

Gibault's Total Eclipse Experiment

Purpose

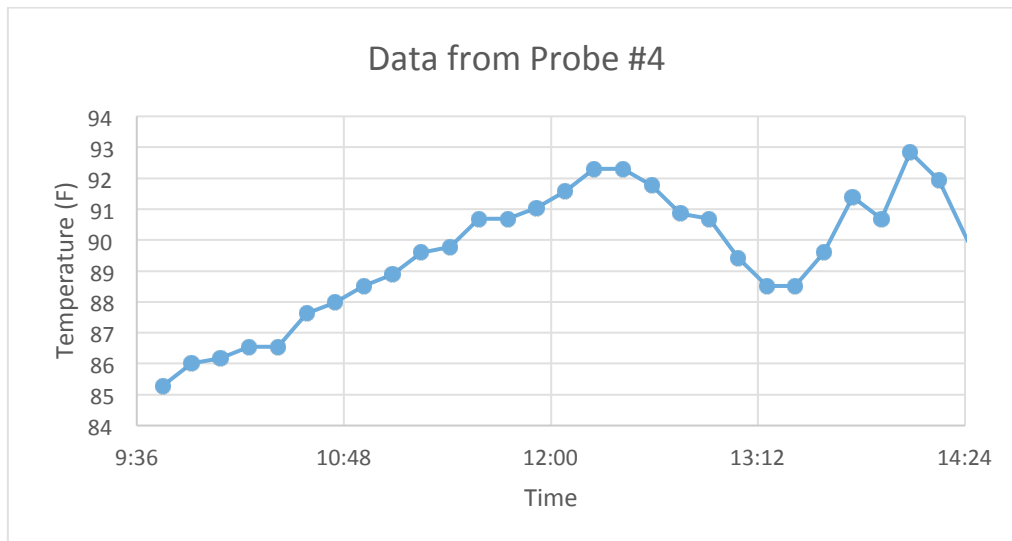
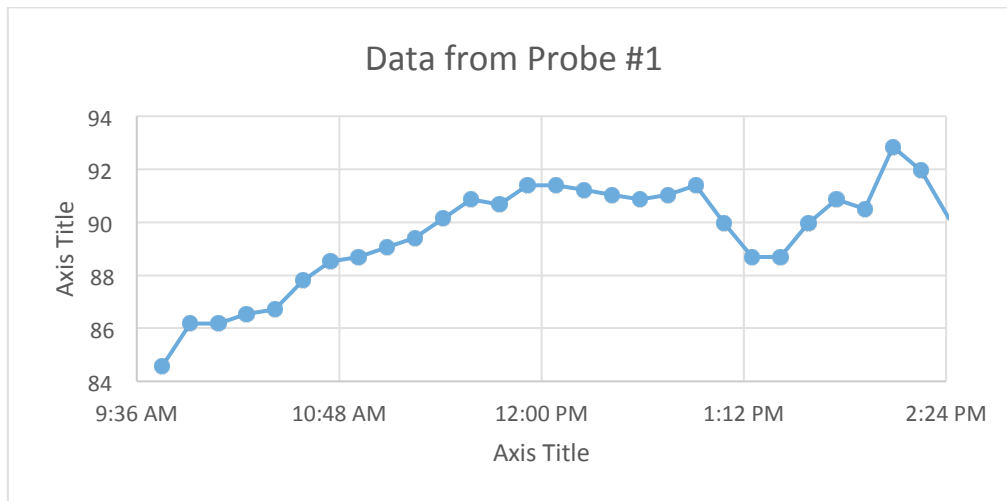
The 1818 Biology students conducted an experiment to determine if and how much does the temperature drop during a total eclipse in our area.

