Ambient Weather stations

Instrument
The ambient weather station used by BSEC is the ws-2902d model
https://ambientweather.com/ws-2902-smart-weather-station

This instrument measures outdoor temperature and humidity, wind speed, wind direction, rainfall, solar radiation and UV, at the location of the station. It also measures the indoor temperature, humidity and barometric pressure, at location of the console. The dew point, wind chill and heat index are also calculated from the outdoor measurements.

A schematic showing the individual components of the station is shown below
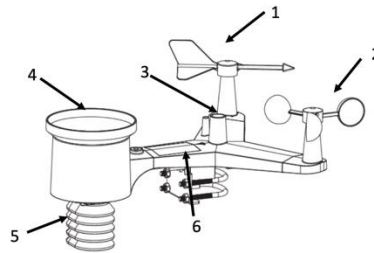
1	Wind Vane	Direction wind is blowing
2	Wind Cups	Speed of the wind speed
3	Light Sensor	Amount of sunlight
4	Rain Gauge	Amount of rain
5	Thermometer - Hydrometer	Temperature and Moisture in the air
6	Solar Panel	Produces energy for instruments

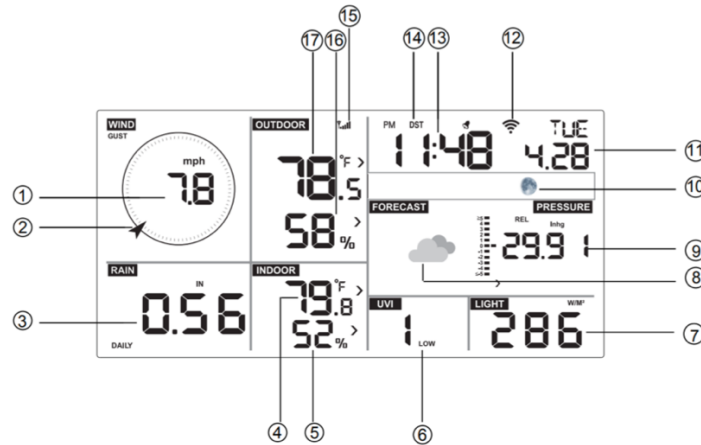The data are reported on the indoor console:

Figure 1

No	Description	No	Description
1	Wind Speed	10	Moon Phase
2	Wind Direction	11	Date
3	Rainfall	12	WIFI Icon
4	Indoor Temperature	13	Time
5	Indoor Humidity	14	Daylight Savings Time (DST)
6	UV index	15	RF Icon
7	Solar Radiation	16	Outdoor Humidity
8	Weather Forecast	17	Outdoor Temperature
9	Barometric Pressure		

These real-time as well as historical data can be view from the internet at AmbientWeather.net (See user guide)

Measurement accuracies are listed below (Figure 35 from manual)

Measurement	Range	Accuracy	Resolution
Indoor Temperature	14 to 140 °F	± 2 °F	0.1 °F
Outdoor Temperature	-40 to 149 °F (lithium batteries) -23 to 140 °F (alkaline batteries)	± 2 °F	0.1 °F
Indoor Humidity	10 to 99%	± 5%	1 %
Outdoor Humidity	10 to 99%	± 5%	1 %
Barometric Pressure	8.85 to 32.50 inHg	± 0.08 inHg (within range of 27.13 to 32.50 inHg)	0.01 inHg
Light	0 to 200,000 Lux	± 15%	1 Lux
Rain	0 to 394 in.	± 5%	0.01 in
Wind Direction	0 - 360 °	± 10º	1º
Wind Speed	0 to 100 mph (operational)	± 2.2 mph or 10% (whichever is greater)	1.4 mph

For more information see manual
https://ambientweather.com/mwdownloads/download/link/id/1174

Data Access

The data from the "Ambient Weather" company are publicly available on the web at https://ambientweather.net/ or by downloading the "Ambient Weather" phone app. Current and past measurements from any station can be viewed as a graph or in a table, and can also be downloaded (see below for more details).

Ambientweather.net shows all weather stations, and not just those deployed by BSEC. The name of every BSEC station starts with "BSEC-" (e.g., BSEC-JHU is the weather station at Johns Hopkins University Homewood campus). To more easily see the BSEC stations we have created an Ambient Weather account:

> Login: guest.bsec@gmail.com
> Password: Weather0!

