Winter Precipitation Type Research Multi-scale Experiment (WINTRE-MIX)
U. of Colorado Parsivel Disdrometer @ COW radar site

1. **Dataset Title**: Land Based: Precipitation - CU Disdrometer at COW radar Site [CU]

2. **Data Set Description:** This dataset contains data from a Parsivel optical disdrometer deployed at Sorel in support of the WINTRE-MIX field campaign (https://www.eol.ucar.edu/field_projects/wintre-mix). Instruments provides precipitation intensity and the drop-size distribution spectrum. Instrument was deployed with the Microwave Rain Radar at the COW radar site and was only operational during IOPs.

3. **Data version**: v1.0, 15 August 2023. DOI: https://doi.org/10.26023/QX88-TJAP-4114

4. **Dataset Author(s):**

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5. **Time of Interest –**

1 February – 15 March 2022: Instrument was continuously running. No data were collected between 16 Feb – 2 March due to a loose cable.

2022/02/10 07:47:00 to 2017/02/10 13:25:00
2022/02/11 22:59:00 to 2022/02/12 06:45:00
2022/02/17 22:21:00 to 2022/02/18 04:23:00
2022/02/22 20:18:00 to 2022/02/23 05:45:00
2022/03/01 15:39:00 to 2022/03/02 02:01:00
2022/03/04 15:39:00 to 2022/03/04 16:32:00
2022/03/06 09:00:00 to 2022/03/08 01:19:00

6. **Area of Interest –**

COW radar site: 45.478247; -72.936154 @ 40 m MSL

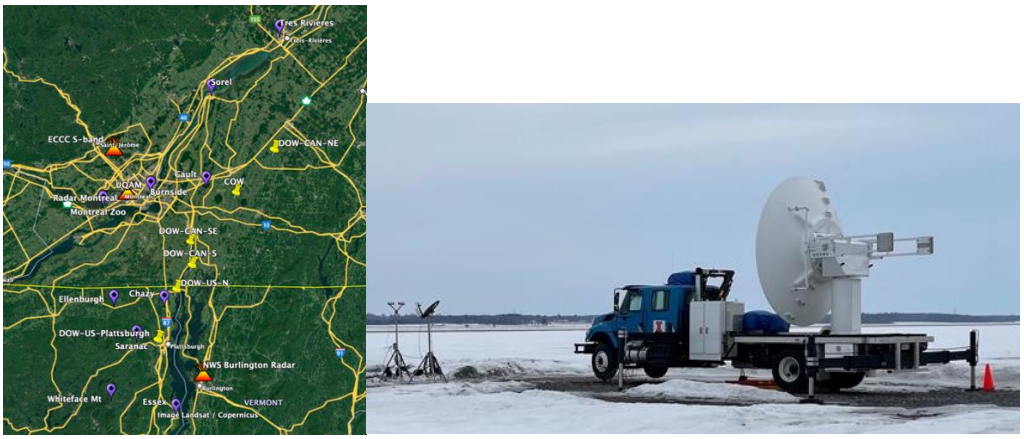

Fig. 1: Left: Map showing various instrument location including the MRR location at COW (yellow pin). Right: Image of the MRR and disdrometer (left side) located at the COW radar site. Note that the instruments only ran when the COW was operating.

7. **Data Frequency** - data sampled every 1 minute.

8. **Dataset 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.

9. **Data Spatial Type - readable ASCII text**

No.	Description	Digits	Form	Range	Unit
01	Rain intensity (32 bit [1])	8	0000.000	0.000 ... 9999.999	mm/h
02	Rain amount accumulated (32 bit [1])	7	0000.00	0.00 ... 0300.00	mm
03	Weather code acc. to SYNOP $w_a w_a$; Table 4680	2	00	00 ... 99	
04	Weather code acc. to SYNOP ww; Table 4677	2	00	00 ... 99	
05	Weather code METAR/SPECI w'w'; Table 4678	5	+RASN		
06	Weather code according to NWS	4	RLS+		
07	Radar reflectivity (32 bit [1])	6	00.000	–9.999 ... 99.999	dBz
08	MOR visibility in precipitation	5	00000	0 ... 20000	m
09	Sample interval	5	00000	0 ... 03600	s
10	Signal amplitude of the laser strip	5	00000	0 ... 99999	1
11	Number of particles detected and validated	5	00000	0 ... 99999	1
12	Temperature in the sensor housing	3	000	–99 ... 100	°C
13	Sensor serial number	6	123456		
14	Firmware IOP version number	6	2.02.3		
15	Firmware DSP version number	6	2.02.3		
16	Heating current	4	0.00	0.00 ... 4.00	A
17	Power supply voltage	4	00.0	0.0 ... 30.0	V
18	Sensor status	1	0	0 ... 3	see Chapt. 12.1
19	Date/time measuring start	19	00.00.0000_00:00:00	DD.MM.YYYY_hh:mm:ss	
20	Sensor time	8	00:00:00	hh:mm:ss	
21	Sensor date	10	00.00.0000	DD.MM.YYYY	
22	Station name	10	XXXXXXXXXX		
23	Station number	4	XXXX		
24	Rain amount absolute (32 bit [1])	7	000.000	0.000 ... 999.999	mm
25	Error code	3	000		
26	Temperature PCB	3	000	–99 ... 100	°C
27	Temperature in the right sensor head	3	000	–99 ... 100	°C
28	Temperature in the left sensor head	3	000	–99 ... 100	°C
30	Rain intensity (16 bit [1]) max. 30.000 mm/h	6	00.000	0.000 ... 30.000	mm/h
31	Rain intensity (16 bit [1]) max. 1200.0 mm/h	6	0000.0	0.0 ... 1200.0	mm/h
32	Rain amount accmulated (16 bit [1])	7	0000.00	0.00 ... 0300.00	mm
33	Radar reflectivity (16 bit [1])	5	00.00	–9.99 ... 99.99	dBz
34	Kinetic energy	7	000.000	0.000 ... 999.999	J/(m²h)
35	Snow depth intensity (volume equivalent)	7	0000.00	0.00 ... 9999.99	mm/h
60	Number of all particles detected	8	00000000	0 ... 8192	1
61	List of all particles detected (including size and particle speed)	13	00.000;00.000	0.200 ... 25.000; 0.20 ... 20.000	mm;m/s
90	Field N (d) 1. Value = average volume equivalent diameter (ved) of the 1. class	223	00.000S	–9.999 ... 99.999	$\log_{10}$ (1/m³ mm)
91	Field v (d) 1. Value = average particle speed (ps) of the 1. class	223	00.000S	0.000 ... 99.999	m/s
93	Raw data (volume equivalent diameter) 1. Value = number of particles 1. ved/1. ps ... 32. Value = number of particles 32. ved/1. ps; 33. Value = number of particles 1. ved/2. ps ... 64. Value = number of particles 32. ved/2. ps; 65. Value = ...	4095	000S	0 ... 999	1

