# The Canadian Urban Environmental Health Research Consortium

## Canue Metadata - Air Quality Nitrogen Dioxide (NO2)

2025-02-22

## DATA SET INFORMATION

**Dataset Code:** NO2LUR_A_YY

**Description:**

The national NO2 (ppb) land use regression model was developed from 2006 national air pollution surveillance (NAPS) monitoring data, following methods reported in Hystad et al. (2011) (see Required Citation below). Background and regional components were estimated in the LUR using satellite-derived NO2 estimates and geographic variables, while local scale variation was modeled using deterministic gradients. The final LUR model includes: road length within 10 km; 2005-2011 satellite NO2 estimates; area of industrial land use within 2 km; and summer rainfall. This model explained 73% of the variation in NAPS measurements with a root mean square error (RMSE) of 2.9 ppb. Local scale variation was modeled using deterministic gradient from the literature and kernel density measures and added to the final LUR model results to produce the final NO2 estimates in this dataset. Dr. Perry Hystad (Oregon State University) produced the final estimates for all unique locations of DMTI Spatial Inc. single link postal codes active at any time between 1983 and 2015. Annual measured NO2 levels from National Air Pollution Surveillance monitoring stations for 24 Census Divisions have been used to produce the estimated levels for 1984 through 2012. based on the modelled values. (See NO2 Supplementary Methods Documentation, in Supporting Documentation). (THESE DATA ARE ALSO AVAILABLE AS MONTHLY METRICS).

**Keywords:** NO2|nitrogen dioxide|land use regression|air quality

**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 NO2 estimates 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**

Modelled data for DMTI postal code locations; DMTI Spatial Inc. postal codes. See Supporting Documentation

**Spatial Resolution:** individual postal code locations.

**Data Preparation Date:** 2018-01-24

**Beginning Date:** 1984

**End Date:** 2016

**Sampling Frequency of Data:** Annual

**Years Available:**

1984 - 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 - 2016

## MAINTENANCE

**Description:** N/A

**File Type:** Comma separated values(.csv)

**File Size:** Between 22 B and 32 MB

**Number of Data Files:** 33

## 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] Hystad P, Setton E, Cervantes A, Poplawski K, Deschenes S, Brauer M, et al. 2011. Creating National Air Pollution Models for Population Exposure Assessment in Canada. Environ. Health Perspect. 119:1123–1129; doi:10.1289/ehp.1002976.

[2] CanMap Postal Code Suite v2015.3. [computer file] Markham: DMTI Spatial Inc., 2015.

[3] Weichenthal S, Pinault L, Burnett RT. (2017) Impact of Oxidant Gases on the Relationship Between Outdoor Fine Particulate Air Pollution and Nonaccidental, Cardiovascular, and Respiratory Mortality. Scientific Reports 7, Article number: 16401. Doi:10.1038/s41598-017-16770-y

**Include the following acknowledgements:**

1. Nitrogen dioxide data were indexed to DMTI Spatial Inc. postal codes , were provided by CANUE (Canadian Urban Environmental Health Research Consortium).

## SUPPORT DOCUMENTATION

1 - NO2 Land Use Regression Method Document (http://canue.ca/wp-content/uploads/2017/10/Hystad-Canada-NO2-LUR-description.pdf)

2 - NO2 Supplementary Methods - Annual Estimate Method 1984-2012 (http://canue.ca/wp-content/uploads/2018/03/NO2-Supplementary-Methods-Documentation.pdf)

3 - NO2 Supplementary Methods - Annual Estimate Method 2013-2016 (https://canue.ca/wp-content/uploads/2020/05/NO2-Supplementary-Methods-Documentation-2013-2016.pdf)

4 - Postal Code metadata (https://canue.ca/wp-content/uploads/2019/09/CANUE-Browser-Metadata-PostalCodes.pdf)

## VARIABLES

NO2LURYY_01 - Original LUR Annual Average Concentration at Postal Code (ppb), Circa 2006

Original LUR annual average concentration at postal code (ppb), circa 2006

NO2LURYY_02 - Annual Average NO2 Concentration at Postal Code (ppb) for File Year

Annual average concentration at postal code (ppb) for file year

NO2LURYY_03 - Census Division Identifier

Census division identifier

NO2LURYY_04 - Census Division Name

Census division name

NO2LURYY_05 - Maximum Distance Between Postal Code Location and Census Division Boundary in Meters

Maximum distance between postal code location and census division boundary in meters (0 = postal code is located within census division)

## 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:** Perry Hystad

**Email:** perry.hystad@oregonstate.edu

**Affiliated Organization:**
Oregon State University

**Corvallis - Oregon - USA**