

# Package ‘mapcan’

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**Type** Package

**Title** Tools for Plotting Canadian Choropleth Maps and Choropleth Alternatives

**Version** 0.0.1

**Maintainer** Andrew McCormack <mccormack.andy@gmail.com>

**Description** A variety of functions that make it easy to plot standard choropleth maps as well as choropleth alternatives in 'ggplot2'.

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

**Depends** R (>= 2.10)

**RoxygenNote** 6.1.1

**Imports** dplyr, ggplot2, magrittr

**Suggests** knitr

**VignetteBuilder** knitr

**NeedsCompilation** no

**Author** Andrew McCormack [aut, cre],  
Aaron Erlich [aut]

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census\_divisions\_2016 *Census divisions (2016)*

---

## Description

A data set with geographic information for Canadian census divisions

## Usage

census\_divisions\_2016

## Format

A data.frame with 91430 rows and 13 variables:

**long** Longitude

**lat** Latitude

**order** Order of layers

**hole** Polygon hole (TRUE or FALSE)

**piece** Piece

**id** Uniquely identifies a census division (composed of the 2-digit province/territory unique identifier followed by the 2-digit census division code).

**group** Group

**census\_division\_name** Census division name

**census\_divison\_type** Census division type

**pr\_alpha** Province or territory 2-letter identifier

**pr\_sgc\_code** Province Standard Geographical Classification (SGC) code.

**pr\_english** Province name (English)

**pr\_french** Province name (French)

**Source**

<https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm> (under Statistics Canada Open Licence <https://www.statcan.gc.ca/eng/reference/licence>)

---

census\_divisions\_2016\_carto

*Census divisions cartogram data frame (territories included) (2016)*

---

**Description**

A data set with geographic information for Canadian census divisions, census boundary divisions distorted by population size, territories included

**Usage**

census\_divisions\_2016\_carto

**Format**

A data.frame with 57513 rows and 18 variables:

**long** Longitude

**lat** Latitude

**order** Order of layers

**hole** Polygon hole (TRUE or FALSE)

**piece** Piece

**census\_code** Uniquely identifies a census division (composed of the 2-digit province/territory unique identifier followed by the 2-digit census division code).

**group** Group

**census\_division\_name** Census division name

**census\_division\_type** Census division type

**pr\_sgc\_code** Province Standard Geographical Classification (SGC) code.

**population\_2016** Population of census division in 2016

**population\_density\_2016** Population density (individuals per square kilometer) in 2016

**land\_area\_2016** Land area of census division

**population\_2011** Population of census division in 2011

**pr\_alpha** Province or territory 2-letter identifier

**pr\_english** Province name (English)

**pr\_french** Province name (French)

**Source**

<https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm> (under Statistics Canada Open Licence <https://www.statcan.gc.ca/eng/reference/licence>)

---

census\_divisions\_2016\_noterr\_carto

*Census divisions cartogram data frame (territories excluded) (2016)*

---

## Description

A data set with geographic information for Canadian census divisions, census boundary divisions distorted by population size, territories excluded

## Usage

census\_divisions\_2016\_noterr\_carto

## Format

A data.frame with 35410 rows and 18 variables:

**long** Longitude

**lat** Latitude

**order** Order of layers

**hole** Polygon hole (TRUE or FALSE)

**piece** Piece

**census\_code** Uniquely identifies a census division (composed of the 2-digit province/territory unique identifier followed by the 2-digit census division code).

**group** Group

**census\_division\_name** Census division name

**census\_division\_type** Census division type

**pr\_sgc\_code** Province Standard Geographical Classification (SGC) code.

**population\_2016** Population of census division in 2016

**population\_2016** Population density (individuals per square kilometer) in 2016

**land\_area\_2016** Land area of census division

**population\_2011** Population of census division in 2011

**pr\_alpha** Province or territory 2-letter identifier

**pr\_english** Province name (English)

**pr\_french** Province name (French)

## Source

<https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm> (under Statistics Canada Open Licence <https://www.statcan.gc.ca/eng/reference/licence>)

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census_pop2016	<i>Census division population data for 2011 and 2016</i>
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---

### Description

A data set with population data at the census level for 2011 and 2016

### Usage

census\_pop2016

### Format

A data.frame with 293 rows and 11 variables:

**census\_division\_code** Uniquely identifies a census division (composed of the 2-digit province/territory unique identifier followed by the 2-digit census division code).

