

Report on the 2018 archaeological excavations at Klipdrift Shelter, southern Cape, South Africa – 18 February to 2 April 2018

Report compiled for Heritage Western Cape by:

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Introduction

This report relates to the permits issued by Heritage Western Cape according to
Reference number: CASE #:1 7100301AS1003E

On 1 November 2017 an excavation permit (CASE #: 1 7100301AS1003E) was issued.
This permit is valid until 17 November 2020 for the proposed excavations, analysis of
material and sampling of speleothems.

This report presents excavation progress during the 2018 excavation season related to the
above permit, and gives an overview of the site, the finds therein, and past and present
analyses. A progress report for the 2011 - 2013 seasons has previously been submitted to
and processed by Heritage Western Cape.

Personnel present

Directors of excavations / excavators

Prof Christopher Henshilwood, University of Witwatersrand and SapienCE, University of Bergen, Norway

Dr Karen van Niekerk, SapienCE, University of Bergen

Excavators / field crew

Magnus Haaland – Post Doc, SapienCE, University of Bergen

Ole Frederik Unhammer – Phd candidate, SapienCE, University of Bergen

Elizabeth Velliky, PhD candidate, University of Tuebingen

Keegan Wallace, M.Sc, University of Witwatersrand

Christina Thorvaldssen, BA, University of Bergen

Lamson Msole, field assistant, Cape Town

Bernard Mtengo, field assistant, Cape Town

Visiting researchers

Simon Armitage, Royal Holloway, UK

Elizabeth Niespolo, University of Berkley, California

Stein Erik Lauritzen, SapienCE, University of Bergen

Nele Meckler, SapienCE, University of Bergen

Curator: Petro Keene, University of Witwatersrand

Laboratory technician: Samantha Mienies, University of Witwatersrand

Sorters/ Casual staff: Amy Rusch, Cape Town

Housekeeper: Marilyn Fielies

Site description and location

Klipdrift Shelter (KDS) forms part of the Klipdrift Complex and is situated in the De Hoop Nature Reserve on Portion 20 of farm 516, Swellendam district (Henshilwood et al., 2014) (Fig. 1).

The Klipdrift Complex is located in a steep quartzite cliff (34°27.0963'S 20°43.4582'E) about 500 m west of the De Hoop Noetsie Trail huts. The complex is a single wave cut platform with a quartzite promontory in the centre (Fig. 2). It is divided into a western and eastern section with the west forming a cave and the east a shelter (Fig. 2).

Just below the site is a quartzite cobble beach and the general area is characterized by a rocky shoreline with few sandy beaches in the vicinity. Blombos Cave is located 45 km East of the Complex (Fig. 1).

The Klipdrift Complex has been undercut on the seaward edge by raised sea levels during the mid-Holocene. Originally, the talus in front of these caves extended to the south east for about 100 m at a slope of about 30°. Remnants of this deposit are visible in the cliff face to the east of the site. The undercut archaeological deposits are clearly visible in the present talus sloping at more than 60°.

