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ORIGINAL PAPER

Reassessment of the Lower Paleolithic (Acheulean) presence in the western Tien Shan

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Abstract Kulbulak (Uzbekistan) is among the most important Paleolithic sites in Central Asia. Based on excavations from the 1960s to the 1980s, a stratigraphic sequence yielding 46 archeological horizons of the Lower, Middle and Upper Paleolithic has been described. The lowermost 22 layers were at that time defined as Acheulean, both in cultural and chronological aspects. Based on these previous works, Kulbulak has thus often been cited as one of the rarest occurrences of Lower Paleolithic and Acheulean in the region. However, this attribution was debatable. New excavations at Kulbulak in 2007–2010 provided new material and the first reliable dates that permitted us to tackle this issue. Moreover, a reappraisal of the lithic collections and documents from previous excavations was also conducted. These new data clearly indicate the absence of Acheulean or even Lower Paleolithic at Kulbulak. On the contrary, the lithic assemblages from this site only correspond to Middle and Upper Paleolithic periods. The lowermost layers are particularly interesting due to the presence of an early industry with blade and bladelet technology.

Keywords Paleolithic · Acheulean · Blade and bladelet technology · Central Asia

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Introduction

Lower Paleolithic industries have been found at a few sites in Central Asia. The clearest instances come from the sites of the "loess Paleolithic" in Tajikistan, like Kuldara, Karatau, Lakhuti, and Obi-Mazar-4 (Davis and Ranov 1999). The term "loess Paleolithic" was used by Ranov to designate the Lower Paleolithic complexes with pebble technique in Central Asia in the loess sediments (Ranov, 1988). Surface collections from western Turkmenistan (Krasnovodsky Plateau, see Vishnyatsky 1996, 1999) and central Kazakhstan (Mugodjary, Koshkurgan and Semizbugu, see Derevianko et al. 2000; Derevianko et al. 2003), as well as debatable assemblage from Selungur (Islamov et al. 1988; Velichko et al. 1990; Islamov and Krakhmal' 1995; Vishnyatsky 1996, 1999; Davis and Ranov 1999), have also been attributed to the Lower Paleolithic. In Uzbekistan, only the lowermost layers of Kulbulak have been ascribed to Lower Paleolithic based on paleomagnetic dates and presence of supposed Acheulean artifacts (bifaces and handaxes) (Kasymov and Grechkina 1994; Kasymov, 1990).

However, there are several viewpoints on the chronology and cultural attribution of the Kulbulak lithic industries and on the Middle and Lower Paleolithic deposits at the site (Ranov and Nesmeyanov 1973; Kasymov 1990). While some scholars supported Kasymov's propositions, notably Abramova and Anisiutkin (Anisyutkin and Vishnyatsky 2001–2002), others disagreed with him (Ranov, Nesmeyanov, Vishnyatsky, and Dodonov).

The opponents to the Acheulean attribution of the Kulbulak lowermost layers based their arguments on several observations: the Middle Paleolithic features of bifacially worked tools, the presence of projectiles, the presence of the only handaxe in the Late Mousterian layer 5, the highly debatable geological position of the putative Acheulean assemblages, and the doubtful assessment of the absolute age of the sediments using the paleomagnetic technique (Ranov 1988; Vishnyatsky 1996; Dodonov 2002).

This debate coupled with the ambiguity regarding stratigraphy, cultural attribution, and chronology is particularly important. The stratigraphic sequence of Kulbulak was considered to be the most complete in western Central Asia. For a long time, the lower complexes, being the only example of Acheulean presence in the region, served as the basis for understanding the local transition from Lower to Middle Paleolithic (Kasymov 1990).

Excavations at Kulbulak in 2007–2010 produced new data suggesting a different cultural and chronological interpretation of the "Acheulean" assemblages that challenged the generally accepted hypothesis of a local Lower-Middle Paleolithic transition. This paper provides a thorough techno-morphological analysis of all available materials concerning the "Acheulean" layers at Kulbulak and proposes a new interpretation of the assemblages.

Context and history of research

The open-air site of Kulbulak (N 41°00′31″ – E 70°00′22″) is located on the southeastern slope of the Chatkal Ridge in the Western Tien Shan (Fig. 1).

Excavations at the site were resumed several times (Kasymov 1990; Anisyutkin et al. 1995; Kolobova et al. 2013). A team headed by the Uzbek archeologist Kasymov excavated the site from 1963 to 1985. The total excavation area exceeded 600 m^2. At the main excavation area, the profile of the Quaternary sediments was 19-m thick. According to Kasymov's interpretation, the profile showed 22 layers of sediments belonging to the Lower Paleolithic, 24 layers of the Middle Paleolithic and 3 layers of the Upper Paleolithic (Fig. 21). The lowermost portion of the profile (layers 46–24) was defined as Acheulean.

Between 1963 and 1985, Kasymov defined several archeological layers as Acheulean. For instance, in 1969, the lithic assemblage from layer 9, found at a depth of 6.9–7.4 m from the surface, was defined as "Late Acheulean" (Kasymov 1972). Two years later, only layer 10 (depth of 8.3 m from the surface) was attributed to the Late Acheulean, while layer 9 was attributed to the early Mousterian (Kasymov 1973). According to the 1976 excavations, only layers 13 and 14 were attributed to the Late Acheulean (Kasymov 1981). In 1980, layers 17 to 24 (depth of 12.75 to 14.5 m from the surface) were excavated and only these layers were defined as Acheulean (Kasymov et al. 1982). In 1981, the excavations reached 17.2 m from the surface and eight Acheulean stratified layers (24–31) were described, between 12.9 and 17.2 m deep. All overlying layers (including layer 23) were then attributed to the Mousterian. Lithic industries from layers 24 to 31, including more than 2000 lithic artifacts, were defined as Acheulean due to occurrences of bifacially worked tools, projectiles, and Clactonian flakes. The upper Acheulean layers 24–25 were determined as transitional from the Acheulean to Mousterian; however, no criteria for such a transition were not described (Kasymov and Godin 1984). Kasymov did not give a clear definition for the term "Acheulean" in any of his articles.

Finally, Kasymov summarized his data in his dissertation in 1990 and described the archeological layers 24 to 46 (depth from 14 to 19 m from the surface) as Acheulean. He also underscored the presence of an archeologically sterile layer, 0.8-m thick, separating these from the overlying Early Mousterian layers. These Early Mousterian assemblages, containing 3210 lithic artifacts, were determined as notch-denticulate and scraper industries similar to the Tayacian (Fig. 21) (Kasymov 1990).

The Kulbulak stratigraphic column as published by Kasymov is actually generalized from several profiles, a practice used occasionally for archeological studies at that time. Not a single profile actually showed a continuous sequence of 46 archeological layers. For instance, the 1972 paper showed a picture of the southern wall of the main excavation area containing at least 12 sterile lithological layers, several meters of deposits separating archeological layers 8 and 9 (Kasymov 1972). On the contrary, in subsequent publications, the western wall demonstrated a continuous sequence of archeological layers with the thickest sterile layer not exceeding 0.8 m (Fig. 21)(Kasymov 1990).

In sum, in the main excavation area of Kulbulak, the archeological layers attributed to the Acheulean by Kasymov varied a lot and their identification seems arbitrary. The depth of the upper limit of the layers defined as Acheulean varies from 6.9 m in 1969 to 14 m in 1990

