

Why so many different stones? The Late (Upper) Palaeolithic record of Sindh reconsidered

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*This paper is dedicated to the memory of Professor Abdul Rauf Khan,
of the Department of Geography, Karachi University,
for his invaluable contribution to the prehistory of Sindh*

Keywords

Pakistan, Sindh, Late (Upper) Palaeolithic, Chipped stone assemblages, Lithic workshops, Raw material sources

Abstract

The research carried out in Sindh during the last forty years, and the study of the chipped stone assemblages stored in Karachi University collections, show that Late (Upper) Palaeolithic complexes are known from at least five regions of Sindh. Most sites are located close to good quality raw material outcrops and freshwater sources. Their precise chronology is often difficult to define because they consist mainly of surface lithic scatters or workshops from which datable material is missing. The chipped stone industries of the Late (Upper) Palaeolithic of Sindh are easy to distinguish from those of the Middle Palaeolithic and Mesolithic periods because of their technological characteristics. The assemblages from the southernmost part of Lower Sindh are represented by typical implements, among which are curved backed points retouched from blade-like flakes that are known also from other parts of the Indian Subcontinent. Lithic workshops are very common in the Rohri, Ongar and Daphro Hills.

1. Introduction

The scope of this paper is to describe and define the main characteristics of the Late (Upper) Palaeolithic² of Sindh, a topic scarcely taken into consideration by most archaeologists who work in the Subcontinent. The reason might be partly due to the impressive remains of the Bronze Age Indus Civilization, which attracted many scholars since their early discovery (Childe, 1934; Lahiri, 2000; 2005), and the difficulties that archaeologists have to face to carry out research in the region.

Before the mid 1970s, Palaeolithic assemblages were reported very rarely from Pakistan (e.g. Krishnaswamy, 1947; Gordon, 1958; Khatri, 1962). During the second half of the 1970s B. Allchin (1976) and A.R. Khan (1979a) published the first Palaeolithic finds of Sindh. In their papers they described the main characteristics of the Late (Upper) Palaeolithic assemblages in very different

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² In this paper the term Late (Upper) Palaeolithic is used. It combines the terminology employed in the Indian Subcontinent (Upper Palaeolithic) with that used in Europe (Late Palaeolithic).

ways. B. Allchin pointed out the uniqueness of the Rohri Hills flint workshops (Allchin, 1976: 479) whose assemblages were “*based upon the manufacture of parallel-sided blades from unidirectional cores*” (Allchin *et al.*, 1978: 320), whilst A.R. Khan emphasized the occurrence of a well-defined type of point, “*a knife like tool, with strongly curved and steeply blunted back and very sharp and more or less straight cutting edge*” that he considered the most characteristic implement of the lithic complexes he discovered around Karachi (Khan, 1979a: 13). In the same paper, this author wrote that Palaeolithic sites are badly preserved in the area because “*they have been eroded so deeply that the entire loose material and soil from their top has been removed*” (Khan, 1979a: 14).

The aforementioned papers were written some a decade after the discovery of Sanghao, a unique Late (Upper) Palaeolithic cave site that opens in the mountains of north-western Pakistan ca. 36 kms north-east of Mardan (Dani, 1964; Allchin, 1973; Ranere, 1982; Salim, 1986). In contrast, excavations at Riwat 55 (Soan Valley, Islamabad) were carried out in the early 1980s (Rendell *et al.*, 1989). Riwat 55 is generally considered to be the oldest Late (Upper) Palaeolithic site of Pakistan, TL-dated to ca. 45,000 BP (Rendell and Dennell, 1987).

Just a few years before interest in the Late (Upper) Palaeolithic period started to arise in India (Raju and Venkatasubbaia, 2002), thanks to the discovery of chipped stone industries of “*Upper Palaeolithic nature*” in Allahabad district (Murty, 1969: 84), and the description of a lithic assemblage from Reniguta (Sharma, 1982). Soon after they were followed by the first definition of the typological characteristics of the Indian Late (Upper) Palaeolithic complexes (Murty, 1970), and their stratigraphic position within the Palaeolithic sequence of the Indian Subcontinent (Mujumdar and Rajaguru, 1970: 97; for a history review see also Sosnowska, 2010: 98). Given the above premises, and also because of our bad knowledge of the Late (Upper) Palaeolithic of the entire Subcontinent (Chauhan and Patnaik, 2012: table 1), Pakistan in particular, it is not surprising that until a few years ago most western authors had paid little or no attention to India. This is clear for example when the problems related to the Middle-Upper Palaeolithic transition in Asia were discussed (Brantingham *et al.*, 2004; Kuhn *et al.*, 2004; Derevianko, 2010; 2011a; 2011b).

Other authors, reassessing a model firstly introduced already in the 1960s (Bulbeck, 2007: 315) suggested a route followed by the first modern humans all along the north Arabian Sea coast of Makran and Las Bela (Field *et al.*, 2007; Blinkhorn and Petraglia, 2014), despite 1) the absence of any material culture remains of this period along the entire coast of Balochistan (Snead, 1966; 1969; Besenval and Sanlaville, 1990) and most of India (Petraglia and Boivin, 2014: 330), 2) any radiocarbon-dated Late (Upper) Palaeolithic assemblage prior to slightly earlier than 40,000 BP all over the Indian Subcontinent (Mishra *et al.*, 2013), and 3) new controversial genetic (Gunz *et al.*, 2009; Beyin, 2011: 9; Fregel *et al.*, 2015) and also fossil evidence (Athreya, 2010; Rightmire,

2015). Other authors studied the problem related to the DNA types in Africa and India (Forster, 2004: 260), others again proposed alternative routes along which *H. sapiens* moved to reach southeast Asia (Henke and Hardt, 2011: Fig. 3.5; López *et al.*, 2015). However, the present archaeological and anthropological evidences hide a scenario more complex than that suggested just a few years ago (Glantz, 2010; Scerri *et al.*, 2014; Bolus, 2015).

2. The Late (Upper) Palaeolithic sites of Sindh

Archaeological sites that we can attribute to the Late (Upper) Palaeolithic have been discovered in five different regions of Sindh. They are: 1) the territory around Karachi, the Mulri Hills in particular, 2) Jhimpir (Thatta), 3) The Ongar and the Daphro Hills (Hyderabad), 4) Ranikot (Jamshoro) and 5) The Rohri Hills (Sukkur-Khairpur) (Fig. 1). Though none of the sites ever yielded any organic datable material, they have been attributed to the Late (Upper) Palaeolithic because of the techno-typological characteristics of the chipped stone assemblages.

2.1. The territory around Karachi and the Mulri Hills

The geomorphology and evolution of the Karachi basin have been studied in detail by Professor A.R. Khan during the 1970s. Thanks to the geoarchaeological surveys carried out in those years (Khan, 1979b; 1979c) he noticed that “*the coastal area near Karachi reveals a series of raised beaches and marine terraces*” (Khan, 1979a: 19). The highest series of terraces ca. 50 m high, covered with windblown sand, yielded evidence of both Late (Upper) Palaeolithic and Mesolithic sites.

Unfortunately A.R. Khan left to us only summarily descriptions of the Late (Upper) Palaeolithic and Mesolithic sites he found in the area (Khan, 1979a: 11). The same author discovered many lithic scatters of the same periods in the Hab River Valley (Mendiari) (Fig. 3, top), and along the banks of the watercourses that flow into the Malir River and the Indus delta, among which is Ran Pethani. Other chipped stone assemblages were discovered around Rehri, a village facing the Khadiro Creek, and the Mulri Hills, at the eastern outskirts of Karachi (Fig. 1, n. 1).

The typological variability of the tool types, the limited information regarding the way the sites were discovered, mapped and sampled, their approximate location and extension, make the attribution of each complex to the Late (Upper) Palaeolithic or to the Mesolithic sometimes problematic. This is why a techno-typological and dimensional analysis of the tool classes, backed points, and geometrics, lunates in particular, is at present underway to frame the different sites into a reliable sequence.

The Mulri Hills are located in front of Karachi University Campus, just south of the University Road. They rise between two important river courses: the Layari (Lyari), in the north, and the Malir, in the south (Fig. 2; Fig. 3, bottom). They consist of variegated beds developed on the Miocene Upper Gaj sedimentary formation that reaches a maximum height of ca. 70 m (Zaidi *et al.*, 1979). During the 1970s Professor A.R. Khan discovered many Palaeolithic and Mesolithic sites mainly on the upper slopes of the hills. Thanks to his unpublished field notes, and the distribution maps he left to us, we know that some sites were located close to two main faults, along which several springs gushed. Small, seasonal streams originate from them. They flow southward into the Malir River that they join ca. 10 km from the present coastline (Biagi, 2003-2004).

One of the Mulri Hills sites, MH-16, yielded a characteristic Late (Upper) Palaeolithic assemblage. Late (Upper) Palaeolithic and Mesolithic industries were recovered also from other Mulri Hills sites, MH-12 (Biagi, 2003-2004: Fig. 11), MH-14 (Fig. 7, nn. 37-54), MH-14a (Fig. 7, nn. 27-36), MH-15a, MH-18 (Biagi, 2003-2004: Fig. 12, nn. 6-13) and MH-22 (Fig. 7, nn. 10-26).

MH-16 is the only site from which A.R. Khan collected a homogeneous Late (Upper) Palaeolithic assemblage. It consists of 425 artefacts obtained from flint pebbles whose source is still unknown. The assemblage is represented by 90 cores (37 prismatic, 35 subconical, 10 polyhedral, and 8 fragments: Fig. 4; Fig. 6, nn. 15, 16), 147 complete, unretouched artefacts that were measured to develop the diagrams of Fig. 8: MH16, 103 unretouched fragments, among which are 45 blades and bladelets, 62 tools, 3 burin spalls, 14 crested blades and flakes and 6 microburins (Fig. 5, nn. 41-47; Fig. 6, nn. 10-12). The tools consist of 14 burins (6 simple, 1 on a fracture, 7 on retouch: Fig. 5, nn. 1-8; Fig. 6, nn. 13, 14), 3 end scrapers (1 long, 1 short, 1 fragment: Fig. 5, nn. 9, 10), 4 truncations (Fig. 5, n. 11), 1 probable triangle (Fig. 5, n. 33), 19 curved backed points (12 total, 7 partial: Fig. 5, nn. 12-17, 19-28, 30, 35; Fig. 6, nn. 2-6, 9), 5 curved points on thick, triangular flakes (Fig. 5, nn. 29, 31, 32), 1 thick backed blade (Fig. 5, n. 18; Fig. 6, n. 1), 6 backed bladelets (Fig. 5, nn. 34, 36, 40-44; Fig. 6, n. 7), 1 backed bladelet and truncation (Fig. 5, n. 39), 3 backed points (Fig. 5, nn. 30, 37, 38; Fig. 6, n. 8), 4 side scrapers, 1 flakelet with abrupt retouch. They are knapped mainly from bladelets or bladelet-like flakelets of normolithic size (2.5 to 5 cm), but also from blades and blade-like flakes (5 to 10 cm). The only microlithic tool (1.25 to 2.5 cm) is the above-mentioned triangle fragment³.

