Notae Praehistoricae, 38/2018 : 169-190

The Mesolithic in and around the city of Bruges
New lithic data from the excavated sites of Dudzele-*Zonnebloemweg*, Koolkerke-*Arendstraat* and Sint-Michiels-*Barrièrestraat* (Brugge, West Flanders, BE)

Gunther NOENS, Dieter VERWERFT, Jari H. MIKKELSEN,
Joris SERGANT & Ann VAN BAELEN

1. *Introduction*

Fortuitous discoveries of lithic artefacts during recent archaeological fieldwork at Dudzele, Koolkerke and Sint-Michiels have led to a number of small-scale excavations aimed at a more complete recovery of these prehistoric remains. Located within three sub-municipalities of the city of Bruges, these newly discovered archaeological sites fall within the operating range of the inter-communal archaeological service *Raakvlak*, an area of more than 600 km² in the extreme north-western part of Belgium (Fig. 1). The sites of *Dudzele-Zonnebloemweg* and *Koolkerke-Arendstraat*, to the northeast of the historical city-centre of Bruges, are part of the coastal Polder area whereas *Sint-Michiels - Barrièrestraat*, located to the southwest of the city-centre, is situated in Sandy Flanders, on top of the large coversand dune of Maldegem-Stekene.

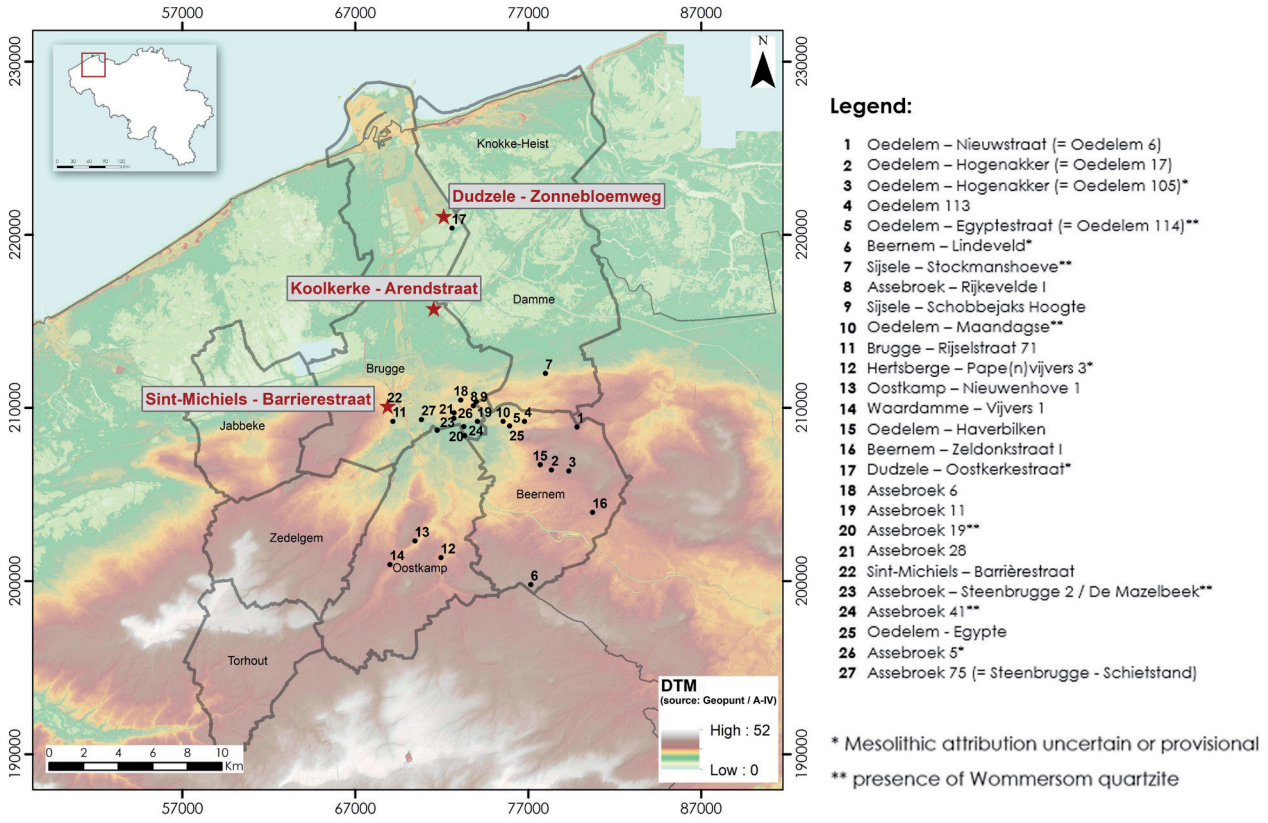

Fig. 1 – Map of study area and Mesolithic sites.

In 2018 Ghent Archaeological Team (GATE) was commissioned by *Raakvlak* to undertake a study of these three lithic collections, totalling well over 2 700 artefacts (Noens & Sergant, 2018), and the results of these analyses will be discussed briefly in this paper. Each collection contains a clear Mesolithic component and it is argued that their study can add considerably to our current knowledge of the Mesolithic in this extreme north-western part of Belgium as these sites represent the first excavated Mesolithic datasets in the area where until now our knowledge of the Mesolithic (and Palaeolithic) occupation remained limited. Despite the existence of a prehistoric research tradition that extends well back into the second half of the 19th century, data belonging to this period has been scarce, especially when compared to some of the surrounding sandy areas of north-west Belgium and to the numerous remains found in the *Raakvlak*-area belonging to more recent archaeological periods.

Following a brief overview of the fieldwork conditions that led to the discovery and recovery of the lithic remains, the results of our attribute, refitting and intrasite spatial analyses are presented. Next, this new data from Dudzele, Koolkerke and Sint-Michiels is set against our current Mesolithic dataset in the region. Given its large potential and the severe threat that the prehistoric record in this area is under, some recommendations are put forward that will allow for a more extensive and adequate incorporation of this prehistoric record into future archaeological (survey and excavation) fieldwork strategies.

2. *Site-discovery and excavation*

Archaeological fieldwork at these three locations took place between 2010 and 2015. A multi-phased survey project between 2010 and 2012 preceding the construction of the A11 highway from Zeebrugge to Westkapelle resulted in the discovery of (Roman) archaeological remains at Dudzele (Verwerft *et al.*, 2012a, 2014, 2016). An initial desktop study was followed by a palaeotopographic reconstruction of the long and narrow project area of 17 ha by means of 711 manual corings which in general revealed a diverse buried Pleistocene coversand dune landscape, characterized by the presence of well-developed and well-preserved podzolic soils covered by Holocene peat and sealed off by estuarine sediments. It led to an archaeological auger survey in a 5 ha large area by means of 486 individual augering point locations, positioned in a 10 m triangular grid configuration, and wet-sieving of the collected soil samples over 2 mm meshes, but none of these samples revealed direct indications for the presence of prehistoric (clustered) artefact distributions. Yet, the subsequent open-area excavations of the Roman site in 2013 exposed several lithic artefacts which prompted four small-scale excavations (designated as trenches A, F, H and J) by means of 0,5 m x 0,5 m excavation units (5 cm spits) and integral wet-sieving of the sediments over 1 mm meshes. Overall, 422 lithic artefacts were collected, more than 60 % of which came from trench F.

Archaeological fieldwork at Koolkerke, between 2012 and 2015 by a partnership between *Raakvlak* and GATE, was instigated by the so-called Stevin-project of Belgium's transmission system operator Elia, which included the construction of a (partly underground) high-voltage power line between Zomergem and Zeebrugge and several high-voltage stations in Zeebrugge, Bruges and Damme (Cruz *et al.*, 2013; Verwerft *et al.*, 2015a). A palaeotopographic survey by means of 383 auger points showed the local presence of well-preserved podzolic soils in the upper part of the Pleistocene cover sands which were covered by Holocene deposits (peat growth followed by estuarine clayey to loamy sediments). Four zones were selected for archaeological augering in 10 m triangular grid configurations. In total, 504 individual point locations were sampled using 12 cm

Edelman-augers and wet-sieving over 1 mm meshes. Although several of these sampled locations revealed some direct and indirect indications for the presence of archaeological remains (e. g. six fragments of charred hazelnut shells from four locations and five lithic artefacts from five other sample points), no additional assessment took place (Cruz *et al.*, 2013: 59-60). In auger zone W, just to the south-east of the later excavations along the Arendstraat, two of the 151 auger points yielded a total of two lithic artefacts associated with a partly disturbed podzolic soil. More lithic artefacts were discovered during subsequent mechanically dug trenches to the north-east of the Arendstraat which ultimately resulted in the excavation of an area of 9 x 27,5 m by means of 0,5 m x 0,5 m squares (10 cm spits) and wet-sieving over 3 mm meshes, after the mechanical removal of the overlying Holocene sediments. Apart from 43 charred fragments of hazelnut shells from 9 excavation units, these surveys and excavations yielded a total of 316 lithic artefacts.

The construction of school infrastructure along the Barrièrestraat in Sint-Michiels was the immediate incentive for a multi-phased archaeological survey by *Raakvlak* in the autumn of 2013 on a parcel of 1,5 ha (Verwerft *et al.*, 2018a, 2018b). In addition to several lithic artefacts found during a pedestrian survey, most of the five corings aimed at assessing the local soil conditions revealed the presence of a (reasonably) well-preserved podzolic soil just below the present-day surface. A subsequent 12 cm Edelman-auger survey by means of 141 sample points in a 10 m triangular grid configuration and wet-sieving over 1 mm meshes failed, however, to provide additional archaeological indicators. No lithic artefacts were found either in the test trenches that were dug mechanically following the pedestrian survey, although a number of archaeological soil features, including the floor plan of a former building structure, were discovered at this stage. Additional lithic remains were, however, discovered during subsequent open-area excavations during which these archaeological soil features were investigated. This prompted three additional small-scale excavations within this area by means of 0,5 m x 0,5 m units and wet-sieving. These were designated as trenches A (38,5 m^2), B (63 m^2) and C (24 m^2) and ultimately resulted in a lithic collection of almost 2 000 artefacts.

