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The Project Schöningen from an ecological and cultural perspective

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ABSTRACT

The open cast mine at Schöningen, Germany, provides the opportunity to study climatic and environmental changes that occurred from the Middle Pleistocene until today. Therefore, researchers from several different institutes and disciplines have been collecting data here for more than 25 years. These studies not only take place on the basis of singular cores, but also mainly in the context of long cross sections through the mine reflecting large landscape areas and biotopes. The quantity as well as the quality of the finds is unique. The Lower Palaeolithic complex includes wooden artefacts, stone artefacts, bones with impact scars and cut marks as well as bone artefacts, charcoal, charred wood and heated flint. Moreover, the countless natural remains of plants (e.g. wood, seeds, roots and leaves), bones, eggshells, molluscs, insects, and microscopic organisms can be used as proxies to understand the landscape and climatic development in Central Europe during the Upper Middle Pleistocene.

Schöningen provides the data from changing environments with rich biodiversity which *Homo heidelbergensis* adapted to over a period of thousands of years. Thus it offers new insights into the evolution of the capacities and mechanisms involved in the exploitation of resources and the settlements dynamics.

1. Introduction

The archaeological complex of Schöningen, situated in the district of Helmstedt, Lower Saxony, Germany, is a unique site within the context of the Middle Pleistocene in Europe and a key to understanding how *Homo heidelbergensis* adapted to its environment.

The exceptional preservation is the consequence of the bedding on the shore of a ca. 300,000 year old lake in anaerobic, carbonate-rich sediments. With its wooden, stone and bone artefacts, Schöningen provides a significant window to the past, offering the opportunity of reconstructing how *Homo heidelbergensis* coped with his environmental and climate changes. The analysis of the implications relating to the weapons and tools recovered in Schöningen allow a discussion about the beginning of abstract concepts that imply consequences for our modern-day way of thinking and acting (Conard, 2015; Conard et al., 2015).

The numerous datasets pertaining to the former landscape, geology, dating, flora and fauna can be used as proxies to understand the landscape and climatic development in Central Europe during the Middle Pleistocene. Schöningen provides the data from a completely natural environment with a rich biodiversity and invites comparison with the present day biodiversity.

2. The landscape around Schöningen

The district of Helmstedt is located in a transitional region between the Harz Mountains in the south (the Brocken is 1141 m a.s.l. high), and the North German lowlands. This region is dominated by the Elm, a 25 km long and up to 8 km wide limestone ridge. Its maximal altitude is 323 m, as opposed to the lowlands with an

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average height of ca. 100 m (Fig. 1).

The present day climate of the Helmstedt region is continental with an average temperature of 9.5 °C (8.7 °C Schöningen). The average mean temperature of the coldest month, January, is around 1.1 °C while that of the warmest month, July, is on average 18.6 °C (DWD, 1996–2014, in Bigga, 2018). The current use of land on the fertile, mainly loess-born soils around Schöningen is characterised by agriculture whereas forest growth is more widespread on the limestone ridge of the Elm. Geologically evident in this area is the presence of Eocene lignite (Riegel et al., 2012).

The opencast lignite mine adjacent to Schöningen was the last in a succession of ten in this mining region. The mining activities were brought to an end in September 2016. Since then the process of re-cultivation is ongoing and in the future will provide the region with new artificially created lakes, developing new woodlands and forests and new areas for agriculture and cultural activities. Furthermore, the region has a key role to play when examining the glacial and interglacial sequences of continental Europe. The region has been repeatedly covered by glaciers including the Elsterian (MIS 12 and MIS 10) and the Saalian glaciation (early Saalian, Drenthian MIS 8). The glacial advance occurred from the north, and carried with it Scandinavian materials including Baltic flint. The glaciers of the late Saalian glaciation (Warthian, MIS 6) as well as the glaciers of the Weichselian glaciation (MIS 4 and 2) did not reach this region during their maximal extension. However, during the cold periods of the Warthian and Weichselian several meters of loess were deposited in Schöningen (Brosche and Walther, 1978; Kunz et al., 2017; Urban et al., 1991a, 1991b; Wagner, 2011). This calcareous material accounts for the richness of the soils and therefore the agricultural use of land in this region from the Neolithic until present day.

3. A long-term, international and multidisciplinary project

From 1979 until 2016, just east of the town of Schöningen, the Brunswick Coal Mining Company (later E. ON, and ultimately the MIBRAG) excavated the open-cast lignite mining sites of Esbeck/Schöningen. This mine is presently 130 m deep and covers an area of 1 km in width and is nearly 6 km long (Figs. 2 and 3 A-B).

