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An early Middle Palaeolithic site at Kesselt-*Op de Schans* (Belgian Limburg) Preliminary results

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Abstract

Recent research at the loam quarry Kesselt - *Op de Schans* led to the discovery of 3 small clusters of lithic artefacts, scattered on the same old landsurface. Based on their position within the local chronostratigraphic sequence they can be attributed to the transition MIS-9/MIS-8. The geomorphological evidence suggests comparatively fast sedimentation rates, resulting in a very good preservation of the lithic material. All three assemblages exemplify a very *ad hoc* fashion of the spatial organisation of production activities.

Keywords: early Middle Palaeolithic, MIS-9/MIS-8, Meuse basin, 3 clusters of lithic artefacts, Kesselt, Prov. of Limburg (B).

1. Introduction

A survey in the loam quarry of Kesselt - *Op de Schans* in the summer of 2006 by J.-P. de Warrimont and M. Klasberg led to the discovery of 3 lithic artefacts which, after further test pit investigation, seemed to be associated with a certain amount of chips in what then appeared to be a pedogenetic horizon. As a result of these findings an excavation campaign was set up by the Prehistoric Archaeology Unit of the K.U.Leuven in collaboration with the Flemish Heritage Institute (VIOE), and took place from May till September 2007.

The site is located in the brickyard quarry Kesselt-*Op de Schans*[1], community of Kesselt (Lanaken), Belgian Limburg (figs 1 and 2) along the Albert canal, exploited by Vandersanden N.V. The same quarry was the scene of archaeological excavations in 2001 (not yet published) and in 2005 (Vroomans *et al.*, 2006[2]), when Middle Palaeolithic artefacts were recovered higher up the stratigraphic sequence. In the past, investigations at Veldwezelt-*Hezerwater* (Vanmontfort *et al.*, 1998; Bubel *et al.*, 1999; Bringmans, 2006a, 2006b; Bringmans *et al.*, 1999-2000, 2000, 2001), at Kesselt (along the western side of the Albert canal; Lauwers & Meijs, 1985) and at Maastricht-*Belvédère* (Roebroeks, 1988; De Loecker, 2006 and references therein) already demonstrated the presence of Middle Palaeolithic occupations in the immediate neighbourhood.

By removing all loam deposits on top, the continuing quarry exploitation exposed from time to time new parts of the level to which the first artefacts (belonging to a concentration in the eastern part of the quarry, named ODS 1) could be ascribed. Hence different survey strategies could easily be employed in order to evaluate the presence of possible additional concentrations associated with the same stratigraphic unit in the newly exposed areas.

A survey, in the form of field walking, led to the discovery by H. Spronck of a second cluster (ODS 2), positioned in the south-western corner of the quarry, which, due to bad weather, could only be partly excavated this season. 29 Test pits of 1 m^2 were dug to the east of concentration ODS 1, but this was considered not to be the most efficient survey strategy. Controlled drillings at regular distances in the western and north-western quarry sector, using an Edelman auger (Ø 20 cm), revealed the presence of a third scatter (ODS 3) in this region.

During the 2007 excavation campaign a total of 119 m^2 was excavated by manual shovelling in units of one square meter. Each individual artefact was recorded three-dimensionally using a total station. Systematic wet-sieving through meshes of 2 and 3 mm enabled us to recuperate the smallest fraction of finds, showing the presence of a great amount of chips at all tree concentrations.

In this article the preliminary results of this year's excavation campaign are presented. Firstly a pedolithological and stratigraphical description is given, together with their implication for the dating of the archaeological assemblages. Secondly a general picture of the lithic material (distribution and character) is given, alongside some prospects for future research.

[1] Latitude 50° 50' 26" N; Longitude 5° 38' 23" E (ODS 1).

[2] Although otherwise suggested in the publication of the 2005 campaign, the correct administrative name for this site's location is Kesselt - *Op de Schans* (instead of Veldwezelt - *Op de Schans*). Therefore this site will be formally renamed in the future.

