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Optical dating of St. Lawrence Iroquoian ceramics from the Mailhot-Curran site, southern Québec

L. Forget Brisson [a, *], M. Lamothe [b], S. Huot [b], F. Hardy [b], C. Chapdelaine [a]

[a] Département d'anthropologie, Université de Montréal, Québec, Canada
[b] Département des sciences de la Terre et de l'atmosphère, Université du Québec à Montréal, Québec, Canada

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ABSTRACT

Infrared-stimulated luminescence dating (IRSL) was applied on pottery sherds from the Mailhot-Curran archaeological site (BgFn-2), a Late Woodland period village located in the Saint-Anicet region, southern Québec (Canada). This site witnessed the presence of St. Lawrence Iroquoians and is thought to have been occupied roughly 500 years ago. The main goal of this study is to chronologically constrain the occupation of this site in order to establish a fine chronological sequence for the occupations of various sites found in this area. The IRSL is used to complement previous dating methods used for Mailhot-Curran (radiocarbon and seriation of the archaeological remains).

Dating results are reported for ten samples of local ceramics made from Quaternary Champlain Sea clay. Luminescence dating on fine grains was preferentially used, since feldspar luminescence typically emit a decent luminescence signal. Although the latter was rather dim, anomalous fading was measured and luminescence ages were successfully corrected. It is therefore possible to validate the occupation age of this site.

1. Introduction

1.1. Brief overview of northern American prehistory

Prehistory in Québec starts around 12,000 years ago with the arrival of Paleoindian groups on the territory (Chapdelaine, 2004). Despite the large variability over time and space, Paleoindian and Archaic periods (Fig. S1) are characterized by a mobile hunter-gatherers lifestyle. From the archaeological remains of the end of the Archaic period, a tendency towards reduced mobility is observed, especially in the St. Lawrence River Valley. This is noticeable in sites by the increasing of their size, the apparition of midden areas and more resistant habitation structures, revealing longer occupation at given locations. The transition between Archaic and Woodland is very gradual but the apparition of pottery provides a diagnostic element recording this transition. For the Iroquoians of the Late Woodland, the transition to a sedentary lifestyle is slow and gradual (Chapdelaine, 1993). The Mailhot-Curran site was occupied at the end of the Late Woodland period. The population of this semi-permanent sedentary villages are focussing on horticulture, as it is typical for contemporary Iroquoians groups of the St. Lawrence Valley.

1.2. The Mailhot-Curran site and the Saint-Anicet cluster

The Mailhot-Curran archaeological site (BgFn-2) is located in the Saint-Anicet region, south of Lake St. François, in southern Quebec (Canada). The site was discovered in 1995 by archaeologist Michel Gagné (MRC du Haut St-Laurent; Gagné, 1996). The remains reveal a semi-permanent sedentary village occupied during the 16th century by St. Lawrence Iroquoians. The economy of this community is centred on horticulture exploitation, hunting, fishing and gathering. The remains of six longhouses were identified as well as some outdoor activity areas and middens. The remains found at Mailhot-Curran are quite typical for a St. Lawrence Iroquoians Late Woodland site. The stone tools assemblage is small but numerous animal bones are present along with carbonized seeds, especially maize, beans and squash but also tobacco and berries. No European or « contact » artefact was found on the site. The most abundant identified material is undoubtedly ceramic. Pots were manufactured on a regular basis due to their everyday usage, but also because of their very short lifespan. This is particularly what allows

* Corresponding author.
E-mail address: laurence_fb@hotmail.com (L. Forget Brisson).

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the use of pottery as a meaningful indicator for the occupation time of a site in this luminescence dating project.

The Saint-Anicet cluster appears to have been occupied from the 14th to the 16th century (Chapdelaine, 2010: p.9) (Fig. 1 and S2). About ten sites have been discovered in this area through a survey program focused on regionally typical glacial landforms: drumlins and moraines (Clermont and Gagné, 2004). The best documented sites are the Mailhot-Curran (BgFn-2), McDonald (BgFo-18) and Droulers (BgKn-1) villages, along with Berry (BgFo-3) and Irving (BgFn-5), two specialized camps. It appears that the groups that occupied these sites were likely to establish on these elevated landforms, probably for their efficient drainage and for the defensive advantages they would provide. Mailhot-Curran appears to be the youngest village of this group; probably the last one occupied in this region before the disappearance of the St. Lawrence Iroquoians, and is also the farthest one from the St. Lawrence River. In fact, the distribution of these villages follows this trend, where the oldest ones are closer to the St. Lawrence River, and the youngest ones are further away. The villages of the St-Anicet cluster display a common cultural identity and archaeologists agree to recognize a regional style for the Saint-Anicet St. Lawrence Iroquoians. Hence, these villages would have been occupied by the same group as they belong to a coherent cultural entity (Chapdelaine, 2013a; 2014).

