17
2013

ARCHEOLOGIA POSTMEDIEVALE

SOCIETÀ AMBIENTE PRODUZIONE

17

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Environmental
resources archaeology
in the Mediterranean
mountains

a cura di Anna Maria Stagno

2013

All'Insegna del Giglio

ARCHEOLOGIA POSTMEDIEVALE

Archaeology and Archaeobotany for the history of the *Costa dei Ghiffi* slopes

Anna Maria Stagno, Claudia Parola*, Carlo Montanari**

1. Introduction

This chapter presents the results of archaeological and complementary archaeobotanical investigations carried out at the *Costa dei Ghiffi* in order to reconstruct the history of the M1 monolith and, more generally, the history of the slope where it was discovered (see Stagno 2014, in this section of the volume). The archaeological investigations concerned the identification of archaeological evidence derived from the archaeological surveys, the analysis of two exposed sections (§ 2), and the archaeological excavation of a suspected quarry site on a sandstone outcrop (UT 4) that geomorphological investigations identified as most similar to the monolith sandstone (§ 3). The archaeobotanical analysis included palynological analysis of soil samples from one of the exposed sections (UT2SI) and anthracological analysis of charcoal fragments sampled during archaeological surveys and excavations (§ 4). Though archaeobotanical analyses were carried out on archaeological evidence, in turn archaeological investigations were based on archaeobotanical information and radiocarbon dating of identified charcoal fragments. Interpretations concerning the history of the slope and of the depositional and post-depositional processes that affected the M1 monolith were based on all of the data that were collected and interpreted. The final section of this chapter addresses the hypothesis derived from investigations concerning the reconstruction of depositional and post-depositional processes that involved the monolith and the verification of the use of the bank of sandstone UT 4 as a quarry for stone blocks during the late-antiquity period. However, at this stage in the investigations, it is not possible to definitively connect this period of the use of the quarry to the monolith, and therefore the chronology of this remains uncertain to an extent.

A.M.S., C.P., C.M.

* Laboratorio di Archeologia e Storia Ambientale (DAFIST-DISTAV), Università degli Studi di Genova.

2. Archaeological surveys: from a monolith to a quarry site

The information from the builder of the forest road confirmed that the provenience of the stones used in the roadbed was exclusively from a trench dug along it, near to the discovery site of the M1 monolith (UT 1)[1]. Thanks to this information, it was possible to plan archaeological surveys in a relatively restricted area between the discovery site of monolith and the main ridge[2].

The archaeological surveys concerned an area of 18000 m². Investigations were carried out with non-systematic methods, with an intensive survey (equidistance between field walkers of 1 meter) in an area of 6000 m² along the slope above the discovery site, and with extensive survey (equidistance of 5 m) in the rest of the area (*fig.* 1)[3].

Surveys identified twelve Topographic Units (called UT in the shorter form), referring to evidence of past uses of the area, as quarries (UT 4 and UT 8) and charcoal burning sites (UT 3 and UT 7), and to two exposed sections analysed for their informative potential on the slope dynamics (UT2SI, UT-3SII). Only evidence used for the understanding of the context of the primary deposition of the M1

[1] See Stagno 2014a, footnote 26.

[2] Archaeological surveys were realized by Silvia Fazzi, Anna Gattiglia, Maurizio Rossi and Anna Maria Stagno.

[3] Archaeological research on mountain areas has now reached maturity at an European level, both from a theoretically point of view (see Stagno 2014a, footnote 2) and methodologically, particularly due to increasingly strict comparisons between environmental archaeology and the traditional practice of archaeological survey: for an application see Rendu 2003; Le Couédic 2010; for the importance of defining a precise methodology for surveys in mountain areas see Van Leusen, Pizziolo, Sarti 2011; Tzortzis, Delestre 2010; for works concerning landscape archaeology in the so-called 'areas of poor visibility', highlighting the need to take into account also aspects traditionally considered obstacles for the investigations (including vegetation) and to not separate historical ecology surveys from archaeological ones, see Giovannetti 2004; Stagno 2014b (chapter 3). This approach, previously less developed in Italy, is currently being explored more frequently: see Stagno 2009a and Moscatelli 2011 for an overview. See also Moreno, Rackham, Piussi 1982 and Moreno 1986 for examples of where the archaeology of woodland is proposed even in the absence of archaeologists.

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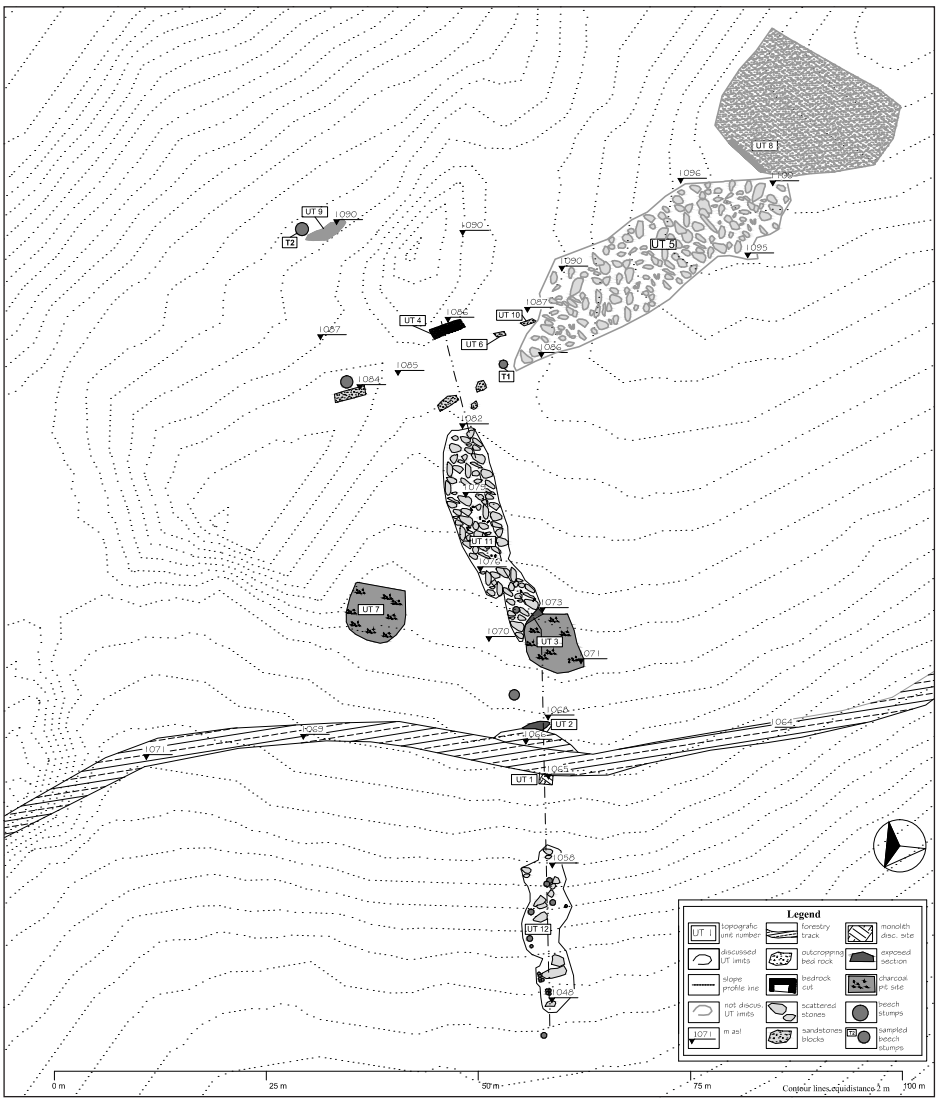

fig. 1 – Location map of the identified Topographic Units at Costa dei Ghiffi *(source CTR 1:5000, interpolated Gps bearing).*

