

# Flint supply and access in prehistoric Hungary

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## Flint: terminology

shallow water marine sedimentary siliceous rock

of relatively young geological age (Tertiary, Cretaceous)

In Hungary, mainly „import” beyond the Carpathians


„Northern” flint 

Swieciechów flint

Jurassic Craców flint

Chocolate flint

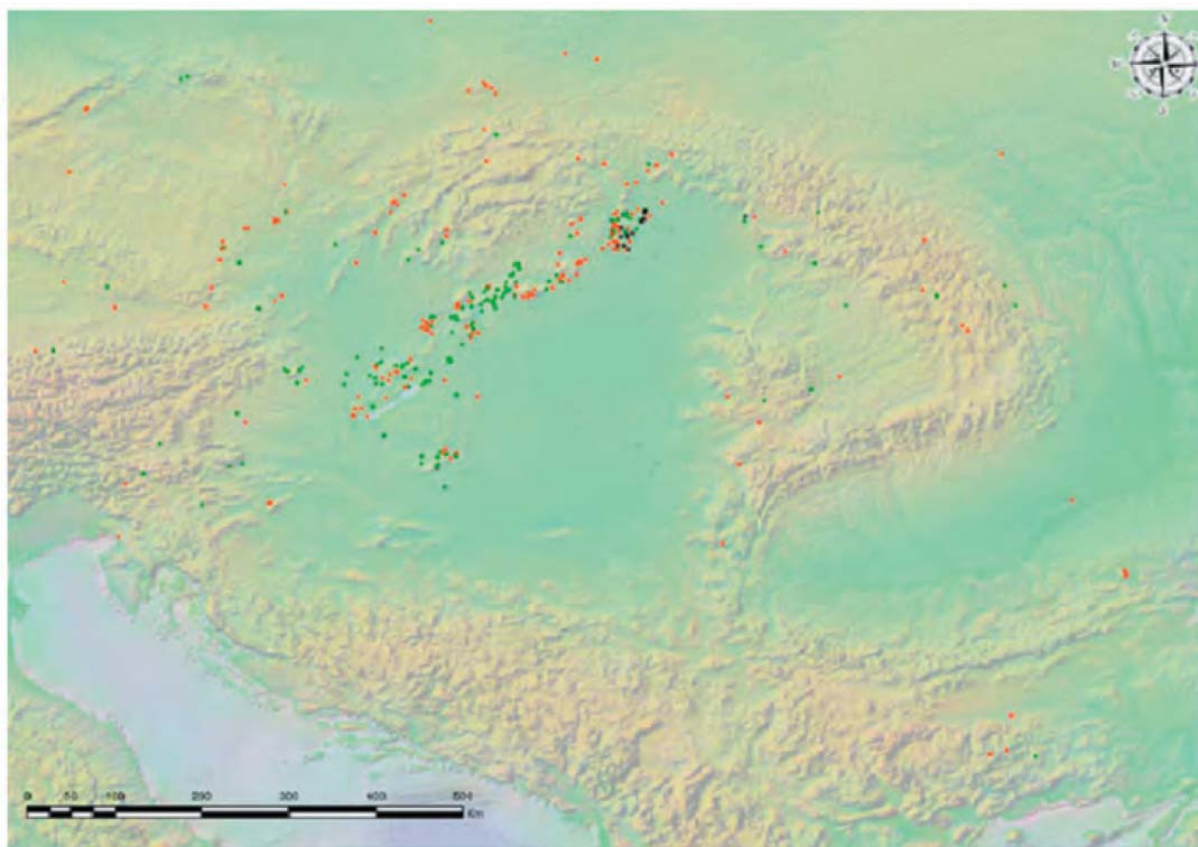
Prut / Volhynian flint

„Southern” flint 

Banat / Balkan flint

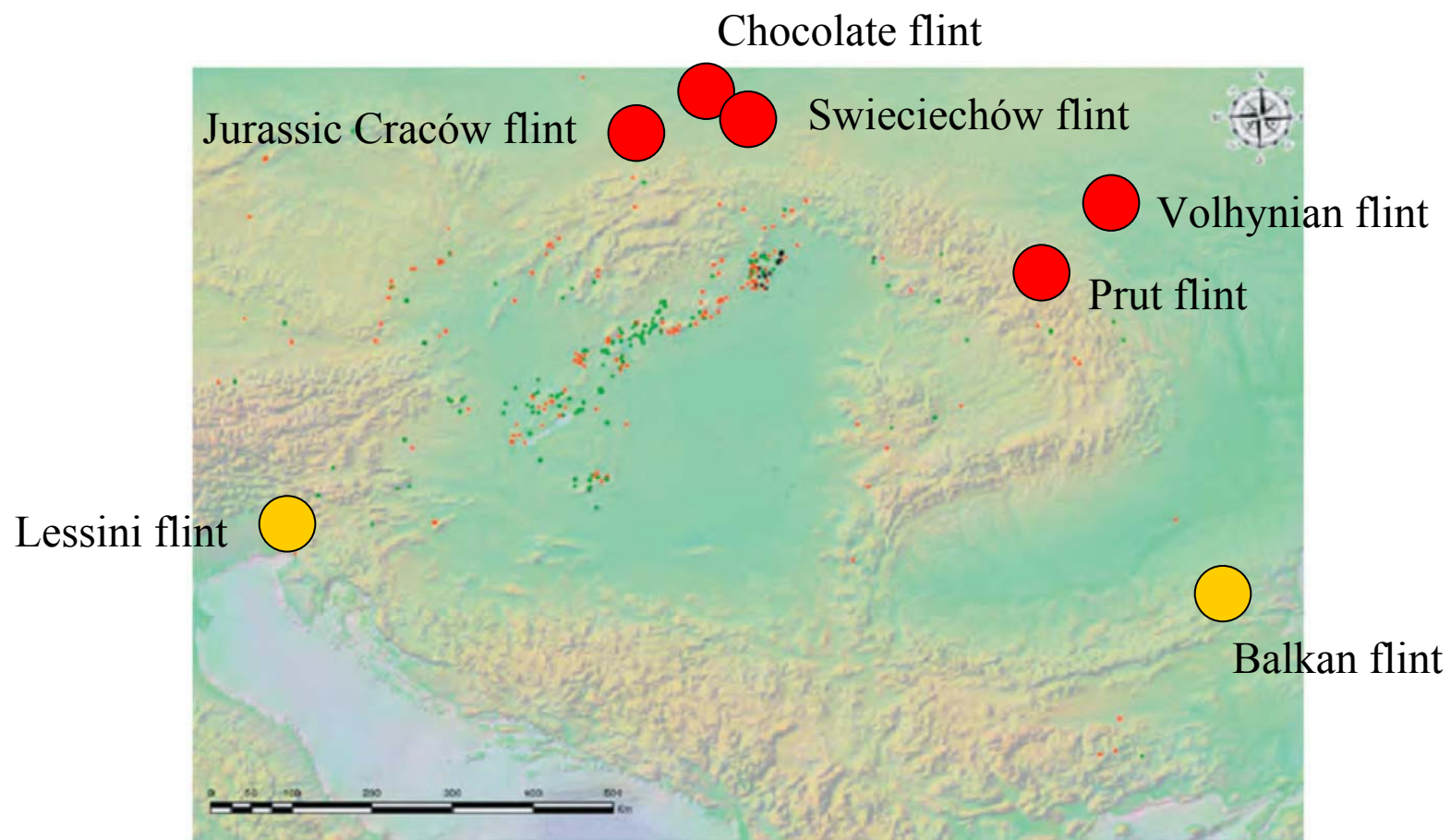
Lessini flint

## Current coverage of Lithotheca HNM



(Base map: Biró 2014)

## Current coverage of Lithotheca HNM with „import flint” highlighted



(Base map: Biró 2014)

## Swieciechów flint

- first „import” flint identified in Hungary, from MP / EUP context (Vértes 1960)

Sólyomkúti / Vidróczky cave



(Photo: J. Antoni)

## Swieciechów flint

- first „import” flint identified in Hungary, from MP / EUP context (Vértes 1960)

Sólyomkúti / Vidróczyky cave



(Photo: J. Antoni)

## Prut flint

- Esztergom-Gyurgyalag: 80 % of lithic industry in UP context made of Prut flint (Dobosi 1991)



(Photo: J. Antoni)

- Polgár-Basatanya, LN/ECA: Prut flint, Volhynian flint, Jurassic Craców flint  
(8/1924 HNM)



(Photo: J. Antoni)

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## Volhynian flint

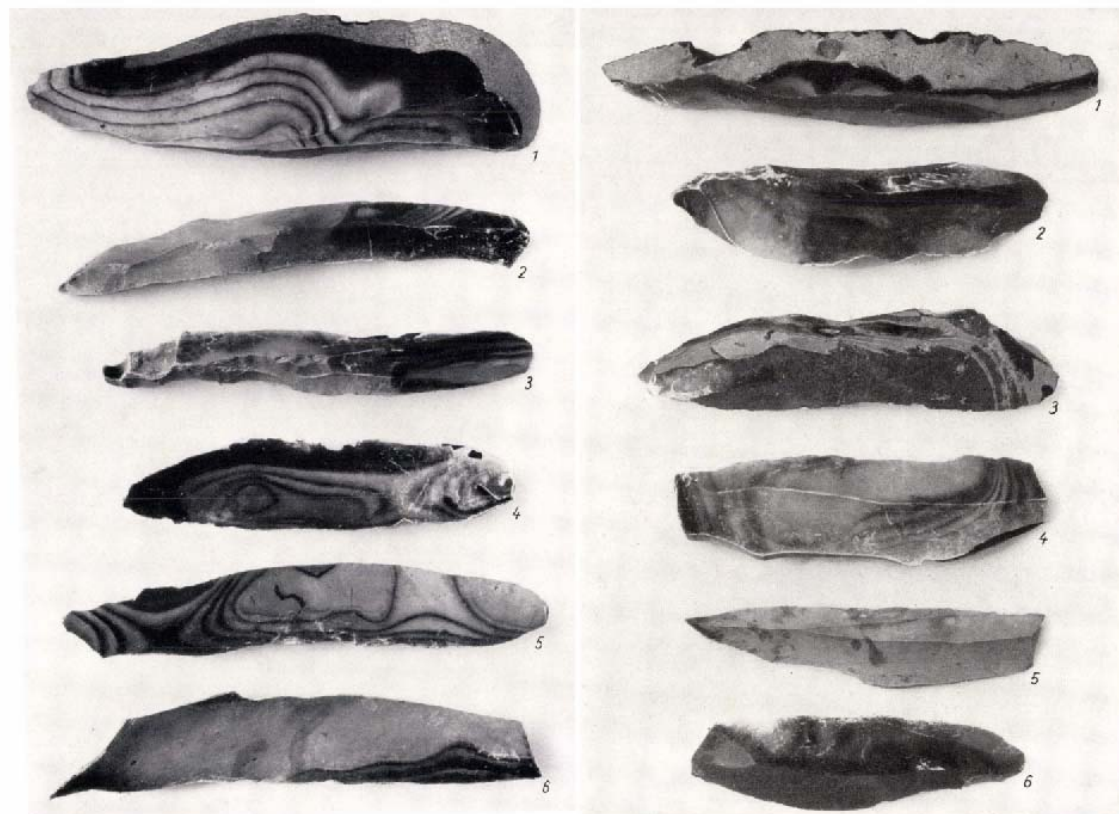
- Pusztavánháza, Copper Age cemetery (Hillebrand 1929)



(Photo: J. Antoni)

## Volhynian flint

- Kálló, Bikázó dűlő, depot find (Patay 1960)



## Banat / Balkan flint

- Endröd 39, EN depot find (Biagi, Starnini 2013)

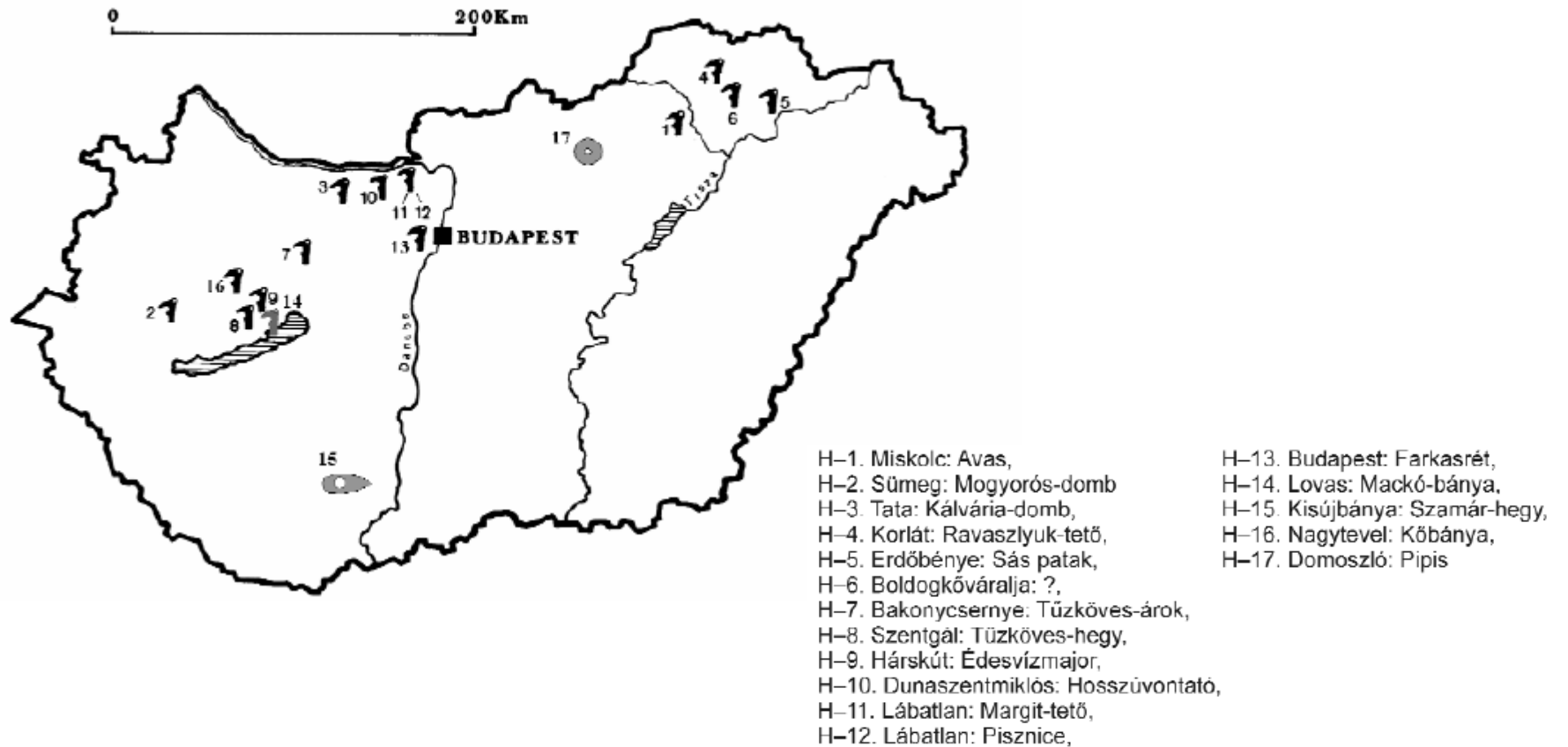


# Banat / Balkan flint

- Pitvaros, EN (Biagi, Starnini 2013)

