Winckler, Diesenberger, Eichert (Hg.)

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Benjamin Štular

One phenomenon or many? Considerations on the role of selected sites in Slovenia: Na Bleku, Mali grad, and Gradišče above Bašelj

The GIS analysis presented in this volume[1] resulted in four groups of sites according to the natural affordance. However, it also cautioned that the interpretations suggested can only be used as a starting point for a discussion on the individual sites. What follows is such a discussion on three selected sites in Slovenia: Na Bleku, Mali grad, and Gradišče above Bašelj.

The Na Bleku[2] site is located on the Krvavec Mountain over 1600 m a. s. l. At least three buildings were built leaning on the steep mountain slope in the 10th century AD. In addition to the large quantity of pottery, a sheep-bell, and a finger ring a spearhead and an arrowhead have also been found. Based on the finds and findings, the site is interpreted as a non-permanent settlement used to exploit the high-mountain pastures in the summer.[3]

In GIS analysis the site exhibits fringe values in every single category and does not correspond well with other sites considered.[4] The first obvious reason is that it is not a hilltop location as such since it is located on the mountain slope. In addition, due to the context of the site, the spearhead and the arrowhead are seen as hunting tools rather than military equipment.

And indeed, this site was added to the GIS analysis intentionally as a "red herring" in the data, i.e. our control group. It was known that this is a different type of site and the aim was for the GIS analysis to clearly show this in order to validate the method chosen.

Nonetheless, in the above analysis the site has been marked as a remote and hidden symbolic site. This interpretation is supported by archaeological evidence. First, there is the material evidence for symbolic activities taking place at the site in the form of a pit filled with ashes, stone, a pot and a knife deliberately placed with the blade upwards.[5] Also, this location has been interpreted as a part of a larger mythical landscape system.[6]

1 Štular/Eichert, this volume.
2 Štular/Eichert, this volume, Appendix: No. 17.
3 Andrej Pleterski, Die frühmittelalterliche Besiedlung des Krvavec. Vorbericht, in: Archäologie in den Alpen. Alltag und Kult, ed. Franz Mandl/Harald Stadler (Haus 2010) 209–218; Benjamin Štular, Medieval High-Mountain Pastures in the Kamnik Alps (Slovenia), in: Archäologie in den Alpen. Alltag und Kult, ed. Franz Mandl/Harald Stadler (Forschungsberichte der ANISA 3, Haus 2010) 259–272.
4 Štular/Eichert, this volume.
5 Pleterski, Besiedlung des Krvavec 215f.
6 Andrej Pleterski, Kulturni genom: prostor in njegovi ideogrami mitične zgodbe (Ljubljana 2014) 287.

Mali grad in Kamnik[7] is a site best known for its High Medieval castle built directly on top of the Early Medieval cemetery. Nowadays castle ruins on the cliffy promontory in the midst of the medieval town Kamnik appear unapproachable. However, before the hilltop was substantially remodelled during and after the castle's construction, it was accessible via a natural "bridge".

Graves of at least 32 individuals were buried on the site in the last third of the 10th century. The age and gender structure as well as the short-lived use of the cemetery are evidence that the dead belong to a single generation of a small community. Archaeological interpretations by different authors agree that the community buried was an extended family of the župan, the Slavic Early Medieval local lord.[8] As of yet, there is no direct archaeological evidence for an Early Medieval settlement. However, based on the cemetery's type and location, the existence of a manor-type site is conjectured.[9] The site is considered in this study due to the stray find of the bronze pendant with enamel inset representing two birds facing a tree of life belonging to a horse harness or a sword sheath.[10]

Directly on top of the cemetery, one of the first and most important castles in the land – of the *Graffenburg* type – was built around AD 1100 as a testimony to the regional importance of the location at the time.[11]

In the GIS analysis the Mali grad site was interpreted as a central place owing to its excellent living conditions. How important the župan of Kamnik was remains unknown, as does the exact location of the manor house. The cemetery, however, is unequivocal evidence that Mali grad was a central place at least at the end of the 10th century.

Among the other sites in the GIS analysis interpreted as central places, Ptujski grad[12] and Puščava[13] are also known to be Early Medieval central places,[14] whereas no such archaeological evidence exists for Dunaj at Jereka.[15]

It needs to be mentioned, though, that the Mali grad, Ptujski grad and Puščava sites also included ritual properties.[16] However, ritual properties are seen as a secondary function to the settlement, i.e. a function inherent to every central settlement.

7 Štular/Eichert, this volume, Appendix: No. 16.

8 Milan Sagadin, Staroslovansko grobišče na Malem gradu v Kamniku, in: Arheološki Vestnih 52 (2001) 359–375; Benjamin Štular, Posamezniki, skupnost in obred v zgodnjem srednjem veku. Primer grobiščnih podatkov z Malega gradu v Sloveniji, in: Studia mythologica Slavica 10 (2007) 23–50; Katarina K. Predovnik, A Brave New World? Building Castles, Changing and Inventing Traditions, in: Atti dalla accademia Roveretana degli agiati ser. IX, Volume II, A, fasc. II (2012) 63–106, at 99–100; Andrej Pleterski, Korak v kronologijo zgodnjesrednjeveškega naglavnega nakita vzhodnih Alp = A step towards the chronology of early medieval head ornaments in the Eastern Alps, in: Arheološki vestnik 64 (2013) 299–334, at 329 and Fig. 15; Andrej Pleterski, Kulturni genom: prostor in njegovi ideogrami mitične zgodbe (Ljubljana 2014) 289–294.

9 Milan Sagadin, Mali grad v Kamniku, in: Varstvo spomenikov 37 (1997) 105–125, at 109; Štular, Posamezniki, at 32f.

10 Benjamin Štular, Mali grad. Visokosrednjeveški grad v Kamniku. = Mali grad. High Medieval Castle in Kamnik (Opera Instituti archaeologici Sloveniae 15, Ljubljana 2009), 118f., *t. 7: 13.*

11 Štular, Mali grad.

12 Štular/Eichert, this volume, Appendix: No. 19.

13 Štular/Eichert, this volume, Appendix: No. 20.

14 Miha Kosi, Predurbane ali zgodnjeurbane naselbine? (Civitas Pettouia, Carnium/Creina in druga centralna naselja neagrarnega značaja v zgodnjem srednejm veku) (I. del), in: Zgodovinski časopis 59/3–4 (2005) 269–331, at 289–331; Andrej Pleterski/Mateja Belak, Grobovi s Puščave nad Starim trgom pri Slovenj Gradcu, in: Arheološki Vestnih 53 (2002) 233–300.

15 Štular/Eichert, this volume, Appendix: No. 3.

16 Pleterski, Kulturni genom, 289–302; Andrej Pleterski, Wie auf der Erde, so im Himmel – himmlischer Hof bei den Slawen, in: Frühgeschichtliche Zentralorte in Mitteleuropa. Internationale Konferenz und Kolleg der Alexander von Humboldt-Stiftung zum 50. Jahrestag des Beginns archäologischer Ausgrabungen in Pohansko bei Břeclav, 5.–9. 10. 2009, ed. Jiři Macháček/Šimon Ungerman (Břeclav/Bonn 2011); Pleterski, Kulturni genom, 350 respectively.

Gradišče above Bašelj is a site best known for numerous finds of military equipment and equestrian gear dated between the late 8th and early 10th centuries.[17] Altogether, more than 1700 metal artefacts are known from this site.[18] However, this is a three-phase site: Late Antique, Early Medieval and High Medieval. The distinction baffled early researchers[19] but was clarified by modern excavation.[20]

The Late Antique phase is characterised by a stone-built fortified settlement. The end of this phase is radiocarbon-dated to between the end of the 4th and mid-6th centuries AD.[21] This date is corroborated by LRA 1B and LRA 2 amphorae found on the pavement dated in the second half of the 5th and the 6th c. AD.[22]

Here we are focusing on the Early Medieval phase. Early Medieval artefacts were found in the charred layer above the ruins of the Late Antique settlement.[23] Many military items were found lying along the ruins of the walls together with pottery, implements for everyday use and charred cereal grain[24] that is radiocarbon-dated to AD 790-990 (∑2).[25] The stratigraphic context of the Early Medieval artifacts is therefore distinctly separate from the Late Antique settlement and there is a hiatus of at least two centuries.

17 Špela Karo/Timotej Knific/Zoran Milić, Pokositreni železni predmeti z Gradišča nad Bašljem, in: ARGO 44/2 (2001) 42–47; Timotej Knific, Zgodnjesrednjeveški pozlačeni predmeti z Gradišča nad Bašljem (Slovenija), in: Prilozi instituta za arheologiju u Zagrebu 24 (2007) 317–326; Timotej Knific, Early mediaeval hoards of iron items in Slovenia, in: Archaeologia Adriatica 4 (2010) 85–99; Špela Karo/Timotej Knific/Marija Lubšina-Tušek, Predmeti avarskega izvora z arheoloških najdišč v Sloveniji, in: VAMZ - Vjesnik Arheološkog muzeja u Zagrebu (annual journal of the museum) 46 (2011) 131–159; Špela Karo, Zgodnjekarolinške najdbe s slovenskih najdišč, in: Emona med A in Panonijo (Emona between Aquilea and Pannonia), ed. Irena Lazar/Bernarda Županek (Koper 2012) 447–458; Karo, Oprema jahača i konja s Gradišča nad Bašljem (Slovenija). Zbornik radova sa Znanstvenog skupa Dani Stjepana Gunjače 2, Hrvatska srednjovjekovna povijesno-arheološka baština, Međunarodne teme, Split, 18.–21. listopada 297–315; Od Rimljanov do Slovanov. Predmeti, ed. Polona Bitenc/Timotej Knific (Ljubljana 2001); Špela Karo/Timotej Knific, Cross Strap Dividers from Gradišče above Bašelj (Slovenia). Zbornik srečanja v Bojni (Nitra, in press).

18 Karo, Gradišča nad Bašljem 297.

19 Rajko Ložar, Gradišče nad Bašljem - nova postojanka staroslovenske kulture. Priprava, koncept za študijo, in: Unpublished manuscript from 1939 (Replicated as a citation in Timotej Knific, Arheološko najdišče Gradišče nad Bašljem, in: Preddvor v času in prostoru. Zbornik Občine Preddvor, ed. Tone Roblek (Preddvor 1999) 55–67, at 57–61).

20 Timotej Knific, Arheološko najdišče Gradišče nad Bašljem, in: Preddvor v času in prostoru. Zbornik Občine Preddvor, ed. Tone Roblek (Preddvor 1999) 55–67; Timotej Knific, Gradišče nad Bašljem, in: Zakladi tisočletij. Zgodovina Slovenije od neandertalcev do Slovanov, ed. Dragan Božič/Janez Dular/Primož Pavlin/Tomaž Lauko/Slavko Ciglenečki/Bronislava Aubelj/Sneža Tecco Hvala/Mateja Belak/Dragica Knific Lunder/Tamara Korošec/Jurij Mikuletič (Ljubljana 1999) 398–401.

21 Špela Karo, Ozemlje današnje Slovenije med Avarskimi vojnami in Madžarskimi vpadi v luči arheoloških najdb (PhD Dissertation at University of Ljubljana, Ljubljana 2007) 205.

22 Verena Perko, Poznoantične amfore v Sloveniji (PhD Dissertation at University of Ljubljana, Ljubljana 1994) 195–197; Zvezda Modrijan, Imports from the Aegean Area to the Eastern Alpine Area and Northern Adriatic in Late Antiquity, in: Ephemeris Napocensis 24 (2014) 51–70, at 55; Špela Karo/Dimitri Mlekuž, The Archaeological Image of the Land Along the Upper Sava River in Late Antique and Early Medieval Periods. A View in Space, in: Swords, Crowns, Censers and Books. Francia Media – Cradles of European Culture, ed. Marina Vicelja-Matijašič (Rijeka 2015) 249–272, at 255–257.

23 Karo/Mlekuž, Archaeological Image, at 255.

24 Knific, Hoards , 86; *cf*. Knific, Arheološko 64; Knific, Gradišče nad Bašljem 400; Špela Karo, Die Typologie der frühmittelalterlichen Steigbügel aus slowenischen Fundorten, in: Zbornik na počest Danny Bialekovej, ed. Gabor Fusek (Nitra 2004) 165; Knific, Zgodnjesrednjeveški 317; Karo, Ozemlje, at 49 and 205; Karo, Gradišča nad Bašljem 297; Špela Karo/Timotej Knific, Gradišče boven Bašelj in het vroegmiddeleeuwse Carniola (Slovenië), in: De erfenis van Karel de Grote 814 – 2014, ed. Dirk Callebaut/Horst van Cuyck (Ename 2015) 255–266, at 259; Timotej Knific/Tomaž Nabergoj, Srednjeveške zgodbe s stičišča svetov (Ljubljana 2016) 84.

25 Knific/Nabergoj, Srednjeveške zgodbe 83.

The Early Medieval site is most often interpreted either as ruins utilised during the construction of a military stronghold[26] or as a settlement.[27] The first interpretation is based on the presence of the military finds and the site's strategic location[28] and the latter has not been substantiated but by half of a sentence: *. . . kot je mogoče soditi po množici zgodnjesrednjeveških drobnih najdb . . .*[29]

An alternative interpretation of Gradišče above Bašelj argues that the circumstances of the discovery, as well as the traces of manipulations and the functional composition of the objects, offer a possibility of community offerings in a desolate fortification from the 5th or 6th century.[30]

The High Medieval phase is only known through finds of pottery[31] and individual metal artefacts.[32]

3.2 Settlement

The first interpretation mentioning the construction of a military stronghold can be refuted beyond reasonable doubt. In 1939 Ložar established *. . . da je moral biti zid ob prihodu Slovanov že do velike mere porušen, kajti apneni omet prihaja na dan v sami ogleni plasti in celo pod njo.*[33] Re-excavation of the same trench in 1998 (Fig. 1: 1) confirmed that not even the slightest rubble clearance was attempted in the Early Medieval period, let alone any construction undertaken (Fig. 2). Since the excavation trench is positioned at the entrance to the Late Antique fortification this is clear archaeological evidence that there were no re-fortification activities on the entire western wall. In addition, Ložar cleaned the rubble on a portion of the northern wall (Fig. 1: 2). A ruined Late Antique wall with no traces of re-fortification has been recorded (Fig. 3).[34] This, therefore, is direct archaeological evidence that the site has not been re-fortified in two of the most vulnerable positions: at the entrance (west) and where the easiest access is (north; Fig. 6).

Figure 1: Gradišče above Bašelj, site plan: 1 – excavation trench No. 3 in 1939, re-excavated in 1998; 2 – excavation trench No. 2 in 1939; 3 – promontory excavated in 1939 (original by P. Fister in 1967; digitally remastered after Knific 1999, Slika 7).

Figure 2: Gradišče above Bašelj, excavation trench in 1998. Left photography (Karo, Knific 2014, Fig. 4), right interpretation based on the photography (by T. Korošec): 1 – wall, 2 – Late Antique house that leans on it, 3 – entrance, 4 –two stone steps led to the entrance of the house; 5 – remains of the charred layer with Early Medieval finds. The interpretation (right) is focused on demonstrating the stratigraphic superposition of the charred layer (a) and the ruins of the wall (b).

Figure 3: Gradišče above Bašelj, plan of the 1939 trench No. 2 (drawing R. Ložar, copy in Archive of ZRC SAZU Institute of Archaeology, Sign. 08-359; digitally remastered by D. Baloh).

26 Knific, Hoards 86; cf. Knific, Arheološko 67; Knific, Gradišče nad Bašljem, 401; Slavko Ciglenečki, Tinje nad Loko pri Žusmu. Poznoantična in zgodnjesrednjeveška naselbina = Tinje oberhalb von Loka pri Žusmu. Spätantike und frühmittelalterliche Siedlung (Opera Instituti archaeologici Sloveniae 4, Ljubljana 2000) 155.

27 Ciglenečki, Tinje 155; Karo, Gradišča nad Bašljem 297; Karo/Mlekuž, Archaeological Image 255; Od Rimljanov do Slovanov, 121 and 137f.; Knific/Nabergoj, Srednjeveške zgodbe 83–84.

28 Knific, Arheološko 67.

29 ". . . as can be judged by a multitude of Early Medieval small finds, . . . " (translated by the author). Polona Bitenc/Timotej Knific, Zgodnjesrednjeveški zakladi železnih predmetov z Gorjancev, Starega gradu nad Uncem in Ljubične nad Zbelovsko Goro, in: Arheološki vestnik 66 (2015) 103–146, at 121; indirectly also in Karo/Knific, Gradišče 259.

30 Andrej Gaspari, Visoko- in poznosrednjeveško orožje iz arheoloških kontekstov. Primer: viteški meč iz poznorimskega vodnega zbiralnika na Ajdovskem gradcu nad Vranjem, in: Vojaška zgodovina 10 (2009) 145–160, at 156.

31 Rajko Ložar, Staroslovensko in srednjeveško lončarstvo v Sloveniji, in: Glasnik Muzejskega društva za Slovenijo 20/1–4 (1939) 180–225, at 200.

32 Knific/Nabergoj, Srednjeveške zgodbe Picture 153.

33 . . . by the arrival of the Slavs the wall must have already been mostly in ruins since the mortar is found within and even beneath the charcoal layer. Rajko Ložar, Gradišče nad Bašljem. Dnevnik (Unpublished excavation diary, Archive of ZRC SAZU Institute of arhaeology, Sign. 19/1–65 1939) 27 (translated by the author).

34 Knific, Arheološko 59.

Could it be, though, that the site was only used for military purposes for a very brief period, i. e. too short a time span for any construction to take place? Not according to the finds assemblage. Namely, although military finds from Gradišče above Bašelj feature most prominently in publications, there are many non-military finds as well. Until a full list of finds is published, only a qualitative statement can be made that the following distinctly non-military finds have been recovered from Gradišče above Bašelj:[35]

- 7 glass beads,
- 1 bone bead,
- 5 decorative iron pins with glass bead,
- 3 finger rings,
- 1 spindle whorl,
- 3 torqued hooks (part of a sawing or weaving kit),
- 1 loom-weight,
- 7 fragments of a wool or flax comb,
- 4 iron scissors,
- 8 rotary keys,
- 3 rotary-lock key-guard plates,
- 1 rotary-lock bolt,
- 9 fragments of small jewellery box fittings,
- 4 awls,
- 4 bells and
- 1 bronze cinder.

Although the 59 non-military artefacts mentioned above pale in significance against the total of more than 1700, so do the 54 military artefacts published thus far.[36]

In conclusion, there is direct archaeological evidence that neither fortification nor any other exclusively military activity took place on the Gradišče above Bašelj site in the Early Medieval period.

Similarly, several arguments can be made against the interpretation of an Early Medieval settlement at Gradišče above Bašelj.

First, no archaeological evidence for Early Medieval settlement structures has ever been put forward (sic). Neither archaeological excavations[37] nor archaeological interpretation of lidar data[38] revealed any evidence of Early Medieval settlement structures. Whereas lidar data cannot be used to directly date settlement remains, a comparison of the number and size of buildings with the Late Antique hillfort settlement Tonovcov grad[39] reveals structural similarity between the two. Also, there are no archaeological features suggesting clearance of the Late Antique ruins. More importantly, though, lidar data exhibit no discernible differences in the shape, size or – most importantly – state of the building ruins throughout the entire site. This uniformity is a strong indicator that the trench excavated in 1939 and again in 1998 (Fig. 1: 1; Fig. 2) – revealing no Early Medieval settlement remains – is a *pars pro toto* indicator for the entire site.

In conclusion, not only is there no archaeological evidence of Early Medieval settlement structures, there is archaeological evidence of its absence.

Second, more than 1700 metal artefacts is a strong indicator against the settlement interpretation. For example, at Ančnikovo gradišče – a Late Antique hillfort that was re-settled in the Early Medieval period – a significant portion of the settlement has been excavated and a total of 63 metal artefacts dis-

35 Od Rimljanov do Slovanov 325–329; Timotej Knific, Železni zvonci iz Kamniško-Savinjskih Alp. Arheološki pregled, in: Človek v Alpah. Desetletje (1996–2006) raziskav o navzočnosti človeka v slovenskih Alpah, ed. Tone Cevc (Ljubljana, 2006) 138–149; Nika Veršnik, Gradišče nad Bašljem v luči drobnih vsakdanjih predmetov in nakita (MA thesis at the University of Primorska, Koper 2009) 21–58; Knific/Nabergoj, Srednjeveške zgodbe 90.

36 Karo, this volume, Plate 1: 6–10; Plate 2; Plate 3: 1–17; Plate 4–Plate 6; Od Rimljanov do Slovanov, 315–324, 330.

37 Ložar, Nova postojanka; Ložar, Gradišče nad Bašljem; Knific, Arheološko 67; Knific, Gradišče nad Bašljem.

38 Karo/Mlekuž, Archaeological Image 252–255.

39 Benjamin Štular, The use of lidar-derived relief models in archaeological topography. The Kobarid region (Slovenia) case study (Uporaba modelov reliefa pridobljenih z lidarskim snemanjem v arheološki topografiji. Študijski primer Kobariške), in: Arheološki vestnik 62 (2011) 393–432, at 421–426.

covered. Among those only one item, pliers[40], could potentially be Early Medieval. At a similar site, Tinje above Loka by Žusm, among 101 metal finds there are none that could be securely dated to the Early Medieval period.[41] As the third example, Pristava in Bled can be mentioned. Excavations of this Early Medieval settlement yielded 118 metal artefacts.[42] As an example of the highest status settlement, a manor house of a central settlement Pohansko in the Czech Republic can be mentioned. Excavation of some 15,000 m^2 revealed 287 metal artefacts[43]. In rare cases, though, large quantities of metal finds are found in settlements, but the finds are concentrated in a confined area and heavily fragmented and are interpreted as workshops.[44]

Even supposing that in the case of Gradišče above Bašelj all metal artefacts have been collected and that it was a settlement of the highest status, the 1700 plus metal artefacts surpasses the expected quantity more than fivefold.

Third, the taphonomy of the pottery.[45] Only a small selection of pottery from the 1939 excavation with unknown contexts has been published.[46] The fragments that have been drawn are, on average, large (6.48 to 92.5 cm^2) and exhibit a high level (28%) of reconstruction. Although the sample is heavily biased, the published fragments can only be interpreted as a primary refuse.[47] This is corroborated by Ložar's description of a context in the western trench (Fig. 1: 1): *Drug kup črepinj iste posode se je začenjal pri ca 110 ter sega do ca 150 cm v od zapadne stene v notranjost in ca 60 – 100 od severne stene proti jugu. Stratigrafija ista. Vmes oglje, in poogleneli pesek-omet.*[48] Therefore a single pot found *in situ* where it was broken (the sherds were spread over 40 by 40 cm) in a burnt layer directly on top of the ruins of Late Antique settlement's walls is described.

The Early Medieval burnt layer at Gradišče above Bašelj is therefore a primary refuse – i. e. the finds have been recorded *in situ* – that bears no evidence of contemporary buildings.

Fourth, the taphonomy of metal finds. The finds excavated by archaeologists have reportedly mostly been scattered, but occasionally found in small groups.[49] However, the vast majority of the metal finds have been robbed by metal detecting and only subsequently acquired by archaeologists. Not many details are known regarding the context of those, but what is known points towards the finds being clustered in several locations. One large group of the artefacts derives from a very limited area on the lowest terrace adjacent to the south wall[50] and many items were lying along the walls.[51] It is important to note that potential post-depositional processes dominated by gravitation cannot explain the described concentrations, as there are no colluvial layers.

Described clusters of metal artefacts with such varied functionality cannot be interpreted as lost or misplaced in a settlement and especially not as objects left *in situ* in a hurriedly abandoned settlement.

40 Mateja Ravnik, Zaščitne raziskave Ančnikovega gradišča pri Jurišni vasi v letih od 1986 do 1994, BA thesis at the University of Ljubljana (Ljubljana 2006), at T.: 47/454.

41 Ciglenečki, Tinje 52–58.

42 Andrej Pleterski, Zgodnjesrednjeveška naselbina na Blejski Pristavi. Najdbe = Frühmittelalterliche Siedlung Pristava in Bled. Funde (Opera Instituti archaeologici Sloveniae 14, Ljubljana 2008) T. 30–32, 35, 39.

43 Bořivoj Dostál, Břeclav-Pohansko IV: velkomoravský velmožský dvorec (Brno 1975); Drahomíra Frolíková-Kaliszová, K významu Klášťova v době velké moravy - místo kultu nebo útočiště?, in: Pravěk 23 (2015) 195–215, at 189–238.

44 E.g. Tina Milavec, Kovinske najdbe, in: Poznoantična utrjena naselbina Tonovcov grad pri Kobaridu. Najdbe, Opera Instituti Archaeologici Sloveniae 24, ed. Zvezda Modrijan/Tina Milavec (Ljubljana 2011) 21–82, at 21–63.

45 For taphonomy, see Michael B. Schiffer, Formation processes of the archaeological record (Salt Lake City 1996); Jiři Macháček, Studie k velkomoravské keramice. Metody, analýzy a syntézy, modely (Brno 2001), at 11–17; Andrej Pleterski, Die frühmittelalterliche Besiedlung des Krvavec. Vorbericht, in: Archäologie in den Alpen. Alltag und Kult, ed. Franz Mandl/Harald Stadler (Haus 2010) 209–218, at 213–216; Benjamin Štular, Small Finds, in: Smlednik Castle, ed. Benjamin Štular (Ljubljana 2015) 45–68, at 66–67.

46 Ložar, Staroslovensko 184; 195–200, Table XV sl. 5 and Table XVI sl. 6; Ciglenečki, Tinje 114-115.

47 *Cf.* Štular, Small finds 66f.

48 The other pile of sherds belonging to the same pot was spread from approximately 110 cm to 150 cm from the western wall towards the interior (of the site) and approximately 60–10 cm from the northern wall towards the south. Stratigraphy is the same. In between charcoal and burnt sand – (i. e.) mortar. Ložar, Staroslovensko 27f. (translated by the author).

49 Knific, Gradišče nad Bašljem 398.

50 As recorded by the author in a brief interview with one of the perpetrators (M. G., 1975, from Radovljica) on the 22nd of February 2003. See also: Gaspari, Orožje 156f.

51 Knific, Hoards 86.

To sum up:

- there is a direct archaeological evidence that re-fortification did **not** take place,
- there is no archaeological evidence of settlement structures,
- pottery taphonomy as well as the number and context of metal artefacts suggest primary deposition.

Refuting an interpretation is always the easier part of the argument. Indeed, it defies all credibility to suppose that Early Medieval people habitually dropped and lost extremely valuable items by accident in such a remote location as Gradišče above Bašelj, a one-and-a-half-hour uphill walk from the fertile plains. Instead it seems inevitable that the deposition of artefacts was far from uncommon in the Early Medieval period,[52] as evidenced by numerous hoards.[53]

Still, successfully arguing intentional deposition of metal artefacts at Gradišče above Bašelj is, in view of the scarcity of available data, a difficult task. Nevertheless, several arguments can be made in support of this hypothesis.

First, the only relevant analogy to Gradišče above Bašelj as a site with a large number of finds is the Czech site Klášťov. Klášťov is a prehistoric hillfort with a well-defined Early Medieval layer, but whether it was settled in the Early Medieval period is still undetermined.[54] What is, however, undisputed, is that 1100 Early Medieval iron artefacts derive from multiple hoards.[55] A similar contemporary site is the Early Medieval hillfort Bojná I-Valy (Slovakia). The metal artefacts include numerous metal detector finds and at least ten hoards with a composition comparable to that at Gradišče above Bašelj. However, Bojná I-Valy was a buzzing central settlement.[56]

The only relevant analogies for the Gradišče above Bašelj site are Klášťov (Czech) and Bojná I-Valy (Slovakia). The large quantity of metal finds from both originates from multiple hoards.

Second, the stratigraphic context. All Early Medieval artefacts from Gradišče above Bašelj that have been recovered by archaeologists derive from the same stratigraphic context: a black layer with a large quantity of charcoal that lies directly beneath the forest humus layer and directly on top of Late Antiquity ruins (Figure 2).[57] Besides metal artefacts, pottery fragments,[58] animal bones[59] and, in places, charred cereals[60] have been recovered from this layer. The description of stratigraphy corresponds directly to stratigraphic contexts (from top down) K 101, K 102 and K 103 from the above-mentioned site Klášťov

52 Cf. Guy Halsall, The Viking Presence in England? The Burial Evidence, in: Cultures in Contact: Scandinavian Settlement in England in the Ninth and Tenth Centuries, ed. Dawn M. Hadley/Julian D. Richards (Turnhout 2000) 259–276, at 268; Stanisław Suchodolski, Warum hat man im frühen Mittelalter Schätze deponiert?, in: Economies, monetisation and society in the west Slavic lands, ed. Mateusz Bogucki/Marian Rębkowski (Szczecin 2013) 89–108.

53 Relevant overviews in: Florin Curta, New Remarks on Early Medieval Hoards of Iron Implements and Weapons, in: Frühgeschichtliche Zentralorte in Mitteleuropa. Internationale Konferenz und Kolleg der Alexander von Humboldt-Stiftung zum 50. Jahrestag des Beginns archäologischer Ausgrabungen in Pohansko bei Břeclav, 5.–9. 10. 2009, ed. Jiři Macháček/Šimon Ungerman (Břeclav/Bonn 2011) 309–332; Mária Müllerová, Depoty južných Slovanov a ich klasifikácia pomocou metódy hlavných component, in: Zborník Slovenského národného múzea CVIII – [redacted] (2014) 197–212; Bitenc/Knific, Zgodnjesrednjeveški.

54 Drahomíra Frolíková-Kaliszová, K významu Klášťova v době velké moravy - místo kultu nebo útočiště?, in: Pravěk 23 (2015) 195–215.

55 Martin Geisler/Jiři Kohoutek, Vysoké pole – Klášťov. Inventář hro madných nálezů železných předmětů a shrnutí terénních výzkumných sezón 2005–2007 (Pravěk Supplementum 28, Brno 2014).

56 Karol Pieta/Alexander Ruttkay, Bojná - mocenské a christianizačné centrum Nitrianskeho kniežatstva, in: Bojná. Hospodárske a politické centrum nitrianskeho kniežastva, ed. Karol Pieta/Alexander Ruttkay/Matej Ruttkay (Nitra 2006) 21–70;Vladimír Turčan, Depoty z Bojnej v zbierkach Archeologického múzea SNM, in: Bojná. Hospodárske a politické centrum nitrianskeho kniežastva, ed. Karol Pieta/ Alexander Ruttkay/Matej Ruttkay (Nitra 2006) 159–166.

57 Knific, Arheološko 64; Knific, Gradišče nad Bašljem 400; Karo, Steigbügel 165; Knific, Zgodnjesrednjeveški 317; Karo, Ozemlje 49 and 205; Knific, Hoards 86; Karo, slovenskih najdišč 297; Karo/Mlekuž, Archaeological Image 255; Knific/Nabergoj, Srednjeveške zgodbe 84.

58 Ložar, nova postojanka passim.

59 Knific, Arheološko 60.

60 Knific/Nabergoj, Srednjeveške zgodbe Picture 108.

except for the fact the the K 103 is prehistoric.[61] It also corresponds well to the stratigraphic context of the Zidani gaber above Mihovo Early Medieval hoard discovered adjacent to the Late Antique hillfort, where iron artefacts were found in a black layer under a thin layer of (forest) humus.[62] Another hoard, Camberk above Cerov Log, has also been discovered in a humus layer directly under a thin layer of (forest) humus, this time mixed with several big pottery fragments that it was possible to reconstruct.[63]

The stratigraphic context of the Early Medieval finds from Gradišče above Bašelj therefore corresponds to several known Early Medieval hoards, indicating a similar depositional process.

Third, the taphonomy of the metal artefacts with known archaeological context – items are tightly packed[64] – suggests that at least some of the artefacts have been intentionally deposited (Fig. 4). And indeed, two such concentrations of artefacts from Gradišče above Bašelj have already been interpreted as hoards.[65]

Figure 4: Gradišče above Bašelj, so called first (Knific 2010) and second (Bitenc, Knific 2015, 110-111) hoard, artefacts in situ (drawn by T. Korošec after Knific 2010, Fig. 2 and Bitenc, Knific 2015, Fig. 18).

Fourth, the censer (lat. *thuribulum* or *incensorium*) made of bronze sheet probably dated to the 9th century.[66] The best analogy is a silver- and gold-plated Cetina censer. This exceptional artefact, with close analogies to the famous Tassilo Chalice, was found in 1925 on a hill, Runjevica near Vrlika, in Croatia overlooking the fertile plains of the Paško polje and two springs of the Cetina River. It is dated either in the second half of the 8th or in the last quarter of the 8th and the beginning of the 9th century.[67] Such censers were used in the Christian liturgy in the Carolingian period, as suggested by depictions in illuminated manuscripts, ivory diptych panels and a pyx from the late 8th and 9th century[68] as well as on the mid-11th-century wall paintings from the Church of St. George in Kostoľany pod Tribečom.[69] It is important to note that, despite the disputed exact location, the Cetina cinder predates the Early Medieval settlement and Church of St. Savior built in the vicinity in the 9th century and it does not derive from the church.[70] The only Early Medieval censer from the Balkans with known context is from Kostol/*Pontes* (Serbia). It belongs to one of the hoards found within an unfortified medieval settlement and it contains a censer and bronze book cover in a pithos.[71]

61 Frolíková-Kaliszová, Velké moravy 199–202.

62 Od Rimljanov do Slovanov 104–106 and 128.

63 Od Rimljanov do Slovanov 106–107 and 128–129, Fig. 15, T. 2: 5.

64 Knific, Hoards Figure 2; Od Rimljanov do Slovanov Figure 18.

65 Knific Hoards; Polona Bitenc/Timotej Knific, Zgodnjesrednjeveški zakladi železnih predmetov z Gorjancev, Starega gradu nad Uncem in Ljubične nad Zbelovsko Goro, in: Arheološki vestnik 66 (2015) 103–146, at 110f.

