



Natural Resources
Canada

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Canada

Toporama

Data Product Specifications

Edition 1.0

2008-10-01

**Government of Canada
Natural Resources Canada
Canada Centre for Mapping and Earth Observation**

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Canada

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RELEASE HISTORY

Date	Version	Description
2008-10-01	1.0	Initial version

These specifications are produced in accordance with *International Standard ISO/TC 211, 19131: 2007 Geographic Information / Geomatics – Data Product Specification*, which refers in particular to standard *ISO 19115: 2003 Geographic information – Metadata*.

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1 OVERVIEW

1.1 TITLE

Toporama: Data Product specifications, Edition 1.0

1.2 REFERENCE DATE

2008-04-01

1.3 RESPONSIBLE PARTY

GeoGratis
Government of Canada
Natural Resources Canada
Canada Centre for Mapping and Earth Observation

GeoGratis Client Services
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E-mail: geoginfo@NRCan.gc.ca
URL: <http://www.GeoGratis.ca>

1.4 LANGUAGE

fra - French
eng - English

1.5 ABBREVIATIONS AND ACRONYMS

CGVD28	Canadian Geodetic Vertical Datum of 1928
CTI	Centre for Topographic Information
EPSG	European Petroleum Survey Group
ESS	Earth Sciences Sector
NAD83	North American Datum (or reference system) of 1983
NHN	National Hydro Network
NRCan	Natural Resources Canada
NRN	National Road Network
GIS	Geographic Information System
NTDB	National Topographic Data Base
NTS	National Topographic System
UTM	Universal Traverse Mercator

1.6 INFORMAL DESCRIPTION OF THE DATA PRODUCT

Toporama is a digital topographic reference product developed by Natural Resources Canada (NRCan). It covers the entire area of Canada's landmass and provides topographic, geo-referenced, and symbolic information in a raster format. The delimitation, content and representation of this product are similar to those of 1:50,000 scale topographical maps.

Toporama is published as an edition (or "release") approximately every six months. It is available free of charge through the GeoGratis portal (www.GeoGratis.gc.ca) in GeoTIFF format, which is a geo-referenced raster format. Toporama is available in the following spatial reference systems: Universal Transverse Mercator and geographic (latitude ("φ") and longitude ("λ")).

Toporama is a product aimed at the general public that can be used by GPS system users who need a geo-referenced raster map product.

2 SPECIFICATION SCOPE

2.1 SCOPE IDENTIFICATION

Global

2.2 LEVEL

006 - series

2.3 LEVEL NAME

Global scope of Toporama

2.4 EXTENT

2.4.1 Description

Canadian territory

2.4.2 Vertical extent

2.4.2.1 Minimum value

0

2.4.2.2 Maximum value

5959

2.4.2.3 Unit of measure

Metre

2.4.2.4 Vertical datum

Elevations are orthometric and expressed in relation to Mean Sea Level (Canadian Geodetic Vertical Datum of 1928 (CVGD28)).

2.4.3 Horizontal extent

2.4.3.1 West bounding longitude

-141.0

2.4.3.2 East bounding longitude

-52.0

2.4.3.3 South bounding latitude

+41.0

2.4.3.4 North bounding latitude

+84.0

2.4.4 Temporal extent

2.4.4.1 Start date

1945

2.4.4.2 End date

Today

3 DATA PRODUCT IDENTIFICATION

3.1 TITLE

Toporama

3.2 ABSTRACT

Toporama is a digital topographic reference product developed by Natural Resources Canada (NRCan). Toporama integrates the best available data sources that cover the Canadian landmass to provide quality topographical information in raster format. It aims to provide a symbolic and current representation of topographical features over the entire Canadian territory.

Toporama is essentially based on the CanVec product, which is a multi-source product based primarily on data from the National Topographic Data Base (NTDB) at 1:50,000 scale, the GeoBase initiative, data updated using Landsat 7 imagery coverage, and the northern data acquisition process. Toporama covers the following themes: Buildings and structures, Energy, Relief and landforms, Hydrography, Industrial and commercial areas, Administrative Boundaries, Places of interest, Water saturated soils, Toponymy, Transportation, and Vegetation.

