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**Early-mid Holocene occupations of the Sile Rivers
Spring area (Venetian Plain, Northern Italy). The case
study of the lithic assemblage from the field ALB-14.**

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ABSTRACT

The present investigation aims to broaden the knowledge about the human occupation of the prehistoric groups that inhabited the ALB-14 site located in the Sile River Spring area (Venetian Plain, Northern Italy) during the Early-Mid Holocene through the study of the lithic industry recovered in the inspection carried out in 2018. To this end, an analysis has been developed with three different approaches: study of the raw material, technological and spatial analysis. This revealed that human groups generally exploited blocks of local raw material from the Val Belluna in the Pre-Alpine area, which were obtained in secondary position and mostly reduced using direct percussion technique often on prismatic cores from which both flakes and lamellar elements were detached. The retouched pieces correspond to a lower percentage of the total sample and are dominated by burins and endscrapers reflecting the relevance of domestic activities. While only a few projectile elements are present in the assemblage, the presence of some microburins indicates the modification of bladelets to produce geometric armature. From a spatial viewpoint the greatest concentration of evidence lies in the Eastern and Northern-Central section of the site. This study attests that the main phase of human frequentation occurred during the Early Mesolithic, although occupations in the Late Mesolithic and Late Mesolithic/Neolithic was also significant. This study provides more information correlated with data from previous studies, which allows for further discussion on the prehistoric inhabitants of the Venetian plain.

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1. INTRODUCTION

This study focuses on the analysis of the lithic industry of ALB-14 fields, located in Sile Rivers Spring area between the provinces of Padova and Treviso, in the Venetian Plain in northern Italy. This area is one of the few areas with Mesolithic occupation in the plain, but it has been heavily impacted by agricultural activities, leading to the destruction of archaeological contexts and complicating the understanding of human occupation. Since the initial discoveries in the 1980's, systematic investigation in the area were carried out from 2012 by the university of Ferrara (direction Professor. Federica Fontana in collaboration with Davide Visentin) developing surveys and identifying a high frequentation of the prehistoric groups. These frequentations are attested by abundant lithic finds. In the following years, two dissertation theses have been developed focused on the assemblages collected in 2015 and 2016 (Guerra, 2015, Scarazzato, 2017). Despite that, the archaeological data about the lithic material of Sile River sources are scarce compared with Alps sites which have been more analysed. For this reason, the analysis of the lithic industry is very important for the reconstruction of some practices of the prehistoric groups that lived in the area. In line with the above, this thesis aims to understand the exploited lithic raw material to make artefacts, the reconstruction of technological processes namely chaines opératoires, typological analysis to determine the possible periods of frequentation and spatial analysis from ALB-14 field. Based on the above considerations, this study is structured in four main chapter, including:

General Context chapter: includes different aspects that allow to understand the context in which the flintknappers of ALB-14 lived such as the environmental framework of the Mesolithic during three climatic phases (Preboreal, Boreal and Atlantic) and their impact at different altitudes in Northern Italy. It's also emphasized the faunal species found in different archaeological sites of the area, the geological and geomorphological setting, the different cultural aspects as well as the lithic production of the Early and Late Mesolithic and the previous research carried out in the study area. Material and Method chapter underlines the steps analysis were carried out for the identification of the exploited raw material and the technological process of the chaine opératoire in unretouched bladelets, flakes cores and typological analyses according to the modification by retouches, the cores recorded as well as the spatial data. Result chapter shows in detail the obtained data as result of the different analyses carried out in in the sample of ALB-14. The last chapter is focused on the discussion of all analysis previously carried out. Also, compares the data of ALB-14 with the data provide in the dissertations of Daniele Guerra (2014-2015) and Chiara Scarazzato (2016-2017) of ALB 5-4-9.

2. GENERAL CONTEX

2.1. The Mesolithic

The term Mesolithic was introduced in the second half of the 19th century to define a period that separated the Upper Palaeolithic and the Neolithic, in which there was a lack of information, leading to infer that the European continent was uninhabited at the end of the Pleistocene. However, according to Valdeyron (2008), at the end of the 19th century and the beginning of the 20th century the first recognition of microlithic industry in France was carried out, in the excavations at Mas D'Azil, in which it showed occupation between the stratigraphic levels of the Paleolithic and the Neolithic. Similarly, Mortillet worked at La Tourasse where Mesolithic evidence was identified.

Some years later L. Coulonges (1928) excavating the sites of Le Martinet and Le Roc Allan (in the municipality of Sauveterre-la-Lémance, Lot-et-Garonne, Nouvelle Aquitaine) identified two well-defined assemblages. The older one is characterised by small backed bladelets and triangular microliths and the recent one attested to numerous trapezes. The Author named the former Sauveterrian, while the latter was attributed to the Tardenoisian. The same lithic industry was then found by R. Lacam and A. Niederlender at Cuzoul de Gramat (Lacam et al., 1944).

In 1930s new excavations took place in France by Saint-Just Péquart in the Breton islets of Tévéc and Hoedic, allowing to identify a "clear evidence of social organization, rich material culture and an unsuspected symbolic and ideological complex" (Valdeyron 2008, 183). However, the Mesolithic continued being considered a "dark age". In the 60s, Rozoy began research, describing in detail the microlithic industry whose result were published in *Les derniers chasseurs* in 1978, using the term "Epipaleolithic".

Currently, the Mesolithic represents the period in which human groups lived in the post-glacial environments between the end of the Upper Palaeolithic and the neolithic (Robinson & Crombé, 2013, Marchand & Perrin, 2017).

2.2. Environmental framework of the Mesolithic

After the Last Glacial Maximum (LGM) temperature started to increase and deglaciation processes began around 19 cal ka BP. The latter period known as Lare Glacial was interrupted by a brief glacial event known as Younger Dryas covering the time from around 12,9 to 11,7 cal ka BP (Crombé & Robinson, 2014). Its origin was largely discussed, and numerous forcing factors have been proposed (MacLeod et al., 2011). At present most studies agree to relate this phenomenon to an either slowing down or cessation of the North Atlantic thermohaline circulation (THC) related to the emission of freshwater from ice sheets into the North Atlantic Ocean (Clark et al., 2002, 2001).

With the onset of the Holocene (11,7 ka BP), the climate shifted from glacial conditions to warm environment (Walker et al, 2009) which led to the transformation of vegetation cover during this period (Finsinger & Tinner 2006). The Holocene has been divided into five phases: Preboreal (11, 700-10,000 cal BP) Boreal (10,000-9,000 cal BP) Atlantic (9,000-6,000 cal BP), Sub-Boreal (6,000-2,400 cal BP) and Sub-Atlantic (2,400-0 cal BP). The Mesolithic covers the first two periods and the beginning of the third one.

2.2.1. Pre-boreal phase

After the Younger Dryas, an increase in temperature began, which produced environmental changes. Recent studies have been carried out for the paleoenvironmental reconstruction in northeastern Alps. At Lake Ledro, located on the slopes of southeastern Italy, coring operations and pollen analyses were developed, attesting that during the Preboreal phase the vegetation was composed by pine mixed with *Quercus* (oak), *Ulmus* (elm) (Joannin et al 2013).

In northern Italy the condition shifted respect to altitude (Finsinger et al, 2006). In the highland, the cold climate prevails with sparse vegetation composed by tundra and alpine meadows (Finsinger & Tinner 2006; Joannin, 2013). In mid-altitude, cool temperature allowed conifer forest composed by pine and birch vegetation. In lowland, the temperature, precipitation and moisture increased producing the retreat of tundra vegetation doing possible the appearance of deciduous forest vegetation composed of oak, birch, larch and pine (Sala, 1977; Drescher-Schneider, 2009).

2.2.2. Boreal phase

During the Boreal, the temperature and humidity increased producing the reduction of the opened areas. The highest zone continued being characterized by tundra and grassland but less reduced compared with the Preboreal one, because the conifer vegetation reached major coverage (Joannin et al 2013). In mid-altitude, the cool was more common but getting warmer with more humidity and rainfall. These areas also experienced major vegetative coverage mainly in the lowest parts composed by mixed forest of deciduous and conifer. In the lowland, the temperature was warmer with moderated humidity, composed by deciduous vegetation including oak and birch, lime, ash, while conifers forest decreased (Sala, 1977, Drescher-Schneider, 2009, Joannin et al 2013).

2.2.3. Atlantic phase

During this phase, the climate reached the current one. In highland, the temperature is cool but slight warmer with snow in the highest part which melted in spring. In the highest, the tundra was more characteristic, while in the lowest part, the coniferous vegetation took wider coverage (Joannin et al 2013, Sala 1977). In mid-altitude, the temperate was more common with high humidity generating the expansion of mixed forest and vegetal biodiversity of deciduous forest, larch and pines. In lowland, temperature was warm and with high humidity with abundant precipitation with dense and diverse vegetation composed by deciduous forest of oak, elms, birch and tile (Cacciari et al, 2019; Sala 1977; Drescher-Schneider, 2009)

2.3. Fauna in the Early and Late Mesolithic northern Italy

Early Mesolithic constitutes Pre-boreal and Boreal phases. Highland areas were inhabited by fauna that left the plains at the beginning of the Holocene in search of steppe environments as ibex. Moreover, these altitudes were occupied by red deer, chamois, marmot, roe deer and hare, as attested in Mondeval de Sora and in Plan di Frea (Fontana et al 2023, Clark, 2000)). The southern Alpine slopes were inhabited by deer and at the end of the pre-boreal wild boars began

to appear (Sala, 1977; Clark, 2000). In the lowland sites is more common to find beaver, wild boar and fish (e.g. Galgenbuhel), while at Soman and Vatte di Zambana, the roe deer, ibex and chamois were found (Fontana et al, 2023). There is variation according to the location area of the archaeological sites.

In the Late Mesolithic, the ibex continued inhabiting the highland, chamois in forested zone of elevated areas. Red deer were also common (Sala, 1977). In the plain, different species have been found such us roe deer in Riparo Gaban, wild boar and red deer at Biarzo site (Fontana et al, 2023).

2.4. Geological and geomorphological setting

The Northern Italian territory is composed by 40% of mountain and another 40% by hill, while 20% portion of the territory is formed by lowland, in which a major part of it is constituted by the Po Plain and Venetian-Friulian plain (Bartolini, 2010). The Venetian plain is delimited north by Venetian Pre-Alps, north-east by some hills such us Montebello, eastward is bordered by the Piave river and Friulian plain, while to western is outlined by Brenta River and Po Plain.

The Venetian plain is formed by alluvial megafans and fans related to the activity of the main easternmost Alpine rivers during the Pleistocene (mostly during the LGM) (Fontana et al., 2010) flowing from north-west to south-east (e.g. Adige, Bacchiglione, Brenta, Piave). The main megafans are those of Bassano (or Brenta), Montebelluna and Nervesa, which are compose by three portions: the apical, the spring belt and the distal part. The first one is compose by gravel, the second one is the transition between the apical and the distal part, while the last one is constituted by finer sedimentary deposit such as sand and silt sediment (Mozzi, 2005; Fontana et al., 2008). Both the apical as well as the distal parts define the high and low plain respectively of the Venetian area (Mozzi, 1990-1991).

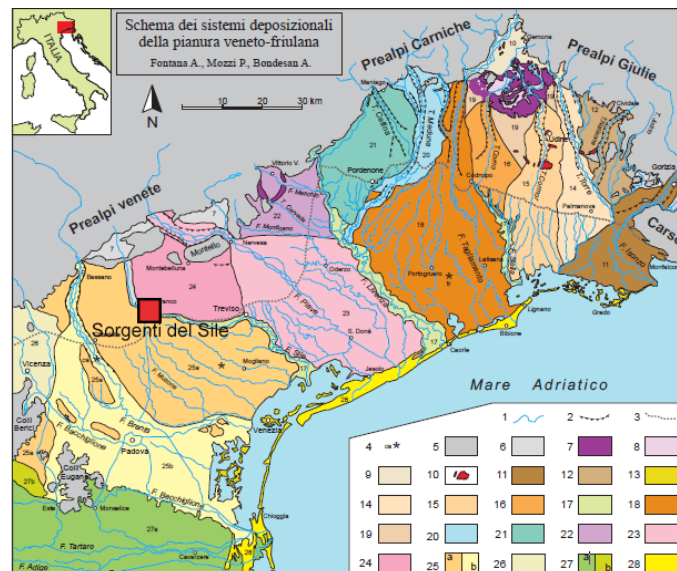


Figure 1 Location of Sargenti del Sile area in the depositional systems scheme map of the Venetian-Friulian plain, From Tosi et al, 2007

Montebelluna is the older megafan produced by the paleo-Piave River before the Last Glacial Maximum (LGM) around 24 cal millennium BP (Fontana et al., 2010), while the Nervesa and Bassano are more recent more formed in the LGM by the Brenta and Piave rivers, respectively (Mozzi, 2005; Fontana et al, 2008; Fontana et al, 2016). Bassano megafan, covers the distal part of the Montebelluna one.

It has been argued that the northern part of Sorgenti del Sile, the pebbles and a sandy matrix are more characteristic. The soil is reddish colour across the western part of Montebello hill, in which it was transported by the paleo-Piave River. In the southern part, the pebbles decrease and silty-clay matrix sediment increase. Here the gravel deposits by Montebelluna were buried by finer material transported by alluvial Brenta in the Late Glacial (Mozzi, 1990-1991).

According to P. Mozzi (1990-1991) the Sile River was born in a little depression, with swampy soil and dense aquatic vegetation (Figure 2). The richness in aquatic and vegetation resources of this area was probably the main reason that rough Mesolithic hunter-gathers to live here (Fontana et al, 2018).



Figure 2 An active spring of the Sile area (photo of D. Visentin). From Fontana et al, 2016: 110

2.5. Cultural aspects in the Early and Late Mesolithic

2.5.1. Settlement

North-eastern Italy is characterised by many Mesolithic sites, both in the plain and in the highlands. The plains are composed by open-air sites with abundant scattered material (Fontana & Visentin, 2016). Rock shelter and cave sites are located mainly at elevations not exceeding 800 meters above sea level, while they tend to decrease at higher elevations (Fontana et al, 2023). It has been shown that during the Early Mesolithic, the highlands show a higher level of occupation compared to the sites on the plains. However, this pattern changed in the late Mesolithic, showing a more homogeneous pattern.

2.5.5 Sauveterrian lithic production in northern Italy

The lithic industry in northern Italy during the Early Mesolithic is a continuity with the Upper Palaeolithic especially the Epigravettian tradition (Fontana et al, 2023). Lithic raw material provisioning was essentially local and extremely variable, from flint to rock crystal and even silicified siltstone and limestones according to the geographic location of the sites. Production process was aimed at obtaining two main sets of products by direct percussion: poorly normalised micro-bladelets/bladelets (mainly shorter than 35-45 mm) and flakes/laminar flakes through an independent reduction sequence starting from nodules, small blocks or thick flakes. Elongated blanks are obtained through several flaking methods:

- by exploiting narrow/large surfaces with a unidirectional and facial debitage
- by shifting from a facial to a semi-tournant debitage or (alternatively) by reorienting cores both orthogonally or bidirectionally either on the same (peripheral exploitation) or on new surfaces (multidirectional exploitation)

On the other side, flakes and laminar flakes were often obtained by a centripetal reduction sequence on thick flakes by using as debitage surface the ventral or the dorsal face of flake-cores.

During the Sauveterrian blanks are transformed by retouch into: domestic tools such as burins, end-scrapers, truncations and backed knives (Fontana et al, 2013). Less frequently, denticulate tools, blade scrapers, splintered pieces, composed tool can be found (Visentin et al, 2016). Regarding the microlithic artefacts, a great variability of the projectile elements has been found such as triangles (isosceles and scalene), crescents, backed and truncated bladelets and double backed points (Sauveterrian points) (Fontana et al 2023, Visentin et al 2016). These armatures were often produced using micro-burin blow technique (Fontana et al. 2023).

2.5.6. Castelnovian lithic production in northern Italy

In this phase, there is a continuation concerning the exploitation of local raw material as in the Sauveterrian phase. At the technological level, indirect percussion and pressure technique were introduced, which allowed the extraction of regular and highly standardised lamellar blanks with dimension from 20 to 50 mm (Fontana et al, 2023). According to Fontana et al (2016) and Fontana et al (2023), for obtaining bladelets the following methods were included:

- Facial/frontal associated to on edge were the more frequently applied method, using indirect percussion/pressure technique.
- Peripheral method for extraction of flakes is less found, which it was used direct percussion technique.

In the Castelnovian phase, retouched flakes and burins decreased as well as crescents, triangular armatures and backed points. Notches and denticulate artefacts, endscrapers made on bladelets were more typical (Broglio, 1980). The regular bladelets were transformed into trapezoidal armatures characterized by different morphologies such as isoscele, scalene or rectangle, which were obtained by a simple transversal and rectilinear truncation, concave and transversal truncation, concave and oblique truncation sometimes using the microburin blow technique (Broglio, 1980; Fontana et al, 2023). These armatures were hafted to the end of the shaft, in some cases as a transverse arrowhead (Marchand & Perrin, 2017: 85).

2.5.2. Bone industry

Mesolithic groups developed bone industry with slight variations between the Early and Late Mesolithic. During the Early Mesolithic, awls and curated point were made from long bones of red deer, while the antler was used to manufacture bevel-end tools and harpoon since the end of the Early Mesolithic and Late Mesolithic (Cristiani, 2009). To manufacture this technologies, direct percussion technique was used in the Early Mesolithic, while direct percussion and longitudinal grooving by flint cutting tools were used in Late Mesolithic.

2.5.3. Ornaments

In Predestel and Mondaval de Sora, ornamental elements have been recorded, mainly performed on shell (Cristiani, 2009; Fontana et al, 2020). In Mondeval de Sora, perforated red deer teeth were found in the Castelnovian burial. Perforated shells of the Sauveterrian phase have not red colour residues around the hole, while the Castelnovian ones of Predestel have it. Within this recent phase, some elements of perforated red deer teeth have been found, which, like the shells, were used as pendants of necklaces.

2.5.4 Burial

Mondeval de Sora has yielded a Mesolithic burial (from the Castelnovian phase), which shows a continuity of the funerary customs of the Epigravettian tradition regarding the supine dorsal position of the skeleton (Fontana et al, 2020). Rich funerary furnishing is composed of diverse elements such as, awl on long bone of elk and red deer, bilateral harpoon of red deer antler beam, lithic elements (flakes, bladelets and cores), vegetal resin, necklace composed of shells and red deer teeth, and ochre pigment. Previous research Sorgenti del Sile (TV, Italy)

Sorgenti del Sile area has a long frequentation since the Late Palaeolithic to the Roman period (Fontana et al, 2018). According to references, the first archaeological evidence has been recorded in 1975 when members of the Gruppo Archeologico Trevigiano collected Early and Late Mesolithic lithic material in a cultivation field in the Vallezze in the Community of Morgano (TV) (Gerhardinger, 1984).

Since then, the archaeological activities were discontinued until more recent investigations conducted by Professors Federica Fontana and Davide Visentin from the University of Ferrara. Several systematic surveys were carried out since 2011 allowing collection of more than 6000 lithic pieces artefacts in more than 500 hectares (Fontana & Visentin, 2016a, Fontana and Visentin, 2018).

Two dissertation theses were carried out by students from Ferrara University, mainly aimed at the analysis of the lithic materials. Daniele Guerra (2014-2015) studied the set material collected during the survey carried out in 2014 in the ALB 5-4-9 fields which are located in the Albaredo area, Vedelado municipality. This study focused on the techno-economic, typological and spatial analysis of the recovered lithic materials to understand the frequentation phases in this area. Results show two main occupation phases dated to the Early and Late Mesolithic respectively. The second study was performed by Chiara Scarazzato (2016-2017) which studied lithic materials from ALB 5-4-9 field collected in 2015. This investigation was oriented to develop the same analysis carried out by D. Guerra.

Concerning the raw material exploited, the Scaglia Rossa from Val Belluna is predominant, and only few elements were produced using Maiolica flint from the Monti Lessini and Asiago plateau.

The study of the cores testified a tendency of flakes and bladelets production. Within the debitage products, most part is related to production/maintenance phases, while a smaller part from maintenance phase. Blades attributes confirmed the presence of both direct percussion and indirect percussion or pressure corresponding to Sauveterrian and Castelnovian phase respectively. Only few retouched pieces are attested mainly armatures and production wastes (e.g microburins) referred to the Sauveterrian phase. The most common domestic tools were endscraper and denticulates. Finally, in the spatial distribution analysis, the Sauveterrian was more widespread while Castelnovian elements were more restricted.

In the surrounding zones of Sorgenti del Sile, especially in Montebelluna, surveys were carried out, identifying lithic artefacts of the Mesolithic periods. Concerning the Early Mesolithic, prismatic and carenoid cores were recorded as well as, truncated point and microburins. Regarding the Late Mesolithic, sub-conical or pyramidal cores, trapezoidal armatures and microburins were documented. Raw material is composed by Maiolica, Scaglia Rossa and Scaglia Variagata exploitation (Duches et al, 2016).

2.6 ALB-14 site

ALB-14 is a small section of approximately 5600 m² located in the southwestern part of the Sorgenti del Sile area between the provinces of Padova and Treviso, Venetian Plain in N-W Italy. The surveys at this site were carried out in the 2018, in which a 5-meter grid system was applied in which more than 300 lithic pieces were collected (Figure 3).

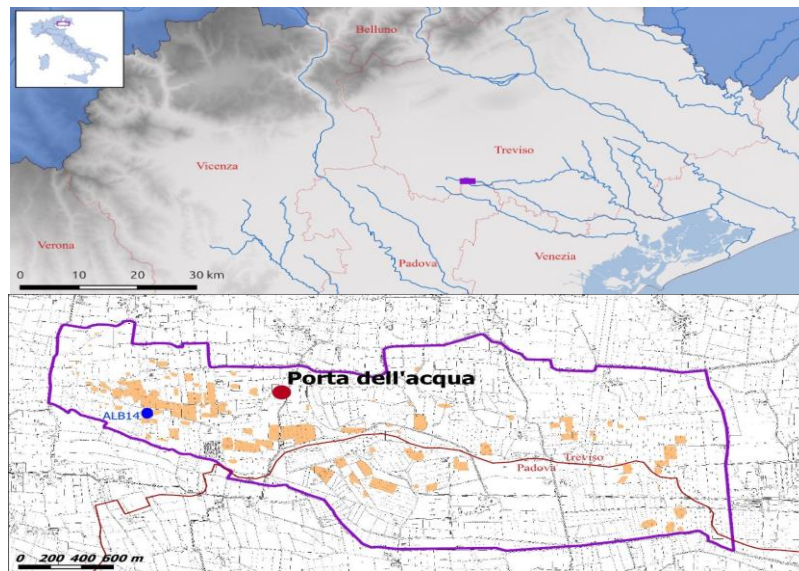


Figure 3. Location of Alb-14 field.

3. MATERIAL AND METHD

This master dissertation focused on the lithic artefacts from the field called ALB-14 which was prospected in 2018- A raw material, technological, typological and spatial analysis has been carried out.

The laboratory work carried out was divided into five stage:

- 1) Washing the materials using water for removing sediment;
- 2) The individualization, labelled and marked of each lithic artefacts bigger than 10 mm with essential information such as the name of the field where the material was recovered, the spatial coordinates (square of grid) and an identification number identifier. This information was applied in the ventral face of the blanks and covered with nail polish. Artefacts smaller than 10 mm were not marked and put directly in a mini-grip plastic bag;
- 3) Raw material identification;
- 4) Technological analysis;
- 5) Spatial analysis.

