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Exploring Wilton microlithic technologies: New analyses from Rose Cottage Cave, South Africa

Iris Guillemard [a,b]

[a] Rock Art Research Institute, School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, 1 Jan Smuts Avenue, Braamfontein 2000, Johannesburg, South Africa
[b] TRACES, Université Toulouse – Jean Jaurès, 5 allée Antonio Machado, 31058, Toulouse, France

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ABSTRACT

The Later Stone Age of southern Africa sees the succession of varied lithic traditions. The Wilton (8ka BP – second millennium AD) corresponds to the last techno-complex of the LSA in South Africa. It has been typologically recognised over vast geographical areas and seems to last until the progressive disappearance of stone tool industries, while experiencing chronological and geographical variations. While Wilton formal tools, mainly small scrapers and microliths, have received much attention, the ways in which the stone tools themselves were produced are still unknown. This paper provides keys to describe mid-Holocene Wilton microlithic productions at the reference site of Rose Cottage Cave (Free-State). The lithic technological analysis highlights the integrated production of 'ready-made' blanks from one volume, including bladelets. The scraper and backed piece typologies are analysed and reveal an interesting diversity. These results provide a foundation for the building of the technological understanding of the Wilton in southern Africa. This paper ultimately aims to facilitate the exploration of regional and chronological variations at Wilton sites, and, by contrast, to differentiate other lithic traditions in southern Africa.

1. The Wilton in southern Africa

1.1. Chronology and definition of the Wilton techno-complex

The knapping methods that were used to produce microlithic mid- and late Holocene Later Stone Age (LSA) assemblages in southern Africa are still not fully understood (but see Modikwa, 2008; Witelson, 2016; Guillemard, 2020). While we know that small scrapers and backed pieces are common in those lithic assemblages, we do not understand what characterises the blank productions, methods and knapping techniques, and if these differed through time and space. These aspects are nevertheless central, because they correspond to learnt and transmitted practices that are imbedded in cultural and social contexts. Furthermore, while homogeneous stone tool shapes may be produced, the way that these objects were fabricated can vary through time and space. Variations and similarities in the fabrication processes, blank production and formal tools are therefore important to describe. In this frame, this paper offers a complete description of mid- Holocene Wilton lithic technologies in South Africa.

The Wilton is the last main lithic techno-complex of the Later Stone Age (LSA) in South Africa (Sampson, 1974; Deacon, 1984). It corresponds to the large-scale occurrence of microlithic toolkits generally characterised by small thumbnail scrapers and backed pieces. The Wilton appears from around 8000 years ago and seems to last until the second millennium AD, while experiencing chronological and regional variations (Deacon, 1984; Lombard et al., 2012; Guillemard, 2020). It was first described by Goodwin and van Riet Lowe (1929) following a study by Hewitt (1921) at Wilton Cave in the Eastern Cape. Later, Sampson (1974) and Deacon (1972, 1984) provided pivotal typological analyses of the Wilton. Deacon (1972) divided the Wilton into three phases corresponding to the 'appearance', 'development' and 'disintegration' of the Wilton techno-complex (Deacon, 1972). Sampson (1974) and following researchers (e.g. Mitchell, 1997, 2002) also discussed the existence of three phases, the 'Early Wilton' (≈8ka – 7ka BP), 'Classic Wilton' (≈7/6ka – 4,5ka BP) and 'Post-Classic Wilton' (≈4,5ka – 2ka BP). A fourth phase, the 'Ceramic Wilton' (after 2ka BP) was added for the late Holocene, and corresponds to the appearance of pottery in LSA sites (see Guillemard, 2020 for discussion).

Deacon (1984) partly associated the appearance of the Wilton with the use of new hafting technologies necessitating the production of standardised stone tools such as microliths. Sampson (1974) argued that the Early phase of the Wilton would have dispersed from the north to the

E-mail address: iris.guillemard@univ-tlse2.fr.

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south of southern Africa. This idea was also expressed by Mitchell (2002: 145) who points out that the earliest dates for the appearance of Wilton-like microlithic assemblages can be found at Diana's Vow in Zimbabwe (10 650 ± 80 BP; 12 720–12 405 cal BP; Cooke, 1979) and Apollo 11 in Namibia (9430 ± 80 BP; 11 068–10 298 cal BP; Wendt, 1976) (all dates in this article were calibrated in OxCal with SHCal13, 95.4% probability, Hogg et al., 2013). The hypothesis that the appearance of the Wilton in southern Africa would be due to population migrations is debated. Deacon (1984) cites Clark (1974) and Phillipson (1976, 1977) who argue that microlithic industries may have appeared independently of migrations, and that we may be observing convergences in stone tool productions rather than migration or diffusion processes. Deacon further proposes that we should understand LSA microlithic industries — including the Wilton — as "*changing constellation*[s] *of attributes, amongst which is the tendency to make bladelets from bipolar and single-platform bladelet cores* [allowing us to] *accommodate hypotheses which include gradual evolution, diffusion and modification of innovations to suit regional requirements*" (Deacon, 1984: 18). She nevertheless also highlights that the earliest Wilton could correspond to "*a gradual infiltration of new ideas from the north*" (Deacon, 1984: 365).

The modalities of the Wilton when it first appeared in southern Africa remain imprecisely defined. Only a few sites containing lithic assemblages correspond to the Early Wilton Phase, for example, Nelson Bay Cave and Wilton Large Rock Shelter in the Eastern Cape of South Africa (Deacon, 1972, 1984) and Tloutle and Liphofung in Lesotho (Mitchell, 2000; Kaplan and Mitchell, 2012). The chronology of the Early Wilton, which falls between around 8ka and 7ka cal BP, is narrower than for the Classic and Post-Classic Wilton. The Early Wilton is often viewed as a transitional phase. For example, Sampson (1974) notes that Oakhurst-like stone tools, such as large side-scrapers, may still be found in the earliest phases of the Wilton in the interior of South Africa, as well as 'large utilised flakes' made of coarse-grained raw material. It is still unclear whether there are elements of continuity from older lithic productions into the first Wilton phases or if some of those mixed signals should be re-evaluated. Deacon (1972, 1984) and Sampson (1974) also highlight new, characteristic Wilton elements that appear from around 8ka BP. Small blanks including bladelets start to be extracted from smaller nodules, and raw material preferences shift towards a selection of fine-grained rocks and quartz (Mitchell, 2002). Deacon observed an increase in the production of formal tools, notably the making of backed pieces including segments and small thumbnail scrapers. Different researchers note that there are generally few segments in Early Wilton assemblages, which then become widespread during the Classic Wilton phase from around 7/6 ka BP (e.g. Mitchell, 1997).

The Classic Wilton (7/6ka – 4,5ka BP) is better represented and understood from a typological point of view (e.g. Deacon, 1984; Wadley, 2000). It is still characterised by the standardised production of microlithic stone tools including small thumbnail scrapers and backed pieces, in particular segments (Deacon, 1984). There seems to be no more elements of continuity from the Oakhurst (Sampson, 1974), with the possible exception of end-scrapers with lateral retouch called 'Woodlot scrapers' in the Maloti-Drakensberg area (Arthur and Mitchell, 2014). Segments become common in the Classic Wilton, and scraper shapes, including thumbnail scrapers, are particularly standardised. Classic Wilton lithic productions are associated with flake and bladelet debitage, and the use of bipolar percussion modalities (Deacon, 1984; Wadley, 2000). These modalities have, however, not been precisely described.

The Post-Classic or 'Developed' Wilton (4,5 – 2ka BP) shows many elements of continuity with the preceding phases (e.g. Sampson, 1974; Deacon, 1984; Guillemard, 2020). However, Sampson (1974) notes changes in certain regions, notably in the interior of South Africa. He observed a shift in raw material preferences, the creation of longer 'end-scrapers', and a decrease in segment production relative to more backed points and backed bladelets. Pressure-flaked points also appear in different areas of southern Africa, but the chronology of their appearance is still unclear (e.g. Mitchell, 2009; Smeyatsky, 2014). For Sampson (1974) and Deacon (1984), this third phase of the Wilton is generally associated with an increased variability in stone tool production compared to the high standardisation observed during the Classic Wilton phase. Lombard et al. (2012) also highlight the appearance of regional lithic industries, which may differ from the Wilton from around 4ka BP. For this reason, they propose using the terms 'Final LSA' and 'Ceramic Final LSA' to include these variations while awaiting comparative studies.

1.2. Geographical variations of the Wilton

The Wilton has been recognised on typological bases at a large geographical scale in southern Africa; including South Africa (e.g. Sampson, 1974; Deacon, 1984; Wadley, 2000), Lesotho (e.g. Mitchell, 1992), and Zambia (e.g. Clark, 1942; Savage, 1983). Other microlithic industries in Zimbabwe (e.g. Walker, 1995), Botswana (e.g. Robbins et al., 2005, 2008), Eswatini (e.g. Barham, 1989) and Namibia (e.g. Richter, 1995; Breunig, 2003; Vogelsang and Eichhorn, 2011; Ossendorf, 2017; Kinahan, 2021) are associated with segments and small scrapers. The apparent ubiquity of microlithic productions during the Holocene in sub-Saharan Africa is discussed by Phillipson (1977, 2005), who highlights the wide dispersion of 'Mode 5' lithic industries, giving the impression of large-scale homogeneity in the lithic assemblages. Nevertheless, Holocene microlithic industries include a wide range of lithic assemblages sharing elements of both similarity and specificity. This diversity is visible from a typological point of view (e.g. Phillipson, 2005). Sampson (1974), for instance, highlights the differences he observes in the Wilton of the interior of southern Africa concerning backed pieces typology. Typological variations in scrapers, backed pieces types, and sometimes core types, have also been further described for the late Holocene (see Guillemard, 2020 for discussion).

In and around the Maloti-Drakensberg range, typological variations are observable, even though systematic comparisons are still needed to precisely describe them. Lithic assemblages from the Lesotho Highlands, such as at Likoaeng (Mitchell, 2009), include pressure-flaked retouch techniques, which are generally absent or different from the lithic assemblages in the Thukela Basin (e.g. Mazel, 1989; but see Mazel, 1996) and west of the Drakensberg, except for a few tanged arrowheads (e.g. Klatzow, 1994; Wadley, 2000). Thumbnail scrapers and especially segments, however, seem to be widespread in southern Africa, linking these varied assemblages under the same typological classificatory umbrella. Looking at the fabrication processes, both bipolar and free-hand knapping techniques to produce small flakes and bladelets have been mentioned for Wilton-like assemblages (Guillemard, 2020). Further research is necessary to better define the methods and techniques used during mid- and late Holocene.

The overall impression of the Wilton, then, is one of temporal and geographical uniformity. However, this uniformity seems to correspond to a limited set of attributes: microlithic dimensions, the production of segments and scrapers, and the often-cited use of bipolar percussion. Investigating the methods and knapping techniques might reveal specific know-hows that could change through time, as well as regional traditions. In this frame, the technological analysis of the Classic Wilton lithic assemblage of Rose Cottage Cave provides a detailed and complete description of the stone tool production modalities at a Wilton site. This paper highlights the specific strategies that were used to extract rectilinear blanks, and reveals an interesting typological variety in the backed pieces and scraper production.

