LAND USE AND SETTLEMENT PATTERNS IN THE MOUNTAIN BELT OF SOUTH SIBERIA: MOBILITY STRATEGIES AND THE EMERGENCE OF 'CULTURAL GEOGRAPHY' DURING THE MIDDLE-TO-UPPER PALAEOLITHIC TRANSITION

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ABSTRACT

A variety of topics (palaeoenvironmental records, evolution of lithic industries, land use and settlement patterns, settlement structures, procurement of raw materials), related to the emergence of 'Cultural Geography' in South Siberia during the Middle-to-Upper Palaeolithic *transition, are reviewed in this paper. I distinguish two major regions within the mountainous part of South Siberia: the Russian Altai and the Transbaikal. In both territories, the earliest appearances of the Middle and Upper* Palaeolithic *and the highest densities of currently known sites in Siberia have been identified. The differences in lithic technology and settlement patterns between these two regions indicate differing responses of populations migrating from the Altai to the east.*

THE MOUNTAIN BELT OF SOUTH SIBERIA

In the course of intensive research over the last few decades, the lithic industrial sequences within the South Siberian Middle and Early Upper Palaeolithic (EUP) have been basically reconstructed (Derevianko 2001; Derevianko *et al*. 1998a, b, 2000; Rybin 1999; Agadjanian 2001; Shunkov 2001). The territory of South Siberia (which may be considered as a natural bridge connecting Europe and the Near East with East Asia) was one of the main core areas where the EUP industries first appeared (Brantingham *et al.* 2001). Continuous human habitation of the western part of South Siberia began more than 120,000 years ago, as evidenced by archaeological data (see Derevianko *et al*., this volume). However, reconstructions of the settlement patterns and behaviour of South Siberian prehistoric populations are still not well investigated, mostly due to scarce archaeological evidence.

The archeological sites dating to the Middle Palaeolithic have yielded complex industrial assemblages characterized by different modes of stone working. From c.45,000 years BP, during the Karginsky Interglacial, Upper Palaeolithic traditions appeared in Siberia. Blade-based industries expanded from the west (Altai) to the east (Transbaikal), and then south-east into Mongolia and the Ordos (China). Chronologically, this paper is focused on the time span between c.120,000 and 30,000 years ago.

Geographically, we distinguish two main regions within the mountainous part of South Siberia that should be considered in reconstructing the behaviour of prehistoric human populations, including dispersal and settlement patterns. These regions are the Russian Altai and the Transbaikal. This geographical selection is based on several factors:

1. These regions contain the highest density of currently known Mousterian and EUP sites in Northern Asia. The available information is sufficient for the reconstruction of an Upper Pleistocene cultural sequence, at least for the Altai.
2. Both the Russian Altai and the Transbaikal experienced similar environmental changes during oxygen-isotope stages (OIS) 5-3.
3. The main characteristics of the EUP assemblages from these regions are very similar. It should be fruitful to compare human behavioural systems under these circumstances.

THE PALAEOENVIRONMENTAL RECORDS

The Upper Pleistocene of Siberia is divided into four stages, the Kazantsevo Interglacial (120,000-100,000 years ago, which corresponds to OIS 5e), the Zyriyanka Glacial (100,000-55,000 years ago, OIS 5d-4), the Karginsky Interglacial (55,000-25,000 years ago, OIS 3), and the Sartan Glacial (25,000-10,000 years ago, OIS 2) (Kind 1974; Tseitlin 1979). The palaeoenvironmental records indicate that these stages were periods of oscillating climate. The composition of the Upper Pleistocene fauna on the Eurasian plains was marked by spatial homogeneity, but dramatic transformations occurred during alterations in climatic conditions. In contrast, the mountain systems of South Siberia, situated at lower latitudes, were less glaciated. Climatic changes in South Siberia were not very severe and led only to partial transformations in biogeography. In the Upper Pleistocene, the climate in the Altai oscillated between a series of glacials and interglacials, and landscapes remained highly mosaic with diverse combinations of

forest, forest steppe and steppe vegetation communities. These biomes supported faunal complexes that consisted of a variety of large and medium-sized mammal species. In comparison with the Altai Mountains, the palaeoclimate of the Transbaikal was characterized by relative aridity and expansion of steppe landscapes (Agadjanian 2001; Shunkov and Agadjanian 2000; Bazarov *et al.* 1982; Ravski 1972).

