CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
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Project Number
J0812

Project Title
How Differentiated Layers of Sand Are Affected by Lateral Compression

Abstract

Objectives/Goals
The purpose of my project is to determine the affects of lateral compression on differentiated layers of sand. Since I live in Humboldt County, where plate tectonics and crustal folding play a major role in our geology, I wanted to test what would happen to the Earth's crust when it begins to fold from these stresses and pressures. My hypothesis for Trial 1 (1 1/2 cm sand layers) was that I would get anticline folds. Trial 2 (3 cm sand layers) hypothesis was that I would get monocline folds. My final hypothesis for Trial 3 (1 1/2 cm saturated sand layers) was that I would receive divergent results, as in overthrust folds.

Methods/Materials
First, I constructed my sand box, using plywood and Plexiglas. Then, for each trial, I filled the box with the designated amount/variable of sand (1 1/2 cm sand layers, 3 cm layers, and 1 1/2 cm saturated layers). I used a drill to move the piston which compressed the sand in the box. I kept the drill at a steady pace. I stopped my piston every 1/4 of the way across the box. I took notes and pictures of the folds that were formed in the sand. The materials I used were: 3/8 in. plywood, 5/16 in. 3 ft. long threaded rod, expansion bolt, acorn cap, 24 x 9 in. piece of Plexiglas, two 25 lb. bags of play sand, food coloring, oven, screws, nails, drill, hammer, screwdriver, wrench, adhesive spray, wood glue, measuring cups, table saw, mitre saw, and a jig saw.

Results
I charted the results from all three of my variables, in which I compared the top and bottom folds from each trial. After analyzing all of the data, I realized that lateral compression does not have a large affect on sand layers. Even though my results varied from each trial, they all basically gave me anticline folds; however the patterns of syncline, moncline, asymmetrical, overthrust, and recumbant folds were also present in my project. I believe I got the overall result of anticline folds because the angle that the piston was applying pressure automatically pushed the sand upward.

Conclusions/Discussion
My hypothesis was only accurate for the first trial, Trial 1 (with 1 1/2 cm layers). My hypothesis for the other two trials proved to be incorrect. After completing this project, I now understand many of the variables involved in crustal folding and plate tectonics. I believe that geologists will/should continue their studies in this field, in order to build appropriate structures to help keep people safe.

Summary Statement
My project was to determine how differentiated layers of sand are affected by lateral compression.

Help Received
Father helped me with power tools needed to build box