3.3 PURPOSE

Toporama datasets are geo-referenced raster images that can be combined to cover an area of interest or serve as background data for various applications. This can be of significant interest to users of global positioning systems (GPS), navigators, hikers, and tourists who, without being geomatics specialists, are nevertheless comfortable with digital topographic data. Toporama is well suited to the creation of value-added products.

3.4 TOPIC CATEGORY

006 - elevation

010 - imageryBaseMapsEarthCover

012 - inlandWaters

013 - location

017 - structure (man-made construction)

018 - transportation

019 - utilitiesCommunication

3.5 SPATIAL REPRESENTATION

002 - Raster

3.6 SPATIAL RESOLUTION

50,000 - Toporama corresponds to a spatial resolution of 1:50,000.

3.7 GEOGRAPHIC DESCRIPTION

3.7.1 Authority

International Organization for Standardization (ISO)

3.7.1.1 Title

ISO 3166-1:1997 Codes for the representation of names of countries and their subdivisions – Part 1: Country codes.

3.7.1.2 Date

1997-10-01

3.7.1.3 Date type code

002 - publication

3.7.2 Code

CA - Canada

3.7.3 Extent type code

1 - Inclusion (polygon delineation is inclusive)

3.8 REFERENCE TO SPECIFICATION SCOPE

Global

4 DATA CONTENT AND STRUCTURE

4.1 DESCRIPTION

Toporama datasets are rectangular, geo-referenced raster files. The dimensions of the datasets vary according to their spatial reference system and latitude. For any given spatial reference system, the pixel size is always constant.

4.2 COVERAGE INFORMATION

4.2.1 Description

The Toporama datasets cover the equivalent of one National Topographic System (NTS) tile at a scale of 1:50,000. It is identical to the system used for current 1:50,000 topographical maps. This system varies the size of tiles, based on latitude, as follows:

- 30 minutes of longitude by 15 minutes of latitude for areas south of latitude 68;
- 60 minutes of longitude by 15 minutes of latitude for areas between latitudes 68 and 80;
- 120 minutes of longitude by 15 minutes of latitude for areas north of latitude 80.

Pixel size varies based on the spatial reference system. For the Universal Transverse Mercator (UTM) coordinate system, pixel size is always 7.5 m by 7.5 m. To print a dataset at 1:50,000 scale, a 7.5 m pixel represents a resolution of 0.15 mm per pixel, or 66.67 pixels per centimetre on paper. For the geographic spatial reference system (latitude/longitude), pixel size is expressed as a fraction of one second of latitude and longitude. Pixel size in latitude is constant, namely 0.25 seconds (7.7 m). Pixel size in longitude varies according to the dataset latitude. South of latitude 68, pixel size is set at 0.4 seconds of longitude (intervals ranging between 9.2 m and 4.6 m); between latitudes 68 and 80, pixel size is 0.8 seconds de longitude (intervals ranging between 9.2 m and 4.2 m); north of latitude 80, pixel size in longitude is 1.6 seconds (intervals range between 8.5 m and 6.0 m).

Toporama datasets are created with elements (symbols, colours, fonts, and line widths) that are similar to the Standards and specifications used for 1:50,000 scale polychrome topographic map.

The Toporama dataset does not contain a legend or map grid. Toporama is not an optical scan of a paper-based topographic map; rather, it is a product that is built entirely digitally from start to finish.

4.2.2 Coverage type

Continuous quadrilateral grid coverage

4.2.3 Specification

4.2.3.1 Domain extent

Canada's territory based on the topographical coverage acquired at the moment of product creation.

4.2.3.2 Range Type

Three integers: [0..255] for each integer

Pixel values are encoded as three 8-bit unsigned integers, for a total of 24 bits. Each integer (byte) contains an intensity value between 0 and 255 and corresponds to a primary color in the colour model of red, green and blue (RGB).

