Middle Neolithic trackway A20 at Kastbjerg Å

High-precision dating and archaeological context

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ABSTRACT

In 2015-2017, East Jutland Museum excavated a series of well-preserved prehistoric and early historic trackways at Kastbjerg Å in the Kastbjerg Å river valley (eastern Jutland, Denmark). In this article, we will present the earliest of the in situ preserved structures, the Middle Neolithic trackway A20, and the high-precision dating of this structure. Dendrochronological dating of wood sequences provides very precise ages for archaeological timbers from buildings or structures, such as bridges or ships. This is not possible, however, when the dendrochronological samples lack sapwood, if the wood sequence has too few rings to provide definite placement on the dendrochronological master curve, if the wood sequence falls outside the range of the master curves or if the species of wood is not suitable for dendrochronological analysis. Here, we date a wood sequence of an alder tree from trackway A20 using the radiocarbon wiggle-match method to 2911 ±5 BC. The function of the trackway and the significance of the Neolithic river crossing at the Kastbjerg Å site are discussed in the light of European parallels and the regional cultural context.

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Introduction

In 2015, East Jutland Museum monitored a river valley rehabilitation project in the Kastbjerg Å valley in Enslev parish, north of Randers in East Jutland, Denmark (Figure 1). This former glacial tunnel valley is characterised by numerous springs from which considerable amounts of water flow: no fewer than 21 springs are located within the project area. The nature rehabilitation project involved re-meandering and regulation of the river. It was expected that the chalky soils and high groundwater levels would provide favourable conditions for the survival of organic archaeological material. The re-establishment of a large curve of the river, Curve 2, on the south side, along the old parish boundary, resulted in the groundwater levels dropping by more than 2 m and drainage of the peat. At least 14 different trackways dating to the Neolithic, Iron Age and medieval period were observed during the course of construction work and subsequently excavated between 2015 and 2017 (DKC site number 140403-26; Madsen 2018; Madsen in press). This article discusses the earliest of the (partially) in situ preserved constructions, A20, and the associated high-precision radiocarbon dating.

There are five in situ preserved Neolithic trackways at Kastbjerg Å: A2, A20, A23, A24 and A25 – see Figure 2. Individual radiocarbon dates place these five structures within the timespan *c.*3000 and 2500 BC, i.e. the period between the later Middle Neolithic Funnel Beaker Culture and the late Single Grave Culture. An even earlier date (*c.*3280 BC) was obtained from an isolated, probably redeposited piece of Y-shaped timber, which most likely represents the remains of an earlier structure located upstream, which was destroyed by water erosion or later human activity (Madsen in press).

Due to the shape of the radiocarbon calibration curve for the period in question, individual calibrated dates correspond to time intervals of 2-300 years for each of the different structures. This chronological resolution is unsatisfactory for providing precise contextualisation and properly evaluating the importance of these significant remains of communication infrastructure. In this article, we therefore use an approach that allows the

