

1. PHD PROJECT DESCRIPTION (4000 characters max., including the aims and work plan)

Project title: Reconstruction of the natural environment conditions in the Middle Holocene in the Chełmno Upland and northern Kuyavia, in the light of pedoarchaeological research.

1.1. Project goals

The proposed project has an interdisciplinary character. The topic is located partly in Earth and environmental sciences and partly in Archaeology. The aim of the project is an attempt to reconstruct the environmental conditions in the Middle Holocene period (ca. 8000-2000 years Before Present) with particular emphasis on the climatic optimum of the Atlantic period (Northgrippian), recorded in the soil morphology and properties at selected archaeological sites of the Chełmno Upland and northern Kuyavia. The assumption of the project is: 1. reconstruction of the primary environmental conditions at the beginning of permanent settlement by the people of the first Neolithic agricultural cultures, 2. reconstruction of environmental changes occurring during the Mesoholocene and the first part of the Neoholocene (Northgrippian – Megalayan), 3. deciphering of the mutual relations between man and the environment in terms of determinants of settlement preferences and anthropopressure from the other side.

1.2. Outline

Soils at archaeological sites are a valuable archive of information about the conditions of the natural environment in the period of human existence, as well as their changes in later periods. However, detailed soil studies in this aspect are rarely undertaken. The project plan is to analyze soil stratigraphy and characteristics at selected ca. 10 sites from the Neolithic and Bronze Age, located in the Chełmno Upland and northern Kuyavia. Research is going to be carried out in parallel with archaeological studies. The sites are supposed to represent objects typical of the main cultures and settlement phases, discovered in recent years by archaeologists, but not yet examined (e.g. "long houses" and rondels from the beginning of the Neolithic, "kuyavian graves" of the funnel beaker culture, settlements, etc.). Soil researches are taken in order to recognise the original, natural features of the soils on which these objects were located, as well as younger soil sediments burying or infilling these objects, using pedological, chemical, macro- and micromorphological methods.

The expected result is to reconstruct the transformations of selected elements of the environment (soil cover, relief, vegetation, climatic and water conditions) related to the Holocene trends of climate changes and intensifying human activity and recorded in the morphological, physical and chemical properties of soils.

1.3. Work plan

Approximately 10 sites representing consecutive periods of the Middle Holocene and particular archaeological cultures are planned as study objects. The frame schedule of the project realisation is:

1. year: application for a financial support, fieldworks in the first half of the sites, participation in scientific conferences, publication;
2. year: fieldworks in the second half of the sites, laboratory analyses, participation in scientific conference, publication;
3. year: laboratory analyses, synthesis of pedological and archaeological data, participation in scientific conference, publication;
4. year: final data elaboration, participation in scientific conference, writing of the PhD final thesis.

1.4. Literature (max. 10 listed, as a suggestion for a PhD candidate)

1. Czerniak, L., Rączkowski, W., Sosnowski W., 2003. New prospects for the study of Early Neolithic longhouses in the Polish Lowlands. *Antiquity* 297, 77. <http://www.antiquity.ac.uk/projgall/czerniak297/>.
2. Kabała, C., Przybył, A., Krupski, M., Łabaz, B., & Waroszewski, J. (2019). Origin, age and transformation of Chernozems in northern Central Europe – New data from Neolithic earthen barrows in SW Poland. *CATENA*, 180, 83–102. doi:10.1016/j.catena.2019.04.014.
3. Krupski, M., Kruczkowska, B., Kittel, P., Jakubczak, P., Skrzyński, G., Golyeva, A., Niedziółka, K., Urbańczyk, P., 2022. Evidence of prehistoric and early medieval agriculture and its impact on soil and land relief transformation in the Białowieża natural forest (NE Poland). *Geoderma*, 410, 115668. <https://doi.org/10.1016/j.geoderma.2021.115668>.
4. Leopold, M., Hürkamp, K., Völkel, J., Schmotz, K., 2011. Black soils, sediments and brown calcic luvisols: A pedological description of a newly discovered neolithic ring ditch system at Stephansposching, Eastern Bavaria, Germany. *Quaternary International*, 243, 2, 293–304. doi:10.1016/j.quaint.2010.11.021.
5. Lisá, L., Komoróczy, (...), Šumberová, R., 2015. How were the ditches filled? Sedimentological and micromorphological classification of formation processes within graben-like archaeological objects. *Quaternary International*, 370, 66–76. doi:10.1016/j.quaint.2014.11.049.

1.5. Required initial knowledge and skills of the PhD candidate

- Basic knowledge in the fields physical geography/Earth and environmental sciences, palaeopedology and archaeology. At least initial experience in analysing and documenting soils in the fieldwork and laboratory.
- At least moderate knowledge of written and communicative English.

1.6. Expected development of the PhD candidate's knowledge and skills

PhD candidate is expected to increase experience in interpretation of soil morphological, chemical and physical properties especially in aspect of palaeogeographical and geoarchaeological reconstructions, as well as to develop field, laboratory and computing skills necessary in scientific work in the field of Earth and environmental sciences.