Cultural landscapes, social networks and historical trajectories: A data-rich synthesis of Early Bronze Age networks (c. 2200-1700 BC) in Abruzzo and Lazio (Central Italy)

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Chapter 3
Introducing the Early Bronze Age in Central Italy

> "Questa sommaria rassegna delle fonti disponibili valga a mettere sull'avviso il lettore. La trama del nostro racconto è dunque povera e discontinua, tale da lasciare campo, nel nostro tentativo di ricostruzione storica, più a congetture che a positive certezze." (Peroni 1971, 13)[41]

The Early Bronze Age (EBA)[42] is a relatively elusive period in later prehistory of Central Italy, sandwiched between two well-documented periods, the Copper Age and the Middle Bronze Age. For a long time, this has made it necessary to scale up any attempt at synthesis of this period in Italy to the scope of the peninsula as a whole. Peroni's *L'antica età del bronzo* (1971) can be considered as the first comprehensive synthesis of the Early Bronze Age. In his synthesis Central Italy still plays a relatively minor part, particularly with respect to Northern Italy. Moreover, some of the evidence that had been regarded as EBA in date at the time of Peroni's synthesis, has been redated to the late-final phase of the Copper Age or the first phase of the Middle Bronze Age (MBA). Because of the relative scarcity of EBA evidence in Central Italy, regional syntheses have been equally scarce. In the case of Abruzzo, discussion of the EBA situation was limited to a couple of pages in a comprehensive overview of prehistory in the 1970s (Radmilli 1977, 381-385). However, even a recent overview of the Bronze Age in the same region by Bietti Sestieri (2003) is only more substantial from the MBA onwards. For instance, the list of sites in this overview follows a periodisation that excludes the Early Bronze Age (Bietti Sestieri 2003, 305-307). In contrast, EBA archaeological records are generally better known in Lazio, but overviews tend to be restricted to site lists. Two such lists present a significant increase from 45 sites in the 1970s (Guidi 1979) to 87 sites in the 1990s (Guidi & Pascucci 1996). Although site numbers had almost doubled within these two decades, overall these have remained relatively low. This means that the discrepancy between the number of sites and the duration of the Early Bronze Age, estimated at 400-500 years (§3.3), has remained.

The synthesis that is currently authoritative was published relatively recently by Cocchi Genick in 1998: *L'antica età del bronzo nell'Italia centrale: Profilo di un'epoca e di un'appropriata strategia metodologica*. It follows up her earlier study (Cocchi Genick 1996a) that had resulted in a more refined typochronology of EBA ceramics in Central Italy (§3.2). As a consequence, the main body of Cocchi Genick's synthesis entails the classification of EBA ceramics, but she takes all other elements into consideration, too, involving a range of places in EBA cultural landscapes. The methodological rigour that she adopts and advocates in the subtitle of the synthesis, has led her to disregard some sites that other scholars have regarded as EBA in date. This concerns those assemblages that consist of only a limited amount of material or had not been published in detail at the time of the synthesis and could therefore not be included in her meticulous classfication of ceramics (Cocchi Genick 1998, 16-21). In addition, a considerable controversy has arisen over the chronological attribution of the so-called "Luni Tre Erici-Norchia" style of decorated ceramics (Di Gennaro & Pacciarelli 1996). This concerns very limited assemblages (mainly isolated fragments) circumscribed to northern Lazio (§7.1.3). For this reason, Cocchi Genick (1998, 19-21) has excluded these from her synthesis and subsequently regarded this particular style as an 'early' Middle Bronze Age phenomenon (Cocchi Genick 2001, 2002). In this thesis I will argue that these particular assemblages can be interpreted as a regional style of ceramics (§7.1.3; §7.2), which seems to make most sense at the Early-Middle Bronze Age transition (§9.2.1).

As the most recent and authoritative synthesis of the period, incorporating both Abruzzo and Lazio, Cocchi Genick's study (1998) will be used as the starting-point for this case study in data-rich synthesis of EBA networks, without overlooking archaeological evidence that was published more

[41] "The reader should note the brevity of this overview of the sources available. The fabric of our account is therefore so poor and discontinuous that it gives way to conjectures, in our attempt at historical reconstruction, rather than positive certainties" (Peroni 1971, 13; my translation).

[42] For the sake of the English-language readership, throughout this thesis Early Bronze Age will be abbreviated as EBA, despite the potential confusion on the part of readers familiar with the common Italian abbreviation BA = "Bronzo antico" (Table 1.1). However, the Italian abbreviation (BA) will be used in references to typochronological subphases, albeit mostly with the addition of 'subphase' as a prefix (§3.2; Table 3.2).

recently (Chapters 4-8). This introductory chapter starts with an exploration of general issues concerning the Early Bronze Age in Central Italy as a whole. First, archaeological records will be introduced (§3.1), followed by a discussion of ceramics typochronology in relation to cultural boundaries from a network perspective (§3.2). Then I will discuss absolute chronology (§3.3), followed by environmental reconstructions in Abruzzo and Lazio, including a consideration of the EBA eruption of SOMMA-VESUVIUS in Campania (§3.4).

3.1 Archaeological records

An overview of the types of place and the respective numbers of sites adapted from Cocchi Genick's synthesis of the Early Bronze Age (1998), can give an indication of extant archaeological records in Abruzzo and Lazio, in the context of Central Italy as a whole (Table 3.1). It shows the discrepancy in the evidence in terms of numbers of sites available for Abruzzo [n=12] and Lazio [n=39], respectively. The overview also highlights significant gaps in the EBA archaeological records in terms of types of place (Table 3.1), which are discussed in greater detail in the respective chapters. In general, however, regional differentiation in archaeological visibility underscores that it is tempting to extrapolate (i.e. to fill in the gaps with information) from other regions in archaeological synthesis. Without going into too much detail in this introduction, some initial observations can be made on the presence of regional differentiation in the form of overrepresentation and underrepresentation of particular types of place (or the constituent elements of cultural landscapes).

	Settlements (Chapter 7)	**Caves & rock shelters** (Chapter 6)	**Burials** (Chapter 5)	**Hoards of metalwork** (Chapter 4)	Total number of sites
Marche	3	1	-	3	7
Umbria	-	1	-	3	4
Tuscany	9	22	1	21	53
Lazio	29	6	2	2	39
Abruzzo	5	3	1	3	12
Total	46	33	4	32	115

Table 3.1: overview of site numbers for each of the five Central Italian regions in Cocchi Genick's synthesis (1998), following her classification of sites in terms of types of place.

Open-air sites (commonly interpreted as settlements) are overrepresented in Lazio, with respect to other regions (Table 3.1). Arguably, this derives from a strong tradition of field survey projects on the part of both Italian and non-Italian archaeologists, with a particular interest in the protohistoric periods in the light of early state formation (§1.2). Nonetheless, EBA sites tend to remain underrepresented in the systematic, (sub)regional field survey projects of non-Italian archaeologists, due to a lack of expertise to recognise EBA ceramics. This is remedied to some extent by current attempts at reassessment and redating of material from sites recorded by these projects, with the help of Italian specialists, for instance in the context of continued research by the British School at Rome focused on Southern Etruria (Di Gennaro & Stoddart 1982; Patterson et al. 2000; Patterson 2004; Stoddart 2004/2007) and the AGRO PONTINO survey of the University of Groningen (Alessandri 2007, 2009). At the same time, there is a lack of excavations of EBA open-air sites, on the basis of which the interpretation of surface assemblages as settlements can be corroborated (Chapter 7).

The relative underrepresentation of evidence for EBA metalwork deposition in Abruzzo and Lazio (Table 3.1) is largely an artifact of the selective focus on multiple finds and the exclusion of single finds of metalwork from Cocchi Genick's synthesis (1998). In both these regions more single finds of metalwork have been recorded than hoards, the latter defined as multiple depositions (Chapter 4). The case study will show that the spatial distributions of single finds of metalwork, which have been studied predominantly from a typochronological perspective, can fill a gap in our understanding of EBA cultural landscapes in Central Italy (Chapters 4 & 8). This does not mean, however, that the relative underrepresentation of hoards in Abruzzo and Lazio, with respect to Tuscany [n=21] (Table 3.1), is irrelevant. It is a strong indication that the copper deposits in the latter region were the most likely, or most frequent, source of raw material in Central Italy as a whole (Chapter 4).

On a general note, the relatively low total number of sites in Abruzzo [n=12], with respect to Lazio [n=39], does pose a serious problem for the inter-regional comparative approach adopted in the case study. Still, there are no obvious qualitative gaps in our knowledge, such as the absence of evidence for settlements and burials in Umbria (Table 3.1). The fact that several types of place are

represented in both Abruzzo and Lazio does seem to allow for adopting a cultural landscape perspective in the case study. On the other hand, the reconstruction of social networks, to a large extent dependent on spatial distributions of places (as nodes), may turn out to be a problem, in particular affecting the reconstruction of settlement patterns (Chapter 7). It is shown that more detailed inter-regional comparisons are possible concerning metalwork deposition (Chapter 4), burial (Chapter 5) and cave use (Chapter 6). Before turning to these discussions of the constituent elements of EBA cultural landscapes, three general frameworks will be discussed in the remainder of this introductory chapter: first and foremost, Cocchi Genick's typochronology of EBA ceramics (1998), the main relative chronology[43] that has also been used as a basis for the delineation of cultural groups (§3.2); secondly, the slowly increasing body of absolute dating evidence pertaining to EBA contexts (§3.3); and, finally, the rising number of reconstructions of environment and climate that are relevant for EBA trajectories (§3.4).

Italian terms and abbreviations (typochronology after Cocchi Genick 1998)	**English terms and abbreviations** (in this thesis)
"orizzonte di passaggio" (so-called 'transitional' horizon)	"Copper Age-EBA transition" (CA-EBA1; or "Copper Age-EBA1 transition")
Bronzo antico (BA; BA1-BA2 or "BA generico")	Early Bronze Age, or "generically EBA"
Bronzo antico 1 (BA1)	Early Bronze Age (first phase) (EBA1)
BA1A & BA1B	subphase BA1A & subphase BA1B
Bronzo antico 2 (BA2)	Early Bronze Age (second phase) (EBA2), rather than subphase BA2 [since Cocchi Genick 1998 does not subdivide BA2]
BA2A & BA2B [only used occasionally]	EBA2 & 'late' EBA2
Bronzo antico/Bronzo medio 1 (BA/BM1)	"Early-Middle Bronze Age transition", or "EBA2-MBA1 transition" (EBA2-MBA1)
Bronzo Medio 1-2 (BM1-2)	Middle Bronze Age (first phase) (MBA1)
BM1A & BM1B (Cocchi Genick 2001, 2002)	subphase BM1A (or "EBA2-MBA1 transition") & subphase BM1B (see Chapter 9)

Table 3.2: abbreviations and terminology based on ceramics typochronology.

3.2 Typology of ceramics: relative chronology and regionalisation

The core of Cocchi Genick's synthesis (1998) is her meticulous classification of EBA ceramics. This has made an invaluable contribution to the relative chronology of this period (§3.2.1), as well as the delineation of cultural groups (or subgroups) in Central Italy (§3.2.2). Still, she herself mentions a number of problems in constructing a relative chronology based on this particular typological classification. One such problem is the general lack of absolute dates from EBA contexts in Central Italy as a whole (§3.3) that can be used to 'calibrate' relative chronologies. Another problem is the lack of stratified assemblages in some regions. Relative chronologies are mainly based on stratigraphies in caves, which in Abruzzo and Lazio have yielded in general only limited amounts of EBA material (Chapter 6). This situation is not balanced by stratigraphical information from other archaeological contexts, given the current lack of excavations of EBA open-air sites in Abruzzo and Lazio (Chapter 7). In the case of Abruzzo, the main problem remains the overall scarcity of EBA sites and assemblages (§3.1; Table 3.1). Nonetheless, Cocchi Genick (1998) has been able to distinguish two main typochronological phases, i.e. an earlier phase [BA1] and a later phase [BA2], and to subdivide the earlier phase in subphases [BA1A & BA1B], whereas the later phase is subdivided only very occasionally (Table 3.2). This relative chronology based on EBA ceramics has been corroborated by further typochronological studies and is generally accepted as the standard in EBA studies in Central Italy (cf. Belardelli et al. 2007; Ialongo 2007; Alessandri 2007, 2009), with the exception of typochronological issues at the Early-Middle Bronze Age transition (Chapter 9).

3.2.1 Typochronology, ceramic connections and typo-networks

Excluding hoards of metalwork (§3.1; Table 3.1), generally dissociated from ceramics (Chapter 4), the majority of assemblages including ceramics (75 out of 83) have been attributed to a specific phase (or both main phases) of the Early Bronze Age (Table 3.3). Including assemblages with evidence for

[43] The other main relative chronology, based on typological classification of EBA metalwork, will be discussed in the context of metalwork deposition (§4.1).

EBA1-EBA2 continuity in the comparison, EBA2 assemblages [56%] are better represented than EBA1 assemblages [44%].

	EBA1	EBA1-EBA2	EBA2	total
Marche	2	1	1	4
Umbria	-	1	-	1
Tuscany	6	12	9	27
Lazio	10	8	18	36
Abruzzo	1	3	3	7
total	19	25	31	75
EBA1 (total)	44	**EBA2 (total)**	56	

Table 3.3: overview of site numbers in terms of the relative chronology based on EBA ceramics in Central Italy (compiled after Cocchi Genick 1998).

These proportions show a strong correlation with those of overall numbers of vessel types, attributed to EBA1 [n=145] and EBA2 [n=191], respectively (Table 3.4). Arguably, this broad similarity underscores that the classification is internally sound and the division into two main phases valid. At the same time, some deviations in proportions can be found that on closer inspection reveal a diachronic pattern. A significant change seems to have occurred in terms of the proportions of vessel types, handles and decorations between the two subphases of EBA1 (Table 3.4). Whereas the proportions of vessel types and handles increased between BA1A and BA1B, the proportion of decorations decreased, accordingly. In this respect, subphase BA1B seems to have constituted a 'transitional' phase in EBA trajectories, corresponding with the lowest number of vessel types (Table 3.4).

	CA-EBA transition	BA1A	BA1 (generic)	BA1B	BA2	Total
Vessel types	11 (57.9%)	36 (66.7%)	13	30 (73.2%)	134 (70.2%)	224 (66.6%)
Handles	2 (10.5%)	8 (14.8%)	9	8 (19.5%)	43 (22.5%)	70 (20.8%)
Decorations	6 (31.6%)	10 (18.5%)	9	3 (7.3%)	14 (7.3%)	42 (12.5%)
Total	19 [5.7%]	54 [16.1%]	31 [9.2%]	41 [12.2%]	191 [56.8%]	336

Table 3.4: overview of the numbers of vessel types, handles and decorations in terms of EBA typochronology (compiled after Cocchi Genick 1998; including variants and unica as separate types and excluding types that are 'non-diagnostic' or generically EBA in date).

