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A new key-site for the end of Lower Palaeolithic and the onset of Middle Palaeolithic at Etricourt-Manancourt (Somme, France)

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ABSTRACT

New Palaeolithic sites are rare for MIS 11 to 9 in Eurasia. The discovery and the excavation of a large new site in 2012 at Etricourt-Manancourt (Somme, France) is an exceptional event. In 2010, a Palaeolithic evaluation was undertaken at a future retention basin by Emilie Goval on 170,000 square metres. The evaluation produced many flint artefacts, demonstrating the existence of at least two important Middle Palaeolithic sites. In 2012, an excavation on one of the sites was conducted by David Hérisson over 6 months and covering 4500 square metres. This excavation was undertaken by a multidisciplinary scientific team, including prehistorians and geomorphologists. This allows us to apply a reliable chronostratigraphic approach based on the analysis of the Glacial-interglacial successions. Five *in situ* Palaeolithic occupations have been excavated, dating from 330 to 70 ka. The youngest occupation dates from 70 to 80 ka (Weichselian) and corresponds to a recent phase of the Middle Palaeolithic. The next two layers belong to the Early Middle Palaeolithic, between 190 and 240 ka (Saalian). Finally, the two oldest layers have dates between 330 and 280 ka (Saalian) and belong to the Lower Palaeolithic. In addition to the archaeology, the sedimentary sequence is very thick (11 m high) and presents for the first time in Northern France a detailed record of the three last interglacial–glacial cycles. This paper presents the first archaeological and chronostratigraphic results of the excavation of Etricourt-Manancourt and its input with high resolution data to discuss behavioural changes occurring at the end of the Lower Palaeolithic and the onset of the Middle Palaeolithic.

1. Introduction

Northern France includes reference sites for the end of the Lower Palaeolithic and the beginning of the Middle Palaeolithic, such as the Cagny complex, Biache-Saint-Vaast, Soucy and Therdonne. These sites with high chronological resolution provide capital evidence of the onset of the Middle Palaeolithic and make a considerable contribution to the identification of all the facets of this key period of human evolution. The current corpus is based on a long process of data accumulation derived from discoveries made from the 19th century until today. Two regional summaries have been established including the early phase of the Middle Palaeolithic, in 1987 by A. Tuffreau, and in 2012 by D. Hérisson.

Even if Northern France can be considered as one of the most documented regions of Western Europe for this period, the discovery and the excavation of a large new site in 2012 at Etricourt-Manancourt (Somme, France) is still an exceptional event. In

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2010, a Palaeolithic evaluation was undertaken at a future retention basin by Emilie Goval on 170,000 square metres. The evaluation produced many flint artefacts, demonstrating the existence of at least two important Middle Palaeolithic sites. In 2012, an excavation on one of the sites was conducted by David Hérisson over 6 months covering 4500 square metres (Fig. 1).

The town of Etricourt-Manancourt is situated on the chalky plateau in the borders between Somme and Pas-de-Calais, in the Vermandois (Fig. 2). The bedrock is Coniacian white chalk (Fig. 3). The site was discovered on the southern hillside of a small dry valley, the Tarteron, a tributary of the Tortille that flows into the Somme few kilometres to the south. Karstic depressions filled by polygenic soils are visible on the chalky northern slope while the southern slope presents a complex geometry. The thickness of the superficial loamy deposits is very variable. Small valleys perpendicular to the Tarteron show slopes oriented towards the north-east (Fig. 3). Loess formations covering these slopes are thick, thanks to prevailing northwest winds (Antoine et al., 2014, Antoine 2015).

This paper presents the first archaeological and chronostratigraphic results of the excavation of Etricourt-Manancourt and its input with high resolution data to discuss behavioural changes occurring at the end of the Lower Palaeolithic and the onset of the Middle Palaeolithic.

2. Material and methods

The excavation of Etricourt-Manancourt took place from April 16th till September 28th 2012. The excavation and the analysis were supervised by D. Hérisson and led by a multidisciplinary team gathering together technicians, specialists of Lower and Middle Palaeolithic (E. Goval and J.-L. Locht), geomorphology and Quaternary palaeoenvironments (S. Coutard, P. Antoine, Y. Chantreau, R. Giros, P. Spagna and S. Pirson), radiometric dating (N. Debenham, J.-J. Bahain, S. Balescu), and geomatics (C. Font).

