

It is difficult to imagine life in the Middle Ages without products such as charcoal, wood tar, oil tar, potash, or slime. All these products have one common denominator, which is wood, used in various types of “charcoal piles”. The “pile” resembled round mounds that predominantly had a diameter of 10 m. Various kinds of wood were arranged, depending on what product was to be obtained, in the mounds under the soil cover. The charcoal burners worked on the “charcoal piles”, and during the nearly 10 days of work they took care of the constant burning temperature (about 300°C) to obtain the desired products. Depending on whether the “pile” was to be used to produce oil tar, charcoal, wood tar, turpentine, or potash, the following parameters were varied: a) the material used, b) its size, or c) the production process. Depending upon the types of products we want to obtain during the wood burning in the “piles”, for example, potash or tar, a particular tree species is selected. We believe that the selective choice of wood has a significant impact on the prevailing structure of the forest. For example, it was possible to get about 30 kg of clean potash from 1 m³ of beech wood, which before the nineteenth century was a product desirable enough that it was transported to very long distances. It should be emphasized that products such as potash or good quality charcoal, probably after 1453, traveled all the way to Damascus, where they were used to melt the most famous steel in the world at that time. It emphasizes how much these products were valued in contemporary Europe and how important they were in the national economy.

The main objective of our project is to perform a temporal and spatial analysis of the impact of “charcoal piles” on the natural environment, primarily on soil processes and vegetation in northern Poland during the Middle Ages. The hypotheses are as follows:

- 1) Human activities related to the functioning of “the piles” caused significant changes in the regional structure of the species vegetation through selective choice of wood for the production of charcoal, tar, turpentine, or potash.
- 2) High temperature during burning and numerous fragments of charcoals and other derivatives related to the process of wood burning disturbed natural soil-forming processes.

We assume that the collected set of information on the ecosystem’s response to the pressure caused by human activity can be used to create a model of cascade impact of charcoal piles on forest ecosystem functioning. We want to determine whether the consequences associated with the functioning of the charcoal piles in the ecosystem were of a short-term character or affected the change in its trajectory. For this purpose, we proposed an interdisciplinary approach. Therefore, specialists in the fields of paleoecology, remote sensing, soil science, history, and ecology will co-operate in the project. The proposed quantitative and qualitative analyses focus not only on biotic proxies such as pollen, macroremains, and charcoal, but also on geochemistry, and will serve to better understand the ongoing changes in the natural environment under the pressure related to charcoal piles.

This project is aimed at conducting basic research to determine the impact of anthropopressure related to the charcoal piles functioning on the forest ecosystem in northern Poland. The proposed research problem of the project is very well in line with the recently discussed issues of determining threshold values and the resistance of ecosystems to anthropopressure or rapid climate fluctuations.