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Tripolye – Strategy and Results of an ongoing Ukrainian-European Project

The aim of the article is to identify the main tasks, strategies and some results of an ongoing Ukrainian-European Project that is dealing with the Tripolye culture phenomenon. In order to investigate emergence and decline of giant-settlements with thousands of houses and very specific spatial layouts, the challenge need to be mastered to perform representative archaeological and scientific sampling with reasonable efforts. This is only possible through the combination of non-destructive survey techniques, targeted archaeological excavations and the application of modern scientific methods. In order to gain a deeper understanding of the social, ecological, demographic and economic dimensions of such settlements and underlying transformations of human societies also in their regional variability, the consideration of different spatial investigation levels is required. In the first phases of the project, high-resolution magnetic surveys were applied to different large Tripolye settlements and exemplary investigations were carried out at the local scale of the Maidanetske settlement. At the current stage of the project, the studies focus more on the meso- and macro-regional level.

Key words: Tripolye, Eneolithic, mega-sites, research-strategy, magnetic survey, spatial scales

Introduction and research questions

Tripolye is the label of a very long-lasting and geographically widespread cultural complex of the Eneolithic of South-East and Eastern Europe. A joint Ukrainian-German research project has covered many aspects of Tripolye settlement systems and environmental conditions since 2011 (funded by the German Research Foundation and the Ukrainian Academy of Science; project directors: Johannes Müller, Kiel University and Mihailo Videiko, currently Borys Grinchenko Kyiv University).

Research on the Tripolye phenomenon has been performed almost continuously since the end of the 19th century. Analysis of aerial images and subsequently the application of magnetic surveys stimulated in the 1970th and 1980th new intensive and innovative research which was triggered by the key finding that some Tripolye settlements – in particular of the Bug-Dnieper interfluvium – represented the by far the largest population agglomerations in prehistoric Europe in terms of sheer settlement size of up to 320 ha, exceptional spatial layout and huge number of houses (Shishkin 1985). This insight raised an intensive discussion of questions like *which dynamic led to the emergence of such settlements, how these unique sites should be interpreted or how the reconstructed huge number of people could be managed*. With view on coarsely contemporary urbanisation processes in Mesopotamia, in particular persistent and controversial the question was pursued if such settlements rep-

resents already some kind of proto-urban character or not (Shmaglij, Videiko 2005; Kruts 2008; Diachenko 2012; Videiko, Rassmann 2016; Müller 2016; Chapman, Gaydarska 2016; Diachenko, Menotti 2017; Chapman 2017; Nebbia et al. 2018).

Under international contribution, since 2009, a new round in the Tripolye research with intensive fieldwork focused on mega-sites have started which newly undertakes the attempt to answer these and further questions with improved methods and the “fresh view” of foreign outsiders (e. g. Chapman et al. 2014; Müller, Rassmann 2016; Chapman, Gaydarska, 2016). Currently, different teams from the Ukrainian Academy of Sciences (direction Aleksey Korvin-Piotrovskiy), the Borys Grinchenko Kyiv University (direction Mykhailo Videiko), the Durham University (direction: John Chapman), the Roman Germanic Commission in Frankfurt (Main) of the German Archaeological Institute (direction Knut Rassmann) and the Kiel University under direction of Johannes Müller are concerned with various research activities. In many respects, the Tripolye Museum in Legedzyne and its director Vladimir Chabanyuk are an indispensable part and in many senses the centre of this research framework.

The intensive preliminary work of the years 2011–2014 is currently continued from Kiel side within the scope of the Collaborative Research Centre 1266: «Scales of Transformation–Human-Environmental Interaction in Prehistoric and Archaic Societies» of the Kiel University in those frame the

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attempt is undertaken to gain a more general understanding of transformations of human societies. Key questions of the sub-project D1 “Population agglomerations at Tripolye-Cucuteni mega-sites” – a case study within this wider cooperative project – concerns the reconstruction of development, population dynamics, environmental conditions and constraints at different spatial scales in order to come up with conclusions regarding the essence, nature and significance (importance) of the so-called «mega-sites».

