



## Canadian Urban Environmental Health Research Consortium

CANUE Metadata Annual Water Balance Model NRCAN  
2018\_05\_22

### DATA SET INFORMATION

Data Set Title:	<b>Annual water balance model metrics</b>
Description:	<p>Each annual file contains 24 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.</p> <p>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.</p> <p>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.</p> <p>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.</p>
Theme Keywords:	Temperature, rain, snow, precipitation, surplus, deficit, max, min, events, annual
Place Keywords:	Canada, national
Data preparation date:	2018-09-01
File Names	WBNRC_A_YY.csv (where 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:	31
File Size	Between 80 MB to 120 MB, total size for all files is 3.25 GB
Data Sources:	See Data Description and Supporting Documentation
Spatial Resolution:	Individual 6-digit postal code locations
Detection Range or Limit:	N/A
Log of Changes:	
Maintenance Description:	New annual files will be added as they become available.
<b>GEOSPATIAL REFERENCE</b>	
Geographic Coverage	Canada
West Bounding Coordinate	N/A
East Bounding Coordinate	N/A
North Bounding Coordinate	N/A
South Bounding Coordinate	N/A
Geometry Type:	N/A
Point Data Source:	N/A
Coordinates have Z values:	N/A
Geographic Coordinate System:	N/A
Datum	N/A
Unit:	N/A



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QUALITY ASSESSMENT		
QA/QC procedures:	CANUE did not assess the quality of the base data. Users should review the documentation provided in the recommended citation, and in the supporting documentation listed below.	
Geographic Coordinate Positional Accuracy:	These metrics can be linked to the corresponding annual postal codes files for mapping and analysis purposes, using the 6-digit postal code as a unique identifier in both files. Refer to the following metadata file for additional information on opportunities for assessing the spatial representativeness of postal code locations when these metrics are linked: <a href="#">CANUE Metadata Postal Codes.pdf</a>	
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:	<a href="#">NRCAN BAMS Customized climate data.pdf</a>	
	<p>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.</p> <p>Hutchinson, M. F., 1991: The application of thin plate smoothing splines to continent-wide data simulation.</p> <p>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.</p>	
	In preparation: Water balance model description document. Please contact CANUE (info@canue.ca) for additional information.	
DATA DICTIONARY		
Field Name:	Description	Data Type
POSTALCODEYY	6 digital postal code with no space between the FSA and LDU. (i.e. L1R2H2)	Text
WBNRCYY_01	Annual minimum of the monthly lowest daily Tmax (celsius)	Numeric
WBNRCYY_02	Annual maximum of the monthly highest daily Tmin (celsius)	Numeric
WBNRCYY_03	Annual total precipitation (rain + snow) (mm)	Numeric
WBNRCYY_04	Annual total rainfall (mm)	Numeric
WBNRCYY_05	Annual total snowfall (mm)	Numeric
WBNRCYY_06	Ratio of snow/rain	Numeric
WBNRCYY_07	Annual total snow melt (mm)	Numeric
WBNRCYY_08	<i>Reserved for future use</i>	Numeric
WBNRCYY_09	Maximum of the monthly highest snow pack thickness	Numeric
WBNRCYY_10	Number of days in the year with snowfall	Numeric
WBNRCYY_11	Number of days in the year with snow on the ground	Numeric
WBNRCYY_12	Number of days in the year with precipitation (rain or snow)	Numeric
WBNRCYY_13	Annual total potential evapotranspiration (mm) or water demand	Numeric
WBNRCYY_14	Annual total actual evapotranspiration (mm)	Numeric
WBNRCYY_15	Annual total surplus (mm). Amount of excess water in the soil—from surface runoff, through flow, or groundwater recharge	Numeric
WBNRCYY_16	Annual total deficit (mm). Extra amount of water required by evapotranspiration	Numeric
WBNRCYY_17	Number of surplus days in the year	Numeric
WBNRCYY_18	Number of deficit days in the year	Numeric
WBNRCYY_19	Sum of monthly average soil moisture (%)	Numeric
WBNRCYY_20	Average of monthly minimum soil moisture (%)	Numeric
WBNRCYY_21	Minimum of the monthly minimum soil moisture (%) values	Numeric
WBNRCYY_22	Relative index of wetness/dryness. Ranges from -1 (absence of precipitation) to 1 (absence of evapotranspiration); 0 means precipitation equals evapotranspiration	Numeric



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### DATA SET CONTACTS

Data Support:	Contact CANUE via the email below.
Email:	<a href="mailto:info@canue.ca">info@canue.ca</a>
Affiliated Organization:	CANUE (Canadian Urban Environmental Health Research Consortium)
	Dalla Lana School of Public Health, University of Toronto
Website:	<a href="http://www.canue.ca">www.canue.ca</a>
City:	Toronto
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Country:	Canada
Exposure Data Source Contact:	Dr. Dan McKenney
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Phone:	705-541-5569
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Last Name:	McKenney
Affiliated Organization:	Canadian Forest Service, Natural Resources Canada
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Prov/State:	Ontario
Country:	Canada

### DATA USE CONDITIONS

Conditions of Use:	<p>The Data User is REQUIRED:</p> <ul style="list-style-type: none"> <li>(i) to acknowledge data sources listed under Acknowledgement(s);</li> <li>(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</li> <li>(iii) complete and sign the CANUE Data Use and Sharing Agreement (available at <a href="http://canue.ca/data/">http://canue.ca/data/</a>), in which the name and signature of the researcher/analyst who takes responsibility for ensuring all conditions are met.</li> </ul>
Data Sharing Restrictions:	<p>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.</p> <p>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.</p>
Required Citation:	<p>Include the following references in any publications resulting from the use of these data:</p> <ul style="list-style-type: none"> <li>[1] Wang PL, Feddema J, Shoostari M. 2018. Water balance model for CANUE. Please contact CANUE (<a href="mailto:info@canue.ca">info@canue.ca</a>) for additional information.</li> <li>[2] CanMap Postal Code Suite v2015.3. [computer file] Markham: DMTI Spatial Inc., 2015.</li> </ul>
Acknowledgment:	<p>Include the following acknowledgements:</p> <p>Weather-related indicators, based on custom data from Natural Resources Canada, were indexed to DMTI Spatial Inc. postal codes and provided by CANUE (Canadian Urban Environmental Health Research Consortium).</p>