This broad diachronic pattern is culturally significant in itself and will be explored further in terms of the spatial dimensions of 'ceramic connections' (or sharing of vessel types between sites). In this respect, a major omission from Cocchi Genick's synthesis (1998) concerns one or several maps that could have served as a starting-point for spatial analysis and substantiated her typochronology.[44] 'Typochronological networks' (or typo-networks) that visualise relationships between assemblages (or places) in terms of vessel types, can be used as a proxy for regional to supra-regional connectivity (§2.2.2). The question is whether Cocchi Genick's typological classification (1998) can be used to visualise such typo-networks. Because of the overall high number of types that she distinguishes (Table 3.4), her approach to classification is one that is characteristic of so-called 'splitters' (as opposed to 'lumpers'). In the end, the number of sites to which each type is linked, ranges from one to ten at the most, with two or three on average. Based on the assumption that a typological or 'ceramic connection' is more likely to be found between two adjacent sites than covering long distances, one would expect that this approach favours the distinction of micro-regional ceramic traditions, not supra-regional patterns of connectivity. In addition, given the gaps in extant EBA archaeological records in Central Italy (§3.1; Table 3.1), one would not expect larger networks to emerge. However, the reverse seems to be the case, in the sense that larger 'typo-networks' do emerge from adding up 'ceramic connections' in each subphase. Visualising the spatial relationships inherent in typological classification of site

[44] The only map entails a general site distribution map with indiscriminate dots, not even distinguishing between types of place (Cocchi Genick 1998, 87 [fig. 4]).

assemblages, these typo-networks will be used as a starting-point for such a spatial analysis of ceramics typochronology.

Types not dated specifically to one of the three (sub)phases (BA1A, BA1B, BA2) have been excluded from the following analysis. Because of their lack of chronological resolution (or precision) 'undated', 'undiagnostic' types and those generically dated to EBA, in vogue in both main phases BA1-BA2 (Table 3.2), have not been included in the typo-networks. Similarly, those types that are only generically EBA1 in date and those dated to a so-called 'transitional' phase ("orizzonte di passaggio") at the Copper Age-EBA1 transition (Table 3.2) have been excluded, although those more specifically dated to the final Copper Age and subphase BA1A are included in the respective typo-networks (Figure 3.1). The two main types of place are rendered as distinctive icons in the following series of typo-networks, showing caves (and rock shelters) as 'triangles' and open-air sites as 'circles'. Visualising these types of place as distinctive icons in typo-networks helps to appreciate the spatial dimensions of Cocchi Genick's observation (1998, passim) that caves constituted crucial, 'central' places in supra-regional connectivity. She interprets this phenomenon, specifically connected with caves as depositional contexts (Chapter 6), in terms of the circulation of ritualised forms of practice in a supra-regional context. As a consequence, the following typo-networks will emerge predominantly from 'ceramic connections' over long distances in Central Italy based on vessel types that are shared between and often exclusive to caves. By contrast, places that lack 'ceramic connections', not sharing vessel types with other sites, can be interpreted (*ex silentio*) as a proxy for the presence of sub-regional (or 'local') ceramic traditions. Finally, the EBA sites from the adjacent region of Emilia-Romagna in Northern Italy that Cocchi Genick incorporates in her synthesis (1998 [nos. 1-11]), will also be included in the following series of typo-networks.[45]

Copper Age-EBA1 transition

The first couple of typo-networks refers to subphase BA1A, one based on vessel types (Figure 3.1a) and the other on decorations (Figure 3.1b). Typochronological connections between sites are rendered as connecting lines that visualise these spatial dimensions as a typo-network. Those sites that participate in the typo-network are highlighted (in dark), different from the remaining, contemporary but unconnected sites (in white). Sites dated generically to EBA1 (or main phase BA1) have been included in the 'typo-networks' of subphase BA1A (Figure 3.1) and subphase BA1B (Figure 3.2). Because generically EBA1 vessel types have been excluded from the typo-networks (see above), the respective sites are, by definition, unconnected and add to the number of white icons. They have been included here, however, to give an impression of potential EBA1 site distributions in Central Italy as a whole.

A first observation is that the typo-network based on BA1A vessel types (Figure 3.1a) is geographically limited to the region of Tuscany and excludes the majority of site assemblages from Abruzzo and Lazio. This can be regarded as a proxy for a focus on Tuscany in connectivity over longer distances. Given the overrepresentation of decorations in subphase BA1A (see above; Table 3.4), a comparison can be made between typo-networks based on vessel types and decorations. By comparison, the typo-network based on decorations is more extensive on the Tyrrhenian side of the peninsula and includes connections to two sites in southern Lazio (Figure 3.1b). Still, a similar focus on Tuscany can be discerned in the typo-network, corroborating the lack of ceramic connections in the larger part of Central Italy in supra-regional connectivity in subphase BA1A. It should be recalled, however, that the gaps in EBA archaeological records from Marche and Abruzzo (§3.1; Table 3.1) contributes to the lack of connectivity on the Adriatic side of the peninsula, both in terms of vessel types (Figure 3.1a) and decorations (Figure 3.1b).

In order to interpret these typo-networks in terms of connectivity, it should be recalled that subphase BA1A was connected to the final Copper Age in a diachronic trend in numbers and proportions of types (Table 3.4). In particular, the overrepresentation of decorations (see above) can be linked to a persistent Bell Beaker tradition of decorated ceramics. It may therefore not be a coincidence that the same geographically limited focus on Tuscany that is shown by typo-networks at the Copper Age-EBA1 transition (Figure 3.1), can be found in the spatial distribution of comprehensive Bell Beaker assemblages in Central Italy. This 'core' Bell Beaker distribution is focused on Tuscany and only extended by a percolated pattern in the distribution of limited amounts of decorated ceramics, focused on Lazio and excluding Abruzzo (cf. Cocchi Genick 1998a; Fugazzola Delpino & Pellegrini

[45] These Northern Italian sites were not included in the discussion of EBA archaeological records (§3.1).

1998a; Sarti 1998; D'Ercole & Pennacchioni 2001). This 'fall-off' pattern on the Tyrrhenian side of the peninsula coincides with the typo-network based on decorations (Figure 3.1b), as these are generally defined in terms of a persistent 'Bell Beaker' tradition of decorated ceramics.[46] To be more precise, the two southernmost nodes in the border zone between Tuscany and Lazio in the typo-network for vessel types (Figure 3.1a) can be interpreted as connecting elements in the typo-network for decorations that extends into southern Lazio (Figure 3.1b).

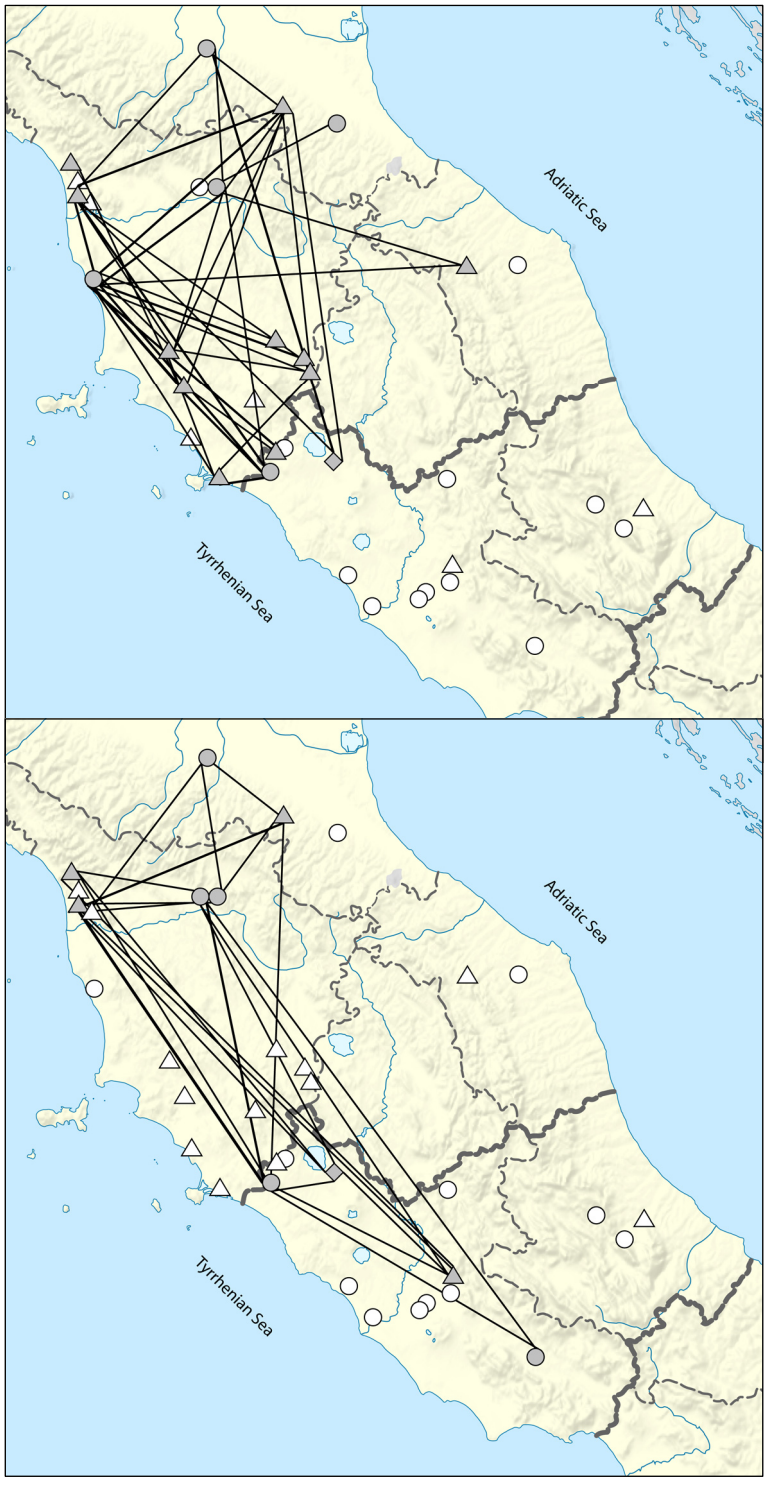


Figure 3.1: map (adapted from http://commons.wikimedia.org/wiki/File:Italy_map-blank.svg) showing the 'typo-networks' of subphase BA1A in Central Italy based on (a) vessel types (above) and (b) decorations (below). Connecting lines between caves (triangles) and/or open-air sites (circles) indicate that at least one vessel type is shared between two sites, while lineweight increases with the number of connections (compiled after Cocchi Genick 1998). The one lozenge-shaped icon in northern Lazio is the cult place of FOSSO CONICCHIO.

These two nodes are situated in northernmost Lazio and constitute the only comprehensive 'Bell Beaker' assemblages in the region, one (FOSSO CONICCHIO) a funerary context and/or cult place (Chapter 5; Appendix 2 [#11]) and the other (TORRE CROGNOLA) an extensive surface assemblage that is commonly interpreted as a settlement (Chapter 7; Appendix 4 [#61]). The historically particular significance of these two nodes in northernmost Lazio as supra-regional meeting-places, in the context of a relatively 'close-knit' network focused on Tuscany (Figure 3.1), will be substantiated in the data-rich synthesis of the case study (Chapter 8). One reason to interpret the supra-regional focus on Tuscany as a past reality, is the location of the COLLINE METALLIFERE at the heart of this region and the typo-network of subphase BA1A in Central Italy. This particular area seems to have

[46] In fact, 'Bell Beaker' types of decoration seems to have persisted in Tuscany into EBA2 (cf. Sarti 2004).

emerged as a major copper source for metalwork production at the Copper Age-EBA1 transition (Chapter 4).

EBA1

The diachronic trend in the proportions of types (Table 3.4) indicates a change between subphases BA1A and BA1B (see above) and requires a closer look, by making a comparison of the respective 'typo-networks' (Figures 3.1 & 3.2). Here it should be recalled that the lowest proportion concerns vessel types specifically dated to subphase BA1B (Table 3.4). This could suggest that the respective typo-network will be less representative as a proxy for regional to supra-regional connectivity. Nonetheless, the 'typo-network' of subphase BA1B (Figure 3.2) does not seem to show a significant change in connectivity with the previous subphase (Figure 3.1a). The main focus of the network on the region of Tuscany persists, again underscored by the relative lack of ceramic connections elsewhere in Central Italy (Figure 3.2). It underscores that acquisition of raw material for metalwork production (or finished objects) from central-southern Tuscany (Chapter 4) probably remained crucial in creating a supra-regional network in terms of 'ceramic connectivity'.

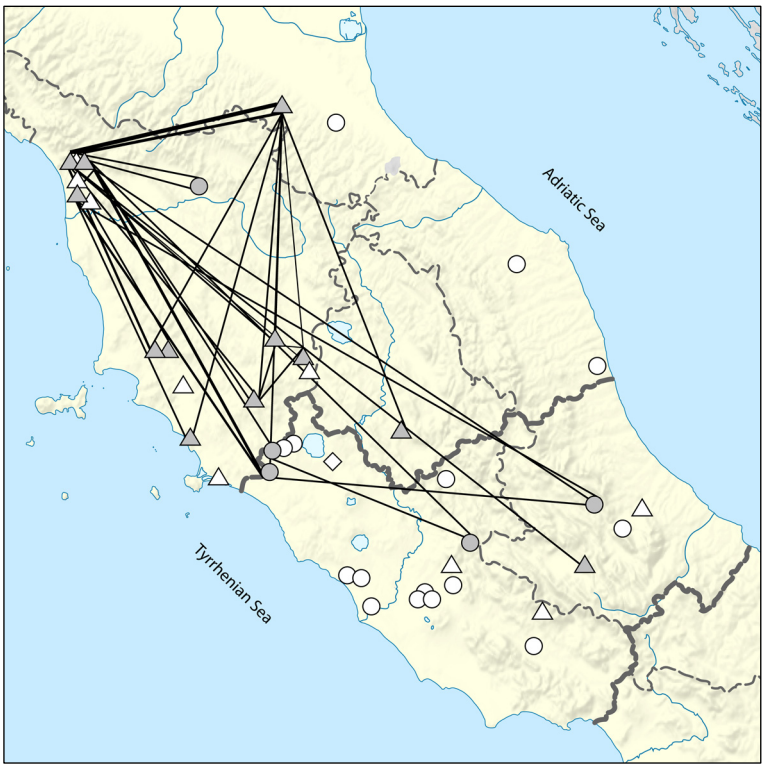
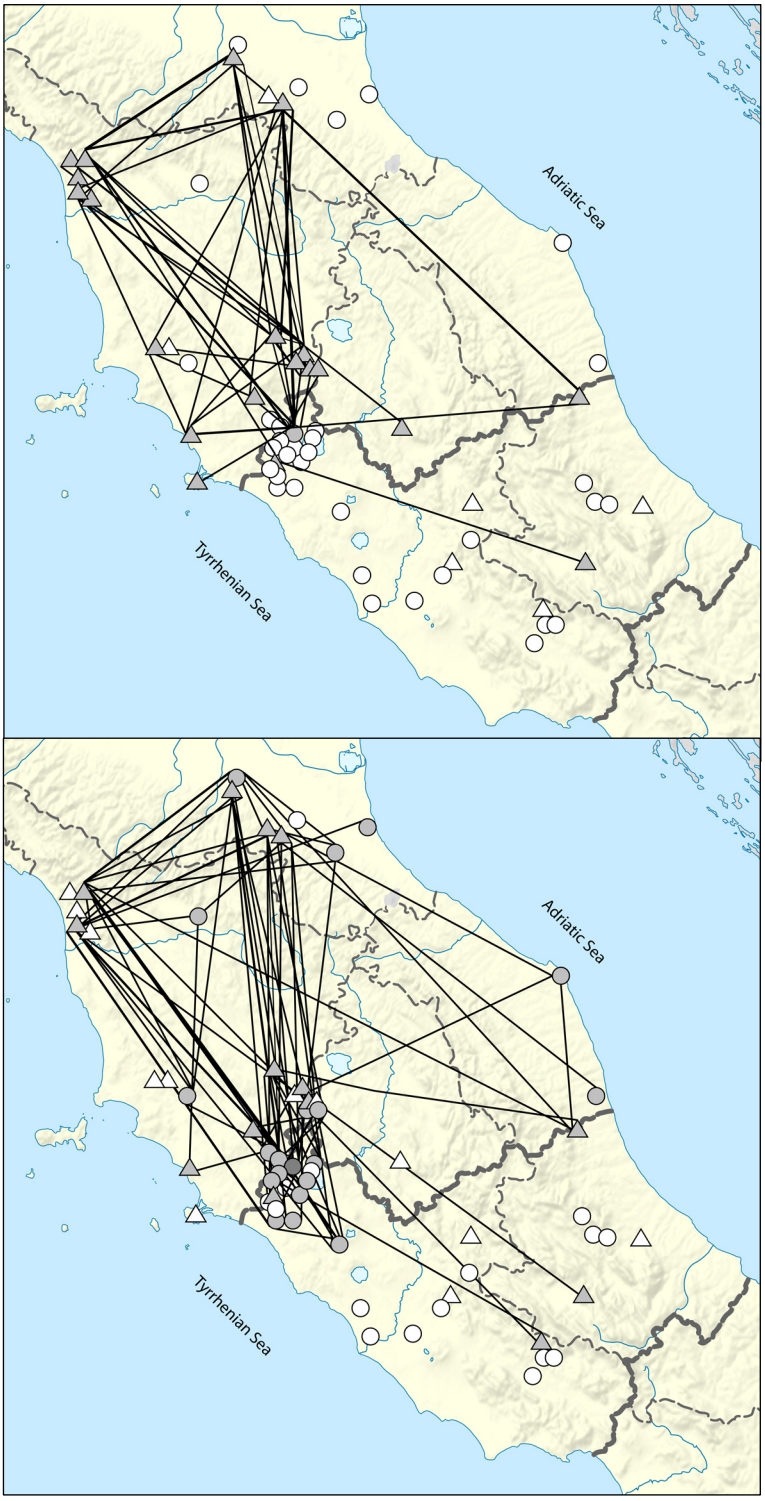