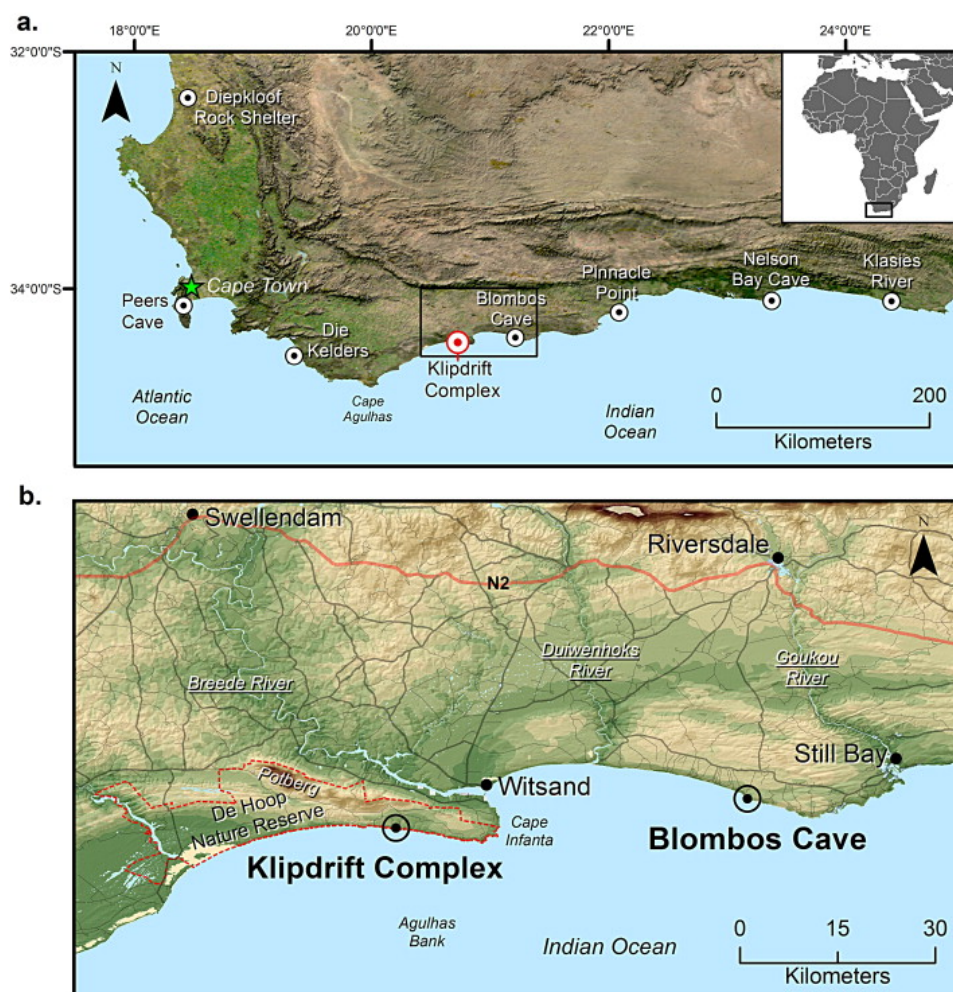


Figure 1. Location of the Klipdrift Complex (Henshilwood et al., 2014)



Figure 2. Klipdrift Complex showing the location of Klipdrift Shelter and Klipdrift Cave (Henshilwood et al., 2014)

Site background

Excavations started at Klipdrift Shelter in 2011 with subsequent excavation seasons in 2012, 2013 and 2018. The sequence has been dated by single grain optically stimulated luminescence (OSL) to between 51 and 65 ka. The lower part of the sequence (59-60 ka, layers PAY to PCA) contains artefacts typical of the Howiesons Poort (HP) techno-tradition.



Figure 3. Excavating at Klipdrift Shelter in 2018

Excavation Method

The excavation methods follow those detailed for the 2011 – 2013 report to HWC and are briefly outlined here.

The Shelter was excavated by square meter units subdivided into 0.5 m quadrates. Different stratigraphic units were identified based on texture, composition, colour, thickness and features. Excavation was conducted by brush or trowel following individual strata or layers. The term “layer” describes a single stratum that accumulated through natural and/or human deposition. Counts of buckets of deposit provide a measure of volume excavated. The location of all lithics >2cm, ochre, ostrich eggshell, identifiable bones, artefacts and features were plotted in 3D using a Trimble Total station. All plotted pieces were individually bagged, labelled and numbered according to square, unit and artefact category as well as entered on the site record form. Recovered deposits were sieved through 3.0 and 1.5mm nested sieves.

A photographic record is kept of all surfaces before excavation and the context of any special finds. Soil, dating and other samples are systematically collected during excavation. Coarse and fine fraction material is washed and sorted at the Potberg House, De Hoop, during the excavation season. Remaining material is sorted at the Wits Satellite laboratory at 167 Buitenkant Street, Gardens, Cape Town.

A full set of records, field notes, and data sheets of the plotted material is housed at the Wits Satellite laboratory and will ultimately be archived at the IZIKO South African Museum, Cape Town. Raw data sets are being processed within the scope of individual research projects that form part of the larger Klipdrift Shelter project and some results are available in the listed published material. All the recovered material is curated at 167 Buitenkant Street, Gardens, Cape Town, with final repository at the Iziko South African Museum, Cape Town.

Description of sediments

The soil layers were of varying consistency (Fig. 5). The soils were often sandy, loose and coarse, with many black, sticky and consolidated layers and contained numerous roofspall pieces. Variation in the layers was represented by soil colours (black, yellow, brown, red-brown, white, grey). Several ash layers and sections of burnt patches containing fragments of charcoal were evidence of hearths or burning events. The HP layers contained abundant shellfish and lithics. Bone was present, generally poorly preserved, however numerous finds were identifiable. Ostrich eggshell was frequently recovered including burnt pieces. Patches of fine ochre pigments (red and yellow) occurred in several places throughout the layers.