For carrying out the analysis of the lithic assemblage, a database in which every artefact was entered have been developed. Generally, products smaller than 10 mm, indeterminate fragments and the debris were only counted. Two independent tables were created, one dedicated to debitage blanks and retouched pieces and one for cores. The followings attributes were registered for blanks and retouched pieces:

- ID: corresponds to number of identifiers for each product bigger than 10 mm.
- Squares: the coordinates (squares of the grid) in which the material was recovered
- Dimension: taking into consideration the length, width and thickness
- Integrity: complete, almost complete, proximal, mesial or distal
- Cortex percentage
- Cortex position
- Cortex type: pebble, natural fracture, natural patinated fracture, limestone, indeterminate
- Cortex colour: black, red, yellow or white
- Provenience: outcrop (O), slope detritus (D), torrential pebble (TP), soil (S) or indeterminate.
- Flake-core: yes, or not
- Reduction phase: initiation, maintenance or production
- Technological interpretation. The attribution to a specific technological category such as blade/bladelet, flake, maintenance flake, etc., encompassing the entire reduction sequence. This field represents one of the most important attributes of this table and, to ensure standardisation, it is based on an editable value list with more than 40 options ([Table 2](#))
- Orientation of removals on the dorsal face of the blank: unidirectional, bidirectional, orthogonal, oblique, multidirectional or centripetal.
- Transversal section: triangular, trapezoidal, polygonal, semicircle or indeterminate, etc.

- Shape, as seen from the dorsal face: parallel and irregular edge, parallel and regular edge, fan-shape, cortical, ovoidal, irregular or indeterminable.
- Profile: refers the morphology of the sagittal section which can be rectilinear, concave, sinusoidal, twisted or convex.
- Butt morphology: plain, punctiform, dihedral, faceted, linear, natural, broken or indeterminable, etc.
- Debitage angle
- refers to the intersection between the dorsal face and butt of the lithic pieces
- Butt profile: the morphology of the internal profile. Different criteria have been considered such as clear impact point, convex morphology, slight convexity, irregular, multiple or indeterminable.
- Bulb morphology: absent, slightly pronounced, pronounce or indeterminable
- Esquillement du bulbe: refers to the bulb scar which can be absent, normal or overflowing
- The presence or absence of abrasion of the overhang
- Debitage technique: the action and gesture employed to produce blank such as direct percussion (by hard and soft stone hammer or organic hammer), indirect percussion or pressure. To do that, the stigmata of the butt lip and bulb has been considered
- Alteration: patinate, burnt alteration, patinated and pseudo-retouched, patinated and use wear, and absent alteration
- Alteration grade: deep, superficial and indeterminable

The second database aim to describe the cores attributes. Some are the same of the first one such as ID (number), grid coordinate, dimension (length, width and thickness), raw material, cortex and flake cores. The other attributes considered are described in detail below:

- Phase of exploitation in which the core was discarded: initiation, tested block, high exploited and fulldebitage
- Production objectives: flakes, bladelets or blades
- The dimension of the last and penultimate removal
- Number and position of the striking platform
- Number and position ofdebitage surface
- Thedebitage angle considering the last striking platform anddebitage surface exploited
- The direction of removals (unidirectional, bidirectional, orthogonal, multidirectional or indeterminable).
- Also was recorded the percussion traces highlighting attributes such as marked counter-bulb, overhang abrasion, broken overhang, none and indeterminate.
- The presence of a previous exploitation phase (yes, not and indeterminable).
- apparent reason of abandonment (dimension, raw material quality, overshot angle, etc).
- Typology of the core: tested block, pre-core, broken core, burin-like, prismatic, pyramidal, polyhedral, discoidal/centripetal, other.
- Type of alteration (thermal and/or patina).
- Possible chronology of the core.

3.1. Raw material

D. Guerra (2014-2015) classified the types of raw material according to colour, homogeneity of texture and fossiliferous content. These criteria allowed him, thanks to the help of Dott. S. Bertola, to identify the following outcrops: Fonzaso (FO), Biancone (BI), Calcarie di Soccher (SO), Scaglia Variegata (SV), Sacaglia Rossa (SR); Rosso di Col Indes (RCI) and Scaglia Grigia (SG) and Maiolica (Mai). Scaglia Variegata (SV) and Maiolica was often considered together because of the difficult to distinguish them due to the Patina. To distinguish the raw materials from the different supply areas D. Guerra decided to group the materials in the following way:

- Val Belluna 1: ScagliaR S.A. Tortal; Scaglia Rossa Mel; Scaglia Rossa Mel Alta; Scaglia Rossa Longarone; Scaglia Rossa/Scaglia Variegata Belluno; indeterminable
- Val Belluna 2: Mailica Belluno; Mailica/Soccher dist Bell; Soccher dist / Maiolica; Soccher – Val Belluna; Soccher (Flysch); Scaglia Variegata 1 – Val Belluna; Scaglia Variegata 2 – Val Belluna
- Asiago + Lessini: Maiolica- Lessini; Mai Asiago-Grappa; Scaglia Variegata 3 – Lessini.

In the analysis of the ALB-14 lithic materials, a separation of the pieces was made taking into consideration the colour, the homogeneity of the texture and inclusions. At this first stage, a set of sub-groups considered as Scaglia Rossa were identified: SR1, SR2, SR3a Patinated, SR3b Patinated, SR4 Bicolour, SR5, SR6 and SR7. Within Scaglia Variegata the following subgroups were recognized: SV1, SV2, SV3, SV4 Patinated, SV5. The Maiolica category was divided in Mai 1, Mai 2 and 2 Patinated. Another sub-group was not possible to identified for which were called 2 Patinated and 2. Subsequently, a comparison was made with the materials analysed by D. Guerra:

- Scaglia Rossa SAT= SR1, SR2, SR3a Patinated, SR3b Patinated, SR5, SR6, SR7 Patinated
- Scaglia Rossa MEL= SR4 Bicolour
- Scaglia Variegata 1= SV2, SV3, SV4 Patinated and SV5
- Scaglia Variegata 2=SV1
- Soccher=2
- Scaglia Variegata 3- Lessini= 2 Patinated
- Maiolica Asiago: Mai 2
- Maiolica indet. =Mai 1, SV6

These last categories were grouped according to procurement areas to perform the technological analysis, which are presented as follows ([Table 1](#)):

Table 1. Designed table for each procurement area of raw material

Val Belluna 1	Val Belluna 2	Asiago+Lessini	Belluna/Lessini +indeterminate
Scaglia Rossa SAT	Scaglia Variiegata 1	Maiolica Asiago	Maiolica Indet.
Scaglia Rossa MEL	Scaglia Variiegata 2 Soccher	Scaglia Variiegata 3-Lessina	

Likewise, observing cortex features was possible to understand if the raw materials was collected directly from the outcrops or in secondary deposit. For distinguishing different types of deposit the follow attributes were followed:

- Primary outcrop: thick and white cortex;
- Slope detritus: presence of natural fractures, thin cortex and presence of organic residues;
- Soil: thin cortex due to dissolution process and presence of Fe or Mg oxides; Torrential pebble: rounded morphology.

3.2. Technological analysis

3.2.2. The reconstruction of the chaine opératoire

Once prehistoric groups were supplied raw materials, the reduction process started for producing different blanks. The reconstruction of this process has been divided in six main phases which correspond to different steps of *chaine opératoire* which are describe bellow (Table 2):

- The initiation phase corresponds to the beginning of the reduction process, and it is characterized by the removal of blades and flakes with partial or total cortex on the dorsal face. Their analysis allows to understand how the striking platform and debitage surface were prepared.
- The production phase is intended to obtain the desire blanks both flakes or blades generally lacking cortex.
- Maintenance phase consists of rejuvenation of re-shape core removing the imperfection produced by accident both the striking platform and debitage surface and achieve the suitable convexity for the extraction of new desired blanks.
- Three ibrid phases were also created since some artefacts do not have a univocal interpretation and they can be located in more than one phase: initiation/maintenance, initiation/production, maintenance/production.

Table 2 Blanks of the reduction sequence within their respective reduction phase

Initiation/shaping out phase	Production
<ul style="list-style-type: none"> ▪ Opening blade /flake ▪ Generic cortical flake ▪ Semi-cortical flake ▪ Crested blade ▪ Partial crested blade 	<ul style="list-style-type: none"> ▪ Blade/bladelet ▪ Laminar flake ▪ Under-crested blade ▪ Flake
Maintenance	Initiation/production
<ul style="list-style-type: none"> ▪ Carénage flake ▪ Surface maintenance blade/flake ▪ Surface maintenance blade/flake from the opposite striking platform ▪ Natural backed blade ▪ Reorientation blade/flake ▪ Distally reorientation blade ▪ Reorientation blade on the overhang ▪ Striking platform flake ▪ Generic maintenance flake 	<ul style="list-style-type: none"> ▪ Semi-cortical blade
	Initiation/maintenance
	<ul style="list-style-type: none"> ▪ Semi-cortical backed blade
	Maintenance/production
	<ul style="list-style-type: none"> ▪ Neo-crested blade ▪ Partial neo-crested blade ▪ Natural backed blade ▪ On edge blade ▪ Debordant flake ▪ Debordant cortical flake

3.2.3. Technological attributes analysis

To reduce the mass of cores different techniques could be implemented such as direct percussion by hard stone hammer, direct percussion by soft stone hammer, direct percussion by organic hammer, indirect percussion and pressure. They can distinguish by the different attributes of the removal blanks as the regularity, bulb morphology, lip formation. To recognise the technique used by the flintknappers from ALB 14 field, this study is supported by Pelegrin (2000, 2006) Damlien, (2015) as well as lithic studies handbooks such as Inizian et al, (1999), and Arzarello et, al (2010).

3.3. Typology analysis

The typological analysis has been carried out following the typological list proposed by Laplace (1964), together with the study of Broglio and Koslowski (1984) which is more specific of the Mesolithic of Northwestern Italy and Isota and Longo (2008) for the Neolithic and Bronze Age artefacts.

3.4. Spatial analysis

Finally, we developed the spatial analysis, which allows us to know the spatial organization of the archaeological record. This analysis was also carried out by Daniele Guerra (2014) and Chara Scarazzato (2015) to know the spatial distribution of the ALB 5-4-9 field.

To carry out this analysis the QGIS software has been used. The first step was the georeferencing of the area following the Coordinate Reference System (CRS) Monte Mario/ Italy zone 1-EPSG: 3003, and the creation of a grid corresponding to the squares used during the survey in ALB-14 field in 2018.

The spatial analysis has done taking into consideration different aspects such post-depositional alteration, raw material groups, reduction phases, typology, chronology of the retouched blanks, type and chronology of the cores. However, it is important to stress that the spatial distribution of the analysed lithic assemblage, being a survey collection, does not correspond to its original position in the deposit, but only to its position before collecting it.

4. RESULTS

4.1 The lithic assemblage

The lithic collection of ALB-14 counts of total 300 pieces. Firstly, the material has been divided into different categories according to presence or absence of conchoidal fracture to determinate human intervention and then according to the morphology of products (blade, flakes, lamellar flakes, the production wastes (cores) and retouches pieces. Flakes reach 34% and blades 19% are prevalent in the lithic assemblage, followed by retouched piece 11%. Blades/flakes represent 5% and cores 5%. Additionally, there was a high frequency of natural pieces that do not exhibit conchoidal fracture (Table 4).

Table 3 Type of blanks identified

Lithic products	N	%
Cores	15	5
Flakes	103	34
Blades/flakes	14	5
Blades	58	19
Retouched pieces	34	11
Natural pieces	76	25
Total	300	100%

In term of alteration, deep patination is predominant at 46%, patination and pseudo retouched 13%, superficial patination at 11%, burnt pseudo retouched and patination and use-wears each account 4% in unretouched. Absent patination constitutes 11%, while materials with only use-wears alteration were not recorded (Table 5).

Table 4 Alteration type in the lithic Assemblage of ALB 14

Alteration	N	%
Absent	39	13
Superficial patination	34	11
Deep patination	138	46
Patination and pseudo retouched	38	13
Patination and use were	13	4
Use-wear	0	0
Pseudo retouched	13	4
Burnt	17	6
Total	300	100

Of the total knapped pieces, complete integrity prevails at 42%, distal at 17%, proximal 15%, almost complete 10%, mesial 9% (Table 6).

Table 5 Integrity of blades, flakes and retouches pieces

	N	%
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Complete	89	42
A. complete	21	10
Proximal	32	15
Mesial	20	9
Lateral	8	4
Distal	35	17
Broken	3	1
Indet.	4	2
Total	212	100

4.2 Raw Material Analysis

Lithic artefacts were macroscopically compared with the assemblage from ALB 5-4-9 analysed by D. Guerra (2014-2015) to identify the raw material and infer the possible procurement areas used. This comparison reveals various flints lithotypes and their geological formation zones, as detailed in [Table 7](#).

Table 6 Types of raw material with their possible procurement area

Raw material	Procurement zone	N	%
Scaglia Rossa-SAT	Val Belluna 1	123	41
Scaglia Rossa-MEL	Val Belluna 1	16	5
Scaglia Variegata 1	Val Belluna 2	59	20
Scaglia Variegata 2	Val Belluna 2	8	3
Scaglia Variegata 3	Lessini	13	4
Maiolica-B/L	Belluna/Lessini	29	9
Maiolica-A.	Asiago-Grappa	8	3
Maiolica indet.	Indeterminate	6	2
Soccher:	Val Belluna 2	10	3
Indet.	indet	31	10
Total		300	100

Nine lithotypes of exploited raw materials were identified in this study. The most frequently used flint comes from the Belluna valley, including Scaglia Rossa SAT (SR-SAT) =41%, Scaglia Rossa MEL (SR MEL) =5% and Soccher=3%. Scaglia Variegata-1 (SV-1) constitutes 20% of the assemblage and Scaglia Variegata-2 (SV-2) constitutes 3%, Maiolica from Asiago (Mai-A) at 3%. Maiolica from Maiolica Belluna/Lessini (Mai-B/L) at 9% and Maiolica Indet. are poorly exploited. Scaglia Rossa and Scaglia Variegata correspond to an Upper-Middle Cretaceous micritic limestones formations, while Maiolica is referred to the Lower Cretaceous.

4.2.1 Raw material from Val Belluna 1

Flint from Val Belluna 1 is composed of Scaglia Rossa SAT which account for 96%, with a smaller quantity Scaglia Rossa MEL at 5%. Both types exhibit a cryptocrystalline texture ([Table 8](#)). Scaglia Rossa SAT is composed by different sub-groups characterised for pale orange colour with low glossy appearance (SR1), dull reddish brown with medium glossy aspect (RS2); bright

reddish-brown painted, very glossy aspect and sporadic calcareous inclusion of medium size (SR3a-Patina); brown patina with small inclusion and glossy aspect (SR3b patina), brown patina with low glossy aspect (SR5) brown patina generally without glossy appearance (SR6); and dark reddish brown patina with very glossy aspect. Scaglia Rossa MEL is bicolour flint, exhibiting red-greyish yellow colour and with a slight glossy aspect (SR4 patination).

Table 7 Subcategories raw material from Val Belluna 1

Subcategory of SR-SAT and MEL	N	%
SR1	15	11
SR2	12	9
SR3a-Patina	31	23
SR3b-Patina	25	18
SR4- bicolour	16	12
SR5	9	6
SR6	13	9
SR7 patina	17	12
Total	139	100

Of the total sample from this formation area, 105 pieces were knapped, the majority of these have pieces lack cortex accounting for 44%, followed by those with less than 50% cortex at 39%. Pieces with more than 50% cortex constitute 10%, while those with almost all cortex are 6% and pieces with the total cortex are only 1%. Regarding the type of cortex, natural patinated fractures cortex is predominant (18%), while the remaining types are more evenly distributed.

Regarding the position of the cortex, the lateral position is the most common, accounting for 33%, followed by the dorsal position at 18%. Both the distal and proximal positions represent 12%. In lower percentages, almost total and bilateral cortex each account for 8%, while mesial cortex accounts for 3%. The dorsal-proximal position, double dorsal, and total cortex are 2%. In term of procurement zone, the majority of cortex could not be identified. Among those that were identified, soil origin represents 14% and torrential pebble account for 10%. Less common human groups from ALB-14 collected flint resources directly outcrops (3%) or in slope detritus (2%). The combination of torrential pebble/soil reached 1%.

4.1.2 Raw material from Val Belluna 2

Raw material from Val Belluna 2 is composed by Scaglia Variegata 1, Scaglia Variegata 2 and Soccher flint. For Scaglia Variegata 1, the material is characterized by a cryptocrystalline texture with the following variations: uniform yellowish/brown patina and grey colour (SV2), light grey colour (SV3), deep yellowish-brown patina and small portion of grey colour (SV4- Patinated) and bright-brown patina with small white inclusions (SV5) (Table 9). Scaglia Variegata 2 is composed only by a flint characterized by dark grey colour and glossy aspect (SV1). Concerning the soccher group, it is composed by only one subcategory characterized by a yellowish and brown colour with fine stratifications and generally without glossy aspect (2).

Considering the total knapped pieces (n=53), the majority (40%) has in its dorsal faces less than 50% of cortex, followed by almost total with 19%, while 13% show total or any cortex.

Table 8 Subcategories of raw material from Val Belluna 2

Sub-categories	Scaglia	N	%
Variegata			
SV1		8	10
SV2		6	8
SV3		12	16
SV4-Patination		11	14
SV5		28	36
2		10	13
Total		77	100

Regarding the type of cortex, pebble cortex is the most prevalent, accounting for 25%, followed by natural fracture (21%) and natural fracture (19%). Other types of cortex are less common, with limestone at 9% and mixed cortex at 6%. In terms of cortex position, lateral is the most common at 19%, followed by almost total at 17%, total at 13%, and distal at 11%. Proximal and mesial positions are less frequent. The provenance of most pieces based on cortex features could not be determined (49%). Among those that could be identified, torrential pebbles and soil are predominant, each representing 27%, while torrential pebble/soil accounts for 9%.

4.2.3 Raw Materials from Asiago and Lessini Trento Plateau

Raw material from Asiago and Lessini is characterised by cryptocrystalline flint. Maiolica from Asiago features as bright-brown patina with large white inclusions (Mai 2). Flint from Lessini is distinguished by a homogeneous orange patina (Mai 2 Patined), which was categorized as Scaglia Variegata 3 (SV3-L) and represents 60% (Table 10). Most of the lithic artefacts made from Asiago and Lessini flints lacks cortex (60%). Of the remaining pieces, 30% have less than 50% cortex, and only 10% exhibit total cortex.

Table 9 subcategories of raw material from and Lessini area

Asiago+Lessini	N	%
Mai 2	8	40
2 patinated	12	60
Total	20	10

Natural patinated fracture is the most common type of cortex, accounting for 25%, while mixed cortex represents 5%. In terms of cortex position, backed cortex is present in 15%, lateral in 10%, and bilateral in 5%. Regarding provenance, most pieces could not be determined (75%). Soil origin represents 20% and torrential pebble/soil accounting for 5%.

4.2.4 Raw material from Belluna/Lessini + Indeterminate Maiolica

Flint from Belluna/Lessini + Indeterminable Maiolica are characterized by cryptocrystalline texture flint composed by brown colour with small white inclusions and glossy aspect (Mai 1), and slightly yellowish and glossy aspect (SV6) (Table 11). In this sample, 60% of the elements lacks cortex, 31% has less than 50% cortex, 9% has more than 50% cortex, and 3% has total cortex.

Table 10 Subcategories from Belluna/Lessini + Indeterminate Maiolica

	N	%
Mai 1	29	83
SV6	6	17
Total	35	100

Lateral position cortex is predominant at 9%, while the backed and mesial positions account for 6% respectively. Distal, lateral, lateral-proximal, proximal and total positions are present at 3%. The provenance based on cortex features could be determined for only 6% of the sample. Within them, torrential pebbled and torrential pebbled/soils are only attested (3%).

4.3 Technological Analysis

4.2.1. Unretouched Lamellar Blanks

Integrity

Regarding lamellar blanks, complete integrity represents 26%, almost complete represent 8%, while the majority are fragmented. In the assemblage from Val Belluna 1, complete pieces account for 33%, while broken reach a higher percentage including proximal, mesial and distal portions (Table 12).

Table 11 Integrity of unretouched lamellar blanks

Integrity	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N°	%
Complete	11	33	3	20	3	30	1	8
Almost complete	2	6	3	20	1	10	0	0
Proximal	9	25	5	33	2	20	3	25
Mesial	4	11	1	7	2	20	3	25
Lateral	0	0	0	0	0	0	0	0
Distal	9	25	3	20	2	20	5	42
Broken	0	0	0	0	0	0	0	0
Indet.	0	0	0	0	0	0	0	0
	35	100	15	100	10	100	11	100

In samples from Val Belluna 2, complete and almost complete pieces each represent 20%, while proximal and distal parts represent 60%. In Asiago + Lessini sample, 30% are complete and almost complete (10%), with proximal, mesial and distal parts each representing 20%. For the Belluna/Lessini + indeterminable Maiolica, 8% are complete while 92% are fragmented.

Table 12 Reduction sequence and phase on the bladelets

Lamellar blanks	Phase	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Belluna/ Lessini+ Indet. Maiolica	
		N	%	N	%	N	%	N	%
Unilateral crested blade	Initiation	0	0	0	0	1	10	0	0
Opening blade	Initiation	0	0	1	7	0	0	0	0
Naturally cortical double backed blade	Initiation	1	3	0	0	0	0	0	0
Semi-cortical blade	Initiation	2	6	1	7	1	10	0	0
Semi-cortical edge blade	Initiation	1	3	0	0	0	0	0	0
Semi-cortical blade/	Initiation/	1	3	2	14	1	10	0	0

bladelet Semi-cortical bladelet/flake	production Initiation/ Production	2	6	1	7	0	0	0	0
Naturally cortical backed blade	Maintenance	1	3	0	0	0	0	0	0
Reorientation blade	Maintenance	0	0	1	7	0	0	0	0
Reorientation blade on overhang	Maintenance	3	9	0	0	0	0	0	0
On edge blade	Maintenance	0	0	0	0	1	10	0	0
Neo-crest	Maintenance	1	3	0	0	0	0	0	0
Naturally double backed blade	Maintenance/ Production	1	3	0	0	0	0	0	0
Naturally backed blade	Maintenance/ Production	1	3	2	13	2	20	0	0
Naturally cortical backed blade	Maintenance/ Production	1	3	2	13	0	0	0	0
Surface maintenance blade	Maintenance/ Production	1	3	0	0	0	0	0	0
On edge blade	Maintenance/ production	1	0	1	7	0	0	0	0
Blade/bladelet	Maintenance/ Production	0	0	0	0	1	10	0	0
Naturally backed flake/blade	Maintenance/ Production	0	0	1	7	0	0	0	0
Neo-crest	Maintenance/ Production	1	3	0	0	0	0	0	0
Naturally double backed blade	Production	1	3	0	0	0	0	0	0
Blade/bladelet	Production	11	31	2	13	3	30	9	82
Bladelet/flake	Production	2	6	0	0	0	0	1	9
Reorientation bladelet/ Flake	Production	1	3	0	0	0	0	0	0
Burin-spall	Other	2	6	1	7	0	0	1	9
Total		35	100	15	100	10	100	11	100

In the Val Belluna 1 sample, the phases are distributed as follows: initiation constitutes 12%, initiation/production 9%, maintenance 15%, maintenance/production 12%, production 43%, and other 6% (Table 13). For the Val Belluna 2 blanks, the distribution is: initiation 14%, initiation/production 21%, maintenance 7%, maintenance/production 40%, production 13%, and other 7%. In the Asiago + Lessini sample, the phases are as follows: initiation 20%, initiation/production 10%, maintenance 10%, maintenance/production 30%, and production 30%. In the Belluna/Lessini + Indeterminate Maiolica sample, production is predominant at 91%, with the remaining 9% representing lamellar blanks from other phases

Dimension

Complete pieces from Val Belluna 1 have a length dimension ranging from 13 to 20 mm. In the Val Belluna 2 sample, the length is 21. In the Belluna/Lessini + Indeterminate Maiolica, the length is 22 mm. (Table 14).

