

THE MESOLITHIC OF TROU AL'WESSE CAVE (BELGIUM) IN REGIONAL CONTEXT

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Abstract: Recent excavations at the cave site of Trou Al'Wesse (Modave, Belgium) have yielded significant new data concerning the Mesolithic occupations at the site that contribute to understanding of the chronology and environmental context of the Belgian Mesolithic. We present the results of analyses of lithic and faunal assemblages, site taphonomy and spatial distribution, and discuss the relationship of the site with other Mesolithic sites in Belgium.

Résumé. La séquence des occupations mésolithiques du Trou Al'Wesse (Modave, Belgique) apporte des nouvelles données pertinentes à la compréhension de la chronologie du Mésolithique belge et son contexte environnemental. On présente des résultats préliminaires des analyses des ensembles lithiques et fauniques, la taphonomie du site et la répartition spatiale du matériel archéologique, suivi par une discussion du site dans son contexte régional en Belgique.

Introduction

Figure 1. Trou Al'Wesse, site plan.

The University of Liège has been excavating the cave site of Trou Al'Wesse near Modave, Belgium since 1988 (Fig. 1). 19th century excavations include an initial trench in front of the cave entrance by Édouard Dupont in 1864, followed by a tunnel dug by Julien Fraipont and Max Lohest from 1885-87, incidentally the same team that discovered the Spy skeletons in 1886 by the same method.

During the first phase of the current project (1988-2001), excavations focused on a 2x25 m longitudinal trench extending from the cave entrance to the alluvial plain of the Hoyoux River and a series of test pits both on the plain and in the cave. Geological and stratigraphic analyses were carried out to describe the long Pleistocene-Holocene sequence (Collin *et al.* 1996; Pirson 1999; Pirson & Collin 1997, 2005). The Mesolithic assemblage in stratum 4, at the time considered a single unit, was subject to technological and typological analyses by C. Derclaye (Derclaye 1999; Derclaye *et al.* 1999, 2000). The second phase of the project, begun in 2003, has expanded the excavations on the terrace and will begin systematic excavation inside the cave.

Trou Al'Wesse is one of the rare cave sites remaining in Belgium that contains a long sequence of intact deposits. The 60,000-year-long sequence contains a series of human occupations, including Mousterian, Aurignacian, Mesolithic and Neolithic levels, as well as strata rich in fauna. It is of particular importance for understanding cultural and environmental change during the Pleistocene and Early Holocene.

This paper presents results for the Mesolithic and Neolithic assemblages found in complex 4.

Project structure and aims

The diversity and richness of the different types of data preserved in the deep Trou Al'Wesse deposits has made it possible to develop a interdisciplinary research program to address different aspects of the Pleistocene and Holocene from around 60,000 BP to 5,000 BP. Our project integrates archaeological, geological and paleoenvironmental data to place the human occupations in chronological and environmental context at regional and continental scales.

Geological aims include interpretation of the depositional processes leading to the formation of the stratigraphic sequence, including significant post-depositional processes that affected the archaeological assemblages. Sedimentological analyses also shed light on the climatic sequence; integrated with palynological and faunal analyses, such data will help clarify the Late Pleistocene and Early Holocene climate and environment in Belgium.

Comparison of stratum 12 (considered to be Lateglacial, 20-10,000 BP, based on fauna, although not yet dated) and the overlying Mesolithic facies of stratum 4b will address change and continuity in human behavior and environment at the Pleistocene-Holocene boundary, beginning with the warming trend after the Last Glacial Maximum and continuing to the Atlantic period. One hypothesis that will be tested can be considered the reverse of the northern refugia hypothesis, which suggests that some temperate species persisted in northern refugia during glacial periods (Stewart & Lister 2001). The reverse is that, during the warming trend, cold-adapted species persisted before becoming locally extinct as the southern limit of their habitat range moved northward. Which species became extinct at the end of the Pleistocene and which persisted, at least for a time, at the beginning of the Holocene?

