Recurrent occupations of the Late Middle Palaeolithic Station Kabazi II, Unit II, Level 8 (Crimea, Ukraine) – Seasonal adaptation, procurement and processing of resources

Wiederholte Belegungen der spät-mittelpaläolithischen Station Kabazi II, Unit II, Level 8 (Krim, Ukraine) – Saisonale Adaptation, Beschaffung und Verarbeitung von Ressourcen

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Abstract - The Middle Palaeolithic site Kabazi II is situated within the western part of the second ridge of the Crimean Mountains. The stratigraphy of Kabazi II ranges from the last Interglacial to the Denekamp Interstadial. The archaeological level II / 8, belonging to the Western Crimean Mousterian, is paralleled with the Hengelo Stadial. Stone artefacts were sorted back to original raw nodules on which basis typical operational sequences were reconstructed. Both faunal remains and lithic artefacts were mainly prepared for off-site usage. A non-exhaustive and economical strategy of core reduction was applied; either by the entanglement of recurrent and preferential Levallois methods within one and the same reduction sequence or by the production of 'secondary cores' on flakes for on-site usage additional to prepared 'primary cores' which were exported. Further, the comparison of the horizontal distribution of faunal remains and raw material units gave confirmation to the postulated Palimpsest character of level II / 8. At least two different occupational zones exist, which suggest at least six different occupational episodes. The presence of human groups all over the year with seasonal shifts of their ranges within the second ridge is likely. Possible scarcities of resources were encountered by more frequent changes of ephemeral occupied campsites on the one hand and with non-exhaustive core reduction strategies on the other hand. Within the proposed land use model level II / 8 functions as 'provisioning station' for the supply of short-term and ephemeral camp-sites.

Zusammenfassung - *Der mittelpaläolithische Fundplatz Kabazi II befindet sich im westlichen Abschnitt der zweiten Schichtstufe des Krimgebirges. Die Stratigraphie von Kabazi II reicht von der Zeit des letzten Interglazials bis zum Denekamp-Interstadial. Die mit dem Western Crimean Mousterian assoziierte archäologische Schicht II / 8 datiert ins Hengelo-Interstadial. Die Steinartefakte dieser Fundschicht wurden zu ursprünglichen Rohknollen zurück sortiert, auf deren Basis Operationsketten rekonstruiert wurden. Ein Großteil der Steinartefakte und Faunenreste wurde exportiert und an einem anderen Ort genutzt und verwertet. In diesem Zusammenhang wurde eine ökonomische Strategie der Kernreduktion angewandt; entweder mittels der Verschränkung wiederholter und präferentieller Levallois-Methoden innerhalb ein und derselben Reduktionssequenz oder durch die Produktion ‚sekundärer Kerne' an Abschlägen für die Reduktion vor Ort zusätzlich zu ‚primären Kernen' für den Export. Weiterhin konnte durch den Vergleich der horizontalen Verteilung von Faunenresten und Werkstücken der postulierte Palimpsest-Charakter von Level II / 8 bestätigt werden. Mindestens zwei Zonen können nachgewiesen werden, welche mindestens sechs verschiedene Belegungen indizieren. Es ist wahrscheinlich, dass sich Menschengruppen über das ganze Jahr innerhalb der zweiten Schichtstufe aufhielten, verbunden mit saisonalen Verlegungen der Schweifgebiete. Möglichen Ressourcenengpässen wurde einerseits durch häufigere Wechsel kurzfristig belegter Camps auf regionaler Basis begegnet. Andererseits wurden ökonomischere Kernreduktionsstrategien angewandt. Innerhalb des vorgeschlagenen Landnutzungsmodells fungiert Level II / 8 als ‚Versorgungsstation', an der Ressourcen für den Konsum an länger- und kurzfristig belegten Wohnplätzen zugerichtet werden.*

Keywords - **Middle Palaeolithic, Crimea, Transformation Analysis, operational chains, land use patterns, raw material economy, seasonal adaptation**
Mittelpaläolithikum, Krim, Transformationsanalyse, Operationsketten, Landnutzung, Rohmaterialökonomie, saisonale Adaptation

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Introduction: geology and geographical setting

The lithic assemblage of Kabazi II, level II/8, presented in this article, was investigated in the course of the field campaign 2005 of the research program "Funktionale Variabilität im Mittelpaläolithikum auf der Halbinsel Krim (Ukraine)", generously funded by the 'Deutsche Forschungsgemeinschaft' (DFG). In this article excerpts of the results are presented, which were filed as a Master thesis at the Institute for Prehistoric Archaeology of the University of Cologne in April 2007 (Bataille 2007). Preliminary results, concerning import- and export activities, were published in 2006 (Bataille 2006b).

The Crimean Peninsula is situated in the northern part of the Black Sea (Ferring 1998, 17 ff.). It is connected with the Ukrainian mainland by the small land bridge of Perokop. The peninsula is the anticline of a tectonically uplifted land mass where the Eurasian and the Southwest-Asian continents collide. Two thirds of the land mass is flat, with maximum elevations of 180 m above sea level. The southern part of the Crimea is dominated by the Crimean Mountains which have their highest elevations in the southwest near Yalta. The Crimean Mountains rise from the third

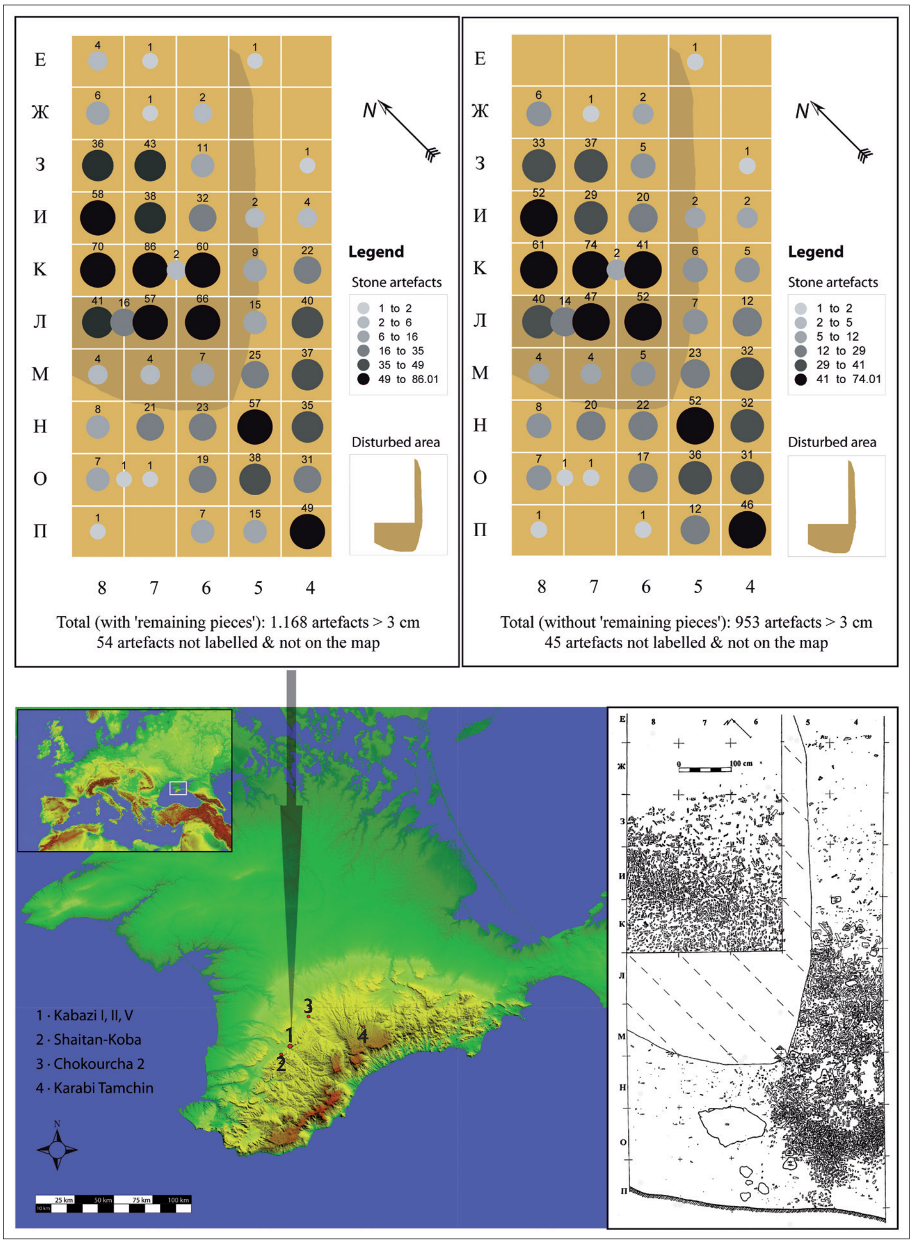

Fig. 1. Crimean Middle Palaeolithic sites mentioned in the text; distribution of stone artefacts bigger 3 cm; original site map (after Patou-Mathis & Chabai 2003, 229).

Abb. 1. *Im Text erwähnte mittelpaläolithische Fundplätze der Halbinsel Krim; horizontale Verteilung der Steinartefakte größer als 3 cm; originaler Grabungsplan (nach Patou-Mathis & Chabai 2003, 229).*

ridge in the north to the main ridge in the south from approximately 300 m to more than 1500 m above sea level. Except Karabi-Tamchin, which is located within the main ridge of the Crimean Mountains, all Palaeolithic sites are situated within the second ridge at an average height of 300 to 600 m above sea level (Fig. 1) (Yevtushenko 2004, 277). Due to the situation within a flint-belt, most Middle Palaeolithic sites are situated near flint sources, except Buran-Kaya III and Chokourcha 1 in eastern Crimea with maximum distances to raw material sources of 20 km resp. 30 km (Chabai & Uthmeier 2006, 339 ff.).

Kabazi II, Unit II, Level 8: stratigraphical and chronological position

Kabazi II is a key-site for the understanding of the Middle Palaeolithic in Eastern Europe since it yields 55 archaeological layers in *in situ* position, 20 of them belonging to the Western Crimean Mousterian (WCM) (Chabai 2006, 1 ff.). 21 further layers were rede-posited. It is one of four stratified Middle Palaeolithic open-air sites in Crimea (Chabai 2005, 1). According to natural sciences investigations featuring different methods of absolute dating (AMS, ^{14}C, ESR, OSL, U-series) as well as the analysis of micro- and macro-fauna and palynological studies this site presents a long geologic stratigraphy (Chabai 2005, 4 ff.). The oldest occupations (level VI / 17) are attributed to the end of the Eemian Interglacial (MIS 5d); the youngest (level A3A) are associated with the Denekamp / Arcy Interstadial (MIS 3). Crimean Micoquian assemblages are embedded in the lower and Western Crimean Mousterian (WCM) assemblages in the upper geological layers. In spite of the clear morphological dichotomy all archaeological levels show functional similarities: short term occupations with a strong emphasis on primary butchering of hunting fauna and no clear evidence for long term occupation. Nevertheless, differences exist between the Micoquian and Mousterian stations of Kabazi II, concerning the intensity of occupation and deriving from this the character of land use patterns.

Kabazi II is an open-air site with specific topographical characteristics: the site's sediment accumulated on a natural plateau on the upper part of the southern slope of Kabazi Mountain, 90 metres above the present-day Alma river course and "70 m from a limestone cliff which towers 33 m over the site" (Chabai 2005, 1). The site is thus situated at the border between the upper steppe plateau (Yaila), which is part of the Eastern European steppe plain, and the Alma river valley. About 14 metres of

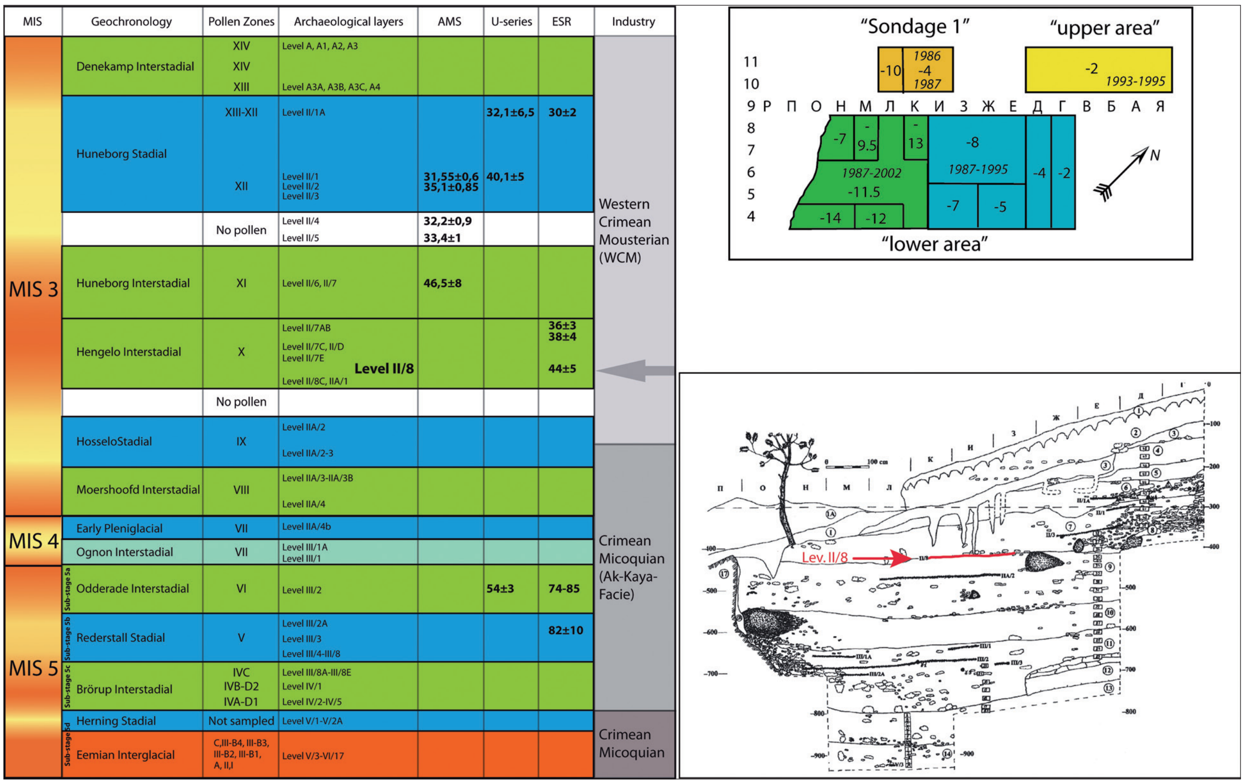

Fig. 1. 1. Kabazi II: stratigraphy of Kabazi II; west-profile of Kabazi II (red arrow marks Level II / 8) (after Patou-Mathis & Chabai 2003, 226); excavation areas of the field campagnes 1986-2002, negative numbers = maximum depth of excavated area, italics = field campagne (after Chabai 2005, 3).

Abb. 1. 1. *Kabazi II: Stratigraphie von Kabazi II; Westprofil von Kabazi II (der rote Pfeil markiert Level II / 8) (nach Patou-Mathis & Chabai 2003, 226); Grabungsareale der Feldkampagnen 1986-2002, negative Zahlen / Ziffern = maximale Tiefen der ausgegrabenen Flächen, kursiv = Grabungskampagne (nach Chabai 2005, 3).*

sediment with 26 lithopedological strata were accumulated by colluvial, pedogenic and alluvial processes, as well as "the exfoliation of limestone blocks" (Chabai 2006, 1 ff.). Colluvial episodes consisting of "rounded / sub-rounded limestone debris" transported from the upper slope, "clayish, silty and sandy sediments" resulted in a swift covering of the archaeological layers (Chabai 2006, 1). Till this day colluvial episodes of limestone debris from the upper slope result in a fast accumulation rate (Uthmeier 2004).

Due to the vertical deposition of a 10 m high limestone block (geological stratum 17) at the southernmost end of the site which collapsed from the cliff during MIS 5d the find bearing sediments accumulated almost horizontally (Ferring in Chabai 1998a, 170 ff.; Chabai 2005, 9) (Figs. 1 & 1.1).

According to the taphonomical studies, serious processes of natural dislocation can be excluded for Level II / 8. Important processes of horizontal displacement of artefacts due to solifluction can be excluded, not at least due to the sediment's low inclination angle from north to south of ~ 5° (Patou-Mathis & Chabai 2003, 231). This can be shown by the absence of artefacts in the squares directly bordering the limestone block as well.

„Excepting the effects of the large limestone blocks in Strata 11 / 13 and 7 / 8, Strata 11 through 7 represent continuous, rapid colluvial deposition, supplied by apparently rapid generation of eboulis up-slope"; Level II / 8 is situated at the basis of geological horizon 7 (Ferring in Chabai 1998, 173 ff.).

Level II / 8 was excavated during two field seasons in 1987 and 1994 under the direction of V. P. Chabai and A. E. Marks (Fig. 1.1). This archaeological layer contains the largest amount of faunal and lithic remains which are scattered across approximately 30 m^2 (Fig. 1). A total of 3.981 stone artefacts comprising 2 796 chips belong to this level (Patou-Mathis & Chabai 2003). 1168 artefacts bigger 3 cm were analyzed by the author. Together with the underlying archaeological level II / 8c, level II / 8 comprises the lowermost part of geological stratum 7 (Fig. 1.1). From level II / 8c and overlying level II / 7E this archaeological layer is divided by sterile sediments of between 3 and 15 cm thickness at places with the highest densities of bones (Patou-Mathis & Chabai 2003, 230 ff.) – thus a mechanical mixture by vertical dislocation with artefacts from the upper Level II / 7E can be excluded. In most quadrants the thickness of level II / 8 does not exceed 12 cm (Chabai 2005, 12 ff.). According to the excavators the average thickness of level II / 8 varies between the thickness of a single artefact and 15 cm. The large amount of faunal and lithic remains, together with traces of weathering on the bone surfaces, brought Patou-Mathis and Chabai (2003, 236) to the conclusion that the inventory of level II / 8 is the result of different visits of human groups. The comparison of the distribution of faunal remains and stone artefacts gave confirmation to the Palimpsest character of that archaeological layer – these results will be presented in this article.

The southern and northern areas were excavated completely, while the eastern and western borders of the lithic and faunal concentration were not reached (Fig. 1). Unfortunately a part of the north-western and western medial excavation area was destroyed by local hazards (Patou-Mathis & Chabai 2003). The artefacts in concern were labelled according to the squares they were found in.

Two ESR-data were taken from one and the same tooth: EU 27±2 and LU 39±3 ka BP, and EU 30±2 and LU 44±5 ka BP (Rink et al. 1998, 333; Patou-Mathis & Chabai 2003, 231).

Level II / 8 accumulated under quite temperate conditions during the Hengelo Interstadial.

Applied methods and aim of interest

The Transformation Analysis was the basic instrument for the investigations presented in this paper. Weissmüller (1995) developed the theoretical and methodological basis of this approach while working on the lithic material of the lower Middle Palaeolithic layers of the Sesselfelsgrotte in the Altmühl valley (Bavaria, Germany). A detailed English description of this method was published by Uthmeier (2004a, 2005).

