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First evidence of Pleistocene rock art in North Africa: securing the age of the Qurta petroglyphs (Egypt) through OSL dating

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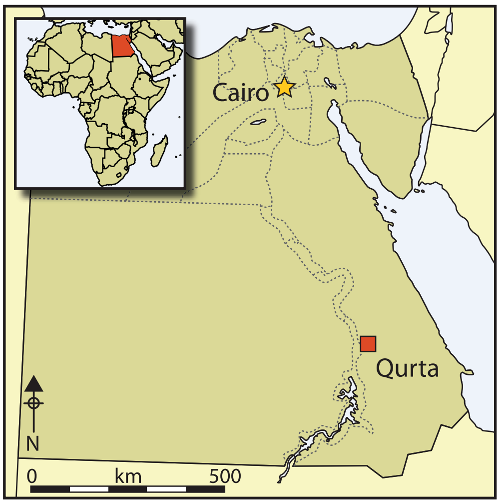

Long doubted, the existence of Pleistocene rock art in North Africa is here proven through the dating of petroglyph panels displaying aurochs and other animals at Qurta in the Upper Egyptian Nile Valley. The method used was optically stimulated luminescence (OSL) applied to deposits of wind-blown sediment covering the images. This gave a minimum age of ~15 000 calendar years making the rock engravings at Qurta the oldest so far found in North Africa.

Keywords: North Africa, Egypt, Pleistocene, ~15 ka minimum age, rock art, OSL dating

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Introduction

The existence of pre-Holocene rock art in North Africa has been a subject of debate ever since 1974, when some Saharan (Libyan) petroglyphs were first attributed to the Upper Pleistocene by F. Mori (1974), a suggestion that received virtually total rejection (e.g. Muzzolini 1992; Le Quellec 1998: 246–9). Thus far, the oldest petroglyphs identified in North Africa with some degree of certainty, the so-called 'fish trap' motifs and associated figurative and geometric scenery of el-Hosh in Upper Egypt, have been ascribed to the Early Holocene and are tentatively dated to ∼9000 cal yr BP (Huyge *et al.* 2001; Huyge 2005). It has now become clear that even older art, of fully Pleistocene age, exists in the same geographic area: the rock art of Qurta.

The particular circumstances of the finding of the Qurta rock art have been detailed in a number of preliminary reports (Huyge *et al.* 2007; Huyge 2008; Huyge & Claes 2008). At Qurta, situated on the east bank of the Nile between Edfu and Aswan (24°37′45″ N, 32°57′45″ E) (Figure 1), three rock art sites have been identified: Qurta I, II and III (henceforth QI, QII and QIII). These sites are located in the higher parts of the Nubian sandstone scarp bordering the Nile floodplain, at an elevation of about 35–45m above the current floodplain. At each site, several rock art locations, panels and individual figures have been identified, with a total of at least 180 individual images. The majority are naturalistically drawn animal figures (Huyge & Ikram 2009). Bovids (*Bos primigenius* or aurochs) are predominant (over 75 per cent of the total number of drawings), followed by birds, hippopotami, gazelle, fish and hartebeest (Figure 2). In addition, some indeterminate creatures and several highly stylised representations of human figures (mostly shown with protruding buttocks, but no other bodily features) appear at the sites. On the basis of the intrinsic characteristics of the rock art (subject matter, technique and style), its patination and degree of weathering through sand erosion and/or water run-off, as well as the archaeological and geomorphological context, we have proposed the attribution of these petroglyphs to the Late Pleistocene, specifically to the Late Palaeolithic period (∼19 000–18 000 cal yr BP; Huyge *et al.* 2007; Huyge 2009). This interpretation has met with very little criticism from the archaeological community, but proof in the form of indirect or direct science-based dating evidence has hitherto been lacking.

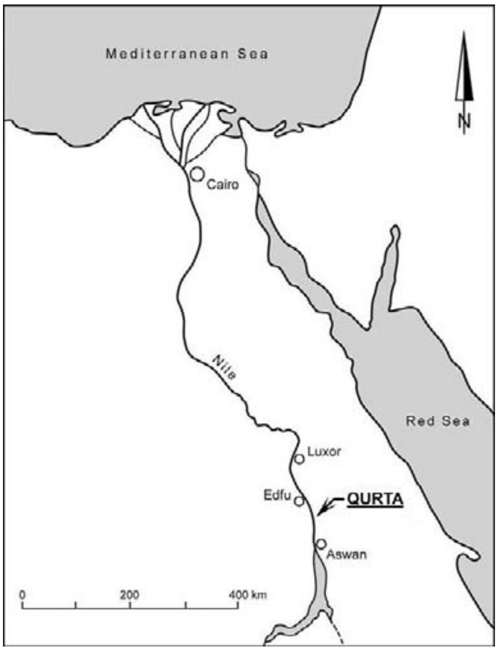

Figure 1. Map of the Egyptian Nile Valley showing the location of Qurta.

