MEGALITHS SOCIETIES LANDSCAPES

EARLY MONUMENTALITY AND SOCIAL DIFFERENTIATION IN NEOLITHIC EUROPE

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Megaliths – Societies – Landscapes
Early Monumentality and Social Differentiation in Neolithic Europe

Volume 1


Eds.: Johannes Müller, Martin Hinz, Maria Wunderlich
Preface of the Series Editor

The DFG Priority Program 1400 »Early Monumen-
tality and Social Differentiation: On the origin and de-
velopement of Neolithic large-scale buildings and the
emergence of early complex societies in Northern
and Central Europe« started its work in 2009. Its re-
search agenda focused on the investigation of the phe-
nomenon of monumental structures, in particular on
megalithic constructions and their social and eco-
omic backgrounds during the Neolithic with a focus
on Northern Central Europe. Already in May 2010 a
workshop on the topic »Megaliths and Identities« took
place in Kiel. The vivid dialogue that had started on
this early workshop continued throughout the years
after. In consequence the international conference
»Megaliths, Societies, Landscapes« was organized
five years after on a broader scale. Many experts gath-
ered to discuss research on megalithic and monumen-
tal structures and the societies that built them on not
only a European scale.

The three volumes, which you hold in your hands,
may inspire again new ideas and perhaps new insides
for future research on the development of these early
monumental landscapes!

Johannes Müller
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Monumentality and megaliths continue to be a prominent and central research object in prehistoric archaeology, as reflected by the lasting interest in the research of monumentality in the course of many research projects. A considerable improvement of the understanding of monumentality has been accomplished by improved dating-methods and comparative perspectives. In accordance with these developments, an international conference was held in Kiel in 2015, aiming to bring together researchers from all over Europe and their respective perspectives on different forms of monumentality. The conference »Megaliths, Societies, Landscapes. Early Monumentality and Social Differentiation in Neolithic Europe« was organised by and meant as a platform for final discussions of the Priority Programme 1400 »Early Monumentality and Social Differentiation. On the origin and development of Neolithic large-scale buildings and the emergence of early complex societies in Northern Central Europe«. This priority programme lasted for six years and included several institutions in Germany. We would like to thank all of the researchers involved for their persistent and fruitful work, which are mainly also published as monographs within this series. The European Megalithic Study Group also took part in the conference.

The conference – and with it this publication – provided a framework for the presentation and discussion of many different case studies, which shed light on the interconnectedness and diversity of the complex »monumentality« in Neolithic and Chalcolithic Europe. It also provided a place to discuss open questions and problems, whereby we hope that this book will equally provide a basis for further discussions. It is undoubtedly the contributions that make up the quality of these three volumes, and we are extremely grateful that so many European colleagues have been willing to contribute their knowledge to the overview of the current state of research that these books intend to provide. Indeed, it is not least thanks to the contributors’ discipline, friendliness, patience and professionalism that we have been able to compile such an extensive body of research. In advance, we had hoped that this publication could become a reference book on Early Monumentality and Social Differentiation, and if we succeed, it is thanks to every single author. Therefore, we would like to express our deep gratitude.

In addition, a multitude of helping hands – in language correction, image processing and layout – make such a comprehensive publication possible in the first place, and whose work is far too rarely appreciated. These include Julia Menne, Richard Forsythe, who honed the last linguistic imperfections, Janine Cordts, Nicole Schwerdtfeger, Susanne Beyer, Agnes Heitmann and Carsten Reckweg, who edited hundreds of illustrations and arranged them in the right places.

Without the support of the German Science Foundation (DFG), it would not have been possible to carry out the DFG-Priority Programme or the conference and this publication. We would like to express our sincere thanks to all these parties involved.

Martin Hinz, Johannes Müller, Maria Wunderlich
The monumentalisation of European landscapes

Martin Hinz, Johannes Müller, Maria Wunderlich

It is the monumental sites that characterised large parts of Neolithic Europe during the 5th and 4th millennia. During these centuries, Neolithic societies began to construct above-ground monuments and enclosures in many regions of southern, western, northern and central Europe. These developments might be linked to processes of social differentiation, changed economic practices, new exchange systems and ritual traditions.

These perspectives were the central focus of the conference ‘Megaliths, Societies, Landscapes. Early Monumentality and Social Differentiation in Neolithic Europe’, which was held in Kiel with 184 participants from 14 countries by the SPP 1400 ‘Early Monumentality and Social Differentiation. On the origin and development of Neolithic large-scale buildings and the emergence of early complex societies in Northern Central Europe’. The conference especially focused on the interlinkage between Neolithic monuments, the construction of landscapes and the societies.

This took place against the background of the priority programme, which from the onset aimed to understand and analyse the monuments in their context. For too long, megaliths in particular have been examined detached as monoliths, so to speak, which in their own right represent a prominent archaeological phenomenon of the European Neolithic, but whose real significance can only be appreciated through their entanglement in the overall network of socio-cultural conditions of early agricultural societies. The investigation of architecture and its regional characteristics is certainly very valuable in itself, and a classification and chronology form an important starting point for further investigations. However, it must not be limited to that! Therefore, the objective of the priority programme was clear from the beginning, and this view was reinforced during the course of the project, namely that the monumentalisation of the landscape through the collective work of communities is to be explained by social processes of differentiation resulting from changed ways of economy, new exchange systems and ritual ideas. Only from the synthesis of all available and newly-acquired data combined with the interpretation from ecological, socio-historical and cultural anthropological perspectives can an understanding of these processes be made possible. The structure of both the priority program and the conference is committed to this goal: the monuments as such must be studied in detail, whereby those that are not made of stone and therefore have not visibly survived to this day and thus have experienced less research activity require special attention. Nonetheless, at least as important is the analysis of the economic basis of the communities constructing them, the material culture, which can be directly or indirectly connected to the monuments themselves, the social conditions, which can be deduced from these traces of human activities and must be given special consideration against the background of collective work and burial, and, finally, the people of the Neolithic period themselves, who we can seldom enough identify for the area of megalithic architecture in general but who are the bearers of this phenomenon and ultimately responsible for the monuments, which still shape landscapes today and can and indeed still do serve as markers and points of crystallisation of identity.

The phase of early monumentality offers important insights into processes that have influenced human coexistence. While it is difficult to recognise a social structure before, the dynamics of change intensify enormously during the construction period of Neolithic monuments. Starting with the Passy type graves, in which individuality and monumentality suddenly emerge to an enormous extent, we see an ever-more developing focus on cooperation. The multiple change in cognitive expression, this quasi search for a social configuration against the background of the new way of life and economy – certainly connected with new ideologies – can be located precisely during the phase of early monumentality.

Therefore, in addition to the individual case studies on individual monument landscapes, the SPP also included projects investigating the background of early monumentality; in fact, more projects were related to this aspect than those set up in the traditional sense. Indeed, this is also the basis for the division of the conference into the individual sessions, which again
reflects a focus on the holistic approach to the concept of early monumentality.

There is a close relationship between monumentality and cooperative practices in the construction and use, especially the burial and other ritual practices of and within the monuments themselves. Expressions of this concept can be found in the form of megalithic tombs, menhirs, stone circles, avenues and non-megalithic constructions like long and round barrows, causewayed enclosures and further timber-and-earth constructions. The session »Monuments of Stone, Wood and Earth« provided an overview of the various manifestations of monumentality in their European context.

Monuments are a part of an economic, social and ritual landscape. Monuments are always embedded in an overall landscape and social practices, from which they gain their meaning. Domestic structures often represent the background and link of symbolic and ritual components associated with monumentality. In order to understand the phenomenon of monumentality, it is essential to take an archaeological perspective that integrates social practices and landscapes. In the session »Monumental Landscapes«, this entanglement was examined. Several contributions identified different levels of meaning by addressing groups of monuments, their relationships with each other and to the non-monumental elements of the Neolithic worlds.

It has always been assumed that early monumentality is associated with changes in subsistence, economy and technology, and may be causally related to these changes. In its quantity and omnipresence, monumentality remains linked—according to today’s state of knowledge—to productive economies. Today, we have a large amount of data, dating and new methods at our disposal in field archaeology and scientific analysis to confirm or question this notion. New light is cast on agricultural tools, techniques and the organisation of the Neolithic subsistence economy, including the movement and mobility of things, plants, animals and humans. In this sense, the development of monumentality in relation to economies can be correctly assessed. The session »Neolithic Subsistence and Megaliths« therefore comprised contributions dealing with the Neolithic subsistence in general, as well as the connection between economy and monumentality in particular.

The study of material culture has always been the backbone of archaeological research. Material culture itself is the most direct way of observing the life of Neolithic societies responsible for the construction of the monuments. Through the exploration of material culture, processes of production and consumption become perceptible, of which the monuments themselves are part. With the help of such analyses, the work processes that to a certain extent determined Neolithic societies can be examined. In addition, it is the tangible densification of communication processes that connected the individual groups of spaces, whereby the exchange of objects may have been a medium for the reproduction of these societies. In the session »Material Culture in Monumental Settings«, material culture was examined in the context of the phenomenon of early monumentality. The focus was on research investigating the production, use and distribution of objects and thus addressing the overarching questions. Chorological or chronological differences in the use of an entire group of materials, site-specific analyses and microscopic examination of individual objects formed the broad framework. The objects themselves were in focus, but above all the question of the practices that were made possible by the artefacts and into which they were embedded.

As a distinctive phenomenon, the megalithic tomb represents a form of monument that points to a significant cooperative aspect. Such monuments could only be built together. At the same time, the common use of these structures is made plausible by a collective burial custom. The same applies to other forms of monumentality in which cooperative building processes by larger groups of people were necessary. At the same time, these monuments may have been important as ritual and symbolic central places, especially for both large or disperse groups of people. In addition to the integrative character of monuments, they might often be associated with the exclusion of persons. For example, a megalithic tomb separates the enclosed from the outside world. The same applies to causewayed enclosures, where in these cases a distinction is made between inside and outside. Accordingly, are these monuments the expression of a cooperative ideology, or do they testify to the power of some over the labour of many? In addition to these inherent characteristics of monuments, the timespan of their emergence seems to be characterised by a stronger (inner) differentiation of groups of people, recognisable archaeological in the field of material culture. For example, in northern Funnel Beaker Societies, there is a significant regionalisation of decorations and ceramic forms, while they are spatially connected by a very similar burial custom, almost a variation of a supra-regional sharing of megalithic construction customs. The topic dealt with in the session »Social Diversity and Differentiation« highlighted references to the underlying processes of the mentioned phenomena, which result from current studies. How can we interpret the rather sparse and often seemingly contradictory traces of the social organisation of Neolithic societies? Can social differentiation be observed in the context of the
monumentality of the landscape, and in what forms are the different developments presented in different regions? Although a differentiated picture has been drawn, a common line may nevertheless be presumed that architecture is in most cases indeed more cooperative but also most often the most traditional and inert element in the course of social change.

There are some approaches that lead directly to the people who erected the monuments, namely the direct study of human remains and the analysis of their sparse personal testimonies. Ultimately, with their data, ethnarchaeological studies – even if they do not examine Neolithic cultures themselves – represent an invaluable extension of the interpretive scope. Human remains are unevenly present in the different areas of the distribution of the phenomenon of early monumentality. Nevertheless, they become all the more important as a source where they are present. Although a knowledge transfer of anthropological studies from one research area where they can be carried out to another must use the same analogy as ethnarchaeological studies, they represent unique focal points that illuminate an otherwise only indirectly visible area. The ›Monuments and their Builders‹ session was devoted to the task of collecting such evidence to get closer to the people behind the monuments.

The three volumes presented here broadly reflect the original structure or the conference. The first volume deals with ›Monuments of Wood and Earth‹, as well as ›Megalithic Studies‹.

We have decided to separate the originally-consolidated session for the publication. This decision was influenced by the outstanding role of non-megalithic monuments made of wood and earth due to their significance as the earliest appearing types of monumental structures in Neolithic Europe. The second chapter focuses on monuments built of stone. Despite this division between the two types of monuments, we would like to stress the interconnectedness, their – in many cases – chronological continuity, as well as the shared role of the monuments in the creation of new and renewed monumental landscapes.

The second volume comprises chapters on ›Monumental Landscapes‹ and ›Neolithic Subsistence and Megaliths‹. Both chapters take an overarching perspective on different regions and types of monuments. Their focus lies on aspects of the creation and alteration of landscapes, as well as aspects of Neolithic economy and subsistence. One of the main accomplishments of these case studies lies in their chance to provide a socioeconomic background against which the phenomenon of monumentality might be understood and interpreted.