With the help of the Transformation Analysis stone artefacts are sorted back to raw material varieties and further to original nodules by analyzing macroscopic features. Features are the structure and colour of cortex and cleavage plains, fossil inclusions and attributes like fissures and cracks etc. (Uthmeier 2004a, 176 ff., Fig 11-2). Such a sortation is only possible with flint, due to its heterogeneous macroscopic features. This aims at reconstructing the import state and on-site transformation of artefacts brought to the site. Pieces altered by patination or thermal influences cannot be analyzed by this approach and are thus filed under the category 'remaining pieces' ('Sortierrest'). Two or more artefacts that are identified, due to macroscopical similarities, as belonging to one original nodule indicate on-site transformation and are called 'workpiece' ('Werkstück') (Rieder 1981 / 82, after Uthmeier 2004b). Single artefacts that do not have any attributes in common with other pieces and for which no on-site transformation is attestable are considered imported as isolated objects ('single pieces'). In the following 'workpieces' and 'single pieces' will be called 'raw material units' (RMUs). In this context, one has to differentiate between 'static' and 'dynamic' objects. Artefacts regarded as static objects are pieces that fell to the ground in the course of core reduction or tool modification and were left on-site (e. g. modification chips, waste of core preparation or crested blanks) (Weissmüller 1995, 45 ff.). On the contrary, pieces

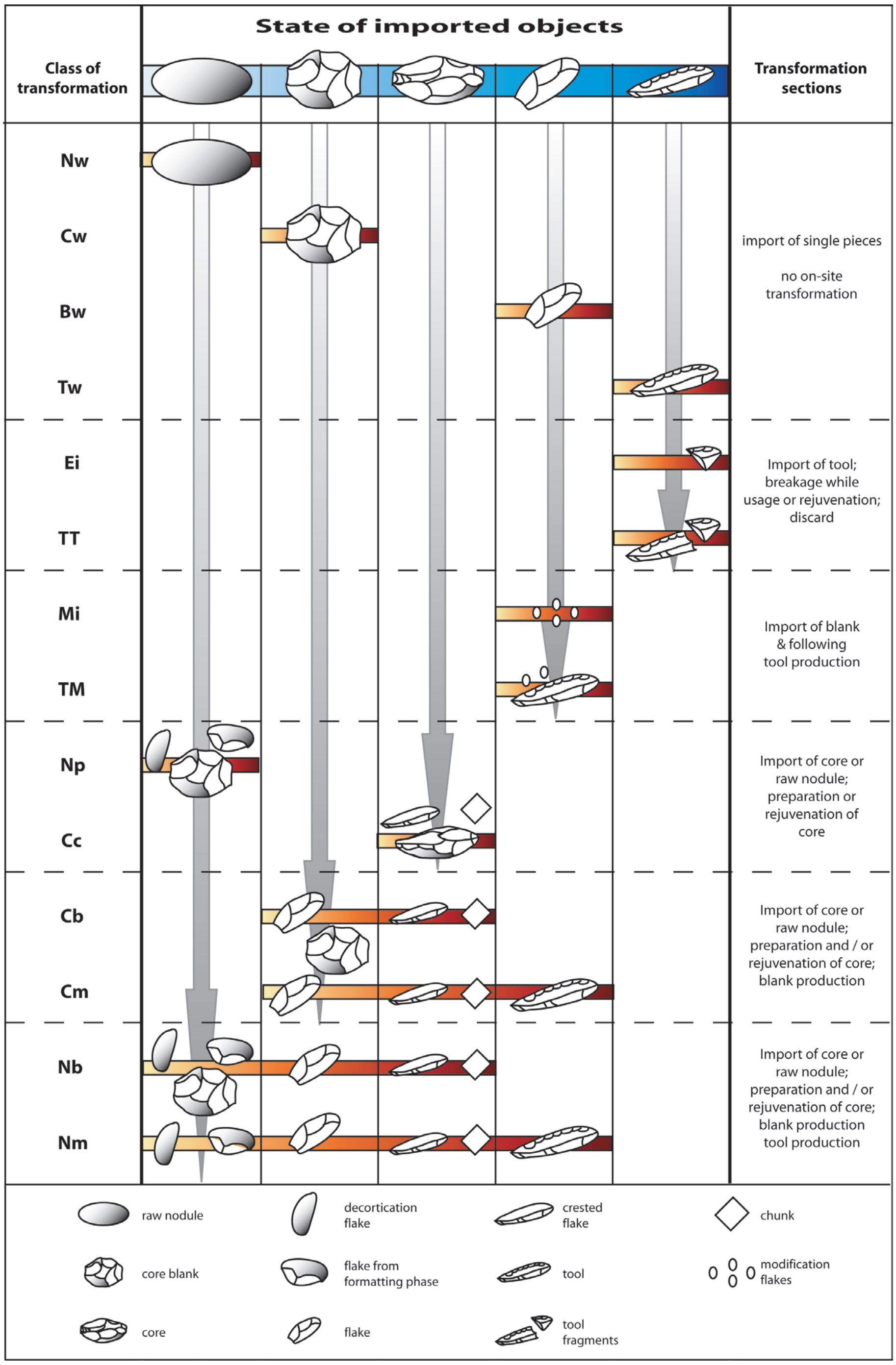

Fig. 2. Transformation Analysis: Model of transformation classes and transformation sections.

Abb. 2. *Transformationsanalyse: Modell der Transformationsklassen und -ausschnitte.*

regarded as dynamic objects are artefacts that move in the course of transformation processes within one site ('intra-site') or between different sites ('inter-site') (Weissmüller 1995, 46 f.). This especially concerns tools and cores which were produced and modified at different sites, but also blank products modified and reworked at different locations (e. g. Kombewa cores).

Since the formation processes of the Middle Palaeolithic stone artefacts were temporally and spatially staggered, we may distinguish different stages: (0) Initializing of raw nodule, (1) preparation of core, (2) blank production, (3) core correction, (4) tool modification (J.-M. Geneste 1985, 178-182). Every stage represents a transformation section with the potential to be inherited within workpieces. According to every possible transformation section Weissmüller established fourteen transformation classes (Weissmüller 1995, 46 ff.) (Fig. 2):

1) **Tw**, **Bw**, **Cw** and **Nw** describe single *dynamic* objects without on-site transformation (tool, blank, core and raw piece).

2) **Ei** (isolated end) and **TT** (isolated tool tip)

describe single static objects deriving from tool rejuvenation (isolated tool tip) or tool utilization (broken tool tip or base).

3) **Mi** and **TM** describe isolated modification waste or tools with appropriate modification chips.

According to the degree of cortical remains on artefacts, in the following there will be a distinction will be made between imported cores (C) and raw nodules (N).

4) **Cc** and **Np** describe the occurrence of indifferent flakes, mostly as fragments, decortications flakes, chunks and crested blank products (Cc = core correction, Np = preparation of nodule).

5) **Cb** and **Nb** describe blank production from imported cores or raw nodules. This is indicated by one or more flakes and preparation flakes. Cores may be present.

6) **Cm** and **Nm** describe blank production from imported cores or raw nodules in the context of later tool modification. This is indicated by one or more tools together with preparation flakes or by one or more tools with flakes or tools together with modification waste. Cores or surface shaped tools may be present. In case of attestable surface shaping (*façonnage*) within a RMU, e. g. the presence of bifacial tools, this is marked by the suffix '/f' ('facial'). The length of a transformation section is attested by the first and the last transformation stages. For instance, the modification of a flake, which was won from an imported raw nodule attested by a high degree of cortical remains and the presence of a formal tool. This would suggest transformation section **Nm**.

With the help of the Transformation Analysis the import and the reduction of flint raw material at the site could be reconstructed. By a first step, typical reduction sequences were established in order to evaluate the relationship of different methods of core exploitation, raw material economy and the export of specific artefact types. Specific operational sequences were reconstructed out of typical reduction sequences and then analyzed according to their functional purposes. By comparing raw material units (RMUs), which were considered as export units, with the remains of faunal elements, different occupations, could be reconstructed.

The lithic assemblage: attribute analysis

The assemblage of Level II/8 ranges within the variability of the WCM, which is characterized by a distinct Levallois component and the absence of bifacial technology (bi-convex *façonnage*) (Chabai 2004, 301; Chabai 1998a, 13). A total of 46 cores, among them one initialized raw piece, with an average share of 3.9 % of all artefacts > 3 cm belong to the assemblage (Fig. 3a). Among the 21 Levallois cores which were classified according to the nomenclature of E. Boëda (1988, 1994) preferential Levallois cores (*Levallois linéale*) are dominant with ten pieces, followed by cores of the methods *Levallois récurrente unipolaire* (3), *bipolaire* (3) and *centripète* (4).

Blanks are the dominating category within the stone assemblage of level II/8 (82 % of all artefacts >3cm) (Fig. 3b). Simple flakes prevail (746), followed by simple blades (78) and chips (59), the longest measured scales being slightly below 3 cm. Levallois blanks are dominated by Levallois flakes (43), followed by Levallois blades (8) and only one Levallois point. 84 artefacts, including crested flakes and blades as well as flakes with remnant crest, indicate the on-site correction of cores.

A total of 121 tools were analyzed during the field campaign of 2005 (10 % of all artefacts > 3 cm) (Fig. 3c). Simple side scrapers (76) are the most frequent formal tools, followed by notched pieces (13), convergent (9) and double side scrapers (8). Peculiarities are a unifacial surface shaped point (RMU 69, Fig. 8) and a double truncated facetted piece.

Transformation analysis: sortation of raw material

A total of 1 168 artefacts bigger 3 cm were analyzed. 953 pieces could be sorted back to 114 raw material units. 215 patinated artefacts, whose raw material features were not recognizable, were only object to the attribute analysis and then filed under the so called 'remaining pieces' ('Sortierrest').

Except one workpiece of black Dolomite (RMU 84), all artefacts analyzed in 2005 are of flint raw material (Fig. 4). A similar raw material, here Dolomite of a grey colour, was also present in the WCM-level II/7E of Kabazi II, probably deriving from the Upper Alma River Valley (Bataille 2006a).

The character of the raw material source could be identified on 97 workpieces by means of the cortical remains. 65 workpieces derive from primary sources, mostly indicated by a white and chalky, sometimes yellowish white cortex (Uthmeier 2004a). The 26 workpieces stemming from residual sources show smooth or coarse cortex of yellowish white to whitish brown colour. Only two pebbles (2 %) with smooth, yellow-coloured cortex were found (RMU 60 & 119) most probably collected from the nearby Alma river gravels. On 82 workpieces the original volume could be estimated. Round (28) and flat (24) nodules prevail, while only one plaquette could be observed (Bataille 2006b).

Macroscopical features of the flint artefacts suggest that 63% of the raw material units derive from the source of Mount Milnaya only 2 km southeast from Kabazi Mountain. Those pieces show fresh and primary cortex and dark to middle grey or brownish cleavage planes (Uthmeier 2004a, 175 ff.; Patou-Mathis & Chabai 2003, 232 ff.). A second smaller group of raw material units show light brown residual cortex and light grey-brown cleavage planes, suggesting an origin from the sources in Bodrak Valley (21%), approximately 6 km to the southwest. Tools which were mainly imported as isolated pieces ('single

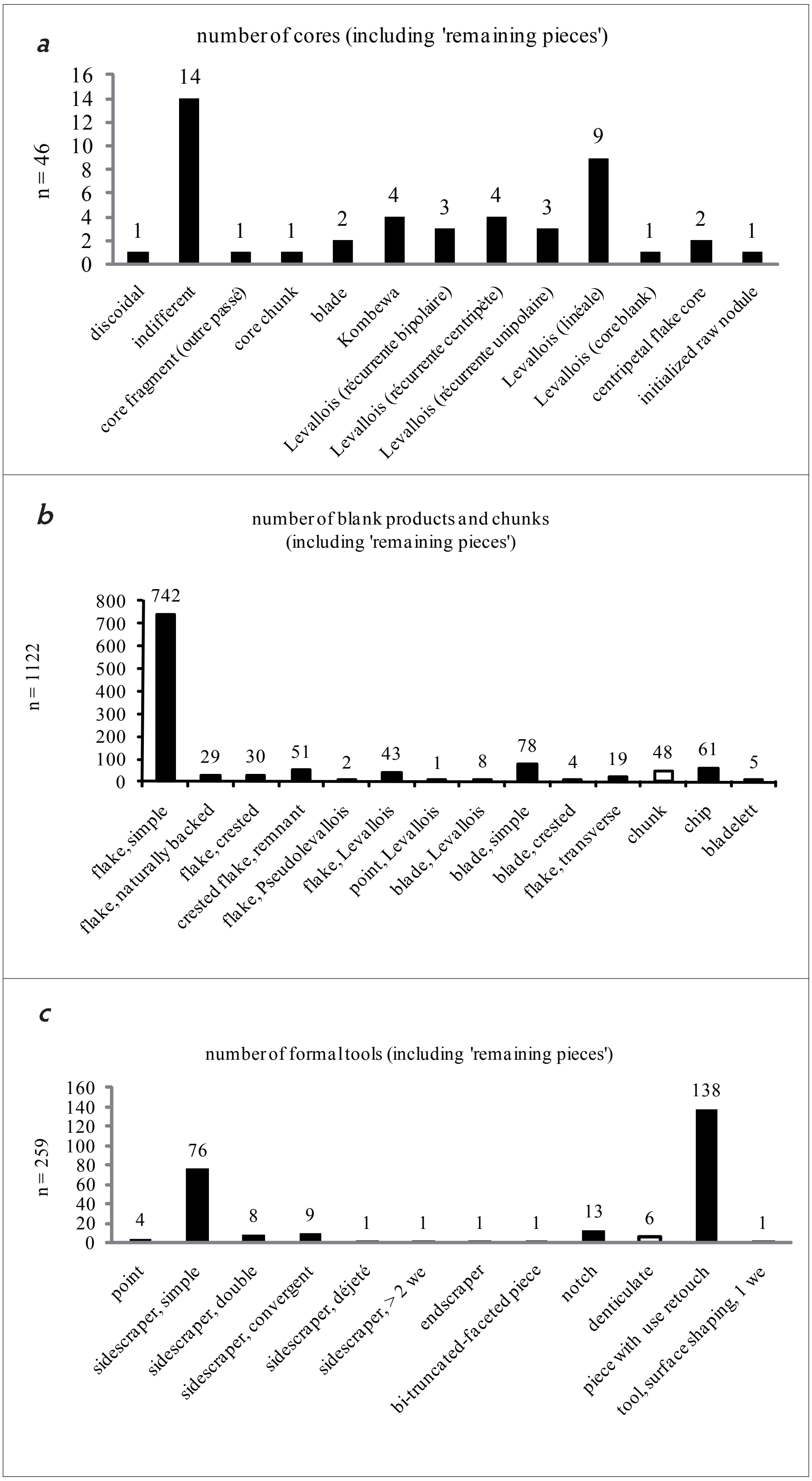

Fig. 3. Kabazi II, level II / 8: a) number of core types, b) number of blank products (including formal tools and sorting rest), c) number of formal tools (including artefacts with use retouch (Ge2)).

Abb. 3. *Kabazi II, Level II / 8: a) Anzahl Kerntypen, b) Anzahl Grundformen (inklusive formaler Geräte und Sortierrest), c) Anzahl formaler Geräte (inklusive Artefakte mit Gebrauchsretuschen (Ge2)).*

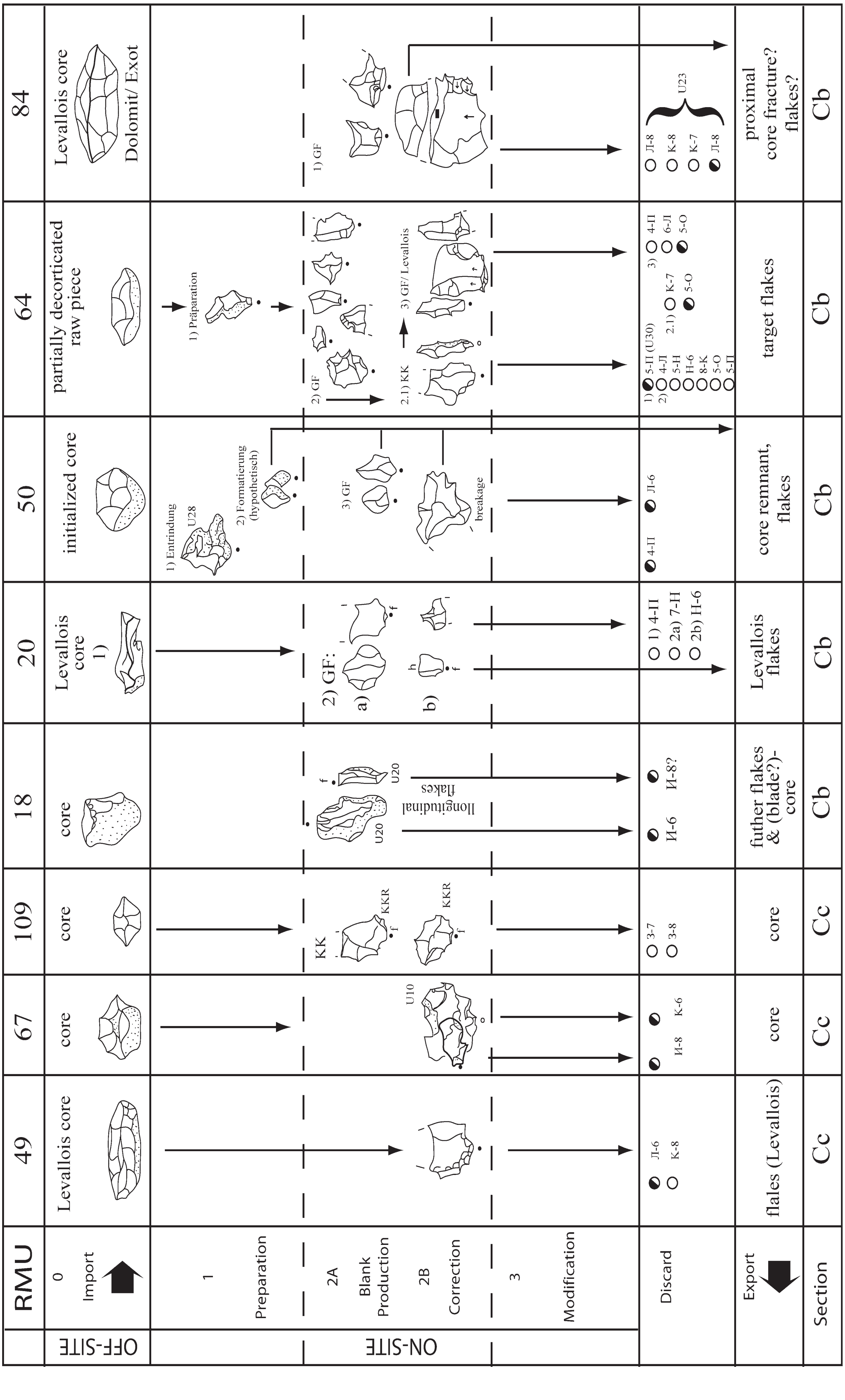

Fig. 4. 1. Legend on following pages.
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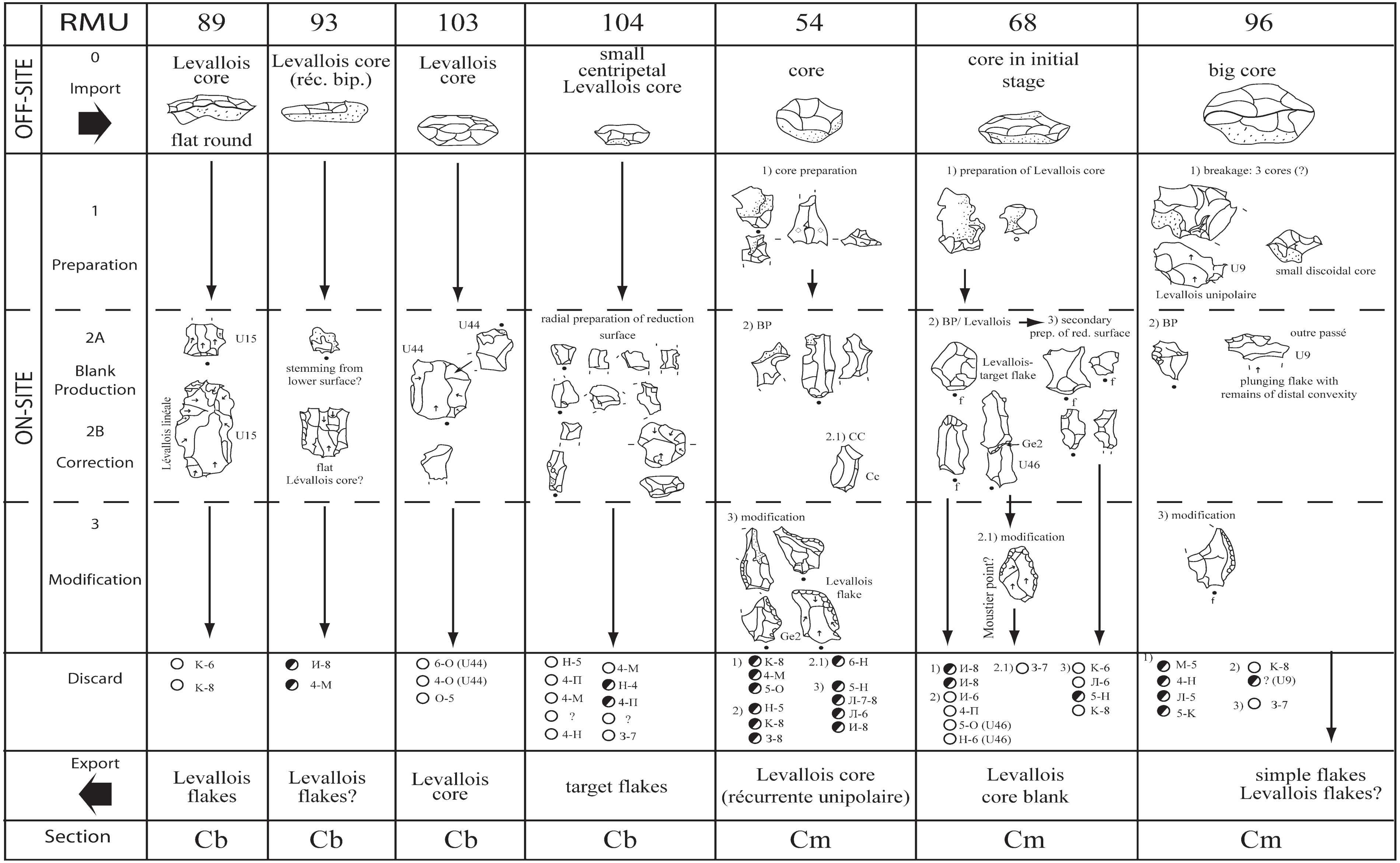

