



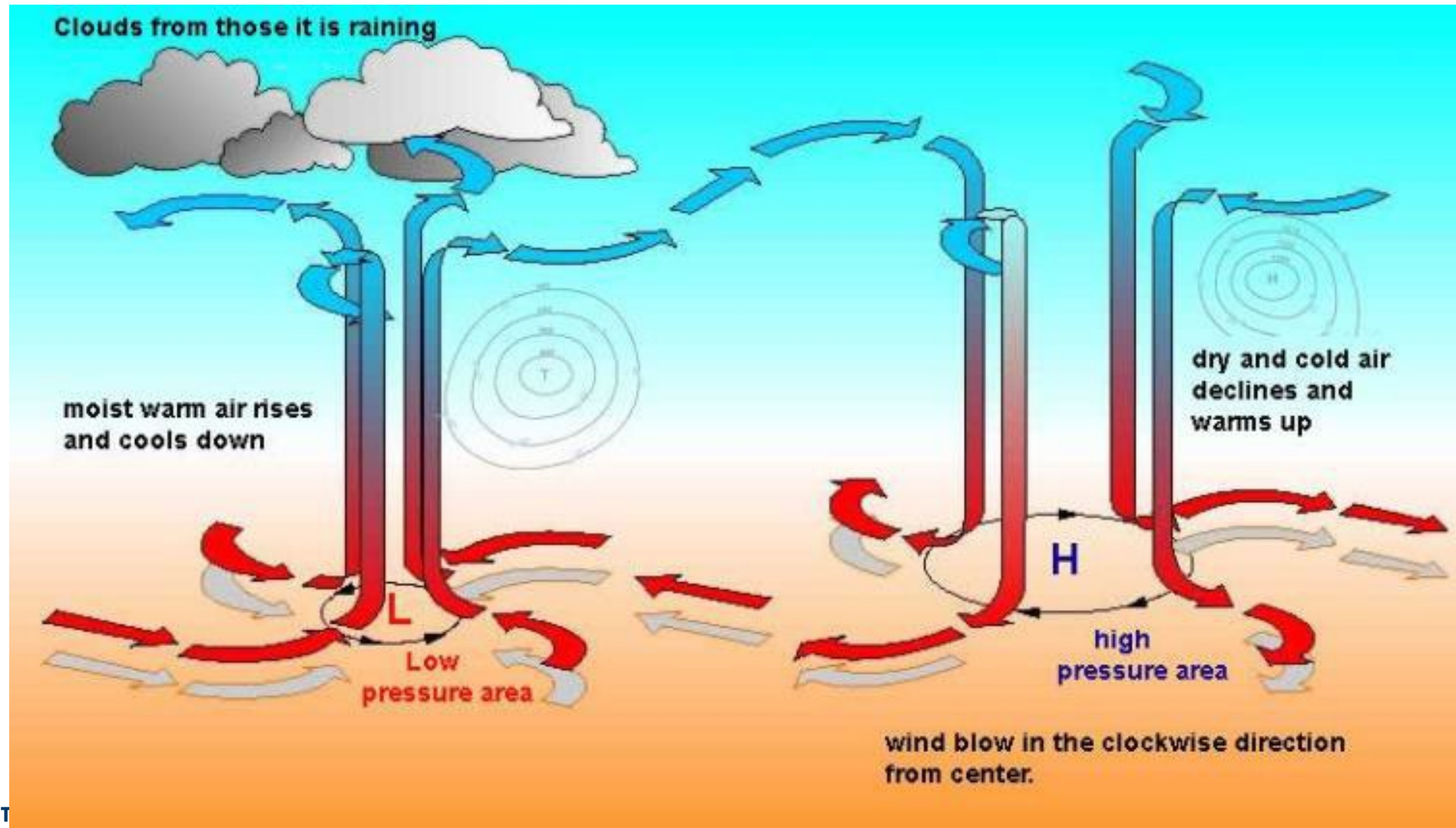
# Weather Anomalies and Radon Measurements

Joshua Kerber | Research Scientist

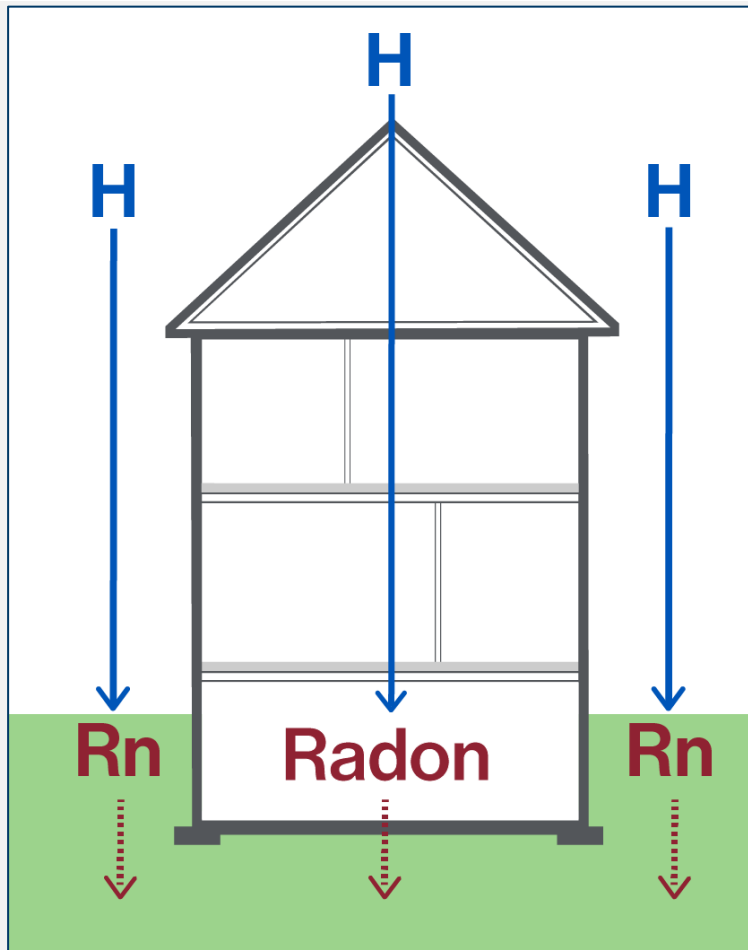
10/31/2023 – AARST International Radon Symposium – Practice and Policy Track