*Figure 2. Tracing of panel 1 at Qurta I, locality 1 (QI.1.1) mainly showing bovids (*Bos primigenius *or aurochs). The total length of the panel is about 4m.*

Micromorphology

During the 2008 field campaign, it became clear that some rock art panels at QII, particularly panels QII.4.2 and QII.5.1, were partly covered by sediment accumulations trapped between the engraved rock face and coarse Nubian sandstone rock debris that became separated from the scarp (Figure 3). The nature and possible provenance of this covering sediment have been investigated using petrographical thin sections. Comparison with reference samples shows that this sediment is not a disintegration product of the local Nubian sandstone, and also that it is different from recent wind-blown material. Instead, the sediment is identified as being derived from the 'Wild Nile' palaeofloodplain deposits of the region, through aeolian reworking. These floodplain sediments were deposited prior to ~14 500 cal yr BP, i.e. during the Late Pleistocene (Paulissen & Vermeersch 1989). The aeolian reworking occurred at a stage with a different environmental setting than the one that characterises the area at present, marked at that stage by a greater areal extent of the 'Wild Nile' deposits in the region. Thin section analysis of the sediment covering panel QII.4.2 shows that it has a purely aeolian origin and hence is ideally suited for optically stimulated luminescence (OSL) dating. In contrast, the sediment cover of panel QII.5.1 contains, at least locally, a significant admixture of non-aeolian material, which renders it less appropriate for OSL dating.

OSL dating

OSL dating can determine the time that has elapsed since buried sediment grains were last exposed to sunlight (e.g. Aitken 1998; Duller 2004). The method uses the constituent mineral grains of the sediment itself, and not associated material. As such, it offers a direct means for establishing the time of sediment deposition and accumulation. OSL dating

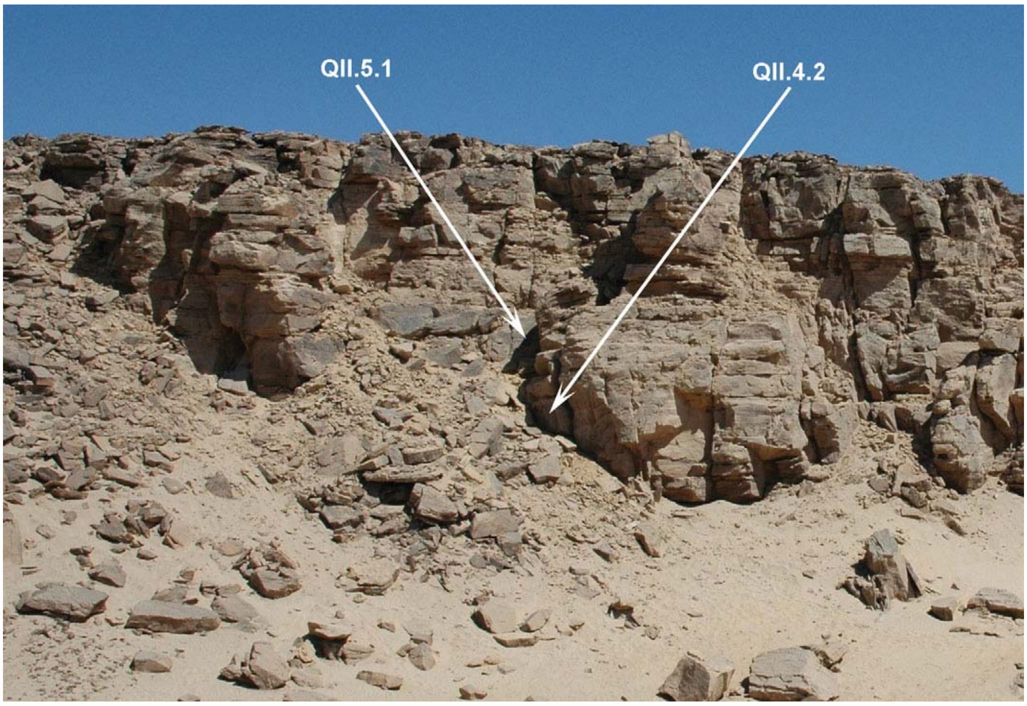

Figure 3. View of Qurta II with location of panels QII.4.2 and QII.5.1 partly covered by Nubian sandstone rock debris and sediment accumulations.

