

The Prehistoric Agrarian Management Pattern in the Volcanic Landscape of the Campanian Plain, Southern Italy

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Abstract

This chapter discusses patterns of prehistoric agrarian management in the Campanian Plain, southern Italy, in particular along the course of the rivers Clanis/Regi Lagni and Sebeto and in the area of Naples. The region was affected by volcanic activity mainly deriving from the Mt Vesuvius and the Campi Flegrei caldera which preserved and sealed the archaeological deposits. Dating volcanic debris provides a robust chronological framework for the identification of agrarian systems dating to between the 4th and the early 2nd millennia BC in the area considered. These chronologies suggest agricultural use of areas over centuries, even millennia, despite the impact of repeated eruptions. The socio-economic implications of reconstructed patterns are discussed in comparison with well-studied European contexts.

Keywords: Campanian Plain, Southern Italy, Prehistory, Agrarian management

14.1 Introduction

The prehistory of the Campanian Plain, southern Italy, was the subject of much discussion in the 1980s and 1990s after Albore Livadie and D'Amore (1981) published a paper on some Early Bronze Age (hereafter: EBA) pottery vessels found intact under the pumice layer of the Plinian Pomice di Avellino eruption of Mt Vesuvius (hereafter PdA; 1950–1820 cal BC; Table 14.1, c) at Palma Campania. This became the type-site for the EBA cultural assemblage of the area considered. The PdA volcanic debris was established as the most important EBA chronological marker for the study area because it is dispersed over most of the Campanian Plain, it is an easily recognisable light grey layer of ash and pumice, and because of the exceptional preservation of the evidence which it sealed.

Subsequent studies since Albore Livadie and D'Amore (1981), in collaboration between geologists, archaeologists and vulcanologists, have demonstrated that eruptions of not only Mt Vesuvius but also of the Campi Flegrei caldera played their roles in sealing and preserving important evidence related to prehistoric human presence through repeated deposits of eruption debris (Albore Livadie 1986; 1999a; Albore Livadie and Widemann 1990; Guzzo and Peroni 1998). In the last decade or so, papers concerning the Campanian Plain published in international journals mostly focused on EBA sites sealed by the PdA eruption debris (e.g. Di Vito et al. 2009, 2019; Laforgia et al. 2009; Matarazzo et al. 2010; Saccoccio et al. 2013; Albore Livadie et al. 2019; Saccoccio 2021). Only recently have researchers started to consider the long-term prehistory of the Campanian Plain from a multidisciplinary perspective (e.g. Vogel et al. 2016; Vingiani et al. 2017).

In 2019, Vanzetti et al. (2019) began looking at long-term anthropogenic patterns in the Campanian Plain based on the evidence at the site of Gricignano d'Aversa US Navy base, Caserta province, which was built between the mid-1990s and the mid-2000s in an area with rich archaeological evidence (Marzocchella 1998; Fugazzola Delpino et al. 2003, 2007; Saccoccio et al. 2013). Vanzetti et al. (2019) claimed that long-lasting agrarian management was in place at the site between the Late Copper Age (c. 2700 cal BC) and the EBA (PdA event; 1950–1820 cal BC; Table 14.1, c). The area was occupied over many centuries, c. 700–800 years, with at least three different field systems detected through changes in orientation. There were seven settlement areas which relocated over time, with limited spatial shift, possibly in correlation with eruptive events, with at least 14 building phases lasting c. 50 years each (Fig. 14.2). Gricignano d'Aversa US Navy base is one of the few sites excavated in the study area where a thorough reconstruction of the prehistoric occupation has been made on the basis of the

settlement and agrarian evidence found allowing the reconstruction of multiple management patterns over time.

There are two main aims of this paper. On the one hand, it aims to provide, for the first time, an overview of the prehistoric agrarian evidence known to date from a selected area of the Campanian Plain between the course of the rivers Clanis/Regi Lagni and Sebeto and in the territory of Naples. Previous publications are mainly limited to preliminary site reports. This enables me to reconstruct the human use of the landscape over a geographical extent and time span not matched to date (Fig. 14.1). I will try to understand to what extent continuities in settlement patterns, as discussed and reconstructed by Vanzetti et al. (2019) for the Gricignano d'Aversa US Navy base, might apply more widely across the study area in order to determine if a diffused and sustainable agrarian management pattern was in place in the Campanian Plain before the Late Copper Age. Moreover, following Marzocchella (2002), in the final part of this chapter a comparison with prehistoric north European agrarian contexts will be used to interpret underlying socio-economic implications related to land tenure. This will be possible only for the positive agrarian evidence sealed by the EBA PdA eruption debris and reconstructed to a significant extent only at Gricignano d'Aversa US Navy base, where the field system is subdivided in elongated agrarian plots of similar size (Saccoccio et al. 2013; Saccoccio 2021).

