

1 **New ochre painted stones from the late proto-Aurignacian of Fumane Cave**

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45 **Abstract**

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Fumane Cave, northern Italy, with its early Upper Palaeolithic deposit, dating between 41.2-35 ky cal BP, is one of the most significant sites for the understanding of the first Anatomically Modern Human groups in Europe. The archaeological excavations led to discover a consistent archaeological record which includes numerous items connected to the symbolic production too: shells, engraved bones and six ochred stones which are considered among the most ancient evidence of painting activity in Europe. Aside the six painted stones, a high number of ochred rock flakes collected during the excavations have been recently re-examined with the aim to trace further lines of research, i.e. what their origin is, so if they are fragments of parietal art or not and how these stones or part of them fit in the wider context of the most ancient forms of art in Europe. Specifically, within this paper, authors present four newly recognised painted stones which were analysed according to their graphic themes and techniques, their chronology and spatial distribution. This leads to deepen the issues of symbolic production in the Fumane Cave, the use of the site, identifying any productive area. Moreover, the newly presented findings, together with the already known ones are contextualized into the contemporaneous Italian and European context providing data towards the understanding of any morphological and stylistic variability and semiotic transformations to interpret any cultural dynamic process occurred in the Alpine area and beyond.

67 **Keywords:**

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Portable art; Palaeolithic art; Aurignacian; symbolic behaviour; northern Italy; Alps

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71 **INTRODUCTION**

72 Over the last 30 years, the application of new chronometric methodologies has
73 permitted to confirm or modify the chronologies of both portable and parietal art in the
74 Middle Stone Age and the Upper Palaeolithic. So, the stylistic comparisons between parietal
75 and portable art objects together with the analysis of figurative palimpsest were further
76 qualified by the new information, giving more accurate data to establish both the
77 synchronicity and the diachronicity of the artistic production, the use of the sites and the
78 graphic and cultural connections among sites. Within this framework great importance has
79 been paid to the emergence of the symbolic production, the discovery of sites and decorated
80 objects, all of which have given a great impulse to the debate among scholars (see Hoffmann
81 *et al.* 2018; White *et al.* 2020; Hoffmann *et al.* 2020).

82 Beside the chronological issue is the one linked to the concept of cultural geographies
83 and graphic territories (Bourdier 2013), i.e. the discovery of new sites that have significantly
84 widen the Palaeolithic art distribution over a large territory including Balkans (Ruiz-Redondo
85 *et al.* 2019), Caucasus (Sigari 2017), Borneo (Aubert *et al.* 2018; Brumm *et al.* 2021) and
86 Egypt (Huyge *et al.* 2011).

87 Therefore, the new advances in Palaeolithic studies and the research on the
88 development of the artistic production focused both the chronology and the space variables.

89 This is also the case for intentionally painted stones, which are a clear distinctive trait
90 of Anatomically Modern Humans since their early presence in Europe, especially during the
91 Aurignacian, when several caves and shelters yielded undisputable evidence of the use of red
92 ochre as pigment for both parietal and mobile art (Chiotti *et al.* 2007, Clottes 2010, García-
93 Díez *et al.* 2015, Bourrillon *et al.* 2018, Wolf *et al.* 2018).

94 In this perspective, the red ochred stones from Fumane Cave offer a preferential
95 insight into the earliest symbolic production, its development along the Aurignacian and

96 Gravettian, and its relationship both with the cave space itself and the other contemporary
97 sites.

98 Fumane Cave in Italy belongs to the group of the most important Aurignacian sites,
99 preserving a detailed stratigraphy including the transition from the Middle to the Upper
100 Palaeolithic. The early Upper Palaeolithic layers witness the large use of symbolic items at
101 the site represented by hundreds of perforated shells, some of them stained with ochre,
102 engraved bones, and finally six ochred stones which are considered among the most ancient
103 evidence of painting activity of anatomically modern humans in Europe (Broglia 2005).

104 Aside these pieces of art, hundreds of small and fragmented stones coated with ochre were
105 collected during the excavations carried out in the 90ies and stored for future analyses. In the
106 frame of a PhD project led by one of us (D.S.), this large assemblage was re-examined with
107 the aim to trace further lines of research to question the origin of the painted stones, i.e. are
108 they fragments of parietal art or not? During this investigation, four additional painted stones
109 have been recently recognised. Within this paper we present this material to deepen our
110 knowledge around the most ancient forms of art in Europe and the issue of symbolic
111 production in the Fumane Cave.

112

113 *FUMANE CAVE*

114 Fumane Cave is located in the Monti Lessini Plateau at the southern belt of the Italian
115 Alps. This is flagship site for the study of Neanderthal and modern human behaviour and is
116 currently under excavation coordinated by the University of Ferrara since 1988. The cave is
117 part of a fossil karst network developed at the base of a rock cliff, formed by a wide cavity
118 and two tunnels that enclose the deposits, a finely layered sedimentary succession with
119 Mousterian, Uluzzian, Protoaurignacian and Gravettian records. Further details on the Late
120 Pleistocene stratigraphic sequence, and paleoclimatic significance, as well as its

121 paleontological and cultural content are further described in a consistent number of
122 publications (Abu Zeid *et al.* 2019, Broglio, Dalmeri 2005, Falcucci *et al.* 2017, López-García
123 *et al.* 2015, Peresani 2012, Peresani *et al.* 2016, Peretto *et al.* 2004)

124 The Protoaurignacian is contained in the upper part of macro-unit A, layers A2, A1
125 (and correlated), dated at 41.2–40.4 ky cal. BP (Higham *et al.* 2009). The late
126 Protoaurignacian is contained in most of macro-unit D, layers D3, D6, D3+D6 (Falcucci *et al.*
127 2020), dated at 38.9–37.7 ky cal. BP (Higham *et al.* 2009), and the Gravettian in layer D1d,
128 dated to 35 ky cal. BP (Falcucci, Peresani 2019). In addition to dwelling structures, faunal
129 assemblages, lithic and bone tools, and marine shells the late Protoaurignacian layers are
130 featured by the notable painted stones (Broglio *et al.* 2009). The use of colouring materials
131 was intense, indeed: tiny pieces of red and yellow ochre scattered in the area, two reddish
132 layers (A2R and A2 S21) with massive presence of ochre (Broglio *et al.* 2005a, 2009, Cavallo
133 *et al.* 2017) belong to the Aurignacian complex, artefacts and shells with red pigment smeared
134 on the surface (Aleo *et al.* 2021, Peresani *et al.* 2019) and an high number of small plaquettes
135 smeared of red ochre (Broglio, Dalmeri 2005, Broglio *et al.* 2009).

136

137 **THE PIGMENT ORIGIN**

138 A recent study aimed to understand the provenance of the archaeological ochre found
139 in the site, providing information towards the understanding of the human skills to select,
140 process and treat suitable raw materials (Cavallo *et al.* 2017).

