Distant connection changes from the Early Gravettian to the Epigravettian in Hungary

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Abstract: Rock resources in the territory of Hungary yielded a large variety of knapped tool stone materials in the Palaeolithic. Flint materials from north and east of the arch of the Carpathians are also present in the Middle and Late Upper Palaeolithic record of Hungary, especially in Gravettian and Epigravettian assemblages. Distant raw materials are often indicative of connections between remote areas. The Hungarian archaeological record shows that from ca. 28 to 13 k years BP there is decrease in the proportions of distant flints at the Last Glacial Maximum. The highest ratio of distant materials appears after the withdrawal of the ice sheet between 17 and 13 k years BP. Therefore climatic conditions seem to have influenced distant connections. Connections could have been direct, and the distant flints in the archaeological assemblage represents an adherence to high quality materials.

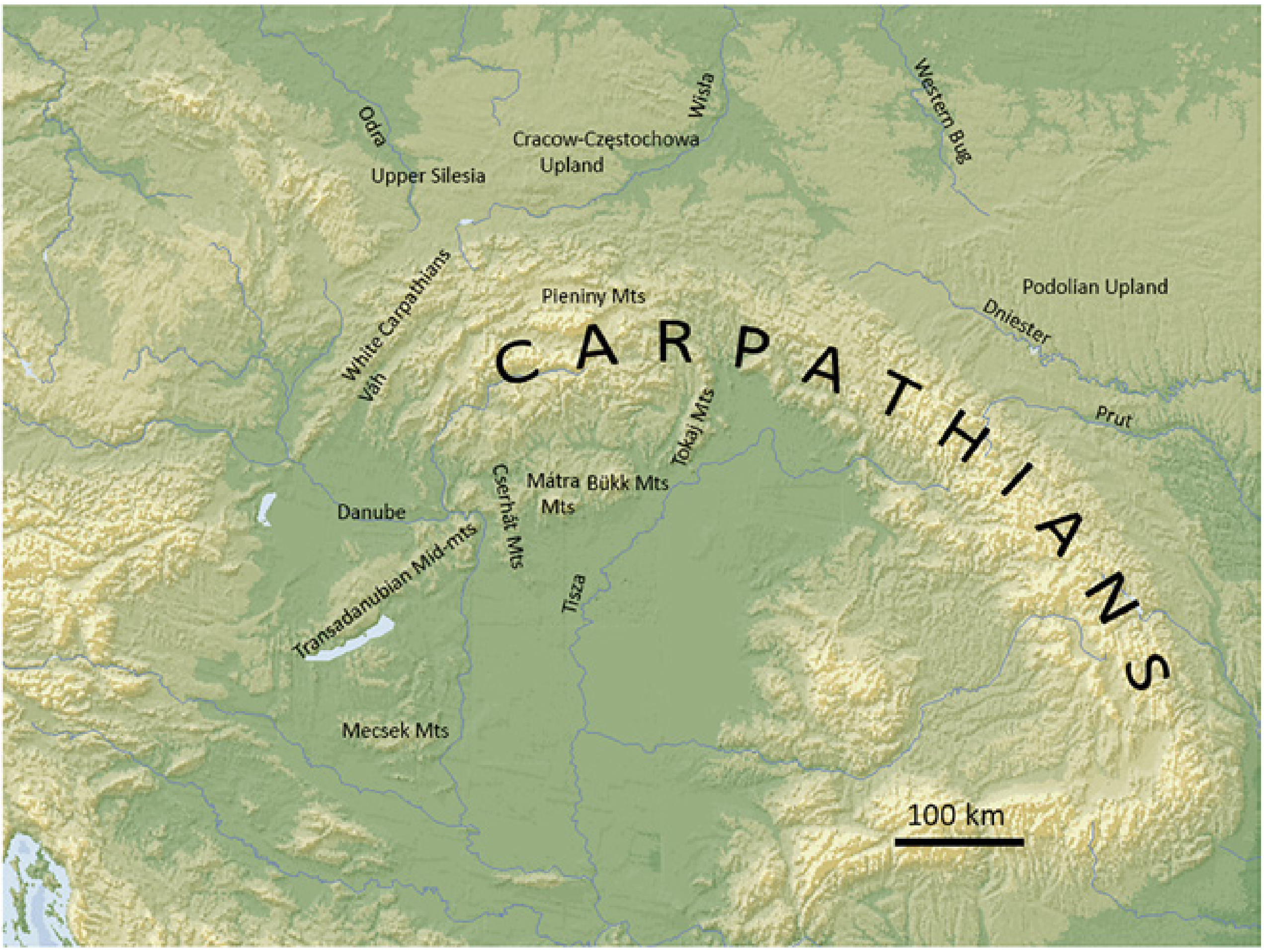
Key-Words: lithic raw material, Gravettian, Epigravettian, Pannonian basin.