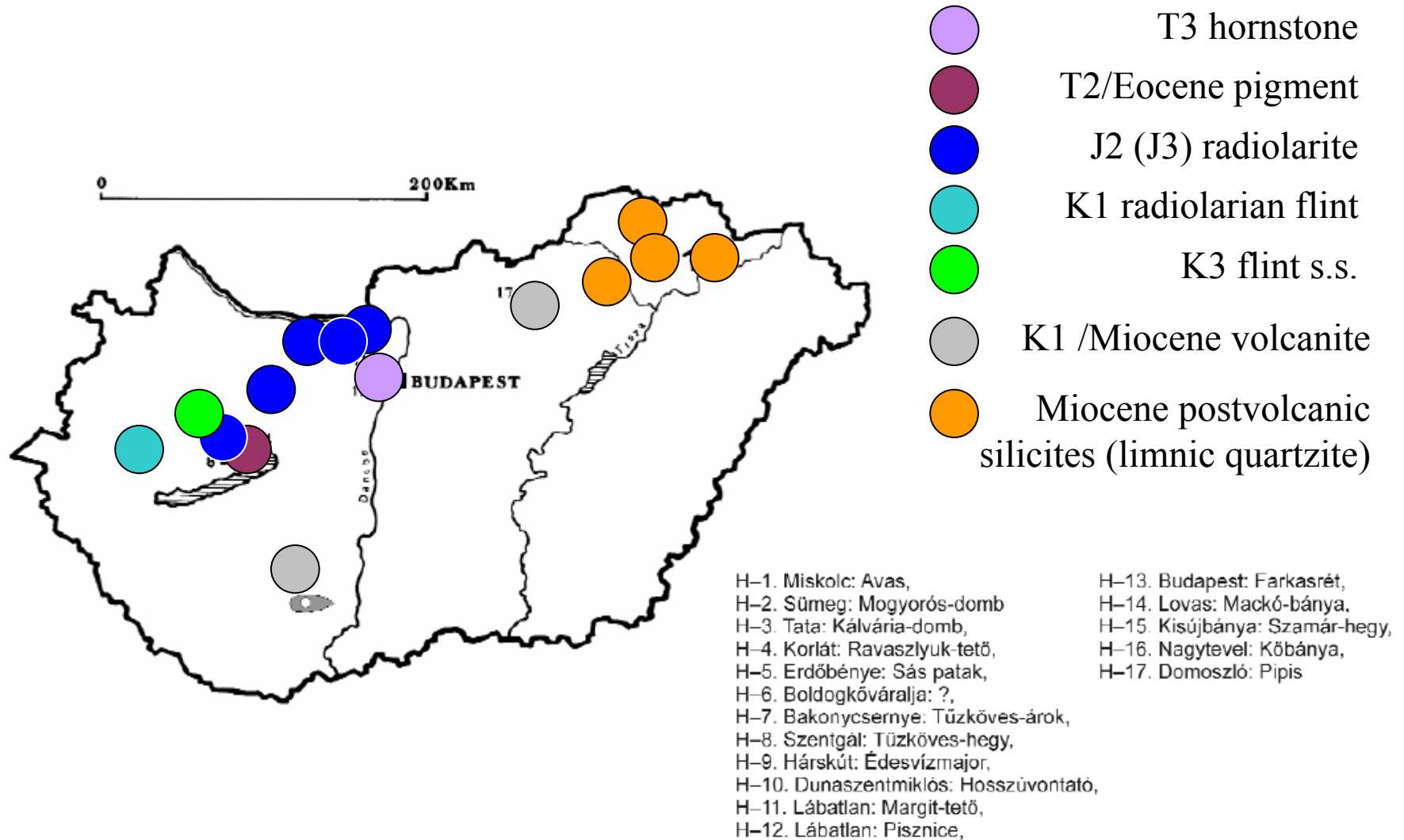


# Map of registered prehistoric quarries in Hungary



(After Biró 2012)

# Map of registered prehistoric quarries in Hungary



**Table 1. Main features of prehistoric mines in Hungary**

Quarry number	Town / Exact locality	Exploited	Formation period (geological age)	Mining period	Host mine (modern)	Open-air exhibition	Absolute Dates	Coordinate Lat. / Coordinate Long (WGS)	Description and mining features	References
II-1.	Niskolc/Aras	hydro-quartzite	Miocene	Paleolithic-Late Neolithic		(plans)	no dating	N 48 10 / E 20 28	First "flint mine" located and excavated in Hungary. Excavations by Hillbrand (1928), Megar (1936) Szmán (1976-78), Ringer (2002). Chipping floor, pits transecting siliceous tuff layer extending to 3-4 m depth. Various opinions on use period from Middle Paleolithic till Late Neolithic.	PAPP 1907, HILLBRAND 1928, 1939, SZMÁN 1979, 1995, RINGER 2003, RINGER, SZALAI 2005, 2007, HARTAL, SZALAI 2008
II-2.	Simegy/ Nogyvőerdő	(radiolarian) chert	Lower Cretaceous	Middle Neolithic-Late Bronze Age		Geological Protection Area (formerly MÁFI, now Vesz Hungarian University)	C-14 by 11010 ±90 BP, HV 11011 ±840 ± 110 BP	N 46 57.80° / E 17 17.40°	Largest flint mine excavated in Hungary, located in course of planning a geological section (L. Kovács 1958). Excavations: Veres 1960-1961, Filip 1963-1976, Bicskai 1978-1989. 1 surface, 2 pits, antler tools, C-14 dates, distributed data. (Open-air exhibition).	BÁCSKAY 1978, 1979, 1990, 1986, 1987, 1990, 1995, BÁCSKAY, VERES 1980, 1970-1975, VERES 1964, VOROS 2007
III-3.	Tata/ Kálvária domb	radiolaria	Middle Jurassic	Copper Age	limestone	Tata Natural Protection Area (ELTE)	1 CA shards (finds)	N 47 38.283 / E 18 19.076*	On the territory of the geological park with unique Mesozoic section, pits of prehistoric mining were located in Middle Jurassic radiolarite beds. Excavated by Fuchs. Late Copper Age shards, antler tools. C-14 dates available. Open-air exhibition.	BÁCSKAY 1980, 1987, 1984a, 1984b, 1990, FUCHS 1971, 1976, 1978
II-4.	Korlát/Ravas-lyuk-tető	limnic quartzite	Miocene	Paleolithic-Bronze Age			no dating	N 48 38 / E 21 25	Excavation by K. Szmán, 1982-83. Mining features: siliceous bedrock, chipping floor	SMÁN 1986, 1995
II-5.	Lrőbénye/Sás ozark	limnic opaline	Miocene	Upper Paleolithic-Prehistoric			no dating	N 48 26 / E 21 36	Excavation by L. Bicskai, 1992. Mining features: pit, chipping floor.	BÁCSKAY 1993
II-6.	Béldorog/Érdő-ajtó?	limnic quartzite	Miocene	Neolithic?			no dating	N 48 33 / E 21 23	Observations by I. Mihálik. Mining features: pits, worked fragments and blocks	MIHÁLIK 1997
II-7.	Bátony-ecsernyé/Turkócs-árok	radiolaria	Middle Jurassic	Neolithic?			no dating	N 47 31 / E 18 08	Located by L. Kovács (1967); stratigraphy by E. Bicskai in 1975. Features: small pits, worked debris, 8 antler tools, no dating.	BÁCSKAY 1980, 1987, 1984a, 1984b, 1990, 1995, FUCHS et al. 1969
II-8.	Szentgyörgyi/Újfalva-hegy	radiolaria	Middle Jurassic	Neolithic			no dating	N 47 48.271 / E 17 41.859*	Target zone with worked radiolarite debris. Excavations by K. Biri 1942-1945, 1992-1995. Mining features: pits (max. 3 m), hammerstones, worked debris. Distribution studies.	TÓTH 1986, 1905 BIRÓ, REGULNYI 1991, 2003
II-9.	Lőrénckút/Érdő-nyájas	radiolaria	Middle Jurassic	Neolithic?			no dating	N 47 18 / E 17 51	Discovered by J. Kovács in 1970 during geological fieldwork. Mining features: pits, worked flakes, antler tools.	BÁCSKAY 1982, 1984a, 1984b, 1990, 1995
II-10.	Lumcsócs/Érdő-nyájas	radiolaria	Middle Jurassic	Neolithic?			no dating	N 47 00 / E 18 38	Discovered by J. Kovács and G. Jékely in the 1980s. Mining features: pits, worked flakes, hammerstones.	BÁCSKAY 1984, 1990, 1995
II-11.	Libálm/Markótelep	radiolaria	Middle Jurassic	Prehistoric			no dating	N 47 75 / E 18 50	Cauldron-shaped pit located during geological sondage. Hammerstones, worked debris.	BIRÓ 1984, BÁCSKAY 1984, 1990, 1995
II-12.	Libálm/Érdő-nyájas	radiolaria	Middle Jurassic	Neolithic?			no dating	N 47 75 / E 18 50	Mining features: pits, worked flakes, hammerstones.	BÁCSKAY 1984, 1995
H-13.	Budapest/Érdő-nyájas	limestone	Upper Triassic	Paleolithic-Copper Age			C-14 (GrN-15567 40,250 ±90 BP, Deva-3470 ±80 BP)	N 47 29.282 / E 18 39.809*	Located by Zs. Baló. Excavated by V. Gábori-Csánka in 1984-1987. Mining features: pits, worked debris, antler tools. C-14 dating.	GÁBORI-CSÁNKA 1989, 2006, VOROS 2000
H-14.	Lovas/ Nádor-bánya	red pigment	Triassic / Eocene	Late Paleolithic	dolomite grt		C-14 ETH-15199 Lovas 11740 ±130	N 47 01.051 / E 17 55.151*	Red pigment exploitation from dolomite grt. Excavations by I. Veres and Gy. Mezősas in 1957. Mining features: pits with large mining tools, chipped stone tools. C-14 dating.	MEZŐSÁS, VERES 1957, VERES 1998, JÓHNS 2000, JÓHNS-VÉRÉS 1979
II-15.	Kiszibánya/Somár-hegy	phosfite	Lower Cretaceous	Late Neolithic			no dating	N 46.15 / E 18.35	Located by Zs. Schödlér in course of geological survey. Blocks and worked fragments on the surface. Petrographic and distribution studies. Relation to Zengővárkony LN settlement.	BIRÓ et al. 2001
H-16.	Nagyterev/Érdő-nyájas	K3 flint	Upper Cretaceous	Middle Neolithic-Late Copper Age	limestone	Natex 2000 area	OSI (MÁFI) 7.5 ±0.9 Ky; 7.6 ±0.9 Ky; 7.8±1.1 Ky; 10.4±1.2 Ky	N 47 16.433 / E 17 14.905*	The only K3 flint occurrence in Hungary. Located by D. Bánai. Excavated by K. T. Biri and J. Reguly, 2003-2008. Mining features: pits, worked debris, hammerstones. A few Neolithic shards, OSI dating. Distribution data.	BIRÓ, REGULNYI 2003, BIRÓ-REGULNYI in press
II-17.	Domonád/Érdő-nyájas	andesite	Miocene	Prehistoric-submodern			N 47 50.494 / E 20 04.088*	N 47 50.494 / E 20 04.088*	Surface use of scattered andesite blocks. Fragments, spoil pieces. Located by Toth L. and Toth Z. No excavation, no dating.	T. BIRÓ, PETTERDÓ 2011

aries and Mines

(After Biró 2012)



## The Nagytevel flint mine



Opened by modern limestone quarry

(After Biró et al. 2010)

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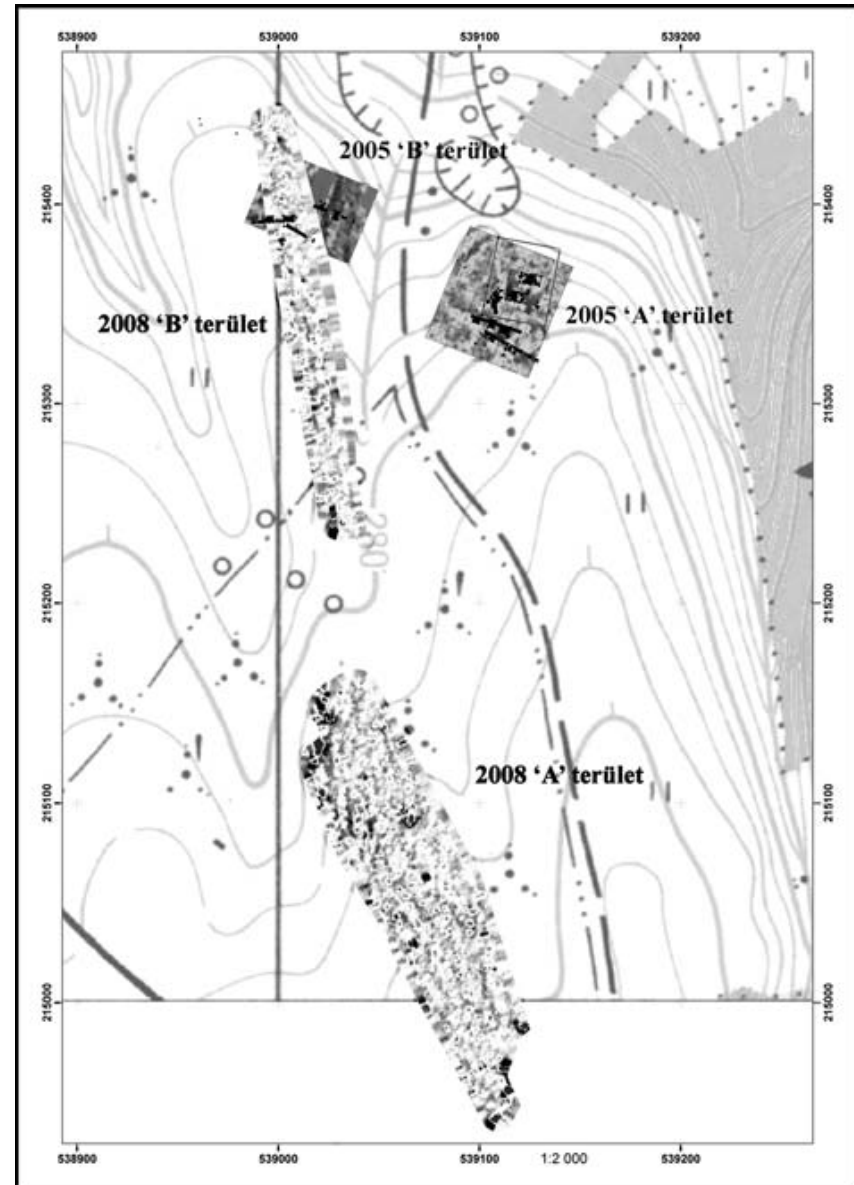
## The Nagytevel flint mine



