SOIL AND ARCHAEOLOGICAL GROUNDWORKS FOR LANDSCAPE DEVELOPMENT PROJECTS OF THE FLEMISH LAND AGENCY

The case study of Assebroek

C. Ampe[1]
K. Gheysen[1]

[1] Vlaamse Landmaatschappij, regio West, Belgium

Corresponding author
Carole Ampe, carole.ampe@vlm.be

ABSTRACT
This paper describes the preliminary soil and archaeological research carried out by the Flemish Land Agency, to achieve a well substantiated project design. At the circular structure of Ver-Assebroek (Bruges), the site of a former medieval castle, a landscape development project aims to increase the visibility of the structure while respecting the soil values and archaeological structures on the site.

KEYWORDS
circular structure, peat, limnic material, land development project

DOI
10.5281/zenodo.3421067

1. Introduction

In Ver-Assebroek (Bruges, Belgium) a large man-made circular structure is positioned on the edge of humid meadowlands (Assebroekse Meersen) and a dry sandy ridge on which the church of Ver-Assebroek is located. Ameryckx (1955) was the first to describe this structure in detail. During the '80s, the site was further examined by De Meulemeester (1981), Soers (1987) and the University of Ghent (UGent) and afterwards a multi-disciplinary research (combining historical, geophysical, soil and archaeological analysis) was contracted (Ryssaert et al., 2010) by the Flemish Government in preparation of the protection of the site as an 'archaeological zone' (2012).

The meadowlands and the archaeological site are part of a land development project called 'Groene Fietsgordel' (VLM, 2009). The project aims to increase the quality of the 'green belt' around the city of Bruges and to complete the missing links between the green spaces of the cycling network encircling the city. A land development plan was agreed between different governmental partners, town councils, farmers, NGO Natuurpunt, and the Water Board (polder). At Assebroekse Meersen the measures consist of restoring the nature values of the humid meadowlands by improving the water management system and securing the future of the archaeological site through visualisation and maintenance.

2. Study area

The circular structure of Assebroek is located on the edge of a large basin-shaped depression (called Assebroekse Meersen) that lies between 3,75 and 5 m TAW (m a.s.l.) south of a cover sand ridge with altitudes of up to more than 10 m TAW.

