CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
J0701

Project Title
Sky Watch: To Determine if the Aerosol Optical Thickness (AOT) Changes Rapidly or Gradually from Day to Day

Abstract

Objectives/Goals
Aerosol Optical Thickness (AOT) is caused by tiny particles and vapors suspended in midair, created by salt, pollen, soot, smoke, water and even ice. The more concentrated the aerosols the less light can pass through. The sun photometer has to be calibrated to the Extra Terrestrial Constant (ET) or suns radiation outside of the atmosphere. From this can be calculated the AOT. Finding the AOT interested me because it has an affect on the growing problem on global warming and the amount of sunlight reaching the earth. Knowing the AOT is also useful in measuring distant objects. I believe that the AOT would vary greatly from day to day because from my extensive research, I learned that weather can have a strong effect on the percentage of AOT.

Methods/Materials
To measure the AOT I had to first find the proper gain resistor so that the measurements would fall in the center range of the sun photometer. Then I had to determine the Extra Terrestrial Constant (ET), which is the sun#s radiation at the top of the atmosphere, unobstructed by aerosols. The sun photometer is then calibrated to the ET. Knowing the ET allows for correlation between sun photometers. I used this in my experiment to measure the sun#s radiation most susceptible to aerosols, to determine the AOT.

Results
The period of data gathering spanned sixteen days. During that time the weather was especially mild for winter. In addition, if the sun was blocked by clouds I could not take my measurements. This resulted in nine days of data. The AOT results ranged from a low of 75% to a high of 92% with a range of 17 %.

Conclusions/Discussion
The results did not support my hypothesis. Instead of varying greatly the percentage of AOT was about the same. This could be from living in a low industrialized coastal region. It could also be due to the unusually mild winter. I expected there to be a greater range of AOT in my results than 17%.
Atmospheric science is now in great demand. Aerosols have a strong effect in global warming. Aerosols reduce sunlight entering the atmosphere, which makes for smaller clouds. This, in a roundabout way, allows for more sunlight to reach the earth#s surface.
Knowing the AOT also can help in measuring objects at sea, from space and on land. On a clear day objects seem closer than on a hazy day. Knowing the difference one can obtain the proper distance of an object.

Summary Statement
My project was to determine how Aerosol Optical Thickness (AOT) varies over a period of time.

Help Received
My father helped me understand concepts and workings of the sun photometer. My mother helped with the backboard. Ron Sabourin introduced me to the sun photometer. The Eureka (Humboldt County Main) Library Reference Department, helped me find needed research materials. Ms. Nickols my teacher,