THE DEVELOPMENT OF THE LITHIC INDUSTRIES

The available data from 15 Altai and Transbaikal Palaeolithic sites were analyzed in the process of this research (ten sites from the Altai and five from the Transbaikal) (Table 1; Figure 1). The Middle Palaeolithic in the mountainous part of South Siberia is best known from the Altai (Table 2), where two industrial variants have been defined (Derevianko *et al.* 2000; Rybin 1999; Shunkov 2001; Derevianko and Shunkov 2002). With the exception of Ust-Kanskaia cave, all cave localities are associated with so-called 'Typical Mousterian' assemblages, based on non-laminar flaking with a rare presence of Levallois technology. Chronological limits of this variant of the Altai Middle Palaeolithic are between 120,000 and 40,000 years ago (Figure 2). Another variant is represented by the 'Karabomian' industries (c.100,000 to 45,000 BP), based on the parallel and convergent methods of Levallois flaking. It is believed that the 'Karabomian' assemblages were the basis for the formation of EUP technologies in South Siberia.

Figure 1: Sites mentioned in text. 1-10: Okladnikov cave, Tiumechin 1, Anui 3, Ust'-Karakol, Ust'-Kanskaia cave, Kara-Bom, Denisova cave, Strashnaia cave, Maloialomanskaia cave, Kara-Tenesh; 11-14: Hotyk, Podzvonkaia, Kamenka A, Varvarina Gora; 15: Tolbaga.

The earliest South Siberian EUP sites occur in the Altai (Denisova Cave and the open-air sites of Kara-Bom and Ust-Karakol), with dates of about 45,000-43,000 BP (Goebel *et al.* 1993; Derevianko *et al.* 1998a, b, 2000). At that time, the EUP coexisted with typical Mousterian Middle Palaeolithic industries (Okladnikov Cave, 44,000-37,000 BP) (Derevianko and Markin 1992). The earliest documented eastward expansion of EUP industries is illustrated by the Makarovo-4 open air site in the Cis-Baikal area, located between the Altai and Transbaikal (Upper Lena River basin, more than 39,000 BP) (Goebel and Aksenov 1995).

Table 1: Major Palaeolithic sites in South Siberia and their regional, chronological and frequency distributions.

Altai	Transbaikal
Okladnikov cave: MP Tiumechin 1: MP Anui 3: MP-EUP Ust'-Karakol: MP-EUP Ust'-Kanskaia cave: MP-EUP Kara-Bom : MP-EUP Denisova cave : MP-EUP Strashnaia cave: MP-EUP Maloialomanskaia cave: EUP Kara-Tenesh: EUP	Hotyk: EUP Podzvonkaia: EUP Kamenka A: EUP Varvarina Gora: EUP Tolbaga: EUP
MP sites: 2 MP-EUP multilayered sites: 6 EUP sites: 2	EUP: 5

MP=Middle Palaeolithic; MP-EUP=Middle and Upper Palaeolithic; EUP=Upper Palaeolithic.

Table 2: Depositional contexts of Palaeolithic sites in South Siberia.

Altai	Transbaikal
Colluvial sites: Tiumechin 1: MP Anui 3: MP-EUP Kara-Bom : MP-EUP Kara-Tenesh: EUP	Colluvial sites: Hotyk : EUP Podzvonkaia: EUP Kamenka A: EUP Varvarina Gora: EUP Tolbaga: EUP
Cave sites: Ust'-Kanskaia: MP-EUP Denisova: MP-EUP Strashnaia : MP-EUP Maloialomanskaia: EUP	none
Confluence of rivers: Ust'-Karakol: MP-EUP	none

MP=Middle Palaeolithic; MP-EUP=Middle and Upper Palaeolithic; EUP=Upper Palaeolithic.

There are only two sites in Transbaikal - Arta 3, and Hotyk (layers 4-6) - that have been attributed to the Middle Palaeolithic (Kirillov and Kasparov 1990; Lbova *et al.* 2003). However, the layers in the Arta 3 site are redeposited and contain Middle Palaeolithic artifacts associated with undoubted Upper Palaeolithic cores and tools. Assemblages from Hotyk layers 4-6 are not dated and the collections are too small (no more then 20 tools and cores in total) for any cultural attribution.