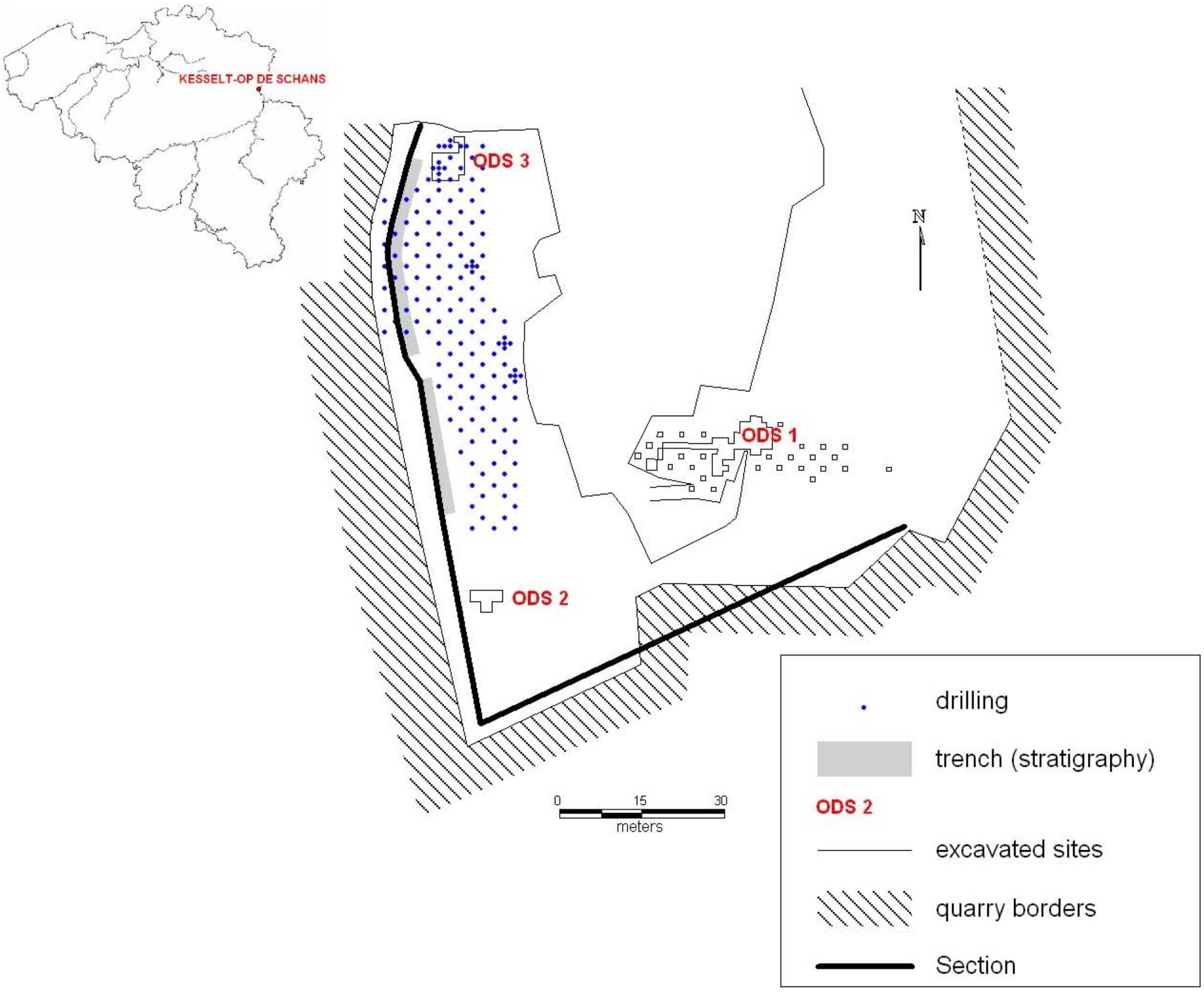

Fig. 1-2 – Location of the site and map of the brickyard quarry Kesselt - *Op de Schans*.