Position of flint nodules in the modern quarry

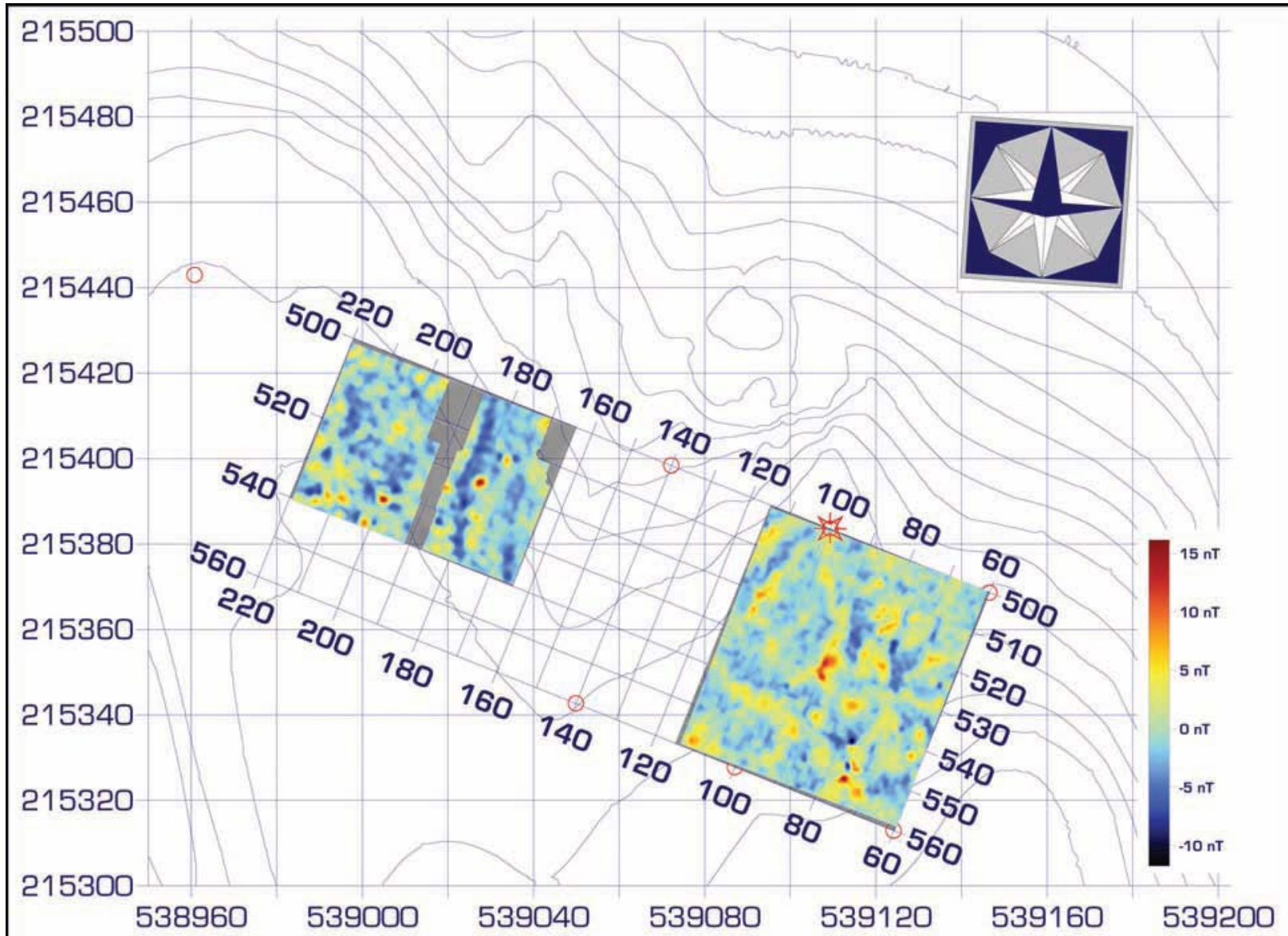
(After Biró et al. 2010)

# The Nagytevel flint mine



Area investigated by geophysical method

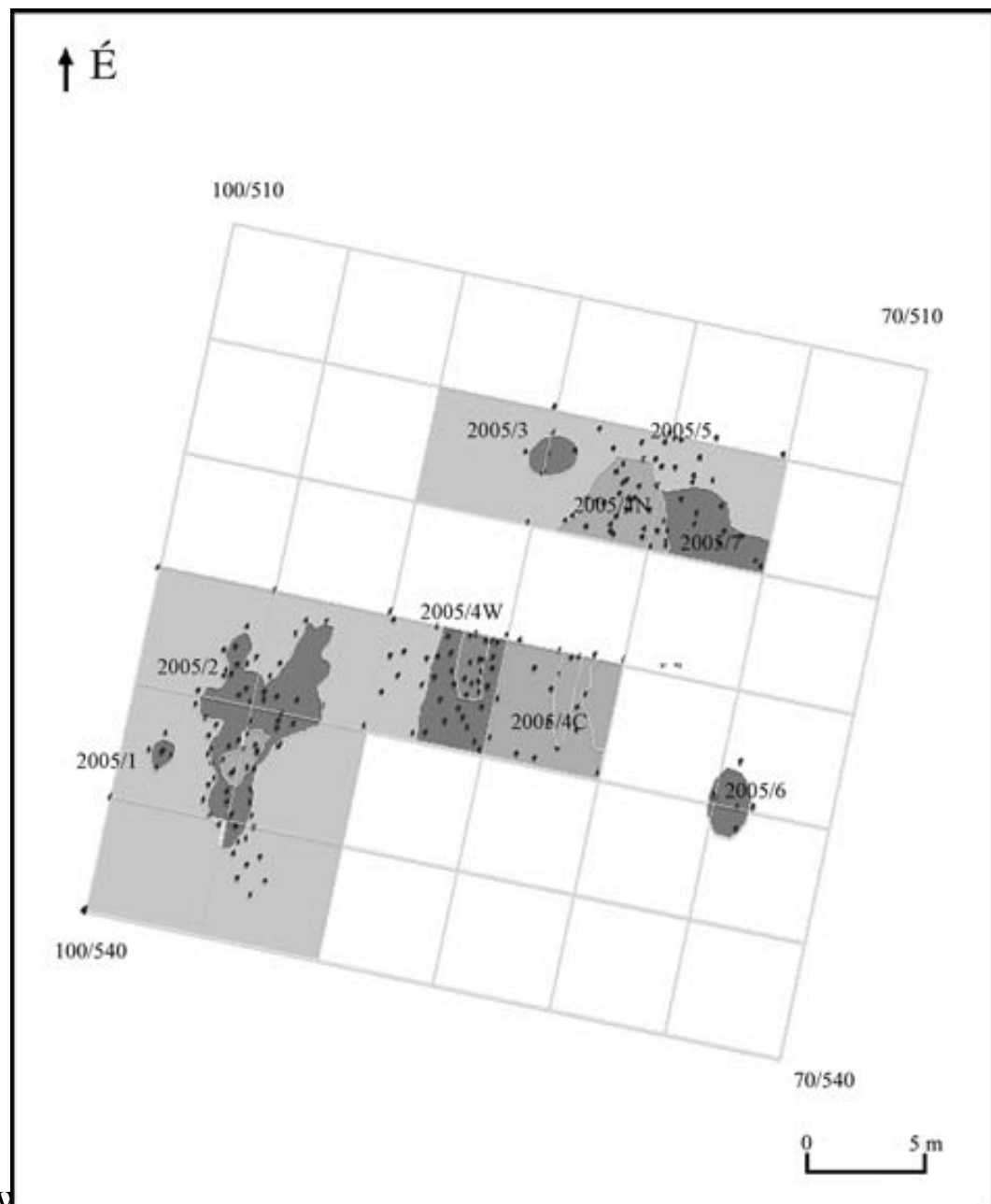
(After Biró et al. 2010)



Area investigated by geophysical method (2005)

(After Biró et al. 2010)

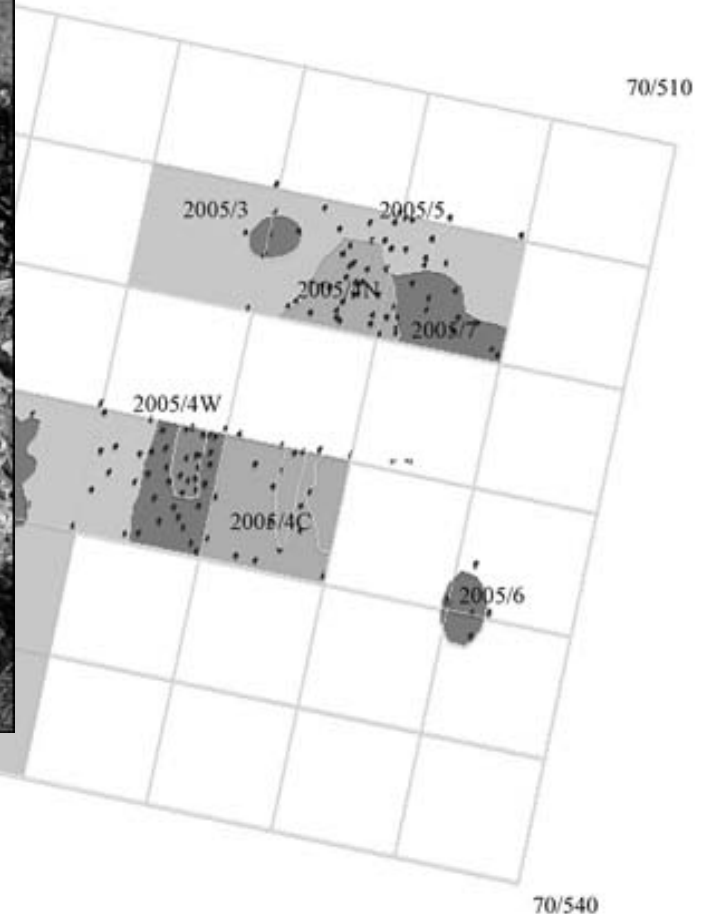
# The Nagytevel flint mine



Extraction pits confirmed by excavations

# The Nagytevel flint mine

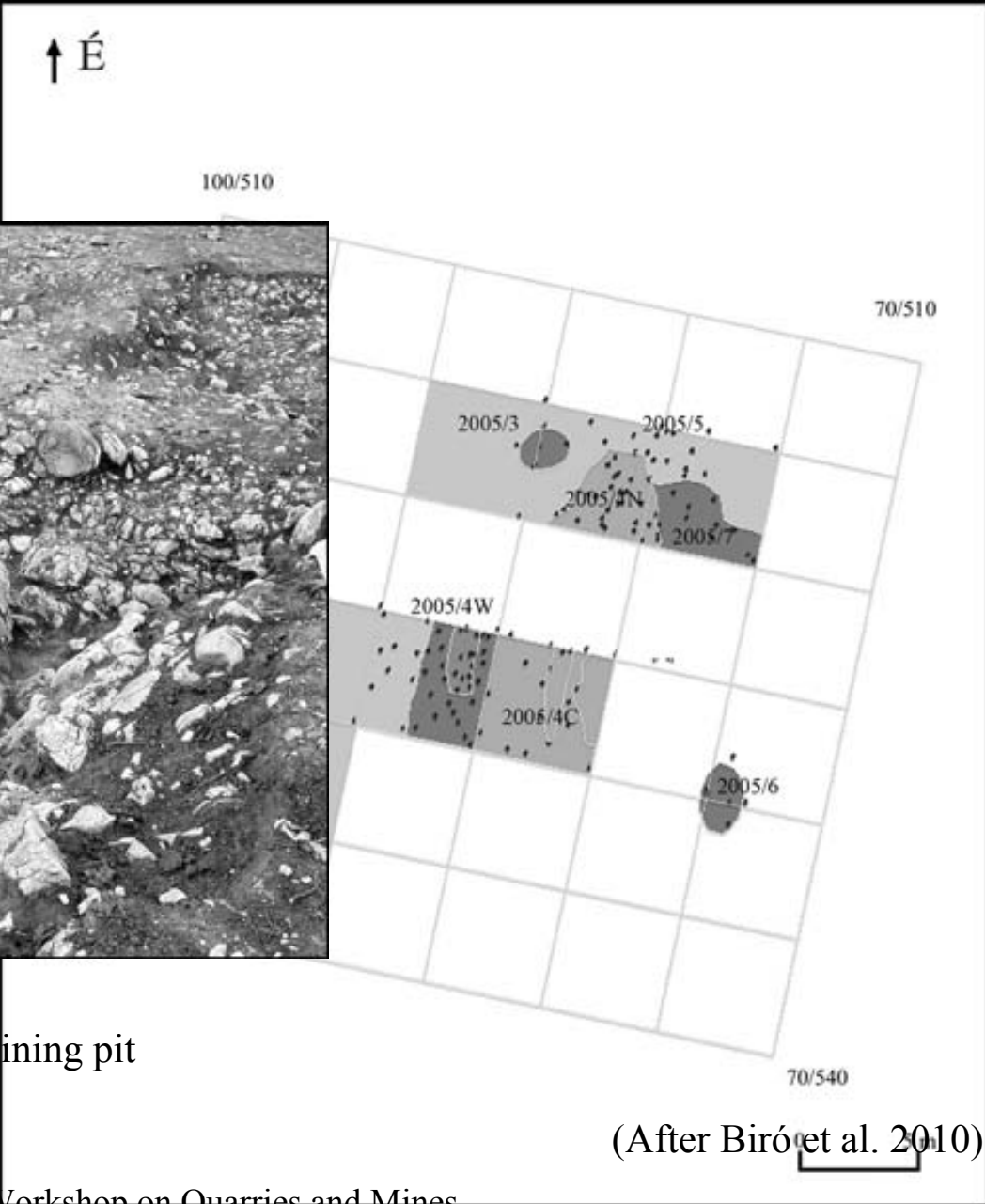
↑ É



Feature 2006/4. Shallow, cauldron-like mining pit  
(Trench Nr. 2006/2, Section 2006/IV)

(After Biró et al. 2010)

