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New dating of the "mask" of La Roche-Cotard (Langeais, Indre-et-Loire, France)

Jean-Claude Marquet, Michel Lorblanchet, Christine Oberlin, Edit Thamo-Bozso and Thierry Aubry

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Introduction

- 1 The site of La Roche-Cotard, discovered in 1912 after the extraction, in 1846, of materials for the works of the Tours-Angers railway, was excavated at the time of its discovery (d'Achon 1913) and in the second half of the 1970s (Marquet 1979; Marquet *et al.* 1997; Lorblanchet 1999). Work has resumed there since 2008 (Marquet and Lorblanchet 2000, 2003). The excavation of the 1970s led to the discovery, in front of the entrance to d'Achon cave, of a thick sedimentary deposit, of very restricted dimensions (4m x 2m) that included notably a beach fragment of the Loire River (fig.1). The sediment of layer 7c, the lower part of layer 7, is a coarse sand containing large fragments of chert and limestone that fill the irregularities of the surface of the substrate. It is overlaid by the same coarse sand (7b) mixed with gravels most often laid flat and it ends with a very thin layer (7a), rich in large mica flakes. Layer 6 has a mineralogical composition that is slightly different from layer 7 but it is also a coarse sand topped, like layer 7, by a homogeneous fine sand. Layers 6 and 7 are alluvial in origin, set up during two successive floods of the Loire (Macaire in Marquet *et al.* 1997, p.76). Layer 7 contained an archaeological level with a lithic industry typical of the Mousterian and rare but well preserved remains of fauna. Refittings between lithic remains of this level indicate that they were not affected by large-scale post-depositional movements (Marquet *et al.* 1997, 87). This level also included a composite

object, long called an enigmatic object (Marquet 1979) and named "mask" of La Roche-Cotard by Michel Lorblanchet.

- 2 The intentional nature of the making of this object, 93 mm high, 105 mm wide, 40 mm thick and weighing 299 g (fig. 2), was discussed earlier (Marquet and Lorblanchet *ibid*). It is based on four criteria: the similar length of the bone fragment on either side of the rocky bridge of the supporting block; the blocking the bone fragment inside the natural hole of the supporting block using small stone plaques neatly visible on the object and on its tomography; the removal of flakes on each of the two faces of the block to create a better symmetry of the object; the straightening of the two ridges in the "lower" part of the object by crushing (the vocabulary used here results from the *a priori* chosen positioning of the object, such that the face of fig. 2 would be the anterior face).
- 3 It seems difficult to deny the symbolic characteristic of this production that was discovered within the Mousterian layer. The hypothesis of F. d'Errico (Nicoud 2004) that the object could have been used as a weight for stretching a hanging does not hold because of the very small mass of the object (299 g) that does seem as complete today as when it was abandoned in the sandy layer. The hypothesis of P. Pettitt (2003) that this object could be the result of a child's play does not seem to be suitable either because if the first two characterization criteria could correspond to this possibility (balance and wedging), on the other hand it does not seem to us that the last two can enter this context (search for symmetry and regularity).
- 4 Fig. 1: Langeais. La Roche-Cotard II. Stratigraphy and position of the latest four dates obtained. The strings of the sagittal section are one meter apart.

Fig. 2: Langeais. La Roche-Cotard II. The "mask". Height: 93 mm, width: 105 mm, thickness: 40mm, weight: 299 gm.

1 - Dating of bone remains by radiocarbon

- 5 On January 10th 1980, G. Delibrias of the Gif-sur-Yvette Center for Low Radioactivity (*in litteris*) indicated an age greater than or equal to 32.1 ka (GIF-4383 of 9-01-1980) for ¹⁴C dating carried out on the large herbivore rib found near the hearth basin of layer 7 in La Roche-Cotard II, the layer that gave the "mask". In her accompanying letter, she says that "very old datings, on most materials, are unreliable. For these reasons I have been reluctant to communicate to you the results obtained... I think we must consider the measured ages only as apparent ages giving a lower limit to the real age." It is this date that was published before the resumption of excavations in 2008.
- 6 From 2009, two new ¹⁴C datings were carried out on bones, again from the Mousterian layer that gave the "mask". Done by the radiocarbon center of Villeurbanne, the first dating (Lyon-6963/SacA 19432) indicated an age older than 40 ka; the second dating (Lyon-9086-SacA 28353) also gave an age older than 40 ka. These two dates were done on bone and in both cases the collagen was treated by ultrafiltration (Higham *et al.* 2011; Oberlin *et al.* 2015). More precise ages than those indicated here have been measured by the laboratory, but since we are at the limit of the application of the method, the laboratory did not wish to publish these values (table 1) that although older than the age obtained in 1980, remain far below the dates obtained by the OSL method.
- 7 **2 - Dating by Optically Stimulated Luminescence**
- 8 In 2014, we reopened La Roche-Cotard II in order to carry out sediment sampling in layers 7c (that of the "mask") and 6f (alluvial layer located immediately above the

