

weathercan

An R package to access to ECCC weather data

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PCAG 2017

Historical Weather Data

- Environment and Climate Change Canada
- 1840 to Present
- 26,000 stations (past and present)

Lots of Data!





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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:

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[How to Use - Search by Station Name](#)

Name:

☒ contains ☐ begins with

☒ with data available between:

 to

☐ with data on:

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Accessing Data the Old Way



Accessing Data the Old Way

weathercan

```
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>
```



```
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>
```



```
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    PB0 49.90  
## 8    MB          BRANDON RCS        49909    5010490    71136    PB0 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)
```



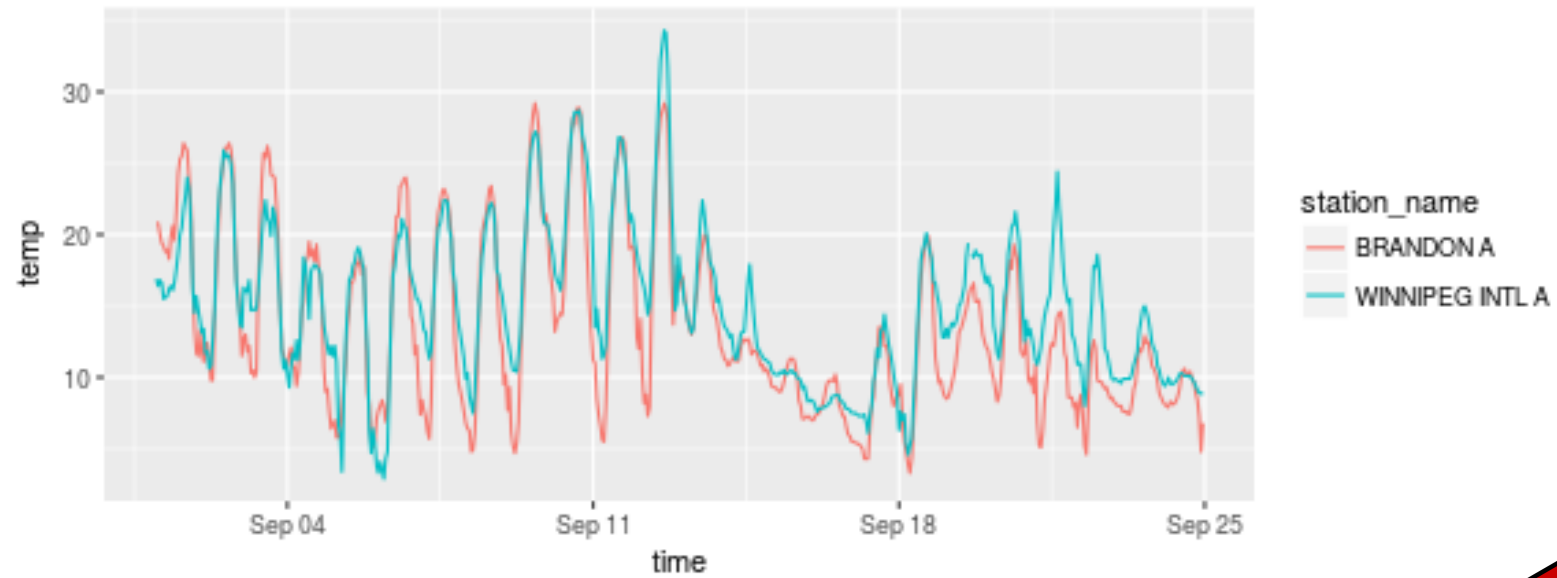
weathercan - Downloading data

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



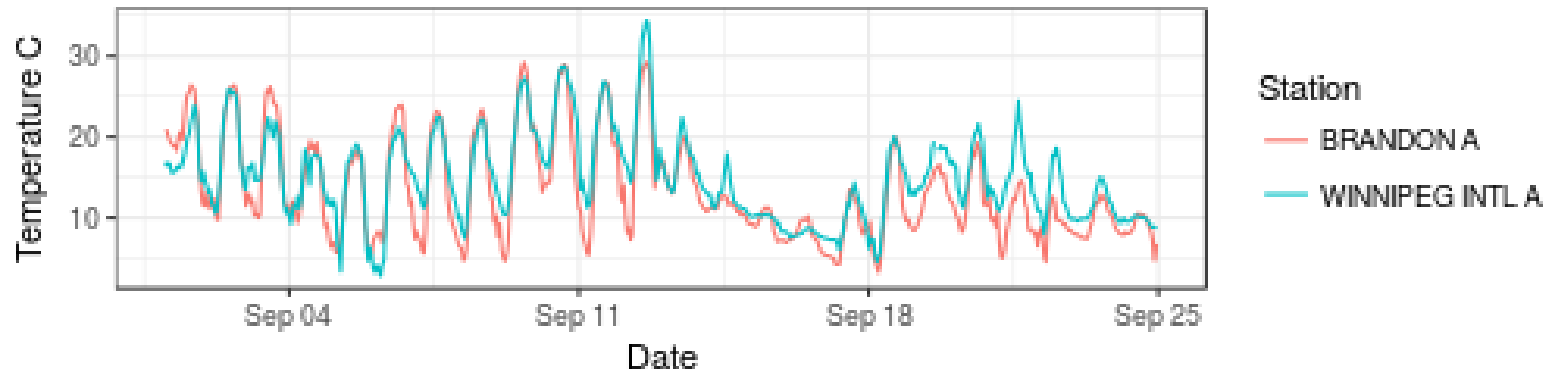
```
library(ggplot2)
```

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

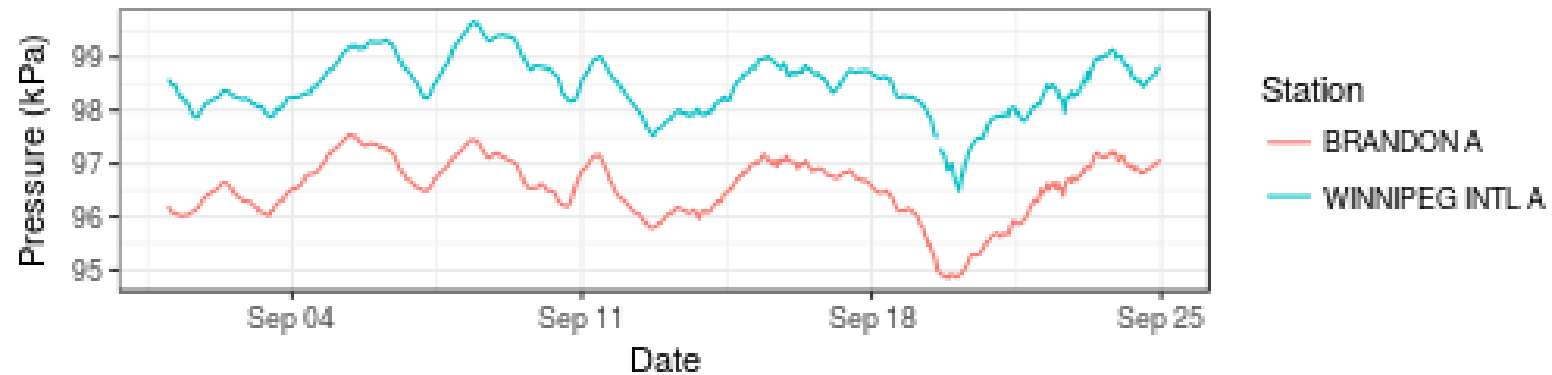


With a bit of formatting...

```
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

```
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")
```



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 [distributor], <http://aafc.geocens.ca/>

Thanks!

Slides created via the R package [xaringan](#).

The chakra comes from [remark.js](#), [knitr](#), and [R Markdown](#).