Table 13 Dimension of the unretouched bladelets of production phase

	Val Belluna 1			Val Belluna 2			Asiago/Lessini			Belluna/Lessini + Indet. Maiolica		
	Len	wid	Th	Len	wid	th	Len	wid	th	len	wid	th
min	13	5	1	21	13	2				22	9	2
mean	16	8	3									
Max	20	10	5									

Shape

Regarding the shape of the sample of Val Belluna 1 consists of 26% elements with regular edges, including those parallel and convergent and regular edges. Elements with a more irregular shape are highly represented reaching 72% (Table 15). The Val Belluna 2 sample shows similar trend, 33% of blanks are regular, while 67% are irregular. Among the irregular blanks, parallel and irregular edges are most common (40%), followed by convergent and irregular edges (27%). In the Asiago + Lessini sample, parallel and irregular edges are predominant, comprising 80% of the blanks, while parallel and regular edges achieve 20%. For the Belluna/Lessini + Indeterminate Maiolica sample, parallel and regular edges are most prevalent at 55%, followed by parallel and irregular edges at 36%.

Table 14 Shape of blade and bladelet

Shape	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Parallel and regular edges	7	20	5	33	2	20	6	55
Parallel and irregular edges	15	43	6	40	8	80	4	36
Convergent and regular edge	2	6	0	0	0	0	0	0
Convergent and irregular edges	7	20	4	27	0	0	0	0
Irregular	3	9	0	0	0	0	0	0
Indet.	1	3	0	0	0	0	1	9
Total	35	100	15	100	10	0	11	100

In Val Belluna 1, the initiation phase is composed by pieces with parallel and irregular edge (50%), and convergent and irregular one (25%) and indeterminate (25%). In initiation phase, parallel and irregular edge is more common (66.6%) followed by irregular (25%). In the maintenance phase, convergent and irregular edge is more frequently (60%), while parallel and irregular reach 20%. In maintenance/maintenance phase, parallel and irregular edge is more

abundant shape (66.6%), followed by parallel and regular edge (16.5%). In production phase, parallel and irregular edge has 40%, parallel and regular edge 26.6%, while convergent and regular edge and convergent and irregular edge achieve 13.3%.

In Val Belluna 2, initiation phase is composed of parallel and edge (66.6%), and convergent and irregular edge (33.3%). In initiation/production phase, convergent and irregular, parallel and irregular edge and parallel and regular edge have 33.3%. In maintenance phase, only parallel and irregular edge was found. In maintenance/production phase, parallel and regular edge has 50%, and convergent and irregular edge and parallel and parallel reach 25%. In production phase, parallel and irregular edge and parallel and irregular edge archive 50%.

In Asiago + Lessini, the initiation phase is characterized by parallel and edge and parallel and irregular edge have 50% respectively. In initiation phase only convergent and irregular edge was recorded, while in maintenance, maintenance/production and in production phase, only parallel and irregular edge.

In Belluna/Lessini + indeterminate Maiolica, parallel and irregular edge and parallel and regular edge have 50%.

Distal morphology

In Val Belluna 1, the most common distal morphology is normal, representing 49%, while plugging appears less frequently at 11%, and hinged morphology accounts for 6%. In Val Belluna 2, the normal prevails with 40% and plugging reaches 13%. In Asiago + Lessini, the normal represent 40% and hinged plugging 10%. In Belluna/Lessini + indeterminate Maiolica the frequency of normal distal morphology decreases to 27% while hinged increase to 18 % (Table 16).

Table 15 Distal morphology of the unretouched lamellar sample

Distal morphology	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Normal	17	49	6	40	4	40	3	27
Hinge	2	6	0	0	1	10	2	18
Plugging	4	11	2	13	1	10	0	0
Indet.	12	34	7	47	4	40	6	55
Total	35	100	15	100	10	100	11	100

In Val Belluna 1, in initiation phase, normal distal morphology is more common (50%), followed by hinged and indeterminate at 25%. In initiation/phase, normal distal morphology has 66.6% and indeterminate 33.3%. In maintenance phase, normal dita morphology has 80% and indeterminate 20%. In maintenance/production phase, normal distal morphology prevails (33.3%), followed by plugging (16.6%). In production phase, normal distal morphology is more frequently (38%), followed by plugging (13%) and hinged (6.5%).

In Val Belluna 2, in initiation phase, plugging distal morphology is more common (66.6%, followed by normal one (33.3%). In initiation phase, normal distal morphology constitutes 33.3% and indeterminate 66.6%. In maintenance phase, only indeterminate was found. In maintenance/production phase, normal distal morphology has 75% and indeterminate 25%. In production phase, only indeterminate distal morphology was found.

In Asiago + Belluna flint, the initiation phase, only indeterminate distal morphology was recorded. In initiation/phase, plugging distal morphology represents 100%, as well, normal one in maintenance. In maintenance/production phase, normal and indeterminate distal morphologies reach 50%. In production phase, normal distal morphology achieves 50% and hinged 25%.

In Belluna/Lessini + indeterminate Maiolica, initiation phase is characterized only by normal distal morphology, while in production phase, normal distal morphology reaches 40%, hinged 20% and indeterminate 40%.

Transversal section

Transversal section in Val Belluna 1 exhibits similar proportion between trapezoidal with 54% and triangular with 46%, while the polygonal and cortical are absent (Table 17). In Val Belluna 2, the triangular is more significant with 73% and trapezoidal represents 20% and a small density appears the cortical one with 7%. In Asiago + Lessini, the triangular section prevail (60%), followed by trapezoidal (40%), while in Belluna/Lessini + indeterminate Maiolica, trapezoidal and triangular reach 45%.

Table 16 Transversal section of blades and bladelets

Transversal Section	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N°	%	N	%	N	%
Triangular	16	46	11	73	6	60	5	45
Trapezoidal	19	54	3	20	4	40	5	45
Polygonal	0	0	0	0	0	0	0	0
Cortical	0	0	1	7	0	0	1	10
Total	35	100	15	100	10	100	11	100

In the initiation phase of Val Belluna 1 sample, triangular section composes 75% and trapezoidal 25% (Table 18). In initiation/production, the triangular section represents 66.6% and trapezoidal 33.3%. In maintenance, the triangular section is more common (60%) and trapezoidal reaches 40%. In maintenance/production, the triangular section is more common (60%) followed by trapezoidal (50%). In the contrary in production, the trapezoidal section is more frequently (75%) and triangular reaches 31.25%.

In the initiation phase of Belluna 2, the cortical section and trapezoidal are 50%. In initiation/production and in maintenance, the triangular section constitutes 100%. In

maintenance/production, the triangular sections represent 75% and trapezoidal 25%. In production, the trapezoidal section is more common (60%) followed by triangular one (40%).

In initiation phase of Asiago + Lessini, the triangular section represents 100%. In initiation/production, only was found the triangular section (100%). In maintenance/production and in production, the triangular section and trapezoidal are 50%. In the production phase of the Belluna/Lessini + Indeterminate Maiolica, the trapezoidal section is more common (55%) while the triangular 45%.

Table 17 Section of blades and bladelets according to each reduction phase

	Phase	Triangular		Trapezoidal		Polygonal		Cortical	
		N	%	N	%	N	%	N	%
Val Belluna 1	Initiation	3	75	1	25	0	0	0	0
	Initiation/ production	2	66.3	1	33.7	0	0	0	0
	Maintenance	3	60	2	40	0	0	0	0
	Maintenance/ Production	2	40	3	60	0	0	0	0
	Production	5	25	10	75	0	0	0	0
	Other	1	50	1	50	0	0	0	0
	Val Belluna 2	Initiation	1	50	0	0	0	0	1
Initiation production		2	100	0	0	0	0	0	0
Maintenance		1	100	0	0	0	0	0	0
Maintenance/ production		3	75	1	25	0	0	0	0
Production		2	40	3	60	0	0	0	0
Other		1	100	0	0	0	0	0	0
Asiago+Lessini		Initiation	2	100	0	0	0	0	0
	Initiation/ production			1	100	0	0	0	0
	Maintenance	1	100	0	0	0	0	0	0
	Maintenance/ production	1	50	1	50	0	0	0	0
	Production	2	50	2	50	0	0	0	0
Belluno+Lessi+ Indet	Maintenance/ production	1	100	0	0	0	0	0	0
	Production	4	45	5	55	0	0	0	0
	Other	0	0	0	0	0	0	1	100

Sagittal Section

Sagittal profile of blades and bladelets of Val Belluna 1 is dominated by rectilinear 49% and concave 17%, while the twisted/concave reaches 14% (Table 19). In Val Belluna 2, blades and bladelets are more rectilinear (47%), while twisted/concave 20% and twisted and sinusoidal

achieve 7% respectively. In the Asiago + Lessini sample, the rectilinear profile is predominant, representing 60%, followed by twisted profiles at 20% and concave profiles at 10%.

Table 18 Sagittal profiles of blades and bladelets

Profile	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Concave	6	17	1	7	1	10	2	18
Convex	0	0	0	0	0	0	0	0
Rectilinear	17	49	7	47	6	60	5	45
Sinusoidal	2	6	1	7	0	0	0	0
Twisted	0	0	1	7	2	20	1	9
Twisted/concave	5	14	3	20	0	0	0	0
Indet.	5	14	2	13	1	10	3	27
Total	35	100	15	100	10	100	11	100

In Initiation phase of Val Belluna 1, the rectilinear profile is predominant (80%, n=5) and concave represent 20% (n=1). In initiation/production, the indeterminate profile represents 66.6% (n=2) and sinusoidal 33.3% (n=1). In maintenance, twisted/concave profile represent 33.3% (n=2) and rectilinear, sinusoidal and indeterminate reach 16.6% (n=1) respectively. In maintenance production, the rectilinear profile and twisted/concave achieve 33.3% (n=2), while the convex and indeterminate represent 16.6% (n=1), respectively. In production, the rectilinear profile represents 73.3% (n=11), followed by concave at 13.3 (n=2).

In initiation phase of Val Belluna 2, the twisted/concave profile represents 66.6% (n=2), while the intermediate 33.3% (n=1). In initiation/production, the rectilinear profile and indeterminate achieve 50% (n=1) respectively. In maintenance, was only recorded the twisted profile at 100% (n=1). In maintenance/production, the concave, rectilinear, sinusoidal, twisted are similarly 25% (n=1) respectively. In production, the rectilinear profile reaches 80% (n=4).

In initiation phase of Asiago + Lessini, the rectilinear profile represents 100% (n=2). In initiation production, the concave profile reaches 100% (n=1). In maintenance, only the twisted/concave profile was found at 100% (n=1). In maintenance/production, only the rectilinear profile was recorded at 100% (n=2). In production, the rectilinear profile prevails at 50%, while twisted/concave and indeterminate profile represent 25% (n=1) respectively. In production phase of Belluna/Lessini + Indeterminate Maiolica, sample, the rectilinear profiles achieve 50% (n=5), followed by concave and twisted at 10% (n=1) respectively, while 40% it was not possible to determinate.

Type of butt

Type of butts of Val Belluna 1 is mostly represented by plain at 17%, linear 14% and punctiform at 9% morphology while indeterminate and broken at 51% (Table 20). In Val Belluna 2, profile is mainly represented by plain at 40%, faceted at 18% and natural at 7%. In Asiago + Lessini is

more frequent punctiform with 30%, dihedral at 10% and plain at 10%. Finally, Belluna/Lessini + indeterminate Maiolica, linear profile at 18%, faceted at 9% and punctiform represent at 9%.

Table 19 Types of butts of blades and bladelets

	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Natural	1	3	1	7	0,0	0	0	0
Plain	6	17	6	40	1	10	0	0
Concave	0	0	0	0	0	0	0	0
Faceted	2	6	2	13	0		1	9
Linear	5	14	1	7	0	0	2	18
Punctiform	3	9	0	0	3	30	1	9
Dihedral	0	0	0	0	1	10	0	0
Broken	4	11	2	13	1	10	2	18
Indet.	14	40	3	20	4	40	5	45
Total	35	100	15	100	10	100	11	100

In initiation phase of Val Belluna 1, the punctiform profile represents 20%, and indeterminate 80%. In initiation/production, the plain and linear profiles reach 33.3% respectively, while indeterminate 33.3%. In maintenance, the plain profile prevails (40%), followed by linear and broken each account for 20%. In maintenance/production, the plain profiles represent 50%, followed by punctiform and broken are 16.6% respectively. In production, the faceted type and broken are 12.5% individually and dihedral, punctiform, linear and plain are 6.25% respectively, while the most of the could not be determinate.

In initiation phase of Val Belluna 2, the plain butt and broken are 33.3% respectively, while the 33.3 was not possible to determinate. In initiation/production, the plain and faceted represent 33.3% respectively and 33.3% was not possible to determinate. In gestion, only the plain profile was found at 100%. In maintenance/production, the plain profile is more frequently (60%) and the broken and indeterminate represent 20% respectively.

In initiation of Asiago + Lessini, the dihedral and punctiform are 33.3% respective and 66.6% was not possible determinate. In initiation/production and maintenance, only punctiform profile was found (100%), while in maintenance/production, the profiles were not possible to determinate. In production, the plain and broken profiles represent 25% respectively.

Esquilement du bulbe

In Val Belluna 1, the absence of esquilement du bulbe represent the 34% and normal type the 17% (Table 21). In Val Belluna 2, the absent esquilement du bulbe represents 53% while normal is less common with 20%. In Asiago + Lessini, the absent esquilement du bulbe represents 30% and normal 50%. In Belluna/Lessini + Indeterminate Maiolica, the absent esquilement du bulbe was high documented while normal only represent 10%.

Table 20 Esquilement du bulb of blades and bladelets

	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Absent	12	34	8	53	3	30	4	40
Normal	6	17	3	20	2	20	1	10
Debordant	0	0	0	0	0	0	0	0
RT	0	0	0	0	0	0	0	0
Indet.	17	49	4	27	5	50	6	60
Total	35	100	15	100	10	1000	11	100

In Val Belluna 1, absent esquilement du bulbe at 25% and indeterminate represent 80% in initiation phase. In initiation/production, the absent esquilement du bulbe at 33.3% and indeterminate 66.6%. In maintenance, the normal esquilement du bulbe is more common (40%) followed by absent (20%) and indeterminate represents 40%. In maintenance/production, the absents esquilement du bulbe at 50% and absent at 16.6% and intermediate at 33.3%. In production, the absentesquilement du bulbe at 25%, normal 12.5% while the most part was not possible determinate.

In Val Belluna 2, the absent esquilement du bulbe at 33.3% and indeterminate at 66.6% in initiation phase. In initiation/production, the absent traces represent 66.6% and indeterminate 33.3%. In maintenance, only absent esquilement du bulbe was found at 100%. In maintenance/production, the normal and absent esquilement du bulbe represent 40% respectively and interminable 20% in initiation phase. In production phase, the absent esquilement du bulbe at 50%, normal 25% and indeterminate at 25%.

In Asiago + Lessini, absent esquilement du bulbe and normal traces are 55% respectively in initiation phase. In initiation/production, normal esquilement du bulbe prevail (100%). In maintenance, the absent esquilement du bulbeat 100%. In maintenance/production, 100% was not possible to determinate. In production, the absent esquilement du bulbe at 25% and in 75%. In Belluna/Lessini + Indeterminate Maiolica, the absent esquilement du bulbe at 36.3%, normal at 9% and indeterminate 54.5% in production phase.

Bulb morphology

In Val Belluna 1, bulb morphology is predominantly diffuse at 40%, followed by pronounced at 9% and absent at 3%, with indeterminate morphology accounting for 49% (Table 22). In Val Belluna 2, the diffuse is more common at 47%, followed by pronounced at 13%, absent 7% and indeterminate at 33%. In Asiago + Lessini Maiolica the diffuse bulb is more significant with at 40% followed by absent at 10% and indeterminate representing at 50%. in Val Belluna/Lessini + Indeterminate Maiolica diffuse bulb prevail at 27% while the indeterminate morphology is predominant at 73%.

Table 21 Butt morphology of blades and bladelets

	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Absent	1	3	1	7	1	10	0	0
Pronounced	3	9	2	13	0	0	0	0
Diffuse	14	40	7	47	4	40	3	27
Indet.	17	49	5	33	5	50	8	73
Total	35	100	15	100	10	100	11	100

Recording the reduction phase of Val Belluna 1, the diffuse bulb at 25% and indeterminate at 75% in initiation phase. In initiation/production, diffuse bulb at 66.6% and indeterminate at 33.3%. In maintenance, pronounced bulb represents 40%, diffuse at 20% and indeterminate at 40%. In maintenance/production, diffuse and absent bulbs represent 33.3% respectively and indeterminate at 33.3%. In production phase, diffuse bulb is more common (40%), followed by pronounced (6.6%) and indeterminate 43.6%.

In Val Belluna 2, the diffuse bulb represents 33.3% and indeterminate at 66.6% in initiation. In initiation/production, diffuse bulb at 66.6% and indeterminate at 33.3%. In maintenance, pronounced bulb represents 40%, diffuse at 20% and indeterminate at 40%. In maintenance/production, diffuse and absent bulbs represent 33.3% respectively and indeterminate at 33.3%. In production, diffuse bulb is more common (50%), followed by pronounced (25%) and indeterminate at 25%.

In Asiago + Lessini, only the diffuse bulb is present in initiation and maintenance phases at 100%. In maintenance/production, 100% are indeterminate. In production, absent bulb at 25% and indeterminate 75%. In Belluna/Lessini + Indeterminate Maiolica, indeterminate bulb represents 100% in initiation. In production phase, the diffuse bulb is at 27.7% and indeterminate at 72.3%.

Butt profile

Butt profiles in the Val Belluna 1 sample, are distributed as follows: the clear impact point prevails at 17%, seconded by slightly convexity at 14, and convex at 9% and irregular at 6%, while the indeterminate profile at 54% (Table 23). In Val Belluna 2, clear impact point represents 40%, convex profile 13%, the irregular and slightly convexity reach both 7%. In Asiago + Lessini the slightly convexity is more significant achieving percentage of 30%, followed by clear impact point at 20%. Concerning to the Belluna/Lessini + indeterminate Maiolica the slightly convexity is also predominant with 18% followed by clear impact point 9%, whereas 73% is indeterminate.

Table 22 Butt profiles of blades and bladelets

Butt profile	Val Belluna 1	Val Belluna 2	Asiago+	Bell/Les+
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					Lessini		Indet. Maiolica	
	N	%	N	%	N	%	N	%
Clear impact point	6	17	6	40	2	20	1	9
Convex	3	9	2	13	0	0	0	0
Slightly convex	5	14	1	7	3	30	2	18
Irregular	2	6	1	7	0	0	0	0
Indet.	19	54	5	33	5	50	8	73
Total	35	100	15	100	10	100	11	100

In Val Belluna 1, the irregular profile at 25% and indeterminate at 75% in initiation phase. In initiation production, the convex and clear impact point are more common at 33.3% respectively and indeterminate at 33.3%. In maintenance, the clear impact point profile represents 40%, and slightly convexity 20%, while the indeterminate at 40%. In maintenance/production, the convex and slightly convex profiles are 33% respectively and indeterminate at 66.6%. In production, the slightly convexity profile at 18.75% and convex at 6.22% and indeterminate 62.5%.

In Val Belluna 2, the clear impact point at 33.3% and indeterminate 66.6% in initiation. In initiation/production, the clear impact point at 66.6% and indeterminate at 33.3%. In maintenance, only clear impact point was found (100%). In maintenance/production phase, clear impact point, irregular and convex profiles are 20% respectively and indeterminate at 40%. In production, the clear impact point, convex and slightly convexity profiles are 25% respectively and indeterminate 25%.

In Asiago + Lessini, the slightly convexity and clear impact point represents 50% respectively in initiation phase. In maintenance, the slightly convex at 100%. In maintenance/production, the indeterminate profile represents 100%. In production, the slightly convexity profile represents 25% and indeterminate 75%. In Belluna/Lessini, in production phase, slightly convex profile at 18.18%, clear impact point 9% and indeterminate 72.72%.

Removals direction

The reduction scheme observed in the Vall Belluna 1 shows the following distribution the unidirectional orientation is more common at 49% followed by bidirectional at 26% and orthogonal at 20%, while the multidirectional is less frequent at 6% (Table 24). Unidirectional at 40% and bidirectional at 47% have similar distribution in Val Belluna 2, and indeterminate represents at 13%. In Asiago + Lessini, the unidirectional at 40%, bidirectional and orthogonal have 30% respectively. In Belluna/Lessini + Indeterminate Maiolica, the unidirectional removal prevails at 79%, followed by orthogonal at 18%.

Table 23 Removals direction on dorsal face of blades and bladelets

Removal direction	Val Belluna 1	Val Belluna 2	Asiago+ Lessini	Bell/Les+ Indet, Maiolica

	N	%	N	%	N	%	N	%
Unidirectional	17	49	6	40	4	40	8	79
Bidirectional	9	26	7	47	3	30	0	0
Orthogonal	7	20	0	0	3	30	2	18
Multidirectional	2	6	0	0	0	0	0	0
Indet.	0	0	2	13	0	0	1	9
Total	35	100	15	100	10	100	11	100

In Val Belluna 1, the unidirectional and bidirectional removal represent 50% respectively in initiation. In initiation/production, the unidirectional orientation has 100%. In maintenance, the orthogonal removal is more common at 60%, while the multidirectional and bidirectional represent 20% respectively. In maintenance/production, the unidirectional rhythm prevails (50%), followed by orthogonal (33.3%) and bidirectional (16.6%). In production, the unidirectional is more common (62.5%), followed by bidirectional (25%) and less frequently the orthogonal (12.5%).

In Val Belluna 2, the cortical, unidirectional and indeterminate removals are 33.3% respectively in initiation. In initiation/production, the unidirectional, orthogonal and indeterminate orientation achieve 33.3%. In maintenance, only orthogonal removal was found (100%). In maintenance/production, the orthogonal orientation shows 80% and unidirectional 20%. In production, the unidirectional rhythm prevails at 75% and bidirectional 25%.

In Asiago + Lessini, the orthogonal and bidirectional have 50% in initiation. In initiation/production, only orthogonal orientation was found (100%). In maintenance, the bidirectional removal represents 100%. In maintenance/production, the unidirectional and orthogonal reach 50%. In production, the unidirectional represents 75% and bidirectional 25%. In Belluna/Lessini + Indeterminate Maiolica, was not possible determinate the removal orientation in initiation. In production, the unidirectional orientation represents 63.63% and orthogonal at 18.18%.

