Arsenic Contamination through Tsunami Wave Movement in Hawaii: Investigating the Concentration of Heavy Metals in the Soil from the 1960 Hilo, Hawaii Tsunami

Goodwin, Jared

This project was an investigative study into the environmental impacts of the distribution of arsenic contaminated soil within inundation zones affected by the 1960 Chilean Tsunami in Hilo, Hawaii, USA. This project was a continuation of last year's study where data supported developing the "Windshield Wiper" Model. The model states that pre-existing soil contamination would be redistributed to the border of the inundation zone and pulled back into the bay by the force of the tsunami waves, similar to the actions of a windshield wiper. The hypothesis was "Do locations farther away from Wailoa Pond contain a greater concentration of arsenic than those near the embankments of the pond?" To test this question, soil samples were collected from 3 areas surrounding Wailoa Pond and the 1960 Tsunami inundation zone. Soil samples were collected at 3 depths from 4 sub-locations within each localized area. The data collected partially supported the hypothesis. Soil sample sites located predominantly away from Wailoa Pond had a greater average concentration of arsenic than those near the embankments. This was the case for 2 of the 3 localized areas. After further analysis from multiple trials, the principle of the "Windshield Wiper Model" is valid, heavy metals were moved to the edges of the inundation zone by the force of the tsunami waves. One recommendation to enhance this study would be to sample more sites around Wailoa Pond and the 1960 Tsunami inundation zone as this could potentially minimize the margin of error, further validating the model.

Awards Won:

Fourth Award of $500

Geological Society of America &amp

American Geosciences Institute: Third Award of $500

National Oceanic and Atmospheric Administration - NOAA: Award of $500