

Joanna Pyzel\*

## Field Survey Versus Excavation – Compatibility of Results Illustrated by the Example of Selected Sites from the A1 Motorway in the Włocławek Province, Poland

### ABSTRACT

Pyzel J. 2017. Field Survey Versus Excavation – Compatibility of Results Illustrated by the Example of Selected Sites from the A1 Motorway in the Włocławek Province, Poland. *Analecta Archaeologica Ressoventsia* 12, 285–298

This paper reconsiders the compatibility of results from survey and subsequent excavations as their verification: the issues of detection of sites and the reliability of estimations of their size as well as their dating including the relative visibility of separate chronological units based on surface material are discussed here. This is presented through the example of archaeological investigations conducted due to the construction of the A1 motorway route within the former Włocławek Voivodeship.

**Key words:** survey; emergency excavations; reliability of survey data; dating of survey sites; Polish Archaeological Record; Kuyavia

**Received:** 06.06.2017; **Revised:** 06.06.2017; **Accepted:** 20.08.2017

### Introduction

Archaeological survey, especially fieldwalking, is the most classic type of non-destructive research. It has for a long time been much more than just a preliminary step to subsequent excavations: it serves as the basis of diverse spatial analysis, especially on the macro-regional scale. Polish archaeology in particular has outstanding research traditions in this field because it can benefit from the unique programme of cataloguing of archaeological sites, called the “Polish Archaeological Record” (AZP – *Archeologiczne Zdjęcie Polski*; see Barford *et al.* 2000). For the purposes of the identification of surface material a special method of “technological dating” has been developed, which allows the assignment of small, stylistic undiagnostic pieces of pottery (Czerniak, Kośko 1980). It is all the more surprising that this has not encouraged a serious debate on the reliability and validity of such research, comparable to the discussion on

---

\* Institute of Archaeology, University of Gdańsk, Bielańska 5 Street, 80-851 Gdańsk, Poland; joanna.pyzel@univ.gda.pl

the relative archaeological visibility inspired by the systematic surface survey in, for example, Greece (Rutter 1983) or Bohemia (Neustupný 1993). The results obtained there demonstrate that survey results do not necessarily simply mirror the underground structures and depend much more on diverse factors such as the character of the settlement (depth of features, their density), different depositional and post-depositional transformations, the distinctiveness of surface material, etc. (Neustupný 1998: 53). In this paper fieldwalking data will be confronted with the results of excavations that took place shortly afterwards. The study area is the A1 motorway route within the former Włocławek Voivodeship between Ciechocinek and Lubień Kujawski. It is 73.5 km long and stretches through the eastern edge of the Kuyavian Plateau (mezoregions of the Inowrocław Plateau and the Kuyavian Lake District: Kondracki 2001), close to its boundary with the Vistula River valley (Toruń and Płock Valley mezoregions). This region consists mainly of agriculturally utilised landscapes of high quality soils developed on heavy moraine gleys.

The whole region was surveyed in the 80s as a part of the AZP Programme. Along the future motorway route altogether 21 sites were registered. The new survey took place as the first step of emergency excavations preceding the motorway construction: in autumn 1999 fieldwalking and in spring 2000 additionally small test excavations on 38 selected sites. The survey was conducted by a group of archaeologists connected with different scientific centres in Poznań. The same team analysed and interpreted the data, using the AZP description system (Chłodnicki *et al.* 2000). The survey was conducted in a 300 m wide strip. Its goal was to discover the endangered sites, visible on the surface mainly as scatters of artefacts. In most cases their range delineated boundaries of a site. The absolute number of artefacts from different categories (pottery, lithics, others) divided into chronological units was recorded without further information on the density of the artefacts, different concentrations within a site, etc.

Altogether 177 archaeological sites have been registered (including nine estimated only as regards an optimal location, where observation was not possible). The eightfold increase in site number compared to the AZP results is striking.

