PETR ŠÍDA · SANDRA SÁZELOVÁ · PAVEL HAVLÍČEK · LIBUŠE SMOLÍKOVÁ
JAROSLAV HLAVÁČ

LOWER AND MIDDLE PLEISTOCENE SEDIMENT SEQUENCE WITH ARCHAEOLOGICAL FINDS IN HORKY NAD JIZEROU (OKR. MLADÁ BOLESLAV / CZ)

At the beginning of the 21st century there are few stratified archaeological sites in the Czech Republic that have been dated to the Middle Pleistocene by their sediments. One of the most comprehensive of these sites is located in the brickyard Horky nad Jizerou (okr. Mladá Boleslav) overlooked for a long time as it was outside the interest of Palaeolithic archaeologists. The brickyard is situated in Central Bohemia, at the coordinates N 50.3302 and E 14.8469 with an altitude of 212-228 m a.s.l. (**figs 1-2**). The loess sediments and soils were originally filling up the side valley leading from the northwest to the main valley of the Jizera river, and were exposed during the quarry activities.

Several assemblages of Palaeolithic chipped stone industry (one larger and four smaller in numbers of pieces) were collected over the last 60 years in five different locations at the site. The first and largest lithic assemblage (known as Horky I) was discovered by F. Prošek on the 31st October 1952, on the western wall of the Old brickyard at a depth of approx. 6 m. The artefacts were deposited in a concentration with a diameter measuring approx. 5 m, and one half of the deposit had been destroyed by quarrying. The objects were accompanied by several heavily damaged and thus unidentifiable animal remains (Prošek 1952a; 1952b). A year later in 1953, F. Prošek excavated and documented the assemblage in its entirety (**fig. 3**; Fridrich 1982, 71). In 1967 J. Kukla and J. Fridrich (Kukla 1967; Fridrich 1982, 71) discovered several new lithic artefacts at the same level as the assemblage found by F. Prošek in 1952. In recent years, this area of the brickyard has been partially buried and covered by vegetation and was not obviously affected by the quarrying; therefore future revisionary excavations can be expected to take place. Whilst he was excavating at site I, F. Prošek also collected several artefacts from nearby the northern wall of the Old brickyard, described as the Horky II site, however, there is still very little known about these finds. Since the brickyard was last visited by J. Fridrich and J. Kukla in the 1960s, the site had ceased to be of any archaeological or geological interest, therefore the following extensive quarrying works in the northern part of the brickyard (towards i.e. New brickyard) from the 1970s and 1980s were not documented. However, between 2000 and the present, this area started to be closely monitored by P. Šída who has detected three smaller accumulations of stone artefacts. The Horky III site, located on the surface of the second storey of the northern part of the brickyard, yielded the first lithic object in 2007, followed by the discovery of animal remains in 2009. Additionally, some sporadic findings were detected at Horky IV, particularly from the surface of the first storey, and several other lithic artefacts and bone fragments were documented on the surface of the inclined track of the brickyard´s northern edge, labelled as the Horky V site. With this most recent knowledge we conclude that the Horky II site is now buried and inaccessible for further

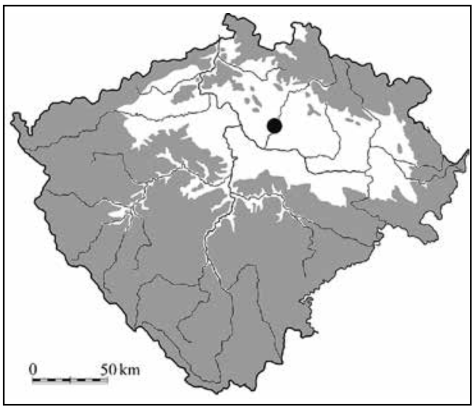

Fig. 1 Horky nad Jizerou (okr. Mladá Boleslav / CZ). Location of the site. – (Illustration P. Šída).

Fig. 2 Horky nad Jizerou (okr. Mladá Boleslav/CZ). Situation of the brickyard. – Legend: **1-2** geological profiles; **old** and **new** geological sections through the Old and New brickyard; **Horky I-V** archaeological sites. – (Illustration P. Šída).

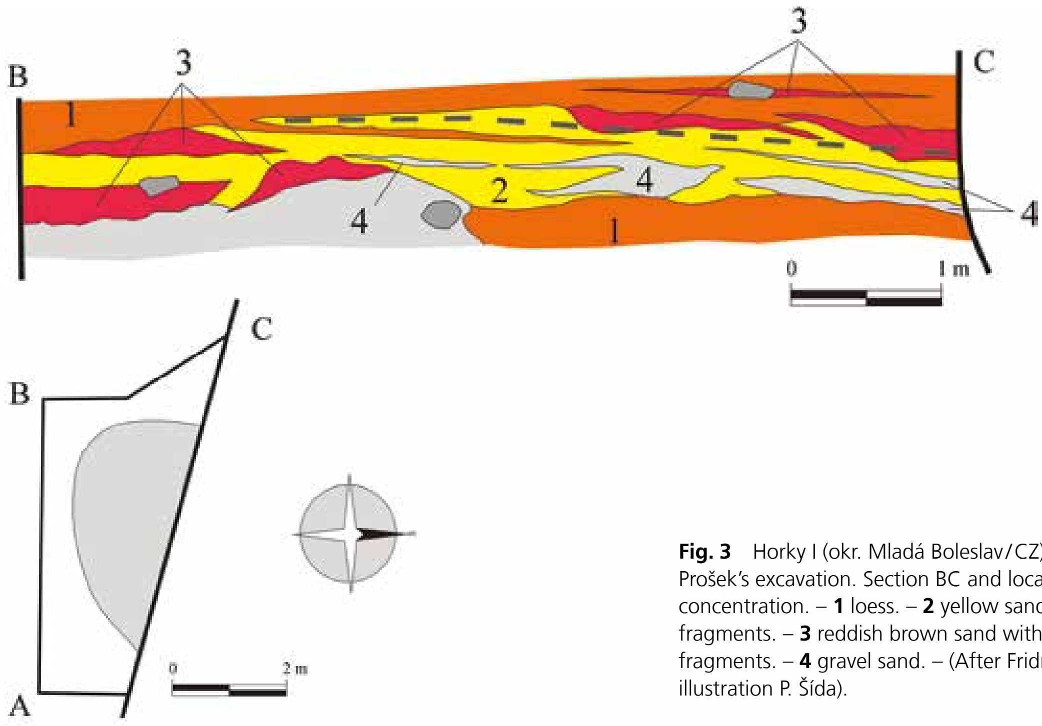

Fig. 3 Horky I (okr. Mladá Boleslav/CZ). Situation of Prošek's excavation. Section BC and location of artefact concentration. – **1** loess. – **2** yellow sand with sandstone fragments. – **3** reddish brown sand with sandstone fragments. – **4** gravel sand. – (After Fridrich 1982; illustration P. Šída).

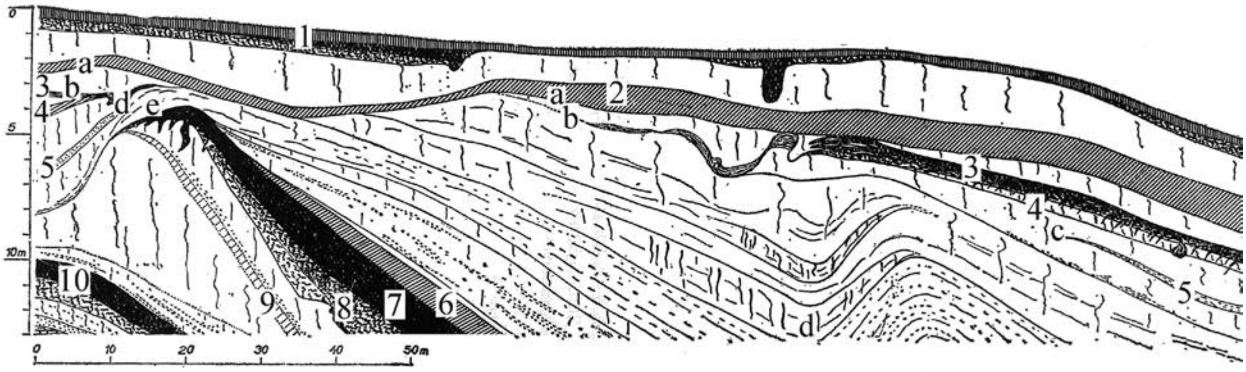

Fig. 4 Horky nad Jizerou (okr. Mladá Boleslav/CZ). Geological section of the Old brickyard. – (After Ložek 1964, with additions).

researches, however, sites III, IV and V are still observed and documented, and site I is still accessible to revisionary excavation. Although the brickyard was studied by many Quaternary geologists (e. g. J. Kukla, V. Ložek) since the 1950s, only selected details were published without comprehensive description (see Kukla 1961; 1966; Ložek 1964, 88; 1971, fig. 1). Therefore, this paper will briefly describe the situation at the Old brickyard, which is not possible to observe anymore, and compare it with the new parts of the brickyard which have roughly the same stratigraphic deposits which were releveled when soil micromorphological analysis was done for the first time.