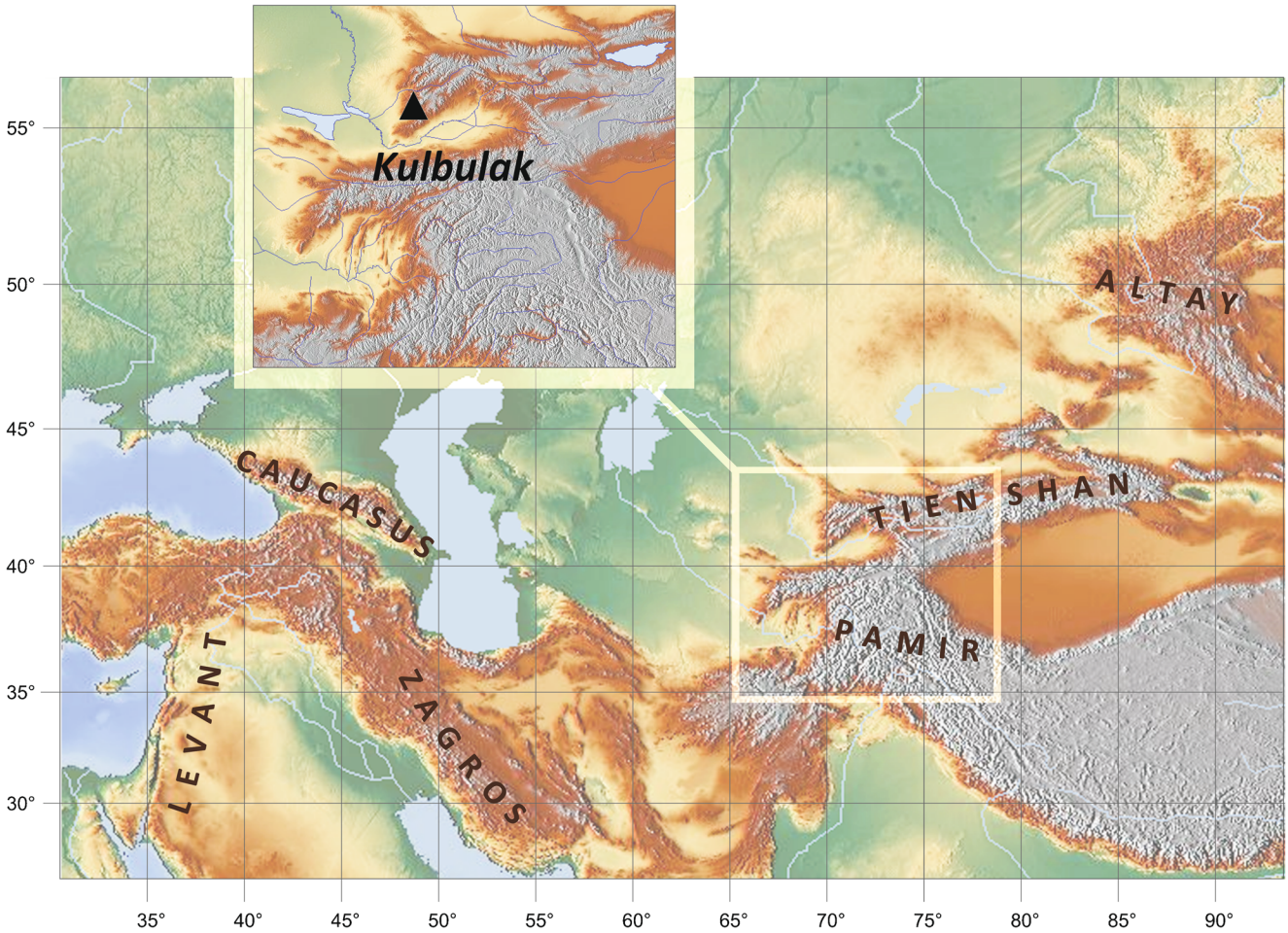

Fig. 1 Map showing the location of Kulbulak site

(Kasymov 1972; Kasymov 1973; Kasymov 1981; Kasymov et al. 1982; Kasymov and Godin 1984; Kasymov 1990). The depth of certain archeological layers is also not clear: according to the excavation records of 1981, the top of layer 24 was established at 12.9-m deep, while in his dissertation, Kasymov mentioned the depth of the top of layer 24 at 14 m below the surface (Kasymov and Godin 1984; Kasymov 1990).

The lowest layers of Kulbulak (under layer 31) were attributed to the Lower Paleolithic based on an age estimation of >700 kyrs BP (Brunhes-Matuyama border)—validated by a paleomagnetic analysis conducted by Toichiev in 1981 (Kasymov and Godin 1984).

However, the present authors discovered Kasymov's field report of the field works of the Akhangaran Paleolithic team in 1981 containing a chapter dealing with the paleomagnetic analysis written by Toichiev. According to him, the soft sediments exposed in the excavation area display normal polarity with polar disturbances increasing with depth. However, the maximum depth of 17.2 m from the surface reached in 1981 was not enough to detect the reverse polarity corresponding to the Brunhes-Matuyama border.

Toichiev also wrote that he made an additional examination of geomagnetic polarity at another profile located 6 km eastwards from the site. The episode of polarity change was there observed at the depth of 18 m from the modern surface and was interpreted as corresponding to the Brunhes-Matuyama border. The sediments below that layer showed reverse polarity up to 31 m deep (Kasymov & Toichiev 1981, unpublished).

Thus, the inverse polarity was established at another profile located several kilometers from Kulbulak and is irrelevant with regard to the age of the archeological sequence. However, the geomagnetic data were extrapolated onto the Kulbulak profile by Kasymov.

New fieldworks took place at Kulbulak after Kasymov's excavations. In 1994–1995, excavations of the upper portion of the deposits containing artifacts of the Late Middle and Upper Paleolithic were carried out by the joint Russian-Uzbek team headed by Anisyutkin (Anisyutkin et al. 1995). In 2001–2002, another team excavated the same portion of the

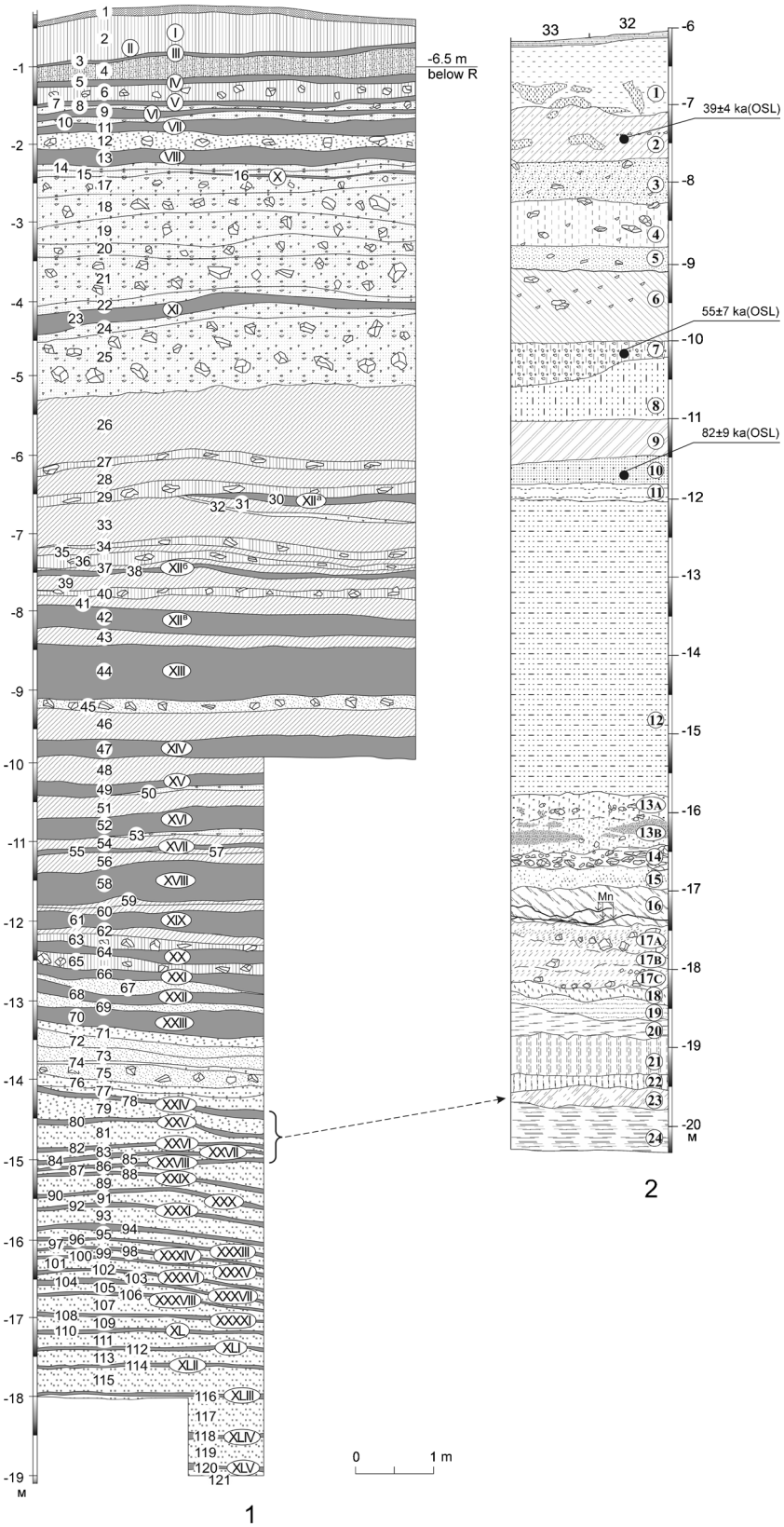

Fig. 2 Profiles of Kasymov's and 2010's excavations: *1* Kulbulak western profile, Kasymov's excavations, *2* Kulbulak western profile, excavations of 2007–2010

deposits under the leadership of the Uzbek archeologist Islamov (Islamov et al. 2003).

