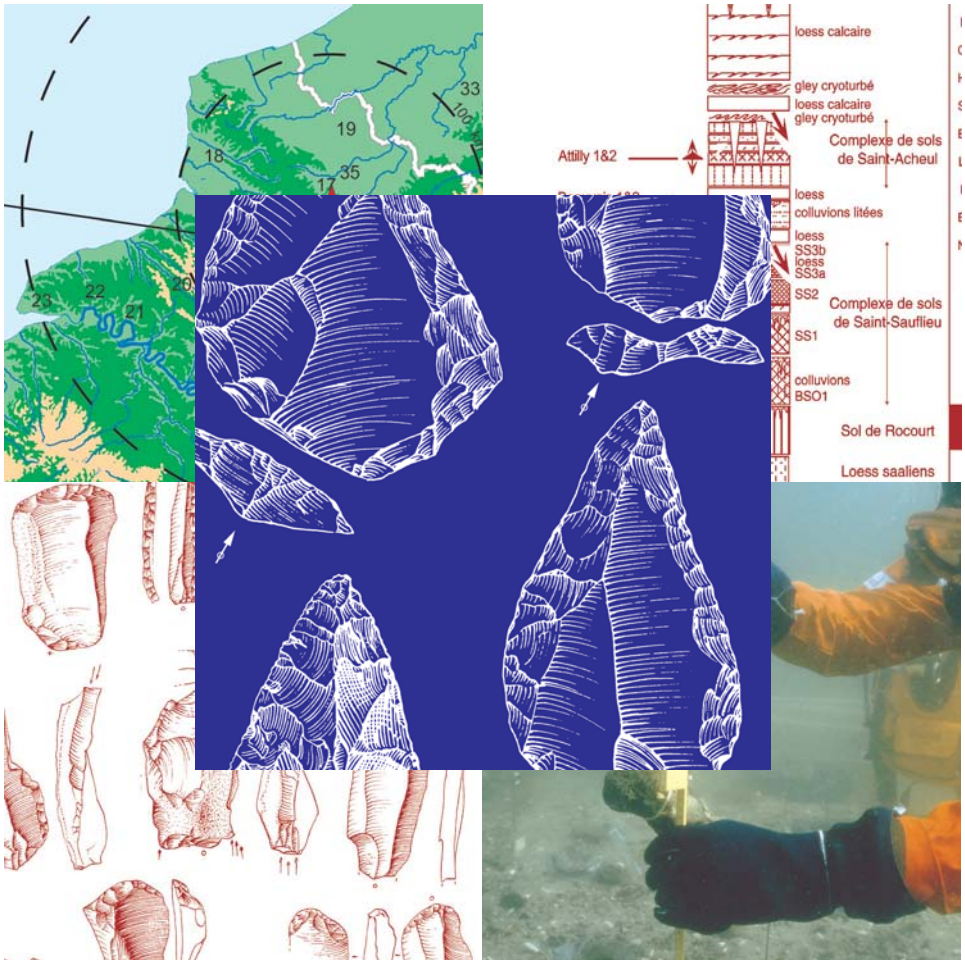

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Groupe de Contact FNRS
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organisation / organisatie

Marcel Otte
Université de Liège
Service de Préhistoire
Place du XX Août 7, Bât A1
BE - 4000 Liège

Marcel.Otte@ulg.ac.be

&

Dominique Bonjean
Kévin Di Modica
asbl Archéologie Andennaise
339d, rue Fond des Vaux
BE - 5300 Sclayn (Andenne)

Scladina@swing.be
www.Scladina.be

coordination / coördinatie

Philippe Crombé
Marc De Bie
Ivan Jadin
Marcel Otte
Michel Toussaint
Philip Van Peer

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Seven Well-preserved In-situ Middle Palaeolithic Open-air Sites in a Loess-soil « Climate-calendar » Sequence at Veldwezelt-*Hezerwater*, Belgium

Patrick M. M. A. BRINGMANS

Summary

The successive archaeological excavation campaigns at Veldwezelt-*Hezerwater* provided important new data on at least 7 separate Middle Palaeolithic valley settlements. The analysis of this data provides some valuable new insights into the behaviour of the Middle Palaeolithic inhabitants of Northwest Europe. At Veldwezelt-*Hezerwater*, Middle Palaeolithic humans were living, were extracting flint, were flaking cores, were making tools, were hunting, butchering and making fire at different times during the late Saalian (late MIS 6), the late Last Interglacial *s.l.* (MIS 5a) and the early Middle Weichselian (first half of MIS 3). We could thus put forward the hypothesis that, at least under « temperate » climo-environmental conditions, Middle Palaeolithic humans could react instrumental in creating their own life-sustaining technologies and this through interactions with the reigning environment, changes in general behaviour and contacts with other Middle Palaeolithic groups.

Keywords: Veldwezelt-*Hezerwater*, Middle Palaeolithic, loess, palaeosoil, climate-calendar, climosequence, Levallois, Quina, blades.