STRATIGRAPHY AND SITE FORMATION

The stratigraphy of the loess formation at the Old brickyard has been documented and described by several researchers concerned with the Quaternary geology, palaeopedology, malacozoology and archaeology. The first mention of the fossil soils in loess strata was by R. Schwarz and L. Urbánek (1948), who described them as the B horizon soil. Although the earliest attempts of Quaternary geological description were dated to the time of World War II, they were published much later in the 1950s. In 1951, E. Schönhals describes an interglacial chernozem soil most likely transported by solifluction on Riss loess. The podzolised soils (A1, A2, A2G, and B) fit much closer to the interstadial W I/II. Another strongly podzolised soil is developed on the solifluction formation from the W II and is likely dated to the interstadial W II/III. The most recent soil type layer is a brown earth. These observations were reviewed by L. Smolíková in 1960, who described the more recent classification of fossil soil complex system as a pair of strongly developed lessivé with humus soils in the overburden. Contrary to previous researchers, she disagreed with Würmian (Upper Pleistocene) soils and last interglacial soils on the major profiles. Nevertheless, it does not mean that Schönhals' (1951) description of strata is incorrect, but is probably more comparable with soil complex IV in terms of J. Kukla, V. Ložek, and Q. Záruba (Kukla 1961). We do not have the exact position of Schönhals' profile, but it is likely the southwestern corner of the Old brickyard, so the accurate position has been subjected to revision (Prošek/Ložek 1954). According to both authors, the site formation is quite complicated as the Middle Pleistocene loess (Rissian) was divided by degraded chernozem soil (R1/R2) and loamed zone (R2/R3), and the interglacial soil (R/W) was then formed by degraded chernozem soil. Additionally, the malacozoology

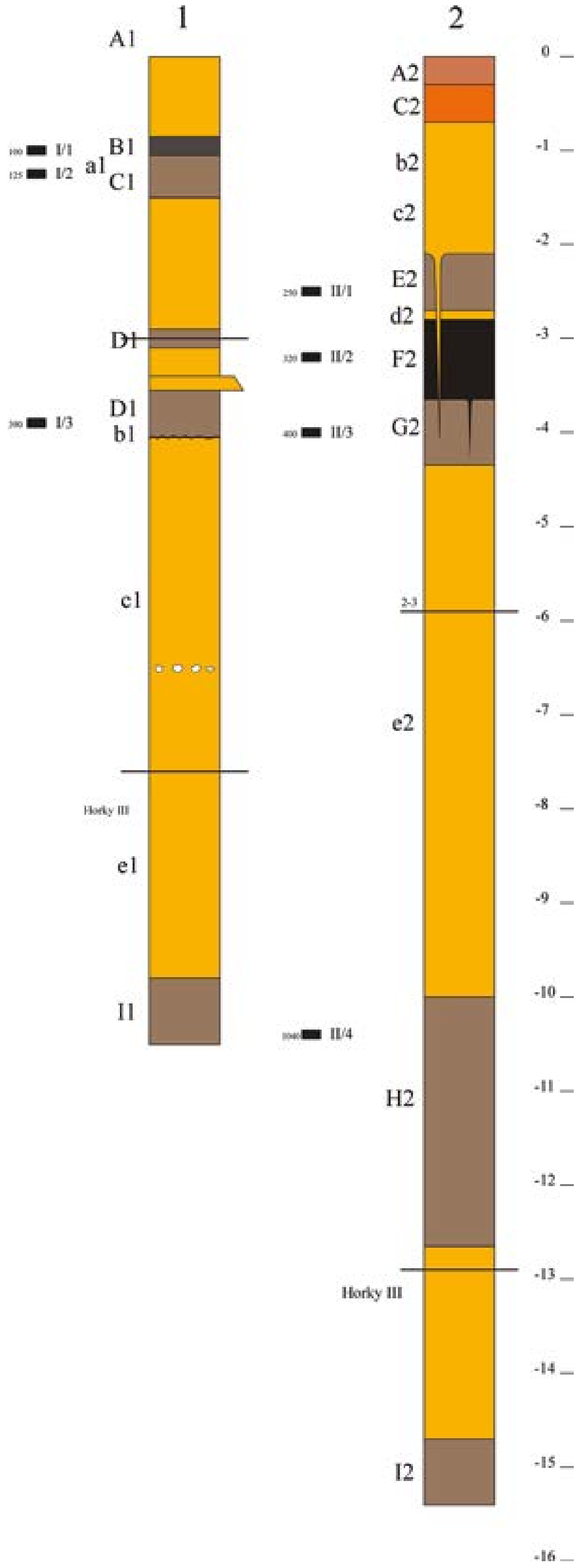

Fig. 5 Horky nad Jizerou (okr. Mladá Boleslav/CZ). Geological profiles 1 and 2 in the New brickyard. – (Illustration P. Šída).

research (Ložek 1955; 1973) does not exclude that formerly described fossil soil from R1/R2 could be redated to the interglacial M/R (Holsteinian). Contrary to these statements, L. Smolíková (1960) came out with her own suggestions that the youngest soils were well developed in the northern wall of the Old brickyard while the development of the southwestern corner is more complicated with several soils dated to older periods. She described a superposition of at least three large soil complexes, the youngest likely corresponding with soil complexes II and III, and two older soils classified by J. Kukla, V. Ložek and Q. Záruba as soil complexes IV and V (Kukla 1961).

Until recently, only one schematic profile of the Old brickyard's northern wall was published by V. Ložek (1964, 88). However, he did provide an important interpretation of fossil soils based on the stratigraphic observations and comparisons in large brickyards from Bohemia and Moravia, namely Sedlec near Prague, Letky near Prague, Červený kopec in Brno, and Dolní Věstonice (Kukla 1961; Ložek 1964; 1971), but unfortunately the ageing of soils was simplified by analogous observations without support of independent micro-morphological analyses. The profile presentation is therefore disunited and contradictory.

As shown on our profile (**fig. 4**), it is possible to observe a total amount of ten soils, eight positions of loess, and five significant erosion interfaces at the site. Soil 1 corresponds to Holocene soil. Soil 2 (Ložek's soil complex I) is poorly developed and the subsoil follows discordantly (erosion interface a). Underneath is the next loess layer followed by loess and two black and brown soils (3 and 4), tapering in the upper part of its formation and passing into a significant erosion affected by cryoturbation (horizon b). In the western part of the stratigraphy the soils are well developed and separated by loess (Ložek's soil complexes II and III). A poorly developed soil (5) is preserved in loess under soil complexes 3 and 4, filling the erosion gully in the western part of the profile. Similar to the upper soils this soil displays tapering and joins an erosion interface (horizon c). This stratigraphic part is followed by a massive loess layer which is intersected by two erosive interfaces (d and e). This extensive erosion created a large erosion valley in the western part of the profile, breaking through the massive complex of soils 6-8 (Ložek's soil complex IV). The next stratigraphic position is characterised by loess layers with one weakly developed soil (9), followed by the last soil complex, 10, previously described as soil complex V, and the weathered Cretaceous pelite subsoil. This Cretaceous subsoil was captured on the base of the western part of the profile as well.

In the case of the New brickyard we have documented in detail two profiles (**fig. 5**) where the micro-morphological samples were taken. A schematic section of the brickyard in the west-east direction was reconstructed parallel to the profile in the Old brickyard and shifted about 250 m northwards, thus making it possible to compare the old and new profiles (for correlations between layers see **tab. 1**).

The surface of the profile (**fig. 6**) is characterised by Holocene soil (A) separated by a narrow layer of loess from a complex of two soils (B and C, intersected by erosion surface a'). This position is followed by loess and soil D strongly affected by solifluction, which passes into erosion interface b'. Then another position of loess appears with another significant soil complex, soil E is resedimented, F and G are braunlehm luvisoils. The substantial erosion interface (c') affected the loess in the overburden and related soils as well. Additionally, another substantial erosion interface (d') is visible in this complex, which is followed by a loess layer also intersected by an erosion interface (e') reducing the subsequent soil (braunlehm soil H). A thin layer of fine loess is present below, followed by the last soil presented at the base (soil I). It is possible that not all of the erosion interfaces were detected in the profiles, especially if they were located in loess as this does not affect the soils; a geochemistry and granulometry will be needed for this study.

Old brickyard	New brickyard	datation	archaeology
soil 1	soil A	Holocene-MIS 1	
loess			
soil 2		SC I-MIS 3	
erosion boundary a			
loess	loess		
soil 3	soil B	SC III-MIS 5	
erosion boundary b	erosion boundary a		
loess			
soil 4	soil C	SC IV a-MIS 7a	
loess	loess		
soil 5	soil D	SC IV b-MIS 7c	Horky V
erosion boundary c			
loess			
erosion boundary d	erosion boundary b		
loess	loess		Horky IV
erosion boundary e	erosion boundary c		
loess	loess		
soil 6	soil E	SC V? removed by solifluction	
	erosion boundary d		
soil 7	soil F	SC V-MIS 9a	
	loess		
soil 8	soil G	SC V-MIS 9c	
loess	loess		Horky I
	erosion boundary e		
soil 9		SC VI?-MIS 11?	
loess	loess		
soil 10	soil H	SC VII+-MIS 13+	Horky II
loess	loess		Horky III
	soil I	SC VIII+-MIS 15+	
Turonian siltstone			

Tab. 1 Correlation of layers in the Old and New brickyard together with datation and position of archaeological layers. – SC: soil complex; MIS: marine isotopic stage.

Finally, a significant correlated horizon between the Old and New brickyard is documented in soils 6-8 and E-G (plus the overlaying sequence) as they are similarly occurring in both profiles (cf. Ložek 1964; Kukla 1967; Fridrich 1982), which can be dated to soil complex V. The problem with the comparisons arises on the level of the subsoil, due to the fact that the sediment base was found only on a small space in both brickworks. Additionally, soil complex VI is missing at the New brickyard, while two braunlehm soils (H and I; at least soil complexes VII and VIII) are present. The less developed soil in the Old brickyard could perhaps correlate with soil complex VI. A distinctive soil complex under this soil could then correspond to soil complex VII, but soil complex VI cannot be definitively excluded.

Fig. 6 Horky nad Jizerou (okr. Mladá Boleslav / CZ). Upper part of the geological profile 1 with soils A, B, C and D and erosion boundaries a and b. – (Illustration P. Šída).

