Underwater digging at Epigravettian site Mohelno in Moravia

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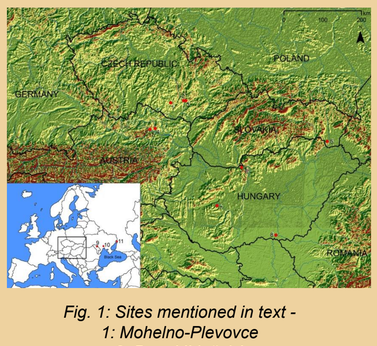

Fig. 1: Sites mentioned in text -
1: Mohelno-Plevovce
2: Brno-Vídeňská
3: Brno-Stránská skála IV
4: Grubgraben
5: Kašov
6: Esztergom-Gyurgyalag
7: Ságvár
8: Szeged-Öthalom
9: Raşcov 7 & 8,
10: Anetovka I
11: Muralovka
12: Rosenburg.

Introduction

A new Late Upper Palaeolithic site that documents repeated human penetration into Central Europe during the Last Glacial Maximum (LGM from here) and the Last Glacial periods, was recently discovered and excavated in Moravia. The terminal LGM occupation (characterized by tiny microlithic tools produced on carenoidal blanks) in combination with a Last Glacial Epigravettien industry (bladey industry reduced from biderectional cores including straight truncated backed microblades) have been identified at Mohelno-Plevovce to date.

Mohelno-Plevovce is located on the Jihlava River in the Czech Moravian Highlands. In the 1970s the area was deforested for the construction of the Mohelno water reservoir, which is a part of Dalešice pumped-storage hydroelectric power plant. Since then the location has been continuously disturbed by erosion caused by fluctuating water levels, which rise and fall by up to 11 m, often on a daily basis. Archaeological field work is possible only during scheduled maintenance breaks when the water level is lowered for several days. The excavation is complicated by a high moisture content of the sediments as well as limited time (maintenance breaks last only 3 – 5 days).

Spatial distribution

The impact of erosion of the fluctuating water levels separates the site into 4 zones that are characterized by different types of erosion.
Zone 1: still forested, not flooded (above the maximum water level) and currently not in danger of disturbance – unexcavated and not available for surface survey;
Zone 2: deforested and grassed area (below the maximum water level) influenced by channel erosion (a network of continually migrating and deepening channels) – artifacts eroding from intact layers are frequently collected in the channel bottoms;
Zone 3: degrassed area (beach) that is affected by surface erosion continually enlarging into Zone 2. Within the lower third of this zone, the sediments with artifacts have already been removed and the removals slowly continue upslope. Two stone structures (KSA & KSB) were excavated in the middle of the beach and two artifact clusters were excavated (AC1 & AC2) on the boundary with Zone 2.
Zone 4: underwater area (under the minimum nuclear power plant emergence water level in the reservoir) – not available for survey or excavation.

Fig. 2: Channel (foreground) and surface (background) erosion on the boundary between zones 2 and 3.

Excavation methodology

The excavation was complicated not only by a severe time restriction, but also by the high moisture content of the sediments. Despite these limitations, we removed the sediments using trowels and recorded the excavated artifacts in a site grid. The excavated sediments were transported to a nearby lake for wet sieving (using a 2 x 2 mm mesh size). We have documented (3D photography) the stone structures and all artifacts within the structure. We have not observed any postholes or pits, but this could be due to the water-logged, muddy, colluvial sediments.

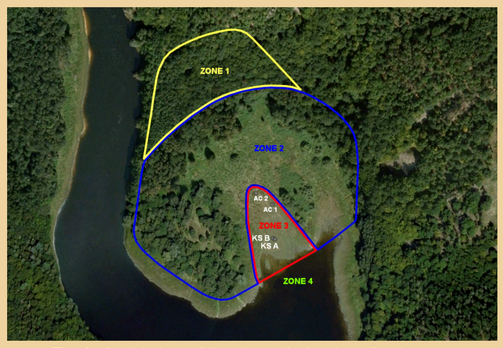

Fig. 3: Aerial view of the site with the described zones.

Fig. 4: Excavation in waterlogged sediments.