Other sites in the area that yielded Late (Upper) Palaeolithic lithic assemblages are Mendiari (Fig. 1, n. 2), Rehri 4a (Fig. 1, n. 3), Deh Konkar (Fig. 1, n. 4), and Ran Pethani 9 (Fig. 1, n. 5; fig.

³ The blank dimensions reported in this paper follow common European nomenclature. They are: hyper-microbladelets and hyper-microflakelets (<1.25 cm), microbladelets and microflakelets (1.25-2.5 cm), bladelets and flakelets (2.5-5.0 cm), blades and flakes (5.0-10.0 cm), macroblades and macroflakes (>10.0 cm).

5, n. 1). Characteristic curved points were collected also from Langeji, Kadeji and Jorando gorges, Kankar Nala, Khar Nai and Bakran.

Mendiari is located in the Hab River Valley, just northwest of Sona Pass (Fig. 1, n. 2; Fig. 3, top). The area is rich in springs. One site yielded characteristic Late (Upper) Palaeolithic tools. The assemblage consists of 40 artefacts, among which are 15 cores (3 subconical, 5 prismatic, 6 polyhedral, and 1 fragment), 1 end scraper, 10 curved backed points (3 total, 7 partial), 1 large lunate, 2 side scrapers, 1 retouched blade, and 15 unretouched artefacts (Fig. 7, nn. 2-9).

Rehri, along the coast of the Arabian Sea east of Karachi, is also important. The Late (Upper) Palaeolithic site Rehri 4a was discovered inside the same depression where the present village is located. It yielded only 12 tools all coated with a white patina. They consist of 1 simple burin, 8 curved backed points, 1 side scraper, 1 fragment of a retouched blade and 1 unretouched flakelet (Biagi, 2003-2004: Fig. 13, nn. 23-28). They were collected *in situ* from a red clayey soil associated with a few mammal bones and wild ox teeth, which were unfortunately impossible to radiocarbon date because of the absence of collagen (Biagi, 2008a: 8).

2.2. Jhimpir

W.T. Blanford was the first to survey the area around Jhimpir. From the area close to the railway station he reported the presence of cherty and flinty limestone rocks (Blanford, 1880: 153). The 2010 surveys were carried out along the terraces that elongate south-west of the small town. They led to the discovery of many sites (fig. 1, n. 6), most of which were attributed to the Late (Upper) Palaeolithic period (Biagi, 2011). The sites consist of flint scatters lying on the surface of the weathered Kirthar limestone terraces. Their distribution is delimited, in the north, by a freshwater spring, in the south, by a long flint outcrop, in the east by a depression at present filled with the artificial Kalri Lake (Fig. 9, top), where Sonehri and Kinjhar basins were originally located (Khan, 1979a: 16; see also Tremenheere, 1867: map).

Sites JHP-1, JHP-7 and JHP-9 yielded a few microlithic lunates (Biagi, 2011: Figg. 5-7). The presence of typical impact fractures shows that two lunates from JHP-1 were used for tipping arrows or spearheads (fig. 10, nn. 14, 15). The length/width and length/thickness diagrams of Fig. 8: JHP-13, have been developed measuring 60 complete, unretouched artefacts. The chipped stone artefacts from Jhimpir are obtained from local, light grey nodular flint (2.5Y7/1-7/2), whose outcrops are located south and southwest of the main cluster of Late (Upper) Palaeolithic sites. They were labelled JHP-21 and JHP-28 (Biagi and Nisbet, 2010). The tools are often coated with a thin dark greyish brown (2.5Y3/2) to dark brown patina (7.5Y3/3) caused by exposure and weathering.

A brief survey carried out in January 2011 led to the discovery of one more good quality flint source (JHP-30: Fig. 9, bottom) ca. 5-6 kms west-south west of JHP-21. Another small Late (Upper) Palaeolithic site scattered over a surface of ca. 20 sqm, was found some 1 km farther west, at 24°58'53.9N - 67°57'25.0E (JHP-W1) (Fig. 1, n. 7; Fig. 11).

2.3. Ongar and Daphro Hills

Ongar is a limestone terrace located just opposite of the homonymous village, west of the national road that from Kotri takes to Jhirak. The archaeological site was discovered in 1959 (Fairservis, 1975: 76). It was revisited by B. Allchin in the 1970s, who called it Milestone 101 (Allchin, 1976; Allchin *et al.*, 1978: 295-304). W.T. Blanford (1880: 148-149) described the Ongar Hill (Aongar) as a Kirthar terrace “*with much flint derived from the limestone*” all around it.

In the 1970s B. Allchin conducted a preliminary survey of the easternmost Ongar hill. On the top of the horseshoe terrace she discovered “*factory debris of Lower, Middle and Upper Palaeolithic and perhaps also Mesolithic and pre-Harappan periods ... in great profusion*” (Allchin *et al.*, 1978: 296). Professor A.R. Khan resumed the research in the area 1972-1973. He was the first to report the presence of typical Levallois tools in Lower Sindh (Khan, 1979d: 80).

The surveys at Ongar were resumed again between 2005 and 2008 (Fig. 1, n. 8) (Biagi, 2005; Biagi and Franco, 2008). The surveys carried out in those years showed that the entire hilltop had already been devastated by at least 50 years of industrial exploitation (Biagi, 2007a; Biagi and Nisbet, 2011). However, a few Late (Upper) Palaeolithic workshops were found still intact (Fig. 12, top). They consist of heaps of debitage and debris products among which are subconical and prismatic cores with bladelet and bladelet-like flakelet detachment, bifacial picks (Figs. 13 and 14) and rare burins. A few workshops of this period were recorded also from the neighbouring hill called Daphro (Fig. 12, bottom).

2.4. Ranikot Fort

The site of Ranikot (RNK-1: Fig. 1, n. 9) was discovered in January 2010, some 720 m north-west of Sann Gate (Fig. 15, top). The site is located on a Kirthar limestone terrace (Blanford, 1867: 15), ca 165 m high, delimited by the deep incision of a seasonal stream that flows into the Nai Rann (or Sann) River (Blanford, 1880: 135). The central point of the lithic scatter, which is distributed over ca. 500 sqm, is 25°53'11.190N - 67°55'29.486E (Fig. 15, bottom).

The chipped stone assemblage of RNK-1 is obtained from small pebbles of local flint (Blanford, 1880: 135). All the artefacts are weathered, coated with an olive yellow patina (2.5Y6/6) with small, lighter spots. Some specimens show a few, small *concassage* detachments, due to either a

slight movement from their original position, or trampling. The terrace did not yield any evidence of pockets of the original Pleistocene soil that contained the tools.

The industry consists of 19 cores (Fig. 16, nn. 8-23), 121 unretouched artefacts (58 complete, from which the diagrams of fig. 6: RNK-1 were developed, 63 broken), 4 burins (Fig. 16, nn. 1-4), 1 crested blade, 12 core rejuvenations (Fig. 16, n. 6) and 1 splintered piece (Fig. 16, n. 5). The cores are small, exhausted, subconical (10) or prismatic (9) with bladelet or bladelet-like flakelet detachments (Fig. 16, nn. 8-23) along one face. The platforms are flat or slightly concave, prepared by one or more removals. A few are thin, others show traces of cortex.

All burins are from flakelets. One is simple with one lateral blow (Fig. 16, n. 1), 1 simple with two opposed, lateral blows (Fig. 16, n. 2), 1 simple with two transversal blows (Fig. 16, n. 3), 1 on retouch with two parallel, lateral blows (Fig. 16, n. 4). The splintered piece is on a bladelet.

2.5. The Rohri Hills

W.T. Blanford was the first to write a geographical and geological description of the Rohri Hills (Blanford, 1880: 101-107) that he attributed to the Brahui limestone formation (Blanford, 1877). He was also the first to report the presence of flint artefacts at the northern edge of the hills near Sukkur and Rohri (Blanford, 1880: 20).

Some 70 years after H. De Terra and T.T. Paterson collected a few lithic implements from the top of a few small terraces at Sukkur (De Terra and Paterson, 1939: 330-336) (Fig. 1, n. 11), which they attributed to their Group A (De Terra and Paterson, 1939: Plate XLV). B. Allchin visited the area in the mid 1970s. She discovered a few Late (Upper) Palaeolithic working floors at Chancha Baloch, ca. 4 kms from Kot Diji, and Unnar (or Nawab Punjabi) (Fig. 1, n. 12) (Allchin, 1976: 479; Allchin *et al.*, 1978: 278-288). The Italian Archaeological Mission resumed the research in 1986 within the framework of the Italo-Pakistani "Joint Rohri Hills Project". Its scope was to verify the presence of prehistoric sites on the hills, map them and try to establish a first chronological sequence (Biagi and Cremaschi, 1988).

During the 1990s it became increasingly clear that all the limestone terraces east of the shrine of Shadee Shaheed were spotted with hundreds of Late (Upper) Palaeolithic workshops (Biagi *et al.*, 1995: 23). The tools were often displaced around oval man-made depressions later filled with windblown Thar Desert sand (Fig. 1, n. 10). Two workshops discovered near the tomb of Ziārāt pir Shābān were excavated during those years (ZPS-2 and ZPS-4: Fig. 17) (Biagi *et al.*, 1998-2000; Biagi, 2008a). According to the micro-morphological analysis of the soil of site ZPS-2 (Biagi *et al.*, 1998-2000: 116), it formed during an “*arid climatic phase that characterized the second part of the*

last glacial", most probably around the beginning of the Late (Upper) Palaeolithic period (Negrino and Kazi, 1996: 36).

3. Discussion

Most of the Late (Upper) Palaeolithic sites of Sindh are located close to good-quality flint outcrops. This is the case for Jhimpir, Ongar, the Rohri Hills and Ranikot. Workshops characterised by debitage products, debris and exhausted cores, were discovered on the Rohri, Ongar and Daphro Hills (Biagi and Starnini, 2008). The cores from these sites show similar techno-typological characteristics (they are often subconical, with one prepared platform, and blade-like flake detachments obtained by indirect percussion), though they are generally somewhat bigger than those from the sites discovered around Karachi and Ranikot (Fig. 18).

Many of the questions regarding the presence of an impressive number of Late (Upper) Palaeolithic workshops on the Rohri Hills are still waiting for an answer. They regard 1) the way the finished products were eventually distributed as well as their distribution radius, 2) the location of the base camps where knappers settled, 3) the number of people involved in the manufacture of the blanks, 4) the period during which knapping took place, and 5) the absence of characteristic retouched tools. Regarding the first question, so far we do not have any evidence for artefacts of this period made on the Rohri Hills workshops from both Sindh and neighbouring Rajasthan (Allchin *et al.*, 1978). This fact contrasts with that of the Thar Desert Mesolithic sites whose assemblages are made from Rohri Hills flint. Mesolithic assemblages are quite common in the desert, around salty basins, east of the caravan town of Thari (Biagi, 2003-2004; 2008b). Regarding the other questions, at present we do not have any trace of Late (Upper) Palaeolithic base camps in the study region, no idea of the number of people involved in the manufacture of blanks, and no absolute chronological scheme for the Late (Upper) Palaeolithic workshops, because of the absence of datable, organic material.