MICRO-MORPHOLOGICAL ANALYSES

In total seven samples from two profiles of horizons bearing signs of pedogenesis were taken for micro-morphological analysis. One of these horizons represents soil sediment, the rest of samples are true soils. In 2014 a new soil horizon was discovered under soil 6, but this sample is not included in the recent micro-morphological description.

Profile 1 (soil B, sample I/1): depth 100 cm (number of thin section 54 137; 7.5 YR 4/4, measured dry), represents: Dark brown-grey, strongly flocculated humic matrix mostly concentrated in the polyhedron tight tracks, some parts retain coprolithic elements of fossil earthworm (*Allolobophora* sp.) showing remnants of the originally aggregate composition. A relatively high amount of sub braunlehm plasma occurs in the matrix which is richly orange with high optical activity, often flanking the walls of supply lines, with a frequently well conserved incremental retaining zone without any occurrence fossil edaphon excretes, causing the significant difference between the colour of biogenically untreated soil mass. The partial braunlehm plasma displays, in some places, fine granulation, the microskeleton corresponds with silt. The large, irregularly radically limited Mn concretions are quite often present here, contrary to the low development of recalcification traces and cracks or fissure networks.
– Strongly developed luvisoil (illimerizzed soil)
– Basal soil of Stillfried A, soil complex III (R / W)

Profile 1 (soil C, sample I/2): depth 125 cm (number of thin section 54 138; 7.5 YR 8/6, measured dry), can be described as: Light ochre braunlehm flocculated matrix with an occurrence of small braunlehm nodules, tiny Mn concretions, and a low proportion of braunlehm plasma. As in the previous case, it borders the walls of supply lines where the observation of incremental zones and fine granulation is possible. The microskeleton reflects perfectly selected granularity of silt dominated by quartz grains. Traces after fossil biogenic activity and decalcification are low.
– Weakly developed luvisoil
– Upper soil of soil complex IV
(Middle Pleistocene)

Profile 1 (soil D, sample I/3): depth 390 cm (number of thin section 54 139; 7.5 YR 5/8, measured dry), is characterised as: Light brown-ochre flocculated matrix containing a higher proportion of sub braunlehm plasma than the overlying soil, its characteristics are analogous. The micro-

skeleton sorting is not as distinct as in the previous case (no. 54 138) as it contains silt and an increased proportion of coarser particles. Besides the partial braunlehm plasma in incoming lines, the various forms of $CaCO_3$ (amorphous, also in the pores of the matrix calcite needles or romboedres), braunlehm concretions (some of which are cracked), and cracks or fissures are abundant.
– Strongly developed luvisoil
– Lower soil of soil complex IV
(Middle Pleistocene, both of these soils correspond to Warm Period »inter Riss« – according to the older division)

Profile 2 (soil E, sample II/1): depth 250 cm (number of thin section 54 140; 7.5 YR 5/8, measured dry), corresponds to: Brown and slightly humic matrix characterised by aggregate composition with intensive activity of fossil earthworm (*Allolobophora* sp.) and pot worm (cf. *Enchytraeidae*). The microskeleton corresponds to silt with other coarser components (e.g. large plagioclases). In the redeposited part numerous braunlehm nodules occur, displaying variability in its construction, such as lumps of partial braunlehm plasma and »mangan-limonite« concretions. The layered material is strongly carbonated with amorphous forms of $CaCO_3$ and calcite crystals.
– Sediment of A horizon of muck soil, soil complex V
(Middle Pleistocene)

Profile 2 (soil F, sample II/2): depth 320 cm (number of thin section 54 141; 7.5 YR 6/6, measured dry), contains: Brown flocculated matrix unequally and slightly humic, containing high proportion of sub braunlehm plasma which is strongly brown grounded and despite lacking the original colour, it is still birefringent and retains the original incremental zones (the best preservation is in the incoming paths). Similar to the overlying position the soil microskeleton is partially sieved including many traces after frequent fossil biogenic activity (prevalence of earthworms – *Allolobophora* sp., less pot worms – *Enchytraeidae*) and number of cracks, fissures, and braunlehm nodules. The recalcification is weak and visible only in supply lines.
– Strongly brown grounded braunlehm luvisoil
– Upper soil of soil complex V
(Upper Holstein – according to the older division)

Profile 2 (soil G, sample II/3): depth 400 cm (number of thin section 54 142; 7.5 YR 5/4, measured dry), corresponds to: Brown slightly humic flocculated matrix with large amount of partial braunlehm plasma occurring in supply lines and the matrix as well. Despite a high degree of brown grounding, incremental zones and optical activity are preserved. In the supply lines the manganese rims are preserved. The grain size is more organised than in the overlying soil and it is richer in mineral composition containing darker minerals such as glauconite and others. Braunlehm nodules are less extended as well as the traces after edaphon activities and amorphous forms of $CaCO_3$. The soil material here is disturbed by mechanical influences as well.
– Strongly brown grounded braunlehm luvisoil
– Lower soil of soil complex V
(Upper Holstein – according to the older division)

Profile 2 (soil H, sample II/4): depth 1040 cm (number of thin section 54 143; 7.5 YR 4/4, measured dry), can be described as: Brown, slightly humic peptized matrix with tight, segregate composition and portion of inner vacancy space. The microskeleton is unsorted and coarse and within the matrix the numerous braunlehm nodules of larger dimensions (if compared to all overlying soils) and manganese concretions are present. Rarely occurring fragments of charred wood with preserved internal structures, signs of decalcification (from amorphous forms of $CaCO_3$ to calcite crystals) and traces of biogenic activity.
– Braunlehm
– Minimal age is soil complex VI
(Warm Period of Elster glacial / Mindel – according to the older division)

ARCHAEOLOGICAL FINDS

Horky I

The concentration of artefacts excavated by F. Prošek was oval in shape and measured about 5 m × 3 m and was half destroyed by quarrying in the brickyard. This concentration was located in a layer of yellow sandy soil with gravel of Turonian sandstones and interbeds of resedimented loess, sand and sunken blocks of sandstone. The plugs of dark brown soil sediment were evident along the cracks and on the surface of the artefacts. The overlaying layers of loess were covered by a lessivé horizon of soil 8 (Kukla 1967; Fridrich 1982, 72), aligned by J. Kukla with soil complex IV.

techno type	quartz	cretaceous quartzite	quartzite	non determined	total	%
fragment	25	2			27	22.3
fragment of core edge	1				1	0.8
flake	62		1	6	69	57
core	4			5	9	7.4
core on flake	1				1	0.8
levalloid core				1	1	0.8
sferoidal core				3	3	2.5
debitage	93	2	1	15	111	91.7
bifacial artefact	1				1	0.8
bifacial knife				1	1	0.8
side scraper	1			4	5	4.1
double ventral side scraper				1	1	0.8
types	2			6	8	6.6
manuport	1				1	0.8
hammer stone	1				1	0.8
others	2				2	1.7
total	97	2	1	21	121	100
%	80.2	1.7	0.8	17.4	100	

Tab. 2 Horky I (okr. Mladá Boleslav / CZ). Composition of collection.

The lithic industry from the Horky I site was first published by J. Fridrich (1982, 72-75) and according to his description, the assemblage consists of 222 objects in total with 16 cores, 145 flakes, 34 fragments, and 27 retouched tools. The raw material of the artefacts was dominated by quartz pebbles, lesser extension should be ascribed to Cretaceous quartzite (4 pieces) and green jasper (1 piece). A portion of this assemblage has been since lost, with only 100 objects are presently accessible. We have added 21 more pieces already displayed by J. Fridrich and evaluated at least in general only by drawings (**tab. 2; list**).

The dominant raw material of the assemblage of 121 artefacts is quartz pebbles (97 objects, 80.2 % of the assemblage), followed by fragmentary Cretaceous quartzite used in production of two artefacts (1.7 %), and the last piece was made from pebble of Palaeozoic quartzite (0.8 %). In the case of the additional 21 objects, the raw material cannot be determined (17.4 % from the whole assemblage, artefacts described by J. Fridrich).

Debitage represents the biggest portion of the assemblage (91.7 %) with 111 artefacts. Most of these are cover flakes (**fig. 7**) of which there are 69 in total (57 % of the collection, 62.2 % of the debitage). Ten of these pieces can be classified as levalloid flakes (14.5 % of the flakes) and a total of 14 flakes bear a retouched base (20.3 % of the flakes), which indicates the adjustment of the impact platform of the core. Moreover, 45 flakes display an untreated base (boulder surface or flat fracture surface, 65.2 % of the flakes) and they originate from the core preparation and reduction. The fragments represent 28 pieces in total (23.1 % of the collection, 25.2 % of the debitage) and one of them was a stroke off from the core edge. Cores represent 14 exemplars in the whole assemblage (11.6 % of the collection, 12.6 % of the debitage).

