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Palaeolithic cave art from Crete, Greece

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ABSTRACT

The earliest figural art known from Greece is dated to the Neolithic period (ca. 8,5 to 5 thousand years ago). A recent study of the petroglyphs at Asphendou Cave on the island of Crete, however, suggests that such art has a much longer history in the Aegean basin. First published over forty years ago, the debate concerning the petroglyphs' age has lain dormant for decades. In light of technological advances in digital imaging and recent archaeological and palaeontological discoveries on the island we re-assess the dating of the petroglyphs and prove that some were made in the Late Pleistocene, or Upper Palaeolithic. Comparison of the iconography to fossil data demonstrates that an extinct endemic deer (*Candiacervus*) is represented at Asphendou Cave. This is the earliest figural art yet discovered in Greece.

1. Introduction

Crete is the largest Greek island and has been isolated from the mainland for the last 5 million years (Zachariasse et al., 2008). In the Asphendou cave near the White Mountains of western Crete (Fig. 1) a speleothem (a calcite flowstone) inscribed with complex geometric and figural rock art (petroglyphs) was discovered in the 1960s; the first reports appeared in the early 1970s (Faure, 1972; Hood, 1974; Papoutsakis, 1972; Tzedakis, 1973; Zois, 1973a, 1973b). A debate centered on whether this rock art should be dated to the Bronze Age (between about 5 to 3 thousand years ago.) or the Palaeolithic period (at least 11 thousand years ago). Due to the lack of compelling evidence, this debate rapidly stagnated and the cave has received little attention since then. We are now in possession of archaeological and palaeontological information, as well as new technologies for documentation and analysis, unavailable to earlier scholars. Bringing these data and new tools to bear on the study of the engravings, we offer palaeontological and iconographic evidence to confirm a Palaeolithic date (most likely the 'Upper' Palaeolithic) for the earliest carvings.

2. The Asphendou Cave

2.1. Location and description of the Asphendou Cave

The cave is located in the region of Sphakia in west Crete (35°14′07.0″ N 24°13′00.6″ E), at an elevation of ca. 720 masl. Today this region serves as a fertile grazing zone for ruminants because of its elevation high in the eastern flanking foothills of the White Mountains and the associated flora. The cave is small (8.5 m × 3.5 m) with a low ceiling (0.6 m), and is formed in crystalline limestone that comprises much of the area's geology (Fig. 2). On its floor is a speleothem where the petroglyphs are carved over an area of ca. 1.15 m × 0.8 m.

The small dimensions of the extant space of the cave suggest the term 'rock shelter' is a more appropriate label, but the presence of several large piles of tumbled boulders in front of the entrance suggests that the cave was larger in the past prior to the collapse of its roof. In addition, the existing scholarly literature primarily refers to it as a 'cave', so we maintain that label here to prevent confusion.

2.2. Palaeontological discoveries after 1970

Unavailable to earlier scholars who studied the cave were the subsequent discoveries of fossil remains of dwarf forms of deer (*Candiacervus*) in the Liko and Gerani Caves on the northern coast of the

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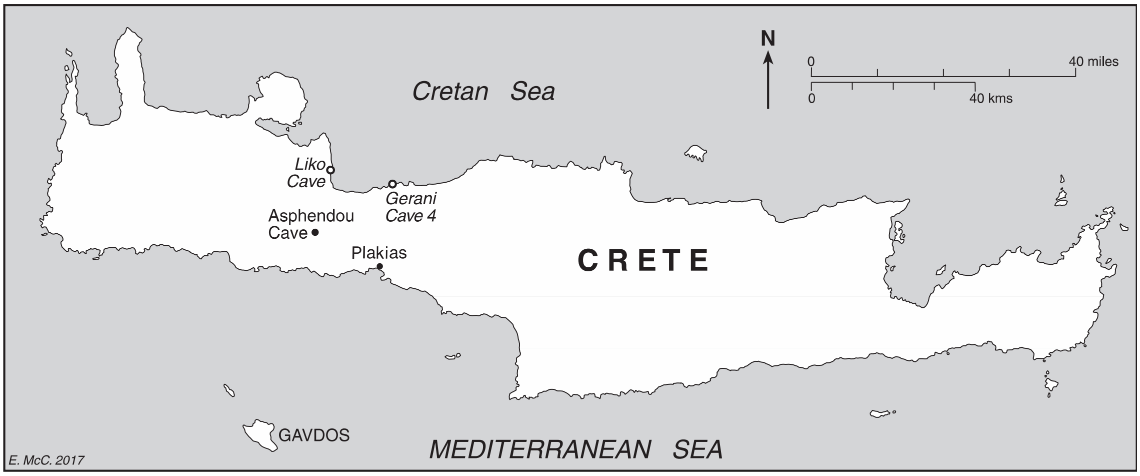

Fig. 1. Location of most relevant sites mentioned in text.
(E. McClellen and S. Murray)

Fig. 2. Exterior view from the south (*T. Strasser*). Interior views of Asphendou Cave facing northwest with speleothem on the floor. Close-up of petroglyphs on right (*S. Murray*).

