Challenges to the Occupation of North-West Europe during the late Middle Pleistocene: Introduction

Introduction

The dating and the nature of the human occupation of northern Europe has been a major subject of debate since Gamble (1986, 1987) set out a framework for the environmental background and the challenges that various climates and environments provided for survival in different geographical zones. The premise that dense forests would have been difficult environments for occupation was challenged by Roebroeks *et al*. (1992; Gamble 1992), while Mithen (1993) used the environment to explain differences in learned behaviour and how that expressed itself in lithic technology, specifically handaxe and non-handaxe assemblages. Meanwhile the earliest occupation of northern Europe was also being scrutinised (Roebroeks and van Kolfschoten 1995). Claims for the earliest lithic industries prior to Marine Isotope Stage (MIS) 13 were thoroughly investigated, and strong evidence was provided that many of the stone tool assemblages could be attributed to natural processes, while often the age was also poorly constrained. The arguments for a more sustained occupation of Europe from MIS 13 have largely stood the test of time, although it now seems that occasional forays into southern and even northern Europe occurred much earlier (Dennell and Roebroeks 1996; Carbonell *et al.* 1995, 2008; Gibert *et al.* 2006; Arzarello *et al*. 2007; Parfitt *et al*. 2005).

While these debates have been ongoing, there have been considerable advances in dating and in the environmental reconstruction of human habitats, and the application of these methods to both old and new sites. The normally fragmented records from terrestrial sites can often now be correlated with the continuous marine isotope record of global climate change. This has been through the wider application of U-series dating (e.g. Grün and Schwarcz 2000; Candy and Schreve 2007), development of TL and OSL dating (e.g. Nitychoruk *et al.*, 2005; Briant *et al.* 2006; Pawley *et al.* 2008), new methods of Amino Acid Racemisation (Penkman 2005; Penkman *et al.* 2008), advances in the application of mammalian biostratigraphy (e.g. Bridgland and Schreve 2004; Parfitt *et al.* 2005; Preece *et al.* 2009) and the use of palaeomagnetism (Carbonell *et al.* 1995, 2008; Gibert *et al.* 2006; Scott and Gibert 2009). How the global climatic record translates into vegetation change is also better understood through the continuous and semi-continuous pollen records from Tenaghi Philippon in Greece (Tzedakis *et al.* 2006), north-west Iberian coast (Desprat *et al.* 2005) and the Velay sites of central France (Reille and de Beaulieu 1995; de Beaulieu *et al.* 2001).

In northern Europe the continuous terrestrial records are lacking, although organic sediments are often preserved in lake basins and within fluvial sediments providing an array of proxies for climatic and environmental reconstruction. These include pollen (e.g. Nitychoruk *et al.* 2005; Urban 2007), molluscs (e.g. Preece *et al*. 2007) and beetles (e.g. Coope 2006). The correlation of these deposits to the marine isotope record is based on the advances in dating above and application of these methods to the glacial stratigraphy of northern Europe. Although there is still disagreement about the correlation of the various glacial tills of northern Europe and how they relate to the terrace formation of the major rivers and with the marine isotope record (e.g. Šibrava 1986; Zagwijn 1986; Turner 1998; Eissmann 2002; Bridgland *et al.* 2006), there is a growing consensus about the British sequence (Pawley *et al.* 2008; Preece *et al*. 2009; but also see Lee *et al*. 2006; Lee 2009).