Units, quadrates and volumes excavated

Figure 4 lists the units and quadrates excavated during the 2011 to 2018 field seasons. During the 2018 season a volume of 0.43m³ was excavated across 9 quadrates and 12 layers. In total (all seasons) a volume of 2.7m³ over an area of 9 m² has been excavated at KDS to depths from 30 cm to 100 cm (in individual quadrates) and more than 20 layers and lenses defined (Figures 4 and 5).

During the 2018 season 78 bones, 386 lithics (including 31 pieces of ochre), 48 pieces of OES and 15 'other' specimens such as shell, charcoal and seeds were individually plotted.

P27c	P27d								
OAB	OAB								
	PAL								
Q27a	Q27b	Q28a	Q28b	Q29a	Q29b	Q30a	Q30b	Excavation year	
PAL	PAL	PAL						2011	
PAM	PAM	PAM						2012	
PAN/PAO	PAN/PAO	PAN/PAO						2013	
								2018	
						PB	PB		
						PBA/PBB	PBA/PBB		
						PCA/PCB	PCA/PCB		
Q27c	Q27d	Q28c	Q28d	Q29c	Q29d	Q30c	Q30d	Q31c	Q31d
PAL									
	PAP	PAP							
	PAQ	PAQ							
	PAR	PAR							
	PAS	PAS							
						PAX	PAX	PAX	
						PAXh1	PAXh1	PAY	PAY
						PAY	PAY	PAZ	PAZ
						PAZ	PAZ	PBA/PBB	
						PBA/PBB	PBA/PBB		
						PBC	PBC		
						PBD	PBD		
						PBE	PBE		
						PCA	PCA		
						PCA/PCB	PCA/PCB		
R27b	R28a	R28b	R29a	R29b	R30a	R30b	R31a	R31b	
PAO									
PAT	PAT	PAT			PAT				
PAU	PAU	PAU							
PAV	PAV	PAV							
PAW	PAW	PAW							
PAX	PAX	PAW							
		PAX							
					PAX	PAX	PAX		
					PAY	PAY	PAY		
					PAZ	PAZ	PAZ	PAZ2	
					PBA/PBB	PBA/PBB	PBA/PBB	PBA/PBB	
					PBC	PBC	PBC	PBC	
					PBD	PBD	PBD	PBD	
					PBE	PBE	PBE	PBE	
					PCA	PCA	PCA	PCA	
					surface PCB?		PCB		
								PCB	
R28c	R28d	R29c	R29d	R30c	R30d	R31c	R31d		
PAY	PAY	PAY	PAY	PAY					
	PAZ	PAZ	PAZ	PAZ					
PBA/PBB	PBA/PBB	PBA/PBB	PBA/PBB	PBA/PBB	PBA/PBB	PBA/PBB	PBA/PBB	PBA/PBB	
PBC	PBC	PBC	PBC	PBC	PBC	PBC	PBC	PBC	
PBD	PBD	PBD	PBD	PBD	PBD	PBD	PBD	PBD	
PBE	PBE	PBE	PBE	PBE	PBE	PBE	PBE		
PCA	PCA	PCA	PCA	PCA	PCA/PCB	PCA/PCB		PCA	
			PCB				PCB	PCB	
S28a	S28b	S29a	S29b	S30a	S30b	S31a	S31b		
PBA/PBB	PBA/PBB			PBA/PBB					
		test pit	PBB						
PBC	PBC		PBC	PBC					
PBD	PBD		PBD	PBD	PBD				
PBE	PBE	PBE	PBE	PBE	PBE	PBE			
PCA	PCA	PCA	PCA	PCA	PCA	PCA			
			PCB						
			PDA						
PDB			PDB						
			PDC						
S28c	S28d	S29c	S29d	S30c	S30d	S31d	S31d		
			PBC						
			PCA/PCB						
			PDA						