alluvial layer containing the Mousterian level) (fig. 3). We asked the Geological and Geophysical Institute of Hungary (1145 Budapest Columbus u 17-23 1442 Budapest POBox 106) for two new OSL datings, other samples having been previously measured for the other studied areas of the site (table 1).

Table 1: Langeais. La Roche-Cotard. Radiocarbon and OSL dates.

LRC I		Méthode	Carré	Couche	Numérotation Labo	Date obtenue
	Salle des lemmings	14 C	L 9	c. supérieure	Lyon-6962 SacA 19431	39,5 à 35,4 ka calBC ou 41,4 à 37,3 cal BP
	Salle des lemmings	OSL	L 9	c. supérieure	MFGI/126.1	64,1 ± 5,1 ka
	Extérieur cavité	OSL	Y08	c. moyenne	MFGI*/126.7	72,6 ± 6,0 ka
	Extérieur cavité	14 C	Y08	c. moyenne	Lyon 11276 (Sac A 37649)	>40 ka BP
	Galerie moustérienne	14 C	D 14	c. moyenne	Gif-4447	>38,4 ka BP
	Salle des lemmings	14 C	L 9	c. moyenne	Lyon-6961 SacA 19430	>40 ka BP
	Galerie moustérienne	14 C	I 14	c. moust. (c. 3)	Lyon-7864 SacA 23350	>40 ka BP
	Entrée	14 C	C 12	c. inférieure	Lyon 11273 Sac A 37646	>40 ka BP
	Salle du pilier	14 C	Q 17	c. 3	Lyon-7865 SacA 23351	>45 ka BP
	Salle de la hyène	14 C	Y 21	c. 1	Lyon-10161 (SacA32828)	>40 ka BP
LRC II	Alluvions Loire	OSL	i 13	6 f	MFGI/136.2	65,7 ± 5,0 ka
	Couche moustérienne	OSL	i 13	7 c	MFGI/136.1	75,6 ± 5,8 ka
	Couche moustérienne	14 C	f. 12	c. 7	Gif-4383	>32,1 ka BP
	Couche moustérienne	14 C	i 13	c. 7	Lyon-6963 SacA19432	>40 ka BP
	Couche moustérienne	14 C	h 12	c. 7	Lyon-9086 SacA 28353	>40 ka BP
LRC III	Remplissage abri	14 C	?	c. XIII	Gif-4384	>45 ka BP
	Remplissage abri	14 C	I 7	c. XIII	Lyon-10162(SacA 32829)	>45 ka BP
	Remplissage abri	OSL	I 7	c. XIII	MFGI/126.3	56,1 ± 4,5 ka
	Remplissage abri	14 C	J 6	c. X	Lyon-10163(SacA 32830)	>44 ka BP
LRC IV	Colluvion versant	14 C	O 9	c. 7a	Lyon 9087 SacA 28354	31 à 29,5 ka calBC ou 32,6 à 31,1 calBP
	Colluvion versant	OSL	Q 4/Q 5	c. 7c	MFGI/126.4	48,1 ± 3,8 ka
	Base colluvion versant	14 C	R 4	c. 9	Lyon-10160(SacA 32827)	>44,6 ka BP
	Remplissage grotte-abri	OSL	R 3	c. 12 cd	MFGI/126.6	86,2 ± 6,5 ka
	Remplissage grotte-abri	14 C	Q 2	c. 13 b	Lyon 7863 SacA 23349	>45 ka BP
	Remplissage grotte-abri	14 C	Q 3	c. 13 d	Lyon 7862 SacA 23348	>45 ka BP
	Remplissage grotte-abri	14 C	Q 3	c. 15	Lyon 9088 SacA42835	>40 ka BP
	Remplissage grotte-abri	14 C	Q 1	c. 16 a	Lyon 9089 (Sac A 28356)	>40 ka BP
	Remplissage grotte-abri	OSL	Q 4	c. 22	MFGI/126.5	189,4 ± 14,9 ka

MFGI* = Magyar Földtani és Geofizika Intézet (Geological and Geophysical Institut of Hungary) H-1143 Budapest, Stefánia 14. Hungary.
Director : Dr. Tamas Francsik., Operator : Dr. Edit Thamo-Bozso.

