



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Sashank S. Srinivasan	Project Number S0835
Project Title A Device to Measure Atmospheric Haze	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Atmospheric haze is caused by several factors, including pollutants in the atmosphere. While few cities routinely measure Aerosol Optical Thickness (AOT) a unit of atmospheric haze, not much is known about this phenomenon on a global scale. The goal of this study was to construct, calibrate, and test a device, a sun spectrophotometer, to measure atmospheric haze using the method of Forrest Mims(1991).</p> <p>Methods/Materials While the intensity of the sunlight striking the top of the earth's atmosphere is constant, its intensity at ground level is less and varies as a function of absorption and scattering of light by air, including pollutants. By measuring intensity of sunlight at a given location and knowing the thickness of the atmosphere that it has passed through, one can determine how much light has been scattered and/or absorbed, and hence the amount of haze present. A light emitting diode (LED) generates an electric current when light of a certain wavelength strikes it. The strength of this current is an indirect measure of the quantity of light striking the LED. The device has a circuit that enables measurement of the electrical output form an LED. So, when the device is pointed at the sun, the intensity of sunlight that hits the LED can be quantified as a function of electrical output. The device was assembled per circuit diagram and first calibrated. Multiple readings were taken as the sun rose and the extraterrestrial constant(ET) was calculated. Preliminary AOT readings were gathered in Saratoga, Daly City, San Mateo, and San Francisco</p> <p>Results The ET was 10.18. The AOT readings at various locations were .065 in Saratoga, .074 in San Mateo of Hwy 280, .105 in Daly City off Hwy 280, and .313 in San Francisco on 19th avenue.</p> <p>Conclusions/Discussion The spectrophotometer was constructed, calibrated, and tested. Preliminary AOT readings demonstrate a fivefold increase in haze from residential Saratoga to an urban part of San Francisco, illustrating the device's efficacy. The device has a potential long-term future in measuring haze on a global scale. While the device has limitations, further and extensive longitudinal studies are required. Being involved with monitoring AOT with a homemade device increased my own awareness of our polluted environment.</p>	
Summary Statement A sun spectrophotometer to measure atmospheric haze was constructed using the method of Mims(1991) was constructed and tested successfully	
Help Received Father helped in the construction of the device.	