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PRELIMINARY COMPARISON OF KULYCHIVKA (LOWER LAYER) AND THE MORAVIAN BOHUNICIAN

1. Introduction

The transitional period between the Middle Paleolithic and the Upper Paleolithic is characterized by a specific technocomplex spreading from Levant to Eastern Central Europe and Asia. Technologically, this technocomplex is characterized by evolved Levallois technology combined with core frontal crest preparation and serial production of pointed flakes (elongated Levallois points) and blades with a faceted striking platform. Typologically speaking, the Upper Paleolithic tool types are combined with Middle Paleolithic tool types. This technocomplex is described by different names reflecting its chronological position between the Middle and the Upper Paleolithic or its geographic position – Initial Upper Paleolithic [e.g. Kuhn et al., 1999], Early Upper Paleolithic [e.g. Marks, 1993], MP/UP transitional period [e.g. Mellars, 1989] or Emiro-Bohunician [e.g. Svoboda, 2004]. This technocomplex is extremely important for the study of AMH dispersal into Eurasia from the Levant [e.g. Richter et al., 2008; Brandmöller et al., 2012; Hoffecker, 2009; Hublin, 2012].

In Eurasia, the transitional period between the Middle and the Upper Paleolithic (dating to ca. 50–40 kya), the lithic industries are similar to those known from the Near East (Boker Tachtit, Ksar Akil, Ücagizli Cave), the Balkan Peninsula (Temnata Cave), Western Ukraine (Kulychivka) and even further to the east (Kara Bom at Altai or Shuidonggou in western China). In contrast to the Levant, this technocomplex is intrusive with no local predecessor in Eastern Central Europe.

The first author of this paper has documented striking similarities in technologies used at the Levantine site Boker Tachtit and the Moravian site Stránská skála based on a detailed technological analysis of refitted sequences [Škrdla, 2003].

In 2012, both authors briefly visited the Ivan Krypiakevych Institute of Ukrainian Studies at Lviv where the Kulychivka material from V. Savych's excavation is currently deposited. Our aim was to examine this collection to see if we could identify characteristic features as defined for the Bohunician technology [cf. Škrdla, Rychtaříková, 2012]. The result of this brief study is presented in this article.

There were numerous expeditions to Kulichivka since its discovery in 1937. The most important field work at this site was a series of excavations conducted by V. Savich from 1968 to 1989. These excavations covered an area of more than 3000 m^2 and resulted in a collection of ca. 600 thousand artifacts from four layers [Ситник та ін., 2007]. Savych's excavation was later followed by two test pits (focused on clarifying the stratigraphy and obtaining new dates) under the supervision of O. Sytnik in 1998 and 2004 [Ситник та ін., 2007, Fig. 3].

In this article we would like to present a step by step technological comparison using the chaîne opératoire approach combined with a comparison of settlement geography.

2. Comparison of the geographic settings of Moravian Bohunician sites and Kulychivka

While Moravia (and the Brno Basin in particular) is characterized by a dense cluster of Bohunician sites, only isolated occurrences are known within the neighboring territories (Bohemia, Slovakia, Poland). Two site clusters (Stránská skála and Bohunice) and three isolated sites (Tvarožná, Líšeň/Podolí I, and Ořechov IV) have been excavated in Moravia. A dozen surface sites have also been documented. The Bohunician sites in the Brno Basin are distributed along the boundary separating highlands (Bobrava and Drahany Uplands) from Svratka River valley. The sites are located on elevated strategic positions above river valleys at altitudes ranging between 270–330 m asl (relative altitude ranges between 70–130 m above the river; Škrdla, 2002). The elevated position allows good

control of both highlands and the river valley. The central point of Bohunician occupation is the Stránská skála limestone cliff (the outcrop of Stránská Skála-type Jurassic chert).