The situation in Lower Sindh is rather different. The chipped stone assemblages discovered around Karachi consist of characteristic tools, among which are different types of curved points obtained by direct or bipolar abrupt retouch. Burins are known from a few sites as are subconical and subcylindrical bladelet cores, while end scrapers are rare. Assemblages of this type have never been recovered west of the Hab River course, though they are well known from other regions of the Indian Subcontinent (Murty, 1969; 1970; 1979; Joshi, 1978). According to the available radiocarbon chronology, the first Late (Upper) Palaeolithic industries made their appearance in India around 40,000 BP (Mishra, 2013: 92).

As mentioned above, Professor A.R. Khan discovered many Late (Upper) Palaeolithic and Mesolithic sites during the surveys he conducted around Karachi in the 1970s. Lunates are the commonest geometric tools he retrieved. They are represented by several types among which are thick specimens, obtained by bipolar retouch, and thin types made by direct, abrupt retouch (Biagi, 2003-2004). According to their typology and size (length, width and thickness) they were retouched mostly from bladelets (2.5-5 cm long) or microbladelets (1.25-2.5 cm long). The occurrence of exhausted cores and debitage flakes show that they were manufactured on the spot.

A few microlithic lunates obtained by abrupt, direct retouch were recovered also from Jhimpir. The Jhimpir sites are most probably to be referred to the end of the Late (Upper) Palaeolithic. Also the chipped stone industry from Ranikot (RNK-1) should be attributed to the study period because of the typological characteristics of both cores and blanks, though this assemblage is rather different from all the other so far discovered in Sindh.

4. Conclusion

Sindh is a very important archaeological region of the Indian Subcontinent. It is located between the Iranian uplands, India and Central Asia, a territory in which not only different aspects interacted and developed during the Middle and Late (Upper) Palaeolithic (Ranov and Gupta, 1979; Glantz, 2010; Biagi and Starnini, 2014), but also Upper (Late) Palaeolithic traces of evidence are scarce (Glantz, 2010: 106). Moreover, according to some authors, it lies along one of the routes that the first modern humans moving out of Africa followed “going east” (Mellars, 2006; Mellars *et al.*, 2013; Petraglia and Boivin 2014), though other models and routes of dispersal have been suggested (Groucutt and Petraglia, 2014: Table 5:1)

However, many important problems are still to be solved concerning the Late (Upper) Palaeolithic period in Sindh. They regard 1) the south-easternmost spread of Neanderthal groups, and their related Levallois Mousterian assemblages (Blinkhorn *et al.*, 2015), 2) the southern and eastern limit reached by the Aurignacian and its related aspects (Otte, 2004; 2015; Otte and Kozłowski, 2007), 3) the origin of the Middle Palaeolithic “Nevasan” and the flake assemblages in the Indian Subcontinent and their chronology (Sankalia and Banerjee, 1958; Allchin, 1992), 4) the origin and chronology of the Late (Upper) Palaeolithic complexes characterised by curved backed points and burins that recur in Sindh and some parts of India (Murty, 1970: 126; Paddaya, 1970: 188), and 5) the distribution of the industries characterised by the systematic occurrence of microlithic lunates (Clarkson *et al.*, 2009)⁴, and their chronological and cultural variability. This

⁴ It is unfortunate that the authors did not provided us with the dimensional parameters employed to describe the geometric microliths.

point is very important, given that the evidence at present available from Sindh does not support the view recently suggested "*that modern humans entered India from the northwest along the coast circa 60 kya with distinctive microlithic technology*" (Clarkson, 2014: 82). In contrast it shows that the (lunate geometric) microlithic technology made its appearance quite late, around the end of the Pleistocene, and that it greatly differs from the preceding Late (Upper) Palaeolithic traditions (blade and Burin etc.), which in turn have nothing in common with the Levallois Mousterian Middle Palaeolithic one.

The first two points have already been discussed in a recent paper (Biagi and Starnini, 2014), whilst point 3 has never been taken into much consideration by most archaeologists, except for those from India (Mishra, 1999). The chronology of some Indian assemblages has been established thanks to the excavation of a few stratified, radiocarbon-dated sites, Patne for instance (Sali, 1989). Regarding point 5, we know that some types of microlithic lunates began to be manufactured around 13,000 BP, if not slightly before in some regions of the Indian Subcontinent (Clarkson *et al.*, 2009: Fig. 4 and Table 1). In Sindh, lunates are common to many Karachi sites. They are made by direct or bipolar abrupt retouch, without microburin technique. Their absence at MH-16, suggests that this site predates their introduction. In southern Sindh they continued to be produced at least until the earliest phases of the Mesolithic (Biagi, 2003-2004).

To sum up: our knowledge of the Late (Upper) Palaeolithic of Sindh is still very fragmentary and its chronology still very imprecise mainly because of the absence of both stratigraphic sequences and datable materials. The techno-typological and dimensional characteristics of the assemblages suggest that the Rohri Hills and Ongar workshops should be attributed to an early stage in the development of the Late (Upper) Palaeolithic period, before the introduction of blade-and-burin complexes. The latter were followed by industries characterised by lunate microliths, which continued to be made at least until the beginning of the Holocene. The manufacturing technology of the Rohri Hills and Ongar assemblages do not seem to derive from those of the Middle Palaeolithic flake industries that, in some regions of western Sindh, are characterised by typical Levallois Mousterian complexes (Biagi, 2007b; Biagi and Starnini, 2014).

Acknowledgements

The 2005-2010 surveys at Ongar, Daphro and Jhimpir were carried out in collaboration with the Institute of Sindhology, Sindh University (Jamshoro, PK). Many thanks are due to Mir Atta Mohammad Talpur, Mir Farooq Ahmed Talpur, Mir Ghulam Rasool Talpur and Mir Abdul Rehman Talpur, for all their help and assistance. Thanks are due also to the late Professor A.R. Khan (Department of Geography, Karachi University, PK), who allowed the author to study the collections from Ongar, the Mulri Hills, and other Karachi basin sites, to Dr. M. Spataro (British Museum, London, UK), for her help during the study of the above assemblages, Dr. C. Franco (Ca' Foscari University, Venice, I), who took part in the 2008 fieldwork season, Dr. R. Nisbet (Ca'

Foscari University of Venice, I) for his assistance during the 2009-2011 surveys at Jhimpir and Ranikot, and Dr. E. Starnini (Turin University, I) for her help during the surveys and excavations carried out by the Italian and Pakistani team of the "Joint Rohri Hills Project".

The research in Sindh was carried out thanks to the financial support of the Italian Ministry of Foreign Affairs (MAE) (Rome, I), the Prehistoric Society (London, UK), the National Geographic Society (Washington, USA), the Ca' Foscari University Archaeology Funds (Venice, I), the Ligabue Foundation (Venice, I), and the CeVeSCO (Ca' Foscari University, Venice, I).

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Captions

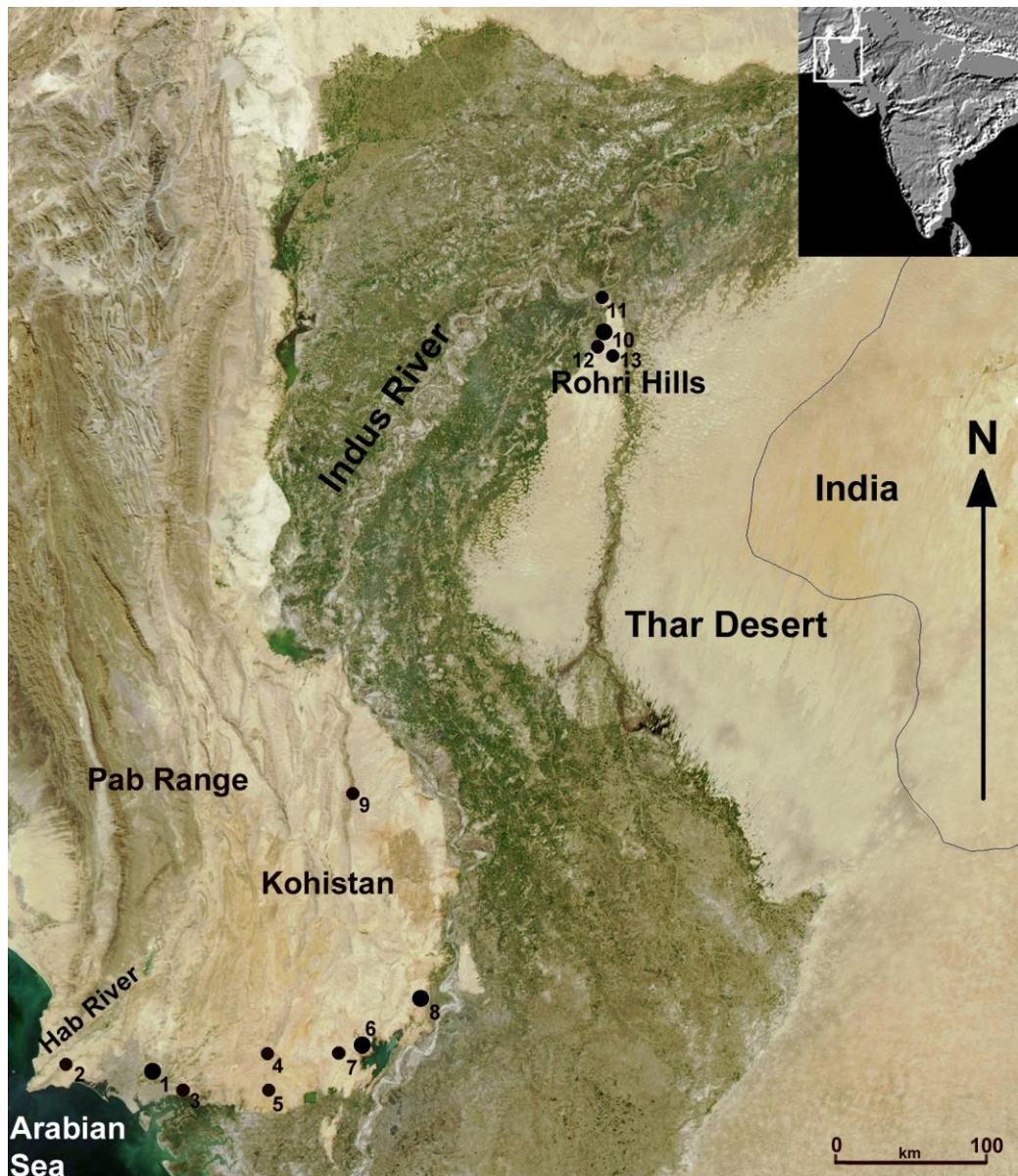


Fig. 1. Distribution map of the Late (Upper) Palaeolithic sites mentioned in the text: Mulri Hills (n. 1), Mendiari (n. 2), Rehri (n. 3), Deh Konkar (n. 4), Ran Pethani (n. 5), Jhimpir (n. 6), Jhimpir W1 (n. 7), Ongar and Daphro (n. 8), Ranikot (n. 9), Rohri Hills, Shadee Shaheed (n. 10), Sukkur (n. 11), Unnar (n. 12), Southernmost hills (n. 13). The larger dots indicate greater complexes (Drawing by P. Biagi).