Figure 3.2: map (adapted from http://commons.wikimedia.org/wiki/File:Italy_map-blank.svg) with 'typo-network' of subphase BA1B in Central Italy based on vessel types. Connecting lines between caves (triangles) and/or open-air sites (circles) indicate that at least one vessel type is shared between two sites, while lineweight increases with the number of connections (compiled after Cocchi Genick 1998).

A new characteristic, however, is that the typo-network of subphase BA1B shows connectivity between Tuscany and the intermontane, APENNINE parts of Abruzzo (Figure 3.2). This extension of the 'typo-network' corresponds with the northernmost extension of the larger Southern Italian sphere into southern 'coastal' Abruzzo (§3.2.2). It could indicate that patterns of mobility linking the Adriatic side of the peninsula to southern Tuscany followed an intermontane route, apparently by-passing the larger part of Lazio (Figure 3.2). This apparent network change seems to have coincided with the abandonment of one of the two 'well-connected' places in northernmost Lazio, on the Tyrrhenian side of the peninsula (see above). Although the lozenge-shaped icon (FOSSO CONICCHIO) is shown because of the presence of generically EBA1 vessel types in its assemblage (Figure 3.2), its lack of connections in the typo-network of subphase BA1B contrasts with its previous role as a node in subphase BA1A (Figure 3.1) and arguably indicates its abandonment. This scenario will be explored in the context of regional connectivity in Abruzzo and Lazio (§7.2) and the multi-sited analysis (Chapter 8). Another characteristic of connectivity that requires further exploration in the case study, is the persistent lack of ceramic connections that leaves the larger part of Lazio seemingly disconnected in EBA1 (Figures 3.1 & 3.2). In particular, the micro-regional synthesis of settlement patterns in the intermontane FUCINO BASIN (Ialongo 2007), including full publication of the respective assemblages, can be used to substantiate regional connectivity between Abruzzo and Lazio (Chapter 7), in greater detail than was possible at the time of Cocchi Genick's synthesis (1998).

EBA2

In the subsequent phase (EBA2) typo-networks emerge from a relatively large number of vessel types specifically attributed to subphase BA2 (Table 3.4). The correspondingly higher number of ceramic connections provides the opportunity to distinguish those based on types that are exclusive to caves (Figure 3.3a) from other connections, based on types that have also (or exclusively) been found in other types contexts (Figure 3.3b). Despite the higher number of ceramic connections, the resulting EBA2 typo-networks give to a large extent the same general impression as EBA1 typo-networks (Figures 3.1 & 3.2). The general focus on Tuscany (see above) persists as a characteristic of EBA2 connectivity in Central Italy, especially among caves (Figure 3.3a). At the same time, a number of differences with EBA1 connectivity can be discerned, mainly the increase of connections that involve EBA2 open-air sites (Figure 3.3b).



Different from EBA1 typo-networks (Figures 3.1 & 3.2), a series of open-air sites on the Adriatic side of the peninsula are included in the EBA2 typo-network (Figure 3.3b). This adds a regional, 'coastal' network in the northern Adriatic to the close-knit, regional network focused on Tuscany in which caves predominate (Figure 3.3a). By contrast, the majority of sites in Abruzzo and Lazio remain unconnected from the EBA2 typo-networks (Figure 3.3). Still, a new cluster of open-air sites at the present border between Tuscany and Lazio does change overall site distributions on the Tyrrhenian side of the peninsula.

Figure 3.3: map (adapted from http://commons.wikimedia.org/wiki/File:Italy_map-blank.svg) with 'typo-networks' of subphase BA2 in Central Italy based on (a) vessel types exclusive to caves and LAGO DI MEZZANO (above) and (b) vessel types that include open-air sites (below). Connecting lines between caves (triangles) and/or open-air sites (circles) indicate that at least one vessel type is shared between two sites, while lineweight increases with the number of connections (compiled after Cocchi Genick 1998).

This new cluster includes the largest EBA2 assemblage (LAGO DI MEZZANO) that has been interpreted as a lake-side cult place, situated in northernmost Lazio (Chapter 7). For this reason, connections based on vessel types from LAGO DI MEZZANO that are otherwise exclusive to caves, have been incorporated in the typo-network based on vessel types exclusive to caves (Figure 3.3a). In itself, the emergence of a large cluster of EBA2 sites in northernmost Lazio constitutes a significant effort in place-making. It is significant, however, that it did not change the basic structure of EBA1 connectivity (see above). Arguably, the nodal character of the border zone between Tuscany and Lazio in a supra-regional context was preserved (Chapter 8), constituting the southern margins of the close-knit network focused on Tuscany (Figures 3.1, 3.2 & 3.3). To reiterate, the most likely explanation for the nodal role of northernmost Lazio is its spatial proximity to the area of copper resources, situated further to the north, at the heart of Tuscany (Chapter 4).

Finally, EBA2 'typo-networks' based on vessel types (Figure 3.3) show a higher number of connections over shorter distances, a higher degree of regional (or even micro-regional) connectivity than before in EBA1 (Figures 3.1 & 3.2). This pattern is more pronounced in the 'typo-network' based on EBA2 handle types (Figure 3.4). Here it should be recalled that the number and proportion of handles had increased with respect to EBA1 (see above; Table 3.4). The resulting typo-network (Figure 3.4) preserves the basic structure of supra-regional connectivity in terms of vessel types (Figure 3.3). It divides Central Italy roughly in a 'northern' sphere (i.e. Tuscany) and a 'southern' sphere (i.e. Abruzzo and Lazio), and perhaps also an 'eastern', northern Adriatic sphere (Figure 3.4). This division of Central Italy in two (or three) spheres indicates that 'regional' traditions of handles can be recognised as socially and culturally significant in EBA2. In particular, the typo-network shows that the two main 'handle spheres' intersect in the Tuscany-Lazio border zone (Figure 3.4), thereby underscoring the nodal role of this particular area (see above).

Figure 3.4: map (adapted from http://commons.wikimedia.org/wiki/File:Italy_map-blank.svg) with 'typo-network' of subphase BA2 in Central Italy based on handle types. Connecting lines between caves (triangles) and/or open-air sites (circles) indicate that at least one vessel type is shared between two sites, while lineweight increases with the number of connections (compiled after Cocchi Genick 1998). Two EBA2 'handle spheres' can be recognised, with LAGO DI MEZZANO at their intersection, and perhaps a third along the northern Adriatic coast.

From the perspective of the case study, it is significant that the 'southern handle sphere' is mainly constituted by Abruzzo and Lazio (Figure 3.4). It is an indication that a larger, regional network existed in the area of the case study that is not based on a lack of connections and its exclusion from the relatively close-knit regional network focused on Tuscany (i.e. generalised absence of evidence). Still, it should be stressed that the general lack of ceramic connections in Abruzzo and Lazio in EBA1 'typo-networks' (Figure 3.1 & 3.2) is culturally and socially significant in itself and cannot wholly explained by gaps in EBA archaeological records (Chapter 8). In this respect, the intermediate position of Abruzzo and Lazio between the regional network focused on Tuscany and the larger Southern Italian sphere, should be taken into account. Overall, the general observations made in this section on the basis of a series of typochronological

networks (or 'typo-networks') can be used as a proxy for (changes in) regional and supra-regional connectivity and should be kept in mind in the following section that discusses the cultural groups that Cocchi Genick (1998) has distinguished on the basis of the same classification of EBA ceramics.

3.2.2 Regionalisation and cultural groups

Despite considerable gaps in EBA archaeological records (§3.1; Table 3.1), Cocchi Genick (1998, 307-333) has been able to delineate a series of cultural groups in Central Italy (Figure 3.5). Her reconstruction is mainly based on patterns of cultural exclusiveness of particular vessel types in her classification of ceramics. This includes the majority of vessel types without parallels that, by definition, do not appear as ceramic connections in the series of 'typo-networks' (Figures 3.1, 3.2, 3.3 & 3.4). Cocchi Genick acknowledges that her classification and delineation of cultural groups is 'polythetic' in character, in the sense that 'cross-cultural' connections help to create a polythetic sense of overlap between cultural groups. She substantiates this in a series of tables with the permutations of vessel types exclusive to a particular group and common vessel types shared between cultural groups (Cocchi Genick 1998, 330-333 [tab. 4-8]).[47]

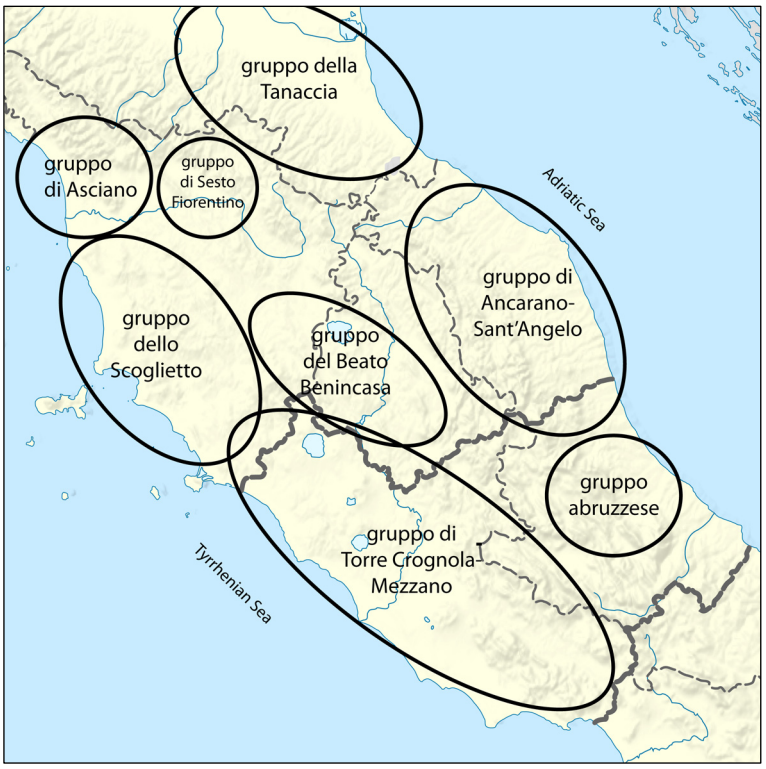


Figure 3.5: map (adapted from http://commons.wikimedia.org/wiki/File:Italy_map-blank.svg) with cultural groups in Central Italy delineated on the basis of EBA ceramics typology (compiled after Cocchi Genick 1998).

The methodological rigour in her classification has allowed Cocchi Genick to study intercultural interaction on a supra-regional in a polythetic sense, going beyond a territorial notion of cultural boundaries. At the same time, however, she does not substantiate her analysis by visualising connectivity and cultural distinctiveness in distribution maps. This reifies her cultural groups (as bounded entities), thereby paradoxically denying them a polythetic character (Figure 3.5).

To be more precise, the map with reconstructed cultural groups, based on her classification in the initial publication (Cocchi Genick 1996a, 89 [fig. 1]), was excluded from Cocchi Genick's final synthesis (1998). This does seem to caution not to misinterpret the respective, reconstructed cultural boundaries (Figure 3.5) in a territorial sense. However, the lack of maps also leaves implicit the benefits of visualising reconstructed cultural groups as networks, as a critical counterpart to the use of typo-networks as a proxy for regional to supra-regional connectivity (§3.2.1). Building on the latter, some critical remarks can be made about the reconstructed cultural groups, both in a 'synchronic' and a 'diachronic' sense, which have the potential to reinforce their polythetic character. The discussion starts from a comparison of the delineated groups (Figure 3.5) with actual site distributions (Figure 3.6).

[47] She has also used this polythetic approach to highlight similarities and differences between assemblages from contexts of burial (Chapter 5), caves (Chapter 6) and settlements (Chapter 7), rather than following preconceived notions of site function.

Cultural landscapes and social networks

A first problem is that remains implicit in the reconstructed EBA cultural groups (Figure 3.5) is that they refer to both EBA1 and EBA2. In a diachronic sense, units of analysis cultural groups that collapse three subphases into a single 'synchronic' construct could hide network changes between EBA1 and EBA2, including changes in the respective cultural boundaries. Secondly, in terms of types of place, some of the delineated groups are predominated by caves, with only a limited number of open-air sites, or none at all (Figure 3.6).