In the Transbaikal region, EUP industries appeared at about 40,000 BP (the earliest sites are Kamenka A and

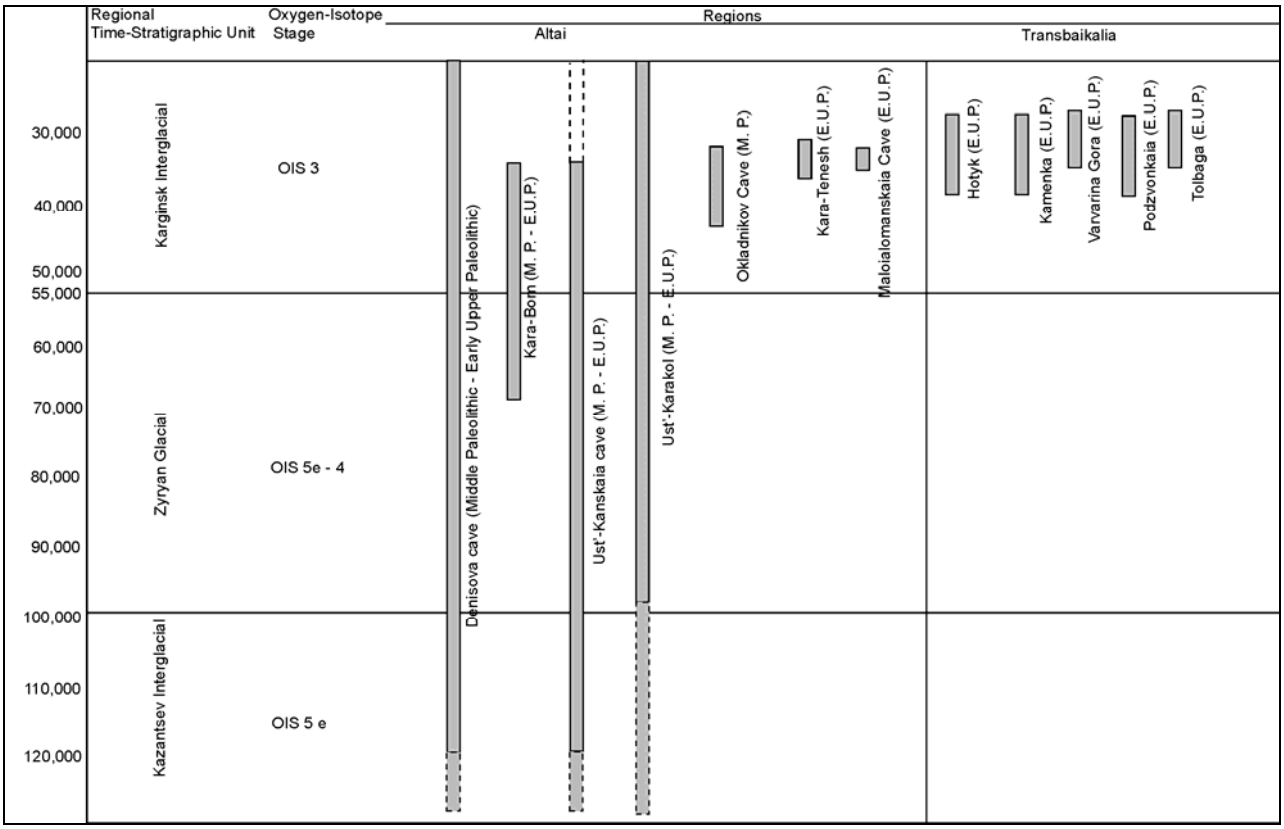

Figure 2. Chronology for South Siberian Middle and Early Upper Palaeolithic sites (based on radiocarbon dating and stratigraphy).