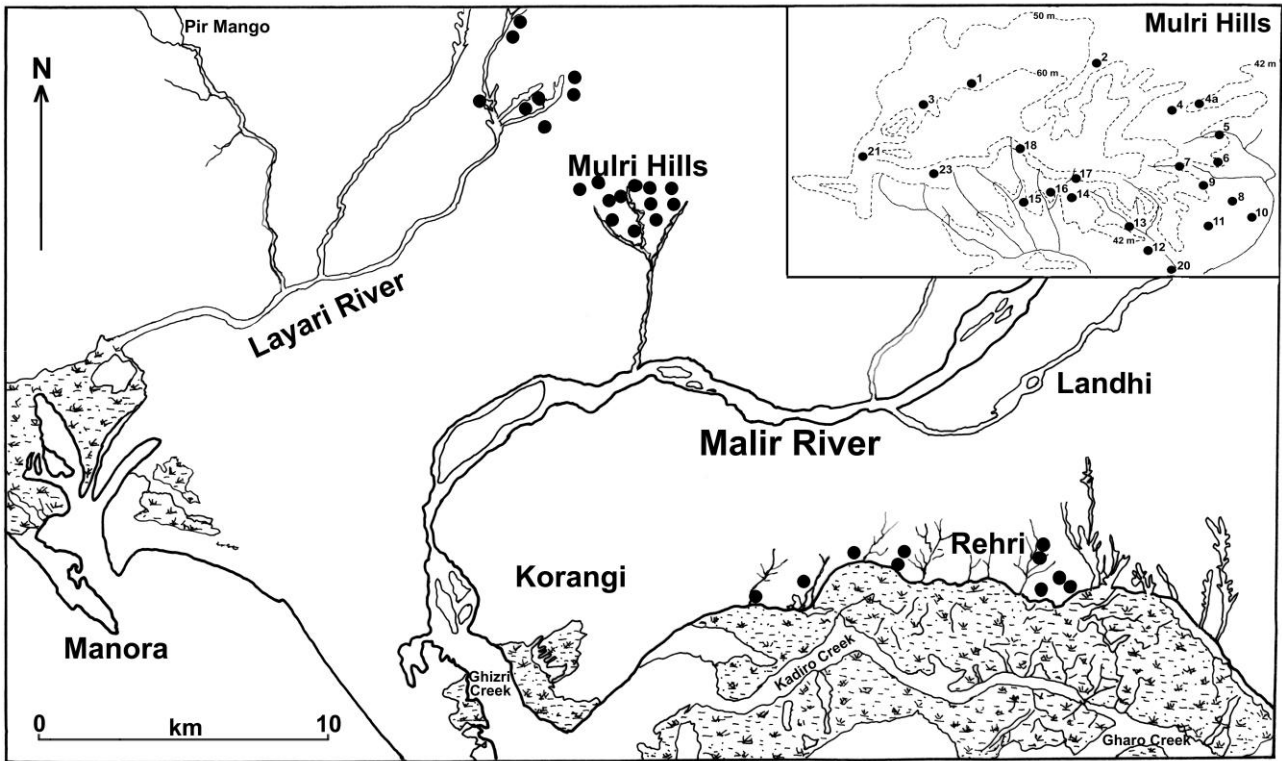


Fig. 2. Location of the Mulri Hills between the Layari and Malir Rivers (Karachi). The detailed distribution of the MH sites, according to A.R. Khan's field map, is shown in the upper right corner. Other sites along the Layari River and at Rehri are reported in the map (top); Prof. A.R. Khan looking for finds at one of the Rehri sites in February 2002 (bottom) (Drawing and photograph by P. Biagi).



Fig. 3. Location of site Mile 12 at Mendiari, along the eastern side of the Hab River Valley, in an area of springs as it was in January 2002 (dot: top); the Mulri Hills photographed from the north in February 2003 (bottom) (Photographs by P. Biagi).

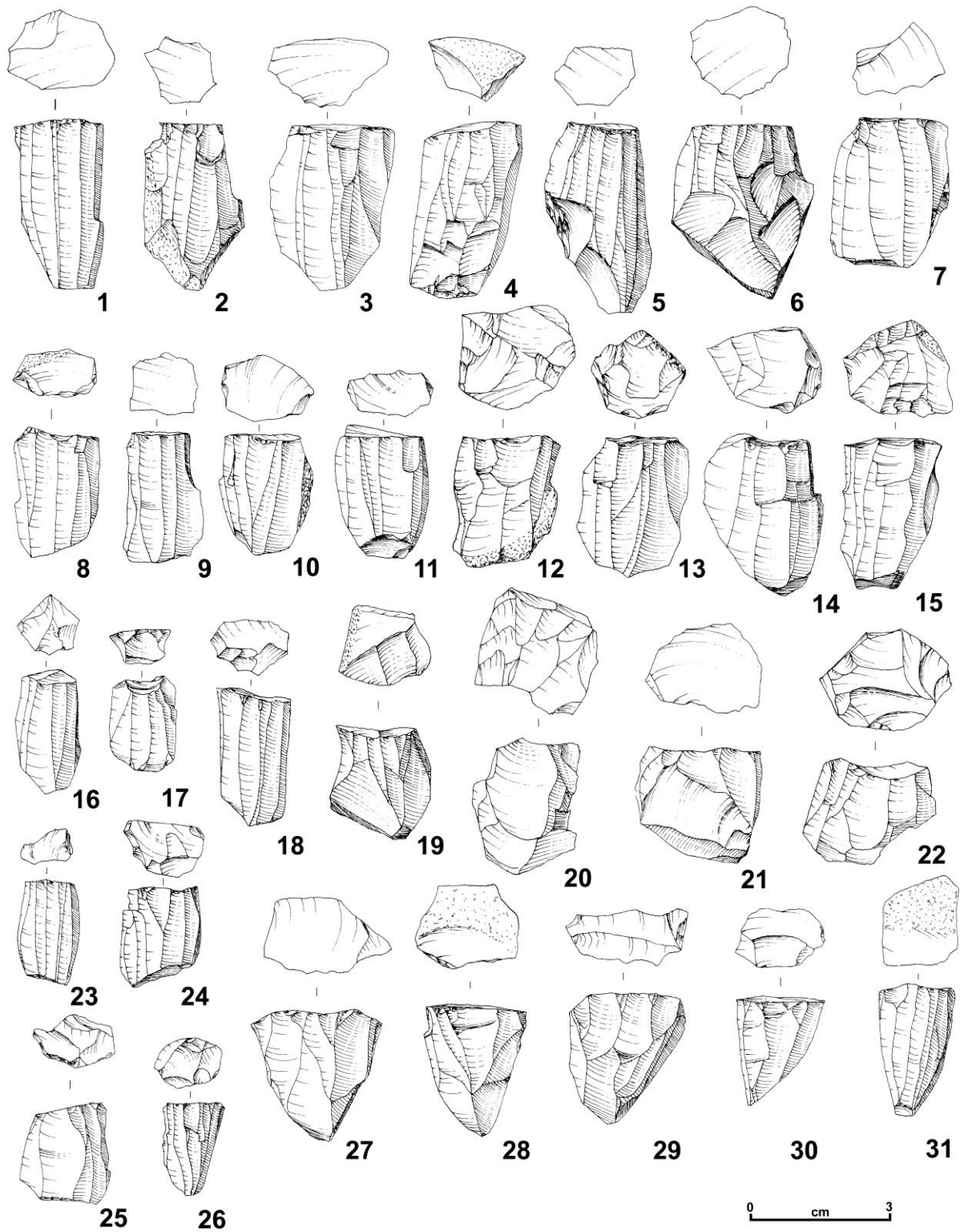


Fig. 4. Mulri Hills, site 16 (MH-16): Core types (Drawings by P. Biagi, inking by G. Almerigogna).

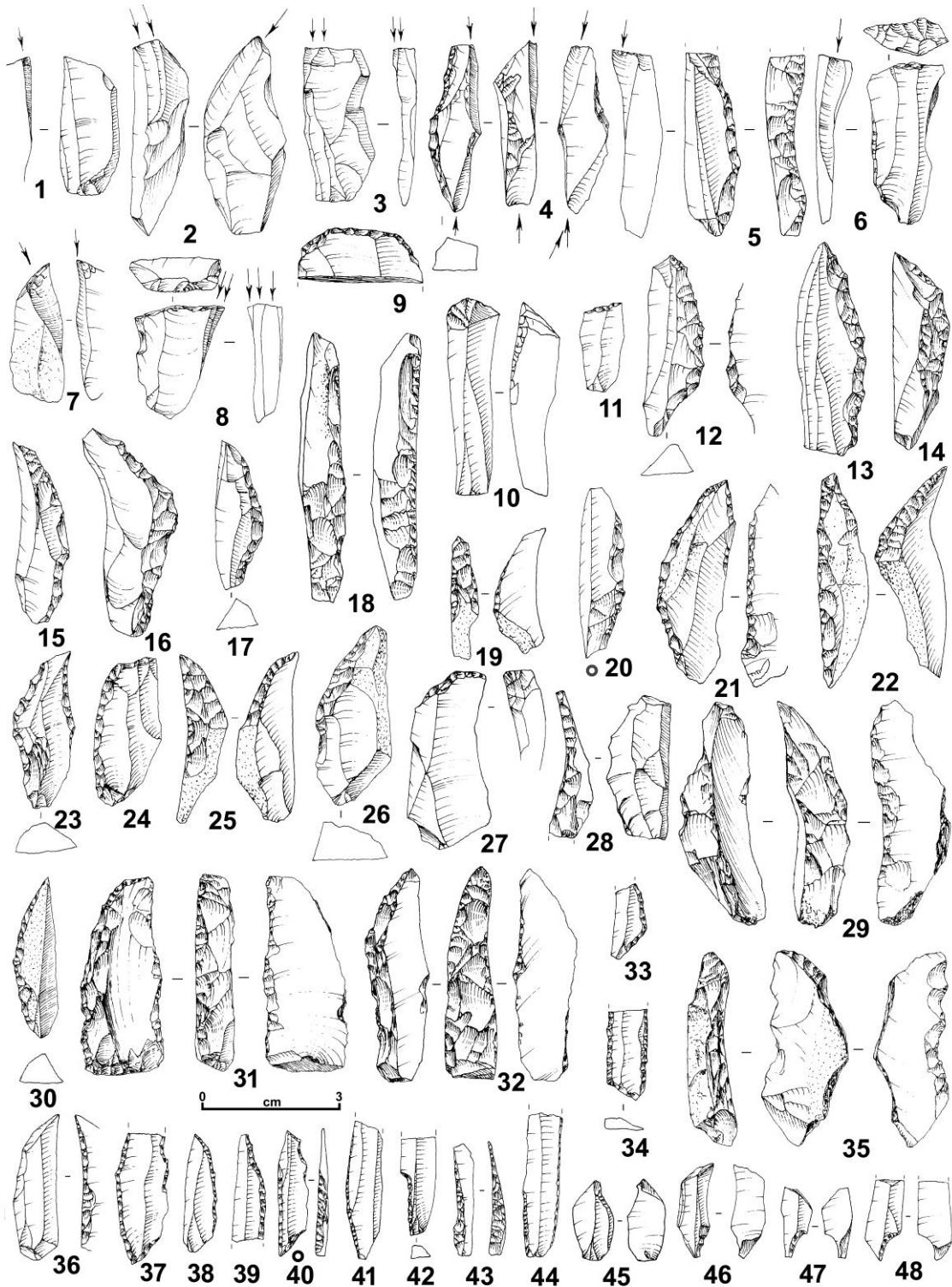


Fig. 5. Mulri Hills, site 16 (MH-16): Burins (nn. 1-8), End scrapers (nn. 9, 10), Truncation (n. 11), Curved, backed points (nn. 12-17, 19-28, 35), Thick backed blade (n. 18), Thick, curved points (nn. 29, 31, 32), Triangle (n. 33), Backed points (nn. 30, 37, 38), Backed bladelets (nn. 34, 36, 40-44), Backed bladelet and truncation (n. 39), Microburins (nn. 45-48) (Drawings by P. Biagi, inking by G. Almerigogna).

