CHAPTER NINETEEN

A MICROLITH SEQUENCE FROM FRIESACK 4, BRANDENBURG, AND THE MESOLITHIC IN GERMANY

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Abstract

The Mesolithic-Neolithic bog site Friesack 4 in Brandenburg (Germany) reveals the most detailed stratigraphy from the Mesolithic in Europe known so far. From 100 Mesolithic layers - covering a time span of approx. 3200 years - came numerous wooden and antler objects as well as thousands of bones and about 140,000 stone artefacts. Using the Harris Matrix to examine the sequence in trench Z, and the typochronological evaluation of the microliths through correspondence analysis, it has been possible to subdivide the stratigraphy into 15 layer complexes with specific microlithic inventories. These can be used as reference assemblages for comparisons with other inventories from the Mesolithic in Germany and from neighbouring regions. As a result, the Mesolithic in Germany has been subdivided into regional and chronological clusters of microlithic assemblages, which can be tentatively associated with social groups.

Résumé

Le site tourbier Friesack 4 au Brandenbourg (Allemagne) datant du Mésolithique et du Néolithique a révélé jusqu'à présent la stratigraphie la plus détaillée connue de l'Europe mésolithique. Des 100 couches mésolithiques couvrant un laps de temps d'approximativement 3200 ans proviennent d'innombrables objets de bois et en bois de cerf, tout comme des milliers d'ossements et environ 140 000 artefacts lithiques. En utilisant la matrice Harris pour examiner la séquence dans la tranchée Z, ainsi que l'évaluation

typochronologique des microlithes par analyse de correspondance, il a été possible de subdiviser la stratigraphie en 15 complexes de couches avec des ensembles spécifiques de microlithes. Ceux-ci peuvent servir d'assemblages de référence pour faire des comparaisons avec d'autres assemblages du Mésolithique en Allemagne et dans les régions avoisinantes. De ce fait, le Mésolithique en Allemagne a été subdivisé dans des clusters d'assemblages de microlithes, qui peuvent éventuellement être associés à des groupes sociaux.

Keywords*: Friesack 4, Mesolithic, Germany, chronology, microlithic typology, 14C-dates, social groups, traditions*
Mots-clés*: Friesack 4, Mésolithique, Allemagne, chronologie, typologie de microlithes, dates au radiocarbone, groupes sociaux, traditions*

1. Introduction

The extraordinarily complex stratigraphy of the Mesolithic-Neolithic bog site Friesack 4 in northeastern Germany (Fig. 19-1) is unique in Europe. From the Early Mesolithic (middle Pre-Boreal period approx. 9000 cal BC) until the Late Mesolithic (early Atlantic approx. 5800 cal BC) hunter-gatherers repeatedly visited this part of what was then the shore of a lake. Neolithic settlers lived here in the later Atlantic period. The approximately 100 archaeological layers in five trenches contained about 140,000 Mesolithic and 18,000 Neolithic lithic artefacts as well as thousands of animal remains and organic finds. The development of the complex stratigraphy at the site was affected several times by erosion and alluvial deposition processes, caused partly by the Mesolithic people themselves and partly by changes in the water level over time.

Friesack 4 was mainly excavated during the 1970s and 1980s by Dr. Bernhard Gramsch (*Landesmuseum für Ur- und Frühgeschichte Potsdam*), who has already published a large amount of information (Gramsch 2000; 2006 with further references). Although now retired, he is working on further publications. The Friesack 4 site is famous for the numerous bone and antler artefacts, some decorated, and the remains of Mesolithic fishing nets and wooden implements. So far, 75 ^{14}C dates from the Berlin laboratory have been published (Dr. Jochen Görsdorf; see Görsdorf & Gramsch 2004); a further 16 charcoal samples and five from the neighbouring site Friesack 27 were radiocarbon dated in the Cologne laboratory (Dr. Bernhard Weninger) but are not yet published.

Fig. 19-1: Aerial photographs with the sites of Friesack, northwest of Berlin. The small map shows the location within Germany.

The project „Die Feuersteinartefakte des mesolithisch-neolithischen Moorfundplatzes Friesack 4, Kr. Havelland, Brandenburg“ was funded by the “Deutsche Forschungsgemeinschaft” from 1st August 2005 to 29th Februrary 2007 (requested by Prof. Dr. Andreas Zimmermann). During the first part of this project, the author established the stratigraphy of the site and examined 3010 Mesolithic microliths and microburins. Trench Z (Fig. 19-2) has 98 layers with typologically identifiable microliths; 1160 of the total of 2688 microliths were excavated from this trench. The typochronological results from the analysis of trench Z are discussed and compared with inventories from northern and southwestern Germany[1] The typochronological analysis and the evaluation of the attribute analysis of the microliths from the other four trenches (A, B, C, D) are still ongoing but will be completed shortly. It is already clear that it will be possible to further subdivide the latest Complex IV – as already suggested by the radiocarbon dates.

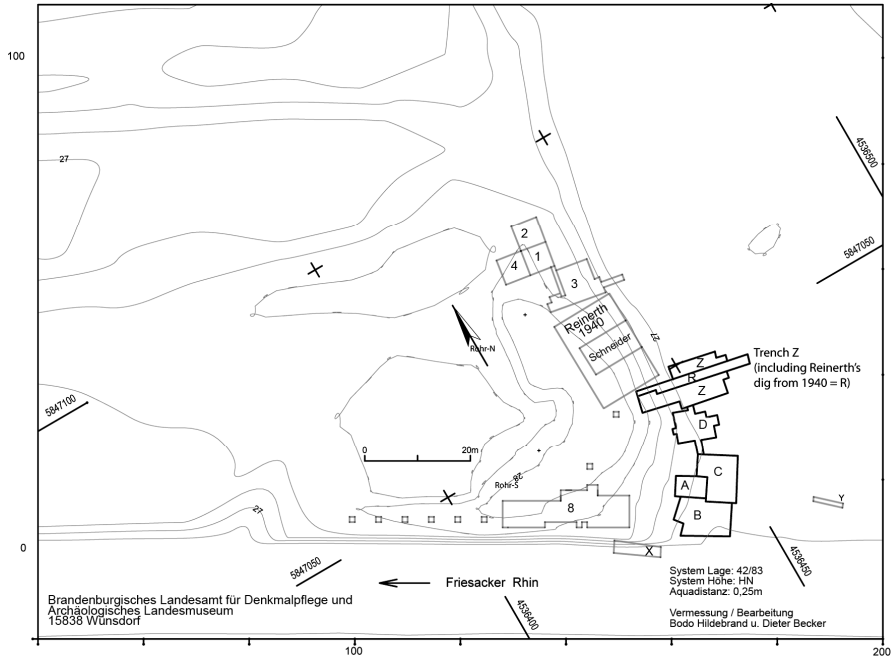


Fig. 19-2: Excavation plan of Friesack 4 with the different trenches plotted. The flint material of the trenches marked in black was examined during the project.

2. The microliths of Friesack 4 – Diversity in continuity

The first aim of the project was to establish a detailed stratigraphic sequence of the excavated layers in the different trenches. This was reached by analysing the excavations documentation with the programme "stratify" from Irmela Herzog (Herzog 1993; 1995; 2004) which is based on the Harris Matrix (see Harris 1984; 1989; Harris et al. 1993). Secondly, all microliths were examined by attribute analysis and typology. The typology used for the microliths is based on the systems introduced by Bernhard Gramsch (1973), Wolfgang Taute (1971) and Peter Vang Petersen (1993) with additional forms from the Friesack 4 assemblages. First of all, the microlith inventory was typologically analysed, whereby a partly new nomenclature was adopted to correlate the different existing typological systems. The correspondence analysis of the microlithic types and their frequency, using 'Reciprocal Averaging' in combination with their stratigraphic positions, produced a grouping of layers that probably correspond to different occupation periods

(Gehlen 2007a; 2007b) (Fig. 19-3). The former division of the stratigraphy into four Mesolithic Complexes (I to IV) by Bernhard Gramsch (Gramsch 2000; 2006) – confirmed by 14C dates and pollen analysis – is supported by this analysis. Moreover, these can now be subdivided into 15 Layer Complexes, which probably represent short chronological phases. This subdivision into several shorter chronological periods is most important for the general chronology of the Mesolithic in northern and eastern Germany. Other than the Duvensee bog sites in Holstein (Bokelmann 1971; 1975-1977; 1980; 1991), no sufficiently well published and radiocarbon dated short-term settlements are so far known in this area.