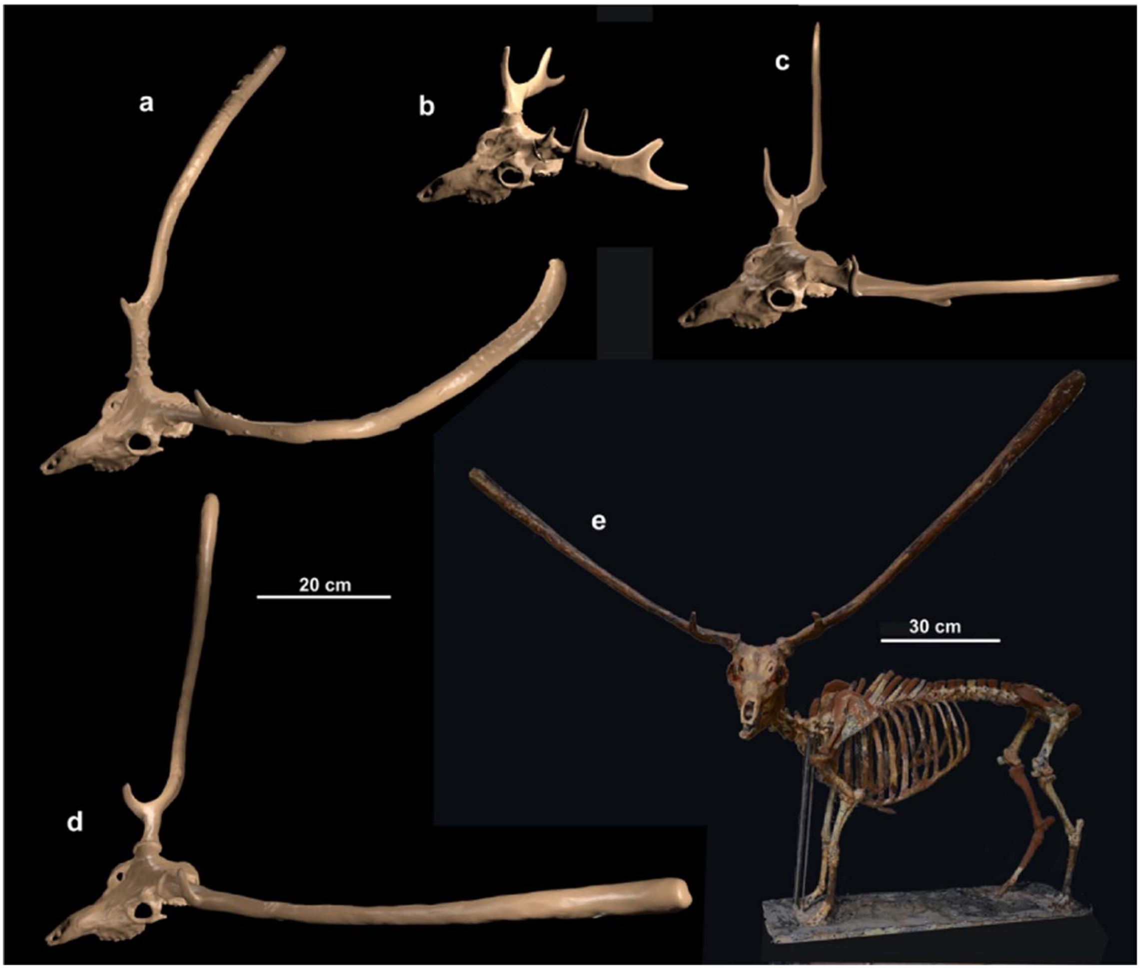

Fig. 3. The extinct endemic deer of Crete (*Candiacervus*). Several types of antlers are recognized ranging from long unbranched beams to short multi-tined antlers. a, Curved *ropalophorus*-type of antler (AMPG(V) 560; Gerani Cave 4). b, Multitined, short antler of *Candiacervus* sp. IIc (AMPG(V) 561; Liko Cave). c, Antler with bifurcation of the first tine and a short back tine of *Candiacervus* sp. IIb (AMPG(V) 1733; Liko Cave). d, Straight *ropalophorus*-type antler (Ge4–2870; Gerani Cave 4). e, composite mount of an adult stag of a dwarf form (withers height c. 50 cm) with *ropalophorus*-type of antler d.
(G. Lyras, S. Murray and A. van der Geer)