1 INTRODUCTION

Rock resources in the territory of Hungary yielded a large variety of knapped tool stone materials in the Palaeolithic (Biró 1986, 1987a, 1987b, 1988, 2009, 2011a; Biró & Dobosi 1991; Biró *et al.* 2000; Dobosi 2000a; Kasztovszki *et al.* 2008; Markó *et al.* 2003; Szekszárdi *et al.* 2010; Vértes & Tóth 1963). This abundance however excludes Cretaceous and Jurassic flints which are plentifully accessible in the present territory of Poland, Romania, Molodova and Ukraine (Féblot-Augustins 1997). In spite of the apparent tool stone availability in the Carpathian basin, flint materials from north and east of the arch of the Carpathians are present in the Upper Palaeolithic record of Hungary, especially in Gravettian and Epigravettian assemblages (Biró 2009; Dobosi 2009b; Simán 1989a). The distance between Hungarian sites and the flint sources is exceptionally great in the Upper Palaeolithic of Europe, varies from 300 to 600 km (Dobosi 2011).

Generally, raw material procurement from a territory exploited for vegetal and animal food resources can be interpreted as an embedded strategy within hunting or food gathering activities (Binford 1979). The presence of distant raw materials in lithic assemblages is commonly interpreted as the trace of connections between territories locating far from each other, which let gaining insight into human land use and mobility (Andrefsky 2009). Besides this, distant raw materials in an archaeological assemblage could also be the expression of immaterial behaviors, such as information exchange (Aubry *et al.* 2012).

FIGURE 1 Physical geographic map of the study area.



Also, there are examples for procuring lesser quality rocks from long distance even though locally better quality was available (Gould & Saggers 1985). Present paper gives an explanation to the changes of connections between the Carpathian basin and the outer territories in the Gravettian, Ságvárian, and Epigravettian cultures on the basis of distant flint proportions in the assemblages.

2 THE "GRAVETTIAN ENTITY" OF HUNGARY

The classification of lithic assemblages containing backed bladelets and Gravette points severally changed in the past 60 years in Hungary (Dobosi 2005; Gábori 1989; Gábori & Gábori-Csánk 1957; Vértes 1960). The term Gravettian became a collective noun for sites dated to between 29 and 12 k years BP and the latest classification model groups these sites into three distinct units under the term "Gravettian Entity" (Dobosi 1999, 2000b, 2005, 2009a).

Gravettian Entity model calls the sites dated to between 29 and 26 k years BP Pavlovian or Older Blade Gravettian. The name Pavlovian refers to both the age and the cultural identity of the sites. The lithic industries are characterized by blade technology, burins, end scrapers, and retouched blades, and a moderate frequency of Gravettian tool types such as backed blades and bladelets, Gravette points, and shouldered blade points.

The next group of sites in the model is called Ságvárian or Pebble Gravettian, dated to between 19 and 17 k years BP. Lithic assemblages are characterized by a special technology that obtained short blades, flakes, and tiny bladelets from pebble raw materials. Stone tool types are similar to those known in Hungarian Pavlovian context, including burins, end scrapers, backed bladelets, and Gravette points, but the proportion of Gravettian tool types is low whilst burins and especially end scrapers are numerous. Because of the pebble raw material use the size of the tools is considerably shorter than in the Pavlovian.

Latest group of sites in the model is called Epigravettian or Younger Blade Gravettian, dated to between 18 and 12 k years BP. Lithic tool types and the technology do not differ from those of the Hungarian Pavlovian. Consequently, the model regards the Epigravettian as the descendant of the Pavlovian.

3 AN ALTERNATIVE DIVISION

The latest review on the radiocarbon dates of the Gravettian Entity pointed out that their majority is inappropriate for absolute chronology (Lengyel 2008–2009). Among all the sites reviewed the Pavlovian sustained a heavy loss of radiometric dates because the organic samples could not have been associated with archaeological features. On the contrary, Ságvárian sites seemed reliably datable to between 20 and 18 k years BP. Epigravettian sites also possessed unreliable dating conditions and finally dates of only two sites assign radiocarbon ages of 17 and 13 k years BP for this cultural phenomenon.

As a consequence of the date revision, the insecurities around the radiocarbon database lead to make the use of relative chronological means to connect sites with archaeological cultures and periods. Although there is no consensus between scholars on the taxonomy of the Gravettian in Eastern Central and East Europe (Kozłowski 2007, 2013; Moreau 2009; Noiret 2009; Oliva 2007; Svoboda 2007), there are some tool types in Gravettian context which seem to be reliable chronological markers. For the earliest period between 30 and 27 k years BP those are the fléchette, microgravette, and pointed blades. This is the Early Pavlovian (Kozłowski 2007; Svoboda 2007) or more convincingly the Early Gravettian (Moreau 2010). In the next period between 27 and 25 k years BP, called Evolved Pavlovian or simply Pavlovian (Moreau 2009), there is a remarkable increase of microliths including backed denticulate bladelets and geometrics (Svoboda 2007). After this, in the Late Gravettian, also called Willendorf-Kostenkian, between 25 and 20 K years BP, shouldered points and leaf points are characteristic (Svoboda 2007). Kozłowski (2013) more precisely divides the Late Gravettian period into three contemporaneous units: the Gravettian with shouldered points, the Late Gravettian with leaf points, and the Late Gravettian with backed bladelets. Between 20 and 18 k years the Ságvárian is characterized by short end scrapers, burins and a moderate frequency of backed laminar elements (Lengyel 2011; Tolnai-Dobosi 2001). On the other hand, Ságvárian sites were annexed to the Kašovian culture dated to between 20 and 15 k years BP (Svoboda & Novák 2004). Svoboda (2004) sees no genetic relation between Kašovian and the preceding Gravettian thus proposed to restrict the term Epigravettian to the Mediterranean Europe, where backed armatures and microliths proliferated in post Last Glacial Maximum (LGM) assemblages. Kašovian typologically is dominated by short endscrapers and burins, and backed implements are present with low frequency such as in the Ságvárian. The definition of Kašovian seems clear, but the lithic assemblages indeed compose a very heterogeneous group to such extent that not much has been accepted from this proposal by others. The Epigravettian, still is used in the region instead of Kašovian, is characterized by a few types of tools such as burin, endscraper, truncation and backed bladelets between 20 and 17 k years BP, while between 17 and 10 k years BP the assemblages yielded a greater number of backed elements and geometrics (Noiret 2009).