In 2007–2011, excavations at Kulbulak were resumed by the joint Russian—Belgian—Uzbek expedition.

Material and methods

During the 2010 field season, our team excavated the area adjoining Kasymov's main trench. Considering the fact that the Kasymov excavation area had the form of an inverted stepped pyramid, we found undisturbed deposits inside it. A new excavation area №3 of 6 m^2 was established within the Kasymov main excavation area (Fig. 3), and 27 geological layers were recognized in it (Fig. 22). All the sediments were screened using sieves with 4- and 2-mm mesh.

Based on the results of geomorphological, sedimentological, and stratigraphic studies carried out in 2007–2010, it can be inferred that the stratigraphy of the studied area reflects a rhythmic alternation of two major sedimentation cycles (Fig. 22). One of them is characterized by a relatively slow accumulation of sediments of mostly an eolian genesis that are modified by slope and subaquatic processes (layers 2, 9, 10, 12, 13, 15, 16, 17.2, 18–23). The subaquatic character of the sediments is determined by the activity of an ascending spring of underground waters, a small brook flowing out of it, and temporally existing dams. The second sedimentation cycle represents a fast (catastrophic) deposition resulting from mud flows that ran down along the beds of the Djar-sai and Kyzylalma-sai and swamped the site's area (layers 3–8, 11, 14, 17.1, 17.3) (Kolobova et al. 2012).

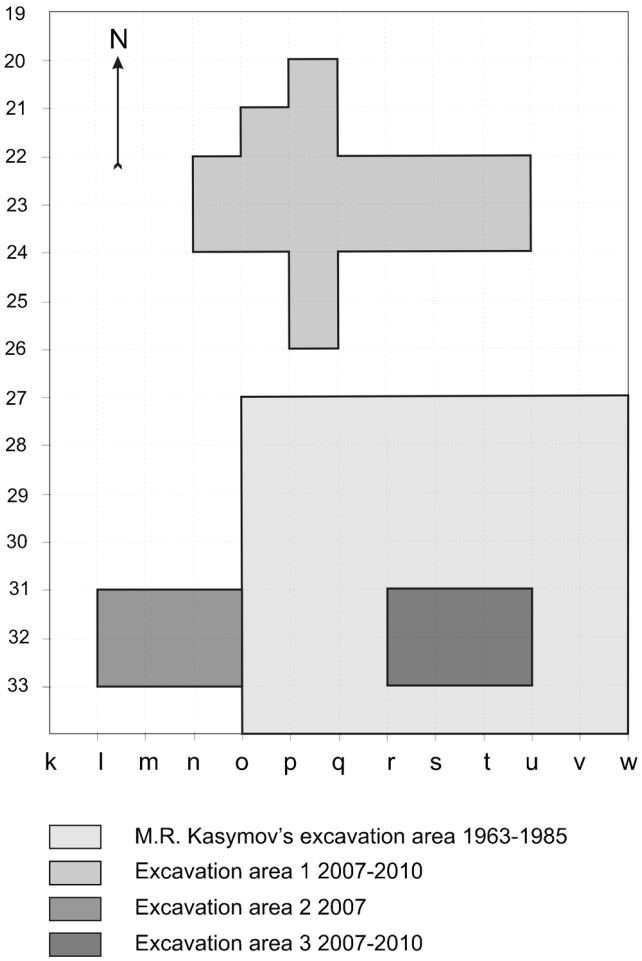

Fig. 3 Scheme of Kasymov's and new excavation areas location

The new excavations exposed the layer corresponding to the Upper Acheulean layers in Kasymov's interpretations at the depth of 13.5 m (layer 23 of the new stratigraphic sequence) (Figs. 2, 3). This layer yielded a large number of lithic artifacts. The uppermost sediments had been removed in the course of the previous excavations and we believe that the lowermost level of 2010 season can be correlated with the layers at 14.5–15.0-m deep in Kasymov's trench. Hence, we assume that the studied layer corresponds to Kasymov's Acheulean layers 26 to 28 (Fig. 2). It is hardly possible to establish a more precise correlation between Kasymov's stratigraphic column with the data of 2010 for the following reasons: (1) the incomplete description of the lowermost lithological layers in Kasymov's publications and (2) the unwarranted measurements of the sediment sequence. The collection from Kasymov's layers 26–28 contained the greatest amount of lithic artifacts among the formerly established Acheulean layers (Kasymov 1990) and is thus a suitable assemblage to make a preliminary comparative analysis between the new assemblage of 2010 artifacts with the so-called Acheulean artifacts of the 1980s.

Results

Lithic analysis of artifacts from layer 23 (excavations of 2010)

The total number of lithic artifacts recovered from layer 23 (Figs. 4, 5, 6) is 4997. Four thousand three hundred two specimens (86.1 %) corresponding to chips, undefined debris, and small flakes not exceeding 3 cm (Table 1) were excluded from the analysis. Six hundred ninety-five artifacts including cores, blanks, and core trimming elements were analyzed.

Cores There are 26 cores (3.7 %) (Table 1), including 21 typologically definable specimens ($n = 21$) that can be classified into several classes (Table 2).

Flat-face cores (showing a flaking surface on their broad face, e.g., Zwyns 2012) *($n = 13$)* include the following varieties: (1) single platform flake cores with one flaking surface ($n = 6$), (2) multiplatform flake cores with one flaking surface ($n = 6$), (3) double platform bladelet core/truncated-faceted piece (Figs. 47).

Narrow-face cores (showing a flaking surface on their narrow face, e.g., Zwyns 2012) for production of blades and bladelets ($n = 7$) were also recognized (Fig. 41, 2; Figs. 510–12), as well as prismatic core for production of bladelets ($n = 1$) (Fig. 48).

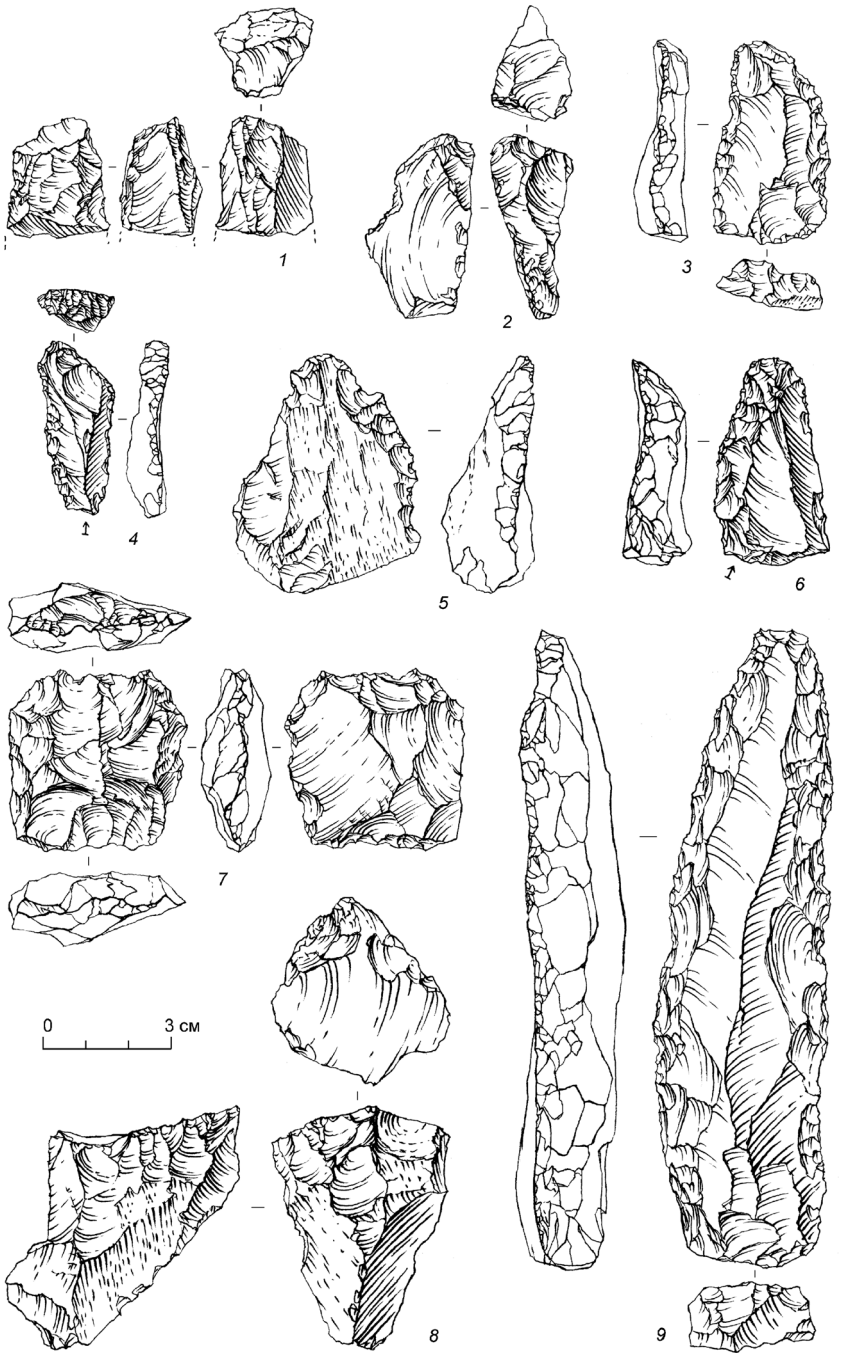

Fig. 4 Stone artifacts from layer 23 (excavations of 2007–2010): *1, 2* narrow-face cores; *3* side-scraper; *4, 6* end-scrapers; *5* knife; *7* flat-face core/truncated-faceted piece; *8* prismatic core; *9* retouched blade