These advances in research are enabling a more detailed investigation of the timing of human occupation of northern Europe and the types of environment and specific habitat that were being occupied. Beyond a regional study of the nature of human occupation, northern Europe provides a unique area to study human physical and technological adaptation to high latitudes. The evidence so far suggests that north-west Europe was the earliest region in which humans adapted to latitudes greater than 42°N (Parfitt *et al.* 2005) and possibly the first region to have more sustained occupation within these latitudes. High latitudes provide specific challenges. Daylight hours are shortened during winter, reducing foraging and hunting opportunities (Dennell 2003). Shorter summers and cold winters would have meant that usable plant resources were only available seasonally, and implies either the development of methods of storage, or a greater dependence on animal resources. Increased winter cold would have required either physical adaptation or improved technology (e.g. fire, shelter, clothing) for survival. New vegetational zones would have been encountered, (e.g. boreal forest), providing new challenges to survival. Finally, northern Europe was subject to large scale changes in climate that led to cyclical depopulation or extinction and subsequent recolonisation (Hublin and Roebroeks 2009; Roebroeks *et al*. in press). More southern latitudes are likely to have been more buffered from such

dramatic shifts in climate and may have enabled more sustained occupation. How early humans addressed these problems can be investigated in northern Europe, and are of global significance in understanding the evolution and adaptation of early humans.

The record from northern mainland Europe has provided many key sites for understanding these questions and shows an array of different environments. The rich vertebrate and molluscan faunas from Miesenheim I, Germany, have enabled a detailed reconstruction of the human habitat on the fringes of the Rhine in a temperate, though continental, climate, probably during MIS 13 (Bosinski 1995; Turner 1999). Steppic and boreal forest environments have been suggested from pollen at the site of Cagny-la-Garenne, France, interpreted as early MIS 12 (Antoine and Tuffreau 1993; Tuffreau *et al*. 2008). A broader range of environmental proxies were recovered from the German sites of Bilzingsleben II (Mania 1995) and Schöningen (van Kolfschoten 1993; Thieme 1997; Urban 2007) with the recovery of floral remains, molluscs and vertebrates. Whereas the environment at Bilzingsleben seems to be fully temperate, there are indications of a cooler climate at Schöningen in one of the main archaeological horizons associated with the spears (level 4b of Channel II) with vegetation dominated by pine. The dating of both sites is controversial (e.g. Schwarcz *et al*. 1988; Mania 1995; Turner 1998; Eissmann 2002; Jöris and Baales 2003; Bridgland *et al*. 2006; Urban 2007)., although most authors would agree that they are attributable to either stages or sub-stages of MIS 11 or MIS 9

Early Middle Palaeolithic sites in northern Europe also provide valuable environment data for the reconstruction of human habitats with many sites indicative of open, often cool conditions. The main exception is Maastrict-Belvedere (Netherlands) where a complex of sites from fine-grained fluvial sediments contain fully temperate faunas, which have been attributed to early MIS 7 (van Kolfschoten and Roebroeks 1985; Roebroeks 1988). In contrast, La Cotte de St Brelade (Jersey) records a series of archaeological levels that span MIS 7 and 6 (Callow and Cornford 1986), with most occupation occurring between the extremes of cold or fully temperate climate. A cooler climate is also recorded in association with the primary context assemblages at Biache-Sainte-Vaast (Tuffreau and Sommé 1988) where molluscs and mammalian fauna suggest a progressively cooler and more open environment towards the end of MIS 7 or early MIS 6.

Britain also has a wealth of sites associated with environmental evidence that date from MIS 13 through to the late Middle Pleistocene. This data contributes to the record from the remainder of northern Europe and provides an ideal area to test some of the questions about the human occupation. Britain also posed an additional challenge to occupation due to its changing status as an island or sometimes a peninsular of north-west Europe. Therefore it provides an opportunity to examine the significance of large water barriers to occupation, and how island populations are able to survive in probable isolation. The papers presented for this thesis can be divided into three groups and provide three modules for the examination of the early human occupation of northern Europe.