3. Lithic analysis

Following an initial assessment, it was decided to subject the lithic artefacts to a more elaborate analysis focussing on raw material characteristics, morpho-typology, dimensions, fragmentation, thermal alteration and their vertical and horizontal spatial distribution. Lithic analysis also included a pilot refitting study. Despite its limited character, it provided some interesting insights with regard to lithic technology and intrasite spatial patterns.

Taken together, the three collections comprise a total of 2 732 lithic artefacts. Nearly three quarter of these were collected at Sint-Michiels, with Dudzele and Koolkerke representing 15 and 12 %, respectively.

More than 60 % of the 422 lithic artefacts from Dudzele came from Vak F and 20 % from trench J (Fig. 2; Tab. 1). Apart from one bladelet made from Wommersom quartzite that was found in the infill of a soil feature, all artefacts are made from flint. Different flint varieties are recorded, indicating the presence of elements from multiple nodules and reduction sequences. Ca. 16 % of the artefacts has cortex, often covering less than 25 % of the outer surface. Less than one fifth of these cortical artefacts has at least 75 % of their surface consisting of cortex. Ca. 10 % of the artefacts show traces of heat alteration, including only two heavily burned fragments. Three burned fragments from trench A -including a potlid, a proximal and a mesial fragment, all burned to the same degree- were refitted (composition DZ-A 1), forming a proximal fragment of a bladelet

that fractured as a result of direct contact with fire. The other fragment(s) of this bladelet are missing from the collection. Most artefacts have limited dimensions: whereas only 2 % is larger than 3 cm, 80 % is smaller than 1 cm and 94 % smaller than 2 cm. Apart from trench A, each of the collections is dominated by chips (e. g. complete flakes smaller than 1 cm), comprising up to 59 % in trenches F and H and up to 84 % in trench J. Flakes, bladelets and their fragments constitute between 13 and 66 % of the collections with the latter group always being dominant. Bulbar flakes were found in trenches F and H, while cores are nearly absent, except for one specimen found in trench J. The presence of these elements suggests on-site knapping activities. Artefacts with modified edges are

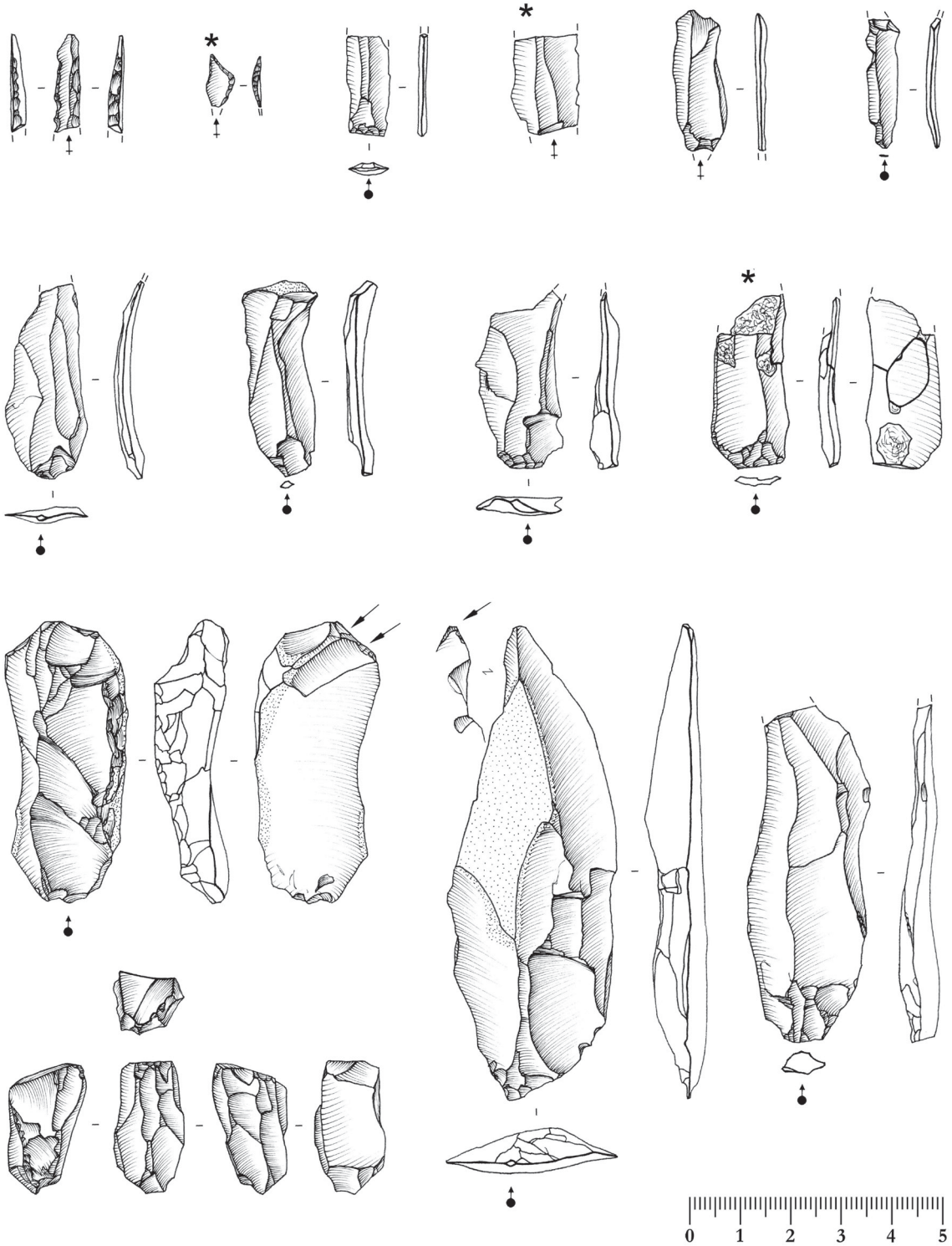

Fig. 2 – Selection of artefacts from Dudzele. Scale: 4/5.

Typology	Fragmentation	Heat alteration	Collection					Total
			A	F	H	J	n/a	
chip	complete	unburnt	1	148	29	79		257
		lightly burnt		3				3
blade(let)	distal	unburnt		3		1		4
	mesial	unburnt		2		1		3
		medium burnt					1	1
	proximal	unburnt	1	5			1	7
		unburnt?		1				1
		lightly burnt	1					1
	complete	unburnt		2	2	2		6
		lightly burnt	1	1				2
flake	distal	unburnt			1			1
	proximal	unburnt		3				3
	complete	unburnt	1	2	1	2	2	8
		lightly burnt		2				2
flake/blade(let) fragment	distal	unburnt	1	27	3	2		33
		lightly burnt		6	1			7
		medium burnt		2				2
	mesial	unburnt		12	3	1		16
		lightly burnt		3				3
		medium burnt					1	1
		heavily burnt					1	1
	multiple	unburnt		1	1			2
		lightly burnt	2	3				5
	proximal	unburnt		17	3	4	1	25
		lightly burnt		6				6
		medium burnt		1	1			2
		heavily burnt	1					1
	burnt	lightly burnt		2				2
	complete	unburnt		1				1
bulbar flake	proximal	unburnt			1			1
	complete	unburnt		1				1
core	complete	unburnt				1		1
chunk	multiple	lightly burnt	1					1
	burnt	lightly burnt		2				2
	n/a	unburnt					1	1
potlid	complete	lightly burnt	1					1
microlith (triangle)	complete	lightly burnt		1				1
microlith (fragment)	distal	unburnt					1	1
notched bladelet	proximal	unburnt	1					1
burin	complete	unburnt			1			1
fragment with retouched edges	proximal	unburnt					1	1
	distal	unburnt				1		1
microburin	complete	unburnt			2			2
			12	257	49	94	10	422

Tab. 1 – The lithic inventory from Dudzele.

equally sparse and include a notched bladelet from trench A and a burin from trench H. Indications for a Mesolithic component are available in trenches F and H, and include a microlith (triangle) and two microburins, respectively. A larger blade (or burin?, see illustrations by Verwerft *et al.*, 2014: Fig. 10, 2016: 22) together with the previously mentioned burin from trench H might reflect a Final-Palaeolithic presence as well. Spatial

