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# Palaeoenvironments and prehistoric interactions in northern France from the Eemian Interglacial to the end of the Weichselian Middle Pleniglacial

Jean-luc Locht, Emilie Goval, Pierre Antoine, Sylvie Coutard, Patrick Auguste, Clément Paris, David Hérison

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*Edited by*

Frederick W. F. Foulds, Helen C. Drinkall, Angela R. Perri,  
David T. G. Clinnick and James W. P. Walker

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# 5. Palaeoenvironments and Prehistoric Interactions in Northern France from the Eemian Interglacial to the End of the Weichselian Middle Pleniglacial

*Jean-Luc Locht, Emilie Goval, Pierre Antoine, Sylvie Coutard,  
Patrick Auguste, Clément Paris and David Hérissou*

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## **Abstract**

The Upper Pleistocene in the north of France is characterised by discontinuous human presence, closely linked to climatic fluctuations. Human groups were mainly present during the Eemian interglacial and at the beginning of the Weichselian glacial period, as well as during the Late Glacial, in correlation with large mammal populations. Upper Pleistocene climatic fluctuations impacted on raw material access, which partly conditioned lithic production modalities. However, the influence of cultural traditions remains important, both for lithic production and subsistence strategies.

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## **Introduction**

The excavation of abundant Middle Palaeolithic sites over the past twenty years has provided invaluable chronological and environmental information on Upper Pleistocene human occupation in the north of France. This region is considered here to extend from the Seine to the Escaut Basins (Figure 5.1).

The study discussed in this paper is based on data from 47 excavated archaeological levels, representing a total surface area of about 55,952 m<sup>2</sup> (Table 5.1), combined with a unique frame of reference in Europe for Pleistocene sequences in loessic context. A total of 75,612 artefacts have been unearthed in these levels. From a chronological viewpoint, five of these levels are contemporary with the Eemian interglacial (Marine Isotope Stage 5e, see Table 5.1 and Figure 5.2), seven are attributed to MIS 5c, ten to MIS 5a and eight others, occurring in steppic soils, to the end of MIS 5a. Lastly, thirteen are contemporary with the end of the Lower Pleniglacial (MIS 4) or Middle Pleniglacial (MIS 3). This significant mass of information has enabled us to analyse interactions between climatic fluctuations, responsible for palaeoenvironmental modifications, and prehistoric occupations. Here we focus on four

main themes: occupation density, raw materials, lithic industries and faunal remains.

## ***Climatic changes and human occupations***

During the Eemian, human occupations only appear to be preserved in fluvial sediments (for example, at Caours – see Locht *et al.* 2010). At present, these are rare for taphonomic reasons (interglacial soil erosion from the first climatic deterioration at the beginning of the Glacial period onwards) (Locht 2004; Roebroeks and Speelers 2002), and do not expose a realistic record of the Neanderthal occupation of our regions during this interglacial (Figure 5.3). The climate and environment is comparable to that of the present temperate zone, with oceanic influence and deciduous woodlands. The forested landscape was closed, with abundant animal species represented by few specimens.

A slow climatic degradation and a progressive continentalisation of the climate in successive stages is observed from the beginning of the Weichselian glacial period (MIS 5d to 5a) (Antoine *et al.* 1994, 2003, 2011a, b). The faunal spectrum is less varied, but sizeable herds of herbivores were clearly present.