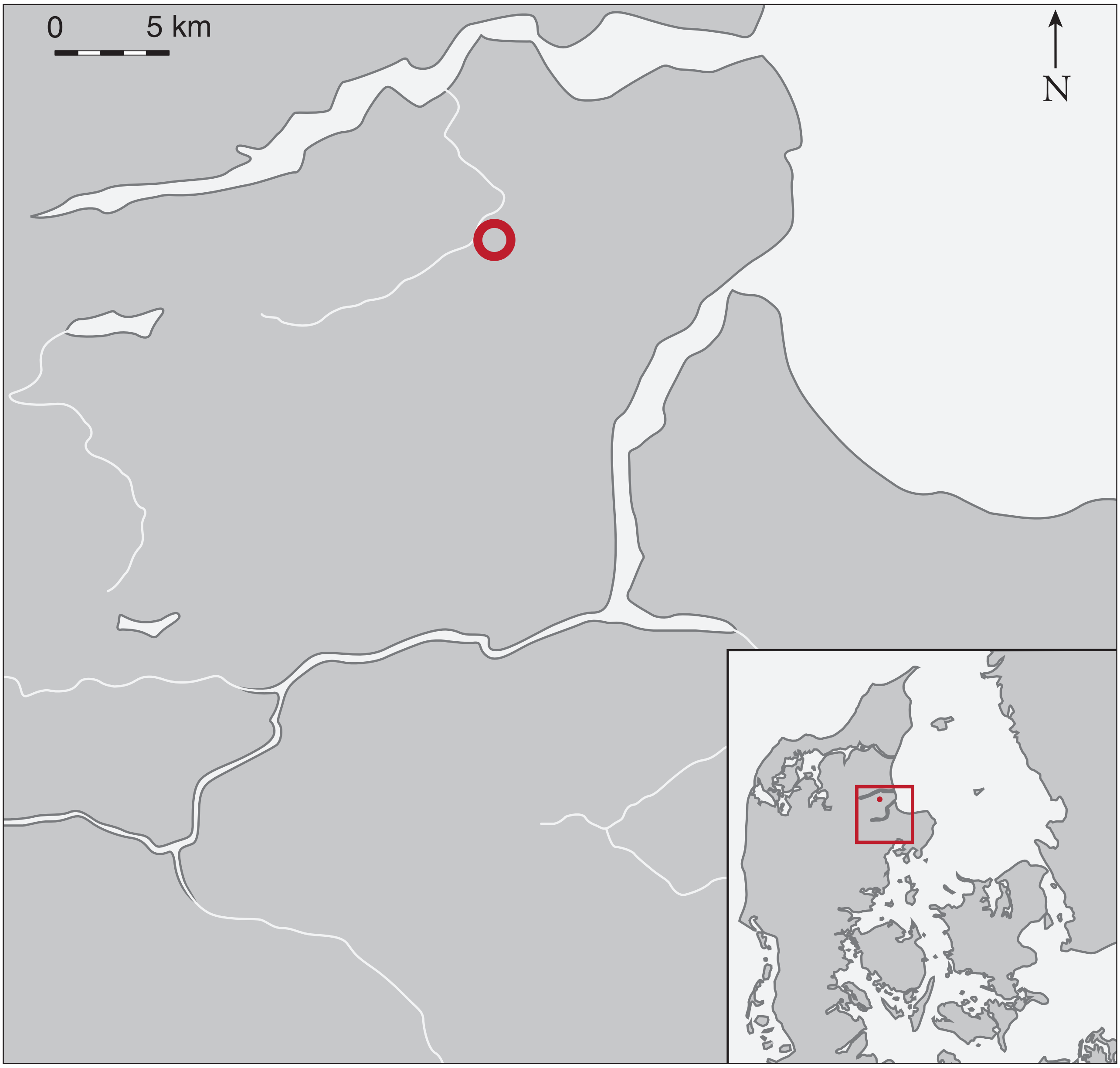

Figure 1. The location of the site at the Kastbjerg Å river, south of Mariager Fjord in north-eastern Jutland, Denmark (Illustration: Ea Rasmussen).

dating of the oldest trackway preserved in situ, A20, to be narrowed down to a period of a few years. Dendrochronological dating using the ring widths of wood sequences provides very precise (typically ≤1 year) ages for archaeological timbers from buildings and structures, such as bridges or ships (e.g. Bill and Daly 2012; Christensen 2006; Dominguez-Delmas et al. 2019). This is not the case though when the sapwood is missing from dendrochronological samples, as this hinders accurate dating of the outermost ring. There are some limitations to the dendrochronological method, however. Most importantly, it can only be used on oak or pine wood, as the most comprehensive master curves used for dendrochronological dating are based on these two species. The method also requires a sufficient number of rings to be present in the archaeological timber sample. When there are too few rings the statistical fit with a dendrochronological master curve becomes inaccurate or even impossible. In other cases, the timber may be too old, and thus falls outside the age range of the dendrochronological master curve. Although in such circumstances the dendrochronological method may not enable the dating of archaeological timbers, the radiocarbon wiggle-match method can produce an accurate and especially precise result (e.g. Bronk Ramsey, van der Plicht and

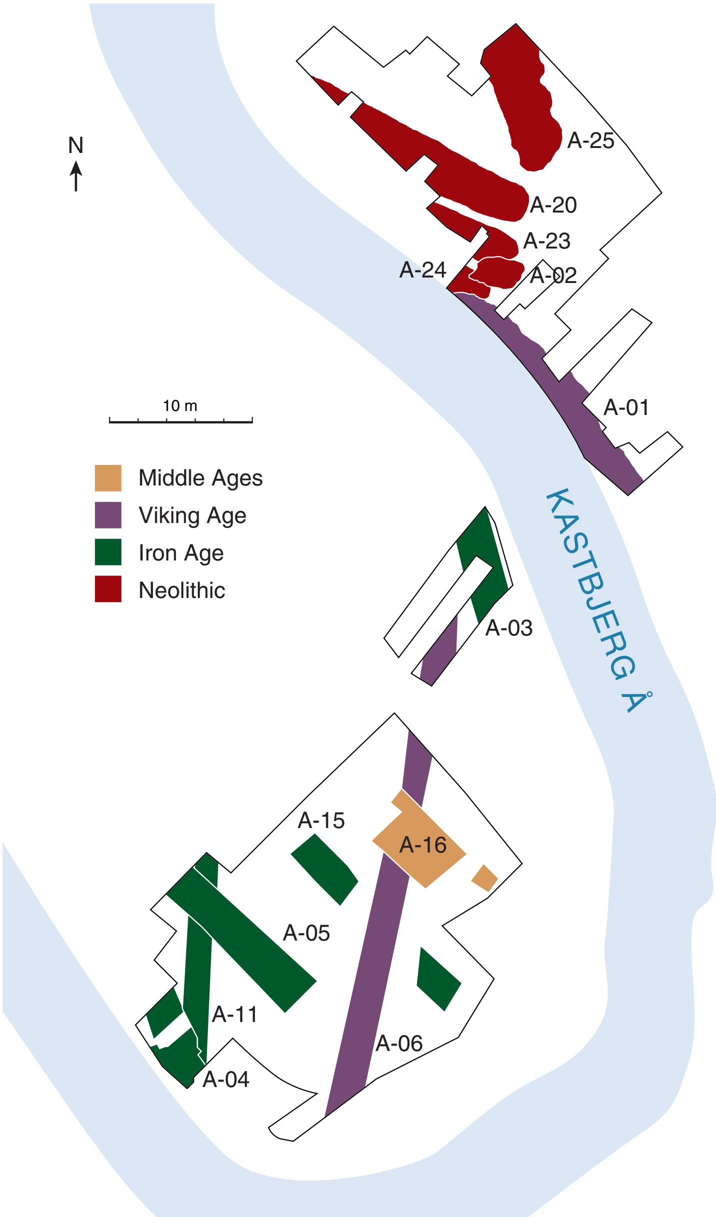

Figure 2. Summary plan showing the distribution of roads and causeways at Kastbjerg Å. Light brown: Viking Age/ Early Middle Ages; Purple: Viking Age; Green: Iron Age; and Red: Neolithic (Illustration: Thomas Guntzelnick Poulsen/Ea Rasmussen).