According to the tool kit compositions of the assemblages in Hungary, the Middle Upper Palaeolithic sites can be reclassified (**figure 7**). Contrary to what has been claimed for decades (Vértes 1955), Istállóskő Cave upper stratigraphic proportion is unlikely Aurignacian and it rather can be classified Early Gravettian on the basis of typological similarity with Willendorf II layer 5 (Mester *et al.* 2008). The radiocarbon dates obtained from these levels match the chronological position estimated with the tool types (Davies & Hedges 2008–2009, Adams & Ringer 2004). The Pavlovian sites, especially Bodrogkeresztúr (Vértes 1966), although have some affinity to the Early Gravettian (Moreau 2009), but the fléchettes, microgravettes, and backed truncated bladelets are also characteristic to Late Gravettian dated to between 25 and 22 k years BP (Wilczyński *et al.* in press; Žaár 2007). Therefore, a very early Gravettian presence in Hungary cannot be firmly argued. A single site in Hungary, Hidasnémeti (Simán 1989b), belongs to the shouldered point variant of the Late Gravettian, which was originally classified as Pavlovian (Dobosi 2005). Also there are Gravettian sites with leaf points, such as Hont-Parassa III (Dobosi & Simán 2003), and Szeleta Cave layers 6 and 5, the tool assemblage of which consists of backed bladelets, retouched blades, a shouldered blade, a Gravette point, and leaf points (Kadić 1916). These assemblages in Szeleta Cave already associated with the Gravettian. Between 20 and 18 k years BP a new Ságvárian site is Budapest Corvin-tér (Ringer & Lengyel 2008–2009). Clear Epigravettian sites in Hungary can be those characterized by abundant number of backed elements and some geometrics thus seem to belong to the late phase of this culture (Noiret 2009).

4 POPULAR LITHIC RAW MATERIAL SOURCES OF THE HUNGARIAN UPPER PALAEOLITHIC (FIGURES 2 AND 3)

Radiolarite

4.1 Abundant outcrops of radiolarite are found in Western Hungary. The Transdanubian Midmountains (especially in Bakony Mountains) and Mecsek Mountains have several outcrops mostly of Jurassic age. The most recognized source is at Szentgál in Bakony Mts. Radiolarites are generally cryptocrystalline, fine grained textured, brown, reddish brown colored but there are colors of gray, green, purple and yellow as well (**figure 5**). They are found in distinct beds and as nodules as well. In its primary source those are often cracked and homogeneous parts are rare (Biró 1988; Biró *et al.* 2009). Another source of radiolarite is in gravels of rivers running south from the Carpathians. The primary sources outcrop from the White Carpathians in West Slovakia to the Pieniny Mountains in South Poland and in east Slovakia (Kozłowski *et al.* 1981).

Post volcanic sedimentary siliceous rocks (limnic silicites, limnic and hydro-quartzite)

4.2 The terminology of these rocks is inconsistent (Götze 2010; Přichystal 2010). These rocks are abundant where Miocene volcanism took place such as in Cserhát, Mátra and Tokaj Mountains (Markó 2005; Takács-Biró 1986). These rocks often form thick beds and they can be found in masses. The materials are very diverse in texture and color (**figure 4**). The matrix is very often heterogeneous, include cracks, and inclusions. These materials today are called limnic and hydro-quartzite (Biró 2010).