UT	Definition	m a.s.l.	Length	width	height	Sect.
1	Carved monolith found in the forestry roadbed	1066				
2	Open space in the forestry road, presenting an exposed section (UT2SI), in front of UT 1	1065			2,2	1
3	Flat open space, above UT 2, rich of charcoal fragments on the surface, of semicircular shape, with the long side perpendicular to the slope (WSW-ENE)	1071	8 (NE-SW)	5	1,5	2
4	Outcrop of sandstone with a quarry scar, nearby the ridge	1087	1,5 (NS)	0,8	0,5	Sett. 400
5	Sandstone stones dispersed north of UT 8	E 1099-W 1085	40 (NS)	10		
6	Sandstone block of metric dimension, nearby the ridge located SW of UT 4	1087				
7	Flat open space, above UT 2, rich of charcoal fragments on the surface, of semicircular shape, with the long side perpendicular to the slope (WSW-ENE), located NW of UT 3	1071	10 (NE-SO)	6	0,60	
8	Trench oriented EW in the bedrock located south of UT 4	1100	5 (NS)		1	
9	Hypothetical rock shelter	1090				
10	Sandstone block of metric dimension, nearby the ridge located SW of UT 6	1087				
11	Dispersion of stones (mainly sandstones) of variable dimension, with a conoid shape and outcropping from the slope between UT 4 and UT 2	SE 1087 NW 1071	26 (NW-SE)	7		
12	Scattered sandstones along the slope below UT 1	S 1058-N 1048	30	2		

tab. 1 – List of the Topographic Units (UT) identified during archaeological surveys carried out at Costa dei Ghiffi *(July 2009). UT discussed in this chapter are highlighted in grey colour.*

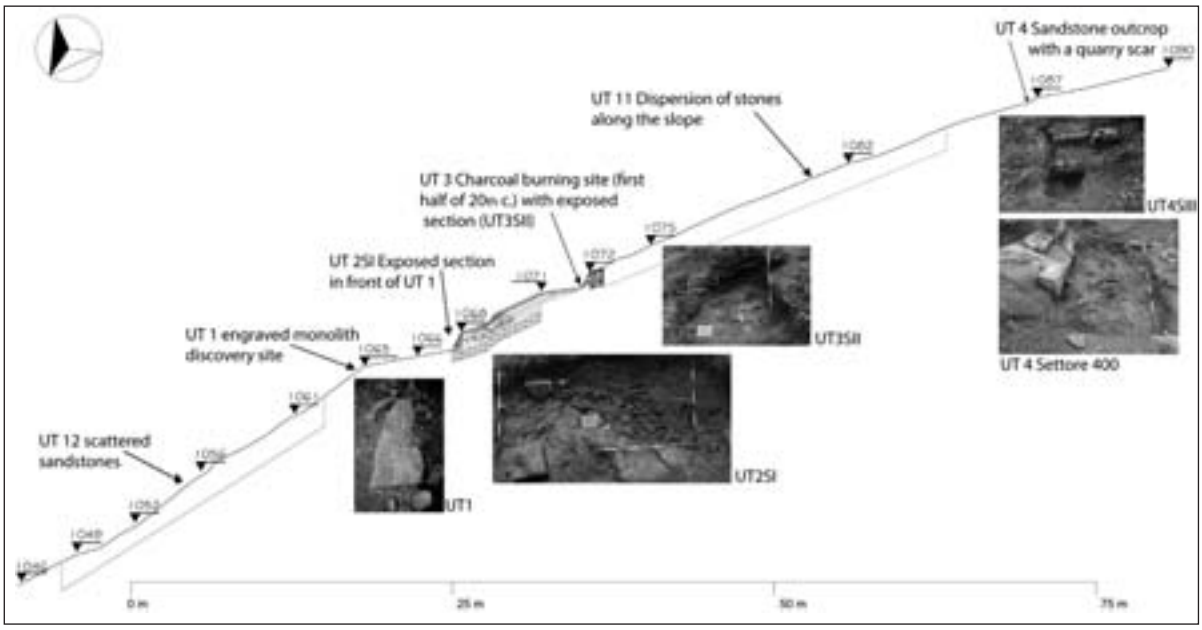

fig. 2 – Costa dei Ghiffi. *LASA Archaeological surveys (2009-2011). Slope profile with archaeological topographic units.*

monolith and its post-depositional processes will be discussed in this paper (*tab.* 1, *fig.* 2)[4].
First of all, it is important to note that the state of conservation of the monolith confirms that for a long period of time it was not exposed to weathering, and has not undergone any particular damage whilst having rolled along the slope[5].
The topographic units presented in this chapter are:
a) the exposed section (UT2SI) along the forestry road just next to the point of discovery of the monolith M1;
b) another exposed section (UT3SII) derived from the trench of the charcoal burning site and located 5 m above the UT2SI exposed section;
c) a dispersion of sandstones (UT 11) with particular characteristics;
d) a probable quarry site (UT 4) identified near to the top of the slope.

All of this evidence is concentrated in an area that is a maximum of seven metres above the discovery site of M1. They occupy the portion of the slope between UT 4 – located on the ridge – and UT 2. Below the monolith discovery site, several stones were scattered, even if with less density, along the slope (UT 12). It is interesting to note that the presence of scattered sandstone was documented only in this part of the slope.
The analysis of the stratification of the exposed sections (UT2SI, UT3SII) gave two similar archaeological sequences that allowed the reconstruction of the depositional and post-depositional processes of the slope's history[6].
The stratigraphic sequence of UT2SI (*fig.* 3) documented a series of layers, top-down constituted by:
– the forest soil that altered the topmost layers of colluvium (US 101, US 102);
– a thick layer with many charcoal fragments (US 103) related to the phase of charcoal production in the early decades of the twentieth century (Cevasco, Parola 2014);
– a thick layer of colluvium (US 104);

[4] Evidence related to charcoal production has been discussed in Cevasco, Parola 2014, in this section, owing to their being strictly connected to the past management of the area and to dendro-ecological analysis. The discussion of all the identified Topographic Units is presented in Stagno 2009b.

[5] An oxide coating on the engraved face of the monolith was affected by the incisions and therefore it could be considered as a peculiar characteristic of the monolith and not connected to its post-functional permanence in the soil (Rossi, Gattiglia 2011, p. 4; Rossi, Gattiglia 2014, in this section). The engraved face shows no traces of chemical and physical alteration that can be connected to the proximity of humus or to root activity. It is therefore possible to assume that the monolith was buried with the engraved face facing downwards (*ibid.*, p. 9).

[6] Concerning the interpretation of formative processes during archaeological investigations see Leonardi 1992 and Schiffer 1987. In particular, for the study of mountain slopes see the ever basic Mannoni 1970 and Walsh, Mocci, Palet-Martinez 2007. For an interesting context characterized by primary and secondary deposition and their interpretation see Quirós Castillo 2012. About erosion modelling for archaeological purposes see Feiken *et al.* 2011.