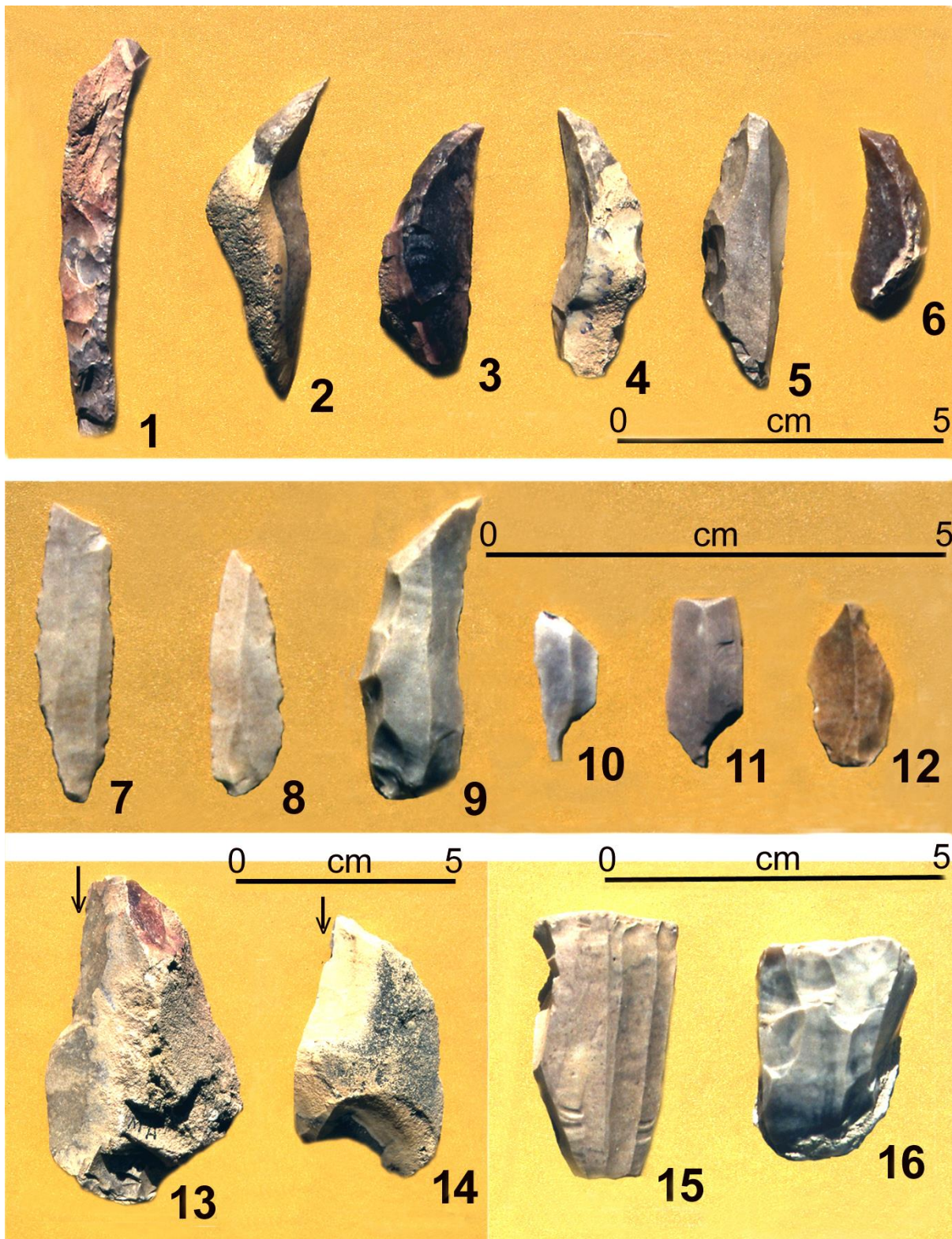


Fig. 6. Mulri Hills, site 16 (MH-16): Different types of abrupt retouch points and bladelets (nn. 1-9), Microburins (10-12), Burins (13, 14) and bladelet Cores (15, 16) (Photographs by P. Biagi).

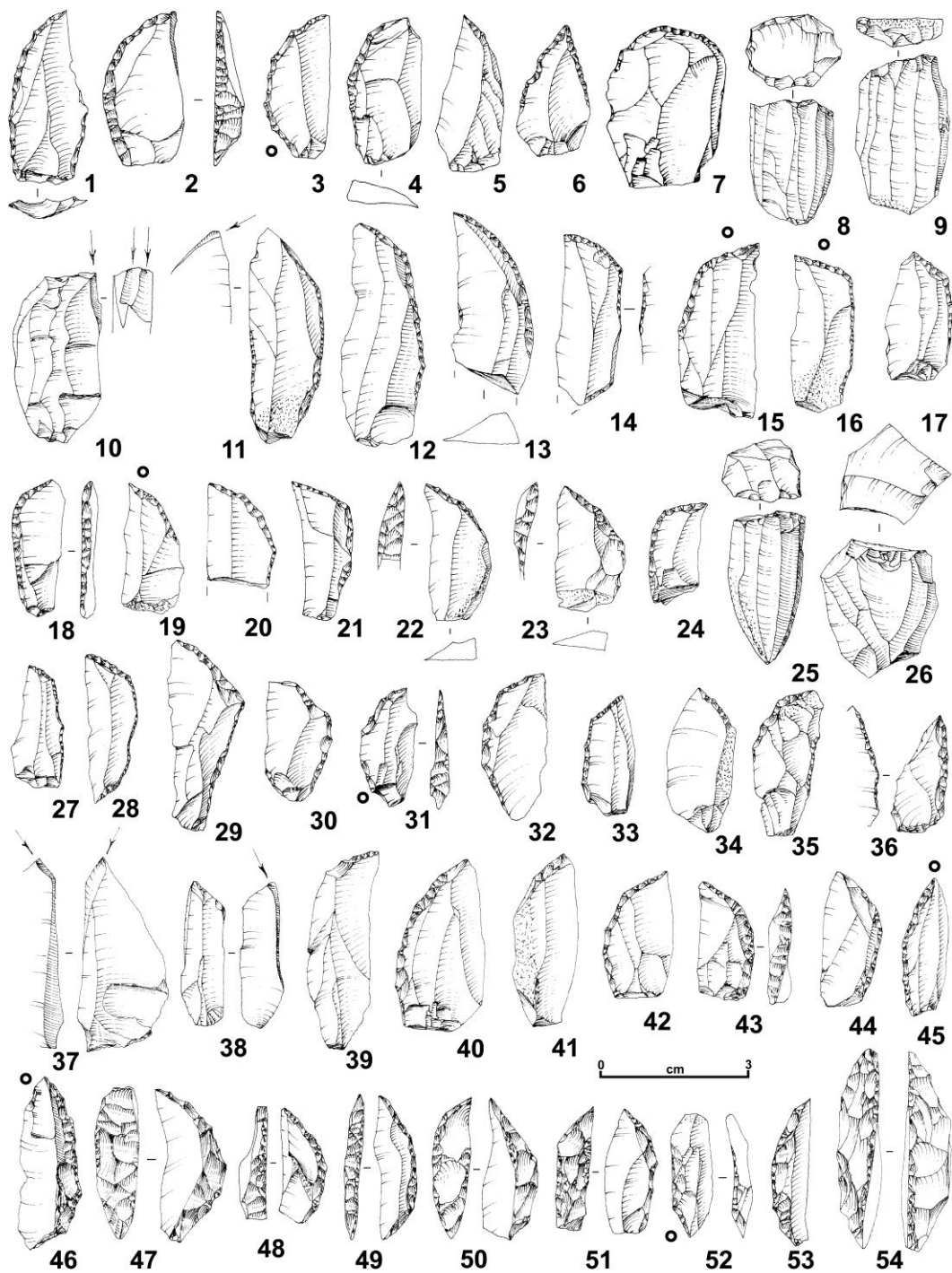


Fig. 7. Late (Upper) Palaeolithic tools from Ran Pethani (n. 1), Mendiari (nn. 2-9), Mulri Hills 22 (MH-22) (nn. 10-26), Mulri Hills 14a (MH-14a) (nn. 27-36), and Mulri Hills 14 (MH-14a) (nn. 37-54) (Drawings by P. Biagi, inking by G. Almerigogna).

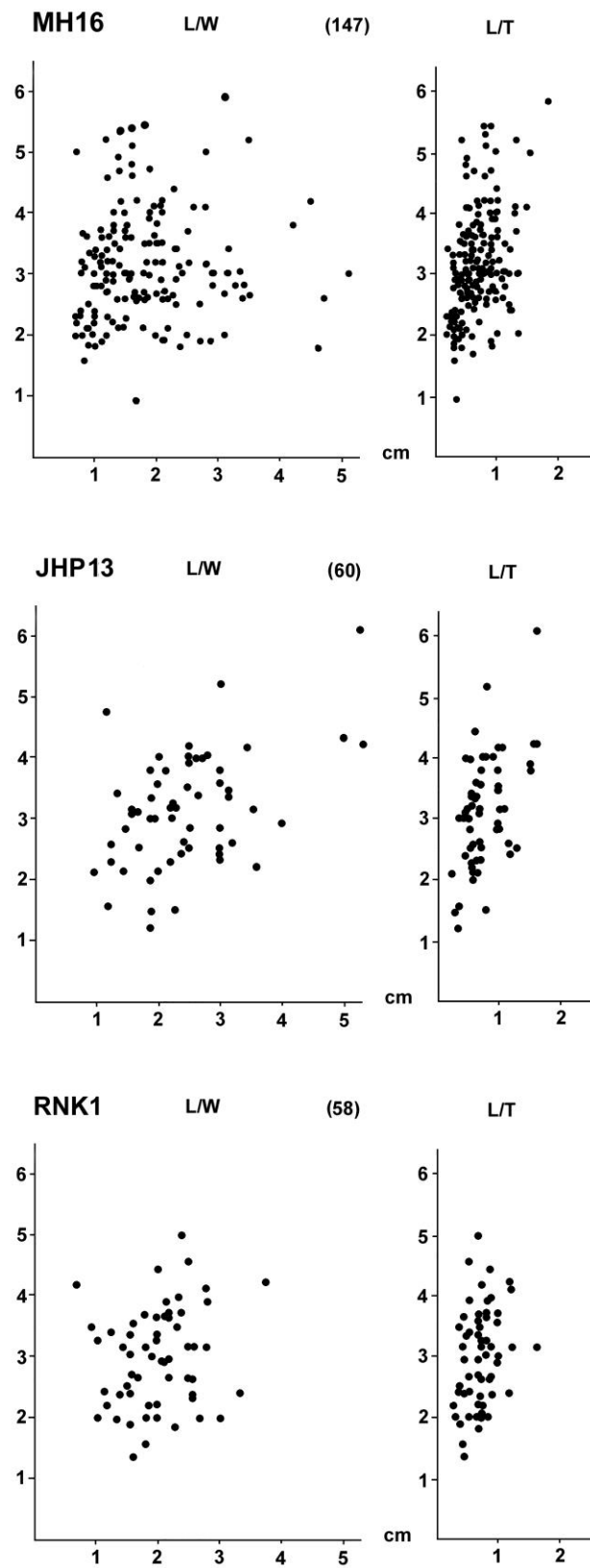


Fig. 8. Length/width (L/W) and length/thickness (L/T) diagrams of the complete, unretouched artefacts from MH-16, JHP-13 and RNK-1 (Drawing by P. Biagi).