Ninety of these sites were selected for subsequent emergency excavations and some of them were combined so that finally it was possible to dig 86 sites. The excavations took place over many seasons between

2001 and 2010, especially intensively at the end of this period. They were conducted by diverse institutions and companies from different parts of Poland. All the results have been analysed so far and their description as well as detailed excavation reports are stored at the National Heritage Board (Narodowy Instytut Dziedzictwa; see also the site catalogue published by Wiśniewski, Kotlewski 2013). Some of these reports have been published as well (see the description of selected sites below).

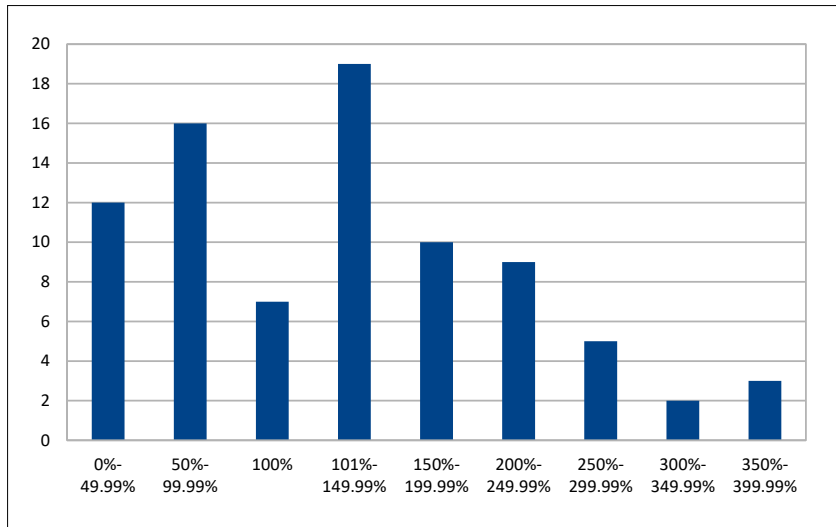
Because the survey was conducted during only one season by a single team and following emergency excavations albeit by many different organisations but still in a relatively short time afterwards, they provide a unique opportunity to compare the results obtained. The focus of this analysis will be placed on the detection of a site as a whole and the reliability of estimations of its size. Further the dating of surface material will be confronted with excavation results and in this way the relative visibility of separate chronological units will be discussed. For selected sites more detailed reflection will be presented on the relationship between unearthed settlement traces and surface material.

### Site detection

The existence of six of altogether 86 sites (7%) selected for the emergency excavations could not be confirmed. One of them was known from the previous AZP research as well. These sites revealed a slightly lower number of surface artefacts (their mean was 30 pottery pieces per site) than the average (74 pieces per site for all sites). In the case of the sites verified negatively the artefacts found were dated not only to the generally most abundant Middle Ages and Modern Times but also prehistoric pottery was found on each of them.

### Estimated site size

For each of the surveyed sites not only their whole area but also the size of the space endangered by the motorway construction was estimated. The latter value could be verified thanks to emergency excavations. Altogether 114% of the preliminarily estimated area was unearthed. In seven cases the excavated space equated exactly to the assumed one, for 28 sites it was smaller and for 48, larger. Most of the sites (35) fall in the range of 50 to 150% of the estimated area (the total



**Fig. 1.** Percentage of a site's size estimated in the survey to an excavated one

congruency excluded). The proportion of the excavated to estimated space is demonstrated in fig. 1.

## Dating

Altogether it was possible to analyse 75 sites in this paper as they yielded both surface as well as excavated finds. Sites estimated only on the basis of their potential good location (where observation was not possible), interestingly all verified positively, as well as the ones not confirmed by excavations were excluded from this evaluation.