2.1. Pedo-stratigraphic and sedimentological approach

The study of the chronostratigraphic and palaeoenvironmental context of human occupations of Etricourt-Manancourt is based on the analysis of the succession of litho- and pedo-stratigraphic units identified on the field. A systematic and continuous sampling strategy (each 5 cm) was undertaken on four reference sections for grain size, chemical (organic carbon) and physical (magnetic susceptibility) analysis. One hundred and twelve sediment blocks of undisturbed soils were sampled for micromorphological analysis. The detailed study of these four sections allows a synthetic pedo-sedimentary sequence to be established. This synthetic sequence is 12 m and can be divided in eighteen main units.

2.2. Thermoluminescence protocol

Thermoluminescence (TL) date measurements were performed on five pieces of heated flint from various locations and contexts at the site. Initially, seven flints were made available for analysis, but two was found to be not sufficiently heated and therefore not suitable for dating. The five selected flints are identified and described as follows in Table 1.

Table 1
Characteristics of heated flint samples selected for TL analysis.

QTLS sample reference	Artefact reference	Context	Description	Dimensions	Weight
EMA1	–	Unit 12 – Humic soil – HUD	Not sufficiently heated and therefore undatable	–	–
EMA2	1333 HUD	Unit 12 – Humic soil – HUD	Mid-grey with a small area of thick cortex, pitted	50 × 25 × 12 mm	25.6 g.
EMA3	1335 HUD	Unit 12 – Humic soil – HUD	Mid-grey, partly reddened, pitted	30 × 30 × 18 mm	18.5 g.
EMA4	–	Unit 12 – Humic soil – HUD	Not sufficiently heated and therefore undatable	–	–
EMA5	2253 HUD	Unit 12 – Humic soil – HUD	Mid-grey, pitted	33 × 25 × 14 mm	16.6 g.
EMA6	458 LJC	Unit Cx – gravel LJC – Probably coming from reworked LRS	Mid-grey interior with lighter patina thickening to cortex, crazed	23 × 18 × 7 mm	6.2 g.
EMA7	705 HUS	Unit 11 – Steppic soil – HUS	Light-grey patina, finely cracked	30 × 15 × 10 mm	6.1 g.

The TL dating method involves two distinct measurements. The first is an evaluation of the total radiation dose received by the flint since it was heated in antiquity. This quantity of radiation, which is referred to as the *palaeodose*, is determined by examining the TL emissions from the sample. Thermoluminescence is the emission of light by a crystalline material while it is undergoing a progressive increase of temperature. The intensity of the light emitted by the crystal is related to the amount of ionising radiation which it has absorbed since it was last heated. This allows the heated flint to be used as a radiation dosimeter. The second phase of the date measurement is an assessment of the rate at which the palaeodose was received by the sample. Ionising radiation is emitted by radioactive elements which occur naturally in both the sample and its environment, and is also present as cosmic rays reaching the earth's surface. By combining the assessment of the radiation dose-rate with that of the palaeodose it is possible to calculate the length of time that has elapsed since the initial heating of the flint in antiquity.

2.2.1. Palaeodose evaluation

The outer surfaces of the flints, that had been exposed both to light and to short-range alpha and beta rays from the surrounding sediment, were first removed. The remaining interior portions were crushed and two ranges of grain size were selected from the crushings. Larger grains, of 75–125 μm size, were etched in dilute hydrochloric acid, then washed and dried. Aliquots of these grains were deposited onto a set of stainless steel discs to allow examination of their TL. In addition, fine grains of approximately 2–10 μm size were separated according to their settling times in dilute hydrochloric acid. After washing, they were deposited from suspension in acetone onto a set of aluminium discs. The palaeodoses were evaluated using the discs of 75–125 μm grains. About half of the discs were exposed to different doses of beta radiation, while the others were left unirradiated. On TL examination, the unirradiated discs gave a measurement of the *natural TL* which results from the sample's exposure to the palaeodose during its burial. The irradiated discs emit additional amounts of TL depending on the dose