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Human-induced landscape dynamics in South Brandenburg - findings from different geoarchives

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South Brandenburg is the central part of the North European Lowland (NEL) extending as a plain landscape from the North and Baltic Sea to the foothills of the Central European Highlands and reaching from the Netherlands to Poland. Since many decades lignite opencast mines have been operating in this region which is known as the Lusatian mining district. The total land demand in Lusatia is about 852 square kilometres and mining will continue for many more years or even decades. Large-scale outcrops resulting from these mining activities are excellent archives to study the younger Earth's history. The scope of our research in open cast mines is to reconstruct the Late Quaternary landscape development and to distinguishing natural from anthropogenic forcing and processes. In more detail, the aims are to identify and to quantify the impact of past land uses, i.e. changes of vegetation, landforms and soils induced by agriculture and/or forestry. Here, we are presenting latest results from our research and review important findings giving novel insights into man-induced environmental changes in Lusatia within the past thousands years and thus improving the general understanding of Late Quaternary landscape dynamics.

Direct legacies of historical farming can be found in form of hook ploughs as well as ridge and furrow systems. Several sites have been documented within the last decades giving us nowadays a quite solid picture of the type and of the spatio-temporal dimension the former agricultural system. During years Airborne Laser Scanning (ALS) data help us to identify ridge and furrow systems under forest canopy and thus to support these findings. Sometimes hook ploughs and ridge and furrow systems are found buried under aeolian sediments proving a causal connection between farming and wind erosion. Obviously the well-drained, sandy and humus-poor soils are prone to dry out easily by agricultural overuse and thus can be eroded by wind. The flat landscape and missing higher/denser vegetation enhance wind speeds and advantage wind erosion, too. In fact, these phenomena can be observed also today and very probably as a consequence of the same reasons as in historical times – mainly (i) overuse or not adapted agricultural practice, (ii) temporal edaphic drought, (iii) less vegetation or wind breaks, and (iv) weather anomalies with high wind speeds.

Comparing our results with other studies in Central Europe we can make some generalizable contributions but we also must state regional differences and specific characteristics caused by the local setting. (i) As proven in other regions, during the Holocene and principally since the onset of agriculture in the Neolithic, the anthropogenic impetus must be considered as the crucial factor to initialize aeolian geomorphodynamics. (ii) Intensification of soil erosion coincides with agricultural land use during the Slavic Middle Ages. (iii) As we see similar processes of wind erosion nowadays we can conclude that in principle the feedbacks between human impact and landscape development (in sense of soil and landform evolution) can be compared between historical and modern times.