The results of the typochronological examination of the microliths from trench Z at the Friesack 4 site reveal diversity in continuity. The analysis of these artefacts within the context of the stratigraphy and the absolute chronology indicates a gradual development from the middle Pre-Boreal to the early Atlantic in terms of typology, style, the size of the microliths and micro-burins and the blade technology. However, the regular introduction of new elements and repeated changes in technology and style are also observed during time.

In the late Pre-Boreal, the first narrow lanceolate points appear and these become very variable in the early Boreal period. During the early Boreal, the first broad trapezes also appear, but only occasionally, as single microliths; they are even rarer in the final Complex IV. The lanceolate points are a special feature of Complexes III and IV in Friesack 4. It is very significant that these types are absent from the Duvensee sites dated to the late Pre-Boreal and early Boreal, and are rare on the middle Boreal 'Duvensee 13' site. However, they are frequent on the late Boreal and early Atlantic sites at Reichwalde (Oberlausitz) in southern Saxony, which date to between approx. 6900 and 5900 cal BC (Vollbrecht 2001). It is probable that these slender microliths are typical of Mesolithic groups in the eastern part of Germany. One type of lanceolate point is also found in Denmark (Type C036), but is found only singly in Friesack 4 (as is the "south Scandinavian" triangular type D025). In my opinion, this very small number of characteristic mircroliths indicates only a very loose connection between the Mesolithic people in Friesack and those in southern Scandinavia from the late Pre-Boreal onwards. But these connections must be studied more closely in future. Contacts between the Friesack people and those from Duvensee must also have been rather sparse from that time on, as is illustrated by the typological analysis of the microliths from the Duvensee sites published so far.

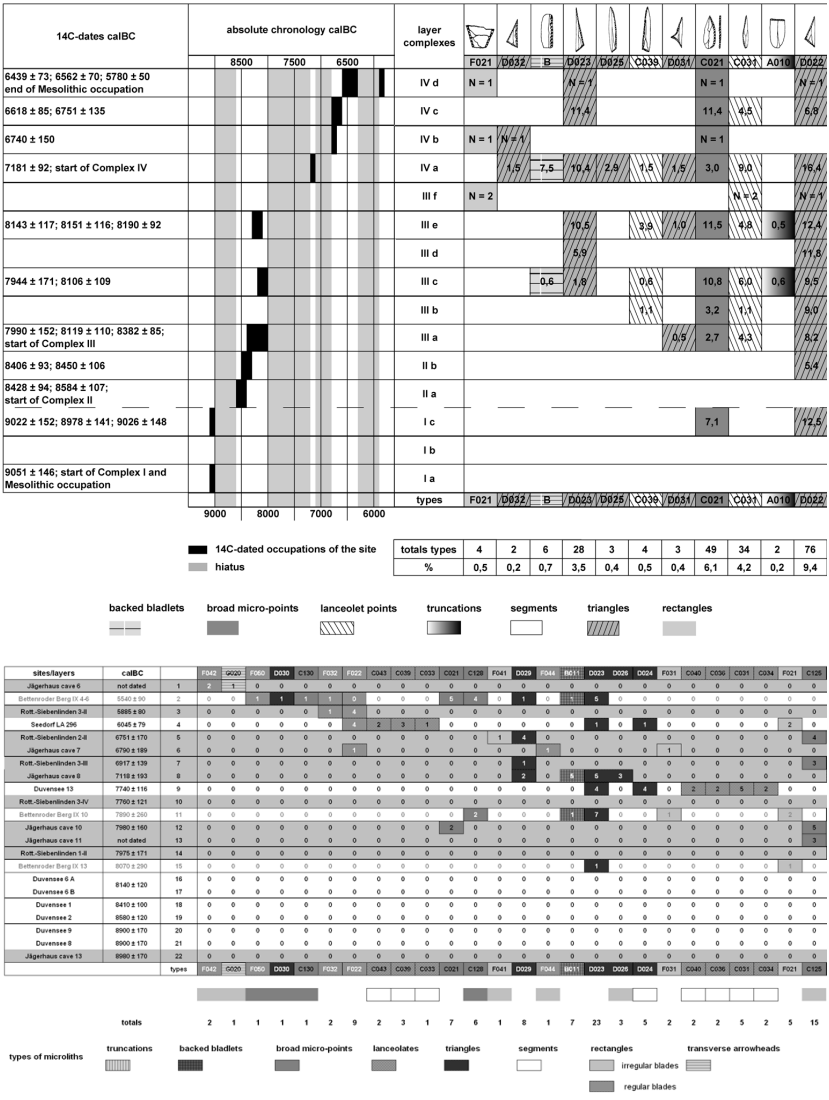
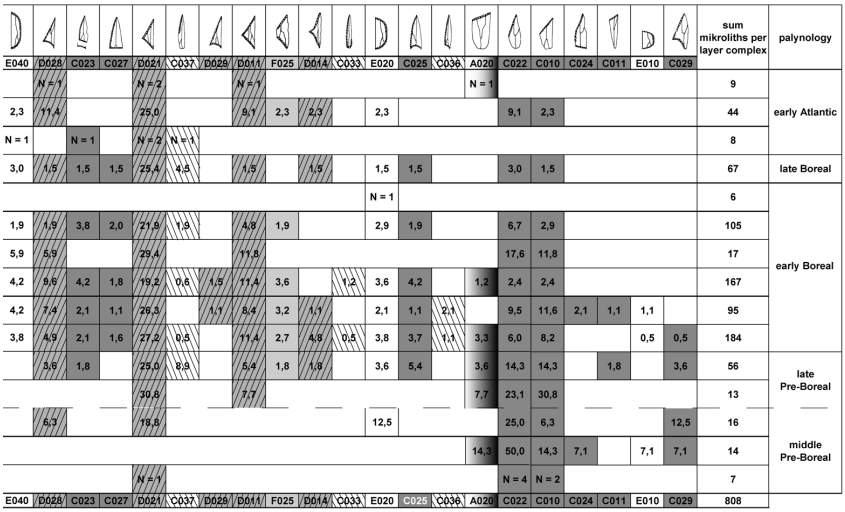


Fig. 19-3 (upper): The typo-chronological sequence of the microliths in Friesack 4, Trench Z, displaying the percentage per microlithic type for the 15 Layer Complexes. Although only the contents of ¼ of the stratigraphic units were used, most of the typologically characteristic microliths (808 pieces) are enclosed. The layer complexes III f and III e are partly contemporary.