2. Rose Cottage Cave: site presentation and former analyses

2.1. The site of Rose Cottage Cave

The site of Rose Cottage Cave (RCC) is located in the eastern Free State Province of South Africa, a few kilometres away from the border

with Lesotho on the western side of the Maloti-Drakensberg Mountain massif (Wadley, 1997; see Fig. 1 for location of Rose Cottage Cave and sites mentioned in the text). It lies in the mesic highveld grassland between the high-altitude grassland of the Drakensberg to the east and the dry highveld grassland of the interior plateau to the west (Mucina and Rutherford, 2006). Climatic variations occurred over the last 10 000 years in and around the Maloti-Drakensberg area and at Rose Cottage Cave (Plug and Engela, 1992; Wadley et al., 1992; Stewart and Mitchell, 2018; Dewar et al., 2024). Stewart and Mitchell (2018), for example, highlight a progressive return to more 'mesic events' from around 8.5–6.6 ka with a moist and warm climate, with temperatures relatively high until around 3.5 ka in the area surrounding Rose Cottage Cave and at the site of Tloutle in Lesotho. The climatic variations between around 6 ka and 3.5 ka are less well documented and include records showing different trends (Stewart and Mitchell, 2018).

Rose Cottage Cave is a 20 m long and 10 m wide rock shelter with an entrance partly enclosed by a big boulder (Wadley, 1997). Wadley excavated the site between 1987 and 1997, following the previous digs by Malan and Beaumont. The site covers a long sequence spanning from the MIS 5 Middle Stone Age (MSA) to a second millennium AD LSA assemblage attributed to the Post-Classic Wilton with pottery (Wadley, 1991, 1992, 1997, 2000, 2023; Loftus et al., 2019). Wadley opened a grid of 38 m^2 and Harper continued the excavation into the MSA in part of the site (Wadley, 1997). All dates and stratigraphic descriptions of the site are available in Wadley's previously cited publications (e.g. Wadley, 1997). New excavations directed by Dr. Viola Schmid will also take place at the site starting this year (Schmid et al. in prep).

Rose Cottage Cave is one of the major reference sites for the LSA in general and the Wilton in particular. Wadley applied Deacon's (1984) typology — originally used to characterise Wilton assemblages in the southern Cape — and successfully linked the mid- and late Holocene layers at Rose Cottage Cave with what Deacon (1984) observed. The LSA deposits have been attributed to the Robberg, Oakhurst and Wilton techno-complexes (Wadley, 1997). Four stratigraphic units carried a lithic assemblage attributed to the Wilton (Wadley, 1992, 1997, 2000). The lowest of these stratigraphic units is named 'Peter', or 'Pt', and corresponds to the Classic Wilton phase (Wadley, 2000). It is the 'Pt' lithic assemblage that is reanalysed and presented in this article.

According to Wadley (2000), the layer 'Pt' is uniformly black and greasy, and dark brown in certain squares due to humidity variations. Charcoal coming from the base of 'Pt' in square P6 was dated to 7630 ± 80 BP (Pta-6783; 8548–-8200 cal BP). More charcoal coming from the top of 'Pt' in square P3 is dated to 5970 ± 70 BP (Pta-5934) (6947–6565 cal BP). Above 'Pt', the layer 'A2' corresponds to a Post-Classic Wilton phase dated to 2240 ± 60 BP (2344–2056 cal BP). On top of A2, the stratigraphic unit called 'A' is dated from charcoal to 680 ± 50 BP (669–547 cal BP) and is overlain by 'Mn' dated from charcoal to 500 ± 50 BP (557–331 cal BP). Both A2 and Mn correspond to a Ceramic

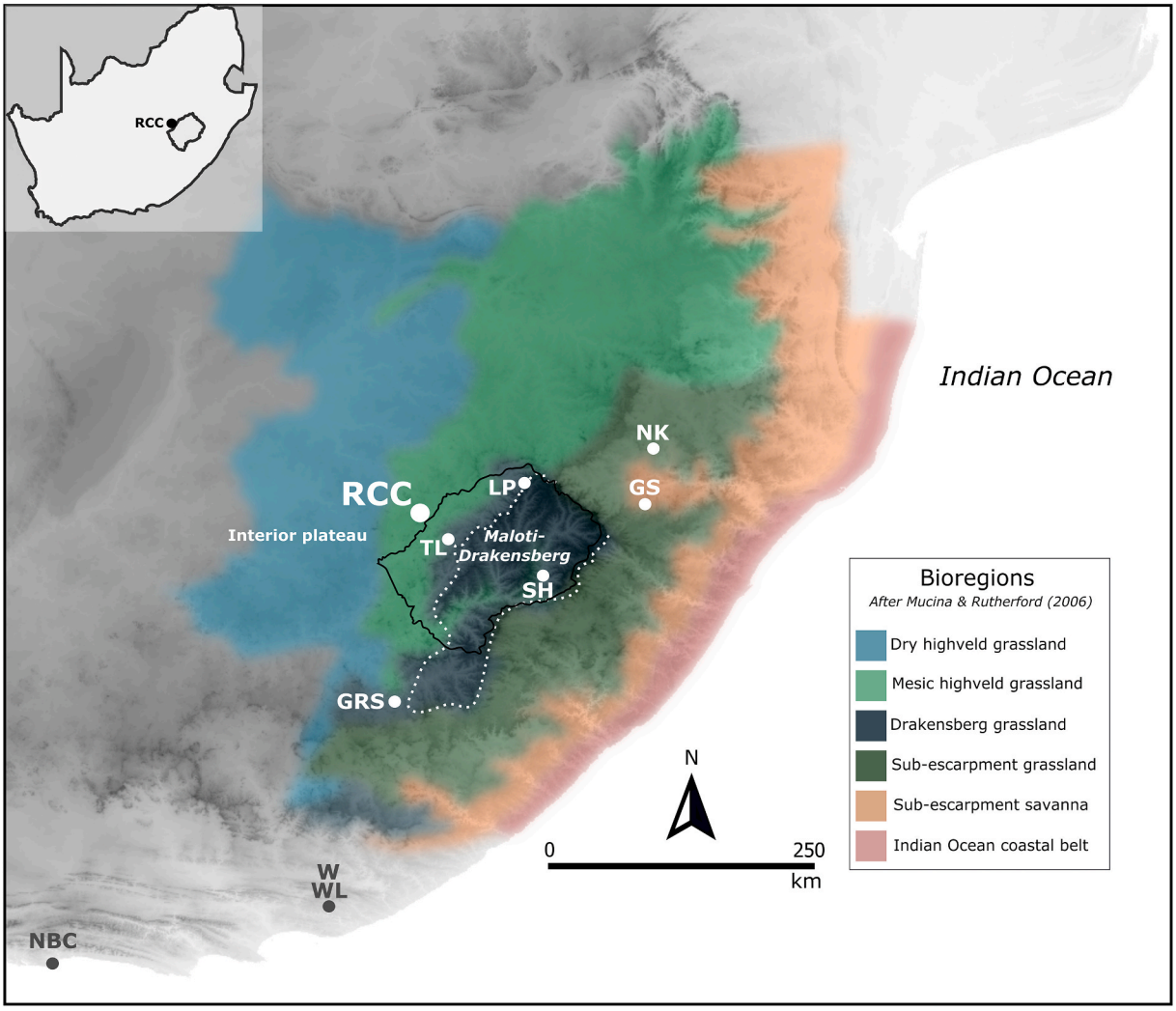

Fig. 1. Location of Rose Cottage Cave (RCC) and sites mentioned in the text. Bioregions after Mucina and Rutherford (2006). GRS: Grassridge Shelter; GS: Gehle Shelter; LP: Liphofung; TL: Tloutle; NBC: Nelson Bay Cave; NK: Nkupe Shelter; SH: Sehonghong; W: Wilton Cave; WL: Wilton Large Shelter.

Post-Classic Wilton phase and are associated with Iron Age and European artefacts (Wadley, 1992, 2000). Ongoing renewed excavations at Rose Cottage Cave directed by Dr. Schmid will allow further descriptions of the stratigraphic and archaeological records.

2.2. Former analysis of the Classic Wilton layer 'Peter'

Archaeological remains found in the layer 'Pt' have been studied and published. For the faunal remains, Plug and Engela (1992) identified several animal species including antelopes, warthog, rock hyrax, hare/rabbit, tortoise and indeterminate bovids. Only a few worked bones were found in this layer, including a single broken bone hook (Wadley, 2000). Ostrich eggshell beads were also found (Wadley, 2000), and residue analyses were carried out on some of the stone tools by Williamson (2000), who identified blood, animal fibre and tissue, and plant residues on at least 50% of the lithics analysed.

Wadley (2000) described different clusters of material remains, including hearths and two knapping areas, and analysed the lithics typologically. She found that almost all the formal tools and cores were made of fine-grained raw materials that may be found locally along the Caledon River. Wadley's (2000) analysis focused on the formal tools representing 2,9% of the total lithic assemblage. She found that scrapers comprised 55% of the total retouched artefacts, with abundant small scrapers (<20 mm). Wadley also found that backed tools, largely dominated by segments, comprised 17% of the total retouched artefacts. Adzes, spokeshaves, awls or borers made up the rest of the formal tool category (Wadley, 2000). Finally, she noted that MSA stone tools were also marginally present in the assemblage, most likely due to re-use of a few older artefact. Most cores fall within the 'irregular' category (80%), with only 9 bladelet cores (Wadley, 2000). Wadley also identified 'core-reduced pieces' and noted a flake production as well as a discrete bladelet production.

The re-analysis of the Classic Wilton lithic assemblage was made possible and greatly facilitated by Wadley's previous work. Starting from her typological description and classification, I researched further aspects concerning the knapping methods and techniques and further described techno-typological elements of the retouched artefacts.

3. New analysis: methods and material

3.1. Methods

As noted earlier, the layer Pt spans the Early and Classic Wilton phases. Nevertheless, Wadley (2000) attributed the whole lithic assemblage to the Classic Wilton phase, but suggested that separate visits may have contributed to the building of the layer Pt. Because the base of Pt is dated to 8548–8200 cal BP and the top to 6947–6565 cal BP, I first investigated whether typo-technological differences could be observed from the base to the top of Pt layer. To do so, I returned to the excavation archives to assess whether different layers within Pt could be individualised. I observed from the written information on bags, the written notes, and excavation sheets that different names were associated with the layer Pt: 'Base of Peter', 'Last of Peter', 'Brown Peter', 'Black Peter', 'Peter 2' and 'Peter'. Following Wadley (2000), most of Peter is black and greasy, except for the squares Q6 and P6 where it is dark brown. The colour difference in Q6 and P6 might be due to 'water soaking in the deposits', these squares being located close to the cave entrance (Wadley, 2000: 91). Following these observations, I did not consider 'Brown Peter' and 'Black Peter' as different from 'Peter'.