Weninger 2001; Christensen et al. 2021; Friedrich et al. 2006; Hogg et al. 2019). Radiocarbon dating of several samples (preferably more than five) from the sequence of a piece of wood, where the gap in years between each sample is known, may result in very precise age estimates for the piece of wood. This is because the wiggle-match method corresponds to resampling a smaller section of the international radiocarbon calibration curve. The shape or structure of the resampled section of the calibration curve can be fitted onto the actual calibration curve, which is called a wiggle-match.

Materials

The Neolithic trackways at the Kastbjerg Å site were all found in the northern part of the excavation area (Figure 2) and excavated in 2017. Structure A20 was the deepest and stratigraphically earliest, and was partly preserved in situ. It was found in the deepest peat horizons, almost 2.7 m beneath the surface and 6 m above sea level, and was only partially uncovered, leaving its wooden components in situ. Signs of water erosion were observed above and underneath the structure, in the form of a subsoil-like sediment of clay and silt.

Figure 3. Trackway A20 being excavated in 2017 seen from the north (Photo: East Jutland Museum).

The preserved parts of the construction consist of roundwood measuring up to 0.4 m in diameter and placed like longitudinal sleepers in a structure spanning up to four courses. The timbers may originally have been more regularly placed. They were up to 3.5 m long (Figure 3). In several cases, these selected straight trunks show signs of having been trimmed and two examples have angled recesses for other

Figure 4. Assembled timber elements of trackway A20 viewed from the west (Photo: East Jutland Museum).

timber at the ends, providing evidence of some kind of basic joinery (Figure 4). This may be due to the former use of these timbers in a construction, possibly a house. Several upright wooden posts had been rammed down between the longitudinal timbers.

The space between the large, longitudinal trunks in A20, held in place by the vertically rammed down posts, must have contained an internal filling. Due to the non-invasive sondage character of the excavation, only the upper part of the basal construction, the longitudinal trunks, was uncovered. No in situ remains of filling material were observed in the limited area that was opened up (Figure 3). This may have consisted of local, compressed, fibrous peat (turfa spagni) mixed with straw, clay and silt, which later washed away. At a higher level, near the north-western end, a number of less substantial tree trunks were observed close by and downstream of A20. These may have been dislodged from A20 by the flowing waters and are perhaps remains of an upper construction consisting of transverse roundwood and branches. This is the most likely design of the worn structure A20, as the numerous Neolithic trackways known from especially North-West Germany and the Netherlands (see more detailed discussion below) were all constructed according to the same design principles: longitudinally placed roundwood sleepers held in place by vertically rammed down posts and covered with transverse roundwood (which in some, but by no means all cases, was also held in place with vertical posts). This specific type of wooden road was called *Pfahlweg* by Hayen (1957), who developed a comprehensive typology and terminology for the numerous wooden trackways dating from the Neolithic to modern times, which had been discovered in bogs in North-West Germany. Feature A20 was at least 4 m wide, but its full width was not uncovered to the south-west.

Around 14 m of its length were recorded, but the feature was not delimited to the north-west. At the southern end where the trackway ends, the terrain rises, indicating that a bank was previously present. Accompanying artefacts, which were found embedded in the construction, consist of a few lengths of young tree trunks, which were presumably chopped with a flint axe as well as a digging stick, made from a split, bark-covered piece of roundwood with a makeshift, hourglass-shaped

Figure 5. Digging stick or simple double spade found at A20 being excavated (Photo: East Jutland Museum).

handle part (Figure 5). Most of the wooden material used to construct trackway A20 consists of alder. This includes a trunk from which sample D49 was taken for wiggle-match dating. The trunk may have been used as timber in a building before it was laid down to form part of trackway A20. Bark or branches were not present, but it showed no further signs of having been worked or trimmed, with the exception of the end, where it had been hewn into a V shape, perhaps to fit together with other beams in a construction.

Methods

The wooden sample D49 has been microscopically identified as *Alnus sp*., a species of alder. It is not possible to distinguish between different species of alder using wood anatomy (Schweingruber 1978, 74). However, the species is most probably *Alnus glutinosa*, black alder. This species corresponds well with the wetland habitat at Kastbjerg Å and is otherwise well known from the Danish Neolithic period. The sample comprises a preserved sequence of 41 annual growth rings. The surface is somewhat worn, bark is completely absent, and there are minimal traces of one more outer growth ring, which have decayed. Importantly, however, the sample represents a full cross section of an alder trunk, with no more than at most a few of the outer rings missing.

Sampling of the ring sequence for wiggle-matching was undertaken by cutting a *c*.6 cm-thick slice from the alder trunk. This was stored in a deep freezer at -24 °C. Still frozen, the surface of the slice was cleanly cut using a razorblade, to reveal the wooden structure. Individual growth rings could then be identified using a binocular microscope. Every fourth ring was marked with a needle, which meant that 11 rings could be used for radiocarbon dating. A sample was taken from each of these rings by cutting into the ring boundaries with a razorblade, so that a sufficient amount of material could be extracted from the growth ring without 'contamination' from the adjacent rings (Figure 6).

