And the river meanders on...the intertwined occupation and vegetation history of the river area Maaskant and adjacent sand area of Oss (Netherlands) in Late Prehistory till Early Roman Period

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And the river meanders on…

The intertwined occupation and vegetation history of the river area Maaskant and adjacent sand area of Oss (Netherlands) in Late Prehistory till Early Roman Period

Richard Jansen and Corrie Bakels[1]

The river area Maaskant and adjacent sand area of Oss, located 'between' the current course of the river Meuse and the city Oss, are among the most intensively researched regions in the Netherlands. Extensive archaeological and palynological research provides ample opportunities for an interregional research of the occupation and vegetation history of both areas. This article describes the intertwinement between the Holocene river area and the adjacent Pleistocene sandy soils, to eventually get a first insight of the relation(s) between the inhabitants of both regions in late prehistoric and Early Roman period (3000 BC – 250 AD).

1 Introduction

People tend to settle close to water. All over the world, villages and towns are situated on riverbanks. In prehistoric times rivers also held a strong attraction for people. Rivers were trade and communication routes, indispensable for the transport of people and animals, and provided fertile land, drinking water and food. However, they have an ambivalent character. Rivers also caused flooding and danger and sometimes formed a barrier. Nevertheless, the dynamic living environment of a river area is attractive for occupation, and was certainly so for prehistoric farming communities.

The river area *Maaskant*, located in the northeast of North-Brabant (Netherlands) can, with its dozen of (surface) sites from the Neolithic till the Middle Ages, rightly be called an 'archaeological treasure trove' (Dutch: '*archeologische schatkamer*'). From *c*. 3000 BC onwards, the first agricultural communities settled here, close to the river. Their occupation history is closely linked to the vegetation and geological history of the area. The occupation of the Maaskant was also not an isolated phenomenon. Large-scale archaeological research has been carried out on the adjacent sandy soils over the past forty years. An interregional research offers excellent opportunities to investigate the relationship between contemporaneous occupation in the flood valley of the river Meuse and on the neighbouring sandy soils; between people from the clay and people from the sand.

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2 A short research history

The Maaskant-area is now wedged between the sandy soils of a coversand ridge and the river Meuse (fig. 1). It literally includes the transition between the higher and drier Pleistocene coversand area and the lower and wetter Holocene river area

of the eastern Netherlands. The different landscapes here gradually and almost imperceptibly merge into one another, with the sand gradually disappearing 'under' the clay.

2.1 Research on the sandy soils …

Since the early 1970s, the Institute of Prehistory Leiden (IPL; now the Faculty of Archaeology) has been carrying out small- and large-scale research in the Maaskant area, in particular on the adjacent sandy soils. In 1979, this research was incorporated into the Maaskant project (Van der Sanden 1987, 100). Since 1983, this project has been led by Harry Fokkens (1996).

In the 70s more regional projects, inspired by the *Archäologische Landesaufname* in Germany, were launched in the Netherlands. The general goal of these projects was the development of (occupation) models of (pre)historic societies on different scales and themes (Jansen and Van Wijk 2007, 82-85; Bloemers 1999, 318-320). Forty years later the Maaskant-project is the only ongoing project. During its duration the objectives of the project have changed several times (Fokkens 1996). Presently the main goal is how (local) prehistoric communities shaped and transformed their environment and dealt with their own (pre)history, with a keen eye for the entanglement of practical, social and ritual aspects.[2]

Until a few years ago, the fieldwork focused mainly on the sandy soils to the north of the city of Oss.[3] The research in Oss is now one of the largest excavation projects in Northwest Europe. Dozens of hectares have been excavated, revealing settlements, cult sites and depositions, cemeteries and burials, as

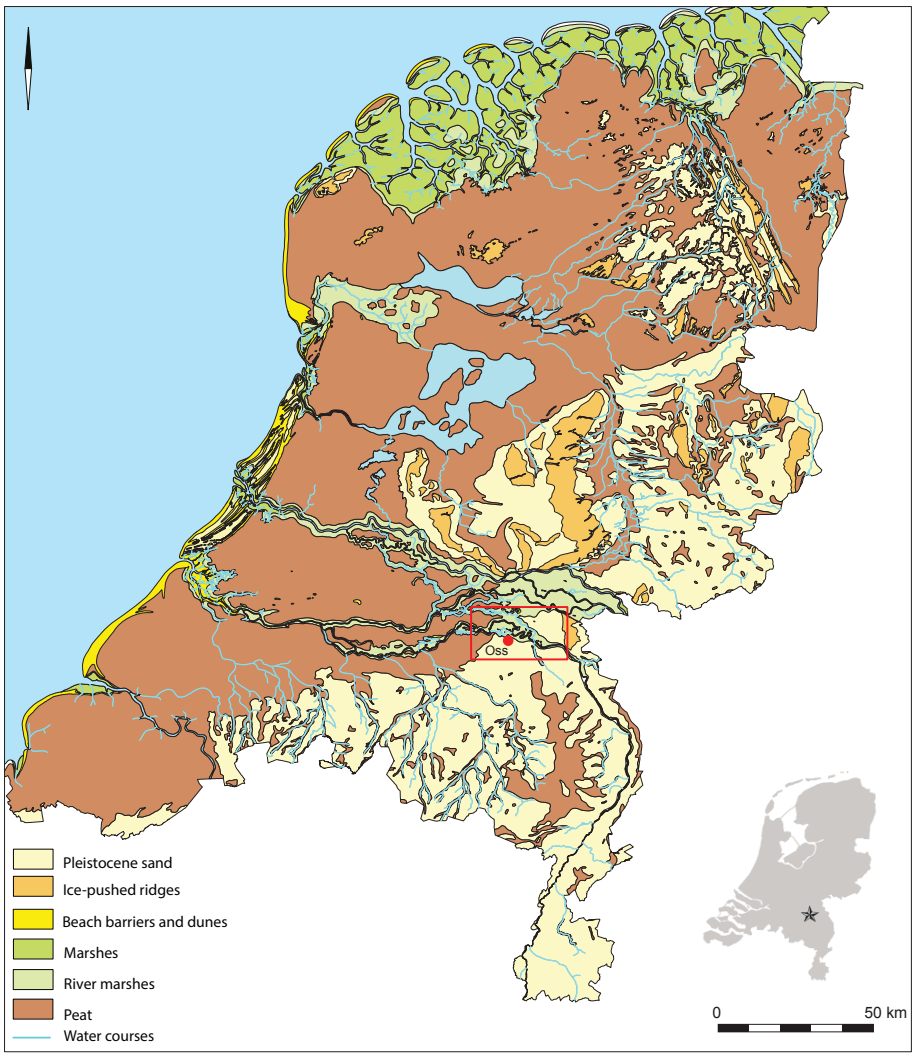

Figure 1 The river area of the Maaskant (red square) lies in the northeast of North-Brabant, wedged between an extensive Pleistocene coversand area in the south and the river flood plains of the Meuse in the north (after Vos and De Vries 2013)

well as extensive land use systems, activity areas and wastelands from the Bronze Age up to the Roman Period (fig. 2). The results have been incorporated in various syntheses and form an important input for the modelling of late prehistoric and native Roman communities on the Pleistocene sandy soils in the south of the Netherlands (a.o. Fokkens *et al.* in prep.; Fokkens and Jansen 2002; Fokkens 1998; Gerritsen 2003; Hiddink 2003 (part one); Jansen in prep.; Schinkel 1998; Wesselingh 2000).

2.2 ... and on the clay soils

During the research on the sandy soils, the idea gradually developed that an important dimension was missing: knowledge about the occupation in the adjacent river area. Through an initial inventory of the Maaskant in the 1950s and because the area had been visited intensively by amateur-archaeologists for decades, it was known that dozens of sites from Late Prehistory and Roman Period were located here (Modderman 1950; Ball and Schiltmans 1998; Jansen 2014a; b; fig. 3). Until recently, only one site had been explored in more detail[4], but since the introduction of the so-called Malta-archaeology in the Netherlands a large number of archaeological desk-based researches as well as coring and field surveys has been carried out here, in addition to various (small-scale) excavations. This not only brought to light sites from the later Bronze Age till Roman Period, contemporaneous to the occupation on the sandy soils, but also sites that were absent on the sand. Examples of this are settlements dating to the Middle and Late Neolithic and the earliest phases of the Bronze Age (Jansen and Smits 2014, 89-93). Traces of occupation from after 250 AD are also rare on the sandy soils, while during the Late Roman Period (3rd to 5th centuries) occupation continued at various sites in the Maaskant (Heeren 2014, 264-265; Jansen 2014b, 459). The presence of the river also lead to specific sites such as regional centres, river cult sites and activity areas for *e.g.* clay extraction. Finally, the

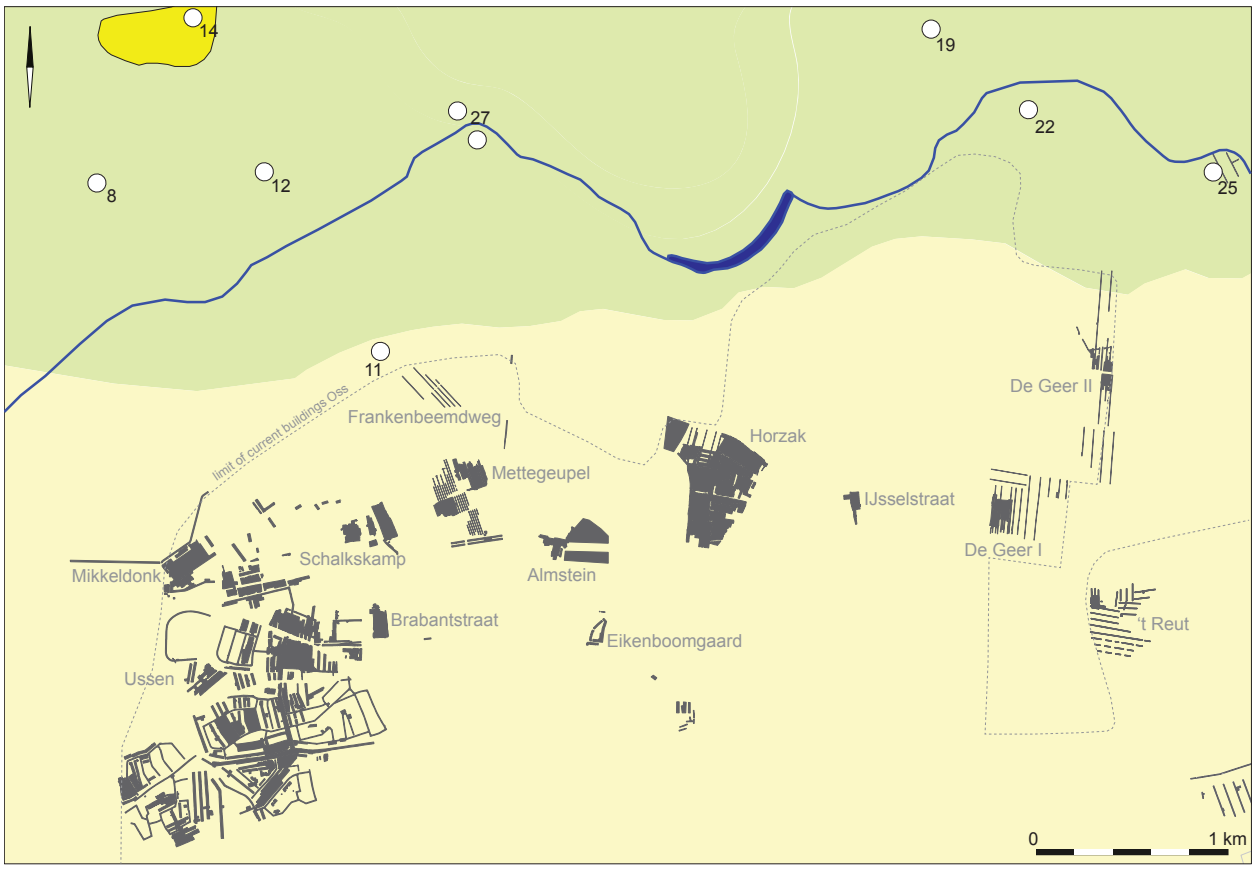

Figure 2 Overview of the excavated areas (dark grey) on the sandy soils (yellow) around Oss including the main sites (white dots) in the neighbouring clay soils (green) and river dune (bright yellow) (for site names see table 1) (after Fokkens in prep. a)

