

Palaeoenvironmental conditions and human-environment relationships in the Stone Age and the Bronze Age in Southern Belarus

The main objective of the study was to reconstruct landscape evolution, palaeoenvironmental conditions, and human-environment interactions during the Stone Age and the Bronze Age in the area of the Kakoryca-4 archaeological site. The dissertation is primarily focused on the study of geological deposits in the vicinity of the Kakoryca-4 archaeological site. The Kakoryca-4 site is located on the territory of the Belarusian Polesie in the basin of the Yaselda River and Lake Sporovskoye, on a small rounded elevation formed by fluvial deposits.

During the research, a wide range of analytical methods was employed, including radiocarbon dating, pollen and plant macrofossil analyses, geochemical and sedimentological analyses, as well as the use of cartographic and archaeological materials.

As a result of the study, a model of the palaeogeographical evolution of the Kakoryca-4 site surroundings was constructed. For selected time periods, reconstructions of geological processes, regional and local vegetation, transgressions and regressions of Lake Sporovskoye, as well as phases of floods and erosional activity of the Yaselda River were elaborated. Possible responses of prehistoric societies to natural changes have been proposed.

This dissertation research contributes to a better understanding of the process of Neolithisation in Eastern Europe. The author challenges previous pollen-based interpretations that suggested the presence of agriculture in Southern Belarus during the Late Mesolithic, the Early Neolithic, and throughout the “forest” Neolithic. These interpretations were most likely the result of the incorrect identification of *Cerealia* pollen and its confusion with pollen of wild-growing *Poaceae*.

On the basis of the literature review presented in this dissertation, it can be concluded that the Kakoryca-4 archaeological site is currently the most comprehensively studied site in Belarus from the perspective of environmental archaeology. The author of this dissertation has made a significant contribution to the development of this discipline by conducting a multidisciplinary investigation of this site in Belarus.

This dissertation has also contributed significantly to the development of palaeogeographical studies of Southern Belarus. In particular, a new interpretation of the origin of the so-called “lacustrine-alluvial” deposits – one of the most characteristic sediment types in this region – has been proposed. These deposits are interpreted as sediments formed by a sand-bed braided river. Furthermore, new interpretations of the transgression and regression phases of Lake Sporovskoye have been proposed based on the analysis of plant macro- and microfossils preserved in biogenic deposits.

In addition to the investigation of the Kakoryca-4 archaeological site, the author conducted several supplementary studies aimed at resolving specific methodological problems. These included the study of bottom sediments from the Zarzetka oxbow lake and the palaeolake marked with the symbol “OST2B”, both situated in Poland.

The Zarzetka oxbow is located in the Bug River valley floor, approximately 50 km NE of Warsaw. The bottom sediments from the Zarzetka oxbow lake were studied to examine how modern human economic activities – such as cultivation, grazing, and the formation of trampled and ruderal environments – are expressed in pollen assemblages, that is, which taxa serve as

indicators. The groups of human pollen indicators established on the basis of the literature review and the investigation of the Zarzetka core were subsequently applied in the pollen analysis of deposits from the Kakoryca-4 archaeological site and the Ostrowite archaeological site. Cerealia pollen grains from the Zarzetka core served as comparative reference material for identifying Cerealia pollen in deposits from the Kakoryca-4 and Ostrowite archaeological sites.

The palaeolake OST2B is located in Northern Poland in the immediate vicinity of the Ostrowite archaeological complex, approximately 60 km N of Bydgoszcz. The aim of this study was to examine how the transition from lacustrine to wetland conditions (or vice versa) is reflected in pollen and plant macrofossil assemblages. This additional study on the deposits of the palaeolake OST2B made it possible to identify pollen and macrofossil indicators of peat and gyttja deposits. Pollen studies based on the OST2B and Zarzetka cores have shown that not only peat but also gyttja deposits can occur between high and low water levels in the lake (limno-terrestrial conditions), where they can be periodically subjected to drying and aeration. In addition, based on pollen analysis, three phases of anthropogenic activity were identified in the vicinity of palaeolake OST2B. The pollen analysis also revealed significant differences in vegetation succession during the Late Weichselian and the Holocene, most likely controlled by catchment geology (morainic versus glaciofluvial deposits).

To prepare this dissertation, the author personally conducted pollen analysis (146 samples), sedimentological analysis (231 samples), and geochemical analysis (361 samples). The author also personally carried out the laboratory processing of 23 samples for plant macrofossil analysis. In total, 761 samples of geological deposits were processed and analysed by the author for the preparation of this dissertation. The author participated in numerous field expeditions, scientific conferences, research internships, and consultations with specialists.

As a result of the author's efforts, the UŁ IDUB grant no. 7/ODW/DGB/2022 was obtained to support research at the Kakoryca-4 archaeological site. The Zarzetka core was investigated with financial support from the NCN OPUS-22 grant (UMO/2021/43/B/HS3/02636, "Biskupie drzewa. Historia środowiskowa Puszczy Białej"). Research on the OST2B core was financially supported by the Doctoral School of Exact and Natural Sciences UŁ.