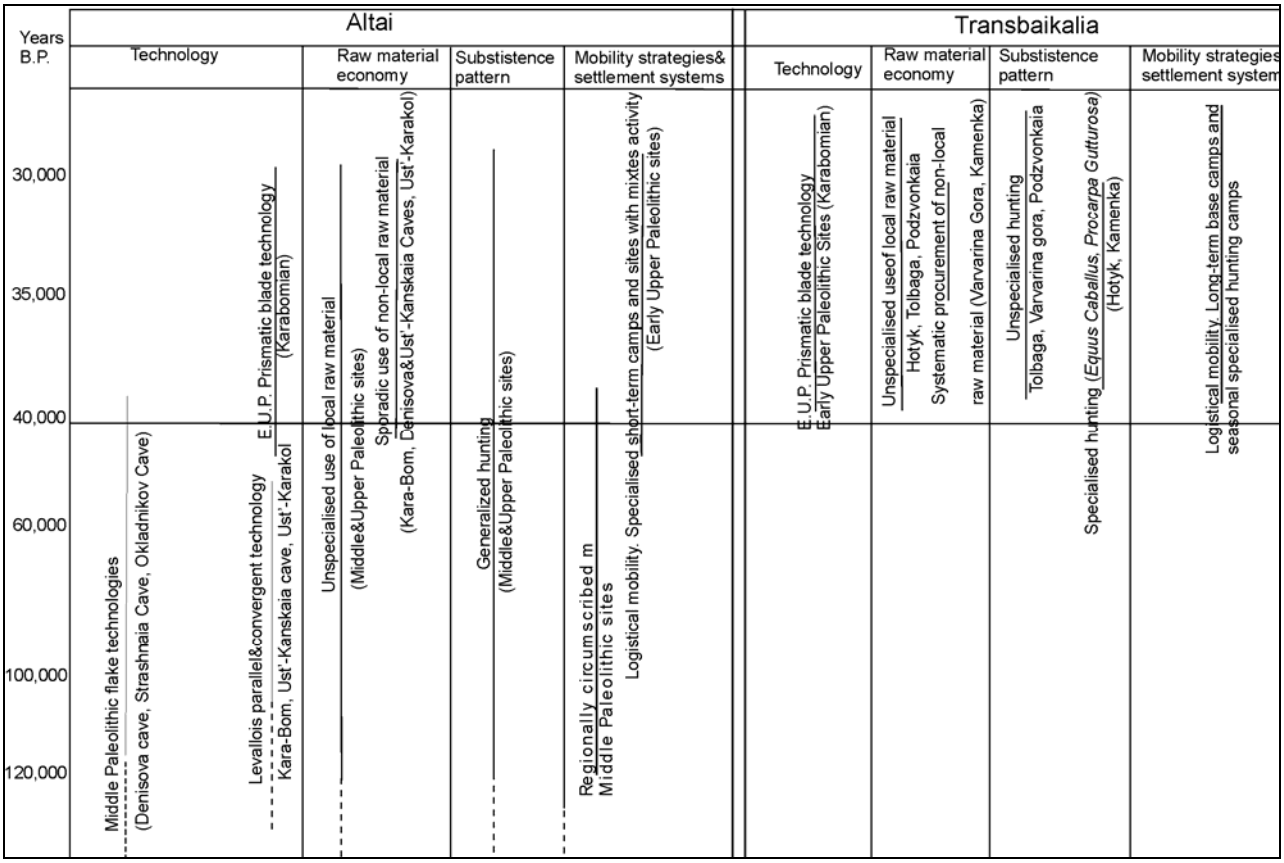

Figure 3. An inter-regional model of the Middle to Upper Palaeolithic *transition in the Altai and Transbaikal regions*

Table 3. The composition of selected Palaeolithic industies of southern Siberia and characteristic features of secondary modification

Site	Stratum	Number of analyzed artifacts	Informal tools, %	Formal tools, %	Tools with utilization/light retouch modification, %	Tools with moderate/heavy retouch modification, %	Tools with retouch along a quarter or less of the perimeter, %	Tools with retouch along half or more of the perimeter, %	Tools exhibiting one technique of secondary working, %	Tools exhibiting more than one technique of secondary working, %	Core:tool ratio	Tool:debitage+core ratio	Core:spall+tool ratio	Core percentage of assemblage	Spall percentage of assemblage	Tool percentage of assemblage
Kara-Bom	MP2	633	20.35	79.65	53.28	46.72	37.72	62.28	47.30	52.70	1:5.55	1:4.7	1:30.6	3.16	79.3	17.5
	MP1	90	44.44	55.56	65.79	34.21	38.46	61.54	47.06	52.94	1:13.6	1:1.2	1:29	3.33	51.1	45.5
	UP6	878	51.05	48.95	59.85	40.15	55.30	44.70	56.25	43.75	1:8.9	1:5	1:52.68	1.82	79.7	16.3
	UP5	594	51.25	48.75	62.07	37.93	61.26	38.74	61.90	38.10	1:11.5	1:6.2	1:82	1.18	83.7	13.6
	UP 4-1	395	39.44	60.56	57.89	42.11	70.00	30.00	44.26	55.74	1:9.1	1:4.4	1:48.3	2.03	79.5	18.5
Denisova	21	163	71.43	28.57	48.15	51.85	85.19	14.81	43.75	56.25	1:1.2	1:5.8	1:7.1	12	73	15
cave	19	1092	63.64	36.36	56.89	43.11	70.00	30.00	52.27	47.73	1:2.1	1:4.8	1:11.5	7.97	74.9	17.1
	14	887	62.65	37.35	61.21	38.79	86.73	13.27	65.52	34.48	1:3.4	1:4.4	1:17.5	5.41	76.2	18.4
	12	1324	66.90	33.10	48.21	51.79	74.21	25.79	54.29	45.71	1:4	1:3.6	1:17.6	5.36	73.2	21.5
	11	1326	44.85	55.15	39.13	60.87	67.00	33.00	53.42	46.58	1:4.9	1:4.5	1:26	3.7	78.3	18
	9	804	66.40	33.60	46.46	53.54	64.17	35.83	43.90	56.10	1:3	1:4.8	1:16.9	5.6	77.1	17.3
Ust-Karakol	18	317	69.79	30.21	73.86	26.14	90.00	10.00	74.36	25.64	1:8.8	1:2.3	1:27.8	3.47	65.9	30.6
	11	184	87.50	12.50	78.18	21.82	95.45	4.55	84.62	15.38	1:4.2	1:2.1	1:12.1	7.61	60.3	32.1
	10	296	66.02	33.98	52.04	47.96	82.95	17.05	64.00	36.00	1:6.7	1:1.9	1:12.1	5.07	60.8	34.1
	9	628	66.15	33.85	61.03	38.97	85.00	15.00	73.86	26.14	1:5.6	1:2.2	1:16.9	5.57	63.4	31.1
Kara-Tenesh		809	27.08	72.92	27.55	72.45	54.08	45.92	42.11	57.89	1:4.8	1:6.3	1:34	2.83	83.1	13.6
Maloialomanskaia		48	56.25	43.7	50	50	50	50	71.42	28.5	1:8	1:2	1:23	4.1	62.5	33.3
Hotyk	2	675	43.20	56.80	21.60	78.40	37.30	62.70	60.80	39.20	1:6.4	1:3.6	1:28	2.8	79	18
	3	491	56.00	44.00	42.00	58.00	32.00	68.00	62.00	38.00	1:4	1:3.3	1:16.5	5	74.5	20.5
Kamenka A	A	970	31.00	69.00	20.70	79.30	27.00	73.00	58.60	41.40	1:8.3	1:2.7	1:32	2.6	74.4	23

