From Funeral Monuments to Household Pottery

Current advances in Funnel Beaker Culture (TRB/TBK) research

Proceedings of the BorgerMeetings 2009, The Netherlands

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Chapter 6
Landscapes as Social Spaces and Ritual Meaning: Some New Results on TRB in Northern Germany

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Abstract: *Since 2009, a Priority Program of the German Research Foundation (DFG) deals with the Funnel Beaker Period in Northern Germany, focussing, in a holistic approach, on the conjunction of social structures and the erection of monuments. To this end, evidence for subsistence patterns, social organisation, communication and networks are considered in a diachronic perspective. Spatial structures and chronologies are re-evaluated and adjusted in the light of new excavation results, scientific data and statistical analysis, environmental and economic data are presented and discussed. Several new fieldwork projects are introduced, and their results are combined into the frame of an overall picture of Funnel Beaker societies which are to be described as a complex mosaic of regionally diverse patterns, different sequences of temporal change and distinct spheres of social interaction. Finally, a discussion of the role of monuments in social reproduction together with considerations towards demographic trends leads to a model of social change reaching from cooperative actions to collective dictions of individual social roles and a rise of social inequalities.*

Keywords: *Neolithic in Northern Germany, Funnel Beaker Period, Subsistence, Social Organisation, Monuments*

Introduction

During the last decades of research on TRB, the intensity of research in different countries has varied. This is due to differences in the selection of research topics at universities and other research institutions, as well as to the conditions of rescue excavations and heritage organizations. In consequence, a deficit of knowledge about megaliths and funnel beakers in Northern Germany became obvious, contrasting with many new efforts on the Early and Middle Neolithic in the Netherlands and especially in Scania and on Fyn (e.g. Andersen 2008; Louwe Kooijmans 1998; Sjögren 2006; Rudebeck 2009). As a consequence, one and a half year ago a Priority Program of the German Research Foundation began to gain new information on the North German development of early monuments and the social differentiation primarily within TRB communities (Müller 2009).

The on-going work is a combination of smaller projects placed in selected regions to further data acquisition by surveys and excavations, and general projects about spatial patterning, scientific dating, palynology, archaeobotany, soil analyses, and anthropology/aDNA. In the following, parts of some preliminary results from different projects of the Institute of Prehistoric and Protohistoric Archaeology in Kiel are discussed.

The holistic goal of the on-going work focuses on the detection of the inter-link between changes within the Early and Middle Neolithic societies of Northern Germany and the construction of megaliths. What promoted the construction of monuments? What were the driving forces of the obvious changes and why did they happen? Do these monuments and the observable changes in material culture reflect social developments?

To answer such questions, research in many fields with respect to Funnel Beakers had to be intensified:

- The subsistence background and the development of domestic structures are still a matter of discussion: What kind of economy are we dealing with between 4300 and 3600 cal BC? How did the immense opening of the landscape around 3600 cal BC correlate with new land use patterns? Is there a diverse economic development in the time period after 3200 cal BC? Is there a typical TRB household with a specific archaeological structure? How can we interpret the agglomeration and the dispersion of domestic structures in the landscape? Which role did the monuments play in the spatial ordering of the environment?
- How did the individuals and small groups reflect the obvious development? What were causewayed enclosures used for and how did the different groups assess the value of their megaliths within their surroundings? Do differences in the character of and the efforts needed for burials reflect social and ritual roles? Are we dealing with some kind of ritual competition, which made ritual activities a productive force in the overall economy with a longing for increasingly more monuments and increasingly more ritual activities?

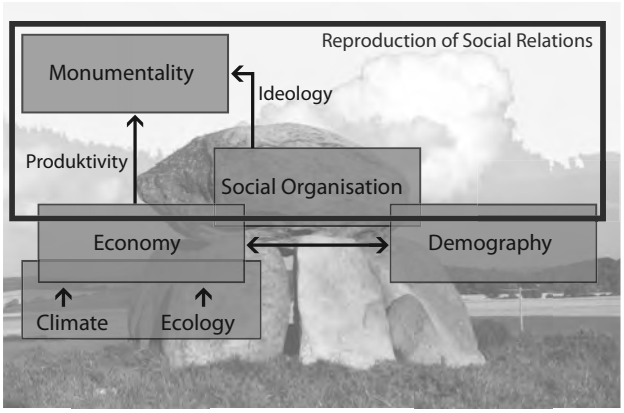

Figure 1. General scheme about the relation of economic, political and social aspects. In many TRB communities the reproduction of social relations includes the use of "monumentality" for the bundling of identities. Source: Holger Dieterich.

- Did networks exist within and between TRB groups? How did supra-regional and foreign influences reach the TRB-world and how were they integrated into the local and regional context?
- Is it possible to write an overall history for TRB or are we dealing with a mosaic of different patterns of local and regional groups with diverse behaviours and varying reactions to internal and external influences?

Before coming up with preliminary results of the on-going research, the particular background concerning the relationship between ecology, economy and society should be explained, as every individual researcher could have quite different ideas about the inter-linkage of societal elements.

Figure 1 displays a simple, but in our opinion useful idea about the conceptual background of societies. Basic fields of influence for the reproduction of social relations are economy and demography, being the elements, which frame the possibilities that can be gained in the social organisation of a society. Economy is understood here in a very simple way: as subsistence economy. Subsistence (as the primary, non-industrial sector) depends on the environmental conditions of both ecology and climate. Economy influences population sizes and is influenced by demographic factors: Group sizes, reproduction rates, endogamic and exogamic marriage practices constitute the possibilities of subsistence activities. Here we already reach the domain of the reproduction of social relations: In TRB one ideological expression of social institutions uses monumentality to create traditional stabilities. In our scheme, the possibility of building monuments is surely dependent on the productivity of the economy: some kind of surplus is necessary to construct these "unnecessary", not primarily functional items.

However, such a simple view of the dynamic and manifold processes has to be specified for the character of non-literate Neolithic societies. In this respect, some other suggestions should be taken into account:

- Driving forces of non-literate, pre-industrial economies are not necessarily just technological innovations, and changes in resources, but also demographic development, kinship organization and ritual activities (Earle and Kristiansen 2011; Hansen and Müller 2011).
- In contemporary sociological theory, the contrast between societies with cooperative and such with competitive elements is emphasized (cf. Blanton *et al.* 1996). In this sense, competition could lead to competition for prestige goods etc., ending in some kind of activity spiral. Monuments might be aims to assure and consolidate cooperation in a community, and might at the same time be symbols for competition with neighbouring groups.

With these remarks in mind we would like to focus on some results of the research during the first year and a half of the Kiel projects **(**Figure 2).

Spatial differentiation and chronologies

The basic fundaments for a solution to most of the questions, which are asked within our research project, continue to be a good chronological resolution and an idea about possible spatial differentiations within the entire area of Northern Central Europe and Southern Scandinavia (Müller *et al.* 2010). From a methodological point of view, a clear typological identification of similarity groups within the material culture, the scientific dating of these similarity groups, and an identification of long term trends in material culture (of which the chronological character is also identified with the help of scientific dates or vertical stratigraphies) are necessary. With respect to chronology, both spatial groupings in the form of restricted distribution areas as well as non-territorial patterns are possible. While a spatial restriction of similarity groups stems from traditional approaches, the non-territorial distribution of similar object groups could be the outcome of network-relations and network-like identities in TRB communities.

Regarding terminology, a clear differentiation between periods (for example "Early Neolithic") or sub-phases (e.g. "Early Neolithic Ia") and stylistic groups (e.g. "Fuchsberg") is applicable. While periods and phases indicate the absolute scale, stylistic groups identify similarity groups, which also could be longer or shorter than one period/phase.

Intensive research during the last decades confirmed chronological periods, phases and stylistic groups in many regions of Scandinavia and Northern Central Europe (Figure 3). Thus, our research concentrates on an evaluation of regions, in which these factors are still fuzzy.

For basic spatial patterning we use the general spatial differentiation of J. A. Bakker and T. Wislanski, which they developed in 1969 for the TRB (Bakker *et al.* 1969;

Figure 2. The distribution of megaliths in Northern Central Europe and Southern Scandinavia (after Fritsch et al. 2010). Important sites mentioned in the article are marked. Cursive written sites are sites of main interest within the Kiel projects. 1 Vroue Heide, 2 Sarup, 3 Büdelsdorf-Borgstedt, 4 Rastorf, 5 Flintbek, 6 Albersdorf-Dieksknöll, 7 Albersdorf-Brutkamp, 8 Oldenburg, 9 Wangels, 10 Bad Oldesloe-Wolkenwehe, 11 Triwalk, 12 Ostorf, 13 Parchim-Löddigsee, 14 Flögeln, 15 Lüdelsen, 16 Hundisburg-Olbetal. Copyrights: Ines Reese.

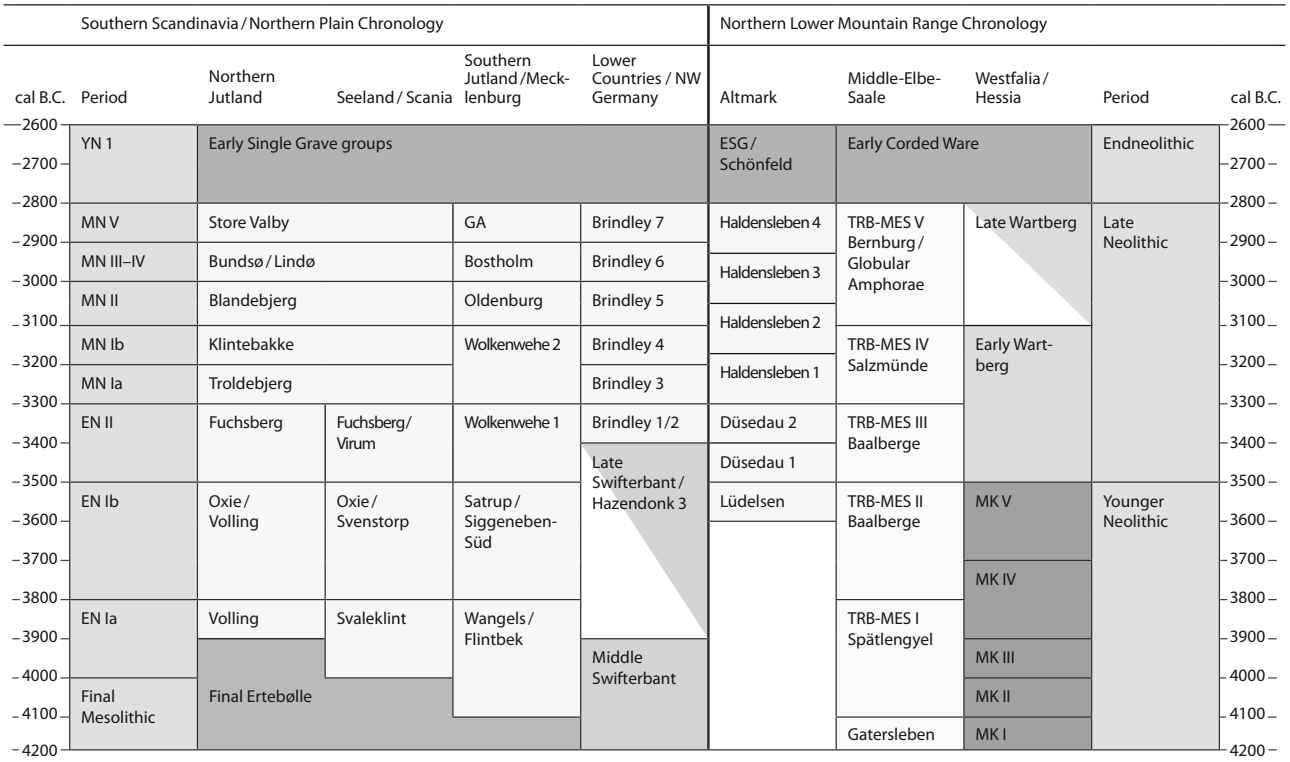

Figure 3. The chronological periodization of Funnel Beaker societies (source: Müller et al. 2010, fig. 1; graphic: Ines Reese/Martin Hinz).

see also Bakker 1979). In our areas of interest the division between the West-, North-, East-, and Altmark-groups is still essential, but examples showing the relevance of the "boundaries" in between these groups are of importance for the interpretation of our data: Do these spatial divisions reflect technical aspects arising mainly when ordering material culture, which then would result in an overestimation of these boundaries? Alternatively, the boundaries of these groups may not necessarily be strictly estimated according to material dissimilarities. In result, not an abrupt change in styles, but a slow shift of stylistic similarities could be an appropriate scenario, as given in the Lower Elbe area, where a lot of TRB-groups merge/dismerge.

Another example is the manifold identification of regional TRB-groups in Southern Scandinavia and Northern Central Europe. The situation is often a result of diverging research histories between countries and schools, obvious e.g. in Balkan archaeology. In respect to TRB, the typological differences and similarities between Northern Germany and Southern Scandinavia have to be evaluated to justify the terminological division of stylistic zones. Some results can be highlighted here.

Network similarities and regional styles

Using ceramic shapes and decorations as an indicator of relations between regions, according to smooth verifications, the general pattern within the TRB world supports the spatial divisions indicated by J. A. Bakker 1979. A network analysis by M. Furholt, which takes the general pattern of each region into account for the entire FB-time-span, indicates the clear separation of the Northern from the Western Group, while the Altmark-Group is strongly linked to the West (Furholt in prep). Furthermore, the uniformity of the Northern Group is clearly subdivided into a Jutland and a Scania/Zealand focus of typological similarities (Figure 4).

While we are dealing here with large-scale analyses, on a regional scale an example taking the correspondence analysis of D. Demnick into account indicates the smooth gradual change of decoration patterns between the Altmark and the Eastern West Group (Demnick in prep). The first eigenvector of a correspondence analysis could be identified as an even change of decoration patterns from the Altmark "Tiefstich" assemblages to the Eastern West Group assemblages (Figure 5). In this case it could be attested that no real boundary existed between the Altmark and the Western TRB. The gradual change of decoration patterns describes the gradual change of decoration customs between neighbouring hamlets.

A further analysis also maintains that the labelling of assemblages in Southern Scandinavia and Northern Germany is due to research history rather than to typological differences within the ceramic decoration. Martin Furholt

Figure 4. A network analysis between TRB regions using ceramic decoration and shape variables confirms linkages and distances for the time period ca. 3500-3000 cal BC (Furholt in prep).