Table 1. Summary of OSL dating results: D_e values, dose rates, optical ages and random (σ_r), systematic (σ_{sys}) and total (σ_{tot}) uncertainties. The uncertainties mentioned with the D_e and dosimetry data are random; all uncertainties represent 1-sigma. The number of replicate measurements of D_e (n) is given between parentheses in subscript.

Panel	Depth (cm)	Sample (GLL-code)	D_e (Gy)	Dose rate (Gy ka^{-1})	Age (ka)	σ_r (%)	σ_{sys} (%)	σ_{tot} (%)	σ_{tot} (ka)
QII.4.2	40	**080302**	$18.3\pm0.5_{(n=23)}$	1.86 ± 0.03	**10**	3.0	9.8	10.2	1
QII.4.2	75	**090806**	$23.1\pm0.5_{(n=24)}$	1.81 ± 0.04	**13**	3.0	10.8	11.2	1
QII.4.2	95	**090807**	$27.0\pm0.6_{(n=24)}$	1.61 ± 0.03	**17**	2.6	10.6	11.0	2
QII.4.2	115	**090808**	$24.3\pm0.5_{(n=24)}$	1.56 ± 0.02	**16**	2.4	10.6	10.9	2

requires that the sedimentary grains were exposed to sufficient daylight in order to fully reset the luminescence clock prior to deposition and burial. The most robust OSL dating procedure currently available involves the use of OSL signals from quartz in combination with the single-aliquot regenerative-dose (SAR) procedure (e.g. Murray & Olley 2002; Vandenberghe *et al.* 2004; Wintle & Murray 2006; Derese *et al.* 2010). We have applied this procedure to four samples to establish the time of sediment deposition on top of rock art panel QII.4.2 and, in this way, to obtain a minimum age for the petroglyphs (Table 1).

Figure 4. Panel QII.4.2. The red line indicates the top of the sediment accumulation. The OSL sample in situ *is GLL-090808 (see Table 1).*

OSL dating was performed in the luminescence dating laboratory at Ghent University, Belgium (for general information on the dating procedures and techniques as used in the Ghent laboratory, see Vandenberghe 2004 and Vandenberghe *et al.* 2004, 2009). The dates were obtained by determining the equivalent dose in quartz using the SAR protocol (Murray & Wintle 2000, 2003). Radionuclide concentrations were measured using low-level high resolution gamma-ray spectrometry (Vandenberghe 2004; De Corte *et al.* 2006) and converted to dose rates using conversion factors derived from the nuclear energy releases tabulated by Adamiec & Aitken (1998). The present-day water content (3±1%) was assumed to be representative for the moisture conditions throughout the burial period.

The samples of the sediment that covers panel QII.4.2 yield optical depositional ages that are fully consistent with the stratigraphic position of the samples (see Figures 4 & 5; Table 1). The dates range from 10±1 ka at the top to 16±2 ka at the base of the sequence. As the covering material is aeolian and as the quartz behaves well as OSL dosimeter, we conclude that the dates for these samples are accurate sedimentation ages. They provide solid evidence for the Pleistocene age of the rock art at Qurta.

Radiocarbon dating

In addition to OSL dating, we have undertaken attempts to obtain minimum ages for the Qurta rock art by means of radiocarbon dating of microvertebrate faunal remains recovered from the sediment covering the petroglyphs. The faunal sample, collected within

