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Author(s): Mikael A. Manninen & Kjel Knutsson

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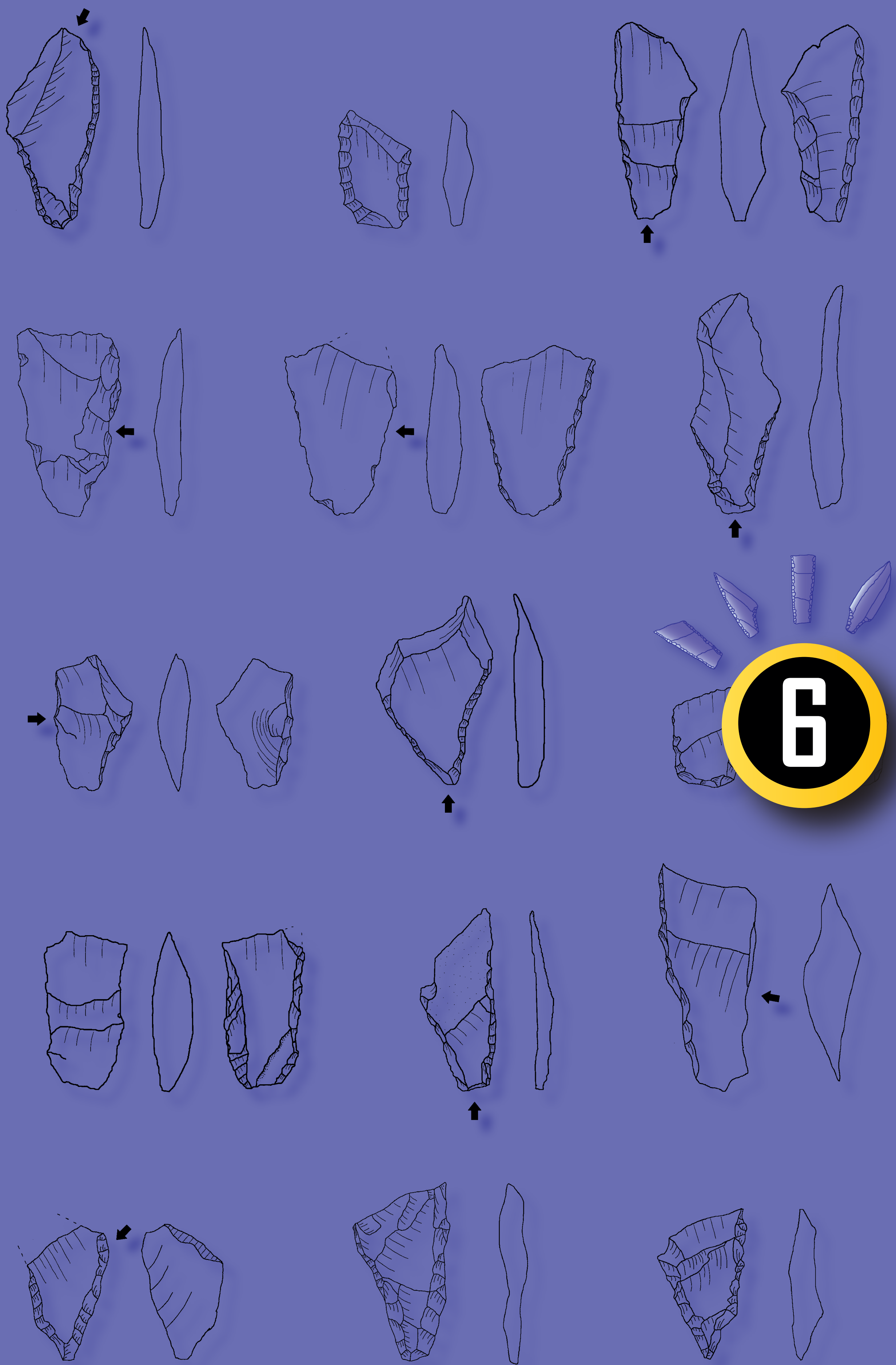
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Northern Inland Oblique Point Sites – a New Look into the Late Mesolithic Oblique Point Tradition in Eastern Fennoscandia

Mikael A. Manninen & Kjel Knutsson

ABSTRACT **The purpose of this paper is to make the first comprehensive survey of inland sites with oblique points in the northernmost parts of Fennoscandia. The chronological and technological relation of these points with similar points from Mesolithic contexts discussed in earlier Finnish, Norwegian and Swedish studies is also assessed. After a presentation and analysis of the available data it is concluded that the oblique points on the northern inland sites date mainly to *c.* 5800–4700 calBC and that at the time they were located in a boreal forest environment. It is further suggested that the discussed points in fact belong to a technological tradition that extended over the whole of eastern and northern Fennoscandia during the Late Mesolithic.**

KEYWORDS
Margin-retouched points, oblique points, inland sites, Late Mesolithic, Finland, Sweden, Norway, Lapland, northern Fennoscandia.

Introduction

The discovery of the first Mesolithic sites in northernmost Norway in 1925 (e.g., Bøe & Nummedal 1936; Tansem 1999) introduced small marginally retouched point types normally called double and single edged tanged points, oblique points and transverse points to the archaeology of northern Fennoscandia.

As a result of subsequent studies conducted at the Norwegian Barents Sea coast, this kind of points have come to be typo-chronological markers used in defining archaeological periods in the area. A typo-chronological sequence devised with the aid of radiocarbon dates and shore displacement chronology (Hesjedal *et al*. 1996; Olsen 1994) suggests a tripartite Mesolithic (Early Stone Age in Norwegian literature) timeline where points are considered typical for two phases. The points used during Phase I (*c.* 9500–8000 calBC) are usually defined as tanged and single edged points whereas the points from Phase III (*c.* 6400–4400 calBC) are called transverse points. However, defining this kind of points, which in reality often are no more than retouched edges, into specific types, is often problematic, especially without knowledge of their technological background. As the greater frequency of given point types (double-edged, single-edged, oblique and transverse) during different time periods should also be seen as tendencies rather than chronologically clear-cut occurrences (see below), in this paper we will henceforth lump together all the above mentioned point types under the general name *oblique point* (following Manninen 2005), unless otherwise indicated.

In many studies these points have been associated solely with a range of artefacts left on the sea shore by coastal groups. They have had a central role in the still continuing discussion on the early settlement of the coastal area - not least because of their likeness (see, e.g., Odner 1966:132) to Late Paleolithic and Early Mesolithic artefact types found further south in Scandinavia. Not until surveys in the late sixties and early seventies (Havas 1999:6; K. Helskog 1974) in the inner parts of Finnmark and Troms county, were a number of sites with similar points identified in the inland areas of northern Norway as well.

In southern and western Finland oblique points have also been known since the early twentieth century (Luho 1948; 1967; Matiskainen 1986; 1989) and are nowadays considered typical for the Late Mesolithic (*c.* 6500–4900 calBC). However, in northern Finland the first oblique points were found as late as the 1960's in excavations at the Neitilä 4 site in Kemijärvi, southern Finnish Lapland (Kehusmaa 1972:76) and only in the late 1980's and early 1990's, when excavation activities had begun, were the first oblique points identified in assemblages from northern Finnish Lapland (Arponen 1991; Halinen 1988; Kankaanpää 1988; Kotivuori 1987a,b).

In northern Sweden sites with Mesolithic oblique points were not recognized until the inland site Rastklippan, situated in southern Swedish Lapland, was discussed in a paper by Knutsson (1993). Through an excavation of the site in the same year, the recovered points could be dated to the Late Mesolithic. Although oblique points have been found also in a couple of other locations in Swedish Lapland, the material has so far not entered into any serious discussion concerning archaeological cultures in the area.

The growing number of oblique point sites found in the inland areas of northern Fennoscandia raises the question of their relation to the oblique points known from other parts of Fennoscandia. Although there is evidence of oblique point using groups using both the coast and the inland areas in northern Finnish Lapland and Finnmark during the Late Mesolithic (Manninen 2009), since evidence from the Barents region suggests that the exploration of inland areas by the maritime adapted population inhabiting the coast was possible already at an early stage (Kankaanpää & Rankama 2005:112), association with at least three archaeologically defined contexts can be suggested for the northern inland oblique point sites. These are: (1) the colonisation phase of the North Norwegian coastal areas, (2) Phase III of the Finnmark typochronology, and (3) the Late Mesolithic oblique point tradition of Southern Finland (see, e.g., Knutsson 1993; 2005b; Olsen 1994; Rankama 2003).

In this paper we evaluate the available data on the northern inland oblique point finds and discuss their date and position in the prehistory of Fennoscandia. The sites discussed are mainly in the counties of Norrbotten and Västerbotten in Sweden, in the counties of Finnmark and Troms in Norway and in the county of Lapland in Finland. As the aim here is to present and discuss inland sites, specific coastal sites are commented upon only when there is a need to contextualize and clarify some features of the inland sites. Oblique points dated to the Mesolithic are found also on the Russian Barents Sea coast and possibly also in the inner parts of Kola Peninsula (Šumkin n.d.:30–31, table IX:1–3; 1986:Fig.4; Woodman 1999:304) but since data on these sites are scarce they are not discussed further in this paper.

Survey of Inland Sites with Oblique Points

A survey of research literature, museum catalogues, and archived reports in Västerbotten county museum (Sweden), Tromsø museum (Norway) and The National Board of Antiquities (Finland) conducted for the purpose of this study revealed 31 inland sites with oblique points from the study area (**Fig. 1**). Short descriptions of the sites are provided in **Appendix I** and a glossary of place names used in the paper in **Appendix II**. In site names the spelling used by the site's namer is followed.

The known inland oblique point sites in the study area are mostly located on lake shores or on the banks of large rivers. This picture, however, is probably distorted due to the focus of modern habitation as well as archaeological field survey work on this type of locations. The area under discussion is largely uncultivated and sparsely populated. Many of the points have been found in field surveys and excavations associated with the building and use of modern infrastructure, especially hydroelectric dams. However, this fieldwork activity, as well as the few more strictly research-oriented field surveys and excavations, has covered only fraction of the vast research area, the best part of which has never been archaeologically surveyed.

When making the archive survey, we have accepted as oblique points only artefacts that have, besides the correct general shape, be it tanged, single edged, oblique or transverse, a backing retouch used to create the shape. Some pieces without retouch or with

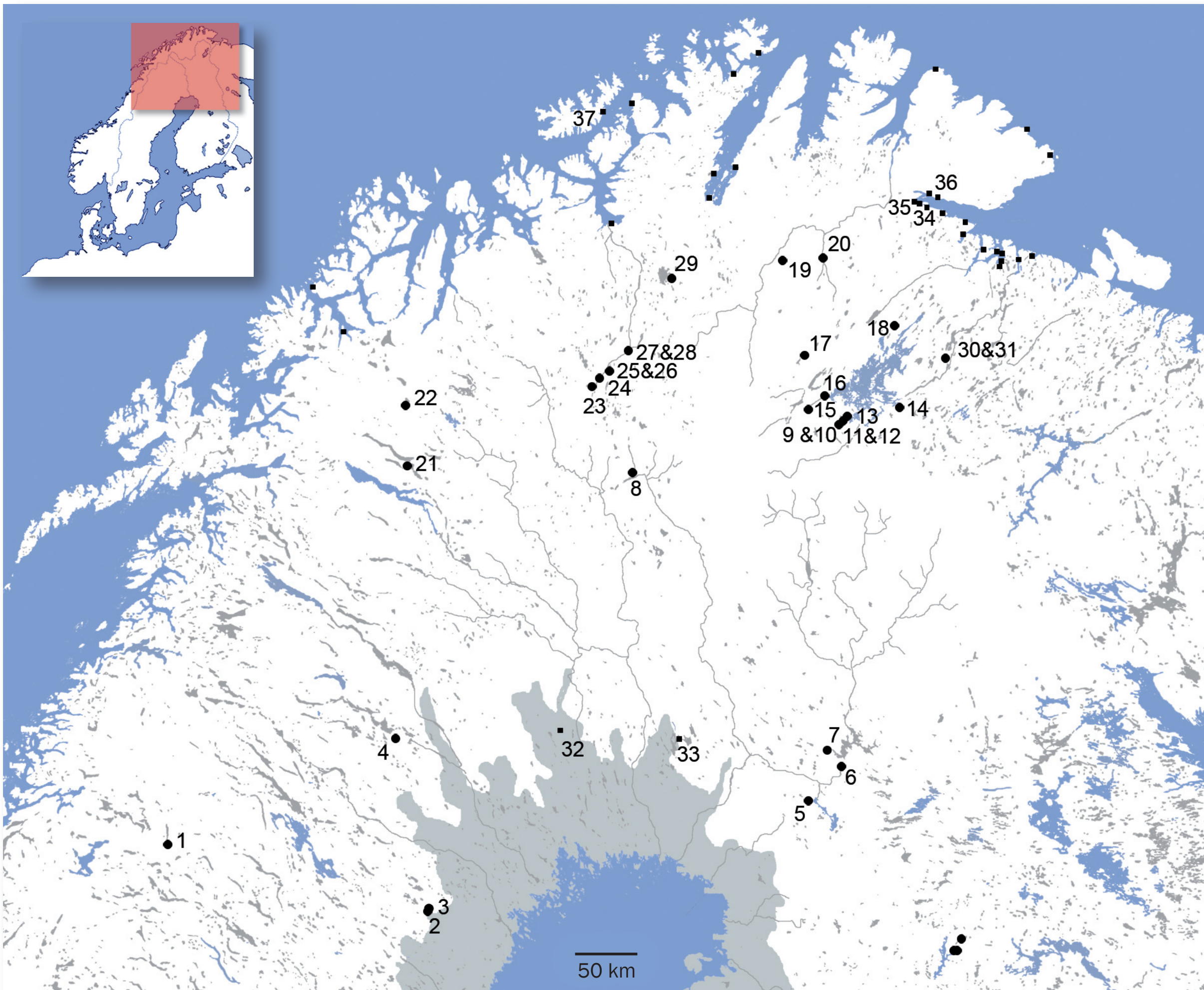

Figure 1. The study area and the oblique point sites in northern Fennoscandia. The extent of the Baltic Sea at *c.* 6400 calBC is marked with light grey (following Andersson 2000). Larger dots: inland oblique point sites. Smaller dots: coastal oblique point sites. Sites discussed in the paper: 1. Rastklippan; 2. Lappviken; 3. Garaselet; 4. Tallholmen; 5. Kujala/Uutela; 6. Neitilä 4; 7. Lautasalmi; 8. Museotontti; 9. & 10. Kaunisniemi 2 & 3; 11. Satamasaari; 12. Kaidanvuono SW; 13. Kirakkajoen voimala; 14. Nellimjoen suu S; 15. Ahkioniemi 1&2; 16. Vuopaja; 17. Bealdojohnjalbmi 1; 18. Supru Suprunoja; 19. Mávdnaávži 2; 20. Jomppalanjärvi W; 21. Leinavatn I; 22. Devdis I; 23. Aksojavri; 24. Kautokeino Kirke; 25. Guosmmarjavrre 5; 26. Njallajavri, 27; Riggajåkka; 28. Peraddjanjarga; 29. Gasadaknes; 30. Noatun Neset; 31. Kjerringneset IV/Inganeset. Coastal sites: 32. Gammelkänt; 33. Kaaraneskoski 1; 34. Lossoas Hus & Gressbakken Øvre; 35. Nordli; 36. Mortensnes; 37. Slettnes; Coastal sites on the Barents Sea coast from Bøe & Nummedal (1936), Gjessing (1942), Odner (1966), Simonsen (1961) and on the Bothnian Bay from Moberg (1955) and Rankama (2009).

only a few inconclusive retouch scars, but nevertheless used as points, might be lost using these criteria. However, as it has become evident that the fracturing of lithic raw materials, especially quartz, produces fragments that are easily misinterpreted as points if only the general shape of the piece is taken into account (Knutsson 1998; see also Skandfer 2003:282) their application is essential. The oblique points from the inland sites discussed here (**Fig. 2**), have been, when possible, confirmed in this study using these criteria.

Some sites that have been reported to have yielded oblique points are excluded from this study as a consequence of applying the strict criteria. These are Virdnejavri 113 (Simonsen 1986:3–4; 1987:36 but see Havas 1999:9–10; Knutsson 1998); Pekkalanvaara Tunturipolku (Halinen 1995; 2005; Manninen 2009) and Rahajärvenkaita (Manninen 2009). All of these sites have yielded point-like artefacts that have un-diagnostic or insufficient modification.