2. *Preliminary results*

2.1. *Pedolithological and stratigraphical description*

The lithic artefact clusters are situated on the floor of the Vandersanden brickyard quarry, around 10 meters beneath the surface (fig. 3). While contained in the same stratigraphic unit, the elevation of cluster ODS 3 is *ca*. 1.5 m higher than that of ODS 1 and 2.

The present landscape forms an interfluvium at around 93 meters + OL (Oostende Level) between the *Hezerwater* brooklet in the North and the *Vroenhovenwater* brooklet in the South.

On the floor of the quarry two trenches of three meters deep were dug to unveil more of the subsurface.

Long-standing lithostratigraphical research in a wider area around the Kesselt - *Op de Schans* quarry allowed the construction of a stratigraphical framework (Meijs, 2002), based on the presence of characteristic marker horizons, in combination with heavy mineral analysis of the loess fraction (% green amphibole). This framework was then chronostratigraphically correlated with river terrace sequences (van den Berg, 1996; Antoine, 1998; Schirmer, 2000), ice isotope temperature and dust sequences (Petit *et al.*, 1999), pollen sequences (Reille *et al.*, 1998) and marine isotope ice-volume sequences (Bassinot *et al.*, 1994).

The result is a chronostratigraphical framework with which the stratigraphic units observed during this year's campaign could be correlated. The sequence starts with the oldest so-called E-loess, originating from Marine Isotopic Stage 12 (MIS-12) after the development of the brownish Dousberg luvisol in MIS-13 (the Dousberg luvisol is often truncated by a distinct gravel lag). In this E-loess the characteristic brown-red Pottenberg luvisol (often truncated by a distinct gravel lag) has developed in MIS-11.