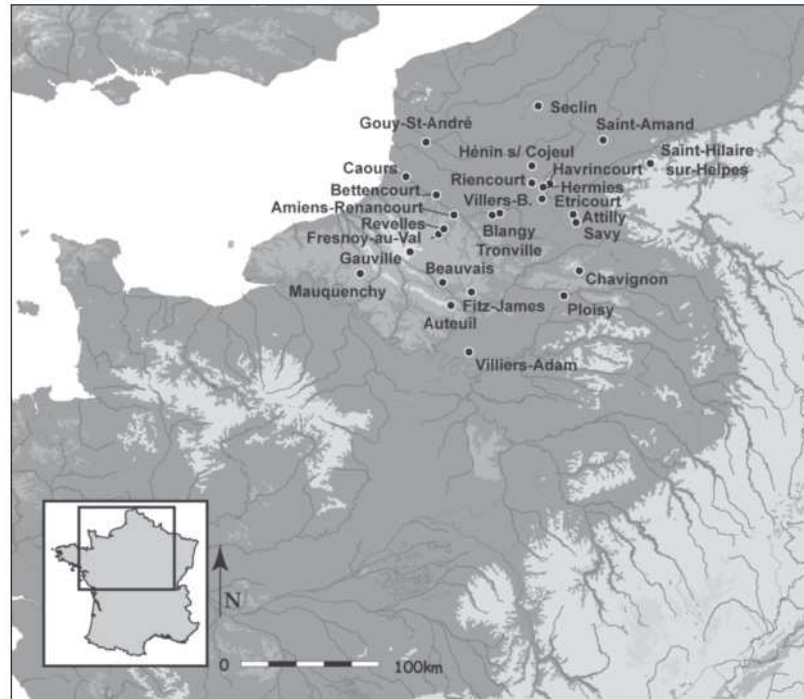


Figure 5.1. Location of the sites.

Sites are preserved in colluvial plateau sediments and especially on lower slopes where pedosedimentary activity is most developed. The high number of well-preserved sites due to favourable conditions seems to indicate that this type of environment was propitious to the implantation and subsistence of Middle Palaeolithic hunting groups.

During the Lower Weichselian glacial maximum (MIS 4), northern Europe seems to be abandoned by human populations. The recolonisation of these regions begins at the end of MIS 4 (Locht 2004) and continues during the Middle Pleniglacial (MIS 3). Again, sites are preserved in loess sediments on slopes and plateaus. The climate, environment and animal communities are globally characteristic of 'Mammoth steppe' conditions (Guthrie 1982), but human occupation appears to occur during short phases of climate improvement (interstadials), during which one can note the formation of Boreal brown soil type horizons. As there are fewer sites for this period than during the early glacial Weichselian, it is probable that human occupation was less dense at this time.

At the end of the Middle Pleniglacial, the first Early Upper Palaeolithic occupations appear in the north of France. Thus, the Havrincourt human occupations (Sector 2, Level 1: early Gravettian) and Amiens-Renancourt 2 in the suburbs of Amiens (early Gravettian) occur at about 28,500 BP (around 34 ka cal. BP), in a

phase of relative climatic improvement during MIS 3 (Goval and Hérisson 2012; Paris *et al.* 2013).

### *Climate changes and raw materials*

Apart from a few rare exceptions, the lithic series are made in Cretaceous flint issued from chalk, available throughout the region. Raw material access appeared difficult during the Eemian, given that temperate forests were abundant that must have concealed flint outcrops. Raw materials, therefore, must only have been accessible at tree falls or riverbeds. The five occupation levels at Caours indicate that flint blocks of reduced dimensions were collected from coarse alluvial deposits in the nearby Scardon. An identical situation occurred during the early Weichselian glacial, characterised by a continental environment with a Boreal forest and open herbaceous areas (Antoine *et al.* 1994). The abundant lithic series contemporary with this slow phase of climatic degradation (MIS 5d to 5a) also show that smaller blocks, gathered from broken stones on the plateau, were selected for reduction.

When the Lower Pleniglacial climatic deterioration eroded the chalky slopes, good-quality flint nodules of large size became available. This period corresponds to recurring Mousterian occupations at the base of these chalk taluses at the end of MIS 4 (for example Fitz-James, Teheux, 2001; Ault, Antoine and Auguste,

