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].

National Snow and Ice Data Center

TABLE OF CONTENTS

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, which can be accessed using software that reads ASCII text. In total, 1062 CSV files are available for Grand Mesa and 170 for Senator Beck Basin.

Users may browse and download the files individually via HTTPS or NASA's Earthdata Search. In addition, users may order the data from Earthdata Search as two separate granules: one which contains all the files for Grand Mesa and/or a second which contains the Senator Beck Basin files.

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]_[param]_[yyyymmdd]_[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)
param	Parameter. Density, stratigraphy, temperature, or environment. Header files also use this convention.
yyyymmdd	Acquisition date
pitID	Snow pit ID. IDs vary in length and can include underscores.
nn	Version number

Example file names:

```
SnowEx17_SnowPits_GM_density_20170206_L36_v01.csv
SnowEx17_SnowPits_GM_header_20170206_L36_v01.csv
SnowEx17_SnowPits_GM_stratigraphy_20170206_L36_v01.csv
SnowEx17_SnowPits_GM_temperature_20170206_L36_v01.csv
```

```
SnowEx17_SnowPits_GM_swe_201702_v01.csv
SnowEx17_SnowPits_GM_environment_201702_v01.csv
```

1.5 File Sizes

CSV files range from approximately 200 B — 18 KB. The single Grand Mesa granule (.zip) is approximately 500 KB. The Senator Beck Basin granule is approximately 75 KB.

1.6 Spatial Coverage

Grand Mesa

Northernmost Latitude: 39.1º N
Southernmost Latitude: 39.0º N
Easternmost Longitude: 107.8° W
Westernmost Longitude: 108.2° W

Senator Beck Basin

Northernmost Latitude: 38.0º N
Southernmost Latitude: 37.8º N
Easternmost Longitude: 107.65 ° W
Westernmost Longitude: 107.8 ° W

1.6.1 Spatial Resolution

N/A.

1.6.2 Projection and Grid Description

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

1.7 Temporal Information

06 February to 25 February, 2017.

1.7.1 Temporal Resolution

N/A

2 SOFTWARE AND TOOLS

2.1 Software and Tools

CSV files can be accessed using software that reads ASCII text.

3 DATA ACQUISITION AND PROCESSING

3.1 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.

3.2 Derivation Techniques and Algorithms

N/A.

3.2.1 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`.

4 REFERENCES AND RELATED PUBLICATIONS

4.1 Related Data Collections

SnowEx at NSIDC

5 CONTACTS AND ACKNOWLEDGMENTS

Kelly Elder
Supervisory Research Hydrologist
240 West Prospect Road
Fort Collins, CO 80526
USA

6 DOCUMENT INFORMATION

6.1 Document Creation Date

May 2018

6.2 Date Last Updated

May 2018