# Prehistoric landscapes of the Dolomites: survey data from the highland territory of Cadore (Belluno Dolomites, Northern Italy)

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## Abstract

The identification of Mesolithic lithic scatters on the highland district of Cadore (1700-2700 m a.s.l.), in the Eastern Italian Alps, started during the 1980s, enhanced by the discovery of the rock-shelter site of Mondeval de Sora. A new archaeological survey project was developed in this area, particularly between Passo Giau and Col de la Puina, from 2011 to 2014. The adoption of a "total archaeology approach" enabled the identification of different types of archaeological evidence. This paper focuses specifically on the small-scale record represented by lithic artefacts. Both previously identified sites and newly recognised find-spots have been positioned, described and spatially analysed in connection to the topography of the investigated territory, in order to set hypotheses on the settlement strategies adopted by prehistoric groups. Most of these scatters can be attributed with a good approximation either to the Sauveterrian or to the Castelnovian phase of the Mesolithic or generically to the Mesolithic, thus confirming the intense occupation of these territories by the last groups of hunter-gatherers. Nonetheless the presence of some lithic artefacts that can be attributed to a more recent period (Copper Age) has led the authors to reconsider the common assumption that all lithic assemblages at high altitude should necessarily be attributed to the Mesolithic.

**Key-words:** Lithic scatters, Mesolithic, Copper Age, Belluno Dolomites, Landscape archaeology

## 1. Introduction

Between 2011 and 2014 a new upland field survey project was undertaken in the Cadore territory (Belluno Dolomites, Northern Italy). The study area is delimited - north to south - by the Boite and Cordevole valleys, sub-tributaries of the Piave river, and comprises the mountainous areas known as Passo Giau, Mondeval de Sora and Malga Prendera-Col de la Puina (1800 to 2700 m a.s.l.). It represents the easternmost part of the so-called Dolomites area extending between the Adige river to the west and the Piave river to the east and bordered to the north by the Pusteria valley and to the south by Valsugana (cf. supplementary material).

The project sought to record any evidence of human activity identifiable on the surface, with no chronological restriction, including prehistoric and historical sites, as well as modern and contemporary occupations, overcoming the traditional chronological boundaries of archaeological research. It is worth pointing out that other archaeological projects in the Alps and in mountainous areas have a similar diachronic approach (Walsh et al., 2014; Reitmaier, 2012; Rendu 2003), although very few of them focus on contemporary material evidence of human activities. Fieldwork was undertaken by adopting a multi-scale approach, searching for evidence of different sizes: small (e.g. artefacts), medium (e.g. rock engravings) and large (e.g. structures and facilities). The multidisciplinary, diachronic and multi-scale approach adopted in this project was named "total archaeology". This definition has been used to describe other archaeological projects that integrate different methods and scales (Olson et al., 2013; Evans et al., 2006), but has been rarely referred to diachronic landscape analysis.

This paper focuses on the small evidence represented by lithic artefacts. Both previously identified sites and newly recognised find-spots were positioned, described and spatially analysed in connection to the topography of the investigated territory, in order to study the settlement and exploitation strategies adopted by prehistoric groups. The project did not include any specific environmental analysis so that the diachronic evolution of the local landscape was inferred from previous studies available for the investigated area. The results were contextualised through a comparison with the dataset available for the Western Dolomites, in the eastern side of the Adige drainage system. This enabled a better understanding of prehistoric occupation in the south-eastern Alps.

The interplay of novel fieldwork methods and multidisciplinary interpretative approaches provided interesting, although preliminary, results. Most of the recorded sites could be attributed with a good approximation to the Mesolithic, thus confirming the intense occupation of these territories during the first part of the Holocene. Nevertheless the last hunter-gatherers were not the only late-prehistoric groups that exploited the highland territories of the Dolomites. This assumption, motivated by an accurate revision of past documentation and by the results of recent surveys, led us to analyse the available dataset in a wider diachronic perspective.

## 2. The Belluno Dolomites: palaeo-environmental and archaeological background

### 2.1 Palaeo-environmental context

Direct palaeo-environmental data on the study area are scarce and most information has to be derived from comparisons with similar mountainous districts of the central and eastern Alps. At a general level it is possible to synthetize the history of the vegetation cover as follows:
at the beginning of the Holocene temperature and moisture gradually increased favouring the development of mixed oak forests in the plain and in the lower part of the inner valleys (Drescher-Schneider, 2009). Highlands were characterised by the diffusion of *Pinus*, *Pinus cembra*, *Larix* and *Betula*. The development of a forested environment enhanced the rapid rising of the timberline. Around 8850 cal BC the latter is attested at 2100 m a.s.l. (Oeggl and Wahlmüller 1994) with the belt located between 1700 and 2100 m a.s.l. and characterised by the presence of a *Larix*-*Pinus cembra* forest with *Betula*, and *Alnus alnobetula.*
This trend continues in the Boreal with the spread of *Picea* in the subalpine belt and in the inner valleys of the south-eastern Alps (Drescher-Schneider, 2009). During the Atlantic dense *Picea* woodlands are attested in central-eastern Alps up to 2200 m a.s.l. while at higher altitudes *Larix-Pinus cembra* forests characterised the timberline (Nicolussi et al., 2005). No significant changes in the composition of the forest are attested at high altitudes during the Late Holocene but for the decrease of the timberline starting at about 2000 cal BC (Drescher-Schneider, 2009).
As far as the investigated area is concerned important data are provided by the multidisciplinary study carried out at the Alpe Fedèra on the east side of the Croda da Lago. Here a thick soil was identified at 2,050 m a.s.l. (Soldati et al. 1997). Results derived from pedological and palynological analyses together with radiometric dating carried out on peat and wood samples found in the soil profile allowed the reconstruction of the environmental evolution of the area in the last 10,000-12,000 years. This suggested the presence of pioneer plants (*Salix*, *Betula*, *Pinus mugo*) in the first part of the Holocene, later replaced by a *Picea*, *Larix* and *Pinus cembra* dominated woodland. Most palynological studies from the Eastern Alpine area confirm that *Picea* started spreading in the Preboreal when *Pinus* was still prevailing and it became dominant in the Boreal when also *Abies*

appeared. In the Eastern Alps the diffusion of *Picea* seems to begin earlier than in the Central Alps. During the Atlantic *Picea* was associated to *Larix*, *Pinus cembra* and *Pinus mugo* while in the Sub-boreal *Pinus cembra* and *Abies* consistently increased.

## 2.2 Palaeo-Mesolithic evidence

The first discovery of Mesolithic artefacts in the Cordevole Basin dates back to the late 1970s. During the summer of 1979 B. Bagolini and D. Nisi identified some lithic artefacts on Monte Forca (next to Passo Pordoi, 2300 m a.s.l.) a few dozen metres far from the border between Veneto region and Trentino Alto-Adige region (Bagolini and Nisi, 1978). In spite of the absence of retouched items this evidence was attributed to the Early Mesolithic. During 1981 three other discoveries confirmed the presence of Mesolithic assemblages in the Belluno Dolomites. In particular B. Bagolini, D. Loss and D. Nisi collected some laminar blanks at Passo Falzarego (2100 m a.s.l.) and Passo Giau (2200 m a.s.l.; Bagolini et al., 1980a, 1980b) while A. Broglio and P. Corai (1980) identified an assemblage composed of both chert and rock crystal artefacts on Passo Valparola (2150 m a.s.l.). Between 1983 and 1985 R. Lunz recorded other lithic scatters in the same area (Lunz, 1986).