PROTECTING, MAINTAINING AND IMPROVING THE HEALTH OF ALL MINNESOTANS

# Weather Systems

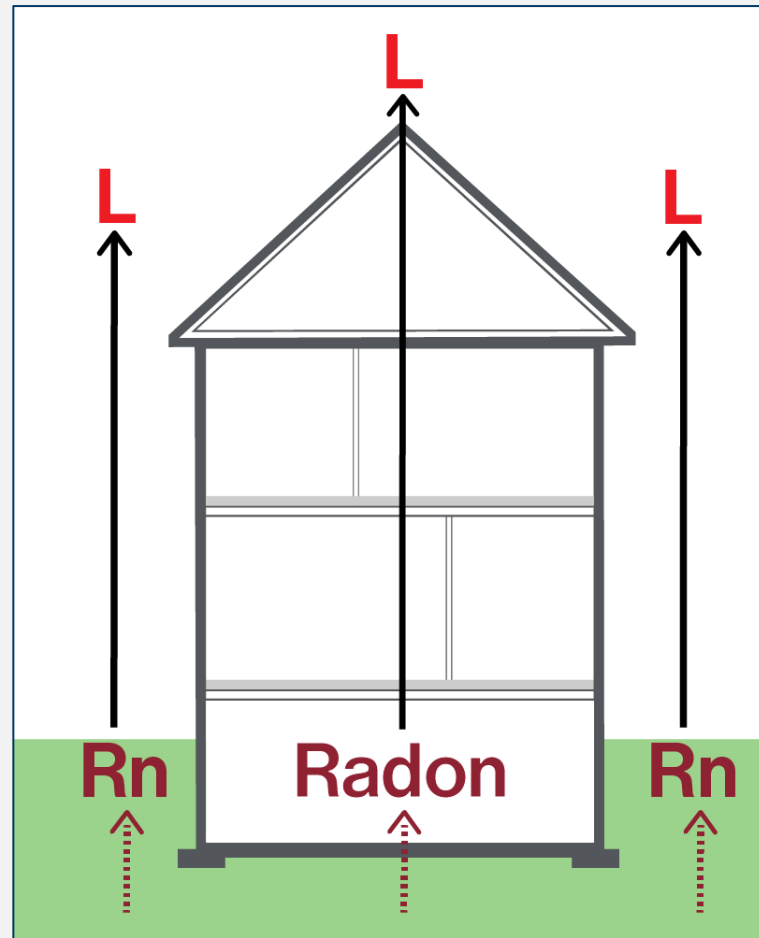


# Weather – High Pressure

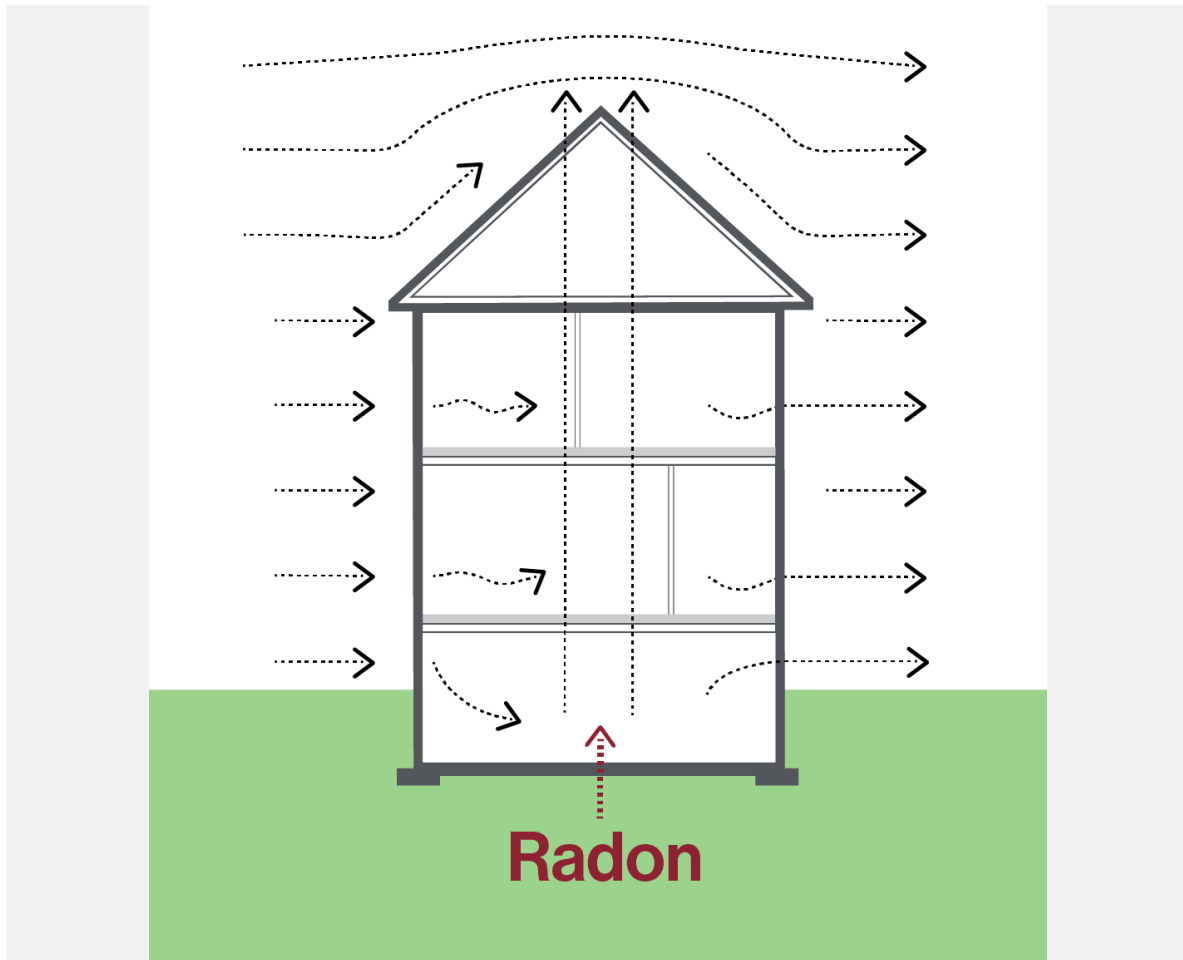


- Rising barometric pressure may reduce the amount of radon leaving the ground and lower radon levels in homes
  - The atmosphere is pushing on the soil

# Weather – Low Pressure

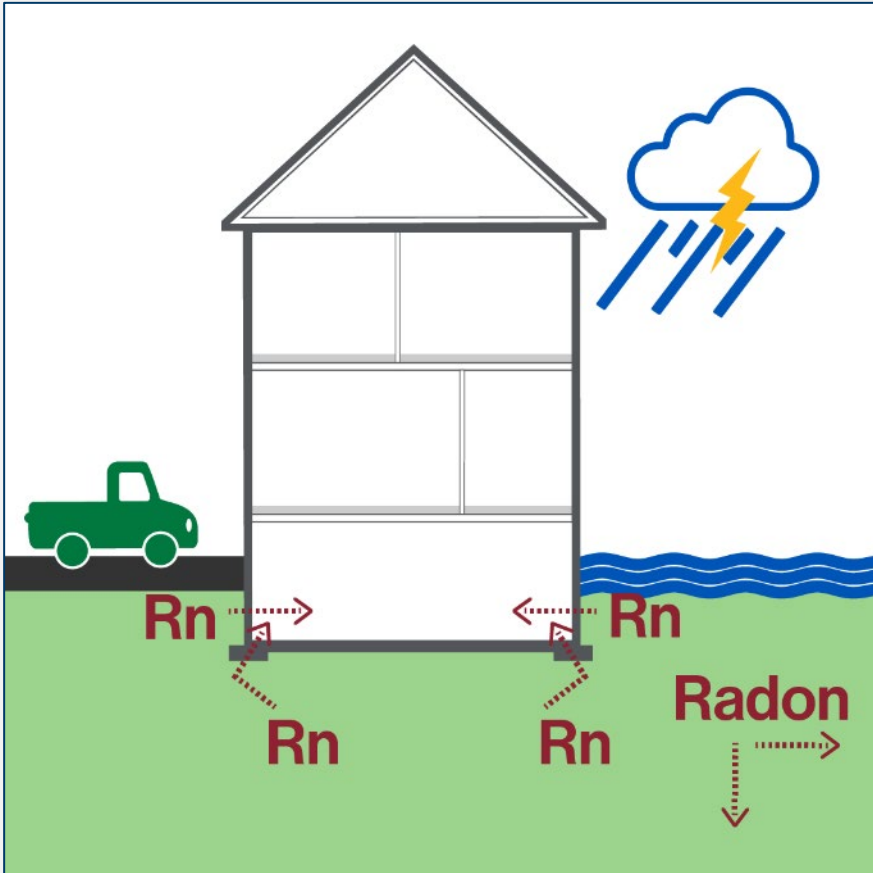


- Falling barometric pressure may increase the amount of radon leaving the ground and increase radon levels in homes
- The atmosphere is pulling on the soil



- Increasing wind speed can change stack pressure and can increase radon levels in homes
  - Especially on hillsides

# Hydraulic Pressure



- Rainfall or melting snow can increase indoor radon
- Adjacent slabs can contribute too