The chronology of sites was estimated mainly on the basis of pottery – altogether 5576 pieces were obtained in the survey. Additionally 86 flint artefacts were found which were classified more generally to the “Stone Age”. Chronological estimations from survey and excavations were of different accuracy not only due to the incomparable quantity and quality of finds but also to the use of diverse taxonomic systems. For the purpose of this paper they have been simplified to 12 entities: Stone Age, Linear Pottery Culture (LBK), post-LBK (including the Stroke Band Pottery Culture and the Brześć Kujawski Group/Culture, further BKC), Funnel Beaker Culture (TRB), Globular Amphorae Culture (GAC), Subneolithic, Late Neolithic/Early Bronze Age (INB),

**Table 1.** Number of pottery pieces found on sites (survey only – verified negatively) divided into chronological entities

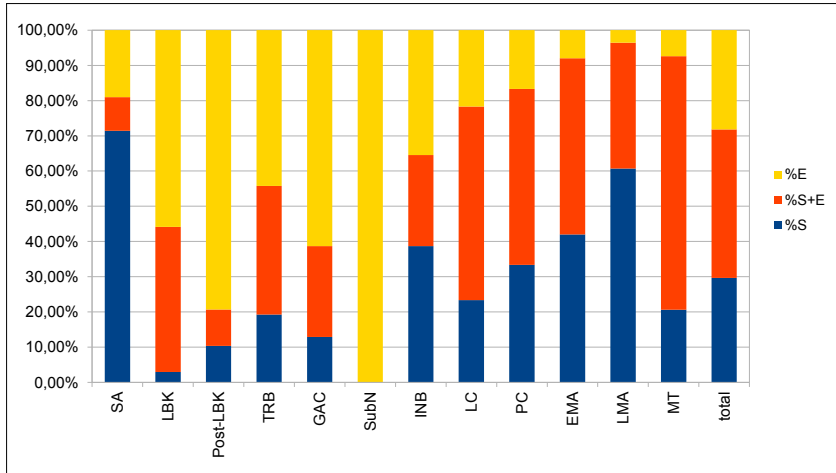
|          | Pottery pcs. | sites | Pcs. survey only | Sites survey only | Pcs. per site | Pcs. per site survey only |
|----------|--------------|-------|------------------|-------------------|---------------|---------------------------|
| LBK      | 50           | 15    | 1                | 1                 | 3.33          | 1                         |
| Post-LBK | 28           | 6     | 3                | 3                 | 4.67          | 1                         |
| TRB      | 308          | 29    | 19               | 10                | 10.62         | 1.9                       |
| GAC      | 58           | 12    | 10               | 4                 | 4.83          | 2.5                       |
| INB      | 92           | 20    | 63               | 12                | 4.6           | 5.25                      |
| LC       | 423          | 47    | 57               | 14                | 9             | 4.07                      |
| PC       | 860          | 40    | 101              | 16                | 21.5          | 6.31                      |
| EMA      | 768          | 46    | 117              | 21                | 16.7          | 5.57                      |
| LMA      | 1509         | 54    | 569              | 34                | 27.94         | 17.53                     |
| MT       | 1480         | 63    | 142              | 14                | 23.49         | 10.14                     |
|          | 5576         | 75    | 1109             |                   | 74.35         |                           |

Lusatian Culture (LC), Przeworsk Culture (PC), Early Middle Ages (EMA), Late Middle Ages (LMA), and Modern Times (MT).

The quantity of diagnostic artefacts for separate categories was not equal: most numerous were the late finds: LMA, MT as well as EMA and PC. The lowest number of sherds per site could be dated to the Neolithic cultures, especially the LBK. Among the Neolithic pottery the TRB was the most abundant (Table 1).

Sites which were verified negatively yielded altogether slightly fewer finds but the proportions between different dating entities were similar. Most numerous was the pottery connected with the LMA and MT, which may be the result of field manuring (Table 1).

Most of the sites on the motorway route have a palimpsest character – they revealed traces of more than one phase of occupation (represented by the above mentioned chronological entities). On average 4.65 such phases were registered per site known from survey and 4.57 from excavations. These are very similar values but specific chronological estimations from these two research types differ strongly. Only on two sites do these values correspond to 100 percent. In nine cases the dating of excavation finds bore no resemblance at all to the survey estimations. On average the datings from both research types correspond in 42.71% of cases, but such matches differ substantially between



**Fig. 2.** Percentage of sites known only from survey (S), only from excavations (E) and from both research types (S+E) for separate chronological entities

separate chronological entities as highlighted in fig. 2, presenting the percentage of sites known only from survey (verified negatively), not discovered before the excavations and the ones confirmed by both research types. The “Stone Age” category must be treated with caution as it was estimated on the basis of survey flint finds only and afterwards this dating was mainly provided with details during excavations.