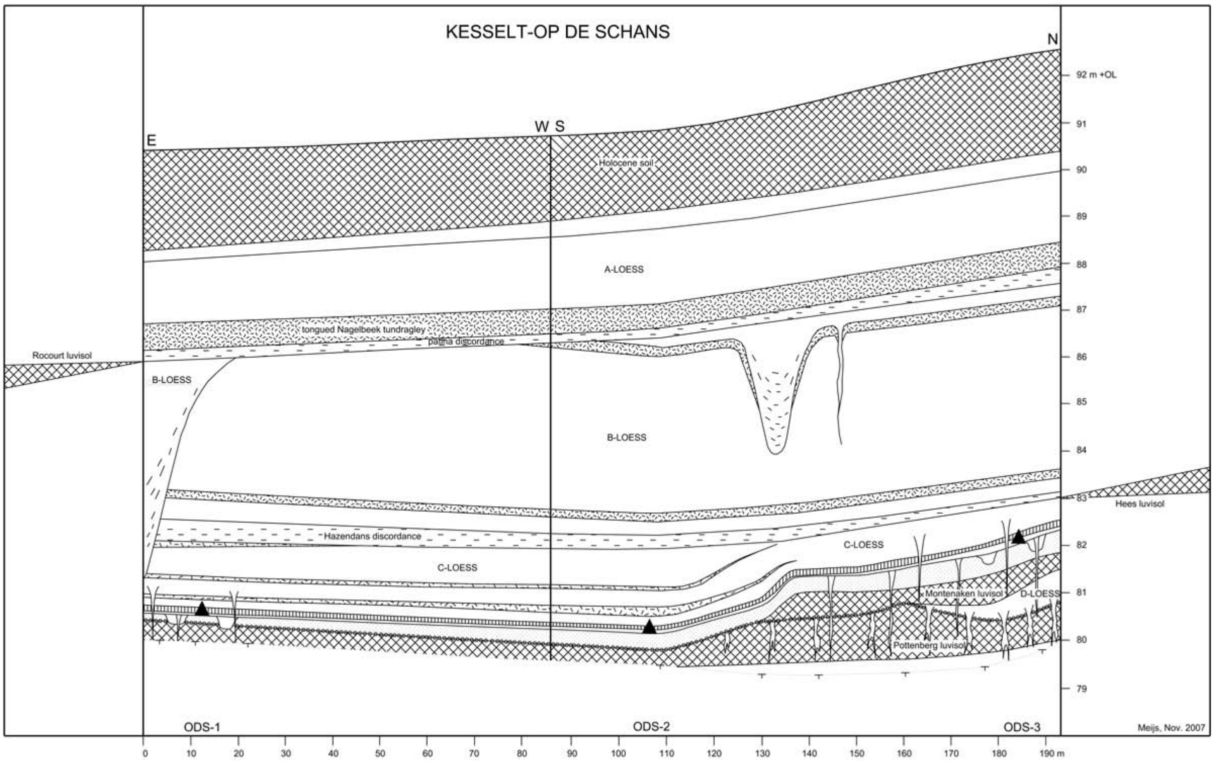

Fig. 3 – Vertical section at Kesselt-*Op de Schans*.

This clayey brown-red mottled luvisol with an erosional gravel lag on top, comprising gravels with a maximal diameter of 25 cm, could be identified in the sequence beneath ODS 3. Above this palaeosol a packet of 50 cm brown-yellowish sandy loess is present. From this level a vast polygonal network with broad fossil ice-wedge casts penetrates into the Pottenberg luvisol (wedges are until 40 cm wide and 2 m deep). The sequence continues with a 50 cm thick homogeneous gray-brown sandy loess and another 50 cm of stratified sandy-loamy sediments, with sand layers and some individual gritty layers (consisting of washed soil material and sesquioxides). In this sandy loess (corresponding with the D-loess from the chronostratigraphic framework; MIS-10), on top of the Pottenberg luvisol, a second red brown luvisol (identified as the Montenaken luvisol) was developed during MIS-9, with a pronounced 50 cm thick white greyish sand layer on top of it, showing little signs of in between erosion[3]. From the middle part of this sand layer, the underlying luvisol has been intensively pseudogleyed. From the upper part a polygonal network with narrow and deep fossil ice-wedge casts descends into the subsoil (wedges are until 30 cm wide and 3 m deep). Here also some former *in situ* tree roots are visible and some mixture with overlying sediments has occurred.

More south along the Albert canal near Vroenhoven/Riemst a thin podsol is present in the upper part of this white grayish sand deposit (15 cm thick; Vroenhoven podsol).

The sequences beneath ODS 1 and 2, which are less complete compared with the one from ODS 3, start with a truncated clayey brown-red mottled polygenetic luvisol (Pottenberg/Montenaken complex palaeosol), with an erosional gravel lag on top. Exceptionally these gravels have a diameter until 50 cm. At this level some isolated, mostly rolled and heavily patinated artefacts were recovered at ODS 1. On top few cm thick sandy yellowish sediment is present with randomly spread displaced sesquioxides.

In the above mentioned subsoil of ODS 1 and ODS 3 some elongated 1 to 3 meters wide depressions are present, which are interpreted as tree falls, originating from the top of the sandy yellowish sediment or the whitish sand layer. These tree fall depressions are filled up with white-greyish and yellowish washed sandy material, red burnt sediment and charcoal *laminae* and particles (the upper part of the filling is weakly

[3] Samples of this boundary were taken by Ghent University for micromorphological analysis. These results might shed some light on whether this white greyish sand layer can be considered as *in situ* leached sediment, or whether this consists of redeposited, perhaps windblown material.

humic). In ODS 1 the centres of these depressions often contain brown-reddish soil material and gravels, originating from the underlying complex Pottenberg/ Montenaken luvisol (which were released by the decaying roots of the fallen trees). Determination of the charcoal by K. Deforce (VIOE) revealed the presence of Pinus.

