

Sophia Schneider

Junior Division Earth & Space Sciences

Reducing Global Warming? The Effect of Microorganisms on Geologic Sequestration

As global climate change becomes a growing concern, new methods of cutting carbon dioxide emissions are vital. One possible solution is a procedure called geologic sequestration. This is a process in which carbon dioxide (CO₂) is injected into underground reservoirs, where it then reacts with the surrounding rock to create a stable, carbonate mineral. The purpose of this study was to determine whether microorganisms naturally found in stream water have an effect on geologic sequestration. It was predicted that the microorganisms would increase the reaction between basalt and CO₂. This would be determined through changes in mass (measured to the nearest ten-thousandth of a gram), pH value, and elemental content (analyzed with an Inductively Coupled Plasma Optical Emission Spectrometer), in addition to observations under a stereoscope. Eight containers were filled with basalt and carbonated water. Stream water was then mixed into four samples; nutrient broth was added to two of these. These were then placed in an oven at 90°C for either two, four, or six weeks. It can be concluded that microorganisms do not have an effect on geologic sequestration, which proves the hypothesis incorrect. Although results did show an increase in mass, pH, and calcium and magnesium levels (which are indicators that the basalt sequestered carbon dioxide), the reaction was not dependent on microorganisms. However, the microorganisms used were not suitable for this experiment; therefore, the conclusion only applies to this study, and needs to be researched further.