The layers 'Base of Peter', 'Last of Peter' and 'Peter 2' are more interesting. Using the excavation archive, I could attribute these layers to the deeper deposits of Peter, at the contact with the layer 'Janice' that is itself associated with the Oakhurst. Furthermore, layers 'Base of Peter', 'Last of Peter' and 'Peter 2' were excavated at depths between around 226 and 236 cm, whereas the layer 'Peter' corresponds to depths varying between around 215 and 225 cm. I therefore decided to regroup 'Base of Peter', 'Last of Peter' and 'Peter 2' as the deposits closest to the base, and potentially associated with the earliest date. I called the grouping of these layers 'Peter Base'. I then regrouped the layers 'Peter', 'Peter brown' and 'Peter black' as 'Peter'. I found that the 'Peter Base' group had a very low number of artefacts, with for instance only three cores versus 51 for the rest of 'Peter'. Furthermore, disturbances such as rat holes, roots and termites seemed to occur in certain squares. Consequently, this article will focus on the middle to upper deposits of Peter, with a brief discussion and limited interpretation of the basal deposits.

In order to investigate the nuances of Wilton assemblages, it is necessary to apply the lithic technology method in combination with systematic techno-typological approaches. The lithic technology method offers a frame to analyse the 'intentions' or 'objectives' of lithic productions (i.e. what did the knappers want to make?), and how the knappers realised these objectives (e.g. Inizan et al., 1999). The knapping *methods* (the mental scheme) and the knapping *techniques* (gestures, types of hammers) are described using a systematic recording of varied qualitative and quantitative parameters (e.g. Inizan et al., 1999; Pelegrin, 2000; see Guillemard, 2020 for a case-study on South African LSA). One of the aims of the lithic technology approach is to reconstitute the *operational sequence* (*chaîne opératoire*) from the selection of the raw material to the discard of the object (e.g. Leroi-Gourhan, 1945; Inizan et al., 1999; Audouze, 2002; Lemonnier, 2010). Lithicists have read-apted the original concepts of the operational sequence by focusing on raw material constraints, fabrication processes and discard stages. When possible, multidisciplinary research also allows a discussion of raw material procurement and stone tool use. However, it is not always possible to reconstruct the whole operational sequence(s). For example, as a result of activity variations, sampling by the archaeologists and many post-depositional processes, only part of the operational sequence might be represented at a site, or in the part of the site that what analysed. It is therefore important to always have a critical understanding of the studied assemblages.

The lithic technology analysis that I conducted relies on Inizan et al. (1999). The details of the methods used to measure artefacts and register qualitative data have been explained elsewhere (Guillemard and Porraz, 2019 for the scrapers; Guillemard, 2020 for a complete lithic assemblage). All measurements have been taken relative to the technological axis of the artefacts. Data were systematically recorded in Excel databases, diacritical scheme of cores, blanks and retouched artefacts were drawn, artefacts were photographed, and the photographs were used to produce digital drawings.

3.2. Material

Wadley (2000) classified and studied the Classic Wilton assemblage from Rose Cottage Cave. Following her counts, the layer Pt includes a total of 11 085 artefacts, including 6165 chips and 1889 chunks. Flakes (N = 2356), bladelets (N = 247), cores (N = 105) and retouched artefacts (N = 308) were also identified by Wadley (2000).

For this new study, I analysed the cores (N = 53), bladelets (N = 157) and retouched artefacts (N = 233) from all available squares. I did not recover all lithic artefacts in the collection which partly explains the difference in counts with Wadley, 2000's publication. However, all artefact categories published by Wadley were found, meaning that the collection remained representative of its original state. The difference in artefact number also derives from slight differences in classification due to the lithic technology approach I used. I further analysed 500 flakes from four squares coming from different zones of the excavation grid (L5, N3, N4 and P3, see Wadley, 2000). I also analysed 500 chunks (*debris* in a fragmentary state) and about 1500 chips from the same squares, from which only seven artefacts were extracted for further analyses. In total, I studied 3000 lithic artefacts from which 949 were systematically described in Excel databases. I created separate files for the cores, blanks, retouched artefacts and one for general counts.

The results of the new lithic analysis are presented by artefact categories (cores, blanks and retouched artefacts) before proposing a reconstitution of the operational sequence(s). This organisation allows for a detailed discussion of the patterns observed.

4. Results

Overall, the lithic assemblage can be qualified as microlithic, as most complete artefacts measure less than 30 mm (92%). Small flakes and bladelets were generally extracted from pyramidal cores with a more or less narrow extraction surface through a combination of free-hand, anvil-rested and bipolar modalities. Selected blanks were transformed into a variety of small scrapers, backed pieces, adzes and other retouched artefacts. Most raw materials are cryptocrystalline silicates (CCS) including chert and chalcedony that make up 86% of the re-analysed assemblage. Coarse grained raw materials were also exploited (14%). No quartz was identified in this new analysis, but Wadley (2000) noted a few quartz artefacts (N = 11).

4.1. The cores

A total of 50 cores were analysed for 'Peter' and three for 'Peter Base'. Most of them are made of chert or chalcedony (N = 47, 92%), two of agate, and two of coarse-grained raw materials. Wadley et al. (2017) noted that small nodules of chalcedony and agate are locally available in the streams descending from the heights of the Maloti-Drakensberg. Three main core categories are discussed here: 'facial cores' (N = 36), 'bipolar cores' (N = 9) and 'reoriented cores' (N = 3) (see Table 1 for measurements). Additional cores include two tested nodules, one core that seems to have been recycled as an adze, and one large flake core made of coarse-grained raw material.

The 'facial cores' are the most common cores in Peter (N = 33, Fig. 2). These cores broadly fit into the microlithic single-platform core category, even though they have specificities that are described here. All of them except two measure less than 30 mm length (Table 1). They tend to have pyramidal to rectangular shapes, and have only one extraction surface from which blanks are extracted unidirectionally. Most facial cores have an extraction surface that is longer than wider (N = 14, 48%), but they are closely followed by the ones with wider extraction surfaces (N = 11, 38%) and equal length and widths (N = 4, 14%). On facial cores, the extraction surface is framed by two steep flanks. Only two facial cores display scar removals slightly overlapping the flanks. The backs of the cores are not shaped. Facial cores were made of all raw materials, including CCS (N = 26), agate (N = 2) and coarse-grained (N = 1). The analysis of the scar removals provides information about what blanks were extracted during the last phases of reduction. Twenty-three facial cores display scars evidencing flake removals, four cores have scars indicative of flakes and elongated flakes, and two have scars showing the removal of bladelets and flakes.

The facial cores are associated with free-hand (N = 26), anvil-rested (N = 4) and axial bipolar modes of percussion (N = 3). The anvil-rested technique of percussion implies that the core is stabilised on an anvil without necessarily applying an axial percussion and to create a counter-shock coming from the anvil to extract blanks (see Callahan, 1987; Guillemard, 2020). Two cores have undetermined modes of percussion. Three other cores were reoriented during the extraction of blanks and have two independent extraction surfaces from which blanks are extracted unidirectionally. I call these '*reoriented facial cores*' (Fig. 2). These cores are not 'single-platform', but a similar geometry is maintained to reach the same objectives of production (Fig. 3).

Table 1
Average measurements per core types for the layer Peter (Wilton), Rose Cottage Cave.

Core types	Length	Width	Thickness	Weight
Facial cores	21,8	21,2	17,2	10,4
Bipolar cores	19,7	12,1	7,5	2,4
Reoriented cores	27,2	24,3	19,1	16,4

The facial cores slightly vary in terms of shape (pyramidal to rectangular), extension of the extraction surface (framed or slightly extending on the flanks), the presence/absence of reorientation, the type of the last scar removals and the associated technique of extraction. This variety highlights the flexibility of the debitage. However, these facial cores also share attributes: they have similar dimensions, are oriented towards the production of microlithic rectilinear blanks (including bladelets), have unipolar sequence removals, and, overall, reflect similar knapping strategies.

Importantly, rectilinear surfaces were favoured for extracting blanks. Specific convexities of the extraction surface were created, combining a slightly curved distal area, created by the extraction of elongated flakes, with a rectilinear surface from which rectilinear flakes and bladelets were removed. This created a specific core geometry illustrated in Fig. 3. The delimited rectilinear surface generally covers between a third and two-thirds of the extraction surface, except for the bipolar facial cores that are totally rectilinear. The distal convexities of the extraction surface can be maintained by the removal of slightly overshooting elongated flakes in between the extraction of rectilinear blanks. It is interesting to note that this core geometry allows for the control of the length of the flakes and bladelets extracted from the upper rectilinear surface, but also for the production of elongated flakes. Knappers could therefore produce a variety of blanks with different properties, more or less rectilinear and elongated, from the same volume.

A few typical bipolar cores, exploited through an axial bipolar modality, were also found in the layer 'Peter' (N = 9, Fig. 4). These cores are also microlithic and generally measure less than 30 mm length (Table 1). They are elongated with one extraction surface from which flakes and elongated flakes are extracted. Opposed removals are visible due to the use of an anvil. However, most of the blanks are extracted unidirectionally, the opposed scar removals being smaller and often resembling crushing rather than blank production. The bipolar modality allowed for the extraction of rectilinear blanks, but in a less controlled way than the facial cores. Some of these bipolar cores could have been made of blanks or represent the very last stage of reduction of the facial cores, but it is difficult to assess because of their advanced stage of reduction. Bipolar knapping is, however, not the preferred extraction modality, as 96% of the blanks display patterns typical of free-hand percussion.

Finally, three reoriented cores were found. They also measure on average less than 30 mm (Table 1). They have diverse shapes and show multiple reorientations of the striking platforms and extraction tables, making them 'multiplatform cores'. Flakes were removed in successive unipolar sequences. On one core, only a few flakes were extracted before it was discarded. These flakes were all knapped using a free-hand percussion.

The three cores recovered from 'Peter Base' do not allow for a statistical comparison with 'Peter'. All of them are microlithic (less than 30 mm long) facial cores. One was reoriented and is very similar to one of the facial reoriented cores found in 'Peter'. Flakes or elongated flakes were extracted unidirectionally from all three cores.