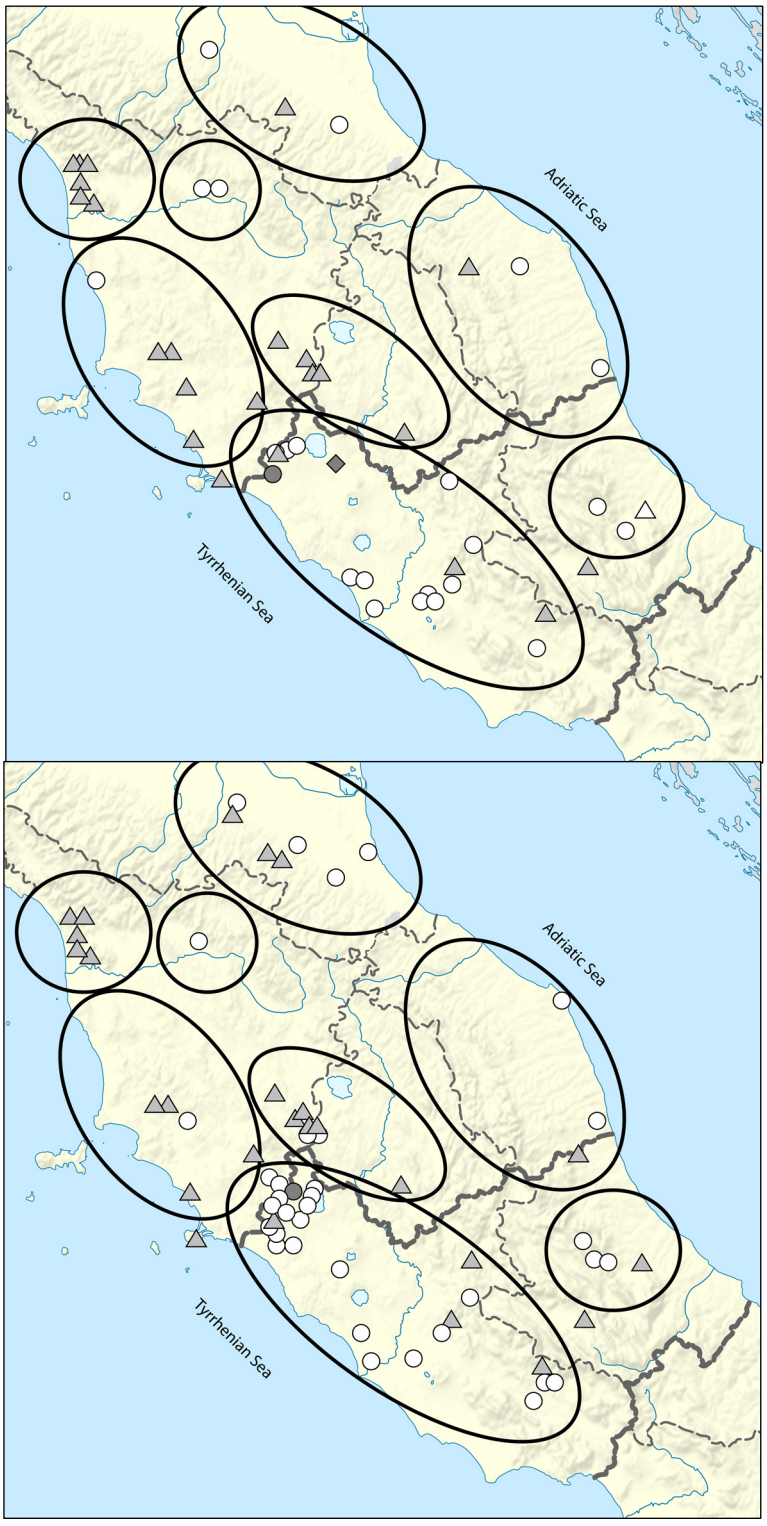


Figure 3.6: map (adapted from http://commons.wikimedia.org/wiki/File:Italy_map-blank.svg) with reconstructed cultural groups in Central Italy (see Figure 3.5) in relation to site distributions (a) in EBA1 (above), highlighting caves, TORRE CROGNOLA and FOSSO CONICCHIO, and (b) in EBA2 (below), highlighting caves and LAGO DI MEZZANO (compiled after Cocchi Genick 1998).

For instance, the presumption in interpreting cave-dominated clusters as cultural groups is that a 'gap' (in terms of contemporary open-air sites) exists in the respective archaeological record, denying the possibility that absence of evidence equals evidence of absence. Here it should be appreciated that two such groups (GRUPPO DI ASCIANO and GRUPPO DEL BEATO BENINCASA) rank among the smaller reconstructed cultural groups (Figure 3.5).

These smaller groups could misrepresent a 'complete' cultural landscape that would actually have extended beyond the reconstructed cultural boundary. Since both these groups are situated at significant, cross-APENNINE nodes in a supra-regional context (Figures 3.1, 3.2, 3.3 & 3.4), each of them could have constituted not so much a cultural group in itself as a group of places used for deposition and shared between cultural groups. Rather than the presumption that a gap in EBA archaeological records (§3.1) will inevitably be filled with open-air sites in the future, the possibility should be taken into account that

GRUPPO DI ASCIANO and GRUPPO DEL BEATO BENINCASA are actually defined by the role of cave use in social interaction over longer distances (see above), therefore not necessarily cultural groups in themselves.

The peculiarity of caves as nodes in networks was already underscored by their crucial role in the connectivity, as visualised by 'typo-networks' (§3.2.1; Figures 3.1, 3.2 & 3.3). In addition, caves stand out for the relatively high incidence of continuity in their trajectories of use between EBA1 and EBA2 (Table 3.5). Whereas trajectories of open-air sites show a high degree of discontinuity, the majority of caves seem to have been used both in EBA1 and EBA2.[48] This diachronic pattern shows that, in general, notions of place related to caves (Chapter 6) would probably have differed from those related to settlements (Chapter 7). Still, the persistence of caves as nodes in networks does not mean that they were not subjected to the same network changes that are highlighted by discontinuity in settlement patterns between EBA1 and EBA2 (Table 3.5). The same, persistent caves have to be situated and studied in each historically distinctive situation (i.e. EBA1 and EBA2 networks). One 'network characteristic' of caves in cultural landscapes that can already be appreciated in this general introduction is that their distribution over the physical landscapes of Central Italy is spatially circumscribed. In particular, caves tend to be situated at the margins of reconstructed EBA cultural groups (Figure 3.6), a spatial pattern that would further underscore their crucial role in intercommunal interaction (Chapter 6). Recursively, the 'marginal' position of caves on a regional scale, with respect to contemporary open-air sites in some of the cultural groups (Figure 3.6), could lend some credibility to these reconstructed entities, with caves as connecting elements between sub-regional groups of settlements as small-worlds (§2.2.2).

	Type of place	EBA1	'persistent' places [EBA1-EBA2]	'new' places [EBA2]
Marche	caves	1	-	-
	open-air sites	1	1	1
Umbria	caves	-	1	-
	open-air sites	-	-	-
Tuscany	caves	4 [21%]	12 [63%]	3 [16%]
	open-air sites	2	-	6
Lazio	caves	1	2	2
	open-air sites	7 (24%)	6 (21%)	16 (55%)
Abruzzo	caves	-	2	1
	open-air sites	1	1	2
Total	caves	6 [21%]	17 [58%]	6 [21%]
	open-air sites	11 (25%)	8 (18%)	25 (57%)

Table 3.5: overview of the numbers of caves and open-air sites in terms of relative chronology based on EBA ceramics in Central Italy (compiled after Cocchi Genick 1998).

A third problem with the delineation of cultural groups in Cocchi Genick's synthesis (1998) is her attempt at incorporating hoards of EBA metalwork (§4.1) in the definition of those entities. This approach starts from the presumption that types of place can be regarded as interchangeable in cultural landscapes and social networks. In other words, a hoard can be equated with the presence of a settled, 'local' community in its immediate vicinity (§2.1). This presumption will be questioned in the data-rich synthesis of EBA networks in Abruzzo and Lazio starting from a multi-sited analysis (Chapter 8) and here by visualising the spatial distribution of hoards with respect to the reconstructed cultural groups in Central Italy (Figure 3.7). In order to bring this distinctive pattern to the fore, the boundaries of the reconstructed cultural groups (Figure 3.5) have been drawn solely on the basis of ceramic assemblages (Figure 3.6), independently from hoards of metalwork.

The distribution of EBA hoards shows that these acts of place-making tend to occupy positions at the margins of the reconstructed cultural groups (Figure 3.7). This spatial pattern situates hoards of metalwork in intermediate positions in cultural landscapes and social networks, similar to caves (see above). It seems, however, that this pattern applies to hoards to a higher degree, given their location outside and between reconstructed cultural groups (Figure 3.7). In this respect, EBA hoards also 'delimit' GRUPPO DI ASCIANO and GRUPPO DEL BEATO BENINCASA, the two smaller cultural groups that mainly comprise caves (Figure 3.5; see above). In other words, the spatial pattern that hoards

[48] Of course, these patterns are skewed towards the region with the majority of caves (Tuscany) and the region with the majority of open-air sites (Lazio), respectively (§3.1; Table 3.1), cf. highlighted proportions in Table 3.5.

occupied 'marginal' positions (Figure 3.7), to an even larger extent than caves (Figure 3.6), would have corroborated Cocchi Genick's cultural groups, provided that she had left them out of her initial reconstruction. The spatial distribution of EBA hoards in Central Italy will be discussed in more detail in the case study, including their typochronology and the notions of place they convey (Chapter 4). Here a final, general observation should be made concerning the spatial pattern that the majority of hoards (Figure 3.7) are intimately linked with GRUPPO DELLO SCOGLIETTO (Figure 3.5). Again, it seems to underscore the significance of the COLLINE METALLIFERE at the heart of Tuscany as a major source of raw material for EBA metalwork production in Central Italy (Figure 3.7).

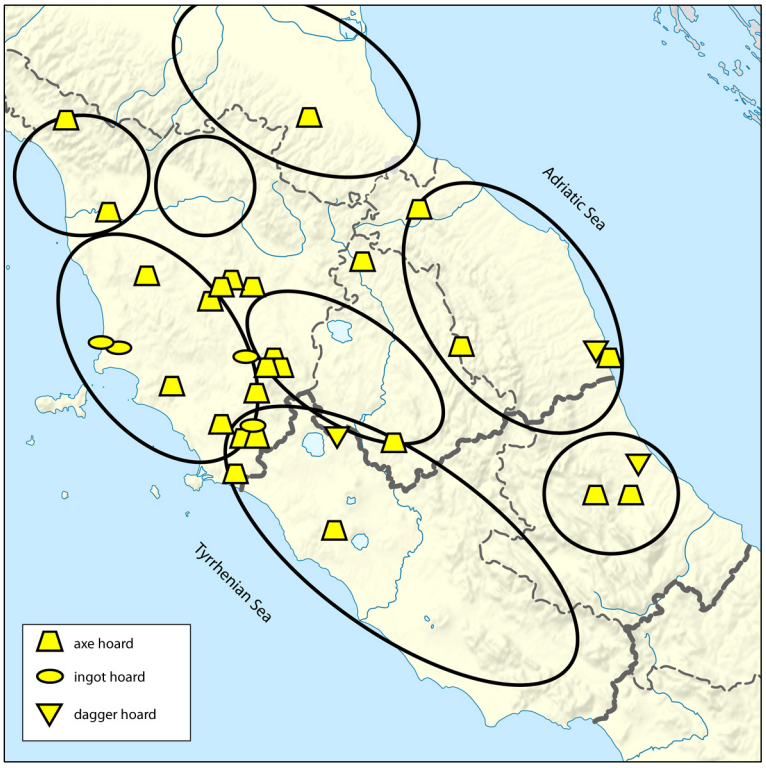


Figure 3.7: map (adapted from http://commons.wikimedia.org/wiki/File:Italy_map-blank.svg) with reconstructed cultural groups in Central Italy (see Figure 3.5) in relation to the spatial distribution of EBA hoards of metalwork (compiled after Cocchi Genick 1998).

In turn, it recalls the scenario that the persistent focus on Tuscany in supra-regional connectivity (§3.2.1) would have been metalwork-based. In other words, metalwork was a 'prime mover' in EBA exchange networks on a supra-regional scale (Chapter 4), with ceramic-based connections in the typo-networks (Figures 3.1, 3.2, 3.3 & 3.4) as a 'secondary' phenomenon. For instance, here the possibility should be taken into account that ceramics served as a container of metalwork in exchange, which may partly explain the long-distance patterns of ceramic connectivity (§3.2.1).

Cultural boundaries: Abruzzo and Lazio

It was argued that the 'marginal', intermediate positions of caves and hoards would to a large extent corroborate the EBA cultural groups reconstructed by Cocchi Genick (1998), despite a number of interpretive problems (see above). The question is whether these entities do not only make sense on a supra-regional scale but also on regional to sub-regional scales. Here the focus shifts to more specific issues concerning cultural boundaries in relation to the case study of Abruzzo and Lazio.

On the Tyrrhenian side of the Italian peninsula, Cocchi Genick (1998, 320-327) incorporates all sites from Lazio in a single cultural group, GRUPPO DI TORRE CROGNOLA-MEZZANO, as well as two open-air sites from the adjacent province of Grosseto in southern Tuscany, immediately to the north (Figure 3.6). This group has been distinguished from GRUPPO DELLO SCOGLIETTO, consisting of sites in the southernmost province of Tuscany and probably extending further north (Cocchi Genick 1998, 316-318); and from GRUPPO DEL BEATO BENINCASA with sites in southeastern Tuscany and a single site in Umbria to the northwest of Lazio (Cocchi Genick 1998, 318-320). GRUPPO DI TORRE CROGNOLA-MEZZANO represents the largest entity in a geographical sense (Figure 3.5), but is characterised by the lowest degree of ceramic connectivity in the series of 'typo-networks' (§3.2.1; Figures 3.1, 3.2 & 3.3). It was argued that such a general lack of connectivity to the regional network focused on Tuscany can be regarded as significant in itself, corroborated by the distinctive 'southern handle sphere' in EBA2, separate from Tuscany (§3.2.1; Figure 3.4). Moreover, the presence of a cultural boundary between Tuscany and Lazio is underscored by the concentration of EBA hoards at the intersection of the SCOGLIETTO, BEATO BENINCASA and TORRE CROGNOLA-MEZZANO groups (Figure 3.7).

If the existence and the location of this particular cultural boundary can be accepted, a methodological problem arises from the fact that the two eponymous, type sites of GRUPPO DI TORRE CROGNOLA-MEZZANO are both situated in the border zone between Tuscany and Lazio. It was already indicated in the discussion of typo-networks (§3.2.1) that the EBA1 type site (TORRE CROGNOLA) constituted the southernmost node of a network focused on Tuscany (Figures 3.1 & 3.2) and that the EBA2 type site (LAGO DI MEZZANO) constituted a major, well-connected cult place that was included in a supra-regional network of caves (Figures 3.3 & 3.4). As such, the term 'type site' seems a misnomer for both these sites in northernmost Lazio, in the sense that they are not representative for the situation in Lazio as a whole. In fact, both 'regional' type sites have yielded ceramic assemblages that show the most variety in terms of vessel types in the context of Central Italy as a whole (Cocchi Genick 1998, 284-286 [tab. 2]). This seems more consistent with their interpretation as nodes to which vessel types were introduced from several directions in a supra-regional context (than 'type sites' in a regional context). One of the main questions that has to be addressed in the case study (Chapters 4-8), is whether the site distributions in Lazio that make up GRUPPO DI TORRE CROGNOLA-MEZZANO, the largest EBA cultural group (Figure 3.5), can and should actually be divided into two (or more) smaller groups. In this respect, the persistent 'gaps' in overall EBA1 and EBA2 site distributions in Lazio (Figure 3.6) deserve a closer look.

