NEW RESULTS OF THE PALAEOENVIRONMENTAL AND ARCHAEOLOGICAL RESEARCH OF THE SUBNEOLITHIC HUNTER-GATHERER COMMUNITIES OF THE NIEMEN CULTURE CASE STUDY FOR LIPSK SITE (NE POLAND)

DOI: : <https://doi.org/10.18509/AGB.2020.15>

UDC: 903/904'1(438)"632/634"

903'12(438)"632/634"

**Marcin Frączek¹, Agnieszka Bęben², Krzysztof Żurek¹, Tomasz Kalicki¹,
Adam Wawrusiewicz³, Weronika Szypul, Piotr Kasprzyk**

¹ *Institute of Geography and Environmental Sciences, Jan Kochanowski University in Kielce, Poland*

² *Student Science Club of Geomorphologists „Złoty Bażant”, Jan Kochanowski University in Kielce, Poland*

³ *Podlachian Museum in Białystok, Poland*

Corresponding author: mfraczek@ujk.edu.pl

submitted: 24.02.2020

accepted: 09.05.2020

published: 20.08.2020

Abstract

Results of studies on Lipsk and other sites in the Biebrza Basin indicate some periods of climatic changes and an increase of morphogenetic processes activity. Presence of peats dated at 7050 ± 60 (MKL-4798) 6033-5789 cal. yr BC on sandy sediments in profile L22 could be correlated with the older colluvial deposits at Lipowo. In profile L20 on the Preboreal peats enters the Boreal or Early Atlantic sandy sediments, which were covered by the Atlantic peats. The aeolian activity could have led to the appearance of sands at the bottom of the L20 profile between 9880 ± 100 BP 9803-9182 cal. yr BC and 7350 ± 110 6425-6026 cal. yr BC.

Keywords: Podlasie region, Biebrza Basin, Niemen Culture, subneolithic hunter-gatherer communities.

INTRODUCTION

The study area is located in the NE part of the Biebrza Basin (ice-marginal valley on the borderland between Central and Eastern Europe in NE part of Poland) in Podlasie Voivodeship. Relief of the region was formed during Middle Polish (Saalian) Glaciation – Warta Cold Stage. The Biebrza is underfit river with vast peat-bogs on its valley floor because this was a pathway of meltwater during Pomeranian phase of last glaciation westward. The Pleistocene relief of

the valley was transformed in small degree during the Late Glacial and Holocene. In this period controlling factors of the evolution were climate and vegetation changes. The region was an oecumene of hunting and gathering community during the Neolithic. Their lifestyle was inextricably linked to the vast valley area and connected to the climate fluctuations. This communities were in constant motion and did not develop an established lifestyle.

THE AIM OF THE STUDY

AND METHODS

The main aim of this work is to present the preliminary results of geoarchaeological studies of the Lipsk area. Although the recognition of the environmental context and stratigraphy of the "Lipsk" archaeological site and reconstruction of

selected components of the environment from the time space of the Niemen Culture. The study includes the archaeological site (on-site study) and surroundings (off-site study). Lipsk is one of the four archaeological sites in the Biebrza Basin

(Figure 1) developed in cooperation between Department of the Geomorphology, Geoarchaeology and Environmental Management, Jan Kochanowski University in Kielce, Institute of Geography Kielce and Podlachian Museum in Białystok. Until this year, during the studies about the Niemen Culture in Podlasie region, geological,

geomorphological and geoarchaeological works were conducted at the Krasnoborki [1], Lipowo [1], [2], Grądy-Woniecko [3] and Lipsk sites [4]. At the last one (red box - Figure 1) all studies were conducted in two excavation seasons in 2018 and 2019.

Figure 1. Location of the study area in the context of other sites in Biebrza Basin (after [1])

GEOLOGICAL AND GEOMORFOLOGICAL BACKGROUND

Relief of this region formed during Middle Polish (Saalian) Glaciation - Warta Cold Stage. During the next ice-sheet advance until the Pomeranian phase (Figure 2) of last glaciation [5] 15.5-15.0 ka BP, [6] 16.2 ka BP outflow from Naroch-Wilia and Skidel the dam lakes and river waters of the upper Neman river followed Łosośna river valley, it's tributary Tatarka river breakthrough Pripilin-Nurki gap section to Biebrza and Narew river valleys [5], [7], [8] (Figure 3). Therefore, the Biebrza is underfit river with vast peat-bogs on its valley floor. However, in the close vicinity of the archaeological site, we can find traces of a now non-existent

watercourse, which could be connected with LGM (Figure 2, 3) only in a short distance from Hacıłówka to Biebrza (Figure 3). In Pomeranian Phase ([9] therein references) the outflow from Upper Niemen through Wolkuszanka, Hacıłówka to Biebrza could be released. It could have occurred around 17-16 ka yr BP [9] or more precisely 16.2 ka yr BP [6]. The Pleistocene relief of this part of Biebrza valley was transformed in small degree during the Late Glacial and Holocene. In this period controlling factors of the evolution were climate and vegetation changes [10].

