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Environmental Challenges for the Medieval North Atlantic World

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The high-latitude North Atlantic periphery and its islands witnessed major political, social, economic and environmental changes during the Medieval Period (c. AD 500–1500). Among the many characteristic developments were: the transformation of northern European tribal societies into kingdoms (e.g. Jones 1984; Noble 2016); the westward diaspora of Norse peoples from their Scandinavian homelands, leading to the settlement of both occupied lands – such as the Northern Isles of Scotland – and the colonisation of unoccupied and ‘pristine’ landscapes in the Faroe Islands, Iceland and Greenland (Dugmore et al. 2005); the expansion and increasing commercialisation of northern trading networks for goods such as dried fish, furs and walrus ivory (e.g. Barrett et al. 2011; Frei et al. 2015); and issues of resilience, or in extreme cases the abandonment of certain western European colonies and outposts (e.g. Greenland and Newfoundland) located at the interface between the Old and the New Worlds (Dugmore, Keller, and McGovern 2007, 2012). These events occurred against a backdrop of significant environmental change including two major climatic perturbations – the so-called ‘Medieval Warm Period’ and the ‘Little Ice Age’. Northern European societies also variously faced other significant challenges throughout this period; for instance, outbreaks of bubonic plague and volcanism in Iceland (e.g. Streeter, Dugmore, and Vésteinsson 2012).

This special issue of *Environmental Archaeology* features content that uses biological, chemical and physical proxies to consider the relationships between people, landscape, resources and climate in northern settings across a dynamic span of time that sits broadly at the interface between prehistory and the emergence of documentary records. At its core are papers that were presented to the 17th Annual Meeting of the *European Association of Archaeologists* (EAA), held

in Maastricht, The Netherlands. These featured in a session that was held to stimulate debate about the challenges faced by, and opportunities open to, northern European societies in the period leading into, through and shortly after c. AD 500–1500. A common theme connecting many of the papers presented here is the spread, influence and environmental impacts arising from the Norse diaspora. The geographical scope of the issue’s content is broad, ranging from events in Norway primarily in the time ahead of the wave of Norse expansion; through the islands off the northern British coastline that were first raided and (in many instances) later settled by Norse peoples; and on to Iceland and, finally, Greenland, which in both cases were unoccupied at the time of the conventional *landnám* (Old Norse: ‘land-taking’; Edwards, Erlendsson, and Schofield 2011; Church et al. 2013). The papers have been arranged in a chronological and geographical order that reflects this westward passage of people and events through time.

The opening paper (Fredh, Prøsch-Danielson, and Jensen 2018) features a synthesis of palynological and radiocarbon results obtained from *cultivation layers* – anthropogenically-created or modified agricultural soils situated beneath the topsoil in depressions or lynchets – in the county of Rogaland, southwestern Norway, the aim of the study being to better understand the nature and timing of agricultural development in this region. The authors have collected data from an impressive number of different contexts – 100 cultivation layers from 20 sites – covering the period c. 2200 BC–AD 1400. These demonstrate that the main agricultural expansion in this area occurred during the pre-Roman Iron Age (500–1 BC), and that this continued into the Roman Iron Age (AD 1–400) and the Migration Period (AD 400–600). The research exemplifies the potential of soils to yield valuable ecofactual information despite the

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many challenges that palynologists can face when working with such archives; for instance, the difficulties that may accompany the interpretation of ^{14}C dates where mixing is a possible issue, and biases arising from varying standards of microfossil preservation and representation (cf. Dimpleby 1985; Ledger, Edwards, and Schofield 2015).

The second paper in the series (Timpany et al., 2020) moves the geographical focus west to the Orkney Islands, specifically to Tuquoy on the island of Westray, which was formerly the location of a high-status Norse farmstead. The authors have applied multiple proxies – notably pollen, plant macrofossils and sediment geochemistry – to consider the response of the surrounding landscape to human activity based upon an analysis of sediments contained within an infilled loch basin situated in close proximity to the archaeological site. The data reveal a long history of agricultural land use dating back almost 3000 cal. yr and including a notable increase in the intensity of human activity roughly coincident with the Viking Period in the Northern Isles. The study demonstrates, amongst other things, the intricacies involved in using pollen analysis to discern human impacts upon vegetation in very open landscape settings, where any changes in arboreal pollen frequencies that result from the clearance or management of woodland are typically subtle and subdued. Comparison between the pollen record and that of the charred plant remains recovered from the site's byre is shown to be particularly valuable, as this allows more confident statements to be made concerning the species of trees and shrubs which were likely to have been growing locally and gathered for fuel.