In ODS 3 these tree falls are visible by faint grayish discolorations, filled up with sand, washed red burnt sediment and charcoal *laminae* and particles.

The sedimentological sequence within the filled tree falls leads to the interpretation that a bush fire took place just before or after the formation of the tree falls. The precise order of these events still has to be established. The filling of these depressions was followed by a severe cold, leading to the formation of ice-wedges.

Sub-horizontally above the sandy yellowish sediment or the whitish sand layer and the tree falls infill (truncating the above mentioned fossil ice-wedge casts), a wide-spread centimetres thick sandy, weakly humic sediment is present, containing washed red burnt sediment material, charcoal *laminae* and particles as well as randomly scattered gravels (0.5-4 cm). Covering the entire former landscape, and thus observed at all three concentrations, this deposit was probably the result of sheet wash and gelifluction processes. To this level the artefacts of ODS 1, 2 and 3 can be assigned. Given the extensive presence of this deposit, not only attested at the Kesselt-*Op de Schans* quarry, but also alongside the Albert canal, and the good preservation of the associated lithic material, this level could potentially contain other lithic concentrations in the same stratigraphical position.

The observation that the first artefacts are generally encountered at the contact between this deposit and the overlying weak humic horizon, the fresh and unpatinated appearance of the artefacts, as well as the occurrence of a great amount of chips, especially at the centre of each concentration, leads us to conclude that the human activity should have taken place just after these solifuction/ gelifluction processes, at the onset of the following aeolian loess aggradation phase (*infra*; corresponding with the beginning of MIS-8). This implies that the artefacts from ODS1, 2 and 3 originate from the transition between MIS-9 and MIS-8, around 300 ka.

After this " human activity phase " a period started with aeolian loess accumulation (C-loess; MIS-8) on a landscape with steppe overgrowth, leading to the formation of a 10-15 cm thick homogeneous loamy syngenetical weak humic gray-brown horizon. Within this humic horizon no gravels or artefacts were found. At location ODS 3 a lot of fossil rodent digging holes (*krotowinas*) and beetle channels could be observed, starting from the humic horizon and the above lying 25 cm thick sandy loess.

On top of this sandy loess a very characteristic clayey loam (C-loess; MIS-8) is present, showing at its base and on top weak 10 cm thick tundragley horizons. Above 75 cm of loess is present, topped by another weak tundragley.

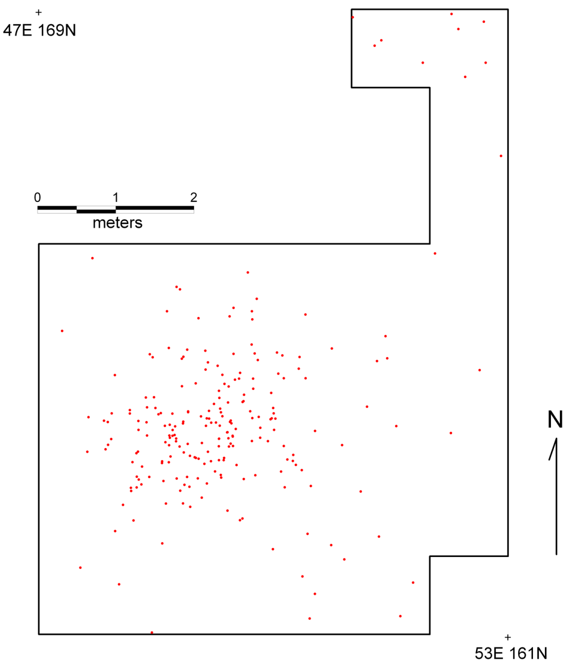

Fig. 4 – Horizontal distribution of the artefacts with 3D-registration at ODS 3.

