weathercan

An R package to access to ECCC weather data

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Historical Weather Data

- Environment and Climate Change Canada
- 1840 to Present

- 26,000 stations (past and present)

Lots of Data!

Search Canada.ca

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Historical Data

To determine data availability for a custom location and date, please complete and submit one of the following searches:

Search by Station Name | Search by Province | Search by Proximity

How to Use - Search by Station Name

Name:

○ contains　○ begins with

○ with data available between: 1840 to 2017

○ with data on: 2017 September 25

Display 25 **results per page.**

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Accessing Data the Old Way

Accessing Data the Old Way

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```
library(weathercan)
```

weathercan - Finding a station

```
stations
```

```
## # A tibble: 26,214 x 12
##      prov            station_name station_id climate_id WMO_id  TC_id
##  * <fctr>                   <chr>     <fctr>     <fctr> <fctr> <fctr>
##  1     BC           ACTIVE PASS           14    1010066   <NA>   <NA>
##  2     BC           ALBERT HEAD           15    1010235   <NA>   <NA>
##  3     BC BAMBERTON OCEAN CEMENT           16    1010595   <NA>   <NA>
##  4     BC            BEAR CREEK           17    1010720   <NA>   <NA>
##  5     BC           BEAVER LAKE           18    1010774   <NA>   <NA>
##  6     BC            BECHER BAY           19    1010780   <NA>   <NA>
##  7     BC        BRENTWOOD BAY 2           20    1010960   <NA>   <NA>
##  8     BC  BRENTWOOD CLARKE ROAD           21    1010961   <NA>   <NA>
##  9     BC  BRENTWOOD W SAANICH RD          22    1010965   <NA>   <NA>
## 10     BC CENTRAL SAANICH VEYANESS         25    1011467   <NA>   <NA>
## # ... with 26,204 more rows, and 6 more variables: lat <dbl>, lon <dbl>,
## #   elev <dbl>, interval <chr>, start <int>, end <int>
```

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```
stations_search(name = "Brandon")
```

```
## # A tibble: 15 x 12
##      prov        station_name station_id climate_id WMO_id  TC_id   lat
##    <fctr>               <chr>     <fctr>     <fctr> <fctr> <fctr> <dbl>
##  1    MB BRANDON #1 WINTER BAY       3474    5010498   <NA>   <NA> 49.83
##  2    MB BRANDON #1 WINTER BAY       3474    5010498   <NA>   <NA> 49.83
##  3    MB           BRANDON A        3471    5010480  71140    YBR 49.91
##  4    MB           BRANDON A        3471    5010480  71140    YBR 49.91
##  5    MB           BRANDON A        3471    5010480  71140    YBR 49.91
##  6    MB           BRANDON A       50821    5010481  71140    YBR 49.91
##  7    MB           BRANDON A       50821    5010481  71140    YBR 49.91
##  8    MB         BRANDON CDA        3472    5010485   <NA>   <NA> 49.87
##  9    MB         BRANDON CDA        3472    5010485   <NA>   <NA> 49.87
## 10    MB         BRANDON RCS       49909    5010490  71136    PBO 49.90
## 11    MB         BRANDON RCS       49909    5010490  71136    PBO 49.90
## 12    MB       BRANDON SOUTH        3473    5010494   <NA>   <NA> 49.82
## 13    MB       BRANDON SOUTH        3473    5010494   <NA>   <NA> 49.82
## 14    QC ST GABRIEL DE BRANDON      5273    7017270   <NA>   <NA> 46.30
## 15    QC ST GABRIEL DE BRANDON      5273    7017270   <NA>   <NA> 46.30
## # ... with 5 more variables: lon <dbl>, elev <dbl>, interval <chr>,
## #   start <int>, end <int>
```

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```
ggmap::geocode("Brandon, MB")
```

Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Brandon,%20MB&sensor=

lon   lat
1 -99.95009 49.84847

