GEOARCHAEOLOGY OF "VALLEY FORTS": CASE STUDY AT JATWIEŹ DUŻA (PODLASIE, E-POLAND) - FIRST RESULTS

DOI: http://dx.doi.org/10.18509/GBP.2019.06
UDC: 550.86:902.2(438)

Paweł Przepióra[1]
Krzysztof Żurek[2]
Tomasz Kalicki[1]
Marcin Frączek[1]
Adam Wawrusiewicz[3]
Aleksander Piasecki[3]
Kornelia Piasecka[3]
Karolina Fularczyk[2]
Piotr Biesaga[2]
Emanuela Malęga[2]
[1] Institute of Geography, Jan Kochanowski University in Kielce, **Poland**
[2] Student Science Club of Geomorphologists „Złoty Bażant", Jan Kochanowski University in Kielce, **Poland**
[3] Department of Archaeology, Podlaskie Museum in Białystok, **Poland**

ABSTRACT

The territory of north-eastern Poland is experiencing a veritable archaeological renaissance through many research initiatives. In 2017, using the LiDAR method, 26 settlement sites located in the Podlasie Lowland were discovered. These sites have a similar form of construction and together they represent a compact settlement system. The main aim of this studies is to present the preliminary results of geoarchaeological studies of the Jatwieź Duża site as an example of this kind of settlement. This form is built by two distinct moats (circle shape) separated by earth embankment and a central flat area with a diameter of about 60 m. It is located on the Pleistocene clays, fluvioglacial sands and gravels. In the course of archaeological excavations, ten archeological resource objects with 79 parts of pottery and 83 flint artifacts were discovered. Technological and stylistic analysis of the pottery has shown that these artifacts belong to Urnfield culture communities from the Surash Group which is one of many regional groups of Urnfield culture in Poland. The communities of this group developed in the Podlasie Lowland in the Bronze and Iron Age based on a strong local tradition. Preliminary results of archaeological studies indicate that this structure was used as a storage facility by the communities of this culture in the Bronze Age (OSL dating).

Keywords: Valley Fort, archaeological, geoarcheological, palaeogeographic, Biebrza River, Podlasie, Jatwieź Duża, Urnfield culture, Bond Event.

INTRODUCTION

The territory of north-eastern Poland, is experiencing a veritable archaeological renaissance through many research initiatives. In 2017, using the LiDAR method were discovered 26 settlement sites in Biebrza Basin located in the Podlasie. These sites have a similar construction form and together a compact settlement system.

The archaeological site Jatwież Duża 5 (approx. 31a) is located on the SE from Jatwież Duża village (Sokółka country, Podlaskie voivodeship, NE Poland) in the Brzozówka river valley, left-site tributary of Biebrza River. There are Biebrza Basin (Fig. 1) in the Biebrza Basin in North Podlasian Lowland) [1]. In 2018 archaeological and palaeoenvironmental studies were carried out. Work aimed at recognition the functional and chronological-cultural context of this object.

