Reconstructed North American, Eurasian, and Northern Hemisphere Snow Cover Extent, 1915-1997, Version 1

USER GUIDE

How to Cite These Data

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

Brown, R. D. 2002. *Reconstructed North American, Eurasian, and Northern Hemisphere Snow Cover Extent, 1915-1997, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/N5V985Z6. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/G02131

National Snow and Ice Data Center

TABLE OF CONTENTS

1 OVERVIEW

This data set contains time series of monthly snow cover extent (SCE) for North America, Eurasia, and the Northern Hemisphere from 1915 to 1997, based on snow-cover reconstruction and NOAA satellite data. The reconstruction method used in situ snow depth and daily climate data from the U.S., Canada, China, and the former Soviet Union (FSU) to generate a monthly snow-cover index, which was closely related to satellite-derived estimates of SCE in certain months. Brown (2000) describes the method, which may be more robust than SCE reconstruction based on statistical methods, such as those found in Brown, 1997; Frei et al., 1999.

In addition, the data set contains time series of annual variation in area-averaged monthly snow depth and estimated snow water equivalent (SWE) for the North American grid domain that was used to derive the snow cover index. These provide additional insights into secular changes in snow cover over North America since SCE and depth variations are not always positively correlated.

The ability to reconstruct SCE via the snow index method is closely constrained by the spatial distribution of in situ data. For North America, six months (November - April) were reconstructed, but only three months (October, March, April) could be generated for Eurasia.

2 DETAILED DATA DESCRIPTION

2.1 Format

The data are in ASCII text format and reside in one data file: time_series_sce_swe.txt.

2.2 File Size

18 KB.

2.3 Spatial Coverage

The data set covers North America, North American mid-latitudes, Eurasia, and the Northern Hemisphere.

2.4 Temporal Coverage

The data span ranges from January 1915 to December 1997.

2.5 Parameter or Variable

2.5.1 Parameter Description

The data set consists of three time series of monthly snow cover extent based on snow cover reconstruction and NOAA satellite data. The reconstruction method used in situ snow depth and daily climate data from the U.S., Canada, China, and the FSU to generate a monthly snow cover index that was calibrated with NOAA satellite-derived estimates of SCE over the 1972-1992 period.

The time series are as follows:

- Historical variation in NA monthly snow cover extent, 1915-1997 (Nov - April)
- Historical variation in Eurasian monthly snow cover extent, 1922-1997 (Oct, March, April)
- Historical variation in NH SCE, 1922-1997 (March, April)

The data sets used to derive the time series were:

- North America - in situ and reconstructed daily snow depths (1915-1992)
- Eurasia - reconstructed monthly snow cover from daily climate data (1915-1993)

NOAA weekly snow cover extent (1972-1997)

The data set also includes two time series of annual variability in area-weighted monthly snow depth and SWE for the North American grid domain used to derive the snow cover index. SWE was estimated by applying mean monthly density values derived from an analysis of Canadian snow course data.

- Historical variability in area-weighted (monthly) mean snow depth over North American mid-latitudes, 1915-1992 (Nov - April)
- Historical variability in area-weighted (monthly) mean (estimated) SWE over North American mid-latitudes, 1915-1992 (Nov - April)

2.5.2 Sample Data Record

Historical variation in North American (including Greenland) SCE (million km^2)

Year	Jan	Feb	Mar	Apr	Nov	Dec
1915	17.405	17.034	15.379	12.066	12.347	16.261
1916	17.796	17.577	16.493	13.128	12.068	16.648
1917	17.770	17.467	16.974	14.293	11.486	17.308

Area-weighted mean snow depth (cm) over North America south of 60ºN

Year	Jan	Feb	Mar	Apr	Nov	Dec
1915	9.9	14.6	13.5	4.5	3.7	7.6
1916	17.2	23.1	29.3	15.6	3.4	8.0
1917	15.7	23.2	27.5	19.6	2.5	9.4

3 DATA ACQUISITION AND PROCESSING

The investigator generated a monthly snow cover index using a reconstruction method that used in situ snow depth and daily climate data from the U.S., Canada, China, and the FSU.

Brown (2000) describes the method for reconstructing snow cover extent, as well as gridding and data analysis methodology. Reconstruction of monthly snow cover extent was possible only in certain months due to the spatial distribution of the in situ data used to derive the snow cover index.

4 REFERENCES AND RELATED PUBLICATIONS

Frei, A. and D. Robinson. 2002. Reconstructed North American snow extent, 1900-1993. Boulder, CO: National Snow and Ice Data Center. Digital media.

Brown, R.D. 2000. Northern Hemisphere snow cover variability and change, 1915-1997. J. Climate 13: 2339-2355.

Brown, R.D. 1997. Historical variability in Northern Hemisphere spring snow covered area. Annals of Glaciology 25: 340-346.

Brown, R.D. and R.O. Braaten. 1998. Spatial and temporal variability of Canadian monthly snow depths, 1946-1995. Atmosphere-Ocean 36: 37-45.

Easterling, D.R., P. Jamason, D. Bowman, P.Y. Hughes and E. H. Mason. 1997. Daily snow depth measurements from 195 stations in the United States. ORNL/CDIAC-95, NDP-059.

Frei, A., M.G. Hughes and D.A. Robinson. 1999. North American snow extent: 1910-1994. Int'l. J. Climatology 19: 1517-153

4.1 Related Data Collections

- Reconstructed North American Snow Extent, 1900-1993
- MEaSUREs Northern Hemisphere Terrestrial Snow Cover Extent Weekly 100km EASE-Grid 2.0
- NOAA Climate Data Record of Northern Hemisphere Snow Cover Extent

5 CONTACTS AND ACKNOWLEDGMENTS

Mr. Ross D. Brown
Meteorological Service of Canada
2121 Trans Canada Highway
Dorval, QC
Canada
H9P 1J3

Telephone: (514) 421-4772
Fax: (514) 421-4768
E-mail: Ross.Brown@ec.gc.ca Document Information

Acknowledgments:

The investigator acknowledges the following individuals and agencies:

- Drs. David Robinson and Allan Frei for support and fruitful discussions
- Dr. Pavel Groisman for supplying updated daily climate data from the FSU and for invaluable advice on correcting sources of inhomogeneity in the data
- The National Climatic Data Center for making the U.S. daily snow depth data set freely available
- The National Snow and Ice Data Center for the historical daily snow depth data set for the FSU

6 DOCUMENT INFORMATION

6.1 Document Author

NSIDC Technical Writers

6.2 Publication Date

15 October 2002

6.3 Date Last Updated

2002