After these first findings, in the following years a few local amateurs took up the survey activities. On the basis of the assumptions derived from the so called "vertical nomadism model" proposed for the Adige valley (Bagolini 1972; Broglio, 1973, 1980), they started looking for Mesolithic evidence in the most likely locations, especially in proximity of the main passes. From these most promising spots they gradually enlarged their research areas, identifying a conspicuous number of sites (Mondini and Villabruna, 1982, 1992). In the same years V. Cazzetta discovered the first Mesolithic artefacts in Mondeval de Sora under the overhangs of two large erratic boulders (VF1 and VF2; 2135 m a.s.l.)(Fig. 1). One year later (1986) the first excavation campaign was undertaken at the so-called site VF1 by A. Guerreschi (Alciati et al., 1992). This site represents so far the only stratified deposit extensively excavated in the Belluno Dolomites, thus standing as the main reference for the Mesolithic of the area (Fontana et al., 2009a, 2009b). Its importance is related to the extraordinary preservation of organic materials together with a rich lithic assemblage and to the discovery of a Castelnovian burial, which still represents the only funerary context dated to this period in the Italian peninsula (Gerhardinger and Guerreschi, 1989; Fontana, 2006; Fontana et al., 2015).

During the latest years of the last century and the first of the new millennium further survey campaigns were undertaken by independent researchers over a wide area spanning from the Pre-Alps to the inner Dolomites, covering most of the Belluno Province territory (Cesco Frare and

Mondini, 2005; Marsale, 2003; Fontana et al., 2002; Marsale and Rebeschak, 2007). A systematic survey was also carried out in 2001 by the University of Ferrara in the area of Mondeval de Sora, allowing the recording of almost thirty sites between Malga Prendera and Forcella Giau (Fontana and Pasi, 2002). Two new sites were the object of stratigraphic investigations in the last years. In 2007 at Pian de la Lora, on the lower slopes of Mount Civetta, a Castelnovian site with a chronology very close to the burial of Mondeval de Sora was explored (Franco, 2015). In 2011 excavations started at Casera Staulanza, on the southern slope of Passo Staulanza (1681 m a.s.l.), yielding a Late Epigravettian rich assemblage which represents, at present, the most ancient evidence of human occupation in the inner area of the Belluno Dolomites after the LGM (Fontana et al., 2014).

These field activities have provided a massive dataset for the Mesolithic occupation of the Belluno Dolomites. Nonetheless, in most cases, its potential has neither been fully exploited nor the object of a critical review, aimed at a contextualization in the general framework of human occupation of the Dolomites area.

## 2.3 Late Prehistoric evidence

Although Mesolithic assemblages are predominant in the study area, important evidence of later prehistoric periods was identified as well. Possible Copper Age potsherds were found in the area of Malga Prendera during the 1980s (Bianchin Citton, 1992, p. 122). Along the Loschiezuoi stream, above the village of Pescul (Selva di Cadore), a rock-shelter, known as Riparo Mandriz, located around 1700 m a.s.l. provided evidence of prehistoric human occupation; significant faunal assemblages were found (mostly sheep-goat but also deer), together with pottery and chert artefacts attributable to the Late Neolithic and the Copper Age, namely between the first half of the 4$^{th}$ millennium and the beginning of the 3$^{rd}$ millennium BC (Bianchin Citton, 1992, p. 123). Unfortunately the stratigraphy of this site was altered by unauthorized excavations, thus preventing the understanding of the actual chronology and function of this context. Another interesting finding is the leaf-shaped chert point found at 2600 m a.s.l. near the main peak of Monte Cernera, which divides the Mondeval area from Passo Giau (Palmieri, 1978; Bagolini and Pedrotti, 1992). This point can be typologically attributed to the Copper Age. During the excavation of the Mondeval de Sora rock-shelter (VF1), several post-Mesolithic phases of occupation were recorded, and late-prehistoric levels in particular were well documented. A preliminary overlook of the material culture suggested the occurrence of Copper Age pottery (Alciati et al., 1992). A recent assessment undertaken by the authors of this paper enabled the identification of only two artefacts potentially attributable to the Copper Age within the archaeological assemblage: a concave-base chert arrowhead and a bone bead. Possible Copper Age chert objects are documented in the other rock-shelter excavated in Mondeval de Sora (VF2): a tanged arrowhead and a flat-retouched chert fragment (Fontana and Pasi, 2002). These objects, however, could be equally attributed to the Early Bronze Age. As far as pottery is concerned, all the diagnostic potsherds from the lower levels of occupations of site VF1 can be dated to the Late and Final Bronze Age. This interpretation matches quite well with the radiocarbon dating of a charcoal sample from one of the prehistoric fireplaces documented during the excavation (3475-2800 BP; Bianchin Citton, 2000, p. 28, note 10). The analysis of the archaeological materials from Mondeval de Sora is not concluded yet, and the assumptions provided are preliminary; nevertheless, they seem to suggest that the possible Copper Age occupation (to be verified) of the rock-shelter was definitely more ephemeral and limited than the Late Bronze Age one.

## 3. New survey data from the highland territory of the Cadore

So far, the survey project has focused on the upland territory of San Vito di Cadore and only partially on the neighbouring municipalities of Livinallongo del Col di Lana, Colle Santa Lucia, Selva di Cadore and Borca di Cadore (Fig. 2). The archaeological evidence identified was complemented with the known sites and these two datasets were managed within a GIS platform. A total of 66 find-spots were documented in the study area (Tab. 1) of which a relatively small number was attributed to a specific cultural phase. In particular, 9 are dated to the Sauveterrian, 8 to the Castelnovian while the two Mondeval de Sora sites (VF1 and VF2) attest a multi-phase occupation; in particular VF1 covers the entire Mesolithic period and continues up to modern times while at VF2 occupation spans from the Late Mesolithic to the Bronze Age. Four other sites can be ascribed to the Copper Age while 14 can be dated to a generic Mesolithic period and 29 (44% of the entire dataset) are isolated finds or meagre lithic scatters for which a chronological attribution is not possible.

### 3.1 Mesolithic evidence

During the survey campaigns new Mesolithic find-spots were recorded and known Mesolithic sites were verified and positioned. These are located between 1950 and 2330 m of elevation (Fig. 3) along the watershed that separates the two main valleys (Cordevole/Fiorentina and Boite). Almost all of them are located along a band running south-east to north-west from Malga Prendera to Melei. As it is easily visible on the map showing the Terrain Ruggedness Index (Fig. 4), it consists of a large and relatively flat high altitude belt stretching more than 9 km as the crow flies. It is also interesting to note that the great majority of the sites are located along the modern paths and in particular on the so called "Alta via delle Dolomiti n.1". Although this distribution can be partly due to a research bias, it is also true that this band represents the easiest way to access the inner area of the Dolomites maintaining a constant altitude. It is also a favourable area for settling during the warm season, due to the advantageous topographic and geographic features (flat areas, rock-shelters, water sources, narrow and large passes, etc.). Therefore a correspondence between some modern paths and prehistoric tracks cannot be excluded, mainly because mountain environments tend to constrain movements.