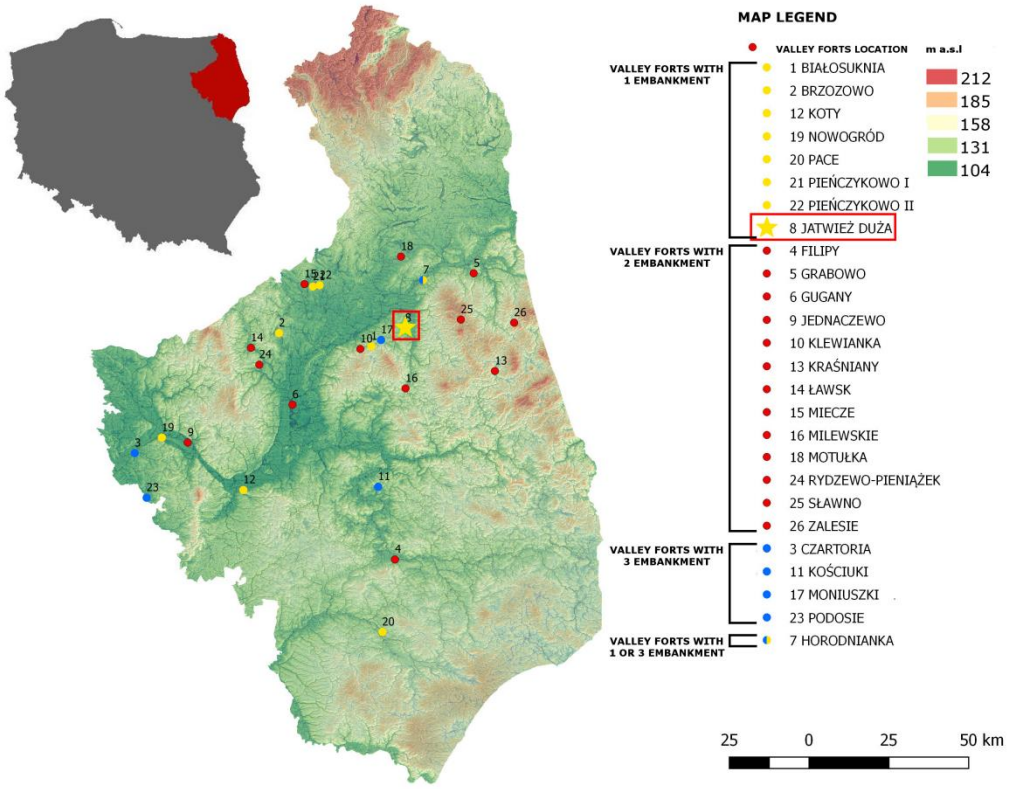

Figure 1. Location of the research area against similar site in the Podlaskie voivodeship

AIM AND METHODS OF THE STUDY

The aim of the study is to present the preliminary results of archaeological and geoarcheological works at the Jatwież Duża 5 archaeological site. The methodology of archaeological research consisted in marking out a trench on the NW-SE orientation, 25 m long and 2 m wide. The archaeological survey was conducted from the central elevation of the form and crossed two moats. In order to capture the palaeogeographic context made 4 geological drilling near the analyzed object. Obtained samples analyzed in the Research and Didactic Laboratories of the Institute of Geography in Jan Kochanowski University in Kielce (Poland). The grain size analyses was made using the sieve method and the results were presented graphically by the GRANULOM program with the Folk-Ward's distribution parameters. Also pH and content of $CaCO^3$ in sediments from excavation and boreholes were done. One sample from the archeological excavation bottom was OSL dated. In order to better recognize of the hillfort to shows how difference in elevation of the structure elements in the site used DEM.

RESULTS

The Jatwieź Duża 5 site is located about 1.5 km westward of the Brzozówka River. The object located at the site is characterized by an oval form of anthropogenic origin, which indicates permanent or temporary settlement in the Prehistory (Fig. 2). This form is build by two distinct shape rings separated by embankment and a central flat elevation with about 60 m diameter. Archaeological excavations were made in the north-western direction. It was 25 m long and 2 m wide, crossing the embankment and both moats (Fig. 3). In the course of excavations discovered 10 archeological resource objects with 79 fragments of ceramics and 83 flint tools.

The materials obtained during the archaeological research carried out in 2018 are very modest. The few monuments are two sets of artifacts: vascular ceramics and flint. The first group consists of 79 fragments of clay vessels, which can be associated with the settlement activity of the Bronze Age society, identified with the regional cultural group of Urnfield culture circle. Technological and stylistic analysis of ceramics has shown that these are artifacts from the Urnfield culture communities from the Surash Group [2], [3]. It is one of many regional groups of the Urnfield culture in Poland. The communities of this group developed in the Podlasie in the Bronze and Iron Age based on a strong local tradition. The society of this group is still poorly recognized by the Polish archaeological school [4], [5]. The population of this culture most probably appeared in this territory at the turn of the 4th and 5th Bronze Age period [2].