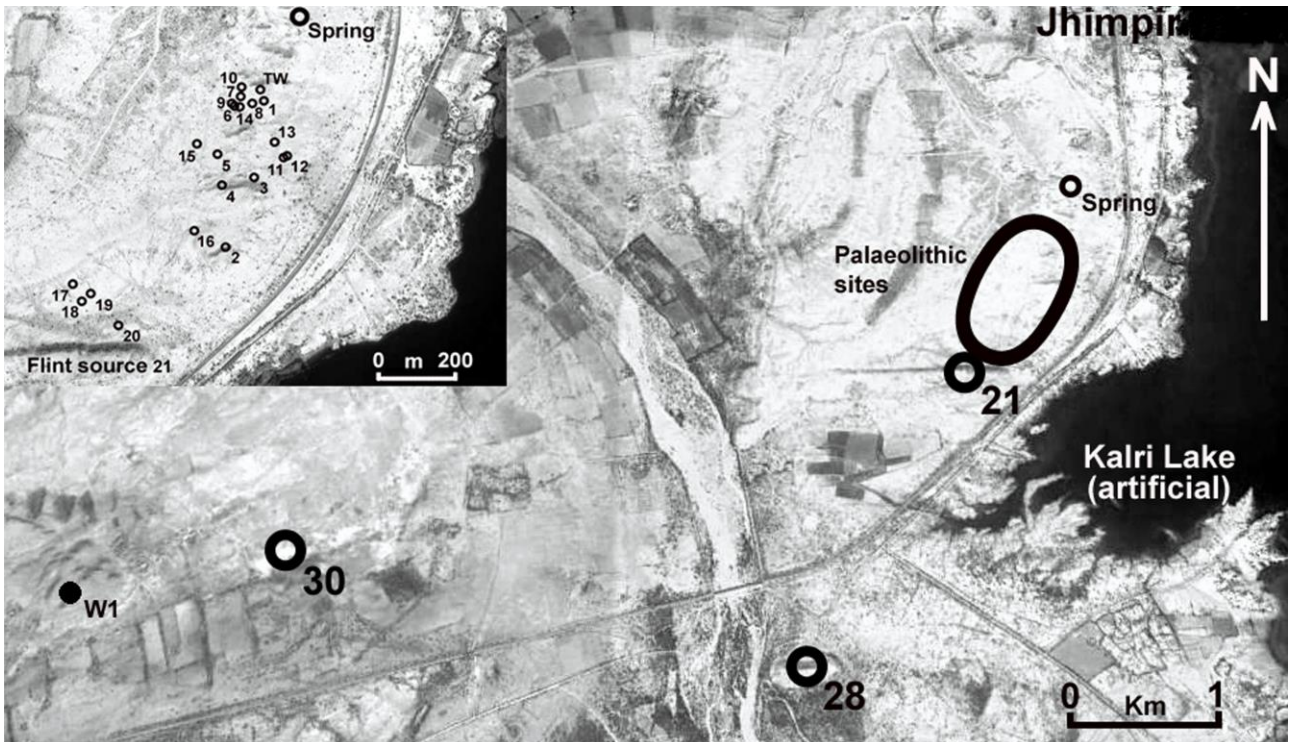


Fig. 9. Jhimpir: Distribution map of the Late (Upper) Palaeolithic sites discovered on the limestone terrace facing the artificial Kalri Lake (top). The precise location of all the JHP sites is shown in the upper left corner. The larger circles show the location of flint sources JHP-21, JHP-28 and JHP-30 (bottom: JHP-30). The Late (Upper) Palaeolithic site JHP-W1 was found some 6.5 kms west south west of the main group of sites (Photograph and drawings by P. Biagi).

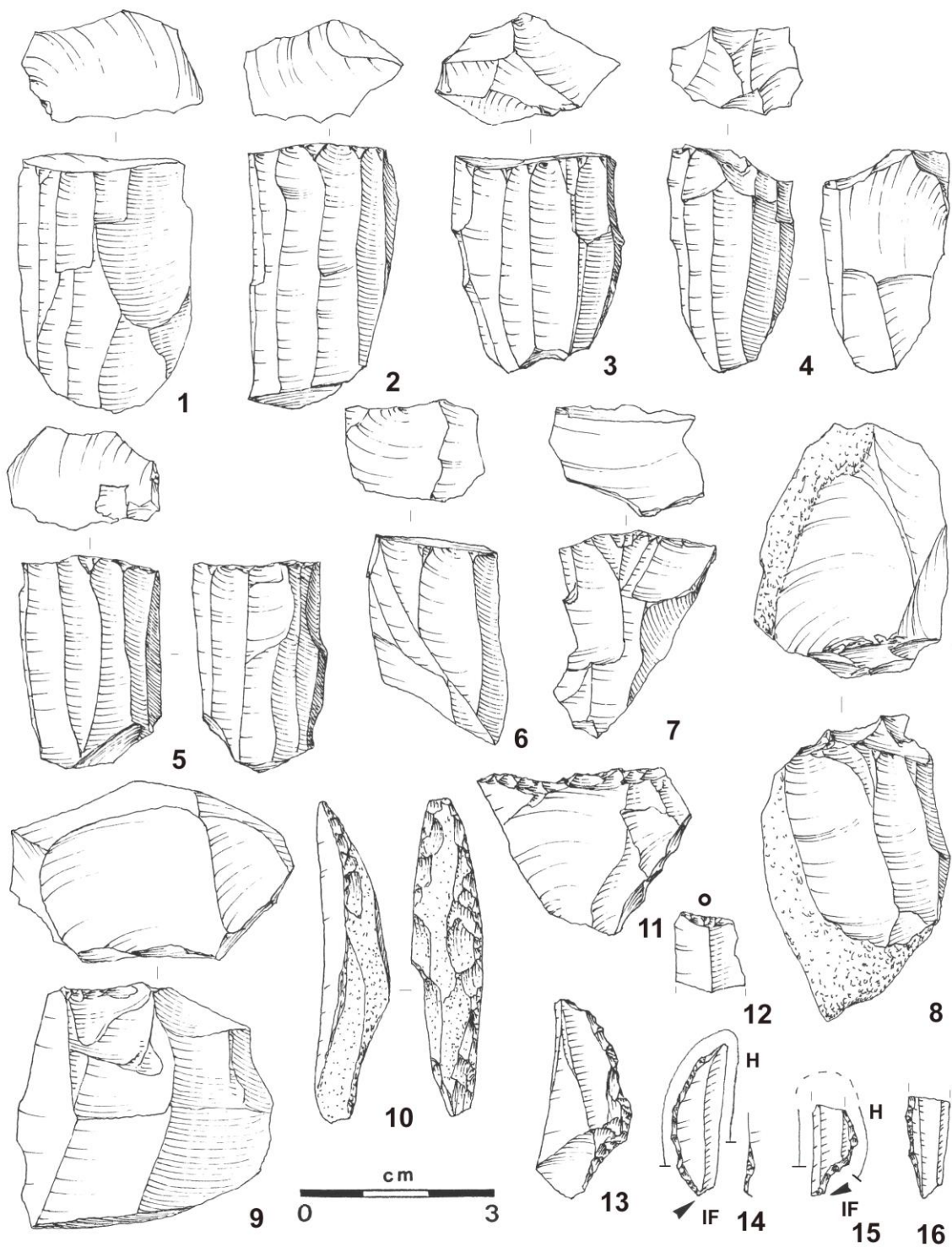


Fig. 10. Jhimpir: Chipped stone artefacts from Jhimpir site 1 (JHP-1): Cores (nn. 1-9), Core rejuvenation blade (n. 10), Backed flakelet (n. 11), Truncation (n. 12), Backed point (n. 13), Lunates (n. 14, 15), Backed bladelet (16). Traces of wear: hafting (H), impact fracture (IF) (after Biagi, 2011: Fig. 5).



Fig. 11. Jhimpir: The terrace on which site JHP-W1 is located (top), and its surface with characteristic chipped stone artefacts (bottom) (Photograph and drawings by P. Biagi, inking by G. Almerigogna).