Fig. 4. 2. Legend on following pages.
Abb. 4. 2. *Legende auf folgenden Seiten.*

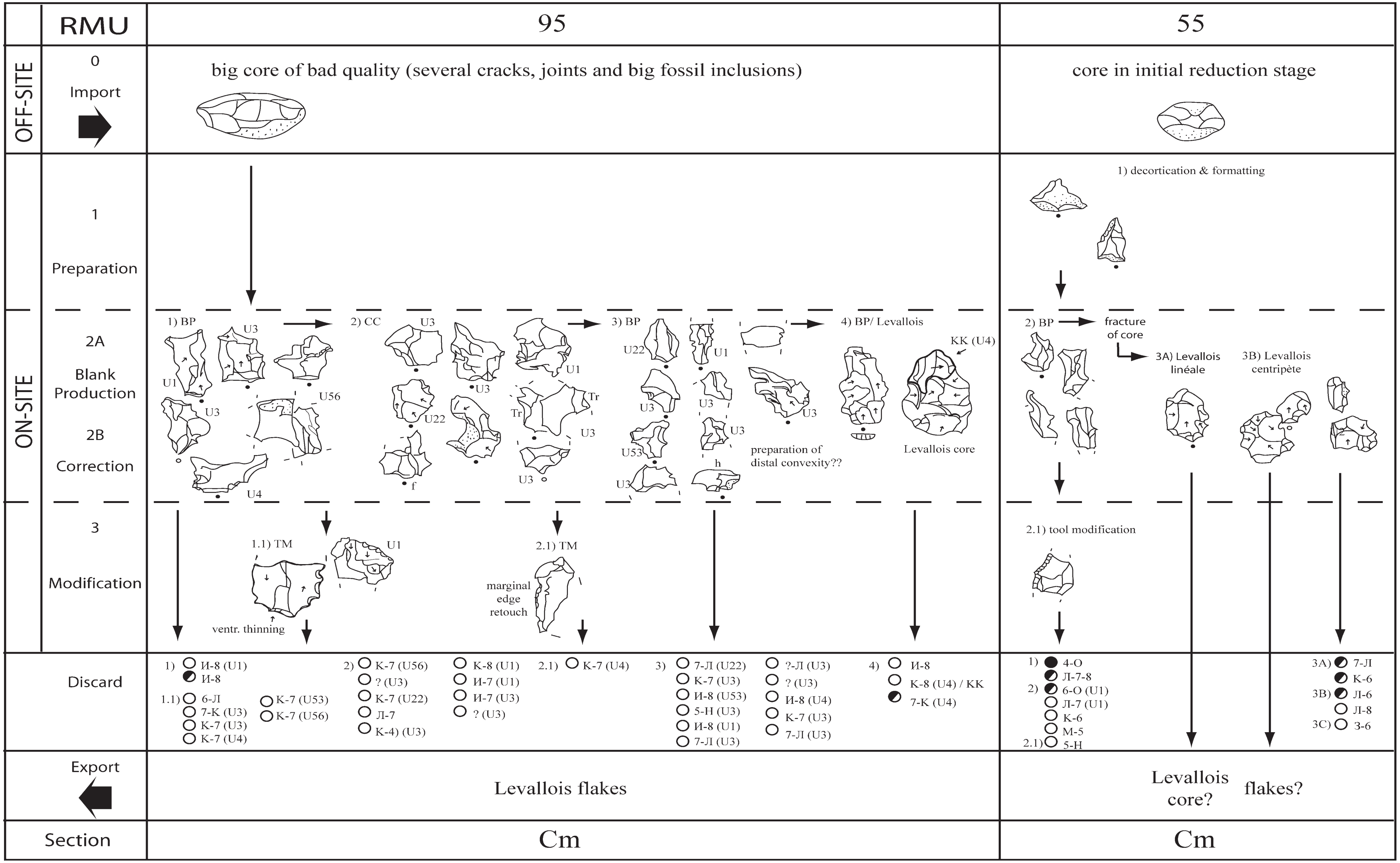

Fig. 4. 3. Legend on following pages.

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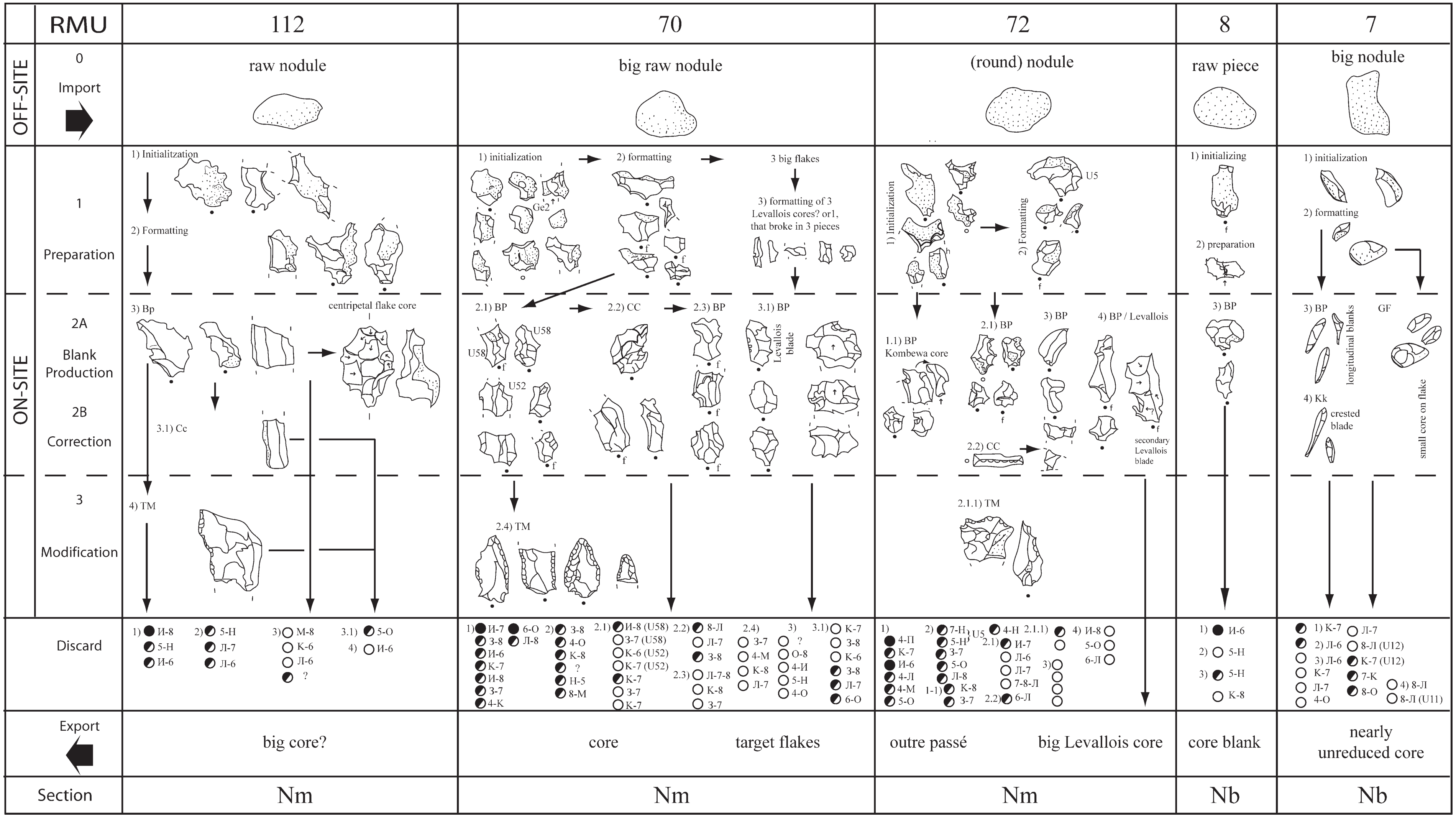


Fig. 4. 4. Flow charts of selected raw material units mentioned in the text. Legend: black circles = cortex, black & white circles = partially cortical, white circles = no cortex; U5 etc. = refittings done by V. Chabai and V. Usik; BP = blank production, CC = core correction, TM = tool modification; f = facetted butt; arrows indicate the direction of percussion; M-5 = quadrant where artefact was found.

Abb. 4. 4. *Flussdiagramme ausgewählter und im Text erwähnter Rohmaterialeinheiten. Legende: schwarze Kreise = vollständige Kortexbedeckung (auf Dorsalfläche), schwarzweiße Kreise = teilweise Kortexbedeckung, weiße Kreise = keine Kortexbedeckung; U5 etc. = Zusammensetzungssequenzen, durchgeführt durch V. Chabai und V. Usik; BP = Grundformproduktion, CC = Kernkorrektur, TM = Werkzeugmodifikation; f = facettierter Schlagflächenrest; Pfeile geben die Schlagrichtung an; M-5 = Bezeichnung des Quadrats, aus welchem jeweiliges Artefakt stammt.*

pieces') are made of 'exotic' raw material, coming from unknown raw material sources and probably being of supra-regional nature (7%) (Figs. 5, 5.1, 5.2). For 6% of the raw material units a definite raw material classification was not possible. To sum up, most RMUs derive from local raw material sources.

Transformation analysis: reconstruction of reduction sequences

By sorting artefacts back to original raw nodules one has to deal with the obvious incompleteness of those raw material units. Weissmüller (1995) proposed the neutral term 'evacuation' for the process of dislocation of artefacts by natural or anthropogenic influence. The verification of the intended export of lithic artefacts is an important challenge. In order to determine whether missing artefacts are the result of anthropogenic export activities, processes of natural dislocation have to be excluded. The sediments of Kabazi II, which include level II / 8, accumulated with an average inclination angle from north to south of about least 5°. As argued above, since no remarkable signs of post-depositional disturbance could be detected and the preservation of stone artefacts is "excellent" a primary context can be assumed (Patou-Mathis & Chabai 2003, 231). The archaeological layers are more or less horizontally deposited; only a natural dislocation with south-eastward direction would be possible – into the direction of a 10 m high limestone block which functioned as sediment trap for colluvial sediments (Chabai 2006). According to this observation, most lithic artefacts would have been present

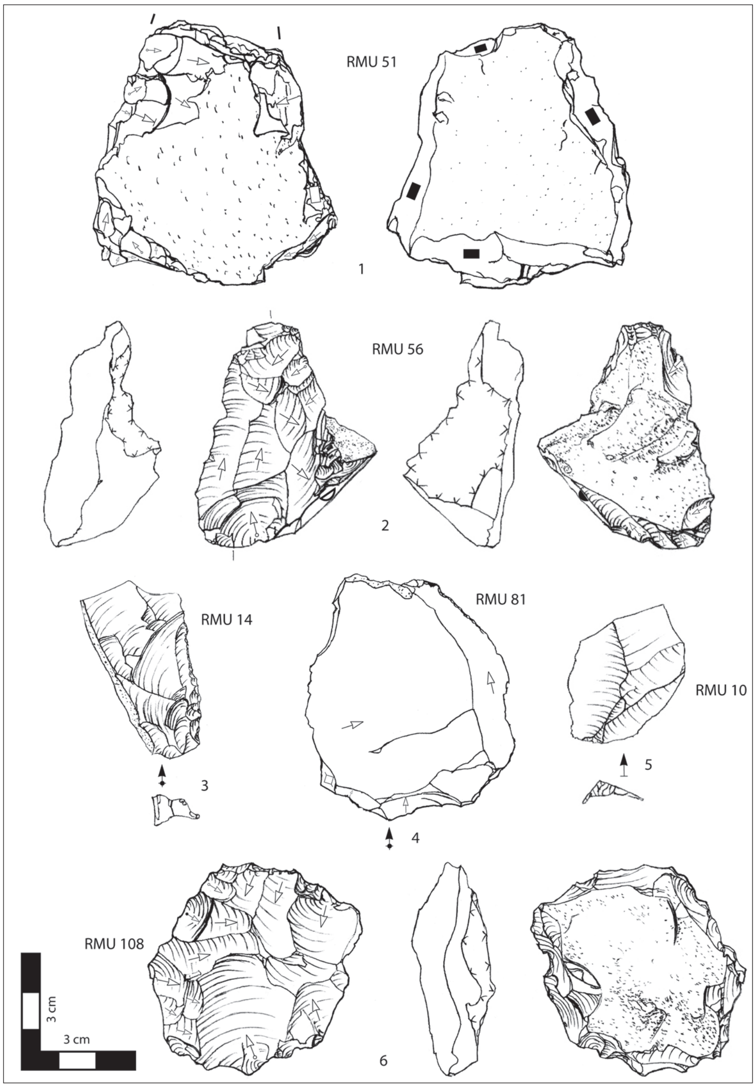


Fig. 5. Artefacts imported as 'Single Pieces': 1) initialized raw nodule, 2) unspecific core on flake, 3) simple side scraper, 4, 5) flakes, 6) Levallois core (récurrente bipolaire). (Drawings: G. Bataille), ½ nat. size.

Abb. 5. *Als Einzelstücke eingebrachte Artefakte: 1) initialisierte Rohknolle, 2) unspezifischer Kern an Abschlag, 3) einfacher Schaber, 4, 5) Abschläge, 6) Levalloiskern (récurrente bipolaire). (Zeichnungen: G. Bataille),* ½ nat. Grösse.

in line П, directly bordering the limestone block - but this is not the case. Therefore a southward dislocation seems very unlikely. In contrast to that, stone artefacts cluster in squares K-8 till K-6, L-7 and И-6 till И-8 (Fig. 1). Another concentration can be found in squares H-5 and П-4. The 'excellent' state of preservation of lithic artefacts suggests an in-situ position (Chabai 1998b). Since the horizontal distribution of artefacts is thinning out to the east and the west, it is likely that the centre of the main concentration has been excavated. Furthermore, the presence of different artefact concentrations does not suggest dislocation processes. Against this background, the question arose whether specific artefact categories are regularly missing within raw material units. The average share of different transformation sections has already been published (Bataille 2006b). Accordingly, I only present the most typical workpieces.

Different RMUs of level II / 8 show different technological methods of core exploitation within single operational sequences. The technological concepts are a reaction to requirements concerning subsistence activities – the choice of specific reduction concepts is situational. Such 'changing of strategies' within single reduction sequences are attestable within all transformation sections of level II / 8. The question is whether this specific way of dealing with reduction concepts is a characteristic feature of the Crimean Mousterian and further what the function of this behaviour is.

V. Chabai revealed analogies between the Levallois concept of Kabazi II and the assemblage of level IIA of Biache-Saint-Vaast. According to him the concepts *Levallois récurrente unipolaire* and *bipolaire* defined by E. Boëda (1994) are present in the assem-

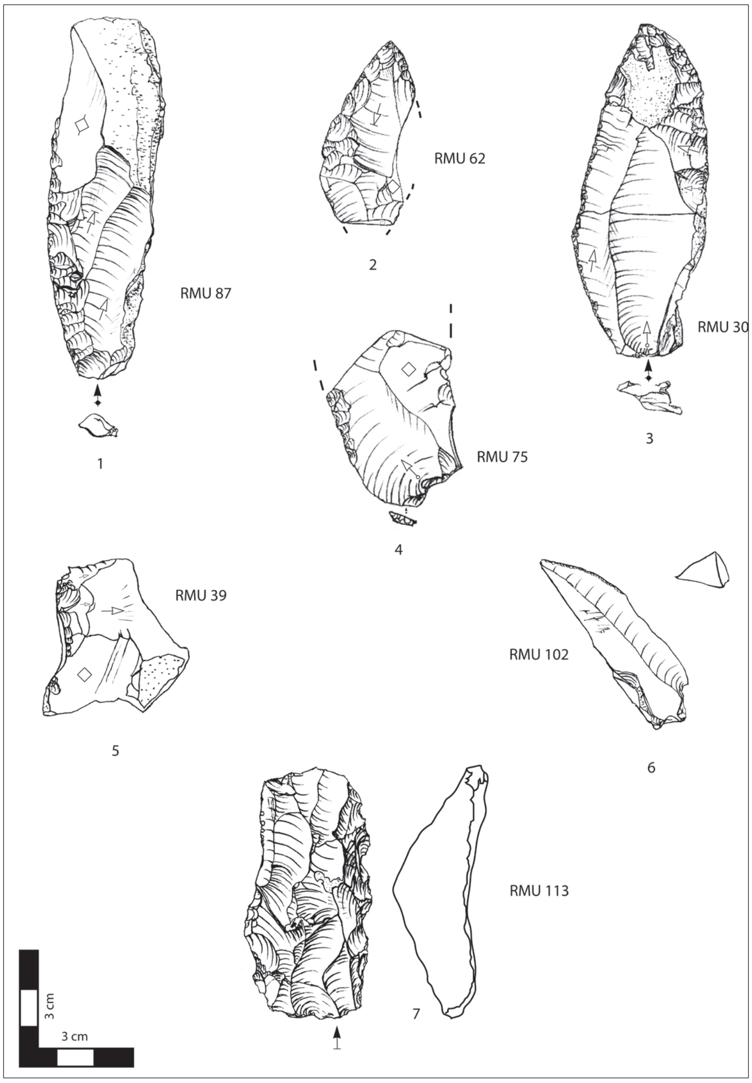


Fig. 5.1. Artefacts imported as 'Single Pieces': 1, 4, 5) simple side scrapers, 2, 3) points, 6) blade with GSM-retouch, 7) bi-truncated-faceted piece, lateral denticulated (cross-section after Chabai, 2004). (Drawings: G. Bataille), ½ nat. size.

