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KABAZI II: THE 70 000 YEARS SINCE THE LAST INTERGLACIAL

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НАЦИОНАЛЬНАЯ АКАДЕМИЯ НАУК УКРАИНЫ
ИНСТИТУТ АРХЕОЛОГИИ
КРЫМСКИЙ ФИЛИАЛ

КЁЛЬНСКИЙ УНИВЕРСИТЕТ
ИНСТИТУТ ДО- И ПРОТОИСТОРИИ

Палеолитические стоянки Крыма,
Том 2

КАБАЗИ II:
70 ТЫСЯЧ ЛЕТ ПОСЛЕ ИНТЕРГЛЯЦИАЛА

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Chapter

18

Settlement Systems in the Crimean Middle Palaeolithic

Victor Chabai & Thorsten Uthmeier

During the last decade, several interpretations of the function of Crimean Middle Palaeolithic sites and their occupational levels have been proposed (Chabai et al. 1995, 1998, 1999, 2000; Demidenko 1996; Stepanchuk 1996; Chabai 1999, 2004c; Chabai, Marks 1998; Marks, Chabai 2001; Yevtushenko 2003, 2004; Uthmeier 2004b, 2006). Whereas there are several factors which benefit the study of functional variability in the Crimea, there are also others which prove more of an obstacle. The compact spatial distribution of Middle Palaeolithic sites, the clear topographical and environmental subdivision of the present day pen-insula, as well as the usually good preservation of both artefact and faunal remains are certainly features which favour any attempts to explain observable differences in assemblages as relating to the function of individual sites. In addition, many past excavations were conducted accurately, technological and typological definitions were precise, and chronological and environmental investigations extensive. Finally, both traditional palaeontological and modern archaeozoological studies were an integral part of most studies. Nevertheless, there are a number of limitations. Firstly, nearly nothing is known of the Middle Palaeolithic sites in the steppe region; second, erosional processes have removed completely Pleistocene deposits in some valleys in the sub-mountain and mountain region; and finally, the rates of sedimentation in a number of localities, especially in rock-shelters, were relatively low, leading to palimpsests of several occupations.

Upper Pleistocene Resources for Hominid Survival in Crimea: an Overview

Habitats

The Crimean peninsula consists of three topographical and environmental zones: the northern steppe zone, which covers about two-thirds of the peninsula; the limestone mountainous zone, which measures 160 km from east to west and 50 km from north to south; and the southern bank, which occupies the southern extremity of the peninsula (Bagrov, Rudenko, eds. 2004). The present day climate of the northern steppe is of a moderate continental type. The southern bank, which lies protected from northerly winds in the lee of the mountains, is today an example of the "subtropical" climate. The climate of the mountainous zone, however, is more complicated.

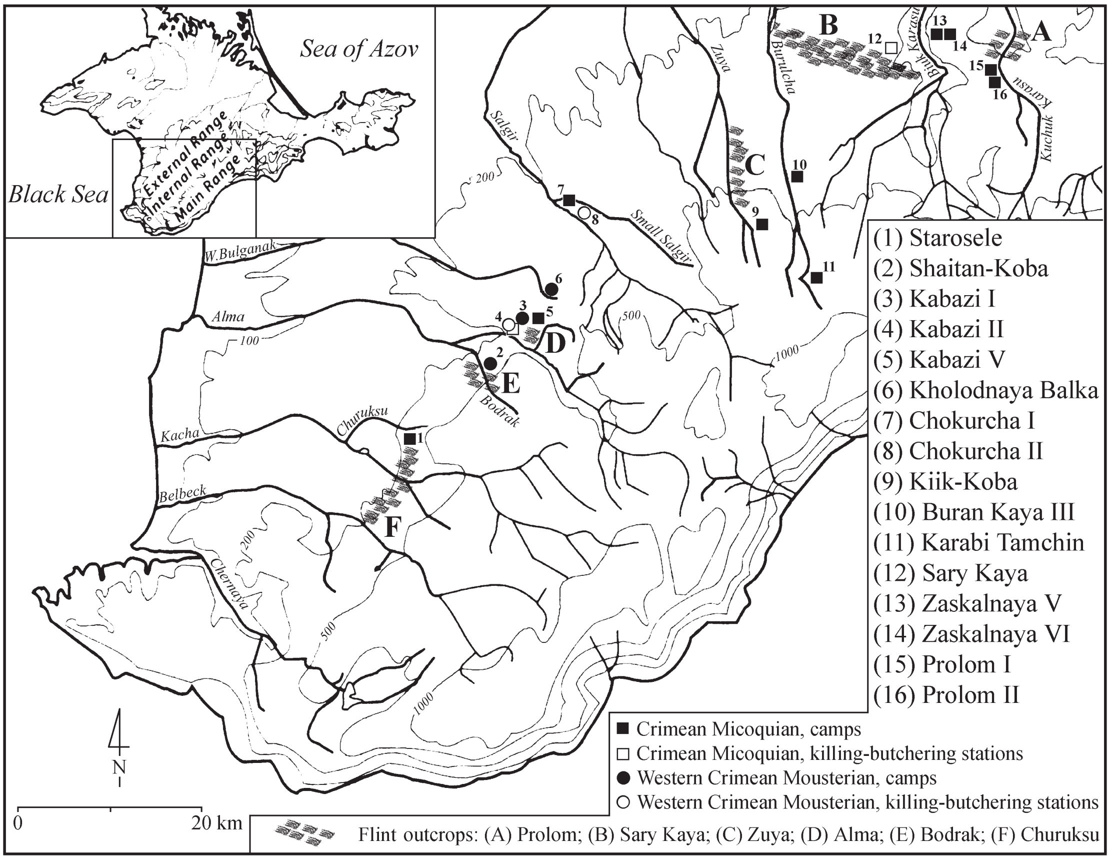

Fig. 18-1 Map showing the raw material outcrops and sites, by industrial and functional definitions.

The mountainous zone comprises three ridges (Fig. 18-1). The first main ridge, situated along the southern bank, is the highest, with an average altitude of little more than 1000 m. Topographically and environmentally, the main ridge is characterised by several plateaus with Alpine pastures and beech forests on the hills. The internal second ridge is represented by a series of cuestas, which stretch from southwest to northeast. The length of this cuesta belt is about 70 km, the width 5-10 km. The elevations of the internal ridge vary from 200 to 700 m. Steppe grasses cover the cuesta plateaus, while the slopes are covered by beech, pine, oak and bush vegetation. The external third ridge is represented by a belt of dissoluted cuesta-like cliffs, with average elevations lower than 200 m. The present day vegetation is dominated by *Herbetum mixtum* vegetation with pronounced percentages of xerophytes, sometimes interrupted by patches of oaks and pine trees. In general, the climate of both the internal and the external ridge is of a moderate continental type, being a little more humid in the internal ridge, and in fact not very different from the steppe zone in the external ridge.

At present, more than 100 Middle Palaeolithic localities are known from the Crimea, and nearly all were discovered in the narrow belt of the internal ridge of the Crimean Mountains. Moreover, almost all of the 30 multi-layered stratified sites, apart from one, are situated here. Of the 30 multi-layered stratified sites, four are open-air sites, while the remainder accumulated in rock-shelters. At the same time, not all of these multi-layered stratified sites are of use to settlement systems studies: while some were studied by small-scale test excavations only, others

Table 18-1 Chronology* of Crimean Middle Palaeolithic.** ►

* data after Hedges et al. 1996; Rink et al. 1998, in press; Pettitt 1998; Chabai et al. 1998, 1999; Gerasimenko 1999, 2004, 2005; Markova 1999, 2004a, 2004b, 2004c, 2005; Mikhailesku 1999, 2004, 2005; Chabai, 2004c; Stepanchuk et al. 2004.

** in bold letters are sites with chronological positions supported by environmental studies

MIS	Geochronology	Vegetation	Sites, levels	AMS / C^{14}	ESR	U-series	Technocomplexes, facies
Stage 3	Vytachiv, vt_{3b}, (Denekamp Int.)	south-boreal forest steppe	Prolom II, II	Ki-10617, 28,1±0,35			**Micoquian, Starosele**
			Buran Kaya III, B	OxA-6674, 28,52±0,46 OxA-6673, 28,84±0,46			**Micoquian, Kiik-Koba**
			Zaskalnaya V, I	Ki-10891, 28,85±0,4 Ki-10744, 30,08±0,35			**Micoquian, Starosele**
			Kabazi II, A3A, A3B, A3C, A4				**Levallois-Mousterian, WCM**
	Vytachiv, vt_2, (Huneborg Stadial)	boreal xeric grassland	**Kabazi II, II/1A**		30,0±2,0		
			Zaskalnaya VI, II	OxA-4131, 30,11±0,63 Ki-10893, 30,7±0,45 Ki-10607, 30,22±0,4			**Micoquian, Ak-Kaya**
			Zaskalnaya V, II	Ki-10743, 31,6±0,35			
			Prolom I, upper layer	Ki-10896, 29,6±0,55 Ki-10614, 30,22±0,45 GrA-13917, 30,51±0,58/0,53 GrA-13919, 31,3±0,63/0,58			**Micoquian, Kiik-Koba**
			Kiik-Koba, upper level	Ki-8163, 32300±300			
			Kabazi II, II/1	OxA-4770, 31,55±0,6			**Levallois-Mousterian, WCM**
			Kabazi II, II/2	OxA-4771, 35,1±0,85			
			Kabazi II, II/3				
			Kabazi II, II/4	OxA-4858, 32,2±0,9			
			Kabazi II, II/5	OxA-4859, 33,4±1			
	Vytachiv, vt_{1c}, (Huneborg Int.)	south-boreal forest-steppe	Prolom I, lower layer	Ki-10615, 33,5±0,4 Ki-10616, 35,2±0,45			**Micoquian, Kiik-Koba**
			Zaskalnaya VI, III	OxA-4772, 35,25±0,9 Ki-10609, 38,2±0,4 Ki-10894, 36,4±0,45			**Micoquian, Ak-Kaya**
			Zaskalnaya VI, IIIa	OxA-4132, 30,76±0,69 OxA-4773, 39,1±1,5 Ki-10610, 39,4±0,48			
			Zaskalnaya V, III	Ki-10603, 39,2±0,52			
			Kabazi II, II/6, II/7				**Levallois-Mousterian, WCM**
	Vytachiv, vt_{1b2}, (Hengelo Int.)	south-boreal forest-steppe	**Kabazi II, II/7AB**		36,0±3,0		
			Kabazi II, II/7C, II/7D, II/7E				
			Prolom II, III	Ki-10611(?), 41,6±0,8			**Micoquian, Starosele**
			Starosele, 1	OxA-4775, 41,2±1,8 OxA-4887, 42,5±3,6	41,2±3,6		
			Kabazi II, II/8		44,0±5,0		**Levallois-Mousterian, WCM**
			Kabazi II, II/8C, IIA/1				
	Vytachiv, $vt_{1b2\text{-}b1}$, (Hosselo Stadial)	boreal xeric forest-steppe	**Kabazi II, IIA/2**				
			Chokurcha I, IV-I, IV-M				**Micoquian, Ak-Kaya**
			Chokurcha I, IV-O	OxA-10877, >45,4			**Micoquian, Starosele**
			Zaskalnaya V, IV	GrA-13916, >46,0			
			Zaskalnaya VI, IV	Ki-10611, >47,0			
	Vytachiv, vt_{1b1}, (Moershoofd Int.)	south-boreal forest-steppe	**Starosele, 2**			60,0 (?)	
			Kabazi II, IIA/4				**Micoquian, Ak-Kaya**
Stage 4	Uday,ud, Pryluki, pl_3, (Ognon Stadial and Int.)	boreal forest-steppe	**Kabazi II, III/1A**				
			Kabazi II, III/1				
			Starosele, 3			67,5 (?)	**Starosele, level 3**
Sub-stage 5a	Pryluki, pl_{1b2}, (Odderade Int.)	boreal, south-boreal forest-steppe	**Starosele, 4**			>80,0	**Micoquian, (?)**
			Kabazi II, III/2		74,0-85,0		**Micoquian, Ak-Kaya**
Sub-stage 5b	Pryluki, $pl_{1b2\text{-}b1}$, (Rederstall Stadial)	boreal, south-boreal forest-steppe	**Kabazi II, III/2A**				
			Kabazi II, III/3		82,0±10,0		
Sub-stage 5c	Pryluki, pl_{1b1}, (Brörup Int.)	south-boreal forest-steppe	**Zaskalnaya V, V, VI**				
			Sary Kaya, 4, 5				
Sub-stage 5d	Tyasmin, ts, (Herning Stadial)	???					
	Kaydaky, kd_{3b2+c}, (Eemian Intergl.)	south-boreal forest-steppe	**Kabazi II, V/3-VI/17**				

are lacking reliable fauna analysis. For this reason, 16 multilayered sites were selected for the investigation of settlement systems. In spite of this, data still comprises faunal and artefact assemblages from a total of 80 layers or *in situ* occupation levels.

From a chronological point of view, these 80 layers or levels date from the time of the Last Interglacial (MIS 5d) up to and including the Denekamp Interstadial (Table 18-1). The local chronosratigraphical synthesis is based on radiometric chronology and environmental studies (Hedges et al. 1996; McKinney 1998; Rink et al. 1998, in press; Pettitt 1998; Chabai et al. 1998, 1999; Gerasimenko 1999, 2004, 2005; Markova 1999, 2004a, 2004b, 2004c, 2005; Mikhailesku 1999, 2004, 2005; Chabai, 2004c; Stepanchuk et al. 2004). Most Crimean Middle Palaeolithic occupations belong to the MIS 3. Occupations from MIS 5 and MIS 4 are rare (Table 18-1). In fact, in the Crimea only three sites have produced more or less reliable information for MIS 5 and MIS 4 occupations: Kabazi II, Starosele and Zaskalnaya V. Although the exact dates for Starosele level 4 and Zaskalnaya V, layers V and VI should be re-examined using additional radiometric and / or environmental information, it is highly likely that such studies would only serve to date these more exactly within the MIS 5. Furthermore, GABO, lower layer may also belong to MIS 5 (Kolosov et al. 1993a, 1993b; Chabai 2004c). Unfortunately, neither artefacts nor faunal material from this site have as yet been studied. The most peculiar feature of the Crimean Middle Palaeolithic chronostratigraphy are the chronological interstratifications of different techno-complexes and their facies. Such interstratifications are found in a number of stratigraphical sequences, such as Kabazi V (Micoquian of Starosele and Ak-Kaya facie, plus WCM), Chokurcha I, IV, Zaskalnaya V and Zaskalnaya VI (Ak-Kaya and Starosele facie). It follows that any attempt to explain the typological variability in the Crimean Middle Palaeolithic by means of chronology, possibly triggered by environmental changes, would probably be erroneous.

During the Upper Pleistocene, the Crimean environments were closely connected with sea level fluctuations in the Black Sea basin. For example, during the Last Interglacial, the Karangat transgression may even have cut the present day connection with the mainland (Fedorov 1978, 1983; Lazukov et al. 1981; Chepalyga 1984; Alekseev et al. 1986). The vegetation of the Crimea in the Last Interglacial (MIS 5d) was characterised by light pine forests with an admixture of broad-leaved trees. In the south-boreal forest / forest-steppe environments (Gerasimenko 2005) open landscapes prevailed, a fact which is also expressed in the dominance of forest-steppe / steppe micro- and malacofauna (Markova 2005; Mikhailesku 2005).

The interstadials of MIS 5c and MIS 5a were characterised by wet summers and mild winters, with forest-steppe landscapes (*Herbetum mixtum*, pine, hornbeam) typical of south-boreal environments (Fig. 18-2). The appearance of fir suggests relatively cooler and wet conditions during MIS 5b (Gerasimenko 2005). The lowest part of Kabazi II, Starosele, and Zaskalnaya V sequences correlate to MIS 5 (Gubonina 1985; Velichko 1988; Gerasimenko 1999; Chabai et al. 1999). At Kabazi II and Starosele, the Last Interglacial deposits show traces of seasonal floodings (Marks et al. 1998; Chabai 2005a). The deposits of GABO, which are thought to date to the Last Interglacial, are characterised by gravels of the Bodrak River terrace remnant (Chabai 2004c). At the same time, the GABO gravel deposits are rich in flint nodules. Despite the fact that the sites mentioned above are today situated above the river valleys (Kabazi II – 90 m, Starosele – 11 m, GABO – 8-10 m), it would appear that at the time of their occupations they were located closer to the rivers than is now the case. The then known flint outcrops were to be found at at least two localities, the Bodrak valley and Sary Kaya (Chabai 1999).

Faunal remains dating to MIS 5d were found at Kabazi II Units V and VI (Patou-Mathis 2005). The most representative species are *Equus hydruntinus, Cervus elaphus* and bovines. The most specific feature of MIS 5d fauna assemblages is the absence of *Saiga tatarica* remains (Fig. 18-2). Whereas the absence of mammoth at Kabazi II, where not a single mammoth bone was identified in 55 *in situ* occupations, might be explained by specific local environments and/or specific modes of site use, the absence of saiga in 19 occupations, chronologically restricted to MIS 5d, is certainly not accidental. Another specific feature of the Crimean MIS 5d fauna is the indirect evidence for the presence of porcupine (*Hystrix sp*): at Kabazi II, level VI/11-14, bones of *Equus hydruntinus* had been gnawed by this animal (Patou-Mathis 2005). It is the first ever evidence of porcupine in the Crimea. Thus, during MIS 5d three (*E. hydruntinus*, red deer, *Bovinae*) of the species which are usually dominant in Crimean fauna assemblages were present. The appearance of saiga and mammoth is listed for MIS 5c at the sites of Starosele level 4, as well as Zaskalnaya V, V and IV (Burke 1999; Kolosov 1983). It is at this point in time that the prey and scavenging package of Crimean Middle Palaeolithic hominids was complete: from then onwards, these five species (*E. hydruntinus*, saiga, mammoth, red deer, and *Bovinae*) played the main role in human nutrition strategies until the Denekamp. The appearance of *Vulpes*

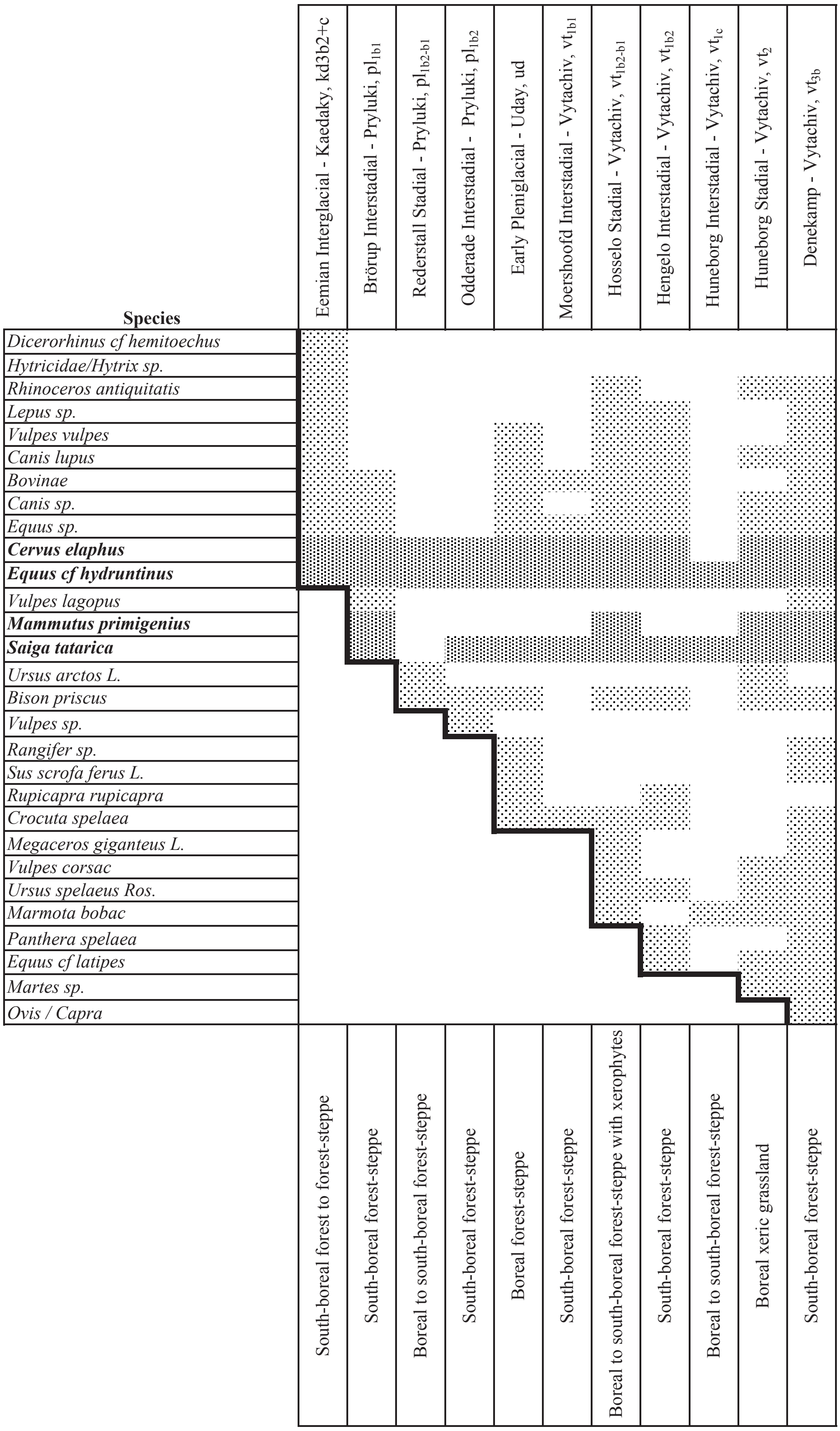

Fig. 18-2 Floristic and faunal assemblages in Crimean MP.*

* data after Vekilova 1971; Kolosov 1983, 1986, Kolosov et al. 1993a; Gerasimenko 1999, 2004, 2005; Markova 1999, 2004a, 2004b, 2004c, 2005; Mikhailesku 1999, 2004, 2005; Patou-Mathis 1999, 2004a, 2004b, 2005, Chapter 2, Chapter 12; Patou-Mathis, Chabai 2003, 2005; Chabai, Patou-Mathis 2006; Burke 1999, 2004.

lagopus (polar fox) completes the Crimean fauna in so far as it now incorporates steppe, forest and arcto-boreal species. After MIS 5c, the Crimean fauna became more or less stable up to and including the Denekamp Interstadial.

The northern-boreal forest-steppe environments of MIS were characterised by a decline of broad leaved trees, as well as by a sharp reduction of arboreal vegetation (Gerasimenko 2005). Reindeer, listed in Starosele 3 (Burke 1999), and polar fox are representatives of boreal environments of the northern Black Sea region, which appear in the following time periods too. In his analysis of the Shaitan Koba fauna, Yu. Kolosov (1972) assumed that the appearance of reindeer in the Crimea was a reflection of winter range migrations of these animals. If so, it would mean that a stable connection existed between the present day peninsula and the mainland. The Crimea would have been either joined with the mainland by a land bridge, or was a part of the mainland, as early as MIS 4, or even before. The hypothesis of an early connection might be evidenced by the absence of *"Würmian"* marine deposits in the Azov Sea (Alekseev et al. 1986). Following the Karangat transgression, two regressions and one transgression (Surozh) have been defined for the Upper Pleistocene Black Sea basin. Nevertheless, the general trend was a decrease of sea level. Even during the Surozh transgression, the sea level was about 30 m lower than it is today.

The environmental reconstructions of MIS 3 are based on multidisciplinary studies of a relatively large number of sites: Kabazi II, Starosele, Zaskalnaya V, Buran Kaya III, Chokurcha I, Karabi Tamchin, Siuren I (Kolosov et al. 1993a; López Bayón 1998; Chabai, Monigal, eds. 1999; Demidenko 2003a, Chabai, Monigal, Marks, eds. 2004). Additional information, mainly regarding the composition of mega-fauna, comes from a number of other sites dated to MIS 3: Prolom I, Prolom II, Kiik-Koba and Zaskalnaya VI (Kolosov et al. 1993a; Stepanchuk et al. 2004; Chabai 2004c). The environments of MIS 3 are characterised by a cyclical pattern. These cycles are seen in the expansion (during interstadials) and retreats (in stadials) of broad-leaved and pine tree woodlands (Gerasimenko 2005). According to Gerasimenko, the alternation of humid / warm and dry / cool intervals was not very pronounced, and south-boreal / northern-boreal forest-steppe environments dominated. The only exception is the Vytachiv, vt2 (Huneborg Stadial), during which time the landscapes were covered by xeric grassland and the frequency of steppe / semi-desert rodents and mollusks increased (Gerasimenko 1999, 2005; Markova 2004a, Mikhailesku 2004). At the same time, neither periglacial floristic nor rodent / insectivore assemblages have been found. In the Crimea the absence of arcto-boreal flora, small mammals and mollusks during the Interpleniglacial differs from more northerly areas of Eastern Europe. However, boreal megafauna is well represented in Crimean sites of this time range. From the Vytachiv, vt_{1b2} (Hengelo) onwards, the already existing diversity of fauna, with reindeer, wooly rhino, polar fox and mammoth, increased with the appearance of *Equus latipes*. The environmental demands of these horses, which were abundant on the Mid Done wet and cool taiga forest, includes *"soft surfaces of forest-steppe and forest biotopes"* found from the southern edge of Western Siberia and Ural Mountains to the Mid Done Valley (Vereschagin, Kuzmina 1982, p. 227, 229). In fact, the appearance of *E. latipes* might even suggest the existence of north-eastern migratory routes into the northern Black Sea region.

Meso-scale simulations of temperatures conducted for a "warm event" in the OIS 3 have produced mean summer temperatures ranging from 20-25°C, and winter temperatures of between –minus 4 - 0°C (Barron et al. 2003). Simulations for a "cold event" in the OIS 3 produced the same mean summer temperatures, but somewhat colder mean winter temperatures of between –minus 4 to –minus 8. The depth of snow cover was simulated as 0.5-5 cm for both warm and cold phases of the OIS 3. The difference between "warm" and "cold events" lies in the number of days with snow cover: while "warm events" where thought to have 10 to 30 days of winter snow cover, "cold events" had between 30 and 60 days (Barron et al. 2003). Thus, pollen, fauna and simulation studies show the absence of the sharp climatic alternations during the OIS 3 in the Crimea.

The beginning of MIS 3 correlates with a sustained drop in the sea level of the Black Sea basin, leading to an incision of Crimean rivers beds. At that point of time, new (2nd) river terraces were formed, a number of rock-shelters came into existence, and erosion processes intensified. Some newly opened rock-shelters contain alluvial deposits at the bottom of the stratigraphical sequences dated to MIS 3 (Chokurcha I, Buran Kaya III, Siuren I), while others have occupational levels in sediments that date to MIS 3 and correspond to the 2nd terrace of local rivers (Prolom I and Prolom II). However, already existent rock-shelters and open-air locations which had been occupied prior to MIS 3 were not abandoned. Humans continued to use Kabazi II, Zaskalnaya V, Zaskalnaya VI, Starosele, and Kiik-Koba – sites which were relatively far from river banks, but still closer than now, owing to the fact that the MIS 3 river terraces are approximately 30-40 m above the present day river flood plains. The intensification of erosional processes led to the exposure of a new flint outcrop: at least one primary flint source was opened by slope erosion on the bank of the Alma River (Chabai 1999).

Some general remarks on the procurement of food resources in the middle palaeolithic of crimea

All in all, resources essential for hominid survival on the Crimea during the period of MIS 5d to the end of MIS 3 can be characterised as more or less stable and relatively rich. Water and ungulates, as well as flint outcrops and, certainly less important, rock-shelters were available. Compared to northern territories, the climate varied from favourable to more moderate conditions, even during MIS 4. Only twice was the forest-steppe uniformity interrupted: first, during MIS 5d, by a short period of south-boreal forest environments, and again during the Vytachiv, vt_2 (Huneborg) stadial by boreal xeric grassland. In the first case, one might assume the disappearance of *Saiga tatarica*, but another popular species, *Equus hydruntinus*, would still have been available. In the second case, pronounced aridisation might have resulted in increased annual ranges of ungulate mobility due to seasonal water deficits. This would undoubtedly have affected the behaviour of humans, but seeing as they did not abandon the Crimea it does not seem as if aridisation was catastrophic. Moreover, new hominid groups with an Upper Palaeolithic technology were entering the Crimea at exactly this time (Chabai et al. 2004). It might be that climatic conditions in neighbouring territories were far worse (van Andel and Davis 2003, eds.).

It has already been mentioned that the large mammal fauna at archaeological sites between the end of MIS 5 and the Vytachiv, vt_{3b} (Denekamp Interstadial) shows a remarkable stability in the presence or absence of species, as well as in their frequencies. In general, *"all sites exhibit a very pronounced bias towards steppe species"* (Marks, Chabai 2001). Among these, equids and saiga dominate, while bovids and mammoth are by far less numerous. The same applies to red deer, which is the only exception from the steppe oriented resource acquisition. In general, and with exceptions (e.g. Prolom II), it is assumed that the most part of the fauna found in occupational levels of the Crimean Middle Palaeolithic sites listed above was procured by hunting (Burke et al. 1999). However, some sites have also yielded evidence of scavenging during times of nutritious stress (Patou-Mathis 2004b), but owing to the fact that the composition of most faunal assemblages is heavily influenced by anthropogenic factors, it is difficult to ascertain whether human selective hunting and scavenging caused the observed stability of species, or whether this results from the absence of significant environmental alterations. Most probably, it is the result of both. At least for MIS 3, A. Markova (2004c, p. 376) concludes that the *"absence of cold-tolerant small mammal species could relate to a rather weak ice-sheet influence on the Crimean landscapes during isotope stage 3* [...]. *It seems that global cooling only resulted in an increase in dry conditions and a decrease of forested areas at these latitudes."* Obviously, these changes rarely exceeded the environmental tolerances of most large mammal species. Apart from the four to five species listed above that make up the prey and scavenging package of Middle Palaeolithic humans in the Crimea, there are others which also show evidence for human hunting, but less often, and usually in much lower numbers (Burke et al. 1999; Marks, Chabai 2001, p. 195-196). Among these, wild pig (*Sus sp.*), chamois *(Rupicapra rupicapra)* (Burke et al. 1999, p. 149) and giant deer (*Megaloceros giganteus L.*) (Vekilova 1971) appear more often in the faunal record than others. It is possible that the presence of these species mirrors their availability in the vicinity of the sites, e.g. the presence of alpine like conditions (e.g. in Starosele for chamois: Burke et al. 1999, p. 149) or closed, relatively humid habitats in and near river valleys (e.g. in Kiik Koba for giant deer). However, preferences were made even within the prey and scavenging package. The presence of large herbivores, e.g. mammoth or rhinoceros, is usually restricted to the remains of heads and limbs. This, and the fact that both the frequencies of identified pieces and the number of individuals is low, speaks for a scavenging mode of procurement. For bovids, the data is more ambiguous. In some cases, e.g. in Kabazi II, level III/2 (Patou-Mathis, Chapter 12) or in Buran Kaya III, level B/B1 (Patou-Mathis 2004a), these massive and dangerous animals were killed by humans. In other cases, as documented in Kabazi II, level IIA/1 and level V/7 (Patou-Mathis, 2005, Chapter 2), humans did not have primary access to the killed animals, and scavenged bovid carcasses. Furthermore, while red deer (*Cervus elaphus*) was probably scavenged in many archaeological levels, e.g. at Kabazi II, Units V and VI (Patou-Mathis 2005), the much larger giant deer is thought to have been hunted in Kiik Koba and Shaitan Koba. Thus, although they had the logistical and technological ability to hunt animals as large as bovids, humans often avoided doing so. Probably as a result of higher risks connected with their kill, mammals weighing more than a ton seem to have been less attractive for human hunters (Uthmeier, in press). For other species, like reindeer (*Rangifer tarandus*) (Burke 2004) or, from the Hengelo Interstadial onwards, *Equus latipes*, it is clear that they were seldom hunted– if at all. The scarcity of their remains, and the fact that any human participation in their discard is not securely attested, make it most probable that these species were not part of the nutritional base of Crimean Middle Palaeolithic humans. Although described site by site in greater detail below, archaeozoological data strongly suggests a patterning in the faunal exploitation. General decisions were made on the basis of a diverse, and at the same time more or less stable environment. The question whether the selection of preferred prey was intentional and resulted from the ability of Middle Palaeolithic humans to avoid competition within the Crimean ecosystem, or whether it was simply a reflection of general carnivore behaviour, is difficult to answer. At least, the relative frequencies of *Saiga tatarica* and *Equus hydruntinus* at Prolom II, levels II and III, are comparable with many other Crimean Middle Palaeolithic archaeological levels; although Prolom II was recognised as having been mainly a hyena den (Enloe, David, Baryshnikov 2000). Perhaps, the dominance of saiga (*Saiga tatarica*) and horses (*Equus hydruntinus*) in faunal assemblages hunted either by humans or by carnivores is simply the result of abundance. However, ecological choices are influenced by minimal rather than maximal availability (Harris 1989, p. 87). For species of the hunting package, several multi layered sites yielded information regarding the season of death (Fig. 18-3). The most reliable data comes from *Equus hydruntinus* and *Saiga tatarica*. In many sites, these species are so numerous that age profiles could be calculated. In addition, foetal bones, as well as new born to juvenile animals, allowed more or less secure assumptions as to the season of death. At first glance, the presence of horses (*Equus hydruntinus*) throughout the year is surprising. During MIS 3, even in the autumn months *Equus hydruntinus* could be found on the highland plateaus near Karabi Tamchin (Yevtushenko, Burke, Ferring 2004, p. 277), some 700 to 1000 m above sea level (Burke 2004). This, as well as the year round presence of *Equus hydruntinus* in general, is suggestive of relatively moderate winter temperatures and a low depth of snow cover (as simulated for MIS 3 by Barron et al. 2003) in the Crimea. Obviously, it was sufficient for this species to move only minor distances between summer and winter ranges, e.g. between higher and lower parts of the second range of the Crimean mountains. So far, *Saiga tatarica* remains stem from layers which have been identified as having been occupied by humans in the late spring, summer or end of summer / beginning of autumn. The Crimea is thought to be the summer range of these animals. During the Upper Pleistocene, they might have spent the winter in regions as far away as Ciscaucasia (Burke et al. 1999, p. 179). The ecological differences between horses and saiga antelopes can be explained by demographic factors. Among Mongolian saigas, migrating herds count up to 200 000 individuals, before they split into groups of 30 to 40 animals following their arrival in the seasonal ranges (MacDonald 2002, p. 569). Although they feed on 150 different plants and herbs (MacDonald 2002, p. 562) and are comparatively small, the sheer number of saiga antelope herds might have limited their stay on a regional scale. The data for the other species from the prey / scavenging package in Fig. 18-3, e.g. red deer, bovids and mammoth, is less reliable. Estimations of the season of death are based solely on their combination with *Saiga tatarica* or *Equus hydruntinus*, for which the season of death could be securely identified. Nevertheless, the data at hand supports some general presumptions. Under Pleistocene conditions, browsers like red deer, for example, should be less tolerant to low winter temperatures and therefore migrate into lower altitudes, a fact which may also apply to grazers with high food requirements , such as bovids and mammoth. In addition, mammoth (if equated with African elephants) were highly dependent on daily water supplies amounting to as much as 150 litres (MacDonald 2002). Altogether, the main species hunted by humans, *Equus hydruntinus* and *Saiga tatarica*, had two important advantages: year around availability (*Equus*), and seasonal abundance (saiga). Both species were small to medium sized (40 kg for saiga and 200 kg for equids: MacDonald 2002, p. 562; Patou-Mathis, 2005, Chapter 2), and lived – with the exception of the migratory phases of the year – in herds of 20 to 30 individuals. Age profiles suggest that both jump kills and ambush hunting were important hunting strategies in the Crimean Middle Palaeolithic (Patou-Mathis 1999, 2004a, 2005, Patou-Mathis, Chabai 2003). Certainly, these strategies fit better to small and medium sized animals which tend to bolt rather than to stand their ground.