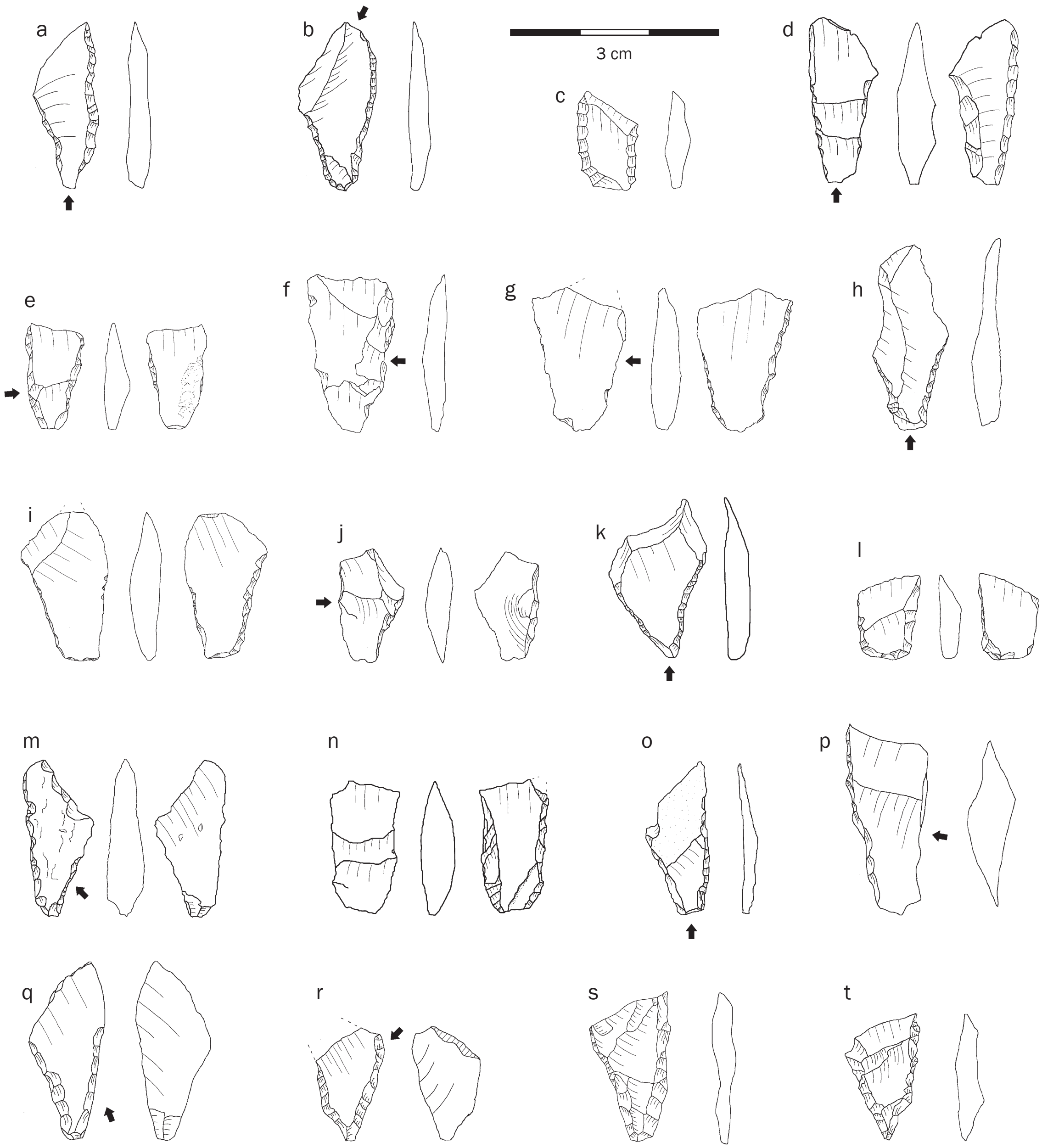

Figure 2. Examples of oblique points from the inland sites. When discernible the orientation of the original blank is marked with an arrow. a) Rastklippan 1969, quartzite; b) Rastklippan 1969, chert; c) Lappviken, porphyry; d) Tallholmen, quartzite; e) Lautasalmi (KM 15846:78), chert; f) Museotontti (KM 28464:289), quartz; g) Museotontti (KM 24464:620), quartz; h) Kaunisniemi 2 (KM 26039:42), chert; i) Satamasaari (KM 26010:4), chert; j) Nellimjoen suu S (KM 24375:454), chert; k) Vuopaja (KM 28365:446), chert; l) Vuopaja (KM28365:442), chert; m) Supru (KM 22685:13), quartz; n) Mávdnaávži 2 (KM 34675:199), chert; o) Mávdnaávži 2 (KM 34675:147), chert; p) Devdis I (Ts. 5720:i), quartzite; q) Devdis I (Ts. 5720:ag) quartzite; r) Aksujavri (Ts. 8479:x) chert; s) Riggajåkka (Ts. 5898:g), chert; t) Gasadaknes (Ts. 5895:di), chert. Drawings by M. A. Manninen, a–d and p–r re-drawn from sketches by K. Knutsson, s–t re-drawn from E. Helskog 1978:Fig. 3.1.1.

The Date of Oblique Points on the Inland Sites

The dating of oblique points in different parts of Fennoscandia is based on shore displacement chronology, typology and/or radiocarbon dates. As regards the inland sites discussed here, only the latter two methods have potential (for a discussion of the shore displacement of Lake Inari, see Arponen & Hintikainen 1995).

The typo-chronological classification into oblique, transverse, tanged double edged, and single edged points (Helskog *et al*. 1976:24–26) has been used in dating Mesolithic sites in Norway. In northern Norway a division is made between Phase I tanged and singled edged points and Phase III transverse points. However, typological dating of simple artefact types, in this case marginally retouched points, is problematic. Excavated and analysed closed contexts with oblique points like Rastklippan and the Mávdnaávži 2 site in northern Finnish Lapland, where one short occupation phase has created the entire lithic assemblage, illustrate the problems well. The variation in point shapes in these assemblages is big and includes the whole range of types from varied tanged points over oblique points to transverse points. What is significant is that these artefacts have been made of one raw material and if not during a single knapping session at least during the same occupation phase (see Manninen & Knutsson *in preparation*). Such examples, of course, must have implications for how we interpret the finds also from other sites with these kinds of points.

For instance, in several discussions of Early Mesolithic sites on the Barents Sea coast, there seem to be points that do not fit typo-chronologically the dating implied by the other finds and the elevation of the site (e.g., Havas 1999:64; Thuestadt 2005:74; see also Tansem 1999:98). This is often explained away as a consequence of several occupations at the same site but, with the above mentioned examples in mind, it could also be interpreted as variation within the artefact type. Whether the points on these sites are Early or Late Mesolithic is of no particular importance here. The situation just goes to show that at sites like Slettnes IVA:1 on the Finnmark coast, where points are considered Preboreal on the basis of typology (Hesjedal *et al*. 1996), but where five radiocarbon dates (**Fig. 10**) and a Holocene transgression shore might rather point towards a Late Mesolithic date, the dating of points on typological grounds can be questioned.

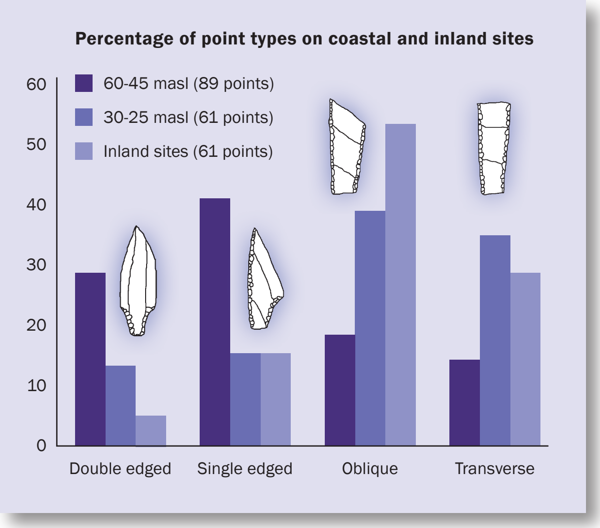

Figure 3. Edge types of points from sites at Varangerfjord divided in two temporal groups (roughly Early and Late Mesolithic) on the basis of altitude above sea level (data from Odner 1966 and Simonsen 1963) and from the inland sites Mávdnaávži 2, Devdis I, Rastklippan and Aksujavri. Point type drawings adapted from Helskog *et al.* 1976.

If one looks through Simonsen's (1961; 1963) and Odner's (1966) descriptions of sites in the Varangerfjord area in eastern Finnmark, variation in point types can in fact be seen. **Figure 3** shows the point types according to Odner's and Simonsen's site descriptions and find classifications in relation to the sites' height above sea level. The diagram gives a rough picture of the typological, chronological and geographical variation.

Although this information should also be set against the technological context of the sites in question, it nevertheless forces a careful approach especially when dealing with stray points found in, for example, the inner parts of Finnmark and northern Finland. It seems obvious that the difference in point types as defined by Helskog *et al*. (1976:24–26) between old sites and younger ones is one of quantity rather than quality. On the older sites there is a higher frequency of double and single edged tanged points, on the younger sites oblique and transverse points dominate. A further problem we are facing here, judging from the contextual analysis of the finds (Manninen & Knutsson *in preparation*) and, assuming that the typo-chronology can be applied to the inland points, is that most of the points we are classifying are actually rejects from the manufacturing process instead of finished products. This makes their classification into point types questionable by definition.

	Site	Lab. No.	Date BP	calBC 2σ	Material	Context
1	**Devdis I**	**T-1343**	6575±150	**5759–5221**	Charcoal	Pit structure 3
2	Devdis I	**T-1453**	1800±220	**357–AD649**	Unburnt bone	Pit structure 2
3	Devdis I	**T-1342**	1020±80	**AD784–1212**	Unburnt bone	Pit structure 1
4	**Garaselet**	**St-5190**	8160±110	**7490–6820**	Charcoal	Feature 22, cooking pit
5	Garaselet	**St-5193**	8040±100	**7300–6660**	Charcoal	Feature 5, hearth
6	Garaselet	**St-5191**	7885±300	**7540–6220**	Burnt bone	Feature 9(u), bone concentration
7	Garaselet	**Ua-2063**	7640±100	**6680–6260**	Charcoal	Feature 27, cooking pit
8	Garaselet	**Ua-2062**	6890±90	**5980–5630**	Charcoal	Feature 24, cooking pit
9	Garaselet	**Ua-2067**	6210±120	**5470–4850**	Charcoal	Feature 35, charcoal layer
10	Garaselet	**Ua-2061**	6190±90	**5350–4860**	Charcoal	Feature 8, hearth
11	Garaselet	**Ua-2066**	5970±110	**5210–4610**	Charcoal	Fearture 34, hearth
12	Garaselet	**Ua-2060**	5920±80	**5000–4590**	Charcoal	Fearture 6, cooking pit
13	Garaselet	**Ua-2064**	4480±80	**3370–2920**	Charcoal	Feature 30, hearth
14	Garaselet	**Ua-2065**	1370±80	**AD540–880**	Charcoal	Fearture 31, hearth
15	**Kjerringneset IV/Inganeset**	**Tua-3025**	5990±55	**5006–4727**	Food crust	Säräisniemi 1 pottery sherd
16	Kjerringneset IV/Inganeset	**Tua-2886**	4815±65	**3712–3377**	Charcoal	Cultural layer
17	**Mávdnaávži 2**	**Hela-963**	6455±45	**5484–5327**	Burnt bone	Bone pit/hearth isnside hut
18	**Museotontti**	**Hel-2563**	7880±140	**7137–6457**	Charcoal	Hearth 119,31/155,42
19	Museotontti	**Hel-2564**	7750±120	**7029–6414**	Charcoal	Refuse pit, 124,5/148,6
20	Museotontti	**Hel-2728**	7640±120	**6770–6232**	Charcoal	Refuse pit, 121,7/176,43
21	Museotontti	**Hel-2565**	7640±110	**6697–6238**	Charcoal	Refuse pit, 122/158
22	Museotontti	**Hel-2559**	7210±120	**6368–5847**	Charcoal	Hearth 120,72/151,83
23	Museotontti	**Hel-2562**	5100±100	**4225–3658**	Charcoal	Hearth 121,75/155,5
24	Museotontti	**Hel-2561**	2150±110	**405–AD71**	Charcoal	Hearth, 123,14/153,21
25	Museotontti	**Hel-2560**	1430±110	**390–AD867**	Charcoal	Hearth, 126,2/146,3
26	**Nellimjoen suu S**	**Hel-2678**	6000±120	**5220–4606**	Charcoal	Cultural layer inside hut
27	**Noatun Neset**	**Beta-131296**	5950±90	**5196–4598**	Food crust	Säräisniemi 1 pottery sherd
28	**Rastklippan**	**Ua-3657**	8055±75	**7287–6695**	Charcoal	Hut floor filling
29	Rastklippan	**Ua-3656**	6540±75	**5626–5363**	Charcoal	Hearth inside hut
30	Rastklippan	**Ua-3655**	6355±75	**5483–5081**	Charcoal	Hearth inside hut
31	Rastklippan	**Ua-3654**	6410±75	**5508–5223**	Charcoal	Hearth inside hut
32	**Supru, Suprunoja**	**Hel-2117**	6650±120	**5782–5365**	Charcoal	Hearth 1034/954
33	Supru, Suprunoja	**Hel-2116**	5830±120	**4997–4403**	Charcoal	Hearth 1036/942
34	Supru, Suprunoja	**Hel-2115**	4230±120	**3319–2476**	Charcoal	Hearth 1030/936
35	Supru, Suprunoja	**Hel-2114**	3680±100	**2434–1772**	Charcoal	Hearth 1030/936
36	**Vuopaja**	**Hel-3584**	7600±90	**6634–6254**	Charcoal	Hearth 121/998
37	Vuopaja	**Hel-3585**	7410±100	**6443–6072**	Charcoal	Hearth 120/1000
38	Vuopaja	**Hel-3582**	7110±140	**6328–5716**	Charcoal	Hearth 116-118/994
39	Vuopaja	**Hel-2628**	5390±120	**4454–3973**	Charcoal	Hearth 3/1987
40	Vuopaja	**Hel-2627**	5340±90	**4341–3984**	Charcoal	Hearth 3/1987
41	Vuopaja	**Hel-2629**	5330±90	**4337–3981**	Charcoal	Hearth 9/1987
42	Vuopaja	**Hel-3581**	5210±140	**4334–3713**	Charcoal	Hearth 102/994C
43	Vuopaja	**Ua-10109**	4955±65	**3942–3640**	Charcoal	Fossil turf layer
44	Vuopaja	**Ua-4364**	4805±85	**3765–3372**	Food crust	Kierikki Ware sherd
45	Vuopaja	**Hel-3583**	4490±90	**3494–2914**	Charcoal	Fossil turf layer
46	Vuopaja	**Hel-2631**	4410±140	**3515–2674**	Charcoal	Hearth 4/1987
47	Vuopaja	**Hel-2626**	4330±90	**3339–2680**	Charcoal	Hearth 3/1987
48	Vuopaja	**Hel-2632**	4140±90	**2902–2488**	Charcoal	Hearth 4/1987
49	Vuopaja	**Hel-2633**	4020±120	**2886–2209**	Charcoal	Hearth 4/1987
50	Vuopaja	**Hel-2630**	3120±90	**1608–1129**	Charcoal	Hearth 7/1987
51	Vuopaja	**Hel-2634**	2530±100	**840–400**	Charcoal	Hearth 106/1004C
52	Vuopaja	**Ua-4365**	2220±80	**406–AD52**	Charcoal	Midden 110/1000A
53	Vuopaja	**Hel-2912**	1770±100	**27–AD532**	Charcoal	Hearth inside hut

Figure 4. Radiocarbon dates from the inland oblique point sites. Data from K. Helskog 1980b; Knutsson 1993; 2005b; *manuscript*; Skandfer 2003; 2005; Manninen 2006; Halinen 2005; Sohlström 1992; Nieminen 1984. See figure 5 for the numbers in the first paragraph.

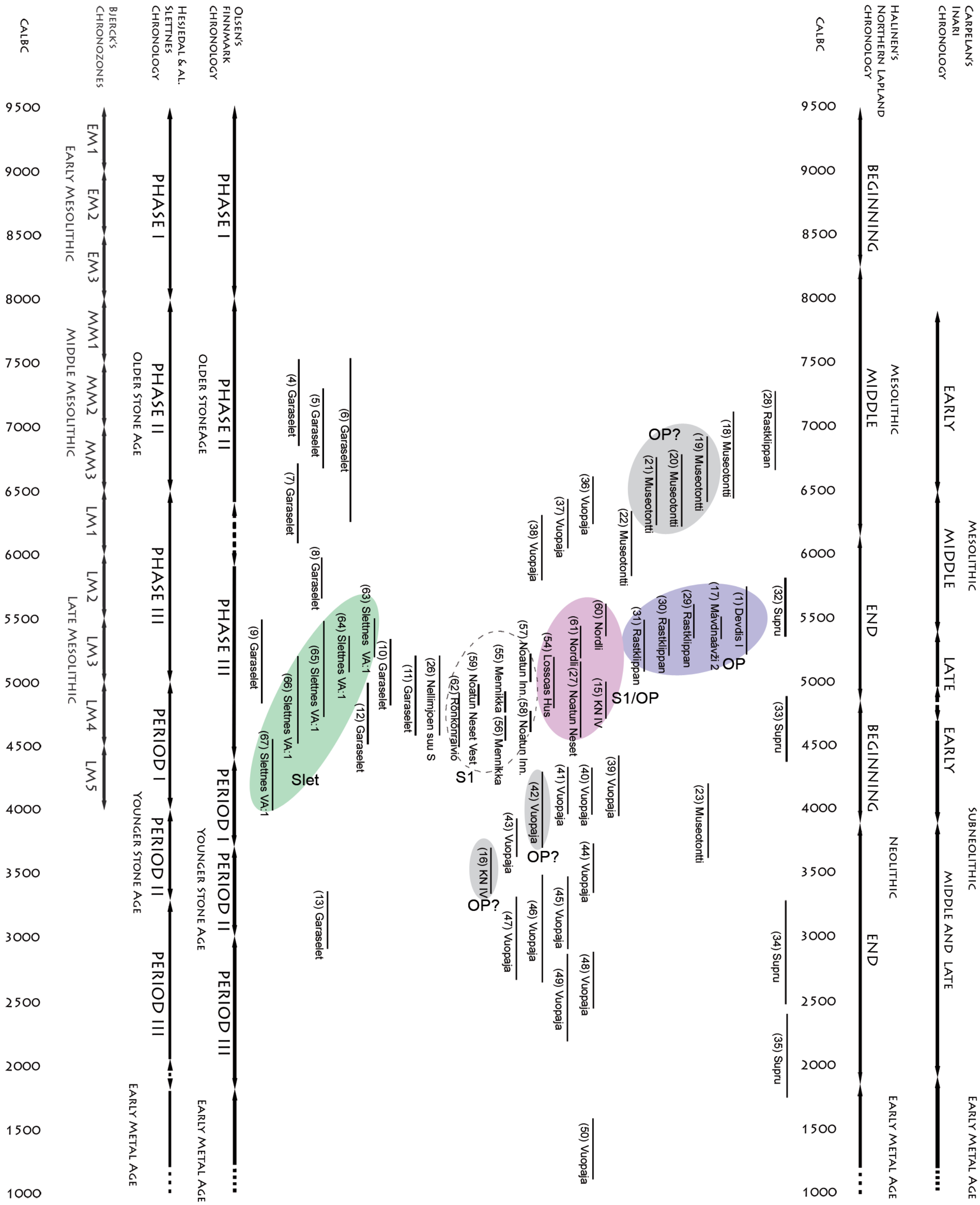

Figure 5. Calibrated radiocarbon dates from inland oblique point sites, Säräisniemi 1 food crust and the coastal site of Slettnes VA:1. Dates from secure inland contexts are marked with purple (OP), dates from Säräisniemi 1 food crust are marked with light red (S1/OP, sites with oblique points) and a grey dashed line (S1, sites without oblique points). Equivocal dates associated with oblique points are marked with grey (OP?). Dates from Slettnes are marked with green (Slet). Site numbers are the same as in Fig. 3. Chronological frameworks by Bjerck 2008; Hesjedal *et al.* 1996; Olsen 1994; Halinen 2005 & Carpelan 2003.

