Hidden Landscapes of Mediterranean Europe

Cultural and methodological biases in pre- and protohistoric landscape studies

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13 Fire making water on the Ligurian Apennines

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Abstract

Research at jasper quarries and copper mines in the eastern Ligurian Apennines has pointed to the exploitation of substantial amounts of raw materials there since the mid-4th millennium BC, and it has been suggested that pastoralism was the main economic base supporting such activities. Multidisciplinary investigations of buried soils and peat bogs at various altitudes also suggest that widespread exploitation of the vegetative resources can explain widespread transformations of the soils. Cases such as the twenty years old example of Prato Mollo (1480 m asl; late 4th – 3rd millennium BC), Piana Damisa (600 m asl; Bronze Age: late 2nd millennium BC) and others show that the clearance of the early Holocene *Abies* forest also generated the waterlogging of basins. Therefore the authors envisage a model for late Neolithic-Bronze Age integrated construction of pastures and water meadows, suitable for both feeding and watering herds. Research currently ongoing at the Mogge di Ertola basin (1115 m asl; 8th millennium BC till late Roman) also suggests more articulated practices of woodland management.

1. The 4th-3rd millennium BC in the Ligurian Apennines: low population, few archaeologists, or both?

The territory of eastern Liguria (NW Italy) is very rugged, with steep valleys and mountains that fall straight into the sea. The prehistoric archaeology of this area is very poor as far as settlement and burial are concerned. For the whole of the 4th and 3rd millennium BC, only one burial site yielded more than ten individuals (the collective cave burial Grotta dei Colombi on Palmaria island; Facchini & Veschi 1994). Villages with features such as huts, hearths, and walls are unknown. Ten boxes are enough to store all of the artefacts from burials, settlements and scattered finds, and less than ten metal objects have been found so far (fig. 1).

Does this indicate a low population number? According to the number and size of burials and residential places the answer is yes, but a different scenario arises when production sites are taken into consideration as well (fig. 2).

2. Production sites

2.1 Red jasper quarries

Several outcrops of red jasper (Radiolarite) occur in eastern Liguria. Excavations in the large open-air

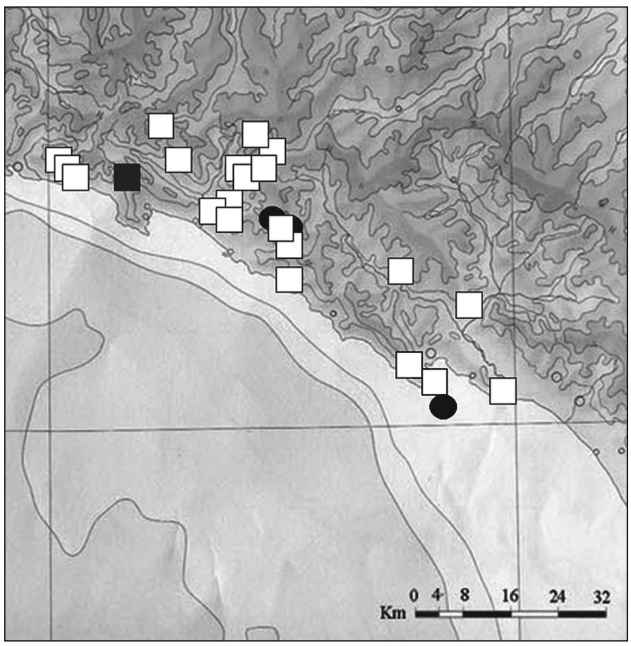

Figure 1 – Burial cave (black circles), residential site (black square) and scattered finds (white squares) of the 4th and 3rd millennium BC in eastern Liguria.