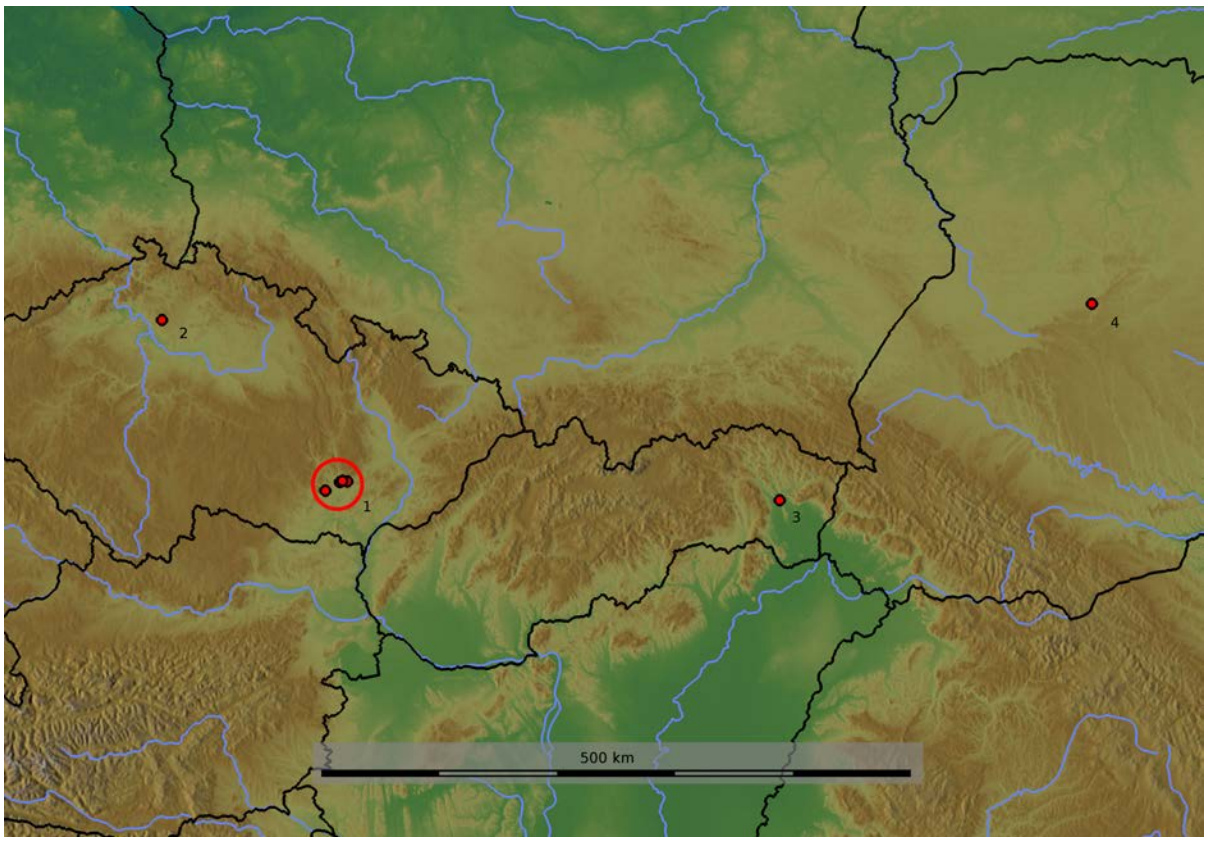

Fig. 1. Map with the location of discussed sites: *1* – Brno Basin and the surrounding region (Bohunice site cluster, Stránská Skála site cluster, Líšeň/Podolí I, Tvarožná X, Ořechov IV); *2* – Hradsko; *3* – Nižný Hrabovec (SK); *4* – Kulychivka (UA)

Рис. 1. Карта розташування стоянок: *1* – Басейн р. Брно і дотичний регіон (осередок пам'яток Богуніце, осередок пам'яток Странська Скала, Лішен/Подолі I, Тварожна X, Ожехов IV); *2* – Градсько; *3* – Нижній Грабовець (Словаччина); *4* – Куличівка (Україна)

The site of Kulychivka is located on a slope of a strategic elevation (Kulychivka Hill) above the Ikva river, on the outskirts of the town Kremenets', Ternopil district. The site lies on the northern headland of PodilskaVysotchyna (Podilie Highland) represented by Kremenetski Gory (Kremenets Mountains) on its boundary with Male Polissia Lowland. The site reaches an elevation between 270–280 m asl. and its relative altitude is ca. 35–40 m above the Ikva River [Sytnik et al., 2007, p. 181]. It is situated near the summit of Kulychivka Hill which reaches an elevation of more than 350 m.