Nr.	Village	Toponyhm	Nr.	Village	Toponyhm
1	*Maren*	*Dorp*	22	*Berghem*	*T(W)inkel*
2	Maren-Kessel	Liesdaal	23	Oss	De Geer
3	Kessel	Lithse Ham	24	*Berghem*	*In 't Broek*
4	*Lith*	*Dorp*	25	Berghem	Hoge Tussenrijten
5	*Lith*	*Tussen de Stegen*	26	*Haren*	*Spaanse Steeg-West*
6	*Lithoijen*	*Dorp*	27	Lith/Oss	Oijensche Hut/Paalakker
7w	*Lithoijen*	*Aan de Tiendweg*	28	*Megen*	*Aan de Berksestraat*
8	*Lithoijen*	*In de Kampen*	29	*Haren*	*Dorp*
9	Oss	Frankenbeemdweg	30	Haren	Groenstraat
10	Oss	Mikkeldonk	31	*Dieden*	*In de Pachtkamp*
11	Oss	Kennedybaan	32	*Berghem*	*In het Berchems Broek*
12	*Teeffelen*	*De Korte Voor*	33	Berghem	Waatselaar
13	*Teeffelen*	*'t Rot*	34	*Dennenburg*	*Dorp*
14	*Teeffelen*	*Dorp*	35	*Deursen*	*'t Steenwerk*
15	*Teeffelen*	*Oost*	36	*Ravenstein*	*'t Hoge Veld*
16	*Oijen*	*De Klootskamp*	*37*	Herpen	Hertogswetering
17	*Oijen*	*Dorp*	38	Herpen	Putwielen
18	*Macharen*	*In de Rotten*	39	Herpen	Wilgendaal (Dorp)
19	Macharen	Hoge Morgen	40	*Megen*	*Dorp*
20	*Macharen*	*Dorp*	41	*Dieden*	*Dorp*
21	Oss	Horzak	42	Overlangel	Asboom (Dorp)

Table 1 The main archaeological sites in the Maaskant area as detected by Modderman (1950; *italic*) and local archaeologist Gerard Smits (Ball and Schiltmans 1998; Jansen 2014b) (see also figures 2 and 3)

better preservation in clay soils results in material categories and find complexes that are lacking on the sandy soils *e.g.* metal and organic materials.

3 'A peculiar contact zone'[5]: sand versus clay[6]

Rivers have a major influence on the landscape they cross. They erode and transport material in order to eventually deposit it elsewhere. Depending on climate, subsoil, flow velocity and sediment, they develop their own character. Today, the Meuse is 'fixed' in a single riverbed, which is bounded by floodplains and summer and winter dykes. The largest meanders have been cut off and sluices ensure regulated water flow. As a result, the 21st century 'man-made' river landscape of the Maaskant forms a stable living environment, incomparable to the originally dynamic character of the area (fig. 3). In later Prehistory and Roman Period, the inhabitants of the Maaskant lived in a frequently changing environment, in which favourable occupation places regularly changed location.

An important tool for a reconstruction of the landscape dynamics of the Maaskant is a detailed soil survey of the area by Van Diepen (1952). Unfortunately, his maps are not sufficiently detailed for research on a site level. For example, the deeper subsoil has not been taken into account and there is no sand depth map, which is important for determining possible occupation locations. A more recent source are studies by Berendsen and Stouthamer (2001) and Cohen and Stouthamer (2012) who include the Maaskant in their paleogeographic reconstructions of the Rijn-Maas estuarium.[7] Still for site contextualisation it is important to map out the fossil Meuse landscape at a local level.

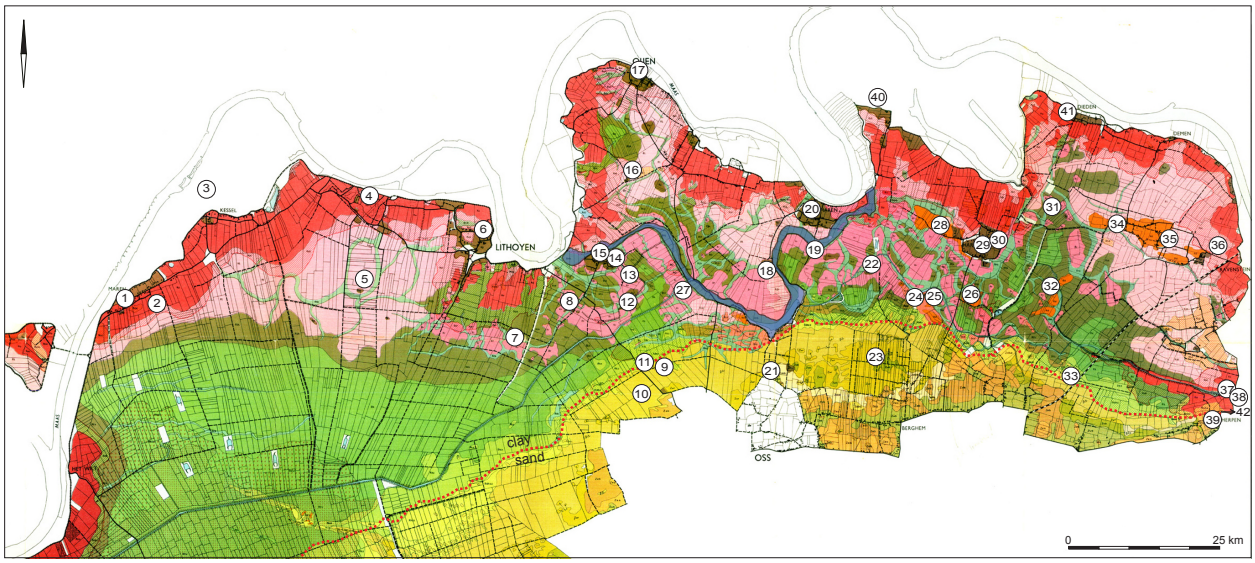

Figure 3 The soil map of Van Diepen (top) show various fossil Meuse streams and smaller channels. In the Iron Age and Roman Period the Meuse had a much more southerly course of which the current Ossermeer – open water to this day – formed the southernmost meander. Modderman detected dozens of archaeological sites based on surface finds; in later years more sites were found (for site names see table 1) (after Van Diepen 1952 and Modderman 1950 appendices)
Legend: yellow-orange: sand deposits; green: clay deposits; pink: deposits due to dike breaches; blue: presumed Iron Age – Roman Period stream; red: border between sand and clay

This shows that different landscape zones were attractive places to live and that preferences and/or possibilities differed from period to period (Wink *et al.* 2014, 47; Van de Meer 2010; Wink 2009).

Pleistocene river dunes
During most of the last Weichselian Ice Age (120,000-10,000 years ago) the Meuse had a braiding character. The river consisted of a system of intertwined (narrow) channels that regularly changed location. During this period, a foundation of coarse, gravel-rich sand was deposited on which the Holocene landscape is founded. Sand plains developed between the various river channels on top of which the wind formed dunes. Locally, these Pleistocene river dunes protrude above later deposits and still lie at, or directly below, the surface. They are attractive occupation locations, both in present as in the past.[8]

Levees and point bars (Dutch: kronkelwaarden)
From the end of the last Ice Age (about 10,000 years ago) the river Meuse got an anastomosing or meandering character whereby the river consisted of one main channel. Deposition of sand on the banks of the river due to regular flooding created levees along the river channel. Raised due to its coarse(r) sedimentation levees lies higher than the clayish floodplains and therefore formed attractive occupation locations.

The meandering rivers transport and deposit material. Depositions at the inner bank of a meander are referred to as the point bar. The typical lateral accretions, with coarser material at the base and and finer material at the top also formed attractive occupation locations in the past.

Crevasse splays
Crevasse splay deposits were the result of breakthroughs along the levees. Water laden with sediment is carried out into the floodplain were it formed sandy zones. Crevasse splay deposits are characterised by upward coarsening sediment and were attractive occupation locations within the clayish floodplain.

Channel belts
Because the Meuse regularly moved its course, a widely branched system of successive channel belts emerged. From *c.* 9000 BP onwards channel belts were formed, active and abandoned by natural processes (Cohen and Stouthamer 2012). In the last two millennia

these processes were also affected by human actions resulting in the current embankment of the river. Eventually the channel belts formed drier and higher ridges within the marshy environment along and on occupation concentrated (table 2; fig. 4).

Coversand ridge

To the south, the clay soils of the Maaskant borders on an extensive, east-west orientated coversand ridge. The Pleistocene coversands were deposited tens of thousands of years ago but still lie close to the surface

	Name channel belt	Start sedimentation (BP)	End sedimentation (BP)	Start sedimentation (cal BC/AD)	End sedimentation (cal BC/AD)	Occupation
1	Molenblok	5700	4500	-4570	-3232	Early- and -Middle Neolithic
2	Haren	4570	3020	-3355	-1363	Middle Neolithic-Middle Bronze Age
3	Lithoijen	4300	4100	-2920	-2615	Middle-Late Neolithic
4	Lith	3500	2734	-1810	-867	Bronze Age
5	Huisseling-Demen	3000	2000	-1237	-11	Middle Bronze Age-Middle Roman Period
6	Macharen	3000	2000	-1237	-11	Middle Bronze Age-Middle Roman Period
7	Maas (binnen-dijks)	1760	850	288	1200	Late Roman Period-Late Middle Ages
8	Maas	2000	0	-11	present active	Early Roman Period-Modern Times

Table 2 Overview of the fossiled Holocene channel belts in the Maaskant region with (an estimate of) the start and end of the sedimentation in years BP and cal BC/AD (based on Cohen and Stouthamer 2012) (after Boshoven *et al.* 2018 tabel 2.1 and Wink *et al.* 2014, 42; see also figure 4)