Lip formation

In the Val Belluna 1 assemblage, an absent lip represents the 29% and a slightly one the 23%, while a pronounce lip is visible only the 3% (Table 25). In Val Belluna 2, the absent lip is more frequent (53%) compared to the slightly one (13%), as well as, in the Asiago + Lessini, and Belluna/Lessini + Indeterminate Maiolica.

Table 24 Lip formation in blades and bladelets

lip formation	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Absent	10	29	8	53	4	40	2	18
slightly	8	23	2	13	1	10	1	9
Pronounced	1	3	0	0	0	0	0	0

Indet.	16	46	5	33	5	50	8	73
Total	35	100	15	100	10	100	11	100

In Val Belluna 1, absent lip represents 25% and indeterminate the 75% in initiation. initiation/production, the absent and slightly lips have 33.3% respectively and indeterminate the 33.3%. In maintenance, the absent lip has 40%, slightly the 20% and indeterminate the 40%. In maintenance/production, the slightly lip is more frequently (50%), the absent the 33.3% and indeterminate the 16.6%. In production, the absent lip represents the 18.75%, slightly the 12.5%, pronounced the 6.25% and indeterminate the 56.25%.

In Val Belluna 2, the absent lip has 33.3% and indeterminate one the 66.6% in initiation. In initiation/production, the slightly li is more common at 66.6% and indeterminate one 33.3%. In maintenance, only the absent lip was found. In maintenance/production, the absent lip was more recorded at 60% and indeterminate the 40%. In production, the absent lip is more frequently at 75% and indeterminate the 25%.

In Asiago + Lessini, only the absent lip was found in initiation as well as in initiation/production and maintenance. In maintenance/production, only the indeterminate lip was recorded. In production, the slightly lip reaches the 25% and indeterminate the 75%. In Belluna/Lessini + Indeterminate Maiolica, was not possible to determinate the lip in initiation. In production, absent lips represent the 20%, slightly the 10% and the most was not possible determinate at 70%.

Debitages techniques

The debitage technique more used within the Val Belluna 1 raw material was the direct percussion at 77%. Less frequently was attested the pressure/indirect percussion technique at 20%, while indirect percussion represents only 6% (Table 26). In Val Belluna 2, the direct percussion appears also with a high frequency (73%), followed by pressure at 7% and indirect percussion at 7%. In Asiago and + Lessini was only identified the direct percussion at 80% while the indeterminate represents 20%. In the Belluna/Lessini + indeterminate Maiolica, the most used debitage technique is the direct percussion (45%). An increase in the use of pressure/indirect percussion technique was observed (27%).

Table 25 Debitages techniques of blades and bladelets

Debitage technique	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Direct percussion	27	77	11	73	8	80	5	45
Indirect percussion	0	0	0	0	0	0	0	0
Pressure	0	0	1	7	0	0	0	0
Pressure/indirect percussion	7	20	1	7	0	0	3	27
Indet.	1	3	2	13	2	20	3	27

Total	35	100	15	100	10	100	11	100
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In Val Belluna 1 assemblage, only the direct percussion technique was used in initiation phase. In initiation/production, the direct percussion technique was more recorded (66.6%), followed by pressure/indirect percussion (33.3%). In maintenance, the direct percussion technique represents the 60% and indirect percussion and indeterminate have 20%, respectively. In maintenance/production, only the indirect percussion technique was used. In production, the direct percussion technique has 60% and pressure/indirect percussion the 40%.

In Val Belluna 2, only the direct percussion technique was used in initiation phase, as well as, in maintenance one. In maintenance/production, the direct percussion technique was more used at 80%, while the indeterminate the 20%. In production, the direct percussion technique has 75% and pressure 25%.

In Asiago + Lessini raw material, only the direct percussion technique was used in initiation, in initiation/production and in maintenance phases. In maintenance/production, the direct percussion and indeterminate techniques are 50%, respectively. In production, the most used technique debitage was direct percussion at (75%) and indeterminate (25%). In Belluna/Lessini + Indeterminate Maiolica, only the direct percussion was used (100%) in initiation phase. In production, the most common debitage technique was direct percussion (55.5%), followed pressure/indirect percussion (22.2%) and indeterminate (22.2%).

The debitage angle

In the Val Belluna 1 sample, the angle <90° represents 17% and angle = 90° represents 17%, while indeterminate angle represents the most part at 63%. In Val Belluna 2, the angle <90° represents 27% and angle = 90° constitutes at 27%, while the indeterminate 33%. In Asiago + Lessini, the angle <90 represents 10% and 90° 10%. In Belluna/Lessini + Indeterminate maiolica, the angle <90° represents 9%, while the indeterminate angle corresponds 91% (Table 27).

Table 26 The debitage angle of blades and bladelets

The debitage angles	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
<90°	6	17	4	27	1	10	1	9
>90°	2	6	1	7	0	0	0	0
=90°	6	17	4	27	1	10	0	0
Indet.	22	63	5	33	8	80	10	91
Total	35	100	15	100	10	100	11	100

In Val Belluna, the angle debitage angle not possible to identify in initiation phase because there is high fragmentation of the pieces. In initiation/production, the angle =90% represents 33.3%

and indeterminate the 66.6%. In maintenance, the angles less than 90° and =90° reach 20% individually and indeterminate the 20%, respectively. In maintenance/production, the angles <90°, >90° and =90° has same percentage of 16.6%, while the indeterminate achieves at 50%. In production, the angle <90° represents 18.7%, while the angles >90 and =90° reaches 6.25%, individually, and the indeterminate 62.5%.

In Val Belluna 2, the angle >90° represents 33.3% and indeterminate the 66.6% in initiation phase. In initiation/production, the angles =90° and <90° achieve 33.3% respectively and indeterminate the 33.3%. In maintenance, only the angle <90° was recorded. In maintenance production, the angles =90° and <90° represent 25% individually and indeterminate the 25%. In production, the angle =90° represents 50% and indeterminate the 50%.

In Asiago + Lessini, only the angle <90° was found (100%) in initiation phase. In initiation/production, maintenance and maintenance/production phases, the debitage angles were not possible to determinate. In production, the angle =90° has 25% and indeterminate the 75%. In Belluna/Lessini + Indeterminate Maiolica, the debitage angle was not possible to find in initiation phase. In production, the angle <90° represents 11.1% and indeterminate 89.9%.

4.3.2 Flakes

In the lithic industry from ALB-14, 103 flakes were recorded, of which 53% come from Val Belluna 1, 26.21% from Val Belluna 2 and to a lesser extent from Belluna/Lessini + indeterminate majolica at 13.6% and Asiago + Lessini at 6.8%.

Table 27 Reduction sequences and reduction phases of flakes

Lamellar blanks	Phase	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Belluna/ Lessini+ Indet. Maiolica	
		N	%	N	%	N	%	N	%
Opening flake	Initiation	1	2	6	22	1	14	1	7
Cortical flake	Initiation	0	0	1	4	0	0	0	0
Generic cortical flake	Initiation	1	2	2	7	1	14	0	0
Semi-cortical flake	Initiation	11	20	6	22	0	0	1	7
Semi-cortical flake	Initiation/ Production	0	0	1	4	0	0	0	0
Reorientation flake on the overhang	Maintenance	2	4		0	0	0	0	0
Carénage flake	Maintenance	2	4	0	0	1	14	0	0
Generic maintenance flake	Maintenance	9	16	3	11	0	0	4	34
Surface maintenance flake	Maintenance	0	0	1	4	0	0	1	7
Maintenance flake from the opposite striking platf.	Maintenance	0	0	0	0	1	14	0	0

Rejuvenation flake from the opposite striking platform	Maintenance	2	4	0	0	0	0	0	0
Reorientation flake	Maintenance	7	13	0	0	2	28	0	0
Lateral debordant flake	Maintenance / Production	2	4	2	7	0	0	1	7
Lateral debordant cortical flake	Maintenance /Production	10	18	2	7	0	0	2	14
Lateral debordant semi-cortical flake	Maintenance /production	0	0	1	4	0	0	0	0
flake	Production	8	15	2	7	1	14	3	21
Kombewa	production	0	0	0	0	0	0	1	7
Total		55	100	27	100	7	100	14	100

In Val Belluna 1, the initiation phase comprises 24% and composed mainly by semi-cortical flakes. The maintenance phase represents 41% and it includes more generic maintenances flakes and reorientation flakes. Maintenance/production phase reaches 22% and it is composed by lateral debordant cortical flake and lateral debordant flake. The production phase represents 15% and it includes composed by production flakes (Table 28).

In Val Belluna 2, the Initiation comprises 55% integrated by semi-cortical flake and opening flake. Initiation/production at 4% composed by semi-cortical flakes. Maintenance represents at 15% composed by generic maintenance flakes and surface maintenance flakes. Maintenance/production reaches 18% composed by lateral debordant cortical flakes and lateral debordant flakes. Production phase achieves 7% and includes production flakes.

In Asiago + Lessini, the initiation phase represents 28.5%, it is composed by generic cortical flakes and opening flakes. The maintenance phase reaches 56% including carénage flakes, maintenance flakes with opposite striking platform and reorientation flakes. Production flakes represent 14%.

In Belluna/Lessini + indeterminate Maiolica, the initiation phase corresponds at 14%, including opening flakes and semi-cortical flakes. The maintenance phase represents 41%, it is composed by generic maintenance flakes and surface maintenance flakes. The maintenance/production achieves 21%, including lateral debordant cortical flakes and lateral debordant flakes. The production phase composes the 28%, it is composed of production flakes and kombewa flake.

Integrity

In the Val Belluna 1, flakes are more frequently complete (56%), followed by almost complete (7%), distal fragments (7%), mesial fragments (5%) and lateral fragments (4%) (Table 29).

In Val Belluna 2, complete flakes are more frequently attested with a percentage of 41%, followed by almost complete at 26% and distal fragments at 15% and in less quantity the lateral one.

In Asiago + Lessini, the complete flakes, the mesial and distal fragments represent the 29%. The lateral ones are the 14%.

In Belluna/Lessini + indeterminate Maiolica, the complete flake represents at 43%, followed by distal fragments at 21% and the lateral fragments at 14%

Table 28 Integrity of flakes

Integrity	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ indet	
	N	%	N	%	N	%	N	%
Complete	31	56	11	41	2	29	6	43
A. complete	4	7	7	26		0	1	1
Proximal	9	16	3	11		0		0
Mesial	3	5		0	2	29	1	7
lateral	2	4	1	4	1	14	2	14
Distal	4	7	4	15	2	29	3	21
Broken	0	0	0	0	0	0	0	0
Indet	5	9	1	4		0	1	7
Total	55	100	27	100	7	100	14	100

In the Val Belluna 1, in the initiation phase, the complete is the most common integrity (61.53%) while almost complete, distal, lateral and proximal and indeterminate are 7.6% respectively. In maintenance phase, the complete is more frequently (52.38%), followed by proximal (19.04%), while almost complete, mesial and lateral reach 9.5%, respectively. In the maintenance/production phase, the complete integrity is more common (63.63%), followed by proximal portion (36.36%). In the production phase, the complete is more frequently (50%), while the almost complete, distal, proximal, mesial and indeterminate portions are 10% respectively.

In Val Belluna 2, in the initiation phase, the almost complete has 33.3%, complete 26.6%, distal and proximal 13.3%, respectively while, the distal and indeterminate reach 6.6%. In the maintenance phase, the complete and almost complete achieve 33.3%, while the distal and indeterminate the 1.6.66%. In the maintenance/production phase, the complete is more frequently (66.6%), followed by proximal (33.3%). In the production phase, only the complete integrity was found (100%).

In Asiago + Lessini sample, in the initiation phase, the complete and lateral part are 50% respectively. In maintenance phase, the distal is the most common integrity (66.6%), followed by complete one (33.3%). In maintenance/production and production phases, only the mesial integrity appears (100%).

In Belluna/Lessini + indeterminate Maiolica, in the initiation phase, only the complete integrity was recorded. In maintenance phase, the lateral is more common (66.6%), followed by distal one (33.3%). In the maintenance/production phase, the distal complete are the most frequently integrity at 33.3% respectively, while the mesial and proximal are 16.6%. In the production phase, the complete have 75.5% and almost complete 25%.

Dimension

The length of flakes from Val Belluna 1 sample ranges from 8 to 52 mm. Those from Val Belluna 2 range from 9 to 40 mm, while those from Asiago + Lessini range from 7 to 40 mm and those from Belluna/Lessini + Indeterminate Maiolica from 7 to 38 mm (Table 30).

Table 29 Dimension of flake

	Val Belluna 1			Val Belluna 2			Asiago/Lessini			Belluna/Lessini +Indet. Maiolica		
	Len	Wid	Th	Len	Wid	th	Len	Wid	th	Len	Wid	th
Min	8	9	1	9	9	2	7	8	1	7	10	2
Mean	18	16	5	21	18	6	17	16	5	20	20	7
Max	52	39	22	40	41	22	43	28	19	38	31	17

Concerning the production flakes, in Val Belluna 1, the length ranges from 12 to 27 mm, the width ranges from 3 to 23 mm and the thickness ranges from 1 to 4 mm (Table 31). In Val Belluna 2, the length ranges from 13 to 40 mm, the width ranges from 10 to 41 mm and the thickness ranges from 2 to 15 mm. In Asiago + Lessini sample, the length ranges from 13 to 43 mm, the width ranges from 13 to 28 mm, and the thickness ranges from 5 to 19 mm. In Belluna/Lessini, the length ranges from 11 to 38 mm, the width ranges from 10 to 30 mm and the thickness ranges from 3 to 17 mm.

Table 30 Dimension of production flakes

	Val Belluna 1			Val Belluna 2			Asiago/Lessini			Belluna/Lessini +Indet. Maiolica		
	Len	Wid	Th	Len	Wid	th	Len	Wid	Th	Len	Wid	Th
Min	12	3	1	13	10	2	13	13	5	11	10	3
Mean	18.8	12.3	2.5	26.8	21.3	5.8	28	20.5	12	22	19	8
Max	27	23	4	40	41	15	43	28	19	38	30	17

Shape

In Val Belluna 1, flakes mostly have anrregular shape (22%), followed by flakes with parallel and irregular edges at 16%. In the Val Belluna 2, the parallel and irregular edges and an irregular shape are more predominant (26%). Convergent and irregular shape was less frequently documented (11%) (Table 32). In the Asiago + Belluna sample, the parallel and irregular edges are more recurrent with 43%, followed by cortical at 14%. In Belluna/Lessini + indeterminate

Maiolica, the parallel and irregular edges, the irregular shape and the ovoidal shape represents at 14% respectively.

Table 31 Shape of the flakes

Shape	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ indet	
	N	%	N	%	N	%	N	%
Parallel and regular edge	2	4	1	4	0	0	2	14
Parallel and irregular edge	9	16	7	26	3	43	1	7
Convergent and regular edge	2	4	1	4	0	0	0	0
Convergent and irregular edge	9	16	3	11	0	0	1	7
Irregular	12	22	7	26	0	0	2	14
Ovoidal	5	9	1	4	0	0	2	14
Cortical	0	0	0	0	1	14		0
Fan shape	4	7	2	7	0	0	1	7
Indet.	12	22	6	22	3	43	5	36
Total	55	100	27	100	7	100	14	100

In Val Belluna sample, in initiation phase, the fan-shape is the most common (23.03%), followed by convergent and irregular and irregular shapes (15.38%), respectively, while the ovoidal and parallel and irregular edge reach 7.6% and indeterminate 30.7%. In maintenance phase, the parallel and irregular edge reaches to 33.3%, the fan-shape and irregular have 19.04%, convergent and irregular edge represent 14.2% and ovoidal 9.5%. In maintenance production phase, the irregular is the most common share (45.5%), followed by the convergent and irregular edge and indeterminate (27.2). In production phase, the parallel and irregular edge is more frequently (40%), followed by the ovoidal (20%). Irregular and convergent and irregular shape are 10%.

In Val Belluna 2, in the initiation phase, the parallel and irregular edge is more common shape (20%) the irregular, convergent and irregular edge, convergent and regular edge, ovoidal and fan-shape are 13.3% and indeterminate 26.6%. In maintenance phase, the irregular prevails (8.33%) and indeterminate has 17.7%. In maintenance/production phase, the parallels and irregular edge has 66.6%, while the convergent and irregular edge 33.3%. In production phase, the convergent and irregular edge and indeterminate shape are 50%.

In the Asiago + Belluna sample, in initiation phase, the cortical and parallel and irregular edge have 50%. In the maintenance phase, parallel and irregular edge has 33.3% and determinate 66.6%. In maintenance/production phase, only the parallel and irregular edge was found, while in the production phase, the shapes are indeterminate.

In the Belluna/Lesini + Indeterminate Maiolica, in the initiation phase, only the ovoidal shape was recorded. In the maintenance phase, the irregular shape represents 33.3% and indeterminate at 66.6%. In maintenance/production phase, the parallel and irregular edge, irregular and fan-shape are 16.6%, while the indeterminate 50%. In the production phase, the parallel is more frequently (50%) and ovoidal and convergent and irregular edge reach 25%.

Distal morphology

In Val Belluna 1, flakes mostly have normal distal morphology (40%), followed by hinged (14%) and plugging (11%) (Table 33). In the Val Belluna 2, the normal morphology remains predominant (44%), followed by plugging (14%). In Asiago + Lessini, the normal distal morphology represents 43% and a similar frequency hinged and plugging (14%). In Belluna/Lessini + indeterminate Maiolica, the normal distal morphology increases significantly (64%) while the plugging appears in low quantity (14%).

Table 32 Distal morphologies of flakes

Distal morphology	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Normal	22	40	12	44	3	43	9	64
Hinged	9	14	1	4	1	14	1	7
Plugging	6	11	7	26	1	14	2	14
Indet.	18	33	7	26	2	29	2	14
Total	55	100	27	100	7	100	14	100

In the Val Belluna 1 sample, within the initiation phase, the normal is the most common distal morphology (46%), followed by hinged (23%), while the indeterminate represents 31%. In the maintenance phase, the normal morphology prevails (28.8%), while the plugging and hinged are 28.5% respectively and indeterminate reaches 33.3%. In the maintenance/production phase, the normal has 27.2%, plugging 19% and indeterminate 54.5%. In production, the normal morphology reaches 70% and less frequently hinged at 20%.

In the Val Belluna assemblage shows in initiation phase that the normal morphology prevails (40%), followed by plugging (27%) and indeterminate 26%. In the initiation/production phase, only the hinge morphology was found (100%). In the maintenance phase, the normal morphology is more recorded (66.6%) followed by plugging (33.3%). In maintenance/production phase, the plugging, normal and indeterminate morphology have 33.3%, respectively. In production phase, the normal and indeterminate reach 50%.

In Asiago + Lessini, within the initialization phase, the normal and plugging morphology have 50%. In the maintenance phase, the normal morphology is more recorded (66.6%), followed by hinged (33.3). In maintenance/production and in production phases, only the indeterminate morphology was recorded.

In Belluna/Lessini + indeterminate Maiolica, in initiation phase, only the normal morphology was documented (100%). In maintenance phase, the normal prevail (66.6%), followed by plugging (33.3%). In maintenance/production phase, the normal morphology represents the 50% and plugging the 16.6%, while the indeterminate 33.3%.

Transversal section

In Val Belluna 1, the triangular is more frequent section (38%) followed by trapezoidal (27%) while polygonal is less frequently recorded (11%) (Table 34). In the Val Belluna 2, the cortical is more recurrent (33%), followed by triangular (26%) and trapezoidal (22%). In Asiago + Lessini, the triangular section reaches 43%, while trapezoidal and cortical 14%, respectively. In Belluna/Lessini + indeterminate Maiolica, the triangular and trapezoidal sections represent 29% individually and cortical 14%.

Table 33 Section of flakes

Section	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Triangular	21	38	7	26	3	43	4	29
Trapezoidal	15	27	6	22	1	14	4	29
Polygonal	6	11	1	4	0	0	1	7
Cortical	3	5	9	33	1	14	2	14
Bi-convex	1	2	1	4	0	0	0	0
Semi-circle	1	2	0	0	0	0	0	0
Indet.	8	15	3	11	2	29	3	21
Total	55	100	27	100	7	100	14	100

In Val Belluna 1, in the initiation phase, the triangular is more common section (31%), followed by trapezoidal (23%) and the cortical one (15%). In the maintenance, the triangular section prevails (52%), the trapezoidal and cortical achieve 19%, while the semicircle at 5%. In maintenance/production, the triangular and trapezoidal sections reach the same frequency (36%) and the polygonal and biconvex 9%, respectively. In the production phase, the trapezoidal section is more common (40%) followed by triangular (20%), while polygonal and biconvex achieve 10%.

In Val Belluna 2 assemblage shows that, in the initiation phase, the cortical section is more common (53%), followed by triangular (20%) and in less frequently trapezoidal and biconvex at 7% respectively. In initiation/production phase, only the trapezoidal section was recorded (100%). In maintenance phase, the triangular and trapezoidal reach 33%, cortical 17% and indeterminate 17%. In maintenance/production, the trapezoidal reaches 66.6% and triangular 33.3%. In production phase, the polygonal and triangular shapes achieve 50%.

In Asiago + Lessini sample shows that in initiation phase, the cortical and triangular section reach 50%, individual. In the maintenance phase, the triangular, trapezoidal and indeterminate are 33.3% respectively. In the maintenance/production phase, only the triangular section was found (100%), while, in the production phase, the indeterminate section was recorded.

In Belluna/Lessini + Indeterminate Maiolica, in initiation phase, only the triangular section was found (100%). In maintenance phase, the triangular section represents 33.3%, while the

indeterminate 66.6%. In maintenance/production phase, the triangular section prevails (33.3%), followed by trapezoidal, polygonal and cortical at 17%, respectively. In Production phase, the trapezoidal section has 75% and triangular 25%.

Sagittal Profile

Concerning the sagittal profiles of Val Belluna 1, the rectilinear was more recorded (38%) followed by concave (35%) (Table 35). In Val Belluna 2, the concave is more recurrent profile (44%) as well as rectilinear (41%). In Asiago+ Lessini, the rectilinear profile is more frequently (86%) as well as in Belluna/Lessini + indeterminate Maiolica.

Table 34 Sagittal profile of flakes

Profile	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ indet	
	N	%	N	%	N	%	N	%
Concave	19	35	12	44	0	0	1	7
Convex	1	2	0	0	0	0	0	0
Rectilinear	21	38	11	41	6	86	12	86
Sinusoidal	2	4	0	0	0	0	0	0
Twisted	2	4	2	7	0	0	0	0
Twisted/concave	1	2	0	0	0	0	0	0
Indet.	9	16	2	7	1	14	1	7
Total	55	100	27	100	7	100	14	100

In Val Belluna 1, the concave and rectilinear profiles represent 31% respectively in initiation phase, while the sinusoidal and twisted have 8% and indeterminate 23%. In the maintenance phase, the rectilinear profile is more frequently (43%), followed by concave (33%), while the convex, twisted and twisted/concave profiles have 5%. In maintenance production phase, the concave profile represents 45%, while the rectilinear, twisted have 9%, and indeterminate the 27%. In production phase, the rectilinear profile high frequently (60%), followed by concave (30%).