Turning to the Adriatic side of the peninsula, Cocchi Genick herself considers the two reconstructed territorial entities, GRUPPO DI ANCARANO-SANT'ANGELO (1998, 327-328) and GRUPPO ABRUZZESE (1998, 328-330) as hypothetical cultural groups (Figure 3.5) because of the overall scarcity of EBA sites in Marche and Abruzzo (§3.1; Table 3.1; Figure 3.6). In the case of Abruzzo, it is often difficult to distinguish between late Copper Age and EBA material in archaeological assemblages (Cocchi Genick 1998, 327-330; Bietti Sestieri 2003, 299-300). Traditionally, this phenomenon has been explained in terms of a prolongued duration of Copper Age cultural traditions in Abruzzo, in comparison with other Central Italian regions (e.g. Radmilli 1977, passim; Cremonesi & Vigliardi 1988, 311; Di Fraia 1996a). These explanations are often phrased in terms of "retardation", which highlights a tendency to stereotype Adriatic regions as backward with respect to Tyrrhenian regions.[49] Still, this scenario could explain the relatively low archaeological visibility of EBA1 assemblages in Abruzzo and seems to be corroborated by Cocchi Genick's classification of ceramics, in which EBA2 vessel types are predominant, if not exclusive, in this region (Cocchi Genick 1998, 344). Another explanation for the relatively low archaeological visibility of EBA1 assemblages can be found in the exclusion of Abruzzo from the 'Bell Beaker' phenomenon in Central Italy (§3.2.1), focused on the Tyrrhenian side of the peninsula (Fugazzola Delpino & Pellegrini 1998a, 155-157; D'Ercole & Pennacchioni 2001). However, a synthesis of the FUCINO BASIN in the intermontane province of Abruzzo (Ialongo 2007) that adopts Cocchi Genick's relative chronology (1998), argues against such a meagre state of affairs. This recent study has more than doubled the number of EBA1 open-air sites in the region as a whole (§7.1.2).

Although the two Adriatic groups (GRUPPO DI ANCARANO-SANT'ANGELO and GRUPPO ABRUZZESE) should be regarded as hypothetical, they highlight the possibility of a boundary that divides Abruzzo between a northern and a southern cultural group (Figure 3.5). Such a division shows that Cocchi Genick's methodology (1998) is sensitive enough to avoid reification of modern regional, administrative boundaries as past cultural boundaries. However, it should be appreciated that the 'southern Adriatic' group (GRUPPO ABRUZZESE) is one of the smallest EBA entities reconstructed in Central Italy (Figure 3.5). It seems likely that the delineation of this particular cultural group has suffered from the geographical scope of Cocchi Genick's synthesis, especially in the light of ceramic connections observed between this group and sites in the Southern Italian region of Puglia (Cocchi Genick 1998, 329-330). The wider horizon of a larger Southern Italian sphere extending into Central Italy also has to be kept in mind in the interpretation of hoards in GRUPPO ABRUZZESE (Figure 3.7). Composition analyses of EBA metalwork from the Adriatic side of the peninsula seem to corroborate that Central and Southern Italian metallurgical spheres articulated (or overlapped) in southern Abruzzo (Chapter 4). On the Tyrrhenian side of the peninsula, the southern boundary of Central Italy does seem to coincide with a modern regional, administrative boundary. At least, southern Lazio can be distinguished from the adjacent EBA cultural group (i.e. the "Palma di Campania" 'facies') in northern Campania, Southern Italy (Cocchi Genick 1998, 327). This Southern Italian 'facies' or style of ceramics has become increasingly well-known following recent excavations of sites buried by the

[49] Cf. Barker 1991 on similar perceptions of the adjacent Adriatic region of Molise, to the south of Abruzzo.

EBA2 'Avellino' (Plinian style) eruption of SOMMA-VESUVIUS (§3.4). Nonetheless, connectivity across this cultural boundary is highlighted by the percolated pattern in the spatial distribution of "Palma di Campania" ceramics into southern Lazio (Chapters 6-7).

Consequently, the overlap between the larger Central and Southern Italian spheres (Figure 1.2) lies within the scope of the case study of Abruzzo and Lazio and will be taken into account in more detail than was possible at the time of Cocchi Genick's synthesis (1998). On the other hand, the case study does stop at the northern borders of Abruzzo and Lazio (§1.3.1). This means that, for instance, a data-rich study of the intersection of three reconstructed EBA cultural groups in southern Tuscany (Figures 3.5, 3.6 & 3.7) lies beyond the scope of this thesis. Nonetheless, the focus of this general introduction on Central Italy as a whole has already helped to underscore the peculiar position of northernmost Lazio in its historically distinctive, supra-regional context (§3.2.1 and see above). Moreover, the extended case study will show that the main boundary between the Central and Southern Italian spheres shifted to the heart of the geographical scope of the case study at the Early-Middle Bronze Age transition (Chapter 9). All in all, the focus of the case study on network changes will address the static notion of boundaries implicit in Cocchi Genick's reconstruction (1998) of cultural groups (see above) from a network perspective.

3.3 Absolute chronology: radiocarbon dates from archaeological contexts

A major problem in interpreting the relative chronology based on ceramics typology (§3.2) in terms of absolute chronology is the scarcity of radiocarbon dates from EBA assemblages in Central Italy as a whole (Cocchi Genick 1998, chapter 8; 2002, 285-287). This scarcity contrasts with the wealth of radiocarbon dates available from Copper Age assemblages, including its late-final phase. The youngest dates for the latter corroborate the conventional date for the Copper Age-EBA1 transition, traditionally set around 2200-2100 BC. At the other end, the conventional date for the EBA2-MBA1 transition, traditionally set around 1800-1700 BC is to a large extent corroborated by radiocarbon dates from MBA1 assemblages in Abruzzo and Lazio. However, a 'time-transgressive' issue emerges from earlier dates for this transition in other Central Italian regions (Cocchi Genick 2002, 285-287; cf. Figure 3.10). In the following discussion of absolute chronology the focus will be on radiocarbon dates from Abruzzo and Lazio between 3300-4000 BP (Tables 3.6 & 3.7), the uncalibrated range that incorporates both the Copper Age-EBA1 transition and the EBA2-MBA1 transition. In general, only a few EBA assemblages have been sampled from archaeological contexts in both these regions. The majority of radiocarbon dates in the 'EBA' range (~3400-3800 BP) are 'anomalies', unexpected dating results of supposedly earlier or later assemblages. It will be argued that these unexpected results, on closer inspection, cannot always be regarded as anomalies, resulting from sampling errors and/or post-depositional intrusions.

Copper Age-EBA1 transition

The youngest radiocarbon dates from Copper Age assemblages (in the 3800-4000 BP range) in Abruzzo and Lazio predominantly result from recent dating programmes (Table 3.6; Figure 3.8). The only date from Abruzzo in this range concerns an isolated late-final Copper Age burial (SANTA TERESA DI SPOLTORE). In one case from southern Lazio it concerns the youngest in a sequence of dates for features (3935±60 BP) and burials (3930±65 BP) in a Copper Age settlement and cemetery (OSTERIA DEL CURATO-VIA CINQUEFRONDI) excavated in the suburbs of the city of Rome (Anzidei et al. 2007, 499 [tab. I]). More recently, the trajectory of this particular site has been extended with a considerably younger date (3740±70 BP) for one of the burials (Anzidei et al. 2011a, 306). The same pattern is shown by the youngest dates (3944±50 BP; 3717±50 BP) in the sequence from the Copper Age cemetery excavated at ROMANINA in the same micro-region (Table 3.6; Figure 3.8). This suggests that burial still took place at Copper Age cemeteries in southern Lazio after (or at) the Copper Age-EBA1 transition (cf. Anzidei et al. 2011a, 306). Such an extension of the trajectories of these places has made the youngest dates in another sequence, deriving from a dating programme on human remains from a Copper Age cemetery (LA SELVICCIOLA) in the far north of Lazio, less anomalous.

The SELVICCIOLA sequence shows a gap in the series between ~4000-4200 BP, but then extends into the EBA range (Tables 3.6 & 3.7). So far, two or three collective tombs have yielded 'anomalous', younger dates. The youngest date from tomb 5 has a wide margin of error (3893±121 BP), but could still represent an episode of EBA1 reuse. The youngest date from tomb 14 (3704±54 BP) is a more certain instance of EBA1 reuse (Figure 3.8). This seems to be corroborated by the

superposition of the later deposition with respect to the other, late Copper Age individual (4337±94 BP) in the same tomb (Conti et al. 1997, 180-181). Recently, radiocarbon dating of human remains from tomb 3 has revealed further episodes of EBA1 reuse (2213-1983 BC [1σ]), EBA2 or MBA1 reuse (1920-1705 BC [1σ]) and perhaps Iron Age reuse (803-534 BC [1σ]) (Petitti et al. 2006, 75 [fig. 4]). Contrary to the EBA1 episode for which parallels exist in the same cemetery, the two most recent dates from tomb 3 are regarded as anomalies (Petitti et al. 2006, 68). Alternatively, I would argue that at least the second youngest, EBA2-MBA1 date can be interpreted as culturally significant in its coincidence with the EBA2-MBA1 trajectories of the 'rock-cut tomb' (without human remains) in a Copper Age cemetery (NAVIGLIONE) and an 'isolated' rock-cut tomb (PRATO DI FRABULINO), both situated in the vicinity of LA SELVICCIOLA, in northernmost Lazio (Chapter 5).

Site	Archaeological context	Sample (lab. no. & dated material)	Uncalibrated in years BP	Calibrated (OxCal 4.1) in years BC	References
S. Teresa di Spoltore (PE)	late Copper Age burial (isolated)	Lyon-2110: human bone	4000±40	2831-2356 [2σ] 2569-2474 [1σ]	Cutilli et al. 2006, 119
Osteria del Curato-via Cinquefrondi (RM)	late Copper Age fireplace (US 2362)	LTL-987A: charred cereal	3992±40	2622-2350 [2σ] 2569-2471 [1σ]	Anzidei et al. 2007, 499 [tab. I]
Osteria del Curato-via Cinquefrondi (RM)	late Copper Age burial ("tomba 5")	LTL-972A: human bone	3989±55	2835-2301 [2σ] 2617-2459 [1σ]	Anzidei et al. 2007, 499 [tab. I]
Luni sul Mignone [unspecified location] (VT)	KI 2: human femur [disarticulated in MBA context (i.e. "acropoli") or from the "Tre Erici" sequence?]	St-2042: human bone	3955±200	3010-1893 [2σ] 2855-2155 [1σ]	Engstrand 1967, 437; Skeates 1994, 189, 246
Romanina (RM)	late Copper Age burial ("tomba 11")	??:	3944±50	2574-2292 [2σ] 2562-2347 [1σ]	Anzidei et al. 2011a, 306
Osteria del Curato-via Cinquefrondi (RM)	late Copper Age oven-fireplace (US 215)	LTL-990A: charred horse bean	3935±60	2579-2210 [2σ] 2561-2341 [1σ]	Anzidei et al. 2007, 499 [tab. I]
Osteria del Curato-via Cinquefrondi (RM)	late Copper Age burial ("tomba 25")	LTL-979A: human bone	3930±65	2579-2206 [2σ] 2550-2301 [1σ]	Anzidei et al. 2007, 499 [tab. I]
La Selvicciola (VT)	Copper Age collective rock-cut tomb (5 H.18)	OZC-169: human bone	3893±121	2853-2028 [2σ] 2566-2155 [1σ]	Conti et al. 1997, 180 [tab. I]; Skeates & Whitehouse 1997/1998, 159; Petitti et al. 2006, 75 [fig. 4]
Luni sul Mignone-Tre Erici (VT)	late Copper Age-EBA1 [BA1A?] [trench 1, stratum 8; fire-place or "living floor"]	St-1343 (=Luni 6, Tre Erici): charcoal	3800±80	2471-2026 [2σ] 2432-2065 [1σ]	Engstrand 1965, 285; Skeates 1994, 190, 246
Montisola (RI)	archaeological layer ("unità b") in geological test-pit	GX-17919	3785±155	2832-1771 [2σ] 2461-2032 [1σ]	Skeates & Whitehouse 1994a, 146; Belardelli & Pascucci 1996, 22
Osteria del Curato-via Cinquefrondi (RM)	late Copper Age burial ("tomba 29"-buried individual 3) [EBA1?]	??	3740±70	2433-1945 [2σ] 2278-2034 [1σ]	Anzidei et al. 2011a, 306
Romanina (RM)	late Copper Age burial ("tomba 23") [EBA1?]	??:	3717±50	2282-1965 [2σ] 2197-2035 [1σ]	Anzidei et al. 2011a, 306
La Selvicciola (VT)	Copper Age collective rock-cut tomb (3 F.B)	[unpublished]	[unpublished]	reported as: 2213-1983 [1σ]	Petitti et al. 2006, 75 [fig. 4]
La Selvicciola (VT)	Copper Age collective rock-cut tomb (14 H.A) [EBA1?]	OZC-173: human bone	3704±54	2280-1944 [2σ] 2197-2026 [1σ]	Conti et al. 1997, 180 [tab. I]; Skeates & Whitehouse 1997/1998, 159; Petitti et al. 2006, 75 [fig. 4]
Montisola (RI)	archaeological layer ("unità b") in geological test-pit	GX-17920	3690±215	2836-1528 [2σ] 2456-1777 [1σ]	Skeates & Whitehouse 1994a, 146; Belardelli & Pascucci 1996, 22
Roma-Giardino Romano (RM)	Bronze Age sequence [without EBA material]	Rome-1318: charcoal	3665±60	2204-1889 [2σ] 2135-1961 [1σ]	Cazzella 2001, 266
Torre Spaccata-Fosso del Patrone (RM)	disturbed late Copper Age-MBA1 deposits	LTL-2025A: bovid humerus	3663±100	2341-1753 [2σ] 2198-1908 [1σ]	Baroni et al. 2008, 140-141 [fig. 15]
Maccarese-Le Cerquete-Fianello (RM)	layer covering Copper Age settlement	[unpublished]	3660±40	2190-1926 [2σ] 2131-1965 [1σ]	Carboni et al. 2002, 215 [fig. 1]; Manfredini 2005; Di Rita et al. 2010
Trasacco 1 (AQ)	lake-side Bronze Age sequence [including EBA2] [square F14-pit 1]	Rome-?: wood from post-hole (post?)	3640±90	2283-1754 [2σ] 2137-1896 [1σ]	Radi 1995, 440; Skeates & Whitehouse 1995/1996, 186

Table 3.6: overview of radiocarbon dates in the range 4000-3600 BP from archaeological contexts in Abruzzo and Lazio [cf. multi-plot in Figure 3.8].

Rather than anomalies, the outliers from the cemetery at LA SELVICCIOLA seem to add up to a culturally significant pattern of EBA1 and EBA2 episodes of reuse of collective tombs in a Copper Age cemetery, seemingly after a gap in its trajectory between ~2500-2200 cal.BC.[50] The extent to which reuse of prior places of burial was a wider phenomenon in other cemeteries of Copper Age tradition, can only be demonstrated by extending the dating programme beyond a single cemetery. In this respect, the dating programme of human remains from the Copper Age cemetery at PONTE SAN PIETRO VALLE (Dolfini 2010) did not yield evidence for episodes of EBA reuse. In this case, however, sampling was specifically aimed at dating a select group of funerary contexts with copper metalwork, not trajectories of tomb use in the cemetery as a whole. The promise of comprehensive dating programmes on human remains is underscored by the recent dates extending into the EBA range from the Copper Age cemeteries at OSTERIA DEL CURATO-VIA CINQUEFRONDI and ROMANINA in southern Lazio (see above). The possibility of a cultural practice in which these Copper Age places were revisited for episodes of burial (or had remained in use continuously), could partly explain the currently low archaeological visibility of EBA funerary practices, especially in Lazio (Chapter 5). In the light of the evidence for accessing prior funerary contexts, the wide Copper Age-EBA range of a radiocarbon date on a disarticulated human femur, possibly from a later, MBA context at LUNI SUL MIGNONE (Table 3.6: 3955±200 BP), should not necessarily be regarded as an anomaly. It can, for instance, be interpreted in terms of later reuse, as secondary handling and circulation of earlier human remains, including their transfer from a prior place of burial.