Finally, the third volume is devoted to different aspects of material culture, social differentiation and dynamics. It comprises chapters on ›Material Culture in Monumental Settings‹, ›Social Diversity and Differentiation‹ and ›Monuments and their Builders‹. The papers included in these sections provide a background on the social processes and mechanism being influential in monumental building practices. They also provide a comparative perspective, including recent examples of ethnarchaeological research in areas of megalith building traditions.

The newly-acquired data now makes it much more possible to integrate the phase of early monumentality meaningfully into developments that span the arc from complex foragers via agriculturalists to metal-producing societies. In our observation, most of the European megaliths are linked to societies that already produced surplus but comprised cooperative ideologies.

However, it is precisely the regional heterogeneity and inner dynamics that ensure that the investigation of early monumentality and social differentiation will continue to be an exciting field of research in the future, which is also relevant for the assessment of today’s social configurations.
Diversified monuments:  
A chronological framework of the creation of monumental landscapes in prehistoric Europe

Maria Wunderlich, Johannes Müller, Martin Hinz

The emergence of different kinds of prehistoric monumentality within modern-day Europe creates a complex structure of diverse building traditions, including both megalithic and non-megalithic monuments.

Only recently, B. Schulz Paulsson (2017) presented a comprehensive summary of available dates of megalithic monuments in western and parts of central Europe. Expanded by the British Isles as well as modern-day Germany and Poland, Figure 1 presents a general overview of the different chronological and social contexts in which the construction of prehistoric monuments took place. In order to ensure comparability and accessibility, the classification of monument types is based on the distinction between dolmens, passage graves and (megalithic and non-megalithic) long barrows. The category of dolmens comprises different sub-types, such as the extended and small dolmens present in Funnel Beaker contexts.

Megalith building traditions and the construction of enclosures represent an archaeological topic of European scale, spanning different regions and times. Both aspects have been the subject of intensive and diverse research questions as well as extensive dating programmes. Besides early approaches (cp. Müller 1984; 1998), especially the improvement of archaeological excavation techniques and the use of Bayesian modelling has significantly improved our understanding of the chronological framework within which the rise of monumentality took place (among others: Schulz Paulsson 2017; Whittle et al. 2011). The summary that we present here strongly relies on these studies.

As reflected in the different chapters of this book, monumentality encompasses monuments made of wood, earth and stone. Certainly among the most impressive sites are the different kinds of enclosures that were built throughout the Neolithic and Chalcolithic phases of European prehistory. Among early examples of causewayed enclosures are those within the context of Cerny and Michelsberger Groups in the Paris Basin, as well as in central Germany (Junesse 2004; Klassen 2014; Whittle et al. 2011). Several centuries later, enclosures were frequently built in the context of Funnel Beaker communities in what is now northern Germany and Denmark (compare Andersen this volume; Hage 2016). With one of the highest densities, but in a different context, enclosures were also erected on the British Isles from 3800 cal BC onwards (Whittle et al. 2011). In contrast to these situations, the building of enclosures in the Iberian Peninsula started slightly later, around 3300 cal BC (Jiménez-Jáimez/Márquez-Romero 2016), already situating them in Late Neolithic and Early Chalcolithic contexts.

The second type of non-megalithic monuments are long barrows, which represent the earliest types of monumental grave structures in the respective regions. Outstanding examples of these early grave types are to be found in both the Paris Basin as well as north-western France. Long barrows are preceded by the monumental tombs of the Passy type in the Paris Basin, of which similar examples can also be found in the Normandy (Chambon 2010; Ghesquière et al., this volume; Schulz Paulsson 2017; Guillaume 2011).

Long barrows are also present in Funnel Beaker contexts, representing the earliest monumental burial types in northern Germany, Denmark and Poland with an appearance from 3900/3800 cal BC onwards (compare Mischka 2014; Müller 2014; Zeepecki 2011; Sjögren 2011). Nevertheless, a distinction can be made between the Kujavian grave types in modern-day Poland – which were always non-megalithic long barrows – and the monuments in northern Germany and Denmark, which were partly transformed into megalithic long barrows by the integration of megalithic grave chambers (Mischka 2014; Nowak 2013; Pospieszny 2010). A similar development is also detectable in southern England. Here as well, the earliest monuments comprise non-megalithic long barrows (3700 cal BC), while later on a transformation into megalithic monuments took place (Davill 2016).

Soon after the introduction of long barrows, the construction of dolmens and passage graves mark the most intensive phase of megalithic building activities throughout Europe. In many cases, the appearance of dolmens precedes the emergence of passage graves, although – based on available 14C-data – a
Fig. 1. The chronological framework of megalith building traditions in Neolithic and Copper Age Europe. Included are both monuments made of stone, as well as stone and earth monuments. The depicted enclosures mark the earliest appearance of this phenomenon in the respective regions. Nevertheless, the presence and use of these enclosures spans a longer timeframe. The different contexts covered by the contributions within this book are marked in lighter grey.
Diversified monuments

contemporaneity of both grave types must be assumed (Furholt/Mischka, this volume; Schulz Paulsson 2017; Sjögren 2011). Once again, the earliest dates of human bones from megalithic grave chambers are to be found around 4500 cal BC in Brittany and along the Atlantic coastline of France in Castellic and Sandun contexts (Schulz Paulsson 2017). The whole area of Brittany, north-western France as well as the Paris Basin provides an extraordinary case of diversified monumentality, encompassing diverse grave types and a long duration of monumental building activities in different contexts (Le Roy et al. 2014; Guilaine 2011; Boujot/Cassen 1993).

Around 4400/4300 cal BC, the earliest dolmens in Sardinia and Corsica were built during the Middle Neolithic, soon to be followed by passage graves and accompanied by the erection of standing stones. These building activities continued until the end of the 4th millennium BC (Cicilloni, this volume).

Another centre of megalith building activities is to be found on the Iberian Peninsula, with the earliest construction phases of dolmens starting around 4300 cal BC in Andalusia and Catalonia. Andalusia provides an interesting case study, including from another perspective. Here, megalith building can be divided into two distinct construction phases. After the
initial Neolithic phase, megalith building activities immensely decreased, although the old monuments were still important places. It is only during the Chalcolithic period that building activities became clearly intensified again. This second phase of megalith building started in the second half of the 4th millennium and lasted for many centuries (SCHULZ PAULSSON 2017; GARCÍA SANJUÁN et al. 2011; GARCÍA SANJUÁN et al., this volume).

On the British Isles, in the Netherlands and Germany as well as Scandinavia, the earliest appearance of dolmens and passage graves is to be found mostly later during the second half of the 4th millennium BC. Many of these monuments are situated in the context of the different Funnel Beaker groups, as well as the neighbouring Wartberg and Bernburg Groups. The megalithic grave chambers appear at a very similar time within the modern-day areas of the Netherlands, northern and central Germany, as well as Denmark. Only in Sweden, the erection of dolmens started slightly later and partly in contemporaneity with the passage graves (FURHOLT/MISCHKA, this volume; MISCHKA 2014, MÜLLER 2014; RAMSTEIN 2014; SCHULZ PAULSSON 2010; SÖGERN 2011).

The last type of megalithic building activities is represented by the gallery graves that occur in modern-day Sweden, Germany, France and Catalonia. These tombs represent a different construction type, albeit at the same time providing a continuation of collective burial rites in the respective regions (RAETZEL-FABIAN 2000; BLANK et al. 2018; SCHIERHOLD 2012).

Despite presenting a wide scope of case studies within different regional and chronological contexts, this compilation is only a summary of the fundamentally diverse and complex monumental building activities in the scope of the 5th to 3rd millennium BC. Future research will sharpen our understanding of chronological matters as well as the occurrence of megalithic architecture in other regions of Europe.


Who and what triggered Neolithic monumentality, and why? As paleo-environmental and archaeological archives of the northern central European and southern Scandinavian Funnel Beaker societies have proven excellent, the reconstruction of their social processes linked with the introduction of agriculture and the construction of first monuments displays a well-researched example for investigating the triggers and meanings of Neolithic structures and processes. Within this article, the methodological basic approach, the research goals and some results of analyses within the SPP 1400 (DFG-Priority Program 1400) are used to describe and explain the development of monumentality in Northern Central Europe and southern Scandinavia.

1 INTRODUCTION WITH RESEARCH QUESTIONS

Within the scope of European archaeology, the northern central European plain has long been known for the richness of megalithic tombs and the high quality of environmental archives. Accordingly, it was reasonable to start a collaborative research project on »Early Monuments and Social Differentiation«, which integrated the different archaeological and paleo-ecological archives into the evaluation of megaliths and environments.

Following intense research efforts in southern Scandinavia and the Netherlands, different goals tackled the interdisciplinary project from simple descriptive questions to the disentanglement of triggers of the monumentalisation processes. How many megaliths were constructed? What kind of domestic sites remain in the background of the megalithic architecture? What role did enclosures play? Was everybody or only a selected part of the population buried within the megaliths? What kind of social development took place? What kind of triggers could be identified for social changes and stability?

The DFG Priority Program 1400 »Early Monumentality and Social Differentiation, on the origin and development of Neolithic large-scale buildings and the emergence of early complex societies in Northern Central Europe« (SPP 1400) started its work in mid-2009 and finished most of the fieldwork in mid-2015. University departments, research institutes and heritage managements in sixteen partial projects investigated the Neolithic on the northern European plain (www.monument.ufg.uni-kiel.de).

Beside many articles, especially the monographs of the SPP series present the manifold results of the joint research project. At present, eighteen monographs and workshop publications are available, especially including PhD theses on excavated sites and regional to supra-regional analyses. In the following, we attempt to present some of the results and interpretations. Some books are still being written and further discourses on the way, although the already available observations and interpretations have quite substantially changed – at least in our view – the picture of northern German megaliths and the Funnel Beaker societies (TRB).

Methodological background

In a traditional sense, within the SPP we employed relatively standardised conceptual terms when analysing Neolithic societies, their monuments and

1 Download possible from http://www.monument.ufg.uni-kiel.de/schwerpunktprogramm/publikationen
environments, which are visualised in figure 1. In practice, a kind of mid-range theory was employed to explain the development of monumentality and social differentiation within the frame of the available archives. In our view, social practices of both daily life and social action are based on the economies of societies as well as their demographics (Kristiansen 1984; Shennan 2009; Zimmermann 2003). A description of the terms helps to quantify the terms and their transformative characteristics.

**Economies**

The frame of human activities is determined by a subsistence economy to satisfy human basic needs and by different sectors of the rest of the economy, which establish the material framework for the capability of individuals in social practice (Earle/Kristiansen 2010). Both the production and reproduction of subsistence and status goods are located in this sphere as well as the organisation of the production, distribution and consumption of the respective values (Bernbeck 1994; Müller/Bernbeck 1996). Value accumulation in a pre-literate agrarian society might include – for example – the non-utilitarian necessity for the construction of monuments within a ritual economy (Holst et al. 2013).

**Demographics**

A further basic societal condition is the demographic development of a society or the societies included within it (Shennan 2009). Essentially, in general demographic terms one assumes demographic growth that is promoted or limited by economic and social conditions. Thus, for example, we can observe similar worldwide tendencies in the context of neolithisation processes of initially strong demographic growth, which decreases after a certain period of time and can even be regressive in association with adjustments to local situations (Bocquet-Appel/Bar-Yosef 2008; Bocquet-Appel/Dubouloz 2003).

Apart from respective general tendencies, we can essentially note that the size of a decision-making group is important for the social constitution of the society: small-scale decision-making is possible with small group sizes, whereas multi-stage, institutional decision-making seems necessary with larger group sizes (Johnson 1982). Both the group size and population density influence the economic and social potentials of groups. Thus, from empirical investigations we know that more densely-populated groups are not inclined to exhibit egalitarian structures or societies based on »Big Man« structures but rather display hereditary power structures (Roscoe 2012).

Moreover, kinship relationships affect social organisation (e.g. Das 1993; Mauss 1971). The relationship between kinship and residential groups is formative for social organisation in different forms of society (Steuer 1982). Of course, one must keep in mind that kinship is – in itself – a social construct that is not necessarily based on genetic reality (Sahlins 2012).