Based on the mentioned research we hope to be able to answer questions about the social or political transformations which triggered the agglomeration of several thousands of people in Tripolye mega-sites in the relatively short period between about 4200 and 3600 BCE, how social and economic space was organised within these settlements and if the regional natural carrying capacity within their catchment area was reached. On the other hand we try to gain a better understanding regarding economic strategies and social and economic factors which caused and influenced the collapse and dispersal of these population agglomerations. In our opinion, the deeper understanding of all these different aspects requires also a trans-regional perspective not only within the distribution area of the Cucuteni-Tripolye cultural complex but also in the wider frame of neighbouring cultures for example in the Caucasus and the Carpathian Basin.

Our field work activities at Tripolye sites coarsely can be divided in three stages. In the *first* stage between 2009 and 2012 high resolution medium and large scale magnetic surveys were performed in several mega-sites. In the *second* stage between 2013 and 2016 research was focused on the site- and micro-regional level at the example of the mega-site Maidanetske. Since 2016 the work is continued at the meso-regional level of three key regions which encompass large parts of the distribution area of the Cucuteni-Tripolye cultural complex. The comparison of these three regions provides a macro-regional perspective on the Cucuteni-Tripolye complex as a whole. In the following strategies and (some) preliminary results of each of these stages are briefly presented.

1. Geophysical Survey

The application of medium and large-scale magnetic surveys on Tripolye settlements became a key-strategy for the current stage of research. Two aspects should be highlighted: On the one hand, in the last decades critical technical enhancement was obtained with the development of car-driven GPS-coupled multi-sensor-gradiometers, which allow magnetic surveying of areas on a new scale providing magnetic maps with very high spatial resolution in the range of centimetres (Rassmann et al. 2016). On the other hand, in the loess-soils of the

Ukrainian lowlands an excellent visibility of burnt and deepened features is given. This good contrast is due to the soil conditions and the relatively short life-spans of many settlements and the resulting low degree of superimposition of findings.

The high-resolution magnetic plans provided completely new insights in components and spatial organization of Tripolye settlements. In the Bug-Dnieper interfluvium important mega-sites as Maidanetske, Talianki, Dobrovody and Nebelivka from the phases Tripolye B2 and C1 were surveyed, which represents the period with the largest settlements and highest degree of population agglomeration (Kruts et al. 2011; Chapman et al. 2014; Rassmann et al. 2014; Ohlrau 2015; Rassmann et al. 2016; Chapman, Gaydarska, Hale 2016).

The magnetic plans of the mentioned settlements consistently show elements which are usually associated with a mega-site of the Bug-Dniester interfluvium. These elements are (Figure 1):

1. Concentric rings of houses around a central unbuild place,
2. Radial trackways those lead into the site, and cross the concentric house rows. Both categories are aligned along house-empty spaces which are interpreted as communication paths,
3. Enclosures those demarcate certain areas within the site and around the site,
4. Houses of different size between 9 and 250 m² (average c.70 m²) that are in the majority of cases burned down, while a smaller parts of buildings are less visible (Ohlrau, 2015),
5. Thousands of pits which can in many cases clearly be affiliated to houses due to their positioning,
6. A special category of buildings, so called “mega-structures”, those are in many cases much larger than normal houses, those are in many cases located in particular visible positions within the public space of the settlements and those show also specific architectural characteristics, and
7. A category of very strong round magnetic anomalies could be identified as remains of up-drought double chamber pottery kilns of an advanced type which might indicate higher degrees of craft specialisation (Kruts et al. 2011; Kruts, Korvin-Piotrovskiy, Rassmann 2014; Korvin-Piotrovskiy et al. 2016).

2. Maidanetske: Research on the spatial level of one mega-site

The described very precise survey results provided an extremely high potential for detailed studies of Tripolye settlements. The activities of the Kiev-Kiel fieldwork team focused on the mega-site Maidanetske and its surrounding which is located in the Uman region and belongs with a size of 200 ha to the largest Tripolye settlements at all (Müller et al. 2014; Videiko et al. 2015; Ohlrau 2015; Müller, Videiko 2016; Müller et al. 2016b).

The attempt to gain a deeper understanding of the site development and potential spatial differentiation of a mega-site required a sampling strategy which takes into account the huge dimension of the settlement (Müller et al. 2016a; Müller et al. 2016b). Elements of this sampling strategy are 1. The systematic evaluation of features in different of the concentric house rings and parts of the settlement, 2. The excavation of test trenches in different parts of the site, and 3. The systematic and exemplary excavation of different feature-categories which we determined in the plan of the magnetic survey. Extensive sampling was performed in all trenches for typo-chronological studies, radiometric dating, soil-scientific and geochemical investigations, zoo-archaeological and paleo-botanical analysis.