66 Knific, Gradišče nad Bašljem 400; Karo/Knific, Gradišče 264.

67 Ksenija Vinski-Gasparini, Ranosrednjovjekovna kadionica iz stare Vrlike, in: Starohrvatska prosvjeta 3/6 (1958) 95–103; Ante Miloševič, Cetina kod Vrlike, Runjavica, in: Hrvati i Karolinzi. Katalozi, ed. Ante Miloševič (Split 2000) 251–253 with cited bibliography; Andre Jurčević, Nalazi ranokarolinškog oružja i konjaničke opreme u doba formiranja Hrvatske Kneževine, in: Starohrvatska prosvjeta III 38 (2011) 111–148, at 115–118, 125f.

68 Ante Miloševič, Karolinški utiecaji u Hrvatskoi kneževini u svjetlu arheoloških nalaza, in: Hrvati i Karolinzi. Rasprave i vrela, ed. Ante Miloševič (Split 2000) 106–141, at 110–112; Herbert Schutz, The Carolingians in Central Europe, Their History, Arts and Architecture: A Cultural History of Central Europe, 750–900 (Leiden 2004) 283–286.

69 Jana Maříková-Kubková/Peter Baxa/Peter Bisták/Zuzana Borzová, The Church of St. George in Kostoľany pod Tribečom, in: Swords, Crowns, Censers and Books. Francia Media – Cradles of European Culture, ed. Marina Vicelja-Matijašič (2015) 214–248, at 236–237.

70 Ante Milošević, Arheološka topografija Cetine (Split 1998) 81; Ante Milošević/Željko Peković, Predromanička crkva Svetoga Spasa u Cetinu = La chiesa di S. Salvatore: definizioni nel tempo e nello spazio (Studia mediterranea archaeologica 3, Dubrovnik/Split 2009), at 13–15.

71 Milutin Garašanin/Miloje Vasič, Castrum Pontes. Izveštaj o iskopavaćima u 1981. i 1982. godini, in: Đerdapske sveske IV, ed. Vladimir Kondic (Beograd 1987) 71–116, 87; cf. Curta, Implements and Weapons 332, No. 83; Perica Špehar, Remarks to Christianisation and realms in the central Balkans in the light of archaeological Ànds (7th–11th c.), in: "Castellum, civitas, urbs": Zentren und Eliten im frühmittelalterlichen Ostmitteleuropa. Centres and Elites in Early Medieval East-Central Europe, ed. Orsolya Heinrich-Tamáska/Hajnalka Herold/Péter Straub/Tivadar Vida (Budapest/Leipzig/Keszthely/Rahden-Westfahlen 2015) 71–94, at 77, Fig. 7.

The context of the Bašelj censer is unknown. It can be said that it was neither abandoned in a fire (the artefact shows no traces of being exposed to heat) nor was it left *in situ* in the building of its liturgical use (the artefact was crushed under the weight of soil[72] – i.e. it was deposited undamaged and was not smashed by collapsing building debris). The possibility that such an exceptional artefact could have been simply lost is rejected as implausible. By elimination, therefore, the censer could only have been deposited. Perhaps the circumstances of its deposition are hinted at by the context of the above-mentioned analogies, one deposited on a hill overlooking an exceptional natural environment and the other deposited in a hoard.

The functionality, state of preservation and the only known analogies of the Bašelj censer therefore bear testimony that this artefact was intentionally deposited.

Fifth, the archaeological contexts. As mentioned, the archaeological contexts of the Gradišče above Bašelj finds are scarcely known. There is, however, one closed stratigraphic context that was excavated by R. Ložar[73] in its entirety: a rocky promontory at the northern end of the site (Fig. 1: 3). This small flat area measuring about 5 by 5 m is surrounded with several metres-high rocks on the south and cliffs overlooking the Belica stream gorge to the north and west.[74] The only possible approach is from the east by first crossing the biggest, highest and best sheltered terrace on the site (where a hunting lodge was built in 1906). The striking ambiences of this location led Ložar to compare it to a pulpit.

A thin layer of up to 10–15 cm of forest humus covered a brown, partially blackened layer with pieces of charcoal above the bedrock.[75] When excavated, the brown layer yielded . . . *presenetljiva množina črepinj, oglja, kosti; . . . del bronaste ostroge, bronast prstan, rimski bronasti novec cesarja Licinija ter spona iz železa. Največ je med najdbami oglja, kosti živali in črepinj posod*[76] and *del steklene mase*.[77] Among the bones, pig and sheep/goat prevailed over cow. The pottery sherds could not be reconstructed into whole pots and included both handmade pots and pots finished on a potter's wheel.[78] Among them were *prav lepe črepinje*[79] suggesting large fragments.

Based on the above data, an archaeological interpretation can be made. There is a complete absence of any settlement remains. The thin and levelled layer on almost the highest peak excludes the possibility of a secondary context, e.g. colluvium, as does the described taphonomy of the pottery sherds; the artefacts were therefore discovered *in situ*. The artefacts were deposited directly on the bedrock. As such, they could not have been lost or misplaced. The description of typologically different types of pottery suggests chronologically different types[80] and thus deposition over a very long period of time. The artefact and ecofact assemblage (from most to least abundant) is: charcoal, animal bones, pottery and a few very valuable metal objects.

Among the latter, the 4th century coin seems to be of special importance. Similar coins have been found in several Early Medieval graves[81] (Fig. 5) and, in one case, in a pit contemporary to the

72 Karo/Knific, Gradišče, Figur 12.

73 Ložar, Nova postojanka.

74 Knific, Arheološko 59.

75 Ložar, Gradišče nad Bašljem 12–13.

76 Knific, Arheološko 60:. . . a surprising amount of pottery sherds, charcoal and bones; . . . a fragment of bronze spur, bronze finger ring, Roman coin of the emperor Licinius (308–324, note by author) and an iron buckle. Among the finds charcoal, animal bones and pottery sherds prevail (translation by author).

77 Fragment of glass raw material (translation by author). Ložar, Gradišče nad Bašljem 18; cf. Žiga Šmit/David Jezeršek/Timotej Knific/Janka Istenič, PIXE-PIGE analysis of Carolingian period glass from Slovenia, in: Nuclear Instruments and Methods in Physics Research B 267 (2009) 121–124; Knific/Nabergoj, Srednjeveške zgodbe slika 107.

78 Knific, Arheološko 60.

79 . . . nice sherds . . . Ložar, Gradišče nad Bašljem 13.

80 Ložar Staroslovensko, 192, 195–200 and 208; cf. Hans Losert, Die früh- bis hochmittelalterliche Keramik in Oberfranken (Zeitschrift für Archäologie des Mittelalters, Beiheft 8, Bonn 1993) 26–39; Štular Mali grad, 123–125, Fig. 6. 1; but see Andrzej Buko, Ceramology and Medieval pottery research in Poland, in: Archaeologia Polona 30 (1992) 5–25, at 8f.

81 *Ptuj*: Paola Korošec, Nekropola na ptujskem gradu-turnirski prostor (Ptuj 1999), Taf. 8: 77(12). Župna cerkev in Kranj: Jože Kastelic/Vinko Šribar, Staroslovensko grobišče ob Župni cerkvi v Kranju. Katalog grobov, izkopanih leta 1953, in: Grobišče Župna cerkev v Kranju. Dokumentacija o izkopavanjih v letu 1953, ed. Benjamin Štular/Mateja Belak (E-Monographiae Instituti Archaeologici Sloveniae 1, 187–202, Ljubljana 2012) 9–465, at 195; Andrej Valič, Grobovi in njih inventar, in: Grobišče Župna cerkev v Kranju. Dokumentacija o izkopavanjih v letih 1964, 1965 in 1966, ed. Benjamin Štular/Mateja Belak (E-Monographiae Instituti Archaeologici Sloveniae 4, Ljubljana 2013) 80–96, at 92. *Pristava na Bledu*:

cemetery.[82] Roman coins have also been found in Early Medieval settlements in contexts suggesting deliberate deposition, e.g. in a building's foundation[83] or in the context of a cult pit.[84] A Late Roman coin in a closed Early Medieval stratigraphic context can therefore be understood as direct evidence of non-profane activities.

Figure 5: Bled – Pristava, grave 95 (2nd half of 10th, 1st half of 11th century): exceptional find of twenty-two perforated Roman period coins best represents the non-monetary use of coins in the Early Medieval period (after Kastelic, Škerlj 1950, Slika 21; reproduced from the NMS archive No. 5603).

Thence, the following interpretation of activities taking place on the promontory can be inferred. In a confined area within an exceptional natural environment and with no man-made structures in sight, a repeated activity took place over a long period of time. The activity involved bringing prime foodstuffs[85] in recipients, making fire (abundant charcoal), occasionally deliberately placing valuable objects (spur) and objects of special meaning (finger ring, coin) on the ground and breaking – not necessary deliberately – the recipients (pottery sherds). Parts of the breakage have been removed (pots can rarely be entirely reconstructed) which suggest attentiveness. The activities were strictly controlled – either by control of access or by a taboo – which is evidenced by the non-removal of valuable objects already present in plain view. The taboo or control of access persisted long enough after the activities ended that the foliage covering discarded items transformed into a forest humus layer, thus obscuring the deposited valuable objects from view. Since humification of foliage is a lengthy process, taboo is more likely than control of access.

Discussing whether the data regarding the activities taking place on the promontory suffices to argue for a sacred rather than profane deposition of artefacts overreaches the ambitions of this article. However, the arguments for the deliberate deposition of artefacts in a non-settlement environment are conclusive.

In summary, there is a pervasive body of evidence that the metal artefacts from Gradišče above Bašelj were deliberately deposited. The arguments are:

- the best analogy for the site as a whole are multiple hoards from Klášťov and Bojná I-Valy,
- contemporary hoards provide best analogies for the stratigraphic context,
- the taphonomy of at least some metal artefacts testifies for deliberate deposition,
- analysis of an exceptional find (censer) suggests deliberate deposition and
- analysis of the only known closed stratigraphic context proves deliberate deposition beyond reasonable doubt.

Gradišče above Bašelj has been interpreted as a settlement based on (i) the interpretation of artefacts and (ii) on the alleged strategic position of the site. The unfeasibility of the former has been demonstrated *in extenso* above. The latter can be discussed using the results of the GIS analysis.[86]

It has long been recognised that Gradišče above Bašelj is too remote to be a self-sufficient permanent settlement[87] and this was confirmed in a comparative analysis.[88] Therefore, the alleged *strategic position* of Gradišče above Bašelj remains as the last argument for the settlement interpretation.[89] How *strategic* is the location of the Gradišče above Bašelj, then?

Jože Kastelic/Božo Škerlj, Slovanska nekropola na Bledu. Arheološko in antropološko poročilo za leto 1948 (Dela SAZU, Monografije 2, Ljubljana 1950), at Slika 21.

82 Štular, Posamezniki 27–28.

83 Pleterski, Blejski Pristavi 110–111.

84 Pleterski, Krvavec 215–216.

85 Pig and other animal bones; *for everyday food* cf. Andrej Pleterski, Kuhinjska kultura v zgodnjem srednjem veku (Ljubljana 2008).

86 Štular/Eichert, this volume; Karo/Mlekuž, Archaeological Image 264–268.

87 *Ložar in* Knific, Arheološko 57f.; Knific, Arheološko 67.

88 Štular/Eichert, this volume.

89 Knific, Arheološko 67; Karo/Mlekuž, Archaeological Image 250.

By *strategic* a natural affordance for defensibility is implicitly envisaged for Gradišče above Bašelj. However, the site is adjacent to the mountain saddle. Therefore, potential attackers would be able to deploy archers on the higher ground, thus nullifying the advantage of the hilltop location (Fig. 6). For this reason the Late Antique settlement was fortified with a wall on the northern side; in the Early Medieval phase, however, there were no (semi)permanent defensive structures in place (see above; Fig. 3). In the Early Medieval period Gradišče above Bašelj therefore offered low defensibility.

Figure 6: Gradišče above Bašelj, 3D view and a section demonstrating the vulnerability of the site to potential attack from the north and the exposed position of the promontory (based on 0.5 m DEM derived from lidar data; source: http://gis.arso.gov.si/evode, tiles GK 453_131, GK 453_132, GK 454_131, GK 454_132).

Another alleged *strategic* characteristic of Gradišče above Bašelj is that it affords a commanding view of the Kranj plain.[90] However, the view of potential fields within a middle-range distance is negligible signifying that the view from the site had no military value: most of the visible land is at a distance of over 5000 m away and thus any possible activity – hostile or friendly – cannot be distinguished.[91]

The location of Gradišče above Bašelj is therefore neither easily defendable nor does it provide a commanding view useful for military purposes. As such, the location had no strategic value in the Early Medieval landscape other than possible policing of the alleged merchant route,[92] a task unworthy of the members of the ruling military class mirrored in the finds.

The visibility analysis of the Gradišče above Bašelj site offers an important insight, though. The viewshed is closed and framed thus creating a visibility "funnel": in the south the view opens towards Kranj, and in the north towards the mountain slopes of Storžič. Visual and physical connections between Kranj, Gradišče above Bašelj and the peak of Storžič imply ideational and conceptual relations between them, perhaps as much a result of the cosmology and identity politics of the then inhabitants of the Kranj Plain as of practical logic.[93]

The importance of this is that it establishes the connection on the axis Kranj–Gradišče above Bašelj–Storžič Mountain. Kranj is a central settlement contemporary to the Early Medieval finds from Gradišče above Bašelj, as evidenced by the large cemetery.[94] Storžič Mountain was described in the 17th century as *Storžič, ki stoji sam samcat nad Kranjem, se dviga tako visoko in strmo, kakor bi hotel predreti oblake. . .* [95] Whether this is just a poetic description or hints at the pre-Christian beliefs – as often in Valvasor's work[96] – notwithstanding, the symbolic meaning of the Storžič Mountain peak in the Early Medieval period has been established.[97] It is very likely that this mountain represented the embodiment of the symbolic *axis mundi*[98] to the then inhabitants of Kranj.

With the association of Kranj (profane central settlement) and Storžič (a local embodiment of the sacred *axis mundi*) established, the intermediary role of Gradišče above Bašelj emerges: situated between the two at a liminal location, on the natural passage from the highly accessible Kranj Plain to the

90 *Ložar in* Knific, Arheološko 57f.; Špela Karo/Timotej Knific, Gradišče boven Bašelj in het vroegmiddeleeuwse Carniola (Slovenië), in: De erfenis van Karel de Grote 814 – 2014, ed. Dirk Callebaut/Horst van Cuyck (Ename 2014) 255–266, at 256.

91 Štular/Eichert, this volume.

92 Karo/Mlekuž, Archaeological Image 252.

93 Karo/Mlekuž, Archaeological Image 268.

94 *an overview with bibliography in* Benjamin Štular/Seta Štuhec, 3D Archaeology. Early Medieval Earrings from Kranj (Ljubljana 2015) 34–42.

95 Storžič situated on its own above Kranj is climbing so high and so steep as if wanting to penetrate the clouds … (translated by author from Slovenian). Janez V.Valvasor, Slava vojvodine Kranjske. Izbrana poglavja (Original Die Ehre dess Hertzogthums Crain, published in 1689) (Ljubljana 1984) 25.

96 E.g. Benjamin Štular/Ivan M. Hrovatin, Slovene pagan sacred landscape. Study case: the Bistrica Plain, in: Studia mythologica Slavica 5 (2002) 43-68, at 62f..

97 Pleterski, Kulturni genom 287f.

98 *Cf.* Zmago Šmitek, The Image of the Real World and the World Beyond in the Slovene Folk Tradition, in: Studia Mythologica Slavica 2 (1999) 161–195.

border of inaccessible hinterland,[99] with an exceptional natural scenery (see above, the description of the promontory) and a clear connection to the forbears (see above, the description of stratigraphy).

In the Early Medieval period the Gradišče above Bašelj site was therefore a place of special symbolic meaning. Such places are typically located in the liminal zones or borders[100] and served as a *lieux de mémoire* – a place *where memory crystallizes and secretes itself*.[101] Using the Occam's razor principle it seems judicious to explore the large quantity of intentionally deposited valuable artefacts at the Gradišče above Bašelj site in connection with its intermediary role between the profane (Kranj) and the sacred (*axis mundi*).

The Mali grad and Na Bleku sites have been used to demonstrate the validity of the GIS analysis of hilltops since the results confirmed previously existing interpretations. Using the study case of Gradišče above Bašelj, we demonstrated the input of the GIS analysis in scholarly ambiguity regarding the site's interpretation. The three examples are therefore both a testimony to the validity of GIS analysis and a cautionary tale against oversimplifying its results.

The following is a selection of previously published[102] non-military finds from the Gradišče above Bašelj site.

Female jewellery

Pl. 1: 1. Bright green glass bead. Diameter 0.26 cm, and thickness 0.1 cm. National Museum of Slovenia, Inv. No. AO S 6271.

Pl. 1: 2. Dark blue glass bead. Diameter 0.58 cm, and thickness 0.23 cm. National Museum of Slovenia, Inv. No. AO S 5838.

Pl. 1: 3. Dark blue glass bead. Diameter 0.60 cm, and thickness 0.12 cm. National Museum of Slovenia, Inv. No. AO S 6240.

Pl. 1: 4. A fragment of an iron pin with the pin-head made of grey glass inlaid with white thread. Length 1.78 cm, pin-head diameter 0.58 cm. National museum of Slovenia, Inv. No. AO S 6264.

Pl. 1: 5. Iron pin with the pin-head made of dark blue glass; the pin is slightly bent. Length 1.78 cm, pin-head diameter 0.58 cm. National Museum of Slovenia, Inv. No. AO S 6264.

Pl. 1: 6. Iron pin with the pin-head made of dark blue glass; the pin is bent. Length 2.75 cm, pin-head diameter 0.62 cm. National Museum of Slovenia, Inv. No. AO S 3009.

Pl. 1: 7. Iron pin with the pin-head made of see-through green glass. Length 3.66 cm, pin-head diameter 0.61 cm. National Museum of Slovenia, Inv. No. AO S 2766.

Pl. 1: 8. Iron pin with the pin-head made of green glass; only the pin-head is preserved. Length 0.81 cm, pin-head diameter 0.55 cm. National Museum of Slovenia, Inv. No. AO S 5263.

Pl. 1: 9. Fragment of a finger ring made of bronze metal sheet. Diameter 2.05 cm, maximum width 1.78 cm. National Museum of Slovenia, Inv. No. AO S 2765.

Pl. 1: 10. Fragment of a finger ring made of bronze metal sheet. Diameter 1.85 cm, maximum width 1.40 cm. National Museum of Slovenia, Inv. No. AO S 4096.

Pl. 1: 11. Fragment of a finger ring made of bronze metal sheet. Diameter 1.98 cm, maximum width 1.82 cm. National Museum of Slovenia, Inv. No. AO S 2242.

99 Karo/Mlekuž, Archaeological Image 266–268, Figure 19.

100 Cf. Julie Lund, Banks, Borders and Bodies of Water in a Viking Age Mentality, in: Journal of Wetland Archaeology 8 (2008) 53–72, at 54f.; Katja Hrobat, Ko Baba dvigne krilo. Prostor in čas v folklori Krasa (Ljubljana 2010), 64–69.

101 Pierre Nora, Between Memory and History: Les Lieux de Mémoire, in: Representations 26 (1989) 7–24, at 7.

102 Nos. 1–23, 27–32 and 35–40 after Veršnik 2009, Gradišče, 21–34 and T.1-T.12; Nos. 24–26 after Knific, Železni zvonci 138–149; Nos. 31, 32 after Knific/Nabergoj, Srednjeveške zgodbe slika 106 and slika 116; Nos. 33 and 34 after Bitenc/Knific, Od Rimljanov, 101, No. 329.

Pl. 1: 12. Damaged rumbler bell with loop made of a copper alloy with a ball made of stone. Diameter 2.62 cm, height 3.56 cm. National Museum of Slovenia, Inv. No. AO S 2639.

Pl. 1: 13. Rumbler bell with loop made of a copper alloy with a ball made of stone. Diameter 2.15 cm, height 2.62 cm. National Museum of Slovenia, Inv. No. AO S 2887.

Sawing or weaving kit

Pl. 1: 14. Iron sawing needle. Length 3.10 cm. National Museum of Slovenia, Inv. No. AO S 2795.

Pl. 1: 15. Pottery spindle whorl. Diameter 3.44 cm, height 0.75 cm. National Museum of Slovenia, Inv. No. AO S 649.

Pl. 1: 16. Iron hook with loop. Length 5.13 cm. National Museum of Slovenia, Inv. No. AO S 2738.

Pl. 1: 17. Iron hook with square section ornamented with horizontal cuts. Length 6.83 cm. National Museum of Slovenia, Inv. No. AO S 2717.

Pl. 1: 18. Iron hook. Length 3.05 cm. National Museum of Slovenia, Inv. No. AO S 6096.

Sheep-farming tools and equipment

Pl. 2: 19. Iron comb for wool or flax; one comb tooth is preserved. Height 8,73 cm. National Museum of Slovenia, Inv. No. AO S 2828.

Pl. 2: 20. Iron comb for wool or flax; one comb tooth is preserved. Height 8.87 cm. National Museum of Slovenia, Inv. No. AO S 2830.

Pl. 2: 21. Iron comb for wool or flax; 12 comb teeth inserted into the rectangular iron plate in two lines are preserved. Height 9.16 cm, width 4.60 cm. National Museum of Slovenia, Inv. No. AO S 3170.

Pl. 2: 22. Iron scissors. Length 23.5, length of blade 10.2, width of blade 1.57 cm. National Museum of Slovenia, Inv. No. AO S 3174.

Pl. 2: 23. Iron scissors. Length 21.7, length of blade 8.8, width of blade 1.95 cm. National Museum of Slovenia, Inv. No. AO S 2818.

Pl. 2: 24. Copper-plated iron bell with hook and clapper. Height 8.8 cm, width 6.1 cm. National museum of Slovenia, Inv. No. AO S 3163.

Pl. 2: 25. Copper-plated iron bell with hook and clapper. Height 9.0 cm, width 7.1 cm. National Museum of Slovenia, Inv. No. AO S 3172.

Pl. 2: 26. Copper-plated iron bell with hook and clapper. Height 8.6 cm, width 6.0 cm. National Museum of Slovenia, Inv. No. AO S 4139.

Housing

Pl. 3: 27. Rotary lock mechanism, only the bolt is preserved. Width 8.1 cm, height 1.32 cm. National Museum of Slovenia, Inv. No. AO S 4144.

Pl. 3: 28. An iron loop. Height 3.5 cm, width 3.3. cm. National Museum of Slovenia, Inv. No. AO S 2712.

Pl. 3: 29. An iron loop. Height 3.3 cm, width 2.6. cm. National Museum of Slovenia, Inv. No. AO S 2720.

Tools

Pl. 3: 30. Iron peg with loop. Length 10.3 cm, width of loop 3.9. cm. National Museum of Slovenia, Inv. No. AO S 2826.

Pl. 3: 31. Iron tongs. Length 11.2 cm, width 3.4 cm. National Museum of Slovenia, Inv. No. AO S 4185.

Pl. 3: 32. Iron spike. Length 17.1 cm, width 2.1 cm. National Museum of Slovenia, Inv. No. AO S 4120.

Liturgical

Pl. 3: 33. Bronze sheet bell with iron clapper; bell is crushed. Height 7.9 cm, width 9.2 cm, restored height 10.2 cm, restored width 5.3 cm. National Museum of Slovenia, Inv. No. AO S 2631.

Pl. 3: 34. Censer (lat. *thuribulum* or *incensorium*) made of bronze sheet; censer is crushed. Height 8.4 cm, width 8.2 cm, restored height 6.6 cm, restored rim diameter 7.2 cm. National Museum of Slovenia, Inv. No. AO S 2630.

Housing (continued)

Pl. 4: 35. Iron rotary key with bow and a bit made of a perpendicularly curved shank. Length 18.3 cm. National Museum of Slovenia, Inv. No. AO S 3217.

Pl. 4: 36. Iron rotary key with bow and a bit with two teeth. Length 11.0 cm. National Museum of Slovenia, Inv. No. AO S 4178.

Pl. 4: 37. Rotary key with bit and hollow shank; bit with decorated elongated bow. Length 9.5 cm. National Museum of Slovenia, Inv. No. AO S 2794.

Pl. 4: 38. Rotary key with bit and hollow shank; bit with two clefts and flat section round bow. Length 13.4 cm. National Museum of Slovenia, Inv. No. AO S 4117.

Pl. 4: 39. Rotary lock mechanism, only key-guard plate with staples and bolt is preserved. Width 7.0 cm, height 4.9 cm. National Museum of Slovenia, Inv. No. AO S 4124.

Pl. 4: 40. Rotary lock mechanism, only key-guard plate with staples and bolt is preserved. Width 6.2 cm, height 4.6 cm. National Museum of Slovenia, Inv. No. AO S 5242.

Od Rimljanov do Slovanov. Predmeti, ed. Polona Bitenc/Timotej Knific (Ljubljana 2001).

Polona Bitenc/Timotej Knific, Zgodnjesrednjeveški zakladi železnih predmetov z Gorjancev, Starega gradu nad Uncem in Ljubične nad Zbelovsko Goro, in: Arheološki vestnik 66 (2015), 103–146.

Andrzej Buko, Ceramology and Medieval pottery research in Poland, in: Archaeologia Polona 30 (1992) 5-25.

Slavko Ciglenečki, Tinje nad Loko pri Žusmu. Poznoantična in zgodnjesrednjeveška naselbina = Tinje oberhalb von Loka pri Žusmu. Spätantike und frühmittelalterliche Siedlung (Opera Instituti archaeologici Sloveniae 4, Ljubljana 2000).

Florin Curta, New Remarks on Early Medieval Hoards of Iron Implements and Weapons, in: Frühgeschichtliche Zentralorte in Mitteleuropa. Internationale Konferenz und Kolleg der Alexander von Humboldt-Stiftung zum 50. Jahrestag des Beginns archäologischer Ausgrabungen in Pohansko bei Břeclav, 5.–9. 10. 2009, ed. Jiři Macháček/Šimon Ungerman (Břeclav/Bonn 2011) 309-332.

Bořivoj Dostál, Břeclav-Pohansko IV: velkomoravský velmožský dvorec (Brno 1975).

Drahomíra Frolíková-Kaliszová, K významu Klášťova v době velké moravy - místo kultu nebo útočiště?, in: Pravěk 23 (2015) 195–215.

Guy Halsall, The Viking Presence in England? The Burial Evidence, in: Cultures in Contact: Scandinavian Settlement in England in the Ninth and Tenth Centuries, ed. Dawn M. Hadley, Julian D. Richards (Turnhout 2000), 259–276.

Milutin Garašanin/Miloje Vasič, Castrum Pontes. Izveštaj o iskopavaćima u 1981. i 1982. godini. = Compte-rendu des fouilles en 1981–82, in: Đerdapske sveske IV, ed. Vladimir Kondic (Beograd 1987) 71–116.

Martin Geisler/Jiři Kohoutek, Vysoké pole - Klášťov. Inventář hro madných nálezuˊ železných předmětů a shrnutí terénních výzkumných sezón 2005–2007 = Vysoké pole - Klášťov. Inventory of mass finds of metal items and summary of field surveys in 2005–2007 (Pravěk Supplementum 28, Brno 2014).

Katja Hrobat, Ko Baba dvigne krilo. Prostor in čas v folklori Krasa (Ljubljana 2010).

Andre Jurčević, Nalazi ranokarolinškog oružja i konjaničke opreme u doba formiranja Hrvatske Kneževine, in: Starohrvatska prosvjeta III 38 (2011) 111–148.

Špela Karo, Die Typologie der frühmittelalterlichen Steigbügel aus slowenischen Fundorten, in: Zbornik na počest Danny Bialekovej, ed. Gabor Fusek (Nitra 2004).

Špela Karo, Ozemlje današnje Slovenije med Avarskimi vojnami in Madžarskimi vpadi v luči arheoloških najdb, PhD Dissertation at University of Ljubljana (Ljubljana 2007).

Špela Karo, Zgodnjekarolinške najdbe s slovenskih najdišč, in: Emona med Akvilejo in Panonijo (Emona between Aquilea and Pannonia), ed. Irena Lazar/Bernarda Županek (Koper 2012a) 447–458.

Špela Karo, Oprema jahača i konja s Gradišča nad Bašljem (Slovenija). Zbornik radova sa Znanstvenog skupa Dani Stjepana Gunjače 2, Hrvatska srednjovjekovna povijesno-arheološka baština, Međunarodne teme, Split, 18. –21. listopada 2011 (2012b) 297–315.

Špela Karo/Timotej Knific/Zoran Milić, Pokositreni železni predmeti z Gradišča nad Bašljem, in: ARGO 44 (2) (2001) 42–47.

Špela Karo/Timotej Knific/Marija Lubšina-Tušek, Predmeti avarskega izvora z arheoloških najdišč v Sloveniji, in: VAMZ – Vjesnik Arheološkog muzeja u Zagrebu (annual journal of the museum) 46 (2011) 131–159.

Špela Karo/Timotej Knific, Gradišče boven Bašelj in het vroegmiddeleeuwse Carniola (Slovenië), in: De erfenis van Karel de Grote 814 – 2014, ed. Dirk Callebaut/Horst van Cuyck (Ename 2014), 255–266.

Špela Karo/Timotej Knific, Cross-shaped Strap dividers from Gradišče hill above Bašelj, Slovenia, in: Bojná 2. Nové výsledky výskumov včasnostredovekých hradísk, ed. Matej Ruttkay (Nitra 2015), 219–232.

Špela Karo/Dimitri Mlekuž, The Archaeological Image of the Land Along the Upper Sava River in Late Antique and Early Medieval Periods. A View in Space, in: Swords, Crowns, Censers and Books. Francia Media – Cradles of European Culture, ed. Marina Vicelja-Matijašič (Rijeka 2015), 249–272.

Jože Kastelic/Božo Škerlj, Slovanska nekropola na Bledu (Arheološko in antropološko poročilo za leto 1948. Dela SAZU, Monografije 2, Ljubljana 1950).

Jože Kastelic/Vinko Šribar, Staroslovensko grobišče ob Župni cerkvi v Kranju. Katalog grobov, izkopanih leta 1953, in: Grobišče Župna cerkev v Kranju. Dokumentacija o izkopavanjih v letu 1953. E-Monographiae Instituti Archaeologici Sloveniae 1, 187–202, ed. Benjamin Štular/ Mateja Belak (Ljubljana 2012).

Timotej Knific, Arheološko najdišče Gradišče nad Bašljem, in: Preddvor v času in prostoru. Zbornik Občine Preddvor, ed. Tone Roblek (Preddvor (1999) 55–67.

Timotej Knific, Gradišče nad Bašljem, in: Zakladi tisočletij. Zgodovina Slovenije od neandertalcev do Slovanov, ed. Dragan Božič/Janez Dular/Primož Pavlin/Tomaž Lauko/Slavko Ciglenečki/Bronislava Aubelj/Sneža Tecco Hvala/Mateja Belak/Dragica Knific Lunder/Tamara Korošec/Jurij Mikuletič (Ljubljana 1999) 398–401.

Timotej Knific, Zgodnjesrednjeveški pozlačeni predmeti z Gradišča nad Bašljem (Slovenija), in: Prilozi instituta za arheologiju u Zagrebu 24 (2007) 317–326.

Timotej Knific, Early mediaeval hoards of iron items in Slovenia, in: Archaeologia Adriatica 4 (2010) 85–99.

Timotej Knific, Železni zvonci iz Kamniško-Savinjskih Alp. Arheološki pregled, in: Človek v Alpah. Desetletje (1996–2006) raziskav o navzočnosti človeka v slovenskih Alpah, ed. Tone Cevc (Ljubljana, 2006).

Timotej Knific/Tomaž Nabergoj, Srednjeveške zgodbe s stičišča svetov (Ljubljana 2016).

Paola Korošec, Nekropola na ptujskem gradu-turnirski prostor (Ptuj 1999).

Miha Kosi, Predurbane ali zgodnjeurbane naselbine? (Civitas Pettouia, Carnium/Creina in druga centralna naselja neagrarnega značaja v zgodnjem srednejm veku) (I. del), in: Zgodovinski časopis 59(3–4) (2005), 269–331.

Hans Losert, Die früh- bis hochmittelalterliche Keramik in Oberfranken (Zeitschrift für Archäologie des Mittelalters, Beiheft 8, Bonn 1993).