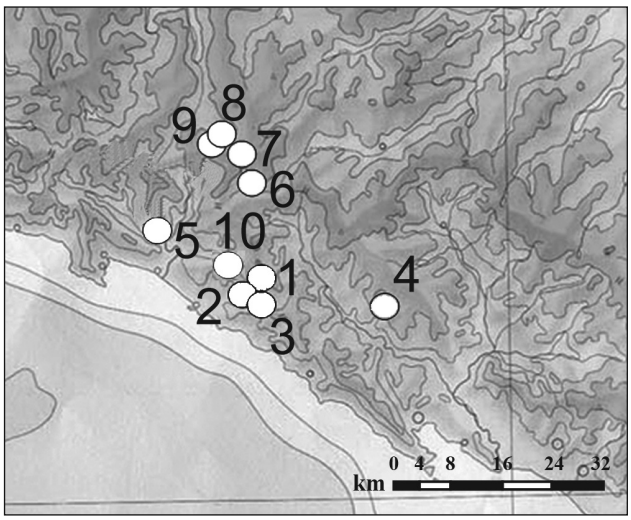

Figure 2 – Production sites and biostratigraphical archives of the 4th and 3rd millennium BC in Eastern Liguria: 1. Valle Lagorara red jasper quarry, 2. Libiola copper mine, 3. Monte Loreto copper mine, 4. Piana Damisa and Pianaccia di Suvero buried soils, 5. Cian di Tenenti buried soil, 6. Prato Mollo peat bog, 7. Lago Riane peat bog, 8. Mogge di Ertola peat bog, 9. Casanova di Rovegno peat bog, 10. Pian del Lago peat bog.