Podzvonkaya, both open-air) (Lbova 2000; Tashak 2000, 2002). The flaking technologies and typologies of the Altai and Transbaikal tool-kits are very similar, even identical (Konstantinov 1994; Lbova 2000, 2002; Derevianko 2001; Rybin 1999). These industries are based on using the entire volume of sub-prismatic and narrow-faced cores, and are located on the eastern margins of the post-Levalloisian industries of the EUP, which appeared simultaneously in Central Europe, the Levant, and the Altai (Bar-Yosef and Kuhn 1999; Kozlowski 2000).

Hominid teeth recovered in association with Middle Palaeolithic technocomplexes in Denisova and Okladnikov caves, and some postcranial bones from Okladnikov Cave, are the only palaeoanthropological materials available thus far in the Altai (Shpakova and Derevianko 2000; Derevianko 2001; Shpakova 2001). Based on the available metric parameters, these dental remains have been attributed to archaic *Homo sapiens* with a high degree of confidence. Notably, non-metric analysis of the Denisova and Okladnikov teeth reveals a mixture of Western and Eastern traits, even in the earliest specimens available. Reconstructions of the development of the Russian Altai lithic industries have shown a continuous development of local Middle Palaeolithic industries into Upper Palaeolithic successors. In my view, the available anthropological data have provided information, though reliable only to a certain extent because of their rarity, on a presumably continuous evolution of human populations in this region throughout the same time period.

LAND USE AND SETTLEMENT PATTERNS

All Palaeolithic sites in both the Altai and Transbaikal are located in the low to middle zone of elevation, between 600 and 1200 metres above sea level (asl). The associations of sites with specific depositional contexts are shown in Table 2. Many Altai and Transbaikal sites were associated with colluvial open landscapes. The association of almost all Middle Palaeolithic sites with caves is also obvious. No correlation between site locations and outcrops of high-quality raw material can be noted. The majority of the Altai Palaeolithic sites are multilayered, suggesting long-term occupation.

Because the Middle Palaeolithic industries of the Altai Mountains were based exclusively on local stone material, they are believed to indicate migrations within a limited territory and limited home range distances. The distribution of sites according to economic functions has not yet been plotted for the Middle Palaeolithic in the Altai. This is in contrast to what has been observed for the EUP in this region, when the appearance of specialized, presumably seasonal, hunting camps suggests that there was probably a planned system of mobility within limited territories. An example of such a system is the Anui River valley (north-western Altai), which has one permanent long-term central site (Denisova Cave), temporary hunting camps (Ust-Karakol and Anui-3), and the Kara-Bom site (central Altai) to which stone was brought from a distance of 5 km to make tools for butchering animals (Derevianko and Shunkov 2002; Rybin 2002). The varying compositions of the lithic industries and the characteristics of retouch indicate a more specialized utilization of EUP sites (Rybin and Kolobova 2004).