A cluster of 14 sites is located in the Mondeval de Sora area (Fig. 5) (Fontana and Pasi, 2002), and among them the famous multi-layered rockshelter site VF1 identified under a large erratic boulder (2135 m; Fontana et al., 2009a, 2009b). Six open-air find-spots are located in proximity (less than 300 m) of the latter while site VF2 and VF12 are found about 500 m to the North-East. Four sites lie further East on the left side of the stream Ambrizola and the last one near the Ambrizola pass (Casotto di Finanza – VF13). The lithic assemblages from these sites confirm that the area was occupied during the Sauveterrian and the Castelnovian period. South-eastward, after Forcella Col Duro (2292 m), where human presence is attested by sporadic artefacts, a large settlement zone is located in the area of Malga Prendera (2148 m). Here the numerous find-spots dispersed over a band of more than 500 m constitute a sort of extensive site that can be interpreted as a palimpsest of recurrent occupations. Unfortunately the area has undergone heavy slope processes caused by anthropic activities and intense natural erosion that have probably led to the destruction of most archaeological deposits (Fontana and Pasi, 2002). As for their cultural attribution one of the find-spots was undoubtedly occupied during the Sauveterrian while no precise chronology can be proposed for most of the others. A couple of other sites—Forcella della Puina (2034 m) and Mont del Fen (1959 m)—suggest the continuation of the aforementioned Mesolithic pathway both southward and towards the main valley bottom (Fig. 4). At the opposite limit of Mondeval basin, towards the North, Forcella Giau pass is located (2360 m). On the flattish slope that leads to this high narrow pass and around the small lake called Lago delle Baste (2281 m), 7 open-air and rock-sheltered sites are attested. One of them (VF20), situated under a small boulder, has been attributed to the Sauveterrian and represents the highest evidence dated to this period in the study area (2330 m).

Another cluster of sites was identified over the Forcella Giau pass - about 900 m east of Passo Giau - along a small valley that separates Col Piombin from Lastoni di Formin, on a slope known as Pra Comun or Val Costeana (Fig. 6) (about 2000 m a.s.l.). Here several open-air sites were identified, most of which yielded Castelnovian assemblages, while on the 5 natural terraces that characterize the northern slope of Col Piombin, 4 Sauveterrian sites and a generic Mesolithic one were discovered (Costone del Col Piombin 1-5; 2112-2263 m) (Cesco Frare and Mondini, 2005). On the southern slope of Passo Giau (Piezza) another Sauveterrian site was found next to a small boulder (2093 m). Unfortunately the main part of the site was destroyed by modern mechanical works (Lunz, 1986). On the ridge, located 2.5 km to the west of Passo Giau toward Mount Pore, in correspondence of an area known as Melei, several Mesolithic assemblages were identified. Both Sauveterrian and Castelnovian artefacts were discovered at different spots along the ridge or on the slopes close to it (Fontana et al., 2002).

The sites for which an attribution either to the Sauveterrian or the Castelnovian is available are too few to attempt a reliable comparison between the two periods. A preliminary overview suggests that settlement strategies are very similar and that major differences seem to concern their vertical distribution. In fact, Sauveterrian sites are clustered between 2065 m and 2330 m a.s.l. while Castelnovian ones were found between 1972 m and 2194 m. The only area where the sites belonging to the two Mesolithic phases are clearly separated is the eastern slope of Passo Giau. Here Sauveterrian sites are located on the small flattish terraces that characterize the northern ridge of Col Piombin, while Castelnovian ones are attested on the small valley at the foot of this relief. The presence of a single Castelnovian item (a trapeze) at Col Piombin could indicate that, besides being settled in the Sauveterrian, this area represented a transit or hunting route for Castelnovian groups. This single case does not enable any general assumption, although it represents undoubtedly a pattern that is worth investigating.

### 3.2 Post-Mesolithic prehistoric evidence

The survey campaigns undertaken in the last years provided very few archaeological data for the Neolithic, the Copper Age and the Bronze Age. A fragment of flat-retouched chert artefact was found by Paolo Fedele near the peak of Lastoni di Formin (2654 m a.s.l.), a long and wide dolomitic ridge that divides Passo Giau from Mondeval. It can be dated to the Late Neolithic or to the Copper Age (Fig. 7). The context of this finding is a stony and gently sloping plateau, suited for hunting rather than for grazing animals. In particular, this chert fragment was found within a very ephemeral round-shaped dry-stone structure; however, a chronological relationship between this structure and the artefact is impossible to assess, and the structure might be easily interpreted as a military facility of the World War I. The chert used for this artefact is dark green, and it was carefully selected among the local Livinallongo chert outcrops (Cavulli et al., 2015); the bifacial retouch is flat, accurate and covers the whole artefact. Even though a relation with hunting activities cannot be completely excluded, the location, the choice of the chert and the accuracy of its retouch rather suggest that this object had a value overcoming its function. This hypothesis seems to be confirmed by the chert dagger found on Monte Cernera, very close to the Lastoni del Formin: the peaks of these two mountains overlook Forcella Giau, traditionally the main narrow pass between the Passo Giau and Mondeval, hence the main connection between the Boite and the Cordevole basins. These two possibly coeval findings, recorded in two extremely high (2600 and 2654 m a.s.l.) and panoramic locations, can be hypothetically interpreted as voluntary depositions, possibly related to rituals aimed at regulating the access to the grazing areas (Passo Giau and Mondeval). Although Neolithic and Copper Age artefacts have been found in correspondence of other peaks and passes of the Dolomites (Bagolini and Pedrotti, 1992), a similar relationship between two nearby peaks has never been documented. It is worth pointing out that further data are necessary to verify this assumption, but the Cernera-Formin area can provide interesting insights for the study of prehistoric territorialisation processes.

## 4. Discussion

In order to contextualise the archaeological record of the Cordevole and Boite basins within the wider scenario of highland occupation of the Dolomites, comparisons have been carried out with the well-known evidence of the Adige valley.

As far as the Mesolithic record is concerned the vertical distribution of sites in both areas focuses around the ecotone zone corresponding to the ancient tree-line (about 2000-2200 m a.s.l.) (Nicolussi et al., 2005; Drescher-Schneider, 2009). In particular a rich evidence is attested along the main ridges and in proximity of the major passes that are believed to be most favourable locations for ambush hunting. As it has been highlighted for Alto-Adige, the position of most sites seems to reflect displacements along paths (mostly corresponding to the modern ones) which allowed a good visibility on the surrounding territory and reduced vertical shifts moving from one location to the other (Kompatscher and Hrozny-Kompatscher, 2007). A specific characteristic of the high Piave valley dataset with respect to that of the Adige valley is the higher number of Late Mesolithic (Castelnovian) sites.

According to the data provided above, it is clear that the late prehistoric assemblages in the study area are by far less abundant than the Mesolithic ones. Early and Middle Neolithic sites (6$^{th}$ and first half of the 5$^{th}$ millennia BC) are not represented at all, and this might reflect a decrease in the intensity of occupation of mountain environments, as also documented in other sectors of the Alps (Walsh et al., 2014; Reitmaier, 2012). Most of post-Mesolithic prehistoric sites are attributed to the Late Neolithic and the Copper Age (second half of the 5$^{th}$ and 3$^{rd}$ millennia BC). This boost of archaeological evidence might reflect a renewed interest of the local communities for high altitudes, possibly related to the origin pastoral mobility. The increasing number of Late Neolithic upland sites in other alpine regions and in mountain areas is equally interpreted as an evidence of the spread of transhumant strategies in prehistoric Europe (Orengo et al. 2014; Carrer, 2013; Curdy, 2007; Rendu, 2003). It is worth pointing out, though, that hunting remained an important strategy up to the Bronze Age (Steiner 2005; Barker, 1999), as suggested also by faunal assemblages (Pedrotti, 2004). Unfortunately, it is often very difficult to discriminate upland hunting sites from pastoral ones. The faunal assemblage found at Riparo Mandrìz, with a large quantity of sheep and goat bones (Bianchin Citton, 1992, p. 123), is the earliest reliable trace of alpine pastoralism in the study area (first half of the 4$^{th}$ millennium - beginning of the 3$^{rd}$ millennium BC) . The possibly voluntary depositions of flint tools attributed to the same timespan on the peaks of Monte Cernera and Lastoni di Formin might indicate a growing importance of pastures (and their control) for local communities.  As indicated by palaeobotanical analyses carried out in neighbouring valleys, such as the Ötztal in the Vinschgau – Alto-Adige (Festi, et al., 2013) and in the studied area, at Alpe Fedèra (Soldati et al. 1997), human impact on the upland environment has been very limited during the Neolithic and the Copper Age, thus suggesting that the exploitation of high pastures was related to hunting and maybe occasional grazing of small herds or flocks.