141 Samples of archaeological ochre from Aurignacian layers A and D were analysed and
142 later compared with possible geological resources. According to their texture, microstructure
143 and composition, the fragments were grouped into four main typological categories. The first
144 type includes those that show dolomite crystals with ferruginous compounds and are covered
145 by Fe-based reddish coating with secondary calcite and apatite. Within this group there are

146 two more samples with an uneven pinkish patina coating the surface whose texture, due to the
147 presence of partially dolomitised sparry calcite including cemented ooids, is similar to the
148 cave bedrock. The mineralogical composition of the first typology samples can be linked to
149 the weathering of Mesozoic dolomitised limestones (Cavallo *et al.* 2017). Only one sample
150 belongs to the second typological group, being made of non-homogeneous quartz and Fe-
151 oxides. Differently, yellow isotropic fragments of goethite characterise the third typological
152 group. Finally, within the Type 4 there are two samples made of Fe-oxides and/or Fe-
153 oxyhydroxides with Ca-phosphate, due to a consistent amount of bone fragments (Cavallo *et*
154 *al.* 2017).

155 All these fragments were compared with samples taken from potential geological
156 resources identified both close to the cave (Manune burg) and distant c. 20 km far from the
157 Fumane cave, in the Sant'Andrea and San Bortolo caves. The high incidence of dolomite
158 samples that can be related to the Mesozoic dolomitised limestones, led to suggest two main
159 interpretative hypotheses to explain their origin: 1) they are fragments of the cave walls and
160 the red colour on their surface can be a ferruginous patina or a post-depositional event; 2) they
161 were taken from fully dolomitised oolitic limestone outcropping at Manune and other sites
162 (Cavallo *et al.* 2017). In conclusion, the (ferroan) dolomite associated with hematite
163 fragments are related to the weathering of Mesozoic dolomitised limestones that can be found
164 with similar characteristics at the Manune, Sant'Andrea and San Bortolo sites, though they
165 have scarce quantity of red material. Differently, the microscopic observation of the
166 characteristic minerals association and of the textural and microstructural features of the ochre
167 Types 3 and 4 have given no information about their origin (Cavallo *et al.* 2017). The rest of
168 the samples show texture, microstructure and composition that recall the cave bedrock
169 (Cavallo *et al.* 2017). During the Upper Palaeolithic occupation of the site, the inhabitants of
170 Fumane cave mainly exploited the carbonate-based resources. The ochre was then used as

171 pigment and in some cases was probably powdered and mixed with bone fragments (Cavallo
172 *et al.* 2017). So, the presence of bone fragments provides new information about the organic
173 binders that were not recorded by Colombini *et al.* (2005), where these authors differently
174 suggested that the ochre was mixed only to water and that the recognised lipids and proteins
175 were mainly tied to the environmental deposit (Colombini *et al.* 2005, Broglio *et al.* 2006).

176

177 **THE PAINTED STONES**

178 Six stones painted with red graphic units are already known: IG VR 60679 (Stone I),
179 IG VR 60768 (Stone II), IG VR 63643 (Stone III), IG VR 63642 (Stone IV), IG VR 63641
180 (Stone V) (Broglio, Dalmeri 2005, Broglio *et al.* 2006, Broglio *et al.* 2009). The sixth one was
181 published in (Broglio, Dalmeri 2005, Broglio *et al.* 2006), but it has never received a
182 catalogue number and has not been described so far.

183 The painted motifs portray different subjects. Stone I and II have figurative themes
184 respectively a zoomorph, interpreted as a mustelid, and the so-called shaman of Fumane. An
185 unidentifiable geometric sign, possibly a scalariform, was painted on Stone III, while a circle
186 with dots and lines is on Stone IV. The fifth fragment has a probable running zoomorph with
187 a spot just under it (Broglio *et al.* 2005b). The last stone flake has few traces that cannot be
188 associated to any specific figurative category.

189 The six stones were respectively found within the Aurignacian layers A2-D3dbase,
190 D5, D3 and D3a+b, in association with the above mentioned massive deposits of ochre and
191 numerous ochred plaquettes, and the Gravettian layer D1d (Masetti 2005, Broglio *et al.*
192 2005b, 2009). Their distribution is not uniform: two of them, Stones IV and V, were found
193 close to the entrance of the Gallery B, the mustelid at the entrance of Gallery A, the shaman
194 close to the eastern wall and the last one, Stone IV, at the main entrance of the site (Broglio *et*
195 *al.* 2005b). Four of the six stones briefly described here were found isolated, though more

196 ochred stones were recovered within different layers from both macro-units A and D, in the
197 whole cave space. At the time of their discovery, the stones had whitish concretions and
198 sediment residuals on their surface, impeding to immediately recognise the painted graphic
199 units (Broglia *et al.* 2005b, Velluti *et al.* 2005). So, once cleaned by the covers over the
200 paintings, graphic signs were exposed.

201 The stone lithology belongs to the locally dolomitised San Vigilio carbonatic
202 sandstone and mudstone, and their origin was linked to ancient detachments of the vault of the
203 cave (Masetti 2005, Cavallo *et al.* 2017, Colombini *et al.* 2005). Mineralogical and chemical
204 analysis of both rock support and pigment led to recognise a surface alteration on the stones
205 under the pigment coating (Colombini *et al.* 2005).

206 In one case hematite was recognised, while on the remaining four stones possibly local
207 iron-oxide had been used to paint the red figures (Colombini *et al.* 2005). The abrupt
208 interruption of the paintings on three of the stones (Stone I, II and V), and the paucity of
209 human traces in association to the painted fragments (Stones II and V) led to hypothesise they
210 were fragments of an ancient decorated vault that collapsed, breaking up into different pieces
211 (Bertola 2005, Broglia *et al.* 2005b, 2009).

212 In 2017 the whole assemblage made of 481 stones smeared with ochre was reviewed,
213 leading to recognise more new stones with painted graphic units. In this work we present
214 four of them that were labelled following the previously chosen code system (Broglia 2005).

215

216 **FORMAL DESCRIPTION OF THE STONES**

217 The four new stones, which are here labelled as Stones VII-X, were unearthed during
218 excavation activities from the layers of the macro-unit D (*Table 1*). Like the already published
219 five painted stones (Colombini *et al.* 2005, Masetti 2005), all the new collected rock flakes
220 with ochre belong to the same lithology of the cave, so they are fragments of the cave walls:

221 • VII. This stone comes from layer D1e, which has not yet yielded any evidence of
222 human frequentation aside an only one date 32.0-29.8 ky cal BP (Broglia, Dalmeri 2005)
223 close to the cave wall at the entrance of the Gallery B. It has convex and almost regular face
224 A (*Figure 1A*), opposed to the face B (*Figure 1B*), which is irregular showing an orange
225 patina caused by natural alteration. The irregular fractures of this surface explain the
226 preferential use of face A, which has an almost oval shape and whose limits are remarked by
227 two clear and continuous curved lines. The red signs are partially covered by the sediment
228 coating. However, the intense colour makes the graphic units standing out.

