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CAVE RITUALS UNDER THE MAGNIFYING GLASS: METHODOLOGICAL RESOURCES TO DETECT UNICITY AT THE ITALIAN MIDDLE BRONZE AGE SITE OF GROTTA DI PASTENA

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PAROLE CHIAVE
Italia centrale; Archeologia delle grotte; Protostoria italiana; Stratigrafia delle grotte; Archeologia del rituale.

KEYWORDS
Central Italy; Cave archaeology; Italian Protohistory; Cave stratigraphy; Archaeology of ritual.

RIASSUNTO
La Grotta di Pastena è una delle spettacolari grotte localizzate nel centro Italia. Il deposito archeologico più promettente e maggiormente preservato è stato rinvenuto nella Grotticella W2 (GW2), una piccola camera che si apre in un settore della grotta complicato da raggiungere. L'area è datata alla Media Età del Bronzo ed è caratterizzata da diverse caratteristiche antropiche, manufatti e materiali biologici, suggerendo un utilizzo rituale della grotta. Lo scopo del presente lavoro consiste in una ricostruzione del processo di formazione del deposito e delle attività umane che hanno avuto luogo in quest'area, attraverso un approccio multivariato, basato su un'analisi critica della stratigrafia relativa al deposito di GW2, sull'utilizzo di datazioni al radiocarbonio e di un approccio analitico di tipo archeologico e bioarcheologico. Le tracce riconducibili allo svolgimento di rituali sono state confrontate con quelle individuate in altri contesti italiani ed europei coevi, con lo scopo di corroborare le interpretazioni proposte e di fornire una più puntuale definizione di grotte rituali, troppo spesso generica. Grotticella W2 sembra essere stata utilizzata come un luogo di sepoltura primaria, successivamente impiegato come ambiente rituale per le attività di culto legate al ciclo della vita e della morte.

ABSTRACT
The Grotta di Pastena is a magnificent show-cave in central Italy. The most promising and best-preserved archaeological deposit of the site was found in *Grotticella* W2 (GW2), a small chamber opening in a difficult-to-reach sector of the cave. This area dates to the Middle Bronze Age and is characterised by several anthropic features, artefacts, and biological materials, suggesting a ritual use of the cave. In critically analysing the stratigraphy of GW2's deposit, while integrating radiocarbon dating, archaeological and bioarchaeological studies, this paper aims to reconstruct the formation processes of the deposit and the human activity which took place here. The identified ritual markers have been compared with those found in other Italian and European coeval sites, thus corroborating the proposed interpretation and assisting in redefining a usually generic definition of ritual caves. *Grotticella* W2 appeared to have been used as a primary burial area, which later became a ritual centre for cult activity surrounding the life-death cycle.

INTRODUCTION

Archaeological knowledge of Middle Bronze Age central Italy comes predominantly from the study of the numerous caves which were used and visited by human groups during the 2nd millennium B.C. here (Fig. 1). The limited range of

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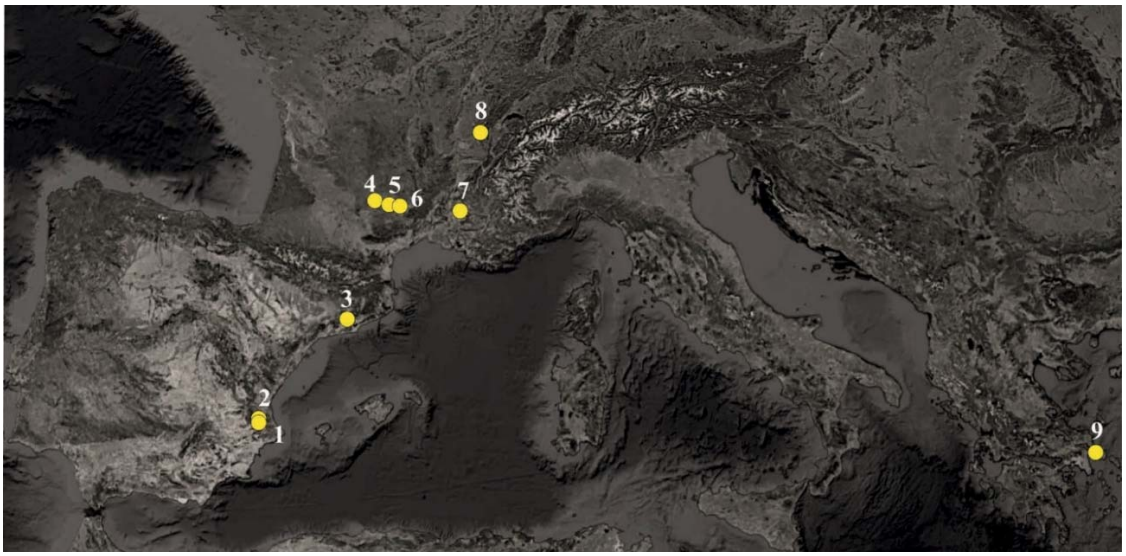

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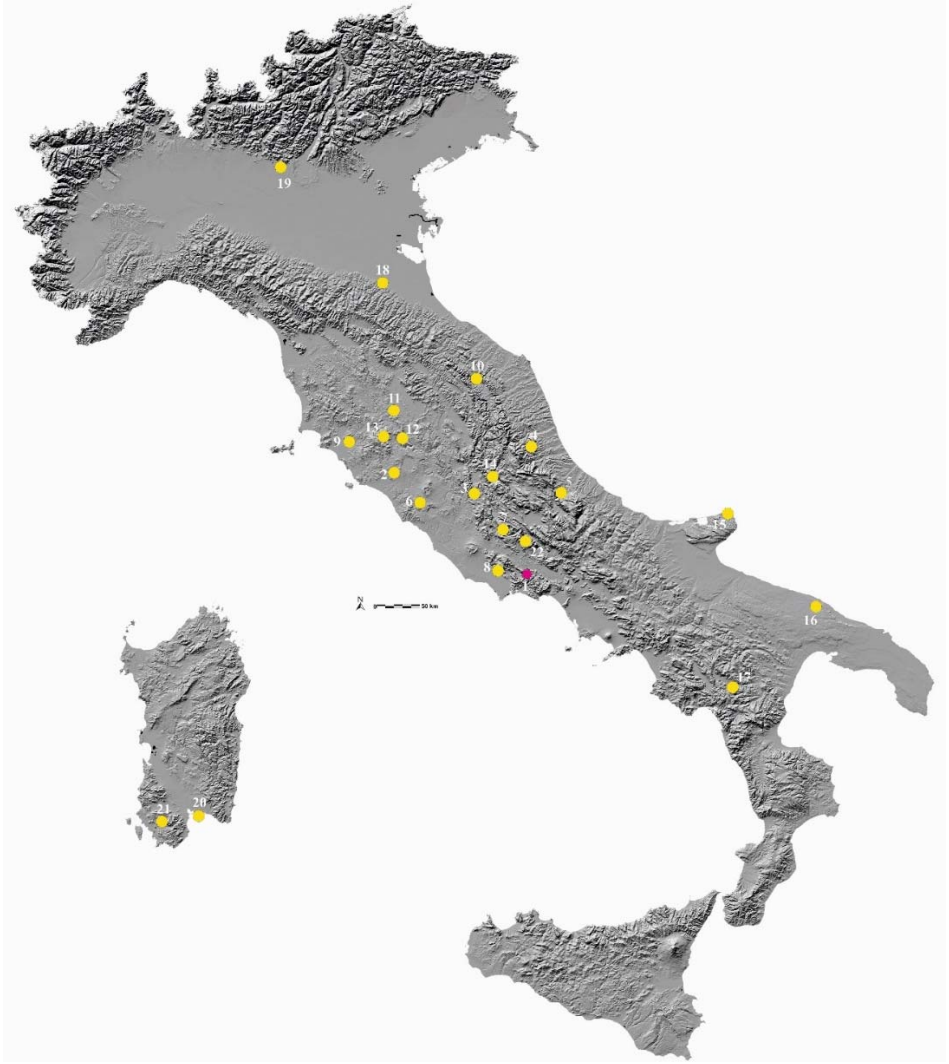