Abb. 5.*1*. *Als Einzelstücke eingebrachte Artefakte: 1, 4, 5) einfacher Schaber, 2, 3) Spitzen, 6) Klinge mit GSM-Retuschen, 7) doppeltes Kostenki-Ende mit lateraler Zähnung (Querschnitt nach Chabai, 2004). (Zeichnungen: G. Bataille),* ½ nat. Grösse.

blage of Kabazi II, Unit II, level 8 (Chabai 1998c, 239 ff; 2004, 57 ff.). However, he does not use the term Levallois in this context but calls the cores unipolar or bipolar (see Uthmeier 2004b). This result has been doubted by V. Usik (2006). On the basis of refitting sequences of level II / 8 he concludes that apart from the method *Levallois linéale*, which he calls Levallois tortoise, none of the recurrent Levallois methods defined by Boëda can be recognized in Kabazi II (Chabai 1998c: 240 ff.; Usik 2003, 44 ff.). According to Usik's opinion the target flakes and core negatives suggesting the presence of the uni- and bipolar Levallois methods are longitudinal preparation flakes and no real Levallois flakes (Usik 2006, 143 ff.). Considering the RMUs of Kabazi II, Level II / 8 containing Levallois products, in my opinion a different picture arises. The method *Levallois linéale* is embedded within other reduction strategies. Such cores often seem to occur at the end of a reduction sequence. In other cases preferential Levallois cores were prepared on big cortical flakes and functioned as additional **secondary cores** besides a **primary core** from which they were struck. The possibility to change a reduction strategy within one and the same operational sequence has already been described (e. g. Dibble 1995). Dibble reinvestigated the Biache Saint-Vaast material analyzed by Boëda and compared scale dimensions and the share of cortical remains of

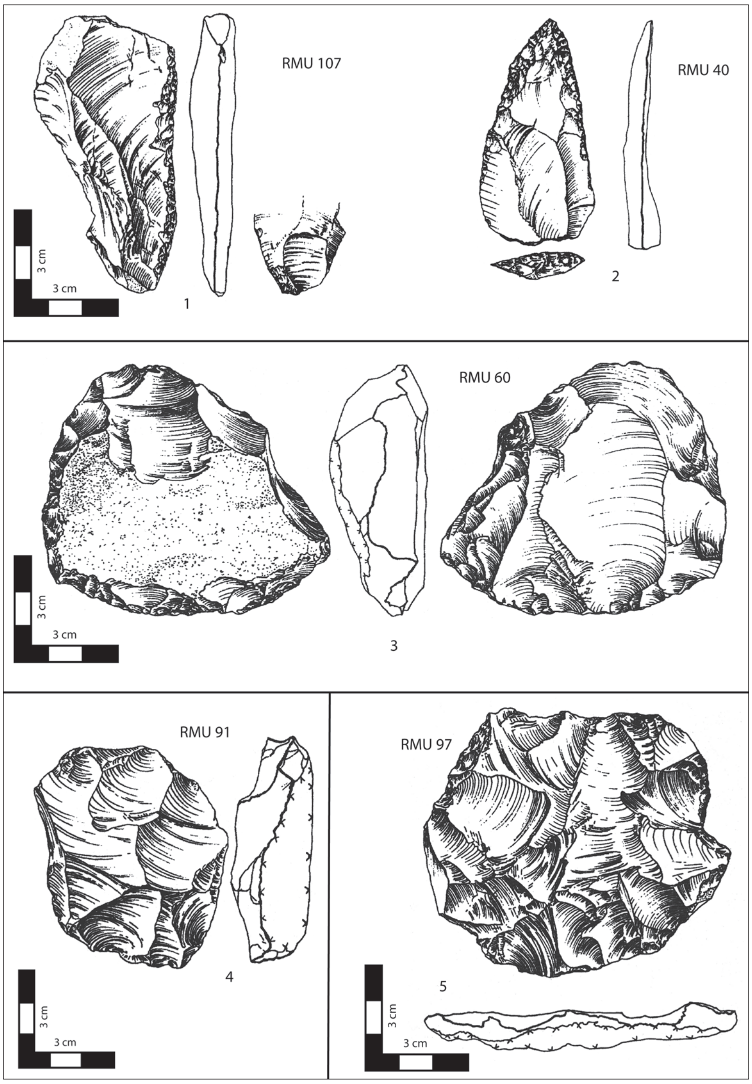


Fig. 5.2. Artefacts imported as 'Single Pieces': 1) simple side scraper, 2) point, 3) Levallois core (récurrente unipolaire), 4) Levallois core (récurrente bipolaire), 5) remnant core / the big negative of a preceding target flake indicates a Levallois core, reduced in centripetal manner at the end of its biography (after Patou-Mathis & Chabai 2003, 234, 237 and Chabai 2004, 68).

Abb. 5.2. *Als Einzelstücke eingebrachte Artefakte: 1) einfacher Schaber, 2) Spitze, 3) Levalloiskern (récurrente unipolaire), 4) Levalloiskern (récurrente bipolaire), 5) Restkern / das große gekappte Negativ eines älteren Zielabschlags zeigt, dass ein Levalloiskern am Ende seiner Biographie zentripetal reduziert wurde (nach Patou-Mathis & Chabai 2003, 234, 237 und Chabai 2004, 68).*

tools and blank products (Dibble 1995, 102 ff.). According to him Levallois cores were reduced as unipolar cores at the beginning of a reduction cycle, with a tendency towards blade production. At the end of a cycle a centripetal reduction was applied.

Operational schemes of transformation sections Cb and Cm: entanglement of reduction concepts

Within transformations section Cb blank products are produced on-site. Most of the activities are connected with the export of on-site produced and reworked cores – this is indicated by the absence of cores in most RMUs. One further motivation for core preparation was the on-site production of flakes for export purposes. This can be assumed for at least seven RMUs (Fig. 4). In these cases the target flakes indicated by the big negatives on discarded cores or blank products were missing (RMUs 18, 20, 64, 84, 89, 93, 103 and 104). This can explicitly be demonstrated with RMUs containing Levallois products (RMUs 20, 64, 84, 89, 93, 103 and 104). It seems as if Levallois target flakes resulting from Levallois cores following the *linéale* reduction (RMUs 20, 64, 84) and sets of Levallois flakes produced according to the methods *Levallois récurrente uni-* and *bipolaire* (RMUs 89, 93, 103) have been produced for off-site usage.

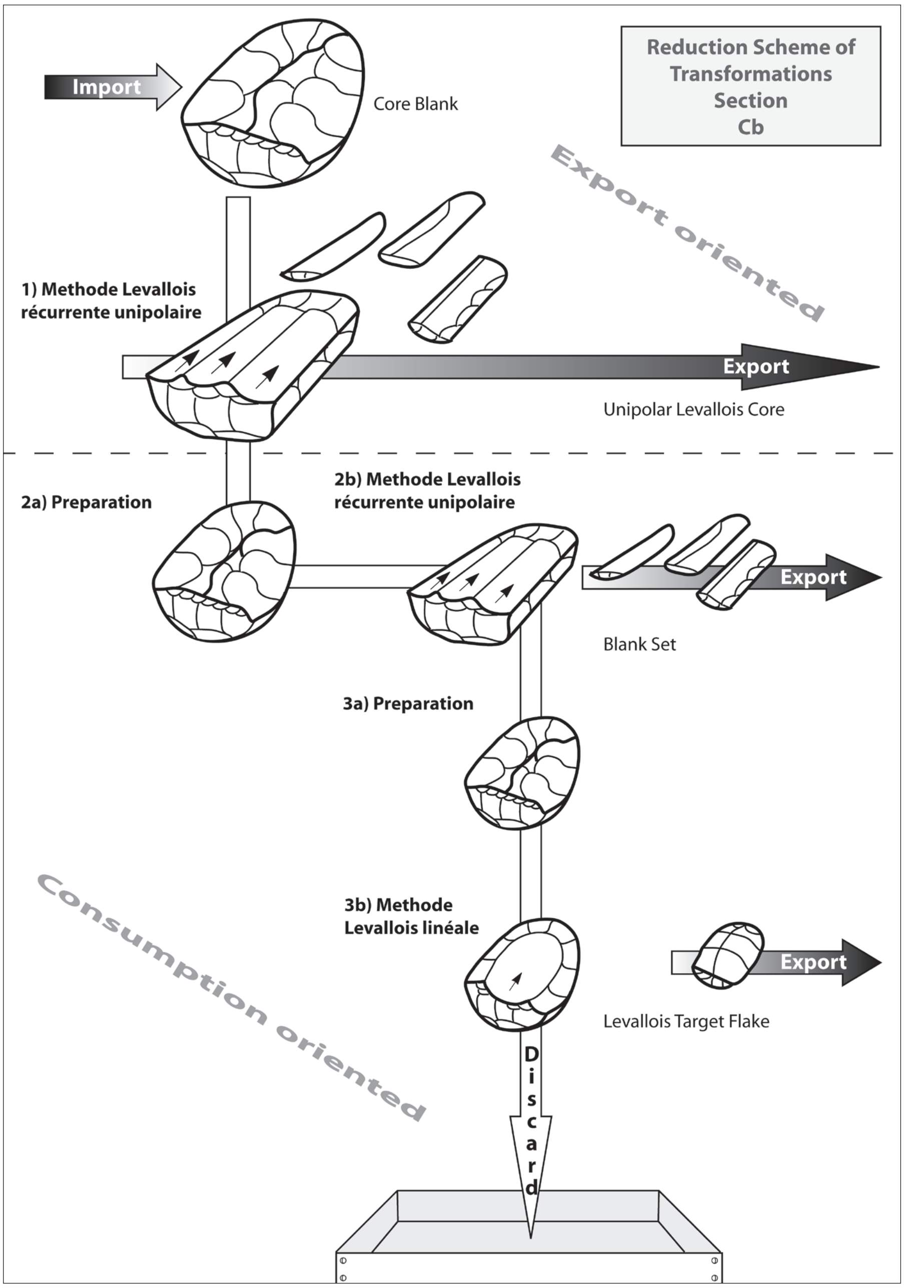


Fig. 6. Operational scheme of transformation section Cb.
Abb. 6. *Operationsschema von Transformationsausschnitt Cb.*

In 33 of 34 cases the main volume of imported raw material units was evacuated from the site. In this context following operational scheme can be reconstructed (Fig. 6).

First, a Levallois core is prepared. On flat round nodules this is done only on the upper surface. In **Phase 1**, primary and secondary Levallois flakes and / or Levallois blades are struck according to the method *Levallois récurrente unipolaire.* Those pieces are left on-site and the core is exported (e.g. RMU 103) (Fig. 4). In case that further blanks are needed or if the core is imported in a reduced state the same procedure (**Phase 2a**) is done after core rejuvenation (**Phase 2b**). The dorsal convexity of the nearly exhausted core is prepared for a last time (**Phase 3a**) and reduced according the method *Levallois linéale* (**Phase 3b**). The Levallois target flake is exported, while the core is discarded as remnant core. A further possibility is the bipolar reduction of the core for the production of longitudinal end products (RMU 93) (Fig. 4).

The above described operational scheme is in accordance with the 'Méthode Biache' described

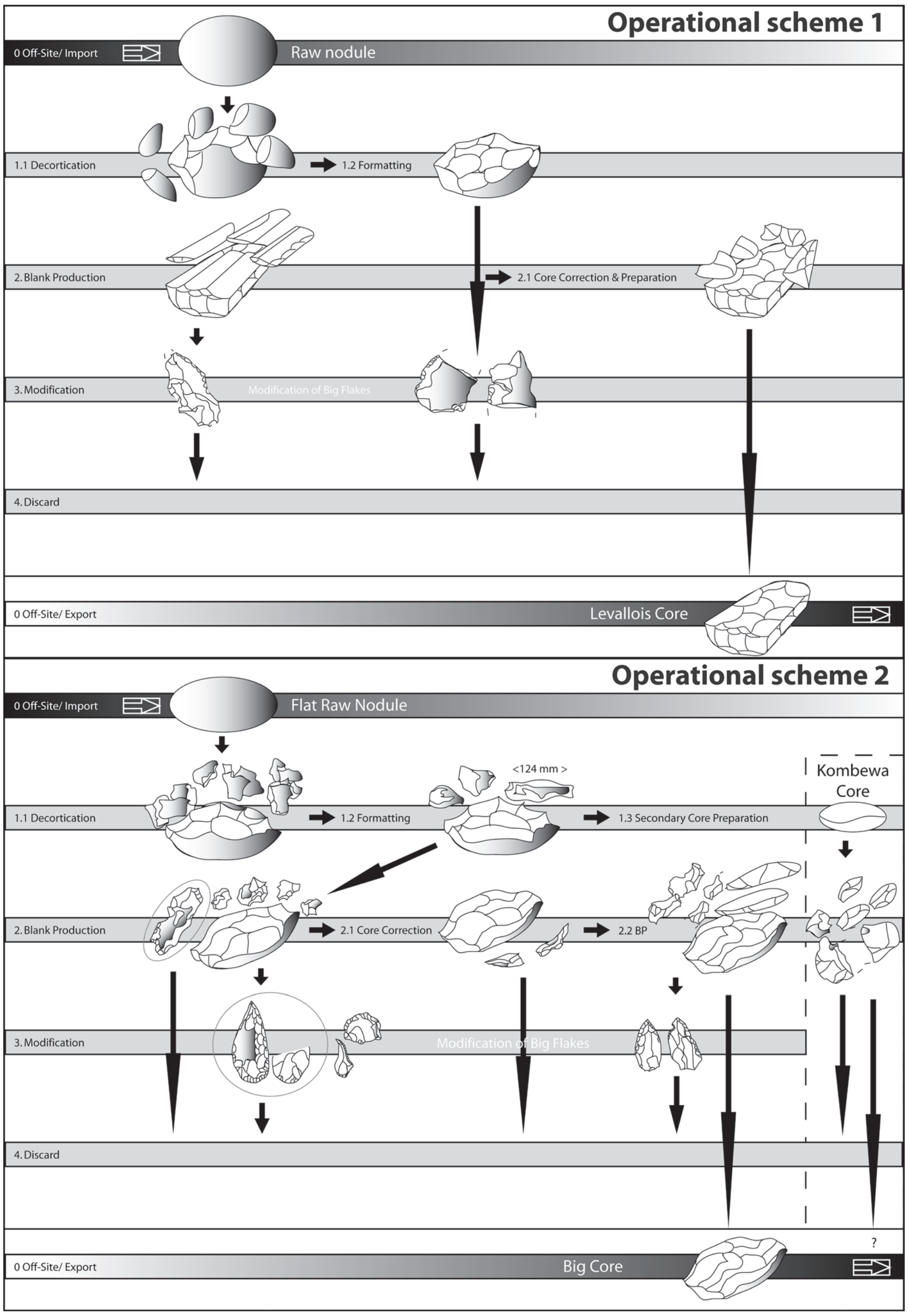


Fig. 7. Operational schemes of transformation section Nm / (f). Operational scheme 1: RMUs 2 & 3, operational schemes 2a & 2b: RMU 69.

Abb. 7. *Operationsschemata von Transformationsausschnitt Nm / (f). Operationsschema 1: Rohmaterialeinheiten (RMs) 2 & 3, Operationsschemata 2a & 2b: RM 69* by Chabai (2004, 57, Fig. II-15). It contradicts the assumption of the preferential Levallois reduction ('Molodova type') as single Levallois method within the Kabazi II assemblages (Usik 2006, 145 ff., 166 ff.) and emphasizes the presence of recurrent technology (Sitlivy & Zięba 2006, 363 ff.) and the entanglement of different methods of reduction.

To sum up, an ecological, not exhaustive and anticipatory usage of lithic raw material can be postulated. Deriving from the above mentioned arguments against a horizontal displacement of artefacts, the remarkable absence of certain artefact categories suggests an intended evacuation of these pieces. Imported cores were reduced in accordance to needed blank types, while the cores were mostly moved away from the site ('export orientation') (Bataille 2006b, 139 ff.). To decide whether the above-described observations are a general technological pattern of this assemblage, other transformation sections have to be taken into consideration.

RMU 55 of transformation section **Cm** is one of four workpieces containing centripetal Levallois cores (RMUs 112, 104, 97) (Figs. 5.2, 4.1, 4.2, 4.3). The small dimensions of both centripetal cores of this workpiece

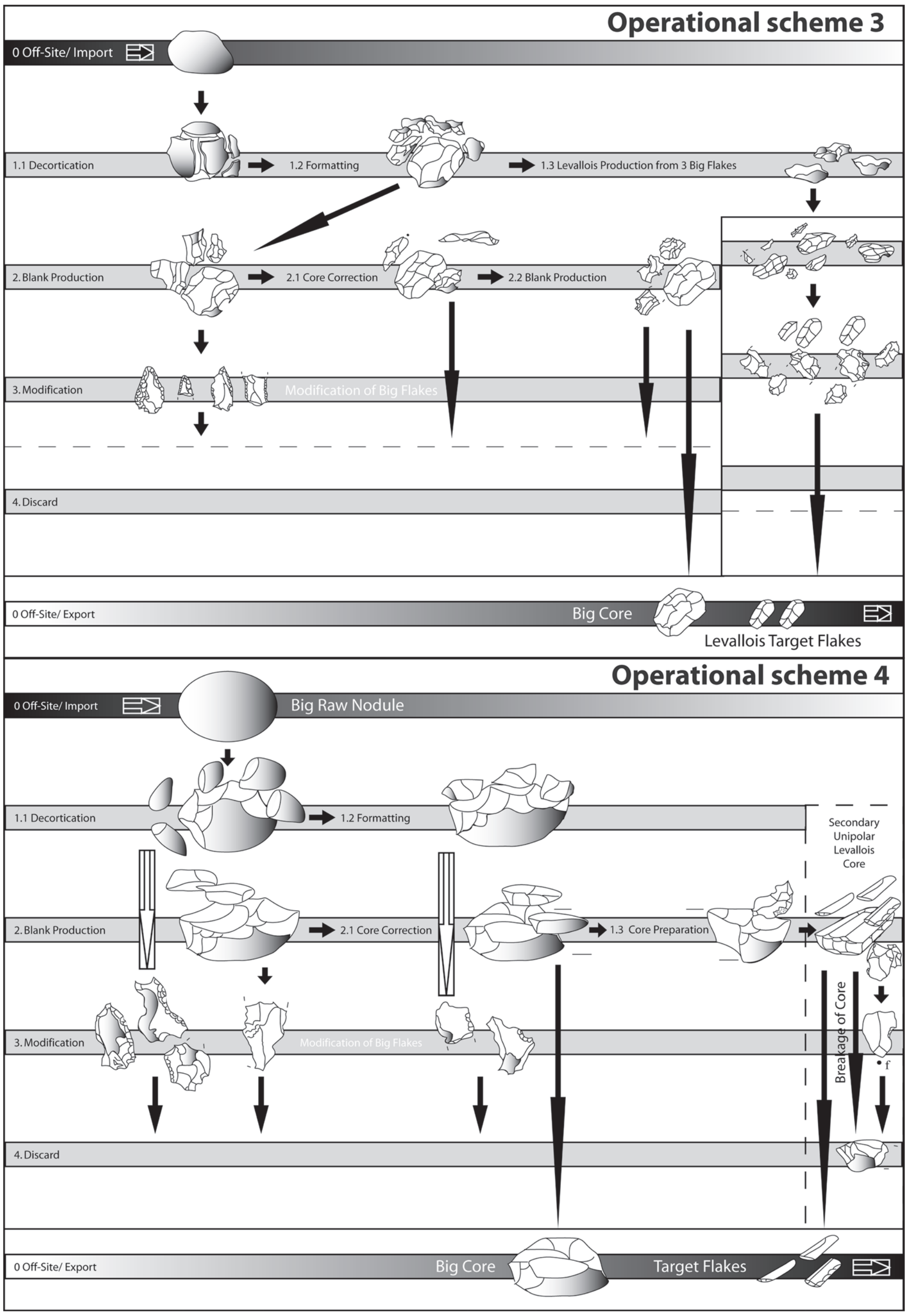


Fig. 7. Operational schemes of transformation section Nm / (f). Operational scheme 3: RMU 70, operational scheme 4: RMU 26.

Abb. 7. *Operationsschemata von Transformationsausschnitt Nm / (f). Operationsschema 3: RM 70, Operationsschema 4: RM 26.*

in comparison with the other artefacts indicate that the cores of this RMU represent the final stage of the reduction chain. One secondary Levallois flake showing the negative of a previous target flake and negatives of lateral convexity indicates the exploitation of a core according to the preferential Levallois method. Refitted flakes indicate new preparation. By a last step, the cores were exploited analogously to the method *Levallois récurrente centripète* and finally discarded as remnant cores. In this case, the production of some smaller flakes was intended – as much volume as possible was transferred into working edges.

The example of RMU 55 emphasizes the entanglement of different reduction methods; in this case from unipolar to centripetal reduction. It has to be asked whether the observations made above are typical features of level II / 8.

Transformation sections Nm and Nm / f: typical reduction schemes of Level II / 8 – primary and secondary cores

Four typical characteristic reduction schemes can be derived by the RMUs of the longest transformation section Nm – here the complete sequence from the initialisation of the cores to the modification of on-site produced blank products can be reconstructed.