Meanwhile almost ninety radiocarbon dates from all investigated excavations were dated in order to gain an idea of the accurate site chronology and development. Preliminary results of the still ongoing evaluation of these data and typo-chronological studies of pottery remains indicating on the one hand far-reaching contemporaneity of house remains from different concentric house rings (Müller et al. 2016a). On the other hand, for example pits backfilled with burnt house remains could be identified which seem to represent earlier stages of the site occupation. In contrast to previous chronological models, our data seem to indicate a surprising long-lasting occupation of the settlement Maidanetske between about 3900 and 3600 BCE.

The exemplary excavation of burnt houses, which seem to a high degree standardised in terms of internal organization and interior furnishings, provided clear indicators for distinct activity zones and also certain differences between individual households (Müller, Hofmann, Ohlrau 2016c; Müller et al. 2017). Accordingly, a somehow elevated storey represented the main floor of the houses were the predominant number of activities took place. On the other hand also the space below this platform was probably used for example for storage and food preparation.

Regularly, beside of houses pits are located which, most likely, were predominantly dug into the ground in order to exploit clay materials for the house construction. We detected that several of these pits partly went through complex biographies with repeated recuttings, deposition of feasting remains and debris of burnt houses (Müller, Videiko 2016; Müller et al. 2016b). With a certain probability, such pits can be identified in the plan of the magnetic survey and distinguished from "normal pits" that were used regularly or occasionally for the disposal of domestic waste (Ohlrau 2015).

In trench 80 we investigated a magnetic anomaly which could be identified based on its specific signature as remain of an updraught pottery kiln of an in Europe new type with separated combustion chamber and firing chamber (Videjko et al. 2015; Müller, Videiko 2016; Korvin-Piotrovskiy et al. 2016). In accordance with other findings, the repeated renewal of this kiln indicates a long use life and therewith indirectly also the long occupation of the settlement. We assume that the construction, operation and maintenance of such kilns required the existence of specialised craftsmen what is supported also by the highly standardised ceramic pastes and generally high quality of Tripolye pottery.

From an economic point of view, analysis of animal bones and botanical macro-remains indicate for Maidanetske a mixed subsistence economy that was based on crop cultivation and animal husbandry (Kirleis, Dal Corso 2016; Müller et al. 2017; Dal Corso et al. 2018). Analyses on the carrying capacity of the site catchment indicate that the environment was able to carry the economic and environmental demands even of these large Tripolye settlements that might encompassed a population in the scale of 10.000 inhabitants per site (Ohlrau et al. 2016). However, regarding the question of the population size, further evaluation of our data need still to show how plausible is the assumed simultaneous existence of a majority of the burnt down houses.

Several sources are used to reconstruct the social and political organisation of Maidanetske community (Ohlrau 2015; Müller, Hofmann, Ohlrau 2016). Above the level of individual houses as the basic unit of social reproduction, separated house clusters of in average seven adjacent buildings in the same row are interpreted as indicator for the existence of neighbourhoods which could be based on kinship and joint decision making. Higher levels of communal political integration might be reflected on the one hand in the spatial division of the site through concentric or radial streets. On the other hand speaks the regular arrangement of the so called "mega-structures" in particular good visible positions within the public space for their character as some kind of communal buildings in those about 50–150 households might have been integrated (cf. Hofmann et al. 2016).

Since, however, so far in Tripolye settlements only very few of such building structures have been investigated in detail, their exact character remains still unclear. Thus, in trench 111 in 2016 one of such structure was excavated situated in the house-empty concentric 'public' ring zone which probably represents the main street of the settlement. This building showed, beside of its prominent positioning with the settlement, also architectural characteristics which are clearly different

from normal houses. Ongoing detailed analysis of the find inventory will hopefully provide further clues on the concrete functions of such buildings.

3. Bug-Dnieper interfluvium: Ongoing meso-regional research

After the exemplary and detailed investigation of one mega-site, the research strategy was extended spatially and diachronically. Three test regions in North Moldova, in the Dniester-Southern Bug interfluvium and in the Southern Bug-Dnieper interfluvium were chosen within those we are trying to trace the emergence and decline of large agglomerated settlements and mega-sites at meso-regional scale in diachronic perspective (Figure 2). Research in these regions is focused on key sites and includes for each of these settlements magnetic surveys, test trenches, radiometric dating, typo-chronological analysis (if possible including find-inventories of earlier research) and paleo-botanical, soil-scientific and zooarchaeological investigations.