Blanks The assemblage of blanks (n = 668) illustrates the reduction strategy aimed at production of elongated blanks: there are 246 blades (Fig. 63, 4, 6–14; 35.5 % of the studied assemblage) and also 176 bladelets (25.4 %; Fig. 61, 2) including 32 that do not exceed 6 mm in widths (Table 1) The number of technical spalls is 34 (4.8 %) (Table 3).

Blades mostly bear plain striking platforms (Table 4). The striking platforms (76.5 %) were usually not rejuvenated. A considerable amount of pieces (18.9 %) show an abrasion of the striking platform edge. Blades were mostly broken; only 46 complete blades were noted. The blade length varies from 32 to 125 mm, the majority of complete blades being short: from 32 to 55 mm (Fig. 7). The width of fragmented and complete blades varies from 13 to 45 mm, the majority of pieces being from 13 to 25 mm wide (Fig. 8). The dorsal removals of blades (Table 5) correspond mainly to unidirectional flaking. Approximately equal number of blades with straight (42.6 %) and twisted profile (35.6 %) was noted. Twenty-one blanks are curved in the medial part (18.2 %). Most blades show triangular cross-sections (58.9 %); trapezoid cross-sections being less numerous (29.6 %).

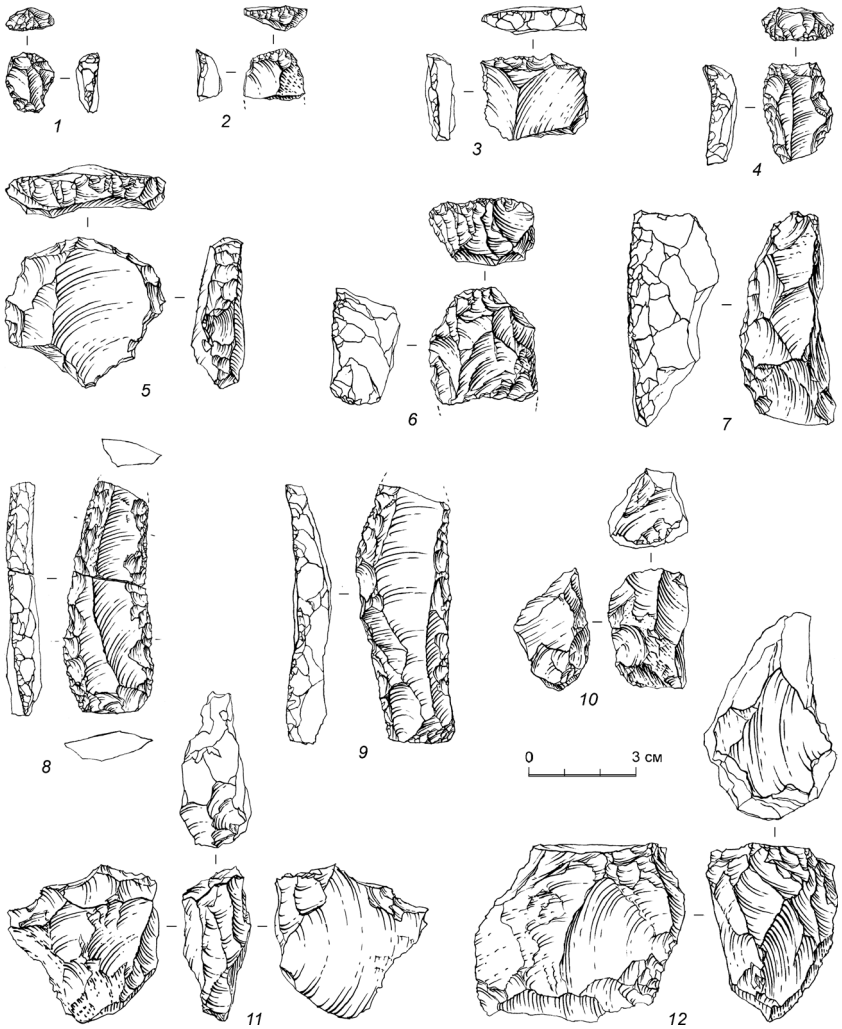

Fig. 5 Stone artifacts from layer 23 (excavations of 2007–2010): *1–5* end-scrapers; *6* carinated end-scraper; *7, 8, 9* side-scrapers; *10–12* narrow-face cores

Bladelets mostly bear plain striking platforms (Table 4); the portion of the punctiform platforms is smaller. However, among the smaller bladelets (width < 6 mm), the proportion of the punctiform platforms is 78.9 %, while the plain platforms is only 21.1 %. The striking platforms were mostly not rejuvenated (80.7 %). Platform reduction was noted on 14 % of the bladelets and overhang removals was traced over 5.1 % of the blanks. The dorsal faces of the bladelets (Table 5) show mostly unidirectional and convergent flaking patterns. The number of straight and twisted bladelets is equal (42 % each); curved bladelets being less common (10.5 %). The majority of bladelets show triangular cross-sections (77. 1 %). Complete bladelets range from 13- to 32-mm long, most of them being between 20 and 30 mm (Fig. 7). The widths of bladelets vary in the range of 6 to 12 mm, the majority of pieces being 12 mm (Fig. 8).

The category of flakes includes 210 pieces (Table 1). The striking platforms are mostly plain and dihedral (Table 4). The flake dorsal surfaces also show mostly unidirectional parallel reduction patterns (Table 5).

The category of points includes only 3 specimens (Fig. 615, 18) (Table 1).

Tool kit Retouched tools include 48 items (Table 6), among which end-scrapers are the most numerous ($n = 16$, Fig. 44, 6; Fig. 51–5), including one carinated end-scraper (Fig. 56). Nine side-scrapers made on flakes are also present (Fig. 43, 5; 5, 7; 6, 15). Pointed retouched blades ($n = 2$) and retouched blades ($n = 10$; Fig. 49; Fig. 58, 9; Fig. 68, 12, 16, 17) are morphologically resemble to side-scrapers. The tool kit also includes retouched points ($n = 2$) (Fig. 618); a tool bearing signs of hewing ($n = 1$); perforators ($n = 2$), denticulate tools ($n = 1$) and other retouched flakes ($n = 4$) (Fig. 65).

New chronological data

Luminescence dating provides the only means to obtain a numerical chronological framework for the sequence at Kulbulak. Samples for OSL dating have been taken in all the sequence from layer 2 to layer 23. Up to now, only the

