

Dataset documentation for 0.1° x 0.1° gridded version of the Canadian historical snow survey dataset

Filename: *Canada_snow_survey_grid_10km_1951to2016.txt*

Period: 1951-2016

Time interval: Biweekly on the 1st and 15th of month from Nov 15 to May 15 (13 per snow season). The period between May 15 and Nov 15 does not have sufficient observations for grid averaging.

Area: 0.1° x 0.1° latitude/longitude grid covering Canadian land area. Only grid boxes containing at least one observation are written to the output file. Data are concentrated in the area south of ~55°N.

Method: Arithmetic average of snow survey observations falling within a 0.1 x 0.1 degree latitude/longitude grid within ±8 days of the 1st and 15th of the month. Only snow survey observations with complete SWE, snow depth and density triplets, with density values between 50 and 600 kg/m³ were included in the grid box averaging. The density range check screens out potentially spurious observations. The average elevation of the observations is also included in the output along with the average elevation of the grid cell as determined from 2-minute digital elevation data.

Data units: Snow water equivalent (SWE mm), Snow Depth (SD cm), Snow Density (DEN kg/m³), Elevation (m)

Output format: Output is provided in ascii format using the following FORTRAN write statement:

```
write(60,300) year,month,day,lat,long,SD,SWE,DEN,elev_obs,elev_grid,nobs
300      format(i4,i2.2,i2.2,7(1x,f8.3),1x,i4)
```

Sample output for Feb 01, 1973:

Date	Lat	Long	SD(cm)	SWE(mm)	DEN(kg.m ⁻³)	obsElev(m)	grdELEV(m)	#obs
19730201	51.300	-116.900	71.000	155.000	218.000	1890.000	1452.778	2
19730201	49.600	-116.700	142.500	438.500	303.000	1730.000	1710.222	4
19730201	51.400	-116.500	53.000	76.000	143.000	1280.000	1810.111	2
19730201	51.700	-116.500	86.000	226.000	263.000	2055.000	2293.889	2
19730201	53.600	-116.400	46.000	76.333	166.000	922.000	908.222	3
19730201	51.400	-116.300	97.000	239.000	246.000	1650.000	2224.556	2
19730201	51.400	-116.200	73.250	174.500	237.000	1738.000	1854.000	8
19730201	49.600	-116.100	95.000	257.750	267.750	1910.000	1463.111	4

Snow survey observations:

Filename: *Cdn_Snow_Survey_Dataset_Lat_Long_Minus_HQ-MELCC.txt*

Contains all the SWE-depth-density triplets in the historical dataset excluding data from Hydro-Québec and the Québec Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC). Some data from these agencies are included from a data rescue project that digitized the *Snow Cover Data* annual summaries of snow surveys published by the Meteorological Service of Canada from 1955-1985. The MELCC snow survey data can be obtained by sending an email to info-climat@environnement.gouv.qc.ca. Requests for access to the Hydro-Québec snow survey data should be addressed to Charles Mathieu at Mathieu.Charles@hydro.qc.ca.

Output format: Output is provided in ascii format using the following FORTRAN write statement:

```
write(70,70) StnID,lat,lon,elev,date,sdep,swe,dens
70      format(a21,1x,f8.3,1x,f8.3,1x,i6,1x,i8,1x,i4,1x,i4,1x,f8.3)
```

Sample output:

StationID	Lat	Long	Elev (m)	Date	SD (cm)	SWE (mm)	DEN (kg/m3)
ALE-05AA801	49.280	-114.370	1520	19670404	190	693	364.737
CHURCHILL-Anderson	52.020	-63.570	502	19720124	92	218	236.957
SCD-QC330	46.930	-71.470	198	19750320	92	274	297.826

The station name corresponding to the Station ID is given in file *Station_List_Minus_HQ-MELCC.csv*. Documentation is included in the header record.

Data sources:

ALE = Alberta Environment and Parks

BCE = British Columbia Ministry of Environment & Climate Change Strategy

CHURCHILL = Churchill Falls (Labrador) Corporation Ltd

ENB = Environment and Local Government, New Brunswick

INA = Indigenous and Northern Affairs Canada

MB = Manitoba Hydro

ONR = Ontario Ministry of Natural Resources and Forestry

OPG = Ontario Power Generation

RTA = Rio Tinto

SCD = From annual "Snow Cover Data" summaries published from 1955-1985 by Environment Canada. The province is indicated e.g. SCD-QC for Quebec

YT = Yukon Territories

References:

Fang (2017) provides details of the data processing carried out in the latest update of the snow survey dataset based on the original version of the dataset developed by Braaten (1998). Brown et al. (2019) provide a detailed description of the gridded dataset along with analysis of trends in SWE, depth and density over the 1951-2016 period.

Braaten, R., 1998: Canadian Snow Water Equivalent Database, Main Documentation, Atmospheric Environment Service, 25 pp. See file *Braaten_1998_Canadian_SWE_Database.pdf*

Fang, B. 2017: Update of the Canadian Historical Snow Survey Dataset, Environment and Climate Change Canada Project Report, May 2017, 30 pp. See file *Report_Canadian_Snow_Survey_Update_Fang_2017.pdf*

Brown, R., B. Fang and L. Mudryk, 2019: Update of Canadian historical snow survey data and analysis of snow water equivalent trends, 1967-2016. Atmosphere-Ocean (accepted)

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