E040	D028	C023	C027	D021	C037	D029	D011	F025	D014	C033	E020	C025	C036	A020	C022	C010	C024	C011	E010	C029	sum mikroliths per layer complex	palynology
	N = 1			N = 2			N = 1							N = 1							9	
2,3	11,4			25,0			9,1	2,3	2,3		2,3				9,1	2,3					44	early Atlantic
N = 1		N = 1		N = 2	N = 1																8	
3,0	1,5	1,5	1,5	25,4	4,5		1,5		1,5		1,5	1,5			3,0	1,5					67	late Boreal
											N = 1										6	
1,9	1,9	3,8	2,0	21,8	1,9		4,8	1,9			2,9	1,9			6,7	2,9					105	
5,9	5,9			29,4			11,8								17,6	11,8					17	early Boreal
4,2	9,6	4,2	1,8	19,2	0,6	1,5	11,4	3,6		1,2	3,6	4,2		1,2	2,4	2,4					167	
4,2	7,4	2,1	1,1	26,3		1,1	8,4	3,2	1,1		2,1	1,1	2,1		9,5	11,6	2,1	1,1	1,1		95	
3,8	4,9	2,1	1,6	27,2	0,8		11,4	2,7	4,8	0,8	3,8	3,7	1,1	3,3	6,0	8,2			0,5	0,5	184	
	3,6	1,8		25,0	8,8		5,4	1,8	1,8		3,6	5,4		3,6	14,3	14,3		1,8		3,6	56	late Pre-Boreal
				30,8			7,7							7,7	23,1	30,8					13	
	6,3			18,8							12,5				25,0	6,3				12,5	16	
														14,3	50,0	14,3	7,1		7,1	7,1	14	middle Pre-Boreal
				N = 1											N = 4	N = 2					7	
E040	D028	C023	C027	D021	C037	D029	D011	F025	D014	C033	E020	C025	C036	A020	C022	C010	C024	C011	E010	C029	808	

25	45	20	10	189	13	2	65	18	8	3	25	21	4	16	65	54	3	2	3	6
3,1	5,6	2,5	1,2	23,4	1,6	0,2	8,0	2,2	1,0	0,4	3,1	2,6	0,5	2,0	8,0	6,7	0,4	0,2	0,4	0,7

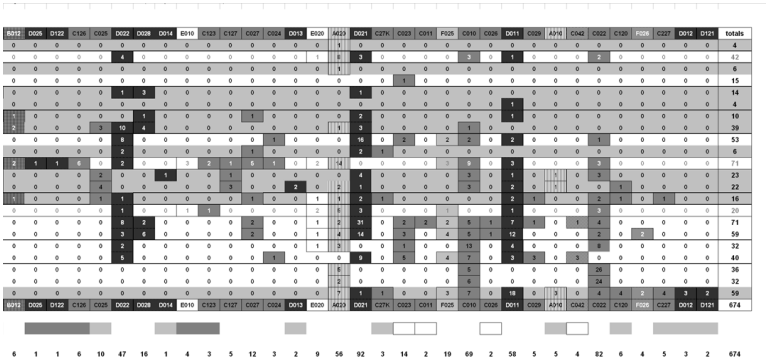


Fig. 19-4 (lower): The microlith assemblages from Duvensee, Bettenroder Berg IX, Jägerhaus cave and Rottenburg-Siebenlinden 1, 2 and 3 used in the correspondence analysis. In the totals row, types that are found in only one region have been highlighted. The different regions are also highlighted in various colours: light grey for southwest Germany, white for Holstein and dark grey for Bettenroder Berg IX.

3. Typological comparison with Mesolithic inventories in north and southwest Germany

Only a few inventories are suitable for a typological and chronological comparison with other Mesolithic finds in Germany. This is partly because reliably dated find complexes are rare and also because the find contexts are not always clear. As far as the Mesolithic is concerned, the research situation in Germany is better than in many other countries (Gehlen 2007b) but, if the material is examined more closely, there are still serious problems (e.g. Drafehn et al. 2003; Gehlen 2003). Often an inventory cannot be precisely assigned to specific ^{14}C dated contexts because the sites were occupied several times, e.g. Wehldorf 6 and 7 (Gerken 1994; 1999; 2001a; 2001b) or no final report on the finds has been published, e.g. Jühnsdorf in Brandenburg (Cziesla and Eickhoff 1995; Cziesla, Eickhoff and Husmann 1998; Gramsch 1976) or Reichwalde in Saxony (Vollbrecht 2001). Sometimes the available statistical base is too small, e.g. Hohen Viecheln in Mecklenburg-West Pomerania (Schuldt 1961). Comparisons with inventories in southern Scandinavia also produce unsatisfactory results, mainly because of the poor quality of the documentation in the publications and/or insufficient absolute dating of the Maglemose habitation sites. The situation is better for the Kongemose sites but there are no Kongemose layers in Friesack 4 with which they can be compared. Southern Scandinavian sites are therefore not taken into consideration here (for the research situation in southern Scandinavia, see also Holst 2007; Brinch Petersen 2006; Grøn 1995; Larsson 1990; Lübke 2000).

Particularly suitable for comparison purposes are the sites (campsites) on the Duvensee bog in Holstein, which were probably occupied only briefly (Bokelmann 1971; 1981; 1986; 1991; 1995; Bokelmann et al. 1985) and for which most of the microliths have been drawn and published (Bokelmann 1991). They can therefore be considered in conjunction with the typology used here. Moreover, they are well dated, usually with several ^{14}C dates per site. The Duvensee sequence presented here, which ends at about 6800 cal BC ('campsite 19' is later but has no microliths), can be extended by the assemblage from Seedorf LA 296, which dates to about 6100 cal BC (Bokelmann 1999).

Less suitable for comparison purposes, but nonetheless usable, is the stratigraphy of the Bettenroder Berg IX abri in the Göttingen Forest - i.e. on the northern edge of the low mountain ranges in Central Germany - for which, at least, outline drawings of all the microliths are available. However, the few ^{14}C dates are of such poor quality (bulk samples, high standard deviations) that better dating results are achieved by correspondence analysis (see below). In order to demonstrate that the ranges of microliths reflect not only supra-regional

communication networks but also regional traditions, the microliths from the Jägerhaus Cave on the Upper Danube (Taute 1971; for the ^{14}C dates see Oeschger and Taute 1978) and the Rottenburg-Siebenlinden 1, 2 and 3 open-air sites (Kind 2006a, 2006b; Kieselbach 2000) have also been included and typologically analysed. A comparison of the microliths from Friesack 4, trench Z, with the northwest and southwest German assemblages indicate regional style traditions that can perhaps be linked to social groups. Thus, for the first time, the different ranges of microliths can be used to provide a statistically secure base for a reconstruction of the development of the Mesolithic in Germany that can be extended and refined by additional material in the future.

Absolute dates are of great importance when correspondence analysis is applied to microlith inventories. When establishing the chronological order of the campsites on the Duvensee bog, I used Daniela Holst's PhD thesis, in which she critically examines the available dates (Holst 2007). She considers 21 out of a total of 50 published dates from Duvensee to be uncertain, contaminated or without a direct link with the finds and, consequently, she does not use these dates to date the inventories. There are 20 dates on which to base the chronology of the sites considered here. The values calculated by Holst have been used to determine the chronological order of the inventories by 'Reciprocal Averaging'.

The range of microlith types in the Duvensee inventories is much less varied than that from Friesack 4, trench Z, although the sites presented here cover approximately the same time span. This is the most important difference and it applies essentially to the lanceolate points. Overall, these are not found particularly frequently in Friesack 4 but they are present in all the assemblages from the late Pre-Boreal onwards, in a very great variety of forms. In Duvensee, they were only found at ‘campsite 13’, which dates to the middle of the Boreal period, which is precisely a phase that is not represented in Friesack 4. From Duvensee, in general, there are more triangular microliths than from Friesack. This too must be considered a distinct difference. On the basis of the Duvensee finds, Klaus Bokelmann has described a Boreal succession that rests mainly on developments in the forms of triangular microliths (Bokelmann 1991, 91 f.).

The Bettenroder Berg IX abri is on the northern fringe of the highlands in Central Germany and thus in an environment totally unlike that of the sites on the North German Plain. A Mesolithic sequence beneath this protective rock overhang in the red sandstone was excavated and published by Klaus Grote (Grote 1994). The three Mesolithic layers (13, 10 and 4-6) contain two Boreal assemblages and one early Atlantic inventory. Unfortunately, the ^{14}C dates for all three layers have high standard deviations. Correspondence analysis indicates a clear difference between Layers 13 and 10 on the one hand and Layer 4-6 on the other. The Late

Mesolithic inventory from the 4-6 horizon has no chronological equivalent in either the material from Friesack 4 or that from Seedorf LA 296 in Holstein. Nevertheless, it is not uninteresting to compare both assemblages with the latest period in Friesack 4.