229 • VIII comes from a Gravettian layer (D1d) as well. The stone flake was recovered in
230 the middle of the entering area to the Gallery B. Traces of ochre were found only on one
231 surface, face A (*Figure 2A*), which is ovaloid in its shape and is less irregular than the
232 opposite face B (*Figure 2B*). The red colour traces are vivid and were applied on the whole
233 surface features, including the fracture edges, where pigment remains are uncovered by the
234 coatings. The whole surface of the stone is uniformly coated by sediment which let partially
235 free the small red traces on the face A.

236 • IX. It was unearthed in the Aurignacian layer D6, in the Gallery B mouth. Its face A
237 (*Figure 3A*), which is almost quadrangular, is characterised by several superficial
238 detachments which affected the dark red-purplish coat of pigment. Light red powder residuals
239 can be seen concentrated inside and around a fracture close to the edge of the stone. On the
240 opposite face B (*Figure 3B*), in the upper part red-orange patina caused by natural alteration
241 of the limestone itself can be recognised, together with dark a red ochre spot on the lower
242 edge. The dark red-purplish ochre film is preserved in discontinuous spots due to the
243 superficial detachments. The traces are all concentrated in a half of the face A. Despite the
244 fragmentary status, the colouring substance appears homogeneous in colour and texture, and
245 constitutes a proper layer applied on the rock, so marking a substantial difference with both

246 the naturally deposited loose red powder on the same face A and the reddened area caused by
247 the natural patina of the lithic support, that are on the opposite side and can be recognised in
248 the fracture section.

249 • X. The stone fragment was unearthed close to the northern cave wall, at the entrance of
250 Tunnel B, within the Aurignacian layer D6base. The stone has an almost triangular shape and
251 only one ochred face, A (*Figure 4A*). On this surface, a faded red curved line can be
252 recognised under a calcite veil. Similarly to Pietra 197, the painted mark looks continuous.
253 The opposite side B (*Figure 4B*) shows a regular fracture surface without any anthropic
254 intervention.

255

256 **METHODS**

257 As mentioned above, each stone was labelled following the previous numeration, so
258 VII-X, in the wait for being recorded with the official and standard classification code
259 provided by the Institutions. For this first study stage, stones have not been cleaned avoiding
260 the removal of their external sedimentary coat. All the stones were photographed using DSLR
261 photography with a digital camera Nikon D5200 24.1-megapixel DX-format CMOS sensor
262 and the produced documentation was checked using the plugin D-Stretch (Harman 2008,
263 Domingo *et al.* 2013, Le Quellec *et al.* 2013) for the software ImageJ to enhance the red
264 pigment traces. Later digital tracing was done using the raster graphic editor software
265 Photoshop.

266 To examine the relationships between ochre and sedimentary residues, and ascertain if
267 the colouring material was anthropically added or determined by post-depositional events,
268 optical microscopic observation was performed through stereomicroscope Leica EZ4 HD
269 equipped with digital camera 8-35x magnification.

270 The four pieces were placed on a rotating platform to perform Digital 3D
271 photogrammetry using Canon EOS 100D 18 megapixel CMOS sensor digital camera. The
272 photogrammetric models were later built using the software Agisoft PhotoScan. To have the
273 enhanced 3D photogrammetric models of the stones, the extracted texture files were then
274 processed by using the DStretch plugin (Sigari 2022).

275

276 **RESULTS AND DISCUSSION**

277 The new stones presented here look painted using only red pigment and do not show
278 either any preferential decorated surface, and the presence of any engraved signs differently
279 from the Mousterian levels (Peresani *et al.* 2014).

280 Concerning the figurative motifs, the enhancing mean of DStretch plugin highlighted
281 some graphic units and some issue linked to their making/composition/realization technique
282 (*Figure 5*). Specifically:

- 283 • *VII.* A curved line measuring 8.1 cm in length and 6.1 cm in height follows and marks
284 the edge of the rock support. The line width is almost regular being 1.5-2 cm. Opposed to it,
285 on the same face, there is a shorter red painted segment, 3.8 cm long and 2.3 cm high. The
286 painting mark width ranges is almost regular being around 1.5 cm. The two marks were
287 possibly part of a circle that used and remarked the face A of the stone fragment. The red
288 pigment is dark, intense and homogeneous in the way it was spread on the stone flake (*Figure*
289 *5A*).
- 290 • *VIII.* The sediment coating obliterates the painting and limits our understanding of the
291 painted motif. Nevertheless, two preserved small traces of red pigment provide information
292 about the tool used to spread the pigment on the whole rock surface. Indeed, the two marks,
293 which are on the low edge of face A and one close to the other (*Figure 5B, 2A*), measure 1 cm

294 in width and 1.8-2 cm in length and show continuous parallel striations inside. The pigment,
295 which partially covers the edge of the stone, is quite vivid, though not bright enough.

296 • IX. We observed a main straight line, 5.5 cm long and 0.7 cm wide, which may
297 possibly correspond to the torso of an anthropomorphic figure. Its extremities show possible
298 perpendicular elements that may remind the arms and the legs painted with the same colour,
299 recalling the silhouette of the famous ‘shaman’ (Broglia 2005). Beside this graphic unit there
300 is a doubtful spot in the shape of a pointed square that reminds an example from the Dalmeri
301 shelter (Dalmeri *et al.* 2009) (*Figure 5C*). However, the very poor preservation condition of
302 the decoration obliges tuning down these interpretations, though inviting to further deepen the
303 investigation and consider a possible restoration. The red spot on the face B was possibly left
304 by ochre on the hands.

305 • X. A geometric sign was enhanced on this stone. It is a curved line 6.4 cm long and 4
306 cm large positioned close to the surface limit (*Figure 5D*). The red mark width ranges
307 between 1-1.5 cm.

308 Though Stone VIII shows a main painted face (A), pigment covers the fracture edges
309 of the fragment as well, differently from what described for the rock fragments I, II and V
310 (Bertola 2005, Broglia 2005, Broglia *et al.* 2009). Therefore, the extension of the colouring
311 substance on more than one side without interruptions, despite the change of the surface
312 shape, fosters the hypothesis that pigmentation occurred after the detachment of the stone
313 from the cave wall.

314

315 The decoration of portable artefacts shows that the whole surface of the support, e.g.
316 pebble, rock or bone fragment could be painted or engraved. A number of examples of rock
317 fragments with more sides painted can be found in Dalmeri shelter (Dalmeri *et al.* 2009) and
318 Parpallò cave (Villaverde 1994), more engraved examples come from a more conspicuous

319 number of sites, e.g. Parpallò cave (Villaverde 1994), Laroux shelter (Airvaux *et al.* 1983),
320 Romanelli (Acanfora 1967), La Ferrassie shelter (Delluc, Delluc 1978), Rochefort cave
321 (Pigeaud, Hinguant 2016) and more (see: Delluc, Delluc 1989). Nevertheless, the existence of
322 only one decorated surface and the fracture of a stone, and so of a graphic unit made on it, is
323 not a sufficient element to state that the stone comes from a decorated wall (Delluc, Delluc
324 1978, Pigeaud, Hinguant 2016, Guerreschi 2005). The examples from the Parpallò Cave in
325 Spain, La Marche and Enlène caves in France, or Dalmeri shelter in Italy witness in this sense
326 the possibility of intentional fractures made *a priori* (Dalmeri *et al.* 2009, Villaverde 1994,
327 Mélard 2008).