**census\_division\_name** Census division name

**census\_divison\_type** Census division type

**pr\_sgc\_code** Province Standard Geographical Classification (SGC) code.

**pr\_english** Province or territory name (English).

**population\_2016** 2016 Population of Province

**population\_density\_2016** Population density (individuals per square kilometer) in 2016

**land\_area\_2016** Land area of census division

**population\_2011** 2011 Population of Province

**pr\_alpha** Province or territory 2-letter identifier

**pr\_french** Province or territory name (French).

### Source

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/comprehensive.cfm>, (under Statistics Canada Open Licence <https://www.statcan.gc.ca/eng/reference/licence>)

---

federal\_election\_results

*Canadian federal election results data*

---

### Description

A data set with information on Canadian federal election results, dating back to 1997

### Usage

federal\_election\_results

### Format

A data.frame with 37111 rows and 12 variables:

**riding\_name\_english** Federal electoral district name in English.

**riding\_name\_french** Federal electoral district name in French.

**riding\_code** Uniquely identifies a federal electoral district (composed of the 2-digit province/territory unique identifier followed by the 3-digit federal electoral district code).

**pr** Province or territory name (English and French).

**population** Population of federal riding.

**voter\_turnout** Voter turnout

**candidate** Name of winning candidate

**election\_year** Year of election (1997, 2000, 2004, 2006, 2008, 2011, and 2015 election included.)

**party** Winning party in riding

**pr\_alpha** Province or territory 2-letter identifier

**pr\_french** Province or territory name (French).

**pr\_english** Province or territory name (English).

**pr\_sgc\_code** Province Standard Geographical Classification (SGC) code.

### Source

<http://www.elections.ca/content.aspx?section=ele&dir=pas&document=index&lang=e>, (under Open Government Licence <https://open.canada.ca/en/open-government-licence-canada>)

---

federal_ridings	<i>Federal ridings</i>
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---

**Description**

A data set with geographic information for Canadian federal ridings (2013 representation order)

**Usage**

federal\_ridings

**Format**

A data.frame with 46830 rows and 15 variables:

**long** Longitude

**lat** Latitude

**order** Order of layers

**hole** Polygon hole (TRUE or FALSE)

**piece** Piece

**riding\_code** Uniquely identifies a federal electoral district (composed of the 2-digit province/territory unique identifier followed by the 3-digit federal electoral district code).

**group** Group

**riding\_name\_english** Federal electoral district name in English.

**riding\_name\_french** Federal electoral district name in French.

**province\_sgc\_code** Province Standard Geographical Classification (SGC) code

**pr\_english** Province name (English)

**pr\_french** Province name (French)

**pr\_alpha** Province or territory 2-letter identifier

**Source**

<https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm>, (under Statistics Canada Open Licence <https://www.statcan.gc.ca/eng/reference/licence>)

---

federal\_riding\_bins     *Canadian federal riding bins (used for tile plots)*

---

**Description**

A data set with coordinates for the `mapcan::riding_binplot()` function.

**Usage**

```
federal_riding_bins
```

**Format**

A data.frame with 944 rows and 8 variables:

**y** y-axis of riding bins (corresponds to longitude)

**x** x-axis of riding bins (corresponds to latitude)

**pr\_alpha** Province or territory 2-letter identifier

**representation\_order** Representation order. Specifies boundaries/number of seats for a given election (e.g. the 2015 election used the 2013 representation order, with 338 seats).

**pr\_french** Province or territory name (French).

**pr\_english** Province or territory name (English).

**pr\_sgc\_code** Province Standard Geographical Classification (SGC) code.

**riding\_code** Uniquely identifies a federal electoral district (composed of the 2-digit province/territory unique identifier followed by the 3-digit federal electoral district code).

---

federal\_riding\_hexagons

*Canadian federal riding hexagons (used for hexagonal tile plots)*

---

**Description**

A data set with coordinates for the `mapcan::riding_binplot()` function.

**Usage**

```
federal_riding_hexagons
```

**Format**

A data.frame with 6629 rows and 15 variables:

**long** y-axis of riding hexagons

**lat** x-axis of riding hexagons

**order** Order of layers

**hole** Polygon hole (TRUE or FALSE)

**piece** Piece

**group** Group

**representation\_order** Representation order. Specifies boundaries/seats for a given election (e.g. the 2015 election used the 2013 representation order, with 338 seats).

**pr\_french** Province or territory name (French).

**pr\_english** Province or territory name (English).

**pr\_sgc\_code** Province Standard Geographical Classification (SGC) code.

**riding\_code** Uniquely identifies a federal electoral district (composed of the 2-digit province/territory unique identifier followed by the 3-digit federal electoral district code).

---

mapcan

*Canadian maps function*

---

**Description**

A function that returns a data frame with map data, for use in ggplot.