Site	Environment/stratigraphic position	Chronostratigraphy	MIS	Dating	Artefacts (no.)	Excavated Area (m <sup>2</sup> )	References
Caours N4	Calcareous fluvial silts (overbank)	Eemian interglacial	5e	121 ± 8 ka BP (TL heated flints, OSL)	1100	241	Antoine <i>et al.</i> 2006
Caours N3	Surface of peat layer (U9)	Eemian interglacial	5e		319	241	Antoine <i>et al.</i> 2006
Caours N2	Tufa deposit	Eemian interglacial	5e		132	241	Antoine <i>et al.</i> 2006
Caours N1	Tufa deposit	Eemian interglacial	5e	123 ± 3 (average / 10 U/Th TIMS dates from indurated tufa)	221	241	Antoine <i>et al.</i> 2006
Caours N C	Tufa deposit	Eemian interglacial	5e		1374	115	Antoine <i>et al.</i> 2006
Saint-Sauveur	Organic calcareous fluvial silts	Weichselian Early-glacial A	5d (?)	95 ± 4 ka (U/Th / bone / minimum age)	4	4	Antoine <i>et al.</i> 1995
Bettencourt N3b	Bettencourt soil (grey forest soil)	Weichselian Early-glacial A	5d		1358	866	Locht (ed.) 2002
Bettencourt N3a	Bettencourt soil (grey forest soil)	Weichselian Early-glacial A	5c		87	180	Locht (ed.) 2002
Fresnoy-au-Val 2	Bettencourt soil (grey forest soil)	Weichselian Early-glacial A	5c	106.8 ± 7.5 ka BP (TL heated flints)	1313	1500	Goval et Loch, 2008
Villiers-Adam	Bettencourt soil (grey forest soil)	Weichselian Early-glacial A	5c	110 ± 11 ka BP (TL heated flints)	2175	2830	Locht <i>et al.</i> 2003
Saint-Hilaire-sur-Helpe	Bettencourt soil (grey forest soil)	Weichselian Early-glacial A	5c	98.9 ± 9.3 ka BP (TL heated flints)	119	2332	Lantoiné and Ferry 2006
Sectin D7	sandy organic fluvial silts	Weichselian Early-glacial A	5c	91 ± 11 (layer 4) ka to 95 ± 11 ka BP (layer 7, TL heated flints)	952	47	Tuffreau <i>et al.</i> 1994
Sectin D6	sandy organic fluvial silts	Weichselian Early-glacial A	5c	91 ± 11 ka to 95 ± 11 ka BP (TL heated flints)	704	39	Tuffreau <i>et al.</i> 1994
Revelles 'Le Camp Féron'	Bettencourt soil (grey forest soil)	Weichselian Early-glacial A	5c		62	752	Sellier-Ségaré N. 2002
Mauquenchy, WA2	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a	83 ± 7.6 ka BP (TL heated flints)	80	3058	Locht <i>et al.</i> 2013
Fresnoy-au-Val 1	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a		4240	1500	Goval and Loch, 2008
Mauquenchy, WA1	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a	77 ka ± 7.2 ka (TL heated flints)	189	1223	Locht <i>et al.</i> 2013
Bettencourt N2b	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a		6466	866	Locht (ed.) 2002.
Riencourt CA	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a		5000	40	Tuffreau (ed.) 1993
Ploisy N1	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a		33	388	Defaux 2004
Chavignon SGF	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a		1164	5830	Sellier 2008
Hermies Champ Bruquette niv. H	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a		4800	160	Vallin and Masson, 2004
Savy N3	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial A	5a		39	330	Locht <i>et al.</i> 2006
Etricourt HU	Saint Sauflieu S51 soil (grey forest soil)	Weichselian Early-glacial B	5a		250	900	Hérisson <i>et al.</i> en cours
Bettencourt N1	Steppic soil (Saint-Sauflieu SS2 soil)	Weichselian Early-glacial B	5a final		438	866	Locht (ed.) 2002.