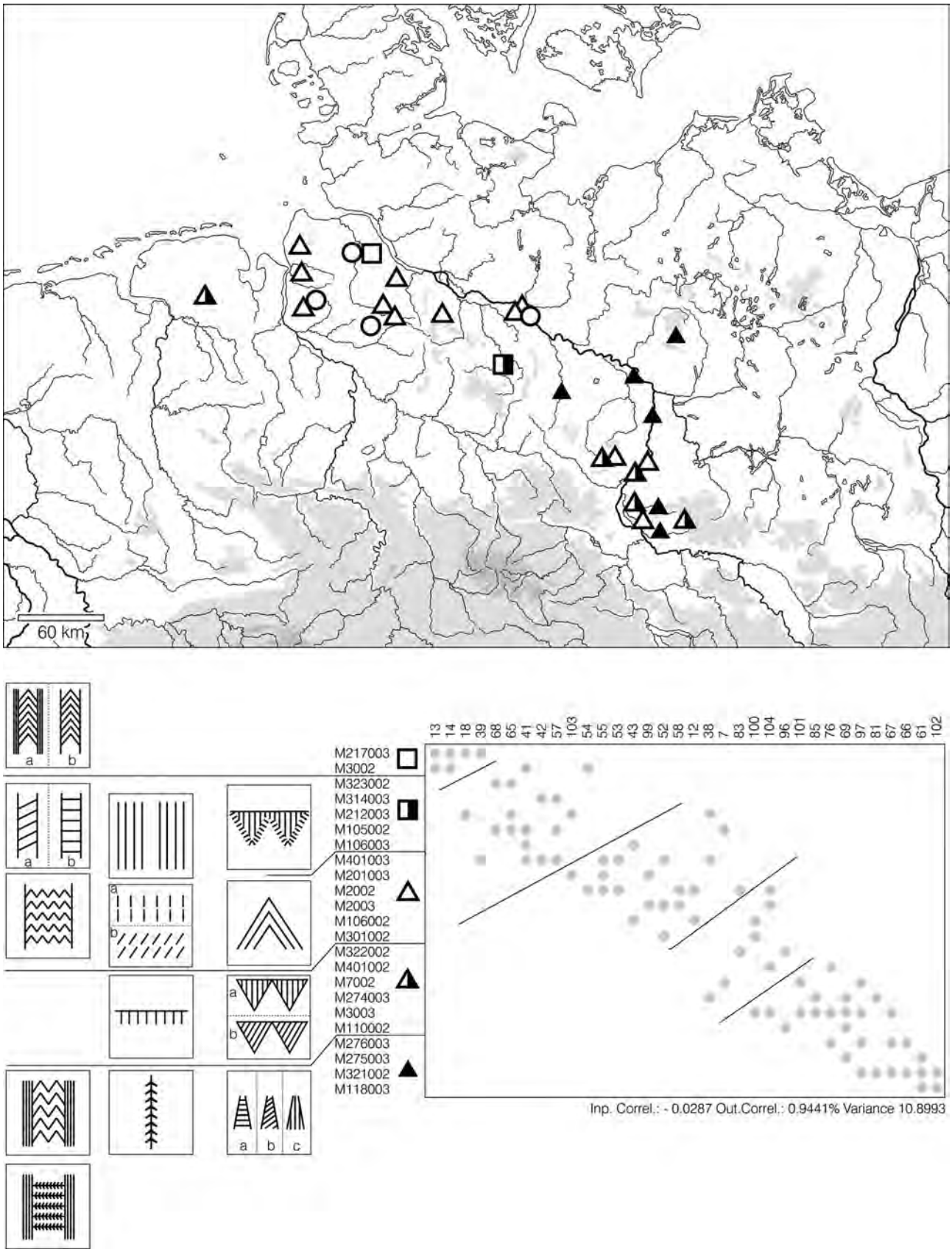

Figure 5. The first eigenvector of the Correspondence Analysis on Tiefstich decorations highlights an only gradual shift between the Altmark Tiefstich Group and the Western TRB (after Demnick in prep).

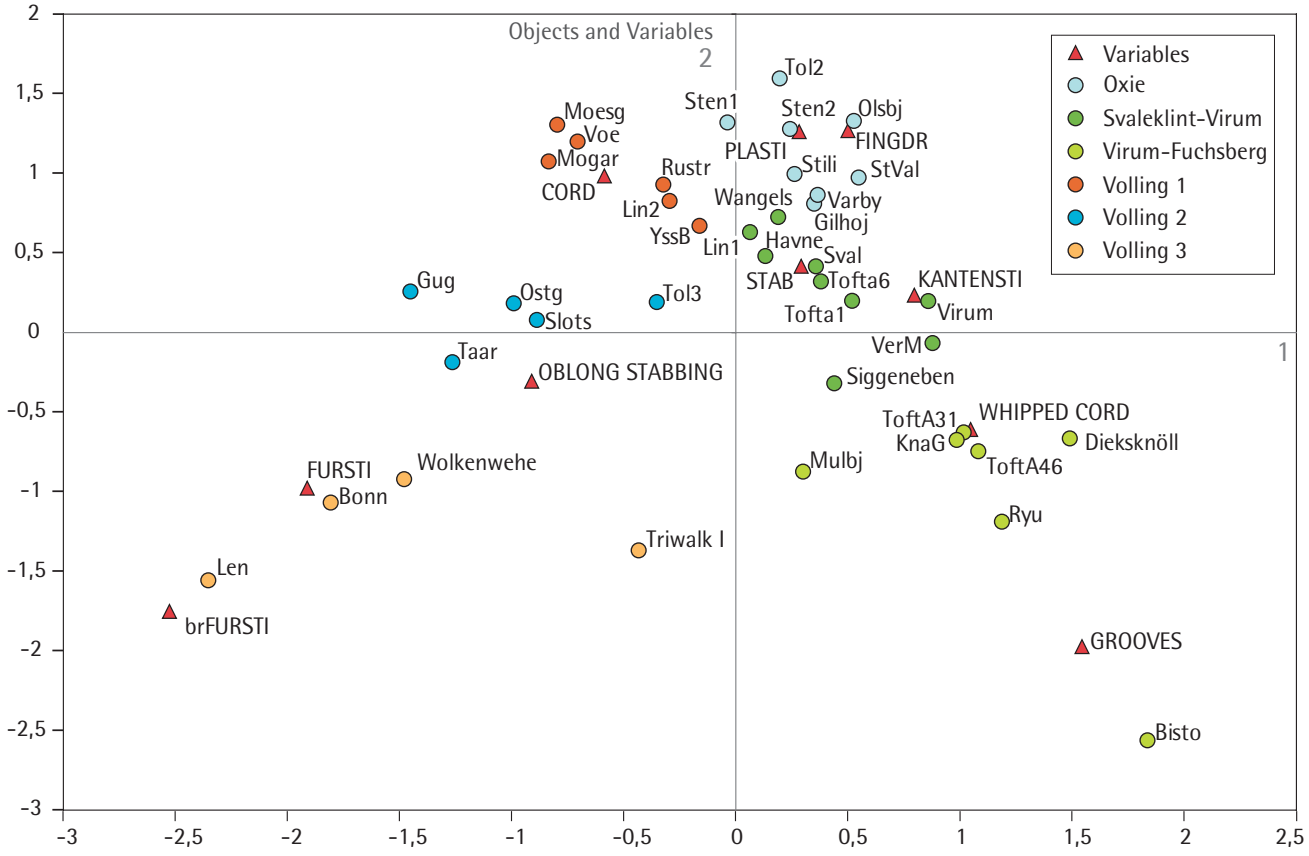

Figure 6. A Correspondence Analysis of rim decoration technics of Danish and North German Early Neolithic assemblages identifies the similarity of sites, independent of their Northern or Southern geographical position. On the Y-axes the 2. eigenvector is identified with "time", on the x-axes the 1. eigenvector with "space". The graph indicates the differentiation between Eastern and Western groups. Abbreviations: Plasti - moulding, Fingdr - finger impressions, Kantensti - edge grooving, Fursti - ordinary stab-and-drag, brFursti - broad stab-and-drag, Stab - stabbing. Source: Martin Furholt.

and Johannes Müller used the analyses of Early Neolithic assemblages, which Madsen and Vang Petersen had collected (Madsen and Petersen 1984; Madsen 1994), to add some assemblages of Northern Germany. In result, the typological similarities, visible in the correspondence analyses (Figure 6) do not support the differentiation of typological groups between north and south, as some literature proposes. Instead, stylistic groups link the entire Western Baltic and cutting differences are not due to locations in the southern or northern part of the region. In consequence, stylistic similarities link the whole area of at least the Danish and North German Northern Group of the TRB.

In summary, spatial differences of e.g. ceramic assemblages are less pronounced in the TRB world, as the group labels, which were constructed during regional research, would imply. An interpretation would therefore suggest the passing on of knowledge and customs from hamlet to hamlet. No indications of mobile groups of some size are given. However, this does not exclude the mobility of individuals, via necessary exogamic marriage practices or individual "traders", but this has to be proved.

Chronologies

The chronological development of the TRB-sphere was primarily discussed in the last decades of the last millennium (Figure 3**)**. Based on regional investigations and radiometric datings - again mainly dealing with ceramics - an elongation of H. Knölls chronological scheme for the TRB-West group (Knöll 1959) was reached by J. A. Bakker and A. L. Brindley, while for Denmark T. Madsen and J.E. Brinch Petersen revised Beckers system for the Early Neolithic. Beckers Middle Neolithic-periodisation was confirmed (Bakker 1979; Brindley 1986; Lanting and Van der Plicht 2000; Madsen and Petersen 1984; Madsen 1994). Further analyses underlined these observations (Koch 1998). In Northern Germany the discussion did not end up with results as clear as one would wish. The Schleswig conference in 1985 described the absolute chronological advance of the Early Neolithic from the south to the north (, but in general H. Schwabedissens chronological labels could not be verified in further analyses (Hoika 1987; Meurers-Balke and Weninger 1985; Hartz and Lübke 2004). Beside such difficulties, which are also due to reduced excavation activities, chronologies for neighbouring southern regions

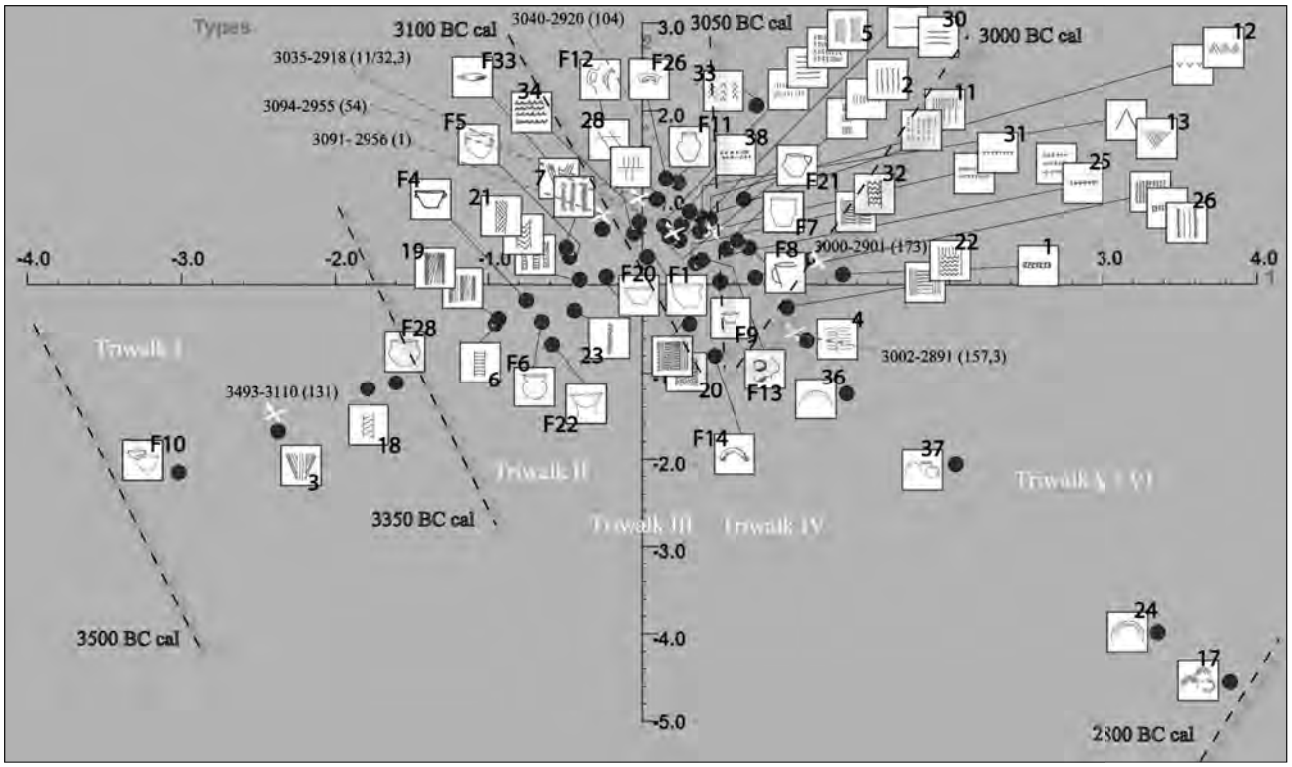

Figure 7. A Correspondence Analysis of ceramic types of the domestic site Triwalk (western Mecklenburg) identifies the typochronological development between 3500 – 2800 cal BC (after Staude in prep).

were verified. Both Michelsberg chronologies (Höhn 2002) as well as Middle Elbe Saale chronologies were pronounced (Müller 2001).

As a main task, the verification of the chronological phasing in Northern Germany remains an object of research. As already mentioned before, the typological differences between Mecklenburg, Holsatia, Jutland and the Danish Isles are not as large as originally expressed. Similarly, Mecklenburg and the Altmark show typological similarities to the Western Group.

So far, deeper chronological analyses both for Mecklenburg as well as for the Altmark were missing. Within our projects D. Demnick conducted such inquiries for the Altmark, K. Staude and L. Lorenz for Mecklenburg. For the Altmark the data base is quite limited, as no closed finds, but rather only relatively mixed assemblages from megalithic burials or domestic sites exist. Nevertheless, correspondence analyses of Tiefstich pots describe a clear typological similarity sequence, which could be identified as chronologically relevant by ^{14}C-dates of linked features (Demnick in prep). In result, a continuous development of Tiefstich-pottery is paralleled to the West-Group chronologies (Figure 3).

For Mecklenburg, the analyses of the domestic site Triwalk near Wismar confirmed six phases between 3500 and 2800 cal BC (Staude in prep). Both vertical stratigraphies, which were observed in pits, as well as radiocarbon dating identified the typological sequence of pot shapes and decoration types as chronologically relevant (Figure 7). In phase Triwalk 1 funnel beakers and bowls with conical rims are found, but also pots with cylindrical rims. Ladder-like ornamentation with vertical stripe groups and plastic mouldings appear. In Triwalk 2 different ladder-like patterns become more diverse and combinations of zig-zag and vertical lines form vertical patterns. Both bowls as well as funnel beakers are two- or three-limbed, a clear breaking point at the belly or on the rim is visible. In Triwalk 3 the decoration becomes complex, but in Triwalk 4 a reduction in complexities starts, which is again seen in Triwalk 5-6. The chronological pattern of the domestic site, which was described by K. Staude for Triwalk, could also be described for single burial assemblages and megalithic tombs in Mecklenburg: L. Lorenz could identify three different phases for megalithic assemblages (Lorenz in prep). In consequence, both domestic and ritual ceramic chronologies of Northeast-Germany are comparable to the development of the Western TRB group. Furthermore, the typological gradients of single grave, megalithic and domestic assemblages are not as different as originally assumed.