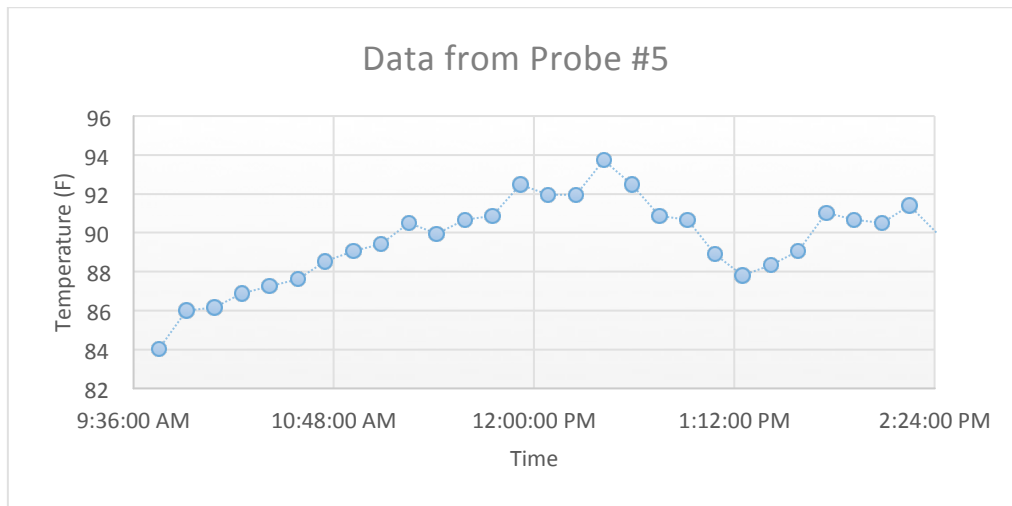
Method

Five Vernier digital temperature probes were used and programmed to record temperature readings every 10 minutes an hour before, during, and after the total eclipse of 2017. The systems were set outside on the Gibault Senior patio close to the building, 1 meter above the ground, and in the shade. It is important to note that readings were done in the shade to alleviate direct heating of the probes from the Sun's rays. Readings were started around 9:45 and continued until 2:30, when a storm started to roll in.

Data

Probes	Temperature change (°F)
1	2.70
4	2.16
5	5.94
Average	3.60





Discussion

In the three probes that were successful in collecting data, a slight drop in temperature was measured several minutes before and during totality of the solar eclipse. The average change in temperature was 3.60 degrees Fahrenheit. During daytime hours, the ambient air is heated mainly by contact with the ground surface and so the probes were set in the shade to account for this effect. When the eclipse began, the incoming solar radiation gradually reduced to zero but then slowly increased after totality. The partial eclipse at Gibault began at 11:50:15 with totality at 1:17:44. The effect of reduced solar radiation can be seen in the graphs of the ambient air temperature with the slow reduction of temperature after 12:00 pm as partiality increased until totality. There may have been even a greater drop in temperature but because the probes were set for 10 minute time intervals, and totality lasted only 2 minutes and 10 seconds, readings were not taken during that time.

According to al.com news, the National Weather Service recorded a temperature degree drop of 10 °F in Huntsville, Alabama, along with Douglas, Wyoming reporting an 11 degree decline. However, Kansas City reported just a 4 degree difference. That data coincides with the data at Gibault and could be because of several factors. It was very hot and humid the day of the eclipse, so much so that later in the afternoon, around 2:30, a storm developed with thunder and rain. Humidity, clouds tend to limit temperature decreases. Also, because the air is heated by contact with the ground and not directly by the sun, urban areas tend to hold in heat more than in rural areas. The probes were right next to the building so that they could be plugged in to the electrical outlet. This could have had an effect on the amount of temperature differences recorded.

Conclusion

Here at Gibault there was a slight change in temperature, an average of 3.6 °F in the shade, during the total solar eclipse. Although larger differences were reported around the country, location of the probes (urban and next to a building) and high humidity could have played a part in the amount of temperature variation during the total eclipse.

References

Gore, Leada. (2017, August 22) Solar eclipse 2017: How much did the temperature change during the eclipse? Retrieved from: http://www.al.com/news/index.ssf/2017/08/solar_eclipse_2017_how_much_di.html