In Val Belluna 2, the concave profiles represent 47%, followed by rectilinear one at 40% and in less frequently the twisted at 7%. In initiation /production, only the twisted profile was recorded (100%). In maintenance phase, the rectilinear profile is more record (50%), followed by concave (33.3%) and indeterminate has 17%. In maintenance/production, the concave profile has 66.6%, while the twisted 33.3%. In production phase, the rectilinear and concave profiles have 50% respectively.

Asiago + Lessini sample shows in initiation, maintenance, maintenance/production, only the rectilinear profiles was recorded, while in initiation, only the indeterminate profile was found. In Belluna/Lessini + Indeterminate Maiolica, within the initiation, maintenance and production phases, only the rectilinear profile was recorded. In maintenance/production phase, the rectilinear profile has 83% and concave the 17%.

Types of butts

Butt morphology in the Val Belluna 1, the plain and natural are more common (25%), followed by the linear (13%) (Table 36). In the Val Belluna 2, the broken butt is highly frequent (26%) followed by the natural (22%) and in less quantity dihedral at 11% respectively. In the Asiago + Lessini, the plain, faceted and punctiform profiles have 14% individually. In the Belluna/Lessini + Indeterminate Maiolica, the plain profile is predominant (43%), while the dihedral and broken but reach 14%, respectively.

Table 35 Butt types of flakes

	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ indet	
	N	%	N	%	N	%	N	%
Natural	6	11	6	22	0	0	0	0
Plain	14	25	3	11	1	14	6	43
Concave	0	0	0	0	0	0	0	0
Faceted	3	5	0	0	1	14	1	7
Linear	7	13	2	7	0	0	0	0
Punctiform	6	11	2	7	1	14	0	0
Dihedral	4	7	3	11	0	0	2	14
Broken	3	5	7	26	1	14	2	14
Indet.	12	22	4	15	3	43	3	21
Total	55	100	27	100	7	100	14	100

Val Belluna 1 sample shows that in the initiation phase, the plain butt is more common (23%), while natural, faceted, punctiform and dihedral represent 8% respectively and indeterminate 38%. In maintenance phase, the plain butt is more common (24%), followed by punctiform and natural (14%), while the linear and broken reach 10%, respectively. In maintenance/production, the plain butt has 27%, while natural and linear have 18%, respectively and in less frequently, the punctiform, dihedral and broken morphologies have 9%. In production phase, the plain butt has 30%, linear and dihedral 20%, respectively, while indeterminate 20%.

In Val Belluna 2, the initiation phase is characterized of natural butt (33%) and plain (13%), while the linear butt and dihedral have 7% respectively and the broken 27%. In initiation/production, only the dihedral morphology was found. In maintenance, the punctiform butt is more frequently (33%, while the linear and broken reach 17% and indeterminate 33%. In maintenance/production phase, the dihedral, plain and broken profiles reach 33.3%. In production phase, the broken and natural butt have 50%, respectively.

In Asiago + Lessini, the initiation phase is composed of punctiform and faceted morphology at 50%, respectively. In maintenance phase, the plain butt represents 33.3% and indeterminate 66.6%. In maintenance/production phase, only the broken butt was found, while in the production phase only indeterminate morphology was recorded.

In Belluna/Lessini + indeterminate Maiolica, in the initiation phase, only the dihedral butt was found. In maintenance phase, the faceted, broken and indeterminate butts reach 33.3% respectively. In maintenance/production phase, the plain butt is more recurrently at 50% and broken 17%, while the indeterminate has 33%. In production, the plain profile prevails (75%), followed by dihedral one (25%).

Esquillement du bulbe

In the Val Belluna 1 assemblage, the absent esquillement du bulbe is more characteristic (49%), followed by normal (22%), while the debordant only represents 4% (Table 37). In Val Belluna 2, the absent esquillement du bulbe is more recurrent (33%), followed by normal (11%). In the Asiago + Lessini sample, the absent and normal appear in small quantity at 14%, respectively. In the Belluna/Lessini + indeterminate Maiolica the normal esquillement du bulbe is more common (43%), followed by absent (36%).

Table 36 Esquillement du bulbe of flakes

Percussion traces	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Absent	27	49	9	33	1	14	5	36
Normal	12	22	3	11	1	14	6	43
Debordant	2	4	1	4	0	0	0	0
RT	0	0	1	4	0	0	0	0
Indet.	14	25	13	48	5	71	3	21
Total	55	100	27	100	7	100	14	100

Val Belluna 1 sample shows that in the initiation phase, only the absent esquillement du bulbe was found (100%). In the maintenance phase, the absent esquillement du bulbe has 57% and normal the 19%, while the indeterminate at 24%. In maintenance/production phase, the absent esquillement du bulbe represent reaches 45%, and normal at 27%, while the debordant has 9% and indeterminate 18%. In production phase, the absent esquillement du bulbe achieves 50%, normal at 20% and indeterminate the 30%.

In Val Belluna 2 shows that in initiation phase, the absent is the most common esquillement du bulbe (40%) and normal, debordant and RT reach 7% and indeterminate 40%. In the initiation production phase, only the absent esquillement du bulbe appears (100%). In maintenance phase, the absent esquillement du bulbe has 33%, while the indeterminate at 67%. In maintenance/production phase, the normal esquillement du bulbe achieves 33% and indeterminate the 67%. In the production phase, the normal and indeterminate esquillement du bulbes reach 50% respectively.

Asiago + Lessini shows that in the initiation phase, the absent and normal esquillement du bulbe have 50%, respectively. In the maintenance production phase, the normal esquillement du

bulbe represent 33% and indeterminate one the 67%. In maintenance/production and in production phases, only indeterminate esquillement du bulbe was recorded (100%).

Belluna/Lessini + indeterminate Maiolica flakes show that in initiation phase, only the normal esquillement du bulbe was found. In maintenance and in the maintenance/production phases, the normal, absent and indeterminate esquillement du bulbe reach 33.3%. In the production phase, the absent and normal esquillement du bulbe achieve the 50%.

Bulb morphology

In Val Belluna 1, the diffuse bulb represents 33% followed by pronounce (27%) and less frequently is the absent (9%) (Table 38). In Val Belluna 2, the diffuse bulb is more recurrent (30%), followed by pronounced (11%) and absent (7%). In the lithic from Asiago + Lessini, the absent and pronounced bulbs represent 14%, respectively. In Belluna/Lessini + indeterminate Maiolica is more common the pronounced (36%) and diffuse (29%) bulbs.

Table 37 Bulb morphology of flakes

Bulb morphology	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Absent	5	9	2	7	1	14	1	7
Pronounced	15	27	3	11	1	14	5	36
Diffuse	18	33	8	30	0	0	4	29
Indet	15	27	14	52	5	71	4	29
Total	55	100	27	100	7	100	14	100

In the Val Belluna 1 flakes show that in the initiation phase, the diffuse bulb represents 46%, the absent and pronounced 8% respectively, while the indeterminate 38%. In the maintenance phase, the pronounced bulb reaches 43% and diffuse the 33%, while the indeterminate 24%. In the maintenance/production phase, the absent, normal and diffuse bulb have 27%, respectively, while the indeterminate one 18%. In production phase, the pronounced represent 40%, diffuse reaches 20% and absent at 10%.

In Val Belluna 2, the initiation phase es composed by pronounced and diffuse bulbs at 20% respectively and absent one 13%, while the indeterminate the 47%. In the initiation/production phase, only diffuse bulb was recorded. In maintenance and in maintenance/production phases, the diffuse bulb represents 33.3%, while the indeterminate at 66.6%. In the production phase, the diffuse and indeterminate bulbs represent 50% respectively.

In Asiago + Lessini sample, the initiation phase is constituted by absent and indeterminate bulbs at 50%, respectively. In the maintenance phase, the pronounced represents 33.3% and indeterminate 66.6%. The maintenance/production and in production phases, the indeterminate bulb has 100%.

In the Belluna/Lessini + indeterminate Maiolica flakes show that in initiation phase, only the pronounced bulb was recorded. The maintenance phase is composed by pronounced, diffuse and absent bulb reach 33.3%. The maintenance/production phase is composed by diffuse bulb achieves 33.3% and indeterminate 66.6%. In production phase, the pronounced bulb reaches 75% and the diffuse one the 25%.

Butt profile

In the Val Belluna 1 sample, the clear impact point is more common butt (20%), followed by slightly convex (16%) and convex (15%), while less frequently irregular profile (11%) (Table 39). In Val Belluna 2, the clear impact point prevails (19%) and less recurrent slightly convex and irregular profile (7%). In Asiago + Lessini, the clear impact point and irregular profiles reach 14%. In Belluna/Lessini + Indeterminate Maiolica, the clear impact point is the more recurrent profile (43%), followed by slight convex (14%) and irregular butt 7%.

Table 38 Butt profiles of flakes

Butt profile	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Clear impact point	11	20	5	19	1	14	6	43
Convex	8	15	0	0	0	0	2	14
Slightly convex	9	16	2	7	0	0	0	0
Irregular	6	11	2	7	1	14	1	7
Multiple	2	4	0	0	0	0	0	0
Indet.	19	35	18	67	5	71	5	36
Total	55	100	27	100	7	100	14	100

In the Val Belluna 1 sample, the initiation phase is composed mostly slightly convex (23%), while the clear impact point, convex and irregular profiles reach 8% and indeterminate 46%. Maintenance phase, the clear impact point prevails (29%), followed by convex (19%) and multiple (10%), while the slightly convex and irregular reach 5% and indeterminate 33%. In maintenance/production, the irregular butt is more common (36%), while the clear impact point and slightly convex reach 18%, convex 9% and indetermined 18%.

In the Val Belluna 2, the initiation phase is characterized of clear impact point (20%), irregular (13%) and slightly (7%), while the indeterminate has 60%. In initiation phase, production, only the clear impact point profile was found, while in maintenance only the indeterminate (100%). In maintenance/production, the clear impact point profile reaches 33.3% and indeterminate the 66.6%. In production phase, the slightly convex and indeterminate profiles have 50%.

In Asiago + Belluna, in the initiation, the irregular and indeterminate reach 50%. In maintenance, the clear impact point profile represents 33.3% and indeterminate 66.6%, while in maintenance and maintenance production phases, only the indeterminate profile was recorded.

In Belluna/Lessini + indeterminate Maiolica, in the in the initiation phase, only clear impact point profile was found (100%). In maintenance phase, the clear impact point represents 33.3% and indeterminate the 66.6%. In maintenance/production phase, the clear impact point, irregular and convex profiles reach 17%, while indeterminate achieves the 50%. In production phase, the clear impact point profile has 75% respectively, while the indeterminate the 25%.

Lip formation

In the Val Belluna 1 sample, the absent lip is predominant (42%), followed by slightly (22%) (Table 40). In the Val Belluna 2, the absent lip prevails (22%), followed by the slightly (11%). In the Asiago + Lessini, the absent represents 29%, while the most part is indeterminate (71%). In Belluna/Lessini + indeterminate maiolica, the slightly lip is more frequent (43%) followed by absent lip one (21%).

Table 39 Lip formation of flakes

lip formation	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Absent	23	42	6	22	2	29	3	21
slightly	12	22	3	11	0	0	6	43
Pronounced	3	5	1	4	0	0	0	0
Indet.	17	31	17	63	5	71	5	36
Total	55	100	27	27	7	100	14	100

In Val Belluna 2, the initiation phase is composed of slightly (38%) and absent lips (23%), while the indeterminate at 38%. In the maintenance phase, the absent lip is more common (43%), followed by slightly (14%) and pronounced (10%), while the indeterminate lip represents 10%. In maintenance/production, the absent lip reaches 55% and slightly 18% and the pronounced the 9%, while the indeterminate 18%. In production phase, the absent lip represents 50%, slightly the 20% and indeterminate the 30%.

In Val Belluna 2, in the initiation, the absent is the more common lip (27%), followed by the slightly (13%) and pronounced (7%), while the indeterminate represents 53%. In the initiation/production phase, only the absent lip was recorded (100%), and maintenance/production phase, only the indeterminate lip (100%). In production phase, the absent and indeterminate lips reach 50%.

In Asiago + Lessini flakes show in initiation phase that in the initiation phase, the absent and indeterminate lips achieve 50%. In maintenance phase, the absent lip represents the 33.3% and indeterminate 66.6%. In maintenance/production and in production phases, only the indeterminate lips were recorded.

In the Belluna/Lessini sample, the initiation phase is only characterized by slightly lip (100%). In maintenance phase, the slightly lip represent 33.3% and indeterminate the 66.6%. In the

maintenance/production phase, the absent lip is more frequently (33%) followed by slightly (17%), while the indeterminate represent the 50%. In production phase, the slightly lip represent 75% and indeterminate 25%.

Removal direction

In the Val Belluna 1, the unidirectional orientation represents 31%, orthogonal 27%, bidirectional 16% and multidirectional 13% (Table 41). In the Val Belluna 2, the unidirectional was more used (33%), followed by orthogonal (30%). In the Asiago + Lessini, the orthogonal is more common (43%), while decrease unidirectional and bidirectional reach 14%. In the Belluna/Lessini + Indeterminate Maiolica, the unidirectional method becomes in predominant (43%), followed by multidirectional (21%) and bidirectional (14%).

Table 40 Removal direction of flakes

Removal direction	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bellu/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Unidirectional	17	31	9	33	1	14	6	43
Bidirectional	9	16	1	4	1	14	2	14
Orthogonal	15	27	8	30	3	43	3	21
Multidirectional	7	13	0	0	0	0	1	7
Cortical	1	2	1	4	1	14	0	0
Indet.	9	16	8	30	1	14	2	1
Total	55	100	27	100	7	100	14	100

In Val Belluna 1, the initiation phase is characterized by unidirectional orientation (38%) and bidirectional (15%), while the orthogonal and cortical achieve 8% and indeterminate 31%. In maintenance phase, the orthogonal is more common (33%), followed multidirectional (29%), while the unidirectional removal reaches 19% and the bidirectional the 14%. In maintenance/production phase, the orthogonal orientation is more recorded (55%), while the unidirectional and bidirectional reach 18%. In production phase, the unidirectional removal is highly frequency (60%), followed by bidirectional (20%), while the orthogonal and multidirectional have 10% respectively.

In Val Belluna 2, the initiation phase is composed of unidirectional orientation (27%), and orthogonal (13%), while the bidirectional and cortical reach 7% and the indeterminate represents 47%. In initiation/production phase, only the unidirectional removal was found (100%). In maintenance phase, the orthogonal is more frequently (50%), followed by unidirectional (33%) and indeterminate (17%). In maintenance/production phase, the unidirectional orientation is more common (67%), followed by orthogonal (33%), while in production phase, only the orthogonal removal was recorded (100%).

In the Asiago + Lessini sample, the initiation phase is characterized by cortical (50%) and indeterminate (50%) removals. In maintenance phase, the unidirectional, bidirectional

orthogonal removals reach 33.3%. In maintenance/production and in phases, only orthogonal orientation was recorded.

In Belluna/Lessini + indeterminate Maiolica, in the initiation phase, only the bidirectional removal was recorded (100%). In maintenance phase, the unidirectional represent 67% and bidirectional 37%. In maintenance/production phase, the unidirectional removal achieves 33% and orthogonal and multidirectional 17% respectively. In the production phase, the unidirectional and orthogonal have 50%.

Debitage techniques

In Val Belluna 1, the direct percussion was more applied (82%) (Table 42). In Val Belluna 2, the direct percussion occurs mostly (81%) and bipolar appear in low density (4%). In Asiago + Lessini, the direct percussion is predominant (43%), while in Belluna/Lessini + indeterminate Maiolica, the direct percussion represents the 86%. The direct percussion was the unique technique used in every reduction phase of each raw material.

Table 41 Debitage technique of flakes

Technique debitage	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Direct percussion	45	82	22	81	3	43	12	86
Indirect percussion	0	0	0	0	0	0		0
Pressure	0	0	0	0	0	0	0	0
Pressure/indirect percussion	0	0	0	0	0	0	0	0
Bipolar	0	0	1	4	0	0	0	0
Indet	10	10	4	15	4	57	2	14
Total	55	100	27	100	7	100	14	100

Debitage Angle

In Val Belluna 1, angles <90° are more frequently (40%), while in less quantity was used angles=90° (6%) and angles >90° (4%) (Table 43). In Val Belluna 2, angles <90° is more common (22%), followed by angles >90° attested 4%. In Asiago + Lessini, angles <90° and >90° were documented in similar frequency (50%). In Belluna/Lessini + Indeterminate Maiolica, angles <90° represents 50% and in less frequency angles =90° (14%).

Table 42 Debitage angle of flakes

	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ indet	
	N	%	N	%	N	%	N	%
<90°	22	40	6	22	1	14	7	50

>90°	2	4	1	4	0	0	0	0
=90°	6	6	0	0	1	14	2	14
Indet	24	24	20	74	5	74	5	36
Total	55	100	27	100	7	100	14	100

In Val Belluna 1 sample shows that in the initiation phase is characterized by angles < 90° (23%), while angles =90° reaches 15% and angles >90° has 8%. In maintenance phase, angles <90° is more common (48%), followed by angle =90° (5%). In maintenance/production phase, angles <90° is more frequently (45%), followed by angles >90° and =90° (9%). In production phase, angles <90° represent 40% and angles =90° the 20%.

In Val Belluna 2, the initiation phase is constituted by angles <90° (13%) and angles >90° (7%), while indeterminate angles represent 80%. In initiation/production, only angles <90° were found. In maintenance phase, only indeterminate angles were found. In maintenance/production phase, angles <90° were recorded (66.6%) and indeterminate reach 33.3%. In production phase, angles <90° and indeterminate represent 50% respectively.

In Asiago + Lessini sample, the initiation phase is composed only by angles =90° and in maintenance phase only by angles <90°, while in the other phases are composed by indeterminate angles.

In Belluna/Lessini + indeterminate Maiolica, initiation phase is only composed by angles <90°. In maintenance phase, angles <90° represents 33% and indeterminate 67%. In maintenance/production phase, angles <90° and indeterminate reach 50%. In production phase, angles <90° and =90° achieve 50%.

4.2.3 Retouched pieces

In Val Belluna 1, the retouched pieces are mainly composed by domestic tools (64%), followed by microburins (29%) and projectile implements (7%) (Table 44), (Appendix: Figure 15). In Val Belluna 2, the domestic tools are more common (84%), followed by microburins (16%). In Asiago + Lessini, domestic tools reach 66.6% and microburins 33.3%, while in Belluna/Lessini + Indeterminate Maiolica, domestic tools prevail (50%), followed by microburins (30%) and projectile implements (20%).

Table 43 Retouched pieces

	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Domestic tools	9	64	6	84	2	66.6	5	50
Projectile implements	1	7	0	0	0	0	2	20
Microburins	4	29	1	16	1	33.3	3	30
Total	14	100	7	100	3	100	10	100

4.2.3.1 Domestic tools

Raw material

Most of the domestic tools correspond to raw material from Val Belluna 1 (41%), followed by Val Belluna 2 (27%) and Belluna/Lessini + Indeterminate Maiolica (23%), while domestic tools from Asiago + Lessini are found less frequently (9%).

Integrity

The domestic tools elaborated with Val Belluna 1 raw material present mostly complete integrity (56%), while the almost complete, mesial, lateral, distal parts reach 11% (Table 45). In the flints of Val Belluna 2, complete integrity is highly represented (83%) and in less frequency the proximal portion is documented (17%). The total of Asiago + Lessini's tools show complete integrity. Finally, the Belluna/Lessini + indeterminate Maiolica tools are characterized by showing complete integrity (40%) while the proximal, mesial and distal parts achieve 20%.

Table 44 Integrity of domestic tools

Integrity	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Complete	5	56	5	83	2	100	2	40
Almost complete	1	11	0	0	0	0	0	0
Proximal	0	0	1	17	0	0	1	20
Mesial	1	11	0	0	0	0	1	20
lateral	1	11	0	0	0	0	0	0
Distal	1	11	0	0	0	0	1	20
Broken	0	0	0	0	0	0	0	0
Indet.	0	0	0	0	0	0	0	0
Total	9	100	6	100	2	100	5	100

Typological recognition of Val Belluna 1, burins (B) represent the most frequently tools (33%) followed by endscrapers (G) (22%) flakes with an abrupt retouch (A) (22%), perforator (Bc2), denticulate (D) were recorded in less frequently (Table 46). representing 11%. In Val Belluna 2, burins are the most abundant tools (67%), followed by endscrapers (27%). In Asiago + Lessini sample, burins and point reach 50%. In Belluna/Lessini + indeterminate Maiolica, endscrapers are more frequently (40%), while burins, truncations and denticulated tool achieve 20%.

Table 45 typologies of domestic tools

	type	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Belluna/Les+ Indet. Maiolica	
		N	%	N	%	N	%	N	%
Burins	B	2	22	4	67	1	50	1	20
Endscrapers	G	3	33	2	23	0	0	1	20

Perforators	R2	0	0	0	0	0	0	1	20
	Bc2	1	11	0	0	0	0	0	0
Truncations	T2	0	0	0	0	0	0	1	20
Denticulates	D1	1	11	0	0	0	0	1	20
Points	P	0	0	0	0	1	50	0	0
Flakes with and abrupt retouch	A1	1	11	0	0	0	0	0	0
	A2	1	11	0	0	0	0	0	0
Total		9	100	6	100	2	100	5	100

Dimension of domestic tools

The length of the burins ranges from 16 to 44 mm, the width from 9 to 27 mm and a thickness of 2 to 13 mm (Table 47). Length of the scrapers ranges from 19 to 31 mm, width from 10 to 23 mm and thickness from 4 to 9 mm. Dimension length of side scraper is 31, width 19 and thickness 9 mm. The Bec doit has a length of 71 mm, width of 23 mm and thickness of 18 mm. The truncation tool has a length of 22 mm, width of 10 mm and a thickness of 2 mm. The length of the denticulated tool is 29 mm, width 10 mm and thickness 2 mm. The length of the point found has a length of 29 mm, width 32 mm and thickness 7 mm. The abrupt mince tools have a length of 17 to 35 mm, a width of 14 to 17 mm and a thickness of 5 mm.

Table 46 Dimensions of domestic tools

	type	Length (mm)	Width (mm)	Thickness (mm)
Burins	B	16-44	9-27	2-13
Endcrapers	G	19-31	10-23	4-9
Sidescraper	R2	31	19	9
Perforators	Bc2	71	23	18
Truncations	T	22	10	2
Denticulates	D1	29	10	2
Points	P	29	32	7
Flakes with an abrupt retouch	A	17-35	14-17	5

Blanks selection of domestic tools

In Val Belluna 1 raw material, burin was made from opening flake of initiation phase (B1) and from maintenance flake from opposite striking platform of maintenance phase (B2, B3) (Table 48). In Val Belluna 2, burins were made from semi-cortical double backed blade (B1) and from opening flake of initiation phase (B3), from generic maintenance flake of maintenance phase (B6) and maintenance (B7). In Asiago + Lessini, burin was made from blade/flake of production phase (B7).