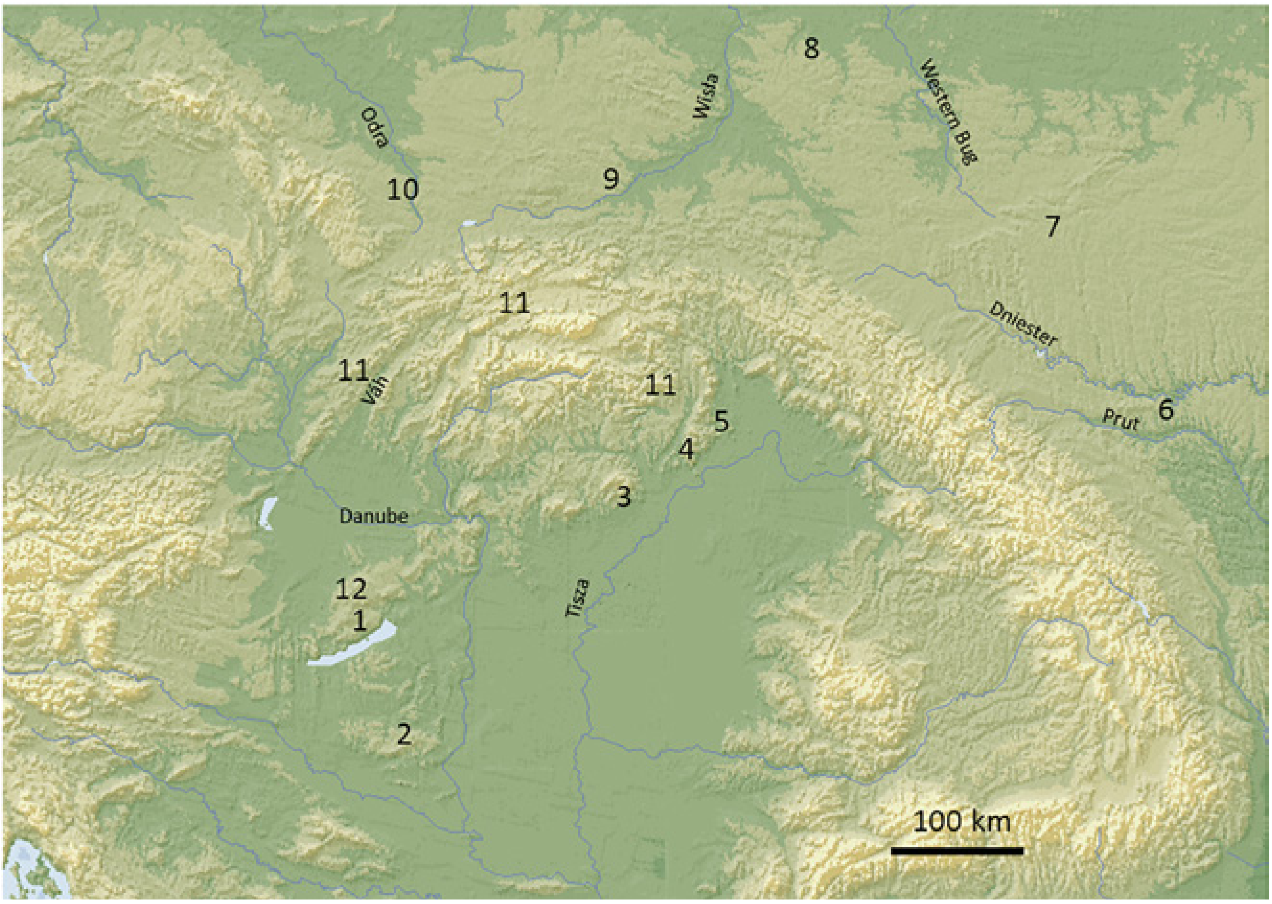


FIGURE 2 Lithic raw material sources mentioned in the text. 1, 2, 11. radiolarite; 3. felsitic porphyry; 4. C2 obsidian (Hungarian) and limnic and hydro-quartzites; 5. C1 obsidian (Slovakian); 6. Prut-Dniester flint; 7. Podolian flint; 8. Swieciechów flint; 9. Jurassic flint; 10. Erratic or Silezian flint; 12. Tevel flint.