3. Comparison of Stránská Skála and Kulychivka chaîne opératoire

The similarity between the Moravian Bohunician (Stránská Skála and Bohunice) and Kulychivka assemblages were noted many times [e.g. Demidenko, Usik, 1993; Svoboda, Škrdla, 1995; Svoboda, 2001; Meignen et al., 2004; Sitlivy, Zięba, 2006; Ситник, Коропецький, 2010].

Fourteen cores were completely reconstructed from artifacts excavated at Stránská skála III, IIIa & IIIc, as well as a series of shorter sequences. In general, the Moravian Bohunician technology, as reconstructed on the basis of refitted cores from Stránská skála, is characterized by serial production of elongated Levallois points (mean value for Stránská Skála length/wide ratio is 1.82 with a standard deviation of 0.62) with a bidirectional dorsal scar pattern and precisely faceted striking platforms. In this concept the blades were reduced in order to shape the core frontal face to an elongated triangle shape. Although the material from Kulychivka has not been refitted yet, contrary to previous comparison of refitted cores from Stránská Skála and Boker Tachtit, the posibility of comparison

between Moravian Bohunician and Kulychivka is limited. However, our preliminary analysis with an aim of finding specific features of Moravian Bohunician technology in the Kulychivka assemblage, allowed a preliminary comparison of the assemblages.

3.1. Raw material procurement

Stránská Skála is an isolated cliff of Jurassic limestone containing chert nodules. The Stránská Skála-type chert was available in both nodules and prismatic blocks extracted from a weathered limestone surface, collected within slope debris or exploited from Miocene sediments. The average dimension of nodules (sometimes blocks) is ca. 10–20 cm (occasionally up to 30 cm in length). Stránská Skála chert varies in quality and the exceptionally high quality known in Polish flint nodules is rare. Stránská Skála chert played an important role during the Early Upper Paleolithic in the Brno Basin and the surrounding region. Its occurence in assemblages decreases proportionately with increasing distance from its source.

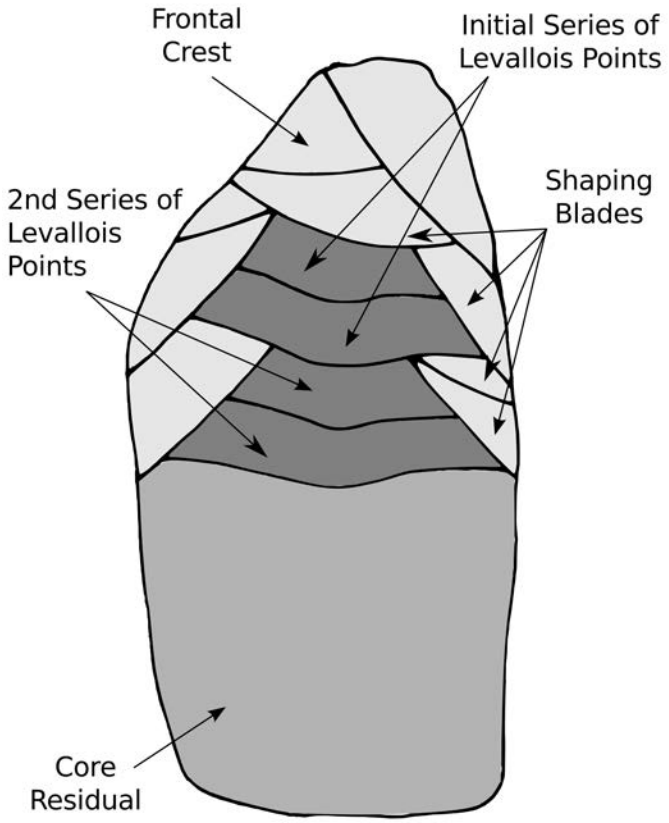

Fig. 2. Theoretical scheme of Bohunician technology
Рис. 2. Теоретична схема Богуніцької технології

At Kulychivka, the Upper Cretaceous (Turonian) flint nodules were available from chalk deposits that are soft and nodules were easy to extract. However, the nodules were also available in secondary (colluvial and alluvial) deposits.