Rajko Ložar, Gradišče nad Bašljem – nova postojanka staroslovenske kulture.

Priprava, koncept za študijo (Unpublished 1939) (Replicated as a citation in Timotej Knific, Arheološko najdišče Gradišče nad Bašljem, in: Preddvor v času in prostoru. Zbornik Občine Preddvor, ed. Tone Roblek (Preddvor (1999) 55–67, at 57–61).

Rajko Ložar, Gradišče nad Bašljem. Dnevnik (Unpublished excavation diary, Archive of ZRC SAZU Institute of arhaeology, Sign. 19/1–65 1939).

Rajko Ložar, Staroslovensko in srednjeveško lončarstvo v Sloveniji, in: Glasnik Muzejskega društva za Slovenijo 20 (1–4) (1939c) 180–225.

Julie Lund, Banks, Borders and Bodies of Water in a Viking Age Mentality, in: Journal of Wetland Archaeology 8 (2008) 53–72.

Jiři Macháček, Studie k velkomoravské keramice. Metody, analýzy a syntézy, modely (Brno 2001).

Jana Maříková-Kubková/Peter Baxa/Peter Bisták/Zuzana Borzová, The Church of St. George in Kostoľany pod Tribečom, in: Swords, Crowns, Censers and Books. Francia Media – Cradles of European Culture, ed. Marina Vicelja-Matijašič (2015) 214–248.

Tina Milavec, Kovinske najdbe = Metal finds, in: Poznoantična utrjena naselbina Tonovcov grad pri Kobaridu. Najdbe = Late antique fortified settlement Tonovcov grad near Kobarid. Finds, Opera Instituti Archaeologici Sloveniae 24, ed. Zvezda Modrijan, Tina Milavec (2011) 21–82.

Ante Milošević, Arheološka topografija Cetine (Split 1998).

Ante Miloševič Cetina kod Vrlike, Runjavica, in: Hrvati i Karolinzi. Katalozi, ed. Ante Miloševič (Split 2000) 251–253.

Ante Miloševič, Karolinški utiecaji u Hrvatskoi kneževini u svjetlu arheoloških nalaza, in: Hrvati i Karolinzi. Rasprave i vrela, ed. Ante Miloševič (Split 2000) 106–141.

Ante Milošević/Željko Peković, Predromanička crkva Svetoga Spasa u Cetinu = La chiesa di S. Salvatore: definizioni nel tempo e nello spazio (Studia mediterranea archaeologica 3, Dubrovnik/Split, 2009).

Zvezda Modrijan, Imports from the Aegean Area to the Eastern Alpine Area and Northern Adriatic in Late Antiquity, in: Ephemeris Napocensis 24 (2014) 51–70.

Mária Müllerová, Depoty južných Slovanov a ich klasifikácia pomocou metódy hlavných component = Hortfunde der Südslawen und Ihre Klassifikation mithilfe der Methoden der Hauptkomponenten, in: Zborník Slovenského národného múzea CVIII – Archeológia 24 18 (2014) 197–212.

Verena Perko, Poznoantične amfore v Sloveniji, PhD Dissertation at University of Ljubljana (Ljubljana 1994).

Andrej Pleterski, Zgodnjesrednjeveška naselbina na Blejski Pristavi. Najdbe = Frühmittelalterliche Siedlung Pristava in Bled. Funde (Opera Instituti archaeologici Sloveniae 14, Ljubljana 2008).

Andrej Pleterski, Kuhinjska kultura v zgodnjem srednjem veku (Ljubljana 2008).

Andrej Pleterski, Die frühmittelalterliche Besiedlung des Krvavec. Vorbericht, in: Archäologie in den Alpen. Alltag und Kult, ed. Franz Mandl/Harald Stadler (Haus 2010) 209–218.

Andrej Pleterski, Wie auf der Erde, so im Himmel – himmlischer Hof bei den Slawen, in: Frühgeschichtliche Zentralorte in Mitteleuropa. Internationale Konferenz und Kolleg der Alexander von Humboldt-Stiftung zum 50. Jahrestag des Beginns archäologischer Ausgrabungen in Pohansko bei Břeclav, 5.–9. 10. 2009, Jiři Macháček, Šimon Ungerman (Břeclav/Bonn 2011).

Andrej Pleterski, Korak v kronologijo zgodnjesrednjeveškega naglavnega nakita vzhodnih Alp, in: Arheološki vestnik 64 (2013) 299–334.

Andrej Pleterski, Kulturni genom: prostor in njegovi ideogrami mitične zgodbe (Ljubljana 2014).

Andrej Pleterski/Mateja Belak, Grobovi s Puščave nad Starim trgom pri Slovenj Gradcu, in: Arheološki Vestnih 53 (2002), 233–300.

Karol Pieta/Alexander Ruttkay, Bojná – mocenské a christianizačné centrum Nitrianskeho kniežatstva = Bojná – neues Macht- und Christianisierungszentrum des Fürstentums von Nitra, in: Bojná. Hospodárske a politické centrum nitrianskeho kniežastva. Wirtschaftliches und politisches Zentrum Nitraer Fürstentums, ed. Karol Pieta/Alexander Ruttkay/Matej Ruttkay (Nitra 2006) 21–70.

Katarina K. Predovnik, A Brave New World? Building Castles, Changing and Inventing Traditions, in: Atti dalla accademia Roveretana degli agiati ser. IX, vol. II, A, fasc. II (2012) 63–106.

Milan Sagadin, Mali grad v Kamniku, in: Varstvo spomenikov 37 (1997) 105–125.

Milan Sagadin, Staroslovansko grobišče na Malem gradu v Kamniku, in: Arheološki Vestnih 52 (2001), 359–375.

Michael B. Schiffer, Formation processes of the archaeological record (Salt Lake City 1996).

Herbert Schutz, The Carolingians in Central Europe, Their History, Arts and Architecture: A Cultural History of Central Europe, 750–900 (Leiden 2004).

Stanisław Suchodolski, Warum hat man im frühen Mittelalter Schätze deponiert?, in: Economies, monetisation and society in the west Slavic lands, Mateusz Bogucki, Marian Rębkowski ed. (Szczecin 2013), 89–108.

Perica Špehar, Remarks to Christianisation and realms in the central Balkans in the light of archaeological finds (7th-11th c.), in: "Castellum, civitas, urbs": Zentren und Eliten im frühmittelalterlichen Ostmitteleuropa. Centres and Elites in Early Medieval East–Central Europe, ed. Orsolya Heinrich-Tamáska/Hajnalka Herold/Péter Straub/Tivadar Vida (Budapest/Leipzig/Keszthely/Rahden-Westfahlen 2015) 71–94.

Žiga Šmit/David Jezeršek/Timotej Knific/Janka Istenič, PIXE-PIGE analysis of Carolingian period glass from Slovenia, in: Nuclear Instruments and Methods in Physics Research B 267 (2009) 121–124.

Zmago Šmitek, The Image of the Real World and the World Beyond in the Slovene Folk Tradition, in: Studia Mythologica Slavica 2 (1999) 161–195.

Benjamin Štular, Posamezniki, skupnost in obred v zgodnjem srednjem veku. Primer grobiščnih podatkov z Malega gradu v Sloveniji, in: Studia mythologica Slavica 10 (2007), 23–50.

Benjamin Štular, Mali grad. Visokosrednjeveški grad v Kamniku. = Mali grad. High Medieval Castle in Kamnik (Opera Instituti archaeologici Sloveniae 15, Ljubljana 2009).

Benjamin Štular, Medieval High-Mountain Pastures in the Kamnik Alps (Slovenia), in: Archäologie in den Alpen. Alltag und Kult, ed. Franz Mandl and Harald Stadler (Forschungsberichte der ANISA 3, Haus 2010), 259–272.

Benjamin Štular, The use of lidar-derived relief models in archaeological topography. The Kobarid region (Slovenia) case study (Uporaba modelov reliefa pridobljenih z lidarskim snemanjem v arheološki topografiji. Študijski primer Kobariške), in: Arheološki vestnik 62 (2011) 393–432.

Benjamin Štular, Small Finds, in: Smlednik Castle, ed. Benjamin Štular (Ljubljana 2015), 45–68.

Benjamin Štular/Seta Štuhec, 3D Archaeology. Early Medieval Earrings from Kranj. (Ljubljana 2015).

Benjamin Štular/Ivan M. Hrovatin, Slovene pagan sacred landscape. Study case: the Bistrica Plain, in: Studia mythologica Slavica 5 (2002) 43–68.

Vladimír Turčan, Depoty z Bojnej v zbierkach Archeologického múzea SNM = Die Eisenhorte aus Bojná in den Sammlungen des Archäologischen Museums des SNM, in: Bojná. Hospodárske a politické centrum nitrianskeho kniežastva = Wirtschaftliches und politisches Zentrum Nitraer Fürstentums, ed. Karol Pieta/ Alexander Ruttkay/Matej Ruttkay, (Nitra 2006) 159–166.

Andrej Valič, Grobovi in njih inventar, in: Grobišče Župna cerkev v Kranju. Dokumentacija o izkopavanjih v letih 1964, 1965 in 1966. E-Monographiae Instituti Archaeologici Sloveniae 4, ed. Benjamin Štular/Mateja Belak (Ljubljana 2013) 80–96.

Janez V.Valvasor, Slava vojvodine Kranjske. Izbrana poglavja (Original Die Ehre dess Hertzogthums Crain, published in 1689) (Ljubljana 1984).

Nika Veršnik, Gradišče nad Bašljem v luči drobnih vsakdanjih predmetov in nakita, MA thesis at the University of Primorska (Koper 2009).

Ksenija Vinski Gasparini, Ranosrednjovjekovna kadionica iz stare Vrlike, in: Starohrvatska prosvjeta 3 (6) (1958) 95–103.

Benjamin Štular and Stefan Eichert

Hilltop Sites with Early Medieval Military Finds in the Eastern Alpine Area

Introduction

As this volume demonstrates, hilltop settlements with early medieval military finds are a phenomena detected over a large area. A majority of the known sites is located in the Eastern Alps and these are further analysed in this text.

At a first glance all of the sites exhibit not only very similar types of finds but are also set in a very similar hilltop environment. However, on a closer inspection significant variations are observed: some locations are more remote than others, some are more prominent in the landscape, some are better positioned for subsistence agriculture, and so on.

These differences are addressed in a systematic and quantifiable manner employing a GIS toolset often termed a predictive modelling kit. The aim of this article is to provide a landscape context to the interpretation of the hilltops with Early Medieval military finds in the eastern Alpine area.[1]

Predictive modelling has been at the core of GIS applications in archaeology from the beginning in the early 90s[2] and is nowadays accepted as a valuable tool in archaeological research and cultural heritage management.[3] It is a set of analytical tools aimed at finding correlations between archaeological site locations and the proximity of environmental variables. It is grounded on the assumption that archaeological sites are where people conducted activities and that these locations are what we want to predict. However, predictive modelling cannot be a productive archaeological pursuit without the explicit realization that statistical tests and correlations can only inform us about coincidences in the present, which must then be linked with the past through the process of explanation.[4] Most often this method has been applied to detecting previously unknown archaeological sites in heritage management.[5]

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1 The studies on the Austrian Hilltop Settlements were funded within the FWF-Project "Eastern Alps Revisited" (PNr. P19446) by the Austrian Science Fund.

2 Interpreting space: GIS and archaeology, ed. Kathleen M. S. Allen/Stanton W. Green/Ezra B. W. Zubrow (London 1990); Zoran Stančič/Tatjana Veljanovski, Arheološki napovedovalni modeli in GIS, in: Geografski informacijski sistemi v Sloveniji 1997–1998, ed. Marko Krevs/Drago Perko/Tomaž Podobnikar/Zoran Stančič (Ljubljana 1998); Gary R. Lock, Beyond the Map: Archaeology and Spatial Technologies (Amsterdam/Berlin/Oxford/Tokyo/Washington, D.C. 2000).

3 E.g. Hans Kamermans, The application of predictive modelling in archaeology: Problems and possibilities, in: Beyond the Artifact. Digital Interpretation of the Past. Proceedings of CAA99 Prato 1999 April 99, ed. Franco Niccolucci/Sorin Hermon (Budapest 2010) 271–277; Aikaterini Balla/Gerasimos Pavlogeorgatos/Despoina Tsiafakis/George Pavlidis, Recent advances in archaeological predictive modeling for archaeological research and cultural heritage management, in: Mediterranean Archaeology and Archaeometry 14/4 (2014) 33–38; overview in Aikaterini Balla/Gerasimos Pavlogeorgatos/Desponia Tsiafakis/George Pavlidis, Efficient predictive modelling for archaeological research, in: Mediterranean Archaeology and Archaeometry 14/1 (2014) 119–132.

4 James I. Ebert, The state of the art in "Inductive' Predictive Modeling: Seven big mistakes (and lots of smaller ones), in: Practical Applications of GIS for Archaeologists. A Predictive Modeling Toolkit, ed. Konnie L. Westcott/Joe R. Brandon (Philadelphia 2000).

5 E.g. Practical Applications of GIS for Archaeologists. A Predictive Modeling Toolkit, ed. Konnie L. Westcott/Joe R. Brandon (Philadelphia 2000); Wilko K. van Zijverden/Walter N. H. Laan, Landscape reconstructions and predictive modeling in archaeological research, using a LIDAR based DEM and digital boring databases, in: Archäologie und Computer Workshop 9, ed. Wilhelm Börner (Forschunggesellschaft Wiener Stadtärchaologie, Vienna 2004); R. E. Warren/D. L. Asch, A Predictive Model of Archaeological Site Location in the Eastern Prairie Peninsula, in: Practical Applications of GIS for Archaeologists. A Predictive Modeling Toolkit ed. Konnie L. Westcott/Joe R. Brandon (Philadelphia 2000) 7-36; Temps

Surprisingly rarely, though, the method has been applied to research-based projects that would allow for the parameters used to be refined and field-tested.[6] Furthermore, predictive modelling is rarely applied to the interpretation of known sites rather than to the prediction of potential site location.

We have termed this approach *reverse engineering* the predictive modelling kit. The tools – i.e. GIS algorithms – used are among the most often used ones: slope, viewshed and visibility, relative height, site-catchment.[7] However, they are used to extract the values for known site locations thus enabling the classification of the sites.[8]

2 DATA

The adopted methodology is built from the ground up on two premises. First is that mentioned above: correlations between site locations and digital representation of the present day landscape can only inform us about coincidences in the present, which must then be linked with the past through the process of explanation. Second, the tools used must be adapted to the regional scale of this study, the size of which has rarely (if ever before) been attempted in predictive modelling in archaeology.

The latter led us to the decision that only analyses of the digital elevation model (DEM) will be used. DEM is the only data source that could presumably be acquired with sufficient *accuracy* and *precision*.[9] For example, the proximity of water is often considered in predictive modelling and there are several data sources for surface waters available for the entire study area; however, the water springs that would be of interest as a source of drinking water are not reliably mapped, let alone available in consistent quality for the entire region. And even if the data for modern springs were to be available, it could not be uncritically applied to the 8th and 9th c. AD.

Initially 82 Slovenian sites were considered (Figure 1). Due to the encouraging results the study area has been considerably enlarged to incorporate 106 sites from Slovenia, Austria, Bavaria in Germany and the Czech Republic, 296,100 km^2 in total (Figure 2). The Slovenian and Austrian sites have been extracted using Zbiva[10] by applying the search for the hilltop locations with 8th and 9th c. AD "militaria" finds. However, the sample is heavily biased by the results of the previous work by the authors and hence 75% of the sites are from Slovenia and the Austrian province of Carinthia. To those, 11 sites in Bavaria and 2 in the Czech Republic have been added, based on the data provided by Christian Later and Nad'a Profantova respectively.[11]

In Austria these sites attracted scholarly attention from an early date, especially in the first half of the 20th c. They have, in particular, been investigated regarding their late Roman phases and have often been interpreted as early-Christian Roman or Germanic settlements from Late Antiquity or the Migration period.[12] Only a small number of them have been excavated and a very large number have only been surveyed by field-walks. In most cases the remains of buildings, especially walls, can still be seen as rampart-like surface features. For Carinthia, where the centre of the early Medieval Carantanian principality can be located, in the early 20th c, Franz Xaver Kohla – among others – has collected

et espaces de l'homme en société, analyses et modèles spatiaux en archéologie, ed. Jean-François Berger/Frédérique Bertoncello/ François Braemer/Gourguen Davtian/Michiel Gazenbeek (Actes des 25. Recontres Internationales d'Archéologie et d'Histoire et d'Antibes, Antibes 2005).

6 Eg Benjamin Štular, Analiza gospodarskega zaledja v arheologiji krajin (Site catchment analysis in landscape archaeology), in: Geografski informacijski sistemi v Sloveniji 2005-2006, ed. Drago Perko/Janez Nared/Marjan Čeh/David Hladnik/Marko Krevs/ Tomaž Podobnikar/Radoš Šumrada (Ljubljana 2006).

7 Cf. Practical Applications of GIS for Archaeologists.

8 For the use of term classification, see Leo S. Klejn, Arheološka tipologija (Ljubljana 1988) 96.

9 Cf. Metric Survey Specifications for Cultural Heritage, ed. Paul Bryan/Bill Blake/Jon Bedford/David Andrews (Swindon 2009) 10 for accuracy and precision.

10 Andrej Pleterski/Mateja Belak, Zbiva. Cerkve v vzhodnih Alpah od 8. do 10. stoletja. Zbiva. Archäologische Datenbank für den Ostalpenbereich. Die Kirchen in den Ostalpen vom 8. bis 10. Jahrhundert, in: Zgodovinski časopis 49/1 (1995) 19–43; Pleterski, Belak, 2016, Zbiva. Http://zbiva.zrc-sazu.si.

11 We are thankful to both for providing us with the data on the site's locations.

12 C.f. Rudolf Egger, Frühchristliche Kirchenbauten im südlichen Noricum (Sonderschriften des österreichischen archäologischen Instituts 9, Wien 1916); Franz Jantsch, Die spätantiken und langobardischen Burgen in Kärnten, in: Mitteilungen der Anthropologischen Gesellschaft in Wien LXVIII (1938) 337–390.

information about all sites known to date and a compilation of them was published in 1973.[13] This compilation has been enlarged by various selected sites from Styria, Upper and Lower Austria, the Czech Republic and, of course, Slovenia[14]. For this paper we chose a selection of 106 of these approximately 300 currently known sites to investigate by means of various statistical and GIS-analyses.

This paper focuses on the Early Medieval usage of the sites and some of those mentioned above have shown finds or features from this period, especially military equipment. Some others, that are not proven by archeological evidence are, however, mentioned in medieval charters and can be identified with certain material remains, still visible today.[15] Of course, not all of the 106 selected sites have delivered evidence for Early Medieval usage. In such cases they have been chosen because they show similar structures to sites with Early Medieval dating for example regarding surface features from high- resolution digital elevation models.

Figure 1: Small area (Slovenia), map of sites. Figures correspond to the catalogue of the sites (Appendix).

Figure 2: Large area, map of 106 sites in Germany, the Czech Republic, Austria and Slovenia. Numbers. correspond to the catalogue of the sites.

The Slovenian sites have been analysed using the high quality 25 m DEM.[16] As a first step, the analyses were run on selected well-known sites and the results have been compared with field experience and other data, e.g. viewsheds have been compared to photographs. Then the analyses were replicated using 50 m and 100 m DEMs. Based on the comparison of the results, it was determined that the analyses can be run on 50 m DEM without losing important information, whereas the 100 m DEM was not suitable. DEM50 produced by median aggregation of the said 25 m DEM has therefore been used to analyse the Slovenian sites.

In 2014 the study area was considerably enlarged. An important factor in that decision was a digital elevation model over Europe from the GMES RDA project (EU-DEM) that became available in late 2013. EU-DEM is a hybrid product based on SRTM and ASTER GDEM data fused by a weighted averaging approach and it has been generated as a contiguous dataset **with *stated*** geometric accuracy of 25 m.[17]

Since this dataset has been published without a formal validation we decided against aggregation and ran the analyses on the 25 m DEM at the expense of computing time. For example, the calculation of the necessary viewsheds on a desktop computer running ArcGIS took more than 197 hours to process and it produced an excess of 200 GB of data.

Unfortunately, EU-DEM visual assessment and the error statistics validation that became available subsequently concluded that the horizontal spacing of EU-DEM is over-estimated and in fact bears more similarity to the SRTM DSM.[18] In other words, although the *precision* of the EU-DEM is 25 m, the *accuracy* is about 90 m.[19]

13 Franz X. Kohla, Kärntner Burgenkunde (Aus Forschung und Kunst 17, Klagenfurt 1973).

14 C.f. Slavko Ciglenečki, Höhenbefestigungen aus der Zeit vom 3. bis 6. Jahrhundert im Ostalpenraum (Ljubljana 1987).

15 On the discussion of the Medieval dating: Stefan Eichert, Zur frühmittelalterlichen Besiedlung des Ostalpenraums am Beispiel Kärntens, in: Untergang und Neuanfang-Tagungsbeiträge der Arbeitsgemeinschaft Spätantike und Frühmittelalter, ed. Orsolya Heinrich-Tamaska (Studien zu Spätantike und Frühmittelalter 3, Hamburg 2011) 107–124; Stefan Eichert, Frühmittelalterliche Strukturen im Ostalpenraum. Studien zu Geschichte und Archäologie Karantaniens (Aus Forschung und Kunst 39, Klagenfurt am Wörthersee 2012); Paul Gleirscher, Keltisch, frühmittelalterlich oder türkenzeitlich? Zur Datierung einfach strukturierter Wehranlagen im Südostalpenraum, in: Beiträge zur Mittelalterarchäologie in Österreich 26 (Wien 2010) 7–34.

16 Tomaž Podobnikar, Kronologija izdelave digitalnega modela reliefa Slovenije, in: Geodetski vestnik 47/1-2 (2003) 47–54.

17 Andrew Bashfield/Andreas Keim, Continent-wide DEM creation for the European Union (International Society for Photogammetry and Remote Sensing Proceedings, Sydney 2011); EU-DEM Metadata. http://www.eea.europa.eu/data-and-maps/data/eu-dem#tab-metadata (accessed 1.7.2016).

18 Edina Józsa/Szabolcs Á. Fábián/Mónika Kovács, An evaluation of EU-DEM in comparison with ASTER GDEM, SRTM and contour-based DEMs over the Eastern Mecsek Mountains, in: Hungarian Geographical Bulletin 63/4 (2014) 401–423.

19 For SRTM DSM cf. Konstantinos G. Nikolakopoulos/E K. Kamaratakis/Nektarios Chrysoulakis, SRTM vs ASTER elevation products. Comparison for two regions in Crete, Greece, in: International Journal of Remote Sensing 27/21 (2006) 4819–

Bearing in mind the above-mentioned initial tests on Slovenian DEM, this leads to the conclusion that the results of analysis based on EU-DEM are severely limited. Hence all analyses have been executed twice:

- on a high-quality DEM50 for the small area (Slovenia) and
- on a low-accuracy EU-DEM for the large area.

3 TOOLS

With the term tools we are addressing the GIS algorithms developed for this particular analysis. Reflecting Ebert's[20] considerations, our starting point is the research question embedded in archaeological interpretation. Given the focus of this analysis – hilltop sites with Early Medieval military finds – the underlying questions are:

- Could these locations have been used as settlements in the Early Medieval period?
- If yes, what kind of settlements?

To address these questions five criteria have been formulated that, on the one hand, sufficiently describe the type of the potential activities on each hilltop and, on the other hand, are observable in the available data on a regional scale:

1. defensibility,
2. living conditions,
3. remoteness and
4. control of local resources,
5. presence in the landscape.

Below both the archaeological reasoning and the GIS algorithm for each of the above criteria are presented. The results are discussed separately for the smaller area with accurate DEM (Slovenia) and the large area with poor accuracy EU-DEM.

3.1 Defensibility

By defensibility the natural affordance of each location to be defended against possible attackers has been evaluated. Obviously, the defensibility of every location depends on many factors such as types of weapons, available military logistics, size of the battle force etc.[21] Without dwelling on the details, the only criterion pertaining to the natural affordance relevant to Early Medieval warfare that can be extracted using GIS analyses at this scale is minimum drop from each hilltop. The bigger the height drop, the higher the slope that needs to be scaled by potential attackers before the defenders can be engaged in combat. Obviously, the steepness is also a very important factor that can be easily calculated in the GIS environment. However, in order to get meaningful results high-resolution DEM's – e.g. lidar derived – are needed.

The only proxy that can be calculated on such a coarse scale is the height of each hilltop, i.e. the vertical distance in metres between the peak (summit) and the highest surrounding area. Within common concepts, the peak is defined as being any point on a surface that is elevated by a certain difference in height with respect to its surroundings.[22]

; Djamel Athmania/Hammadi Achour, External validation of the ASTER GDEM2, GMTED2010 and CGIAR-CSI-SRTM v4.1 free access digital elevation models (DEMs) in Tunisia and Algeria, in: Remote Sensing 6/5 (2014) 4600–4620.

20 Ebert, State of the art.

21 Cf. Takashi Sakaguchi/Jesse Morin/Ryan Dickie, Defensibility of large prehistoric sites in the Mid-Fraser region on the Canadian Plateau, in: Journal of Archaeological Science 37/6 (2010) 1171–1183.

22 Tomaž Podobnikar, Detecting mountain peaks and delineating their shapes using Digital Elevation Models, Remote Sensing and Geographic Information Systems using autometric methodological procedures, in: Remote Sensing 4 (2012) 784–809 at 788.

Algorithm: This proxy was calculated using LandSerf v2.3 software. Peak classification has been iterated five times with values for minimum drop surrounding the peak 10, 20, 30, 40 and 50 m respectively. The results have been added together so that in the resulting raster peak values 1 to 5 reflected value 1 for peaks with 10 m or smaller minimum drop, 2 for peaks with 10 to 20 m drop up to value 5 for peaks with 40 m or more. Height brackets have been chosen arbitrarily.

However, more than half of the sites – described by archaeologists as "strategic" hilltop locations – were attributed value 0. The majority of those are either ridge or saddle locations. Since ridge and saddle locations afford some potential defensibility they were attributed the value 2.

Results. Among the Slovenian sites 69% were ridge or saddle locations, 3% were located on the slope. 11% of the sites had peak value 1, 3% value 2, 3% value 4 and 12% value 5. Two thirds of the Slovenian sites are therefore located on sites with poor (values 1, 2) and the remaining third on locations with very good (values 4, 5) natural defensibility affordance, thus creating two distinct groups (Figure 3).

The comparison of the results for the Slovenian sites calculated on DEM10 and EU-DEM revealed that 23 were an exact match, 1 was an approximate match and 2 were a mismatch (value difference 1 and 2 respectively). 2 sites were a complete mismatch exhibiting value 0 instead of 5. With 71% of exact matches and only 7% of complete mismatches we consider the defensibility analyses executed on EU-DEM to be acceptable.

Figure 3: Small area (Slovenia), map of sites according to defensibility. Labels correspond to the catalogue of the sites (Appendix).

Among the 106 sites, 9% are located on a slope, 3% on peaks 10 m high or less, 8% on peaks between 10 and 20 m high, 49% are positioned either on a ridge or on a saddle, 4% on peaks between 20 and 30 m, 3% on peaks between 30 and 40 m high and 24% on peaks more than 40 m high. Similarly to the above, 69% of sites are therefore located on sites with poor natural defensibility affordance, 4% have medium and 26% are located on sites with very good natural defensibility affordance. Therefore, two distinct classes can be determined, sites with poor defensibility affordance and sites with medium or very good defensibility affordance (Figure 4).

Figure 4: Large area, map of sites according to defensibility. Labels correspond to the catalogue of the sites (Appendix)

3.2 Living conditions

Detecting the agricultural potential – for the purposes of this article termed ***field*** – suitable for the 8th and 9th c. AD technology and climate conditions can only be achieved on a case-to-case basis.[23] In addition, the possibility of other types of self-sufficient agriculture should be considered.[24]

Therefore, a far more robust proxy for calculating the agricultural potential was needed, such as slope.[25] In an Alpine environment, however, most intensive agricultural activities take place on alluvial soils in valley bottoms and other flat formations surrounded by higher ground. Soils on hillslopes are generally shallower than in valleys and are dominated by erosion and transportation regimes, whereas valley bottoms are generally depositional environments where material accumulates over time.[26]

23 Eg. Štular, Analiza gospodarskega.

24 E.g. Tina Milavec, Poznorimske pasne garniture z jezdeci iz jugovzhodnih Alp in Panonije = Late Roman belt sets with riders from the southeastern Alps and Pannonia, in: Prilozi instituta za arheologiju u Zagrebu 28 (2011) 133–146.

25 E.g. Robert E. Warren/David L. Asch, Practical applications of GIS for archaeologists. A predictive modeling toolkit, in: 2000, Practical Applications of GIS for Archaeologists. A Predictive Modeling Toolkit, ed. Konnie L. Westcott/Joe R. Brandon (Philadelphia 2000) 7–36, at 13–18.

26 John C. Gallant/Trevor I. Dowling, A multiresolution index of valley bottom flatness for mapping depositional areas, in: Water resources research 39 (12) 2003, 1347.

We therefore consider the valley bottom area within a 3 km radius – a rough approximation of a sedentary site catchment area[27] – to be the proxy for each site's agricultural potential. The term *field* is therefore used throughout this article as denoting this area.

Algorithm: The multiresolution index of valley bottom flatness was calculated using System for Automated Geoscientific Analyses GIS software (hereafter SAGA) v2.1. The morphometric analysis multiresolution index of valley bottom flatness utilizes the flatness and lowness characteristics of valley bottoms that are combined by multiplication and are interpreted as membership functions of fuzzy sets. Values greater than 0.5 are considered as valley bottom areas. For this module, the default settings have been used since these are already optimized for a 25 m DEM.[28] The result is reclassified into a binary raster where values of 0.5 and higher are considered to be valley bottoms (value 1) and the rest are not (value 0). Clusters with an area of less than 2 ha are deleted in order to limit the negative influence of the EU-DEM poor quality, especially spikes. As a last step, the result is expressed as the *field* percentage of the total 5 km radius area.

The results can be classified in 5 classes using Jenks natural breaks implemented in ArcGIS Desktop 10.2. Natural breaks classes are based on natural groupings inherent in the data, whereby the class breaks are identified that best group similar values and that maximize the differences between classes. The features are therefore divided into classes whose boundaries are set where there are relatively big differences in the data values.[29]

Results: The Slovenian sites have from less than 1% to 89% – ie. 4 to 2900 hectares – of *fields* within the 3 km radius. The average value is 21% and the median value 15%. 18% of the sites fit the very small *field* category, 36% small, 25% average, 14% large and 7% very large (Figure 5; Figure 6).

Figure 5: Small area (Slovenia), chart representing the percentage of field category of the total 5 km radius area; labels on the x axis correspond to the catalogue of the sites (Appendix).

Figure 6: Small area (Slovenia), map of sites according to the field.

To compare the results for Slovenian sites calculated on DEM50 and EU-DEM first some statistical observations have been made. A discrepancy of ± 3% would result in a misclassification for 3 % of the sites whereas ± 5 % misclassifies 50 %, ± 7 % misclassifies 80% and ± 12 % misclassifies 97 % of sites. This means that a tolerable discrepancy is ± 3% whereas ± 5 % would already misclassify half of the sites.

The comparison of the results for Slovenian sites calculated on DEM50 and EU-DEM reveals that the EU-DEM results on average estimate the size for 5%. Only 8% had a discrepancy of no more than ± 3 % and only 25% had a discrepancy of no more than ± 5 %. In other words, had *field* category for Slovenian sites been calculated based on EU-DEM, only 5 sites would be classified correctly and 23 would be misclassified. Therefore the *field* category based on EU-DEM data has only been used to detect the outliers, ie. sites that differ greatly from the majority. In other words, from the categories calculated with natural breaks on the DEM50 data we only kept the very small (6%) and very large category (54%) and the rest have been merged and are considered to be of average size.

Among the 106 sites analysed based on EU-DEM data 7% have a very small, 77% an average, and 16% have a very large *field* (Figure 7).

[27] Mike R. Jarman/Claudio Vita-Finzi/Eric Higgs, Site catchment analysis in archaeology, in: Man, Settlement, and Urbanism, ed. Peter J. Ucko/Ruth Tringham/G Dimbleby (London 1972) 61–66; Alan Zarky, The Early Mesoamerican village (1976) 117–130; Donna C. Roper, The method and theory of site catchment analysis: a review, in: Advances in Archaeological Method and Theory 2, ed. Michael B. Schiffer (New York 1979) 119–140; Štular, Analiza gospodarskega; Oula Seitsonen, Prehistoric land-use in the Loita-Mara Region, Southwest Kenya: A preliminary GIS site catchment analysis, in: NYAME AKUMA 71 (2009) 46–53; Isaac I. T. Ullah, A GIS method for assessing the zone of human-environmental impact around archaeological sites: a test case from the Late Neolithic of Wadi Ziqlâb, Jordan, in: Journal of Archaeological Science 38/3 (2011) 623–632.

[28] Gallant/Dowling, multiresolution index.