As a result, we are now able to fix the typochronological development for Northern Central Europe and Southern Scandinavia - also in some areas of Northern Central Europe. As a result, the dating and duration of monuments is easier to detect and the archaeological evidence can be linked with palaeoecological data in a better chronological solution.

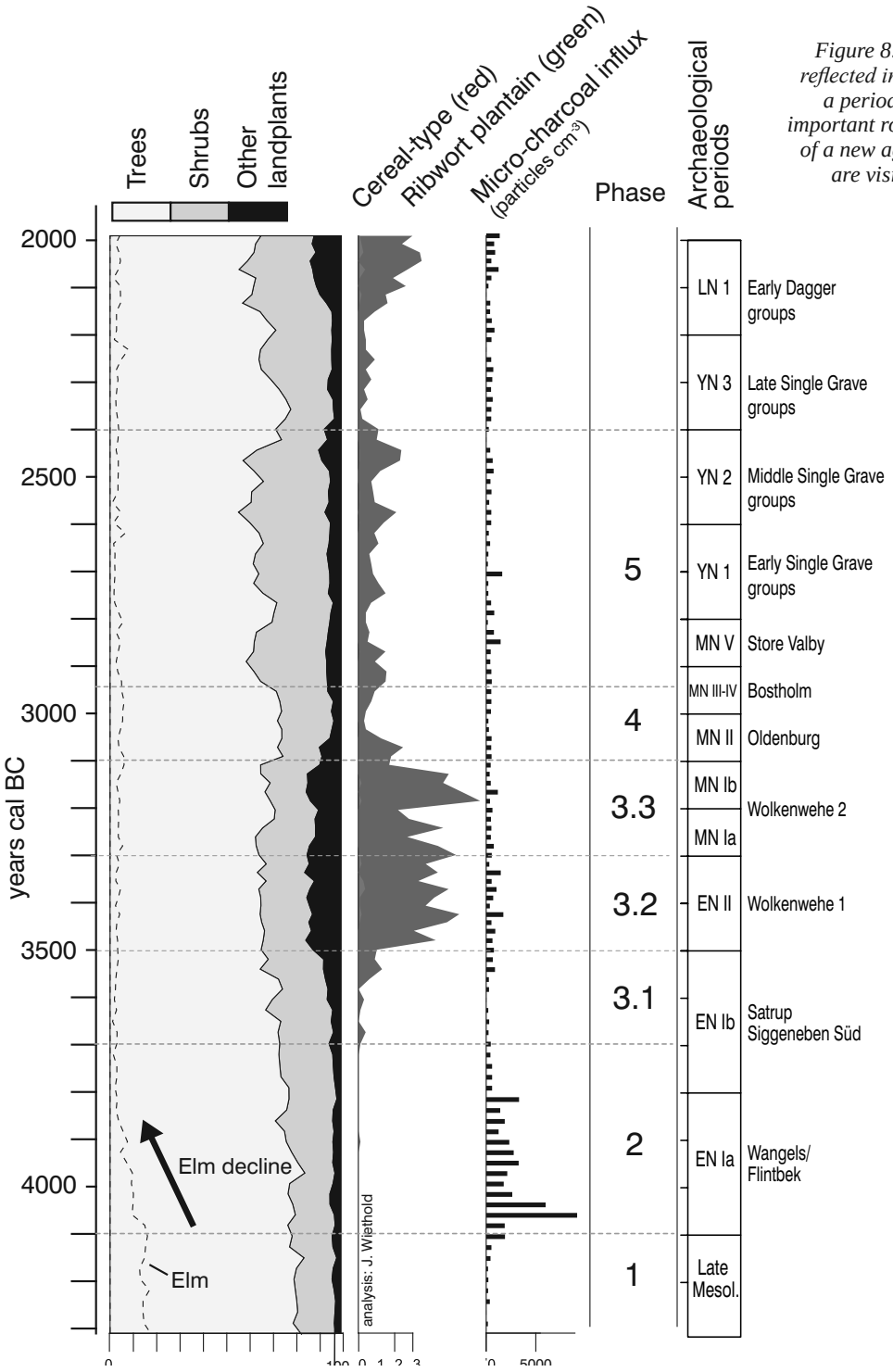

Figure 8. The opening of the landscape reflected in the record of Lake Belau. After a period in which charcoal played an important role, around 3500 BC, the imprints of a new agricultural system on vegetation are visible. Copyright: Ingo Feeser.

Environment and Economy

Within the Priority Program palynological and archaeobotanical research started to gain closer information both about the environmental as well as about the economic development of TRB societies.

Environs and land use

One of the major sources of research continues to be the laminated pollen profile from Lake Belau, published already in 1998 by Wiethold but with a correction of the absolute dating by Dörfler and Feeser in 2011 (Kirleis *et al*. 2011; Wiethold 1998; Dörfler and Feeser in prep) (Figure 8). With the new dating in mind we can distinguish several phases and sub-phases, which are also reflected in other pollen profiles of the Southern Cimbric Peninsula:

Phase 1 Mesolithic

Before 4100 cal BC: The pollen record of Lake Belau suggests a closed canopy with mixed oak forest. Clear evidence for human interference with the natural woodlands is missing. Ongoing investigations of another profile

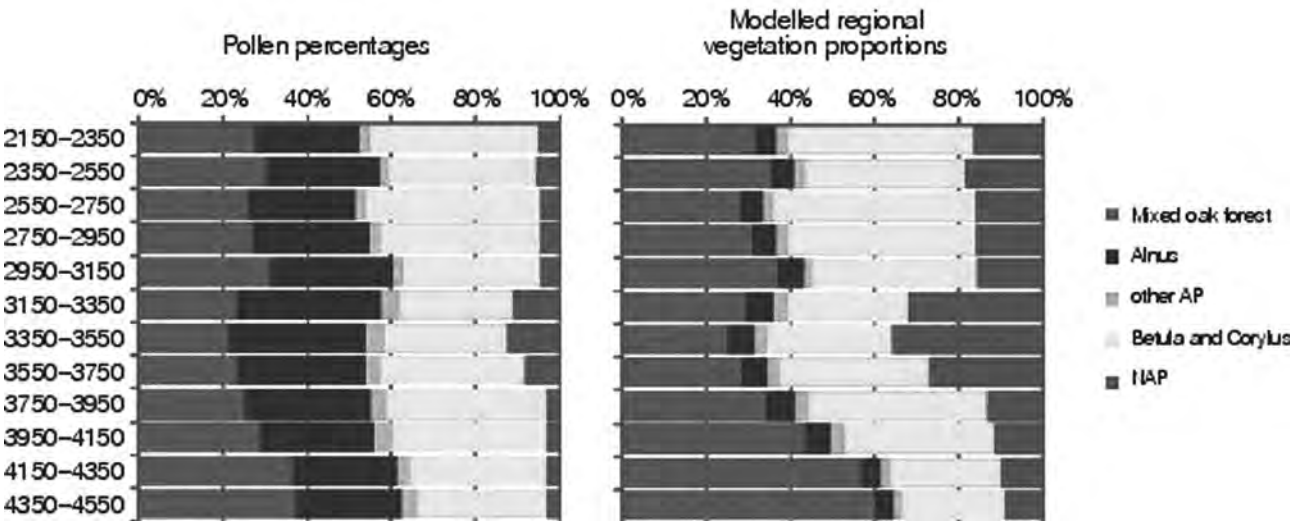

Figure 9. The modelling of the real vegetation pattern with the REVEAL model indicates the openness of the Belau Lake surroundings. Copyright: Ingo Feeser.

of Poggensee, a small sized lake 2km northeast of the archaeological site Wolkenwehe, however, reveal first evidence for woodland clearance, although very localized, from around 4500 cal BC onwards. Generally, however, human impact seems to have been low between 4300-4100 cal BC.

Phase 2 Small scale agriculture and woodland pasture:

4100-3700 cal BC: The beginning decline of elm (*Ulmus* spp.) around 4100 cal BC coincides with an increase of micro-charcoal influx and provides first clear evidence for human impact in the profile of Lake Belau. Although natural fires cannot be excluded, the synchronous archaeological evidence for a shift from hunter gatherer to Neolithic societies supports this interpretation. Therefore, it seems likely that human interference with the natural woodlands favoured the spread of a phytopatogenic elm disease, which is generally accepted to be responsible for the mid-Holocene elm decline (e.g. Peglar and Birks 1993).The remaining high presentation for arboreal pollen, however, points towards a more or less closed woodland cover. The generally high values for micro-charcoal could indicate a form of fire management in connection with wood pasture and included pollarding (Schneitelwirtschaft). This might also explain the increased importance of hazel (*Corylus avellana*), a light demanding species growing in the understory of the woodlands. Agricultural activities – occasional finds of Cereal-type pollen are known from several other pollen diagrams, but the possibility of their origin from non-cultivated grasses has to be considered (cf. Behre 2007) – were probably rather small scale.

Phase 3 Agricultural expansion phase

Subphase 3.1 3700-3500 cal BC: Increasing importance of ribwort plantain (*Plantago lanceolata*) and grass (Poaceae excl. Cereal-type) pollen, as well as lower micro-charcoal values from 3700 cal BC onwards indicate the expansion of areas of open landscape in combination with profound economic changes or changes of land-use strategies. A comparison of pollen diagrams from northern Germany shows that this has been a rather synchronous development along the southern Baltic coast. One possible explanation could be the introduction of the ard (see also below), which would have allowed the cultivation of larger areas. Evidence for cereal pollen, however, is generally scarce.

Sub-Phase 3.2 3500-3300 cal BC: Around 3500 BC a sharp increase in *Plantago lanceolata* and Poaceae (excl. cereals) is visible in Lake Belau. Compared with other pollen data from the region this feature seems to be of more local importance. Thus, it is regarded to reflect the establishment of agricultural fields in the vicinity of Lake Belau, which is in agreement with regular occurrences of cereal-type pollen in the record. Results of an approach to model and quantify the regional vegetation composition (used was the REVEALS model, cf. Sugita 2007) indicate an opening of the landscape of up to 40% of the total land cover (Figure 9).

Subphase 3.3 3300-3100 cal BC: The decrease of lime-pollen in the 33rd century cal BC indicates the clearance of primary woodlands on more fertile, but also heavier soils. At the same time however, classical indicators for farming activities such as *Plantago lanceolata*, Poaceae (excl. cereals) and Cereal-type decrease slightly. This argues against a simple intensification of land use, but could indicate a shift in land-use strategies. In the 31st century the classical indicators of human activity recover which could reflect a shift back to old land-use strategies and/or an intensification of human impact.

Phase 4: (Agri-)Cultural collapse and overregional woodland regeneration

3100-2950 cal BC: This phase is characterized by reduced human activity and the recovery of woodland, which is in agreement with the results from other pollen diagrams from Schleswig-Holstein and Mecklenburg-Vorpommern and suggests fundamental changes in the Neolithic societies and/or settlement systems.

Phase 5: Renewed human activity

2950-2400 cal BC: In Lake Belau there is evidence for several minor phases of increased human impact during this period (around 2900, 2740, 2590, 2440 cal BC). Based on the representation of land-use indicators, human impact did not recovery to previously reached intensity. The comparison with other diagrams from northern Germany, however, indicates that settlement activities are generally more diverse than in the previous phases.

In general, three main phases of land use activities, linked to TRB-activities activities can be interpreted as follows: Phase 2 with small woodland management influences on the environment, Phase 3 with an intense human impact and Phase 5 characterized by renewed human activity after a period of ca. 200 years characterised by drastically reduced human impact (Phase 4).

Subsistence economy

Archaeobotanical research underlines the observations, which were made on the basis of the pollen-record. The evidence of cereals or cereal-related weeds paints a similar picture (Kirleis *et al.* in prep; Kirleis *et al.* 2011; Regnell and Sjögren 2006). Remains of domesticates from Neolithic sites between 4100-3800 cal BC are very sparse. Between 4100 and 3800 BC we do not have a single cereal find from a settlement except cereal impressions on pottery. It is not quite clear, but most possibly the imprints stem from imported cereals. Not until the Early Neolithic IB, after 3800 BC, are cereal finds from different sites present when at the same time ribwort plantain occurs regularly in the pollen records, both together indicating an agricultural expansion.

The main input of archaeobotanical evidence for cultivation belongs to the late Early Neolithic and the Middle Neolithic. Important North German sites with archaeobotanical evidence and already known evidence belong to the late Early Neolithic II in Rastorf LA 6 (Kroll 2001; Steffens 2009), the Middle Neolithic to the end of TRB (Middle Neolithic V) in Oldenburg-Dannau LA 191 (Kroll 1981) and Flögeln (Behre and Kučan 1994), and of MNV in Wangels LA 505 (Kroll 2001; Kroll 2007). The main crop plants in the TRB were naked barley (*Hordeum v. nudum*) and emmer (*Triticum dicoccum*). In Flögeln hulled barley (*Hordeum v. vulgare*) is more important than naked barley. Evidence for einkorn (*Triticum monococcum*) and naked wheat (*Triticum aestivum / durum*) is sparse. Only in Rastorf LA 6 naked wheat is present to a somewhat higher amount and it dominated the Late Neolithic storage find from Bosau (Kroll 1980). Seeds of opium poppy (*Papaver somniferum*) were found in relative high numbers in the wet layers of Wangels LA 505 (Kroll 2007).

The archaeobotanical record for former and newly investigated settlement sites mainly deals with food plants. This is not astonishing because food production and consumption takes place within domestic sites. There were two ways of getting access to food plants. Either food plants were grown as crops or they were gathered in the vicinity of the settlement. If we separate the plant assemblages into crop plants and gathered plants, the data on charred remains from four different settlements shows similar tendencies: In Rastorf LA 6 cultivated plants represent 57 % of the plant assemblage. In Oldenburg-Dannau LA 191 and Flögeln almost all food plant remains (98 to 99 %) stem from cereals. The situation at Wangels LA 505 is slightly different because the plant remains are partly charred and partly waterlogged. If the waterlogged material is excluded, gathered plants hardly occur (about 1 %).