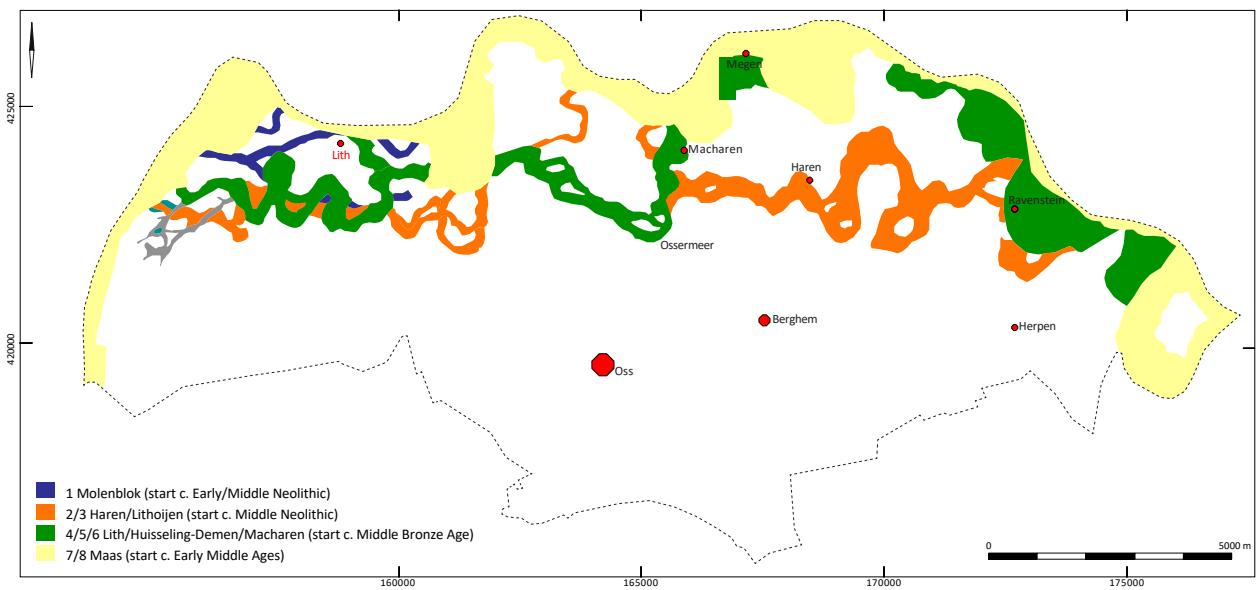

Figure 4 Since the Neolithic the Meuse has shifted to its current position. During the Bronze Age, for example, the Macharen/Huisseling-Demen channel belt was created, which also formed the main stream of the Meuse for the Iron Age and a large part of the Roman Period (after Boshoven *et al.* 2018 figure 2.1 and Botman and Van der A 2009 figure 3.8 and 3.9; based also on Cohen and Stouthamer 2012)

here. This homogeneous and stable sandy landscape lies relatively high in relation to the Maasdal (Meuse valley) and forms a good occupation location.

4 Vegetation history of the Maaskant and adjacent sand ridge[9]

The changing environment is also clearly reflected in the vegetation history. Seven pollen studies or series of pollen studies from the research area are available for the Holocene up to and including Roman times. Five come from sandy soils and two from the valley of the Meuse (table 3; fig. 5). Based on these pollen studies, an almost continuous vegetation history for the area can be compiled, including the Middle Ages. Here we limit ourselves to Prehistory and the first centuries AD.

4.1 The first half of the Holocene

Information on plant growth in the first half of the Holocene is provided by the investigations of a former watercourse in Herpen-Wilgendaal (fig. 6). At the end of the Pleistocene, during the Late Glacial, a stream cut metres deep into the subsoil. At the start of the Holocene the gully lost its function as a watercourse. The gully became filled with peat.

The oldest demonstrable plant growth was birch forest. The preserved fruits show that the birch was

No.	Location	Context	Reference
1	Lith-Herenengstraat	Deposit in the valley of the Meuse	Bunnik 2010
2	Oss-Ussen	Ditch fills from Roman Period cemetery	De Jong 1982
3	Ossermeer	Old branch of the river Meuse	De Haan 2009; Bakels 2014; Bakels and De Haan in prep.
4	Oss 45E/346	Old branch of the river Meuse	Bakels 2002a
5	Herpen-Wilgendaal	Abandoned watercourse	Bakels 2002b
6	Oss-Zevenbergen	Old surface under barrow	Bakels and Achterkamp 2013
7	Oss-Vorstengraf	Old surface under barrow	De Kort 2002; De Kort 2007

Table 3 Overview of pollen analyses from the Maaskant and adjacent sandy soils (after Bakels 2014, 52)

Figure 5 Locations of the pollen analyses. 1 Lith-Herenengstraat; 2 Oss-Ussen; 3 Ossermeer; 4 Oss-45E/346; 5 Herpen-Wilgendaal; 6 Oss-Zevenbergen; 7 Oss-Vorstengraf (after Bakels 2014 figure 1)

silver birch (*Betula pendula*). This forest was gradually replaced by a poplar-dominated forest. Both types of forest were relatively open. On the ground grew wormwood (*Artemisia*) and various other herbs including alpine plantain (*Plantago alpine*). These herbs represent the last remains of the cold steppe that must have characterised the region before the first tree growth. The diagram also shows willow (*Salix*). These willows may have grown both in the dry environment and in the wet gully. Aquatic plants such as water lilies (*Nymphaea*) were found in the gully as well, but these data have not been included in figure 6. The diagram is not provided with ^{14}C-dates, but this kind of plant growth belongs in the first half of the Preboreal (*ca.* 9500-8000 BC). A large part of the region must have been covered with this type of light forest, although the proportion of poplar will have varied locally.

The light deciduous forest was succeeded by a dense pine forest (*Pinus*, in this case Scots pine), which must have covered both the higher and lower parts of the Maaskant. This forest roughly dates to the end of the Preboreal and a large part of the Boreal (*ca.* 8000-7500 BC). Gradually, however, more deciduous trees and shrubs arrived in the area, beginning with hazel (*Corylus*), oak (*Quercus*) and elm (*Ulmus*). Hazel, and to a lesser extent elm, replaced the pine. Oak then replaced the hazel. Lime trees (*Tilia*) and ash (*Fraxinus*) followed. A deciduous forest developed on the higher ground, but there were also open spaces. The fact that birch was able to hold its own, as well as the presence of plants such as the fern polypody (*Polypodium*) and heather (*Calluna*), is a clue. It is quite possible that there were already small areas covered with heather at that time, but a counter argument that can be made is that the pollen analysis also shows high percentages of peat moss (*Sphagnum*) during this period. This peat moss does not fit in with the vegetation in the low-lying areas. In the period when on the higher ground oak dominated, the wet areas became overgrown with alder (*Alnus*) and herbs such as simplestem bur-reed (*Sparganium erectum*); it should be noted that a plant such as reed cannot be shown in the diagram because pollen from reed cannot be distinguished from other grasses. This means that the wet environment was nutrient-rich, which is not compatible with the growth of peat moss. The traces of that moss were probably blown over from the Peel

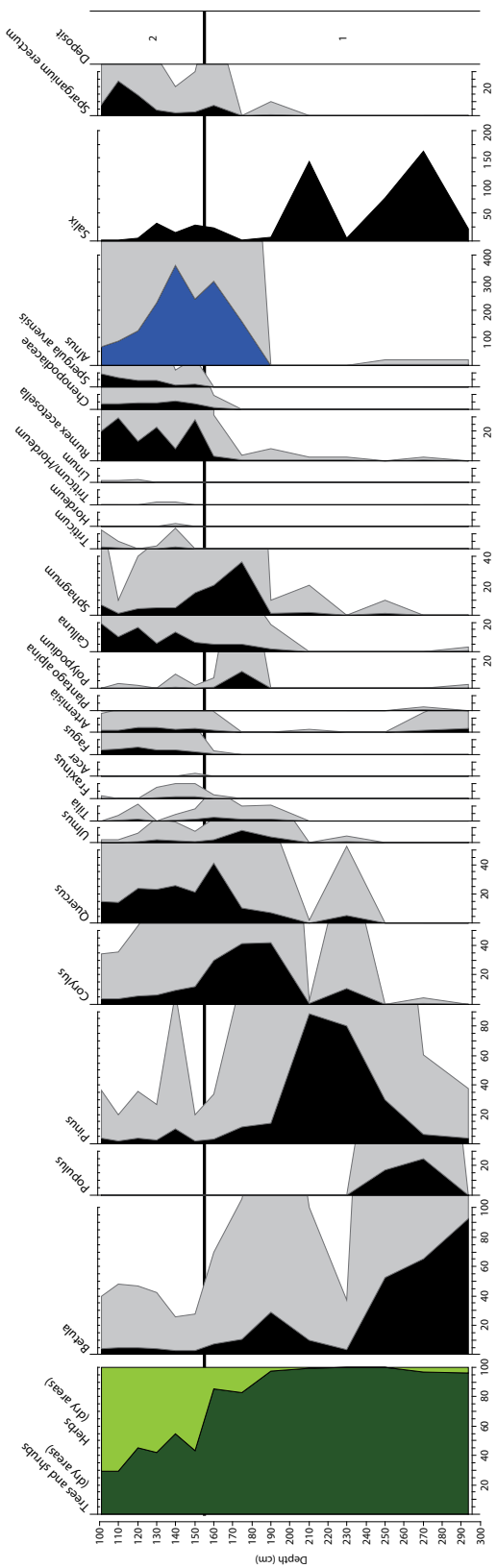

Figure 6 The pollen diagram from Herpen-Wilgendaal, a selection of taxa; in grey the curves 10x; the black line shows the hiatus in deposition (after Bakels 2014 figure 2)

region where the heather might have grown as well. However, research in recent heaths has shown that the pollen of heather does not spread far from the parent plant (De Kort 2002; Doorenbosch 2013), which would mean that the heather pollen of Herpen-Wilgendaal came from local open spaces and not from far away.

So there were open spaces and that is not surprising, because open spaces are needed for forest regeneration. Rooting, grazing and browsing wildlife also keeps such places open, temporarily or not (Vera 2000). How large they were, however, cannot be said. The mixed deciduous forest vegetation on higher grounds and alder carr in the lowlands belong to the end of the Boreal, transitioning into the Atlantic period (7500-5000 BC).

This is followed, unfortunately, by an interruption (hiatus) in the deposit. The development outlined above, from birch forest to pine forest, to mixed deciduous wood on the higher soils and to marsh forest in wetland situations, undoubtedly applies to the entire region. However, it should be borne in mind that the changes did not occur at the same time in all cases. As Van Leeuwaarden (1982) has shown, the microclimate plays a major role in this. In sheltered places, everything happens more quickly.

4.2 Man's earliest influence

The vegetation of the second half of the Atlantic period is not represented by the right kind of deposits in the Maaskant area. This is common in the Netherlands. Apparently, this is a period in which less abandonment of stream and river courses and peat growth occurred than in the previous and subsequent periods.

In the pollen diagram Oss 45E/346, which was obtained from an abandoned course of the Meuse (Bakels 2002a), the oldest sedimentation was (AMS) ^{14}C-dated between 3100 and 2900 BC and thus belongs to the Subboreal. The higher grounds were still covered with a mixed deciduous forest consisting of oak, elm, lime, ash and birch, as well as rarer species and some shrubs and herbs indicating open areas (fig. 7). On the low grounds in the Maaskant, there were alder trees, willows and, if it was wetter. marsh vegetation with bur-reed. It can be assumed that the second half of the Atlantic period, which was not represented in the pollen data, was characterised by similar plant growth.

