Canadian Urban Environmental Health Research Consortium

CANUE Metadata Weather NRCAN
Browser August 2019

DATA SET INFORMATION	
Data Set Title:	**Weather and climate metrics**
Description:	Each annual file contains 35 metrics calculated by CANUE staff using base data provided by the Canadian Forest Service of Natural Resources Canada. The base data consist of interpolated daily maximum temperature, minimum temperature and total precipitation for all unique DMTI Spatial Inc. postal code locations in use at any time between 1983 and 2015. These were generated using thin-plate smoothing splines, as implemented in the ANUSPLIN climate modeling software. The earliest applications of thin-plate smoothing splines were described by Wahba and Wendelberger (1980) and Hutchinson and Bischof (1983), but the methodology has been further developed into an operational climate mapping tool at the ANU over the last 20 years. ANUSPLIN has become one of the leading technologies in the development of climate models and maps, and has been applied in North America and many regions around the world. ANUSPLIN is essentially a multidimensional “nonparametric” surface fitting method that has been found particularly well suited to the interpolation of various climate parameters, including daily maximum and minimum temperature, precipitation, and solar radiation. Equations for calculating the included metrics, based on daily minimum and maxmum temperature, and total precipitation were developed by Pei-Ling Wang and Dr. Johannes Feddema at the University of Victoria, Geography Department, and implemented by CANUE staff Mahdi Shooshtari.
Theme Keywords:	Annual climate parameters, precipitation,rain, snow, temperature, heat, interpolated surface
Place Keywords:	Canada, national
Data preparation date:	2017-10-01
File Names	wthnrc_a_YY.csv (were YY is the last two digits of a specific year).
File Type:	Comma separated values (.csv)
Beginning Date:	1985
End Date:	2015
Sampling Frequency of Data:	Annual
Number of Data Files:	30
File Size	Between 170 MB to 260 MB, total size for all files is 6.88 GB
Data Sources:	Daily Interpolated precipitation and temperature, DMTI Spatial Inc. postal codes
Spatial Resolution:	Individual 6-digit postal code locations
Detection Range or Limit:	N/A
GEOSPATIAL REFERENCE	
Geographic Coverage	Canada
West Bounding Coordinate	-140.875303 dd
East Bounding Coordinate	-52.654112 dd
North Bounding Coordinate	76.410808 dd
South Bounding Coordinate	41.735230 dd
Geometry Type:	Point
Coordinates have Z values:	No
Geographic Coordinate System:	GCS_WGS_1984
Datum	D_WGS_1984
Unit:	Decimal degrees

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QUALITY ASSESSMENT	
QA/QC procedures:	CANUE did not assess the quality of the base data. Users should review the supporting documentation and any recommended citations.
Geographic Coordinate Positional Accuracy:	These metrics are linked to the corresponding annual postal codes files for mapping and analysis purposes. Refer to the postal code metadata file in Supporting Documentation for more information.
Vertical Positional Accuracy:	N/A
Attribute Accuracy:	N/A
Data Validity :	NoData = -9999 (for numeric fields).
Associated Files:	N/A
Data Comment:	Elevations were assigned to postal code locations by NRCAN CFS staff. Where coastal locations were not assigned an elevation, a default of 10 m above sea level was assigned.
SUPPORTING DOCUMENTATION	
Additional documentation:	NRCAN BAMS Customized climate data.pdf
	Documentation in preparation from PLWang/Mshooshtari. Contact info@canue.ca for more information.
	Wahba, G., 1990: Spline Models for Observational Data. CBMS-NSF Regional Conference Series in Applied Mathematics, Vol. 59, Society for Industrial and Applied Mathematics, 169 pp. Hutchinson, M. F., 1991: The application of thin plate smoothing splines to continent-wide data similation. Data assimilation systems: Papers presented at the Second BMRC Modelling Workshop, J. D. Jasper, Ed., Bureau of Meteorology Research Centre Research Rep. 27, 104–113.