[29] Mike De Smith/Mike F. Goodchild/Paul Longley, Geospatial Analysis: A Comprehensive Guide to Principles, Techniques and Software Tools.(5th online edition: http://www.spatialanalysisonline.com 2015) chapter 4.2.12.

Figure 7: Large area, map of sites according to the field.

The regional scale of the analysis has been an all-important factor in calculating the ***accessibility*** of the *field* as well. The standard approach such as the site catchment's time budget[30] or path modelling[31] were not applicable, especially given the problems identified with modelling travel on the steep slopes.[32]

A more robust method was therefore needed. Since we are interested in the travel between the hilltop and the valley floor, calculating the height-difference-dependent time budget is a valid approximation for the accessibility of the *field*. Experienced hikers report that a fit person walking on maintained paths on average ascends 300 m of height difference per hour.

Algorithm: Vertical distance to channel network was used to calculate the height of the hilltop location above the valley. This module – implemented in SAGA v2.1 – calculates the vertical distance to a channel network base level. The algorithm interpolates a channel network base level elevation and then subtracts it from the original elevations.[33] The value of each site's location on the resulting digital surface model (DSM) therefore equals the height in meters above the valley. This divided by 300 produces the results in hours needed to ascend from the valley to the hilltop.

For DEM50 the hydrological map has been used as a channel network input, whereas for EU-DEM the channel network has been interpolated from DEM.

Results: Statistically calculated natural breaks for the DEM50 data are as follows: 14.4, 31.2, 47.6, and 75.6 minutes, i.e. approximately ¼, ½, ¾ and 1 ¼ of an hour. On the other hand, sample site catchment studies in archaeology (see above) allow for different breaks based on anthropological and archaeological observations:

- 7 minutes (site catchments preferred in densely populated areas)[34]
- 15 minutes (half of anthropologically defined site catchment area)[35]
- 30 minutes (anthropologically defined site catchment area)[36]
- 1 hour (approximation of a 4.5 km radius for pastoral societies)[37]
- 2 hours (approximation of a 9 km observed maximum daily grazing herding radius)[38]

Based on excellent correlation between the 15 and 30 minute breaks and to some extent all but the 7 minute bracket – clearly not applicable to this site type – the decision has been made to use the statistically calculated natural breaks rounded up to a quarter of an hour: up to 15, 30, 45, 75, and more

30 E.g. Štular, Analiza gospodarskega.

31 Benjamin Štular, Mreža poti = Path Network, in: Poznoantična utrjena naselbina Tonovcov grad pri Kobaridu. Naselbinski ostanki in interpretacija = Late Antique fortified settlement Tonovcov grad near Kobarid. Settlement remains and interpretation, ed. Slavko Ciglenečki/Zvezda Modrijan/Tina Milavec (Ljubljana 2011) 53–64, see cited bibliography; Dimitrij Mlekuž, Modeliranje gibanja in dostopnosti, in: Geografski informacijski sistemi v Sloveniji 2011–2012, ed. Rok Ciglič/Drago Perko/Matija Zorn (Ljubljana 2012) 153–160; Philip Verhagen, On the road to nowhere? Least cost paths, accessibility and the predictive modelling perspective, in: CAA2010: Fusion of Cultures. Proceedings of the 38th Annual Conference on Computer Applications and Quantitative Methods in Archaeology, Granada, Spain, April 2010, ed. Francisco Contreras/M. Farjas, Fco J. Melero (Oxford 2011) 319–331; Heather Richards-Rissetto/Kristin Landau, Movement as a means of social (re)production: using GIS to measure social integration across urban landscapes, in: Journal of Archaeological Science 41 (2014) 365–375; Peter Bikoulis, Hypothesis Testing and Validation in Archaeological Networks, in: CAA2015. Keep The Revolution Going. Proceedings of the 43rd Annual Conference on Computer Applications and Quantitative Methods in Archaeology, ed. Stephano Campana/Robert Scopigno/Gabriella Carpentiero/ Marianna Cirillo (Oxford 2016) 543–551.

32 Štular, Analiza gospodarskega 201, slika 2

33 Cf. Michael Bock/Bernd Cyffka/Florian Haas/Barbara Stammel, Remediation of the Danube floodplain between Neuburg and Ingolstadt (Bavaria/Germany) – GIS supported modelling of ecological flooding, in: SAGA – Analysis and Modelling Applications, ed. Jürgen Böhner/Keith R. McCloy/Josef Strobl (Göttingen 2006) 1–12; Michael Bock/Rüdiger Köthe, Predicting the Depth of hydrologic Soil Characteristics influenced by ground water, in: SAGA – Seconds Out, ed. Jürgen Böhner/Thomas Blaschke/Luca Montanarella (Hamburg 2008) 13–22.

34 Cf. Štular, Analiza gospodarskega 207.

35 Cf. David L. Rossmann, The village and its catchment area, in: The Early Mesoamerican village, ed. Kent V Flannery (New York/San Francisco/London 1976); Zarky, village.

36 Rossman, village; Zarky, village; Isaac I.T. Ullah, GIS 623–632.

37 Cf. Ullah GIS method.

38 Peter B. Coppolillo, The landscape ecology of pastoral herding: Spatial analysis of land use and livestock production in East Africa, in: Human Ecology 28/4 (2000) 527–560.

than 75 minutes for accessibility values 5, 4, 3, 2, and 1 respectively. Therefore, 21% of sites have excellent accessibility, 32 % good, 21 % average, 21% poor and 3 % are inaccessible (Figure 8; Figure 9).

Figure 8: Small area (Slovenia), chart representing the accessibility of the field from the sites presented using vertical distance to channel network translated in ascent time budgets.

Figure 9: Small area (Slovenia), map of sites according to accessibility.

In comparison, EU-DEM results on average underestimate the ascent time by 16 minutes, which is one full class. 29% of sites differ ± 5 minutes or less, 25% are 5 to 15 minutes lower, 29% are 15 to 30 minutes lower and the remaining 18% are more than 30 minutes lower. The prevailing underestimation of time can most likely be explained by the reduced accuracy of the data since the peaks, i.e. hilltops, tend to be lower than the actual values on low, coarser DEM's. However, the big range of dispersion of the differences – 64 minutes – means that this mistake cannot be corrected.

Therefore, accessibility results based on EU-DEM can also only be used to detect the outliers: sites with excellent accessibility of less than 15 minutes and inaccessible sites that take more than 1 ¼ hours to access. Among the 106 sites, 24% have excellent accessibility, 66% have average accessibility and 9% are inaccessible (Figure 10).

Figure 10: Large area, map of sites according to accessibility.

The *field* and accessibility modelled above are just an aid to modelling the archaeological criterion of our interest, the ***living conditions***. Living conditions as used in this article describes the potential for a permanent self-sufficient agricultural settlement. This premise is built upon the assumption that in the 8th and 9th-c. AD Eastern Alpine area there were no military forts that would be externally supplied with provisions by some sort of centrally governed logistics network. Such forts were a common feature during the Roman period and probably also existed in Late Antiquity[39] but only reappeared in the post-medieval period. Therefore, had the sites in question had permanent military staff, the supporting infrastructure for self-sufficient supply with provisions should have been in place, i.e. conditions for agriculture. In this vein, living conditions are therefore determined by a combination of the potential *field* size and its *accessibility* modelled above.

Algorithm: Both the potential and its accessibility are deemed of equal importance and therefore the average value has been used. However, if either *field* or *accessibility* had value 1 the living conditions value is 1. For example, even if a site is easily accessible, if there are no potential *fields* the living conditions do not exist.

Results. Among the Slovenian sites 18% do not have suitable living conditions as defined above, 11% have poor, 35% average, 32% good and 14% have excellent living conditions (Figure 11).

Figure 11: Small area (Slovenia), map of sites according to the living conditions.

As mentioned, the poor accuracy of the EU-DEM only allows for detecting the outliers in our data. Among the 106 sites, 14% do not have suitable living conditions as defined above, 72% have good or very good, and 14% have excellent living conditions (Figure 12).

Results for both datasets display normal distribution with approximately 2/3 of the sites with average living conditions and the rest equally distributed among the no suitable living conditions and excellent living conditions categories.

Figure 12: Large area, map of sites according to living conditions.

[39] E.g. Slavko Ciglenečki, Posočje v poznoantičnem času = The posočje area during Late Antiquity, in: Poznoantična naselbina Tonovcov grad pri Kobaridu. Naselbinski ostanki in interpretacija, ed. Slavko Ciglenečki/Zvezda Modrijan/Tina Milavec (Ljubljana 2011) 33–52.

3.3 Remoteness

Distances from probable routes of travel or inaccessibility due to barriers are to be considered with regard to the function of an archaeological site.[40] We have termed this characteristic remoteness to distinguish it from both accessibility and control. Although the three characteristics – remoteness, accessibility and control – are somewhat overlapping, it is the subtle differences we are interested in. The concept is perhaps easiest to demonstrate using the example of a medieval castle. Smlednik castle,[41] for example, had an extremely large viewshed, thus exerting firm landscape presence. This was largely due to its position on a rock promontory 155 m above the valley, making it accessible in just over a half an hour. This makes sense since daily access to the fields was not a primary concern when the location for the castle was sought out. However, the castle was not remotely located since it was positioned 685 m from the fields of the closest village. The location therefore makes perfect sense for a feudal castle that obtains the majority of its provisions from the surrounding villages (or at the very least by the work of the villagers) but needs to exert strong symbolic presence in the landscape and at the same time strong factual control over its dominion in the nearby villages. This location would not be suitable for a self-sufficient settlement, though. And indeed, a self-sufficient settlement in the form of a prehistoric hilltop settlement is located on the neighbouring hilltop.[42] Among the sites in this analysis, perhaps the difference between the Gradec at Velika Strmca (No. 6) – remote but accessible – and Home above Sora (No. 14) – non-remote but inaccessible – best demonstrates the difference between remoteness and presence in the landscape.

Algorithm: Remoteness is calculated as a Euclidian distance, i.e. as a crow flies, from the *field* category. This function is robust enough to be reliably replicated in most GIS software packages.

Results: The 28 Slovenian sites are, on average, 0.7 km away from the nearest *field*. Statistically calculated natural breaks for the DEM50 data are 0.25, 0.6, 0.83 and 1.3 km. 18% of the sites are not remote, 36% are slightly remote, 25% are averagely remote, 14 % are remote and 7% are very remote. Only 1/5 of the sites are therefore remote or very remote by being almost 1 km or more distant from the nearest *field* (Fig. 13, Fig. 14).

Figure 13: Small area (Slovenia), chart representing the remoteness modelled with the distance as a crow flies in km to field.

The distances calculated on EU-DEM are on average 0.4 km shorter than those calculated on DEM50. The range of differences is between – 0.32 and 0.92 km, a whopping 1.24 km that compares to the range of four classes.

Such poor accuracy in the EU-DEM-derived data would only allow for singling out the very remote outliers that are more than 1 km remote from the *field*. However, only 4% of sites fall into this category and all are located in Slovenia (Nos. 1, 7, 22, 27). Since more reliable information is derived for these from DEM50, the EU-DEM derived remoteness data is not suitable for further analysis.

Figure 14: Small area (Slovenia), map of sites according to remoteness.

40 Sakaguchi/Morin/Dickie, Defensibility 1172.
41 Benjamin Štular, The castle in the landscape, in: Smlednik Castle, ed. Benjamin Štular (Ljubljana 2015) 107–116.
42 Petra Vojaković, Smlednik in prehistoric times, in: Smlednik Castle, ed. Benjamin Štular (Ljubljana 2015) 15–24.

3.4 Control of local resources

Visibility analyses were among the first to be gainfully employed in GIS studies of human behaviour[43] and archaeologists have been at the forefront of this development.[44] The most influential work in archaeology was done early on, most notably by Wheatley and Gillings[45] and Marcos Llobera.[46] The theoretical foundation of the methods developed is Gibson's[47] ecological approach to visual perception[48] and the pioneering work on the visual and spatial structure of landscapes by the Japanese landscape planner Tadahiko Higuchi.[49] The tool remains among the most often used in archaeology.[50]

Working in archaeology it is very important to distinguish between someone or something being visible on the one hand and the unobstructed view of the said someone or something on the other hand. An unobstructed view, for example, between two people standing 20 km apart does not mean that they can see each other with their naked eyes; however, an unobstructed view of a 20 km-remote mountain on a clear day does make that mountain visible. Any result is also subject to the limitations of the DEM, such as altitude errors and the absence of vegetation data.

In this case study, the control that could have been exerted with the weapons and military and policing tactics employed in the 8th and 9th c. AD is of interest. The mistake often made in similar studies is to apply the 19th-c. gun-fort thinking, leading archaeologists to describe ancient hillforts as exerting "control" of river crossings and such. The historic reason for such inference is the fact that many of the early archaeologists were indeed retired 19th century military officers – e.g. General Pitt-Rivers – and the notion of what constitutes the "strategic" position of an archaeological site remained largely unquestioned.

With that in mind we built our tool based on two premises:

- the control of local resources is of interest and
- control is considered to be visual control over people and their activities (that in turn allows for the deployment of appropriate military or policing procedures).

43 Peter F. Fisher, First experiments in viewshed uncertainty: the accuracy of the viewable area, in: Photogrammetric Engineering and Remote Sensing 57 (1991) 1321–1327; Peter F. Fisher, First experiments in viewshed uncertainty: simulating fuzzy viewshed, in: Photogrammetric Engineering and Remote Sensing 58 (1992) 345–352; Peter F. Fisher, Algorithm and implementation uncertainty in viewshed analysis, in: International Journal of Geographical Information Science 7/4 (1993) 3[illegible]

44 E.g. Vince Gaffney/Zoran Stančič, GIS Approaches to Regional Analysis: A Case Study of the Island of Hvar (Ljubljana 1991), at 61-63; David Wheatley, Cumulative viewshed analysis: a GIS-based method for investigating intervisibility, and its archaeological application, in: GIS and Archaeology: a European Perspective, ed. Gary Lock/Zoran Stančič (London 1995) 171–186.

45 David Wheatley/Mark Gillings, Vision, perception and GIS: developing enriched approaches to the study of archaeological visibility, in: Beyond the map: archaeology and spatial technologies, ed. Gary R. Lock (Amsterdam/Berlin, Oxford/Tokyo/Washington,D C .[illegible]

46 Marcos Llobera, Extending GIS-based visual analysis: the concept of visualscapes, in: International Journal of Geographical Information Science 17/1 (2003) 25; id. Reconstructing visual landscapes, in: World Archaeology 39/1 (2007) 51–69; id. Modeling visibility through vegetation, in: International Journal of Geographical Information Science 21/7 (2007) [illegible]

47 James J. Gibson, The Ecological Approach to Perception (Hillsdale1986).

48 Cf. James Conolly/Mark Lake, Geographical Information systems in Archaeology (Cambridge 2006).

49 Tadahiko Higuchi, The Visual and Spatial Structure of Landscapes (Master Thesis, Cambridge 1983).

50 E[illegible] overview in Mark D. McCoy/Thegn N. Ladefoged, New developments in the use of spatial technology in archaeology, in: Journal of Archaeological Research 17 (2009) 263–295, at 272; Jago Cooper, Modelling mobility and exchange in pre-Columbian Cuba: GIS led approaches to identifying pathways and reconstructing journeys from the archaeological record, in: Journal of Caribbean Archaeology 3 (2010) 122–137; Sakaguchi/Morin/Dickie, Defensibility; Dimitrios Alexakis/Apostolos Sarris/Theodoros Astaras/Konstantinos Albanakis, Integrated GIS, remote sensing and geomorphologic approaches for the reconstruction of the landscape habitation of Thessaly during the neolithic period, in: Journal of Archaeological Science 38/1 (2011) 89–100; Wesley Bernardini/Alicia Barnash/Mark Kumler/Martin Wong, Quantifying visual prominence in social landscapes, in: Journal of Archaeological Science 40/11 (2013) 3946–3954; Mlekuž, Modeliranje; Francisco Vaz da Silva, A tomb with a view new methods for bridging the gap between land and sky in Megalithic Archaeology, in: Advances in Archaeological Practice 2/1 (2014) 24–37; Sylviane Déderix, More than line of sight and least cost path. An application of GIS to the study of the circular tombs of South-Central Crete, in: Best Practices of GeoInformatic Technologies for the Mapping of Archaeolandscapes, ed. Apostolos Sarris (Oxford [illegible]

The only local resource of interest that we are able to model on the regional scale is the *field* category, i.e. the visibility of the *field*. At the same time, the *field* is the location where most subsistence-related activities would take place.

In order to model the visual control over people and their activities, the Higuchi's middle-distance of 3 km is used. The middle-distance range is that which we most commonly associate with a pictorial landscape: the outline of treetops is visible but not the details of individual trees.[51] For the purposes of our analysis we interpret the middle-distance range as that enabling a local connoisseur of the landscape to distinguish between familiar and unfamiliar activities that people engage in, e.g. to distinguish between the oxen team ploughing the field from the approaching band of mounted marauders. This, in our mind, is a good approximation of the responsibilities a guard at his regular post on a day with good visibility might be tasked with.

Algorithm: Two measurements have been taken to minimize the negative effect of the coarse or low accuracy DEM for the small and large window respectively. The observer height of 4 m has been used to minimize the effect of the "shadow" produced by the raster cell. And the site locations have been manually moved to the centre of the highest local (ie. movement of less than 100 m) cell of the DEM. A viewshed analysis for each location has been executed in ArcGIS Desktop v10.2 (a significant difference with the viewshed executed with GDAL tools has been noticed).

The binary viewshed was then multiplied with the binary *field* category and the binary 3 km radius thus resulting in a binary raster of the *field* that is visible from the respective site and is within a 3 km distance from it. The final result is expressed as a percentage of a field that is visible, i.e. value 33% means that 33% of *field* within the middle-distance range is visible.

Results. Among the 28 sites based on the DEM50, on average 46% of the *field* is visible; the range is between 0 and 86%. Statistically calculated natural breaks are at 10%, 24%, 40% and 61%. 25% of the sites have very poor, 18% poor, 14% average, 32% good and 32% excellent control of local resources (Figure 15; Figure 16). Unlike *field*, ascent time and remoteness that all exhibit the exponential growth trend, the control of local resources exhibits the logistic growth trend.

Figure 15: Small area (Slovenia), chart representing the control of local resources modelled by the percentage of the field visibility within a middle-distance range.

Figure 16: Small area (Slovenia), map of sites according to the control of local resources.

The viewsheds calculated on EU-DEM are, on average, 0.1 km^2 smaller with the range from 2.6 km^2 smaller to 9.1 km^2 bigger, i.e. discrepancies between – 52% and 33% of the control the range. Again, the inaccuracy of the result prohibits further use of the EU-DEM derived data for anything other than isolating the outliers.

9% of the 106 sites in the larger area have very poor, 69% average, and 22% have excellent control of the local resources (Figure 17).

Figure 17: Large area, map of sites according to the control of local resources.

3.5 Landscape presence

Landscape presence as defined in this study is a symbolic effect that a hilltop site has on the people observing it, i.e. were these sites seen and felt daily by landscape-dwellers.[52] By definition, all of the hilltop sites have similarly high visual prominence, ie. the hilltop sites stand out from their immediate neighbourhood. In addition to this, the calculation of visual prominence *sensu* Llobera[53] was beyond our scope due to the insufficient processing power and is thus considered to be equal for all of the sites.

We built the model on the assumption of a predominantly self-sufficient community: the majority of

51 Higuchi, Structure of Landscapes 13–14; Cf. Wheatley/Gillings, GIS 16–19.

52 Cf. William Anderson, Fortification and landscape transformation in late antique Pessinus, in: Journal of Mediterranean Archaeology 26/1 (2013) 75–96.

53 Llobera, Visual analysis.

the non-urban people of the time spent most of their time engaging in agricultural activities. In this context, the effect of the site's presence on the potential travellers – a reoccurring theme in similar studies[54] – is of lesser importance. The only agricultural activity that can be reliably modelled on the regional scale is engaging in work taking place in the *field*, eg ploughing crop mending harvesting Therefore 50 random points have been selected for each site within the *field* simulating the observers.

Potential landscape presence of a prominent site is, according to our interpretation, taking place both in Higuchi's middle- and long-distance, i.e. in the 5 km radius from the site. At the long-distance range a viewer can tell that an area is wooded but little more; the contours of the treetops cannot be perceived, the overall texture is uniform and colour only functions as lighter or darker patches in an overall blur. One of the most important factors is the horizon and what is viewed acts as a vertical backdrop.[55] Our interpretation is that – since the hilltops are always on the horizon and the potential settlement or fort is also distinguished from the background by colour and shape – the presence of such a site is felt even at the long distance range .

Algorithm: 0 random points within the *field* have been created with the "create random points" tool in ArcGIS Desktop 10.2. Intervisibility between the random points and the site has been simulated by detecting which of the random points fall within the area of the *field* within a 5 km viewshed of each site. The landscape presence is expressed as a percentage, i.e. intervisibility of the site with 25 randomly selected points (out of 0 is expressed as 0% landscape presence.

Results: Among the 28 Slovenian sites the average landscape presence is 26% with values ranging from 0 to 80%. Statistically calculated natural breaks for the DEM50 data are 6%, 12%, 28% and 53%. 25% of the sites don't have landscape presence, 18% poor, 25% good, 21% very good and 11% excellent landscape presence (Fig. 18; Fig. 19). The trend line exhibits exponential growth, however the most striking feature is that there are three very distinguishable classes: the division in 5 classes is enforced to provide compatibility with other criteria, the three classes inherent in the data are:

- 1 and 2,
- 3,
- 4 and 5.

Figure 18: Small area (Slovenia), chart representing the landscape presence expressed as a percentage of visible points within the field category at long-distance range.

Figure 19: Small area (Slovenia), map of sites according to the landscape presence.

Values calculated on EU-DEM are, on average, smaller for 7% with ranges between – 56% and 42% and are thus only used to calculate the outliers.

14% of the sites don't have landscape presence, 62% have average, and 24% have excellent landscape presence (Figure 0 .

Figure 20: Large area, map of sites according to the landscape presence.

4 RESULTS

The aim of the analyses described above is, as mentioned, to provide a landscape context to the interpretation of the hilltops with Early Medieval military finds in the eastern Alpine area. To this end two questions have been formulated:

- Could these locations have been used as settlements in the Early Medieval period?
- If yes, what kind of settlements?

The aim of the above analysis of the five criteria (defensibility, living conditions, remoteness, control of local resources, presence in the landscape) is therefore to aid in extracting the landscape context –

54 E.g. Štular 2009, 161–165; Štular, Mreža poti; Štular, Castle.

55 Higuchi, Structure of Landscapes 4 cf. Wheatley/Gillings, GIS 16–19.

i.e. archaeological meaning – of the sites. Thus, all of the criteria have been appended to each site (see Appendix).

Due to the significant data accuracy discrepancy the results for the smaller area (Slovenia) and the larger area are discussed separately.

4.1 Small area (Slovenia)

The subject matter of this study is hilltop sites with military finds. Therefore a very strong supposition from the start was that these are military sites (eg territorial defences[56]) and most of the criteria address this question. The supposition is that an Early Medieval military fort exhibits:

- good defensibility (values 4 or 5),
- decent control (values 3, 4 or 5) and
- sustainable living conditions (values 3, 4 or 5).

There are 6 sites (21%) that exhibit such values (Fig. 21). In an independent expert opinion (see Appendix) all of these sites have also been considered to be military or partially military, but so have 10 others that exhibit very low defensibility and/or control. This contrast is particularly useful for further discussion.

Figure 21: Small area (Slovenia), map of sites according to the archaeological interpretation based on the reverse engineering of the predictive modelling.

A refuge is a different type of site that could explain the presence of military finds.[57] A refuge must:

- be hidden (presence and control values 1 or 2),
- remote (values 4 or 5) and
- offer basic defensibility (values 2, 3, 4 or 5).

Since it is to be used only in exceptional circumstances, good living conditions are not needed.

There are 4 sites (14%) that exhibit typical values for a refuge (Figure 21). In an independent expert opinion (see Appendix) 2 have been defined as a refuge, one as symbolic / military and one as an unknown type.

The third possible explanation for the presence of military finds is that these are sites with special symbolic meaning. There are many, many ways to describe symbolic meaning in archaeology.[58] Perhaps the most efficient approach in this study is to consider the visual presence as has been done for medieval castles: when a castle is viewed in relation to the identities of the people who used them a whole new vantage point is uncovered; castles become backdrops against which people played out their social roles.[59] A similar approach to Early Medieval hilltop sites is warranted providing that what is known of the religious and/or symbolic Early Medieval activities is considered: although the entire inhabited landscape possesses symbolic meaning,[60] places of special meaning – *lieux de mémoire* – are very often located on the borders or otherwise remote.[61] Such symbolic sites therefore exhibit:

- high landscape presence (values 4 or 5) and
- at least slight remoteness (values 2, 3, 4 or 5).

56 Cf. Johnny D. Meulemeester/Kieran O'Connor, Fortifications, in: The Archaeology of Medieval Europe, Vol. 1: The Eighth to Twelfth Centuries AD, ed. James Graham-Campbell/Magdalena Valor (Aarhus 2007) 316–341, at 319–322.

57 Cf. Meulemeester/O'Connor, Fortifications 316–318.

58 E.g. Symbolic and Structural Archaeology, ed. Ian Hodder (Cambridge 1982).

59 Matthew Johnson, Behind the Castle Gate: From Medieval to Renaissance. (Abingdon/New York 2002); cf. Joachim Zeune, Burgen, Symbole der Macht. Ein neues Bild der mittelalterlichen Burg (Regensburg 1996).

60 E.g. Andrej Pleterski, Kulturni genom: prostor in njegovi ideogrami mitične zgodbe (Ljubljana 2014).

61 E.g. Benjamin Štular/Ivan M. Hrovatin, Slovene pagan sacred landscape. Study case: the Bistrica Plain, in: Studia mythologica Slavica 5 (2002) 43–68; cf. Katja Hrobat, Ko Baba dvigne krilo. Prostor in čas v folklori Krasa (Ljubljana 2010), at 61–107.

There are 7 sites (25%) that can be qualified as symbolic places. In an independent expert opinion (see Appendix) 2 have been defined as symbolic, 1 as symbolic / military and 2 as an unknown type.

Another type of potential symbolic site is a remote and hidden site, e.g. detected as a hoard in the mountains.[62] Such sites can be understood as a component of the complex relations between those making offerings on the one hand and the numinous forces of the other world on the other.[63]

Such sites exhibit:

- very low landscape presence (values 1 or 2),
- very low control (values 1 or 2) and
- high remoteness (values 4 or 5).

By definition, this type of symbolic sites often coincides with the refuge.

There are 5 sites (18%) that can be qualified as remote symbolic places, 4 of them are also refuge sites. In an independent expert opinion (see Appendix) 2 have been defined as a refuge, 4 as military and 1 as an unknown type.

Among the remaining sites, 4 (14%) with excellent or very good living conditions should be mentioned that are placed in such a manner as to maximize the agricultural potential. However, since these are hilltop sites with exceptional quantities of military finds they are not simple agricultural settlements. These sites (Figure 21) therefore exhibit high potential to be a central place, i.e. *Zentralort*.[64] In an independent expert opinion (see Appendix) 3 have been defined as military or military / symbolic and 1 as an unknown type.

4.2 Large area

As mentioned, due to the data inaccuracy, the majority of sites within the large area cannot be analysed with the same rigour as the Slovenian sites within the small area. Foremost, due to the uncertainty of most of the first level results (living conditions, remoteness, control of local resources, presence in the landscape), second level results (military site, refuge, symbolic site) cannot be extrapolated. Nevertheless, some conclusions can be reached considering the outliers in the first level results.

First to be mentioned is the *defensibility* of the sites. Among the 106 sites, 9% are located on a slope, 3% on peaks 10 m high or less, 8% on peaks between 10 and 20 m high, 49% are positioned either on a ridge or on a saddle, 4% on peaks between 20 and 30 m, 3% on peaks between 30 and 40 m high and 24% on peaks more than 40 m high. Similarly to the above, 69% of sites are therefore located on locations with poor natural defensibility affordance, 4% have medium and 26% are located on locations with very good natural defensibility affordance. Therefore, 2 distinct classes can be determined, the sites with poor defensibility affordance and the sites with medium or very good defensibility affordance

There are 13 sites (12%) that do not exhibit any natural affordance for defensibility (Figure 4: classes "Slope" and "0–10m") and 25 sites (24%) with high natural affordance for defensibility (Figure 4: class "Upwards of 40 m"); 68 sites (64%) are average, i.e. do exhibit some natural affordance for defensibility (Figure 4: the remaining classes).

From this important archaeological inferences can be made: there are detectable differences in natural affordance for defensibility, most notably 13 sites described as hilltop do not exhibit natural affordance for defensibility. Descriptions such as "strategic position on the hilltop" are therefore insufficient for archaeological inferences regarding the natural affordance for defensibility.

The other criteria are considered in a similar vein. Regarding the *living conditions* approximately 1/6 do not have suitable living conditions, 2/3 have good or very good, and 1/6 have excellent living con-

62 E.g. Andrzej Buko, The Archaeology of Early Medieval Poland. Discoveries, Hypotheses, Interpretations (Leiden/Boston 2

63 Peter Turk/Andrej Gaspari, Gifts to the gods and ancestors, in: Ljubljanica: kulturna dediščina reke, ed. Peter Turk/Janka Istenič/Timotej Knific/Tomaž Nabergoj (Ljubljana 2009) 66–71, at 68.

64 An overview in Edward B. Banning, Archaeological Survey (New York 2002), at 157–161; for the Early Medieval period, see: Frühgeschichtliche Zentralorte in Mitteleuropa. Internationale Konferenz und Kolleg der Alexander von Humboldt-Stiftung zum 50. Jahrestag des Beginns archäologischer Ausgrabungen in Pohansko bei Břeclav, 5.–9.10.2009, ed. Jiří Macháček/Šimon Ungerman (Břeclav/Bonn 2011).

ditions (Figure 12). For further individual analysis the sites without suitable conditions and those with excellent conditions should be focused on in order to establish whether the living conditions of the sites influenced the composition of the finds. Should there be no noticeable differences, it would be a strong indication that these sites were not settled.

As far as *control* is concerned 10 of the sites have very poor control and 15 have excellent control (Figure 17). The former have high potential to be refuges and the latter to be military posts.

Roughly 1/9 of the sites don't have *landscape presence* and 29 have excellent landscape presence (Figure 20). The latter have high potential to be type 1 symbolic sites, and the latter to be type 2 symbolic sites.

As the GIS approach only allows for the interpretations described above, we also tried to interpret selected sites the other way around. Some of them had already been investigated in detail by archeological means or described in written sources so we know about their function and usage. In the following, five examples shall be discussed. We know of military finds only from two (spurs from Karnburg and from Hemmaberg). However, Karnburg, Teurnia and St. Martin in Villach had similar functions, according to the written sources. Hemmaberg and Hochgosch also show similar attributes concerning their topographical environment. (Figure 21)

Hemmaberg

In the 6th c. a certainly very famous sanctuary was located on the Hemmaberg in south-eastern Carinthia. Next to various prehistoric phases it mainly comprised of at least 5 early-Christian churches, certain buildings for housing pilgrims, a range of infrastructure and a fortification wall. A grotto (today "Rosaliengrotte") directly underneath the hilltop's plateau might also have played an important role for the sacred character of this place.[65] Sabine Ladstätter has analyzed the site's material culture[66] and shown that with the advancing 6th c. a decrease of prosperity can be observed. It seems that at the end of this period the sacred buildings were in some cases no longer used for religious but rather for housing purposes. Also ceramics of the "Prague" type found there are interpreted as remains of an early Slavic population, which at that time began to dwell in the Eastern Alps. For the 7th c. no new buildings have been observed and it seems as if the "newcomers" – probably together with the remaining autochthonous people – still used the Roman hilltop settlement for habitation.[67] Around the middle or in the 2nd half of the 8th c. this place somehow seems to have been used again as the finds of two iron spurs show.[68] They were not found in defined archeological layers but in the humus directly underneath the surface. No architectural or other archeological features that can be dated to this period with certainty have been found. A rampart that has been erected using stones from late Antiquity walls might be connected to this phase but it has not yet been investigated in detail and a reliable dating is also not given.

The site of Hemmaberg was thus a very important and representative place in the Early Christian period. To place it on a hilltop might, of course, reflect the general situation when settlements were moved to better defendable terrain. Regarding the GIS-Analyses, Hemmaberg shows good defensibility. While the "field" value is average, accessibility is very poor, not to say inaccessible. This, of course, comes as a surprise and a contradiction to the site's actual function, a place where many pilgrims are to be expected. Also, regarding the living conditions as defined in this article, the site is not suitable. Control is average and the landscape presence is excellent.

65 Franz Glaser, Das frühchristliche Pilgerzentrum auf dem Hemmaberg (Aus Forschung und Kunst 26, Klagenfurt 1991); ders., Eine weitere Doppelkirchenanlage auf dem Hemmaberg und die Frage ihrer Interpretation, in: Carinthia I 183 (1993) 165–186; id. Rettungsgrabung in St. Peter in Holz (Gem. Lendorf), in: Rudolfinum. Jahrbuch des Landesmuseums Kärnten 2009 (2010) 41.