A typical site of the late Early and Middle Neolithic of the TRB-North Group is Oldenburg in Holsatia, where excavations still continue. The preliminary analyses underline, that cultivated plants dominate the plant assemblage (figure 10). 98 % of the charred remains stem from cereals, 1.4 % belong to weed species and 1.2 % are the remains of gathered plants. The main component of cereals is naked barley. It is followed by emmer by a large margin. Single grains of einkorn present a third domestic plant. Mainly the fruits of cereals are documented. Threshing remains like rachis fragments and glume bases occur to a lesser extent. Weeds are scarce. Poaceae represent the majority of finds. In addition, *Galium spurium*, *Vicia* sp. and Cyperaceae are present. The spectrum of gathered plants consists of three species: *Corylus avellana*, *Rubus fruticosus* and *Chenopodium album*.

Of considerable interest is the importance of apple within the record (figure 11). In comparison with other prehistoric and historic periods, evidence of apples during the Neolithic is as high or even higher as during the Middle Ages. It seems to be clear, that some kind of careful management was carried out in Neolithic “apple groves” (Jantz and Kirleis 2010), which also would imply the presence of hedges in Neolithic times (Kreuz 1988; Kreuz 1992). If we interpret these hedges as borders, they perhaps imply private property within the landscape, e.g. fenced apple groves.

In contrast to domestic sites, already gathered archaeobotanical evidence for different ritual sites highlight the role of non-cultivates for the society (figure 10). As an example, the site of the megalithic tomb of Albersdorf-Brutkamp is mainly characterized by charred remains of non-cultivated plants that may either stem from fire clearing

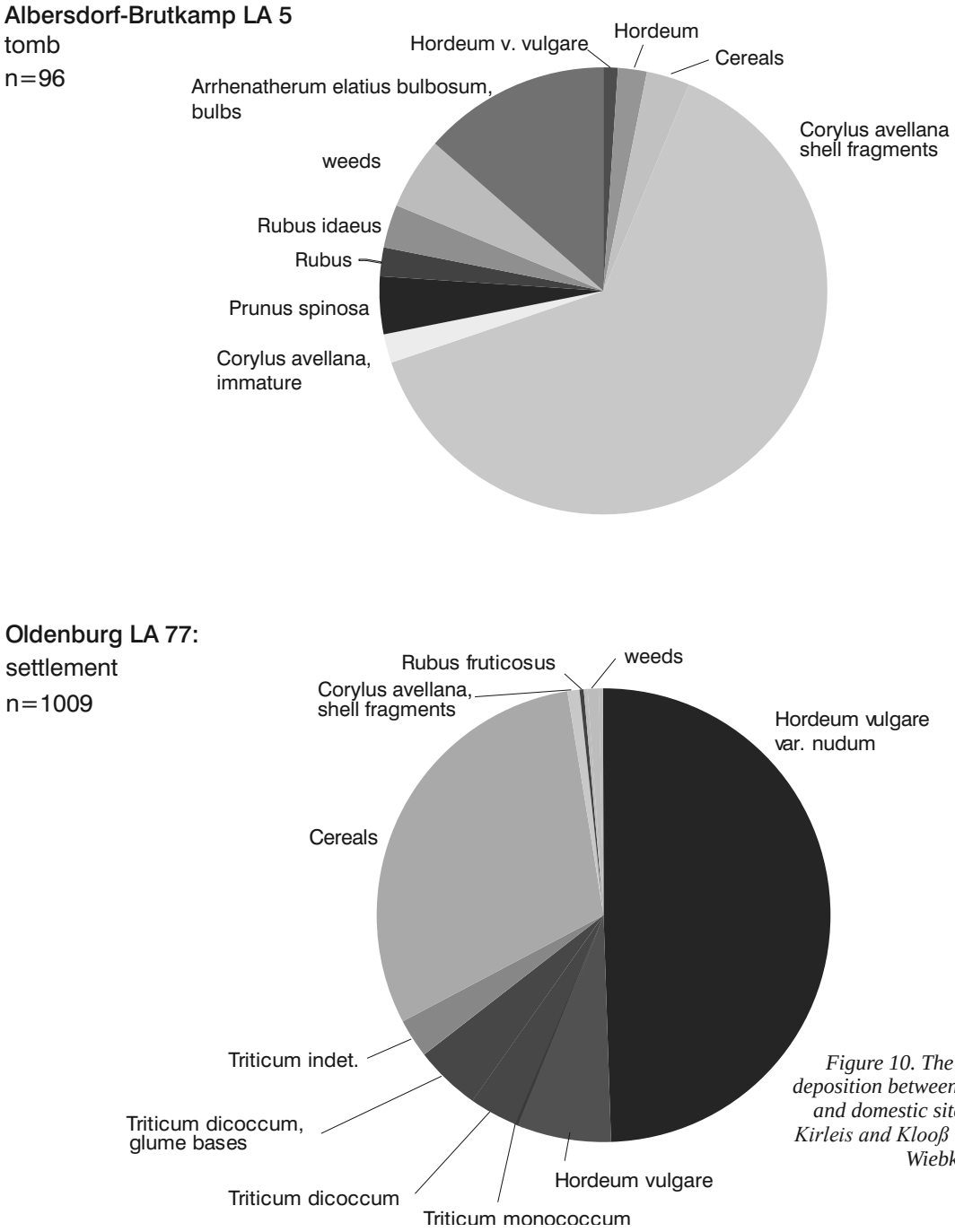

Figure 10. The differences in plant deposition between megaliths (Brutkamp), and domestic sites (Oldenburg) (after Kirleis and Klooß in prep, fig. 2; graphic: Wiebke Kirleis).

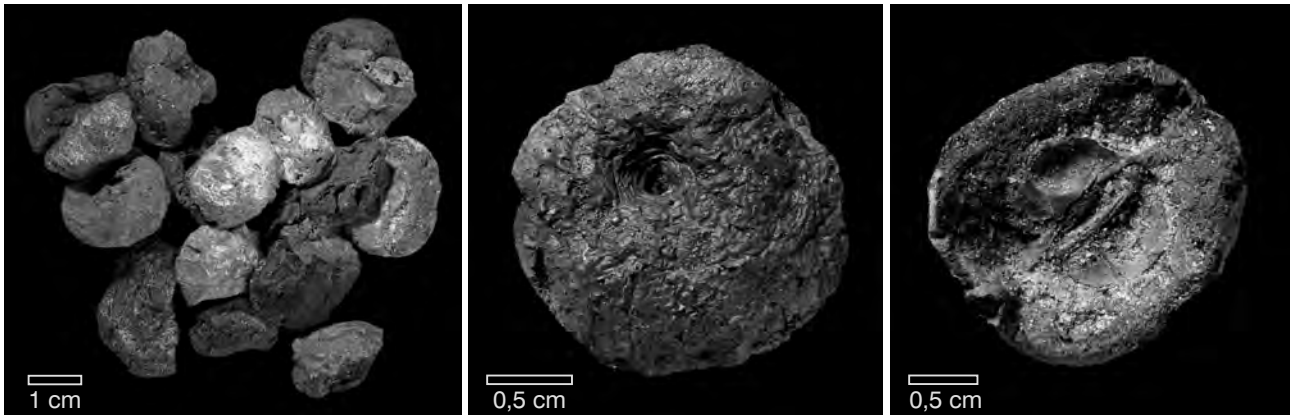

Figure 11 An apple. Copyright: Sara Jagiolla/Ines Reese.

as ritual activity to prepare the ground for the erection of the megaliths or hint towards fruit gathering related to the burial ritual. Among others, hazel is well represented (Kirleis and Klooss in prep). The same applies to the causewayed enclosure of Albersdorf-Dieksknöll where the percentage of cereals per liter remains even lower and the plant spectra are dominated by charred finds from a nearby riverine forest. It cannot be said for sure if shrubs such as hazel or species of fruit trees were promoted by a special kind of forest management. In consequence throughout the different societal spheres herbal products were used and deposited in various, sometimes markedly different ways which are reflected in the variety of find scenarios.

The development of agricultural techniques has to be considered as well. The opening of the landscape and the sudden increase in evidence of cultivated crops should be connected to the introduction of the crooked plough, marks of which can be found under and near megalithic graves and houses since the Early Neolithic II in North Central Europe and Southern Scandinavia. The plough marks of Aptrup (Amt Viborg) and Flintbek (Mischka in prep.) date to 3600-3300 BC and those of the Fuchsberg-house of Rastorf may also be mentioned (Hübner 2005; Steffens 2009).

The technological improvement of the plough strengthens the role of cereals as a nutritional foundation, a fact that is underlined by the frequent occurrence of cereal samples on domestic sites dating to the Early Neolithic II and the Middle Neolithic phase.

Wheat and barley are seconded by related weeds that show small-scale agriculture (e. g. Bogaard 2004), furthermore poppy appears. The cultivation in small plots augments the opening of the landscape and the increase of shrubs in pollen profiles accounts for the existence of hedges. Grinding stones and sickles become common finds within most settlement types after 3600 cal BC. The appearance of sickle glance serves as another indicator for a chronological offset from south to north: the percentages of sickle glance are higher in southern settlements. In Sarup, deforestation is evidenced as late as 3300 BC accompanied by a simultaneous rise of sickle evidence within the settlement (Jensen 1994).

The change from primary gathering and gardening activities to the "New Economy" with larger scale land-opening is also visible in changing figures for domesticated animals. „Hard" evidence of a Neolithic lifestyle is only represented by low proportions of domestic animals at the beginning of the Early Neolithic (Steffens 2005). Between 4100 and 3800 BC the share of domestic bones within zoological inventories range from 14.5 % in Danish Svaleklint, 22.6 % in Basedow/Mecklenburg, only 6 % in Scanic Lödelsborg and 25.8 % in Bebensee, whereas Wangels displays a share of 64 %. The following Early Neolithic Ib is characterized by values of more than 60%, for example Siggeneben-Süd features 67%. With the Early Neolithic II and Middle Neolithic the values level off at over 90% with the exception of specialized settlements such as Bad Oldesloe-Wolkenwehe. So we have to concede that the adoption of a Neolithic lifestyle took place gradually, beginning in the Early Neolithic and ending a few centuries later. This transformation is reflected in the percentage of domestic animals. New house mammal species were mainly cattle, but also pigs and small ruminants. aDNA-analyses of, for example, cattle bones reveal that the animals bred did not stem from local species, like e.g. aurochs, but from Anatolian races (Bollongino 2006).

Temporary TRB settlements or camps were built for different purposes but some of them were clearly engaged in hunting activities as we have already stated for Bad Oldesloe-Wolkenwehe with a high percentage of game in the Early as well as the Middle Neolithic. A straightforward example of a hunting camp is the temporary station in Parchim-Löddigsee from which no domestic animal remains are known (Becker and Benecke 2002). There is evidence that the settlement was used to carry out a specialized hunting of wild horses at the end of the Middle Neolithic. Some structures feature a strong hunting component probably due to social reasons, for example the grave field of Ostorf (Lübke *et al.* 2009) even though the subsistence economy was mainly based on agricultural products during the late Early Neolithic and Middle Neolithic.

As for animals in this context, the cart tracks of Flintbek can be mentioned. They could recently be dated precisely to 3400 BC and confirm the use of cattle as working animals (Mischka 2010; Mischka 2011). The appearance of double burials of animals, especially of cattle, in wide areas of Europe is a very powerful indicator for the increasing significance of animals. We find anti-podic double burials of cattle which were - as is the case for Central Germany - placed analogous to human burials in a crouched position alongside common grave goods. A recent study revealed that the sole remains found in double burials, which were aligned in front of the megalithic tomb of Vroue Heide, were cattle teeth (Johannsen and Laursen 2010). The position of the finds suggests that the burials could have well been double burials of cattle which had maybe been buried together with a cart or carts. This is another strong indication for the importance of animals.

We have as yet not mentioned fishing and the exploitation of maritime resources which remained common during the whole timespan, as many finds of seal and fish bones, fishhooks and weights from fishnets confirm. In Bad Oldesloe-Wolkenwehe seal bones were found and indicate that these animals were an important resource even inland.

In consequence stable agriculture surely existed after 3600/3500 BC. But, how can plant cultivation before 3600 cal BC be characterized? The described palynological evidence from Lake Belau, reports an increase of charcoal between 4100 and 3700 BC (figure 8). The first half of the 4th millennium is characterized by a distinct increase of colluvial depositions in Schleswig-Holstein, followed

by a decrease (Dreibrodt *et al.* 2010). Both discoveries may be seen as indicators for the often discussed small scale woodland opening by fire („Brandfeldbau"; Schier 2009). We think that small forest areas are burnt down, the ground is then fertilized by the ash and cultivation of crops requiring hoeing starts and is continued on the same plots year in, year out. This method leads to very good harvesting results and may have opened up the non-loess areas and by this the Northern Central European and South Scandinavian region to cereal cultivation before the invention of the crooked plough could consolidate the new economy. From an archaeological point of view cultivation techniques separate an horticulture (Early Neolithic I) from agriculture (Early Neolithic II).

Regional mosaics

If we present phases of TRB-development here we have to take the manifold regional differences into consideration. Concerning the start of Neolithic economies, the comparison of pollen diagrams from the TRB region, indicates significant differences in the beginning of extensive opening of the landscape for agricultural purposes. Whereas in the southern TRB North group an agricultural expansion starts around 3700/3600 cal BC, corresponding features generally occur significantly later in the pollen records of the more southern TRB areas**.** These differences in the starting point of land opening stands not only for the differences, but also for the independence of each region.

At the end of the TRB development we again may identify various regionally differing structural organizations of societies. Some areas are reforested after 3100 cal BC, in other areas we observe an increase of pasture land. The transition to an Early Neolithic economy with a strong bias towards animal husbandry also characterizes the end of the TRB development which appears just as diverse as the beginning.

Settlements and spatial patterns

In addition to economic analyses, the on-going activities of the Priority Program in Kiel focus on settlement structures as a basic prerequisite for developing ideas about the political organization of the society, which in turn depend e.g. on population sizes and the size of basic societal units.

So far, small field surveys and excavations, which are still under progress, support the idea of single households as the basic unit of TRB societies, an observation already verified in other TRB regions. Mainly rectangular houses are to be considered. They appear as single homesteads and small hamlets, never clustered to bigger villages, at least in our area of research. The sites seem to never have existed longer than three hundred years. However, depositional processes on the sites are quite difficult to disentangle. Remains, which we label "sunken floors", "cultural layers", and "pits" are still without any clear explanation.

Rastorf

One example for such a single farmstead is the Dagstorp type house from Rastorf, East Holstein (Figure 12 and 13). On a small promontory the 6 x18m sized two-ailed house was constructed with different sized posts. A diversity of silex artefacts, querns, domestic ceramics and crops indicate the activities of a farmstead in existence around ca. 3500-3300 cal BC (Fuchsberg). In front of the 120m2 house lay refuse pits, fire places, a single burial and plough marks: a classical example of a combination of a domestic structure, small fields, near burial places, rubbish areas, and installations for outdoor activities (Steffens 2009). The homestead was occupied only for a short period of time (3 generations?), as no indications of a household continuity were recovered. Instead, a "cultural layer" indicates the deposition of refuse above the house after its destruction, while later on a megalithic monument was erected (Middle Neolithic Ia).