Alnus glutinosa is a diffuse-porous wood, i.e. it lacks the large pores in the early wood that are characteristic of ring porous wood like oak. Therefore, the boundaries between the growth rings in alder wood can be somewhat unclear. In three cases in D49, this means that there is some uncertainty whether the gap in the three rings between two samples is accurate:

- Between D49-0 (ring 0) and D49-1 (ring 4), there are 2 or 3 rings (a very small, faintly defined ring is counted as full growth ring).
- Between D49-1 (ring 4) and D49-2 (ring 8), there are 3 to 4 rings (a very faintly defined ring boundary is disregarded).
- Between D49-8 (ring 32) and D49-9 (ring 36), there are 3 to 4 rings (also in this case, a very faint ring boundary is disregarded).

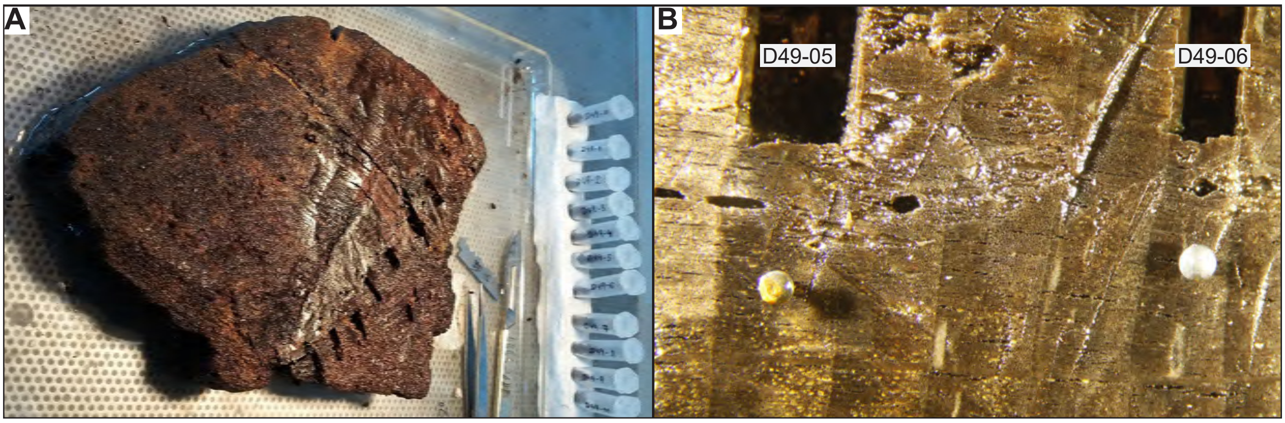

Figure 6. A. The slice of alder wood D49, after the series of samples for wiggle-matching had been taken. B. Microscopic picture of part of the sequence of tree rings, showing the gap of three annual growth rings between samples D49-05 and D49-06, and at the top of the picture the voids where the samples have been cut from the growth ring (Illustration: Carsten Korthauer).

For radiocarbon analysis, the wood samples were pretreated with acid-base-acid (ABA) at AARAMS (e.g. Brock et al. 2010). First, the samples were treated with 1M HCl at 80 °C for one hour to remove carbonates, then with 1M NaOH at 80°C for at least three hours to remove humic acids (checking the colouring every hour and adding new 1M NaOH to very dark coloured samples). Subsequently, the samples were treated overnight with 1M HCl at room temperature to remove CO_2 absorbed during the base treatment stage. The pretreated samples were converted to CO_2 by combustion in sealed evacuated quartz tubes with 200 mg CuO wires. The CO_2 was reduced to graphite by the H_2 reduction method using an iron catalyst and $MgClO_4$ to remove the water (Santos et al. 2007; Vogel et al. 1984). The samples were ^{14}C dated using the HVE 1MV tandetron accelerator AMS system at the Aarhus AMS Centre, Department of Physics and Astronomy, Aarhus University (Olsen et al. 2016). ^{14}C dates are given as uncalibrated ^{14}C ages BP normalised to 25‰ according to international conventions using the online $^{13}C/^{12}C$ ratios (Stuiver and Polach 1977). The radiocarbon ages are calibrated with OxCal v.4.4 (Bronk Ramsey, van der Plicht, and Weninger 2001) using the international calibration curve IntCal20 and are given as calibrated ages (Reimer et al. 2020). The piece of wood D49 is calibrated using the wiggle-match method by a sequence and using the function 'intervals' to provide information about the gap in years between the ^{14}C dated samples (Bronk Ramsey, van der Plicht and Weninger 2001). The gap between each ^{14}C-dated sample is 3 ±1 years, with the error taking into account the possibility of missing rings or other uncertainties in the ring count. The OxCal time resolution is set to 0.2 years.

Results and Discussion

The outermost ring of the wiggle-matched piece of wood D49 dates to 2910-2902 BC (68.2% confidence interval). The resulting probability distribution resembles a normal probability distribution and the result can therefore be given as 2911 ±5 BC (Table 1, 7). The overall model agreement of the wiggle-match is 108.8%. However, the agreement index of the outermost ring AAR31158 is 57.9% and thus slightly lower than the lower limit of 60%. Although the agreement index of AAR-31158 is low, the overall wiggle-match of the sequence of the piece of wood D49 is regarded as valid.