In the year 1983 Hartmut Thieme from the Lower Saxony State Office for Heritage Management and Archaeology (NLD) was entrusted with the mission of excavating and saving as many archaeological and palaeontological remains as possible before they fell victim to the large scale mining operations in Schöningen. He initialised and led the multidisciplinary project “Archäologische Schwerpunktuntersuchungen im Helmstedter Braunkohlerevier” (ASHB = Archaeological investigations in the lignite mining area around Helmstedt). In the first ten years, the excavations were focussed on the Holocene archaeological remains which were found within the top 2 m of sediment from the current surface of the area.

The first Lower Palaeolithic stone and wooden artefacts (interpreted as “Klemmschäfte” = hafting shafts) were recovered in the year 1992 in the locality of Schöningen 12 (Schö 12 II), making it clear that hominins were present in this region in the Middle Pleistocene. Until 2009 archaeological excavations in Pleistocene layers were combined with the simultaneous excavation of Holocene sites, and had the character of rescue excavations. Two exceptions were the area Schöningen 13 II, termed the “Speersockel” (where the spears were recovered in the archaeological layers Schö 13 II-4a and Schö II-4b(c), called together the “Spear Horizon”) and the area Schöningen 12 II referred to as the “DB-Pfeiler” (German Railway Embankment) (Fig. 3).

From the year 2008 onwards a new direction of excavations, now under the auspices of Nicholas Conard (director of the project) and Jordi Serangeli (local director of the excavation), both from the University of Tübingen, allowed a fresh start and a new phase of research excavation under greatly improved conditions. The process of excavation and research is now run under the heading of “Project Schöningen". At present approximately 80 researchers from ca. 30 different institutions around the world are collaborating on this project. The building of the “paläon - Research and Experience Centre Schöningen Spears” in the year 2013 which is situated only 300 m away from the main excavation site as well as the implementation of further research under the direction of the “Senckenberg Research Institute” in July 2016 are two further

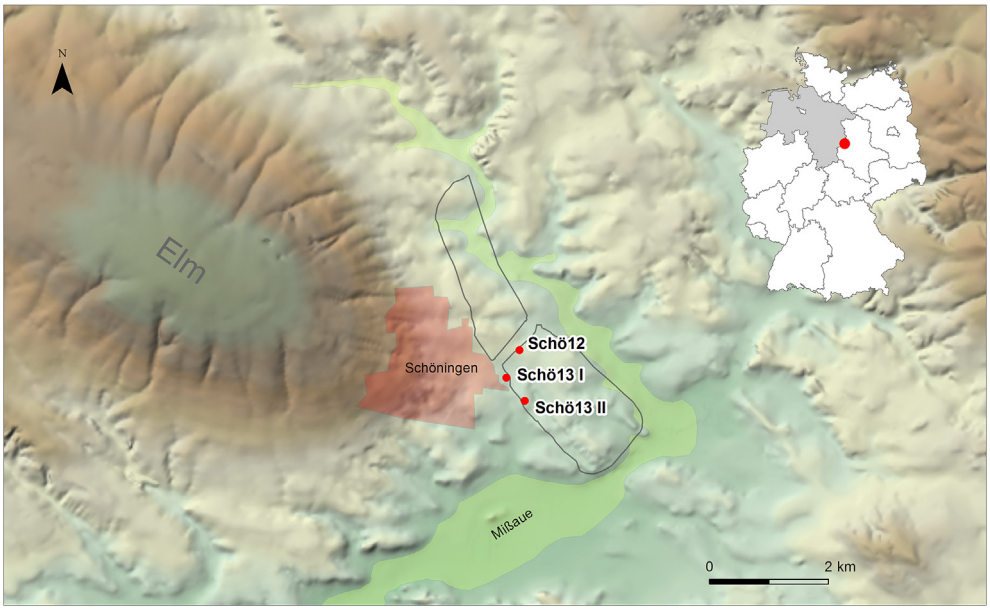

Fig. 1. Geographical map of Germany showing the location of Schöningen, on the border between Lower Saxony and Saxony-Anhalt, with a digital elevation model from the reconstructed landscape showing the direct surroundings of Schöningen and the position of the open-cast mine. North of the Miβaue flood plain lies the Elbe-Weser-watershed, EPSG:31468. Graphics: Utz Böhner, DEM D. Fabian.