

Erik Schoonover
PhD candidate, Department of Geosciences
Pennsylvania State University

Impact Melting Prevalence in the Early Earth; Determined Through Zircon Depth Profiling

Project summary:

One of the main questions in geology is “How did continents form?”. There are many theories surrounding this question. One theory is that a high amount of impact events melted the enough surface rock and generated the differentiated rocks that makes up the continental crust. This project aims to examine the geochemical evolution of rocks formed by impact melting and determine if the same geochemical evolution is recorded in rocks from the early Earth.

The geochemical evolution is recorded in accessory minerals called zircon, which record the changing trace element geochemistry of the magma as it grows. This evolution is characteristic of the melt environment it formed within. We can measure the evolution with a novel method called “depth profiling” allowing us to quantify the chemical trend in the zircons. Zircons from the Sudbury Impact Structure will be used and the trend measured will be compared to Archean zircon trends. The comparison will then tell us if zircons from the early Earth formed from impact melting.

Personal Statement:

I was not interested in rocks until I started college. My introduction was a field geology course, where we traveled throughout the Upper Peninsula of Michigan and studied the various rock types. It showed me how geologists tell a story. Unraveling the story is like a puzzle where you have to find all the pieces and put them together in a logical order. I was a chemistry major in college and took geology classes for fun. I did not find the story telling the same in chemistry, so I decided to switch when I went to graduate school. Now I can use my chemistry background to study minute details of the geologic history and find new pieces to add to the story. Studying geochemistry has become the best combination of my interest in studying the world around us outside, while still using my background in chemistry.