island (de Vos, 1979, 1984) (Fig. 1). Medium-sized forms of the Pleistocene Cretan deer have been known since the early 20th century (*Candiacervus cretensis*) (Simonelli, 1908; for an overview, see van der Geer et al., 2006, 2010). In the late 1970s, after drawings of the Asphendou Cave had been published, abundant fossil material belonging to four dwarf species was discovered in coastal caves along the northern coast, including, for the first time, the *ropalophorus*-type antler: a characteristically elongated antler with a very short brow tine and lacking subsequent tines or palmation (de Vos, 1979, 1984) (Figs. 3-4). Prior to these discoveries, only proximal fragments of the *ropalophoros*-type antler and multi-tined antlers had been retrieved. Consequently, this extinct deer was unknown to the scholars who originally published the Asphendou Cave petroglyphs.

The palaeontological excavations on Crete, mainly in coastal caves, reveal the presence of two main Pleistocene (Last Ice Age) biozones (Dermitzakis and de Vos, 1978; Mayhew, 1996). The first and oldest biozone is dated to the Early Middle Pleistocene, is characterized by a typical island fauna lacking terrestrial predators and poor overseas colonizers (Sondaar, 1977) and consisted exclusively of giant mice (*Kritimys catreus, K. kiridus*), a dwarf mammoth (*Mammuthus creticus*) and a dwarf hippopotamus (*Hippopotamus creutzburgi*). The second biozone, ranging from the Middle Pleistocene to the end of the Late Pleistocene, is characterized by a similarly distinctive endemic fauna that differs in composition from that of the previous period. For the Asphendou Cave, only this second biozone is relevant. The typical faunal elements of this biozone are giant mice (*Mus bateae, M. minotaurus*), a dwarf elephant (*Elephas creutzburgi*), the Cretan deer (*Candiacervus*, with eight species: *ropalophorus*, sp. IIa, b and c, *cretensis*, *rethymnensis*, *dorothensis* and *major)*, the Cretan otter (*Lutrogale cretensis*), and the Cretan shrew (*Crocidura zimmermanni*). All elements are now extinct, except for the shrew.

The eight species of Cretan deer (*Candiacervus*) range from a dwarf size with withers height of about 0,4 m (*C. ropalophorus*) to a much larger size with withers height of up to nearly 1,65 m (*C. major*) (de Vos, 1979, 1996). This is explained as a sympatric speciation (a new species evolving from a single ancestral species occupying the same geographic area) to occupy all possible available ecological niches (de Vos and van der Geer, 2002). The largest forms are extremely rare and limited to two sites (Liko Cave, Bate Cave). By contrast, the dwarf forms were found in more than 60 coastal caves along the entire Cretan coast (Iliopoulos et al., 2010). The smallest species (*C. ropalophorus*, *C*. sp. IIa) not only have relatively short limbs (van der Geer et al., 2006), but they also possess elongated, undifferentiated antlers (de Vos, 1984).

2.3. Faunal context

The history of Cretan ungulates contextualizes the quadruped images of Asphendou. In the late Pleistocene, or Upper Palaeolithic, the only ungulates on Crete were the Cretan deer (*Candiacervus*) (de Vos, 1979, 1984, 1996). The pygmy forms of the Cretan deer have singular,

Fig. 4. Skull and antler of dwarf *Candiacervus*. The antler, showing the slight curvature towards the anterior, is from Gerani Cave 4 (AMPG(V)560). This cave contains the geologically youngest Late Pleistocene fauna. The curved variety belongs to the smallest species, *Candiacervus ropalophorus*. The non-associated skull (GE6984 Gerani Cave 4) from the same species is used here only for reference regarding the antler's direction and position.
(S. Murray and A. van der Geer)