4.2. The blanks

A total of 690 blanks were analysed including 203 complete flakes, 251 broken flakes, 79 elongated flakes, 155 bladelets and 2 blades (Fig. 5). These numbers are not representative of the proportion of flakes *versus* bladelets, as I sampled around 500 flakes to conduct a more detailed technological analysis. In her inventory of the whole Pt layer, Wadley (2000) counted 16 blades, 129 bladelets and 102 broken blades/bladelets (N = 247) against 1788 complete flakes and 568 broken flakes (N = 2356). Flakes and elongated flakes therefore dominate the assemblage, with bladelets comprising around 9,5% of the total blanks (Wadley, 2000). Nevertheless, the 40 backed tools in Wadley's (2000)

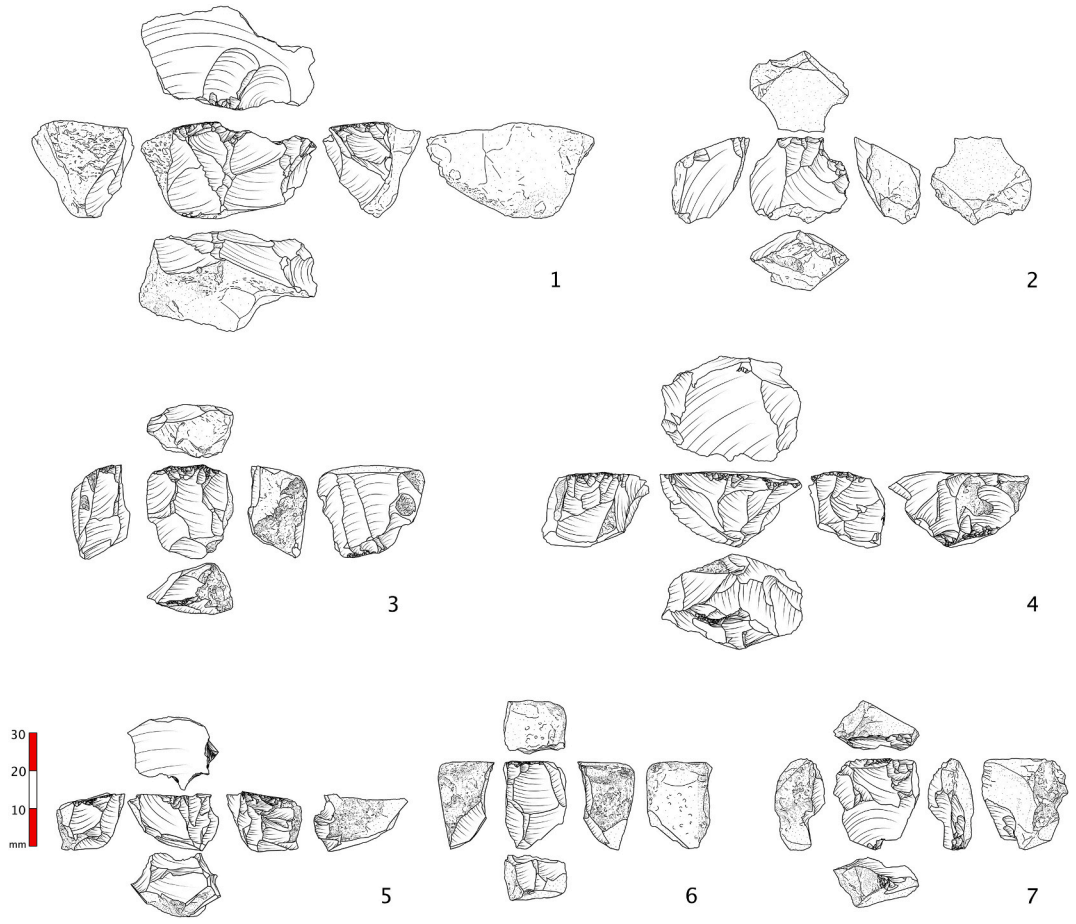

Fig. 2. Wilton cores from Rose Cottage Cave, layer Peter. Facial cores: 1, 2, 5, 6, 7; Reoriented facial cores: 3, 4.

count (Wadley, 2000) could have been made on bladelets. It is therefore likely that the number of bladelets originally produced is higher than was recovered from the site.

Most of the blanks are microlithic and measure on average less than 30 mm length (92% of the complete flakes). Measurements per blank type are given in Table 2. Most of the blanks were extracted with a direct free-hand percussion that was sometimes preceded by an abrasion of the striking platforms (see abraded platforms in Fig. 5).

All flakes tend to be rectilinear, with some presenting a slightly curved distal area. Their shapes are variable, including irregular (32%), expanding (27%), convergent (25%), parallel (13%) and round (4%) morphologies. Only 1% of the flakes are associated with a bipolar mode of percussion, the rest being characteristic of direct free-hand percussion. Most flakes have plain platforms (66%), followed by punctiform (19%), filiform/linear (12%) and crushed (3%) platforms. 54% of the complete flakes are non-cortical *versus* 46% cortical, indicating that flakes could be removed at different stages of the reduction process. Five flakes show a reorientation of the extraction surface.

Elongated flakes (N = 79) were always extracted with a free-hand percussion. They show a similar repartition of the percentage of platform types: plain platforms predominate (66%), followed by punctiform (21%), filiform/linear (5%) and crushed (8%) platforms. Elongated flake shapes are more standardised than the flakes. Most have parallel sides (45%), followed by convergent (34%), expanding (11%) and irregular (11%) shapes. 68% of the elongated flakes are non-cortical and 32% cortical. This supports the fact that elongated flakes could be removed at the beginning of the reduction process — or to open a new extraction surface — and throughout the reduction of the core.

The bladelets (N = 155) are rectilinear (71%) or slightly curved (29%). Most bladelets have parallel (52%) or convergent (36%) sides, while only 12% have expanding or irregular shapes. A few bladelets (N = 26) are partly cortical meaning that some of them could have been extracted quite early on during the reduction process. Most bladelets have unidirectional scar removals (78%), followed by multidirectional (13%), opposed (9%) and transversal (1%). A few bladelets (N = 3) display the removal of part of a natural plane surface on their side, meaning that they were extracted from the corners of the extraction surface. Two bladelets also show the reorientation of the extraction surface.

Overall, most blanks are microlithic, rectilinear to slightly curved and were extracted with free-hand percussion that could be preceded by an abrasion. Most blanks display unipolar sequences of removals, and a few indicate that cores could have been reoriented during the reduction process. No tablets or crests were found, but slightly curved elongated flakes were extracted. This is consistent with what was observed on the cores, where convexities were mostly maintained in the longitudinal area, combined with the use of natural flanks to frame the extraction surface. Bladelets have standardised shapes and tend to be rectilinear. They are slightly shorter than the elongated flakes, and a bladelet scar removal is sometimes observed on elongated flakes (see top left elongated blank on Fig. 5). Bladelets, however, have lengths similar to the flakes. These observations, coupled with the cores analysis, indicate that there likely was a continuity in the extraction of flakes, elongated flakes and bladelets from a single volume. Bladelets could have been removed in short extraction sequences, or even closely intercalated within the removal of flakes and elongated flakes. The flakes, elongated flakes and bladelets could then have been selected to make retouched artefacts. In the following sections I present the different retouched artefact categories present in the collection, and discuss the type of blanks that could have been used to make these different tools.

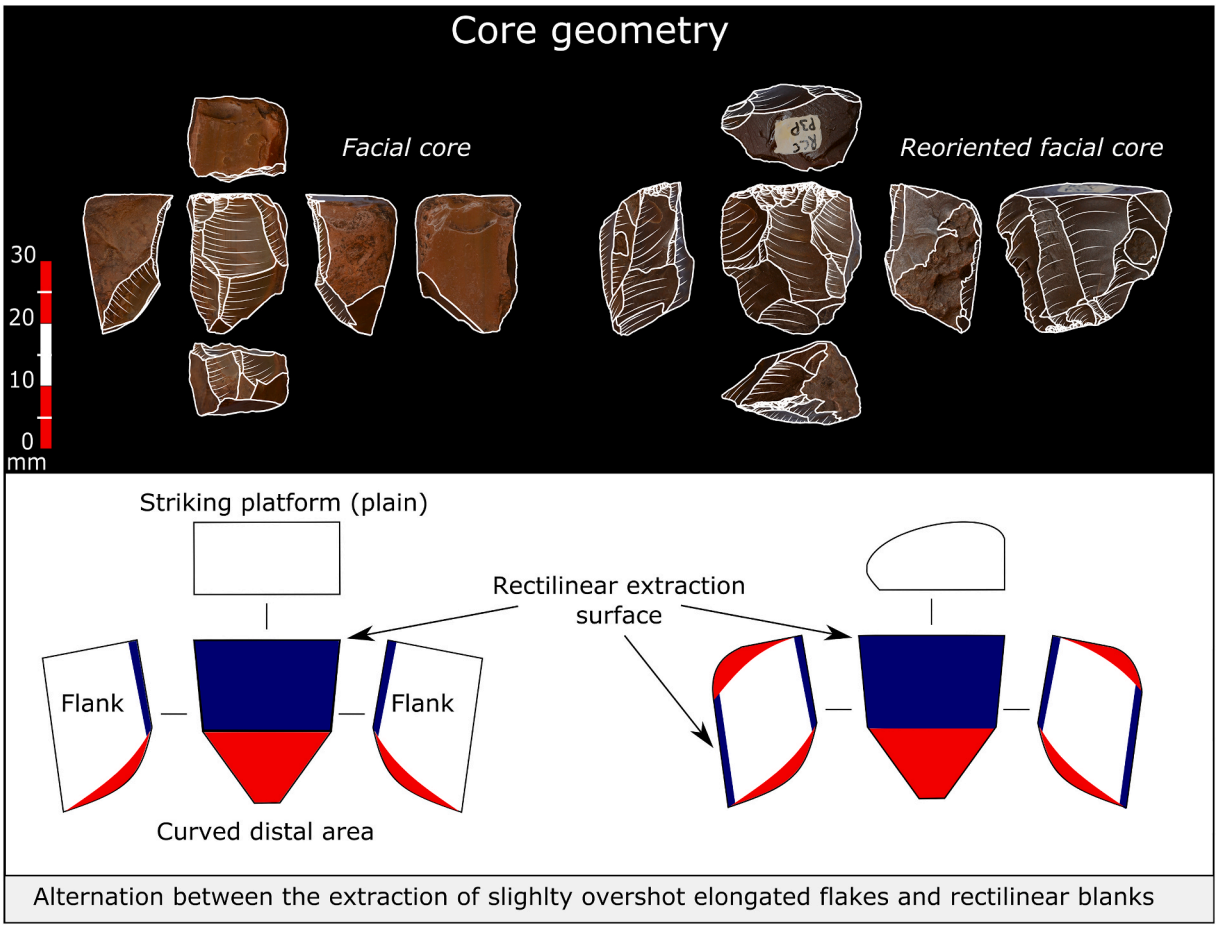

Fig. 3. Wilton cores, Rose Cottage Cave, Layer Peter. Geometry of facial cores (whether reoriented or not).