1. Archaeological Context

The stretch of land on the left bank of the now dry *Hezerwater* valley in the *Vandersanden* brickyard quarry at Veldwezelt-*Hezerwater* (Lanaken, Province of Limburg, Belgium) has been an advantageous location for Middle Palaeolithic settlement throughout the late Middle and Late Pleistocene. For several years, the *Vandersanden* company exploited the loamy fill of the asymmetrical *Hezerwater* valley. The industrial exploitation started in 1995 and came to an end in 2002. Over the last three decades, increasing attention has been paid by archaeologists to these open-air quarries as a means of examining Middle Palaeolithic occupation in Northwest Europe. Particularly in the European loess belt, researchers have invested much energy in excavating large portions of Middle Palaeolithic open-air sites. It was probable that also at the *Vandersanden* brickyard quarry Palaeolithic remains would be discovered. In order to deal with the expected archaeological finds in a structured way, Prof. Dr. Pierre M. Vermeersch (then: Laboratory of Prehistory - *Katholieke Universiteit Leuven* - Belgium) stepped in and started the « Veldwezelt-*Hezerwater* Middle Palaeolithic Project ».

At Veldwezelt-*Hezerwater*, high sedimentation rates resulted in a very detailed lithostratigraphic record, which has been preserved from erosion because it was deposited in the *Hezerwater* valley, which was sheltered there by an ancient *Maas* terrace. The final western quarry wall has been preserved and still is accessible to date. This final wall is slightly oblique to the *Hezerwater* valley, but incorporates the remainders of all the major archaeological horizons. The area, which was archaeologically surveyed at the *Vandersanden* brickyard quarry, comprised approximately 75000 m^2. Except for the presence of pieces of charcoal (n = 835) and animal bones (n = 613), the Palaeolithic finds at Veldwezelt-*Hezerwater* were exclusively lithic artefacts. More than 2500 flint artefacts were excavated at 24 different *loci* [spots where isolated or concentrations of artefacts were found]. However, most of the artefacts were found at the 7 *in situ* Middle Palaeolithic settlements, of which ultimately 1000 m^2 were excavated. In total, 6 successive summer excavation campaigns were organised (Gullentops *et al*., 1998; Vanmontfort *et al*., 1998; Bringmans, 2000, 2001; Vermeersch, 2001; Meijs, 2002; Gullentops & Meijs, 2002; Bringmans *et al*., 2003, 2004a,b,c; de Warrimont, 2002; Bringmans, 2006).

2. The Loess-soil « Climate-calendar » Sequence at Veldwezelt-Hezerwater

The most characteristic feature of the Quaternary deposits, which were studied at the *Vandersanden* quarry at Veldwezelt-*Hezerwater* (Gullentops *et al*., 1998; Gullentops & Meijs, 2002; Meijs, 2002), is the recurrent alternation of sedimentation, weathering and denudation processes, which were called forth by climatic fluctuations (*sensu* Kukla, 1977; Kukla *et al*., 2002). Loess, loess-derived

