



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Irene Hsu</b>	<b>Project Number</b> <b>J0610</b>
<b>Project Title</b> <b>Relationship between Sunspot Number and the Earth's Magnetic Field</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this study was to examine the effects of sunspot number on the Earth's magnetic field. Sunspots are dark areas on the Sun, where the magnetic field is about 2,500 times stronger than the Earth. Occasionally, high-energy and high speed solar winds are ejected from the sunspot areas and thus may cause an impact on the Earth's magnetic field. In this study, I examined whether the increases or decreases of sunspot number could cause a proportionate change in the geomagnetic field. <b>Methods/Materials</b> Sunspot measurements were taken with a Sunspotter daily, and magnetometer measurements were taken with a simple bar magnet magnetometer at 10:00 pm nightly for two months. The magnetic deflection, which is in centimeters, was then converted to the magnetic declination angle, in degrees, for comparison with the sunspot number. <b>Results</b> It appears that there is a positive correlation between sunspot number and change in the geomagnetic field <b>Conclusions/Discussion</b> The results suggest that sunspot numbers can affect the Earth's magnetic field. However, it was noticed that there was a discrepancy between sunspot number and the change of the geomagnetic field close to the end of the two months. Several factors may have caused or influenced this inconsistency. Perhaps one of the most important is that the high speed solar wind that originated from a sunspot region did not come directly in contact with the geomagnetic field. Nevertheless, even with this discrepancy, my hypothesis, which states that sunspot numbers do affect the geomagnetic field, seems pretty solidly confirmed by these data.	
<b>Summary Statement</b> This study examined the possible correlation between sunspot number and the declination component of the Earth's magnetic field.	
<b>Help Received</b> My mother and father helped me set up the bar magnet magnetometer. Dr. Mark Moldwin, from the Department of Earth and Space Sciences at UCLA, lent me the Sunspotter.	