Despite the 3$^{rd}$ and mainly the 2$^{nd}$ millennia BC are widely recognized in the Alps (and especially in the Eastern Alps) as a period of increasing human occupation of the uplands (Walsh and Mocci, 2011; Marzatico, 2007; Mottes and Nicolis, 2002), in the study area only the site of Mondeval de Sora - VF1 has yielded artefacts that can be attributed to this time span. Considering the abundance of Bronze Age sites in the neighbouring Trentino province (Marzatico, 2007) and in other areas of the Belluno province (Leonardi, 2004), it is quite likely that this gap depends mainly on a research bias.

Lastly it is worth pointing out that 44% of the lithic scatters recorded during the survey campaigns is not chronologically determinable. This value, which is comparable to the one recorded from other mountain areas, affects the reliability and the accuracy of the reconstruction of mountain settlement patterns.

## 5. Conclusions

The survey carried out over the last years in the uplands of Cadore provided important data for the interpretation of Alpine prehistory. On the one side, a complete and reliable database of Mesolithic sites is now available which will be crucial to investigate the settlement and mobility strategies of the last hunter-gatherers. On the other side the post-Mesolithic period appears still poorly represented; as previously pointed out, this lack of evidence seems to mirror a research bias, and only the continuation of fieldwork activities will enable this gap to be filled.

Some considerations regarding the vertical distribution of the sites can be suggested. Mesolithic sites appear to be clustered between 1950 m and 2330 m a.s.l. and Sauveterrian sites are generally at higher altitudes than Castelnovian sites. Two of the three sites located at higher elevation are dated to a more recent period (the two Copper Age bifacial points) while at lower elevation both older settlements such as Casera Staulanza (Late Epigravettian) and more recent ones such as Riparo Mandrìz (Late Neolithic and Copper Age) are attested. According to these data a correlation between elevation ranges and chronological attribution might be assumed. Nevertheless, altitude cannot be seen as a discriminant criterion *per se*. Several exceptions to these elevation trends are well-attested (Dalmeri and Pedrotti 1994). Moreover, examples of multi-phase sites in the study area (Mondeval de Sora VF1 and VF2), as well as lithic scatters corresponding to palimpsests of multiple occupations (Malga Prendera), suggest that the same locations were occupied in different prehistoric periods. Elevation is just one of the multiple environmental variables that influenced the locational strategies of prehistoric groups (Cavulli et al., 2011), producing the complex spatial and temporal patterns highlighted in this paper.

This inference enables some final remarks to be drawn. Quite often, in past studies, typologically undeterminable lithic scatters were attributed to the Mesolithic period, simply because they were located above 2000 m a.s.l. (see Bagolini and Nisi 1978). According to what has been previously said, this attribution might be incorrect and could lead to distorted and misleading interpretation of archaeological settlement patterns in mountain environment.

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## Figures Captions

Fig. 1: The site of Mondeval de Sora VF1 (2135 m a.s.l.) as seen from the West. The rock-shelter on the right side of the boulder corresponds to Sector 1 and the one on the left to Sector 3 (photo D. Visentin).

Fig. 2: Location of the study area with the distribution of prehistoric sites.

Fig. 3: Vertical distribution of the sites recorded in the study area.

Fig. 4: Map showing the Terrain Ruggedness Index (estimated from the DTM) with respect to the Mesolithic evidence (red dots). Darker colours stand for flatter and less steep areas.

Fig. 5: The area of Mondeval de Sora as seen from the South (photo D. Visentin).

Fig. 6: The eastern slope of Passo Giau. On the foremost terrace several Sauveterrian artefacts have been collected (photo D. Visentin).

Fig. 7: The flat-retouched chert point found on the Lastoni di Formin (Photo P. Chisté, graphic layout F. Cavulli).

## Table Caption

Tab. 1: Prehistoric evidence on the uplands of the study area. Altitudes have been calculated using the 5x5 m DTM (digital terrain model) provided by Regione Veneto. Notes: [*] uncertain position/unverified during the survey; [1] identified during the survey 2012-2014; [2] identified by D. Lucia; [3] identified by P. Cesco Frare.