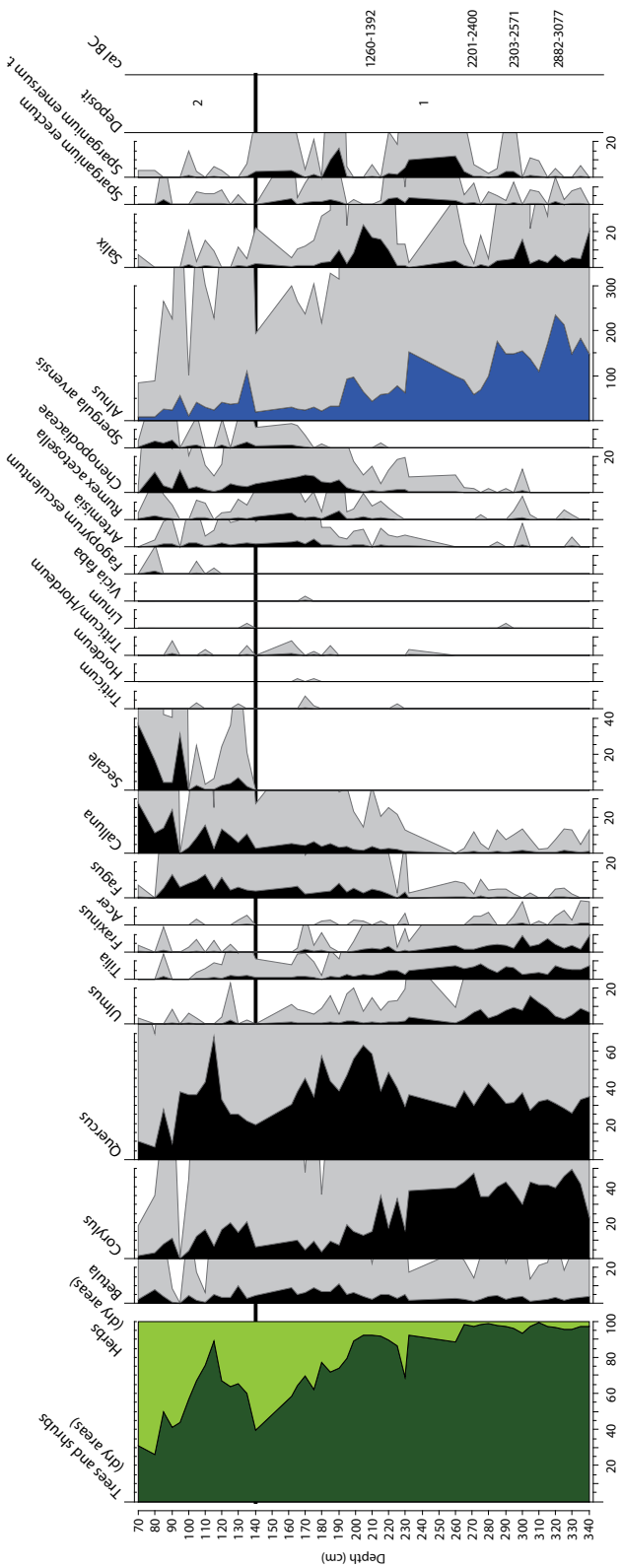

Figure 7 The pollen diagram from Oss 45E/346, a selection of taxa; in grey the curves 5x; the black line shows the hiatus in deposition (after Bakels 2014 figure 4)

Halfway through the diagram the number of herbs starts to increase. In addition, somewhere between 2400 and 1350 BC, on a level that unfortunately could not be more accurately dated due to the absence of suitable material, a new tree species, beech (*Fagus*), appeared in the landscape. The low numbers of beech pollen from before that time may have come from elsewhere, even from very far away. Other species of trees growing in dry areas declined in number, with the exception of oak and birch. In the valley of the Meuse the alder lost ground. Willow and marsh plants, again represented by bur-reed in figure 7, replaced them. The appearance of beech is a natural process, but the rest of the developments in this period are attributable to farming people. Pollen grains of wheat (*Triticum*, in this time almost certainly emmer wheat), barley (*Hordeum*) and horse bean (*Vicia faba*, here most probably var. *minor*), among other things, indicate human activity. The main developments date to the Bronze Age, but the beginning of the changes in tree growth and the first advance of herbs, may be attributed to prior habitation. Pollen grains from the cultivated crops barley or wheat (*Hordeum/Triticum*) and flax (*Linum usitatissimum*), present at deeper levels in the diagram, are among the arguments in favour of this. Like Herpen-Wilgendaal, the diagram Oss 45E/346 shows a gap in the Late Bronze Age (after 1100 BC).

4.3 Fulltime agricultural communities

The continuation of the vegetation construction is based on pollen from old soils under burial mounds, found immediately to the south of the Maaskant. These barrows were built in existing open spaces, not specially cleared for the occasion (Doorenbosch 2013). These are the open areas that were indicated by the increase in the number of herb pollen in diagram Oss 45E/346. Already in case of the oldest studied mounds, those from the Early and Middle Bronze Age, those places were mainly covered with heather. Their size is difficult to determine because the old soils mainly contain pollen from the strictly local vegetation smothered by barrow construction. But the mounds were also made up of heath sods and with some calculation it can be said that they represent heathlands at least half a hectare in size. Mounds from the Late Bronze Age and Early Iron Age show the same (fig. 8). The burial mound complexes of Oss-Vorstengraf and Oss-Zevenbergen show that one and the same heathland could remain in use from the Middle Bronze Age up to and including the Early Iron Age. The heathland thus remained heathland for centuries and that means that it was maintained by man. The possible techniques for this are sod-cutting, burning or grazing. The construction of the burial mounds already demonstrates sod-cutting was used. In addition, the samples for pollen analysis often contain very small pieces of charcoal, which may indicate that burning

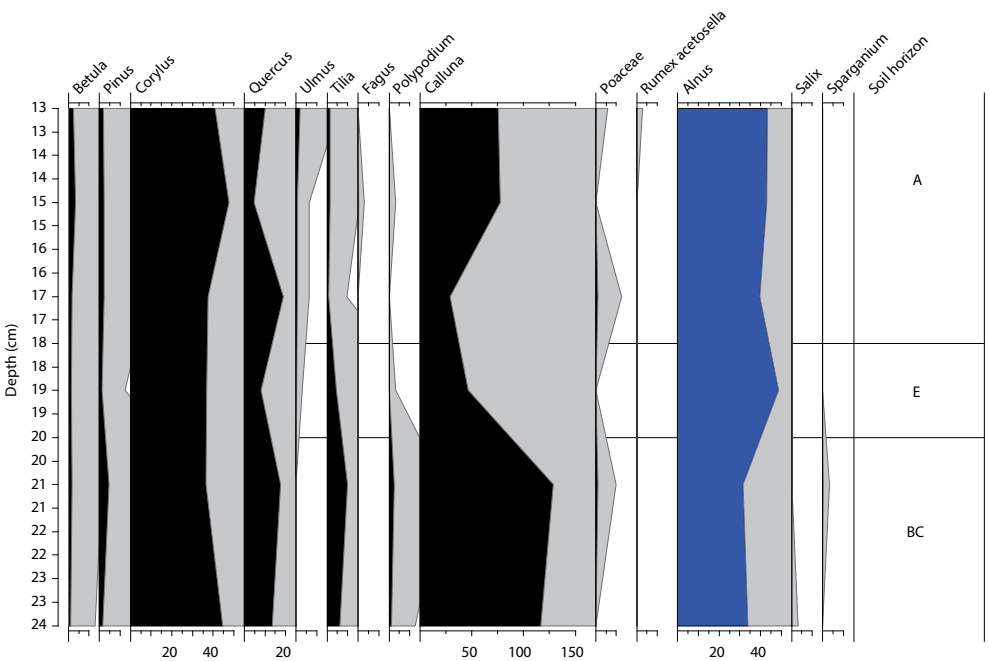

Figure 8 The pollen diagram of the soil under Oss-Zevenbergen Mound 7, a selection of taxa; in grey the curves 10x (after Bakels 2014 figure 5)

was practiced as well. However, grazing by livestock is probably the most important factor. Because the old surface under the oldest burial mounds already shows the presence of heath, the heathlands have to date from before the Middle Bronze Age. They may have been there already in the Late Neolithic. The first sand drifts in the area also date from the Late Neolithic, as can be seen for example at Oss-Zevenbergen (Fokkens *et al.* 2009).

In addition to the heather, there was still forest present, consisting mainly of oak with some elm, lime, ash and birch, with lime increasingly replaced by beech in the Late Bronze Age. Hazel grew along the edges of the forest. It is difficult to determine whether the landscape was made up of woods with large clearances with heather, or whether it was a mosaic of heathland and small forests. There must have been arable fields somewhere, but it is not clear where they were situated.

The wetter areas in this period were still covered with alder carr, although the pollen diagram Oss 45E/346 shows that this forest also suffered from human activity.

For the vegetation history of the Late Bronze Age – Early Iron Age, or the Late Subboreal early Sub-Atlantic, we have at our disposal not only the burial mounds but also the youngest pollen-containing deposit of Herpen-Wilgendaal, the material from after the hiatus (fig. 6, deposition 2). At that time the former gully was an open pond that slowly filled up with humus-rich sand. The diagram shows the extensive deforestation of the surrounding area. Only the oak tree still plays a significant role and beech was on the rise. Pollen of wheat, barley and flax indicate arable crops in the vicinity. Sheep's sorrel (*Rumex acetosella*), goosefoot (Chenopodiaceae), corn spurrey (*Spergula arvensis*) and heather account for a significant proportion of herb pollen, all of which is related to human influence. The pond was eventually filled with wind-blown sand, which is also related to human activity.

From the Maaskant, information from the subsequent centuries is lacking, except for one spectrum from Lith that demonstrates man's lasting influence (Bunnik 2010). However, on the basis of information obtained elsewhere in North Brabant and the Rijk van Nijmegen, we can assume that deforestation continued, also in the lower areas (Van Beurden 2002; Teunissen 1988).

4.4 The Roman Period

The story is continued by the fill of ditches that were constructed around Roman burial monuments in Oss-Ussen. They date from the 2nd century AD. The pollen from these ditches is dominated by alder, hazel, heather and grass. This means that there was still alder in the valley of the Meuse, but that the forest on the higher grounds had largely changed into coppice with a lot of hazel. The heathlands are clearly still present and there was grass in the open areas where no heather was growing. That grass may, of course, have dominated the cemetery itself. Most of the pollen will have come from the immediate vicinity of the graves. This certainly applies to pollen from either corn or long-headed poppy (*Papaver rhoeas* or *P. dubium*) found in considerable numbers. Poppies grow well on reworked soil and the cemetery of Oss-Ussen may have been coloured red by it at times. But, as said, the scope of a vegetation reconstruction based on the contents of ditches is limited and says something about the site itself, but possibly little to nothing about the wider surroundings.

4.5 The late Roman Period (and the Middle Ages)

History is continued by pollen from the sediments at the bottom of the Ossermeer, an old branch of the river Meuse (fig. 9). Sampling was carried out at the western end of this still existing lake. Although the age of these deposits was not determined by ^{14}C-dating, it is clear from the pollen analysis that the old course started to fill from the 3rd century onwards (De Haan 2009; Bakels 2014). During this period the last remains of the alder carrs were cut down. Meadows and hay fields with a wealth of flowering herbs replaced them. The forest continues to deteriorate in the higher areas. Only oak trees were apparently spared and perhaps partly used as oak coppice. Traces of arable farming are abundant. The diagram shows the beginning of rye cultivation (*Secale cereale*). Rye only gained significance in the southern part of the Netherlands when Germanic tribes arrived, first as part of the Roman army and later on their own initiative (Lauwerier *et al.* 1998-1999). The emergence of rye as a main crop dates back to the early Middle Ages. An even later arrival is a well-known field weed, the cornflower (*Centaurea cyanus*). This plant has only been present en masse in our fields since the full Middle Ages (Bakels 2012). The upper fill of the other abandoned branch, Oss 45E/346, the filling after the hiatus (fig. 7, deposition 2), also originates from the full Middle Ages and shows exactly the same results.