**Usage**

```
mapcan(boundaries, type, province = all, territories = TRUE)
```

**Arguments**

boundaries	Unquoted expression specifying boundary divisions. Options are province, census, and ridings.
type	Unquoted expression specifying type of map. Options are standard (for a standard geographic map), cartogram (for a map that alters the geography of the map based on population size at the province or census division level), and bins (for a binned map of federal electoral districts).
province	An unquoted expression specifying province to plot. Acceptable input is French or English province names, or two-letter provincial abbreviations. Default is to plot all provinces.
territories	A logical value indicating whether or not to include territories in the returned data frame, default is FALSE

**Examples**

```
mapcan(boundaries = census, type = standard)
```

---

provinces\_noterr\_carto

*Provinces and territories cartogram data (territories excluded)*

---

### Description

A data set with geographic information for Canadian provinces and territories, boundary divisions distorted by population size. Territories excluded.

### Usage

provinces\_noterr\_carto

### Format

A data.frame with 16797 rows and 11 variables:

**long** Longitude

**lat** Latitude

**order** Order of layers

**hole** Polygon hole (TRUE or FALSE)

**piece** Piece

**pr\_english** Province or territory name (English).

**group** Group

**population** 2016 Population of Province

**pr\_alpha** Province or territory 2-letter identifier

**pr\_french** Province or territory name (French).

**province\_sgc\_code** Province Standard Geographical Classification (SGC) code

### Source

<https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm>, (under Statistics Canada Open Licence <https://www.statcan.gc.ca/eng/reference/licence>)

---

provinces\_territories *Provinces and territories standard geographic data*

---

**Description**

A data set with geographic information for Canadian provinces and territories

**Usage**

provinces\_territories

**Format**

A data.frame with 37111 rows and 10 variables:

**long** Longitude

**lat** Latitude

**order** Order of layers

**hole** Polygon hole (TRUE or FALSE)

**piece** Piece

**province\_sgc\_code** Province Standard Geographical Classification (SGC) code

**group** Group

**pr\_english** Province or territory name (English).

**pr\_french** Province or territory name (French).

**pr\_alpha** Province or territory 2-letter identifier

**Source**

<https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm>, (under Statistics Canada Open Licence <https://www.statcan.gc.ca/eng/reference/licence>)

---

provinces\_territories\_carto

*Provinces and territories cartogram data (territories included)*

---

**Description**

A data set with geographic information for Canadian provinces and territories, boundary divisions distorted by population size. Territories included.

**Usage**

provinces\_territories\_carto

**Format**

A data.frame with 40064 rows and 12 variables:

**long** Longitude

**lat** Latitude

**order** Order of layers

**hole** Polygon hole (TRUE or FALSE)

**piece** Piece

**pr\_english** Province or territory name (English).

**group** Group

**population** 2016 Population of Province

**pr\_alpha** Province or territory 2-letter identifier

**pr\_french** Province or territory name (French).

**province\_sgc\_code** Province Standard Geographical Classification (SGC) code

**Source**

<https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm>, (under Statistics Canada Open Licence <https://www.statcan.gc.ca/eng/reference/licence>)

---

province\_pop\_annual     *Annual provincial populations data frame dating back to 1971*

---

**Description**

A data set with annual information on provincial and territorial populations dating back to 1971.

**Usage**

```
province_pop_annual
```

**Format**

A data.frame with 638 rows and 3 variables:

**province** English name of province

**population** Population of province

**year** Year

---

quebec\_provincial\_results  
*Quebec provincial election results data*

---

**Description**

A data set with information on 2018 Quebec provincial election results

**Usage**

quebec\_provincial\_results

**Format**

A data.frame with 125 rows and 6 variables:

- party** Winning party of riding.
- vote\_share** Percentage of vote won by winning candidate.
- riding\_code** Uniquely identifies a provincial electoral district
- riding\_name** Riding name (lowercase)
- riding\_name** Riding name (uppercase)

---

quebec\_prov\_ridings2018  
*Quebec provincial ridings geographic data*

---

**Description**

A data set with geographic information for Quebec provincial ridings

**Usage**

quebec\_prov\_ridings2018

**Format**

A data.frame with 23995 rows and 11 variables:

- long** y-axis of riding hexagons
- lat** x-axis of riding hexagons
- order** Order of layers
- hole** Polygon hole (TRUE or FALSE)
- piece** Piece

**riding\_code** Uniquely identifies a provincial electoral district  
**group** Group  
**riding\_name** Riding name (lowercase)  
**riding\_name** Riding name (uppercase)  
**centroid\_long** Longitude for riding centroids (useful for labeling)  
**centroid\_lat** Latitude for riding centroids (useful for labeling)

---

quebec\_riding\_bins      *Quebec provincial riding bins (used for tile plots)*

---

### Description

A data set with coordinates for the `mapcan::riding_binplot()` function.

