**PERMIT APPLICATION DETAILS:**

**PERMIT FOR THE EXPORT OF CRYPTOTEPHRA SAMPLES FROM BOOMPLAAS CAVE in 2022 FOR THE PURPOSE OF TESTING AGE MODEL**

**Export/sampling permits**

The proposal should include (you can fill these in below):

* a list of participants (name, affiliation, phone no, email addresses) and how they are involved;
* the name and address of the facility, including address, it is being scanned at;
* name and address of the museum/university department that currently hosts the object;
* names of the responsible person(s) during transport and while the fossil is at the facility;
* the period/time frame during which the fossil(s) will be outside the country;
* detailed information on the fossil(s), especially as it is a "unique" specimen;
* detailed information on the research project behind it & methodology including expected outcomes (i.e., the reason for export);
* the written confirmation of the institution that currently hosts the object that the object may be used as proposed and be returned in good condition;
* should there be any damage/destructive analysis (e.g., coating for higher resolution) undertaken, this needs to be stated in detail;
* Statement why this study cannot be done in South Africa.

**Applicant (name and affiliation):**

Dr. Justin Pargeter

Department of Anthropology, New York University, New York, NY, USA

Palaeo-Research Institute, University of Johannesburg, Johannesburg, South Africa

e-mail: justin.pargeter@nyu.edu

USA Office Phone: +9142550980

South Africa Mobile: +27828736123

Role: Primary Archaeological Investigator

**Participants with affiliations, email addresses, phone numbers (& their role):**

1) Dr. Eugene Smith

Emeritus Professor of Geology

Department of Geoscience

University of Nevada, Las Vegas

4505 S Maryland Pkwy

Las Vegas, NV 89154-4010, USA

e-mail: gene.smith@unlv.edu

USA Office Phone: (+1)702-895-3971

Role: Cryptotephra Primary Investigator

2) Dr. Justin Pargeter

Department of Anthropology, New York University, New York, NY, USA

Palaeo-Research Institute, University of Johannesburg, Johannesburg, South Africa

e-mail: justin.pargeter@nyu.edu

USA Office Phone: +9142550980

South Africa Mobile: +27828736123

Role: Primary Archaeological Investigator

**Export mode:**

The material will be **shipped via FedEx** to Arizona State University.

The material will not be returned after analysis, as cryptotephra analysis is destructive.

**Institution incl. address that currently hosts the object:**

Mossel Bay Archaeology Project CRM, Inc.

Munro House Laboratory

Diaz Museum

Mossel Bay, South Africa

**Facility incl. address at which the experiment will be done:**

Sediment and TEphra Preparation (STEP) Laboratory

Institute of Human Origins

Arizona State University

777 E University Dr

Tempe, Arizona 85287-8404

Cryptotephra Laboratory for Archaeological and Geological Research (CLAGR)

Department of Geoscience

University of Nevada, Las Vegas

4505 South Maryland Parkway

Las Vegas, Nevada 89154-4010 USA

**Table of objects or upload file:**

See attached Excel File.

**Site including age at which object was found:**

Boomplaas Cave (BPA)

The portion of this site that was sampled has been dated using radiocarbon to 80-19 ka

**Permit time frame:**

Samples will be sent by FedEx to the Sediment and TEphra Preparation (STEP) Laboratory at Arizona State University in USA, within a month of receipt of permit.

**Return date:** Not Applicable

**Aim/rationale:**

Our research goals for Boomplaas are to 1) test and develop the site’s current age model, and 2) use cryptotephra to link Boomplaas with neighboring sites. In 2018, we published our results from initial cryptotephra investigations at Pinnacle Point 5-6 (PP5-6) and Vleesbaai Area B (VBB) (Smith et al., 2018). Results showed that the Youngest Toba Tuff (YTT), a large volcanic eruption dating to 74 ka, was present at both sites. This discovery allowed for a tight correlation of the sections between VBB and PP5-6. In addition to VBB and PP5-6, the YTT cryptotephra has also been identified at various other sites throughout South Africa. Therefore, Boomplaas has the potential to be tightly correlated to five different archaeological sites and will contribute to building a broader context of the past. Additionally, it is very likely that this network of sites will grow as we investigate more deposits.

In March 2022, we collected one continuous cryptotephra column from Boomplaas, beginning at the base of the previously excavated stratigraphic section and covering deposits dating to 80-19 ka. Sampling for cryptotephra involves collecting 10-20 grams of sediment and all archaeological material is removed. These cryptotephra samples are essential for building a high-resolution chronological profile at BPA and building an isochron that can be used to compare deposits from other sites.

**Methodology (short):**

A column of 170 individual sediment samples was collected from full stratigraphic section at BPA using protocols established by Dr. Eugene Smith at Pinnacle Point 5-6 and Vleesbaai Area B (Smith et al., 2018). Samples are comprised of sediment only – archaeological and other objects, such as rocks, were removed from samples during the process of collection. Sample weights range from about 9 to 20 grams, with a mean of 15 grams. Samples will be analyzed at Arizona State University and the University of Nevada, Las Vegas using published protocols (Blockley et al., 2005; Smith et al., 2018).

**Confirmation/permit by museum (Attached):**

See attached HWC permit case number 18021501AS0223E to remove specimens from the Boomplaas assemblage currently stored at the Diaz Museum, Mossel Bay, South Africa.

**Damage/destructive analysis? (if yes, explain in detail)**

Yes. Cryptotephra analysis will result in the destruction of sediment samples.

**Statement why this study cannot be done in South Africa:**

This study cannot be completed in South Africa because there is no laboratory set up to process cryptotephra samples. Currently, Arizona State University and the University of Nevada, Las Vegas are the only two laboratories that are capable of processing extremely low abundance cryptotephra samples. Therefore, following sample collection, these samples must be sent to the USA for further processing.

**References Cited:**

Blockley, S.P.E., Pyne-O’Donnell, S.D.F., Lowe, J.J., Matthews, I.P., Stone, A., Pollard, A.M., Turney, C.S.M., Molyneux, E.G., 2005. A new and less destructive laboratory procedure for the physical separation of distal glass tephra shards from sediments. Quaternary Science Reviews 24, 1952–1960. doi:10.1016/j.quascirev.2004.12.008

Smith, E.I., Jacobs, Z., Johnsen, R., Ren, M., Fisher, E.C., Oestmo, S., Wilkins, J., Harris, J.A., Karkanas, P., Fitch, S., Ciravolo, A., Keenan, D., Cleghorn, N., Lane, C.S., Matthews, T., Marean, C.W., 2018. Humans thrived in South Africa through the Toba eruption about 74,000 years ago. Nature 555, 511–515. doi:10.1038/nature25967