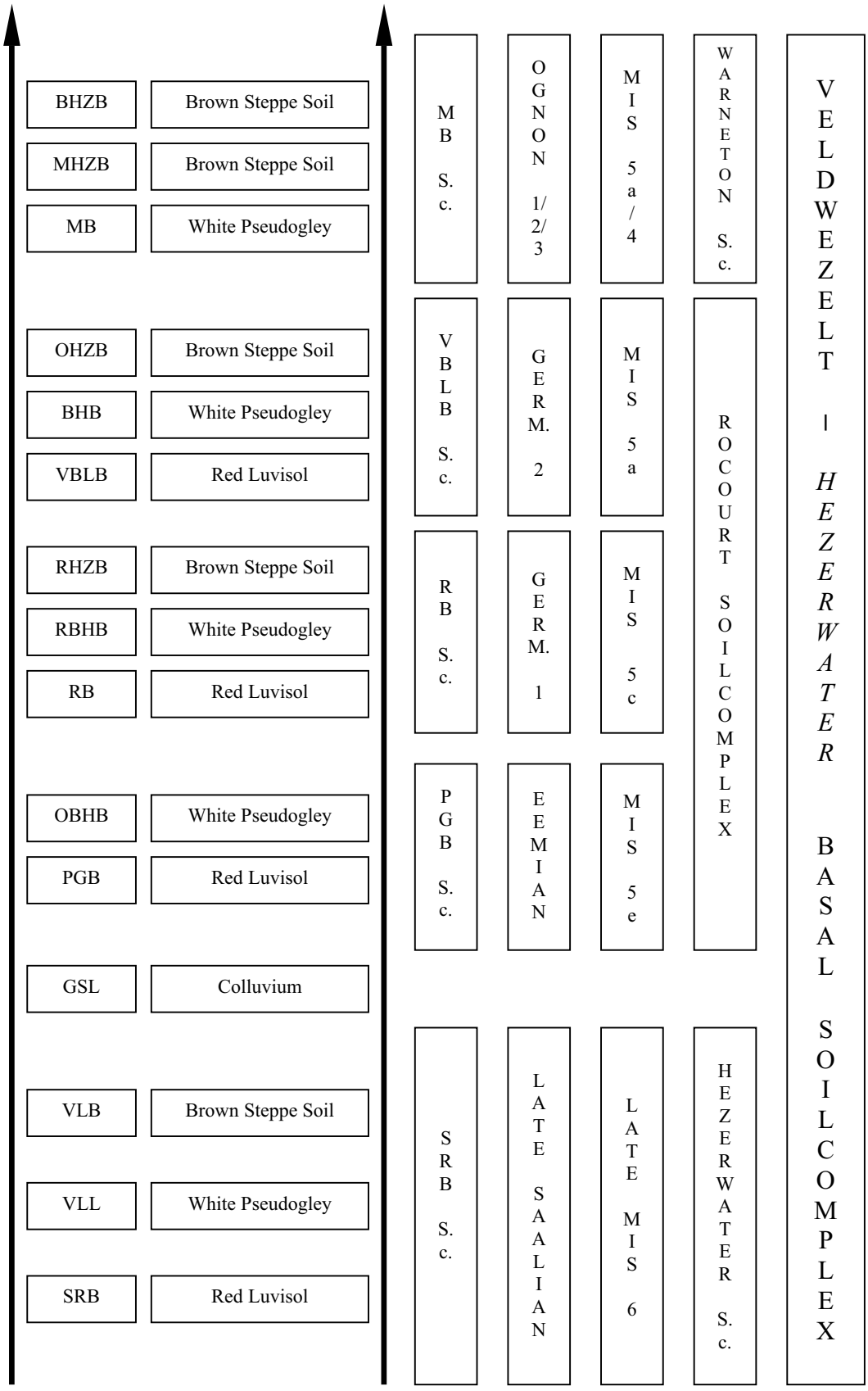


Fig. 1 — Schematic Overview of the « Basal Soilcomplex » at Veldwezelt-*Hezerwater*.

sediments and soils are usually very susceptible to these climatic fluctuations. In favourable conditions, as is the case at Veldwezelt-*Hezerwater*, they provide possibility for several cycles to be studied in direct superposition. At Veldwezelt-*Hezerwater*, the late Middle Pleistocene and Late Pleistocene loess-soil sequence is strongly developed and provides detailed chronostratigraphic, palaeoclimatic and palaeoenvironmental information. The Veldwezelt-*Hezerwater* loess-soil records are now considered one of the best continental analogues of the deep-sea oxygen isotope record (Schirmer, 2000, 2002; Bringmans, 2006; Schirmer & Kels, 2006).

The loess-soil climosequence at Veldwezelt-*Hezerwater*, overlies the fluvial *Maas* terrace (Middle Pleistocene) and layers of *Hezerwater* gravel, sands and silts (probably late Middle Pleistocene). Then follow several loam and loess layers, within which several late Middle Pleistocene soils were attested. The Late Pleistocene starts with a complex of soils, which has been labelled the « Basal Soilcomplex » (fig. 1). In a depression at Veldwezelt-*Hezerwater*, which was created by a so-called « spring-amphitheatre » (Gullentops & Meijs, 2002), the Last Interglacial « Basal Soilcomplex » starts with the formation of a sequence of soils (SRB-VLL-VLB). The most striking horizon of the « Basal Soilcomplex » is a luvisol (PGB), which shows macroscopically distinguishable traces of movement of the clay substance [« clay-coatings »]. This massive luvisol was capped by a bleached horizon. Then followed two other luvisols (RB & VBLB), which were each capped by a bleached and a humic horizon. The luvisol sequence, which has been labelled the « Rocourt Soilcomplex », is covered by a series of distinct humic soils, which have been labelled the « Warneton Soilcomplex ». The Last Interglacial « Basal Soilcomplex » at Veldwezelt-*Hezerwater*, is overlain by relatively thick and differentiated Last Glacial loess/loam layers, which were further characterised by periods of interstadial pedogenesis (*e.g.*, TL & WFL soils). Indeed, this Last Glacial loam and loess accumulation phase has been interrupted repeatedly by periods of soil formation. At the beginning of the Glacial cycle, the formation of soils exceeds the sedimentation of loess or loam, whereas to the end of the Last Glacial cycle, the deposition of pure loess prevailed.