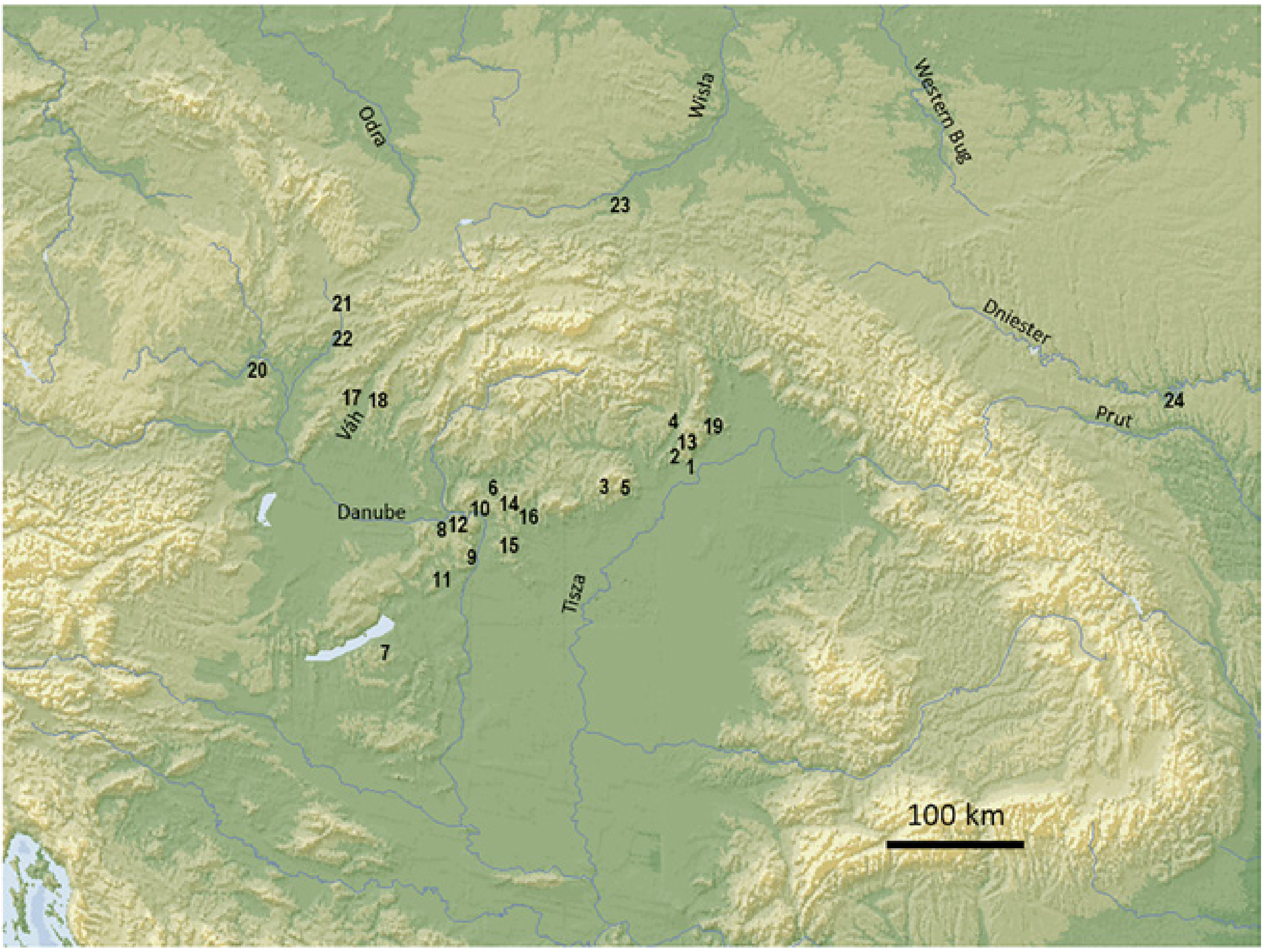


FIGURE 3 Sites mentioned in the text: 1. Bodrogkeresztúr; 2. Megyaszó; 3. Istállóskő Cave; 4. Hidasnémeti; 5. Szeleta Cave; 6. Hont-Parassa III; 7. Ságvár; 8. Mogyorósbánya; 9. Budapest Corvin-tér; 10. Szob; 11. Nadap; 12. Esztergom; 13. Arka; 14. Püspökhatvan; 15. Jászfelsőszentgyörgy; 16. Verseg; 17. Trenčianske Bohuslavice; 18. Moravany sites; 19. Cejkov I and Kašov I; 20. Dolní Vestonice I, Pavlov I, Milovice I/G; 21. Předmostí; 22. Jarošov II and Napajedla; 23. Targowisko 10; 24. Babin I and Voronovitsa I.

Obsidian **4.3** Obsidian sources are located in the Tokaj–Prešov Mountains in Hungary and Slovakia. Their formation is connected to tertiary, Miocene volcanism (Kaminská 1991; Takács-Biró 1986; Williams & Nandris 1977). Slovakian obsidian is also called Carpathian type 1 and the Hungarian Carpathian type 2. The main difference between the two is that the former is translucent while the latter is thick black or dark grey non translucent (**figure 3**) (Williams-Thrope *et al.* 1984). There is a reddish variety of the obsidian in the Hungarian sources (Biró *et al.* 2005). The obsidian nodules are in secondary deposition and today their size hardly larger than 5 cm and the majority is even smaller. In archaeological assemblages also this size is the most common, but there are knapped specimens referring to much larger nodules as well.

Felsitic porphyry **4.4** Felsitic porphyry or metarhyolite was widely applied in the leaf point and bifacial lithic industries in East Hungary (Markó *et al.* 2003; Kasztovszky *et al.* 2008). This material forms large masses and beds in the eastern Bükk Mountains. Its general feature is a laminated structure that makes it often heterogeneous. It has a vitreous appearance and light to dark gray color (**figure 5**).