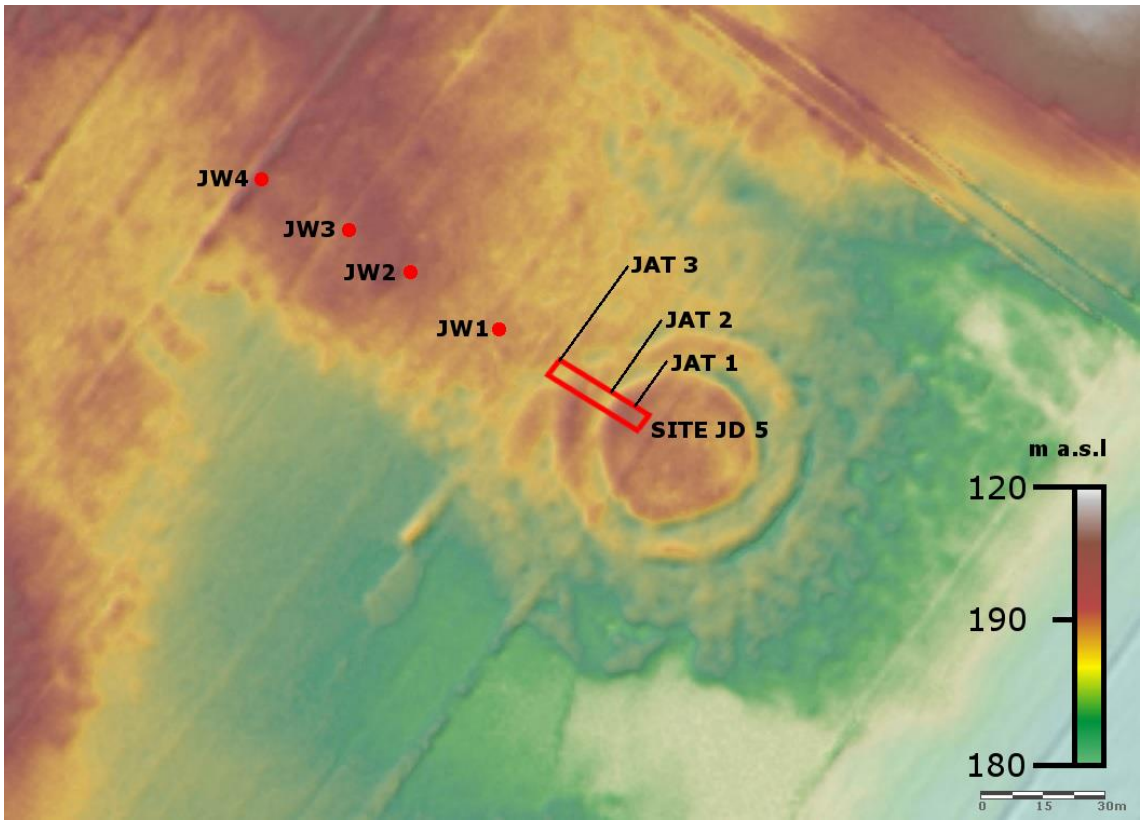

Figure 2. Location of profiles and archaeological excavation at the Jatwieź Duża 5 site [6]

