

MIDDLE PALAEOLITHIC BLADE INDUSTRIES AND THE UPPER PALAEOLITHIC OF CENTRAL ASIA

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INTRODUCTION

During the last few years, geological and archaeological investigations have taken place in the foothills of Southern Tadzhikistan. The research objects were outcrops of huge dimensions, containing loess palaeosoil sequences of up to more than 100 m in thickness. As a result, a new geochronological framework is presented which shows close comparisons to the marine oxygen isotope record and the Chinese loess stratigraphy (Forster and Heller 1994; Dodonov, Ranov and Schäfer 1995; Shackleton, An, *et al.* 1995; Schäfer, Sosin and Ranov 1996; Ranov and Schäfer 1998).

The geoarchaeological expeditions led to the discovery of many new archaeological sites¹. The association of numerous archaeological find horizons (17 up to now) with a well-stratified loess palaeosoil sequence from about 800,000 up to about 70,000 years (from the 8. PC - stage 17 up to the first loess - stage 4) enables the examination of the "cultural evolution" of man against the background of changing environments, and the reconstruction of his behaviour concerning settlement patterns and landscape exploitation (Schäfer, Ranov and Sosin 1998).

The research took place in the district of Khovaling, mainly at the sites of Obi-Mazar/Lakhuti and Khonako I, II, III and IV, and at Khudzhi, close to the capital Dushanbe (Fig. 1; 2). In particular, the last three glacial cycles of the outcrop Khonako III show an excellent stratigraphical subdivision of interglacial soils, interstadial sediments and loess layers. The penultimate interglacial and glacial complexes (stages 7 and 6) contain numerous artefact layers. The assemblages are Middle Palaeolithic blade industries which are characterised by laterally retouched blades, standardised conical blade cores of the Upper Palaeolithic type, rare Mousterian implements and rare Levallois technology.

The research results in Southern Tadzhikistan have far-reaching consequences for the Central Asian Palaeolithic concerning the age and relations of the Lower to Middle and Middle to Upper Palaeolithic transitions (Ranov and Schäfer 1998; Schäfer, Ranov and Sosin 1996; Schäfer, Ranov and Sosin 1998; Schäfer, Sosin and Ranov 1996).

Because the new data of the Central Asian Palaeolithic are based on new geochronological observations, the authors will first summarise the geochronological results. An insight into the phenomenon of Central Asian Middle Palaeolithic blade industries and its relation to the Upper Palaeolithic then follows.

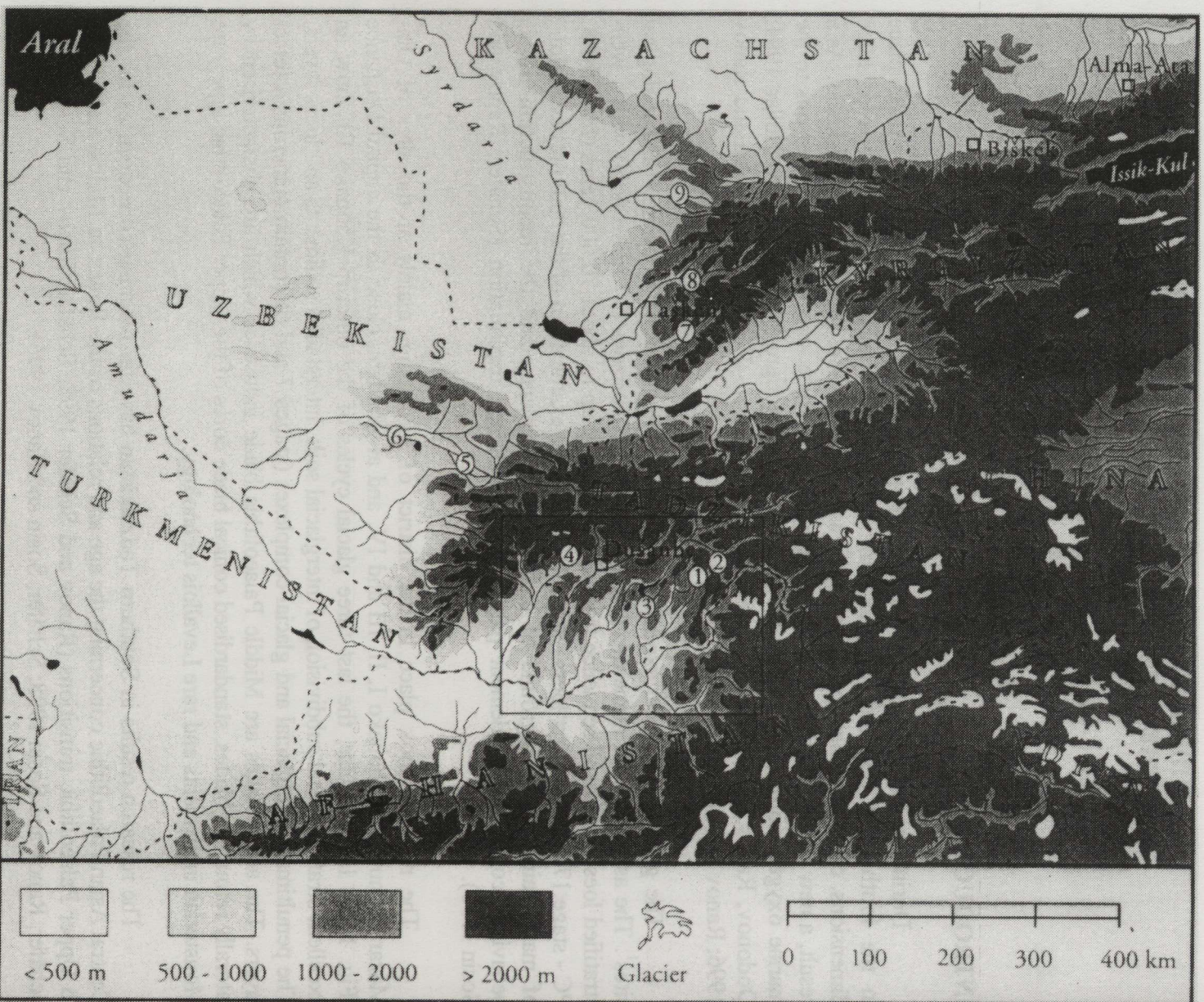


Fig. 1. Karte von Zentralasien. Modifiziert nach: Atlas Tadschikskoj SSR, Dushanbe-Moskva 1968. Erwähnte Fundplätze: 1 - Obi-Mazar, Lakhuti, Khonako; 2 - Shugnou; 3 - Ogzi-Kichik; 4 - Khudzhi, Sondal, Kharkush; 5 - Samarkand; 6 - Zirabulak; 7 - Kulbulak; 8 - Obi-Rakmat; 9 - Valikhanova.

Fig. 1. Map of Central Asia, modified after Tadzhijskoj SSR, Dushanbe-Moskva 1968. Sites mentioned: 1 - Obi-Mazar, Lakhuti, Khonako; 2 - Shugnou; 3 - Ogzi-Kichik; 4 - Khudzhi, Sondal, Kharkush; 5 - Samarkand; 6 - Zirabulak; 7 - Kulbulak; 8 - Obi-Rakmat; 9 - Valikhanova.

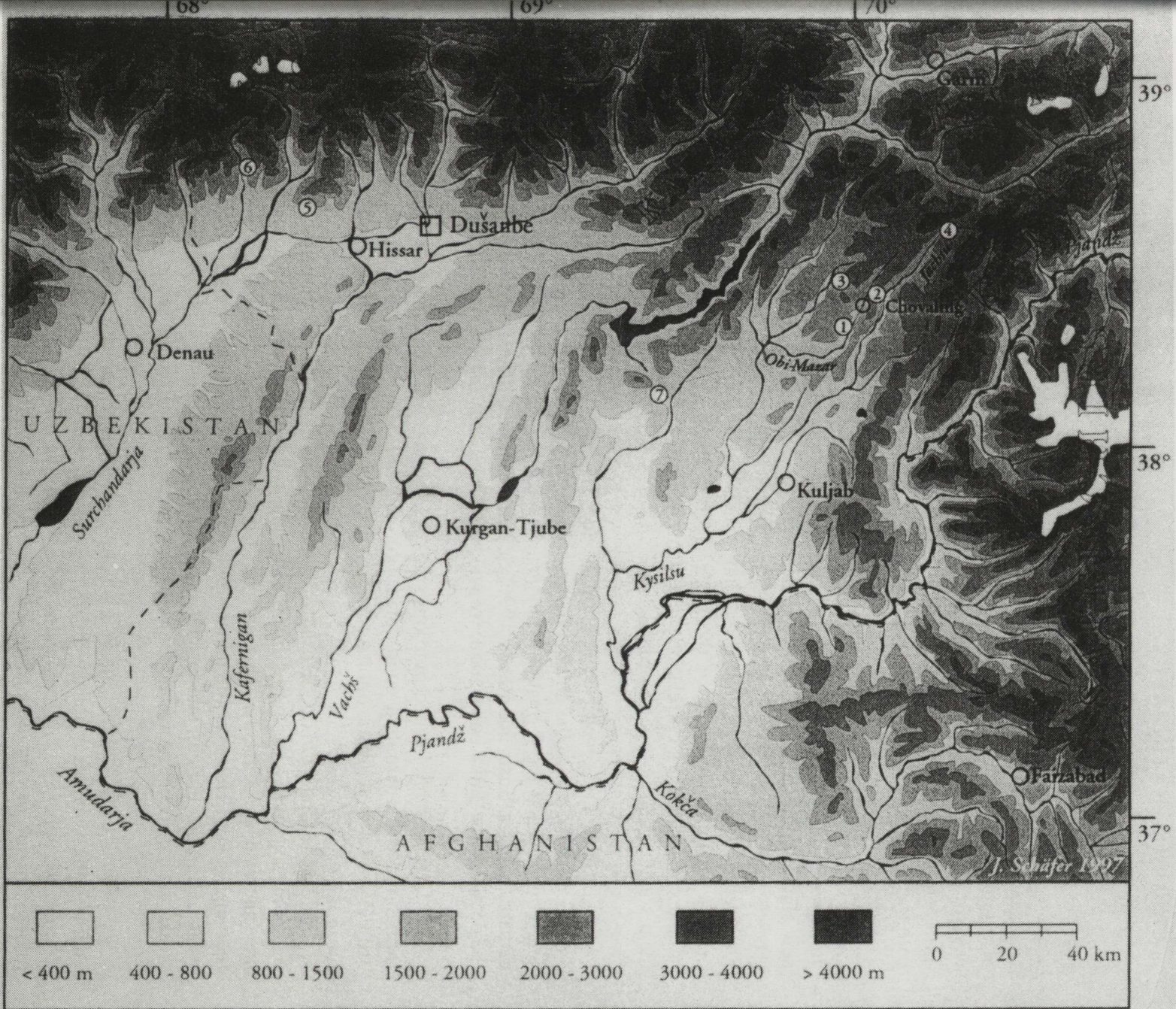


Fig. 2. Karte von Süd-Tadjikistan. Fundplätze: 1 - Obi-Mazar/Lakhuti, 2 - Khonako, 3 - Daraj-Kolon/Tshashmanigar, 4 - Shugnou, 5 - Khudzi, 6 - Sondal u. Kharkush.
Fig. 2. Map of Southern Tadjikistan. Sites: 1 - Obi-Mazar/Lakhuti, 2 - Khonako, 3 - Daraj-Kolon/Tshashmanigar, 4 - Shugnou, 5 - Khudzi, 6 - Sondal u. Kharkush.