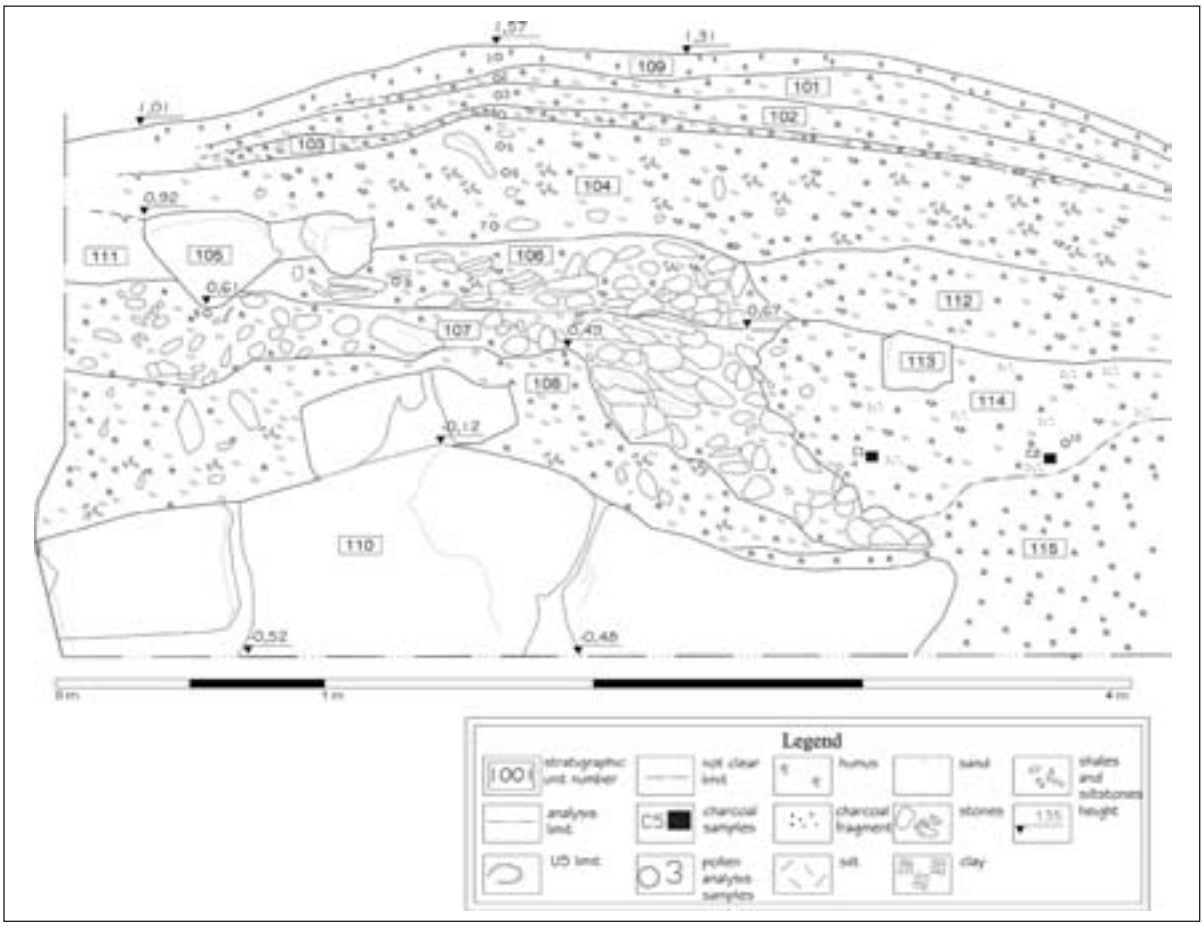

fig. 3 – Sketch of the exposed section (UT2SI) along the forestry road just next to the point of discovery of the monolith M1. Drawing of S. Fazzi & A. M. Stagno (year 2009, original scale 1:20).

– a layer with big and medium size (sub-metric) stones (US 105), some of which with the characteristics of the monolith;
– two layers of decimetric clayey schists and siltstones (US 106, US 107);
– a series of layers of colluvium mixed with the weathering of the clayey bedrock (US 108, US 114, US 115) where vitrified charcoal fragments were found[7];
– the bedrock (US 110).

As highlighted by this short description, only US 105 and US 106-US 107 were rich in stones. In particular, it is important to note that US 105 was characterized by large blocks similar to the sandstone of the monolith M1 medium-coarse greenish gray sandstone (the carved side is coarse-grained with a bedding plane bearing a limonitic reddish patina of ancient oxidation, Rossi, Gattiglia 2014, in this section). This element is particularly relevant in seeking to establish the provenience of the monolith. As previously mentioned, the builders of the forest road stated that the stones for the road side were only taken from the area of UT 2, and thanks to the analysis of the section we can suppose that the monolith could have been part of US 105, as were other similar sandstone blocks. The analysis of the exposed section (UT3SII) of the charcoal-burning site (*fig.* 4) provides further information concerning the hypothetical provenience of the monolith and of the slope formation processes. The sequence documented in this second section is comparable with that of UT2SI (see *fig.* 5 for the comparison of the two sections). It is important to stress that in the second section we can also see the presence of big and medium size stones concentrated in a single layer (US 206) covering another one of clayey-schists and siltstones (US 208).

[7] See Montanari in § 4 for anthracological analysis.

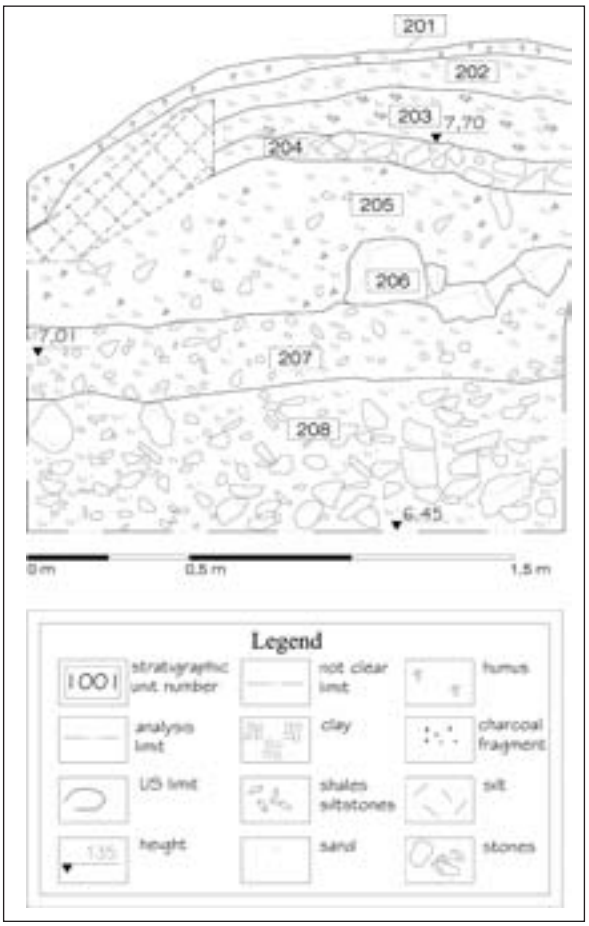

fig. 4 – Sketch of the exposed section (UT 3SII) of the charcoal burning site. Drawing of S. Fazzi & A.M. Stagno (year 2009, original scale 1:20).

These two sections were located on the northern limit of a dispersion of scattered stones (UT 11), visible from the ridge along the slope in the area below the outcrop UT 4. The dispersion UT 11 appears as a scrap aisle consisting of sandstone stones of irregular shapes and sub-metric sizes, partially emerging from the ground. Fragments of sandstone lithologically similar to the sandstone of the M1 monolith were only found within UT 11[8]. The shape of UT 11, its topographical position and the absence of similar evidence outside of this area lead us to hypothesize that UT 11 constitutes the deposit of materials removed from erosion along the ridge (similarly to US 105 and US 206).
Based on this evidence, we can argue that the stones documented in the two sections could be related to this dispersion and they are evidence of the same process of erosion from the ridge[9]. Therefore, it is possible to affirm that M1 participated in the erosion process of the ridge that resulted in the formation of the layers US 105 and US 206, and – as with other sandstones with similar characteristics – in its primary position, it was located at the top of the ridge, near UT 4.
The stones dispersion UT 11 originates from the ridge, where evidence of quarry action was identified: the sandstone outcrop UT 4 presents a quarry scar. This rocky outcrop (visible for an area of 1,5×0,8) has been affected by a rectangular cut (0,85×0,45×0,25 cm, *fig.* 6), that suggested the presence of a single quarry action. The outcrop was not totally visible (since it is covered by sediments and soil), and the exposed surface did not show other signs of quarry activity.
The archaeological observations showed that the lithological characteristics of outcrop UT 4 are extremely similar to those of the monolith (coarse greenish sandstone, with an oxide coating on the surface)[10]. As described by A. Cevasco (Cevasco 2014) this hypothesis was confirmed by geomorphological and geological analyses. The results from the rebound tests not only showed the general compatibility between the characteristics of discontinuities detected in the studied area and those found on the carved monolith, but also a particular compatibility between the engraved monolith and the outcrop of sandstone called UT 4. In order to verify the presence of evidence connected to quarry activity, a small shovel test was carried out at the base of the sandstone outcrop (UT4S.III).
A large step (30 cm high), set on a natural orthogonal discontinuity of the bedrock, was exposed by the shovel test. In doing so, a stratigraphic sequence was shown, that top-down was constituted of a layer of *humus* (US 301), an organic brown silt (US 302), and a sandy-gravelly yellow-reddish silt with sub-decimetric skeleton of grey, yellowish and greenish sandstone similar to the sandstone of M1 (US 303). Sub-centimetric charcoal fragments were sampled in US 303[11], one of which charcoal was identified as *Abies* and dated to 430±110 cal.

[8] Rossi, Gattiglia 2011, p. 7.