Module 1: Human habitats and environment in MIS 11

The first group of papers provide evidence of human habitat choice during MIS 11 in Britain (Ashton *et al.* 2005, 2006, 2008). The structure of MIS 11 is known from the marine isotope record (Oppo *et al*. 1998; McManus *et al.* 1999; EPICA Community Members 2004) and from long, terrestrial pollen sequences from southern Europe (Reille and de Beaulieu 1995; de Beaulieu *et al.* 2001; Desprat *et al.* 2005; Tzedakis *et al.* 2006). From these records a five-fold division has been suggested, which shows a sustained period of temperate climate from c. 425 ka through to c. 395 ka (MIS 11e). This was followed by a complex series of oscillations in climate, with several marked cool episodes, that cover the period c. 395 ka through to about c. 365 ka (MIS 11d-11a). It is not entirely clear as to how these recorded climatic changes in southern Europe translate into more northerly latitudes, although it is suggested from the evidence at Hoxne (Ashton *et al.* 2008) that the coldest episodes of MIS 11 (11d and 11b) are marked by parkland type vegetation with dwarf willow and dwarf birch. It is further suggested that the later temperate sub-stages (MIS 11c and 11a) may still be relatively cool with a boreal type environment.

The variation in climate during MIS 11 therefore provides an opportunity to examine which environments humans were favouring or at least able to tolerate. Due to the richness of sites during this period it is also possible to examine their location in the landscape. This is the subject of Ashton *et al.* (2006), which critically studies the landscape locations for British Hoxnian sites, in particular the

interpretation that many of these are lake-edge locations (Wymer 1999). These include the recently excavated sites of Barnham (Ashton *et al.* 1998), Beeches Pit (Preece *et al.* 2006, 2008), Elveden (Ashton *et al.* 2005) and Hoxne (Singer *et al.* 1993; Ashton *et al.* 2008), together with the evidence from older excavations and collections at Hitchin (Reid 1897; Boreham and Gibbard 1995) and Foxhall Road, Ipswich (Layard 1904, 1906; White and Plunkett 2005).

The main conclusions drawn from these studies is that humans were attracted to the more dynamic landscapes within the river valleys with much of the evidence being indicative of temperate environments. It is suggested that the river valleys were kept open by the destruction of large herbivores, whereas the interfluves were heavily forested. The benefits of these landscapes can be found in the diversity of micro-environments and the variety of resources. Of particular importance would have been the erosive forces of the rivers in exposing sources of lithic raw materials from bedrock sources and gravels. Although most of the evidence suggests occupation during temperate climates, the work at Hoxne indicates humans also surviving cooler, boreal environments. This evidence is possibly complimented by a number of poorly-dated surface scatters on the slopes and hilltops of south-east England. It is suggested that these areas would have been more accessible during more open conditions, and at times when sub-aerial erosion would have provided alternative sources of lithic raw material.

Module 2: Population change from MIS 13 – MIS 5e

The second group of papers examines demographic change and the reasons for a possible decline in population in Britain during the late Middle Pleistocene (Ashton and Lewis 2002; Ashton and Hosfield in press). The demography of Britain can be viewed against the background of cyclical changes in climate and environment, which have led to Britain being colonised and depopulated on numerous occasions. To this list of physical constraints can be added the changing status of Britain as a peninsular or island of Europe and the filtering effect that this had on colonisation (White and Schreve 2000; Ashton and Lewis 2002).

Britain possesses one of the best known and mapped archaeological records to which questions of constraints on colonisation can be applied. Rather than using sites with high-resolution and detailed records, such as Boxgrove (Roberts and Parfitt 1999), Beeches Pit (Preece *et al.* 2006, 2007), Barnham (Ashton *et al.* 1998) and Hoxne (Ashton *et al.* 2008), these papers use the immensely rich fluvial archive. This archive provides insights into the broader scale changes in human presence and technology through time.

