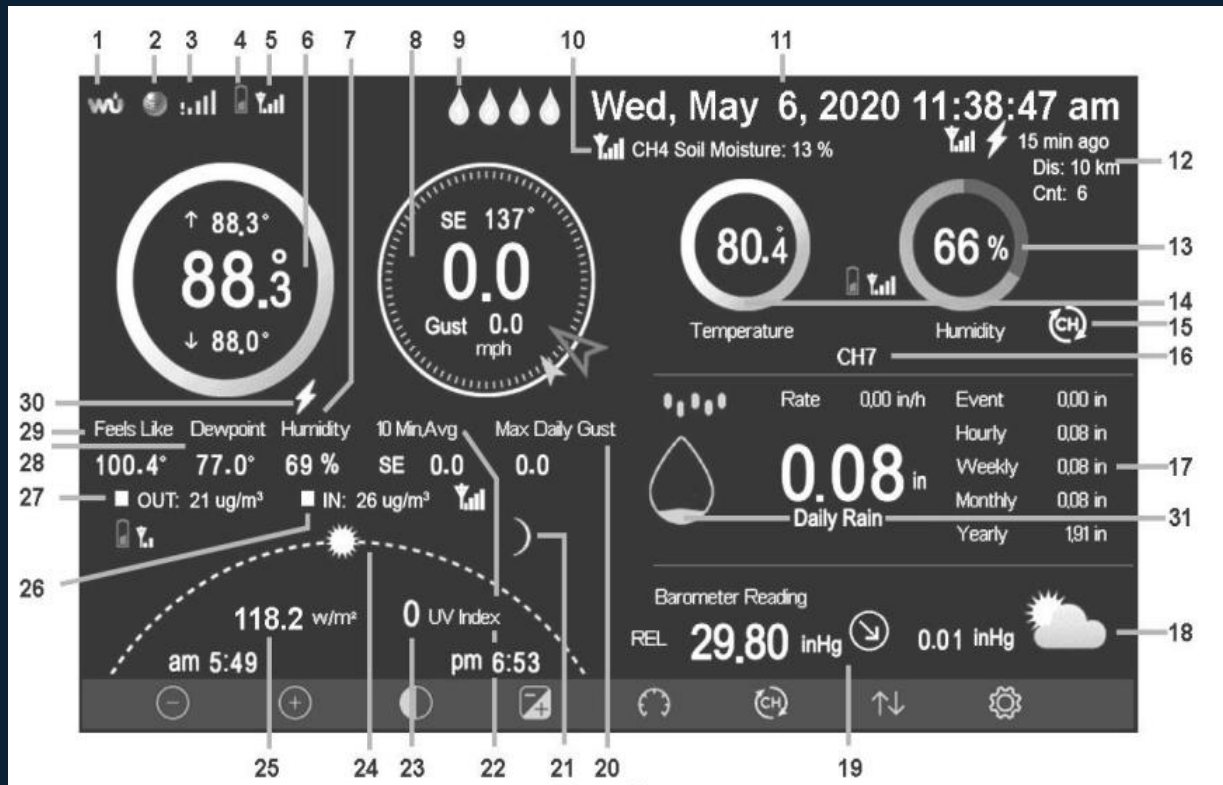


JHBBFS Weather System





No	Description	No	Description
1	WeatherUnderground.com connection icon	16	Channel indicator
2	AmbientWeather.net connection icon	17	Rain rate, daily, hourly, weekly, monthly, and yearly rain
3	Wi-Fi signal strength icon. An exclamation point ! indicates the display is connected to Wi-Fi but not the Internet.	18	Forecast icon based on rate of change of pressure
4	Outdoor Sensor Array Low Battery Indicator	19	Barometric pressure (REL or ABS), rate of change and rate of change arrow
5	Outdoor Sensor Array Signal Quality	20	Max daily wind gust
6	Current, high and low outdoor temperature	21	Moon Phase
7	Humidity	22	10-minute average wind speed and direction
8	Wind speed, wind gust, current wind direction (blue arrow), 10-minute average wind direction (larger gray arrow).	23	UV Index
9	Leak detector status (channels 1-4)	24	Sunrise, sunset, sun arc
10	Soil moisture (channels 1-8)	25	Solar Radiation
11	Current date and time	26	Indoor PM2.5 sensor
12	Lighting detector last strike, last strike time and strikes per hour	27	Outdoor PM2.5 sensor
13	Indoor, Channel 1-8 humidity	28	Dew Point
14	Indoor, Channel 1-8 temperature	29	Feels Like Temperature
15	Channel scroll mode indicator	30	Lightning icon appears when then Dew Point exceeds 70 °F, which signifies conditions may be possible for lightning storms to form in the area.
		31	Hourly Rain Icon

Weather Display Key

Indoor T/H/P & Lightning Monitors

The lightning sensor detects lightning strikes and will transmit the data to our weather system. This sensor operates by detecting electromagnetic pulses emitted by a lightning strike. From the strength of the EMP the sensor can estimate the distance of the strike. This sensor has a detection range of 25 miles from this location. This is beneficial to us at the Field Station to know when it is safe for our visitors and workers to be out.



