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Chapter 12

Oss-Zevenbergen and surroundings

Near the town of Oss, encompassing an area of approximately 7.5 km², several burial complexes are situated from which palynological data have been obtained (see figure 12.1). The palynological results of these barrows will be described and discussed to reconstruct the barrow landscape in this area. At the end of this chapter three pollen diagrams derived from a palaeosoil and peat sediments (Schaijksche heide, Sint Annabos and Venloop, see section 12.5) will be discussed. These pollen diagrams will provide more information about the vegetation in the wider surroundings of the barrows.

12.1 Oss-Vorstengraf area and Oss-Zevenbergen

Close to the town of Oss two burial complexes are situated, Oss-Zevenbergen and the grave field of the Chieftain’s Grave of Oss (Dutch: Oss-Vorstengraf). These two sites have been the subject of various excavations since 1933 when the Chieftain's Grave of Oss was discovered. Especially in the last 15 years detailed research has taken place, revealing that these two sites might actually form one large burial complex. This will be further discussed in section 12.1.3.

The sites of Oss-Vorstengraf and Oss-Zevenbergen have a long and rather complex research history, the results of which have been published in several publications (Verwers 1966, Fokkens and Jansen 2004, Jansen and Fokkens 2007, Fokkens et al. 2009b, Fontijn and van der Vaart 2013). For a detailed report of all the research on the two sites the reader is referred to those publications. A short overview of the several research campaigns and a summary of their findings will be given in table 12.1. Then a more detailed description per barrow will be given.

12.1.1 Site description and sample locations

Oss-Zevenbergen and the Oss-Vorstengraf area are situated on the northwest edge of the Peel Blok, a by tectonics elevated (uplifted) area. The grave fields in this area are for the most part located on a ridge of cover sands. Along the side of the Peel Block area groundwater seepage wetland occur, causing locally very wet conditions west, north and east of the cemetery area (Dutch: wijstgronden; see figure 12.2). The higher parts of the terrain consist of a Carbic Podzol (Dutch classification: Haarpodzol, while the lower and wetter areas consist of Gleyic Podzols (Dutch classification: Veldpodzol). Thin layers of wind-blown sand can be found all over the terrain, especially at the flanks of the barrows. Along the southeast-side of the terrain an extended drift-sand layer is located (van der Linde and Fokkens 2009, Jansen and van der Linde 2013)
Figure 12.1. Locations of the barrows in the case-study area of Oss-Zevenbergen and surroundings. In addition the location of a possible Middle Bronze Age settlement has been indicated, as well as the locations where groundwater seepage wetlands occur. The map is based on digital elevation model of the AHN (copyright www.ahn.nl).
In 1933 a large barrow with a diameter of approximately 53 m, surrounded by a circular ditch, was discovered in which a rich Hallstatt C (Early Iron Age) grave was found: a bronze situla containing amongst others cremation remains, a Mindelheim sword (an iron sword with a hilt inlaid with gold) and many small bronze objects. Because of the grave good’s richness the grave was named the Chieftain's Grave (Dutch: Vorstengraf) (Bursch 1937). Later research revealed that the cremation remains were of an older, disabled man, although recent research showed that he...
might have been much younger and healthier than previously thought (Lemmers et al, in prep). The bronze objects were probably the remains of bronze horse gear (Fokkens and Jansen 2004, Jansen and Fokkens 2007, Fokkens et al. 2012). The Chieftain’s Grave was rediscovered in 1997, although it was heavily disturbed at this time. The mound itself had disappeared and only the remains of ditches and posts were preserved. The re-excavation nevertheless revealed that the grave was a secondary burial into a smaller Bronze Age barrow, which had an original diameter of 16 m and was surrounded by a ditch. A new barrow was built on top with the Chieftain’s Grave positioned off-centre in relation to the Bronze Age barrow, possibly to respect the older grave. The Hallstatt C barrow had a diameter of 53 m. It was probably 1 m in height above the older mound and flattened at the top. During the 1997 excavation a fallen tree that had grown on top of the barrow was investigated. It was discovered that in its fall, the tree had retained a small intact part of the barrow in between its roots (see figure 12.3 and 12.4). Although the original mound was levelled in the past, the part of the barrow that was captured by the tree roots contained a fraction of the old surface, the soil below and some sods. Samples for pollen analysis were taken from here by de Kort (1999): three samples from the old surface and four samples from the sods. In addition two monolith tins were hammered into the section of which samples could be taken from the old surface downwards to provide a pollen diagram as has been described in chapter 5. Samples were also taken from the ditch belonging to the original Bronze Age barrow and from the ditch belonging to the Chieftain’s Grave. All samples were analysed and published by de Kort as part of his MA thesis (de Kort 1999).

Three barrows

In 1935 Bursch excavated three other barrows that were situated close to the Chieftain’s Grave (see figure 12.1). Just south of it a barrow was located that was dated to the Late Neolithic, based on the find of a Veluvian Bell Beaker. Two other barrows were surrounded by multiple post circles, which date them to the Middle Bronze Age. In addition an undecorated Middle Bronze Age urn was discovered in one of the mounds (Bursch 1937, Fokkens et al. 2012). No samples for pollen analysis were taken from these barrows.

Urnfield

Some urns were found in 1972 and the discovery of three small circular ring ditches and four urns without monumental structures in 1997 and 2002 indicated the presence of a small urnfield southeast of the Middle Bronze Age barrows. Two ring ditches were found in 1997 just east of the Chieftain’s Grave and had a diameter of respectively 10 and 7 m. The largest ditch was located about 15 m east
Figure 12.3. Location of the barrows in the Chieftain’s grave of Oss area. Figure after Fokkens and Jansen (2004, figure 4.5).

Figure 12.4. Tree fall at the Chieftain’s grave of Oss that had captured a small intact section of the barrow. A fraction of the old surface, the soil below and some sods were remained in this section. A indicates the uprooted subsoil from underneath the tree. B, C, D and E together form the original podsolic soil, with the original topsoil (E), a leached horizon (D) and the zone with iron pan formation (C). F1, F2, F3 and F4 are sods from the barrow, laid down with the turf upwards. Figure by H. Fokkens.
of the Chieftain’s Grave and had a maximum depth of 25 cm. A cremation was found in the centre of the (now disappeared) barrow. The other ditch was located about 25 m east of the Chieftain’s Grave. A cremation was not found in the centre, but eccentric at only about 1 m from the ditch. This was probably a secondary burial, dating the ditch to the Late Bronze Age/Early Iron Age. The northern part of a third ring ditch was discovered in 2002. In addition the remains of 4 urns without monumental structures were found (Fokkens and Jansen 2004, Jansen and Fokkens 2007, Fokkens et al. 2012). Samples for pollen analysis were taken from the two ring ditches that were found in 1997 (see figure 12.3). One of the samples from the northern ditch (urnfield ditch sample 2) was useless for pollen analysis (de Kort 1999).
Posts

In 1997 a double and partly triple post alignment was found. This post alignment was located partially underneath the eastern part of the Chieftain's Grave, dating the post alignment before the Hallstatt C period. The alignment is probably related to the Bronze Age burial underneath the Chieftain's Grave (Fokkens and Jansen 2004, Jansen and Fokkens 2007, Fokkens et al. 2012).

A six-post structure was found directly north of one of the ring ditches, which was interpreted as a mortuary house. It was not possible to date this post structure (Fokkens et al. 2012). None of the posts were sampled for pollen analysis.

Oss-Zevenbergen

Approximately 350 m east of the Chieftain's Grave a barrow complex including at least seven burial mounds and several post structures is located (see figure 12.5), called Oss-Zevenbergen. The barrows date from the Middle Bronze Age to the Early Iron Age. They are situated on a ridge of cover sands in a southwest to northeast alignment. Below follows a description per barrow. All information about these barrows is based on the publication of van Wijk et al. (2009), unless stated otherwise.

Oss-Zevenbergen 1

In 2004 Barrow 1 was the first to be excavated. The mound itself had mostly disappeared, but the ditches were for the greater part still recognizable. Barrow 1 is a long bed that measured 4.7 m by at least 23.5 m. Its height was probably between 30 and 50 cm. It probably dated to the Late Bronze Age/Early Iron Age (van Wijk et al. 2009, 73-74). The soil underneath the barrow was a Carbic Podzol (Dutch classification: Haarpodzol). De Kort took five samples for pollen analysis, of which three were analysed: two pollen samples of the old surface and a sample from the fill of the lower part of the surrounding ditch (de Kort 2009, 158).