unusually long antlers with a small first tine. The main beam is either relatively straight or gently curved (*ropalophorus*-type), with (*C. ropalophorus*) or without (*C.* sp. II a) a bludgeon-shaped distal end. The main beam may also have an additional back tine (*C.* sp. II b) or a shorter antler with three tines (*C.* sp. II c), though this latter variant is rare (de Vos, 1984) (Figs. 3-4). These are the most prominent terrestrial fauna at the end of the Late Pleistocene or Upper Palaeolithic on Crete. There is no evidence for artiodactyls from the Mesolithic period on the island (ca. 9 to 11 thousand years ago). The faunal remains of the Neolithic include the well-known suite of introduced domesticates (sheep, goat, cattle and pig). The agrimi or Cretan ibex (*Capra aegagrus cretica)* is a feral goat originating from founders introduced during the early Neolithic (ca. 8 to 9 thousand years ago) (Groves, 1989; Masseti, 2009), several thousand years after the extinction of the Cretan deer. Restricted to Holocene sites are Red Deer (*Cervus elaphus*) (Masseti, 2012) and Fallow Deer (*Dama dama*) (Sykes et al., 2013), which have complex multi-tined and palmate antlers, respectively. *Candiacervus ropalophorus*, along with its polymorphous cousins, and *Capra aegagrus cretica* are the only two species that possessed simple, unbranched cranial appendages such as those depicted at Asphendou Cave. The main difference between these two ruminants is that the smallest *Candiacervus* species had unusually long, either straight or slightly curved, unbranched antlers that could almost match the length of their bodies (van der Geer et al., 2006) (Fig. 4), while agrimi horns, though also unbranched, scimitar at and towards the shoulders. A second but minor obvious difference is that the antlers of the Cretan deer have a smooth surface whereas the horns of the feral goats have deep horizontal grooves or ridges. If the quadrupends engraved at Asphendou cave are *Capra*, then they date from 9 thousand years ago to the present; if *Candiacervus*, then they date earlier than the end of the Palaeolithic at least 11 thousand years ago.

3. Materials and methods

3.1. Photogrammetry

One major contribution of this field project is the production of improved visual documentation of the Apshendou Cave rock engravings. Existing photos of the engravings, mostly snapshots taken by recent visitors or the archaeologists who studied the cave in the 1970s, are not of professional quality (e.g. Faure, 1972, 409, Fig. 4; Papoutsakis, 1972, Pls. 11–14). Most are blurry or of low resolution, and none present the entirety of the cave surface in a fashion that facilitates a thorough understanding of its layout and complexity. Therefore, one goal of our work at Asphendou was to generate modern scientific documentation of the carvings, which could serve as a professional record should any calamity befall the art, would facilitate communication with collaborators and colleagues, and will help with further analysis.

We chose to document the surface primarily using Structure-from-Motion technology (commonly known as photogrammetry). This option was preferable over other digital imaging or modeling technologies such as RTI (Reflectance Transformation imaging) or 3D terrestrial laser scanning for several reasons. RTI was unappealing for our project because the spatial constraints of working within the Asphendou Cave presented insuperable challenges for building an appropriate RTI setup. The customized RTI light domes designed for this kind of work simply do not fit into the cave. Furthermore, the vertical clearance between the cave surface and the ceiling is sufficiently tight, about 60 cm. at its maximum, to obviate the possibility of setting up a camera on a tripod anywhere that would provide a synoptic view of the engravings. Furthermore, we were concerned that forcing a tripod setup might damage the carvings, since the engraved surface is made of a relatively soft flowstone.

While 3D laser scanning has been effective in recording the geometry and extent of caves in archaeological contexts (Grussenmeyer et al., 2010; Lutz and Weintke, 1999; Tyree et al., 2014), the accuracy (~1 cm) and resolution of point clouds generated by scanners within the project budget would not have been adequate to record the tiny engravings in the Asphendou Cave to an appropriately high standard. Each quadruped is about 5 cm long, and many features are engraved so shallowly that they hardly have any depth at all, so we anticipated that the laser scanner would have difficulty recording them consistently, accurately and at a high resolution.

Conversely, photogrammetry is relatively inexpensive, requires no special setup, can produce imagery at the same resolution as the camera used to record the scene, and can measure distances with precision up to 1 part in 50,000 (Stamatopoulos and Fraser, 2014; Sapirstein, 2016), making it the ideal solution for imaging the Asphendou Cave. We used methods, equipment and standard software that are customary in the field of archaeology (Sapirstein and Murray, 2017) and therefore require little elaboration in the current context. Our equipment comprised a Nikon D800E 36.3 mpx DSLR camera fitted with a Zeiss Distagon T* 25 mm f/2.8 ZF.2 fixed focus lens. We processed images using AgiSoft Photoscan Pro, a software kit for archaeological photogrammetry (Green et al., 2014; Olson et al., 2013; Sapirstein, 2016; Shortis et al., 2006). From the photomodel we exported a high-resolution orthophoto, the first complete photographic documentation of the Asphendou rock art ever produced. This orthophoto is a valuable tool for research, because it allows an analyst to examine the entire engraved surface of the cave at once, without the additional interpretation and editing added by an artist's rendering of the surface

Fig. 5. A metrically accurate orthophoto of the engraved speleothem in the Asphendou Cave.
(S. Murray)

