

**CFI Climate Sentinels Trois-Rivières MRR-Pro data (Trois-Rivières, Québec)**  
**[UQAM]**

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**1. Data Set Description**

- 1.1. Introduction:** This dataset contains data from a METEK vertically profiling K-band Micro Rain Radar Pro (MRR-Pro) that was temporarily installed at the Université du Québec à Trois-Rivières (UQTR) campus during February and March 2022 to support the Winter Precipitation Type Research Multi-Scale Experiment (WINTRE-MIX). The instrument provides vertical profiles of reflectivity, Doppler

velocity, and spectrum width. The site sits in the St. Lawrence River Valley. Several other sites also collected MRR data during WINTRE-MIX. Data from these other sites will also be made available in the WINTRE-MIX data archive ([https://data.eol.ucar.edu/master\\_lists/generated/wintre-mix/](https://data.eol.ucar.edu/master_lists/generated/wintre-mix/)).

**1.2. Data version:** v1.0, 28 June 2022

**1.3. Time period covered:** 1 February 2022 – 31 March 2022

**1.4. Location:**

- The MRR-Pro was mounted on a small tripod located at UQTR campus (Fig. 1), co-located with other meteorological instruments. The approximate location is shown in Fig. 2. The MRR-Pro emitter was 1 m above the ground.
- Latitude: 46.349835°
- Longitude: -72.581354°
- Elevation: 48 m MSL

**1.5. Data frequency:** 60 seconds

**1.6. Web address:** <https://doi.org/10.26023/1042-VCN5-QA0E>

Preliminary MRR-Pro data are visualized as “quick look” plots on the WINTRE-MIX field catalog ( <https://catalog.eol.ucar.edu/wintre-mix/114/date/> ).

**1.7. 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](https://www.eol.ucar.edu/system/files/Data_Management_Plan-1Dec2021.pdf)) for more information regarding dataset restrictions and dissemination.



Fig. 1. Photos of the Trois-Rivières site and MRR-Pro.





Fig. 2. Approximate location of the Trois-Rivières MRR-Pro radar.

## 2. Instrument Description

A METEK K-band FM-CW Micro Rain Radar-Pro (MRR-Pro, <http://metek.de/product/mrr-pro/>) was temporarily installed at the Université du

Québec à Trois-Rivières (UQTR) campus during February and March 2022 (Fig. 1). The attributes of the MRR are summarized in Table 1. More detailed technical information on the MRR-Pro is available in METEK (2018).

*Table 1: Technical specifications and configuration settings for the MRR-Pro*

<b><u>Parameter</u></b>	<b><u>Value</u></b>
Transmit power	50 mW
Frequency	24,23 GHz
Number of range gates	128
Range resolution used	50 m
Raw data collection frequency	60 s

### **3. Data Collection and Processing**

The MRR-Pro was configured to collect data every 60 seconds with a 50-m range gate spacing (Table 1). Antenna heating was used to prevent accumulation of snow and ice on the dish. MRR-Pro data are processed by MRR-Pro software with version 1.1.23. Data is output in a netcdf format.

### **4. Data format**

Files are daily, containing 24 hours of data, and are named with the following format: *TR\_MRRPRO\_YYYYMMDD.nc* where *YYYYMMDD* is the date of data collection in UTC.

The data is provided in netCDF4 format. The derived variables are listed in Table 2. Additional metadata is provided in the netCDF file.

Table 2: Variables recorded in processed data files

<u>Field Name</u>	<u>Description</u>	<u>Unit</u>
Za	Log attenuated reflectivity	dBZ
Z	Log reflectivity	dBZ
Zea	Log attenuated equivalent reflectivity factor	dBZ
Ze	Log equivalent reflectivity factor	dBZ
RR	Rainfall rate	mm h <sup>-1</sup>
LWC	Mass concentration of liquid water in air	g m <sup>-3</sup>
PIA	Path integrated rain attenuation	dB
VEL	Radial velocity of scatterers towards instrument	m s <sup>-1</sup>
WIDTH	Doppler spectrum width	m s <sup>-1</sup>
ML	Melting layer	-
SNR	Signal to noise ratio	dB
index_spectra	Index variable spectra	-
spectrum_raw	Log attenuated power	dB
N	Drop size distribution	-

## 5. Data Remarks

No major data artifacts were noticed in review of the data. Some spurious weak echos are occasionally found above 5 km MSL in the data, perhaps associated with local sources of microwave interference. Table 3 summarizes the only 2 interruptions > 10 minutes that occurred during the instrument deployment.

Table 3: Summary of missing data

Interruption length [hours]	Start	End
0.4	2022-02-05 07:59:00	2022-02-05 08:23:00
0.5	2022-03-27 00:59:00	2022-03-27 01:29:00

## 6. Acknowledgment

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## 7. References

\*METEK, 2018: Micro-Rain-Radar MRR-2 and MRR-Pro a Tutorial. *METEK GmbH*.

\* *Metek MRR manual is provided as attachment.*

## 8. Appendix

Suggested GCMD keywords to accompany this dataset are provided below in no particular order:

- Solid precipitation
- Frozen precipitation
- Precipitation profiles
- Melting layer height
- Rain
- Freezing rain
- Drizzle
- Freezing drizzle
- Ice pellets
- Snow
- Ice storms
- Snow storms

- Extratropical cyclones
- Radar
- Doppler velocity
- Radar reflectivity
- Spectrum width