The published radiocarbon dates from the discussed inland oblique point sites cover a time span ranging from *c.* 7300 calBC to *c.* AD 1210 (**Fig. 4**). When discussing the dating of the oblique points some dates can be rejected offhand. These are the two young dates from Devdis I that the excavator deems unreliable (Helskog 1980:98), the old date from Rastklippan that derives from the filling used to level the hut floor (Knutsson 2005:246) and six Iron Age dates from multi-period sites: one from Garaselet, three from the lower terrace of Vuopaja and two from Museotontti. In **Figure 5,** the positions of the remaining radiocarbon dates from the inland oblique point sites are compared with chronological frameworks used in the research area, radiocarbon dates from food crust attached to Säräisniemi 1 pottery, and radiocarbon dates from the coastal site Slettnes VA:1.

Most of the dates derive from sites with multiple occupations from different time periods and are not directly associated with oblique points. Their usefulness in dating the points is therefore questionable at best. Only one charcoal sample from Devdis I, three charcoal samples from Rastklippan and one of burnt bone from Mávdnaávži 2 derive from reliable contexts, in this case camp sites with a limited use period. They are all dated to a short period between 5800 and 5100 calBC. It is noteworthy that also the Aksujavri site in inner Finnmark has recently been dated to this time interval (B. Hood *pers. comm*. 2008).

The representativity of this group of short-term camps can be questioned when it comes to the whole set of inland oblique point sites. Some sites with oblique points have yielded dates of *c.* 6500 calBC or older. Most of these dates have no clear association with the oblique points in these sites. However, at the Museotontti site, some radiocarbon dates falling between *c.* 7000 and 6200 calBC could indicate that oblique points were already in use in the inland area considerably earlier.

The distribution of the seven excavated points at Museotontti can be compared with the general distribution of quartz artefacts, burnt bones, radiocarbon dates, and hearths. During the 1987–1989 excavations finds were registered using an exact system where finds located within a palm sized area in an excavation spit were registered to the same grid. The data have been later used to illustrate find distributions (see, e.g., Halinen 1988; 1995:Appendix 18; 2005:179; Kankaanpää 1988; 1990; Manninen 2006:Fig. 3) that were the basis for the illustrations of combined horizontal distributions shown here (**Fig. 6**). Since there are no radiocarbon dates or reported oblique points from the 1989 area, only the 1987 and 1988 areas are presented in these distributions.

The stone concentrations in the excavated area most probably represent hearths that are more or less disturbed by post-depositional processes such as later human activity and tree roots. Kankaanpää (1988:7–9) identified nine stone hearths in the 1987 area and Halinen (1988:4–6) seven or eight more in the 1988 area. Most of the stones are likely to have been brought to the site that is situated on sandy soil. Judging from the radiocarbon dates at least two stone-packed hearths date to the Iron Age and one hearth has yielded iron slag (Kankaanpää 1988:21). It is difficult to distinguish possible Stone Age hearths from the mixed and disturbed stone concentrations on the map. A clearer picture of Stone Age activity can be achieved by studying the distribution of lithic material versus burnt bones. Although a considerable amount of burnt bone fragments may also be late, concentrations of bone fragments were found in pits filled, besides burnt bone, with sooty soil and charcoal. Some of these pits have been radiocarbon dated to the Mesolithic. These pits correlate with concentrations in the distribution of quartz artefacts that also include most of the oblique points.

The Mesolithic dates, however, derive from pits and hearths dug through the cultural layer, whereas the points were found in the mixed topmost excavation spits (Kankaanpää 1988; Halinen 1988). Although it is tempting to date the points on the basis of the *c.* 6500 calBC dates that coincide with the clearly defined quartz concentrations, it must be borne in mind that the correlation may be a result of post-depositional processes such as the recycling of older lithic waste or the clearing of hut areas. The surface areas of the quartz concentrations are not small, a fact that supports Halinen's assertion that each concentration in fact represents multiple occupations. It is worth noting that the area covered by one of the quartz concentrations has yielded radiocarbon samples with more than two thousand years' minimum difference in age (6700–6240 and 4230–3660 calBC). However, even with these problems in mind, the correlation of the early radiocarbon dates and the distribution of quartz debitage and identified oblique points at Museotontti cannot be bypassed. Until new evidence from more closed contexts is found, however, the dating

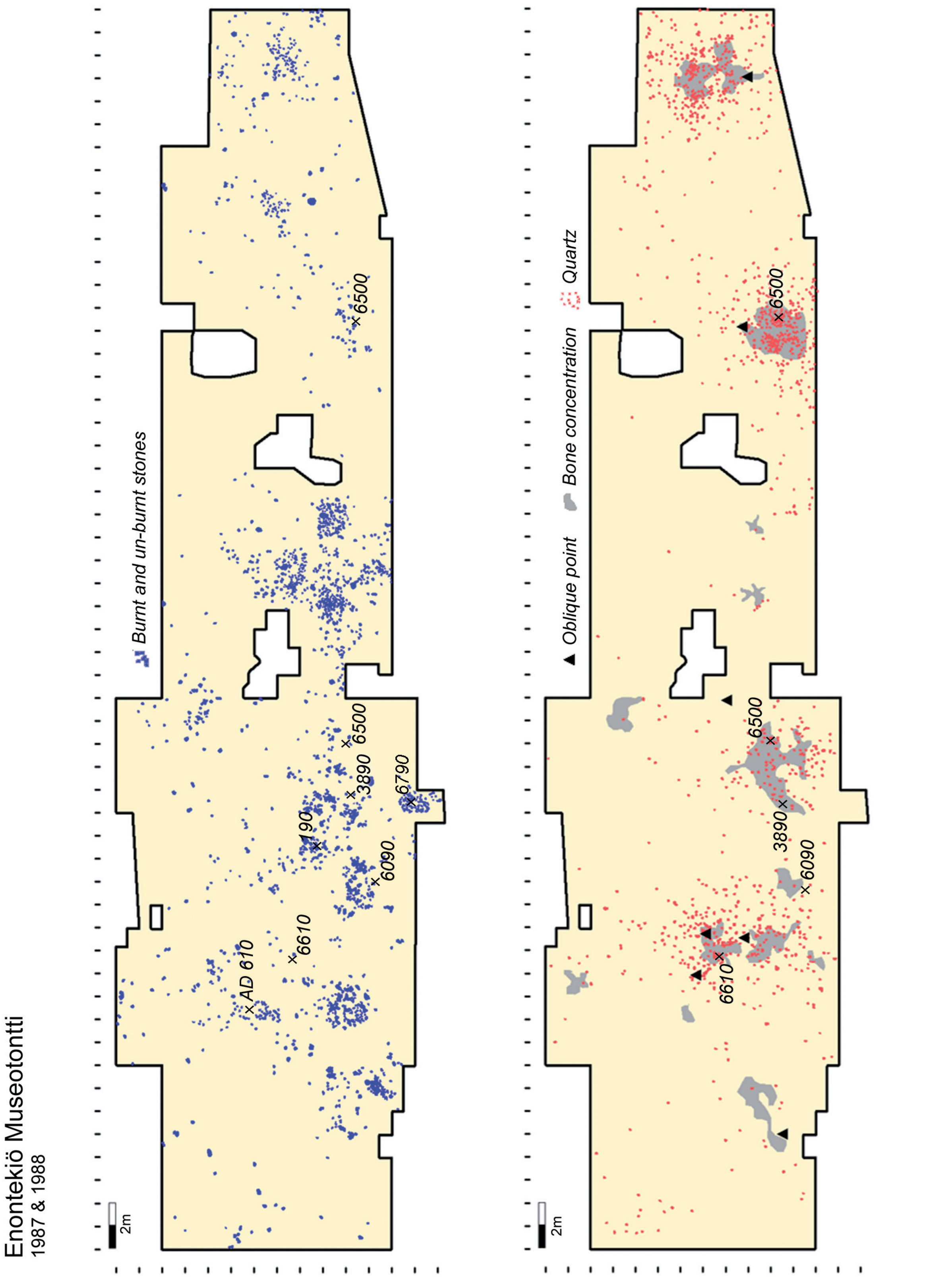

Figure 6. Oblique points, radiocarbon dates and concentrations of stones and finds at the Museotontti site. Dates are marked as calibrated median ages BC. Maps drawn by M. A. Manninen after maps by P. Halinen and M. Koponen in Kankaanpää (1988) and Halinen (1988; 2005).

	Site	Lab. No.	Date BP	calBC 2σ	OP
15	**Kjerringneset IV/Inganeset**	Tua-3025	5990±55	**5006–4727**	x
54	**Lossas Hus**	Tua-3024	6065±55	**5207–4808**	x
55	**Mennikka**	Tua-3027	5975±60	**5002–4720**	
56	Mennikka	Tua-3022	5795±55	**4785–4520**	
57	**Noatun Innmarken**	Tua-3023	6185±65	**5307–4983**	
58	Noatun Innmarken	Tua-3029	5850±55	**4837–4554**	
27	**Noatun Neset**	Beta-131296	5950±90	**5196–4598**	x
59	**Noatun Neset Vest**	Tua-3026	6030±70	**5207–4729**	
60	**Nordli**	TUa-3028	6570±60	**5629–5384**	x
61	Nordli	TUa-3021	6330±50	**5466–5215**	x
62	**Rönkönraivio**	Hela-38	5830±85	**4905–4488**	

Figure 7. Radiocarbon dates from charred food crust adhering to Säräisniemi 1 pottery found in Finnmark and Northern Finnish Lapland. Data from Skandfer (2005) and Carpelan (2004). OP= oblique points found at the same site.

of the oblique points at Museotontti to *c.* 6500 calBC must be considered tentative.

As regards younger sites, an interrelation between oblique points and early Comb Ware of Säräisniemi 1 type has been suggested by several authors (e.g., Engelstad 1989:335; Skandfer 2003:281–283). At a number of the inland sites (Nellimjoen suu S, Vuopaja, Kjerringneset IV/Inganeset and Noatun Neset) as well as at several coastal sites in Varanger (Nordli, Gressbakken Øvre and Lossoas Hus) both oblique points and early Comb Ware of Säräisniemi 1 type have been discovered (Gjessing 1942:174–177; Skandfer 2003:282).

The radiocarbon dates from food crust adhering to Säräisniemi 1 pottery sherds from both inland and coastal sites (**Fig. 7**) indicate that pottery was adopted in the Varanger area and northern Finnish Lapland as early as before 4400 calBC (5600 BP) (see Carpelan 2004:28; Skandfer 2003; 2005), i.e., before the conjectural end of the Mesolithic Phase III in Olsen's Finnmark chronology and during Bjerck's (2008:74) Mesolithic LM4 chronozone (**Fig. 5**). It thus seems clear that oblique points and Säräisniemi 1 pottery are partly coexistent, or at least chronologically close, in the research area even if the earliest dates from Säräisniemi 1 food crust in Finnmark included an error due to the marine reservoir effect (but see Skandfer 2005:5–7). An association between the points and the pottery seems therefore plausible.

It is important to note, however, that although they were found at the same sites, none of the oblique points derive from contexts unequivocally associated with Säräisniemi 1 pottery. Schanche (1988:108), for example, suggests that the points from Nordli could be considerably older than the pottery from the site while Skandfer (2003:283) proposes a post-Säräisniemi 1 dating of *c.* 3500 calBC for the oblique points from Kjerringneset IV/Inganeset.

In sum, the current evidence from the research area speaks in favour of a use period ranging from *c.* 5800 to 4700 calBC for the oblique points in the inland areas of northernmost Fennoscandia with the best contexts dating between *c.* 5800 and 5100 calBC. However, the possibility that oblique points were in use longer, possibly from *c.* 6500 calBC until *c.* 3500 calBC, cannot be completely ignored. It is also important to note that there is no evidence at the moment that would suggest an early Mesolithic (Olsen´s Phase I) date for oblique points from the inland sites.

The Dating of Points Found North and South of the Northern Inland Sites

The *c.* 5800–4700 calBC use period of oblique points on the northern inland sites suggested here is close to the dating of oblique points in southern Finland, as well as to the dating of the late oblique points on the Barents Sea coast. Since the oblique points discussed here seem to fill a gap between these two areas, where similar points are also found, a closer look at the foundations for their dating seems appropriate.

In 1982 Heikki Matiskainen used shore displacement chronology to date the oblique points from the southern part of the east coast of the Gulf of Bothnia and from along the northern shore of the Gulf of Finland to *c.* 6500–4900 calBC (7700–6000 BP) (Matiskainen 1982; 1986; 1989:389; 2002:100).

The fact that oblique points in Finland have not been found in any good context with radiocarbon dates older than 6400 calBC strengthens the result of the shore displacement dating. According to present knowledge, the end of the use of oblique points in southern Finland coincides with the adoption of pottery. The earliest Early Comb Ware dates in mainland Finland, which range from *c.* 5000 to 4800 calBC (Hallgren 2008: 63; Leskinen 2002: Table 1; Schulz 2004), agree with Matiskainen's results. It is also worth noting that only occasional oblique points have been reported from sites that have yielded Early Comb Ware (e.g., Luho 1957:157).

As regards the use period of oblique points in southern Finland, it is important to note that none of the coastal sites have been radiocarbon dated. Therefore, the possibility that the oldest sites according to shore displacement chronology were never close to the shoreline, and are therefore younger than the shoreline dating indicates, cannot be excluded (Matiskainen 1982:66–67).

The Kaaraneskoski 1 site, one of the two oblique point sites in our study area that are located at the former shores of the Gulf of Bothnia, has yielded a radiocarbon date that gives support to this caveat. The distribution of finds at Kaaraneskoski 1 suggests a series of small camps following successive shorelines. The altitude of the site at 83–90 meters above sea level indicates a Late Mesolithic shore displacement dating of approximately 5900–5500 calBC (7000–6500 BP) and suggests an occupation history of some four hundred years. Charcoal collected in the midst of a concentration of burnt bone at approximately 88 m a.s.l. has been dated to 5470–5060 calBC (6310±85 BP, Hela-323). The date gives reason to believe that habitation at the site was well above the actual shoreline. (Kankaanpää 1998; Rankama 2009.)

It must therefore be stressed that the beginning of the use of oblique points in southern and western Finland at *c.* 6500 calBC as indicated by shore displacement chronology, should be seen as a *terminus post quem*. The majority of oblique point sites in Matiskainen's study (1989:Fig.17) are located on shorelines dated to *c.* 5500–4900 calBC (6500–6000 BP).

As mentioned earlier, on the Norwegian Barents Sea coast oblique points are considered typical for two Mesolithic phases. Following Olsen (1994): Phase I, *c.* 9500–8000 calBC (10,000–9000 BP) and Phase III, *c.* 6400/5900–4400 calBC (7500/7000–5600 BP). Olsen's Phases I and III are essentially the same as Woodman's (1993; 1999) Komsa and Trapetze phases. On the basis of the Slettnes excavations, Hesjedal *et al.* (1996:184–186, 190) suggest a slightly differing time span for the third phase (6400–4900 calBC or 7500–6000 BP), but all in all, there seems to be a consensus in recent Norwegian literature about a bimodal typo-chronological dating for oblique points in northernmost Norway (Grydeland 2000:20; Hesjedal *et al.* 1996:184–186; Olsen 1994:29–36).