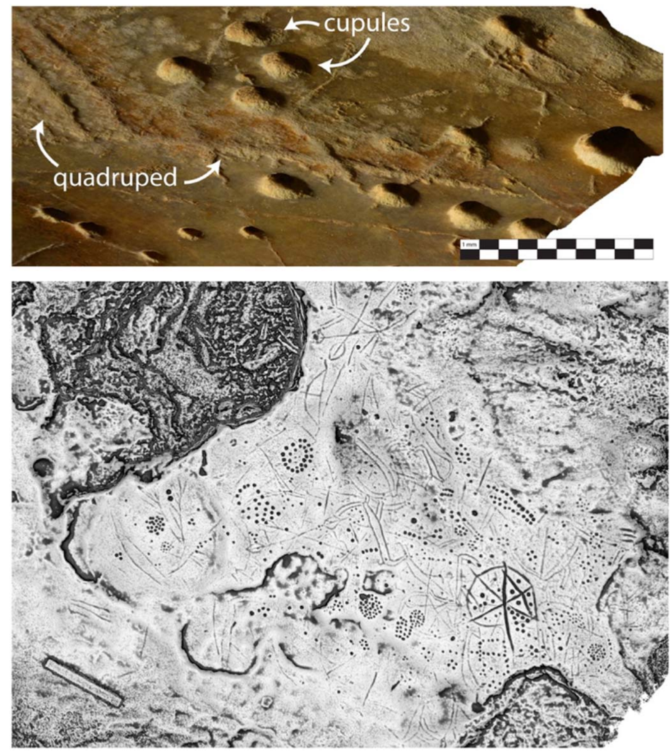

Fig. 6. *Above* An image, generated from a high-resolution 3D model, showing the range of relief or depth in the carving of cupules, antlers, and other scratches in the Asphendou Cave surface. *Below* A gray-scale depth map of the Asphendou Cave petroglyphs. Each pixel is colored according to its distance from the plane (the surface) of the speleothem, so that darker pixels indicate deeper engravings, and lighter pixels indicate shallow engravings.
(S. Murray and P. Sapirstein)

(Fig. 5). From the orthophoto and direct visual confirmation, we traced the engravings in toto and in sequence from the uppermost to the basal carvings. We then processed the 3D model to create a topological map of the surface that highlights the differences in depth and methods of incising used, and clarifies relationships between the various engraving episodes (Fig. 6; Fig. 70–4). Finally, we took detailed, high-resolution photographs of each individual quadruped represented in the petroglyphs (examples in Fig. 7a–c) to generate a comprehensive illustrated gazetteer. The result is an important archive of photographic and sketch images of the entirety of the Asphendou Cave engraving sequence, which enabled a novel interpretation of the whole, essential to resolve the question of dating.

3.2. Fossil material

We analyzed fossil *Candiacervus* antlers from the Liko and Gerani Caves. All studied antler material is housed at the Museum of Paleontology and Geology of the National and Kapodistrian University of Athens, Greece. Comparative analysis of these antlers, excavated after the publication of the Asphendou Cave petroglyphs, and the petroglyphs themselves provides a far more detailed understanding of the iconography, and eliminates any confusion concerning the genus of the quadrupeds depicted.

Fossil antlers were scanned with a NextEngine HD laser scanner and processed with Blender 3D software for correct positioning on the skull in order to obtain a virtual model that could be rotated in any direction for comparison with the depictions at the cave.

4. Results

4.1. A palimpsest in stone

The petroglyphs, a combination of figural and geometric rock art, were scored into a speleothem on the cave floor that provides an excellent canvas for such art (Figs. 2; 7d). Variation in the depth of carving suggests that different tools were used to make separate, discrete engravings. In addition, most engravings overlap, indicating a sequence of carving events analogous to a palimpsest. The black-and-white illustrations and drawings produced in the 1970s are therefore misleading (Fig. 70). They suggest that the creation of the rock art occurred as a single event. This confuses the viewer with a jumbled array of images that are difficult to interpret. Earlier scholars also made the mistake of using one element to date the whole image-field. Our method distinguished different layers of the engravings, demonstrated that they were not made in unison, and then considered each layer and figure independently. Our novel documentation resulted in: 1) the discovery of new elements in the iconography, increasing the recorded number of observed quadrupeds from about 20 to 37; 2) the finding that the cave surface is an intermittent sequence of engravings, with later images carved over earlier ones; and 3) the conclusion that the earliest layer represents a Palaeolithic animal herd without ground-line or background (Fig. 74).