The work in geographically and ecologically different areas opens different perspectives: On the one hand, regionally differentiated trajectories and populations dynamics can be identified and reconstructed. On the other hand, it seems possible to understand environmental and cultural factors which triggered for example distinct differences in sites size and site densities in the different study regions. Since for example mega-sites of more than 100 ha extension are clearly concentrated in the Southern Bug-Dnieper region, a lot of attention was paid to this region.

In this study "region A" we chose sites from different phases of the Tripolye development for further investigations. In order to understand the beginnings of the mega-site phenomenon early large sites were selected as key sites for further work which represent so-called "East Tripolye" (Chizhovka, Onopriyivka, Vesely Kut) situated north of the city Talne. Among other things due to differing techniques of pottery decoration with deepened ornaments, "East Tripolye" is considered as different line of development in contrast to the "Cucuteni" or "West Tripolye" development which is characterized through painted decorations (e.g. Movsha 1984: 66).

"East Tripolye"-settlements from the period Tripolye B1, B1-B2 and B2 were investigated by E. Tsveck who suggested four stages of East-Tripolye development (Cvek 1980; 1985; 1999; 2006). In order to gain a more clear understanding of the development of settlement layout and chronology we chose settlements from different stages. Based on new settlement plans among other things the continued growth of settlement size from about 20 ha (Chizhovka) to 60 ha (Vesely Kut) within the period Tripolye B1-B2 can be traced and

the emergence of the characteristic concentric settlement layout observed.

The trajectory towards the formation of mega-sites continued later under contribution of "West-Tripolye" during the phases Tripolye B2 and C1 in the well-known Vladimirovko-Tomashovka line of development. New magnetic research, surface collections and test excavations were for example performed in the settlement Volodimirovka (95 ha). Magnetic surveys were carried out also in the mega-site Glybochok (Tripolye B2 or C1, 140 ha) and several small sites in the wider surrounding of the mega-site Maidanetske (Ohlrau 2018).

In order to understand also the decline of Tripolye population agglomerations in the Southern Bug Dnieper interfluvium it is necessary to investigate further also mega-sites of the so-called Kosenovka regional group which represents the phase of final Tripolye C1 or C2 according to current relative-chronological opinions (Movsha 1984, c. 71; Rizhov 2007, c. 469). These last mega-sites which are differing from settlements of the Tomashovka group by many aspects as for example pottery style and house building are included in the focus of our research as well.

Conclusions

Currently, increased effort is made to understand the societal dynamics behind the emergence and the decline of singular Eneolithic mega-sites of the late 5th and the 4th millennium BCE which were situated in the Ukrainian forest steppe zone. The extreme large spatial extension of sites, high number of structures which belonging to such settlements and the existence of clearly different regional trajectories and regional differences requires the consideration of the problem on different spatial scale levels. Thus, the application of the strategy – *performing large-scale surveys, in order to refine the research potential – site level investigations – and a more in-depth study of the mega-site phenomenon through a diachronic and spatial perspective* seems appropriate for studying our research questions. The third stage of the Tripolye project is still in the stage of development, however the chosen strategy is in many respect already justified.

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Трипілля – стратегія та результати поточного українсько-європейського проекту

Метою статті є визначення основних завдань, стратегії та окремих результатів поточного українсько-європейського проекту, що має справу з феноменом трипільської культури. В даний час докладаються значні зусилля для розуміння соціальної динаміки виникнення та занепаду унікальних енеолітичних мега-сайтів кінця 5-го та 4-го тисячоліття до нашої ери, які знаходилися в лісостеповій зоні України. Надзвичайно великий розмір цих поселень, велика кількість різних археологічних об'єктів, що на них зафіксовані, а також чітка наявність різних регіональних траєкторій, відмінностей, в тому числі хронологічних, між цими сайтами, вимагають розгляду проблеми на різних рівнях просторового масштабу. Таким чином, застосування стратегії – 1 проведення великомасштабних розвідок з метою визначення дослідницького потенціалу – 2 дослідження на рівні окремого сайту – 3 більш поглиблене вивчення феномену мега-сайтів через діяхронічну та просторову перспективу, здається доцільним для вивчення наших дослідницьких питань. Третій етап трипільського проекту все ще знаходиться на стадії розробки, проте обрана стратегія в багатьох відношеннях вже виправдовує себе.