Fig. 3 : Langeais. La Roche-Cotard II. Positions of the two samples for OSL dating. A for level 7c and B for level 6f.

- 9 OSL dating is well suited to dating sediments since they are likely to have been bleached during their deposit. The single aliquot technique was applied to La Roche-Cotard sediment samples. It makes it possible to measure a large number of fractions,

assumed to be analogous, of the sample to be dated. The OSL dating of the two samples was done on quartz grains with a diameter between 0.10 and 0.16 mm. The protocols for the preparation and measurement of the samples have been appended to our note.

- 10 The retained age of the sample of layer 6f (RSC/LSO/9), identified by the laboratory under number MFGI / 136.2, is 65.7 ± 5.0 ka (see appendix). The age of layer 7c containing the Mousterian level and the "mask" (RSC/LSO/8) is 75.6 ± 5.8 ka. MFGI / 136.1.

3 - Discussion

- 11 La Roche-Cotard site is currently the subject of a collective research project whose main objective is to determine its chronology, understand its geological genesis and the nature of the anthropogenic and animal occupations of its four parts. Productions of a symbolic nature, probably unrelated between them, an object called "the mask of La Roche-Cotard" found within a Mousterian layer (LRC II), tracings (digital and other) as well as very rare stains of ochre make it more necessary to try and achieve the chronological objective in particular. The problem is also complex because of a certain isolation of the site that is surrounded, with regard to the stratified deposits containing industries of the Middle Paleolithic, only by the sites of Roches d'Abilly, 50 km in the south-east (Aubry *et al.* 2012, 2014a, 2014b), Roc-en-Pail in Chalonnes-sur-Loire, 60 km to the west (Gruet 1984; Soriano 2012), the site of Angé in Loir-et-Cher, 50 km to the west (Locht *et al.* 2015). One can quote only the memory of the Champs-Penais site, again by the town of Abilly, whose stratigraphy and archaeological contents are poorly known (Cordier and Berthouin 1956).
- 12 Concerning La Roche Cotard, the age obtained by OSL on the sediment of the base of the LRC IV sequence (189.4 ± 14.9 ka) indicates its deposit is contemporary to the end of the isotopic stage 7 or else to the beginning of stage 6 (fig. 4); it anchors firmly over time the filling dynamics. Although it was a glacial episode, it does not seem that we have any trace of colluvium, which is quite possible if the river is immediately down the slope, taking away the materials as and when they accumulate. It is also possible that there was accumulation in the absence of the river but release after its return.

Fig. 4: Langeais. La Roche-Cotard. Position of some OSL dates on the reference curve of oceanic $\delta^{18}\text{O}$ variations for the last 200,000 years, corrected according to the earth's orbit (Imbrie *et al.*, 1984).

- 13 During the Eemian period, a significant phase of alteration increased the volume of the caves creating voluminous blocks of chalky tuffeau that remained trapped, coated in an alteration clay matrix (LRC IV and deepest hall of LRC I). Then the cave, now open, was probably visited by large carnivores (cave bears and large cave lion), of which only a few remains have been found.
- 14 The first human occupations of the site appear to be those of LRC IV (layer 12 c/d around 85 ka) and at the entrance to the LRC I cave (lithic under the flood layer dated to $72.6 \pm 6,0$ ka).
- 15 Layer 7, which is the background for the Mousterian level of La Roche-Cotard II, is, among the multiple strata that belong to the four parts of the site, the one that attests to a fluvial deposit of the Loire in the most characteristic manner. Other deposits originating from the river exist in the other sectors but here we note the presence of a fragment of a true sandy beach of the Loire that set up while the slope was cleared of all its colluvium by the erosion of the River.
- 16 The lithic industry of layer 7 was produced almost exclusively according to a Levallois debitage principle with recurrent centripetal flakes (Boëda, 1994), from flint pebbles of the lower Turonian originating from fluvial terraces or Cretaceous or Cenozoic flints coming from several regional sources of the Loire basin and its tributaries. The flakes, with thinly faceted and narrow butts were obtained on Levallois cores with low convexity. It is possible to reconstitute one of them thanks to a refitting between two flakes (fig.5). A single corresponding core, accidentally broken during its shaping, was discovered. The retouched toolkit is represented by different types of simple or convergent scrapers, prepared on this type of blanks. According to the raw materials employed, several appear to have been produced elsewhere than in the excavated area.