In his 1966 study Knut Odner, building on relative shore displacement dating of Mesolithic sites in the Varanger area, arrived at a similar conclusion. Odner's Horisont 2, however, possibly due to an assumption of a developmental sequence, included transitional forms between the tanged and single-edged points of Horisont 1 and the transverse points of Horisont 3 (Odner 1966:106). In the more updated radiocarbon based typo-chronologies, the use of oblique points is said to considerably decrease (Olsen 1994:31, 39) or completely end (Hesjedal *et al.* 1996:184–185, 198) during Phase II. This notion is significant in relation to the inland oblique point sites, as it seems to indicate that oblique points reappeared on the coast in tandem with the appearance of oblique point sites in the inland areas.

The argument that oblique points disappeared at the end of Phase I and later reappeared during Phase III is based on the absence of oblique points from assemblages assigned to Phase II. If we look at the typo-chronological definition of Phase II (Hesjedal *et al.* 1996:184–185; Olsen 1994:39; Woodman 1993:70), it is based on two radiocarbon dated house/tent foundations: Mortensnes, *fornminne* 2, R10 (Schanche 1988:72–75) and Slettnes *Felt* IVA, *Område* 2, *tuft* 45 (Hesjedal *et al.* 1996:65–66), four un-dated house foundations from the site Starehnjunni with a radiocarbon dated outside activity area (Engelstad 1989:334, Woodman 1993:70), and three un-dated house foundations from the multi-period site Sæleneshøgda (Olsen 1994:39; Simonsen 1961:27–42; Woodman 1993:70). More recently one more house pit in the Varanger area has been radiocarbon dated to Phase II (Grydeland 2005:57).

All of the above-mentioned houses have yielded artefacts indicating systematic blade/microblade production, a technological trait considered typical for Phase II (Olsen 1994:31–33; Woodman 1993). Oblique points have been found, depending on the author, in two or three of the houses at Sæleneshøgda (Simonsen 1961:27–37; Woodman 1993:table 2). The authors disagree about the number of houses that have yielded oblique points. Simonsen reports two from House I, three from House II, and three from House III whereas Woodman mentions two from House I, one from House II, and none from House III. Simonsen originally considered the site Neolithic (1961:42) due to polished stone adzes discovered, but this dating was later questioned by K. Helskog (1980a:48), who suggested a Late Mesolithic date. The site's elevation at 56 m a.s.l. (Grydeland 2000:28), however, suggests a *post quem* shoreline dating of *c.* 8700 calBC (9400 BP, see **Fig. 8**). Woodman suggests that the blade production at the site belongs to Phase II, whereas the points found inside the houses, as well as the points found in the dump outside the houses, derive from an earlier occupation at the site (Woodman 1993:71). This explanation for the points is possible but their dating to Phase II seems equally possible. Hence the context of the oblique points remains unclear.

There is an obvious problem in the fact that only assemblages found inside houses are available for

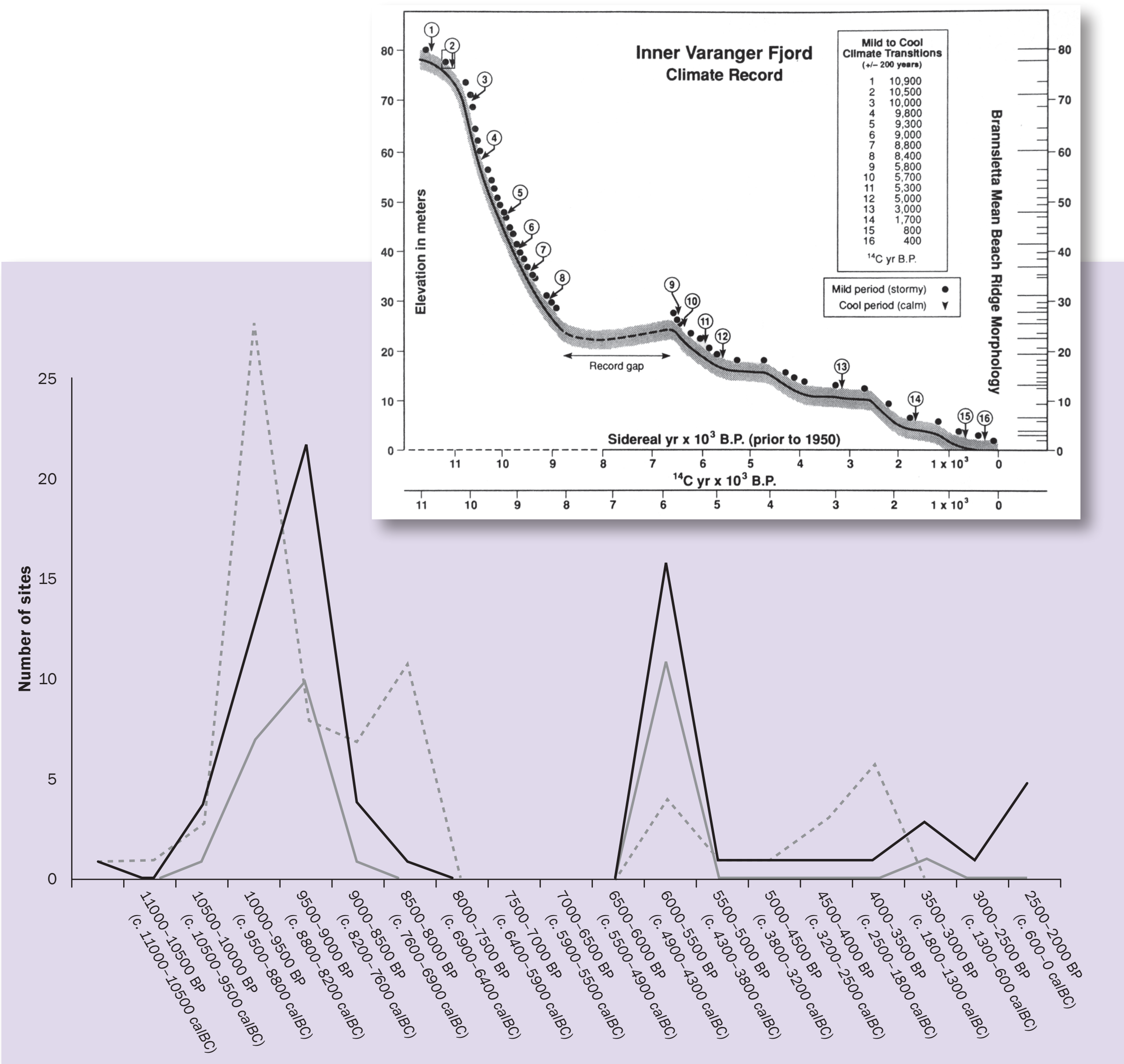

Figure 8. The number of sites in 500 year blocks according to altitude above the sea level on the southern shore of the Varangerfjord. The graphs indicate the total number of sites (solid black line, n=74) and sites with oblique points (solid grey line, n=30) according to the corrected altitude (reduced by 5 metres) and, for comparison, the total number of sites according to uncorrected altidutes (grey dashed line, n=74). The shore levels are dated using the shore displacement curve by Fletcher *et al.* (1993:125) for inner Varanger Fjord (right upper corner). Site and site altitude data from Bøe & Nummedal (1936); Simonsen (1961); Odner (1966).

assessing whether oblique points were in use during Phase II. Artefact types used in other parts of the sites besides houses, or on other kinds of sites, are inevitably underrepresented. Further, due to the mid-Holocene Tapes transgression, shore-bound Phase II assemblages in Finnmark have been largely mixed and destroyed (e.g., Hesjedal *et al.* 1996:134; see also Møller 1987:58) - another factor reducing the available data.

This can be illustrated with data from the Varanger area. According to a simulated shore displacement curve the Tapes transgression should not have affected sites (isobase 28 in Møller & Holmeslet 1998) or at least was less strongly felt than in more westerly Finnmark. A shore displacement diagram for the geological locality Brannsletta, east of Nyelv, based on radiocarbon dated archaeological sites and paleoshoreline indicators (Fletcher *et al.* 1993), shows a record gap at shore levels dating to *c.* 8000–5900 BP (*c.* 6900–4900 calBC). The gap corresponds to the Tapes transgression and indicates that sites dated to this time period were probably affected by the transgression also in the Varanger area (**Fig. 8**). The record gap covers parts of Phases II and III in the Finnmark chronology.

As this curve fits also the more recent radiocarbon dates from the area (e.g., Stuorrasiida-1 in Grydeland (2005) and Nordli in Skandfer (2005)) better than the simulated curve, we have used it to compile a graph representing the number of sites with oblique points at different shore levels in the Varanger area (**Fig. 8**). Møller (1987) has reached the conclusion that Stone Age sites on the Barents Sea coast were located on average 4.8 metres (1.9–9.5 m) above the shoreline. We have therefore lowered the altitude of each site by five meters before comparing it with the shore displacement curve.

The emerging picture seems to indicate that the mid-Holocene transgression may have been a major factor contributing to the absence of points in the archaeological record during Phase II. It is notworthy that during the Mesolithic as a whole the number of sites with oblique points correlates with the overall number of sites.

The diagram is not necessarily accurate enough when it comes to the dating of the peaks and it is probably also affected by old survey and altitude data. However, as regards the number of sites, a similar trend is seen in the more updated data presented by Grydeland (2005:Fig. 5).

	Site	Lab. No.	Date BP	calBC 2σ
	Slettnes IV A:1	CAMS 2684	7320±60	**6361–6056**
	Slettnes IV A:1	Beta 49006	6860±170	**6055–5484**
	Slettnes IV A:1	Beta 49005	6720±120	**5886–5471**
	Slettnes IV A:1	Beta 49004	6200±100	**5373–4851**
	Slettnes IV A:1	T 8101	6160±110	**5356–4807**
63	**Slettnes VA:1**	Beta-49052	6390±80	**5509–5214**
64	Slettnes VA:1	Beta-49057	6390±100	**5551–5078**
65	Slettnes VA:1	Beta-49056	6170±170	**5473–4727**
66	Slettnes VA:1	Beta-49053	5930±110	**5205–4531**
67	Slettnes VA:1	Beta-49054	5470±120	**4547–3996**

Figure 9. Late Mesolithic radiocarbon dates from the Slettnes IVA:1 and VA:1 sites. Data from Hesjedal *et al.* 1996.

All in all, judging from the data presented here, it must be concluded that at the moment the evidence from the Varanger area implies a decline in oblique point use during Phase II but the data cannot be interpreted as indicating that the points were totally absent. It must be stressed, however, that there is a very limited number of published radiocarbon dates and assemblages from Phase II and that since we have not had the opportunity to study the sites and assemblages in the area in detail we may be lacking relevant unpublished information.

It must also be emphasized at this point that published radiocarbon dated coastal contexts from Phase III that include oblique points are not numerous either. At Slettnes there are twenty-five radiocarbon dates from five different areas that fall within Phase III, but Hesjedal *et al.* only date 11 obliques points to this phase. Nine of these points derive from area VA:1 that has yielded five dates falling between 5510 and 4000 calBC (**Figs. 5 & 9**). Two more points have been found in probable secondary contexts in Early Metal Age houses. (Hesjedal *et al.* 1996:167.) The transportation of points to secondary context in soil and turf used in house building is a plausible explanation also for the two points from house 1 at Nyelv nedre vest (Simonsen 1961:410) dated by shore displacement chronology to *c.* 3200–2650 calBC (see Helkog 1980a:Table 1 for radiocarbon dates) and the one point found in the Early Metal Age House 1 at Noatun Neset (Simonsen 1963:77–80).

Besides Slettnes, points have been reported from Mortensnes 8R12 (Schanche 1988:78–80), a midden radiocarbon dated to the interface between the Late Mesolithic and the Early Neolithic, but according to Skandfer (2003:282) these artefacts are not retouched and therefore cannot be regarded as points.

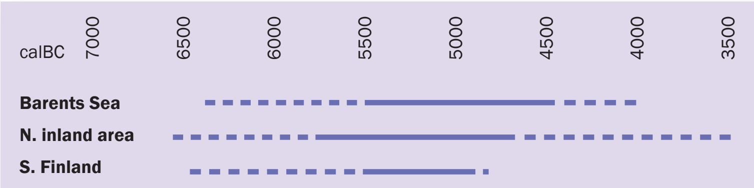

Figure 10. Roughly defined use-periods of late oblique points in Eastern Fennoscandia according to data from radiocarbon dates and shore displacement chronologies with the best evidence marked with a solid line.

The dates from Slettnes VA:1 that fall between 5510 and 4000 calBC are in good agreement with the dates suggested for oblique points on the northern inland sites and within the dating suggested for oblique points further south in Finland (**Fig. 10**).

Allowing for a margin of error of a few hundred years, the main use periods of Late Mesolithic oblique points on the northern inland sites (*c.* 5800–4700 calBC) and the Late Mesolithic oblique point sites on the Barents Sea coast (*c.* 5500–4300 calBC) and in southern Finland (*c.* 5500–4900 calBC) seem the same, and even the dates suggesting possibly older and younger dates for oblique points, if correct, do not change this picture much.

The Extent of the Late Mesolithic Oblique Point Tradition

As has become apparent, the Late Mesolithic oblique points in the inland areas of northern Fennoscandia are not an isolated phenomenon. Although only a few good contexts have been radiocarbon dated, the evidence from shore displacement studies and find contexts supports a rapid expansion of the oblique point technology into most of Eastern Fennoscandia during The Late Mesolithic.

From a technological point of view, there are some shared traits in the Late Mesolithic oblique points that separate them from the Early Mesolithic points of the Barents Sea coast. For instance, the type variation within the lower lying and thus younger group of points in the Varanger area appears similar to the variation on the inlands sites (**Fig. 3**). Besides being an indication of contemporaneity and thus in line with the evidence that the same groups used both the coastal and the inland areas in Eastern Finnmark and northern Finnish Lapland (see Manninen 2009), this also supports the observations about technological differences in blank production.

According to Hesjedal *et al.* (1996:166) and Woodman (1999:301–302), at coastal sites points made from blades in a technological "blade context" seem to be typical of the early stages of the Mesolithic, whereas the Late Mesolithic points are generally made from flakes and related to a more dynamic flake industry (Hesjedal *et al.* 1996:186; Olsen 1994:34). However, the description of tanged points at Slettnes (Hesjedal *et al.* 1996:166) indicates that the blank type (blade vs. flake), the orientation of the blank, and the position and localization of retouch vary also in Early Mesolithic points to some degree.

In the same way as for the late coastal points, the use of flake blanks from platform cores is a common denominator for the technology employed to make points at Rastklippan, Devdis I, Aksujavri and Mávdnaávži 2, as well as the other points from northern inland sites (**Fig. 2**) and the oblique points of more southern Finland (see Manninen & Knutsson *in preparation*; Manninen & Tallavaara *this volume*; Matiskainen 1986).

Grydeland (in Skandfer 2003:270) notes that occasional blades are found at Late Mesolithic sites in the Varangerfjord area and some blades are also known from the Late Mesolithic inland sites (e.g., Manninen 2005:Fig. 6) but they do not seem to derive from systematic blade production.

On the Barents Sea coast some chronological changes in raw material use have also been observed. Schanche (1988:124) has noted, mainly on the basis of shore displacement dates, that at Mortensnes the use of fine grained raw materials grew until *c.* 6400 calBC (7500 BP) but nearly ended towards the end of the Mesolithic. In a similar vein the use of quartz is noted to have increased during the Mesolithic Phase III at Slettnes (Hesjedal *et al.* 1996:159) and in the Varanger area Grydeland (2005:57), also relying on shore displacement dating, has noted a gradual increase in quartz use and in the use of cobbles as a raw material source towards the end of the Mesolithic. These differences can be seen as further indication of the spread of a new flake-based technology which, as a consequence, was less dependent on fine grained raw materials.

All in all, the Late Mesolithic oblique point technology can be characterised as very flexible. The flake blanks do not seem to have been of a standardised shape and the manufacture of points was not dependant on specific raw materials. In addition, the quality of the raw material, as regards workability or the size of raw material pieces, does not seem to have been a major factor, although, when available, cherts and fine grained quartzites were preferred. The studied assemblages include points made, by archaeological definitions, of quartz, quartz crystal, slate, rhyolite and different kinds of cherts and quartzites. This kind of technology facilitates the use of areas with very different raw material situations and enables organizational strategies not tied to specific lithic raw material sources.

The geographical distribution of the technological concept described above covers most of eastern and northern Fennoscandia. In Finland, the southern border of the area with oblique points is the Gulf of Finland. The distribution of sites that have yielded oblique points, as shown in **Figure 11,** is of course biased due to the impact of focused research projects. The large blank areas between the known sites are most probably artefacts of research history (Manninen & Tallavaara *this volume*). To the north and west in northern Norway, the sea forms a natural border, in the east we so far have to accept the fact that the Finnish/Russian border, due to a different research tradition, creates an artificial eastern limit for the area of oblique point sites (but see Halinen *et al*. 2008:250; Nordqvist & Seitsonen 2008:228). Future collaboration with Russian colleagues will surely change this picture.

Oblique points made of quartz flakes have been reported also from a small group of sites in East Middle Sweden dated by shore displacement to *c*. 6500–5300 calBC. Since these points have no clear counterparts in adjacent areas in mainland Sweden and since they predate the Early Neolithic Ertebølle type transverse points, Guinard and Groop have suggested that these points, if correctly classified, are related to the northern Swedish Late Mesolithic oblique point sites. (Guinard & Groop 2007:209.) However, oblique points in this area could also be related to points found east of these sites. It has been suggested that the skerry landscape at the entrance to the Gulf of Bothnia between present day Sweden and Finland was colonised from the east (e.g., Åkerlund 1996; Åkerlund *et al*. 2003).