In order to estimate the effectiveness and intensity of the primary reduction of cores and the secondary production of stone tools within a particular industry, a set of indices has been applied (Table 3). These include the extent, intensity and polymorphism of retouch and relative proportions of the three major categories of cores, spalls and tools, as well as indices reflecting the ratios of different categories within an assemblage. The core:tool ratio represents how many tools correspond to one core, and the tool:non-retouched spall and core ratio expresses how many debitage pieces correspond to one tool. The core:tool ratio allows an estimation of the effectiveness of core utilization at a site, while the tool:non-retouched spall and core ratio indicates the intensiveness of tool production at a site. An additional index (the core:non-retouched spall ratio) is an indicator of the intensity of primary reduction at a site.

The available analytical data also allow differentiation between techniques of stone working with respect to the proximity of the source of raw material. Specific techniques of raw material utilization and tool working were employed with different raw materials obtained from sources located one or more kilometres from a site. A similar pattern has been noted not only within the archaeological materials from the Altai and Transbaikal, but also at some Central Asian sites belonging to the same culture-historical province as the Altai.

On the basis of the analysis of stone industries, several site use patterns can be established:

1. Transient camps inhabited for extremely short periods and with only scant traces of human activity: Kara-Bom (MP horizon 1), Maloialomanskaia Cave, and Ust-Karakol stratum 18;
2. Short term hunting camps with intensive utilization of raw materials and tool manufacturing associated with butchery, divided into two sub-types. Sub-type A includes those sites to which raw material was transported from areas one or more kilometres away: Kara-Bom (MP horizon 2, UP habitation horizons 6-1), and Kara-Tenesh, both in the Altai; Kamenka, Hotyk (layer 2) in Transbaikal. Sub-type B comprises sites with implements made of local raw material: Ust-Karakol (strata 11-9); Denisova Cave (stratum 11).

SETTLEMENT STRUCTURES

Specific structural elements such as hearths and heavily used activity places associated with primary flaking appeared at the Altai sites in the Middle Palaeolithic (Table 4). As a rule, hearths with surrounding stone slabs appeared only in the EUP. Reliable evidence of dwelling structures or storage pits has not been discovered in the MP.

Table 4: Settlement structures within sites in South Siberia.

Region	Altai		Transbaikal			
	Hearths	Activity places	Hearths	Activity places	Storage pits	Dwellings
MP	Denisova cave Kara-Bom Ust'-Kanskaia cave	Kara-Bom Ust'-Kanskaia	none	none	none	none
EUP	Denisova cave Kara-Bom Ust'-Karakol Maloialomanskaia cave	Kara-Bom Ust'-Karakol Kara-Tenesh	Hotyk Tolbaga Kamenka A Varvarina Gora Podzvonkaia	Hotyk Tolbaga Kamenka A Varvarina Gora Podzvonkaia	Hotyk Tolbaga Varvarina Gora	Tolbaga Kamenka A Varvarina Gora

MP=Middle Palaeolithic; EUP=Upper Palaeolithic.

In assemblages from the majority of the Altai sites, the whole cycle of stone treatment can be traced. Analysis of the lithic industries reveals the existence of a complex system of mobility within a certain territory. As an example of an advanced system of landscape exploitation and subsistence activity we can consider the Kara-Bom site. Based on our research, the Kara-Bom lithic materials can be interpreted as the remains of repeated intensive but short term occupations associated with the utilization of prey. Kara-Bom was a very convenient locality for this kind of activity: the landscape is suitable for hunting, water resources were available in the immediate vicinity, and the necessary lithic materials were transported from outcrops located within a 5 km area of the site (and see Derevianko *et al.*, this volume).

Evidence of site specialization appeared only in the EUP and is represented mostly by short term hunting camps. Settlement structures in the Altai and Transbaikal differ significantly (Table 4). We have been able to trace the existence of more intensive site specialization and the appearance of more definable settlement structures like storage pits and dwellings in the Transbaikal region during the EUP (Lbova *et al.* 2003; Tashak 2003). Along with the large base-camps, such as Tolbaga, where more than 40% of artifacts are classified as tools (Konstantinov 1994), medium and small-sized seasonal camps such as Kamenka A, Hotyk, and Varvarina Gora (Lbova 1999) have also been found. However, like the Altai, the earliest Transbaikalian EUP site of Podzvonkaia shows only evidence of generalized, non-specific activity (Tashak 2003).

