

**FINAL REPORT ON THE EXPORT PERMIT FOR MICROMORPHOLOGICAL ANALYSIS OF SEDIMENTS FROM
KNYSNA EASTERN HEADS CAVE 1 (KEH CAVE 1)**

SAHRA EXPORT PERMIT

CaseID: 7996 PermitID: 2211

DATE:

December 29, 2016

PERMIT HOLDER:

Dr. Thalassa Matthews
Natural History Department
Iziko Museums of Cape Town
25 Queen Victoria Street
Cape Town
8001
Tel: (+27)21 481 3877
Fax: (+27)21 481 3993
email: tmattthews@iziko.org.za

PRINCIPAL RESEARCHERS:

1) Dr. Ximena S. Villagran,
Assistant Professor
Museu de Arqueologia e Etnologia
Universidade de São Paulo (MAE/USP)
Av. Prof. Almeida Prado 1466
São Paulo, 05508-070, Brazil
Email: villagran@usp.br
Phone: +55 11 3091 2826
Role: Micromorphology Expert Analyst

2) Dr. Naomi Cleghorn
Associate Professor
Dept. of Sociology and Anthropology
University of Texas at Arlington
Arlington, Texas, USA
Email: cleghorn@uta.edu
Phone: +1-510-847-4190
Role: Archaeologist, Site Director

OBJECTS:

Micromorphology Sample Number	Record number	Stratigraphic Aggregate	Context
1	8374	DHA - Top	Hearth
2	8636	DHA	Hearth with rubified clay
3	8408	DHA - Top	Hearth beneath sample 1
4	8802	DHA	Hearth
5	8808	DHA-Shelly	Shell layer inside DHA-shelly
6	8811	DHA/DBS	Stratigraphic transition

RELATED PERMITS:

We currently hold a permit from Heritage Western Cape Permit for excavation and materials analysis (including analysis such as micromorphology sampling). This is an extension of our previous permit.

HWC Permit ID: 3661-4579, valid from 2016 – 2019.

SUMMARY:

Knysna Eastern Heads Cave 1 (KEH-1) is a Stone Age archaeological site on the southern coast of South Africa, near the town of Knysna. Initial excavation began in 2013 and is ongoing. Our original permit for excavation and materials analysis has been extended through 2019. We requested a permit for the export of micromorphology samples in order to characterize the depositional context of the site, determine the extent of disturbance (if any) of hearth features, and identify possible erosional events. Samples were selected from four hearth units and two critical stratigraphic transitions (Figure 1). Each sample was less than 15 cm x 12 cm x 10 cm. The blocks were recorded extensively using photography and total station while *in situ* (Figure 2) during the 2015 excavation season. Subsequent excavations in 2016 targeted the features associated with these samples.

Samples were stabilized within resin blocks after field collection and were initially shipped to the US for preparation. The US firm originally contracted to perform thin section analysis was unable to complete the project. A SAHRA permit alteration was granted, and the samples were sent to Spain for preparation. The final resin-impregnation process and thin section slide preparation was successfully completed in September of 2016 at the lab of Dr. Judith Graus Collado at SCT Micromorfologia i Anàlisi d'Imatges, Universitat de Lleida, Spain. In November 2016, Dr. Ximena Villagran traveled to Europe to personally collect the sample slides for analysis.

RETURN of MATERIALS:

Archive samples of each object were returned to the Dias Museum for re-integration with the full collection in December 2016.

PRELIMINARY RESULTS:

Undisturbed sediment samples for micromorphological analyses were collected from the main stratigraphic aggregates at the site of Knysna Eastern Heads Cave 1 (KEH Cave 1). The sampling strategy focused on:

- 1) The combustion features from stratigraphic facies DHA.
- 2) The contact between DHA and DHA-shelly.
- 3) The contact between DHA-shelly and the centimetric layer of shells found inside the stratigraphic facies.
- 4) The contact between DHA-shelly and DBS facies.



2015 Excavation at KEH-1



Stratigraphic profile prior to sampling.



Perfil estratigráfico donde se tomaron las muestras K1-15-1 a K1-15-3

Stratigraphic profile with samples 1 – 3 *in situ*, in plaster.



Stratigraphic profile with samples 4 – 6 *in situ*, in plaster.

Figure 1. Overview of samples in stratigraphic position.



Sample 1 (8374) *in situ*



Sample 2 (8636) *in situ*



Sample 3 (8408) *in situ*



Sample 4 (8802) *in situ*



Sample 5 (8808) *in situ*



Sample 6 (8811) *in situ*

Figure 2. Samples *in situ* (with object numbers).