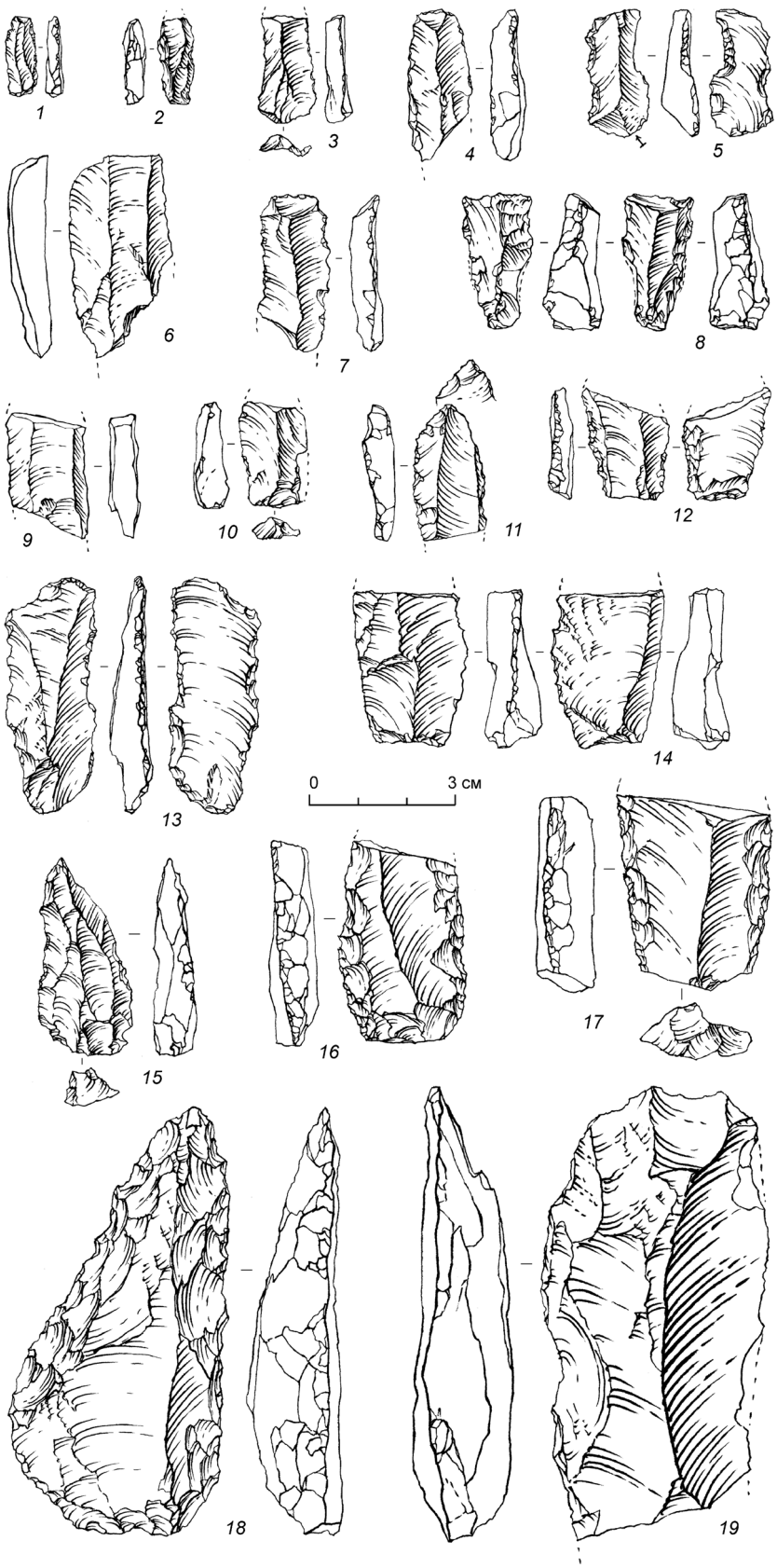

Fig. 6 Stone artifacts from layer 23 (excavations of 2007–2010): *1, 2* bladelets; *3, 4*, *6, 7, 9–11, 13, 14, 19* blades; *5* retouched flake; *8, 12, 16, 17* retouched blades; *15* point; *18* retouched point

Table 1 Composition of the lithic industry, Kulbulak, layer 23 (2010)

Primary reduction category	Number	%
Core-like artifacts[a]	26	3.7
Core trimming elements[a]	34	4.9
Points[a]	3	0.4
Flakes[a]	210	30.2
Blades[a]	246	35.4
Bladelets[a]	176	25.3
Total without waste[b]	695	13.9
Waste (shatter, scales, chips)[b]	4302	86.1
Total	4997	100

[a] Percent of total number of artifacts in the industry (waste disregarded)

[b] Percent of total number of artifacts in the industry

results for the upper part of the sequence (layer 2 to 10) are available, the dating of the lowermost layers still being in progress (Vandenberghe et al. 2013, 2014).

For the upper 6 m of sediment (layers 2–10), a generally consistent set of ages was obtained, which range from 39 ± 4 to 82 ± 9 ka. The date of 39 ± 4 ka confirms the Early Upper Paleolithic age of the artifacts found in layer 2. Layers 3 to 10 are dated to the Middle Paleolithic, with numerical ages that range from 55 ± 7 to 82 ± 9 ka. Archeological remains were only found in layer 3, but the sediment and its embedded lithics were the result of alluvial processes. Hence, artifacts and sediment are not necessarily contemporaneous (Kolobova et al. 2012). Ongoing work aims at extending the luminescence chronology to the remainder of the sequence (deeper layers 11 to 23). The lithic artifacts found in layer 12 to 18 and the more important lithic assemblage from layer 23 are thus certainly older than 80 ky BP. However, preliminary results of the OSL samples from layer 12 to 23 indicate an age much younger than Lower Paleolithic, between 100 and 200 ky BP (D. Vandenberghe pers. com.).

Table 2 Typology of the cores, Kulbulak, layer 23 (2010)

Type	Number	%
Flat-faced	13	61.9
Single platform for flakes	6	
Multyplatform for flakes	6	
Truncated-faceted pieces	1	
Prismatic	1	4.8
Single platform for bladlets	1	
Narrow-faced	7	33.3
Single platform for laminar blanks	4	
Double platform for bladelets	3	
Total	21	100

Table 3 Typology of the core trimming elements, Kulbulak, layer 23 (2010)

Type	Number	%
Striking platform rejuvenation flakes from flat-faced cores	4	11.7
Striking platform rejuvenation fakes from prismatic cores: "tablets"	1	2.9
Crested blades	1	2.9
Semi-crested blades	2	5.8
Lateral blades	15	44.1
Lateral spalls	10	29.4
Plunging spall	1	2.94
Total	34	100

Lithic analysis of artifacts from the Kulbulak lowermost layers (Kasymov's excavations of the 1980s)

The lithic artifacts recovered from the deeper deposits at Kulbulak during the 2007–2010 excavations, notably marked by the importance of blade production, are thus very different from the assemblages previously described by Kasymov. To understand this discrepancy, we conducted a revision of the technical and typological features of the artifacts from the lowermost Kulbulak layers 46–25 that were recovered in 1981–1984.

The number of artifacts available for analysis was 1259, corresponding to 39.2 % of the lithic assemblage coming from the layers classified as Acheulean by Kasymov. We did not find the remaining 60.8 % of Kasymov's collection. The artifacts from Kasymov's excavations vary from 1 specimen in layer 46 to 675 specimens in layer 27 and include, notably, cores and retouched pieces (Tables 7, 8, and 9). Considering that Kasymov did not give a clear definition for "Acheulean," it is may be assumed that he followed Bordes' definition (Leroi-Gourhan 1997) popular in the 1970s and 1980s in

Table 4 Distribution of artifacts in terms of striking platforms types, Kulbulak, layer 23 (2010)

Striking platforms	Blades		Bladelets		Flakes		Points	
	N	%	N	%	N	%	N	%
Plain	99	73.9	48	61.5	91	70.0	2	100,0
Dihedral	10	7.5	1	1.3	21	16.2	0	0,0
Faceted straight	7	5.2	0	0.0	3	2.3	0	0,0
Faceted convex	2	1.5	0	0.0	1	0.8	0	0,0
Polyhedral	2	1.5	1	1.3	0	0.0	0	0,0
Punctiform	11	8.2	27	34.6	10	7.7	0	0,0
Cortical	2	1.5	0	0.0	4	3.1	0	0,0
Unidentifiable	1	0.7	1	1.3	0	0.0	0	0,0
Total	134	100	78	100	130	100	2	100