328

329 The pieces described here were found in different layers: two, Stones IX and X, are
330 from Aurignacian layers D6 and D6-base, increasing the total number of the studied pieces
331 from the levels of this phase up to six. Differently, the Gravettian record still remains in the
332 minority with only three findings in total: a trend that is in line with the more sporadic
333 presence of human groups in the cave in this phase (Falcucci, Peresani 2019) (*Figure 6*).
334 Looking into the horizontal distribution of the stones, four of them, VII-X, are from the
335 entrance of Gallery B, similarly to Stones IV and V, further suggesting the idea of specific
336 area dedicated to the painted stones that probably lasted for as long as the cave was inhabited
337 (*Figure 7*). However, further studies may provide more secure information about the
338 persistence of a productive area during the different occupation stages of the cave.

339

340 Stereomicroscope observation revealed the presence of a microstratigraphy on the
341 stone surface similar to that on the Stones I-V as reported in the previous literature (see:
342 Colombini *et al.* 2005). Remarkable evidence is provided by Stone IX, whose superficial
343 detachments exposed a microsection of the surface coatings showing that the pigment lays on

344 an alteration veil of concretion and is extensively covered by a second thin concretion of
345 sediment (*Figure 8*).

346 Furthermore, stereomicroscope observation of Stone VIII led to recognise the presence
347 of parallel striae inside the red marks, confirming the use of tools to spread the pigment on the
348 rock surface (*Figure 9*). Striations witness the application of a dense substance with a brush
349 and or with a crayon (see: Grapp 1993, Múzquiz Pérez-Seoane 1994, 1998, Aujoulat *et al.*
350 2010). Further supporting the interpretation about the use of a tool to spread the colour is the
351 regular width of the red marks on Stones VII, VIII and X. Unfortunately, the thin calcite crust
352 covering the painted surface of Stone X precludes the exact understanding of the tool used.

353 Concerning the pigment recipes and binders important suggestions (Clottes 1993)
354 come from the analysis carried out by (Colombini *et al.* 2005) who recognised the use of red
355 ochre on Stones I, II, IV and V, and hematite on Stone III. Furthermore they proposed that
356 organic elements, such as lipids and proteins, have to be tied to the natural deposit and not to
357 organic binders. Therefore, according to (Colombini *et al.* 2005), pigment was possibly mixed
358 only with water and then spread on the stones. However, the presence of ochre mixed with
359 bone fragments as revealed by (Cavallo *et al.* 2017) on two samples from layer A2R, reminds
360 that the practice of mixing red colouring substance with crushed bone fragments was not rare
361 in Palaeolithic art (García-Diez, Ochoa 2013) and we cannot exclude this hypothesis for the
362 ochred stones of Fumane as well. So, both interpretations support the idea that a liquid
363 pigment may have been spread on the stones by using a brush that left those marks recognised
364 on Stone VII.

365 Probable indications about the pigment origin can be establish considering the
366 stratigraphical association between the ochre sample D6-125c that belongs to the ochre Type
367 1 (Cavallo *et al.* 2017) and the painted Stones IX and X that come from the same layer and
368 close squares.

369

370 The new record of graphic units of the Fumane Cave is composed by two clear
371 geometrics and two doubtful graphic marks. The recognised technique is exclusively painting,
372 similarly to the already published five painted stones (Broglia 2005, Broglia *et al.* 2009).
373 Both themes and graphic trend in remarking the natural features of the rock still match with
374 the already documented evidence and further increase the number of painted stones.
375 Nevertheless, the Stones VII-X are fragments of an ancient vault that were painted after
376 falling down and being selected for their shapes, e.g. the round edges (Stone VII), and regular
377 surfaces (Stones VII-X), to be painted. To further reinforce this hypothesis is the presence of
378 the pigment on a fracture side of Stone VIII and the applied ochre on both faces A and B on
379 Stone IX.

380

381 The presence of non-figurative elements makes hard to establish links with other
382 coeval graphic evidence. Indeed this graphic category is ubiquitous in Upper Palaeolithic art
383 studies, being not definitively diagnostic (Sauvet 2014). Comparisons of the Fumane
384 paintings within other Aurignacian paintings are very few and do not show any common
385 element, not even with other kinds of graphic expressions in Europe (see: Bourrillon, White
386 2015). Aurignacian sites with both portable and parietal art are the ones of Aldène, Baume-
387 Latrone, Blanchard, Castanet, Cellier, La Ferrassie and Chauvet in France (Clottes 2010,
388 Azéma *et al.* 2012, Bourrillon, White 2015, Combier, Jouve 2014, Alcolea-González, de
389 Balbín Behrmann 2007), Hohle-Fels, Geissenklösterle and Vogelherd in Germany (Wolf *et al.*
390 2018), Altxerri B, Tito Bustillo, Altamira and Castillo in Spain (González-Sainz *et al.* 2013,
391 García-Diez *et al.* 2013). However, almost none of them provides valid comparable graphic
392 elements with the documented record of Fumane, neither the figurative, nor the non-figurative
393 themes although, for instance, there are red painted geometric signs in Altamira or Castillo

394 caves (García-Diez *et al.* 2013, Pike *et al.* 2012) or the painted stone from Geissenklösterle
395 (Wolf *et al.* 2018, Conard, Floss 1999). Therefore, for its both non-figurative and figurative
396 graphic ensemble, the Fumane record still appears as a unique example of the Aurignacian art
397 in Europe.

398

399 Same limitation in establishing comparisons is faced when analysing the red painted
400 stones VII and VIII, respectively unearthed in the Gravettian layers D1e and D1d. The Italian
401 record does not provide any possible comparable element because of the paucity of portable
402 art finds discovered so far and the striking difference with the very few items currently known
403 which are the engraved ibex and chevrons motif of Paglicci Cave (Palma di Cesnola 2003),
404 the engraved pebble from San Sebastiano Cave (Belluomini *et al.* 2007) and the so called
405 Gravettian ‘Venuses’ from the Balzi Rossi (Mussi *et al.* 2004).

406 Differently, a richer record of red paintings can be found in a number of western
407 Europe sites, especially in the parietal art with numerous red painted figures, e.g. Covalanas
408 and La Haza caves in Spain (García-Diez, Eguizabal Torre 2007, García-Diez *et al.* 2011).
409 However, the available finds from Fumane Cave are too fragmentary and scarce at the
410 moment to fix solid and valid links, so even the curved lines painted on Stone VII are not
411 sufficient elements to be used as diagnostic parameters.