The ^{14}C dates from Layers 10 and 13 are statistically identical. However, their stratigraphy and also the microlith assemblages in fact indicate a different time period for the two horizons, the two periods of occupation probably following each other within a comparatively short time span. Particularly striking are the relatively high proportions of end-retouched microliths (Type A020) and various broad base-retouched micropoints (Types C130; C128; C127; C126; C123) in the Bettenroder Berg IX abri, most of which are not found in Friesack 4. Another particularity is the triangular piece with *retouche inverse plate* (Type D122) in Layer 10. The Late Mesolithic assemblage, which is about 2500 years later than the two Boreal assemblages, contains a large number of Early Mesolithic forms but also rectangular pieces made from regular blades (Types F032 and F050). The similarity with the older inventories is remarkable. It is unlikely that this is the result of mixing with lower layers. It is possible that this is a case of continuity in the tradition of microlith manufacture and use, similar to that in Friesack 4, where it is clearly indicated by the retention of older forms with the addition of new forms.

Although there are some similarities between the contemporaneous inventories from Friesack 4, trench Z, Layer Complexes III a - III e and the Bettenroder Berg IX, Layers 13 and 10, the differences are considerable. On the one hand, there are the 'foreign' forms in Bettenroder Berg IX and, on the other, the percentage proportions of some of the types present on both sites lie outside the confidence interval for Friesack 4. This is also true of the two Late Mesolithic inventories from Seedorf LA 260 and Bettenroder Berg IX, Layer 4-6. In the former, this may be due to different regional characteristics while, in the latter, there are also chronological differences: these two Late Mesolithic inventories are at least 1000 years younger than Layer Complex IV d from Friesack 4. As already mentioned, there are no later Late Mesolithic complexes in Friesack 4.

In order to determine other regional characteristics in dated microlith inventories, the assemblages from Holstein and the Bettenroder Berg IX abri were compared with those from the Jägerhaus cave on the Upper Danube (Taute 1971; Oeschger and Taute 1978) and Rottenburg-Siebenlinden on the river Neckar (Kind 2006a, 2006b; Kieselbach 2000). Correspondence analysis was carried out on the combined microlith inventories. The rows were sorted on the basis of the stratigraphy of the find layers at each site and all the relevant ^{14}C dates were included: 22 find layers or sites were included in the investigation. Only

inventories with illustrations of all the microliths (or, in the case of Duvensee, almost all of them) were analysed. These were described in accordance with the measurements laid down for the typology used here. As a result, some changes were made to the way they had originally been described by the authors in question.

The following figures 19- to 12 are maps of the sites/find layers discussed here with the positions of the microliths indicated in each case. The time span is from the middle Pre-Boreal, from approx. 9000 cal BC, to the early Atlantic around 5500 cal BC. These 3500 years can be broken down into 8 phases.

Phase 1 - middle Pre-Boreal (from approx. 9000 cal BC) (Fig. 19-6)

Relatively close similarities can be observed between campsites 8 and 9 - the oldest Duvensee sites - and Complex I from Friesack 4, which is dated to about the same time and, here too, marks the point when occupation began. The range of microliths from the Duvensee sites is limited to three types with end and edge-retouched forms (A020, C010 and C022). These are also particularly frequent in Friesack 4, Complex I, but here there are also various triangular and rectangular forms already, which date to the same period. Layer 13 in the Jägerhaus cave also has the same forms, also dating to the same period. In this case, however, there are already broad base-retouched micropoints as well, which are typical of the Beuronian in southwest Germany as defined by Wolfgang Taute (1971; 1975). Although regional differences between the inventories from southwest Germany, Holstein and Friesack 4 can already be observed in this phase, the supra-regional similarities are also clear. These can be seen in the large proportion of 'simple' end-retouched microliths and micropoints (Types A020, C010, C022). Friesack 4, trench Z, does not yet have any lanceolate points. On the other hand, there are various triangular and rectangular forms as well as short broad segments. In southwest Germany, this phase has so far only been well documented in Layer 13 of the Jägerhaus cave, where there are the broad base-retouched micropoints as well as various triangular and rectangular forms but no segments. Layer 13 is the eponymous find layer for Beuronian A (Taute 1971; 1975).

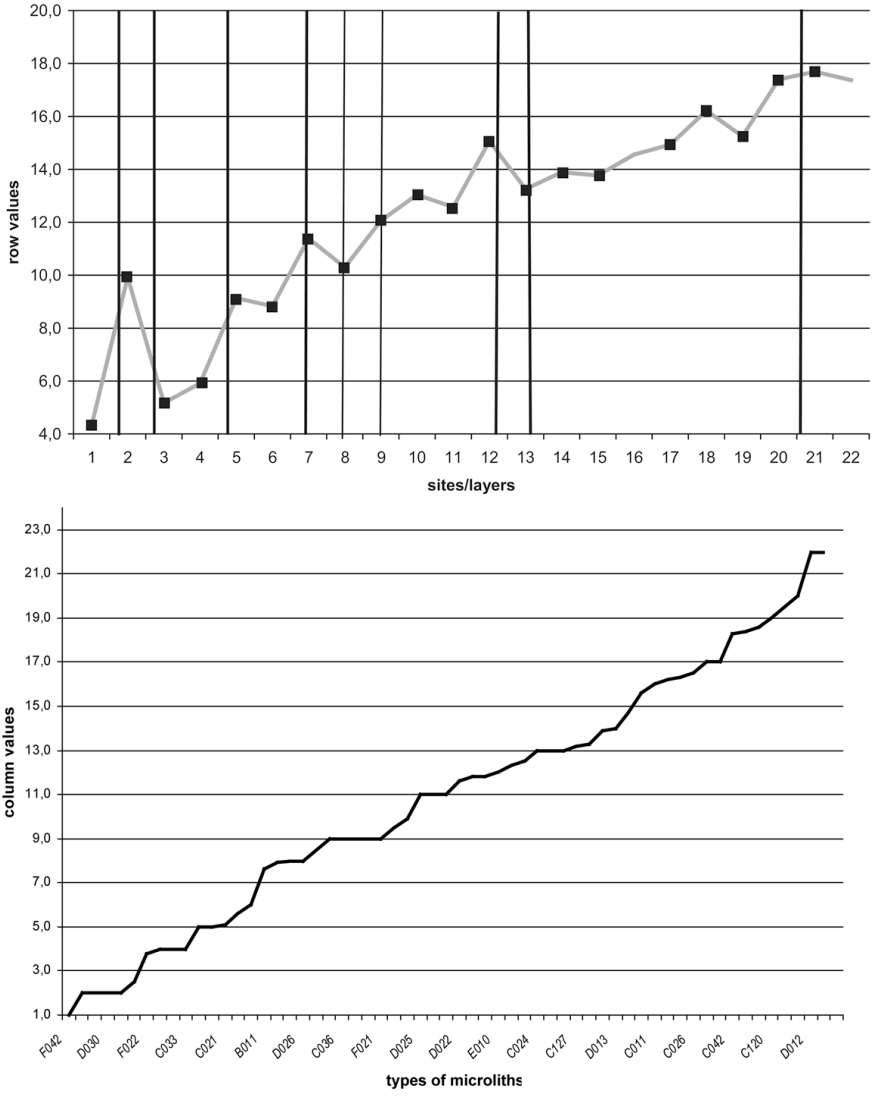


Fig. 19-5: Typo-chronological sequence of the microlith inventories in the table of the correspondence analysis. A Row values; B Column values.