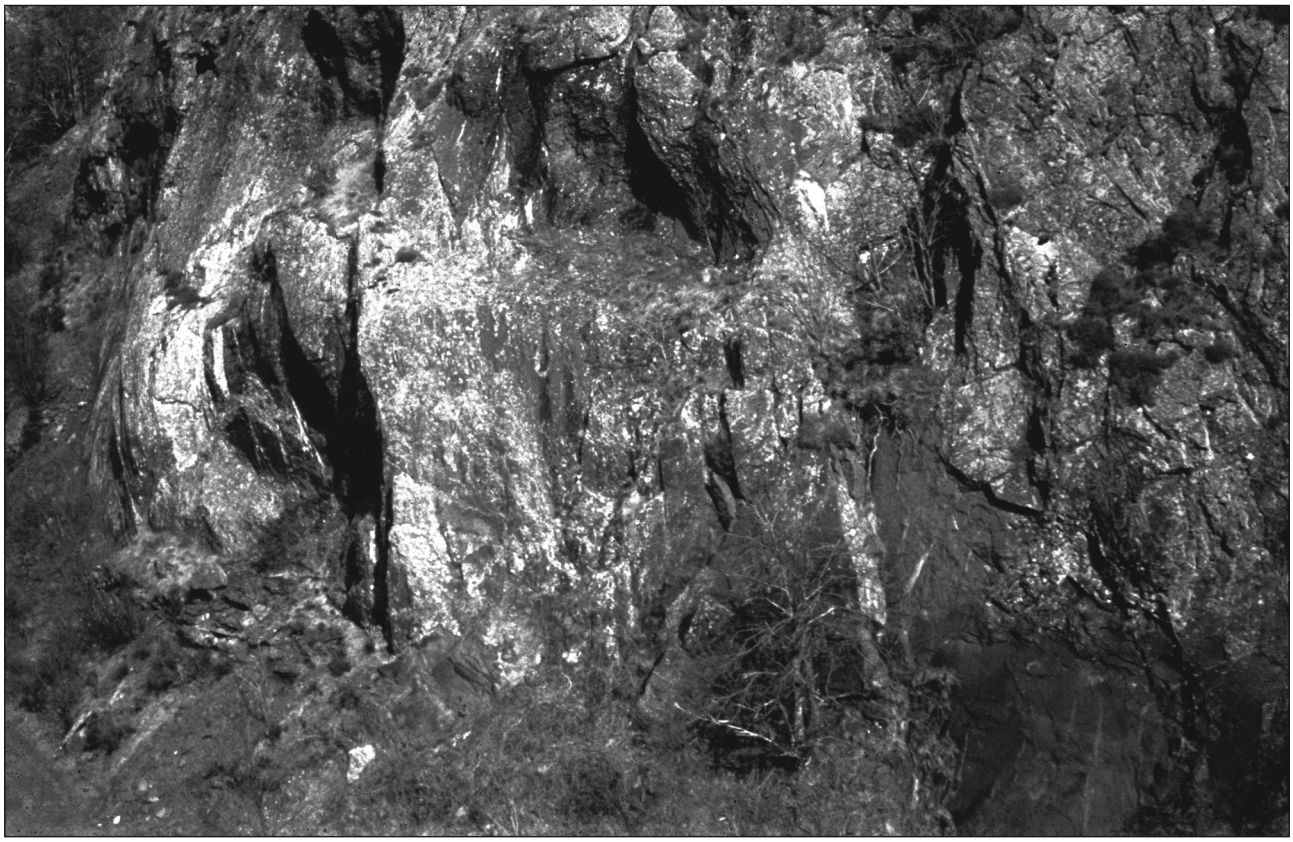

Figure 3 – Aerial view of the open-air red jasper quarry at Lagorara valley (Maissana, La Spezia).

red jasper quarry at Lagorara valley (Maissana, La Spezia; fig. 3) revealed that, from 3500 to 2500 cal. BC, jasper was mainly exploited for the production of small, oval chipped bifaces.

These are the pre-forms for foliate arrowheads of the type found scattered on the mountains, in settlements and in burials (Maggi *et al.* 1996; Campana & Maggi 2002). The dimensions of the extraction niches resulting from the quarrying suggest that at least 1000 cubic meters of material has been exploited. Since the exploited material was mainly used to produce arrowheads, it has been calculated that some 5-10 millions of these must have been produced (Maggi 2002). Where have all of these artefacts gone, if less than 50 arrowheads have been found so far?

2.2 Copper mines

The ophiolithic area located around Sestri Levante (Genova), just a few kilometres away from the coast and not far from the Lagorara valley, hosted several copper mines in the 19th century. Some of these, such as Monte Loreto and Libiola, provided evidence of medieval and prehistoric exploitation. Between 1996 and 2005 the Soprintendenza per i Beni Archeologici della Liguria and the Department of Archaeology of the University of Nottingham investigated the conspicuous remains left at Monte Loreto (367 m asl), where prehistoric copper mines and ore-dressing facilities have been recorded in various places along the slopes of the mountain.

Twelve radiocarbon dates demonstrate that early mining and ore exploitation occurred from the mid-4th to the late 3rd millennium cal. BC (Maggi & Pearce 2003, 2005). It appears that the technique employed was able to quarry almost exclusively the ore, leaving the embedding rock largely untouched, except where it was necessary to widen the works for access. The prehistoric mining features include dumps and shafts, as well as evidence of fire-setting practices. In a fissure investigated between 1999 and 2003 (fig. 4) there were layers very rich in charcoal dated 4090±60 BP (2875-2475 cal. BC - 2σ; Beta-135159); the fill also contained hammer stones and Copper Age pottery.

A total of seven hundred complete and fragmented hammer stones, many showing damage from use, were collected during the fieldwork campaigns. They are made of basalt, dolerite, sandstone, diorite and gabbro, with sources sometimes a few kilometres away from the site. The hammers have single or double notches or are grooved for hafting. It is interesting to note that the same particularly hard types of rock were also used at the contemporary jasper quarries of Valle Lagorara, located near

Monte Loreto (Cortesogno *et al.* 2006; De Pascale 2004a, 2004b).

The investigation of in-situ ore treatment areas and of exploited veins allowed us to calculate the total amount of quarried material. Keeping in mind that other prehistoric mines existed at the same time, such as at Libiola, it has been suggested that the Sestri Levante mining district produced an amount of copper ore suitable for casting up to perhaps 5000 artefacts per year (Campana *et al.* 2006). These indicators of a quite significant production of arrowheads and of copper ore contrast with the low demography suggested by the scant remains of villages and cemeteries, which in themselves would not allow us to argue for an extensive exploitation of the environmental resources. Therefore a question arises automatically: is there evidence of subsistence practices to support a level of population consistent with the quarrying and mining activities calculated above? The answer is yes, such evidence exists, lying hidden in the landscape (figs. 5-6).

3. Subsistence (in the hidden landscape)

3.1 Buried soils

In Eastern Liguria buried soils occur widespread at different locations and altitudes. The most extensive date to the late Bronze Age. The main archaeological features of this period are the so-called 'Castellari', open-air sites located strategically on rocky hilltops, which probably functioned as control sites for both pastures and watershed routes of a short-distance transhumance system.