Prior to Scandinavian settlement in the northern British Isles, these islands were subject to a series of Viking raids (Jones 1984). The third paper (Jones et al., 2020) focuses upon one of the locations that suffered in this manner, the island of Iona in the Inner Hebrides. Renowned for its early monastery that was founded following the arrival of Columba in AD 563, Iona was repeatedly raided in the late 8th and early 9th centuries – the first of these events being recorded in AD 795. The authors present palaeoecological (primarily pollen and insect) data from multiple sedimentary contexts at and around the monastery with the aim of reconstructing the environmental history of the site. Their data reveal a dynamic situation in which a phase of agricultural expansion and stability – which developed during the early monastic period – was followed by an episode of crisis in the 9th century AD. This witnessed arable farming either being abandoned or severely diminished in intensity as local woodlands began to regenerate. Subsequently, the site appears to have experienced various short phases of recovery and retreat, the timings of which may be at least partly

reflective of wider political events affecting Scotland in the late first to early second millennia AD. The research exemplifies how an accepted series of historical events can be reflected in palaeoecological records.

On a related theme, the study by Riddell et al. (2018) from the medieval monastic site of Þingeyrar, in northern Iceland, demonstrates how palaeoecological investigation of historical sites can often reveal additional details about local land use that go beyond the information recorded in documentary sources. Applying palynological and sedimentary methods, the authors reconstruct vegetation changes at the site during the time leading up to, through and beyond the Norse *landnám* (c. AD 877) and the monastic period (c. AD 1130–1550). Their data reveal a vegetation cover initially dominated by dwarf shrub communities that was superseded by an open pastoral landscape. A muted (regional) palynological signal for human impact around the time of the Icelandic *landnám* becomes much stronger from the time of the construction of the monastery. The palynological record also appears to reflect outbreaks of plague that affected Iceland in the 15th century, with the regeneration of dwarf birch scrub apparent around the time the monastery and nearby farms were deserted, at least temporarily, as population declined.

Remaining in northwestern Iceland, our fifth paper (Bates et al., 2021) applies pollen analysis and associated proxies to a peat profile containing multiple layers of tephra in order to reconstruct the environment in the area around Kagaðarhóll, a 'standard farm of average value' within a region for which there is relatively little archaeological information. The authors note that, to date, most studies that have sought to examine the impacts of the Icelandic *landnám* on vegetation, soils and landscape have focused on the southwestern and northeastern areas of the island, with other regions receiving scant attention. Their data strongly suggest that following the first indications of human activity appearing in the pollen record – demonstrating woodland clearance and grazing, beginning by AD 900 at the latest – the intensity of anthropogenic impacts upon the landscape varied over time, with indications that dwarf birch scrub regenerated to some extent beginning in the mid-13th century AD. This could imply active management of this resource to meet demands for fuel, a practice that is known to have been employed in other areas of Iceland, especially where charcoal was required for the smelting of metal (e.g. Simpson et al. 2003).

The final paper (Schofield et al., 2019) focuses upon events in the Western Settlement of Greenland, which was colonised by Norse settlers arriving from Iceland in c. AD 985 (Ingstadt 1966). To date, this region has been little studied from a vegetation history perspective, and questions still surround the reasons

that ultimately motivated the settlers to establish farmsteads in a mountainous and rugged region just south of the Arctic Circle, close to the viable limits for agriculture. The authors present palynological results from the vicinity of a moderately large Norse farmstead situated inland and close to the margins of the Greenland Ice Sheet. The data reveal that the impacts on landscape and vegetation from the settlers and their domesticated animals was subdued in the locale of the farm, much more so than is typically the case for farmsteads in the larger and more southerly Eastern Settlement (Edwards, Erlendsson, and Schofield 2011, 2021). The patterns in the data indicate that pastoral farming was probably of low intensity, at least in this location, thereby lending further support to the idea that human activity in the Western Settlement was more heavily centred upon hunting and trade (e.g. of walrus ivory) rather than farming (cf. Dugmore, Keller, and McGovern 2007).

A common technique linking all the papers in this special issue is pollen analysis. It is not long ago that the technique celebrated 100 years since its inception (Gaillard et al. 2018), over which time it has become regarded as, ‘undoubtedly the most widely adopted and arguably the most versatile’ of all the palaeobiological methods currently used in the reconstruction of Quaternary environments (Lowe and Walker 2015, 183). The collection of papers presented here continue to demonstrate that pollen analysis has much to offer the scientific community, not least in the valuable insights it can reveal about past land use in studies that sit at the interface between environmental archaeology and early history.

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