The rate of estimation failure is quite low for the Neolithic cultures – especially for the LBK, due to its highly distinctive pottery. The relatively high percentage of sites mistakenly dated to the TRB is astonishing, while the high (highest) proportion of sites erroneously estimated to the LMA can be explained by field manuring as well as some mistakes in the precise dating for example between the LMA and MT.

It is worth taking a closer look at the ratio of occupation phases discovered only due to excavations. In this category we find all “Subneolithic” estimations, which is quite easy to explain as this pottery occurs only as a small admixture in features connected with other Neolithic cultures and thus it is very difficult to detect in the survey. Moreover for every other chronological entity there is a certain ratio of sites undiscovered in the survey. It is quite low for later periods, especially the Middle Ages and MT, where it does not exceed 10%. The older the culture, the more numerous are sites not detected during the survey. The highest ratio of such sites distinguishes the post-LBK cultures.

## Survey vs. excavation: examples of the LBK and post-LBK cultures

The A1 motorway route stretches through a region intensively occupied by the LBK communities and some of the most interesting and important discoveries made during this linear project are connected with this culture (cf. Muzolf *et al.* 2012, Pyzel 2013). Altogether 34 sites were dated to the LBK. Only one survey site, whose dating was based on a single LBK sherd, was verified negatively. In the case of 14 other sites the survey finds estimations were able to be confirmed by excavations. In all the cases we are dealing with occupational traces of various sizes but always with different LBK features discovered. During the survey it was possible to detect all the largest villages: Smólsk 2/10 (Muzolf *et al.* 2012), Kruszyn 10 (Płaza 2016), Wieniec 10 (Maciszewski 2010a) and Ludwinowo 7 (Pyzel 2013). Interestingly the number of artefacts found on their surface (on average four pottery pieces per site) is not significantly higher than on smaller sites.

During emergency excavations 19 new LBK sites were discovered. Among them are five sites with scarce LBK pottery recorded only in secondary contexts. In all other cases we are dealing with traces of real LBK settlements of various sizes: from single pits (one site), isolated hamlets/clusters of pits (five sites) to villages consisting of some quite loosely arranged households (eight sites).

After the field survey altogether six sites had been dated to the post-LBK cultures. Three of them were verified negatively during the excavations. Two of them turned out to be LBK villages, one with a feature without finds but radiocarbon-dated to the first half of the 5th millennium (Maciszewski 2010b). The third site was a large LC settlement.

It was possible to verify three sites positively. Two of them are quite large, stable, long-lasting settlements of the BKC of a relatively loose internal built-up structure (Bodzia 1 and Ludwinowo 3: see Czerniak, Pyzel 2016, 101, fig. 4). The third site is a large LBK village at Ludwinowo 7, which was occasionally visited by the post-LBK communities who, however, did not construct any permanent structures there (Czerniak, Pyzel 2016).

Astonishingly as many as 23 post-LBK sites had not been detected until the excavations. Among them are small pit clusters of the Stroke

Band Pottery Culture, as well as large and stable BKC villages at Dubielewo 8 (Siewiaryn, Mikulski 2016) and Kruszynek 6 (Czerniak, Pyzel 2016: 101, fig. 4).

### Presentation of selected sites

Five sites have already been published. These are Kruszyn 10, excavated by the Fundacja Badań Archeologicznych im. Prof. Konrada Jażdżewskiego and the Muzeum Archeologiczne i Etnograficzne w Łodzi (Siciński *et al.* 2016) and four sites dug by Fundacja Uniwersytetu Adama Mickiewicza w Poznaniu: Bodzia 6, Dubielewo 8, Śliwkowo 4 and Witoldowo 1 (Kaczor, Żółkiewski 2013a, 2016a). For these sites it is possible to compare the survey estimations with results of excavations more thoroughly, taking into account among other things the number of features and the quantity of pottery of each settlement phase (Table 2).