[9] In mountain contexts characterized by steep slopes and severe erosion, similar evidences of stone materials still visible on the surface, though very old, have been documented in pre-protohistoric landfills, as in the prehistoric mines of Monte Loreto, Sestri L. (GE) (Benente *et al.* 2008; Campana, Maggi, Pearce 1998).

[10] The outcropping portion of this bench looks to be tilted to the west of about 38° and stepped. At the time of the investigations, it showed backs of bank with a width from 25 to 45 cm, high front steps from 15 to 30 cm, with an angle of approximately -63 ° (Rossi, Gattiglia 2011, p. 9).

[11] Rossi, Gattiglia 2011, p. 7.

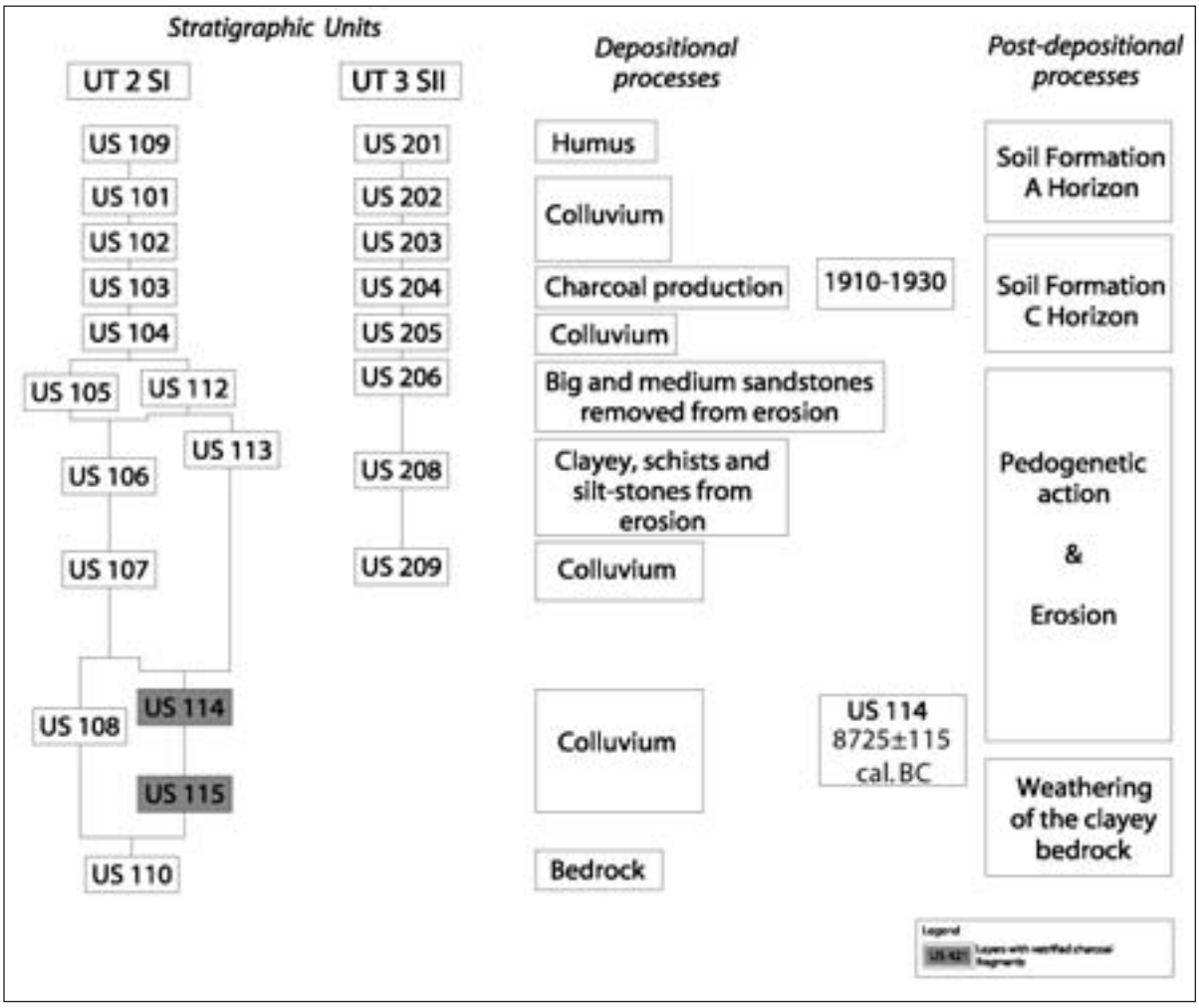

fig. 5 – Harris matrix and layers comparison between forestry road section (UT2SI) and charcoal burning site section (UT3SII). Depositional and post-depositional processes are indicated.

fig. 6 – Quarry scar UT 4 nearby the ridge of Costa dei Ghiffi.

AD[12]. Below this layer, a clay layer was exposed (US 304), characterized by the thermo-transformation of its surface and a large amount of charcoal. Even if it has not been excavated, it was clear that US 304 was evidence of a fireplace. Given the absence of traces of thermo-transformation in US 303, it is possible to hypothesize that those fragments of charcoal originated from US 304 and have been incorporated into US 303 as a result of natural sedimentation. In order to understand the relationship between the fireplace, the possible presence of quarry activities and the M1 monolith, an archaeological excavation was conducted at the base of the outcrop.

3. Archaeological excavation of a hypothetical quarry site

As it is generally known, before the introduction of explosives, quarries were located where best layers appeared on the ground surface, and where the thin roofing material could be easily removed. The extraction was carried out through maximum exploitation of natural discontinuities of the bedrock. Various methods for extracting rock blocks are historically documented, that imply both mechanical cuts and chemical dissociation, which also involved the use of fire[13].

Since we decided to excavate the hypothetical quarry area, in 2011, a stratigraphic test was carried out at the base of the outcrop UT 4. The sample was called 'Settore 400' and was 3,5×2 m wide, the outcrop was called US 401 and the quarry scar US -403.

The purpose of the excavation was to verify the consistency of the quarry and to acquire information so as to understand how it was used, the period of its abandonment and its chronology. The investigation is not yet complete. The investigated sequence reaches up to 160±100 cal. AD, referring to the oldest fireplace (*fig.* 7 cumulative section and *fig.* 10 Matrix of *Settore 400*).

Below the humus (US 401) a colluvial deposit interested by the pedogenesis of the present forest soil was identified (US 404, horizon A of the soil). This colluvium lies upon a sheet of sandy-silt sediment, rich of centimetric fragments of beech charcoal (US 416), whose deposition could be related to charcoal production in this area (1900-1930), yet documented during surveys and dendroecological analysis (Cevasco, Parola 2014, in this volume). This layer covers a thick layer of colluvium (US 406) constituted of silty and sandy sediments rich in sub-millimetric charcoal fragments that document the apparent abandonment of the area. In fact, the abandonment is referred to the quarry activity, but not to the agro-sylvi pastoral activities: pollen analysis of this layer could eventually identify some evidence of wooded pastures. The presence of charcoal dust could implicate the use of controlled fire for the management of wooded pastures (*ibid.* and § 4.1). This colluvium is now part of the present woodland soil, corresponding to its C horizon.

Below this layer, clear evidence of the frequentation of the area was shown and documented in the palaeosurface US 408 that highlights various completely exposed layers and forming a relatively flat and smooth surface, almost certainly as a result of trampling. The most important indicator of this situation was the fireplace already identified in the shovel test, which was documented as US 413-415 = US 303-US 304). This fireplace was located in exact correspondence with the discontinuity in the rock where the scar (US -403) was dug. Thanks to charcoal sampled in US 303 (= US 413), it was dated to 430±110 cal. AD[14].

Under this palaeosurface, the layers were characterized by shales and siltstones with a flat disposition and more or less weathered (US 409, US 410, US 418), mixed with silt-sandy sediments with clay fractions (US 411, US 412). These layers have been interpreted as evidence of the alternation

[12] LTL5401A: Radiocarbon Age (BP) 1653 ± 45; δ^{13} C (‰) -27.0 ± 0.4 (Cedad, Università del Salento). See § 4 for a discussion.