66 Sabine Ladstätter, Von Noricum Mediterraneum zur Provincia Sclaborum: Die Kontinuitätsfrage aus archäologischer Sicht, in: Slowenien und die Nachbarländer zwischen Antike und karolingischer Epoche. Die Anfänge der slowenischen Ethnogenese, ed. Rajko Bratož (Situla 39, Lubljana 2000) 219–240.

67 Sabine Ladstätter, Die materielle Kultur der Spätantike in den Ostalpen, Eine Fallstudie am Beispiel der westlichen Doppelkirchenanlage auf dem Hemmaberg (Mitteilungen der Prähistorischen Kommission 35, Wien 2000).

68 Erik Szameit, Zu Funden des 8. Jahrhunderts aus Kärnten, in: Acta Histriae II (1994) 89–92.

Teurnia

Teurnia/Liburnia – situated on a hill in the western part of modern-day Carinthia near Spittal an der Drau – was the late Roman capital of the province Noricum Mediterraneum. It was a bishopric and protected by a large city-wall as well as by the river Drau/Drava. As the capital city, administrative and political tasks were the most important ones here. However, at least two churches – one that of the bishop – also show the religious importance.[69] The city lacks distinct evidence for immediate further usage after the end of the late Roman period. The mention of a Church in "civitas Liburnia" – but with no clearly identified location as yet – for the time around 750 however allows speculation about Teurnia also being the centre of some elitist potentate during the Slavic era of Carantania.[70]

Finds of graves and grave goods from the 9th/10th, for example, found next to the Church of St. Peter in Holz,[71] indicate the contemporary existence of the church and therefore it might have been the location of a respective surrounding settlement. The mentioning of a royal manor "curtis Liburnia" and a church may, of course, hint at these structures, but other locations for the aforementioned objects are also under discussion.[72]

In late Antiquity and probably also in the Early Middle Ages, Teurnia – although at that time with an unclear location – was primarily an administrative and political centre.

While control is average, regarding our analyses, defensibility is not given. However, Teurnia is protected by the river Drau/Drava on one side and a wall on the other. Missing hilltop-terrain could, in this case, have been substituted by water and man-made defensive means. The accessibility is excellent. Living conditions are good, all other criteria are average.

Karnburg

The site of Karnburg has also been the focus of scholarly attention both from Carinthia and Slovenia from an early date as the prince's stone ("Fürstenstein") was originally located nearby. This stone and the Karnburg stronghold have become national symbols for both countries, which often caused national and ethnic interpretations by archeologists and historians.[73]

Based on archeological evidence, one can reconstruct several phases of usage, although it has to be mentioned that only small-scale excavations have been carried out so far and that their results most probably do not represent the full spectrum of this site's chronological, cultural and typological characteristics.[74] Based on what we know to date, a first dwelling phase can be observed in the 8th c. It is represented by the find of an iron spur and also by a ^{14}C dating of the church's foundation wall[75]. The existence of a church at that time already points to a representative function. Also toponymical

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69 On this site: Franz Glaser, Teurnia. Römerstadt und Bischofssitz. Ein Führer zu den Ausgrabungen und zum Museum in St. Peter in Holz sowie zu den Fundorten im Stadtgebiet von Teurnia (Klagenfurt 1992); ders., Teurnia – civitas Tiburnia, in: „Castellum, civitas, urbs". Zentren und Eliten im frühmittelalterlichen Ostmitteleuropa, in: Castellum Pannonicum Pelsonense 6 (Rahden/Westfahlen 2015) 11–26; Stefan Eichert/Katharina Winckler, Von der metropolis Norici zum comitatus Lurniensis. Teurnia und sein Umfeld zwischen Spätantike und Hochmittelalter, in: Archäologie Österreichs 23/2 (2015).

70 Eichert/Winckler, Teurnia; Herwig Wolfram, Conversio Bagoariorum et Carantanorum. Das Weißbuch der Salzburger Kirche über die erfolgreiche Mission in Karantanien und Pannonien. Herausgegeben, übersetzt, kommentiert und um die Epistola Theotmari wie um gesammelte Schriften zum Thema ergänzt von Herwig Wolfram. Zweite, gründlich überarbeitete Auflage (Ljubljana^2 2012) 66; Andrej Pleterski, Modestuskirchen und Conversio, in: Slowenien und die Nachbarländer zwischen Spätantike und karolingischer Epoche. Anfänge der slowenischen Ethnogenese, ed. Rajko Bratož (Situla 39 Ljubljana 2000) 425–476.

71 Franz Glaser, Neue Funde der Ostgotenzeit in Kärnten (493–536). Die Kirchen auf dem Hemmaberg und das Gräberfeld im Tal bei Globasnitz, in: Symposium zur Geschichte von Millstatt und Kärnten 2005, ed. Franz Nikolasch (Millstatt 2005) 93.

72 Eichert/Winckler, Teurnia.

73 Stefan Eichert, Archäologie und ethnische Identitäten – Das Fallbeispiel Kärnten, in: Beiträge zur Mittelalterarchäologie in Österreich 29/2013 (2014) 263–271; Sabine Nikolay, Der Kärntner Fürstenstein im Bild. Darstellungen eines europäischen Rechtsdenkmals. Mit Beiträgen von Heinz Dopsch und Peter Štih (Klagenfurt-Celovec/Ljubljana-Laibach 2010).

74 Die Karnburg. Forschungen zu Kärntens Königspfalz. 2006–2010, ed. Heimo Dolenz/Christoph Baur (Klagenfurt am Wörthersee 2011). On the discussion: Eichert, Strukturen 138–151; Paul Gleirscher, Die Karnburg im Kärntner Zollfeld: vom königlichen Wirtschaftshof zur Residenz des Gewaltboten, in: Mitteilungen des Instituts für Österreichische Geschichtsforschung 119 (Wien 2011) 1–38.

75 Dolenz/ Baur, Karnburg 93–94; 121.

thoughts support this theory: the name of the 8th-c. Slavic principality Carantania could derive from this dominion's main stronghold with central importance, which in this case must have been Karnburg ("Carantana").[76]

In the 9th c. the Slavic principality was incorporated into the Carolingian empire and the Slavic princes were replaced by Bavarian dukes. At least in the 2nd half of this century we know that Karnburg was a royal manor "curtis" and that even King Arnulf (emperor since 896) spent Christmas there in 888. The contemporary charters suggest that Karnburg was the main focal point of the royal power in Carantania and the crown's most important base in the south-eastern periphery of the region. The mention of a "curtis" fits well with the archeological remains known to date.[77] For the 9th c. they do not necessarily point to a strongly fortified site but more probably to an economical and administrative centre. In the 10th c. Karnburg is mentioned as a "civitas" as well as the "sedes regalis" and an impressive fortification wall seems to have been erected sometime in that century. The Hungarian threat might be a possible reason for this modification. In the 11th c. the stronghold lost its importance and in the High and Late Middle Ages it is only mentioned as a village.

In Karnburg we have archaeological and historical evidence for an administrative, political, economic, cultural and military centre. One would therefore expect certain characteristics for its position in the landscape. On the one hand this would be a high landscape presence and good living conditions. Also the control of the surrounding landscape must have been important. The defendability on the other hand does not seem to have been the most important factor as the fortification wall was erected only very late during the site's life-span. It should, however, be mentioned, that the place itself is already well protected against the Glan river valley by steep slopes. The low/average defensibility value may also result from the DEM resolution that does not properly show the small-scale differences in the elevation.

Villach St. Martin

The church of Villach St. Martin, on the right side of the river Drau/Drava was founded at least in the 10th c. as the remains of early graveyard burials have shown.[78] Until the 1960s massive remains of a surrounding rampart (up to 5 m high) around the churchyard could still be observed.[79] They have been removed due to the construction of new buildings and roads. Thus archaeological evidence points to an important fortified site with a church inside and therefore, most probably, also with representative duties. This theory is supported by a charter from the late 10th c. that tells us about "curtis", "castellum" and "ecclesia" in Villach.[80] There are, of course, discussions on the exact location of these structures but St. Martin seems to be the most probable solution to this question. Further excavations inside the former fortified area have shown remains of walls as well as burials. Assuming that the archeologically and historically passed on structures are identical, St. Martin would be a representative political, religious and economical centre. It was protected against possible attackers on one side by the river and on the other by a wall or rampart.

The attributes of this site are average landscape presence and control, combined with excellent living conditions, accessibility and field value. However, the defensibility is non-existent. Similar to Teurnia, here we have a case where this is compensated for by a wall/rampart and the river.

Hochgosch

On a mountain ridge above the lake Millstätter See the fortified hilltop of Hochgosch is located.[81] A wall constructed of earth and wood with a dry-stone wall at its front surrounds an area of 0 sqm. Due to radiocarbon and dendrochronological datings we know that this wall was erected in the middle of

76 Peter Štih, The Middle Ages between the Eastern Alps and the Norther Adriatic. Select Papers on Slovene Historiography and Medieval History (East Central and Eastern Europe in the Middle Ages, 450–1450 11, Leiden/Boston 2010).

77 On the charters: Eichert, Strukturen 139.

78 Eichert, Strukturen 175–178 (with further bibliography).

79 Wilhelm Neumann, Zur Geschichte von Burg und Stadt Villach, in: Bausteine zur Geschichte Kärntens, Spätlese (Das Kärntner Landesarchiv 33, Klagenfurt 2005) 193–225, at 202.

80 Eichert,S trukturen 3

81 Kordula Gostenčnik, Die frühmittelalterliche Befestigungsanlage auf dem Hochgosch bei Molzbichl, Kärnten, Die Grabung 1987, in: Archaeologia Austriaca 81 (1997) 255–271; Eichert, Struktuen 96–101.

the 9th c.[82] At that time this landscape was part of the region Liburnia, where a royal "curtis" of the same name is also mentioned in historical sources (see above). The site of Hochgosch has been investigated by a small-scale excavation. Except for the features mentioned above, no early medieval remains have been found: neither metal finds nor pottery or anything else that would provide definitive evidence of a permanent settlement of that time. So one interpretation is that it was a refuge or hideout, a fortification used only temporarily, that could be frequented in the event of danger.

It shows very low values regarding control combined with good defensibility. Living conditions such as, for example, a proximity to nearby fields can more or less be neglected.

For building castles at that time – at least in theory – the crown had to give its permission and a stronghold like Hochgosch was most probably erected under the king's influence.[83] As the royal manor "curtis Liburnia" must have been located nearby, it even seems possible that Hochgosch was the connected "castellum" to this manor. In this case we would have a division between administrative, religious and economical functions that were fulfilled by a non-fortified manor with a church in the valley and military functions, held by Hochgosch on the mountain top.

Summary

Teurnia, Karnburg and Villach St. Martin represent settlements that were permanently used and held a central administrative meaning for the surrounding landscape. In many cases churches also indicate the religious function. In the 9th and 10th c. they were mentioned as "curtis" in contemporary charters. Usually such curtes are located in valleys or basins and not fortified. They are often the cornerstones of today's villages. This fits well with what we know from early medieval "leges", that tell us that the manor was not to be surrounded by a wall. At the most a wooden fence was allowed. However the cases given above are different: although they contain fortification walls they are mentioned as "curtis". In Karnburg we can observe a development from a "curtis" in the 9th c. to a fortified "civitas" in the 10th c. There a change of meaning, legal status and terminology goes along with a change of architectural structures. From Karnburg comes an iron spur. Given Karnburg's central character, this spur might best be explained by the presence of military forces on the site.

As explained above, Villach St. Martin is mentioned in a charter that tells us about "curtis", "castellum" and "ecclesia". Here all three functions seem to be united in one place. The function is the same as the one of a "regular" manor. One important difference concerns its architectural design: it is well-protected due to artificial elements like walls and ramparts in combination with natural features like steep slopes and the river. The combined mentioning of "curtis" and "castellum" for one site might probably point to such cases where manors were fortified

The three examples discussed show similar GIS-attributes. A common one is a lack of defensibility. They are actually not hilltop settlements but built in the valleys or basins on a slightly elevated terrain. However this "disadvantage" is compensated for by walls/ramparts and/or by nearby floating rivers.

Another category of sites we know by archeological and historical evidence are sites with a mainly protective function. They did not serve as civil settlements and were often used only temporarily:

In a charter from 8 King Arnulf orders his fellow Heimo to organize the construction of a "castellum" and instructs him to take care of its custody afterwards.[84] As at that time no standing armies are to be expected for the Eastern Alps it seems most probable that this did not include a permanent garrison but rather the maintenance of the buildings and walls. Such a site must have been used only as and when required. From an archeological viewpoint, the Hochgosch may be an example of such a type of site. Built in the crown's immediate area of influence (the nearby royal "curtis Liburnia") but in a well-hidden/hardly visible location it might have served as a separate refuge to retreat to and defend in times of danger.

82 Huber 2009, 153–155.
83 Eichert,S trukturen 8
84 Eichert.S trukturen 8

Hemmaberg shows similar GIS-attributes to Hochgosch. One reason for the spurs found there could be that it had been used as a refuge in the 8th century. However, one could also think of a similar explanation as for Gradišče above Bašelj[85] and discuss intentional deposition.

5 Conclusion

The aim of this article is to shed additional light on the landscape context to the hilltop sites with Early Medieval military finds in the Eastern Alpine area. The most important conclusion is that the sites in question are not positioned in a uniform environment as suggested by the generic description hilltop.

The exciting results (Figs. 19 and 20) should not be mistaken for the final interpretation. Rather, the results can serve as an additional argument in interpretation of individual sites as demonstrated above. The Mali grad and Na Bleku sites have been used to demonstrate the validity of the GIS analysis since the results confirmed previously existing interpretations. Using the study case of the Gradišče above Bašelj we demonstrated the input of the GIS analysis in scholarly ambiguity regarding the site's interpretation[86].

For further individual analysis, the outlier sites should be focused on. For example, a comparison of the finds between the positive and negative outliers on the one hand and between the outliers and average sites on the other hand should establish whether any of the above criteria influenced the composition of the finds. Should there be no noticeable differences in defensibility and living conditions it would be a strong indication that these sites were not settled (for military purposes or otherwise), i.e. it is more likely that this entire phenomenon it to be viewed as hoards or similar. Should there be noticeable differences in landscape presence, this would be a strong indicator that places of special importance in the Early Medieval Eastern Alpine area were chosen according to visual properties. And vice versa.

[85] See Štular this volume.
[86] See Štular this volume.

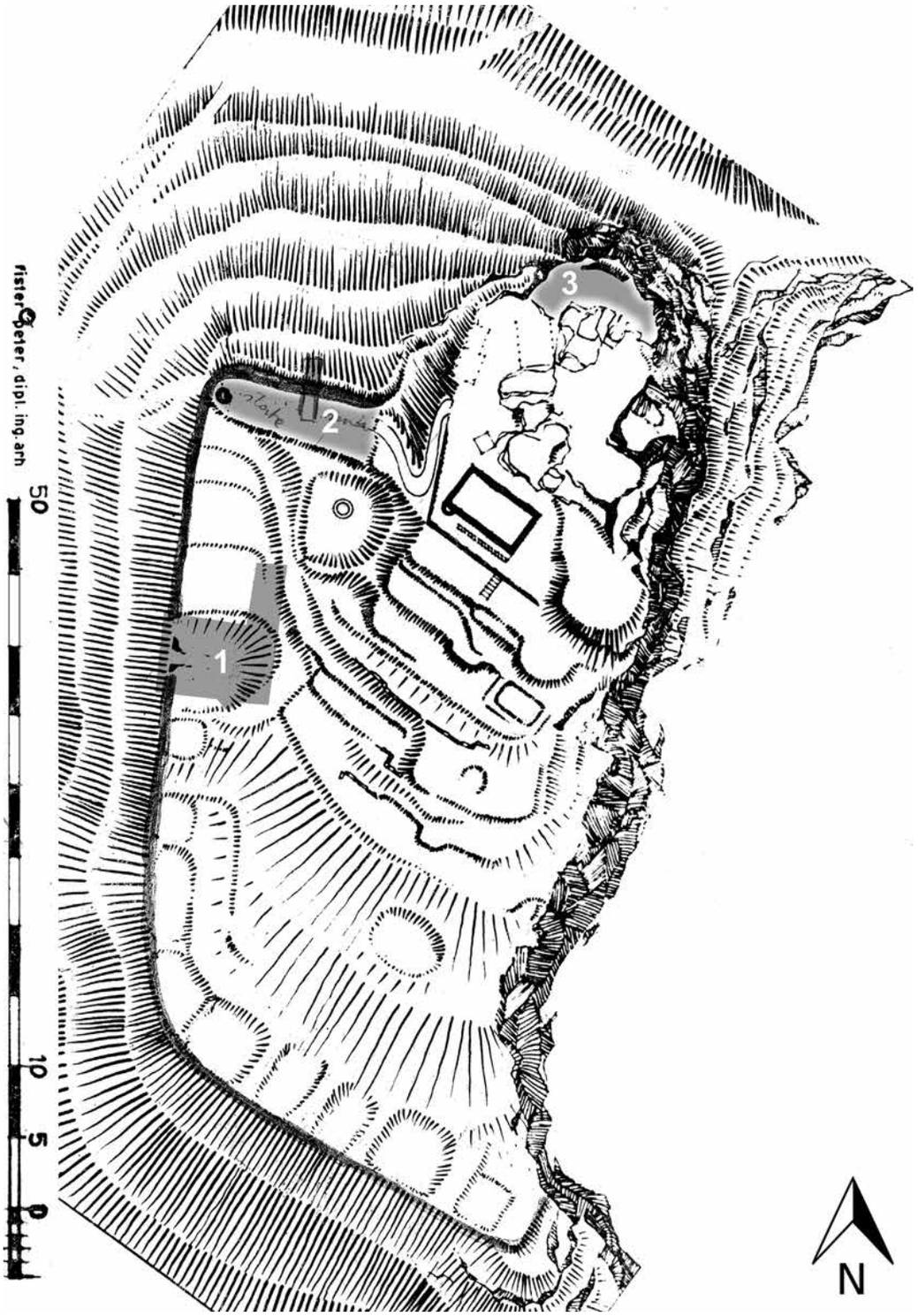


Fig. 1: Gradišče above Bašelj, site plan: 1 – excavation trench No. 3 in 1939, re-excavated in 1998; 2 – excavation trench No. 2 in 1939; 3 – promontory excavated in 1939 (original by P. Fister in 1967; digitaly remastered after Knific 1999, Slika 7).

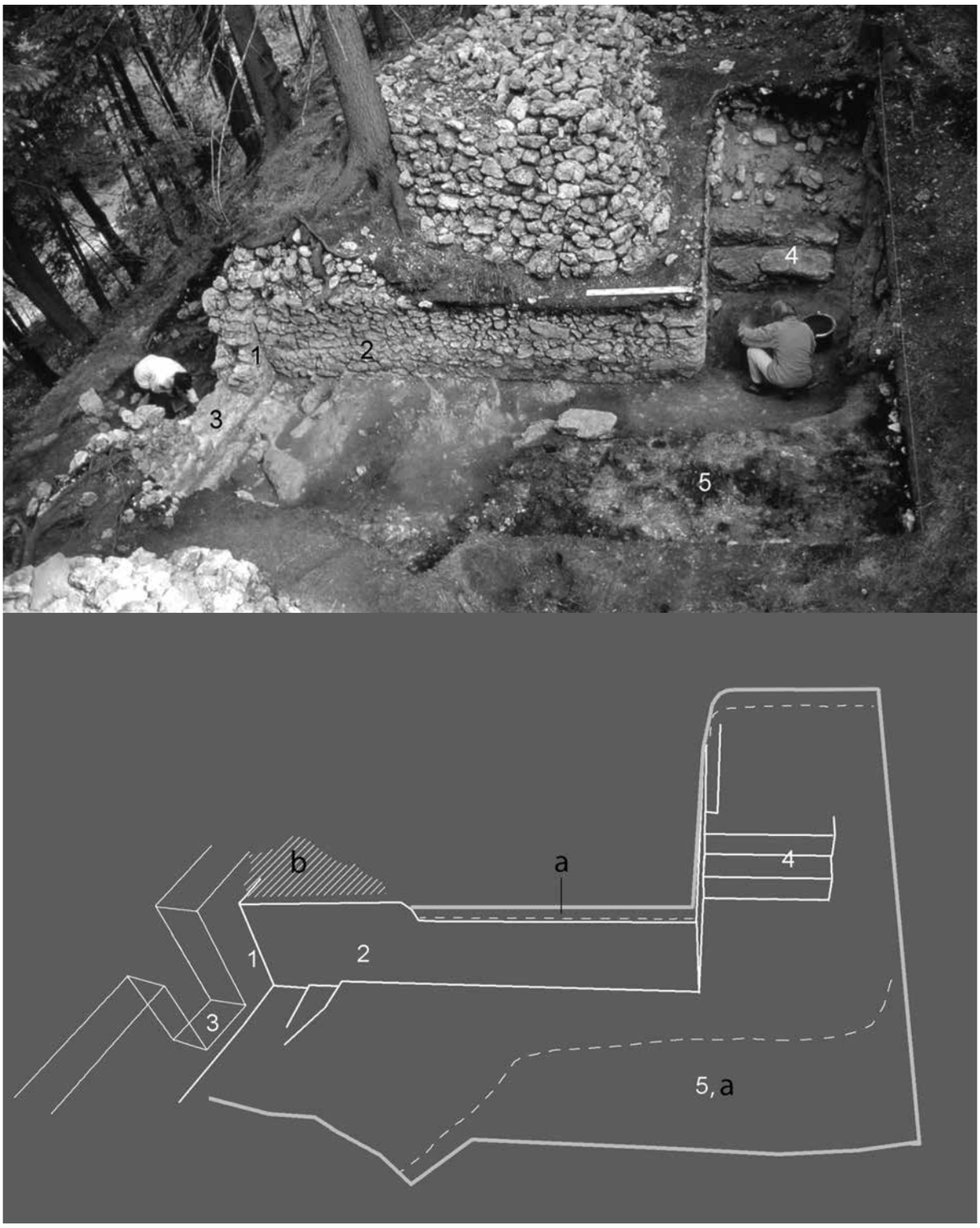


Fig. 2: Gradišče above Bašelj, excavation trench in 1998. Left photography (Karo, Knific 2014, Figuur 4), right interpretation based on the photography (by T. Korošec): 1 – wall, 2 – Late Antique house that leans on it, 3 – entrance, 4 –two stone steps led to the entrance of the hous; 5 – remains of the charred layer with Early Medieval finds. The interpretation is (right) is focused on demonstrating the stratigraphic superposition of the charred layer (a) and ruins of the wall (b).

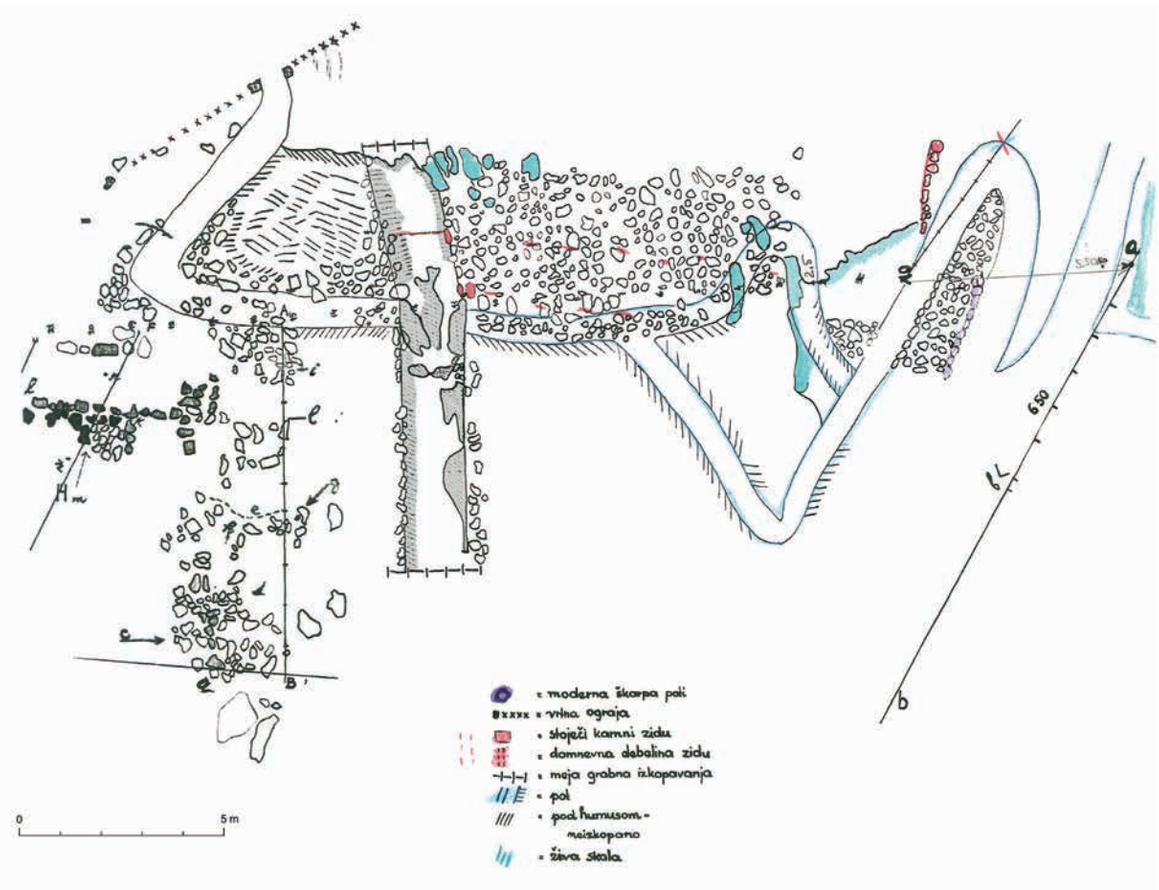


Fig. 3: Gradišče above Bašelj, plan of the 1939 trench No. 2 (drawing R. Ložar, copy in Archive of ZRC SAZU Institute of arhaeology, Sign. 08-359; digitally remastered by D. Baloh).

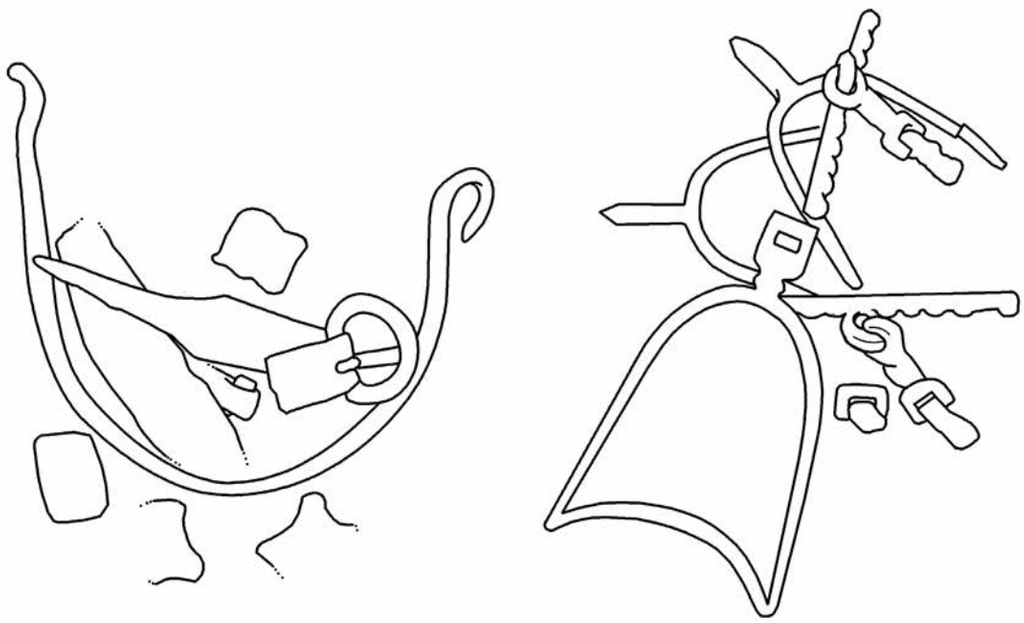


Fig. 4: Gradišče above Bašelj, so called first (Knific 2010) and second (Bitenc, Knific 2015, 110-111) hoard, artefacts in situ (drawn by T. Korošec after Knific 2010, Fig. 2 and Bitenc, Knific 2015, Fig. 18).

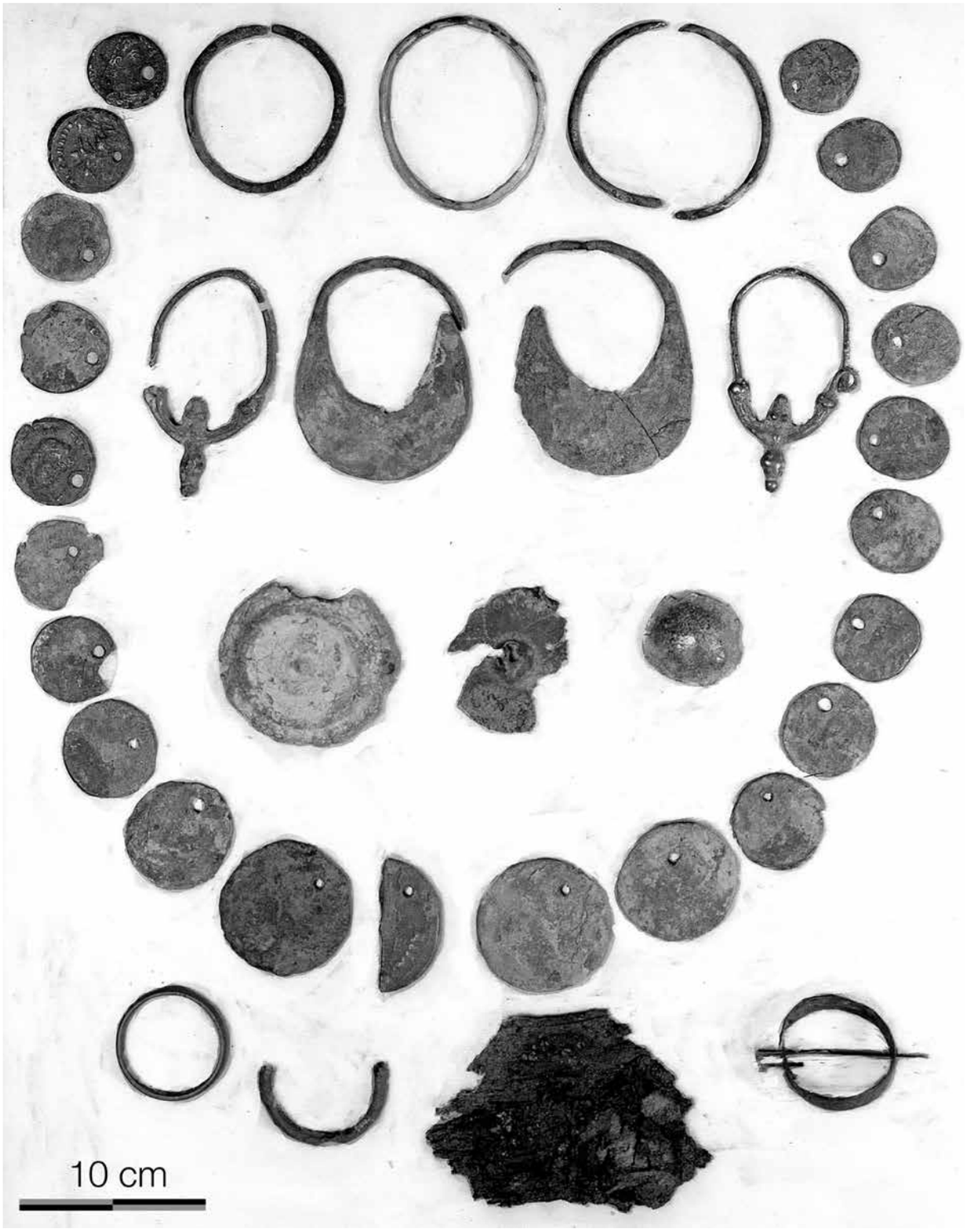


Fig. 5: Bled – Pristava, grave 95 (2nd half of 10th, 1st half of 11th century):
exceptional find of twenty-two perforated Roman period coins best represents the non-monetary use of coins in Early Medieval period (after Kastelic, Škerlj 1950, Slika 21; reproduced from the NMS archive No. 5603).