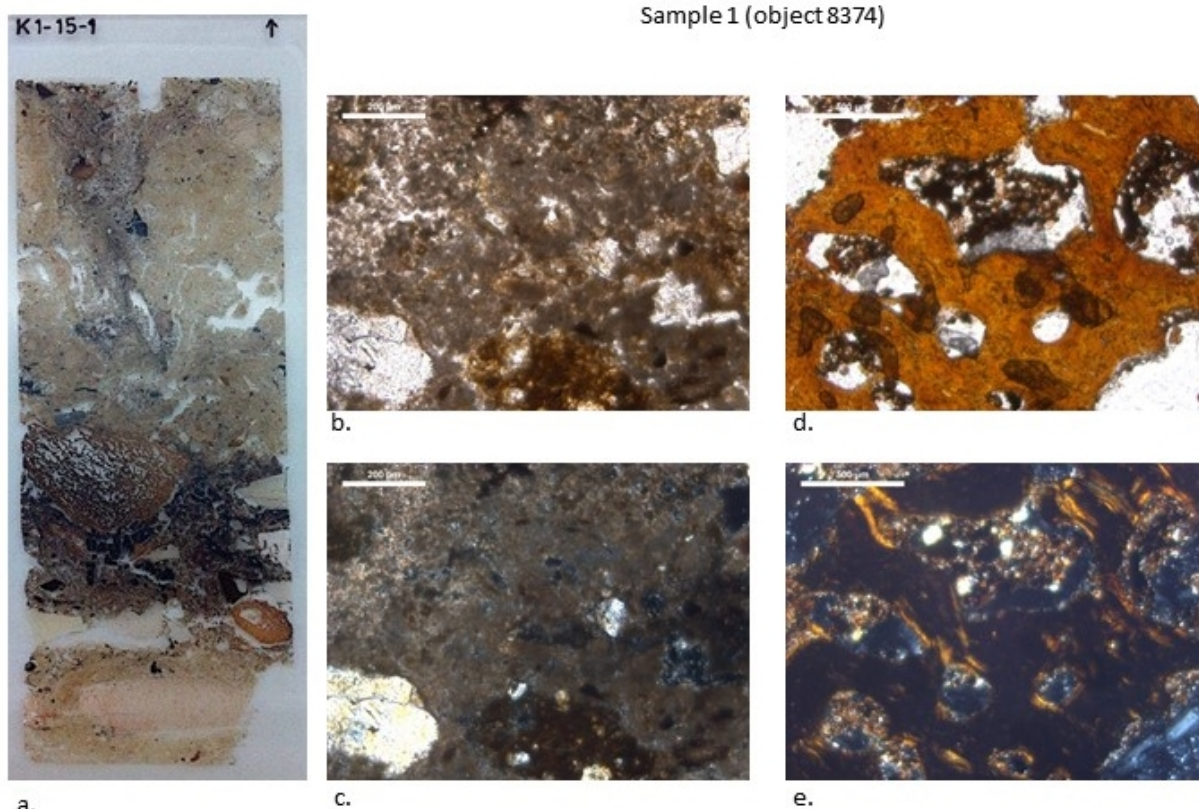


Figure 3. Sample 1. a. Full slide. b. & c. Photomicrographs showing re-crystallized ash with clay and phosphates. d.& e. Bone fragments showing birefringence in edges indicating recrystallization of mineral.

Sample 1 Description

Sample is from a hearth feature exposed by a natural erosional face. This hearth was later excavated in the 2016 field season. Coarse fraction is comprised of unsorted, subangular rock fragments and bone fragments. Micromass is comprised of recrystallized ashes (Figure 3, b – e.). Ash crystals are mixed with clay and an orange micromass with low interference color, possibly phosphates. Bone fragments show signs of dissolution and burning (Figure 3, d - e).