2. CHRONOSTRATIGRAPHY

The geochronology of the Tadzhik loess outcrops was reconstructed primarily through the pioneer research of Dodonov, Lazarenko and Shelkopljas (1977). The stratigraphic position of the Matuyama/Brunhes border was located between the 9th and 10th palaeosoil complexes (PC) (Gamov and Penkov 1977). This has also been confirmed by new investigations carried out by Forster and Heller (1994). Dodonov and Lazarenko, however, were of a different opinion concerning the dating and correlation of palaeosoils (the same and different outcrops). The beginning of the Upper Pleistocene, for example, was connected with both the 3rd and the 5th palaeosoil complexes (Schäfer, Sosin and Ranov 1996).

On the basis of susceptibility measurements, pedological investigations and archaeological comparisons in the last few years, various research groups have presented a new chronostratigraphy which has radically changed assumptions about the age of palaeosoils (Forster and Heller 1994; Dodonov, Ranov and Schäfer 1995; Bronger, Winter *et al.* 1995; Shackleton, An *et al.* 1995; Schäfer, Ranov and Sosin 1996). The above-mentioned authors presume that the beginning of the Upper Pleistocene is documented by the 1st palaeosoil complex. As a result, a correlation was established between the Tadzhik loess stratigraphy and the marine oxygen isotope record (Fig. 3).

Besides the general correlation of the Tadzhik loess stratigraphy with the marine oxygen isotope record, the authors have also been able to connect various details of the loess soil sequences and the formation of individual palaeosoil complexes (PC) with fluctuations in climate (Schäfer, Sosin and Ranov 1996; Schäfer, Ranov and Sosin 1998). Without going into the details of the entire correlation, we will now present the more recent sections.

In favourably located outcrops, the 1st, 2nd and 3rd PCs show a comparable, typical formation, which permits a good correlation with individual peaks in the isotope record: the 3rd PC shows two climatic optima which can be correlated with two peaks within stage 9.

The second PC is composed of three well-developed soils (climatic optima) whereby the lower soil layer is separated from the middle soil layer by loess, a rich calcareous horizon and interstadial sediments. This can be assessed as a clear deterioration in the climate (cooling/aridity). However the upper soil layer is divided from the middle soil layer by only a weak calcareous horizon and insignificant interstadial sediments. This can be interpreted as a weak climatic change. An analogue isotope sequence can be recognised in stage 7 (Fig. 3, 4).

The 1st PC, like the 2nd PC, is composed of three climatic optima. In contrast to the 2nd PC, the two lower soil layers of the first PC are divided by a weak climatic decline, whereas the upper soil layer is divided from the middle soil layer by loess sediments, indicating a longer period of climatic change. The correlation with the marine oxygen isotope record is not as clear as in the 2nd and 3rd PC: in this way the lower soil layer could be linked with stage 5e, the middle soil layer with 5c and the upper soil layer with 5a. However, it cannot be ruled out that the two lower layers could be placed in stage 5e. Future investigations should clarify this point.

The Tadzhik geochronology was backed up by absolute dating. In Daraj-Kolon (Tshashmanigar), M. Frechen was able to correlate the first palaeosoil complex with the last interglacial by means of luminescence measurements (Frechen and Dodonov 1998). The elaboration of a biochronology is still in progress. The authors are convinced by the correlation of the Tadzhik loess stratigraphy with the marine oxygen isotope record. Moreover, the stratigraphy seems to show a more sophisticated correlation than the well-established correlation of the Chinese loess stratigraphy with the oxygen isotope record.

These new investigations revise the traditional dating and correlation of the Central Asian terrace formation with the loess stratigraphy (Dodonov 1986; Nikonov, Pakhomov *et al.* 1989). This also concerns the Upper Palaeolithic site of Shugnou (South Tadzhikistan, District of Khovaling). (Nikonov and Ranov 1971; Ranov 1973; Ranov, Nikonov and Pakhomov 1976). If the terrace sequence is indeed comparable for the whole of Central Asia, as is presumed, then this also has consequences for numerous archaeological sites in other Central Asian countries. The Tadzhik loess chronostratigraphy, thanks to its correlation with the terrace sequence, can then contribute to the dating of archaeological sites which lie outside the loess regions.

Further correlation possibilities which can be derived from the new Tadzhik loess stratigraphy and the large number of stratified sites include archaeological techno-typological and palaeontological biostratigraphic comparisons (particularly of small mammals).

Among the newly discovered sites in the Khovaling region, the blade assemblages of Khonako III have commanded particular attention. Due to the Middle Pleistocene age of this site, these assemblages have prompted a rethinking of traditional ideas about the blade industries and their relation to the Upper Palaeolithic of Central Asia.

3. THE BLADE INDUSTRIES OF KHONAKO III

The great outcrop of Khonako is located 10 km northeast of Khovaling. With a span of approximately 5 km, it stretches from the mountain ridge between the rivers Jakhsu in the east and the Obi-Mazar in the west, to the Holocene terrace area of the Obi-Mazar. Khonako III lies in a small hollow under the west face of the peak. The outcrop is 90 metres in height and extends over a length of 300 metres between the section Khonako I on its eastern border and the section Khonako II to the west. The base of the section ends with the 5th PC. Archaeological finds come from the 4th, 3rd, 2nd and 1st PC, as well as from the loess and interstadial sediments between the 1st and 2nd PC. The time range extends from approximately 400,000 to 70,000 years (Fig 3).

The 2nd PC from Khonako III is characterised by a highly differentiated stratigraphic division into soils (Bt, Bmt, Bm)⁷, interstadial sediments (Bm, LB), loess (L) and calcareous horizons (Sca, Bc, Bmc, LBc), as well as the archaeological and palaeontological finds which are embedded within them (Fig 4) (Schäfer, Ranov and Sosin 1998). The entire soil complex is dated as isotope stage 7 with an age of between approximately 240,000 and 200,000 years.

The archaeological assemblage of the entire palaeosoil complex (PC 2 to PC 2a) is characterised by a moderate number of blades (32%)⁸, as well as flakes (simple flakes and a few Levallois flakes) (49%) and angular debris (15%). Cores (4%) are rare (Fig. 9 - the artefacts of PC 2 are portrayed here divided into the lower and upper layers). The modified artefacts are primarily retouched blades (Fig 5), there are few endscrapers, some denticulated/notched pieces and only a few sidescrapers. The typological juxtaposition of Upper Palaeolithic and Middle Palaeolithic pieces is complemented by the occurrence of prismatic technology and Levallois technology⁴. The number of blades increases from the lowest soil layer (PC 2c) through the transition area of the upper soil layer (PC 2a) to the loess, while the number of Levallois flakes and simple flakes decreases (Fig. 9). This could indicate a chronological development towards a blade industry which is clearly comprehensible in the interstadial above (LI 2b)⁹.

A dense concentration of related stone artefacts was excavated in the terminate lower loess interstadial (LI 2b - LB), approximately 2 m above PC 2a (Fig 4). The artefacts are approximately 180,000 years old. The complete assemblage of this layer⁸ has been hitherto divided into 49% blades, 31% flakes, 15% angular debris and 5% cores (Fig 9). Three conical blade cores of an Upper Palaeolithic type originate from this concentration. The cores are highly standardised, both in their technological design and their morphological qualities. The 'residual' cores permit a sufficient technological interpretation: the cores are unipolar with traces of distal preparation. The prepared striking platform is flat or slightly sloped. The reduction was circular or semi-circular with only slightly cortical remains. The number of artefacts found is hitherto small; the blank production indicates a pure prismatic (conical) blade production. The tools are a retouched flake, a thick, steep notched scraper (denticulate ?) and a distal fragment of a blade or flake with steep lateral and terminal retouch (endscraper/truncation).

While making a step at an exposed place in the section of Khonako III, a small concentration of related stone artefacts was found. They originate from a lightly-weathered loess (LB) about a metre below the last interglacial soil (PC 1c). The interstadial is LI 2, approximately 150,000 years of age. The artefacts are very small (mostly under 3 cm) and are composed for the most part of blades and bladelets. Flakes and angular debris are rarer. Retouched pieces have hitherto not been found.

Only very few artefacts have been found in the upper soil layer (PC 1a) of the last interglacial soil complex. However, an assemblage of artefacts has been found in the outcrop Khonako IV, located 3 km down the slope, which can probably be ascribed to the 1st PC on the basis of terrain morphological observations. Due to the presence of large Levallois artefacts, the assemblage can be characterised as Mousterian (Ranov and Schäfer 1998) (Fig 7).

In conclusion, one can establish that blade technology developed during the penultimate interglacial (stage 7) and that blade cores of Upper Palaeolithic design are documented from the beginning of the penultimate glacial. In addition, it has become apparent that the blade assemblages are overlain stratigraphically by a more recent Mousterian assemblage. Since there are at present too few artefacts from the 3rd PC, it has not been

established which industries can be reckoned with in the time between the 4th PC (late Lower Palaeolithic or the transition to the Middle Palaeolithic) and the 2nd PC.

4. THE MIDDLE PALAEOLITHIC BLADE INDUSTRIES AND THE UPPER PALAEOLITHIC OF CENTRAL ASIA.

Due to new geostratigraphic results (see above), traditional chronological presumptions and the development tendencies of Palaeolithic cultures of Central Asia derived from them have to be revised in certain cases. This also concerns recent publications in which the new geostratigraphic and archaeological results could not be taken into account (e.g. Vishnjackij 1996; Ranov 1995). For example, new perspectives have opened up concerning the interpretation of blade assemblages and concerning the question of the transition from the Middle to the Upper Palaeolithic.

What is unusual about the Central Asian Palaeolithic is the occurrence of 'Upper Palaeolithic' elements in Middle Palaeolithic assemblages, and the continued occurrence of 'Middle Palaeolithic' elements in Upper Palaeolithic assemblages. The Upper Palaeolithic stations, in particular those located north of the Hissar-Karategin Mountain-Range, are characterised by the occurrence of sidescrapers and Mousterian points (This is also valid for the neighbouring Siberian regions.) Middle Palaeolithic assemblages often have a considerable proportion of laterally retouched blades (of various design) and variable, less elegant, types of endscrapers.

The two most well-known stratified Upper Palaeolithic sites in the Commonwealth of Independent States in Central Asian are Samarkand (Uzbekistan) and Shugnou (the upper reaches of the Jakhsu; District of Khovaling, Tadzhikistan) (Fig. 1; 2). Samarkand² has been written about as an open air site with three separate find layers (Lev 1965; Dshurakulov 1987). Dshurakulov *et al.* (1980) were able to establish a technological development within this stratigraphic sequence. The authors (Ranov and Schäfer) prefer to interpret the many, occasionally overlying, artefact concentrations as a large number of smaller settlement activities spread over a period of time. We feel that the entire assemblage makes a uniform impression and we are unable to recognise developmental tendencies within it.