At Kruszyn 10 the total excavated area was 27590 sq m and altogether 1515 features have been registered there. Most of them are undated, the dated ones belong mainly to two major settlement phases: the first one is dated to the LBK (more than 100 features) and the second to the PC (84 features). The main concentration of these settlement traces was recorded in the southern part of the site. Scarce pottery of this age could be found on the surface as well.

Furthermore single features of the post-LBK, TRB, the Mierzanowice Culture, the LC (with Pomeranian Culture) were found. None of these phases was represented in the pottery from the survey; sherds dating to the EMA and MT were registered instead (Siciński *et al.* 2016).

At Dubielewo 8 the total unearthed area was 25245 sq m. In the northern part of the site traces of a single LBK household were recorded, as well as a large BKC village stretching over an 80 m wide strip. Interestingly none of these cultures were recorded in the survey. Seven flint artefacts found during the fieldwalking had been assigned to the TRB, but its occupation could not be confirmed by the excavations.

After a very sparse occupation episode in the Bronze and Early Iron Ages (the Trzciniec and Lusatian Cultures) in the Late Pre-Roman Period (PC) a 5000 sq m large, stable settlement was established in the northern part of the excavation area. In the survey material the pottery of both phases – PC as well as LC – was represented (Kaczor, Żółkiewski 2016b).



**Table 2.** Number of pottery pieces from survey and excavations and number of features dated to separate chronological entities from selected sites

|                          | LBK      | Post-LBK | TRB     | GAC  | INB      | LC   | PC   | EMA  | LMA | MT  |
|--------------------------|----------|----------|---------|------|----------|------|------|------|-----|-----|
| Kruszyn 10               |          |          |         |      |          |      |      |      |     |     |
| survey, pottery pcs.     | 3        | 0        | 0       | 0    | 0        | 0    | 4    | 3    | 0   | 2   |
| excavation, features     | ca. 100  | 2        | 2       | 0    | 1        | 17   | 84   | 0    | 0   | 0   |
| excavation, pottery pcs. | ca. 7000 | 80       | ca. 200 | 0    | 1 vessel | 519  | 2136 | 0    | 0   | 0   |
| Bodzia 6                 |          |          |         |      |          |      |      |      |     |     |
| survey, pottery pcs.     | 4        | 0        | 0       | 5    | 0        | 2    | 7    | 172  | 5   | 17  |
| excavation, features     | 14       | 90       | 1       | 0    | 3        | 4    | 0    | 136  | 0   | 3   |
| excavation, pottery pcs. | 786      | 8677     | 49      | 0    | 76       | 601  | 0    | 8267 | 0   | 132 |
| Dubielewo 8              |          |          |         |      |          |      |      |      |     |     |
| survey, pottery pcs.     | 0        | 0        | 0       | 0    | 0        | 4    | 20   | 0    | 1   | 0   |
| excavation, features     | 18       | 156      | 0       | 0    | 2        | 30   | 41   | 2    | 0   | 0   |
| excavation, pottery pcs. | 39       | 4558     | 0       | 0    | 45       | 1193 | 6104 | 128  | 0   | 0   |
| Śliwkowo 4               |          |          |         |      |          |      |      |      |     |     |
| survey, pottery pcs.     | 0        | 0        | 2       | 0    | 0        | 1    | 0    | 0    | 0   | 0   |
| excavation, features     | 0        | 1        | 5       | 1    | 0        | 0    | 0    | 1    | 1   | 30  |
| excavation, pottery pcs. | 0        | 3        | 13      | 1    | 0        | 0    | 0    | 1    | 24  | 0   |
| Witoldowo 1              |          |          |         |      |          |      |      |      |     |     |
| survey, pottery pcs.     | 0        | 0        | 0       | 0    | 0        | 0    | 0    | 4    | 5   | 2   |
| excavation, features     | 1        | 35       | 25      | 71   | 0        | 0    | 0    | 0    | 2   | 11  |
| excavation, pottery pcs. | 17       | 2371     | 325     | 1738 | 66       | 0    | 0    | 0    | 24  | 114 |