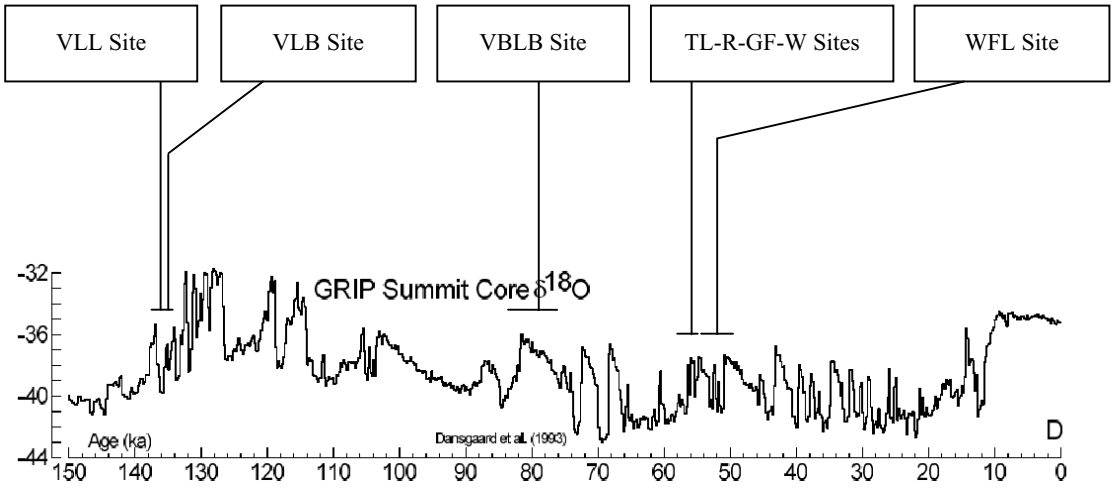
The pedogenesis (Gullentops & Meijs, 2002) of the rusty-brown decalcified luvisols at Veldwezelt-*Hezerwater* (*e.g.*, SRB, PGB, RB & VBLB) took place when precipitation was abundant, but without periods of heavy downpours, which would produce erosion. We also have to take into consideration the fact that the ground was probably covered by dense shrub or by forest, which protected the surface from erosion and to a certain degree, from sedimentation as well. Luvisols represent the maximum development of vegetation in warm climates. The humic soils (*e.g*, HZ), on the other hand, suggest the retreat of forest under a marked decrease of humidity. Degradation of the humic soils pointed to the recurrence of a more humid climate. However, loess accumulation is always characterised by a cold and dry climate. The loess layers have been deposited intermittently, the sedimentation being interrupted by periods of rest. In the periods without loess deposition, weak soils developed under steppe climates (*e.g.*, TL & WFL). Weakly developed soils witness to a relatively longer period of damper climate.

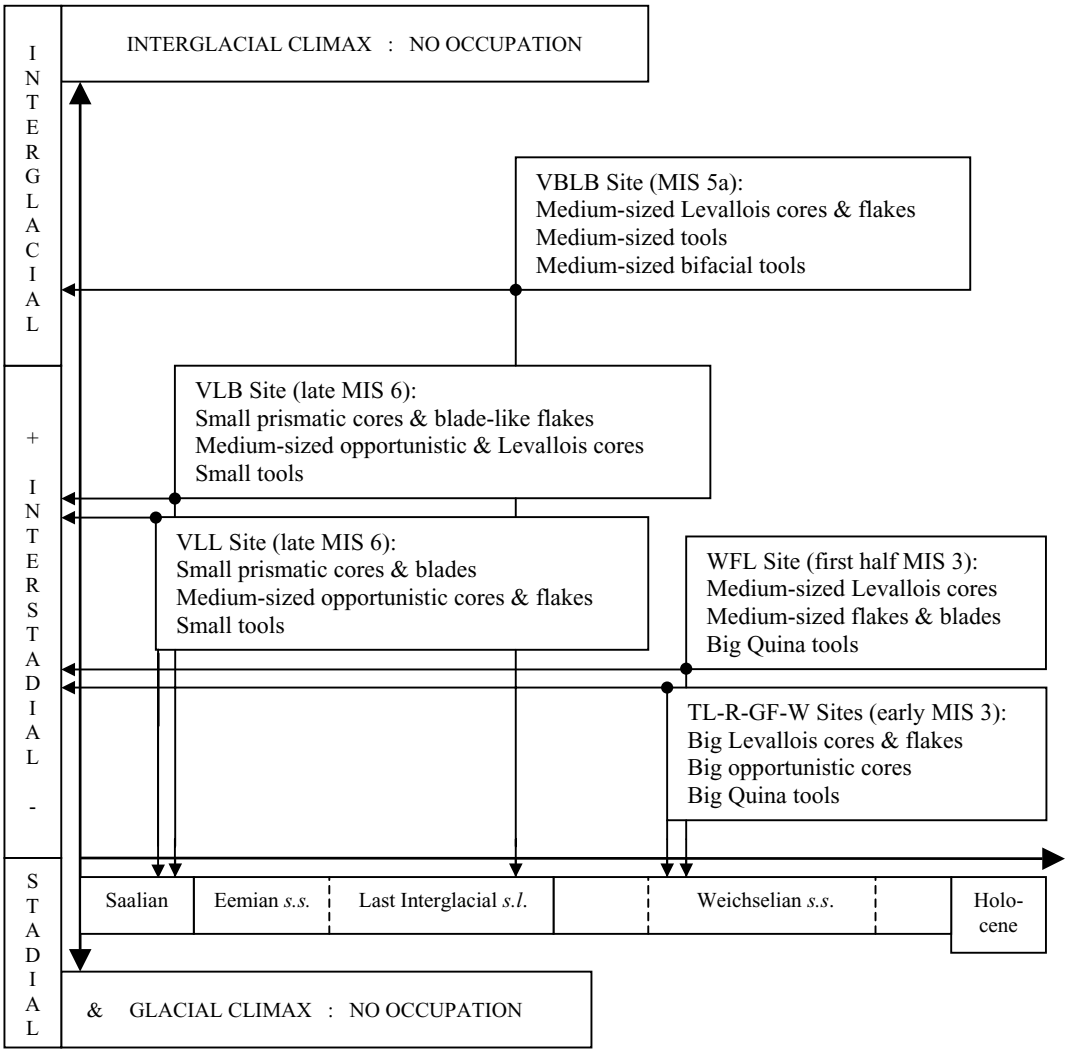
The loess-soil « climosequence » at Veldwezelt-*Hezerwater* provides proof of a complicated sequence of environmental and by inference, palaeoclimatic changes, which affected this part of Northwest Europe during the late Middle and Late Pleistocene. However, soils interstratified with loess and loam deposits also recorded the principle character of vegetation established at a locality. But, because most of the studied palaeosoils at Veldwezelt-*Hezerwater* lay on slopes, these soils were probably « para-autochthonous » (*sensu* Kukla, 1977), which means that their surfaces had not become fully stabilised and soil material from higher elevations continued to be redeposited into the depressions [= « syndepositional, cumulative pedogenesis »]. Nevertheless, it seems that the complexity of climate history at Veldwezelt-*Hezerwater* is quite similar to the climate history attested in oceans and ice-cores (Schirmer, 2000, 2002; Bringmans, 2006; Schirmer & Kels, 2006).