The described house was located on a small elevation within a group of different natural mounds. Nearby, a contemporary megalith and a megalithic long mound (Early Neolithic II) were situated, probably also further farmsteads, of which only horizontal refuse layers remain.

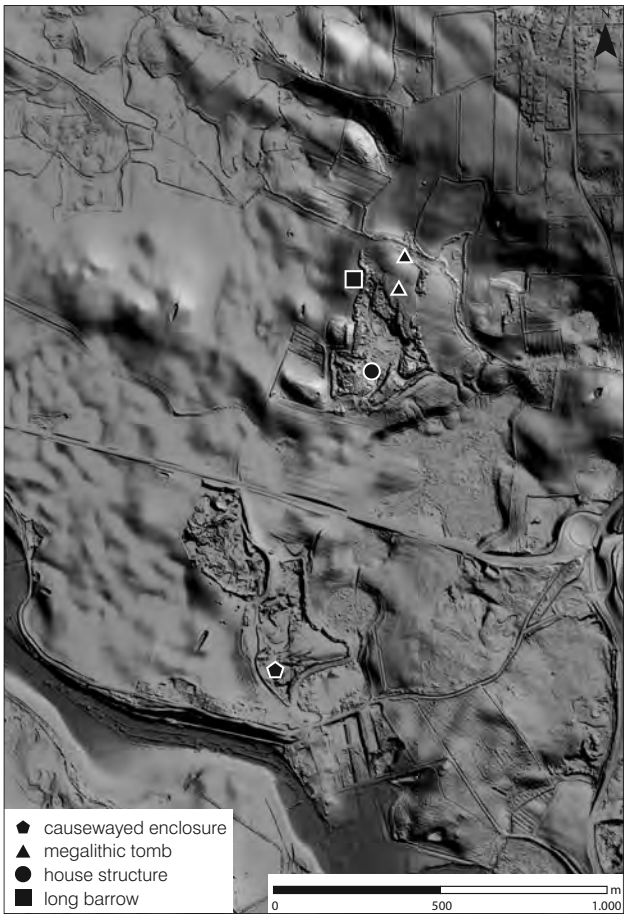

Figure 12. The spatial distribution of the Rastorf Early Neolithic II enclosure, house and megaliths. Copyright: Jan Piet Brozio.

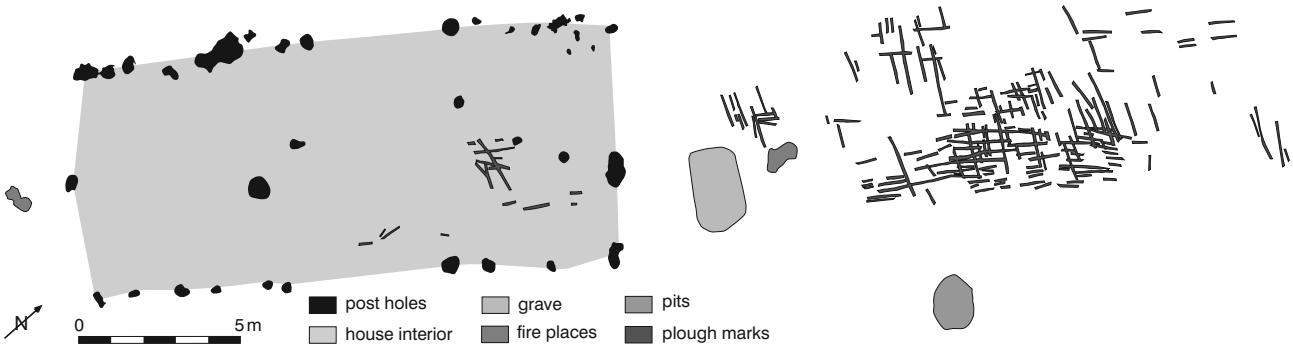

Figure 13. The Early Neolithic II house of Rastorf (after Steffens 2009; Brozio 2011). Both the arable land as well as the house with a burial are visible. Copyright: Jan Piet Brozio.

In general, at Rastorf the association "megalithic collective tomb – farmstead" is indicated.

At a distance of 1km to the south nearer to the Schwentine river, the causewayed enclosure of Rastorf is positioned. Composed of elongated pits, which originally formed at least three concentric ovals with causeways (diameter ca. 200m), the site itself presents on the one hand deliberate depositions within the ditches, on the other hand remains of axe and item production within the site. Domestic structures are not evident at the enclosure, however because of its contemporaneity with Rastorf a spatial organization is pronounced: single farmsteads with monuments for collective burials are situated at a far distance from the ritual enclosure, which might have functioned as a gathering place for different local groups of farmsteads (Brozio 2011).

Albersdorf

A similar spatial division of the landscape might be true for the area near to Albersdorf ca. 150km to the west of Rastorf (Dibbern and Hage 2010). Although there is a lack of clear evidence for domestic activities, which might be due to erosional processes or the lack of an extensive archaeological survey, megaliths are again found at a marked distance from the causewayed enclosure (Figure 14). While long barrows and megaliths are distributed on the hilly plain of a moraine landscape, the enclosure is sited on a western promontory, separated from burial monuments by deeper wetlands with small burns. The excavation at the elongated dolmen Albersdorf-Brutkamp and at the enclosure Albersdorf-Dieksknöll demonstrated that both monuments (and probably also the other megaliths) were constructed contemporaneously in the 37th or the 36th century cal BC.

The excavation at the enclosure revealed a pattern, which was already known from investigations in Sarup and other Southern Scandinavian enclosures (Andersen 1997; Klatt 2009). The ditch system and the filling of the ditches is a product of several phases of activities, reflected in 13 different layers. Radiometric evidence displayed the core of main activities between 3650 and 3300 cal BC, while after 2800 cal BC a renewal of activities at the site took place (Figure 15 and 16). In general *phase 1* represents the digging of the ditch, which was left open for a while (leading to the sedimentation of blown in sand at the bottom). *Phase 2* comprises three sub-phases of infillings and recuttings, finalized by the deposition of a charcoal layer, which embodies the remains of an inner, now burnt wooden palisade. As the palisade was probably erected contemporaneously to the ditch system, its burning around 3500 cal BC represents the first "clear cut" in the biography of the site.

Until this moment, the enclosure was composed of a ditch system of elongated pits, in which crushed pots and other items were deposited, a transversal pit in one of its gateways (also with recuttings and infillings), and the mentioned inner palisade. The enclosed area was "empty", an emptiness, which from a pedological point of view could not be due to the results of Post-Neolithic erosion.

In *phase 3* of the site again four sub-phases of infillings and recuttings took place, while around 3300 cal BC these activities ceased, partly again linked with fire. About 500 years later (*phase 4*, Middle Neolithic V), the ditches and the transversal pit were again used for two sub-phases with recuttings and infillings, - but this time perhaps with a different background: the in-filled layers are not as homogenous as the previous ones.

On the whole, we think that the site was a meeting point of different local hamlets, which gathered together to re-secure their relations through the "strange" on-going processes at and in the ditches, the processing of some tools and, probably in general feasting activities. If we take the absolute time scale into consideration, this must have taken place at least 15 times in around three hundred years, - thus every 20/25 years that amounts to once in the life-span of a human generation in general. In practice, this might point to a situation, in which the children participated in these corporative activities, the adults were the main agents, and the mature or senile were still present. In such a manner, knowledge and rites could have been passed on in suitable surroundings. That these activities were probably only

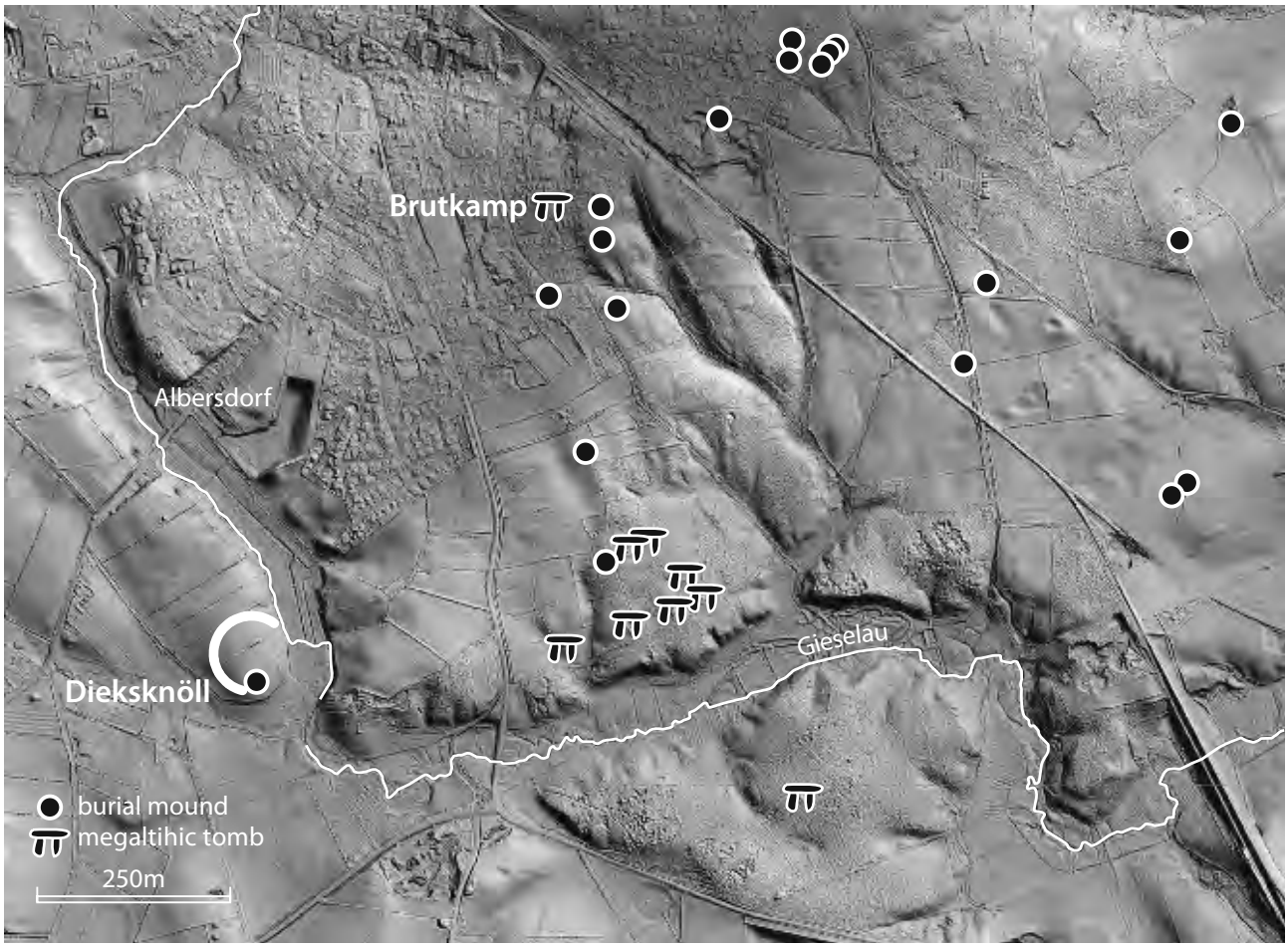

Figure 14. Albersdorf land pattern. The causewayed enclosure is situated at a distance from the megaliths. Copyright: Doris Mischka.

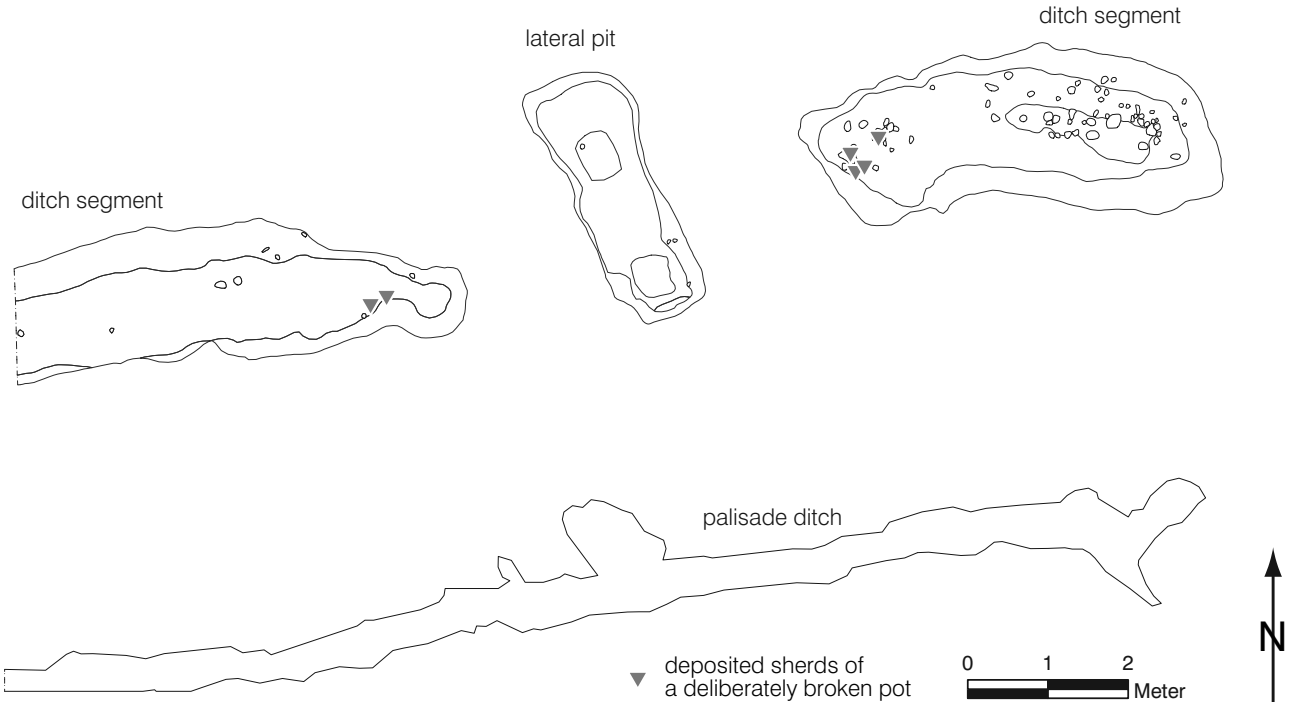

Figure 15. The deliberate breaking and deposition of one pot in the segmented ditches of the causewayed enclosure Albersdorf-Dieksknöll. Copyright: Hauke Dibbern.