# Finding Local Weather Data

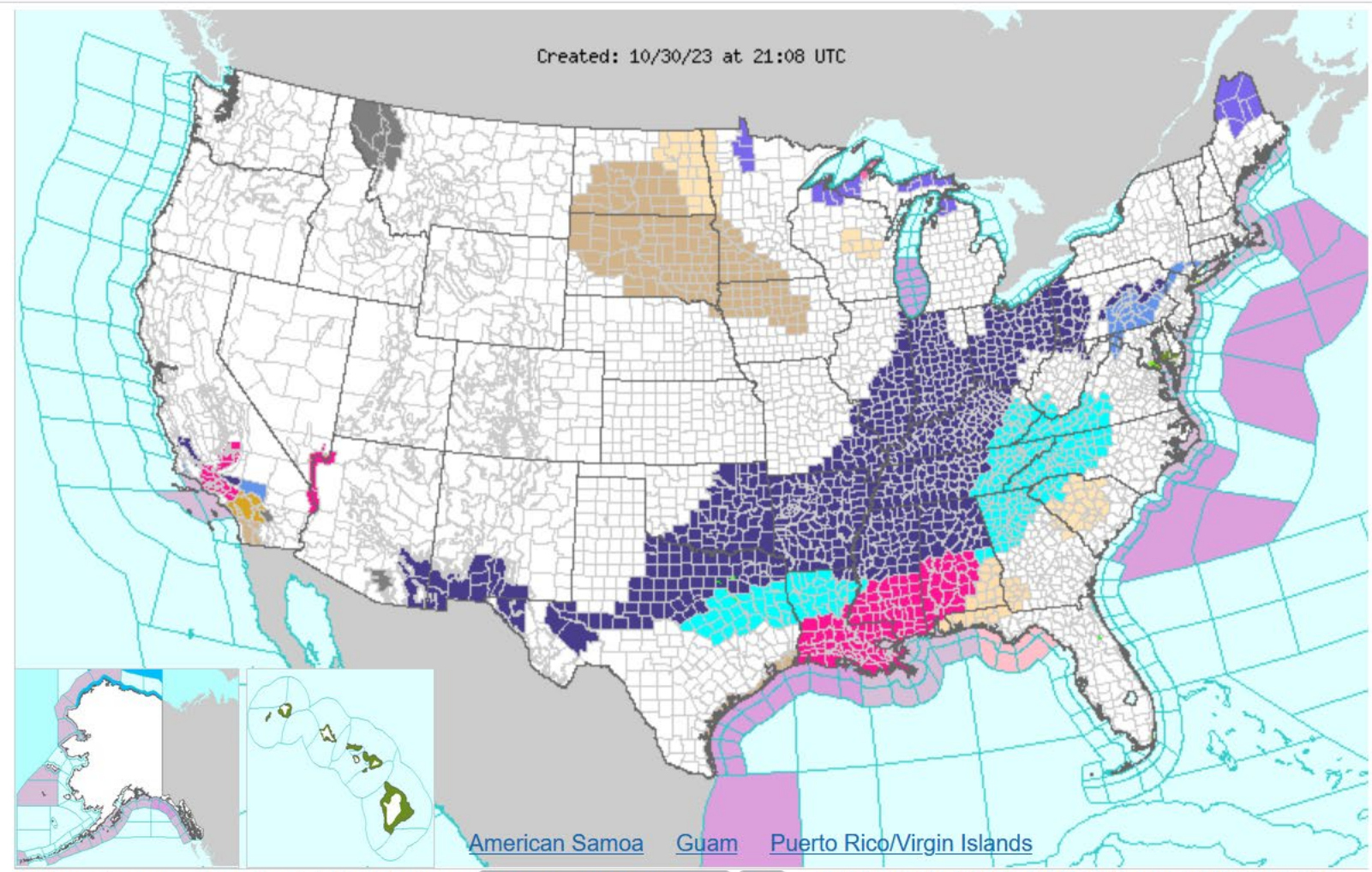
- National Weather Service (NWS) has a three-day rolling data set: [weather.gov](https://weather.gov)
  - Primary Data Source
- Midwestern Regional Climate Center @ Purdue University: <https://mrcc.purdue.edu/CLIMATE/>
  - Non-commercial data source

### Customize Your Weather.gov

Enter Your City, ST or ZIP Code

 Remember Me

**Get Weather**  
[Privacy Policy](#)



Click on the map above for detailed alerts or [Warnings By State](#)  [Public Alerts in XML/CAP v1.2 and ATOM Formats](#)

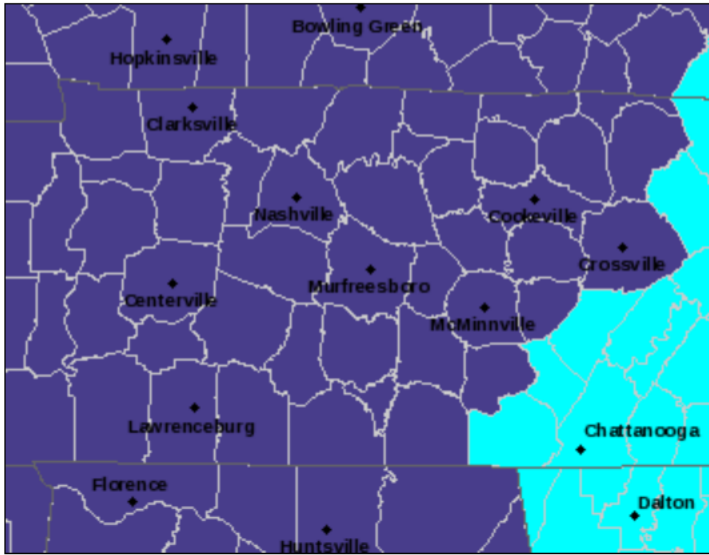




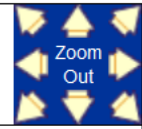
Probability of freezing temperatures late tonight/early Tuesday morning

[Hide Caption](#)

Click a location below for detailed forecast.

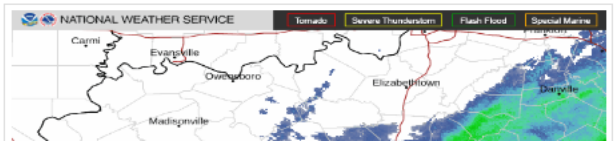


[Watches, Warnings & Advisories](#)

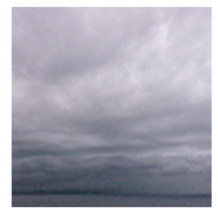


- [Freeze Warning](#)
- [Freeze Watch](#)
- [Fire Weather Watch](#)
- [Hazardous Weather Outlook](#)

Last Map Update: Mon, Oct. 30, 2023 at 4:10:27 pm CDT



Current conditions at  
**John C Tune Airport (KJWN)**  
Lat: 36.19°N Lon: 86.88°W Elev: 492ft.



Overcast  
**43°F**  
6°C

**Humidity** 93%  
**Wind Speed** N 7 mph  
**Barometer** 30.15 in  
**Dewpoint** 41°F (5°C)  
**Visibility** 9.00 mi  
**Wind Chill** 39°F (4°C)  
**Last update** 30 Oct 3:50 pm CDT

- More Information:**  
[Local Forecast Office](#)  
[More Local wx](#)  
[3 Day History](#)  
[Mobile Weather](#)  
[Hourly Weather Forecast](#)

Extended Forecast for  
**2 Miles NNE Nashville TN**

**i** Click here for hazard details and duration

This Afternoon	Tonight	Tuesday	Tuesday Night	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday
Slight Chance Showers	Mostly Cloudy then Areas Frost	Frost then Sunny	Mostly Clear then Frost	Frost then Sunny	Clear then Frost	Frost then Sunny	Mostly Clear	Areas Frost then Sunny
High: 50 °F	Low: 31 °F	High: 50 °F	Low: 26 °F	High: 40 °F	Low: 28 °F	High: 50 °F	Low: 35 °F	High: 65 °F

weather.gov  
**Weather observations for the past three days**  
**John C Tune Airport**

Enter Your "City, ST" or zip code  Go metric

Date	Time (cdt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (°F)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour					altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
								Max.	Min.								
30	15:50	N 7	9.00	Overcast	BKN012 OVC017	43	41			93%	39	NA	30.15	NA			
30	14:50	NW 7	9.00	Overcast	BKN009 BKN019 OVC042	43	41			93%	39	NA	30.14	NA			
30	13:50	NW 7	4.00	Light Rain	FEW008 SCT014 BKN020	43	41			93%	39	NA	30.12	NA			
30	12:50	NW 10	6.00	Light Rain	BKN013	45	43			93%	40	NA	30.17	NA			
30	11:50	NW 10	4.00	Light Rain	BKN014 BKN019	45	43			93%	40	NA	30.18	NA			
30	10:50	NW 10	6.00	Light Rain	BKN013 BKN018	45	43			93%	40	NA	30.17	NA			
30	09:50	N 6 G 14	10.00	Overcast	OVC013	46	43			87%	43	NA	30.13	NA			
30	08:50	N 7	2.00	Mostly Cloudy	SCT016 SCT034 BKN043	45	45			100%	41	NA	30.12	NA			
30	07:50	NW 9 G 17	8.00	Overcast	FEW014 BKN018 OVC044	46	45			93%	41	NA	30.11	NA			

New website and server migration IN PROGRESS! Service disruptions are possible at this time. We apologize for any inconvenience.



Hi Joshua!  
Log out

**CURRENT DAILY STATION INFORMATION:**

Station Name: CHAMPAIGN 3S  
County: CHAMPAIGN  
State: IL

More Info

Select Daily Station

Synchronize Stations



**CURRENT HOURLY STATION INFORMATION:**

Station Name: NASHVILLE INTL AP  
County: DAVIDSON  
State: TN

More Info

Select Hourly Station



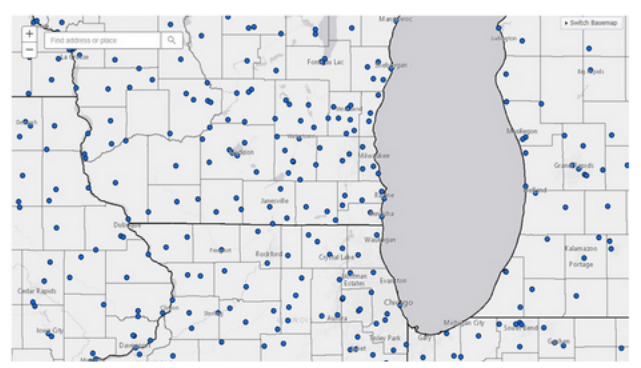
Privacy Policy

- Daily-Observed Data ▶
- Hourly-Observed Data ▶
- Climate Division Data ▶
- State Data ▶
- Gridded Data ▶
- Maps of Data ▶
- Charts and Graphs ▶
- Help ▶

Send Feedback

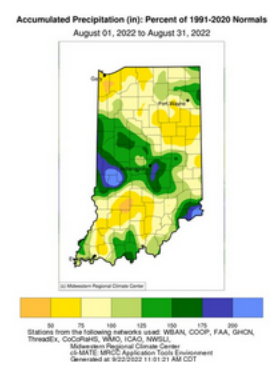
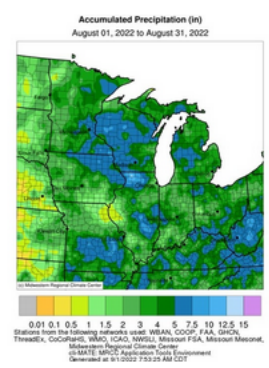
Welcome to **cli-MATE**, the Midwestern Regional Climate Center's online data portal. If you are unsure of how to get started, we have resources for you in the "Help" section, located in the menu to the left. Should you have any issues while working in cli-MATE, please report them [here](#).