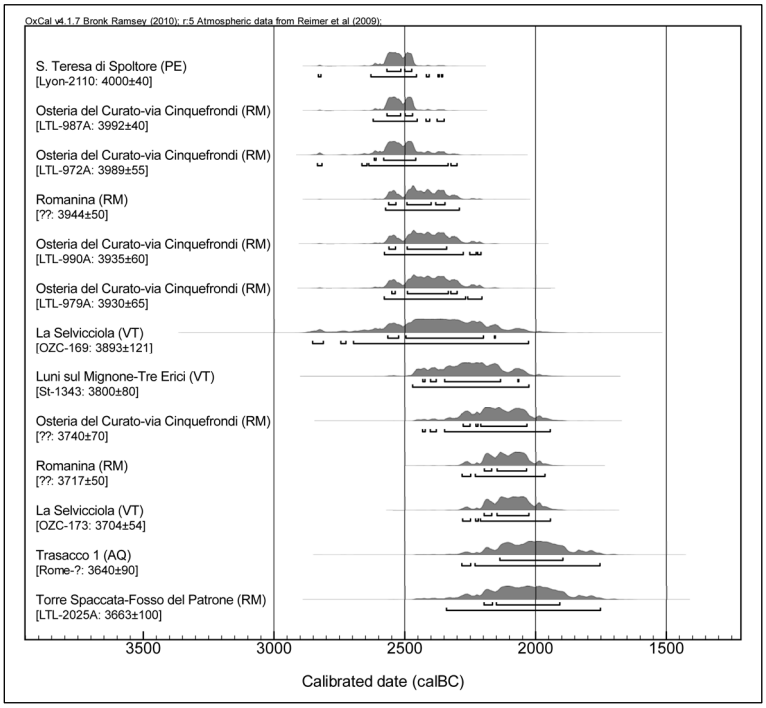


Figure 3.8: multi-plot of radiocarbon dates (4000-3600 BP) for archaeological contexts in Abruzzo and Lazio with OxCal 4.1 (http://c14.arch.ox.ac.uk/oxcal/OxCal.html) **[cf. Table 3.6 for further details].**

Another date from the site of LUNI SUL MIGNONE was sampled from the stratigraphy at the TRE ERICI location (Table 3.6: 3800±80 BP), with a data range that covers the Copper Age-EBA1 transition (Figure 3.8). This is in line with a recent revision of the relative chronology of the assemblage from LUNI SUL MIGNONE-TRE ERICI (Ialongo 2007), which suggests that it includes 'early' EBA1 [subphase BA1A] ceramics (§7.1.3). Similarly, the range of the single date (Table 3.6: 3663±100) from the alluvial deposit at TORRE SPACCATA-FOSSO DEL PATRONE is consistent with the associated final Copper Age-EBA2 assemblage (§7.1.4). By contrast, the two radiocarbon dates from a geological testpit (MONTISOLA) in the RIETI BASIN remain 'anomalous', in the absence of associated Copper Age-EBA assemblages, unless they can be connected to reported MBA remains (Appendix 4 [#28]), given their wide margins of error (Table 3.6: 3785±155 BP & 3690±215 BP). Two further dates, with a smaller margin of error, can also be regarded as 'geological' dates, dissociated from contemporary, EBA1 remains. Nonetheless, the first 'EBA1' date on charcoal (Table 3.6: 3665±60 BP) from a Bronze Age sequence in the city of Rome (ROMA-GIARDINO ROMANO) is not necessarily unrelated to human EBA activity, in the light of finds from adjacent areas, such as metalwork (Chapter 4) and isolated ceramic fragments (§7.1.4). The second 'EBA1' date (Table 3.6: 3660±40 BP) is significant in both a cultural and environmental sense, because it dates a alluvial layer that seals a Copper Age settlement (MACCARESE) in a coastal wetland area (§3.4).

[50] It should be noted, however, that not all of the tombs from LA SELVICCIOLA have been dated yet.

Taking the younger dates from Copper Age contexts into account, it seems likely that the Copper Age-EBA1 transition should be dated to ~2200 cal.BC (Figure 3.8). The premise of 'typochronological fuzziness' (§2.2.2) implies that the youngest dates (3750-3700 BP) in the sequences from three Copper Age cemeteries in 'coastal' Lazio (LA SELVICCIOLA; OSTERIA DEL CURATO-VIA CINQUEFRONDI; ROMANINA), should be interpreted as EBA1 episodes of (re)use. However, none of the few radiocarbon dates currently available for archaeological assemblages with EBA ceramics from Abruzzo and Lazio (see below) can corroborate this scenario. If available, these dates would show the overlap postulated by typochronological fuzziness as a shared date range at the Copper Age-EBA1 transition. Still, it seems that ~2300 cal.BC (Figure 3.8) is the most likely earliest 'starting-point' for EBA1 in Abruzzo and Lazio, incidentally the same date at which Cocchi Genick (1998, chapter 8) arrives for the start of the Early Bronze Age in Central Italy as a whole, without making a comparison with Copper Age absolute chronology.

Site	Archaeological context	Sample (lab. no. & dated material)	Uncalibrated in years BP	Calibrated (OxCal 4.1) in years BC	References
Lago Albano-"Villaggio delle Macine" (RM)	EBA2-MBA1 lake-side assemblage [US9]	[unpublished]: wood	[unpublished]	reported as: 2000-1800	Angle & Guidi 2007, 154 [note 4]
Grotta di Monte Salviano (AQ)	articulated burial [EBA1B]	Beta-141093: human bone	3530±50	2016-1739 [2σ] 1931-1773 [1σ]	Irti 2001; Irti 2001a, 95
Tenuta Radicicoli Maffei area 86 (RM)	pit bottom in MBA1-MBA2 settlement (US 9758/2)	GrA-34317: seed	3515±35	1936-1746 [2σ] 1892-1773 [1σ]	Nijboer 2008, 51 [tab. 1], 52 [fig. 30]
La Selvicciola (VT)	Copper Age collective rock-cut tomb (3 F.G)	[unpublished]	[unpublished]	reported as: 1920-1705 [1σ]	Petitti et al. 2006, 75 [fig. 4]
Grotta del Fauno (AQ)	cave deposit, including later Bronze Age ceramics	R-66: charcoal (fragments and powdered)	3500±250	2572-1260 [2σ] 2194-1518 [1σ]	Alessio et al. 1964, 81; Skeates 1994, 193, 239
Tenuta Radicicoli Maffei area 86 (RM)	pit bottom in MBA1-MBA2 settlement (US 9758/1)	GrA-34316: twig	3485±35	1898-1694 [2σ] 1878-1754 [1σ]	Nijboer 2008, 51 [tab. 1], 52 [fig. 30]
Gran Carro (VT)	Early Iron Age lake-side settlement [square Q1, 10 cm below lake base]	R-1121 (sample too small) [Gran Carro 3]: darkened wood fragments	3470±80	2021-1541 [2σ] 1890-1690 [1σ]	Alessio et al. 1978, 69; Skeates 1994, 194, 242
Pian Sultano (RM)	rock fissure cult place [EBA2-MBA1, etc.]	OZD-279: human bone	[unpublished]	reported as: 1835-1675 [1σ]	Di Gennaro et al. 2002, 676
Ortucchio-strada 28 (AQ)	lake-side assemblage [late Copper Age-EBA1-2, MBA1, etc.]	Pi-80: charcoal	3366±130	2020-1401 [2σ] 1871-1505 [1σ]	Ferrara et al. 1961, 102-103; Skeates 1994, 195, 240
Lago di Mezzano (VT)	EBA2-MBA1 lake-side site [depth 7.6m, point 24A]	R-984a (=Mezzano I-A, 24A): wood from pile	3320±60	1745-1456 [2σ] 1668-1526 [1σ]	Alessio et al. 1975, 317; Skeates 1994, 195, 244

Table 3.7: overview of radiocarbon dates in the range 3600-3300 BP from archaeological contexts in Abruzzo and Lazio [cf. multi-plot in Figure 3.9].

Absolute dates from EBA contexts

The virtual lack of absolute dates of EBA contexts from Abruzzo and Lazio (Tables 3.6 & 3.7) underscores the problem of substantiating relative chronologies (see above). At present, it is impossible to differentiate EBA1 from EBA2 in terms of absolute dates in both these regions. The problem is illustrated by the 'reversal' of two dates from assemblages in the intermontane FUCINO BASIN. Despite its wide margin of error (Table 3.6: 3640±90 BP) the radiocarbon date from TRASACCO 1 seems to refer to a pre-MBA phase of this lake-side assemblage. Although the start of the trajectory of TRASACCO 1 had originally been considered as MBA1 in date (Radi 1995, 440), Ialongo (2007) has extended the relative date of the assemblage to include EBA2. Still, this EBA2 date for TRASACCO 1 overlaps and even seems to 'precede' (Figure 3.9) the one on human bone (Table 3.7: 3530±50 BP) from GROTTA DI MONTE SALVIANO, a funerary context dated to EBA1 on the basis of ceramics. This suggests that the ceramics were not associated with the radiocarbon dated human remains as grave goods (unless curated 'heirlooms') and that the dated burial was a later addition. At the same time, a reason for regarding the TRASACCO 1 date not as 'too early' (and its range as covering both EBA1 and EBA2), is the evidence for regional differentiaton in absolute chronology for the EBA2-MBA1 transition (Figure 3.10; cf. Cocchi Genick 2002, 285-287). It suggests that the traditional date of ~1800/1700 BC for this transition is too low, at least for Central Italy as a whole.

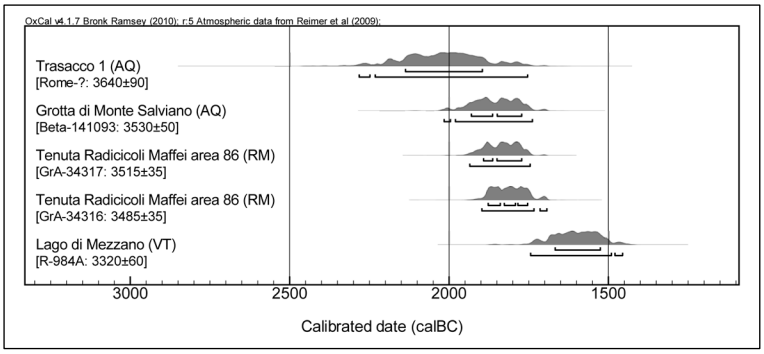


Figure 3.9: multi-plot of radiocarbon dates (3600-3300 BP) for archaeological contexts in Abruzzo and Lazio with OxCal 4.1 (http://c14.arch.ox.ac.uk/oxcal/OxCal.html) **[cf. Table 3.7 for further details].**

A higher chronology for the Early-Middle Bronze Age transition would be in line with a pair of 'anomalous' dates (Table 3.7: 3515±35 & 3485±35; Figure 3.9) for a later, MBA2 settlement (TENUTA RADICICOLI) in southern Lazio (§9.2.1). Again, none of the few radiocarbon dates currently available for EBA assemblages from Abruzzo and Lazio can further corroborate this scenario. However, a number of reported (but as yet unpublished) date ranges are relevant. In particular, the earliest date in a series deriving from a comprehensive dating programme on wooden elements (mainly posts) from a major lake-side assemblage (LAGO ALBANO-VILLAGGIO DEL MACINE) in southern Lazio has been reported as EBA2 in date (Table 3.7).[51] A second reported date range, from a funerary context (PIAN SULTANO) in northern Lazio (§5.1.3; §6.1.3), does not necessarily refer to the earliest, EBA2 stage of its trajectory, but rather to MBA1 (Table 3.7: 1835-1675 [1σ]). The latter predates the earliest date (Table 3.7: 3320±60 BP; Figure 3.9) in the series on wooden posts from an EBA2-MBA1 lake-side assemblage (LAGO DI MEZZANO) in northernmost Lazio (§7.1.3). Arguably, the discrepancy between the presence of a comprehensive EBA2 assemblage and the lack of 'contemporary' wooden posts at LAGO DI MEZZANO indicates that the structural remains were introduced only at a later, Middle Bronze Age stage in its trajectory (cf. Cocchi Genick 1998, 377).

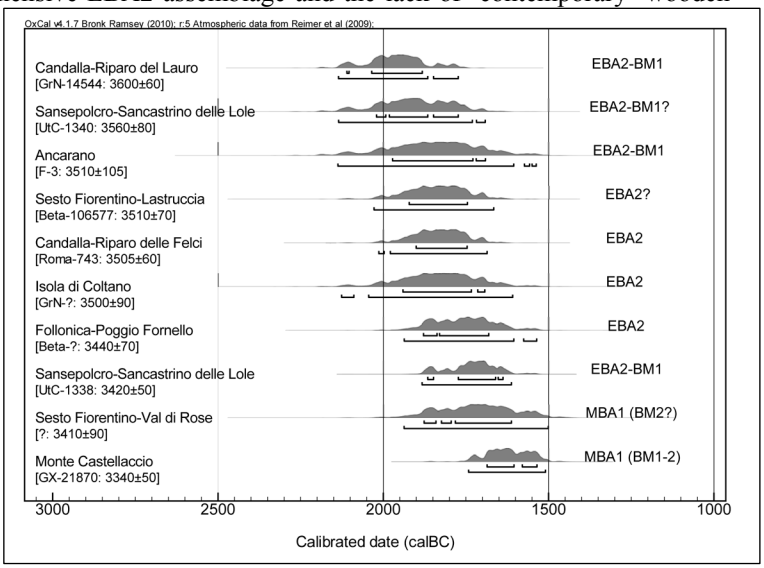


Figure 3.10: multi-plot of radiocarbon dates (3600-3300 BP) from archaeological contexts in other regions in Central Italy than Abruzzo and Lazio with OxCal 4.1 (http://c14.arch.ox.ac.uk/oxcal/OxCal.html) **[cf. Cocchi Genick 2002, 285-287 for further details].**

Three further radiocarbon dates between 3300-3500 BP (GROTTA DEL FAUNO; GRAN CARRO; ORTUCCHIO-STRADA 28) are to a large extent irrelevant for the discussion, in the sense that they have not been sampled from EBA assemblages and/or are characterised by too wide a margin of error. Both the absence of EBA remains and its wide margin of error (Table 3.7: 3500±250 BP) make the date from GROTTA DEL FAUNO inconclusive. A recent, more precise radiocarbon date (LY-10210: 2960±55 BP) of the same sequence (Agostini et al. 2008) lies at the lower end of the wide range of the 'older' date, but the stratigraphical relationship of these samples is unclear. In the case of the sample with an early, 'EBA-MBA1' date in the series from the Early Iron Age lake-side assemblage at GRAN CARRO (Table 3.7: 3470±80 BP), its limited size prevented it from receiving the full preparation (Alessio et al. 1978, 69), which might explain the anomalous outcome. On the other hand, evidence for both Copper Age and MBA1 activity has recently been reported from the same area (Tamburini 2006). Finally, the date with a wide margin of error from ORTUCCHIO-STRADA 28 (Table 3.7: 3366±130 BP) is consistent with

[51] Reportedly, the majority are a couple of centuries later and refer to MBA1, in agreement with the proportions of the assemblage (Angle & Guidi 2007, 154 [note 4]).

the long, late Copper Age-Bronze Age sequence at this lake-side location, but it derives from a bulk charcoal sample collected from several locations (Ferrara et al. 1961) and should therefore be excluded from consideration.