Figure 2. The extent of the last Scandinavian Ice Sheet (SIS) south of the Baltic Sea (after [9] therein references).

PALAEOGEOGRAPHICAL AND ARCHAEOLOGICAL RESULTS

Lipsk site is located in northern part of Upper Biebrza Basin near Nowy Lipsk on a vast peat plain. Nowadays it is a well-exposed dune-like elevation with an area of about 1 ha, in the central part of a large peat-bog. From the south, it adjoins the modern Biebrza riverbed. On the eastern side of the elevation, at a distance of about 100 meters, there is an oxbow lake with is the remnant of a now non-existent watercourse, whose relic is the extensive (about 0.5 ha) old lake partial covered by the floating mat (Figure 4). In the depression, there are peats and peaty silts with a thickness of up to 6 meters in borehole L21 (Figure 5). Based on off-site studies it was possible to create schematic geological cross-section for the surrounding area (Figure 5) and more detailed for the archaeological site and part of the dune (Figure 6). Within the site and its surroundings can be distinguished several different age geological segments. The first one is an elevation built of dune fine and medium-grained

sands. The second one, located at the foot of the elevation, is a part of the sandy alluvial plain of a braided river. A beginning of peat accumulation in the valley floor was radiocarbon dated at 9880 ± 100 BP (MKL-4799) 9803-9182 cal. yr BC from L20 borehole (Figure 5). In the next stage occurred beginning of peat accumulation, near an archaeological site in Lipsk, which was radiocarbon dated at 7600 ± 90 BP (MKL-4801) 6633-6254 cal. yr BC in the bottom of L22 profile (Figure 5). Around the same time 7350 ± 110 (MKL-4798) 6425-6026 cal. yr BC peats enter on deluvial (colluvial)/aeolian/fluvial deposits? (samples under analysis) in L20 profile (Figure 5). After that, 7050 ± 60 (MKL-4798) 6033-5789 cal. yr BC, on the same kind of sediments? (not cleared yet) enters peats in profile L22 (Figure 5). After that event, at both sites, starts the accumulation of undisturbed peats.

Map Legend

1 - Peat, 2 - Peaty, sandy muds and humus sands, 3 - Sands and gravels of flood terraces, 4 - Aeolian sands in dunes, 5 - Aeolian sands, 7 - Sands and muds of lowest supra-inundation terrace, 8 - Sands and muds of middle supra-inundation terrace, 9 - Sands, gravels and muds of higher supra-inundation terrace, 10 - Sands, gravels and muds of highest supra-inundation terrace, 11 - Glaciofluvial sands and gravels, 12 - Glaciolacustrine sand, silts and clays, 13 - Sands, gravels and boulders of kames terraces, 14 - Sands and gravels of kames and dead-ice moraines, 15 - Sands and gravels of crevasse features, 16 - Sands, gravels, tills and boulders of end moraines, 17 - Sands, gravels, tills and boulders of push moraines, 18 - Glacial sands and gravels, 19 - Tills, locally with interbeds of glaciofluvial sands and gravels or glaciolacustrine clays and silts, 21 - Glaciolacustrine sands, silts and clays, 22 - Glaciofluvial sands and gravels, 25 - Sands, silts, gravels and tills of kames, 28 - Sands, gravels, tills and boulders of end moraines, 29 - Sands, gravels, tills and boulders of push moraines, 30 - Glacial sands, gravels and boulders, 31 - Tills, 32 - Last Glacial Maximum (LGM), 33 - study area, 34 - Bedrock outcrop of glacial rafts in Quaternary deposits and in glaciotectionic structures

Figure 3. Part of geological map 1:250 000 [after 11].

Figure 4. Location of the geological boreholes and archaeological trench.

