



SnowEx17 Community Snow Pit Measurements, Version 1

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Elder, K., L. Brucker, C. Hiemstra, and H. Marshall. 2018. *SnowEx17 Community Snow Pit Measurements, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. <https://doi.org/10.5067/Q0310G1XULZS>. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/SNEX17_SnowPits



National Snow and Ice Data Center

TABLE OF CONTENTS

| | | |
|-------|--|---|
| 1 | DETAILED DATA DESCRIPTION | 2 |
| 1.1 | Parameters | 2 |
| 1.2 | Format | 2 |
| 1.3 | File Contents..... | 2 |
| 1.4 | File Naming Convention..... | 3 |
| 1.5 | Spatial Information | 4 |
| 1.5.1 | Coverage | 4 |
| 1.5.2 | Resolution..... | 4 |
| 1.5.3 | Geolocation | 4 |
| 1.6 | Temporal Information..... | 5 |
| 1.6.1 | Coverage | 5 |
| 1.6.2 | Resolution..... | 5 |
| 2 | DATA ACQUISITION AND PROCESSING | 5 |
| 2.1 | Data Acquisition Methods | 5 |
| 2.2 | Derivation Techniques and Algorithms | 5 |
| 2.2.1 | Quality, Errors, and Limitations..... | 5 |
| 3 | VERSION HISTORY | 6 |
| 4 | RELATED PUBLICATIONS..... | 6 |
| 5 | DOCUMENT INFORMATION..... | 6 |
| 5.1 | Publication Date..... | 6 |
| 5.2 | Date Last Updated | 6 |

1 DETAILED DATA DESCRIPTION

1.1 Parameters

The main parameters in this data set are snow pit measurements obtained by the SnowEx community during the 2017 campaign. Data are available for two locations in Colorado, USA: Grand Mesa, a snow-covered, forested study site about 40 miles east of Grand Junction and Senator Beck Basin approximately 80 miles to the SSE of Grand Mesa. The following measurements are available:

- Temperature
- Stratigraphy
- Grain size
- Grain type
- Wetness
- Depth
- Density
- Snow water equivalent (SWE)

Descriptions of each parameter are provided in the [technical reference](#) for this data set.

1.2 Format

Data files are provided in Comma Separated Values (.csv) format. 1062 CSV files are available for Grand Mesa and 170 for Senator Beck Basin.

1.3 File Contents

Data were recorded for 265 snow pits: 225 at Grand Mesa (GM) and 40 at Senator Beck (SBB). Density, stratigraphy, and temperature are provided in separate files for each snow pit. Each snow pit also has a corresponding header file that contains site information such as location (UTM) and comments. Snow water equivalents are stored in two master files, one for each study site (GM or SBB). Qualitative environmental observations about each study site are also available. The original data intake form, including descriptions of each parameter, are provided as a technical reference for this data set.

The following table describes the contents of each file type:

Table 1. File Types and Contents

| File Type | Contents |
|-----------------------|---|
| Header | Location (GM or SBB), site and Pit ID, date/time, UTM coordinates, slope, total depth, new snow depth, new snow SWE, weather, comments. |
| Density | Density (kg/m ³) profile at 10 cm intervals |
| Stratigraphy | Layer thickness, grain size, grain type, |
| Temperature | Location (GM or SBB), site and Pit ID, date/time, UTM coordinates, depth, temperature (°C). |
| Snow Water Equivalent | Two files, one for GM and one for SBB. Each row contains the site and snow pit ID, date/time, UTM coordinates, density A (kg/m ³), density B (kg/m ³), mean density (kg/m ³), SWE A (mm), SWE B (mm), mean SWE (mm), and snow depth (cm). |
| Environment | Two files, one for GM and one for SBB. These files contain qualitative observations about potentially impactful environmental conditions, such as precipitation, cloud cover, wind, and ground cover. No QA/QC was performed on non-numerical values in these files. |

1.4 File Naming Convention

Data files utilize the following naming convention and as described in Table 2:

