Alex Newsom

Calvert Award Application

Reflective Essay

The research project submitted for review of this award concerns the discovery and analysis of cryptotephra at Whitney Mesa Nature Preserve (Henderson, NV) and was done through the thesis course HON 499. It should be noted here that this project was conducted through the Department of Geoscience so uses Geological Society of America (GSA) citation guidelines. I implemented two main forms of research: the search, evaluation, and usage of other researchers’ work as well as direct research done locally and in campus laboratories.

A variety of resources through UNLV’s Lied Library were utilized in the literature review process. Within the first semester, I was met with a librarian at Lied Library, who aided in the research process and offered advice concerning advantageous search methods. I then used suggested search engines and databases through the Lied Library such as GeoRef, WebofScience, and GeoscienceWorld, along with the Lied Library’s own online database. Separate from Lied Library, I used Google and Ecosia as basic search engines along with Google Scholar and other cites that acted as research paper databases, including Nature and ScienceDirect. Moreover, I made use my main faculty advisor Gene Smith’s connections, since they allowed access to papers from sources and information from colleagues that may have otherwise been inaccessible to me as an independent undergraduate student. I also borrowed a physical textbook from my advisors Smith and Racheal Johnsen that aided in the research and explanation of more basic volcanic processes.

Finding relevant papers through various search engines and databases involved using keywords such as “cryptotephra,” “Whitney Mesa,” “Las Vegas Formation,” “Western United States,” “tephrochronology,” and “paleoclimatology.” Throughout this process, there were many instances where there would be a ‘failed search’ or a search that led to no useful information. For one, there has been very little research conducted at Whitney Mesa or even concerning Unit X of the Las Vegas Formation, which led to many ‘dead-end’ searches. Other times, results would show tephra and ash studies rather than cryptotephra-specific studies. Early in the process, many results would show volcanic sources and tephra deposits in geographically irrelevant locations, such as Kamchatka or Japan. Sometimes, results yielded papers concerning relevant volcanic systems with the irrelevant focus on tephra and ash depositions in the northeastern United States. In most cases of a failed search, I would utilize a separate database as well as alter keywords, such as switching from a numbered year to a geological term (i.e. “Pleistocene”), adding a geographic descriptor (i.e. “cryptotephra” AND “Cascades”), or using words similar or relating to my specific subject (i.e. “shard” or “distal tephra”).

Each resource was evaluated on the basis of quality of data, including the specificity of age ranges, locations provided, description of dating techniques, and provided margin of error. Another factor that was used to evaluate each resource was the publication date. Whenever multiple papers covered a similar sample area or subject matter, the publication age and quality of presented data would be used to determine which resource I would use. When a paper was evaluated to be useful, I would then search the authors’ names to find more relevant data relating to the topic. Furthermore, I would use the bibliographies of relevant papers to find more concerning similar subjects or papers that went into further detail on mentioned subjects. I believe this was one of the most useful techniques I implemented for the literature review.

The direct research conducted for the project was largely conducted at CLAGR (Cryptotephra Laboratory for Archaeological and Geological Research) and EMiL (Electron Micro-Imaging Laboratory) at UNLV. The main methodology for the research is described in the thesis paper itself and included techniques of acidic dissolution, mesh sieving, density separation, and petrographic and electron microscopy.

There may have been areas in which I could have delved deeper into the subject or obtained more resources, such as for the ‘implications and significance’ sections of my thesis. Finding a fifth or sixth volcanic source to compare to Whitney Mesa might also have been beneficial. However, I am fairly confident in the data I have collected, from papers written by others, volcanology and geology databases and websites, and our research conducted within the UNLV laboratories.