

# The Kirkjubæjarklaustur Midden Core (KBKL-A)

A PRELIMINARY REPORT (2022)

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## Introduction

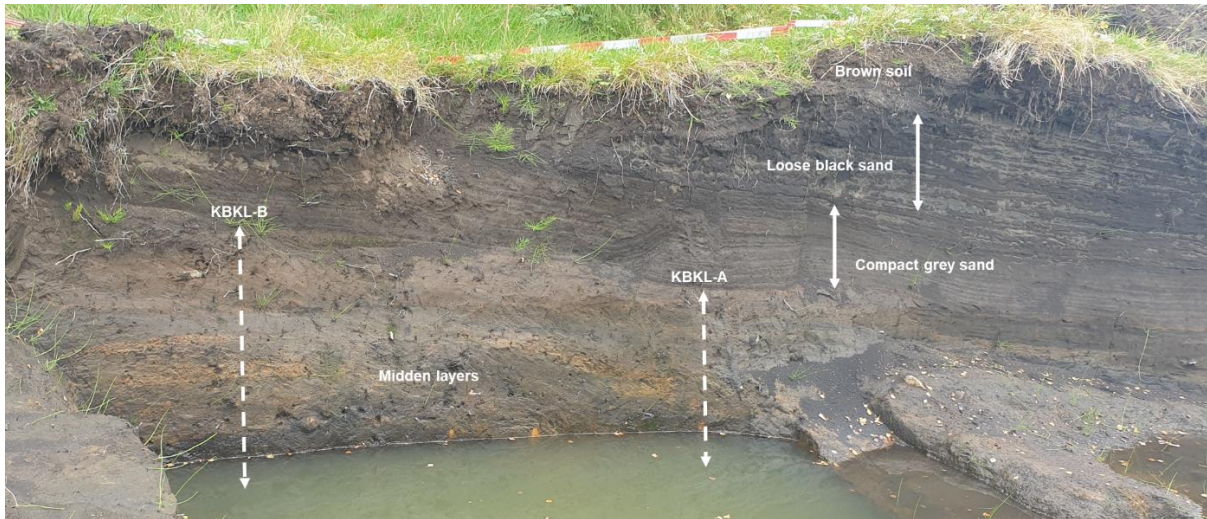
During the summer of 2022, a midden feature was uncovered at Kirkjubæjarklaustur by the Man and Nature in Iceland Archaeological Project (Icelandic Research Fund: 2016-0285). Initial interpretation of ceramic material derived from the midden (no context) is dated to the medieval period (Professor Steinunn Kristjánsdóttir, personal communication), and is perhaps associated with the former convent of Kirkjubæjarklaustur. On this basis, in the autumn of 2022, Scott Riddell (PhD candidate, University of Iceland) was commissioned by the project to acquire a sediment core from the midden in order to analyse it for pollen. Pollen material derived from archaeological contexts can provide some insight into the use of plants in the past for medicinal, culinary, and dyeing purposes, as well provide some understanding of past vegetation and land use in the immediate vicinity of the archaeological feature (Bakels, 2020).

## Site description

The archaeological excavation area is in the small town of Kirkjubæjarklaustur in south east Iceland, just beyond the south west wall of the church cemetery (54°6749,94 E, 36°5408,31 N). It is thought to lie within the former bounds of a medieval monastery. The immediate vicinity of the dig is currently a rank, unimproved grassland, incorporating *Alchemilla vulgaris*, *Equisetum* sp., *Galium* sp., Poaceae (dominant), *Potentilla anserina*, *Ranunculus acris*, *Rumex acetosella* and *Salix*. *Betula pubescens* growing in the cemetery overhangs the excavation area. A defunct livestock fence suggests that the area may have been grazed until fairly recently while there are also drainage features i.e. a culvert at the junction of Skríðuvellir and Klausturvegur.

The excavations of the summer had cut through the midden with particularly good exposure of a sedimentary sequence to the northeast (Fig.1) from which it was proposed a core could be extracted for pollen analysis. An initial visit to the site on the 12<sup>th</sup> of September 2022 found the excavation area flooded and no cores were taken. It was observed that *Equisetum* spp. had started to grow on the exposed sections even though only a few months had passed since they were excavated. A return visit to the site the following month (5<sup>th</sup> October) found the excavation area similarly flooded (to the water table) but it was subsequently pumped in order to allow full access to the exposed sections of the midden.