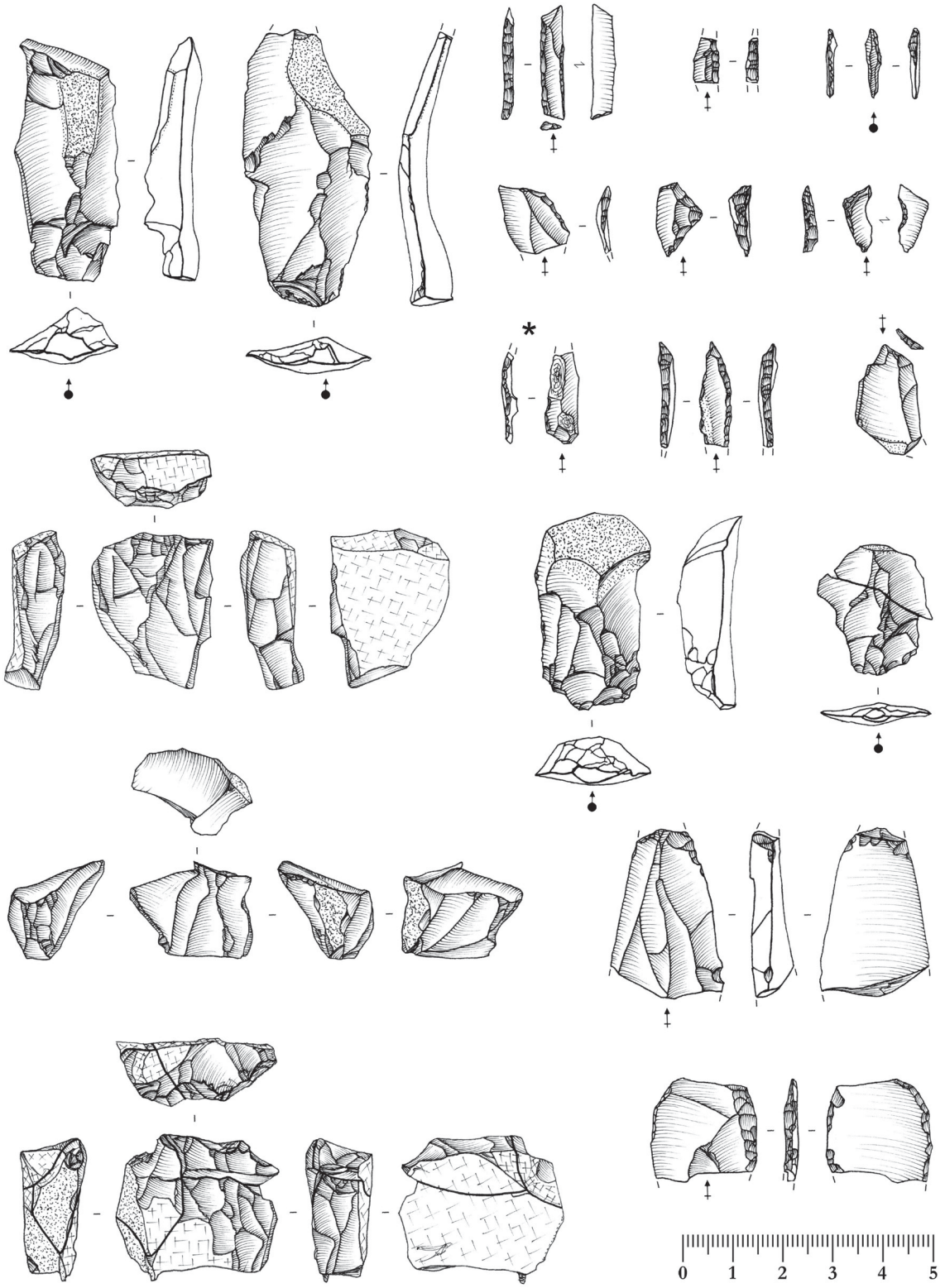

Fig. 3 – Selection of artefacts from Koolkerke. Scale: 4/5.

analysis indicates that the vertical and horizontal limits of the artefact distribution were not reached in any of the excavated areas, prohibiting more in-depth studies of the distribution patterns in terms of past human behaviour. Artefact densities are always low and only trench F shows a clustered occurrence with a maximum density of 33 artefacts per 0,25 m^2. The only microlith from Dudzele was found in this cluster and the position of the 32 (mainly lightly) burned artefacts from trench F also corresponds with the densest part of this cluster. It remains unclear whether these low artefact densities and the overall lack of artefact clustering reflect the periphery of clusters, intercluster distributions or is due to the incomplete recovery of the assemblages (or a combination of these explanations). Most of the finds from trench J are situated near the north-eastern edge of the excavation pit, possibly reflecting the periphery of one or more non-excavated clusters.

All 316 lithic artefacts from Koolkerke are made from flint, dominated by distinctive very dark (grey to black) fine-grained varieties, sometimes possessing large, coarse inclusion (Fig. 3; Tab. 2). A number of lighter flint varieties indicates the presence of elements

Typology	*Fragmentation*	*Heat alteration*				*Total*
		unburnt	*lightly burnt*	*medium burnt*	*heavily burnt*	
chip	complete	48			3	*51*
blade(let)	complete	12				*12*
	proximal	14				*14*
	mesial	3				*3*
	distal	11				*11*
flake	complete	57	2	3	2	*64*
	proximal	6	1			*7*
flake / blade(let) fragment	proximal	27		1	5	*33*
	esial	13		2	2	*17*
	multiple	1				*1*
	distal	30	1	2	3	*36*
	burnt		1			*1*
core	complete	2				*2*
	fragment	5			2	*7*
core preparation/rejuvenation	complete	1				*1*
	proximal	1				*1*
chunk	fragment	11		2		*13*
	burnt		1	16	5	*22*
nodule	complete	1				*1*
potlid	burnt			3		*3*
fragment with retouched edges	proximal	1				*1*
	mesial	2				*2*
	distal	2				*2*
retouched flake	complete	2				*2*
burin	complete	1				*1*
burin spall	complete	1				*1*
microlith (triangle)	complete	1			1	*2*
microlith (small backed bladelet)	complete	2				*2*
microlith (fragment)	mesial	1			1	*2*
	distal	1				*1*
		257	*6*	*29*	*24*	*316*

Tab. 2 – The lithic inventory from Koolkerke.

from different nodules. Over half of the artefacts possess remains of cortex, ca. 40 % of which covers at least half of the outer surface of the artefacts. Dimensions are small, with only 11 % of the artefacts measuring over 3 cm and artefacts larger than 5 cm are nearly absent. The frequent occurrence of cortex, together with the small dimensions might reflect the use of small nodules. Traces of heat alteration, often moderate to heavy (90 %), were found on nearly 20 % of the artefacts. Several potlids were also encountered. Despite the overall small dimensions of the artefacts, chips are rather sparsely represented (16 %). Flakes, bladelets and their fragments on the other hand are dominant. None of the 40 bladelets -including 28 fragments- show macroscopic traces of burning, in contrast to the flakes (11 %) and undetermined fragments (19 %). Nine cores are present, as well as one complete, small, unworked nodule. The collection further also includes a burin (or core-on-flake?), a burin spall, two retouched flakes, five retouched fragments, as well as seven microliths including two triangles and two small backed bladelets. These last two artefacts might point to the presence of a (Middle?) Mesolithic component. Over 80 % of the artefacts was recovered from the upper 10 cm of the deposits, but the vertical artefact distribution is at least 20 cm. It is unclear whether the vertical limits of the artefact distribution were actually reached, but given that the vertical artefact distribution at other excavated sites in similar sandy contexts might amount to half a meter or more, this is considered rather unlikely. Artefacts, including those in the dark flint varieties, occur over the entire excavated surface, always in low densities. A number of clusters are discernible near the western and eastern edges of the excavated area. Covering a surface of ca. 9 m^2, the western cluster is particularly distinct. It has a maximum (low) density of 13 artefacts per 0,25 m^2 and contains around 80 lithic artefacts including mainly chips (N = 19), flakes (N = 14), bladelets (N = 5) or their fragments (N = 33). In addition, it overlaps with half of the charred hazelnut shells, but no burned lithic artefacts were found in this cluster, which reduces the potential for radiocarbon dating as no clear indications exist for the presence of a latent surface hearth. Two of the seven cores are situated at the southwestern edge of this cluster; the remaining five are dispersed over the excavated area. This also is the case for the microliths, none of which is spatially associated with the western cluster.

The results of the attribute analysis and a confrontation of morpho-typology, fragmentation and heat alteration of the 1.994 lithic artefacts from Sint-Michiels are provided in the tables below (Fig. 4-5; Tab. 3-4). Nearly two-thirds of the artefacts are from trench A (64 %), whereas trenches B and C represent 12 % and 19 % of the lithic finds, respectively. Apart from a proximal fragment of a bladelet made from Wommersom quartzite found in trench B, all artefacts were made from flint. Amongst these flint artefacts, there is a large variation with regard to colour, texture, inclusions and cortex, indicating the presence of elements from different nodules and reduction sequences. At least for trench A this interpretation is confirmed by the refitting analysis. Cortex was found on only 16 % of the artefacts, with similar percentages for trenches A and C and slightly lower values for trench B. When present, the cortex often covers less than half of the outer surface of the artefacts. Less than 20 % of the artefacts has visible traces of heat alteration, with low percentages for trenches A and B (12 and 5 %), in contrast to trench C where nearly half of the artefacts are burned. For all three of the excavated areas, heavily burned pieces dominate amongst this group of heat-altered artefacts. Dimensions are small, with 86-93 % of artefacts measuring less than 1 cm and a near-absence of artefacts larger than 3 cm (1-2 %). Chips dominate the three collections (69-84 %), followed by flakes, bladelets and their fragments (14-22 %). Trench A has a considerably larger number of complete specimens (70 %) when compared to trenches B and C where at least half of the artefacts from this group consists of fragments. The majority of cores was found in trench A (N = 7), the two remaining ones come from trench C. Cores are completely lacking in trench B, as are core preparation and rejuvenation products, and potlids. Trench A yielded a small fragment which matches Inizan *et al.*, (1999: 36-

37, fig. 7.4) description of a "parasitical flake" and Tsirk's (2010: 153-154, fig. 1; 2014: 168-169) description of a "compression wedge" or "lateral wedge". Also Pelegrin (1984: 114-115) briefly discusses this type of product, which can be created accidentally during bending fractures. Artefacts with modified edges are rare in the collections from Sint-Michiels (N = 17). Apart from a scraper and several retouched blade(let)s (N = 3), flakes (N = 1), chunks (N = 1) and fragments (N = 3) this group consists of seven microliths found during the excavation of trenches C (N = 5, including a triangle and a point with non-retouched base) and A (N = 2, including a small backed bladelet). Microburins are