Scavenging is often combined with hunting, and therefore seems to have been opportunistic. In Chokurcha I, however, it can be seen as a consequence of periods of nutritious stress (Patou-Mathis 2004b). The levels of Unit IV mainly go back to visits at the beginning of the warm season (end of spring / beginning of summer). After the winter, animals

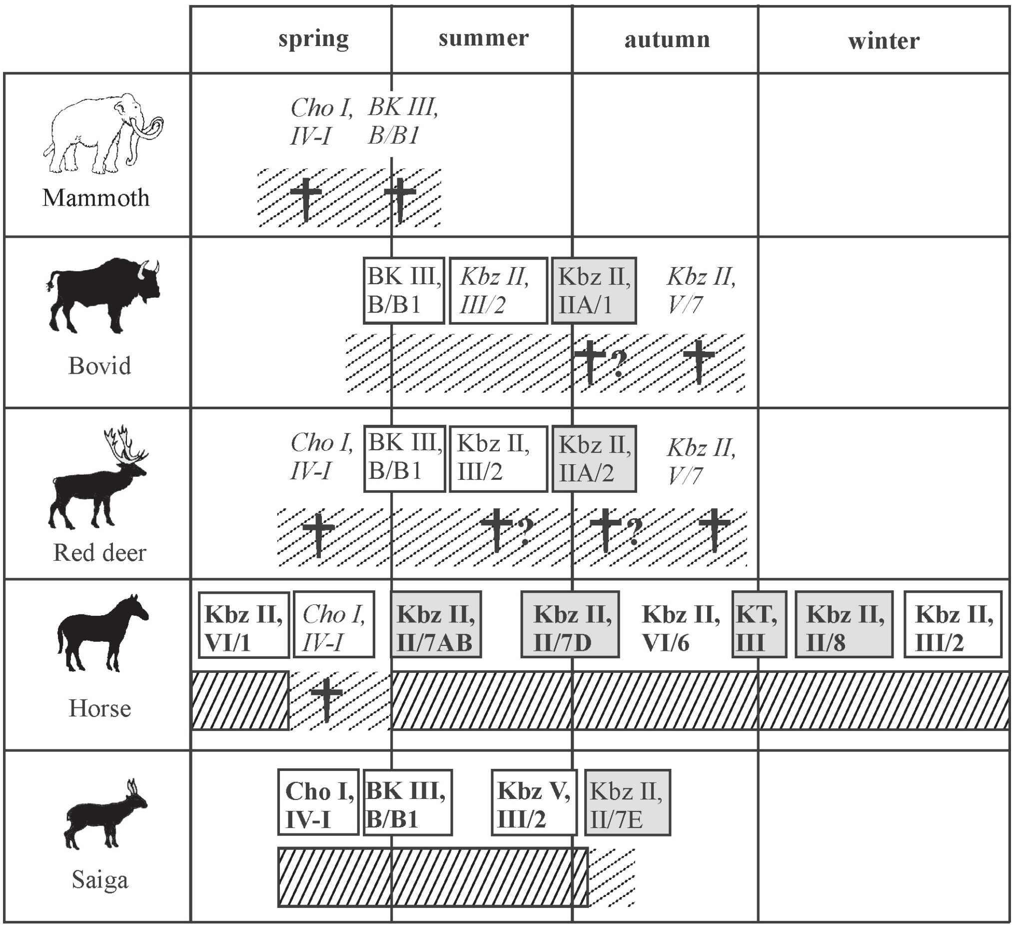

Fig. 18-3 Season of death for main species hunted and / or scavenged in the Crimean Middle Palaeolithic. More than one occupation per season and species possible: grey squares= Western Crimean Mousterian; white squares = Crimean Micoquian; no square = species not confirmed as human quarries, possibly killed by carnivores; bold = season classified on basis of foetal bones or juvenile individuals; italics = season classified on basis of combination with the latter; † = scavenged; †? = probably scavenged (data is coming from the following sources: Chokurcha I (Patou-Mathis 2004b); Kabazi II, Units V and VI (Patou-Mathis 2005); Karabi-Tamchin, level III (Burke 2004); Kabazi II, Unit III (Patou-Mathis, this volume); Kabazi II, Unit IIA (Patou-Mathis, this volume); Kabazi, Unit II (Patou-Mathis, Chabai 2003); Buran-Kaya III, level B/B1 (Patou-Mathis 2004a)).

had lost a lot of their weight, and the timing of their moves from the more northern winter ranges to the second range of the Crimean Mountains were not easy to predict. This may have been the situation encountered by human hunters at Chokurcha I, where they only managed to kill individual saiga antelopes and / or equids. However, even if scavenging was opportunistic, its presence may also be reflective of environmental factors. At the time of Chokurcha I, Unit IV was situated near the river and affected by flooding, which might have resulted in the accumulation of dead corpses – a scenario also assumed for Starosele, level 4 (Burke 1999). However, season and site catchment might not only have influenced the practice of scavenging, but might also help to explain the dominance of certain species in the archaeological record. For example, Kabazi II, Units II to III served as a kill and butchering site for jump kills (Patou-Mathis 1999, Chapters 2 and 12). Consequently, faunal assemblages are characterised by family groups of *Equus hydruntinus*. A similar picture, but almost certainly associated with a different hunting strategy, is related from the site of Buran Kaya III, which is situated in a small river valley where family herds of *Saiga tatarica* were supposed to have watered during the dry summer months (Patou-Mathis 2004a). All in all, the procurement of animal resources was focused on abundant, but less dangerous small to mid sized species. Hunting and scavenging of large species seems to have occurred opportunistically, depending on the season and the habitat around the sites. The fact that hunting played a major role in the acquisition of protein resources, and the observation that the influence of carnivores on many faunal assemblages is small, points to successful subsistence strategies which enabled human groups to compete with animal predators.

Methods Used for the Classification of Occupations

In general, two variables are used to classify occupations (Table 18-2): the position within the food acquisition process (which is thought to be essential), and the distance from raw material sources (see also Marks, Chabai 2001, p. 191). According to current investigations of stable isotopes in Neanderthal bones, meat was the main source of calories (Bocherens, Drucker 2005). At least for Neanderthals, a nutrition based upon proteins from terrestrial animals was not restricted to cold phases, but also typical for interglacial individuals (Bocherens et al. 1997). After first analyses had suggested that aquatic protein resources grew in importance during the Upper Palaeolithic, pointing to broad-spectrum adaptation, it now seems that the dominance of meat from terrestrial animals, otherwise attributed to Neanderthal populations, was also characteristic for early *Homo sapiens sapiens* (Drucker, Henry-Gambier, Lenoir 2005). As far as faunal exploitation is concerned, two classes of occupation are distinguished:

1. kill and butchering stations, with emphasis on the extraction of food resources, and

2. camps, which saw mainly the consumption of food resources.

From stations, varying amounts of meat were exported ("reverse strategies"). At camps, parts of carcasses were imported, while other animals might have been killed in the immediate vicinity and transported to the site for butchering ("inverse strategies"). Certainly, the time of activity is an aspect inherent in this distinction. However, although stations are supposed to represent only short-term stays, lasting from some hours to a few days, some of the camps might not have existed much longer either. The duration of a given occupation depends partly on function, but at the same time results from the number of animals hunted and / or consumed, and also group size. For example, some of the camps saw the consumption of three to four *Saiga tatarica* only, which equates to approximately 60 to 80 kg of meat (a point to be discussed later in greater detail). With reference to data from recent arctic populations (Hahn 1977, p. 280), as well as estimations of Neanderthal calorie requirements(Culotta 2005), such an amount of meat would have sufficed a family of 5 individuals for no longer than 3 to 4 days. This is probably not much longer than required for the killing and butchering of a family group of *Equus hydruntinus*, combined with the consumption of some soft tissue and marrow. Even worse, it is now quite clear that some of the sites formerly thought to represent *"base camps"* occupied for a *"considerable period"* (Marks, Chabai 2001, p. 194), e.g. several months, are in fact palimpsests (Chabai 2004c; Chabai, Patou-Mathis 2006).

Although hunting strategies in the Crimean Middle Palaeolithic seem to have been selective, a classification of sites into camps and stations does not necessarily imply a particular pattern of land use, e.g. *"radiating"* or *"circulating"* (Mortensen 1972, Marks, Chabai 2001, p. 197), or *"foragers"* and *"collectors"* (Binford 1980). Often it is not entirely certain whether stations were located at considerable distances from camps, and visited by task groups, or whether the distance between them and the camps was short, and the whole group participated in the hunt. For the jump kill of small herds in particular, task groups of two to three (male) Neanderhals may have been too small for a successful hunt. The second variable used here to classify occupations is the distance from raw material sources. This is not to say that this was a factor that generally limited territories: Crimean Middle Palaeolithic groups also used regions as far away from raw material sources as 30 km – in mountainous landscapes. Nevertheless, it may have influenced the time of activity – and certainly the lithic assemblages. In theory, the amount of primary flaking and blank production decreases with growing distance from the outcrops, while the amount of imported cores and tools, as well as the degree of preparation and rejuvenation, increases. Three classes are used to distinguish between occupations (Table 18-2):

1. Sites that are situated near raw material sources, feature a large number of artefacts from primary flaking and initial preparation, and are thus representative of the "site-workshop" model;

2. Sites that are situated at considerable distances

	distance to site of initial blank production (at outcrop or residential camp)		
	low	local moves < 10 km	regional moves ? 10 km
(kill and) butchering, export	**Station, Type A** core reduction/ (bifacial) tool-production and export	**Stations, Type B** core/(bifacial)tool-import and reduction/rejuvenation	
(kill and) butchering, consumption and export		**Stations, Type C** core/(bifacial)tool-import and reduction/rejuvenation	
(kill and) butchering, consumption			**Camps, Type D** core/(bifacial)tool-import and reduction/rejuvenation
import and consumption	**Camps, Type A** core reduction/ (bifacial) tool-production	**Camps, Type C** core reduction/(bifacial) tool-production and core/(bifacial)tool-import reduction/ rejuvenation	**Camps, Type B** core/(bifacial)tool-import and reduction/rejuvenation

Table 18-2 Variables used to classify occupations in Crimean Middle Palaeolithic.

from the outcrops, feature high amounts of imported and heavily reduced lithics, and are thus representative of the "tool user" model;

3. Sites that are situated within a distance of local moves from the raw material sources, feature variable amounts of imported objects from more advanced phases of the *chaîne opératoire*, can be classified according to the amount of on-site blank and tool production.

Functional Variability of Western Crimean Mousterian Occupations

Owing to the much higher number of available layers, most studies dedicated to settlement systems in the Crimean Middle Palaeolithic have referred to Micoquian occupations, while only a few articles have ever focused on WCM occupations. Until today, WCM occupations have been studied at three stratified sites: Kabazi II, Karabi Tamchin and Shaitan Koba (Bonch-Osmolowski 1930; Kolosov 1972; Chabai 1998b, 1998c, 2000; Yevtushenko 2003, 2004). In addition, two lenses of WCM artefact and faunal assemblages were found in a secondary stratigraphical context at Chokurcha II (Bader 1979), and artefacts which, on typological and technological grounds, are indicative of WCM occupations have been excavated at Kholodnaya Balka and Kabazi I. Unfortunately, the latter sites were studied as a single "cultural layer", though they yielded multi-layered stratigraphies (Formozov 1959a, 1959b). In sum, the analysis represented below is based on 23 clearly stratified occupations with WCM artefacts and faunal remains.

Kill and butchering stations

Kill and butchering stations are represented by 16 *in situ* occupations of Kabazi II, levels IIA/2 through II/1A, and "two lenses" of re-deposited artefacts and faunal remains at Chokurcha II. Kabazi II and Chokurcha II are open-air sites situated on the slope of a cuesta below limestone cliffs. The topographical setting provided the perfect location for driving ungulates to their deaths from the cuesta cliffs above the sites, and it looks as if the butchering activities took place on, or very close to, the area where animals fell after successful hunts. The main kind of on-site activity at these stations was butchering, but also included different modes of flint exploitation.

Kill and butchering stations, type A

This type is represented by all of the Kabazi II occupations mentioned above, except for IIA/2. The occupations formed under environmental conditions classified as south-boreal forest-steppe (Kabazi II, IIA/1 through II/4, Hengelo and Huneborg Interstadials – Vytachiv, vt_{1b2} and Vytachiv, vt_{1c}) and boreal xeric grassland (Kabazi II, II/3, II/2, II/1, Huneborg stadial – Vytachiv, vt_2) (Gerasimenko 1999, 2005). The accumulation of sediments occurred relatively swiftly, while human visits were infrequent and, according to the exploitation of the surfaces, not very intense (Ferring 1998; Chabai 2005a, Chapter 1). The thickness of all occupations is equivalent to the thickness of a single bone or artefact, the only exception being level II/8 in which some squares the thickness of bone concentrations reached 10-15 cm. Artefact densities are middle to low (Table 18-3), whereas the densities of bones are usually 5-10 times higher than those of artefacts. All occupations are separated by pronounced lenses of sterile sediments (Chabai, Chapter 1, Table 1-2).

Neither artificial structures nor traces of the use of fire have ever been discovered at this type of kill and butchering station. In all levels, faunal remains are heavily dominated by *Equus hydruntinus* – in some levels up to 100 % of all identifiable bones and individuals (Fig. 18-4; 18-5, *1, 2, 3, 4*). If the average ratio between the number of remains (NR) and the minimal number of individuals (MNI) is considered, then each horse is represented by more than 60 bones. Species other than equids are only represented by a few bones each, their direct association with human activity, however, being somewhat problematic. According to M. Patou-Mathis (1999, Chapter 2), the main model of faunal exploitation is butchering. In some cases, the butchering was complemented by the extraction of marrow from fresh bones. In many cases, the age profiles of individual horses point to the hunting of herds, i.e. "family groups". Based on the structure of these family groups, M. Patou-Mathis has been able to define "winter" and "summer" hunting games. In levels II/8, II/8C and IIA/1, the composition of the hunted herds corresponds to "winter" episodes (II/8C – autumn/winter, II/8 – beginning of winter), while horses found in levels II/7AB, II/7C, II/7D and II/7E were killed in "summer" (II/7AB –beginning of summer, II/7D – beginning of autumn). With the exception of level II/8, all levels yielded a restricted number of individuals only, and therefore seem to represent single hunting and butchering episodes of one family group only. "Summer" hunting game amounts to about 16-18 horses. The results from "winter" game is not as impressive, but also produced a considerable number of carcasses: 6-9 horses. Level II/8 is a palimpsest of a number of "winter" hunts (Patou-Mathis 1999, Chapter 2; Patou-Mathis, Chabai 2003).

The extraction of calories can be described as *"reverse bulk (mass)"* and *"reverse gourmet"* strategies, e.g. nearly all nutritive parts and most of the nutritive valuable parts of the horses were transported from the site (Patou-Mathis 1999). In the first case (*"reverse mass"*) the quantity of meat played a bigger role than the quality. The second case (*"reverse gourmet"*) is different, here only the best meat bearing parts of carcasses were exported. In both cases, reverse models of faunal exploitation suggest the existence of camps for consumption of the exported parts of the hunted game.

The primary source of high quality flint at the time of occupation was the Mount Milnaya flint outcrop, which is situated in the very near vicinity of Kabazi II (about 2 km from the site) . Flint was transported to the site as raw nodules / plaquettes, with the subsequent removal of cortex occurring on the site. Blanks covered either completely or partialy by cortex account for 32 – 48 % of material, while those completely covered by cortex reach percentages of 7 – 16 % of all blanks longer than 2.99 cm. In average, core-like pieces make up 4.2 – 8 % of the total amount of artefacts, excluding chips. About the same percentages falls upon

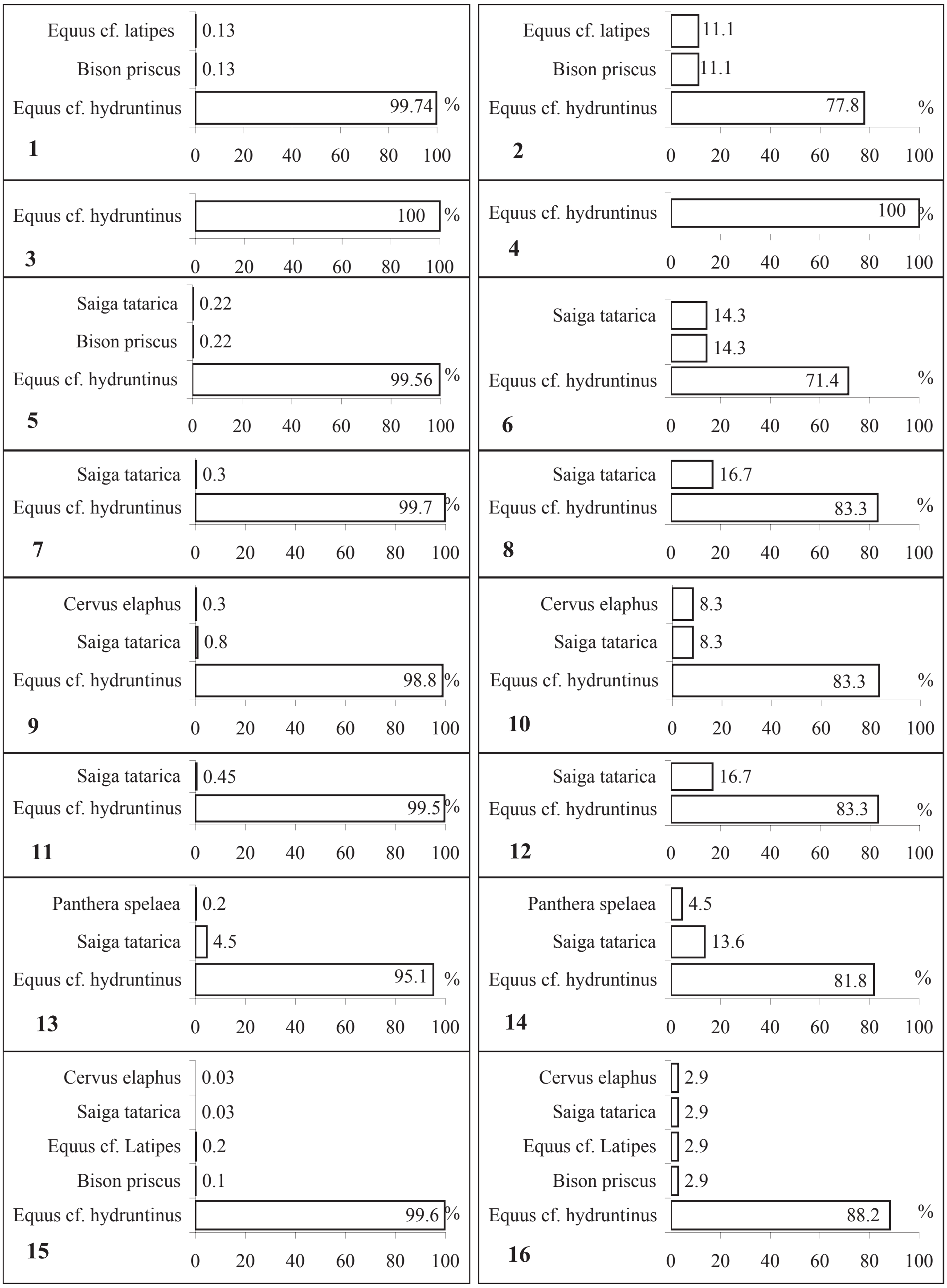

Fig. 18-4 Model of fauna exploitation in WCM killing-butchering sites, type A: number of remains (NR) by species, in % (1, 3, 5, 7, 9, 11, 13, 15); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10, 12, 14, 16). Kabazi II, levels: II/1 (1, 2); II/2 (3, 4); II/3 (5, 6); II/4 (7, 8); II/5 (9, 10); II/6 (11, 12); II/7E (13, 14); II/8 (15, 16).*

* data after Chabai 1998b; Patou-Mathis 1999, Chapter 2; Patou-Mathis and Chabai 2003

	Tools, %	Blanks : Cores	Tools : Cores	Density of artefacts per m^3
Kabazi II, II/1A-II/4	19.9	23.6 : 1	4.9 : 1	145.8
Kabazi II, II/5-II/7	14.1	22.9 : 1	4.4 : 1	132.9
Kabazi II, II/7AB	11.3	12.5 : 1	1.5 : 1	145.0
Kabazi II, II/7C	14.1	22.8 : 1	3.4 : 1	137.9
Kabazi II, II/7D	12.4	21.8 : 1	2.9 : 1	80.4
Kabazi II, II/7E	7.0	17.7 : 1	1.3 : 1	101.7
Kabazi II, II/8	11.8	21.6 : 1	2.7 : 1	143.1
Kabazi II, II/8C	5.1	No cores	No cores	43.8
Kabazi II, IIA/1	8.9	No cores	No cores	40.0

Table 18-3 Model of raw material exploitation in WCM killing-butchering stations, type A.*
* after Chabai, Chapter 1

core trimming elements: *éclats débordants*, core tablets, crested blades and flakes. The absence of cores, as well as the low artefact densities, in levels II/8C and IIA/1 might be explained by the peripheral character of the excavated area, since the main concentrations of these levels are expected in unexcavated square lines 3, 2 and 1 (Chabai 1998c, 1998d). Another explanation for the absence of cores in level II/8C, as proposed by Th. Uthmeier (Chapter 10), might be the export of cores, as well as some blanks, to other, more or less contemporaneous sites. A comparable hypothesis, again based on transformation analyses, has been proposed for levels II/7D and IIA/1 (Maier, Chapter 6; Kretschmer and Maier, Chapter 11).

A number of refits, which include both cores and blanks, shows that core reduction took place on-site (Chabai 1998c, Usik 2003). Nevertheless, core reduction was not intensive. This can be seen in the measurements of cores and blanks, which are usually longer than 5 cm. On average, one core was used for the production of 20 blanks, of which about three were then modified into tools (Table 18-3). Compared to other sites of the Crimean Middle Palaeolithic, the percentage of tools in these assemblages is very low (Table 18-3), indicative of a less intensive on-site reduction of cores. This is further strengthened by the observation that there is no evidence for an intensive use of modified pieces. Most tools were formed by either marginal or not invasive scalar retouch. The average tool sizes vary between 5 and 7 cm. In sum, raw material exploitation was based on the on-site reduction of cores, followed by the production of tools, ie.the "site-workshop" model.

Probably, at least two more kill and butchering occupations were excavated by O. N. Bader at Chokurcha II. Two lenses with faunal remains and artefacts were found below the cuesta cliffs near the valley bottom of the Small Salgir. Despite the secondary stratigraphical position, bones and artefacts were well preserved. The remains of *Equus hydruntinus* account for approximately 98 % of the faunal assemblage. The ratio between tools and core-like pieces is 2.6 to 1 (Bader 1979). If the two lenses at Chokurcha II really represent kill and butchering stations, than it would be the first example of a WCM killing-butchering station situated at a further distance from the known flint sources. However, as in the other cases listed above, Chokurcha II inhabitants used the site-workshop model of raw material exploitation.

Thus, one can reconstruct the following activities at the Western Crimean Mousterian kill and butchering stations of type A, which took place after a family group of horses had been successfully driven down from the cuesta cliffs:

1. On-site core reduction of nodules and plaquettes imported from local flint sources, tool modification, and subsequent export of cores, blanks and tools.

2. On-site butchering of horses followed by export of most of the meat bearing parts.

Even when taken together, these activities were not time consuming. This, and the fact the bulk of meat was exported suggests the existence of corresponding, e.g. contemporenaous, localities for meat consumption.

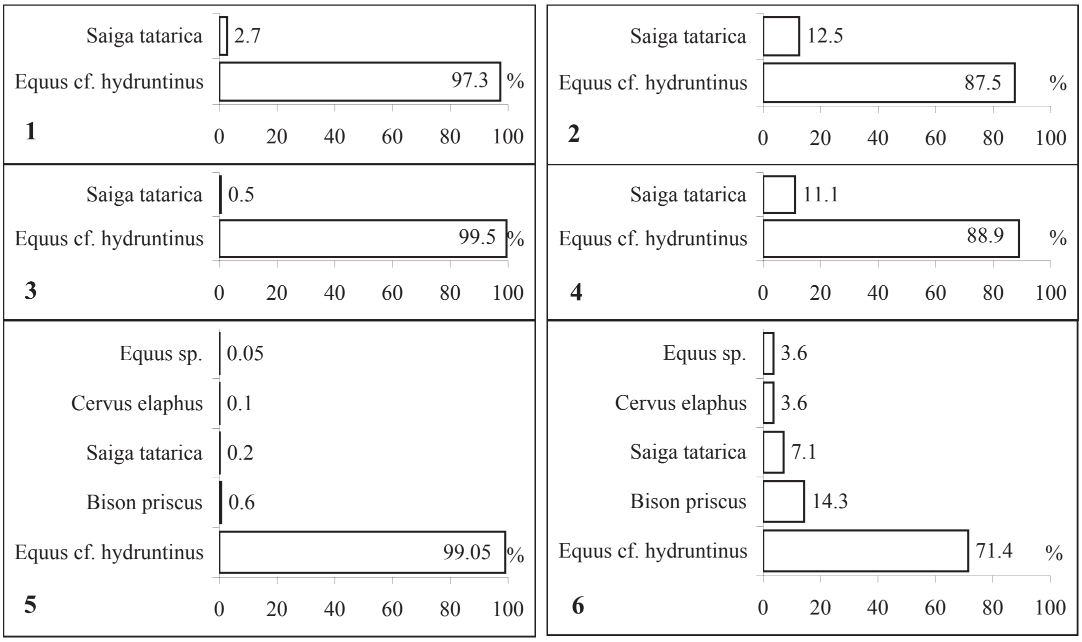

Fig. 18-5 Fig. 18-5. Model of fauna exploitation in WCM killing-butchering sites, types A (1, 2, 3, 4) and B (5, 6): number of remains (NR) by species, in % (1, 3, 5); minimal number of individuals (MNI) by species, in % (2, 4, 6). Kabazi II, levels: II/8C (1, 2); IIA/1 (3, 4); IIA/2 (5, 6).*

* data after Patou-Mathis 1999, Chapter 2

Kill and butchering stations, type B

The only Western Crimean Mousterian occupation kown so far, and classified as a kill and butchering station of type B is Kabazi II, level IIA/2, which accumulated during the Hosselo Stadial – Vytachiv, $vt_{1b2\text{-}b1}$ under boreal xeric forest-steppe climatic conditions (Gerasimenko 2005). The site formation process and the sedimentation rate are analogeous to the Kabazi II occupations mentioned above. In contrast to these, the intensity of occupation – expressed by the density of artefacts per square metre – is among the lowest in the Crimea (Table 18-4). This is even more siginificant as the excavation area of level IIA/2 represents not the periphery, but a central part of the occupation (Chabai 1998b, 1998c). At the same time, the density of bones is about 10 times higher than in other excavated levels. With the exception of two bone clusters with a thickness up to 10 cm, the thickness of level IIA/2 equates to the thickness of a single bone or artefact.

There are no fire-places nor burnt bones and artefacts indicative of the use of fire. In addition, no evident traces of any other kind of artificial structures were found within the excavated area.

Faunal remains are dominanted by *Equus hydruntinus* (Fig. 18-5, *5, 6*). On average, each individual of this species is represented by approximately 85 bones. Other species found in this layer – *Bison priscus, Equus sp., Saiga tatarica* and *Cervus elaphus* – are represented by 1 – 2.5 bones per individual. According to M. Patou-Mathis (1999, Chapter 2), the model of faunal exploitation in level IIA/2 is similar to that found in some of the uppermost levels, and results from the hunting of game during the summer / early autumn, and following the reverse gourmet strategy. The quarry of human hunters in level IIA/2 comprised 16 horses (MNIc). According to M. Patou-Mathis, the faunal remains of horses in this level reflects a single hunting and butchering episode. As a result, food resources were so abundant that some of the meat bearing parts were left in anatomical order, and two skulls were not broken.

On the other hand, flint exploitation was characterised by an economical treatment of the raw volumes, probably because the local flint source at Mount Milnaya was not yet opened by slope erosion (Chabai 1999). The nearest known flint source was situated in the Bodrak river valley, some 7 km from the Kabazi cuesta. Typical blanks, indicative of core reduction processes, e.g. primary blanks, debordantes and crested blanks, as well as core-like pieces,

	Tools, %	Blanks:Cores	Tools : Cores	Density of artefacts per m^3
Kabazi II, IIA/2	29.03	No cores	No cores	19.3

Table 18-4 Model of raw material exploitation in WCM killing-butchering station, type B.*
* after Chabai, Chapter 1

are absent. The percentage of tools is relatively high. In fact, the value for level IIA/2 is more than twice as high as that calculated for the kill and butchering stations from the overlying stratigraphical units (Table 18-4). The high frequency of tools speaks for an import of blanks and ready made tools onto the site, e.g. the "tool user" model, an assumption which is also supported by the results from transformation analysis (Kretschmer and Maier, Chapter 11). In addition, it must be assumed that some modified pieces were exported. Otherwise one has to question how 16 horses could have been dismembered: the entire assemblage includes only 9 tools, 3 blades and 19 flakes, 14 of them being shorter than 4 cm (Chabai 1998d, p. 270-271).

All in all, the dismemberment of 16 horses, which had been driven from the cliffs above the site, by imported artefacts is the only on-site activity documented in level IIA/2. Sufficient to say, the time spent on this activity was much less than the estimated time required at kill and butchering stations of type A.