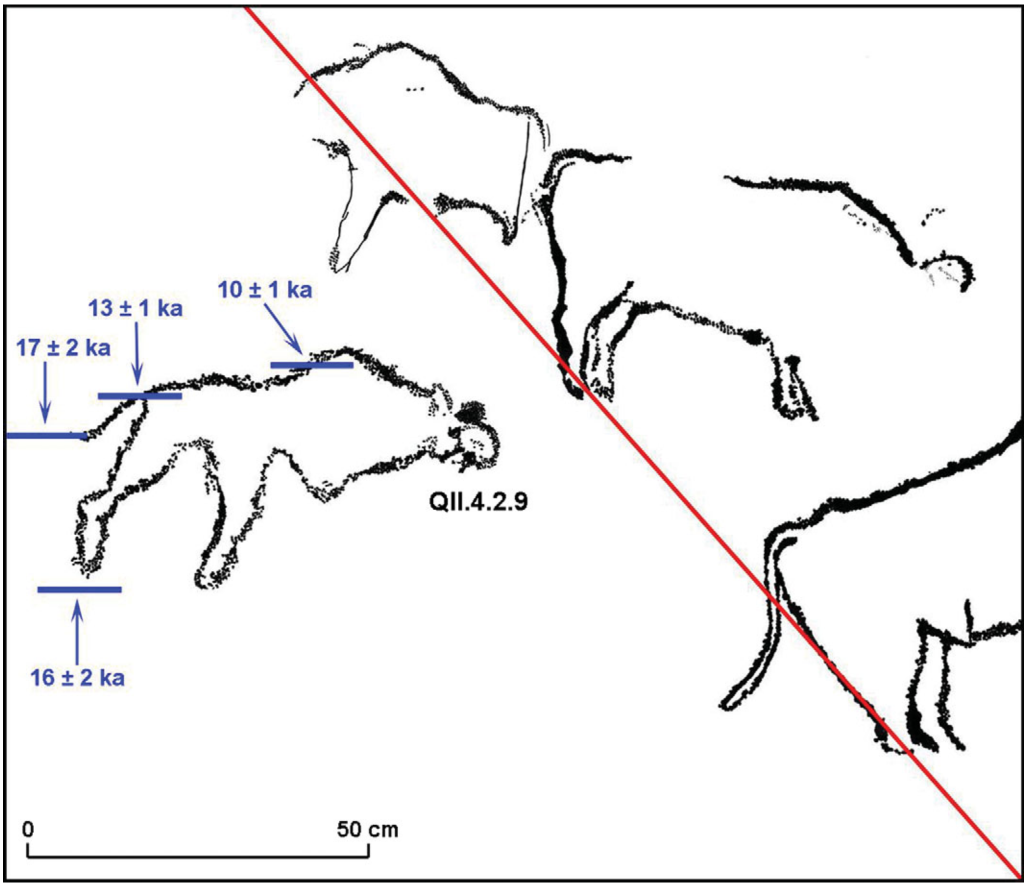

Figure 5. Detail of panel QII.4.2. The red line indicates the top of the sediment accumulation (see Figure 4). The OSL ages are presented for sediments completely covering drawing QII.4.2.9, representing an indeterminate two-legged creature (see Table 1).

this sediment at the same level as OSL sample GLL-090808 (16±2 ka), was subdivided into a terrestrial component, composed essentially of mouse and bird bones, and an aquatic component, comprising frog and fish bones. In the absence of an adequate amount of collagen, the substance used for dating was bioapatite, which contained sufficient quantities of organic carbon. The results are 12 130±45 BP (KIA-41532) for the terrestrial material and 10 585±50 BP (KIA-40546) for the aquatic component, the latter requiring no reservoir effect correction (Dee *et al.* 2010). This implies a calibrated age (cal yr BP) of ∼14.0 ka and ∼12.7 ka respectively (calibration using OxCal Version 3.10; Bronk Ramsey 1995). At the 2-sigma level, the two radiocarbon dates are not significantly different from the OSL date for sample GLL-090808. However, the radiocarbon results for the terrestrial and the aquatic component differ significantly. This may indicate that different events have been dated and/or that some exchange of carbonate has taken place between the bone material and its environment. In the field, no evidence was observed for post-depositional disturbance of the sediment fill that could have caused mixing of faunal remains of various age. Because of the apparent inconsistency in the radiocarbon data, and the nature of the material used for OSL dating, we conclude that the OSL results provide more reliable minimum age estimates for the Qurta rock art.