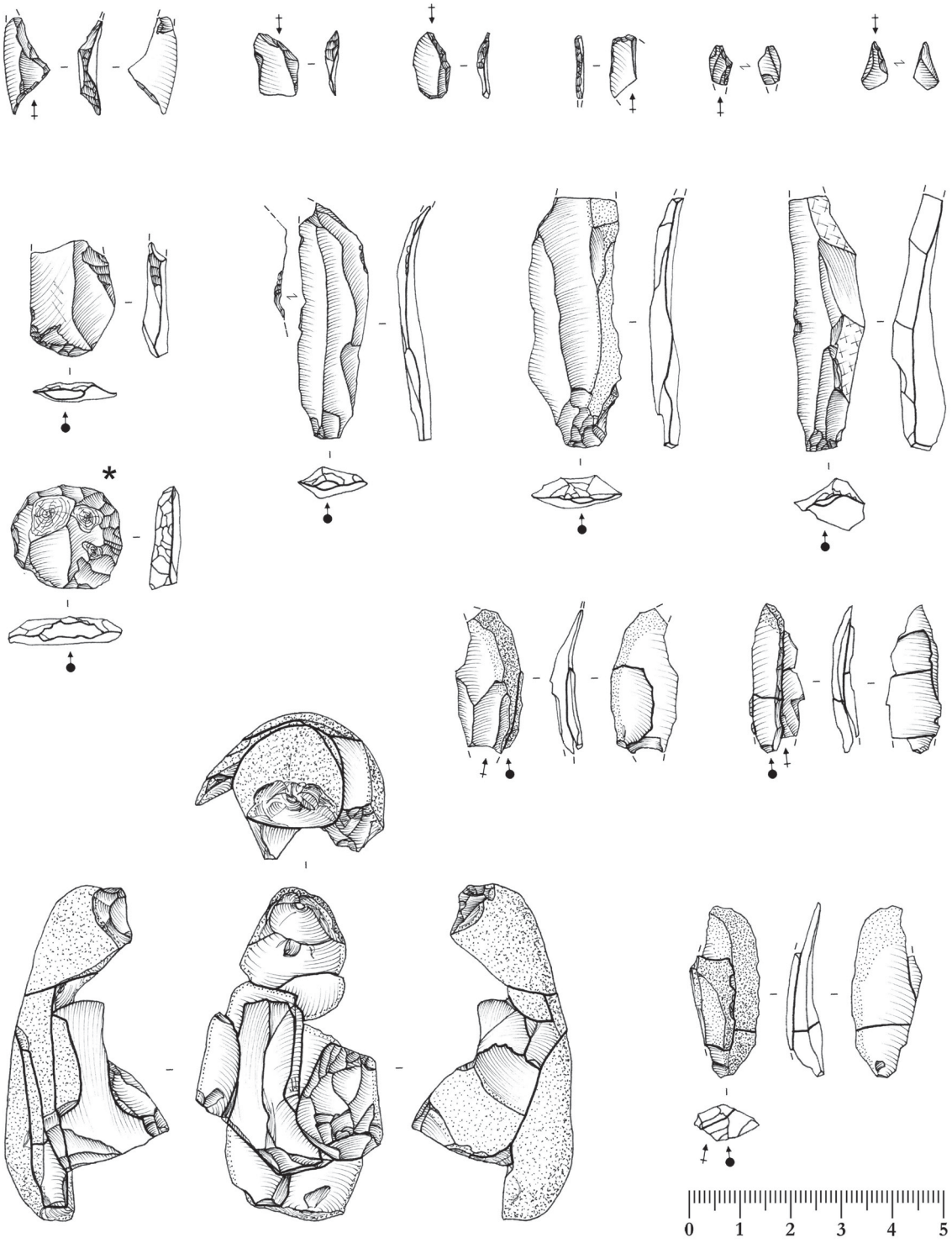

Fig. 4 – Selection of artefacts from Sint-Michiels, part 1. Scale: 4/5.

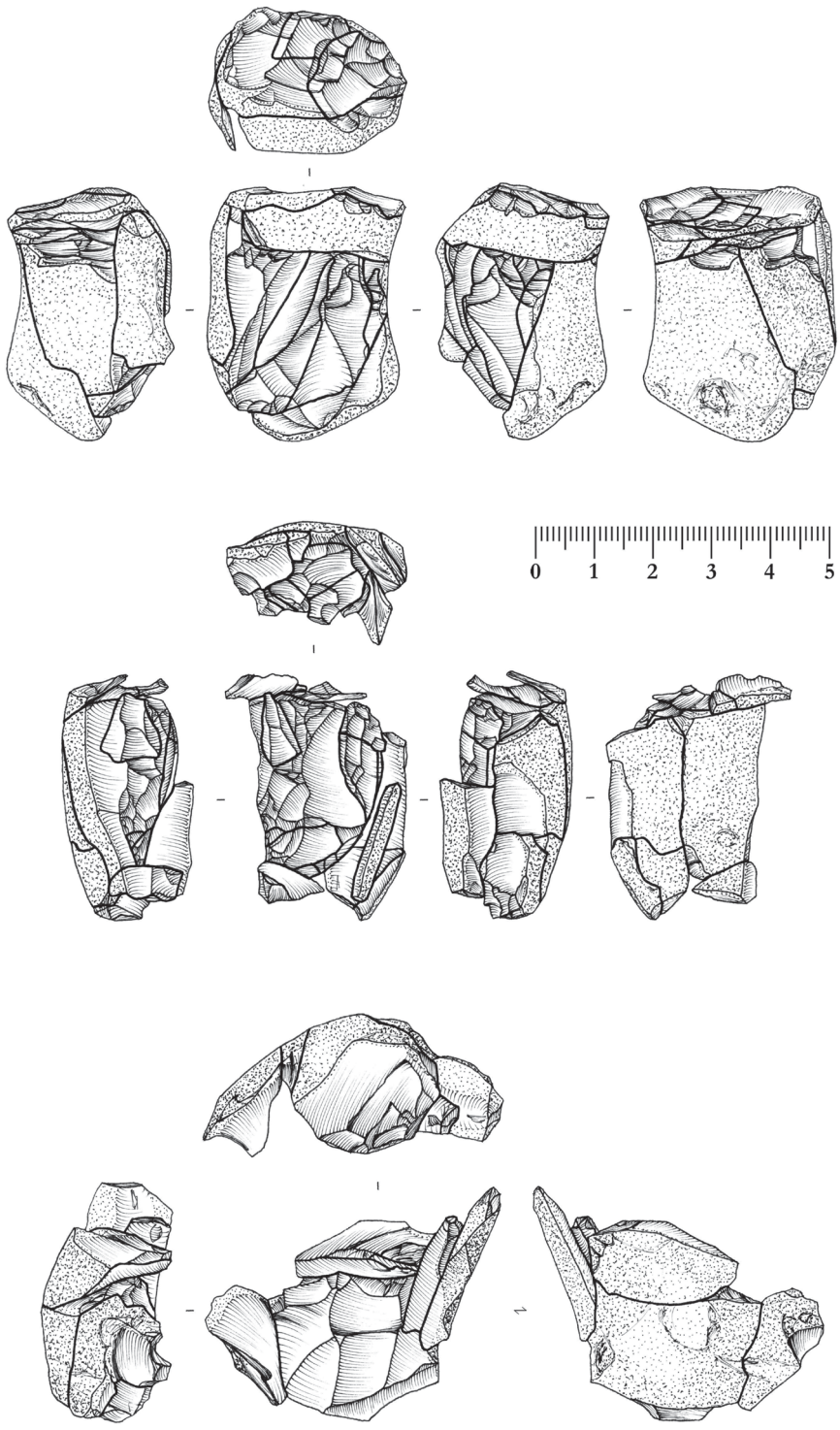

Fig. 5 – selection of artefacts from Sint-Michiels, part 2. Scale: 4/5.

found in trenches A (N = 3) and B (N = 2). Both the microliths and the microburins point to a Mesolithic component in each of the three collections.

Several artefacts were refitted. Trench C has three refit-compositions (SMB-C 1-3), each consisting of two artefacts. Two of these compositions relate to burned fragments recovered from the same excavation unit. Given this fact and their similar degree of burning it cannot be excluded that the fracture is of recent origin and relates to excavation or post-excavation handling. The third composition is a ventral-dorsal refit of a chip and a flake. The most interesting refitting results, however, come from trench A where 74 artefacts are part of 16 refit compositions (SMB-A 1-16). Whereas most of the refits consist of only two artefacts (n = 9), the six remaining compositions are composed of 3, 4, 5, 7, 10, 12 and 15 artefacts, with the compositions of 10 and 15 artefacts almost certainly belonging to the same nodule despite the lack of a physical contact between both refit sets. Some of the larger compositions allow for a fairly detailed reconstruction of the reduction sequences at the level of individual nodules and confirm technological observations from other Mesolithic (refitted) collections in Sandy Flanders (e. g. Perdaen, 2004; Perdaen & Noens, 2011; Noens, 2013). These include (1) the use of small nodules, often fractured during the initial stages of production along existing frost fissures, the resulting fragments of which were then further reduced creating multiple cores in the same flint variants; (2) the presence of elements of the entire production sequences; and (3) the non-standardised, ad hoc character of the lithic production processes, primarily directed towards the production of small irregular bladelets or flakes. As was observed during previous technological studies none of the refitted sequences contains all the elements of the reduction sequences. Although the limited extent of the excavation and the incomplete recovery of the artefacts have to be taken into

account, this might also indicate a temporal and spatial fragmentation of the lithic *chaînes opératoires*, reflecting a highly complex and dynamic mobile pattern of the technological organization.