To test the robustness of the wiggle-match, two alternative models are constructed: one where the sample AAR31158 is removed and another where an outlier model is applied to the wiggle-match. Removing AAR31158 results in agreement indices that are all above 60%. The outermost ring dates to 2994-2981 BC (20.7%) or 2923-2906 BC (47.6%). The latter calibrated age interval agrees with the wiggle-match result including all samples, whereas the interval 2994-2981 BC (20.7%) would date the road slightly earlier. The outlier

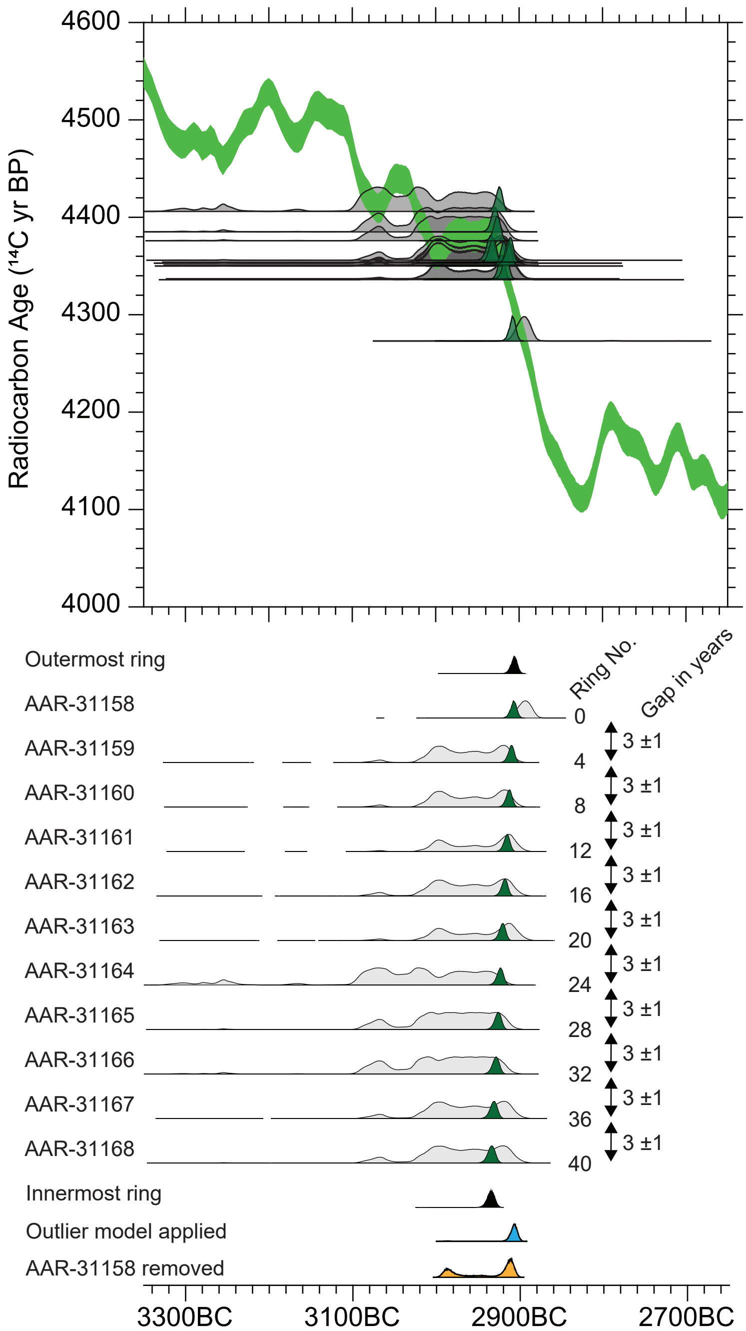

Figure 7. Upper part: The Intcal20 calibration curve plotted together with the calibrated probability distribution (grey) of the 11 ^{14}C-dated samples from the piece of wood D49. The wiggle-matched probability distributions of D49 (green) are also shown. Lower part: Wiggle-matched probability distributions of the ^{14}C-dated samples from the piece of wood D49 (green), together with the calibrated probability distributions (unmodelled in grey) (Illustration: Jesper Olsen).

model suggests that there is a 12% chance that AAR31158 is an outlier and gives the outer ring a date of 2909 ±16 BC. The result of the outlier model thus agrees with the model using all samples. However, the outlier indicates that the calibrated age uncertainty is higher than in the case of the model including all samples. Overall, the alternative models support the model including all samples, and if anything, there is a chance that the road structure is slightly earlier in date. We therefore propose that the probable date of the road structure is 2911 BC (or slightly later, if the sample is from a re-used timber, see above).