Auteuil sup.	Steppic soil (Saint-Saufieu SS2 / SS3)	Weichselian Early-glacial B	5a final	1549	3700	Swinnen <i>et al.</i> 1996
Chavignon LBG	Steppic soil (Saint-Saufieu SS2 / SS3)	Weichselian Early-glacial B	5a final	438	5830	Sellier 2008
Gouy St André	Steppic soil (Saint-Saufieu SS2 / SS3)	Weichselian Early-glacial B	5a final	491	430	Depaepe and Deschodt 2001
Villers Bretonneux	Steppic soil (Saint-Saufieu SS2 / SS3)	Weichselian Early-glacial B	5a final	79	262	Depaepe <i>et al.</i> 1997
Villers Bretonneux	Steppic soil (Saint-Saufieu SS2 / SS3)	Weichselian Early-glacial B	5a final	102	262	Depaepe <i>et al.</i> 1997
Blangy-Tronville inf.	Steppic soil (Saint-Saufieu SS2 / SS3)	Weichselian Early-glacial B	5a final	337	2000	Depaepe <i>et al.</i> 1999
Blangy-tronville sup.	Steppic soil (Saint-Saufieu SS2 / SS3)	Weichselian Early-glacial B	5a final	92	2000	Depaepe <i>et al.</i> 1999
Ploisy N2	Steppic soil (Saint-Saufieu SS2 / SS3)	Weichselian Early-glacial B	5a final	8	388	Defaux 2004
Beauvais 2	Eolian sands	Weichselian Lower Pleniglacial	4	11700	763	Locht 2004
Beauvais 1	Eolian sands	Weichselian Lower Pleniglacial	4	2000	763	Locht 2004
Fitz-James	Loess	Weichselian Lower Pleniglacial	4	1391	644	Guerlin 2001
Ault	Calcareous slope deposits (head)	Weichselian Lower Pleniglacial	4	-	-	Antoine and Auguste 2003
Savy N2	Brown loams	End isotopic stage 4/ beginning stage 3		36	330	Locht <i>et al.</i> 2006
Havrincourt sect.1	Brown loams	End isotopic stage 4/ beginning stage 3		73	2100	Goval <i>et al.</i> 2013
Havrincourt sect. 2, niv.2	Brown loams	End isotopic stage 4/ beginning stage 3		88	4100	Goval <i>et al.</i> 2013
Attilly 2	base of Saint-Acheul boreal brown soil	Transition between Lower and Middle pleniglacials	4/3	74	73	Locht and Guerlin 1997
Attilly 1	Saint-Acheul boreal brown soil	Weichselian Middle Pleniglacial	3	452	292	Locht and Guerlin 1997
Hénin-sur-Cojeul G	Saint-Acheul boreal brown soil	Weichselian Middle Pleniglacial	3	3500	175	Marcy <i>et al.</i> 1993
Hermies T'chio Marché niv. 1c	Saint-Acheul boreal brown soil	Weichselian Middle Pleniglacial	3	790	30	Vallin and Masson 2004
Ploisy N3	Saint-Acheul boreal brown soil	Transition between Lower and Middle pleniglacials	4/3	286	388	Defaux 2004
Gauville	Saint-Acheul boreal brown soil	Weichselian Middle Pleniglacial	3	139	1555	Guerlin 2002
Saint-Amand-les-Eaux	Eolian sands	Weichselian Middle Pleniglacial	3	11500	277	Feray <i>et al.</i> 2010
Havrincourt sect. 2, niv. 1	Arctic brown soil	Final part of Weichselian Middle Pleniglacial	3	6453	4100	Goval and Hérisson 2012
Amiens-Renancourt 2	Arctic brown soil	Final part of Weichselian Middle Pleniglacial	3	1415	700	Paris <i>et al.</i> 2013
			Total	75612	55952	

Table 5.1. List of concerned sites (fluvial sediments in grey).