Scheme 1 shows the production of Levallois cores for export (Fig. 7). In RMU 2 and 3, Levallois cores were produced on big raw nodules for the production of primary and secondary target flakes according to the method *Levallois récurrente unipolaire*; those pieces were discarded while core correction took place on-site and the cores were exported. In addition to that, tools were produced on big flakes for on-site usage; within RMU 2 one simple side-scraper was retouched on a Levallois flake, whereas within RMU 3

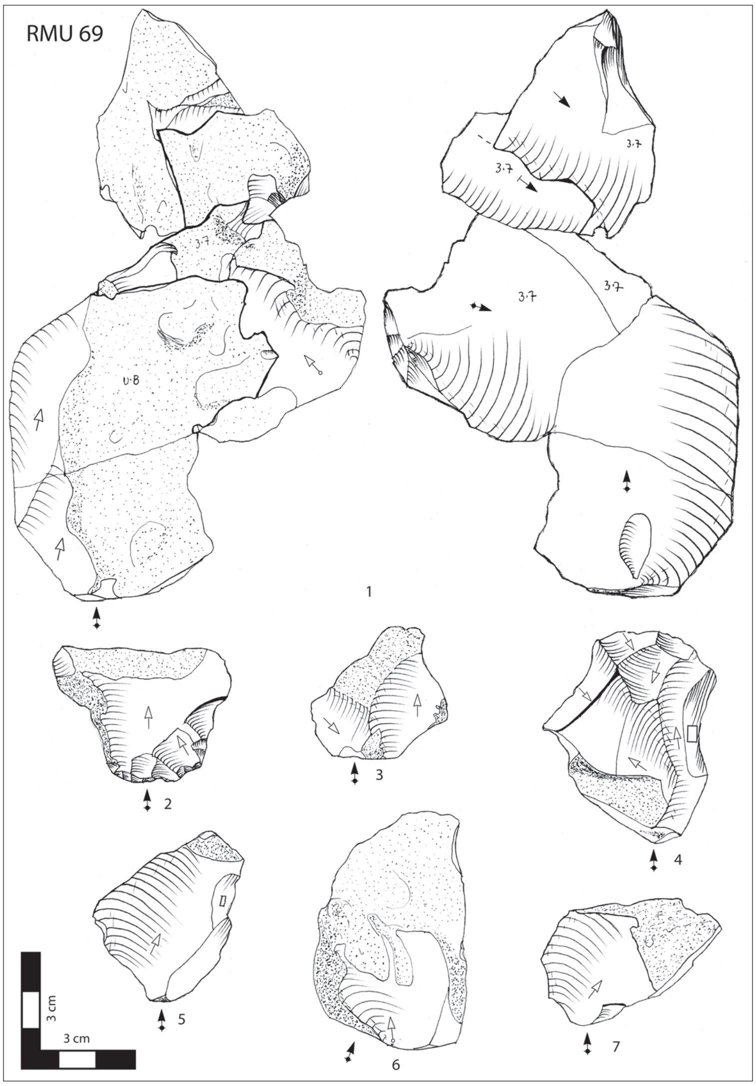


Fig. 8a. Artefacts of RMU 69. 1) Refitted decortication flakes, 2-7) flakes from decortication phase and core formatting phase. (Drawings by Th. Uthmeier), ½ nat. size.

Abb. 8a. *Artefakte von Rohmaterialeinheit 69. 1) Zusammensetzungs-Sequenz von Entrindungsabschlägen, 2-7) Abschläge der Entrindung und der Kernformatierung. (Zeichnungen: Th. Uthmeier),* ½ natürliche Grösse.

only flakes from the core formatting phase were modified. According to this, **Scheme 1** describes export oriented sequences with the secondary production of tools for on-site usage.

In **Scheme 2a** Levallois cores were produced for export purposes and Kombewa cores for on-site utilisation (Fig. 7). In RMU 6 and RMU 72 respectively one Levallois core was produced from an imported raw nodule. Numerous unspecific flakes in RMU 6 suggest a first stage in which the core was reduced as indifferent flake core for the production of big flakes and blades; two big flakes were modified. The latter rejuvenation and the re-preparation of the upper convexity are indicated by crested flakes. Two Levallois flakes and two simple side-scrapers were discarded. In addition to the primary core one Kombewa core was reduced on-site and then discarded.

Similar to that, a Kombewa core within RMU 72 was used to produce blanks for on-site usage while a primary core was produced for exportation. Big flakes were modified and then discarded. After core rejuvenation a Levallois core was configurated – the dorsal scars on a longitudinal Levallois flake indicate a reduction following the *Levallois récurrente unipolaire.*

In contrast to **Scheme 2a**, where Levallois cores provided longitudinal flakes, within **Scheme 2b** an indifferent flake core was produced for the same purpose (RMU 69, Nm / f) (Figs. 7, 8).Tools were mainly produced on big flakes, used on-site and then discarded; the core was brought off-site. In contrast to that, the complete exploitation of secondary Kombewa core was conducted on-site, and the core was discarded afterwards.

Within **Scheme 3** Levallois cores on big flakes are

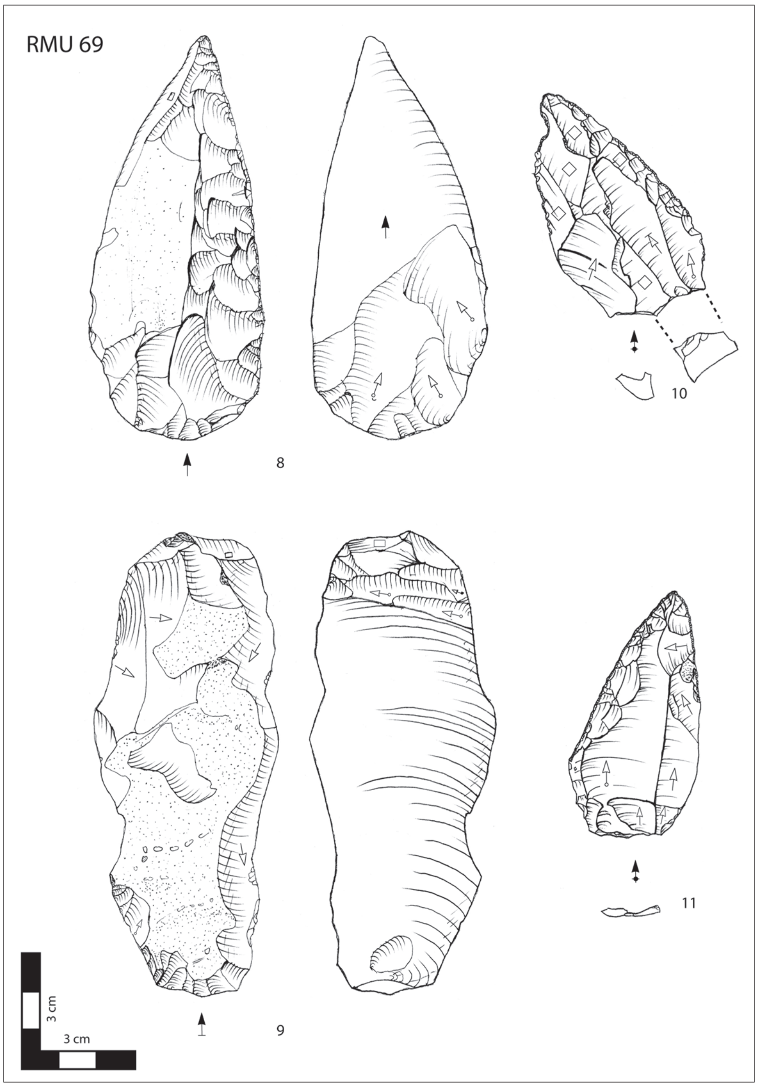


Fig. 8b. Artefacts of RMU 69. 8) unifacial surface shaped point, 9) end-scraper on blade with ventral thinning, 10) simple side scraper, 11) convergent side scraper. (Drawings by Th. Uthmeier), ½ nat. size.

Abb. 8b. *Artefakte von Rohmaterialeinheit 69. 8) unifaziell formüberarbeitete Spitze, 9) Kratzer an ventral verdünnter Klinge, 10) einfacher Schaber, 11) Spitzschaber. (Zeichnungen: Th. Uthmeier),* ½ natürliche Grösse.

additionally prepared as primary flake cores. Within the first phase of core exploitation large flakes should be produced for the modification of tools (Fig. 7). In RMU 70, for instance, Levallois cores were prepared on three big decortications flakes. All three pieces were reduced according to the preferential Levallois method. Further target flakes must have been produced which were probably exported. The Levallois cores were discarded, while the big primary core they come from was corrected on-site and exported.

Scheme 4 is exemplified by RMU 26, where a big raw nodule was configurated as a flake core (Fig. 7). Tools were modified on big flakes from core formatting and on a big flake without cortical remains stemming from a later phase of core exploitation. The core was rejuvenated on-site and exported later. Additionally, a Levallois core was prepared on a chunk which possibly resulted from the core correction phase and exploited according to the method *Levallois récurrente unipolaire.* One fragment of the Levallois core was discarded, while target flakes and flake core were exported.

Interpretation of applied reduction sequences – export oriented versus consumptive raw material economy

From the four postulated reduction schemes for transformation section Nm / (f) in accordance with the remaining operational schemes described for transformation sections Cb, Cm and Nb three characteristic operational sequences (OS) can be derived (Fig. 9). A highly economical, not exhaustive handling of lithic raw material can be observed. For on-site consumption, most of the time small secondary cores

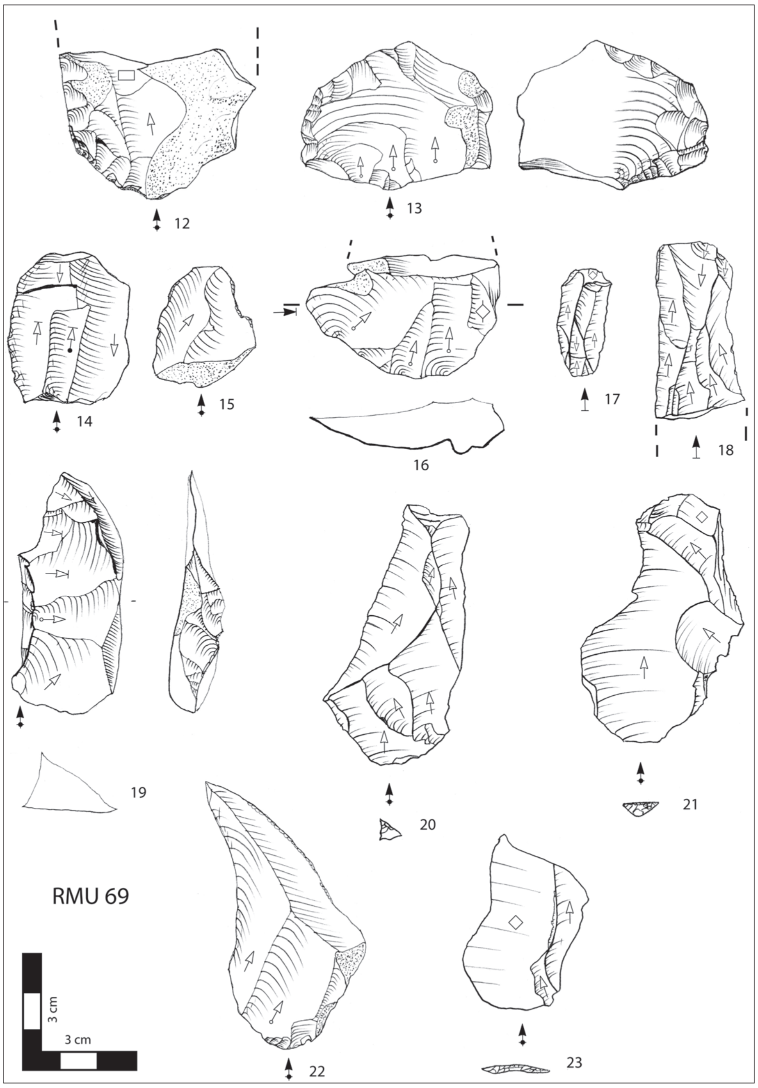
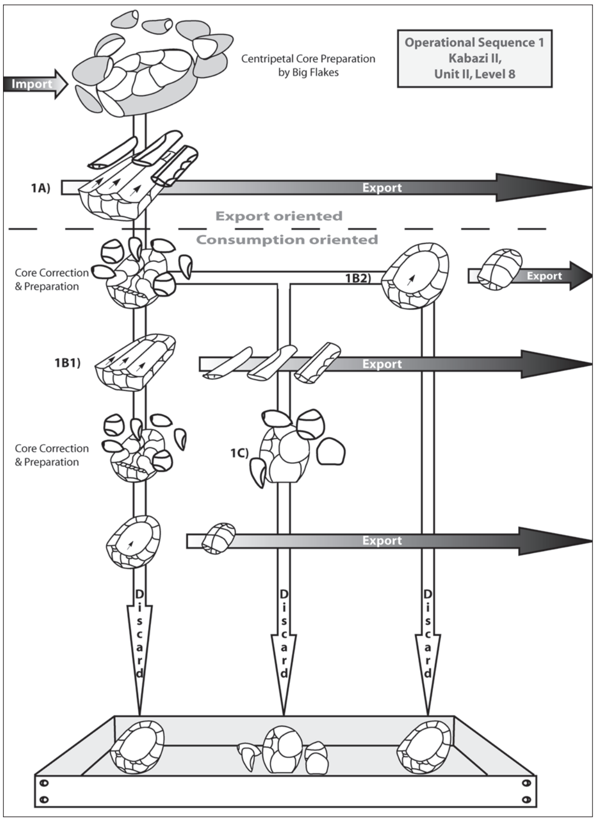
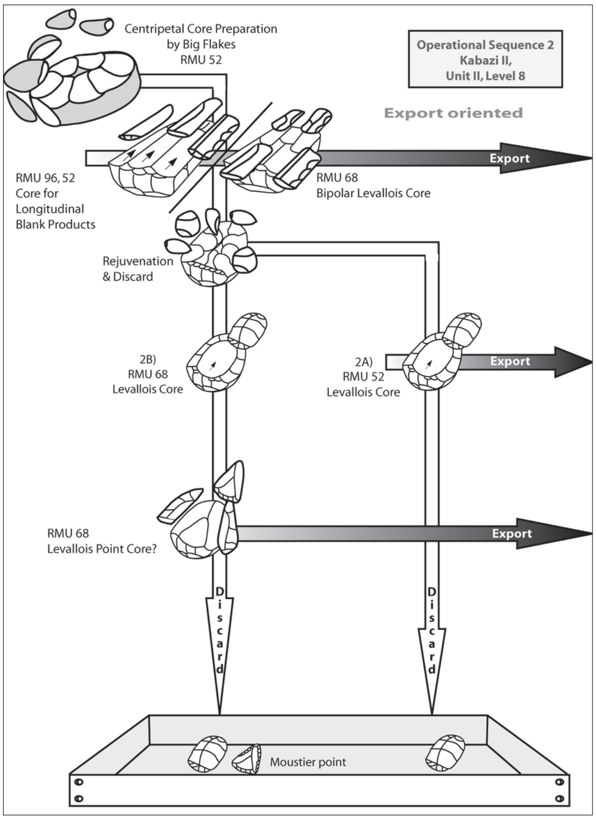


Fig. 8c. Artefacts of RMU 69. 12) & 13) simple side scrapers, 14-18, 20, 21, 23) blanks, 19) crested flake 22) flake with lateral abrasion. (Drawings by Th. Uthmeier), ½ nat. size.

Abb. 8c. *Artefakte von Rohmaterialeinheit 69. 12) & 13) einfache Schaber, 14-18, 20, 21, 23) unmodifizierte Grundformen, 19) Kernkantenabschlag 22) Abschlag mit l ateraler Perlretusche. (Zeichnungen: Th. Uthmeier),* ½ natürliche Grösse.





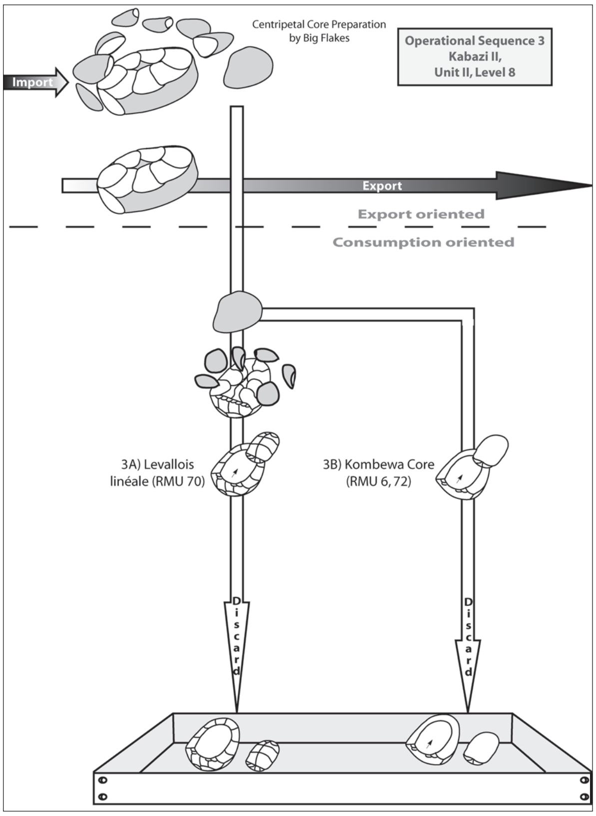


Fig. 9. Typical operational sequences of Kabazi II, Unit II, Level 8. **Operational Sequence 1**: Preparation of a non-Levallois core for longitudinal blanks or a Levallois core. 1A) Reduction according to the method *Levallois récurrente unipolaire* for exportation. 1B1) Re-preparation and reduction according to the method *Levallois récurrente unipolaire;* afterwards core rejuvenation and reduction according to the method *Levallois linéale*. Or: 1B2) Re-preparation and reduction according to the method *Levallois linéale*. Or: 1C) Re-preparation and reduction according to the method *Levallois récurrente centripète*. **Operational Sequence 2**: Preparation of a Levallois core and reduction according to the method *Levallois récurrente bipolaire* or preparation of a non-Levallois core for longitudinal blanks. 2A) Core rejuvenation and reduction according to the method *Levallois linéale*. Or: 2B) Core rejuvenation and reduction according to the method *Levallois linéale*. Re-preparation as Levallois point core and production of a Levallois point (RMU 68). **Operational Sequence 3**: According to reduction scheme II, III & IV. Preparation of either a Levallois core (scheme II) or a non-Levallois flake core (schemes III & IV) for exportation (**primary cores**). Production of preferential Levallois cores (3A) or Kombewa cores (3B) for on-site usage (**secondary cores**).

Abb. 9. *Typische Operationsketten von Kabazi II, Unit II, Level 8.* ***OS 1****: Präparation eines non-Levallois-Kerns für die Produktion langschmaler Grundformen oder eines Levalloiskerns. 1A) Reduktion nach der Methode* Levallois récurrente unipolaire *und Export des Kerns. 1B1) Kernkorrektur sowie erneute Präparation und Reduktion analog der Methode* Levallois récurrente unipolaire*; darauffolgend Kernkorrektur und Reduktion analog der Methode* Levallois linéale. *Oder: 1B2) Erneute Aufwölbung eines Levalloiskerns und Reduktion analog der Methode* Levallois linéale. *Oder: 1C) Erneute Aufwölbung eines Levalloiskerns und Reduktion analog der Methode* Levallois récurrente centripète. ***OS 2****: Präparation eines Levalloiskerns und Reduktion nach der Methode* Levallois récurrente bipolaire *oder Präparation eines non-Levalloiskerns zur Produktion langschmaler Grundformen. 2A) Kernkorrektur und Reduktion analog der Methode* Levallois linéale. *Oder : 2B) Kernkorrektur und Reduktion nach der Methode* Levallois linéale. *Erneute Präparation als Levalloisspitzen-Kern und Produktion einer Levalloisspitze (RM 68).* ***OS 3****: Entspricht Reduktionsschemata II, III, IV. Entweder Präparation eines Levalloiskerns (Schema II) oder eines einfachen Abschlagkerns (Schemata III & IV) zum Zweck des Kernexports (****primäre Kerne****). Zurichtung eines Kerns der Methode* Levallois linéale *(3A) oder eines Kombewakerns (3B) für den Verbrauch vor Ort (****sekundäre Kerne****).*

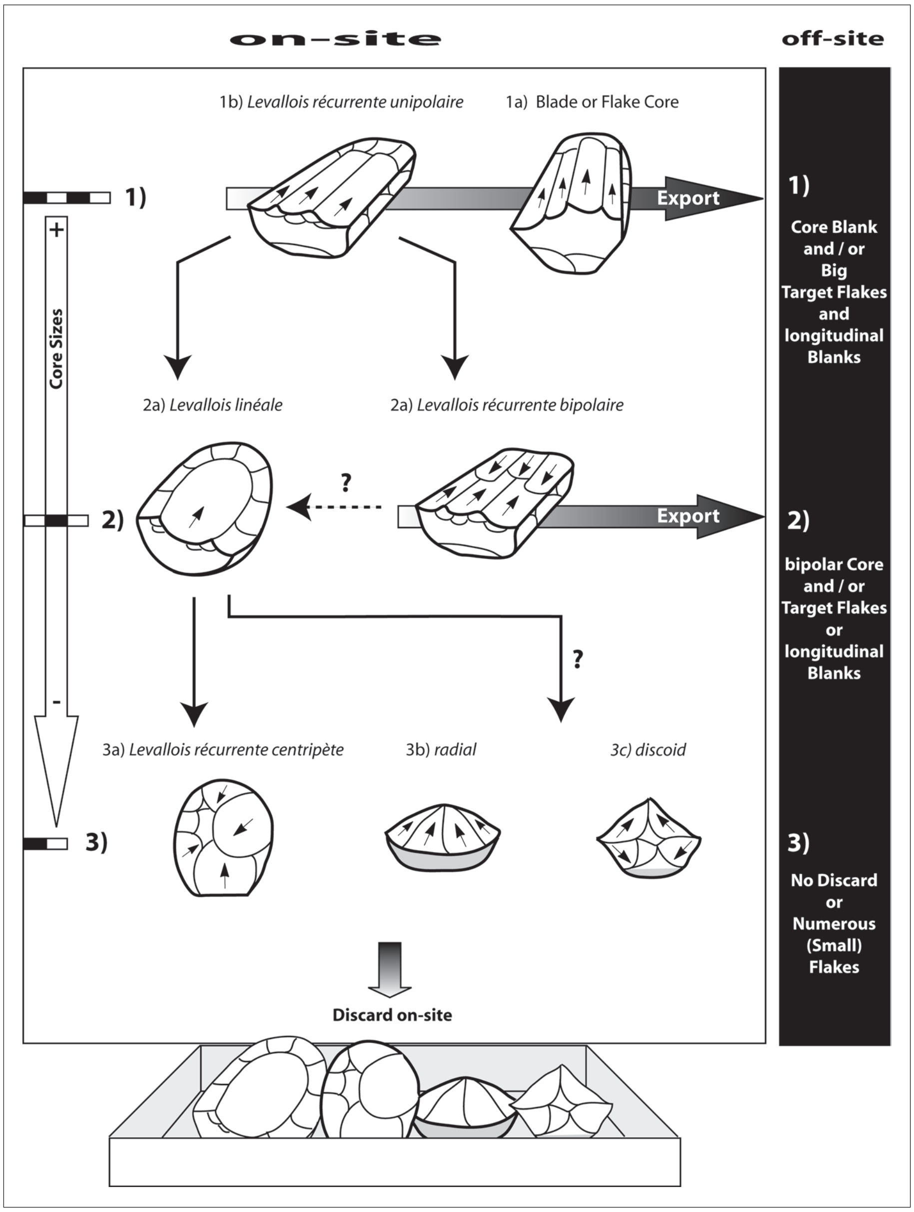


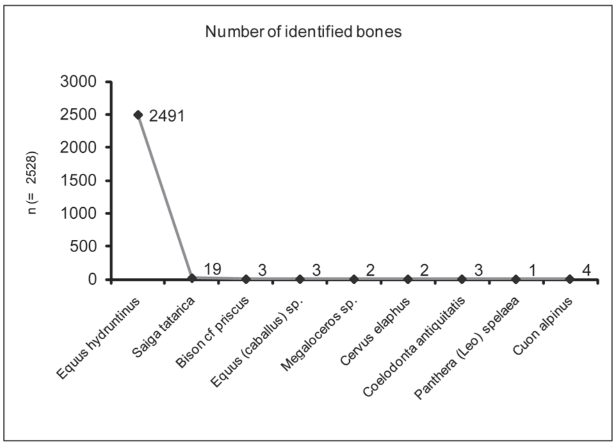
Fig. 10. Schematic illustration of the possible succession of core reduction strategies according to measured core scales and reduction sequences of Kabazi II, Unit II, Level 8.