Industry from stone structures KSA & KSB

Two similarly shaped stone structures interpreted as floor pavements of dwelling structures were documented. These structures are characterized by a high density of artifacts within the paved area and their density decreases rapidly away from the paved area – this is interpreted as a result of the 'barrier-effect' of the covered area.
The dominant raw material in the KSA assemblage is imported erratic flint (70.3%) while in KSB it is locally sourced rock crystal (78.1%). Other rock types used include a siliceous weathering product of serpentinite, colorful varieties of radiolarite (including Szentgál-type), quartz, and Krumlovský les-type chert. The industry is characterized by atypical carinated end scrapers that served as cores for the production of blanks that were used to manufacture retouched microlithic tools. The microlithic tools are small, often less than 10 mm long. Comparable microlithic tools have not been documented in Moravia, or the surrounding countries, but examples of very similar microlithic industries include Muralovka (1700 km east of Mohelno) on the lower Don in Russia, Anetovka I on the lower Bug in Ukraine (1125 km east of Mohelno), and possibly also Raşcov 7 & 8 in Moldavia (960 km east of Mohelno).
The Szentgál-type radiolarite indicates contacts with the Bakony Mountains area in Hungary and the erratic flint indicates contacts with the Moravia/Poland border. The raw materials used suggest a large source territory and group mobility covering a minimum distance (in direct line) of 300 km in the north-south direction. Chronological and paleoenvironmental data indicate a cold phase at the end of the LGM.

Industry from the artifact concentrations AC1 & AC2

Another two spatially constrained artifact clusters (AC1 & AC2) were excavated at the Mohelno-Plevovce locality. The AC1 & AC2 assemblages are similar to each other and characterized by the production of elongated, narrow and straight blades and bladelets removed from bidirectional cores. The tool kit is characterized by backed bladelets, sometimes with a straight truncation (in one case at both ends – a rectangle). The industry was produced from imported raw materials - mostly erratic flint supplemented by several items made from radiolarite and one artifact made from obsidian. In addition, the amphibole pads were excavated within both clusters, one of them with remarkable impact traces on its surface. Although material suitable for dating was not recovered, based on the technology and typology we can compare AC1 & AC2 with the Brno-Štýrice site cluster.

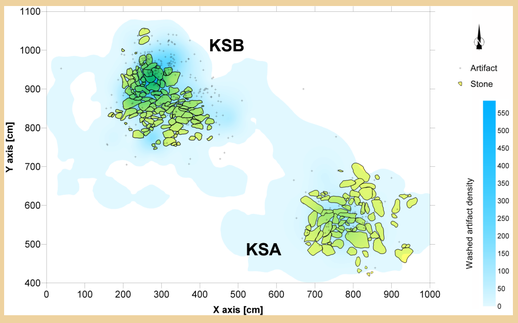

Fig. 5: Stone structure KSA and stone structure KSB plotted in the site grid system.

Fig. 6: Cleaned KSB stone structure.

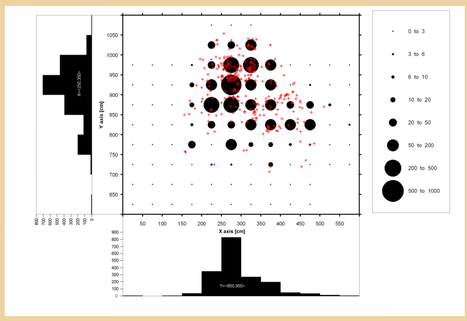

Fig. 7: Barrier effect along the KSB stone structure.

Fig. 12: Amphibolite slab with traces of use from AC1.

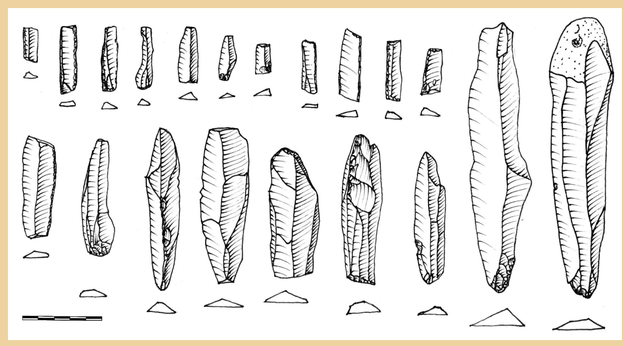

Fig. 13: Selected artifacts from AC1.

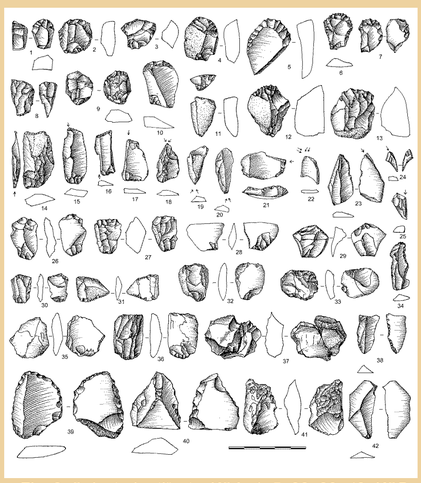

Fig. 8: Selected artifacts. KSA: 1–5, 23–29, 42; KSB: 6–22, 30–41.