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Fig. 1. Map of Protohistoric sites from Europe (a) and Italy (b), used for comparison (Grotta di Pastena is in red). a) Spain – 1: Cova d'en Pardo, 2: Cova de l'Or, 3: Can Sadurnì; France – 4: Abri du Camp des Armes 1, 5: Grotte des Truels, 6: Baume Layrou, 7: Grotte Unang, Sanguinouse à La Roques-sur-Pernes; 8: Balme Gontran; Greece – 9: Ayia Triada. b) 1: Grotta di Pastena; 2: Grotta Nuova; 3: Grotta dello Sventatoio; 4: Grotta S. Angelo; 5: Grotta dei Piccioni; 6: Grotta Misa; 7: Grotta Mora Cavorso; 8: Grotta Vittorio Vecchi; 9: Grotta del Fontino; 10: Grotta del Mezzogiorno, Grotte di Frasassi, Grotta dei Baffoni, Grotta del Prete; 11: Grotta dell'Orso di Sarteano; 12: Antro della Noce, Antro del Poggetto, Grotta Bel Vedere di Cetona, Grotta San Francesco; 13: Grotta Poggio La Sassaiola; 14: Grotta Val de' Varri; 15: Grottone di Manaccora; 16: Grotta Pacelli; 17: Grotta di Latronico; 18: Tanaccia di Brisighella; 19: Riparo Valtenesi; 20: Grotta di S. Bartolomeo; 21: Grotta di Monte Meana; 22: Grotta di Collepardo.

our knowledge is certainly due to the rarity of identified and/or fully investigated coeval open-air sites, because of geomorphological impediments, methodological reasons, and historical urbanization (SILVESTRI *et alii* 2018, with references). Furthermore, the majority of Protohistoric caves in central Italy were frequented for ritual and burial purposes rather than as settlements (e.g., WHITEHOUSE 2007, pp. 97-106; MINNITI 2012): meaning that the archaeological reconstructions carried out by specialists reflect only a partial picture of Bronze Age culture.

Nevertheless, the study of rituality inferred by the many caves available - each one characterised by its own identity and variables (e.g., the caves from southern Lazio, SILVESTRI *et alii* 2018) - can provide a crucial contribution to the overall understanding of Italian Protohistory, especially when integrated with complementary information from other contexts. However, most of the known Bronze Age caves have been discovered, excavated, and studied several decades ago (e.g., CREMONESI 1968, pp. 247-331; DI FRAIA, GRIFONI CREMONESI 1996). Often these paid little attention to stratigraphy or the use of multidisciplinary studies (e.g., COCCHI GENICK 2002), and at times the outdated interpretations led to very biased readings of the data (e.g., PUGLISI 1959). Therefore, the study of new contexts using the most updated methods is fundamental in modern archaeological research.
Grotta di Pastena (Fig. 2) is situated approximately 196 metres a.s.l. and 4.5 km north of the eponym village. The site became a show-cave shortly after its discovery in the early 20th century due to its remarkable dimensions and magnificent speleothems. The entrance is 20 m high and 25 m wide, leading to a majestic 80-m-long chamber, which features a seasonal stream of the Rio Mastro Creek. The presence of archaeological remains was first noticed in the 1940s (GUARESCHI, MORANDINI 1943, pp. 43-62), with surface surveys undertaken again in the 1980s (BIDDITTU 1987, pp. 237-239), and the earliest excavations took place in the first decade of the 2000s by the University of Perugia (BIDDITTU *et alii* 2007, pp. 683-693) and the *Soprintendenza Archeologia del Lazio e dell'Etruria Meridionale* (ANGLE *et alii* 2010, pp. 369-380). This preliminary research brought to light various archaeological materials from niches placed along the cave's walls, generically attributed to a timespan ranging between the late Neolithic and the Middle Bronze Age.

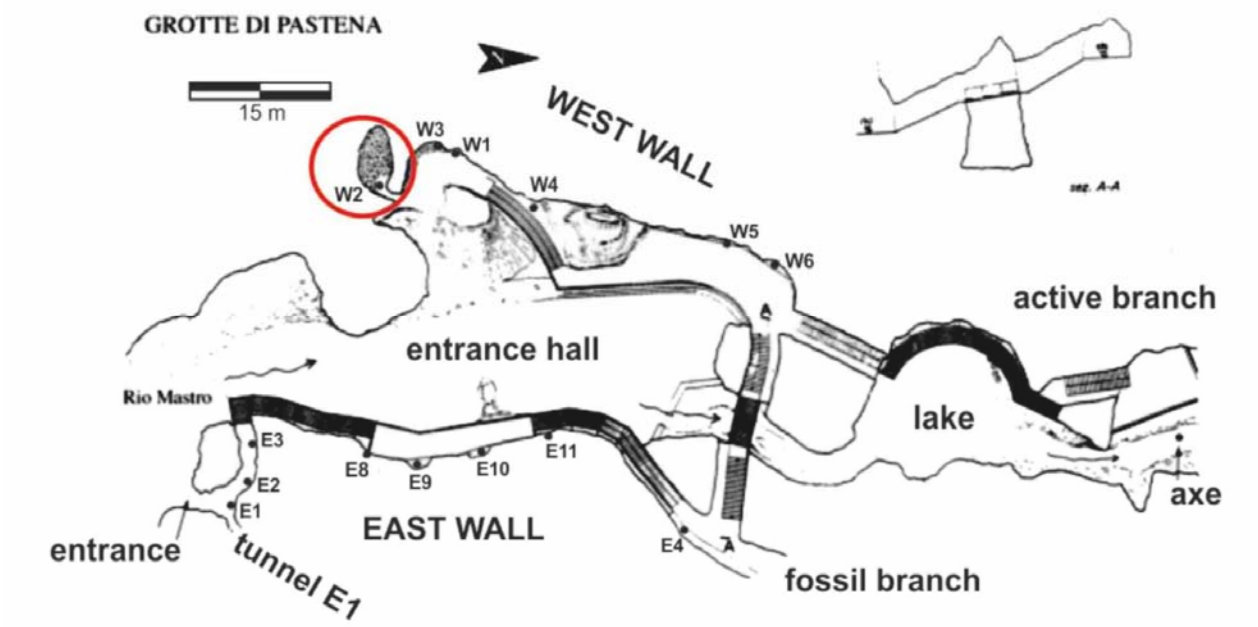

Fig. 2. Map of Grotta di Pastena (after ANGLE *et alii* 2010, fig. 2). Grotticella W2 is circled in red.

A systematic archaeological project, that focused on the investigation of the most promising and best-preserved sector of the cave (Grotticella W2, Fig.3 – ANGLE *et alii* 2014, pp. 205-211; SILVESTRI *et alii* 2019, pp. 87-112), was conducted between 2012 and 2018 allowing for the comprehensive study of the preserved Protohistoric context.