DATA DICTIONARY

Field Name:	Description	Data Type
postalcodeYY	6 digital postal code with no space between the FSA and LDU. (i.e. L1R2H2)	Text
province	Province code (AB, BC, MB, NB, NL, NS, NT, NU, ON, PE, QC, SK, YT)	Text
latitude	Latitude in decimal degrees	Numeric
longitude	Longitude in decimal degrees	Numeric
wthnrcYY_01	Annual highest temperature (celsius)	Numeric
wthnrcYY_02	Annual lowest temperature (celsius)	Numeric
wthnrcYY_03	Annual average temperature (celsius)	Numeric
wthnrcYY_04	Annual average of daily maximum temperature (celsius)	Numeric
wthnrcYY_05	Annual average of daily minimum temperature (celsius)	Numeric
wthnrcYY_06	Annual average of difference between maximum and minimum temperatures (celsius)	Numeric
wthnrcYY_07	Annual total precipitation as rain (precipitation on all days with minimum temperature > = 0) (millimeters)	Numeric
wthnrcYY_08	Annual number of rain events (consecutive days with rain including single day events)	Numeric
wthnrcYY_09	Annual number of days with rain (precipitation on all days with minimum temperature > = 0)	Numeric
wthnrcYY_10	Annual average amount of rain per event (millimeters)	Numeric
wthnrcYY_11	Annual average length of rain events (days)	Numeric
wthnrcYY_12	Annual total precipitation as snow (precipitation on all days with minimum temperature < 0) (millimeters)	Numeric

wthnrcYY_13	Annual number of snow events (consecutive days with snow, including single day events)	Numeric
wthnrcYY_14	Annual number of days with snow (precipitation on all days with minimum temperature < 0)	Numeric
wthnrcYY_15	Annual average amount of snow per event (millimeters)	Numeric
wthnrcYY_16	Annual average length of snow events (days)	Numeric
wthnrcYY_17	Annual number of heat event starts based on maximum temperature (where there are three or more consecutive days with maximum daily temperature > 95th percentile of daily normal maximum temperatures; normal distribution based on daily maximum temperatures 1985-2015)	Numeric
wthnrcYY_18	Annual number of days in heat events based on maximum temperature (where there are three or more consecutive days with maximum daily temperature > 95th percentile of daily normal maximum temperatures; normal distribution based on daily maximum temperatures 1985-2015)	Numeric
wthnrcYY_19	Annual average length of heat events based on maximum temperature (where there are three or more consecutive days with maximum daily temperature > 95th percentile of daily normal maximum temperatures; normal distribution based on daily maximum temperatures 1985-2015)	Numeric
wthnrcYY_20	Annual number of cool event starts based on maximum temperature (where there are three or more consecutive days with maximum daily temperature <5th percentile of daily normal maximum temperatures; normal distribution based on daily maximum temperatures 1985-2015)	Numeric
wthnrcYY_21	Annual number of days in cool events based on maximum temperature (where there are three or more consecutive days with maximum daily temperature <5th percentile of daily normal maximum temperatures; normal distribution based on daily maximum temperatures 1985-2015)	Numeric
wthnrcYY_22	Annual average length of cool events based on maximum temperature (where there are three or more consecutive days with maximum daily temperature <5th percentile of daily normal maximum temperatures; normal distribution based on daily maximum temperatures 1985-2015)	Numeric
wthnrcYY_23	Annual number of heat event starts based on minimum temperature (where there are three or more consecutive days with minimum daily temperature > 95th percentile of daily normal minimum temperatures; normal distribution based on daily minimum temperatures 1985-2015)	Numeric
wthnrcYY_24	Annual number of days in heat events based on minimum temperature (where there are three or more consecutive days with minimum daily temperature > 95th percentile of daily normal minimum temperatures; normal distribution based on daily minimum temperatures 1985-2015)	Numeric
wthnrcYY_25	Annual average length of heat events based on minimum temperature (where there are three or more consecutive days with minimum daily temperature > 95th percentile of daily normal minimum temperatures; normal distribution based on daily minimum temperatures 1985-2015)	Numeric
wthnrcYY_26	Annual number of cool event starts based on minimum temperature (where there are three or more consecutive days with minimum daily temperature <5th percentile of daily normal minimum temperatures; normal distribution based on daily minimum temperatures 1985-2015)	Numeric