412

413 Aside the above mentioned difficulties in establishing comparisons, we consider the
414 possibility of searching for shared elements between the Fumane red graphics with the later
415 graphic production in the Alpine area, especially with the one of Dalmeri shelter (Dalmeri *et*
416 *al.* 2009; Dalmeri *et al.* 2005). Specifically, the red circular motifs of Stones VII and X recall
417 the red painted stones No. 9 and 102 from Dalmeri (Dalmeri *et al.* 2005a, 2009). We are fully
418 aware that the comparison between two or more sites with a strong chronological difference

419 can be highly hasty (Sauvet 2014), even in such a small region of Eastern Alps with a gap of
420 data for the Gravettian-Early Epigravettian. This is mostly due to a too sparse distribution of
421 sites and findings across the Great Adriatic-Po Region, a vast land crossed by hunter-
422 gatherers during the Last Glacial Maximum. However, continuity in the use of red pigment is
423 recorded at Romualdova Cave in Istria, where red cave painting have been recognised in
424 recent times (Ruiz-Redondo *et al.* 2019), and in Romanelli Cave in southern Italy as well
425 where a red painted slab was found (Sigari 2020). The artistic tradition consisting in strong
426 schematisation and red painted figures would be further confirmed in another Alpine
427 Epigravettian site, i.e. Villabruna shelter (Broglia 1992, 1998). So, the recalled examples
428 based on the graphic production of Fumane may witness a durable practice in the Alpine area
429 in terms of artistic choice both for the support and the technique and in a general sense for the
430 styles, from the Aurignacian to the Epigravettian. Supporting the idea of a thematic or stylistic
431 tradition that may last for long time, affinities can be found in what it has been recognised in
432 the Altamira Cave, where calcite crusts covering red claviform signs confirmed how they had
433 been produced at different times within the same site as well (García-Diez *et al.* 2013).
434 Unfortunately, the still limited record from Fumane Cave does not help in identifying any
435 consistent morphological or stylistic variability, but we do not exclude that the progress of the
436 research can definitively solve this issue.

437

438 **CONCLUSION**

439 The newly here presented decorated stones from Fumane Cave provide an update in
440 our knowledge about the artistic activity in this site, enriching also the record of the paintings
441 made by early Upper Palaeolithic populations of both Italy and Europe.

442

443 More specifically, the painted Stones VII-X offer new thematic, technological and
444 productive perspectives.

445 Thematic elements to the general record of the figurative and non-figurative graphic
446 units of this site are provided by three new geometric signs and a possible anthropomorphic
447 figure on Stone IX. However, still scarce or completely absent are the comparisons with other
448 contemporaneous sites, but on the other hand the connections with more recent evidence, i.e.
449 Epigravettian Dalmeri and Villabruna shelters portable art, reinforce the possibility of a
450 graphic expression that lasted for long time in the pre-Alpine area.

451

452 At a macroanalysis scale it was possible to note how pigment was spread on one or
453 more faces, as the fracture side of Stone VIII and the two ochred faces of Stone IX witness.
454 This evidence suggests that the stones were ochred after their fall from the cave vault. To
455 further support this interpretation is the homogeneous microstratigraphy of the Stones surface
456 recorded by using the microscope analysis. Indeed it shows how pigment lays on an alteration
457 veil of concretion which has later been covered by a second thin concretion of sediment.

458 Furthermore, microscope observation provided information about the painting
459 technique, revealing how a dense pigment was applied on the stone flakes by using a brush,
460 specifically on Stone VIII and X.

461

462 Further research activities may provide the identification of more pieces and
463 information to understand the relationship between art production and site use. In this view it
464 will become crucial the definitive understanding of the presence of an ancient painted cave or
465 not. In other words, answering the question: have the painted stones from Fumane Cave to be
466 considered parietal or not? Moreover, they can provide more data towards the definition of

467 specific graphic trends in the early upper Palaeolithic and so to sketch a more valid
468 evolutionary stylistic scheme for the Palaeolithic art.

469

470 To conclude, we can state that the ochred stones from Fumane Cave still represent a
471 unique case in the artistic production of the early AMH in Europe. In this perspective, the
472 study on more painted stones of this site might provide new significant data to understand any
473 consistent morphological and stylistic variability and semiotic transformations of the earliest
474 forms of art in the European continent. This can represent a key to interpret those cultural
475 dynamic processes occurred within the site itself between Aurignacian and Gravettian, and
476 within a wider territory, not only during the early upper Palaeolithic, but even during a longer
477 time frame, especially in the Alpine area and beyond.

478

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485

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743

744 **TABLE TITLES**

745

746 **Table 1** Catalogue of the Stones VII-X with indication of their spatial coordinates, square and
747 layer of provenience, number of ochred surfaces, and presence of calcite concretion
748 covering the pigment and sizes.

749

750 **TABLES**
751

Stone	Excav. Year	Square	SU	Progr. Excav. Numb.	Clea - ning	Ochred sides	Calcite	Length	Width	Thickness
VII	-	147i	D1e	12	no	1	no	11.5	8.1	3.4
VIII	n/a	137A	D1d	376	no	2	no	11.4	6.5	3.5
IX	-	128c	D6	37	no	2	no	12.2	9.8	1.6
X	-	135i	D6-base	30	no	1	yes	16	12.5	1.7

752

753 Table 1

754

755

756 **FIGURE LEGENDS**

757

758 **Fig. 1** Stone VII, (A) face A with the red signs that mark the upper and lower edge of the
759 surface. The sediment coat is clearly visible on the whole face (B) the irregular face B
760 with its orange patina.

761 **Fig. 2** Stone VIII, (A) side A with the exposed red marks in the lower part. Red traces can be
762 seen under the sediment coat the covers the surface; (B) face B is free from the sediment
763 coat and has an orange patina

764 **Fig. 3** Stone IX, it has not sediment coat on its surface. However, on its face A red sediment
765 powder is in a fracture in the left bottom part, while on right side are the traces of
766 pigment (A); below (B), on face B the reddish patina caused by natural alteration of the
767 limestone support can be recognised.

768 **Fig. 4** Stone X has the red curved line in the left part of face A, under a calcite veil (A),
769 differently from face B which does not show any anthropic intervention, nor any other
770 specific natural alteration, apart some surface detachments (B).

771 **Fig. 5** Tracing of the faces A of the ochred Stones VII (A), VIII (B), IX (C), X (D).

772 **Fig. 6** Indication of the stratigraphical position of the ochred stones.

773 **Fig. 7** The spatial distribution of the ochred stones within the Fumane cave space. The
774 differently coloured triangles indicate the provenance layer of the findings.

775 **Fig. 8** Face A of Stone IX: the area analysed by stereomicroscope outlined in white (A).
776 Microscopic photography of the face A of Stone IX: I) the rock bedrock; II) the red
777 pigment; III) the concretion (B).

778 **Fig. 9** Face A of Stone VIII: the zoomed red mark where the parallel striations were
779 recognised is outlined in white (A). Microscopic photography of the striations indicated
780 by arrows (B).

