Winter Precipitation Type Research Multi-scale Experiment (WINTRE-MIX)
U. of Colorado Microwave Radiometer @ Sorel

1. **Dataset Title**: Upper Air: Radiometer - CU Radiometer Data at Sorel [CU]

2. **Data Set Description:** This dataset contains post-processed level 2 data from a Radiometrics microwave radiometer deployed at Sorel in support of the WINTRE-MIX field campaign (https://www.eol.ucar.edu/field_projects/wintre-mix). The level 2 data is based on a neural network processing providing vertical profiles of temperature, vapor density (g/m3), liquid (g/m3), and relative humidity as well as integrated vapor and liquid, cloud base, and surface observations of pressure, temperature, relative humidity, and precipitation.

3. **Data version**: v1.0, 8 September 2022. DOI: 10.26023/GM4R-XJKX-9A0G

4. **Dataset Author(s):**
Dr. Katja Friedrich
Department of Atmospheric and Oceanic Sciences,
University of Colorado
4001 Discovery Drive
311 UCB
Boulder, CO 80309-0311
Katja.Friedrich@colorado.edu,
303-492-2041

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.

2022/02/05 00:00:00 to 2017/01/07 23:55:00
2022/02/06 00:00:00 to 2022/02/06 23:55:00
2022/02/07 00:00:00 to 2022/02/07 23:55:00
2022/02/08 00:00:00 to 2022/02/08 23:55:00
2022/02/09 00:00:00 to 2022/02/10 23:55:00
2022/02/10 00:00:00 to 2022/02/10 23:55:00
2022/02/11 00:00:00 to 2022/02/11 23:55:00
2022/02/12 00:00:00 to 2022/02/12 23:55:00
2022/02/13 00:00:00 to 2022/02/13 23:55:00
2022/02/14 00:00:00 to 2022/02/14 23:55:00
2022/02/15 00:00:00 to 2022/02/15 23:55:00
2022/03/03 19:10:00 to 2022/02/03 23:56:00
2022/03/04 00:00:00 to 2022/03/04 16:30:00
2022/03/05 23:07:00 to 2022/03/05 23:58:00
2022/03/06 14:07:00 to 2022/03/06 23:55:00
2022/03/07 00:00:00 to 2022/03/07 14:14:00

2022/03/07 14:24:00 to 2022/03/07 23:55:00
2022/03/08 00:00:00 to 2022/03/08 23:55:00
2022/03/09 00:00:00 to 2022/03/09 23:55:00
2022/03/10 00:00:00 to 2022/03/10 23:55:00
2022/03/11 00:00:00 to 2022/03/11 23:55:00
2022/03/12 00:00:00 to 2022/03/12 23:55:00
2022/03/13 00:00:00 to 2022/03/13 23:55:00
2022/03/14 00:00:00 to 2022/03/14 23:55:00
2022/03/15 00:00:00 to 2022/03/15 23:55:00
2022/03/16 00:00:00 to 2022/03/16 16:03:00