Two cores (KBKL-A and KBKL-B), each c. 1 m long, were extracted from the north eastern section of the midden (Fig 1). Note that the lower strata of the two cores lies beneath the current water table.



**Fig. 1** The north eastern section of the midden at Kirkjubæjarklaustur indicating the approximate locations of the two cores (KBKL-A and KBKL-B).

## Methods & Results

The top of KBKL-A begins at 86 cm depth while KBKL-B begins at 52 cm depth. This is because the sediments immediately above the midden strata are comprised of thinly stratified sand (sometimes interrupted by very thin soil layers and possibly midden material) that is difficult to extract as a core due to a lack of cohesion (Fig. 1 and Table 1.). Furthermore, these sandy layers are unlikely to harbour pollen suitable for analysis due to poor preservation conditions. Note also that the lower strata of KBKL-A and KBKL-B lie beneath the current water table.

KBKL-A is the primary core used for analysis as it has greater cohesiveness and integrity than KBKL-B (retained in cold storage). A detailed soil description is provided for KBKL-A (Table 2) based upon Troels-Smith as adapted by Aaby and Berglund (1986) and further amended to reflect the archaeological context. This represents an estimate of the organic and minerogenic content of the strata and is supplemented further by a consideration of humification (Shotyk, 1988) and colour (Munsell Soil Color Charts, 2009). The primary aim of this exercise is to identify organic layers within the strata that can be targeted for pollen

sampling. It also provides an opportunity to identify tephra layers by which to refine the chronology of the sediments containing pollen (Thorarinsson, 1944), with further potential with regard to radiocarbon dating, macro-botanical, and invertebrate remains.

In total, 90 pollen samples were cut from KBKL-A (88-186 cm) of which 16 will be chemically processed and counted (March 2023) following Moore, Webb, and Collison (1991). In particular, the pollen of exotic utilitarian plant species (Kristjánsdóttir, Larsson, & Ásen, 2014) will be sought alongside cereal crops (Tweddle, Edwards, & Fieller, 2005) and indigenous Icelandic flora. Gaps in the pollen sampling sequence occur due to the presence of tephra layers, while the upper two centimetres (86-88 cm) of the core were possibly compromised when it was cut from the section at Kirkjubæjarklaustur.

Approximately 8 potential tephra layers were identified for KBKL-A (Table 2.), of which 6 were cleaned of humic material (10% NaOH) and sieved (63 µm) in preparation for geochemical analysis (February 2023). Note that although there are clear layers of tephra in KBKL-A, a black/brown, angular, tephra is found throughout the core along with windblown silt and sand.

Twelve samples were cut from selected organic sediments (Table 3), rinsed in a solution of 5% NaOH, and sieved (250 µm mesh) in order to acquire material for C<sup>14</sup> analysis i.e. bone, wood, moss or seeds. No suitable material was found although KBKL-A retains potential for further investigation.

**Table 1.** General field description of strata of north east section of excavation sites at Kirkjubæjarklaustur in relation to KBKL-A and KBKL-B.

<b>cm</b>	<b>KBKL-A</b>	<b>cm</b>	<b>KBKL-B</b>
0	Intersection of surface vegetation with sediments.	<b>0</b>	Intersection of surface vegetation with sediments.
0-14	Dark brown soil with bands of black sand.	<b>0-9</b>	Dark brown soil with bands of black sand.
14-52	Layers of loose black sand, occasionally truncated by thin layers of light brown soil.	<b>9-30</b>	Layers of loose black sand, occasionally truncated by thin layers of light brown soil.
52-86	Compacted grey sand. Intermittent reddish (peat ash) material suggests that it might transition into the midden layers beneath.	<b>30-52</b>	Compacted grey sand. Intermittent reddish (peat ash) material suggests that it might transition into the midden layers beneath.
86-186	Consolidated cultural layers (midden).  Water table at c. 146 cm.	<b>52-152</b>	Consolidated cultural layers (midden).  Water table at c. 90 cm.