The use of the area by Late Mesolithic groups from mainland Finland is indicated by the fact that the first permanent settlement on the Åland islands, identified from Early Comb Ware pottery dated to *c*. 5000 calBC (Hallgren 2008:58–63), arrived from this direction. Late Mesolithic oblique points in East Middle Sweden could therefore be seen as a sign of a south-western extension of the oblique point tradition from mainland Finland. One oblique point is also mentioned in passing by the Finnish archaeologist Ville Luho (1967:118) to have been found in Västerbotten in Sweden, from the shore of Lake Malgomaj, approximately 140 km south of Rastklippan.

If we exclude these at the moment unpublished points in East Middle Sweden and the possible point from Västerbotten, the southern border of oblique point sites in Sweden passes through Rastklippan and Lappviken/Garaselet. The large void between these sites and Finnmarksvidda with only the stray finds from Jokkmokk and Överkalix, is most probably a result of low research intensity, or perhaps the fact (see Knutsson 1998) that Swedish archaeologists simply have not had the oblique point in their culturally constructed repertoire of types to be discovered during excavation or surveying in this area.

However, there are indications that oblique points are not necessarily common in the area where the Rastklippan, Lappviken and Garaselet sites are found. In 1969 Hans Christiansson initiated a survey project in central Norrland (Christiansson & Wigenstam 1980). During a period of 10 years 10 000 prehistoric finds at more than 2000 mainly Stone Age sites were found in the *c*. 3000 km² area west of Lappviken and Garaselet. In 1998 the material was catalogued by Lennart Falk. One of the present authors (Knutsson) had the opportunity to follow the process of classification of the material.

Despite the fact that every flake in the assemblage was scrutinized, no points of the type discussed here were found. It is, according to our opinion, thus reasonable to assume that the Arvidsjaur area is outside the main distribution of the more North and East Fennoscandian oblique point tradition. However, within and to the south of this area in central and southern Swedish Lapland, there are several sites which contain debitage from another technological tradition – the handle core tradition (Knutsson 1993; Olofsson 1995; 2003).

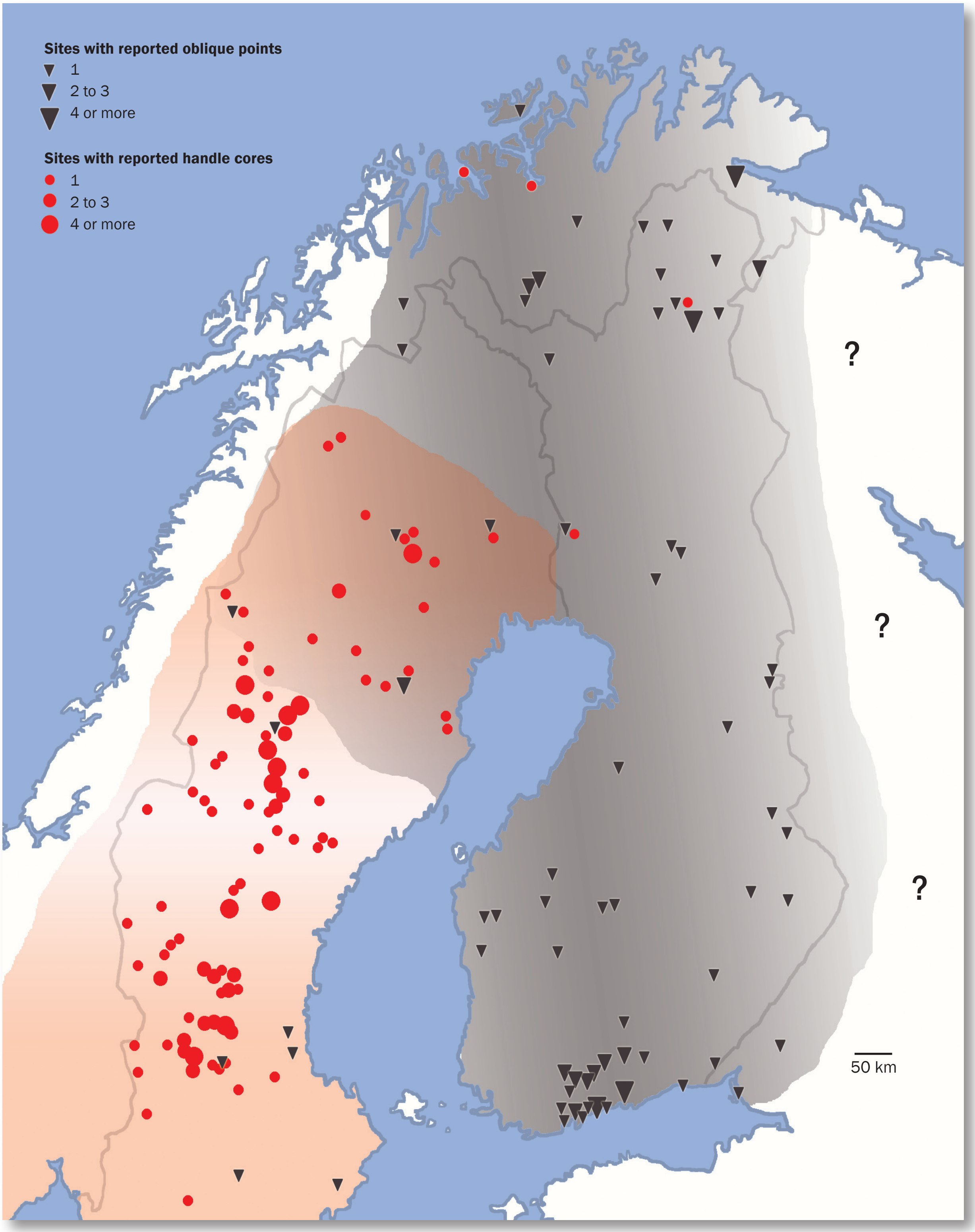

Figure 11. Rough areas of distribution of sites with oblique points (triangles) and handle cores (dots) in Finland, Sweden and northern Norway. In Norway only the two known handle cores from northern Norway, the northern inland oblique point sites, and the unequivocally late oblique point sites on the Barents Sea coast are indicated. Note that artefacts that may not fulfil the defining criteria otherwise used in this paper are also included albeit the artefacts reported by Schulz (1990) as representing boat shaped microblade cores in earlier contexts have been excluded (cf., Knutsson 1993:11–12; Rankama & Kankaanpää *this volume*). Data from Damm *pers. comm*. 2009; Guinard & Groop 2007; Halinen *et al*. 2008; Luho 1967; Manninen & Tallavaara *this volume*; Matiskainen 1986; Nordqvist & Seitsonen 2008:228; Olofsson 1995; Rankama 2009; Siiriäinen 1982).

In 1996 Lars Forsberg presented an analysis of 33 radiocarbon dated Mesolithic sites from Norrland. On the basis of a multivariate matrix and a statistical analysis, he came to the conclusion that the Norrland Mesolithic can be separated into three chronological phases with distinctly different material cultures. According to the analysis, the second of these phases, which includes handle cores, dates to *c.* 6300–4650 calBC (7400–5800 BP) (Forsberg 1996).

Anders Olofsson (1995; 2003) evaluated the handle core tradition in more detail, making also a survey of all handle core sites with radiocarbon dates known at that time in northern Sweden. With a few exceptions, all of the sites are multi-component sites with problematic relations between dating and find material. According to Olofsson (2003:77–79) the earliest dates associated with handle cores are more or less uncertain but there are, however, three stratified sites with handle cores and/or keeled scrapers which give a better context for dating this tradition, or at least a part of it, in the discussed area. One of the sites is Garaselet, where an oblique point has also been found. A one metre thick sealed layer containing handle cores at Garaselet could be dated by four separate dates from hearths and cooking pits (Knutsson 1993) to between *c.* 5450 and 4600 calBC (**Fig. 12**).

The two other sites are also close to the Swedish finds of oblique points: at Döudden in Arjeplog parish in Lappland, Sweden, two stratigraphically secured keeled scrapers/handle cores have been dated to *c.* 5600–3600 calBC by six samples from the find layer (Bergman 1995:91). In addition, the Gressvattnet VI site in Norway, which lies close to the Swedish border and just 40 km east of Rastklippan, yielded handle-cores and/or keeled scrapers in layers dated by four radiocarbon dates (Holm 1991:33) to *c.* 6070–4400 calBC.

The handle core tradition in Norrland thus seems to approximate the handle core chronology in the south (see Andersson & Wigforss 2004; Guinard & Groop 2007; Knutsson 2004; Sjögren 1991), and can be dated to *c.* 6400–4300 calBC (7500–5500 BP) making it contemporaneous with the oblique point tradition. However, only in northern Sweden are oblique points known from the same sites as typical handle cores.

Our hypothesis will thus be that the handle cores and the oblique points are artefact types that represent contemporaneous but spatially exclusive social networks with some distinctly different traits in their material culture. It is probable that even in northern Sweden microblades detached from handle cores were in fact also a part of a projectile technology, namely slotted points (Larsson 2003:xxvii; Liden 1942).

	Site	Lab. No.	Date BP	calBC 2σ
	Döudden	St 453	6260±225	**5630–4710**
	Döudden	St 456	6170±100	**5330–4840**
	Döudden	St 548	5200±200	**4450–3640**
	Döudden	St 552	5100±185	**4340–3530**
	Döudden	St 550	5070±125	**4230–3640**
	Döudden	St 551	5050±120	**4230–3640**
9	**Garaselet**	Ua-2067	6210±120	**5470–4850**
10	Garaselet	Ua-2061	6190±90	**5350–4860**
11	Garaselet	Ua-2066	5970±110	**5210–4610**
12	Garaselet	Ua-2060	5920±80	**5000–4590**
	Gressvattnet VI	Birm-654	6990±115	**6070–5660**
	Gressvattnet VI	T-654	6860±120	**5990–5560**
	Gressvattnet VI	T-656	6750±100	**5840–5490**
	Gressvattnet VI	T-655	5980±220	**5370–4370**

Figure 12. Radiocarbon dates from the handle core sites Döudden, Garaselet and Gressvattnet VI. Data from Bergman (1995), Holm (1991) and Knutsson (1993).

The distribution of handle core sites in Norway (Olofsson 1995:113–118) is otherwise beyond the scope of this paper, but it is worth noting that in northern Norway, in the counties of Finnmark and Troms, only two unambiguous handle cores have so far been found (Damm 2006; *pers. comm.* 2009). The small number of artefacts reported as handle cores in Finnmark and northern Finland in earlier studies (e.g., Odner 1966; Schulz 1990; Siiriäinen 1982; Simonsen 1961) have been questioned in Olofsson's survey (Olofsson 1995:118, 122; see also Kankaanpää & Rankama 2005:139–140; Knutsson 1993:11–12) and it can be stated that although occasional handle cores, or at least microblade cores, are likely to be found also in the Late Mesolithic assemblages here, they are outside the main area of the handle core tradition.

It is, thus, not possible to define exactly the southern border of the oblique point tradition in Sweden and Norway. The contact zone of the spatially exclusive but temporally synchronous distributions of handle cores and oblique points seen in **Figure 11** could, however, indicate an actual "historical" border approximately in the area where the last remnants of the Scandinavian ice sheet melted at the end of the last glacial cycle. The process of human colonisation and the consequent establishment of social networks in northern Sweden during prehistory seem to be closely related to the speed of ice retreat and the extent of the area covered by the ice sheet in the early Holocene (see Knutsson 2004). From this point of view the border between the two Late Mesolithic technological traditions could be seen as reflecting a border deriving from when the first colonisers arriving from the south and from the east met in northern Sweden at the end of the last glacial cycle.

Discussion – the Spread of the Late Mesolithic Oblique Point Technology

The Late Mesolithic oblique points in Finnmark have provoked debate (e.g., Hood 1992:45; Olsen 1994:40; Rankama 2003) stemming from the assumption that the points represent the first colonisers of Finnmarksvidda. The assumption was based on the fact that for a long time no earlier cultural substrata were known in Finnmarksvidda, although finds on the Finnmark coast and in northern Finnish Lapland indicated habitation for millennia before this period.

If, in fact, the inland areas of Finnmarksvidda were not colonised before the Late Mesolithic by oblique point using groups, this could indicate that the spread of the new technology was related to a demographic expansion. This would have further implications for the study of forager groups inhabiting the source area of the expansion and would naturally also raise the question why the area had previously remained uninhabited.

The biotic environment of the late Mesolithic oblique point sites is one parameter that might explain or at least contextualize the events leading to the expansion of this specific technological tradition in northern Fennoscandia, including Finnmarksvidda. In 1993 Olsen (1994:40; 45) suggested that the Late Mesolithic inland sites with oblique points are the first signs of permanent settling of the area and resulted, in addition to social reasons, from environmental changes, namely the expansion of pine forest into this region.

In the study area estimations of the extent of forest cover and temperatures during prehistory are based, besides other sources, on reconstructed prehistoric tree lines. Alpine tree lines can be seen as sensitive bioclimatic monitors and robust proxy paleoclimatic indicators (Kullman 1999:63). More recent studies in this field give a different picture of prehistoric forest cover in Finnmarksvidda than the one prevailing at the time of Olsen's book.

Finds of birch megafossils indicate that the tree line in the northern Scandes was 300–400 meters higher than today almost directly after deglaciation (*c.* 7500 calBC) and until *c.* 3000 calBC (Kullman 1999; Barnekow 2000:416). According to Eronen *et al.* (1999) and Kultti *et al.* (2006) pine forest reached its maximum extent in Finnish Lapland between *c.* 6300 and 2000 calBC, with a peak prior to *c.* 4000 calBC when pine colonised 95% of the currently unforested areas of northern Finnish Lapland. These results are congruent with data from Dividalen in inner Troms (Jensen & Vorren 2008) and can be extrapolated to the inland areas of northern Norway in general (e.g., Hicks & Hyvärinen 1997). It can thus be concluded, that a mixed birch pine forest, with a gradually growing proportion of pine, was present in Finnmarksvidda much earlier than the appearance of oblique point technology in the area.

Hence, the securely dated inland oblique point sites were in a boreal forest environment with a tree-line up to 400 meters higher than today. Both the pollen spectrum from the floor of the Rastklippan hut which was dominated by pollen from pine, birch, alder and hazel as well as various herbs (Robertsson & Hättestrand *manuscript*), and the pine charcoal found in the Mávdnaávži 2 and Rastklippan huts, are in good agreement with this. This knowledge also undermines the explanation that the spread of oblique point technology in the inland areas of northern Norway was a colonisation process related to the spread of the boreal forest.

Evidence from areas surrounding Finnmarksvidda does not support the idea of a Late Mesolithic colonisation of vacant land, either. Finnish Lapland was gradually freed of continental ice starting from the northeast at *c.* 9500 calBC (10,000 BP) and by *c.* 8400 calBC (9100 BP) the edge of the ice sheet crossed the present day border between Finland and Sweden (Johansson & Kujansuu 2005). The earliest known site in northern Finnish Lapland, the Sujala site in Utsjoki, dates to the interface between the Preboreal and the Boreal periods, at *c.* 8300 calBC (Rankama & Kankaanpää 2008).