Ключові слова: *трипілля, енеоліт, мега-сайти, дослідницька стратегія, магнітні дослідження, просторові масштаби*

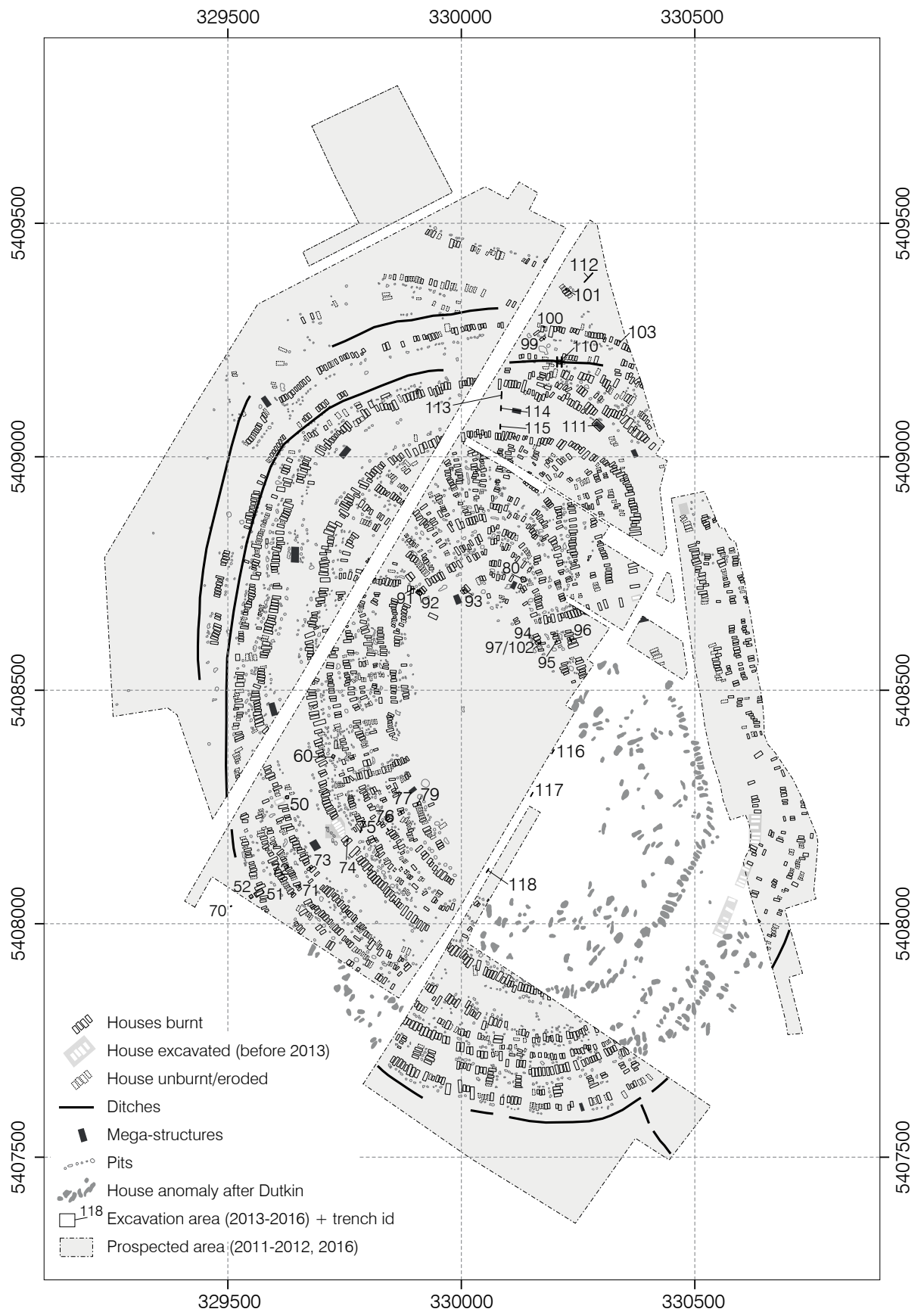


Fig. 1. Maidanetske. Plan of the magnetic survey (as of 2016) with excavation trenches (WGS84 ellipsoid, UTM 36N coordinate system). With numbers are trenches of the 2013 to 2016 excavations displayed (Source: R. Ohlrau/R. Hofmann).