This paper focuses on the contextual analysis and discussion of all the available data collected from GW2, with special attention to deposit formation, stratigraphic intelligibility, and the reconstruction of human actions which impacted the site. Several research questions are addressed: first, to what extent can an accurate stratigraphic analysis, integrated with reasoned radiocarbon dating and holistic material culture studies, provide an improved understanding of the occupation dynamics within a cave site? Secondly, how can we reconstruct the detailed characteristics of a funerary deposit, using a contextual approach to move beyond the generic - and often too simplistically adopted - definition of "burial practices"? What other more specific interpretations can we produce regarding yet another "ritual burial" in an Italian Bronze Age cave, using these rare and invaluable data? To answer these questions, an effort was made to integrate the results found here with several other Italian and Mediterranean

case-studies, which, hopefully contributes to a better understanding of the human uses of caves and their significance in 3rd-2nd millennium B.C. Europe.

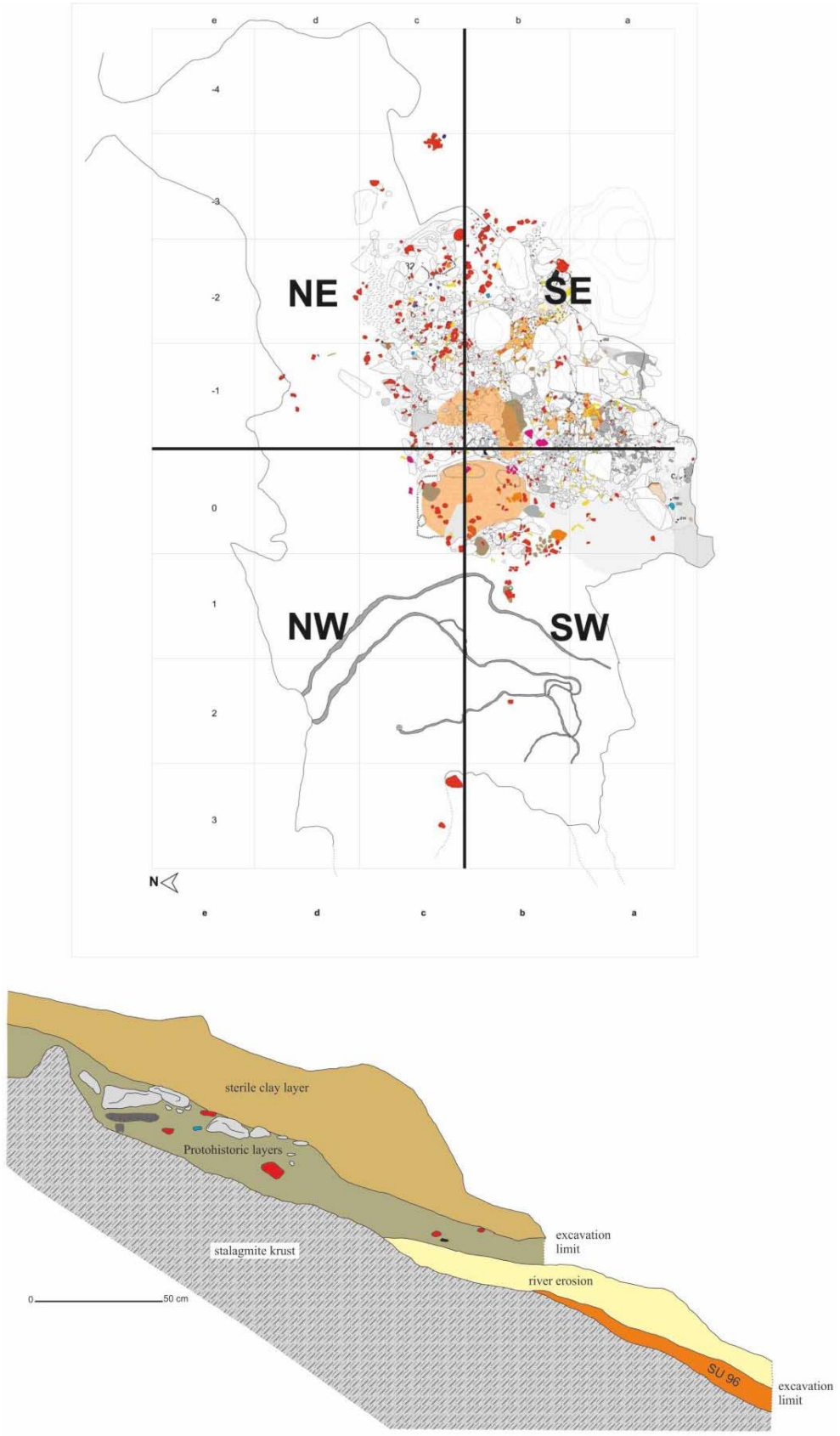

Fig. 3. Plan of W2 with sectors. Light yellow: soil with natural concavities; yellow: faunal remains; pink: human bones; orange: reddened area; red: pottery; violet: burnt pottery; brown: concotto; grey: ashes and burnt stones; black: charcoals.

METHODS

Before the start of systematic investigations, a north-oriented, 1 m^2 grid was created in W2, and a datum point was established, placing it on the west wall at an a.s.l. absolute height of 179,631m. The deposit has almost been fully investigated, after 8 years of excavation, except for an east-west balk, intentionally preserved in the northern sector. The whole excavation area has been digitally mapped using a total station (Leica TS02 power 7''), and every find has been photographed, georeferenced, hand-drawn on maps and later digitized. The excavated soil was sieved by 2-to-5 mm^2-mesh sieves and subjected to water flotation.

In total, 65 stratigraphic units were identified and later regrouped into six main layers (referred to as Context Groups or CGs), progressively numbered from the bottom to the top of the deposit. Each layer thus includes multiple stratigraphic units, either formed around the same time or presenting similar colour, texture, and composition. These levels cover the whole surface of the excavated area and appear to represent four distinct occupation phases of the site. The investigated deposit found between CGs 2 and 5 (i.e., the most relevant Protohistoric and anthropized contexts) has a total depth of 70 cm ca.

Concerning the archaeological finds, zooarchaeological and preliminary palaeobotanical analyses were already undertaken and published (SILVESTRI *et alii* 2019, with references), the results of which are briefly summarized here. The study of ceramic assemblage and the human bones, preliminarily presented in ANGLE *et alii* (2010, pp. 369-380) and now completed, is presented in this work for the sake of a more comprehensive contextualization. Potsherds were counted, and the intact vessels and significant forms were drawn and chrono-culturally attributed. The spatial distribution of the pottery was analysed in relation to the main archaeological areas.

Anthropological analyses, based on WHITE *et alii* (2012), assessed morphological identifications, bone siding, and an estimation of MNI (Minimum Number of Individuals). Age classes were estimated based upon changes to the morphological features of the bones and dental eruption patterns (ACSÁDI, NEMESKÉRI 1970; UBELAKER 1969); due to the limited amount and poor preservation of the human remains, sex and pathologies could not be identified. Stable isotope analyses for these bones, as well as for the faunal and carpological remains, are still ongoing.

Several features have been identified in GW2, which are useful to highlight and help us to understand the human actions performed in the cave (BINFORD 1987, pp. 391-404; HODDER 2016). Some key characteristics have been selected for comparisons with coeval sites, to build an ever more reliable reconstruction of past human behaviours represented through the archaeological record here. The identified features are: i) a high quantity of burnt seeds and their spread throughout the deposit; ii) stone paving episodes; and iii) placement of upside-down vessels in marginal areas or inside pits. GW2 is also characterised by anthropic pits, hearths and rubified areas, as well artefacts, potsherds and faunal remains. However, after a meticulous study of published works, it was determined that these archaeological elements were too general to determine the specific use of a site; they were commonly found in most of the investigated caves, independent of their vocation.