**Climate and ecology**

It is crucial for our initial, definitely-simplified linkage of various aspects of human-environmental relationships and the organisation of societies that both economies and demographics develop based on ecological and climatic conditions (Sutton/Anderson 2004). In our observations, ecological change – irrespective of its perception by the actors in society – directly affects economic and demographic constants on a short-, medium – or long-term basis (e.g. in Landscape®. Thus the following description is partly cited from Müller 2018a.)

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2 The mid-range theoretical base and methodological considerations, which were developed for the SPP, were also used in the Kiel Graduate School »Human Development in Landscape«. Thus the following description is partly cited from Müller 2018a.
Social organisation

In order to organise economic and demographic relations, individual actors of societies necessarily adopt forms of basic social rules, i.e. social forms of organisation (Dobres/Robb 2000; Müller 2013b; Renfrew 1986). How and when during the course of a day that – for example – crops are harvested from a field or how and with what procedures the extraction and extrication of metals is carried out are only possible through institutionalised rules (Hofmann et al. 2010; Kirleis/Klooss 2016; Vandkilde 2006). Since there are relatively many alternatives of social organisation, the actors involved can in principle decide »freely«. Nevertheless, it is clear that our triangle of socio-economic dependences conceived from the interchange of the constants economy, demography and social organisation determines the basic goal of the reproduction of social relationships within a framework of possibilities and limitations.

Productivity, ideology and monuments

In this context, the productivity of societies – as seen from an economic standpoint – but also the reception of social conditions by actors play a crucial role. The reception of society and environment is always also »ideology«: in a hermeneutical sense, one’s »worldview« is driven by one’s own possibilities and interests, which is formative for the »maintenance« of things and processes (Earle 1991; Maran 2006; Wood/Wood 1978). In this respect, all receptions and perceptions are value-driven and decisively influence the form of reproduction or revised reproduction of relations/conditions. Consequently, things affect representations and processes: whether these are socially-generated spatial structures whose feasibility and characteristics are influenced by productions and ideologies or non-utilitarian goods for the representation of social relations such as innovations in the form of technologies, which have economic functions and social meaning and therefore an immanent ideological function (Dobres 2000; Furtolt/Stockhammer 2008; Killick 2004; Maran/Stockhammer 2012; Müller 2002). Within this field, the construction of monuments depends on the economic productivity (a surplus to invest in monuments is present or has to be confirmed) and the ideological constitution of the societies, which might further the medial power of monumental landmarks for the representation of cooperative or competitive practices of power. Monuments are defined as above-ground architecture that lasted for a longer time and aided in the transfer of ideological principles from one generation to the next.

Social space

Within the framework of corresponding structures, each society and each group »creates« social space (e.g. Nakonz 2013). Social space is initially discernible in the design of the »natural« environment by humans. Second, it becomes visible through the constellations in the framework of – for example – the construction of monuments (Kristiansen 2006; Sherratt 1997; Müller et al. 2013) and third through the design of populated areas, including villages and towns (e.g. Dafinger 2010). Thus, social space is recognised as cultural landscapes.

Consequently, the described framework enabled bringing together the different archives from environmental and archaeological research to models of monumentality and social differentiation.

2 ARCHIVES, RESULTS AND INTERPRETATION

The SPP research gathered manifold information on domestic sites, monuments, environmental and economic aspects via field activities and archive studies. Both a spatial and chronological approach allowed further analyses on the social development of societies that produced the Neolithic monuments of northern Germany.

2.1 Number of megaliths

How many megaliths do we know of today and how many were originally erected? This simple question is not so easy to tackle, although different evaluations allowed a rough estimation of how many monuments originally existed.

Within an original evaluation of the data from northern and central Europe that was mainly based on
available catalogues (Bägerfeldt 1992; Bakker 1979a; Beier 1991; Bock et al. 2006; Dibbern 2016; Kirsch 1993; 1994; Roß 1992; Schuldt 1972; Sjögren 2011; Sprockhoff 1966; 1967; 1975), known megalithic monuments were mapped during the early phase of the SPP project (Fritsch et al. 2010) (Fig. 2).

On this basis, 5,001 monuments were registered in Denmark (61.1%), 2,447 in northern Germany (30%), 639 in Sweden (7.8%), 101 in the Netherlands (1.2%) and we add 18 in Poland (Sprockhoff 1967, 91–102; Nowaczyk et al. 2017). The altogether 8,206 monuments represent those that are mainly preserved and those that are not preserved but reported.

In the meanwhile, information on Neolithic monuments has significantly increased in northern Germany. On the southern Cimbrian Peninsula (federal state of Schleswig-Holstein), nowadays 3,212 known megalithic monuments and 958 long mounds are reported (Brozio et al. acc.). Detailed information on the typological and typochronological character of the often-destroyed sites is only roughly known in more than 95% of cases, although information from different surveys (Rinne 2011; Roß 1992) contributes further information. Thus, of the 958 long mounds, at least 27 are non-megalithic and 141 megalithic (Rinne 2011, appendix), whereby in principle we have to calculate with 154 non-megalithic and 804 megalithic long mounds. Consequently, 4,016 megaliths (of which only 118 are in a good state Roß 1992 and 300 are reported by Sprockhoff 1966) are known from the southern Cimbrian Peninsula, thus almost fourteen times more than reported in 2010.

From north-east Germany (the federal state of Mecklenburg-Vorpommern), nowadays 5,991 megaliths are reported (in contrast to 648 in 2010, the number increased more than nine times) and 1,155 for northwest Germany (Lower Saxony) (in contrast to 1013 in 2010). Altogether, 11,162 megaliths are known from the three mentioned regions, while in Brandenburg and Sachsen-Anhalt the figures did not change. Overall, we are talking about 11,648 megaliths in northern Germany and additionally at least 835 non-megalithic long mounds.

For northern Germany, the new figures more than double the figures of Midgley’s summary of the accounts of northern German megaliths from 2008 (Midgley 2008, 29–31). If we add the reports on 7,000 megaliths from Denmark, about 650 from Sweden, 100 from the Netherlands and about 20 from Poland, we end up with about 19,000–20,000 megaliths from Scandinavia and the northern European plain, where we are informed about their location.

Although the number of known megaliths is quite impressive (ca. 20,000 megaliths on roughly 300,000 km²), their discovery and survival rate have very strongly depended on regional conditions. While the general average points to reports on 0.07 megaliths/km², in areas with records documented before the agrarian industrialisation or records produced by general prospections (Landesaufnahmen), the average value points to about 0.25 megaliths/km² (cp. Rügen 0.27; Schleswig-Holstein 0.25; Mecklenburg-Vorpommern 0.25) (Fig. 3). Even if we take areas into account where intense modern surveys took place and significantly enlarged the amount of evidence for megaliths, the value is in principle not overtaken (e.g. South Fyn, Fig. 4). Consequently, the probability of the original density of megaliths could be set around 0.25/km². If we transfer these values (ca. 0.25 megaliths/km²) to the whole area under discussion, we would expect a minimum number of about 75,000 originally-constructed megaliths. With these estimations the general development and the triggers for the northern Neolithic monumentality were investigated.

2.2 General development in the North

From the Iberian Peninsula to northern Europe, both neolithisation processes and the monumentalisation of landscapes are combined in many regions, which is not the case in northern central Europe and southern Scandinavia (Furholt et al. 2011; Laporte 2005; Midgley 2008; Müller 2011a; Soe-Rensen 2014; Whittle et al. 2011a). In southern Scandinavia and northern central Europe, these processes are linked to the so-called Funnel Beaker societies (TRB). The archaeological assemblages of these communities are named after the »Funnel Beaker«, which was already in 1910 identified as typical artefact for many Neolithic sites in central and northern Europe (Bakker 2010; Kossinna 1911; Midgley 1992). As early as at...
Fig. 2. The distribution of megalithic tombs in northern central Europe and southern Scandinavia. About 12,000 megaliths, of which the location is known, are mapped. Originally probably about 70,000 monuments existed (Fritsch et al. 2010). Important sites mentioned in the article are marked. 1 Liselund; 2 Mysinge; 3 Denghoog, Tinnum; 4 Sarup; 5 Schwesing; 6 Büdelsdorf, Borgstedt; 7 Flintbek; 8 Rastorf; 9 Oldenburg-Dannau, Putlos, Wangels; 10 Albersdorf; 11 Frestedt; 12 Flögeln; 13 Lavenstedt; 14 Tolsterglope; 15 Dalfren; 16 Emmeln; 17 Ostenwalde; 18 Visbek; 19 Wittenwater; 20 Pennigbüttel; 21 Lüdelsen; 22 Lengerich-Wechte; 23 Haldensleben; 24 Belleben; 25 Salzmünde-Schiepzig.
the beginning of the 20th century, it became evident that these groups who produced Funnel Beaker ceramics, thin-butted flint axes and amber beads were those who also built the northern European megaliths. While early research was bound to chronological, typological and spatial aspects, during the last 50 years manifold information regarding other aspects of these societies has been collected, including different house types, the economic and environmental background, etc. At present, many investigations (including such of the SPP) have compiled information on archaeological and paleo-environmental archives that support the reconstruction of socio-environmental processes.

Regarding the TRB North Group – on which many activities of the SPP have focused – new research on environmental and economic issues during the last decade have clarified that in different regions different economic systems as well as a huge variation in climatic and spatial aspects, during the last 50 years that these groups who produced Funnel Beaker phases is an important step to identify possible triggers of economic, social and political developments. For example, we should verify or falsify the hypothesis that scenarios where the vulnerability of communities is high due to changing weather and climatic conditions triggers general societal developments (including the openness of networks).

In both the south-western Baltic region as well as from the Skagerrak, paleo-ecological archives show a deep fall in temperature for the 41st century BCE (Buuruille et al. 2016; Dörfler et al. 2012; Dreibrodt et al. 2012). Sedimentological analyses identify 40 »bad years« spanning 4050–4010 BCE in laminated sediment layers and reduced humus development indicate long winters and a shortened vegetation period during the summer months. The impact of these weather oscillations must have been immense for both foragers and fishers who lived in the area: a reduction of the annual mean temperature triggered by a drop of summer temperature – probably with late frosts – significantly affected the annual vegetation regime. In addition, the contemporary change of the sea surface temperatures affected the availability of certain fishes and molluscs. Consequently, the final Mesolithic Late Ertebølle communities must have been disturbed in their annual economic practice within their »Schweifgebiete« (circuiting areas) as well as on certain sites, which might have been used as year-round domestic locations (Fig. 5).

After ca. 4000 BCE until ca. 3350 BCE, summer temperatures continuously recovered again and led to moderate and partly warm summers. Until ca. 3850 BCE, winters could still be strong, although later on these cold winters only rarely occurred. These approximately 650 years could be interpreted as...
 Boom and bust, hierarchy and balance

»moderate« or even »good years«, before around 3350 BCE again a break in the weather conditions is indicated by changing structures of laminated sediment sequences from different lakes. Rapidly decreasing summer temperatures that are also documented in other European climate archives indicate a period of relative cold summers and mild winters until at least 3050 BCE (DREIBRODT et al. 2012, 155). The occurrence of cool summers continued at least until ca. 2600 BCE. Such climate reconstruction is also supported by evidence from Skagerrak archives (BUTRUILLE et al. 2016).

Consequently, four different weather conditions for west Baltic communities are identified. On a relative scale, the described changes imply strong

Fig 5. Sedimentological differences of the annual sedimentations of lakes in East Holstein indicate about 40 ‘Bad Years’ (type 2 sedimentation) 4050–4010 BCE (DREIBRODT 2012, 153 fig. 6).
climate deterioration at ca. 4050–4000 BCE, with the more favourable conditions lasting until ca. 3850 BCE, a climatic Giurastphase (favourable phase) with warm summers and moderate winters around ca. 3850–3350 BCE, and again an abrupt – but not as harsh – climate change to colder summers around 3350 BCE, lasting until ca. 2600 BCE. Within such climatic conditions, the TRB societies developed a mosaic-like pattern of local adoptions and social activities.

2.2.2 TRB North Group: a mosaic of different activities

In principle, »TRB« is a synonym for the first agrarian societies on the northern European plain and in southern Scandinavia, divided chronologically into different phases and periods, and spatially into different stylistic groups in an area that reached from Little Poland to Middle Sweden and from Drenthe to Kujavia (Bakker 1979b; Midgley 1992; Soerensen 2014). If we concentrate our inquiry on the TRB North Group (geographically western Baltic and Scandinavian TRB sites), in principle five different stages of a development are detectable (Müller et al. 2012). Even if they vary and overlap on a regional or even local scale in chronological and spatial terms, they represent general tendencies (Fig. 6).