This device takes readings of the indoor temperature, as well as the humidity and pressure. This is for our visitors to monitor some of these indoor measurements.



PM 2.5 Monitoring System

Our PM2.5 sensor is used to measure particulate matter in the air. PM2.5 refers to particulate matter that is 2.5 microns or smaller in diameter. Our sensor works by using laser scattering to radiate suspending particles in the air. It then collects scattering light to obtain the curve of scattering light change with time. The amount of particulate matter is then calculated per unit volume. PM2.5 is measured in micrograms per cubic meter. This is important to us at the Field Station so we know when there may be unhealthy conditions outside. This allows us to either postpone some of the outside activities or proceed with caution.



AQI Category	Color	Breakpoints ($\mu\text{g}/\text{m}^3$)
Good	Green	0.0 – 12.0
Moderate	Yellow	12.1 – 35.4
Unhealthy for Sensitive Groups	Orange	35.5 – 55.4
Unhealthy	Red	55.5 – 150.4
Very Unhealthy	Purple	150.5 – 250.4
Hazardous	Maroon	250.5 – 500

Soil Moisture Sensor

The soil moisture sensor measures moisture content in the soil. This is important for us to know here at the Field Station because our sensor is in one of our gardens. This allows us to know when the soil is too dry and needs to be watered.



WS-2000 Ambient Weather Station

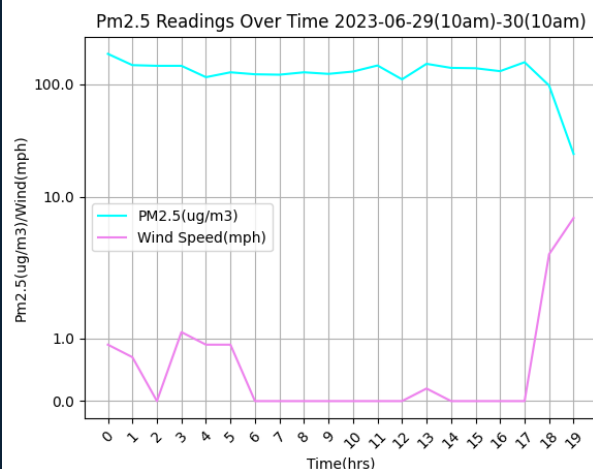
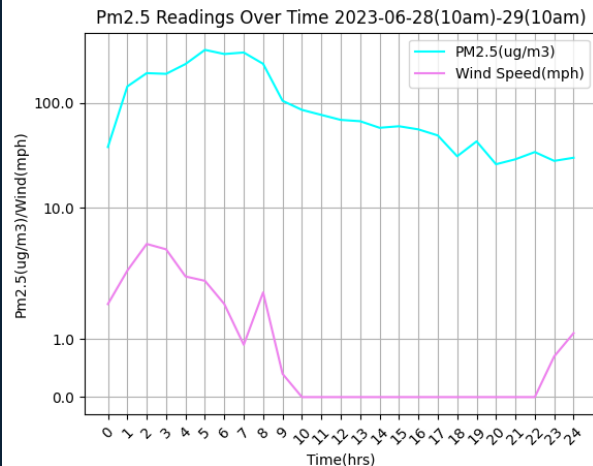


This station is where a lot of our data is measured. The station tracks rain levels along with a lot of the other measurements that you can see on the display. Our device is located outside on top of the stream building.

Data Analysis Process

More Data Analysis Information:

https://github.com/henryroeth/fs_sample_testing



The JHBBFS weather system hosts a wide variety of different weather reading equipment. There are also various methods in displaying the local data to show correlations between different weather readings and to showcase weather trends in the area directly surrounding the Field Station. Python programmed displays and simple R-script analyses allow us to see various air quality measurements in graphical displays and quickly calculate averages and deviations directly from the CSV files that the data is recorded to from the display.

Correlations To The Environment

With the ongoing wildfires in Canada, we can observe some of the effects that it has on us at the Field Station. With our data we can observe wind direction along with wind speeds which plays a big role in where and how fast particulate matter is being spread. For example, when we get northern winds from Canada, we are having air quality issues in this region of the United States. Being able to track data also allows us to correlate extreme weather events to climate change. Having a record of this data is important not only for ongoing current environmental problems, but also for the future.

Wind(mph)	Gust(mph)	Wind Direction...	ABS Pressure(...	REL Pressure(...
2.5	3.4	188	733.3	733.3
1.6	2.2	206	733.3	733.3
1.6	2.2	217	733.3	733.3
3.1	4.5	204	733.3	733.3
0.4	1.1	240	733.3	733.3
1.1	1.1	225	733.3	733.3
1.8	2.2	226	733.3	733.3
2.9	5.8	237	733.2	733.2
0.9	1.1	229	733.2	733.2
1.1	1.1	66	733.2	733.2
1.8	2.2	243	733.3	733.3
1.8	2.2	238	733.3	733.3
2.0	3.4	243	733.4	733.4
2.9	4.5	220	733.3	733.3
3.4	3.4	249	733.3	733.3
0.4	1.1	230	733.2	733.2



Arduino Controlled Pm2.5 & Ozone Sensors