3. *Discussion: The Link between Lithic Raw Material Availability, Climate and Core and Tool Reduction Strategies at Veldwezelt*-Hezerwater

At Veldwezelt-*Hezerwater*, 24 archaeological *loci* were discovered at different spots in the *Vandersanden* loam quarry. Only 7 of the 24 discovered *loci* seemed to represent *in situ* sites, which thus required further excavation. These 7 *in situ* sites [(1) VLL - N of artefacts = 795, (2) VLB - N of artefacts = 687, (3) VBLB - N of artefacts = 350, (4) TL-R - N of artefacts = 57, (5) TL-GF - N of artefacts = 27, (6) TL-W - N of artefacts = 29 & (7) WFL - N of artefacts = 133] provided enough evidence to support the hypothesis that Middle Palaeolithic humans were present at Veldwezelt-*Hezerwater* at different times during the late Middle and Late Pleistocene (Bringmans, 2006). These 7 *in situ* sites were all situated in geologically sealed contexts. The VLL and VLB sites (late MIS 6 – around 133000 years BP) were characterised by laminar products (blades) and small tools, the VBLB site (MIS 5a – around 85000 years BP) was characterised by medium-sized Levallois flakes and a few bifacial tools

CHRONOLOGICAL POSITION OF THE VELDWEZELT-*HEZERWATER* SITES





and the TL-R, TL-GF, TL-W sites (start first half MIS 3 – around 58000 years BP) and the WFL site (end first half MIS 3 – around 50000 years BP) were all characterised by big Levallois flakes and a few big Quina Tools (fig. 2). We think that climate and lithic raw material availability had a clear impact on the lithic variability observed within the different assemblages. A number of trends concerning the use of particular sorts of lithic raw material and the production of specific artefacts have been observed at Veldwezelt-*Hezerwater*:

(1) Levallois products have usually been made of « exotic », fine-grained lithic raw materials (*e.g.*, VLB, TL & WFL sites). It has been noticed that at Veldwezelt-*Hezerwater*, Levallois core reduction strategies tended to produce relatively large, broad flakes that were comparatively thin and light for their size (fig. 3). Levallois products thus usually tend to maximise the length of the cutting edge per unit weight. The specific technical characteristics of Levallois products thus seem to offer a relatively straightforward explanation in so-called « transport-energy » terms for the general tendency that Levallois products were preferentially made of « exotic », fine-grained lithic raw materials, which would imply, that they are more likely to have travelled greater distances relative to the initial lithic raw material source.