At Bodzia 6 altogether 12 000 sq m in the eastern part of the site were excavated. Scarce traces of the LBK occupation were recorded in the north-eastern section of the trench, which had probably belonged to a single household. Thirteen features scattered over the central part of the area could be dated to the Stroke Band Pottery Culture and 71 to the BKC (both post-LBK). The latter represent traces of a loosely arranged village. Single features belonged to the TRB (one feature), the Trzciniec Culture (EBA – three features) and LC (four features). The most intensive traces of occupation are connected with the EMA (136 features spreading out over the whole excavated area). Most of the pottery from the survey dates to this period as well. There are also some pieces of the LBK and the LC in this assemblage, as well as some

finds of the GAC, PC, LMA and MT not confirmed in the excavations (Kaczor, Żółkiewski 2013b).

At Witoldowo 1 the excavated area of 19 300 sq m revealed many Neolithic features. Apart from a single LBK pit, these were traces of BKC (35 features), TRB (25 features) and above all GAC settlements (71 features: Jankowska 2013). During the survey, however, absolutely no prehistoric finds had been obtained but only MA and MT pottery. This can be connected with numerous features of these periods scattered over the whole excavated area (Kaczor, Żółkiewski 2013d).

Śliwkowo 4 is the only one of the sites presented here located on sandy soils. During the emergency excavations solely an area of 2000 sq m was investigated here, which yielded altogether ca. 40 features, mostly without any finds. Singular pits could be dated to the post-LBK, GAC, EMA and LMA. In the southern part of the trench five pits of the TRB, concentrated in a small area of 10 m were discovered as well. This corresponds to the survey finds, as two pottery pieces are dated to the TRB. The other one should have belonged to the LC, but the presence of any occupation traces of this time could not be confirmed during the excavations (Kaczor, Żółkiewski 2013c).

## Discussion

The comparison of results obtained in the survey and emergency excavations conducted shortly afterwards (which excludes for example the complete destruction of features caused by tillage) clearly demonstrates that surface finds do not exactly mirror what is really underground. The visibility of certain chronological units is indeed relative and depends to a high degree on the distinctiveness of their material. The example of the Danubian cultures is highly indicative: the likelihood that someone will recognise the LBK pottery with its unique ornaments and organic temper is much higher than for the mainly undecorated post-LBK ceramics with its mineral inclusions very common also in many other periods. The fact that these communities in the later phase (BKC) established vast, stable, multigenerational villages with numerous deep features, comparable to the LBK settlements, does not really help. The character of the settlement certainly influences the detectability – by means of precisely this factor we can explain the total lack of finds dated to the early post-LBK (Stroke Band Pottery

Culture) in the surface material<sup>1</sup>. These communities left very scarce occupational traces in the form of small clusters of pits; in addition their pottery can also easily be mistaken for other prehistoric cultures.

This special character of specific cultures and periods must be taken into account while analysing any survey finds. It seems, however, that apart from some differences, the reliability of chronological estimations, especially for prehistory, is high, although for each culture and period a significant number of sites still remains undetected. It is relevant especially for different economic or demographic estimations based on the survey data.

It seems important to point out that the size of a site does not correspond with the quantity of surface finds. This makes, for example, quite popular implications concerning the settlement hierarchy unreliable.

Taking the above into consideration survey data can still be regarded as a very valuable source of information on settlement, especially in the macro-regional scale.