Oss-Zevenbergen 2

Barrow 2 was recognized as a burial mound in 1964/1965, but not excavated until 2004. It was situated on the highest part of the cover sand ridge. The barrow appeared to be a two-period barrow. The primary mound was built on top of a pit that was filled with thin (5-10 cm) sods. No skeletal remains have been found in this pit. The mound was constructed of sods with a thickness of 10-15 cm and an average length of 34 cm. The diameter of the first period was approximately 12.5 m. Its height was probably approximately 60 cm. The mound was increased to a height of approximately 1.2 m and a diameter of approximately 17.5 m. No grave was found. A closely spaced double post circle was placed around the mound probably preceding the sod placing (the mound seemed to cover the post holes), dating the second phase of mound building also to the Middle Bronze Age (1700-1300 cal BC, cf. Bourgeois 2013, 34). The old surface belonging to period 1 was, different from what was underneath the other barrows, an Umbric Podzol (Dutch classification: Moderpodzol). The secondary mound was also constructed of sods of which the thickness is unknown. The mound was increased to a height of approximately 1.2 m and a diameter of approximately 17.5 m. No grave was found. A closely spaced double post circle was placed around the mound probably preceding the sod placing (the mound seemed to cover the post holes), dating the second phase of mound building also to the Middle Bronze Age (1700-1300 cal BC, cf. Bourgeois 2013, 34). The barrow was re-used in the Iron Age, when an Iron Age urn with cremation remains was placed in the mound. In the Medieval

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14 The barrow was heavily damaged and exact measurements could not be reconstructed (Fokkens et al. 2009).
Period another three graves were dug at the base of the mound. Barrow 2 has been sampled for pollen analysis by de Kort (2009). Samples were taken from the E- and B-horizon underneath the primary mound, from 2 sods belonging to the first period, from the old surface underneath the secondary mound and from a sod belonging to the second period. Another sample was taken from underneath a grey layer that covered the sods of period 1, but since it is not very clear what this sample represents it will not be discussed.

Oss-Zevenbergen 3

Barrow 3 is located approximately 40 north of the barrow alignment and situated in a lower part of the area. It was first discovered in 1964/1965 and excavated in 2004. It is a single-period barrow with a diameter of approximately 30 m. Its original height is not exactly known but is conservatively estimated to have been approximately 90 cm. The mound was constructed of sods with an average thickness of 8-18 cm and an average length of 50 cm. The central grave consisted of a large burnt oak plank, some smaller pieces of charcoal, a piece of burned bone, a small fragment of a bronze sword and fragments of one bronze and two iron objects; probably a pars pro toto deposition (only parts of an object and/or the deceased have been buried representing a whole object and/or person). The barrow was dated to the Hallstatt C period (Early Iron Age), based on 14C dating of the oak plank and might be contemporary to the Chieftain’s Grave. The soil underneath the barrow was a Gleyic Podzol (Dutch classification: Veldpodzol). Samples for pollen analysis have been taken from the old surface and from three sods by de Kort (2009).

Oss-Zevenbergen 4

Barrow 4 was heavily disturbed and not recognized as a barrow before the excavation in 2004. Barrow 4 concerns a barrow that was built in four phases. The first phase consists of a sod layer with a thickness of approximately 15 cm. Before adding a new layer of sods (phase 2) burning seems to have taken place, indicated by a high concentration of charcoal fragments in the old surface underneath phase 2. Phase 2 consists of another layer of 10-15 cm thick sods (length about 80 cm). After phase 2 the mound measured approximately 14.5 m in diameter and approximately 50 cm in height. Another burning event seems to have taken place after phase 2 as indicated by fragments of charcoal. Charcoal fragments 14C date this layer to phase 2 to the Middle Bronze Age A (1530-1390 cal BC). The barrow was increased to a height of approximately 60 cm in phase 3, while the diameter of the mound was not enlarged. No sods have been recognized in this layer. In the fourth phase the mound was probably enlarged to a diameter of about 16 m, while the mound was not heightened. After the last period the mound was covered with a layer of drift sand. Underneath the barrow a disturbed brown layer was found on top of which the old surface belonging to the primary mound was situated. This layer was probably anthropogenic and was interpreted as an old arable layer. Five samples have been analysed for pollen by de Kort (2009). One sample was taken from the old surface underneath the drift sand layer at the southern part of the barrow. Four samples were taken from the old surface belonging to phases 2, 3 and 4. A fifth sample was taken from the disturbed brown layer underneath the old surface.
Mound 5

Mound 5 was recorded as a barrow in 1964/1965. During the excavation in 2004 it appeared not to be a barrow but a natural hill formed of drift sand. Two samples for pollen analyses were taken from the old surface underneath the hill (de Kort 2009).

Oss-Zevenbergen 6

Barrow 6 was first excavated in 1964/1965 by Verwers. The data from this excavation were reinterpreted by Valentijn (2013). It was discovered that a round mound was built on top of an oblong monument. Next to the ditch a closely spaced multiple post setting was found. Pottery sherds together with cremation remains were found. In 2004 the eastern part of the barrow was re-excavated. The western part of the monument could not be excavated yet since this part was situated in a protected zone due to a badger sett in barrow 7 (see next section). It was concluded that barrow 6 was constructed in two or three phases, but possibly these construction phases occurred in the same period (the Late Bronze Age/Early Iron Age). The first (and possibly second) phase consisted of an oblong ditch and a double ring of posts with a length of 27 m and width of 7.5 m. In the next phase a round barrow was erected within the eastern part of the oval monument (van Wijk et al. 2009).

In 2007 the remaining part of the monument could be excavated, revealing that the oldest peripheral structure is the double post setting, which measures 28.5 by 8.5 m. The post setting probably dates to the Middle Bronze Age B or Late Bronze Age. During the second phase an oval ditch was dug that cut the inner post-setting. It was also shown that the round mound probably was the remains of a disturbed long mound. The long mound was extended on the southern side, covering the oblong ditch (Valentijn 2013). In 2007 one single sample for pollen analysis was taken from the ditch, which was analysed by Bakels (Bakels and Achterkamp 2013).

Oss-Zevenbergen 7

Barrow 7, a large mound with a diameter of about 36 m and a height of 1.5 mm, was first discovered in 1964/1965. During the excavation campaign of 2004, when most of the other barrows at Oss-Zevenbergen were investigated, this barrow had to be left alone. A badger family made the barrow their home and since badgers are a protected species in the Netherlands Barrow 7 (and part of Barrow 6) could not be excavated before the badgers had been relocated. Finally, in 2007 the barrow could be thoroughly investigated. It appeared to be built of sods on a naturally formed small hill of cover sand and the actual barrow did not measure 36 m in diameter, but 22.8 m, and was 80 cm high. On the northern side of this hill wind-blown sand was deposited in the Middle Neolithic. Underneath the burial mound a Carbic Podzol (Dutch classification: Humuspodzol) had developed in the cover sand. An Early Iron Age urn (Schräghals type) was excavated near the centre of the mound. The urn was half-filled with cremation remains that appeared to be from a male in the age of 23-40 years. The bone was $^{14}C$ dated to the Hallstatt C period (794-538 cal BC) (Fontijn et al. 2013a, 96; Smits 2013). Very close to the urn more than 1000 small, bronze studs and large amounts of scattered charcoal

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15 The original height of the mound could not be exactly reconstructed, but it was presumed that at least 30 cm of the original top was absent (Fontijn et al. 2013a, 70).
16 Based on OSL dating by Wallinga and Lemmers, reported in an unpublished thesis (Lemmers 2008), the deposition took place around 5000 BC.
were found. Since the bronze and wood items appeared to be very fragile it was decided to lift the area with its finds, covering an area of approximately 10 m², in blocks to allow for further treatment, preservation and excavation in a laboratory (cf. Fontijn et al. 2013a, 80-81).