The dating of Samarkand is not unequivocal but, on the basis of its terrace formation, its age is presumed to be 20,000 to 15,000 years. The assemblage of Samarkand is characterised by a large proportion of pebble tools. However, one of the authors (Schäfer) has the impression that part of the pebble tools can be classified as cores and that a further part can be evaluated as unusable material. Technologically speaking, Samarkand can be described as an Upper Palaeolithic flake industry since the production of long flakes occurs, rather than that of long, narrow blades. The cores are mostly heavily reduced; blade cores and microblade cores are rarer. The tools are not very standardised; along with Middle Palaeolithic points and sidescrapers, there is a large number of various endscrapers (mostly short, thick ones and short, small ones), laterally retouched blades and some carinated scrapers (core scrapers.)

Layer 1 of the multi-layered site Shugnou (Fig. 2) provides us with a comparison (Ranov 1973). Smaller settlement activities have also been documented here through various artefact concentrations. However, seen technologically and typologically, the assemblage of Shugnou layer 1 can be estimated to be more standardised and possibly a little younger. For Layer 1, a C-14 age of 10,700 $\pm$ 500 years has been calculated.

Layer 2 of Shugnou is characterised by the production of long, narrow blades and a typical Upper Palaeolithic tool assemblage which consists of endscrapers on blades, short endscrapers, truncated blades, points and microblade cores. The points are variable in their design, they are often steeply retouched on both edges at the lateral base and on one or both edges in the lateral and terminal part. They can be long and narrow and reminiscent of Gravette points, or they can be shorter and wider, look sturdier and be reminiscent of Châtelperron points. This type has gone down in the literature as a Shugnou point or Tutkaul point (Leroi-Gourhan 1997). The age of Shugnou layer 2 has been estimated by V.A. Ranov as being between 25,000 and 20,000 years, and by R. Davis as being between 20,000 and 15,000 years (Ranov and Davis 1979). The find layer, however, also has certain parallels with the Upper Palaeolithic sites of southern Siberia and of the Altai. Comparable tools have been found, for example, in Kara-Bom (Russia, Altai) with a dating of 40,000 years: unipolar and bipolar prismatic cores, endscrapers on blades, retouched blades, some core scrapers and a tool comparable to a Shugnou point (Goebel, Derevjanko and Petrin 1993). There are also similarities with sites in south-easterly early Upper Palaeolithic areas such as Afghanistan, Iran and Iraq. It therefore cannot be ruled out that Shugnou layer 2 can be dated as being early Upper Palaeolithic.

The 3rd and 4th find layers of Shugnou as well as the sites of Karasu/Valikhanova (40 km north of Tshimkent, Kazakhstan), Zirabulak (80 km northwest of Samarkand, Uzbekistan), Kul'bulak (near Angren, Uzbekistan), Obi-Rakhmat (100 km north-east of Tashkent, Uzbekistan) and Khudzhi (40 km west of Dushanbe, Tadzhikistan) are controversial as far as their chronological and 'cultural' position is concerned. The Upper Palaeolithic sites of Sondal and Kharkush (in the southern Hissar Mountains), about 60 km northwest of Dushanbe) have hitherto scarcely been considered in the literature.

Sondal and Kharkush lie in the estuary of small streams in the Shirkent (Filimonova 1991 (Fig 2). With an altitude of 2,000 metres above sea level and their general morphological situation, these sites are very similar to Shugnou. On the basis of their blade technology and the occurrence of endscrapers on blades, the assemblages, which comprise few artefacts, can best be compared to Shugnou horizon 2.

The multi-layered site Valikhanova (or Karasu) (Fig. 1) has been described by its excavators as Middle Palaeolithic (Tajmagambetov 1990). However, there are researchers familiar with the material who would prefer to place the site in the Upper Palaeolithic (Vishnjackij 1996). Valikhanova can be characterised by a juxtaposition of prismatic flake/blade technology and Levallois technology. The blade technology is, however, not dominant so that Valikhanova can more readily be characterised as a flake industry. Among the tools, the many Upper Palaeolithic elements, such as short endscrapers on blades, short, small endscrapers, massive endscrapers and core scrapers are clearly in the majority compared with

the Middle Palaeolithic sidescrapers. The scrapers are comparable with those of the Upper Palaeolithic stations of Samarkand, Shugnou 1 and 2, Zirabulak and Kul'bulak 1-3. The authors would therefore like to place Valikhanova in the Upper Palaeolithic. This supposition is further supported by a C 14 dating of 24,800 +/- 1100 years BP (Hd 15844-15280)³ of a charcoal found 3.70 metres under the surface.

Zirabulak (Tashkenbaev and Sulejmanov 1980) (Fig. 1) is probably discussed as being both Middle and Upper Palaeolithic because the find layers to be investigated were probably redeposited. New excavations by T. Ju. Gretshkina (Gretshkina and Khudajberdyev 1992) excavated a stratified assemblage in an area around a spring. Among the artefacts are some Middle Palaeolithic types of sidescraper. Characteristic of Zirabulak are microblade cores, conical flake cores, laterally retouched blades and various types of endscrapers. Among the endscrapers, endscrapers on blades, small short endscrapers and core scrapers are significant. Tools are standardised and of better manufacture than comparable pieces from Samarkand or Kul'bulak 1-3. Zirabulak may therefore be dated as late Upper Palaeolithic.

The multi-layered site of Kul'bulak (Fig 1) also lies near a spring. Its stratigraphy extends over 19 m in height with several find layers (27) from Acheulian to Upper Palaeolithic (Kasymov and Godin 1984). The upper stratigraphic sections in particular have been interpreted as redeposited in contrast to the opinion of Kasymov, its excavator (Ranov and Nesmejanov 1973). However, the assemblage of the upper sections (but only partially of the 1st find layer) can be clearly divided into different assemblages with a 'development' from Middle to Upper Palaeolithic. The archaeological layers 6 to 9 are characterised by Levallois and discoid technology, as well as sidescrapers and denticulated/notched pieces. The layers 2 to 3 are distinguished by prismatic flake and blade technology as well as bladelet production and Upper Palaeolithic tools such as laterally retouched blades, various types of endscrapers such as flat endscrapers on blades, short thick endscrapers, and core scrapers, as well as a single limace. In the intermediate layers 4 and 5, a blade technology, a prismatic flake technology and a discoid technique can be detected. There are no Upper Palaeolithic tool types. There are sidescrapers, a Mousterian point and several limaces. These intermediate layers could show a 'development', whereby they show technological similarities to the Upper Palaeolithic assemblages above, and typological similarities to the Middle Palaeolithic assemblages below. The authors did not investigate whether Middle Palaeolithic blade assemblages could be identified in the lower layers 10 to 27.

A blade technology is characteristic of the site Obi-Rakhmat (Fig 1) (Sulejmanov 1972). This is the reason why most researchers have placed the site in a transition towards the Upper Palaeolithic. Obi-Rakhmat is a cavern with a comprehensive stratigraphic sequence of several find horizons. Its lithological structure and the division of the layers have been discussed (Ranov and Nesmejanov 1973). Investigations of the site material by the authors (Schäfer) showed that the comprehensive assemblages of the lower horizons differ from the sparse assemblages of the upper layers (<= Layer 4). The lower layers are characterised by a concentrated blade production which led to semi-circular to circular reduced cores (prismatic unipolar and bipolar blade cores, Levallois blade cores). Technologically, it was a matter of opportunistic technology rather than a preparation of cores: blades were mass-produced, beginning at the natural ridge of the angular unhewn blocks. Modified artefacts are rare.

Generally they were laterally, marginal, steep or scaled retouched blades. There are also single endscrapers and Mousterian points. In contrast to the lower layers which are dominated by blades, a flake technology can be recognised in the upper layers. Blades become insignificant, flat flakes and Levallois flakes are now more numerous.

One of the authors (Schäfer) is therefore of the opinion that in Obi-Rakhmat, as in Khonako III, a Middle Palaeolithic Levallois flake industry overlies a Middle Palaeolithic blade industry. Consequently Obi-Rakhmat cannot be unequivocally placed in the transition to the Upper Palaeolithic. A dating of 170,000 years (Tscherdycey 1969) supports this supposition.

The open-air station Khudzhi (Ranov and Amosova 1984) shows similarities to Obi-Rakhmat (fig 2). Solid blades also occur here which have been made from comparable blanks. In Khudzhi, though, Levallois technology is more prominent than prismatic blade technology⁴. The main find layer of Khudzhi is distinguished by numerous finds such as concentrations of artefacts and fireplaces, as well as the accumulation of food remains. A systematic procedure can be deduced from the preferred prey (ovis/capra) and the pattern of cutting up the bones. The assemblage can be characterised by the dominant production of blades (53%)⁸. The proportion of flakes is 28%, of angular debris 12% and of cores 7% (fig 9). Retouched flakes and denticulated/notched pieces should be mentioned among the Middle Palaeolithic tool types. However the biggest part of the assemblage consists of Upper Palaeolithic tool types such as laterally retouched pointed blades (points which are reminiscent of those from Shugnou 2 or Châtelperron points) and various types of endscrapers (Fig 8). The scrapers can be solid endscrapers on blades or smaller, very steep endscraper caps on various blanks. There is for example, a thick, solid endscraper on blade with abrupt denticulated lateral retouch and steep half-rounded endscraper cap (careinated scraper - Fig. 8.4) or an abrupt endscraper which also has burin facets and is therefore reminiscent of Chamfreins. Typologically, Khudzhi could be characterised as Upper Palaeolithic, but the Upper Palaeolithic tool components do not appear to be as standardised as those from Shugnou 2 or the other Upper Palaeolithic sites. Technologically, Khudzhi is more archaic since the blade technology corresponds more to the 'traditional procedure' of Middle Palaeolithic production techniques. Khudzhi is dated in the late Middle Palaeolithic, confirmed though a C14 dating of 38,000 years. However, with this age the limit of acceptable C-14 dating has been reached. A more advanced age can therefore not be ruled out. Khudzhi also shows typological similarities with other Tadzhik blade assemblages such as Khonako III PC 2, LI 2b or Shugnou 3 and 4.

The assemblages of Shugnou and Khonako are based on comparable raw material resources (Neogene conglomerates - river pebbles) and differ in this way from Khudzhi and Obi-Rakhmat.

The assemblages of Shugnou 4 and 3 are only small in comparison to the find layers above. This is the reason why there are only provisional statements concerning their cultural-chronological position (Ranov 1973). Both early Upper Palaeolithic and a transition from the Middle to the Upper Palaeolithic have been discussed. The authors would now like to make a new attempt to describe the assemblages in the light of the new geochronological results and new comparable assemblages.