Figure 4. Units and quadrats excavated at KDS by year

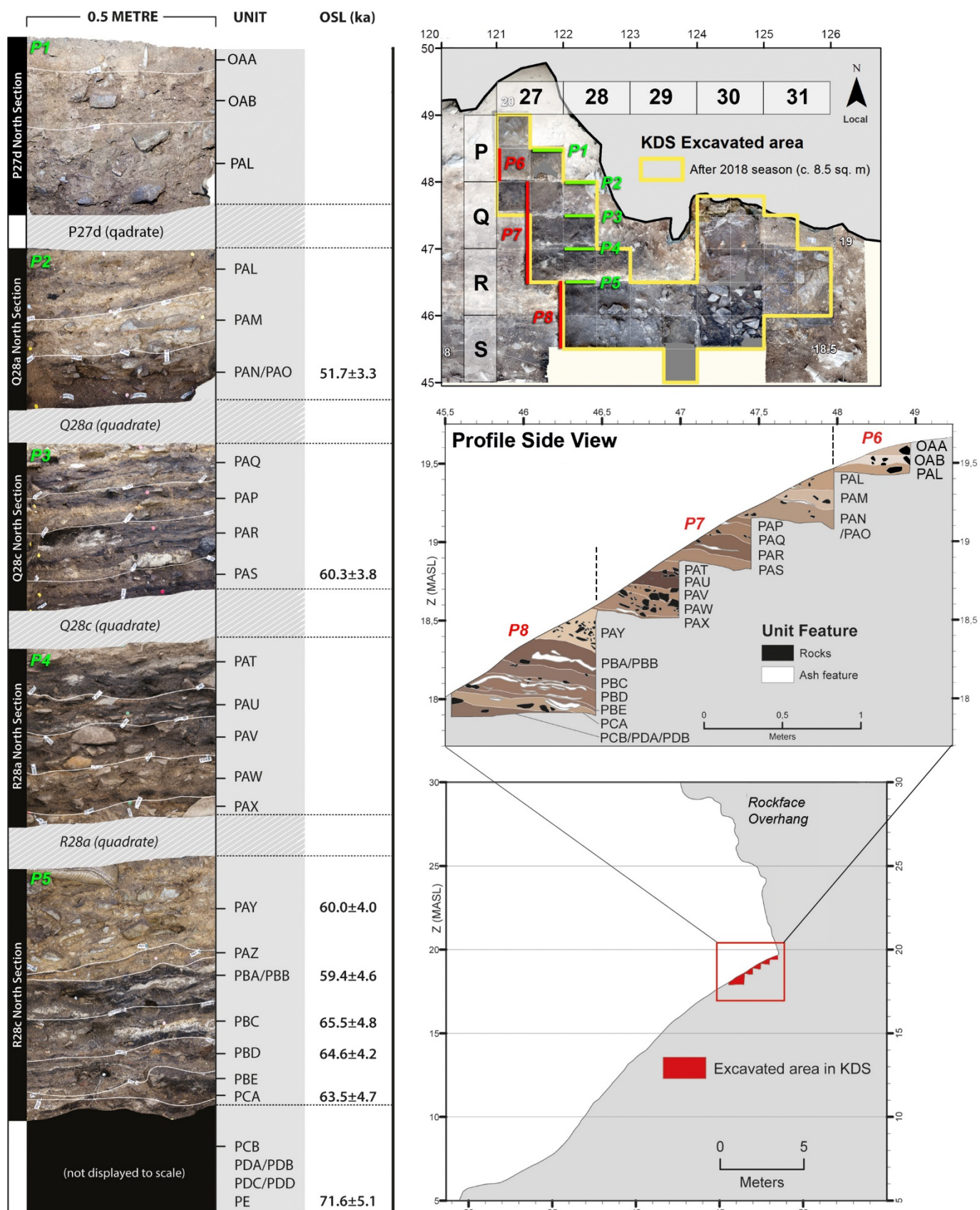


Figure 5. The stratigraphic sequence of Klipdrift Shelter (Image from Nel and Haaland, in prep)

Results and ongoing research

Lithics

There are significant changes in the relative proportions of lithic raw material over time in the HP, with silcrete most dominant in the lower layers, quartz increasing in the overlying layers, while in the uppermost HP layers quartzite and calcrete become more abundant (Douze et al., 2018) (Fig. 5). In addition, technological variations were observed, and three main phases identified. The lowermost phase is characterised by silcrete blades, notched tools, strangulated blades and highly standardised truncated blades. The main tool group in the middle phase consists of backed tools and segments. In the uppermost phase blade sizes increase, some unifacial points are present, and flake production based on the Levallois concept emerges. There is evidence for extensive heat treatment of silcrete during production of tools in the HP (Delagnes et al., 2016).

The sample sizes of the material from the upper, post HP layers above PAY are still too small to confidently assign to a specific techno-tradition.