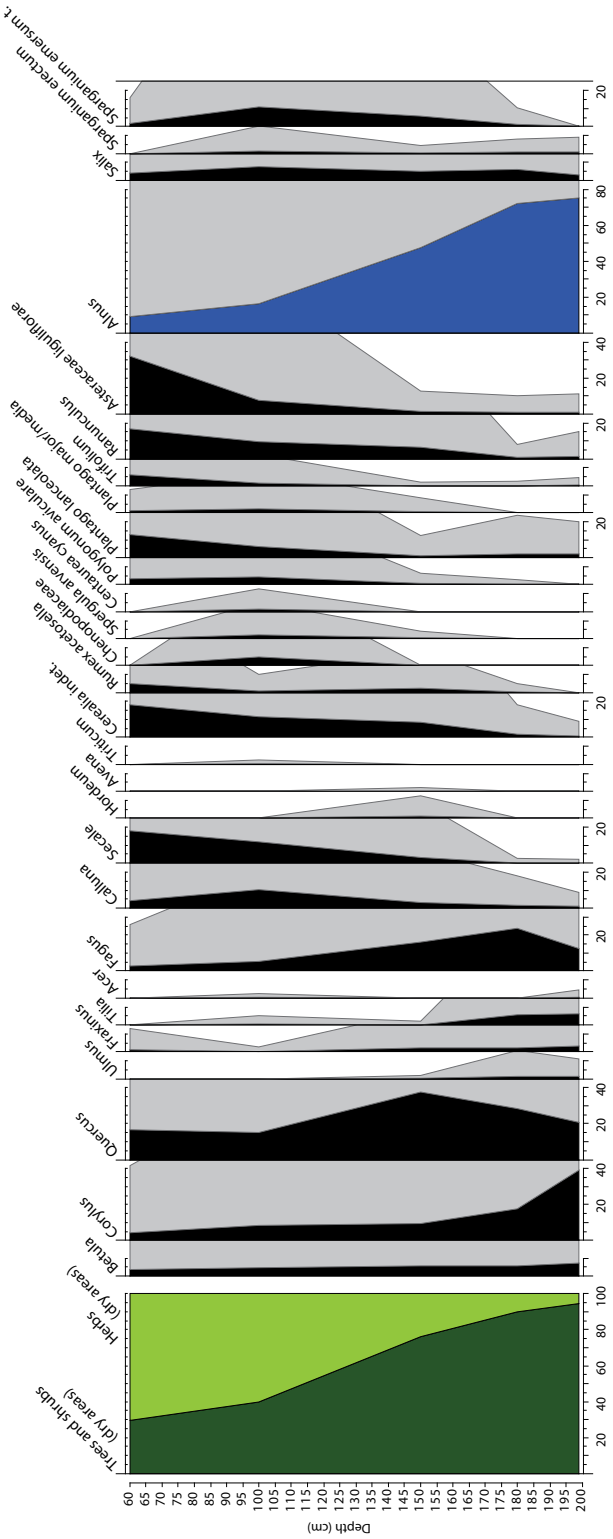

Figure 9 The pollen diagram of Ossermeer, a selection of taxa; in grey the curves 10x (after Bakels 2014 figure 8)

4.6 A changing and varied living environment

From a *longue durée* perspective, the Maaskant forms a strongly changing landscape. This peculiar contact zone' of sand and clay formed an ideal living environment for Late Prehistoric and native Roman agricultural communities, judging by the amount of sites. The diversity of the landscape was an attractive feature rather than a hindrance.

5 Occupation history of the Maaskant and adjacent sandy soils[10]

Central in our narrative are the general dia-chronical developments of the occupation history of local agricultural communities living between about 3000 BC and 250 AD in the Maaskant. We consider a local community a group of people who lived together in an area, who buried their dead in the same cemetery and revered the same ancestors (Gerritsen 2003, 111-113; Fokkens 1996). These communities will have had a strong bond with the environment they (daily) lived in. That environment consisted of places that were meaningful to the identity of a community implying a reciprocal and historically grounded relationship between community and landscape (Gerritsen 2003, 113). An important question in this respect is how people used and organised their living environment, and how this changed over time?

C. 4200-2000 BC: the first farmers?

It is difficult to determine *when* farming and husbandry as basis for existence was introduced in the research area. The footprint of Mesolithic and Early Neolithic hunter-gatherers as well as the earliest (partly) agricultural communities is very modest. The oldest excavated site (Haren-Groenstraat) dates from the beginning of the Late Neolithic and is located on the flank of a river dune. A small concentration of ceramics, flint tools and flakes and a handful pig bones indicates a short-term occupation during the Stein/Vlaardingen period, approximately 3400-2900 BC (Knippenberg 2014, 74-76). The location of the site fits the broad-spectrum subsistence economy that is presumed for this period. Finds from this period are also known from the sites Herpen-Putwielen and Berghem-Waatselaar but both have hardly been excavated (Jansen *et al.* 2014) (fig. 10). Both sites are also situated in a transition zone in the landscape.

Sites from the last phase of the Neolithic are also scarce. In Macharen-Dorp, in the middle of a Pleistocene sand dune, a number of post holes with Late Neolithic Bell Beaker pottery has come to light

Figure 10 Pot from the Stein/Vlaardingen period found at Herpen-Putwielen (© L. Mulkens)

(De Leeuwe 2014). In Herpen-Wilgendaal, a number of sharpened flint axes and Bell Beaker as well as pot beaker was were found in the filling of a brook from the Middle and/or Late Neolithic (Ball 2014). Finally, sherds from the Late Neolithic and the Early Bronze Age have been collected at various locations between Oss-Frankenbeemdweg and the Hertogswetering, in a clayey area directly north of the sandy soils (Jansen and Smits 2014; Jansen *et al.* 1999).

Thus in the course of the 3rd millennium BC there were communities in the Maaskant that – in addition to hunting and collecting – also farmed crops and livestock part-time. The question of whether this concerns newcomers or that local communities gradually embraced an agricultural subsistence economy on their own initiative cannot be answered. It is no coincidence that sites from this period are concentrated on the flanks of higher sand dunes and levees and in particular in the transition zone from the (higher) sandy soils to the river area (fig. 11). From these gradient zones the prehistoric inhabitants could easily exploit the heterogeneous landscape of the Maaskant with its strong ecological diversity, making optimal use of the natural environment.

The relatively homogeneous sandy landscape offered less favourable conditions from this point of

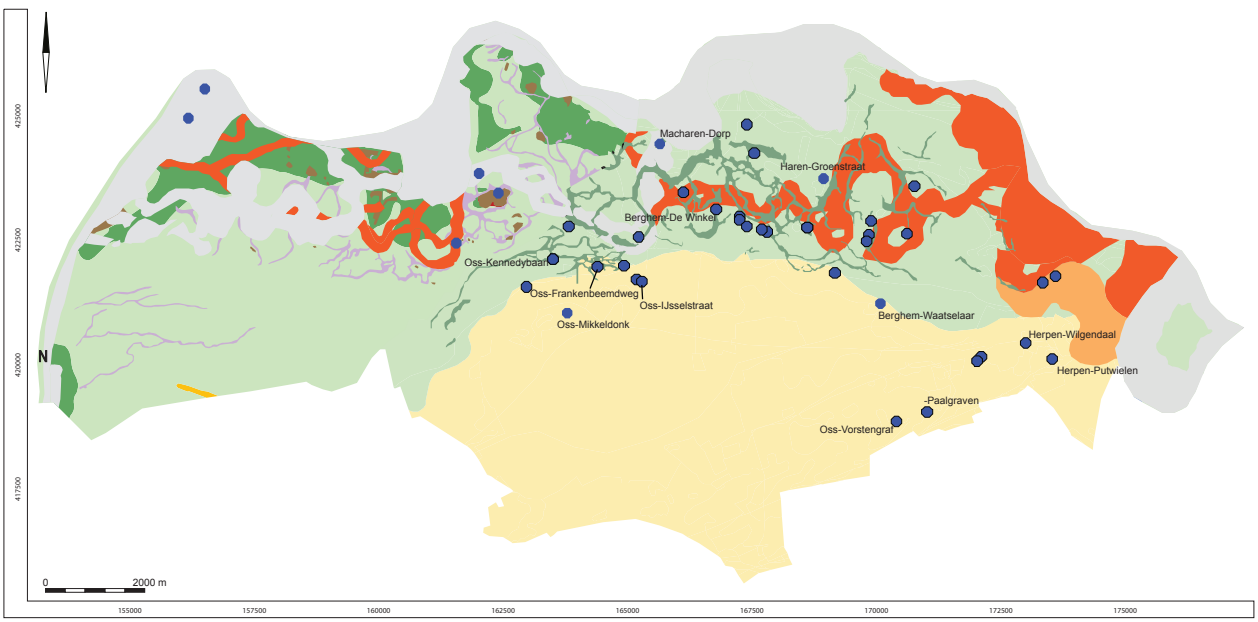

Figure 11 Distribution of the maim sites from the (Middle and Late) Neolithic period in the Maaskant (after Botman and Van der A 2009 figure 4.1)

view. It was apparently not attractive to communities that had not yet fully converted to farming. Only a handful of pits with finds from the Late Neolithic and/or Early Bronze Age are known from the sandy soils, spread over an excavated area of dozens of hectares (Fokkens in prep. b; Jansen and Arnoldussen 2007).

5.2 C. 2000-800 BC: farmers on clay and sandy soils

In the Early and probably also the first part of the Middle Bronze Age the same locations were prefered as in earlier periods (fig. 12). The amount of sites is still limited. This changed in the course of the Middle Bronze Age. From around *c.* 1500 BC onwards, the number of sites slowly increased, a development that occurred in large parts of the river area (*e.g.* Arnoldussen 2008, 387), whereby sites are also being found along fossil Meuse streams and creeks. Several (settlement) sites are known through surface finds like Oss-Ossermeer and -Paalakker. At the same time, we see the first clear reclamation of the sandy soils. From the transition from the Early to the Middle Bronze Age, the first wells and pits and later also houseplans occur here, increasing from the 16th century BC onwards (Fokkens in prep. a; Jansen and Arnoldussen 2007). The earliest houseplan date from the 15th-14th century and was found at Oss-De Geer (Jansen and Van Hoof 2003, 111-114). Later plans, dating in the 12th-11th century BC, were found at Oss-Mikkeldonk (Fokkens in prep. b) (fig. 12).

The oldest, unquestionable house plan found in the Maaskant also dates from the later Middle Bronze Age. At a small excavation in Deursen, on the flank of a river dune, the plan of a Bronze Age farm was found. Around the floor plan there were several pits with pottery from this period (Van de Glind in prep.).