Finally, we have identified only eight retouched tools (6.6 % of the collection; **fig. 8**), including six side scrapers on flakes from prepared cores (4.9 % of the collection, 75 % of the types). The remaining two pieces are a retouched bifacial knife type (0.8 % of the collection, 12.5 % of the types; Fridrich 1982) and a fragment of a bifacial tool. Additionally, we have to mention two remaining artefacts representing a different lithic industry type, a manuport and a hammer stone. Within the assemblage, prepared cores are the dominant technology with indications of Levallois technique knowledge, in some cases performed on a low quality pebble raw material. The tools are produced on flakes chipped from prepared cores and bifacial

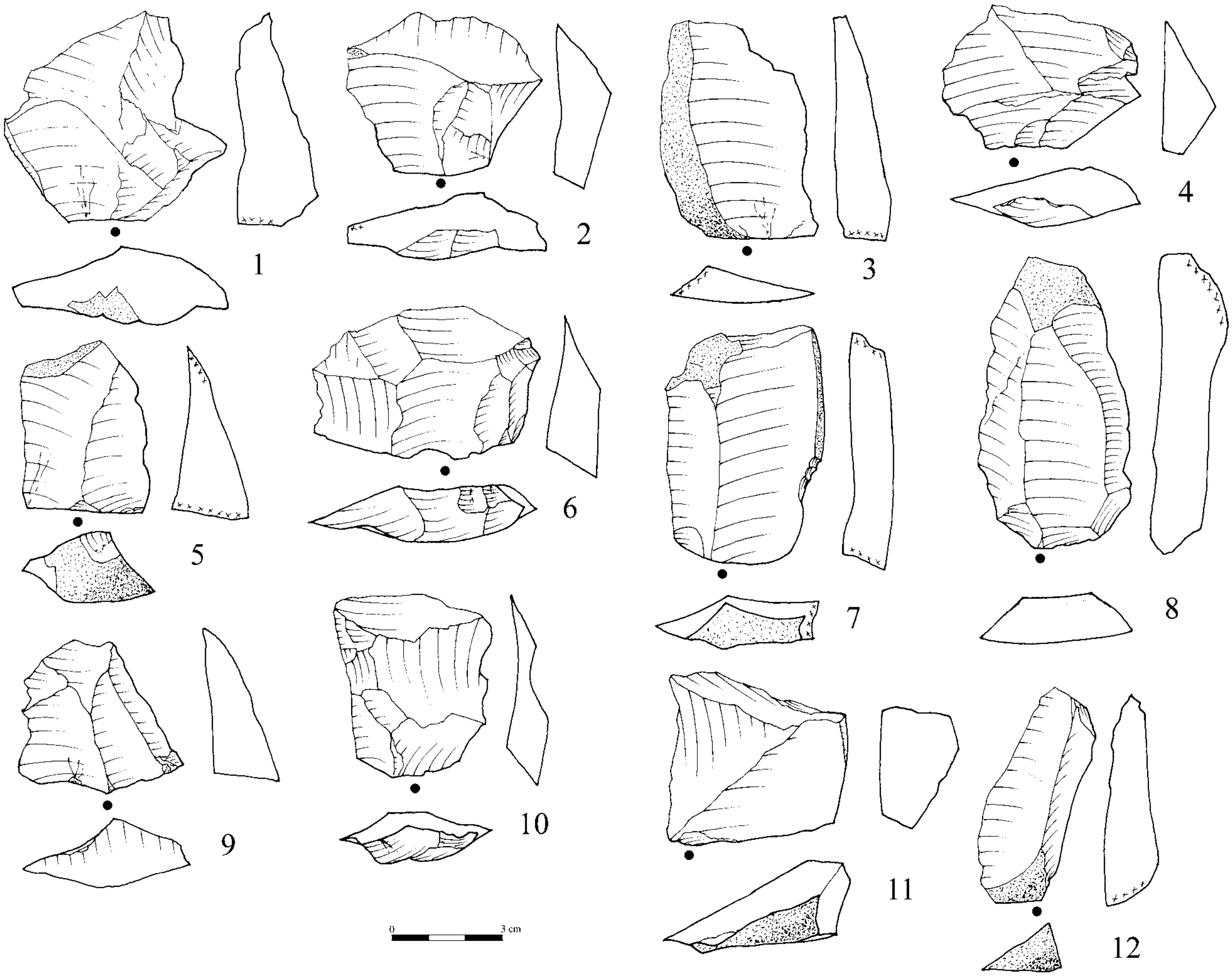

Fig. 7 Horky I (okr. Mladá Boleslav/CZ). Flakes (**1-12**). – (Drawings P. Šída).

technology is present. J. Fridrich (1982) classified this assemblage as »typical middle Palaeolithic« from the Riss glaciation period, comparable to Bečov I (okr. Karlovy Vary/CZ; Upper Acheulean and Lower Mousterian). According to our reviews of the overall data in the brickyard, the revision of its chronological position (see below) seems to be necessary.

Horky II

F. Prošek discovered a small lithic assemblage in soil later described by J. Kukla and V. Ložek (1964) as soil complex V (soil 10 according to our classification). Unfortunately, the artefacts have not survived to the present day, so we are only left with one published description of them (Fridrich 1982, 75). According to this publication, eight objects (2 retouched tools, 1 flake and 5 amorphous fragments) came from this location. The first tool was an atypical bifacially retouched point made of yellow grey patinated silicite with dimensions of 2.5 cm × 2.0 cm × 0.8 cm. The dorsal side of the point was retouched flat, on the edges displayed irregular retouching and notching, and the base was retouched to a straight edge. On the ventral side of the lateral edge a bulbus of a primary flake (from which the flake was made) was evident. The edges on the ventral side were worked out by irregular notched retouching.

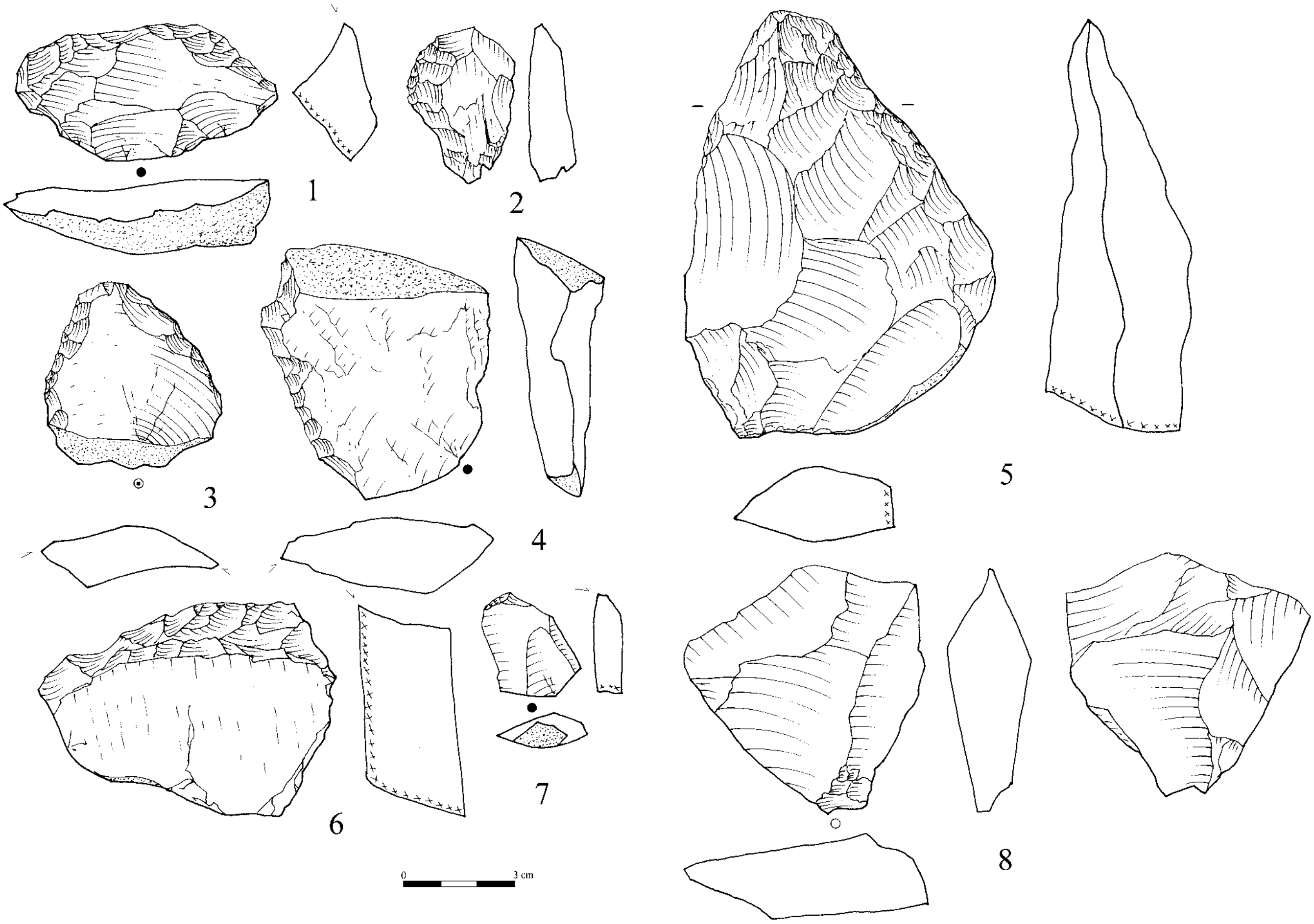

Fig. 8 Horky I (okr. Mladá Boleslav/CZ). Types: **1-4. 6-7** side scrapers. – **5** bifacial knife. – **8** fragment of bifacial artefact. – (1-6 after Fridrich 1982; 7-8 drawings P. Šída).

The second tool was an atypical quartz pebble chopper with dimensions of 3.7 cm × 5.0 cm × 2.7 cm. The chopper was produced on pebble cut in half with a single strike, shaping the lateral edge. The remaining flake was also made of quartz pebble with dimensions of 2.0 cm × 2.0 cm × 0.8 cm and its base was formed by the pebble surface. Alongside the lithic artefacts, charcoals have been found leading some authors to speculate about the presence of a fireplace (Sklenář 1977, 14-17; Fridrich 1982, 75). However, the charcoals may be directly related to the soil horizon as the objects do not bear any evidence of burning and other traces of the fireplace have not been detected. F. Prošek (Prošek/Ložek 1954, 45) classified these artefacts after various comparisons with similar assemblages from Taubach and Ehringsdorf (both Stadt Weimar/D). Most recently the objects have been identified as belonging to the Lower Palaeolithic industry group, however, the precise ageing of our assemblage remains open.