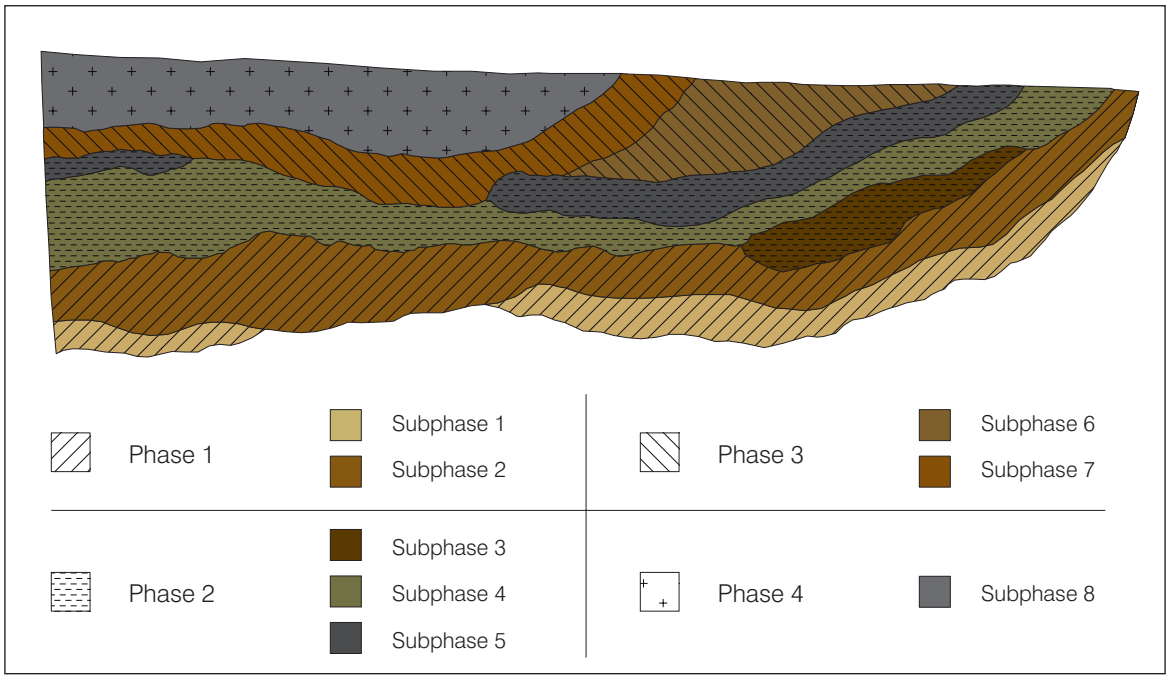

Figure 16. Albersdorf-Dieksknöll profile of the ditch. Indicated are several phases and subphases of infillings and recuttings. Copyright: Hauke Dibbern.

short time occasions at the site is indicated by the very low number of finds in comparison to domestic or other sites (Figure 17).

In detail, these celebrations were associated with the demolition of vessels (perhaps libation) and their placement in pits. One such vessel, for example, is broken and deposited in both parts of the northern and southern head ends of the ditch, whereby the 2m deep pit was omitted (Figure 17). Due to its heavy wood posts it was obviously covered up in a tent-like fashion and was reserved for other special purposes, still connected to re-cuttings and in-fillings. The activities which we attribute to the ditch system correspond surely to temporary gatherings. The quantity of archeological finds is absolutely meager and cannot be compared to that what we know from domestic sites. The deposition of clay dishes and Funnel Beakers verify from our point of view that only temporal activities (e.g. feastings) took place here. The archaeobotanical results show that cultivated plants did not play any role in these rituals. Furthermore, it is interesting that the pits were repeatedly dug out perhaps until a point in time around 3300 BC. However, afterwards a phase began in which the ritual was no longer maintained. The renewed pit diggings around 2800 BC verify however, that knowledge of the assumed activities was still present over the centuries and here at the end of the TRB societies and the beginning of the development of Single Grave societies it was shortly practiced once again.

As already mentioned, the excavations in the cairn of the polygonal dolmen Albersdorf-Brutkamp displayed a starting point for the monument also in the 37th century cal BC, obviously contemporary to the first activities at Dieksknöll. At Brutkamp the sequence of depositions confirmed that the chamber was used at least until 3000 cal BC, both verified by radiocarbon dating as well as by typo-chronological indications. Yet unknown reasons which were responsible for the end of activities at the Dieksknöll enclosure did not interrupt Brutkamp burial undertakings.

In spite of the missing proof of domestic structures, in our model Albersdorf farmsteads were spatially linked to megaliths as in Rastorf. If such a model is likely, a continuation of settlement activities would be indicated, while the "central" enclosure ceased. Evidence of the pollen profile also indicates such a pattern (Dörfler 2005).

Oldenburger Graben

East Holstein features favorable climatic circumstances with low rainfall/precipitation values (500/600mm/a) and was therefore one of the best settlement regions on the Cimbric Peninsula near the west Baltic Sea. The agglomeration of megalithic tombs and settlements bears evidence that this region must have been one of the most densely populated areas of the TRB development.

In contrast to Ditmarschen, TRB domestic sites are both known from the so-called "Oldenburger Graben" as well as the Trave Valley. From the Oldenburger Graben we are informed about different sites of the Late Mesolithic located near the original shoreline and islands of the former fjord (Hartz 2005). This settlement pattern did not change during the Early and Middle Neolithic, while in the Younger and

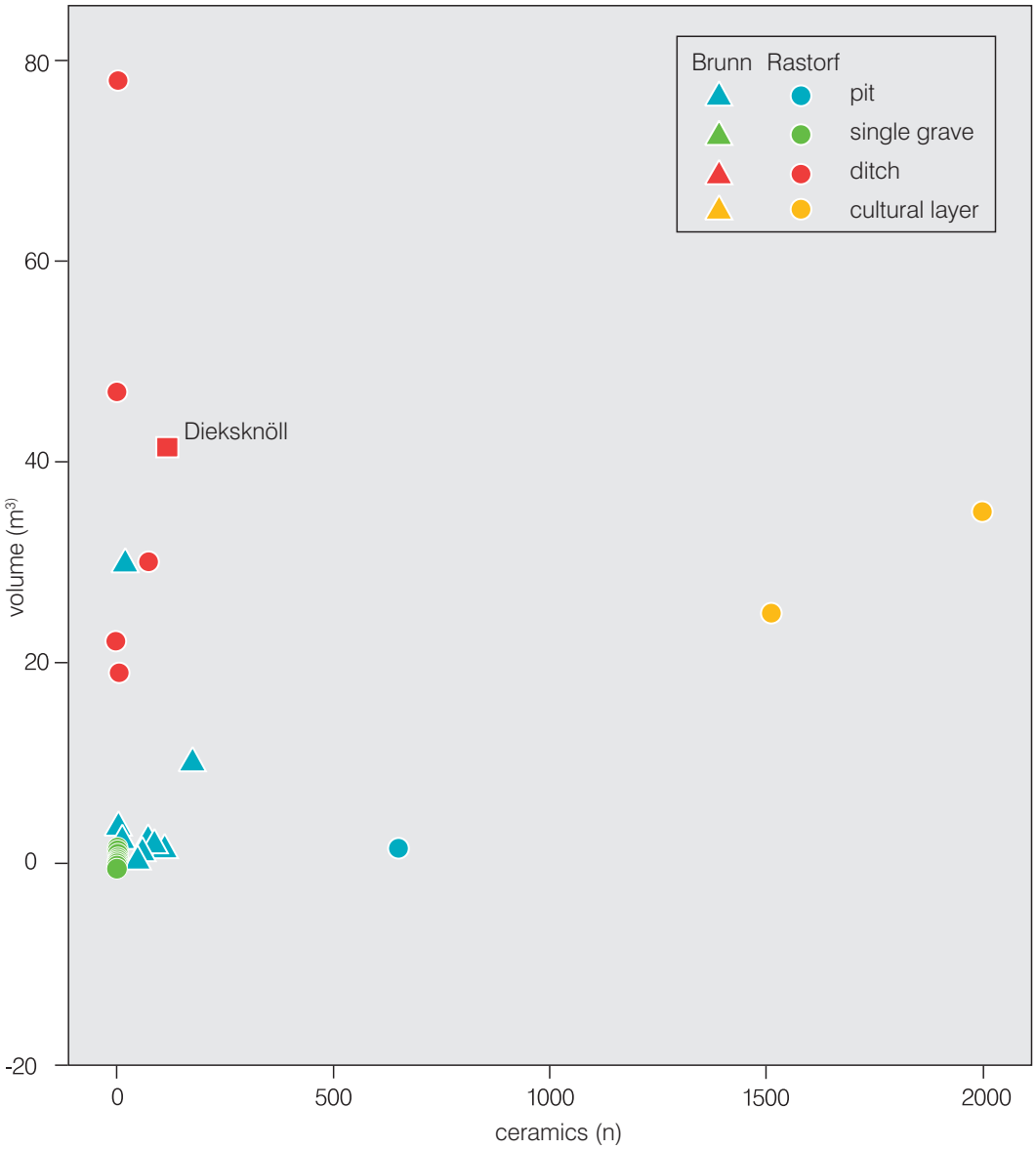

Figure 17. Comparison of ceramics per cubic meter. The difference between causewayed enclosures and other type sites is visible (data for Brunn after VOGT 2009; for Rastorf after Steffens 2009).

Late Neolithic domestic activities also took place in the hinterland of the fjord.

Additionally, during the TRB a clear spatial patterning of domestic and ritual sites is observable (Figure 18). Domestic sites are distributed as described, while megaliths and other burial monuments are known primarily from the hinterland. This land use configuration contrasts with the spatial patterning of Rastorf sites, but is similar to the situation of the Middle Trave Valley, where again domestic sites are distributed in lowland areas, while burials are placed on and behind the terraces of the hinterland. The lack of enclosures in Ostholstein might be due to research deficits, but might also be due to a difference in Neolithic spatial organization. Possibly, the Ostholstein settlement pattern is similar to what is known from some other TRB regions (for example Falbygden; cf. Sjögren 2003).

Our main East Holstein TRB site under excavation is Oldenburg, situated on a former island with both waterlogged and mineral conditions. The settlement was inhabited sometime between 3400 and 2900/2800 BC according to radiometric dating, mainly dating to the Middle Neolithic II (Brozio 2011).

Until now three clusters of features were observed in the main area, which could be associated with households (Figure 19): both pits and postholes indicate two-ailed houses, of which until now only the main parts have been excavated. On the whole, the archaeological features are comprised of an occupation horizon, houses (including sunken floors), different pits, a wooden lake-site fortification, the rubbish area in a former low-water area, a single burial within the site, and human bones found in the former low-water areal. Evidence of tool production,

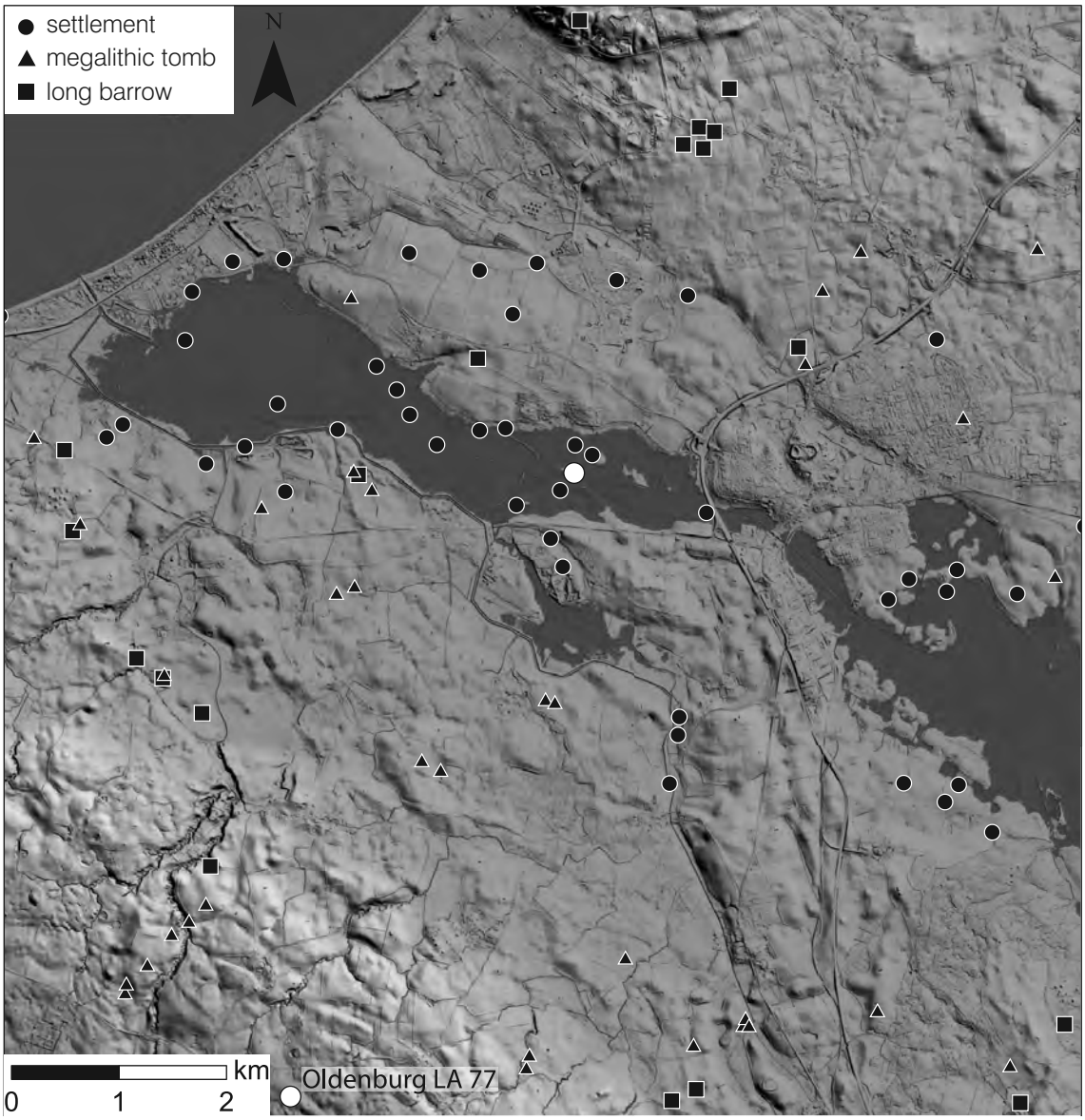

Figure 18. The organization of space in the Oldenburger Graben (after Brozio 2011). The spatial division between domestic sites in the lower land and on the islands and the megaliths in the hinterland is observable. The original watershed is reconstructed by palaeoecological data.

grinding stones, the ceramic inventories and bone tools account for the various every day activities dominating the life of the few families that must have lived there.

The part of the settlement situated at the edge of the fjord bank and which today marks the beginning of bog land, must have once demarcated the zone of brackish water. Various wooden posts belonged to the mentioned fortification of the embankment, behind which a lot of waste and depositions were found under waterlogged conditions.

