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Reconstructing past environments and societies - interdisciplinary research in the open cast mine Jänschwalde, Germany

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Active lignite mines in Lower Lusatia (Brandenburg, Germany) are a controversial discussed issue. Though lignite mining destroys whole landscapes, it offers the opportunity to investigate prehistory and landscape development on a landscape scale. Since 2010 scientists from Brandenburgische Technische Universität (BTU) Cottbus and archaeologists from Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum (BLDAM) collaborate to study human-environment interactions. Our study area is the open cast mine Jänschwalde, one out of four active lignite mines in Lower Lusatia. The mine is situated c. 150 km southeast of Berlin. Archaeological excavations have been carried out in the prefield over many years and the outcome is manifold.

Different approaches are combined for a comprehensive reconstruction: archaeological investigations, geomorphological/pedological studies and historical research. The archaeological fieldwork includes prospection, the opening of test trenches and area excavations. These outcrop situations provide a view into the stratigraphy and are to some extent commonly used for archaeological and sedimentological/pedological studies. In addition, chronological information is obtained by different methods of relative and absolute (14C, OSL, dendrochronological) age determination. To build up a model for the landscape development, data (topographical maps, historical maps, physiogeographical information, etc.) is gathered and processed.

The initial situation for our research is the historic charcoal burning in the former “königliche Taubendorfer Forst” and its impact on the environment. In the study area, this trade was carried out from the c. 17th to the 19th century and is very well documented by about 700 excavated ground plans of circular upright kilns and another c. 300 prospected kilns. It is assumed that charcoal was produced for the smelter at Peitz nearby, where bog iron ore was processed since 1567. There is sedimentological proof of the relationship of logging for wood/deforestation and the formation of wind-blown deposits.

In addition, sedimentological/pedological studies of several test trenches (up to 150 m long and up to 150 cm deep) show that buried plough horizons are widespread. First results of radiocarbon dating of charcoal fragments from buried Ap horizons date to the Slavic middle ages (600-1200 AD). It is assumed that the eolian activity was triggered by deforestation and agricultural use.

In conclusion, our results suggest that there are two major periods with eolian activity induced by human impact: the first period was caused by the extending agriculture during the Slavic middle ages (600-1200 AD) and the second period was induced by deforestation for charcoal burning between the 17th and 19th century.

Future research concentrates on unanswered questions like to what extent the landscape was changed by human impact and the consequences for the environment (soil loss, water balance, vegetation) and for the population. Furthermore, absolute and relative age determinations are needed to supplement the chronology information. For a comprehensive understanding, especially concerning the charcoal burning in the study area, archival studies are carried out. The obtained data will be used to build up a GIS-based model of the paleoenvironment and it is intended to extend the model spatially and temporally.