Horky III

Alongside the animal remains, a subsferoide and a side scraper on flake with two indeterminate fragments of quartz pebbles were found on the surface of the second stage of the New brickyard (loess between soils H and I; **fig. 9**). The subsferoide is made of quartz pebble with dimensions of 3.05 cm × 4.3 cm × 2.0 cm and the side scraper was produced from a massive quartzite flake with dimensions of 4.5 cm × 4.5 cm × 2.3 cm. The surface of both artefacts is slightly eolised with corroded edges. Retouching processes were evident on

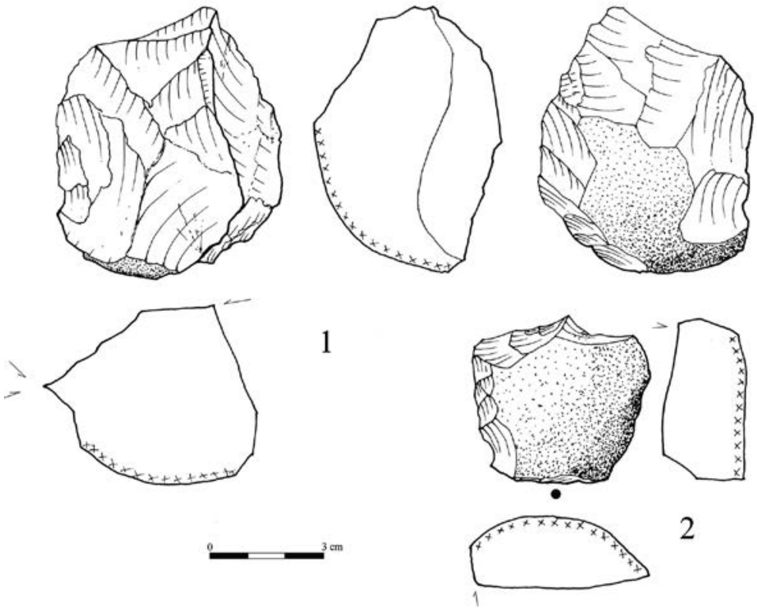

Fig. 9 Horky III (okr. Mladá Boleslav/CZ): **1** subsferoide. – **2** side scraper. – (Drawings P. Šída).

both the left lateral and terminal edge of the side scraper (constricting an angle of 90°). The massive base of the flake carried several negative coarse flakes shaping the striking platform. Its core was simple without traces of previous preparation. The dorsal surface of the flake almost covers an entirely eolised surface of the primary raw material. The presence of the subsferoide and the character of the side scraper production could be dated to the Lower Palaeolithic, although the total number of findings is not extraordinary.

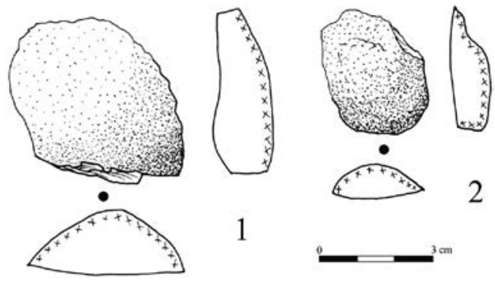

Fig. 10 Horky IV (okr. Mladá Boleslav/CZ). Flakes (**1-2**). – (Drawings P. Šída).

Horky IV

On the surface of the first stage of the New brickyard (the loess above the erosion interface c), two isolated flakes and one indeterminable fragment from a quartz pebble were discovered (**fig. 10**). The first of the flakes has dimensions of 4.3 cm × 4.8 cm × 1.8 cm and the second of 3.1 cm × 3.2 cm × 1.2 cm. The dorsal surface of both flakes is covered by a primary pebble surface, therefore it did not originate from a prepared core. The base of the first flake is simply flat with a straight fracture surface. The base of the second exemplar is the natural pebble surface. Both pieces are slightly eolised with a simple character, therefore a closer cultural classification is preliminary. Faunal remains were not detected here.

Horky V

On the surface of the oblique slant path leading from the first stage directly to the bottom of brickyard´s northern wall (soil D removed by solifluction), three residual cores (**fig. 11**) and a flake with four atypical raw material fragments and one small fragment of heavily weathered bone were discovered. The lithic flake made from quartz pebble has dimensions of 1.3 cm × 1.35 cm × 0.7 cm and its base is the natural surface of the pebble which covers 10 % of the dorsal side as well. The artefact also displays signs of burning and an eolised surface. There were also two cores with eolised surfaces and made of quartz pebble with dimensions of 4.5 cm × 3.8 cm × 2.2 cm and 3.7 cm × 2.6 cm × 1.65 cm (**fig. 11, 1-2**). The third core is made of a jasper fragment strongly eolised and white patinated (**fig. 11, 3**) with dimensions of 2.7 cm × 2.15 cm × 1 cm. This assemblage is not large enough to allow for cultural classification, but the small size of the artefacts might refer to small dimensional industries.

FAUNAL REMAINS

Mammals

During the earlier stages of the excavation (1952-1953) at the Horky I site, several bone fragments likely belonging to larger sized mammals were discovered. However, extensive weathering excluded their closer taxonomical determination (Prošek 1952a; 1953b; Fridrich 1982). The new osteological assemblage discovered at the Horky III site in 2009-2012 consists of 37 fragments of animal bones and teeth (MNE [minimal number of elements] = 24), of which only seven fragments (18.9 % NISP [number of identified species]) were taxonomically determinable as *Equus* sp. (namely third metacarpus and first and third phalanx; **tab. 3**). All of the bones displayed a high degree of fossilization, as the individual crystals may be visible to the naked eye. Moreover, various taphonomic agents were recorded such as weathering as described by A. K. Behrensmeyer (1978) between the 2nd and the 5th degree. He describes the destruction of the bone surface with small and deep inner cracks up to missing parts of compact bone and the whole bone disintegration or root etching as observed at the proximal part of first phalanx. The small black dots regularly dispersed on the bone surfaces are likely due to the chemical composition of the sediment (especially manganese compounds), rather than the irregular dot pattern caused by microbial attack (cf. Lyman 1994). Finally, the smooth edge pattern of breakage excluding precise bone restoration was observed on several bones, namely the horse metacarpus. This evidence supports bone breakage with separate post-depositional and taphonomic history, with fragments found approx. 15 m from each other. This phenomenon influenced slightly the measurements taken from the metacarpal bone, which are a little bit underestimated.

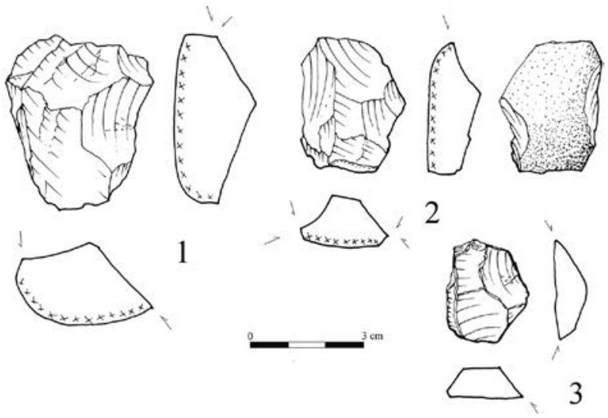

Fig. 11 Horky V (okr. Mladá Boleslav / CZ). Cores (**1-3**). – (Drawings P. Šída).

type of bone	Gl	Bp	Dp	Bd	Dd	SD	other measurements
metacarpus III	235.00*	48.84	31.77	59.98	49.49	–	
phalanx I	82.82	54.37	33.20	47.29	18.30*	37.38	
phalanx III	–	–	–	–	–	–	min. breadth of c. 57.17

Tab. 3 Summary of measurements on *Equus* sp. bones (according to von den Driesch 1976). – Gl: greatest length; Bp: breadth of proximal part; Dp: depth of proximal part; Bd: breadth of distal part; Dd: depth of distal part; SD: smallest diameter of diaphysis; * estimated measurement (the minimal value in mm).

locality	MIS	excavated/collected by	measured by
Achenheim (dép. Bas-Rhin/F)	6	Wernert 1956	Cramer 2002
Ariendorf 2 (Lkr. Neuwied/D)	6	Bosinski/Brunnacker/Turner 1983	Cramer 2002
Bilzingsleben (Lkr. Sömmerda/D)	7	Mania 1991	Musil 1991; Cramer 2002
Horky nad Jizerou (okr. Mladá Boleslav/CZ)	5/6-14	Šída in 2009-2014	Sázelová in 2014
Mosbach (Lkr. Neckar-Odenwald/D)	13/15	Kahlke 1961	Cramer 2002
Lunel Viel (dép. Hérault/F)	15/17	Bonifay 1976	Bonifay 1980
Salzgitter-Lebenstedt/D	6	Staesche 1983	Cramer 2002
Stránská Skála (okr. Brno/CZ)	19	Musil 1971	Musil 1971; 1995
Švédův Stůl (okr. Brno-venkov/CZ)	5a/5e	Klíma 1962	Musil 1962
Taubach (Stadt Weimar/D)	5a/5e	Kahlke 1961	Cramer 2002
Villa Seckendorf (Stadt Stuttgart/D)	5a	Ziegler 1996	Cramer 2002
Wannen bei Ochtendung (Lkr. Mayen-Koblenz/D)	6	Turner 1990	Cramer 2002

Tab. 4 List of localities used in comparative metric data to *Equus* sp. metacarpus III. – From Lunel Viel and Stránská skála only the mean of measurements was used.