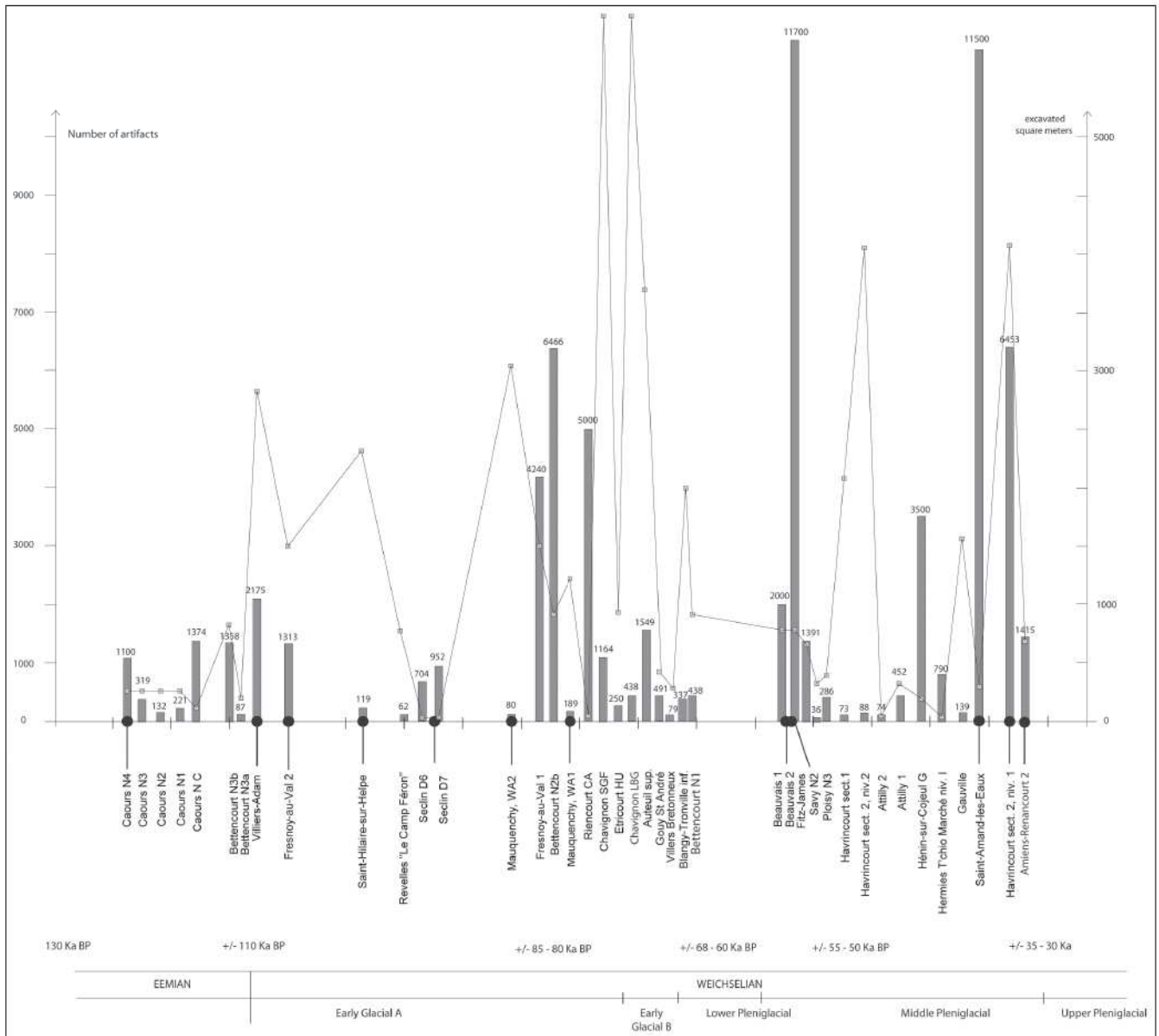


Figure 5.2. Excavated areas and number of artefacts.

2003, etc.). The less abundant lithic series from the Middle Pleniglacial (MIS 3) show that these outcrops must still have been partly accessible (Gauville, Attilly, Havrincourt Sector 1) before being covered with Upper Pleniglacial loess.

### *Climatic changes and lithic production systems*

Environmental changes do not seem to have had a direct impact on lithic reduction strategies. During the Eemian, the five occupation levels from Caours indicate discoidal reduction, sometimes associated with Levallois methods (Figure 5.4). Subsequently, during

the early Weichselian, reduction strategies became more diversified and several systems coexist (blade core, Levallois, convergent unipolar and sometimes discoidal) with multiple production aims (blades, flakes, points, etc.). At the end of the Lower Pleniglacial, raw materials became accessible once again and lithic complexes are characterized by the exclusive presence of Levallois debitage. The site of Beauvais is an exception with two levels characterised by the sole presence of discoidal debitage (Locht 2004). Handaxe production is very poorly represented, thereby emphasising the specialised nature of sites with handaxes and mass handaxe production (Figure 5.4).