Therefore, another unique feature of GW2 was used to inform on past human behaviours within the cave, that is the presence of scattered human remains which indicated some sort of deposition activity, possibly resulting from secondary processes. Quantitative and qualitative distribution, natural or anthropic post-depositional processes, and demographic representation of human bones in every Italian or European cave with similar deposits, are extremely diverse. Therefore, direct parallels have not been extrapolated in this study, as they were considered too wide-ranging to make, and would require an extensive study in their own right.

Three seed samples from CGs 2, 4, and 7, and one human bone from CG 5, all different contexts (Tab. I), have been radiocarbon dated to provide a reliable reconstruction of the stratigraphic sequence and to clarify the chronological interval between the identified anthropic activities. The main find category selected for dating was seeds, as these were the most widespread organic remains across the various CGs, and therefore best reflected the repeated human activities carried out in GW2. The human bone was chosen from the context richest in human remains, to shed light on the time of deposition and the relationship with the rest of the archaeological deposit. The dating of Context 48 took place in the SUERC Laboratory of the University of Glasgow; the remaining dates were obtained from the CEDAD Laboratory of Lecce (Tab. I).

Laboratory	**Sample**	**SU – CG**	**BP**	**BC**
Lecce - LTL20378A	Seeds	501 – CG1a	3322 ± 45	1693-1503 B.C. (91,7%)
Lecce - LTL20379A	Human bone	32 – CG5	3435 ± 45	1831-1622 B.C. (79,6%)
Glasgow – GU55522	Seeds	48 – CG4	3253 ± 24	1546-1447 B.C. (87%)
Lecce - LTL20377A	Seeds	95 – CG2	3235 ± 45	1612-1422 B.C. (95.4%)

Tab. I – Radiometric dating

Archaeological Context

Grotticella W2 is a small room opening in the west wall of the cave's entrance hall, 20 m ca. above the floor level where the present-day Rio Mastro Creek runs. The steep path leading to the small entrance of this chamber (Fig. 4) presents some niches that were surveyed in the early 2000s (Angle *et alii* 2010, pp. 369-380) and yielded a wealth of archaeological remains, as well as rare evidence of a partially intact stratigraphy. GW2, measuring around 5 x 5 m, was once characterised by an intensive karst activity, based on the strong gradient of its floor, and features multiple levels of limestone terraces sloping downwards (west-east) toward the entrance. Another key element of this chamber is the presence of two suspended terraces divided by a stalagmite column, located about 2 m above the room's floor and facing southeast of the large entrance room with two small openings (Fig. 4). At the time of its prehistoric occupation, the openings may have been better connected to the chamber's base, which were later isolated due to a rock collapse. The removal of a thick sterile soil deposit brought to light an exceptionally preserved Bronze Age context. This layer likely remained intact since the seasonal stream was not able to flood this room, due to the formation of a sort of "air bubble"; the flood limit is clearly visible close to the chamber's entrance. At the start of the investigations, GW2 revealed a walkable surface with a natural, 115 cm ca.-deep west-east gradient at the top of the deposit. This gradually slopes down from the innermost part of the cave to its entrance (Fig. 3), located at the top of the natural cliff facing the Rio Mastro Creek.

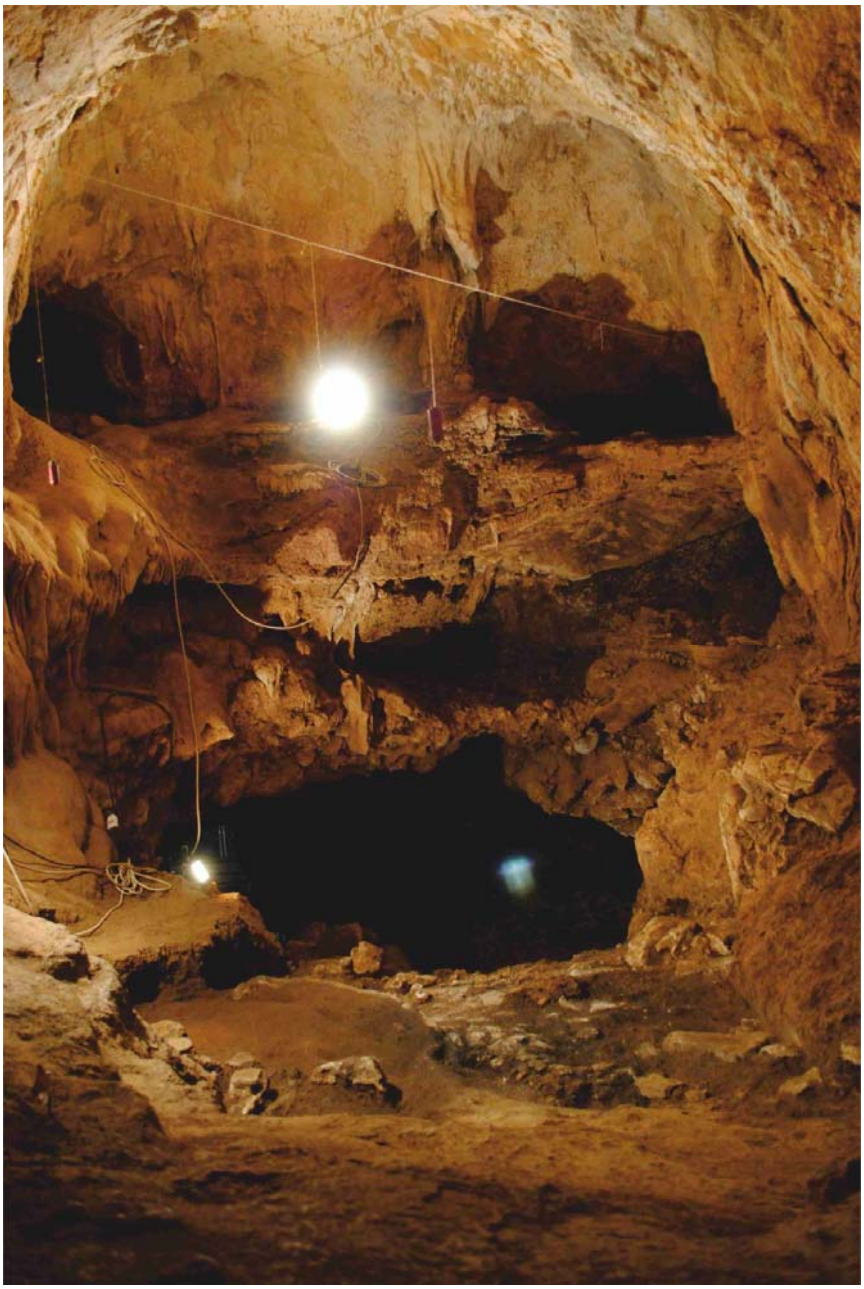

Fig. 4. East view of Grotticella W2 with its upper terrace

While GW2 constitutes the best archaeologically preserved and richest sector in the entire cave, several previously unexplored niches and areas were also identified during the 2012-2018 campaigns. Some of these cave sectors, revealed materials consisting in abundant pottery, fauna, burnt seeds, sporadic stones, and bone and faïence artefacts and/or structural remains, most likely coeval to those identified in the main investigated chamber (BIDDITTU *et alii* 2007, pp. 237-239).