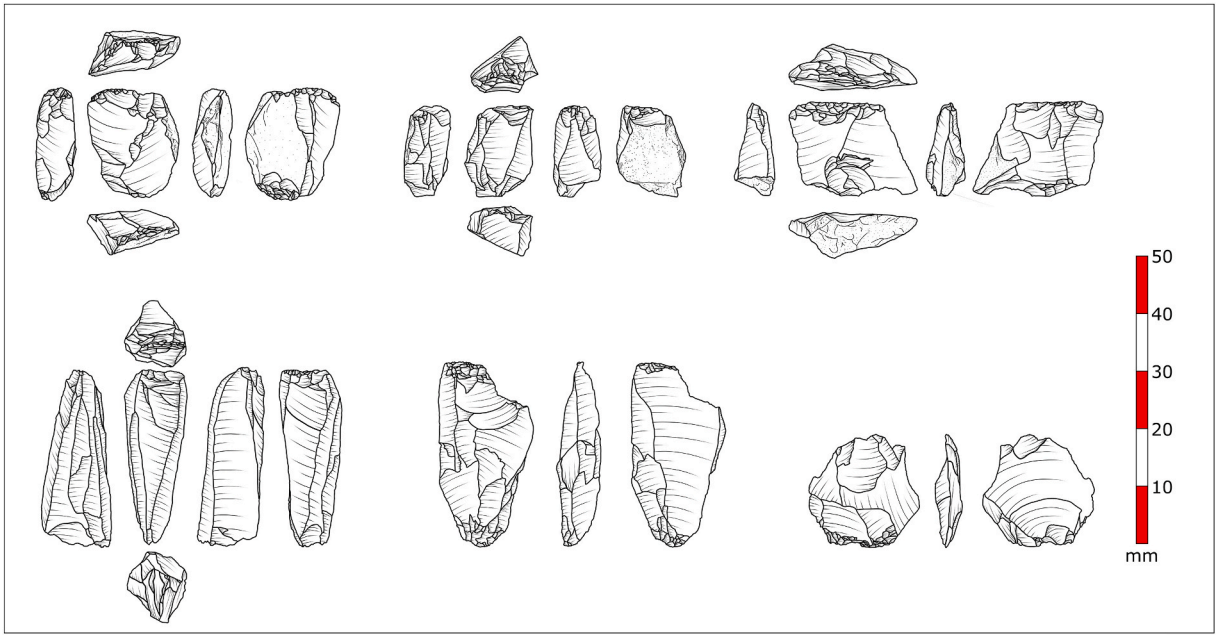

Fig. 4. Wilton bipolar cores and blanks, Rose Cottage Cave, Layer Peter.

4.3. *The retouched artefacts*

A total of 233 retouched artefacts were re-analysed. Scrapers are the most common retouched artefacts (N = 142, 61%), followed by backed pieces (N = 47, 20%), adzes (N = 15, 6%), miscellaneous retouched flakes (N = 13, 6%) including five attributed to the MSA by Wadley

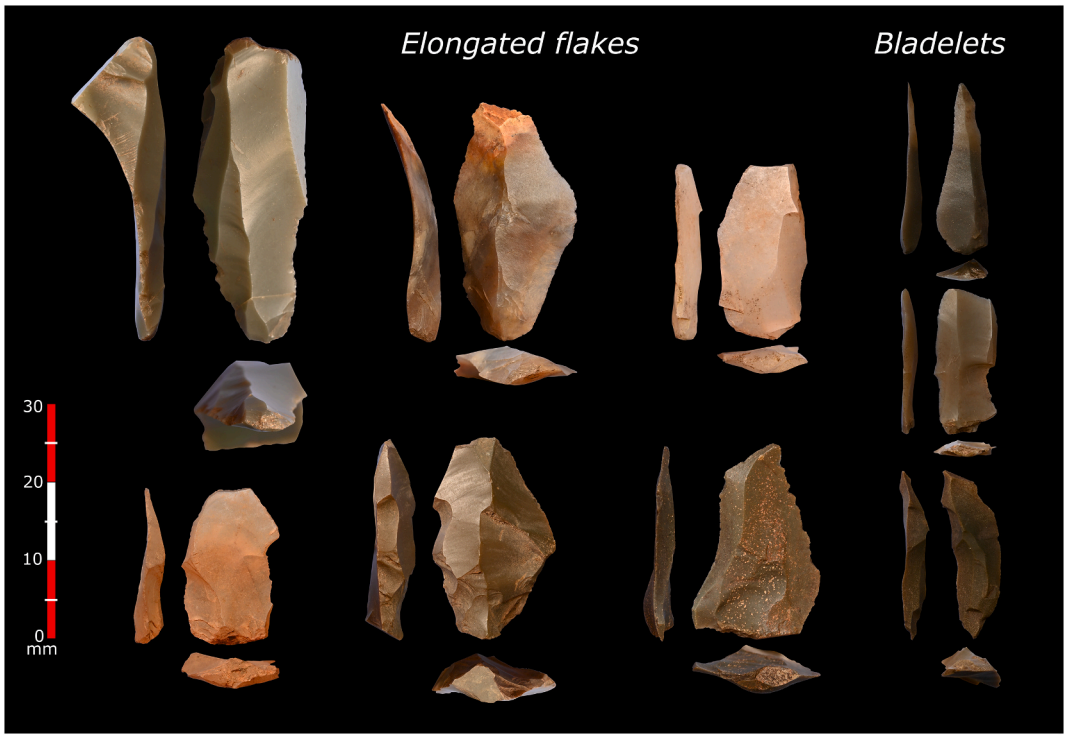

Fig. 5. Wilton blanks including elongated flakes and flakes, Rose Cottage Cave, layer Peter.

Table 2
Average blank dimensions per blank type for the layer Peter (Wilton), Rose Cottage Cave.

Blank types	Length	Width	Thickness
Flakes	18	15,1	4,6
Elongated flakes	21,7	10	3,5
Bladelets	17,6	6,4	2

(2000), one awl and one borer (1%), and broken retouched artefacts (N = 14, 6%). Unfortunately, not all retouched artefacts were found, and the new percentages given might not be exactly representative of the original assemblage. However, all artefact categories listed by Wadley have been found, meaning that our sample is typologically representative. This new analysis allows discussing in detail the variations identifiable notably within the scraper and backed pieces categories.

4.3.1. *The scrapers*

The scrapers (N = 142, Fig. 6) measure on average 15,9 mm long, 15,3 mm wide for the distal retouched area, 12,2 mm wide for the mesial area, and 6 mm thick. A percentage of 85% of these scrapers measure less than 20 mm and fall within Deacon's (1984) small scraper category. Most scrapers are divergent, meaning that they are larger in the distal part (width of the retouch) than in their mesial-proximal area. The

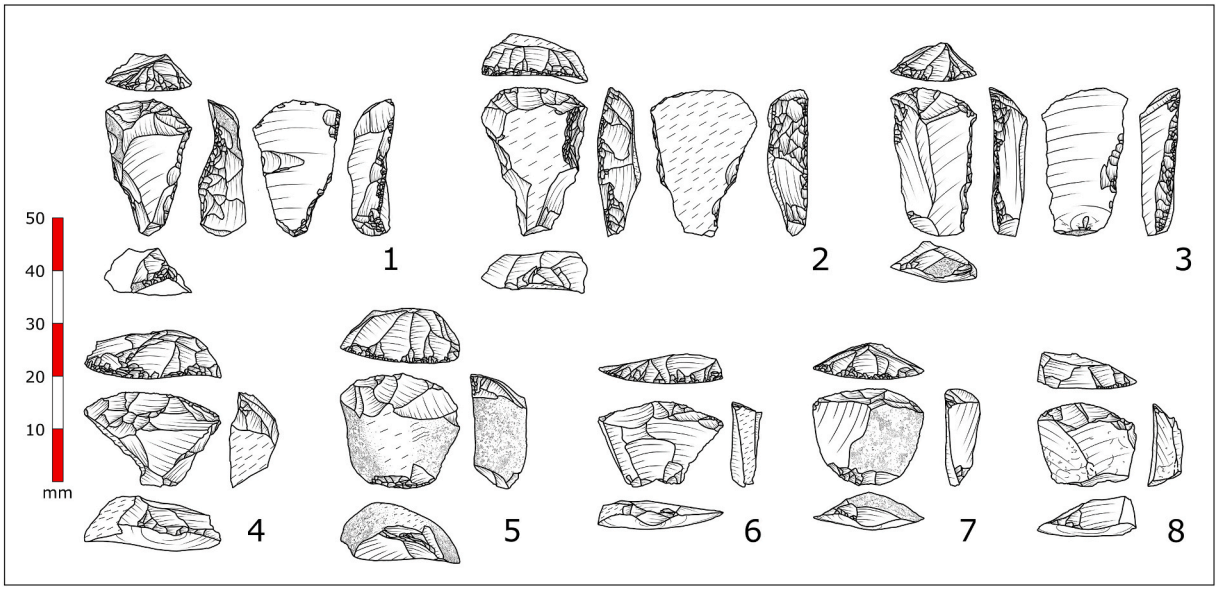

Fig. 6. Wilton scrapers from Rose Cottage Cave, layer Peter. 'Woodlot' scrapers: 1–2; elongated thumbnail scraper: 3; thumbnail scrapers: 4-8.

retouched edge of the scrapers does not overlap the sides of the scraper blank.

Even though most scrapers fit in Deacon's (1984) small scraper category, variation in their shapes and functional properties were noted. The majority of the scrapers (N = 86, 61%) correspond to the 'thumbnail scraper' category defined by Clark (1959). Thumbnail scrapers are often perceived as a '*fossile directeur*' of the Wilton (see Guillemard and Porraz, 2019 for discussion). Further variations within that category will be discussed below for the layer Peter, with distinctions between typical thumbnail scrapers, wide thumbnail scrapers and elongated thumbnail scrapers. Scrapers with lateral retouch, called 'Woodlot scrapers' in the Drakensberg (Opperman, 1987; Mitchell et al., 1998; Mitchell, 2000), or 'V-shaped' scrapers (Guillemard and Porraz, 2019), were also identified at RCC (N = 21, 15%). Because RCC is situated in the foothills of the Drakensberg, I use the term 'Woodlot scraper' in this article. A total of 6 (4%) other scrapers do not fit these typological categories, while 29 (20%) are too broken to be attributed to a specific category. The broken scraper dimensions are consistent with those of the thumbnail and Woodlot scrapers. There are only three scrapers in 'Peter Base' including one thumbnail, one Woodlot scraper and one unidentified scraper. These artefacts do not differ typologically from the scrapers in the rest of 'Peter'.

In the layer Peter, typical 'thumbnail scrapers' (N = 45) vary in terms of shape and dimensions. In addition to measuring the dimensions of the artefacts, the standard deviation (σ) and the coefficient of variation (CV) were calculated to estimate whether parts of the tools were standardised. At RCC, thumbnail scrapers measure on average 12,9 mm length (σ = 1.8; CV = 14%), 13,2 mm retouch width (σ = 1.7; CV = 13%), 11,2 mm mesial width (σ = 2; CV = 18%) and 4,5 mm thickness (σ = 1.6; CV = 36%). These typical small thumbnail scrapers are end-scrapers with a prehensive or hafted area that is rather short, and of trapezoidal to rectangular shape, associated with a straight-convex to convex retouch area (see n. 5 to 8 on Fig. 6). These are the archetypes of the thumbnail scrapers described by Clark (1959) and other researchers (e.g. Goodwin and van Riet Lowe, 1929; Sampson, 1974; Guillemard and Porraz, 2019). Their front edge delineations are straight-convex (N = 24, 53%), convex (N = 15, 33%) or straight (N = 6, 13%). Their 'body' (the rest of the scraper that was held or hafted) are quadrangular (N = 27, 71%), trapezoidal (N = 7, 18%), triangular (N = 2, 5%) or irregular (N = 2, 5%). Their front angle measures on average 60°, the right edge 60° and the left edge 50°. The blanks used for these small thumbnail scrapers are rather thin, whether cortical or not.