(2) Blades usually provide the maximum of cutting edge per unit weight. Blades would thus seem to represent the most « economical » or the « cheapest » stone artefacts. However, where the appropriate data exist, it has often been observed that blades are the artefacts most likely to have been made of « exotic », fine-grained raw materials (*e.g.*, Bar-Yosef & Kuhn, 1999). However, at the VLL and VLB sites at Veldwezelt-*Hezerwater*, blades and blade-like flakes were clearly made of locally available raw materials, which were not really fine-grained lithic raw materials. However, it seems that at the VLL and VLB sites, the crucial factor was the elongated morphology of the initial flint nodules, rather than the quality of the nodules. Indeed, the Veldwezelt-*Hezerwater* blades and blade-like flakes were produced in an opportunistic fashion. Nevertheless, these blades were made by typical parallel/prismatic core reduction strategies and the flint nodules have probably been intentionally selected.

Fig. 2 — (opposite page) Climo-environmental Framework (Dansgaard *et al.*, 1993) and Chrono-technological Charaterisation of the *in situ* sites at Veldwezelt-*Hezerwater*.

(3) Oversized tools, which are tools that are exceptionally big relative to the rest of the lithic toolkit, have been found at the Middle Weichselian TL and WFL sites. These pieces had been made of « exotic », fine-grained lithic raw materials. It seems that these oversized tools have usually travelled greater distances than the rest of the lithic assemblage to which they belong. At first sight, there would appear to be a contradiction between « heavy » tools being transported over longer distances. However, the presence of « heavy » tools can also be explained in « transport-energy » terms. Indeed, the associational link between transport and weight is strengthened by the observation that « oversized » tools are more frequently retouched than « medium-sized » tools. It seems that under temperate « glacial » conditions, Middle Palaeolithic flint knappers seem to have produced larger, broader, thicker and heavier tools. These more « long-lasting » tools, which were repeatedly retouched, actually functioned as portable and « recyclable » sources of lithic raw material.

(4) Quina tools actually appear to be the most intensively retouched pieces of all Middle Palaeolithic tools. These Quina tools have been excavated at the Middle Weichselian TL and WFL sites. However, it is often said that Quina tools were frequently made of lithic raw materials of « inferior » quality (*e.g.*, Turq, 1992; Mellars, 1996). According to some researchers (*e.g.*, Dibble & Rolland, 1992), lithic assemblages with Quina tools are more often associated with relatively cool climatic conditions. The assumption is that during relatively cool periods Middle Palaeolithic humans were more tethered to their caves. In spending more time in these places, they tended to recycle previously discarded tools. In this scheme, a lack of mobility goes hand in hand with the heavy modification and reuse of « inferior » quality flint tools. However, it is important to note that Quina tools (fig. 4) were also made of « exotic », fine-grained lithic raw materials, as is the case at Veldwezelt-*Hezerwater*. Within toolkits, « exotic » Quina tools usually are even more intensively retouched and modified than Quina implements, which were made of « inferior » quality flint. In our view however, the presence of Quina tools shows that another factor also seems to have influenced the intensity of tool rejuvenation, namely the « nature » of the activities in which these tools were employed.

(5) Although we believe that the initial morphologies of the Middle Palaeolithic tool blanks and tools,