14.2 Campanian Plain: A Geo-Archaeological Overview

The Campanian Plain, Campania region (southern Italy), is delimited towards the north-west by the natural barrier of the Mt Massico and the quiescent Roccamonfina volcano. The Apennine chain borders the Campanian Plain to the north-east, while the Mts Lattari enclose it to the south-east (Fig. 14.1).

The Regi Lagni is the outcome of a seventeenth century land reclamation programme promoted by the Spanish rulers of Naples and, nowadays, it is the main water drainage system of the Campanian Plain. Its course mostly follows the ancient course of the river Clanis, a river mentioned in the classical sources (listed in Giordano 1834: note 105), and its valley is easily identified on maps 183–184 of the *Carta Geologica d'Italia* (Italian Geological Map; Fig. 14.1, dark grey).

As a result of the presence of at least five volcanoes (Roccamonfina, Campi Flegrei caldera, Procida, Ischia and Mt Vesuvius; see Fig. 14.1), the Campanian Plain has been shaped by volcanic debris overlying Quaternary deposits since at least c. 40 kyr cal BC (De Vivo et al. 2001: 59; Di Renzo et al. 2007: 754–755). Volcanic debris was possibly subject to argillation which led to the development of clay minerals by weathering as attested by the Plinian volcano Mt Pinatubo in the Philippines (Sasaki et al. 2003), but this phenomenon has been only little explored in the case-study area (Delibrias et al. 1979).

Eruptive quiescence periods led to the development of two prehistoric paleosols, A and B, which are very important in archaeological terms as chronological markers (Di Vito et al. 1999). Paleosol A developed during the first phase of quiescence of the Campi Flegrei caldera, between 9150–8740 cal BC and 7740–7490 cal BC (Table 14.1, t, s), which corresponds to the Mesolithic in central-southern Italy. Paleosol B developed during the second phase of quiescence of the Campi Flegrei caldera which dates between 7460–7080 cal BC and 3700–3520 cal BC (Table 14.1, r, n) and corresponds to a period dating between the Late Mesolithic and the Final Neolithic/Early Copper Age in the area considered. Di Vito et al. (1999: 244) proposed that Paleosol B covered just the Campi Flegrei caldera but the evidence from Gricignano d'Aversa US Navy base suggests a wider distribution, possibly most of the Campanian Plain (Saccoccio et al. 2013: Fig. 3).

The third period of activity of the Campi Flegrei caldera dates between the 4th and 3rd millennia BC, marked by the Agnano 1 and Fossa Lupara eruptions (Di Vito et al. 1999: 238; Table 14.1, n, e). Within this phase it is worth mentioning the Agnano Monte Spina eruptive event (hereafter: AMS), dated to 2860–2480 cal BC, described by de Vita et al. (1999: 300) as the highest-magnitude eruption to have occurred in the last 5000 years deriving from the Campi Flegrei caldera, which had a significant environmental impact over an area of about 1000 km² (Table 14.1, i).

From the point of view of the human presence in the area considered, the second most important eruption after the AMS event is the Vesuvian Plinian eruption of the PdA, dated to 1950–1820 cal BC (Table 14.1, c). At Gricignano d’Aversa US Navy base, the debris linked to this eruption seems to close a long period of human occupation characterised by the presence of paleosols alternating with minor eruption debris possibly deriving from the Astroni volcano (Saccoccio et al. 2013; Vanzetti et al. 2019; Fig. 14.2).

The PdA eruption may have affected the climate, probably causing a drop in temperature (Zanchetta et al. 2011). Despite its characterisation as a devastating event, Albore Livadie et al. (2019: 208) recently suggested that even proximal areas to Mt Vesuvius were resettled “no more than a few decades after the Avellino Pumice event” (see also Di Vito et al. 2019). Moreover, Albore Livadie et al. (2019: 217) argued that there was a cultural change in the Campanian Plain after two Middle Bronze Age Sub-Plinian eruptions, labelled as AP1 and AP2 (Table 14.1, b, a), which critically affected the local population a short time after the PdA event. After the AP2 event, there was a new archaeological culture, the Proto-Apennine, which it is suggested may reflect the presence of new groups in the area (Albore Livadie et al. 2019: 218).

