

NARRATIVE

The fields below are expandable, but must **NOT exceed 2 pages**. This form must be completed using a word processing program (12 point font, single-spaced, 1" margins).

Project Director:**Objectives**

During my sabbatical in 2016 I was invited to take part in an NSF funded field expedition to the highlands of Guerrero, Mexico to excavate a rockshelter (Cacalotepexi Cave). I brought my expertise of paleoecology to the research team, which was led by Dr. Gerardo Gutiérrez, University of Colorado, Boulder. The field season was successful and approximately 200 soil samples were collected for macro-botanical analysis. Unfortunately, NSF funds were only available for the field campaign and did not support secondary lab analyses. Preliminary lab analysis indicates that the samples are rich in plant remains and radiocarbon dating further demonstrates that the sediments extend back to the Postclassic period (~1000 years ago).

Mini-grant funds would be used to: 1/ Process soil samples for plant remains; 2/ process soil samples for abiotic sedimentary characteristics; 3/ Support 2 undergraduate students and 1 CRM graduate student.

Significance

Archaeological Significance: Few geoarchaeological studies have been undertaken in the highlands of Guerrero. The results from this study will provide important insights into the cultural use of plants at a critical time in Mesoamerican prehistory. The cave deposits date to the Postclassic period, which is a time frame of significant demographic and cultural change throughout Mesoamerica. Further, deposits transition through to the time of conquest (and to present) and can thus provide insights into the changes in plant usage as well as the introduction of animal domesticates that occurred following Spanish contact. Significantly, oral tradition indicates that the cave played an important role in providing refuge and shelter from Spanish raids following Conquest. Further, this research will incorporate a number of abiotic proxy analyses, not previously considered in cave settings. This combined data set will provide novel means to understand spatial and temporal changes in cave occupation and use. Specifically we will be able to address the following important questions:

- 1/ Did the types of plants utilized by the cave occupants change through time? (e.g. Does this reflect dietary changes or climatic changes)
- 2/ Can the analyses provide insight into what the rockshelter was primarily used for and if this changed over time (e.g. was it a habitation site or was it used for ceremonial events).
- 3/ Were there specific regions within the cave that were designated as food preparation, or food storage areas and did these locations change over time?

Significance to the Project Director: Mini-grant funds will provide invaluable support in enabling the processing of the large numbers of samples gathered. This will greatly enhance the ability of the PI to undertake a thorough and novel analysis of the sediments, which will lead to timely analysis and publication of the results.

Significance to Sonoma State and SSU Students: The mini-grant funds will support undergraduate and a graduate student during the summer and academic school years. The students will gain invaluable training in laboratory skills. The PI will present the research results at national meetings and will publish the results in leading journals within the discipline, thus representing the scholarly endeavors of SSU to a broad audience.

Results from Previous RSCA Funding

This project has not previously been supported through SSU funding sources. The field campaign was supported via an NSF (BCS #1450562: \$85,000) to Dr Gutiérrez (Boulder). The Project Director has previously received mini-grant support (academic year 2016-2017) to support research examining the Oxygen isotopic signal of carbonate material from lake deposits from Oaxaca. The results from this research are currently in preparation for submission to the journal the *Holocene*. Funds were used for analytical analysis and to support three undergraduate students to work on the project.

Plan of Work

A number of tasks will be undertaken in tandem. All soil samples (N=200) will be wet sieved at different sieve sizes and organic material removed, photographed, tallied and ultimately identified. Each soil sample will be processed for magnetic susceptibility and loss-on-ignition analysis (N=200). A subsection of samples from throughout the cave and at different time horizons (N=50) will be processed for grain size analysis. Soils were imported under a USDA soil permit and so are regulated under strict guidelines, the students will be trained in the appropriate processing and disposal of waste soil material. An approximate plan of work is provided in the table (below). Data will be input into excel and a database developed. Analysis, interpretation and write up will occur towards the end of the project and will likely extend beyond this timeline. The research will initially be presented at national conferences such as the Association of American Geographers (AAG), Geological Society of America (GSA), and the Society for American Archaeology (SAA). Eventually, several publications will result from this research. Target journals will be the Journal of Archaeological Research, Latin American Antiquity, and Geoarchaeology.

Task	Summer 2018	Fall 2018	Spring 2019
Macrobotanical: Processing, microscopy, and identification	X	X	
Abiotic: LOI, Grainsize, Magnetic Susceptibility	X	X	
Database: Design and input		X	X
Analysis: Interpretation and write up		X	X

Student Involvement

I am hoping to recruit students to work on the project who are currently taking my GEP 441 course (Lab Methods in Physical Geography). I expect 1 CRM student and 2 undergraduate (GEP/Anthropology students). The students will be trained in a variety of laboratory analyses, data analysis, and write up. Students will be working with a variety of pieces of equipment such as dissecting microscopes and associated image capturing devices, ovens, furnace, Bartington magnetic susceptibility machine, sieves, settling columns, and analytical balance. The students will be encouraged to present their results at regional conferences and SSU graduate and undergraduate research symposia. I expect that this research will develop into senior/MA theses for the students.