Phase 1 (ca. 4100/4000–3800 BCE). Characteristic for this phase are first the integration of cereals and domestic animals into food production and gift exchange, second the introduction of pointed and rectangular flint axes as a tool for wood cutting as well as a symbolic value for prestige, third the change of ceramic types and decoration towards Funnel Beaker types, and fourth new house and hut types in combination with changing solutions for waste deposition (pits) (Andersson et al. 2016; Artursson et al. 2003; Soerensen 2014). Evidence of huge human-induced environmental changes is lacking (Feesser/Dörfler 2015). The locally-organised communities did not produce archaeological remains that indicate social differences aside from biological factors.

Especially in Jutland and on the Danish isles, kitchen middens formed a visible sign of occupation at many shorelines, first as pure domestic sites, and later on used as burial places (Andersen 2000; Andersen 2008). The linkage between the waste deposition of domestic consumption and formal burials within these sometimes 120 m-long and 1.5 m-high »long mounds« already implies a kind of monumentality for the deceased: the white shining long mounds of shells displayed a visible feature at the coasts, which easily could be seen from a distance (Müller 2013d).

Phase 2 (ca. 3800–3600 BCE). Around the latest 3800 BCE, the construction of non-megalithic long mounds with manifold ritual activities and long-lasting changes at their architectural layout as well as first causewayed enclosures describe a new pattern in the construction of social landscapes (Midgley 2005; Müller et al. 2014; Rzepecki 2011): Small TRB communities displayed themselves not only in the domestic sphere of houses, hamlets and horticultural areas but also in visible marked ritual places. These monuments (defined as architecture for a social memory) were no longer domestic waste deposits with integrated ritual activities but pure ritual places. If so, the division between the ritual and the domestic societal sphere is represented for the first time in TRB societies, thus reflecting an ideological change developed that enabled the commemoration of individuals and structures. The demarcation of ritual space was linked with an economic process in which an increased importance of small scale cultivation was first visible in the environmental records on a larger scale (Kirleis/Fischer 2014; Kirleis et al. 2012).

Phase 3 (ca. 3600–3350 BCE). Around 3600 BCE, the innovation of new technologies (e.g. plough, wheel, waggon, deep-sea shipping) enhanced the development of new TRB »worlds«: in core areas, the environment was changed into cultural landscapes, where settlements and arable fields as well as monuments like megalithic dolmen and causewayed enclosures had their certain locations (Müller et al. 2013). In contrast to former cleared plots inland and near the coast as spatial clusters of human activities, now the communities extended landscape openings on a larger scale. Sophisticated communication systems via trackways and communication knots causewayed

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**Fig. 6. Archaeological phases, and social characteristics of the TRB North Group.**

<table>
<thead>
<tr>
<th>BCE</th>
<th>Traditional Periodisation</th>
<th>Archaeological Phases</th>
<th>Social Characteristics</th>
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<tr>
<td>3100–2800</td>
<td>MN III-V</td>
<td>5 Diversity</td>
<td>Individualisation</td>
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<tr>
<td>3350–3100</td>
<td>MNI-II</td>
<td>4 First villages</td>
<td>Sharing</td>
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<tr>
<td>3600–3350</td>
<td>FN II</td>
<td>3 Economic boom</td>
<td>Boom and social competition</td>
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<tr>
<td>3800–3600</td>
<td>FN I b</td>
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<td>4100/4000–3800</td>
<td>FN I a</td>
<td>1 Experiments</td>
<td>Bad years and open networks</td>
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enclosures (during this phase regularly constructed) were formed (Bakker 1991; Dibbern 2016; Hage 2016; Nakoinz 2012).

During more than twelve generations of monumental building, the deposition of ritual objects and the creation of social values—especially those that represent consumption—were practised (KLASSEN 2004b; MÜLLER 2011b). An immense population increase furthered the development of boundaries and the construction of property rights between communities. Nevertheless, access to flint and other resources was not yet restricted (Hinz et al. 2012; MüLLER 2011b).

Phase 4 (ca. 3350–3100 BCE). At least in the southwest Baltic TRB region, at the latest around 3300 BCE a decline of human impact in the pollen records, a reforestation in some zones and an agglomeration of parts of the population in the first villages is visible (Feese/DüRR 2015; MüLLER 2017). The population agglomerations might be due to severe economic and social problems that are indicated by a relative increase in the number of burial items that could be used in feuds and other forms of killing (MüLLER 2011b). The creation of villages was paralleled in the construction of a new category of collective burial tomb: passage graves represent collective burial places, where space for burials is larger and the division between the outer space of the living and the space of the ancestors is more pronounced than in dolmen. The diversity of burial rites that already included a quantitative boom of flat burials (which could be correlated with the boom in megaliths) since 3600 BCE continued. Nevertheless, after ca. 3100 BCE nearly no new burial mounds and no new causewayed enclosure were erected until ca. 2800 BCE.

Phase 5 (ca. 3100–2800 BCE). While the construction of monuments seized, their re-use for depositions and burials continued. In contrast to the boom in monumental building activities of the preliminary phases, for some centuries from 3100 BCE onwards the production of axes and adzes boomed. The ritual investment previously concentrated in collective monumental building now seemed to be linked to individual depositional processes, with ritual depositions of unused objects. Coherently, the first burials of a novel developing tradition like Globular Amphorae or Single Grave societies appeared. Around 2800 BCE, a new non-TRB »world« is established.

2.2.3 TRB North Group: Hierarchy and balance

The translation of these archaeological phases into socio-economic categories might enable the identification of social processes. TRB events, processes and structures hint at societal worlds that are mainly acephalous-oriented and seldom develop social stratification (MÜLLER 2011b). Limited differences in access to resources, common property rights in contrast to individual properties and participation in common ritualised activities were vehicles to keep the household mode of production and a kind of reciprocity (in the sense of SAHLINS 1972) valid for centuries. With respect to our archaeologically-defined TRB phases, societal characteristics are detected.

Phase 1 – Bad years and open networks. Late Ertebølle communities were already identified as societies in which social identity was expressed by communal activities like the maintenance of fish fences or the ritual waste deposition in kitchen middens (glykou 2016; Klooss 2015). The collective organisation of daily and yearly life was expressed in local customs and regional ties that included the integration of rare objects from the »south« into depositions (Vang Petersen 1984). As a specific pattern, the ritual destruction of objects and the exclusion of such objects from the utilitarian consumption hindered the development of institutionalised social stratification (KLASSEN 2001).

The 40 bad years of the 41st century BCE brought this deliberate social behaviour under pressure. Consequently, the long-lasting ties to other regions were opened and used for the integration of new tools and technologies into the existing system. This did not result in the creation of social hierarchies but rather the continuation of existing social practices by compatible innovations (see below). Within such a »world«, the division between ritual and domestic ideologies did not exist.

Phase 2 – Better years and self-construction. In a similar manner, the construction of long mounds is not the expression of a diversification and a stratification of the society, but rather a continued practice that was already materialised in the »kitchen midden« principle (the latter disappearing with the changing sea salinity) (MÜLLER 2013d). If so, for the first time the division of domestic and ritual spheres as described above created a social arena in which the display of social power not only for communities but also for individuals or families was possible. However, this never happened; instead, the better years furthered a demographic growth and a manifold of economic practices that led to the integration of further domesticates and cultivars into subsistence economies.

Phase 3 – Boom and social competition. The beginning main building phase of dolmens, enclosures and the main depositional period followed around 3650–3300 BCE. While the division of ritual and domestic activities furthered the construction of cultural landscapes, it is difficult to estimate reasons for the increased building activities around 3650 BCE and the
boom afterwards. The first monuments and enclosures were built before the main shift towards an agrarian economy (already in the 38th century BCE) with partly open landscapes in the core areas of the development.

The demographic and economic boom was not reflected in the exclusion of parts of the population, e.g. from burial or depositional customs (Hinz 2014). Instead, all practices were organised in a manner that left almost everybody with possibilities to participate. Nevertheless, beside the principle of reciprocity and sharing that is detectable e.g. in similarly-used raw material resources or constructed architecture, social competition and hierarchical structures also gained significance. Examples include different qualities of the equipment of individual flat graves or even different size categories of neighbouring monuments (Geißler 2014).

**Phase 4 – Sharing.** In terms of the divergence of such developments, the answer seemed to differ in respect to governance. The accumulation of populations in first villages again allowed the collective organisation of economic, social and ritual matters. The construction boom of passage graves with a collective social connotation again represented the acephalous or polyphalous orientation of the society. Even if power were organised and marked by symbols of power, the individuals were first of all actors of a common organisation and not so much an institutionalised social class.

### 3 SPECIAL ASPECTS

Besides the general diachronic development of TRB communities, certain aspects are important and were researched in the SPP. Within the general framework, triggers of transformation were identified on local and reginal scales.

#### 3.1 Houses, settlements and rituals

Based on the field surveys, archive studies and excavations of the SPP, the idea about TRB households and settlements changed immensely. Even though the number of known houses and huts from northern Germany remains limited, figures 7–8 describe impressively the house plans of different sites. In principle, early huts with sunken floors (Frestedt), two-ailed houses of rectangular type (Rastorf), houses of Moss-by type (Wittenwater and Oldenburg-Dannau), such of Büdelsdorf type with one apsidal and one straight wide site, and three-comparted houses of the Flögeln type are known. While the variety of contemporary individual house types and huts is obvious, certain developments are visible. Both the size differentiation of up to 30 m-long Büdelsdorf houses in contrast to smaller Dannau houses (5x12 m), and the development of the three-comparted Flögeln house with clear functional divisions of the different house modules is remarkable as they indicate opposite developments of spatial meanings. We observe such divergent patterns especially during the main social TRB phases 3 and 4. Besides the different meanings in respect to social organisation (see below), a general study on southern Scandinavian and northern central European houses has demonstrated that especially after ca. 3600 BCE the size differences between small huts and overdimensioned houses significantly increased (Müller 2013c, 255–259 fig. 5–9).

Evidently the main settlement type in northern Germany between ca. 4000–3350 BCE was the single farmstead or a small hamlet. An example is the two-ailed rectangular house from Rastorf with waste pits, nearby flat burials and a ploughed field, situated on a raised area near the Schwentine (Fig. 8). Examples of villages are known from Büdelsdorf (ca.

**Phase 5 – Individualisation.** Nevertheless, the described processes were associated with a concentration of power. While the prior energy investment and conspicuous consumption of communities was originally visible at many dispersed places with the construction of smaller monuments, the new concept of passage graves was restricted to a small number of places (Müller 2011b). This agglomeration of energy investment was enforced by a kind of competition between communities that furthered the importance of individuals, e.g. »warriors«. The further development might be characterised as an individualisation through which the collective system of the TRB societies was overcome by a new kind of society: not a necessarily more hierarchised one, but a society with the pronunciation of the individual (later the Single Grave societies). Whether these changes were induced by mobile groups (cp. Kristiansen 1989), cohesion processes within the Funnel Beaker societies (Damm 1993; Furtbott 2014) or by both is a matter of discussion.