```
stations_search(coords = c(49.84847, -99.95009), dist = 10)
```

A tibble: 13 x 13
prov   station_name station_id climate_id WMO_id TC_id   lat
<fctr>   <chr>   <fctr>   <fctr> <fctr> <fctr> <dbl>
1   MB BRANDON #1 WINTER BAY   3474   5010498   <NA>   <NA> 49.83
2   MB BRANDON #1 WINTER BAY   3474   5010498   <NA>   <NA> 49.83
3   MB   BRANDON SOUTH   3473   5010494   <NA>   <NA> 49.82
4   MB   BRANDON SOUTH   3473   5010494   <NA>   <NA> 49.82
5   MB   BRANDON CDA   3472   5010485   <NA>   <NA> 49.87
6   MB   BRANDON CDA   3472   5010485   <NA>   <NA> 49.87
7   MB   BRANDON RCS   49909   5010490 71136   PBO 49.90
8   MB   BRANDON RCS   49909   5010490 71136   PBO 49.90
9   MB   BRANDON A   3471   5010480 71140   YBR 49.91
10   MB   BRANDON A   3471   5010480 71140   YBR 49.91
11   MB   BRANDON A   3471   5010480 71140   YBR 49.91
12   MB   BRANDON A   50821   5010481 71140   YBR 49.91
13   MB   BRANDON A   50821   5010481 71140   YBR 49.91
... with 6 more variables: lon <dbl>, elev <dbl>, interval <chr>,
start <int>, end <int>, distance <dbl>
```

```
stations_search("Winnipeg", interval = "hour")
```

```
## # A tibble: 5 x 12
##     prov            station_name station_id climate_id WMO_id  TC_id
##   <fctr>                   <chr>     <fctr>     <fctr> <fctr> <fctr>
## 1    MB              WINNIPEG A CS      27174    502S001  71849    XWG
## 2    MB            WINNIPEG INTL A      51097    5023227   <NA>    YWG
## 3    MB    WINNIPEG RICHARDSON AWOS      47407    5023226  71852    YWG
## 4    MB WINNIPEG RICHARDSON INT'L A       3698    5023222  71852    YWG
## 5    MB          WINNIPEG THE FORKS      28051    5023262  71579    XWN
## # ... with 6 more variables: lat <dbl>, lon <dbl>, elev <dbl>,
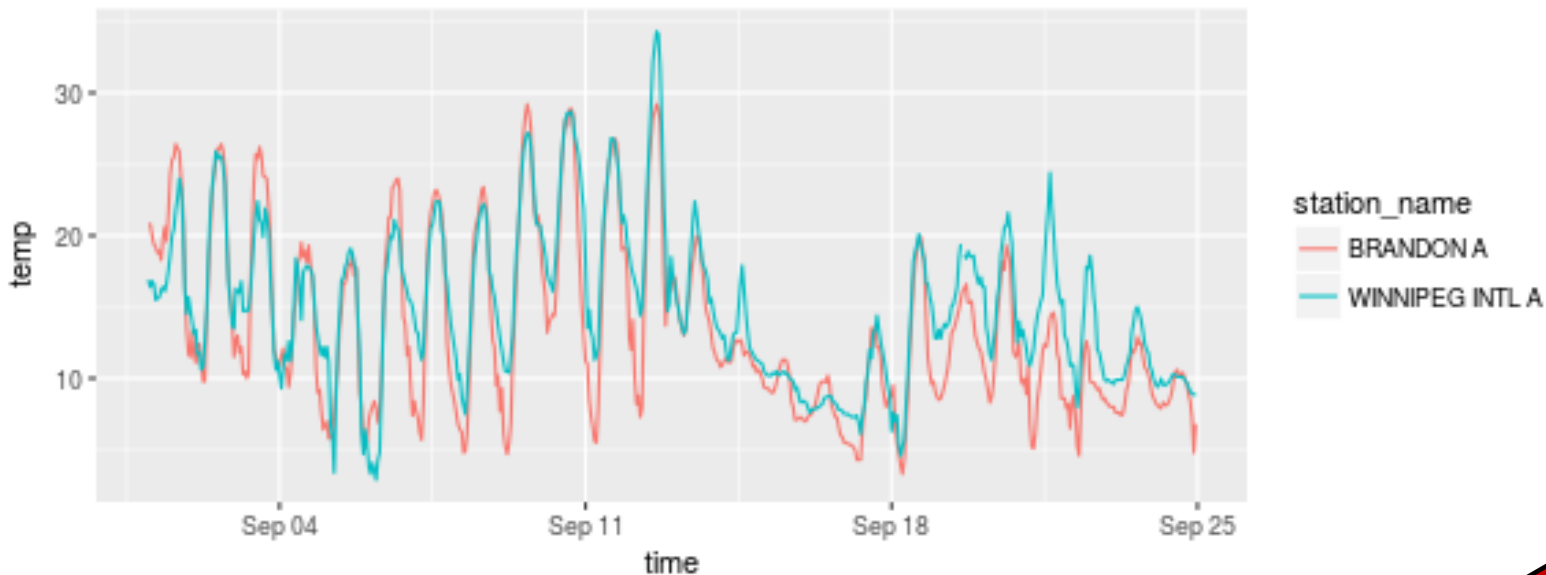## #   interval <chr>, start <int>, end <int>
```

```
ids <- c(50821, 51097)
```