4.2. The engraving sequence

In the top level (Level 1) we find deeply carved images broadly interpreted as a 'boat(s)' and a 'starburst', for lack of better terms (Fig. 8). They are made with a tool different from that used for the underlying levels, and they are cut most deeply. Level 2 is a series of cupules arranged in various geometric configurations (Fig. 8). The meaning of these is enigmatic, but they serve as a potential *terminus ante quem* for the engravings below. Similar, though larger, cupules carved into bedrock in the Aegean area are found at Strofilas on the Cycladic island of Andros (Liritzis, 2010; Televantou, 2008), on Naxos

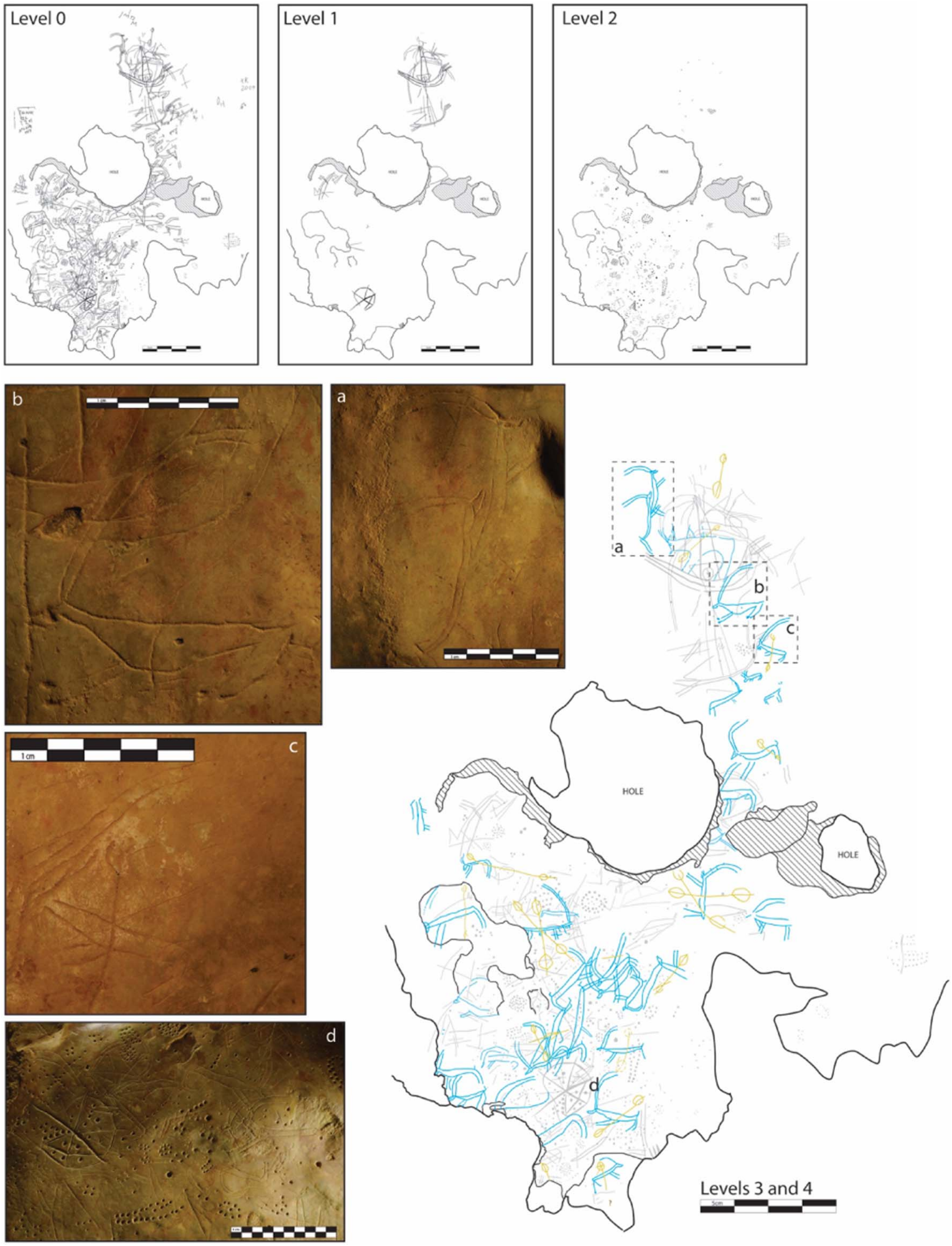

Fig. 7. The Asphendou Cave petroglyphs.
0–4.
0, synthetic drawing of the petroglyphs produced in 2016; 1, the top level (Level 1) consists of deeply carved images including several boats; 2, Level 2, cupules; 3–4, bottom levels of 17 paddle-shaped objects (yellow = Level 3) and 37 quadrupeds (blue = Level 4).
a–d.
a, quadrupeds 1 and 2 running or galloping; b, quadruped 4, engraved using several distinct tooling techniques; c, quadruped 5, dwarfish in proportion with notably outsized antlers or horns; d, a general view of the engraved surface. A variety of tooling techniques is observable.
(S. Murray and C. Kolb)

