# Sorel, QC Vaisala Weather Transmitter WXT520 data [ECCC]

## Authors

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## 1. Data Set Description

**1.1. Introduction:** This dataset contains the raw data from the Vaisala WXT520 weather sensor sited at Sorel-Tracy, QC for the Winter Precipitation Type Research Mult-Scale Experiment (WINTRE-MIX). Data was collected between October 20, 2021 and May 03, 2022. The WXT520 measures wind speed and direction, precipitation, atmospheric pressure, temperature and relative humidity. Sorel-Tracy is located at the northern end of the Champlain Valley, on the southern shore of the St. Lawrence River northeast of Montreal (Figure 1). The site was in a small park to the east of the Richelieu River. Several other instruments were also stationed at the site (Figure 2) and will be available from the WINTRE-MIX data archive (https://data.eol.ucar.edu/master_lists/generated/wintre-mix/).

**1.2. Data version number:** 1.0

**1.3. Data version date:** 2022-03-16

**1.4. Data Status:** Final

**1.5. Time period covered by data:** 09:00 UTC November 09, 2021 to 12:00 UTC May 03, 2022

**1.6. Latitude:** 46.030222°N

**1.7. Longitude:** -73.110337°E

**1.8. Elevation:** 19.0 m (http://geogratis.gc.ca/services/elevation/cdem/altitude?lat=46.030222&lon=-73.110337); 13.3m (http://geogratis.gc.ca/services/elevation/cdsm/altitude?lat=46.030222&lon=-73.11033)

**1.9. Other (address):** Sorel-Tracy, QC, Canada (approximately behind 66 Rue de la Comtesse)

**1.10. Data Frequency - Frequency of data collection:** 5 second

**1.11. Data source:** High Impact Weather Research, Environment and Climate Change Canada

**1.12. Web address references:** https://www.eol.ucar.edu/field_projects/wintre-mix

**1.13. Data set restrictions:** Please refer to the WINTRE-MIX data policy (https://www.eol.ucar.edu/content/wintre-mixdata-policy) as well as the WINTRE-MIX data management plan (https://www.eol.ucar.edu/system/files/Data_Management_Plan-1Dec2021.pdf) for more information regarding dataset restrictions and dissemination.

## 2. Instrument Description

**2.1. Description:** The Vaisala Weather Transmitter WXT520 is a small and lightweight transmitter that offers six weather parameters in one compact package. WXT520 measures wind speed and

direction, precipitation, atmospheric pressure, temperature and relative humidity. Winds are measured via an array of three ultrasonic transducers. Precipitation is measured by a piezoelectrical sensor under a steel cover. The WXT520 issues one data telegram every 5 seconds.

For these datasets, a WXT520 weather sensor was located in Sorel-Tracy, Quebec, Canada (Figure 1).