14.3 Prehistoric Settlement and Agrarian Evidence in the Campanian Plain

The following sections provide an overview of the published prehistoric evidence found in the Campanian Plain between the territory of Gricignano d’Aversa and Naples following the course of the rivers Clanis/Regi Lagni and Sebeto (see Fig. 14.1). Most publications are preliminary reports which record scattered pieces of information and generally do not specify the extent or the orientation of the agrarian evidence found. In the worst cases, only an approximate chronology and the location of the evidence is provided. When it is specified, eruption debris and material culture will be used as chronological markers. It is important to note that most of the agrarian evidence consists of negative plough-marks generated by the tip of the plough/ard cutting into the soil which, depending on the depth reached, can rearrange the content of the affected layers through homogenisation (Vanzetti et al. 2019: 151 and fig. 6). Ploughing is a destructive process, so that often negative plough-marks do not correspond to any overlying positive ridge-and-furrow evidence, which has been homogenised by subsequent ploughing. For this reason, the stratigraphic position of negative plough-marks has to be seen as *terminus post quem* for the related agrarian exploitation of the study area.

14.3.1 The Territory of Gricignano d’Aversa, Caserta Province

The oldest evidence found in the territory of Gricignano d’Aversa (hereafter: Gricignano) is Late Neolithic Serra D’Alto cultural aspect pottery at Collegamento di Gricignano lotto 3 (Fig. 14.1 and Table 14.2, number 1). Although it was found not in situ under the AMS debris (Table 14.1, i), it could be dated to the late 5th/early 4th millennia BC or slightly earlier (Fig. 14.1 and Table 14.2, number 1). Final Neolithic pottery found at Gricignano-Fusarello TAV sites 5 and 6 (Fig. 14.1 and Table 14.2, numbers 2-3) is dated to the early/mid 4th millennium BC as the emergence of the Copper Age in Campania is dated through the radiocarbon dates from the site of Casalboro to 3630-3520 cal BC (Talamo et al. 2011: 40 and fig. 1). At Gricignano-Fusarello TAV site 5 Final Neolithic pottery sherds were found associated with an apsidal hut (Table 14.2, number 2; Fig. 14.3a).

However, the oldest agrarian evidence known so far from the study area is much later and was recorded at Gricignano US Navy base where negative plough-marks were found cutting through the ash of the early/mid 3rd millennium BC PaleoAstroni 1 eruption reaching the underlying Paleosol B (Fig. 14.1 and Table 14.2, number 5; Table 14.1, k). Negative cross-cutting plough-marks were also found between the early/mid 3rd millennium BC PaleoAstroni 2 and the mid 3rd millennium BC AMS debris at Gricignano-Fusarello TAV site 6 (Fig. 14.1 and Table 14.2, number 3; Table 14.1, j, i; Fig. 14.3b), and under the AMS tephra at Collegamento di Gricignano lotto 3 (Fig. 14.1 and Table 14.2, number 1; Table 14.1, i).

Continuous occupation is recorded at Gricignano US Navy base and at Gricignano-Cambrannone between the mid 3rd millennium BC AMS and the early 2nd millennium BC PdA eruption debris, c. 700–800 years, with the presence of at least three different field system orientations and at least seven settlements, the latter showing a maximum extension of c. 5 ha per phase (Fig. 14.1 and Table 14.2, numbers 4–5; Table 14.1, i, c). They relocated over time but the spatial shift was never great since all are found within a radius of c. 1 km (Fig. 14.1 and Table 14.2, numbers 4–5). Vanzetti et al. (2019: fig. 9) were able to associate the three different field systems to four of the seven settled areas (Fig. 14.2). In total, there are c. 14 building phases, each lasting c. 50 years, while field systems seem more persistent over time, spanning different settlement phases (Fig. 14.2, PS1 before the PdA eruption and sealed by the PdA eruption; Vanzetti et al. 2019: 159).

Cart-ruts were also found as part of the agrarian infrastructure recorded at Gricignano US Navy base, generally running parallel to the field system. Cart-tracks were also possibly used as communication routes between the different prehistoric settlements in the Campanian Plain (Nava et al. 2007: 114) but, unfortunately, on the basis of the scanty data in our possession, it is not possible to clearly detect the end points of these cart-tracks, as only short sections have been explored.