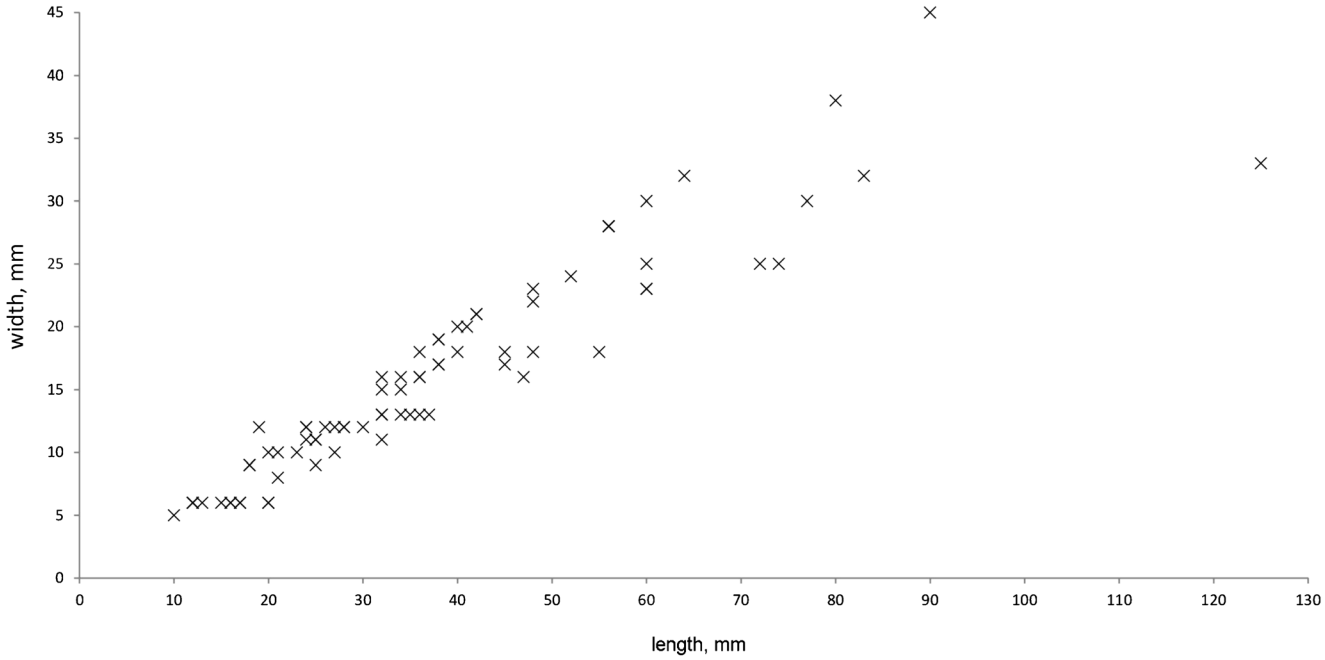

Fig. 7 Comparison of the dimensions (length and width) of the complete blades and bladelets. Layer 23 (excavations of 2007–2010)

Soviet Union. For Kasymov, the main Acheulean features were the following: the presence of bifaces, handaxes, projectiles, and the use of large flakes as blanks (Kasymov 1990). However, by Borde's definition, an Acheulian industry could not be determined at the lowermost layers of Kulbulak, considering the number and morphological characteristics of the hand axes and bifaces.

The lithic assemblages from Kasymov's layers 46–25 appear technologically and typologically similar but their study has not revealed any Acheulean features (Figs. 9, 10, 11). The bifacially worked tools mentioned in Kasymov's publications were not found and, judging by the available illustrations, these few artifacts (not exceeding 10 pieces among all the assemblages), are consistent with a Middle Paleolithic

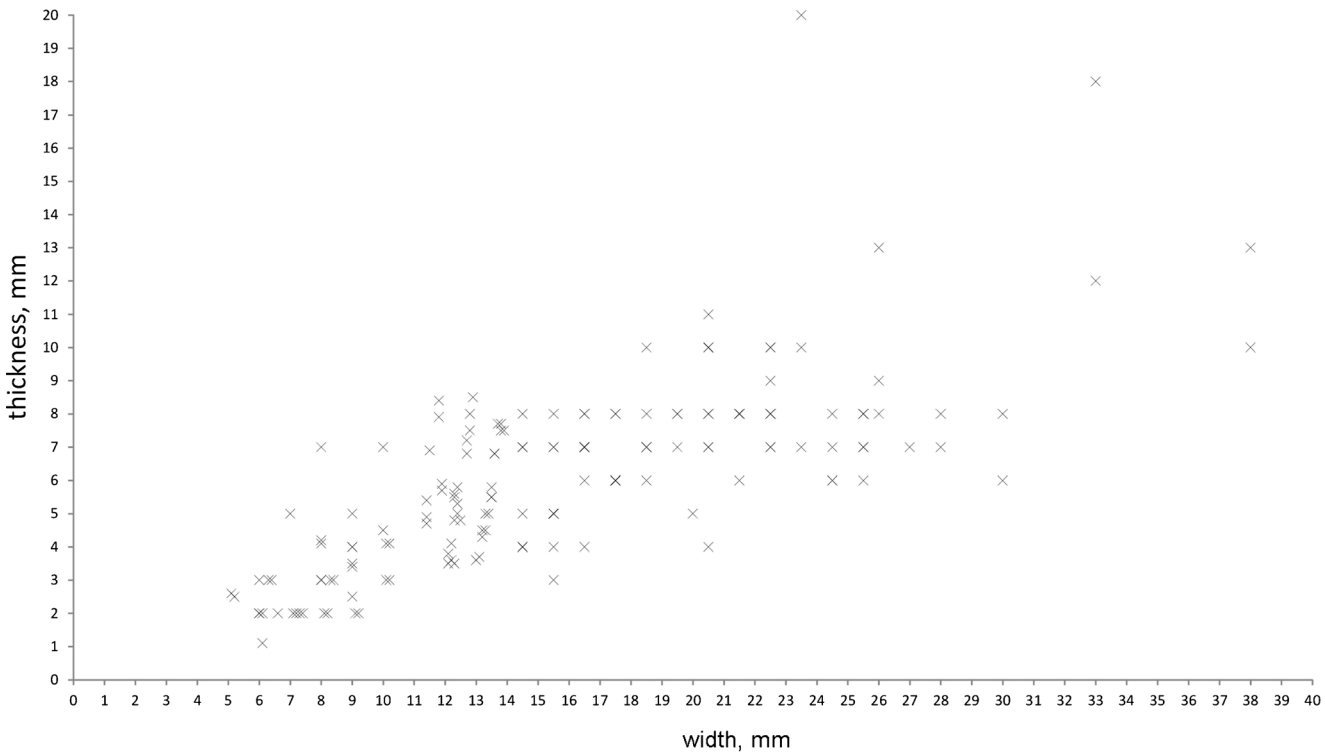

Fig. 8 Comparison of the dimensions (width and thickness) of blades and bladelets. Layer 23 (excavations of 2007–2010)

Table 5 Distribution of artifacts in terms of dorsal scar pattern, Kulbulak, layer 23 (2010)

Dorsal scar pattern	Blades		Bladelets		Flakes		Points	
	N	%	N	%	N	%	N	%
Parallel unidirectional	147	59.8	143	81.3	83	39.5	0	0.0
Parallel bidirectional	16	6.5	3	1.7	7	3.3	0	0.0
Convergent unidirectional	54	22.0	24	13.6	33	15.7	2	100.0
Convergent bidirectional	15	6.1	0	0.0	0	0.0	0	0.0
Radial	0	0.0	0	0.0	6	2.9	0	0.0
Plain	1	0.4	3	1.7	23	11.0	0	0.0
Irregular	0	0.0	0	0.0	0	1.0	0	0.0
Orthogonal	9	3.7	2	1.1	6	2.9	0	0.0
Semi-cortical	0	0.0	0	0.0	38	18.1	0	0.0
Cortical	3	1.2	1	0.6	2	1.0	0	0.0
Transverse	1	0.4	0	0.0	12	5.7	0	0.0
Total	246	100	176	100	210	100	2	100

industry. (Fig. 10*1–3*; Derevianko and Shunkov 2002). No by-products of bifacial reduction have been found in Kasymov's collection.

Moreover, these assemblages indicate the coexistence of large blade production from flat-face, narrow-face and sub-prismatic cores and smaller laminar blanks mostly from narrow-face cores. Primarily flakes, that are more abundant than blades, were produced, with some pointed blanks from flat-face cores.

Based on the most abundant assemblage from Kasymov's collection (layer 27), plain platforms are predominant, with very few examples of facetted, straight, dihedral, punctiform, and natural platforms. Dorsal scars correspond mostly to unidirectional parallel and convergent flaking. The tool kit include end-scrapers, splintered pieces, retouched blades, side-scrapers, perforators, and notch-denticulate tools. Few of the tool fragments also bear invasive retouch on one or both faces (Fig. 9*3, 4*; Fig. 11*5*).

Table 6 Typology of tools, Kulbulak, layer 23 (2010)

Type	Number	%
End-scrapers	16	33.3
Carinated end-scrapers	1	2.1
Sidescrapers	10	20.8
Retouched pointed blades	2	4.2
Retouched blades	8	16.7
Retouched points	2	4.2
Spur-like tools	2	4.2
Denticulated tools	1	2.1
Knives	1	2.1
Retouched flakes	4	8.3
Fragment of tools	1	2.1
Total	48	100

Discussion

The results of new excavations and the reassessment of Kasymov's old materials, together with the new chronometric results, allow us to offer a new cultural and chronological attribution to the Kulbulak lower industries.