**Featured Products**



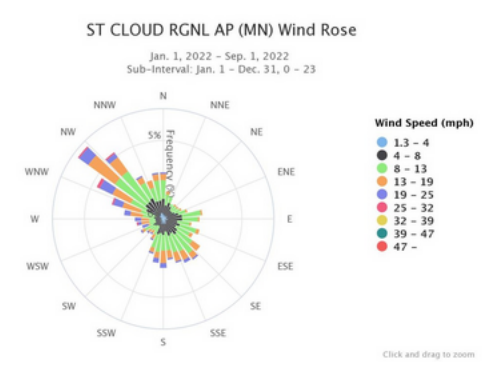
**Daily Station Selector Tool**

Choose the daily station of interest by using a map, where you can select from multiple climate



**Interpolated Maps**

Create temperature and precipitation maps for customized time frames, data networks, and regions



**Wind Rose**

Create plots showing the distribution of hourly wind speed and direction for a chosen location and date

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State: IL

More Info

Select Daily Station

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Station Name: NASHVILLE INTL AP  
County: DAVIDSON  
State: TN

More Info

Select Hourly Station

Synchronize Stations <



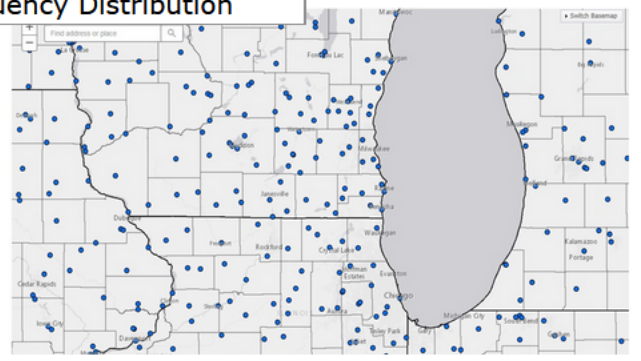
Privacy Policy

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- Daily-Observed Data ▶
- Hourly-Observed Data ▶**
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- Charts and Graphs ▶
- Help ▶

- Sub-Daily ▶**
- Sub-Daily Data Lister**
- Daily ▶
- Threshold Search
- Wind Rose
- Frequency Distribution

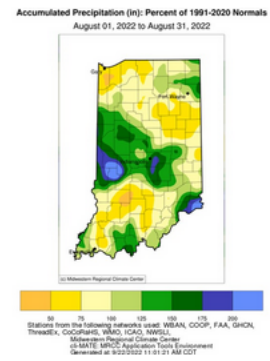
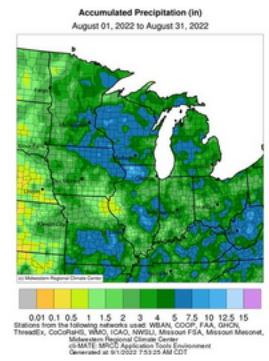
Send Feedback



**Daily Station Selector Tool**

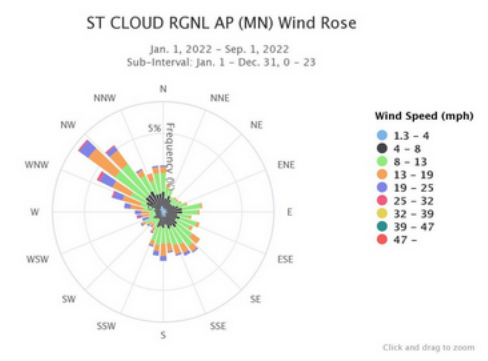
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- Help ▶

Send Feedback

More Info Stations More Info Privacy Policy  
Select Hourly Station > Select Daily Station

### SUB-DAILY DATA LISTER

#### ASOS/AWOS Selection

**Date**

Custom    Last 7 Days   **Beginning Date:** October 1 2023

Last Month    Yesterday & Today   **Ending Date:** October 10 2023

This Month

**Sub-Interval Window**

Start Date: January 1   Start Hour: 00 (times in local standard time)

End Date: December 31   End Hour: 24

Select All   Clear All

**Raw Data**

<input checked="" type="checkbox"/> Temperature	<input checked="" type="checkbox"/> Wind Speed	<input type="checkbox"/> Cloud Height - Lowest	<input checked="" type="checkbox"/> Atmospheric Pressure	<input checked="" type="checkbox"/> Visibility
<input checked="" type="checkbox"/> Relative Humidity	<input checked="" type="checkbox"/> Wind Direction	<input type="checkbox"/> Cloud Height - Middle	<input checked="" type="checkbox"/> Sea Level Pressure	<input checked="" type="checkbox"/> Precipitation
<input checked="" type="checkbox"/> Dew Point Temperature	<input checked="" type="checkbox"/> Wind Gust	<input type="checkbox"/> Cloud Height - Highest	<input checked="" type="checkbox"/> Altimeter	

**Derived Data**

Wind Chill Temperature    Heat Index

Product Description   **Plot Data**   **Get Tabular Data**

Data Selector

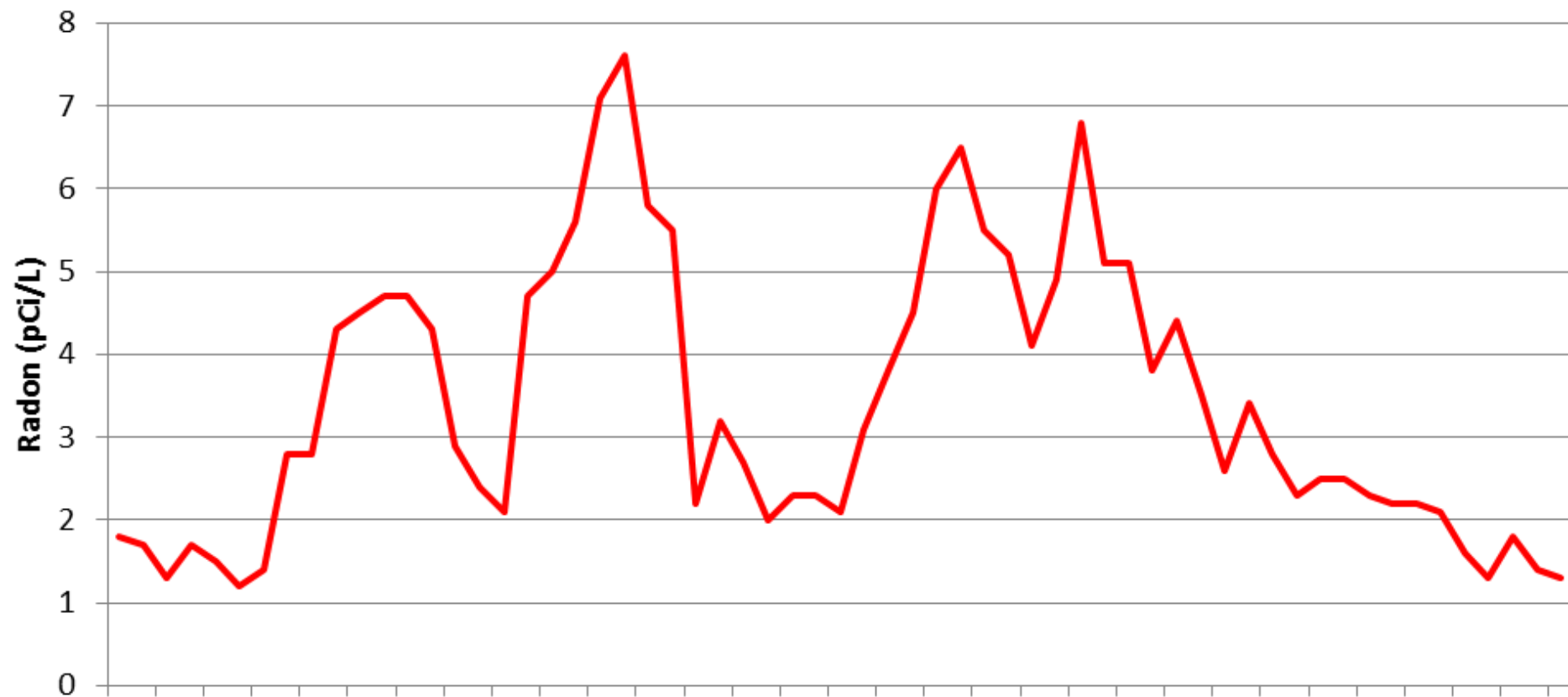
- See Data Values
- Data CSV Version**
- Product Description