# The Nagytevel flint mine



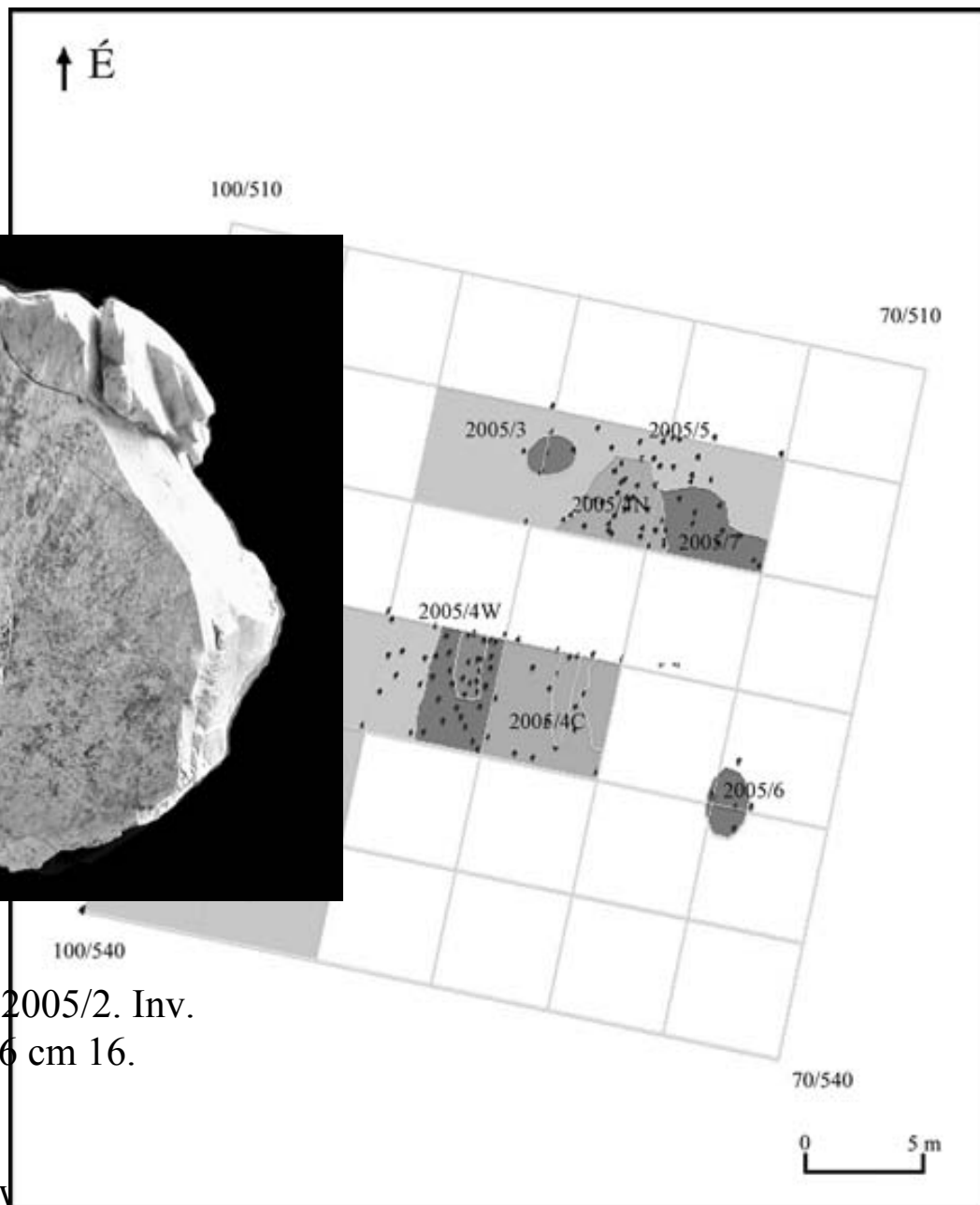
Feature 2005/2. Deep, croissant-form mining pit  
(Section 2005 90/100, 525/540 #)

(After Biró et al. 2010)

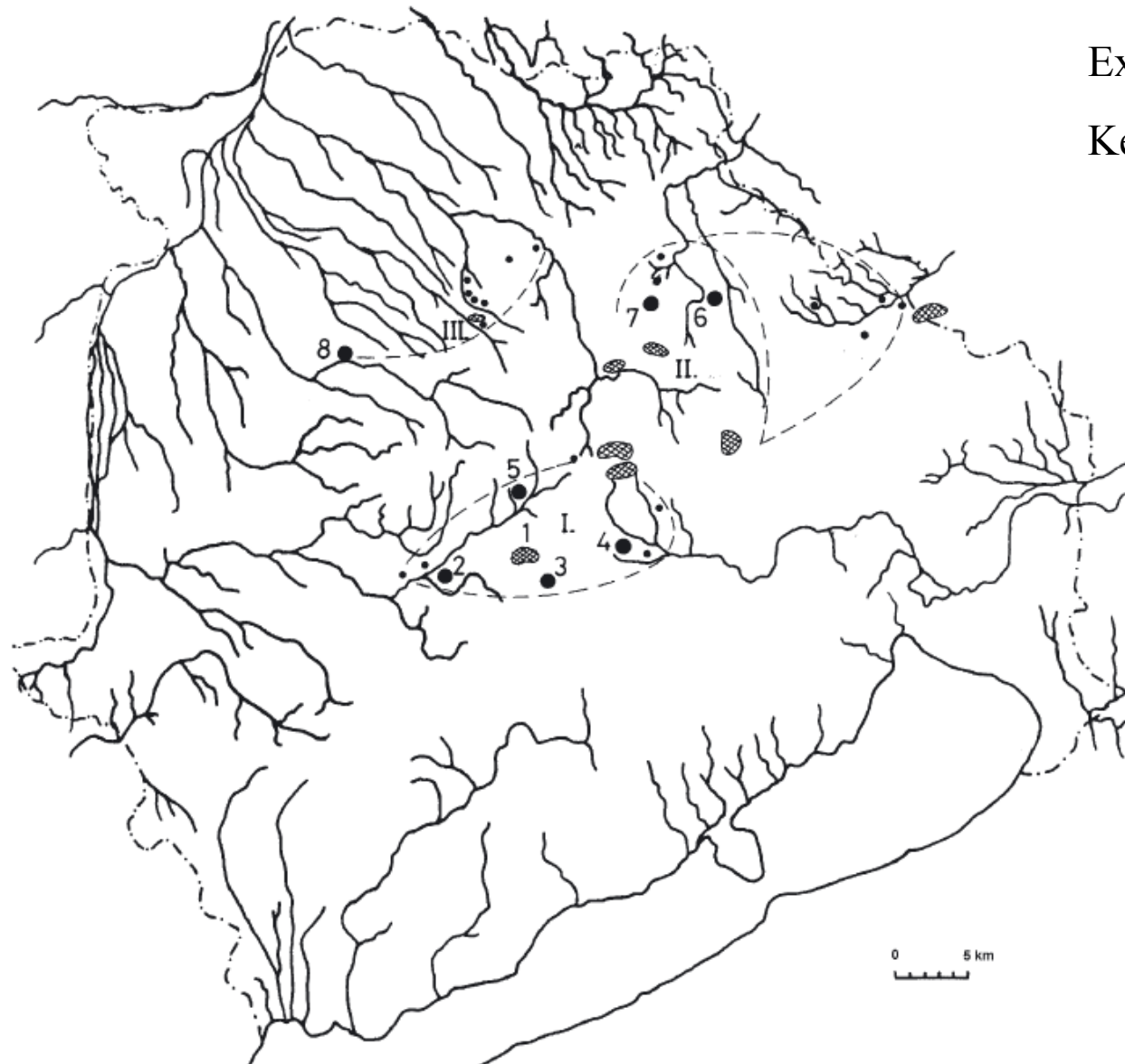
# The Nagytevel flint mine



Large flint flake, refitted from Feature 2005/2. Inv. nr.: 2008.4.1. Dimensions: 28 × 19 × 16 cm 16.



## Associated workshop site

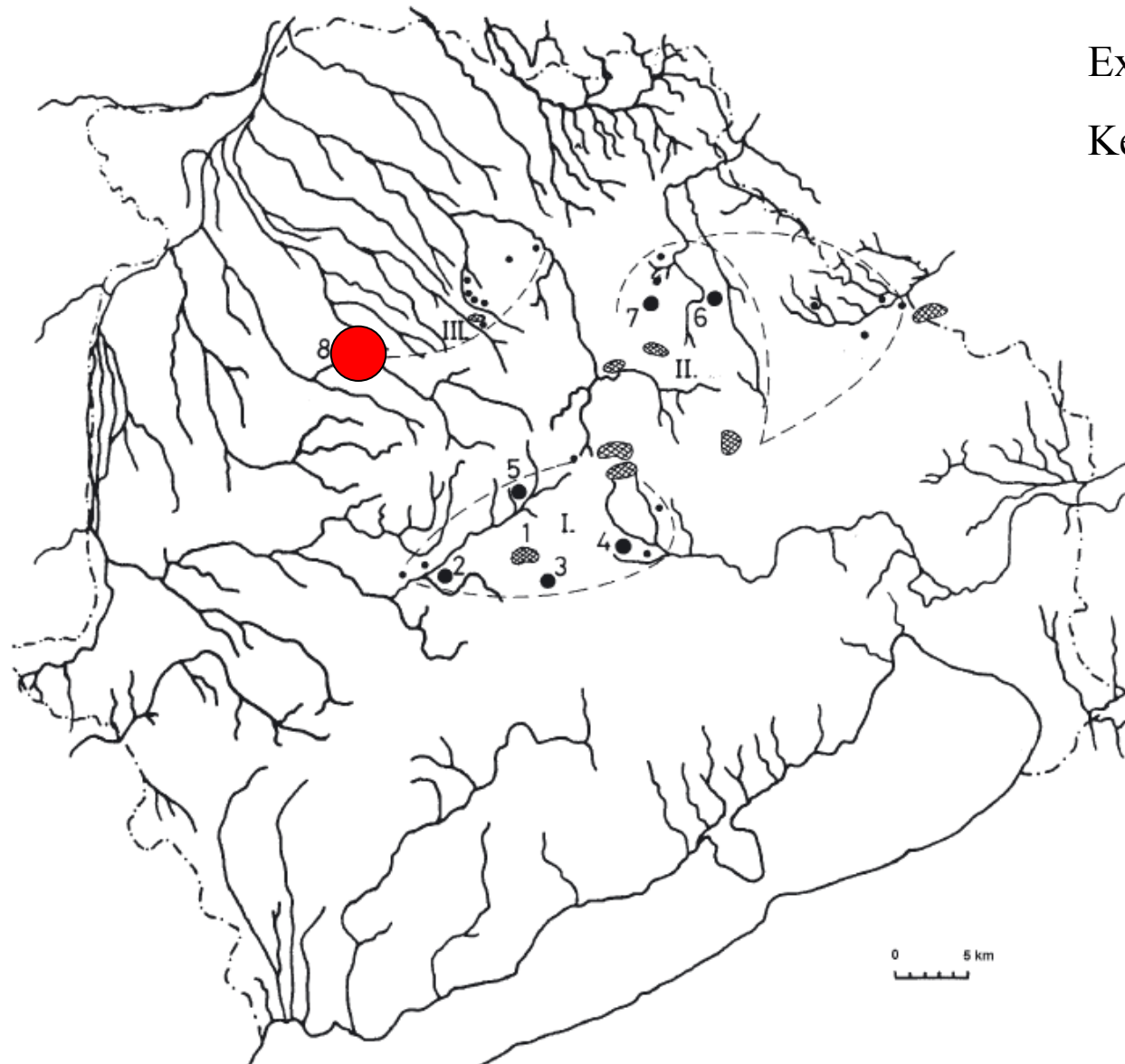


Exploitation region III.

Key: site 8 – Kup-Egyes

(After Biró-Regenye 2003)

## Associated workshop site



Exploitation region III.

Key: site 8 – Kup-Egyes

(After Biró-Regenye 2003)

## **Kup-Egyes: workshop site for Tevel flint (and more...)**

Excavations:

S. Mithay 1974

K. Biró – J. Regenye, 2000-2003

Publication on lithic finds:

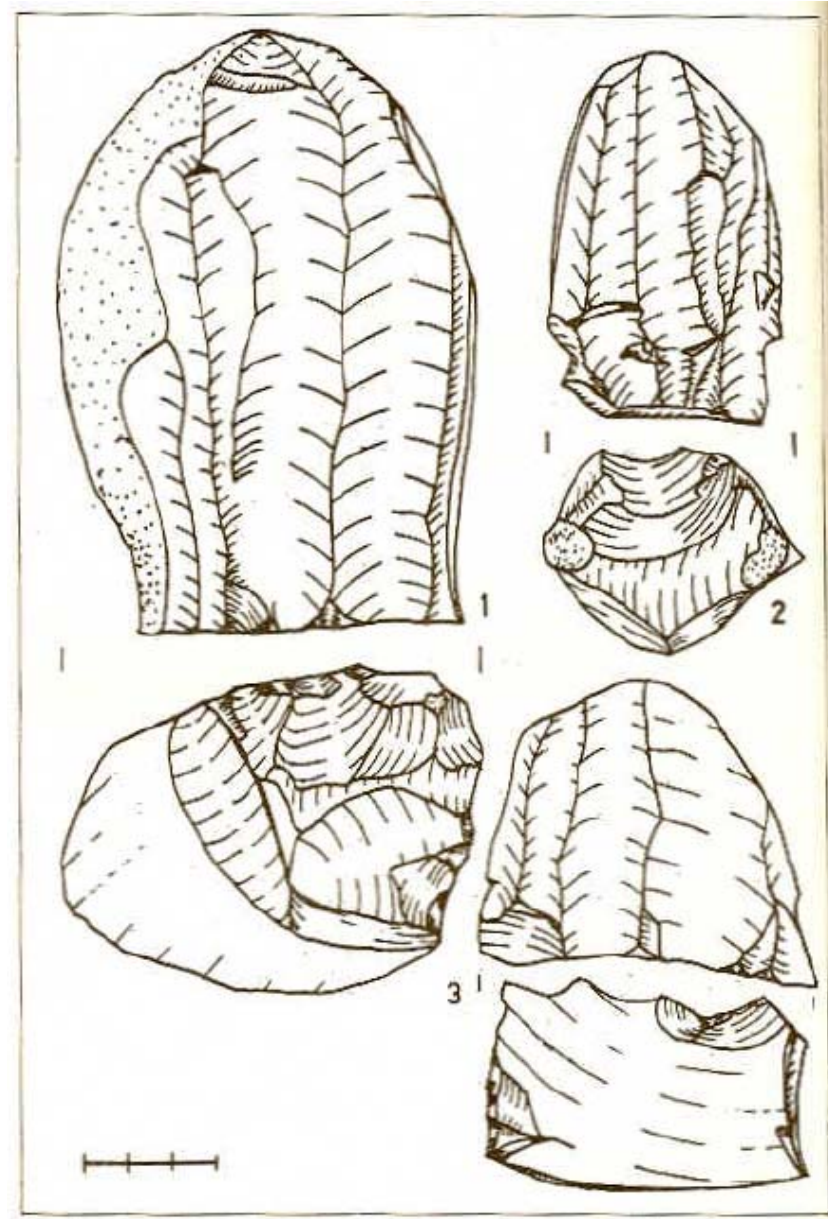
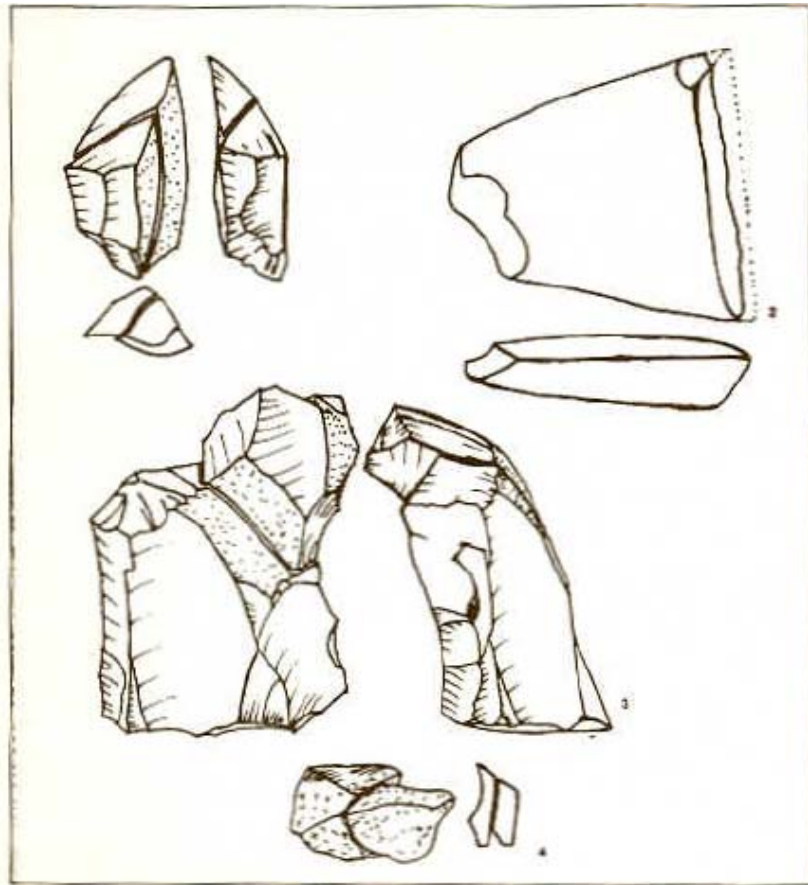
K. Biró 1989 (196 pieces, Pápa Museum)

K. Biró 2011 lecture Brno (2610 pieces, HNM)

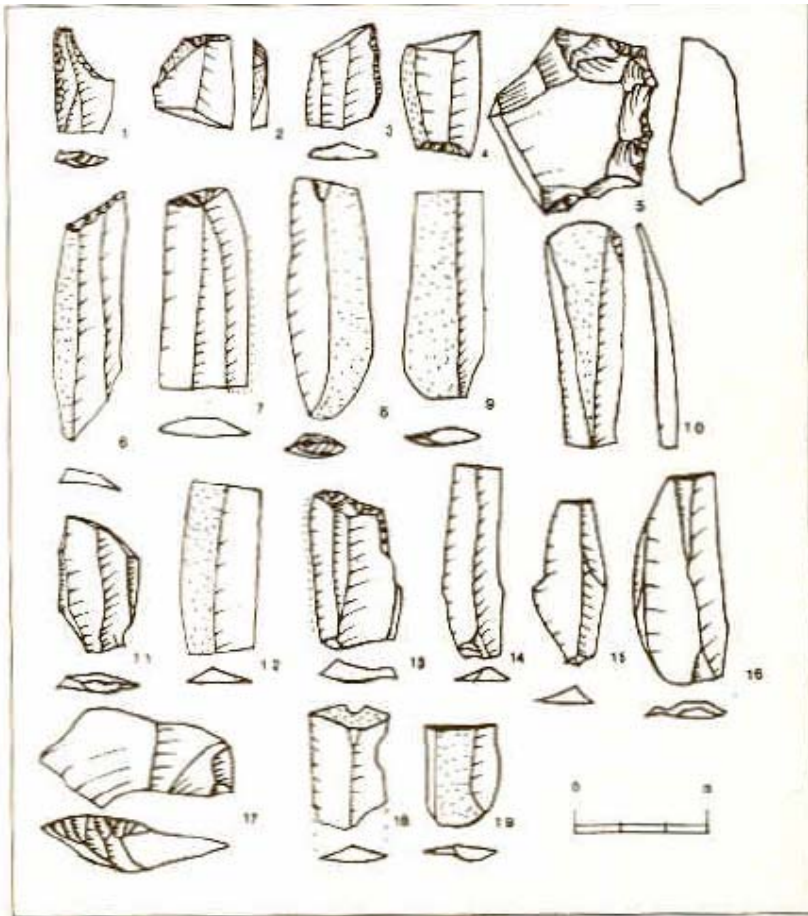
current work (2764 pieces, HNM)

Large cores (LBC,1989)

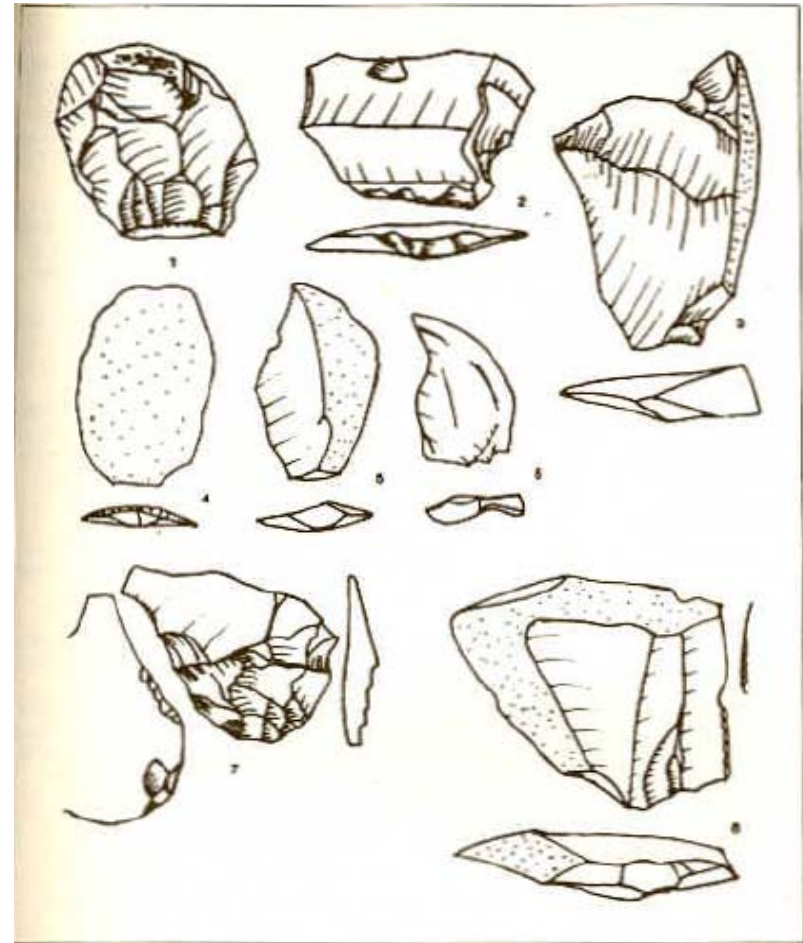
Refit (1989)



Tevel flint tools (LBC,1989)

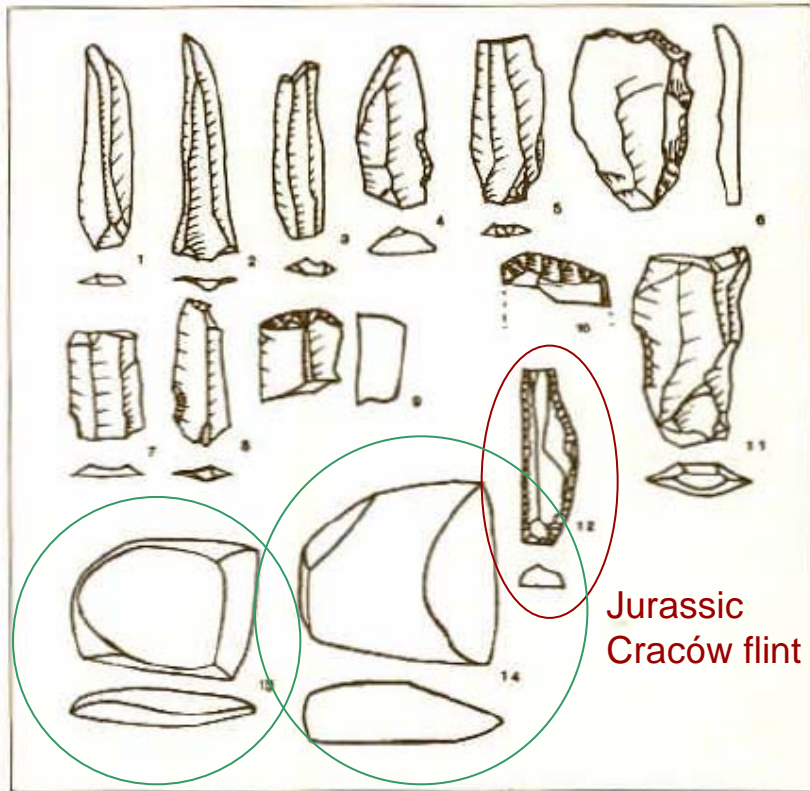


Technological types (LBC,1989)



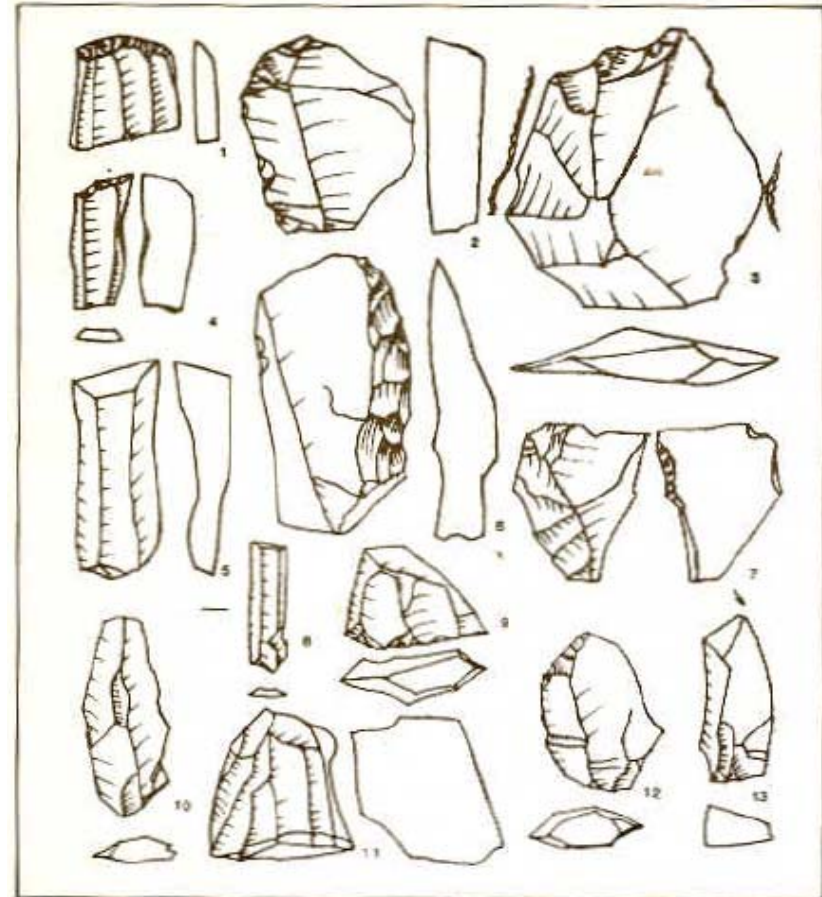
## Radiolarite and LD tools (LBC,1989)

5. ábra. Távolabbi nyersanyagból készült eszközök a vonaldíszes kultúra kőanyagában. 1-11: dunántúli radiolarit, 12: északi (krakkói jurai) tűzkő, 13-14: csiszolt kőeszközök metamorf kőzetből.



## Lengyel culture tools (1989)

6. ábra. A lengyel kultúra kőanyaga.