The assemblage from layer 23 (excavations of 2010) is mostly marked by the production of elongated blanks (often around 12–13 mm wide, Fig. 8) from prismatic, narrow-face, and flat-face cores. Some bladelets were detached from cores prepared on blanks and small nodules (Fig. 4*1*, 8*; 5*, *11, 12*). The technique of the striking platform preparation of blades (overhang removals) was different from that used for bladelets (platform reduction). However, blades and bladelets with straight and twisted profiles have been noted in approximately equal proportions and they both mostly have triangular cross-sections. Due to these observations and considering the low number of cores in the assemblage, it is difficult to conclude whether the blades and bladelets were produced by a single or different reduction process.

The analysis of the artifact collections from layers 46–25 of Kasymov's excavations in 1981–1984 has shown a considerable similarity in the techno-typological features with the collection from layer 23 in 2010 excavations. Above all, it concerns the major purpose of stone reduction aimed at detaching laminar blanks, including bladelets, as well as similar types of tools (retouched blades, end-scrapers, side-scrapers).

Assemblages with similar features have been reported from western Central Asia, notably at Obi Rakhmat Grotto (Uzbekistan). Archeological excavations at Obi-Rakhmat have revealed 22 layers containing archeological materials with a chronology estimated between 80 and 40 ka BP, (Krivoshapkin et al. 2010; Krivoshapkin 2012). Based on

Table 7 Composition of the lithic industry, Kulbulak, layers 44–25 (M.R. Kasymov's excavation)

Layers	Core-like artifacts	%	Blades	%	Bladelets	%	Points	%	Flakes	%	Core trimming elements	%	Shatter, scales	%	Chips	%	Total
46	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	1
44	2	22.2	0	0.0	0	0.0	1	11.1	5	55.6	0	0.0	1	11.1	0	0.0	9
43	0	0.0	1	14.3	0	0.0	0	0.0	6	85.7	0	0.0	0	0.0	0	0.0	7
42	0	0.0	3	30.0	0	0.0	0	0.0	6	60.0	1	10.0	0	0.0	0	0.0	10
41	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	100.0	0	0.0	2
40	0	0.0	3	30.0	0	0.0	0	0.0	4	40.0	1	10.0	2	20.0	0	0.0	10
39	1	4.5	3	13.6	0	0.0	0	0.0	11	50.0	0	0.0	7	31.8	0	0.0	22
38	0	0.0	0	0.0	0	0.0	0	0.0	9	81.8	0	0.0	2	18.2	0	0.0	11
36	0	0.0	0	0.0	1	5.9	0	0.0	8	47.1	1	5.9	7	41.2	0	0.0	17
35	4	21.1	2	10.5	1	5.3	0	0.0	10	52.6	1	5.3	1	5.3	0	0.0	19
34	0	0.0	4	13.8	0	0.0	0	0.0	14	48.3	1	3.4	7	24.1	3	10.3	29
33	2	10.5	3	15.8	0	0.0	0	0.0	10	52.6	0	0.0	2	10.5	2	10.5	19
32	0	0.0	0	0.0	0	0.0	0	0.0	4	44.4	0	0.0	1	11.1	4	44.4	9
31	0	0.0	5	13.5	0	0.0	0	0.0	23	62.2	1	2.7	7	18.9	1	2.7	37
30	0	0.0	6	15.4	0	0.0	0	0.0	25	64.1	2	5.1	6	15.4	0	0.0	39
29	3	20.0	1	6.7	0	0.0	0	0.0	9	60.0	2	13.3	0	0.0	0	0.0	15
28	1	5.0	0	0.0	0	0.0	0	0.0	15	75.0	0	0.0	4	20.0	0	0.0	20
27	76	11.5	48	7.3	6	0.9	0	0.0	366	55.5	16	2.4	103	15.6	44	6.7	659
26	1	2.3	4	9.1	0	0.0	0	0.0	25	56.8	2	4.5	8	18.2	4	9.1	44
25	3	1.2	17	6.9	4	1.6	0	0.0	162	65.6	7	2.8	25	10.1	29	11.7	247
Total	93		100		12		1		713		35		185		87		1226

the typological and technological similarities with both Middle Paleolithic blade industries and early Upper Paleolithic complexes in Southwest Asia and the Siberian Altai Mountains, it has been suggested that the Obi-

Table 8 Typology of the cores, Kulbulak, layers 44–25 (M.R. Kasymov's excavation)

Types	Layer 44 N	Layer 39 N	Layer 35 N	Layer 33 N	Layer 31 N	Layer 29 N	Layer 28 N	Layer 27 N	Layer 25 N	Total
Flat-faced	1	1	1	1	3	0	1	34	0	42
Single platform for points					1					1
Single platform for blades		1		1				12		14
Single platform for flakes			1					13		14
Double platform for blades							1	1		2
Double platform for flakes	1							1		2
Double platform with two flaking surfaces for flakes								1		1
Radial								1		1
Orthogonal for flakes					1			3		4
Orthogonal for laminar blanks					1					1
Cube-shaped								1		1
Truncated-faceted pieces								1		1
Prismatic	0	0	1	0	0	1	0	5	3	10
Single platform for blades			1			1		5	2	9
Double platform for bladelets									1	1
Narrow-faced	1	0	2	0	0	2	0	13	0	18
Single platform for blades								6		
Single platform for bladelets			1							
Double platform for laminar blanks	1		1							
Wedge-shaped for blades								4		
Wedge-shaped for bladelet										
Wedge-shaped on blanks for bladelets						1				
Burin-core						1		3		
Combination (prismatic and narrow-faced)	0	0	0	0	0	0	0	2	0	2

Table 9 Typology of tools, Kulbulak, layers 44–25 (M.R. Kasymov's excavation)

Types	Layer 44	Layer 42	Layer 40	Layer 39	Layer 33	Layer 31	Layer 30	Layer 27	Layer 26	Layer 25	Total
End-scrapers		1		1				5		1	8
Side-scrapers							1	15		1	17
Retouched blades			1			2	1	3			7
Retouched bladelets								3			3
Unifacial tool					1						1
Splintered pieses						1					1
Spur-like tools								3			3
Burins								1			1
Notched tools								1			1
Retouched flakes								11		1	12
Knives									1		1
Fragment of tools	1							4			5
Total	1	1	1	1	1	3	2	46	1	3	60

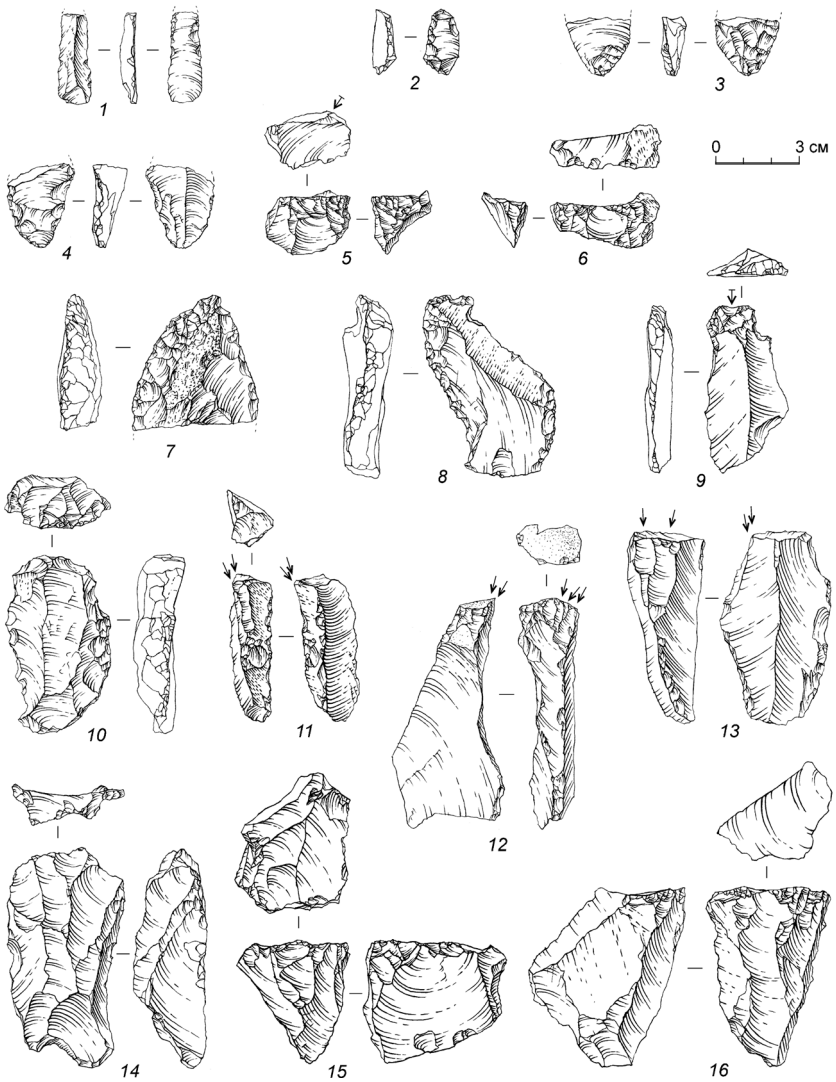

Fig. 9 Stone artifacts from layer 27 (excavations by Kasymov):*1* retouched blade; *2* retouched bladelet; *3, 4* implements with signs of hewing; *5, 15, 16* narrow-face cores; *6* technical spall of the platform rejuvenation; *7* dejete scraper; *8, 9, 10* end-scrapers; *11* angle burin; *12, 13* core-burins; *14* flat-face cores