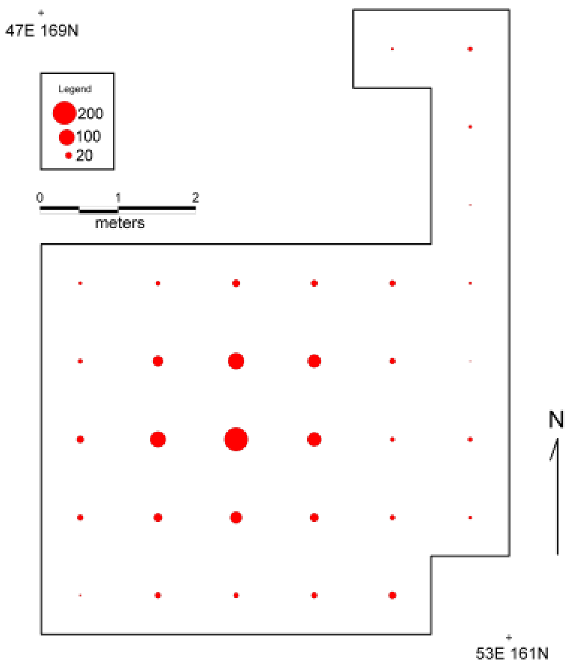

Fig. 5 – Distribution of all artefacts (per m²) at ODS 3.

Especially at location ODS 1 a vast polygonal network with fossil ice-wedge casts descends into the subsoil from the middle of this clayey loess (wedges are until 25 cm wide and 1.5 m deep).

In this C-loess the complex Hees luvisol was formed during MIS-7. This Hees luvisol could not be observed in this part of the *Op de Schans* quarry, because of the rigorous wind/water-erosion period within the cold MIS-6 (" *Hazendans-discordance* "), which almost always eroded the underlying C-loess and accompanying Hees luvisol.

This observed erosion/deflation layer contains some small gravels, gritty sediment and occasionally some patinated displaced artefacts. A polygonal network with fossil ice-wedge casts penetrates from this erosion level into the subsoil (wedges are until 10 cm wide and 1.5 m deep). An older polygonal network with broad fossil ice-wedge casts, penetrating into the C-loess (and at other locations penetrating into the complex Hees luvisol and the underlying C-loess), is also truncated by the Hazendans discordance (wedges are until 30 cm wide and 2 m deep).

The overlying calcareous sequence is identical to the described sequence of the adjacent Nelissen brickyard quarry in Kesselt on the over side of the Albert canal (Meijs, 2002). However in the Kesselt-*Op de Schans* quarry only the two lowermost tundragleys are present. Just from above the second tundragley a broad polygonal network with large fossil ice-wedge casts penetrates into the subsoil (wedges are 60 cm wide and 3.5 m deep). The upper three tundragleys are missing because they were sub-horizontally eroded by a vast and wide spread wind deflation horizon, just beneath the tongued " Horizon of Nagelbeek "-tundragley (the so-called " *patina-discordance* ").

A vigorous water-erosion period at the end of MIS-6 eroded again much of the accumulated B-loess and created large valleys in the former landscape. Only within these ancient valleys the Rocourt pedocomplex (MIS-5) and the overlying A-loess of MIS-4 and MIS-3 have been preserved for the later widespread wind-erosion at the beginning of MIS-2 (" *patina-discordance* ").

The base of the patina-discordance contains some small gravels and occasionally some wind-varnished displaced artefacts. Above the typical Brabant loess (A-loess; MIS-2) is present, in which the Holocene luvisol has developed (MIS-1).

2.3. The lithic assemblages

2.3.1. Artefact distribution

Both clusters ODS 1 and 3 are characterized by the same restricted horizontal distribution (*ca*. 5 m diameter) (figs 4 and 5). A similar horizontal artefact spread might be expected for ODS 2. Additionally, all 3 concentrations display a density, with a maximum of *ca*. 200 pieces (including all chips) per m^2 in the centre of the concentration.