In terms of human occupation of northern Europe, and the origins of the Mesolithic in Belgium specifically, our goal is to examine land-use patterns prior to and during the Mesolithic. In this, we use lithic raw material and subsistence resource data, comparing the Mesolithic occupations from Trou Al'Wesse with the Lateglacial and Mesolithic occupations known elsewhere in Belgium. Trou Al'Wesse is unique in Belgium in that it contains a series of stratified Mesolithic occupations dating from the end of the Early Mesolithic to Recent Mesolithic, thus indicating regular exploitation of the cave throughout the Mesolithic.

The site of Trou Al'Wesse

Trou Al'Wesse is located on the right bank of the Hoyoux, a tributary of the Meuse River originating on the Condroz Plateau. The cave consists of a large, relatively horizontal, gallery extending around 35 m to the back of the cave. The karstic system continues, but the corridors are filled with sediment and have not yet been explored. A 9 meter high chimney, excavated in the 19th century and containing a Neolithic burial with 15 individuals (Masy 1993), opens onto the plateau above the site. Intact deposits are present both on the terrace and inside the cave.

Conditions at the site would have been favorable for human occupations. Open to the southwest, the cave is warmed by afternoon sun; it is large and deep. Fresh water would have been available from the Hoyoux; different subsistence resources would have been accessible in the valley as well as on the Condroz Plateau. Flint may have been available locally in the form of river cobbles and certainly on the Hesbaye Plateau (Mehaigne Valley 15 km north and on the Meuse terraces between Liège and Maastricht, some 40 km distant).

The Belgian Mesolithic

Figure 2. Location of the principal Mesolithic sites in Belgium.

The Mesolithic is fairly well-represented in Belgium by open-air sites, caves and rockshelters, but data is diverse, of variable quality and there are significant gaps in our understanding of the chronology, environment and human behavior of the Mesolithic. To place Trou Al'Wesse in geographic context, sites of the Belgian Mesolithic are summarized here (Fig. 2).

A series of Mesolithic burials is known from caves and rockshelters, for the most part discovered and analyzed by N. Cauwe and M. Toussaint (Grotte Margaux, Cauwe 1998; Abri Autours, Polet & Cauwe 2002; Grotte de la Martina, Dewez *et al.* 1995; Claminforge, and Grotte des Sarrasins, Toussaint *et al.* 1996; Petit-Ri, Jadin & Carpentier 1994; and most recently, Bois Laiterie, Otte & Straus [dir.] 1997). Interestingly, all of these burials – collective and individual – date only to the Early Mesolithic, between 9640 and 9015 uncal. BP; there is very little data on burial practices for the Middle and Late Mesolithic.

The Ourthe Basin in eastern Belgium (Liège province) was subject to intensive surface survey and studied by A. Gob (Gob 1981) and more recently re-analyzed (Henrard 2003). Abundant evidence was found as surface finds, thus lacking stratigraphic data and means of dating. Typological analysis was used to construct a relative chronology. Comparable evidence for Mesolithic occupation has also been recovered in surface context in western Belgium (Hainaut province) (Van Assche 2005).

In contrast to such surface finds, two open-air sites in Wallonia contain Mesolithic and Neolithic occupations in stratified context. These are the Place Saint Lambert site in Liège (López Bayón 1994; Remacle *et al.* 2000; Van der Sloot 1999; van der Sloot *et al.* 2003) and the Grognon site in Namur

(Meer 1993; Meer *et al.* 1997; Munaut & Defgnée 1997), both found in modern urban contexts on the Meuse River and which also contain medieval architectural layers. Dates obtained from these sites suggest Mesolithic occupation from Middle to Final Mesolithic. Their location on the banks of the Meuse or along small channels draining into the Meuse, the excellent preservation of fauna, particularly at the Tivoli zone of Place Saint Lambert, has made it possible to better understand hunting strategies, butchery practices and other activities that would have taken place at specialized open-air sites.