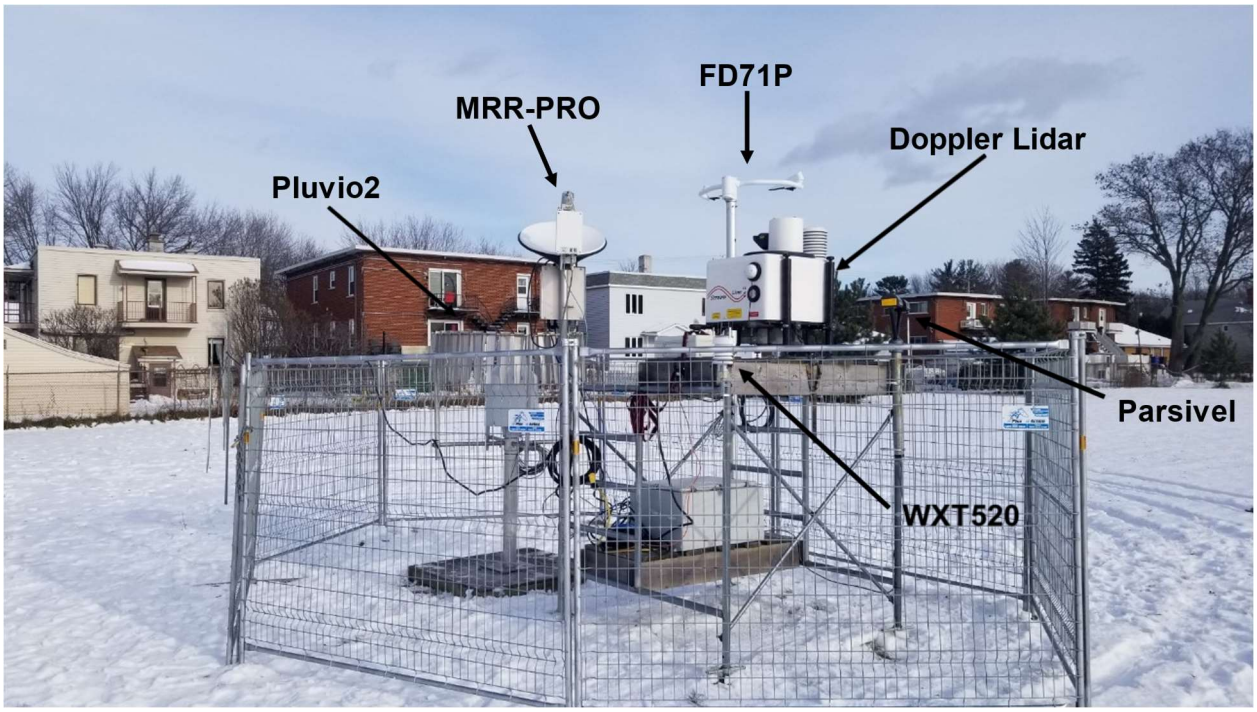


*Figure 1 - Photograph of the Sorel-Tracy meteorological instrument site.*

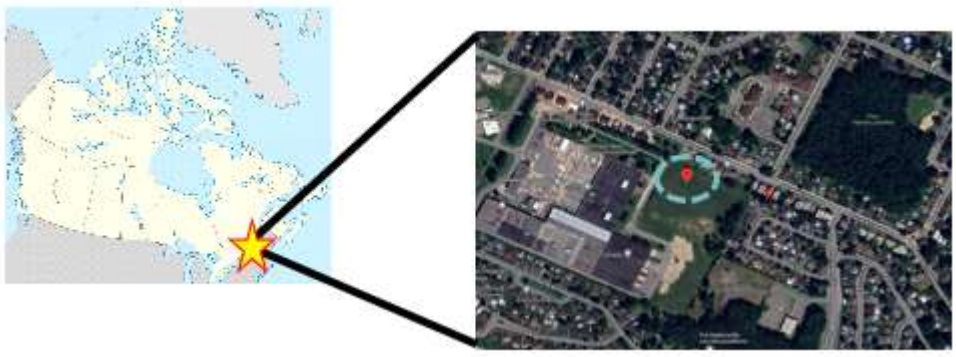

*Figure 2 - Google Maps map of the location of the Sorel-Tracy site.*

## 3. Data Collection and Processing

**3.1. Description of data collection:** The WXT520 was configured to collect data every 60 seconds, using the aR0 command to report all parameters. The data was logged on a Windows PC using

a RubberDAQy data logging program. This program prepended a UTC date/time stamp to the message output. Messages were collected into daily text files. No quality control has been done beyond the internal WXT520 processing.

**3.2. Description of derived parameters/processing techniques:** See Vaisala Weather Transmitter WXT520 manual.

**3.3. Description of quality assurance/control procedures:** See Vaisala Weather Transmitter WXT520 manual.

## 4. Data format

**4.1. Data file structure and file naming conventions:** Observations are collected in comma delimited ASCII files (generated via the aR0 command). File names are of the form: WXT520YYMMDD.txt where YY=year (e.g. 22), MM=month (e.g. 02 or 03), DD=day

**4.2. Data format and layout:** Daily data files with single header line. A date/time stamp (UTC) record is followed by '0R0' and a series of comma delimited parameters and units as given in Table 1.

**4.3. List of parameters:**

*Table 1: List of Parameters*

| Parameter | Name | Unit | Status[1] |
|---|---|---|---|
| Sn | Wind speed minimum | m/s | #, M |
| Sm | Wind speed average | m/s | #, M |
| Sx | Wind speed maximum | m/s | #, M |
| Dn | Wind direction minimum | Deg | #, D |
| Dm | Wind direction average | Deg | #, D |
| Dx | Wind direction maximum | Deg | #, D |
| Pa | Air pressure | hPa | #, H |
| Ta | Air temperature | °C | #, C |
| Tp | Internal temperature | °C | #, C |
| Ua | Relative humidity | %RH | #, P |
| Rc | Rain accumulation | mm | #, M |
| Rd | Rain duration | s | #, S |
| Ri | Rain intensity | mm/h | #, M |
| Rp | Rain peak intensity | mm/h | #, M |
| Hc | Hail accumulation | hits/cm$^2$ | #, M |
| Hd | Hail duration | s | #, S |
| Hi | Hail intensity | hits/cm$^2$h | #, M |
| Hp | Hail peak intensity | hits/cm$^2$h | #, M |
| Th | Heating temperature | °C | #, C |
| Vh | Heating voltage | V | #, N, V, W, F[2] |
| Vs | Supply voltage | V | V |
| Vr | 3.5 V ref. voltage | V | V |
| Id | Information field | alphanumeric | |

1. Status field flag indicate the Unit (letters) or indicates invalid data (#).
2. For heating:
   # = heating option is not available.
   N = heating option is available but disabled, or the heating temperature > high limit.
   V = heating is on (50% duty cycle) and heating temperature > middle control limit.
   W = heating is on (100% duty cycle) and heating temperature > low control limits.
   F = heating is on (50% duty cycle) and the heating temperature < low control limit.

## 5. Data Remarks

No significant (> 1h) missing data periods except:

*Table 2: List of Data Gaps*

| Gap Start | Gap End | Length |
|---|---|---|
| 2021/10/20 09:00 | 2021/11/09 09:30 | 20d 00h 30m |
| 2021/11/10 12:35 | 2021/11/24 13:56 | 14d 01h 21m |
| 2021/11/24 17:50 | 2021/12/07 16:47 | 12d 22h 57m |
| 2021/12/15 17:30 | 2021/12/17 16:48 | 01d 23h 18m |

Note: No missing data periods during the WINTRE-MIX campaign

## 6. Acknowledgment

This README was inspired by CFI Climate Sentinels Gault MRR-2 Processed Data (Lachapelle *et. al.*, 2022).

## 7. References

Lachapelle *et. al.*. 2022: CFI Climate Sentinels Gault MRR-2 Processed Data. Version 1.0. UCAR/NCAR - Earth Observing Laboratory. https://doi.org/10.26023/AKWD-BRV8-R80D. Accessed 20 April 2023.

Vaisala, 2012: User's Guide – Vaisala Weather Transmitter WXT520. Vaisala Oyj. Document number M210906EN-C. https://www.vaisala.com/sites/default/files/documents/M210906EN-C.pdf. Accessed 20 April 2023.

## 8. Appendix

Suggested GCMD keywords (no particular order):

- Liquid precipitation rate
- Rain
- Hail
- Drizzle
- Wind speed
- Wind direction
- Air temperature
- Surface pressure
- Dew point temperature