River crossings constructed of brushwood and branches are known in Denmark from the earliest Neolithic, around 3900 BC, onwards (find from Baarse, southern Zealand, crossing the Risby River (Jørgensen 1977, 147), but see Rostholm (1978, 202-203) for doubts regarding the function of this construction). Trackway A20 from Kastbjerg Å is, however, up until now the earliest example from Denmark of a road structure involving massive roundwood. Similar Neolithic structures are known in quite large numbers from *c.*4700 BC onwards, from the relatively nearby bogs in north-western Germany (Bauerochse and Metzler 2001; Both and Fansa 2011; Burmeister 2002; Metzler 1997) and neighbouring parts of the Netherlands (Casparie 1987; van der Sanden 2002, 104-110). Other important and comparable (although geographically more distant) structures have been excavated at several locations in the British Isles, with a remarkable concentration in the Somerset Levels in south-western England (Bell 2020; Coles 1984) and other, more isolated examples from locations such as the Thames Estuary (Bates and Stafford 2013; Hart 2010), the Isle of Wight (Tomalin et al. 2012) and in Ireland (Raftery 1990); for a complete survey see Bell (2020, Supplementary Appendix 6.1). The numerous wooden trackways which are known from the north alpine forelands (Heumüller 2002) differ from the Kastbjerg Å examples and their parallels listed above in that they were discovered in settlement contexts rather than isolated in bogs. But due to their often precise dendrochronological dating and constructional observations they are still of value to the interpretation of the Kastbjerg Å trackways.

The numerous parallels from the European Neolithic with structure A20 at Kastbjerg, as outlined above, can be broadly divided into two categories based on their width: very narrow trackways that are only a few decimetres wide which can only have functioned as pedestrian walkways for one person at a time, and much broader and more massive constructions that were as much as over 5 m wide. The first group is only represented by a few examples, the best known of which is probably the Sweet Track from the Somerset Levels in England, dating to the early fourth millennium BC (Coles and Coles 1986). The Sweet Track differs from the general *Pfahlweg* category due to its very elaborate construction, but proper *Pfahlwege* of comparable dimensions and date are known from North-West Germany (trackway XXXV (Pr): Bauerochse, Leuschner and Metzler 2012, 149). The second group comprises dozens of trackways from all of the European regions mentioned above. The earliest known example, which also is the oldest known preserved wooden road in the world, is trackway XXXI (Pr) from North-West Germany. As mentioned above, it is dated to around 4700 BC (Both and Fansa 2011, 147-149). Trackways of the same construction, including those from Kastbjerg Å, were constructed throughout the whole of the subsequent parts of the Neolithic and into the Bronze Age (see e.g. Both and Fansa 2011 and Casparie 1987 regarding North-West Germany and the Netherlands).

These trackways may have had several different functions: for the movement of large groups of people possibly carrying heavy goods, as roads for moving livestock to distant grazing areas across rivers and bogs, and as roads for the transportation of cattle-drawn vehicles. It is not possible to determine the function of individual trackways based solely upon their construction. The latter remained unchanged through the entire period in question – trackways predating the introduction of carts/wagons are similar to those constructed after this occurred (Burmeister 2004, 130-131; Heumüller 2002, 136-137). Finds recovered in or at the trackways, such as parts of wagons/carts or cattle hooves, can provide clues. But such finds are often absent (as at Kastbjerg Å) and finds of hooves may indicate both use as a transport route for carts or wagons and also the movement of herds of cattle. Because of this, as well as its poor state of preservation, it is not possible to decide what purpose the Kastbjerg Å trackways served, but it is worth considering different lines of circumstantial evidence for both possibilities.

The interpretation of structure A20 as a possible transport route for carts or wagons is entirely plausible, as the earliest direct evidence of wheeled transport in Denmark, in form of a wooden disc wheel from Pilkmose near Give in Central Jutland, has been dendrochronologically dated to 2935 BC (Christensen 2007, 231). From a chronological point of view, the use of cattle-drawn vehicles may even have started several hundred years earlier, as indicated by tracks recorded at Flintbek (Zich 1993), even though these probably indicate that sledges were in fact used, which may not have been suitable for use on wooden trackways. It should also be noted that in both the north alpine region (Heumüller 2002, 136; Maier and Schlichterle 1992; Schlichterle 2002, 10) and North-West Germany (Burmeister 2004, 329-330), the earliest finds of parts of carts/wagons combined with trackways occur around 3000 BC. This is probably no coincidence, but demonstrates that there was a chronological horizon for the introduction the use of carts/wagons on wooden trackways across a broad geographical region. Trackway A20 at the Kastbjerg Å site may have been part of this development. Moreover, wheel tracks have been observed running in a parallel direction to alignments of the so-called stone heap graves in north-western Jutland, which date to the period 3100-2800 BC. These graves involve burials of pairs of draught cattle with a cart, often arranged in lines following the direction of contemporary roads (Johannsen and Laursen 2010, 39-44).

