



The Canadian Urban Environmental Health Research Consortium

Canue Metadata - Weather Water Balance Metrics

2021-02-15

DATA SET INFORMATION

Dataset Code: WBNRC_A_YY

Description:

Each annual file contains 21 metrics developed by the CANUE Weather and Climate Team, and 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. The water balance model was developed by Pei-Ling Wang and Dr. Johannes Feddema at the University of Victoria, Geography Department, and implemented by CANUE staff Mahdi Shooshtari. (THESE DATA ARE ALSO AVAILABLE AS MONTHLY METRICS).

Keywords: temperature|rain|snow |precipitation|moisture surplus|moisture deficit|annual

Place Keywords: Canada|national

GEOSPATIAL REFERENCE

Upper Left Corner: 65.14N , -141.02W

Lower Right Corner: 41.68N , -52.62W

Coordinate System: GCS_WGS84 - EPSG:4326

Geometry Type: POINT - Units: Decimal Degree

Geometry Data Source: DMTI Spatial Inc. (postal codes)

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) - NoData=null (for category fields) - Data insufficient to calculate value = -1111

Associated Files: N/A

Data Comment:

N/A

DATA SOURCE

Data Source

Daily Interpolated precipitation and temperature, DMTI Spatial Inc. postal codes.

Spatial Resolution: Postal code locations

Data Preparation Date: 2018-09-01

Beginning Date: 1985

End Date: 2015

Sampling Frequency of Data: Annual

Years Available:

1985 - 1986 - 1987 - 1988 - 1989 - 1990 - 1991 - 1992 - 1993 - 1994 - 1995 - 1996 - 1997 - 1998 - 1999 - 2000 - 2001 - 2002 - 2003 - 2004 - 2005 - 2006 - 2007 - 2008 - 2009 - 2010 - 2011 - 2012 - 2013 - 2014 - 2015

MAINTENANCE

Description: N/A

File Type: Comma separated values(.csv)

File Size: Between 80 MB to 120 MB

Number of Data Files: 31

DATA USE CONDITIONS

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
- (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 Sharing and Use 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 Sharing and Use Agreement. Data can be shared only 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.

Include the following references in any publications resulting from the use of these data:

- [1] Customized spatial climate data files prepared for the Canadian Urban Environmental Health Research Consortium by the Canadian Forest Service of Natural Resources Canada, October 2017.
- [2] Wang PL, Feddema J, Shooshtari M. 2018. Water balance model for CANUE. Please contact CANUE (info@canue.ca) for additional information.
- [3] CanMap Postal Code Suite v2015.3. [computer file] Markham: DMTI Spatial Inc., 2015.

Include the following acknowledgements:

- 1. The water balance model and associated metrics were developed by Dr. Johannes Feddema and Pei-Ling Wang, and implemented by 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).

SUPPORT DOCUMENTATION

- 1 - NRCAN customized data document (<http://canue.ca/wp-content/uploads/2017/10/NRCAN-BAMS-Customized-climate-data.pdf>)
- 2 - 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. ()
- 3 - Hutchinson, M. F., 1991: The application of thin plate smoothing splines to continent-wide data simulation. ()
- 4 - 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. ()
- 5 - In preparation: Water balance model description document. Please contact CANUE (info@canue.ca) for additional information. ()
- 6 - Postal Code metadata (<https://canue.ca/wp-content/uploads/2019/09/CANUE-Browser-Metadata-PostalCodes.pdf>)

VARIABLES

WBNRCYY_01 - Annual Minimum of the Monthly Lowest Daily Tmax (Celsius)
Annual minimum of the monthly lowest daily Tmax (celsius)

WBNRCYY_02 - Annual Maximum of the Monthly Highest Daily Tmin (celsius)
Annual maximum of the monthly highest daily Tmin (celsius)

WBNRCYY_03 - Annual Total Precipitation (mm)
Annual total precipitation (rain snow) (mm)

WBNRCYY_04 - Annual Total Rainfall (mm)
Annual total rainfall (mm)

WBNRCYY_05 - Annual Total Snowfall (mm)
Annual total snowfall (mm)

WBNRCYY_06 - Ratio of Snow/Rain
Ratio of snow/rain

WBNRCYY_07 - Annual Total Snow Melt (mm)
Annual total snow melt (mm)

WBNRCYY_08 - Maximum of the Monthly Highest Snow Pack Thickness
Maximum of the monthly highest snow pack thickness (mm)

WBNRCYY_09 - Number of Days in the Year with Snowfall
Number of days in the year with snowfall

WBNRCYY_10 - Number of Days in the Year with Snow on the Ground
Number of days in the year with snow on the ground

WBNRCYY_11 - Number of Days in the Year with Precipitation
Number of days in the year with precipitation (rain or snow)

WBNRCYY_12 - Annual Total Potential Evapotranspiration (mm) or Water Demand
Annual total potential evapotranspiration (mm) or water demand

WBNRCYY_13 - Annual Total Actual Evapotranspiration (mm)
Annual total actual evapotranspiration (mm)

WBNRCYY_14 - Annual Total Surplus (mm)
Annual total surplus (mm). Amount of excess water in the soil--from surface runoff, through flow, or groundwater recharge

WBNRCYY_15 - Annual Total Deficit (mm)
Annual total deficit (mm). Extra amount of water required by evapotranspiration

WBNRCYY_16 - Number of Surplus Days in the Year
Number of surplus days in the year

WBNRCYY_17 - Number of Deficit Days in the Year
Number of deficit days in the year

WBNRCYY_18 - Sum of Monthly Average Soil Moisture (%)
Sum of monthly average soil moisture (%)

WBNRCYY_19 - Average of Monthly Minimum Soil Moisture (%)
Average of monthly minimum soil moisture (%)

WBNRCYY_20 - Minimum of the Monthly Minimum Soil Moisture (%) Values
Minimum of the monthly minimum soil moisture (%) values

WBNRCYY_21 - Relative Index of Wetness/Dryness
Relative index of wetness/dryness. Ranges from -1 (absence of precipitation) to 1 (absence of evapotranspiration); 0 means precipitation equals evapotranspiration

SUPPORT CONTACT

Data Set Support Contact: info@canue.ca

Affiliated Organization:

CANUE (Canadian Urban Environmental Health Research Consortium)
Dalla Lana School of Public Health, University of Toronto

WebSite: <https://www.canue.ca>

Toronto - Ontario - Canada

DATA SOURCE CONTACT

Data Set Support Contact: Dan McKenney

Email: dan.mckenney@canada.ca

Affiliated Organization:

Canadian Forest Service, Natural Resources Canada

Sault Ste. Marie - Ontario - Canada