In the Late Bronze Age, the number of sites in the Maaskant as well as on the sandy soils seemed to decline. This seems to be characteristic for large parts of the river area (*e.g.* Arnoldussen 2008, 410). The general idea is that (local) changes in the landscape led to a contraction of occupation instead of a population decline but also the visibility of sites forms a factor (Arnoldussen 2008, 413-415; Fokkens in prep. b).[11]

In general the later part of the Bronze Age is characterised by the first indications of human interven-

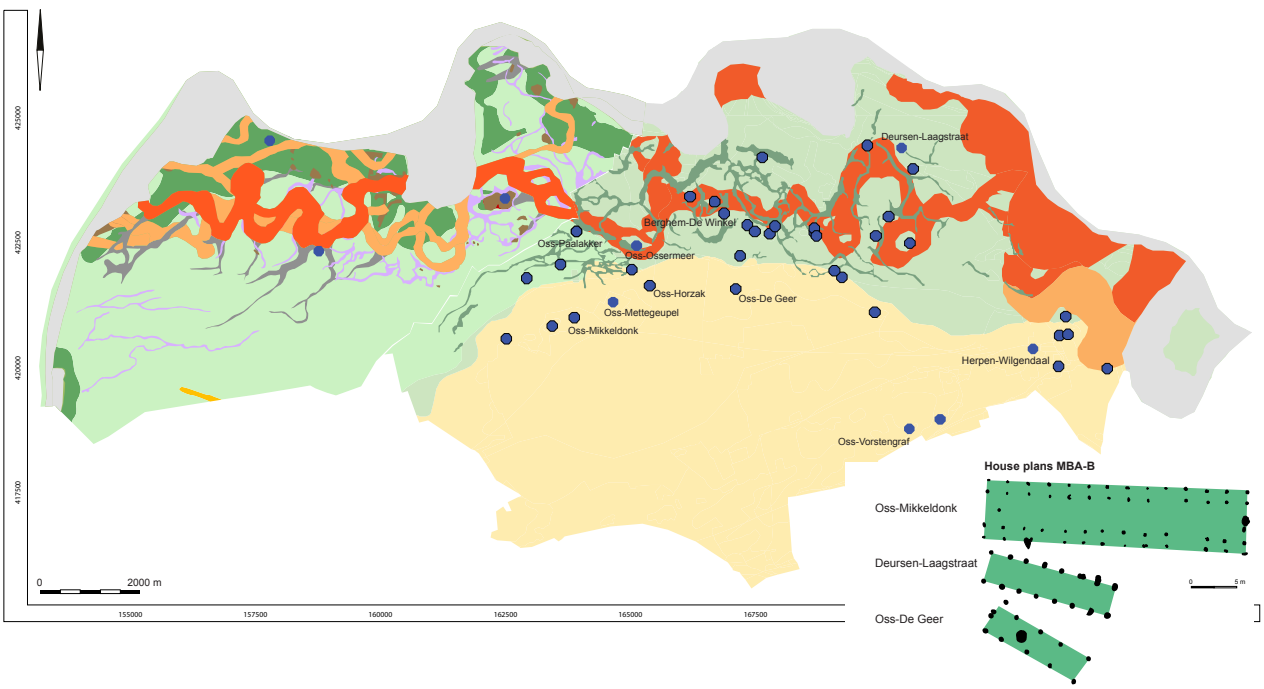

Figure 12 Distribution of the main sites from the Bronze Age in the Maaskant (after Botman and Van der A 2009 figure 4.3). Inset: Middle Bronze Age B house plans from three different sites in the Maaskant (after Fokkens in prep. a; Van de Glind in prep.; Jansen and Van Hoof 2003 figure 6.2)

tions in the landscape. The result of this pre-modern deforestation is the emergence of open spaces in the still vast forest area. Finally it is noticeable that the Middle and Late Bronze Age agricultural occupation is still concentrated on the edge of the coversand ridge, not far from the 'familiar' river area from where the reclamation of the sandy soils began.

5.3 C. 800-12 BC: strong increase in occupation

From the Iron Age onwards, the number of sites increased significantly, in both areas. Locations remained inhabited, but at the same time new locations were occupied. Various sites in the Maaskant were excavated in a fragmentary manner: settlements in Onze-Lieve-Vrouwenberg (Stikkelorum 2017) (fig. 13), Overlangel-Asboom (Van der Linde 2014), Herpen-Wilgendaal (Ball 2014), Berghem-Lallenberg (Beex 1955) and Maren-Kessel-Liesdaal (Van Kampen 2014), a cemetery in Haren-Groenstraat (Knippenberg 2014), a waste dump in Herpen-Hertogswetering (Van Wijk *et al.* 2004) and an activity area nearby Lith-Oijensche Hut (Jansen *et al.* 2002, 26)(fig. 3). One site stands out for the amount of (extraordinary) find material. Kessel, situated where the rivers Meuse and Waal closely flowed together (and possibly even were connected with each other), is interpreted as a Late Iron Age regional centre and cult place (Heeren 2014, 260-261; Roymans 2004, 133-134). Late Iron Age cult places are also found in Haren(-Spaanse Steeg) and Lith(-Oijensche Hut) (Jansen and Jacques 2014; Jacques 2014). In all cases findmateriaal – ceramics, animal and human bone material, glass and metal objects – were found in a filled-in channel of the Meuse (fig. 14). Maybe these river cult places were the counterpart of the rectangular cult sites found on the sandy soils?

Considering the distribution of the sites it is striking that the transition zone from sand to clay, including the utmost flanks of the coversand ridge,

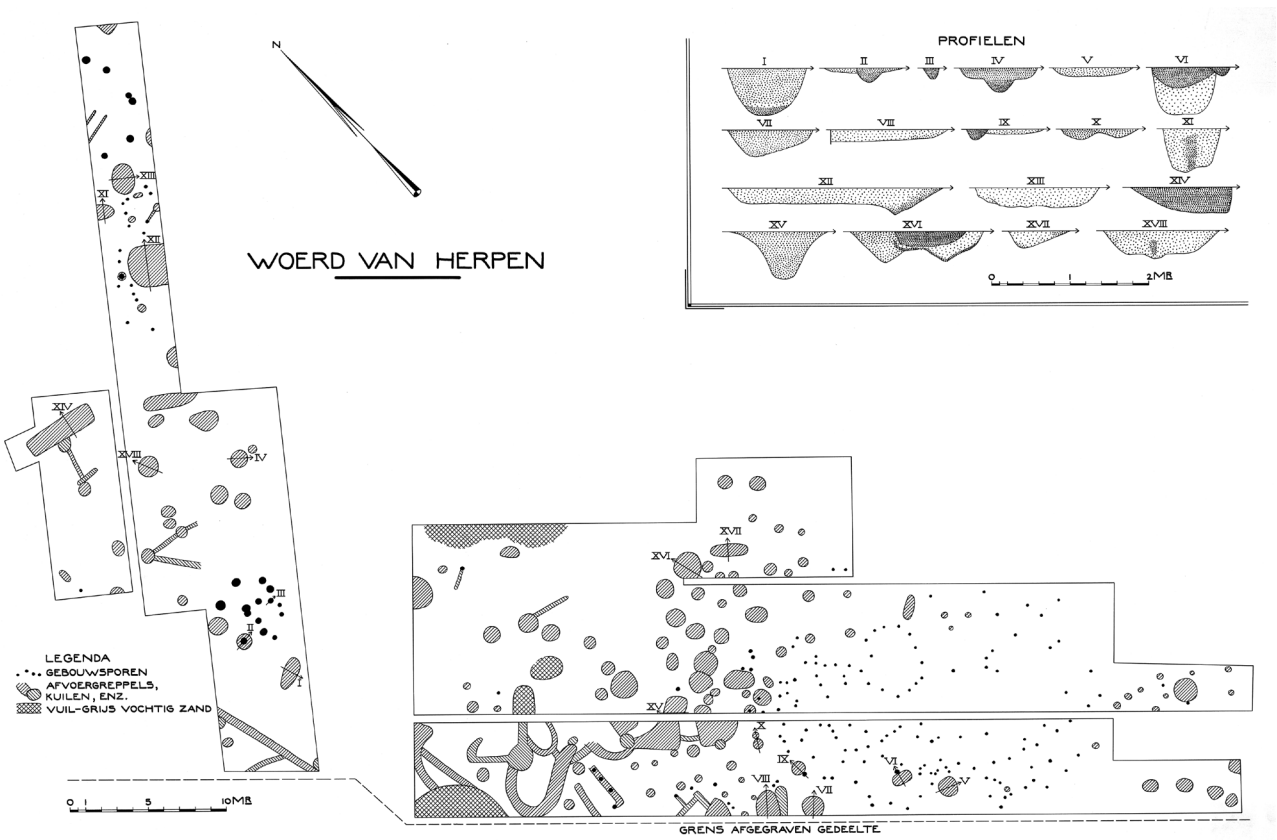

Figure 13 One of the few (partly) excavated Iron Age settlements in the Maaskant area was already researched in 1939. Sand extraction at the Onze-Lieve Vrouwenberg was reason for an excavation by the Museum of Antiquities in Leiden. The cluster of postholes and larger pits closely resemblance the Iron Age settlements on the sand (© RMO Leiden)

Figure 14 At the Late Iron Age cult site Lith-Oijensche Hut ceramics, animal bones, glass and metal objects, like this iron spearhead, were deposited in the edge of a then active course of the river Meuse (© H. Fokkens)

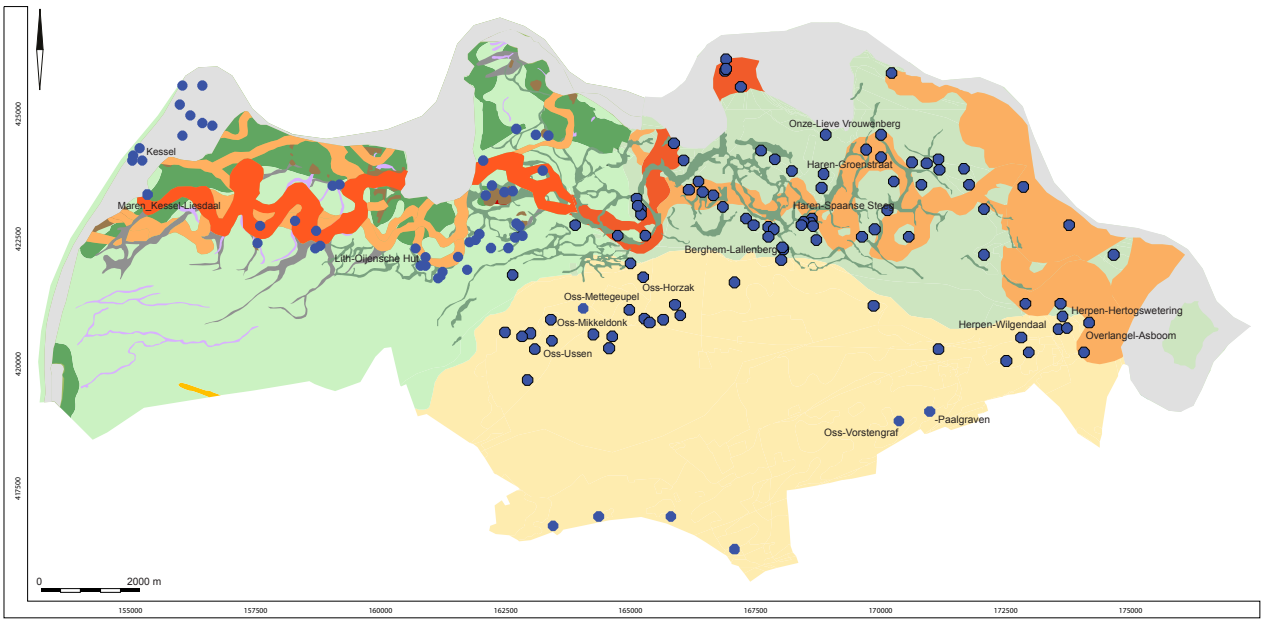

Figure 15 Distribution of the main sites from the Iron Age in the Maaskant (after Botman and Van der A 2009 figure 4.6).

were no longer inhabited. In the clay area the Iron Age sites are situated at almost all relatively higher lying zones: (Pleistocene) sand dunes, crevasses and channel belts (levees) (fig. 15). It's difficult to get a clear view of the settlement pattern. The ribbon development that emerges from the excavation Overlangel-Asboom suggests however clear that the settlement dynamics are (more) strongly determined by the landscape conditions (Van der Linde 2014, 163).

Contemporaneously, the still largely unreclaimed coversand ridge started to be exploited extensively. Here, extensive settlements from the different phases of the Iron Age have been excavated (*e.g.* Schinkel 1998; Fokkens *et al.* in prep. a). Settlement areas show a more far-reaching structuring of the environment. Farmers start to structure their environment, which at the end of the Iron Age results in enclosed yards and settlements.