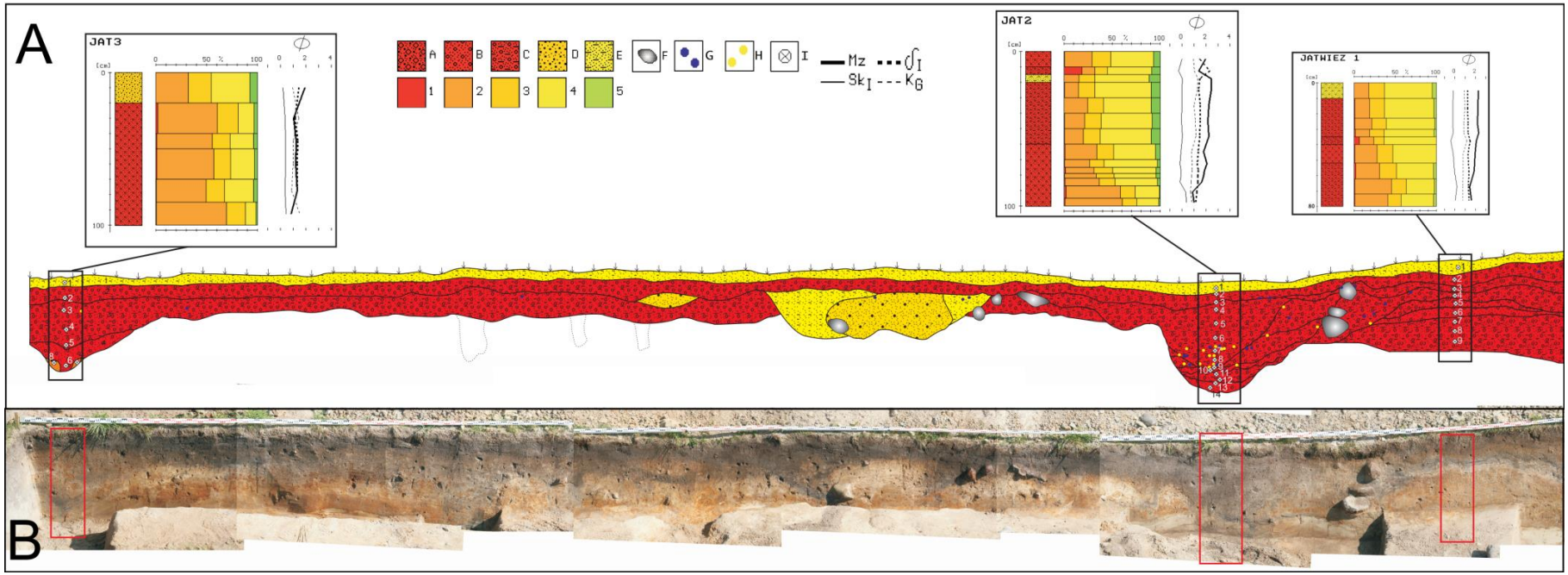

Figure 3. Geological cross-section of Jatwieź site, lithology, grain size and Folk-Ward' s distribution parameters of selected profiles (A) and panoramic photo of archaeological excavation: N profile (B)

Lithology: A - sands with gravels, B - sands with single gravels, C - silty sands with single gravels, D - coarse sands E - silty sands, F - boulders, G - single flint artifacts, H - parts of pottery, I - sedimentological samples;

Fractions: 1 - medium and fine gravel (under -2ϕ), 2 - coarse sand (-1 to 1ϕ), 3 - medium sand (1-2ϕ), 4 - fine sand (2-4ϕ), 5 - coarse and medium silt (4-6ϕ), 6 - fine silt (6-8ϕ), 7 - clay (above 8ϕ); Folk and Ward' s distribution parameters: Mz - mean diameter, δ_I - standard deviation (sorting), Sk_I - skewness, K_G - kurtosis

The flint material consists of 83 monuments. These artifacts were made with the use of splitered pieces techniques, the most common in the production of societies of the Bronze Age and the beginnings of the Iron Age.
In order to determine the date of the site, a sample was taken from the layer below the moat filling. The stratigraphic scheme was determined by the OSL dating of the sample taken from the southern profile. The sediments was OSL dated at 2.93±0.44 ka (UJK-OSL-98). This date should be associated with the beginning of the functioning of this object. It correlates with the community Urnfield culture activity in NW Poland and with climate cooling - Bond Event [2], [7].
Archaeological site area lies on fluvioglacial sands and gravels upper stage (Vistulian glaciation) [8]. In the JW1 profile the sediments is represented by fluvioglacial sands. In the first phase of accumulation there were sediments with coarsening upwards.The upper part (second phase) of the profile is build by fining upward deposits (Fig. 4). In the profile JW2 there are simple layers, mostly build by fine sands with single gravels, separated by three inserts with sands with gravels at depths (140-115 cm), (90-80 cm) (35-20 cm)(Fig. 5). Texture and structure of sediments in both profiles are typical for braided river.

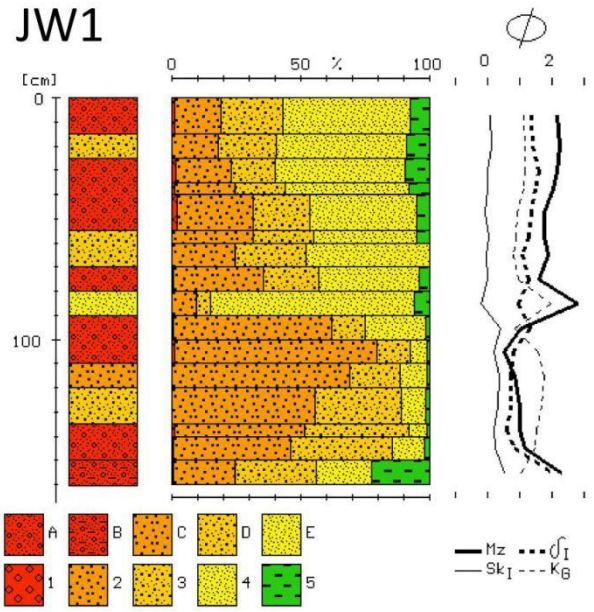

Figure 4. JW1 profile (drilling) located about 20 m NW from the archaeological site.