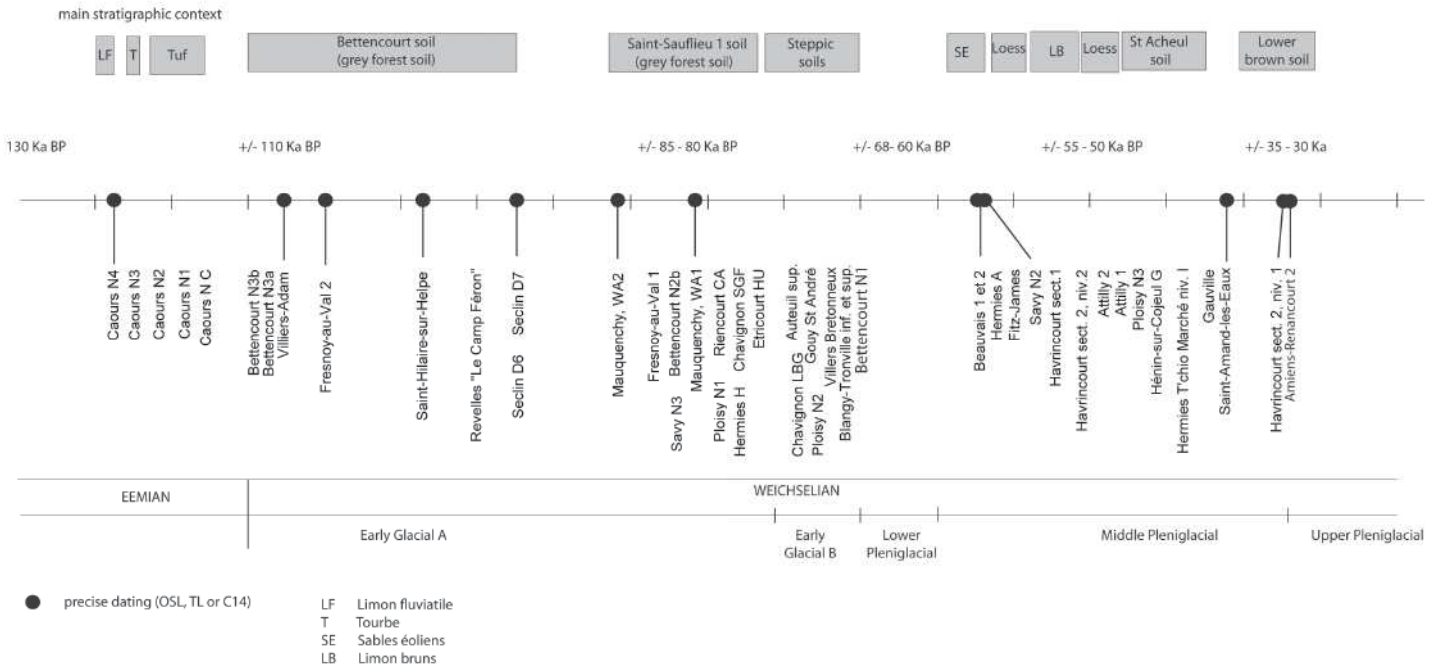


Figure 5.3. Chronostratigraphical position of the archaeological levels.