Fig. 9: Retouched microlithic implements refitted on a carinated end scraper.

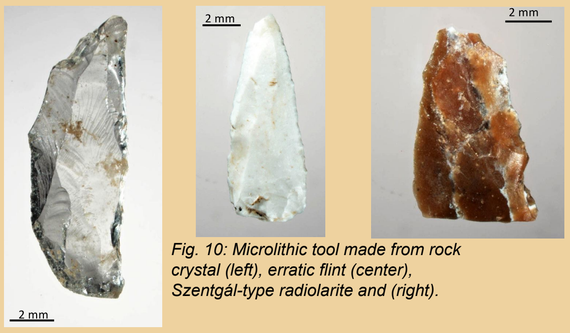

Fig. 10: Microlithic tool made from rock crystal (left), erratic flint (center), Szentgál-type radiolarite and (right).

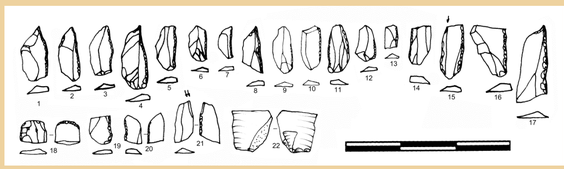

Fig. 11: Selected microlithic tools from KSA.

Fig. 14: Excavation of AC1.

Fig. 15: Bidirectional cores from AC1.

Epigravettian chronology in Moravia

Upon eyeballing the spread of radiocarbon dates for Moravia and the neighbouring territories (Slovakia, Austria, Hungary, Poland, and Germany) and taking into account the techno-typological aspects of lithic industries, it is possible to subdivide the Epigravettian into three phases.

- **Phase "SS-IV" (22.5–21.0 ky cal BP)**

Stránská skála IV (CZ), Grubgraben (A), Kašov I (upper layer) (SK), Ságvár (HU), Mittlere Klause, Kastelhöhle-Nord and Wiesbaden-Igstadt (D), Kraków-Spadzista C2 and Deszczowa cave (PL)(?) The lithic industries at these sites include steeply retouched artefacts and microlithic tools. While the lithic assemblages from Stránská skála IV and Kašov are distinctly rich in blades, those from Grubgraben and Ságvár feature flake technologies.

- **Phase "Plevovce" (20–19.5 ky cal BP)**

Mohelno-Plevovce (KSA), Esztergom-Gyurgyalag, Szeged-Öthalom (HU), Rosenburg, Grubgraben (upper layer) (?) (A). The lithic assemblages are characterized by variable microlithic components – microliths on carenoidal blanks removed from carinated endscrapers are present in Mohelno.

- **Phase "Brno-Vídeňská" (19–17 ky cal BP)**

Brno-Vídeňská, Mohelno-Plevovce (AC1&2), and Stadice (CZ), more sites in Poland and Hungary.
The lithic assemblages are characterised by the manufacture of long, narrow, symmetrical blades, often manufactured from bipolar cores. A typologically dominant component are burins with blade endscrapers and microliths represented by backed blades.

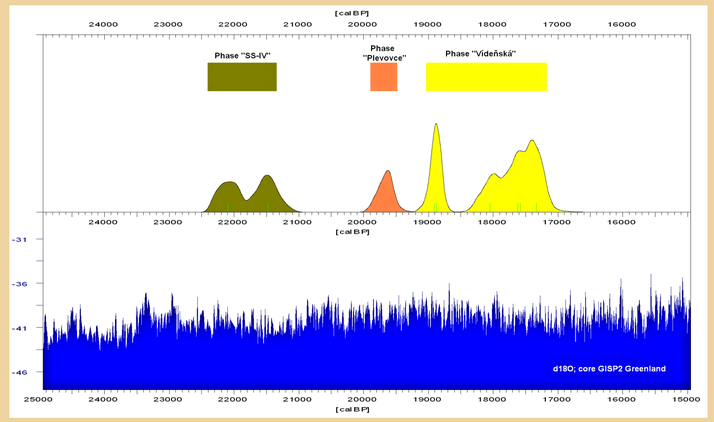

Fig. 16: Available dates for Moravian Epigravettian. Dates were calibrated using CalPal 2014 software (Weninger and Jöris, 2008) on IntCal13 (Reimer et al., 2013) curve.

Preliminary conclusion

Salvage excavation of the Mohelno–Plevovce site yielded important results even though it was conducted under uniquely challenging excavation conditions. Continuing research (both in the field and the laboratory) could significantly contribute to the study of LGM and post-LGM human adaptations in Eastern and Central Europe and possible contacts with eastern refugia during and after the LGM.

References to the site

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