CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)

Gabriel Arroyos; Jose Benitez Ponce; Victor Ornelas

Project Number

S1201

Project Title

The Effect of Altitude on Tropospheric Ozone

Abstract

Objectives/Goals

The objective of this experiment is to find the correlation between ozone concentration and altitude.

Methods/Materials

Ozone test strips with a scale to measure
Reliable transportation (car, train, bus)
Camera
Altimeter
Means of measuring weather conditions (Smartphone, psychrometer, thermometer, etc.)

Results

Across all trials, ozone concentrations were measured at 7 different altitudes at increments of 1000 feet (approximately, 300 meters). All 4 trials consistently showed that elevation and ozone concentration are directly proportional; in other words, higher altitudes appear to feature higher levels of ozone. Each sample was taken within 20 minutes of each other on average, and each trial was conducted within 4 hours (roughly from 8am to 12pm). This was done because of the fact that different levels of human activity subsequently affects ozone levels. This phenomena can also be observed in the data. For example In Trial 2, which was taken later in the day than other trials, displays slightly higher ozone levels. Finally, the most important detail to note, is how the control group (sea level) disobeys the aforementioned trend in the first two trials. This anomaly did not show up in our subsequent trials, which controlled for air quality index.

Conclusions/Discussion

After conducting the experiment, the relationship between ozone concentration and altitude was determined through a couple of trials. It was discovered that ozone concentration increases as elevation was increased, showing a positive correlation. These results contradicted the hypothesis as it was first believed that ozone would have an inverse relationship when associated with altitude. To expand upon this subject, other studies like testing the correlation between population density and ozone concentration can be explored; as well as the correlation between ozone levels and other environmental factors. Perhaps, even testing to see what environmental factors influence ozone levels most.

Summary Statement

We measured the concentration of ozone at various altitudes and found that ozone concentration and altitude are directly proportional.

Help Received

None