The economical structure of this type of settlement points to a considerable amount of planning depth: while some working steps were made in the past to prepare the hunt (tool production), others were conducted on site, but dedicated to future activities (meat and tool export for further consumption). At the same time, the highly specialised, yet ephemeral character of the occupation calls for the existence of a contemporaneous site for meat consumption and tool utilisation. In fact, the only difference between kill and butchering stations of types A and B lies in the models of raw material exploitation. In the case stations of type A, this is based on the on-site core reduction and tools production. At stations of type B, to the contrary, previously made tools, imported into the butchering area, were used. Both models suggest the export of tools, but in different quantities.

Camps

In contrast to the kill and butchering stations, camps of the Western Crimean Mousterian were found in rock-shelters. Allthough the occupations have the character of short-term camps, they were connected with a much larger variety of activites than than the stations decribed above. These include the construction of fire-places, secondary butchering and subsequent consumption of meat, as well as core reduction and the modification and rejuvenation of tools. Within the Western Crimean Mousterian, two types of camps can be distinguished: type A (Shaitan-Koba), and type B (Karabi Tamchin).

Short-term camps, type A

The chronology and the environmental setting of the occupations in Shaitan-Koba are still unresolved, as neither chronological nor environmental studies have as yet been conducted in any detail. Regarding the environment, all that can be said is that the fauna indicates a combination of species typical for forest (*Cervus elaphus*), steppe (*Saiga tatarica*) and tundra (*Vulpes lagopus*). However, this observation is not of much help, as such a combination is characteristic for both stadial and interstadial environments in the Crimea. If the chrono-stratigraphical limits of the Western Crimean Mousterian seen in the Kabazi II sequence is taken as a reference (Vytachiv, vt_{1b2-b1} – Vytachiv, vt_{3b}), then Shaitan Koba, upper level might have accumulated at any time from the Hosselo Stadial and up to and including the Denekamp Interstadial. The sedimentation rate in Shaitan-Koba rock-shelter is among the lowest in the entire Crimean Middle Palaeolithic: only about 1 m of sediments accumulated in the rock-shelter during the Upper Pleistocene and up until Medieval times. In the course of the Medieval use, the inhabitants of the nearby cave town of Bakla "cleaned" the rock-shelter by removing two thirds of sediments. Thus, about 0,3 m of lithologically original sediments were all that remained when Bonch-Osmolowski began his excavations. Using metrical criteria, he subdivided these sediments into four horizons: 1/1, 1/2, 2/1 and 2/2 (Bonch-Osmolowski 1930). Later, Yu. Kolosov combined horizons 1/1, 1/2 and 2/1 into his "upper level", whereas the materials from horizon 2/2 were described as "lower level" (Kolosov 1972).

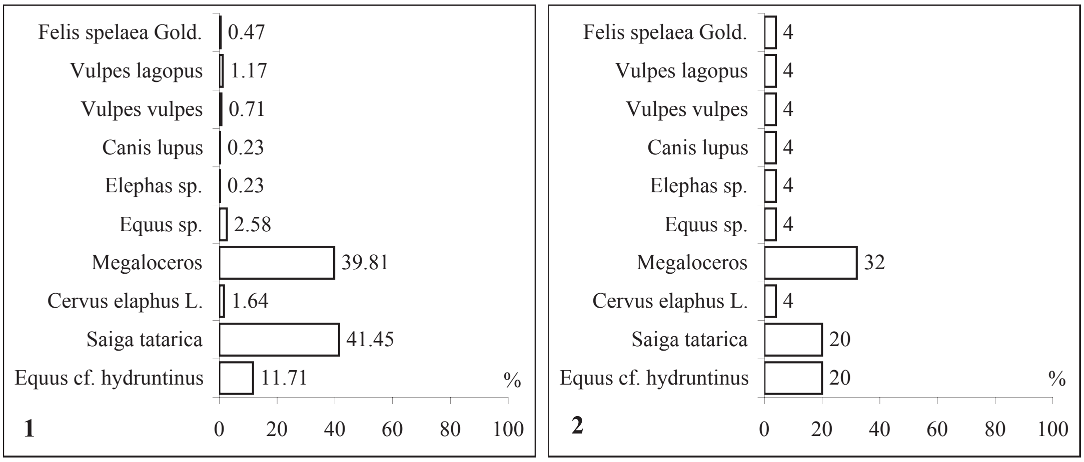

Fig. 18-6 Model of fauna exploitation in WCM camps, type A: number of remains (NR) by species, in % (1); minimal number of individuals (MNI) by species, in % (2). Shaitan Koba, upper level (1, 2).*

* data after Bonch-Osmolowski 1934; Vekilova 1971; Kolosov 1972

	Tools, %	Blanks : Cores	Tools : Cores	Density of artefacts per m^3
Shaitan-Koba, upper level	12.4	29.8 : 1	3.8 : 1	313.1

Table 18-5 Model of raw material exploitation in WCM camp, type A.*

* data used for calculations are after Kolosov 1972

The artefacts from the upper level show characteristic features of the WCM; the lower level industry belongs to the Crimean Micoquian (Chabai 2004c). Compared with other WCM occupations, the density of artefacts in Shaitan-Koba, upper level is relatively high (Table 18-5). Taking into account the low sedimentation rate and relatively high density of artefacts, it is highly probable that the Western Crimean assemblage considered here results from repeated, and altered, occupations of humans and carnivores on the same surfaces. One hearth was found in the upper level, along with numerous burnt bones and burnt artefacts.

The list of faunal remains published so far is of contradictory character. The most ambiguious point is the occurence of giant deer (*Megaloceros giganteus L.*). While Bonch-Osmolowski (1934) and Kolosov (1972) do not mention giant deer in the faunal assemblage of Shaitan-Koba at all, Vekilova states that *Megaloceros giganteus* L was represented by 170 bones from 8 individuals (Vekilova 1971). All other species occur in the list of faunal remains of all authors in more or less equal numbers. Thus, the Shaitan-Koba fauna comprises *Saiga tatarica* (177 bones from 5 individuals), *Megaloceros giganteus* L (170 / 8), *Equus sp* (11 / 1), *Equus hydruntinus* (50 / 5), *Elephas sp* (1 / 1), *Cervus elaphus* (7 / 1), *Canis lupus* (1 / 1), *Vulpes vulpes* (3 / 1), *Vulpes lagopus* (5 / 1) and *Felis spelaea* (2 / 1) (Fig. 18-6). For every species, the ratio of NR to MNI is not characteristic of primary butchering. The presence of giant deer, however, is rare – if not exceptional – in the Crimean Palaeolithic. Apart from at Shaitan Koba, this species has only ever been recorded (263 / 8) in the upper level of Kiik-Koba (Bonch-Osmolowski 1940). For the faunal assembalge of Shaitan Koba, NR to MNI ratios for *Saiga tatarica*, *Megaloceros giganteus* L, *Equus sp* and *Equus hydruntinus* suggest consumption of prey, but not primary butchering. It follows that meaty parts of saiga, giant deer and horse were consumed on the site and tranported from the killing site (at another location) to the rockshelter. The ratio of NR to MNI of the other species suggests that their presence is caused by activities of non-human agents.

The Shaitan-Koba occupants used flint from the Bodrak valley, which is now located about 30 m below the site. Cores are abundant. Together with many core trimming elements, this speaks for an on-site reduction of raw material (Kolosov 1972). The cores are not exhausted, and tools are represented by relatively large items. Mainly, not invasive scalar retouch was used in tool production. The percentages of tools, as well as the ratios of blanks to cores, and of tools to cores are very close to that described for type A kill and butchering stations. In other words, on-site core reduction was not intensive, and tool production took place on site: the Western Crimean Mousterian assemblage of Shaitan Koba is therefore a further example of the "site-workshop" model.

One more site probably belongs to this type of camp: Kabazi I. Unfortunately, this multi-layered buried rock-shelter was excavated as a single layer site (Formozov 1959b). Several fire-places were found under the collapsed ceiling of the rock-shelter. Among the faunal remains, *Equus hydruntinus* is the dominant species both in terms of identified items (NR) and the minimal number of individuals (MNI). The tool to core ratio (5,5 to 1) suggests that the flaking of raw material followed the "site-workshop" model. Since the multi-layered character of the site was not recognised during excavations, nothing can be said about the homogenity of the Kabazi I assemblage, and any suggestions remain hypothetical.

Thus, the activities at Shaitan-Koba, and probably Kabazi I, include the following elements:

1. Construction of fire places;

2. On-site core reduction and tool production using flint from nearby raw material sources;

3. On-site secondary butchering followed by consumption of part of saiga, horses and giant deer (?) which were imported to the camp from locations where they had been dismembered.

Obviously, such a package of activities took more time and energy than the activities characteristic for kill and butchering stations. Taking into account the low sedimentation rate and the on-site consumption of at least two different species, it seems more probable to assume that these economic episodes correlate with several different visits on the same living surface. In any case, there are no differences in the raw material exploitation between the occupations of kill and butchering stations of type A and camps of type A.

On the other hand, Western Crimean Mousterian camps of type A recieved meat resources procured at other places, and altough it seems unlikely that the camps identified in the upper level of Shaitan-Koba were contemporaneous with some of the killing-butchering stations of Kabazi II, Unit II, it is obvious that an economic connection existed between the spatially distinct primary butchering at the kill and butchering stations and meat consumption at camps on the level of the overall settlement pattern. In this regard, it is perhaps more plausible to assume a connection between the kill and butchering occupations at Kabazi II, Unit II and the camp (s) at Kabazi I. However, the homogenity of assemblages from the latter site makes this proposition hypothetical.

Short-term camps, type B

Short-term camps, type B have been recognised at Karabi Tamchin, levels II/2 and III. The Karabi Tamchin buried rock-shelter is situated on the Karabi plateau. With an elevation of about 800 above sea level, Karabi Tamchin is the highest site in Crimean Middle Palaeolithic (Yevtushenko 2003, Yevtushenko et al. 2003, 2004).

Levels II/2 and III were formed under cold climatic conditions during one of the interstadials of MIS 3. A. Yevtushenko's analysis of all available biostratigraphical information (Markova 2004b, Mikhailesku 2004) and radiometric dates resulted in the follwing chronological succession: level II/2 was accumulated before the Arcy Interstadial, levels III and IV/2 no later than the Hengelo Interstadial, and level V was formed during the Last Interglacial or one of the Early Glacial interstadials (Yevtushenko 2003). The process of sediment accumulation in Karabi Tamchin buried rock-shelter was very slow. During the time period from the Last Interglacial until the Arcy Interstadial, about 1 m of sediments accumulated in the rock-shelter. In fact, there are practically no soft sediments, the deposits comprising small to medium size gravel. Such sedimentation clearly affected the preservation of both flint artefacts and faunal remains: while artefacts are patinated, bones are fragmented (usually, < 2cm) and bone surfaces are weathered and exhibit pronounced traces of carnivore digestion and gnawing (Burke 2004). During long periods in which no sedimentation took place, unburied artefacts and faunal remains were influenced by climate, gravel, as well as by human and nonhuman agents. In other terms, levels II/2 and III are palimpsests of activities of both humans and carnivores. Traces of carnivores are widely represented in the faunal assemblage (Fig. 18-7). At the same time, humans visited the

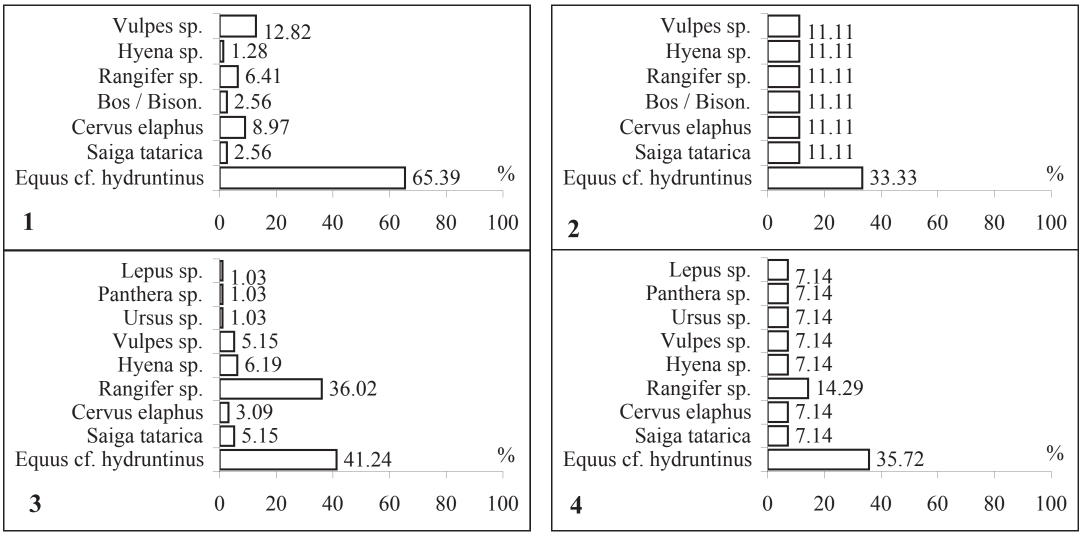

Fig. 18-7 Fig. 18-7. Model of fauna exploitation in WCM camps, type B: number of remains (NR) by species, in % (1, 3); minimal number of individuals (MNI) by species, in % (2, 4). Karabi Tamchin, levels: II/2 (1, 2); III (3, 4)*

* data after Burke 2004

	Tools, %	Blanks : Cores	Tools : Cores	Density of artefacts per m^3
Karabi Tamchin, II/2	54.4	23.0 : 1	12.3 : 1	41.2
Karabi Tamchin, III	54.6	19.2 : 1	9.4 : 1	47.6

Table 18-6 Model of raw material exploitation in WCM camps, type B*

* after Yevtushenko 2004

rock-shelter only seldomly, or their occupations were not intensive. This is reflected in the densities of artefacts, which are very low (Table 18-6). The densities of bone fragments are more impressive, and in some squares reach values of up to 1000 items. The twofolded use of the rockshelter points to a major question essential to our understanding of the site formation process: Who was responsible for the high fauna densities observed, humans, carnivores, sedimentation process – or all three?

In the Western Crimean Mousterian occupations, evidence for the use of fire is restricted to burnt bones. Again, this is related to the depositional characteristic of the sediments, which did not allow the preservation of fire-places.

According to A. Burke (2004), the model of faunal exploitation in both levels is charaterised by on-site processing of entire carcasses of *Equus hydruntinus*, which dominates both the values for NR and MNI in the faunal assemblages (Fig. 18-7). However, it is not entirely clear where primary butchering took place. On the one hand, whole horse skulls, including mandibles, were transported to the camp in levels II/2 and III, which supports A. Burke´s notion that *"hominids had preferential access to kills"*, and that a *"killing site"* was situated not far from the camp. On the other hand, skull bones in the level II/2 assemblage are represented by 18 % of all elements, whereas in level III skull elements are represented by 3 % only (Burke 2004, p. 286). These differences between levels II/2 and III might result from different distances to kill sites, as well as being a reflection of different dismembering patterns. Whatever the distance to the kill site might have been, the NR to MNI ratios for levels II/2 (25,5 to 1) and III (8 to 1) fit better to on-site consumption rather than on-site primary butchering.

Foetal bones (15-23 weeks of age) of three hydruntinus found in level III suggest a late autumn / winter season for the accumulation of bones on the site (Burke 2004, p. 285). The late autumn period is, however, preferable, because even nowadays deep snow and a chilly wind makes the Karabi plateau uncomfortable for both humans and ungulates in winter (Yevtushenko 2003). The agents of the remains of two reindeer in level III, which were defined on the basis of 35 bones, is still unresolved. It is supposed that the remains of other species result from carnivore activities. All in all, the small number of hunted animals (3-5 individuals) speaks for short stays of humans in this area.

The closest source of raw material is the Sary Kaya outcrop, situated about 30 km to the north, and 600 m below Karabi Tamchin. Probably from there, but undoubtly over long distances, flint plaquettes, cores and tools were transported to the site. At the same time, high percentages of tools, as well as blank to core ratios, indicate only limited on-site core reduction. Tools were mainly imported (Yevtushenko 2004) and fit into the "tool user" model of flint exploitation, which, to some extent, was added by the "site-workshop" model (Table 18-6). Attribute analysis shows that some of the tools were originally made on thick and wide blanks, which were widely reduced in length, and became short at the point of discard. This, and the invasive retouch, are all attributes of intensive utilisation. Considering that estimations of the times of activity, based on the amount of prey, speak for less prolonged stays, it seems unlikely that the recurrent cycles of rejuventation and reuse of the heavily reduced tools all happened during the occupations at Karabi Tamchin. The assumption that they were tool-kits, used and resharpened several times during a number of previous hunting episodes before they were discarded at in Karabi Tamchin, offers a much better explanation.

At least one more occupation from the Kholodnaya Balka multi-layered rock-shelter might belong to this type of camp. Like Kabazi I, the multi-layered site of Kholodnaya Balka was excavated as a single layer occupation (Formozov 1958, 1959a, 1959b). The nearest known flint sources are situated at a distance of about 8 km from Kholodnaya Balka. *Equus hydruntinus* is the dominant species both in NR and MNI. The remains of saiga, bos / bison and red deer are represented by low frequencies only. The tool to core ratio (9.6 to 1) is very close to that identified by A. Yevtushenko at Karabi Tamchin, III, and might be indicative of a side by side application of the "site-workshop" and "tool user" model. The tool assemblage is heavily reduced: convergent tools compose about 40 % of all modified pieces, and invasive retouch is more frequent than any other type of retouch (Kolosov et al. 1993a). However, although the characteristics of the lithics are pronounced, it is not certain whether the assemblage(s) of Kholodnaya Balka are homogeneous.

Thus, on-site activities at Karabi Tamchin, II/2, and III, and, probably, Kholodnaya Balka comprise the following actions:

1. Construction of fire-places;

2. On-site reshaping of imported tool kits and limited blank production from imported cores or plaquettes / nodules, e.g. a mixture of the "tool user" and "site-workshop" models.

3. On-site consumption of horses, which were previously dismembered at a killing-butchering station.

Considering the number of consumed animals, it is unlikely that the aforementioned operations were of a long duration. In addition, the season of death of the hunted animals and the deficit of flint supports indirectly the assumption that stays on the Karabi plateau were short.

The model of faunal exploitation practiced on camps of types A and B is more or less identical and is characterised by secondary butchering and the consumption of animals dismembered elsewhere. Both types of camps recieved meat from contemporaneous kill sites. However, the models of raw material exploitation were significantely different. The humans of type B camps used mainly imported tools, while the inhabitants of type A camps produced tools on site. Thus, the inhabitants of type B camps were recipients of both kinds of resources, meat and lithics, which were prepared in advance. Obviously, the organisation of type B camps required a more detailed planning than camps of type A.

The Functional Variability of Crimean Micoquian Occupations

Functionally, Micoquian settlements display a large variety of settlement types: two types of killing-butchering stations and four types of camps have been identified. Unlike the WCM, where kill and butchering stations dominate over camps, Micoquian occupations consist of comparable numbers of kill and butchering stations (29) and camps (28).

Kill and butchering stations

Among Micoquian kill and butchering stations, no analogies were found to the WCM kill and butchering stations of type A. Vice versa, no analogies to the Micoquian kill and butchering stations of type C have been recognised among WCM occupations. Finally, despite the marked differences in the concepts of flint knapping between WCM and the Micoquian, economic activities of humans at kill and butchering stations of type B were identical.

Kill and butchering stations, type B

Kill and butchering stations type B have been identified at Kabazi II, levels IIA/4, III/1A, III/1, III/2, III/2A, III/3, III/4, III/5, III/6, III/7, and in five levels of the 1985-86 and 2004 excavations at Sary Kaya. The collections from the 1977 field season at Sary Kaya, when levels were not subdivided, also belong to this type of settlement (Kolosov 1983, Kolosov et al. 1993a, Chabai 1998d, 1999). The occupations listed above were accumulated under boreal to south-boreal forest-steppe conditions of MIS 5c, 5b, 5a and 4 (Pryluky, pl_1 – pl_3, Uday, ud) (Gerasimenko 1999, 2005, personal communication; Mikhailesku 2005; Rink et al., in press).

To some extent, the topography of Kabazi II and Sary Kaya are quite similar. Both are open-air sites, and both are situated on the slope of a cuesta below the cliffs of plateau. Such topographical settings are ideal for hunting strategies that intend to drive ungulates from cliffs. Today, it is mainly the elevation above the valley bottom that differentiates the topography of the sites. Whereas Kabazi II it situated 90 m above the Alma River valley, Sary Kaya is located 20 m above the bottom of the valley which stretches between two plateau ridges. However, at the time of Units III and IIA of Kabazi II, , the bed of the Alma river was much less incised into the landscape, and approximately 50-60 m higher than at present. Therefore, Kabazi II occupations were located only 30-40 m above the valley, and the elevation above the river valleys at Kabazi II and Sary Kaya was very similar during MIS 5c and MIS 4. Nevertheless, the surroundings of the sites differed: Kabazi II, Units III and IIA were much closer to the river, while the Sary Kaya occupations were much closer to flint outcrops. As will be shown below, it turns out that such topographical differences, which at first glance attract scientific studies focusing on the interpretation of sites, in some cases seem to have had only minor effects on human activities.

Sedimentation at both sites is characterised by a combination of colluvial and pedogenic processes. Artefacts are not patinated, but the surfaces of bones are weathered. During the 1977 and 1985-86 field seasons, excavations at Sary Kaya only produced *Equus hydruntinus* teeth. During the campaign in 2004, however, tube bones, mandibles and teeth of this species were found. Stratigraphically, the occupations of Kabazi II, Units III, IIA and Sary Kaya are subdivided by pronounced lenses of sterile sediments (Kolosov et al. 1993a; Chabai, Chapter 1). All occupations mentioned here were found in thin carpets of faunal remains and artefacts. The thickness of these "carpets" are usually equivalent to the thickness of a single bone or artefact. As an exception to the rule, bone clusters in some squares of levels III/1, III/1A and III2 at Kabazi II were up to 15 cm thick. From a sedimentological point of view, most of Kabazi II, Units III, and IIA and Sary Kaya occupations seem to be the result of a single economic episode. Perhaps, however, this view is too optimistic, especially after Kabazi II, III/2 turned out to be a clear palimpsest (Patou-Mathis, Chabai 2005). However, the densities of artefacts are very low in all occupations (Table 18-7), and no traces of the on-site use of fire were documented.

The only model of human faunal exploitation at Kabazi II, Units IIA and III was butchering (Patou-Mathis, Chapters 2 and 12). The only hunted prey is *Equus hydruntinus* (Fig. 18-8), the remains of this animal accounting for more than 90 % in the NR calculations, and no less than 70 % in MNI calculations of each level. Every *Equus* is represented by a minimum of 40 remains. The horses were butchered on-site, and most of the meat bearing parts of the carcasses were exported (Patou-Mathis, Chabai 2005; Patou-Mathis, Chapter 12). Sexual ratios and age structures of hunted horses from levels III/A, III/1, III/2A are indicative of the death of entire herds during the time of the "summer range" (III/1 – end of spring / summer) of these animals. On the other hand, the structures of the groups hunted in levels IIA/4 and III/2 are mixed, and reflect palimpsests

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Kabazi II, IIA/4	35.4	No cores	No cores	27.1
Kabazi II, III/1A-III/1	27.8	No cores	No cores	12.3
Kabazi II, III/2-III/3	54.7	50.5 : 1	18.5 : 1	11.8
Kabazi II, III/4	50.0	No cores	No cores	10.5
Kabazi II, III/5	23.1	12.0 : 1	3.0 : 1	27.1
Kabazi II, III/6	60.0	No cores	No cores	19.6
Kabazi II, III/7	100.0	No cores	No cores	8.3
Sary-Kaya, 1985-86, levels 1-5	46.8	No cores	No cores	15.5
Sary-Kaya, 1977	77.5	34.1 : 1	76.9 :1	16.5

Table 18-7 Model of raw material exploitation in Micoquian killing-butchering stations, type B.*
* after Veselsky 2003; Chabai, Chapter 1

of occupations. At the same time, there is some evidence for winter hunting in level III/2. Also, in level III/1 one bison and one red deer are thought to result from human activities, probably scavenged (Patou-Mathis, Chapter 12).

The Sary Kaya fauna is less well preserved, and therefore problematic. On the other hand, no species other than *Equus hydruntinus* was found in clear connection with artefacts. Teeth of *Equus hydruntinus* are very abundant, being one of the most important attributes of kill and butchering stations, as they indicate the presence of large numbers of skulls. However, even if there is enough evidence to assume kill and butchering activities at Sary Kaya, it is clearly not enough information to define the season of hunting or to propose the kind of nutritive strategy applied.

The inhabitants of Kabazi II, Units IIA and III used the flint sources from the Bodrak River Valley, some 7 km from the Kabazi cuesta. Groups that visited Sary Kaya preferred local flint which was available at 100 m distance from the site. Nevertheless, blocks of raw material, preforms of cores, and preforms of bifacial tools were only rarely transported to the site area. Instead, the exploitation of raw material followed the "tool user" model, i.e. mainly tools, and rarely nodules, plaquettes or preforms, were imported to the site. This assumption is further strengthened by extremely high percentages of tools (Table 18-7) in contrast to rare nodules, preforms, cores and primary flakes. In this regard, the small sizes of flakes (usually, < 4 cm) again supports the "tool-user" model proposed here (Chabai 1999; Veselsky 2003). Bifacial tools comprise between 25 and 50 % of the tool kits. Most of the debitage is the result of the reshaping of bifacial tools, and exhibits all attributes of soft hammer surface shaping: obtuse, lipped and semi-lipped platforms, transversal proportions, low thickness at mid point and, on average, small size. At the same time, the reduction of bifacial tools was not intensive. There are no reshaping blanks of bifacial point tips, which, according to Demidenko (2003b), would appear to be an indicator for the intensity of bifacial tool reduction. On the other hand, the bifacial tools from Kabazi II, Units IIA and III are reduced to a further extent than the same from Sary Kaya (Veselsky 2003). Considering that there is no evidence for intensive on-site reduction, bifacial tools from Kabazi II, Units IIA and III seem to represent "pocket tool kits" which were gradually resharpened during a number of previous activities prior to discard at Kabazi II. In addition, a number of tools, as well as rare cores and preforms, were exported (Bataille, Chapter 13; Uthmeier, Chapter 14; Kurbjuhn, Chapter 15; Maier, Chapter 16).

Thus, the inhabitants of Kabazi II, IIA, III and Sary Kaya preferred to apply the "tool-users" model of flint exploitation, irrespective of the fact that the distances from the raw material outcrops vary significantly.

The pattern of activities at Micoquian kill and butchering stations of type B is similar to those observed at WCM kill and butchering stations of type B, and consists of the dismembering of horses driven from the cliffs above by using tools made at other locations. Most meat bearing parts of the horses were exported for further consumption. The only difference between WCM and Micoquian kill and butchering stations of type B is the bifacial tool reshaping, typical for Micoquian occupations, but absent in WCM occupations. While the activities at Crimean Micoquian kill and butchering stations of type B were not very time consuming, planning and organisation of the stays certainly required some time and a degree of mental effort.

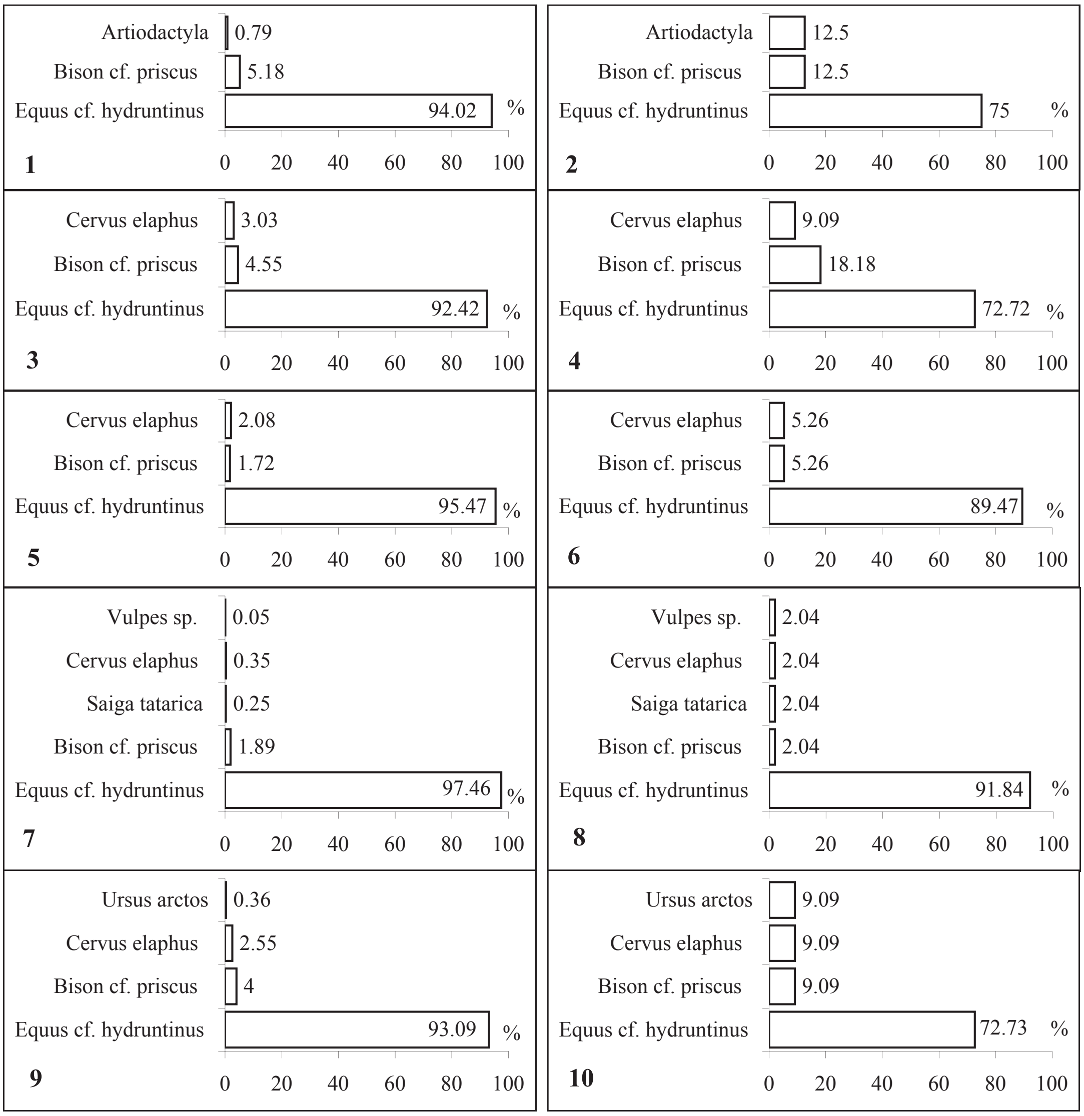

Fig. 18-8 Model of fauna exploitation in Micoquian killing-butchering stations, type B: number of remains (NR) by species, in % (1, 3, 5, 7, 9); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10). Kabazi II, levels: IIA/4 (1, 2); III/1A (3, 4); III/1 (5, 6); III/2 (7, 8); III/2A (9, 10).*

* data after Patou-Mathis, Chapter 12; Patou-Mathis and Chabai 2005

Kill and butchering stations, type C

This type of killing-butchering station is represented by 15 occupations at the open-air site Kabazi II, units V and VI, in levels V/3 through VI/10. Compared with the present topographical situation, occupations of levels V/3 to VI/10 were, at the time of deposition, much closer to the bank of the Alma river (Chabai 2005a). According to environmental studies, these occupations date to the Kaydaky, kd_{3b2+c} (e.g. the end of Eemian Interglacial) (Gerasimenko 1999, 2005; Markova 2005; Mikhaikescu 2005) and accumulated under south-boreal forest / forest-steppe environmental conditions of MIS 5d.

A number of different factors was responsible for the formation of the stratigraphical sequence of Kabazi II, Units V and VI, e.g. colluvial and alluvial sedimentation, pedogenetic processes, and the exfoliation of limestone walls (Chabai 2003b, 2005a). The combination of these processes affected the sedimentation rate in so far as levels V/3 to VI/10 were recognised as representing one of the swiftest accumulations of deposits ever recorded in Crimean Middle Palaeolithic.