According to the present general model of deglaciation (Andersson 2000), the northernmost part of Sweden saw opportunities for human occupation from both the north and the south. By *c.* 7500 calBC the last remnants of the Scandinavian ice sheet melted and it was

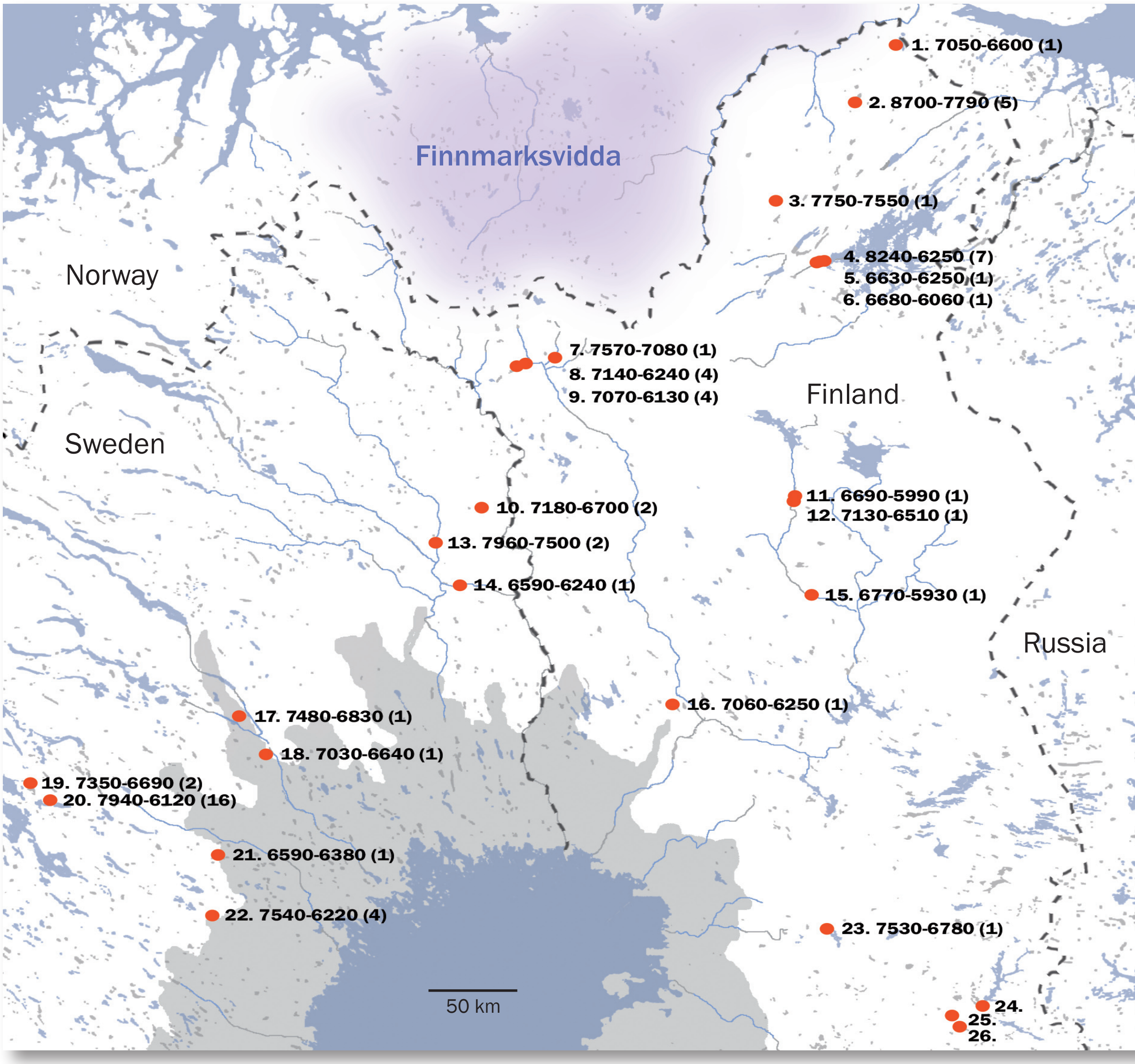

Figure 13. Sites with radiocarbon dates of *c.* 6400 calBC or older from areas around Finnmarksvidda. The extent of the Baltic Sea at approximately 6400 calBC is marked with light grey (following Andersson 2000). The number of dates falling within the given calBC interval is marked in brackets. The sites: 1. Pulmankijärvi, 2. Sujala, 3. Kielajoki, 4. Saamenmuseo, 5. Vuopaja, 6. Vuopaja N, 7. Myllyjärämä, 8. Museotontti, 9. Proksin kenttä, 10. Kitkiöjärvi, 11. Matti-Vainaan palo 2, 12. Autiokenttä II, 13. Kangos, 14. Pajala, 15. Alakangas, 16. Lehtojärvi, 17. Killingsholmen, 18. Tröllomtjärn, 19. Ipmatis, 20. Dumpokjauratj, 21. Skiljesmyren, 22. Garaselet, 23. Varisnokka, 24. Vanha Kirkkosaari, 25. Nuoliharju W, 26. Koppeloniemi. For references and exact dates see Appendix III.

slightly before this time that the first traces of human occupation appeared. Radiocarbon dates from the Dumpokjauratj site close to Arjeplog (Olofsson 2003:19) and the Kangos site in Junosuando (Östlund 2004) push the first settlement of northern Swedish Lapland to as far back as *c.* 7900 calBC. Although scattered and few, the dates from the early sites indicate that the foragers establishing themselves in the area followed closely the shrinking ice from both the north-east and the south. Other sites in Finnish and Swedish Lapland dating from the eight and the seventh millennia BC, indicate a relatively continuous occupation of the area from the colonisation period onwards (**Fig. 13; Appendix III**).

The deglaciation of Finnmarksvidda occurred in parallel with northern Finnish Lapland and by *c.* 8700 calBC (9400 BP) the area was free of ice. The early colonisation of the adjacent inland areas in Finland and Sweden give reason to suspect that the absence of early sites in Finnmarksvidda is a research historical coincidence. In fact, burnt bone samples from two sites in Finnmarksvidda have been recently dated and indicate that both sites have been occupied considerably earlier than 6400 calBC (B. Hood *pers. comm*. 2008). Although only two, these dates add to the indications from surrounding areas in Finland and Sweden and speak in favour of a habitation predating the spread of oblique point technology and even the suggested beginning of Finnmark Phase III at *c.* 6400 calBC.

It thus seems probable that the spread of the oblique point technology in the inland areas of northern Fennoscandia, including Finnmarksvidda, was not the result of the colonisation of pristine land by groups from the north, nor from any other direction, but the result of changes within existing forager groups in the same way as in other parts of eastern Fennoscandia.

The boreal forest environment may not explain the spread of oblique point technology but it gives a context for its adoption. The spread of pine was favourable for species that are adapted to the boreal forest such as the European elk, the beaver, the brown bear, and birds like the capercaillie and the black grouse. The effect of the expanding forest cover on reindeer (*Rangifer tarandus*) is more difficult to assess. Reindeer are present in many of the earliest dated archaeological assemblages in northern Finland (Rankama 1996; Rankama & Ukkonen 2001) and at the early Mesolithic sites Dumpokjauratj close to Arjeplog and Kangos close to Pajala in northern Swedish Lapland (Bergman *et al.* 2004; Olofsson 2003; Östlund 2004).

The present existence of two reindeer subspecies in Fennoscandia, the mountain reindeer (*Rangifer tarandus tarandus*) and the forest reindeer (*Rangifer tarandus fennicus*), has provoked discussion on their importance to prehistoric hunter-gatherers. Since it is hardly ever possible to distinguish between the two subspecies in archaeological assemblages in the area, conclusions about their occurrence are based on the environmental adaptations of the two subspecies today and the context of reindeer bones in archaeological assemblages (e.g., Halinen 2005:43–45; Rankama & Ukkonen 2001). However, the premiss behind this discussion, namely that forest reindeer had a Late Pleistocene refugial origin separate from the mountain reindeer (Banfield 1961), is not supported by research on mitochondrial DNA (Flagstad & Røed 2003). This study suggests a similar diphyletic origin for both subspecies and a relatively recent forest adaptation for the forest reindeer – possibly connected to the postglacial forest expansion.

Oscillations in climate, annual mean temperature and the ensuing changes in forest cover and vegetation in general, suggest that reindeer foraging strategies in northern Fennoscandia during the Holocene have probably changed considerably and not necessarily in a linear fashion – a fact that prevents reliable extrapolation of present reindeer behavior to more distant times.

The reindeer bones from northern oblique point sites, such as Mávdnaávži 2, Aksujavri and Vuopaja, therefore can probably not be connected with either of the present subspecies. Instead, they can be seen as an indication of the adaptation of the original tundra species to boreal forest environment. Whether it had the morphological features of *Rangifer tarandus fennicus* at this point, is of no real importance here. It is known that northern ungulates may have a large variety of foraging strategies to meet the changing needs and circumstances (for a woodland caribou (*Rangifer tarandus caribou*) example see Johnson *et al.* 2001).

Putting the discussion on reindeer subspecies aside, it is clear that the gradual introduction of new fauna to northern Fennoscandia during the Mesolithic is indicated in the archaeological record. After the initial post-glacial reindeer dominance, the refuse fauna at sites becomes more varied. At many sites from the pine forest phase, reindeer only forms a small part of the total recovered faunal assemblages (Rankama 1996; Rankama & Ukkonen 2001).

The availability of specific lithic raw materials is another environmental factor potentially affecting the spread of lithic technology. In large parts of Fennoscandia quartz was the main raw material used to make small lithic artefacts during the Stone Age. These artefacts were mainly simple scrapers and cutting tools on flakes and flake fragments that do not include formal types. For this reason the oblique point stands out in the Mesolithic assemblages in eastern Fennoscandia as the first retouched artefact type since the earliest colonisation phase. The oblique point, albeit a formal artefact type, lends itself to manufacture from many different raw materials, including quartz. This is a quality that most probably facilitated the spread of this technological concept. It is also the reason why this particular lithic technology is archaeologically so readily visible.

The reasons and mechanisms behind the rapid expansion of the oblique point technology are beyond the scope of this paper. Nevertheless, we suggest as one requirement an interconnected network of hunterfisher-gatherer groups covering large areas of eastern and northern Fennoscandia. The oblique points seem to represent an archaeologically visible change in material culture among already established groups and can be seen as one of the first clear signs in the archaeological record of a relatively tight-knit but dynamic network of groups in the discussed area. A cohesion in material culture, suggested already earlier but especially during later periods by shared traits such as stone tool types and pottery styles (see, e.g., Hallgren 2008:57–64; Knutsson 2004; Manninen *et al*. 2003), speak in favour of a long-term ”culture-historical” network system. These kinds of social networks are not stable and change through time (e.g., Whallon 2006). It must be therefore stressed that here a social network does not equal a uniform archaeological culture. Segments of material culture within a social network may well have differing distributions due to different descent histories, *i.e*., differences in the mechanisms of cultural transmission (see, e.g., Jordan & Shennan 2009).

Conclusion

In this paper we have made the first comprehensive survey of oblique point finds known to date in the inland areas of northern Sweden, northern Norway and northern Finland. According to the present data the majority of the points at the inland sites date to *c.* 6400–4700 calBC and the best contexts with oblique points all date to 5800–5100 calBC.

The technology used to manufacture points at the studied inland sites entails the use of flake blanks from a wide spectrum of raw materials, including ones that are usually considered unsuitable for the successful execution of more elaborate lithic technological concepts, such as blade production. This differentiates these points from many of the early Phase I tanged and single edged points of the Barents Sea coast that were manufactured from blade blanks. Together with the absence of evidence of the use of similar points during the coastal Phase II, the technological differences and the available dates thus lead to the conclusion that the oblique points in the inland areas of northern Fennoscandia are mainly a Late Mesolithic phenomenon.

Further, we suggest that the inland points of northern Fennoscandia can be combined with the remaining two of the three possible wider contexts suggested in the introduction, namely the Phase III points of the Finnmark coast and the Late Mesolithic points known from southern Finland. These constitute a chronologically and technologically coherent Late Mesolithic technological tradition that was present, most probably through a network of forager groups, in the whole of Eastern Fennoscandia at roughly 5500 calBC.

The environmental context of the spread of the new technology was a boreal forest. Recent work focussing on vegetation and climate development in northern Finland and along the Scandes in Sweden indicates that the expansion of pine into the already existing birch forest, began already in the early Holocene. It is probable that as species adapted to the boreal forest, such as the European elk, became common also in the northernmost parts of Fennoscandia during the Mesolithic, this contributed to the adoption of the new (hunting) technology in the area. However, as the area covered by the oblique point tradition has experienced relatively quick transmission of technological traditions both before and after the time period discussed here, one should be careful not to make a too simplistic correlation between the new technology and, for instance, the introduction of new prey species.

The point of origin of the Late Mesolithic oblique point tradition within the large area where oblique points are found cannot at this point be distinguished. It is nevertheless clear that Late Mesolithic oblique points appear in the study area and other parts of eastern and northern Fennoscandia before the centuries constituting Bjerck's (2008) LM 4–5 chronozones. These points also predate the Late Mesolithic transverse points in the southern highlands and eastern forest areas in Norway (see also Grydeland 2000:39–40) as well as the transverse points of the South Scandinavian Ertebølle Culture.

Postscript

After the writing of this paper, new radiocarbon dates have become available for several of the discussed sites, as well as three oblique point sites located in more southern parts of Finland (see Manninen & Tallavaara *this volume*). These dates lend support to the *c.* 6400 calBC date for the Museotontti points, push the earliest date of oblique points in the inland areas of northern Fennoscandia possibly as far back as *c.* 6900 calBC, and suggest that the use of oblique points began earlier in northern Finland than in southern Finland.

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Appendix I. The Inland Sites

SWEDEN

Sorsele

1. Rastklippan

The Rastklippan site is located on a small rocky island close to the southern end of Lake Deärnnájávrrie, southern Swedish Lapland. The site was discovered in the 1960s by Ivar Eriksson, one of the Swedish King's rowers, during a fishing trip with King Gustav VI Adolf.

In connection with excavations nearby at Forsavan in 1969 personnel of the Skellefteå museum, Asta Brandt and Ernst Westerlund, took 660 flakes and 14 "microliths" from the site, which consists of a small roundish turf patch on the otherwise rocky surface. Since the collecting caused damage to the site, Peter Gustafsson of the same museum visited the location again the following year and made some basic recording (Gustafsson 1970). After going through the finds Gustafsson concluded that the assemblage did not resemble any of the known archaeological finds from northern Sweden. The recovered lithic assemblage from Rastklippan was kept in the Skellefteå museum collection for over 20 years before it was "rediscovered" by Knutsson (1993) in connection with a research program on the earliest settlement of northern Scandinavia. In order to gain a better understanding of the site an excavation was carried out in 1993.

The turf patch that covered roughly 18 m² was excavated. The lithic assemblage from the site, including the finds retrieved during the 1969 visit, amounts to a total of 974 pieces. The assemblage includes 21 oblique points of quartzite and chert and a large number of other artefacts related to point manufacture. The whole assemblage has been analysed by Knutsson while a comparative analysis was carried out by Manninen in 2005. These artefacts derive mostly from a hut floor with a diameter of approximately three meters, which had been levelled using gravel and sand and lined with stones. Oblique points, a central hearth, and an associated sooty sand layer comprise a closed context that has been dated by three separate pine (*Pinus sylvestris*) charcoal samples. The samples are all dated to the Late Mesolithic (5630–5360 calBC, 5510–5220 calBC, 5480–5080 calBC; see Fig. 4). A piece of charcoal from the layer used to level the hut floor was dated to 7290–6700 calBC. (see Knutsson *manuscript*; 2005a; 2005b; Manninen & Knutsson *in preparation*).

Find numbers with oblique points: 1969:1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17; 1993: 28d, 53, 55, 64, 67 (see Knutsson 1993:Fig. 4; 2005a:Fig. 5; 2005b:Fig. 6).

Skellefteå

2. Lappviken

This site was discovered in 1969 during the excavation of a medieval house foundation by Lappviken at the northern shore of the river Byskeälven in Västerbotten. The excavation was carried out by Lennart Sundqvist of Skellefteå museum (Knutsson 1993; Sundqvist 1983) and covered 80 m². A flaked quartzite and porphyry assemblage was found in two concentrations, including six oblique points made of porphyry (no find numbers). The assemblage is not radiocarbon dated.

For examples of oblique points from Lappviken see Knutsson 1993:Fig. 4.

3. Garaselet

The Garaselet site lies at the southern shore of the river Byskeälven, less than two kilometers from the Lappviken site. The site was found by amateur archaeologist Ivan Ekenstedt in the late 1960s. A test excavation was conducted by Lennart Sundqvist in 1969 and followed by excavations in 1970–1975 (Sundqvist 1978).

The *c.* 600 m² site has a complex stratigraphic sequence consisting of flood layers of silt deposited by the river, and partly mixed cultural layers with hearths and cooking pits from different time periods. Knutsson (1993) and Olofsson (2003:41–42) concur that there are at least two Mesolithic occupation phases at the site, one dating to between *c.* 7500 and 6700 calBC and the other between *c.* 5500 and 4600 calBC. The handle core technology present at the site belongs to the latter of these (Knutsson 1993; Olofsson 2003:42).

The site has also been in use during later periods. For example, a separate layer containing typo-chronologically Neolithic flint axes and another layer containing bifacial points dating typo-chronologically to the Late Neolithic/Early Metal Age can be distinguished. There is also refuse from iron working, a late Iron Age/Early Medieval hut foundation and an Early Medieval knife from the site. (Sundqvist 1978:132–134.) The eleven radiocarbon dates from samples representing human activity at the site (Knutsson 1993:Fig. 11) range between *c.* 7500 calBC and AD 900.

The lithic assemblage consists of 4140 artefacts. The eight handle cores/keeled scrapers and associated artefacts have received the most attention (see Knutsson 1993; Olofsson 1995:92–94). Anders Olofsson has also analysed a small sample of finds deriving from the layers that are with the greatest likelihood associated with the oldest radiocarbon dates from the site. This sample included also an oblique point of quartzite, gone unnoticed in earlier studies (Olofsson 2003:48). Olofsson notes, however, that the dating of the point must be left open due to the absence of a clear context and the fact that the refitting of lithic sequences from Garaselet has shown that there has been considerable vertical, and to some degree also horizontal, post-depositional movement of lithic artefacts (Knutsson 1993:33; Åkvist-Nordlund 1992).

Find numbers with oblique points: no. 495 (see Olofsson 2003:Fig. 3:8).

Jokkmokk

4. Tallholmen

This possible site was found by Kjel Knutsson in a survey carried out on the shores of the Tallhomen island in Lake Burgávrre, directly west of Jokkmokk. An oblique point made of grey quartzite was found in beach sand devoid of any other clear signs indicating a site. However, a few quartz flakes were lying not far from the point.

Find numbers with oblique points: not catalogued yet (see Knutsson 2005a:Fig. 5).

FINLAND

Ranua

5. Kujala/Uutela

The site is located on the shore of Lake Simojärvi, southern Finnish Lapland. The site was inspected by Markku Torvinen in 1978 (Torvinen 1978) and by Hannu Kotivuori during a 1990 survey (no report). Evidence of Stone Age activity at the site is spread over a large area that is nowadays mainly cultivated land. Surface finds from the site include ground stone tools and flakes, fragments and retouched tools of quartz and other, probably local, raw materials (Torvinen 1978). The artefacts retrieved in the 1990 survey are reported to include one oblique point of quartz crystal (Kotivuori 1996:400).