In association with these retouched tools and in the immediate vicinity of the "mask" a simple convex scraper with double patina was discovered. Unlike the rest of the lithic industry, it was retouched on a flake obtained according to a Levallois scheme with preferential flake (Boëda 1994; Delagnes *et al.* 2007) and made of flint from a more distant origin, from the Upper Turonian of the Grand-Pressigny region (Indre-et-Loire).

Fig. 5 : Langeais. La Roche-Cotard II. Refitting of two Levallois flakes from the level 7.

- 17 This mode of debitage of large flakes according to a preferential Levallois operating scheme that resulted in characteristic cores is known for numerous surface series in the Touraine, Poitou and Brenne regions, sometimes associated with a few bifaces (Primault 2003; Aubry and Rigaud 2004; Aubry *et al.* 2014b). The chronology of these industries can only be based on the large Levallois flakes produced according to this principle of debitage and discovered in place in layer 5 of the sector LRA Virage 31/35 of the Roches d'Abilly site. This layer has been measured by several methods of luminescence on quartz and feldspar grains (OSL). Two of the methods provide preliminary results that are coherent and would place this occupation between 58 and 76 ka (Aubry *et al.* 2014b), in line with the statistical age difference for layer 7 of La Roche Cotard II and for layer 6 that is directly subjacent.
- 18 The Levallois method with preferential flake is demonstrated in the North of France "in rather old Mousterian assemblages, prior to the last glacial period" (Delagnes *et al.* 2007: 216). The new data obtained at La Roche-Cotard and Roches d'Abilly confirm this hypothesis and an attribution at the end of the isotopic stage 5. Nevertheless, the chronology and contemporaneity of the numerous series using Levallois debitage with large preferential flakes in the North and Center-west of France remains hypotheses.
- 19 The lithic, discovered by d'Achon in 1912 in the first part of the cave (LRC I) is unfortunately lost today. According to what can be observed of the bifaces on the

photographs available, this industry is in all likelihood to be related to a Mousterian of Acheulean tradition (MTA) and to the isotopic stage 3. Indeed, the latter differ technologically and typologically from the bifacial pieces of the site of Angé (Loir-et-Cher) that was attributed to stage 5a, found in a pedo-sedimentary context of gray forest soil (Locht *et al.* 2015). The attribution to a recent industry of the Middle Paleolithic of this occupation of La Roche-Cotard I was further confirmed by the discovery of a fragment of a triangular biface in a chamber further from the entrance during excavations subsequent to 2008 (fig. 6).

- 20 From a technological point of view, some fragments from layer 12c/d of La Roche-Cotard IV indicate a production according to the same Levallois operating scheme of recurrent centripetal type as that which prevails in layer 7 of La Roche-Cotard II.
- 21 On the other hand, the small assemblage of the base of the filling of La Roche-Cotard III, which allowed a high rate of refittings, reveals a production of flakes according to a discoid debitage scheme from flint pebbles. This production mode, although ubiquitous in the Middle Palaeolithic period (Thiébaud, 2007; Jaubert 2010; Jaubert *et al.* 2003; Mourre 2003), is demonstrated in the region around 45 ka in the D2 layer of the Bordes-Fitte rock shelter (Aubry *et al.* 2014a). The OSL dates indicate that this occupation of La Roche-Cotard III must be to the most recent occupation phase of the site during the Middle Paleolithic.