4.2.3.3 Common point rule

High

4.3 REFERENCE TO SPECIFICATION SCOPE

Global

5 REFERENCE SYSTEMS

5.1 SPATIAL REFERENCE SYSTEM: GEOGRAPHIC

Spatial data is expressed as geographic coordinates of latitude (φ) and longitude (λ) according to the North American Datum 1983 (NAD83). Longitude is stored as a negative number to represent a position west of the prime meridian (0°).

5.1.1 Authority

5.1.1.1 Title

EPSG Geodetic Parameter Registry

URL: <http://www.epsg-registry.org>

5.1.1.2 Date

2008-11-12

5.1.1.3 Date type code

002 - publication

5.1.1.4 Responsible party

OGP - International Association of Oil and Gas Producers

URL: <http://www.epsg.org>

5.1.2 Code

4269

5.1.3 Code space

EPSG - European Petroleum Survey Group

5.1.4 Version

6.18

5.2 SPATIAL REFERENCE SYSTEM: UNIVERSAL TRANSVERSE MERCATOR

Spatial data is expressed according to the Universal Transverse Mercator (UTM) projection according to the North American Datum 1983 (NAD83).

Overlapping of data in UTM projection: The product is delimited based on NTS divisions at the 1:50,000 scale according to the UTM projection using the following coordinate pair: minimum X meters, maximum Y meters and maximum X meters, minimum Y meters. These coordinates come from the corners (neatline ends) of the NTS tiles and are used to create a bounding box that contains the data inside of these limits. The coverage of a Toporama dataset is somewhat larger than the corresponding NTS dataset. This approach generates an area of overlap between adjacent Toporama files along all four sides of the data set.

5.2.1 Authority

5.2.1.1 Title

EPSG Geodetic Parameter Registry

URL: <http://www.epsg-registry.org>

5.2.1.2 Date

2008-11-12

5.2.1.3 Date type code

002 - publication

5.2.1.4 Responsible party

OGP - International Organisation of Oil and Gas Producers

URL: <http://www.epsg.org>

5.2.2 Code

26907 to 26922

Depending on the UTM zone in which the dataset is located, the EPSG code used to identify the parameters varies from 26907 (for zone 7) to 26922 (for zone 22).

5.2.3 Code space

EPSG - European Petroleum Survey Group

5.2.4 Version

6.18

5.3 REFERENCE TO SPECIFICATION SCOPE

Global

6 DATA QUALITY

6.1 COMPLETENESS

6.1.1 Commission

The data quality assessment (including completeness and thematic accuracy) is directly performed during the data production process. The validation method applied depends on the data source used. Toporama data comes from two different sources: the GeoBase initiative (ex.: National Road Network, (NRN) data and National Hydro Network (NHN) data) and digital topographic data produced by Natural Resources Canada.

For the GeoBase initiative data, data quality is ensured by the producer (and partner). The validation mechanism used may vary from one partner to another.

For Natural Resources Canada data, during data inspection, datasets produced are grouped into distinct batches. A few datasets are selected from each batch and inspected in order to check their contents and compare them to a data source used in production or to another independent source. If the percentage of error detected is less than 5%, then all datasets in the batch are normally considered acceptable.

6.1.2 Omission

The methodology described to evaluate the “Commissions” is also applied to verify the omissions in the Toporama product.

6.2 LOGICAL CONSISTENCY

6.2.1 Conceptual consistency

Not applicable

6.2.2 Domain consistency

Not applicable

6.2.3 Format consistency

The use of proven commercial software to generate distribution formats ensures format consistency for the Toporama product.

6.2.4 Topological consistency

Not applicable

6.3 POSITIONAL ACCURACY

6.3.1 Absolute or external accuracy

The assessment of the planimetric (horizontal) accuracy of a dataset is a function of its sources. Given that Toporama is a multi-source product, an accuracy range that provides minimum and maximum accuracy values is a better measure of dataset accuracy than a single accuracy value.