By contrast, 'wide' thumbnail scrapers (N = 31) have slightly larger retouched areas (see n. 4 on Fig. 6). While most of them are also end-scrapers, four are side-scrapers. They measure on average 16,1 mm in length (σ = 2.8; CV = 17%), have retouch 19,8 mm wide (σ = 3.3; CV = 17%), a mesial width of 15,6 mm (σ = 2.8; CV = 18%) and are 6,6 mm thick (σ = 1.9; CV = 29%). Their front edge delineations are straight-convex (N = 20, 65%), convex (N = 9, 29%) or straight (N = 2, 6%). Their 'bodies' are quadrangular (N = 16, 59%), trapezoidal (N = 5, 19%), triangular (N = 3, 11%) or irregular (N = 3, 11%). Their front angle measures on average 65°, the right edge 65° and the left edge 65°.

The wider aspect of these 'wide' thumbnail scrapers likely falls within the thumbnail scraper variability in the layer Peter. Nevertheless, I have argued before that side-scrapers with a wider retouched area could have been used with a motion that differs from that for small thumbnail scrapers (Guillemard and Porraz, 2019). Slight variations in breaks do not, however, provide further clarity about use. A total of 13 small thumbnail scrapers and 7 wide thumbnail scrapers are broken. Small thumbnail scrapers have breaks that are more frequently localised in their proximal area (67% of the breaks), while wide thumbnail scrapers have breaks more frequently localised on their sides (63% of the breaks). Some of these breaks, especially 'flexion breaks' could have occurred during the use of these scrapers (Shott and Scott, 1995; Chesnaux, 2014; Guillemard and Porraz, 2019). However, 'flexion breaks' — a better indication of breaking during use than 'neat breaks' — are not well represented in this assemblage. Only two thumbnail scrapers have proximal flexion breaks, while all the other breaks are 'neat'. It is therefore not possible to clearly assess if the thumbnail and wide thumbnail scrapers were used with different motions.

'Elongated' thumbnail scrapers with a relatively longer prehensive or hafted area were also identified (N = 10). They measure on average 17,6 mm long (σ = 2.7; CV = 15%), have retouch 11,5 mm wide (σ = 1.5; CV = 13%), a mesial width of 9,1 mm (σ = 1.6; CV = 18%) and a thickness of 4,5 mm (σ = 1.5; CV = 33%). Their front edge delineations are straight-convex (N = 7, 70%) or convex (N = 3, 30%). Their 'bodies' are trapezoidal (N = 8, 80%) or rectangular (N = 2, 20%). Their front angle measures on average 60°, the right edge 55° and the left edge 55°. The blanks used to make these elongated scrapers are thin elongated flakes. Only one has non-invasive retouch located on its edges (see n.3 on Fig. 6). It is possible that at least some of these elongated thumbnail scrapers could represent a less advanced stage of reduction than the typical small thumbnail scrapers, which would have been resharpened several times. Indeed, at least some of the shorter thumbnail scrapers have only preserved the proximal or mesial part of the original blank, whereas for the elongated thumbnail scrapers most of the original blank lengths are preserved. However, both elongated and non-elongated thumbnail scrapers have similar retouched edge angle values.

A total of 21 Woodlot scrapers were also described. These have average measurements of 19,1 mm length (σ = 2.8; CV = 15%), 14 mm retouch width (σ = 2; CV = 14%), 9,5 mm mesial width (σ = 1.7; CV = 18%) and 5,9 mm thickness (σ = 1.8; CV = 31%). Their front edge delineations are convex (N = 12, 57%), straight-convex (N = 7, 33%), or straight (N = 2, 10%). Their 'bodies' are trapezoidal (N = 11, 52%), triangular (N = 8, 38%) or quadrangular (N = 2, 10%). Their front angle measures on average 60°, the right edge 75° and the left edge 80°. At least one of the side edges is modified by steep retouch than can tend to be scalariform. Naturally steep scar removals or natural planes on the sides may also be left unretouched. These Woodlot scrapers have steeper side edge angle values than for the thumbnail scrapers.

Different hypotheses about the variations between the four scraper types can be formulated if we compare their dimensions. While all scrapers measure less than 30 mm long, there are slight dimensional variations (Fig. 7). For all scraper categories except the wide thumbnail scrapers, the width of the retouch area is the most standardised, corresponding to the smaller CV. In Fig. 7, we can see that the widths (retouch area and mesial) of the thumbnail, elongated thumbnail and Woodlot scrapers are similar, whereas the wide thumbnail scrapers show more dimensional variations.

The variations observed within the three types of the thumbnail scraper class could be due to the selection of varied blanks and to the different stages of the reduction process at which the artefacts were discarded. Only the proximal-mesial parts of the original blanks of the small thumbnail scrapers are sometimes preserved. It is possible that at least some of these scrapers were originally made on elongated flakes. Elongated and small thumbnail scrapers could therefore be linked within one reduction process. By contrast, larger blanks could have been used for an independent reduction process to produce the wide thumbnail scrapers. A few wide thumbnail scrapers are side scrapers, whereas the other thumbnail scrapers are end-scrapers.

Following these observations, we could ask if the small thumbnail, elongated thumbnail, wide thumbnail and Woodlot scrapers were used with the same motion, and if they could all have been inserted into a similar hafting system. Unfortunately, two few diagnostic breaks exist to formulate a strong hypothesis. Opperman (1987), however, suggested that the lateral retouch on Woodlot scrapers might standardise their widths. Given the standardisation of Woodlot, small thumbnail and elongated thumbnail scraper widths, the data suggest that controlling the width for all these scraper types was important, and that it might have been related to the constraints of the hafting system used (e.g. Guillemard and Porraz, 2019). Use-wear studies are necessary to further address these questions.

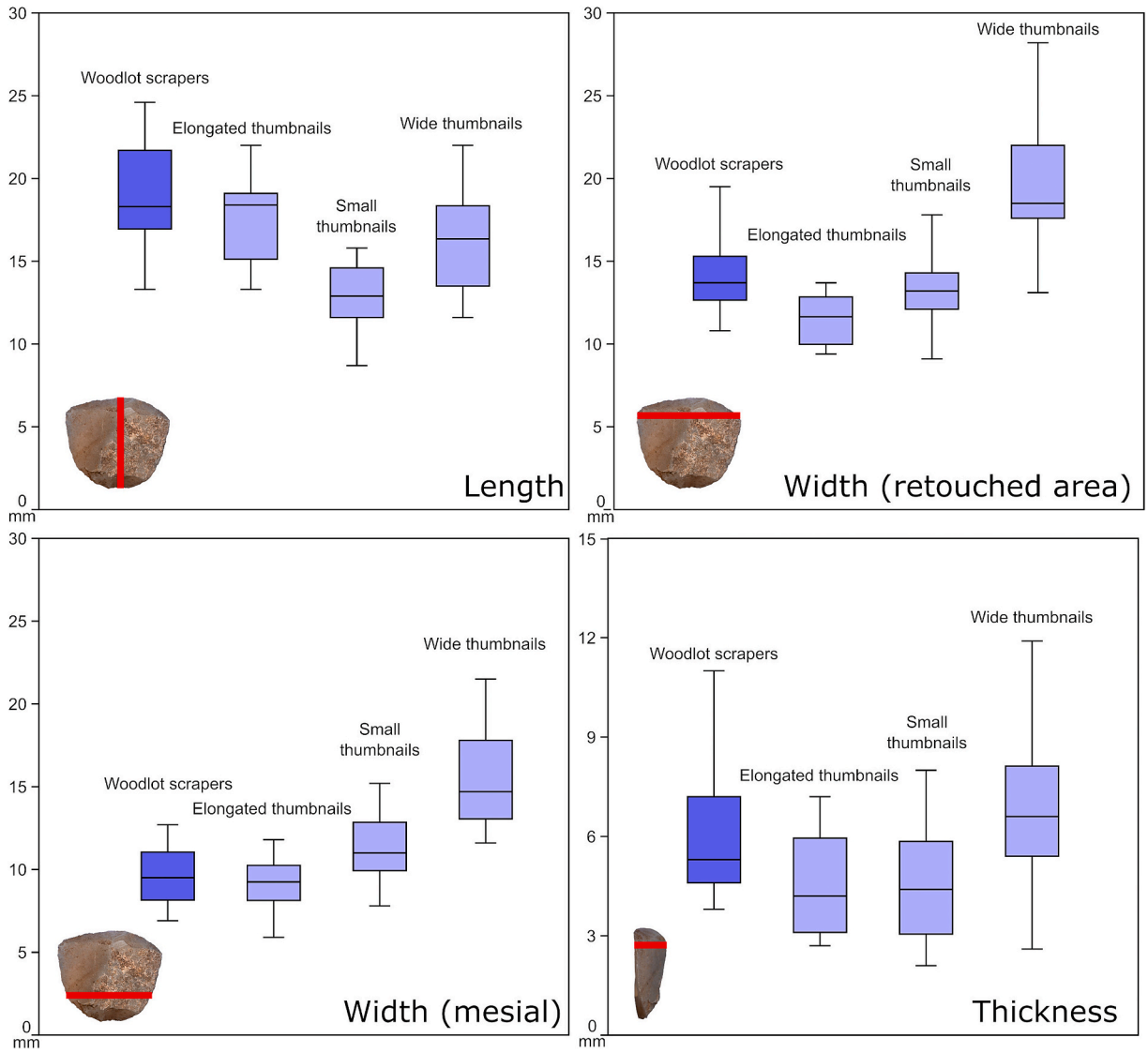

Fig. 7. Boxplots showing length, width and thickness of the Woodlot (dark blue) and thumbnail scrapers sub-types (light blue) at Rose Cottage Cave, layer Peter (Wilton).

4.3.2. The backed pieces

A total of 48 backed pieces were re-analysed (Fig. 8). Only four were found in 'Peter Base', but these do not differ typologically from those in 'Peter'. The two main typological categories are segments (N = 31) and backed bladelets (N = 4). Six others are indeterminate because they are broken, and two are axial points likely to be borers rather than microliths.

Further variations were noted in the segment category. Segments are generally understood as small semi-circles with a curved back opposed to a rectilinear cutting edge with two opposite points (e.g. Deacon, 1984). Following Chesnaux's (2014) classification, segments are 'double-points'. The presence of these two opposite points, convex backing and an opposed cutting edge are important functional properties indicating that these artefacts can pierce from both ends, dilacerate, and that their back may be hafted or hand-held. At RCC, this typological definition of 'segment' applies to 26 backed artefacts. Following the analysis of the collection, I differentiated three sub-types of segments: (small) segments (N = 21), elongated segments (N = 5), and flat-based segments (N = 5), which may functionally differ from the other types (Fig. 8).

The segments (both small and elongated) have average measurements of 11,5 mm length, 5,8 mm width and 2,8 mm thickness. All are double points with a convex back opposing a cutting edge that is rectilinear (N = 20) to slightly curved (N = 4). The segments vary in size. Most are particularly small, while others are slightly thicker and more elongated (see *segments* and *elongated segments* in Fig. 8). In Fig. 9, 20 segments measure between 8 and 13 mm, and five are slightly bigger, up to 21 mm length. There are two few segments to know if there are sub-types that might otherwise be reflected by an asymmetric or bimodal distribution of the length values. Nevertheless, the small and elongated segments were made from different blanks. The blanks selected for the smaller segments were thin, rectilinear and non-cortical. The few elongated segments were made of thicker elongated blanks that could be cortical (N = 1) and slightly curved (N = 1).