weathercan - Downloading data

```r
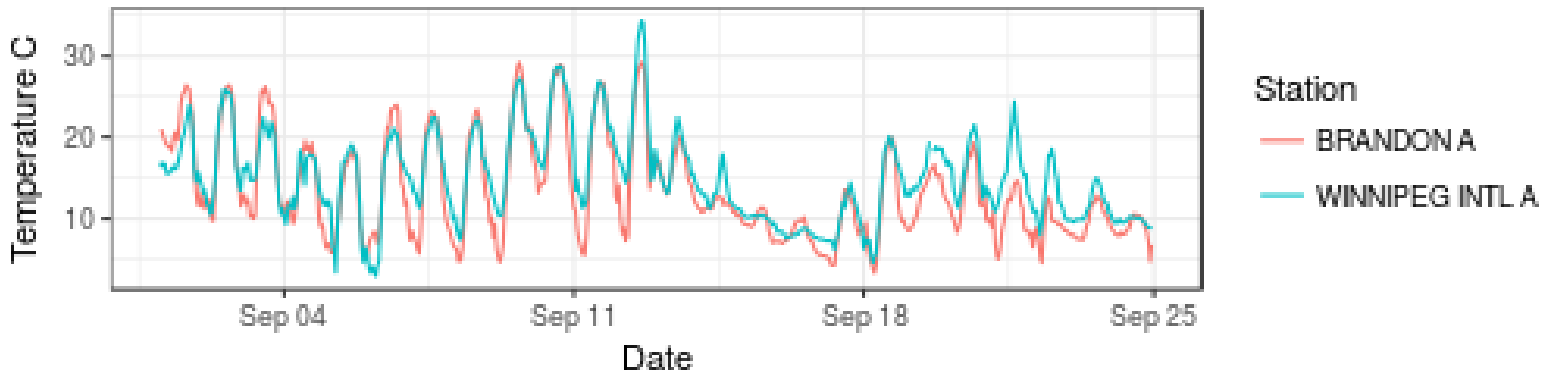w <- weather(station_ids = ids, start = "2017-09-01")
```

```
library(ggplot2)

ggplot(data = w, aes(x = time, y = temp, colour = station_name)) +
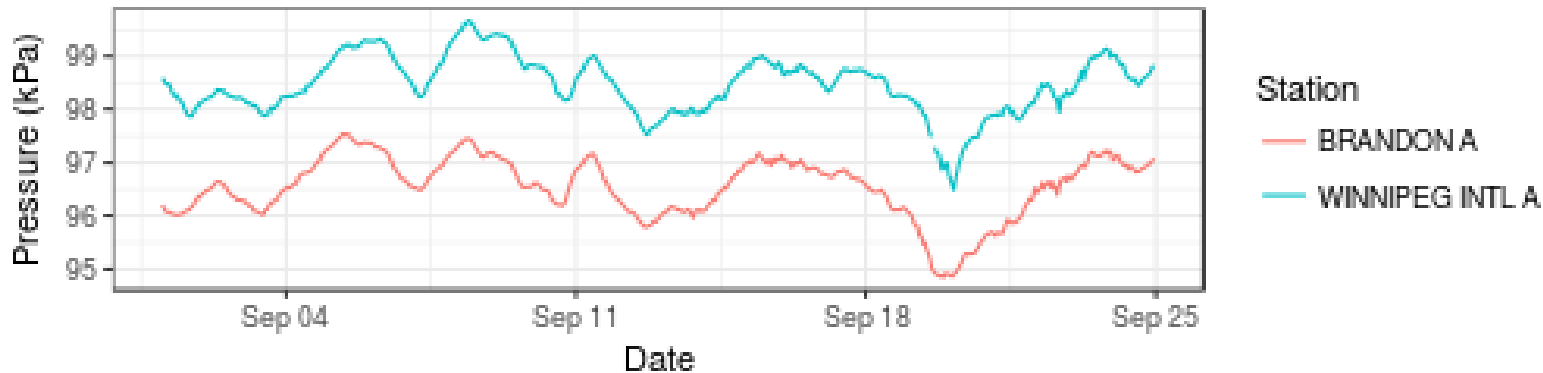  geom_line()
```

With a bit of formating...

```
ggplot(data = w, aes(x = time, y = temp, colour = station_name)) +
  theme_bw() +
  geom_line() +
  labs(x = "Date", y = "Temperature C", colour = "Station")
```

```
ggplot(data = w, aes(x = time, y = pressure, colour = station_name)) +
  theme_bw() +
  geom_line() +
  labs(x = "Date", y = "Pressure (kPa)", colour = "Station")
```

Understanding the Data

```
#flags
#weather_index
```

Nitty Gritty

Dates are converted

Combining data

05MH001 - Assiniboine River at Brandon

Combining data

```r
w <- weather(50821, start = "2017-09-01", interval = "day")
hydro_mean <- left_join(hydro_mean, w, by = "date")

ggplot(data = w, aes(x = date, y = scale(total_precip))) +
  geom_line() +
  geom_line(aes(y = scale(water_level)), colour = "blue") +
  geom_line(aes(y = scale(discharge)), colour = "green")
```

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Interpolating

```
hydro_weather <- add_weather(data = hydro, weather = w, col = ")
```

Other cools stuff?

Presentation available online:

Steffi LaZerte

Reference TRU here

Agriculture and Agri-Food Canada (Download Year). Real-time In-situ Soil Monitoring for Agriculture (RISMA) Network Data. Calgary, AB: Geospatial Cyberinfrastructure for Environmental Sensing [distributer], http://aafc.geocens.ca/

Thanks!

Slides created via the R package **xaringan**.

The chakra comes from remark.js, **knitr**, and R Markdown.