[13] All these methods are classifiable as 'bench methods', the worldwide preferred system up to the present, that leaves its mark at the site as a series of steps (Ward-Perkins 1972; Forbes 1963). «In order to remove blocks in antiquity usually three mechanical cuts were made in two planes, at both ends and at the rear. The bottom attachment area was then separated by drilling holes at intervals, inserting wooden wedges and either driving them with hammers or soaking them with water so that they swelled and broke the block loose. An alternative method was to cut the block completely loose on all sides without resorting to wedge» (Kopper, Rossello-Bordoy 1974, p. 168). In particular, concerning fire setting, Kopper and Rossello-Bordoy wrote (even if for a limestone quarry, but the same method is employed also for sandstone quarries): «The mechanical dissociation involved the use of fire to chemically detach lapies blocks from bedrock […]. Fire might be employed 1) to chemically decompose the limestone along the attachment area or 2) to expand the stone in the same area after which it was doused with water to contract the stone, thereby setting up a mechanical stress that fractured the block at its junction with the bedrock (*ibid.*, pp. 163-165).

[14] See footnote 12.

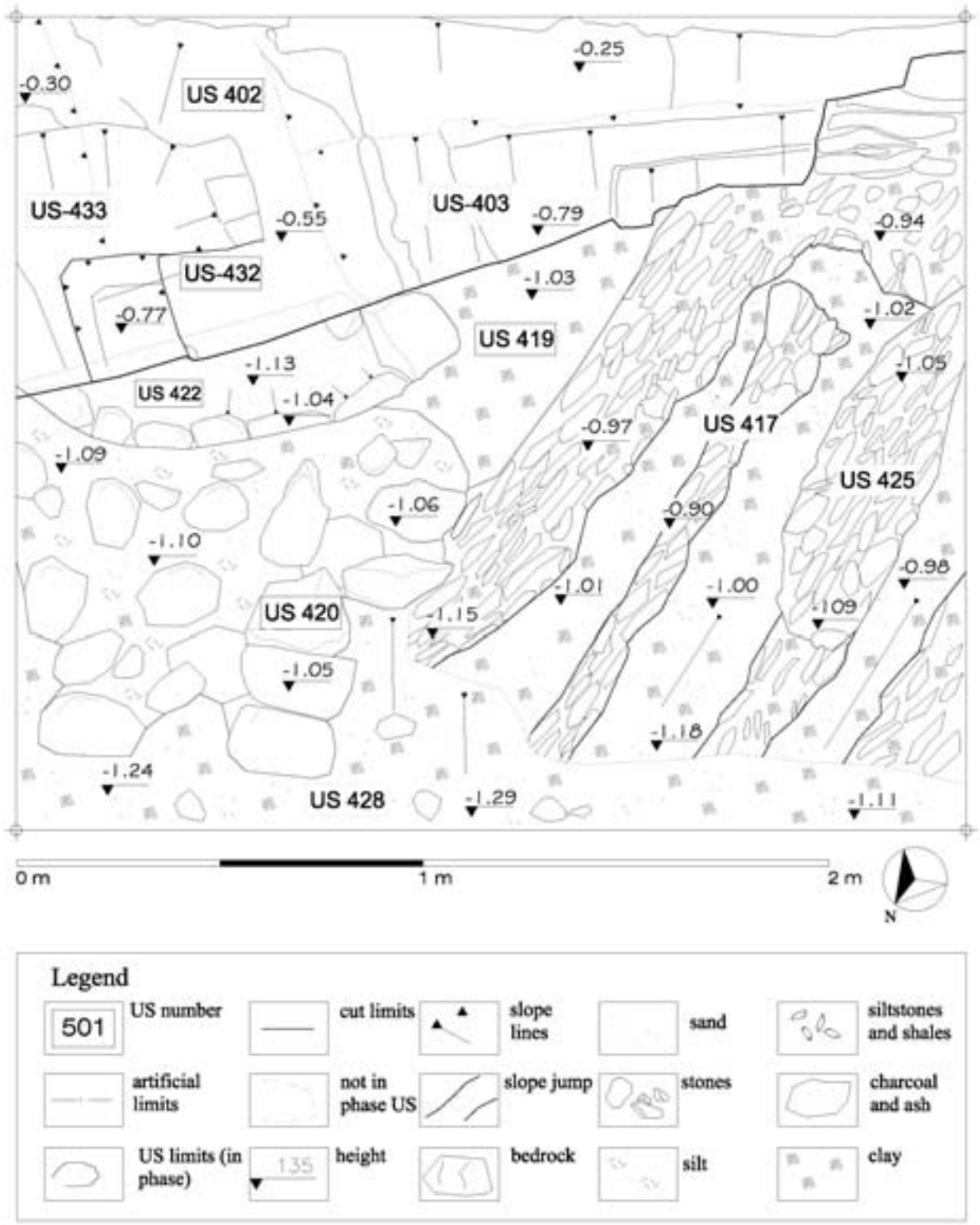

fig. 7 – Plan of the Costa dei Ghiffi *excavated area (Settore 400), with the horizon connected to the quarry scar US -432. Drawing of S. Fazzi & A.M. Stagno (year 2011, original scale 1:20).*

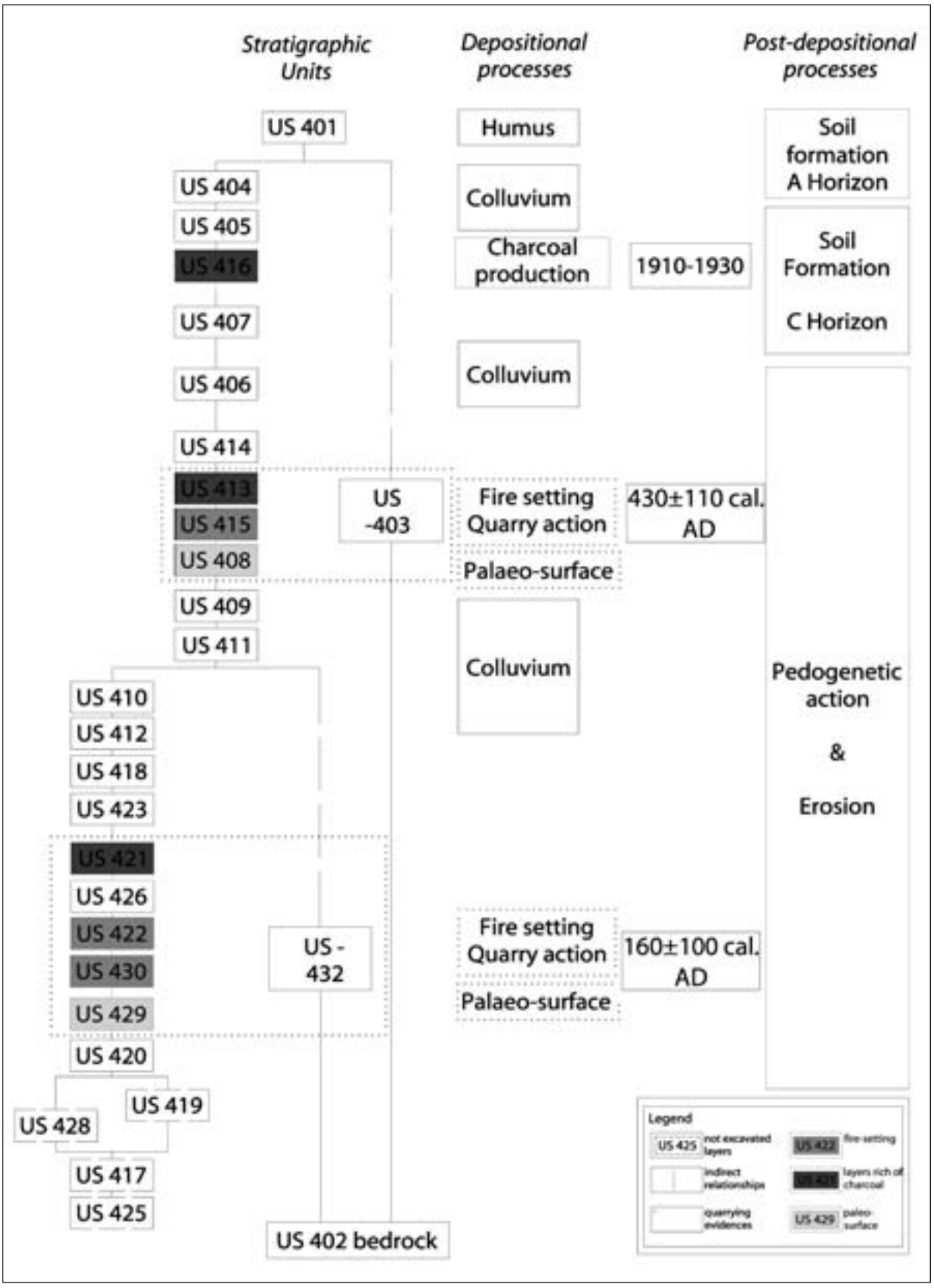

fig. 8 – Harris matrix of the Settore 400. Depositional and post-depositional processes are indicated.

