



CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

Name(s) Katie A. Dolence	Project Number 22604
Project Title The Thermal Induction of Atmospheric and Marine Currents	
Objectives/Goals The thermal induction of atmospheric and marine currents is a project designed to illustrate how complex currents can be generated between two standing bodies of water or air at different temperatures. Such atmospheric currents have profound affects on the weather. Such marine currents in nature have profound affects on the weather. Abstract Methods/Materials To demonstrate atmospheric currents, I utilized our spa to simulate a large warm water mass heating the air above it, causing convection currents (an updraft of warm air in a cooler over layer). To simulate the cooler upper atmosphere a 10lb block of dry ice was placed 2 meters above the water's surface. I gradually heated the spa to a temperature of 110 degrees Fahrenheit. I then recorded the results using a digital camera. To demonstrate marine currents, I utilized our pool and spa to demonstrate the forces driving the induction of thermal currents. Our swimming pool is connected to a spa. The water level was raised to 1 inch above the wall dividing the pool and spa creating an interface. I blocked the connection between the pool and spa using bricks. The pool temperature at the time of this experiment remained a constant 67.4 degrees F. I gradually heated the spa and performed the experiment, made observations and recorded the results at three different temperatures, 79.7, 88.3, and 104.1 degrees F. To conduct the experiment one brick was removed to create a connection. I used algaeicide as an indicator and observed the connection for evidence of movement of water. Results Atmospheric Observations: I observed that the colder sublimated CO2 flowed down to the water's surface, while the very warm air heated by the spa rose vertically to form convection currents. Marine Observations: I observed that colder water from the pool flowed over the shelf and plunged into the spa. The colder pool water displaced the warmer water causing it to flow over the top of the pool in a plume and creating a displacement current. Conclusions/Discussion Atmospheric and Marine Conclusions: 1. When air/water is warmed it rises, conversely cold air sinks to the earth's surface. 2. A current is spontaneously generated between masses of different temperatures. 3. The larger the difference in temperature, the stronger the current generated. 4. When the air/water temperatures equalize the current stops flowing.	
Summary Statement The simulation of Ocean and air currents	
Help Received Father helped with Pictures, Mother helped edit report	