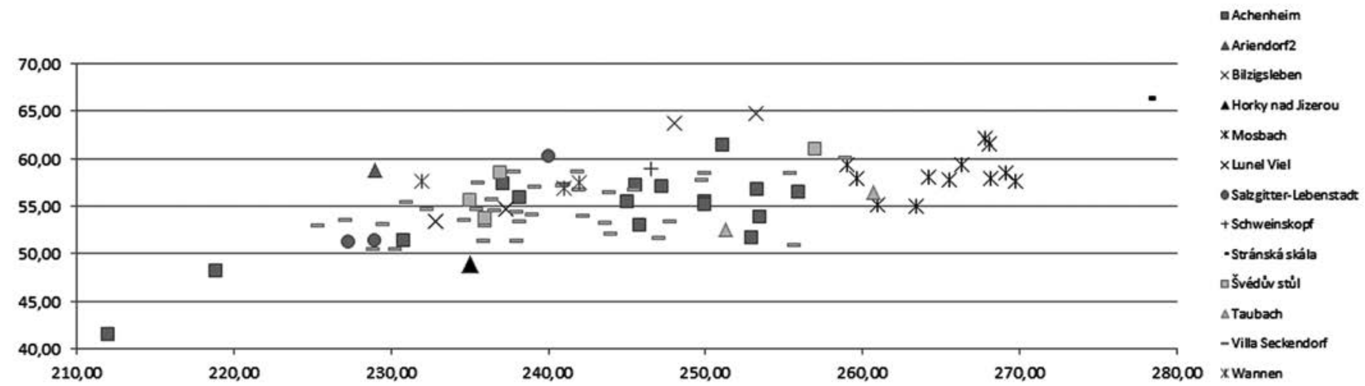

Fig. 12 Horky III (okr. Mladá Boleslav/CZ). Measurements (in mm) of *Equus* sp. metacarpal bones coming from selected Lower and Middle Palaeolithic localities. – GL: greatest length; Bp: breadth of proximal part. – (Illustration S. Sázelová).

The three horse bones from the base of soil complex VII cannot contribute much to the taxonomic status of the Middle Pleistocene caballoid horse discussion. This discussion (Nobis 1971; Eisenmann 1991a; 1991b; Forstén 1998; Cramer 2002) remains controversial, especially in the efforts to define morphological changes causing distinct biostratigraphical units typical of the individual horse species. According to various studies (e.g. Forstén 1993; van Asperen 2012), the horse size and shape seemed to fluctuate around a mean width, so that the relationship between specific horse adaptations and various environments is expected. However, this comprehensive discussion might be inspirational when we are trying to understand the caballoid material from the Horky III site. As shown in the comparison of measurements collected on selected Lower and Middle Palaeolithic horse sites from the Czech Republic, Germany, and France (**tab. 4; fig. 12**), the size and shape of the third metacarpal bone most likely resembles the lineage leading to the *Equus germanicus* rather than the lineage of *Equus mosbachensis* or other species.

Malacology

A new sample was taken from the immediate vicinity near the bone findings (Horky III) from the loess to the base of the braunlehm soil H designated (minimally dated to soil complex VII). The sample volume was 0.25 l in which the following species were determined: *Helicopsis striata*, *Pupilla muscorum*, *P. loessica*, *P. sterri*, and *P. triplicata*. All of the identified molluscs belonged to the terrestrial malacofauna representing the loess fellowship with a prevalence of steppe species such as *Helicopsis striata* and several kinds of *Pupilla*, as well as typical loess species such as *P. loessica*. Other typical loess species, such as *Vallonia tenuilabris* or *Succinella oblonga elongate* are missing, but this might be due to the small amount of analysed sample rather than species absence. The identified malacocenosis indicates the presence of loess steppes, i.e. short blade grass formations without shrubs or trees. This sample (although limited in species) fully corresponds with observations by V. Ložek (1964, 90) in loess positions from the Old brickyard (subsoil 10). The species, detected here, namely, *Helicopsis striata*, *Pupilla sterri*, *P. triplicata*, *P. loessica*, *P. muscorum*, *P. muscorum aff. densegyrata*, *Columella columella*, *Vallonia costata*, *V. tenuilabris*, *Vertigo pseudosubstriata*, *Euconulus fulvus*, *Trichia hispida*, *Clausilia parvula*, and *C. dubia* (Ložek 1964, 90 f.), he described as typical loess cool steppe formation dating to Mindel glaciations. The sandy loam clay above soil 10 contains the interglacial malacofauna (Ložek 1964, 88).

DISCUSSION

Based on new research from the New brickyard at the site of Horky nad Jizerou, including the soil micro-morphology analysis, we are able to open the revision of the situation documented at the Old brickyard in the 1950s and 1960s, particularly addressing the question of individual soil complexes and archaeological finds from the loess sequence dating.

The sediments at Horky nad Jizerou evolved in loess and fossil soil sedimentation, perhaps from MIS 15 to the pleniglacial of the last glaciation (MIS 2). Its development was interrupted by numerous hiatuses evident in the erosive interfaces, causing various problems in orientation and interpretation of the whole sequence. The loess layers with fossil soils are located mainly on the western slope of the north to south oriented valley extending to the main Jizera river valley in Horky nad Jizerou.

Firstly, the base of the loess sedimentary sequence in the New brickyard is composed of two soils (soils H and I), the uppermost corresponds to braunlehm type (soil H, minimally dated to soil complex VII-MIS 13). Perhaps soil 10 from the Old brickyard displays features parallel to this soil complex from the New brickyard as the base of both profiles (below soils 8 and G) can be correlated with certain degree of probability.

Within the overlying layers of the basal sequence we found a very significant soil complex with two soils (brown and black braunlehm, luvisoils) and soil sediment (soils 6-8. E-G). These soils are affected by two generations of ice wedges, the first of which penetrates from the base of soil F into the subsoil and is filled by the material of this soil. The second generation penetrates the whole soil complex and is filled by loess. According to the soil micro-morphology, this soil complex can be correlated with soil complex V (MIS 9) and both brickyards definitely contain this complex. The soil equivalent to soil complex VI (MIS 11) is missing in the New brickyard, while in the Old brickyard it may correspond to soil 9. During the MIS 12-11 stage, the local erosion, affecting the underlying soils, begins to perform and develop substantially in nearby overburden soils corresponding to the MIS 9 stage. In the New brickyard these soils are partially or, in some cases, completely eroded and carried away by erosive processes. The subsequent sedimentation development is documented throughout the whole sequence, although it is obvious that the thickness of layers decreases in the direction of above-lying parts of the valley. Finally, in the New brickyard both soils of soil complex IV (MIS 7) are present, however, the lower one is remodified by significant solifluction and the upper one is at many places located in a para-autochtonnous position as well. From soil complex III (MIS 5) only the upper part, the luvisoil, basal soil of Stillfried A, has survived, contrary to the brown soil of the Eemian interglacial which was eroded. Similarly, in the Old brickyard this horizon was affected by significant erosion and solifluction. The younger sediments were thicker and preserved only at the Old brickyard (loess with soil complex I and overlying loess of the last pleniglacial).

The oldest archaeological levels (subsferoide and side scraper) were detected at Horky III, in the loess, dating to at least MIS 14, which corresponds with the character of the artefacts. Due to the small size of the faunal assemblage and the high degree of weathering, the accurate age of the bones cannot be confirmed and the morphological evidence in closer horse species cannot be determined.

The small dimensional lithic industry assemblage of Lower Palaeolithic character from Horky II is slightly younger and corresponds to either MIS 13 or MIS 11. The largest lithic assemblage was found in an erosional channel under the loess from MIS 10 and the significant soil complex (MIS 9) at Horky I. The sediment filling in this erosion channel seems to correspond with the beginning of the MIS 10 glacial. Within the corpus of lithic artefacts, the dominant technology is of preformed cores with hints of knowledge of Levallois technique as well as bifacial retouching technology. Both technological characteristics provide evidence that the assemblage from Horky I can be dated to the Upper Acheulean. These characteristics appear in other Middle Palaeolithic assemblages at sites such as Bečov I (Fridrich 1982) and Kůlna 14 (okr. Blansko/CZ; Neruda 2011), and are important factors in understanding the transition between the Lower and Middle Palaeolithic.

This transition may have also been documented at the site of Račiněves (okr. Litoměřice/CZ; Fridrich 2002), where the significantly small dimensional corpus of a Lower Palaeolithic character contained prepared cores and flakes. This assemblage could be dated to the Holsteinian complex of glaciation, particularly to the interglacial MIS 11 or MIS 9. The last Czech assemblage dated to the same period comes from Karlštejn-Altán (okr. Beroun; Smolíková/Fridrich 1984, MIS 11), where there is a lack of evidence for prepared core technology, however, the number of lithics in the collection is quite small and the artefacts are produced using a very low quality raw material. All these sites are contemporary with locations such as Bilzingsleben (Lkr. Sömmerda/D; Fischer et al. 1991; Mania 1995) and Schöningen (Lkr. Helmstedt/D; Thieme/Maier 1995).

Additionally, two flakes from Horky IV lay in the loess corresponding to MIS 8, but are not bearing any significant markers to enable their closer classification. The youngest site is Horky V, with the soil strongly affected by solifluction corresponding to the MIS 7c stage. The lithic assemblage is very small in number and chronologically featureless with only one striking marker of small size, which could connect them with other small dimensional industries from the Middle Palaeolithic linked to interglacial oscillations (e. g. Ehringsdorf or Taubach).

The remaining question concerns the authenticity of the living structure detected by F. Prošek. The artefact position in layers of sand, gravel, or resedimented loess goes against this interpretation (possible assemblage accumulation due to resedimentation?). However, the objects bear no traces of water transport and they are not eolised. Moreover, we do not know the exact position of the archaeological deposits within the formation, so we can only assume that at least the upper part of the stratigraphy has been created by very short material transport. But these processes did not have a power to erode the lower parts of the stratigraphy containing archaeological deposits as during sand deposition the slowly flowing stream of water could not significantly move with artefacts. So the existence of the living structure cannot be definitively denied and future excavation in the undamaged part of the site will be needed.