4 - Conclusions

- 22 The research on La Roche-Cotard site is part of a current trend of research that accumulates the evidence of very ancient symbolic activities, largely before the arrival of modern Man, especially among the Neanderthals.
- 23 In the early 1990s, speleologists discovered in the vast cavern of Bruniquel (Tarn et Garonne) 300 m from the entrance, that is to say in the deep dark zone, a strange closed oval structure of 7m x 4 m constituted a mass of stalagmites and various concretions. At the southern end there is also another ring of broken concretions, of round shape, about 2 m in diameter. In the vicinity, speleologists have noticed the presence of clay pellets projected on the gallery ceiling (Rouzaud *et al.* 1996), but these remains may not be those of a traditional dwelling, although the structure may evoke the Mousterian hut of Molodova (Ukraine), whose skins were kept at the base by a large ring of mammoth bones. No tools, nor real traces of occupation have been identified for the moment in this structure. However, a burned cave bear bone (probable trace of a "lighting" position) had been dated by radiocarbon to 47.6 ka BP, which corresponded to the ultimate limits of the carbon 14 dating method. New dating by Uranium-Thorium have just been carried out on stalagmites sealing or constituting the large structure. The obtained result of 176.5 ka places the construction of the structure in a period corresponding to an old phase of the Middle Paleolithic (Jaubert *et al.* 2016).
- 24 New searches, and perhaps excavations, will undoubtedly clarify these first data, but already Bruniquel's discovery shows the penetration in the dark depths of the caves by Mousterian people controlling lighting and the use of the caves for most probably ritual activities, i.e. not directly related to immediate imperatives of everyday life.

Fig. 6 : Langeais. La Roche-Cotard I. Pilar room. Triangular biface.

- 25 In 2011, a red hand stencil from the Castillo cave (Cantabria, Spain) was dated to a minimum of $37,630 \pm 340$ BP, by the U-Th dating of the calcite film covering the paintings. This method was developed by a European team of researchers including physicists, geologists and prehistorians (CENIEH laboratory in Burgos). A large red punctuation of the same cave was dated by the same method between $34,250 \pm 170$ and $37,720 \pm 260$. Some dates associated with red patterns of the Altamira cave would even reach 41,000 years. These dates and methods put forward the hypothesis that Neanderthal people authored the first parietal interventions (Pike *et al.* 2012 and Pike and Pettitt 2012).
- 26 In 2016, a new study of the block with cup-marks of the Mousterian burial No. 6 of La Ferrassie (Dordogne) excavated by L. Capitan and D. Peyrony (Peyrony 1934) confirmed and developed the observations of the first excavators. Using photogrammetric tracings (with equidistant contours of 1 mm) and experiments, we showed that this block of Coniacian limestone covering the burial of a Neanderthal child actually had 30 cup-marks on its lower face turned towards the skeleton. These artificial cup-marks were probably obtained with different tools (pebbles and points) at perhaps different times, which supports the hypothesis of collective ritual operations in relation to a burial (Lorblanchet and Bahn 2017). Finally, the abstract motif carved on the bedrock of Gorham's Cave in Gibraltar, whose deep tracings have been covered by a Mousterian archaeological level, thus giving these traces an age greater than 39 ka. (Rodriguez-Vidal *et al.* 2014).
- 27 Thus the existence of a symbolic expression 50,000 years ago, and even beyond that, largely preceding the Upper Paleolithic, and a probable origin of European rock art in the Middle Paleolithic, are becoming clearer. It is becoming increasingly evident that in other parts of the world, symbolic activities predate the Middle Paleolithic (Lorblanchet and Bahn *ibid*)
- 28 In this sense, the new 75 ka datings (layer 7c/A in fig. 3) and 65 ka (layer 6f/B in the same figure) complete the existing series (table 1) and confirm, while précising it considerably, the old dating obtained on bone by the radiocarbon method in 1980 that indicated an age greater than 32.1 ka for layer 7.

- 29 With the obtaining of a set of OSL dates, the understanding of the nature and rhythms of the occupation of La Roche-Cotard was enriched chronologically. New dates are in progress that will probably help to clarify a little more the chronology of this complex site but, in any case, it should now be considered that the "mask" of La Roche-Cotard comes from a Mousterian layer that has been dated by the OSL method of an age of the order of 75 ka.

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APPENDIXES

Appendix

Sample preparation

OSL dating of two samples was carried out on quartz grains between 0.10 and 0.16 mm in diameter. Sample preparation was done in dark room under subdued red light conditions. Organic material was removed by 20% H₂O₂, carbonates were dissolved by 10% HCl. Feldspars and the outer 10 µm layer from the quartz grains (which absorbed a dose from alpha radiation) were removed by 40% HF for 60 minutes (Aitken 1998). Then the quartz fractions were cleaned by 10 % HCl, and the grains were mounted on stainless-steel discs in a 5 mm diameter (medium aliquots) monolayer using silicone spray.