Consequently, TRB communities developed themselves in a mode of hierarchy and balance, triggering booms and busts in respect to monument building and economic input. Tendencies towards social stratification were hindered by different processes, including the integration of communities in the construction of monuments.
Fig. 7. A scaled compilation of TRB-house plans from northern Germany. Early huts with sunken floors (Frestedt), two-ailed houses of rectangular type (Rastorf), houses of Mossby type (Wittenwater and Oldenburg-Dannau), such of Büdelsdorf type with one apsidal and one straight wide site, and three-comparted houses of the Flögeln type are displayed. The variation of contemporary individual house types and huts, size differentiation, and the development of the three-comparted Flögeln house with different house modules is obvious.
Fig. 8. Examples of TRB-house plans from northern Germany. Modulated Flögeln houses with functional divisions of the different house modules are indicated as well as the single farmstead Rastorf with waste pits, nearby flat burials and a ploughed field (cp. fig.13). 1 Flögeln 7617; 2 Pennigbüttel B; 3 Flögeln 12100; 4 Visbek; 5–7 Oldenburg-Dannau; 8 Frestedt; 9 Büdelsdorf; 10 Rastorf. (1–4: Mennenga 2016, 274 fig. 257; 5–7: Brozio 2016, 61 fig. 65; 8: Dibbern 2016, 141 fig. 9.4; 9: Hage 2016, 61 fig. 72; 10: Steffens 2009, 260 tab. 19).
3350–3250 BCE) and Oldenburg-Dannau (ca. 3300–2950 BCE), where several houses formed household clusters of originally probably 40–50 houses with up to 400 inhabitants (Fig. 9). Communal wells, palisades, waste areas and spatially-separated production zones identify cooperative activities that joined the households to a village in the classical sense. While the ›farmstead era‹ (primarily until ca. 3350 BCE) is

Fig. 9. TRB-villages are known from Büdelsdorf (ca. 3350–3250 BCE) and Oldenburg-Dannau (ca. 3300–2950 BCE). An extrapolation of the excavated house area to the whole settled area allows estimating the original figure of contemporary houses (Oldenburg-Dannau: 20–30; Büdelsdorf: 40–50) (Brozio 2016, 75 fig. 59; Hage 2016, 59 fig. 70).
mainly associated with long mounds and dolmens, the »villagers« (ca. 3350–2950 BCE) were more associated with the construction of passage graves. In all categories of settlements, the reconstruction of depositional processes and artefact distributions helped in identifying certain activity zones and processes (BrOziO 2016; Hage 2016; mennenga 2016; SteffenS 2009). In Lavenstedt, a central grinding area between houses could be identified (Fig. 10), in Oldenburg-Dannau activities outside and inside houses, as well as workplaces in huts. In Büdelsdorf, the main production places for flint and stone tools were placed in the surrounding of the settled area (Hage 2016, 127 fig. 177).

During the Neolithic, domestic activities were linked to ritual activities, which is also visible in the remains from the settlements. One example is the detection of three to four compartments of the Flögeln houses in Lower Saxony, of which three are associated with utilitarian purposes, while the small southern or south-eastern module is linked to single graves or Funnel Beaker depositions (Fig. 8; cp. mennenga 2016, 274 fig. 257). The integration of rituals into the houses around 3400 BCE is also comparable with further ritual activities, which are placed within the settlements or at their boundaries. Examples include stone packing graves from Oldenburg-Dannau or from Penningbüttel, which are placed separately from the main domestic area at the border of the settled area. Moreover, the deposition of human remains in the wetland waste area holds interest.

»Memorisation« and »destruction« are narratives that are also visible in the domestic record of the sites. At Oldenburg-Dannau, the earliest feature of the settlement is the flat burial of a 40–50 year-old woman, which was respected until the 31. century BCE (Fig. 11). Around 3070 BCE, two wells of the village were filled in the same manner, with burned apples and cereal at the ground, destroyed TRB pots and querns following and white shining shells at the top (BroziO et al. 2013) (Fig. 12). This obviously ritual infilling was added by the femur of the female flat grave, for which a pit was specially dug. In principle, for about 250 years the burial of the female village founder was respected, although certainly at a moment of other changes it was destroyed and used for ritual performances. While this happened in a settlement, the case of Rastorf

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3 Beside the villages still single farmsteads and hamlets were founded.
especially holds interest. The already-mentioned farmstead was replaced by a dolmen in the central space of the original house (Fig. 13). After several elongation phases, a slightly trapezoidal long mound was added, which exactly followed the symmetrical lines of the original house (Müller 2017). Obviously again, still after generations the memorisation and ritualisation of the ancestor house was one of the purposes perhaps comparable with the memorisation and secondary ritualisation of the individual in Oldenburg-Dannau.

In summary, the evidence of TRB domestic sites in northern Germany exemplifies the domestic background of the non-monumental and monumental ritual activities of these households and villages. While
manifold domestic activities were reconstructed, non-utilitarian activities and features are also visible within the domestic world, from flat graves to episodes of memorisation. Nevertheless, the main input of rituals shifted to the ›outside‹ world.

3.2 Extramural flat graves, long mounds and megalithic monuments

Flat graves

Since the earliest excavations in shell middens and megalithic burials, the manifold aspects of *the rite de passage* within the southern Scandinavian and northern central European Mesolithic and Neolithic have been discussed. Within the scope of our studies, questions related to graves outside of domestic areas hold the main interest: on the one hand, flat and mostly non-collective burials and human deposits, while on the other hand above-ground burial monuments like non-megalithic long mounds and megaliths. Furthermore, the role of causewayed enclosures within the burial right has been discussed.

Flat graves are known as single features or in small grave groups, as well as in larger cemeteries for both the middle and late Mesolithic as well as the Neolithic in the area under discussion (Kossian 2005). As dating of these flat graves is typo-chronologically not problematic in many cases, a systematic chronological and spatial mapping was conducted (Figs. 14–16). In an original hypothesis, we stated that these burials were a phenomenon not linked to that of monumental burial constructions.

As such graves were constructed until around 4300 BCE in the western Baltic area and southern Scandinavia, there are only a few examples for the time period until 3800 BCE (Fig. 17). Around the later date, the construction of flat graves – especially in north-eastern Germany – started again. Remarkably, during the centuries until around 3100 BCE, a huge variety of grave constructions were partly applied by the burying communities. While the earthen pit grave is known during all relevant centuries, the huge diversity of flat grave constructions started around 3600 BCE with the introduction of stone heap, Konsens Høj, stone frame and stone cist, as well as wooden cist graves. The variety was even pronounced around 3400–3300 BCE by the introduction of rock, stone floor, stone frame and stone cist graves. Moreover, wooden tree coffin burials appeared. The contemporaneity of most burial types between around 3400 and 3100 BCE is followed by a reduction in diversity after 3100 BCE (Fig. 17). The described development is also visible in a compilation of the flat burial types, this time separated for different key regions of northern Germany and the Netherlands (Fig. 15).

Taking the quantities of the flat graves into account, the boom in flat grave construction around 3600 BCE until about 3300 BCE is more or less contemporary with the boom of megalithic monuments, while the same is observable for the bust after 3200 BCE. Given that the increase and decrease in the variability of the flat grave constructions is more or less contemporary with the increase and decrease in the variability of megalithic monuments, the TRB flat grave phenomenon has to be linked with the megalithic phenomenon (Fig. 17).

Thus, in contrast to our original hypothesis, it became clear that the boom and bust of both categories of burials appear simultaneously within the ritual practices of the TRB communities. Even within most of the areas of northern Germany, the spatial distribution of flat graves is present in areas with megaliths and *vice versa*. Nevertheless, we have to take into account that surely in the western part of the TRB West Group and the eastern part of the TRB North Group in some areas flat graves are known, but no megaliths. However, at the local level the scenario in East Holstein might be typical: flat burials and bone deposition are known from the domestic site Oldenburg LA 77, collective burials were practised in the nearby megaliths to the south (e.g. Wângels LA 69), and a group of extramural flat graves existed 1 km to the north in Putlos (Brozio 2016; Kossian 2005; Müller 2017).

Despite the availability of each burial type and burial location at a time, the development indicates significant differences in time. The individual burials in elongated megaliths (as known from Rastorf and Wângels) already indicate an emphasis on individual burials staring in the 31st century BCE, at a time when no further megaliths were constructed.

Non-megalithic and megalithic long mounds

While especially on the British Isles, in Denmark and in northern Poland non-megalithic long mounds had been excavated for decades, this was not the case.

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4 The data of the analysis are available on the data exchange platform of the Johanna-Mestorf-Academy Kiel.
Fig. 14. Borgstedt. Examples of flat grave variation: Earthern pit graves, stone heap graves, wooden cists, Konsens Høj-type graves and stone packing graves (Hage 2016, 77 fig. 99).
Fig. 15. The chronological appearance of flat graves in northern central European TRB-regions. Pit graves are known during all relevant centuries. The huge diversity of flat grave constructions started around 3600 BCE with the introduction of stone heap, Konsens Høj, stone frame and stone cist, as well as wooden cist graves. The variety was pronounced around 3400–3300 BCE by the introduction of rock, stone floor, stone frame and stone cist graves, and tree coffin burials. The contemporaneity of most burial types between around 3400 and 3100 BCE is followed by a reduction in diversity after 3100 BCE.
in northern Germany, with the exception of Baalberg trapezoidal mounds in the Mittelelbe-Saale region (cp. Madsen 1979; Midgley 2005; E. Müller 2017; Rebecki 2011). Within recent research of the SPP, three sites in northern Germany have been excavated or analysed, which helped to clarify the role of non-megalithic long mounds.

We are dealing with no less than three different biographies of long mounds (Müller et al. 2014, 178 fig. 10): (1) rectangular or trapezoidal mounds with single burials or facades used for rituals (e.g. Lüdelsen 6, Tosterglope 2); (2) long mounds with single burials and a megalithic stone kerb (Tinnum LA 37); and (3) a sequential alignment of non-megalithic graves, culminating in a long mound (Flintbek LA 3) (Fig. 18).

Some long mounds started with wooden enclosures and never changed into a real mound, while others were transformed into monuments with later megaliths. Borgstedt LA 22 with such a double-post enclosure (61 m x 10.5 m) dated to the 40th century BCE and represents the earliest known type 1 long mound in northern Germany. During the 37th century BCE, a rectangular dolmen was added and changed the
place into a megalithic monument (Hage 2016, 180 figs. 225–226) (Fig. 19). At Albersdorf LA 56, an early non-megalithic long mound (86 m × 14 m) was erected in the 38th century BCE, while a rectangular or polygonal dolmen was located within the monument around 3650 BCE (Dibbern 2016, 116–118). At Lüdelsen 6, a similar phenomenon was observed with a long mound (75 m × 11 m) constructed in the 37th century BCE and a megalithic stone kerb added in the 36th century BCE, later also a passage grave (Müller et al. 2014, 173–175 figs. 3–4; Diers 2018, 32–34 figs. 2.16–2.17).

In contrast to these sites with a long mound concept already from the start, in Flintbek LA 3 four single burials of mainly Konsens Høj type with individual small oval mounds were erected in a chain-like manner and later linked to a long mound in the 35th century BCE (Mischka 2011) (Fig. 20). In Rastorf LA 3 and Wangels LA 69 even round mounds with a dolmen or a Holsteiner passage grave were elongated to long mounds with extra individual burials (Steffens 2009; Brozio 2016).

Consequently, as already described for the memorialisation at domestic sites, the site biographies of long mounds also indicate the creation of memories and long-lasting memorialisation within their site biographies. Within such processes, the transformation of non-megalithic monuments into megalithic monuments as well as the elongation of megalithic round monuments to megalithic long mounds was observed.

Taking the evidence from the new excavations into account, long mounds in the classical sense (type 1) were erected from the 39th to the 37th/36th century BCE, and long mounds as cumulations of different individual burial mounds (type 2) from the 35th century onwards. These mounds are an integrative part of the European long mound phenomenon, which stretches from the Upper Vistula to the Isle of Man and where the gap between the central and south Scandinavian distribution and the British Isles might be narrowed by a few candidates like from Dalsen or Schipluiden (Peeters et al. 2018, 156–162). In northern Germany, they are the predecessors of the megaliths, even if an overlap in time exists. Obviously the early long mounds cluster in small groups in contrast to the later megaliths, of which the location is obviously linked to tracks within the landscape, at least in the region of West Holstein (Dibbern 2016) (Fig. 21).

The megalithic boom

The major boom of the megaliths in northern Germany started with an increasing number of monuments around 3600 BCE and the boom around 3450 BCE (Fig. 24) (Brozio et al. acc.). We are talking about 1,200 monuments that were erected around 3200 BCE in about 50 years only on the southern Cimbrian Peninsula, which means about 25 megaliths each year! If the distribution of megaliths was random, a megalith would have been constructed every 25 km (a walking distance of about 7 hours by foot).