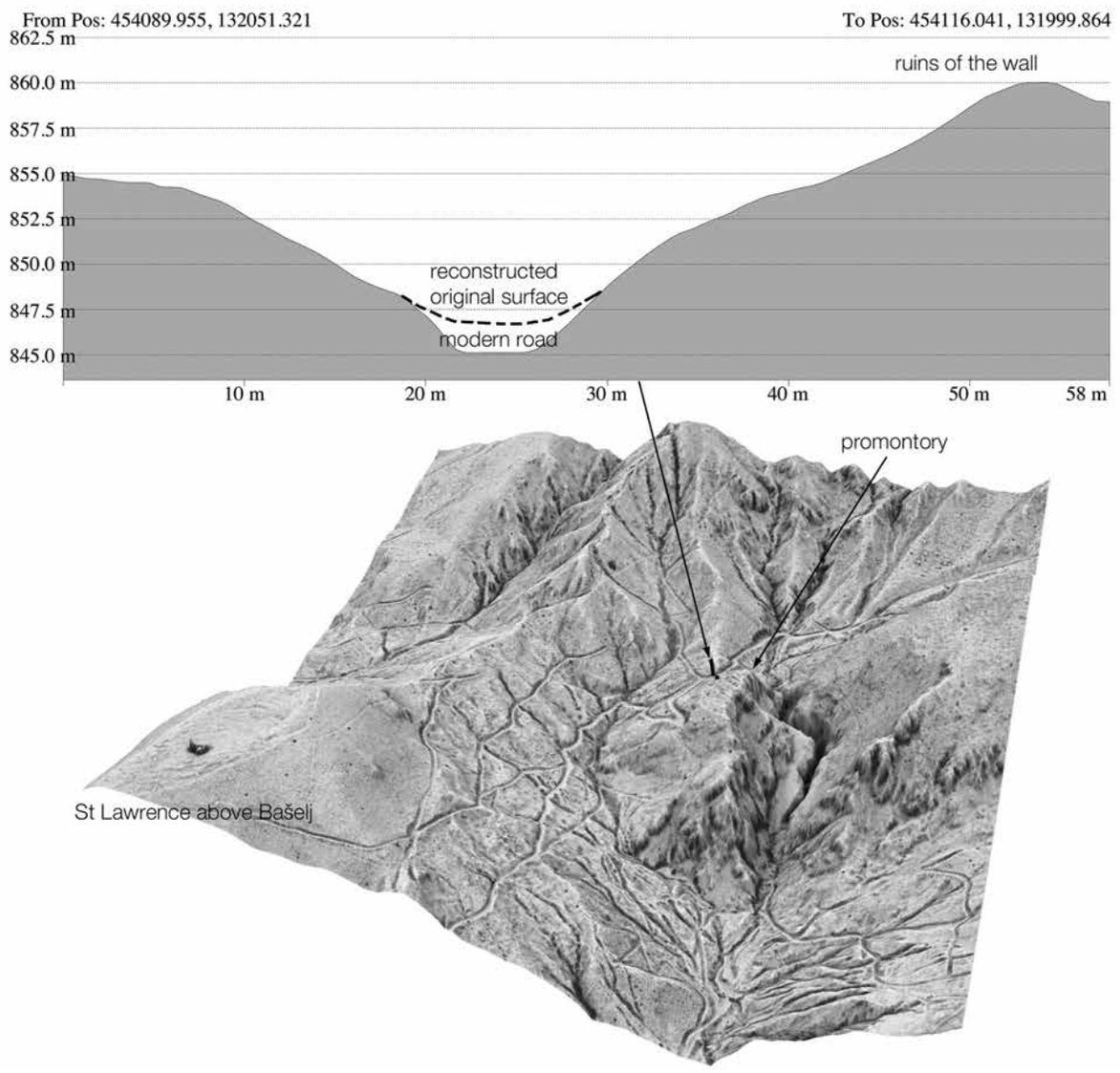
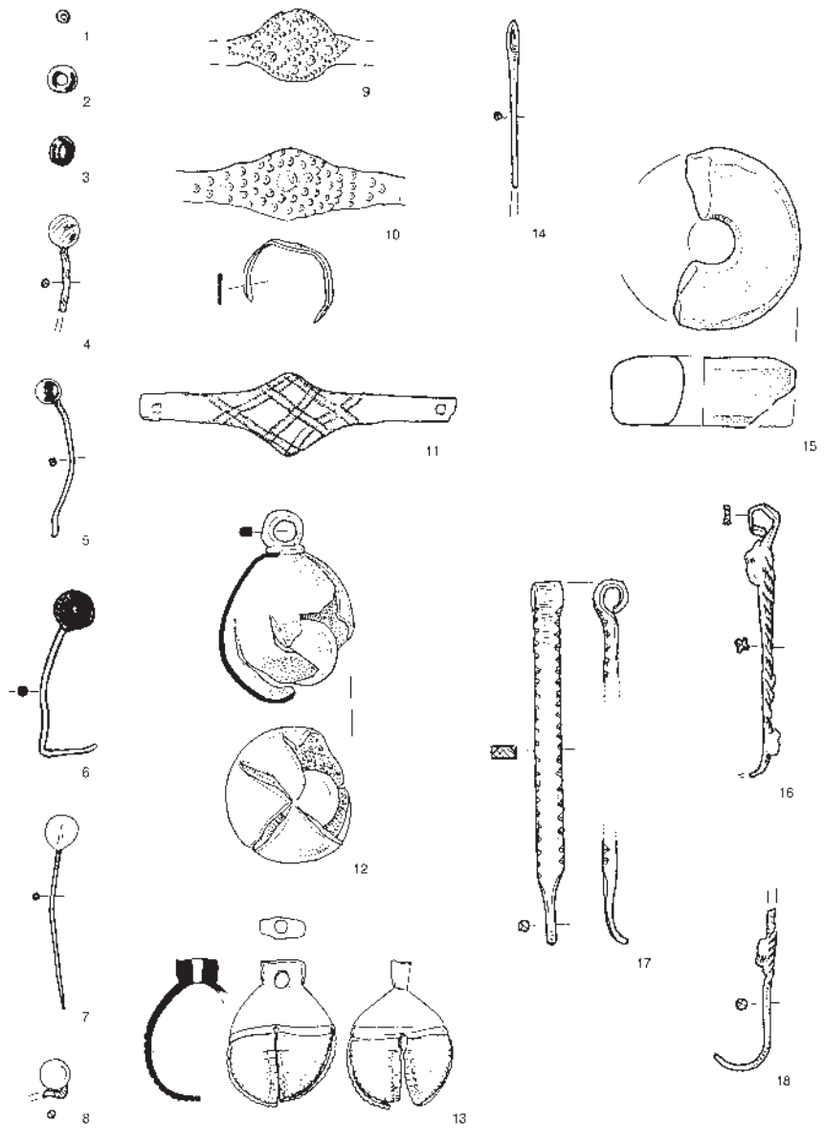
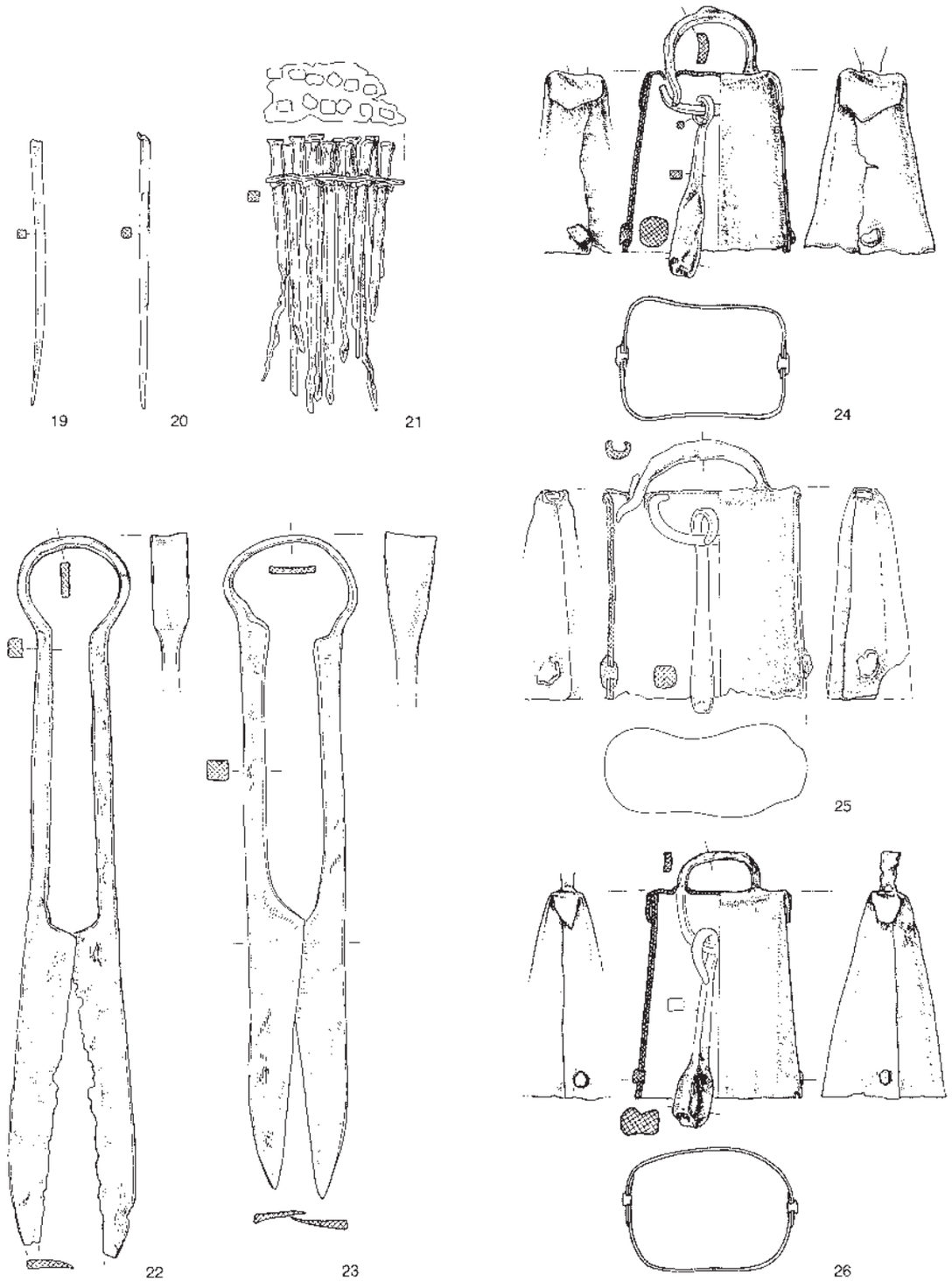


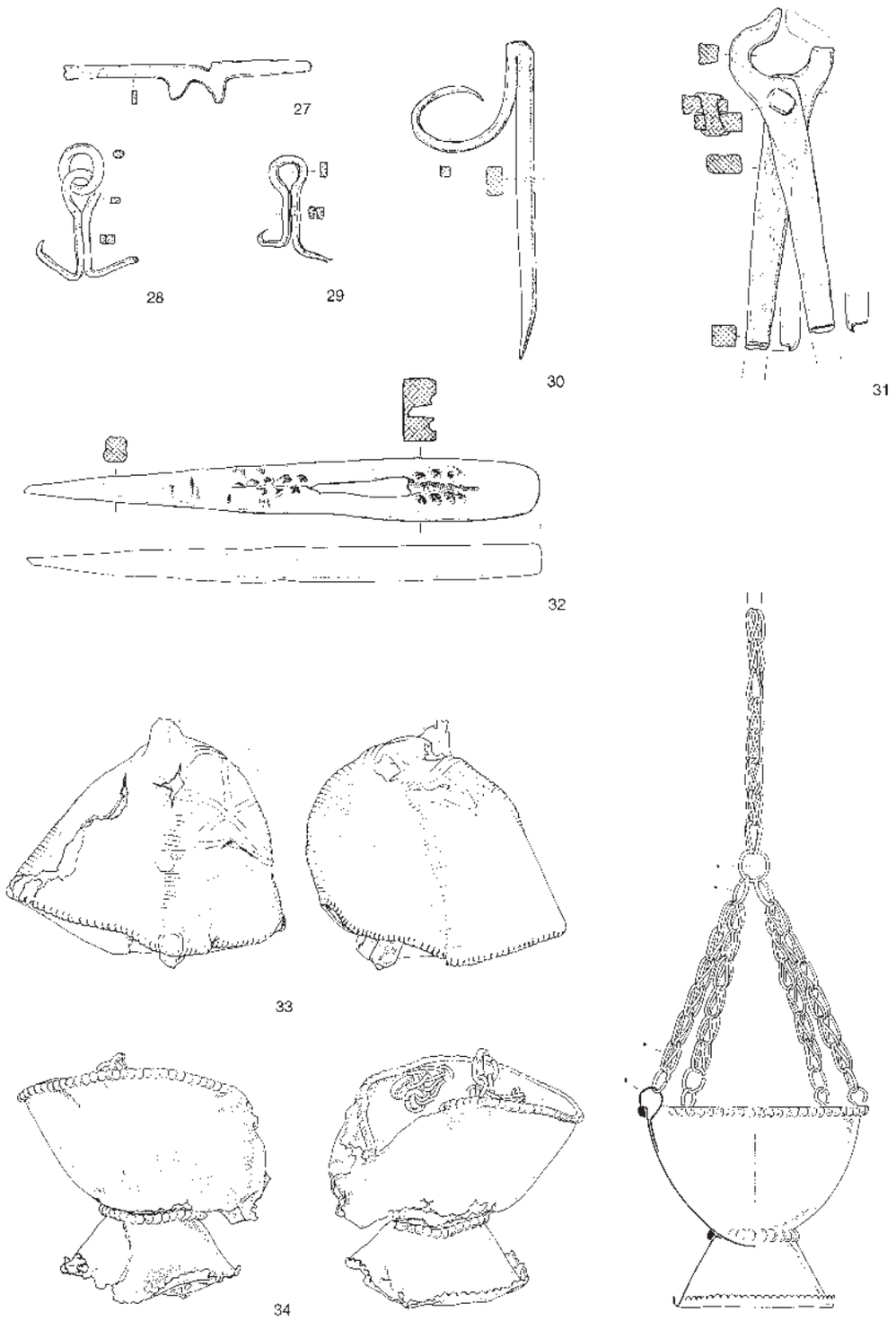
Fig. 6: Gradišče above Bašelj, 3D view and a section demonstrating the vulnerability of the site to the potential attack from the north and the exposed position of the promontory (based on 0,5 m DEM derived from lidar data; source: http://gis.arso.gov.si/evode, tiles GK 453_131, GK 453_132, GK 454_131, GK 454_132).



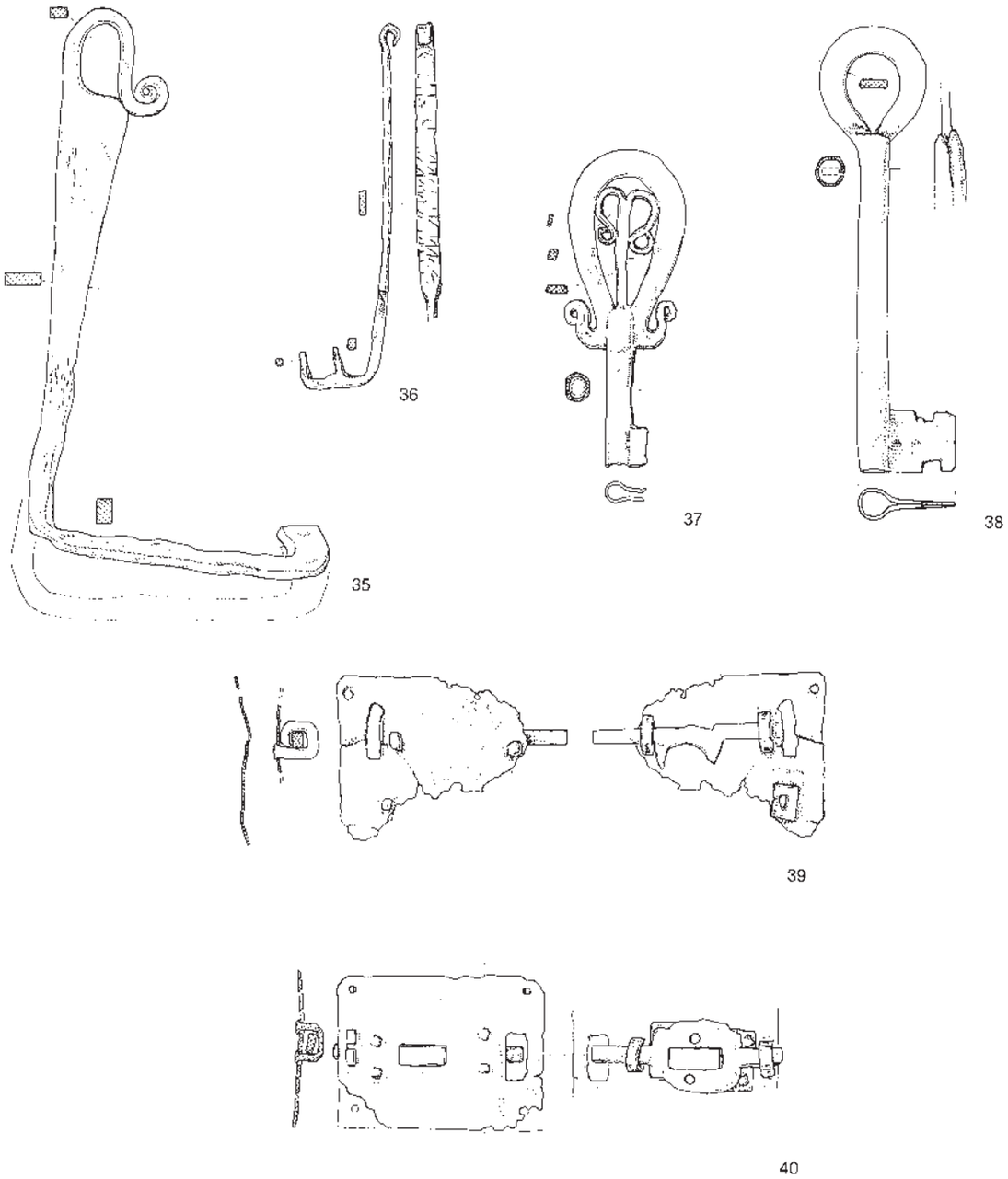
Pl. 1: 1. Bright green glass bead. Diameter 0.26 cm, and thickness 0.1 cm. National museum of Slovenia, Inv. No. AO S 6271. 2. Dark blue glass bead. Diameter 0.58 cm, and thickness 0.23 cm. National museum of Slovenia, Inv. No. AO S 5838. 3. Dark blue glass bead. Diameter 0.60 cm, and thickness 0.12 cm. National museum of Slovenia, Inv. No. AO S 6240. 4. A fragment of iron pin with the pin-head made of grey glass inlaid with white thread. Length 1.78 cm, pin-head diameter 0.58 cm. National museum of Slovenia, Inv. No. AO S 6264. 5. Iron pin with the pin-head made of dark blue glass; the pin is slightly bent. Length 1.78 cm, pin-head diameter 0,58 cm. National museum of Slovenia, Inv. No. AO S 6264. 6. Iron pin with the pin-head made of dark blue glass; the pin is bent. Length 2.75 cm, pin-head diameter 0.62 cm. National museum of Slovenia, Inv. No. AO S 3009. 7. Iron pin with the pin-head made of see-through green glass. Length 3.66 cm, pin-head diameter 0.61 cm. National museum of Slovenia, Inv. No. AO S 2766. 8. Iron pin with the pin-head made of green glass; only the pin-head is preserved. Length 0.81 cm, pin-head diameter 0.55 cm. National museum of Slovenia, Inv. No. AO S 5263. 9. Fragment of a fingering made of bronze metal sheet. Diameter 2.05 cm, maximal width 1.78 cm. National museum of Slovenia, Inv. No. AO S 2765. 10. Fragment of a fingering made of bronze metal sheet. Diameter 1.85 cm, maximal width 1.40 cm. National museum of Slovenia, Inv. No. AO S 4096. 11. Fragment of a fingering made of bronze metal sheet. Diameter 1.98 cm, maximal width 1.82 cm. National museum of Slovenia, Inv. No. AO S 2242. 12. Damaged rumbler bell with loop made of a copper alloy with a stone-made ball. Diameter 2.62 cm, height 3.56 cm. National museum of Slovenia, Inv. No. AO S 2639. 13. Rumbler bell with loop made of a copper alloy with a stone-made ball. Diameter 2.15 cm, height 2.62 cm. National museum of Slovenia, Inv. No. AO S 2887. 14. Iron sawing needle. Length 3.10 cm. National museum of Slovenia, Inv. No. AO S 2795. 15. Pottery spindle whorl. Diameter 3.44 cm, height 0.75 cm. National museum of Slovenia, Inv. No. AO S 649. 16. Iron hook with loop. Length 5.13 cm. National museum of Slovenia, Inv. No. AO S 2738. 17. Iron hook with square section ornamented with horizontal cuts. Length 6.83 cm. National museum of Slovenia, Inv. No. AO S 2717. 18. Iron hook. Length 3.05 cm. National museum of Slovenia, Inv. No. AO S 6096.



Pl. 2: 19. Iron comb for wool or flax; one comb-tooth is preserved. Height 8,73 cm. National museum of Slovenia, Inv. No. AO S 2828. 20. Iron comb for wool or flax; one comb-tooth is preserved. Height 8.87 cm. National museum of Slovenia, Inv. No. AO S 2830. 21. Iron comb for wool or flax; 12 comb-teeth inserted into the rectangular iron plate in two lines are preserved. Height 9.16 cm, width 4.60 cm. National museum of Slovenia, Inv. No. AO S 3170. 22. Iron scissors. Length 23.5, length of blade 10.2, width of blade 1.57 cm. National museum of Slovenia, Inv. No. AO S 3174. 23. Iron scissors. Length 21.7, length of blade 8.8, width of blade 1.95 cm. National museum of Slovenia, Inv. No. AO S 2818. 24. Copper plated iron bell with hook and clapper. Height 8.8 cm, width 6.1 cm. National museum of Slovenia, Inv. No. AO S 3163. 25. Copper plated iron bell with hook and clapper. Height 9.0 cm, width 7.1 cm. National museum of Slovenia, Inv. No. AO S 3172. 26. Copper plated iron bell with hook and clapper. Height 8.6 cm, width 6.0 cm. National museum of Slovenia, Inv. No. AO S 4139.



Pl. 3: 27. Rotary-lock mechanism, only the bolt is preserved. Width 8.1 cm, height 1.32 cm. National museum of Slovenia, Inv. No. AO S 4144. 28. An iron loop. Height 3.5 cm, width 3.3. cm. National museum of Slovenia, Inv. No. AO S 2712. 29. An iron loop. Height 3.3 cm, width 2.6. cm. National museum of Slovenia, Inv. No. AO S 2720. 30. Iron peg with loop. Length 10.3 cm, width of loop 3.9. cm. National museum of Slovenia, Inv. No. AO S 2826. 31. Iron tongs. Length 11.2 cm, width 3.4 cm. National museum of Slovenia, Inv. No. AO S 4185. 32. Iron spike. Length 17.1 cm, width 2.1 cm. National museum of Slovenia, Inv. No. AO S 4120. 33. Bronze sheet bell with iron clapper; bell is crushed. Height 7.9 cm, width 9.2 cm, restored height 10.2 cm, restored width 5.3 cm. National museum of Slovenia, Inv. No. AO S 2631. 34. Censer (lat. thuribulum or incensorium) made of bronze sheet; censer is crushed. Height 8.4 cm, width 8.2 cm, restored height 6.6 cm, restored rim diameter 7.2 cm. National museum of Slovenia, Inv. No. AO S 2630.



Pl. 4: 35. Iron rotary key with bow and a bit made of perpendicularly curved shank. Length 18.3 cm. National museum of Slovenia, Inv. No. AO S 3217. 36. Iron rotary key with bow and a bit with two teeth. Length 11.0 cm. National museum of Slovenia, Inv. No. AO S 4178. 37. Rotary key with bit and hollow shank; bit with decorated elongated bow. Length 9.5 cm. National museum of Slovenia, Inv. No. AO S 2794. 38. Rotary key with bit and hollow shank; bit with two clefts and flat-section round bow. Length 13.4 cm. National museum of Slovenia, Inv. No. AO S 4117. 39. Rotary-lock mechanism, only key-guard plate with staples and bolt is preserved. Width 7.0 cm, height 4.9 cm. National museum of Slovenia, Inv. No. AO S 4124. 40. Rotary-lock mechanism, only key-guard plate with staples and bolt is preserved. Width 6.2 cm, height 4.6 cm. National museum of Slovenia, Inv. No. AO S 5242.

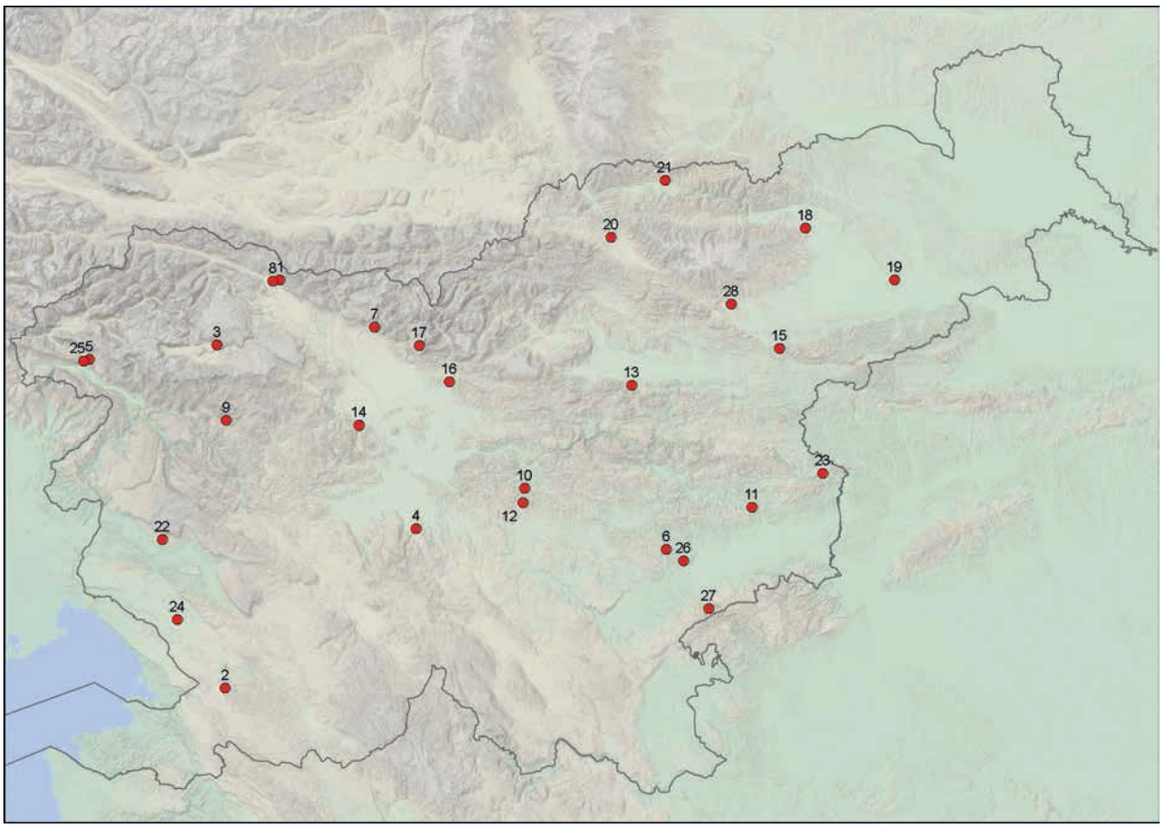


Fig. 1: Small area (Slovenia), map of sites. Figures correspond to the catalogue of the sites (Appendix).

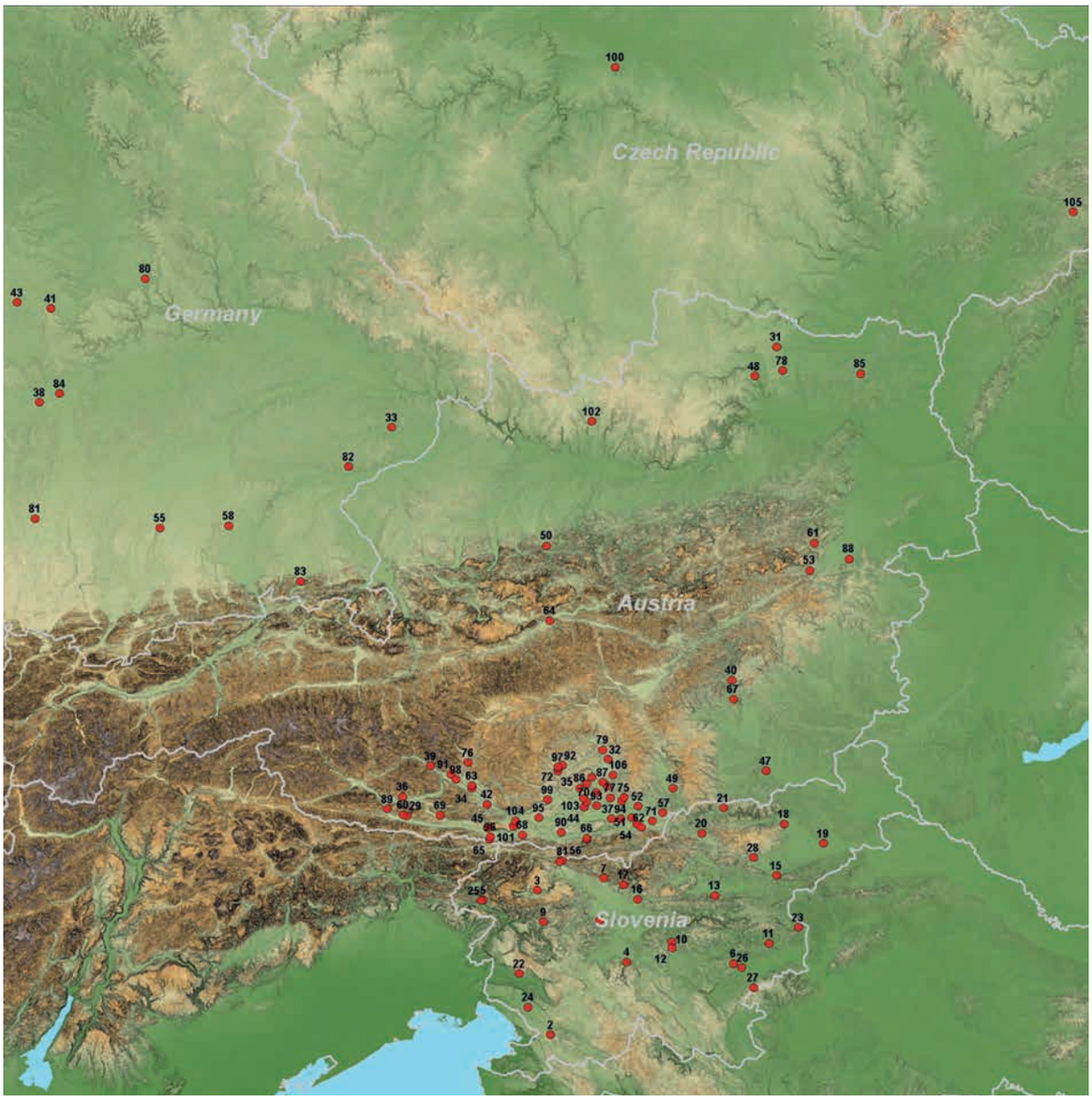


Fig. 2: Large area, map of 106 sites in Germany, Czech, Austria and Slovenia. Numbers. correspond to the catalogue of the sites.

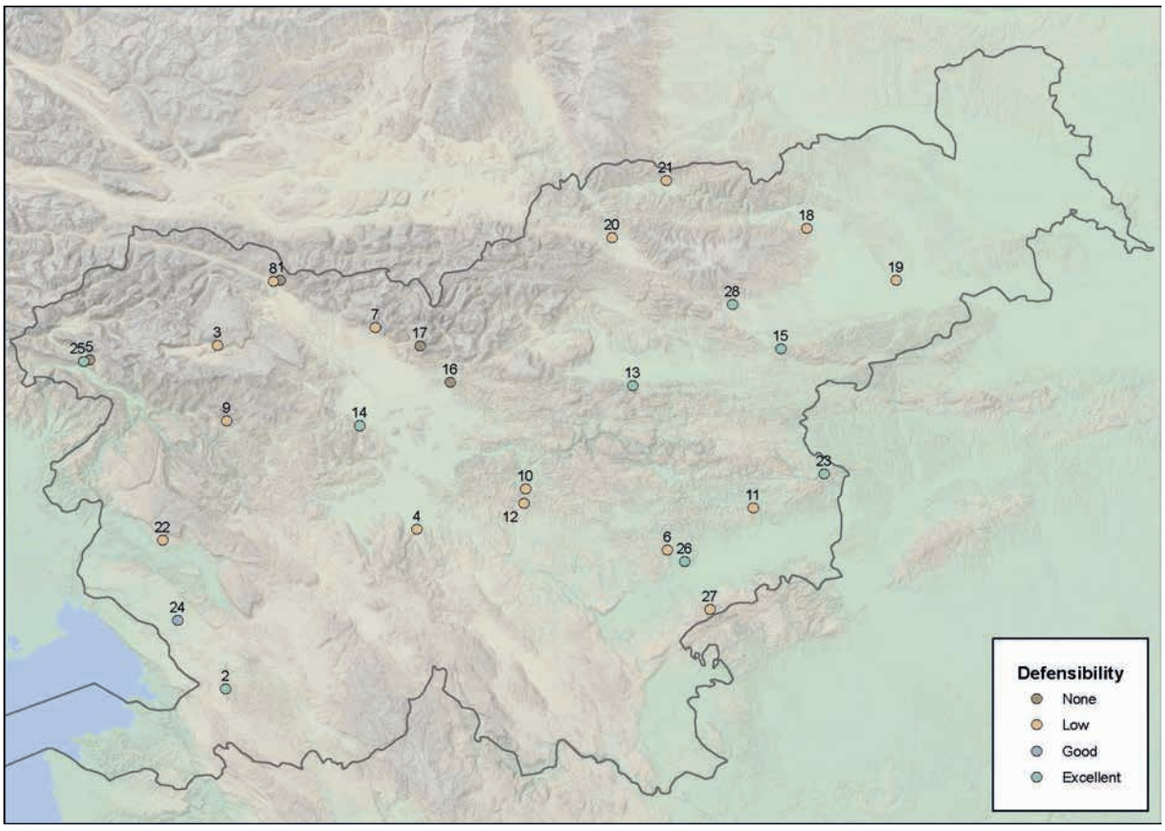


Fig. 3: Small area (Slovenia), map of sites according to defensibility. Labels correspond to the catalogue of the sites (Appendix).