All artefacts from trench B were found within the same 5 cm spit, making an analysis of the vertical artefact distribution impossible. Artefacts from trenches A and C are dispersed over at least 15 cm but both locations show different vertical distribution

Typology	*Fragmentation*	*Collection*					
		survey	*vak A*	*vak B*	*vak C*	*n/a*	*Total*
chip	complete		908	201	264	39	*1412*
blade(let)	complete	1	11	1	2	2	*17*
	proximal		4	3	3	1	*11*
	distal		8		3	1	*12*
	mesial		7	1	2		*10*
flake	complete	3	60	3	7	5	*78*
	proximal		5		4	6	*15*
	distal		6		1		*7*
flake / blade(let) fragment	complete		2				*2*
	proximal		56	6	14	2	*78*
	distal		59	12	17	4	*92*
	mesial		78	6	23	1	*108*
	multiple	1	21	2	10	1	*35*
	burnt		6				*6*
core	complete		6				*6*
	fragment		1		2		*3*
core preparation / rejuvenation	complete				1		*1*
	proximal		2			1	*3*
	distal		2		1		*3*
	mesial		1				*1*
chunk	fragment	2	22	3	16	8	*51*
nodule	complete					1	*1*
potlid	complete		10		8	1	*19*
parasitical flake	complete		1				*1*
fragment with retouched edges	proximal					2	*2*
	multiple					1	*1*
retouched blade(let)	complete					2	*2*
	distal					1	*1*
retouched flake	complete	1					*1*
	proximal					1	*1*
scraper	complete					1	*1*
retouched chunk	complete					1	*1*
microlith (triangle)	complete				1		*1*
microlith (small backed bladelet)	complete		1				*1*
microlith (point with unretouched base)	complete				1		*1*
microlith (fragment)	complete		1		1		*2*
	distal				2		*2*
microburin	complete		2	2			*4*
	distal		1				*1*
		8	*1281*	*240*	*383*	*82*	*1994*

Tab. 3 – The lithic inventory from Sint-Michiels, part 1.

patterns. While each of the three 5 cm-spits from trench A yielded ca. 1/3th of the artefacts, more than 2/3th of the artefacts from trench C were recovered from the upper spit with only 6 % of the artefacts coming from the lower spit. Combined with the fact that artefacts were also collected during a pedestrian survey and that the upper part of the soil profile was removed mechanically, these observations indicate that the vertical (upper and/or lower) limits of the artefact distribution were not reached on this location and that only part of the artefact assemblages was collected. The horizontal distribution in trench A shows two partly overlapping clusters, which clearly continue beyond the

Typology	*Heat Alteration*	*Collection*					*Total*
		survey	*vak A*	*vak B*	*vak C*	*n/a*	
chip	unburnt		871	193	167	34	*1265*
	lightly burnt		1		4		*5*
	medium burnt		2	1	20	2	*25*
	heavily burnt		34	7	73	3	*117*
blade(let)	unburnt	1	24	5	6	2	*38*
	lightly burnt		4		1		*5*
	medium burnt					1	*1*
	heavily burnt		2		3	1	*6*
flake	unburnt	3	62	3	7	9	*84*
	lightly burnt		3			1	*4*
	medium burnt		2		1		*3*
	heavily burnt		4		4	1	*9*
flake / bladelet fragment	unburnt	1	155	24	20	5	*205*
	lightly burnt		20		7	1	*28*
	medium burnt		10	1	13	1	*25*
	heavily burnt		37	1	24	1	*63*
core	unburnt		7		2		*9*
core preparation / rejuvenation	unburnt		5		1	1	*7*
	medium burnt				1		*1*
chunk	unburnt	1	5	1	1	6	*14*
	lightly burnt		5	2			*7*
	medium burnt		3		2		*5*
	heavily burnt	1	9		13	2	*25*
nodule	unburnt					1	*1*
potlid	lightly burnt		7		4		*11*
	medium burnt		1		2		*3*
	heavily burnt		2		2	1	*5*
parasitical flake	heavily burnt		1				*1*
fragment with retouched edges	unburnt					2	*2*
	lightly burnt					1	*1*
retouched blade(let)	unburnt					3	*3*
retouched flake	unburnt	1				1	*2*
scraper	heavily burnt					1	*1*
retouched chunk	unburnt					1	*1*
microlith (triangle)	unburnt				1		*1*
microlith (small backed bladelet)	unburnt		1				*1*
microlith (point with unretouched base)	unburnt				1		*1*
microlith (fragment)	unburnt		1		3		*4*
microburin	unburnt		3	2			*5*
		8	*1281*	*240*	*383*	*82*	*1994*

Tab. 4 – The lithic inventory from Sint-Michiels, part 2.

excavation boundaries. The maximum artefact density amounts up to 55 artefacts per 0,25 m². Burned artefacts are dispersed over the entire surface but also show a cluster corresponding with the northern peak. The same picture emerges when only the heavily burned artefacts are taking into account, leading to the interpretation that this heavily burned artefact cluster possibly reflects a latent hearth. While the horizontal distribution of the chips corresponds closely with that of the total artefact distribution, its southern peak is more pronounced. Three cores are situated within the cluster, whereas two additional ones are found along its north-eastern edge. The two microburins were present along the eastern edge and both microliths are found in the south-eastern part of the cluster. The horizontal artefact distribution in trench B seems to indicate the presence of multiple smaller clusters, most of these situated near the northern edge of the excavated area. Artefact density is low, varying between max. 10 and 26 artefacts for the different clusters. It remains unknown to what extent this pattern is influenced by the incomplete recovery of the lithic assemblage. The bladelet fragment made from Wommersom quartzite was found in the southern part of the excavated area, outside of the clusters. Burned artefacts, low in numbers, are concentrated within the two northernmost clusters. Conversely, no burned artefacts occur in the south-eastern part of the excavated area, including the eastern cluster which contains one of the two microburins from trench B. The horizontal distribution pattern in trench C also shows a partly excavated cluster of which the densest part (29 artefacts per 0,25 m²) is located along the northern edge of the excavated area. The burned artefacts display a similar horizontal distribution pattern, whereas the heavily burned specimens -comprising the majority of burned artefacts- show an even more pronounced clustering. The cores are situated southeast of the cluster, as are two of the microliths including a triangle. Two other microliths, including the point with non-retouched base, are situated in the western part of the cluster.

4. Discussion

The finds from Dudzele, Koolkerke and Sint-Michiels presented above, are not the first prehistoric remains from the region around Bruges. Amongst the earliest of these are numerous late 19th-early 20th century discoveries in Sint-Kruis, Steenbrugge, Aartrijke, Tillegem and Torhout made by Gillès de Pélichy (1893, 1897, 1903) and de Maere d'Aertrycke (1907, 1911, 1912). The Central Archaeological Inventory (CAI) provides the most extensive inventory of archaeological sites in Flanders and lists over 3 000 records for the *Raakvlak*-area. Merely 4 % of these known sites in this area date to the stone age (> 300 000 – 4000 years ago) and for almost half of these no further chronological specification is available. However, when such data is available, it mostly refers to the Neolithic (N = 40) and to a lesser extent to the Mesolithic (N = 19) and/or (mainly the later part of) the Palaeolithic (N = 13). The majority of these prehistoric remains came to the surface by means of non-invasive pedestrian surveys by diligent amateur archaeologists or archaeology students. Archaeological approaches consisting of more invasive methods (e. g. augering, mechanical trial trenching, excavations, etc.), and executed by professional archaeologists, have occurred less frequently and are mostly linked with archaeological remains (e. g. soil features) belonging to more recent periods. This finding reflects the need to apply more adequate invasive survey and excavation strategies in order to deal in a more correct way with the prehistoric record, also in areas where part of the prehistoric record is present in the plough layer.

Most of the prehistoric remains from the *Raakvlak* area recorded in the CAI were found in the central zone (Sandy Flanders), with a prominent cluster in the northern part of Beernem. Here, the deposits associated with these remains are not covered by (more recent) Holocene sediments and as a result the remains are located at or near the present-

day surface, vulnerable to erosion and destruction. Conversely, the coastal polders and dunes in the northern half of the *Raakvlak* area, where the prehistoric record -if not eroded by the estuarine tidal system- is buried by up to 4 m of Holocene sediments, and the sandy-loamy area in its southern tip have so far yielded almost no prehistoric remains (but see In't Ven *et al.*, 2005: 45-49 and Pieters *et al.*, 2010: 182-186 for a brief discussion of some artefacts from the coastal and polder areas). The most plausible explanation for this (arguably severely biased) distribution pattern, with an apparent lack of prehistoric remains in the latter areas, is to be found in the scarcity of purposive archaeological survey strategies to detect archaeological (clustered) find distributions. Seen from this perspective, the application of auger sampling strategies in Dudzele, Koolkerke and Sint-Michiels can be viewed as an important first step towards a more adequate treatment of the prehistoric archaeological record in this coastal polder area. The urgent need for the increasing application of more adequate strategies to systematically identify and locate the prehistoric record cannot be emphasized enough and has recently also been expressed by other scholars with regard to different parts of this area (e. g. Pieters *et al.*, 2010; Ryssaert *et al.*, 2010a, 2010b; Verwerft *et al.*, 2012b, 2015b).

In the presentation of the three collections above we argued for the presence of some unequivocal Mesolithic elements, including microliths (e. g. Dudzele F; Koolkerke; Sint-Michiels A and C) and microburins (e. g. Dudzele H; Sint-Michiels A and B), further supported by the presence of some artefacts made from Wommersom quartzite (e. g. Dudzele; Sint-Michiels B). More specifically, the few small backed bladelets from Koolkerke and Sint-Michiels A might reflect a Middle Mesolithic component. Because of these Mesolithic indicators, an updated overview of the known Mesolithic sites (ca. 11 000 – 6000 years ago) in this north-western part of Belgium was added, three decades after (partial) inventories were made by archaeology students from the universities of Ghent and Leuven (Devos, 1984; Soers, 1985, 1987; Van Acker, 1985, 1986; Vandermoere, 1981, 1983). Our updated list adds new datasets made available from the late 1980s onwards and supplements -and partly corrects- the CAI-inventory. As the discussion below will be restricted to some general remarks, the reader is referred to Noens & Sergant (2018: 49-67) for a more detailed account.

Figure 1 shows that the finds from Dudzele and Koolkerke represent the first Mesolithic remains from the coastal polder area around Bruges. Most Mesolithic sites on this map refer to one or more lithic artefacts. The only exception is the fortuitous discovery of a charcoal-rich soil feature during the construction of a sports centre at Sint-Michiels–Rijselstraat in 2004. Based on the orange-red discoloration of the surrounding sediments and the presence of several lithic artefacts in its filling, it was initially interpreted as a Mesolithic hearth-pit (Hillewaert, 2003) and presented -in the newspapers- as the oldest remains ever found in Bruges. Amongst the 39 lithic artefacts recovered from the same infill was a surface-retouched microlith (possibly an unfinished *feuille de gui*?) suggesting a Middle Mesolithic component (Noens 2004). The other lithic artefacts from this small collection included chunks (N = 17) and to a lesser extent flakes (N = 8), bladelets (N = 6), chips (N = 4) and artefacts with modified edges (N = 4). Only 1/3th of these artefacts displayed macroscopic traces of heat alteration. A radiocarbon measurement on Salix-charcoal from the infill provided a post-Mesolithic date (3865 ± 30 BP, KIA-27164, source: c14.kikirpa.be, consulted at 24/08/2018) and the temporal association of the soil feature, its infill and lithic content therefore remains unknown.