Still the full-time Iron Age farming communities kept within a relatively short distance of the clay soils. Several large-scale exploratory researches on the coversand ridge further away from the Meuse yielded no indications for Iron Age and/or Roman Period occupation whatsoever (Jansen in prep.). So we not only have insight into where agricultural communities from the Iron Age and Roman Period lived, but also where they consciously did *not* live; not far from the river in this case.

5.4 C. 12 BC till 450 AD: structured landscapes

The distribution of sites from the first centuries AD is very similar to the distribution of sites from the Iron Age (fig. 16). For the the Maaskant as a whole we presume occupation continuity during the Iron Age and Roman Period although it is often difficult to demonstrate continuity for the individual sites. The latter is caused to a large extent by the fact that excavations of sites from this period are scarce; most sites with surface finds can, on the basis of the find material, be referred to as native Roman Period settlements. These sites – like Lithoijen-Lange Maaijen, Teeffelen-De Honing, Berghem-de Winkel and Berghem-Hoge Tussenrijten – are characterised by large numbers of finds, the dating of which indicates an intensive occupation of each site over a longer period of time (*e.g.* Louwen *et al* 2014, 185). At one location we may be dealing with stone constructions and/or a villa site based on the found building materials and the results of a geophysical survey (Macharen-De Hoge Morgen: Verschoof *et al.* 2014, 275-280).

The only excavated Roman Period feature concerns a burial monument at Berghem-Lallenberg (Beex 1955). This contrasts strongly with the sandy soils where eleven settlements, including two cemeteries (Oss-Ussen and -Horzak), cult sites (*e.g.* Oss-

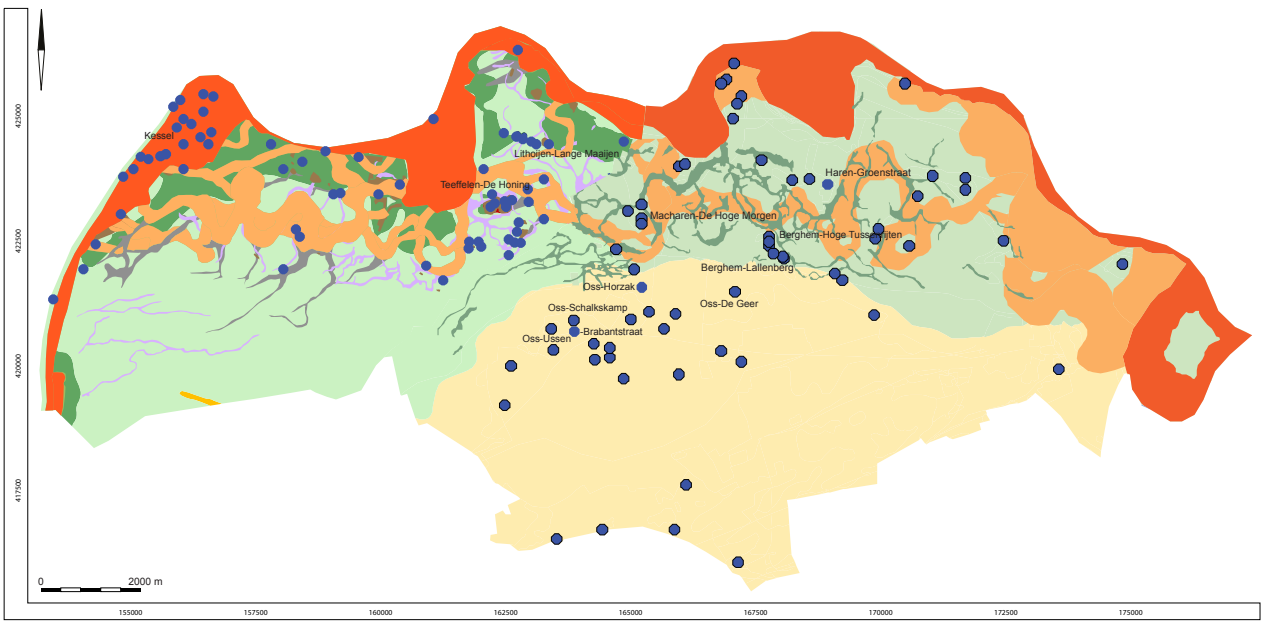

Figure 16 Distribution of sites from the various phases of the Roman Period in the Maaskant (after Botman and Van der A 2009 figure 4.9)

Brabantstraat) and a field system from the first two centuries AD have been (partially) excavated. Due to the scale of the research – tens of hectares were investigated here – it is possible to establish that the environment around and between the settlements was structured on a large scale by means of ditches (Jansen and Van As 2012). The difference between the different settlements also suggests a hierarchic organisation with smaller satellite sites structured 'around' a central site. Examples of the latter are the settlements Oss-Horzak and -Westerveld (in Ussen), both of which are surrounded by a square ditch system (Jansen and Fokkens 2010). It is not possible to determine whether the landscape in the Maaskant was also designed on such a large scale and with such a high degree of planning. The number of sites only indicates that the area was intensively inhabited. Based on the material culture a handfull of possible central sites only can be presumed. Illustrative perhaps is the research carried out at Wijk bij Duurstede in the river area of the Kromme Rijn, where the landscape also was subdivided on a large scale in the Roman Period (Vos 2009, 109-116).

In the course of the 3rd century AD, the population density on the sandy soils decreased sharply. A number of wells are the only evidence for occupation in the 3rd and 4th centuries (Jansen and Van As 2012). From the following centuries there are no indications at all. The number of sites in the Maaskant area also declines, although it seems to be less drastic. Ceramics and coins from the Late Roman Period, the 3rd to 5th centuries, have been found at various sites. Some of them were already inhabited in the Iron Age and/or Roman Period, but it is not possible to determine whether there was continuity at site level. A continuity of occupation for the whole Maaskant is however plausible, even though there is clearly a decrease in the number of sites. The latter applies not only to the sandy soils, but also to large parts of the southern Netherlands (Heeren 2005; Verwers 1998, 315-316).

The very modest occupation on the sandy soils and the more flourishing occupation in the Maaskant may be explained by political and military changes.

Figure 17 The site Kessel, situated at the 'junction' of Meuse and Waal, probably was a regional economic and religious centre in the Late Iron Age. This was strengthened in the Roman Period when a small Roman 'town' lay here (© G. van Alphen)

In the Late Roman Period, the civil character of the Meuse changed radically with the establishment of military reinforcements, among others at Kessel (fig. 17). In these centuries the Meuse plays a role in the (in depth) defence system of the northwest (Rhine) border of the Roman Empire (Roymans 2004, 127 note 349). Therefore, occupation of the hinterland – the Maaskant – was probably important.

6 Living near the Meuse (fig. 18)

From the beginning of the 3rd millennium BC onwards, the Maaskant was inhabited and exploited by communities whose basis for existence can be defined as a flexible extended farming economy. In addition to arable and livestock farming, hunting and gathering were also part of their livelihoods (Fokkens *et al.* 2017, 294-297). Sites from this period are mainly found on Pleistocene (river) dunes, relicts of a braiding river system that still protrude (just) above the Holocene clay deposits. They used the arable land on the dune, the grasslands in the flood plains and exploited the valley environment through fishing, fowling and hunting. The landscape is dominated by deciduous forests including oak, lime, elm, birch and ash, and alder carr in wet areas. In the first part of the Bronze Age the situation didn't differ that much.

During the later Bronze Age we see the occupation slowly 'expanding' to the sand ridge where deciduous forests interspersed with heathland. From at least 1800 BC onwards, both areas were inhabited. The early agricultural communities in the Maaskant region ultimately formed the seedbed for the 'colonisation' of the adjacent sandy soils whereby it is striking that in particular the flanks remain favoured for habitation, also on the sandy soils. Bronze Age farming communities still chose settlement locations that enabled them to exploit a diverse environment to the full extent; not only farming but also still hunting and fishing (Van Amerongen 2015, ch. 8; Fokkens in prep. a). Locational preferences thus did not change that much compared to earlier periods. With the gradually growing population density, except for the Late Bronze Age, we see the first clear indications of deforestation, both on the sand ridge as well as in the flood valley of the Meuse. More and larger open area's emerge in the landscape as a result of the localization of farming communities and their need of space.

From the beginning of the Iron Age, population density increased even more, as did the size of the occupied area. Farming had become the main source of existence giving the inhabitants the opportunity to settle in (almost) all environments. The large-scale excavations on the sandy soils show a discontinuous settled landscape wherein small groups of farms lie in a forested area. In the course of the Iron Age some of the yards and settlements were visibly demarcated through ditches. In general, the occupation on the sandy soils is still situated just beyond the flood plain, generally close to the Meuse, especially when we realize that in Late Prehistory and the Roman Period its river channels were closer by then now. The modest scale of research makes it difficult to get a clear picture of the Iron Age occupation in the Maaskant besides that the occupation dynamics are more determined by the landscape conditions compared to the extended sandy soils.

In accordance with the Iron Age the first part of the Roman Period both areas were intensively inhabited. For the sandy soils the structured settlement and landscape layout implies some kind of 'central planning' including a site hierarchy (Fokkens in prep. a; Jansen and Van As 2012; Jansen and Fokkens 2010). The landscape changed drastically into a much more open environment with forests at a distance. Changes are (also) the result of human intervention and subsequent events: forest clearing, drift sands and the expansion of heathland.

Broadly speaking, we can state that the Late Prehistoric and Roman Period occupation of the Maaskant is concentrated along active river channels or channel belts, Pleistocene sand dunes and crevasse deposits (a.o. Ball and Schiltmans 1998). The inhabitants of the Maaskant constantly had to take into account the ambiguous character of the river Meuse, which dominated the landscape in which they lived. On the adjacent sand ridge, occupation concentrated on the flanks, just beyond the sphere of influence of the river.

In both environments people kept returning to previously inhabited places. Specific locations were regularly (re)occupied for shorter or longer periods of time – one or more generations – and with shorter or longer intervals (*persistent places*). At the end of the Iron Age and the Roman Period we can distinguish a long(er) continuity of use and/or a more sustainable use of a place, especially on the sandy soils (Gerritsen 2003, 194-197; for Oss see Schinkel 1998, 174-179; Wesselingh 2000, 195-200) (*permanent places*).