Some differences can be observed between the concentrations in terms of the vertical displacement of the artefacts. At ODS 3 the vertical spread of the lithic material seems to be larger in comparison with the two other clusters. This discrepancy can be associated with local lithological differences, *i.e.* the very sandy character of the deposit containing the artefacts in the north-western part of the quarry, in contrast to the more loamy character of this level at the other locations.

The remarkable freshness of the lithic material, the presence of a large amount of small debitage products, the identical stratigraphic position of the assemblages, and the fast sedimentation rates for the cover (based on its aeolian character (*supra*) and the fact that no erosion discordances could be observed) indicate a possible contemporaneity for the different assemblages, scattered on the same old landsurface, after which the lithic material underwent some vertical displacement.

2.3.2. General character of the lithic assemblages

All three concentrations display a remarkable homogeneity. They are characterised by a specific type of raw material and the assemblages almost entirely consist of debitage products. Only one formal tool (a broken double side scraper) was found in connection with the ODS 1 concentration.

The majority of artefacts (fig. 6:4 and 6:6) from concentration ODS 1 is made of a coarse grained light grey to white flint. Other types of raw material are rare. Debitage seems to be characterised by a limited preparation of the striking platforms: most flake butts are dihedral or plain. One discoidal core was found. Remarkable is the high degree of fragmentation of the pieces and the presence of some burnt/heated artefact fragments. This would imply the occurrence of a second fire.

A fine grained dark grey to black flint type with light grey inclusions forms the raw material used at ODS 2. Cortex is moderately rolled. Most debitage products (fig. 6:3 and 6:7), *i.e.* flakes and a few blades, are comparatively small, but some of them exhibit well prepared butts (type *chapeau de gendarme*) alongside some dorsal preparation near the butt (crushed butt edge). Plain butts seem to be limited in number. Refitting shows that at least two cores and one core fragment were part of the same reduction sequence, in which a larger volume of raw material was successively divided into smaller units. This illustrates the use of a sophisticated discoid technology.

At ODS 3 again a coarse grained light blue/greyish silex is exploited. Cortex is rolled and many pieces show the result of (posterior) frost damage. The size of the debitage products (fig. 6:1-2 and 6:5) suggests the reduction of a larger volume of raw material, compared to the other two concentrations. Striking platforms are seldom prepared. One core displays in its final reduction stage some characteristics of Quina debitage (Bourguignon, 1998: 249-254).

Situated in the flint-rich Meuse basin, local nodules of differing quality seem to have been collected and utilized as raw material in a very *ad hoc* fashion. The use of comparatively high quality raw material at ODS 2 can be related to the application of a more sophisticated technology.