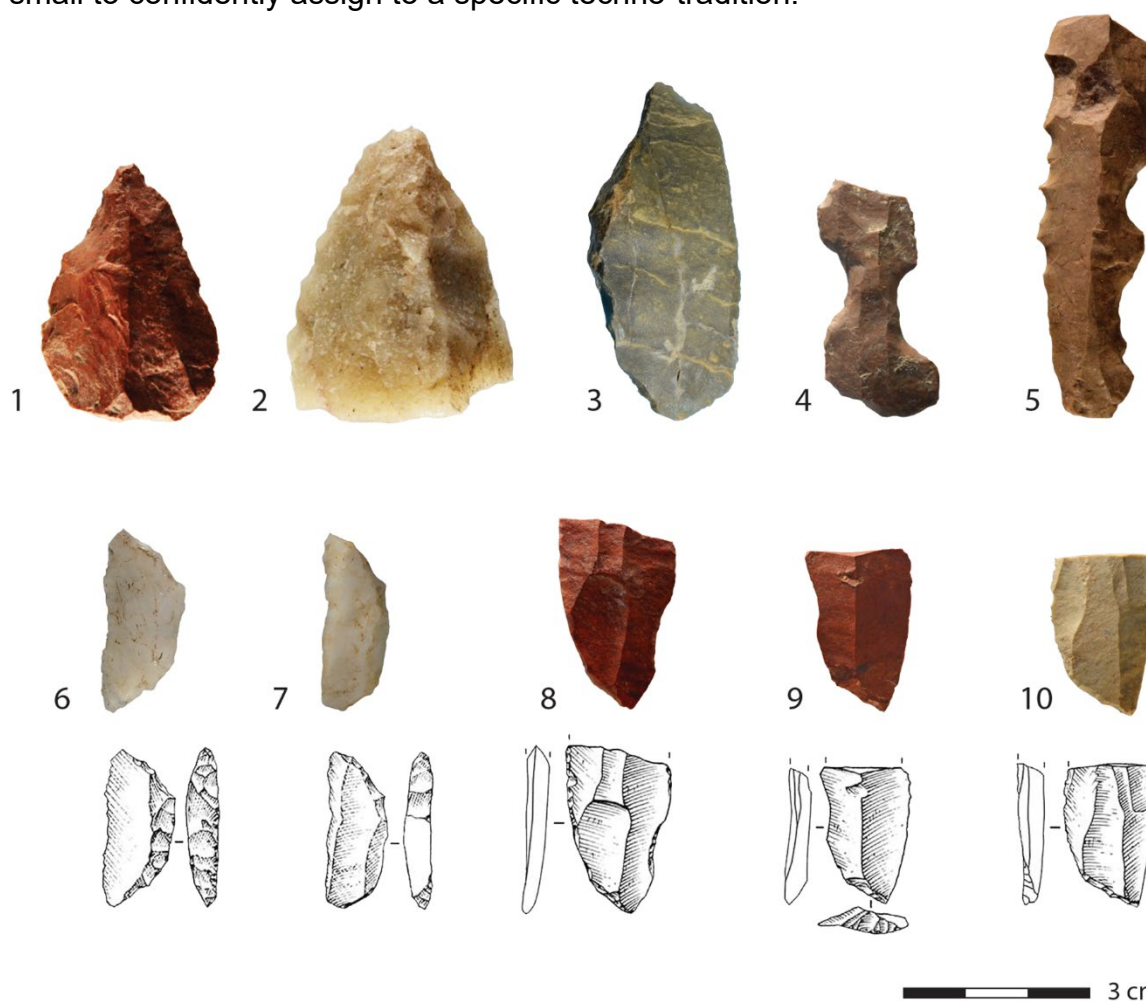


Figure 5. Example of lithics from the HP layers at Klipdrift Shelter (Douze et al., 2018)

Ochre

Ochre seems to have been widely utilized as several units contained pieces of ochre as well as patches of pigment. There were numerous lithic finds with traces of ochre, and several flat grindstones with ochre residue. The whole ochre assemblage (2011 – 2018) is currently subject to an intensive and systematic study by Elizabeth Velliky.

Ostrich eggshell

Ostrich eggshell (OES) fragments occur throughout the sequence. 123 pieces of deliberately engraved OES fragments have been recovered from the HP layers up to and including 2018 material. No engraved OES has been found in the layers above the HP. Analysis of the engraved OES is in progress.

A pilot study by Patrick Roberts to determine whether the OES from KDS might originate from another location (indicating transport of shells/movement across the landscape) using strontium isotopes showed that the isotopic signals of the shells could not be differentiated from the local geological baseline.

Bone artefacts

Possible intentionally modified bones are currently under study by Francesco d'Errico and Jerome Reynard.

Shellfish

Shellfish are abundant in the HP layers and include a wide variety of species. Shellfish is most abundant in layers PBA/PBB and below, but also occur in the upper layers, and in low, but not yet quantified numbers in layers above PAY. Three species dominate the assemblage, and the frequencies of these species change through the sequence. At the base of the sequence, in PCA, *Turbo sarmaticus* is most common, in the PBE and PBD above *Haliotis midae* is most common, and from layer PBA/PBB to PAY *Dinoplax gigas* is the most frequently occurring species. Shellfish densities are highest in layers PBD and PBC and decrease in the younger layers (Henshilwood et al., 2014).