Sample 2 (object 8636)

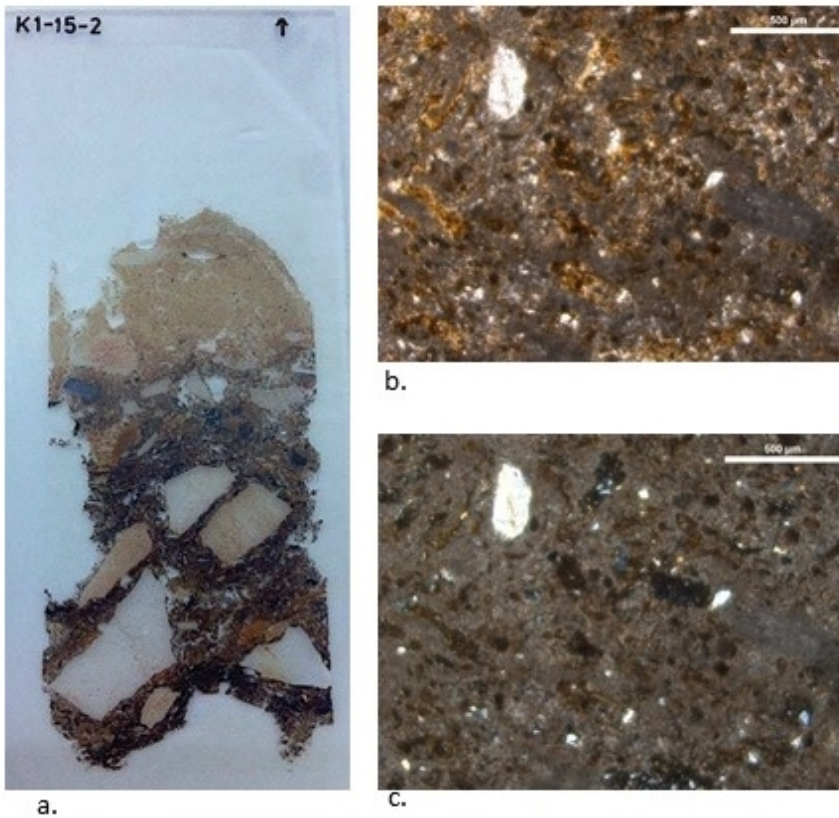


Figure 4. Sample 2. a. Full slide. b. & c. Photomicrographs of the fine fraction from sample 2 showing recrystallized ash crystals and phosphates.

Sample 2 Description

This is from a hearth feature exposed by a natural erosional face and. This hearth was later excavated in the 2016 field season. Similar to sample 1. Coarse fraction comprised of unsorted, angular rock fragments and unsorted bone fragments (Figure 4a). Bones are both burned and show signs of dissolution. Recrystallized ash crystals and phosphate aggregates make up the fine fraction (Figure 4 b & c).

Sample 3 (object 8408)