Table 47 Blanks selection of burin tools

	Reduction sequence	Phase	Typology	N°	%
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Val Belluna 1	Opening flake	Initiation	B1	1	12.5
	Maintenance flake from opposite striking platform	Maintenance	B2	1	12.5
	Maintenance blade from opposite striking platform	Maintenance	B3	1	12.5
Val Belluna 2	Semi-cortical double backed blade	Initiation	B1	1	12.5
	Opening flake	Initiation	B3	1	12.5
	Generic maintenance flake	Maintenance	B6	1	12.5
	Maintenance flake	Maintenance	B7	1	12.5
Asiago+Lessini	Blade/flake	Production	B7	1	12.5
Total				8	100

Endscrapers of Val Belluna 1 are manufactured from blades and from initiation flake (G1) maintenance/production flakes and from production flakes (G3, G4) (Table 49). In Val Belluna 2, endscrapers represent 28% were made from naturally crested blade of initiation/production phase (G1) and from semi-cortical on edge blade of initiation phase (G7+G7). In Asiago + Lessini, side scraper fabricated from surface maintenance flake (G4) and lateral debordant cortical flake of maintenance phase (R2) (Table 50).

Perforators (Bc2) were made from debordant cortical flake of maintenance/production phase of Asiago + Lessini raw material (Table 51), while the truncation tool (T2) was produced from naturally cortical backed blade of initiation/production phase of Belluna/Lessini + indeterminate maiolica, (Table 52). Denticulate (D1) was made from blade/bladelet of production phase of Val Belluna 1 flints (Table 53). Point (P) was created from lateral debordant cortical flake of maintenance/production phase of Asiago + Lessini raw material (Table 54). Two flakes with and abrupt retouches were made with Val Belluna 1 flint, from lateral debordant cortical flake of maintenance/production phase (A1), and from generic maintenance flake of production/maintenance phase (A2) (Table 55).

Table 48 Blank selection of scrapers

	Reduction sequence	Phase	Typology	N°	%
Val Belluna 1	On edge blade	Maintenance/ production	G1	1	14
	Flake	Production	G3	1	14
	Flake	Production	G4	1	14
Val Belluna 2	Naturally crested blade	Initialization /production	G1	1	14

	Semi-cortical on edge blade	Initialization	G7+G7	1	14
Asiago+Lessini	Surface maintenance flake	Maintenance	G4	1	14
Total				7	100

Table 49 Blank selection of side scraper

	Reduction sequence	Phase	Typology	N°	%
Asiago+Lessini	Lateral debordant cortical flake	Maintenance	R2	1	100
Total				1	100

Table 50 Blank selection of Bec doit

	Reduction sequence	Phase	Typology	N°	%
Asiago+Lessini	Debordant cortical flake	Maintenance/Production	Bc2	1	100
Total				1	100

Table 51 Blank selection of truncation tool

	Reduction sequence	Phase	Typology	N°	%
Belluna/Lessini + indet	Naturally cortical backed blade	Initiation/ Production	T2	1	100
Total				1	100

Table 52 Blank selection of denticulate tool

	Reduction sequence	Phase	Typology	N°	%
Val Belluna1	Blade/bladelet	Production	D1	1	100
Total				1	100

Table 53 Blank selection of point

	Reduction sequence	Phase	Typology	N°	%
Asiago+Belluna	Lateral deborbordant cortical flake	Maintenance/ Production	P	1	100
Total				1	100

Table 54 Blank selection of abrupt mice

	Reduction sequence	Phase	Typology	N°	%
Val Belluna1	Lateral debordant cortical flake	Maintenance/ Production	A1	1	50
	Generic maintenance flake	Maintenance	A2	1	50
Total				1	100

4.2.3.2 Projectile implements

Raw material

Projectile implement is composed mainly Belluna/Lessini + indeterminate Maiolica (66.6%), followed by Vall Belluna flint (33.3%).

Integrity

In the Val Belluna 1 projectiles show only proximal integrity, while the Belluna/Lessini + indeterminate Maiolica projectiles show only near-total integrity (Table 56).

Table 55 Integrity of projectile implements

Integrity	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Bell/Les+ Indet. Maiolica	
	N	%	N	%	N	%	N	%
Complete	0	0	0	0	0	0	0	0
Almost complete	0	0	0	0	0	0	2	100
Proximal	1	100	0	0	0	0	0	0
Mesial	0	0	0	0	0	0	0	0
lateral	0	0	0	0	0	0	0	0
Distal	0	0	0	0	0	0	0	0
Broken	0	0	0	0	0	0	0	0
Indet.	0	0	0	0	0	0	0	0
Total	1	100	0	0	0	0	5	100

Regarding the typological recognition, the sample of Val Belluna 1 presents only one crescent (Gm1), while in the Asiago + Belluna set, backed fragment (fD) and foliated point reach 50% (F2f) (Table 57).

Table 56 Typologies of projectile implements

	type	Val Belluna 1		Val Belluna 2		Asiago+ Lessini		Belluna/Les+ Indeterminate	
		N	%	N	%	N	%	N	%
Geometrics	Gm1	1	100	0	0	0	0	0	0
Backed fragments	fD	0	0	0	0	0	0	1	0

Foliated points	F2f	0	0	0	0	0	0	1	10
Total		1	100	0	0	0	0	2	100

Dimension of projectile implements

The length of the geometric elements is 17 mm, width 4 mm and thickness 5 mm, while the dorsal fragment has a length of 12 mm, width 7 mm and a thickness of 3 mm (Table 58). On the other hand, the foliated tip has a length of 29 mm, a width of 21 mm and a thickness of 5 mm.

Table 57 Dimension of projectile implements

	type	Length (mm)	Width (mm)	Thickness (mm)
Geometric	Gm1	17	4	2
Backed fragment	fD	12	7	3
Foliated point	F2f	29	21	5

Blank selection

Crescent (Gm1) was identified made from bla phase, in which Val Belluna flint was used (Table 59), while the backed fragment (fD) was produced from blade/bladelet of production phase using Belluna/Lessini + indeterminate Maiolica flint (Table 60). concerning the foliated point was not possible to determinate the blank selection (Table 61).

Table 58 Blank selection of geometric implement

	Reduction sequence	Phase	Typology	N°	%
Val Belluna1	Blade/bladelet	production	Gm1	1	100
Total				1	100

Table 59 Blank selection of backed fragment

	Reduction sequence	Phase	Typology	N°	%
Belluna/Lessini+ Indet. Maiolica	Blade/bladelet	Production	fD	1	100
Total				1	100

Table 60 Blank selection of foliated point

	Reduction sequence	Phase	Typology	N°	%
Belluna/Lessini+ Indet. Maiolica	Indet.	indet	F2f	1	100
Total				1	100

4.2.3.3 Microburins

Raw material

Most of the microburins come from flints from Val Belluna 1 (56%), followed by microburins manufactured from flints from Belluna/Lessini + indeterminate Maiolica (33%), while the microburins from raw material coming from Asiago + Lessini represent 11% respectively.

Microburins obtained of Val Belluna raw material are similarly distributed with distal left and proximal left notches (50%), while those obtained with Val Belluna 2 and Asiago + Lessini raw material have predominantly distal left notches (Table 52). On the other hand, microburins from Belluna/Lessini + indeterminate maiolica, are more frequently the right distal notches (66.6%) followed by microburins with left proximal notches (33.3%).

Table 61 Microburins waste

Waste product	Val Belluna 1		Vall Belluna 2		Asiago+ Lessini		Bell/Less+Indet. Maiolica	
	N°	%	N°	%	N°	%	N°	%
Microburin-distal-left	2	50	1	100	1	100	0	0
Microburin-proximal-left	2	50	0	0	0	0	1	33.3
Microburin -distal-Right	0	0	0	0	0	0	2	66.6
Total	4	100	1	100	1	100	3	100

Dimension of microburins

In the sample six distal microburins and three proximal were recorded with a minimum length of 8 mm, mean length of 10 mm and maximum length of 15 mm. The minimum width is 3 mm, the mean width is 6 mm, and the maximum is 11 mm. The minimum thickness is 2 mm, the mean thickness is 1.3 and the maximum thickness is 2 mm.

All microburins were obtained from bladelets blank of the production phase.

4.2.4 Cores

In the ALB-14, fifteen cores were collected in surveys carried out in 2018 (Appendix, Figure 16). Cores of Val Belluna 1 represent 73% (n=11), Val Belluna 2 represents 20% (n=3), Asiago + Lessini 7% (n=1) and in Belluna/Lessine + indeterminate Maiolica was not recorded.

Cortex types

The analysed cores show that 46% show cortex in different positions such as behind, backed and behind, distal-backed-behind, while a small number show almost complete cortex or the absence of cortex. Based on the characteristics of the cortex, most part of sample suggests that the nodules were collected from secondary deposits and there is no evidence of collection from outcrop areas.

Cores typology

In the Val Belluna 1 sample, cores are prismatic (36%) followed by tested blocks and pyramidal cores (18%). In Val Belluna 2, the pre-cores type, the prismatic and diverse cores represent 33.3% individually, while in Asiago + Lessini, only a burin-like was attested ([Table 63](#))

Table 62 Core typologies

Core type	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet. Maiolica	
	N°	%	N°	%	N°	%	N°	%
Tested block	2	18	0	0	0	0	0	0
Burin-form	1	9	0	0	1	100	0	0
Partial centripetal on ventral face flake	1	9	0	0	0	0	0	0
Pyramidal	2	18	0	0	0	0	0	0
Polyhedric	1	9	0	0	0	0	0	0
Pre-core	0	0	1	33.3	0	0	0	0
Prismatic	4	36	1	33.3	0	0	0	0
Diverse	0	0	1	33.3	0	0	0	0
Total	11	100	3	100	1	100	0	0

Flake Cores

Flakes-cores comprise 33% of the total number of cores (n=5). They were mainly recorded in the Val Belluna 1 (40%; n=2) and Val Belluna 2 (40%; n=2) and in Asiago + Lessini (20%; (n=1) ([Table 64](#)).

Table 63 Flake core

	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet. Maiolica	
	N°	%	N°	%	N°	%	N°	%
si	2	18	2	66.6	1	100	0	0
No	9	82	1	33.3	0	0	0	0
Indet	0	0	0		0	0	0	0
Total	11	100	3	100	1	100	0	0

Debitage objective

Prismatic cores of Val Belluna 1 were intended to obtain flakes (75%: n=4) or blades (25%: n=1). Pyramidal cores were destined to produce bladelets. The core attesting a centripetal exploitation from a ventral face of flake and the polyhedric cores were used to produce flakes, while the burin-like core for obtaining bladelets. In Val Belluna 2, the pre-cores, prismatic and diverse cores were destined to produce flakes. The burin-like made on Asiago + Lessini lithotype was used to produces bladelets.

Below the measurements of the last and penultimate removals recorded on the last debitage surface of cores are presented:

Flakes	Length mm	Width mm	Bladelets	Length mm	Width mm
	Minimum	6		4	12
Mean	14	12.3	29.14	9.5	
Maximum	28	26	54	18	

Previous Exploitation Phase

Cores of Val Belluna 1 have not previous exploitation phase at 82% while in small frequency occur at 18% (Table 65). Cores of Val Belluna 2 were not recorded previous exploitation at 66.6% while occurred at 33.33%. Total cores of Asiago + Lessini has not previous exploitation phase.

Table 64 Previous exploitation phase of the cores

	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet	
	N°	%	N°	%	N°	%	N°	%
si	2	82	1	33.3	1	100	0	0
No	9	18	2	66.6	0	0	0	0
Indet	0	0	0	0	0	0	0	0
Total	11	100	3	100	1	100	0	0

Debitage surface

In Val Belluna 1, the exploitation of only one debitage surface is more common (73%), while two adjacent debitage surface are recorded in 18% of cases and three surfaces represents 9% (Table 66). In cores from Val Belluna 2, two adjacent debitage surfaces, two opposite debitage surfaces and three adjacent debitage surfaces represent 33.3% respectively. In the only core from the Asiago + Lessini lithotype, one debitage surface was used.

Table 65 Debitage surface of the cores

	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet	
	N°	%	N°	%	N°	%	N°	%
One	8	73	1	33.3	1	100	0	0
Two adjacent	2	18	1	33.3	0	0	0	0
Two oppose	0	0	1	33.3	0	0	0	0
Three adjacent	1	9	0	0	0	0	0	0
Total	11	100	3	100	1	100	0	0

In the first debitage surface of Val Belluna 1 cores were mainly exploited following a large and frontal modality (64%), followed by narrow and frontal (18%) and indeterminable (18%) (Table 67). In Val Belluna 2, the large frontal method is the only attested. In Asiago + Lessini, the on-edge reduction was used for exploiting the burin-like core.

In the second debitage surface of Val Belluna 1, the large and frontal, narrow and frontal, on edge and semi-tournant comprise 25% individually. In Val Belluna 2, the large and frontal and narrow and frontal reduction represent 50% each (Table 68).

Table 66 First debitage surface of cores

	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet	
	N°	%	N°	%	N°	%	N°	%
Large frontal	7	74	3	100	0	0	0	0
Narrow frontal	2	18	0	0	0	0	0	0
On edge	0	0	0	0	1	100	0	0
Semi-tournant	0	0	0	0	0	0	0	0
Indet	2	18	0	0	0	0	0	0
Total	11	100	3	100	1	100	0	0

Table 67 Second debitage surface of cores

	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet	
	N°	%	N°	%	N°	%	N°	%
Large frontal	1	25	1	50	0	0	0	0
Narrow frontal	1	25	1	50	0	0	0	0
On edge	1	25	0	0	0	0	0	0
Semi-tournant	1	25	0	0	0	0	0	0
Indet	0	2	0	0	0	0	0	0
Total	4	100	2	100	0	0	0	0

Removals direction in Val Belluna 1 cores are: unidirectional (64%), orthogonal (27%) and bidirectional (9%). In Val Belluna 2, the unidirectional, bidirectional and orthogonal represent 33.3% individually and in Asiago + Lessini, the unidirectional rhythm is the only one attested.

In prismatic cores, the unidirectional and bidirectional are more typical at 40% respectively and orthogonal represent 20%. In pyramidal, burin-form, cores, only unidirectional removal was recorded. In polyhedric, the orthogonal is more common.

Striking platform

In Val Belluna 1 cores one striking platform is more recurrent at 38%, followed by two opposites coplanar at 19%, while two opposite non coplanar and two orthogonal non coplanar represent 13% each. A smaller proportion shows two orthogonal non coplanar + one striking platform at 6.5% (Table 69).

In Val Belluna 1, only one striking platform prevail at 45% followed by two opposites at 19%. One partial peripheral, two opposite non coplanar, two orthogonal coplanar and two orthogonal non coplanar + one represents 9% respectively. In Val Belluna 2, two opposite coplanar, two opposite non coplanar and two orthogonal non coplanar represent 33.3% respectively. In Asiago + Lessini, only one striking platform was recorded.

Table 68 Cores striking platform

	Val Belluna 1		Vall Belluna 2		Asiago+ Lessini		Bell/Less+ Indet	
	N°	%	N°	%	N°	%	N°	%
One	5	45	0	0	1	100	0	0
One and + one secondary	0	0	0	0	0	0	0	0
One partial peripheric	1	9	0	0	0	0	0	0
Two opposites coplanar	2	18	1	33.3	0	0	0	0
Two opposites non coplanar	1	9	1	33.3	0	0	0	0
Two orthogonally coplanar	1	9	1	33.3	0	0	0	0
Two orthogonally non coplanar	0	0	0	0	0	0	0	0
Two orthogonally non coplanar + one	1	9	0	0	0	0	0	0
Three striking platform	0	0	0	0	0	0	0	0
Indet	0	0	0	0	0	0	0	0
Total	11	100	3	100	1	100	0	0

Concerning the debitage angle of the first striking platform of Val Belluna 1, angles <90° prevail with 64%, followed by angles =90° (27%) and indeterminable (9%). In the second striking platform, angles <90 as well as angles =90° which represent 50% respectively. In Val Belluna 2, angles <90° represent 66.6%, while angles =90° represent 33.3%. In the second striking platform, only angles <90° were recorded.

Percussion Traces

In Val Belluna 1 cores, the marked counter-bulb was frequently attested (64%), while the abrasion of the overhang was recorded in 27% (Table 70). In Val Belluna 2, the marked counter-bulb is more common at 66.6% and abrasion of the overhang 33.3%. In Asiago + Lessini, only marked counter-bulb was recorded.

Table 69 Percussion traces of the cores

	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet. Maiolica	
	N°	%	N°	%	N°	%	N°	%
Overhang abrasion	3	27	1	33.3	0	0	0	0
Marked counter-bulb	7	64	2	66.6	1	100	0	0
Indet.	1	9	0	0	0	0	0	0
Total	11	100	3	100	1	0	0	0

Abandonment

Cores of Val Belluna 1, highly exploited represents 45% followed by tested block, initiation phase and plain debitage at 18% respectively (Table 71). In Val Belluna 2, the initiation phase prevails at 66.6% and tested block at 33.3%. In Asiago + Lessini only the highly exploited core was recorded at 100%

Table 70 Level of exploitation of the cores

	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet	
	N°	%	N°	%	N°	%	N°	%
Tested block	2	18	1	33.3	0	0	0	0
Initiation	2	18	2	66.6	0	0	0	0
Highly exploited	5	45	0	0	1	100	0	0
Plein debitage	2	18	0	0	0	0	0	0
Total	11	100	3	100	1	0	0	0

Cores from Val Belluna 1 were abandoned for several reasons: small dimension (36%), a bad debitage angle (9%) and low quality of raw material (9%). 27% were abandoned without reason (Table 72). In Val Belluna 2, a bad debitage angle, small dimensions are the main reasons. In Asiago +Lessini, the only core attested were abandoned due to its small dimension.

Table 71 Reason of abandonment of cores

	Val Belluna 1		Vall Belluna 2		Asiago+Lessini		Bell/Less+Indet	
	N°	%	N°	%	N°	%	N°	%
Angle	1	9	1	33.3	0	0	0	0
Dimension	4	36	1	33.3	1	100	0	0
Raw material	1	9	0	0	0	0	0	0
none apparently	3	27	1	33.3	0	0	0	0
Indet	2	18	0	0	0	0	0	0
Total	11	100	3	100	1	0	0	0

4.3.4 Possible chronology

4.3.4.1 Bladelets

According to the regularity of the pieces analysed, in the unretouched bladelets, 69.5% correspond to the Early Mesolithic, while 22.5% to the Late Mesolithic. Some blanks produced on Maiolica (7%) could be dated the Neolithic period. According to the debitage technique, the 85% of the materials correspond to the Early Mesolithic and 15% to the Late Mesolithic or Neolithic.

4.3.4.2 Retouched pieces

To determine the possible chronology of the retouched pieces, the typologies defined by Laplace (1964) were considered. However, since some typologies appear in different chronologies, some attributes that may approximate the period y of these pieces were also taken into consideration, such as regularity and others that indicate the debitage technique and, in some cases, the dimension of the elements (Figure 4).

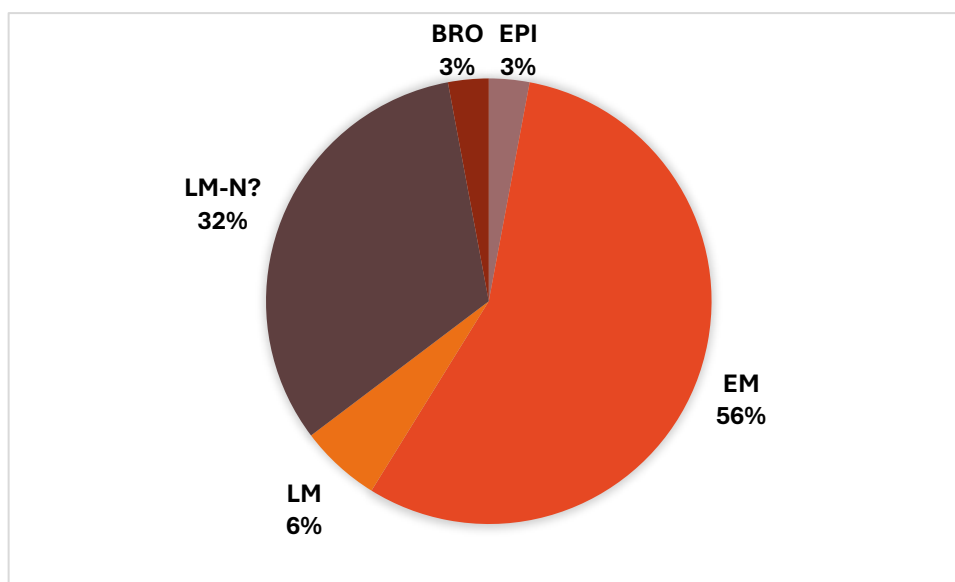


Figure 4 Possible chronology of retouched sample

Considering the above criteria, it has been hypothesized that materials from the Early Mesolithic prevail at 56% composed by burins, endscrapers, abrupt retouched flakes and microburins waste. This is followed by materials considered to be from the Late Mesolithic or from the Neolithic at 32% composed by burins, long end scraper, one point, truncations, backed fragment and microburins. Materials from the Late Mesolithic represent 6% composed by denticulated tools and Bronze Age appear at 3% composed foliated as well as from the Epigravettian tradition at 3% composed by borer.

4.3.4.4 cores

To determine the chronology of the core, the typology and regularity of the negative removals were considered. Following the above criteria, the total core shows irregular negative for which they can be places within the Early Mesolithic (Figure 5).

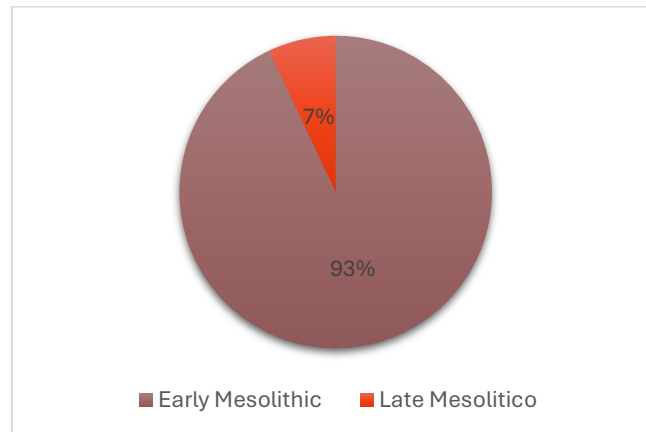


Figure 5 Possible chronology of cores

4.3 Spatial analysis

This chapter focuses on the analysis of this chapter only was taken into consideration 183 elements which the collected from various grids within the study area. These grids served as the basis for recording and analysing key variables, such as the exploited raw materials, levels of alteration, types of blanks and debitage, retouched pieces, the spatial distribution of cores, and their associated chronologies.

The material collection was carried employing a grid system with 5m x 5m. Each square was assigned to a unique alphanumeric identification, which was subsequently also represented in the virtual map using QGIS software. The map of ALB-14 is organized into 16 columns, labelled from A to R, with the exception of columns J and K orientated East to West. Rows, on the other hand, are numbered 1 through 14, following a North-South orientation

Each map employed in the analysis features a blue background with gradient tones to represent the density of lithic materials. Lighter tones indicate areas with a lower concentration of finds, while darker tones reflect a higher density of material. In grids where lithic artifacts were present, pie charts are used to visualize the distribution of various attributes associated with the artifacts. Each pie chart includes one or more colours, each corresponding to different characteristics of the lithic material collected in that grid. The size of the pie charts varies in proportion to the number of artifacts, with larger charts representing grids with higher artifact counts.