Piana Damisa (600 m asl) is a broad field located about 1200 m south of the middle to late Bronze Age site of Castellaro di Zignago (950 m asl) and 1100 m north of Castellaro di Vezzola (500 m asl, also late Bronze Age). Test trenches revealed that what is now a large flat field, before the Bronze Age was in fact a valley, filled by colluvium that began in the late Bronze Age. In fact this is the date of *two* extensive buried soils, stratigraphicaly located at the bottom of the infill and dated to 3180±50 BP (1525-1380 cal. BC - 2σ; Beta 100354) and 3160±50 BP (1515-1305 cal. BC - 2σ; Beta 100355). The absence of artefacts and features such as pottery, huts and fireplaces suggests that this site did not have a residential function. Micromorphological analyses (carried out by C. Ottomano) suggest that the buried soil was formed as a consequence of activities such as woodland clearance by fire. The considerable organic enrichment of the Bronze Age soil suggests that the site was intensively visited by herds. Micromorphology also indicates the occurrence of shallow waterlogged features. The Bronze Age transformation was so strong that it seems the area never went back to woodland (Ottomano *et al.* 2006).

A similar situation occurs at the nearby site of Pianaccia di Suvero (600 m asl), with a long Middle Palaeolithic, Mesolithic, Neolithic and Bell Beaker history. During the late Bronze Age a shallow terrace was built, that promoted the accumulation of an extended soil similar to that of Piana Damisa (Macphail 1987; Gernone & Maggi 1998). Bubble flotation of a significant soil sample yielded (despite

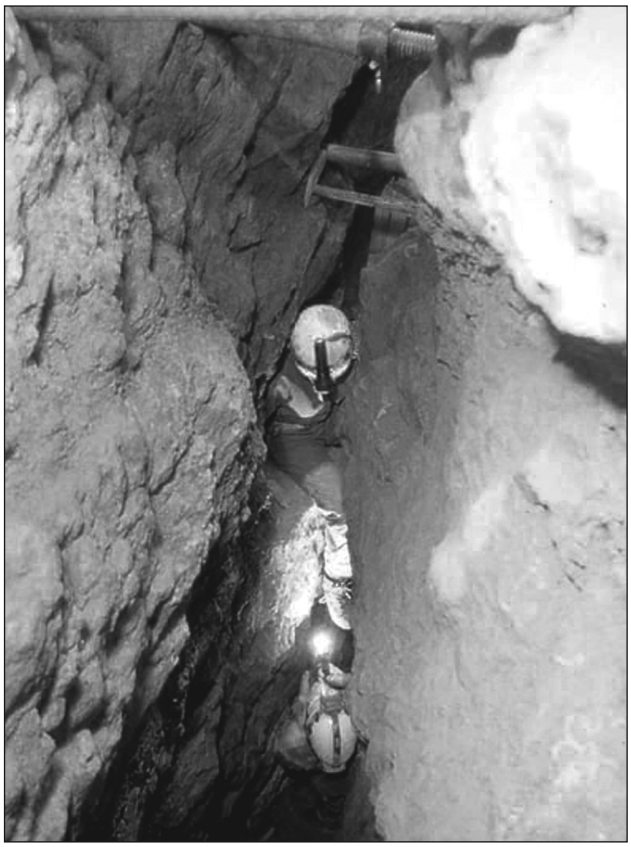

Figure 4 – A shaft of the prehistoric copper mine at Monte Loreto (Castiglione Chiavarese, Genova). Photo: Centro Studi Sotterranei, Genova.

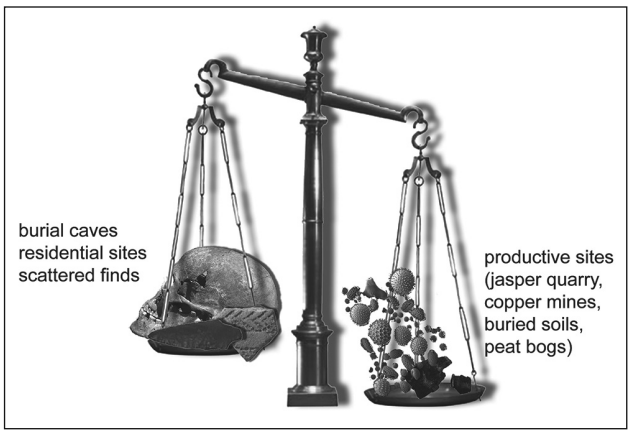

Figure 5 – A weighted comparison between the archaeology of artefacts versus the archaeology of hidden landscapes.

an abundance of charcoal) no seeds of domesticated plants, suggesting that the area was not used for agriculture.