Figure 1
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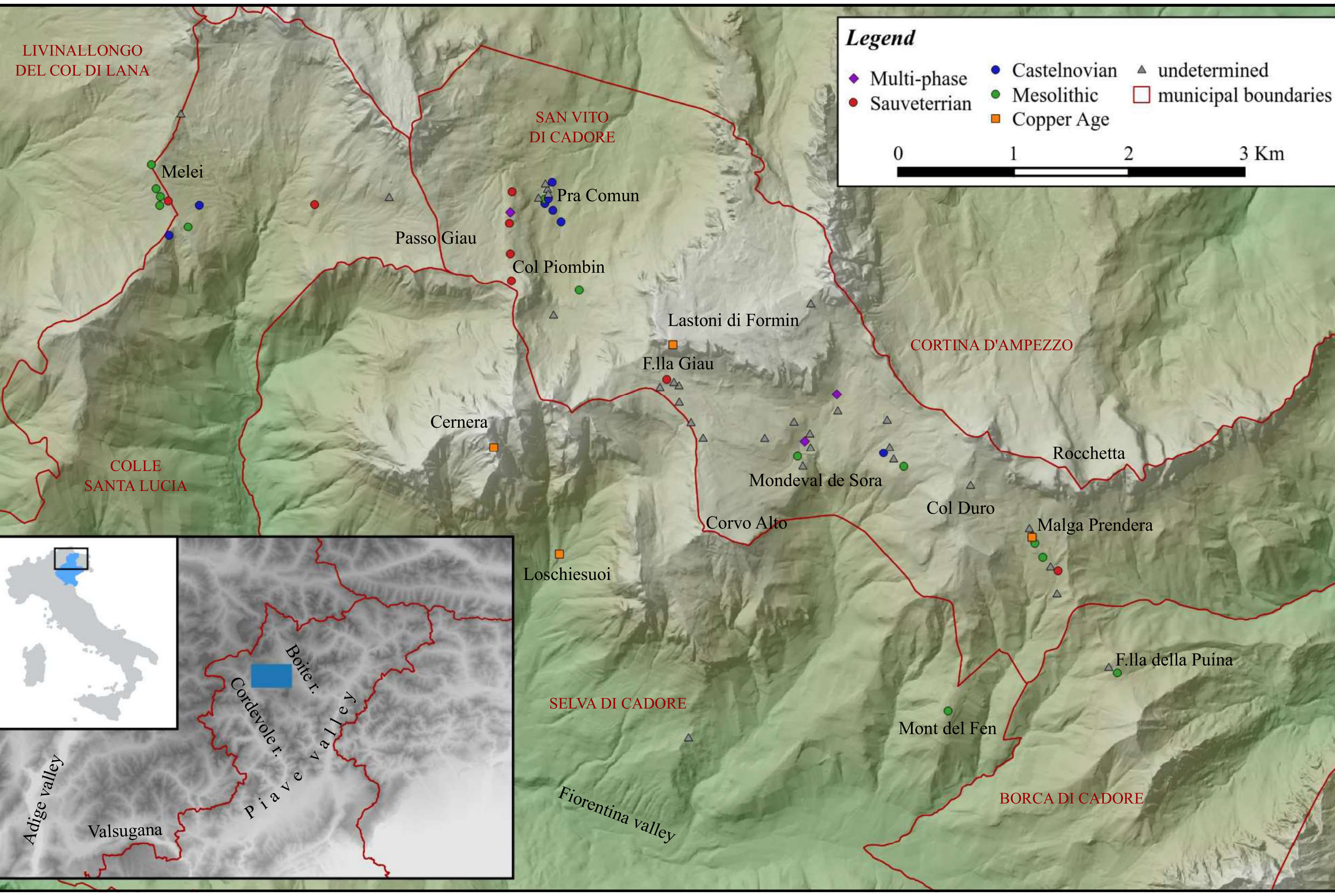
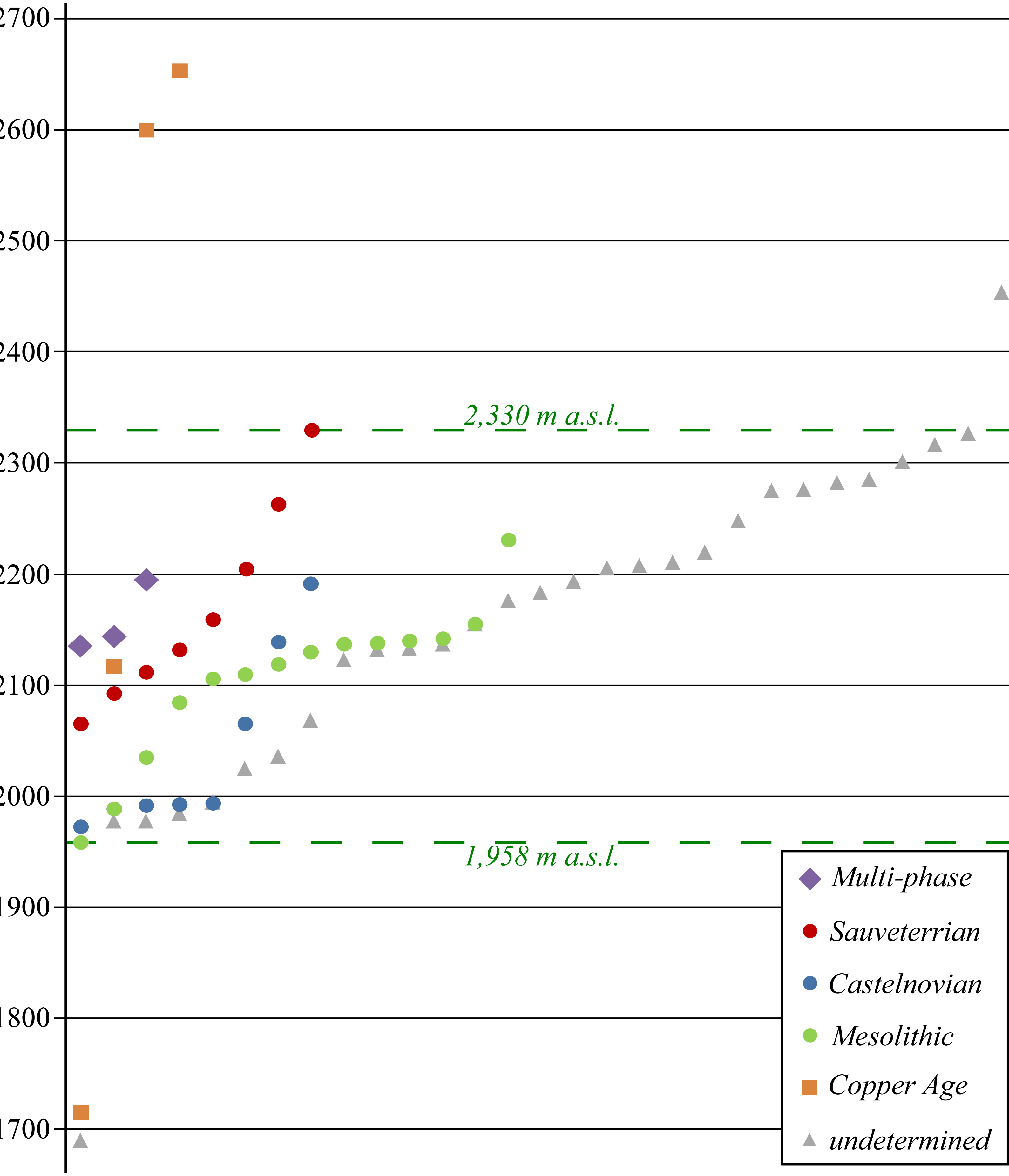
Figure 2



Legend
Multi-phase
Sauveterrian
Castelnovian
Mesolithic
Copper Age
undetermined
municipal boundaries
0
1
2
3 Km
LIVINALLONGO DEL COL DI LANA
SAN VITO DI CADORE
CORTINA D'AMPEZZO
COLLE SANTA LUCIA
SELVA DI CADORE
BORCA DI CADORE
Melei
Pra Comun
Passo Giau
Col Piombin
Lastoni di Formin
F.lla Giau
Cernera
Mondeval de Sora
Rocchetta
Col Duro
Corvo Alto
Malga Prendera
Loschiesuoi
F.lla della Puina
Mont del Fen
Fiorentina valley
Boite r.
Cordevole r.
Piave valley
Adige valley
Valsugana

Figure 3



2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
2,330 m a.s.l.
1,958 m a.s.l.
Multi-phase
Sauveterrian
Castelnovian
Mesolithic
Copper Age
undetermined

