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A Middle Neolithic well from Northern Germany: a precise source to reconstruct water supply management, subsistence economy, and deposition practices

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ABSTRACT

Wells constitute a seldom, but important archive particularly as a source for reconstructing prehistoric economy. For the newly discovered Middle Neolithic well of the Funnel Beaker North Group at the domestic site of Oldenburg-Dannau LA77 (North Germany), a deposition of settlement refuse in a former well was documented. Due to depositional processes, the remains provided a detailed palaeo-ecological and archaeological archive for a short time-span around 3050 cal BC. The integration of wells in Middle Neolithic water management strategies, the high value of cereal production – including cereal threshing in the settlement and the documentation of a large number of querns – as well as the early management of "fruit gardens" were reconstructed. Subsequently, the probabilities of profane versus ritual social praxis associated with the depositional process were discussed.

1. Introduction

Funnel Beaker Societies (FBC) existed on the Northern European Plain and in Southern Scandinavia from ca. 4100–2800 cal BC. While evidence for human impact and cultivated plants in the FBC-North group is still limited during the Early Neolithic Ia (ca. 4100–3800 cal BC), major economic and environmental changes are documented for the Early Neolithic Ib (ca. 3800–3500 cal BC). First macrofossil evidence for cereal cultivation (Kirleis et al., 2012) coincided with the beginning of a wide scale, supra-regional opening of the landscape (Feeser et al., 2012). The number of domestic sites, causewayed enclosures, and megalithic tombs as well as the quantities of produced items, such as ceramics or adzes, increased rapidly (Müller, 2011). Economic and demographic growth is also documented in the curve of the ^{14}C-dates (Hinz et al., 2012). These developments culminate during the Early Neolithic II (ca. 3500–3300 cal BC) when most of the megaliths were erected. In the following Middle Neolithic (ca. 3300–2800 cal BC) an economic and demographic decline is registered (Hinz et al., 2012; Feeser et al., 2012).

It is to be assumed that access to fresh water was an important factor associated with the Neolithic economy. The water management strategies of prehistoric communities are one aspect of the scientific discourse, which increasingly has become a focus of economic archaeology (e.g. Hamburg and Louwe-Kooijmans, 2006: 42; Lindemann, 2006). Did the shift to agriculture trigger new technologies in water supply management? Did environmental change – especially in the direct surroundings of domestic sites – necessitate new forms of water management? How did these underlying conditions influence the pattern of communal activities of the first farmers?

Although a reasonable number of features connected with water supply management, such as wells, water holes, and springs, are documented for the FBC (e.g. Bakker, 1998; Andersson, 2004; Rudebeck, 2009), our knowledge of water management for the Northern moraine and sandy areas, i.e. the area of the North FBC group, is still minimal. In this respect, the newly discovered well from Oldenburg-Dannau, found within a Middle Neolithic FBC Settlement, and its interdisciplinary investigation involving archaeology, archaeobotany, archaeozoology and palynology, promised new important insights. While functional and structural issues have been and are the main focus of many studies (Koschik, 1998), here questions concerning the significance of water management, the reconstruction of the subsistence economy, and possible ritual aspects of the infilling process will be addressed. What conclusions can be drawn from the finds and evidence on the manner of subsistence in a Middle Neolithic Funnel Beaker settlement? Do the archaeological and the ecological data correlate?

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How can the significance of water management be evaluated for the well in connection with a reconstruction of the environment?

2. Study area

The study area is located at the Baltic coast of Northern Germany within the so-called Oldenburger Graben, an area of 37 km^2 that was shaped by two fjords during the Holocene sea-level rise (Fig. 1). When the sea-level rise slowed down in the Late Atlantic (Late Mesolithic), the coastline was stabilised by a sequential arrangement of cliffs and beach ridges. The former bays and fjords were cut off from the sea by sand barriers and lagoons developed. During the Middle Neolithic (3300–2800 cal BC), i.e. the time period of interest, such a lagoon setting prevailed (Jakobsen, 2004). Dependant on the freshwater supply from the hinterland and the inflow of brackish water during high tides and storm events, these lagoons exhibited a brackish to freshwater environment. In the case of the western part of the Oldenburger Graben, the former bay was cut off from the Baltic by sand barriers. Freshwater was provided by a river which entered the lagoon just 400 m southwest of the investigated settlement (see below) and by a number of smaller inflows around the shore of the lagoon.

Evidence for Mesolithic and Neolithic settlement activity is concentrated along the periphery of the fjord/lagoon as well as on islands and peninsulas. The Middle Neolithic settlement Oldenburg-Dannau LA 77 (cf. also Brozio, 2010, 2011, 2012) is situated on one of these islands, measuring ca. 3 ha in size (Fig. 2).