In retrospective, there is a shift from adapting *to the* landscape to adapting *the* landscape. At a certain point in time farmers start to modify their environment. Extensive, limitless landscapes are gradually

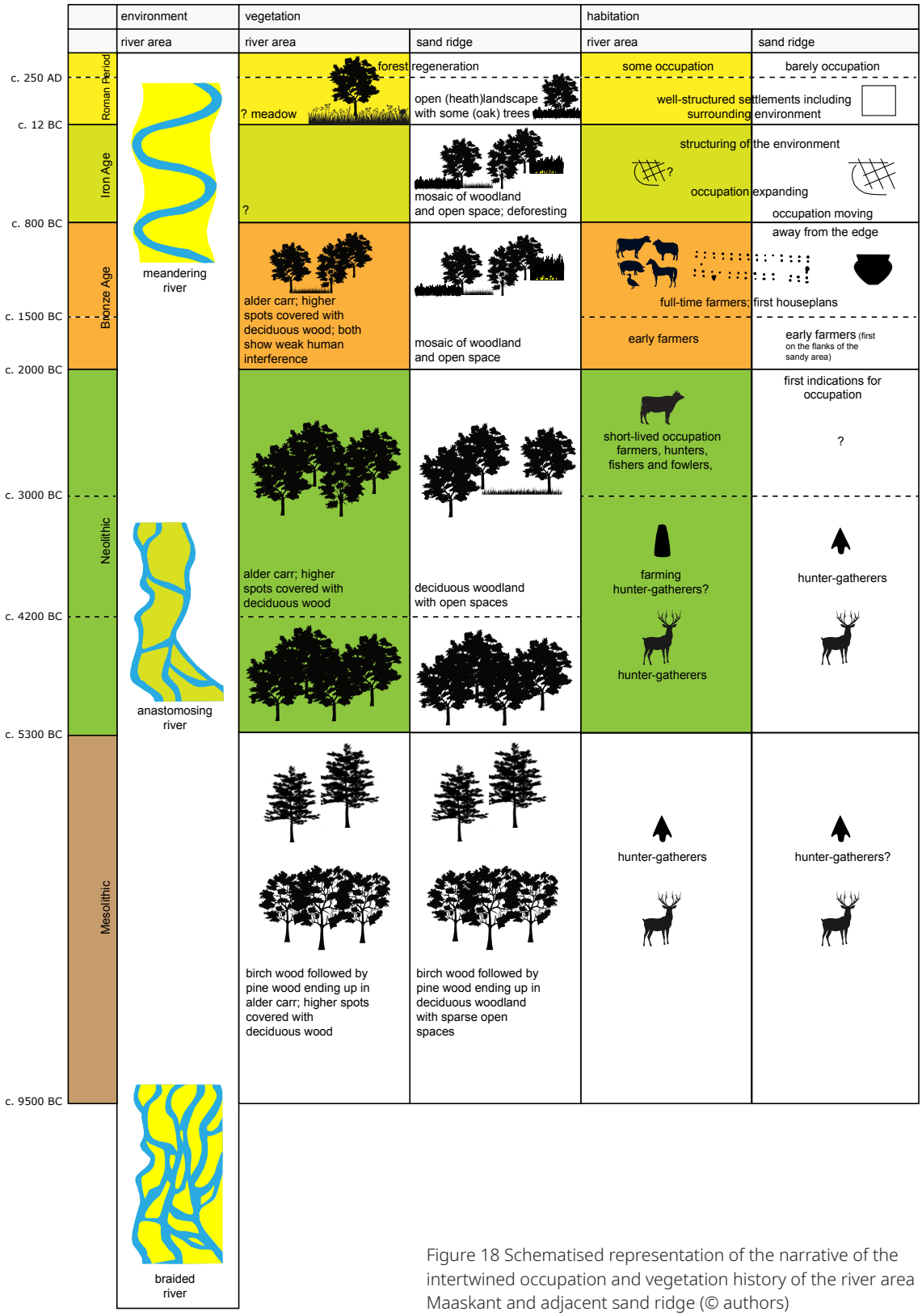

Figure 18 Schematised representation of the narrative of the intertwined occupation and vegetation history of the river area Maaskant and adjacent sand ridge (© authors)

transformed into limited landscapes in which visible boundaries of a yard, settlement and/or parcels of land occur more and more frequent.

The long-term occupation history shows a noticable repetitive pattern. In the Late Neolithic and Bronze Age, the occupation spreads gradually from the Maaskant to the adjacent sandy soils. In Late Roman Period the habitation continued in the river area. A few centuries later, in the Merovingian Period (6th century AD), the population slowly increased again, whereby the sandy soils became inhabited (again). This growth continues up to the present day, with the inhabitants of the sandy soils mainly living in a large city, while the clay area is characterised by dozens of smaller and larger villages and hamlets that follow the meandering of the Meuse more or less like a bead string. The occupation and vegetation history of the river area Maaskant and adjacent sand area of Oss is thus strongly intertwined, despite the fact that living environment is very different. But what can we say about the actual relation(s) between the inhabitants *on* the sand and *on* the clay, especially in the relatively densely populated period between the last centuries BC and the first centuries AD?

7 Clay versus sand – different environments, different identities?

Nowadays there are about twenty larger and smaller villages and hamlets scattered in the Maaskant, on the adjacent sandy soils lie the city Oss and two smaller villages. Both areas have their own identity: village versus city, industry versus agriculture, hustle and bustle versus tranquillity. In addition, people now living *on* the sand are reputed differently from people living *on* the clay.

Was that also the case in the past? Can we say something at all about the relationship between the inhabitants of the different areas through time, are there differences to be seen and does the environment play a role in this?[12] The landscape is an important factor in the 'identity' of communities especially for the (pre)historic (agricultural) communities that were closely bonded with their environment. A landscape has a history and evokes memories; it sets the mind as to say (Kolen 1999, 271; 284)?

It's clear that the daily environment of the inhabitants of the Maaskant and the inhabitants of the sandy soils differs. On the one hand a varying, heterogeneous clay landscape and on the other hand a homogeneous, hardly altered sand landscape. Each environment posed its own demands.

However, if we look at what we can observe, the material culture, the subsistence economic basis, house plans and land use, there are hardly any differences. Distinctions seem to be gradual rather than fundamental. It strongly appears that the immediate surroundings had relatively little influence, especially on the full-time agricultural Late Prehistoric and subsequent communities. The economic basis for existence was developed in such a way that it met the requirements of both the dynamic and fertile river landscape and the vast and less fertile sandscape. This flexible and pragmatic approach to different (and changing) living environments can be seen as an important characteristic of agricultural communities.

Despite the difference in landscape characteristics and although archaeological reality strongly determines our perception the differences between the inhabitants – the farmers that lived here around the beginning of the era – seem limited. They were closely interrelated and both strongly oriented towards – and even dependent on – the river Meuse. She formed an essential element for the inhabitants of both areas and bridged their local 'small' worlds with the 'big' world beyond. Sand and clay flow seamlessly into one another, together with the inhabitants living *on* the sand and *on* the clay. Maybe people living close to the river were referred to as people from the clay and vise versa but in general they live each within different environments.

Epilogue: a local community in a big world

This *small narrative* is a result of the regional Maaskant-project of which Harry Fokkens was the scientific director for three decades. Such evidence-based narratives about the deep past of local communities form essential 'building blocks' for our *grand narratives* about the prehistoric world that stretched out far beyond the environment in which local late prehistoric and Early Roman Period communities daily lived and worked. We hope that the small world narrated above contributes to our understanding of the big world it was part of. Both aspects are important in Harry's work.

Notes

1 This contribution is based on a series of articles published earlier in a Dutch book about the Maaskant (a.o. Bakels 2014; Jansen 2014b). The text is translated by Sasja van der Vaart-Verschoof.
2 See also the editorial in this book.
3 This is due to the fact that most of the research took place within the framework of the urban expansions of Oss, which are limited to the sandy soils.
4 The Haren-Spaanse Steeg site was investigated in 1962, 1972 and 1999: see Jansen and Jacques 2014; Jacques 2014; Jansen *et al.* 2002.
5 Title of this section after Wink 2009.
6 This section is based on Wink *et al.* 2014.
7 The mapping is based on coring data, lidar images and sedimentological and geomorphological principles, the dating is based on 14C, archaeological sites, historical sources and maps and geological cross-cutting principles.
8 On the map of Van Diepen, the river dunes are indicated as old residential areas. Current villages such as Haren, Teeffelen, Deursen and Dennenburg are situated on such a river dune. Archaeological finds are regularly found in the centres of these villages (Dutch: *dorpen*).
9 This paragraph is an edited translation of an article published earlier in Dutch (Bakels 2014).
10 This paragraph is an edited translation of an article published earlier in Dutch (Jansen 2014b).
11 Among other things, the recognizability of the Late Bronze Pottery plays a role in this, but also the character of the settlements in that period: these left far less clear traces than settlements from the previous Middle Bronze Age (B).
12 It is important to realise that we are dealing with sites whose conservation differs greatly due to tafonomic and (post)depositional processes, which are closely related to the landscape context.

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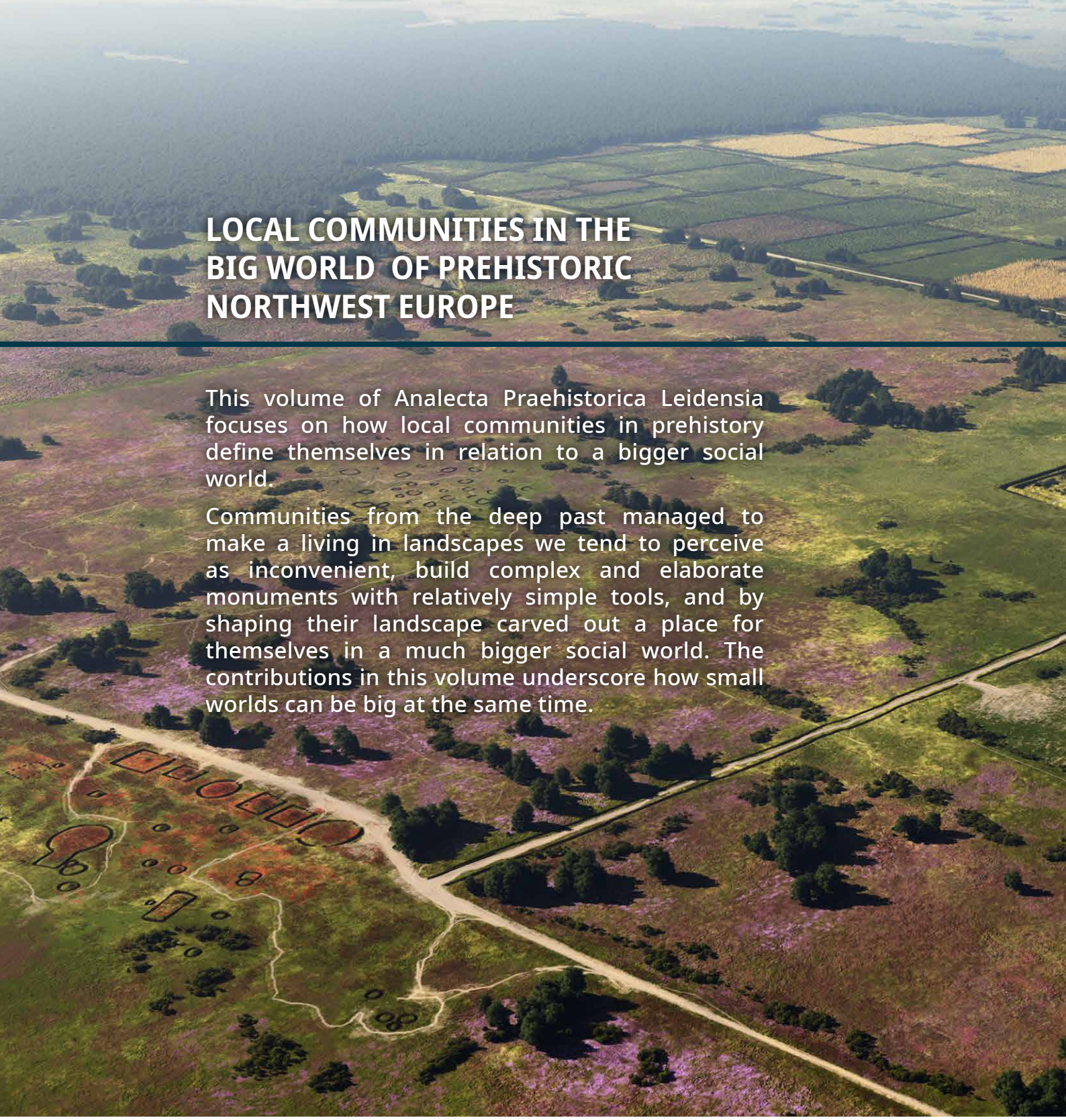

LOCAL COMMUNITIES IN THE BIG WORLD OF PREHISTORIC NORTHWEST EUROPE

This volume of Analecta Praehistorica Leidensia focuses on how local communities in prehistory define themselves in relation to a bigger social world.

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