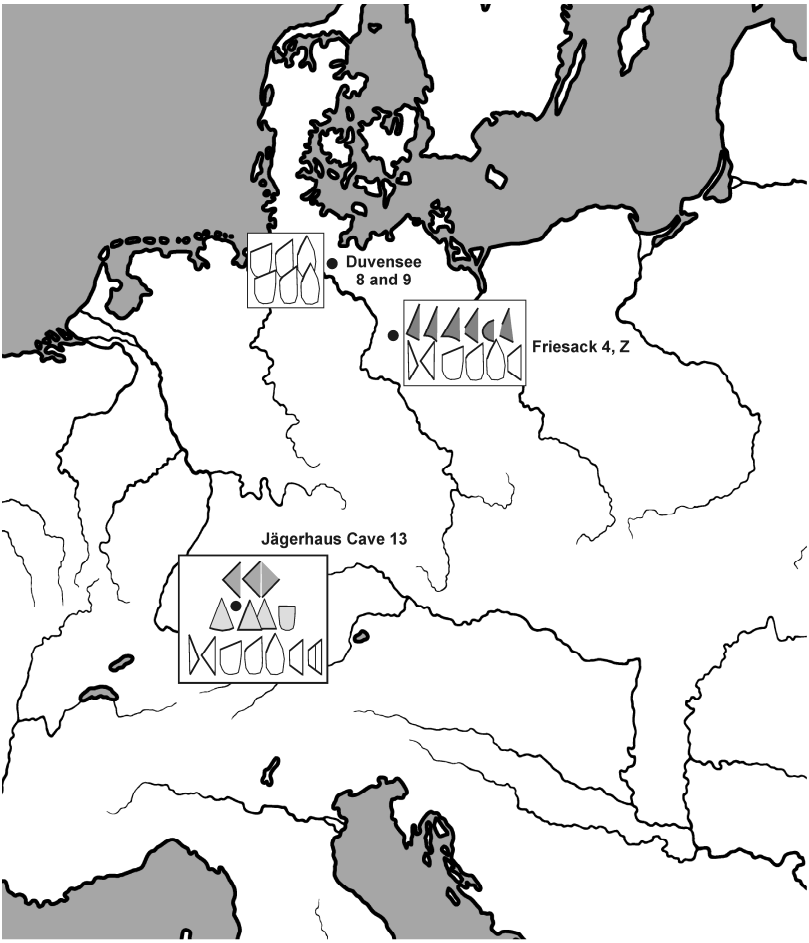


Fig. 19- 6: Phase 1, middle Pre-Boreal, from approx. 9000 cal BC. Range of microliths from Duvensee, Friesack 4 and southwest Germany.

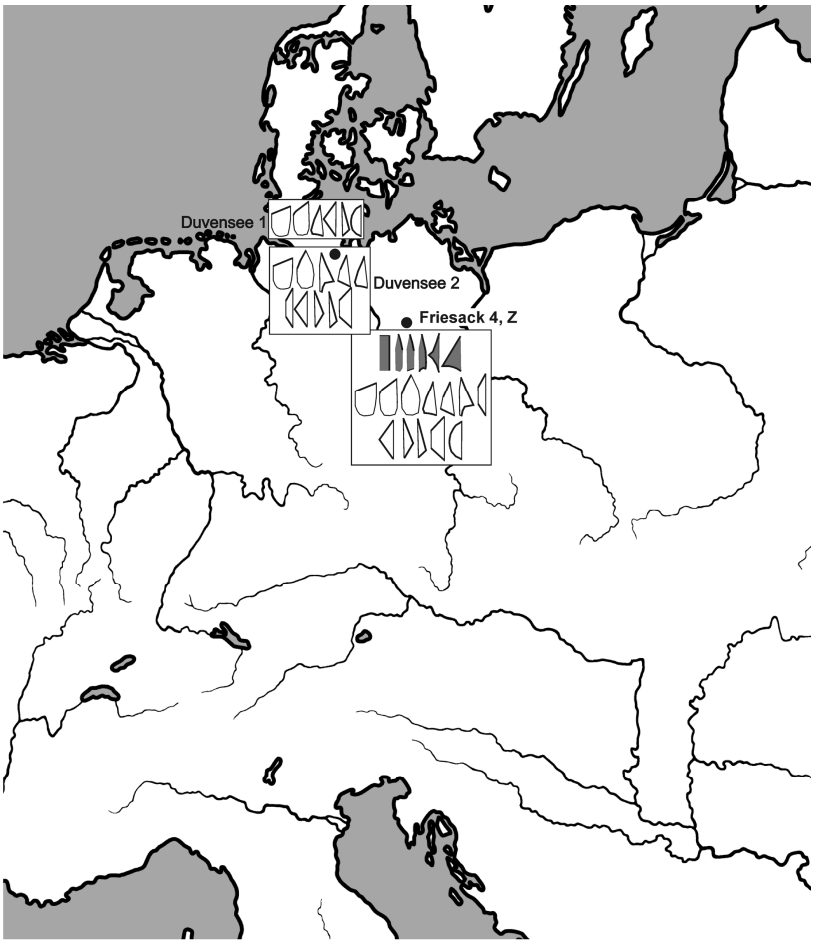


Fig. 19-7: Phase 2, late Pre-Boreal, from approx. 8700 cal BC. Range of microliths from Holstein and Friesack 4.

Phase 2 - late Pre-Boreal (from approx. 8700 calBC) (Fig. 19-7)

So far, no firm dates from southwest Germany are known for this phase. Important innovations in Friesack 4, trench Z, Complex II are the lanceolate points. From this point on, these become typical for Friesack, although they are never found in great numbers. On the Duvensee 1 and 2 sites, triangular forms are particularly noticeable and remain frequent from now on. In this later phase of the Pre-Boreal period there are also various additional rectangular forms. In Holstein, it would seem that these new types were adopted from the plain to the southeast where they were known much earlier. On the other hand, lanceolate points are first found centuries later.

Phase 3 - early Boreal, earlier part (from approx. 8400 cal BC) (Fig. 19-8)

None of the sites in southwest Germany considered here has any sign of occupation at this time, nor does the Bettenroder Berg IX abri site. In Friesack 4, trench Z, the inventories are very similar to those of the previous phase. The Duvensee campsite 6, which is divided into two separate excavation areas, now also has trapezes and segment-shaped microliths. The triangular pieces are more varied than in the previous phase. No lanceolate points appear there yet.

Phase 4 - early Boreal, later part (from approx. 8200 cal BC) (Fig. 19-9)

Except in Holstein, this is the phase with the most sites/find layers. Common to all the inventories is a great variability in the microlith types. The first trapeze-shaped pieces that can be called transverse arrowheads appear on the sites on the northern edge of the mountainous area in Central Germany and Friesack 4. In southwest Germany, at least in Layer 11 of the Jägerhaus cave, there are acute-angle triangular pieces that can also be interpreted as transverse arrowheads. While the range of types in Friesack, trench Z, is still very similar to that of the previous phase, in southwest Germany the variability in the broad base-retouched micropoints is quite remarkable. W. Taute (1971; 1975) called this phase Beuronian B in southwest Germany. Layers 13 and 10 in the Bettenroder Berg IX abri belong to this phase but are quite different in their microlith ranges. On the one hand, the similarities between the dorso-ventral retouched micropoints here and in southwest Germany are very noticeable (although they are usually of different shapes), while the extremely scalene triangles and the transverse arrowheads are similar to those in Friesack 4.