781



A



B

10cm



782
783
784
785

Figure 1



A



B

10cm



786
787
788
789

Figure 2



A



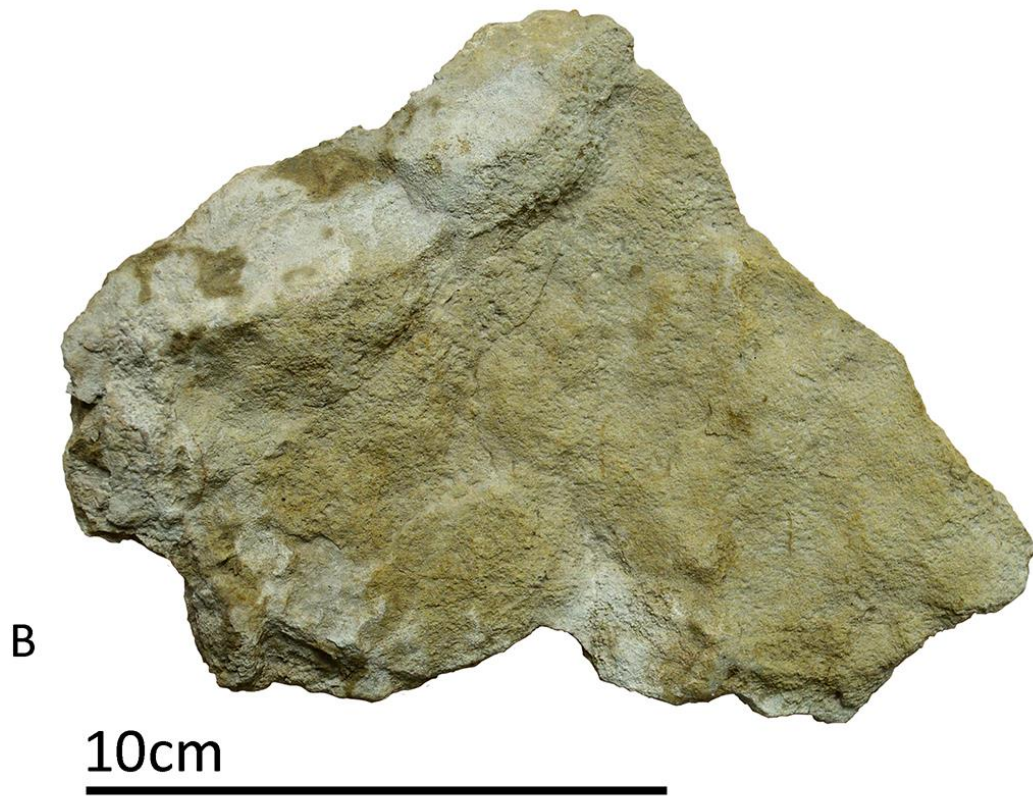
B

10cm



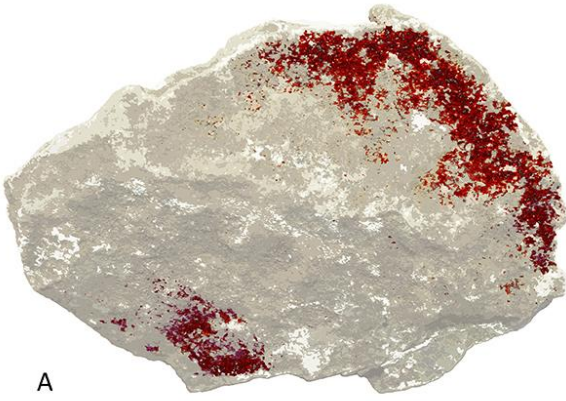
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792
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Figure 3



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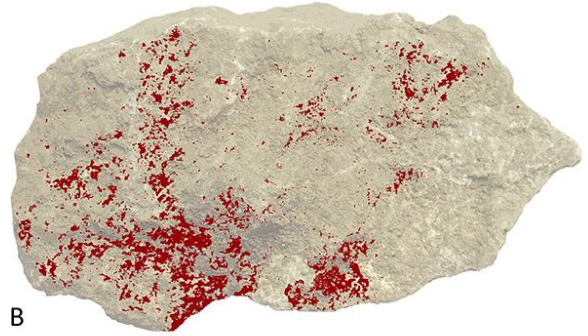
Figure 4