Concerning the distribution of the raw materials, the spatial analysis reveals two main concentrations. The first and most concentration is found between columns A-G and rows 2-13. However, there are other important concentration between columns F-M and between the rows 1-6 (Figure 6). The Val Belluna 1 flint exhibits a wide concentration around whole ALB-14 field, mainly in the Eastern section. The Val Belluna 2 raw material is distributed mostly in the

Northeast and central areas and on the Southwestern margin between columns P-R and rows 3-13. In contrast, Asiago and + Lessini raw materials is sparsely distributed in southeast with less number in the central and north areas, while the Belluna/Lessini + indeterminate Maiolica es more scattered in northeast part. The grid A6, D9, L3 and M1 show the more density and variation lithotypes.

Regarding the alteration, the high presence of patinated become in a wide distribution around the area, mainly in the East end and in the South margin between the columns A-R and the rows 11-13 as well as between the columns G-M and the rows 1-6 (Figure 7). Burnt materials, (including naturally altered pieces) was found in the Southeast and in the North zones of the field corresponding to the most concentration of the material appears. Slightly patinated and pseud retouches and deep patinated are widely spread in whole the field.

The distribution of flakes and bladelets across the study area, indicates a mixed pattern, with both artifact types present in most sectors. However, flakes show a higher concentration in the eastern portion, particularly between columns A-F and rows 2-13 (Figure 8). Additionally, flakes are more densely distributed in the Southwestern part of the site, between the columns M-R and the rows 9 to 13, while a significant distribution of flakes is observed between the columns L-P and the rows 6-7 as well as between the columns H-M and the row 1. Between the columns I-N and the rows 7-11 as well as between the columns N-Q and the rows 2-5 there are empty areas.

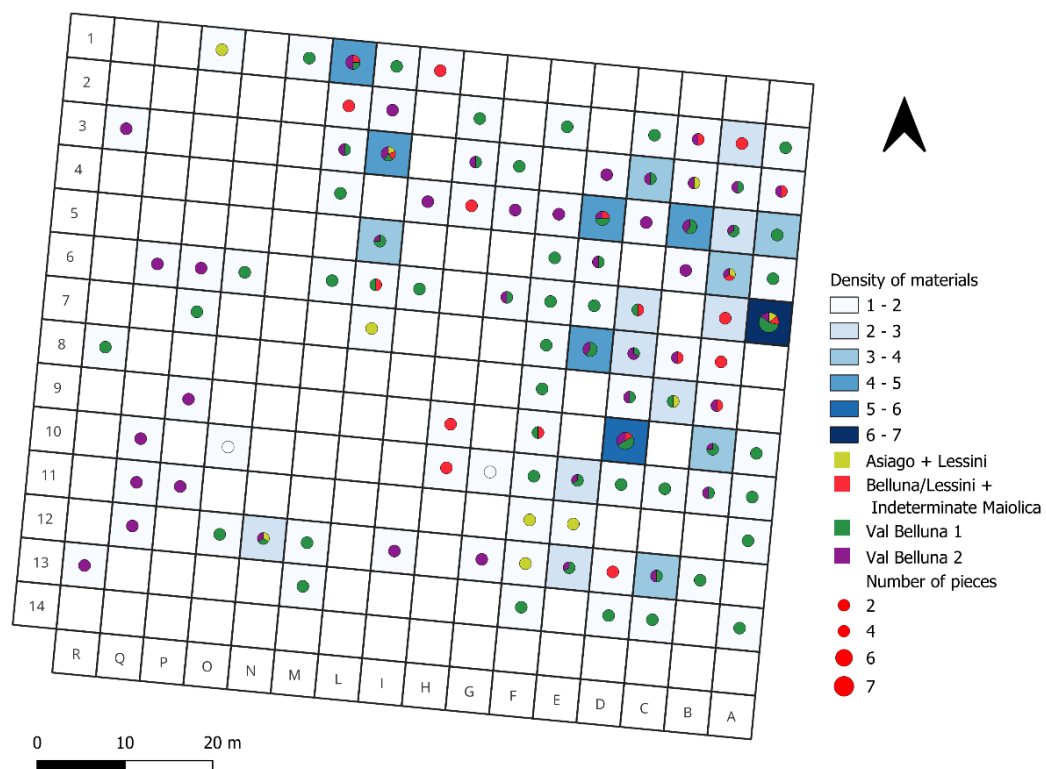


Figure 6 Spatial distribution of the raw material

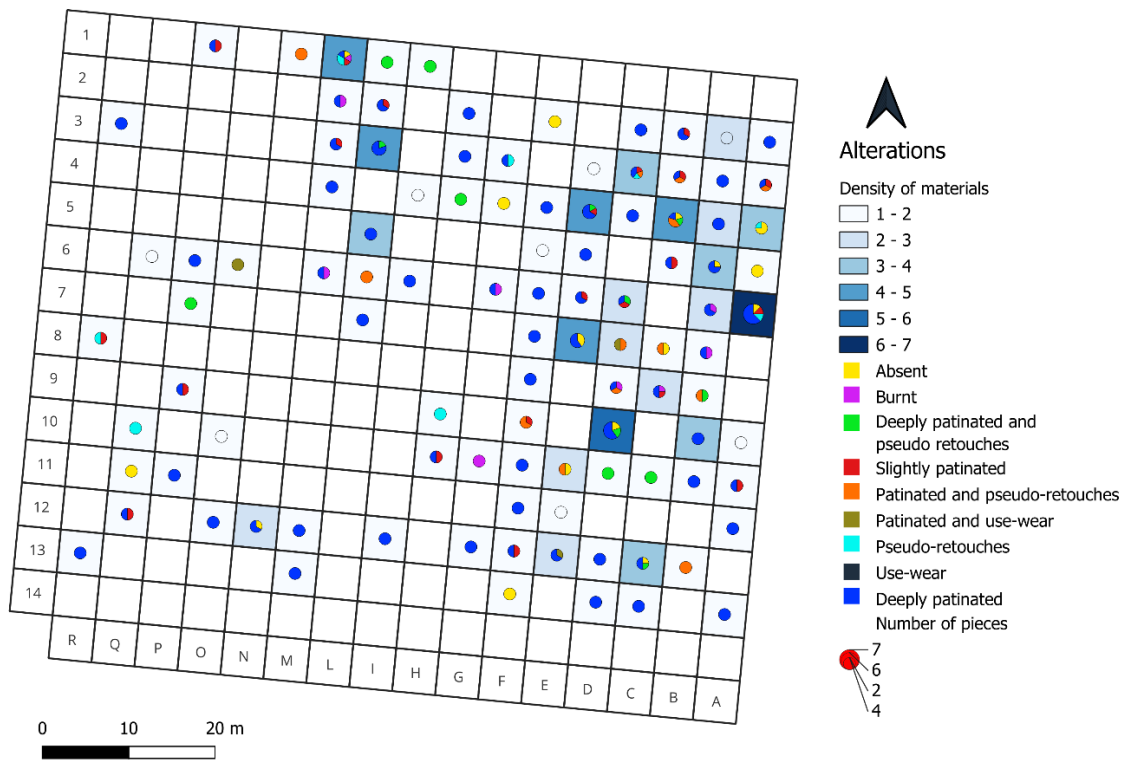


Figure 7 Spatial distribution of alteration

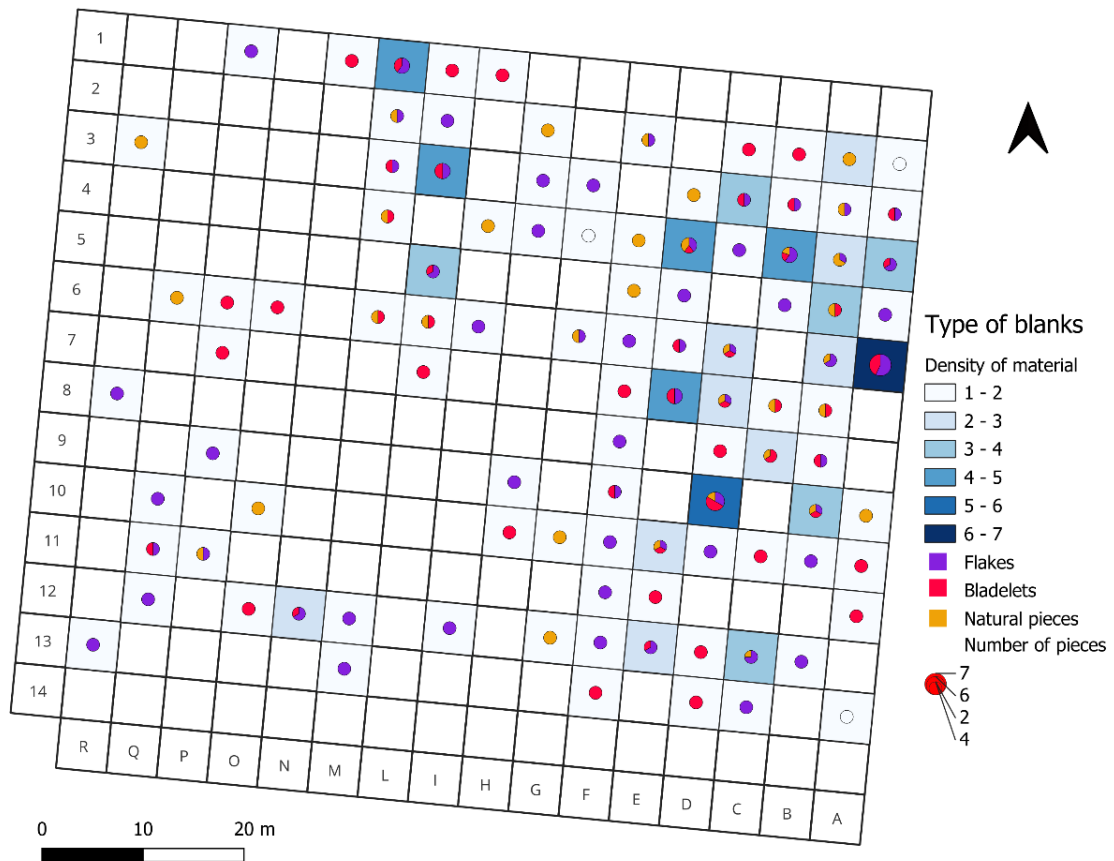


Figure 8 Spatial distribution of flakes and bladelets

Concerning the reduction phases, the initiation is more restricted to the Eastern section of the site, while in others sector was sporadically registered. Maintenance and production are scattered with a similar pattern around in the whole of ALB-14 (Figure 9). The maintenance/production phase reveals a similar spatial configuration to the previous ones, but without presence in the Southeast end between the columns A-F and the rows 11-13. There is specific area with more density of material attesting a high variation of reduction phase such as A6, D9, B4, I3 and M1.

The spatial distribution of flakes and bladelets attributable to the Early Mesolithic are disperse around entire area, with a notable concentration in the Eastern section, Northern section and in the Southwestern end section (Figure 10). In contrast, artefacts assigned to the Late Mesolithic are predominantly found in the northeastern part of the site, with only sparse occurrences in the northwest. Instead, those elements considered to the Late Mesolithic/Neolithic (?) exhibits greater density on the Southwest, where they are often found in association with Early Mesolithic artifacts. However, certain grids (F9, F11, H9, H10) show exclusive presence of Late Mesolithic/Neolithic (?) pieces. Unretouched artifacts from the Late Mesolithic are more concentrated in the northeast, with fewer occurrences in other sectors.

Concerning the retouches pieces, they are distributed mainly in the squares of the center of the East end, which are characterized mainly by domestic tools such as flakes with abrupt retouched, endscrapers, and some burin and denticulate (Figure 11). Additionally, one crescent was identified in this area. On the contrary, the microburins reveal a wider distribution in the area western and some cases to the north but with large empty spaces. The absence of retouches pieces its notable. The Early Neolithic are distributed in almost in total area in which the retouched pieces were found (Figure 12). Only one Late Mesolithic artefact was recorded placed in the grid A4, while those considered of the Late Mesolithic/Neolithic are in the grids of the Southeastern sector, while other was recovered in L3 grid.

The distribution of cores across the study area is notably sparse, particularly in the eastern sector. The cores are very sparsely distributed in the Eastern sector (Figure 13). Prismatic Cores are concentrated in the central part of the above-mentioned zone, while the pyramidal core was recovered in the Southeastern sector specifically in the grid A3 and burin like in the grid G4. Other elements, such as tested blocks do not exhibit a specific concentration pattern and are scattered widely across the area, with no apparent clustering. The map also indicates that no cores were recovered in the grids extending from the central part to the eastern boundary of ALB-14.

The chronological analysis of the cores and other exploited elements suggests that the majority of them can be attributed to the Early Mesolithic. These Early Mesolithic elements are distributed across the entire area where cores were found, reflecting a broad spatial presence. In contrast, the pyramidal core, which is linked to the Late Mesolithic, was specifically located in the southeastern margin of the site. This distinction in spatial distribution highlights a

temporal shift in core usage, with Early Mesolithic artifacts more widely dispersed and Late Mesolithic artifacts being more localized (Figure 14).