Another extended late Bronze age-early Iron age buried and terraced soil, again rich in charcoal and organic matter but lacking any residential domestic evidence, has been found 6 km from the Castellaro di Uscio, at Case Cordona (Cremaschi *et al.* 1992). Among several late Bronze Age soils, at least two belong to the 3rd millennium BC: Giridello 2 (Campana *et al.* 1998) and Cian di Tenenti (San Colombano, Genova; Maggi 2000, 2004a). Here too, bubble flotation shows that no seeds of domesticated plants were associated with the charcoals and organic matter. Furthermore, two buried soils that do include tiny fragments of pottery go back to the middle and early Neolithic (Giridello 1 and Isolalunga 1; Maggi 2003, 2004a).

The long use-history, the location away from habitations, the evidence for forest clearing/colluvium, the dark brown color, the abundance of charcoal and organic matter, the absence of cultivated seeds, and the occurrence of features such as terracing, all suggest that these extensive

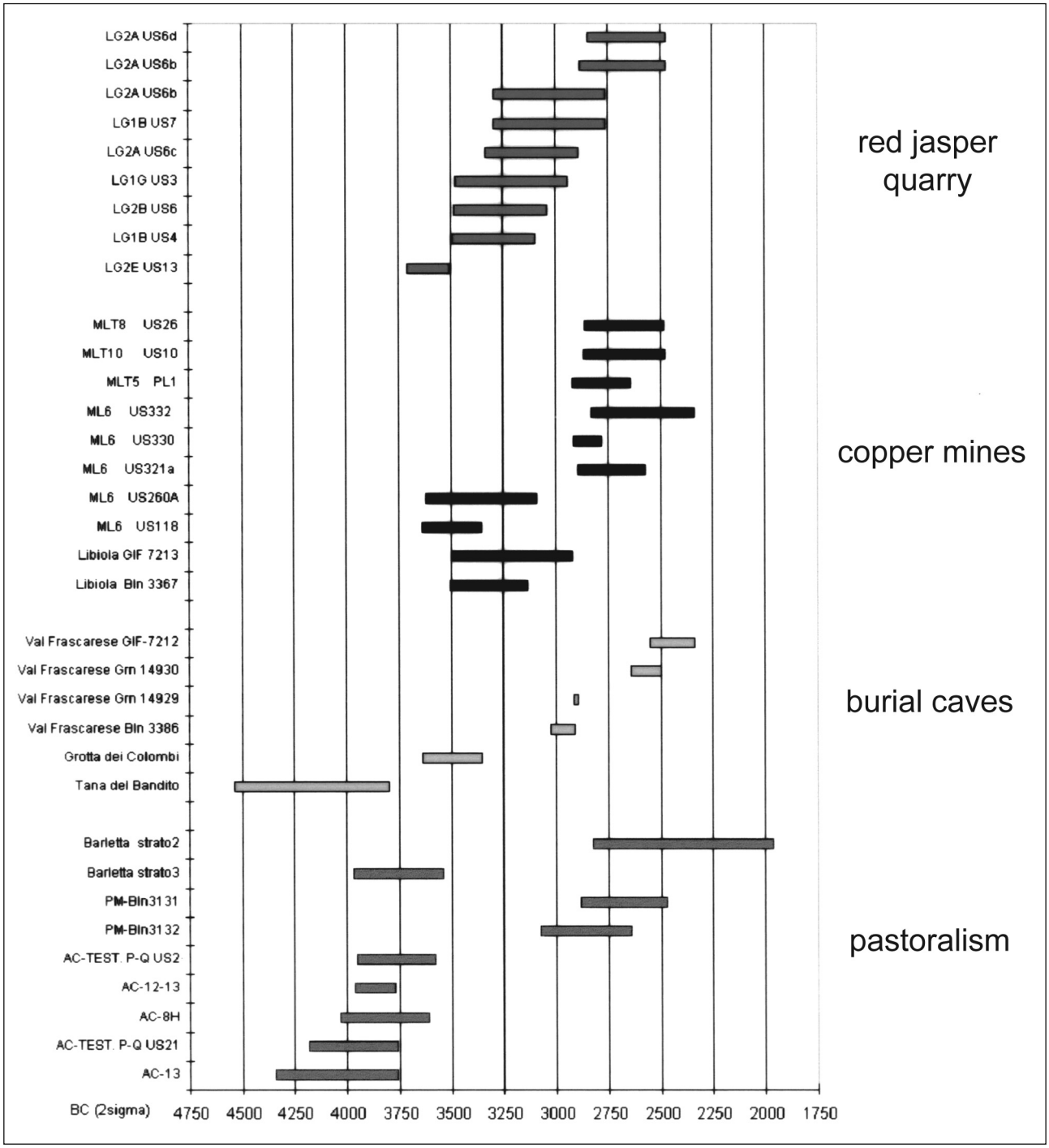

Figure 6 – Organising the Ligurian chronology of the 4th and 3rd millennium BC.

buried soils are the archaeological remains of productive practices probably related to the management of herds.

3.2 Peat bogs

Prato Mollo (1480 m asl) is one of several peat sites in eastern Liguria where palynological and sedimentological studies were carried out by R. I. Macphail and G. M. Cruise (Baffico *et al.* 1987; Courty *et al.* 1989, pp. 305-309). The site is a shallow depression (possibly a wurmian glacial *cirque*) located on the southern slopes of M. Aiona and M. Nero, where Mesolithic and Copper Age flint artefacts have been recovered. The *Abies alba* forest around Prato Mollo underwent a major decline during the period 4300±60 BP (3079-2642 cal. BC - 2σ; Bln 3132) to 4130±60 BP (2889-2472 cal. BC - 2σ; Bln 3131), in response to multiple widespread fires. In the examined stratigraphy the grey-blue serpentinite gravel below the peat shows that, after