Flora

A few isolated seeds have been recovered from KDS. These have not yet been identified.

Bone

Bone was present in all layers but generally poorly preserved and extremely fragmented, although there were a number of finds that were identifiable. Small mammals and tortoise are common throughout the sequence, along with some larger mammals, such as equids (Reynard et al., 2015, Reynard et al., 2016, Reynard and Henshilwood, 2017).

The microfauna, including those from the upper, post-HP layers excavated in 2018, are currently being studied by Turid Hillestad Nel.

Attempts at extracting DNA from bone via sediment samples by Matthias Meyer resulted in one sample showing evidence of trace amounts of ancient mammalian DNA, but these were too fragmented to assign to species.

Palaeoproteomic analysis (ZooMS) of (large mammal) bone fragments by Katarina Douka resulted in identification to genus, mostly *Equus*, of 11 out of 115 specimens. ZooMS analysis of micromammal bones is ongoing (Hillestad Nel and Douka).

Human remains

A single hominin second deciduous molar was recovered from R29d PBE (Harvati et al., 2015). The morphology of the tooth suggests it comes from a human population that fits between recent modern humans and the earliest *Homo sapiens* populations.

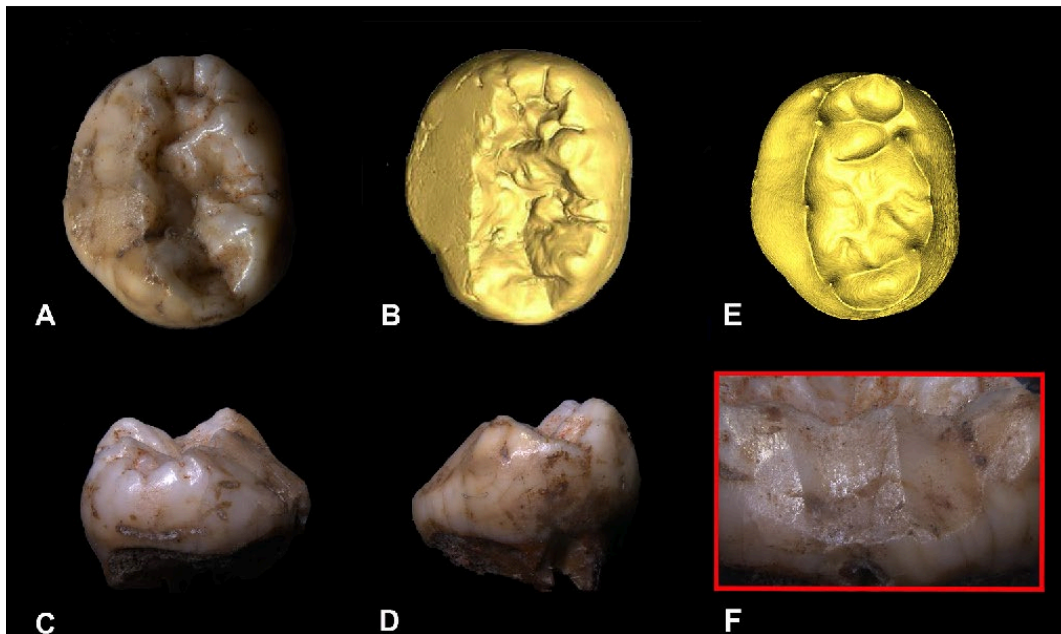


Figure 6. The hominin tooth from KDS (Havarti et al., 2015)

Micromorphology

Micromorphology blocks have been systematically collected during each excavation season by Magnus Haaland. All of the blocks, including those taken in 2018 have now been processed into thin sections and are being analysed by Haaland.

Publications

Delagnes, A., P. Schmidt, K. Douze, S. Wurz, L. Bellot-Gurlet, N. J. Conard, K. G. Nickel, K. L. van Niekerk and C. S. Henshilwood (2016). "Early Evidence for the Extensive Heat Treatment of Silcrete in the Howiesons Poort at Klipdrift Shelter (Layer PBD, 65 ka), South Africa." *PLOS ONE* 11(10): e0163874.

Douze, K., A. Delagnes, S. J. D. Wurz and C. Henshilwood (2018). "The Howiesons Poort lithic sequence of Klipdrift Shelter, southern Cape, South Africa." *PLOS ONE* 13:e0206238(11): 1-24.