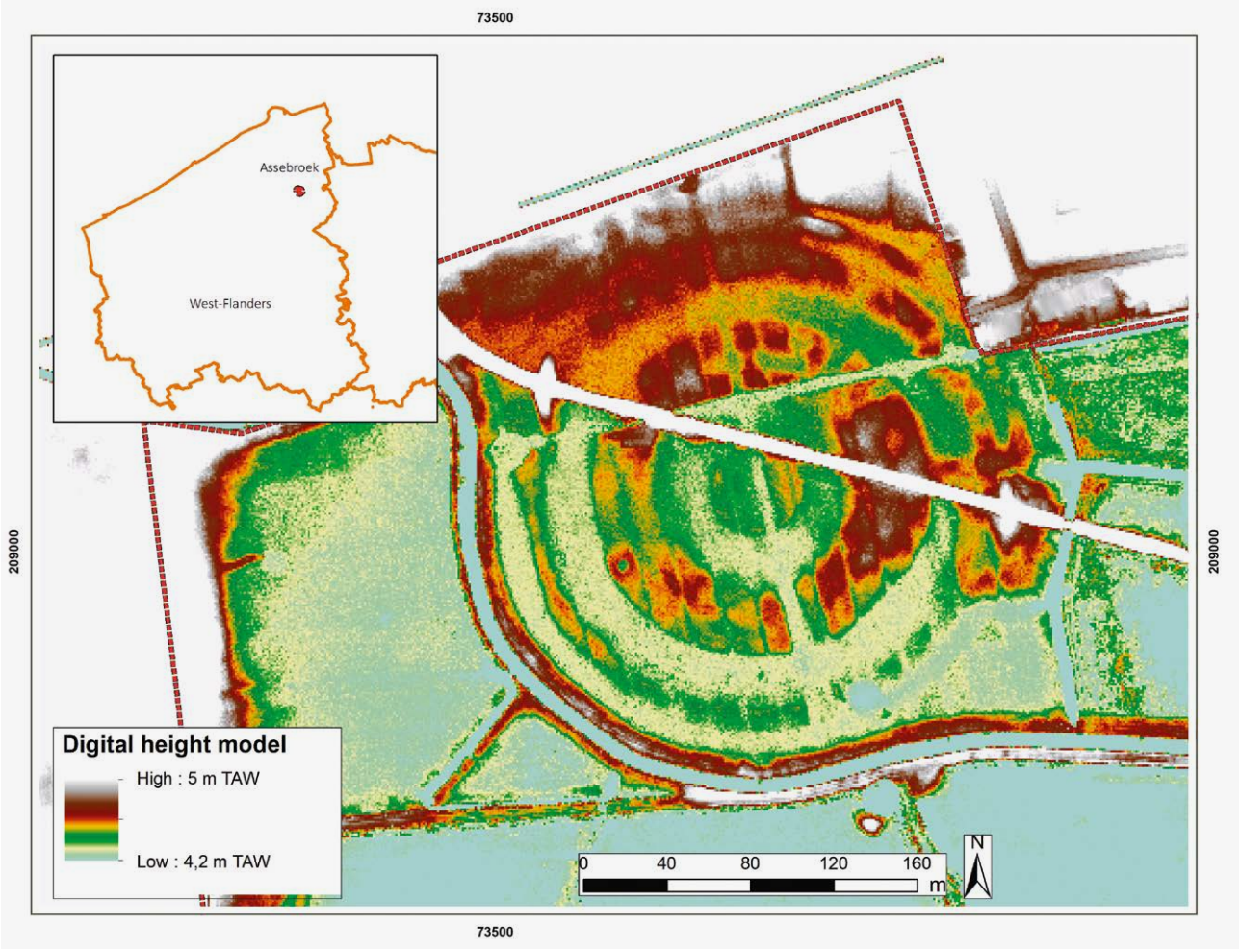


Figure 1. Location of the Assebroekse Meersen in West-Flanders, Belgium and the digital height model (*Digitaal Hoogtemodel Vlaanderen* II, 2013) showing the four circles of the archaeological site.

The Assebroekse Meersen have a very specific landscape position within the Sandy region. They are part of the 'Zuidbrugse dallandschap' (Deduytsche, 1974), a wide basin-formed depression south of Bruges in which different valleys convene. During the Late Glacial period the cover sands were reworked to a broad cover sand ridge from Gistel to Stekene (De Moor and Heyse, 1978) obstructing the river systems. At the Assebroekse Meersen a palaeolake was formed and filled with lake marl sediment. The lake evolved to a swamp and in due course peat developed (soil series V) (Soil map of Belgium, Brugge 23W, MGI, 1958). The soils and former hydrological conditions form a very suitable environment for the development of *Calthion palustris* grasslands.

The circular structure of Assebroek consists of 4 concentric ditches separated by banks. The inner ditch is up to 40 m wide, the second 20 m, the third and fourth only 7 m. The outer circle has a diameter of 260 m. The concentric ditches surround a central platform mound with a diameter of approximately 50 m (Figure 1). The platform was elevated by sand and held a castle in the form of a fortified house or tower. The site was built in the 13th century, but already abandoned at the end of the 15th or early 16th century (Ryssaert et al., 2010). The archaeological findings in the ditches are covered by peat, which suggests water saturation conditions after the abandonment of the site. In the 19th century the area was remediated for agricultural use. New parcelling was applied, ditches were dug and the mound, banks and historical ditches were levelled. In 1863 a tramway was constructed through the site.

3. Aim of the study

The interdisciplinary approach has two objectives: restitution of the original ecosystem and a visual representation of the archaeological site.

The main bottlenecks for the preservation of intended habitats in the meadowlands are 1) excessive drainage in summer causing deep groundwater tables and degradation of the peat; 2) flooding during winter with nutrient rich water from polluted ditches; 3) spilling over of excess water on the meadows of the sewage system after heavy rainfall; 4) changes in the last decades towards a more intensive agricultural use of the meadowlands.

Additionally, the visual observation of the archaeological site of Assebroek is at present very difficult. The microrelief of ditches and banks is hardly observable. Heavy trampling by cattle, drainage by recently made ditches cutting through the site, and the tramway track splitting the site in two are the main causes for the decreased visibility of the site.

The aim of the landscape restoration project is to optimise the water management (both water quality and quantity) on the archaeological site and in the meadowlands. The project will also improve the visibility and 'readability' of the circular structures and the landscape of the archaeological site.

