CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Elizabeth Bolanos

Project Number
J0604

Project Title
How Does Ocean Floor Morphology Affect Wave Height and Speed at the Shore?

Abstract

Objectives/Goals
The purpose of my project was to find out how ocean floor morphology near the shoreline affects the behavior of incoming waves.

Methods/Materials
I decided to do my testing where the waves would be controlled, which was a wave tank at the Cabrillo Marine Museum. I attached two measuring tapes to the tank in order to measure the height and speed of the waves. I captured the action of the incoming waves on a video camera that was placed in front of the wave tank. I created 5 different morphologies on the bottom of the wave tank: 1) gradual slope, 2) simulated reef, 3) shelf, 4) sandbar, and 5) trough w/sandbar. I observed and filmed multiple sets of waves for each morphology. I then used iMovie to measure the height and calculate the speed of one wave in each set and then I averaged all measurements for the sets in that morphology.

Results
My results showed that the trough with a sandbar was the morphology that produced the highest and fastest waves. This morphology had the deepest water near the shoreline of all of the morphologies.

Conclusions/Discussion
My results supported my hypothesis that the deeper the water is near the shoreline, the greater the wave height and speed will be. Since tsunami waves are fast moving ocean waves, these results can be used by people who live near a beach to understand what type of tsunami waves they are at risk for, based on the morphology of their beach.

Summary Statement
The purpose of my project was to determine how the morphology of the ocean floor near the shore affects the dynamics of an incoming wave.

Help Received
Cabrillo Beach Marine Museum provided me with the wave tank. Mr. Simonsen helped me set up the wave tank and edit my project.