Find numbers with oblique points: KM 26481:4

Kemijärvi

6. Neitilä 4

The site is located on the east shore of the former Neitikoski rapids in the River Kemijoki in southern Finnish Lapland. The site is currently under water due to artificial water level changes. Excavations at the site were conducted by Pekka Sarvas in 1962, 1963 and 1964. A total of approximately 300 m² were excavated. The site yielded finds from many different periods ranging from the Mesolithic to the Iron Age in a more or less stratigraphic sequence, as well as ten or more stone settings. The lithic finds include three oblique points of quartz. (Kehusmaa 1972.) There are no radiocarbon dates from the site. One of the points has been analysed by Manninen and Tallavaara in 2007.

Find numbers with oblique points: KM 16145:1750; KM 16553:794, 1637 (see Kehusmaa 1972:Fig. 68–70).

7. Lautasalmi 1

The site is located on the northern shore of the Reinikansaari island in Lake Kemijärvi in southern Finnish Lapland. The site was found by Christian Carpelan in a survey in 1962 and partly excavated under his supervision the same year. The excavation revealed that the site was mostly destroyed by roadwork, gravel extracting and water level changes in the lake. In the roughly 350 excavated square meters six or seven hearth remains were found, as well as scattered burnt stones, burnt bone and lithic artefacts. The lithics consist mainly of quartz artefacts but fragments of ground slate tools and an oblique point of black chert were also found. (Carpelan 1962) There are no radiocarbon dates from the site. The point was analysed by Manninen and Tallavaara in 2007.

Find numbers with oblique points: KM 15846:78.

Enontekiö

8. Museotontti

The Museotontti site is located on the northern shore of Lake Ounasjärvi. The site was registered in an inspection conducted by Markku Torvinen in 1985. Excavations at the site have been carried out in 1986 and 1988 by Petri Halinen, in 1987 and 1989 by Jarmo Kankaanpää, and in 1994 by Taisto Karjalainen. The 1994 excavation produced no finds. In 1986–1989 an area of 664 m² was excavated and several hearths and find concentrations were registered. These have been divided into 22 camp sites/areas by Halinen (1995:47–62; 2005:51–55). There has also been considerable modern activity at the site (Halinen 1986; Kankaanpää 1988).

Finds from the 1987–1989 excavations include 2881 quartz artefacts, 29 artefacts of different quartzites, 50 artefacts of different cherts, 132 artefacts of different slates or slate-like rocks and 28 artefacts of other rocks/lithic raw materials (Halinen 1988:7–9; Kankaanpää 1988:11–15; 1990:12–15). Some artefacts represent typo-chronologically datable shapes giving the site a coarse use span ranging from the Mesolithic (oblique points) to the Late Neolithic (knife handle of red slate). Iron slag found in one of the hearths indicates later occupation. There are also eight radiocarbon dates from the site (Halinen 2005:Table 19), ranging from the Mesolithic to the Iron Age and clearly indicating that the site in fact has an occupation history of several thousand years.

The lithic material from the Museotontti excavations has been analysed and classified by Petri Halinen (Halinen 1988; 2005; Kankaanpää 1988). Halinen classified five artefacts from the 1987 assemblage and four artefacts from the 1988 assemblage as oblique points. All points are made of quartz. According to Halinen there are no oblique points in the 1989 assemblage. The points and microliths identified by Halinen were re-analysed in 2007 by Manninen and Tallavaara (*this volume*) using more strict criteria. In this analysis seven of the nine points identified by Halinen were classified as oblique points with distinct retouch. One artefact classified as a microlith by Halinen was also re-classified as an oblique point. These eight points include one surface find made outside the excavated area.

Due to the long occupation history and consequent mixing of artefacts from different time periods it was not considered practical to analyse the rest of the quartz assemblage in more detail. The uniformity of quartz, a raw material known to have been used in northern Lapland throughout the Stone Age and also in later periods, prevents the use of methods like nodule analysis or refitting in any useful way on a multi-period site.

Find numbers with oblique points: KM 23877:122, :411, :455, :491, :537, KM 24464:289, :329, :620 (see Knutsson 2005a:Fig. 5).

Inari

9. & 10. Kaunisniemi 2&3

The two sites were found by Aki Arponen in 1990. They are located on the shore of Lake Rááhájävrion the eastern side of the Kaunisniemi peninsula (Kaunisniemi 2) and on a long and narrow, currently submerged, point extending east of the cape (Kaunisniemi 3). The site areas are large and, with natural water levels, stretch over a *c.* 700 meters long strip of the lake shore. Finds were spread into several separate concentrations. At least 68 stone hearths on the two sites were observed by Arponen. The collected finds include artefacts from the Stone Age (slate, chert, quartz, quartzite), but also from more recent times (iron slag, iron strike-a-light). (Arponen 1991.) The finds from the sites were analysed by Manninen and Tallavaara in 2007. Among the lithic artefacts from Kaunisniemi 2 there is one oblique point of white burnt chert and from Kaunisniemi 3 two points of translucent quartz, one of white, probably burnt, chert and one of dark greenish-grey quartzite. There are also a few flakes of the same distinct non-local quartzite as the point, suggesting raw material import and possible on-site manufacture of points.

Find numbers with oblique points: KM 26039:42; KM 26040:2, :5, :35, :53.

11. Satamasaari

The site was found by Aki Arponen in 1988 (Arponen 1989). It lies on the shore of Lake Rááhájävri on a small peninsula pointing towards the north. In the 1990 survey by Arponen a *c.* 150 meters long stretch of the lake shore yielded Stone Age finds in three find areas consisting of several concentrations of lithic debitage and a number of stone-built hearths washed and broken up by water level changes (Arponen 1991:33–36). The finds from the site were analysed by Manninen and Tallavaara in 2007. Besides fragments of ground slate tools and tools and flakes of quartzite, quartz and chert, the finds include an oblique point of white, possibly burnt, chert.

Find numbers with oblique points: KM 26010:4.

12. Kaidanvuono SW

The site was found by Hannu Kotivuori and Markku Heikkinen in a survey in 1986 (Kotivuori 1987a). It is located on the shore of Lake Rááhájävri (partly under water) and is one of six sites found by Kotivuori and Heikkinen on the shore of Kaijanvuono bay. The site includes several stone hearths. The assemblage includes one oblique point made of quartzite, a basal fragment of a straight based bifacial point and other lithic artefacts of quartz and quartzite. (Kotivuori 1987a.)

Find numbers with oblique points: KM 23354:9

13. Kirakkajoen Voimala

The site is located *c.* 20 kilometres south-east of Inari village on the high lying bank of Kaareehjuuhâ River, close to the outflow of the river into the part of Lake Inari called Äijihjävri. The site was found by Aki Arponen in 1990 (Arponen 1990). It was badly disturbed by gravel extraction and a road leading to the power plant located next to it. Flakes and tools of chert and quartzite were found on the road on the verge of the gravel quarry. The site is briefly discussed by Havas (1999:59), who mentions two fragmentary points in the assemblage but in the analysis conducted by Manninen and Tallavaara in 2007 only one broken oblique point of grey chert could be verified.

Find numbers with oblique points: KM 26245:1.

14. Nellimjoen suu S

The Nellimjoen suu S site lies on the south-eastern shore of Lake Inari in Nellim village. The site was found in a survey conducted by Markku Torvinen in 1974 and excavated by Beatrice Sohlström in 1988 (Sohlström 1989; 1992). The excavated area covered a total of 204 m², including test pits. The excavation revealed that later activity had badly disturbed parts of the Stone Age cultural layer (Sohlström 1989).

A circular patch of discoloured soil and a relatively dense concentration of finds (Säräisniemi 1 pottery, lithic tools and debitage, burnt bone) around a hearth have been interpreted as the remains of a circular hut foundation with a diameter of approximately six metres (Halinen 2005:Figs. 40a–I; Sohlström 1992). Only one radiocarbon sample from the site has been dated. A charcoal sample from the cultural layer inside the hut area was dated to 5220–4606 calBC.

The lithic assemblage (1477 artefacts) was analysed by Manninen in 2005. The finds include an oblique point of white (possibly discoloured) chert, as well as flakes of the same raw material, some of which refit into reduction sequences of two to three flakes. The point was found about two metres outside the hut area. Although some flakes of the same or a similar raw material were found inside the hut area, the association of the point or the flakes with the hut is uncertain, especially since the site has been heavily disturbed by later activity.

Find numbers with oblique points: KM 24375:454.

15. Ahkioniemi 1&2

The site was found by Hannu Kotivuori and Markku Heikkinen in a survey in 1986. It is located on the southern shore of Lake Solojävri, *c.* 12 kilometres south-west of Inari village. Stone Age finds, possible prehistoric pit structures, and remains of a World War II military base were registered at the site. The lithic finds include tools and flakes of quartz and quartzite and an oblique point of white, possibly burnt, chert. (Kotivuori 1987b.) The point was analysed by Manninen and Tallavaara in 2007.

Find numbers with oblique points: KM 23363:4.

16. Vuopaja

The Vuopaja site lies at the western end of Lake Inari near the mouth of river Juutuanjoki in the area of the Sámi museum and the Nortern Lapland nature centre Siida (see Seppälä 2007). The earliest survey and consequent excavation at the site took place as early as 1908–1910 (Itkonen 1913). Since then, excavations have been conducted in 1929 by Sakari Pälsi (1929), in 1987–1988 by Aki Arponen (1987; 1988) and in 1993–1994 by Sirkka-Liisa Seppälä (1993; 1994).

A total of 394 m² have been excavated on two terraces with a *c.* 4–5 metres' difference in altitude. Two oblique points of black chert and one of red quartzite have been found on the lower terrace and a concentration of four points made of grey chert in the 44 m² excavated on the higher terrace

The lower terrace has yielded finds from a number of periods, and seventeen radiocarbon dates (Halinen 2005:Table 19) range from 6630 calBC to AD530. The three oblique points were found several metres apart and are therefore not interrelated in any clear manner. One of the points was found in a hearth dated by a charcoal sample to 4330–3710 calBC (Hel-3581). However, since the terrace has been in use throughout prehistory it is quite possible that the point is not contemporaneous with the dated sample. The typo-chronologically datable finds include bifacial points and sherds of Säräisniemi 1 and Vuopaja ware (e.g., Carpelan 2004:26–30) supporting the long use of the lower terrace indicated by the radiocarbon dates (see also Halinen 2005:71; Fig. 36a–i; Seppälä 2007).

The excavated area on the higher terrace does not seem to be as mixed as the one on the lower terrace. It yielded relatively few finds: 84 lithic artefacts of quartz, quartzite and chert, including four points of grey chert (partly burnt white), and fragments of burnt bone. Twenty bone fragments have been identified to the species. Four of these are elk (*Alces alces*) and sixteen are reindeer (*Rangifer tarandus*) (Ukkonen 1994; 1995). There are no radiocarbon dates from the upper terrace. All of the lithics from the upper terrace have been analysed by Manninen in 2005 and the points from both terraces by Manninen and Tallavaara in 2007. For a more detailed analysis of the oblique points and find distribution on the upper terrace see Manninen and Knutsson (*in preparation*).

Find numbers with oblique points: KM 28365:442, :446, :454, :660, :673, :692, :889.

17. Bealdojohnjalbmi 1

The Bealdojohnjalbmi 1 site lies on the northern shore of Lake Bealdojávri in north-western Inari borough. The site was found by Oula Seitsonen, Kerkko Nordqvist, Heidi Pasanen and Sanna Puttonen in 2005 and was partly excavated in 2006. The excavated area covered 20 m² and revealed both Stone Age and later activity at the site. The finds from the survey and excavation include at least three oblique points of chert classified as *trapezoid microliths* by the excavators. (Nordqvist & Seitsonen 2009). The finds from the site have not yet been available for closer analysis.

Find numbers with oblique points: KM 35217:1; KM 36200:115, :120 (see Nordqvist & Seitsonen 2009:Fig. 2).

18. Supru, Suprunoja

The Suprunoja site is located on a narrow strip of land between the lakes Čuárbbeljävri and Kuošnâjävri close to the northern shores of Lake Inari. The site was found by Markku Torvinen in a 1983 survey. Three excavation areas and several test pits covering a total of 202 m² were excavated by Eeva-Liisa Nieminen in 1984 in connection with road improvement work. The results suggest that Stone Age and later activity has taken place all over the neck of land between the lakes. Up to fifteen hearths were located in the excavated areas. (Nieminen 1985.)

The finds were analysed by Manninen in 2005. They include burnt bone and artefacts of quartz and chert. The total number of lithic artefacts is only 55. Among the 42 quartz finds there is one oblique point. Four radiocarbon dates were obtained from charcoal found in hearths in different parts of the site. Two of the dates (2430–1770 calBC and 3320–2480 calBC) derive from the same hearth and belong to the Early Metal Age. One date (5000–4400 calBC) is from the transitional period between the Mesolithic and Neolithic and one date (5780–5380 calBC) is Late Mesolithic. The oblique point cannot be positively tied with any of the dated contexts. Activity at the site during different time periods and the coarse method of recording find locations prevent any reliable interpretations based on find distributions.

Find numbers with oblique points: KM 22685:13.

Utsjoki

19. Mávdnaávži 2

The Mávdnaávži 2 site is located on the bank of the small Mávdnaávžijohka River in the western fell area of Utsjoki borough. The site was found in 1999 by Taarna Valtonen in a survey conducted as a part of a research project concentrating on the Báišduottar – Paistunturi wilderness area (Manninen & Valtonen 2002; 2006; Valtonen 1999). An excavation covering 52 m² was conducted by Manninen in 2004. Most, if not all, of the area containing finds was excavated.

The site was found to be a short-term camp with only one short occupation phase. The excavation revealed a round hut foundation with a diameter of approximately three meters and a central hearth as well as an outside activity area. The hearth inside the hut was surrounded by clearly defined knapping locations, where the finds mainly consisted of grey chert debitage related to oblique point manufacture: a total of 726 artefacts, including 13 intact or slightly broken oblique points. (Manninen 2005; 2006; 2009; Manninen & Knutsson *in preparation*.)

Five burnt bone fragments from the hearth were identified to the species (Lahti 2004). All of them derive from reindeer (*Rangifer tarandus*). The charcoal in the hearth has been identified as pine (*Pinus sylvestris*) (T. Timonen, Finnish Museum of Natural History, Botanical Museum, *pers. comm.* 2004). An AMS dating obtained from burnt bone from a pit located within the hearth area inside the hut dates the site to 5490–5320 calBC.

Find numbers with oblique points: KM 32590:1; KM 34675:7, :147, :164, :199, :225, :261, :317, :335, :13+:214, :222+:104, :223+:234, :5+:21 (see Knutsson 2005a:Fig. 5; Manninen 2005:Fig. 7).

20. Jomppalanjärvi W

The Jomppalanjärvi W site lies on the west shore of Lake Jumbáljávri, a part of the chain of lakes constituting the Utsjoki River. The site was found by Tuija Rankama and Jarmo Kankaanpää in an inspection in 1997. Lithic artefacts (grey chert and quartz), burnt bone, burnt sand, and possible hearths are found on an approximately 150 meters long stretch of sandy soil. (Rankama & Kankaanpää 1997) Among the 1997 finds there is a potential oblique point of quartz, which, however, is excluded here due to insufficient modification. The site was revisited in 2009 by Rankama and Kankaanpää and an oblique point of burnt chert was found.

Find numbers with oblique points: KM 38078:2.

NORWAY

Bardu

21. Leinavatn I

The site was found on the shore of Lake Leinavatn in the county of Troms by Knut Helskog during a survey in 1971. Six flakes of fine grained quartzite and an oblique point were collected from the surface of a 10 m² area. No additional artefacts were found during test pitting. (Helskog 1980b:120–121.)

Find numbers with oblique points: Ts. 11147a

Målselv

22. Devdis I

The Devdis I site is located by a river outlet on the southern shore of Lake Devddesjávri. When found in a 1969 survey by Bjørn Myhre, Devdis I was the first known Mesolithic site in Troms county (Thuestad 2005:13). Contrary to the Rastklippan find, the Devdis I material was familiar to the local researchers, as oblique points had been discovered already for 40 years at Mesolithic sites on the Finnmark coast. Since Devdis I is an inland site, the inland region has, from early on, been integrated in the discussions conserning the Mesolithic of this particular region of northern Norway (see, e.g., Helskog 1974).

An excavation covering 42,5 m² and additional test pitting was carried out by Knut Helskog in 1970 (Helskog 1980b). No artefacts were found outside the excavated area. The site contained four structures: a stone hearth and three pits interpreted as cooking pits, and a pit hearth. The lithic assemblage was discovered both around and inside these features. (Helskog 1980b.)

The site yielded a total of 1475 lithic artefacts, at least 30 of which are oblique points made of different qualities of quartzite and chert. According to an analysis carried out by Knutsson in 1995, a large number of the other artefacts are also related to point manufacture (Manninen & Knutsson *in preparation*).

Three samples from the site have been radiocarbon dated, one from each pit. Two samples were bone and gave Iron Age dates 360 calBC–AD650 and AD780–1210. However, the bone sample sizes were inadequate and these dates cannot be considered reliable. The third date was charcoal and gave the result 5760–5220 calBC, a date supported by the Mesolithic character of the assemblage. (Helskog 1980b; Manninen & Knutsson *in preparation*.)

Find numbers with oblique points: Ts. 5720a ,b, c, e, f, h, i, k, l, n, m, p, t, u, w, x, aa, ab, ac, ad, ae, af, ag, ah, al, an, ap, ar, as, at, aw, lg, om (see Helskog 1980b; Knutsson 2005a:Fig. 5; 2005b:Fig.6).