4. Material and methods

The study of the soil and ecology by the VLM and the inventory of the archaeological structure formed the basis of the project design. At the same time, Ryssaert et al. (2010) collected historical data and soil data by augering, geophysical survey and 3 trenches in preparation of the designation of the site as a protected heritage site.

In order to refine the data, additional research by VLM was necessary. Soilscape research through augering consisted of 10 transects in a radial pattern according to the terrain conditions starting from the centre of the archaeological structure. Augerings were placed every 10 m as long as profiles were intact. Distances in between were shortened to 0,5 m whenever the profile morphology changed. Each augering was located by dGPS and combined with the digital height model (*Digitaal Hoogtemodel Vlaanderen* II, DSM, *raster*, 5 m; 2013) and an ecological recording. Soil profiles were described according to FAO guidelines (2006).

5. Results

The digital height model (DTM) (*Digitaal Hoogtemodel Vlaanderen* II, DSM, *raster*, 5m; 2013) was used for an easier location of the structures on the field. By manipulating the height interval, it became possible to recognize the ditches of the archaeological structure and the ditches and drainage ditches of the 19th century parcelling pattern. Across the structure the track of the tramway runs with different elevated access ramps to the parcels.

The soil – landscape research by augering resulted in a distinction into 3 soil units:

1. Natural profile: the substrate is formed by Eemian sediments. On top of these are limnic sediments with gyttja in the lower part and marl in the upper part (Figure 2). The surface horizon consists of peat (dated on the site between approx. 1750 – 1400 BC, Ryssaert et al., 2010). This peat was probably exploited in medieval times, and most likely this horizon was originally thicker. Towards the sandy ridge in northern direction, the surface horizon gradually changes from peat to clayey to sandy material, and the thickness of the marl gradually peters out towards the sand ridge.

2. Ditches: the study of Ryssaert et al. (2010) showed that the 2 most inner ditches were dug through the limnic sediments into the sandy layer. Moreover, the trenches showed a 2-stepped profile with a first level on the limnic layer and a second level cutting through this layer into the substratum of the sandy material. The slope is very gradual from the onset of the ditch towards the first level. Because of natural accumulation of organic matter in water saturated conditions after the site had been left, the peaty layer was much thicker in the ditch than in the natural profile, with an abrupt lower boundary. In this recent peat, plant remnants are often visible unlike in the older peat which is amorphous. The older peat showed a natural transition to the limnic layer, which helped to distinguish the boundary between the original soil and the ditch. Finally, the shallow depressions of the ditches were recently (in the 19th and 20th centuries) refilled with heterogenous materials up to 10 – 20 cm thick of humiferous sandy loam to sandy material. Most archaeological information lies in the slope of the ditches and in the deeper central part of the ditches. In the project design, these zones had to be excluded from any disturbance in order to protect the archaeological heritage features. The outermost (fourth) circular ditch and part of the third ditch, in the northern part of the structure, are situated in the transition zone between the sandy ridge and the peaty depression. The argument of the absence of the marl layer as an indicator for the existence of a ditch could not be used here. In this case, it was only the presence of a humiferous horizon indicating the refill of the ditch.

3. Mound and banks between the ditches: the natural profile has been buried with (on average) a 40 cm thick mixture of peat, marl and sandy material. The closer towards the centre of the site, the more archaeological artefacts (bricks, pottery, ...) appeared (Ryssaert et al., 2010). The profile sequence is all the way through made up of mixed materials of limnic material with peat and sand originating from digging the ditches and used for the construction of the mound (in a latter phase this material is ploughed) – peat – limnic materials – sandy/loamy material.

Figure 2. Assebroekse Meersen. The natural profile shows a horizon of about 45 cm thick consisting of amorphous peaty material, underlain by marl sediments with former root galleries (bar = 80 cm).

Based on the soil typology and the DTM is was possible to delineate, with high accuracy, the ditches and to determine their width. The central island has a diameter of 48 m. The width of the first ditch, between the cutting through the marl, is 20 m. In the ditch lies a recent secondary fill on top of the recent peat, which has developed since the abandonment of the site. The bank between the first and second ditch measures 38 to 40 m. The bank was raised with a mixture of peat, sand and marl on top of the original peat. The second ditch is, between the cutting of the marl, about 12 m wide, the next bank between 20 to 23 m. The third ditch is about 7 m wide. The fourth and outermost ditch could not be identified in the trenches nor through augerings at the SE side. However, at the NW and NE side a ditch was encountered with a width of 5 to 6 m and identified through the presence of humiferous sandy material up to 160 cm deep. At the S and SW-side, the fourth ditch continues in a brook called Sint-Trudoledeken. Whether this brook was incorporated into the site or vice versa is still a question to be answered (Figure 3).