**Table 2.** Sediment description for KBKL-A featuring strata (86-186 cm depth) from which pollen and tephra samples have been extracted.

cm	Colour (Munsell)	Shotyk (1988)	Troels-Smith*	Note
86-90.5	10yr-2/1 (black)	Amorphous (silt)	Sh <sup>3</sup> , Ag <sup>1</sup> , Th <sup>+</sup>	Disturbance 86-88 cm
90.5-91	5yr-6/4 (light reddish brown)	Amorphous	n/a	Peat ash
91-95	7.5yr-2.5/1 (black)	Amorphous (sand)	Sh <sup>3</sup> , Gs <sup>1</sup>	
95-95.3	n/a	n/a	n/a	Tephra (sampled)
95.3-106	7.5yr-2.5/1 (black)	Amorphous (silt)	Sh <sup>2</sup> , Ag <sup>1</sup> , Gg <sup>+</sup> , Th <sup>+</sup>	Rootlets and red mottling (peat ash)
106-109.2	10yr-2/2 (very dark brown)	Amorphous (silt)	Sh <sup>3</sup> , Ag <sup>1</sup>	
109.2-110.5	n/a	n/a	n/a	Tephra
110.5-121	10yr-2/2 (very dark brown)	Amorphous (sand)	Sh <sup>2</sup> , Ag <sup>1</sup> , Gs <sup>1</sup> , Th <sup>+</sup>	
121-121.3	n/a	n/a	n/a	Tephra (sampled)
121.3-129	10yr-2/2 (very dark brown)	Amorphous (clay)	Sh <sup>3</sup> , As <sup>1</sup>	Red mottling (peat ash)
129-129.3	10yr-6/4 (light yellowish brown)	Amorphous	Sh <sup>4</sup>	Red and yellow mottling (peat and dung ash)
129.3-132	10yr-2/2 (very dark brown)	Amorphous (clay)	Sh <sup>3</sup> , As <sup>1</sup>	Red mottling (peat ash)
132-133.5	n/a	n/a	n/a	Tephra (sampled)
133.5-137.5	5yr-6/4 (light reddish brown)	Amorphous	Sh <sup>4</sup>	Oxidised iron (Fe)
137.5-137.7	n/a	n/a	n/a	Tephra (sampled)
137.7-143	7.5yr-4/4 (brown)	Amorphous (clay)	Sh <sup>3</sup> , As <sup>1</sup>	Red mottling (peat ash)
143-146	7.5yr-2.5/1 (black)	Amorphous (silt)	Sh <sup>3</sup> , Ag <sup>1</sup> , Th <sup>+</sup>	Charcoal flecks, soot, rootlets Water table c. 146 cm
146-146.1	n/a	n/a	n/a	Tephra (sampled)
146.1-153	10yr-2/1 (black)	Amorphous (silt)	Sh <sup>2</sup> , Ag <sup>2</sup> , Gg <sup>+</sup> , Th <sup>+</sup>	<i>Equisetum</i> spp. stem and red mottling (peat ash)
153-164	2.5yr-2.5/1 (black)	Amorphous (silt)	Sh <sup>2</sup> , Ag <sup>2</sup> , Gg <sup>+</sup>	Stone ≤ 2 cm (angular)
164-169	7.5yr-2.5/2 (very dark brown)	Amorphous (silt)	Sh <sup>3</sup> , Ag <sup>1</sup>	Yellow mottling (dung ash), large animal tooth
169-171	7.5yr-2.5/2 (very dark brown)	Amorphous	Sh <sup>4</sup>	Burnt bone and red mottling (peat ash)
171-174	7.5yr-2.5/2 (very dark brown)	Amorphous (silt)	Sh <sup>3</sup> , Ag <sup>1</sup>	Burnt bone and red mottling (peat ash)
174-176	7.5yr-2.5/1 (black)	Amorphous (silt)	Sh <sup>3</sup> , Ag <sup>1</sup>	Burnt bone and red mottling (peat ash)
176-177	n/a	n/a	n/a	Tephra (sampled)
177-186	7.5yr-2.5/1 (black)	Amorphous (silt)	Sh <sup>3</sup> , Ag <sup>1</sup>	

\*Sh (disintegrated organic substance), Th (plant material), Ag (silt), As (clay), Gs (sand), Gg (gravel)

**Table 3.** Depths and description of material derived from KBKL-A (86-186 cm) sampled for C<sup>14</sup> dating.

cm	Content*
92-93	Sand and tephra
107-108 117-118 118-119 119-120	Conglomeration of humic material, clay, iron, charcoal and tephra.
140-141	Peat ash layer-conglomeration of humic material, clay, iron, charcoal and tephra.
146-147	Conglomerations of humic material, clay, iron, charcoal, burnt bone and tephra.
147-148 148-149	Conglomeration of humic material, clay, iron, charcoal ( $\leq 1$ mm) and tephra.
156-157 157-158 158-159	Conglomeration of humic material, clay, iron, charcoal and tephra.

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