CONCLUSIONS

The revision of the geological situation at the site of Horky nad Jizerou confirmed the presence of sediments from MIS 15 up to MIS 2 with few partial hiatuses, which represent one of the most comprehensive loess records in the Czech Republic. The analysis of soil micro-morphology allowed for the correlation of all present soil complexes with Central European soil stratigraphy. The review of the geology gives a precision in the dating of formerly known archaeological sites such as Horky I and II and newly discovered sites such as Horky III-V.

The oldest site is Horky III belonging to at least MIS 14 with several artefacts of Lower Palaeolithic characteristics and findings of animal remains (*Equus* sp. molluscs). The collection of small dimensional Lower Palaeolithic industry from Horky II corresponds to MIS 13 or MIS 11. The largest corpus of lithics from Horky I displays Middle Palaeolithic characteristics and corresponds to MIS 10. The prepared cores and their flakes show signs of the Levallois technique and flake tools production from prepared cores. Isolated flakes from Horky IV were situated in loess dated to MIS 8. The youngest collection from Horky V dated to MIS 7c and contains several cores, flakes, and fragments of a small dimensional character.

LIST: HORKY I. LIST OF EVALUATED ARTEFACTS

No. identification; techno type; raw material and type; length × width × height in cm; comment (e.g. butt type)

1. ID: Q; fragment; quartz pebble; 4.3 × 4.2 × 2.7
2. ID: 225, A; fragment; quartz pebble; 5.5 × 5.4 × 2.45
3. ID: 225, H; fragment; quartz pebble; 7 × 5 × 2.7
4. ID: 225; fragment; quartz pebble; 3.9 × 2.7 × 0.9
5. ID: 225; fragment; quartz pebble; 2.8 × 1.9 × 0.7
6. ID: 225; fragment; quartz pebble; 3.6 × 3.1 × 2.2
7. ID: 201; fragment; quartz fragment; 3.4 × 1.5 × 0.7
8. ID: H; fragment; quartz pebble; 6.4 × 5.7 × 2.3
9. ID: 217; fragment; quartz fragment; 6.4 × 3.5 × 2.2
10. ID: 228; fragment; quartz pebble; 5.7 × 3.4 × 1.7
11. ID: 221, A; fragment; quartz fragment; 4.3 × 4.2 × 1.4
12. ID: H; fragment; quartz pebble; 4.8 × 2.9 × 1.3
13. ID: 203, D; fragment; quartz pebble; 8 × 3.8 × 1.9
14. ID: H; fragment; quartz pebble; 5.4 × 5 × 2.15
15. ID: – ; fragment; quartz pebble; 3.5 × 2.2 × 1.4
16. ID: P; fragment; Cretaceous quartzite, concretion; 8 × 5.5 × 1.95
17. ID: H; fragment; quartz pebble; 7.4 × 5.4 × 3.15
18. ID: H; fragment; quartz fragment; 6.4 × 3.9 × 1.5
19. ID: E; fragment; quartz pebble; 7.4 × 4.5 × 3.6
20. ID: 218, 2; fragment; quartz fragment; 5.8 × 2.9 × 2.3
21. ID: S; fragment; quartz pebble; 5.7 × 4.1 × 2.1
22. ID: H; fragment; quartz fragment; 4.5 × 3 × 2.15
23. ID: 207, A; fragment; quartz pebble; 7.5 × 5.7 × 2.1
24. ID: 221; fragment; quartz fragment; 3.5 × 1.3 × 0.4
25. ID: bč; fragment; quartz fragment; 3 × 1.2 × 0.4
26. ID: 73; fragment; quartz pebble; 5.4 × 3.95 × 1.45
27. ID: 74; fragment; Cretaceous quartzite, concretion; 4.9 × 3.5 × 3.4
28. ID: H; fragment of core edge; quartz fragment; 5.7 × 3.15 × 2.3
29. ID: 20; flake; quartz pebble; 9 × 7.2 × 3.1; unprocessed
30. ID: 21; flake; quartz pebble; 6.7 × 6.2 × 2.5; retouched
31. ID: 22; flake; quartz pebble; 4.7 × 5.3 × 2.25; unprocessed; **fig. 7, 11**
32. ID: 23; flake; quartz pebble; 7.9 × 4.3 × 1.9; unidentified; levalloid; **fig. 7, 8**
33. ID: 24; flake; quartz pebble; 7.5 × 5.2 × 2.5; unidentified
34. ID: 25; flake; quartz pebble; 5.3 × 4.2 × 1.5; unprocessed; **fig. 7, 12**
35. ID: 26; flake; quartz fragment; 7.4 × 4.45 × 1.8; unidentified; from core edge
36. ID: 27; flake; quartz pebble; 6.4 × 4.3 × 1.5; unprocessed; **fig. 7, 7**
37. ID: 29; flake; quartz pebble; 4.2 × 5.8 × 1.7; retouched
38. ID: 24; flake; quartz pebble; 7.6 × 5.2 × 2.7; unprocessed
39. ID: 15; flake; quartz pebble; 6.9 × 8.7 × 2.2; unprocessed
40. ID: 16; flake; quartz pebble; 7.4 × 7.95 × 2.45; retouched
41. ID: 17; flake; quartz pebble; 6.9 × 5.15 × 3; unprocessed
42. ID: 19; flake; quartz fragment; 8.4 × 8.2 × 3.8; retouched
43. ID: 206, A; flake; quartz pebble; 5.1 × 6.1 × 1.7; unprocessed
44. ID: 205, H; flake; quartz pebble; 3.2 × 9.7 × 3.3; unprocessed
45. ID: – ; flake; quartz pebble; 6.2 × 9.2 × 4; unprocessed
46. ID: 226, A; flake; quartz pebble; 4.55 × 4.55 × 2.55; unprocessed
47. ID: A; flake; quartz pebble; 7.95 × 5.4 × 3; unprocessed

48. ID: C; flake; quartz pebble; 6.4 × 5.1 × 2; unprocessed
49. ID: – ; flake; quartz pebble; 6.7 × 5 × 2.1; unprocessed
50. ID: – ; flake; quartz pebble; 3.8 × 3.3 × 1.3; unprocessed
51. ID: H; flake; quartz pebble; 5.6 × 2.85 × 2.9; unprocessed
52. ID: A; flake; quartz pebble; 3.6 × 4.15 × 1.6; unprocessed
53. ID: 140; flake; quartz fragment; 3.1 × 4.2 × 0.95; unprocessed
54. ID: 142; flake; quartz fragment; 3.2 × 2.1 × 1.2; retouched
55. ID: 134; flake; quartz fragment; 2.5 × 3.85 × 1.2; unprocessed
56. ID: 134; flake; quartz pebble; 2.5 × 1.85 × 0.5; unprocessed
57. ID: – ; flake; quartz fragment; 2.5 × 2.5 × 0.7; unprocessed
58. ID: 444; flake; quartz fragment; 2 × 2.2 × 0.7; retouched
59. ID: – ; flake; quartz fragment; 3 × 2.8 × 0.95; unprocessed
60. ID: bč1, A; flake; quartz pebble; 6.6 × 8.25 × 3.05; unprocessed
61. ID: bč2, H; flake; quartz pebble; 7.6 × 9 × 3.65; unprocessed
62. ID: bč3, H; flake; quartz pebble; 5.3 × 4.9 × 2.35; unprocessed
63. ID: 46; flake; quartz fragment; 3.8 × 4.45 × 1; retouched; levalloid
64. ID: 47; flake; quartz pebble; 3.15 × 4.75 × 1.4; unprocessed
65. ID: 48; flake; quartz pebble; 5.1 × 3.2 × 1.4; retouched
66. ID: 49; flake; quartz pebble; 5.2 × 4.7 × 1.5; retouched; levalloid
67. ID: 50; flake; quartz pebble; 5.8 × 4.9 × 2.1; unprocessed
68. ID: 51; flake; quartz pebble; 3.25 × 4.8 × 1.6; unprocessed
69. ID: 52; flake; quartz pebble; 4.75 × 4.55 × 1.65; retouched
70. ID: 53; flake; quartz pebble; 6.5 × 4.8 × 2; unidentified
71. ID: 54; flake; quartz pebble; 4 × 5.4 × 2.3; unprocessed
72. ID: 55; flake; quartz pebble; 4.9 × 3.7 × 1.6; unprocessed
73. ID: 56; flake; quartz pebble; 6.3 × 4.05 × 1.7; unprocessed; **fig. 7, 3**
74. ID: 57; flake; quartz pebble; 5.6 × 5.2 × 3; unprocessed
75. ID: 58; flake; quartz fragment; 4.6 × 4.4 × 1.85; unprocessed; levalloid; **fig. 7, 9**
76. ID: 59; flake; quartz fragment; 4.1 × 5.4 × 1.6; retouched; levalloid; **fig. 7, 4**
77. ID: 60; flake; quartz pebble; 3.7 × 4.25 × 2.3; unprocessed
78. ID: 61; flake; quartz fragment; 4.25 × 6.1 × 1.5; retouched; levalloid; **fig. 7, 6**
79. ID: 62; flake; quartz pebble; 6.1 × 3.5 × 1.7; unprocessed
80. ID: 63; flake; quartz fragment; 5.2 × 4.4 × 1.4; retouched; levalloid; **fig. 7, 10**
81. ID: 64; flake; quartz pebble; 3.6 × 4.3 × 1.65; unprocessed
82. ID: 65; flake; quartz pebble; 4.95 × 4.85 × 2.1; unprocessed
83. ID: 66; flake; quartz pebble; 5.8 × 5.9 × 2.25; unprocessed; levalloid; **fig. 7, 1**
84. ID: 67; flake; quartz pebble; 7.3 × 5.1 × 2.1; unprocessed
85. ID: 68; flake; quartz pebble; 4.9 × 3.5 × 2.25; unprocessed; **fig. 7, 5**
86. ID: 69; flake; quartz pebble; 4.7 × 5.3 × 1.65; retouched; levalloid; **fig. 7, 2**
87. ID: 70; flake; quartz pebble; 4.9 × 4.6 × 1.7; unprocessed
88. ID: 71; flake; quartz pebble; 5.3 × 5 × 2; unprocessed; levalloid
89. ID: 72; flake; quartzite pebble; 5.1 × 4.5 × 1.45; retouched
90. ID: 75; flake; quartz pebble; 4.4 × 4.6 × 1.75; unprocessed
91. ID: 76; flake; quartz pebble; 4.95 × 3.9 × 2; unprocessed
92. ID: – ; flake; Fridrich 1982, fig. 87
93. ID: – ; flake; Fridrich 1982, fig. 88
94. ID: – ; flake; Fridrich 1982, fig. 90
95. ID: – ; flake; Fridrich 1982, fig. 91
96. ID: – ; flake; Fridrich 1982, fig. 91
97. ID: – ; flake; Fridrich 1982, fig. 91
98. ID: bč4, P; core; quartz pebble; 7.6 × 6.7 × 4.4
99. ID: bč5, YE; core; quartz pebble; 6.5 × 7.4 × 3.95
100. ID: bč6, A; core; quartz pebble; 4.4 × 6.9 × 3.2
101. ID: bč7, P; core; quartz pebble; 5 × 4.8 × 3.7
102. ID: – ; core; Fridrich 1982, fig. 84
103. ID: – ; core; Fridrich 1982, fig. 85
104. ID: – ; core; Fridrich 1982, fig. 93
105. ID: 12; core on flake; quartz pebble; 6 × 5.5 × 4.2; unprocessed
106. ID: – ; sferoidal core; Fridrich 1982, fig. 83
107. ID: – ; sferoidal core; Fridrich 1982, fig. 83
108. ID: – ; sferoidal core; Fridrich 1982, fig. 86
109. ID: – ; levalloid core; Fridrich 1982, fig. 82
110. ID: – ; core; Fridrich 1982, fig. 82
111. ID: – ; core; Fridrich 1982, fig. 87
112. ID: A; bifacial artefact; quartz fragment; 6.5 × 6.6 × 2; **fig. 8, 8**
113. ID: – ; bifacial knife; Fridrich 1982, fig. 90; **fig. 8, 5**
114. ID: 140; side scraper; quartz pebble; 2.8 × 2.6 × 0.9; unprocessed; **fig. 8, 7**