3. Material and methods

In the summer of 2010, the excavation of the settlement Oldenburg-Dannau (LA77) revealed a long oval feature measuring 1.3 m in diameter beneath the occupation layer (Fig. 3). The feature was located within the domestic site and ranged into a depth of 2.3 m below the Neolithic surface into the glacial sand. Following Bakker's definition (1998), which describes cylindrical pits that reach ground water level and may include casings made from wattle work or hollowed-out tree trunks, the feature was interpreted as a well. In order to gain as much information as possible from this feature, a multi-disciplinary sampling strategy in addition to archaeology was agreed upon after consulting experts on palynology, archaeobotany and archaeozoology.

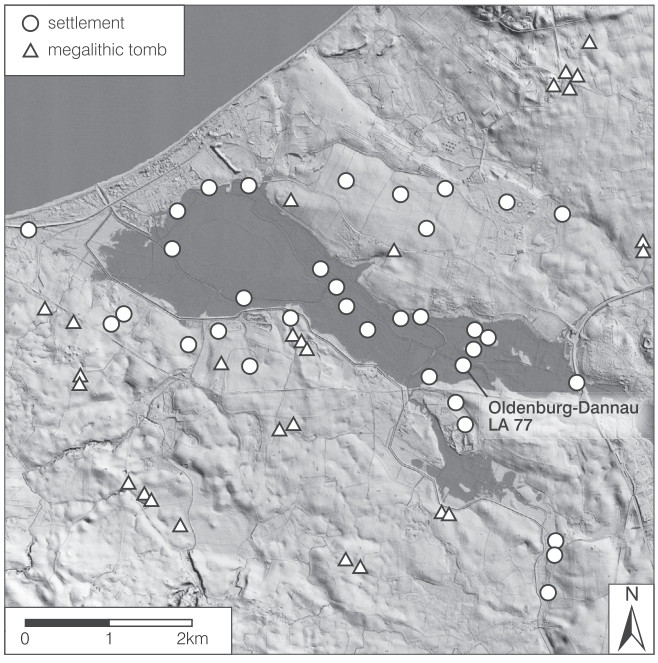

Fig. 1. Neolithic sites in the region of the western "Oldenburger Graben". In addition to Oldenburg-Dannau LA77, further FBC domestic sites and megaliths are mapped.

3.1. Excavation and field observations

The first half of the feature was excavated in a first step. After the identification of the stratigraphy in the profile section, the second half was excavated and sampled in layers (Figs. 3 and 4). The well filling could be differentiated into 13 different layers that were sieved for findings and subsampled separately. The size and weight of the findings were measured as well as the volume of the layers to enable find density calculation (Fig. 12). The well bottom was located 230 cm underneath the former surface of the feature and consisted of a 5–10 cm thick, dark black layer rich in macro-botanical material and charcoal fragments (layer 2) overlying sorted glacial sands (layer 1). It is followed by a grey–black sandy layer with a lot of daub plus organic material (layer 4). In contrast, beside charcoal flakes and organic remains, including animal bone fragments, three layers which follow above (layers 5, 8 and 9) all contained Middle Neolithic artefacts. These included daub, flint artefacts, querns, abraders, and adze fragments. Noteworthy is the presence of a human femur that belongs to a ^{14}C-dated, probably late Early Neolithic burial of a mature woman at a distance of two metres from the well (Brozio, 2012). The upper layers (layers 12 and 13) exhibited – in addition to frequently occurring flint artefacts – partly closed marine molluscs. These represent the youngest anthropogenic depositions in light of the stratigraphical situation. A number of intrusions seen in the profile of these upper layers indicate extraction and refilling processes. Moreover, layers 3, 6 and 7 suggest a collapse of the structure in the compressed glacial sand through a loss in stability during the building of the construction and due to the eroding influence of ground water. No traces of a casing were found even though the depth and cylindrical shape of the feature in relation to its small diameter would have required a casing in the event of a prolonged use. Alternatively, a short time span of usage without a casing has to be considered.

3.2. ^{14}C dating

For absolute chronological dating, ten radiocarbon dates were determined from the different layers. Short lived plant material was chosen to prove the vertical stratigraphic succession of the feature (Table 1).

3.3. Botanical macrofossil analyses

After removal of the archaeological artefacts and bones, the complete filling of the pit was evaluated for an archaeobotanical analysis of macro remains. Altogether 540 L of sediment were examined, divided into 25 samples of uneven volume from eight different layers. As no water-logged preservation of plant remains was observed, floatation was applied to the sediment samples to gain the charred remains which then were caught in a sieve of 0.3 mm mesh size. The heavy residue from flotation was broadly scanned for further remains, but as we dealt with sandy soils that easily release the charred macro remains, there were only insignificant black particles, mainly vitrified unidentifiable charcoal. Sieve residues were dried, sorted and identified with Olympus SZ 51 stereomicroscopes at magnifications of ×10–×40. For validation, the reference collection of modern seeds and fruits at the Institute of Prehistoric and Protohistoric Archaeology at Kiel University was used. Additionally, identification keys like Jacomet (2006), Beijerinck (1947), and Cappers et al. (2006) were consulted.