between natural sedimentation and the erosion of the underlying layer of stones.
Under these layers, another surely frequented palaeosurface was documented, named US 429. Similar to US 408, the palaeosurface US 429 is a relatively smooth surface slightly sloping towards NW. A second fireplace (US 426, US 422) was documented on this palaeosurface. This fireplace is well defined by a circle of stones, and was dated 60±260 AD[15] thanks to charcoal fragments[16]. Also in this case, the fireplace was located exactly on the basis of the quarry scar US -432 (*fig.* 7), one metre N of US -403. Even if, in both the two cases, the quarry scar has not a physical stratigraphic relationship with the fire-setting, the same situation observed in two different cases led to observations concerning the connection between the quarry actions and the fireplaces[17]. The quarry scar US -432 seems to cut another rock cut, not completely exposed (US -433).
The layers under the palaeosurface US 429 were not excavated, and investigations have since stopped. They appear as a series of layers of sandstones and clayey schists and siltstones of big and medium size, laying flat (US 417, 418, 425), that, at present, it is not possible to interpret precisely. However, they could be interpreted as the results of digging, but also as natural fragmentation.

A.M.S.

4. Archaeobotanical Analysis for the Environmental History of the *Costa Ghiffi*

Studies carried out in the area where the engraved monolith was found at the *Costa Ghiffi* included archaeobotanical analyses, in order to provide additional information concerning the context and possible chronological parameters of the find. Plant remains obtained from stratigraphic tests were examined in order to determine the environmental history of the slope and to look for traces of practices linked to the production of the artefact. For this purpose, the following exploratory investigations were carried out:
– palynological analysis of soil from the Section 1 of the UT2 (§ 4.1).
– anthracological analysis of charcoal from the excavation of section I of UT2 and section I of UT4 (§ 4.2).
– preliminary analysis of charcoal from UT3 and anthracological analysis of the remains of charcoal burning site UT7. These analyses are discussed by C. Parola (Cevasco, Parola 2014 in this volume) since they are strictly connected to the results of dendroecological analysis concerning the beech-wood management.

C.M., C.P.

4.1 *Palynological analysis of soil from the Section 1 of the UT2*

Sampling for pollen analysis was carried out along the section I of UT2 down to 80 cm from the surface, even if pollen assemblages useful for environmental considerations have been found only at 20 cm depth (Parola 2012), that corresponds to stratigraphic units between US 109 and US 103 (see *fig.* 3). In this sub-recent period, the pollen assemblage shows the structure of modern woodland (*Quercus* deciduous, *Fagus*, *Alnus*, *Corylus, Carpinus*, *Ostrya, Fraxinus, Pinus and Abies*), but also grasslands (herb pollen c. 20%: *Graminaceae*, *Plantago* and *Ranunculaceae* prevail, with a few *Chenopodiaceae*, *Caryophyllaceae*, *Chichorioideae*, *Asteroideae*, *Apiaceae*, *Rosaceae* and *Saxifraga*). The micro-charcoal analysis shows a constant presence of charcoal dust, with higher amounts for the 125-250 μm dimensional class in IV (20 cm deep) that corresponds to UT 103. This is in agreement with the pollen data and could correspond both to the use of controlled fire for the activation of wooded pasture (1880-1935)[18] and to the charcoal production documented by the presence of two charcoal burning sites in this slope and by the archaeological analysis of the exposed sections (Parola, in Cevasco, Parola in this section)[19]. The presence

[15] LTL12572A: Radiocarbon Age (BP) 1850 ± 45; δ^{13} C (‰) -19.7±0.4 (Cedad, Università del Salento). See § 4 for a discussion.

[16] It is interesting to note a difference between the two sources of evidence for fire: in the older, there was only *Abies* (silver fir) charcoal, while in the second one there was also *Fagus* (beech) charcoal. In this part of Ligurian Apennines, the silver fir completely disappeared during the Middle Ages and was substituted by beech (§ 4.2.3).

[17] On the possibility to connect archaeological evidences on the base of circumstantial evidences, and even if in absence of surely stratigraphic relationships see Quirós Castillo 2012, pp. 64-66.

[18] I.e. the presence of open vegetation that would allow the incoming of airborne carbon particles from neighbouring areas (Parola. 2012).

[19] The analysis of the two exposed sections showed the presence of a number of charcoal fragments of large dimensions in the more recent colluvial deposit that could be related to washing away of charcoal during the phases of dismantling of the charcoal-pit, after cooking (§ 2 and Cevasco, Parola 2014, in this volume).

Charcoal	US 406	US 409	US 414	US 413 = 303	US 415 = 304	US 411	US 412	US 418	US 423	US 421	US 422	US 419	total
Abies	15	1	9	11	27	1	3	19	3	18	10	4	121
Fagus	10			32	1			1					44
Indet. (vetrif. p.m.p.)			2		2								4
Tot.													169
Datation				320-540 AD							60-260 AD		

tab. 2 – Costa dei Ghiffi. *Charcoal fragments analysed from Settore 400 (excavation, 2011, July). The order of the layer number in this table corresponds to their position in the stratigraphic sequence.*

of micro-charcoal of the class size > 250µm in the uppermost layers (I, II and III) can be explained by the run-off from charcoal burning sites after their abandonment.

C.P.

4.2 *Anthracological analysis*

The anthracological analysis was carried out on charcoal fragments sampled during the analysis of the exposed section UT 2SI and the excavation of UT 4 (shovel test UT4SIII and Settore 400).
In UT 2SI, two samples were collected in a thick layer located in the lower part of the section (US 114), that was characterized by different concentration of charcoal fragments (C1 and C2) and was interpreted as a layer of colluvium mixed with the weathering of the clayey bedrock.
Concerning UT 4, the charcoal fragments analysed derived from the shovel test (UT4SIII, US 303= US 413) and from different layers documented during the excavation of Settore 400 (*tab*. 2). Charcoal fragments from the shovel test are described, while others were only identified.
As mentioned above, the layer US 303 incorporated the fragments of charcoal from the underlying fireplace (US 304=U 415), and it documents the most recent fire setting connected to quarry actions (§ 2).

4.2.1 Charcoal fragments from UT 2 S.I, US 114

A few, small fragments of macroscopic charcoal with different anatomical features were collected:
– *Sample C1.* A fragment of approximately 0.5 cm³: the features of the cross section, only partially visible, and the tangential longitudinal section show anatomical structure attributable to broom, cf. *Cytisus scoparius*. This fragment was dated (AMS) 8725±115 cal. BC[20]. This species is presently common in the hill and mountainous glades and in post-cultural stages of re-colonization by light demanding shrubs. Therefore it can be considered as an evidence of open woodland during the Mesolithic.
– *Sample C2.* Some other small, extensively glazed fragments have characteristics similar to the sample C1 and were therefore attributed to broom bush. The anatomical characteristics of a small piece of Gymnosperm charcoal were more similar to *Juniperus* (juniper) than *Abies* (fir).