115. ID: – ; side scraper; Fridrich 1982, fig. 89; **fig. 8, 1**
116. ID: – ; side scraper; Fridrich 1982, fig. 89; **fig. 8, 2**
117. ID: – ; side scraper; Fridrich 1982, fig. 89; **fig. 8, 4**
118. ID: – ; side scraper; Fridrich 1982, fig. 92; **fig. 8, 6**
119. ID: – ; double ventral side scraper; Fridrich 1982, fig. 89; **fig. 8, 3**
120. ID: 200; manuport; quartz pebble; 3×2.5×1.05
121. ID: 202; hammer stone; quartz pebble; 5.3×4.8×2.7

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Zusammenfassung / Summary / Résumé

Eine alt- und mittelpleistozäne Sedimentfolge mit archäologischen Funden aus Horky nad Jizerou (okr. Mladá Boleslav / CZ)

Dank der neuen Kartierung und Untersuchung der Mikromorphologie an der Neuen Ziegelei von Horky nad Jizerou war es möglich, die dort in den 1950er und 1960er Jahren nachgewiesene Sedimentfolge an der Alten Ziegelei neu zu beleuchten. Die Folge von Horky nad Jizerou dokumentiert die Lösssedimentation mindestens von MIS 15 bis zum Höhepunkt der letzten Eiszeit (MIS 2). Die Entwicklung der Lössfolge war mehrfach unterbrochen, wie erodierte Oberflächen zeigen. Seit den 1950er Jahren wurden mehrere archäologische Komplexe an fünf verschiedenen Orten aufgesammelt. Dabei stammen die ältesten Fundensembles von der Fundstelle Horky III aus einem Lössbereich, der mindestens in MIS 14 datiert werden kann. Funde aus diesen Schichten wie ein Subspheroid und ein Schaber zeigen Merkmale, die genauso wie das Vorhandensein von Pferdeknochen auf diese Zeitstufe verweisen. Eine begrenzte Sammlung von klein dimensionierten Steingeräten altpaläolithischen Charakters aus Horky II ist etwas jünger und entspricht entweder MIS 13 oder MIS 11. Das größte Fundensemble aus Horky I stammt aus einer Erosionsrinne unter dem Löss von MIS 10, bedeckt von einem ausgeprägten Bodenkomplex, der mit MIS 9 korrespondiert. Die Sedimentverfüllung dieser Erosionsrinne scheint dem Beginn der Vereisung von MIS 10 zu entsprechen. Das Ensemble ist insofern charakteristisch, als es sich bei den Hauptformen um Kerne mit Präparationen handelt, die Hinweise sowohl auf die Kenntnis der Levalloistechnik als auch auf das zweiseitige Retouchieren geben. Zwei Abschläge von Horky IV waren in Löss eingebettet, der MIS 8 entspricht. Die jüngste Fundstelle Horky V befindet sich in einem Boden, der stark durch Solifluktion beeinflusst ist und mit MIS 7c korrespondiert. Hier ist das Fundensemble sehr klein und chronologisch nicht aussagekräftig.

Lower and Middle Pleistocene Sediment Sequence with Archaeological Finds in Horky nad Jizerou (okr. Mladá Boleslav / CZ)

Due to the recent mapping and study of soil micro-morphology of the New brickyard at Horky nad Jizerou we were able to revise the sequence documented in the 1950s and 1960s in the Old brickyard. Sediments from Horky nad Jizerou document the evolution of loess sedimentation from at least MIS 15 to the pleniglacial of last glaciation (MIS 2). The development of loess sedimentation was interrupted by numerous hiatuses, evidenced by erosive interfaces. Since the 1950s several archaeological assemblages from five different locations were collected. The oldest archaeological levels are at the site of Horky III, situated in the loess which has a minimum age of MIS 14. Artefacts such as a subspheroide and a side scraper from these levels have characteristics which correspond to this period well as the presence of horse bones does. A limited collection of small dimension stone industry of Lower Palaeolithic character discovered at Horky II, is slightly younger, corresponding to either MIS 13 or MIS 11. The largest assemblage from Horky I was found within an erosion channel under the loess of MIS 10 which lay under a significant soil complex, corresponding to MIS 9. The sediments filling this erosion channel seem to correspond to the beginning of the glacial MIS 10. The collection is significant as the dominant forms are of preformed cores with hints of knowledge of Levallois technology as well as evidence of bifacial retouching. Two flakes from Horky IV lay in the loess corresponding to MIS 8. The youngest site is Horky V situated in soil strongly affected by solifluction and corresponding to MIS 7c. The assemblage is very small and chronologically featureless.

Une séquence sédimentaire du Pléistocène ancien et moyen avec des découvertes archéologiques à Horky nad Jizerou (okr. Mladá Boleslav / CZ)

Suite à une cartographie récente et des études de micromorphologie des sols de la nouvelle briqueterie de Horky nad Jizerou, il a été possible de revisiter la coupe de l'ancienne briqueterie qui avait été documentée dans les années 1950 et 1960. Les sédiments de Horky nad Jizerou documentent la sédimentation lœssique depuis au moins MIS 15 jusqu'au Pléniglaciaire de la dernière glaciation (MIS 2). Le développement de la sédimentation du lœss a été interrompu lors de nombreux hiatus, attestés par des surfaces d'érosion. Depuis les années 1950 des assemblages archéologiques sont collectés à cinq emplacements différents. Les niveaux archéologiques les plus anciens sont le site de Horky III situé dans des lœss avec pour âge minimum le stade isotopique MIS 14. Parmi les artefacts de ces niveaux, un sub-sphéroïde et un racloir caractéristiques, ainsi que la présence d'os de cheval, sont en accord avec cette interprétation. Un assemblage un peu plus jeune a été découvert à Horky II, il s'agit d´un assemblage composé d´artefacts lithiques de petites dimensions de type paléolithique ancien qui correspond à MIS 13 ou MIS 11. L´assemblage le plus riche est celui de Horky I qui a été mis au jour dans un paléochenal sous le lœss MIS 10, lui-même situé sous un pédo-complexe correspondant à MIS 9. Les sédiments comblant ce chenal semblent correspondre au début de la glaciation de MIS 10. La collection est significative, dans la mesure où les formes dominantes sont des nuclei mis en forme indiquant une connaissance des technologies Levallois, et que la mise en forme de l´outillage par retouche bifaciale y est également attestée. Deux éclats en provenance de Horky IV étaient dans le lœss correspondant à MIS 8. Le site le plus jeune est Horky V, situé dans un sol très affecté par la solifluction et correspondant à MIS 7c. Le mobilier est pauvre et non diagnostique.

Traduction: L. Bernard

Schlüsselwörter / Keywords / Mots clés

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Petr Šída
Sandra Sázelová
Masarykova univerzita
Přírodovědecká fakulta
Ústav antropologie
Kotlářská 2
CZ - 61137 Brno
petrsida@seznam.cz
sazelova@sci.muni.cz

Pavel Havlíček
Česká geologická služba
Klárov 3
CZ - 11821 Praha 1
pavel.havlicek@geology.cz

Libuše Smolíková
Univerzita Karlova v Praze
Přírodovědecká fakulta
Ústav geologie a paleontologie
Albertov 6
CZ - 12843 Praha 2

Jaroslav Hlaváč
Geologický ústav AV ČR, v. v. i.
Rozvojová 269
CZ - 16500 Praha 6 Lysolaje
hlavac@gli.cas.cz

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