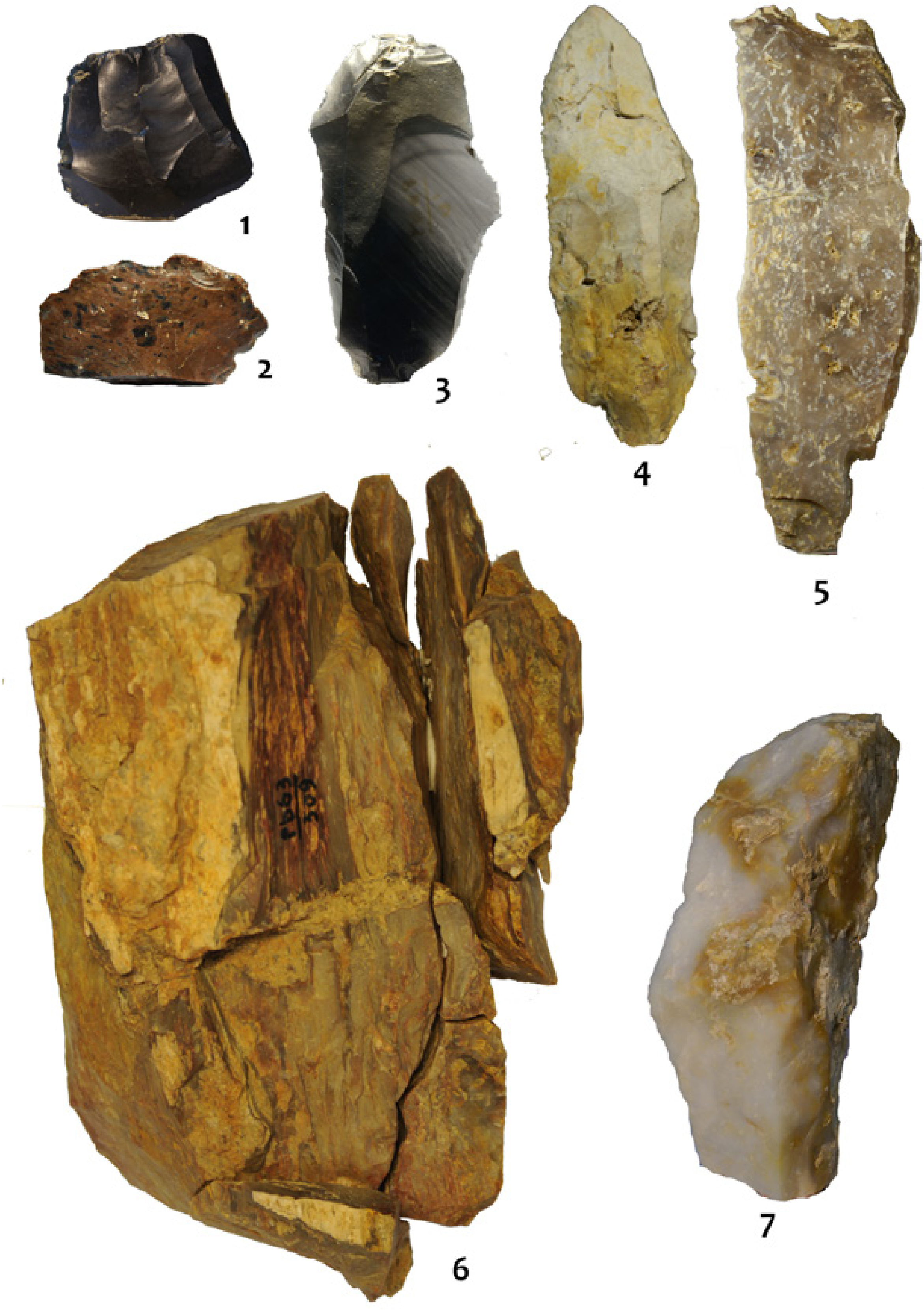


FIGURE 4 Lithic raw materials of the Carpathian basin: 1-2. C2 obsidian; 3. C1 obsidian; 4-7. limnic quartzites from Tokaj–Prešov Mountains. Items 1, 3-5, 7 are from Bodrogkeresztúr; items 2 and 6 are from Arka.

FIGURE 5 Lithic raw materials of the Carpathian basin: 1. Radiolarite from Mecsek Mountains; 2-3. Radiolarite from Bakony Mountains; 4-5. Radiolarite of Carpathians; 6. Felsitic porphyry. Items 1-3 are from Ságvár; 4 is from Arka; 5 is from Bodrogkeresztúr; 6 is from Szeleta Cave.

4.5 Flints from north and east to the Carpathians

The term flint herein refers to the cryptocrystalline sedimentary rock composed of silica gel that appears as nodules in marine sedimentary lithological environment (Götze 2010). In Eastern Central Europe flint nodules can be found in Cretaceous and Jurassic formations (Féblot-Augustains 1997).

Commonly, Cretaceous flint is a very fine grained rock (**figure 6**). Held against light it is brown colored otherwise it is deep blue-grayish. It encloses rarely small to large non-translucent light grey patches. Source of this flint are in the Prut and Dniester valleys, in the Podolian upland, and in the glacial moraines of Silesia (Biró 2011b; Dmochowski 2006; Féblot-Augustains 1997; Noiret 2009).

FIGURE 6 Flint materials: 1, 7. Erratic flint; 2. Jurassic flint; 3. Swieciechów flint; 4, 6. Prut-Dniester flint; 5. Podolian flint. Items 1-4, 6, 7 are from Bodrogkeresztúr; 5 is from Arka.

A special Cretaceous flint is the Swieciechów type, that has a source in Poland in Holy Cross Mountains (Balcer 1976). It is easily recognizable due to the white-grayish dots in its grayish brown body (**figure 6**).

Jurassic flint originates northwest to the city Krakow in South Poland. The flint is translucent grayish-brown, fine grained that encloses small fossils (Kaczanowska & Kozłowski 1976).