The charred wood consisted of oak (94%), ash (5%) and willow (<1%). In the centre of the mound three charcoal pieces were recovered from the find assemblage. These charcoal fragments were ¹⁴C dated to the Hallstatt C period (Fontijn et al. 2013a, 115-116). Several fragments of burned bone were found in between the pyre remains as well as two pieces of decorated (animal) bone and an undefined iron object. The burned bone most likely belonged to the same individual as the remains in the urn that was buried next to the pyre debris, although this cannot be confirmed with absolute certainty (van der Vaart et al. 2013, 138-139). The bronze items probably were the remains of a wagon/horse-gear (yoke decoration) that was dismantled and then partly burned with the deceased. The burned remains were partly deposited a little to the east of the pyre and partly left behind (Fontijn and van der Vaart 2013, 191, 193). The A-horizon was missing under the centre of the barrow, indicating that the surface was stripped before the pyre was built (Fontijn et al. 2013a, 114). Altogether, Barrow 7 appeared to be a rich Hallstatt C burial mound, broadly contemporaneous with the Chieftain's Grave and Barrow 3.

In the corner of the southwest quadrant traces of an oval pit containing a large amount of charcoal were discovered underneath the barrow. The pit was dated to the Middle Bronze Age A based on ¹⁴C dating of a piece of charcoal that was retrieved from the pit fill (Fontijn et al. 2013a, 111-112). Close to this pit, traces of an (pre-barrow) eight-post structure were found. This feature was interpreted as an allée, a corridor related to funerary activities, comparable to the post alignment that was found underneath the Chieftain's Grave (see 12.1). The allée might have been related to the funeral activities of Mound 6 (Fontijn et al. 2013a, 110-111).

Samples for pollen analysis were taken from several locations in the barrow. As a large part of the top surface of the hill was stripped before the barrow was erected on top of it, sampling of the old surface was difficult, but on top of the wind-blown sand dune part of the old surface was preserved. A monolith tin that was driven in this section contained two soils on top of each other of which the lowest probably contained the old surface underneath the dune and the upper the old surface underneath the actual barrow. The lower soil did not reveal pollen. From the results of the upper soil a pollen diagram was derived, based on the theory described in Chapter 5. In addition eight samples that were taken from sods were analysed for pollen. Sampling and analysis of these samples was done by Achterkamp as part of her research master's thesis (Achterkamp 2009, Bakels and Achterkamp 2013). In 2009 a bulk sample was taken from the central grave assemblage by Restaura, the laboratory at which the lifted blocks were investigated. This sample was analysed for pollen by the author of the present work.

Oss-Zevenbergen 8

Barrow 8 was for a great part excavated in 1964/1965 by Modderman and Verwers. The last part (northwest quadrant) was excavated in 2004. The results of both excavations show that Barrow 8 is a single period barrow that measured approximately 12 m in diameter and 0.6 m in height. It was built of sods, covering an inhumation grave. The barrow was dated to the Early or Middle Bronze Age, based on the stretched position of the deceased. The barrow contained two
secondary interments (urns) of which the oldest dates to the Middle Bronze Age and the youngest to the Early Iron Age. An encircling ditch with a diameter of 9.5 m was dug into the barrow probably when the youngest urn was buried. The ditch was most likely part of the urnfield that was located northwest of Barrow 8 (see next section; van Wijk et al. 2009, 121-126). Samples were taken for pollen analysis: two samples from the old surface, one from the ditch fill and one from a sod18. In addition a monolith tin was driven into the soil underneath the barrow of which three samples have been analysed (de Kort 2009).

Urnfield, Oss-Zevenbergen 9-12

North of the barrow alignment the remains of a small urnfield were found (see figure 12.5). In addition to the Early Iron Age ditch at Barrow 8 (the remains of) four ring ditches were found, called Barrow 9 (d=5 m), 10 (d=7.5 m), 11 (d=4 m) and 12 (d=2.5-2.8 m). Fragments of urns were found in Barrows 10 and 11, which were dated to the Early Iron Age (van Wijk et al. 2009, 126-131). Samples for pollen analysis were taken from the ditch belonging to Barrow 10, 11 and 12. One sample from the ditch of Barrow 12 has been analysed by de Kort (2009). The samples of the ditch of Barrow 10 have not been analysed and the samples from the ditch of Barrow 11 did not contain enough pollen for analysis.

Post alignments and post structures

Five post alignments and four post structures were revealed during the excavation in 2004 (see figure 12.5). Post alignment 1 is situated east of Barrow 3 and about 116 m long. At the southern part of the alignment (close to Barrow 3) some additional posts were found, belonging to post structures 1 and 2 (see figure 12.5). Post alignment 2 is situated in extension of alignment 1, but with different orientation. Its length is unknown, but at least 18 m and probably 32 m. Post alignment 3 was found east of barrow 4 and has a length of 58 m. Two extra posts were placed parallel to the alignment, forming post structure 3. A 17 m long alignment of posts is situated between Barrows 6 and 8. The fifth post alignment is located between Barrow 8 and Mound 5. At the end of this 8 m long alignment post structure 4 is situated, consisting of 4 posts. The dating of the post alignments and structures is unknown, but van Wijk et al. argue that they belong to the urnfield and that they date to the Early Iron Age (van Wijk et al. 2009). The fill of one of the post features of alignment 1 was sampled and analysed for pollen by de Kort (2009).

Drift sand layer

Thin layers of drift sand were present throughout the entire Oss-Zevenbergen area, probably the result of (post) Medieval small scale sand drifting due to the intensive use of roads. An older layer of drift sand was found in the southeast of the area. A sample from the old surface underneath this sand layer was analysed for pollen by de Kort (2009).

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18 At the time the samples were taken it was not entirely clear yet whether the barrow was built in one phase or in two phases. In between the sods a layer with grey-yellow sand was present. It was not clear whether this layer represented a second building period or that sods were taken from less developed podzol or that the barrow was built of sods and sand. It was later concluded that the barrow was built in one phase. The pollen sample was taken from one of the sods taken from less developed soil/sand layer.
One barrow complex or not?

The Oss-Vorstengraf area was at first believed to be separate from the Oss-Zevenbergen barrows. However, it has also been assumed that they formed one large barrow complex (Fokkens et al. 2009a, 223-224). The area was probably first used for barrow building in the Late Neolithic, when a barrow was built in the Oss-Vorstengraf area. In the Middle Bronze Age (A) the burial complex got its shape, with probably six barrows dating to this period: the Bronze Age mound underneath the Chieftain’s Grave, two additional barrows nearby and Barrow 2, 4 and 8 in the Oss-Zevenbergen area. In the following period several barrows were enlarged and/or used for secondary burials. In the Late Bronze Age/Early Iron Age two additional mounds were constructed (Barrows 1 and 6) and in the Hallstatt C period (Early Iron Age) three more barrows were added to the now already extensive burial complex (Barrow 3, 7 and the Chieftain’s Grave). Two small urnfields were probably contemporaneous to the Hallstatt barrows.

The barrow complex of the Oss-Vorstengraf area and the Oss-Zevenbergen area might certainly have formed one barrow complex, since they are similar in time depth. It is however not likely that they physically formed one complex. West, east and south of the Oss-Zevenbergen area seepage of groundwater occurs, causing these areas to be very wet. The occurrence of seepage water west of the Oss-Zevenbergen area creates a natural boundary between the barrow complex of Oss-Zevenbergen and the Vorstengraf area (R. Jansen pers.comm., March 2013; see also the introduction of section 12.1.1 and figure 12.1).

12.1.2 Results

Now follows a description of the results per barrow/sampled feature of which the data have been produced by several researchers mentioned in the previous section. The data have been reprocessed and reinterpreted by the author. After this section this reinterpretation will be discussed in section 12.1.3.

Oss-Vorstengraf area

Chieftain’s Grave, old surface and sods (see figure 12.6a)

The pollen spectra from the old surface and sods are very similar, indicating that sods belong to the same environment as the barrow. They show arboreal pollen percentages of approximately 55% (ADF= 100 m), except for sod 1 that shows an arboreal pollen percentage of almost 70%. The arboreal pollen component is very much dominated by Alnus pollen with percentages of over 65%, indicating an alder carr was present in the near surroundings. Corylus is well represented with percentages of 10-20%, being present in the drier parts of the surrounding forest. Quercus (ca. 5%), Tilia (1-2%) and Fagus (1-3%) pollen, also representing components of the dry forest, are present in low percentages. Herbal pollen consists of almost only Ericales, showing that a species-poor heathland was present at the site.