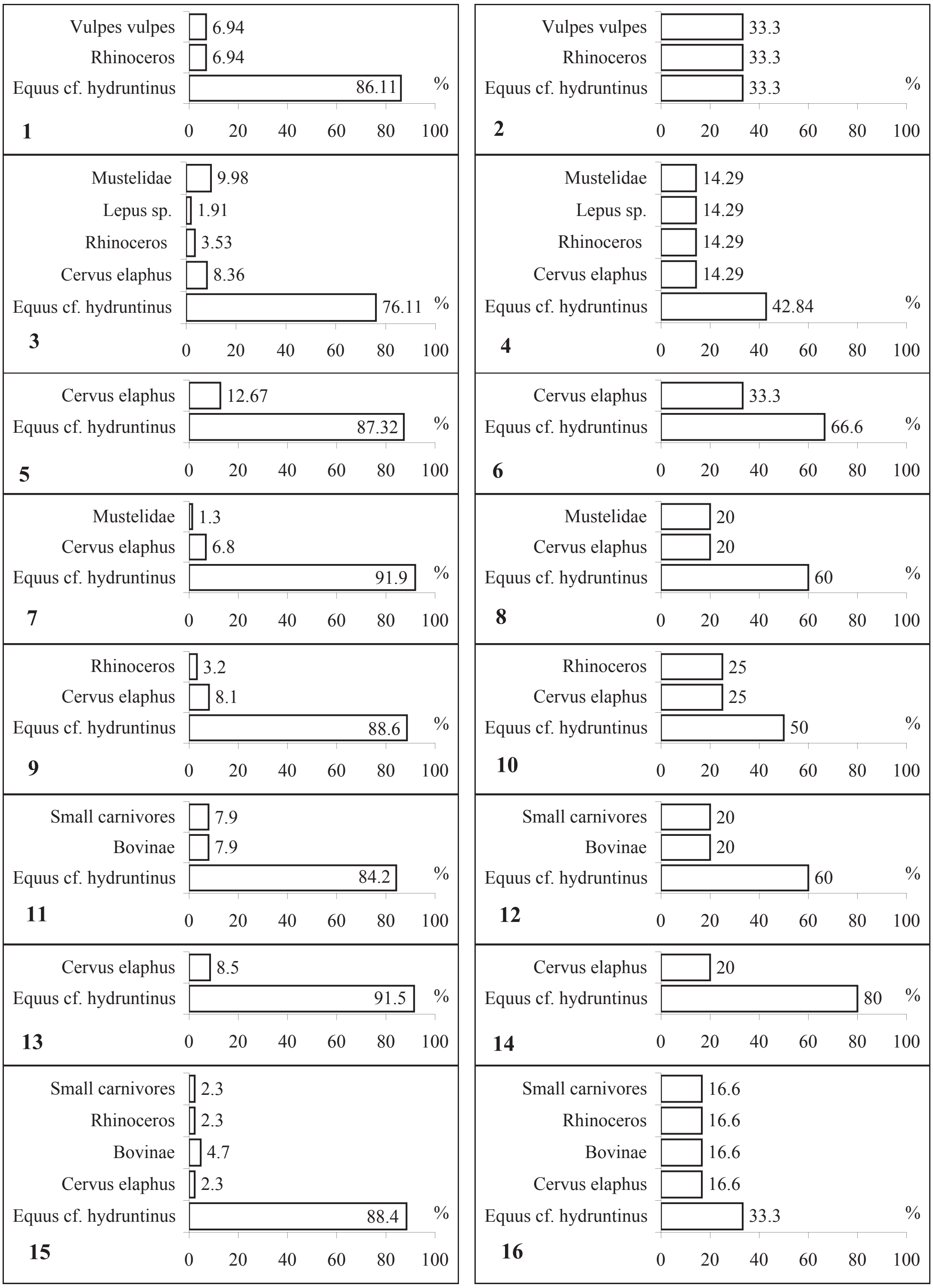

Fig. 18-9 Model of fauna exploitation in Micoquian killing-butchering stations, type C: number of remains (NR) by species, in % (1, 3, 5, 7, 9, 11, 13, 15); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10, 12, 14, 16). Kabazi II, levels: V/4 (1, 2); V/5 (3, 4); V/6 (5, 6); VI/1 (7, 8); VI/2 (9, 10); VI/3 (11, 12); VI/4 (13, 14); VI/5 (15, 16).*

* data after Patou-Mathis 2005

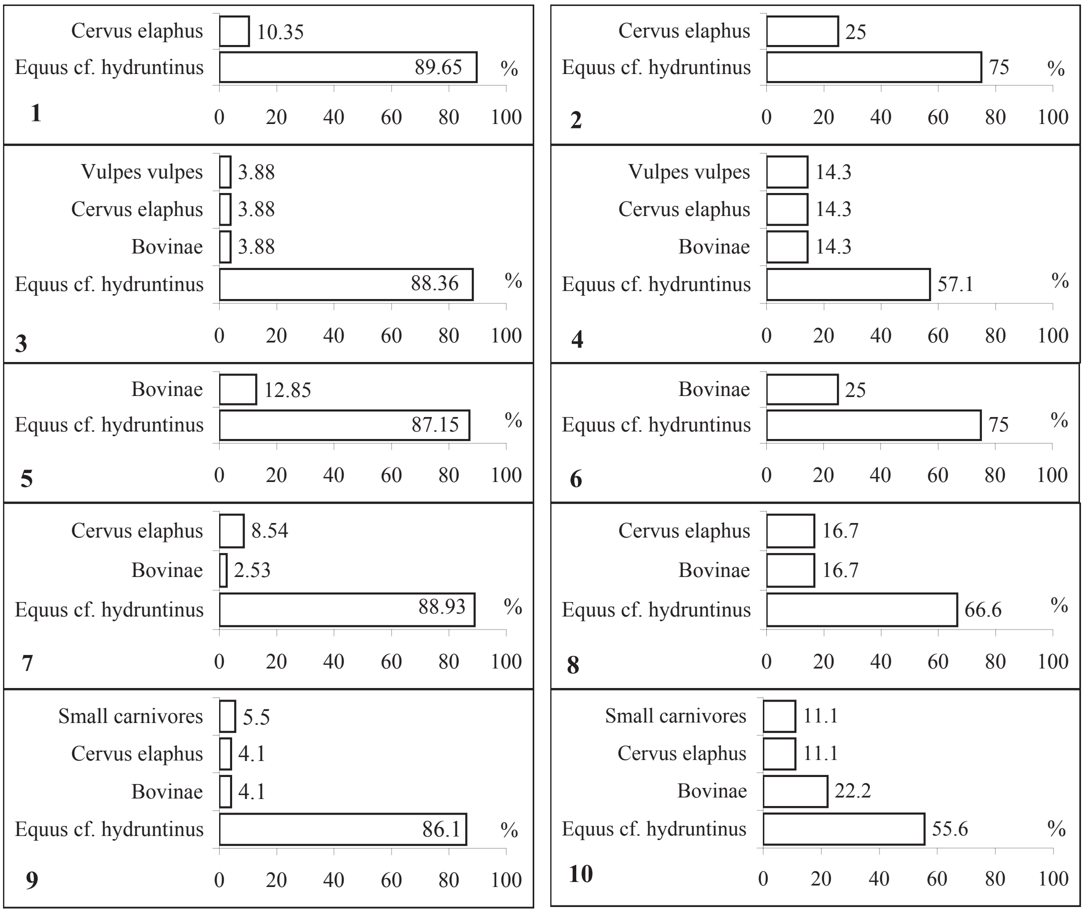

Fig. 18-10 Model of fauna exploitation in Micoquian killing-butchering stations, type C: number of remains (NR) by species, in % (1, 3, 5, 7, 9); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10). Kabazi II, levels: VI/6 (1, 2); VI/7 (3, 4); VI/8 (5, 6); VI/9 (7, 8); VI/9A (9, 10).*

* data after Patou-Mathis 2005

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Kabazi II, V/3	35.3	No cores	No cores	44.74
Kabazi II, V/4	40.0	No cores	No cores	26.32
Kabazi II, V/5	22.2	No cores	No cores	44.74
Kabazi II, V/6	14.3	No cores	No cores	75.7
Kabazi II, VI/1	29.4	No cores	No cores	44.74
Kabazi II, VI/2	33.3	No cores	No cores	40.54
Kabazi II, VI/3	19.1	19.0 : 1	3.0 : 1	55.26
Kabazi II, VI/4	23.1	11.0 : 1	3.0 : 1	39.39
Kabazi II, VI/5	30.0	8.0 : 1	2.0 : 1	29.41
Kabazi II, VI/6	20.7	23.0 : 1	2.0 : 1	121.88
Kabazi II, VI/7	22.2	No cores	No cores	53.13
Kabazi II, VI/8	20.0	21.0 : 1	4.0 : 1	83.33
Kabazi II, VI/9	25.7	30.0 : 1	6.0 : 1	109.38
Kabazi II, VI/9A	40.0	12.5 : 1	5.0 : 1	142.88
Kabazi II, VI/10	16.7	No cores	No cores	68.42

Table 18-8 Model of raw material exploitation in Micoquian killing-butchering stations, type C.*

* after Chabai 2005a

The frequency of visits and intensity (Table 18-8) of occupations at Kabazi II, Units V and VI were very low (Chabai 2005a), and are recognised as the remains of single economic episodes (Patou-Mathis 2005).

All occupations mentioned mentioned above contain evidences for the use of fire.

Remains of *Equus hydruntinus* dominate the faunal assemblages in both NR and MNI calculations (Fig. 18-9; 18-10), but *Cervus elaphus* and *Bovinae* are also well represented in practically every level. According to M. Patou-Mathis, the model of faunal exploitation at Kabazi II, levels V/3 to VI/10 is of mixed character. In levels V/4 through V/6, humans butchered *Equus hydruntinus* and exported meat bearing parts of the carcasses. Bones were heavily fragmented, pointing to a maximal exploitation of the hunted equids. On the site itself, the marrow of some long bones was consumed. In levels VI/1 through VI/10, humans hunted *Equus hydruntinus*, but enlarged their procurement strategy by scavenging *Cervus elaphus* and *Bovinae*. The animals were dismembered on the site, and meat bearing parts were again exported. The faunal assemblages of levels VI/1 and VI/5 accumulated in the spring. In levels VI/6 and VI/7, horses were killed and butchered in autumn. It is important to stress that kill and butchering stations of type C are characterised not only by the acquisition of food resources, partly realised by both hunting and scavenging, but also by partial consumption, as indicated by the extraction of marrow.

The distance to raw material sources, as well as the model of flint exploitation (Table 18-8), are analogous to kill and butchering stations of type B (Chabai 2005b; Kurbjuhn 2005; Uthmeier 2005a, 2005b, 2005c; Richter 2005a, 2005b, 2005c; Uthmeier, Richter 2005). In addition, the range of activities was quite similar. However, there are few but important differences, including the use of fire and the on-site consumption of part of the prey. All in all, the range of activities at kill and butchering stations of type C might be described in the following terms:

1. Dismemberment of hunted and / or scavenged animals by imported tool-kits.

2. Construction of fire-places.

3. Partial consumption of hunted and / or scavenged animals, followed by the export of most of the meat bearing parts of the carcasses, as well as some artefacts.

Such a program certainly calls for the existence of camp sites where the exported parts of the carcasses were consumed.

Camps

There are four types of Micoquian camps. Differences occur in the model of raw material exploitation, the mode of butchering, and the presence and absence of scavenging.

Camps, type A

Camps of type A were found at Zaskalnaya V (six layers), Zaskalnaya VI (four layers) and Kabazi V (two levels). Micoquian camps of type A are known from the time of the Pryluki, pl_{1b1} (Brörup) Interstadial until the Vytachiv, vt_{3b} (Denekamp) Interstadial, e.g. from MIS 5c to the end of MIS 3. Within this large chronological frame, occupations of this settlement type do not correlate to a continuous temporal sequence, but are interrupted by times lacking such evidence. Zaskalnaya V, layer V, and probably layer VI, belong to MIS 5c. During MIS 5b, 5a and 4, Micoquian camps of type A are unknown. All other occupations date to MIS 3, or cannot be dated securely, for example, Zaskalnaya VI, layer V. The pollen spectra of the time periods mentioned above fluctuated from south-boreal to boreal forest-steppe (Gubonina 1985; Gerasimenko 1999, 2005). The only exceptions are Zaskalnaya V, layer II, and probably Zaskalnaya VI, layer II, which were formed under the boreal xeric grassland conditions of Vytachiv, vt_2 (Huneborg Stadial).

All sites classified as camps of type A were found in buried rock-shelters. For Crimean standards, sedimentation rates were medium. For example, the longest stratigraphical sequence at Zaskalnaya V is 4 metres deep and contains sediments from MIS 5c up until the end of MIS 3. During the same period, Kabazi II saw the accumulation of 7 to 8 metres of sediments. At the same time, the frequency of visits, as well as the intensity of occupations at Kabazi V, Zaskalnaya V and VI, was the most prominent of the Crimean Middle Palaeolithic. The thickness of the "cultural layers" at Zaskalnaya V and VI varies from 10 to 50 cm (Kolosov 1983, p. 45, 70, 82, 95, 102, 106; 1986, p. 8-10). All occupations comprise densely packed bones, burnt bones, and artefacts (Table 18-9). At Zaskalnaya V, layers II, III, and Zaskalnaya VI, layer II Yu. Kolosov studied a number of vertically deposited lenses of charcoal and burnt bones (Kolosov 1983, p. 47, 70; 1986, p. 8-10) which are indicative of different occupational periods within the

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Kabazi V, III/1A	28.49	56.5 : 1	14.9 : 1	1834.5
Kabazi V, III/2	19.44	290.5 :1	54.0 : 1	1285.7
Zaskalnaya V, I	20.5	30.8 : 1	5.2 : 1	261.8
Zaskalnaya V, II	*max* 23.7	*min* 48.3 : 1	9.6 : 1	*min* 686.3
Zaskalnaya V, III	*max* 24.3	*min* 110.1 : 1	21.9 : 1	*min* 708.6
Zaskalnaya V, IV	*max* 19.2	*min* 73.3 : 1	12.1 : 1	*min* 975.9
Zaskalnaya V, V	30.6	76.0 : 1	18.9 : 1	957.1
Zaskalnaya V, VI	28.6	19.1 : 1	4.7 : 1	767.1
Zaskalnaya VI, II	*max* 37.9	*min* 26.5 : 1	7.9 : 1	*min* 362.7
Zaskalnaya VI, III	*max* 33.3	*min* 48.7 : 1	14.0 : 1	*min* 459.1
Zaskalnaya VI, IV	*max* 29.3	*min* 57.7 : 1	15.4 : 1	*min* 511.2
Zaskalnaya VI, V	14.7	16.6 : 1	2.3 : 1	209.0

Table 18-9 Model of raw material exploitation in Micoquian camps, type A.*
* data used for calculations are from Kolosov 1986; Veselsky 2006; Chabai, Patou-Mathis 2006

same "cultural layer" (Chabai 2004c, p. 93, 94). The thickness of level III/1A at Kabazi V was about 8 cm, but did not allow a reliable subdivision into distint occupational episodes (Veselsky 2006). While the interpretation of these levels calls for caution, because they all are candidates for the existence of palimpsests, it was originally thought that Kabazi V, level III/2 represented a single, continuous visit. However, although the thickness of the level was equal to the thickness of a single bone or artefact, it turned out that this assumption was wrong (Chabai, Patou-Mathis 2006). As a consequence, it has to be admitted that the most peculiar feature of the site formation processes at Kabazi V, Zaskalnaya V and Zaskalnaya VI is the fact that the frequency and intensitiy of visits was much higher than the rates of sedimentation.

All occupations belonging to this type of camp display clear evidence for the use of fire: solid lenses of charcoal, burned bones and artefacts, as well as strictly limited hearths have all been documented (Chabai 2004c, p. 101-103; Veselsky 2006; Chabai, Patou-Mathis 2006). Some occupations contain small pits. Usually, these are empty, but two pits in Zaskalnaya V, layer III (84 blanks from one core) and Zaskalnaya VI, layer II (eight bifacial tools) were filled with carefully selected artefacts (Kolosov 1983, p. 70; Kolosov 1986, p. 20-21). These pits and pits-cashes might well be seen as evidence for a long-term planning of predictably repeated visits. Finally, a "burial complex" containing the remains of three juvenile Neanderthals was found at Zaskalnaya VI, layer IIIa (Kolosov 1986, p. 40; Smirnov 1991, p. 148).

The main characteristic feature of the faunal assemblages of type A camps is the high diversity of species (Fig. 18-11; 18-12). The most abundant species (in NR and MNI), such as saiga, horse, mammoth and red deer, are represented by 20-50 bones per individual. Other, less frequent species are usually represented by 1-3 bones per individual. The model of faunal exploitation at this type of camp is best described by the example of Kabazi V, level III/2. According to M. Patou-Mathis, who recently studied the faunal assemblage (Chabai, Patou-Mathis 2006), four already dismembered *Saiga tatarica* were imported during late summer: one juvenile and one prime age individual, as well as two female adults. The carcasses were highly processed for the extraction of marrow and grease. After humans had left the site, the saiga bones were gnawed by carnivores. In the frame of a second occupation, the dismembered carcasses of three *Equus hydruntinus*, one juvenile individual and two prime aged female adults, were brought to the camp. One of the females was gravid. According to the foetal age of approximately 24 weeks, the animals were killed in spring. Unlike the remains of saiga, bones of horses show traces of weathering. In addition to the ungulates listed above, humans probably also hunted one hare. While these human activities were cleary dedicated to the procurement of food resources, the collection of mammoth bones is best explained by the use as fuel for the maintance of fire-places. However, there are a number of animals which were scavenged either by carnivores or humans. This applies to a red deer without antlers (winter), one hydruntinus, one young mammoth, and a woolly rhino. In addition, a young bear entered the rockshelter during a winter period, probably together with its mother, leaving behind a worn milk canine.

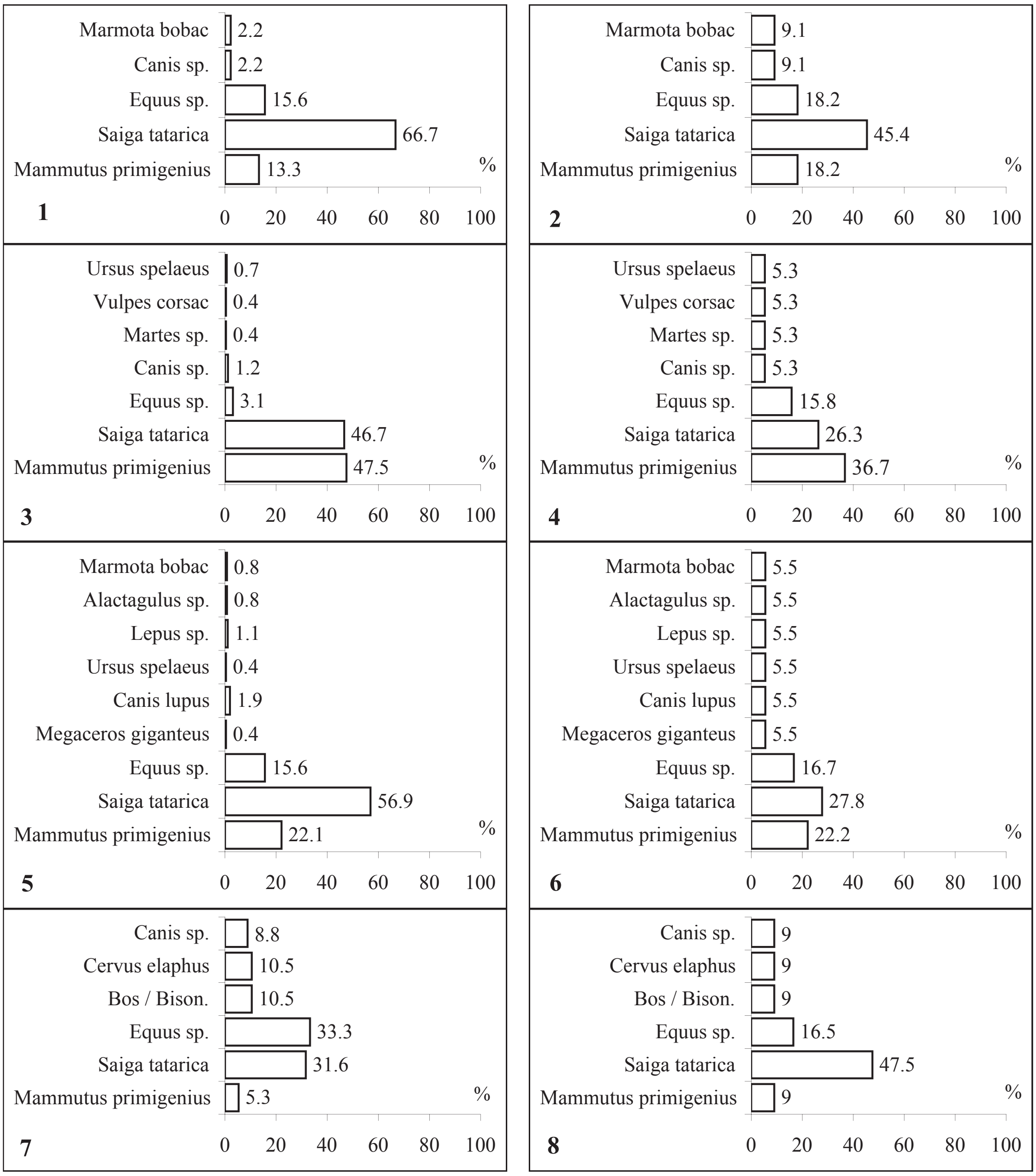

Fig. 18-11 Model of fauna exploitation in Micoquian camps, type A: number of remains (NR) by species, in % (1, 3, 5, 7); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8). Zaskalnaya V, layers: I (1, 2); II (3, 4); IV (5, 6); VI (7, 8).*

* data after Kolosov et al. 1993a

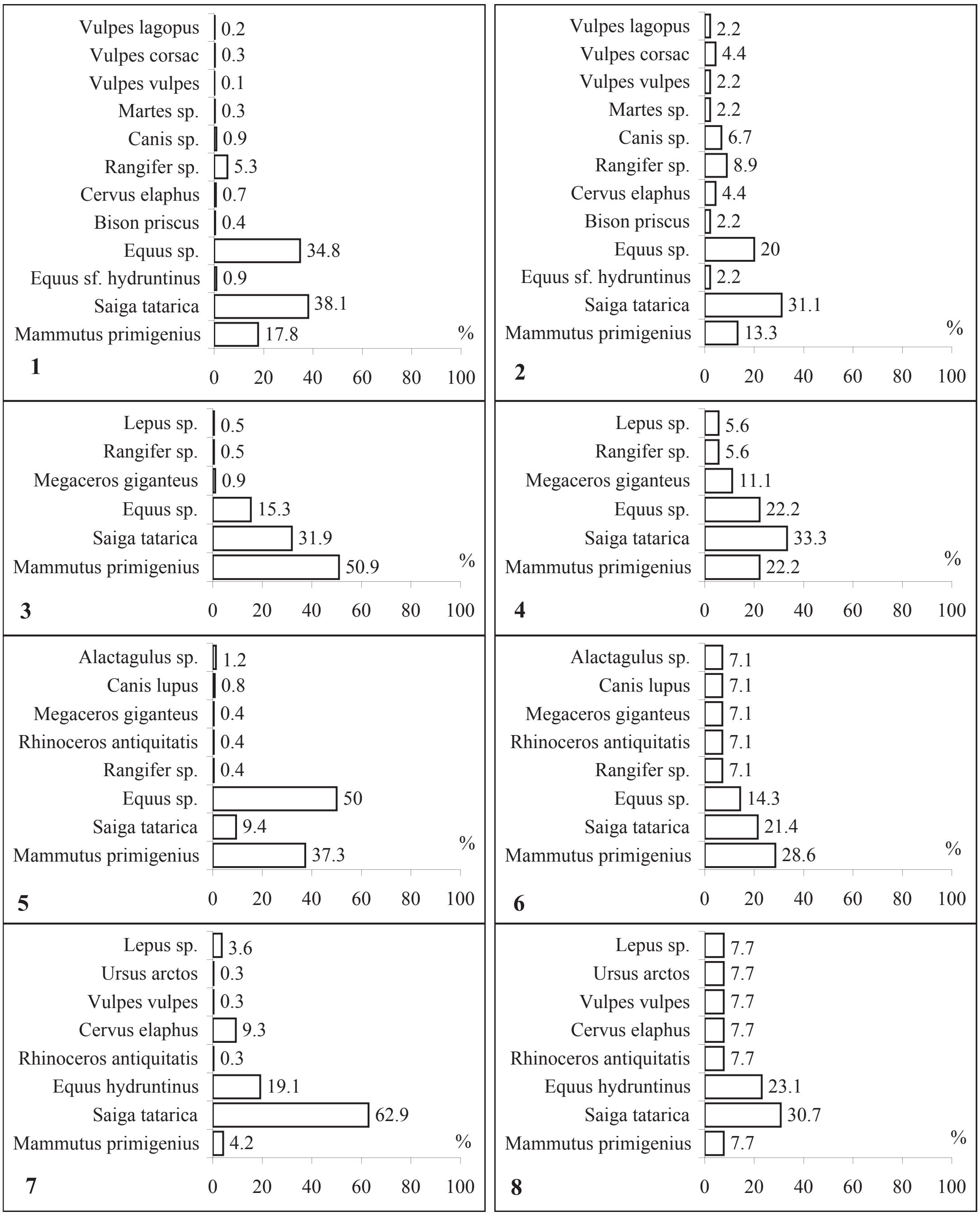

Fig. 18-12 Model of fauna exploitation in Micoquian camps, type A: number of remains (NR) by species, in % (1, 3, 5, 7); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8). Zaskalnaya VI, layers: II (1, 2); III (3, 4); IV (5, 6), Kabazi V, level III/2 (7, 8).

The detailed archaeozoological studies at Kabazi V, level III/2 show how complex the accumulation of fauna in Micoquian camps of type A can be. First of all, it is clear that there was no continuous stay of humans, not during a season, nor for some months or even weeks. Instead, the camps were visited regularly, but for relatively short periods of time. Secondly, the accumulation and modification of fauna was caused by humans and carnivores, and the visits of these agents altered. Thirdly, although it is difficult to prove scavenging strategies in prehistoric human hunter gatherers, it still cannot be excluded that humans brought with them parts of animals which had died naturally or had been killed by carnivores. Perhaps, the procurement of scavenged animal parts occurred on an ecounter basis, embedded in the activity of active hunting.

The model of flint exploitation is characterised by on-site core reduction and tool production typical for the "site-workshop" model (Table 18-9). Flint was abundant in outcrops situated in 1 km distance to the camps. The "site-workshop model" is indicated by unmodified nodules and plaquettes, numerous preforms, cores and primary flakes, as well as unfinished bifacial tools (Kolosov 1983, 1986; Veselsky 2006; Chabai, Patou-Mathis 2006). Assemblages like those from Kabazi V, level III/2, Zaskalnaya II, levels II, III, V and VI and Zaskalnaya VI, levels II and III show little to no evidence of tool reshaping. Conversely, some tool reshaping was documented at Kabazi V, level III/1A, Zaskalnaya V, levels I and IV, and Zaskalnaya VI, levels IV and V. However, this is not the only difference. In addition, the percentages of unifacial convergent tools (both scrapers and points) are higher in latter assemblages, while the percentages of bifacial tools are bigger in the former. These differences were the basis for a subdivision of assemblages mentioned into an Ak-Kaya (former) and a Starosele (latter) facies of the Crimean Micoquian.

In sum, Micoquian camps of type A demonstrate an unusually wide range of on-site activities:

1. Construction of fire-places;

2. Supply of fire-places by previously collected dry mammoth bones, at least under the condition of boreal xeric grassland (Vytachiv, vt_2 – Huneborg Stadial);

3. Construction of pits, some of them used as cashes for future visits;

4. the construction of burial pit(s) on at least one occasion, at Zaskalnaya VI, IIIa;

5. A whole range of flint knapping processes, including tool production and rejuvenation, based on raw material from nearby outcrops;

6. Finally, the consumption of either hunted or collected animals.

It is the most intensive and time consuming program known in Crimean Middle Palaeolithic. On the other hand, as has been demonstrated by the example from Kabazi V, III/2, this diversity of activities may have resulted from several visits. If single continuous occupation correlate to the consumption of of 3-4 *Equus hydruntinus* or saiga, than these occupations do not fulfil the definition for long-term continuous stays.

Except for the pits and cashes, Micoquian and WCM camps of type A are functionally similar, although pronounced differences in flint knapping technology did exist.

Camps, type B

Camps of type B have been identified at Chokurcha, Unit IV, and Karabi Tamchin, levels IV/2 and V. Chokurcha I, Unit IV was found in a rock-shelter situated near the valley bottom of the Small Salgir River (Ernst 1934; Chabai 2004a). Karabi Tamchin is a buried rock-shelter located on the Karabi plateau, which is the part of the 1st ridge of the Crimean Mountains, about 800 m above sea level (Yevtushenko et al. 2003, 2004). As far as the topography is concerned, Chokurcha I and Karabi Tamchin share no common features.

The chronological frame of Chokurcha I, IV occupations corresponds to the Vytachiv, $vt_{1b2\text{-}b1}$ (Hosselo Stadial), which dates to the onset of MIS 3 (Markova 2004c; Mikhaikescu 2004; Chabai 2004a). The chronology of Karabi Tamchin is more problematic. On grounds of biostratigraphical analysis, A. Yevtushenko proposed a Last Interglacial age for level V, and the Hengelo Interstadial as *terminus ante quem* for level IV/2 (Yevtushenko et al. 2004; Markova 2004b; Mikhailescu 2004). If these considerations are correct, then the conditions of the occupations vary from south-boreal forest / forest-steppe (Karabi Tamchin, levels IV/2 and V) to boreal / south-boreal forest-steppe with xerophites (Chokurcha I, Unit IV).

The nature and speed of the sedimentation processes in both sites is markedly different. At Chokurcha I, IV, a numbers of processes, e.g. colluvial and alluvial sedimentation, pedogenetic developments, and exfoliation of limestone walls, all contributed to the formation of the stratigraphical

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Karabi Tamchin, IV/2	67.2	38.3 : 1	26.0 : 1	48.8
Karabi Tamchin, V	66.5	No cores	No cores	98.0
Chokurcha I, IV-B	44.2	No cores	No cores	489.0
Chokurcha I, IV-F	66.6	58.8 : 1	38.0 : 1	610.0
Chokurcha I, IV-I1	52.3	No cores	No cores	1119.0
Chokurcha I, IV-I2	56.6	27.0 : 1	15.0 : 1	1000.0
Chokurcha I, IV-L	53.3	No cores	No cores	467.0
Chokurcha I, IV-M	66.0	No cores	No cores	800.0
Chokurcha I, IV-O	55.3	24.6 : 1	13.8 : 1	700.0

Table 18-10 Model of raw material exploitation in Micoquian camps, type B.*
* data used for calculations are from Chabai 2004b; Yevtushenko 2004

sequence (Chabai 2004a). On the other hand, the main (and probably only) process responsible for the accumulation of the 1 m sequence at Karabi Tamchin was the exfoliation of the limestone walls and the ceiling of the rock-shelter (Yevtushenko 2003, Yevtushenko et al. 2004). These differences affected directly the sedimentation rates. Chokurcha I, Unit IV, with one of the fastest depositional processes, and Karabi Tamchin, with its unusual slow sedimentation, mark the two very ends of the range of site formation processes so far recognised in the Crimean Palaeolithic. Even more, Karabi Tamchin, level IV/2 was partially, and level V completely, brecciated.

Both the frequency of visits and the intensity of occupations were high at Chokurcha I, IV, whereas at Karabi Tamchin, IV/2 and V both variables were low (Table 18-10). Most of the Chokurcha I, IV occupations, as well as both layers at of Karabi Tamchin are palimpsests (Chabai 2004a, 2004c).

All of the occupations listed above contain evidence for the use of fire. In Chokurcha I, level IV-B, a small empty pit was found.

