CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

S1719

Project Title

Solar and Cosmic Radiation at and above the Pfotzer Maximum

Abstract

Objectives/Goals

Our objective was to send a weather balloon with data recording equipment into space and make observations on key variables that determine the amount of radiation at and or above the pfotzer maximum. Additionally, our goal was to further understand the location and significance of the pfotzer maximum in space flight.

Methods/Materials

In total we launched three weather balloons over the course of one year. All weather balloons were launched from the same launch area. Both Mission 6 and 8 were launched at 8:00 a.m., while Mission 7 was launched at 1:45 p.m. in order to gather data from the partial solar eclipse that took place during the flight. All the materials are listed within materials document.

Results

Hypothesis #1 was validated to a certain extent, while Hypothesis #2 was proven incorrect.

Hypothesis #1 As the weather balloon rises in altitude there will be an increase in the amount of radiation.

Hypothesis #2 Radiation at a given altitude is directly related to the sunlight intensity present at the given altitude.

Conclusions/Discussion

Our first hypothesis that the radiation increases as the altitude does is partially correct. We found that this hypothesis holds true until the altitude reaches 18,500 meters, at which point the average radiation begins to level off, then decrease. Unfortunately, the weather balloon has a finite altitude limit, and it may not be possible to consistently observe the radiation levels beyond approximately 25,000 meters.

Our second hypothesis that radiation correlates to light intensity was found to be incorrect. Although it is possible to see that there is a dip in background UVB light intensity, there is no direct correlation to the dip in radiation: the radiation did not decrease notably during the solar eclipse of Mission 7 while the UVB intensity saw significant changes. Therefore, it is unlikely that light intensity has a significant effect on the radiation. The decrease in background UVB intensity is more likely caused by an external event not related to the radiation levels. Thus, the radiation experienced at high altitudes comes, for the most part, from events not related to the sun.

Summary Statement

Our goal was to identify the boundaries and potential causes of the photzer maximum and to identify methods in which we can predict its presence based on constants, such as altitude.

Help Received

We had the assistance of Jim Snyder to supply crucial data analysis and printing of the graphs. As well as retrieval of the craft as its distant location.