Many of the major rivers of southern and eastern England have formed clearly defined and well-mapped flights of terraces, some of which contain large collections of stone artefacts (Gibbard 1985, 1994; Bridgland 1994; Allen and Gibbard 1993; Westaway *et al*. 2006). The artefact collections have been systematically listed in the *Gazetteer of British Lower and Middle Palaeolithic Sites* (Roe 1968) which has been updated with better contextual detail in *The Southern Rivers Palaeolithic Project* and *The English Rivers Palaeolithic Project* (e.g. Wessex Archaeology 1993, 1996). As the highest terraces are the earliest, and the lowest terraces the latest, they contain a means of assessing relative changes in technology and human activity over time. The underlying principle is that these collections form time-averaged assemblages and represent the full range of human activity across a valley system over a broad length of time. It is this fluvial record and how it contributes to the understanding of the human occupation of Britain during the later Middle Pleistocene that forms the focus of Ashton and Lewis (2002) in the Middle Thames Valley and Ashton and Hosfield (in press) in the former Solent Valley. These archives provide the means to look at recolonisation events and discuss whether the archaeological record has changed in terms of technology, relative population size and, if so, the reasons for these changes.

The evidence from the papers suggests that handaxe numbers decline from MIS 11 (or possibly earlier) through to at least MIS 8, and that Levallois and handaxes become increasingly rare after MIS 7. If artefacts can be used as a proxy for human population then the figures suggest a decline in population from MIS 11 and a possible absence of humans after MIS 7. These conclusions provide data towards the questions in Module 3.

Module 3: Explanations for low or absent populations between MIS 6 and MIS 4

For over 30 years it has been suggested that humans were absent from Britain during the Last Interglacial (MIS 5e), largely based on the absence of artefacts in association with hippopotamus, but also on the absence of horse (Stuart 1976; Currant 1986; Wymer 1988; Sutcliffe 1995). Since then this suggested period of absence has been extended to include MIS 6 (Jacobi *et al*. 1998) and also the remainder of MIS 5 and MIS 4 (Currant and Jacobi 2001).

The third group of papers (Ashton 2002; Ashton and Scott submitted) concentrate on the earlier part of this period by scrutinising the evidence from MIS 7 through to MIS 5e and investigating reasons for any apparent absence. The evidence also draws on Ashton and Lewis (2002) and Ashton and Hosfield (in press). This is achieved through both the re-evaluation of sites attributed to MIS 7 and by using the evidence from the fluvial archive of the Middle Thames and Solent rivers.

Two possible reasons for absence are suggested, the first being the progressive adaptation of Neanderthals to open steppe environments, with populations only reaching Britain as this biome expanded from the east. A second suggestion for the apparent absence is a comparatively late breach of the Chalk of the Weald-Artois Anticline, perhaps towards the end of MIS 6, rather than the more widely accepted timing in MIS 12 (Smith 1985; Gibbard 1995). These interpretations are assessed through the comparison of the British and north-west European records. If there were similarities in the records, this would suggest that Neanderthal adaptation to open steppes was producing the pattern, whereas differences in the record would suggest that Britain was cut-off from mainland Europe at this time.

Differences in the archaeological records between Britain and mainland Europe suggest that it is the changing status of Britain as an island is the main contributory factor to the apparent decline in population. It is increasingly clear that, rather than the breach of the Weald-Artois Anticline, it is the progressive subsidence of the North Sea basin that provides the main control on the access to Britain. It is suggested that during MIS 11 the floor of the North Sea basin was little below current sea-levels and therefore access to Britain was largely unimpeded across this area. However, with increasing subsidence, access became more and more difficult over time. By MIS 7 a significant cooling in climate, with a drop of perhaps 20m in sea-level, would have been required for the floor of the basin to become exposed. The work therefore suggests that the decline in human population is directly linked to the increasing difficulty in access across this area. The work has also drawn attention to possible differences in the archaeological signatures from western and south-eastern Britain. It is tentatively suggested that similar differences can be identified between western France and areas further north. The geography of Britain can provide an explanation with one routeway across the North Sea basin and a second route via the Channel River. However, the identification of such regional differences needs to be substantiated through future work.

A summary of all the papers and a discussion of the modules are provided in the conclusions after the submitted papers. Together they provide insights into how humans overcame the challenges of the occupation of northern Europe during the late Middle Pleistocene, with a particular focus on how changing geography affected the colonisation of Britain.

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