Abb. 10. *Schematische Darstellung der möglichen Abfolge unterschiedlicher Kernreduktions-strategien analog genommener Kernmaße und rekonstruierter Reduktionssequenzen von Kabazi II, Unit II, Level 8.*

on flakes are used which are prepared additional to the primary core. Tools for on-site usage are mostly modified on big flakes, often resulting from the core preparation phase. In contrast to that, the primary core is only carefully exploited by preserving as much of the original raw volume as possible. Afterwards the prepared core is often exported.

In addition to that it has been pointed out, that different reduction concepts occur within one and the same workpiece. In numerous cases, this comes along with primary cores being prepared for export and small secondary cores on flakes for on-site usage (e.g. RMU 70) (Fig. 4). According to this, an entanglement of technological concepts and an entanglement of export oriented and consumption oriented on-site activities can be manifested – technological concepts and subsistence activities are interrelated.

Cores are prepared and reduced depending on the necessity of special blank products and formal tools. In the course of the operational chain, an applied reduction concept can be replaced by another one, better fitting to a special aim. On-site activities, as well as future off-site activities seem to play an important role for the choice of applied reduction concepts and their succession within single operational chains. In accordance to present and future activities and demands the flint knappers decide which blank products will be produced in which way. The



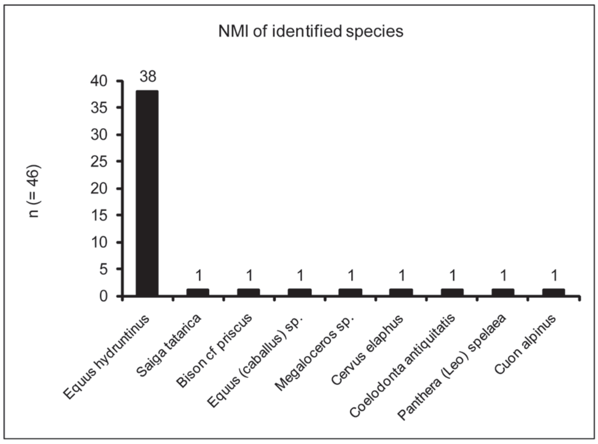


Fig. 11. Faunal remains of Kabazi II, Unit II, Level 8: a) number of identified bones; b) minimum number of individuals of identified species. After Patou-Mathis (2006) and Patou-Mathis & Chabai (2003, 239 f.).

Abb. 11. *Faunenreste von Kabazi II, Unit II, Level 8: a) Anzahl identifizierter Knochen; b) Mindestindividuenzahl identifizierter Spezies. Nach Patou-Mathis (2006) und Patou-Mathis & Chabai (2003, 239 f.).*

succession of reduction methods within a single reduction sequence does not at all look arbitrary. The observations of the assemblage of level II / 8 suggest that the cores were reduced by applying analogue strategies.

In case that the core has to be exported without a bigger loss of volume it is reasonable to produce a second one on flake (**OS 3**). Such **secondary cores** are most of the time Kombewa cores (RMU 6) or *Levallois linéale* cores (RMU 70) (Figs. 4.3, 7, 9). Concerning Levallois cores, the production of big target flakes with predetermined shape is the intended aim; if required, working edges can be modified (RMU 70). Concerning Kombewa cores, not prepared as Levallois cores, the extraction of a bigger number of smaller cutting edges is intended (RMUs 6, 50, 69, 72) (Figs. 4, 4.3, 7, 8, 10).

In most cases, a core for the extraction of longitudinal blank products or a Levallois core is produced as a **primary core (OS 1)**. It is obvious that in these cases *Levallois linéale* cores represent the end of the operational chains. Levallois cores in level II / 8 are almost exclusively reduced first as uni- and / or bipolar and then as preferential Levallois cores. The convexity of the upper surface of uni- and bipolar cores is configurated at the end of a reduction sequence. These cores are subsequently reduced according to the method *Levallois linéale*, presumably to achieve a final big target flake. Therefore, it is not surprising that more *Levallois linéale* cores than uni- or bipolar cores are present in the assemblage. In these cases the main core is exported, flakes obtained from it often modified as tools for on-site usage. A 'migrating' blade-like or uni- / bipolar Levallois core serves as a 'supplier' of whole blank sets on the way or at the destination. This reduction scheme is oriented toward off-site activities (**export orientation**).

The maximum length of all artefacts was determined in the course of an attribute analysis. The measured scales of Levallois cores of level II / 8 further confirm the sequence from preferential to centripetal cores – centripetal Levallois cores show the shortest scales of all cores of Level II / 8 (Fig. 10). In this context it is obvious that preferential and centripetal Levallois cores have been discarded as remnant cores. This thesis is as well proved by the longer size of Levallois blades that result from the unipolar and bipolar recurrent Levallois methods. These pieces are in most cases longer than preferential Levallois flakes.

Under functional aspects the reduction concepts of level II / 8 can be put into a hierarchical succession. Comparing the core's measurements of length it is striking that the cores representing the same reduction concepts range within the same size classes. So, the measured lengths steadily decrease from cores of the method *Levallois récurrente unipolaire* to cores of the method *Levallois récurrente centripète*. While taking into consideration those RMUs where preferential Levallois products and recurrent Levallois products commonly occur, a succession of decreasing sizes from the methods *Levallois recurrent unipolaire* to *Levallois linéale* is attestable (e. g. RMU 68) (Fig. 4). Centripetal Levallois cores and the inventory's only discoidal core (RMU 96) show the shortest measured lengths (Fig. 4). One non-Levallois centripetal flaking core is very flat and represents the final stage of reduction (RMU 112) (Fig. 4).

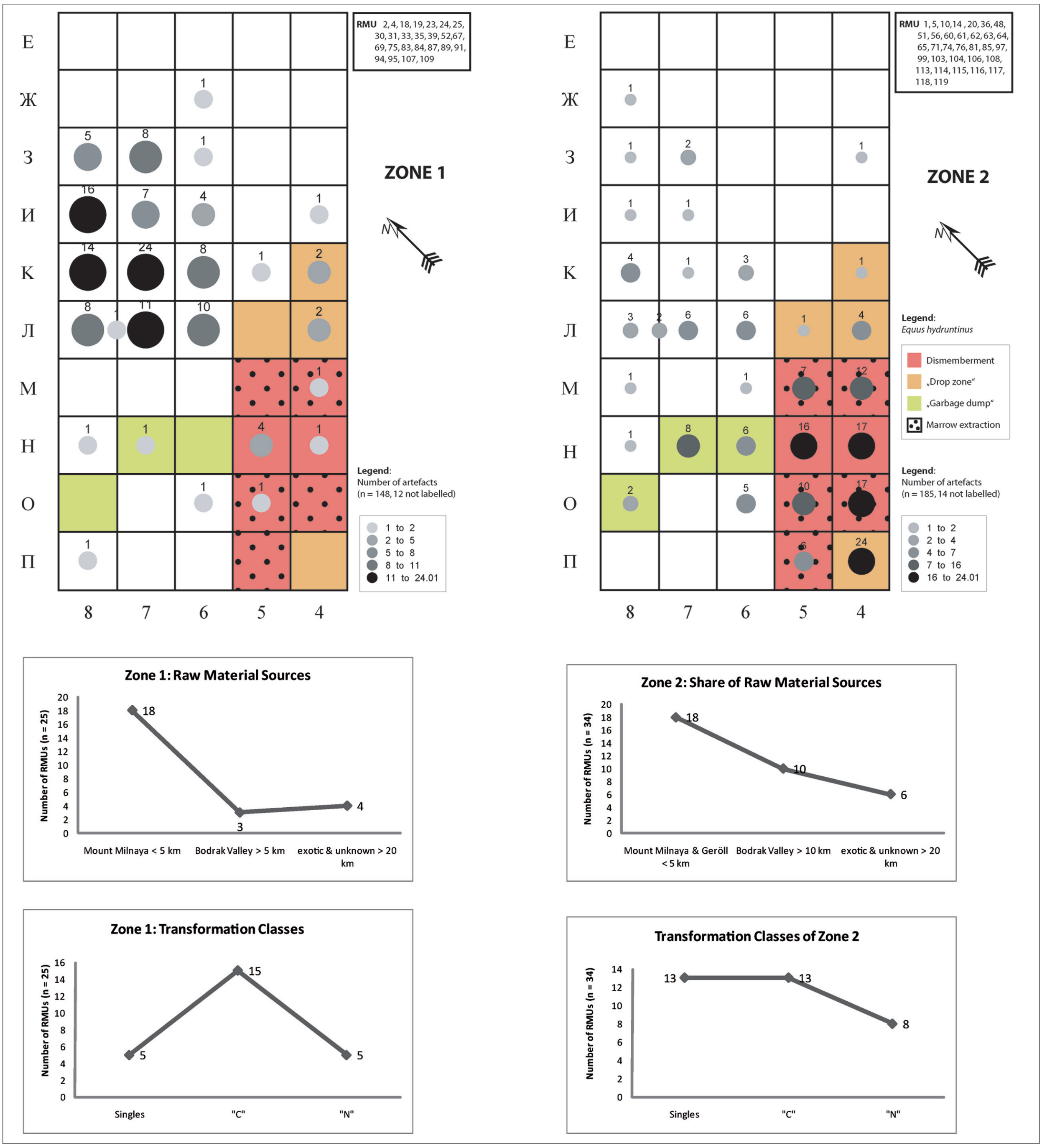
According to size classes the reduction schemes can be placed in decreasing succession like this (Fig. 10): 1) *Levallois récurrente unipolaire*, 2b) *Levallois récurrente bipolaire*, 2a) *Levallois linéale*, 3a) *Levallois récurrente centripète*, 4b) radial reduction, 3c) discoidal reduction.

To obtain an optimum on-site consumption of raw material, either at first Levallois cores were reduced according to the method *récurrente unipolaire* **(1b)** or big blank products, often with longitudinal section were struck from indifferent flake cores (**1a**)

(RMUs 7, 8) (Fig. 4). In case that a further reduction was desired but a limited raw volume was left, it was possible to reproduce the lateral and distal convexities in order to obtain a comparatively big target flake from a *Levallois linéale* core (**2a**) (RMUs 64, 95) (Figs. 4, 4.2). However, if enough of the core volume was still available and the production of longitudinal blank products was desired, the unipolar Levallois core could, by applying a second opposed striking platform, be reduced as a bipolar core (**2b**) (RMUs 91, 93, 108) (Figs. 5, 5.2, 4.1).

To sum up, the methods *Levallois linéale* and *Levallois récurrente bipolaire* have to be seen within the context of optimal raw material utilization: in the first case to obtain a final big target flake and in the latter case to produce a series of blades and longitudinal flakes with rectangular shape to receive a certain quantum of cutting edges.

Centripetal Levallois cores, which exhibit the smallest sizes, most probably represent the final stage of preferential Levallois cores which at the end of their reduction were re-prepared and finally reduced from a radial striking platform – the centripetal mode of reduction serves to achieve a last quantum of cutting edges (**3c**) (RMUs 55, 104) (Fig. 4). Another possibility to produce a larger amount of blanks from nearly exhausted cores is either to follow a non-Levallois radial reduction from one striking surface (**3b**)



(RMU 112) or a discoid reduction (**3c**) (RMU 96) (Figs. 4.1, 4.3). In RMU 96 the occurrence of discoidal and Levallois methods could be attested by the presence of one discoidal and one unipolar Levallois core. The possibility of reshaping a preferential Levallois core into a discoid one has already been described by Tixier et al. (1980, 43 ff., after Hahn 1993). In this case, shape and size of produced flakes are not predetermined. On the other hand, more flakes can be produced than by the *linéal* Levallois method (Hahn 1993, 99 ff.). Anyway, the discoid reduction would also suggest optimum raw material exploitation. In contrast to the Levallois method (**2a**), a target flake with predetermined shape and scale is not intended, but a set of thick flakes for on-site utilization. These examples describe **consumptive activities**.

The operational chains introduced as isolated concepts by Boëda (1994) appear in Kabazi II, level II / 8 as functional entangled reduction stages targeting on present and future off-site demands. Taking into consideration the processes of reduction observed in level II / 8, the necessity of a recurrent control of distal and lateral convexities to maintain the angle between under and upper surface within one operational sequence (Van Peer 1992, 31-33) does not contradict Boëda's concept of recurrent Levallois methods.

In level II / 8 the reduction angle is controlled by the re-preparation of uni- and bipolar Levallois cores at the end of their reduction and the final reduction according to the method *Levallois linéale* to obtain an *éclat préfèrentiel*. Afterwards nearly exhausted cores may be reduced in a centripetal manner according to the method *Levallois récurrente centripète*. The reconstructed embedding of different Levallois methods within a single operational sequence contradicts the results of maintaining a specific reduction concept within a single operational sequence as observed by Van Peer (1992, 89 ff., 114 ff.). In Level II / 8 of Kabazi II the opposite can be said: specific methods occur at the beginning or in the end of a reduction sequence. In this context the absence of the recurrent Levallois method claimed by Usik (2006) cannot be verified. In contrast to his opinion, products of all Levallois methods are present (see Fig. 5: 6, & Fig. 5.2: 3, 5, 4). His assumption that target flakes representing the uni- and bipolar Levallois method are in reality preparatory flakes to finally obtain one preferential Levallois flake per cycle is contradicted by the results of the Transformation Analysis and is

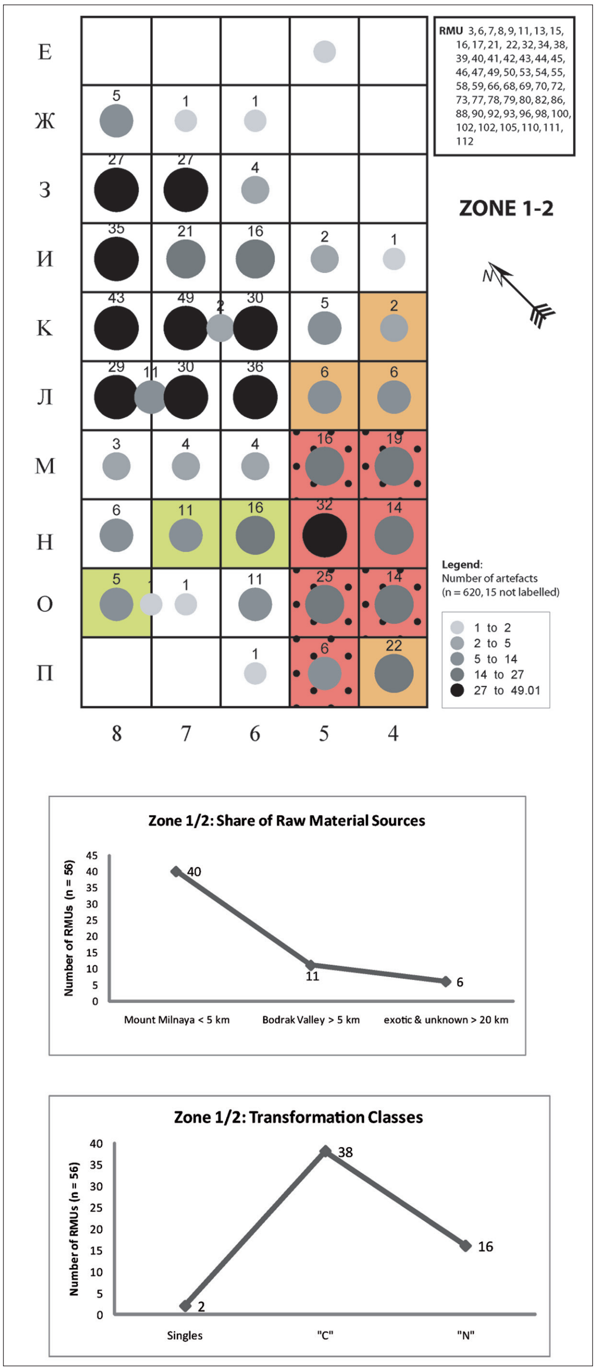


Fig. 12. Occupational Zones 1, 2 & '1 / 2': a) spatial distribution of lithic artefacts bigger 3 cm, b) distances between Kabazi II and raw material sources, c) share of transformation classes ('singles' = import of single artefacts, 'c' = import of cores, 'n' = import of raw nodules). The, in comparison to Zone 1, high share of 'single pieces' in Zone 2 speaks for a preceding sojourn in another region temporarily before the accumulation of artefacts belonging to Zone 2. This is further indicated by the in comparison to Zone 1 low share of local raw material stemming from the nearby source at Mount Milnaya. Legend: 'Single' = artefacts imported as isolated objects; 'C' = raw material units imported as cores; 'N' = raw material units imported as raw nodules.

Abb. 12. *Belegungszonen 1, 2 & 1 / 2: a) horizontale Verteilung der Artefakte größer als 3 cm, b) Distanzen zwischen Kabazi II und genutzten Rohmaterialquellen, c) Anteil der Transformationsklassen („singles" = Import von Einzelstücken, „c" = Import von Kernen, „n" = Import von Rohstücken). Der im Vergleich zu Zone 1 hohe Anteil von Einzelstücken in Zone 2 indiziert einen vorausgegangenen Aufenthalt in einer Region abseits des Alma-Tals. Dies wird darüber hinaus angedeutet durch den im Vergleich zu Zone 1 geringen Anteil lokalen Rohmaterials, welches von der nahe gelegenen Quelle am Mount Milnaya stammt. Legende: „Single" = Artefakte, die als isolierte Objekte eingebracht wurden; „C" = Rohmaterialeinheiten, die im Kernzustand importiert wurden; „N" = Rohmaterialeinheiten, die als unmodifizierte / getestete Rohstücke importiert wurden.*

therefore doubted by the author. Secondary Levallois target flakes occur e. g. in RMU 72 (Fig. 4) and have already been documented by Chabai (2006, Fig. 1-13).