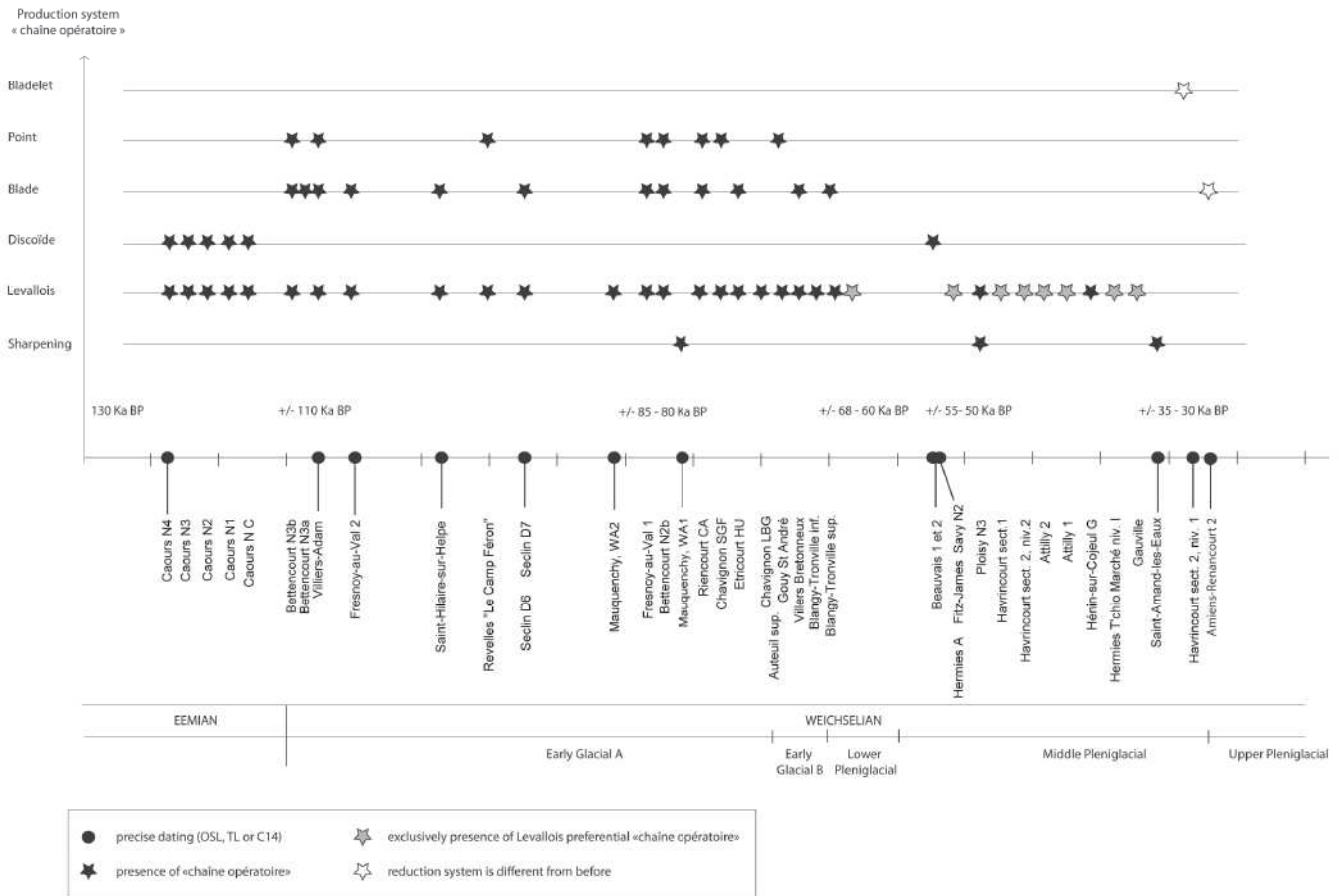


Figure 5.4. Characterisation of the main chaînes opératoires of the archaeological levels.