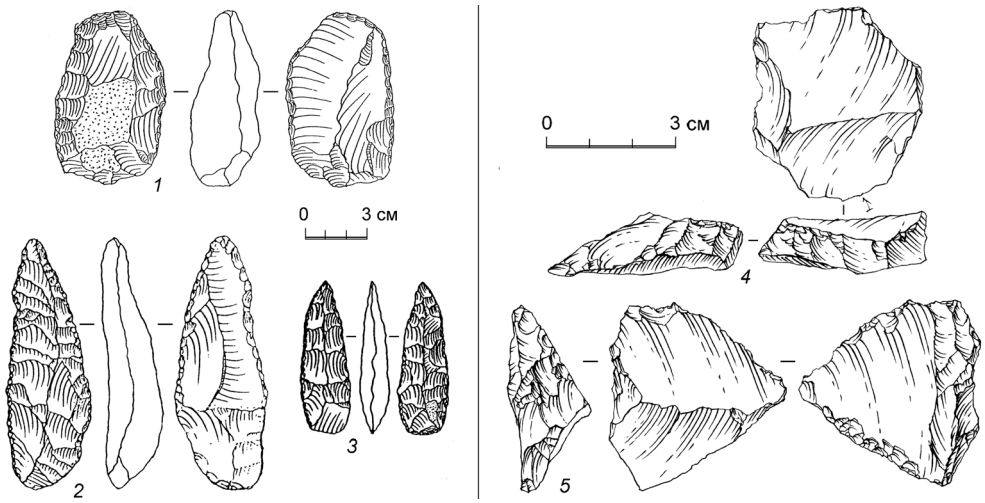

Fig. 10 Stone artifacts from assemblages excavated by Kasymov: *1* end-scraper, layer 42; *2* tablet, layer 42; *3* blade with signs of use-wear retouch, layer 31; *4* end-scraper, layer 31; *5* tools with signs of hewing on the ventral face, layer 33; *6* splintered piece, layer 33; *7* narrow-face, bladelet core, layer 35; *8* sub-prismatic, blade core, layer 35; *9* side-scraper, layer 30; *10* point, layer 45; *11* double platform narrow-face core, layer 44

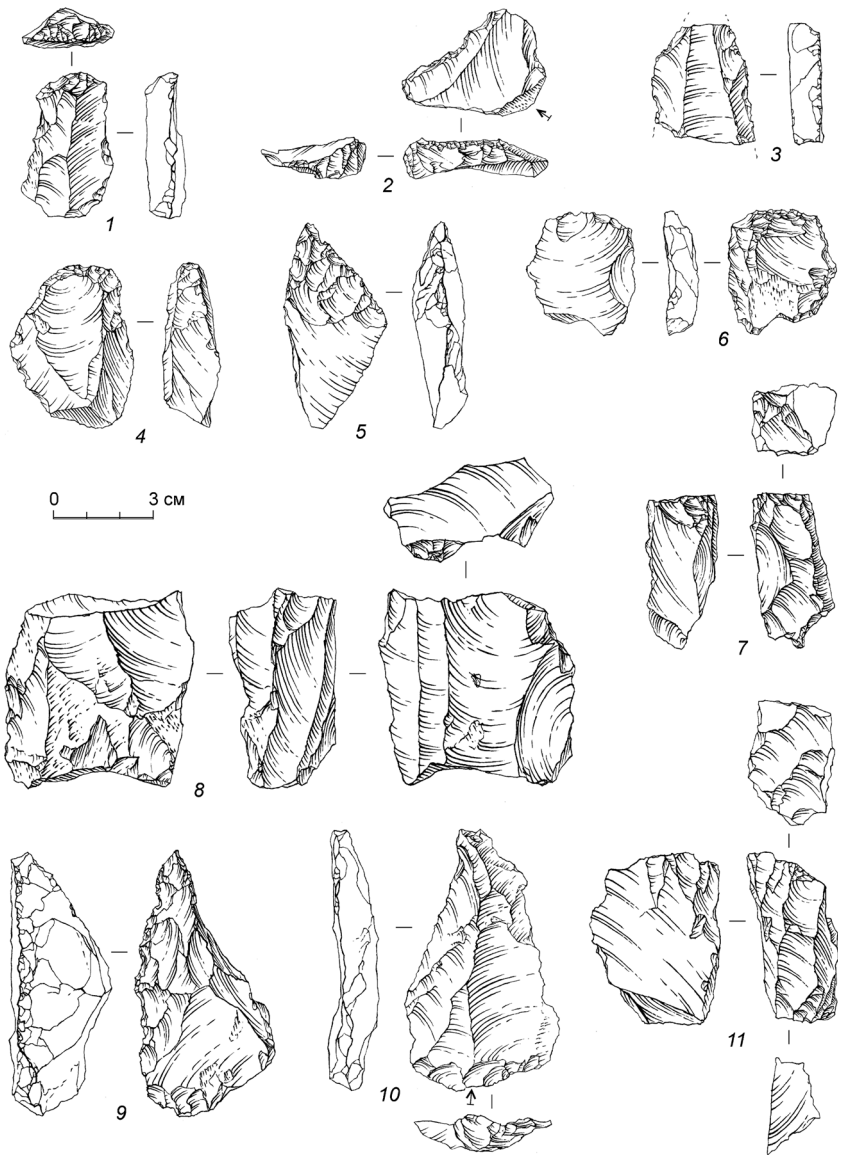

Fig. 11 Stone artifacts from assemblages excavated by Kasymov: *1* biface-scraper; 2 projectil; *3* elongated point (as described by Kasymov, after Kasymov & Grechkina, 1994); *4* tablet, layer 29; *5* narrow-face core on a blank, layer 29

Rakhmat sequence corresponds to a gradual Middle-to-Upper Paleolithic transition occurring in western Central Asia (Krivoshapkin et al. 2010; Krivoshapkin 2012). Human remains have been found in layer 16 and show not only Neanderthal but also modern human morphological traits (Bailey et al. 2008; Glantz et al. 2008:235).

Comparisons of the Obi-Rakhmat and Kulbulak (layer 23 from 2010 excavations and Kasymov's layers 46 to 25) assemblages have shown many similar features, notably the production of large blades and bladelets from prismatic and narrow-face cores. Kulbulak layer 23 assemblage also yielded one truncated-faceted core for small flakes and bladelets (Fig. 47), similar to the truncated-faceted items from Obi-Rakhmat, as well as other tool types commonly found at Obi-Rakhmat: extensively retouched blades, pointed blades, thick elongated points, and end-scrapers (including one of carinated shape). Moreover, some artifacts from the Kasymov layers 46 to 25 show additional common features with the Obi-Rakhmat industry. For instance, the presence of core-burins (Fig. 912, 13), from which small laminar blanks with straight profile were removed.

In view of new absolute dating, assemblages from layers 46–25 of Kasymov's excavations in 1981–1984 and layer 23 (excavations of 2010) are possibly older than Obi Rakhmat sequence but does not correspond to a Lower Paleolithic chronology.

Conclusions

Excavations of the lowermost layers at Kulbulak in 2010, new chronological data, and the reappraisal of field records and archeological materials from Kasymov's excavations of he 1980s have provided solid grounds to contradict the Lower Paleolithic age and Acheulean attribution of these lithic assemblages.

These new works allow us to reconsider the problem of the Lower Paleolithic adaptation strategies in western Central Asia. If there is no Acheulean, the "Karatauskaya culture," known in Tajikistan (Kuldara, Karatau, Obi-Mazar) and yielding assemblages knapped on pebbles, dated to 950–450 kyrs BP, is the only Lower Paleolithic adaption known in western Central Asia (Ranov et al. 1995; Ranov 1988). In this case, the transition from the Lower to the Middle Paleolithic is not documented in this region. Moreover, Kulbulak is now providing new data showing the presence of an earlier development of blade industry. This industry not only aimed at the production of large blades but also smaller laminar blanks, as well as flakes and points. These assemblages show similarities with other Paleolithic sites from Central Asia, particularly with Obi-Rakhmat.

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