While most artefacts from Dudzele, Koolkerke and Sint-Michiels are made from flint, two of the collections revealed at least one bladelet(-fragment) made from Wommersom quartzite, a lithic raw material that is primarily -but by no means exclusively- associated with the Mesolithic in the Rhine-Meuse-Scheldt basin. At least six other locations in the

Raakvlak area also revealed one or more artefacts made from this raw material, including Assebroek 19 (a single flake; Soers, 1987), Assebroek 41 (a single bladelet; Soers, 1987), Assebroek–Steenbrugge 2 (one or more artefacts, including a core; Crois, 1959; Van Acker, 1985), Oedelem–Egyptestraat (Vandermoere, 1983), Oedelem–Maandagse vindplaats Kc (seven artefacts; Van Acker, 1985), Sijsele–Stockmanshoeve (two bladelets; Van Acker, 1985), and possibly also Waardamme–Vijvers 1, although this latter claim remains provisional and requires a more in-depth study of the unpublished part of the recovered lithic remains from this excavated site. Although the bladelets from Dudzele and Sint-Michiels are not the only artefacts manufactured from this raw material in the *Raakvlak* area, they do represent two of its most western occurrences (Noens & Van Baelen, in preparation). More specifically, both finds push the western boundary of the distribution range of artefacts made from Wommersom quartzite more towards the present-day coastline (Fig. 6).

This (north-)westward expansion of the distribution range of artefacts made from Wommersom quartzite into the area between the river Scheldt and the North Sea has been touched upon several times in the archaeological literature. The very first distribution map of Wommersom artefacts, produced well over a century ago by Hamal-Nandrin & Servais (1913), already showed the presence of two sites west of the river Scheldt (Dentergem & Mendonk). In his extensive study on the use of this raw material during the Mesolithic, Gendel (1982a, 1982b, 1983, 1984, 1987, 1989) stressed that the western part of the distribution range is still poorly known due to the limited amount of usable data. Other studies have investigated this issue in more detail. Vanmoerkerke & Van Vlaenderen (1985) briefly presented 16 locations (including one from Oedelem) containing artefacts made from Wommersom quartzite which were found during intensive pedestrian surveys, excavations or the analysis of old collections. They argued that the spatial and temporal distribution of these artefacts west of the river Scheldt deviates from Gendel's data: in sharp contrast with his study area east of the Scheldt, locations to the west of this river systematically contain low percentages of artefacts made from Wommersom quartzite (< 1 %) throughout the Mesolithic. To them this pattern indicated seasonal migrations of prehistoric groups and the potential existence of a cultural border between such groups (Vanmoerkerke & Van Vlaenderen 1985: 6). More than a decade after this study, Crombé (1996, 1998) paid considerable attention to the use of 'exotic' quartzites in NW-Belgium, mainly -but not exclusively- focussing on the Early Mesolithic period. Compared to the data from Gendel, Crombé's map depicted a westward extension of ca. 35 km into the north-western part of the province of East-Flanders and -for the first time- also the eastern half of the province of West-Flanders. A more recent article by Crombé (2002) on the potential meaning of Early Mesolithic microlith variability ended with a short discussion on the presence of these exotic quartzites in the different early Mesolithic assemblage types he had defined. It included an updated version of his earlier map in which the distribution range included a large part of West-Flanders (for more recent reproductions of this map, see Perdaen, *et al.*, 2009; Robinson, 2010). Recently, Crombé (2017: fig. 8; Herremans & Crombé, 2017: 61) pushed this boundary further westwards, this time reaching the present-day North Sea coastlines in Belgium and part of the Netherlands. Although our own inventory of archaeological locations with Wommersom quartzite (Noens & Van Baelen, in preparation) so far has failed to find published data for these westward extension towards the present-day coastline proposed by Crombé and others since the early 21th century, it is likely that his hypothesis will indeed be supported by future finds. As the inundation of the North Sea basin only took place very slowly and in a complex manner during the Mesolithic period (i. e. De Clercq, 2018; Mathys, 2009; Van Lancker *et al.*, 2015; Borremans, 2015), the current coastline will very likely prove to be an artificial boundary of the Wommersom quartzite distribution pattern.

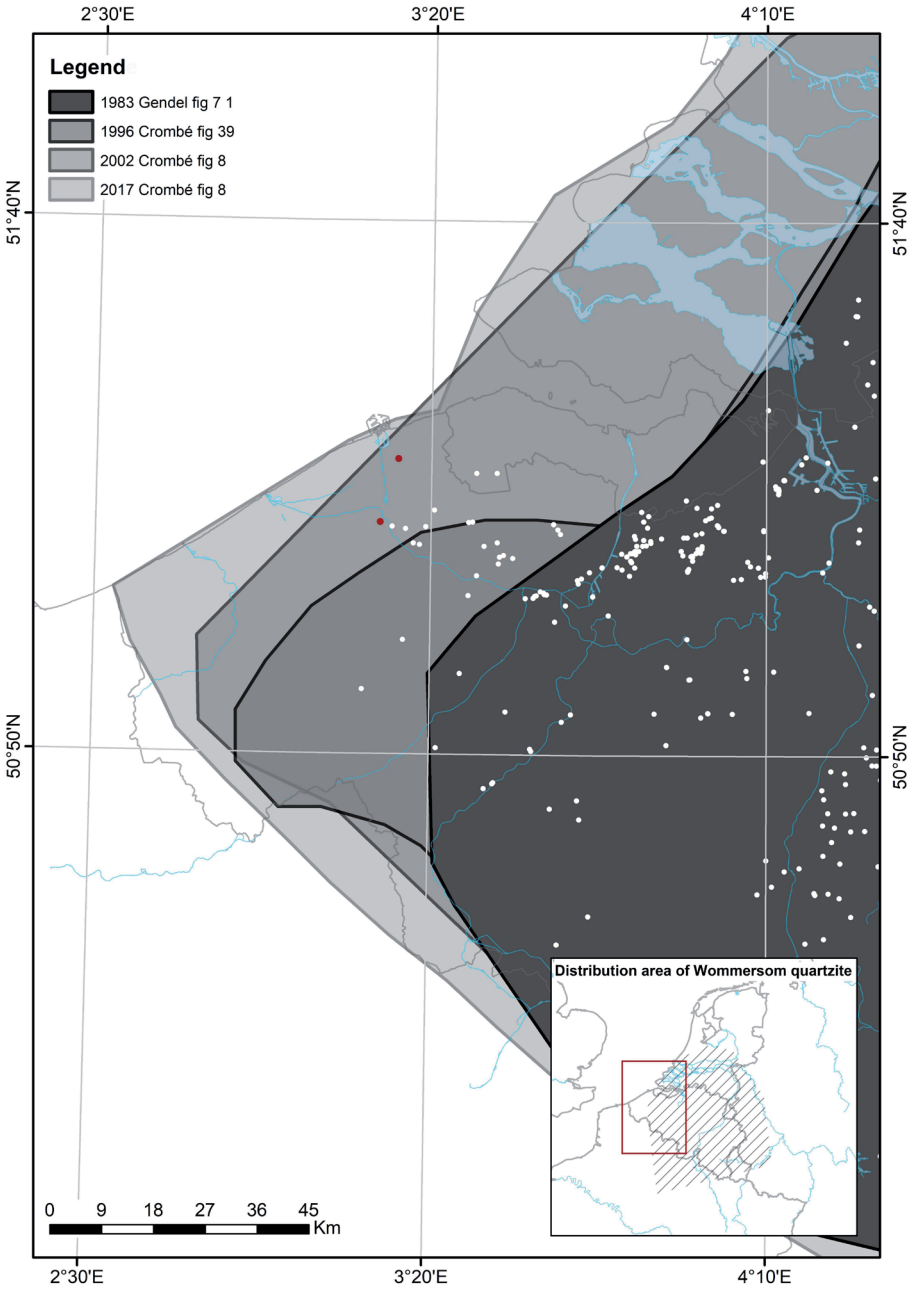

Fig. 6 – The western edge of the distribution of Wommersom quartzite. Red dots are Dudzele and Sint-Michiels; white dots are archaeological locations where this raw material was found. Inset map shows entire distribution area as currently known.

5. Conclusion

Instigated by lithic and spatial analyses of three recently discovered and partly excavated lithic artefact collections from the area of Bruges, this paper presented a brief overview of the currently known Mesolithic dataset in the operational range of *Raakvlak*, an area of ca. 600 km² situated in the extreme north-western part of Belgium. It was found that two artefacts made from Wommersom quartzite recovered in Dudzele and Sint-Michiels are amongst the westernmost occurrences, extending the distribution range of this raw material further in the direction of the present-day coastline. These new excavated locations, from surface and subsurface contexts, underline the potential of this area around Bruges for finding well-preserved prehistoric records, both at and (sometimes deeply buried) below the present-day surface. Despite a number of shortcomings, the surveys and excavations at these locations represent a first important step towards a more systematic investigation of the prehistoric record in an area where the amount of prehistoric data so far has been limited. Highly threatened and at the same time difficult to detect, this regional prehistoric record that is part of the southern North Sea basin -a vast area characterised by a varied and complex environmental evolution with a large but still largely obscure and unexplored prehistoric potential- requires adapted survey strategies. Such strategies should have a multi-phased character and in the first place focus on an assessment of local topographic conditions and soil preservation by means of geophysical survey and/or augering, followed by detailed archaeological auger sampling with a sufficient resolution in order to be able to systematically and reliably detect and assess prehistoric landscapes and (clustered) artefact distributions. The inventory of known Mesolithic locations reveals the poor and biased nature of the current dataset which in part can be explained by the presence of

old (sometimes debated) surface collections, but also reflects the limited application of such invasive research methods, either to assess these surface collections or to detect buried remains. In this regard it is interesting to note that the Mesolithic record, despite its long duration, currently represents less than 1 % of all known archaeological sites in this area. Carefully excavated datasets, characterized by a complete recovery of the artefact assemblages combined with a detailed recording of their contexts, are still missing. Yet, such investigations are a prerequisite to gain reliable insights into human behaviour during the Mesolithic. Therefore, there is an urgent need to further apply and intensify adequate survey, excavation and post-excavation approaches, an issue that unfortunately also applies to many other areas in Flanders where the prehistoric record is threatened or destroyed as a result of present-day human activities without proper investigation or assessment. The studies at Dudzele, Koolkerke and Sint-Michiels, reported in this paper, represent some of the first, small but important steps to further raise this awareness for the *Raakvlak*-area.