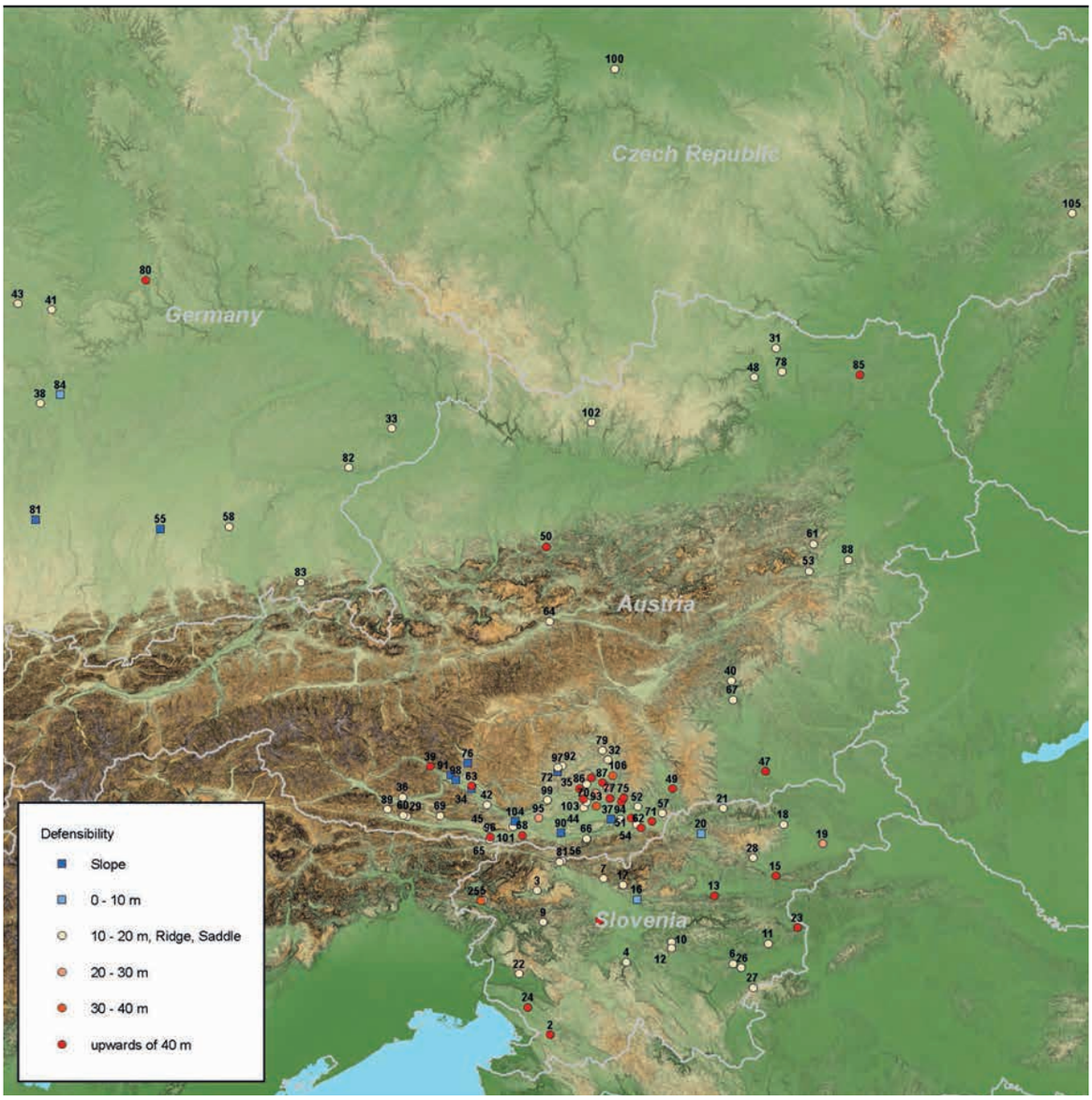


Fig. 4: Large area, map of sites according to defensibility. Labels correspond to the catalogue of the sites (Appendix)

No.	name	Field (ha)	Field (type)	% 5km2	Field 3km (ha)	% 3km	EU - fields in 3km in km2	EU - fields in 3km (ha)	SVN/EU	SVN/EU %	SVN/EU ha
17	Na Bleku	305	1	4%	4	0%	0,22	**22**	18%	-82	-18
9	Gradišče nad Trebenčami	27	1	0%	25	1%	0,53	**53**	48%	-52	-28
27	Zidani gaber	482	1	6%	37	1%	1,48	**148**	25%	-75	-111
12	Gradišče pri Pristavi	672	1	9%	79	3%	1,33	**133**	59%	-41	-54
10	Gradišče nad Vintarjevcem	568	1	7%	121	4%	1,68	**168**	72%	-28	-47
5	Gradec pri Drežnici	750	2	10%	229	8%	3,22	**322**	71%	-30	-93
7	Gradišče nad Bašljem	1258	2	16%	237	8%	2,38	**238**	100%	0	-1
8	Gradišče nad Sotesko	1461	2	19%	267	9%	4,11	**411**	65%	-35	-144
11	Gradišče pri Dunaju	1329	2	17%	307	11%	4,21	**421**	73%	-27	-114
6	Gradec pri Veliki Strmci	211	2	3%	350	12%	5,18	**518**	68%	-32	-168
1	Ajdna	1461	2	19%	383	14%	3,73	**373**	103%	3	10
22	Sv.Pavel nad Vrtovinom	1535	2	20%	388	14%	4,35	**435**	89%	-11	-47
25	Tonovcov grad	807	2	10%	397	14%	4,33	**433**	92%	-8	-36
15	Ljubična	1734	2	22%	401	14%	5,07	**507**	79%	-21	-106
3	Dunaj pri Jereki	855	2	11%	451	16%	5,13	**513**	88%	-12	-62
23	Svete gore	1406	3	18%	496	18%	5,44	**544**	91%	-9	-48
28	Zimrajh	1675	3	21%	551	19%	4,38	**438**	126%	26	113
13	Hom nad Preboldom	2537	3	32%	624	22%	6,96	**696**	90%	-10	-72
2	Ajdovščina nad Rodikom	1890	3	24%	626	22%	7,09	**709**	88%	-12	-83
21	Stari grad nad Radljami	971	3	12%	744	26%	6,58	**658**	113%	13	86
14	Hom nad Soro	2805	3	36%	765	27%	7,37	**737**	104%	4	28
20	Puščava	1714	3	22%	831	29%	8,08	**808**	103%	3	23
16	Mali grad	2327	4	30%	931	33%	9,43	**943**	99%	-1	-12
26	Vinji vrh	3567	4	45%	1022	36%	10,54	**1054**	97%	-3	-32
4	Gradec nad Iško vasjo	3041	4	39%	1122	40%	10,82	**1082**	104%	4	40
18	Poštela	4177	4	53%	1344	48%	12,60	**1260**	107%	7	84
24	Tabor v Tomaju	4302	5	55%	1700	60%	18,05	**1805**	94%	-6	-105
19	Ptujski grad	6572	5	84%	2379	84%	22,49	**2249**	106%	6	130
	AVG			23%		21%			85%		-31
	MED			19%		15%			90%		-42

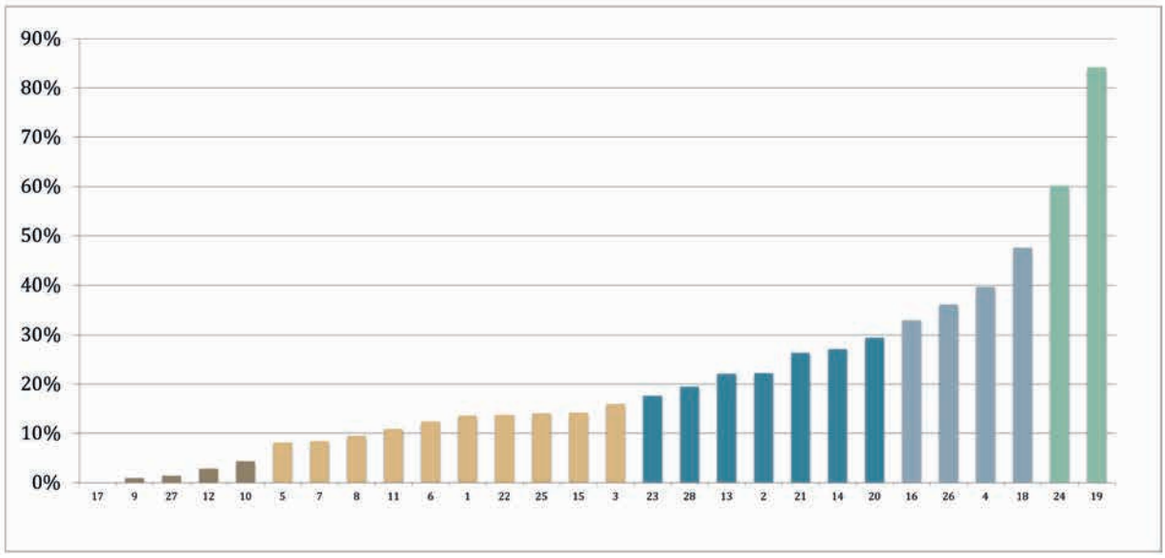


Fig. 5: Small area (Slovenia), chart representing the percentage of field category of the total 5 km radius area; labels on the x axis correspond to the catalogue of the sites (Appendix).

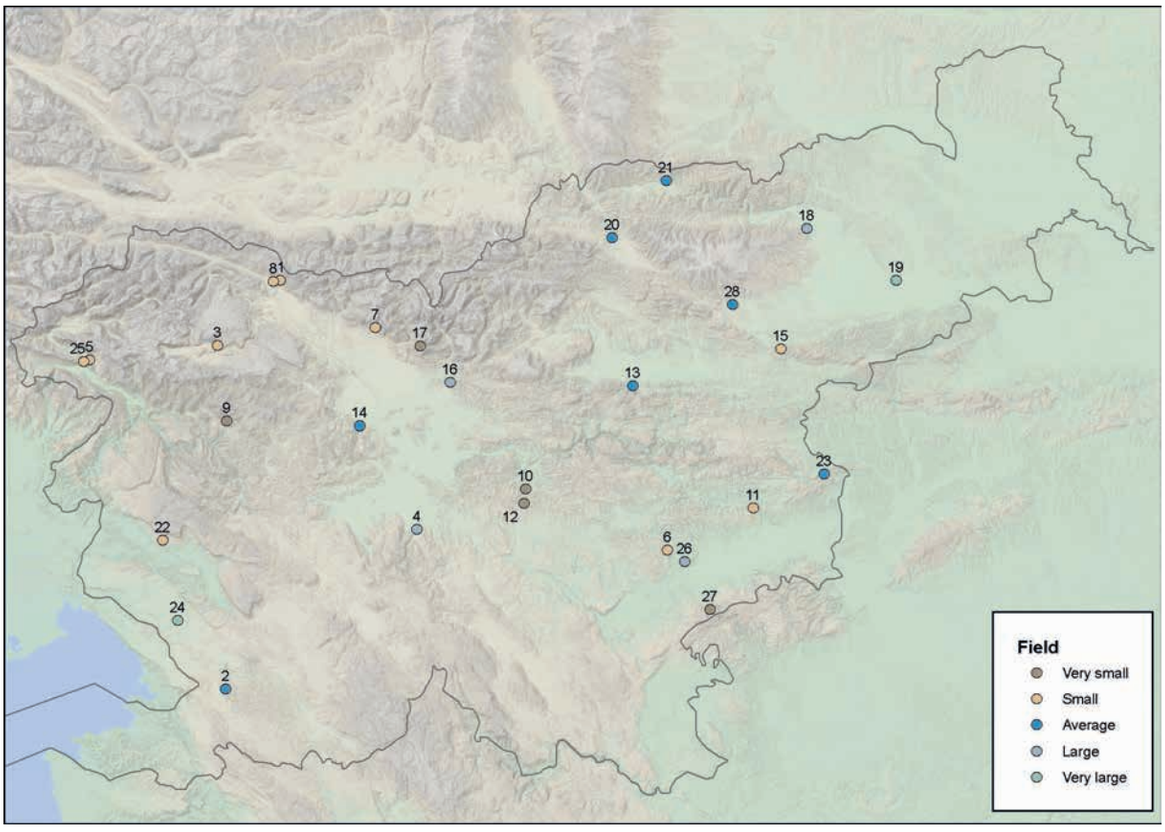


Fig. 6: Small area (Slovenia), map of sites according to the field.

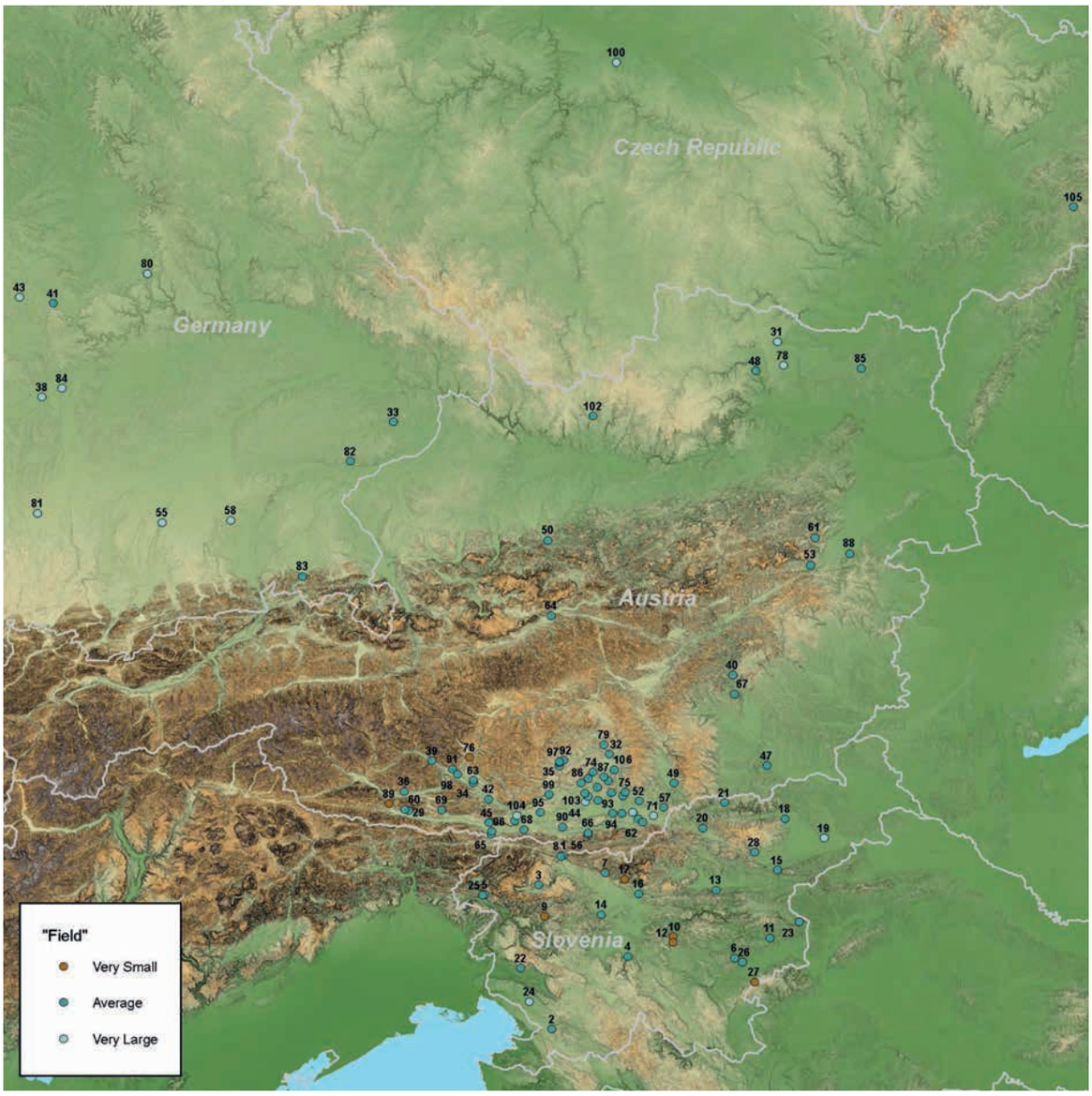


Fig. 7: Large area, map of sites according to the field.

No.	name	name	VDCN (m)	time (min)	AccessT	VDCN (m) - EU	EU (min)	SVN-EU (min)	living conditions
17	Na Bleku	Na Bleku	778	156	1	1075	215	-59	6
14	Hom nad Soro	Hom/Soro	378	76	2	385	77	-1	5
2	Ajdovščina nad Rodikom	Ajdovščina/Rodikom	369	74	2	442	88	-15	5
27	Zidani gaber	Zidani gaber	332	66	2	481	96	-30	5
13	Hom nad Preboldom	Hom/Preboldom	292	58	2	328	66	-7	4
1	Ajdna	Ajdna	284	57	2	477	95	-39	4
23	Svete gore	Svete gore	280	56	2	325	65	-9	4
15	Ljubična	Ljubična	238	48	2	258	52	-4	4
22	Sv.Pavel nad Vrtovinom	Sv.Pavel/Vrtovinom	228	46	2	367	73	-28	4
18	Poštela	Poštela	219	44	3	278	56	-12	4
26	Vinji vrh	Vinji vrh	215	43	3	207	41	2	4
28	Zimrajh	Zimrajh	202	40	3	179	36	5	4
4	Gradišče pri Pristavi	G/Pristavi	175	35	3	355	71	-36	3
25	Tonovcov grad	Tonovcov grad	156	31	4	176	35	-4	3
24	Tabor v Tomaju	Tabor v Tomaju	154	31	4	144	29	2	3
21	Stari grad nad Radljami	S. Grad/Radljami	141	28	4	220	44	-16	3
8	Gradišče nad Bašljem	G/Bašljem	138	28	4	274	55	-27	3
11	Gradec pri Drežnici	Gc/Drežnici	125	25	4	177	35	-10	3
7	Gradec nad Iško vasjo	Gc/Iško vasjo	108	22	4	161	32	-11	2
6	Gradišče pri Dunaju	G/Dunaju	107	21	4	221	44	-23	2
9	Gradišče nad Sotesko	G/Sotesko	88	18	4	171	34	-17	2
20	Puščava	Puščava	83	17	4	114	23	-6	2
5	Gradišče nad Vintarjevcem	G/Vintarjevcem	72	14	5	153	31	-16	2
19	Ptujski grad	Ptujski grad	42	8	5	52	10	-2	1
10	Gradišče nad Trebenčami	G/Trebenčami	40	8	5	193	39	-31	1
3	Dunaj pri jereki	Dunaj/Jereki	18	4	5	142	28	-25	1
12	Gradec pri Veliki Strmci	Gc/Strmci	12	2	5	186	37	-35	1
16	Mali grad	Mali grad	4	1	5	5	1	0	1
	AVG							-16	
	MED							-13	

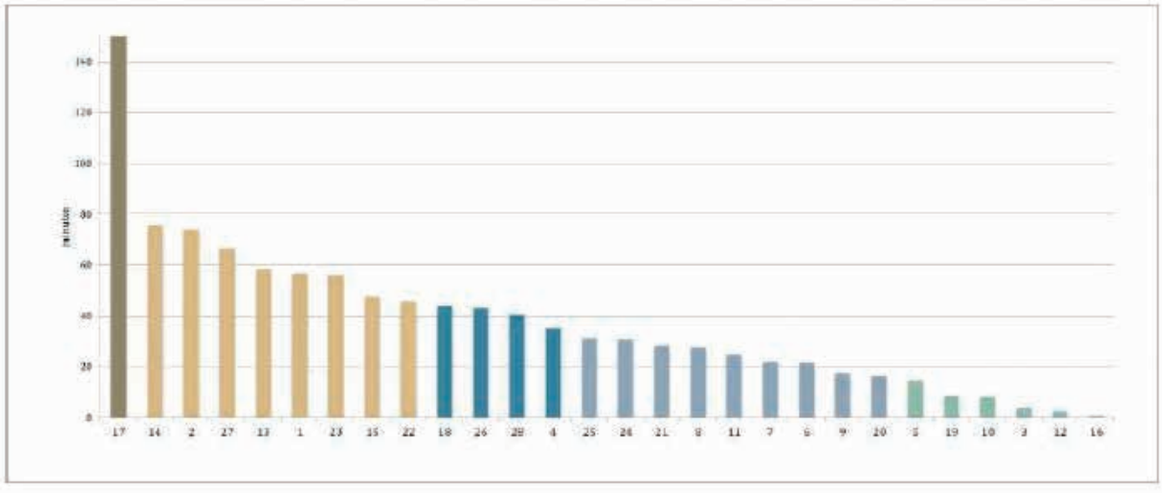


Fig. 8: Small area (Slovenia), chart representing the accessibility of the field from the sites presented using vertical distance to channel network translated in ascend time budgets.

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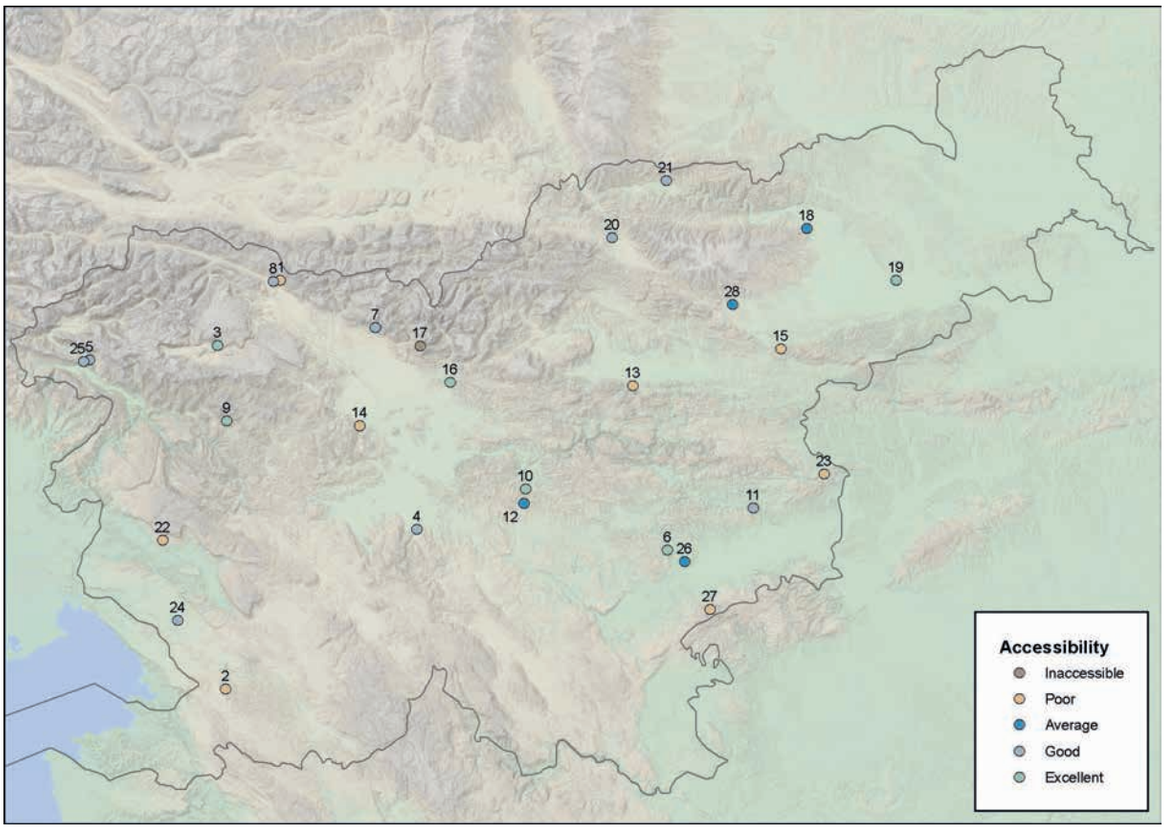

Fig. 9: Small area (Slovenia), map of sites according to accessibility.

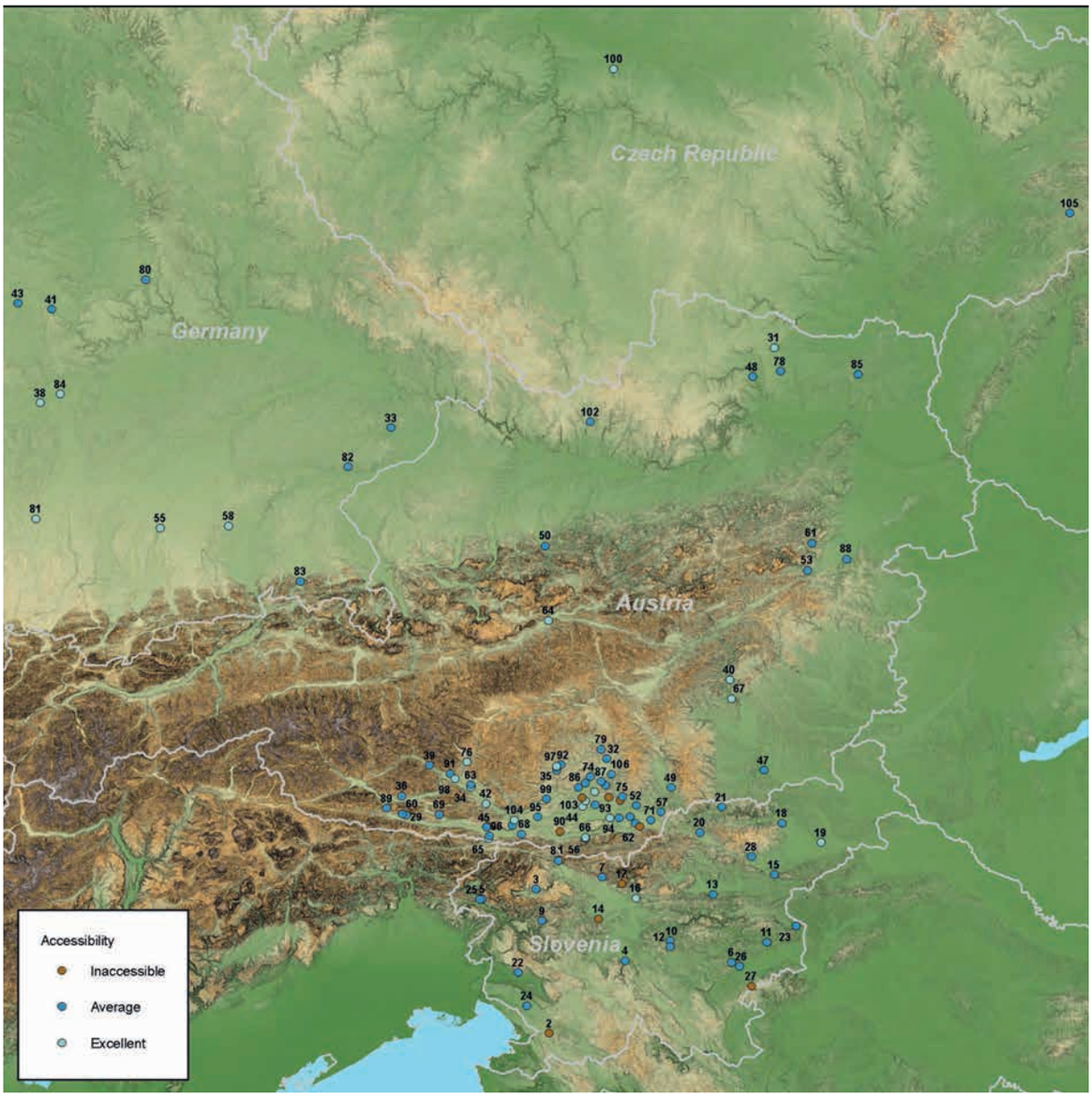

Fig. 10: Large area, map of sites according to accessibility.

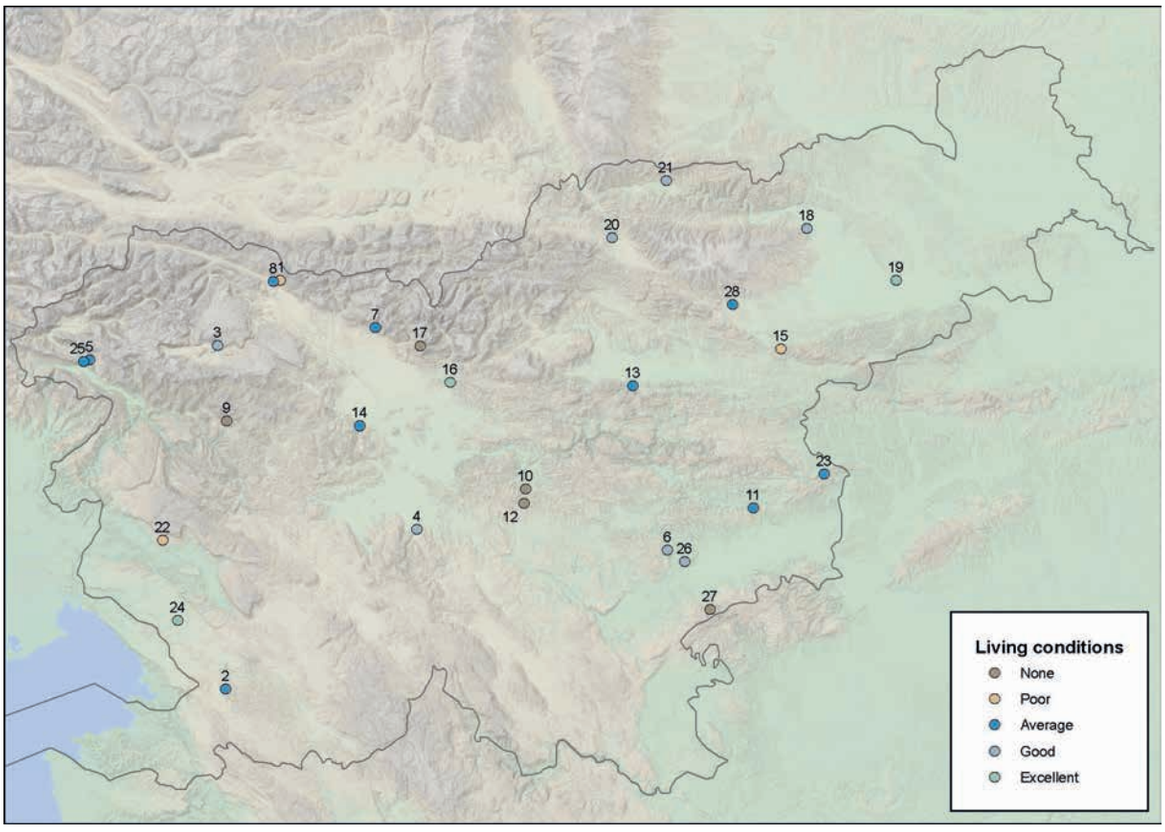

Fig. 11: Small area (Slovenia), map of sites according to the living conditions.