A total of five backed artefacts called 'flat-based segments' were also isolated (Fig. 8). These flat-based segments do not fit the strict definition of a segment because they have only one piercing end opposed to a convex non-piercing base. These artefacts therefore do not have the same functional properties as other segments. The flat-based segments have average measurements of 15,6 mm length, 8,8 mm width and 3,4 mm thickness. All of them are mono-points with a convex backing opposed to a cutting edge that is rectilinear (N = 4) to slightly curved (N = 1). Their widths appear slightly wider than the most elongated segments, meaning that different blank types could also have been selected to make them (Fig. 9).

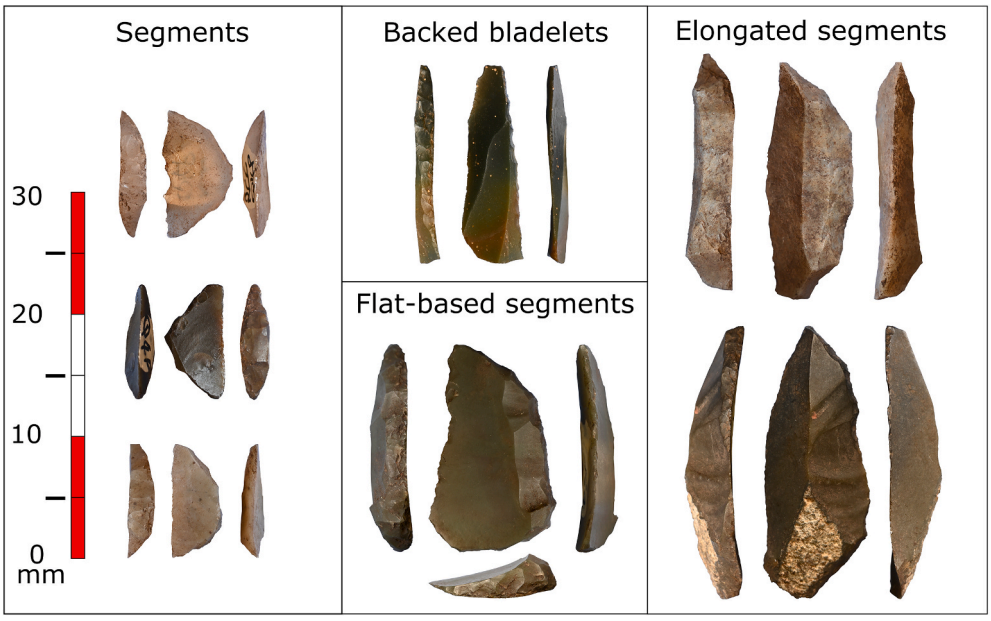

Fig. 8. Types of Wilton backed pieces including segments, flat-based segments, elongated segments and backed bladelets at Rose Cottage Cave, layer Peter (Wilton).

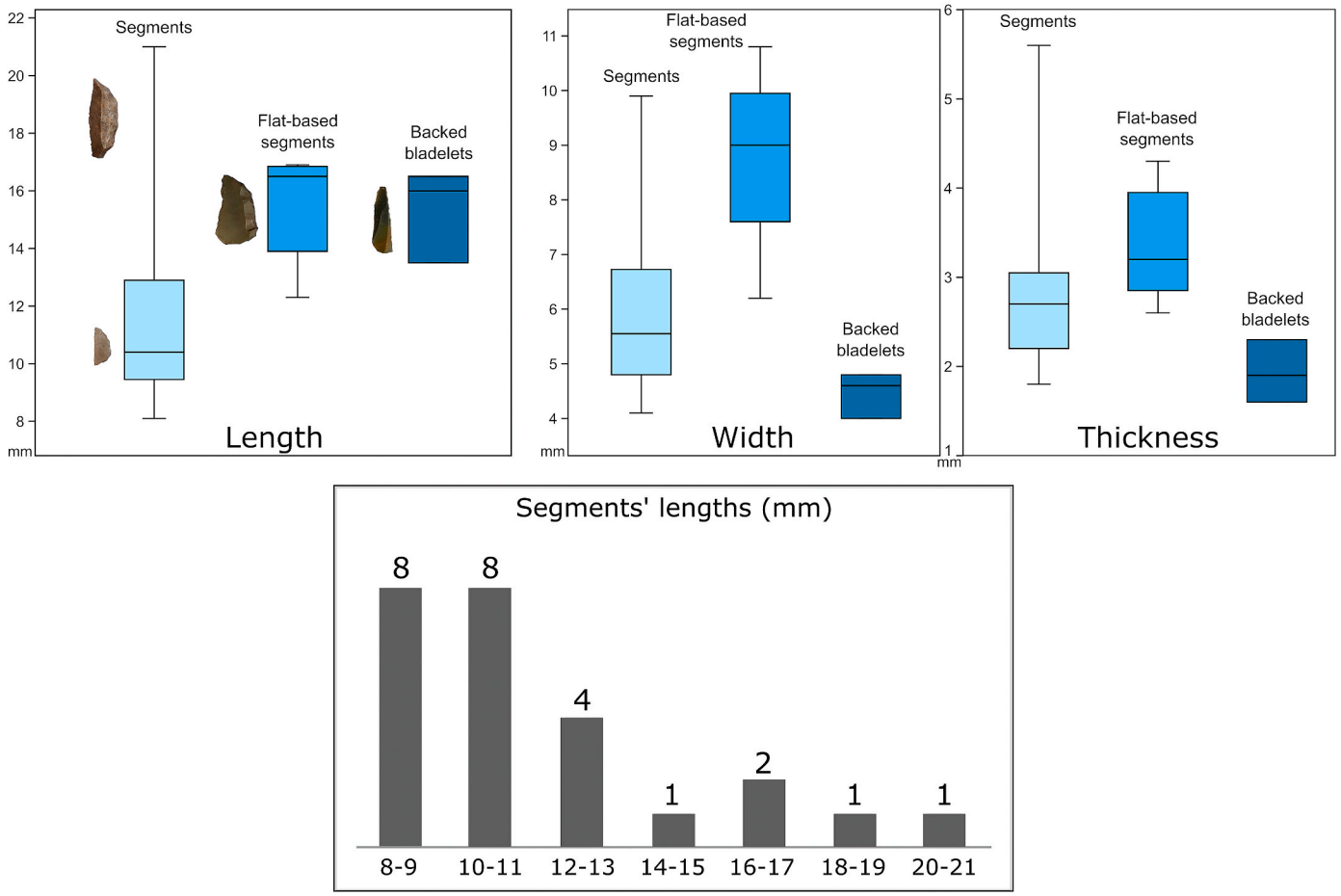

Fig. 9. Boxplots showing length, width, and thickness of the segments (light blue), flat-based segments (turquoise blue) and backed bladelets (dark blue) at Rose Cottage Cave, layer Peter (Wilton). The bar chart represents the dispersion of the segments' lengths.

Finally, four *backed bladelets* were described. These artefacts have a rectilinear back opposed to a rectilinear cutting edge. They have average measurements of 17, 1 mm length, 5,5 mm width and 2,4 mm thickness. Two of them are double points, and one broken backed bladelet is at least a mono-point. All of them are made of non-cortical bladelets.

The backed artefact category includes different sub-types with

different dimensions (Fig. 9), functional properties and which are made of different blanks. All these criteria could correspond to varied functioning and maybe functions for these tools. Here, too, use-wear analyses are necessary to explore these aspects further.

The analysis of the fabrication processes showed that segmentation techniques such as snapping of the blanks or micro-burination were not observed. This implies that complete blanks were directly reduced into backed pieces. It was therefore important for knappers to create blanks of controlled size, which links this observation with the peculiar geometry of the cores described already that allowed for the control of the length of the blanks, including bladelets.

Interestingly, the blanks selected to make backed artefacts differ. If we link these observations to the core analysis, we see that thin rectilinear blanks (including bladelets) could be extracted from the middle to upper part of the facial cores represented in blue on Fig. 3. Elongated flakes could be extracted from the total length of the extraction surface. Following this logic, small segments (less than 15 mm) and backed bladelets were likely made of thin rectilinear blanks extracted from the upper rectilinear surface of the cores, while the elongated and flat-based segments could have been made of blanks extracted from the whole length of the facial cores. Other blanks that derive from bipolar cores or reoriented cores could also have been used.

4.3.3. *The adzes, borers and other retouched artefacts*

A few other retouched artefacts were found in the Peter Base and Peter layers, including 15 adzes, two borers, 14 retouched flakes and 17 broken retouched artefacts. The adzes are elongated tools with at least one retouched edge, most often two (Fig. 10). They have average measurements of 34,1 mm length, 15,1 mm width and 9,2 mm thickness. They are made using thick blanks or slabs, and their retouch tends to be scalariform (wide and steep), such as seen on Fig. 10. The retouch delineation is variable, generally rectilinear to concave, but sometimes associating concave, rectilinear and convex areas on the same tool (Fig. 10). More than half of the adzes display crushing of at least one edge and/or ventral flaking.