At Gricignano US Navy base, Laterza cultural aspect funerary evidence was found overlying settlement traces between the AMS and the so-called Flegrea 1/Astroni 3(?) debris, dated to the mid/late 3rd millennium BC, with graves generally following a similar orientation to the underlying huts (Fugazzola Delpino et al. 2003, 2007; see Fig. 14.2). This pattern also suggests that human groups returned quickly to the study area while hut timbers were still visible, which allowed them to follow the alignment of the huts.

A nearly intact 90 ha field-system was found at Gricignano US Navy base sealed by the PdA debris. SW-NE oriented coaxial elongated agrarian features were identified, with a maximum ascertained length of c. 700 m (Saccoccio et al. 2013: 86–87; Saccoccio 2021). Furrows, with a 0.35 m inter-distance, were bordered by shallow gullies used for water drainage (Saccoccio 2021). Agrarian plots were also hypothesised on the basis of the presence of low hardened-soil banks, regularly distributed about every 56–57 m. A single cart-track was found, heading NE towards the contemporary settled area at Cambrannone but nothing can be said about its destination to the SW (Fig. 14.2). An EBA funerary tumulus was found c. 2 km west of the Gricignano US Navy base at Gricignano-Centro Sportivo Comunale (Municipal Sport Centre; Table 14.2, number 6).

14.3.2 The Prehistoric Evidence Between the Rivers Clanis/Regi Lagni and Sebeto

Construction work for the Rome-Naples High-Velocity Train line (Italian TAV, *Treno Alta Velocità*) in the territory between Caivano and Ponticelli in Naples province led to the discovery of significant prehistoric settlement and agrarian evidence. In the literature, the TAV line in the case-study area is subdivided into two sections: TAV 4, passing through the territory of Caivano, and TAV 5, passing through the territory of Afragola (Nava et al. 2007: fig. 2). In the following section, sites will be labelled following Nava et al. (2007) and discussed chronologically. This means that geographically the narrative will jump from north to south and *vice versa* between the middle course of the river Clanis/Regi Lagni and the course of the river Sebeto.

The oldest material in this area is Serra d'Alto and Diana cultural aspects pottery, the latter aspect dated to the Final Neolithic. Giampaola et al. (2019: 212) suggest that pottery related to these two cultural aspects is usually found associated in the Campanian Plain. This pattern, however, could be in part explained through the agrarian destructive process which tends to homogenise affected layers. Serra d'Alto and Diana cultural aspects pottery was found at TAV 4-lotto 7 site 3, TAV 5-lotto 12/13 site 11, and Ponticelli-viadotto Botteghele (Fig. 14.1 and Table 14.2, numbers 8, 15, 17). At this last site, a Late and Final Neolithic pluristratified settlement was found on top of the mid 7th millennium BC Pomici di Mercato debris (Table 14.1, q). The settlement was affected by subsequent agrarian exploitation which lasted until the mid 3rd millennium BC AMS debris; Serra d'Alto and Diana cultural aspects pottery was found not *in situ* under the last agrarian layer (Table 14.1, i; Table 14.2, number 17).

4th millennium BC agrarian evidence is known in the study area at TAV 5-lotto 12/13 site 11 (Fig. 14.1 and Table 14.2, number 15). At this site, negative cross-cutting plough-marks and post-holes, interpreted by the researchers as pertaining to stockyards and/or fences, were found on a paleosol above the Pomici di Mercato eruption debris (Fig. 14.1 and Table 14.2, number 15; Table 14.1, q). The agrarian evidence was dated to 4040–3660 cal BC (Table 14.1, p) thanks to a charcoal sample, and cultivation seems to have continued until the top of the Paleosol B sealed by the mid 4th millennium BC Agnano 3 eruption debris (Table 14.1, m; Sampaolo 2005: 676).

4th millennium BC settlement evidence was found at TAV 4-lotto 10 site 5 and at TAV 5-lotto 1/18 site 7 (Fig. 14.1 and Table 14.2, numbers 10 and 12). At TAV 4-lotto 10 site 5 settlement traces were found both under and above the mid 4th millennium BC Agnano 3 eruption debris associated with Final Neolithic and Early Copper Age pottery sherds (Fig. 14.1 and Table 14.2, number 10; Table 14.1, m). At TAV 5-lotto 1/18 site 7 a settlement was set up after the Agnano 3 event; it is dated to 3640–3110 cal BC based on charcoal found in a post-hole and was abandoned before the PaleoAstroni 2 event, dated to 3020–2600 cal BC, after which the area was cultivated until the AMS tephra (Table 14.1, m, l, j, i; Table 14.2, number 12).