no data available between 02/16-03/02

6. **Area of Interest –**
   Sorel: 46.030244; -73.110328 @ 13 m MSL
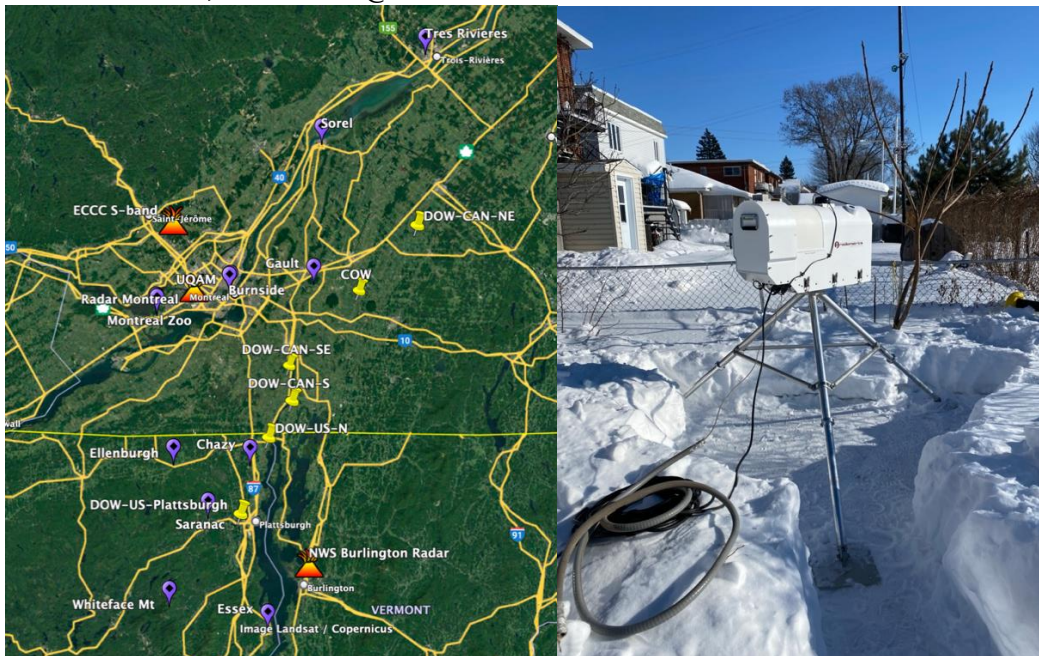
7. **Data Frequency** - Frequency of data collection continuously during IOPs; data sampled every 1-2 minute.

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 – csv format

Example of the data format. Data are being recorded following the data stamp in the 3rd column (10, 30, 80, 100, 200, 300, 400):

30 – Geolocation data

200 - Surface observations of temperature, humidity pressure etc.

400 – retrieval output of temperature (401), vapor density (402), liquid (403), and relative humidity (404) at the height levels (in meters) shown under 400 (0.00, 0.05, 0.10, 0.15, …) for
- zenith (denoted as Zenith),
- 20deg above the horizon (denoted as Angle20(AZ-000)) towards the north (N), south (S), and an average between north and south (A), and

300 – Integrated vapor, integrated liquid and cloud base for zenith, 20deg north, 20deg south, 15deg average,

```
Record,Date/Time,10,Tamb(K),Rh(%),Pres(mb),Tir(K),Rain,Vint(cm),Lqint(mm),Cldb, 0.00, 0.10, 0.20, 0.30, 0.40, 0
Record,Date/Time,30,GPS Date/Time,Latitude,Longitude,Magnetic Variation,Status,Quality,Number Satellites,Altitu
Record,Date/Time,80,ID,SNR,Az(deg),El(deg),Tamb(K),Rh(%),Pres(mb),Tir(K),Rain,Vint(cm),ZVint(cm),VDly(cm),ZVDly
Record,Date/Time,100,Record Type,Title
Record,Date/Time,200,Tamb(K),Rh(%),Pres(mb),Tir(K),Rain
Record,Date/Time,300,Int. Vapor(cm),Int. Liquid(mm),Cloud Base(km)
Record,Date/Time,400,LV2 Processor, 0.00, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.60, 0.7
     1,03/16/2017 00:00:25,101,401,Temperature (K)
     2,03/16/2017 00:00:25,101,402,Vapor Density (g/m^3)
     3,03/16/2017 00:00:25,101,403,Liquid (g/m^3)
     4,03/16/2017 00:00:25,101,404,Relative Humidity (%)
```

Example of one data record (explanations are based on the number in the third column after record, date, time):

31 – geolocation

201 – surface observations

401-404 Temperature, vapor density, liquid, RH profiles for zenith scan

301 – integrated quantities for zenith scan

401-404 Temperature, vapor density, liquid, RH profiles for 20deg north, 20deg south, 20deg average

301 – integrated quantities for zenith scan for 20deg north, 20deg south, 20deg average

401-404 Temperature, vapor density, liquid, RH profiles for 20deg north, 20deg south, 20deg average

301 – integrated quantities for zenith scan for 20deg north, 20deg south, 20deg average