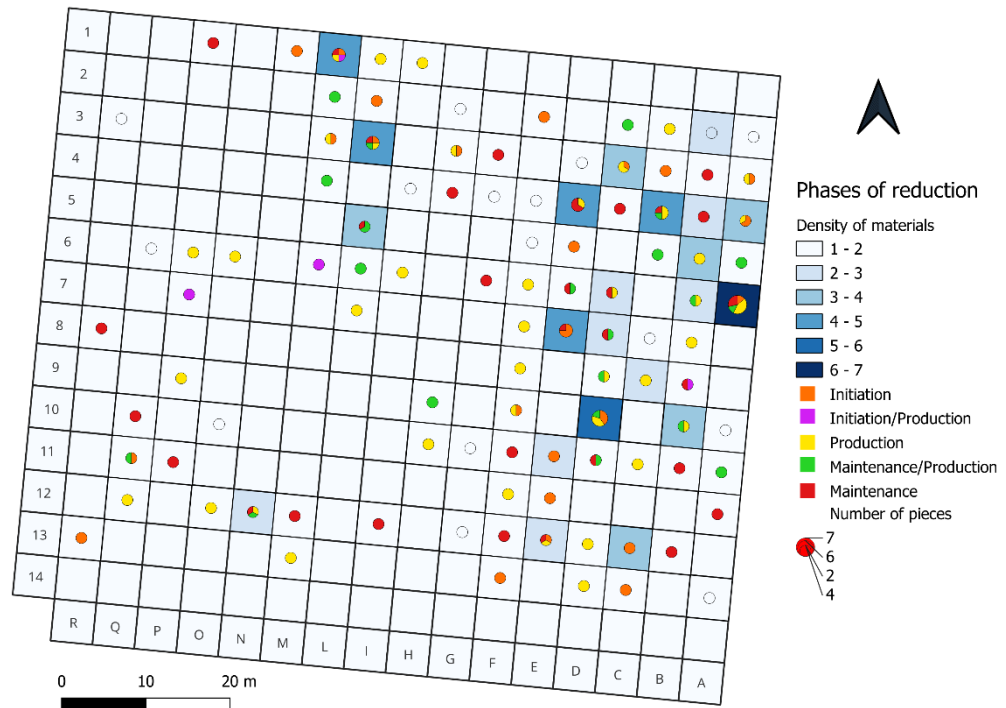


Figure 9 Spatial distribution of reduction phase

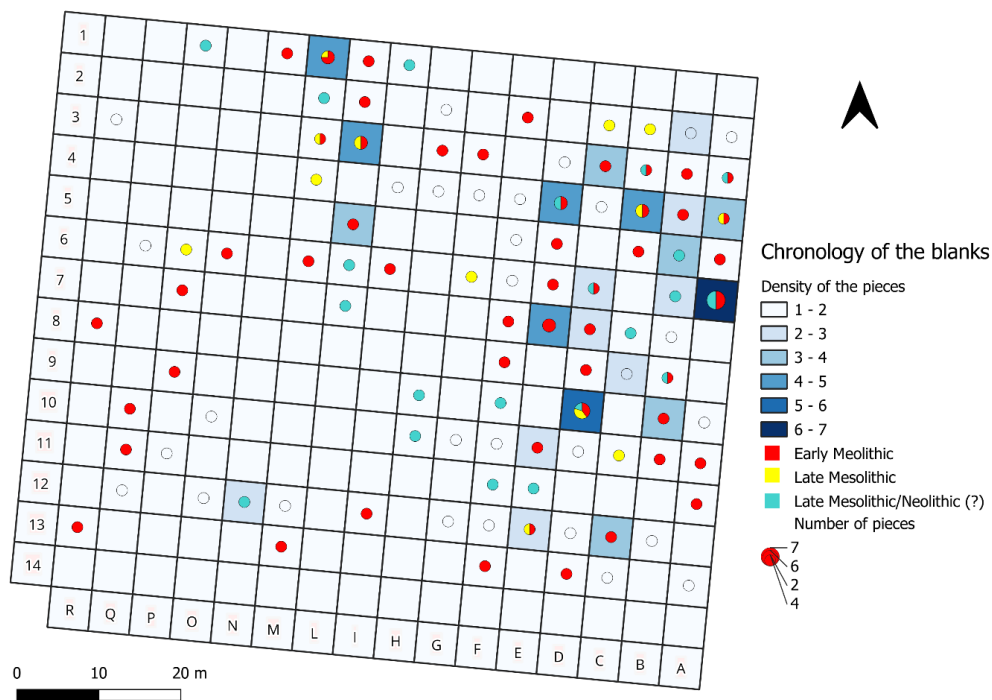


Figure 10 Spatial distribution of the chronology of the blanks

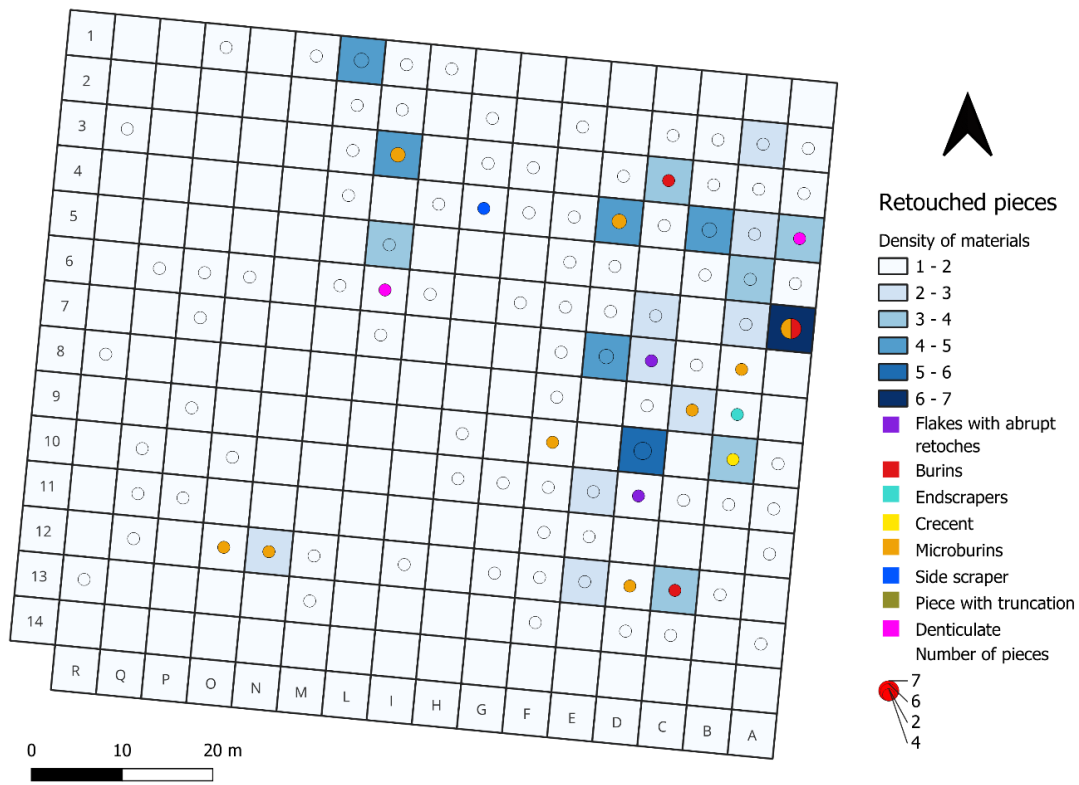


Figure 11 Spatial distribution of retouched pieces

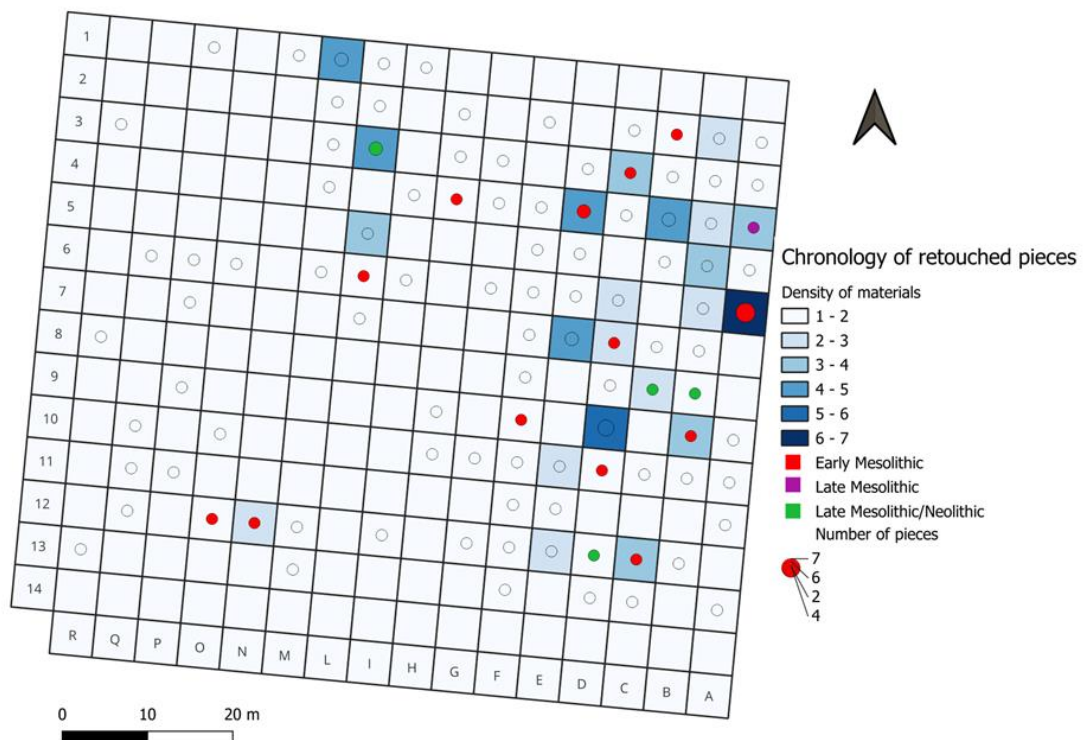


Figure 12 Spatial distribution of the chronology of retouched pieces

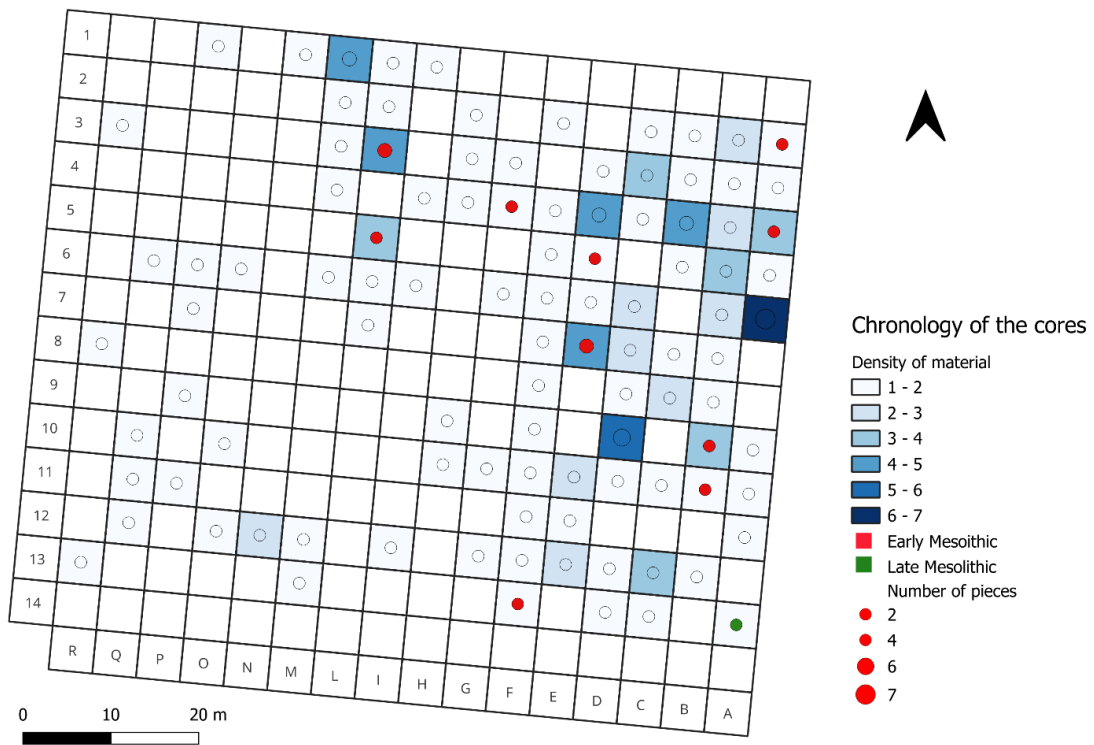


Figure 13 Spatial distribution of core types

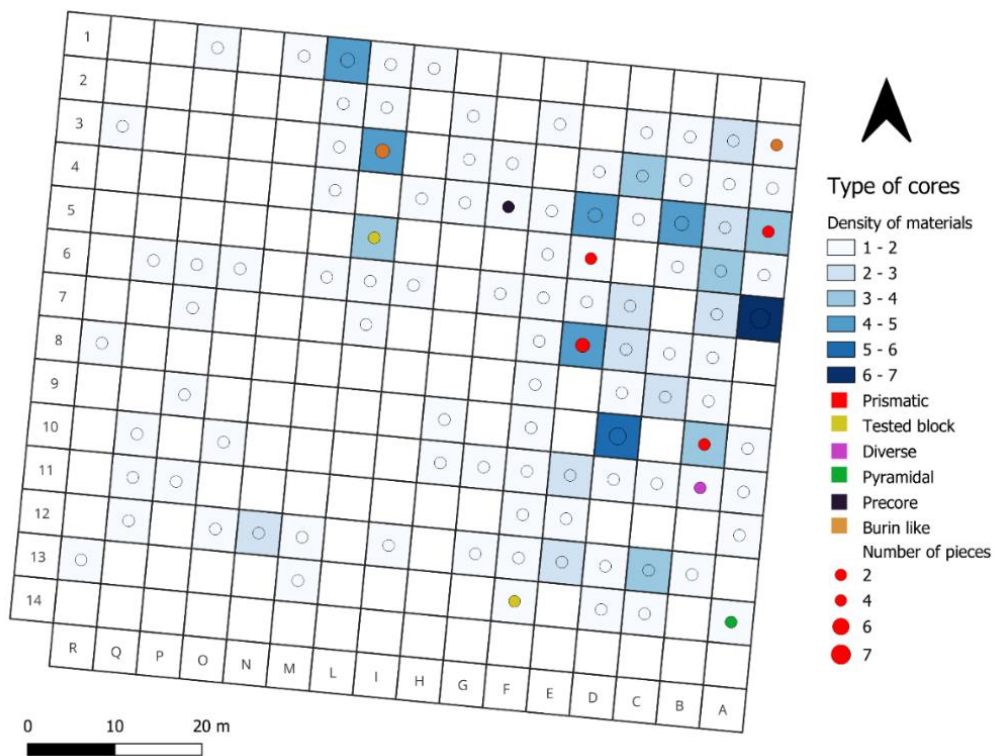


Figure 14 Spatial distribution of the chronology of the cores

5. DISCUSSION

In the survey carried out in the ALB-14 field, more than 300 pieces were collected, most of which are characterized by patina alteration, which according to previous studies is attributable to the peaty soil of the area (Scarazzato, 2016-2017). Most of the elements are composed of unretouched microlithic pieces, while a smaller amount is made up of retouched ones and cores.

For the chronological definition of the unretouched pieces, I relied on the existing literature (Broglio, 1980; Crombé & Robinson, 2016). Those with irregular shape were considered as part of the Early Mesolithic, while those with regular edge and ridge were placed within of the Late Mesolithic. However, due to the lack of a stratigraphic context, it is also necessary to take into consideration that some artifacts made of Maiolica, especially those from the Asiago + Lessini Mountains, may correspond to the Neolithic period, since at this time the use of this material was widely expanded (Goldenberg, 2006), which was attested in the Po plain (Starnini et al., 2016). The presence of artifacts made of this flint in ALB-14, could suggest that they correspond to a transitional period between the Late Mesolithic/Neolithic.

Concerning the raw material, the human groups of ALB-14 had a special preference for local raw material, particularly exploiting Scaglia Rossa from the pre-alpine areas, which has already been attested in studies carried out of the area (Guerra, 2015; Scarazzato, 2017) and surrounding zones of Montebello area (Duches et al, 2016). The exploitation of local Scaglia Variegata was also important. Raw materials from more remote areas, such as flint from the Asiago-Grappa and Lessini Mountain is attested, albeit in small numbers. Thus, the flint knappers did not often travel to the original flint formation area, but they collected flint sources locally in a secondary position, mainly from the course of the river as attested by the high rounded level and the reduced thickness of the cortex. Additionally, flints embedded in the soil were also collected. Moreover, the scarcity of flint pieces related to the initiation phase produced from raw materials from Asiago-Grappa and Monti Lessini allow to hypothesize a possible preliminary reduction of cores before on these raw materials arriving to the Sorgenti del Sile area.

In the analysed sample it can be observed that most of the flakes were obtained during the initiation and maintenance phases, while the number is reduced in the production phase. Instead, the lamellar elements show that they were often produced in the production phases while they decrease in the initiation and maintenance phase. Due to the low level of standardization of the pieces, and the characteristics of the bulb, lip and butt, it can be considered that in general the flintknappers use the direct percussion technique with stone hammer using stone hammer. However, a large part of the sample analysed that is characterized by a significant regularity was obtained by the direct percussion technique, which is possible according to previous experimental study data (Damlien, 2015). In field ALB-14, the use of the indirect percussion/pressure technique was restricted exclusively to detaching lamellar elements in the production phase.

Based on the study of cores, it can be inferred that the debitage was carried out mainly from one striking platform, although the use of two opposite coplanar and orthogonally coplanar striking platforms is also important, in which a predominantly large debitage surface, pattern that has also been attested ALB-5-4.9 field (Guerra, 2014-2015, Scarazzto, 2016-2017), but in ALB-14 the use of narrow frontal and on edge debitage surface were very rare. Additionally, as has been shown in previous studies carried out in the area, all the cores show traces of direct percussion technique, while the use of indirect percussion and pressure techniques were not documented.

Although the sample analysed is small, there is a significant number of retouched elements (11%) consisting mainly of domestic tools including burins and endscrapers. Contrary to site ALB-5-4.9, where the armatures prevail, at the site subject to analysis in this thesis it is extremely rare to find armature. However, the analyses of the retouched elements from both sites conclude that there was frequentation the Sauveterrian sequence compared to the Castelnovian one, while other artifacts attributable to the Neolithic and Metal Age, where the site was apparently undergoing a process of gradual abandonment.

Although the flintknappers' intention was to produce laminar elements, as shown in the production phase, the flakes obtained during the initiation and maintenance were also modified by retouching to produce domestic tools in field ALB-14, which has also been attested in Mondeval de Sora located in the Alpine mountains (Valletta et al., 2016). Concerning the domestic tool during initiation and maintenance of the cores, multiple blanks tended to be detached, mostly flake, which correlates with the information provided in studies carried out in sites in northern Italy such as the case of Romagnano Loc III, located in Trento (Flor et al, 2011).

Spatial analysis show that there is a large concentration of lithic material around whole area of ALB-14, except between the columns I-0 and rows 8-11, and between the columns N-Q and the rows 2-5, both of which are located in western sector of concerned area. The denser concentration was located between the columns A-F and the rows 2-12. In addition, in Northern sector the maps reveal other significant density of pieces specifically between columns H-M and rows 1-3. The mentioned area provides also the highest concentration of burnt alteration, unretouched pieces, reduction phase, retouched pieces and cores.

The debitage bladelets and flakes attest that in the Early Mesolithic there was a frequentation along the area, while the more recent pieces attributable to the Late Mesolithic are more restricted to northward zone with little frequentation toward south. Based on materials presumably from the Mesolithic/Neolithic Mesolithic/Neolithic (?), the more occupation occurred to the Southeast, but also there are evidence of occupation in the North area.

The East zone was used for multiple functions perhaps in the long-term including knapping activities attested by the high frequency of pieces of initiation phase, the presence and cores and microburins as well as the domestic task due the presence of burins, endscrapers and denticulated piece. The spatial distribution of the maintenance and maintenance/production pieces show a more flexible distribution around the ALB-14, suggesting a possible reshaping

activity of the artefact carried out in anywhere of the site, essentially by the groups of the Early Mesolithic. In this study, the inclusion of natural pieces subject to thermal alteration was considered to understand possible hearth-places due the low frequency of debitage elements. However these pieces have not a specific pattern in this sites, because usually they were recovered outside of the grids with more density of material, which could suggest a post depositional alteration. However, previous studies in the area show higher concentrations of burnt materials in the area which could indicate the presence of a fireplace as has already been evidenced at sites of southern part of Po Plain, northern Italy (Davide & Fontana, 2016). For this reason, the high dispersion of burnt lithic materials from the study site may be caused by plowing activities.

The data from this research compared with those previously developed in the same area (Guerra, 2014-2014; Acarazzato, 2016-2017), it can be said that this area was intensively occupied during the Mesolithic period, but particularly in the Sauveterrian sequence. However, it can be stressed that although in general the functionality of the sites was very similar, due to the variety of lithic artefacts, it is possible to suggest that in ALB-4-5-9 hunting activity was very frequent due to the important presence of armatures, domestic activities and production workshops. All these functions could have been possible in the ALB-14 field, except for hunting activities, in which is attested low frequency according to the poor evidence of projectile implements in the survey carried out in 2018. However, it can be hypothesized that these differences may be the result of aspects related to the size of both fields and the sample size, which are much larger in the ALB 4-5-9 field.

At a more general level, Mesolithic groups of ALB-14, whether from the Siverrian or Castelnovian phase, were confined to inhabiting those spaces that were close to streams, which allowed them to obtain materials that they transported, such as pebbles. This pattern has been recorded throughout the sites studied in the south of the Po Valley (Visentin & Fontana, 2016). This favoured several open-air sites being occupied for long periods of time, as is the case with the Collechio site.

6. CONCLUSION

This study was focused on the study of the lithic industry at ALB-14, a prehistoric site in the Sile River Spring area of the Venetian Plain, northeastern Italy. The research presents new data that will allow to discuss the occupation of the prehistoric human groups that occupied this area characterized as one of the richest in lithic material and that become an important source to answer questions about human practices, which are approached here from the analysis of the raw material, the technological, typological analysis and the spatial distribution of the evidence.

Sorgenti del Sile is strategically located, facilitating intensive human occupation since the Mesolithic. The area's abundance natural resources, originated in the area due to the climate change that began in the Holocene, enabled attracted the occupation of hunter-gatherer groups. In addition, its location allowed these groups to collect flints formed in the pre-alpine areas, with which the manufacture of stone artifacts was possible.

Local flintknappers primarily used raw materials from the Val Belluna in the pre-Alpine area, favoring varieties such as Scaglia Rossa and Scaglia Variegata. The human groups rarely moved to distant areas, in search of flints for the manufacture of artefacts. A few allochthonous flints used are confined to the formations of the Lessini and Asiago-Grappa Mountain. Based on the rounded and thin cortex of the flints, it is possible argue that the most part of the used blocks were collected in the secondary position produced by fluvial transportation, while it was rare that the flintknappers collected raw material in outcrop zone.

Due to the severe impact of agricultural activities, establishing the chronology of the evidence is one of the most challenging tasks due to the lack of the stratigraphic context that allows for a more certain reconstruction. However, analysis suggests that the site was most intensively used during the Early Mesolithic, with a decline in activity during the Late Mesolithic. Evidence from the Metal Age is sparse.

Given the availability of abundant natural resources and the variety of lithic artifacts analysed in this thesis, it can be suggested that this site was frequented in long-term periods during the Mesolithic, during which different activities could have been developed, such as the manufacture manufacturing of artifacts, domestic activities and possibly hunting, although in ALB-14 the projectile elements are poorly documented. However, based on the data provided in previous studies (Guerra, 2014-2015; Scarazzto, 2016-2017), it is highly possible that this activity was carried out at least in the surrounding areas.

Spatial analysis carried out suggests a denser occupation in the eastern part of the site where most diagnostic artifacts were found during a 2018 survey, while evidence in the western section is notably sparser.

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8. APPENDIX

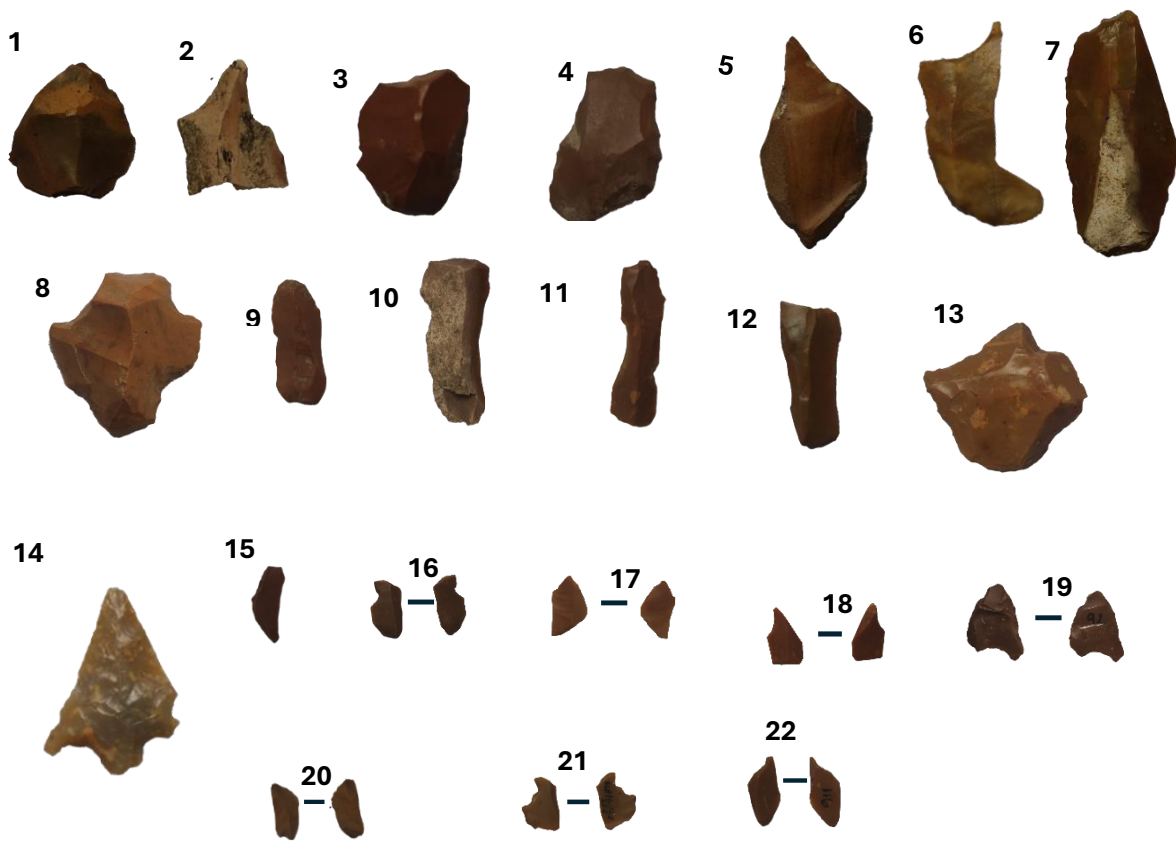
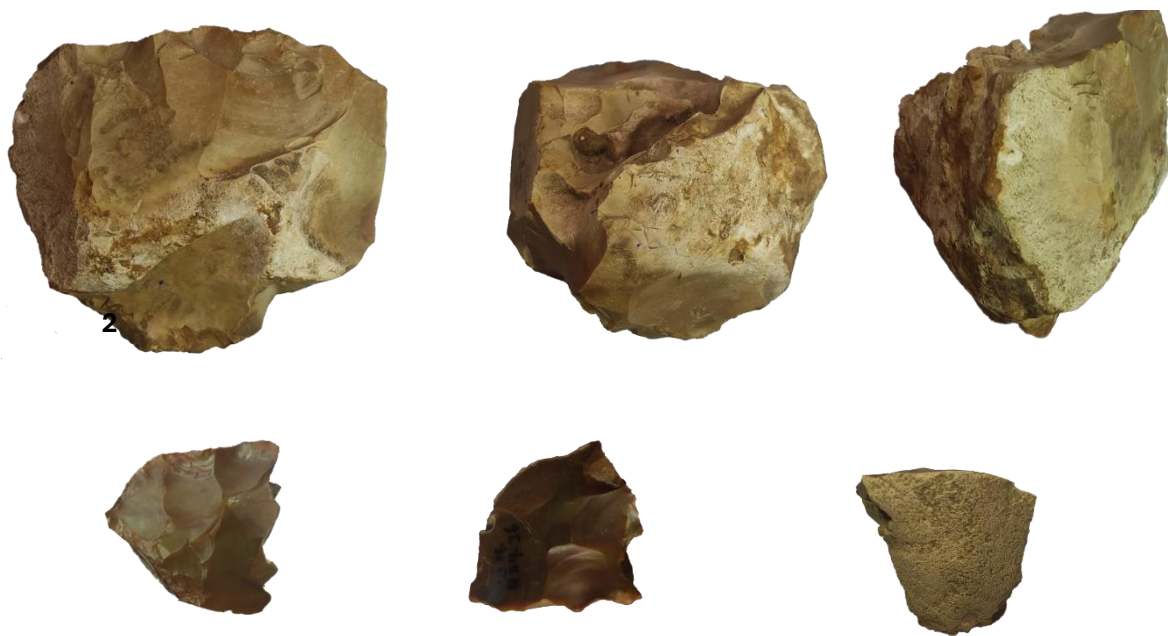


Figure 15. 1-7. Burins, 8-10. Endscrapers, 11. Denticulated, 12. Truncated, 13. Perforator, 15. Crescent, 16-22. Microburins



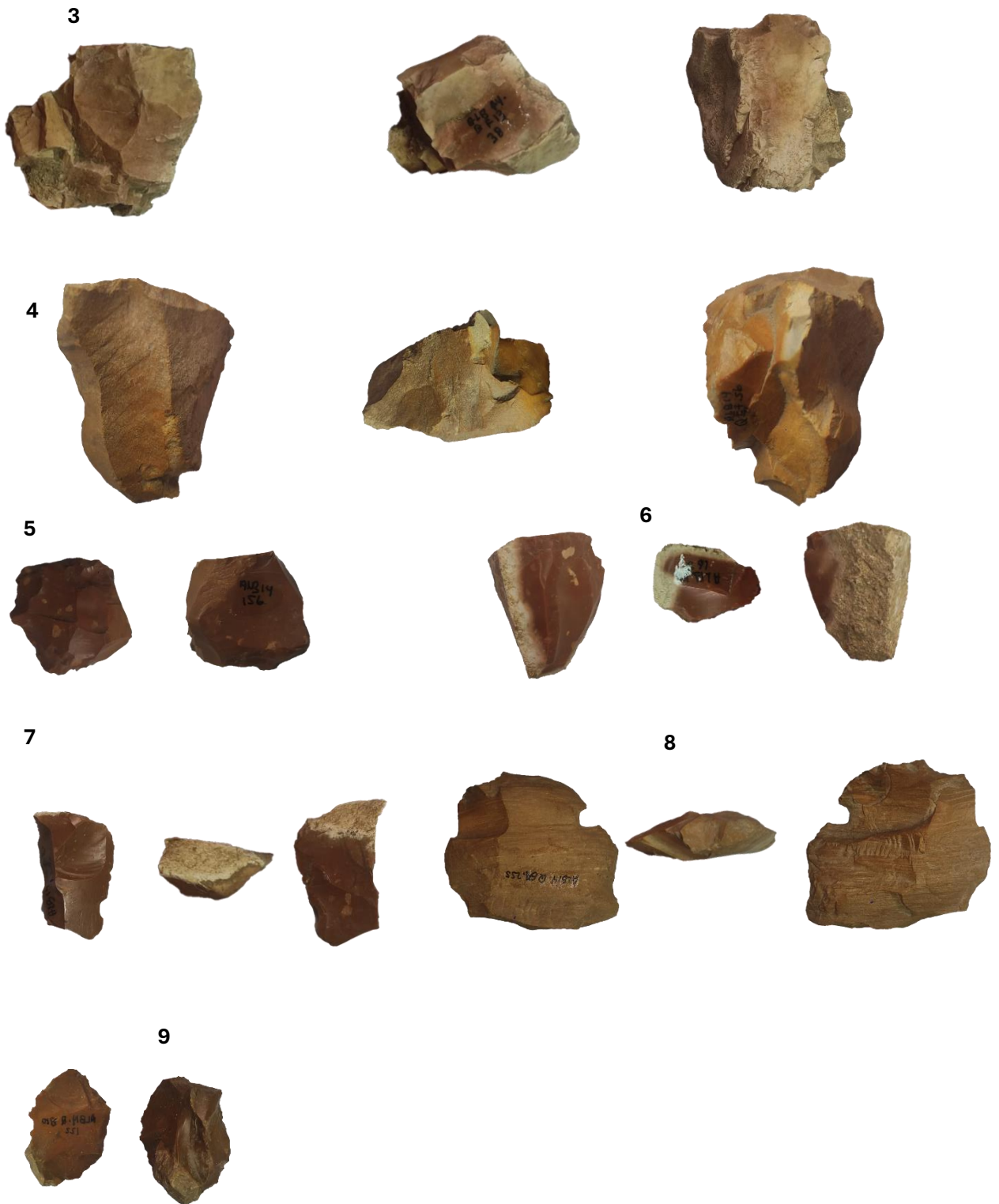


Figure 16. 1-4. Prismatic, 5. Polyhedral, 6. Pyramidal, 7. Burin-like, 8. Tested block, 9. Diverse