Send Feedback

**Sub-Daily Data Between Two Dates**  
**NASHVILLE INTL AP (TN)**  
**13897**  
**Lat/Lon/Elev: 36.1189/-86.6892/600 ft**

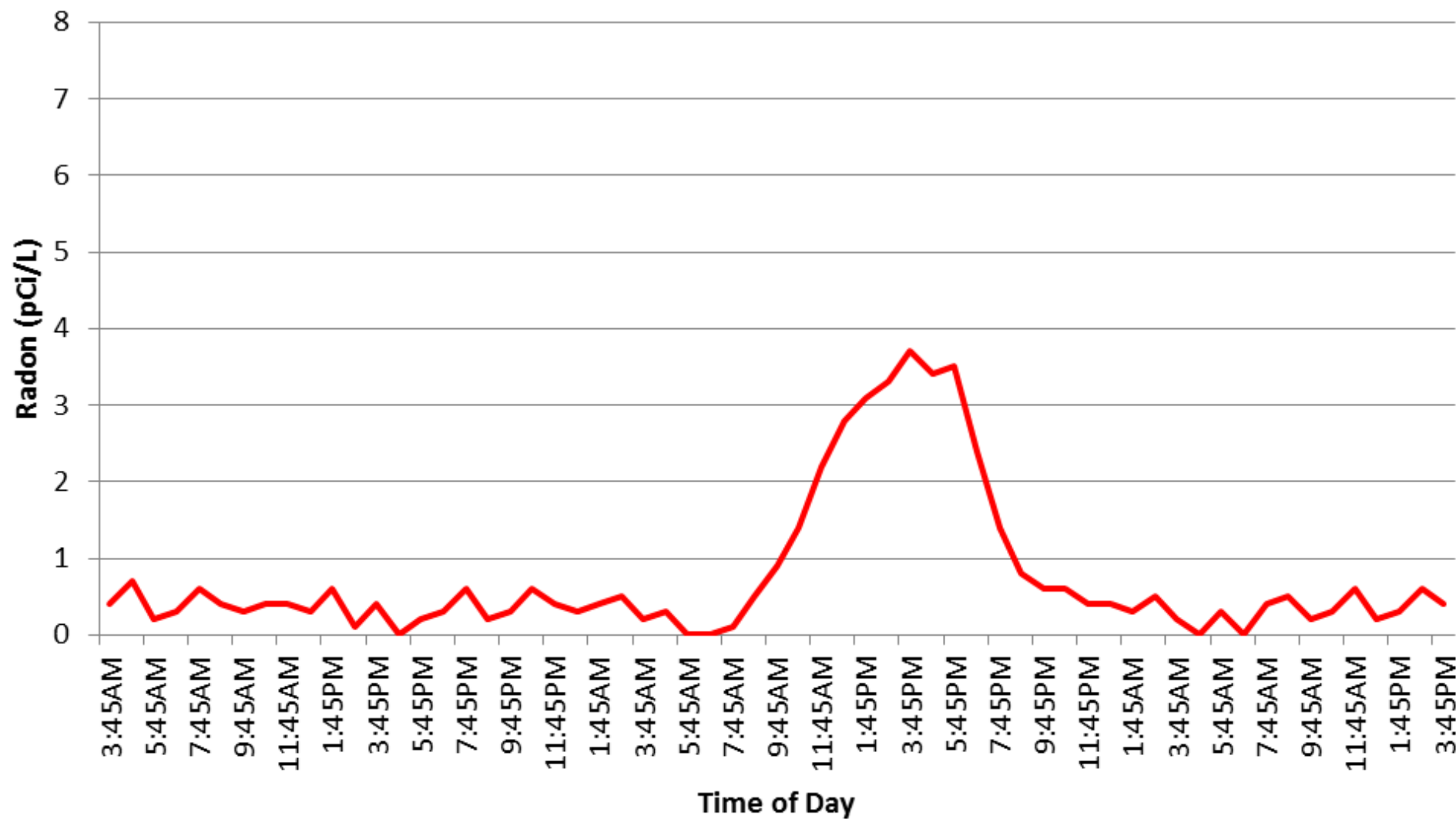
Date	Time	Temp (F)	RH (%)	Dewpt (F)	Wind Spd (mph)	Wind Direction (deg)	Peak Wind Gust(mph)	Visibility (mi)	Atm Press (hPa)	Sea Lev Press (hPa)	Altimeter (hPa)	Precip (in)	Wind Chill (F)	Heat Index (F)
2023-10-01	00:53	65	90	62	0	0	0	10	1000.30	1021.50	1022.40	0.00	NC	NC
2023-10-01	01:53	64	90	61	0	0	0	9	999.90	1021.30	1022.00	0.00	NC	NC
2023-10-01	02:53	65	87	61	3	10	m	10	999.90	1021.40	1022.00	0.00	NC	NC
2023-10-01	03:53	64	87	60	3	20	m	10	1000.60	1022.00	1022.70	0.00	NC	NC
2023-10-01	04:53	64	87	60	3	40	m	10	1001.30	1022.50	1023.40	0.00	NC	NC
2023-10-01	05:53	62	88	59	0	0	0	8	1001.60	1023.20	1023.70	0.00	NC	NC
2023-10-01	06:53	65	87	61	0	0	0	10	1001.90	1023.60	1024.00	0.00	NC	NC
2023-10-01	07:53	72	73	63	3	60	m	10	1002.60	1023.90	1024.70	0.00	NC	NC
2023-10-01	08:53	76	62	62	3	M	m	10	1002.90	1024.20	1025.10	0.00	NC	NC
2023-10-01	09:53	80	54	62	5	M	m	10	1002.60	1024.00	1024.70	0.00	NC	NC
2023-10-01	10:53	84	43	59	6	40	0	10	1002.30	1023.60	1024.40	0.00	NC	84
2023-10-01	11:53	87	38	59	5	M	m	10	1001.60	1023.10	1023.70	0.00	NC	86
2023-10-01	12:53	84	40	57	7	350	0	10	1000.60	1022.10	1022.70	0.00	NC	83
2023-10-01	13:53	87	36	57	5	M	m	10	999.90	1021.40	1022.00	0.00	NC	86
2023-10-01	14:53	87	36	57	3	M	m	10	999.60	1020.80	1021.70	0.00	NC	86
2023-10-01	15:53	85	37	55	7	100	0	10	999.30	1020.70	1021.30	0.00	NC	84
2023-10-01	16:53	83	40	56	7	50	0	10	999.60	1020.90	1021.70	0.00	NC	82
2023-10-01	17:53	80	45	57	7	70	0	10	999.60	1021.10	1021.70	0.00	NC	NC
2023-10-01	18:53	77	54	59	5	70	m	10	999.90	1021.50	1022.00	0.00	NC	NC
2023-10-01	19:53	75	58	59	3	50	m	10	1000.60	1022.00	1022.70	0.00	NC	NC