Chieftain’s Grave, tree fall section (see figure 12.6b)

The pollen diagram shows a vegetation development from the period before the construction of the Chieftain’s Grave. Arboreal pollen percentages fluctuated through time between 40% and 80%, indicating a fluctuating ADF between 25 and 150 m. This is mainly caused by fluctuating percentages of Ericales pollen. Other herbs are almost absent. Alnus shows an increase from about 40% to 60%, Corylus decreases from 45% to 25%. Tilia decreases while Fagus appears. The
is included. In the total NAP (= non arboreal pollen) AP (= arboreal pollen) used, indicated with different colours.

Figure 12.6a-c. Pollen spectra from the samples taken from the Chieftain’s grave of Oss area. 12.6a: pollen spectra from the samples taken from the old surface and sods; 12.6b: pollen diagram from the samples taken from section captured by the roots of the fallen tree; 12.6c: pollen spectra from the samples taken from the ditches in the Chieftain’s grave of Oss area. BA= Bronze Age, EIA= Early Iron Age. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (=arboreal pollen) Betula is included. In the total NAP (= non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours.
Figure 12.6b
Figure 12.6c
oldest samples show percentages of up to 20% while this species has decreased to less than 5% at the time the barrow was built.

Bronze Age ditch (see figure 12.6c)
The Bronze Age ditch (underneath the Chieftain’s grave) shows an arboreal pollen percentage of approximately 60% (ADF is around 50 m). The two dominating tree pollen species are *Alnus* (~45%) and *Corylus* (~35%). *Quercus* pollen is present with a percentage of 10%. Other trees are present in percentages less than 2%. Herbal pollen mainly consists of Ericales with a percentage of 55%.

Urnfield
The ditches belonging to the urnfield of the Oss-Vorstengraf area show arboreal percentages of about 55%, indicating an open space with an ADF of approximately 75-100 m. The herbal vegetation is dominated by Ericales with pollen percentages of 70-80%. The arboreal pollen component is dominated by *Alnus* (35-45%), *Corylus* (35-45%) and *Quercus* (5-10%).

Oss-Zevenbergen
Oss-Zevenbergen 1 (see figure 12.7)
The pollen spectra taken from the old surface, and the ditch belonging to arrow 1, show arboreal pollen percentages of 45-60% (ADF=50-125 m). Tree pollen is dominated by *Alnus* (ca. 50%), indicating that an alder carr was present nearby. *Corylus* (ca. 30%) and *Quercus* pollen (5-10%) represent the forest in the higher and drier environment. Herbal pollen is dominated by Ericales with percentages from 60-120%. Other herbs, including anthropogenic indicators, are almost absent.

Oss-Zevenbergen 2 (see figure 12.8)
The oldest period, which is represented by the sample from the B-horizon, shows a non arboreal pollen percentage (NAP) of about 70%, indicating the open space had an ADF of approximately 300-500 m. The high NAP is mainly the result of a very high percentage of Ericales pollen of over 200%. Some other herbs like Poaceae are present although in low percentages of less than 5%, indicating that the heathland was poor in species. The arboreal pollen component consists of mainly *Alnus* (ca. 45%), *Corylus* (ca. 30%), *Quercus* (ca. 10%) and *Tilia* (ca. 3%). The following period, represented by the sample taken from the E-horizon, shows a higher arboreal pollen percentage of about 70%, indicating that the open space was probably much smaller at this time. The arboreal component is comparable to the B-horizon, except for an increased percentage of *Corylus* (ca. 45%). The percentage of Ericales decreased to about 40%. The following periods, represented by respectively the sods of period 1 and the old surface and sod belonging to period 2, show similar pollen spectra as the E-horizon with an AP of about 55-70%. Only *Corylus* has decreased slightly till around 35% at the youngest period in favour of *Alnus*, which has increased to approximately 50%. The old surface belonging to period 2 shows a peak of 20% in Poaceae pollen.
Pollens. In the total AP (=arboreal pollen) Betula are excluded. Different scales have been used, indicated with different colours. MBA= Middle Bronze Age.
Oss-Zevenbergen 3 (see figure 12.9)
The sods and old surface show similar pollen spectra, indicating that the sods were cut in the near vicinity of the barrow location. The old surface and sods of Barrow 3 show arboreal pollen percentages of approximately 55-60%, indicating an open space with an ADF of approximately 75-100 m. The main tree species is *Alnus* with percentages of more than 50%. *Corylus* is also present in high amounts (20-45%), together with *Quercus* (3-15%). Ericales pollen dominates the non arboreal pollen component with percentages of 50-80%. Other herbs are almost absent, except for Poaceae with a percentage of 40% in sod 3.

Oss-Zevenbergen 4 (see figure 12.10)
The oldest sample, from the anthropogenic layer underneath the mound, shows an arboreal pollen percentage of approximately 50% (ADF is around 100 m). This arboreal pollen component consists of *Alnus* (ca. 40%), *Corylus* (ca. 40%), *Quercus* (ca. 10%) and *Tilia* (ca. 10%). The herbal pollen component is mainly Ericales (ca. 50%) and Poaceae (ca. 10%). There are few other herbal pollen species, which are present albeit in very small amounts.

The pollen spectra from the barrow period and the following periods show a decrease in the arboreal pollen percentage, indicating an increasing ADF of the open space. At the time the barrow was built AP was around 60%, which decreased to 15% just before the wind-blown sand covered the barrow. This is mainly due to an increase of Ericales pollen, which increases to over 500%. At that time some changes are visible in the arboreal pollen composition: *Quercus* has increased to approximately 25%, while *Corylus* has decreased to around 20% and *Tilia* has disappeared.

Mound 5 (see figure 12.11)
Pollen spectra from the old surface underneath this naturally formed hill show arboreal pollen percentages of 40-55%. Arboreal pollen is mainly *Alnus* (ca. 45%) and *Corylus* (ca. 45%). *Quercus* is present in percentages of about 10%. Ericales is the dominant herbal pollen with percentages of 75 to 150%.

Oss-Zevenbergen 6 (see figure 12.12)
The ditch of Barrow 6 shows an arboreal pollen percentage of 50% (ADF is around 100 m). Ericales (ca. 90%) is dominant in the non arboreal pollen component. Dominant trees are *Alnus* (ca. 50%) and *Corylus* (ca. 40%). Pollen from other trees like *Quercus*, *Tilia* and *Ulmus* are present in lower percentages (3-5%).

Oss-Zevenbergen 7, sods and grave (see figure 12.13a)
Pollen spectra from the sods and the grave show arboreal pollen percentages of 40-60%, indicative of an open space with an ADF of 75-150 m. The arboreal pollen component consists mainly of *Alnus* (45-65%), indicating an alder carr in the surroundings. Some difference between the sods in the percentages of *Alnus* might indicate that some were taken closer to an alder carr than others. The arboreal component representing the drier forest is dominated by *Corylus* (25-40%) and *Quercus* (5-15%). The herbal pollen component is dominated by Ericales with percentages of 65-150%.
Figure 12.9. Pollen spectra from the samples taken from Oss-Zevenbergen barrow 3. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (=arboreal pollen) Betula is included. In the total NAP (=non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours.
Figure 12.10. Pollen spectra from the samples taken from Oss-Zevenbergen barrow 4. OssZ4_brown is the pollen sample taken from the disturbed brown layer underneath the old surface. OssZ4_os_drift is the pollen sample taken from the old surface underneath the drift sand layer at the southern part of the barrows. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (=arboreal pollen) Betula is included. In the total NAP (=non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours. MBA= Middle Bronze Age.
Figure 12.11. Pollen spectra from the samples taken from Oss-Zevenbergen mound 5. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (=arboreal pollen) Betula is included. In the total NAP (=non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours.

Figure 12.12. Pollen spectra from the samples taken from Oss-Zevenbergen barrow 6. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (=arboreal pollen) Betula is included. In the total NAP (=non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours. LBA= Late Bronze Age, EIA= Early Iron Age.
Figure 12.13a-b. Pollen spectra from the samples taken from Oss-Zevenbergen barrow 7.
12.13a: pollen spectra from the samples taken from the sods and the grave. 12.13b: pollen diagram from the section taken underneath barrow 7. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (=arboreal pollen) Betula is included. In the total NAP (= non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours.
Oss-Zevenbergen 7, pollen diagram (see figure 12.13b)

The pollen diagram shows a vegetation development from the period before the barrow was constructed. The arboreal pollen percentage fluctuated between 42% and 77% and at the time the mound was built an arboreal pollen percentage of approximately 55% can be seen, indicating an ADF of approximately 75-100 m. The herbal vegetation is dominated by Ericales, which fluctuates from over 100% to 30%. The arboreal pollen percentages fluctuate some with Alnus (35-50%), Corylus (35-45%), Quercus (5-20%) and Tilia (2-10%) being the main components.