Date/Time	Code	Label	Value1	Value2	Value3	Description	Extra1	Extra2
3/10/22 0:04	31		7/25/02 0:04	4601.8292	-7306.6046	16 Geolocation (lat/lon/height)		
3/10/22 0:04	201		272.911	73.55	1011.402	255.23 Suface obs (T, RH, p, Tir, Rain)		
3/10/22 0:06	401	Zenith		272.911	273.883	274.323 Zenith T		
3/10/22 0:06	402	Zenith		3.504	3.49	3.529 Zenith vapor density		
3/10/22 0:06	403	Zenith		0.001	0.001	0.001 Zenith liquid		
3/10/22 0:06	404	Zenith		73.55	64.335	66.369 Zenith RH		
3/10/22 0:06	301		0.777	0.011	2.5	Zenith IV, IL, CB		
3/10/22 0:06	401	Angle20(AZ-000)(N)		272.911	274.991	20deg North T	4.639	2
3/10/22 0:06	401	Angle20(AZ-000)(S)		272.911	277.462	20deg South T	8.114	2
3/10/22 0:06	401	Angle20(AZ-000)(A)		272.911	276.435	20deg average (North/South) T	6.242	
3/10/22 0:06	402	Angle20(AZ-000)(N)		3.504	3.233	20deg North vapor density		
3/10/22 0:06	402	Angle20(AZ-000)(S)		3.504	3.748	20deg South vapor density		
3/10/22 0:06	402	Angle20(AZ-000)(A)		3.504	3.878	20deg average (North/South) vapor density		
3/10/22 0:06	403	Angle20(AZ-000)(N)		0.011	0.001	20deg North liquid		
3/10/22 0:06	403	Angle20(AZ-000)(S)		0.177	0.021	20deg South liquid		
3/10/22 0:06	403	Angle20(AZ-000)(A)		0.016	0.001	20deg average (North/South) liquid		
3/10/22 0:06	404	Angle20(AZ-000)(N)		73.55	61.688	20deg North RH		
3/10/22 0:06	404	Angle20(AZ-000)(S)		73.55	71.727	20deg South RH		
3/10/22 0:06	404	Angle20(AZ-000)(A)		73.55	71.662	20deg average (North/South) RH		
3/10/22 0:06	301		0.766	0.046	4.5	20degNorth IV, IL, CB		
3/10/22 0:06	301		2.719	3.03	4.5	20degSouth IV, IL, CB		
3/10/22 0:06	301		1.64	0.524	4.5	20degAverage IV, IL, CB		

10. General Dataset Description

The instrument had a blower working constantly to keep the surface free of snow. Snow around the area was constantly removed. Instrument was calibrated during the installation. Data were visually inspected, and no instrument failure was observed. The instrument was deployed so that "north" is at magnetic north and "south" is at magnetic south. Level0 and level1 data were also recorded and can be requested from the PI.

11. File Names

WINTRE-MIX_Radiometer_CU@Sorel_2022-02-05_18-25-48_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-05_18-26-34_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-05_19-34-56_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-06_00-04-06_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-07_00-04-05_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-08_00-04-05_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-09_00-04-05_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-10_00-04-05_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-11_00-04-05_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-12_00-04-05_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-13_00-04-05_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-14_00-04-08_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-02-15_00-04-05_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-03_19-09-26_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-04_00-04-08_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-05_23-07-24_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-06_14-07-32_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-07_00-04-09_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-07_14-22-50_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-08_00-04-09_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-09_00-04-08_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-10_00-04-14_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-11_00-04-10_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-12_00-04-11_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-13_00-04-09_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-14_00-04-12_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-15_00-04-11_lv2.csv
WINTRE-MIX_Radiometer_CU@Sorel_2022-03-16_00-04-22_lv2.csv

12. GCMD Keywords - See

http://gcmdservices.gsfc.nasa.gov/static/kms/sciencekeywords/sciencekeywords.csv?ed_wiki_keywords_page

13. Publications –

Bianco, L., K. Friedrich, J. Wilczak, D. Hazen, D. Wolfe, R. Delgado, S. Oncley, and J. K. Lundquist, 2017: Assessing the accuracy of microwave radiometers and radio acoustic sounding systems for wind energy applications. Atmos. Meas. Tech., 10, 1707-1721, doi:10.5194/amt-10-1707-2017

Friedrich, K., J. K. Lundquist, M. Aitken, E. A. Kalina, and R. F. Marshall, 2012: Stability and turbulence in the atmospheric boundary layer: A comparison of remote sensing and tower observations. Geophys. Res. Lett., Vol. 39, No. 3, L03801, doi:10.1029/2011GL050413.