The stone heap graves are of particular interest in relation to trackway A20 from Kastbjerg Å. The main distribution area of this grave type in north-western Jutland is associated with a regional group of the later Middle Neolithic Funnel Beaker Culture, which was probably characterised by a mobile or semi-mobile lifestyle with considerable economic focus upon cattle herding (Johannsen et al. 2016). The easternmost stone heap graves have been found at Galgevang (Fabricius and Becker 1996, 257 no. 23) and Øster Tørslev (Stidsing 1989), just 2-5 km south-east of the Kastbjerg Å site, indicating that the Kastbjerg Å trackway may have played a part in wheeled transport between the area and north-western Jutland (Figure 8A and 8B). The Kastbjerg Å site is located in a border zone between the aforementioned pastoral Funnel Beaker group to the west/north-west and Pitted Ware farmer-hunter-fishermen groups located to the north, east and south-east on the shores of Mariager Fjord and Randers Fjord, as well as on the Djursland peninsula (Figure 8A). Several important Pitted Ware sites are known from the Randers Fjord area at Øster Tørslev, 8 km south-east of the Kastbjerg Å site (Aagaard I and II, Becker 1951, 174-176; Højvang, unpubl., j.no. KHM 1053) and even closer to the aforementioned stone heap graves (Figure 8B). The river crossing at Kastbjerg Å may thus have of been of importance in contact and communication between two quite different Neolithic groups. This is also indicated by a straight-walled beaker with a pronounced foot found at the important Pitted Ware site of Kainsbakke, *c.*50 km to the south-east in Djursland (Wincentz 2020, 64 Fig. 30.4; Figure 8C, top). The vessel is decorated with a rhombic pattern, in which the rhombuses are alternately undecorated and filled with short, oblique lines. This specific vessel, for which there is a possible parallel at the nearby Pitted Ware settlement of Kirial Bro (Wincentz 2020, 123 Fig. 69.32-34), has previously probably been somewhat misidentified as reflecting Swedish Boat Axe Culture influences (Wincentz 2020, 66, 72). The Kainsbakke vessel closely resembles a vessel from Ørum, east of Vejle (Davidsen 1978, 114 Fig. 57g), and especially finds from several stone heap graves in North-West Jutland (Ristoft III and particularly Herrup XXI: Fabricius and Becker 1996, 265 Pl. 6, 266 Pl. 7 and 271 Pl. 12; Figure 8C). It thus provides evidence of contact and communication between north-western Jutland and Djursland. The Kainsbakke vessel, which according to analyses of its fabric is a local product of the Pitted Ware group inhabiting the Kainsbakke site (Blank, Brorsson and Fridén 2020), is dated to around 2900 BC (Philippsen, Iversen and Klassen 2020, 263-271) and is thus contemporary with trackway A20 at Kastbjerg Å. The river crossing may therefore have played a role in long-distance transport and communication, not only between the Randers Fjord area and north-western Jutland, but also between regions of Jutland that were even further apart (Figure 8A). As Kainsbakke is located on what was a large island at the time in question, the main importance of the Kastbjerg Å trackway may have been the connection between North-West Jutland and the Pitted Ware communities in the Randers Fjord area, from where transport could have continued by boat (Randers Fjord and Kolindsund, near which Kainsbakke is located, were interconnected at the time in question).

The relationship between pastoral or semi-pastoral groups in North-West Jutland and farmer-hunter-fishermen groups of the Pitted Ware culture further east in Jutland is also of interest regarding the second possible function of trackway A20 at Kastbjerg Å – as a means of moving herds of cattle. Strontium isotope analyses of a large group of cattle from the central Pitted Ware site Kainsbakke indicate that two different groups of these animals were present. The first group, which most likely stayed within the same restricted area/the same grazing zone until the cattle were slaughtered, has strontium isotope ratios that probably indicate a local origin. A second group of cattle had been moved around during their lifetimes and were probably reared in a mobile way (Klassen et al. 2020, 428). Measurements of the strontium isotope ratios for these animals