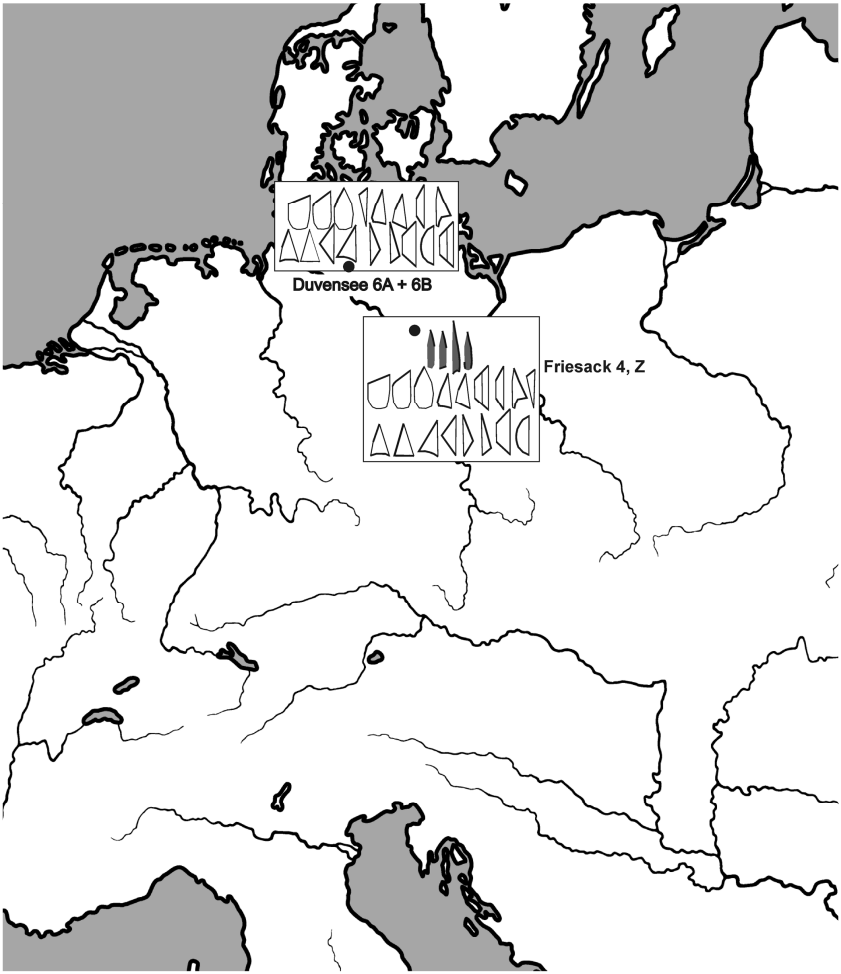
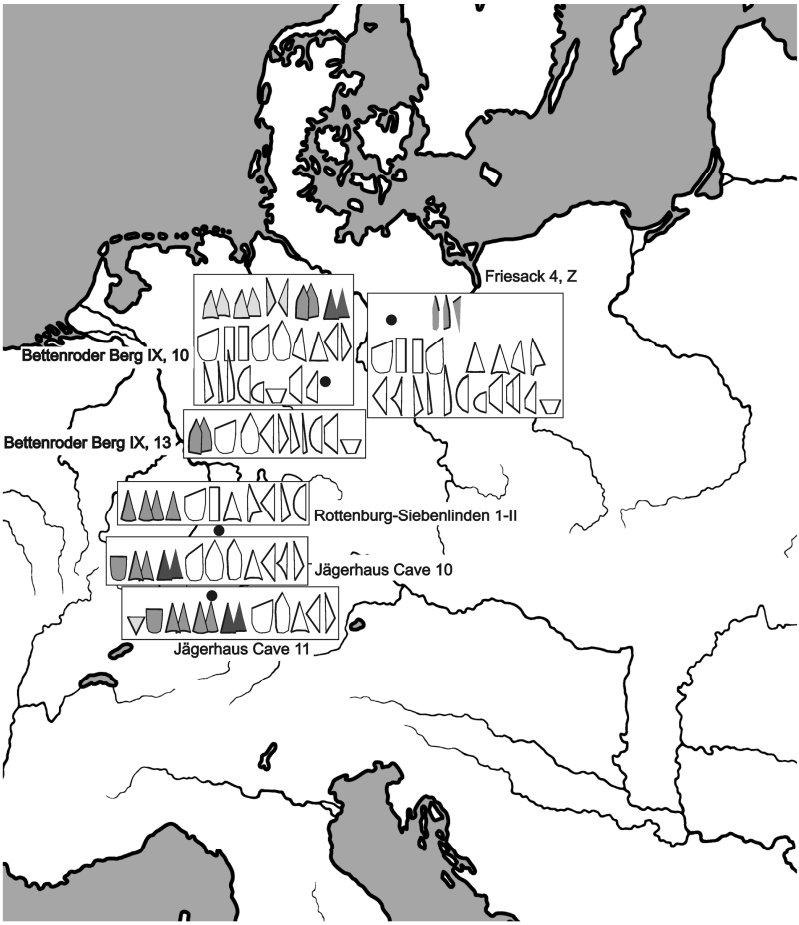


Fig. 19-8: Phase 3, early Boreal, earlier part from approx. 8400 cal BC. Range of microliths from Holstein and Friesack 4.



Microlith types of Friesack 4 Z, of three assemblages from southwest Germany (Jägerhaus Cave, Layers 10 and 11; Rottenburg-Siebenlinden 1-II = Beuronian B), and of two from the northern fringe of the highlands (Bettenroder Berg IX, Layers 10 and 13)

early Boreal, younger phase - from approx. 8200 calBC

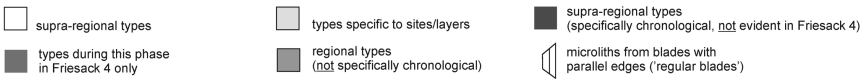


Fig. 19-9: Phase 4, early Boreal, later part from approx. 8200 cal BC. Range of microliths from Friesack 4, Bettenroder Berg IX and southwest Germany.

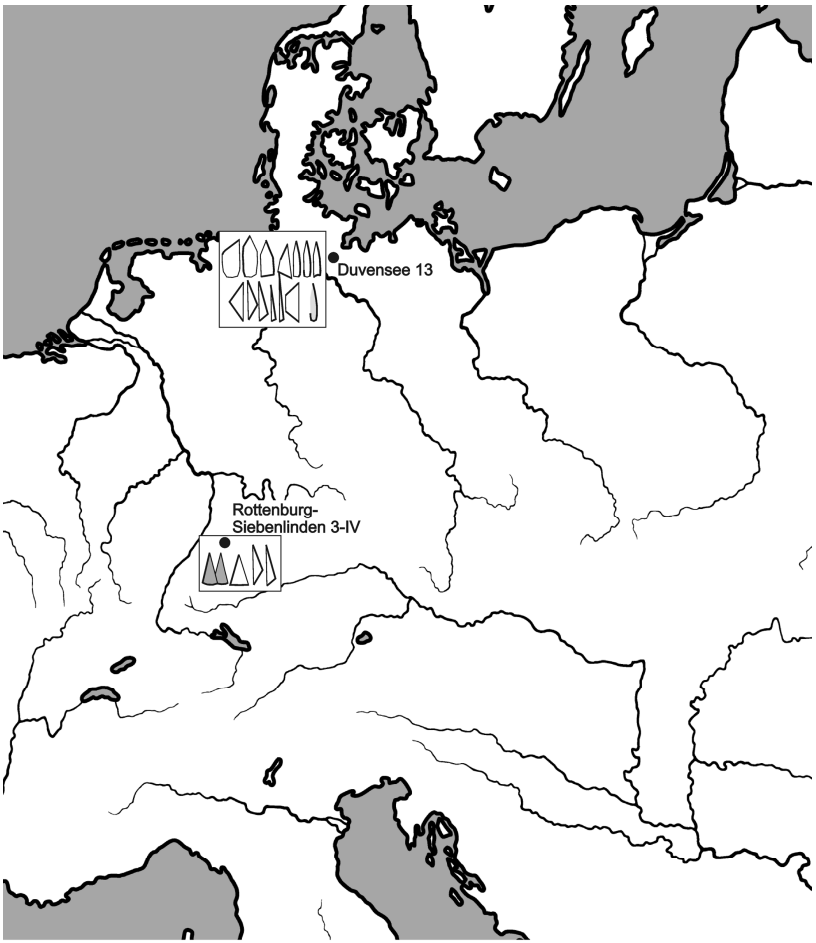


Fig. 19-10: Phase 5, middle Boreal, from approx. 7800 cal BC. Range of microliths from Duvensee and Rottenburg-Siebenlinden.

Phase 5 - middle Boreal (from approx. 7800 ca lBC) (Fig. 19-10)

This phase was not found in either Friesack 4, trench Z, or the Bettenroder Berg IX abri.

