



SnowEx23 Bonanza Creek Experimental Forest Terrestrial Lidar Scans, Version 1

USER GUIDE

How to Cite These Data

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

Liddle-Broberg, K., A. L. LeWinter, and D. L. Filiano. 2024. *SnowEx23 Bonanza Creek Experimental Forest Terrestrial Lidar Scans, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center.
<https://doi.org/10.5067/R466GRXNA61S> [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/SNEX23_BCEF_TLS



National Snow and Ice Data Center

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1 DATA DESCRIPTION

NOTE: This user guide refers to SnowEx 2023 Terrestrial Laser Scanning Support Final Reports from [October 2022](#) and [March 2023](#) (hereafter 'SnowEx23 Reports'), which contain a description of the mission, instrumentation, and data.

1.1 Parameters

This data set contains digital terrain models (DTMs) derived from terrestrial lidar scans (TLS) collected during the SnowEx 2023 campaign from the Bonanza Creek Experimental Forest near Fairbanks, Alaska. Data were collected in October 2022 (snow-off) and March 2023 (snow-on).

1.2 File Information

1.2.1 Format

The DTMs are provided as Geographic Tagged Image (GeoTIFF) files.

1.2.2 File Contents

Each GeoTIFF file provides a DTM derived from the lidar point cloud data at each survey site, showing height of the terrain in meters. This data set contains 10 DTMs from October 2022 and 21 DTMs from March 2023, for a total of 31 files.

1.2.3 Naming Convention

The data files are named according to the following conventions and as described in Table 1:

SNEX23_BCEF_TLS_DD_YYYYMMDD_XXXXX_V01.0.tif

SNEX23_BCEF_TLS_DD_YYYYMMDD_SPR_V01.0.tif

SNEX23_BCEF_TLS_DD_YYYYMMDD_DEC_V01.0.tif

Table 1. File Naming Convention

Variable	Description
SNEX23_BCEF_TLS	SnowEx 2023 Bonanza Creek Experimental Forest Terrestrial Lidar Scans data set
DD	Direction: N = north, NE = northeast, SW = southwest
YYYYMMDD	4-digit year, 2-digit month, and 2-digit day of data acquisition
XXXXX	Identifier for 21 individual survey sites (see SnowEx23 Reports). Some files do not have a site ID but are instead identified with a tree type (SPR = spruce, DEC = deciduous).
V01.0	Data set version 1.0

Examples:

SNEX23_BCEF_TLS_SW_20221024_CRS6_V01.0.tif

SNEX23_BCEF_TLS_NE_20221022_SPR_V01.0.tif

SNEX23_BCEF_TLS_N_20230316_DEC_V01.0.tif

1.3 Spatial Information

1.3.1 Coverage

The data were collected in the Bonanza Creek Experimental Forest in Tanana Flats, southwest of Fairbanks, Alaska, along the Tanana River. The spatial coverage is as follows:

Northernmost latitude: 64.714 °N

Southernmost latitude: 64.697 °N

Easternmost longitude: 148.278 °W

Westernmost longitude: 148.325 °W

1.3.2 Resolution

The point clouds have 2–5 cm accuracy, and the DTMs were created using a cell size of 15 cm.

1.3.3 Geolocation

The data are projected to the WGS 84 horizontal datum, UTM Zone 6N. The vertical projection is NAVD88 and calculated based on GEOID12B. Table 2 provides additional information for geolocating the data.

Table 2. Geolocation Details

Coordinate reference system	WGS 84
Projected coordinate system	UTM zone 6N
Longitude of true origin	-147
Latitude of true origin	0
Scale factor at longitude of true origin	0.9996
Datum	WGS 84
Ellipsoid/spheroid	WGS 84
Units	meters
False easting	500000
False northing	0
EPSG code	32606
PROJ4 string	+proj=utm +zone=6 +datum=WGS84 +units=m +no_defs +type=crs
Reference	https://epsg.io/32606

1.4 Temporal Information

1.4.1 Coverage

Snow-off data collection occurred 22–27 October 2022

Snow-on data collection occurred 8–16 March 2023

1.4.2 Resolution

N/A

2 DATA ACQUISITION AND PROCESSING

2.1 Background

In October 2022 and March 2023, the US Army Corps of Engineers Cold Regions Research and Engineering Laboratory's Alaska Projects Office (AKRO) and Remote Sensing and GIS Center of Expertise (RSGIS CX) conducted field collection and processing of TLS data for NASA's SnowEx 2023 field campaign.

2.2 Acquisition and Processing

Data were collected with the Riegl VZ-400i lidar scanner and processed using Riegl's RiSCAN Pro software and the Point Data Abstraction Library (PDAL). Local survey data were collected to ensure high geospatial accuracy, and attempts were made to collect high-accuracy and high-resolution survey points in open ground and forest conditions.

Multiple scans were required to overcome line-of-sight obstructions caused by dense ground vegetation. Tie points in the way of High-Definition Surveying (HDS) targets were deployed to register the multiple scan positions together. A Trimble DGPS R8 rover and base unit were used to collect position data for each HDS target, and the individual scan positions were then combined into a single point cloud. The data were then classified into point clouds and DTMs. The raw lidar data are available as the [SnowEx23 Bonanza Creek Experimental Forest Terrestrial Lidar Scans Raw, Version 1 \(SNEX23_BCEF_TLS_Raw\)](#) data set.

2.3 Quality, Errors, and Limitations

N/A

2.4 Instrumentation

See the SnowEx23 Reports for information on instrumentation.

3 VERSION HISTORY

Table 3. Version History Summary

Version	Release Date	Description of Changes
1	February 2024	Initial release

4 RELATED DATA SETS

[SnowEx23 Bonanza Creek Experimental Forest Terrestrial Lidar Scans Raw \(SNEX23_BCEF_TLS_Raw\)](#)

5 RELATED WEBSITES

[SnowEx at NSIDC | Data Sets](#)
[SnowEx at NSIDC | Overview](#)
[SnowEx at NASA](#)

6 DOCUMENT INFORMATION

6.1 Publication Date

February 2024

6.2 Date Last Updated

February 2024