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wthnrcYY_27	Annual number of days in cool events based on minimum temperature (where there are three or more consecutive days with minimum daily temperature <5th percentile of daily normal minimum temperatures; normal distribution based on daily minimum temperatures 1985-2015)	Numeric
wthnrcYY_28	Annual average length of cool events based on minimum temperature (where there are three or more consecutive days with minimum daily temperature <5th percentile of daily normal minimum temperatures; normal distribution based on daily minimum temperatures 1985-2015)	Numeric
wthnrcYY_29	Annual number of heat event starts based on average temperature (where there are three or more consecutive days with average daily temperature > 95th percentile of daily normal average temperatures; normal distribution based on daily average temperatures 1985-2015)	Numeric
wthnrcYY_30	Annual number of days in heat events based on average temperature (where there are three or more consecutive days with average daily temperature > 95th percentile of daily normal average temperatures; normal distribution based on daily average temperatures 1985-2015)	Numeric
wthnrcYY_31	Annual average length of heat events based on average temperature (where there are three or more consecutive days with average daily temperature > 95th percentile of daily normal average temperatures; normal distribution based on daily average temperatures 1985-2015)	Numeric
wthnrcYY_32	Annual number of cool event starts based on average temperature (where there are three or more consecutive days with average daily temperature <5th percentile of daily normal average temperatures; normal distribution based on daily average temperatures 1985-2015)	Numeric
wthnrcYY_33	Annual number of days in cool events based on average temperature (where there are three or more consecutive days with average daily temperature <5th percentile of daily normal average temperatures; normal distribution based on daily average temperatures 1985-2015)	Numeric
wthnrcYY_34	Annual average length of cool events based on average temperature (where there are three or more consecutive days with average daily temperature <5th percentile of daily normal average temperatures; normal distribution based on daily average temperatures 1985-2015)	Numeric
wthnrcYY_35	Annual number of frost free days (min temp > 0) (days)	Numeric
DATA SET CONTACTS		
Data Support:	Contact CANUE via the email below.	
Email:	info@canue.ca	
Affiliated Organization:	CANUE (Canadian Urban Environmental Health Research Consortium)	
	Dalla Lana School of Public Health, University of Toronto	
Website:	www.canue.ca	
City:	Toronto	
Prov/State:	Ontario	
Country:	Canada	
Exposure Data Source Contact:	Dr. Dan McKenney	
Email:	dan.mckenney@canada.ca	
Phone:	705-541-5569	
First Name:	Dan	
Last Name:	McKenney	
Affiliated Organization:	Canadian Forest Service, Natural Resources Canada	
City:	Sault Ste. Marie	
Prov/State:	Ontario	
Country:	Canada	

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DATA USE CONDITIONS	
Conditions of Use:	The Data User is REQUIRED: (i) to acknowledge data sources listed under Acknowledgement(s); (ii) cite the publication(s) listed under Recommended Citation(s) as the providers and source of these data when using them in support of research, analysis, operations, policy decision or any other undertaking including publication; and (iii) complete and sign the CANUE Data Use and Sharing Agreement (available at http://canue.ca/data/), in which the name and signature of the researcher/analyst who takes responsibility for ensuring all conditions are met.
Data Sharing Restrictions:	These data files are provided solely for the purposes stated in the CANUE Data Use and Sharing Agreement and should not be re-distributed for any reason. These data also contain proprietary postal code data and may only be used for the project named in the CANUE Data Use and Sharing Agreement. Data can be shared within a project team for the exclusive purposes of teaching, academic research and publishing, and/or planning of educational services in accordance to DMTI End User Agreement associated with the Spatial Mapping Academic Research Tools (SMART) Program.
Required Citation:	Include the following references in any publications resulting from the use of these data: [1] Customized spatial climate data files prepared for the CanadianUrban Environmental Health Research Consortium by the Canadian Forest Service of Natural Resources Canada, October 2017. [2] CanMap Postal Code Suite v2015.3. [computer file] Markham: DMTI Spatial Inc., 2015.
Acknowledgment:	Include the following acknowledgements: Weather-related indicators were developed bu Dr. Johannes Feddema, Pei-Ling Wang, and Mahdi Shooshtari for CANUE, based on custom data from Natural Resources Canada. These indicators were indexed to DMTI Spatial Inc. postal codes and provided by CANUE (Canadian Urban Environmental Health Research Consortium).