The investigated sections yielded the following stratigraphic succession: CG1 was widespread in the southwest and southeast sectors of the deposit. The bottom-most identified part of this context showed an archaeologically sterile, clayey layer. A thin stalagmite layer was located above this stratigraphic layer and constitutes what appears to have been the natural base floor of the Protohistoric period.

CG2 dated to 1612-1422 cal. B.C. (Tab. I); it has been identified only in the southeast-northeast sector and is stratigraphically interpreted as a starting point for the occupation phase. It was characterised by a decimetric-sized pit, intentionally dug into the stalagmite crust, and by natural concavities of the clay layer. A paving of scattered stalagmite sheet fragments (subsequently defined as "stone paving" or "stone floor"), similarly found also in the upper layers, has been detected near the pits and occupied a small area.

CG3 shows different anthropic activities and has a wider extension in the southeast-northeast direction. The most significant evidence identified here was a reddened area, extended over a large area and possibly related to one or more hearths. The level is also characterised by further features located in marginal areas, such as: i) the remains of three hearths, ii) a reddened area; iii) a subcircular pit; and iv) a small pit surrounded by stones. A widespread activity phase followed the above-mentioned activities, covering most of the central sector. This layer consisted of a dispersion of combustion residues, such as ash remains, charcoal, and large quantities of burnt seeds.

CG4 dated to 1546-1447 cal. B.C. (Tab. I) and is defined by the laying of another stone floor located mainly in the southeast-northeast sector. This covered most of the analysed surface and presented a regularization of the structure through fragmented clasts arranged to limit the gradient, composed by flat stones. A layer made up almost entirely by burnt seeds, where the clay component was almost absent, has been identified above the stone paving. Several clayey stratigraphic units and a small, reddened area have been recorded between the burnt seeds' layer and the following context group (5).

CG5 radiocarbon-dated to 1831-1622 cal. B.C. (Tab. I) and is the most extensive in GW2 (from the easternmost to the westernmost sector of the area). It revealed a third stone paving episode. Recurring activities have also been identified above this stone floor. Several reddened areas were found, one of which was particularly wide and located to the west of the stone paving and contained in a 60 cm-wide and 12 cm-deep natural karst pool (*gour*). Burnt seeds and charcoals were widespread over the rest of the surface. This layer likely marks the end of the Protohistoric use period and appears to be one of the most interesting ones. For example, on the one hand it has the extension and the stone paving, while on the other hand there were a large number of human bones discovered with a better degree of preservation of the remains compared to the other levels, likely due to the absence of subsequent rearrangements of these deposits.

CG6 has been attributed to a more recent use period. In the lowest section of the deposit, which is 5-cm-thick, pottery was recovered which is attributable to the Archaic period. Above this, a thicker stratigraphic sequence has yielded sporadic Recent Age items, mostly from the 2nd World War. Finally, the last and uppermost layer presented a huge quantity of contemporary avifaunal remains determined to be intrusive.

CG1a dated to 1693-1503 cal. B.C. (Tab. I), this context makes up the upper terrace of GW2, and was characterised by a complex stratigraphic situation, difficult to investigate due the instability of the terrace. The northern sector was featured by stone paving and a reddened area, possibly indicative of a hearth, with an underlying sterile layer. More striking is the archaeological deposit in the southern sector, this deposit was 10 cm thick and presented a similar situation to those previously described for the main investigated area. A stone paving and a great number of burnt seeds, thought to belong to a phase of intense use of the area, were discovered in this sector. In the centre of the stone floor, an anthropic pit was found, surrounded and covered by clasts. An upside down-bowl and a pebble, found near the handle, were discovered inside this structure; a few faunal remains were also uncovered below the bowl. The whole deposit was characterised by a huge quantity of burnt seeds and charcoal. Considering the complexity and multiple deposits, which point to symbolic and repetitive actions as well as the very specific, intentional, placement of a feature with a potentially meaningful and suggestive find that was brought to light here, this niche seems to have had a clearly ritual use.

ARCHAEOLOGICAL STRUCTURES

The study of the stratigraphy revealed evidence for reiterated intentional activities. The preparation, placement and creation of such features and finds within the layers, such as the hearth structures and stone paving, allude to a precise symbolic value both in relation to the actions themselves and to their cyclical repetition. (Fig. 5). Clear ritual repetition practices have been recently documented also in the nearby Grotta Regina Margherita in Collepardo, although

referring to different features - mainly to the thousands of accumulated human bones (Skeates *et alii* 2021, pp. 1-17) - than those identified in W2. Here we discuss the features from Grotticella W2 and their interpretations.

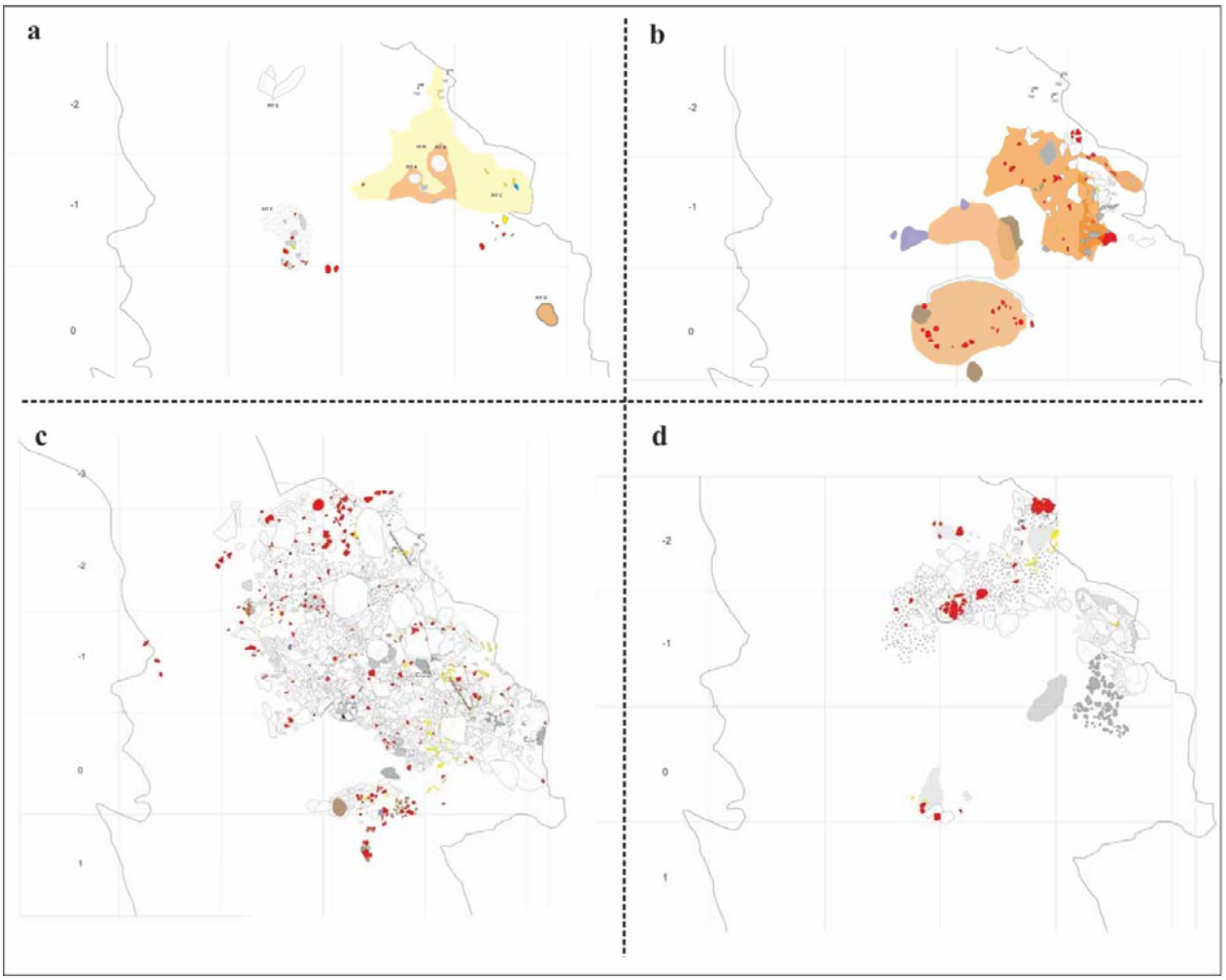

Fig. 5. Anthropic actions identified in GW2: a) pits; b) reddened areas; c) stone pavings overlapped (SSUU 101, 49, 30); d) hearths.