Harvati, K., C. C. Bauer, F. E. Grine, S. Benazzi, R. R. Ackerman, K. L. Van Niekerk and C. Henshilwood (2015). "A human deciduous molar from the Middle Stone Age (Howiesons Poort) of Klipdrift Shelter, South Africa." *Journal of Human Evolution* 82: 190-196.

Henshilwood, C. S., K. L. van Niekerk, S. Wurz, A. Delagnes, S. J. Armitage, R. F. Rifkin, K. Douze, P. Keene, M. M. Haaland, J. Reynard, E. Discamps and S. S. Mienies (2014).

"Klipdrift Shelter, southern Cape, South Africa: preliminary report on the Howiesons Poort layers." *Journal of Archaeological Science* 45(0): 284-303.

Reynard, J., E. Discamps, S. Badenhorst, K. L. Van Niekerk and C. Henshilwood (2015). "Subsistence strategies in the southern Cape during the Howiesons Poort: Taphonomic and zooarchaeological analyses of Klipdrift Shelter, South Africa." *Quaternary International*. Volume 404, Part B, 6 June 2016, Pages 2-19

Reynard, J. and C. Henshilwood (2017). "Subsistence strategies during the Late Pleistocene in the southern Cape of South Africa: Comparing the Still Bay of Blombos Cave with the Howiesons Poort of Klipdrift Shelter." *Journal of Human Evolution* 108: 110-130.

Reynard, J. P., E. Discamps, S. Wurz, K. L. van Niekerk, S. Badenhorst and C. S. Henshilwood (2016). "Occupational intensity and environmental changes during the Howiesons Poort at Klipdrift Shelter, southern Cape, South Africa." *Palaeogeography, Palaeoclimatology, Palaeoecology* 449: 349-364.

Speleothem analysis

Rationale

De Hoop Nature Reserve (34°27'15.08" S | 20°23'58.63" E) is located about 280 km east of Cape Town in the Overberg district of the Western Cape. The Reserve has multiple caves which are well documented by amateur and professional cavers affiliated to the Cape Peninsula Speleological Club. During a previous field exploration, and later sampling (under a previous permit, 2011/03/001), Prof. Henshilwood and Prof. Lauritzen identified various speleothems, which are geological formations of cave mineral deposits, within a series of caves situated on the eastern side of the De Hoop Nature Reserve (Figure 7). The material formed the basis for Dr. Jane Audigun's PhD thesis, and has been returned and reported 31. May 2011. During this work, it became clear that Bloukrantz cave (Figure 7) is the one that may yield continuous material that covers the timespan for the last 100,000 years and thus provide climatic data onto which human occupation in nearby caves can be tied.



Figure 7: Location map of the De Hoop Nature Reserve (study area) containing Bloukrantz Cave, West Cave and Klipdrift Sea Cave. The extent of the reserve is shown (- - -) and the location of the other speleothem bearing caves in the southern Cape. These sites are the Congo Cave, Pinnacle Point (containing PP29 & Crevice Cave), the Little Karoo, Sandkraal Cave and Herold's Bay Cave (From Adigun 2016).

Excavations

In late February 2018 Prof. Stein-Erik Lauritzen, together with Prof. Simon Armitage and assoc. Prof. Nele Meckler, all scientist at the SapienCE Centre of Excellence, collected speleothem samples as outlined in the permit of February 9th 2018. The samples were given accession numbers BL-18- (1-9). One sample, BL18-1, was a broken stalagmite top, the others were thinner (15 mm) cores drilled at the top and base of specimens that were left in the cave (Figure 8). The samples were shipped to Norway and curated at the Department of Earth sciences, University of Bergen.



Figure 8: Prof. Lauritzen (left) and Prof. Armitage (right) drilling at the base of speleothems.

The drilled cores were dated and indicated that the speleothem growth in Bloukrantz cave occurred mainly from 55 to 75 ka (Figure 8). Of those speleothems with preliminary dates, we selected three that display the most suitable age range for further investigations: BL18-1, BL18-4, BL18-6 (displayed in red in Figure 8). All three speleothems' growth overlap, allowing a continuous coverage from ~88 ka to ~45 ka and initial dating indicating the potential for a high resolution record.