These tools are often associated with wood-work because of their

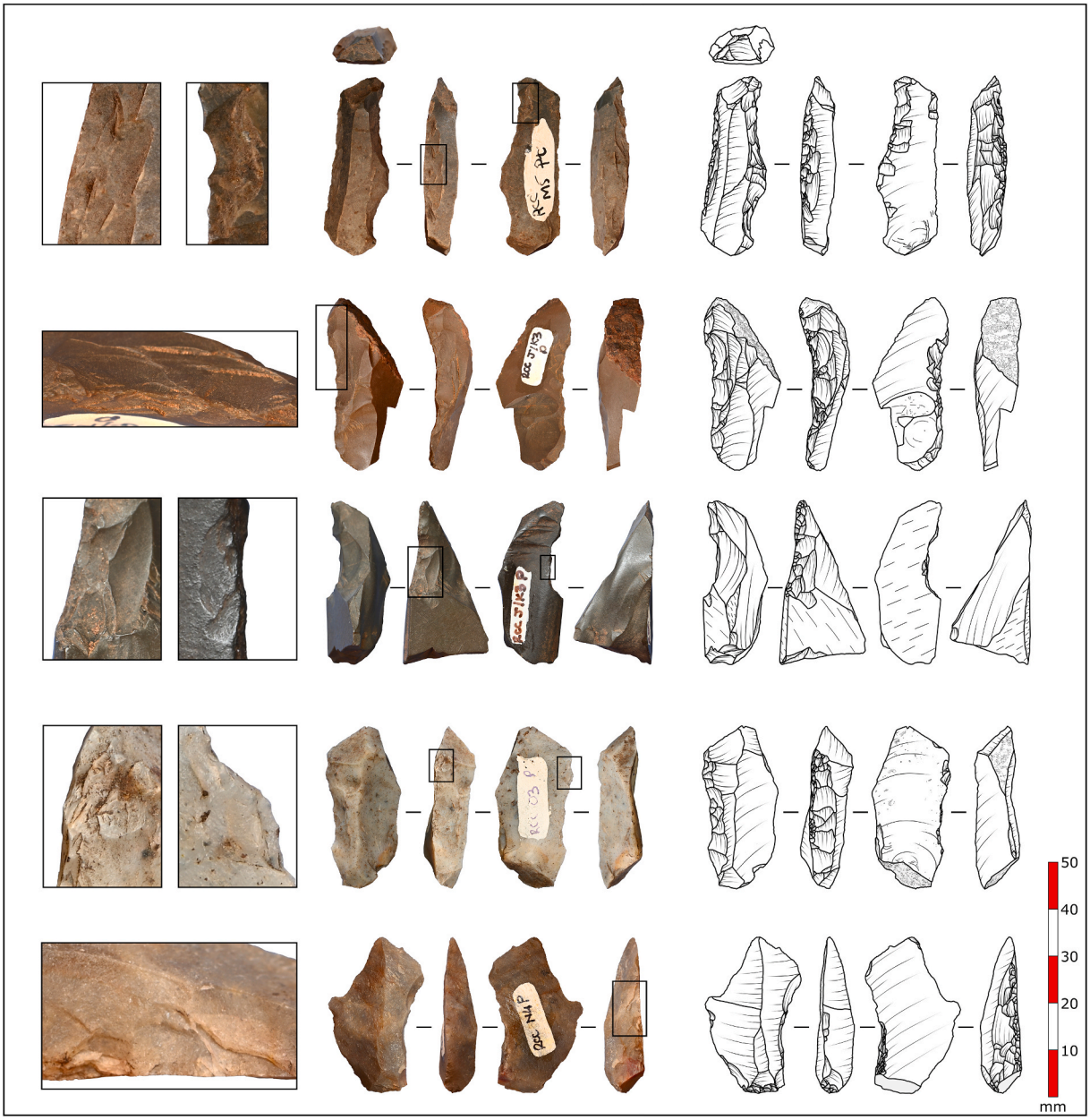

Fig. 10. Adzes from Rose Cottage Cave, layer Peter (Wilton).

scalariform retouch sometimes called 'adzing' (e.g. see Guillemard and Porraz, 2019 for discussion). At RCC, most adzes display signs of heavy-duty work that has created crushing and flaking. In addition to the shaping of the tool by retouch, the use could contribute to the flaking of the edges. Experimental and use-wear studies are still needed to determine what materials were likely worked, and in what motion.

Two borers were identified, and 14 retouched flakes including 5 attributed to the MSA by Wadley (2000). The other retouched flakes could belong to the adze or large scraper categories. A total of 17 broken retouched artefacts were counted, but are too broken to be attributed to a specific retouched artefact type.

4.4. Conclusion of the analysis

The lithic assemblage from Peter Base and Peter is techno-typologically homogeneous, as there were not different modes of production or an obvious mixing of different time-periods. This is consistent with Wadley's (2000) analysis. Most artefacts are microlithic and made of CCS, most cores and blanks are exploited with a free-hand percussion, and their scar removals display similarities. The blanks selected for the retouched artefacts also fit with the blank production visible in the assemblage. Using these observations, operational sequence re-constitutions focused on the fabrication processes can be proposed. This does not mean, however, that all tools were produced at the same time by one group of people — which is unlikely given the nature of the site —, but that there are enough similarities in the assemblage to describe general trends.

One of these general trends is the presence of three different core exploitation modalities. The most common one is the unifacial core modality. After a nodule of fine-grained raw material was selected, a striking platform was opened, or a natural area used. Elongated flakes covering the whole length of the nodule were unipolarly removed. Following this operation, thin and short to elongated blanks including bladelets were extracted from the upper two thirds of the extraction surface's length. Bladelets were extracted in short removal sequences and closely intercalated with the removal of small flakes. Elongated flakes which contribute to the maintenance of the longitudinal convexities of the core could then be removed again. During the debitage, the core became smaller. An anvil could be used to stabilise it, and there might in some cases have been a shift from free-hand to a bipolar modality at the very end of the reduction process. Nevertheless, most discarded cores remain characteristic of a free-hand percussion. A variant of this widespread modality is the reoriented facial core modality. Here, the exploitation and geometry of the core are similar, but the core was reoriented. This reorientation recreated the same convexities and overall core geometry. Finally, the bipolar core modality also represented at the site shows that blanks could be selected to be transformed into bipolar cores, or that bipolar percussion could be directly applied to small nodules.

The unifacial and reoriented facial core modalities created similar blanks that could be transformed in retouched artefacts. Flakes and elongated flakes, extracted from the totality, or the upper part, of the extraction surface, could be transformed into scrapers and elongated segments. Especially thin rectilinear to slightly curved blanks extracted from the upper extraction surface could then be used to make small segments and backed bladelets. Thick sturdier blanks or chunks could be used for adzes and for some Woodlot scrapers. The bipolar modality does not allow for the creation of slightly curved flakes and elongated flakes, but small rectilinear thin blanks could have been transformed in backed pieces. The flexibility, but also control, of the core geometry therefore allowed for the production of a variety of blanks that could then be transformed directly into an array of formal tools.

5. Towards a definition of Wilton lithic technologies

The new analysis of the layers Peter and Peter Base reveals traits of 'Wilton' typo-technologies at Rose Cottage Cave. The first trait is the integrated aspect of the knapping method and techniques allowing to produce 'ready-made' blanks with different properties from one volume. The specific geometry of most cores, combining a curved distal area with a rectilinear upper-to-middle area on the extraction surface, allowed both control and flexibility in the blank production. These blanks could then directly be retouched without the use of segmentation techniques. The restriction of the extraction surface on one face of the core, the flanks and back not being shaped, is also a point worth highlighting. Even if the core was reoriented, the blanks did not overlap (or only slightly) on the flanks. The potential integration of free-hand, anvil-rested and bipolar knapping techniques, with a preference for free-hand knapping, also allowed knappers to efficiently extract more or less rectilinear blanks from small volumes.

Another important aspect is the diversity of the scraper and backed piece typology. The diversity of scrapers in Wilton assemblages have been discussed before (e.g. Guillemard and Porraz, 2019), and this new analysis strengthens previous observations. Small thumbnail scrapers were indeed an important part of the toolkit at RCC, but other scrapers such as Woodlot scrapers were also fabricated. This has been observed at other sites in Lesotho (e.g. Kaplan and Mitchell, 2012). Furthermore, the presence of elongated thumbnail scrapers indicates flexibility in the scraper production. It implies that some of the typical small thumbnail scrapers might represent advanced stages of reduction, rather than having been directly made from small flakes. Importantly, too, the backed piece category appears more diversified than expected. The small segments predominate and are particularly standardised, but they occur together with longer segments and flat-based segments.

Wadley (2000) included the mid- and late Holocene layers of RCC in the Wilton techno-complex. Similar observations have been made by other authors who discussed the RCC assemblage (e.g. Deacon, 1972; Lombard et al., 2012; Kaplan and Mitchell, 2012). The new analysis presented in this paper agrees, even though it calls for finer typological categories and for technological analyses. Small thumbnail scrapers and segments are indeed common in the interior of South Africa (e.g. Sampson, 1974), in the Lesotho Highlands (e.g. Mitchell, 1992) and the foothills of the Drakensberg (e.g. Opperman, 1987), and for instance in the Thukela Basin (e.g. Mazel, 1989). But what about the associated knapping methods and techniques? If we restrict the chronological and geographical frame, only a few sites dated to between 8,8 and 8,2ka and 6,9–6,5ka cal BP have been found in and around the Maloti-Drakensberg (see sites on Fig. 1). These, for instance, include: Tloutle, with layers dated to between around 8ka and 7ka cal BP (Mitchell, 2000); Sehonghong, with layers dated to between around 7,8ka and 6,7ka cal BP (Mitchell, 1996); Gehle shelter, with a date around 6,4ka cal BP (Mazel, 1984); Nkupe shelter, with layers dated to between around 7, 5ka and 6,5ka cal BP (Mazel, 1988); and Grassridge Shelter with layers dated to between around 7,7ka and 6,9ka cal BP (Opperman, 1987; Collins et al., 2017).

It is unfortunately not possible to compare the operational sequences between these sites and our analysis of Rose Cottage Cave, due to a previous research focus on typological data. A few elements can however be highlighted, while awaiting further technological lithic studies. Bipolar technologies seem to be common at Tloutle during the mid-Holocene, even though free-hand single-platform and multi-platform cores are well represented (Mitchell, 2000). There might therefore be a stronger emphasis on bipolar debitage at Tloutle, even though it is at this stage difficult to estimate. The formal tool typology at Tloutle appears similar to RCC, even though sub-variations for the segment class have not been described. For Sehonghong, a similar typology is also discussed, including varied backed pieces (Mitchell, 1996). Single-platform irregular free-hand cores are suggested (Mitchell, 1996). Interestingly, bipolar cores seem to be less represented at Sehonghong than at Tloutle. A technological analysis would be necessary to compare the results with the methods and techniques we observed at RCC. The comparison with Gehle Shelter (Mazel, 1984) is

difficult because of the 'enigmatic' dating of the deposits due to a date inversion (Mazel, 1984: 7). Nevertheless, similar formal tools are observable in Mazel's drawings, with scrapers and backed pieces potentially displaying similar variations. No further technological information can be used to establish comparisons. The same conclusion is reached for Nkupe Shelter (Mazel, 1988), which shows potential similarities in the stone tool typologies, but does not allow us to go further. For Grassridge, while Opperman's (1987) work seems to indicate typological similarities with RCC (with very limited information on reduction processes), the more recent work by Collins et al. (2017) on the early and mid-Holocene layers shows potential differences, with an emphasis on hornfels-dominated debitage. It is difficult at this stage to know whether these differences could be due to earlier dates, or to regional variation. Ongoing research by the author on Eastern Cape sites will allow these aspects to be explored further. Finally, in these different areas, different formal tools typologies have been described for the more recent 'Post-Classic' Wilton, for which more sites are represented than for 'Classic Wilton' assemblages (see Wadley, 2000 for an outline). Further research will tell us if technological changes are also visible in the upper layers of Rose Cottage Cave, and how they compare to these other sites.

Our understanding of the Wilton will surely evolve in the years to come. The results from this new analysis allow for the pinpointing of key elements of the methods and techniques that knappers used to make stone tools during the mid- Holocene at Rose Cottage Cave and also identified interesting typological variations. The next step will be to investigate whether these patterns can be observed elsewhere. We will then have to ask why know-hows remain stable or change through time, what elements are broadly shared, and which ones show more diversity. Further research in southern Africa will contribute to the formulation of new hypotheses and will surely show a less unified picture of the lithic material cultures of the last 8000 years.

CRediT authorship contribution statement

Iris Guillemard: Single-author paper based on new research conducted by the author, Conceptualization, Formal analysis, Investigation, Writing – original draft, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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