the ice melted, the basin was permeable perhaps up to the 4th millennium BC; micromorphological analysis of the sediment show that the layer of serpentinite gravel was then sealed and made impermeable by clay infilling as a result of the erosion caused by the disturbance of the surrounding forest soil. This caused waterlogging conditions favouring the accumulation of peat. A large amount of charcoal provides the dark colour for two bands located at the base of the peat (fig. 7); micromorphological analysis shows that each dark band is multilayered and that the grass burned together with the trees (Courty *et al.* 1989, pp. 305-309). Most researchers agree that the invasive human exploitation during the late 4th and 3rd millennia cal. BC was intended to improve pastures.

As the *Abies* forest was opened up locally, some pollen taxa which were transported up from lower altitudes, e.g. *Quercus* and *Ulmus*, became statistically more important. Open *Fagus* woodland expanded greatly and became dominant after the *Abies* forest had been cleared. It is well known that beech wood-pastures provide the best fodder for cows, and the locally manufactured *San Ste* cheese is still very much appreciated. The pollen diagram shows that the marked fall of the primary Silver-fir from 40% to 20% occurred together with the evidence for fire, erosion, waterlogging, and peat formation. In contrast, as already written, there is an increase of grasses and of beech, which today is dominant (Baffico *et al.* 1987). It can therefore be argued that, at the beginning of the 3rd millennium BC, fire-based practices were used to manage the woodland cover and the soil to create both pastures and water reservoirs (for watering herds?).

Figure 7 – Prato Mollo (Borzonasca, Genova): two multilayered bands full of charcoal, indicating clearing by fire (modified after Baffico et al. 1987).

Figure 8 – Mogge di Ertola (Rezzoaglio, Genova), waterlogged trees buried in the peat, sealed by an early medieval clay-silty layer.