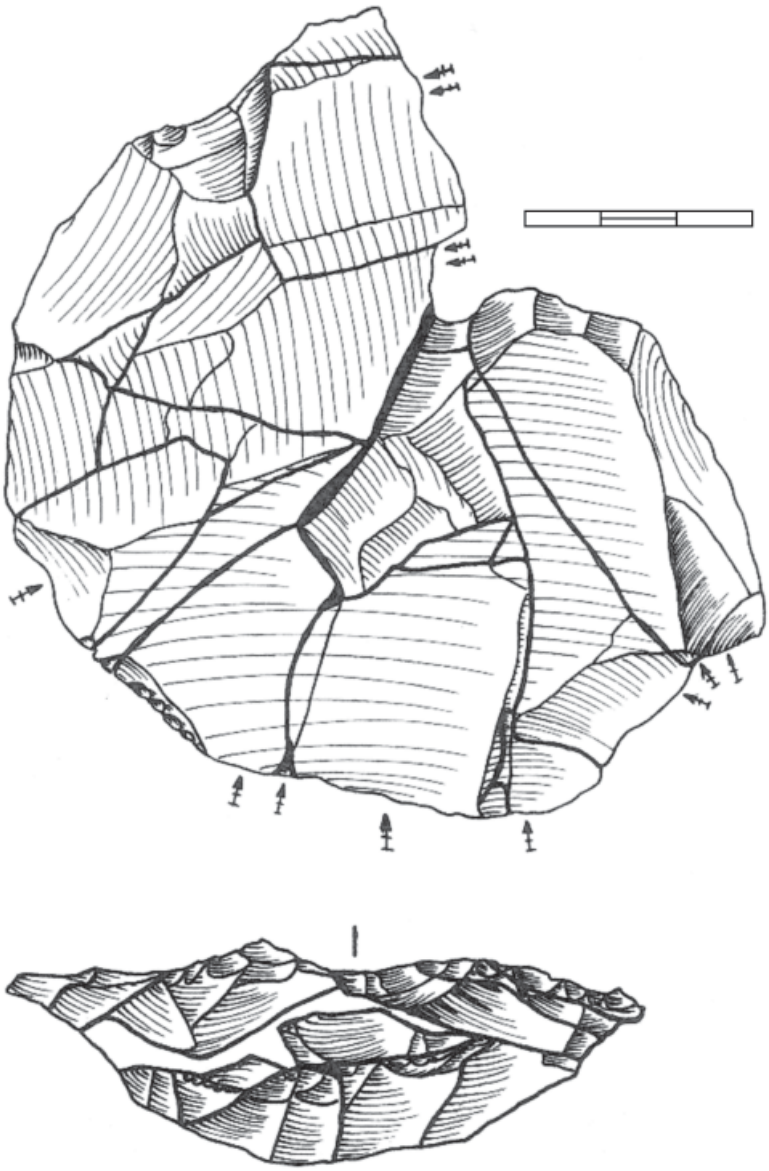


Fig. 3 — Veldwezelt-*Hezerwater*.
VLB Site: Levallois core & refits (Scale 1:1).

which have been excavated at Veldwezelt-*Hezerwater*, were primarily provoked by « functional » constraints. We also believe that tool blanks and tools did not have « stable » or « long-lasting » morphologies. Indeed, tool blanks and tools tend to change progressively their sizes and shapes until they are discarded. Tool blanks and tools were continually modified throughout their use-life and by the time that they were discarded, their morphologies were usually quite different than initially designed (*sensu* Clark, 2002a,b). Nevertheless, tool morphologies must have been right for the tasks at hand. However, there is no simple one-to-one correlation between tool form and tool function. Then again, « expedient » tools may have been used only briefly, which resulted in only limited morphological changes. On the other hand, the function of « curated » tools may have remained unchanged during prolonged reduction processes, while it is also possible that the function of « curated » tools may also have been changed as tool morphologies changed progressively. These complex processes make it extremely difficult to determine the exact function of tools.

(6) At Veldwezelt-*Hezerwater*, differences in lithic raw material availability and use seem to have resulted in differences in tool reduction strategies. Indeed, « curated » formal tools were more often made of « exotic », fine-grained lithic raw materials than « expedient » tools and other artefacts. However, the attested morphological differences are not always consistent within the lithic assemblage of a site and

