



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Karen V. Pham</b>	<b>Project Number</b>  34947
<b>Project Title</b> <b>The Effect of Hurricanes and Tropical Storms on Hypoxic Zones: A Seven-Year Study in the Gulf of Mexico</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this project is to find a potential correlation between hurricane and tropical storm occurrence and the prevention of the formation of the Gulf of Mexico's hypoxic zone. <b>Methods/Materials</b> Data supplied by the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA) Godard Space Flight Center, which included amounts of dissolved oxygen, hypoxic zone size, chlorophyll a concentrations, and hurricane and tropical storm occurrences from 2006 to 2012, inclusive, in the Gulf of Mexico were examined to establish the hypothesized correlation. Graphs were created to examine correlation of both hypoxic zone size and amount of dissolved oxygen and the occurrence of tropical disturbances. Observations were made for chlorophyll a concentration images on areas where chlorophyll a concentrations increased or decreased in amount and/or size. <b>Results</b> In the dissolved oxygen analysis, the graphs created showed a general increase in dissolved oxygen saturation of the water as tropical disturbances increased, but the R <sup>2</sup> values were very low. In the hypoxic zone size analysis, only the graph of tropical storms vs. hypoxic zone size showed that the hypoxic zone size decreased with increasing occurrence of tropical storms. In the chlorophyll a concentration analysis, there was a general decrease in area and/or concentration of chlorophyll a in areas where tropical disturbances occurred. <b>Conclusions/Discussion</b> There appeared to be little to no correlation between tropical disturbance occurrence and ocean hypoxia when dissolved oxygen content and hypoxic zone size were investigated. There was, however, a potential correlation found when the chlorophyll a concentration in the Gulf of Mexico's waters were examined. Thus, the results of the investigation must be deemed inconclusive. Though no solid correlation was found, the general trend uncovered in the chlorophyll a concentration observations is a possible indication that such a correlation may exist. If a strong correlation could be established, such knowledge could be used to slowly diminish - and ideally, to eventually dissolve - the hypoxic zone in the Gulf of Mexico.	
<b>Summary Statement</b> This project attempts to find a correlation between the occurrence of tropical disturbances and the reduction of hypoxic zones in the Gulf of Mexico.	
<b>Help Received</b> Data obtained from public databases run by NOAA and NASA; Mr. Paul Hunt provided advice; Family provided much-needed moral support.	