Pian del Lago (830 m asl) is a small peat-filled basin with a maximum depth of 6 m. It is situated on the seaward slopes of Mount Roccagrande at Casarza Ligure, only 9 km inland from the coast of Sestri Levante, in what is now a highly eroded

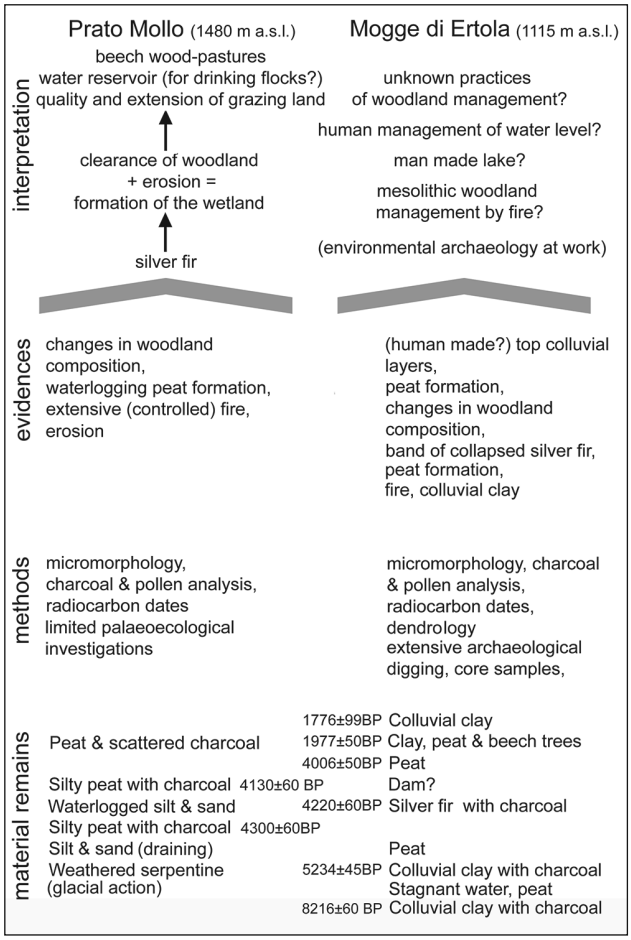

Figure 9 – Comparison between Prato Mollo and Mogge di Ertola.

heath landscape. The stratigraphy spans the whole Holocene through to the Middle Ages: the bottom dates to 10870±90 BP (11040-10640 cal. BC - 2σ; GnR 21307) and the top to 700±60 BP (1220-1400 cal. AD - 2σ; GnR 21308). The pollen diagram, which is being studied by G. M. Cruise, shows the presence of domesticated cereals at levels dated two to four centuries before 5000 BC. As it is well known that cereal pollen is heavy and the wind could not transport it more than a few hundred meters, this suggests local agriculture. The pollen could also have been transported by sheep coming to drink (Cruise *et al.* 1998; Cruise & Maggi 2000; Maggi 2004b), but these would then predate the rise of pastoralism.

These earliest domesticated cereals are closely followed by the first appearance of *Vitis* pollen, which are therefore also definitely earlier than 5000 BC (Cruise & Maggi 2000). Charred pips of *Vitis vinifera* L. are known from various settlements of the earliest Neolithic in Italy (Castelletti & Rottoli 1998). In the Late Neolithic, around 4300-4200 BC, *Olea* pollen become a bit more frequent: this could indicate some kind of management. The walnut tree (*Juglans*) appears in the early centuries of the Copper Age, between 3500 and 3000 BC (Cruise *et al.* 1998; Cruise & Maggi 2000; Maggi 2004b), also suggesting possible productive practices. Preliminary results of the research therefore suggest that the vegetation and the soils of the area around Pian del Lago were disturbed by grazing during the Neolithic and the Copper to Early Bronze Age. The intensive use of fire for controlling the vegetation was unequivocally attested for the late Iron Age and the Roman period, when there is evidence for a greater impact of deforestation and heathland spreading (Maggi 2000, 2004b; Cruise *et al.* 2009).

