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Short Paper

Climate change, patch choice, and intensification at Pont d'Ambon (Dordogne, France) during the Younger Dryas

Emily Lena Jones *

Department of Sociology, Social Work, and Anthropology, Utah State University, Logan, UT 84322-0730, USA

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ABSTRACT

This paper considers the impact of the Younger Dryas on the prehistoric inhabitants of Pont d'Ambon, a site in the Dordogne region of southwestern France, through an examination of the zooarchaeological remains from this site. An investigation of patch choice indicates that patch choice evenness declines during the Younger Dryas due to increasing local dominance of the grassland patch. Analyses of demographic composition, cutmark frequency, and marrow processing in the wild European rabbit (*Oryctolagus cuniculus*) assemblage suggest intensified rabbit use during this period. This study thus supports the hypothesis that changing climate had significant impacts on the prehistoric inhabitants of Pont d'Ambon. However, the traditional climate hypothesis—that changing climate negatively impacted the availability of larger fauna, forcing a switch to smaller, lower-ranked prey items—is not supported here. The inhabitants of Pont d'Ambon seem to have adapted to changing climate by efficiently exploiting the new species available to them, and possibly, during the Younger Dryas, by intensifying their use of one of these new species, the European rabbit.

Introduction

Research on the relationship between the Younger Dryas climate change and contemporary human populations across the globe has flourished in recent years, with investigations on everything from megafaunal extinctions in the Americas (Firestone et al., 2007; Newby et al., 2005) to landscape use in northern Africa (Bouzouggar et al., 2008) to the development of maritime activity in the Mediterranean (Broodbank, 2006). In the Dordogne region of southwestern France (Fig. 1), where the Younger Dryas is known to have triggered a return to glacial conditions (Magny, 1997), analyses of the impact of the Younger Dryas on human populations are relatively rare. Instead, archaeologists have traditionally focused on the impacts of the longer-term warming that occurred at the end of the Pleistocene, commonly portrayed as a traumatic event for prehistoric peoples. During this time period in the Dordogne, diets dependent on large ungulates, principally reindeer (*Rangifer tarandus*), were replaced by those dependent on smaller species, and in particular on the wild European rabbit (*Oryctolagus cuniculus*) (Jones, 2006). Both previously published faunal data (Cochard, 2004; Delpech, 1992, 1999; Straus, 1999) and site location analyses (Demars, 2000, 2002; Jones, 2007) suggest that diets broadened to include a greater variety of species in the Dordogne during the Pleistocene-Holocene transition; the broadening began with the Allerød and continued through the Azilian (~9000 ^{14}C yr BP) and early Holocene.

As this change in diet coincides with a major warming period, the assumption that it has something to do with climate change seems logical. What increasing diet breadth means in terms of subsistence stress, however, is hotly debated (Broughton, 1999; Hockett and Haws, 2003; Stiner and Munro, 2002). In the Dordogne case, some researchers have concluded that climate change negatively impacted large mammal populations, thus forcing people to begin incorporating smaller and/or swifter species into their diets (e.g., Straus, 1996). If a straightforward causal relationship between climate and decreasing availability of large game is driving the increase in small prey in human diets in the late Pleistocene Dordogne, however, we would expect a return to the large game-dominated diets characteristic of the last glacial maximum with the return of glacial conditions precipitated by the Younger Dryas.

Unfortunately, fine-grained analyses of the impacts of the Younger Dryas on the archaeological populations of the Dordogne are rare. In this paper, I use data from the zooarchaeological assemblage at Pont d'Ambon, a site in the Dordogne region with deposits that span the Pleistocene-Holocene transition, to examine how climate change impacted human hunting choices at this site during the Younger Dryas and beyond.

Pont d'Ambon

Pont d'Ambon, a small rockshelter, is located on the banks of the Dronne River, in the northwest part of the Dordogne (Fig. 1). This site, excavated during the 1970s and 1980s by Guy Célérier, was used extensively by Magdalenian and Azilian people and has been relatively undisturbed by non-anthropogenic processes (e.g., Célérier

* Fax: +1 435 797 3943.
E-mail address: Emily.Jones@usu.edu.

