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Geochemistry of Archaeological and Marine Environments in Southwest Maine

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Geochemistry of Archaeological and Marine Environments in Southwest Maine
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Objectives
- To examine the trends within marine sediments over time that indicate significant environmental changes such as sea rise and a shift to a marine environment from a terrestrial one.
- To reveal signs of pollution such as elevated levels of lead, arsenic or cadmium.
- To reveal traces of human activity within the Spiller Farm archaeological site.

Results – Malaga Island
1. The concentration of calcium within the Malaga Island vibracore increases significantly over time indicating the gradual shift from a terrestrial landscape to a marine environment. The calcium carbonate from seashells accumulates in the sediment proportional to sea level rise as the area becomes an increasingly active marine environment.
2. The concentration of titanium decreases over time significantly which indicates a decrease in overall weathering of rock, typical of a shift to an underwater environment reducing the activity of weathering agents.
3. The concentration of strontium increases over time which supports the transition to a marine environment because it begins to disperse from rock as the pH decreases.
4. There was no indication of pollution within the sediment. Concentrations of lead, arsenic and cadmium were below the limit of detection.

Methods
- Samples were carefully selected from 5 cm sections of each vibracore analyzed.
- Samples were run on an X-Ray Fluorescence Spectrometer for a 90 second run time.
- The data obtained was analyzed against benchmark element values to assess whether toxic conditions were present.
- Trends were observed and graphed to examine slope intensity.

Results – Spiller Farm
- There was no indication of pollution within the sediment samples analyzed. Arsenic and cadmium were below the limit of detection and lead concentrations were below the benchmark values for toxicity.
- There was no clear indication of human habitation from the data collected. This could be due to the brief nature of the occupation or that a different method of analysis may be better suited for this examination.

Results
- There was no indicators of pollution in either site with both arsenic and lead levels below benchmark concentration values.
- All obtained data support the hypothesis that there was a transition from a terrestrial to a marine environment at the Malaga Island site.
- Future goals include measuring phosphorous concentrations throughout the samples from the spiller farm site to detect signs of human habitation. Phosphorous can indicate human habitation because it can originate from the bones and excretions of humans and animals.

References