In southwest Germany, there is just one inventory from Rottenburg-Siebenlinden. This too is assigned to the Beuronian B. On the Duvensee bog, this phase is represented by 'campsite 13'. Here, lanceolate points appear for the first time, i.e. they are dated about 600 years later for the Duvensee bog than for Friesack 4, trench Z. No later microlith inventories are known from Duvensee.

Phase 6 - late Boreal (from approx. 7200 cal BC) (Fig. 19-11)

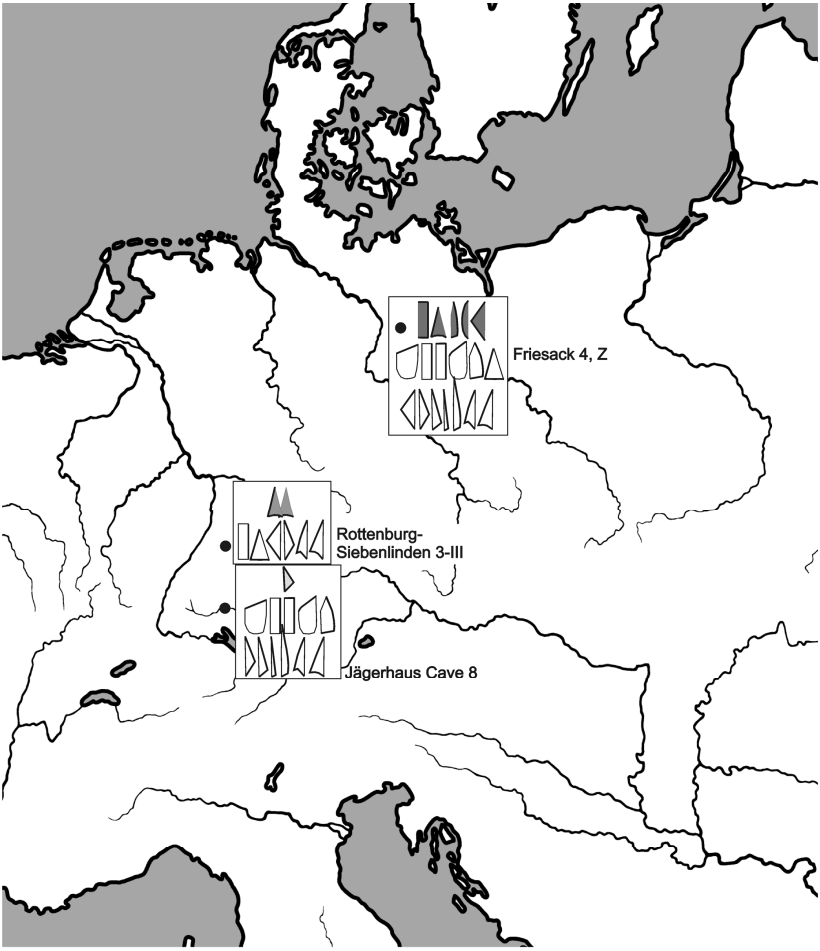
In Friesack 4, trench Z, there are now considerably fewer microlith types. However, these include more long narrow forms, e.g. backed bladelets and long narrow segments. In southwest Germany this is the Beuronian C period. However, given the appearance of broad dorso-ventral retouched micropoints and the absence of long narrow triangular forms, the inventory from Rottenburg-Siebenlinden 3-III would seem to be somewhat older than that from Layer 8 in the Jägerhaus cave.

Phase 7 - late Boreal to early Atlantic - earlier Late Mesolithic (from approx. 7000 cal BC) (Fig. 19-12)

The range of microliths from Friesack 4, trench Z, shows that in this early phase of the Late Mesolithic there are more site-specific types than in the previous phase. It is important to note that here, unlike in southwest Germany, there are not yet any rectangular microliths made from regular blades. Obviously, this method in blade technology and the predominant use of rectangular microliths were adopted in southern Central Europe about 1000 years earlier than in the northern area. Apart from a few rectangular microliths, the inventory from Rottenburg-Siebenlinden 2-II still has mainly Early Mesolithic forms. This would indicate a gradual adoption of the new technology and weapon form in southwest Germany, too.

Phase 8 - early Atlantic - later Late Mesolithic (from approx. 6100 cal BC) (Fig. 19-13)

Not until the later part of the Late Mesolithic - proof of which is not clearly established for Friesack 4, trench Z (only a single ^{14}C date so far, around 5780 cal BC) - are rectangular microliths made from regular blades also found in the northern part of the mountainous area in Central Germany. The inventory from Rottenburg-Siebenlinden 3-II is very small and therefore contains only a few types, but the two north German sites have a very varied range of types. At the same time, Early Mesolithic forms are definitely more numerous than the new rectangular types.



Microlith types from Friesack 4 Z and from two assemblages in southwest Germany (Jägerhaus Cave, Layer 8, and Rottenburg-Siebenlinden 3-III = Beuronian C)

late Boreal - since approx. 7200 calBC

supra-regional types

type specific to southwest Germany

types during this phase in Friesack 4 only

type specific to Jägerhaus Cave 8 during this phase

Fig. 19-11: Phase 6, late Boreal, from approx. 7200 cal BC. Range of microliths from Friesack 4 and southwest Germany.

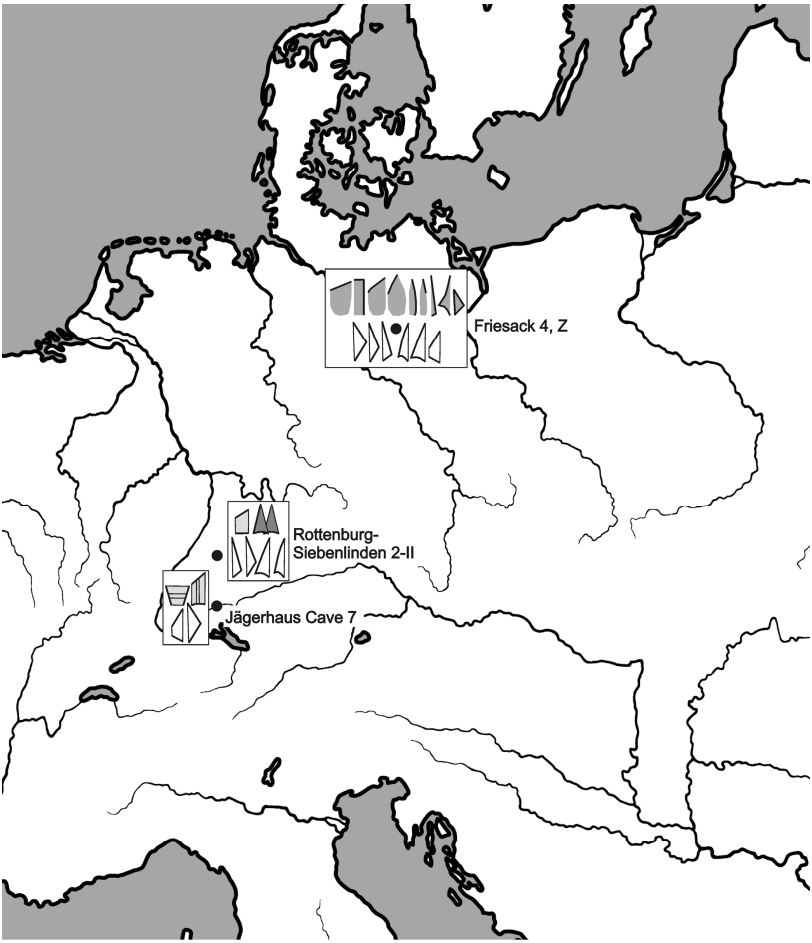


Fig. 19-12: Phase 7, late Boreal/early Atlantic - earlier Late Mesolithic from approx. 7000 cal BC. Range of microliths from Friesack 4 and southwest Germany.