**Figure 4**

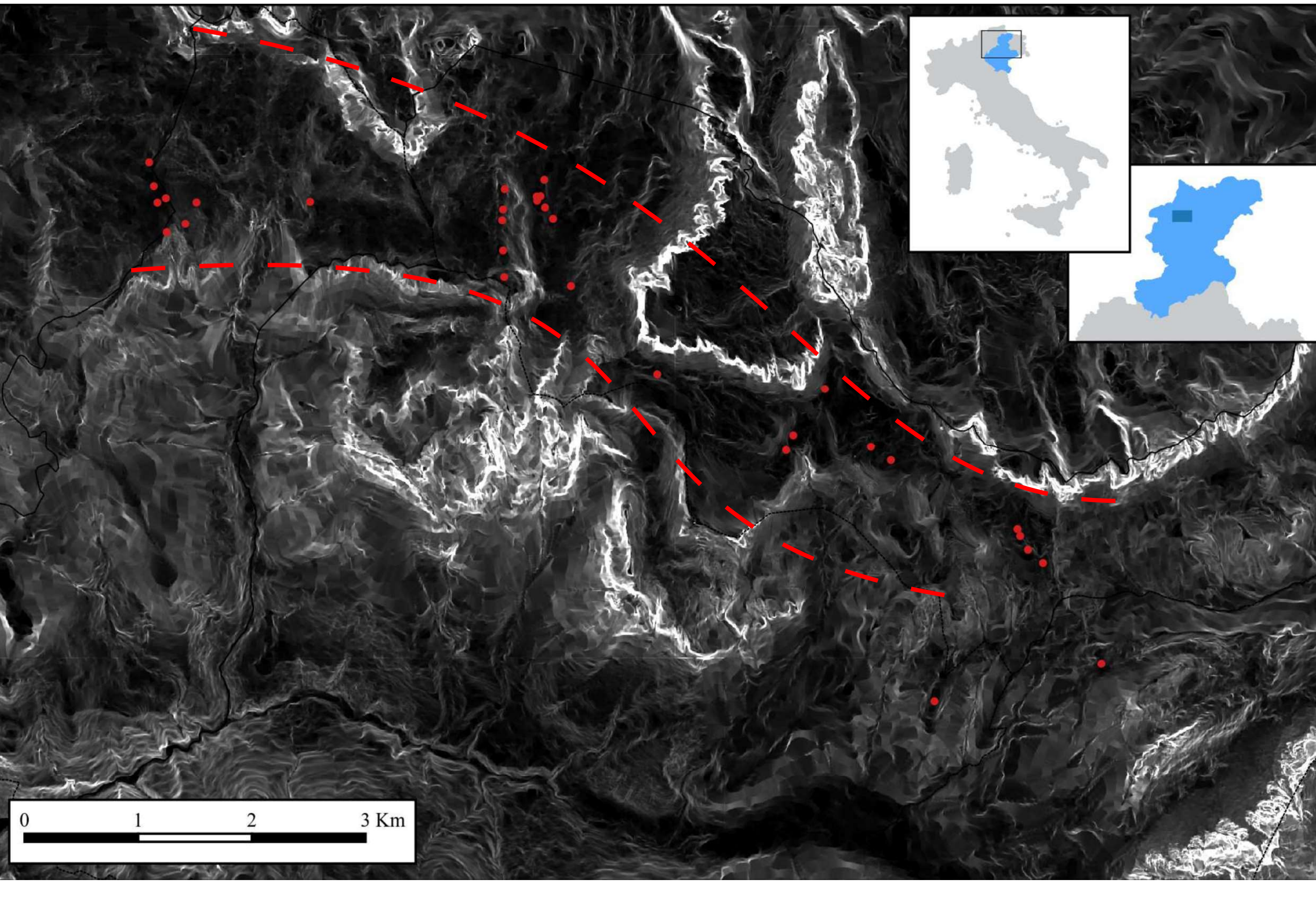


**Figure 5**

Forcella Giau
Lastoni di Formin
Croda da Lago
Becco di Mezzodi
Rocchetta
orvo Alto
Forcella Col Duro
Lago delle Baste
Col Duro
Mondeval de Sora
Rio Ambrizzola
Malga Prendera

Figure 6


Figure 7
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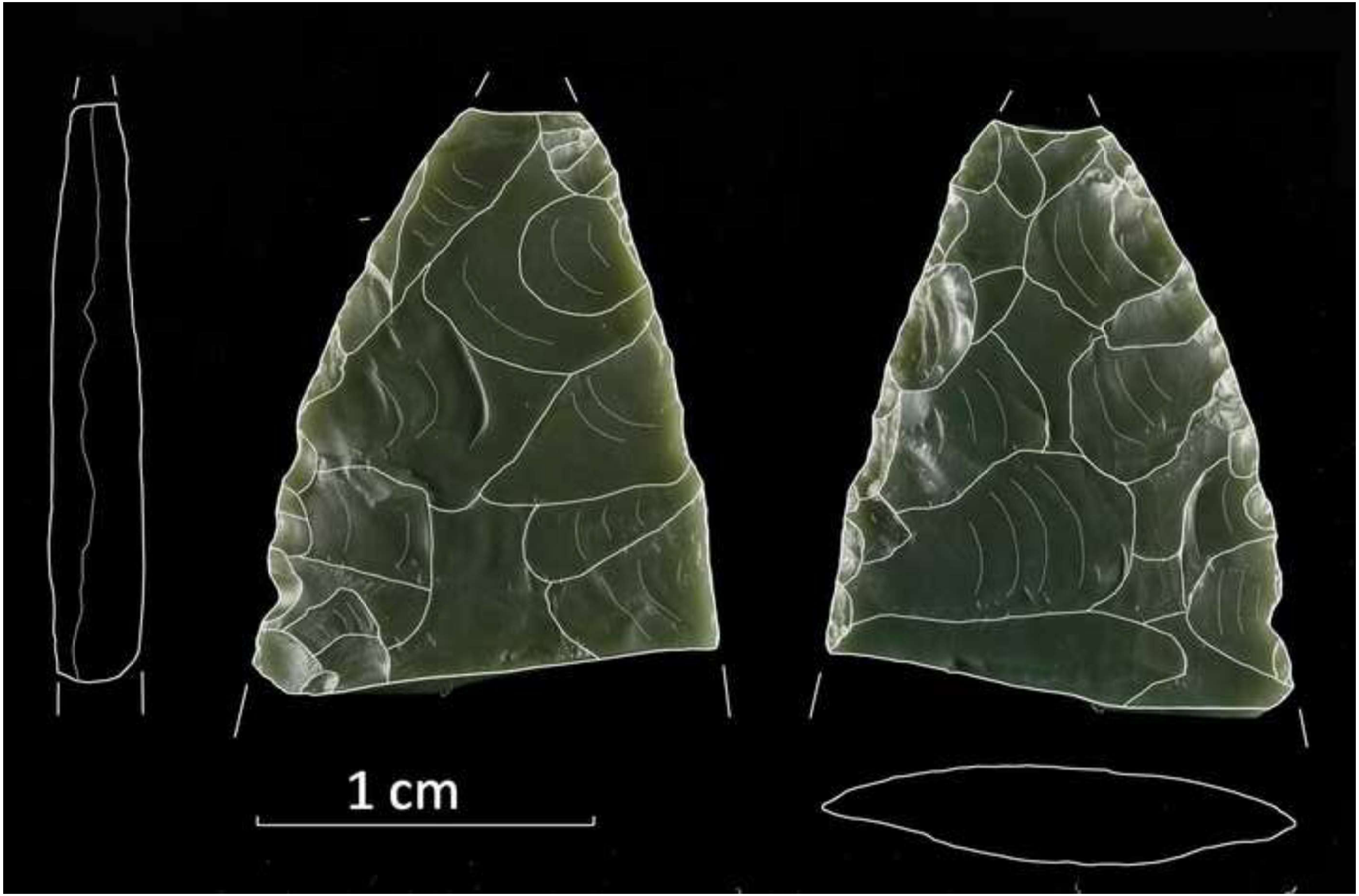
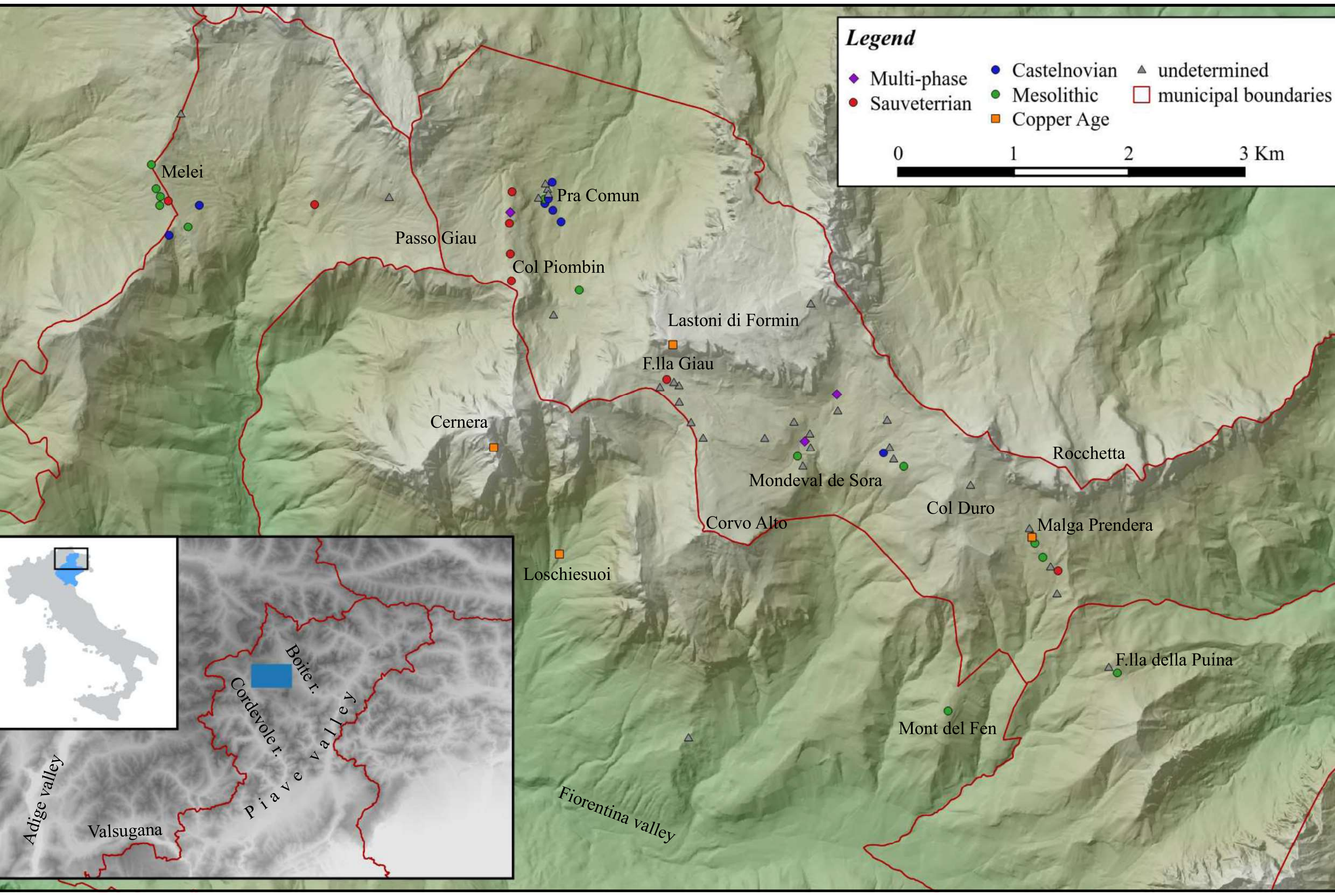