PROCUREMENT OF RAW MATERIALS

More striking differences in regional mobility strategies were identified in the different approaches to raw material procurement used by prehistoric humans in the Altai and Transbaikal. All of the Altai Middle Palaeolithic assemblages were oriented toward the use of local materials. Beginning in the EUP, we can trace evidence of the use of imported stone from distant sources. As demonstrated by specific petrographic studies (Postnov *et al*. 2000; Kulik and Shunkov 1999; Derevianko *et al*. 2003), the only distinctive 'exotic' raw material in the Altai is red jasper. This material is found only in the alluvium of the Peschanka river, 40 km from Denisova Cave and 60 km from Kara-Bom. However, the frequency of such imported material never exceeds 1-2%. In contrast, there are at least two sites (Kamenka and Varvarina Gora) in the Transbaikal region which have 40-60% of imported raw materials, transported from a distance of more than 40 km. As reported (Lbova *et al.* 2003), these are very distinctive high-quality rhyolites from the Khotogoy-Khabsagay lithic workshop.

It should be noted that about 75% of the minimum number of identified individuals in the faunal assemblages from these sites consist of two animal species – *Procapra gutturosa* (Mongolian gazelle) and *Equus caballus* (horse) (Germonpre and Lbova 1996; Lbova 1999). With the exception of these sites, all Middle-EUP sites both in the Altai and Transbaikal show evidence of a more generalized subsistence strategy with a predominance of mountain and steppe animals.

DISCUSSION AND CONCLUSION

Here I will provide a more detailed discussion of the various aspects of land use and settlement pattern in the Altai and Transbaikal (Figure 2). Firstly, the Middle Palaeolithic and EUP human populations in the Altai exploited limited areas and employed short distance high mobility systems. As evidence of such systems, we can mention the predominance of local raw material use, even when of poor quality. This can be explained by adaptation of ancient humans to diverse low and middle altitude landscapes that allowed them to subsist in very restricted territories. The apparent increase in exploited territory size, and the increasing number of sites, during the EUP, could reflect increasing population densities and improvement of interpopulation relations. The Transbaikal sites with their high percentages of imported raw materials might reflect the existence of larger territorial ranges, particularly in more open steppe landscapes.

Secondly, there were differences in the mobility strategies of the Altai and Transbaikal populations. Most of the Altai sites were temporary hunting camps without definite settlement features, whereas the Transbaikal sites

were specialized seasonal hunting camps and large base camps with elaborate dwelling settlement patterns.

Thirdly, contrasting with the pronounced changes in Altai stone tool technologies during the Middle to Upper Palaeolithic transition, the behavioural systems changed only to a minor extent. However, the appearance of personal ornaments in the EUP gives us more information about social changes. The first signs of symbolic behaviour in South Siberia appear to coincide with the first Upper Palaeolithic blade-based industries. They are represented mainly by personal ornaments, such as pendants, beads, and a diadem-shaped bone ornament (Lbova 2000; Derevianko and Rybin 2003). The earliest personal ornaments have been found at the Kara-Bom site, in a layer dating to 43,000 BP (Goebel *et al.* 1993). Another area of symbolic behaviour was the Transbaikal region, where various types of body decoration have been discovered in all EUP sites, as a rule associated with ochre. The bearers of the Upper Palaeolithic industries coexisted with representatives of other cultural traditions: in the EUP, the last Mousterian groups still inhabited the Altai and Transbaikal. Therefore, it might be assumed that the appearance of various decorative objects was due to a need to distinguish and identify different populations. Differences between the Altai and Transbaikal can be explained by the comparatively early onset of the Upper Palaeolithic in the Altai, and the lack of Middle-to-Upper Palaeolithic transitional industries in the Transbaikal.

Fourthly, differences in territorial exploitation strategies also occurred. In the Altai, human populations exploited relatively small territories during the Middle Palaeolithic and Early Upper Palaeolithic. The basis for this hypothesis lies in the fact that most sites demonstrate a predominant use of local raw materials, irrespective of quality. Such a limited mobility pattern may be the result of an adaptation by Palaeolithic humans to the low montane environment, which sustained human populations without specialized resource exploitation strategies. Life in closed valleys and intermontane basins with their predictable resources and relatively dense biomass did not require high mobility of human populations. Animal bones reported from the Altai archaeological sites show no human preference in prey choice. A small extension of exploited territory size noted in the EUP, indicated by sporadic transportation of raw materials from places situated at distances of 60-80 km from the Kara-Bom and Denisova Cave sites (Postnov *et al.* 2000; Rybin 2002), as well as an increase in the number of sites dating from this period, was probably caused by an increase in the density of human populations and an expansion of social relationships between human groups.