Another peat bog near Rezzoaglio (Genova), locally called *Mogge di Ertola* (1115 m asl), was subjected to a preliminary investigation in 2001 (Guido *et al.* 2003). In 2004-2006 three campaigns of environmental archaeological research were then carried out jointly by the Direzione regionale per i beni culturali e paesaggistici della Liguria and the University of Genova, Dipartimento di Storia Moderna e Contemporanea and Dipartimento per lo studio del Territorio e delle sue Risorse. Coordinated by D. Moreno, C. Montanari, M.A. Guido and R. Maggi, this study focused on the historical ecology of the site (Moreno *et al.* 2005; De Pascale *et al.* 2006; Bellini *et al.* 2007; Menozzi *et al.* 2007). The remains of a stone structure close to a clay edge of the bog, the surface of which shows evidence of burning, and which is buried by peat dated to 4660 ± 50 BP (3540–3350 cal. BC - 2σ; LTL2215A), is interpreted as a dam. Several waterlogged trees are buried in a peat that contains charcoal (fig. 8). The chronology of this layer of buried silver firs at Mogge di Ertola agrees with that of the multilayered charcoal bands at Prato Mollo, while the peat bog itself dates from as early as 8912 ± 100 BP (8300-7700 cal. BC - 2σ; LTL547A) up to the Roman period: 1977 ± 50 BP (110-130 cal. AD - 2σ; LTL776A).

The two sites are located some 7 km apart in the eastern Apennines, and both are close to the watershed: Prato Mollo at 1480 m altitude and Mogge di Ertola at 1115 m. Despite the similarity in location, the ecological history of the two sites is different (figs 9 and 10). The most visible difference occurs perhaps in the 3rd millennium BC, when Prato Mollo shows evidence of the clearing by fire of the silver fir forest, while Mogge di Ertola contains the actual silver firs fallen down. At the present stage of research we do not know if, how and why the two phenomena might correlate. At Prato Mollo the signs of environmental practices detected so far place the shift from a 'natural' to

BP	regional history	**Prato Mollo** (1480 m asl)	**Mogge di Ertola** (1115 m asl)
1500	End of the roman empire. Strong impact on mountains: vegetation change and dramatic erosion. Centuriated fields became marshy	Peat, few charcoals, beech wood-pastures	A clay (man made?) cover transformed the bog into a field
2000	Mid altitude farms, roman *tegoloni* up to 1500m asl, silver fir used for ships and carpentry	Peat, few charcoals, beech wood-pastures	End of peat formation
3500	Tribal organisation of the society. Stony features on the mountains to support the control of watershed routes	Peat, decrease of silver fir continues, increase of beech	Peat, charcoal, collapsing of few beech trees
4500	Quarries of hard stones, mines of copper ores, few artifacts, parentelar social organisation	Waterlogging condition, peat, dramatic decrease of silver fir, increase of pastures, woodland management	Peat, charcoal, collapsing of many silver firs, ill trees
5000	Scattered indicators of mountain pastoralism	Arrowheads on Monte Aiona, band of charcoal, fire, multilayered fine colluvial material sealed the basin, that became wet	Peat
5500/6000	Success of the neolitich breeding, coastal demographic increase		Peat, charcoal, widening of the wet area
6400/6300	Anthropogenic marker on the mountains	Draining gravel	Peat, charcoal
7000	First neolithic settlement on the coasts	Draining gravel, silver fir forest around	Peat, widening of the wet area due to more claysh colluvium
7500	Several mesolithic sites on the mountains; residential sites around 1300 m asl, signals of woodland burning	Draining gravel, silver fir forest around	Peat in the central zone of the basin
8500/9000	Few early mesolithic sites on the mountains	Weathered serpentinite	Central area of the basin sealed by claysh colluvial material including charcoal, beginning of wetland and of peat formation
10000	End of the glaciation, epipalaeolithic sites up to 700 m asl	Glacial/nival circle	

Figure 10 – Comparison of the local history of Prato Mollo and of Mogge di Ertola against the background of the regional history.

a 'man-made' landscape in the late 4th – early 3rd millennium BC; at Mogge di Ertola the felled silver firs are part of a perhaps more complex history, beginning with the formation of a colluvial clay that sealed the basin around 7200 BC, if not earlier. It is important to note that this clay formation below the peat contains several charcoals (mainly of silver fir), suggesting that human practices might also here be involved in the lake/wetland formation at a surprisingly early time (Mesolithic) and apparently with more 'hidden' practices.

We do not know yet the level of detail that the ongoing multidisciplinary research at Mogge di Ertola will reach, nor if and to what degree it will be able to answer the questions posed in fig. 10. However it is certain that the site, together with the previously investigated Prato Mollo and the other sites mentioned, is emblematic of the explanatory potential hidden in the landscape.

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