**Fig. 1**


Legend
Multi-phase
Sauveterrian
Castelnovian
Mesolithic
Copper Age
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Loschiesuoi
F.lla della Puina
Mont del Fen
Fiorentina valley
Boite r.
Cordevole r.
Piave valley
Adige valley
Valsugana

Fig. 5
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Fig. 6

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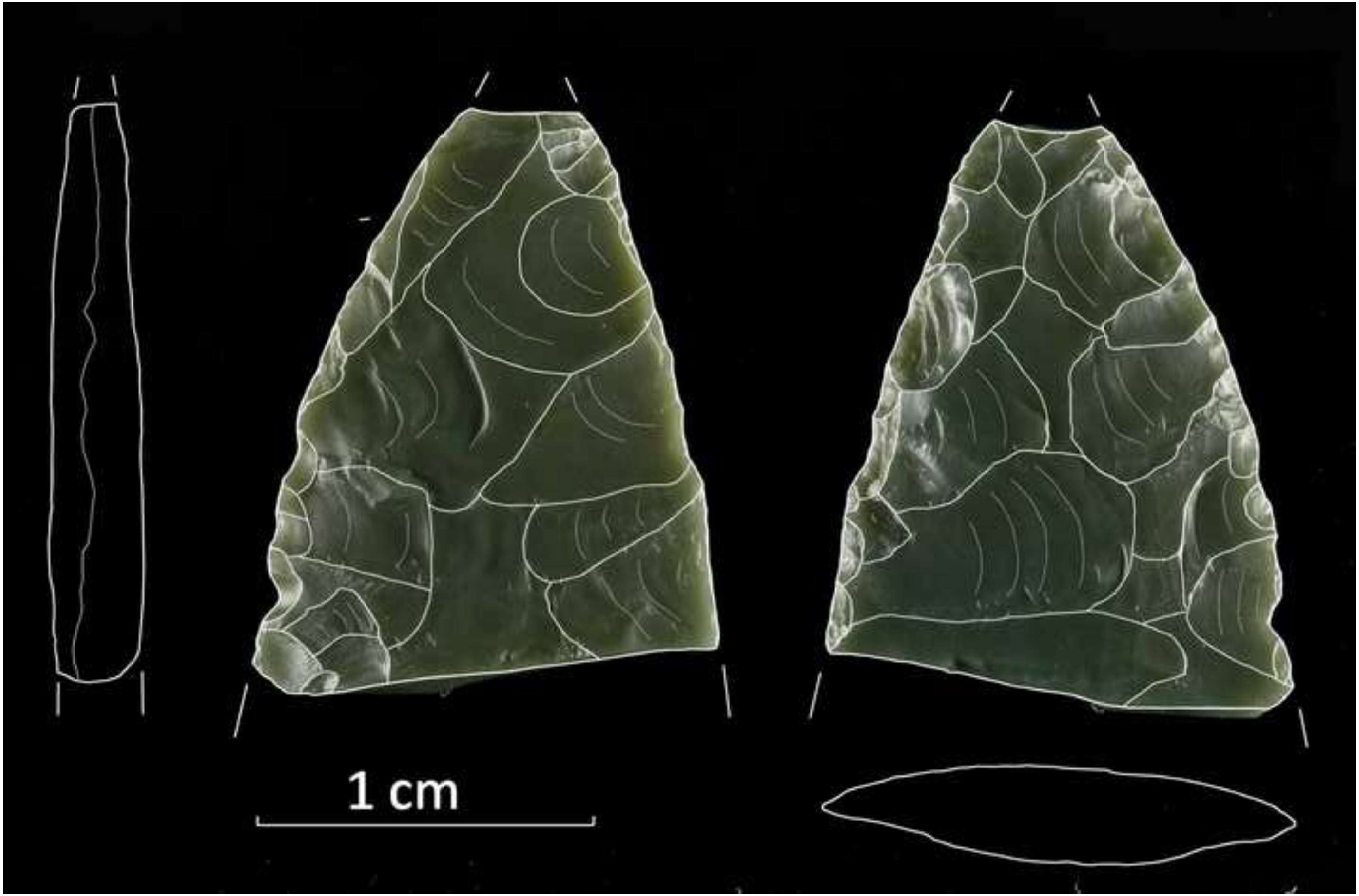