The lowest horizon, layer 4, is separated from the layer 3 above by colluvium. The artefacts lie directly on meadow sediments which are linked with the closing phase of the terrace formation (Ranov 1973; Ranov, Nikonov and Pakhomov 1976)⁵. Due to the chronological restructuring of the loess stratigraphy, the traditional dating of the terrace sequences can be questioned. If settlement indeed occurred directly after the deposit of the terraces, then an Upper Pleistocene age is unlikely. Layer 4 of Shugnou could therefore also be Middle Pleistocene. Layer 3 is embedded in proluvial and aeolian cycles of sedimentation. However, in contrast to find layer 4 (and find layer 2) the dispersion of the artefacts reflects different phases of settlement.

Both assemblages (find layer 3 and 4) are characterised by a dominant blade production. The prismatic blade production is complemented by other techniques, including the Levallois method. It should also be mentioned that a bladelet production has been documented in Shugnou 3. The blank production⁸ of Shugnou 3 consists of 48% blades, 34% flakes, 16% angular debris and 2% cores; that of Shugnou 4 consists of 54% blades, 28% flakes, 12% angular debris and 6% cores (Fig 9).

The Middle Palaeolithic tool spectrum of Shugnou 3 includes retouched flakes and angular debris and some denticulated/notched pieces. Upper Palaeolithic tools are laterally retouched blades and various endscrapers, including a carinated scraper and one piece which is reminiscent of a Chamfrein. In Shugnou 4 a sidescraper, a laterally retouched blade, an endscraper and laterally retouched points have been found. The points are comparable with samples from Khudzhi and Khonako III, and are reminiscent of the well-known tool types from Shugnou 2 (see above).

The assemblages of Shugnou 3 and 4 were more comparable to the assemblages of Khonako III, Obi-Rakhmat and Khudzhi. They differ from the more standardised Upper Palaeolithic assemblages Shugnou 2, Shugnou 1, Kul'bulak 2-3, Valikhanova, Samarkand and Zirabulak.

5. TECHNICAL COMPARISONS OF TADZHIK BLADE INDUSTRIES

Now that we have portrayed various Middle Palaeolithic blade assemblages and Upper Palaeolithic find horizons, we will subsequently present a technological analysis of the Tadzhik blade assemblages of Khudzhi, Khonako III lower PC 2, Khonako III upper PC 2, Khonako III LI 2b, Shugnou 4, 3 (and Shugnou 2)⁶. For our interpretation the investigated characteristics will be divided into 'progressive' and 'archaic'. According to this division the progressive characteristics tend to correspond to traditional ideas of the Upper Palaeolithic, and the archaic characteristics to those of the Middle Palaeolithic. The following will be contrasted:

1. large numbers of blades compared with flakes (Fig. 9, 14)
2. long, narrow blades compared to wide, short ones (Fig. 14)
3. slender blades compared to solid ones (Fig. 13)

4. narrow blades compared to wide ones (Fig. 13)
5. unipolar and bipolar dorsal flake scars compared to miscellaneous and centripetal ones (Fig. 10, 14)
6. a small number of dorsal negatives compared to a larger number (Fig. 11, 14)
7. point-shaped and plain platform remnants compared to prepared (faceted) ones (Fig. 12, 14)
8. small platform remnants compared to bigger ones (also in proportion to the solidity of the blade (Fig. 12, 13)

As a result we can establish that Shugnou 2 (an Upper Palaeolithic find layer, see above) progressively stands out from the other assemblages. As far as Khudzhi is concerned, one can make the generalisation that this site seems the most archaic, even when one takes into account that the assemblage is based on a different raw material. In Khonako a clear 'development' from the lower layers (lower PC 2) through the upper PC 2, to the upper layer LI 2b is recognisable⁹.

In contrast to Khonako III no technological development can be established between Shugnou 4 and 3 from the later to the earlier find layers. Shugnou 4 seems to be more progressive on the whole (if one considers the bladelet production of Shugnou 3 as an innovation and does not take it into account). The relationship between Shugnou 3/4 and Khonako is not unequivocal. If one simply considers the manufacture of blades, then Khonako III LI 2b seems to be more progressive than both assemblages from Shugnou (3 and 4).

6. THE TRANSITION FROM MIDDLE TO UPPER PALAEOLITHIC

At the present stage of investigation the blade assemblages cannot sufficiently be considered from a chronological point of view. Reliable dates only exist for Khonako III: for PC 2 a stratigraphic age of 240,000 to 200,000 and for LI 2b of 180,000. Due to its advanced age and the stratigraphic overlying of Middle Palaeolithic Mousteroid industries, a transition area between the Middle and Upper Palaeolithic can be ruled out.

Shugnou 4 cannot be dated due to its stratigraphic situation and its relationship with new results in loess stratigraphy (see above). Shugnou 3, like the find layers above it, is embedded in the alluvial/proluvial sequence, which shows marked discordance to the colluvium below it. It is therefore probable that Shugnou 3 belongs to the Upper Pleistocene. Shugnou 3 differs from the other assemblages through its bladelet production. Since this is only known from other Upper Palaeolithic sites (in Central Asia), and not found in the other Middle Palaeolithic blade assemblages which have been discussed here, it makes sense to describe Shugnou 3 as Upper Palaeolithic.

Due to its late C-14 dating of 38,9000 years, Khudzhi's age is not sufficiently reliable. Khudzhi shows the closest similarities to Shugnou 3 among the blade assemblages discussed here, in terms of both its technological and typological characteristics. If one attempts a comparison with Middle Palaeolithic (Mousterian) sites, then there are connections with Ogzi-Kitshik (Ranov and Amosova 1975). Due to its proximity to Shugnou 3 on the one hand, and

to Ogzi-Kitshik on the other, the authors tend to date Khudzhi in the transition from the Middle to the Upper Palaeolithic.

Due to the chronological considerations and the techno-typological features of the blade industries described, the following conclusions can be reached for Central Asia:

1. Middle Palaeolithic blade industries do not represent a general tradition in the sense of a progressive development, but reflect the variable technological skills of mass blade production. Central Asia can therefore be compared with other regions such as north-west Europe (Révillion 1995).
2. Middle Palaeolithic blade industries are not to be considered technologically more archaic than Upper Palaeolithic ones. The progress of the Upper Palaeolithic expresses itself in the innovation of new techniques (bladelet production) but not in an improvement in traditional ones.
3. Progressive tool forms such as laterally retouched blades, laterally, steep retouched points, steep solid endscrapers on blades, core scrapers and carenated scrapers, as well as a progressive blade technology, were already in existence in the early Middle Palaeolithic (Middle Pleistocene). This also means that these 'type fossils' cannot be taken into account to define an early Upper Palaeolithic.
4. If Shugnou 2 can be seen as early Upper Palaeolithic, then there would be a standardisation in Central Asia which did not appear in many other regions until the middle Upper Palaeolithic (Gravettian). Furthermore, a bladelet production occurs in the stratigraphically older find layer 3, which then has to be dated in the transition from Middle to Upper Palaeolithic.
5. If, as has been hitherto presumed, Shugnou 2 is to be dated as middle Upper Palaeolithic, this does not only mean that early Upper Palaeolithic traditions were already in existence in the Middle Palaeolithic (see above point 3), but also that these traditions were not complemented by innovations until the middle Upper Palaeolithic.

In conclusion the above-mentioned considerations can be interpreted to the effect that in the former Soviet Central Asia a division into Middle Palaeolithic and early Upper Palaeolithic on the basis of stone artefacts does not appear to be meaningful.

In a supra-regional consideration of the assemblages of Central Asia discussed here, the following conclusions can be reached:

1. The Upper Palaeolithic of Central Asia (with the small number of hitherto known sites) can be divided into a region with a blade technology, located south of the Hissar-Karetegin Mountain-Range, and into a region with a flake technology, located to the north.
2. The southern region permits connections with the West over Afghanistan, Iran, Iraq up to the Levant. The northern region, though, is comparable with the traditions of southern Siberia.

3. The special features of the Central Asian Palaeolithic could be useful for the interpretation of archaeological assemblages in neighbouring regions: 'Upper Palaeolithic' tool forms and techniques are a component of Middle Palaeolithic assemblages. Laterally steep retouched blades, for example, do not have to be reduced double sidescrapers (versus Dibble and Holdaway 1993). 'Middle Palaeolithic' tools are a component of Upper Palaeolithic assemblages and do not have any direct chronological meaning.

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Footnotes

- ¹ Travel within Central Asia and the expeditions in Tadzhikistan were carried out by the German Archaeological Institute (Deutsche Archäologische Institut) and within the framework of a research scholarship, a research trip and a post-doctoral research scholarship from the German Research Foundation (Deutsche Forschungsgemeinschaft) (Sch 535/1, 436 TAD 111/2, Sch535/3). The authors would like to thank the institutions for this generous support. In addition the authors would like to thank the Predstavitel of Khovaling and the Mufti of Khudzhi for their hospitality and help.
- ² Only those assemblages were considered which both authors (Ranov and Schäfer) were able to study intensively. The authors would sincerely like to thank T.Ju. Gretshkina, R.Kh. Sulejmanov and M.D. Dzhurakulov from Samarkand, U.I Islamov from Tashkent and O.A. Artjukhova and Sh.K. Tajmagambetov from Alma Ata for their hospitality, the expeditions to the various sites and the opportunity to study the assemblages.
- ³ The authors would like to thank Dr Kromer from the Institute for Environmental Physics at the University of Heidelberg for carrying out the dating in 1993.
- ⁴ While the authors use the terms 'Levallois blade technology' and 'prismatic blade technology', we would like to point out that these terms insufficiently describe the technical production processes. First, the variety of technological variability of mass blade production cannot be sufficiently covered by these two terms, and second, the available residual cores do generally not reflect the entire reduction sequence.
- ⁵ The geologist A.A. Nikonov (Nikonov and Ranov 1971) is of the opinion that the settlement of find layer 4 did not take place until after the close of the alluvial cycle, and that settlement is connected with proluvial and aeolian sediments. That is, he sees no chronological connection between terrace formation and settlement horizon.
- ⁶ The following must definitely be considered: 1. The number of the items found (or rather their comparable characteristics) is hitherto very small; 2. The entire assemblage is not always taken into account, and 3. the ongoing excavations will lead to different data. The results are therefore to be seen purely as a trend.
- ⁷ The classification of soils is based on the system of B.G Rosanov (1983).
- ⁸ For the statistical evaluation of the blank-production, blades, blade fragments, cores, flakes and angular debris were considered. Only flakes and angular debris which were ≥ 3 cm were included.
- ⁹ It has to be taken into account that the development must not necessarily be linear, since the assemblage division of PC 2 took place under less precise stratigraphic aspects, due to the small number of artefacts. The lower layers of PC 2 generally correspond to the find horizons $< 49,5$ m and the upper ones to $\geq 49,5$ m (Fig. 4). The ongoing excavations will show what the techno-typological relationship of the individual find horizons is, from a stratigraphic standpoint, and in particular from a climate-oriented standpoint.