Bibliograhy

https://cai.onroerenderfgoed.be

BORREMANS M., 2015. Cenozoïcum: het Quartair. In: Borremans M. (ed), *Geologie van Vlaanderen*, Academia Press, Gent: 189-258.

CROIS R., 1959. Voorhistorische woonplaatsen te Steenbrugge. *Biekorf*, 60: 181-184.

CROMBÉ P., 1996. *Epipaleolithicum en vroeg- en midden-Mesolithicum in Zandig Vlaanderen. Bijdrage tot de studie van de typochronologie en nederzettingsstructuur.* PhD-dissertatie, Universiteit Gent, Gent.

CROMBÉ P., 1998. *The Mesolithic in Northwestern Belgium. Recent Excavations and Surveys.* British Archaeological Reports (BAR), International Series, 716, Archaeopress, Oxford.

CROMBÉ P., 2002. Quelques réflexions sur la signification de la variabilité des industries lithiques mésolithiques de Belgique. In: Otte M. & Kozłowski J. K. (ed.), *Préhistoire de la Grande Plaine du Nord de l'Europe. Les échanges entre l'Est et l'Ouest dans les sociétés préhistoriques. Actes du Colloque Chaire Francqui Interuniversitaire au titre étranger (Université de Liège, 26 juin 2001)*, Université de Liège, Liège, ERAUL, 99: 99-114.

CROMBÉ P., 2017. Abrupt cooling events during the Early Holocene and their potential impact on the environment and human behaviour along the southern North Sea basin (NW Europe). *Journal of Quaternary Science*, 33(3): 353-357.

CRUZ F., DE BRANT R., HUYGHE J., LALOO P., LAMBRECHT G., LOMBAERT L., NOENS G., MIKKELSEN J. & VERWERFT D., 2013. *Archeologische prospectie zonder ingreep in de bodem op het Stevin-project (Brugge/Damme). RAAKVLAK/*Gate, Brugge.

DE CLERCQ M., 2018. *Drowned landscapes of the Belgian Continental Shelf: implications for northwest European landscape evolution and preservation potential for submerged heritage*. Ph.D., Universiteit Gent, Gent.

DE MAERE D'AERTRYCKE M., 1907. Quelques stations néolithiques découvertes dans la Flandre occidentale. *Annales de la Fédération Archéologique et Historique de Belgique*, 20: 145-152.

DE MAERE D'AERTRYCKE M., 1911. Anciens et nouveaux emplacements de populations néolithiques en Westflandre. *Annales de la Société d'Émulation de Bruges*, 61: 330.

DE MAERE D'AERTRYCKE M., 1912. Stations préhistorique de la ligne de faîte Ichteghem-Zedelghem. *Annales de la Société d'Emulation de Bruges*, 62: 102.

DEVOS D., 1984. *Archeologisch onderzoek in de gemeente St.-Michiels: prospectie - analyse - synthese*. Onuitgegeven licentiaatsverhandeling, RUG, Gent.

GENDEL P., 1982a. The distribution and utilization of Wommersom Quartzite during the Mesolithic. In: Gob A. & Spier F. (ed.), *Le Mésolithique entre Rhin et Meuse. Actes du Colloque sur le Paléolithique final et le Mésolithique dans le Grand-Duché de Luxembourg et dans les régions voisines (Ardenne, Eifel, Lorraine), tenu à Luxembourg, le 18 et 19 mai 1981*, Luxembourg: 21-50.

GENDEL P., 1982. An analysis of stylistic variation in some late Mesolithic assemblages from northwestern Europe. *Bulletin de la Société Royale Belge d'Anthropologie et de Préhistoire*, 93: 51-62.

GENDEL P., 1983. *Mesolithic social territories in northwestern Europe*. PhD-dissertatie, University of Wisconsin-Madison, Madison

GENDEL P., 1984. *Mesolithic social territories in Northwestern Europe*. British Archaeological Reports (BAR), International Series, 218, Archaeopress, Oxford.

GENDEL P., 1987. Socio-stylistic analysis of lithic artifacts from the Mesolithic of Northwestern Europe. In: Rowley-Conwy P., Zvelebil M. & Blankholm H. P. (ed.), *Mesolithic Northwest Europe: Recent Trends*, Sheffield: 65-73.

GENDEL P., 1989. The analysis of lithic styles through distributional profiles of variation: examples from the European Mesolithic. In: Bonsall C. (ed.), *The Mesolithic in Europe. Papers presented at the Third International Symposium. Edinburgh*, 1985, Edinburgh: 40-47.

GILLÈS DE PELICHY C., 1893. Découverte de quatre stations préhistoriques et de deux cimetières francs aux environs de Bruges. *Annales de la Société d'archéologie de Bruxelles*, 7: 258-270.

GILLÈS DE PÉLICHY C., 1897. Les stations préhistoriques de la Flandre Occidentale. *Annales de la Fédération Archéologique et Historique de Belgique*, 11: 28-37.

GILLÈS DE PÉLICHY C., 1903. Les formes spéciales remarquées dans l'outillage des stations néolithiques de la Flandre occidentale peuvent-elles servir de base à un essai de classification ? *Annales de la Fédération Archéologique et Historique de Belgique*, 16: 204-207.

HAMAL-NANDRIN J. & SERVAIS J., 1913. Étude sur le Limbourg belge préhistorique (Âges de la Pierre). *Annales de la Fédération Archéologique et Historique de Belgique*, 23: 3-27.

HERREMANS D. & CROMBÉ P., 2017. *De Schelde. Stroom in verandering. Mens, landschap en klimaat van de prehistorie tot nu*. Snoeck Publishers, Gent.

HILLEWAERT B., 2003. Verslag van de prospectie aan de Boomgaardstraat in Brugge. *Raakvlak*, Dossier nr. 03/01.

INIZAN M.-L., REDURON-BALLINGER M., ROCHE H. & TIXIER J., 1999. *Technology and terminology of knapped stone*. Préhistoire de la pierre taillée, CREP, Nanterre.

IN 'T VEN I., HOLLEVOET Y., HILLEWAERT B., VANMONTFORT B. & ERVYNCK A., 2005. *DW5: Brugge/Dudzele - Landslag Oost 2*. In: In 'T Ven I. (ed.), *Een lijn door het landschap. Archeologie en het VTN-project 1997-1998*: 45-49.

MATHYS M., 2009. *The Quaternary geological evolution of the Belgian continental shelf, Southern North Sea*. PhD, Universiteit Gent, Gent.

NOENS G., 2004. *Brugge-Sint-Michiels–'Ten Boomgaarde': onderzoek van de lithische artefacten*. Intern rapport.

NOENS G., 2013. Analyse intra-site de gisements du Mésolithique ancien de la Flandre sableuse: l'exemple de Doel-"Deurganckdok J/L", C3. In: Valentin B. *et al.* (ed.), *Palethnographie du Mésolithique. Recherches sur les habitats de plein air entre Loire et Neckar. Actes de la table ronde internationale de Paris, 26 et 27 novembre 2010*, Société préhistorique française, Paris: 217-234.

NOENS G. & SERGANT J., 2018. *Dudzele–Zonnebloemweg, Koolkerke–Arendstraat, Sint-Michiels–Barrièrestraat. Lithische en ruimtelijke analyse van drie opgegraven steentijdvindplaatsen met resten uit het Mesolithicum*. In het werkingsgebied van *Raakvlak*, Gate, Bredene.

NOENS G. & VAN BAELEN A., in voorbereiding. *Mapping the archaeological spatial distribution of Wommersom quartzite in the RMS-area*.

PELEGRIN J., 1984. Systèmes expérimentaux d'immobilisation du nucléus pour le débitage par pression. In: Tixier J. (ed.), *Économie du débitage laminaire: technologie et expérimentation. IIIe table ronde de technologie lithique*, Meudon-Bellevue, octobre 1982: 105-116.

PERDAEN Y., 2004. *De lithische technologie in het Finaal-Paleolithicum en Vroeg-Mesolithicum. Een studie aan de hand van enkele recent opgegraven vindplaatsen in de Wase Scheldepolders*. Proefschrift ter verkrijging van de graad van Doctor in de Archeologie, Universiteit Gent, Gent.

PERDAEN Y. & NOENS G., 2011. The social organization of technology. An early Mesolithic case study from the Low Countries. *Lithic Technology*, 36(2): 165-176.

PERDAEN Y., CROMBÉ P. & SERGANT J., 2009. The use of quartzite as a chrono-cultural marker in the Mesolithic cultures of the Low Countries. In: Sternke F., Eigeland L. & Costa L.-J. (ed.), *Non-flint material use in prehistory. Old prejudices and new directions. Proceedings of the XV UISPP World Congress, Lisbon. 4-9 September 2006. Session C77*, Archaeopress, Oxford: 217-224.