6. Progress of the project

The aim of the landscape restoration project is to optimise the water management on the archaeological site and in the meadowlands and to improve the hydrological and soil conditions for the development of high quality meadowlands. The first phase of the project was completed in 2016. In the meadowlands, the water management works involved the instalment of weirs and earth dams to regulate the water level and to retain more water during summer. Clearing water courses, ditches and drainage ditches was needed to improve water flow and to increase the buffer capacity of the area. A bypass of the Meersbeek towards the meadowlands ensured the supply of good quality water. The cycle path was rerouted and the tramway track was removed.

The second phase includes the upgrading of the archaeological site to improve the visibility of the archaeological structure. It includes the removal of the felted turf in the ditches of the southern part, of the recently (19th and 20th century) applied heterogenous materials in the ditches of the northern part, and of the access ramps. A recently dug ditch that drains the site will be refilled with locally recuperated sandy material. Finally, a walking path will lead to the core of the archaeological structure where a viewpoint will be established.

As the circular structure of Assebroek is legally protected as an archaeological site, it is a challenge to develop a restoration plan without damaging the site and the soils and to safeguard the ecological values. The soil – landscape reconstruction through augering made it possible to establish the exact thickness of the recent deposits, which can be removed without disturbing the archaeological structures.

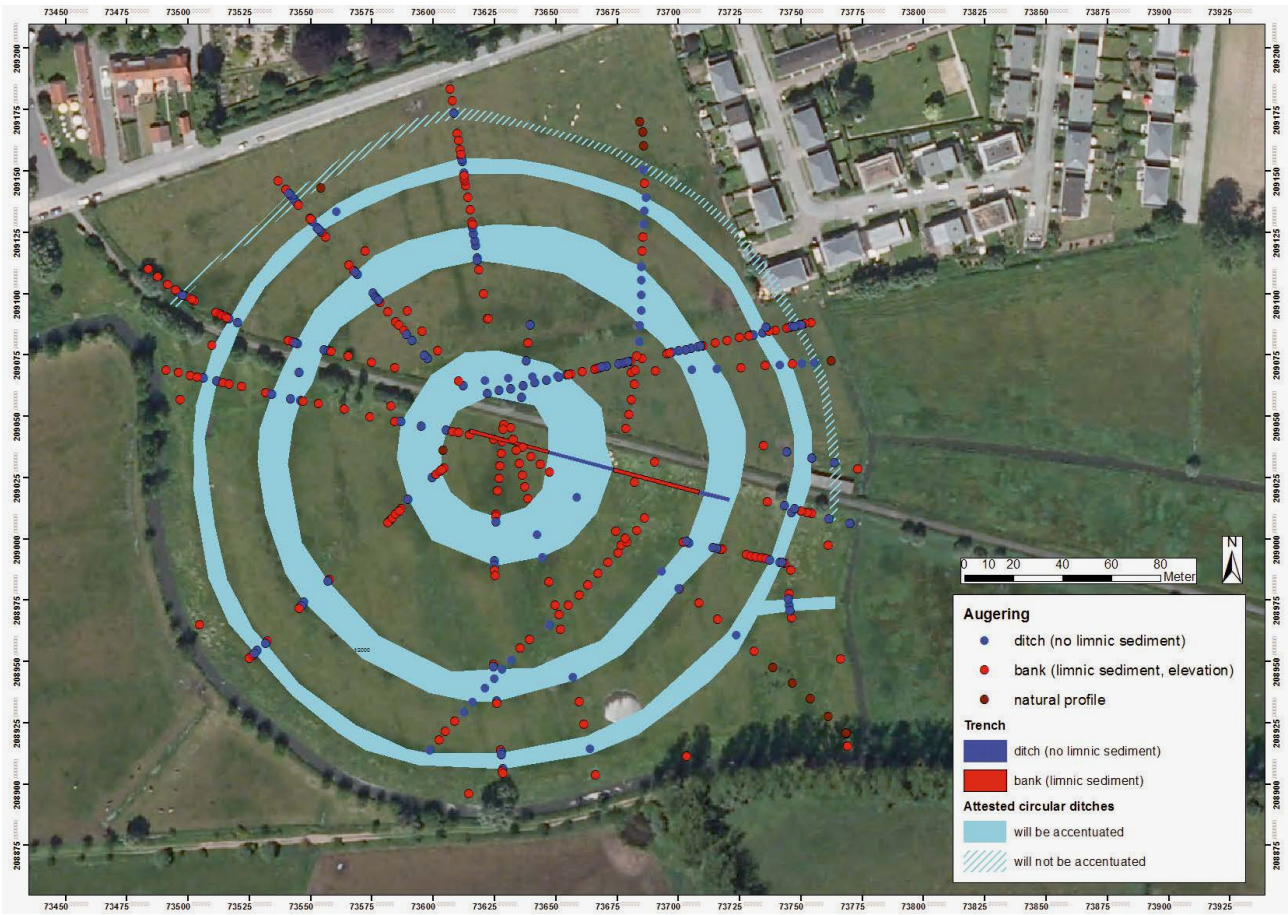


Figure 3. Localisation of the circular ditches separated by banks, position of the augerings and trench (Ryssaert et al. (2010); research VLM).

References

Ameryckx, J., 1955. Merkwaardige oudheidkundige vondst te Assebroek. *Biekorf*, 56, 7-8, 205-209.

Ameryckx, J., 1958. *Bodemkaart van België. Verklarende tekst bij het kaartblad Brugge 23W*. Gent, centrum voor bodemkartering, IWONL.

Ampe, C., 2012. *Assebroekse Meersen: bespreking van de boorresultaten; bijlage beschrijving van de boringen*. Onuitgegeven rapport, VLM Regio West, vestiging Brugge.

Deduytsche, A., 1974. *Studie van enkele geomorfologische aspekten van het Zuid-Brugse Dallandschap*. Onuitgegeven licentiaatsverhandeling, Rijksuniversiteit Gent, 58 p.

De Meulemeester, J., 1981. Circulaire vormen in het Vlaamse kustgebied. *Archaeologia Belgica,* 234.

De Moor, G. and Heyse, I., 1978. De morfologische evolutie van de Vlaamse Vallei. *De Aardrijkskunde*, 4, 343-375.

FAO, 2006. *Guidelines for soil description*, fourth edition, FAO, Rome.

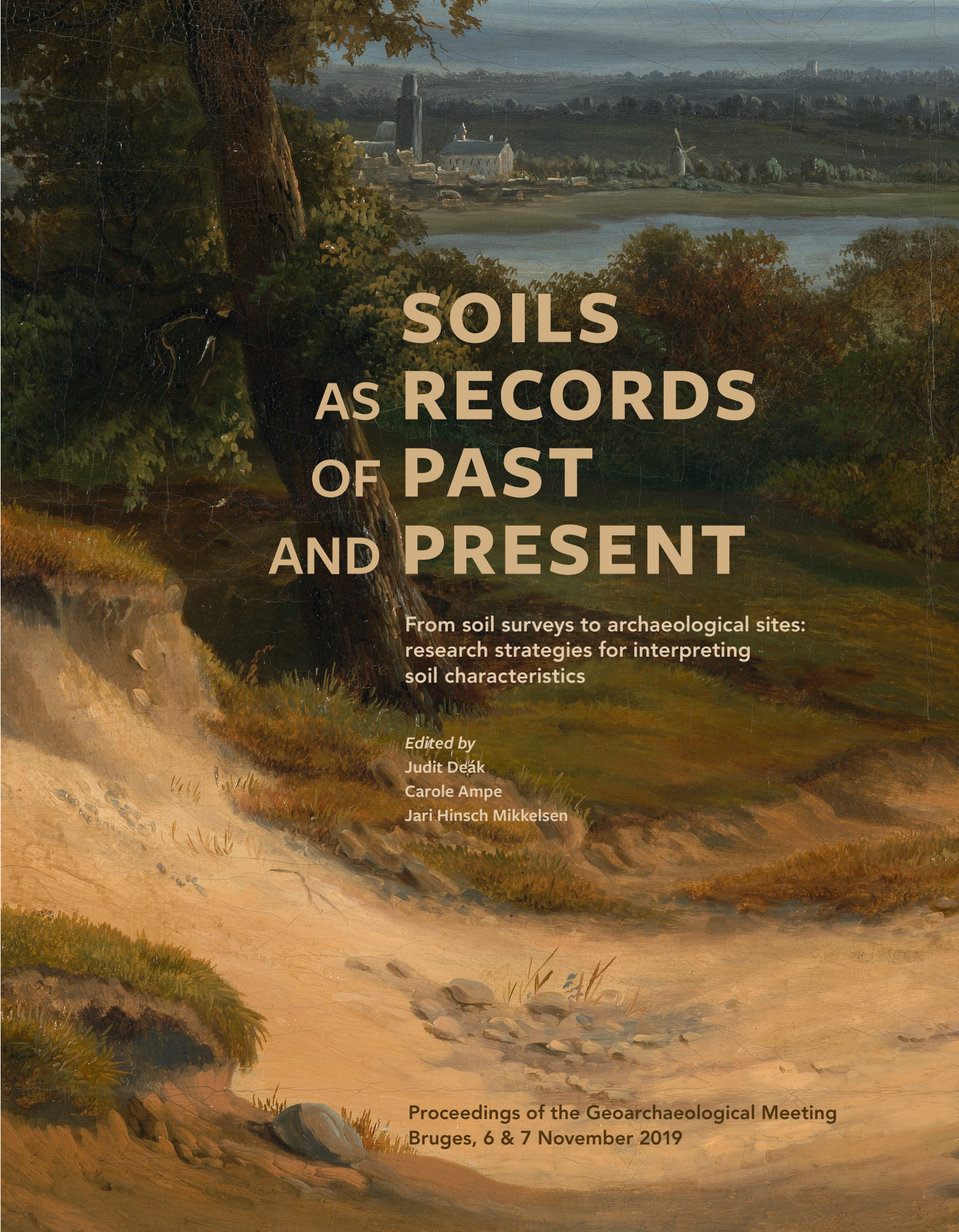
Gheysen, K., 2019. *Archeologienota Assebroekse Meersen fase 3. Verslag van resultaten*. VLM Regio West, vestiging Brugge.