More detail on the data format can be found on page 29 in http://www.ott.com/en-us/products/download/operating-instructions-present-weather-sensor-ott-parsivel2/

Classification according to diameter and velocity is described in Pages 44-45 in http://www.ott.com/en-us/products/download/operating-instructions-present-weather-sensor-ott-parsivel2/

10. General Dataset Description

The instrument had the heater turned on high throughout the IOPs. However, we discovered that the window was iced up during strong wind conditions. Field 18 (Sensor status – see list below) will indicate if the sensor was clear or not. Data were visually inspected and no instrument failure was observed.

0 = Everything OK
1 = Laser protective glass is dirty, but measurements are still possible
2 = Laser protective glass is dirty, partially covered. No further usable measurements are possible.
3 = Laser damaged

Note that only time steps with DSD measurements are recorded.

11. File Names

WINTRE-MIX_20220210_DISD-CU_COW.dat
WINTRE-MIX_20220211_DISD-CU_COW.dat
WINTRE-MIX_20220212_DISD-CU_COW.dat
WINTRE-MIX_20220217_DISD-CU_COW.dat
WINTRE-MIX_20220218_DISD-CU_COW.dat
WINTRE-MIX_20220222_DISD-CU_COW.dat
WINTRE-MIX_20220223_DISD-CU_COW.dat
WINTRE-MIX_20220301_DISD-CU_COW.dat
WINTRE-MIX_20220302_DISD-CU_COW.dat
WINTRE-MIX_20220304_DISD-CU_COW.dat
WINTRE-MIX_20220306_DISD-CU_COW.dat
WINTRE-MIX_20220307_DISD-CU_COW.dat
WINTRE-MIX_20220308_DISD-CU_COW.dat

12. GCMD Keywords –

EARTH SCIENCE ATMOSPHERE CLOUDS CLOUD DROPLET DISTRIBUTION cbb0d517-462a-46fe-a0e6-32555f7e7f23

EARTH SCIENCE ATMOSPHERE CLOUDS CLOUD MICROPHYSICS CLOUD DROPLET CONCENTRATION/SIZE 47812ef8-b64b-4988-9ae4-31f3581ae9a5

EARTH SCIENCE ATMOSPHERE PRECIPITATION DROPLET SIZE 6eaed241-db16-4a1a-a06c-893da5d98b45

EARTH SCIENCE ATMOSPHERE PRECIPITATION HYDROMETEORS 56f2cdbd-2a91-4267-97eb-1680e8582322

EARTH SCIENCE ATMOSPHERE PRECIPITATION PRECIPITATION RATE ac50c468-df2f-429c-8394-9d63efcc6f9d

EARTH SCIENCE ATMOSPHERE PRECIPITATION PRECIPITATION AMOUNT cad5c02a-e771-434e-bef6-8dced38a68e8

EARTH SCIENCE SERVICES ENVIRONMENTAL ADVISORIES WEATHER/CLIMATE ADVISORIES PRESENT WEATHER 020585ff-91fb-421b-ba24-305d657c2231

EARTH SCIENCE SPECTRAL/ENGINEERING RADAR RADAR REFLECTIVITY 46975e66-863a-49c9-b673-b2e099a04c85

13. Publications –

Aikins, J., K. Friedrich, B. Geerts, and B. Pokharel, 2016: Role of a Low-Level Jet and Turbulence on Winter Orographic Snowfall. *Mon. Wea. Rev.,* **144**.

Friedrich, K., E. A. Kalina, J. Aikins, J. Sun, D. Gochis, P. Kucera, K. Ikeda, and M. Steiner, 2016: Raindrop size distribution and rain characteristics during the 2013 Great Colorado Flood. *J. Hydromet.,* **17**, 53-72.

Friedrich, K., S. Higgins, F. J. Masters and C. R. Lopez, 2013: Articulating and stationary PARSIVEL disdrometer in severe weather. *J. Atmos. Ocean Technol.*, **30**, 2063-2080.