## Kup-Egyes: workshop site for Tevel flint (and more...)



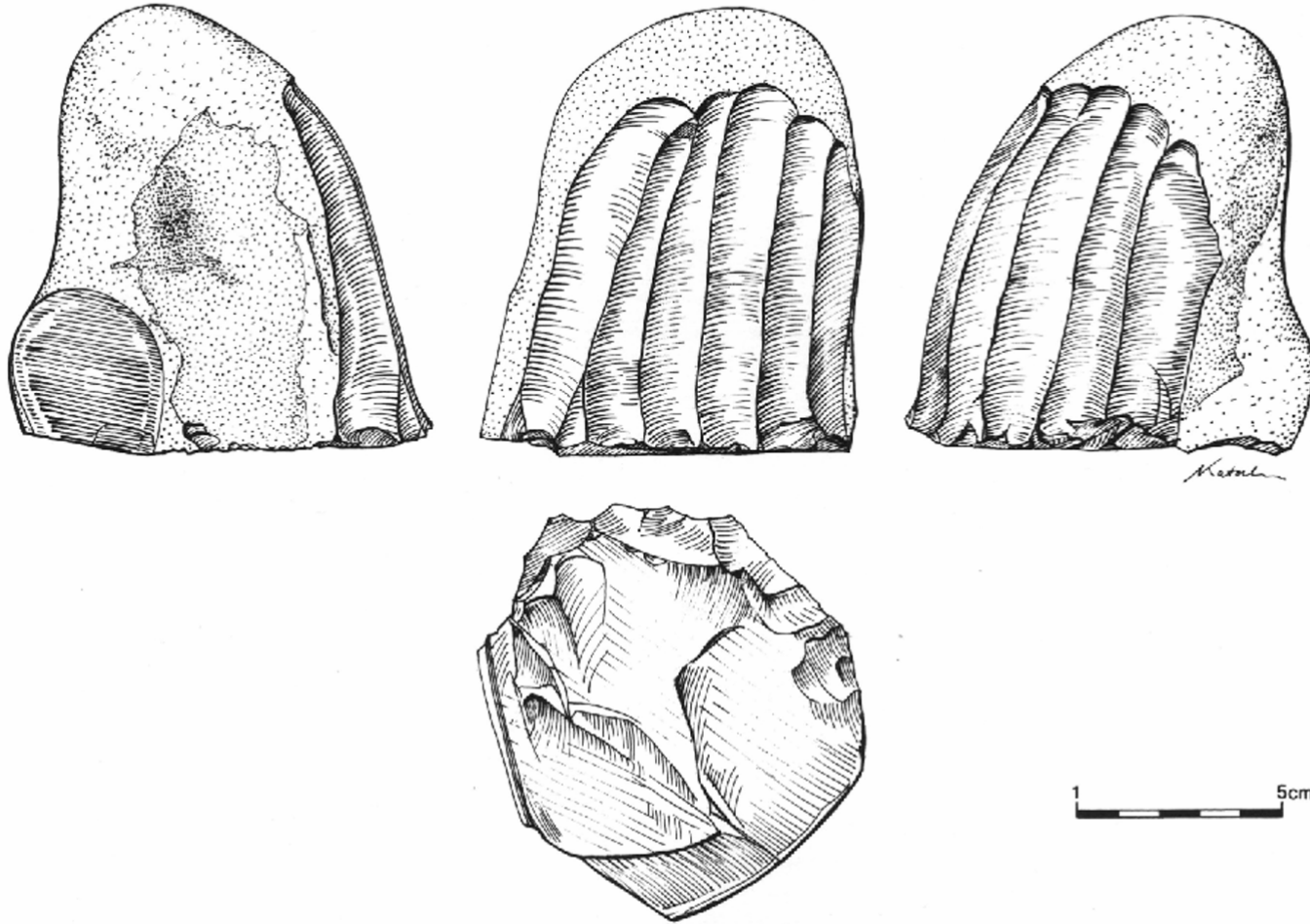
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**Kup-Egyes: workshop site for Tevel flint (and more...)**



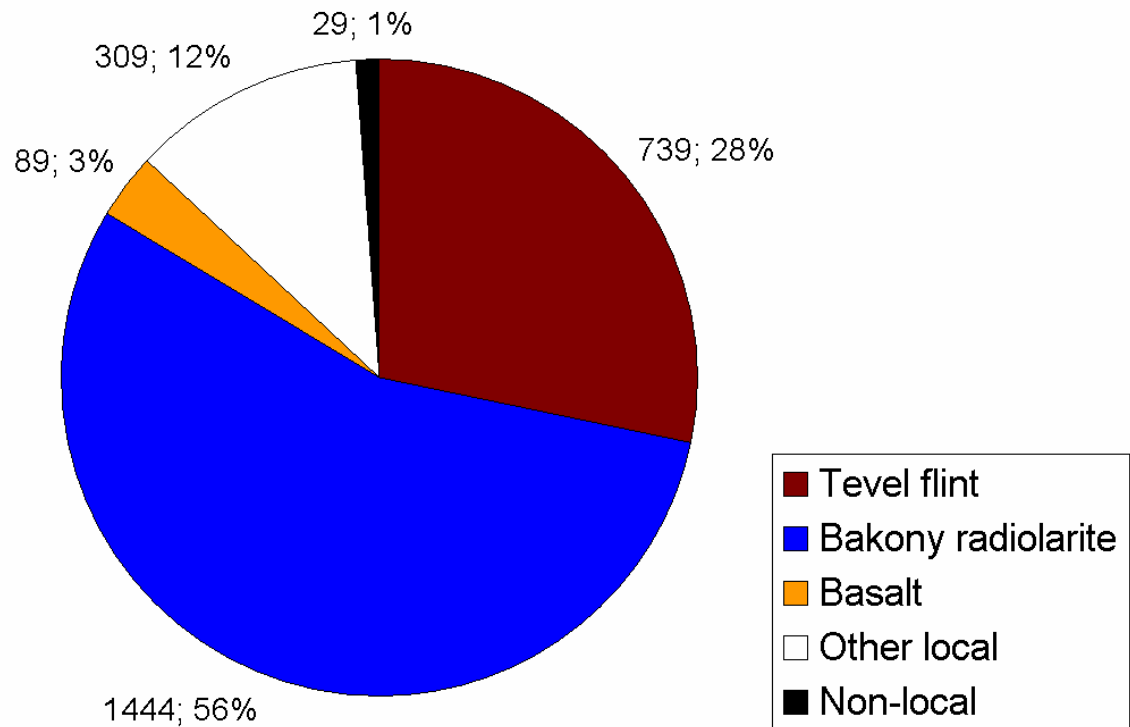
(Photo by A. Dabasi)

KUP - EGYES



(Drawing by K. Nagy)

# Raw material distribution at Kup-Egyes (MN, LN, LCA)



**N=2610**

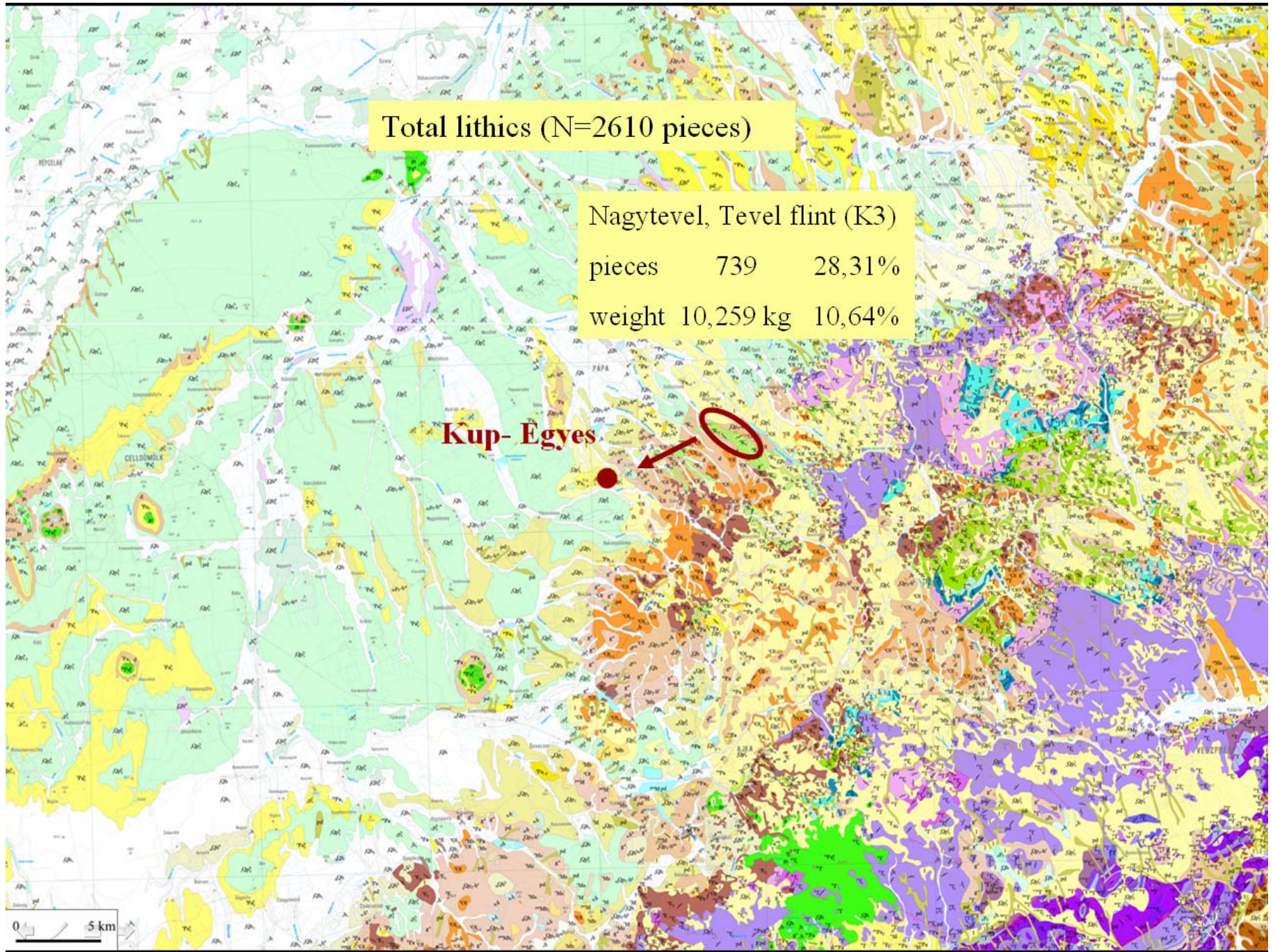
Total lithics (N=2610 pieces)

Nagytevel, Tevel flint (K3)  
pieces 739 28,31%  
weight 10,259 kg 10,64%

**Kup- Egyes**



0 5 km



Chipped stones only (N= 2281 pieces)

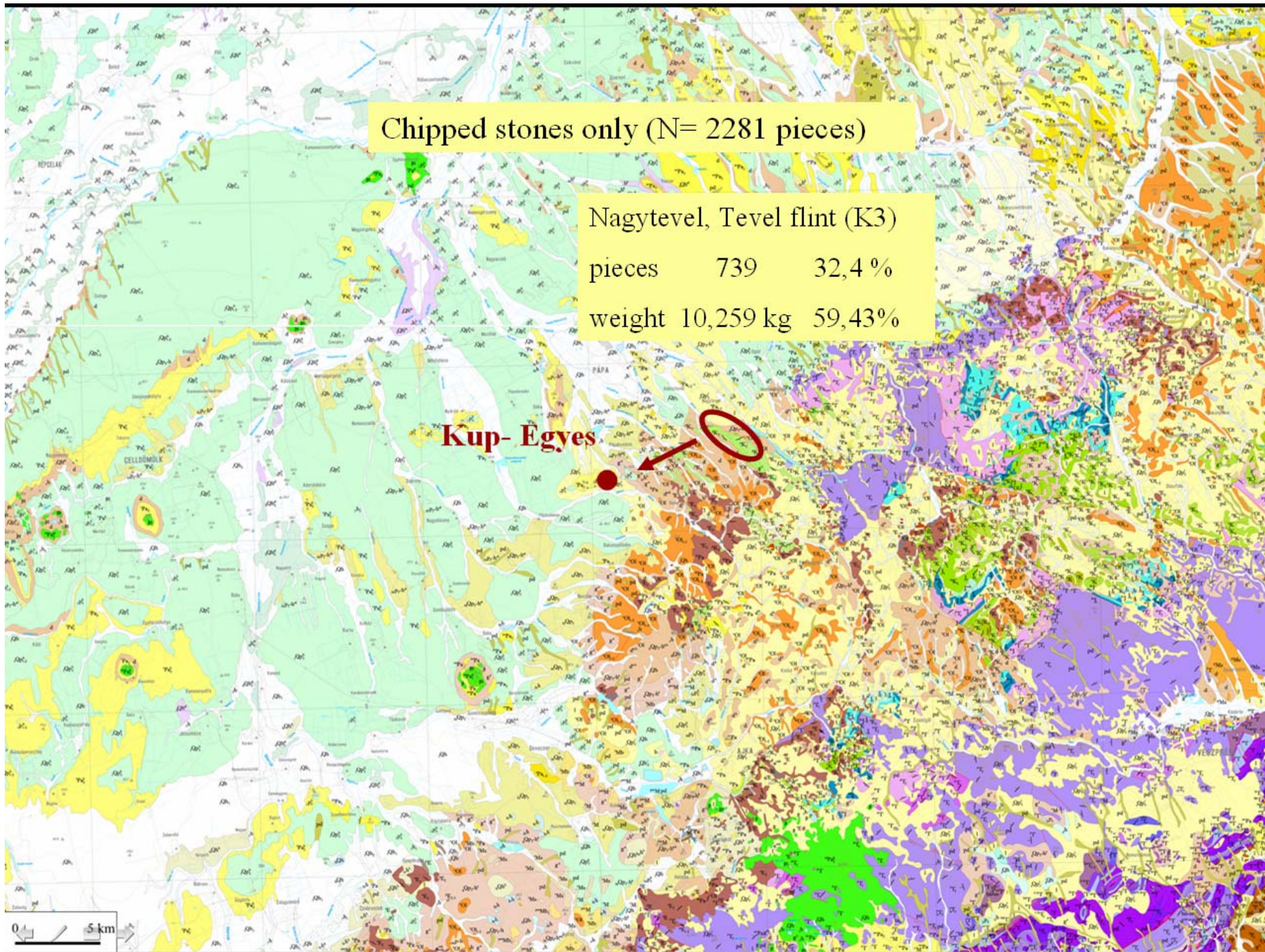
Nagytevel, Tevel flint (K3)

