CanSISE Observation-Based Ensemble of Northern Hemisphere Terrestrial Snow Water Equivalent, Version 2

USER GUIDE

How to Cite These Data

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

Mudryk, L. R. and C. Derksen. 2017. *CanSISE Observation-Based Ensemble of Northern Hemisphere Terrestrial Snow Water Equivalent, Version 2*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/96ltniikJ7vd. [Date Accessed].

Literature Citation

Mudryk, L. R. et al. 2015. Characterization of Northern Hemisphere Snow Water Equivalent Datasets, 1981–2010, *Journal of Climate*. 28. 8037-8051. https://doi.org/10.1175/JCLI-D-15-0229.1

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/NSIDC-0668

National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

1.1 Format

Data are in NetCDF-3 format.

1.2 File and Directory Structure

Data are available via HTTPS in the `https://daacdata.apps.nsidc.org/pub/DATASETS/nsidc0668_swe_ensemble_v2` directory.

There are 62 files, two files per year between 1981-2010 and two files that are the daily average for the thirty-year period. The `.nc` file provides the SWE for 365 days of the year and the `.spread.nc` file provides the difference in meters of snow water equivalent (SWE) from the highest and lowest observation of the component data sets. All files contain six variables. Three of the variables are one-dimensional floating-point arrays: Time, Lat, and Lon. The lat_bnds and the lon_bnds are two-dimensional floating arrays. To maintain compliance with the Climate and Forecast (CF) metadata standard, the variable for SWE is SNW. SNW is a three-dimensional floating array. See Table 1 for a description of the variables in each file. The metadata for all files are CF (Climate and Forecast) compliant.

Table 1. Variable Description

Variable	Long Name	Number of Elements	Description
Time	Time	365	For individual year files, time is the number of days since Jan. 01, 1981. For the 1981-2010 climatological files, time is the number of days since Jan 01. Values range from 0 - 364, corresponding to a specific calendar date. There is no 29 February for any year in any file.
Lat	Latitude (°)	90	Degrees north. Values range from 0 - 89.
lat_bnds	Latitude bounds (°)	2 columns x 90 rows	Minimum and maximum bounding latitudes for each latitude measurement from 0° to 90° within a range from -.5° to 1.5°.
Lon	Longitude (°)	360	Degrees east. Values range from 0 - 359.
lon_bnds	Longitude bounds (°)	2 columns x 360 rows	Minimum and maximum bounding longitudes for each longitude measurement from 0° to 359° within a range from -.5° to 1.5°.

Variable	Long Name	Number of Elements	Description
SNW	Snow Water Equivalent (m)	360 columns x 90 rows	Values range from 0.0 to ~1.5 m. There are 365 bands of SNW in each file, and each band is a 360 x 90 floating-point array. A value of 1.e+2Θf indicates missing data.

1.3 File Naming Convention

The file naming convention for the files in this data set is explained in Table 2. The thirty-year climatological files follow the naming convention except for the year, which is a range of years instead of individual years. See the examples below.

Naming Convention:

SWE_Blended5_1x1daily.xxxx.v2.nc
SWE_Blended5_1x1daily.xxxx.spread.v2.nc

Example File Names:

SWE_Blended5_1x1daily.1981.v2.nc
SWE_Blended5_1x1daily.1981.spread.v2.nc
SWE_Blended5_1x1daily.1981-2010.v2.nc
SWE_Blended5_1x1daily.1981-2010.spread.v2.nc

Table 2. File Naming Convention

Variable	Description
SWE	Snow Water Equivalent
Blended5	Indicates that the data are a blend of five component SWE data sets
1x1daily	Data are re-gridded on a 1x1 grid; temporal resolution is daily
xxxx	Year of original data acquisition. The 1981-2010 files denote climatology.
spread	Indicates that the values represent the difference in meters SWE from the highest and lowest observation of the component data sets
v2	Version 2 file

1.4 File Size

Each file is 45.12 MB.

1.5 Volume

The volume of the data set is 2.73 GB.

1.6 Spatial Coverage

Northern Hemisphere:

Southernmost Latitude: 0.0°
Northernmost Latitude: 90.0°
Westernmost Longitude: -180.0°
Easternmost Longitude: 180.0°

1.6.1 Spatial Resolution

Spatial resolution is 1 degree x 1 degree.

1.7 Temporal Coverage

The data set coverage is from 01 January 1981 through 31 December 2010.

1.7.1 Temporal Resolution

The data have a daily temporal resolution.

1.8 Parameter

The parameter of this data set is snow water equivalent.

1.8.1 Sample Data Record

Figure. 1 shows a sample of the NetCDF plot of SWE for March 13, 1981 (day 72).