SnowEx17_SnowPits_[site]_[yyyymmdd]_[param]_[pitID]_v[nn].csv

Table 2. File Naming Convention Variables

| Variable | Description |
|-------------------|---|
| SnowEx17_SnowPits | SnowEx17 Community Snow Pit Measurements data set |
| site | Grand Mesa (GM) or Sentaor Beck Basin (SBB) |
| yyyymmdd | Acquisition date |
| param | Parameter. Density, stratigraphy, temperature, or environment. Header files also use this convention. |
| pitID | Snow pit ID. IDs vary in length and can include underscores. |
| nn | Version number |

Example file names:

SnowEx17_SnowPits_GM_20170206_density_L36_v01.csv

SnowEx17_SnowPits_GM_20170206_header_L36_v01.csv

SnowEx17_SnowPits_GM_20170206_stratigraphy_L36_v01.csv

SnowEx17_SnowPits_GM_20170206_temperature_L36_v01.csv

SnowEx17_SnowPits_GM_swe_201702_v01.csv

SnowEx17_SnowPits_GM_environment_201702_v01.csv

1.5 Spatial Information

1.5.1 Coverage

Grand Mesa

Northernmost Latitude: 39.1° N

Southernmost Latitude: 39.0° N

Easternmost Longitude: 107.8° W

Westernmost Longitude: 108.2° W

Senator Beck Basin

Northernmost Latitude: 38.0° N

Southernmost Latitude: 37.8° N

Easternmost Longitude: 107.65 ° W

Westernmost Longitude: 107.8 ° W

1.5.2 Resolution

Point measurements.

1.5.3 Geolocation

All snow pit locations are reported in geographic coordinates within UTM Zone 13N. Refer to Table 3 for details.

Table 3. Geolocation Details

| | |
|---|-----------------------|
| Geographic coordinate system | WGS 84 |
| Projected coordinate system | WGS 84 / UTM zone 13N |
| Longitude of true origin | -105 (13N) |
| Latitude of true origin | 0 |
| Scale factor at longitude of true origin | 0.9996 |
| Datum | WGS 1984 |
| Ellipsoid/spheroid | WGS 84 |
| Units | meters |
| False easting | 500000 |
| False northing | 0 |
| EPSG Code | 32613 (13N) |

| | |
|---------------------|---|
| PROJ4 string | +proj=utm +zone=13 +datum=WGS84 +units=m +no_defs |
| Reference | https://epsg.io/32613 |

1.6 Temporal Information

1.6.1 Coverage

06 February to 25 February, 2017.

1.6.2 Resolution

N/A

2 DATA ACQUISITION AND PROCESSING

2.1 Data Acquisition Methods

Measurements were hand-written in field notebooks and transcribed to Excel files by a contracted company. After all records in the data set were verified, transcription errors were manually corrected with the exception of comments, including stratigraphy comments. Pit positions were adjusted based on GPS or differential GPS measurements, where available, that were recorded in the summer 2017. The data set was then visually inspected for completeness and positional accuracy.

2.2 Derivation Techniques and Algorithms

N/A

2.2.1 Quality, Errors, and Limitations

Non-numerical values were not evaluated for errors in the environment files
SnowEx17_SnowPits_SBB_environment_201702_v01.csv
and SnowEx17_SnowPits_GM_environment_201702_v01.csv.

3 VERSION HISTORY

Table 4. Version History Summary

| Version | Date Implemented | Impacted Temporal Coverage | Description of Changes |
|---------|------------------|----------------------------------|--|
| v01.0 | May 2019 | 06 February to 25 February, 2017 | Initial release |
| v01.0 | November 2024 | 06 February to 25 February, 2017 | Document updated to reflect changes in granule organization necessary for ingest in Cumulus. |

4 RELATED PUBLICATIONS

[SnowEx at NSIDC](#)

5 DOCUMENT INFORMATION

5.1 Publication Date

May 2018

5.2 Date Last Updated

November 2024