# Radon

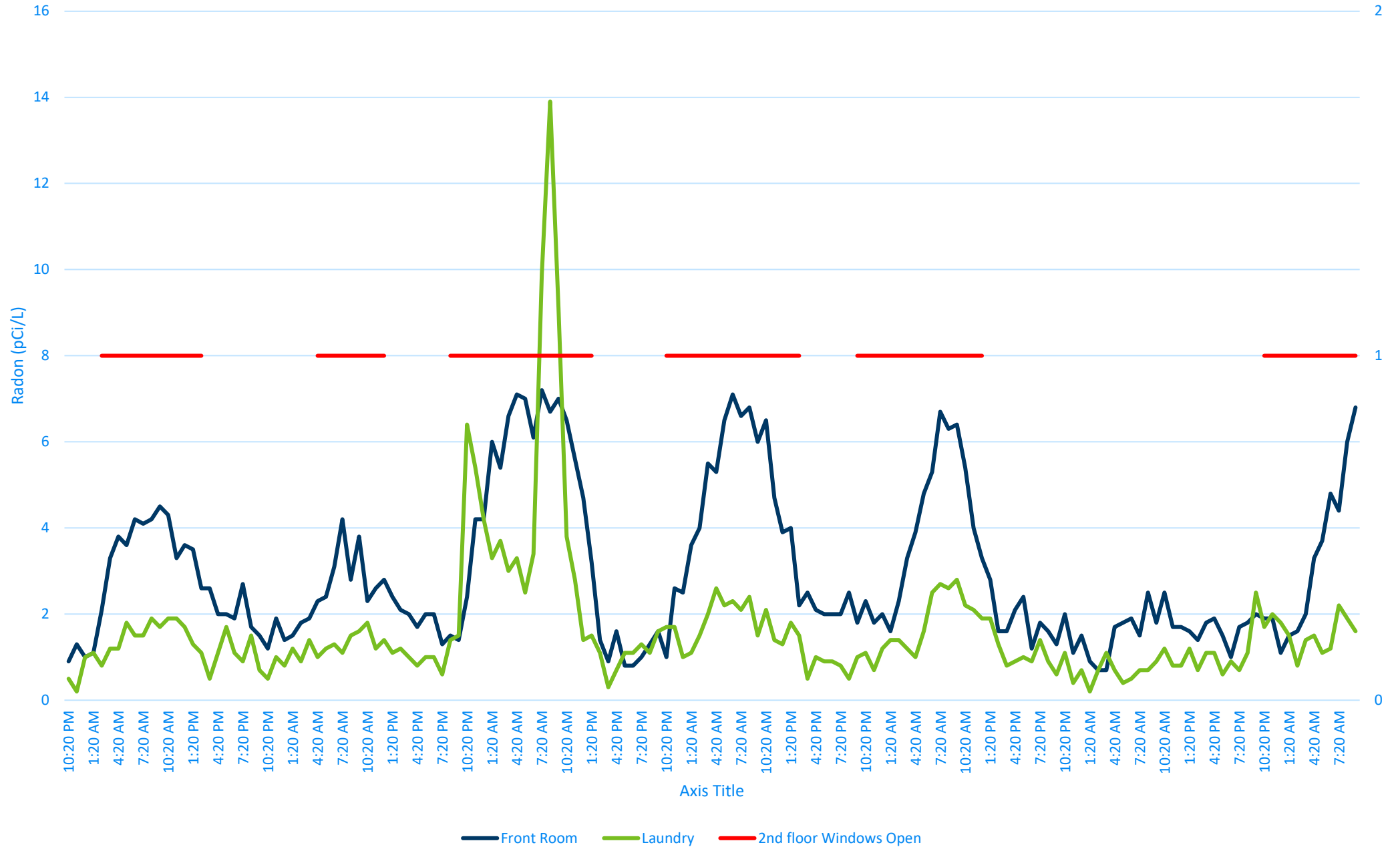




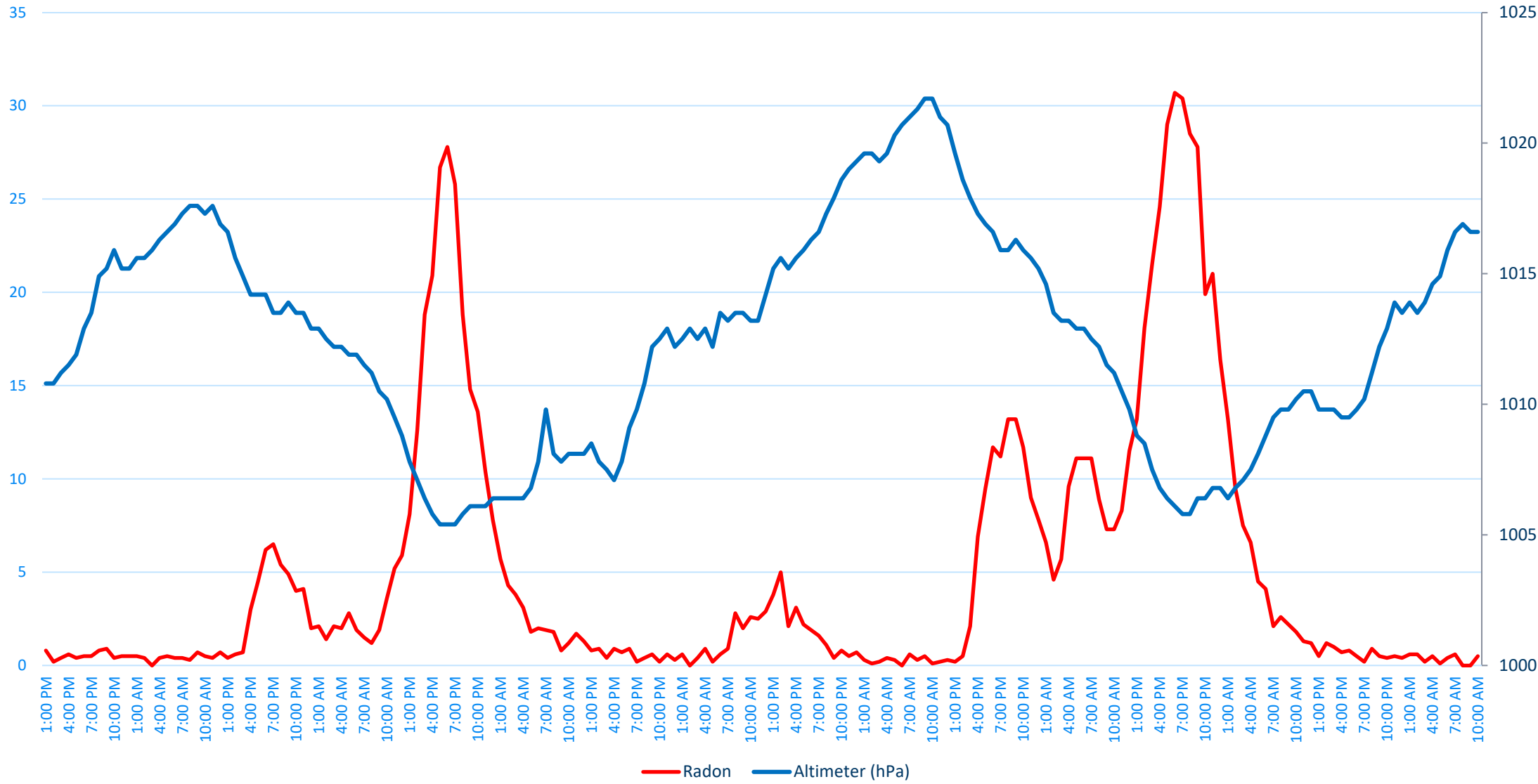
# Radon



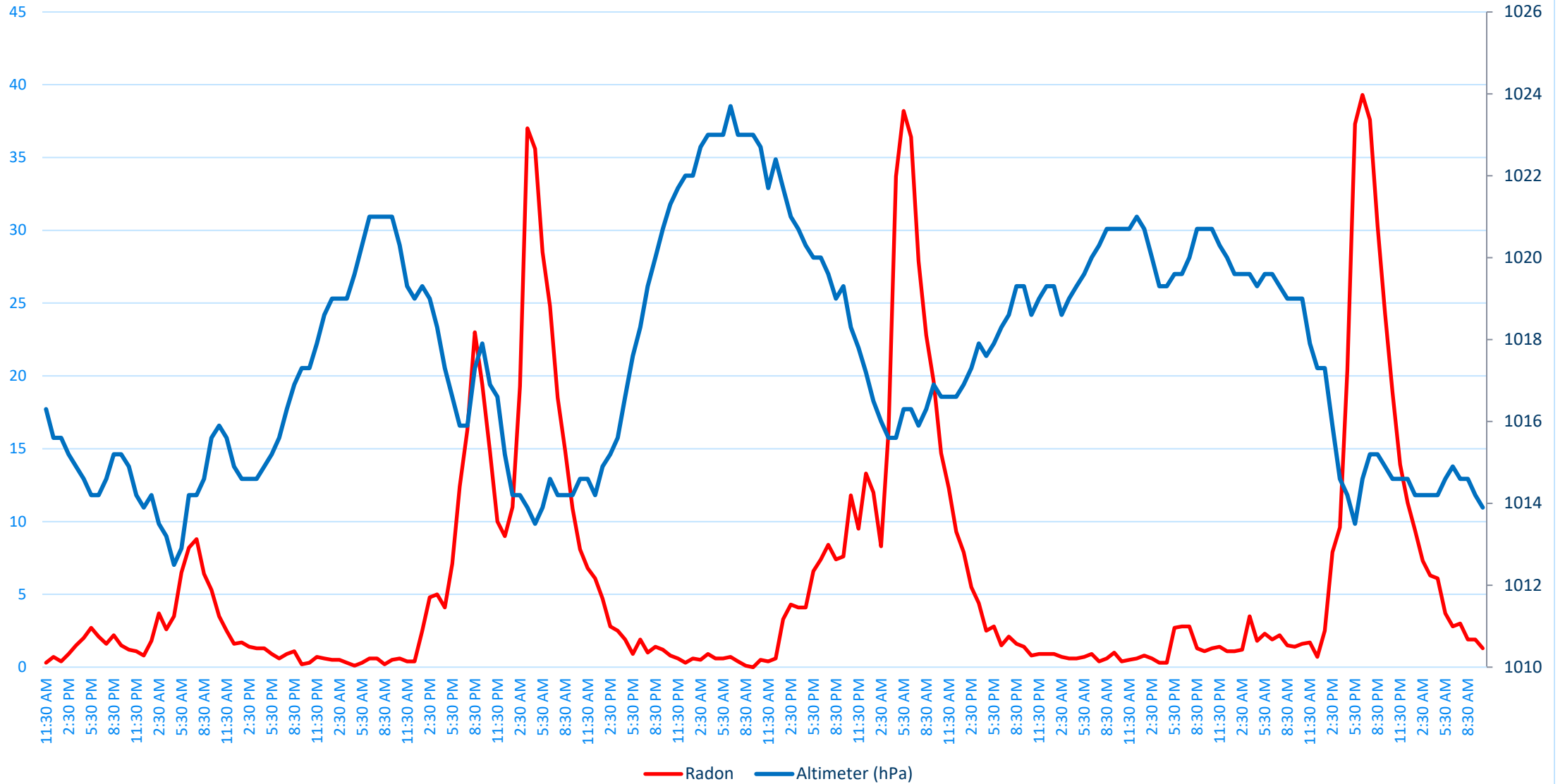
# Division Street - Damper Closed



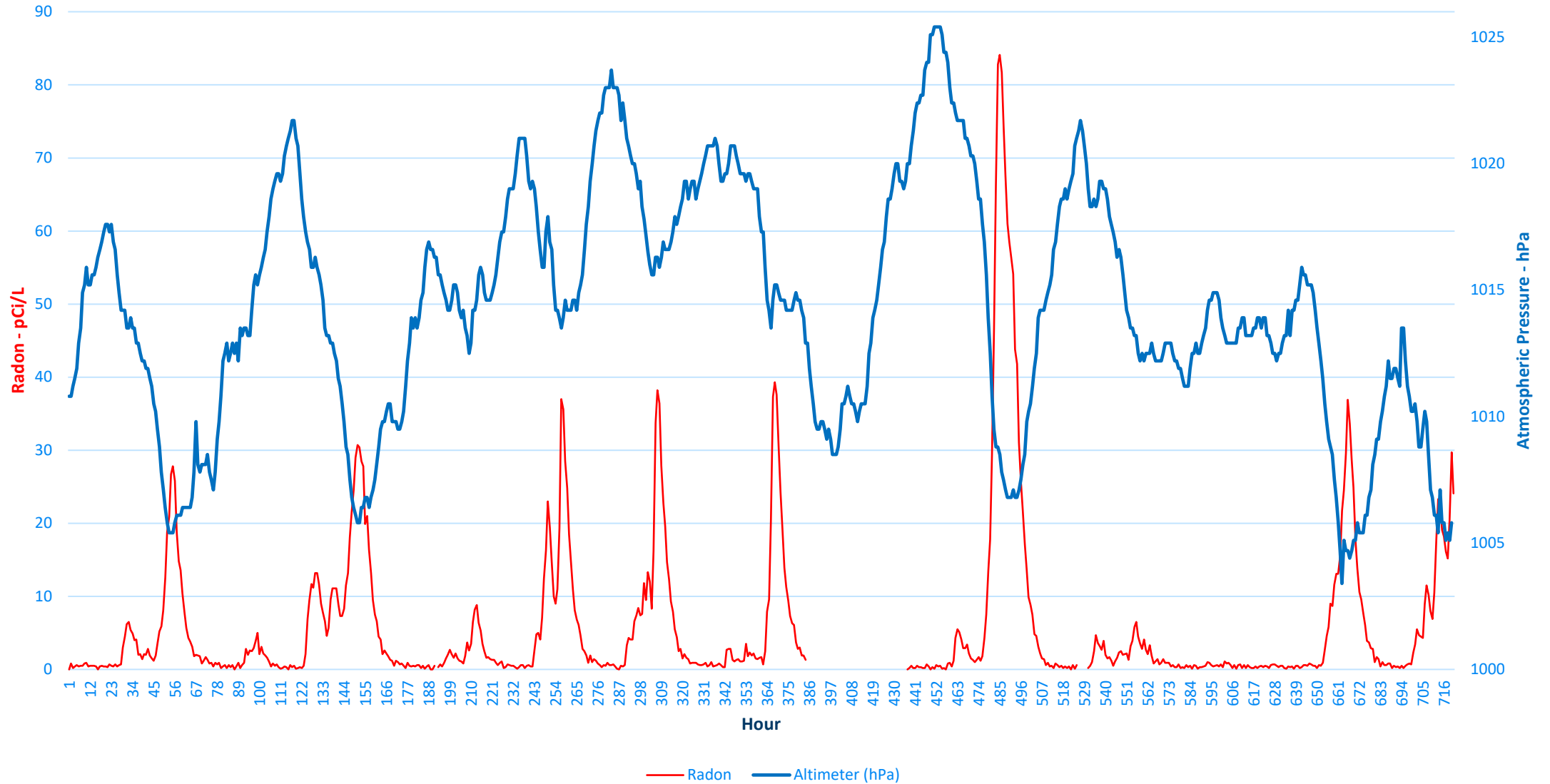