5 RATIO OF FLINTS IN LITHIC ASSEMBLAGES OF GRAVETTIAN, SÁGVÁRIAN AND EPIGRAVETTIAN

Plotting the flint quantity in the assemblages in the order of the newly proposed chronology of the sites, the proportions draw a tendency (**figure 7**). The Early Gravettian yield ~64 % of flints from outside of the Carpathians. After a chronological gap, which represents the lack of Pavlovian, the period between 25 and 20 k years, shows a drastic drop in the proportions of flints between 3,6 and 0,6 %. Averagely lower percentages characterize the assemblages between 20 and 18 k years BP. From 17 k years BP the proportion of flints starts increasing with the Epigravettian. Earlier, Dobosi (1997) claimed a homogeneous use of raw materials from sites between 28 and 18 k years BP (sites at Püspökhatvan, Mogyorósbánya, Jászfelsőszentgyörgy, Verseg and Nadap). Later Dobosi (2009b) concluded that the increased utilization of long distance raw materials was parallel with the deterioration of climatic conditions between about 28–16 k years BP. Present results disagree with Dobosi (2009b), because having compared the data with the climate of the last glacial cycle the decrease of flint use falls within the LGM between 24 and 18 k years BP (Markova *et al.* 2009; Monegato *et al.* 2007) and the proliferation of distant raw material use started after the end of LGM.

Toward the northern margin of the basin, in Slovakia, there is a different pattern of raw material use. While the very few early Gravettian sites mostly used local lithic raw materials (Kaminská 2001), the number of human occupations increased between 25 and 20 k years BP in the Váh valley, western Slovakia, and there was a frequent use of Silezian flint at the sites. Trenčianske Bohuslavice leaf point Gravettian site dated to roughly 25–22 k years BP yielded 23,8 % flint of Polish origin and the largest portion of the raw materials is radiolarite of local origin.

FIGURE 7 Hungarian sites with their cultural classification and the percentages of local and flint in the lithic assemblages (counts). References for the sites: Bodrogkeresztúr, Szeleta Cave, Ságvár, Esztergom, Arka (personal counts); Megyaszó (Dobosi & Simán 1996); Istállóskő Cave (Mester *et al.* 2008); Hont-Parassa III (Dobosi & Simán 2003); Mogyorósbánya (Dobosi 2009b); Szob (Markó 2007, 2008-2010); Nadap (Dobosi *et al.* 1988).

ESTIMATED AGE K YEARS UNCAL. BP.	RECENT CULTURAL CLASSIFICATION	SITE	LOCAL %	FLINT %
30–27	Early Gravettian	Bodrogkeresztúr (tentative)	88,6	11,4
		Megyaszó (tentative)	96,5	3,5
		Istállóskő Cave upper	35,8	64,2
25–20	Gravettian with shouldered point	Hidasnémeti	99,4	0,6
	Gravettian with leaf point	Szeleta Cave layer 5-6	96,4	3,6
		Hont-Parassa III	99,4	0,6
20–18	Ságvárian	Ságvár	99,3	0,7
		Mogyorósbánya	96,7	3,3
		Budapest Corvin-tér	100,0	0,0
		Szob	100,0	0,0
17–13	Epigravettian	Nadap	35,0	65,0
		Esztergom	7,2	92,8
		Arka	95,0	5,0

Besides these materials, obsidian also is present in the assemblages with low number (Vlaciky *et al.* in press; Žaar 2007). Moravany Lopata II, dated to 21–24 k years BP (Verpoorte 2002), yielded 6 pieces of Tevel flint from Transdanubian Midmountains in Hungary and the proportion of Silezian flint is 38 % plus 0,4 % from Dniester area (Kazior *et al.* 1998). Banka shouldered point Gravettian site yielded 87,8 % flint from within trench IV (Kaminská 2001, Kozłowski 2000), dated to 22 k years BP (Verpoorte 2002). Moravany Žakovska dated to 24 k years BP however yielded only 1,3 % of flint and the rest of the raw material is local radiolarite (Hromada & Kozłowski 1995). In East Slovakia shouldered point Gravettian sites are almost missing. Cejkov I site is dated to that period and local raw materials dominate the assemblages (Kaminská and Tomášková 2004). Basically, after ca. 22 k years there are no sites in the western Slovakia (Verpoorte 2002). However, in the center of the Carpathian basin in Hungary and East Slovakia Ságvárian and Epigravettian sites are quite abundant (Kaminská 2001). In east Slovakia Kašov I lower layer dated to 20 k years BP yielded 49 % Cretaceous flint either from Poland or the Dniestr area (Novák 2004). Kašov I upper layer Epigravettian dated to ca 18 k years BP used local raw material obsidian (Kaminská 2001).

Outside of the Carpathian basin, in the areas of northern flint sources, the proportion of Carpathian raw materials in Gravettian assemblages is almost zero. Although radiolarite of Carpathians is present, but other materials from further south, including the obsidian is very occasional in the lithic assemblages. The sites commonly preserved the use of local raw materials (Kozłowski 1987). The first relatively significant appearance of Carpathian basin raw material north to the Carpathian arch is dated to ca. 15 k years BP at Targowisko 10 Epigravettian site in south Poland at which 2,5 % of the recovered material is obsidian of Tokaj–Prešov Mountains in East Hungary and East Slovakia (Wilczińsky 2009).