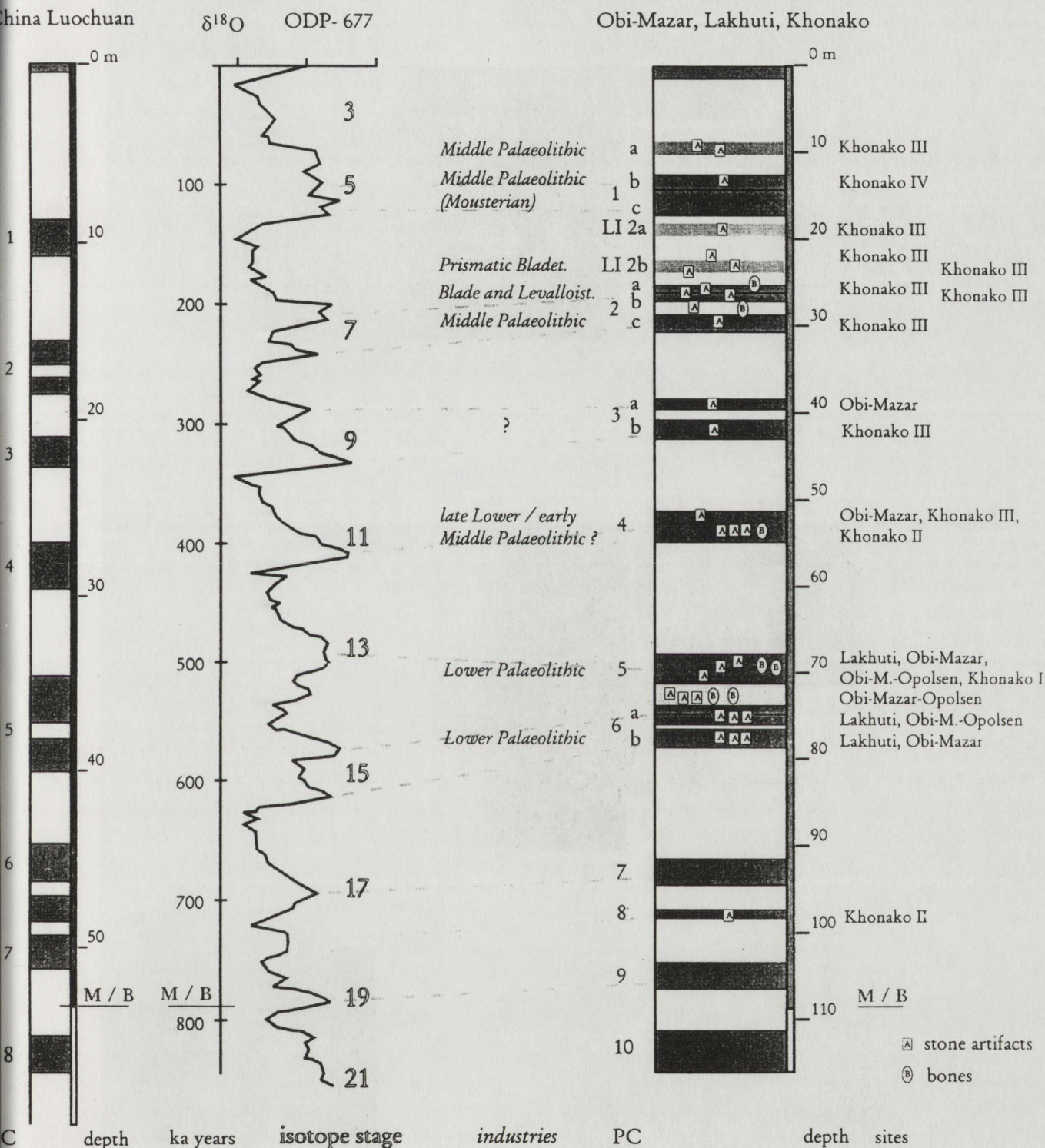


Fig. 3. Die tadzhikische Löß-Chronostratigraphie, die archäologischen Fundpunkte (modifiziert nach Schäfer, Sosin & Ranov 1995), die marine Sauerstoff - Isotopenkurve (nach Shackleton *et al.* 1990) und die Luochuan Stratigraphie (nach Liu & Baoyin 1987).

Fig. 3. The loess chronostratigraphy, archaeological findspots (modified after Schäfer, Sosin & Ranov 1995), marine oxygen-isotope stages (after Shackleton *et al.* 1990), and the Luochuan stratigraphy (after Liu and Baoyin 1987).

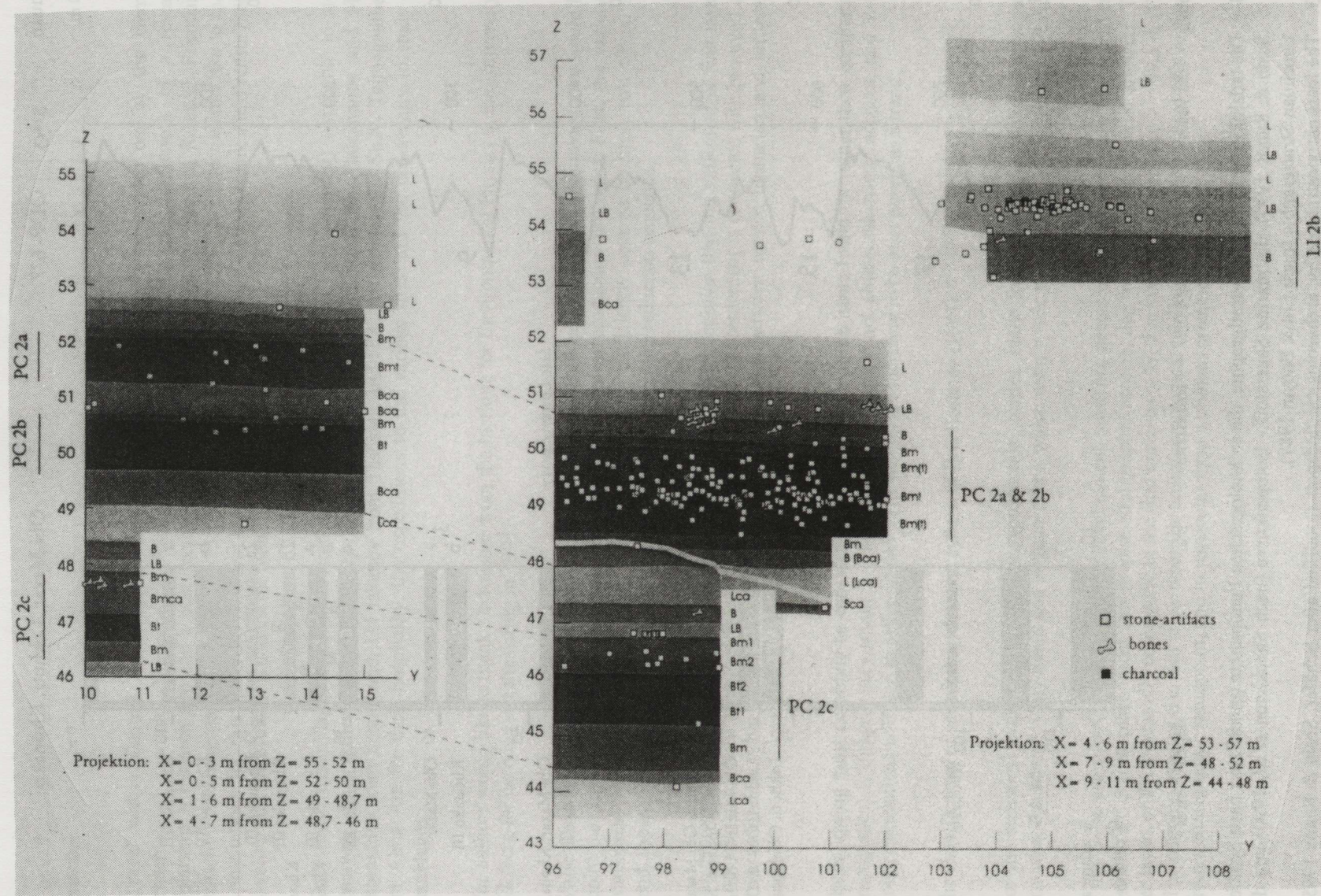


Fig. 4. Der Aufschluß Khonako III - PC 2 und LI 2b; Grabungsprofile und vertikale Artefaktprojektion.
 Fig. 4. Khonako III profiles PC 2 and LI 2b; Excavation profiles and vertical artifact projections.

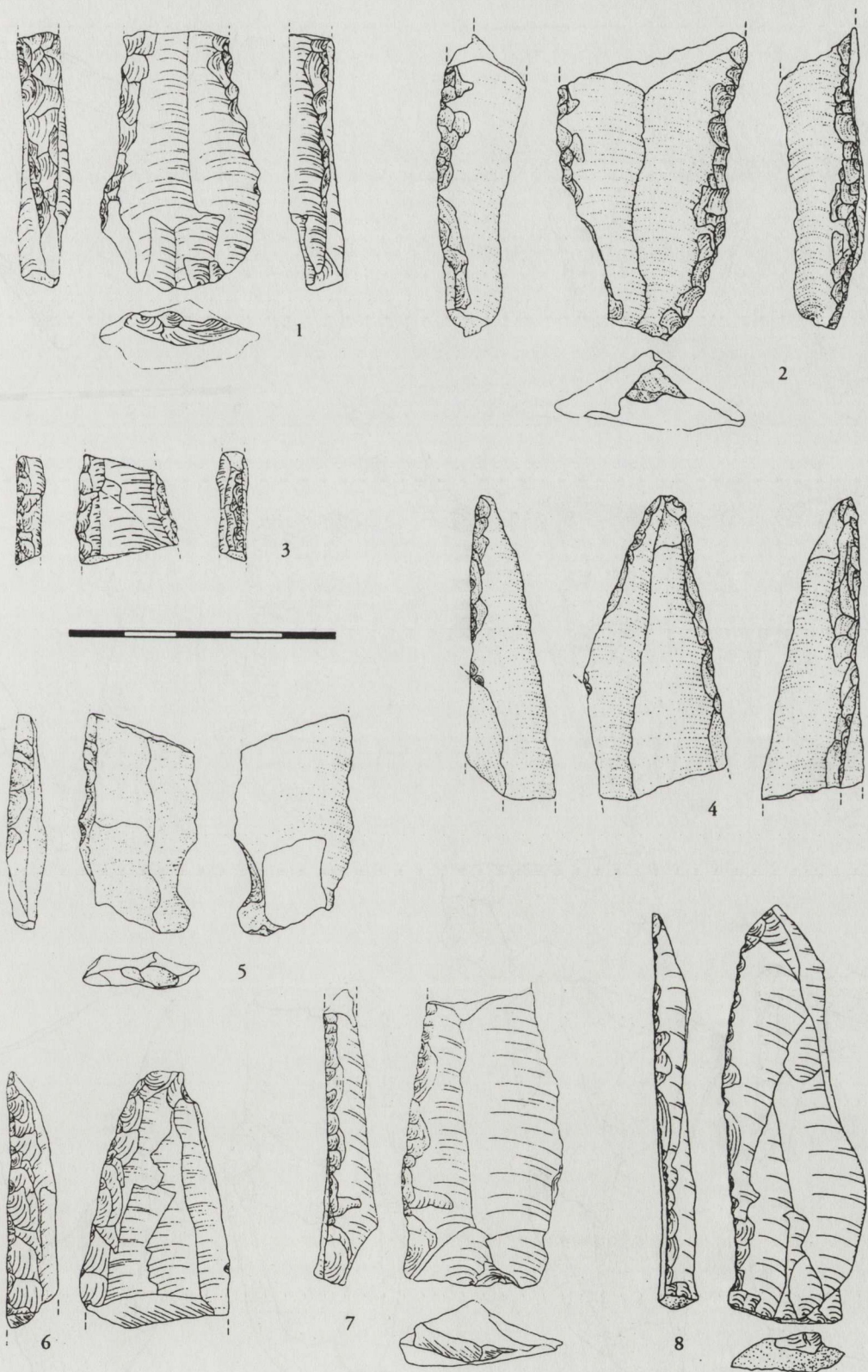


Fig. 5. Khonako III PC 2: retuschierte Klingen.
Fig. 5. Khonako III PC 2: retouched blades.