Ryssaert, C., De Gryse, J., Tys, D., Baeteman, C., Orbons, J., Pype, P., Termote, D., Germonprez, D., and Perdaen, Y., 2010. *Archeologische evaluatie en waardering van de circulaire structuur van Ver-Assebroek* (gemeente Brugge, provincie West-Vlaanderen). Onuitgegeven rapport. Studie in opdracht van Vlaamse Overheid, Ruimte en Erfgoed.

Soers, K., 1987. Assebroek. *Archeologische Inventaris Vlaanderen*, band IX. Rijksuniversiteit Gent, Gent.

UGent. *Databank Luchtfotografie van de Vakgroep Archeologie van de Universiteit Gent*.

VLM, 2009. *Brugse Veldzone. Veldgebied Brugge. Inrichtingsproject Randstedelijk Gebied Brugge. IP Groene Fietsgordel Brugge*. VLM, West-Vlaanderen.



SOILS AS RECORDS OF PAST AND PRESENT

From soil surveys to archaeological sites: research strategies for interpreting soil characteristics

Edited by
Judit Deák
Carole Ampe
Jari Hinsch Mikkelsen

Proceedings of the Geoarchaeological Meeting
Bruges, 6 & 7 November 2019

This book is published on the occasion of the Geoarchaeological Meeting:

Soils as records of Past and Present.
From soil surveys to archaeological sites: research strategies for interpreting soil characteristics

on 6 & 7 November 2019 in Bruges, Belgium.

Editors
Judit Deák, Carole Ampe and Jari Hinsch Mikkelsen

Technical editor
Mariebelle Deceuninck

English language reviewer
Caroline Landsheere

Graphic design
Frederick Moyaert

Printing & binding
Die Keure, Bruges

Publisher
Raakvlak
Archaeology, Monuments and Landscapes of Bruges and Hinterland, Belgium
www.raakvlak.be

ISBN 978 90 76297 811

Citation recommendation
Judit Deák, Carole Ampe, and Jari Hinsch Mikkelsen (Eds.). Soils as records of past and Present. From soil surveys to archaeological sites: research strategies for interpreting soil characteristics. Proceedings of the Geoarchaeological Meeting Bruges (Belgium), 6 & 7 November, 2019. Raakvlak, Bruges.
ISBN 978 90 76297 811
Doi: http://10.5281/zenodo.3420213

TABLE OF CONTENT

3. Archaeology and soil science, unravelling the complexity

4. Past climates and environments

5. Present and future use of soil data