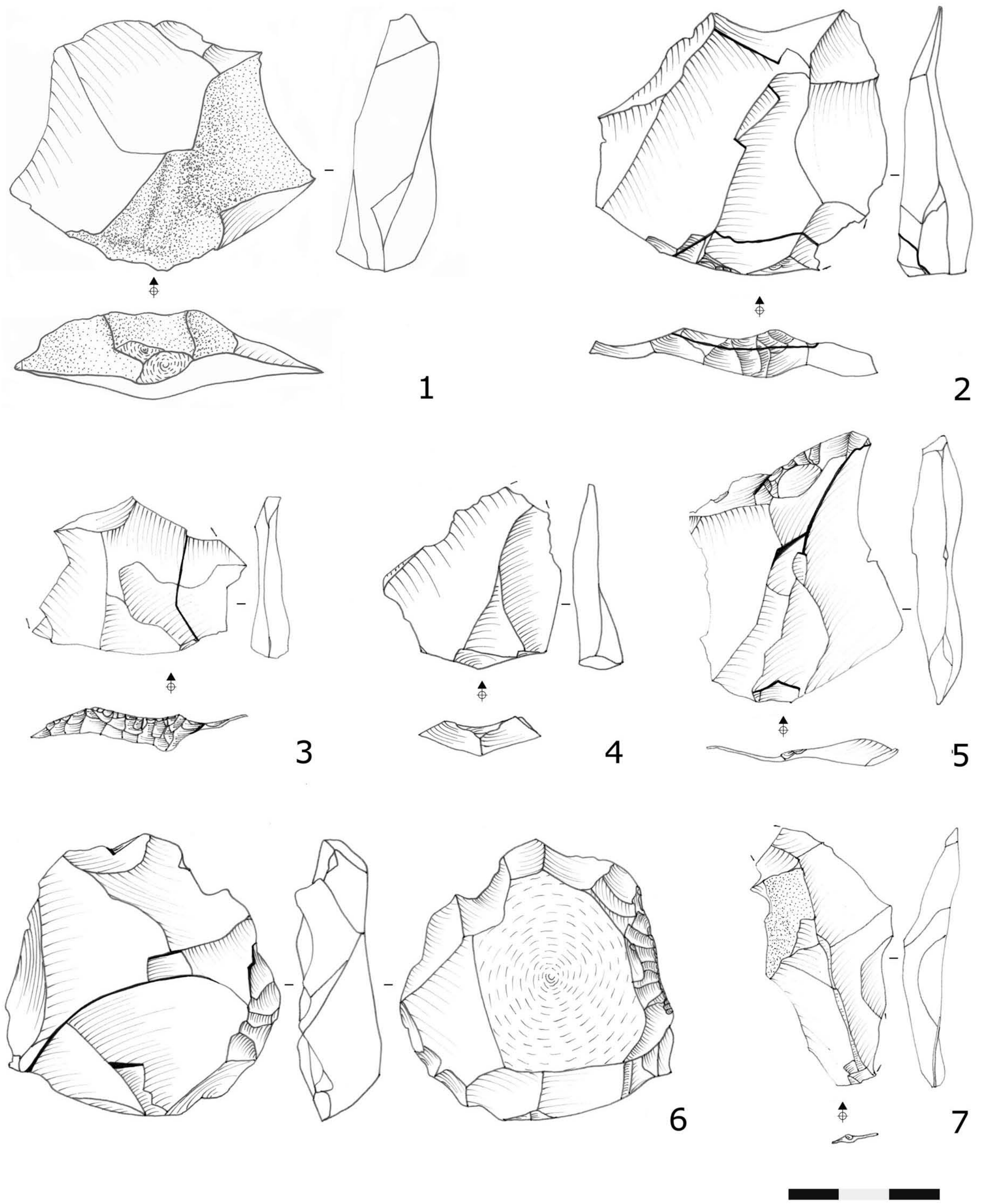

Fig. 6 – Lithic material from Kesselt-*Op de Schans*. 1, 2, 5: ODS 3; 3, 7: ODS 2; 4, 6: ODS 1.

The current data, such as for example the limited presence of cortex in cluster ODS 1, suggest the presence of partial reduction sequences at each concentration. Refitting will offer supplementary information on the spatial organisation of technology and production activities within the local palaeo-landscape. Further analysis of the lithic material should also contribute to the understanding of the attested technological characteristics and differences between the assemblages, and shed light on early Middle Palaeolithic behaviour in this region.

3. Conclusion and prospects for future research

The 2007 excavation campaign at Kesselt-*Op de Schans* showed the presence of 3 small, discrete but internally homogeneous concentrations of lithic artefacts. Situated at the base of the loess sequence, these early Middle Palaeolithic assemblages are contained within the same stratigraphic unit and can be attributed to the transition MIS-9/MIS-8, some 300 000 years ago.

In the near future we hope to monitor the continuing exploitation of the quarry by drillings in order to locate more possible find scatters and to gather more information about the palaeo-landscape. The excavation of the ODS 2 concentrations will be continued, allowing an evaluation of the whole assemblage.

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