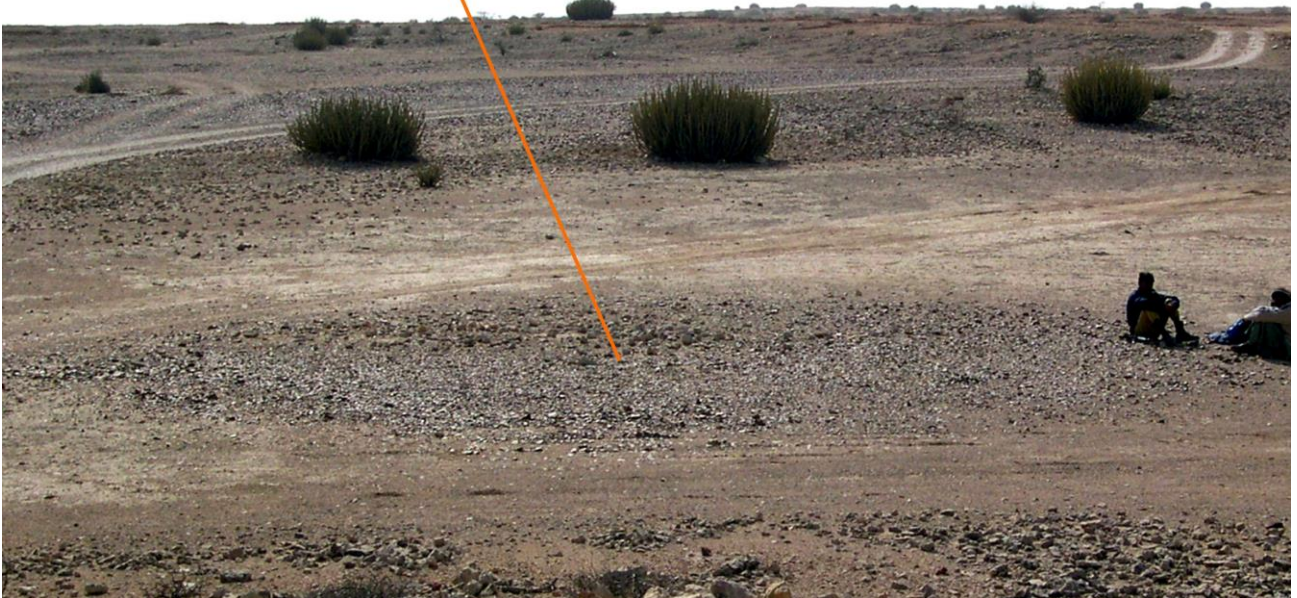
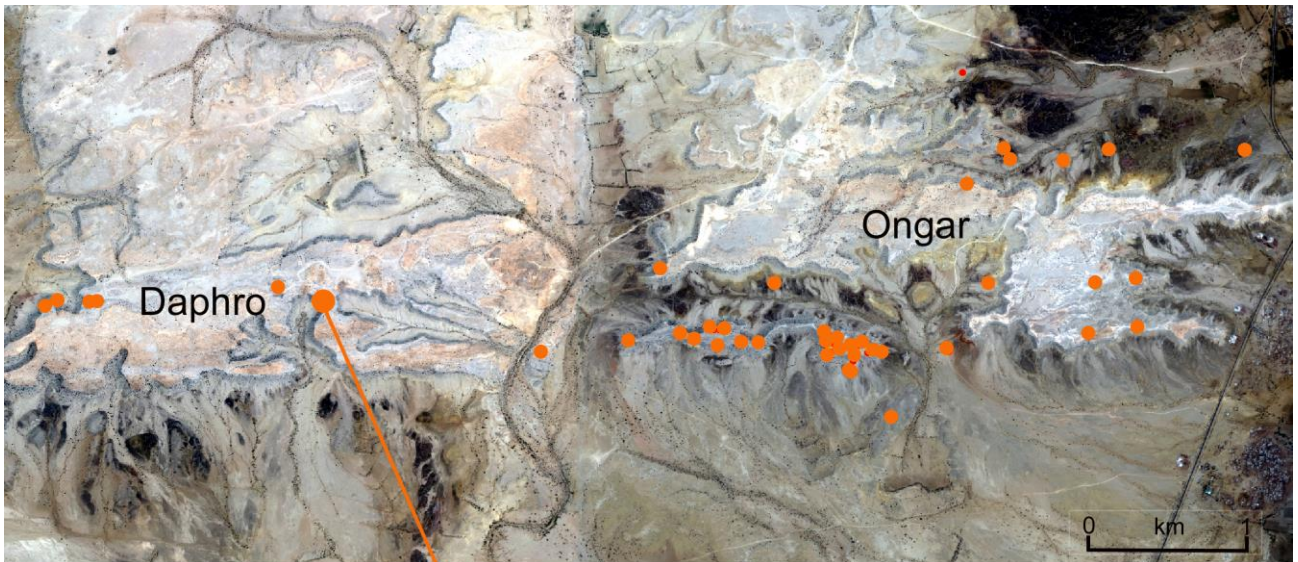


Fig. 12. Ongar and Daphro Hills: Distribution map of the Palaeolithic tools and workshops discovered on the hills (top). A Late (Upper) Palaeolithic workshop discovered still intact in 2007 at Daphro: $25^{\circ}09'47.80''\text{N}$ - $68^{\circ}10'56.42''\text{E}$ (bottom) (Map by C. Franco, photograph by P. Biagi).



Fig. 13. Ongar and Daphro Hills. Late (Upper) Palaeolithic cores on the surface of the limestone terraces at 25°09'38"N-68°12'30"E (top), and 25°09'38"N-68°12'50"E (bottom) (Photographs by P. Biagi).

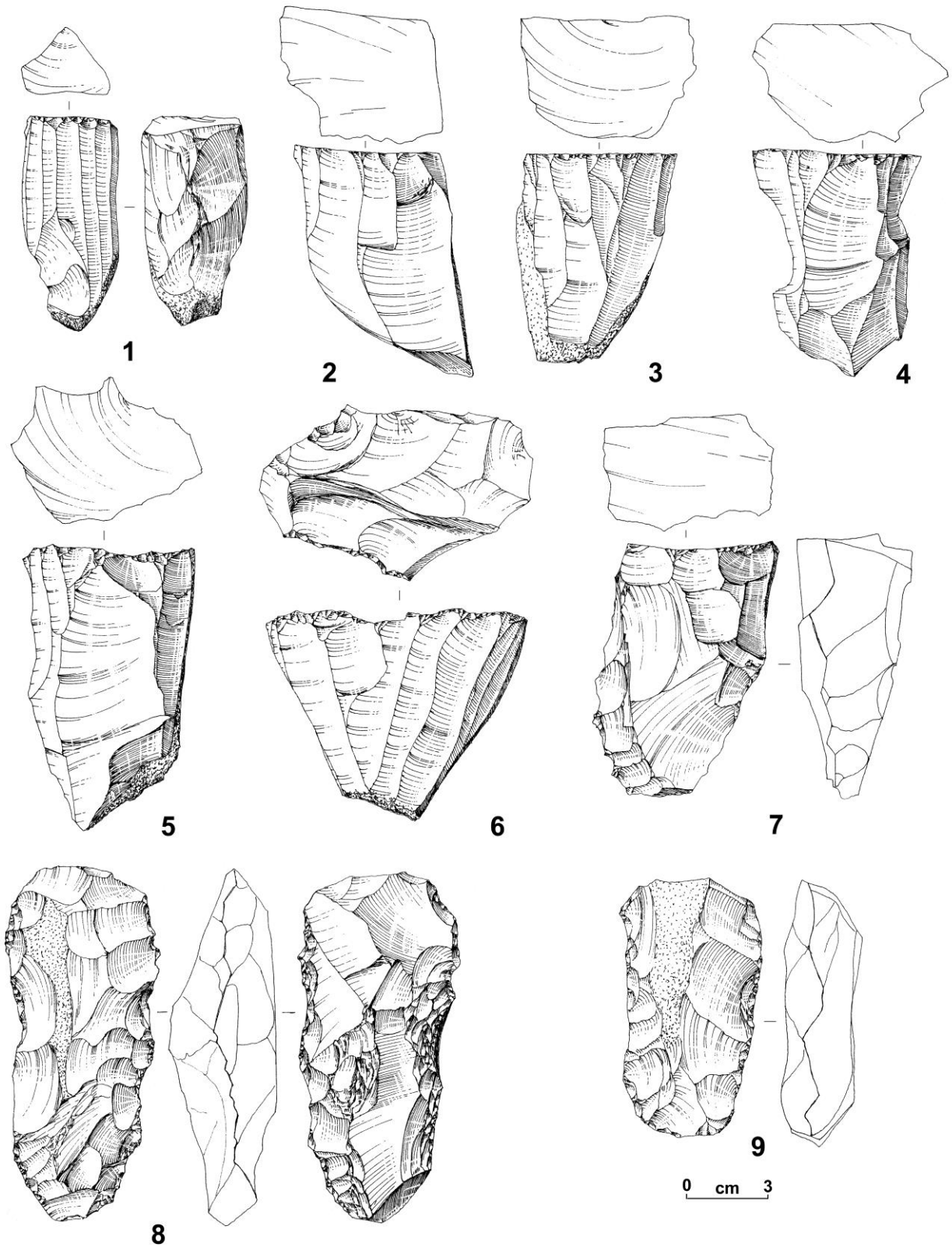


Fig. 14. Ongar and Daphro Hills. Late (Upper) Palaeolithic bladelet and bladelet-like flakelet cores (nn. 1-7) and bifacial picks (nn. 8, 9) (After Biagi and Franco, 2008: Fig. 5).

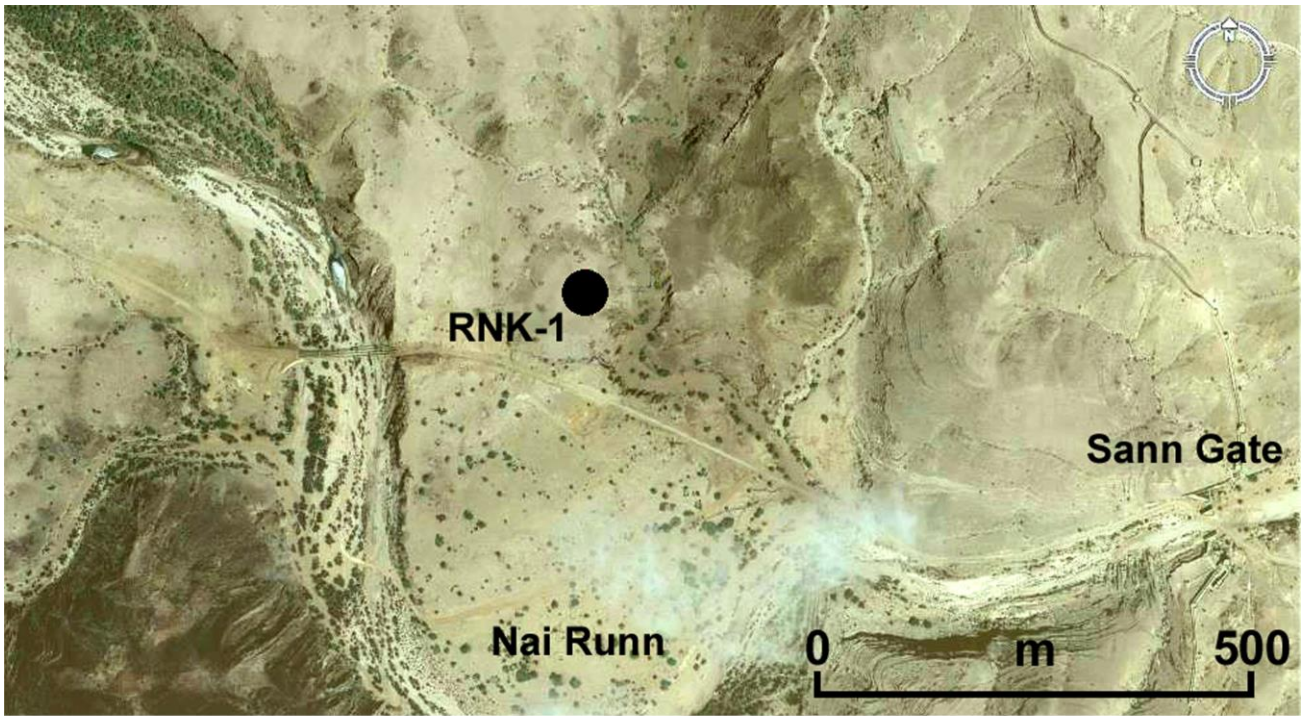


Fig. 15. Ranikot. Location of the Late (Upper) Palaeolithic site RNK-1 (top), and the site from the south-west (bottom) (Photograph and drawing by P. Biagi).