In Flanders, large open-air sites have been discovered in the sandy lowlands of the Schelde River near Antwerp – Melsele 'Hof ten Damme', Doel Deurganckdok and Verrebroek Dok (Crombé 1998, 2005). The first two sites have been subject to a systematic dating programme concentrating on hearths; a long series of dates demonstrates an Early to Final Mesolithic occupation of the region (Crombé *et al.* 2002).

Caves and rockshelters containing single-stratum Mesolithic layers have been excavated in Wallonia (Abri du Pape rockshelter, Léotard *et al.* [dir.] 1999; Coléoptère Cave at Bomal, Dewez *et al.* 1983; Lechat rockshelter at Hamoir, Lausberg *et al.* 1984, Lausberg & Lausberg 1985; Station Leduc at Remouchamps, Gob 1981). These caves contain single occupation Mesolithic layers ranging from Early to Late Mesolithic.

Trou Al'Wesse is, to date, the only site in Belgium to contain a stratified Mesolithic sequence for multiple occupations from Early to Late Mesolithic.

Analysis results

A series of hypotheses has been proposed to address the nature of the Pleistocene-Holocene transition, the chronology of the Belgian Mesolithic and continuity and change during the Mesolithic. To test the hypotheses, geological, archaeological and paleoenvironmental analyses have been carried out on data recovered from the Holocene sequence at Trou Al'Wesse.

These analyses include:

- a) the geological interpretation of longitudinal profile M/N 5-18 (Pirson & Collin 2005),
- b) analysis of artifact spatial distribution in stratigraphic context (ceramics, lithics, fauna),
- c) preliminary description of the ceramic assemblage from stratum 4a,
- d) description of the perforated bone pendant from stratum 4a,
- e) comparative analysis of the lithic assemblage structure for stratum 4a (Early Neolithic) and the Mesolithic facies of stratum 4b,
- f) faunal analysis for sample column K4: evaluation of the quantity and diversity of faunal remains present, preliminary environmental interpretation and confirmation of the Holocene attribution of complex 4, evaluation of methodology being developed for sedimentary clast analysis,
- g) faunal analysis of identifiable piece-plotted fauna from complex 4, and
- h) initial dating of stratum 4b, facies α .

Geology

Interpretation of the longitudinal profile M/N 5-18, recently published by Pirson and Collin (2005), places the human occupations of Trou Al'Wesse (Mousterian, Aurignacian, Mesolithic, Neolithic) in stratigraphic context. Comparison between other longitudinal and transversal profiles has verified the geometric coherence of the terrace deposits.

Stratigraphic complex 4, based on geological and archaeological analyses (Pirson & Collin 2005; Miller *et al.* 2003, 2004, 2005, 2006, in press), is now divided into strata 4a and 4b and stratum 4b further into four laterally superimposing facies descending downslope to the alluvial plain of the Hoyoux.

Stratum 4a is attributed to the end of the Early Neolithic, based on the identification of the ceramic sherds found in the lower half of the stratum. These are associated with the remains of domesticated (ovicaprines, dog, probable pig, probable cattle) and wild (deer, boar) fauna, and Neolithic flint artifacts. Mesolithic artifacts in secondary context are also present, redeposited as a result of

downslope erosion during the deposition of stratum 4a. Rare lithic artifacts attributed to the Neolithic are also present. A small perforated bone pendant, shaped in the form of a vestigial deer canine and as yet unique in Belgium, was found in this context. Finally, several elongated sandstone cobbles, interpreted as retouchers, were also found.

Stratum 4b contains a series of Mesolithic assemblages found in four separate facies (α - δ), dating from the end of the Early Mesolithic to Recent. Each facies contains a palimpsest of lithic artifacts and fauna, but the chronology of the facies appears to be coherent. The earliest facies (α), dated to 9000 ± 40 uncal. BP (Beta-209871), is closest to the entrance of the cave and appears to be the least disturbed by slope erosion. The other facies, by contrast, have undergone significant downslope movement, although they appear to retain their assemblage integrity. Lithics are mostly patinated white, fauna is highly fragmented, burnt fauna and lithics are common and charred organics, particularly hazelnut shell, are extremely abundant in these two facies.