Kautokeino

23. Aksujavri

The site originally named Kautokeinoelva IX and X, but better known as Aksujavri lies on the western shore of Lake Ákšojávri only some 100 meters from the Kautokeino River. The site was registered by Knut Helskog in 1976 and an excavation of 27,7 m² (including test pits) was carried out by Bryan Hood and Bjørn Helberg in 1986. (Havas 1999:136; Helskog 1976; Hood 1986; 1988.)

The site consists of a series of small lithic scatters, four of which were studied with small excavation trenches. No distinct hearths or other features were observed. Oblique points were found in three trenches. One of the trenches yielded a concentration of 341 pieces of burnt bone. Some of the bone fragments have been identified as reindeer (*Ragnifer tarandus*). (Hood 1986;

1988.) A sample of burnt bone from Aksujavri has been recently dated to *c.* 5500 calBC. (B. Hood *pers. comm*. 2008).

A total of 755 artefacts from the site were analysed by Knutsson in 1995. There are 14 oblique points and point fragments of chert, quartzite and a rhyolite-like raw material in the assemblage, as well as other artefacts indicating point manufacture and intact knapping floors at the site. (Manninen & Knutsson *in preparation*.)

Find numbers with oblique points: Ts. 8479n, å, ø, x, z, ab, ac, ae, ag, bm, bå, bw (see Hood 1988:Fig. 4; Knutsson 2005a:Fig. 5).

24. Kautokeino kirke

The site is located in the vicinity of the Kautokeino church. It is represented in the Tromsø museum collections by three find numbers. These consist of finds collected by an amateur collector in 1971 and material collected by Knut Helskog in 1972 and Ericka Helskog in 1981 (Helskog 1981). A total of six oblique points made of grey fine grained quartzite are included in the finds. The points have been analysed by Knutsson.

Find numbers with oblique points: Ts. 5932a, b, c; Ts. 6956p, q, r (Knutsson 2005a:Fig. 5/Kautokeino 1&2).

25. Guosmmarjavrre 5

The Guosmmarjavrre 5 site lies on the shore of the Lake Guosmmarjávri, approximately six kilometres north-east of Kautokeino church and directly upstream of Lake Njallajávri on the Kautokeino River. The finds, surface collected by Kristian Jansen in 1971, consist of artefacts of white quartz, rock crystal and white and grey quartzite. Included are a point and a point fragment of fine grained grey quartzite. (Tromsø Museum - arkeologisk tilvekstkatalog; B. Hood *pers. comm.* 2010)

Find numbers with oblique points: Ts. 5840a, b.

26. Njallajavvre

The Njallajavvre site lies on the shore of the lake Njallajávri, approximately seven kilometres north-east of the Kautokeino church. It was discovered during surveys in the early seventies and excavated in 1974 by Ericka Helskog. The material contains some asbestos-tempered pottery and lithics of variable raw materials including a polished slate point and fragments of ground stone tools. The only flaked point found during excavation has been analysed by Knutsson.

Find numbers with oblique points: Ts. 5829dæ (see Knutsson 2005a:Fig. 5).

27. Riggajåkka

The site is an area of aeolian sand on the shore of the River Riigájohka, *c.* 22 km kilometres north-east of the Kautokeino church. The site consists of surface finds, two hearths and a burial. In 1974 lithics and asbestos-tempered pottery were found in test pits and from the surface by Ericka Helskog. The assemblage includes a single oblique point made of grey chert (Havas 1999:8–9; E. Helskog 1978).

Find numbers with oblique points: Ts. 5898g (see E. Helskog 1978:Fig. 3.1.1.)

28. Peraddjanjarga

The Peraddjanjarga site is located on the Cape Coagesnjárga on the western shore of the Kautokeino River, slightly south of the Riggajåkka site. Three oblique points of dark and lighter grey chert, alongside other lithic artefacts of the same material, have been surface collected from a sandy terrace in 1971 (Tromsø Museum - arkeologisk tilvekstkatalog; B. Hood *pers. comm.* 2010)

Find numbers with oblique points: Ts. 5880a,b,c.

Karasjok

29. Gasadaknes

The Gasadaknes site lies on the eastern shore of Lake Iešjávri. Finds have been collected by Knut Helskog in a 1973 survey and by Ericka Helskog in 1974 in a 27 m² excavation (Havas 1999:9; E. Helskog 1978:Fig. 3.1.1. b–d). According to Havas (1999:136), the site has yielded also three unpublished Early Metal Age radiocarbon dates. The material consists of debitage of variable raw materials and some sherds of asbestos-tempered pottery. The eight oblique points found during excavation have been analysed by Knutsson. The points are made of white and grey quartzite and grey chert.

Find numbers with oblique points: Ts. 5895ai, an, bæ, cp, dg, di, dk, du (see E. Helskog 1978:Fig. 3.1.1.; Knutsson 2005a:Fig. 5).

Sør-Varanger

30. Noatun Neset

The site is located on a small peninsula in the valley of the Paatsjoki River on the Russian-Norwegian border. The site is relatively large, with 2–3 house pits, and has yielded finds from at least two occupation phases. Excavations at the site were carried out in 1959 by Nils Storå and John Rea-Price, in 1961 by Povl Simonsen, and in 1999 by Marianne Skandfer. More than 100 m² have been excavated. In 1959 an oblique point was found in an excavated house pit (House 1), and a second point in an area interpreted as a refuse heap. Other finds from the site include bifacial and slate points, pottery of the Säräisniemi 1 type and asbestos tempered pottery. According to Simonsen, house 1 presents a later use phase of the site than the Säräisniemi 1 pottery and is associated with the asbestos ware. Charred food crust from a piece of Säräisniemi 1 pottery from the site has been dated to 5196-4598 calBC (Simonsen 1963:74–108, Skandfer 2003:36–38, 231, 233.)

Find numbers with oblique points: Ts. 6116cx; Ts.6120n.

31. Kjerringneset IV/Inganeset

The site is located on the Russian-Norwegian border, on a peninsula in the valley of the Paatsjoki River *c.* 60 kilometres from the coast. It was found in 1959 by Samuel Mathisen and Reidar Wara who also conducted small scale excavations there the same year. Further excavations were conducted in 1961 by Per Hartvig. Simonsen reports two house pits and finds of Säräisniemi 1 pottery, as well as diverse lithic artefacts from the site. The site dubbed Kjerringneset IV by Simonsen was revisited in 1999 by Marianne Skandfer who renamed it Inganeset. Skandfer was unable to locate the house pits and find spots mentioned by Simonsen but a small scale excavation higher up the river bank yielded flint blades and six oblique points of flint. A sample of charcoal (pine) from the excavation was dated to 3710–3380 calBC and according to Skandfer dates the points that consequently would be younger than the Säräisniemi 1 pottery. Charred food crust from a Säräisniemi 1 pottery sherd from the site has been dated to 5010–4730 calBC. (Simonsen 1963:159–161; Skandfer 2003:27–29, 283, 441.)

Find numbers with oblique points: Ts. 11188.

Appendix II. Glossary of place names

Finnish (Fi), Inari Saami (sI), Kven (Kv), Lule Saami (sL), Meänkieli (Mk), Norwegian (No), North Saami (sN), Russian (Ru), Swedish (Sw), Skolt Saami (sSk), South Saami (sS), Ume Saami (sU).

Arjeplog (Sw), Árjepluovvi (sN), Árjjapluovvi (sU)
Arvidsjaur (municipality, Sw), Árviesjávrrie (sU)
Báišduottar (sN), Paistunturi (Fi)
Bardu (municipality, No), Perttula (Kv), Beardu (sN)
Bealdojávri (sN), Peltojärvi (Fi)
Burgávrre (sL), Purkijaur(e) (Sw)
Byskeälven (Sw), Gyöhkahe (sU)
Čuárbbeljävri (sI), Jorvapuolijärvi (Fi)
Devddesjávri (sN), Dødesvatn (No)
Deärnnájávrrie (sU), Tärnasjön (Sw)
Enontekiö (municipality, Fi), Eanodat (sN)), Enontekis (Sw)
Finnmark (county, No), Ruija (Fi, Kv), Finnmárku (Ns)
Finnmarksvidda (area, No), Finnmárkkoduottar (Ns)
Inari (municipality, Fi), Aanaar (sI), Anár (sN), Aanar (sSk), Enare (Sw)
Jokkmokk (municipality, Sw), Jokimukka (Fi), Jokinmukka (Mk), Jåhkåmåhkke (sL), Johkamohkki (sN)
Jumbáljávri (sN), Jomppalanjärvi (Fi)
Junosuando (Sw), Junosuvanto (Fi), Čunusavvon (sN)
Juutuanjoki (Fi), Juvduujuuhâ, Juvduu (sI), Juvdujohka (sN)
Kaijanvuono (Fi), Kaidanvuono (Fi), Skäiđivuonâš (sI)
Karasjok (municipality, No), Kaarasjoki (Fi), Kárášjohka (sN)
Kautokeino (municipality, No), Koutokeino (Fi), Guovdageaidnu (sN)
Kemijoki (Fi), Giemajohka (sN), Kemi älv (Sw)
Kemijärvi (municipality, Fi), Kemijävri (sI), Giemajávri (sN), Kemiträsk (Sw)
Kirakkajoki (Fi), Kaareehjuuhâ (sI), Garitjohka (sN)
Kuošnjâjävri (sI), Kuosnajärvi (Fi), Kuosnajäu'rr (sSk)
Leinavatn (No), Lulit Lenesjávri (sN)
Malgomaj (Sw), Jetneme (sS)
Mávdnaávžijohka (sN), Mávnnaávžijohka (sN)
Mortensnes (No), Ceavccageađgi (sN)
Målselv (municipality, No), Málatvuopmi (sN)
Nellim (Fi), Nellimö (Fi), Njellim (sI), Njeä'llem (sSk)
Norrbotten (county, Sw), Pohjoispohja (Fi), Norrbottena leatna (sN)
Norrland (landsdel, Sw), Norlanti (Fi), Norrlánda (sN)
Ounasjärvi (Fi), Ovnnesjávri (sN)
Paatsjoki (Fi), Paččveijuuhâ (iS), Река Паз (Ru), Báhčaveaijohka (sN), Paččjokk (sSk), Pasvikelva (Sw)
Rahajärvi (Fi), Rááhájävri (iS)
Skellefteå (municipality, Sw), Heletti (Mk), Skielliet (sU)
Solojävri (sI), Solojärvi (Fi)
Sorsele (municipality, Sw), Suorssá (sU), Suorsá (sN)
Sør-Varanger (municipality, No), Etelä-Varanki (Kv), Mátta-Várjjat (sN)
Troms (county, No), Tromssa (Kv), Tromsa, Romsa (sN)
Utsjoki (Fi), Ohcejohka (sN)
Varanger (No), Varanki (Kv), Várjjat (sN)
Varangerfjord (No), Varanginvuono (Fi, Kv), Várjavuotna (sN)
Västerbotten (county, Sw), Länsipohjan lääni (Fi), Västerbottena leatna (sN)
Åland (county, Sw), Ahvenanmaa (Fi)
Äijihjävri (sI), Ukonjärvi (Fi)
Överkalix (municipality, Sw), Ylikainuu (Mk)

Appendix III. C14 dates older than *c.* 6400 calBC from northern Finland and northern Sweden

Site Nr.	Site	Lab Nr.	BP	calBC 2σ	Source
1	**Pulmankijärvi**	Hela-372	7905±85	**7048–6603**	Kotivuori 2007
2	**Sujala**	Hela-1102	9265±65	**8695–8302**	Rankama & Kankaanpää 2008
2	Sujala	Hela-1442	9240±60	**8612–8305**	Rankama & Kankaanpää 2008
2	Sujala	Hela-1441	9140±60	**8541–8256**	Rankama & Kankaanpää 2008
2	Sujala	Hela-1103	8948±80	**8293–7827**	Rankama & Kankaanpää 2008
2	Sujala	Hela-1104	8930±85	**8287–7794**	Rankama & Kankaanpää 2008
3	**Giellájohka 5**	Hela-1610	8615±55	**7751–7545**	Nordqvist & Seitsonen 2009
4	**Saamenmuseo**	Hela-430	8835±90	**8240–7660**	Rankama & Kankaanpää 2005
4	Saamenmuseo	Ua4296	8760±75	**8198–7599**	Rankama & Kankaanpää 2005
4	Saamenmuseo	Ua4363	8380±90	**7584–7187**	Rankama & Kankaanpää 2005
4	Saamenmuseo	Hel-3320	8290±110	**7541–7071**	Rankama & Kankaanpää 2005
4	Saamenmuseo	Hel-2635	8180±110	**7511–6829**	Rankama & Kankaanpää 2005
4	Saamenmuseo	Hel-3319	7940±120	**7174–6510**	Rankama & Kankaanpää 2005
4	Saamenmuseo	Hel-3580	7600±90	**6634–6254**	Rankama & Kankaanpää 2005
5	**Vuopaja**	Hel-3584	7600±90	**6634–6254**	Rankama & Kankaanpää 2005
6	**Vuopaja N**	Hel-3570	7530±150	**6677–6064**	Rankama & Kankaanpää 2005
7	**Myllyjärämä**	Hel-2710	8320±110	**7570–7082**	Rankama & Kankaanpää 2005
8	**Museotontti**	Hel-2563	7880±140	**7137–6457**	Rankama & Kankaanpää 2005
8	Museotontti	Hel-2564	7750±120	**7029–6414**	Rankama & Kankaanpää 2005
8	Museotontti	Hel-2728	7640±120	**6770–6232**	Rankama & Kankaanpää 2005
8	Museotontti	Hel-2565	7640±110	**6697–6238**	Rankama & Kankaanpää 2005
9	**Proksin kenttä**	Hel-2449	7900±110	**7065–6506**	Rankama & Kankaanpää 2005
9	Proksin kenttä	Hel-2454	7760±130	**7036–6417**	Rankama & Kankaanpää 2005
9	Proksin kenttä	Hel-2450	7740±150	**7050–6269**	Rankama & Kankaanpää 2005
9	Proksin kenttä	Hel-2451	7630±140	**7002–6125**	Rankama & Kankaanpää 2005
10	**Kitkiöjärvi**	Ua-24560	8055±55	**7176–6776**	Hedman 2009
10	Kitkiöjärvi	Ua-24559	8010±55	**7072–6700**	Hedman 2009
11	**Mattivainaanpalo 2**	Hel-3322	7470±180	**6690–5985**	Jungner & Sonninen 1998
12	**Autiokenttä II**	Hel-1621	7930±110	**7131–6514**	Jungner & Sonninen 1989
13	**Kangos**	Ua-23818	8720±60	**7956–7596**	Östlund 2004; *pers. comm.* 2009; Hedman 2009
13	Kangos	Ua-23266	8555±65	**7727–7503**	Östlund 2004; *pers. comm.* 2009; Hedman 2009
14	**Pajala**	Ua-33469	7555±80	**6587–6240**	Östlund 2004; *pers. comm.* 2009; Hedman 2009
15	**Alakangas**	Hel-2660	7480±190	**6768–5928**	Jungner & Sonninen 1996
16	**Lehtojärvi**	Hel-168	7740±170	**7063–6254**	Jungner 1979
17	**Killingsholmen**	T-5774	8160±100	**7480–6828**	Olofsson 2003; Bergman et al. 2004
18	**Tröllomtjärn**	Ua-31018	7900±55	**7031–6643**	Hedman 2009
19	**Ipmatis**	Ua-15380	8120±75	**7346–6825**	Olofsson 2003; Bergman *et al.* 2004
19	Ipmatis	Ua-17669	8020±75	**7142–6686**	Olofsson 2003; Bergman *et al.* 2004
20	**Dumpokjauratj**	Ua-19212	8630±80	**7939–7535**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-17340	8445±90	**7619–7193**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-17481	8440±90	**7608–7193**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-18265	8250±85	**7489–7072**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-17480	8215±100	**7521–7038**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-17479	8120±80	**7421–6815**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-18268	8050±85	**7295–6688**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-14276	8020±80	**7174–6682**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-17339	8010±75	**7137–6681**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-18266	8005±85	**7141–6653**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-17338	8000±80	**7129–6655**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-18267	7980±80	**7072–6654**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-14275	7900±80	**7045–6607**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-17478	7870±80	**7044–6534**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-4667	7660±70	**6641–6417**	Olofsson 2003; Bergman *et al.* 2004
20	Dumpokjauratj	Ua-14277	7465±75	**6464–6115**	Olofsson 2003; Bergman *et al.* 2004
21	**Skiljesmyren**	Ua-24561	7600±55	**6591–6379**	Hedman 2009
22	**Garaselet**	St-5190	8160±110	**7488–6819**	Knutsson 1993
22	Garaselet	St-5193	8040±100	**7301–6656**	Knutsson 1993
22	Garaselet	St-5191	7885±300	**7543–6222**	Knutsson 1993
22	Garaselet	Ua-2063	7640±100	**6681–6255**	Knutsson 1993
23	**Varisnokka**	Hel-2568	8190±140	**7534–6776**	Pesonen 2005
24	**Vanha Kirkkosaari**	Hel-2313	8950±120	**8430–7683**	Pesonen 2005
24	Vanha Kirkkosaari	Hel-3035	8200±130	**7533–6825**	Pesonen 2005
25	**Nuoliharju W**	Hel-3924	8960±120	**8449–7723**	Korteniemi & Suominen 1998
25	Nuoliharju W	Hel-4045	8890±110	**8287–7681**	Korteniemi & Suominen 1998
26	**Koppeloniemi**	Hel-3033	8440±130	**7742–7084**	Pesonen 2005
26	Koppeloniemi	Hel-1425	8260±120	**7570–7046**	Pesonen 2005