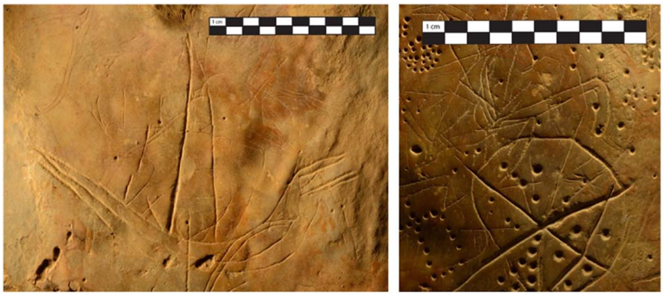

Fig. 8. *Left* The boat engraving near the back of the cave. *Right* the starburst, cupules, and quadrupeds.
(S. Murray)

Fig. 9. A quadruped with paddle shaped icons engraved across the torso.
(S. Murray)

(Bardani, 1966; Doumas, 1965, 1990) and at Mesorachi on Crete (T. Brogan, pers. comm. July 19, 2017). They are dated to the Final Neolithic/Early Bronze Age (ca. 5,5 to 4,7 thousand years ago). Levels 3 and 4 contain 17 paddle-shaped images above 37 quadrupeds (Fig. 73–4; a–b). We include as well the ‘bow & arrow’ motif (immediately below the central hole) that is an outlier and whose relation to the other engravings is unknown. All paddle-shaped icons crosscut a quadruped, suggesting a correlation, but their interpretation is unclear (Fig. 9). Level 4 depicts a herd of 37 quadrupeds (Fig. 73–4). Papoutsakis (1972) recorded 19 to 20 such figures, while Faure (1972) recognized 24–25, and an anonymous archaeological report of the same year (*To Ergon*, 1972) mentions 25–26. Our documentation and restudy confirms that, based on overall shape, body proportions and the simultaneous presence of hooves and appendages, these quadrupeds are ruminants. The cranial appendages are long, are generally weakly curved, and have different lengths relative to the body. In some quadrupeds, the cranial appendages run more horizontally, without change in angle, whereas in others they are short with a clear change in angle halfway. None of the appendages is scimitar-shaped. These details are crucial to our reinterpretation of what must, based on the sequence of carving events we observe, have been the earliest layer of the Asphendou Cave carvings.

4.3. Identification of the quadrupeds

None of the cranial appendages of the zoomorphic carved figures depicted at Asphendou Cave has a sharp scimitar-shape, and none is forked, except perhaps one shallowly carved behind a boat (see Fig. 8). The appendages are smooth, and show no evidence of ridges. Therefore, we identify the quadrupeds here as *Candiacervus*; a genus of extinct deer endemic to Pleistocene Crete. Most publications addressing the Asphendou petroglyphs followed earlier studies in assuming the animals to be agrimia (*Capra aegagrus cretica*), a feral goat introduced to, and now endemic to, Crete. A careful analysis of the zoomorphic figures engraved at Asphendou Cave and the morphology of fossil *Candiacervus* antlers, however, demonstrates that the depicted quadrupeds more closely resemble the extinct *Candiacervus* species than the Cretan agrimia.

Though *Candiacervus* antlers vary in size and form (some are curved, others straighter) they all lack the complexity of mainland deer antlers (de Vos, 1984) (Fig. 3). In the anterio-lateral view of the head with antler, this unique configuration – of a relatively straight or sometimes curved antler, without multiple tines or palmation, and most notably, nearly equal in length to the deer's body – closely resembles the renderings of most of the Asphendou Cave quadrupeds (Fig. 74; Fig. 7a-b).

4.4. Art historical argument

Stylistically, there are two points that compare well with other Palaeolithic illustrations of quadrupeds. The first is the very common practice of depicting an animal notionally intended to be in lateral profile, but showing a pair of antlers and/or horns as if the image were a three-quarter view. A strict profile illustration should, of course, only show one antler, but it seems that the Palaeolithic convention was to include the pair of antlers to facilitate the identification of the species. Secondly, the lack of a ground-line in the rendering of the herd is more common in Palaeolithic art than in the Bronze Age Minoan depictions of agrimia (*Capra aegagrus cretica*), which were a frequent artistic subject. It is unclear how or why a Bronze Age artist intending to engrave sequential images of agrimia would depict all of them with cranial appendages bearing such a close resemblance to Pleistocene *Candiacervus* antlers and not at all suggestive of agrimia horns. *Candiacervus* had been extinct for at least 6 thousand years by the Bronze Age, so such an artist could never have seen this species. Greater interpretive license is required to construe these Asphendou Cave quadrupeds as Holocene agrimia rather than as Pleistocene dwarf deer. It is simply implausible that these are Bronze Age distortions explained by random artistic license, rather than Ice Age depictions of what we now know was the dominant Cretan fauna in the Late Pleistocene.