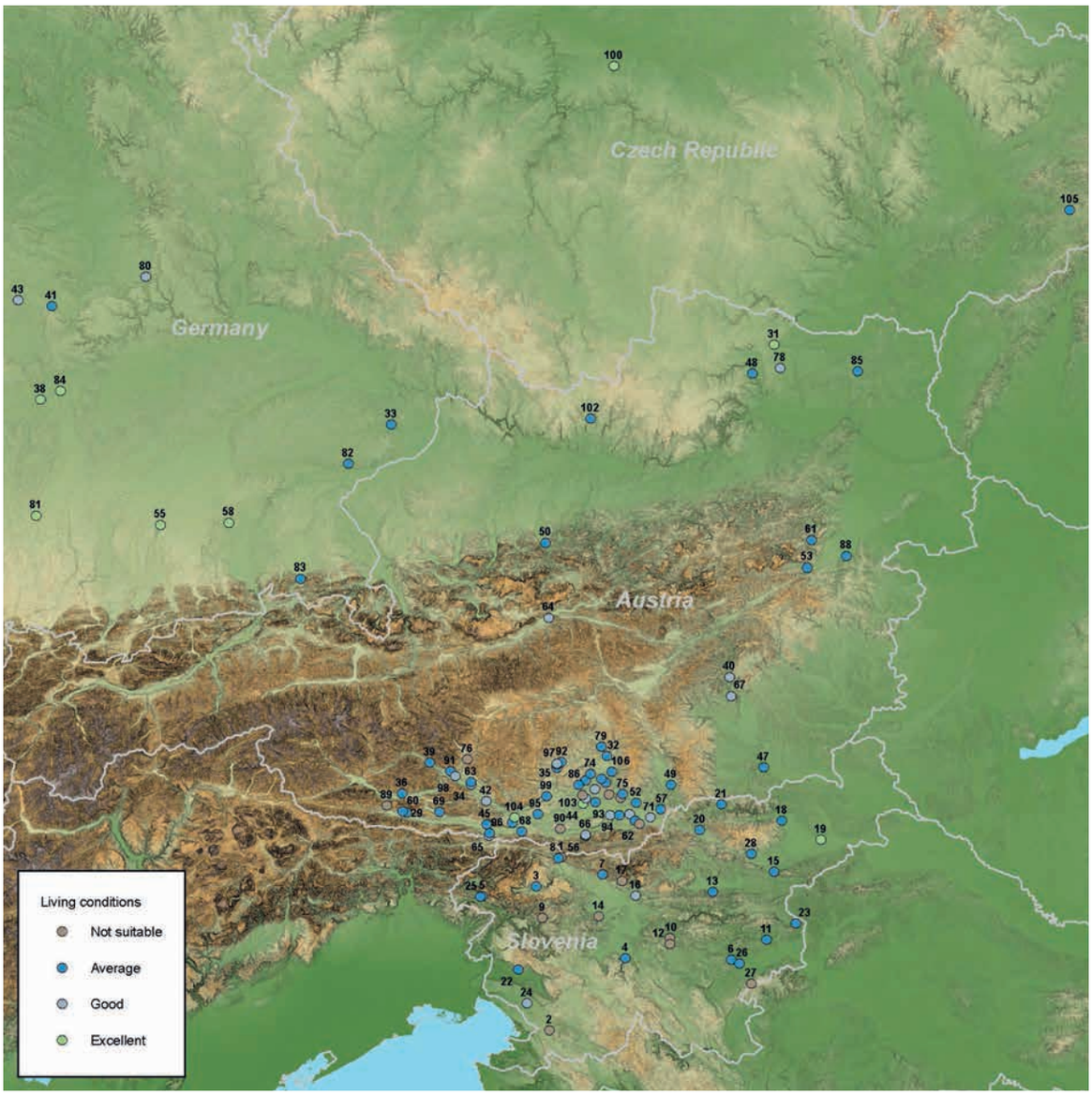

Fig. 12: Large area, map of sites according to living conditions.

No.	name	Distance to Valley (km)	Remoteness	Dist EU	SVN-EU km	
16	Mali grad	0,0	1	0,02	0,02	39%
19	Ptujski grad	0,1	1	0,17	-0,04	-34%
20	Puščava	0,2	1	0,09	0,06	41%
10	G/Vintarjevcem	0,2	1	0,18	0,00	0%
3	Dunaj pri jereki	0,2	1	0,16	0,04	18%
4	Gc/Iško vasjo	0,3	2	0,15	0,10	38%
8	G/Sotesko	0,4	2	0,31	0,04	11%
24	Tabor v Tomaju	0,4	2	0,08	0,28	78%
21	S. Grad/Radljami	0,4	2	0,35	0,02	5%
26	Vinji vrh	0,4	2	0,01	0,41	97%
15	Ljubična	0,5	2	0,47	0,01	1%
5	Gc/Drežnici	0,5	2	0,19	0,31	61%
13	Hom/Preboldom	0,6	2	0,32	0,24	42%
25	Tonovcov grad	0,6	2	0,16	0,40	71%
14	Hom/Soro	0,6	2	0,33	0,27	45%
28	Zimrajh	0,7	3	0,01	0,71	98%
11	G/Dunaju	0,7	3	0,19	0,55	75%
23	Svete gore	0,8	3	0,16	0,60	79%
9	G/Trebenčami	0,8	3	0,29	0,48	63%
18	Poštela	0,8	3	0,58	0,21	27%
2	Rodik	0,8	3	0,44	0,36	45%
22	Sv.Pavel/Vrtovinom	0,8	3	0,18	0,65	78%
12	G/Pristavi	1,0	4	0,27	0,70	72%
6	Gc/Veliki Strmci	1,1	4	0,20	0,88	82%
7	G/Bašljem	1,1	4	0,05	1,06	95%
1	Ajdna	1,3	4	0,75	0,55	42%
27	Zidani gaber	1,9	5	0,35	1,56	82%
17	Na Bleku	2,7	5	0,58	2,12	78%
	AVG	0,7			0,45	

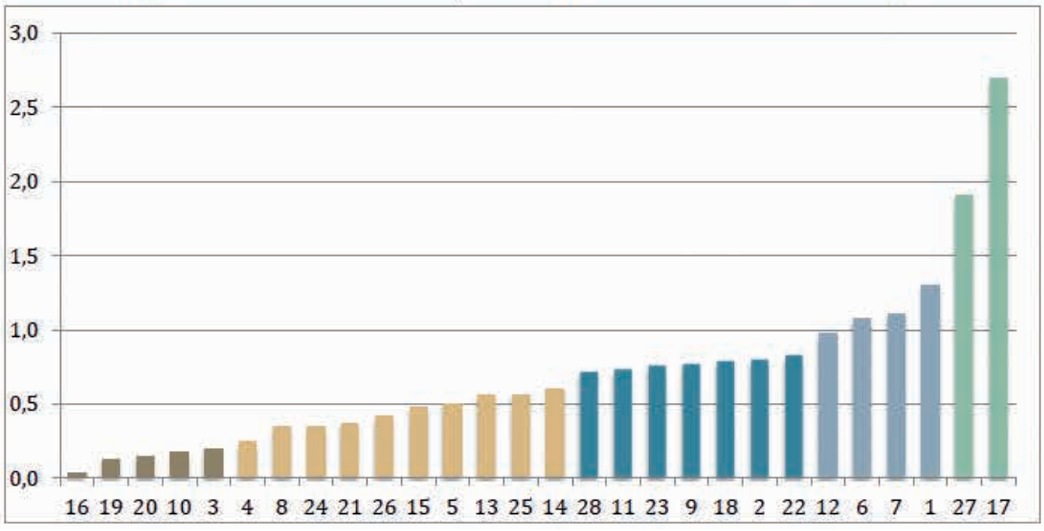

Fig. 13: xxxxxx

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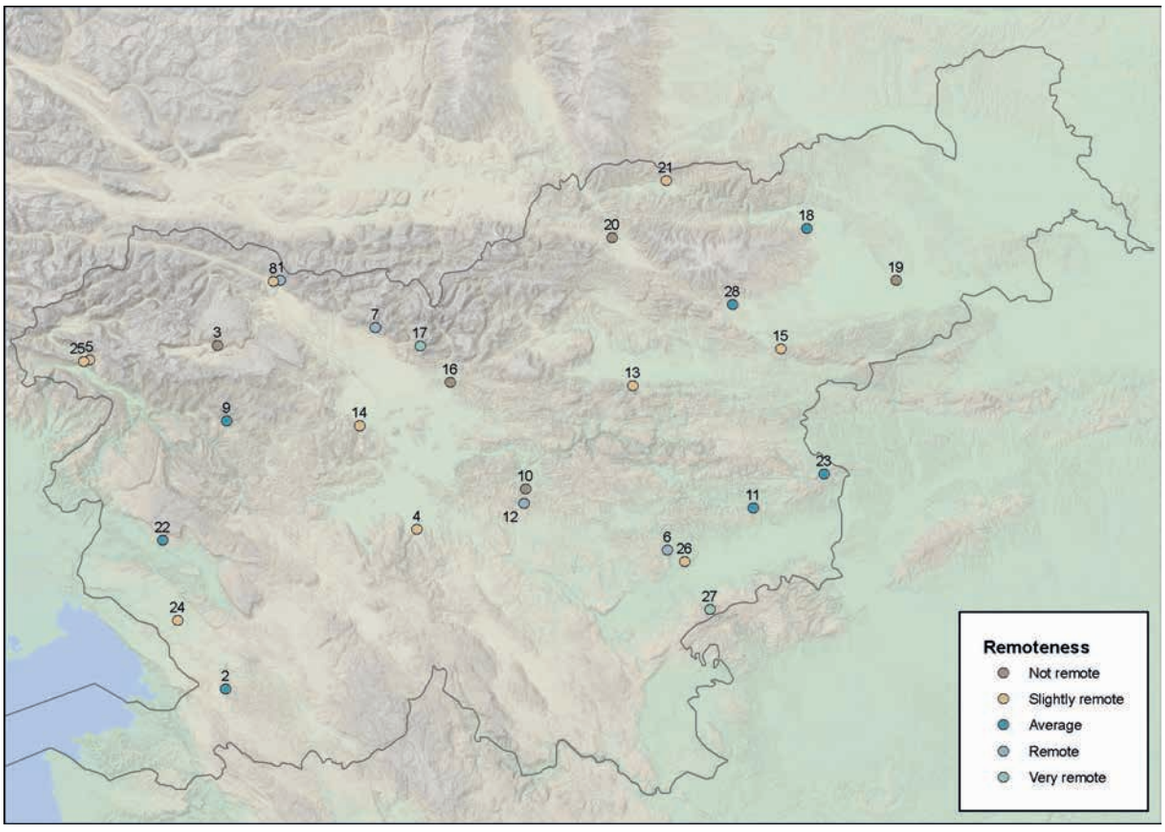

Fig. 14: Small area (Slovenia), map of sites according to remoteness.

No.	full name	name
6	Gradec pri Veliki Strmci	Gc/Veliki Strmci
12	Gradišče pri Pristavi	G/Pristavi
27	Zidani gaber	Zidani gaber
9	Gradišče nad Trebenčami	G/Trebenčami
22	Sv.Pavel nad Vrtovinom	Sv.Pavel/Vrtovinom
17	Na Bleku	Na Bleku
10	Gradišče nad Vintarjevcem	G/Vintarjevcem
3	Dunaj pri Jereki	Dunaj/Jereki
25	Tonovcov grad	Tonovcov grad
11	Gradišče pri Dunaju	G/Dunaju
7	Gradišče nad Bašljem	G/Bašljem
1	Ajdna	Ajdna
28	Zimrajh	Zimrajh
5	Gradec pri Drežnici	Gc/Drežnici
15	Ljubična	Ljubična
8	Gradišče nad Sotesko	G/Sotesko
23	Svete gore	Svete gore
2	Ajdovščina nad Rodikom	Ajdovščina/Rodikom
13	Hom nad Preboldom	Hom/Preboldom
21	Stari grad nad Radljami	S. Grad/Radljami
26	Vinji vrh	Vinji vrh
20	Puščava	Puščava
14	Hom nad Soro	Hom/Soro
4	Gradec nad Iško vasjo	Gc/Iško vasjo
24	Tabor v Tomaju	Tabor v Tomaju
16	Mali grad	Mali grad
18	Poštela	Poštela
19	Ptujski grad	Ptujski grad
	AVG	

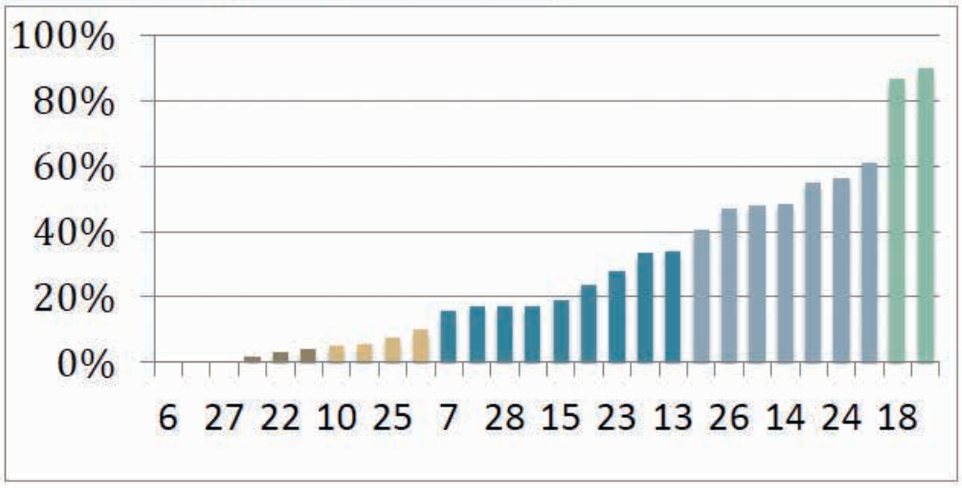

Fig. 15: Small area (Slovenia), chart representing the control of local resources modelled by the percentage of the field visibility within a middle-distance range.

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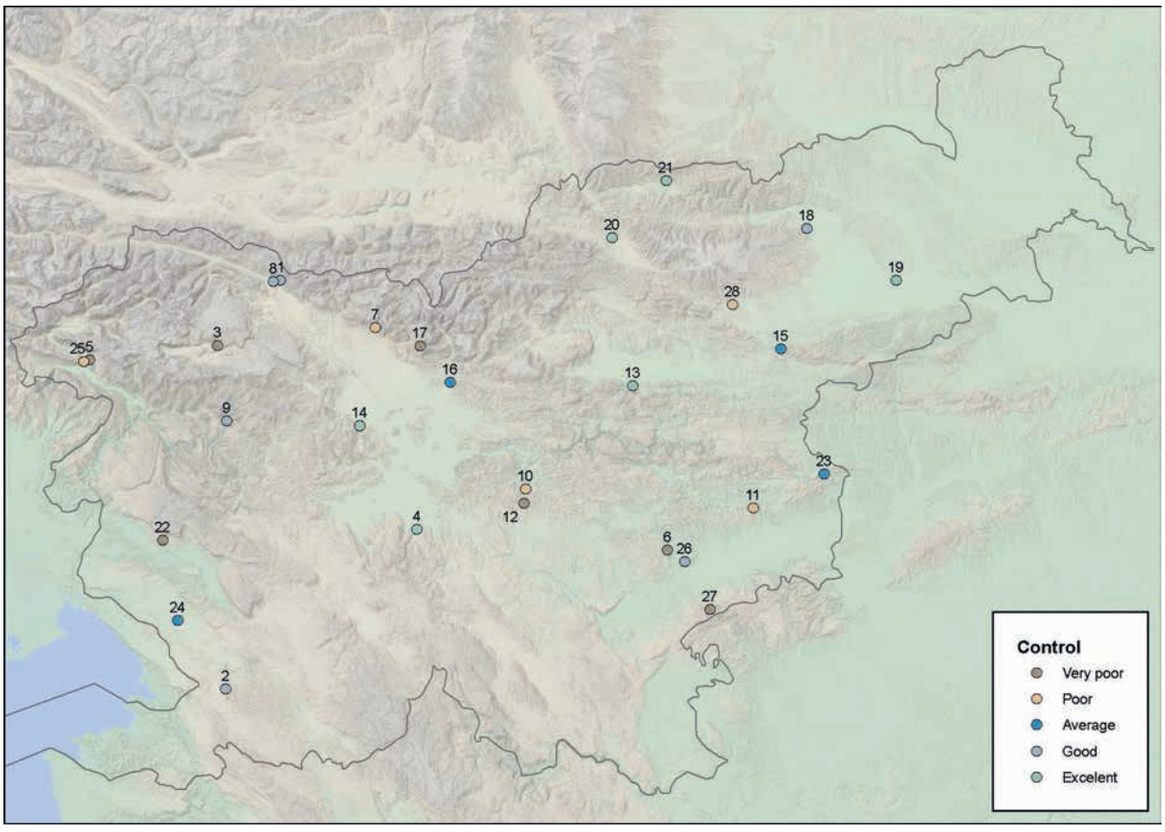

Fig. 16: Small area (Slovenia), map of sites according to the control of local resources.

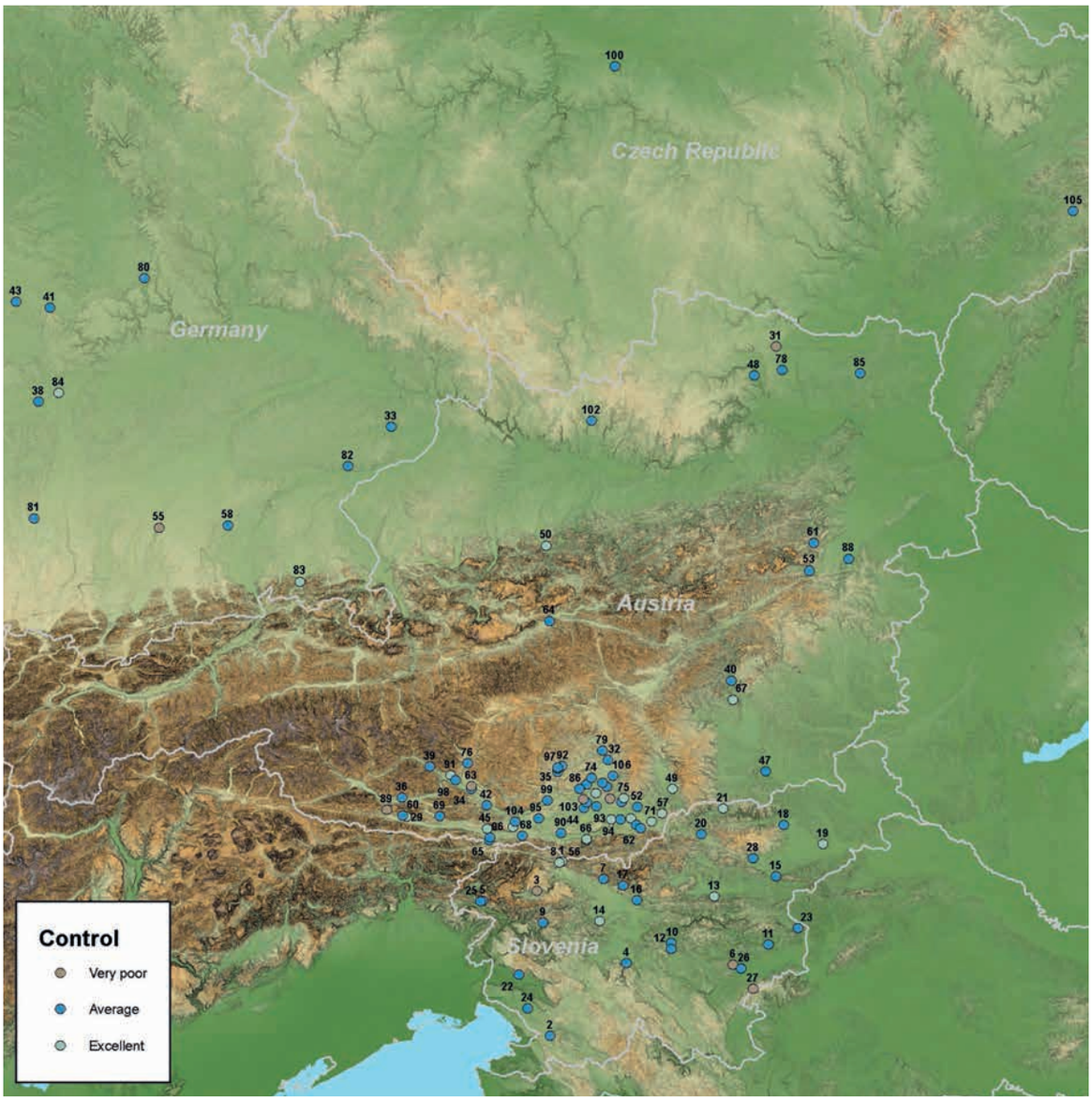

Fig. 17: Large area, map of sites according to the control of local resources.

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Fig. 18: Small area (Slovenia), chart representing the landscape presence expressed as a percentage of visible points within the field category at long-distance range.

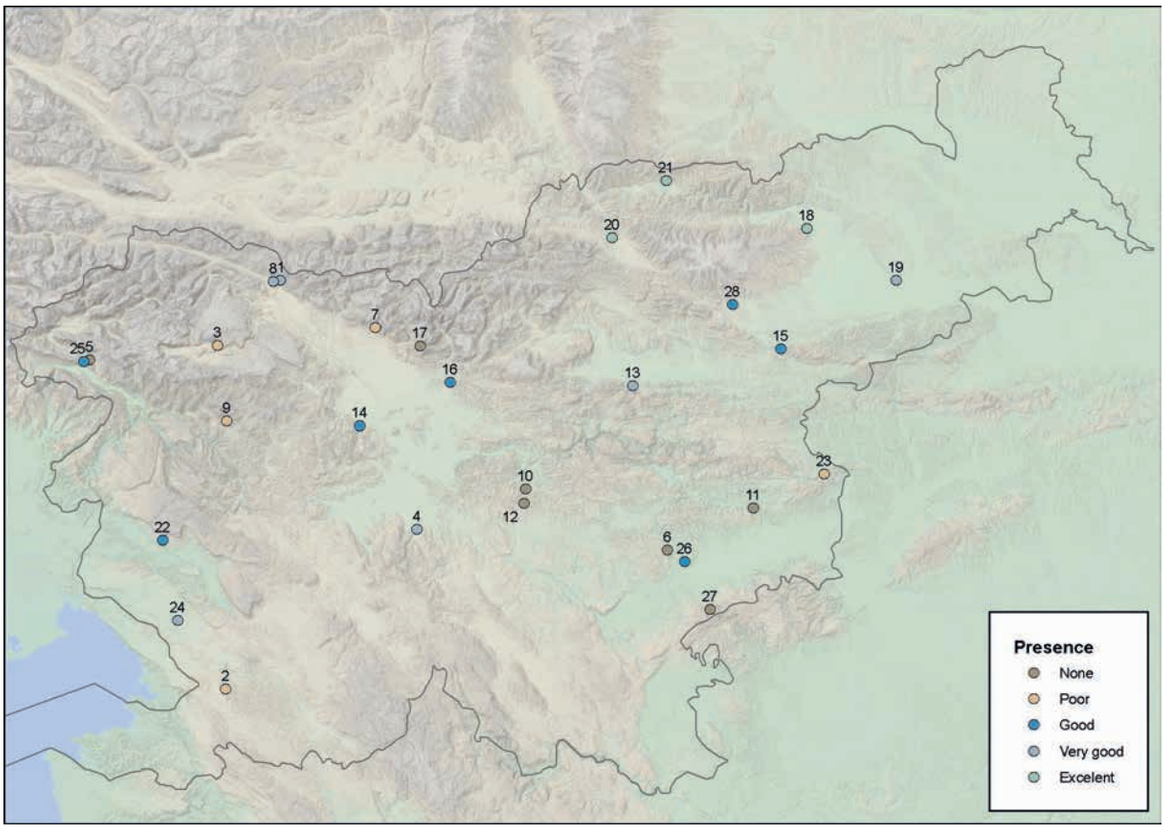

Fig. 19: Small area (Slovenia), map of sites according to the landscape presence.

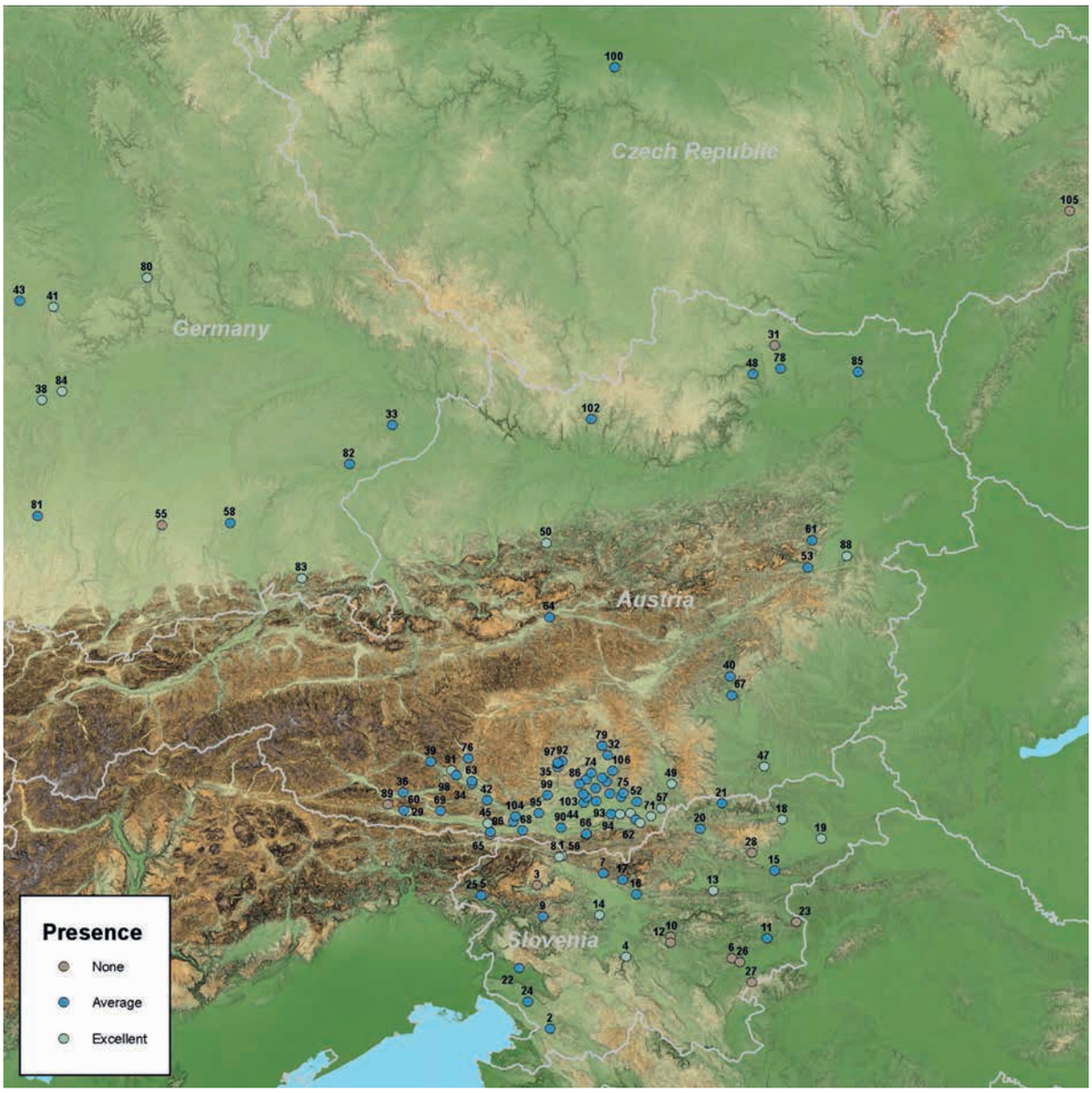

Fig. 20: Large area, map of sites according to the landscape presence.

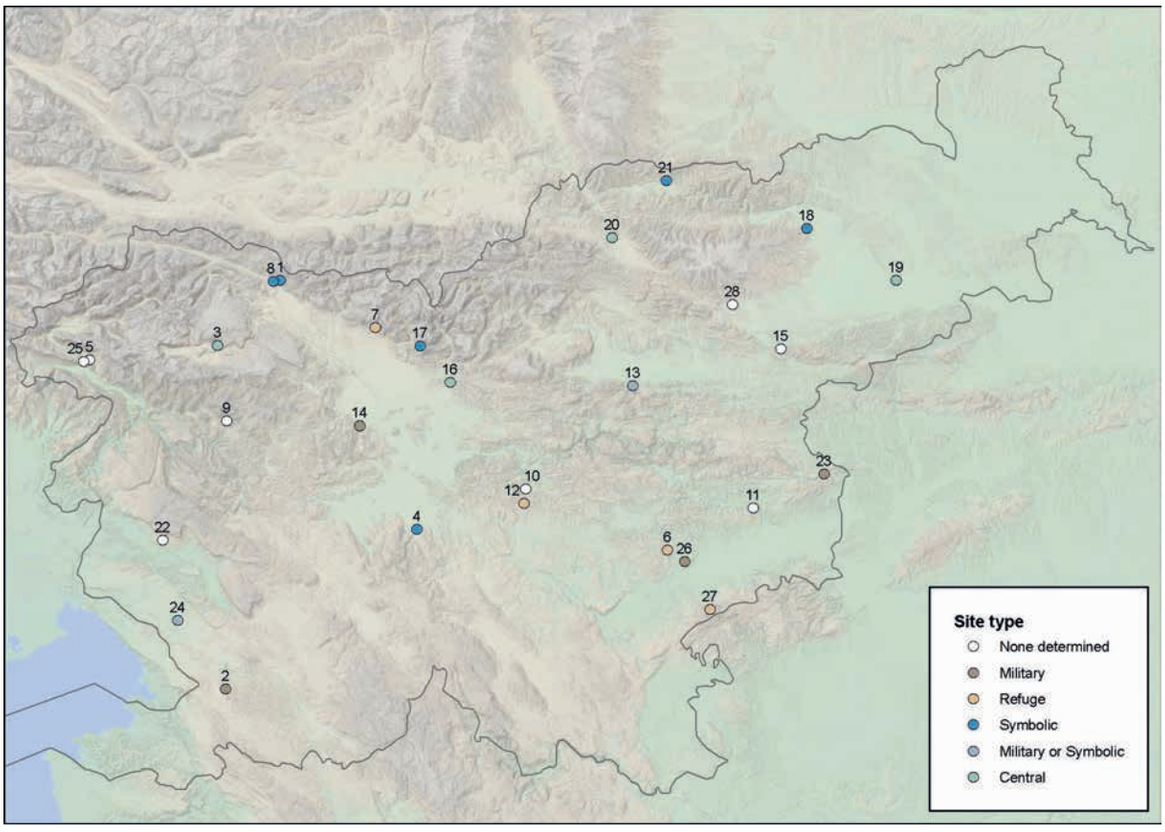

Fig. 21: Small area (Slovenia), map of sites according to the archaeological interpretation based on the reverse engineering of the predictive modelling.

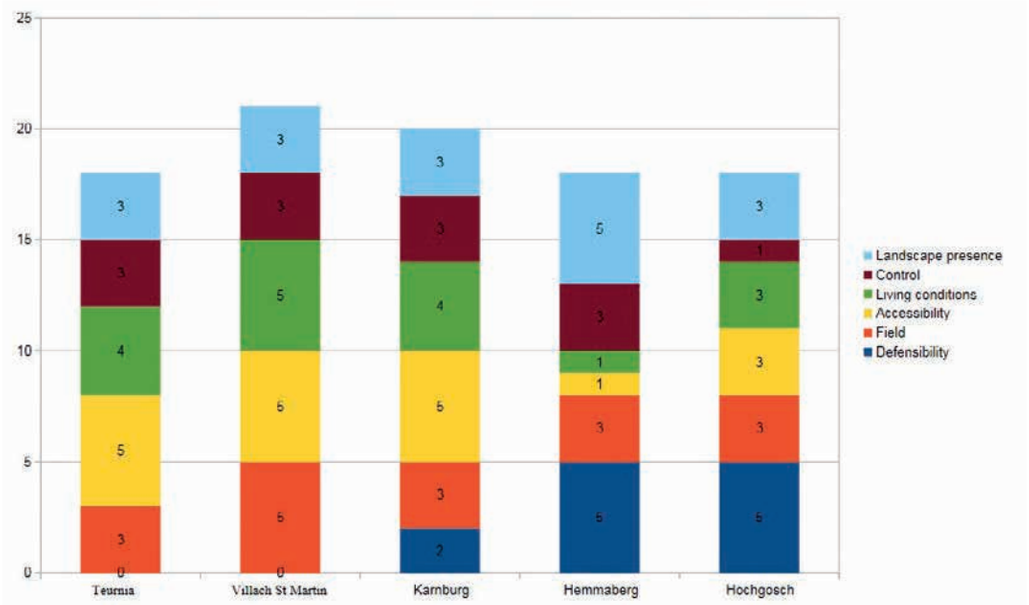

Fig 22: xxxxxx

APPENDIX: LIST OF SITES

1 Ajdna
2 Ajdovščina nad Rodikom / Rodik
3 Dunaj pri Jereki
4 Gradec nad Iško vasjo Gc / Iško vasjo
5 Gradec pri Drežnici Gc / Drežnici
6 Gradec pri Veliki Strmci Gc / Veliki Strmci
7 Gradišče nad Bašljem G / Bašljem
8 Gradišče nad Sotesko G / Sotesko
9 Gradišče nad Trebenčami G / Trebenčami
10 Gradišče nad Vintarjevcem G / Vintarjevcem
11 Gradišče pri DunajuG / Dunaju
12 Gradišče pri Pristavi G / Pristavi
13 Hom nad Preboldom Hom / Preboldom
14 Hom nad Soro Hom / Soro
15 Ljubična
16 Mali grad
17 Na Bleku
18 Poštela
19 Ptujski grad Ptujski grad
20 Puščava
21 Stari grad nad Radljami S. Grad / Radljami
22 Sv.Pavel nad Vrtovinom Sv.Pavel / Vrtovinom
23 Svete gr e
24 Tabor v Tomaju
25 Tonovcov grad
26 Vinji vrh
27 Zidani gaber
28 Zimrajh