From a typological perspective, the traditional categorisation of the monuments into different kinds of dolmens and passage graves has been in use since decades and there is no obvious reason to change the classification system used (Figs. 22–23). From a chronological perspective, in northern Germany the earlier »start« of dolmens and the later of passage graves is approved by both radiometric dating as well as typochronological considerations (cp. Hoika 1999; Mischka 2014, 132–142 fig. 9 and fig. 13). As the majority of dolmens are dated to 3650–3350 BCE and passage graves mainly to 3300–3100/3000 BCE (Jörgen 2011, 107–108), some earlier dates indicate the availability of the new architectural innovation already before the boom of each architectural concept started. This is exemplified with early dolmen dates from Borgstedt and the early dates for Havlshöje, Mysinge 2 and Ansarve in

5 This is comparable with the Danish and Swedish dates for the construction of non-megalithic long mounds (cp. Mischka 2014, 136 fig. 13).
Boom and bust, hierarchy and balance

Fig. 19. Examples of long mounds from Borgstedt. In most cases non-megalithic long mounds were changed into megalithic monuments around 3600 BCE. The mounds were delimited mostly either by elongated extraction pits or double post settings (HAGÉ 2016, 68 fig. 85).
Fig. 20. Flintbek LA 3. Four single burials of mainly Konsens Høj type with individual small oval mounds were erected in a chain-like manner and later linked to a long mound in the 35th century BCE (MISCHKA 2011). In following phases elongated dolmens were added. A card was used for ritual transport of burnt silex from a fire place to dolmen IV. (FURHOLT et al. 2018, 93 fig. 4).

Fig. 21. West Holstein. In contrast to later megaliths early long mounds cluster in small groups, of which the location is obviously linked to tracks within the landscape. The causewayed enclosure Albersdorf-Dieksknoll is located at the communication knot of three settlement areas. The green areas were part of the North Sea during the Neolithic (HINZ 2015, 13).
Fig. 22. Dolmens at Flinbek LA 3 and Büdelsdorf (FURHOLT et al. 2018, 95 fig. 5; HAGE 2016, 72 fig. 91).
southern Scandinavia (passage graves: MISCHKA 2014; SCHULZ PAULSSON 2010, 137. – Dolmens: HAGE 2016, 196). Thus, already in the 39th century BCE singular dolmen and in the 36th century BCE singular passage graves were erected (long before the dolmen boom after ca. 3650 BCE and the passage grave boom after ca. 3350 BCE).

The combination of radiometric dating, typochronological dating of the earliest inventories within the megaliths and the aoristic approach made an absolute quantification of the megalithic development in northern Germany possible (BROZIO et al. acc.). Monuments were especially erected between ca. 3400–3100 BCE, an extraordinary boom and bust of monumentality that is visible in both Schleswig-Holstein and Mecklenburg-Vorpommern (Fig. 24). Obviously after ca. 3050 BCE, almost no new megaliths were erected, whereby two more or less non-monumental centuries followed (before the boom of early Single Grave mounds started in some areas). The boom in megalithic architecture changed the landscape. Not only the impressive monuments were erected, but they were also used for centuries with the integration of different social and ritual practices. Excavations of the rectangular dolmen Lüdelsen 3 confirmed a long-lasting site history (DEMNIK et al. 2008 (2011); DIERS 2018) (Fig. 25). The ritual occupation of the place started with a ritual pit, in which both pottery and other objects were broken and fluviatile sediments from half a kilometre distance were deposited. At the boundary of the pit around 3650 BCE, the chamber and its entrance were constructed with a dry

Fig. 23. The Holsteiner passage grave Wangels LA 69 (BROZIO 2016, 131 fig. 116).
Stone walled earthen mound of 9.6 m diameter. Until around 3100 BCE, the site underwent different rituals, including the re-deposition of pots from the pit and the chamber in the mound, whereby processes of re-cutting and infillings of the burial mound took place. Obviously around 3000 BCE, a standing stone was erected in front of the entrance, linked perhaps to Globular Amphorae intrusions. While around this time the last activities at the pit and in the chamber terminated for centuries, around 2400 BCE the chamber was re-dug, a Corded Ware/Schönfeld/Bell Beaker associated crouched person buried, for whom the mound was elevated and enlarged to a 35 m diameter.

Fig. 24. The quantification of frequencies of monumental construction and artefact production (Brozio et al. acc.). Monuments were especially erected between c. 3400 – 3100 BCE. After 3050 BCE, almost no new megaliths were erected. Two more or less non-monumental centuries followed (before the boom of early Single Grave mounds).

Fig. 25. Lüdelsen 3. Earliest activities took place at the pit beside the entrance. Later activities included also infillings and recuttings at the burial mound, partly linked to this pit. Probably in combination with Globular Amphorae activities the standing stone was erected at the forecourt (DeMnick et al. 2008, 252 fig. 13).
mound. Thus, the original collective burial place changed into the representative burial of an individual. In contrast to Lüdelsen 3, the excavations at Albersdorf-Bratkamp described a different handling of the ritual practices at the site (Dibbern 2016, 88–105). In front of the entrance of the polygonal dolmen, Funnel Beakers and other pots were deposited on the ground or on the entrance blocks (Fig. 26), but not in a certain pit or associated with infillings or re-cuttings of the mound. During the use phase of the burial chamber (until 3100 BCE), at least one clearing phase took place that distributed destroyed pots and burned flint randomly on the mound surface (Dibbern 2016, 105). Similar to Lüdelsen 3, the use of the dolmen ceased around 3100 BCE, whereby a re-use probably for individual burials took place here 900 years after the TRB occupation during the Late Neolithic I.

Fig. 26. Albersdorf-Bratkamp. Different votive offerings, but also clearings of the chamber took place during the TRB. The spatial distribution of the sherds from funnel beaker CU1 indicates that the vessel originally was placed in front of the entrance, probably as a votive offering (Dibbern 2016, 100 fig. 7.10).

The site biographies of passage graves also confirm a huge variety of ritual practices. At Lüdelsen 6, both the destruction of pots in front of the passage and the random deposition of clearings from the inner chamber are confirmed (Demnick et al. in prep.). At the Denghoog passage grave on the island of Sylt, votive offerings of ceramics and other objects took place in the forecourt of the passage and extra pits on both sides of the passage entrance from 3200–2950 BCE (Wunderlich 2014) (Fig. 27). Obviously offering practices are present that are also known from e.g. the Borgstedt LA 28 polygonal dolmen (Hage 2016, 142 fig. 198) and several other Scandinavian passage graves (cp. Strömberg 1971), as well as the Hundisburg-Küstberg passage grave (Schmütz 2017, 116–118).

At the Holsteiner passage grave of Wangels LA 69, neither a clearing of the inner chamber nor votive offerings in front of the passage were detected (Brozio 2016). This might already represent the tendency that is extremely pronounced in the TRB West Group westwards of the Weser. Here, rich and manifold ceramic services were deposited within the huge elongated chambers, e.g. in Emmeln 2, Ostenwalde 1, Glimmern 2 or Lengich-Wechte 2, not in the forefront (Menne 2018).

Within the projects of the SPP, most sites were excavated, where the bone preservation (like at other places in Northern Germany) was extremely poor due
Fig. 28. Wangels LA 69. Within the open chamber of the megalith an assemblage of different vessels was respected for centuries. Three of the undestroyed vessels are displayed (Brozio 2016, 503 table 213).
to the acid character of most of the soils. Thus, most advances were made in respect to the reconstruction of depositional processes, architectural histories and site biographies in general.

One example is the already-mentioned Holsteiner passage grave Wangels LA 69 (Brozio 2016). The Bayesian calibration of 85 radiometric dates confirmed the construction of the chamber after a foundational depot around 3350 BCE, a deposition of many pots in the inner part around 3200 BCE and the last activities within the chamber around 2100 BCE. Highly relevant is the observation that the passage and chamber were hold open for hundreds of years, although the deposition of pots and jugs was never touched or destroyed (Fig. 28). In our interpretation, the site signifies the institutionalised ancestor worship and the creation, as well as deliberate change of memories. The incorporation of individual burial practices – represented in a stone heap grave in an additional long mound elongation of the round mound – describes the beginning of a new ideological practice at the site around 3100 BCE (Müller 2018b) (Fig. 29).

The example of Wangels LA69 displays the long-lasting memorisation of the site without any clearing events (but surely with changes in the ideological orientation). Even if such clearings of the chamber are probable (like at Albersdorf-Brutkamp), the dismantling of sites or the closing of chambers took place not before 3100/3000 BCE. Thus, clearings at sites

Fig. 29. Wangels ground plan (Brozio 2019, 493 fig. 8, this volume).
like Hundisburg-Küsterberg and Lüdelsen 6 are probably associated with Globular Amphorae activities, the dismantling of the passage at Albersdorf-Dieksknoll during the Late Neolithic dagger period (Demnick et al. 2008 (2011); Dibbern 2016; Schmütz 2017) (Fig. 30). Thus, the ritual practices at the sites and the ancestor worship enabled the creation of ritual places with changed memories even after described elements of deconstruction or disintegration.

While the places catalysed memory construction, sites of agglomerated megalithic places were also linked to certain taboos. The spatial respecting of neighbouring megaliths highlights the agglomeration of further memories both within the agglomeration of megaliths at megalithic cemeteries like Flintbek, Borgstedt or the Haldensleber Forst, and within smaller megalithic grave groups like Lüdelsen or Albersdorf. Obviously, the chain-like agglomeration of single burials and burial mounds to a long mound at Flintbek 3 (Fig. 20) is mirrored by the integration of the many megalithic monuments at Flintbek into the chain of megaliths of the whole cemetery. From the micro to the meso level, as a product megalithic landscapes are consequently a memorised carpet of the living world (Fig. 31).
3.3 Enclosed spaces, open landscape

Within the setting of Neolithic and especially Funnel Beaker landscapes, different projects within the SPP dealt with causewayed enclosures as a further type of monument. The main concern was related to the function of the sites within the general framework and the individual site activities, the duration of the sites and a general contribution to the chronological development of the sites. Especially three enclosures were at the forefront of our research, namely Albersdorf-Dieksknöll, Büdelsdorf and Hundisburg-Olpetal (Dibbern 2016; Hage 2016; Schmütz 2017). Further investigations took place in Belleben and partly a re-analysis of the Rastorf site.

The chronology of the phenomenon enclosure significantly changed with the new results. The appearance of enclosures in the TRB North Group took place about 300 years earlier than originally postulated, whereby in Büdelsdorf, Albersdorf-Dieksknöll and the North Jutish site of Liselund the first cuttings and infillings of the ditches took place in the 38th century BCE. Furthermore, in the zone south of the central TRB areas, enclosures also started earlier than originally thought. In Hundisburg-Olpetal, the huge enclosure was constructed at latest during the 42th century BCE, associated with a mixture of Michelsberg and Late Lengyel pottery (named Schiepzig). Further enclosures of Schiepzig link the area to early Michelsberg enclosures, as well as a Late Lengyel/Rössen tradition of enclosures within the Middle Elbe Saale region and beyond. Thus, beside the western causewayed enclosures, a local enclosure tradition might have contributed to these early ones.

While the Schiepzig enclosure of Hundisburg-Olpetal enclosed normal and trapezoidal pits, the northern enclosures yielded more or less an empty inner space or some vague evidence of gathering events. The re-cuttings and infillings of ditches and pits took place for centuries, as expected from previous excavations, although the new possibility emerged to indicate the rhythm and pace of these events. In Albersdorf-Dieksknöll, the gatherings that produced the detectable archaeological features within the ditches slowed down from about every 40–60 years to one every 200–250 years (Dibbern 2016). It is quite obvious that some of the TRB enclosures (like the just mentioned one) were still used during the Nordic Younger Neolithic, while others stopped being used (like Rastorf and Büdelsdorf). The relatively sparse quantity of deposition (including the destruction of pots during festivities) is interpreted as indicating a relative restricted number of gatherings at the enclosure site. On the other hand, in both Büdelsdorf and Rastorf the production of silex and flint tools took place, and especially in Büdelsdorf the re-distribution of whitish silex adzes has to be mentioned (Hage 2016; Steffens 2009).

Causewayed enclosures as a kind of highest »work« investment within the TRB zone are in many cases focal places within the social and cultural landscape. Albersdorf-Dieksknöll is located at the topographical linkage of three former peninsula-like settlement areas in Westholstein (Dibbern 2016). A probably 4–5m-high wooden post in one of the causeways made the monumental place even more visible to the outside world. In Büdelsdorf, the enclosure is located at the crossing of the traditional north-south trackway (Ochsenweg) and during the Neolithic – the shortest east-west land connection. Like at Albersdorf-Dieksknöll, the demarcation of one of the causeways was marked with a huge wooden post, with which also a fireplace with burned emmer and einkorn was associated (Hage 2016) (Fig. 32). The assemblage both enhanced the visibility of the site and encountered the ritual situation together with special mostly rectangular fire pits that were in line with the palisade and ditch system.