Oss-Zevenbergen 8 (see figure 12.14)

The arboreal pollen percentage fluctuates between 35 and 60%, indicating a fluctuating size of the open space with an ADF of 50-250 m. Percentages of Ericales fluctuate between 65-180%. Other herbal species show only low pollen percentages, indicating the presence of a species-poor heathland. The arboreal pollen component is dominated by Alnus, which seems to increase from about 25% to 45-50%. Corylus is fluctuating between 35-45%. Percentages of Quercus (5-15%) and Tilia (0.5-10%) show a slight decline. Remarkable is the high percentage of Betula in the oldest sample, while Betula pollen only occurs in low amounts in all other pollen spectra from all mounds. Perhaps a Betula tree was standing nearby.

Oss-Zevenbergen 12 (see figure 12.15)

The pollen spectrum derived from the ditch that remained from barrow 12 shows an AP of approximately 50% (ADF is around 100 m). Alnus (ca. 60%) and Corylus (ca. 30%) are the main components of this arboreal pollen percentage, while Ericales is the dominating herb (ca. 80%).

Post alignment 1 (see figure 12.15)

The pollen spectrum from one of the posts from the post alignment shows an arboreal pollen percentage of 40%. The main trees are Alnus and Corylus with a pollen percentage of 45%. Herbs are dominated by Ericales with a percentage of 150%.

Drift-sand layer (see figure 12.15)

The pollen spectrum from underneath the drift-sand layer shows an arboreal pollen percentage of 45%. Alnus (ca. 55%) and Corylus (ca. 35%) are the main trees, while Ericales (ca. 120%) pollen dominates the herbal vegetation.

Size of the open space

The minimum size of the open spaces can be estimated by the measurements of the barrows and the height of the sods that had been used in the construction of the mounds (see section 7.1 and table 12.2). This leads to the following estimates of sod-cut area:

Chieftain’s Grave: 11036 m², \( r_{\text{open area}} = 59 \) m, based on a circular open spot
Oss-Zevenbergen 1: 442 m², \( r_{\text{open area}} = 12 \) m
Oss-Zevenbergen 2: 284 m², \( r_{\text{open area}} = 9.5 \) m
Oss-Zevenbergen 3: 24504 m², \( r_{\text{open area}} = 28 \) m
Based on the ratio AP versus NAP of the old surfaces the open spaces the barrows were built in had an ADF of 50-150 m. The sizes of the open spaces will be discussed more in detail in section 12.1.3.

12.1.3 Discussion

The barrow landscape

Middle Bronze Age (Oss-Zevenbergen 2, 4 & 8)

The oldest group of barrows at Oss-Zevenbergen that was sampled for pollen analysis (Barrow 2: sods and old surface period 1 & 2; Barrow 4: period 2; Barrow 8: Ah, sods) shows that the mounds were built in species-poor heathland. Based on the similarity of the pollen spectra from the sods and the old surface, the sods that were used to build the barrows were probably cut in the near surroundings of the barrow location. Since the barrows were located close together they were probably constructed in one open space with an ADF of about 25-100 m, based on arboreal pollen percentages of 50-70%. The forest in the environment was probably quite open with a high percentage of Corylus at the forest edge. Besides Corylus the forest’s main components were Quercus and some Tilia.

Betula is present in all spectra, which could indicate its presence in the forest or perhaps some individual trees in the heathland area. In the wetter parts of the area most likely alder carr was present. This might have been a few hundred metres north of the barrows, the lowest part in the area based, or at the ‘groundwater seepage wetland areas’ in the area (see figure 12.2).

The Bronze Age ditch of the Chieftain’s Grave shows an arboreal percentage of about 60%, indicating an open place at the Oss-Vorstengraf area with an ADF of approximately 50 m. The barrow was built in heath vegetation with mainly Ericales. The forest in the surroundings is, as expected, comparable to the forest around the Oss-Zevenbergen barrows. The heath in which Barrows 2, 4 and 8 were situated was most likely separate from the heath in which the Bronze Age barrow of the Vorstengraf area is situated. As has been mentioned in 12.1.1, seepage water occurs in between the Oss-Zevenbergen and the Vorstengraf area, causing conditions that were probably too wet for heath vegetation. One heathland area stretching from the Oss-Zevenbergen area to the Vorstengraf area is therefore very unlikely.

Late Bronze Age/Early Iron Age (Oss-Zevenbergen 1&6)

Compared to the Middle Bronze Age not much seems to have changed. Barrows 1 and 6 were built in an open space covered with species-poor heath vegetation. The estimated ADF of the open space was approximately 50-100 m (AP= 45-60%). The composition of the forest seems unchanged with mainly Quercus and Tilia. Corylus was present at the forest edge. Alder carr was present in the lower and wetter parts of the area. The spectrum of barrow 6 might represent a slightly older period than the spectrum of Barrow 1, since Fagus is not present here.
Figure 12.14. Pollen spectra from the samples taken from Oss-Zevenbergen barrow 8. OssZ8_Eh, OssZ8_EB and OssZ8_B2h are samples taken from the profile underneath the barrow, at respectively 6 cm, 10 cm and 14 cm underneath the old surface. OssZ8_Eh_ditch is a sample taken from the E horizon in the ditch fill. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (= arboreal pollen) Betula is included. In the total NAP (= non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours. EBA= Early Bronze Age, MBA= Middle Bronze Age.
Figure 12.15. Pollen spectra from the samples taken from urn field barrow 12, the posthole fillings, and from the old surface underneath the drift sand layer. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (=arboreal pollen) Betula is included. In the total NAP (= non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours. EIA= Early Iron Age, ME= Medieval Period.
Early Iron Age (Hallstatt C) (VG, Oss-Zevenbergen 3 & 7, urnfield)

The younger barrows in the Oss-Zevenbergen area (3, 7) were built in open spaces that were perhaps slightly larger than the older ones were built in (AP=40-60%, ADF=50-150 m). The composition of the heath vegetation had not changed considerably and it was still poor in species. The forest seemed not to have changed very much, except for Tilia being partly replaced by Fagus. Some differences can be seen between sods belonging to the same barrow. This could be the result of different locations the sods were been taken from. Some sods might have been taken closer to the alder carr than others.

The Chieftain’s Grave, about 500 m to the west, shows a similar picture. It was probably erected at approximately 50-100 m from the forest. Especially an alder carr must have been reasonably close, indicated by high percentages of Alnus.

In addition, the pollen spectrum of the ditch of Barrow 12, belonging to the urnfield near Barrow 3, indicates a vegetation composition as described above.

Pre-barrow landscape (Oss-Zevenbergen 2 & 8, Oss-Zevenbergen 7 and Chieftain’s grave)

Two of the Bronze Age barrows (2 and 8) provide information about the landscape before barrow building took place. These spectra show that the open space already existed and that it was covered with heath vegetation before the barrows were built. The forest does not seem to differ greatly from later periods with alder carr in the lower parts of the region and Quercus and Tilia being the main components of the drier forest. However, Tilia seems to have a higher share in the forest at the oldest spectra of Barrows 2 (e.g. Bh_per1; see figure 12.8) and 8 (e.g. Eh, EB and B2h; see figure 12.14). The size of the open space might even have been larger than when the Middle Bronze Age barrows were built, with an ADF up to 200-500 m (AP barrow 2 Bh_per1 and barrow 8 B2h=30%, see figure 12.8 and section 12.14). A barrow in the Oss-Vorstengraf area that dates to the late Neolithic B period was situated about 200 m southwest of the Chieftain’s Grave (figure 12.1b). Although no palynological data are available from this barrow it can be assumed that this barrow was built in heath vegetation as well, based on palynological data discussed in chapter 8-12, showing that all barrows were built in heath vegetation. This could indicate that all barrows were built in a narrow, but long-stretched heath area with a length of about 1 km that was already present in the Neolithic. However, since the area in between the Vorstengraf area and the Oss-Zevenbergen area probably was very wet due to seepage, it is more likely that there were two separate heath areas. In one heath area the Neolithic barrows of the Vorstengraf area were built, in the other heath area the first barrows of the Oss-Zevenbergen group were built.