3.2. Preparation stage

A distinguishing feature of refitted cores from Stránská Skála is frontal crest preparation indicated by the presence of crested blades. Crested blades (often secondary crests) were documented in the Kulychivka assemblage. The refitted Stránská Skála cores also indicate preparation of two opposed platforms. Although the preparation of two opposed platforms was not detected in the (non-refitted) Kulychivka assemblage, a bidirectional dorsal scar pattern occurs frequently on blanks and opposed platform core residuals indicating that bidirectional reduction for this preparation of two opposed platforms was necessary. An important find is a single burnt pre-core with a prepared frontal crest and two opposed platforms.

3.3. Production stage

The refitted cores from Stránská Skála [Škrdla, 2003; Škrdla, Rychtaříková, 2012] show that the result of the preparation phase was a core with a frontal crest and one or two prepared reduction platforms. The core reduction began with crest blade removal followed by a series of blade removals, often reduced from both opposed platforms. The aim of these removals, called débordant blades, was the attainment of an elongated triangular shape of the frontal face of the core. The striking platforms of these blades were faceted, allowing better control of the strike. In that time, the core often had two prepared platforms and its frontal face was ready for Levallois point production. The prevailing dorsal scar pattern was bidirectional or opposed directional [Škrdla, 2003, tab. 7,1]. Before the Levallois point removal, the striking platform was carefully prepared (faceted) to reach a slightly prolonged convex shape (not in the style of chapeau de gendarme, however) to allow accurate targeting of the strike. Now, the first Levallois point, or in many cases, a series of two Levallois points, was produced

(from the same platform). The striking platform was often reshaped before each point removal. The outcome was a wide frontal face of the core, not pointed, and the loss of its distal convexity – the necessary shape for subsequent production of a Levallois point. Therefore, it was necessary to narrow the wide frontal face of the core with several blade removals to prepare it for the production of another Levallois point. This process, defined by these two steps – 1) shaping and narrowing, and 2) production of Levallois points, continued until the raw material was exhausted.

As the Kulychivka assemblage is not refitted, we were able to only describe the cores and morphology of the blanks. The Kulychivka Levallois points are both short and elongated (length more than 2x greater than width). Bidirectional dorsal scar pattern is common, unidirectional dorsal scar pattern is rare and centripetal dorsal scar pattern was not observed et all. Striking platforms on Levallois points are faceted, often just coarsely. The faceting created a protruding convex form of the proximal end. The Levallois points are supplemented by blades, with faceted striking platforms infrequent.

3.4. Core abandonment

The refitted cores from Stránská Skála [Škrdla, 2003] show that in the final stage of working the core, the striking platforms for all removals were further prepared, and the frontal face was intensively shaped (narrowed) by a series of blade and flake removals from both opposed platforms. The core residual was thus significantly modified during that stage and its final shape does not reflect the technology used in the production phase.

Although the cores within the Kulychivka assemblage are often irregular in shape, many of them indicate bidirectional reduction and faceting of striking platforms. Although the negatives of Levallois points on core frontal surfaces cannot be unambiguously identified, this is due to the subsequent removal of flakes, potentially obliterating the negatives in question.

3.5. Formal tool production

The different Bohunician collections contain up to 4 % of tools (cf. Svoboda, 1987; Škrdla et al., 2013). The Bohunician typological spectrum represents a mixture of Middle and Upper Palaeolithic tool-types. Among the Middle Palaeolithic tool-types, side scrapers of different forms occur frequently followed by different types of points, notched and denticulated artifacts. Points include unretouched Levallois, convergently retouched (Mousterian), leaf points, rare Jerzmanowice-type points and Quinson-type points. The Upper Palaeolithic tool kit is represented mainly by end scrapers and rare burins.

