



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Sheng Yue Zhang	Project Number J0813
Project Title Hail to Tornadoes: The Fastest Winds on Earth	
Abstract Objectives/Goals The objective is to determine whether or not there is a relation between hail and tornadoes using F4 and F5 tornadoes for better tornado prediction methods. Methods/Materials A tornado and hail database named Severe Plot 3.0 was used to obtain F4 and F5 tornado records and hail records that included the time, location, and size of tornadoes and hail occurring. Geographic locations were also recorded. Each tornado was matched up to hail records occurring around its area within an hour prior to its occurrence. These information were recorded on Microsoft excel and in data tables made in the composition book. There were two parts to this project, each consisting of four trials. Results F5 tornadoes (the strongest rank of tornadoes, from F0-F5) were 21.21% more likely to be preceded by hail than F4 tornadoes (the second strongest rank of tornadoes). The tornado intensity has nothing to do with the size of the hail it is associated with. Overall, 52.66% of tornadoes were preceded by hail, and the majority of the hail was severe sized. Kansas was the most popular place for tornadoes, and Texas had the largest sized hail. Conclusions/Discussion My results did not support my hypothesis, which was that 25% of tornadoes F4 and above would be preceded by severe hail, as opposed to 75% preceded by common sized hail (smaller than 1 in.). Overall, 87% of tornadoes F4 and above were preceded by severe hail. Some other interesting elements were discovered. Hail occurrences have almost tripled during the last 30 years, it was concluded that global warming or better tracking technology may be the cause of this. A tornado blind spot in the Appalachian Mountains was also discovered. This may be because the humid air coming from the East is being pushed up into the higher elevations then coming down in another form such as hail or rain instead of drifting onward to meet the warm and cool dry air from the West that would usually cause an unsettlement in the air, thus creating tornadoes.	
Summary Statement By analyzing previous tornado and hail data, a relation between hail and tornadoes is hoped to be discovered for better tornado prediction methods.	
Help Received My mentor, Mr.Fain, helped me answer many questions I had on tornado and hail formation.	