The archaeological trench was located on the south-eastern edge of the dune at a distance of about 10 m from the currently visible slope of the dune (Figure 4, yellow box). This area was chosen because of the possibility of capturing well-preserved stratigraphical systems that can be correlated with specific settlement phases in the palaeoenvironmental context. During the archaeological research in the 2019 season, nearly 2000 artifacts were documented. Most of the prehistoric material discovered at this site was flint material. Fragments of ceramic vessels represent only 10 percent of this collection. The artefacts were in all explored layers. The first, few finds were recorded at a depth of about 0.2 m, in the bottom of the organic sediment (peat). Up to a depth of about 0.5 m, these elements were clearly culturally incoherent. In the same stratigraphic system, flint products characteristic for the Preboreal period (Kunda Culture) and the Atlantic period (Janisławice-Neman Culture) coexisted. They were also accompanied by fragments of ceramic vessels from different periods. The youngest of them should be dated at the beginning of the Subatlantic period (about 2500-2000 BP). Correlating these archaeological data with the stratigraphic layers of

the excavation profile (4 in Fig 7), it can be assumed that these materials could be mixed by the deluvial processes. This process was probably launched in the Subatlantic period. It caused the dislocation and mixing of archaeological material associated probably with the existence marks of encampments or settlements located in higher parts of the dune. Below this stratigraphic segment (Fig. 7 layer 3, 4), homogeneous archaeological material, related to the settlement and economic activity of subneolithic hunter-gatherer communities, was documented (Neman Culture).

Most of the artefacts discovered here have been preserved in situ, including a deposit of several fragments of flint blocks and cores. At this level, fragments of ceramic vessels have also been registered, which can be initially dated for a period of about 7-6 thousand years BP. The presence of several products of the Late Paleolithic origin is unclear. These artefacts were found in the lowest strata of anthropogenically transformed position. They may not be as obvious proof of the old settlement. There are many examples when the old flint artifacts/products were transferred and used in much later times.

PRELIMINARY CONCLUSIONS

Results of studies on Lipsk and other sites in the Biebrza Basin [1], [2], [3] indicates some periods of climatic changes and an increase of morphogenetic processes activity. Presence of peats dated at 7050 ± 60 (MKL-4798) $6033-5789$ cal. yr BC on sandy sediments in profile L22 could be correlated with the older colluvial deposits at Lipowo site deposited after 7020 ± 70 BP cal. $6016-5746$ BC, which have been covered with peat-bog during the next humid period at the end of the Atlantic [2]. The origin of this sediment is still unexplained (during laboratory analysis). In profile L20 we are dealing with different age sequence. On the Preboreal peats enters Boreal or Early Atlantic sandy sediments, which were covered by The Atlantic peats. Aeolian activity during this period is not excluded. Around

the same time, that kind of activity took place near Grzędy site [3]. Within the non-fluvial segment of Wizna Basin, the dune complex is surrounded by peats whose thickness reaches 2 m and the bottom was $14C$ dated at $10\ 135 \pm 90$ BP $10\ 143-9396$ cal. yr BC. The surface under the peats was transformed by aeolian processes at the end of the last glaciation and the Younger Dryas cooling resulted, in probably, that the complex of parabolic dunes was still active at the end of the Late Glacial and Early Holocene. After the climate warming in the Preboreal starts the accumulation of peats but with short-time an increase of aeolian processes activity at the beginning of the Atlantic - 8320 ± 80 BP $7542-7141$ cal. yr BC [3].

Figure 5. Geological cross-section of Lipsk site, lithology, grain size and Folk-Ward's distribution parameters of selected profiles. Lithology: A - fine-grained sands, B - peaty silts, C - silty peats, D - peats; Fractions: 1 - coarse sand (-1 to 1 ϕ), 2 - medium sand (1-2 ϕ), 3 - fine sand (2-4 ϕ), 4 - coarse and medium silt (4-6 ϕ), 5 - fine silt (6-8 ϕ), 6 - clay (above 8 ϕ), 7 - organic content; Folk-Ward's distribution parameters: Mz - mean diameter, δl - standard deviation (sorting), Skl - skewness, KG - kurtosis.