# Radon April 18-26



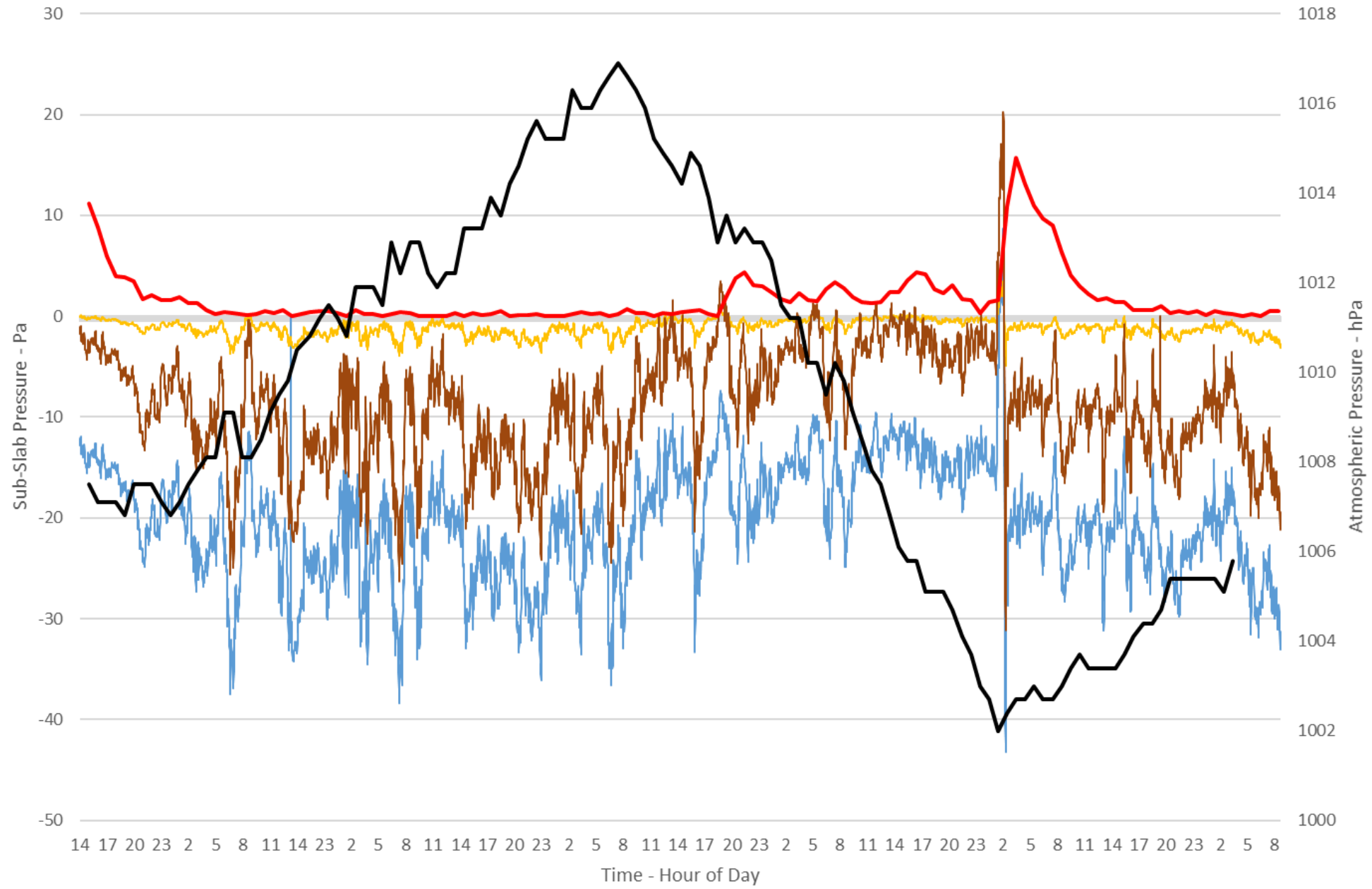
# Radon April 26-May 4



# Hourly Radon and Atmospheric Pressure | April - May 2019

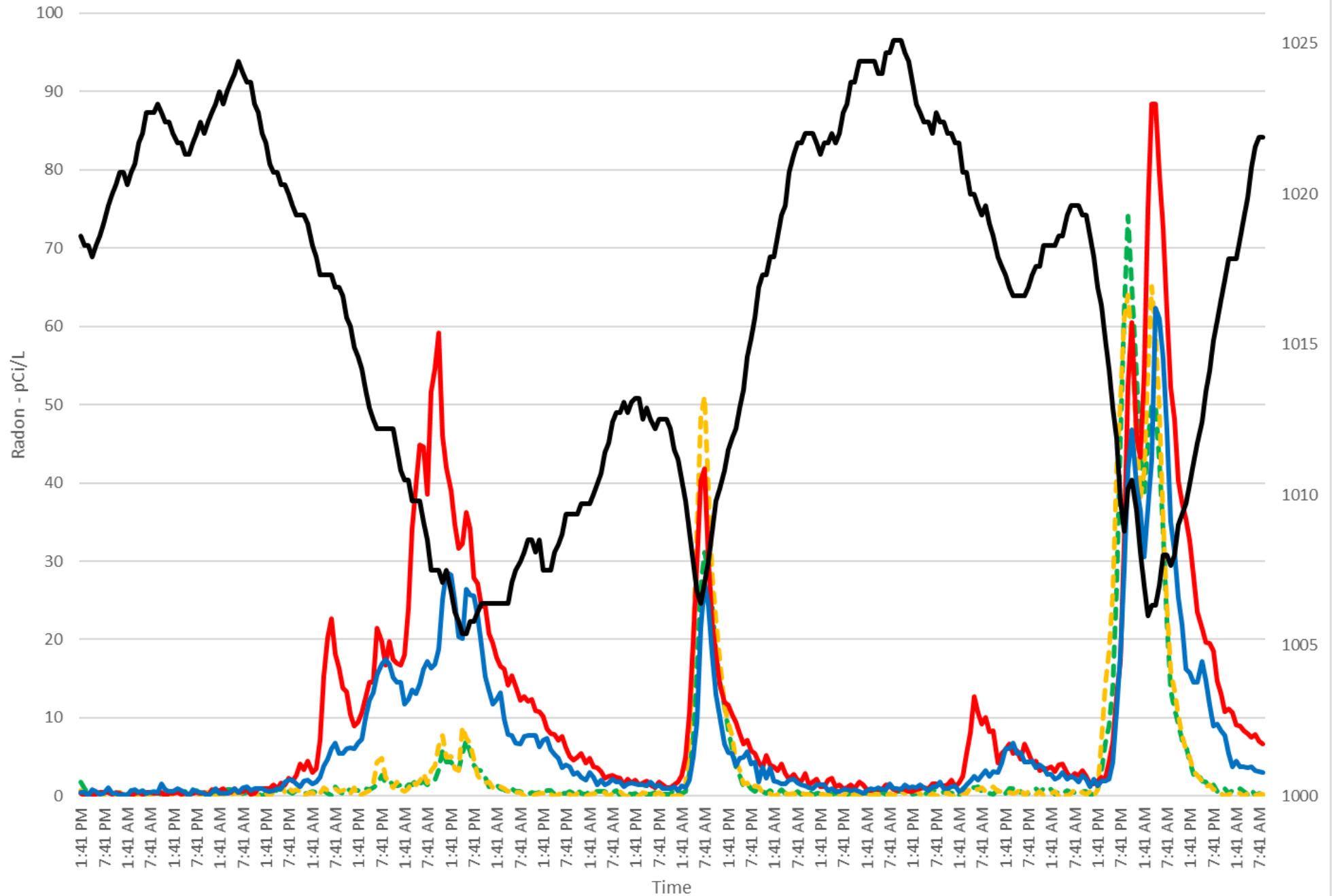


Pressure Field Extension by Minute vs Hourly Atmospheric Pressure June 19-25, 2019