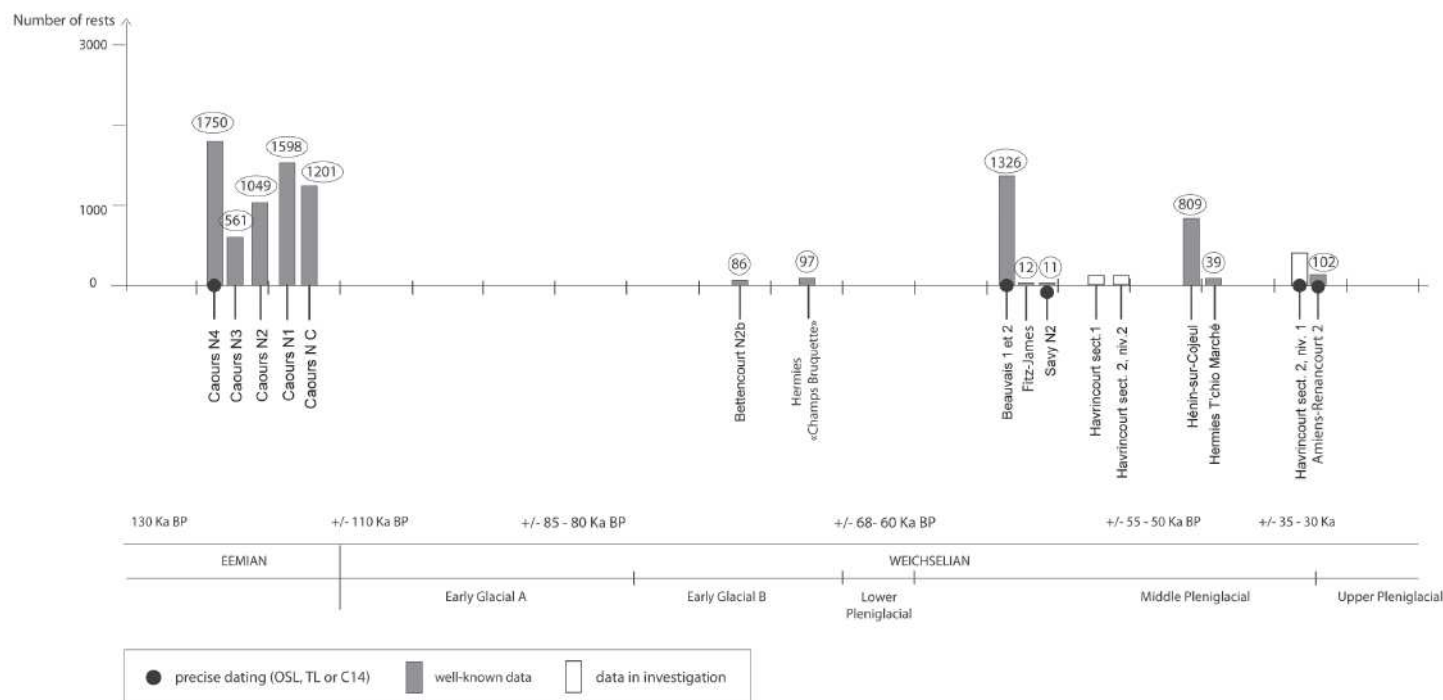


Figure 5.5. Number of preserved faunal remains.

### The impact of climatic changes on subsistence strategies

Faunal data are less abundant, exclusively due to taphonomic reasons. Out of 47 occupations ascribed to the recent Middle Palaeolithic (MIS 5e to 3), only fourteen have yielded fauna (Figure 5.5). The two Early Upper Palaeolithic occupations (Havrincourt Sector 2, Level 1 and Renancourt 2) have also yielded abundant bone remains. During the Eemian, the fauna is dominated by cervids (red deer and fallow deer), but aurochs are also present, as shown by the five Caours levels. Generally speaking, the faunal series are then dominated by large herbivores from the beginning of the Weichselian glacial period, particularly horse and Steppe bison, like at Hermies or Hénin-sur-Cojeul (Auguste 2009). Woolly mammoth and woolly rhinoceros are also present, though much less abundant. However, mammoth plays a central role at certain sites, such as Ault. During phases of climatic deterioration, reindeer is present in the spectrum, *e.g.* at Beauvais and Havrincourt. All these occupations are mainly characterised by the hunting of large herbivores, although are occasionally oriented towards smaller animals such as reindeer. The butchery activities that have been identified at these sites attest to the removal of meat, occasionally accompanied by the breakage of long bones, indicating diversified subsistence strategies that may be linked to the seasonality of occupation. In all

of the sites younger than the Eemian, the environment is always open and dominated by grasslands during clement phases, such as at Bettencourt-Saint-Ouen, and steppe during cold phases (Auguste 2012).

### Discussion

Environmental changes had an impact on human access to flint, which was the main raw material during the Palaeolithic occupation of the north of France. Generally speaking, access to deposits was hampered by the presence of forests, which stimulated the procurement of flint from secondary sources. The flint nodules that were exploited are, therefore, relatively small in size and variable in quality. During the Lower Pleniglacial, slopes were eroded and flint bars became easily accessible on the chalky talus. Correspondingly, good-quality raw material was available in larger sized modules, propitious to the production of large preferential Levallois flakes.

Climatic change does not seem to have influenced the choice of lithic reduction strategies. The case of Bettencourt-Saint-Ouen is evocative and shows the persistence of similar needs (*chaîne opératoire*s oriented towards the production of points, blades and flakes using identical technical schemas) for more than 40,000 years in the same area, across differing environments (forest at the base and steppe towards the top). This stability



in lithic reduction strategies underlines the importance of cultural traditions in the face of environmental modifications (Locht 2002; Antoine *et al.* 2003). Recurring occupations at the northern French sites suggests some kind of management of territory, as well as the transmission of technical traditions throughout time.

Climatic modifications do not appear to influence Neanderthal subsistence strategies other than varying their main herbivorous prey taxa. Similar behaviour can be observed at sites characterised by contrasting environments, *e.g.* interglacial (Caours) and Pleniglacial (Beauvais) where subsistence strategies were identical. Hunting preferentially targeted small or medium sized herbivores, although larger species are present. Transportable animal carcasses, such as those of red deer, fallow deer, and reindeer, were brought back whole to butchery sites, while larger animals (*e.g.* elephant, aurochs, mammoth, and rhinoceros) seem to have been butchered at the kill site and brought back in quarters. At both sites, tools produced by discoidal reduction were mainly used for carcass processing. At other sites, however, large herbivores dominate, highlighting different subsistence strategies.

The occupations of both Neanderthals and the first anatomically humans in the north of France are correlated with phases of climatic amelioration. Both groups displayed the ability to adapt to their environment and their behaviour does not seem to have been very different. Thus, the animal and lithic procurement strategies demonstrate that subsistence behaviour and anticipation were similar during the Middle and Upper Palaeolithic (Locht 2004).

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