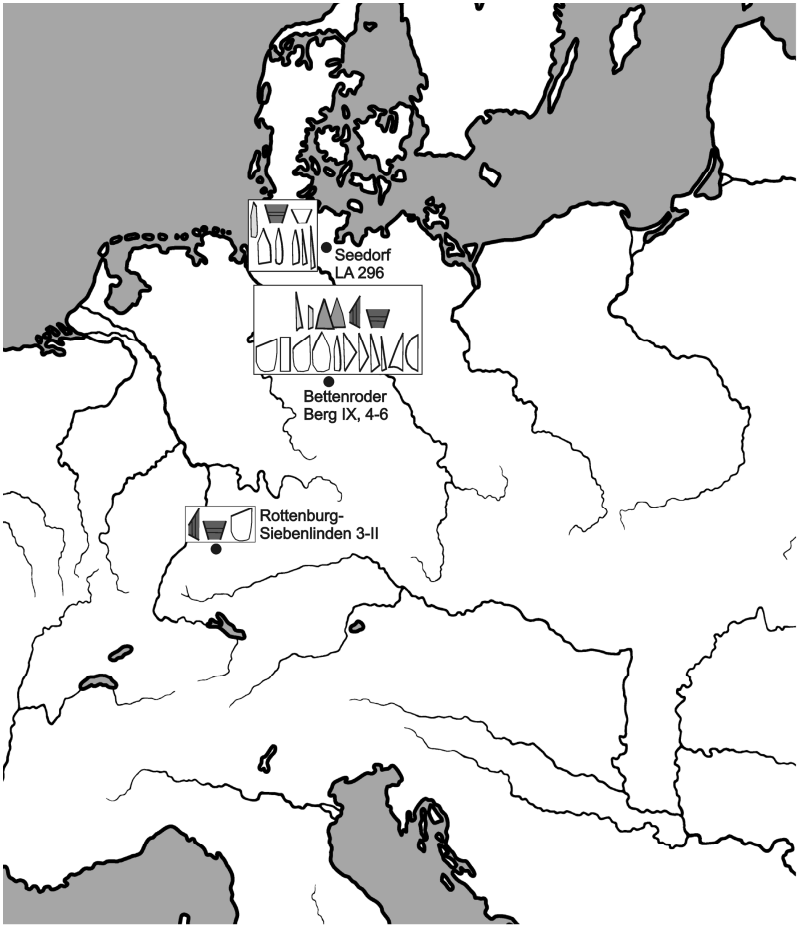


Fig. 19-13: Phase 8, early Atlantic - later Late Mesolithic from approx. 6100 cal BC. Range of microliths from Friesack 4 and southwest Germany.

Of the 60 types of microlith in the compared inventories 38, i.e. 63%, are forms that appear exclusively in only one of the three regions. Exclusive features found only in Holstein are various types of broad micropoints without base retouching and also, in the later inventories, an occasional lanceolate point. For the Bettenroder Berg IX abri, on the northern edge of the mountains in Central Germany, the exclusive features are principally broad micropoints with dorsal retouching and rectangular micropoints with dorso-ventral retouching**.** In southwest Germany, there are broad triangular micropoints with dorso-ventral retouching in the Early Mesolithic and various rectangular forms made from blades with parallel edges ('regular blades') in the Late Mesolithic**.** Links between the three regions and Friesack 4 can be deduced from 16 microlith forms that are found in Friesack and are also present in at least two of the three regions. Of particular interest is the fact that, in the case of certain individual types, Friesack can be linked with just one of the regions. Most of these forms date to between approx. 8100 and 7700 cal BC. All of them are found in the early Boreal Complex III of Friesack 4, trench Z, where they are dated to between approx. 8200 and 8000 cal BC. Although the time span between approx. 8000 and 7100 cal BC is not represented in Friesack 4, trench Z, it would appear that, during the early Boreal, the inhabitants of Friesack probably had connections reaching out in various directions.

During the Late Mesolithic, the types of lanceolate points in Seedorf LA 296 are different to those in Friesack 4. Whether this also applies to the Late Mesolithic sites on the plain to the southeast cannot yet be answered because this phase is not evident in Friesack 4, trench Z.

4. Conclusions

In Friesack 4, trench Z, a marked change in the range of microliths is observed from the late Pre-Boreal onwards; this is also the case in the other regions - although other microlith types are involved. The results of the correspondence analysis of 22 comparable inventories from the three different geographical regions show that from about 7100 cal BC onwards there was an ever greater differentiation between the microlith inventories, indicating greater diversity in the various traditions and a more rapid cultural evolution than before. The idea that there was a more or less uniform Late Mesolithic throughout Central Europe must be abandoned in view of the chronologically structured inventories presented here. For Friesack 4, it is hoped that the late Boreal/early Atlantic phase, i.e. the earlier part of the Late Mesolithic, can be further sub-divided when the microliths from trench D are analysed as this would provide a better basis for comparison.

Around 9000 cal BC, there were obviously already specific regional characteristics in the ranges of microliths. However, the large proportion of 'simple points' shows that the similarities were still considerable. Although this indicates that there were already different regional groups with their own traditions at this time, it also points to close links between them, which probably extended over the whole core area of Central Europe and the southern part of northern Europe. Towards the end of the Pre-Boreal these ties had apparently loosened and regional traditions developed in the production of microliths: these were probably also expressed in different kinds of arrows. Both the extremely scalene triangular pieces and the lanceolate points, which probably had a similar function as inserts in a wooden shaft, appeared in Friesack several hundred years before Duvensee. It is also possible that these forms came to northern Germany from the plain to the southeast. Moreover, it is conceivable that the differences in the microlith inventories are due to the different ways in which the landscape was used and the duration of the different uses. The campsites on the Duvensee Moor were probably used only briefly and this may be the reason for the limited range of microliths. Further arguments must be found to answer such questions. The analysis of the basic forms and the other tools found at Friesack 4 will provide a better foundation for this purpose.

The correspondence analysis of the microlith types from several stratigraphic Mesolithic sites from the northern fringe of the highlands in Lower Saxony (Abri Bettenroder Berg IX), the banks of the river Neckar (Rottenburg-Siebenlinden 1, 2, and 3) and the Upper Danube (Jägerhaus Cave), reveals that some microlith types are very important indicators of different cultural traditions that, from a regional perspective, can be tentatively associated with different social groups. Although regional traditions are obvious already during the middle Pre-Boreal period, a further remarkable differentiation of the Mesolithic inhabitants of Central Europe into regional groups must have taken place towards the end of the Pre-Boreal. Based on the published microliths from these sites and from Friesack 4, a southwestern, a northeastern, a northern and a central group can so far be determined.

This brief report should be enough to show that microlith forms reflect not only chronological but also, and more especially, regional traditions that can probably be associated with social groups. If there were enough well-dated, well-defined microlith inventories, one could probably determine the geographical extent of the territories of such groups. Unlike organic materials and ornaments, microliths would have the advantage that they can be collected in large quantities from all geographical regions even if the preservation conditions are relatively poor. Despite much effort (Newell et al. 1990; Płonka 2003; Cziesla 2004; David 2006; Terberger 2006), it has been shown that because of their relative rarity and often

unclear find circumstances organic artefacts and ornaments are of limited use for the purpose of differentiating between cultural groups and reconstructing detailed chronologies of their development. For the Late Mesolithic in the southern regions of Europe, it has also been shown that, given a sufficiently large data base, microlith types can be a better point of departure for this purpose (Gehlen, in prep.).

The detailed results of the project will be published as soon as possible: first of all, a typochronological framework for the Mesolithic in the northern and northeastern part of Germany and the neighbouring regions. The subsequent functional analysis of the larger tools and descriptions of the production sequences and their development over time will then refer back to the analysis of the stratigraphy and general spatial distribution of the Mesolithic lithic artefacts conducted in this first phase of the project.

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[1] Since 2007 the correspondence analysis for trench Z was worked over. The results presented here therefore differ from those published in Gehlen (2007a).