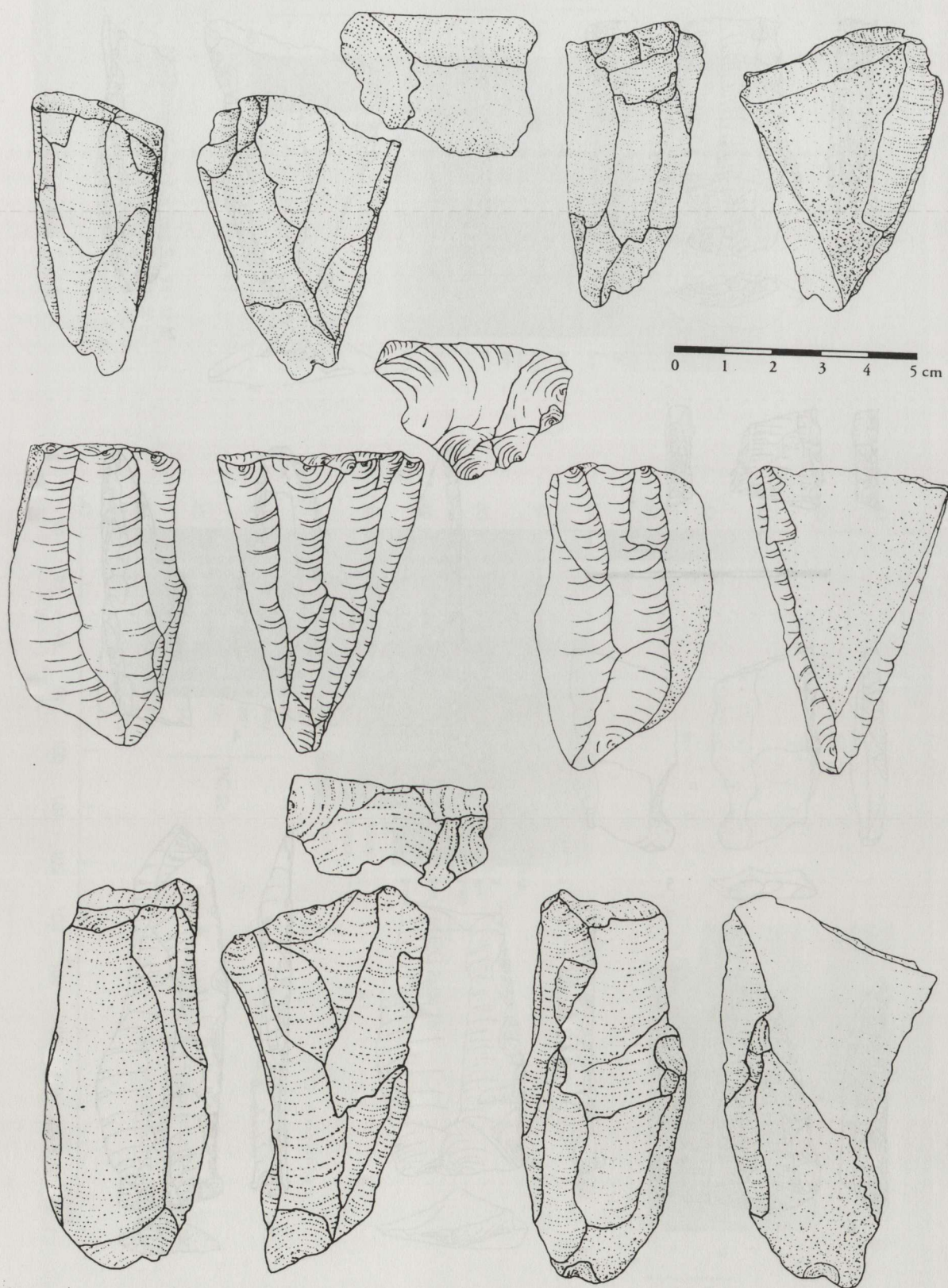


Fig. 6. Khonako III LI 2b: konische Klingengerne.
Fig. 6. Khonako III LI 2b: conical blade cores.

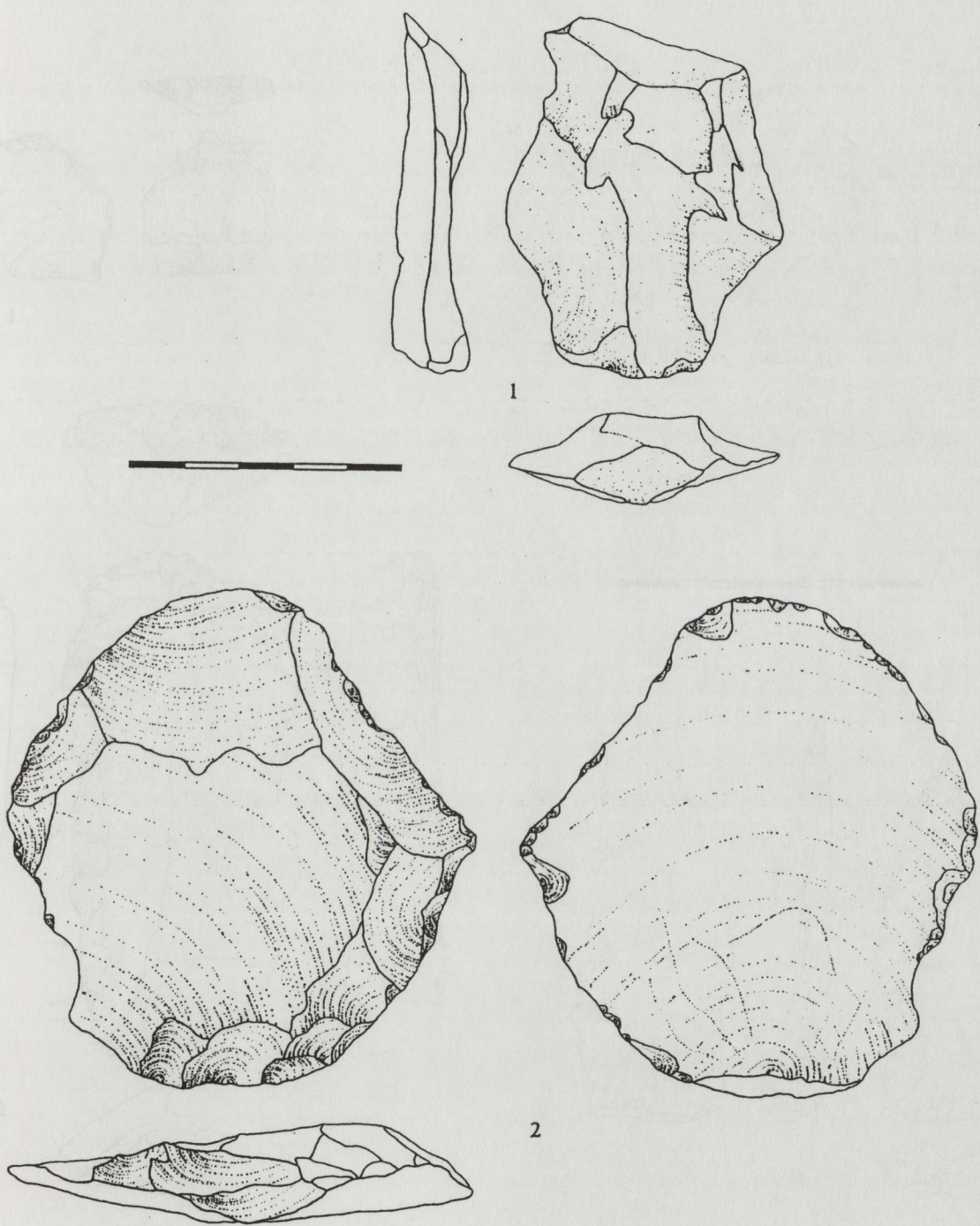


Fig. 7. Khonako IV: 2 Levalloisabschläge.
Fig. 7. Khonako IV: Levallois flakes.