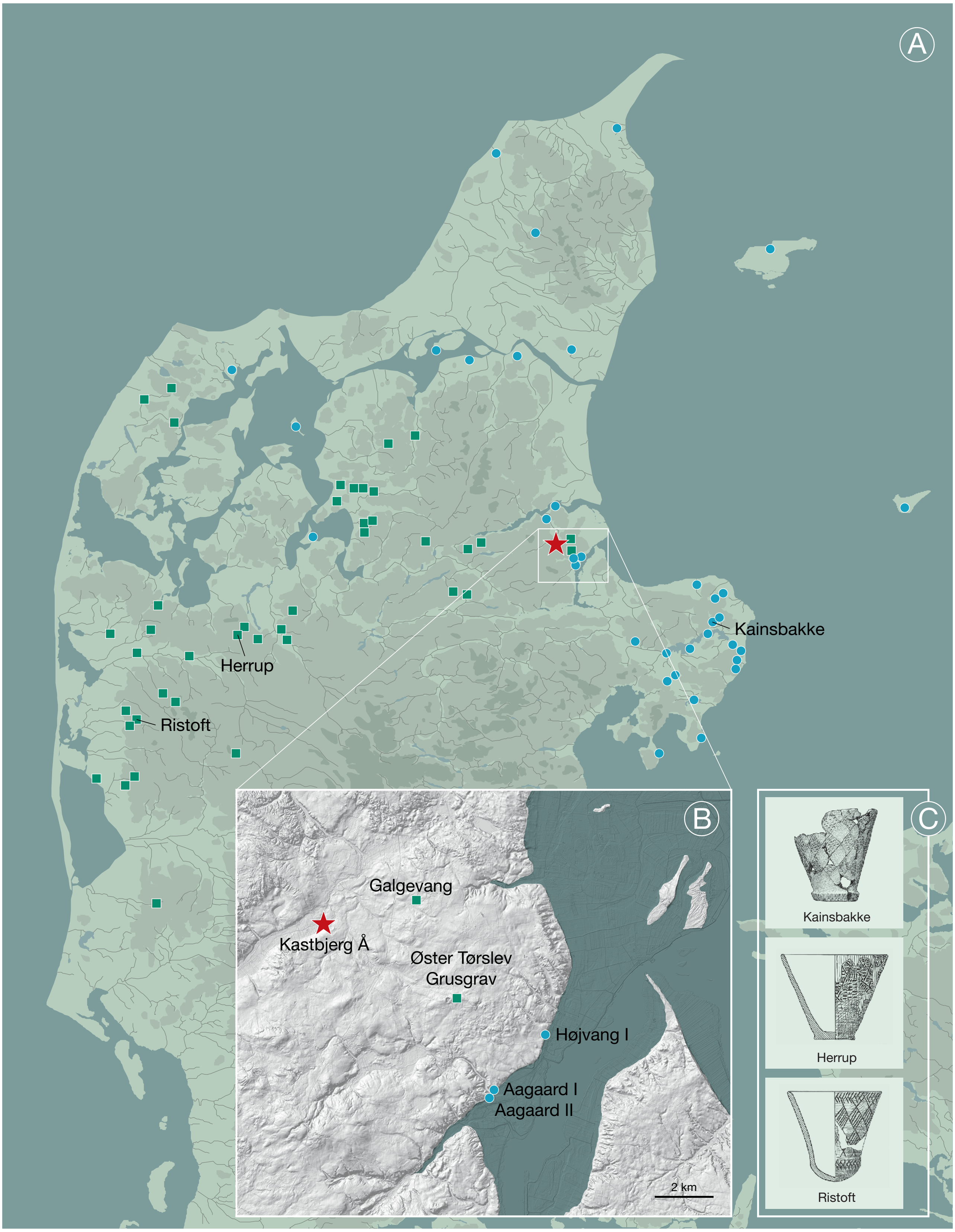

Figure 8. A. Distribution of stone heap graves (green rectangles, after Johannsen and Laursen 2010), important sites of the Pitted Ware culture (blue dots, after Becker 1951, Iversen 2010 and Rasmussen et al. 2020) and the location of the Kastbjerg Å site (red star). B. The location of the Kastbjerg Å site (red star), the Aagaard I, Aagaard II and Højvang I sites of the Pitted Ware Culture (blue dots) and the stone heap graves at Galgevang and Øster Tørslev Grusgrav (green rectangles). Coastline reconstructed for the period in question (*c*.3000 BC). C. Typologically related vessels from Kainsbakke (from Wincentz 2020), Herrup and Ristoft (from Fabricius/Becker 1996) (Illustration: Lutz Klassen/Ea Rasmussen).

involved values exceeding the local baseline and thus indicated a non-local origin. The stone heap grave area of north-western Jutland may well be where these cattle came from, although this cannot be demonstrated for certain (Klassen et al. 2020, 437). This possibility is further supported by the relationship between Kainsbakke/Kirial Bro and North-West Jutland, as is suggested by the ceramic vessels discussed above. From a general perspective as well, this scenario is entirely plausible, as the movement of cattle over considerable distances as part of complex Neolithic economies has been demonstrated in the case of Funnel Beaker groups in central western Sweden (Sjögren and Price 2013; Sjögren et al. 2021). The fact that Kainsbakke and Kirial Bro were located on an island, which was separated from the mainland by a sound (Kolindsund/Randers Fjord) that was a few hundred metres wide, does not contradict this assumption. The appearance of domesticated cattle, pigs and sheep/goats on the island of Bornholm, at the time of neolithisation around 4000 BC, clearly demonstrates that the transportation of livestock, even over considerable stretches of open sea (Bornholm is around 37 km from the nearest mainland), could be undertaken by Neolithic farmers in South Scandinavia.

The available evidence does not allow us to reach a definite conclusion about the function of trackway A20 at Kastbjerg Å. Apart from a simple use as pedestrian walkway, which judging by its dimensions was not its main purpose, both a use as a transportation route for carts or wagons and as infrastructure for moving herds of cattle are possible and not mutually exclusive functions. The fact that at least 14 different trackways were constructed at the site during a period spanning *c.*4,500 years, from the Middle Neolithic through the Iron Age, Viking Age and into medieval times, indicates that the river crossing was of at least regional importance. During the Neolithic, no less than five of these constructions indicate that it was of continual importance. This significance may even have extended back several hundred years earlier than trackway A20, which is discussed here, as is indicated by the aforementioned possible remains of a sixth, even earlier construction dating as far back as the early Middle Neolithic, around 3300 BC. Large numbers of burial mounds and megalithic graves located to the north of the Kastbjerg Å site (Bekmose 1977, 53 Fig. 5; Madsen in press) indicate that the area was focused on from at least this point in time onwards. At the time of trackway A20, around 2900 BC, the site could even have been of superregional importance, as part of a connecting link between Neolithic groups in different parts of Jutland.

Conclusion

Construction work in wetlands at sites such as Kastbjerg Å is comparatively rare today. Nevertheless, the scientific potential of archaeological investigations that are prompted by such work can be highly significant. In this case, they have led to the discovery of the oldest solidly built Neolithic trackway in Denmark. Here, the application of state-of-the-art analyses enabled trackway A20 from Kastbjerg Å to be precisely dated to 2911 ±5 BC. In the future, our findings can be better contextualised by utilising other high-resolution results from evidence of contemporaneous transport and communication. In the meantime, our results contribute to our growing understanding of an important period of the Neolithic, which is characterised by the co-existence of different groups that followed very different social, economic and ritual strategies.

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