



3D Reconstruction of historical wind erosion concerning an inland dune development of the Lower Geest of Schleswig-Holstein (Northern Central Europe)

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PhD project „Geoarchaeological reconstruction and 3D visualization of an inland dune development in Northern Germany”

Wind erosion and the occurrence of sand drifts has been a distinctive phenomenon of the Weichselian outwash plain in northern Germany since the very beginning of deforestation and agricultural land use. Although the main periods of aeolian activity are broadly constrained, estimations of the frequency of wind erosion events during these periods remain elusive. The aim of this investigation is to provide a 3-dimensional reconstruction of historical wind erosion of a dune complex in high spatial and temporal resolution, using a small inland dune complex in the vicinity of Joldelund (Germany, Northern Frisia) as a study area. The dune complex, Kuhharder hill, covers an area of around 2 ha and forms the westernmost part of a larger inland dune field approximately 80 ha in size. During forestation in the 1950s, several archaeological sites were discovered which formed the basis for further archaeological investigations during the 20th century.

The reconstruction of man-nature interactions against the background of dune development on Kuhharder hill is achieved via a multi-disciplinary approach interlinking the study of soil-sediment-sequences, ancient dune surfaces as well as archaeological and historical records, pollen and anthracological analysis.

On the basis of a dated, process-based stratigraphy different phases of dune activity (sediment deposition) and dune stability (soil formation) can be interpreted.

The early aeolian relief developed during the Weichselian Late Glacial (Younger Dryas) and was followed by a longer period of dune stabilisation and soil formation due to natural reforestation. Early settlement activities and iron ore production during the Roman Iron Age caused remarkable albeit local landscape changes, which resulted in moderate sand drifts. During the migration period aeolian activity decreased according to a decreasing human impact on the landscape. As a consequence of extensive landscape changes during Medieval Times disastrous wind erosion events occurred. At least three phases of severe wind erosion events are recorded in the dune profiles.

On the basis of this preliminary geoarchaeological reconstruction 3D landscape visualizations for both archaeological periods were created.