SUMup Snow Density Dataset readme

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01 June 2021 UPDATE:

In the previous version of SUMup (sumup_density_2020.nc), the latitude and longitude were switched for citation #180. This error has been corrected in the latest version (sumup_density_2020_v060121.nc).

1.0 Introduction

This snow density dataset was compiled by the Surface mass balance and snow on sea ice working group (SUMup). This dataset includes snow density measurements over both the ice sheets, ice caps and snow on sea ice. It excludes seasonal snow on land measurements. This dataset is a community effort to distribute easy to use in-situ data to improve surface mass balance modeling and remote sensing efforts. This dataset is a compilation of work from many individual researchers. When using this dataset please cite **both** the individual researchers who provided the data as listed in the Citation column as well as the SUMup dataset. For questions about the dataset or to contribute your data to the dataset please contact the dataset compiler Lora Koenig lora.koenig@colorado.edu or Lynn Montgomery *lynn.montgomery@colorado.edu.*

Max Stevens has provided a python script to help with visualizing the location (and see a bit of metadata) of each core in the database. You can find his script on GitHub at https://github.com/maximusjstevens/SumUpTools with more information on how the code works with the data. You can contact him at *maxstev@uw.edu* for more information.

2.0 Contributing to the dataset

If you would like to contribute to the dataset please contact the authors as instructed above with the following data.

For no data enter -9999 otherwise fill in the columns as follows:

Date Taken- enter the year and day the data was taken in format YYYYMMDD. If only the year is known enter YYYY0000.

Lat-Latitude of measurements in decimal degrees (dd) (N is positive S is negative).

Long- Longitude of measurement in decimal degrees (dd) (E is positive W is negative).

Start depth- the start depth of the measurement in m from the snow/air interface (snow surface). The snow/air interface (snow surface) is defined as 0 m or the zero point.

Stop depth- the stop depth of the measurement in m form the snow/air interface (snow surface). The snow/air interface (snow surface) is defined as 0 m or the zero point.

Midpoint depth- the midpoint depth of the measurement in m from the snow/air interface (snow surface). The snow/air interface (snow surface) is defined as 0 m or the zero point.

Density- snow density measurement in g/cm^3.

Error- Uncertainty with associated measurement.

Elevation- the surface elevation of the location in m.
SDOS flag- snow depth on sea ice flag. If the density measurement was taken simultaneously with a snow depth on sea ice measurement contained in the SUMup Snow Depth on Sea Ice dataset enter 1. If not enter 0.

Method- see method key for snow density measurements below for numeric value of method used. If a

method was used not listed in the key please add the method to the key with the next highest number.

Citation- Enter the citation for the data.

3.0 Format

The dataset has the following columns, described in more detail in section 2.0. Date Taken, Lat, Long, Start depth, Stop depth, Midpoint depth, Density in g/cm3, Error on density measurement, Elevation of surface in m, SDOS flag, method, citation. Measurements are accurate to four significant figures after the decimal place. Please use this as a standard when doing analysis of the data.

For additional information on netCDF format please see the National Snow and Ice Data Centers support page here https://nsidc.org/data/netcdf/.

No data value is -9999. These data were not provided by the original dataset and we advise you to visit the original citation or contact the original owner for more information.

4.0 Method Key

1. 1000 cc density cutter
2. 250 cc density cutter
3. 100 cc density cutter
4. Ice core section
5. Neutron density probe/MADGE
6. Density cutter- size unknown
7. 2300 cc density cutter
8. 500 cc density cutter
9. 99 cc density cutter
10. X-ray microfocus computer tomography (AWI-IceCT)
11. Gamma-ray attenuation density (Wilhelms, 1996)
12. Pycnometer (Micromeritics)
13. Custom trace metal clean sampler
14. Optical Televiewer (OPTV) borehole logging
15. Density-and-conductivity mixed permittivity (DECOMP)
16. Dielectric profiling (Wilhelms, 2000)

17. 30 mm x 60 mm x 56 mm density cutter

5.0 Citations

When using this dataset please cite **both** the individual researchers who provided the data as listed in the Citation column as well as the SUMup dataset.

5.1 Density Datasets Compiled (7/2018)

New citations for the 2018 dataset begin after citation 44, and for the 2017 dataset begin after citation 12, all other citations were present in the July 2015 dataset.

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6.0 Combining datasets

Different datasets compiled were recorded to a different number of significant figures or precision yet all numbers in this dataset were standardized to a certain length. Measurements are accurate to four significant figures after the decimal place. Please use this as a standard when doing analysis of the data.

7.0 Acknowledgement

The SUMup working group was previously supported by the NASA Cryospheric Sciences Program and is now supported by the National Science Foundation grant PLR 1603407.