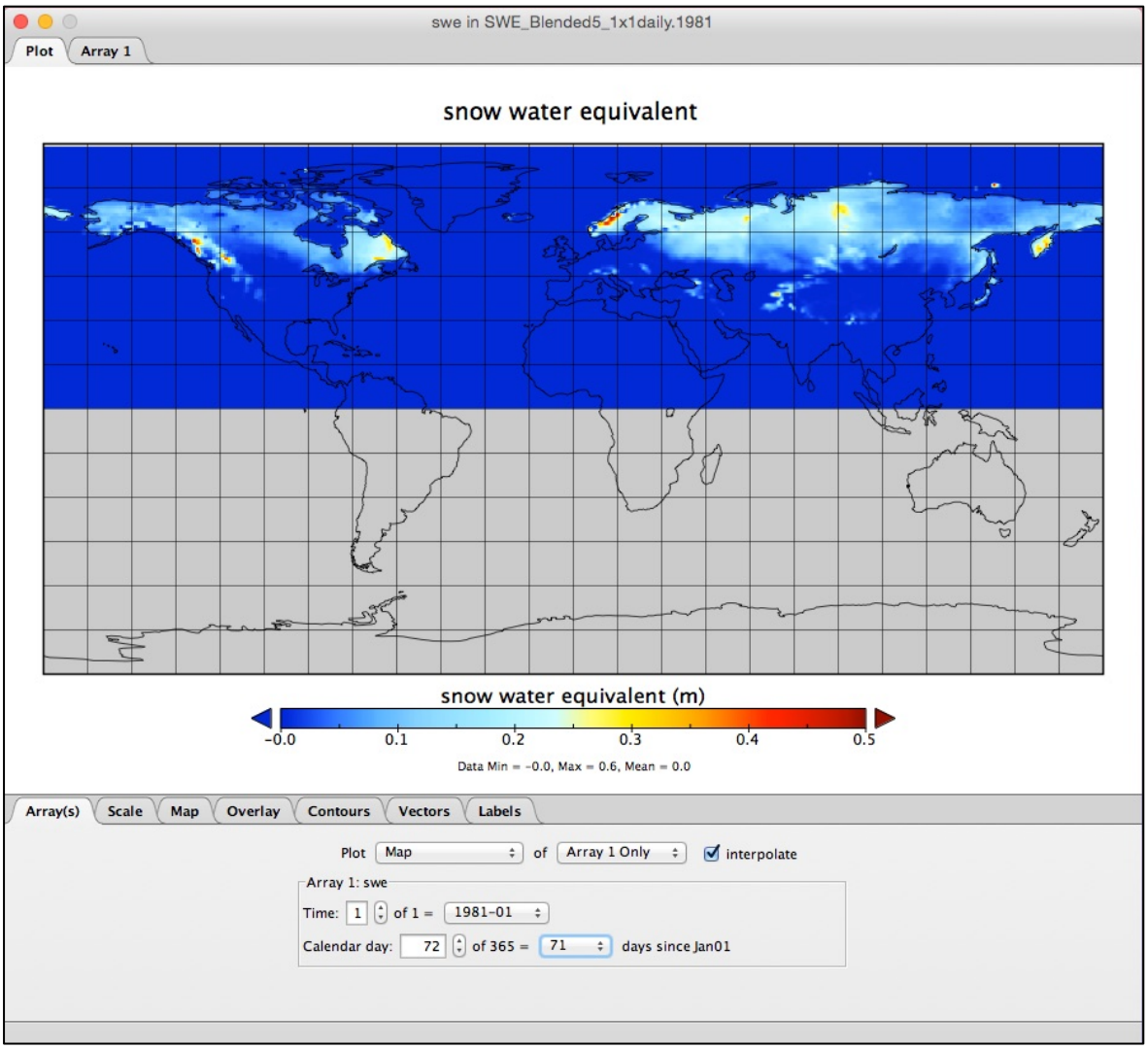

Figure 1. SWE for March 13, 1981

2 SOFTWARE AND TOOLS

2.1 Software and Tools

For a list of resources for accessing NetCDF files, see NetCDF Software Tools.

3 DATA ACQUISITION AND PROCESSING

3.1 Processing Steps

The following is the methodology used in processing the data:

1. Acquired component data sets at native resolution, daily frequency, from 1981-2010
2. Re-gridded to common 1 x 1 degree regular lon/lat grid (resolution of coarsest data product)
3. Assessed temporal homogeneity in total Northern Hemisphere snow water mass over the 1981-2010 period
4. Calculated unweighted average (full spatial field for each day) of the five SWE data sets
5. Calculated spread (difference between maximum and minimum SWE) among the five products (full spatial field for each day)

3.2 Sensor or Instrument Description

See the following web pages for descriptions of the instruments used to gather the data:

Special Sensor Microwave/Imager Instrument Description

Scanning Multi-channel Microwave Radiometer (SMMR) Instrument Description

AMSR-E Instrument Description

MODIS Instrument

4 REFERENCES AND RELATED PUBLICATIONS

Balsamo, G., et al. 2015. ERA-Interim/Land: A global land surfaces reanalysis data set. *Hydrology and Earth System Sciences* 19(1): 389–407. doi: 10.5194/hess-19-389-2015.

Brun, E., et al. 2013. Simulation of northern Eurasian local snow depth, mass, and density using a detailed snowpack model and meteorological reanalyses. *Journal of Hydrometeorology* 14(1): 203–219. doi: 10.1175/JHM-D-12-012.1.

Rienecker, M. M., et al. 2011. MERRA: NASA's Modern-Era Retrospective Analysis for Research and Applications. Journal of Climate 24: 3624–3648. doi: 10.1175/JCLI-D-11-00015.1.

Rodell, M., et al. 2004. The Global Land Data Assimilation System. *Bulletin of the American Meteorological Society* 85(3): 381–394. doi: 10.1175/BAMS-85-3-381.

Rodell, M., and H. K. Beaudoing. 2013. GLDAS CLM Land Surface Model L4 3 Hourly 1.0 x 1.0 degree subsetted, version 001. Goddard Earth Sciences Data and Information Services Center (GES DISC), NASA/GSFC/HSL, doi: 10.5067/0JNJQ8ZDZRBA.

Takala, M., K. Luojus, J. Pulliainen, C. Derksen, L. Lemmetyinen, J.-P. Kärnä, and J. Koskinen. 2011. Estimating Northern Hemisphere snow water equivalent for climate research through assimilation of space-borne radiometer data and ground-based measurements. *Remote Sensing of Environment*115(12): 3517–3529. doi: 10.1016/j.rse.2011.08.014.

5 CONTACTS AND ACKNOWLEDGMENTS

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6 DOCUMENT INFORMATION

6.1 Publication Date

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6.2 Date Last Updated

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