Facies γ is clearly differentiated from the others by the presence of abundant small light-colored carbonate granules and tufa in brown sandy silt. Lithics are patinated differently and fauna is, in general, in a better state of preservation. Burned bone and flint, and charred organics, while present, are less common.

Facies δ , excavated in part during phase 1 of the project, has not yet been excavated in the current phase. It has been dated to 6650 ± 70 uncal. BP (Lv-1751), or Late Mesolithic. Facies β and γ are currently being dated.

Differences observed between the facies suggest that the site was regularly visited during the different phases of the Mesolithic, continuing a long tradition of human occupation beginning with the Middle Paleolithic. The assemblages within each facies are likely to be palimpsests of seasonal occupations. While analyses of the lithic and faunal assemblages inform on the technological and hunting activities that took place at the site, redeposition has made it impossible to identify specific activity zones.

The vertical distribution of artifacts in stratigraphic context shows differences between the Mesolithic facies as well as variability between different zones on the terrace, due to variability in post-depositional geological processes. The zone directly in front of the cave entrance (rows N and O) has been subject to more intensive geological processes. Facies alpha and beta are here poor in archaeological material, while artifacts are much more common in facies gamma, located further downslope. Facies gamma has clearly been redeposited, with sediment containing flint and bone filling in the spaces around the large dolomite blocks present in underlying stratum 7a. In addition, the presence of carbonate and disintegrated dolomite fragments and tufa fragments indicate the action of geological processes different from those acting on facies alpha and beta, possibly flooding of the Hoyoux and bank erosion.

In contrast, the zone to the right of the entrance (squares H-J 4-7), against the rock face, appears to have undergone less movement: facies alpha is 10-15 cm thick and contains a dense concentration of lithics and fauna, including extremely abundant small debris. This zone would have been protected by the rock face and is in part behind the drip line. Refitting, which is in progress, will clarify the integrity of the assemblages and permit estimation of the degree of downslope movement and mixing of deposits.

Archeology

Figure 3. Trou Al'Wesse, complex 4, row I 6-10. Vertical distribution of find classes.

One of the questions addressed in the second phase of the project was the provenience of the ceramic sherds found in stratum 4: to determine whether or not they were directly associated with the Mesolithic occupations. The vertical distribution as represented by artifacts in row I 6-10 (Fig. 3) clearly demonstrates the distinction between Neolithic stratum 4a and Mesolithic stratum 4b. All Early Neolithic sherds are found in the lower part of stratum 4a, associated with Neolithic artifacts (flint tools and debitage as well as elongated cobbles used as retouchers or polishers) and redeposited Mesolithic artifacts. No sherds are found in the facies of stratum 4b. This distribution, as well as more detailed stratigraphic interpretation of complex 4, clearly demonstrates the presence of an Early Neolithic stratum overlying the Mesolithic facies. There is currently no evidence to support the

hypothesis of Mesolithic use of ceramics at Trou Al'Wesse. By contrast, ceramic sherds have been documented in Mesolithic context in the Tivoli zone at the Place Saint Lambert site in Liège (van der Sloot *et al.* 2003).

Table 1. Trou Al'Wesse. Stratigraphic distribution of find classes.

The broad artifact categories for the different assemblages in complex 4 show clear differences between the Early Neolithic in stratum 4a and the Mesolithic facies of 4b (Table 1). Stratum 4a contains all of the ceramic sherds, a series of retouchers on elongated cobbles and the bone pendant. The high degree of fragmentation of ceramics and their dispersal throughout stratum 4a indicates downslope movement on the terrace; artifacts are in secondary position. Faunal remains are much more common, and often better preserved, than in any of the Mesolithic facies. The lithic assemblage is, however, limited, particularly when the redeposited Mesolithic component is excluded.

The Mesolithic assemblages are fairly similar in overall composition, although there are significant differences in terms of alteration (burnt flint and bone), patina, degree of bone fragmentation and density of microfauna, mollusks and charred organic remains within each facies, facies 4b-gamma in particular quite different from alpha and beta.