Hearths. Combustion areas were identified thanks to the vast quantity of burnt seeds, charcoals, ash residues, and the reddened areas. Hearths would have been placed in marginal spaces, where they were surrounded by stone structures, or on the stone paving, without delimitations.

Pits. Different types of pits have been identified in the investigated area. Some pits were intentionally dug in the stalagmite crusts of the archaeological deposit, while others consisted of natural concavities of soil. It must be noted that pits were identified only in older layers (CG2 and CG3) and in some cases they could have constituted post holes, where the poles were subsequently burned.

Reddened areas. These stratigraphic contexts were characterised by a bright red colour of the soil. They laid mainly on natural clay layers and never on stone floors or stalagmitic crusts. The colour and texture of the soil indicate that hearths had been lit in these areas. While structural remains of the actual combustion area were absent, the presence of charcoal, burnt seeds, and ash areas lead us to hypothesise that these areas represent the widespread use of hearths near the reddened layers. These areas exhibited few archaeological remains.

Stone paving. In GW2, there were two examples of extended stone paving, as well as a smaller example, which was ascribed to an initial use phase. These structures consist of flooring episodes paved with flat stones and stalagmite sheet fragments taken from the wall of the cave. The stones were easily removed from the wall through a percussion of the surface and had different dimensions (ranging from 2 cm to 30 cm). The construction of the stone floors was then correlated with layers rich in burnt seeds and charcoal, that were placed above or under them. It is likely, then, that these structures were linked to other anthropic activities, i.e., the lighting of hearths, the dispersion of burnt seeds, etc. The purpose of the stone floors was presumably both functional, serving as a sub-horizontal plane to decrease the natural gradient of the archaeological deposit, which was slippery due to the humidity and presence of water, and symbolic.

Evidence for stone paving is quite rare in natural caves; only a few other Italian sites (listed from northern to southern Italy) have yielded such features, for instance, Riparo Valtenesi (BARFIELD 2007), Grotta del Fontino (VIGLIARDI 2002), Grotta dei Piccioni (RADMILLI, MALLEGNI, FORNACIARI 1979, pp. 179-198), Grottone di Manaccora (MIELI, TRUCCO 1999, pp. 223-234), and Grotta Pacelli (STRICCOLI 1988). In Mediterranean Europe (listed from west to east), stone floors were found in the Spanish site of Cova d'en Pardo (SOLER DIAZ *et alii* 1999, pp. 111-117) and in the French caves of Abri du Camp des Armes 1 (PONS 1998), Grotte des Truels 2 (CURBÉZY, POUJOL 1996, pp. 52-54), Sanguinouse à La Roques-sur-Pernes (SAUZADE, DUDAY 1983, pp. 280-297), and Grotte Unang (GUILAINE *et alii* 1987).

ARCHAEOLOGICAL FINDS

Grotticella W2 is characterised by several archaeological materials, consisting of pottery, human bones, charred seeds, and faunal remains among the most abundant categories (Tab. II). The finest finds are represented by metal ornaments (i.e., a small ring, a bracelet, and several fragments of broken pins), glassy faïence (a biconical bead and a large conical button), six spindle whorls, a pierced marine-shell, a bone awl and two, possibly polished, faunal bones, several pebbles and lithic remains (few flint flakes, debris elements and a skittle-shaped pendant in soapy greystone) (Fig. 6).

Context group	Human bones		Macro-mammal remains		Pottery		Spindle whorls		Faïence		Bronze ornaments		Lithic industry		Bone and marine-shell artefacts	
	NF	%	NF	%	NF	%	NF	%	NF	%	NF	%	NF	%	NF	%
1	0	/	0	/	0	/	0	/	0	/	0	/	0	/	0	/
2	1	2.3	88	16.3	148	13.3	1	16,7	1	50	0	/	0	/	0	/
3	7	16.2	206	38.2	395	35.6	2	33,3	0	/	2	28,6	10	58.8	3	75
4	5	11.6	85	15.7	176	16	1	16,7	0	/	1	14,2	3	17.6	1	25
5	30	69.9	149	27.6	367	33	2	33,3	1	50	2	28,6	4	23.6	0	/
6	0	/	0	/	4	0.4	0	/	0	/	0	/	0	/	0	/
1a	0	/	12	2.2	19	1.7	0	/	0	/	2	28,6	0	/	0	/

Tab. II. Archaeological materials found in each CG. NF: number of finds per Context group; %: percentage of finds per Context Group on the total of Context Groups. Due to their extremely vast number, carpological remains' quantities are only estimated rather than precisely counted. The botanical finds are thus excluded from this table; it is implied that they are always present.

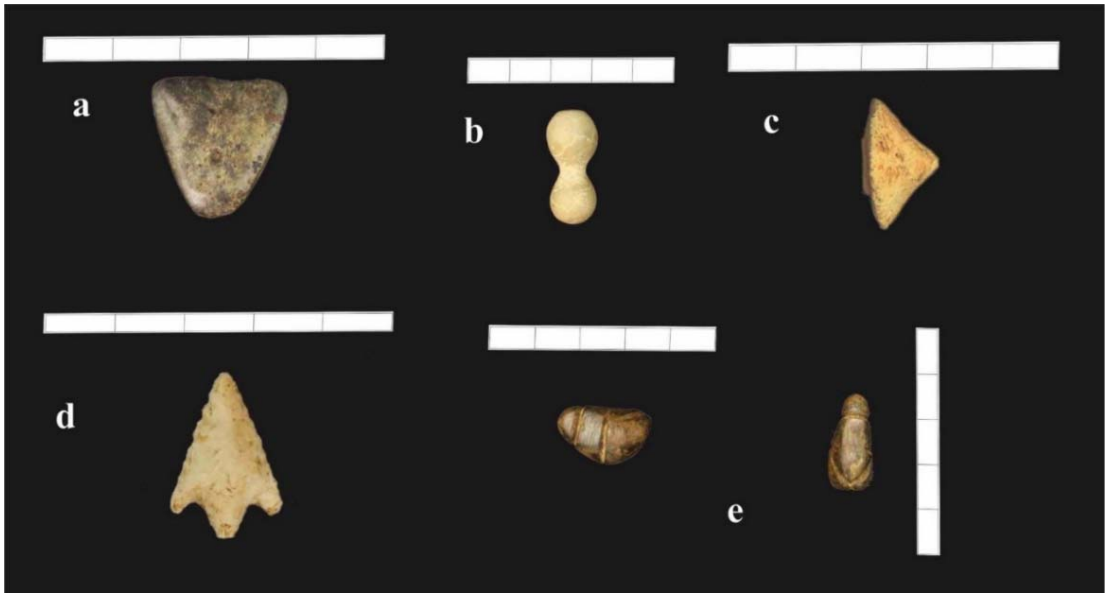

Fig. 6. Artefacts from areas outside of Grotticella W2. a: small-polished stone axe; b: pear-shaped stone artefact; c: biconical faïence button; d: flint arrowhead; e: incised steatite figurine.