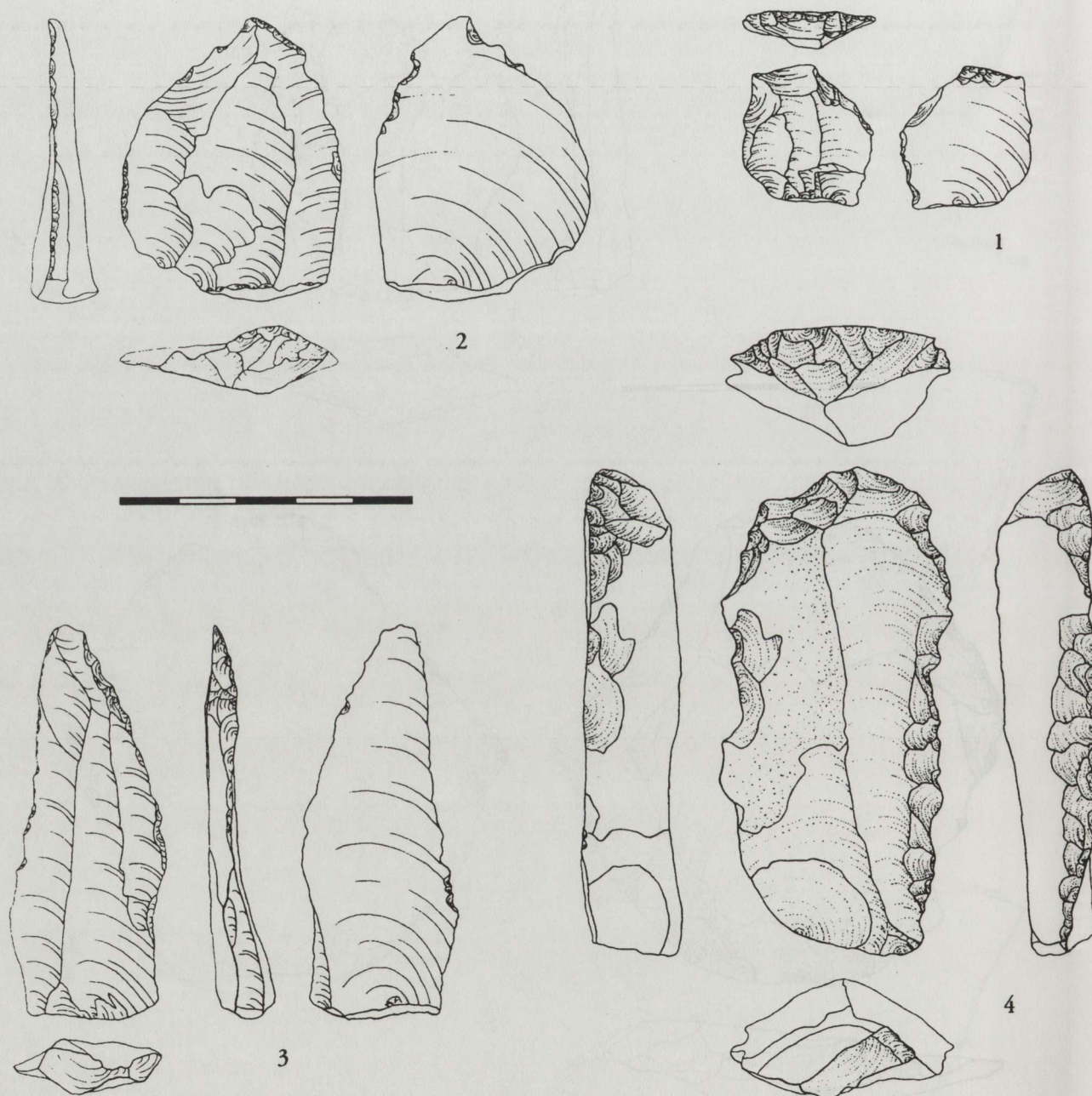


Fig. 8. Khudzhi: 1: Raclette, 2: Bohrer (bec), 3: rückenretuschierte Spitze, 4: Kielkratzer (grattoir à museau).
 Fig. 8. Khudzhi: 1: raclette, 2: borer, 3: retouched backed blade, 4: nosed endscraper.

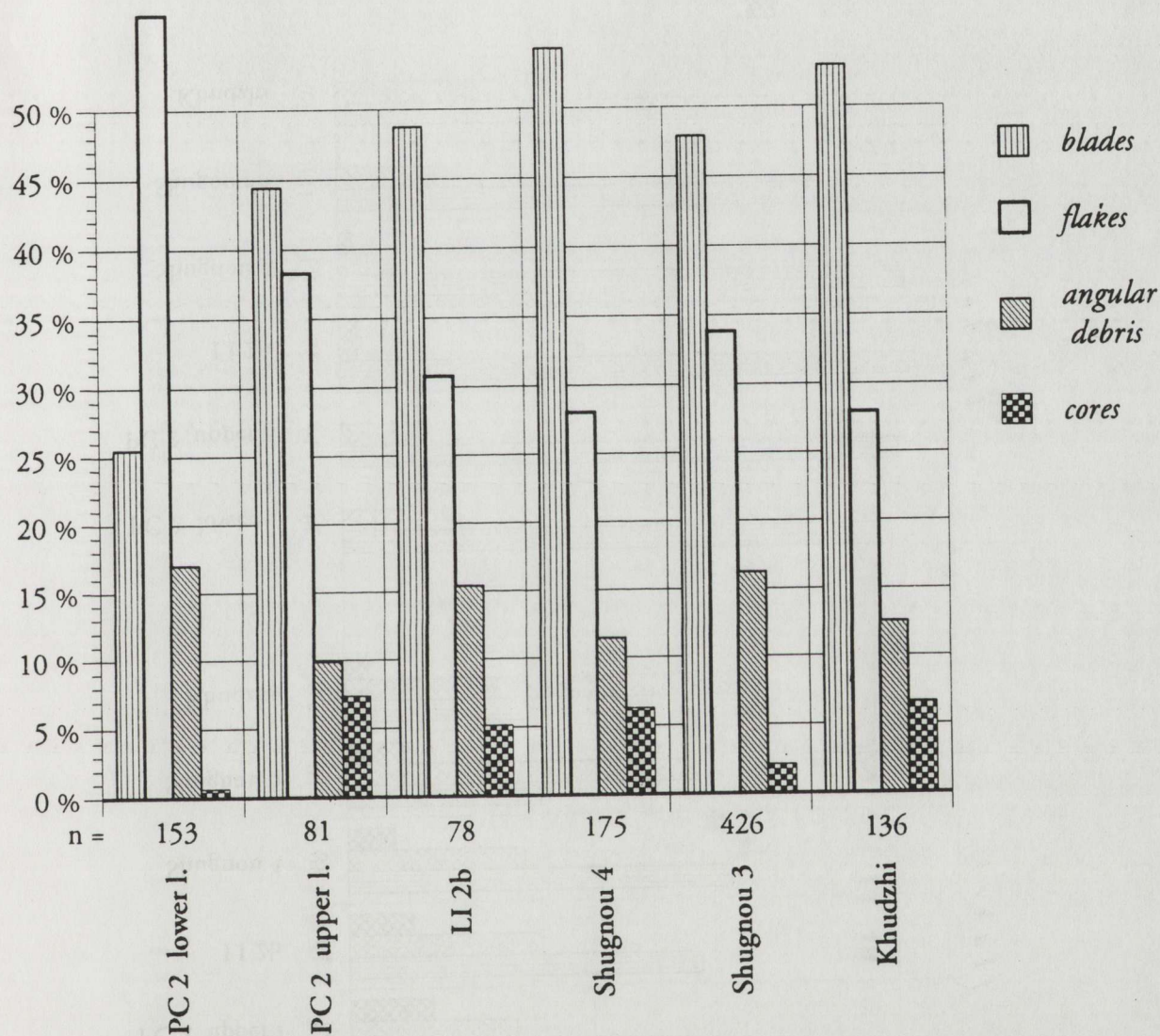


Fig. 9. Grundformproduktion: Khanako III PC 2 untere Schichten ($z < 49,5$ m), PC 2 obere Schichten ($z \geq 49,5$ m), Khanako III LI 2b, Shugnou 4 und 3 und Khudzhi.

Fig. 9. Blank production: Khanako III PC 2 lower levels ($z < 49,5$ m), PC 2 upper levels ($z \geq 49,5$ m), Khanako III LI 2b, Shugnou 4 und 3 und Khudzhi.

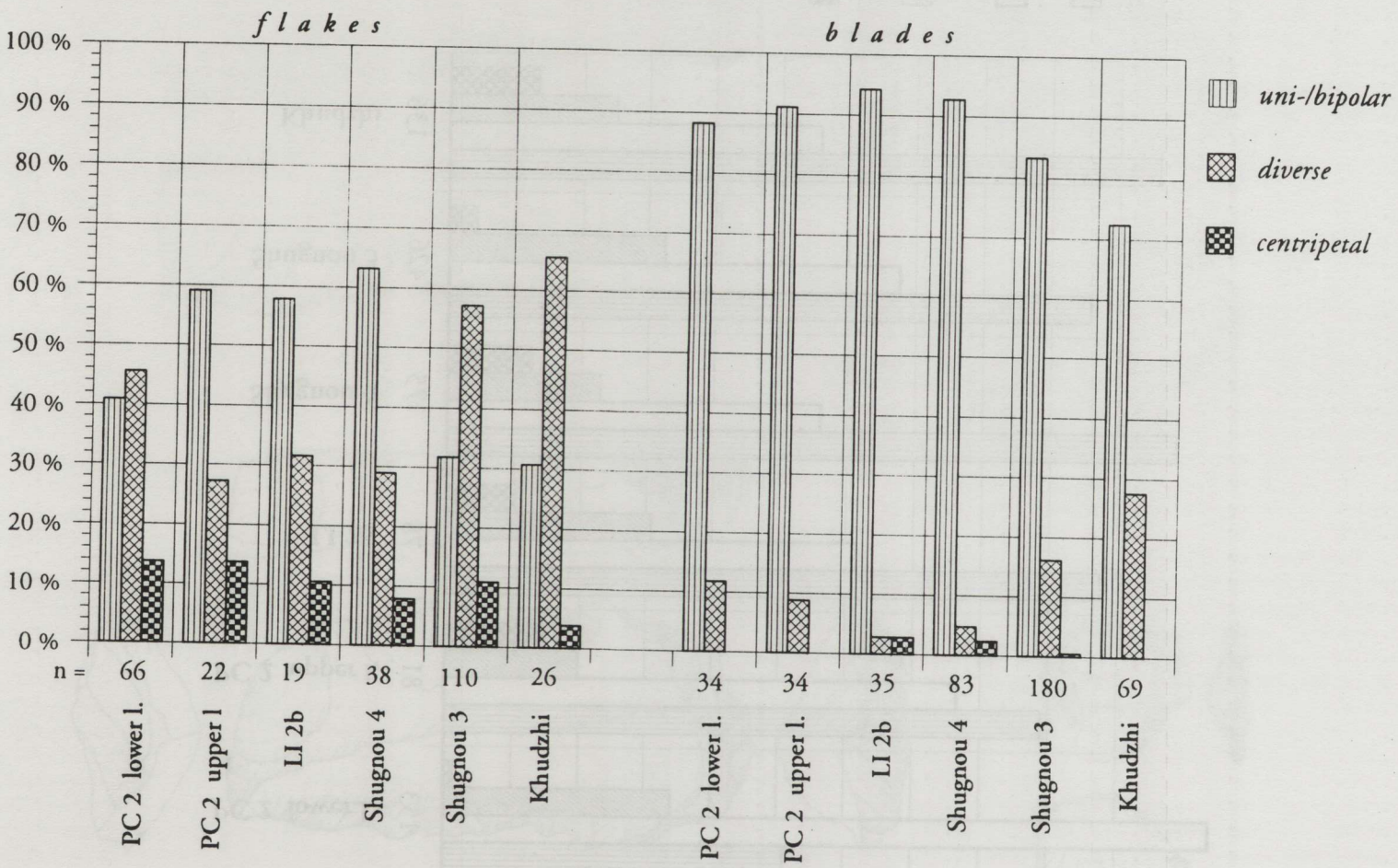


Fig. 10. Richtung dorsaler Negative: Khanako III PC 2 untere Schichten ($z: < 49,5$ m), PC 2 obere Schichten ($z: \geq 49,5$ m), Khanako III LI 2b, Shugnou 4 und 3 und Khudzhi.

Fig. 10. Direction of dorsal scars: Khanako III PC 2 lower levels ($z: < 49,5$ m), PC 2 upper levels ($z: \geq 49,5$ m), Khanako III LI 2b, Shugnou 4 and 3 and Khudzhi.