Lithology: A - sands with single gravels, B - silty sands with gravels, C - coarse sands, D - medium sands, E - fine sands; Fractions: 1 - gravels, 2 - coarse sands, 3 - medium sands, 4 - fine sands, 5 - silts and clays; Folk and Ward's distribution parameters; Mz - mean diameter, δ_I - standard deviation (sorting), Sk_I - skewness, K_G - kurtosis

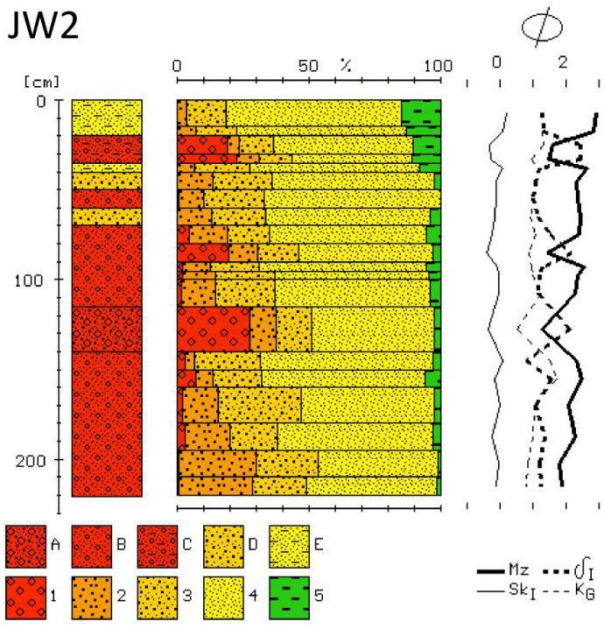

Figure 5. JW2 profile (drilling) located about 50 m NW from the archaeological site.

Lithology: A - sands with gravels, B - sands with single gravels, C - silty sands with gravels, D - medium sands, E - silty sands; Fractions: 1 - gravels, 2 - coarse sands, 3 - medium sands, 4 - fine sands, 5 - silts and clays; Folk and Ward's distribution parameters: Mz - mean diameter, δ_I - standard deviation (sorting), Sk_I - skewness, K_G - kurtosis

Actually, the archaeological site area is cultivated land, that means the natural reaction of soil is probably disturbed by agrotechnical works (e.g. manure fertilization, liming). The normal reaction to the growth and yield of plants shouldn't be lower than 5.6 pH (at a depth of about 30 cm), in the JW1 profile the average pH it's about 5.58 and in the JW2 profile - 5.55, (profiles located closer to the archaeological site) which indicates a slightly to much acidic environment to obtain satisfactory crops.

The largest soil acidification occurs up to a 35 cm depth, which is probably related to the decomposition of the accumulated organic matter, leaching alkaline cations deep into the profile. For this reason, that in the JW2 profile there is more coarse material than in the JW1 profile, leaching occurs faster, therefore the alkaline reaction of the soil in the JW2 profile starts already at a depth of 90-95 cm, not as in the JW1 profile at a depth of 135-140 cm. In JW3 and JW4 profiles is very similar situation as in JW1 and JW2, so it's well visible an increase of the pH and calcium carbonate content below 100 cm depth (Fig. 6). Lack of calcium carbonate to the 100 cm depth are noticed in the samples from the archaeological site, as well the average pH is around 4.5-5.5 (slightly more acidic than in nearby profiles).

Due to the fact that calcium carbonate occur in alkaline soils, their presence is observed when in both profiles the pH is about 7.5 (calcium carbonate isn't present in surface and subsurface layers, because it's washed out to deeper levels)[9].