## References

- Barford P.M., Brzeziński W. and Kobyliński Z. 2000. The Past, Present and Future of the Polish Archaeological Record Project. In J. Bintliff, M. Kuna, N. Venclová (eds.), *The Future of Artefact Survey in Europe*. Sheffield: Sheffield Acad. Press (= *Sheffield Archaeological Monographs* 13), 73–92.
- Chłodnicki M., Czerniak L., Makiewicz T. and Mazurowski R. 2000. *Wyniki weryfikacyjnych badań powierzchniowych i sondażowych wzdłuż trasy autostrady A1 w granicach dawnego woj. wrocławskiego*. Unpublished typescript.
- Czerniak L. and Pyzel J. 2016. Being at home in the early Chalcolithic. The Longhouse phenomenon in the Brześć Kujawski culture in the Polish Lowlands. *Open Archaeology* 2/1, 97–114. (<http://www.degruyter.com/view/j/opar.2016.2.issue-1/opar-2016-0007/opar-2016-0007.xml?format=INT>).
- Czerniak L. and Koško A. 1980. Zagadnienie efektywności poznawczej analizy chronologicznej ceramiki na podstawie cech technologicznych. *Archeologia Polski* 25/2, 247–280.
- Jankowska D. 2013. Witoldowo, stan. 1. Osadnictwo z okresu neolitu i wczesnej epoki brązu. In W. Kaczor and M. Żółkiewski (eds.), *Bodzia, stan. 6, Witoldowo, stan. 1, Śliwkowo, stan. 4. Archeologiczne badania ratownicze na trasie autostrady A1 w woj. kujawsko-pomorskim*. Poznań: Wydawnictwo Nauka i Innowacje, 415–544.

<sup>1</sup> See similar conclusions made by E. Neustupný for Eastern Bohemia (Neustupný 1993).

- Kaczor W. and Żółkiewski M. (eds.) 2013a. *Bodzia, stan. 6, Witoldowo, stan. 1, Śliwkowo, stan. 4. Archeologiczne badania ratownicze na trasie autostrady A1 w woj. kujawsko-pomorskim*. Poznań: Wydawnictwo Nauka i Innowacje.
- Kaczor W. and Żółkiewski M. 2013b. *Bodzia, stan. 6. Informacje wstępne*. In W. Kaczor and M. Żółkiewski (eds.), *Bodzia, stan. 6, Witoldowo, stan. 1, Śliwkowo, stan. 4. Archeologiczne badania ratownicze na trasie autostrady A1 w woj. kujawsko-pomorskim*. Poznań: Wydawnictwo Nauka i Innowacje, 13–18.
- Kaczor W. and Żółkiewski M. 2013c. *Śliwkowo, stan. 4. Informacje wstępne*. In W. Kaczor and M. Żółkiewski (eds.), *Bodzia, stan. 6, Witoldowo, stan. 1, Śliwkowo, stan. 4. Archeologiczne badania ratownicze na trasie autostrady A1 w woj. kujawsko-pomorskim*. Poznań: Wydawnictwo Nauka i Innowacje, 609–612.
- Kaczor W. and Żółkiewski M. 2013d. *Witoldowo, stan. 1. Informacje wstępne*. In W. Kaczor and M. Żółkiewski (eds.), *Bodzia, stan. 6, Witoldowo, stan. 1, Śliwkowo, stan. 4. Archeologiczne badania ratownicze na trasie autostrady A1 w woj. kujawsko-pomorskim*. Poznań: Wydawnictwo Nauka i Innowacje, 409–413.
- Kaczor W. and Żółkiewski M. (eds.) 2016a. *Dubielewo, gm. Brześć Kujawski, stanowisko 8. Archeologiczne badania ratownicze na trasie autostrady A1 w woj. kujawsko-pomorskim*. Poznań: Wydawnictwo Nauka i Innowacje.
- Kaczor W. and Żółkiewski M. 2016b. *Dubielewo, stan. 8. Informacje o stanowisku*. In W. Kaczor and M. Żółkiewski (eds.), *Dubielewo, gm. Brześć Kujawski, stanowisko 8. Archeologiczne badania ratownicze na trasie autostrady A1 w woj. kujawsko-pomorskim*. Poznań: Wydawnictwo Nauka i Innowacje, 15–20.
- Kondracki J. 2001. *Geografia regionalna Polski*. Warszawa: Wydawn. Naukowe PWN.
- Maciszewski I. 2010a. *Osada ludności kultury ceramiki wstęgowej rytej*. In: I. Maciszewski (ed.), *Opracowanie wyników archeologicznych badań wykopaliskowych poprzedzających budowę kujawskiego odcinka autostrady A1. Stanowisko Wieniec 10 (NR AUT. 61)*. Łódź. Unpublished typescript stored in National Heritage Board of Poland in Warsaw, 82–124.
- Maciszewski I. 2010b. *Ślad osadnictwa mezolitycznego*. In I. Maciszewski (ed.), *Opracowanie wyników archeologicznych badań wykopaliskowych poprzedzających budowę kujawskiego odcinka autostrady A1. Stanowisko Wieniec 10 (NR AUT. 61)*. Łódź. Unpublished typescript stored in National Heritage Board of Poland in Warsaw, 81.
- Muzolf B., Kittel P. and Muzolf P. 2012. *Sprawozdanie z prac badawczych na wielokulturowym kompleksie osadniczym w miejscowości Smólsk, stanowisko 2/10, gm. Włocławek, woj. kujawsko-pomorskie*. In S. Kadrow (ed.), *Raport 2007–2008. Tom I*. Warszawa: Narodowy Instytut Dziedzictwa, 43–64.
- Neustupný E. 1993. *Some field walking theory*. *Památky archeologické* LXXXIV/2, 150–152.
- Neustupný E. 1998. *The transformation of community areas into settlement areas*. In E. Neustupný (ed.), *Space in Prehistoric Bohemia*. Praha: Institute of Archaeology, Academy of Sciences of the Czech Republic, 45–61.
- Płaza D. 2016. *Osadnictwo młodszej epoki kamienia i wczesnej epoki brązu*. In: W. Siściński, D. Płaza and P. Papiernik (eds.), *Ratownicze badania archeologiczne na stanowisku 10 w Kruszynie, pow. Włocławek, woj. kujawsko-pomorskie (tra-*