4.2.2 Charcoal fragments from UT 4 SIII US 303 (= US 413)

During the excavations of the shovel test (UT4SIII) conducted in 2009, 15 small fragments of Gymnosperm charcoal were sampled in US 303. Some of these charcoals were vitrified (*fig*. 9) but most of them showed anatomical characteristics that corresponded in part to *Juniperus* and in part to *Abies* (the anatomical features of the two species are rather similar) (*fig*. 10). Whilst the possibility could not be excluded that both species were present, it is more likely it have been *Abies*, since it has been found elsewhere that the young branches of silver fir have anatomical characteristics very similar to that of Juniper. This has been confirmed also by subsequent analyses carried out on larger size fragments from UT4, which were identified as silver fir. In particular, a fragment of charred wood measuring approximately 1.5 cm³ was analysed. Even if the vitrification process has almost completely changed the anatomical structure, creating the typically highly reflective features, the anatomical structure of this wood was preserved in a small part of the sample. Therefore, was possible to assign the sample to gymnosperm wood apparently devoid of resin ducts. Other anatomical characteristics (the rays height and the cross field pitting characteristics) correspond to those of *Abies* (fir). However, due to the lack of good visibility of the cross fields (see also below) the genus *Juniperus* (juniper) can-

[20] LTL5400A: Radiocarbon Age (BP) 9445 ± 45 (8840-8610 cal BC); δ^{13} C (‰) -29.6 ± 0.4 (Cedad, Università del Salento). See § 4 for a discussion.

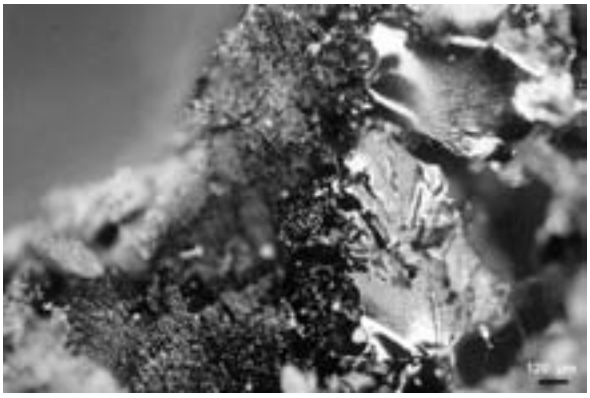

fig. 9 – UT4 SIII US 303. Charcoal of Abies*, partially glazed cross-section.*

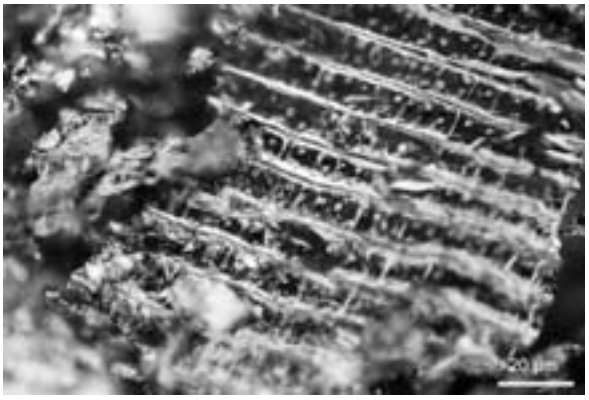

fig. 10 – UT 4 SIII US 303. Radial section of Abies *charcoal, with characteristic pitting of the cross-fields.*

Section	UT 2S.I	UT3 S.II	UT4S.400
Humus	109	201	401
Colluvium interested by pedo-genetic processes	101; 102	202; 203	
Evidence of charcoal production	103	204	416
Colluvium	104	205	406
Large and medium sandstones	105 washed out	206	
clayey schists and siltstones	106, 107 washed out	208 washed out	417, 425, 418, 420, 421

tab. 3 – Comparison between the layers from the analysis of the exposed sections and the excavated sites.

not be excluded. This fragment was dated (AMS) 430±110 cal. AD (LTL5401A 1653 ± 45 BP)[21].

4.2.3 Charcoal from UT 4 Settore 400

In the excavations of 2011 (sett. 400, US 423, 422, 421, 419, 418, 415, 413, 412, 411, 409, 406), more than 150 fragments of charcoal were recovered in the area of the structure interpreted as being a hearth near the sandstone bank, probably used as a stone quarry (*tab.* 3[22]). Some of these are partially vitrified small branches measuring approximately 1.5 cm in diameter, and almost all were identified as *Abies*. In the US 406 and 413, beech charcoal was also abundant.
A number of fragments were found in the layers referred to two hearths documented during the excavation. Charcoals of *Fagus* and *Abies* were found in the more recent layers (US 413 and US 415) while in the older only charcoal of *Abies* was found. The first hearth was dated to 320-540 AD thanks to radiocarbon (AMS) analysis of a charcoal from US 303 (that coincides with US 413). A charcoal fragment from the second hearth was dated 160±100 cal. AD[23]. As noted above, the two hearths were interpreted as referring to two (probably different) phases of quarrying. The fire could have been employed in order to facilitate the stones extraction, as it is common ever since. The small dimensions of the charcoal fragments concur with high fire, even if in absence of other clear clues of this practice (e.g. charcoal from faggots of broom or heather, true significance of vitrified charcoal, see § 4.2.3) an interpretation in this sense is not sure. From an environmental point of view, the presence of beech in only the more recent hearth could indicate the transition from a fir-beech woodland to a beech-wood, that actually happened during the Roman-Medieval times on these mountains (Guido *et al.* 2002; Branch 2004; Guido *et al.* 2013).

4.3 *Comments on the results*

In some cases the identification of the charcoal samples was rather uncertain. Therefore, for the sample GHIFFI 09 UT2 US 114 (cf. *Cytisus scoparius*), it is not possible to confirm with certainty the presence of this species, but it is clear that it is not one of the angiosperm trees presently common in the sur-

[21] See footnote 12.

[22] In *tab.* 3 fragments of US 416 are not indicated, since during the excavation they where collected erroneously together with the ones of US 406.

[23] See footnote 15.

roundings. A rather unusual feature of the charred wood was the frequency of vitrification that, in the past, was commonly attributed to exposure to high temperatures or the effects of sudden cooling, even by means of water, a practice that was widely used to cause rock fracturing in order to facilitate extraction. If so, its presence could confirm the hypothesis concerning the connection of fire with the quarry action (§ 3). However, recent, specific studies have suggested that the vitrification of coal does not necessarily have a connection with high temperatures and with other circumstances (e.g. burning of fresh wood) experimentally reproduced (McParland *et al.* 2010). Concerning the charcoal of Gymnosperms, as dealt with in other occasions (e.g. *Pian delle Groppere* charcoals, wood and charcoals of the *Mogge di Ertola* site), the problem is that the young branches of silver fir often show an anatomical structure hardly distinguishable from juniper (Guido *et al.* 2002; Guido *et al.* 2013). However, in this case it is likely that it is silver fir. Moreover, the presence of this species would provide an approximate indirect dating, due to the fact that silver fir decreased on the Apennines from the Roman period and has practically disappeared to a spontaneous state during the Middle Ages. The remains of charred wood identified on this slope suggest that the presence of local tree cover with silver fir was prevalent until the first centuries AD, while beech became dominant in the post-medieval period (cf. charcoal from burning sites and recent woodland).

C.M.

5. General discussion

The excavations have documented two different periods of quarrying from the sandstone bank UT 4. These quarry actions took place during the late antiquity, as it emerged by the chronology of the two connected fireplaces (US 422 and US 303=US 413). As noted above, the use of fire to cause fractures in bedrock seems to have been common across the Mediterranean during antiquity (Becker 2007). In particular, this practice has been documented as an important technique for cracking silicified sandstone and flaking off smaller pieces of stone from quarry faces[24].

[24] Heldal *et al.* 2005, pp. 20-21. For a detailed description of fire-settings employed in stones extraction see Heldal, Bloxam 2008, pp. 50-55.

The results of rebound tests suggest that the monolith was most probably carved from the sandstone bank near to site of the monolith find (Cevasco 2014 in this section). The dimension of the engraved monolith suggests that it could have been carved from the scar identified during the shovel test called US -403 (Rossi, Gattiglia 2014 in this section). Therefore, the monolith could have a late-antiquity chronology, from the supposed chronology of this scar (4th-6th century AD). It is necessary to underline that the hypothesis on the provenience of the monolith from this scar was formulated before the archaeological excavation, and that this revealed another quarrying scar (US -432), whose dimensions however aren't comparable with those of the monolith and dated to 1th-3th c. AD. The stratigraphic sequence that emerged during the excavation, the possible chronology of the quarry actions (and the consequent chronology of the monolith) are not in contrast with the hypothesis on its voluntary defunctionalization and destruction, and they induce to collocate them during the Early Middle Ages, a period when other felling of carved monoliths are already documented (Rossi, Gattiglia 2014, in this section). However, the chronology contrasts with the stylistic characteristics of the monolith that could suggest a protohistoric attribution. Only an enlargement of the archaeological excavation could verify the presence of more ancient episodes of quarrying (as suggested by the cut US -433) in the sandstone bank that could add new data for the chronological attribution.