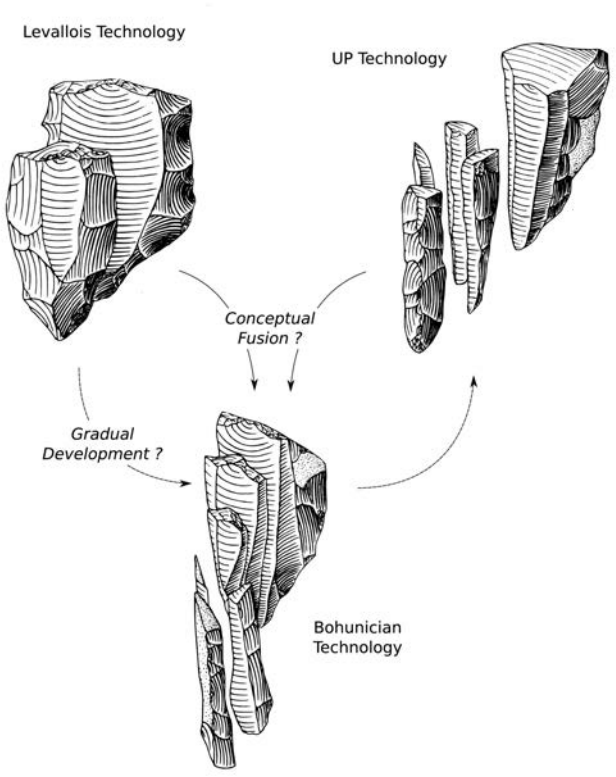

Fig. 3. Position of Bohunician technology between the Middle and Upper Paleolithic technologies

Рис. 3. Позиція Богуніцької індустрії у системі середньо та пізньопалеолітичних технологій

The proportion of tools in Kulychivka reaches 3.4 % of the total number of artifacts [Ситник, Коропецький, 2010, p. 24]. Middle Palaeolithic tool types include side scrapers of different forms, Levallois points, retouched flakes and notches. The Upper Palaeolithic tool kit is represented by end scrapers, retouched blades, and burins.

3.6. Chronology

Series of ^{14}C, OSL and TL dates are available for the Moravian Bohunician. The radiocarbon dates (calibrated using CalPal, Weninger et al., 2007) have a relatively wide spread (between 40–48 ky cal BP_{HULU}). The spread in OSL age estimates is even larger [cf. Richter et al., 2009; Nejman et al., 2011]. The TL weighted mean value of 48.2±1.9 kya [Richter et al., 2008] was obtained directly from heated stone artifacts and relates most directly to the human occupation, unlike the results of other dating methods. The results obtained by different methods document the presence of the Bohunician since GIS-12. The results of dating indicate that Bohunician lasted for either one or even three subsequent GIS periods.

Fig. 4. A view of Stránská Skála (left) and Kulychivka (right, photo by O. Sytnik) raw material outcrops
Рис. 4. Вид на виходи сировини біля стоянок Странська Скала (ліворуч) та Куличівка (праворуч, фото О. Ситника)

Although no absolute dates are available for the Kulychivka lower layer (4), there are two new ^{14}C dates (29700±280 ^{14}C BP, Poz-38145, and 33000±400 ^{14}C BP, Poz-51432) and a TL date (34±4 BP_{TL}, Lub-4920) from sediment in the overlying layer (3) [Sytnik et al., 2012]. While the TL date and one radiocarbon date after calibration (34020±270 cal BP_{HULU}) overlap with GIS-6, the second radiocarbon date (37300±820 cal BP_{HULU}) falls into GIS-8. If the later date is accepted as the oldest date for layer 3, then layer 4 – stratigraphically below layer 3 – must be older and will overlap with the large probability distribution of the Moravian Bohunician dating results.

4. Discussion

Although the Moravian Bohunician sites and Kulychivka are distant to each other, one can look for similarities both in their geographic position (on highland margins above river valleys) and settlement strategies (strategically located elevations allowing control of a large area, on a raw material outcrop).