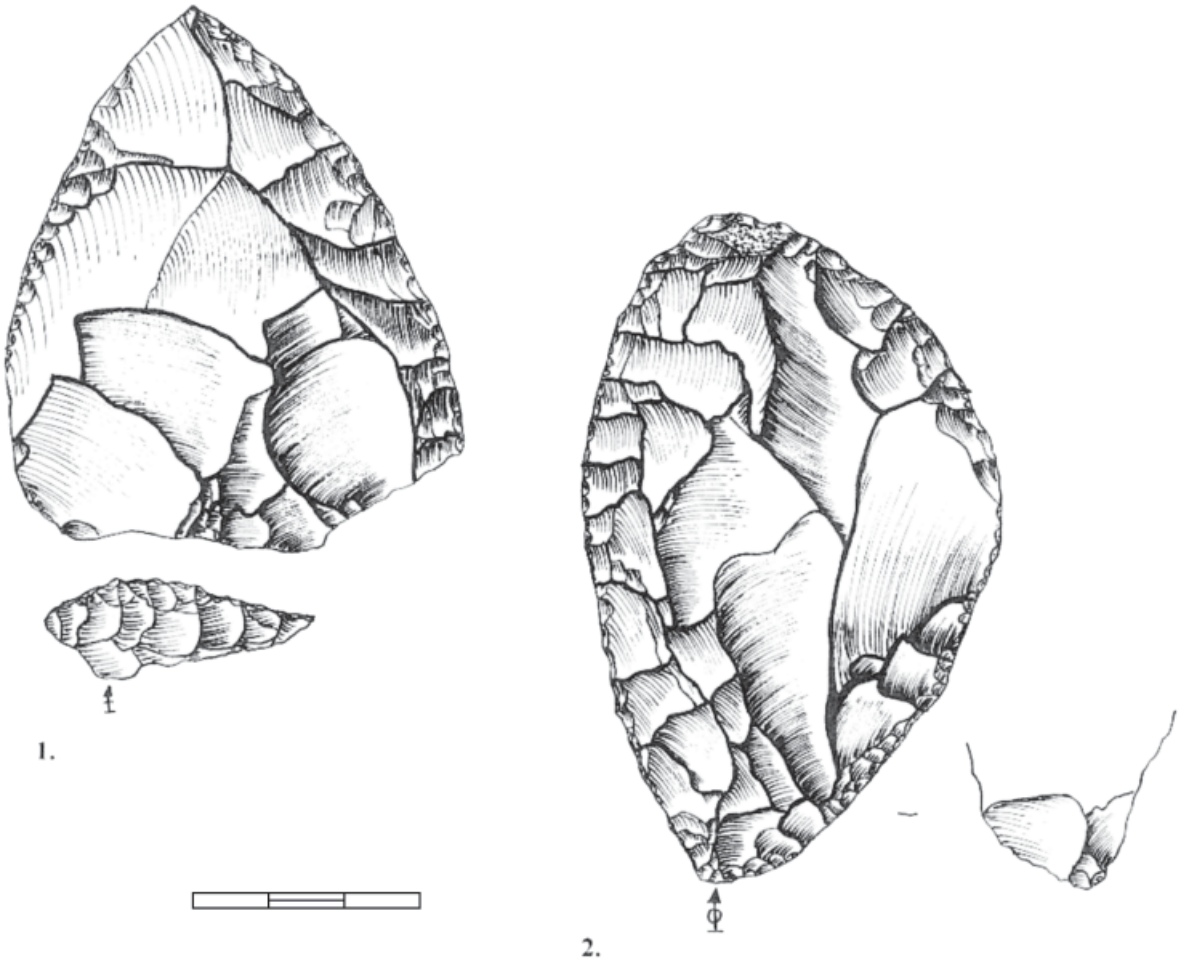


Fig. 4 — Veldwezelt-*Hezerwater*. WFL Site: Quina side-scrapers (Scale 1:1).

between different lithic assemblages of different sites. Interpreting these patterns individually might prove difficult, because each lithic raw material sort distinguished, consists in turn of multiple Raw Material Units (RMUs), which actually seem to form a continuum of variability rather than discrete units. Nevertheless, we believe that we can conclude that different lithic raw materials were reduced differently by the Middle Palaeolithic flint knappers who were active at the Veldwezelt-*Hezerwater* sites.

4. *Conclusion*

The successive archaeological excavation campaigns at Veldwezelt-*Hezerwater* provided us with important lithic and faunal remains of at least seven separate Middle Palaeolithic valley settlements. It is indeed awesome to imagine that Middle Palaeolithic humans were extracting flint, were hunting animals, were collecting wood, were lighting fires, were reducing cores and were producing tools at this spot in the *Hezerwater* valley at different times during the Late Saalian, the late Last Interglacial *s.l.* and the early Middle Weichselian. Middle Palaeolithic humans, who wanted to make a living at Veldwezelt-*Hezerwater* in a particular environmental setting, had to respond to that setting. This fact of course led to adaptation in terms of migrational, technological and « cultural » behaviour, which in turn affected their clothing, shelter, mobility, meat procurement and butchery methods, and thus their lithic technology. We believe that « culture » was a relatively unimportant restraint on the character of core and tool reduction strategies, being overridden in most contexts by mechanical constraints and socio-economic and ecological processes.

It seems that Middle Palaeolithic core and tool reduction strategies constituted a whole range of technological options, which were invoked differently according to context. The « cyclic » appearance or reappearance of prismatic or Levallois core reduction strategies, the presence or absence of unifacial, bifacial,

notched, denticulated, Quina or « small » tools in the different lithic assemblages excavated at the Veldwezelt-*Hezerwater* open-air sites should not be seen as extraordinary events, but simply as the natural outcome of the dynamics of flint knapping. Not the cyclic « reinvention » of some sort of core or tool reduction strategy, but the recognition of it, as being more useful for certain kinds of activities in specific climo-environmental contexts, was the crucial element in this fluctuating technological system. Technological change is thus not the result of a linear « evolution », but the outcome of isolated creative human actions. Indeed, frequently doing the « same » thing, but minor dissimilarities in the original settings, can bring about diverging results. Various elements must come together before triggering a technological shift: the element of restricted access to certain resources, climo-environmental conditions, the element of group mobility, socio-economic dynamics, *etc*. On the other hand, « technological equifinality » and « formal convergence » (*e.g.*, mechanical & physical restraints) almost certainly overrode in most cases any hypothetical « cultural » component.

We could thus put forward the hypothesis that, at least under « temperate » climo-environmental conditions, Middle Palaeolithic humans could react instrumental in creating their own life-sustaining technologies and this through interactions with the reigning environment, changes in general behaviour and contacts with other Middle Palaeolithic groups. However, we would like to emphasise once more, that the wrongly perceived lack of « material evidence » of contact with other Middle Palaeolithic groups in the wider *Maas* and Rhine area, does not necessarily mean that the Veldwezelt-*Hezerwater* humans have lived isolated lives. We think that « organismic » forms of interaction and exchange between different Middle Palaeolithic groups of people were probably the general rule, rather than the exception. We argue for the recognition of the universality of contact and influence as a fundamental feature of Middle Palaeolithic human existence. This approach considers the Veldwezelt-*Hezerwater* Middle Palaeolithic humans as « connected » and « active » agents, rather than passive recipients of optimised environmental conditions.

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Patrick M. M. A. Bringmans
then Researcher at the Laboratory of Prehistory
Katholieke Universiteit Leuven
Belgium
Patrick.Bringmans@hotmail.com