PIETERS M., DEMERRE I., LENAERTS T., ZEEBROEK I., DE BIE M., DE CLERCQ W., DICKINSON B. & MONSIEUR P., 2010. De Noordzee: een waardevol archief onder water. Meer dan 100 jaar onderzoek van strandvondsten en vondsten uit zee in België: een overzicht. *Relicta. Archeologie, Monumenten- en Landschapsonderzoek in Vlaanderen*, 6: 177-218.

RYSSAERT C., DEGRYSE J., TYS D., BAETEMAN C., ORBONS J., PYPE P., TERMOTE D. & GERMONPREZ D., 2010a. *Archeologische evaluatie en waardering van de circulaire structuur van Ver-Assebroek (gemeente Brugge, provincie West-Vlaanderen)*. Sijsele.

RYSSAERT C., DEGRYSE J., TYS D., BAETEMAN C., ORBONS J., PYPE P., TERMOTE D., GERMONPREZ D. & PERDAEN Y., 2010b.

Steentijdvondsten te Ver-Assebroek (Brugge, West-Vlaanderen): hoe het onderzoek van een middeleeuws kasteel naar een steentijdlandschap kan leiden. *Notae Praehistoricae*, 30: 43-48.

ROBINSON E., 2010. *Cultural transmission of the Neolithic in Northwest Europe: a critical study*. PhD-dissertatie, University of Sheffield, Sheffield.

SOERS K., 1985. *Archeologisch onderzoek in de gemeente Assebroek*. Onuitgegeven licentiaatsverhandeling, RUG, Gent.

SOERS K., 1987. *Assebroek*. Archeologisch Inventaris Vlaanderen, Gent.

TSIRK A., 2010. Popouts and related fractures. *Lithic Technology*, 35(2): 149-170.

TSIRK A., 2014. *Fractures in knapping*. Archaeopress, Oxford.

VAN ACKER R., 1985. *Studie van de prehistorische bewoning in het oosten van Brugge aan de hand van de lithische artefacten*. Onuitgegeven licentiaatsverhandeling, KUL, Leuven.

VAN ACKER R., 1986. Prehistorische vondsten ten oosten van Brugge. In: West-Vlaamse Archaeologica, *Jaarboek uitgegeven door de Vereniging voor Oudheidkundig Bodemonderzoek in West-Vlaanderen*, 2(3): 91-103.

VANDERMOERE N., 1981. *Archeologisch onderzoek in de gemeente Oedelem*. Onuitge-geven licentiaatsverhandeling, RUG, Gent.

VANDERMOERE N., 1983. Prehistorie te Oedelem. *Jaarboek van de Heemkundige Kring Bos en Beverveld*, 16: 22-31.

VAN LANCKER V., DERONDE B., DE VOS, K., FETTWEIS M., HOUTHUYS R., MARTENS C. & MATHYS M., 2015. Kust en Zee. In: Borremans M. (ed.), *Geologie van Vlaanderen*, Academia Press, Gent: 340-408.

VANMOERKERKE J. & VAN VLAENDEREN L., 1985. De verspreiding van het Wommersomkwartsiet in West-België in het Mesolithicum. *VOBOV [Verbond voor Oudheidkundig Bodemonderzoek in Oost-Vlaanderen]-info* 18/19: 1-6.

VERWERFT D., LAMBRECHT G., MIKKELSEN J. H., ALLEMEERSCH L. & DECRAEMER S., 2012a. Resultaten archeologisch booronderzoek A11: Zonnebloemweg, Dudzele. *RAAKVLAK*, Brugge.

VERWERFT D., LAMBRECHT G. & MIKKELSEN J. H., 2012b. Op de rand van het prehistorisch landschap? Een vermoedelijk finaal-paleolithische context in Sijsele, Damme (West-Vlaanderen, B). *Notae Praehistoricae*, 32: 205-2012.

VERWERFT D., ROELENS F., LAMBRECHT G., HUYGHE J., MIKKELSEN J. H., ALLEMEERSCH L. & DEFORCE K., 2014. *Zonnebloemweg, Dudzele (Brugge) – Evaluatienota naar aanleiding van de archeologische opgraving*. AardeWerk. Brugge.

VERWERFT D., ROELENS F., LAMBRECHT G., HUYGHE J. & MIKKELSEN J. H., 2015a. *Arendstraat, Koolkerke (Brugge)*. AardeWerk, Brugge.

VERWERFT D., LAMBRECHT, G. HUYGHE J. & MIKKELSEN J. H., 2015b. Op de rand van het prehistorisch en middeleeuws landschap: het archeologisch onderzoek langs de Gentse Steenweg in Sijsele (Damme, West-Vlaanderen. *West-Vlaamse Archaeologica. Jaarboek uitgegeven door de Vereniging voor Oudheidkundig Bodemonderzoek in West-Vlaanderen*, 25: 83-101.

VERWERFT D., MIKKELSEN J. H., HILLEWAERT B., LAMBRECHT G., ROELENS F., HUYGHE J. & DECRAEMER S., 2016. Steentijd onder de polderklei – Archeologisch onderzoek van prehistorische resten in de oostelijke kustvlakte. *De Grote Rede*, 45: 15-23.

VERWERFT D., HUYGHE J., ROELENS F., LAMBRECHT G. & MIKKELSEN J. H., 2018a. *Barrièrestraat, Sint-Michiels (Brugge): archeologisch vooronderzoek met ingreep in de bodem (bureauonderzoek, veldprospectie, landschappelijk en archeologisch bodemonderzoek en proefsleuven-onderzoek)*. AardeWerk, Brugge.

VERWERFT D., HUYGHE J., ROELENS F., LAMBRECHT G. & MIKKELSEN J. H., 2018b. *Barrièrestraat, Sint-Michiels (Brugge): opgraving*. AardeWerk, Brugge.

Abstract

This paper presents the results of the analyses of three recently discovered and partly excavated lithic collections from Dudzele, Koolkerke and Sint-Michiels. Instigated by these discoveries, a brief overview of the Mesolithic dataset in the extreme north-western part of Belgium is provided, as well as a discussion of the westernmost distribution of Wommersom quartzite, represented by some artefacts in two of the studied collections. Despite the poor and biased nature of the current dataset from the area around Bruges, it is argued that this part of the southern North Sea basin has a large potential for finding well-preserved Mesolithic (and Palaeolithic) records, both at and (sometimes deeply buried) below the present-day surface, provided that adequate survey and excavation strategies are being applied. The investigations of these three sites forms a first important step towards a more systematic investigation of the prehistoric record in an area that is characterised by a varied and complex environmental evolution with a large but still largely obscure and unexplored prehistoric potential.

Keywords: Dudzele "Zonnebloemweg", Koolkerke "Arendstraat", Sint-Michiels "Barrièrestraat", municipality of Bruges, Prov. of West Flanders (BE), Mesolithic, survey, excavation, Wommersom Quartzite, refitting.

Résumé

Cet article présente les premiers résultats des analyses lithiques de trois gisements préhistoriques récemment découverts et fouillés dans le nord-ouest de la Belgique (Dudzele, Koolkerke et Sint-Michiels). Suite à ces découvertes récentes un aperçu de la base des connaissances actuelles du Mésolithique dans cette région autour de Bruges est fourni. En plus, la distribution occidentale du grès-quartzite de Wommersom, rencontré dans deux de ces collections, est abordée. Malgré la pauvreté des connaissances actuelles du Mésolithique dans cette partie du bassin de la Mer du Nord, le potentiel de la découverte des restes préhistoriques bien conservés, à la fois au-dessus et en-dessous de la surface actuelle, est souligné, à condition qu'on utilise des stratégies de prospection et de fouille efficaces. Bien que limitées, les recherches de Dudzele, Koolkerke et Sint-Michiels représentent une première tentative d'une recherche plus systématique des restes préhistoriques dans une région de grand potentiel préhistorique qui est caractérisée par son évolution environnementale complexe.

Mots-clés : Dudzele « Zonnebloemweg », Koolkerke « Arendstraat », Saint-Michel-lez-Bruges « Barrièrestraat », commune de Bruges, Prov. de Flandre-Occidentale (BE), Mésolithique, prospection, fouilles, Grès-quartzite de Wommersom, remontages.

Samenvatting

Dit artikel presenteert de resultaten van een lithische studie van drie recent ontdekte en deels opgegraven vindplaatsen uit Dudzele, Koolkerke en Sint-Michiels en geeft op basis hiervan een actueel overzicht van het gekende mesolithische databestand in de noordwestelijke uithoek van België. Daarnaast biedt het een discussie over de meest westelijke verspreiding van Wommersomkwartsiet, aangezien enkele artefacten uit deze grondstof werden aangetroffen in twee van de bestudeerde collecties. Ondanks de beperkte kwaliteit van het huidige Mesolithische databestand in deze regio wordt beargumenteerd dat dit deel van het zuidelijke Noordzee-bekken een groot potentieel bezit voor het aantreffen van goed bewaarde prehistorische bestanden, zowel aan als (soms diep) onder het huidige loopoppervlak, mits gebruik wordt gemaakt van adequate prospectie- en opgraafstrategieën. De uitgevoerde onderzoeken op bovenvermelde vindplaatsen vormen een eerste, belangrijke stap naar een meer systematische benadering van het steentijdbestand in een gebied dat gekenmerkt wordt door een complexe landschappelijke evolutie en een groot, maar vooralsnog grotendeels obscuur gebleven, prehistorisch potentieel.

Trefwoorden: Dudzele "Zonnebloemweg", Koolkerke "Arendstraat", Sint-Michiels "Barrièrestraat", gemeente Brugge, prov. West-Vlaanderen (BE), Mesolithicum, prospectie, opgravingen, Wommersomkwartsiet, refitting.

Gunther NOENS
Joris SERGANT
Ann VAN BAELEN
GATE bvba
Dorpstraat, 73
BE – 8450 Bredene
gunther.noens@gatearchaeology.be
joris.sergant@ gatearchaeology.be

Dieter VERWERFT
Jari H. MIKKELSEN
IOED Raakvlak
Komvest, 45
BE – 8000 Brugge
dieter.verwerft@brugge.be
jari.mikkelsen@brugge.be