Pottery. The pottery assemblage consists of 1,109 generic impasto fragments (Tab. II), including 330 potsherds that could be morphologically identified, mostly bowls and jars (Silvestri *et alii* 2019, pp. 87-112). Cups, jugs and two spouted forms have also been identified.
The study of the spatial distribution showed that pottery was widespread in each context, although with variable concentrations: the two sectors with the greatest number of vessels are the southeast (CGs 2, 3 and 5) and northeast (CGs 3 and 4). Pottery was placed outside and/or around the reddened areas and hearths, above the stone paving; in some cases, pottery was found in marginal areas as well. The only exception is represented by SU 31, a reddened area found within the *gour*, where potsherds and spindle whorls were found. It is significant to note that burnt potsherds are almost always absent.
Further significance can be given to the recovery of upside-down bowls. GW2 revealed three instances of such findings; one upside-down bowl was found leaning into a niche of the cave wall, while two other upside-down vessels had been placed into pits, one of them which was completely covered with stones. The literature review suggests that this was a common feature in Italian sites from the Neolithic period on. Several Italian caves contained similar findings (Grifoni Cremonesi 2006, pp. 221-230). Likewise, the Bronze Age sites (listed from northern to southern Italy) of Tanaccia di Brisighella (Farolfi 1976), Grotta dell'Orso di Sarteano (Cremonesi 1968, pp. 247-331; Cocchi Genick 1999, pp. 167-177), Grotta dei Piccioni (Radmilli, Mallegni, Fornaciari 1979, pp. 176-198), Grotta S. Angelo (Di Fraia, Cremonesi 1996), Grotta Nuova (Cocchi Genick 2002), Grotta Mora Cavorso (Silvestri *et alii* 2018), Grotta Vittorio Vecchi (Guidi, Rosini 2019), and Grotta di S. Bartolomeo (Atzeni 1962, pp. 184-189) all revealed the presence of at least one pit. Most of these pits also yielded upside-down vessels, found on the soil nearby or inside the pits themselves; the site of Grotta Nuova is particularly relevant to this study for the presence of overturned bowls which contained carpological remains as well.

Human remains. Fifty-three completely disarticulated human bones have been found in GW2. The bones are thought to belong to four individuals, each ascribed to different age classes: an approximately 6-month-old infant, a child of 6-8 years, an adolescent of 10-13 years and one adult. The human finds mostly consist of distal limb segments, such as phalanges, metacarpals, and metatarsals, except for a mandible, some teeth, and a few long bones, which were useful to estimate age at death and MNI. The great majority of the human finds (65%) belong to CG5 (Tab. II), from the southeast sector of the stone floor. Nineteen human bones were also discovered in a single area measuring 1 x 1 m, from different levels, but within the same context. Most of the finds (63%) were in marginal areas, while the remainder (37%) were spatially related to the anthropic activity areas.
Faunal and Botanical remains. Despite the small amount of faunal remains compared to the rest of the archaeological dataset (i.e., around 100 finds), it was possible to identify most of the meaty body parts from mainly young and young-adult domestic mammals. Bones showed evidence of several cutmarks and scorching, suggesting the preparation and consumption of meals inside GW2 (Angle *et alii* 2014, pp. 205-211; Silvestri *et alii* 2019, pp. 87-112).
The hundred thousands of seeds (mostly broad beans, and secondary cereals such as emmer-spelt, barley and wheat) were also fully burnt (Silvestri *et alii* 2019, with references), confirming the hypothesis of an *in-situ* combustion. Among all the archaeological finds, burnt seeds are the most abundant find and they are widespread in all the Protohistoric contexts (2-5) (Tab. II). The Grotticella revealed a further interesting find, which consisted of a compact lump (15 x 7 cm) of seeds and charcoal with a thickness of about 4 cm.
Burnt carpological remains have been found in large quantities in several cult and/or funerary Italian caves (listed from north to south) (Grifoni Cremonesi 2007, with references): Riparo Valtenesi (Barfield 2007), Antro della Noce (Calzoni 1962), Antro del Poggetto (Calzoni 1962), Grotta Bel Vedere di Cetona (Calzoni 1962), Grotta San Francesco (Calzoni 1962), Grotta dell'Orso di Sarteano (Cocchi Genick 1999, pp. 167-177), Grotta Poggio La Sassaiola (Metta 2014, pp. 101-128), Grotta dei Baffoni (Pacciarelli 1997), Grotta del Mezzogiorno (Pacciarelli 1997), Grotta del Prete (Pacciarelli 1997), Grotta di Frasassi (Pacciarelli 1997), Grotta dei Piccioni (Radmilli, Mallegni, Fornaciari 1979, pp. 176-198), Grotta Sant'Angelo (Di Fraia, Cremonesi 1996), Grotta Val de' Varri (Güller, Segre 1948, pp. 269-281), Grotta Misa (Tongiorgi 1950, pp. 804-806), Grotta Nuova (Cocchi Genick 2002), Grotta dello Sventatoio (Guidi 1991-92, pp. 427-437), Grotta Vittorio Vecchi (Guidi, Rosini 2019), Grotta di Monte Meana (Ucchesu *et alii* 2014, pp. 343-355), and Grotta di Latronico (Rellini 1916).

The abundance and concentration of charred seeds, however, finds no parallels with that found here in Grotta di Pastena, which was highly remarkable and thus cannot be specifically compared with the above-mentioned archaeological sites, which present a much smaller amount of plant remains. However, for Italian contexts, widespread seed findings were noted on the soil of the Grotta Nuova, Grotta Vittorio Vecchi, and Grotta di Monte Meana and as mentioned in the case-study of Pastena (Silvestri *et alii* 2019, pp. 87-112).
When looking at the differences between broad beans and cereals, furthermore, there are only a few sites which present higher amounts of these over cereals, such as found at Pastena: these are Grotta Val de' Varri, Grotta Vittorio Vecchi, and Grotta Nuova.

In the Mediterranean area, some of the most prominent sites (listed from western to eastern Europe) with burnt carpological remains are Can Sadurni (Antolìn, Buxò 2011, pp. 53-66) and Cova de l'Or (Hopf 1966, pp. 53-80) in Spain, Balme Gontran and Baume Layrou (Bouby, Fages, Treffor 2005, pp. 313-328) in France, and Aya Triada Cave in Greece (Mavridis, Tankosić 2016, pp. 207-242). All these archaeological sites, dating between the Neolithic and the Bronze Age, were characterised by burnt seeds, and especially cereals, that were placed into vessels.