The intra-site burial pit held skeletal remains of an approximately 40 year-old female who had been arranged in a straight position on her back, with the neck and upper body part slightly following the curve of the pit´s upper profile (Figure 20). The skeleton lacked the left femur whereas traces of another pit were present and thus indicated a secondary, intentional manipulation of the burial. Taking the bone (or maybe trying to get to the object placed on the upper limb) out of the joint capsule resulted in a slight elevation of the skeleton. Later the remaining disturbance was filled with soil again. 2m away, a well, 2.3 m deep and 1.3 m wide, confirms that the brackish water was not drinkable (Figure 21). The infilling of the well revealed several funnel beakers, depositions of grinding and whetstones, as well as a lot of settlement waste and last but not least the missing femur of the nearby burial. The latter may either be seen as an intentional, somewhat ritual deposition or as a profane disposal.

In contrast to the burial from the inner part of the settlement, the area of the fjord bank held disarticulated

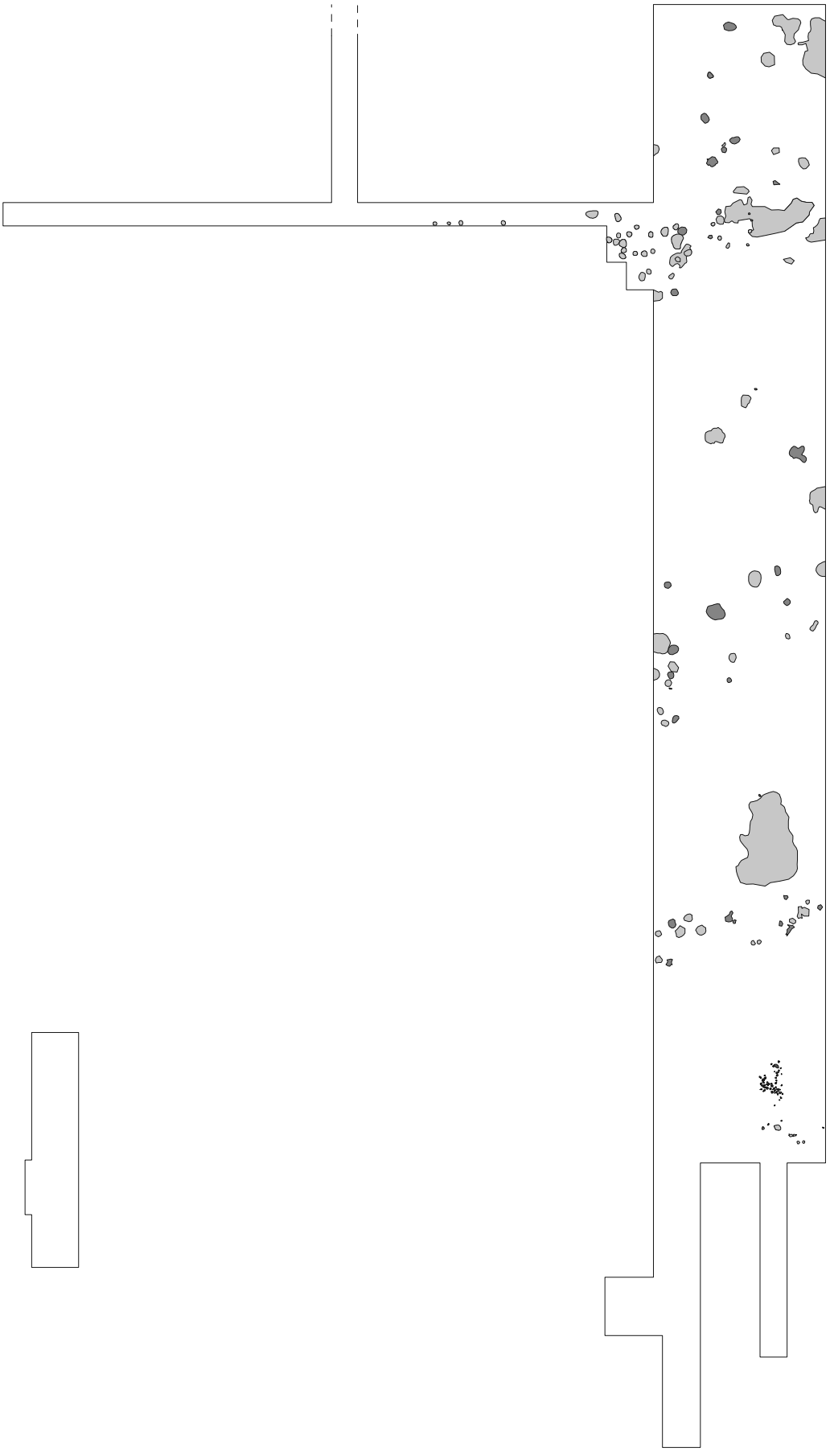

Figure 19. Oldenburg. The ground plan of houses and other features (including the well and single burial). Copyright: Jan Piet Brozio.

Figure 20. A burial from the domestic site Oldenburg. The 40 year old woman was placed in a pit, later - during a secondary manipulation - the femur was taken away. Copyright: Jan Piet Brozio.

Figure 21. The well from the domestic site Oldenburg (after Brozio 2011). Beside many archaeological objects the femur of the nearby burial (fig. 20) was also found.

human remains - several bones and a cranium - which were deposited together with some broken objects on the border between dry and wetland. At first glance there seems to be no difference between the treatment of these bones and the treatment of animal bones.

Particularly, the settlement on the island in the Oldenburg Fjord must have had farm land in the dry areas cultivated by the families belonging to the site. Such insular sites already existed during the earliest TRB phase: the site of Wangels represents such an early settlement (Grohmann 2010), with Oldenburg coming later.

While from Oldenburg our project gains information about a typical permanent domestic site, Bad Oldesloe-Wolkenwehe represents a temporary TRB site (Mischka *et al.* 2007). While its central area was already excavated by H. Schwabedissen (Hartz *et al.* 2007), new trenches confirmed a duration from Early Neolithic to Late Neolithic. The combination of results from the old and the new excavations resulted in a model of small houses, which partly overlap in the plan and obviously represent three or four contemporary huts (Brozio 2011; Müller 2011). Missing tools for agricultural activities and evidence of cyclical flooding by the Trave oxbow lake indicate the temporary occupation of the site. One reason for this might have been the salty springs nearby. The exploitation of saline areas without clear archaeological evidence (briquetage) is probable not only because of ethno-historical or ethnographic reports but also because of two elements of the site. Both the documented peaks in charcoal and ashes as well as the irregular but anthropogenic ditch system point, for example, to the burning of salty peat, as known from other areas from the Cimbric Peninsula. With the hypothetical character of our interpretation in mind, this kind of explanation for the occupation in the "middle of nowhere" has some plausibilty, because there are other examples of these irregular ditch systems linked to salt production (Jodłowski 1977; Saile 2000).

Mosaic of spatial meaning

In summary, the description of the spatial patterns in three different regions cumulated to the general observation, that the spatial organization of social space and environment was quite different within the TRB "world", even in its small area of the Southern TRB North group. These differences are not only due to different environmental conditions (including different topographies, water levels, soil fertilities) but they are also dependent on a conscious differentiation of the landscape. Examples are the division into an elongated domestic area along coast lines and rivers and the use of the hinterland for megalithic monuments. The world of the ancestors is divided from the world of the living, - in areas of special economic purposes (e.g. herding) or in deliberate "calm" areas. This is the case in the Oldenburger Graben, in the Middle Trave Valley, but also in the Western Altmark (Demnick *et al.* 2008). In other areas (as at Rastorf), a contrasting pattern is obvious: megaliths are spatially linked to farmsteads and not separated. In consequence, varying patterns of spatial-planning existed within the TRB communities and for all described spatial patterns further examples have been reported on from other TRB-regions decades earlier (e. g. Andersen 1997; Larsson 1984; Madsen 1982; Strömberg 1971). The contemporaneity of these divergent land use and land meaning patterns is quite clear. However, in our projects a special differentiation is not yet possible and constitutes a future research goal. Furthermore, the role of causewayed enclosures has to be investigated again in detail. The described division and separation of causewayed enclosures in Alberdorf-Dieksknöll and Rastorf might also be observed for the site at Büdelsdorf, but differing patterns of spatial relations might be true for other regions.

Nevertheless, these spatial patterns are obviously not so much dependent on ecological conditions or climate and vegetation changes. Obviously, they are a result of driving ideological forces, which further the necessities of a ritual economy. Here, the ancestors play an important part for the living society.

Monuments, ancestors, bones

As we already have known for many decades, TRB societies used quite a lot of different burial practices at different locations in their local environs. Single burials like the Oldenburg burial in an earthen pit within the domestic site, single burials near farmsteads like in Rastorf, and extra-mural single burials alone, in small groups or in small cemeteries are a general pattern of the Early Neolithic Ib until the Middle Neolithic V. Different kinds of megaliths are also known, starting in the Early Neolithic Ib with small dolmen and ending in quite sophisticated monuments later on (Midgley 1992; Müller 2011).

Concerning our projects, the results of the excavations from the elongated dolmen of the Western Altmark have already been published in a preliminary report (Demnick *et al.* 2008). This dolmen with Tiefstich pottery belongs to a group of megaliths, which was separated from domestic areas. In contrast to the number of activities and manipulations, which took place at the megalith between the 37th and the 30th century cal BC, the forested area was not used for any kind of economic purpose: No forest herding and no clearances accept for tree cuttings at the building site, which were followed by reforestation of the site after the building of the monument, have been observed.

This pattern stands in clear contrast to other sites. At Flintbek as well as in Büdelsdorf-Borgstedt plough marks in the direct vicinity of the megaliths indicate that the monuments were located in the agricultural field systems. Both the long development of the monuments as well as the development of the mounds, describe the ongoing importance of the demarcation of the landscape.

This demarcation took place in clusters of megaliths, in

disperse distributions, as well as in linear structures. The difference in the degree of "megalithic concentrations" might indicate an ongoing process of a differentiation between regions of relevance mainly for subsistence economy and such of relevance for a ritual economy (Müller 2011).

One impressive example of the use and spatial ordering of megaliths is given by the site of Borgstedt near the enclosure Büdelsdorf (Figure 22). As at other sites in this part of Southern Schleswig megalithic monuments are lined up between two local settlement areas: They mark a track, which connected both areas. The radial orientation of the 12 monuments at Borgstedt towards the causewayed enclosure of Büdelsdorf at one end of this track underlines the idea that this monumental cemetery was directly linked to the enclosure.

Borgstedt is composed of eight megalithic long barrows, three megalithic round barrows, five flat grave burials, altogether 12 burial chambers and two burial cists. The analyses of the 11.000 ceramics indicate a chronological development of the site, which included the construction of monuments from the Early Neolithic II until the Middle Neolithic V (Figure 23). In consequence, the manipulations which are concentrated e.g. at Lüdelsen 3 on one single monument, took place in Borgstedt on the whole cemetery. If such an elongated pattern of monumental constructions is also due to economic activities, this might be judged after the nearby pollen samples are analyzed.

Beside marked burials - should they be chambers for collective burials, cists, stone packing and other types of burials or just earthen pits - the handling of single human bones or groups of human bones is quite obvious in TRB contexts. The example of Oldenburg with human long bones and a skull in the wet refuse area at the outer skirts of the settlement is only one example for the use of human bones. Their disarticulated deposition might be the result of long ongoing rituals, which include manipulations on primary burials as well as secondary depositions. This multi-faced relation to the ancestors and the many forms of burial practices might indicate social diversities. In this sense, burial archaeology is one source for the reconstruction of social formations and dynamics.

Population sizes and social organization: a model

At the outset, social reconstructions require knowledge about the size of social groups. Demography is a limiting factor on the size of a social group, as is the economic ability. A simple model analysis therefore helps to emphasize that demography and economy are imperative for the reconstruction of social formations and social re-organization.

Demography

The demographic problem might be solved by drawing on basic tendencies perceptible in general data collections. We could use palynological evidence of *human impact* as a proxy for a general evaluation of the demographic development. The amount of 14C-dates reflects the amount of archaeological features left behind and by carefully discussing and evaluating the circumstances under which a deposition took place we might even be able to add to our knowledge of the demographic development (Müller 2009) (Figure 24).

Here, both methods result in the discovery that there was a marked increase of population in the southern TRB area mainly in the Early Neolithic II and at the beginning of the Middle Neolithic. The late TRB development would most likely be characterized by a decrease in population.

To get a more accurate picture of these tendencies, a test region was defined in which we tried to sum up all relevant archaeological data in order to gain a more solid overview about what the demographic and social development might have looked like (Müller 2010).

The nearly complete survey of megalithic tombs and other archaeological finds and features on the North Friesian Islands provided us with the ideal sample region and could be used as a basis for further observations (Hinrichsen 2006). There are 94 indications of megalithic tombs densely packed within a small area, at least in comparison to other areas.

The reconstruction of the minimum population size draws upon simple calculations: The average area of a TRB single grave (of around 1m2) represents one individual. Summing up all areas of the recorded grave sites (megalithic tombs, flat graves and other grave types) that are known to have been in use at the same time on the islands would result in a minimum individual count, given that all the chambers were full of burials. The calculation is more difficult than it seems at first because some corrections have to be made, for example the loss rate of megalithic tombs. It has to be taken from similar calculations for other regions where old maps and/or thorough excavation and survey techniques in small areas (Southwest Fune and Altmark) gave us a fairly good idea of how many megaliths must have disappeared over the centuries.

On flat grave cemeteries the proportion between burials with and without burial items should give us another correction value, as flat graves without any such items may never be detected. We also have to consider how long the grave structures were used, although in the case of the North Friesian Islands we may only draw upon typo-chronological considerations to reconstruct probable periods of utilisation.

If we take all of the above factors into account, the North Frisian Islands, in modern times encompassing ca. 202km2, were inhabited by 200-400 people at the beginning of the Early Neolithic II, 500 -1500 during the Middle Neolithic I and 350-550 people in the Middle Neolithic IV.