Barrow 2 was built on an Umbric Podzol (Dutch classification: Moderpodzol). All other investigated barrows were built on a Carbic Podzol (Dutch classification: Humuspodzol). It was suggested by de Kort that the open space in which Barrow 2 was built was created from forest recently, since heath vegetation would have caused degradation of the soil to a Carbic Podzol (de Kort 2009). This could indicate that Barrow 2 was one of the first barrows that was built at Oss-Zevenbergen, before the heath vegetation could change the soil into a Carbic Podzol. However, since the formation of a Carbic Podzol underneath heath vegetation can take 250 years (and most likely takes even a longer period; Andersen 1979), it is not likely that the open space was created very recently or for the intention of building a barrow there.
What the heath areas were used for prior to the barrow building is not known. Flint artefacts, dating to the Mesolithic, have been found during the excavation campaigns in 2004 and 2007 (van Hoof 2009, 186), suggesting that the area was in use by prehistoric man long before the first barrows were erected. Indications for a settlement have only been found for the Middle Bronze Age south of the burial complex (see figure 12.1b; Fokkens and Jansen 2004, Jansen and van der Linde 2013a, 43-44). It was suggested that part of the area might have been used as an agricultural field, indicated by the brown layer that was present underneath Barrow 4. This can however not be confirmed by pollen analysis (see figure 12.10).

All pollen spectra show that a heath vegetation was present that was comparable to that of the barrow period: very poor in species other than Ericaceae. Based on the arboreal pollen percentages the ADF of the open space has probably fluctuated through time before the barrows were built and probably at some point in time, the ADF was larger than when the barrows were built (e.g. maximum AP= 30%-35% in the pollen spectra Bh_per1 of Barrow 2 and B2h of Barrow 8, indicating an ADF of approximately 250-500 m). The fluctuating size of the open space could have been the result of fluctuating human related activities.

As has been explained in previous chapters, to maintain the heath it was probably managed. Changes in grazing pressure could have caused varying ADF, although grazing indicators are not present in high amounts in the pollen spectra. Particles of charcoal that were found in the soil profiles throughout the entire area could indicate that heath vegetation was regularly burned. The heath could also have been managed by sod-cutting. From the Middle Bronze Age onwards sods were cut in the area for the building of barrows, but it is not known whether sods were already cut in the area before. The anthropogenic activities might even have caused local sand drifting events. A layer of wind-blown sand was revealed underneath Barrow 7, indicating such a period of sand-drifting probably in the Neolithic period. This could have been a direct result of (too extensive) heath maintenance activities in the area. When sods are cut a bare soil is left behind. Possibly in combination with intensive grazing activities vegetation was not able to stabilize the soil and the topsoil could be blown away locally. The Middle Neolithic sand-drifting event recorded at Barrow 7 predates the barrow building activities and it is not known whether sod cutting already took place there at that time. Later events of sand-drifting were recorded in the area as well. For example mound 5 appeared to be a natural hill formed of wind-blown sand. Although the mound has not been dated, the pollen spectra from the old surface underneath the sand suggest that the sand was deposited in the Middle Bronze Age (Fagus is still absent). The activity of barrow building might very well have contributed to this sand drifting event.

Pollen spectra showing the vegetation composition from before the Iron Age barrows were built can be obtained from Barrow 7 and the Chieftain’s Grave. Although the pollen spectra from underneath Barrow 7 and the Chieftain’s Grave have not been dated, the pollen composition of both diagrams suggests that they go back to before the Bronze Age barrows were constructed. The lower parts of the diagrams show relatively high percentages of Tilia, reaching 5-10%. These percentages can also be observed in the older spectra of the soil underneath Barrow 2 (e.g. Bh_per1) and 8 (e.g. B2s). Bakels and Achterkamp (2013) suggest that the lowest spectra from the soil underneath Barrow 7 date to the Early Bronze Age, which indeed precedes the Middle Bronze Age barrow building. Then Tilia decreases and Fagus increases, probably representing the replacing of Tilia by Fagus.
The pollen diagrams of Barrow 7 and the Chieftain’s grave both show a fluctuating ADF much like the older barrows. The species-poor heathland areas were probably fluctuating in size and at some point in time larger than when the Hallstatt C barrows were built (minimum AP≈40%, ADF≈150 m).

Post-barrow landscape
What happened to the area after the barrows were built is only partially known. In the Medieval Period the barrow complex of Oss-Zevenbergen was probably used as an execution site. Two inhumation graves dated to the 13th and 14th century cal AD were found dug into Barrow 2 and a 15th century cal AD inhumation grave was found in Barrow 7 (Fontijn et al. 2013b, 313). There are no archaeological traces that could indicate what the area was used for before the Late Medieval Period, but the continued pressure by man is indicated by the pollen spectrum from a sample taken underneath a drift sand layer that had covered Barrow 4. This spectrum shows that the open space had increased, possibly by increased grazing and/or burning activities. Layers of wind-blown sand that were found at the flanks of the barrows could have been the result of this increased activity. It is suggested that they are related to the intensive use of roads in the (post) medieval period (van der Linde and Fokkens 2009, 51).

12.1.4 In conclusion: the history of the Oss-Zevenbergen landscape
A species-poor heathland area was present on top and at the side of a ridge of cover sand in the Oss-Zevenbergen area, long before the first barrows were built. Two heath areas had probably developed, separated by a due to seepage very wet area. The ADF of the open space at Oss-Zevenbergen was probably fluctuating through time and might have reached a maximum of approximately 500 m already long before the barrows were built, according to the pollen spectra of Barrows 2 and 8 (e.g. b2: Bh_per1 and b8: B2b). Grazing and burning activities and possibly sod-cutting were probably involved in maintenance of the heath vegetation and varying pressure in these human related activities might have been responsible for the varying heathland size and perhaps even some local sand drifting when the pressure by grazing, sod-cutting and/or burning became too high.

Some indications for a Middle Bronze Age settlement have been found south of Oss-Zevenbergen (see figure 12.1b) and it can be assumed that the community responsible for heath management activities were settled at this location. Alder carr was present in the lower and wetter areas in the region, probably a few hundred metres to the north of the Oss-Vorstengraf area. The forest in the drier surroundings consisted of mainly Quercus and Tilia with Corylus present at the forest edge. In the Middle Bronze Age barrows (barrow 2, 4 and 8) were built in an open space with Ericaceae as the main vegetation and an ADF of approximately 25-100 m. Since they were located on one of the highest locations in the area the barrows were probably highly visible in the landscape. The heathland had perhaps slightly expanded when the youngest group of barrows was built during the Early Iron Age. Not only were new barrows constructed but also present barrows were re-used. The construction of the very rich Chieftain’s Grave emphasises the importance of this grave field. At this time the forest had undergone some slight changes and Fagus had partly replaced Tilia. After this period the area was probably kept in use for grazing. There are no indications that the area had been used as settlement area or for other activities like crop cultivation. All this time the barrows must have occupied a prominent place in the landscape while situated on a relatively high location with the vegetation kept low by management activities.
12.2 Vorssel

Close to Heesch a group of six barrows is located called the Vorssel. One of these barrows was palynologically investigated by de Kort in 2005 after it was reported disturbed (de Kort 2005).

12.2.1 Site description and sample locations

Mound 2 of the barrow complex was built from sods on top of a Carbic Podzol (Dutch classification: Humuspodzol). The mound has not been dated. Two other barrows in the complex contained Drakenstein urns, dating them to the Bronze Age. Samples were taken from the old surface and from one of the sods of arrow 2. Two samples were prepared and analysed described by the methods Chapter 4.

12.2.2 Results and discussion

See figure 12.16

The barrow was built in an open space with an ADF of about 50-100 m (AP≈55%) covered with heath vegetation. There were only few other herbs besides Ericales present amongst which some grasses. The dry forest in the surroundings consisted mainly of Quercus and Tilia with Corylus at the forest edge. Alder carr was present in the wetter parts of the region and the main contributor to the arboreal pollen component.