Discussion

The systematic archaeological project of GW2's deposit, focused on one of the most promising and best-preserved sectors of the Grotta di Pastena. As of 2018, that deposit has now been almost completely investigated and five mains Protohistoric CGs have been identified. To contribute to a better understanding of the human uses of caves and their significance in the 2nd millennium BC we focused upon a contextual analysis of the available data with attention to deposit formation, stratigraphic intelligibility, and the reconstruction of human actions taking place here. This information was then integrated with results found from several other Italian and Mediterranean case-studies.
The radiocarbon dates (Tab. I) validate the chronotypological attribution of Middle Bronze Age to the archaeological deposit between CGs 2 and 5. Thanks to the radiocarbon investigation, CG1a has been identified as having the earliest use period out of the investigated areas. The date of CG4 slightly overlaps with that of CG2: we must point out that use of the cave occurred over a limited time period, and it is possible that layers and finds were inverted from a trampling effect. The human bone of CG5 is older, for instance, than those found in lower layers, and while this may be due to natural processes that disturbed the deposit, we cannot rule out intentional human practices having contributed to the formation of the deposit as well. Radiometric dating suggests that the cave was used in two distinct periods and purposes: the first presumably was a 'funerary' phase, while the second served more as a cult phase. The theory of a secondary deposition of human bones is to be almost certainly excluded, considering that the bones found in GW2 most likely represent existing initial primary burials, due to the massive presence of small distal limb segments, such as metacarpals, metatarsals and phalanges: the absence of larger and more suggestive bones could infer secondary practices which followed initial depositions. Furthermore, human bones were unburnt, indicating that they were not involved in rituals which followed and therefore may be chronologically older and stratigraphically separated from the subsequent cult practices, such as the burning of seed remains, or construction of features. The second cult phase spanned a limited time and is characterised by ritual performances only.
There were different concentrations of archaeological features and remains within the deposit. These complex and multiple deposit episodes reveal repeated anthropic activities, very often characterised by the same type of features (e.g., pits, hearths, and stone paving), leading to the hypothesis that the use of the cave and the performance of rituals all happened over a short time and that some phases could have been more intense than others. Human remains are mainly found in CG5, although the few human remains retrieved in CG2, CG3 and CG4 could constitute infiltrations from the upper CG5 or pre-existing burials; nonetheless, intentional placement of bones in these areas cannot be completely ruled out. Ceramic remains are found in CG2 to CG6 and lithic ones in CG3 to CG5, while bronze finds were recovered only in CG3 and CG5. Faunal remains are sporadically distributed in all four Protohistoric CGs, especially near the hearths, reddened areas, and stone floors. The massive presence of seeds indicates that they were the main object/subject of the ritual performances, while the sporadic fauna in the anthropic areas could represent the residue of ritual meals, all, however, symbolically connected with the human finds.

Several comparisons have been carried out between relevant archaeological features of GW2 and coeval sites, to place Grotta di Pastena in the Protohistoric panorama of ritual caves. The data obtained from the analysed literature highlight a close connection between upside-down bowls, burnt seeds and rituals, linked in turn with the afterlife or supernatural (Miari 1995, pp. 11-29; Grifoni Cremonesi 2015, pp. 1-14). The relationship between broad beans and the underworld is attested to across many ancient cultures from the Mediterranean to northern Europe. According to these traditions, broad beans were widely believed to contain the souls of the dead (Silvestri *et alii* 2019, pp. 87-112). This made them a taboo food in ancient Egypt, for the head of the Flamen priests in ancient Rome, and among the Greeks observing Pythagoras's practice (Beer 2010). Burkert (1962) relates the Pythagorean taboo to Orphism, which was linked in turn to the myth of Demetra. Because of their soul content, beans were also used among Greeks in political elections, as the wise minds of the ancestors would have guided the citizens towards a good decision (de Cleene, Lejeune 2004; Beer 2010). Moreover, archaic Roman rites included offering beans to the dead and to the gods of the Underworld; these seeds were also thrown to the ground by the *pater familias* during the *Lemuralia* and *Parentalia* festivals, to keep the evil spirits away on the days when the world of the living was accessible to the creatures of the Underworld. Finally, in the Slavic mythology legumes are associated with "Baba", a legendary creature which cooked broad beans and brought dead children with her (Virloget 2015, pp. 153-163). Considering the presence of broad beans in most of the Italian funerary caves, these obviously had a symbolic role for protohistoric cultures, and we may hypothesize that some similar held beliefs to those previously described traditions may have had roots long before this period (Silvestri *et alii* 2017, pp. 1-15).

Affinity with the above-mentioned historical traditions as well as the parallels found with coeval caves, reinforce the hypothesis of a cult vocation of GW2. The anthropic actions reconstructed indicate that rituals were performed in the cave, through the lighting of hearths, combustion of materials, the spreading of seeds and charcoal, and the placement of the stone floors, which represented the arrangement phase of the ritual and its subsequent development. The presence of upside-down vessels inside the pits, and the anthropic pits themselves, often without any filling, could have been related to rituals of the afterlife, probably linked with the seasonal agricultural cycle (WHITTLE 2010). The connection with the life-death cycle in Grotta di Pastena is corroborated by the massive presence of broad beans associated with few, but significant, human bones, which in turn confirms an affinity with other European traditions (DE CLEENE, LEJEUNE 2004). In sum, all the archaeological materials and features identified at Grotta di Pastena (especially seeds, upside-down bowls, hearths, and human bones) concur with its interpretation as a ritual site.

CONCLUDING REMARKS

Grotticella W2 is a fascinating cult place which dates to the Middle Bronze Age. The radiocarbon dates confirm the deposit was a mono-phasic one and corroborates the hypothesis that at all activities occurred here over a relatively short period (Tab. I).

This paper has sought to demonstrate how an integration between stratigraphic analyses, radiocarbon dating, and studies on archaeological materials can allow for an improved reconstruction of the occupation dynamics which occurred at a given site, exhibited through the investigation of GW2. On one hand, the study of the stratigraphy and archaeological finds lead to the identification of, with reasonable accuracy, the human actions linked to the reiterated rituals. These actions had a symbolic purpose which was certainly meant to invoke the life-death cycle, which in turn was connected to the seasonal cycles, revealed by the presence of burnt broad beans. On the other hand, radiometric analyses allowed us to identify the overall duration of the reiterated ritual practices identified in GW2; this was but a short two centuries. The stratigraphic studies enabled us to also understand the characteristics of the funerary deposition better, which, based upon the dated human bone, seems to have occurred earlier than the other anthropic activities identified in GW2. The scattered human remains, then, are thought to belong to the pre-existing burial deposits, that were disturbed by the subsequent rituals.

Stone paving, among the most peculiar structures identified, might have been constructed as a stage on which rituals were performed. While some hypotheses see the use of stone floors as a place for the treatment of the dead, as described in French caves (BEYNEIX 2003), the data do not corroborate this idea here, although it remains a fascinating possibility. The limited presence of human bones and the radiocarbon dates suggest an initial funerary phase, followed by rituals that sometime later disrupted the burials. The area is also characterised by an abundance of artefacts, and while some of these may be commonly considered as 'grave goods' or personal ornaments, these seem to have no physical relation with the actual human remains. The former was recovered mainly on the northeast-northwest sectors, while the latter were found in the southeast-southwest areas. Therefore, the described scenario alludes to two main hypotheses: a) the distance between personal ornaments and human bones could indicate a post-burial displacement, or b) the personal ornaments could instead be exclusively ritual depositions.

Overall, the Grotta di Pastena is a multi-faceted ritual and burial site that offered the opportunity to expand on the classic definition of cult and funerary cave, moving forward to better clarify the relation between these two aspects through the study of stratigraphy and the integration of multiple interpretive tools. While this study adds to the existing knowledge of central Italian Protohistory, such a methodological approach could be successfully applied to a wide range of archaeological cave sites of different periods and geographical areas, and thus help to improve the often-oversimplified interpretations of such fascinating archaeological sites.

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