The step by step comparison of chaîne opératoire beginning from raw material procurement through preparation and production phases until abandonment of the exhausted core allowed detailed comparison of the technological process. Procurement of raw material in the Moravian Bohunician was characterized by the utilization of Stránská Skála-type chert. The Stránská Skála site complex is located directly at the outcrop and other key-sites (Líšeň/Podolí I, Bohunice, Tvarožná X, Ořechov IV) are no further than 15 km from it. The distribution of Stránská Skála-type chert was documented up to ca. 35 km from the source, however, the percentage of this chert decreases proportionately with increasing distance from the outcrop. In an analogous fashion, the Kulychivka site is located directly at the important local raw material outcrop and this high-quality Turonian flint was also exported away from the outcrop. We can conclude that raw material procurement is the same. The next three steps on the operational chain are not easy to recognize in detail because a refitting study of Kulychivka cores has not been completed. However, we can look for particular artifacts indicating similarities in the technological process. The preparation of crested cores with two opposed platforms

is indicated by the presence of crested blades and opposed directional cores. Similarly, the production phase focused on production of elongated Levallois points with faceted striking platforms and bidirectional dorsal scars is demonstrated by a number of Levallois points meeting those criteria.

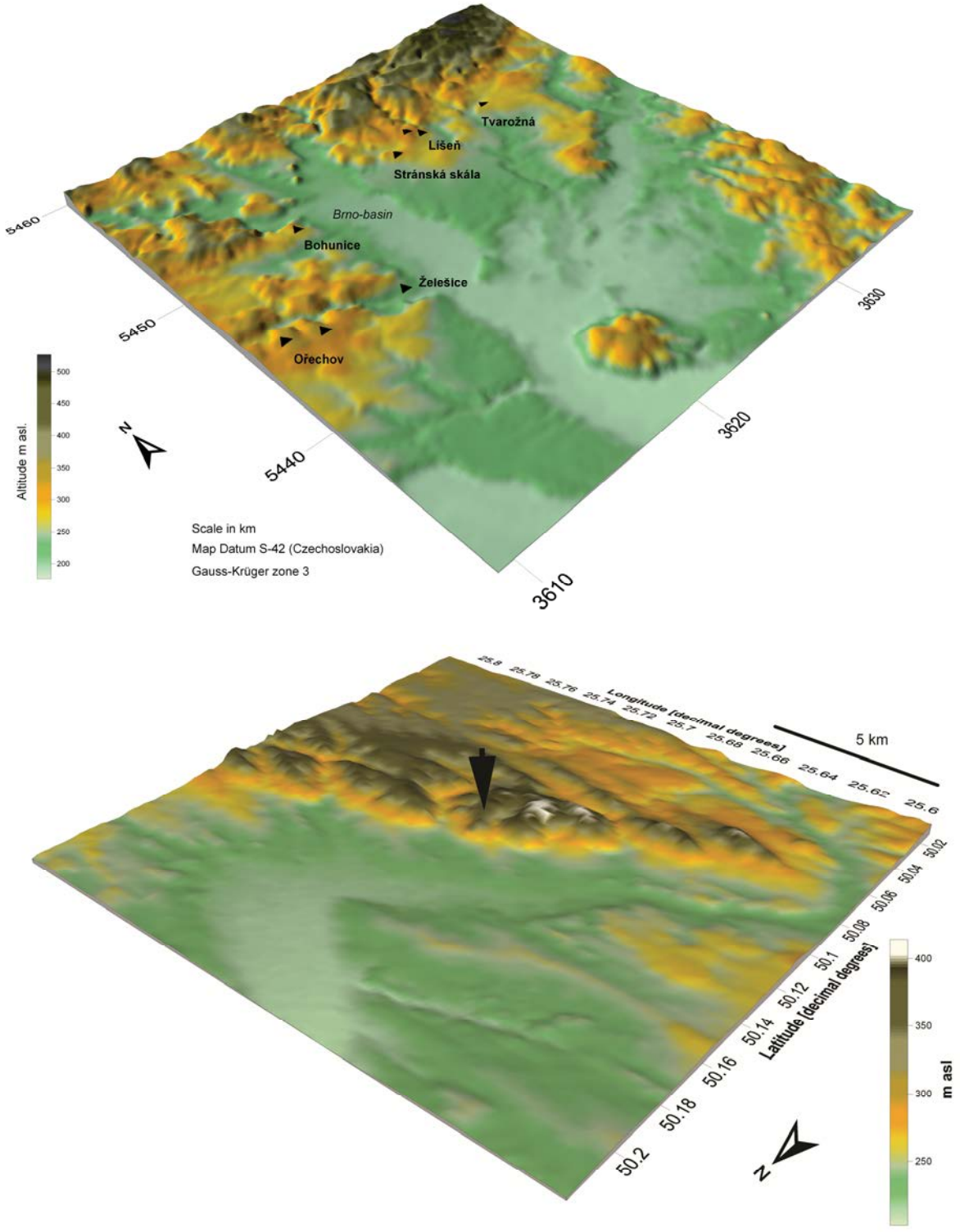

Fig. 6. Relief map on the location of sites Stranska Skala (above) and Kulychivka (below)
Рис. 6. Карта місцерозташування пам'яток Странська Скала (згори) та Куличівка (внизу)

The fact that blades occur frequently, including typical débordant blades, demonstrates that narrowing of core frontal faces for Levallois point production. The core morphologies were changed in their final phase of reduction and core residuals do not accurately reflect the method used during their production phase [(cf. Škrdla, 2003]. We can conclude that we have documented a high degree of technological similarity in all the steps of the technological chain between the Moravian Bohunician sites and Kulychivka.

The typological spectra at both sites are typified by a mixture of Middle and Upper Paleolithic tool types. The typological spectrum of the Kulychivka assemblage falls within the range of Moravian Bohunician collections that are not homogeneous (e.g. presence of bifacial reduction in Bohunice).