Reconstruction of on-site activities – recurrent occupations of level II / 8

In the following the question whether there is a causal relationship between the workpieces and the processing of faunal remains of level II / 8 will be discussed.

The faunal remains of Level II / 8 were analyzed by Patou-Mathis and the results were published in 2003 and 2006 (Patou-Mathis & Chabai 2003, Patou-Mathis 2006). First analyses were carried out by Belan (Marks & Chabai 1998). Wild ass (*Equus hydruntinus*) dominates the assemblage with 38 individuals (Fig. 11). The primary butchering was undertaken on-site, while the body elements of high nutritional value are missing regularly in the assemblage – Patou-Mathis concluded that these body elements were exported to a residential camp nearby ('inverse gourmet strategy') (Patou-Mathis 2003, 2006). This pattern could be observed in different archaeological layers of Kabazi II. The assemblage is dominated by steppe species; besides wild ass, remains of Saïga antelope (*Saïga tatarica*) and steppe wisent (*Bison cf. priscus*) are present (Fig. 11). Species of more temperate conditions are represented by *Megaloceros* sp. and *Cervus elaphus*. Activities of carnivores did not play an important role. Gnawing marks could only be observed on four of altogether 2.562 bones of wild ass (Patou-Mathis & Chabai 2003, 239). Horizontal dislocation processes caused by carnivores can be excluded.

Due to the age-structure of the hunted animals and the presence of two (Patou-Mathis 2006) resp. four stallions (Patou-Mathis & Chabai 2003, 246 ff.) the hunt on maximum four family herds was reconstructed. Only one adult male belongs to a group of females and defends his territory against rivals (Patou-Mathis & Chabai 2003, Uthmeier 2004b, 82 ff.). The presence of teeth and bones of juvenile animals younger 3 years and foetus bones attests that hunts were undertaken in the vicinity of Kabazi II during spring / early summer and especially winter (Patou-Mathis 2006, 48 ff.; Patou-Mathis und Chabai 2003, 246 ff.).

The flint artefacts are scattered across the complete excavation area, with two clusters in the north-western and south-eastern area (Fig. 1). There are different RMUs of different transformational sections which either completely or predominantly belong to one of both concentrations (**Zone 1** and **Zone 2**) (Fig. 12).

The horizontal distribution of artefacts connected with **Zone 2** coincides with the south-eastern excavation area, which was described as the zone of dismembering of four *Equus hydruntinus* family herds (Patou-Mathis & Chabai 2003, 249 ff.). It is very likely that the 26 RMUs concentrating completely or predominantly in this area are directly connected with the observed butchering activities (М-5 М-4, Н-5, Н-4, О-5, О-4, П-5). Square П-4, showing the highest share of artefacts, correlates to one of the 'drop-zones' where by-products of faunal dismemberment (e.g. bone splinters) were discarded (П-4, Λ-5, Λ-4, К-4) (Patou-Mathis 2003, 249 ff.). Stone artefacts are present in two out of three squares where waste of faunal dismemberment was deposited (Н-7, Н-6, О-8). Broken bones with traces of marrow extraction were found within squares О-4 (7), М-4 (3), М-5 (3), П-5 (2) und О-5 (2). Beside the high density of faunal remains and the observed butchering activities, the spatial correlation of remnants of carcasses and different RMUs and the high share of blank products in these areas are consistent with an interpretation as primary butchering station (Patou-Mathis & Chabai 2003). Experiments and ethnographic investigations emphasized that primarily the sharp edges of unmodified blank products were used for butchering game (Schütz et al. 1990, 232 ff.; Brugal & Mourre 2005, 32 ff.). This was also proposed for Level II / 7E of Kabazi II, where remains of faunal dismemberment coincided with the horizontal distribution of specific transformation sections (Cb, Cm) connected with blank and tool production (Bataille 2006a). For instance, tools, like simple side-scrapers, were used, besides cutting activities, presumably for the extraction and processing of fur (Hardy & Kay 1999, 197 ff; Kay 1999, 165).

It seems as if the preparation of imported raw nodules and cores for the production of blank products and formal tools for faunal processing was predominant, while cores were mostly exported afterwards. Among the transformation sections classes Cb and Cm are clearly dominant – pre-site prepared cores were obviously reduced in the context of butchering activities, most probably to save raw material. To sum up, all transformation sections observed in Level II / 8 occur in both occupational zones. As argued above, no processes of horizontal displacement worth mentioning could be documented for Level II / 8 (Patou-Mathis & Chabai 2003, 231). If solifluction played a role in the evacuation processes of specific artefact categories, like cores, these artefacts would have been accumulated following the slope inclination (~ 5°) in the southern area of the site, in direct vicinity of the big limestone block – this is not the case. The adjacent line П (P) is nearly free of finds and no remarkable high density of cores is attestable here (Fig. 1.). Another explanation for the regularly missing of cores, a fact that was observed in other archaeological layers of Kabazi II (Chabai et al. 2005, 2006), could be a deposition of these artefacts in the unexcavated area of Level II / 8. But this assumption is very unlikely: first, such a depot of cores was never observed in the Middle Palaeolithic of Crimea. Secondly, 77 of the raw material units that indicate on-site modification imply the evacuation of cores; those pieces that must have been imported. The complete reduction sequences can be observed within the excavated area; this is also true for **Zones 1** and **2**. To explain the core's absence different than as result of intended export leads to unlikely assumptions: in this case a big part of the cores would have been moved *intra-site* to the not excavated area at the end of the reduction sequences due to natural or anthropogenic (dislocation) processes, while all other artefact categories would have been left in place. Like argued above, natural processes can be excluded and core depots have never been observed. One important reason for the acquisition of hunter-gatherers with cores might be the absence of bifacial tools within the WCM industry: *"Despite the technological differences between the Crimean Micoquian and the Western Crimean Mousterian, both industries show identical models of land use, have the same logistical strategy for the acquisition of resources, and inhabit the mountain and sub-mountain regions. [...] On the other hand, WCM and Micoquian mountain camps* (= Karabi Tamchin, the only known Crimean Middle Palaeolithic site situated in the main ridge of the Crimean Mountains, showing both WCM and Micoquian occupations; the author) *[...] 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"* (Chabai & Uthmeier 2006, 356 ff.).

Zone 1 is located in the north-western excavation area (Fig. 12). A total of 23 RMUs belong more or less completely to this zone. Apart from RMU 69 (28 artefacts) and RMU 95 (34 artefacts), the concerned workpieces show only small numbers of artefacts. RMUs of transformation category 'C' are dominating (Fig. 12). The main focus of the reconstructed activities was the reduction and the correction of cores for the purpose of export. The core rejuvenation is not at least verifiable by the presence of three out of all transformation sections **Cc** (RMU 49, 67, 109) (Fig. 4).

Zone 1 and **2** show all transformation sections represented in Level II / 8 (Fig. 12). However, different shares of the artefacts stem from different raw material sources. Thus, it does not make sense to interpret these zones as activity zones of different functions within one and the same occupational event (e.g. zone of core preparation and zone of butchering); in **Zone 1**, rather another occupation episode is indicated. Partially the belonging artefacts must have been used for the dismemberment of hunted individual animals. The published distribution of archaeological material shows faunal remains within **Zone 1**, most probably remains of hunted or scavenged individuals (Patou-Mathis & Chabai 2003, Fig. 4). Unfortunately, it is not possible to conclude from the literature which species belong to **Zone 1**. This problem has to be discussed in the next chapter, by comparing the different occupational zones according to the share of transformation sections and raw material sources.

'**Zone 1 / 2**' inherits those RMUs that scatter across the excavation area without any clear connection to Zones 1 and 2, since they do not occur completely or nearly completely in one of both zones. This 'zone' seems to represent at least one other occupational episode not connected with the activities conducted in **Zone 1** and **2**. It is not possible to conclude if only one or several occupations constitute '**Zone 1 / 2**', but it is very likely that different occupational episodes are responsible for the accumulation of artefacts here. In '**Zone 1 / 2**' primarily lithic resources for export purposes were prepared. The initial preparation of raw nodules and the preparation of cores were conducted here. Furthermore, blank products were produced, partially utilized on-site and partially exported as blank-sets. The modification of tools for on-site consumption was embedded in these activities; mostly those pieces were discarded as simple edge retouched pieces.

Probably the procurement with lithic and other not preserved resources was embedded in hunting activities. Animals were ambushed at neuralgic locations, where the provisioning with diverse resources was guaranteed. In this context, it is worth mentioning that Kabazi II is situated at the border between steppe habitat in the north and the river valleys, where steppe species had access to water. Thus, apart from one exception, all WCM levels defined as 'killing and butchering stations' are situated in the direct vicinity of raw material sources and rivers being important both for animals and humans (Chabai & Uthmeier 2006). In general, Middle Palaeolithic sites at Crimea show in most cases a distance of five to ten km to flint sources (Marks & Chabai 2001).

Functional differences between the concentrations and their embedding into a common land use system will be discussed in the next chapter.

The function of the 'provisioning station' Kabazi II, Unit II, Level 8 in the context of possible land use systems

Taking into consideration the flint raw material used in level II / 8, the 'exotic' materials, mostly imported as single pieces, indicate the maximum transport distance, while material stemming from the neighbouring sources of Mount Milnaya show the minimum transport distance (see Uthmeier 2004b, 428 ff.). Flint raw material derives mostly from local (< 5 km distance, 65 %) and less often from regional (< 20 km distance, 21 %) raw material sources. 'Exotic' artefacts most probably deriving from supra-regional (> 20 km distance, 7 %) sources are an exception (in agreement with Géneste 1988, 61 ff.). For seven percent of the artefacts the location of the raw material could not be determined.

In the following the region around Kabazi Mountain will be called ‚**core region**'. This **core region** is indicated in **Zone 1** by the dominant local raw material stemming from Alma Valley and is embedded within a larger region between Alma and Bodrak Valley appr. 5 km southwest of Kabazi Mountain (= **Region 2**) (Fig. 13). Hunting episodes on wild ass family groups constituting **Zone 2** indicate occupations in spring and (early) winter – a time when probably a sufficient supply with meat was still available (Patou-Mathis & Chabai 2003, 247 ff. & 251 ff.).

The high share of 'exotic' RMUs and such with unknown origin in **Zone 2** indicates that the human groups first dwelled in a more remote region (> 20 km distance) before they reached the region around Mount Milnaya (Fig. 12). However, 29 % of the raw material comes from the sources of Bodrak Valley. Weniger (1991, 84) denotes the relocation of a camp site into another local context area (‚Nutzungsareal') as macro moves. Movements within a local context area are described as micro moves. This indicates that human groups shifted in *macro-moves* in the region between Alma and Bodrak Valley. Probably an encampment was established in the immediate vicinity of Kabazi II. Raw material procurement took place at Mount Milnaya and at the residual sources along the Alma river terrace, while the preparation took place in Kabazi II. Maybe this preparation proceeded in the course of planned hunting events on *Equus hydruntinus.* Captured wild ass herds were dismembered on-site, sections rich in meat and prepared cores were brought to the camp site afterwards ('inverse gourmet strategy') (Patou-Mathis & Chabai 2003, 247 ff.). In case that further resources, like game, were needed smaller task-groups could be sent out or a shift with the whole group for resource procurement connected with the processing of resources at 'low bulk' locations or 'stations' could be made (Binford 1980, 10 ff.; Bataille 2006a, c).

Possibly single non-migratory animals, like *Cervus elaphus* und *Megaloceros* sp., were captured in the course of such *micro moves* around Mount Milnaya. Together with collected raw nodules the prey was prepared for consumption at Kabazi II and exported to a camp site (Burke et al. 1999, 149 ff.; Uthmeier 2004, 445-446). Binford (1979, 259f.) emphasizes that Nunamiut Escimos supplied themselves with meat resources at places where a secure supply was ensured by the possibility of choosing between different resources (in that case fish and game). Thus, occuring nutritional bottle-necks of one resource could be compensated by another. The collection of nearby lithic material is embedded into these activities. Kabazi II, with its geographical and 'strategically' convenient setting between steppe plateau and river valley, offers similar topographic conditions.

Zone 1 could represent such an embedded occupation episode in connection with activities of task groups. Remarkably most of the time local raw material from Mt. Milnaya was obtained and prepared (72 % of all RMUs belonging to **Zone 1**), whereas regional (Bodrak Valley) and supra-regional raw material occurs with 12 % (3 RMUs) respective 16 % (4 RMUs) of all RMUs belonging to **Zone 1** (Fig. 12). The high share of local raw material (18 RMUs) in connection with only few workpieces imported as single pieces (5 RMUs) emphasizes that people already were present in the core region around Mount Kabazi for a longer span of time (Fig. 12).

In contrast to that, in **Zone 2** local raw material occurs in smaller numbers (53 %, 18 RMUs), while regional (29 %, 10 RMUs) and supra-regional (18 %, 6 RMUs) resources show a more emphasized presence than in **Zone 1**. In contrast to **Zones 1** and **1 / 2**, **Zone 2** obeys a high share of workpieces imported as single pieces (13 RMUs) – a high share of single objects, especially tools, should be expected by groups just arriving from another region who supplied themselves for underways with tools ('provisioning of individuals') (see Kuhn 1995, 22 ff. & 177).

In this context, the export of blank sets claimed in this article could be the starting point for the provisioning of individuals with blanks which are modified underway and finally are discarded as heavily overworked or broken tools which arrived in Level II / 8 as isolated tools (e. g. RMUs 89, 93,96, 103, 104) (Fig. 4). On the other hand, the prevalence of exported cores speaks for a 'provisioning of places' (Kuhn 1995, 24 ff.). In the case of Kabazi II, ephemeral camps in the vicinity of this station (e. g. Kabazi V) were supplied with cores together with meat resources primarily prepared at Kabazi II. Like Kuhn emphasizes: *"Finished implements have relatively low transport costs, but are limited in their potential versability. Minimally modified raw materials have the potential to fill a vast number of different functions, but are energetically costly to carry around"* (Kuhn 1995, 23 ff.). This would be the case by preparing cores for the supply of nearby situated residential camps. *"However, cores contain a large proportion of wasted material, and they are not generally expected to play a large role in transported toolkits [...]. Instead, provisioning of individuals should involve primarily retouched tools and flakes, which provide the best ratio of utility to unit weight"* (Kuhn 1995, 32 ff.). The possible provisioning of mobile hunter-gatherers is, in the case of Level II / 8, obviously solved by the provisioning with blank sets like demonstrated on the basis of several RMUs of

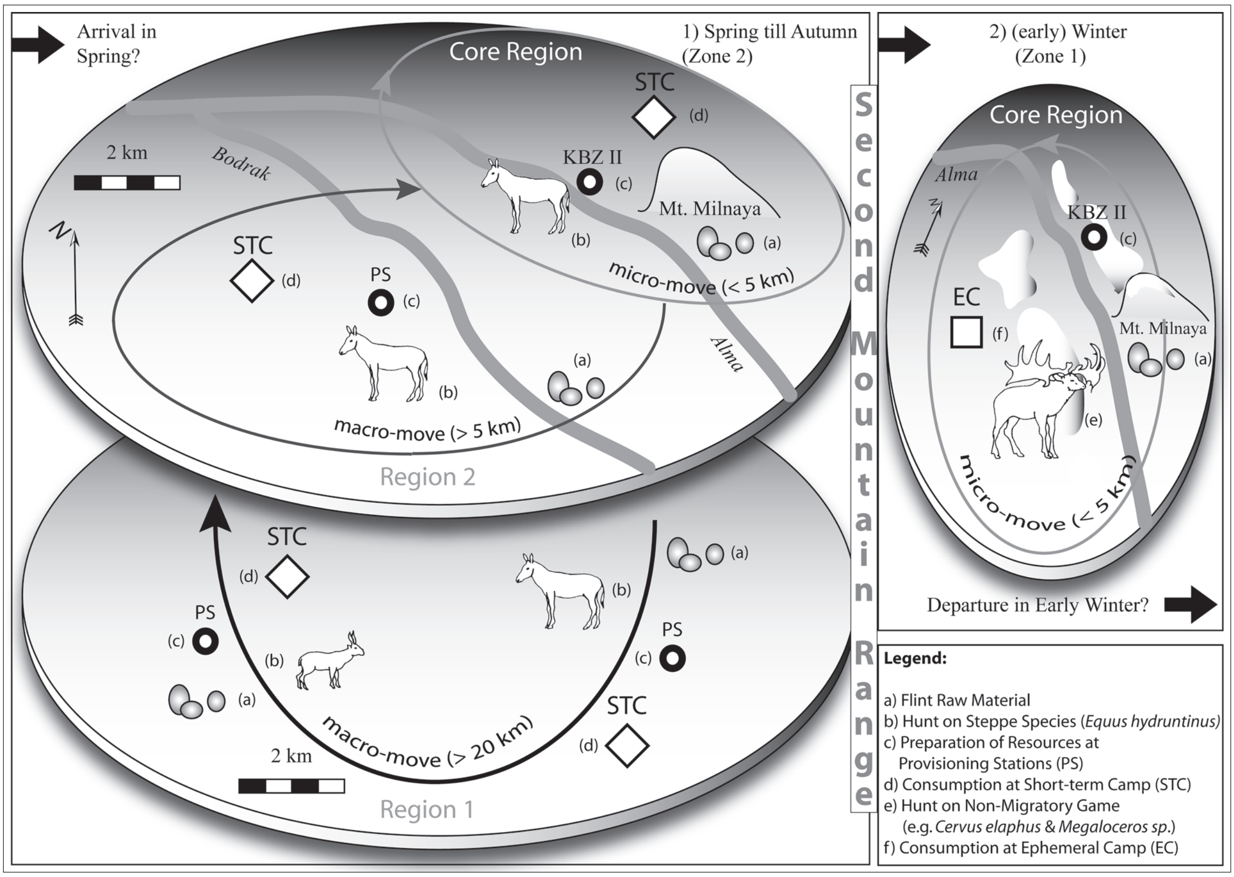


Fig. 13. Land use model. During the seasons between spring / early summer and autumn / early winter Middle Palaeolithic groups dwell in the region of the western 2. Mountain ridge. In case, that the main hunting game *Equus hydruntinus* does not leave this elevated area, in accordance with Pellegrini et al. (2008), human groups are able to stay the whole year round. According to the availability of game, 'short-term camps' are established for a maximum of a few weeks (1). In case of food shortages, e.g. in winter when steppe species like *Saïga tatarica* etc. have left the region, groups shift to hunting and scavenging of non-migratory game for supply of 'ephemeral camps' in connection with a higher frequency of residential moves according to the availability of nutritional resources (2).

Abb. 13. *Landnutzungsmodell. Während der warmen Jahreszeit zwischen Frühjahr / Frühsommer und Herbst / frühem Winter halten sich mittelpaläolithische Gruppen innerhalb der Region der westlichen 2. Schichtstufe auf. Im Fall, dass das Hauptjagdwild* Equus hydruntinus *dieses Gebiet nicht in der kalten Jahreszeit verlässt, wie von Pellegrini et al. (2008) beschrieben, ist es den Menschen, während aller jahreszeitlicher Zyklen in dieser Region zu verweilen. Abhängig von der Verfügbarkeit von Jagdwild, werden ‚Short-term Camps' für maximal einige Wochen aufgeschlagen (1). Im Fall von Nahrungsengpässen, z. B. während des Winters, wenn Steppentiere wie* Saïga tatarica *in ihre Winterstände abseits des Krimgebirges gezogen sind, wechseln die Gruppen zu einer eher opportunistischen Jagdstrategie, verbunden mit der Jagd auf Standwild und / oder der Verwertung von Aas. Dies geschieht in Verbindung häufigerer Wechsel der Wohnplätze, nach Maßgabe der Verfügbarkeit von Nahrungsressourcen (2).*

Level II / 8. In many of those cases sets of blanks are exported (e. g. RMU 25, 49, 64) (Bataille 2006b, 137 ff., Fig. 8-11). Another important moment is the need to *"maximize the number of flakes (or edges) per core at the expense of flake size"* in order to save raw material during longer occupations or in case of raw material scarcity (e.g. forced by snow cover during winter occupations in Kabazi II) (Kuhn 1995, 33). This is in case of Level II / 8 achieved by the above described entanglement of reduction concepts and especially by the centripetal reduction at the end of an operational chain.