The main goal of this project consists in dating the occupation of the Mailhot-Curran site, and eventually other archaeological sites from the Saint-Anicet cluster using infrared-stimulated luminescence dating methods to determine their chronological framework (Chapdelaine, 2013b).

It is also expected to achieve a complementary chronology with IRSL dating along with radiocarbon and relative dating methods already used on this archaeological site. Due to an atmospheric production plateau, ^{14}C ages are problematic for the late prehistoric period (Fig. S3). Thus, dating uncertainties are as such that it is currently difficult to test the occupation contemporaneity of some critical sites. Optical dating applied to heated pottery appears as an interesting solution for this Late Woodland site.

2. Methods

2.1. Sampling

In 2013, seventeen pottery fragments were collected at Mailhot-Curran during the second excavation campaign carried out on this site by the Prehistoric field school of the Anthropology Department of University of Montreal, directed by archaeologist Claude Chapdelaine. Each sample was collected from pits or middens sufficiently deep to ensure *in situ* conditions (Fig. S4). Pits are most of the time located in longhouses, dug under the living floor for several purposes, including the storage of food or waste disposal. Finding a sherd in a pit suggests that it was quickly buried. For the samples collected in middens, a rapid burying is also assumed due to the rapid accumulation of waste over time.

Only plain pottery fragments, of sufficient size, were used for luminescence dating. As they were unearthed, they were promptly hidden from sunlight and wrapped in aluminium foil. Location and depth of each sample were properly recorded. Soil samples directly under the sherds and from adjacent sedimentary layer were collected for dose rate assessment. The top soil is very thin on this site and shows two different layers. The Ah layer has an average thickness of 11–12 cm. Beneath it, the B horizon appears to be usually sterile (Chapdelaine, 2014, p. 64). Therefore, the majority of the archaeological remains are found in the top 12 cm. The situation is different in pits and middens since the artefacts can be found at the bottom of the structure where the Ah layer is noticeably thicker. As the material of these moraines and drumlins is made of glacial till, numerous stones are present in the soil horizons (Fig. S5).

The use of OSL dating methods on Northeast North American pottery is challenged by the high degree of fragmentation of these archaeological remains (Fig. S5). Retrieved pieces are usually small, significantly reducing the amount of material available for dating.

2.2. Preparation

From these retrieved fragments, ten were selected for

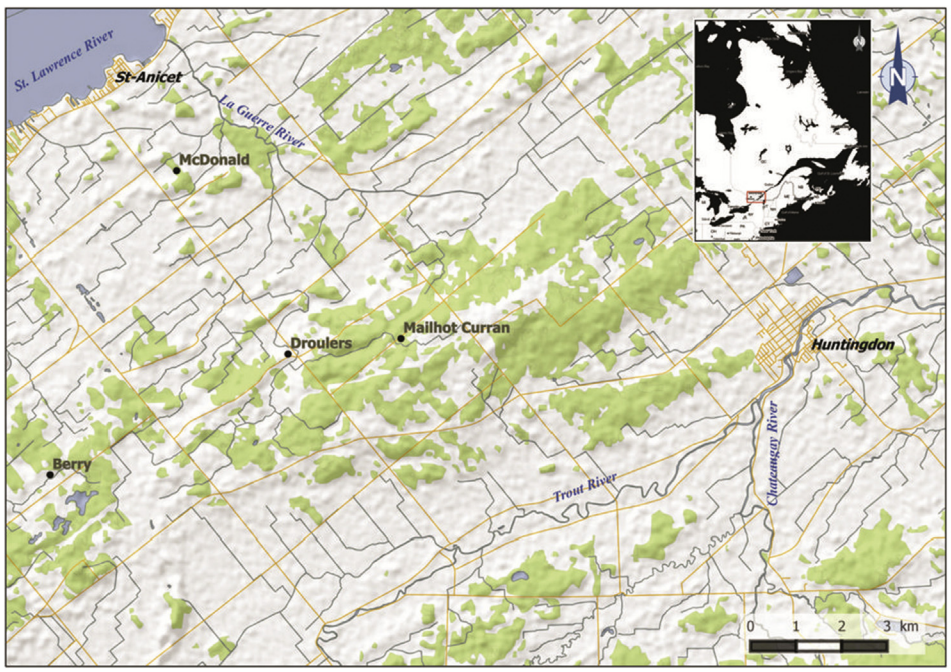

Fig. 1. Location of Mailhot-Curran in the Saint-Anicet cluster, Southern Quebec, Canada (Map data from Geogratis, Natural Resources, Canada).

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