Comparison of general assemblage structure shows that facies 4b-alpha reflects a greater degree of reduction activity in comparison with beta and gamma. Cores are rare and tools are equally present in each facies.

Typological classification of Mesolithic tools was carried out based on the typology used by Charlotte Derclaye (1999) for the analysis of the phase 1 material of stratum 4. Nine tool classes were defined: endscrapers, perçoirs, burins, retouched flakes, blades and bladelets, armatures and microliths. A separate class groups microlith production technical by-products, including microburins, *piquant-trièdres* and notch fractures. The phase 1 toolkit, grouping stratum 4a and the 4b facies, comes from a longitudinal trench near the midline of the terrace (L-M 5-18). The phase 2 tools come from the zone to the right of this trench (G-I 6-10) and to the left (O6-13 and N7-8, N 12-13).

Among the tools, certain types are temporally sensitive. For example, the Recent Mesolithic is characterized by Montbani retouched blades and abundant trapezes. However, while Montbani blades were found during phase 1, the different facies had not yet been distinguished and thus facies attribution is impossible. Trapezes are, however, rare in both phases (phase 1: n=13; phase 2: n=2). The most common microliths are scalene triangles (phase 1: n=10; phase 2: n=13) which, in phase 2, are evenly distributed among facies alpha, beta and gamma. The 20 armatures found during phase 2 include three with retouched base, two with unretouched base, a Tardenois point and a Zonhoven point. All twenty, however, are distal or mesial fragments; they may possibly be tools broken during hunting and brought back to the site within animal carcasses.

Microlith production by-products (phase 1: n=90; phase 2: n=17) indicate on-site preparation of microliths, at least to some degree. Refitting will clarify the nature and intensity of on-site reduction activity.

Environment

Figure 4. Trou Al'Wesse. Sample column K4, upper section.

Preliminary results have been obtained from faunal analysis of sample column K4, located to the right of the cave entrance, adjacent to the transversal profile L-M 4/5 studied by Pirson (1999) (Fig. 4).

Samples 4 and 5, attributed to complex 4, support the Holocene attribution. Taxa represented include roe deer, aurochs, beaver and wild boar and, among the small mammals, mole, fat dormouse, mouse and vole, which all indicate a temperate climate, grassland and deciduous forest. However, the presence of collared lemming may be the result of redeposited Pleistocene deposits. In general, their presence would indicate open tundra, absent in the Belgian Ardenne since the Late Pleistocene. The complex 4 samples also contain taxa reflecting a local aquatic habitat: fish (eel, percids and cyprinids) and amphibians. The other constant habitat is the cave itself, represented by bats and swallows.

Sample 10 from Lateglacial stratum 12 is proportionately dominated by bird remains including undetermined song birds and one confirmed ptarmigan or red/willow grouse bone. These birds are very commonly found in Late Pleistocene deposits of the last glaciation (Tyrberg 1995, 1998; Stewart 1999) and are generally taken to be indicative of an open steppe tundra habitat. The only identified microtines are short-tailed / common vole remains that indicate the presence of grassland. An aquatic habitat is also indicated.

This preliminary study gives some general indications of the local environment. Other columns have been selected for systematic sampling to integrate more precise analyses of fauna, mollusks, pollen and charred organics, in order to more clearly distinguish the different strata and facies of complex 4 as well as the Pleistocene sequence.

Identification of piece-plotted fauna from complex 4 has demonstrated the presence of domesticated fauna in stratum 4a (Miller *et al.*, in press). These include ovicaprines, probable pig and cattle, and dog.

Conclusions

The site of Trou Al'Wesse contains a complex stratigraphy rich in different kinds of data that make it possible to carry out a hypothesis-driven interdisciplinary project addressing a series of research questions at different scales of analysis. Such questions integrate geological, archaeological and paleontological data to clarify the Late Pleistocene-Early Holocene sequence in Belgium and to place the human occupations at Trou Al'Wesse in context.

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