East to the Carpathians, at the Prut and Dniester regions, sites of Gravettian yielded assemblages highly dominated by local raw materials (Noiret 2009). Extremely rarely, in Gravettian tool kit context the radiolarite of the Carpathians occurred as at Babin I lower level (no dates) (Noiret 2009:231). In the Epigravettian also local raw materials dominate the assemblages, but there are slightly more traces of connection toward west with the Carpathian basin than in the Gravettian. The obsidian is present with a very few specimens at two sites in the Dniester valley (Voronovitsa I, no radiometric dates, 2 items; Cosăuţi level 5 dated to ca. 17–18 k years BP, 7 items) (Noiret 2009:457).

From west to the Carpathians raw materials hardly entered the territory of Hungary. The only material is the rock crystal that is sporadic at sites dated to between 29 and 26 k years BP and the greatest collection (51 items) derives from four adjacent sites at Pilismarót in the Danube bend dated to ca. 18 k years BP (Dobosi 2009b, Dobosi & Gatter 1996). Rocks from Hungarian sources are also rarely found at some sites on the west. For example, in Moravia, Pavlovian sites are abundant in moraine flint from Oder valley (Kozłowski 1987), although some obsidian items in the assemblages of Dolní Věstonice I, Pavlov I, Milovice I/G, Předmostí, Jarošov II and Napajedla were observed (Oliva 2007:202; Škrdla 2005:37). Grubgraben site, Austria, also dated to ca 18–19 k years BP, probably used some radiolarites from Hungary because the Váh origin was not proven (Pawlikowksi 1990) while many tools were made of flint of Silezian origin (West & Montet-White 1990).

6 DISCUSSION

Data presented above shows that the raw material circulation between sites in Hungary and at the flint sources is unbalanced. It means that at areas where good quality flints are available, there are hardly any stones from the areas where the Hungarian cultural counterparts are found. This may be explained with the quality of the siliceous rocks. Recently, results of knapping experiments on the Early Gravettian of Hungary pointed out good quality flints tend to yield significantly higher percentage of laminar elements than low quality limnic quartzites (Lengyel 2013). A good quality material can be consumed more efficiently because the same weighted block lasts longer in the processing without accidents and consequently yields significantly more blanks than low quality rocks. This is also an effect of raw material quality upon the lithic technology (Andrefsky 1994, Borrazzo 2012). It could thus be supposed that the presence of quality material in the lithic assemblages had simply material and ecological reasons and only the better quality and the more productive knapping properties make them attractive to transport as raw material for tool kit for travelling long distances. Therefore, what Aubry *et al.* (2012) claim that distant raw materials in an archaeological assemblage could be the expression of immaterial behaviors cannot be read out of the Hungarian Gravettian record. This conclusion is similar to, for example, Verpoorte's (2009) assertion that the mobility of human groups (and the long-term human survival) in the Gravettian depends upon ecological constraints, available prey animal resources, and no social process.

Plotting the percent of flints by the (estimated) age of the sites against the climatic curve of the Pleniglacial, the drastic drop in flint proportion in the territory of Hungary shows a clear relation with the LGM dated to about 24 and 17 k years BP (Markova *et al.* 2009). The series of Hungarian assemblages datable close to the peak of the LGM (Marks 2002) contain the least number of flints. While in the territory of Hungary flints from the north are rare at sites during the LGM, the northwestern part of the Carpathian basin, the Váh valley sites still prove northward connections. Therefore, the northern flint import stopped in the northwestern periphery of the Carpathian basin, at Váh valley, in the first half of the LGM and not between the inner and outer territories of the Carpathians. However, the connections between northwest and the inner area were not completely lost because Trenčianske Bohuslavice assemblage contains dozens of obsidian finds. The second half of the LGM still presents a very few flint material within the Carpathian basin. Sites close to the edge of the basin (Váh valley) where abundant occupations are recorded between 25 and 21 k years BP disappeared and the human settlements are concentrated inside the basin (Verpoorte 2004). According to Verpoorte (2004), raw materials and site distributions indicate the use of an enormous territory during the LGM. In the view of current data Verpoorte's opinion is acceptable only for the first half of the LGM between 24 and 20 k years BP. The raw material data rather show minimal or no extensive mobility of humans between 20 and 17 k years BP. Verpoorte (2004) also concludes the Carpathian basin was abandoned by 17 k years BP, due to arid climate take over that affected the vegetation and thus the herbivore and human subsistence. Yet sites from the period after 17 k years are indeed rarely known, but the Epigravettian, after the LGM, made use of flint from the east in amounts undetected in earlier periods. Consequently the connections between Prut-Dniester and inner Carpathian basin could have been intense in spite of the apparent scarcity of sites. The connection intensity can also be proven by the few obsidian finds in the Dniester area in Epigravettian times where inner Carpathian lithic materials are unknown from earlier periods of the Gravettian.

7 CONCLUSION

LGM seems to make a major effect upon the raw material circulation of the whole Gravettian and related cultural phenomena in the territory of Hungary. The presence of distant raw materials is rather the expression of adherence to good quality raw material and economic use than of any immaterial behaviors.

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