A

10cm

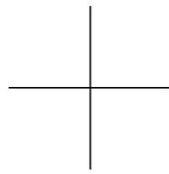
Stone VII



B

10cm

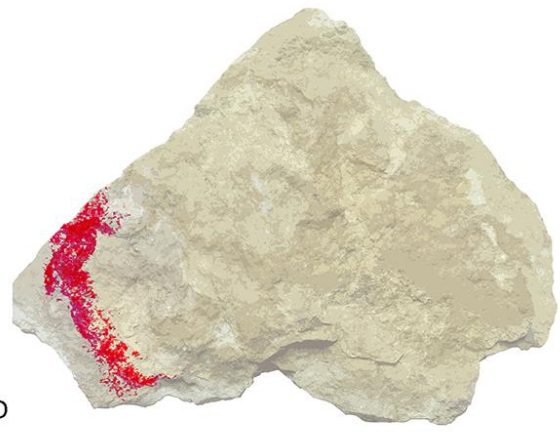
Stone VIII



C

10cm

Stone IX



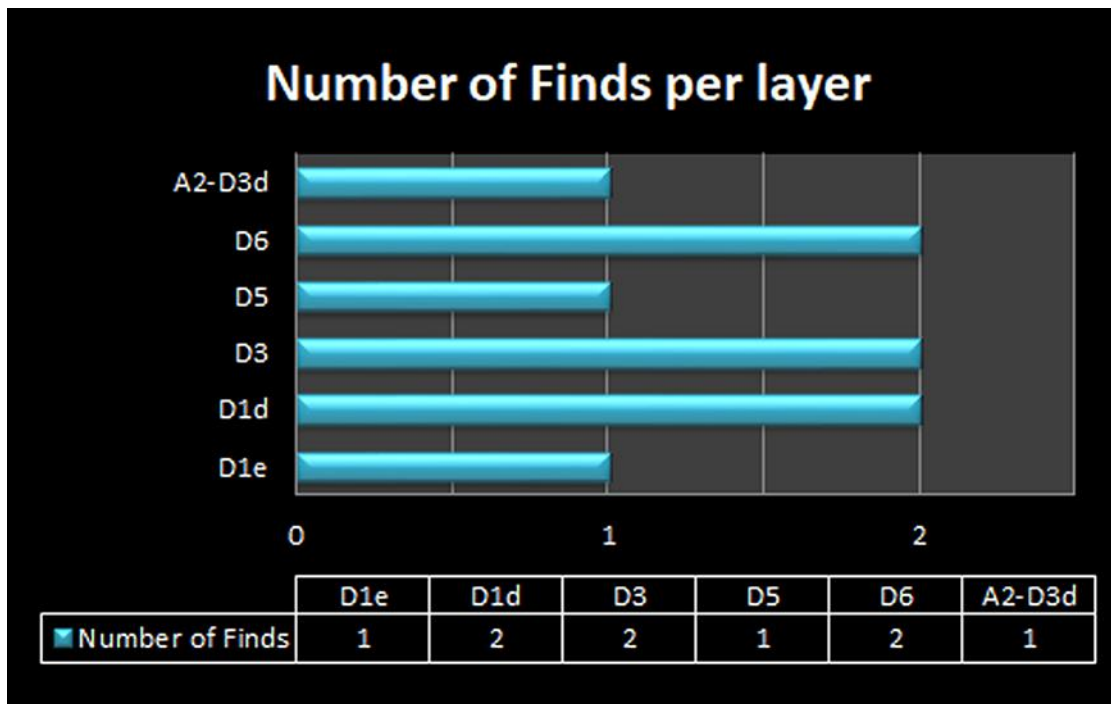
D

10cm

Stone X

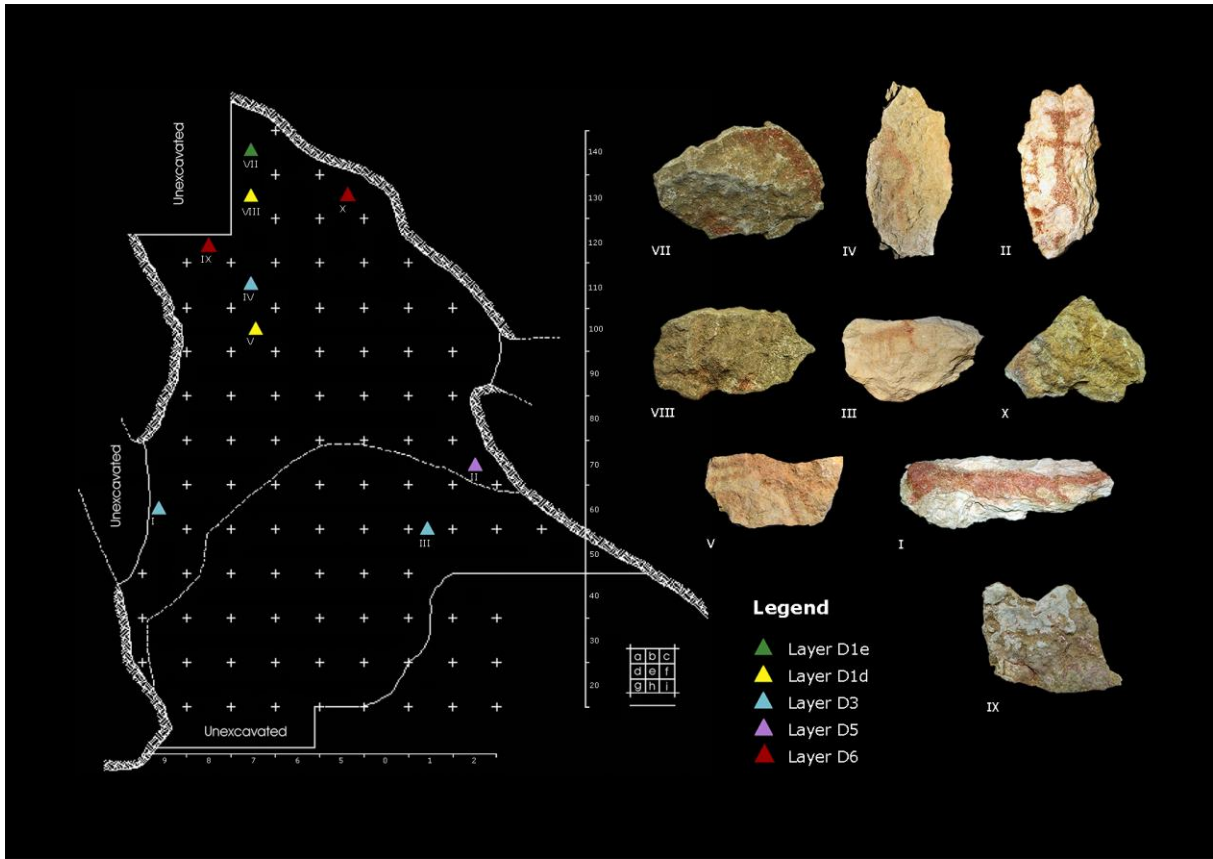
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Figure 5