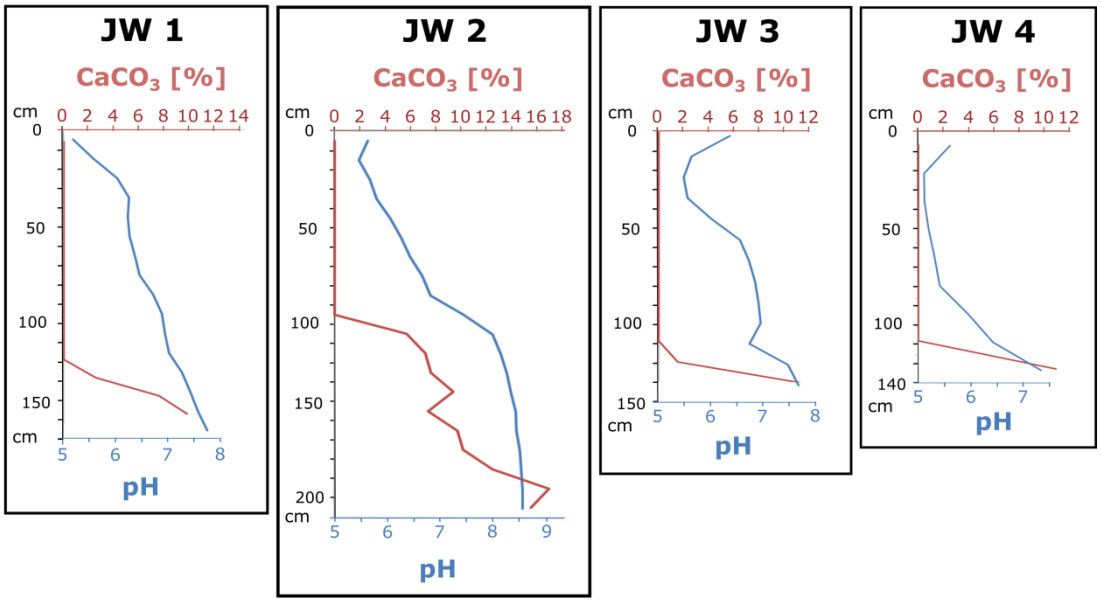

Figure 6. Dependencies between changes in pH (blue) and calcium carbonate content (red) in JW1, 2, 3, and 4 profile (drillings) located on the NW from the archaeological site

CONCLUSIONS

The „Valley Fort" at Jatwież Duża is located on the Pleistocene clays, fluvioglacial sands and gravels. It probably started to function in the period about 900 BC (HaB/V EB), OSL dated at 2.93±0.44 ka (UJK-OSL-98). Is related to second Bond Event [10].
This settlement probably is a storage facility by the communities of the Urnfield culture in the Bronze Age. Sudden cold period forced food accumulation by communities of the Urnfield culture in the middle Bronze Age. Currently, the structure of this object is poorly visible in the area due to e.g. agricultural activity, which can be noted in analyzes results. For this reason, in order to detect similar archaeological objects in northern Poland, it should be supported by digital elevation models (DEM).

REFERENCES

[1] Kondracki J. Geografia Polski: regiony fizyczno-geograficzne, Wydawnictwo Naukowe PWN, Warszawa, 2014.

[2] Dąbrowski J. Epoka brązu w północno-wschodniej Polsce, Białystok, 1997.

[3] Pawlata L. Stanowisko kultury łużyckiej w Popowlanach, gm. Tykocin, pow. białostocki, Zeszyty Podlaskie, vol. 5, pp 55-95, 2009.

[4] Żurek K., Kalicki T., Wawrusiewicz A., Frączek M., Przepióra P., Piasecki A. & Piasecka K. „Valley Forts" in Poldasie river valleys - preliminary archaeological and paleogeographical results on the Jatwież Duża archaelogical site, 24. Kvarter, Brno, pp 70, 2018.

[5] Żurek K., Kalicki T., Frączek M., Przepióra P., Wawrusiewicz A., Piasecki A. & Piasecka K. Fenomen założeń obronnych typu „Valley Forts" w dolinach Podlasia - wstępne wyniki badań geoarcheologicznych ze stanowiska Jatwież Duża, 20. MISSA, Poznań, pp 48, 2019.

[6] www.geoportal.gov.pl.

[7] Marks L. Zmiany klimatu w holocenie, Przegląd Geologiczny, vol. 64, no. 1, pp 59-65, 2016.

[8] Kozłowski I. Szczegółowa Mapa Geologiczna Polski, Arkusz Suchowola 224, PIG, 2003.

[9] www.doradca-rolniczy.pl.

[10] Bond G., William W., Cheseby M., Lotti R., Almasi P., deMenocal P., Priore P., Cullen H., Hajdas I., Georges Bonani G. A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates, Science 278 (5341): 1257–1266, 1997, DOI: 10.1126/science.278.5341.1257.