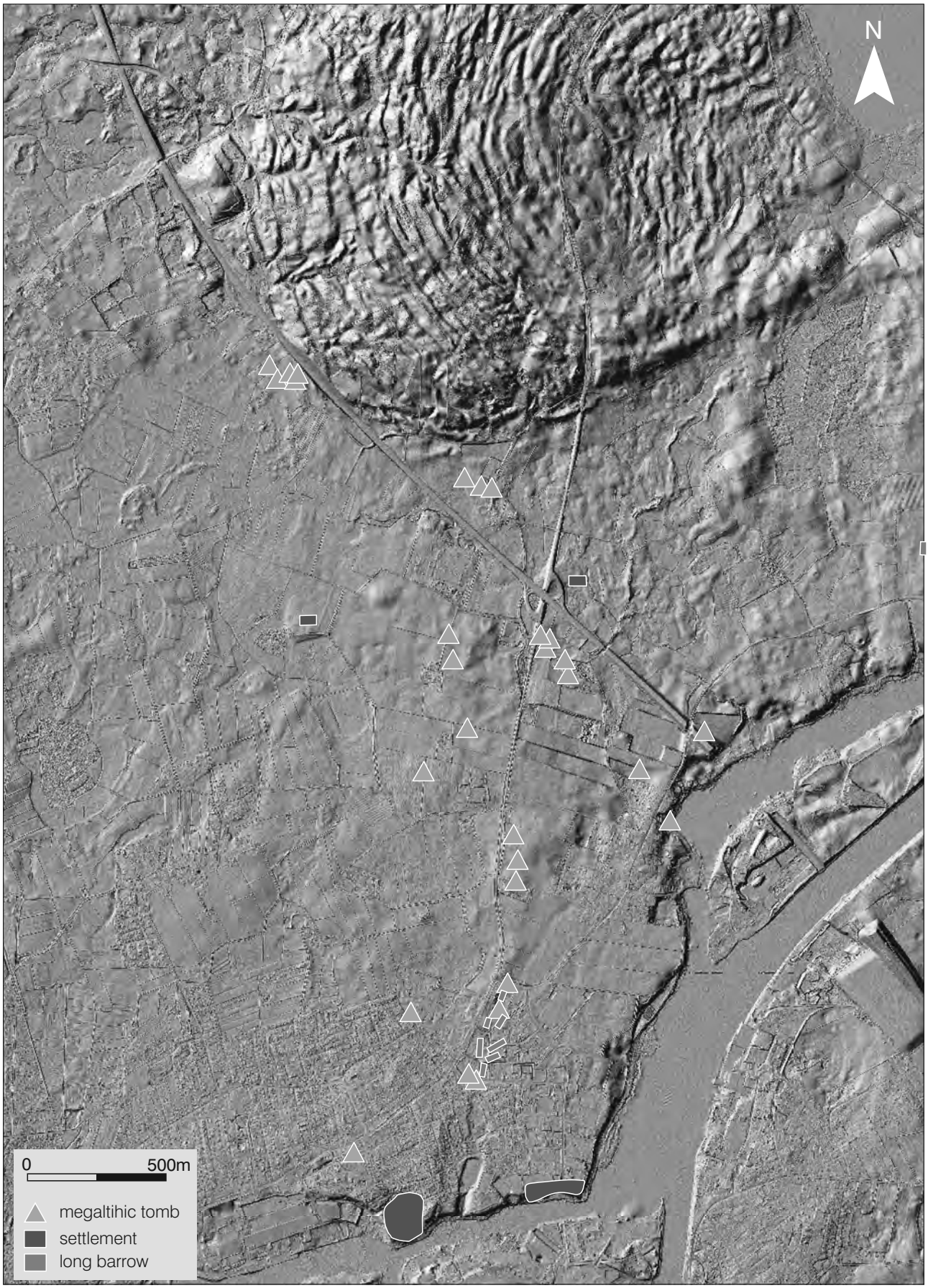

Figure 22. Southern Schleswig: In the area of Borgstedt and Büdelsdorf a line of megaliths combines two settlement areas. Copyright: Franziska Hage.

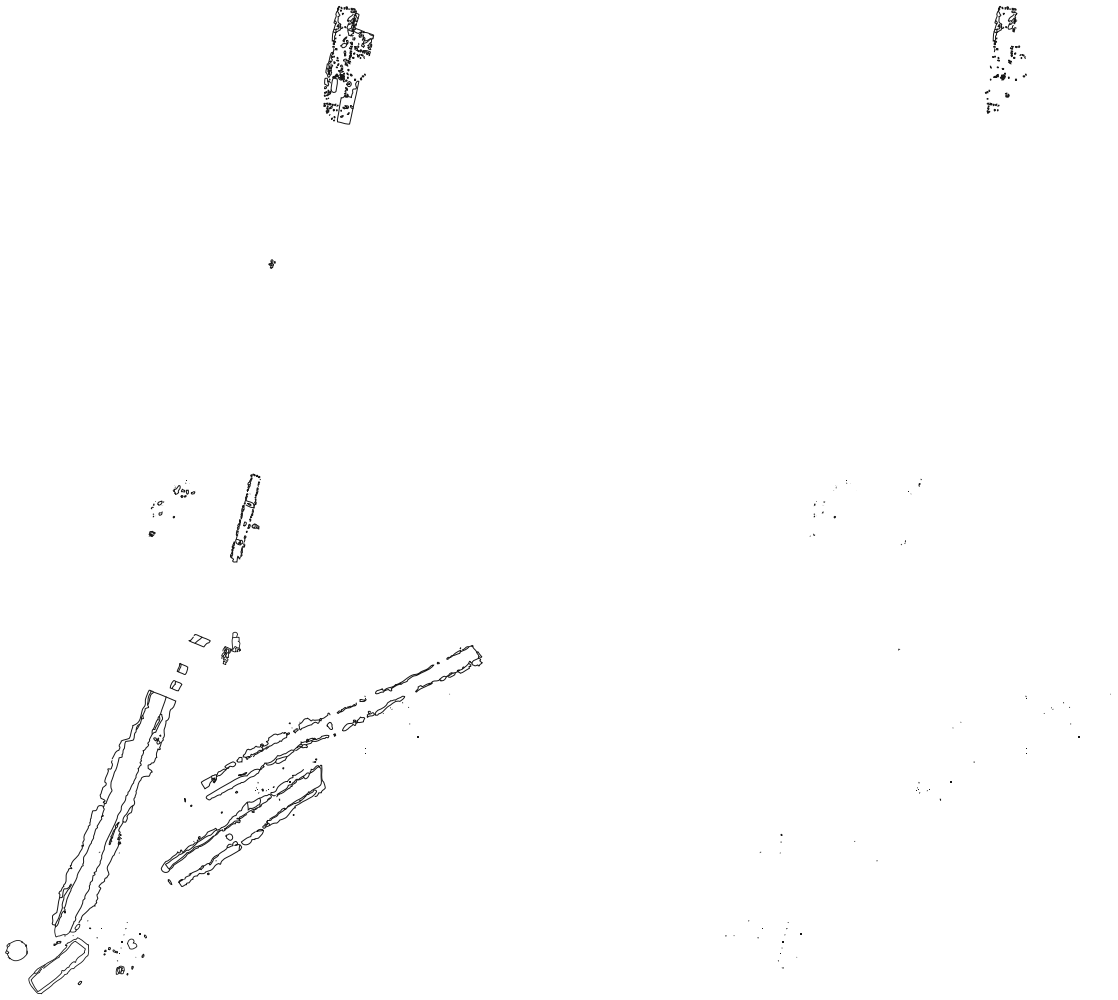

Figure 23. Borgstedt. The burial monuments of the megalithic cemetery were constructed and used continuously from Middle Neolithic I until Middle Neolithic IV. Copyright: Franziska Hage.

If a TRB farmstead was inhabited by the average of 10 people, between 20 and 150 farms would have existed simultaneously during any of the above mentioned stages. More or less 100 megalithic tombs are known to us today and the assumption that there is a 1:1 proportion between farmstead and megalithic tomb might well be correct.

We could then conclude that the population density must have amounted from 1 to 7 person(s)/km2 which reflects a considerable increase of the island population during the Early Neolithic II. Calculations based on other, quite different data sets in south-west Fune rendered similar numbers.

Our model calculation also indicated a decrease of population during the Late Neolithic but this could also be due to a miscalculation based on unreliable data. Still, the pollen analyses of Southern Jutland and the compilation of the relevant 14C-dates indeed show a similar drop-off.

But apart from all possible immanent mistakes, such models give us in any case an idea of the population density and of the number of people having been buried in the archaeologically confirmed graves of at least the TRB North group.

The Single Grave culture is known for its mass of possibly 50.000 Southern Scandinavian grave mounds. Nevertheless, only approximately 100 burials/year could have been placed inside them (summary in Hübner 2005). In contrast, 50.000 megalithic tombs would have had a capacity to house 10.000 burials/year within the same area. If we consider the average life expectancy and death rate of Neolithic times, the area of study could have been the home of around 500.000 TRB people.

Cooperation, collectives and individuals

All in all the Early and the Middle Neolithic were characterized by single farmsteads and hamlets, forcing the inhabitants to adopt exogamic procreation strategies which in turn made them reliant on a cooperative way of life.

After 3600 BC this societal motion became more noticeable:

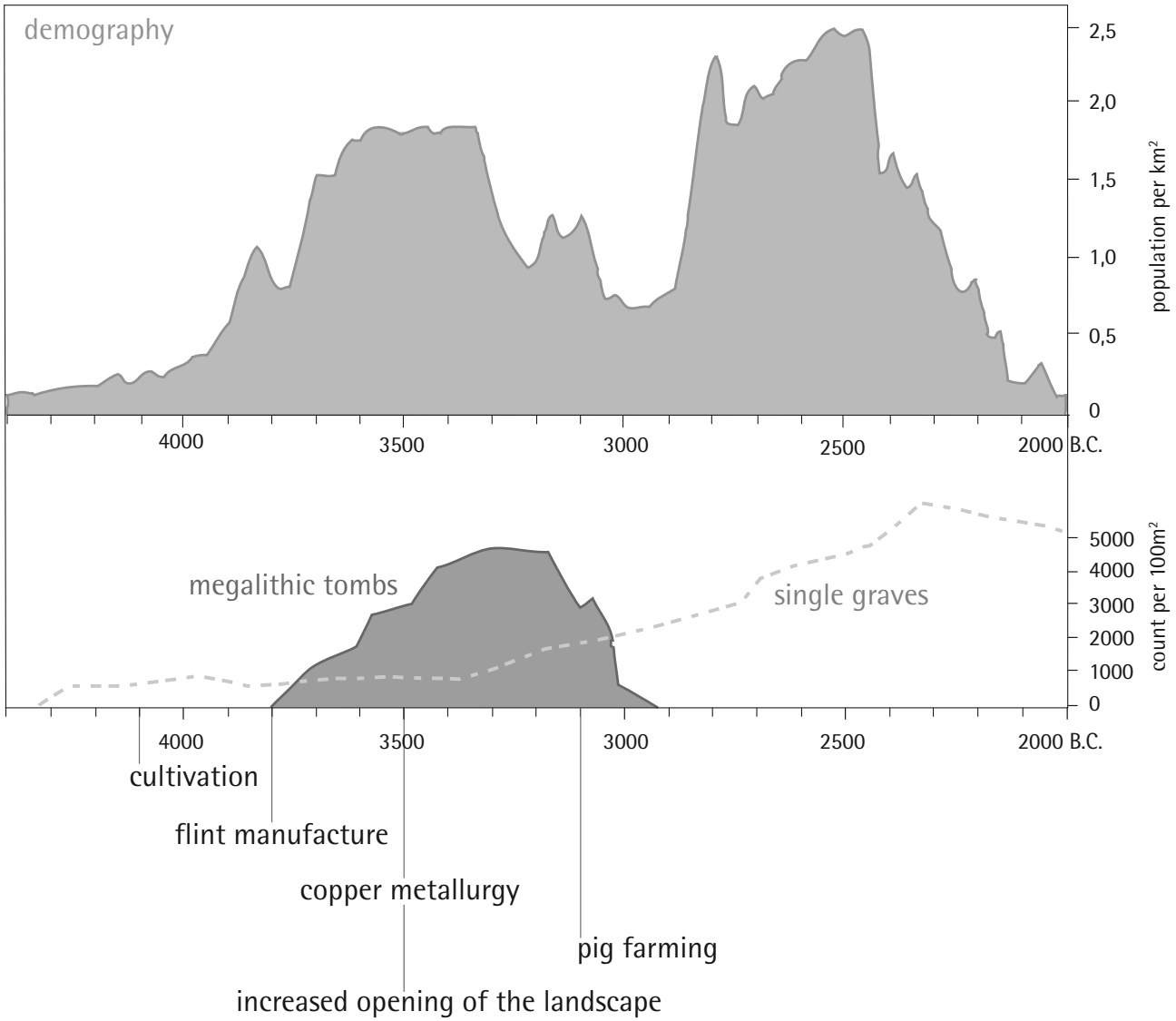

Figure 24. The quantity of radiometric dating in Southern Scandinavia and North Germany might indicate population densities as well as the construction of burial mounds. The differences are used to create a model of the demographic development and burial construction (data base: Persson 1995; Persson 1999; RADON). Copyright: Holger Dieterich.

the landscape was opened and new production technologies were introduced. Furthermore, there were burials of obviously very special individuals in non-megalithic structures and in dolmen, and last but not least we witness the constructions of large cooperative monuments - the causewayed enclosures.

These only temporarily used and visited "areas of festivities, distribution and partially also of production" represent the heart of a cooperation. The construction of enclosures and the act of depositing and thereby destroying goods in isolated parts of the landscape dominates the cooperative ideology of the late Early and beginning Middle Neolithic. The conformity of the Fuchsberg-style pottery, which is spread across a wide area, could also symbolize the concept of a cooperative life style.

These general changes are related to a marked growth in population which - after several generations - leads to an increase of internal conflicts. After 3200 BC existing enclosures remain in use but there is no evidence that the construction of new ones had been carried out.

Burials in passage graves then predominated and bound a high amount of energy. The idea of collective burials prevails in most areas of North Central Europe and Southern Scandinavia. But the term "collectivity" contradicts all other visible social tendencies: The proportion of items that might have been used as "weapon" rises, a tendency also observable in other areas, for example in Central Germany (Müller 2011). Pottery ornamentation lessens and there is a renewed regionalization of ornamentation and vessel forms.

It is impossible to grasp the reasons for this social diversification within the TRB groups but we are able to identify special, socially relevant components:

Animals, especially cattle, are associated with wealth, and the significance of the male individual is emphasized in single grave burials. Social separation evolves and new symbols predominate material culture, pointing to privileged positions within the social network.

Concepts and consequences

In summary, this article attempts to indicate some preliminary information about Kiel projects within a larger TRB research program about 'Early monumentality and social differentiation'. While the reconstruction of environmental conditions, subsistence economies and land use patterns opens the perspective of a generalized chronological pattern of change, the construction of monuments, including both megaliths and causewayed enclosures, and the distribution of domestic sites reflects a mosaic of different solutions: The TRB individual and the TRB communal group developed different spatial patterns and meanings in respect to the division of social space and rituals. However, the diversity, which is obvious in the patterning of the different regions, ends up in general observations regarding the TRB groups. While this "Northern Neolithic" is quite different from the rest of Central Europe, internal divisions are more fuzzy than pronounced.

In this sense, in nearly all TRB regions monumentality might be described as a result of demographic and economic growth, enhanced by new technologies in agriculture and transportation, but furthered to a great extent by the change from cooperative to collective dictions of individual social roles. In this sense, a competitive approach to ritual behaviour terminated in rituals as the focus, which stimulated the economies of these plant growing societies and which were responsible for the rise of social inequality: The change from cooperative prestige to individual power.

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