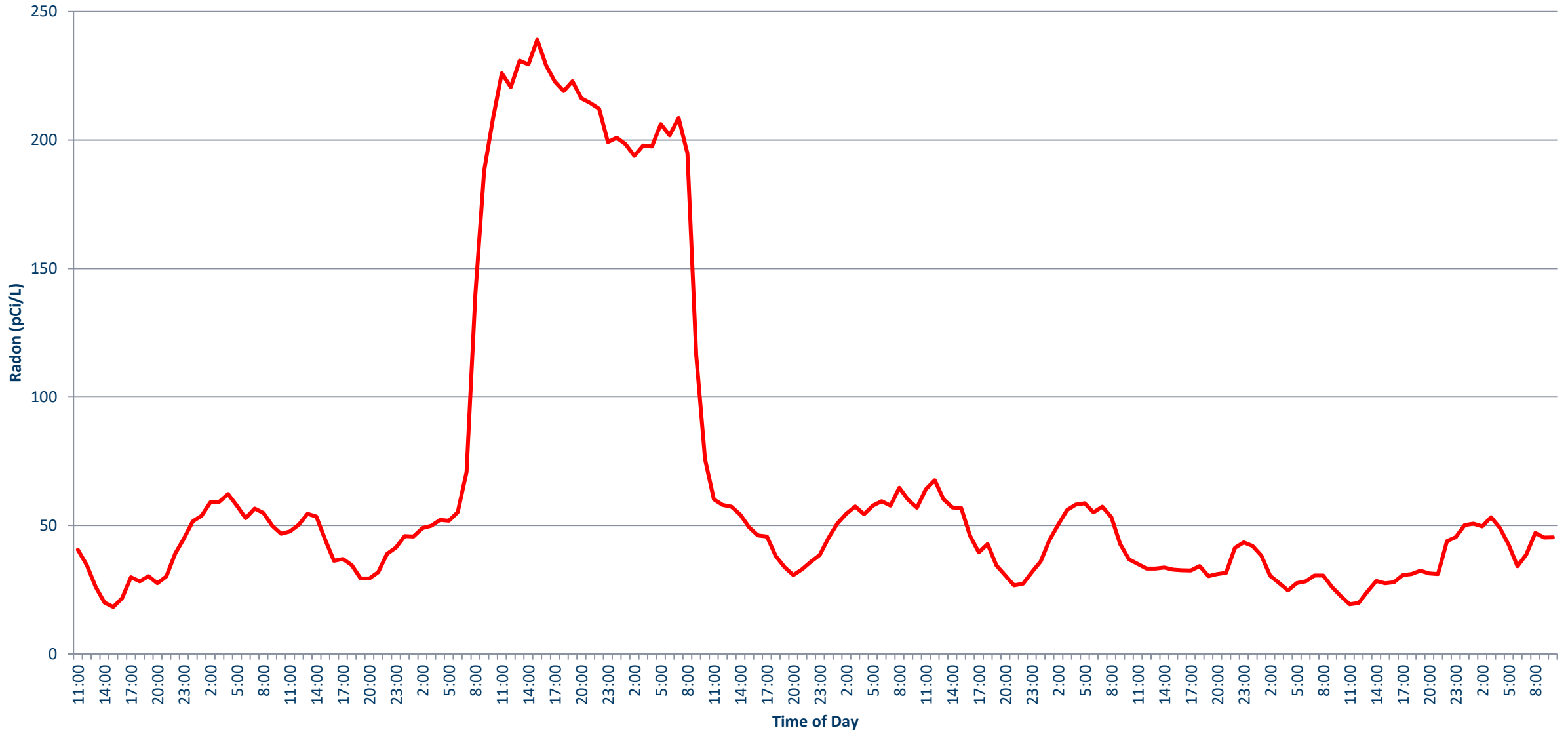
— A — D — Sump — Radon — Altimeter (hPa)







# Inver Grove Heights Radon Levels 7/19/12 - 7/26/12



# Thank you.

Joshua Kerber

[Joshua.kerber@state.mn.us](mailto:Joshua.kerber@state.mn.us)