Other similar occurrences

The rock art of Qurta is not an entirely isolated occurrence. Four other sites are known in the region, all with a limited but highly homogeneous assemblage of drawings, which display a very similar art, both thematically and stylistically. One site, Abu Tanqura Bahari 11 (ATB11) at el-Hosh, is situated about 10km north of Qurta and on the opposite bank of the Nile; the other three, Wadi (Chor) Abu Subeira 6 (CAS-6), 13 (CAS-13) and 14 (CAS-14), lie about 45km to the south and on the same bank as Qurta. ATB11, which was discovered by us in 2004, prior to the finding of the Qurta rock art (in 2005), has not yet been studied in detail (see Huyge 2005). The assemblage of about 35 drawings consists mainly of naturalistically drawn aurochs, but it also seems to include some anthropomorphs similar to the stylised human figures at Qurta. The Wadi (Chor) Abu Subeira rock art sites, discovered by the Egyptian Supreme Council of Antiquities (Aswan) in 2006 (CAS-6) and 2010 (CAS-13 and CAS-14), are composed of several dozens of animal figures only (for CAS-6, see Storemyr *et al.* 2008; for CAS-13, see Kelany in press). The repertoire of these sites again consists mainly of bovids, but fish, hippopotamus, Nubian ibex and possibly bubal hartebeest, African wild dog (*Lycaon pictus*) and Nubian wild ass are also represented. None of these other sites, however, offer the dating opportunities that Qurta does.

Conclusions and prospects

By providing a reliable pre-Holocene minimum age, the Qurta OSL dates present the first solid evidence for the existence of sophisticated figurative Pleistocene rock art in North Africa. Whereas this makes the Qurta rock art definitely the oldest discovered in North Africa thus far, its true age remains unknown. It is clear that the buried drawings at QII were already considerably weathered before they became covered by sediment. It seems likely therefore that the rock art is significantly older than the minimum ages obtained by means of OSL. An age of ∼17 000–19 000 calendar years would make the Qurta rock art more or less contemporaneous with Solutrean/Early Magdalenian art as known from Upper Palaeolithic Western Europe (Bahn & Vertut 1997: 58–76). Significantly, the rock art of Qurta and the other Egyptian Pleistocene art sites has several thematic and stylistic features in common with European Late Magdalenian art. This is particularly evident from the human figures, most of which are very similar to the anthropomorphs of the Lalinde/Gönnersdorf type (see Lorblanchet & Welté 1987; Bosinski *et al.* 2001: 299–346). Moreover, some of the more elaborately executed bovids are highly reminiscent of Late Magdalenian aurochs representations, such as those from the Grotte de la Mairie in Teyjat (Dordogne, France) (Barrière 1968). Both the Lalinde/Gönnersdorf type figures and the Teyjat bovids are dated to ∼14 000–15 500 cal yr BP. Whereas it would be premature to speculate on any implications of this in terms of long-distance influence and intercultural contacts, it is clear that the Pleistocene age of the Qurta petroglyphs — as demonstrated by the present study — along with their degree of sophistication, similar to that of European Ice Age art, introduce a new set of challenges to archaeological thought.

Whether its nature is the result of independent evolution or of indirect diffusion of iconographic and symbolic concepts — direct contact with Europe being unsupported by any records of Magdalenian-affiliated industries in North Africa — the rock art of Qurta and other Pleistocene rock art sites in Upper Egypt remains a relatively isolated phenomenon at this stage. The only other North African rock art site known to us that seems to bear a relationship to Qurta is Caf Eligren in Cyrenaica (northern Libya), a cave site likewise characterised by the presence of large, naturalistic representations of aurochs (Paradisi 1965; Jelínek 2004: 177–80, 320–23). Like Qurta, this coastal site, the Upper Palaeolithic nature and antiquity of which had already been anticipated by P. Graziosi (1968), is located within the restricted geographical range of Late Pleistocene aurochs in Africa (Linseele 2004). Undoubtedly, more sites remain to be discovered within this area of distribution but, because of Late Pleistocene regional hyperaridity, chances are slim that Pleistocene rock art exists in the Central Saharan desert. To the present day, no Upper or Late Palaeolithic settlement is known throughout the whole of this area.

This having been said, the now proven occurrence of Pleistocene rock art in North Africa should not come as a surprise. Depictional 'Upper Palaeolithic' mobiliary rock art, dating back to ~26 000 cal yr BP (called 'Later Stone Age [LSA]' in this particular stratigraphic context), has been known from the southern part of the African landmass for some time, particularly from the Apollo 11 Cave in Namibia (Wendt 1974, 1976). More recent finds of even older age (Middle Stone Age [MSA] or ~75–100 ka) include the sophisticated abstract artwork from Blombos Cave in South Africa (Henshilwood *et al.* 2002, 2009). As is often the case in archaeology, one find provokes another, and we feel confident that more Qurta-related Pleistocene rock art sites will be discovered during the coming years, not only in the Upper Egyptian Nile Valley and its immediate environs, but probably also in the whole coastal range of North Africa.

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