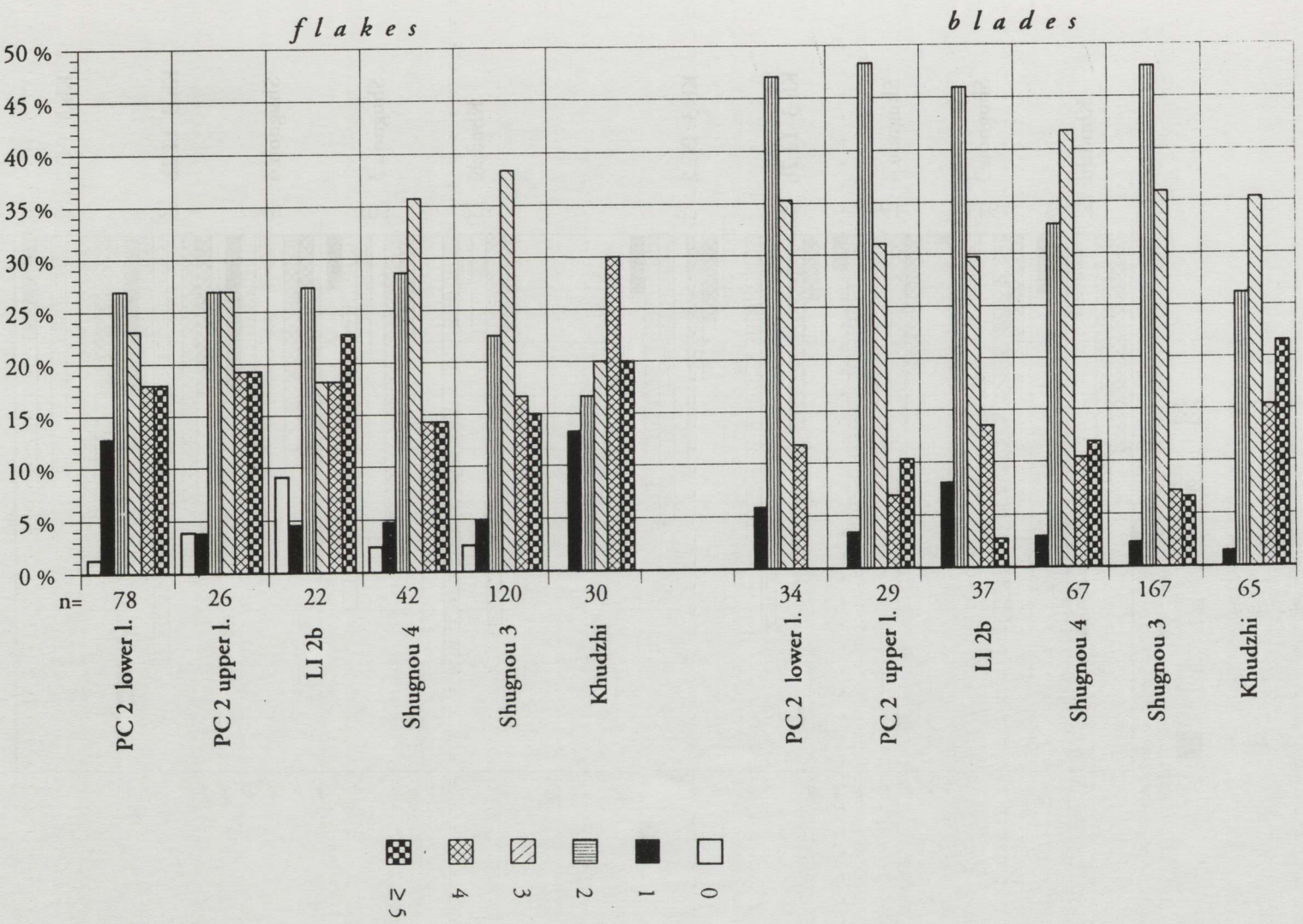


Fig. 11. Anzahl dorsaler Negative: Khanako III PC 2 untere Schichten ($z: < 49,5$ m), PC 2 obere Schichten ($z: \geq 49,5$ m), Khanako III LI 2b, Shugnou 4 und 3 und Khudzhi.

Fig. 11. Number of dorsal scars: Khanako III PC 2 lower levels ($z: < 49,5$ m), PC 2 upper levels ($z: \geq 49,5$ m), Khanako III LI 2b, Shugnou 4 and 3 and Khudzhi.

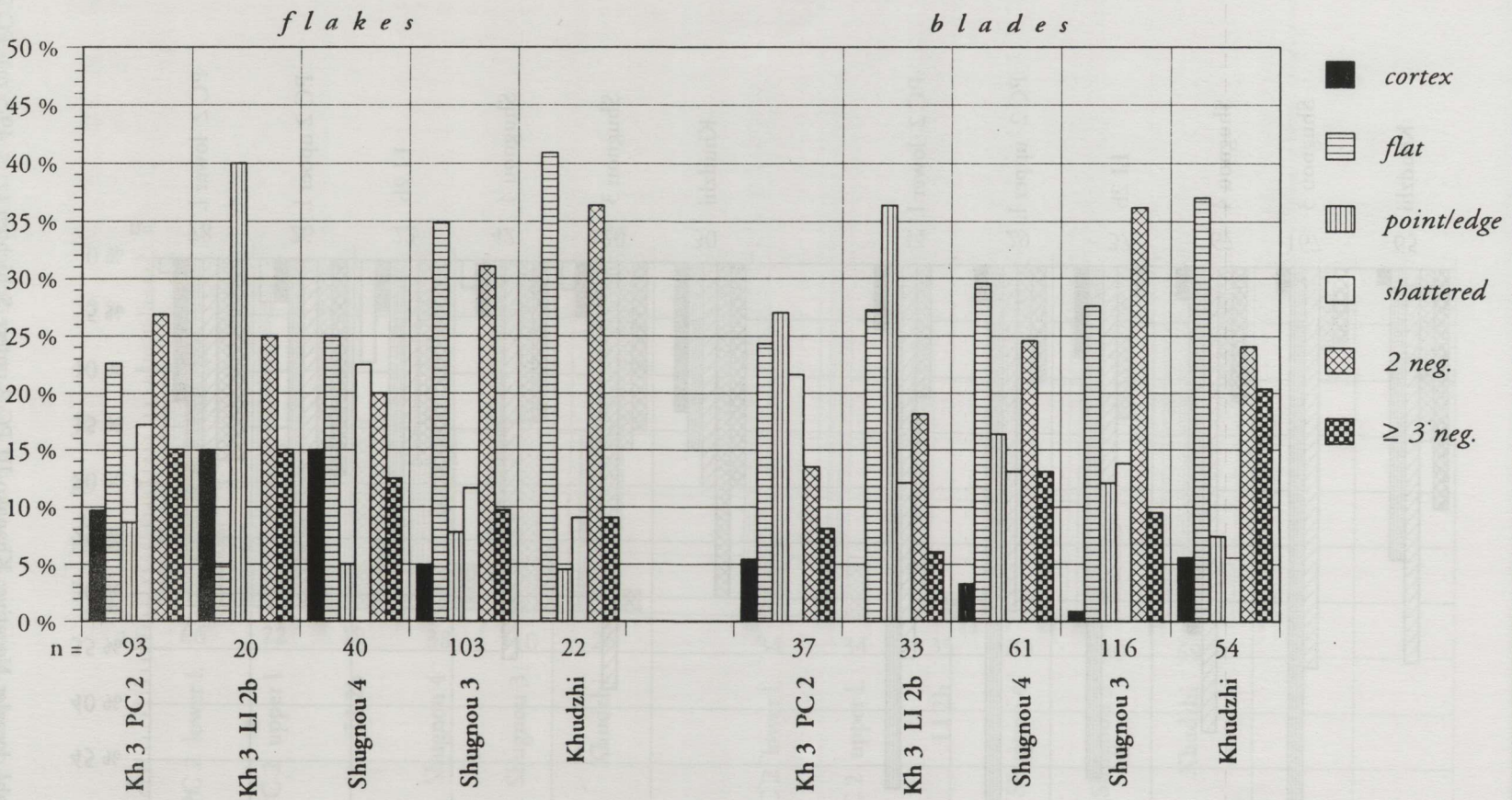


Fig. 12. Morphologie der Schlagflächenreste: Khanako III PC 2, Khanako III LI 2b, Shugnou 4, Shugnou 3 und Khudzhi.
Fig. 12. Platform morphology: Khanako III PC 2, Khanako III LI 2b, Shugnou 4, Shugnou 3 and Khudzhi.

<i>sites:</i>	<i>Kh. 3 PC 2</i>	<i>Kh. 3 LI 2b</i>	<i>Shugnou 4</i>	<i>Shugnou 3</i>	<i>Shugnou 2</i>	<i>Khudzhi</i>
blade measurements:						
width of blades (mm)	24	21	24	22	20	28
width x thickness of blades (mm)	216	177	191	158	159	270
str. Platform width x thickness (mm)	117	94	131	121	85	167
% of str. Plf. (width x thickn.) in proportion to width x thickn. of blades	51	52	58	59	44	63

Fig. 13. Mittelwerte von Klingenmaßen der Inventare: Khanako III PC 2, Khanako III LI 2b, Shugnou 4, Shugnou 3, Shugnou 2 und Khudzhi.

Fig. 13. Average values of blade measurements of the following inventories: Khanako III PC 2, Khanako III LI 2b, Shugnou 4, Shugnou 3, Shugnou 2 und Khudzhi.

blade and flake features:	<i>Kh. 3 PC 2</i>	<i>Kh. 3 PC 2 lower layers</i>	<i>Kh. 3 PC 2 upper layers</i>	<i>Kh. 3 LI 2b</i>	<i>Shugnou 4</i>	<i>Shugnou 3</i>	<i>Khudzhi</i>
blades in proportion to flakes	0,6	0,5	1,2	1,6	1,9	1,5	1,9
complete blades: length in proportion to width	2,3	--	--	2,3	2,7	2,3	2,3
blades: direction of dorsal negatives uni-/bipolar in proportion to diverse/centripetal	9	8	10	17	13	5	3
blades: number of dorsal negatives ≤ 2 in proportion to ≥ 3	1,1	1,1	1,1	1,2	0,6	1,0	0,4
blades: striking platform flat + point/edge in proportion to ≥ 3 negatives	1,4	--	--	10,5	3,5	4,2	2,2
flakes: direction of dorsal negatives uni-/bipolar in proportion to diverse/centripetal	0,8	0,7	1,4	1,4	1,7	0,5	0,4
flakes: number of dorsal negatives ≤ 3 in proportion to ≥ 4	1,7	1,8	1,6	1,4	2,5	2,2	1,0
flakes: striking platform flat + point/edge in proportion to ≥ 3 negatives	2,1	--	--	3,0	2,4	4,4	5,0

Fig. 14. Mittelwerte "progressiver" Merkmale im Verhältnis zu "archaischen" der Inventare Khonako III PC 2, (Khanako III PC 2 untere Schichten, PC 2 obere Schichten), Khanako III LI 2b, Shugnou 4 und 3 und Khudzhi.

Fig. 14. Average values of "progressive" features in ratio to "archaic" features of the following inventories: Khonako III PC 2, (Khanako III PC 2 lower levels, PC 2 upper levels), Khanako III LI 2b, Shugnou 4 and 3 and Khudzhi.