According to M. Patou-Mathis, the analyses of the models of faunal exploitation observed in occupations at Chokurcha I, Unit IV suggest both hunting and scavenging of fresh carcasses (Patou-Mathis 2004b). The species consumed on the site include saiga, hydruntinus, mammoth, bison, giant deer, and rhino (Fig. 18-13, *5, 6, 7, 8, 9, 10*; 18-14, *1, 2, 3, 4*). There is no evidence for on-site primary butchering, but M. Patou-Mathis assumes that saiga was butchered in front of the rock-shelter. At the same time, there is no evidence for the off-site transportation of parts of the carcasses. In most of the cases, the maximum number of consumed animals per level is 4 individuals per species. Usually, one individual is represented by 2 to 40 bones. Mammoths are mainly represented by skull elements, pointing to a scavenging mode of procurement. Some occupations took place at the end of spring, others at the end of the summer. During these seasons, humans obviously felt dietary stress, indicated by the high degree of fragmentation of bones. In sum, both qualitative and quantitative studies of the Chokurcha I, Unit IV fauna assemblages suggest that they did not result from hunting alone (saiga and hydruntinus), but also from scavenging (saiga, *hydruntinus*, mammoth, rhino, giant deer and bison). In addition, carnivores made their contributions to the faunal assemblages. Nevertheless, the mammoth skulls were undoubtedly imported by humans (Patou-Mathis 2004b). At least for the levels of Chokurcha I, classified as spring occupations, the topographical setting adds another argument for the scavenging hypothesis. In springtime, the Small Salgir valley might have been a flooded area relatively rich in animals which would have died from natural causes. M. Patou-Mathis (2004b, p. 370) suggests that some of the occupations may reflect single economic episodes (levels IV-A, IV-B, IV-L, IV-S) or extremely short stays (levels IV-F, IV-I, IV-M, IV-O, and IV-Q). However, the sedimentation process and the frequency of human visits make it difficult to prove or reject the palimpsest nature of Chokurcha I, Unit IV occupations. However, even if all of the studied occupations were palimpsests, they still were palimpsests of identical recurrent activities.

The faunal assemblages of Karabi Tamchin, levels IV/2 and V also show a complex pattern. According to A. Burke, much of the faunal accumulation results from the consumption of hunted prey (Burke 2004). The dominant species, *Equus hydruntinus*, is represented by 3 individuals per level, each identified on the basis of 18 – 37 remains (Fig. 18-13, *1,*

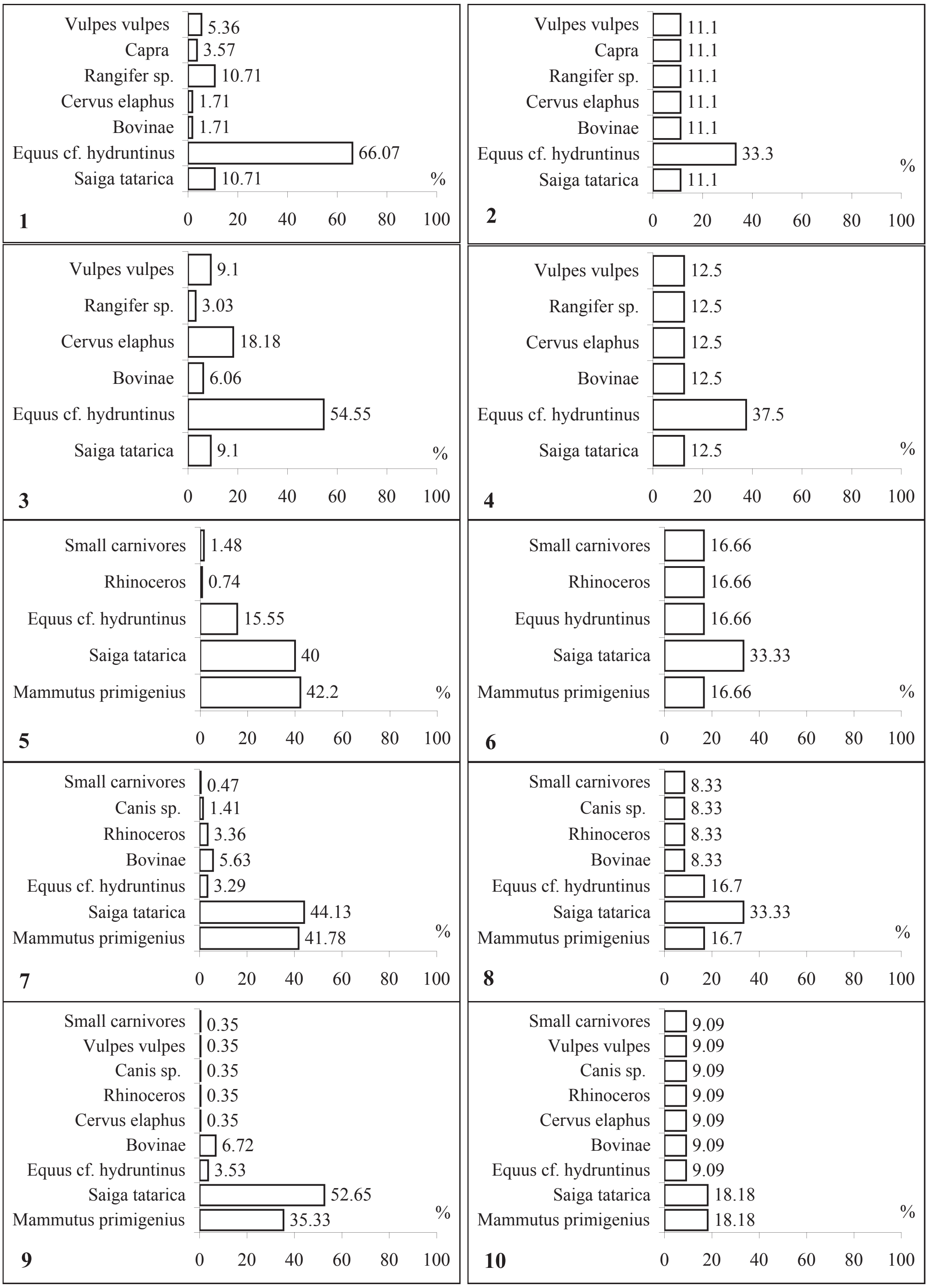

Fig. 18-13 Model of fauna exploitation in Micoquian camps, type B: number of remains (NR) by species, in % (1, 3, 5, 7, 9); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10). Karabi Tamchin, levels: IV/2 (1, 2) and V (3, 4). Chokurcha I, levels: IV-B (5, 6); IV-F (7, 8); IV-I (9, 10).

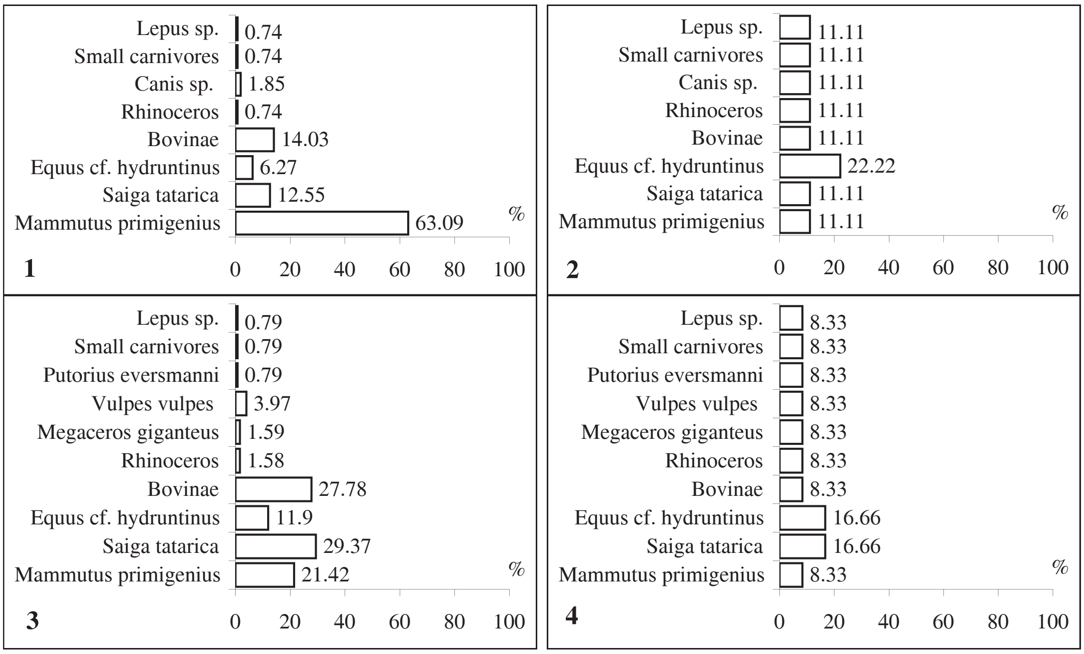

Fig. 18-14 Model of fauna exploitation in Micoquian camps, type B: number of remains (NR) by species, in % (1, 3); minimal number of individuals (MNI) by species, in % (2, 4). Chokurcha I, levels: IV-M (1, 2); IV-O (3, 4).

2, 3, 4). The remaining species are represented by 1 to 6 bones per individual. It is highly likely that carnivores contributed to the faunal assemblages. Furthermore, the faunal remains from levels IV/2 and V are to a large extent fragmented. This fragmentation might well be the result of either dietary stress, or of post-depositional effects (Burke 2004). The hypothesis of dietary stress might be indirectly supported by the presence of saiga on the Karabi plateau, which usually tries to avoid steep slopes. One possible explanation for the unexpected move of these aninmals into mountaineous regions might be a catastrophic drought in the sub-mountain and steppe regions, which forced ungulates – and humans who followed their prey – to migrate to a higher plateau region.

All known flint outcrops are situated in a distance of about 25-30 km from Chokurcha I and Karabi Tamchin. The pattern of raw material exploitation was based on the import of tools (Chabai 2004b; Yevtushenko 2003, 2004). The assumption that the "tool-users" model should be applied is supported by high percentages of tools, which were often bifacials, and the near absence of cores, preforms and primary flakes (Table 18-10). If debitage occurs at all, flakes are of small size. In addition, bifacial tools were resharpend intesively. The reshape of bifacial tools led to a considerable reduction in size, and to series of small bifacial thinning flakes. At Chokurcha I, these flakes were used for the production of unifacial scrapers. Other evidence for raw material deficit are heavily reduced artefacts, and reutilised bifacial tools, core-like scrapers of Chokurcha types, and triangular scrapers. Under such conditions of a general deficit of raw material, bifacial tools were the source of flakes used for the on-site manufacture of unifacial tools.

In sum, the activity package of type B camps might be summarised in the following terms:

1. Construction of fire-places.

2. On-site consumption of dismembered hunted and / or scavenged animals.

3. On-site utilisation of imported tool-kits, complemented by bifacial tool resharpening and the production of unifacial tools from bifacial thinning flakes.

All in all, Chokurcha I, Unit IV and Karabi Tamchin, levels IV/2 and V were camps for the consumption of both hunted and scavenged animals. The carcasses were usually dismembered before reaching the camp areas. The artefact supply was based on the "tool users" model, which was modified by the unifacial modification of by-products from bifacial tool reshaping. Probably, these camps were visited after severe crises in the availability of food resources had occured in the sub-mountain and steppe regions. It is evident that the maintance of camps of type B was dependent on meat supply from butchering stations, and relied on the curation of tools transported over long distances to the site. How long were the stays in regions situated at greater distances from flint sources, especially in the case of the Karabi plateau? The reconstructed activities and the number of animals consumed, suggest that each of the occupations at all of these camps was short-lived.

Camps, type C

This type of camp has been identified in the artefact and faunal complexes at Prolom II, layers II and III. Prolom II is a rock-shelter situated 22 m above the Kuchuk Karasu River Valley, correlating with the second river terrace (Kolosov 1986, p. 75). The topographical position is in a good agreement with the AMS chronology for the archaeological occupations that date between 28 and 40 kyr BP (Stepanchuk et al. 2004). If the proposed age is correct, these occupations existed under south-boreal to boreal forest-steppe environments.

Each layer was about 30 cm thick, but did not contain pronounced lenses of sterile sediments that could have been used for further subdivisions (Kolosov 1986). However, the densities of artefacts are very low (Table 18-11). The depositional process was caused mainly by exfoliation of the limestone walls and the ceiling of the rock-shelter. As a consequence, sedimentation rates were medium to low. At the same time, human visits were infrequent and not intensive (Chabai 2002). In the past, V. Stepanchuk attempted to argue for the existence of a *"ritual cluster of bones"* near the back-wall of rock-shelter in second layer of Prolom II (Stepanchuk 1993). Recent re-analysis of the stratigraphy and the patterns of artefact and faunal distribution (Chabai 2002), as well as archeozoological studies (Enloe et al. 2000), demonstrate, however, that the deposition of the bone cluster was stratigraphically younger than the artefacts discarded in the second layer. It follows that the bone cluster results from carnivore activities and has nothing at all to do with human activities at the site.

With hearths, burned bones and burned sediments, the occupations at Prolom II, layers II and III contain clear evidence for the use of fire (Kolosov 1986, p. 86).

The main feature of Prolom II, layers II and III is the large variability of species, among which one half are carnivores (Fig. 18-15). Speaking in numbers of identifiable remains, Prolom II, layer II yielded more remains from saiga than from any other species, followed by fox (*Vulpes corsac*). If the minimum number of individuals (MNI) is considered, again saiga dominates the faunal assemblage of layer II, this time followed by both fox (*Vulpes corsac*) and hyena (*Crocuta spelaea*). In layer III, the number of cave bear (*Ursus spelaeus Ros.*) individuals is more or less equal to that of saiga. According to J. G. Enloe, F. David and G. Baryshnikov (2000), saiga is the only species hunted and consumed by humans. The consumption of saiga carcasses took place on the site. Because bones are heavily affected by carnivore activities, it is difficult to identify any other human activities in the faunal assemblage other than those related to the processing of saiga.

The inhabitants of Prolom II exploited two raw material sources which were markedly different both in distance to the site and in quality. The outcrop at Sary Kaya is situated at a distance of 15 km from Prolom II and was a source of high quality flint plaquettes. Nodules from local flint outcrops, some hundred metres from the site, are brownish in colour and of low quality. All bifacials, and some unifacial tools, were produced on Sary Kaya flint. Moreover, evidence of on-site primary flaking of Sary Kaya flint is practically absent. Vice versa, there are no bifacial tools made on local flint. The latter was used for on-site flaking of cores and the subsequent modification of blanks into unifacial tools. Thus, the assemblage shows a clear patterning in the use of distant, high quality flint on the one hand, and local flint of poor quality on the other. The Sary Kaya flint was used for the manufacture of bifacial tools. As ready made items, they were transported to the site in relatively

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Prolom II, III	40.7	23.1 : 1	8.5 : 1	31.4
Prolom II, II	25.8	36.7 : 1	7.5 : 1	67.0

Table 18-11 Model of raw material exploitation in Micoquian camps, type C.*
* data used for calculations are from Kolosov 1986

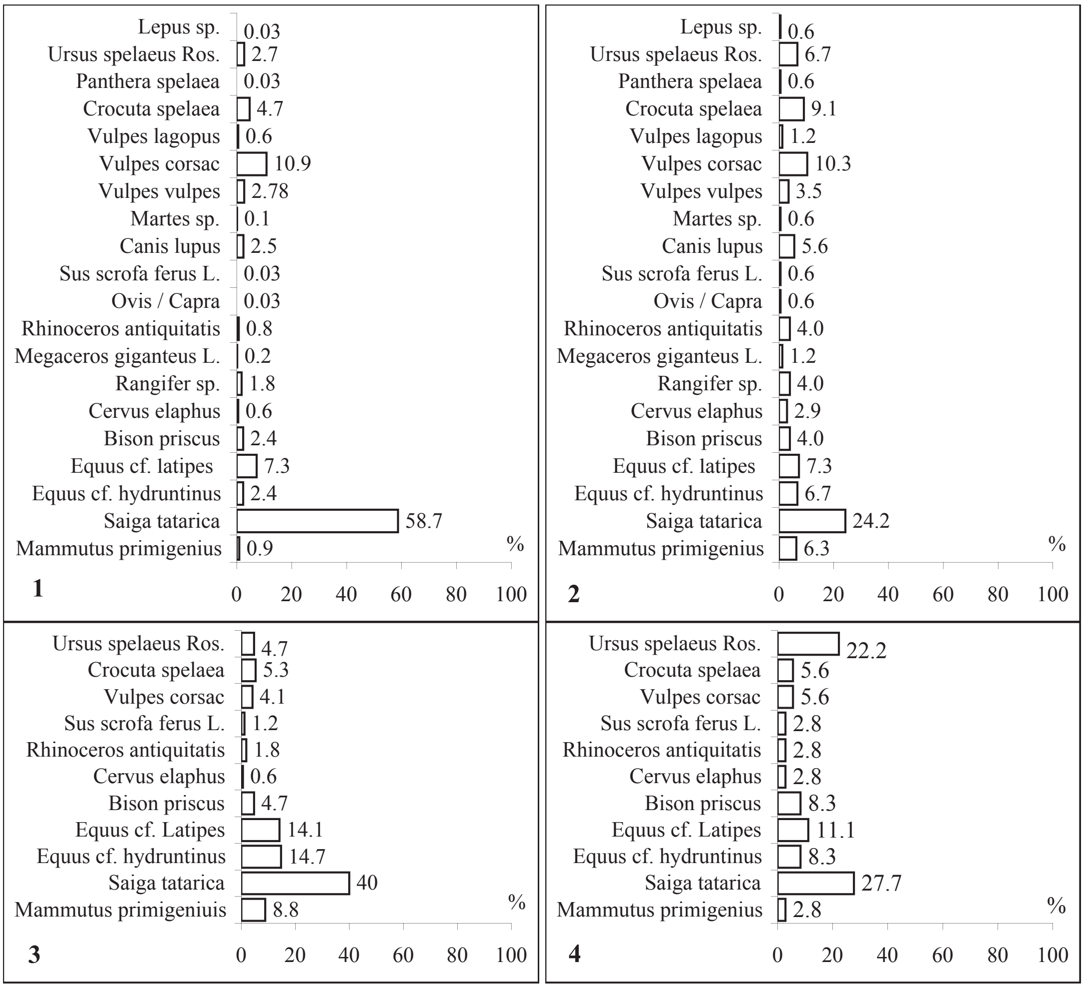

Fig. 18-15 Model of fauna exploitation in Micoquian camps, type C: number of remains (NR) by species, in % (1, 3); minimal number of individuals (MNI) by species, in % (2, 4). Prolom II, layers: II (1, 2) and III (3, 4).

high numbers and contributed to the overall high percentages of tools in the Prolom II assemblages. In fact, metrical comparison between the part of the assemblage at Prolom II, layer II made on Sary Kaya flint, and the assemblages from Chokurcha I, Unit IV demonstrate their absolute similarity (Chabai 2002): this merely bifacial part of Prolom II, layer II was produced in the frame of the "tool-user" model. Local flints are a totally different matter, because they show the application of the "site-workshop". It is the on-site flaking of cores that is responsible for the medium unifacial tool to core ratios (Table 18-11). In sum, the reduction at camps of type C was very specific. It combined the long distance transportation of (mainly bifacial) tools which underwent further on-site reshaping, and the on-site production of blanks from local raw nodules followed by modification of flakes into unifacial tools. It is the only evidence of a combination of the "site-workshop" and "tool user" model in the Crimean Middle Palaeolithic.

All in all, occupations at Prolom II, layers II and III classified as camps display evidence for the following activities:

1. Construction of fire places.
2. On-site production of unifacial tools from the local raw material.
3. On-site consumption of saiga, whereby the animals were probably imported in an already dismembered state.
4. On-site reshaping of imported tool-kit, comprising mainly bifacial tools.

In addition to human activities, carnivores altered heavily the faunal assemblage, and are the agents responsible for most of the bones found in the rock-shelter.

If camps of types B and C are compared, differences are not numerous, but fundamental: the exploitation of a second (local) raw material source for the blank production and unifacial tool production. However, perhaps this distinction is purely scientific. Due to the pronounced thickness of each layer, it is difficult to prove or reject the hypothesis that both flint sources were used during one continuous stay; it might well be the case that each layer represents several occupations accumulated in a palimpsest.

Camps, type D

This type of camp is represented by five occupations found in Starosele, level 1, Prolom I, upper and lower layers, Buran Kaya III, level B and Kiik-Koba, upper level. Chronologically, these all belong to a period defined by the Vytachiv, vt_{1b2} (Hengelo) Interstadial, as the lower chronological border, and the Vytachiv, vt_{3b} (Denekamp) Interstadial, the youngest age. Some of these occupations, like Starosele, 1 (Vytachiv, vt_{1b2}), Buran Kaya III, B, as well as the upper layers of Prolom I and Kiik-Koba (Vytachiv, vt_{3b}), existed under south-boreal forest-steppe environmental conditions. According to radiocarbon dates (Stepanchuk et al. 2004), the occupation at Prolom I, lower layer might have accumulated under the boreal xeric grassland conditions of the Vytachiv, vt_{1c} (Huneborg Stadial). If combined, these occupations show a temporal continuity in the existence of this type of camp in the Crimea.

Artefacts and faunal remains in Kiik-Koba, Prolom I and Buran Kaya III accumulated under conditions characterised by the lowest sedimentation rates known in the Crimean Middle Palaeolithic, only comparable to those at Shaitan-Koba and Karabi Tamchin. Taken together, Upper Pleistocene sediments in Prolom I and in Kiik-Koba hardly compose 1 m of deposits (Bonch-Osmolowski 1940; Kolosov 1979). At Buran Kaya III, all Pleistocene sediments accumulated between the Hengelo and the Denekamp Interstadial comprise 0.9 m of deposits (Monigal 2004). The sedimentation rates at Starosele are only slightly higher: a minimum of 0.4 m of sediments accumulated during the Hengelo Interstadial (Marks et al. 1998). The fact that during the same time period (from Hengelo to Denekamp Interstadial), at least 2.5 m of sediments accumulated at Kabazi II underlines the extreme position of sites classified as camps of type D within the the range of sedimentation rates in Crimean Palaleolithic sites. The low sedimentation rates at Kiik-Koba, Prolom I and Buran Kaya III rock-shelters were accompanied by frequent, and at the same time intensive, visits on the same occupation surfaces. This depositional phenomenon was termed "Kiik-Koba layer" (Chabai 2004c) and is represented by 10-20 cm thick lenses densely packed with artefacts (Table 18-12), fragmented bones, burned sediments and faunal remains.

All occupations of type D camps show clear evidence of the on-site use of fire. However, well preserved fire-places were only found in two occupations, Prolom I, lower layer and Starosele level 1 (Kolosov 1979; Marks et al. 1998). The upper occupations of Prolom I and Kiik-Koba, as well as Buran Kaya III, layer B, yielded abundant burnt bones, but no clear hearths (Bonch-Osmolowski 1940; Kolosov 1979; Demidenko 2004a). Presumably, original fire-places were destroyed after being exposed on the living floor for considerable times. Most probably human agents also contributed to this facette of the site formation process by trampling on the occupation surface during repeated stays. In the upper layer of Kiik-Koba, three shallow pits were observed during the excavations of Bonch-Osmolowski which had been used as fire-places. In the same layer, two relatively big and deep pits were found (length – 1.4 m;

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Starosele, 1	28.5	63.8 : 1	17.5 : 1	256.0
Prolom I, lower layer	23.2	52.9 : 1	11.7 : 1	208.0
Prolom I, upper layer	23.9	64.4 : 1	14.3 : 1	203.0
Kiik-Koba, upper layer	*max* 52.0	*min* 57.7 : 1	28.9 : 1	*min* 211.0
Buran Kaya III, layer B	47.9	32.8 : 1	15.6 : 1	541.0

Table 18-12 Model of raw material exploitation in Micoquian camps, type D.*

* data used for calculations are from Bonch-Osmolowsky 1940; Marks, Monigal 1998; Stepanchuk 2002; Demidenko 2002

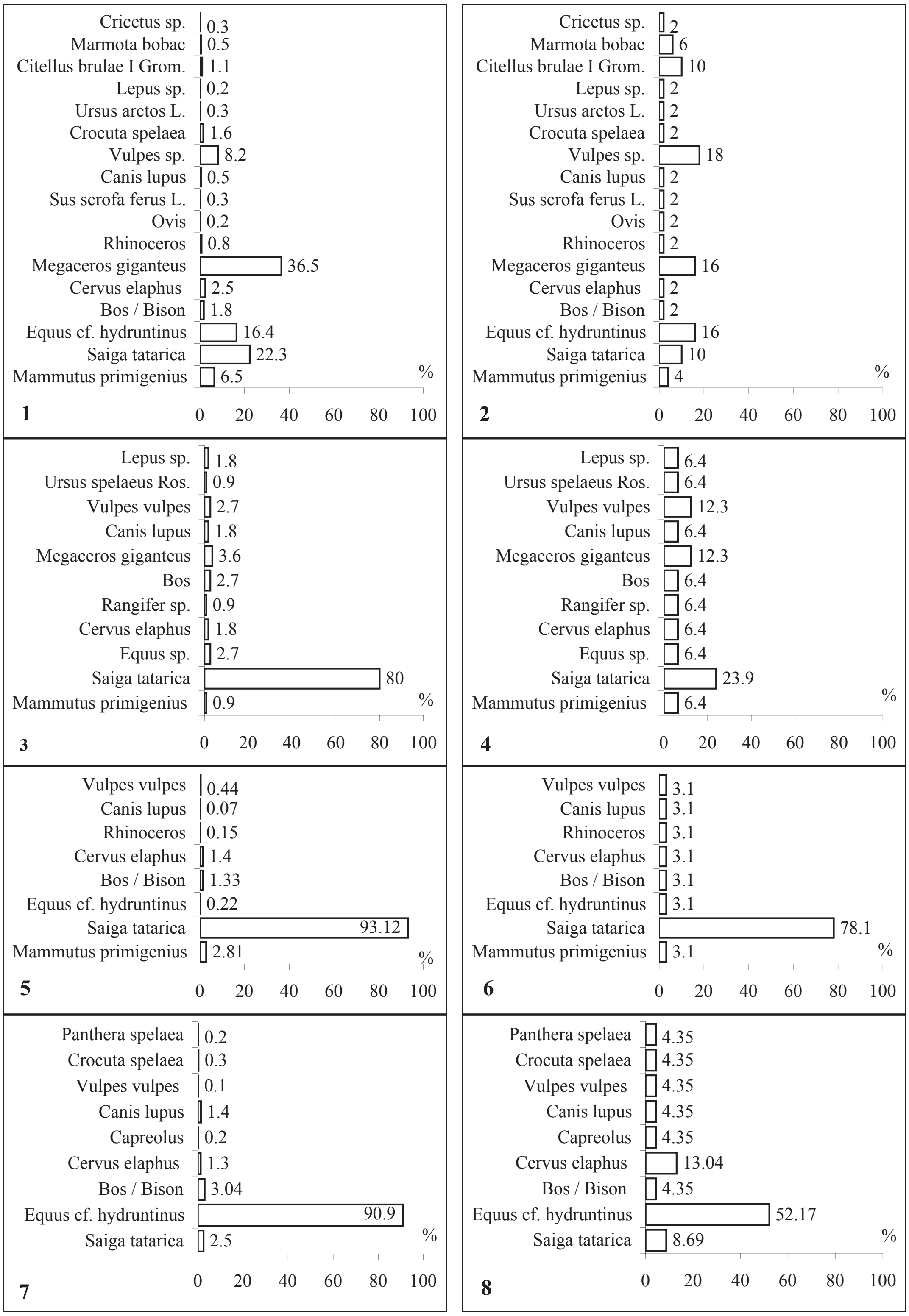

Fig. 18-16 Model of fauna exploitation in Micoquian camps, type D: number of remains (NR) by species, in % (1, 3, 5, 7); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8). Kiik Koba, upper level (1, 2); Prolom I (3, 4); Buran Kaya III, level B (5, 6); Starosele, level 1 (7, 8).

width – 0.8 m; depth – 0.6 m and length – 0.7 m; width –0.82 m; depth – 0.38 m), which were filled with bones and artefacts similar to those from the neighbouring areas. The filling of one of these pits had an internal stratigraphical sequence which was represented by three lithologically different layers (Bonch-Osmolowski 1940, p. 133). The observation that these layers within the pit contained artefacts and bones supports the notion that the Kiik-Koba, upper layer represents a palimpsest of several distinct occupations. At least one of the two Neanderthal burials excavated by Bonch-Osmolowski belongs to this layer (Bonch-Osmolowski 1940; Smirnov 1991).

The faunal assemblages of Buran Kaya III, B and Starosele, 1 are each clearly dominated by one species. In the case of Buran-Kaya III level B, saiga antilopes is by far the most frequent quarry, while at Starosele, 1, horses were preferred (Fig. 18-16, *5, 6, 7, 8*). In Prolom I, the distribution of frequencies is less weighted, but still saiga contributed the most remains to the faunal assemblage (Fig. 18-16, *3, 4*). At Kiik-Koba, upper level, several ungulates reach nearly equal frequencies (Fig. 18-16, *1, 2*). From each saiga found at Buran Kaya III, level B, approximately 52 identified bones were left at the site. In Starosele level 1 each horse is represented by approximately 92 bones. The less weighted faunal assemblages show lower ratios: while each saiga is represented by 22 bones at Prolom I, the more frequent species of the Kiik-Koba faunal assemblage – giant deer, saiga and "elephant" – are represented by 39, 29, and 21 bones per individual, respectively. For Starosele, level 1 and Buran Kaya III, level B, both primary butchering and consumption were reconstructed (Burke 1999; Patou-Mathis 2004a), the animals being hunted not far from the sites (Burke 1999; Patou-Mathis 2004a). With regard to the bone representations of the more frequent species at Prolom I and Kiik-Koba, upper level, it is unlikely that on-site primary butchering took place at the site itself. The most probable scenario for Prolom I and Kiik-Koba, upper level is the on-site consumption, in the case of Prolom I of saiga, and in the case of Kiik-Koba, upper level of giant deer, saiga and "elephant". According to M. Patou-Mathis, Buran Kaya III, level B is a palimpsest of several repeated occupations that were very similar with regard to activities conducted (Patou-Mathis 2004a).

The nearest known flint outcrops are situated at a distance of between 12 and 30 km from the sites. The blank to core and tool to core ratios suggest a minor role of on-site core reduction. This notion is further strengthened by relatively high tool percentages which result from imported items. However, there is some evidence for the on-site flaking of bifacial preforms (Marks et al. 1996; Uthmeier 2004b, 2004c; Kurbjuhn 2004), and perhaps some bifacial tools experienced a secondary reduction as cores at the very end of their use lives (Uthmeier 2004b). Certainly, the repeated reduction of bifacial tools was the main source for flakes (Richter 2004) and led to a reduction of bifacial tool sizes, the increase in the number of small transversal flakes, and the production of unifacial tools from bifacial thinning flakes. In all of these assemblages, flakes as well as bifacial and unifacial tools are usually shorter than 5 cm, being the smallest of the Crimean Middle Palaeolithic (Stepanchuk, Chabai 1986; Stepanchuk 2002; Demidenko 2004b). Nevertheless, the amount of on-site artefact reduction at Prolom I, Buran Kaya III, level B and especially at Kiik-Koba, upper level was much bigger than at Starosele, level 1. The higher intensity of tool reduction is indicated by higher percentages of unifacial convergent tools, lower percentages of bifacial tools, smaller sizes of both unifacial and bifacial tools, and in numerous special chips and flakes for the rejuvenation of tool tips (Demidenko 2003b, 2004b). These features serve as the attributes for the distinction of the Starosele and Kiik-Koba facies of the Crimean Micoquian.

The following activities were carried out on the excavated areas of camps belonging to type D:

1. Construction of fire-places.

2. On-site primary butchering of animals imported over short distances into the sites, followed by their consumption.

3. On-site reduction and intensive rejuvenation of mainly imported tools, as well as limited flaking and unifacial tool production on bifacial thinning flakes.

4. Construction of pits, including at least one burial pit.

To some extent, the procurement strategy and exploitation of hunted animals and raw material at Buran Kaya III, level B and Starosele, level 1 are self-sufficient. In other words, no distant kill and butchering sites were needed for the maintanance of these camps.

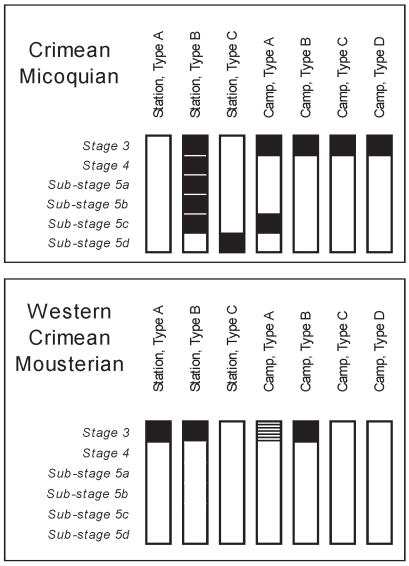

Fig. 18-17 Chronology of settlement types in the Crimean Middle Palaeolithic.