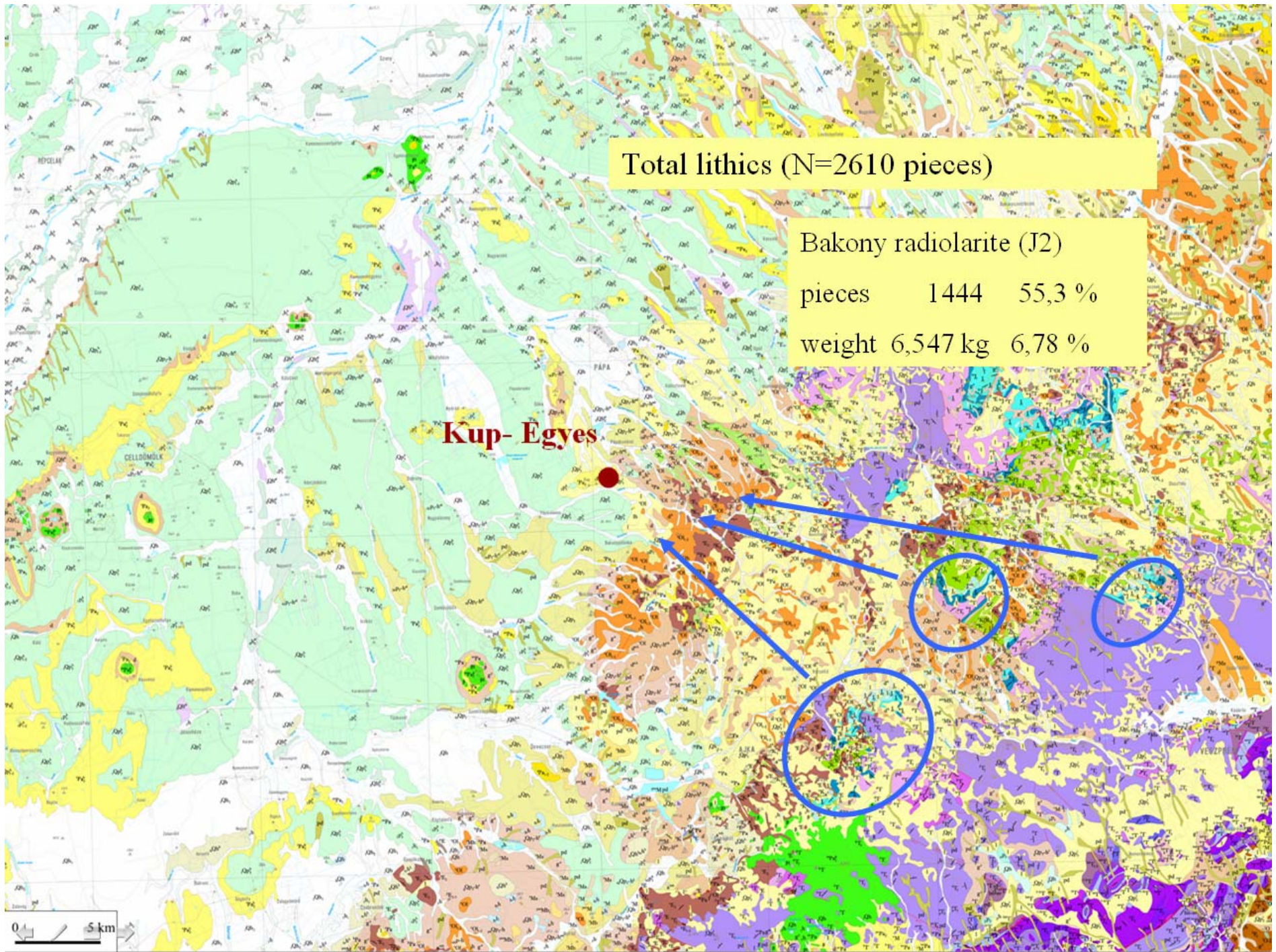
pieces 739 32,4 %

weight 10,259 kg 59,43%

**Kup- Égyes**

0 5 km





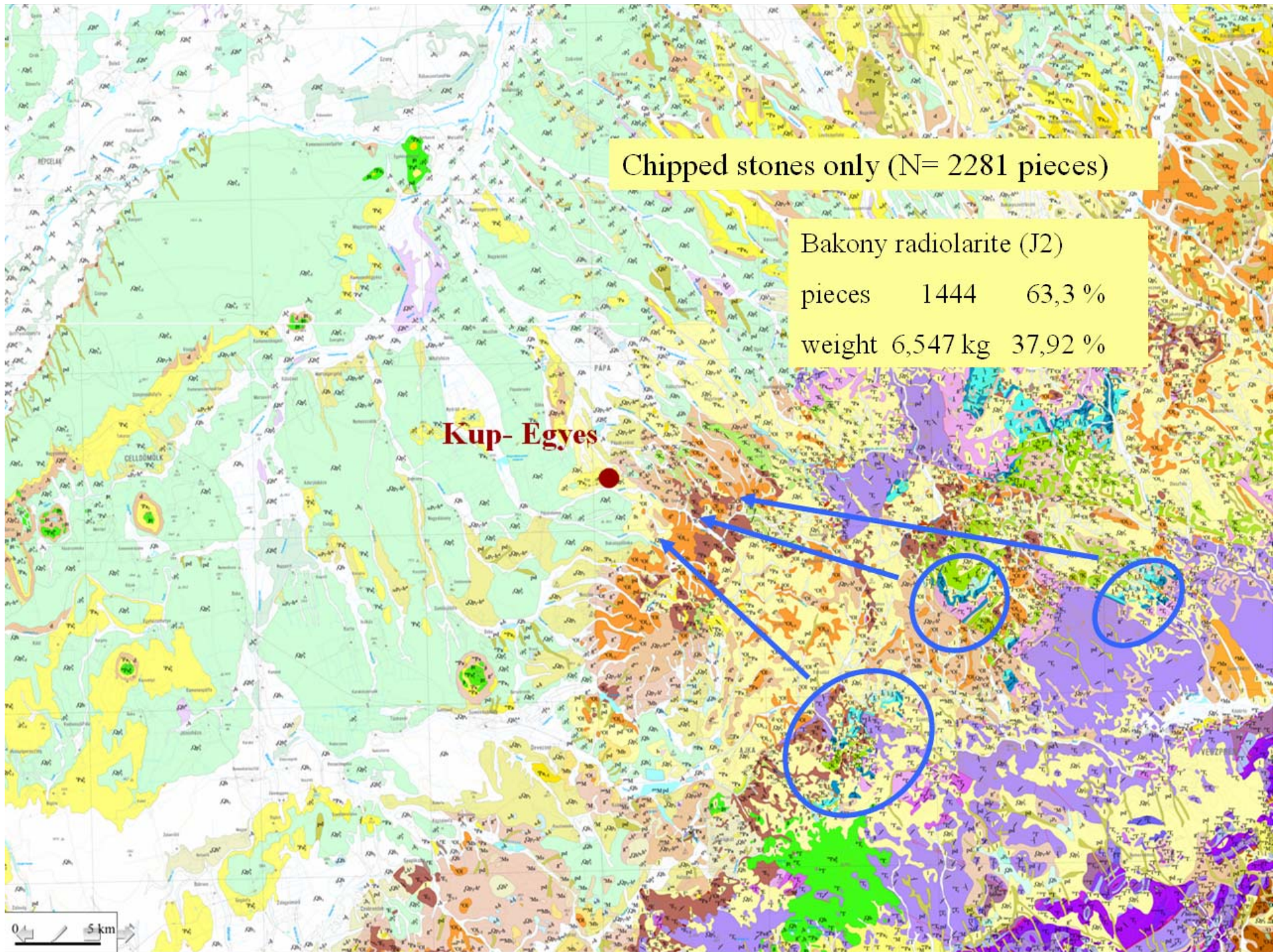
Chipped stones only (N= 2281 pieces)

Bakony radiolarite (J2)

pieces 1444 63,3 %

weight 6,547 kg 37,92 %

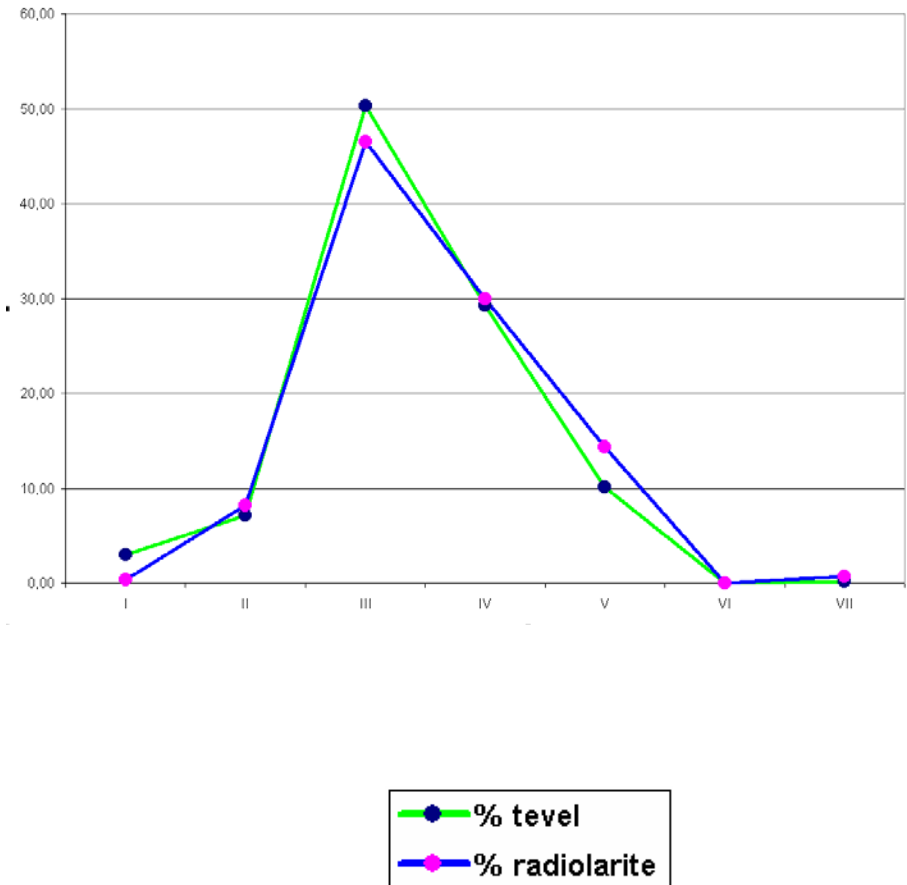
**Kup- Egyes**



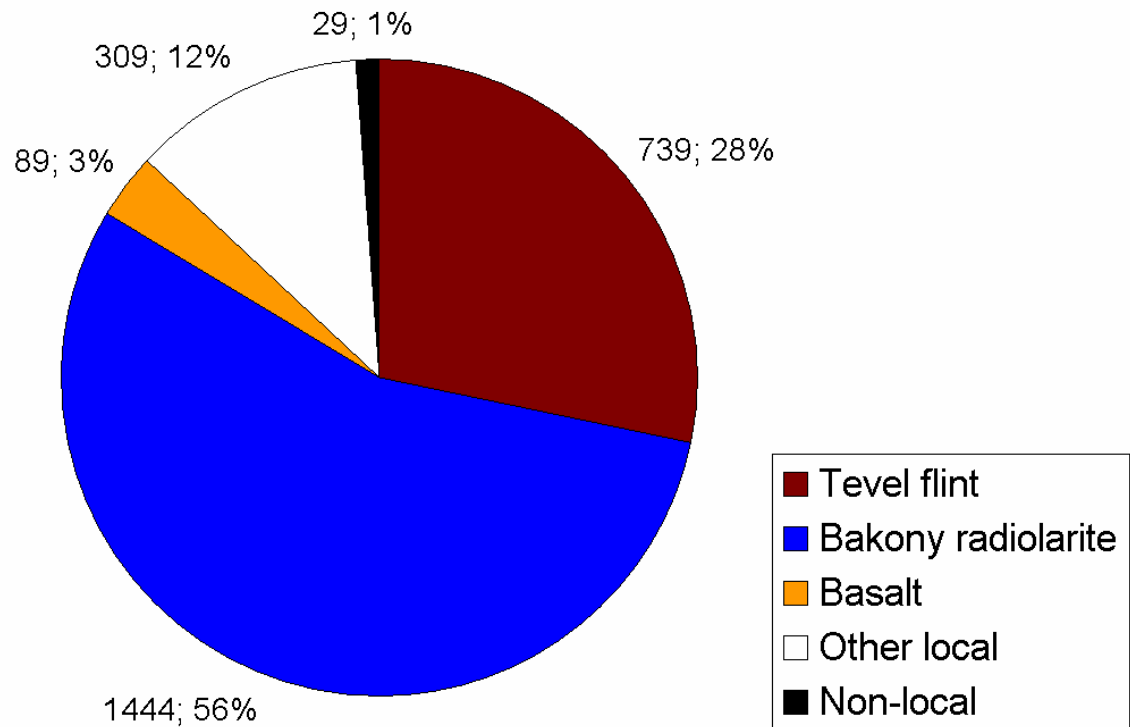
## Type group / Raw material distribution at Kup-Egyes

- I raw material
- II core
- III flake
- IV blade
- V retouched tool
- VI polished tool
- VII others

type group	tevel flint	radiolarite	type group	% tevel	% radiolarite
I	22	5	I	2,98	0,35
II	53	118	II	7,17	8,17
III	372	672	III	50,34	46,54
IV	216	432	IV	29,23	29,92
V	75	207	V	10,15	14,34
VI	0	0	VI	0,00	0,00
VII	1	10	VII	0,14	0,69
total	739	1444	total	100	100