The Transbaikal materials suggest more specific behavioural functions of archaeological sites: seasonal hunting camps and large long-term occupation sites, with clear dwelling structures. This functional differentiation of sites may have been the result of a migratory or transhumant lifestyle. Life in the Transbaikal required a more extensive subsistence strategy than in the Altai because of the more severe and less varied and predictable environmental conditions in this region. Archaeological collections reported from the Transbaikal (for example, Kamenka and Varvarina Gora) are generally based on raw materials imported from distances of about 40 km (Lbova 2000: 80), suggestive of a considerable extension of exploited territories. Faunal collections from the western Transbaikal include remains of steppe and mountain-steppe animal species only. The available data suggest that hunters preferentially pursued gregarious animal species. This phenomenon is indicative of an adaptation of human communities to the open spaces characteristic of semi-arid steppe zones.

There appear to be two chronological milestones in the development of South Siberian Palaeolithic cultures. The first, at about 40,000 BP, was related to the decline of the Levallois and Middle Palaeolithic stone reduction technology, the appearance of the EUP volumetric core technology, enlargement of exploited territories, and a system of planned mobility of the human population. In my personal view, the available facts suggest that the 'explosive' changes that occurred in human behaviour during the Middle-to-Upper Palaeolithic transition in South Siberia were not connected with the appearance of a new species of *Homo* in this region. Of course, we have no proof that the originators of the Upper Palaeolithic 'behaviour set' could only be *Homo sapiens sapiens*, but we also have no firm evidence that the Middle Palaeolithic of South Siberia is represented only by archaic *H. sapiens*. Nevertheless, although quite limited, the sum of the current anthropological data for the Middle Palaeolithic (including the Late Middle Palaeolithic from Okladnikov Cave) deals with only one species of hominid, that is, the anthropologically modern human. Thus, we can assume that this species appeared in our region around 100,000 years ago (although this statement may seem to be quite speculative), contemporary with the emergence of the Middle Palaeolithic blade industries. Some light can be shed on the problem by the recent findings in Uzbekistan, where in layer 19 of the Obi-Rakhmat grotto, with a Mousterian blade industry very similar to the Siberian Middle Palaeolithic, and, I believe, genetically connected to the blade-based Middle Palaeolithic of the Altai, the remains of a hominid identified as *H. s. sapiens* (Glantz *et al.* 2003) have been discovered. The age of these layers has not been determined, but they are thought to be 60,000 to 80,000 years old (Wrinn *et al.* 2003). Thus, according to this scenario, Upper Palaeolithic technologies and symbolic behaviour developed locally from the Middle Palaeolithic in Siberia.

The second milestone, which occurred at 30,000 BP in the Altai and 27,000 BP in the Transbaikal, was associated with the eventual disappearance of the EUP blade-based technology, the abandonment of non-specialized hunting, and a further enlargement of territorial ranges. In South Siberia, the EUP-like blade-based industries related to the Levant and Central European Bohunician (Rybin 2004) ceased to exist

beyond the LGM at 20,000-18,000 BP, when the region became occupied by technologically diverse and specialized groups of hunter-gatherers who entered from the periglacial steppes.

Thus, in the Altai, subsistence technology and other kinds of behaviour (except for the emergence of symbolic behaviour) appear to have undergone only minor changes compared with the more pronounced changes in the lithic industry during the Middle-to-Upper Palaeolithic transition. However, the settlement system in the Upper Palaeolithic was more complex than in the Middle Palaeolithic. The appearance of personal ornaments also suggests dramatic changes in the social sphere. In the new epoch, the Transbaikal populations appear to have had more 'Upper Palaeolithic' behavioural features than those in the Altai. Among these are more advanced settlement features, transportation of distant raw materials, and expanded territorial ranges. In Transbaikal, these changes reflect the responses of migrating populations to the more severe environmental conditions and less predictable resources.

Finally, the material culture of the Middle Palaeolithic in Central Asia (including South Siberia) provides no evidence for any specific early hominid adaptation to the environment. But the EUP of Altai and Transbaikal presents a different picture, in which we can trace geographically determined cultural areas which I consider to reflect what I call "cultural geography". This resulted from the migration of culturally similar groups into different Altai and Transbaikal geographical regions, at the beginning of the Upper Palaeolithic.

ACKNOWLEDGEMENTS

I would like to thank the organizers of the 17th Congress of the IPPA for partial support of my participation in the Congress and I am grateful to the co-organizer of the session, Susan Keates, for inviting me to this important event. Much of the work leading to this paper was supported by the Russian Foundation for the Humanities (RGNF), project No. 03-01-00424a and RFFI projects Nos. 04-06-80017 and 04-06-80018. We appreciate their support.

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