Sorel, QC Parsivel Disdrometer Data [ECCC]

Authors

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1. **Data Set Description**
   1.1. **Introduction:** This dataset contains the raw data from the OTT Parsivel2 laser disdrometer 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 Parsivel utilizes a horizontal beam of light to detect particle sizes and fall speeds and deduce precipitation types, accumulations and visibility. Sorel-Tracy is located at the northern end of the Champlain Valley, on the southern shore of the St. Lawrence River northeast of Montreal.   The site was in a small park to the east of the Richelieu River. Several other instruments were also stationed at the site 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 October 26, 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:** 1 minute
   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 OTT Parsivel2 is a laser-based optical system used for the measurement precipitation. The size range of measurable liquid precipitation particles is from 0.2 to 5 mm and

for solid precipitation particles it is from 0.2 to 25 mm. Precipitation particles are categorized as: Drizzle, drizzle with rain, rain, drizzle with snow, snow, snow grains, freezing rain, and hail.

Precipitation measurements are carried out using a special laser sensor head that detects precipitation optically from a horizontal strip of light. Both particle size and particle speed are measured and used for deriving parameters such as size spectrum, type of precipitation, kinetic energy, intensity of the precipitation, radar reflectivity, and visibility. The Parsivel2 issues one data telegram every 60 seconds.

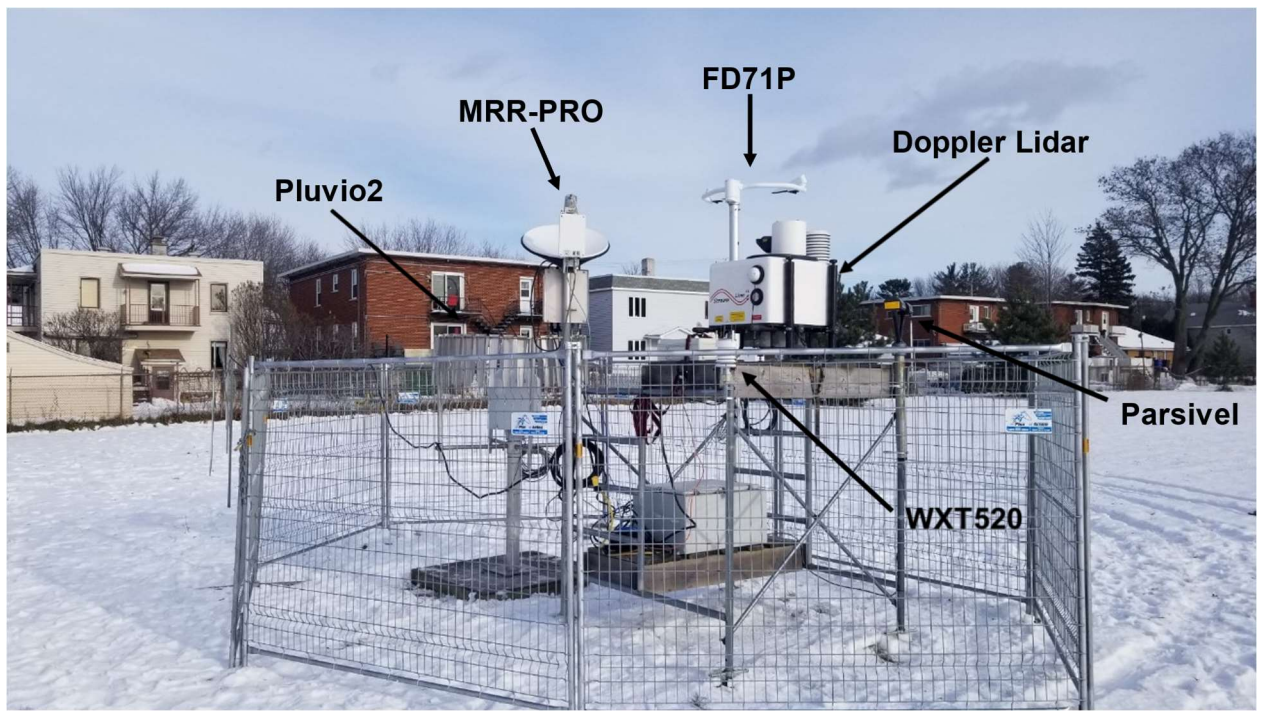For these datasets, a Parsivel weather sensor was located in Sorel-Tracy, Quebec, Canada.