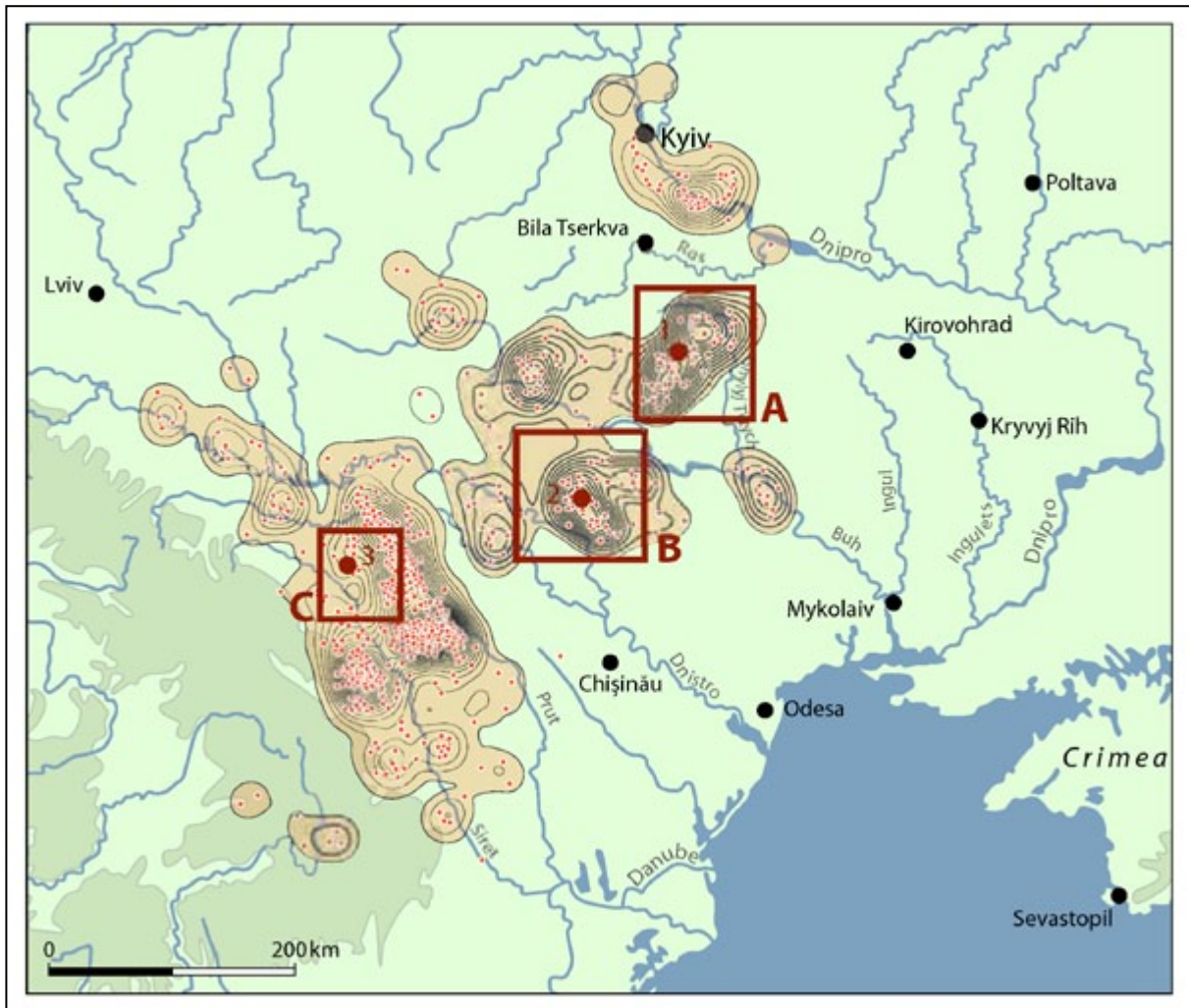


Fig. 2. The distribution of Tripolye C1 sites (kernel density; KDE radius 30 km) after Müller and schematic illustration of the study regions of the project “Population Agglomerations in Tripolye-Cucuteni Mega-Sites” in the CRC 1266 “Scales of Transformation”. **A)** Southern Bug-Dnjepr interfluvium; **B)** Southern Bug-Dniester interfluvium; **C)** Middle Dniester Region (Source: K. Rassmann/K. Winter/J. Müller).