Richter (2001, 209 ff.) denotes small assemblages as ‚Initialinventare' which are characterized by a varied raw material spectrum, which he thinks might mark the arrival of a given group in one region coming from a remote one. Occupations marked by the usage of few different and primarily local raw material sources Richter calles 'Konsekutivinventare', since groups already dwell for a longer period in a given region. Apparently the occupational remains of **Zone 2** represent initial assemblages (Initialinventare) of mobile groups which originally dwelled in a region remote of the region between Alma and Bodrak Valley (= **Region 1**) (Fig. 13). The composition of raw material sources, however, observed in **Zone 1,** emphasizes the presence of a consecutive assemblage ('Konsekutivinventar'). Primarily local material was used; the share of regional and supra-regional resources is much smaller. This emphasizes that people within the same occupational episode had already dwelled for a certain span of time in the core region around Kabazi II. This interpretation is underlined by the fact that local raw material arrived at the site mostly as already prepared cores (transformation class 'C'). In fact, this last point can also be documented in **Zone 2**, but the share of workpieces belonging to transformation section Nb and Nm is higher than in **Zone 1**. The contingent of 'single pieces' belonging to section Tw (4) and Cw (1) emphasizes high mobility. In this context, **Zone 1** could be interpreted as a result of short-term *macro moves* within a seasonal phase of scarcity of animal resources. Nutritional demands had to be substituted by the hunting of individual game. This scenario could have happened in wintertime after the merging of wild ass family herds to larger congregations and their migration to less elevated or more secure areas in times of low temperatures, harsh wind or snow fall (Uthmeier 2004b, 441). But one has to keep in mind that winters during OIS 3 were not very pronounced in Crimea: average winter temperatures did not fall below -4°C and average snow depth did not exceed 0.5 to 5 cm depth (Davies & Gollop 2003). Burke et al. (2003) compare the Pleistocene ass *Equus hydruntinus* with today's Asian Kulan (*Equus hemionus*). This species migrates between summer and winter ranges due to atmospheric conditions (Denzau & Denzau 1999). In warm months of the year wild ass live in small congregations of five to fifteen individuals, one lead mare, some adult females and their foals aged between 0 and 24 months. Apart from these family herds, there are congregations of adult females accompanied by young males aged between two and four years (Patou-Mathis 2006). The prime age-structure of the herds in Kabazi II indicates huntings on these animals in late spring and late autumn / early winter. An analogous behaviour is as well recognizable by the faunal assemblages of Kabazi II, Kabazi V and Karabi Tamchin, by the presence and absence of specific skeletal remains like foetal bones (Burke et al. 2008, 896). But nevertheless, the possible distances between summer and winter ranges have to be put into consideration in order to reconstruct Pleistocene ranges of this important game and the ranges of human groups. Since there are clear indicators for winter episodes in the assemblage of Kabazi II, Level II / 8, the possible shift of hunter-gatherers' ranges according to warm and cold conditions has to be discussed. New Isotopic analysis on teeth of *Equus hydruntinus* and *Cervus elaphus* individuals from Pleistocene sites in Italy contradict the assumption of big seasonal migrations of Pleistocene wild ass (Pellegrini et al. 2008). Contrary to expectations, the investigated *Equus hydruntinus* herds seem to have occupied quite stable habitats throughout the year, while *Cervus elaphus* showed bigger ranges than the latter. Remarkable seasonal migrations could not be proven (Pellegrini et al. 2008). At the moment, it cannot definitively be ruled out that wild ass in Pleistocene Crimea remained within the safer river valleys of the second ridge of the Crimean Mountains during the whole year; but the faunal assemblage of level II / 8 might emphasize this. Other insecure hints at 'roughly late summer to winter deaths' of 'indeterminate species', possibly 'Saiga or Equus', were assumed for levels II-A, II / 4, II / 7 and III / 1a of Kabazi V (Burke 1999, 37). In case that wild ass herds seasonally shifted their range, an alternative hiding place from harsh atmospheric conditions could be the less elevated valleys of the second and third mountain ridge east of the river Salgir or the region between the southern slopes of the main mountain ridge and the Black Sea (Fig. 1). New comparative analyses of geographical data of Pleistocene Crimea, the setting of sites within the second and third mountain ridge and ethological studies of wild ass might militate for the assumptions of Pellegrini et al (2008). Burke et al. (2007) point out that the Middle Palaeolithic sites and thus Neanderthal ranges coincide with habitats on which today Khulan and possibly Pleistocene *Equus hydruntinus*, the main hunting game during OIS 3 in Crimea, are adapted.

Since three occupations of **Zone 2** and following my arguments probably one of **Zone 1** are the result of winter episodes it is possible that the remains of *Saïga tatarica* and *Bison* cf. *priscus*, steppe adapted species that leave the elevated areas in winter time, might belong to some of the occupations that led to the accumulation of '**Zone 1 / 2**'. Steppe bison (*Bison* cf. *priscus*) avoids high regions in winter time (Kappler 1995, after Uthmeier 2004). *Saïga tatarica* shows pronounced seasonal migration behaviour. In Pleistocene Crimea their summer range can be assumed in the region of the second ridge. In winter, they migrated into areas without snow cover (Burke et al. 1999, 149 ff.).

The RMUs of '**Zone 1 / 2**' are distributed across the whole excavation area. Ultimately, it cannot be decided if we are dealing here with only one or more occupations, but the latter is more likely. Local raw material clearly dominates with 70 %, followed by local material from the Bodrak Valley (19 %) and 'exotic' pieces (11 %) (Fig. 12).

The articulate dominance of 38 workpieces of transformation class 'C' (Cc, Cb and Cm) emphasizes a longer stay in the core region (Zone 1) (Fig. 12). The high share of workpieces of transformation class 'N' shows that core preparation, which was embedded in blank and tool production (Nb and Nm), played an important role. Possibly the preparation and rejuvenation of cores was connected with the dismemberment of single prey animals.

According to reasons mentioned above, the characterization of level II / 8 as 'primary butchering station' seems to be appropriate (Patou-Mathis & Chabai 2003). Nevertheless, other functions are definite criteria for this site, as well. One further function was the preparation and supply with flint resources, mostly for off-site purposes; maybe also other resources, which have not been preserved, played a role. Level II / 8 is rather a '**station of provisioning**' for general resource preparation for off-site utilization, similar to Binford's 'locations' for camp supply with different resources (Bataille 2007a, b; Binford 1980, 9 ff.). The sites interpreted as 'killing-butchering stations' (Chabai 2001, 191 ff.; 2003) are nearly exclusively located in immediate vicinity to ubiquitous flint sources of the second mountain ridge, which further emphasizes this interpretation. Exceptions are possibly two lenses of artefacts and faunal remains excavated in dislocated sediments of Chokourcha II by O.N. Bader (1979).

The question is which features of 'circulating' or 'radiating settlement systems' level II/8 shows (Mortensen 1972, after Marks & Chabai 2001, 197 ff.).

Binford (1980) distinguishes between a 'foraging strategy' and a 'logistical strategy'. The main difference is how human groups move through the landscape to acquire resources: with the 'foraging strategy' people move to sources of nourishment ('circulating system') while with 'logistical strategies' group members bring resources to the group's location ('radiating system') (Bernbeck 1997, 155). In a 'circulating system' a band of foragers moves through the landscape according to seasonal cycles and establishes campsites near to food resources. All incoming activities were done within such campsites. A 'radiating system' is characterized by the existence of a central campsite which is supplied by a set of action specific stations ('base camp') (Marks & Chabai 2001; Bernbeck 1997). But such a long-term 'base camp', occupied for a whole season, could not be attested for the Crimean Middle Palaeolithic (Chabai 2006; Chabai & Uthmeier 2006, 306). Crimea is one of very few regions with an extremely high resolution due to the presence of 35 stratified Middle Palaeolithic sites accompanied by 76 not stratified sites (Chabai 1998a, 11; Chabai & Uthmeier 2006) – it is very likely that more or less all different types of sites have been recognized. The possibility that other possible camp types, like long-term base camps, are hidden in the Crimean steppe regions further north or at the now flooded western steppe regions to the west or in the small southern shore band is due to that not likely. Not at least since in the coastal area south of the main ridge of the Crimean Mountains no Palaeolithic sites could be observed. Since the Middle Palaeolithic groups of Crimea were adapted to the hunt of wild ass (*Equus hydruntinus*) followed by steppe adapted species like Saïga antelope (*Saïga tatarica*) the interpretation of Burke et al. (2007) seems to me a good explanation why Middle Palaeolithic people stuck to the Crimean Mountains as main habitat. Following their interpretation, late Middle Palaeolithic people of Crimea stayed at the wild ass habitat in the Crimean Mountains. According to Pellegrini et al. (2008) this might have been the case during all seasons of the year. Due to this, all Middle Palaeolithic site types are probably known today – vice versa this does not mean that their seasonal range did not exceed across the Crimean Mountain boundary or even further. Chabai & Uthmeier (2006) presented a detailed analysis of Crimean Middle Palaeolithic land use systems. They were established on base of the solitarily high density of Middle Palaeolithic sites which they subdivided into different site types according to intensity and duration of occupations.

Chabai and Uthmeier (2006, 308 ff.) defined two types of WCM hunting stations. The ephemeral frequented in-situ occupations of Kabazi II were classified as 'killing-butchering stations, type A'. Beside the dismemberment of wild game, stone raw material is prepared for off-site utilization. The definition of such stations is in accordance with activities especially reconstructed for **Zone 2** of level II/8: reduction of cores, modification of tools, and use of local raw material and dismemberment of wild ass. Afterwards these resources are exported for off-site consumption (Chabai & Uthmeier 2006).

Furthermore, two different camp types of WCM were described, which are located in rock shelters, different from the hunting stations of this industry. We are referring to the sites of Shaitan-Koba ('Camp Site, type A') and Karabi Tamchin ('Camp Site, type B') (Chabai & Uthmeier 2006, Yevtuchenko & Burke 2004, 153 ff.). Both camp types show activities of secondary butchering and consumption of prey and furthermore of the preparation of raw material (type A) and the preponderant rejuvenation of imported tools (type B). At Shaitan-Koba, besides fire places and traces of secondary butchering, cores and artefacts stemming from core correction could be found. While 'camp type A' indicates short-term occupation between some days and few weeks, 'camp type B' describes more ephemeral occupation. So in general type A describes 'short-term camps' and type B 'ephemeral camps' (Bataille 2006c, Fig. 13-10). 'Short-term camps' are understood here as residential camps occupied for some days and a maximum of few weeks. Owing to circumstances they are recurrently supplied with resources prepared for transport at ,provisioning stations'. 'Ephemeral camps', on the contrary, are occupied only for a few hours or days as a residential camp for final resources consumption. In this case, there are only a few traces of lithic exploitation and of secondary butchering and consumption of few game individuals; such a camp type can be described with Kabazi V, level III/2.

In cases of nutritional scarcity ephemeral camp sites were frequently shifted, the groups that visited Kabazi II were highly mobile on a regional base. The archaeological remains of **Zone 1** might prove this. Single game was hunted or scavenged, processed in Kabazi II and consumed on the campsite near Kabazi II. Further usage of on-site prepared cores took place off-site as well. After the exhaustion of food resources the groups moved on.

Only few remains of secondary butchering (consumption), one fire place and few stone artefacts, mark such a camp type. Karabi Tamchin and in Kabazi V, level III-2 documented such a recurrently occupied ephemeral campsite, showing traces of secondary butchering ('Micoquian Camp Site, type A') (Chabai & Pathou-Mathis 2006; Chabai & Uthmeier 2006).

However, taking into account the low degree of core reduction in combination with the high number of cores exported from **Zone 1 / 2**, a transport of resources to a 'short-term camp' similar to Shaitan-Koba (WCM Camp Site A) seems possible (Bataille 2006c). At that site, the utilization of local raw material took place; represented cores are scarcely reduced (Chabai & Uthmeier 2006). The site Kabazi I excavated by Formozow (1959, after Chabai 1998a) is another possible candidate for this scenario. Taking into consideration the high share of cores that were exported in scarcely reduced states from level II / 8, it stands to reason that they arrived in a hardly reduced state at the campsite in the immediate vicinity of Kabazi II. The evacuation and the possible export of cores was attested in nearly all levels of Kabazi II analyzed by Transformation Analysis (Chabai et al. 2006). The 'atelier' character of Level II / 8 was also noticed by Patou-Mathis and Chabai (2003). Most likely the preparation and reduction of cores was embedded within several hunting events – such behaviour has been ethnographically documented as well (Binford 1980). Concerning the case of **Zone 2**, the cores were brought to camp sites nearby in connection with skeletal elements of high nutritional value. A possible candidate for a camp-site connected with Kabazi II activities is Kabazi V in direct vicinity of Kabazi II; but this could only be proven by refitting between assemblages of both sites.

Possibly group members decamped as task groups in successive episodes from the campsite in order to restock supply by collecting food and lithic resources in the Alma Valley (Bataille 2006a, 127 ff.).

Zone 2 also indicates transport of a big bulk of wild ass remains (NMIc = 38) to a short-term camp (Patou-Mathis & Chabai 2003). This is indicated by the high volume of exported meat, estimated by Patou-Mathis (2006) on 3960 kg, by already deducting 40 % of not exploitable elements. The composition of raw material sources featured in **Zone 2** indicates that the groups dwelled between Bodrak and Alma Valley over a longer span of time; camps were established near rivers and flint sources, and were supplied by 'provisioning stations', like Kabazi II (Fig. 13).

By dividing the reconstructed total number of 38 individuals of wild ass by four reconstructed hunting events indicated by four stallions, approximately nine animals were butchered per single occupation: *"chasses successives de [...] 3 ou 4 petits groupes familiaux"* (Patou-Mathis & Chabai 2003, 247). The in these cases now smaller share of meat per hunt in **Zone 2** of level II / 8 in comparison to other archaeological levels of Kabazi II where different occupations could not be attested (e. g. Level II / A2: 16 individuals), what does not mean that these layers definitely were not recurrently occupied, might suggest this assumption (Patou-Mathis 1999, 41 ff.). The supply of a camp-site could, depending on the number of group members living there, last for a maximum of some weeks; storage must have played a role. The Middle Palaeolithic groups would in this respects behave like collectors described by Binford (1980, cited after Chabai & Uthmeier 2006, 346).

The reconstructed seasonality of hunting events gives an impression of the possible time frame human groups dwelled in **region 1** between Alma and Bodrak Valley (Patou-Mathis 2006, 2003) (Fig. 13). Taking into consideration other upper levels of Kabazi II, we are predominantly dealing with the warm season between spring and early winter. This is indicated by the presence of *Saïga tatarica* in level II / 8, as well. It is assumed that this species, which avoids snow cover and draught, wintered in a region remote to Crimea (Burke et al. 1999, 149; Uthmeier 2004, 82).

Taking into consideration possible seasonal migrations of *Equus hydruntinus*, it would have been advantageous for hunter gatherers to stick to rivers, like in Alma and Bodrak Valley, for the supply with animal resources and also stone raw material. Before the arrival of animal herds in their summer ranges in late spring or in case of food shortage at the beginning of winter, additional hunt on single animals or even scavenging might have been a possible solution. Remains of single individuals, like *Bison* cf. *priscus, Equus* sp., *Cervus elaphus*, *Megaloceros* sp., militate for this presumption, (Patou-Mathis & Chabai 2003). Obviously these faunal remains correlate with the occupations of **Zone 1** and **1 / 2**. *Saïga tatarica* remains from level II / 8 might indicate a shortage of resources in the warm season, with humans reacting by scavenging or hunting of single animals. The winter episodes documented in **Zone 2** probably took place in (early) winter when *Equus hydruntinus* gathered in bigger congregations, before migrating into winter ranges (occupational episode of **Zone 2**). As mentioned above, new investigations on *Equus hydruntinus* of Italy contradict this scenario, since these animals turned out to have small seasonal ranges (Pellegrini et al. 2008). Nevertheless, winter occupations are an exception at Kabazi II (Chabai & Uthmeier 2006, 305).

Coming back to the question if the archaeological remains of Kabazi II, level II / 8 suggest either a 'circulating' or a 'radiating settlement system', only an ambiguous answer is possible. Taking into consideration the character of the assemblage and reconstructed activities outlined in this article a 'circulating system' embedded in a 'radiating system' seems to be the most appropriate description (Fig. 10). The Middle Palaeolithic groups of Crimea show features of both 'collectors' and 'foragers' (Binford 1980, 5 ff.; Chabai & Uthmeier 2006, 350 ff.). Due to the existence of both residential camps and stations for resources procurement in Crimea Chabai and Uthmeier (2006) describe the Crimean Middle Palaeolithic settlement system as radiating system. *„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 the camps [...], while hunters ("producers") procured specific resources at stations [...]. However there is no evidence for longer stays at 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. [...] 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."* (Chabai & Uthmeier 2006, 354 ff.).

Short-term camps are established at locals near water and flint resources. The high amount of exported meat from Zone 2 indicates a stay between days and weeks. According to collector's behaviour the storage of this resource would play an important role. Due to the presence or absence of hunting game residential camps are shifted several times within a given season ('short-term camps' / **Zone 2**). In case of scarcity of food resources, the frequency of shifts of residential camps increases ('ephemeral camps') in connection with the butchering or scavenging of single individuals of non-migratory and / or steppe species what would more speak for forager's behaviour (**Zones 1** and '**1 / 2'**). But in all those cases, the resource procurement of the residential camps, ephemeral or short-term, is achieved via locations like Kabazi II where resources are prepared for transport; the amount of exported cores still shows the provisioning of camp sites, possibly shifted more frequently. Thus, it is more likely that we are dealing in the cases of **Zone 1** and '**Zone 1 / 2**' with a shift from collector's to forager's behaviour during periods of higher stress.

Crimean Middle Palaeolithic groups presumably moved through different habitats in a seasonal rhythm. Between spring and late autumn resp. early winter they dwelled in the contact zone of second mountain range and upper steppe region of the first mountain ridge, where steppe adopted species were hunted in river valleys and lithic resources were collected at raw material sources nearby. 'Short-term camps' like Kabazi I or Shaitan Koba and 'ephemeral camps' like Karabi Tamchin were established for some days or a maximum of a few weeks. The organization of hunt and the procurement of other resources took place at these campsites. Resources were primarily prepared at 'provisioning stations' like Kabazi II and exported to nearby campsites for further utilization and consumption. Potentially, different kinds of 'provisioning stations' existed. For instance, level IIA / 2 of Kabazi II ('killing-butchering station, type B') was solely used for the primary butchering of hunted animals. Additionally raw nodules were prepared at WCM-occupations of levels II / 7E and II / 8 (Bataille 2006a). In this context, local hunting events can be understood as 'micro moves' which are embedded in 'macro moves'. There was the possibility to shift between different regional ranges according to the appearance of prey. Considering the example of level II / 8, such a range is the area between the raw material sources of Alma and Bodrak River Valley. Assumedly, such a context area forms the lowest level of a larger land use system.

As already mentioned, single pieces of 'exotic' raw material emphasize a preceding sojourn in another region, comparable to the 'core region'. For instance, a stay in the 30 km abroad situated Upper Alma region prior to the occupation of level II / 7E of Kabazi II was postulated (Bataille 2006a). During the winter months people possibly shifted to other ranges when animal herds migrated into regions better protected against snow-cover and disturbing atmospheric exposures.

Taking into consideration larger habitats of *Equus hydruntinus*, this range is possibly described by the region of the 'eastern group' of Crimean Middle Palaeolithic (**Thesis 1**). Due to the occurrence of raw material stemming from sources in the west which could be observed in assemblages in Eastern Crimea, the internal Crimean Mountain range east of the river Salgir was assumed as possible target region for Middle Palaeolithic groups leaving in autumn / winter the internal Mountain range west of the Salgir (Uthmeier 2004, Fig. 12.1, 12.2).

Considering the main hunting game *Equus hydruntinus* as resident game frequenting only limited seasonal areas, as proposed by Pellegrini et al. (2008), groups possibly remained in the region of the second mountain ridge all over the year, in wintertime rather sticking to better protected river valleys connected with the hunt on single animals (e.g. *Cervus elaphus*) and scavenging activities (e. g. *Megaloceros* sp.) in case that herds of steppe adopted animals were not at hand (**Thesis 2**).

To sum up, a stay of Neanderthal groups all over the year in connection with seasonal shifts within the second and first ridge is likely. The provisioning of short-term residential camps with resources, especially game and water, maybe also flint, plays an important role. Possible scarcities of resources are encountered by shifting to a higher regional mobility in connection with a more frequent shift of ephemeral camp-sites on the one hand and with non-exhaustive core reduction strategies on the other hand.

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