Figure 6. The layout of the archaeological excavation profile ST 46/W1 (green box Figure 5)

These phenomena could have led to the appearance of sands at the bottom of the L20 profile between 9880 ± 100 BP $9803-9182$ cal. yr BC and 7350 ± 110 $6425-6026$ cal. yr BC. After detailed sedimentological analyses, we will be able to answer the question of what kind of sediment and in what kind of sedimentological environment it was deposited (Figure 5. - L20 and L22 profiles). Around the same time in Wizna Basin had occurred macromeander cut off 14C dated at 9900 ± 90 BP $9762-9231$ cal. yr BC (Ruś site) [1] and the beginning of peat accumulation on calcareous gyttja 14C dated at $10\ 290 \pm 120$ BP $10\ 593-9664$

cal. yr BC (Włochówka site) [1]. The elevated form located near Lipsk certainly belongs to one of the most interesting archaeological sites in the Biebrza Basin. Its size and variety of documented settlement phases forces discussion mainly about the role it played in the context of environmental conditions determining the lifestyle of hunting and gathering communities. The technological and morphological characteristics correspond to the general "idea" of the Late-Mesolithic lithic technology of hunter-gatherer communities from the areas of north-eastern Poland from the beginning and the first half of the Atlantic period (comp. with [1]).

REFERENCES

- [1] Frączek M., Kalicki T., Wawrusiewicz A., Sanko A.F. Kontekst środowiskowy i stratygrafia stanowiska archeologicznego Lipowo w Kotlinie Biebrzy (NE Polska), *Acta Geographica Lodziensia*, 107, 25-37, 2018.
- [2] Frączek M., Kalicki T., Wawrusiewicz A., Sanko A.F., Małęga E. The hunter-gatherer communities from Upper Biebrza Basin - environmental context. Case study from Lipowo site (NE Poland), *Geobalcanica Proceedings*, 87-93, 2018.
- [3] Wawrusiewicz A., Kalicki T., Przeździecki M., Frączek M., Manasterski D. Grądy-Woniecko. Ostatni łowcy-zbieracze znad środkowej Narwi, Muzeum Podlaskie w Białymstoku, Białystok, 2017.
- [4] Wawrusiewicz A., Kalicki T., Frączek M., Bęben A., Kasprzyk P., Szypul W., Żurek K. Wyspa wśród bagien. Pierwsze wyniki badań archeologicznych i paleogeograficznych nad osadnictwem społeczności subneolitycznych w Lipsku nad Górną Biebrzą, 9-12.12.2019 Konferencja "PRZESZŁOŚĆ MA PRZYSZŁOŚĆ! THE PAST HAS A FUTURE", Instytutu Archeologii Uniwersytetu Warszawskiego, 32-33.
- [5] Val'chik M. A. Razvitie dolinno-rechnoy seti Belorussii i Pribaltiki v sviazi s degradaciey valdayskogo lednikovogo pokrova [in:] *Gidrographicheskaya set' Belorussii i regulirovanie rechnogo stoka.* (ed. L. M. Shirokov). Universitetskoye. Minsk. 3-10, 1992.
- [6] Kozarski S. Deglacjacja północno-zachodniej Polski: warunki środowiska i transformacja geosystemu ($\sim 20\text{KA} \rightarrow 10\text{KA}$ BP). Dokumentacja Geograficzna 1, 1995.
- [7] Żurek S. Geomorphology of the Biebrza valley [in:] *Towards protection and sustainable use of the Biebrza Wetlands: Exchange and integration of research results for the benefit of a Polish-Dutch Joint Research Plan* (eds. H. Okruszko, M. J. Wassen). Utrecht, 15-47, 1994.
- [8] Kalicki T. Zapis zmian klimatu oraz działalności człowieka i ich rola w holocenijskiej ewolucji dolin środkowoeuropejskich, *Prace Geograficzne IGiPZ PAN* 204, 348 p, 2006.
- [9] Tylmann K., Woźniak P.P., Vincent R., Rinterknecht V.R. Erratics selection for cosmogenic nuclide exposure dating – an optimization approach, *BALTICA*, 31/2, 2018, p.100–114.
<https://doi.org/10.5200/baltica.2018.31.10>
- [10] Kalicki T., Wawrusiewicz A., Frączek M. Upper Biebrza basin – problems of geological, geomorphological and geoarchaeological mappings, *Universitetskiye geologicheskiye chteniya „Sovremennyye problemy geologicheskogo kartirovaniya”*, 14-15.04.2016, Mińsk, 61-64, 2016.
- [11] Marks L., Karabanov A.K. Geological map of Polish - Belarusian cross-border area, Sokółka and Grodno area, MNiSW, PIG-BIP, Warszawa, 2011.