The region at the middle Eider valley with the Büdelsdorf and Borgstedt sites (1.5 km distance) exemplifies the relational and partly fluid structure between enclosures, settlements, non-megalithic and megalithic monuments (Fig. 33). Within the long-lasting history (Hage 2016), the demarcation of the forested area with the 5.6ha large enclosure and the partly earlier burial activities at Borgstedt started around 3900 BCE. After different phases of renewals and erections of new monuments, including the re-arrangement of the non-megalithic long mounds to megalithic tombs, around 3300 BCE the ritual character of Büdelsdorf 1c was abolished. A new settlement with probably about 40–50 longhouses was constructed with an inner living and working area and an outer area for special activities. Besides, the transformation from a poorly ritual centre to a mainly domestic area was accompanied by a continuation and intensification of the burial activities in nearby Borgstedt6. After about four generations, the agglomeration of probably about 400–500 people was abandoned again (probably due to

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6 Sarup (Fyn), where also the transformation of the ritual enclosure into a domestic site took place (Andersen 1997).
Fig. 32. In Büdelsdorf, the demarcation of one of the causeways was marked with a huge wooden post, and a fireplace, at which cereals were burnt. The assemblage both enhanced the visibility of the site and encountered the ritual situation together with special mostly rectangular fire pits that were in line with the palisade and ditch system (Hage 2016, 230 fig. 271; Hage 2016, 33 fig. 17).
an over-exploitation of the nearby soils, cp. FEESER et al. 2016) and Büedelsdorf continued as a renewed causewayed enclosure until around 2800 BCE.

Within the middle Eider valley, megalithic monuments cluster within the areas of local population agglomerations, although they are also located as chains probably at the linking tracks between settled areas (Fig. 34). Within such a local ordering of the spatial arrangements, the ›loading‹ of the landscape with the meaning of the social practices of monumentality is mirrored. The arrangement of architectural elements of the enclosures (e.g. the transverse pit and the double-post setting in the entrance; KLASSEN 2014a, 183 fig.106 and 222 fig.129) at Albersdorf-Dieksknöll, the distribution of certain economic traits (e.g. tetraploid naked wheat; KLASSEN 2014a, 236 fig.138) at Albersdorf-Dieksknöll or of certain objects, (e.g. the clay discs (DIBBERN 2016, 80 fig. 6.32), in Walmsdorf and Albersdorf-Dieksknöll indicate the role played by the ritual centres for the transition of supra-regional knowledge and items into the regional and local worlds.

3.4 TRB North Group: Long distances

The development and role of long-distance contacts and barter exemplify significant differences for almost each of the socio-cultural phases.

**Phase 1 – Open access.** While already since centuries intense exchange had been practised between Ertebølle foragers and central European LBK and post-LBK farmers, in the 41st century BCE the amount and intensity of in-bartered objects from west, central and south-east Europe dramatically increased (KLASSEN 2004b). In my view, this should be related to the described external climatic conditions (›bad years‹) that enhanced a much wider strategy of living in terms of both the integration of new subsistence strategies as well as the use of networking for the solution of daily aspects.

The activation of long-lasting ties to the ›south‹ that we observe were obviously linked to efforts to gain new ›economic‹ and ›technological‹ knowledge that resulted in economic and technological changes. New tools like point-butted adzes and first rectangular double-ailed houses (ANDERSSON et al. 2016; ARTURSSON et al. 2003) are a sign of the need for new clearance techniques and a new stable domestic accommodation. The integration and experimentation with domesticates and cultivars was influenced by the exchange and barter of information and animals/ cultivars with southern farmers (KRAUSE-KYORA et al. 2013; SOERENSEN 2014).

Thus, phase 1 is characterised by a kind of ›practical‹ integration of long-distance information and items with implications for the economic development. The presence of foreign ›artefacts‹ is not important, but rather the integration of new tools and practices – which were earlier established in other regions – into the Ertebølle world. In the long run, the integration of these new practices changed access to resources and property rights. As an example, the new need for flint adzes was followed up by quarrying flint at the Limefjord and probably also at other places.
Fig. 34. Within the middle Eider valley, megalithic monuments cluster within the areas of local population agglomerations. They are also located as chains probably at tracks between settled areas. Such a local ordering of the spatial arrangements is visible north of Büdelsdorf.
The flow of northern items and knowledge to the south is still restricted (woltermann 2016). Only a few amber objects are known from non-amber areas in central, western and eastern Europe.

**Phase 2 – Ritual items.** In contrast to the time before 3800 BCE with its more utilitarian character of input from long-distance contacts, in phase 2 long-distance influences and »foreign« artefacts were strongly related to the ritual sphere. They were introduced by existing networks and then locally changed in terms of both their value and typological variation. An example is the large greenstone axes with a perforated butt (Klassen 2014b), which are characterised by a bi-conical perforation. They were unused, and thus not used as working implements. Typologically, these few early axes can be associated with elements of the Armorican Tumiac perforated type of jadeite axes, which are mainly known from Brittany already some centuries before.

Imported copper flat adzes also appear as a kind of ritual objects without any utilitarian use. They derived from northern Alpine centres of copper metallurgy, probably the Mondsee area near Salzburg (Klassen 2001; Matuschik 1998). The restricted number of objects that were imported to the west Baltic regions do not signal a local Scandinavian copper metallurgy (like e.g. contemporary Central Germany), although the appearance of these objects indicates the value that TRB communities associated with the new raw material.

Similar to the distribution of Alpine Mondsee copper objects (a cluster in southern central Europe, an empty corridor in the central European mountain range and a further cluster in southern Scandinavia), the distribution of most of the early polygonal hammer axes follows such a spatial pattern. Chronologically, these polygonal hammer axes are mainly linked to our phase 2 (Zapotocky type fi-iv,ki-kiv; Hallgren 2008; Soeren sen 2014; Zapotocký 1992, 177), even if early objects are already known in phase 1. »The quantities of locally produced preforms indicate that it was important ... to create their own imitations, and perhaps their own meanings for the objects, in a process of hybridisation. The necessity of creating a more regional material culture seems to have been a growing tendency during the latter part of the Early Neolithic in certain regions of South Scandinavia, which took place at the same time as the adoption of selected trends and ideas from the larger agrarian network« (Soeren sen 2014, 177). The contexts (single finds, deposits, long mounds) of these axes describe a primarily ritual or prestige function of these axes.

The three examples describe global interaction that becomes visible first in a distinct adze type of western European tradition, second in a south central European hammer axe tradition, and third in the first copper object imports. They hint at the character of phase 2 long-distance contacts: within the division of the ritual and profane sphere of living and memorisation, the »foreign« influences »materialise« the ritual sphere of social memories. While ties to major centres of innovation are kept going (e.g. of copper metallurgy), the internal possibility to use ritual practices for ideological reasons was given: a conspicuous consumption of these objects not only for the identity of the community, but also as a display of individual power. Nevertheless, there are no examples that this happened in an institutionalised way. Even while the flow of amber to the south increased during ca. 3800–3600 BCE compared with earlier centuries, there are no signs of a significant barter exchange (woltermann 2016).

**Phase 3 – The economic value of long-distance exchange.** In contrast to phase 2, since about 3600 BCE a manifold of economic uses for exchange relations becomes visible:

1. Different flint resources are distributed over longer distances, not only at the local but also the regional level. For example, the red Helgoland flint is used besides other flint raw materials along the North Sea coast and in the west Baltic area (müller 2013a). The distribution and contexts indicate a utilitarian use of this flint.

2. The distribution of Baltic amber is significant in many central European regions and indicates the value to barter amber from the north to the south (woltermann 2016) (Fig. 35). In fact, the production of local Scandinavian types of copper artefacts indicates a TRB copper metallurgy that is dependent on central European copper sources (klasse n 2004a). Both copper and amber indicate long-distance relations that are bound into an economic mode of exchange.

3. The interregional appearance of different Zapotocky hammer axe types indicates the exchange relations that existed between e.g. central Germany, the southern Cimbrian Peninsula and North Mecklenburg/Pomerania (Zapotocky D4) (rinne 2012). As a different example, the contemporary short greenstone axes with a perforated butt display signs of use (in contrast to the long examples in phase 2), and describe exchange relations of northerly regions (North Cimbrian peninsula, Danish Isles, Scania) (klasse n 2014b).

In general, the context of the items could show a utilitarian use, as well as non-utilitarian depositions in burials and deposits.

**Phase 4 – Continuation.** After a clear economic re-ordering of the societies in phase 3, no changes within the pattern of barter and long-distance exchange are visible in phase 4. With respect to the mentioned examples, a quite similar pattern continues.
**Phase 5 – Different foreign influences.** During the latest TRB development, extreme changes in the integration of foreign influences into the regional and local constitutions are identified. Both elements of Globular Amphorae ceramics as well as new axe types are integrated into the assemblages of the southern Cimbrian Peninsula (Brozio 2016; Woidich 2014). As mentioned above, axes and adzes are now partly associated with individuals, whereby for the first time a fragmentation of the society might be indicated and open the way for the new kind of socio-cultural signals of the later Younger Neolithic. Burial and depot contexts of the new items indicate that long-distance signals are used again in the ritual sphere of the society, where especially the ideological frame for new developments and group interests could be present. Interestingly, the former exchange systems (e.g. amber to the south and copper to the north) also broke down (Woltermann 2016), and were rewarded by new exchange systems of Single Grave Societies.

**Spatial organisation of barter and exchange.** The described scenarios of long-distance contacts and exchange were organised in quite different ways. At least until the 37th century BCE, the exchange of information and items had to be organised between single homesteads or small hamlets. Besides the possibility of mobile agents – for which no evidence has been presented to date – an exchange from site to site or by travellers and expeditions took place. At latest from the 37th century BCE onwards, in some TRB regions causewayed enclosures were located at communication knots of trackways and functioned as a focal point for the distribution of new knowledge or even items (Andersen 2011; Klassen 2014a). As an example, in Albersdorf-Dieksknöll a very early appearance of the new tetraploid free-threshing wheat as well as »southern« Michelsberg construction elements of the enclosure architecture were documented (Dibbern 2016; Kirleis/Fischer 2014). In some areas like the southern Cimbrian Peninsula, in the 34th century the importance of causewayed enclosures decreased again, as with the agglomeration of populations in small villages these villages overtook the distribution and possible re-distribution of items and knowledge.

*Fig. 35. The distribution of Baltic amber is significant in many central European regions and indicates the value to barter amber from the north to the south. In the TRB North Group amber ornaments are used to imitate also other important prestige items like axes. The displayed examples are from different grave contexts at the cemetery Borgstedt (Hage 2016, 90 fig. 117).*
3.5 Environment and economy

Within a landscape that mainly comprised closed mixed oak forests with patchy open areas along the waters and open areas along the coasts, the early transformation from foraging to farming is contemporary to the North Atlantic Bond Event 4 with regional input in southern Scandinavia and northern Germany (see above). This was conducted from Skagerrak deepwater reconstructions around 4000−3800 BCE (Butruille et al. 2016) and high-resolution sedimentological evidence from Lake Belau (Dreibrodt et al. 2012). Especially evidence for the 40 bad years in 4050−4010 BCE in Ostholstein suggests that this climatic event had a huge impact on the economic and social development (Weinelt 2018). From an environmental perspective, the warmer and bettering conditions until the 35th century BCE and the climatic deterioration around 3200 BCE might have modulated the economic and social developments, including the boom and bust of monuments.

Phases of land opening and reforestation are indicated by the palynological proxy record (Feeser et al. acc.) (Fig. 36). Increasing land openings around 4200−3600 BCE are followed by an impressive boom around 3600−3400 BCE with a high level until around 3200 BCE, as well as a steep bust around 3100−3000 BCE. Differences are visible between the southern Cimbrian Peninsula – where the high level of the land opening boom lasted from around 3500 until around 3100 BCE – and in Mecklenburg-Vorpommern were already around 3500 BCE a steep bust until around 3100 BCE is visible. Weighted numbers of colluvial layers support these observations by increasing and decreasing amounts of colluvial incidence. Besides environmental triggers for the land openings, mainly the intensity of human impact has to be seen as the course for the observations. Both demographic developments as well as changes in the economic strategy could be the cause for the landscape changes.