A Functional Synthesis: Land Use in the Crimean Middle Paleolithic

Occupation types in time

As pointed out in earlier studies (Chabai, Marks 1999; Marks, Chabai 2001), any reconstruction of a settlement pattern in the Crimean Middle Palaeolithic has to be hypothetical, since occupations classified as camps or stations are not contemporaneous. With the exception of MIS 5c (Pryluki, pl_{1b1} or Brörup Interstadial) with Crimean Micoquian camps of type A and stations of type B or type D, and the Huneborg-Stadial with camps of type A and D respectively, this applies to the Western Crimean Mousterian, as well as to the Crimean Micoquian, even on an interstadial level. If marine isotope stages are the shortest chronological entity analysed (Fig. 18-17), the discontinuity of the Crimean Micoquian data becomes apparent. During MIS 5d, stations of type C are the only class of occupation known. During MIS 5b, MIS 5a and MIS 4, the situation is similar: the corresponding camps to the only type of station, type B, are not yet located. It is only during MIS 5c and MIS 3 that a combination of stations and camps is documented in the archaeological record. The chronological perspective reveals two things:

1. For most of the time, movements were local; long distances (of 20 km and more) were generally restricted to residential moves (camps of type B and D) and occur only during MIS 3.

2. On the other hand, stations of type C existed during MIS 5d, and therefore might be seen as an adaptation to specific habitats.

The fact that pollen analyses do not support this view calls for caution. It is more probable that other camps and stations are missing from the record, simply because Kabazi II is the only site known so far from MIS 5d. Here, a question of general importance must be challenged: do lithic industries and settlement patterns necessarily have to go through the same development? In other words, might we conclude from the fact that a lithic industry shows little to no innovation that the same applies to its settlement pattern? If so, the consistancy of lithics in the Crimean Micoquian would suggest that all types of occupations existed from MIS 5d until the Denekamp Interstadial. The relative stability of pollen and faunal spectra speaks for such an approach, although this does not mean that simple analogies of this kind are more than mere hypotheses. For the Western Crimean Mousterian, however, the situation seems to be less complicated. All sites date to MIS 3. But the character of the camps is specific to such an extent that it is unclear whether the known stations correspond to them at all. While at stations of type A and B from Kabazi II large portions of meat were extracted during one episode, camps of type B in Karabi Tamchin consume remarkably low numbers of animals. In addition, camps of type A are represented with one site only, Shaitan Koba, which might be a palimpsest. The meaning of the diversity of hunted fauna is therefore unclear, and the specific mode of acquisition is unresolved. Even more, some technological development from Levallois to volumetric cores is reported for the Western Crimean Mousterian – but this is obviously not a consequence of changes in the settlement pattern, as both concepts are found at stations of type A (e.g. in Kabazi II Unit II). To conclude, the composition of data is still discontinuous (Marks, Chabai 2001) and therefore problematic. Due to the fact that the environment was not subject to any considerable change, and the lithic technology is either identical (CM) or shows little developments (WCM), it might be acceptable to assume the existence of camps and stations known from different MIS for the entire existence of both industries.

Comparative analysis: the transformation of raw material and food resources

In the following, the two main variables used to distinguish camps and stations, e.g. distance to raw material sources and faunal exploitation, are used separately for comparative analysis. Data comes from several sources: transformation analysis (Chabai et al. 2002; Uthmeier 2004b, 2006; Chabai, Richter, Uthmeier eds. 2005), faunal analysis (Burke 1999, 2004; Patou-Mathis 1999, 2004a, 2004b, 2005; Chabai, Patou-Mathis 2006), and statistical analysis of lithics (Chabai 1998b, 1998c, 1998d, 2004b, 2004c, 2005b, Chapter 1). With regard to settlement systems, transformation analysis (Weissmüller 1995; Uthmeier 2004a, 2004c) is of special interest, as it separates on- and off-site parts of the flaking sequences of raw nodules. Until now, transformation analysis was applied mainly to the long sequence of Kabazi II (Chabai, Richter, Uthmeier, eds. 2005). In addition to Kabazi II, Units VI, V, III, and II, the assemblages from Starosele, levels 3 to 1 (Chabai et al. 2002; Uthmeier 2006), Buran-Kaya III, level B/B1 (Uthmeier 2004b), and Chokurcha I, Unit IV (Uthmeier 2006) have been analysed. It follows that the sample used here is a cut out of the data at hand, and does not cover all types of occupations. The following occupation types are missing: camps of type A (Zaskalnaya V and VI, Kabazi V) and type C (Prolom II) for the Crimean Micoquian, and camps of type A (Shaitan Koba) and type B (Karabi Tamchin) for the Western Crimean Mousterian.

Transformation of raw material

In the following, comparisons between assemblages of the Crimean Micoquian and the Western Crimean Mousterian are made on the level of transformation sections only, without distinction between surface shaping and unifacial tool production. A 2D-plot of the first two dimension of a correspondence analysis (relative frequencies of transformation sections in assemblages) gives an overview of the structure of the data (Fig. 18-18). The values of the first and second dimension are low, which means that the differences between the units analysed here are not very pronounced. This makes sense, as several transformation analyses (Uthmeier 2004b; Chabai, Richter, Uthmeier, eds. 2005, this volume) have shown that many reduction processes were not finished at the site where they started. Instead, many preforms, half finished bifacial tools, and cores were carried around, a behaviour often described in cultural anthropology: „*Transport is generally no major limiting factor for logistical hunter gatherers. Since most mobility involves task-specific forays out from relatively stable residential locations, only a small portion of the total artifact inventory must be carried around at any one time.* [...] *In contexts of high residential mobility, manufacture and maintenance take place in short episodes throughout the year and across most or all the settlement system.* [...] *Anthropologists often observe that residential mobile foragers seem to be constantly at work repairing or making something, using free time when and where they find it: Manufactured articles often take a long time to complete; people work sporadically, for short periods of time, and carry the partially finished goods from one camp to another* [...]" (Kuhn 1989, p. 35). Another reason for the low overall diversity is perhaps of greater importance, as it results not only from general features in hunter-gatherer life patterns, but from specific aspects of the Crimean Middle Palaeolithic. Obviously, the transformation of raw material was, to a certain extent, independent from the industry. Nevertheless, the parabola like composition of units along the first and second dimension shows that the sortation itself is meaningful. At both ends of the parabola, units are positioned in some distance from the rest.

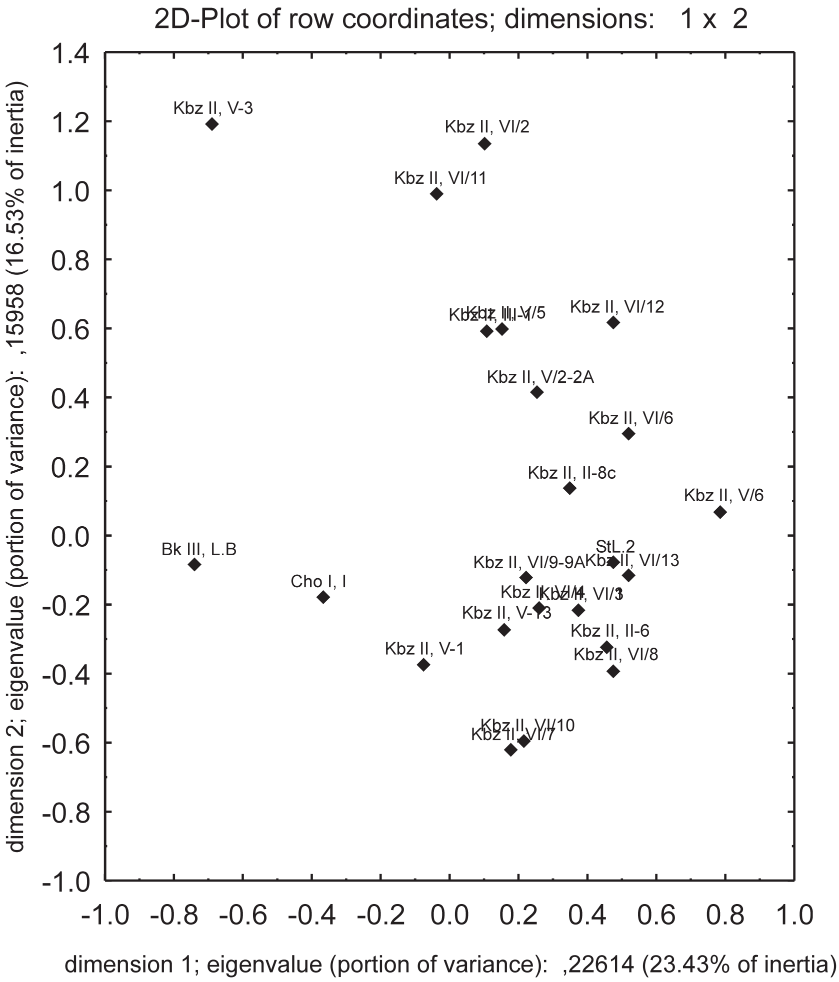

Fig. 18-18 2D-plot of the two main dimensions of a chi-square based correspondence analysis with the percentages of transformation sections in assemblages calculated with StatSoft Statistica 6.0 (Cho = Chokurcha, Bk = Buran-Kaya, Kbz = Kabazi, St = Starosele).

The transformation sections of Crimean Micoquian camps of type B (Chokurcha I, level IV/I) and type D (Buran Kaya III, level B), and of one of the many Crimean Micoquian units that represent stations of type C, Kabazi II, level V/3, are exceptional. Crimean Micoquian stations of type B (Kabazi II, level III/1) and Western Crimean stations of type A (Kabazi II, levels II/8C and II/6) were sorted into a cloud of units from Kabazi, II Units V and VI, which are all Crimean Micoquian stations of type C. All that can be said from the correspondence analysis is that only a limited number of units show significant differences when compared to the bulk of units; and this is partly due to the fact that many units are stations of type C. Within this biased sample, the distance from raw material sources seems to be an important reason for different positions along the first dimension, which, at the same time, is the most important. In the left part of the diagram, units are supplied with non-local raw materials, while towards the right part, assemblages from Kabazi II, Unit II indicate local outcrops.

To investigate the transformation of raw material at stations and camps in greater detail, analysis was focused on import. To reduce mistakes, only units that entered the site as raw nodules, bifacial preforms or cores were considered. Single pieces, be they bifacial tools, simple tools or blanks, were excluded, as any additional piece would alter significantly their transformation section. For this analysis, the sample is much smaller and only includes 8 assemblages (Uthmeier 2006): two from the different chronological stages of the Western Crimean Mousterian (Kabazi II levels II/8c and II/6), and six from

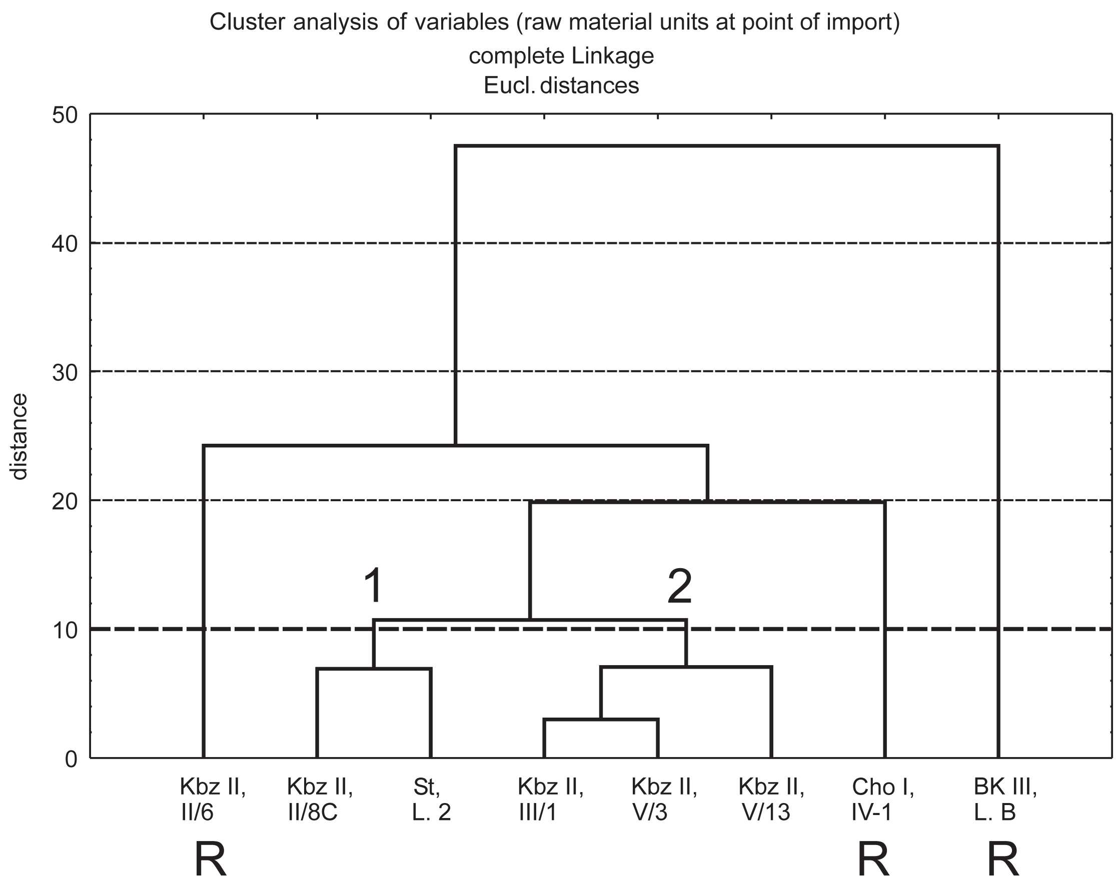

Fig. 18-19 Dendrogramm of a cluster analysis with objects imported into excavated areas according to transformation analysis calculated with StatSoft Statistica 6.0 (blank, unifacial tool, bifacial tool, raw nodule, core, bifacial preform); Kbz = Kabazi, St = Starosele, Cho = Chokurcha, BK = Buran-Kaya

the three facies of the Crimean Micoquian (Ak Kaya, Starosele and Kiik Koba). A cluster analysis (complete linkage, Euclidian distances) of imported items in assemblages again reveals much conformity (Fig. 18-19). However, on a lower level of distance, two clusters can be defined: one consists of Kabazi II, level II/8C (WCM station, type A) and Starosele, level 2 (CM camp, type D?), and the second includes Kabazi II, level III/1 (CM station,type B) and Kabazi II, levels V/3 and V/13. While cluster 2 combines Kabazi II assemblages which procure raw material at the Bodrak valley, cluster 1 is less easily understood. In the latter, sites with local (Kabazi II) and relatively long distance raw material acquisition (Starosele) are combined. Perhaps, it is the local component of raw material at Starosele (Marks, Monigal 1998) that brings these two assemblages together. As residue, Kabazi II, level II/6, Chokurcha I, level IV-I, and Buran Kaya III, level B are different from all other units – again a reflection of raw material distances.

XY-dispersal diagrams (Fig. 18-20, 18-21, 18-22) allow a closer look at the imported items. From items brought into the sites, bifacial preforms show the strongest correlation (Pearson´s r = 0.70) with the distance to raw material outcrops (Fig. 18-20). It must be stressed that this is not only a consequence of the fact that Western Cimean Mousterian assemblages lack bifacials and are situated near the outcrops. The sample itself is biased towards Crimean Micoquian units, which are therefore responsible for most part of the correlation. The only exception is Kabazi II level V/13. Cores (in a broad sense), on the other hand, show a weaker, yet negative correlation (r = - 0.44) with the distances from the outcrops (Fig. 18-21). They are less numerous at Crimean Micoquian sites, but reach over 80 % in Western Crimean Mousterian assemblages from Kabazi II that are situated near the outcrops. Surprisingly, raw nodules do not show any correlation (r = - 0.04) with the distances raw material was transported (Fig. 18-22). This is far from our theoretical expectation, but the following explanations help to understand this evidence:

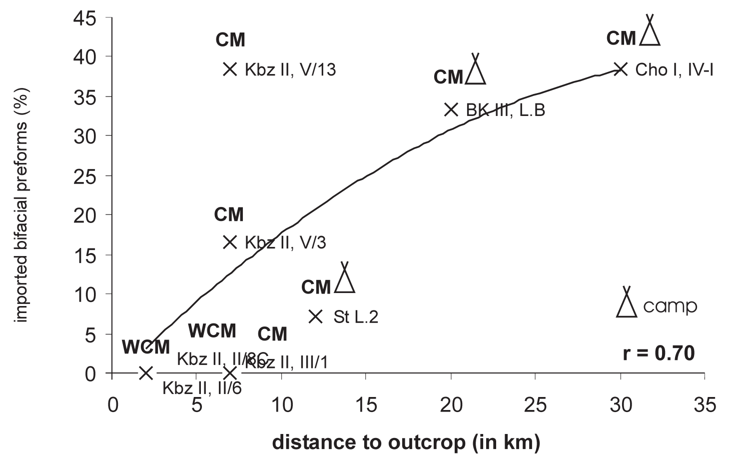

Fig. 18-20 Scatter plot of distance to raw material outcrop (x-axis) and percentage of imported bifacial preforms (y-axis); Kbz = Kabazi, Cho = Chokurcha, BK = Buran-Kaya, WCM = Western Crimean Mousterian, CM = Crimean Micoquian, r = Pearson´s correlation index, ranging from strong positive (1), none (0) to strong negative (-1).

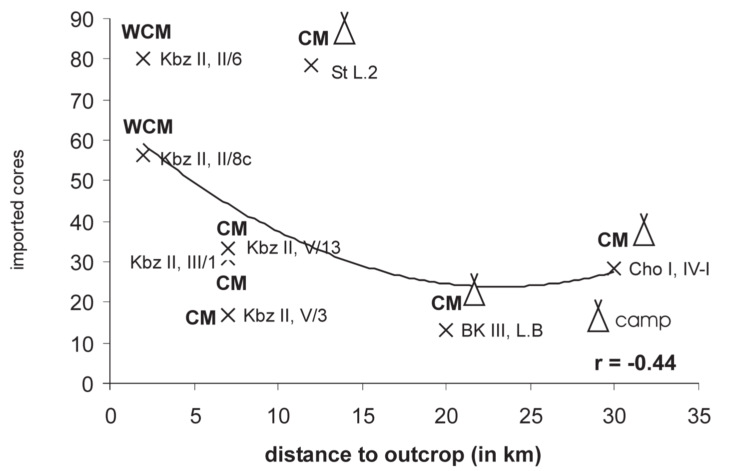

Fig. 18-21 Scatter plot of distances to (main) raw material outcrops (x-axis) and percentage of imported cores (y-axis).

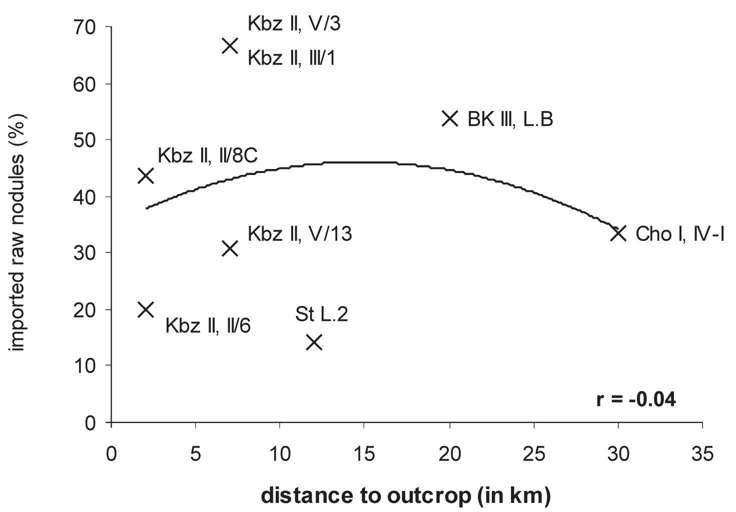

Fig. 18-22 Scatter plot of distances to raw material outcrop (x-axis) and percentages of imported raw nodules (y-axis).

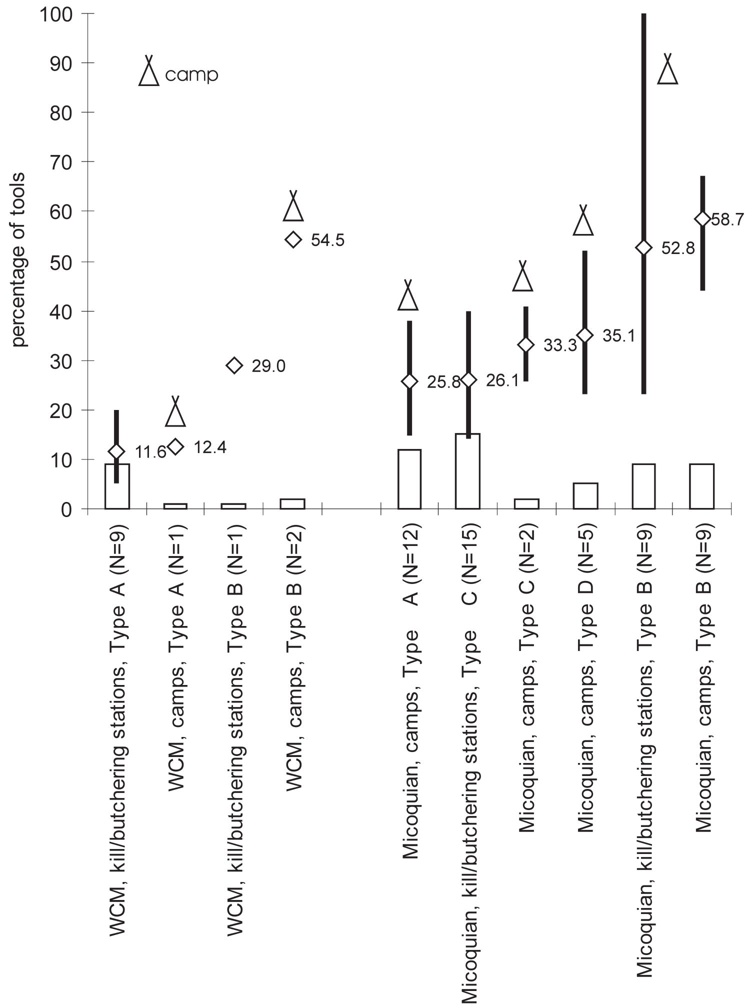

Fig. 18-23 Diagramm showing the mean values for percentages of tools (grey rhombi) in assemblages of the Western Crimean Mousterian (left) and Crimean Micoquian (right) in ascending order, the range of the corresponding set of data (black lines), and the number of assemblages used for the calculation of each mean value (white bars).

1. Kabazi II, levels II/6 and II/8C are Western Crimean sites situated at a distance of 2 km from the outcrops at Mount Milnaya, though Kabazi II is not a workshop *sensu strictu*. Therefore, initial flaking at the outcrop makes sense – especially when advanced technologies that call for good quality nodules, like the volumetric concept in level II/6, are applied. Despite the short distance, between 45 and 80 percent (in level II/8C) of the raw nodules were, to some extent, flaked before they were brought to the site.

2. In Buran-Kaya III, level B, and in Chokurcha I, level IV-I, raw material comprises mainly plaquettes used in the production of bifacial tools (Uthmeier 2004b). At the same time, it is assumed that most of the blanks used for unifacial tools stemmed from surface shaping (Chabai 2004b; Uthmeier 2004b). It follows, that the import of (tested?) flat nodules provided a better reserve of raw material than bifacial preforms.

3. Chokurcha I, level IV-I and Buran Kaya III, level B are camps which were probably reached after residential moves. Given that the correlation is correct, it must be assumed that the residential move led directly to the site, or there were not enough stops in between to decorticate and reduce all raw nodules.

The intensity of blank use should increase the longer occupations last, and / or according to the distance from raw material sources. To test this hypothesis, the mean percentages of tools from

52 Crimean Micoquian assemblages classified to occupation types were ordered according to their values (Fig. 18-23, right part). As in other analyses, the distance to the raw material source seems to be more important than other variables. At least, it is not the time of activity that is responsible for the percentage of tools in assemblages. Otherwise, stations on the one hand, and camps on the other would have been grouped together. However, the opposite appears to be the case: camps and stations alternate along the x-axis. At one end of the sortation, camps of type A and stations of type C do not differ essentially. Both display a mean percentage of tools of approximately 25 %. Assemblages from camps of type C, with mixed raw material procurement, and those of type D, also have similar mean values of 33.3 and 35.1 %. Obviously, the relatively high amount of raw nodules at sites such as Buran Kaya III level B helps to avoid a shortage of blanks at camps of type D, although they cannot use fresh local raw materials. Camps of type B show comparable distances to raw material sources, but higher mean percentages of tools. In average, more than one half of all blanks are used. The same applies to stations of type B, but data from this group is heterogeneous, as indicated by the large range of percentages. The mean values for the Western Crimean Mousterian (Fig. 18-23, left part) recall the sortation of the Crimean Micoquian, but with a less reliable sample.

Consumption of food resources and time of activity

While the number of tools and the intensity of rejuvenation processes indicate pure labour (or time of activity related to the use of artefacts), calculations of the meat available for consumption at a given site allow hypotheses relating to the maximum time spent there. In this case, several factors, such as group size, mode of faunal exploitation, or additional scavenging, are all important elements requiring consideration. Here, meat is calculated as 50% of the living weight (Hahn 1977, p. 280); living weight is after Pichler (1996, p. 32-37). The human daily supply of kilocalories is calculated as average from values given by J. Hahn (1977, p. 280), who refers to cold adapted hunter-gatherers. This estimation is in good accordance to Churchill´s calculation of 4000 kilocalories for adult Neanderthals under glacial conditions (cf. Culotta 2005). According to J. Hahn, 4000 kilocalories correlate to 4 kg of meat a day for an adult individual. "Meatdays" (as days with sufficient supply of meat for one adult individual) are calculated for intimate (family) groups of five persons, and effective groups of 20. The calculations made here are based on complete carcasses of securely hunted species only; different strategies of faunal exploitation (*"reverse gourmet"*, *"reverse bulk"*) were not differentiated. The fact that the calculations tend therefore to be too optimistic is outweighted by the high value of 4 kg of meat per day, which is the supply for an adult male. Women and children certainly needed less. Two diagrams, one for the Western Crimean Mousterian (Fig. 18-24), the other for the Crimean Micoquian (Fig. 18-25), have been compiled using reference sites for occupation types. A comparison between the absolute numbers of meatdays gives the impression that hunters of the Western Crimean Mousterian were more successful than those of the Crimean Micoquian. If the probable palimpsest of Shaitan Koba is excluded, kill and butchering stations produced the highest numbers of meat in both industries. Meat extracted at Western Crimean Mousterian kill and butchering stations, like Kabazi II, Units II and IIA, would allow occupations at corresponding camps of 80 days for a family group and 20 days for an effective group – minus those parts of the game that were left at the kill and butchering site. At the same time, the composition in age and sex of the herds speaks for single episodes, rather than a succession of hunting events. The same applies to the Crimean Micoquian site of Kabazi II, level III/1, which in this industry has delivered the maximal number of animals killed during one episode. The number of meatdays is near to those known from the Western Crimean Micoquian, but all other values calculated for Crimean Micoquian sites are much lower. They vary between 13.5 and 3.8 meatdays for an intimate (family) group. Crimean Micoquian occupations with higher numbers were recognised as palimpsests, e.g. Starosele, level 1 (Burke 1999), Prolom II (Enloe, David, Baryshnikov 2000), which is at the same time a hyeana den and was therefore calculated with 10 % of the MNI), and Buran-Kaya III (which is not included here: Patou-Mathis 2004). Perhaps, the fact that scavenging was observed quite often in Crimean Micoquian occupations, whereas it is the exception in Western Crimean Mousterian sites (Fig. 18-3), points to slightly different ways of adaptation to a more or less identical habitat. As meatdays differ so obviously, Crimean Micoquian hunter-gatherers may have acted in intimate groups only, and quite often the occupations were probably short. As a consequence, one has to expect more residential moves.

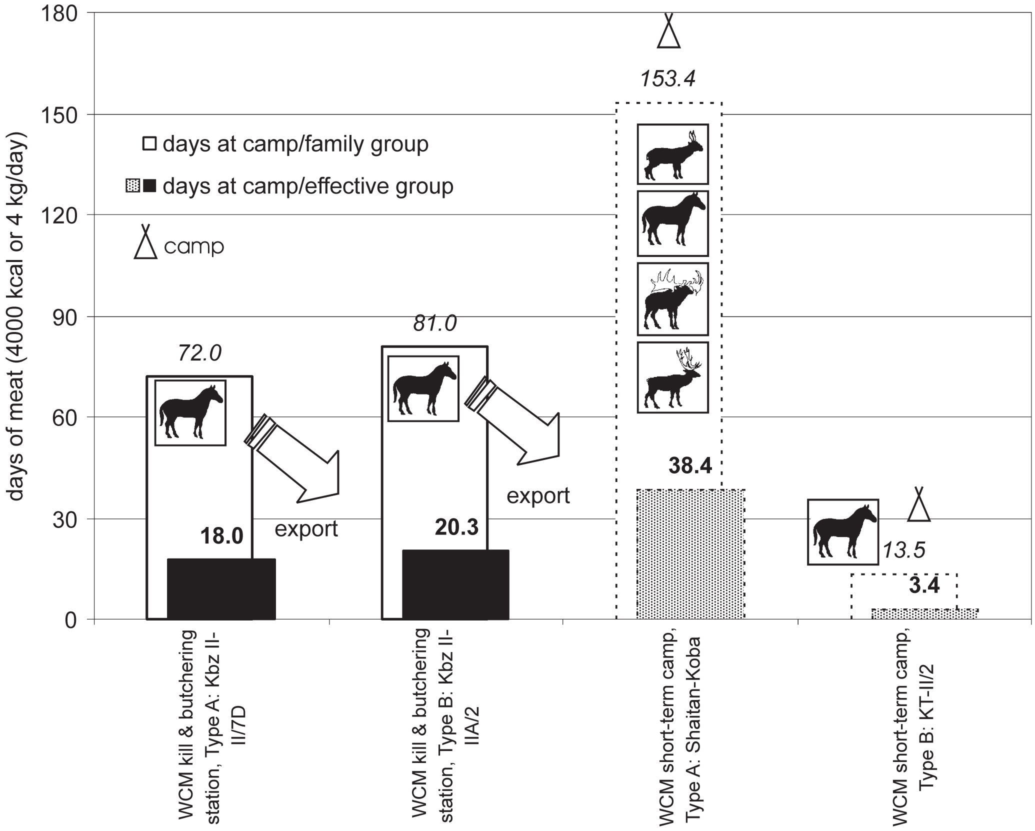

Fig. 18-24 Amount of meat available (with indication of main species hunted) at reference sites for each occupation type defined for the Western Crimean Mousterian, calculated as „meatdays" for Gamble´s intimate group (family) (of 5 persons: white bars) and effective groups (of 20 persons; black bars); note: meat from stations is exported, which reduces meatdays at the camp; Shaitan Koba and Karabi-Tamchin are palimpsests, indicated by different signatures (Kbz = Kabazi, KT = Karabi Tamchin).

Finally, we tested the influence of the distance to the raw material outcrops on the number of meat-days (Fig. 18-26). Again, these variables correlate, this time in a negative way (r = -0.452): the further away the raw material outcrop, the shorter the occupations. To some extent, this interpretation is misleading. Karabi Tamchin, for example, is not only far away from raw material sources, but at the same time is far away from the second range of the Crimean Mountains. Most outcrops known today are situated in the "flint belt" of the lower part of the second range. This part of the Crimean Mountains is near to the steppe region, and provides many locations where valleys and steppic environments (of the cuestas) would have been within easy reach. It follows, that the stays at Karabi Tamchin were not so much limited by the distance to the raw material sources. Instead, the distance to preferred logistical territories, and – along with this – the high altitude were reasons for the low number of meatdays.