At this stage of the investigations, it is impossible to say if the two quarry actions identified are the first clue of a larger exploitation of the sandstone bank UT 4. In fact, even if the investigation showed that between these two moments the site was not frequented, it is impossible to extend this observation to the surroundings. We cannot exclude that other portions of this bank, buried until today, were used as quarry at the same or other times. The enlargement of the excavation area could also help to interpretate what can be deduced from the geomorphologic investigations (Cevasco 2014, in this section). These could indicate the traces of a quarrying activity so extensive so as to have altered the slope morphology, therefore much more intensive and extensive than those documented until now, within the limited excavation area of the Settore 400.

In fact, the presence of a large amount of stones (from sub-metric stones to little fragments) found in the Settore 400 and, due to the erosive-

sedimentary cycle, along the slope (UT 11) and in the exposed sections (UT2SI, and UT3SII, *tab*. 3) supports the hypothesis of the existence of a quarry larger than the limited examples already documented by the quarry scars. The stones could be interpreted as waste materials resulting from a wide quarrying and of the first processing of gouged stones. As described in § 2 and beyond the identification of its precise site of quarrying, the surveys suggest that at its primary deposition, the monolith M1 was placed on the ridge, nearby UT 4, and that after its knocking down participated in the post-depositional movements of these dispersed stones and was finally been set together with the stones visible in the exposed section UT2SI, identified as US 105.

The erosional-sedimentary cycle has obviously led to the formation of even more ancient colluvial deposits documented in the exposed section UT2SI that may have been affected by materials washed away from the ridge when the quarry was active and following its abandonment. This would explain the presence, in one of these layers (US 114), of vitrified charcoal of Gymnosperms (probably fir) apparently very similar to those documented in the excavated fireplaces. Only the radiocarbon dating of one of these vitrified fragments could confirm this hypothesis. In another place of the same layer US 114, a non-vitrified charcoal fragment of Angiosperm (probably broom, *Cytisus scoparius*) was found. It was dated 8725±115 cal. BC, and could be connected to more ancient sedimentary and colluvial movements. However, this light-demanding shrub species is evidence of a period when the forest cover was open.

Concerning vegetation history and that of management practices of the environmental resources, the results of anthracological analysis, and more generally, of the archaeobotanical research, permitted a partial reconstruction since the 2th century AD (date of the first hearth). It is possible to confirm that in that period, the slopes of the *Costa dei Ghiffi* were covered by a fir woodland, within which beech began dominant from the 4th century AD (date of the second hearth).

The presence of charcoal dust in the colluvial deposit US 406 could be related to the use, also during the Middle Ages and modern times, of controlled fire for the activation of wooded pastures, that could to be verified with pollen analysis. The exploitation of these slopes through this practice is certainly documented for the nineteenth and early twentieth century by historical ecology observations and suggested by dendroecology (Cevasco, Parola 2014, in this section).

Between the late-nineteenth and the early -1930s, the traces of the exploitation of this beech-wood for the charcoal production are even more evident and have been identified in the exposed sections (US 103 and US 204), in the excavation (US 405), through charcoal pits sites (UT 3 and UT 7), and by means of dendroecological analysis (regular cuts of the coppicing).

A.M.S.

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Abstract

The paper presents the results of archaeological and complementary archaeobotanical investigations carried out at *Costa dei Ghiffi*, with the aim to reconstruct the provenience of the engraved monolith M1, reconstructing also its depositional and post-depositional history. Archaeobotanical analysis was carried out on archaeological evidences, and archaeological investigations have been in turn addressed by the results of archaeobotanical analysis and the radiocarbon dating of charcoal. Archaeological surveys were carried out in the surroundings of the site where the monolith was discovered. The investigations have allowed to identify a sandstone outcrop with a scar of digging nearby the ridge, and to hypothesize that the monolith, until it was re-employed in the forestry road, participated of the same post-depositional processes of dispersed stones documented along the slope; actually, in its primary deposition it was near the outcrop, and, according with geological and geomorphological analysis, it probably was carved out from the same bed. Archaeological excavations at the bottom of the outcrop allow to document the presence of two quarry actions dated in the roman period (160±100 cal. AD) and in the late antiquity (430±110 cal. AD), as documented by the presence of ^{14}C dated fire-places. The combination of archaeological investigation and archaebotanical ones allowed to reconstruct the environmental history of the slope, at least since the 2th century AD (date of the first hearth).

Key words: Archaeological Surveys, depositional and post-depositional processes, Archaeobotany, quarry action.

Riassunto

Archeologia e archeobotanica per la storia dei versanti di *Costa di Ghiffi*. Il contributo presenta i risultati delle indagini archeologiche e delle complementari indagini archeobotaniche condotte presso il sito di *Costa dei Ghiffi*, con l'obiettivo di ricostruire la storia del monolite M1, e dei processi deposizionali e post-deposizionali a cui ha partecipato. Le analisi archeobotaniche sono state condotte sulle evidenze archeologiche documentate durante le ricognizioni, mentre i risultati di tali analisi e delle datazioni radiocarboniche hanno indirizzato le scelte sull'area da sottoporre a scavo archeologico. Le ricognizioni di archeologia di superficie sono state condotte nell'area circostante il luogo di rinvenimento del monolite e hanno permesso di identificare, nei pressi del crinale, un affioramento di arenaria con una cicatrice di cavatura e di ipotizzare che, fino a quando non fu inserito all'interno della massicciata di sostegno alla strada forestale, il monolite abbia partecipato degli stessi processi post-deposizionali

di una concentrazione di frammenti di arenaria, documentate lungo il versante, nell'area compresa tra la cicatrice di cavatura e il luogo del suo rinvenimento; nella sua giacitura primaria si trovasse nei pressi dell'affioramento, e sia stato cavato proprio da quell'affioramento, conformemente a quanto emerso dai risultati delle indagini geologiche e geomorfologiche, Lo scavo archeologico condotto alla base dell'affioramento roccioso ha permesso di documentare la presenza di due azioni di cavatura databili nel periodo romano (160±100 cal. AD) e nella tardantichità (430±110 cal.), come attestato dalla presenza di due focolari connessi con le azioni di cavatura e datati al radiocarbonio. L'insieme delle indagini ha permesso, inoltre e soprattutto, di ricostruire la storia ambientale del versante, almeno a partire dal II secolo d.C. circa, periodo in cui si data il primo focolare.

Parole chiave: Archeologia di superficie, processi deposizionali e post-deposizionali, Archeobotanica, azioni di cavatura.

MONTAGNE INCISE. PIETRE INCISE

Archeologia delle risorse nella montagna mediterranea

a cura di Anna Maria Stagno

Questo volume riprende una delle proposte fondanti dell'archeologia postmedievale italiana: l'archeologia delle risorse ambientali. A partire da oggetti concreti – le montagne e le pietre incise appunto – e attraverso punti di vista eterogenei, i contributi offrono un'ampia rassegna di metodi e percorsi di ricerca, ampliando la discussione a una riflessione sui paesaggi culturali e sui problemi della loro patrimonializzazione. Il volume si caratterizza per il taglio fortemente diacronico (dalla preistoria al XXI secolo) e il confronto tra discipline e procedure di ricerca. L'approccio non è nuovo per la rivista e, in particolare, rimanda al numero 6 (*L'approccio storico ambientale al patrimonio rurale delle aree protette*) che già aveva proposto alla ricerca archeologica "convenzionale" i temi dell'archeologia ambientale e dell'ecologia storica. Il monografico raccoglie i risultati dell'*International Workshop on Archaeology of European Mountain Landscapes* (Borzonasca, GE, 20-22 ottobre 2011), promosso dal Laboratorio di Archeologia e Storia Ambientale dell'Università di Genova e finanziato dal Parco Naturale Regionale dell'Aveto.

€ 54,00

ISSN 1592-5935
ISBN 978-88-7814-603-7