To sum up, the absolute timeframes of EBA1 and EBA2 in Central Italy seem to correspond with 2300/2200-2100/2000 and 2100/2000-1900/1800 cal.BC, respectively, but these scenarios cannot be substantiated in Abruzzo and Lazio because a lack of absolute dates (see above). For this reason, the chronological resolution and/or cultural relevance of the three EBA subphases (i.e. BA1A, BA1B and BA2) in ceramics typochronology (§3.2.1) remains unsubstantiated. The virtual absence of well-dated assemblages from Abruzzo and Lazio (Tables 3.6 & 3.7) means that, at present, Cocchi Genick's 'refined' relative chronology based on EBA ceramics typology (1998) remains the basic framework for assessing temporalities of change in these regions, with due caution. However, the 'time-transgressive' possibility of an earlier date of the EBA2-MBA1 transition, as evidenced in other regions (Figure 3.10; cf. Cocchi Genick 2002, 285-287), cannot be overlooked (Chapter 9).

3.4 Reconstructions of climate and environment

The final section of this introductory chapter is devoted to interpretive frameworks that entail reconstructions of climate and environment in Abruzzo and Lazio. In general, geological and environmental reconstructions tend to be focused on sedimentation basins, such as (crater) lakes, intermontane basins and (alluvial) plains (Figure 3.11). These can be contrasted with the highly dynamic nature of river catchments, determined by the APENNINE source of the majority of (major) rivers in Central Italy. This is to the detriment of the accessibility (or existence) of early to mid Holocene deposits in river catchments, which obviously affects archaeological visibility of (potential) EBA assemblages in such environments. Archaeological assemblages can be relatively inaccessible in major river contexts, either eroded away or buried at considerable depth, but they are relatively accessible and well-preserved, if embedded in the fine-grained matrix of closed sedimentation basins (Chapter 7). Coastal environments tend to be a mix of favourable and unfavourable depositional circumstances, divided between coastal sedimentation regimes and the erosive impact of marine transgression (Antonioli et al. 2009, 2011; Lambeck et al. 2011). Although present-day transgression exposes Bronze Age remains, it seems that the coastline of Lazio was relatively stable and at least did not shift significantly landward since EBA (Alessandri 2007, 2009). By contrast, the coastline of Abruzzo seems to have shifted seaward since the Copper Age, especially in the context of river mouths. For instance, a late Copper Age radiocarbon date (SSAMS ANU-6010: 4125±35 BP) has recently been reported for marine sediments at a depth of ~6m below the present surface, ~ 600m landward from the present shoreline in the LOWER PESCARA valley (Parlagreco et al. 2011). Given these distinctions in depositional circumstances, the discussion in this section follows the focus of environmental reconstructions on closed basins and coastal wetland zones.

Figure 3.11: map (adapted from http://commons.wikimedia.org/wiki/File:Italy_map-blank.svg) showing the location of intermontane lake basins, crater lakes and wetland areas in Abruzzo and Lazio with reconstructions of climate and environment (including other places mentioned in this section).

Relatively fine-grained dated sequences for environmental reconstructions in closed basins have emerged from multi-disciplinary projects. Here it

should kept in mind that the suitability of closed basins for environmental reconstructions is derived from sedimentation in catchment areas, such as crater lakes, with particular micro-topographical characteristics. These may limit the extent to which those reconstructions can be extended from local (or micro-regional) to regional, let alone supra-regional scales. In this respect, another consideration is that the discussion in this section is skewed towards Lazio, since crater lake basins with deep, laminated sequences are situated on the Tyrrhenian side of the Italian peninsula (Figure 3.11). Moreover, climatically induced environmental changes would have differed between 'coastal' and mountainous regions (Zanchetta et al. 2012). Despite such constraints, reconstructions of climate and environment have revealed a so-called 'dry event' that seems to have started in EBA2 and lasted into MBA1 (see below). Geological dating of this 'event' is partly based on tephrochronology, relating to the EBA2 'Plinian-style' eruption of SOMMA-VESUVIUS in Campania. This event will also be discussed here in terms of its (potential) impact on connectivity and social networks, as well as notions of place related to the subsurface connotation of volcanoes and earthquakes. The brief discussions of these two issues that are archaeologically relevant, will spill over into a more general consideration of environmental 'events' in relation to EBA cultural landscapes.

Climatic 'dry event' and deforestation

The chronological resolution of 'geologically' well-dated sequences is relatively fine-grained in the long term of environmental reconstructions. On the other hand, it is difficult to translate absolute and relative dates from geological contexts into absolute and relative chronologies from an archaeological perspective, dissociated as the former tend to be from archaeological assemblages. Nonetheless, several environmental reconstructions based on sequences from lake basins indicate that the impact of human-induced and/or climate-induced deforestation started (or became more pronounced) around ~3500-3700 BP (Table 3.8; Figure 3.12).

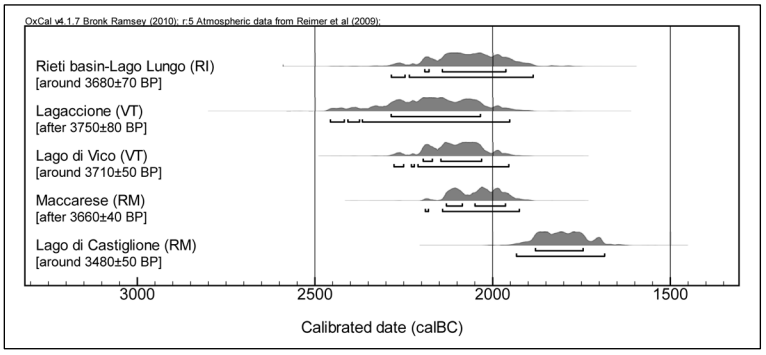


Figure 3.12: multi-plot of radiocarbon dates related to 'dry event' signatures from Lazio with OxCal 4.1 (http://c14.arch.ox.ac.uk/oxcal/OxCal.html) **[cf. Table 3.8 for further details].**

Quoting Magri (1997, 526), "The question whether this recession of woodland was natural or human-induced should be interpreted also in the light of archaeological, palaeohydrological and sedimentological data." Given the closed nature of the lake basins, signatures of deforestation in these reconstructions predominantly relate to the catchment of the basins themselves. Still, a signature of deforestation shared by most of the (smaller) lake basins in Lazio (Table 3.8), makes sense in a wider, regional context, especially in its coincidence with an EBA climatic 'dry event' (Magri 1997; Magri 1999, 199-200).[52] It should be stressed, however, that the chronological resolution of a date range of 3500-3700 BP for the start of a 'dry event' is diffuse by default, as it concerns the geological visibility of a prolongued period of increasingly drier conditions. In addition, the relatively imprecise origin of absolute dates for (bulk) samples from geological contexts should be taken into account. Such a caution also applies to seemingly precise varve dates (Table 3.8) based on laminated sequences (see below).

Despite all of these considerations, the date range of 3500-3700 BP would suggest that from an archaeological persistent this 'dry event', a prolongued period of dry (or drier) climatic conditions (Figure 3.12), started approximately 'halfway' the Copper Age-EBA1 and EBA2-MBA1 transitions (§3.3). The relative chronology of lake-side assemblages found in some of the same basins on which environmental reconstructions are based, seem to corroborate that the 'dry event' postdates EBA1 and started in EBA2, although the number of lake-side assemblages increased again in MBA1 (Table 3.8). On the other hand, a recent study that synchronises environmental changes between coastal and mountainous areas in Central Italy (Zanchetta et al. 2012), has distinguished two stages in the sequence

[52] The term 'aridity crisis' is also used in this context, but climatic 'dry event' is preferred in this thesis.

of the so-called 'dry event', using the 'Avellino' eruption of SOMMA-VESUVIUS as a tephra marker (see below). A renewed phase of growth of the CALDERONE GLACIER in the GRAN SASSO massif in Abruzzo, the highest peaks of the APENNINES (Figure 3.11), predated the 'Avellino' event, whereas major changes in the crater lake basins in 'coastal' Lazio postdated this EBA2 eruption (Zanchetta et al. 2012). More importantly, this study stresses regional (or geographical) differentiation in trajectories of environmental changes, as well as their prolongued character. This means that the 'dry event' cannot be linked to a single phase or period in archaeological sequences, but has to be regarded as yet another, multifaceted piece of the four-dimensional jigsaw of 'earlier' (Early-Middle) Bronze Age networks in Central Italy. Overall, the various strands of evidence indicate that deforestation was the result of a coincidence of climate change (i.e. the 'dry event') with increased human activity inside closed lake basins (Magri 1997; Zanchetta et al. 2012).

Site [Figure 3.11]	Geological context	Date dry event and/or deforestation signature [Figure 3.12]	Archaeological evidence in lake basin (Chapters 7 & 9)	References
Rieti basin-Lago Lungo (RI)	intermontane basin, with 'lakes' along active river course	change in hydrological regime around 3680±70 BP	EBA?, MBA1, etc.	Magri 1997
Fucino basin (AQ)	closed intermontane basin with large (former) lake	drop in lake level between 5000-2800 BP	Neolithic, Copper Age, EBA, MBA, etc.	Giraudi 1989
Lago di Mezzano (VT)	small crater lake	originally: dry and cool climatic deterioration between 5000-4000 calBP (varve dated); aridity crisis: later 'recalibrated' to 3800 varve years BP	EBA2-MBA1, etc.	Ramrath et al. 1999, 2000; Sadori et al. 2004
Lagaccione (VT)	small crater lake	deforestation after 3750±80 BP	-	Magri 1997, 1999
Lago di Vico (VT)	crater lake	deforestation around 3710±50 BP	Neolithic; MBA1-MBA2	Magri 1997; Magri & Sadori 1999
Maccarese (RM)	coastal lagoon	temporarily lower lake-levels after 3660±40 BP	Copper Age; MBA1-MBA2	Carboni et al. 2002; Di Rita et al. 2010
Lago Albano (RM)	crater lake	deforestation and human impact around Avellino tephra layer; 4000-3650 calBP (extrapolated varve dates)	EBA2-MBA1 etc.	Lowe et al. 1996; Oldfield 1996; Guilizzoni et al. 2002
Lago di Nemi (RM)	small crater lake	deforestation, 4900-4100 calBP & 3890-3500 calBP (extrapolated varve dates)	MBA1	Guilizzoni et al. 2002
Lago di Castiglione (RM)	(former) crater lake	deforestation around 3480±50 BP	MBA2	Magri 1997

Table 3.8: overview of 'dry event' and/or deforestation signatures from lake basins in Abruzzo and Lazio.

The sustained decrease in precipitation would have resulted in a widely experienced change in hydrological regimes. The latter included the lowering of water levels in closed basins by several metres, in addition to seasonal lake-level fluctuations. In turn, these changes may have prompted increased human activity in such basins (including land reclamation). The 'human-induced' aspect of this climatic and environmental signature cannot only be found in the 'synchronised' start of trajectories of lake-side assemblages in EBA2 (Chapter 7), but also in their apparently 'synchronised' abandonment in the course of the Middle Bronze Age. The latter, arguably, coincided with the end of the climatic 'dry event', when lake-levels would have risen again.[53] Because of the climate change towards wetter conditions, increased precipitation and the steady rise of water levels in lakes (since MBA2), 'earlier' Bronze Age (EBA2-MBA1) lake-side assemblages have been preserved relatively well under water-logged conditions, the more so if embedded by continued sedimentation. These circumstances have saved these sites from later 'dry events', for instance in the later Bronze Age, but the current 'dry event' (and present-day overuse of water) has started to threathen these conditions over the last decade. This has resulted in the exposure of, for instance, LAGO ALBANO-VILLAGGIO DELLE MACINE, prompting rescue excavations (§7.1.4). Given the correlations between environmental changes and human activity in closed basins, the impact of the 'dry event' on physical landscapes

[53] Different from larger crater lakes, most of the open-air sites at the lake-side in smaller basins seem to have been abandoned in MBA2 (cf. Van Rossenberg forthcoming).

should be taken into account in the reconstruction of EBA cultural landscapes. The question is whether distinctive notions of place would have been connected to dynamic 'natural places' such as crater lakes (Chapters 7 & 8).

In the larger intermontane basins with distinctive micro-topographical characteristics, such as the RIETI BASIN and the FUCINO BASIN (Table 3.8; Figure 3.11), changing settlement patterns do not seem to have been so intimately related to changing hydrological regimes in EBA2. At the same time, the possibility of regional differentiation in sequences of environmental changes should not be overlooked (see above), including distinctive hydrological regimes in the APENNINES as evidenced by glacier growth (Zanchetta et al. 2012). A methodological issue arises, however, from circular reasoning in reconstructions of large fluctuations in lake levels in the FUCINO BASIN and the RIETI BASIN based on changes in the position of relatively large numbers of lake-side assemblages (§7.1.2). Micro-regional studies of these intermontane basins have shown that 'earlier' Bronze Age open-air sites were generally situated on lower elevations than 'later' Bronze Age open-air sites. This is explained in the sense that the corresponding lake levels would have been lower as well, due to a climatic deterioration, both in the FUCINO BASIN (Giraudi 1989) and the RIETI BASIN (Carancini et al. 1986, 1990). A degree of circularity emerges from the assumption that all open-air sites would have been situated at the lake-side, an issue that will be addressed in more detail in the discussion of these assemblages (§7.1.2). In general, the strong possibility that 'natural' deforestation due to the climatic 'dry event' occurred on a wider scale, means that particular areas across a range of geographic environments in the physical landscapes of Abruzzo and Lazio were opened up. This constituted a condition of possibility that could have facilitated (or prompted) new patterns of mobility and connectivity to emerge in EBA2, different from the Copper Age, another issue to be explored in the case study (Chapters 7-8).