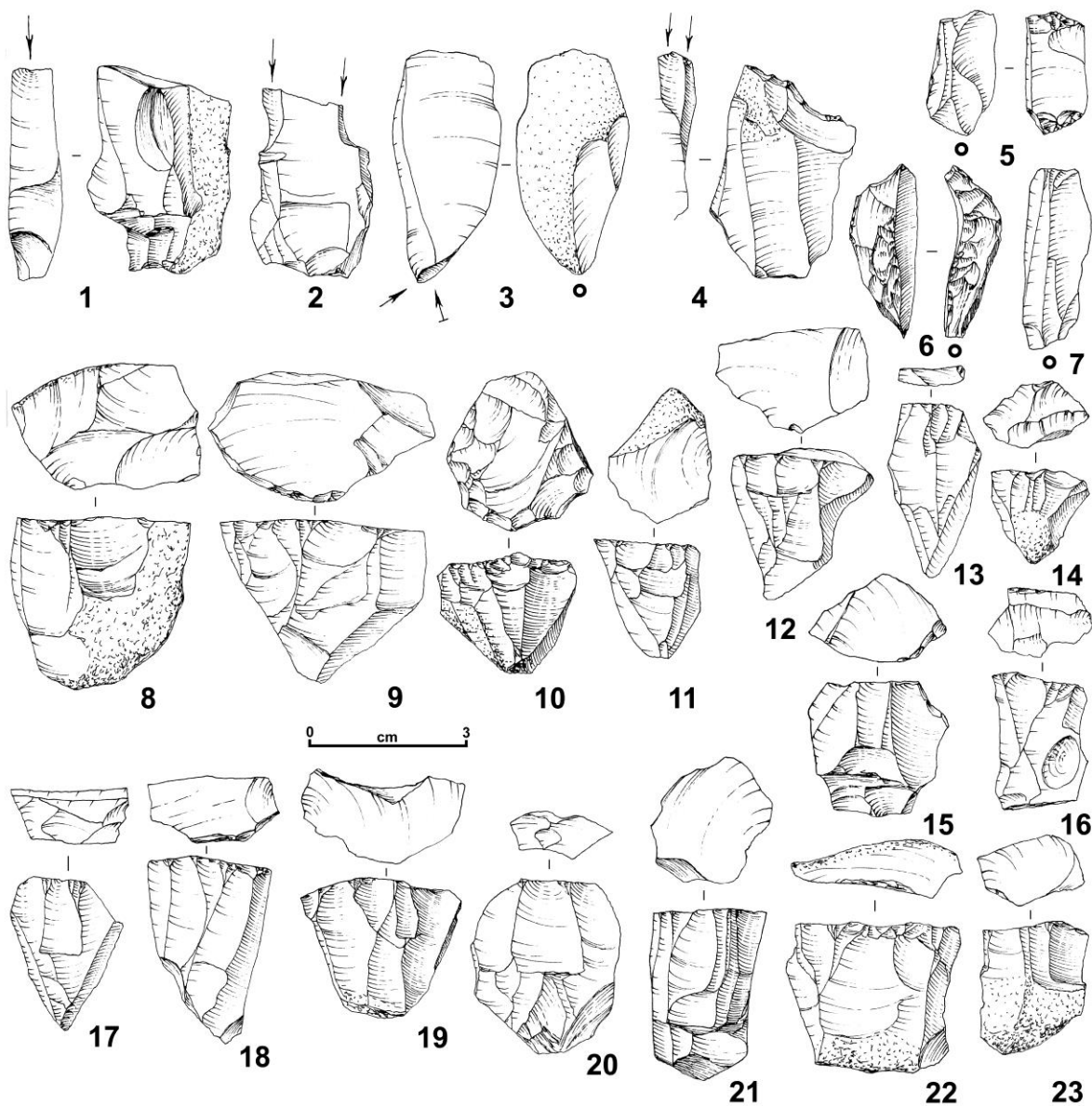


Fig. 16. Ranikot: Late (Upper) Palaeolithic artefacts from RNK-1. Burins (nn. 1-4), Splintered bladelet (n. 5), Core rejuvenation flake (n. 6), Bladelet (n. 7), Subconical and prismatic cores (nn. 8-23) (Drawings by P. Biagi, inking by G. Almerigogna).

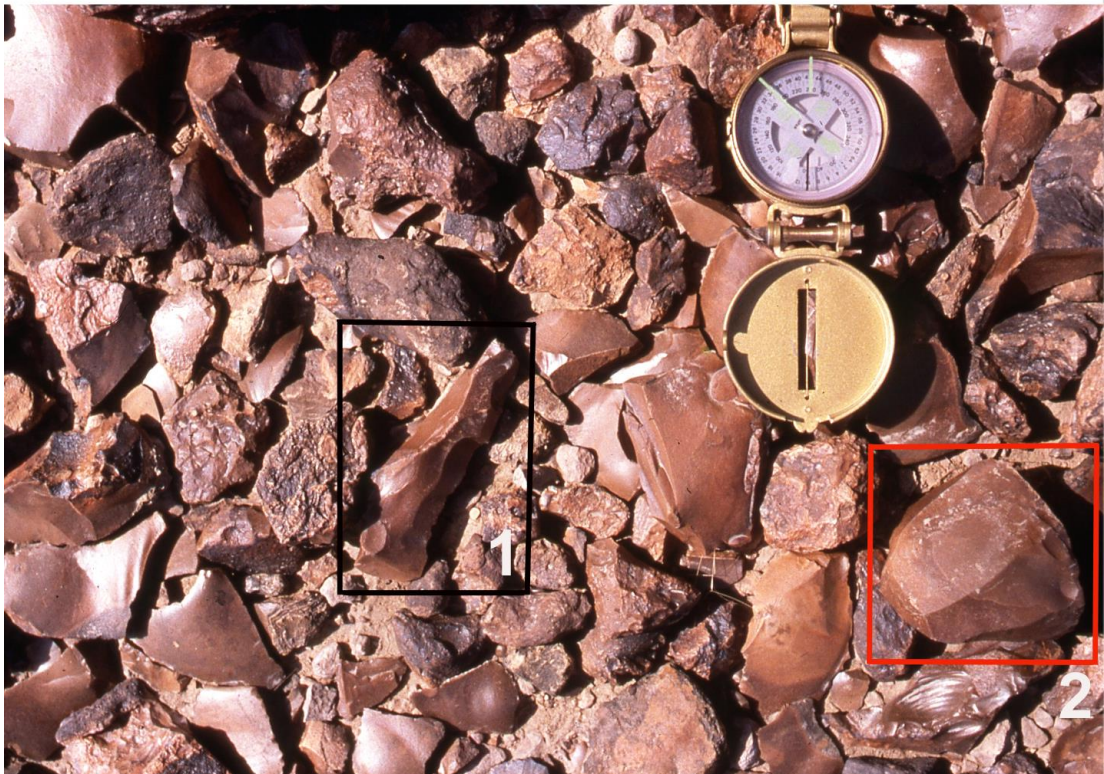


Fig. 17. Ziārāt Pir Shābān in the Rohri Hills: Location of workshop ZPS-4 (top) and surface of the knapping area of the same workshop with debitage flakelets, one crested blade (n. 1) and one blade-like flake core (n. 2) (bottom) (Photographs by P. Biagi).

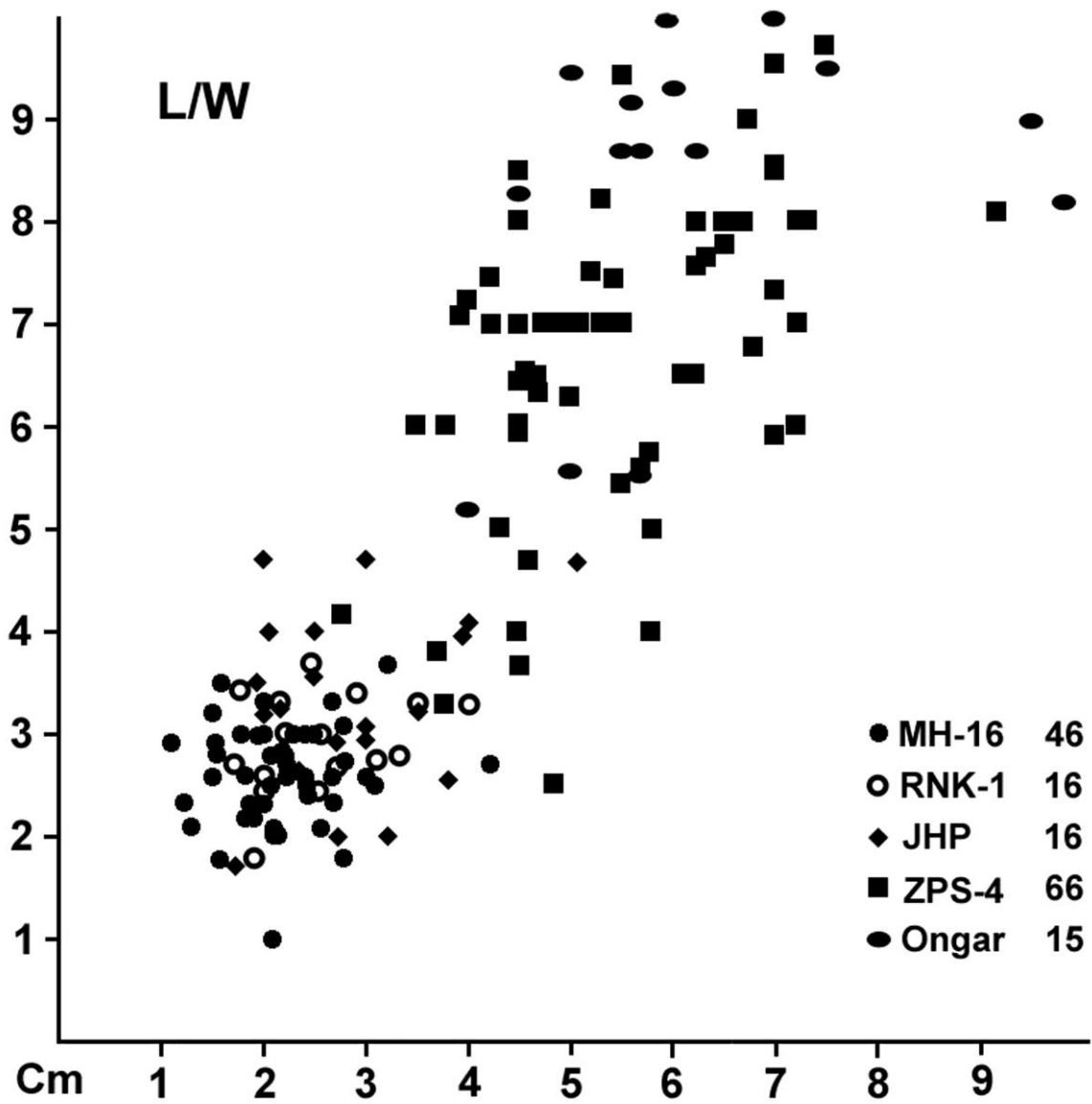


Fig. 18. Length/width diagram of a sample of cores from the sites mentioned in the text: MH-16, RNK-1, Jhimpir, Rohri Hills ZPS-4 and Ongar (Drawing by P. Biagi).