**Table 1**

| N. | Site | Alt.(m) | Type | Culture | References |
|---|---|---|---|---|---|
| 1 | Casotto di Finanza - VF13 | 2220 | open-air | undetermined | Fontana and Pasi, 2002 |
| 2 | Cernera* | 2600ca. | open-air | Copper Age | Palmieri, 1978 |
| 3 | Costone del Col Piombin 1* | 2263 | open-air | Sauveterrian | Mondini and Villabruna, 1992; Cesco Frare and Mondini, 2005 |
| 4 | Costone del Col Piombin 2 | 2205 | open-air | Sauveterrian | Mondini and Villabruna, 1992; Cesco Frare and Mondini, 2005 |
| 5 | Costone del Col Piombin 3 | 2159 | open-air | Sauveterrian | Mondini and Villabruna, 1992; Cesco Frare and Mondini, 2005 |
| 6 | Costone del Col Piombin 4 | 2144 | open-air | Sauv. + Castel. | Mondini and Villabruna, 1992; Cesco Frare and Mondini, 2005 |
| 7 | Costone del Col Piombin 5 | 2112 | open-air | Sauveterrian | Mondini and Villabruna, 1992; Cesco Frare and Mondini, 2005 |
| 8 | Dorsale Ovest Fedare* | 2176 | open-air | undetermined | Cesco Frare and Mondini, 2005 |
| 9 | Forcella Col Duro - VF6 | 2275 | open-air | undetermined | Fontana and Pasi, 2002 |
| 10 | Forcella della Puina 1 | 2035 | open-air | Mesolithic | Fontana et al., 2002; Marsale, 2003 |
| 11 | Forcella della Puina 2 | 2025 | open-air | undetermined | Unpublished[1] |
| 12 | Forcella Giau - VF19 | 2302 | open-air | undetermined | Fontana and Pasi, 2002 |
| 13 | Forcella Giau - VF20 | 2330 | rock-shelter | Sauveterrian | Fontana and Pasi, 2002 |
| 14 | Forcella Giau - VF21 | 2317 | rock-shelter | undetermined | Fontana and Pasi, 2002 |
| 15 | Forcella Giau - VF22 | 2327 | open-air | undetermined | Fontana and Pasi, 2002 |
| 16 | Forcella Giau - VF23 | 2285 | rock-shelter | undetermined | Fontana and Pasi, 2002 |
| 17 | Forcella Roan | 2036 | open-air | undetermined | Unpublished[1] |
| 18 | Forcella Rossa | 2454 | open-air | undetermined | Unpublished[2] |
| 19 | Lago delle Baste - VF10 | 2282 | open-air | undetermined | Fontana and Pasi, 2002 |
| 20 | Lago delle Baste - VF27 | 2276 | open-air | undetermined | Fontana and Pasi, 2002 |
| 21 | Lastoni di Formin | 2654 | open-air | Copper Age | Cavulli et al. 2015 |
| 22 | Le Rive* | 1690ca. | open-air | undetermined | Cesco Frare and Mondini, 2005 |
| 23 | Malga Prendera* | 2117 | open-air | Copper Age | Bianchin Citton, 1992 |
| 24 | Malga Prendera - VF3 | 2065 | open-air | Sauveterrian | Fontana and Pasi, 2002 |
| 25 | Malga Prendera - VF4 | 2084 | open-air | Mesolithic | Fontana and Pasi, 2002 |
| 26 | Malga Prendera - VF5 | 2119 | open-air | Mesolithic | Fontana and Pasi, 2002 |
| 27 | Malga Prendera - VF24 | 2110 | open-air | Mesolithic | Fontana and Pasi, 2002 |
| 28 | Malga Prendera - VF25 | 2068 | open-air | undetermined | Fontana and Pasi, 2002 |
| 29 | Malga Prendera - VF26 | 2132 | open-air | undetermined | Fontana and Pasi, 2002 |
| 30 | Melei 1 | 2065 | open-air | Castelnovian | Fontana et al., 2002; Cesco Frare and Mondini, 2005 |
| 31 | Melei 2.1* | 2155 | open-air | Mesolithic | Fontana et al., 2002; Cesco Frare and Mondini, 2005 |
| 32 | Melei 2.2 | 2140 | open-air | Mesolithic | Fontana et al., 2002; Cesco Frare and Mondini, 2005 |
| 33 | Melei 2.3 | 2138 | open-air | Mesolithic | Fontana et al., 2002; Cesco Frare and Mondini, 2005 |
| 34 | Melei 2.4 | 2130 | open-air | Mesolithic | Fontana et al., 2002; Cesco Frare and Mondini, 2005 |
| 35 | Melei 2.5 | 2132 | open-air | Sauveterrian | Lunz, 1986; Fontana et al., 2002; Cesco Frare and Mondini, 2005 |
| 36 | Melei 2.6 | 2137 | open-air | Mesolithic | Fontana et al., 2002; Cesco Frare and Mondini, 2005 |
| 37 | Melei 2.7 | 2139 | open-air | Castelnovian | Fontana et al., 2002; Cesco Frare and Mondini, 2005 |
| 38 | Mondeval de Sora - VF1 | 2135 | rock-shelter | S.+C. + Co./Br. Age | Fontana et al., 2009a, 2009b |
| 39 | Mondeval de Sora - VF2 | 2194 | rock-shelter | Cast. + Co./Br. Age | Fontana and Pasi, 2002 |
| 40 | Mondeval de Sora - VF9* | 2248 | open-air | undetermined | Fontana and Pasi, 2002 |
| 41 | Mondeval de Sora - VF11 | 2193 | open-air | undetermined | Fontana and Pasi, 2002 |
| 42 | Mondeval de Sora - VF12* | 2183 | open-air | undetermined | Fontana and Pasi, 2002 |
| 43 | Mondeval de Sora - VF14 | 2155 | open-air | undetermined | Fontana and Pasi, 2002 |
| 44 | Mondeval de Sora - VF15* | 2133 | open-air | undetermined | Fontana and Pasi, 2002 |
| 45 | Mondeval de Sora - VF16 | 2142 | open-air | Mesolithic | Fontana and Pasi, 2002 |
| 46 | Mondeval de Sora - VF17 | 2137 | open-air | undetermined | Fontana and Pasi, 2002 |
| 47 | Mont del Fen | 1958 | open-air | Mesolithic | Fontana et al., 2002; Marsale, 2003 |
| 48 | Passo Giau | 2211 | rock-shelter | undetermined | Bagolini et al., 1981 |
| 49 | Piezza | 2093 | open-air | Sauveterrian | Lunz, 1986 |
| 50 | Pra Comun - Val Costeana 1 | 1972 | open-air | Castelnovian | Cesco Frare and Mondini, 2005 |
| 51 | Pra Comun - Val Costeana 2 | 1977 | open-air | undetermined | Cesco Frare and Mondini, 2005 |
| 52 | Pra Comun - Val Costeana 3 | 1984 | open-air | undetermined | Cesco Frare and Mondini, 2005 |
| 53 | Pra Comun - Val Costeana 4 | 1988 | open-air | Castelnovian | Cesco Frare and Mondini, 2005 |
| 54 | Pra Comun - Val Costeana 5 | 1993 | open-air | Castelnovian | Cesco Frare and Mondini, 2005; Marsale and Reberschak, 2007 |

| | | | | | |
|---|---|---|---|---|---|
| 55 | Pra Comun - Val Costeana 6 | 1992 | open-air | Castelnovian | Cesco Frare and Mondini, 2005 |
| 56 | Pra Comun - Val Costeana 7 | 1988 | open-air | Mesolithic | Cesco Frare and Mondini, 2005 |
| 57 | Pra Comun - Val Costeana 8 | 1994 | open-air | Castelnovian | Unpublished[3] |
| 58 | Pra Comun - Val Costeana 9 | 1995 | open-air | undetermined | Unpublished[1] |
| 59 | Pra Comun - Val Costeana 10 | 1977 | open-air | undetermined | Unpublished[3] |
| 60 | Rio Ambrizzola - VF7 | 2231 | open-air | Mesolithic | Fontana and Pasi, 2002 |
| 61 | Rio Ambrizzola - VF8 | 2208 | rock-shelter | undetermined | Fontana and Pasi, 2002 |
| 62 | Rio Ambrizzola - VF18 | 2191 | rock-shelter | Castelnovian | Fontana and Pasi, 2002 |
| 63 | Rio Ambrizzola - VF28 | 2206 | open-air | undetermined | Unpublished[1] |
| 64 | Riparo Mandriz | 1715 | rock-shelter | Copper Age | Bianchin Citton, 1992 |
| 65 | Val Cernera 1 - La Busa | 2123 | open-air | undetermined | Unpublished[1] |
| 66 | Val Cernera 2 | 2106 | open-air | Mesolithic | Unpublished[3] |