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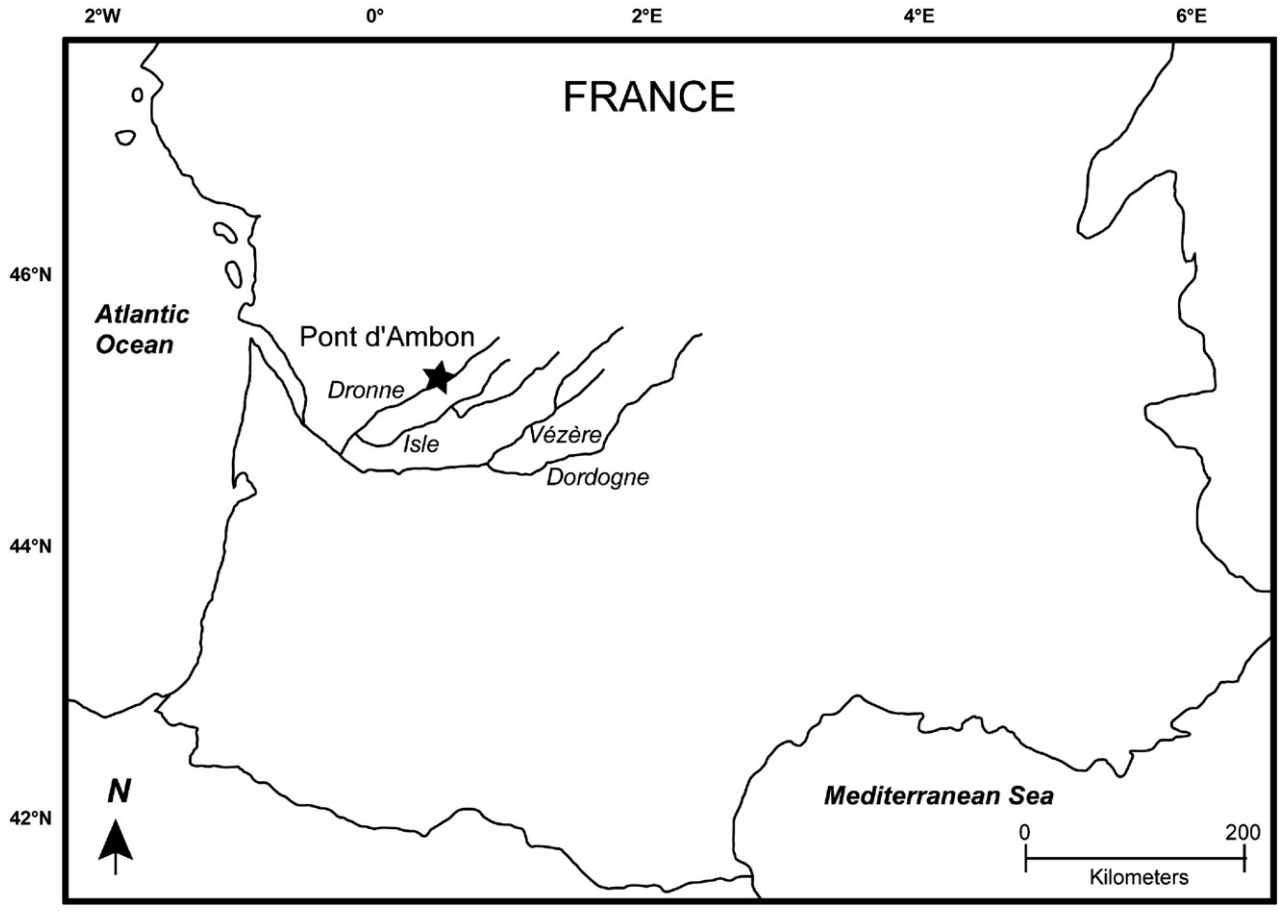

Figure 1. Location of Pont d'Ambon (Latitude 45°19.12′N, longitude 0°36′E) within the Dordogne River Valley.

and Kervazo, 1994). The deposits (extensively dated by Célérier; see Célérier, 1998) date between 13,000 and 9500 ^{14}C yr BP, including the Younger Dryas (Table 1).

The fauna of Pont d'Ambon is of particular interest to those interested in the Pleistocene–Holocene transition in the Dordogne because it is extraordinarily rich in smaller prey species (Delpech, 1983; LeGall, 1993). Despite the fact that the site has been securely dated to the interval between 13,000 and 9500 ^{14}C yr BP, the fauna contains no reindeer (Table 2; Célérier, 1994; Delpech, 1983). Larger prey species in the Pont d'Ambon fauna include red deer (*Cervus elaphus*), aurochs (*Bos primigenius*), and horse (*Equus caballus*). However, the mammalian fauna at Pont d'Ambon are consistently dominated by lagomorphs, rather than large game. European rabbit (*Oryctolagus cuniculus)* remains comprise approximately 90% of the mammalian fauna throughout the Pont d'Ambon sequence (Fig. 2). There is a significant presence of other small prey types at Pont d'Ambon as well, including both fish and birds (Table 2).

Previous seasonality studies suggest year-round occupation of the site (LeGall and Pannoux, 1994; Pike-Tay, 1991). The *Oryctolagus* assemblage at Pont d'Ambon has undergone a detailed demographic analysis (Jones, 2006), which has provided information about both seasonality and hunting technique. The demographic data indicate that throughout the sequence, rabbits of a variety of ages were being taken (Jones, 2004a), providing further support for the hypothesis that Pont d'Ambon was occupied throughout the year.

In addition, the demographic data suggest that at least some warren-based harvest, a mass collecting technique that would boost the energetic return of rabbits, was ongoing at Pont d'Ambon (Jones, 2006). In warren-based harvesting, the hunter focuses his attention on rabbit warrens, large, complex burrows used by this species for reproduction and protection from aerial predators. Because the warrens are easily visible, rabbits can be trapped in and taken directly from them, *en masse*, thus raising the rate of energetic return for this prey species. As warrens contain primarily adult female and juvenile rabbits, this technique can be identified through demographic analyses. Though the Pont d'Ambon rabbits most likely represent a palimpsest of hunting techniques, the sex profiles indicate that warren-based harvest was probably the dominant method throughout the sequence (Jones, 2006).

Table 1
Culture history and ^{14}C dates from Pont d'Ambon (Célérier et al., 1994).

Stratigraphic layer	Industry represented	^{14}C yr BP
Couche 2	Azilian	9640 ± 120
Couche 3	Azilian	10350 ± 190 and 9990 ± 250
Couche 3a	Azilian	9830 ± 130
Couche 3b	Transitional Azilian	12130 ± 160
Couche 4	Final Magdalenian	12840 ± 220

Patch choice at Pont d'Ambon

Environmental reconstruction for southwestern France suggests that local environments during the Pleistocene–Holocene transition would have been characterized by extreme patchiness (Huntley, 1990). The patch choice model of optimal foraging theory (Nagaoka, 2002) as well as more general patch-based analyses (i.e., Delpech, 1999) are often employed by zooarchaeologists in such situations. Patch-based analyses are difficult to operationalize in archaeological contexts due to the difficulty of fully reconstructing past patches (Lupo, 2007; Ritchie, 1998). As prehistoric patches have to be inferred from zooarchaeological remains, in most situations only very general patch types, such as “marine” and “forest” can be inferred. Despite the