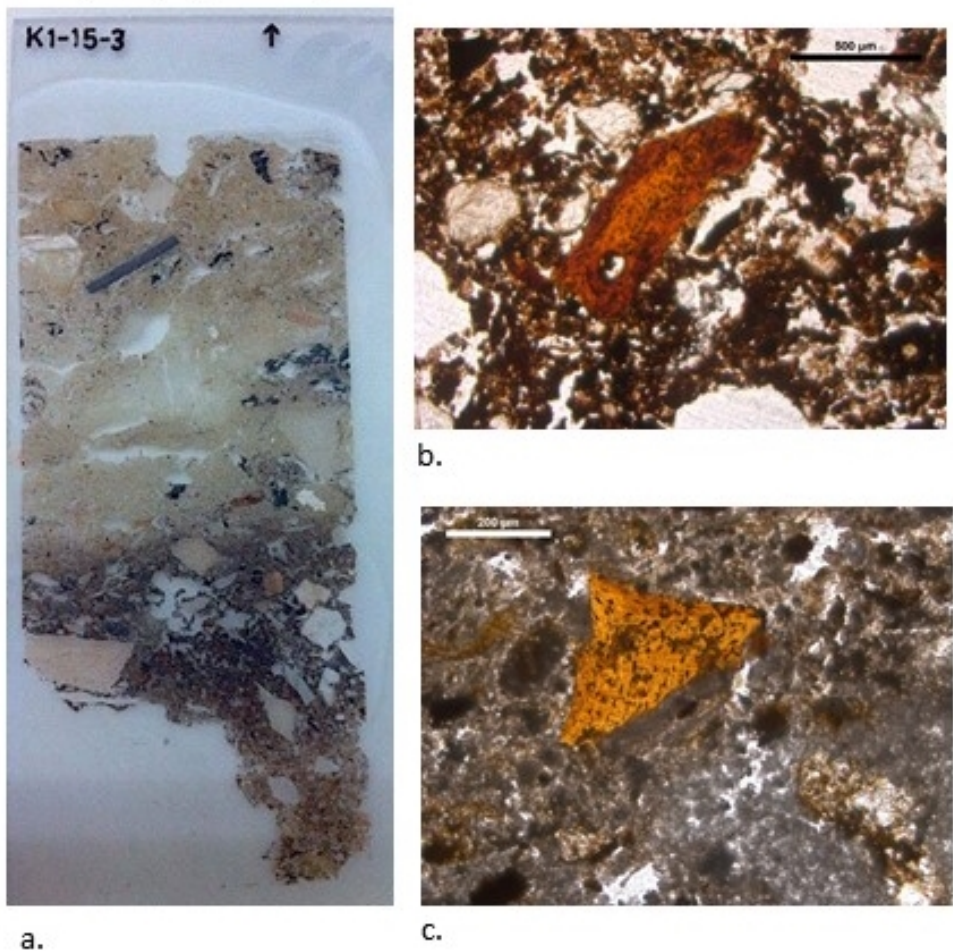


Figure 5. Sample 3 a. Full slide. b. & c. Bone fragments from sample 3. See reddish color of bone in b. indicating burning.

Sample 3 Description

Sample is from a hearth feature exposed by a natural erosional face. This hearth was later excavated in the 2016 field season. Recrystallized ashes mixed with organic matter, clay, and phosphates (Figure 5). Unsorted, angular rock fragments, bone fragments and charcoal make up the coarse fraction. Bone fragments are mostly fine with diverse degrees of burning (Figure 5 b & c).

Sample 4 (8802) *in situ*

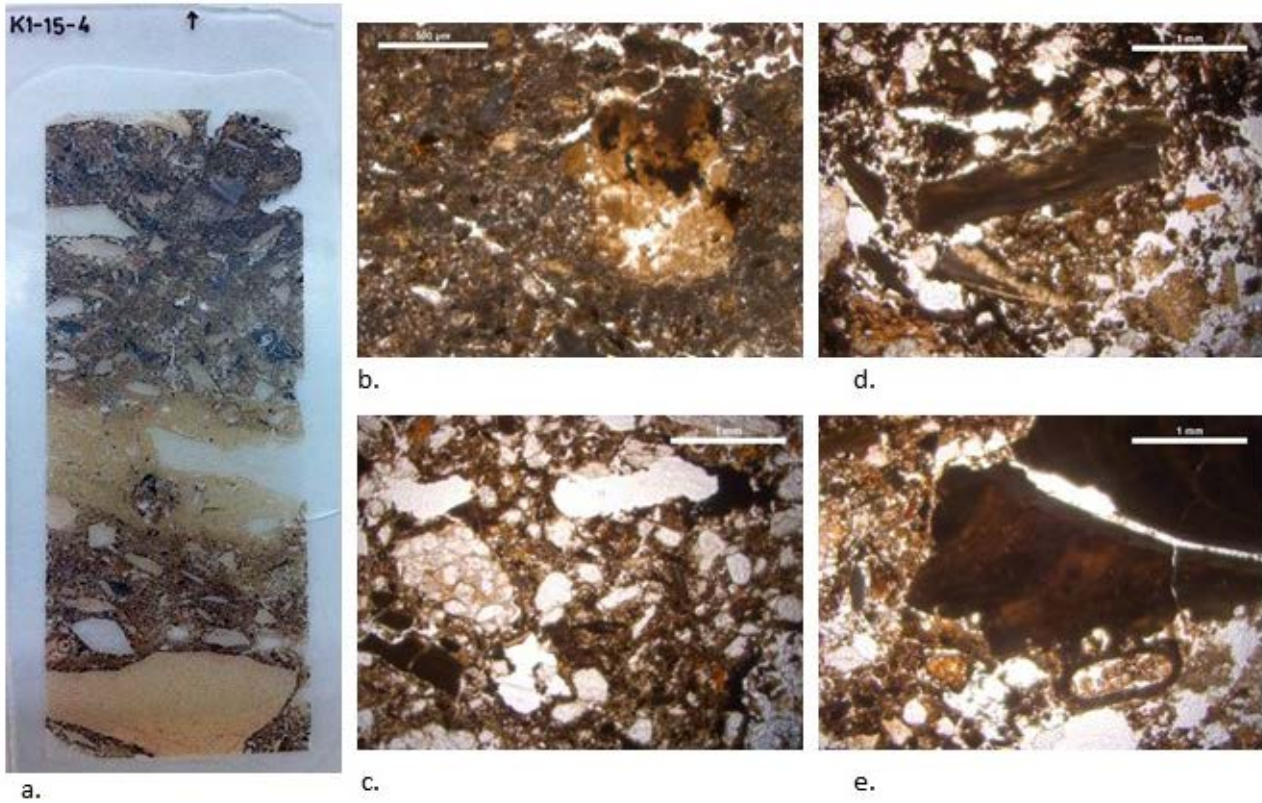


Figure 6. Sample 4 a. Full slide. b. Phosphate nodule in ashy matrix. c. Mixed ashes with clay and organic matter. d & e. Examples of burned shell.