5. Discussion

Given that the quadrupeds depicted in the oldest layer of the Asphendou Cave rock carving are likely to represent *Candiacervus*, this art should be dated to the Palaeolithic period, making it the earliest figural art not only on Crete, but also in Greece. Until now, the earliest figural art known from Greece is dated to the Neolithic period (ca. 8,5 to 5 thousand years ago) (Perlès, 2004). The Sphakia Survey's earlier investigations of Upper Palaeolithic in the Samaria Gorge proved unfruitful, but the authors precociously state that such “scoured” areas are not rewarding foci for the discovery of Palaeolithic artifacts (Nixon et al., 1990). However, in light of the recent discovery of Palaeolithic artifacts near caves in southwest Crete (Strasser et al., 2010, 2011), it is not surprising that cave art would be found in the area. Since the publication of Palaeolithic stone tools on the southwest coast of Crete in 2010 and the nearby island of Gavdos (Kopaka and Matzanas, 2009), several new Palaeolithic sites have been discovered throughout the Aegean basin (Carter et al., 2014; Çilingiroğlu et al., 2016; Galanidou et al., 2016). Upper Palaeolithic tools were discovered on Gavdos, while the other sites have turned up primarily Lower-Middle Palaeolithic and Mesolithic finds. Despite the paucity of Upper Palaeolithic sites on the island, it is important to emphasize that the discovery of Pre-Neolithic sites on Aegean islands is just beginning, and subsequent surveys are almost certain to document more Upper Palaeolithic material. In the Mediterranean region overall, art similar to what appears at Asphendou Cave is usually attributed to the Upper Palaeolithic (Bahn, 2016, 110–111), and on current evidence we believe this is the most likely date to ascribe to our Level 4. Given the stylistic affinity of the

Asphendou Cave petroglyphs to other Palaeolithic cave art, and the increasingly abundant archaeological evidence for human habitation in Crete during the Palaeolithic period, this date should be considered highly plausible.

While it has long been dismissed because of the previous scholarly consensus dating the earliest presence of humans on Crete to the Neolithic period, there is direct evidence that humans arrived on the island in the Palaeolithic period and this evidence further supports our conclusions about the Asphendou Cave petroglyphs. The earliest human remains recovered thus far by archaeologists on Crete were found by Vittorio Simonelli (Simonelli, 1897) in the district of Chania in 1893. The remains were cemented by a very hard calcareous breccia, which may be related to the formation of a littoral bench. Fragments of bones and horns of Cervidae (Cretan deer) were found at the same location, but no mention is made of their stratigraphic position relative to the human remains in Simonelli's publications. A sample of breccia in direct contact with the human bones has been dated using the Protactinium/Uranium method to 51 ± 12 thousand years ago (Facchini et al., 1989). The basic shape of the skull cap, characterized by a receding low forehead and a rather flat cranial vault, is archaic compared to that of modern humans, whereas the weakly developed superciliary ridges are typical for modern humans (Facchini and Giusberti, 1992). This head shape, intermediate between archaic and modern *Homo sapiens*, is suggestive for a late Pleistocene or at least pre-Neolithic human.

Absolute dates based on Amino Acid Racemization of fossilized bones and teeth from several caves in the Rethymnon area, including Gerani and Liko caves, place the Cretan deer throughout the late Pleistocene between 152 ± 20% thousand years ago (Reese et al., 1996) and 21,5 ± 20% thousand years ago (Belluomini and Delitala, 1983).

6. Conclusion

The last occurrence of the Cretan dwarf deer *Candiacervus* sometime after 21,500 years ago provides a *terminus ante quem* for the earliest layer of the Asphendou Cave rock carvings and confirms them as the oldest figural art found in Greece. Unsurprisingly, Palaeolithic artists represented what they knew, in this case a prevalent species of Cretan dwarf deer (*Candiacervus*), which became extinct in the Upper Palaeolithic. Comparable early artistic expressions are not known from the Aegean basin. Our study of the Asphendou petroglyphs therefore deepens scholarly understanding of early hominins' capacities for imaginative projection and confirms the precocity of Palaeolithic seafarers in the Mediterranean. With this new evidence of an interface between hominins and extinct insular fauna, paleontologists and archaeologists can now address issues of resource exploitation, environmental impact and symbolic behavior on Crete.

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