OSL measurements and results

OSL measurements were made using a Risø TL/OSL DA-15C/D automatic reader with a calibrated 90Sr/90Y beta source. Blue light emitting diodes (LEDs, λ=470±20 nm) were used for the optical stimulation of quartz for 40s at 125°C. The resulted OSL signals were collected through an UV filter (Hoya U-340). Single-Aliquot Regenerative-dose (SAR) protocol was used to estimate equivalent doses with illumination for 40s at 280°C in the last step of each cycle (Wintle and Murray 2006).

The quartz separates gave bright luminescence and their signals decreased rapidly (fig. 7). Infrared stimulation test indicated that the measured mineral separates were pure quartz. According to the preheat plateau test and thermal transfer test 260°C preheat temperature and 200°C cutheat were applied, when the thermal transfer is negligible, maximum 0.085% of the natural dose. Dose recovery ratio of the samples is 0.98 ± 0.01 in average, indicating that the SAR protocol correctly measures the given dose. Figure 8 shows the dose response growth curves of the samples. Only a few measured subsamples (aliquots) were saturated (3 for sample 136.1 and only one for 136.2) and not used for dating.

Equivalent doses were measured and based on D_e values of 33 subsamples (aliquots) of sample 136.1. and 33 subsamples of sample 136.2. and showed more or less symmetric distribution (fig. 9), therefore the luminescence ages were calculated by the average D_e value of each sample (156.15 ± 2.89 Gy for sample 136.1. in 7c layer and 138.18 ± 2.50 Gy for sample 136.2. in 6f layer, Tabl. 2).

Fig. 7 : Langeais. La Roche-Cotard II. OSL Signals 136.1 and 136.2.

Fig. 8 : Langeais. La Roche-Cotard II. OSL growth curves 136.1 (calculated on 36 aliquots) and 136.2 (calculated on 34 aliquots).

Fig. 9 : Langeais. La Roche-Cotard II. OSL histograms 136.1 and 136;2.

Table 2: Langeais. La Roche-Cotard II. OSL ages calculated with the average equivalent dose of the samples.

sample	depth (cm)	U (ppm)	Th (ppm)	K (%)	equivalent dose (Gy)	n	w.c. %	dose rate (Gy/ka)	OSL age (ka)
136.1.	180	1,29 $\pm$ 0,02	5,45 $\pm$ 0,10	1,31 $\pm$ 0,01	156,15 $\pm$ 2,89	33	10,4	2,06 $\pm$ 0,15	75,6 $\pm$ 5,8
136.2.	160	1,22 $\pm$ 0,02	5,49 $\pm$ 0,09	1,43 $\pm$ 0,01	138,18 $\pm$ 2,50	33	13,3	2,10 $\pm$ 0,15	65,7 $\pm$ 5,0

n: number of aliquots, w.c.: water content

Current and saturated water content of the samples was measured; for sample age dating we used the average value (10 and 13% water content). Dose rates of the sediments were calculated based on laboratory high-resolution gamma spectrometry measurement (Canberra GC3020) of bulk samples using the conversion factors of Adamiec and Aitken (1998). In the case of medium water content the dose rates are $2,06 \pm 0,15$ Gy/ka for sample 136.1 and $2,10 \pm 0,15$ Gy/ka for sample 136.2 (tab., Thamó-Bozsó *et al.* 2015).

The age of the sample from layer 6f (RSC / LSO / 9), identified by the laboratory under the number MFGI / 136.2, was $65,7 \pm 5,0$ ka (tab. 2). The age of the sample from layer 7c, the one containing the Mousterian level and the "mask" (RSC / LSO / 8), identified by the laboratory as MFGI / 136.1, was $75,6 \pm 5,8$ ka (fig. 8).

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ABSTRACTS

The « mask » of La Roche-Cotard was discovered in a layer containing a characteristic Middle Paleolithic lithic industry. After a first ^{14}C result of 32 ka BP, two further ^{14}C dates now assign the layer to more than 40 ka, but above all an OSL date obtained on quartz attributes to the layer containing the « mask » an age of 75.6 ± 5.8 ka. This new result confirms that ^{14}C dates with Accelerator Mass Spectrometry, obtained on bones of that layer are beyond the limit of validity of the radiocarbon dating method. We present the principle of the method of luminescence dating that should be retained for the Neanderthal occupation of the Roche Cotard II level 7 and its implications.

INDEX

Keywords: Middle Palaeolithic, Neanderthal, Symbolic, Luminescence dating

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