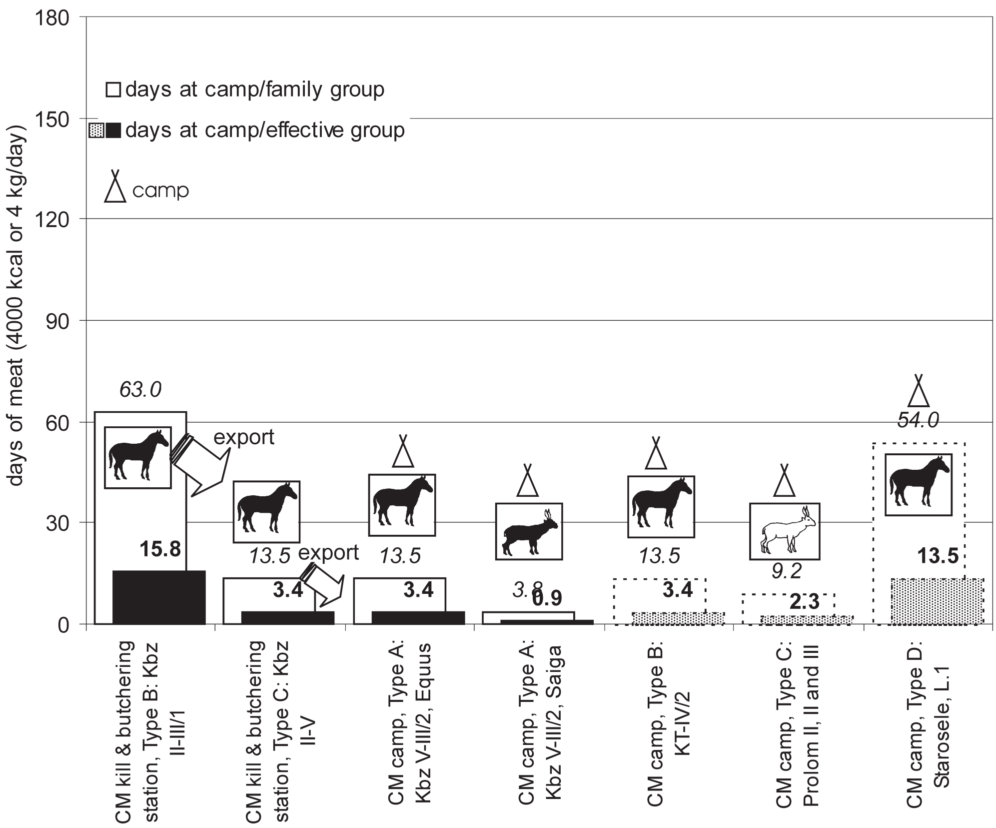

Fig. 18-25 Amount of meat available (with indication of main species hunted) at reference sites for each occupation type defined for the Crimean Micoquian, calculated as „meatdays" for Gamble´s intimate group (family) (of 5 persons: white bars) and effective groups (of 20 persons; black bars); note: meat from stations is exported, which reduces meatdays at the camp; Karabi-Tamchin; Prolom II and Starosele are palimpsests, indicated by different signatures (Kbz = Kabazi).

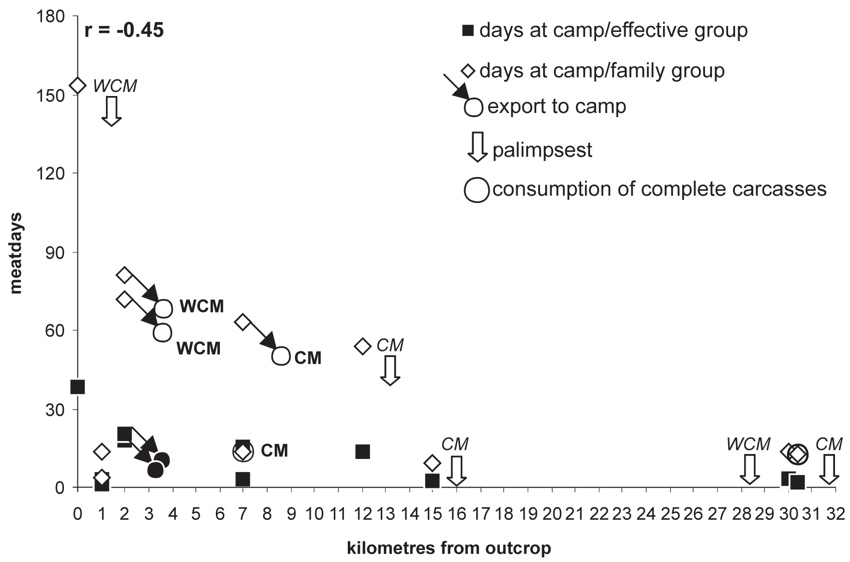

Fig. 18-26 Scatter plot of distance to (main) raw material outcrops (x-axis) and „meatdays" (y-axis); WCM = Western Crimean Mousterian, CM = Crimean Micoquian; r = Pearson´s correlation index, ranging from strong positive (1), none (0) to strong negative (-1).

Subsistence Tactics in the Crimean Middle Palaeolithic: Foragers or Collectors ?

Any hunter-gatherer settlement pattern results from the tactics of resource procurement. Before discussing the reconstruction of settlement patterns, it is therefore necessary to identify the strategies of resource acquisition applied by groups of the Crimean Micoquian and the Western Crimean Mousterian. According to recent studies focusing on the accumulation of stable isotopes in skeletons (Bocherens et al. 1997; Bocherens et al. 2005; Bocherens, Drucker 2005; Drucker, Henry-Gambier, Lenoir 2005), as well as archaeozoological analyses of faunal remains (Patou-Mathis 2000), Neanderthal and early *Homo sapiens sapiens* subsistence strategies were focused mainly on the consumption of meat obtained from hunting and, in rare cases, scavenging.

Ethnographical studies

World wide ethnographic data from 361 hunter gatherer groups provided by L. R. Binford (2001, Tab. 5.01) show a strong correlation (of Pearson´s r = 0.742) between the percentage of hunting on the one hand, and the annual distance of residential moves on the other (Fig. 18-27). But, although groups that are merely hunters move their residential camps over long distances, this they do not necessarily do more often than those who procure relatively large quantities of plant resources (Fig. 18-28). In general, the correlation index between the percentage of hunting and the number of residential moves within an annual cycle is low (r = 0.461). Thus, if the amount of resources acquisitioned by hunting is high, distances of residential moves tend to be large, while the number of residential moves is less pronounced. The data set taken from Binford (2001, Tab. 5.01) includes 14 ethnographic groups that secure their subsistence by more than 66 percent of hunting. Almost certainly, this is a consequence of the geographical setting of ethnic groups which are heavily dependent on a diet scarce in plants (Table 18-13). With one exception, the Ona from Argentinia, tactics of subsistence with more than two thirds of the resources procured by hunting occur in environments of North America. As biomass varies both spatially and seasonally, the annual sum of residential moves is generally high, reaching a maximum of 570 km. Residential camps are moved between 11 (Nunamiut) and 31 (Gros Ventre) times a year, which places these groups in the middle of the total range between 0 and 60 residential moves per year. The area exploited during a year varies between 24,000 km^2 (Table 18-13: Nunamiut) and 619,400 km^2 (Table 18-13: Chippewyan). Such huge annual ranges

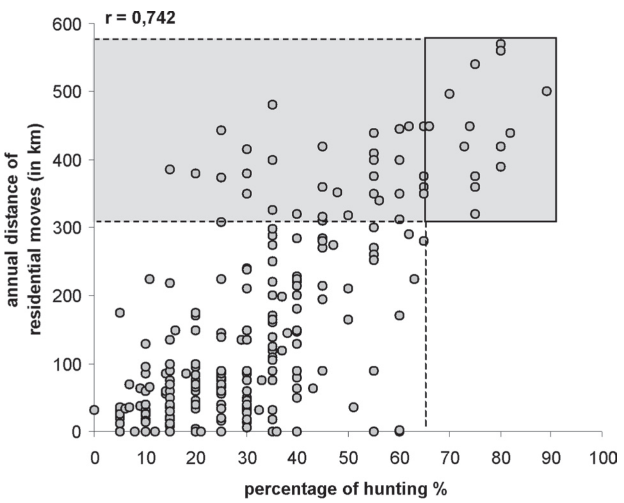

Fig. 18-27 Scatter plot of percentages of hunting in food procurement (x-axis) and annual distances of residential moves (y-axis) in 361 hunter-gatherer groups documented in ethnographic studies (data taken from Binford 2001, Tab. 5.01).

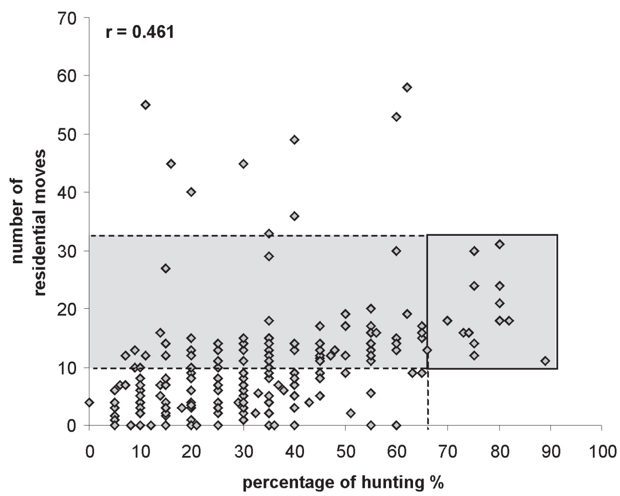

Fig. 18-28 Scatter plot of percentages of hunting in food procurement (x-axis) and numbers of residential moves in an annual cycle (y-axis) in 361 hunter-gatherer groups documented in ethnographic studies (data taken from Binford 2001, Tab. 5.01).

correspond to low population densities between 0.004 and 0.073 individuals per 1 km^2. However, it is not possible to transfer directly the sizes of the annual ranges reported from recent historical hunter-gatherers, as they stem partly from moves made by boats and / or horses. Both cultural elements are not known from the Middle Palaeolithic (but cf. Richter 2005d). But still, if the results of stable isotopes analyses are taken as an indicator for high percentages of hunting in the Neanderthal subsistence pattern, then ethnographical data would suggest that Crimean Middle Palaeolithic settlement patterns were characterised by a moderate number of long residential moves within large annual ranges, and low population densities. However, ethnographical data is not Palaeolithic reality, and it is far from certain that what has been said also applies to the southeastern European during the Last Interglacial and to glacial environments, or even to Neanderthal groups – which still have to prove that they were able to act like complex hunter-gatherers.

To examine the subsistence strategies of Palaeolithic hunter-gatherers, two models of resource acquisition may help to formulate expectations which can be tested for their validity when compared to the archaeological data at hand: foragers and collectors (Binford 1980; cf. Binford 1983). Both are socially organised in units of different social density, ranging between 5 to 20 individuals. According to Clive Gamble (1999), 5 individuals make up intimate (family) groups, which represent all day social, as well as economic bounds, and consist mainly of near relatives. Up to 20 individuals join effective groups which might cooperate (seasonally?), but easily split into intimate groups if resources become scarce. Foragers (Fig. 18-29) gather goods on a daily basis, e.g. all members of the group who (alone or in a task group) participate in the search for resources return every afternoon or evening to a residential base or residential camp, defined as *"the locus out of which foraging parties originate and where most processing, manufacturing, and maintenance activities take place"* (Binford 1980; cf. Binford 1983, p. 343). In general, the amount of planning is low. Resources are treated on an encounter basis, which – in most cases – leads to "low bulk" procurement. As procurement itself is organised as daily trips, a small area around the residential camp, the foraging radius, is investigated intensively. In cases of successful hunting or gathering, resources are processed at particular locations, *"a place where extractive tasks are exclusively carried out"* (Binford 1982; cf. Binford 1983, p. 359). Due to the accidental character of the activity carried out at each location, and the limited quantities procured, times of occupation are short and the density of discarded tools produced from local raw materials tends to be low. Today, most foragers are found in largely undifferentiated habitats, such as tropical rain forests or other equatorial settings.

On the other hand, collectors (Fig. 18-29) are confronted with habitats characterised by spatial and temporal incongruity of resources. Instead

region	name	population	area (sqkm)	population density (in pers./sqkm)	acquisition of resources: gathering	hunting	fishing	number of residential moves	annual distance of residential moves (in km)
Northwest Territories	Dogrib	1590	180,900	0.009	3.0	66.0	31.0	13	450
Saskatchewan	Chippewyan	2850	619,400	0.005	5.0	70.0	25.0	18	496
Quebec	Naskapi	400	96,000	0.004	1.0	73.0	26.0	16	420
Quebec	Mistassini Cree	450	77,900	0.006	0.9	74.0	25.1	16	450
Argentina	Ona	3497	48,100	0.073	5.0	75.0	20.0	24	320
Alberta	Blackfoot	2425	70,000	0.035	20.0	75.0	5.0	30	540
Northwest Territories	Satudene	825	150,000	0.006	5.0	75.0	20.0	14	375
Alaska	Noatak Inuit	550	25,000	0.022	0.1	75.0	24.9	12	360
Colorado	Cheyenne	2750	57,000	0.048	15.0	80.0	5.0	18	390
Wyoming	Crow	4650	80,000	0.058	20.0	80.0	0.0	31	570
Montana	Gros Ventre	2260	67,000	0.034	20.0	80.0	0.0	24	420
Alberta	Peigan	1525	60,000	0.025	20.0	80.0	0.0	21	560
Alberta	Sarsi	700	40,000	0.018	10.0	82.0	8.0	18	440
Alaska	Nunamiut Inuit	240	24,900	0.010	0.1	89.0	10.9	11	501

Table 18-13 Overview of hunter-gatherers with more than 60 percent of hunting in their acquisition of resources.*
* data from Binford 2001, Tab. 5.01

of strategies that seek to procure resources on an encounter basis, deeply planned tactics based on the transportation and storage of food resources are needed. As one critical resource may be found near a residential camp, e.g. near the consumers, while others are located in distances that exclude the return of parties that left for acquisition within the same day (Binford 1980; cf. Binford 1983, p. 351), logistically organised *"special task groups leave the residential camp to specifically selected locations judged most likely to result in the procurement of specific resources (in specific contexts)"* (Binford 1980; cf. Binford 1983, p. 345). During these logistical moves, procurement parties search and exploit areas far beyond the foraging radius, which rarely exceeds 6 miles around the residential camp. For the logistical radius, L. R. Binford (Binford 1982; cf. Binford 1983, Fig. 24.1) gives an idealised maximal distance of 25-30 miles. To accommodate task groups operating so far from the residential camps, and to process and prepare gear for transportation, field camps are erected. From these, stations are visited to gather information (e.g. about seasonally moving herds), or for awaiting the prey (Binford 1980; cf. Binford 1983, p. 347). In many situations, the survival of collectors depends on a small number of producers who, therefore, procure resources for groups larger than themselves ("large bulk"). At the same time, they seek to procure high quantities which they store to overcome the temporal incongruity of resources, caused mainly by a short growing season. Because they rely on patchy resources, collectors are dependent on optimal equipment and will curate tools (Binford 1977, 1979). Equally, they will carry prepared raw material while moving logistically, and establish caches for future activities in the same area.

In sum, residential placement in logistical systems *"is a compromise strategy relative to already known resource distributions, while forager strategies emphasize tactics aimed at learning about the distribution of resources in a region. Foragers emply coverage tactics, while collectors site patterning derives from positioning tactics relative to a prior knowledge of resource distributions"* (Binford 1982; cf. Binford 1983, p. 361). Therefore, foragers *"move consumers to goods with frequent residential moves, while collectors move goods to consumers with generally fewer residential moves"* (Binford 1980; cf. Binford 1983, p. 351). At the same time, foragers exploit a foraging radius on a daily encounter basis, producing a "low bulk" of resources, while collectors additionally exploit a logistical radius by moving skilled task groups to specific resources expected to return a "large bulk". Finally, collectors store food at least for part of the year to avoid seasonal shortage, while this is by and large not necessary for foragers. Table 18-14 summarises the sites left behind in each subsistence system, and features of the material culture expected at these sites in an archaeological context (irrespective of the fact that sites might be re-visited for different purposes). Basically, logistical tactics lead to a higher number of site types, which include the residential camps and locations of foraging subsistence systems, as well as field camps and stations for the special task groups, and as caches for food storage and the preparation of future returns into the same region. Thus, we have to expect a larger inter-site variability of sites than in foraging systems (Binford 1980). In addition, logistical collectors should search for large bulk of specific resources, leading to kill and butchering locations that are dominated by several individuals of the same species killed at the same event. If these locations are palimpsests, it is more likely that we find higher numbers of MNI, than an enlarged diversity of species. As procurement activities are planned, prepared raw material and tools or blank should be carried around by special task groups for retooling and rehafting (Binford 1977; 1979). Special task groups accommodate in field camps, where distant lithic raw material, as well as extraction and, in parts, consumption of food resources should be found. On the other hand, foragers will leave behind only two kinds of sites, residential camps and locations. Activities are not planned beforehand, and therefore raw material distances should be local. If visited only once, kill locations should bear evidence for small numbers of individuals only, or, if it is a palimpsest, a considerable diversity of species. Which features of each subsistence tactic can be found in the Crimean Middle Palaeolithic, and which of these are indicative of site types?

Camps and stations of the WCM and Micoquian: testing the ethnographical models

Stations

To begin with, the Western Crimean Mousterian stations of types A and B, as well as the Crimean Micoquian stations of type B, produce "large bulk", a point that will be discussed in greater detail below. Sufficient to say that the killing of a herd of female horses, partly with their foals, at Kabazi II would suggest either a high number of consumers and / or the conservation and storage of meat resources over a certain period. The fact that considerable portions of meat bearing parts were transported from the site (*"reverse bulk"* / *"reverse gourmet"* strategy)

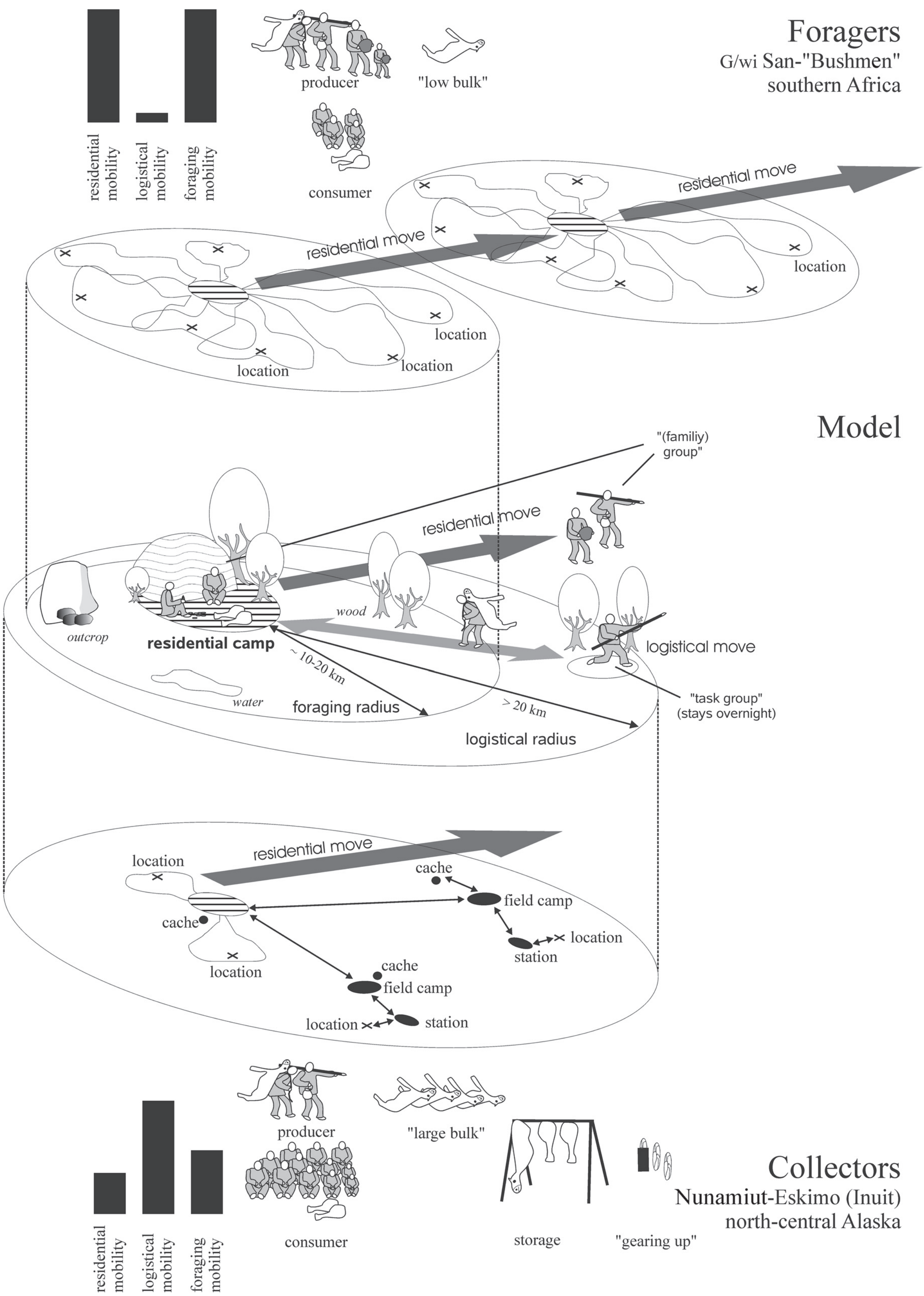

Fig. 18-29 Models of land use patterns for foragers (above) and collectors (below), compared to a general model of land use around camp sites (middle)

features of settlement pattern (L. R. Binford 1980)		time of activity	structures	expected archaeology: artefacts	expected archaeology: fauna	foragers	collectors
	cache	short	pit(s) with or pile of objects	ready made artefacts, low diversity	one species, meat bearing parts		■
	station	short (minutes to hours)	none	(if not palimpsest) low scatter of artefacts	none		■
	location	short (hours)	none	(if not palimpsest) low scatter of similar artefacts	one species, complete carcasses, export of meat bearing parts	■	■
	field camp	medium (days)	fire place(s), concentration(s)	high amount of imported items/rejuvenation, extraction of raw material (?)	one species, (complete carcasses), some onsumption, export of meat bearing parts		■
	residential camp	long (weeks to seasonal)	all	high density of artefacts, all stages of flaking, high diversity of tools, export	several species, (complete carcasses), import of meat bearing parts, consumption	■	■

features of subiststence pattern	foragers	collectors
intersite variability	low	high
storage	no	yes
residential mobility	high	low
settlement pattern (Mortensen 1972)	circulating	radiating
spatial organisation of resources	homogeneous	incongruous
conceptual basis for procurement of resources	encounter	specific
bulk at procurement	low	large
consumers	few	many
producers	many	few

Table 18-14 Main features of foraging and logistical strategies of resource procurement (according to Binford 1979, 1980) and archaeological expectations drawn from them.

speaks not only for the acquisition of resources for social units that might well exceed the size of intimate family groups, but at the same time proves the existence of residential camps which were supplied by these kill and butchering locations. In addition, the successful hunt of small herds almost certainly required the observation of the future prey and the cooperation of several (experienced?) hunters, even if the horses were simply driven over the cliff. Therefore, stations of types A and B are considered as the remains of (kill and butchering) locations and their corresponding stations, e.g. hunting stands. Finally, the recurrent presence of the same pattern of hunting strategy and faunal exploitation clearly speaks against an acquisition on an encounter basis. Apart from some levels at Kabazi II in which *Saiga tatarica* was killed in low numbers, probably pointing to an independent reuse of the site, *Equus hydruntinus* is the dominant species – even in cases where archaeozoological and / or sedimentological reasons speak for a palimpsest. All this points to a specific procurement of resources at locations and stations, an assumption that is supported by the need of raw material transportation to stations of type B before the end of MIS 4 or the beginning of MIS 3. Afterwards, local outcrops became accessible after further incisions of the Crimean river systems. In this, a *"strategy relative to already known resource distributions"* (Binford 1980; cf. Binford 1983, p. 346) becomes apparent. The question as to where these locations and stations were situated within the system of moves around the residential camp is another matter. If raw material distances are taken as an indicator of distances to residential camps, than both have to be placed in the foraging radius: stations of type A have a strictly local supply of lithic raw materials, and stations of type B are supplied by moves with distances that rarely exceed 10 km. However, this assumption is perhaps erroneous, as it suggests that lithics are a key resource that influenced the choice for the position of the residential camp. Instead, lithic raw materials were most probably procured within embedded strategies (Binford 1979; cf. Binford 1983, p. 273-274). Even more, in the case of stations of type A, it excludes the possibility that the extraction of a specific resource, e.g. the horses, and the encounter search for other resources, e.g. lithic raw material (and saiga antelope), were separated activities in time. Finally, stations and locations are no field camps. This leaves it open to speculation whether the moves from stations of type A and B led to residential camps – or to field camps.

From a qualitative point of view, true field camps would match best the stations of type C, which are only known from the early Crimean Micoquian at Kabazi II, Units VI and V. In between the processing of the kill and the export of meat, perishable or less qualitative parts of the prey like tongue, brain and marrow were consumed, and fireplaces were kept. It is conceivable that these sites accommodated special task groups that returned to the residential camp after several days of hunting horses. The residential camp was most probably located in the Alma Valley, at a distance of some 7 km, and from where the lithic raw material originates. Whereas it must remain open to question as to whether the distance of raw material transportation is far enough to assume a logistical move, part of the fauna itself causes some doubt about the classification as a field camp. The main reason for this is the low amount of meat processed in some levels: especially in Unit V, the MNI of horses calculated for each level ranges between 1 and 3. In Unit V, the MNI of killed horses slightly increases, and ranges between 2 and 5 in Unit VI, respectively. Where is the boundary between "low bulk" and "large bulk"? Certainly, this is a question of group size: whereas 1 horse with a living weight of 180 kg can give up to 90 kg of eatable meat (which is undoubtedly "low bulk"), 5 horses must be calculated with 450 kg, which is "large bulk" for a family group of five persons. Perhaps the differences in the bulk of meat result from differences in the season of occupation, or short-term fluctuations of the horse biomass after dry or cold years.

In sum, Crimean Middle Palaeolithic stations can, on the one hand, be put on a par with stations and locations, and, on the other, with field camps. The focus on the hunting of one species, *Equus hydruntinus*, sometimes in areas distant to raw material outcrops, and the export of meat bearing parts, often in portions considered as "large bulk" for storage, points to logistical strategies of resource procurement.

Camps

Concerning the distinction between foragers and collectors, residential camps are less diagnostic. For example, not only collectors, but also foragers will prepare carcasses for transportation when the killed animal is heavy, or temperatures are high (Binford 1980; cf. Binford 1983, 343). Therefore, import of meat bearing parts is a feature which might appear in residential camps of both systems. Furthermore, Crimean Middle Palaeolithic sites discussed as residential camps come mainly from rock shelters characterised by slow to medium sedimentation rates. As a result of this, and in part due to comparably thick excavation units, assemblages from Shaitan-Koba, Kabazi V, Zaskalnaya V, Zaskalnaya VI, Buran-Kaya III, and perhaps Starosele I (Chabai 2004c; Chabai & Patou-Mathis 2006) result from the accumulation of several visits in a palimpsest. Thus, the overall diversity of species and the total amount of meat available might be inadequate features for a classification of the procurement and processing strategies of food resources. Nevertheless, there are some features found in residential camps of the Crimean Middle Palaeolithic which are worth mentioning in respect of the subsistence strategies applied. The provenance of lithic raw materials found at camps of type A is without distinction of local origin, which could be taken as an indicator of moves in the foraging range only. If moves led special task groups to distant field camps in the logistical range, one would expect at least some "exotic" raw materials, which is not the case. While this argues for a foraging system of resource acquisition, the numerous horses killed during one stay at the Crimean Micoquian site of Kabazi V, level III/2, and the – admittedly problematic – diversity and amount of the prey at the Western Crimean Mousterian site of Shaitan Koba correspond to features expected from residential camps of collectors: "large bulk", and long times of activity. Additionally, two Crimean Micoquian camps of type A yielded direct evidence for caching. In Zaskalnaya V, layer III, 84 blanks from one core were deposited in a small pit, as were eight bifacial tools at Zaskalnaya VI, layer II.

At camps of type B, the exploitation of fauna documents the consumption of meat resources mainly procured in the immediate vicinity of the sites. In general, bulk tends to be low. At Karabi Tamchin, level VI/2, some 3 (!) *Equus hyduntinus* spread over several visits of a palimpsest. If intimate family groups were assumed to be the consumers, than the meat of an adult horse would have lasted for 5 days. In the Crimean Micoquian, it seems as if hunting was supplemented by scavenging of species other than the preferred hunting prey. At first glance, camps of type B seem to reflect foraging tactics, with an acquisition of resources on an encounter basis. Important arguments against such a conclusion are the long raw material distances of 25 to 30 km, which – at least in the case of the Crimean Micoquian – reveal cautious planning of residential moves. In Chokurcha I, Unit IV mainly large bifacial tools, accompanied by large flakes, were imported and then object of recurrent rejuvenation, the latter being the source for blanks modified into simple tools (Chabai 2004b, p. 415). The initial size of imported items at Chokurcha I, Unit IV and Karabi Tamchin, levels IV/2 and V suggests that residential moves in the Crimean Micoquian were done in one step. On the other hand, Western Crimean Mousterian assemblages at Karabi Tamchin show a scale of lithic reduction which is best explained by a use of tools at intermediate camps between the outcrops and the site itself. However, in both industries camps of type B seem to indicate phases of dietary stress, well known to ethnographic hunter-gatherers regardless of their subsistence strategy (Pasda 2002). In the case of Chokurcha I, dietary stress might be caused by the season of occupation during spring or late autumn / early winter, at which time animals were emaciated and / or on the move between summer and winter ranges. Alternatively, phases of general climatic deterioration, as supposed for the exploitation of the high plateaus of Karabi Tamchin, might have reduced critically the abundance of resources in lower altitudes. The conclusion to be drawn from what has been said above is as ambiguous as the archaeological data itself. In phases of severe dietary stress at the end of the cold season, Crimean Micoquian hunter-gatherers were moving the entire group over a large distance to Chokurcha I. The aim was to come near to a critical resource. Most probably, this specific resource represented carcasses of animals which had accumulated following flooding in the valley of the Salgir (as supposed for Starosele level 4 by Burke 1999, p. 7). The distance of the residential move alone speaks for previous logistical moves which would have reached the new foraging area, and / or an exploitation of already known resource distributions. While this has some aspects of logistical strategies, Western Crimean Mousterian groups were searching for their preferred prey, *Equus hydruntinus*, by a series of residential moves into high altitude environments. In this case, the search for resources has the character of an encounter strategy, rather than featuring prior planning.

Given their features, camps of type C are classical representatives of sites used by collectors. At the only camp of type C known so far in the Crimea, Prolom II, distant raw material from outcrops near Sary Kaya, some 15 km from the site, would correlate with logistical moves, while local raw materials were procured during movements in the foraging radius. However, the case of Prolom II is weak: given the palimpsest character of the assemblage, it is far from certain that both raw materials were used simultaneously. In addition, the human impact on the faunal assemblage tends to be low (Enloe, David, Baryshnikov 2000).

Camps of type D are Crimean Micoquian residential camps which were supplied by food resources obtained at locations near to the site. In cases where modern archaeozoological analyses were conducted, e.g. Starosele level 1 and Buran-Kaya III level B, they speak in favour of specialised hunting of one species, and – even if palimpsests existed – an acquisition of food that resulted in a "large bulk" of meat. Thus, the procured resources were specific in that their acquisition was selective, planned, and therefore based on prior knowledge of animal behaviour and their ranges. In this regard, logistical tactics were applied. Raw materials stem from distances of between 12 km and 30 km, showing that the availability of lithics in general was not a limiting factor in Crimean Middle Palaeolithic subsistence strategies. Comparable to Crimean Micoquian camps of type B, consumers and producers moved over long distances near to the critical resource; and again, imported raw nodules, furthermore, the initial size of the imported bifacial tools points to direct moves. But this time one has the impression that the hunting was more successful, and the times of activity therefore longer. This, and the scarcity of local raw material, explains the degree of reduction found in assemblages of the Kiik Koba facie of the Crimean Micoquian. However, residential movements and moves of parties searching for food were following foraging strategies in that consumers were brought to the resource and activities related to hunting occurred within the foraging radius.

Conclusion: Crimean Middle Paleolithic hunter-gatherers as collectors

The comparison between different types of Crimean Middle Palaeolithic stations and camps on the one hand, and the features of sites in two models of subsistence strategy on the other, has revealed the following (Table 18-15):

1. Data from stations indicates the existence of logistical tactics in the Crimean Micoquian and the Western Crimean Mousterian. Western Crimean Mousterian stations of types A and B, and Eastern Micoquian stations of type B are the remains of hunting stands and kill locations that produced "large bulk" of specific resources, e.g. horses, transported to the consumers, and / or stored. Crimean Micoquian Stations of type C were recognised as field camps.

features of settlement pattern (L. R. Binford 1980)	Stations, Type A	Stations, Type B	Stations, Type C	Camps, Type A	Camps, Type B	Camps, Type C	Camps, Type D
cache (field storage)							
field camp			advanced phases of *chaîne opératoire*, kill/butchering and consumption and export, specific procurement, logistical radius?				
station / **location**	initial phases of *chaîne opératoire*, kill/butchering and export, encounter procurement? (but: large bulk), foraging radius	advanced phases of *chaîne opératoire*, kill/butchering and export, specific procurement (large bulk), foraging radius?				?	
residential camp				initial phases of *chaîne opératoire*, import and consumption of meat	advanced phases of *chaîne opératoire*, kill/butchering and consumption, encounter procurement, foraging radius	initial and advanced phases of *chaîne opératoire*, import and consumption of meat?	advanced phases of *chaîne opératoire*, import and consumption of meat, specific procurement
cache (residential storage)	due to amount of meat: highly likely	due to amount of meat: highly likely		CM:			
Crimean Micoquian		■	■	■	■	■	■
Western Crimean Mousterian	■	■		■	■		

Table 18-15 Resource procurement in Crimean Middle Palaeolithic.