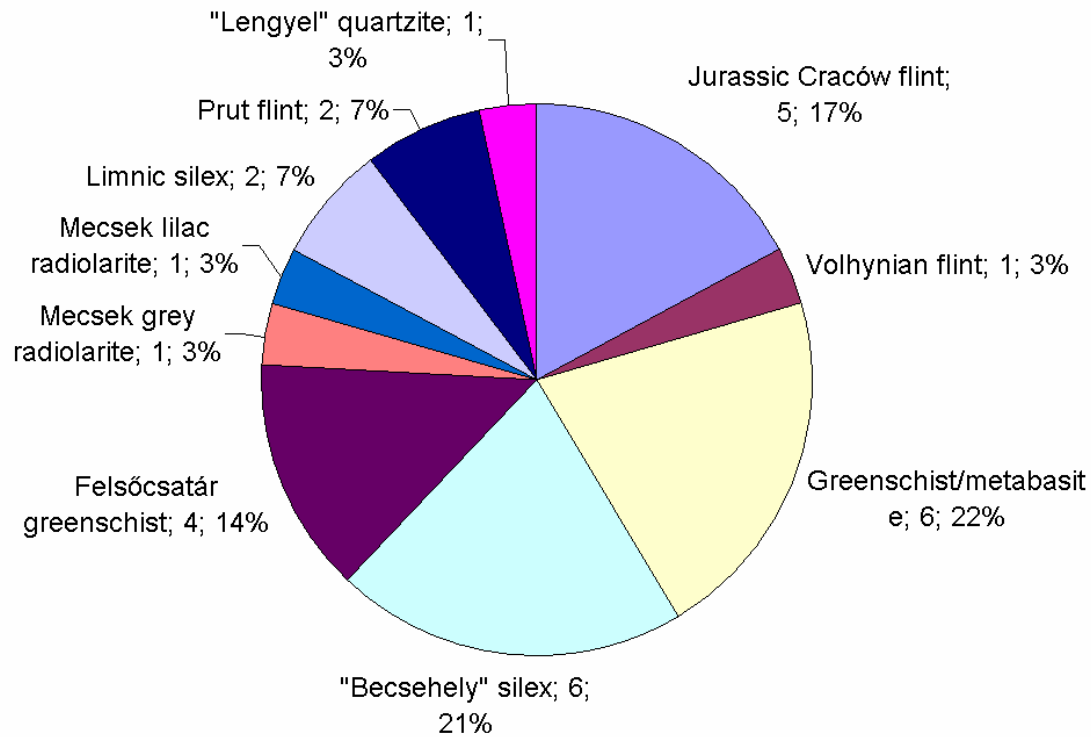


# Raw material distribution at Kup-Egyes (MN, LN, LCA)



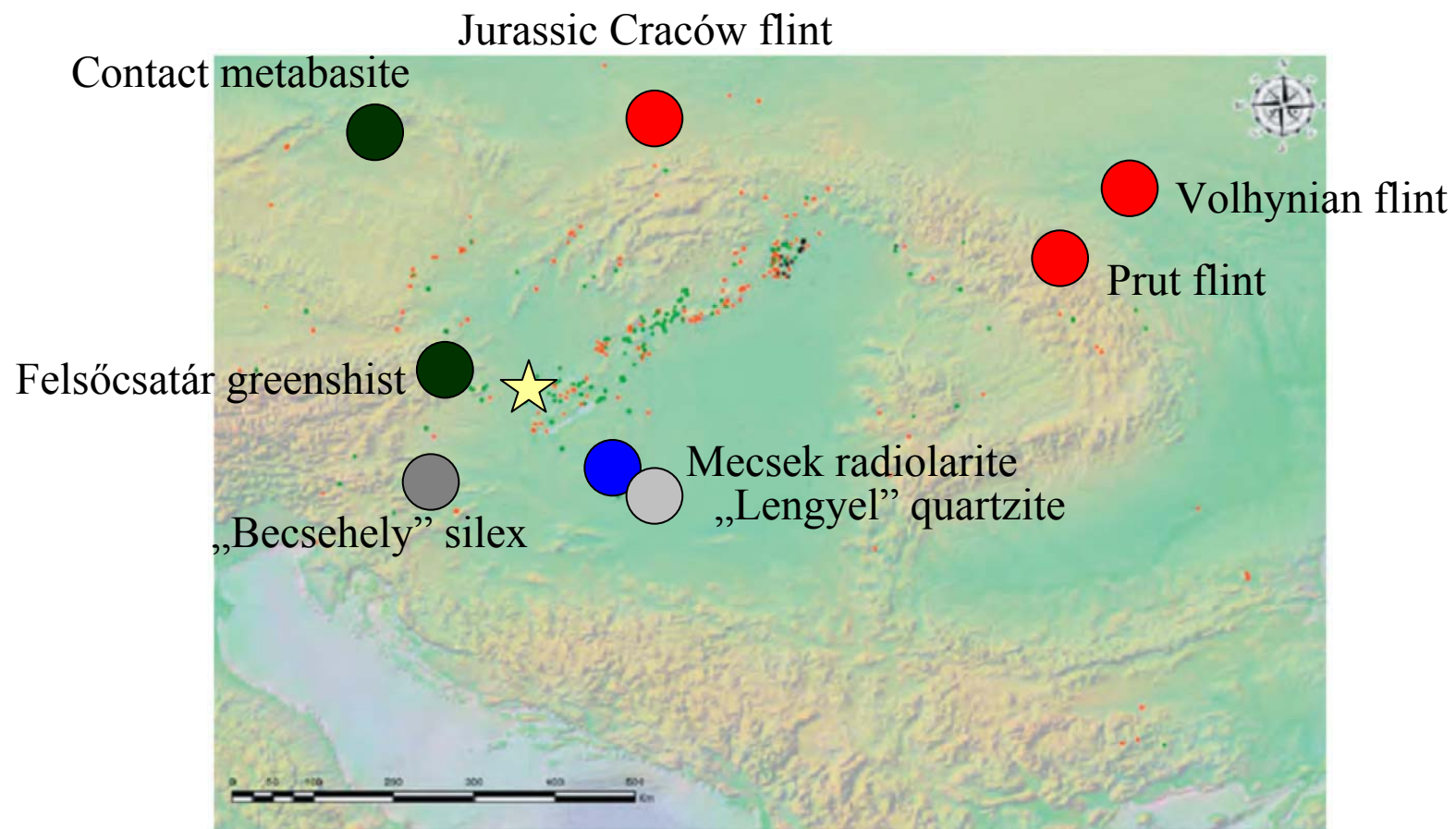
**N=2610**

## Raw material distribution regional and „long distance” raw materials



**N=29**

## Raw material distribution regional and „long distance” raw materials



(Base map: Biró 2014)

## Kup-Egyes: workshop site for Tevel flint (and more...)

Lithic intensity:

	Kőeszköz (darab)	teljes felület (m <sup>2</sup> )	kőeszközös felület (m <sup>2</sup> )	kőeszköz intenzitás / teljes felület (db/m <sup>2</sup> )	kőeszköz intenzitás/ kőeszközös objektumok (db/m <sup>2</sup> )
Pápateszér (lengyeli)	410	1580	145	0,259494	2,827586
Kup <sup>28</sup> (DVK, lengyeli)	2610	400	400	6,525	6,525
Szentgál-Füzikút <sup>29</sup> (lengyeli)	1143	293	293	3,901	3,901
Füzesabony- Gubakút <sup>30</sup> (AVK)	942	8000	450	0,118	2,093
Felsővadász- Várdomb <sup>31</sup> (Bükk)	719	350	350	2,054	2,054
Gellénháza <sup>32</sup> (Starcevo, DVK)	1414	750	750	1,885	1,885
Litér <sup>33</sup> (DVK-LBA)	188	4000	180	0,047	1,044
Aszód <sup>34</sup> (lengyeli)	3988	4620	4197	0,863	0,950
Kompolt-Kistérs <sup>35</sup> (AVK, rézkor)	444	28700	n.a.	0,015	0,015
Sormás- Törökföldek <sup>36</sup> (lengyeli)	752	52500	n.a.	0,014	
Sormás-Mántai dűlő <sup>37</sup> (lengyeli)	533	37300	n.a.	0,014	

(After Biró-Regenye 2012)

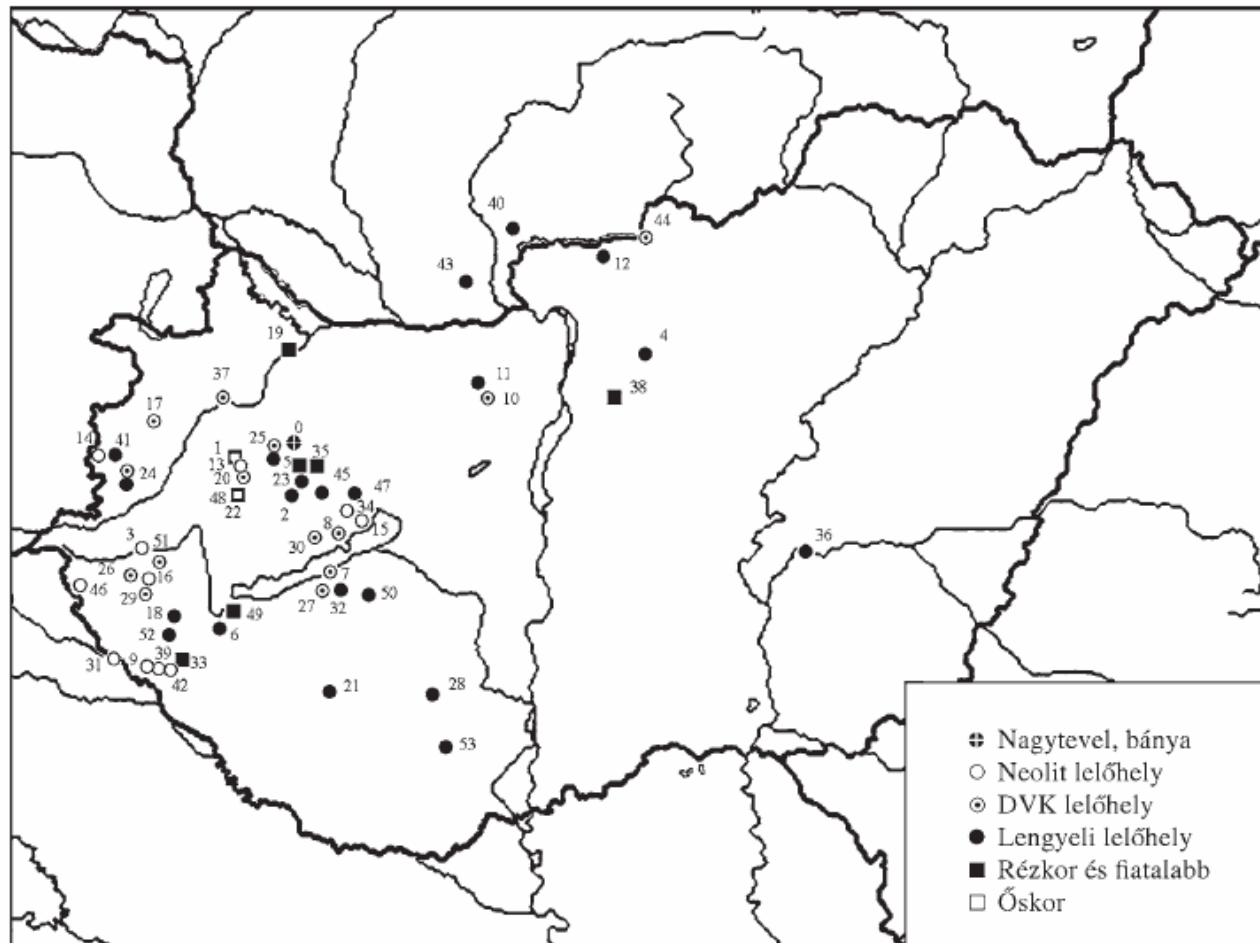
## Kup-Egyes: workshop site for Tevel flint (and more...)

Lithic intensity:

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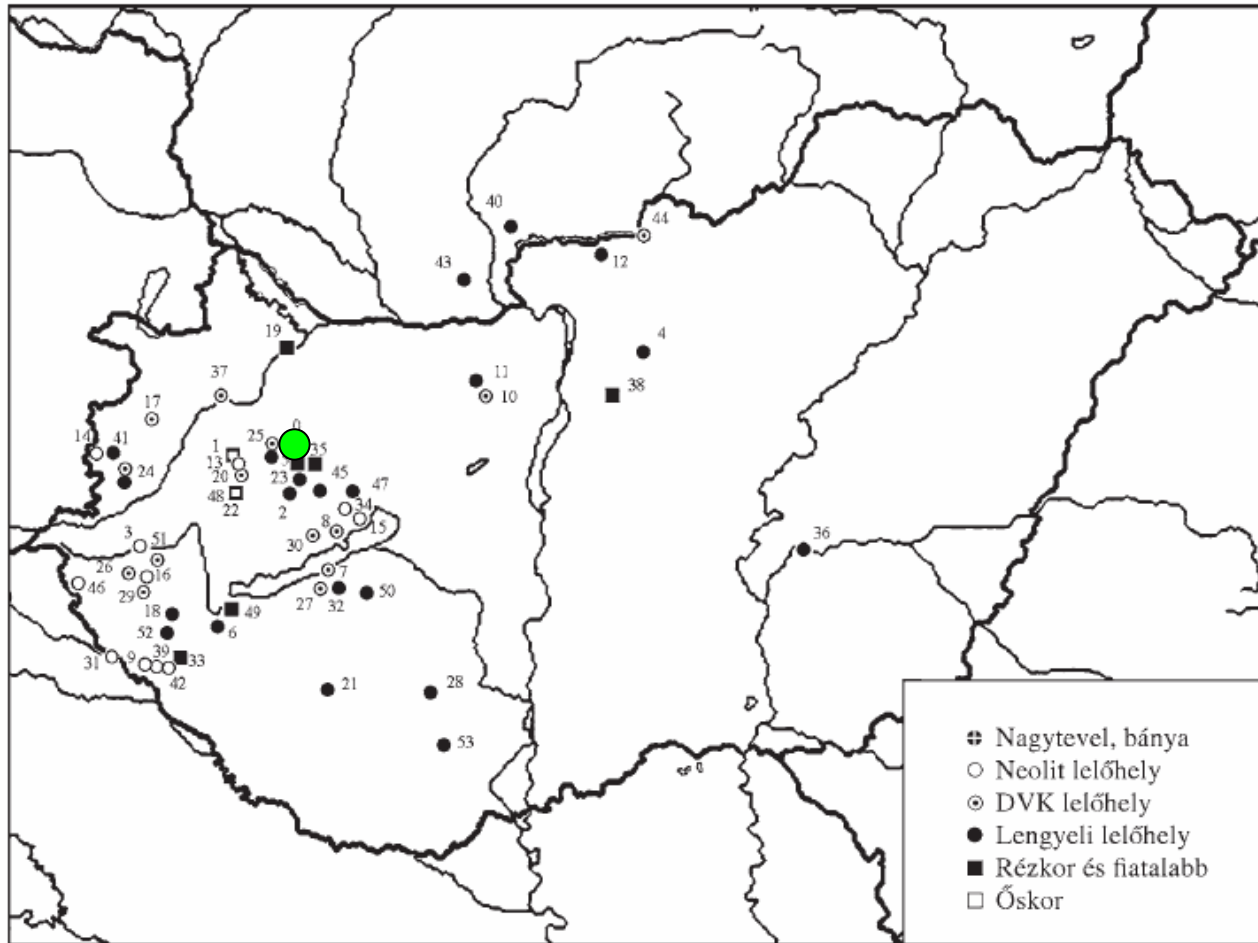
(After Biró-Regenye 2012)

## Distribution of Tevel flint on archaeological sites



(After Biró et al. 2010)

## Distribution of Tevel flint on archaeological sites



0. Nagytevel (bánya/quarry); 1. Adorjánháza Ó; 2. Ajka LN; 3. Andrásrida N; 4. Aszód LN; 5. Bakonyjákó LBA; 6. Balatonmagyaród LN; 7. Balatonszemes MN; 8. Balatonszőlős MN; 9. Becsehely N; 10. Bicske MN; 11. Csabdi LN; 12. Csesztve LN; 13. Csögle N; 14. Dozmat N; 15. Felsőörs N; 16. Gellénháza EN-MN; 17. Gór MN-LBA; 18. Hahót LN, CA; 19. Ikrény CA; 20. Iszkáz MN; 21. Kaposvár LN; 22. Kisberzsény Ó; 23. Kislód LN; 24. Kisunyom MN-LN; 25. Kup MN-LN; 26. Kustánszeg MN; 27. Látrány MN; 28. Lengyel LN; 29. Lickóvadamos MN; 30. Mencshely MN; 31. Muraszemenye N; 32. Nagycsepely LN; 33. Nagykanizsa CA; 34. Nemesvámos MN-LN; 35. Németbánya LBA; 36. Öcsöd LN; 37. Páli MN; 38. Pécel MCA; 39. Petrivente N; 40. Santovka LN; 41. Sé LN; 42. Sormás N; 43. Svodín LN; 44. Szécsény MN; 45. Szentgál LN; 46. Szentgyörgyvölgy EN; 47. Veszprém LN; 48. Veszprémpinkóc MN-LN; 49. Vörs EBA; 50. Zala LN; 51. Zalaegerszeg EN-MN; 52. Zalaszentbalázs LN; 53. Zengővárkony LN

(After Biró et al. 2010)

## Conclusion

Flint is a minor but very important constituent of the Hungarian prehistoric raw material stock. Transcarpathian (Northern) flint appeared as early as the end of the MP period.

The utilisation of Northern flint types was most widespread in the Late Neolithic and Copper Age.

Southern flint was utilised from the Early Neolithic onwards, in much smaller quantities.

Local flint of good quality is known from one geological occurrence only, from Nagytevel (W Central Transdanubia). The quarrying and utilisation of this raw material can be dated to the Middle Neolithic (LBC) and Late Neolithic / Early Copper Age (Lengyel culture) periods.