Accuracy values, when available, are expressed in terms of the Circular Map Accuracy Standard (CMAS). The accuracy of Toporama product is generally between 15 and 30 meters.

6.3.2 Relative or internal accuracy

Unknown

6.4 TEMPORAL ACCURACY

6.4.1 Accuracy of a time measurement

Not applicable

6.4.2 Temporal consistency

Not applicable

6.4.3 Temporal validity

Not applicable

6.5 THEMATIC ACCURACY

6.5.1 Classification correctness

Not applicable

6.5.2 Non-quantitative attribute correctness

Not applicable

6.5.3 Quantitative attribute accuracy

Not applicable

6.6 REFERENCE TO SPECIFICATION SCOPE

Global

7 DATA CAPTURE

7.1 DESCRIPTION

The Toporama product is generated using the Toporama Web Mapping Service (WMS). The service description is available at the following address: <http://www.GeoGratis.gc.ca/>. This service contains data corresponding to CanVec vector product. This public, on-line mapping service is used in Toporama section of The Atlas of Canada web site (www.atlas.gc.ca), among others.

If this product's parameters (projection, resolution, scale, list of themes, etc.) are not suitable for your needs, the WMS can be used directly to generate data according to your specific parameters.

7.2 REFERENCE TO SPECIFICATION SCOPE

Global

8 DATA MAINTENANCE

8.1 DESCRIPTION

Maintenance of the various entities comprising the Toporama product is based primarily on two different sources: the GeoBase agreements and production activities conducted by Earth Sciences Sector (ESS) of Natural Resources Canada (NRCan).

The Toporama product is distributed by edition (or "release") and follows the publication of the new release of CanVec product. Each new edition contains all the maintenance performed since the last release. The frequency of maintenance, the list of updated entities, and the location of updated regions may vary from one release to the next, depending on the maintenance agreements and national priorities.

8.2 REFERENCE TO SPECIFICATION SCOPE

Global

9 PORTRAYAL

9.1 TITLE: POLYCHROME MAP

Standards and Specifications, Polychrome Map 1:50,000, National Topographic System, Version 2.0, Centre for Topographic Information, Natural Resources Canada (http://maps.nrcan.gc.ca/cartospecs/mainindex50_e.php).

9.2 DATE

First edition 1988, revised September 2001 (for 1:50,000)

9.3 DATE TYPE CODE

03 - Revision

9.4 REFERENCE TO SPECIFICATION SCOPE

Global

10 DATA PRODUCT DELIVERY

10.1 DELIVERY FORMAT INFORMATION: GEOTIFF

10.1.1 Format name

GeoTIFF

10.1.2 Version

1.8.2

10.1.3 Specification

GeoTIFF Format Specifications – Revision 1.0

URL: <http://www.remotesensing.org/geotiff/spec/geotiffhome.html>

10.1.4 File structure

Pixel values are encoded as three 8-bit unsigned integers, for a total of 24 bits. Each integer (byte) contains an intensity value between 0 and 255 and corresponds to a primary color in the colour model of red, green and blue (RGB).

10.1.5 Language

und - Undetermined

10.2 DELIVERY MEDIUM INFORMATION

10.2.1 Units of delivery

National Topographic System (NTS) tiles

10.2.2 Transfer size

The average size of a dataset is between 45 and 60 megabytes; once compressed using a ZIP algorithm, the average size is 5 to 10 megabytes.

10.2.3 Medium name

Datasets are available free of charge on the GeoGratis web site at: www.GeoGratis.gc.ca

10.2.4 Other delivery information

Each raster dataset (.tif) to be downloaded is compressed in a ZIP format (.zip) and accompanied by the following files:

- two FGDC (www.fgdc.gov) metadata files in XML format (.xml), one in French, the other in English;
- two FGDC metadata files in HTML format (.html), one in French, the other in English.

10.3 REFERENCE TO SPECIFICATION SCOPE

Global

11 METADATA

Not applicable