2. Camps yield ambiguous information. While residential camps of type A and C speak for logistical strategies, camps of type B and D are indicative of foraging tactics. As camps belonging to both groups are found in the Crimean Micoquian and the Western Crimean Mousterian, both industries are affected by this ambiguity. Such foraging tactics seem to be independent of the availability of resources, since they were observed at sites visited during phases of abundance, such as Buran-Kaya III, level B/B1 (during summer: Patou-Mathis, 2004a, p. 105) and Starosele, level 1 (during late summer: Burke, 1999, p. 25), as well as at sites visited in times of dietary stress, such as Chokurcha I (Pathou-Mathis 2004b).

3. Despite their chronological position and spatial distribution, some of the stations lack camps which would correspond to the large amounts of exported meat. These are the Western Crimean Mousterian stations of types A and B, with the exception of Shaitan Koba, which is an uncertain candidate, given the stratigraphical problems excavators faced at this site. There is no camp that would have received such "large bulk" as that produced at Kabazi II, Units II and IIA.

When compared to the expectations deduced from ethnographical models, the incompleteness of the archaeological data is underlined if chronology is considered. Even if marine isotope stadiums are the shortest chronological entity analysed, the discontinuity of the Crimean Micoquian data becomes apparent. During MIS 5d, stations of type C are the only class of occupation known. Since these were identified as field camps in a logistical subsistence strategy, it has to be assumed that residential camps and stations of different functions existed. During MIS 5b, MIS 5a and MIS 4, the situation is similar: the corresponding camps to the only type of station, type B, are not yet located. It is only during MIS 5c and MIS 3 that a combination of stations and camps is documented in the archaeological record. For the Western Crimean Mousterian, the situation seems to be less complicated. All sites date to MIS 3. On

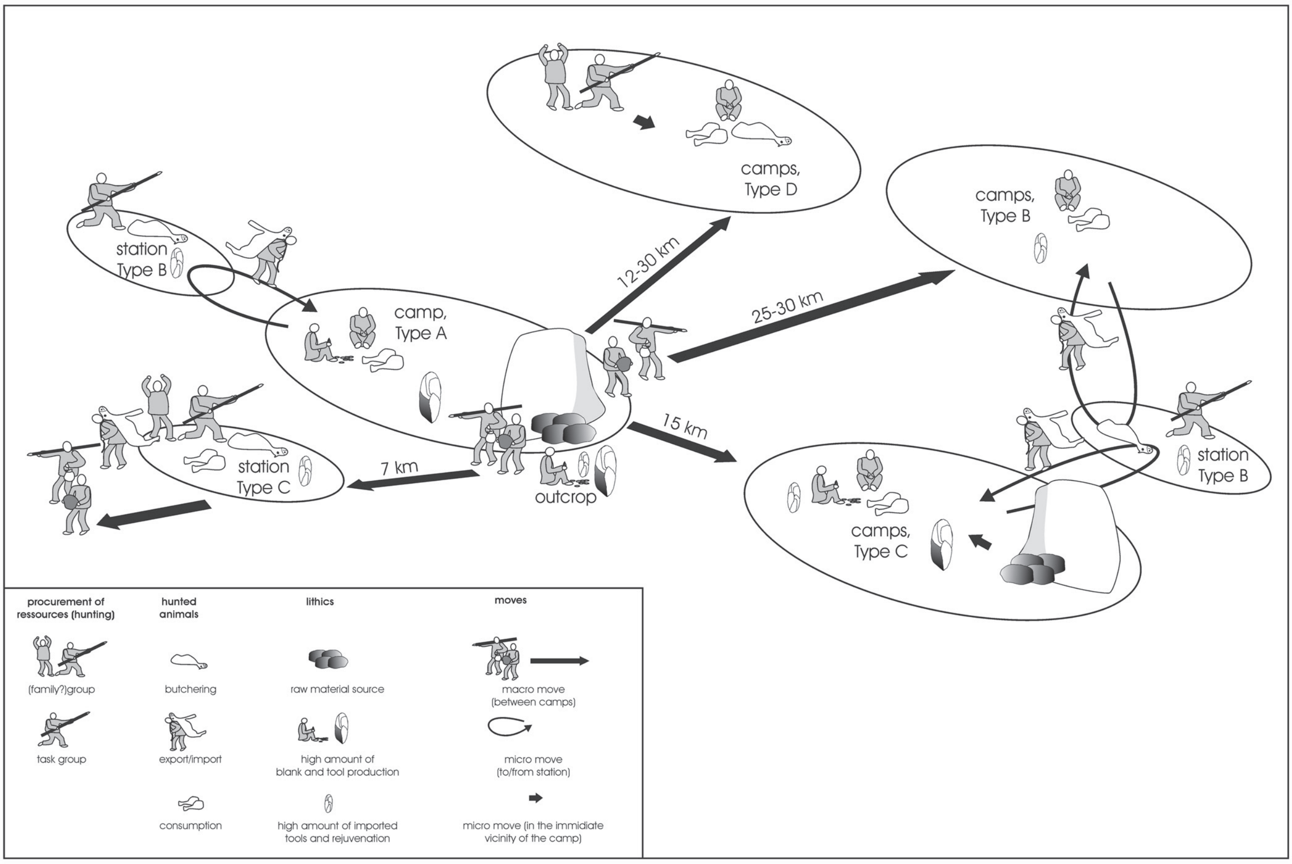

Fig. 18-30 Crimean Micoquian: settlement system.

the other hand, if such a low chronological resolution is accepted as reflecting essential features of long lasting traditions, than the inter-site variability seen during MIS 3 can be taken as another argument for the hypothesis that Crimean Middle Palaeolithic hunter-gatherers lived as collectors. This hypothesis is further strengthened by curated technologies reported from the Crimean Micoquian (Richter 2004; Kurbjuhn 2005). They again speak for a preparation for anticipated periods, rather than encountered subsistence strategies. And, finally, a classification as collectors would also correlate best with the paleo-environment: from MIS 5 until MIS 3, open landscapes prevail. Even in MIS 5d, habitats were not undifferentiated, but showed an admixture of steppe and forested areas. In these south-boreal forest / forest-steppe environments, as well as in the northern-boreal forest-steppe environments of MIS 4 and the south-boreal / northern-boreal forest-steppe environments of MIS 3, biomass varied both spatially and seasonally. It has already been mentioned that a meso-scale simulation revealed mean temperatures for the Crimea of 20-25°C for the summer, and -4-0°C for the winter. Again, the postulated focus of the Crimean Micoquian and the Western Crimean Mousterian on logistical tactics for resource acquisition matches the expectation that *"the greater the seasonal variability in temperature, the greater the expected role of logistical mobility in the settlement of ´positioning´ strategy"* (Binford 1980; cf. Binford 1983, p. 351).

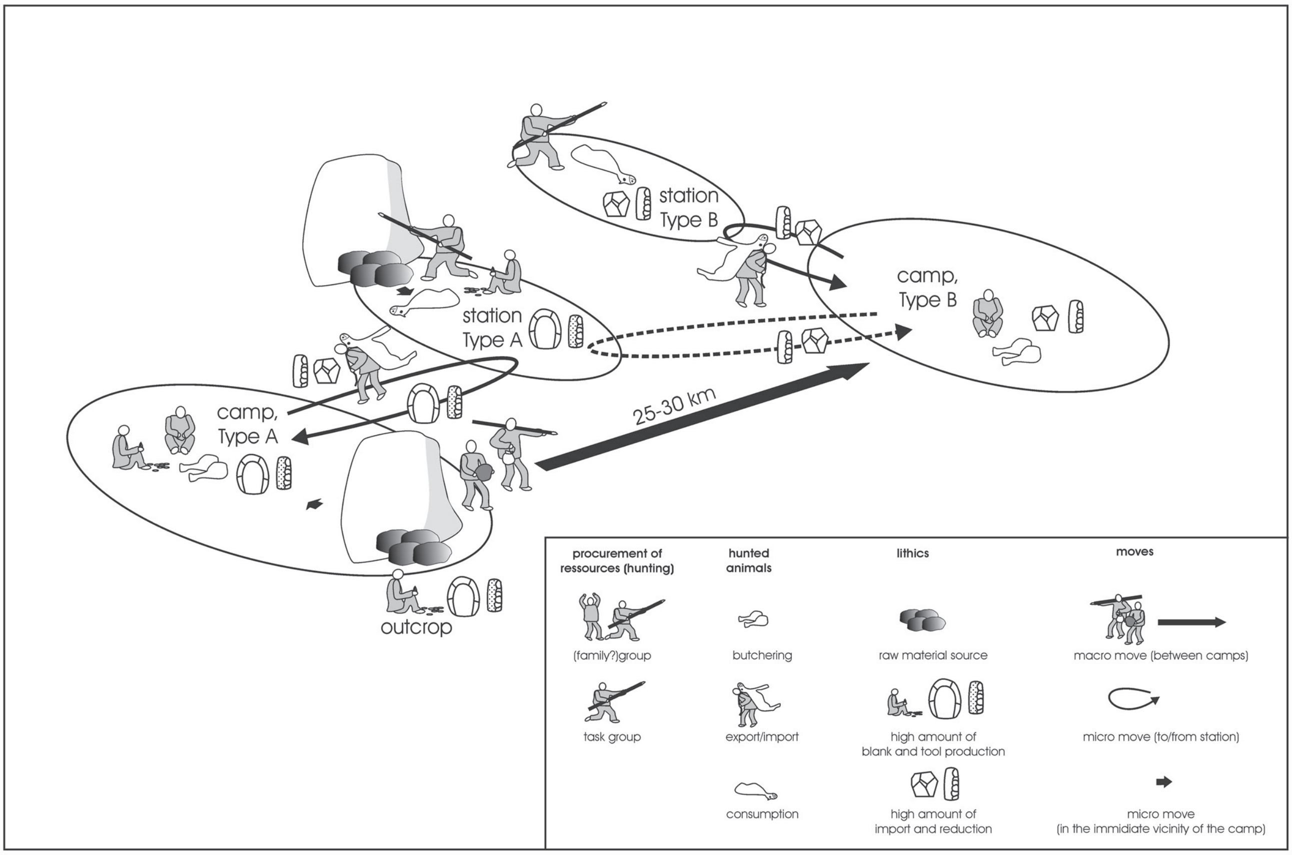

Fig. 18-31 Western Crimean Mousterian: settlement system.

Settlement Patterns: Territories of Resource Procurement in the WCM and the Crimean Micoquian

Both groups of the Western Crimean Mousterian and the Crimean Micoquian exploited two ecologically different regions, the sub-mountains of the second ridge and the mountains of the first ridge. During MIS 5, Micoquian camps (type A and probably type B) and stations (types B and C) were known in the Crimea (Fig. 18-17). These settlements existed under relatively humid south-boreal forests to boreal-south forest steppe conditions in the sub-mountains and mountains. At the time of MIS 4, only Micoquian stations of type B are known (Fig. 18-17).

During MIS 3, groups of the Crimean *Micoquian* and the Western Crimean *Mousterian* hunted and gathered in the sub-mountain region. However, Micoquian settlements are not known in the mountain region. With the onset of MIS 3, environmental conditions changed in so far as that the Interpleniglacial conditions led to a gradual aridification of the climate. Parallel to this, the regression of the Black Sea led to rivers deepening their beds. These changes of climate and topography, though mild if looked upon from a global point of view, influenced the floristic and faunal communities of the Crimea. This is reflected by the constantly growing importance of xerophytes, which are characterised by relatively short growing seasons and a low amount of green mass above the surface, in the grass cover. All of this must have forced the ungulates, the main quarry of humans, to increase their mobility both on a regional and annual level.

The sub-mountain model

Seeing as kill and butchering stations are known from both the "summer" and "winter" seasons, it cannot be excluded that the sub-mountain region was inhabited the whole year round by hunter-gatherer groups during the Crimean Middle Palaeolithic. In the sub-mountains, three different kinds of occupations existed – kill and butchering stations, camps and "self-sufficient" camps of type D, whereby the latter are known only for the Crimean *Micoquian*. Except for the type D self-sufficient camps, stations and camps were functionally dependent and connected by meat and artefact transportation (Fig. 18-30, 18-31): parts of the dismembered animals were transported from the kill and butchering stations to the camps for further consumption, as were artefacts. Perhaps, the movement of artefacts was not confined to movements between camps and stations only, but took place also between camps. Within the model, flint outcrops are of special importance in that they are the sources for the supply of both camps and stations. It can be suggested that raw material sources were well known, often visited either in search for raw material, or, even more probable, when passed by in the frame of other activities and then, during a halt, used for the (embedded) procurement of raw nodules. They certainly had a central function in human cognition of the landscape, and thus influenced the routes that were chosen.

The variety of kill and butchering stations

There are chronological and environmental differences between Micoquian and Mousterian killing-butchering stations. All known Micoquian killing-butchering stations were found in deposits corresponding to MIS 5, MIS 4, and the very beginning of MIS 3. On the other hand, WCM kill and butchering stations correlate with MIS 3. At most of the WCM kill and butchering stations, blanks were produced from cores (stations, type A) in a "site-workshop" model. In some kill and butchering stations, the frequency of imported tools was high, and on-site flaking minimal, speaking for a "tool user" model of raw material exploitation (stations, type B). In the Crimean Micoquian kill and butchering stations, the main feature of raw material treatment is the import of tools, regardless of the distance to the raw material sources (Fig. 18-30). In the case of stations of type B, *Mousterians and Micoquians* applied the same model of raw material and faunal exploitation in functionally similar to identical occupations. On the other hand, kill and butchering stations of type C are unknown for the WCM, whereas kill and butchering stations of type A never occurred in the Crimean *Micoquian*. The use of fire at kill and butchering stations of type C, and the limited consumption of hunted and scavenged animals, shows that this type of occupation is close to the type B of *Micoquian* camps. However, butchering activities were less pronounced at camps of type B.

The variety of camps

In the sub-mountain region, Micoquian camps are far more variable than those of the Western Crimean Mousterian: three types of camps were identified for the Micoquian, but only one for the WCM. Micoquian camps are known from MIS 5 and MIS 3. Given the uncertain nature of the data, it is not entirely resolved whether the only WCM camp at Shaitan Koba upper level indeed belongs to MIS 3. For the Western Crimean *Mousterian*, only one model of raw material exploitation is known: on-site core reduction and production of tools – the "site-workshop" model (camps, type A). When camp types were the same, *Micoquians* treated the raw material in the same way (Fig. 18-30, 18-31). As at kill and butchering stations of type B, WCM and *Micoquians* used the same model of raw material and faunal exploitation during functionally identical occupations of camps of type A. Chronologically, it is well possible that the WCM occupation at Shaitan Koba, upper level and the Micoquian occupations at Zaskalnaya V, layers I, II and III coexsisted. The remaining camp types (B, C, and D) occur only in Crimean Micoquian sites and are unknown to the WCM in the sub-mountain region. The main difference between these types of occupation lies in the model of raw material exploitation: camps of types B and D belong to assemblages in which the "tool users" model was recognised, and camps of type C display an admixture of the "tool user" and "site-workshop" models. In addition, some camps of type D were maintained by local kill sites, and were therefore not dependent on more distant kill and butchering sites. The latter, e.g. a procurement of meat at special kill and butchering sites, accounts for camps of types A, B and C (Fig. 18-30).

The functional dependance of camps and specialised kill and butchering sites is a classical attribute of a radiating settlement system in the sense that most part of the group ("consumers") stayed at camps (types A, B and C), while hunters ("producers") procured specific resources at stations (types A, B and C). However, there is no evidence for longer stays at the camps. The "consumers" inhabited the camps during two, maximum three hunting events – and it is far from certain whether these hunting events were the result of one continuous stay, particularly as many occupation layers at camps show all attributes of palimpsests. If this were true, stays would have been relatively short. Thus, it is not unlikely that the mobility of the entire group, e.g. residential moves, were closely related to the richness of resources in the vicinity of the camps, the latter supplied by logistical strategies. As resources varied substantially, residential moves were numerous and followed the movements of ungulates. Nevertheless, these moves were planned carefully on grounds of prior knowledge, rather than being the result of a search on an encounter basis. It has been said before that the overall impression of logistical procurement tactics is somehow cut back by the short duration of stays at camps and short distances between camps and stations. Thus, the sub-mountain settlement pattern combines attributes of radiating and circulating settlement models and the degree of mobility similar to the circulating model.

The mountain model

Karabi Tamchin is the only site which belongs to the mountain model. Both WCM (level II/2 and III) and Micoquian (levels IV/2 and V) occupations were found here. According to A. Yevtushenko et al. (2004), it is possible that levels V (MIS 5) and IV/2 (MIS 3) are separated by a considerable chronological gap.

Within an annual cycle, the occupations in the mountain regions date to late autumn, but almost certainly avoided the winter season. This assumption is based not only on the fact that even today winter conditions are more than uncomfortable, but also on foetal horse bones found in Karabi Tamchin, level III. The inhabitants of these camp occupations consumed already dismembered parts of animals. The dismembering itself must have taken place at kill and butchering stations not yet located in this region. The hypothetical kill and butchering stations should be located in a distance of no more than 10 km from any camp on the Karabi Plateau, simply because the latter covers an area of about 100 km^2. According to A. Burke (2004), the primary butchering at Karabi Tamchin occurred near the site.

Tools and raw material from flint outcrops located in a distance of 30 km from the site supplied the camps in the mountain region. The Western Crimean Mousterian inhabitants of Karabi-Tamchin applied a combination of the “site-workshop” and “tool user” models of raw material exploitation. Crimean Micoquian groups preferred the on-site utilisation of imported tool-kits. These differences are one of the most important behavioural differences between the two industries, Crimean *Micoquian* and Western Crimean *Mousterian*. The former always preferred the import of tools, irrelevant of whether raw material was scarce (Karabi Tamchin and Chokurcha camps) or abundant (Sary Kaya kill and butchering station), while the latter were focused on the on-site flaking of cores, again independent of the distance towards the raw material sources, which varies between 30 km and more local distances (Maier, Chapter 6; Uthmeier, Chapter 10).

Like the settlement pattern of the sub-mountain region, the mountain model was based on the radiating settlement system and with a mobility level characteristic of circulating settlements.

Discussion and Conclusion

Similarities between the mountain and sub-mountain models of resource exploitation comprise the coexistence of kill and butchering stations and camps (Fig. 18-30, 18-31). According to faunal analyses, the main difference between the two models lies in the season of the year: the mountain region was visited during late autumn, whereas the sub-mountain region might have been inhabited all year round. However, although the seasons of death of the hunted game show that humans were on the move in the sub-mountain region all year round, this does not mean that their presence in this area, or even on the Crimea, was continuous. All occupations are chronologically distinct, separated from each other by considerable temporal gaps. Essential for the question of a year round presence in the sub-mountain region are the annual movements of ungulates, and – related to this – the carrying capacity. Ethnographical studies (Pasda 2002) indicate a recurrent collapse of reindeer populations in Greenland under Holocene conditions, probably due to natural causes. After modelling the quantities of grass and herbs in the Upper Danube Valley, J. Hahn (1995) came to the conclusion that only one herd of horses lived in the vicinity of the Buttentalhöhle. In this respect, one event, the killing of several horses found in the Magdalenian level of Buttentalhöhle, would have represented a severe ecological intervention which might have endangered the survival of the local herd. It is not entirely certain whether this also applies for the Crimea, but these two examples point to rather low carrying capacities, and a certain fragility of at least some Upper Pleistocene interstadial habitats. Thus, the question whether an all year round presence of human hunter-gatherers in the Crimean sub-mountain region would have been possible is still open to debate, and requires further investigations.

However, the mountain model required more planning, and certainly more calories. Perhaps, the decisions to move residential camps into the mountains were made at times of dietary stress. In the Upper Pleistocene of the Crimea, dietary stress could have occurred during dry interpleniglacial summers during which arid periods led to an early withering of grass in the steppe and sub-mountain regions. This would have forced the ungulates to migrate onto the Alpine pastures of the Karabi plateau (Yevtushenko 2003).

Despite the technological differences between the Crimean Micoquian and the Western Crimean Mousterian, both industries show identical models of land use, have the same overall logistical strategy for the acquisition of resources, and inhabit the mountain and sub-mountain regions. In detail, one type of kill and butchering station (type B) and one type of camp (type A) existed in both industries. On the other hand, WCM and Micoquian mountain camps (type B) display similarities in the exploitation of fauna, but marked differences in the way lithic raw material was supplied: while the Crimean *Micoquian* is characterised by the import of tools, the Western Crimean *Mousterian* used both imported tools and blanks produced on the site from imported cores. In this, differences in the way of artefact manufacture become apparent: because bifacial tools do not play a role in the Western Crimean Mousterian tool kit, the transportation of cores secured the supply of lithics, both on hunting excursions and at future residential camps. In the Crimean Micoquian, bifacial tools are an essential component of the tool kits. Their function is twofold: first, they gave the possibility for recurrent resharpening due to their volume, and second, they served as a source of blanks for unifacial tools obtained in the process of facial reduction. As a consequence, the "tool user" model was more developed in Micoquian settlements, and led to a increased variability within the assemblages that was, at least in part, dependent on the scale of bifacial reduction. Even more, this variability was also reinforced by the fact that during MIS 5 and 4, many raw material outcrops were still covered by sediments. Following the incision of the river beds at the end of MIS 4 and the beginning of MIS 3, more raw material sources became available and enabled humans to apply a "site workshop" model.

Except for camps of type D, each camp received food resources from kill and butchering sites. Territorially, the Micoquian camps of types B and C are not associated with any known kill and butchering station. Moreover, all known Micoquian kill and butchering stations belong to MIS 5, MIS 4 and the very beginning of MIS 3: Kabazi II, Units VI, V (kill and butchering stations, type C), Kabazi II Units III, IIA and Sary Kaya (kill and butchering stations, type B) (Fig. 18-17). Micoquian camps belonging to MIS 5 were found in Zaskalnaya V, layers VI and V (type A) and Karabi Tamchin, layer V (type B). For the Eemian (MIS 5d), the only Micoquian type of settlement known so far is the kill and butchering station of type C (Kabazi II, Units VI and V). During MIS 3, all defined types of camps are documented, but only one type of kill and butchering station (type B). It can be stated that in the frame of MIS 3, or even in a more limited time period, such as 50 – 30 kyr BP, the following Micoquian camp types were known: type A (Zaskalnaya V, I, II, III); type B (Chokurcha I, IV and Karabi Tamchin, IV/2); type C (Prolom II, II and III); and type D (Starosele, 1, Prolom I, Kiik-Koba, upper level and Buran-Kaya, III, B). Moreover, during the same time period all of the mentioned Micoquian camps are contemporaneous with all known WCM camps and killing-butchering stations (Fig. 18-17). The present day data allow only a few, still hypothetical, correlations between camps on the one hand, and kill and butchering stations on the other. Considering the present level of chronological control, it can be stated that one of at least five killing-butchering stations (type B) at Sary Kaya might be functionally tied to camps (type A) from Zaskalnaya V, layers V and / or VI (Fig. 18-17). At present, no camp is known which could be the functional equivalent to kill and butchering stations (types C and B) at Kabazi II dated to MIS 5, MIS 4 and MIS 3. In theory, it would be a local analogy to camps of type A known from Zaskalnaya V, layers V and / or VI.

For the WCM, the situation is more simple and, at the same time, more complicated. Although the camp (type A) at Shaitan Koba, upper level is chronologically close to numerous kill and butchering stations (type A) at Kabazi Unit II, it is not entirely certain whether humans transported parts of the carcasses as far as 7 km from the Kabazi plateau to the Bodrak valley. According to the logistical strategies of resource procurement proposed above, this cannot be excluded. However, there are other candidates for WCM camps at Kabazi plateau, such as Kabazi I and some of the occupations at Kabazi V. Any statement about Kabazi I remains hypothetical since this site was excavated in the mid-1950s, and Kabazi V remains as yet unanalysed. Direct evidence for contemporanity would be refits of lithics from both sites, but such an approach is hindered by the fact that the most part of the Kabazi V material is heavily patinated. Apart from speculations, it is quite clear that all WCM occupations known so far belong to MIS 3 and concentrate in an even more limited period, between 50 and 30 kyr BP (Fig. 18-17). Thus, it might be assumed that the proposed elements of the WCM settlement system, the kill and butchering stations and camps, were indeed connected with each other.

The discussion of the chronology of occupation types raises the question whether low diversity of Micoquian camps and stations during MIS 5 and MIS 4, which contrasts so obviously to the variability observed during MIS 3, is the result of preservation and missing evidence, or the reflection of a special adaptation and / or innovations in the land use pattern? Are there any new types of occupations to come in the frame of future excavations? In this article, asynchronous sites and occupations where used to construct a settlement system, relying on the assumption that they are linked by one tradition of blank production and tool manufacture. Only time and fresh investigations will tell if this assumption is correct.

In the reconstruction of the annual mobility pattern, generally three different kinds of residential moves may be considered (Binford 1982): 1. „half radius continuous“ pattern, mainly found among highly mobile foragers in undifferentiated habitats, such as the San, who do not establish a logistical zone at all (Binford 1982, p. 361). 2. „complete radius leapfrog“-pattern, often found among hunter-gatherers in high biomass environments (ibid.), and 3. „point-to-point“-pattern, mainly found in habitats with low biomass exploited by collectors. Faunal analysis at Kabazi V, level III/2 (Chabai, Pathou-Mathis 2006) revealed a repeated use of the site during two seasons, late summer and spring. The different species hunted, as well as differences in their exploitation, points to the „complete radius leapfrog“-pattern. However, if the origin of raw material flaked at camps is used as a means of tracing residential moves, then the Crimean Middle Palaeolithic groups also followed a „point-to-point“-pattern: distances of 25 to 30 km reconstructed for Buran-Kaya III, Chokurcha I and Karabi Tamchin are beyond the logistical radius of previous camps, and are therefore too far for a „complete radius leapfrog“-pattern. Instead, it is more probable that these moves were stimulated by prior knowledge, either from extended ranges or from past visits. Recurrent visits of identical function within the same sedimentological unit, as at Buran-Kaya III, level B/B1 or Karabi Tamchin, level VI/2, seem to favour the latter. But as sedimentation rates were slow, the idea of extended ranges cannot be rejected either. However, the reconstruction of annual patterns of movement helps to integrate some problematic camps into a collector scenario. It was the camps listed above and classified as types B and D which posed problems, because foraging strategies were applied when consumers, and not special task groups, were moved to critical resources. If the organisation of the residential mobility is considered, they belong to a "point-to-point"-pattern typical for logistical strategies.

Finally, there are some substantial questions that were not answered in this article. It is still amazing to see that there are, apart from differences, marked functional similarities between contemporaneous, yet technologically different industries. One example for this are camps of type A at Shaitan-Koba upper level, which is Western Crimean Mousterian, and Zaskalnaya V layers I, II and III, which are Crimean Micoquian. Given the low overall populations densities during the Middle Palaeolithic, one would assume that the same environment, and the same function of the site, would lead in regions as small as the Crimean Mountains to identical assemblages. However, the opposite is the case. The fact that in the long sequence of Kabazi II, and at Karabi Tamchin, occupations with identical function and local environment vary technologically also points into the same direction. At the moment, there seem to be more arguments for an interpretation of the Crimean Micoquian and the Western Crimean Mousterian as an expression of two different traditions, which then should correspond to distinct social units. Again, future investigations have to prove the validity of this approach.

Abstract

СИСТЕМЫ ПОСЕЛЕНИЙ В СРЕДНЕМ ПАЛЕОЛИТЕ КРЫМА

В. П. ЧАБАЙ, Т. УТМАЙЕР

Исследования систем поселений в среднем палеолите Крыма основаны на анализе около 80 кремневых и фаунистических комплексов происходящих из 16 многослойных стратифицированных памятников.

Для западнокрымского леваллуа-мустье и микока характерны два основных вида поселений: специализированные стоянки по разделке охотничьей добычи и кратковременные лагеря. Как правило, на специализированных стоянках происходила только разделка добытых животных, тогда как на территории лагерей потреблялись части туш предварительно разделанных животных. В свою очередь, стоянки и лагеря подразделяются на ряд типов, отражающих различные модели эксплуатации кремневых и фаунистических ресурсов. Стоянки обнаружены только на памятниках под открытым небом, тогда как лагеря – только в гротах.

Тип А стоянок определен для 15 западнокрымских горизонтов Кабази II, IIA/1 –II/1A. На этих стоянках происходила первичная разделка туш *Equus hydruntinus*. Наиболее ценные в питательном отношении части туш транспортировались за пределы стоянок. Модель использования кремня характеризуется изготовлением и использованием на территории стоянки орудий из принесенных конкреций (модель стоянка-мастерская). Свидетельства использования огня, как, впрочем, и какие-либо конструкции на стоянках данного типа не обнаружены.

Стоянки типа В определены для 11 микокских (Кабази II, III/7 – IIA/4 и Сары Кая, 1-5) и 1 западнокрымского комплекса (Кабази II, IIA/2). Модель использования фауны на стоянках типов А и В практически сходна, тогда как модели использования кремневого сырья существенно отличаются. Для стоянок типа В характерно использование и модификация импортированных орудий при практически полном отсутствии следов первичного расщепления на их территории (модель потребителей). Очаги, ямы и прочие конструкции на стоянках данного типа отсутствуют.

Стоянки типа С были определены на основании анализа 15 микокских комплексов артефактов и фаунистических остатков Кабази II, горизонты V/3 – VI/10. Кроме разделки охотничьей добычи (*Equus hydruntinus*) для стоянок этого типа вероятно собирание падали (*Cervus elaphus, Bison priscus*). Не исключено частичное потребление подобранных и убитых животных, хотя также имеются свидетельства экспорта наиболее ценных в мясном отношении частей туш Equus hydruntinus. Использование кремня соответствует «модели потребителей». Также на территории данных стоянок обнаружены следы использования огня.

Лагеря типа А характерны для 12 микокских (Заскальная V, I – VI, Заскальная VI, II – V, Кабази V, III/1A и III/2) и 1 западнокрымского (Шайтан Коба, верхний горизонт) комплексов. На территории данных лагерей происходило потребление частей туш лошадей и сайги. Свидетельства первичной разделки туш отсутствуют. В отношении кремневого сырья была применена модель «стоянка-мастерская». Территории лагерей типа А были оборудованы очагами и реже различного типа ямами.

Лагеря типа В определены для 7 микокских (Караби Тамчин, IV/2, V, Чокурча I, IV-B, IV-F, IV-I, IV-M, IV-O) и 2 западнокрымских (Караби Тамчин, II/2, III) комплексов. На

территории лагерей типа B происходило потребление частей туш сайги и гидрунтинусов, которые были добыты и разделаны вне данных поселений. Возможно, также потребление в пищу падали. Использование кремневого сырья соответствует «модели потребителей». Лагеря типа B оборудовались очагами и ямами.

Поселения культурных слоев II и III в гроте Пролом II определены, как лагеря типа C. Кремневые комплексы данных слоев относятся к микокскому технокомплексу. Единственное отличие лагерей данного типа от лагерей типа B состоит в модели использования кремневого сырья. Данная модель носит смешанный характер. Для приносного сырья использовалась «модель потребителей», тогда как для местного сырья – «модель стоянка-мастерская». Также на территории лагерей типа C отмечены свидетельства использования огня.

Лагеря типа D обнаружены в гротах Строселье, 1, Проломе I, Киик Кобе, верхний слой, Буран Кае III, B. Данный тип лагерей ассоциируется с микокскими орудийными наборами. Модель использования фауны (сайга и гидрунтинусы) в лагерях типа D представлена разделкой туш животных и их потреблением. На территории лагерей типа D переоформление и реутилизация орудий были более глубокими, чем в остальных известных на сегодня лагерях и стоянках среднего палеолита Крыма. В определенной степени можно утверждать, что в условиях сырьевого дефицита жилые поверхности лагерей типа D играли роль источников сырья для каждых последующих визитеров гротов. Лагеря типа D были обустроены очагами и разнообразными ямами.

Специализированные стоянки типов A, B и лагерей типов A, C являются отражением использования логистической стратегии (logistical strategy) эксплуатации территорий. С другой стороны, наличие стоянок типа C и лагерей типов B и D указывает на использование тактики заготовителей (foraging tactics). В целом, для среднего палеолита Крыма присуща система организации поселений коллекторов (collectors), для которых характерны четкие функциональные отличия между типами поселений, значительные объёмы ресурсов, добываемых на специализированных стоянках, и хозяйственная взаимозависимость стоянок и лагерей.

Технологически и типологически различные крымский микок и западнокрымское мустье, представленные функционально сходными типами поселений и сосуществовавшими в сходных климатических и топографических условиях, являются стилистически дискретными образованиями.