Sample 4 Description

Sample is from a hearth feature exposed during the 2015 excavation, and is the lowest hearth unit yet documented within the DHA facies (above the DHA-shelly facies). This hearth was later fully excavated during the 2016 field season. Same composition described for the combustion features sampled in samples 1,2, and 3. Recrystallized ashes in the fine fraction mixed with organic matter and clay. Large phosphate nodule and a higher number of rock fragments in the coarse fraction (Figure 6 b & c). Few shell fragment with signs of burning (Figure 6 c & d).

Sample 5 (object 8808)

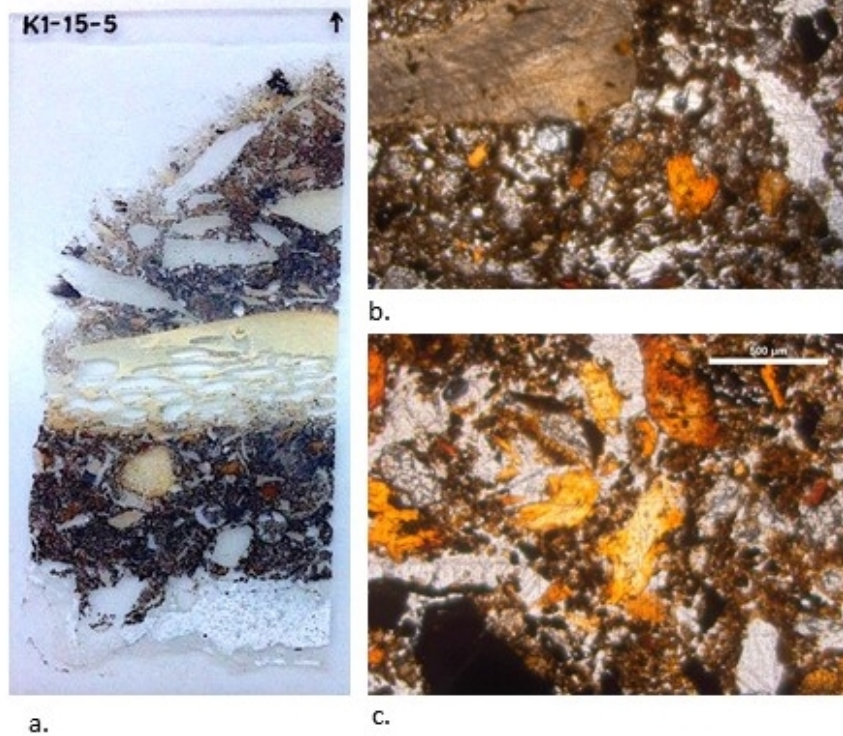


Figure 7. Sample 5. a. Full slide. b & c. Shell fragment with fine sized bone fragments.

Sample 5 Description

Sample 5 records the apparent position of a thin shell lens exposed during the 2015 excavations. Coarse fraction made of coarse, unsorted angular rock fragments (Figure 7). Fine fraction contains clay mixed with organic matter and frequent fine sized bone fragments (Figure 7 b & c). Shell fragments are rare and do not show signs of burning. Bone fragments are both burned and show signs of dissolution.

K1-15-6



Sample 6 (object 8811)



Figure 8. Sample 6. Full slide.

Sample 6 Description

This sample records a transition between the dark DHA-shelly stratigraphic facies and the underlying DBS facies (lighter in color). The slide is currently being analyzed and photographed.

DISSEMINATION OF MICROMORPHOLOGY RESULTS:

Analysis of materials is currently underway, however, our initial results will be presented at the 2017 Annual Meeting of the Society for American Archaeology in Vancouver, Canada. In addition, we are preparing the publication of these results, and we plan to present these results in South Africa.

2017 Cleghorn, N., Villagran, X., Schoville, B., Peart, D., and Keller, H. Hearth Features at Knysna Eastern Heads Cave 1, Southern Coast of South Africa. Poster to be presented at the 82nd Annual Meeting of the Society for American Archaeology, Vancouver, British Columbia, Canada. March 29th – April 2nd.