Site [Figure 3.11]	Context	Sample	Uncalibrated in years BP [unless varve dates]	Calibrated in years cal.BC [Figure 3.13]	References
Lago di Accesa (Grosseto, Tuscany)	core Accesa 3/4 [two tephra layers, depth 563 cm & 445 cm]	VERA-2135 [643-644 cm] & VERA-2134 [305-307 cm]: both on peat	between 3910±30 and 3355±50	between 2473-2299 [2σ] and 1755-1510 [2σ]	Drescher-Schneider et al. 2007
Lago di Mezzano (VT)	core with tephra layer in laminated sequence [depth 586 cm]	varve dating	-	4020 calBP (intrapolated date)	Ramrath et al. 1999, 2000
	depth 542-544 cm	Beta-105871: bulk sediment sample	before 3290±40	before 1682-1464 [2σ]	
Lago Albano (RM) & Lago di Nemi (RM)	PALICLAS cores: tephra layer in laminated sequences	macrofossils	before 1910 BC	4100 calBP	Calanchi et al. 1996; Chondrogianni et al. 1996
Agro Pontino (LT)	trenches with tephra layer in paleolake sequence	wood from trunk	3715±15 (core) 3690±15 (outer rings)	OxCal code [= Bayesian model]: 3945±10 calBP = 1995 ±10 calBC	Sevink et al. 2011
		leaves covered by tephra layer	3585±20		
Sulmona intermontane basin (AQ)	tephra layer (SUL2-12) in exposed lake stratigraphy	U-series age	3550±900	-	Giaccio et al. 2009
Avellino paleosols & charcoal (Campania)	Pozzelle quarry & Ottaviano quarry	corrected averaged samples	3360±40	-	Vogel et al. 1990
Nola-San Paolo Belsito (Campania)	skeleton of woman, died and buried by eruption	human bone?	3560±110	2205-1620 [2σ]	Passariello et al. 2009
Nola-Croce del Papa (Campania)	buried EBA2 village	DSA-177: goat bone	3451±60	1921-1620 [2σ]	Albore Livadie & Vecchio 2005a; Lubritto et al. 2006
	buried EBA2 village	DSH 103, 145 & 146: goat bone	3550±20 (corrected averaged sample)	1960-1770 [2σ] 1935-1880 [1σ]	Passariello et al. 2009, 2010
	EBA village (earlier phase?) [US 1A1]	DSA-214: charcoal	3436±71	1926-1535 [2σ] 1877-1640 [1σ]	Albore Livadie & Vecchio 2005a
Nola-Masseria Rossa (Campania)	EBA2 village postdating eruption	DSH-143: human skull	3492±23	1890-1740 [2σ] 1880-1770 [1σ]	Passariello et al. 2009
La Starza (Ariano Irpino, Campania)	EBA2-MBA1 village postdating eruption	DSH 76-78: charcoal	3466±20 3423±25 3470±24	1880-1690 [2σ] 1870-1630 [2σ] 1890-1690 [2σ]	Passariello et al. 2009

Table 3.9: overview of absolute dates from geological and archaeological contexts related to the Avellino eruption of SOMMA-VESUVIUS (Campania).

Tephrochronology: the Avellino eruption

One means to calibrate the relative chronologies of environmental reconstructions based on sequences in (smaller) lake basins, is tephrochronology. At least one so-called 'marker tephra' can be linked to an EBA event in the Italian peninsula and has been identified in several lake and sea cores in Italy and the Mediterranean. It concerns the so-called 'Avellino' eruption of SOMMA-VESUVIUS (Campania), part of a longer series of Copper Age through Bronze Age eruptive events, including those from the CAMPI FLEGREI in the immediate vicinity (Albore Livadie 1993; Guzzo & Peroni 1998; Narcisi & Vezzoli 1999; Isaia et al. 2004; Mastrolorenzo et al. 2006; Milia et al. 2007; Santacroce et al. 2008; Sulpizio et al. 2008, 2008a; Giaccio et al. 2009; Passariello et al. 2010). The absolute chronology of the 'Avellino' eruption has long depended on radiocarbon dating of soil samples, which yielded a wide range of dates between 3900-3500 BP (Table 3.9). This lack of chronological resolution has changed with systematic excavations (including dating programmes) of a series of EBA2 settlements, buried by the 'Avellino' eruption in the environs of the SOMMA-VESUVIUS volcano. The first date from the EBA2 settlement at NOLA, destroyed by the 'Avellino' eruption, had already indicated the lower end of the range of age estimates from geological contexts as the more likely for the event (Albore Livadie & Vecchio 2005a, 45 [fig. 48]; Lubritto et al. 2006; Milia et al. 2007; Terrasi et al. 2008, 2223). More recently, its archaeological date has been set at 3550±20 BP (Table 3.9), an averaged date of a series of three on a single bone (pertaining to one of the penned goats buried alive at NOLA) that sits well in a Bayesian sequence of pre- and post-'Avellino' dates available.[54]

Until recently, dates from archaeological contexts (Table 3.9) were excluded from geological syntheses of the 'Avellino' eruption, as these preferred to adopt the higher end of the range of age estimates (as a 'maximum age').[55] A preference for the higher end of the range of 3900-3500 BP misrepresents the 'Avellino' eruption as an EBA1 event. By contrast, the 'geological' date (1995±10 cal.BC) based on recent fieldwork in the AGRO PONTINO (Table 3.9), is more in line with the recent archaeological 'standard' (Sevink et al. 2011). Although it is slightly earlier than the Bayesian date from NOLA, both dates refer to the twentieth century cal.BC (Figure 3.13) and historically situate the 'Avellino' eruption in EBA2 (§3.3). Further radiocarbon dates on samples from archaeological contexts (from NOLA and other settlements that were similarly destroyed by the eruption) can and should once and for all corroborate the lower age estimate for the 'Avellino' event. However, in the preliminary publication of another EBA2 settlement destroyed by the 'Avellino' eruption (AFRAGOLA) the higher age estimate (~3800 BP) is still followed and an additional dating programme is not explicity mentioned (Di Vito et al. 2009; but cf. Matarazzo et al. 2010).

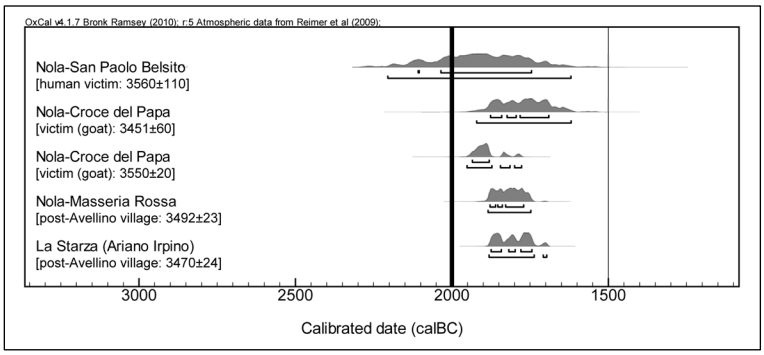


Figure 3.13: multi-plot of radiocarbon dates of archaeological contexts related to the Avellino eruption of SOMMA-VESUVIUS, with recent robust date (Sevink et al. 2011) as a marker, with OxCal 4.1 (http://c14.arch.ox.ac.uk/oxcal/OxCal.html) **[cf. Table 3.9 for further details].**

Archaeological corroboration of the lower age estimate for the 'Avellino' eruption has ramifications for the chronology of those environmental studies that are based on a (wrongly) postulated absolute date in the higher range of age estimates for the marker tephra.[56] This might explain, for instance, the discrepancy of one or two centuries between varve dating and radiocarbon chronology at LAGO DI MEZZANO (Table 3.9).[57] The chronological resolution of the environmental

[54] Cf. Passariello et al. 2009, 2010 for the full series, here reproduced only partially (Table 3.9; Figure 3.13).

[55] E.g. Santacroce et al. 2008, 2 [tab. 1] who reserve the lower range for two subsequent, 'interplinian' eruptions (Rolandi et al. 1998), which archaeologically are MBA events.

[56] Some studies (e.g. Narcisi & Vezzoli 1999) had already followed the lower age estimates (3360±40 BP, after Vogel et al. 1990), but these can now be disqualified as too low (Table 3.9; Figure 3.12). Cf. Sevink et al. 2011 for a discussion of such examples from Southern Italy.

[57] Sadori et al. 2004, 7-8. The discrepancy may have arisen from intrapolation that starts from an age estimate for the 'Avellino' event that is too high (Ramrath et al. 2000, 89), but at the same time it creates another discrepancy with the estimated varve date

reconstructions related to the two remaining lake basins (LAGO ALBANO, LAGO DI NEMI) in the ALBAN HILLS is even more complex (Figure 3.11; Tables 3.8 & 3.9). Here varve dates have been estimated by extrapolation of sedimentation rates from one lake to the other by way of the corresponding tephra layer and intrapolation starting from a higher age estimate for the 'Avellino' event (Calanchi et al. 1996; Chondrogianni et al. 1996; Lami et al. 1997).

The issue is complicated further by the recent debate that Holocene phreatomagmatic volcanic activity ('lahar') originated from the ALBANO crater in the ALBAN HILLS, including Neolithic, Copper Age and Late Iron Age-Archaic events (Funiciello et al. 2002, 2003).[58] To be more precise, Funiciello et al. (2002, 2003) argue that Holocene volcanic activity could explain a major hiatus in the sedimentation and laminited sequences of LAGO ALBANO, which in turn may acount for the discrepancies in the (limited) radiocarbon chronology of the sequence (Table 3.8). Still, in adopting the tephra layer as a 'terminus ante quem', they wrongly start from the higher age estimate for the 'Avellino' event (Table 3.9). Finally, another event has recently been added to the 'lahar' sequence for LAGO ALBANO, the scenario that an EBA 'eruptive' event (or cycle) may have occurred in the same area (Arnoldus-Huyzendveld 2008). It remains to be seen, however, whether the dramatic changes in the course and regime of rivers and streams in this scenario can equally be explained by changes in hydrological regimes in the EBA2-MBA1 'dry event' and/or due to the subsequent change to wetter conditions in MBA (see above).

Environmental 'events' and cultural landscapes

The climatic 'dry event' and the 'Avellino' eruptive event (see above) are distinctive in terms of duration and geographical extent. The former will have had longer-lasting repercussions on physical landscapes and, by implication, cultural landscapes in Abruzzo and Lazio. The sustained impact of the EBA2-MBA1 'dry event' may have had significant consequences for patterns of settlement and connectivity, but it remains to be seen to what extent EBA1-EBA2 discontinuity in trajectories of open-air sites (Table 3.5) should be understood solely or even partially in terms of climatic and environmental change (Chapter 7). On the other hand, the impact of the 'Avellino' eruption on EBA2 communities in Abruzzo and Lazio cannot be underestimated. The 'Avellino' eruption entailed a 'Plinian' style reactivation of the dormant SOMMA-VESUVIUS volcano in EBA2, similar to the well-known Roman event in AD 79. Moreover, the area was the only area in the Italian peninsula with an active volcanic complex, including a sequence of prehistoric and protohistoric 'Plinian' and 'sub-Plinian' eruptions of SOMMA-VESUVIUS (Albore Livadie 1993, Rolandi et al. 1998, Santacroce et al. 2008) and for a series of seven Copper Age-EBA1 eruptive events in the adjacent CAMPI FLEGREI caldera (Isaia et al. 2004). For this reason, it would have been widely known throughout the peninsula, if only through oral history and/or geomythology.[59] Especially in the case of people living in southern Lazio, intimate first- or second-hand knowledge of an active volcanic complex further to the south seems likely on the basis of spatial proximity (Figure 3.11). This can also be deduced from the occasional occurrences (or limited archeological assemblages) of ceramics that archaeologically date the 'Avellino' horizon. Instances of so-called "Palma di Campania" ceramics follow a percolated distribution from Campania into southern Lazio (§3.2.2; §7.2). Arguably, these refer to social interaction with people living under the volcano in Campania, including the sharing of geological and/or cosmological knowledge.

In the case of the 'Avellino' eruption, the question is how unnoticeable the impact of a reconstructed 'Plinian' column of 36km in height or other episodes in the eruptive sequence (pumice deposits, tephra, tsunami) would have been (Milia et al. 2007; cf. Tinti et al. 2011 for the potential aftermath along the coast of southern Lazio). Although the scenario of a landslide causing a tsunami (Milia et al. 2007) has been rejected (Sulpizio et al. 2008a), the distribution of fine ash and/or tephra was wide (Sulpizio et al. 2008). Even if the direct impact of the EBA2 eruption may have been marginal outside Campania, the destruction of several settlements in the vicinity of the volcano could also have been incorporated in the oral history of EBA2 (and later) communities outside the region (cf. Torrence & Grattan 2002). Since the larger part of the population seems to have survived (Di Vito et al.

(4020 calBP) starting from radiocarbon dates in the laminated sequence. Still, the varve date is more in line with the new robust date of 3945±10 calBP proposed by Sevink et al. 2011.

[58] The Archaic lahar event has been identified ethnohistorically as the early 4th century BC event, regarded as a prodigy in the context of early Rome's battle over the South Etruscan city of Veii (De Benedetti et al. 2008). This prompted the construction of a tunnel in 398 BC, draining the ALBANO crater at a certain water level to prevent overflows of the lake (Drusiani et al. 2007).

[59] Cf. Mayor 2005, Clendenon 2009; Stoppa et al. 2010 on the field of geomythology.

2009), the question is how far and in which directions the many 'refugees' travelled to escape the aftermath of the disaster and establish new settlements. One scenario is that such a trajectory of renewed community formation would have followed existing social networks, thereby intensifying connectivity into southern Lazio. Moreover, the occurrence of a high-magnitude eruptive event of a dormant volcano may also have changed the appreciation of remnant, dormant, if not moderately active volcanic craters, such as the crater lakes in the ALBAN HILLS (see above), in the physical and cultural landscapes of Lazio. It could be significant that the 'Avellino' eruption (Figure 3.13) more or less coincided with the climatic 'dry event' (Figure 3.12). The changes that took place in the hydrological regimes of crater lakes in EBA2 due to the latter (see above) included the exposure of subsurface sources (and gas vents) as a result of lower lake levels (Chapter 7) and could have (re)activated 'volcanic' notions of place in Lazio.

Earthquakes may have constituted another class of events with a potentially large impact, given the high degree of background seismicity in the APENNINES, incorporating the highest peaks in Abruzzo (Bagh et al. 2007). Cultural elaboration of the impact of high-magnitude earthquakes and their aftermath (such as landslides and destruction far beyond epicentres) can be expected in Abruzzo and Lazio, as recorded since Roman history (cf. Stoppa 2010a, 2010b). Major earthquakes are reconstructed to have taken place on major and minor faults throughout prehistory and protohistory until present-day (Galadini et al. 1997; Galadini & Galli 1999; Galli & Galadini 2001; Palumbo et al. 2004; Galli et al. 2008). On individual faults high magnitude events have a periodicity of up to several millennia, but the intermontane parts of Abruzzo and Lazio would have suffered on a more regular basis on a regional scale. However, major earthquakes remain more elusive than volcanic eruptions, in the sense that geological dating of the former can only arrive at wide date ranges. Nonetheless, at least two (or three) major earthquakes with Bronze Age date ranges have been revealed in intermontane Abruzzo. Here the scientific aftermath of the L'AQUILA event on April 6, 2009 holds a promise. It has prompted more intense and detailed seismological research of the intermontane part of Abruzzo that can only help to refine the 'geological' dates of earthquakes in the region and perhaps bring these in line with relative, if not absolute Bronze Age chronology.

Despite their differentiation in duration and chronological resolution, all of the environmental 'events' that were discussed in some detail in this section, contribute to the dynamics of physical landscapes. Both the EBA2-MBA1 climatic 'dry event' (in terms of deforestation, changing hydrological regimes and the exposure of subsurface sources in crater lake basins), the EBA2 'Avellino' eruption of SOMMA-VESUVIUS and the continuous occurrence of smaller and larger earthquakes with epicentres in the central APENNINES can be characterised as subsurface phenomena, originating from underground physical activity. As such, they may have increasingly directed the attention of EBA communities on the surface to the impact of the subsurface realm. Familiarity with environmental change related to subsurface phenomena would have deepened the intimate knowledge of the physical landscape on the part of EBA communities. Although it is not the focus of the following chapters on metalwork deposition (Chapter 4), funerary practices (Chapter 5), cave use (Chapter 6) and settlement patterns including lake-side assemblages (Chapter 7), cultural elaboration of subsurface phenomena does emerge as a common theme in depositional practices. This will be explored in the synthesis, in the discussion of changes in cultural landscapes, as well as cosmology, between EBA1 and EBA2 (Chapter 8).