-15.RME.riproject/
2018-11-15.RME.riproject/ScanPos001/
2018-11-15.RME.riproject/ScanPos001/181115_190915.pat
2018-11-15.RME.riproject/ScanPos001/181115_183731.mon.rxp
2018-12-03 21:00 2018-11-15.RME.riproject/ScanPos001/181115_191513.png
2018-11-15.RME.riproject/ScanPos001/181115_195828.mon.rxp
2018-11-15.RME.riproject/ScanPos001/181115_191820.png
2018-11-15.RME.riproject/ScanPos001/181115_183731.png
2018-11-15.RME.riproject/ScanPos001/181115_203845.mon.rxp
etc...
```

## TLS project data

```
running tar -tvf SNEX20_RC_TLS_Project_data_20190318_v01.tgz reveals:
2019-03-18_RME.RiSCAN/
2019-03-18_RME.RiSCAN/project.log
2019-03-18_RME.RiSCAN/epsg_32611.gsfx
2019-03-18_RME.RiSCAN/project.pop
2019-03-18_RME.RiSCAN/SCANS/
2019-03-18_RME.RiSCAN/SCANS/ScanPos001/
2019-03-18_RME.RiSCAN/SCANS/ScanPos001/SCANSEQUENCES/
etc...
```

## GNSS-GPS data

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```

GNSS-GPS/
├── 20200123_RME
│   ├── Garmin-data
│   │   ├── 20200124BlueGarmin_rmesnowex.dbf
│   │   ├── 20200124BlueGarmin_rmesnowex.prj
│   │   ├── 20200124BlueGarmin_rmesnowex.shp
│   │   ├── 20200124BlueGarmin_rmesnowex.shx
│   │   └── Waypoints_24-JAN-20.gpx
│   ├── log0123t.tps
│   ├── OPUS solution _ log0123t.tps OP1581371362644.pdf
│   └── RTK-data
│       └── 20200123_SnowEX.mjf
├── 20200212_RME
│   ├── Garmin-data
│   │   ├── 20200214BlueGarmin_rmesnowex.dbf
│   │   ├── 20200214BlueGarmin_rmesnowex.prj
│   │   ├── 20200214BlueGarmin_rmesnowex.shp
│   │   ├── 20200214BlueGarmin_rmesnowex.shx
│   │   └── Waypoints_13-FEB-20.gpx
│   ├── log0212s.tps
│   └── RTK-data
│       └── 20200212_SnowEX.mjf
├── 20200226_RME
│   ├── Garmin-data
│   │   ├── 20200214BlueGarmin_rmesnowex.dbf
│   │   ├── 20200214BlueGarmin_rmesnowex.prj
│   │   ├── 20200214BlueGarmin_rmesnowex.shp
│   │   ├── 20200214BlueGarmin_rmesnowex.shx
│   │   └── Waypoints_27-FEB-20.gpx
│   ├── log0226s.tps
│   └── RTK-data
│       └── 20200226_SnowEX.mjf
├── readme.txt
└── snowex_rtk
    ├── Corrected_RTK_20200123
    │   ├── 20200123_snow_ex.c1f
    │   ├── 20200123_snowex_corrected_rtk.csv
    │   ├── 20200123_snow_ex.dbf
    │   ├── 20200123_snow_ex.shp
    │   ├── 20200123_snow_ex.shx
    │   ├── lai.c1f
    │   ├── lai.dbf
    │   ├── lai.prj
    │   ├── lai.shp
    │   ├── lai.shx
    │   ├── t1sref1.c1f
    │   ├── t1sref1.dbf
    │   ├── t1sref1.prj
    │   ├── t1sref1.shp
    │   ├── t1sref1.shx
    │   ├── uavgcp.c1f
    │   ├── uavgcp.dbf
    │   ├── uavgcp.prj
    │   ├── uavgcp.shp
    │   └── uavgcp.shx
    ├── Corrected_RTK_20200212
    │   ├── 20200212_snow_ex.c1f
    │   ├── 20200212_snowex_corrected_rtk.csv
    │   ├── 20200212_snow_ex.dbf
    │   ├── 20200212_snow_ex.shp
    │   ├── 20200212_snow_ex.shx
    │   ├── uavgcp.c1f
    │   ├── uavgcp.dbf
    │   ├── uavgcp.prj
    │   ├── uavgcp.shp
    │   └── uavgcp.shx
    └── Corrected_RTK_20200226
        ├── 20200226_snow_ex.c1f
        ├── 20200226_snowex_corrected_rtk.csv
        ├── 20200226_snow_ex.dbf
        ├── 20200226_snow_ex.shp
        ├── 20200226_snow_ex.shx
        ├── t1s.c1f
        ├── t1s.dbf
        ├── t1s.prj
        ├── t1s.shp
        ├── t1s.shx
        ├── uavgcp.c1f
        ├── uavgcp.dbf
        ├── uavgcp.prj
        ├── uavgcp.shp
        └── uavgcp.shx

```

## UAS survey data

```
tar -tvf SNEX20_RC_UAS_Surveys_20200212_v01.tgz
20200212_snow_ex_rme/
20200212_snow_ex_rme/raw/
20200212_snow_ex_rme/raw/DJI_0872.JPG
20200212_snow_ex_rme/raw/DJI_0919.JPG
20200212_snow_ex_rme/raw/DJI_0476.JPG
20200212_snow_ex_rme/raw/DJI_1001.jpg
20200212_snow_ex_rme/raw/DJI_0097.JPG
...
20200212_snow_ex_rme/movies/
20200212_snow_ex_rme/movies/DJI_0002.MOV
20200212_snow_ex_rme/planning/
20200212_snow_ex_rme/planning/20200212-RME_Snow-ex.docx
```

(note there's a fun mix of '.JPG' and '.jpg' files). 'movies' and 'planning' subfolders are found in the 20200212 and 20200226 zips, but the 20200123 tgz contains just a 'raw' dir and it's jpg/JPG contents.