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Figure 6

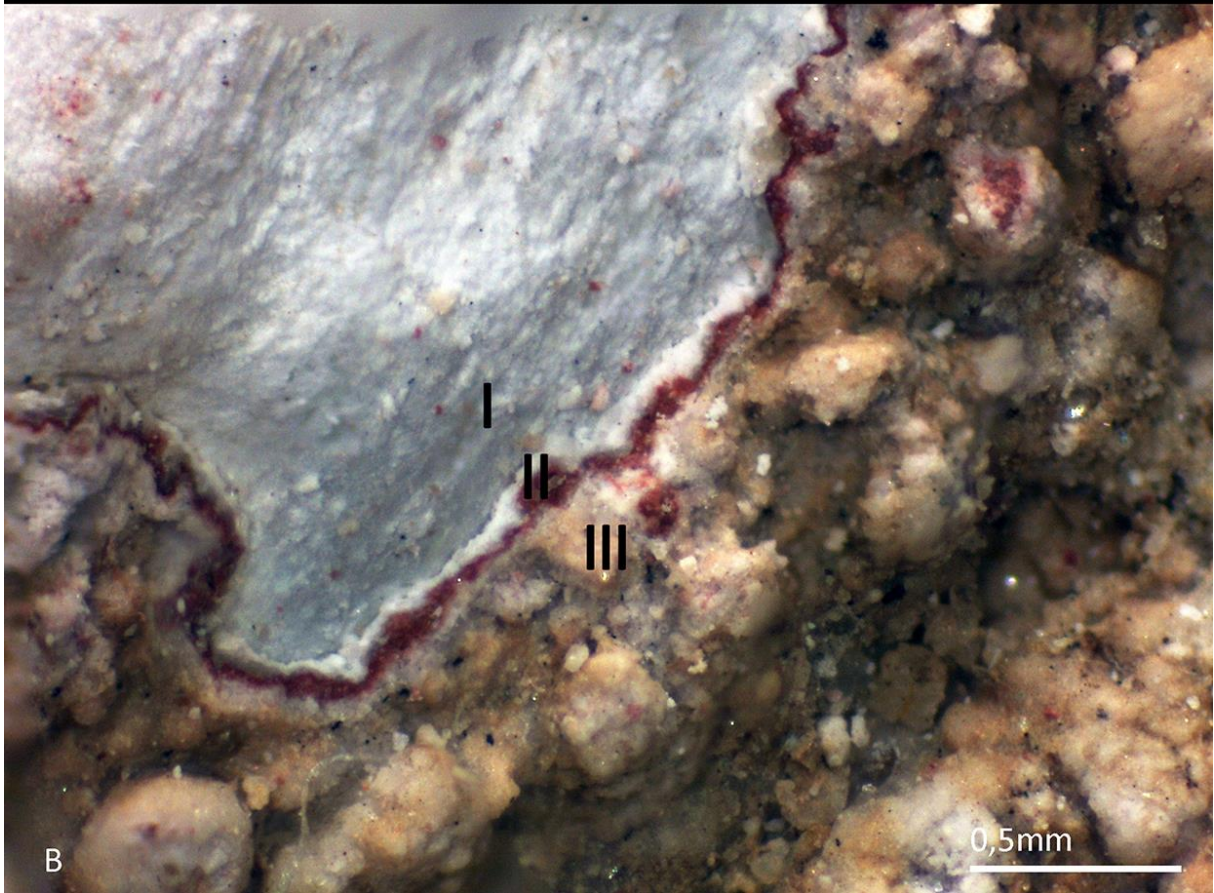


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Figure 7



A

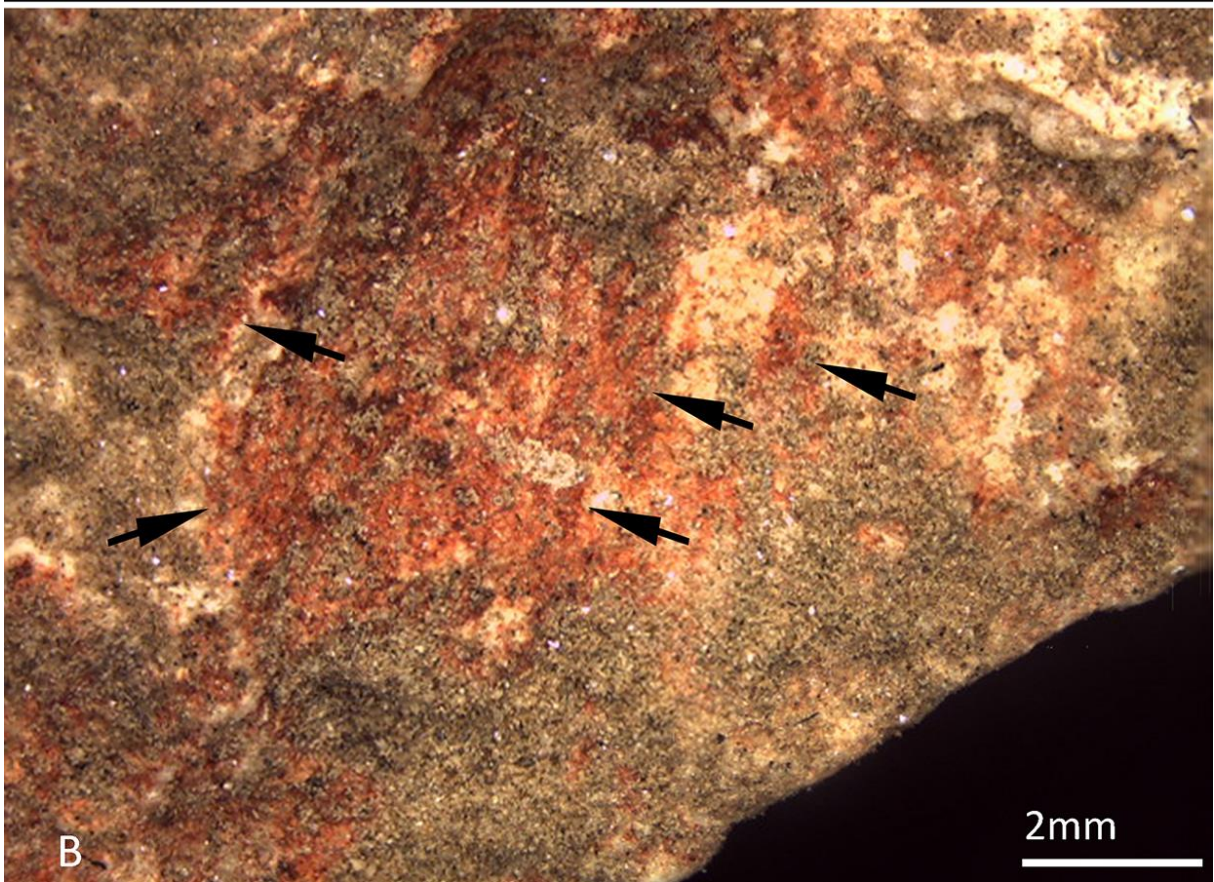
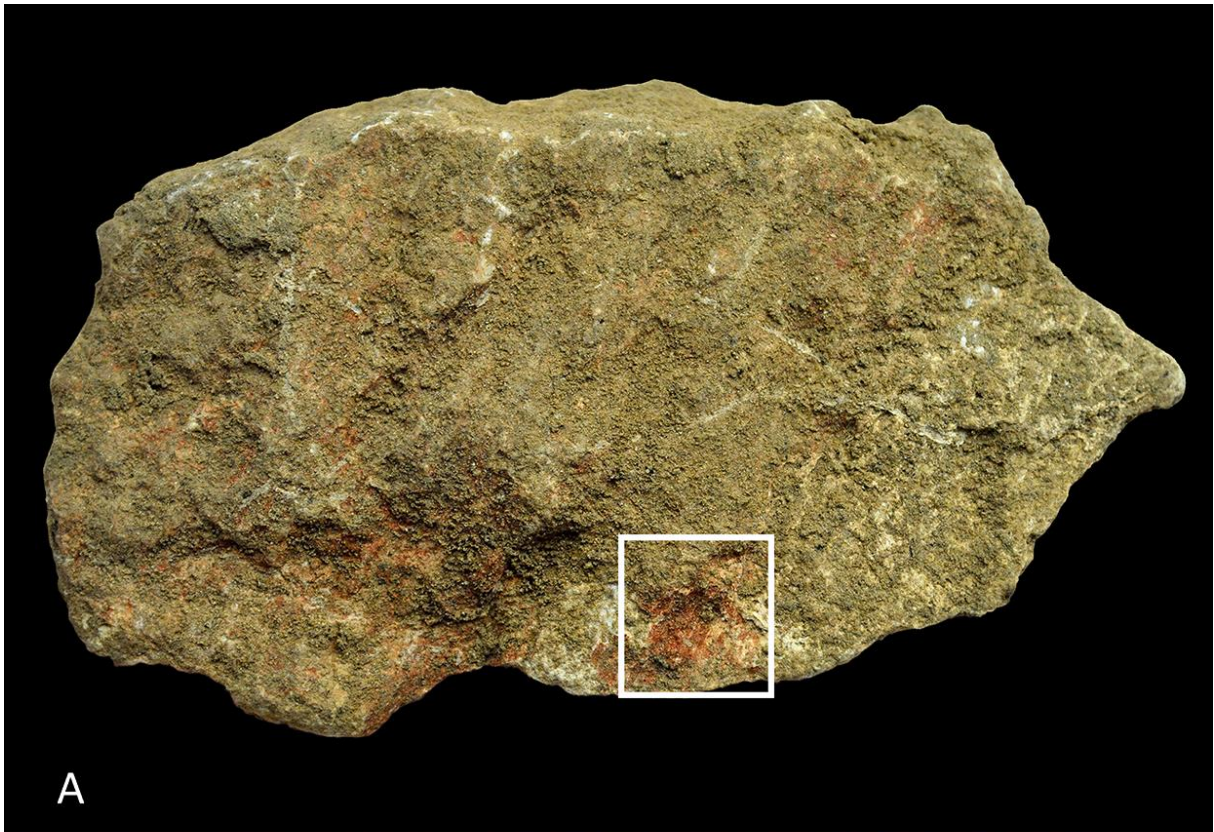


B

0,5mm

810
811
812
813

Figure 8



814
815
816

Figure 9