CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
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Project Number
J0602

Project Title
Did Temperature Affect the Salt Formation in the Dead Sea?

Abstract

Objectives/Goals
My project was to determine if the temperature at the Dead Sea affected its salt formation. If it was located in a cooler climate would it have still remained as salty?

Methods/Materials
I compared how salt crystals would form at different temperatures that would be models for four locations around the world: freezing, cool, moderate and warm climates. I made seed crystals from a supersaturated salt solution, which I then immersed in four separate jars containing additional supersaturated salt solutions. I repeated this step three times, each time adding more salt until the seed crystals did not dissolve in the solutions. I placed the jars at different temperatures and measured the width, height, and depth of each crystal everyday. I calculated the volumes of each crystal, made graphs of the growth of the crystals over time and calculated the best-fit line, correlation coefficient, and slope using Excel.

Results
The correlation coefficients were all large, 0.71 to 0.96, indicating that the best-fit lines were pretty accurate and therefore the slopes of the lines were also fairly accurate. The slopes are a measurement of how fast each crystal grew. The slope for the crystal at freezing temperature was 1.07 meaning that it grew very little. The slope for the crystal at the cool temperature was 2.28 meaning that it grew slowly. The slope for the crystal at room temperature was 12.98 meaning that it grew moderately. The slope of the crystal in the warmest temperature was 24.14 meaning it grew the fastest.

Conclusions/Discussion
My experiment showed that the hotter the temperature was in the jar the faster the salt crystal grew. The seed crystal at the warmest temperature is a control for the temperature at the Dead Sea during the summer. Since it grew the fastest I believe that the temperature at the Dead Sea did affect the salt formation there. If it was in a cooler climate I think the high concentration of salt and salt crystallization at the Dead Sea would have either occurred at a slower rate or possibly not at all, similar to what was observed in the jar in the freezing climate. This lack of salt crystallization might be because the water would not have evaporated as much in a colder climate. The water evaporated faster in the jar at the warmest temperature, leaving a saltier solution and more crystal formation, similar to the environment found at the Dead Sea.

Summary Statement
I grew salt crystals at different temperatures to compare their growth rates.

Help Received
Father explained how to use Excel. Mother supervised me boiling solutions on the stovetop and drove me every night to her work to measure the crystals in the incubator.