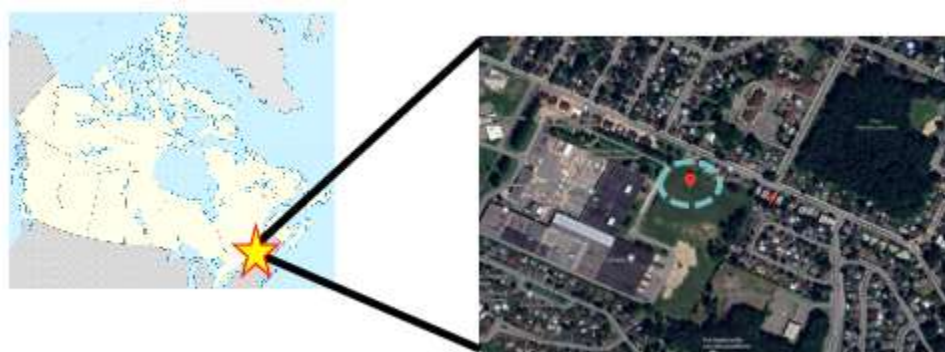*Figure 1 - Photograph of the Sorel-Tracy meteorological instrument site.*

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 OTT Parsivel2 was configured to collect an OTT Telegram Message every 60 seconds. The Telegram is defined in 4.0 Data Format. Heating was supplied to the sensor heads to prevent accumulation of snow and ice, using the default temperature threshold of 10℃. 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 OTT processing.

3.2. Description of derived parameters/processing techniques: See OTT Parsivel2 manual.

3.3. Description of quality assurance/control procedures: See OTT Parsivel2 manual.

4. Data format

4.1. Data file structure and file naming conventions: The minutely data are collected into daily comma delimited ASCII (OTT Telegram Message) files. File names are of the form: ParsivelYYMMDD.txt where YY=year(e.g. 22), MM=month(02 or 03), DD=day

4.2. Data format and layout: Daily data files with a single header line.

4.3. List of parameters: The OTT Telegram Message used is defined by: *%01,%02,%03,%04,%05,%06,%07,%08,%10,%11,%12,%16,%17,%18,%25,%90,%91,%93* where the parameters are shown in Table 1. This is prepended with the UTC Datetime in format: YYY/MM/DD hh:mm:ss

Table 1: List of Parameters

Format % No.	Description	Digits	Form	Units
01	Rain intensity (32 bit*)	8	0000.000	mm/h
02	Rain amount accumulated (32 bit*)	7	0000.00	mm
03	Weather code (SYNOP wawa Table 4680)	2	00	
04	Weather code (SYNOP ww Table 4677)	2	00	
05	Weather code (METAR/SPECI w'w' Table 4678)	5	+RASN	
06	Weather code according to NWS Code	4	RLS+	
07	Radar reflectivity (32 bit*)	6	00.000	dBz
08	MOR visibility in the precipitation	4	0000	m
10	Signal amplitude of the laser strip	5	00000	
11	Number of detected particles	5	00000	
12	Temperature in the sensor	3	000	°C
16	Current through the heating system	3	0.0	A
17	Power supply voltage in the sensor	4	00.0	V
18	Sensor status	1	0	
25	Error code	3	000	
90	Field N (d)	223	00.000x	$1/m^{3*}mm$
91	Field v (d)	223	00.000x	
93	Raw data	4095	000x	

(adapted from Table 11.2 in Parsivel Operating Instructions)

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	2021/10/26 09:46	06d 00h 46m
2021/11/10 12:34	2021/11/24 13:57	14d 01h 23m
2021/11/24 17:50	2021/12/07 16:10	12d 22h 20m
2021/12/15 17:29	2021/12/17 16:48	01d 23h 19m

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

6. Acknowledgment

This README was inspired by CFI Climate Sentinels Arboretum Parsivel Disdrometer Data [ARBO] (Fraser *et. al.*, 2022).

7. References

Fraser *et. al.*. 2022: CFI Climate Sentinels Arboretum Parsivel Disdrometer Data [ARBO]. Version 1.0. UCAR/NCAR - Earth Observing Laboratory. https://doi.org/10.26023/2CYR-MNGB-B413. Accessed 20 April 2023.

OTT Hydromet, n.d.: Operating instructions - Present Weather Sensor OTT Parsivel2. OTT Hydromet GmbH. Document number 70.210.001.B.E 12-1016. https://www.ott.com/download/operating-instructions-present-weather-sensor-ott-parsivel2-without-screen-heating-1/. Accessed 20 April 2023.

8. Appendix

Suggested GCMD keywords (no particular order):

- Solid precipitation
- Frozen precipitation
- Rain
- Freezing rain
- Drizzle
- Freezing drizzle
- Ice pellets
- Snow
- Ice storms
- Snow storms
- Extratropical cyclones
- Droplet size