- sa autostrady A1). Łódź (= *Via Archaeologica Lodziensis VI*). Łódź: Fundacji Badań Archeologicznych Imienia Profesora Konrada Jażdżewskiego, 21–136.
- Pyzel J. 2013. Different models of settlement organisation in the Linear Band Pottery Culture – an example from Ludwinowo 7 in eastern Kuyavia. In S. Kadrow and P. Włodarczak (eds.), *Environment and subsistence – forty years after Janusz Kruk's „Settlement studies...”*. (= *Studien zur Archäologie in Ostmitteleuropa/Studia nad Pradziejami Europy Środkowej 11*). Rzeszów, Bonn: Institute of Archaeology Rzeszów University, Dr. Rudolf Habelt GmbH, 85–93.
- Rutter J.B. 1983. Some thoughts on the analysis of ceramic data generated by site surveys. In D.R. Keller and D.W. Rupp (eds.), *Archaeological Survey in the Mediterranean Region*. Oxford (= *British Archaeological Reports. International Series 155*), 137–142.
- Siciński W., Płaza D. and Papiernik P. (eds.) 2016. *Ratownicze badania archeologiczne na stanowisku 10 w Kruszynie, pow. Włocławek, woj. kujawsko-pomorskie (trasa autostrady A1)*. (= *Via Archaeologica Lodziensis VI*). Łódź: Fundacji Badań Archeologicznych Imienia Profesora Konrada Jażdżewskiego.
- Siewiaryn M. and Mikulski P. 2016. Osadnictwo z okresu neolitu i wczesnej epoki brązu. In W. Kaczor and M. Żółkiewski (eds.), *Dubielewo, gm. Brześć Kujawski, stanowisko 8. Archeologiczne badania ratownicze na trasie autostrady A1 w woj. kujawsko-pomorskim*. Poznań: Wydawnictwo Nauka i Innowacje, 23–201.
- Wiśniewski M. and Kotlewski L. (eds.). 2013. *Archeologia autostrady. Badania archeologiczne w pasie budowy Autostrady A1 w granicach województwa kujawsko-pomorskiego*. Katalog wystawy. Bydgoszcz: Generalna Dyrekcja Dróg Krajowych i Autostrad Oddział w Bydgoszczy.