12.3 Slabroek

A grave field that is located at Uden-Slabroekse heide (see figure 12.1) has been partially excavated in 1923 by Remouchamps (Remouchamps 1924, Jansen and Louwen in prep.). After the excavation the area has been partially used for crop cultivation until 2003, when it was bought by Staatsbosbeheer to turn it into a nature reserve area. The grave complex was supposed to form part of the area. It was supposed to be presented and to be visible to the public as an archaeological monument and as such to contribute to the cultural tourism. The area was therefore archaeologically investigated in 2005 (prospectively) and excavated in 2010 (van Wijk and Jansen 2005, Jansen and Louwen in prep.). Several samples for pollen analysis have been taken and analysed.

12.3.1 Site description and sample locations

The area is centrally located on the plateau of the Peel Blok, about 4 km south of the Oss-Zevenbergen complex (see section 12.1.1). The urn field is located on a ridge of cover sand. The size of the complex is unknown, but based on present knowledge it should at least have been 250 by 200 m. The soil is classified as a Carbic Podzol (Dutch classification: Haarpodzol). During the Medieval Period the area was covered with heath vegetation until it was used for crop cultivation between the early 20th century and 2003 (see previous section).

The area was first excavated in 1923. At that time 38 burial mounds were discovered. Most of them were built of sods and they were all surrounded by a ditch. In many of the barrows urns were found that were usually placed on the old surface (some were dug into the old surface) before they were covered with a barrow.

In 2005 and 2010 the area was re-investigated. The area was highly disturbed by the cultivation activities during the last century and in 2005 the remains of only 10 of the 38 monuments recorded by Remouchamps were rediscovered. On the other hand, 26 ‘new’ ring ditches and the remains of two burial mounds were
found (van Mourik 2005, 43). The excavation campaign in 2005 revealed that the preservation of all archaeological features was very poor. To document all traces an area of almost two hectares was completely excavated in 2010, when all archaeological features were excavated and recorded. Several ‘new’ burial monuments were discovered in 2010, amongst which a rich Iron Age inhumation grave and several burials from the Roman Period. This excavation revealed that the cemetery must originally have existed of more than hundred burial monuments and probably has been in use from the Bronze Age until the Roman Period (Jansen and Louwen in prep.). From all the burial monuments and features found during the excavations in 2005 and 2010 several samples for pollen analysis have been taken and analysed of which the details will be described below.

Slabroek 39 and 40

In 2005 the remains of two burial mounds were excavated, Slabroek 39 and 40. Slabroek 39 appeared to be a barrow with a diameter of about 30 m and a height of about 50-60 cm. The burial mound was built of sods that had an average length of 50 cm and were between 7 and 29 cm thick. The central grave was looted. The base of the barrow was dated by OSL to the Middle Bronze Age (1765-1500 cal BC; van Mourik 2005). Samples for pollen analysis were taken and analysed by de Kort and van Mourik. de Kort analysed a sample from a sod and a sample from the old surface underneath the mound (de Kort and van Mourik 2005). Van Mourik analysed a sample from the old surface and two samples were taken respectively 5 and 10 cm below the old surface underneath the mound (de Kort and van Mourik 2005).

Slabroek 40 was heavily disturbed and only 10 cm of its original height had been preserved. It could still be observed that the barrow was built of sods and was surrounded by a ditch with a diameter of 12 m. Three samples were taken from this ditch by de Kort of which two were analysed for pollen: one sample from the base of the primary ditch fill and one sample from the B horizon that had developed in the ditch fill (see figure 12.17; de Kort and van Mourik 2005).

Urnfield

During the excavation of 2005, 26 new ring ditches were discovered. At the north of the burial complex three ring ditches were found, of which one, Slabroek ditch 43 (see figure 12.17) the ditch fill has been sampled for pollen analysis by de Kort (de Kort and van Mourik 2005).

In 2010 all discovered ring ditches belonging to the urnfield have been excavated and recorded. Ditch 43 has been sampled for pollen analysis again and in addition samples were taken from Slabroek ditch 12 (see figure 12.17) by the author of this thesis (see also 6.1). Although none of the ring ditches has been dated urnfields are generally assumed to date to the Late Bronze Age/Early Iron Age. The dating of the urn field of Slabroek can probably be further specified to the Early Iron Age, based on the finds of several Early Iron Age pottery by Remouchamps (Remouchamps 1924).

Slabroek ditch 43 and 12

Ditch 43 has a diameter of 13-14 m. De Kort has taken four samples from the northern part of the ditch. Three of these samples have been analysed: one sample from the B horizon that had developed in the ditch fill, one sample from the base
of the E horizon and one sample from the top of the Eh (de Kort and van Mourik 2005). In 2010 ditch 43 has been sampled for pollen again, but this time samples were taken from the southern part of the ditch (referred to as ditch 43A).

Ditch 12 has a diameter of 7 m. This ring ditch had already been discovered by Remouchamps in 1923, who found an urn that was most likely filled with cremation remains19. From the section of the ditch fill of both ditches 43 and 12 samples were taken from the top to the bottom every cm downwards. Samples from the bottom of the fill have been analysed since it has been argued that samples from the bottom of the ditch fill will probably provide the most reliable information about the period that is closest to the period the ditch was dug (see for argumentation 4.1.4).

Ditch ‘landweer’

At the western part of the burial complex a 340 m long ditch was discovered in 2005 that was partially filled with sods. The ditch was probably part of a Late Medieval defence system called ‘landweer’ generally dating to around 1400 cal AD. Three samples were taken for pollen analysis by de Kort. One sample from the bottom of the primary fill and one sample from bottom of the secondary fill were analysed (de Kort and van Mourik 2005).

12.3.2 Results and discussion

All pollen spectra (fig 12.18) show heath vegetation with mainly Ericales (most likely Calluna as has been found in the urnfield ditches 12 and 43) and some grasses. Through time, the heath area varied in size and was probably smallest at the time (Middle Bronze Age) barrow 39 was built with an ADF of approximately 50 m (AP=60%). The heath expanded in the following period when several ditches were dug in the area during the Early Iron Age, although ditch 12 seemed to have been dug closer to the forest. The heath was probably larger than in the period the ditch of the landweer was dug. AP was only 10-30% in the samples from the B-horizon in that ditch. The pollen spectra are in agreement with the Late Medieval dating suggested by the excavators (see section 12.3.1). This is indicated by the relatively high percentage of Secale, which was not commonly introduced in the Netherlands before the Roman Period (van Zeist 1976, Behre 1992). The find of this species and some other Cerealia indicate that crop cultivation took place nearby. There are no indications that this was also the case in the earlier periods, when the Iron Age ditches and the Middle Bronze Age barrow were created. Some anthropogenic indicators were found, but only in very low numbers.

During the entire period represented by the samples the forest composition did not seem to change much. Alder carr was present in the surroundings on the lower and wetter locations (probably west of the area, see figure 12.1b). Corylus and Quercus dominated the forest on the higher and drier areas. Betula might have been part of the forest or have been present in the heathland area as individual trees. Although not all pollen spectra can be placed exactly in time, it is likely that the area was covered with heath vegetation for centuries and that the area must have been kept open to maintain this heath vegetation.

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19 Cremation remains were not considered interesting at that time and were often discarded.
Excavation 1923
Trenches 2005
Excavation 2010
Ring ditch
Barrow without surrounding features
Possible burial monument
Grave 'Prince(ss) of the Maashorst
Urn
Cremation remains
Posts
Ditch landweer

Middle/ Late Bronze Age
Early Iron Age
Middle Iron Age
Roman Period
Pollen samples 2005
Pollen samples 2010

Figure 12.17. Locations of the samples taken at Slabroek. Figure after Jansen and Louwen (in prep.).
Figure 12.18. Pollen spectra from the samples taken at Slabroek. Spectra are given in % based on a tree pollen sum minus Betula pollen. In the total AP (=arboreal pollen) Betula is included. In the total NAP (=non arboreal pollen) spores are included, non pollen palynomorphs are excluded. Different scales have been used, indicated with different colours.
12.4 Schaijk

12.4.1 Site description and sample locations

Near Schaijk five barrows were excavated in 1937 by van Giffen (van Giffen 1949). The old surface of one of these barrows (Tumulus 3) was sampled and analysed for pollen by Waterbolk (van Giffen 1949, Waterbolk 1954). This barrow has not been dated.