Once logged into this account the stations installed by BSEC will appear with a star in "Weather Map" view (and appear under "favorites" in "Dashboard" view). The advantage of focusing on the "BSEC-" stations is that we installed these stations and monitor the data stream, so we have some confidence in data quality and awareness of limitations. You'll find many other stations on the website, and those could be useful; we just can't vouch for the quality of those data.

Full Data Archive:
The ambientweather.net is rather cumbersome to download the full data record. For this purpose, an archive of all BSEC weather station data (from OttHydro and Ambient Weather stations) is on the Department of Energy's "MSD-LIVE" site (https://data.msdlive.org/records/vdhnv-5np29). This archive will provide an access point for hourly data from all stations, from date of installation up to about a week behind real-time.
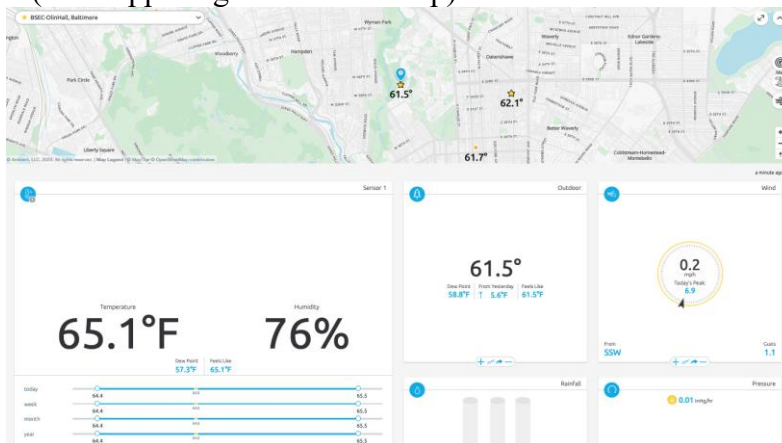
Using the ambientweather.net website:
In *Weather Map* view (e.g., when webpage first opened) you will see.
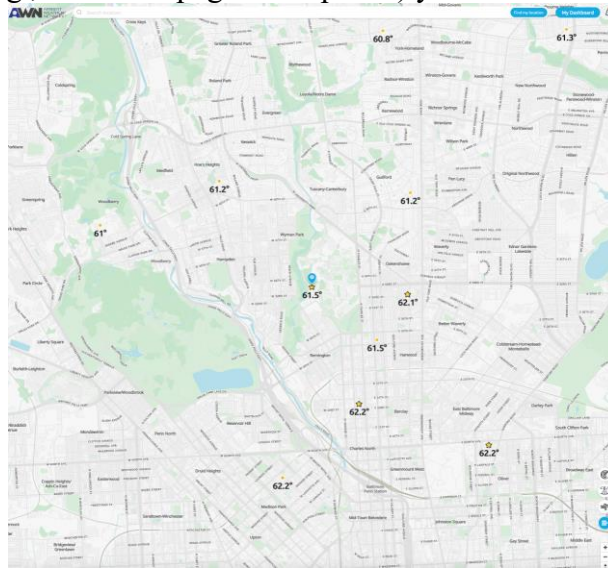
(This example is when logged into the guest.bsec@gmail.com, so BSEC stations are stars.)

In *Dashboard* view (click upper right button on map) it will look like:

If logged into the guest.bsec@gmail.com, then clicking on symbol on right of box at top left of map will show all BSEC stations:
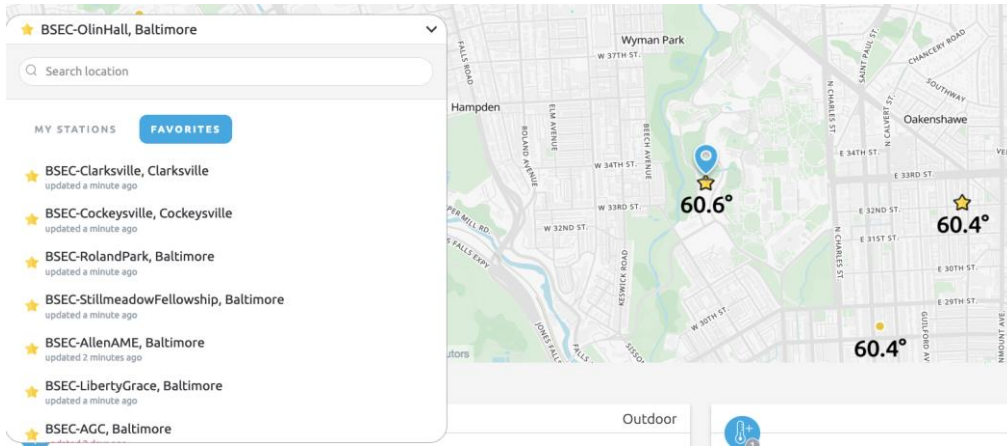
You can then move up and down the list and select the station of interest. Below the map are "tiles" with data for different quantities.
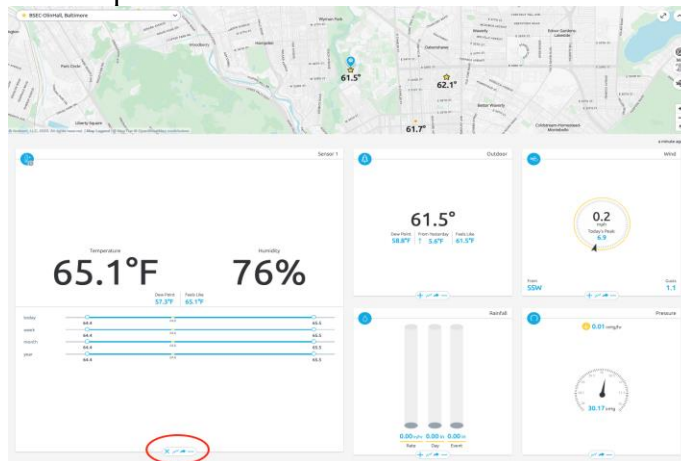
At bottom of each tile there are 4 symbols (see red ellipse): clicking the "sawtooth" (2nd symbol) produces line graphs, e.g.:
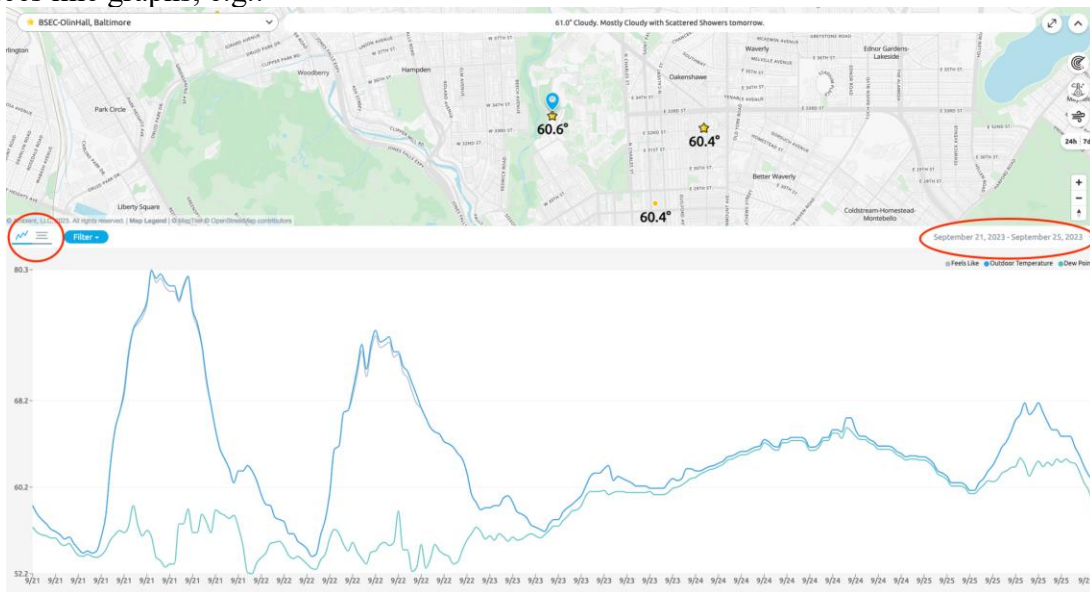
The date shown can be adjusted using the dropdown menu on right below the map (red ellipse on right).

Also, on the left below maps there is a symbol with 3 horizontal lines (red ellipse on left), clicking on this produces a table view:

In this view there is a symbol (see red boxes) on the right-hand side for downloading data.