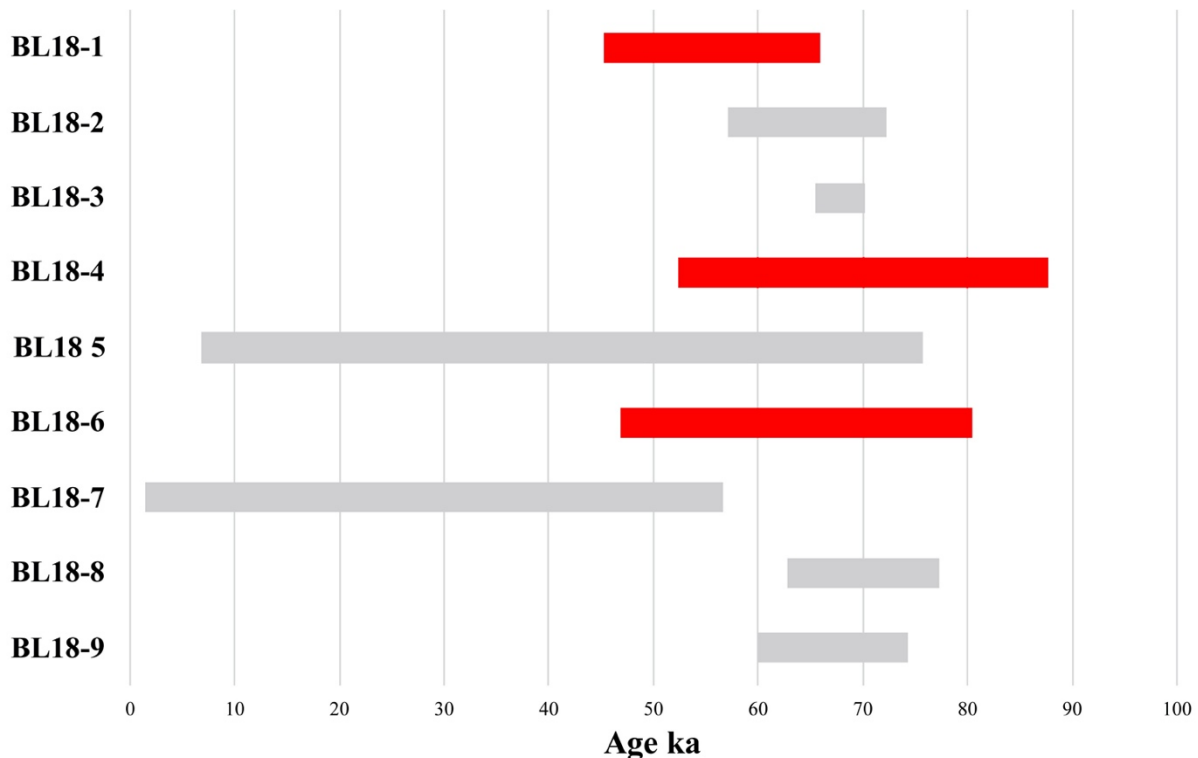


Figure 8: Age range of the 9 drilled speleothems from Bloukrantz cave in 2018.

In March 2020 Prof. Lauritzen, Prof. Armitage and Dr. Maccali returned to Bloukrantz cave to collect the selected samples: BL18-1 (8), BL18-4 (2) and BL18-6 (4). The samples were further broken into smaller pieces (digit in parenthesis) for transport purpose as Bloukrantz cave is only accessible through a ~1 hour hike.

In addition, a thin core (BL20) was drilled into an actively dripping wall to further document the cave activity through time. The samples were shipped to Norway in June 2020 and curated at the Department of Earth sciences, University of Bergen.

Each piece will be cut in half lengthwise. One half will be returned to be curated in SA as archive while the other half (the working half) will be further sub-sampled for U-Th dating and paleoclimatic proxies at the University of Bergen.

Permits

This work has been performed following guidelines from the Cape Nature, Heritage Western Cape and SAHRA permits:

- Cape Nature permit to enter in a Nature Reserve for scientific purpose. Permit no: CN32-28-12392; expiry date 18/01/2021.
- Heritage Western Cape permit for Proposed excavations, analysis of material and sampling of speleothems at De Hoop Nature Reserve. Permit case #: 17100301AS1003E; expiry date 17/11/2020.
- SAHRA permit to collect geological samples (speleothems) from de Hoop Caves for Palaeoclimatic analysis. PermitID: 2681; expiry date 06/02/2021.

Publications

The analytical work is carried out iteratively and progress depends upon the first results. Analyses include U-Th dating, Oxygen and Carbon isotopes of both the calcite and the water from fluid inclusions, trace element and liquid-vapor homogenization temperature from fluid inclusions. Publication in open access peer-reviewed journals is expected within year 1-5 of the project. Publication on sample BL18-1 (from the 2018 excavation) is expected in early 2021.