



## Canadian Urban Environmental Health Research Consortium

CANUE Metadata SO2 OMI V1.1  
2017-11-22

DATA SET INFORMATION	
Data Set Title:	<b>OMI Ground-level Sulfur Dioxide (SO<sub>2</sub>) Concentration- Environment and Climate Change Canada</b>
Description:	<p>Ground-level sulfur dioxide (SO<sub>2</sub>) concentrations were estimated from the Ozone Monitoring Instrument (OMI) satellite data using SO<sub>2</sub> profiles from the Global Environmental Multi-scale – Modelling Air quality and Chemistry (GEM-MACH) model over North America for the period of 2005-2015.</p> <p>These annual gridded datasets were aggregated to 3-year running averages and used by CANUE staff to impute values of annual mean concentration of SO<sub>2</sub>, for all postal codes in Canada for each year from 2007 to 2015 (DMTI Spatial, 2015). Three-year averages are labelled as the last year in the series, i.e., 2005, 2006, and 2007 were averaged and labelled as the 2007 annual average.</p>
Theme Keywords:	SO <sub>2</sub> , sulfur dioxide, air quality, satellite monitoring, chemical transport model, gridded surface
Place Keywords:	Canada national
Data preparation date:	10/1/2017
File Names	SO2OMI_A_YY.csv, where YY is the last two digits of a specific year
File Type:	Comma separated values (.csv)
Beginning Date:	2007
End Date:	2015
Sampling Frequency of Data:	Annual
Number of Data Files:	9
File Size	Individual year files are approximately 35 MB in size, all files total 312 MB in size.
Data Sources:	Files provided by Environment and Climate Change Canada, Air Quality Research Division, under the Open Government License ( <a href="http://open.canada.ca">open.canada.ca</a> )
Spatial Resolution:	These data are provided on a 10km grid, but are at an effective resolution of 20 km.
Detection Range or Limit:	Original data include negative values, which indicate random errors in the retrieval and represent background concentrations below the detection limit of the methods used. These have been replaced with null values, indicating that data are missing from one or more of the years included in the running average.
Log of Changes:	N/A
Maintenance Description:	Indices for subsequent years will be added when available.
GEOSPATIAL REFERENCE	
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 SO <sub>2</sub> 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 V1.0.pdf</a>	
Vertical Positional Accuracy:	N/A	
Attribute Accuracy:	N/A	
Data Validity :	N/A	
Associated Files:	N/A	
Data Comment:	N/A	
SUPPORTING DOCUMENTATION		
Additional documentation:	<a href="#">ECCC OMI SO2 and NO2 Supplemental.pdf</a>	
DATA DICTIONARY		
Field Name (YY = last two digits of specific year of data)	Description	Data Type
SO2OMIYY_PC	6-digit postal code with no space between the FSA and LDU. (i.e. L1R2H2).	Text
SO2OMIYY_01	3 year annual average SO2 concentration, in parts per billion	Numeric
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	
Prov/State:	Ontario	
Country:	Canada	
Exposure Data Source Contact:	Environment and Climate Change Canada / Air Quality Research Division	
Email:	Shailesh.Kharol@canada.ca OR Chris.Mclinden@canada.ca	
Phone:		
First Name:		
Last Name:		
Affiliated Organization:	ECCC AQRD	
City:	Toronto	
Prov/State:	Ontario	
Country:	Canada	



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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 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.</p> <p>Data can be shared only within a project team, with those members who have access to a Research Data Centre (RDC) or are affiliated with an academic institution 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> <p>[1] Environment and Climate Change Canada, 2017. Air Quality Research Division, Toronto, Canada. Data files: OMI_Ground-Level_SO2_NA_2005.nc to OMI_Ground-Level_SO2_NA_2015.nc inclusive, generated 2017-07-05.</p> <p>[2] McLinden, C. A., Fioletov, V., Boersma, K. F., Kharol, S. K., Krotkov, N., Lamsal, L., Makar, P. A., Martin, R. V., Veefkind, J. P., and Yang, K.: Improved satellite retrievals of NO<sub>2</sub> and SO<sub>2</sub> over the Canadian oil sands and comparisons with surface measurements, <i>Atmos. Chem. Phys.</i>, 14, 3637-3656, doi:10.5194/acp-14-3637-2014, 2014.</p> <p>[3] Kharol, S. K., McLinden, C. A., Sioris, C. E., Shephard, M. W., Fioletov, V., van Donkelaar, A., Philip, S., and Martin, R. V.: OMI satellite observations of decadal changes in ground-level sulfur dioxide over North America, <i>Atmos. Chem. Phys.</i>, 17, 5921-5929, doi:10.5194/acp-17-5921-2017, 2017.</p> <p>[4] CanMap Postal Code Suite v2015.2. [computer file] Markham: DMTI Spatial Inc., 2015.</p>
Acknowledgment:	<p>Include the following acknowledgements:</p> <ol style="list-style-type: none"> <li>1. SO<sub>2</sub> metrics indexed to DMTI Spatial Inc. postal codes , were provided by CANUE (Canadian Urban Environmental Health Research Consortium)</li> <li>2. The authors acknowledge Environment and Climate Change Canada for the provision of ground-level SO<sub>2</sub> data accessed via CANUE.</li> </ol>