### Usage

`quebec_riding_bins`

### Format

A data.frame with 125 rows and 6 variables:  
**y** y-axis of riding bins (corresponds to longitude)  
**x** x-axis of riding bins (corresponds to latitude)  
**riding\_code** Riding code  
**region** Region  
**riding\_simplified** Simplified riding name  
**riding\_name** Riding name

---

quebec\_riding\_hexagons      *Quebec provincial riding hexagons (used for hexagonal tile plots)*

---

### Description

A data set with coordinates for the `mapcan::riding_binplot()` function.

### Usage

`quebec_riding_hexagons`

**Format**

A data.frame with 6629 rows and 15 variables:

**long** y-axis of riding hexagons  
**lat** x-axis of riding hexagons  
**order** Order of layers  
**hole** Polygon hole (TRUE or FALSE)  
**piece** Piece  
**group** Group  
**y** y-axis of riding hexagon center  
**x** x-axis of riding hexagon center  
**region** Region  
**riding\_simplified** Simplified riding name  
**riding\_name** Riding name  
**riding\_code** Riding code

---

riding\_binplot

*Canadian federal ridings tile plot function*


---

**Description**

A function that returns a data frame with map data, for use in ggplot.

**Usage**

```
riding_binplot(riding_data, riding_col = riding_code, value_col,
  continuous = TRUE, arrange = FALSE, riding_border_col = "white",
  year = 2015, riding_border_size = 1, provincial = FALSE,
  shape = "square", province, legend_name = "default")
```

**Arguments**

riding_data	A dataframe with a continuous or categorical riding-level characteristic and a riding code variable.
riding_col	An unquoted character expression specifying the riding code variable from the dataframe provided in riding_data.
value_col	An unquoted character expression specifying the column or categorical riding level characteristic you would like to visualize.
continuous	logical. Specify as FALSE if the variable is categorical (e.g. for winning party) and TRUE if the variable is continuous.

arrange	logical. Specify as TRUE if variable should be ranked according to value within provinces and FALSE to plot values according to riding coordinates. Because the binned ridings are only a rough approximation of their actual location, arrange = TRUE is often preferable.
riding_border_col	To ensure the appearance of stand alone tiles, set 'riding_border_col' to be the same as the background colour of the plot. Default is "white".
year	Election year. Options are 1997, 2000, 2004, 2006, 2008, 2011 and 2015. This will change the number of tiles to correspond to the number of ridings in the election of the specified year. Default is 2015
riding_border_size	Change the size of tiles. Larger values make smaller tiles. Default is 1.
provincial	logical. Specify as FALSE for provincial (not federal) ridings of a single province. If provincial = TRUE, specify a 2-letter provincial abbreviation for the province in the province argument. Default is FALSE (i.e. the default is to provide federal electoral boundaries). (Note: this argument is still in development, only Quebec provincial boundaries are available at the moment.)
shape	Unquoted character expression specifying shape of tiles. Options are square and hexagon, default is square.
province	An unquoted character expression specifying the 2-letter provincial abbreviation of the province for which provincial electoral boundaries are desired. (Note: this argument is still in development, only Quebec provincial boundaries are available at the moment.)
legend_name	Quoted character expression specifying the title of the legend. The variable name will be used as a default if no value is supplied.

### Examples

```
election_2015 <- federal_election_results[federal_election_results$election_year == 2015, ]

riding_binplot(riding_data = election_2015, riding_col = riding_code,
value_col = party, continuous = FALSE, arrange = TRUE)
```

---

riding\_info

*Canadian federal riding population information*

---

### Description

A data set with information on Canadian federal election results, dating back to 1997

### Usage

```
riding_info
```

**Format**

A data.frame with 37111 rows and 12 variables:

**party** Winning party in riding

**riding\_code** Riding code

**population\_2011** Population of riding in 2011

**population\_2016** Population of riding in 2016

**Source**

<http://www.elections.ca/content.aspx?section=ele&dir=pas&document=index&lang=e>, (under Open Government Licence <https://open.canada.ca/en/open-government-licence-canada>)

---

theme\_mapcan

*Mapcan theme*

---

**Description**

A ggplot theme that removes unnecessary components of map plots. Builds on theme\_bw().

**Usage**

```
theme_mapcan(legend_position = "bottom", base_size = 12,  
             base_family = "")
```

**Arguments**

`legend_position` Position of legend, default is "bottom"

`base_size` Base font size (default is 12)

`base_family` Base font family

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