Comparing the Moravian Bohunician sites and Kulychivka chronologically is not easy due to lack of dating at the Kulychivka site. Some authors [e.g. Svoboda, 2001; Meignen et al., 2004] have suggested that Kulychivka is younger than the Moravian Bohunician. However, recently obtained radiocarbon dates from layer 3 and TL date from sediment of the same layer indicate the earlier age for underlying layer 4 – earlier than GIS-8, is similar to the dates for the Moravian Bohunician.

5. Conclusion

The distance between Brno Basin and Kremenets' measured in a straight line is ca. 670 km. It is probably unreasonable to surmise that direct contacts took place between the two sites. However, as noted by many authors before us, and based on our own conclusions, both sites shared a similar behavioral package [cf. Tostevin, 2000, 2012] including similarities in settlement strategies and lithic chaîne opératoire.

Based on our preliminary investigation we can conclude that a high degree of similarity exists between the Brno Basin Bohunician and Kulychivka lower layer assemblages. However, further research needs to be completed to verify these results – technological studies (including refitting and attribute analysis) and dating are needed to clarify the chronological position of Kulychivka.

Acknowledgments

We would like to express our gratitude to Olexandr Sytnik for permitting access to Kulychivka material, Ruslan Koropets'kyi for organizing our visit in L'viv and a visit to the Kulychivka site, and to Ladislav Nejman and Ruslan Koropets'kyi for fruitful discussions concerning the theme of this paper. The early Upper Palaeolithic project, in the frame of which we visited L'viv, was supported by ASCR grant No. IAA800010801.

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ПОПЕРЕДНІ РЕЗУЛЬТАТИ ПОРІВНЯННЯ НИЖНЬОГО ШАРУ СТОЯНКИ КУЛИЧІВКА ТА ПАМ'ЯТОК МОРАВСЬКОГО БОГУНІСЬЄН

Наведено короткий порівняльний аналіз двох пізньопалеолітичних осередків: пам'яток моравської індустрії богунісьєн (Чехія) та поселення нижнього шару стоянки Куличівка (Україна), дуже подібних у багатьох аспектах, включаючи поселенську стратегію та техніку розщеплення кам'яної сировини. Розглянуто особливості їхнього географічного розташування, часові рамки та характерні риси кременеобробки. На думку авторів, означені осередки є частиною масиву технологічно близьких індустрій, які поширились від Близького Сходу до Західного Китаю у перехідний період між середнім та пізнім палеолітом. Відзначено, що характер зв'язків між комплексами, включеними до цього масиву, на сучасному рівні досліджень встановити складно. Для розв'язання цих питань необхідно продовжити опрацювання колекцій артефактів (у тому числі з використанням методів реконструкції та аналізу атрибутів) та отримати нові абсолютні дати для уточнення хронологічної позиції стоянки Куличівка.