12.4.2 Results and discussion

See figure 12.19

The barrow was built in an extensive heath area with an ADF that could have reached approximately 500 m (AP=25%). Other herbs besides heath were practically absent. The forest in the surroundings was dominated by alder carr in the wetter regions. The drier regions were covered with mainly Tilia, Quercus and Betula with Corylus present numerously at the forest edge.

12.5 Palynological results from palaeosoils, peat and lake sediments

In the environment of the Slabroekse heide van Mourik has palynologically investigated several palaeosoils (fossilized soils), peat and lake sediments (see figure 12.1; van Mourik et al. 2012b). In addition he applied OSL-dating to these soils and sediments and in combination with ^14^C-dating he could make a reconstruction of the evolution of agricultural soils and land forms in the area. The data of his results will be used by the author to make a regional vegetation reconstruction of the area around Oss-Zevenbergen from around 4700 cal BC.

12.5.1 Site description and sample locations

Schaijksche heide

The Schaijksche heide is a former heath area that was used for sod cutting in the 12th and 13th century AD. The most part of the area has been planted with pine forest in the early 20th century, which is the main vegetation at present times. It is located approximately 5.5 km southeast of Oss-Zevenbergen and about 2.5 km northeast of the urnfield of Slabroek (see figure 12.1). The profile that was sampled for pollen analysis consists of a podzol, developed in wind-blown sand, which was deposited on top of a podzol developed in cover sand. The wind-blown sand deposits were dated to around 4700 BC by OSL (three OSL dates were determined: 4790 ± 308 BC, 4666 ± 377 BC, 4684 ± 337 BC). Samples for pollen analysis were taken at 5 cm interval (van Mourik 1985).

Sint Annabos

Sint Annabos is a wetland nature reserve that used to be an extensive alder carr. It is situated about 7 km south of Oss-Zevenbergen and about 3.5 km southwest of the urnfield of Slabroek (see figure 12.1). Peat formation has taken place in the area, which started between 4710 and 4530 cal BC. The profile that was sampled for pollen consisted of three layers. The 2A layer developed in cover sand; the H2 and H1 horizons consisted of peat. The H2 layer consisted of humified sediments and in combination with 

Figure 12.19. Pollen spectrum from the sample taken at the Schaijk barrow. The spectrum is given in % based on a tree pollen sum minus Betula pollen. In the total AP (non arboreal pollen) spores are included. Different soils have been used, indicated with different colours.
organic plant remains and the H1 horizon consisted of humified plant remains with blown in mineral grains (see figure 12.21). Samples were taken every 5 cm (van Mourik 1987).

Venloop

The Venloop is a stream valley where peat formation had taken place on top of a mineral soil (cover sand). Most of the peat had disappeared due to drainage of the area. At some locations the peat was preserved and one of these locations was sampled for pollen analysis (van Mourik and Pet 2001). Samples were taken every 5 cm. According to the $^{14}$C-dating peat formation started between 750 and 410 cal BC. The sampled profile was situated approximately 5 km southwest of Oss-Zevenbergen and 1 km southwest of the urnfield of Slabroek (see figure 12.1).

12.5.2 Results and discussion

See figure 12.20-12.22

At the Schaijksche heide, about 3 km west of the Slabroekse heide, a deciduous forest developed after the wind-blown sand event of around 4700 cal BC. This forest was dominated by Corylus and Quercus. Some Alnus was present in the environment, but probably not in the form of the extended alder carrs that were recorded in the barrow pollen spectra. Heath was already present in considerable amounts. Around 4700 cal BC a short period of sand drifting occurred. Very interesting is to realise that such early events of sand drifting have also been recorded in the Laarder Wâsmeren area (see 10.2) and as has been discussed in Chapter 10, this might indicate an over-exploitation of the soil. The cause of the sand drifting can however not be deduced from the pollen data. Sand drifting might have been a local event; it has not been recorded at St Annabos, which is located about 5.5 km southwest of Schaijksche heide. At the time peat started to accumulate (between 4710 and 4539 cal BC) at St Annabos a birch carr (cf. high percentages of Betula) was present, which probably evolved into an alder carr. The development of an alder carr is probably reflected in the pollen diagram of Schaijksche heide as well, shown by an increase in Alnus pollen. Also at the Venloop, approximately 2.5 km southwest of Schaijksche heide and 1 km south of Slabroekse heide alder carr was dominating the local vegetation when peat accumulation started between 750 and 410 cal BC.

The extensive heath areas that must have been present from the Late Neolithic onwards according to the barrow pollen spectra have not been recorded in the peat diagram of St Annabos as such. This confirms that peat diagrams are not suitable for a total landscape reconstruction, as has already been subject of discussion in section 6.1. Expansion of heath is not recorded before deforestation started accompanied by an expansion of grasses and some Cerealia, shown by all three diagrams. The appearance of Fagopyrum in the diagrams of Venloop and St Annabos indicates that the vegetation development of the area is recorded at least until far into the Medieval period.

12.6 Summary: the barrow landscape of Oss-Zevenbergen and surroundings

The barrow landscape of Oss-Zevenbergen and surroundings is, like the barrow landscapes discussed in the previous chapters, a landscape dominated by open spaces with heath vegetation.
When and how these heath areas came into existence is not known, but an anthropogenic origin is indicated. Heath vegetation was probably part of the landscape already long before the first barrows were built, as has been recorded for instance in the pollen diagram of the Schaijksche heide. The area might even have been intensively exploited, causing sand-drifting as early as around 4700 cal BC. Such early sand-drifting is also known for the Laarder Wasmeren area (see section 10.2) and is remarkable for this period, since man-caused sand-drifting was assumed to have started not before the Early Middle Ages (Castel et al. 1989, Riksen et al. 2006). Heath was able to regenerate at the Schaijksche heide and it is likely that heath was also present at other locations in the area. This is at least the case for the Early and Middle Bronze Age period when several barrows were constructed. It is not known whether the heath at the burial complexes around Oss-Zevenbergen originated from the same early period as at the Schaijksche heide, but heath was probably present at that location since the Late Neolithic, when the first barrows were built. This heath area remained until at least the Iron Age, when the Hallstatt C barrows were created. At that time, when the burial complexes of Oss-Zevenbergen and Oss-Vorstengraf were at their most extensive size, an extensive heath area must have been present.

To conclude, heath was present in the area for thousands of years. To maintain such areas heath management must have taken place, which probably involved grazing and burning. Other human activities were hardly recorded in the area. It is not exactly clear where people lived and where they cultivated their crops. Indications for crop cultivation have hardly been found in the barrow pollen spectra, so it is not very likely that crop cultivation took place close to the burial complexes.

Forest was also part of the barrow landscape. Before the barrows were built, at the time of the sand-drifting (around 4700 cal BC), forest mainly consisted of Quercus and Corylus, with birch carr in the wetter surroundings. Alder brook was starting to expand at the wetter areas like Sint Annabos. At the time the barrows were built extensive alder carrs were present as has been shown by the high amounts of Alnus pollen in all the pollen spectra. These alder carrs could most likely be found at locations like Sint Annabos and Venloop. In the dry forest dominating trees were now Quercus and Tilia with high amounts of Corylus at the forest edge.

Figure 12.20. Pollen diagram from the Schaijksche Heide. Redrawn from the pollen diagram of van Mourik et al. (2012b, figure 9). A percentage diagram is shown, with % based on a total tree pollen sum.
Figure 12.21. Pollen diagram from St Annabos. Redrawn from the pollen diagram of van Mourik (1987, figure 6). A percentage diagram is shown, with % based on total tree pollen sum.
Figure 12.22. Pollen diagram from the Venloop. Redrawn from the pollen diagram of van Mourik et al. (2012b, figure 5). A percentage diagram is shown, with % based on total tree pollen sum.
In conclusion, the barrow landscape of Oss-Zevenbergen and surroundings was a managed landscape of heath areas that could be quite extended, surrounded by *Corylus*, *Quercus* and *Tilia* forest at the drier regions and alder carr in the brook valleys. Part of this managed landscape had its origin probably thousands of years before the first barrows became part of it (in the fifth millennium, see section 12.5). The barrow landscape existed as such for at least several centuries and seems to have been a very stable element in the landscape.

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Table 12.2. The minimum size of the open space per barrow based on the sods used to build the barrows.