Subsistence economy increasingly depended on cereal cultivates and domesticated animals (Brozio et al. acc.; Hinz 2018; Kirleis/Fischer 2014; Kirleis/Klooss 2015; Kirleis/Klooss 2016; Kirleis et al. 2012; Steffens 2007). The cereal spectrum mainly included free-threshing barley and emmer as the main crops, followed to a minor extent by einkorn (Triticum monococcum) and free-threshing wheat (Triticum aestivum s.l.). In respect to intensive versus extensive agricultural practices, the ratio of free-threshing barley/emmer-spelt and perennial/annual weeds indicates changes within the agricultural practices. Around 4000−3300 BCE, free-threshing barley had been grown extensively. As emmer and annual weeds were also present, probably the intensive crop growing was an add-on to the dominant extensive system (Brozio et al. acc.). In contrast to the phase of dominantly-extensive agricultural practices around 3300−2800 BCE, a phase with more or less balanced extensive and intensive agricultural practices followed. The development of animal husbandry (Hinz 2018; Steffens 2007) displays a steady increase of domesticates around 4000−3700 BCE from about 10 to 70% of the bone assemblages, a smooth increase from 70 to 90% around 3400−3100 BCE, which obviously also continues in the 3rd millennium BCE. Otherwise, no clear tendencies are observed except a reduction of the dominance of cattle in the domestic animal assemblages from around 75 to 50% around 4000−3400 BCE.

Isotopic analysis of the animal bones from Oldenburg-Dannau indicates a restricted local pasture strategy of the TRB settlers (makarewicz et al., forthcoming). This remains in contrast to the results for Fallbygden, where a huge mobility of animals was observed (Stoegren 2017). Thus, huge differences in the local practices and adaptions to the environmental and social conditions in the economic practice are also to be expected in future analyses. Nevertheless, indications of manuring are detected in both regions by isotopic analysis (Filipovic et al. acc.). Besides animals and plants, both gathered plants and fish also played an important role within the subsistence economy. A modelling of the land use pattern for East Holstein indicates that especially during changing times the non-domesticated nutrition sources gained importance. Nevertheless, the carrying capacity of the environment was obviously never reached (Knitter et al. forthcoming).

From an economic perspective the introduction of the animal-pulled plough and the wheal furthered important changes within the agricultural system and the land use practices. While evidence of ploughing is already indicated in the 38th century BCE, the main breakthrough of the new technology took place between ca. 3650 and 3300 BCE (Mischka 2013). The increasing role of intensive agricultural practices might be a result of this technological change, as well as the possible trigger for the appearance of the first villages in the 34th century BCE.

Within the northern TRB development, the already-pronounced variability of the economic systems in the different regions is also indicated by isotope analysis on human bones (Terberger et al. 2018). There are assemblages that reflect a high agricultural contribution and others with a high aquatic nutrition content (Fig. 37). The variability is due to the local conditions and thus expected from Neolithic societies, which live and create a landscape within a high degree of sustainability. This might also be the reason for the observation that the main factors for the location of domestic sites did not change within the period under
Boom and bust, hierarchy and balance

Fig. 36. Land opening and reforestation are indicated by palynological data (Feeser et al. acc.). Increasing land openings around 4200–3600 BCE are followed by a boom around 3600–3400 BCE with a high level until around 3200 BCE. Colluvial layers support these observations by increasing and decreasing amounts of colluvial incidence. Radiometric dating for settlement sites indicate a possible population increase especially observable around 3300 BCE and a decrease around 3100 BCE. Taking all 14C-dates from archaeological contexts, an increase in population figures from around 3700 BCE until 3400 BCE and a high population level until about 3050 BCE are indicated. It follows a decrease in the values after 3050 BCE.
discussion (Knitter et al. forthcoming): the economic practices did not change extremely but were constantly adopted to the local conditions.

3.6 Demography

As pronounced in the methodological introduction, besides the economy demography is one of the main arenas constituting the social relations of societies. The archaeological evidence points to single farmsteads and small hamlets of usually 5–10 persons per house, thus less than 20–25 people who lived together in disperse settlements probably from 4100 BCE onwards. Larger sites with communal activities (villages) are known from 3350 BCE onwards. The archaeological evidence points to population values of 100–400 people living together in these villages, which are documented until 2900 BCE.

From a regional perspective, calculations ended up with quite low population figures for the areas under discussion (cp. Rassmann/Schafferer 2012). One example is the calculations for the north-west Frisian Archipelago, where a population density between 1.00 and 7.40 persons/km² was reconstructed (200–1,500 persons on the whole archipelago) (Müller 2011b). Population estimations by Sarah Schiesberg that include age estimations, the reconstruction of minimal burial numbers in megaliths and estimations on the duration of the mounds end up with lower population estimations between 0.7 and 1.6 p/km² (Schiesberg 2012, 132 fig. 10). In both regional studies, a population increase is indicated until around 3000 BCE. Besides direct archaeological evidence, radiometric sum calibrations are partly used to reconstruct relative population developments. While in a former study a decreasing amount of radiometric data was indicated (Hinz et al. 2012), the new 14C-data of the SPP has significantly changed the picture. Taking the radiometric datings for settlement sites, an increase is especially observable around 3300 BCE and a decrease around 3100 BCE. Taking all 14C-dates, an increase is visible from around 3700 BCE until 3400 BCE and a high level until about 3050 BCE. It follows a decrease in the values after 3050 BCE, which is also in line with the two regional studies (Fig. 36).

In a global study about population densities in Europe for the Neolithic in southern Scandinavia and Germany, demographic values of about two inhabitants/km² have recently been published (Müller/Diachenko 2019). Our results are in line with this study. Thus, on the southern Cimbrian Peninsula we are dealing in absolute terms with about 30,000 inhabitants during the TRB period. This is probably the level that we have to expect around 3300 BCE, whereas the decrease around 3050 BCE would imply a reduction by 10,000 people.

Different calculations on the composition of the few human bone assemblages in megaliths showed that the buried collectives from megaliths in southern Scandinavia and northern Germany »represent a viable population. So it is not implausible that we are dealing with a representative cross section through the Neolithic population« (Hinz 2011, 141). In principle, the few analyses that have attempted to reconstruct parameters on actual population sizes and the number of buried individuals in megaliths prompted with results verifying the possibility that the whole population could have been buried within the megaliths. Even if we know that this was not the case in respect to flat burials and other burial practices, there is no need to exclude huge parts of the population from getting an ancestor within the megalith. One example are the mentioned calculations for the north-west Frisian Archipelago (Müller 2011b, 278 tab.2).

3.7 Social differentiation

The boom and bust in early and middle Neolithic monuments is linked to certain changes within the economic sphere, which are more or less correlated (Fig. 36). The increase in land openings and its decrease could be associated with the megalithic boom, which followed some generations later than the first impact of the new economy. Furthermore, the quantity of produced and deposited artefacts increased and decreased in a similar manner. If we associate certain objects with a prestigious value (e.g. the few axes), an
increase and decrease in a similar way is also detectable (Brozio et al. acc.).

As the cultural development is comparable with the economic one (cp. Fig. 24), gaining prestige within TRB societies seems to be associated with economic activities. Land openings are detectable some generations earlier as the boom of the other factors. Insofar, the changes and success within the broadening of the subsistence economy is obviously responsible for social success of the cooperative groups.

As already described, most of the people were buried within megaliths. The cooperative character of these monuments is expressed in the de-individualisation of the individuals in the chamber. Becoming an ancestor is linked to the collectivism within the burial right. Moreover, the causewayed enclosures do not display any sign of the demarcation of individual social power; instead the cooperation through festivities seems to be associated with the ritual character of these sites. Within the known settlements, no pronounced differences are detectable between houses and their inventories. Even individuals who are buried inside or outside villages in individual graves do not display an accumulation of surplus. They are »used« by the communities for social events and the expression of the social group as a whole.

The productivity of these societies could be explained by the acephalous character. If we take the few anthropological archives into account, the age distributions of the males indicate a more peaceful constitution, such as – for example – in the south: the peak of young dying male persons is not present in the bone assemblages (compare Petrasch 2014; Schiesberg 2012), which might indicate that they were not destroyed in combat as much as this is the case in other societies.

Nevertheless, differences occur in the size of megaliths and houses between different communities. If differences in wealth accumulation exist, this is the case between rather than within communities. Insofar the idea of ritual economies, in which the competition between groups triggered the construction of bigger
and bigger monuments, might be valued for some of the TRB areas (e.g. parts of Jutland, cp. gebauer 2014).

While the described picture of the TRB social world as cooperative and mainly sharing subsistence resources and ritual activities is paintable for the phases 3600–3100 BCE, the role of the individual or of certain clans might have been more pronounced before and after. Within the transformation from foraging to horticultural practices especially non earthen long mounds and earliest individual flat grave might indicate different access to resources. But especially in the latest phases of the TRB North Group the fragmentation of the societies that is indicated by the reduction of investment into collective monuments, and the appearance of pronounced individual burials, is obvious. The kind of fragmentation and individualization was probably a prelude for the upcoming Younger Neolithic with e.g. the Single Grave societies.

4. DISCUSSION AND CONSEQUENCES

Funnel Beaker societies are the first communities in southern Scandinavia and north central Europe that practised horti – and agriculture. Within the framework of this article, I have concentrated on the TRB North Group because both archaeological and paleo-environmental archives allow a qualitative reconstruction of former socio-environmental developments.

Quite obviously, the environmental crisis of the 41st century BCE with the 40 bad years triggered an experimental phase of local fishers and foragers. Building on their already well-developed supra-regional networks with southern farmers, new items and practices were introduced in the north. Even if new techniques for arable activities (clearances) and domestic purposes (houses) as well as changing elements in the subsistence economy (cultivars, domesticates) were introduced, no significant change in the social organisation of these acephalous communities is evident. While in the first three TRB centuries the links to other areas (described by many authors, e.g. kirleis/fischer 2014; klassen 2001; klassen 2004a; klimescha 2016; soerensen 2014) are integrated in an »utilitarian« way into the existing societies, in the 38th century BCE the character of the societies changed. »Non-utilitarian« objects and monument building were used to pronounce the separation of a ritual sphere of the society from the domestic sphere. Even if this opened the avenue for ritual economies (kristiansen 2006) with the pronunciation of powerful men or women, this did not happen. In no case limited access to resources by only a small portion of the population is identified; instead, causewayed enclosures were developed as a collective mean for the distribution of items and ideas. Nevertheless, the growing population demanded (even if the climate could be described as »good years«) changes in the economic system. Driven by the ritual need for monument building and a more extensive agriculture, innovations took place or were integrated: the introduction of wheel and waggon, animal-driven ploughs and deep-sea shipping made the creation of both the first cultural landscapes as well as open arable field systems possible.

Besides slight variation, for centuries the TRB social structure remained stable. Thus, the main result of our brief inquiry shows the stability of the acephalous social structures of the TRB societies over the centuries, despite the changing environmental conditions as well as the introduction of new technologies and the use of new objects as a result of both internal and external triggers.

Within the TRB societies the creation, control and development of »memories« constitute the institutionalized practice for the transfer of cooperative norms of communities as well as their receptions by individuals (müller 2018b). Due to ethnographic observations, social practice of memory construction within non-literate sedentary societies includes a renewal and/or refinement of social memories after ca. 150–200 years (5–8 generations). Obviously this was the case at causewayed enclosures and megalithic monuments, but also within domestic sites (Fig. 38). In general, the site and landscape biographies were key issues for TRB societies to stabilize their societies in the cooperative manner.

Nevertheless, main changes happened around and after 3100 BCE, with the fragmentation and
individualisation of the communities as described above. New kinds of memorisation were developed about 10 generations later with the second monumental boom in the regions. But than the construction of early Single Grave mounds represented the ideological materialisation of social practices of different societies.

The TRB examples support the view on the independent existence and development of non-hierarchical societies in history. The megaliths are an expression for the meaning of these societies, which could be best described as hierarchies in balance. The latest summary of such an approach is provided by Hermann Amborn, who summarises his ethnographic inquiries in north-east Africa with the consequence that domination-free societies existed contemporarily with stratified societies (Amborn 2016). These societies are not a first stage in evolutionary processes of societies but independent in their historical existence. The attempt to reduce the appearance of non-stratified social systems to small band-like groups is rejected, as societies with tens of thousands of people are living under domination-free conditions. Thus, the example of TRB societies explains that not only foraging but also horticultural and agricultural economies with huge efforts in monument building are historically known as being free from dominance.

In our case, access to resources was used by the TRB communities to further their egalitarian attitude. Expressions and objects that did not support a domination-free behaviour by their connotation and reception were not integrated into the habitus. In spite of booms and busts, hierarchies were kept in balance.

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