At Casalnuovo di Napoli-piers 125-127, 129-130 and 132, agrarian traces were found between the early/mid 3rd millennium BC PaleoAstroni 1/2 and the early 2nd millennium BC PdA eruption debris (Fig. 14.1 and Table 14.2, number 16; Table 14.1, k, j, c). There is Gaudio cultural aspect pottery evidence at a cemetery at TAV 4-lotto 1/13 site 1 and in two ritual pits at TAV 4-lotto 7 site 3 (Fig. 14.1 and Table 14.2, numbers 7a and 8). Gaudio cultural aspect pottery is dated between the early and the mid 3rd millennium BC in the case-study area since it is bracketed between the Agnano 3 and AMS events (Talamo et al. 2011: fig. 1; Table 14.1, m, i).

Then, there is Laterza cultural aspect pottery together with ash and animal bones in a pit found at TAV 4-lotto 1/13 site 2 which was interpreted as a ritual pit (Fig. 14.1 and Table 14.2, number 7b). In the case-study area, Laterza cultural aspect pottery is dated to the mid/late 3rd millennium BC as it is bracketed between the AMS and the so-called Flegrea 1/Astroni 3(?) eruption debris (Talamo et al. 2011: fig. 1; Tab. 1, i).

There was also Laterza cultural aspect pottery at a settlement at TAV 5-lotto 12 site 10, stratigraphically positioned on top of a paleosol above the AMS eruption debris and dated to 2870–2350 cal BC thanks to a charcoal sample from a hearth (Fig. 14.1 and Table 14.2, number 14; Table 14.1, h). The settlement seems to have been active until “the last Astroni eruption” debris, possibly Astroni 7, dated after 2460–2140 cal BC (Table 14.1, f) but before PdA (1950–1820 cal BC; Table 14.1, c), also suggested by the co-existence of Bell Beaker and Capo Graziano cultural aspects pottery. After the site was abandoned, the area was used for agriculture (Nava et al. 2007: 112). The settlement discovered at TAV 4-lotto 10 site 4 might also be dated to a similar period on the basis of the material culture found and its stratigraphic position (Fig. 14.1 and Table 14.2, number 9). Another two settlements, abandoned before the PdA eruption, were found at TAV 5-lotto 1/18 site 6 and at TAV 4-lotto 10, the latter located c. 130 m south of the above TAV 4-lotto 10 site 4 (Fig. 14.1 and Table 14.2, numbers 11 and 9).

In the area considered, there are only two settlements that were demonstrably occupied at the moment of the PdA event: Gricignano-Cambrannone and Afragola TAV 5-lotto 17 site 8 (Fig. 14.1 and Table 14.2, numbers 4 and 13). At Afragola, excavation identified the north and south perimeter of an EBA site destroyed by the PdA eruption enclosing at least 24 huts (Di Vito et al. 2019: 239). Beyond this boundary an extensively wooded zone was identified, dominated by oak (Laforgia et al. 2009: 103).

14.3.3 Naples Underground Lines and Fuorigrotta

Archaeological fieldwork between the territory of Naples and Fuorigrotta has brought to light prehistoric agrarian evidence dating to between the early 4th millennium BC and the 3rd millennium BC. Nevertheless, Late Neolithic postholes were found at Naples-Vico Pallonetto, Naples-via Toledo/via Diaz, Naples-Piazza Montecalvario and Naples-Piazza Santa Maria degli Angeli on top of the humified layer related to the 8th millennium BC Pigna San Nicola eruption debris (Table 14.2,

numbers 22, 24-25 and 28). Giampaola et al. (2019: 212) suggest that in this phase the area considered was occupied only for seasonal exploitation.

At Naples-Piazza Santa Maria degli Angeli, the settlement found on top of the Pigna San Nicola debris was associated with Serra d'Alto cultural aspect pottery; the settlement was then affected by negative hoe-marks filled by ash deriving from the Ischia eruption of Piano Liguori dated to the 4th millennium BC (Table 14.1, o; Fig. 14.1 and Table 14.2, number 28). Agrarian exploitation, characterised by negative cross-cutting plough-marks associated with Diana cultural aspect and Early Copper Age pottery, is documented on top of the Paleosol B (Fig. 14.4a) and continues until the paleosol on top of the PaleoAstroni 2 eruption debris, dated after 3020–2600 cal. BC (Table 14.1, j; Table 14.2, number 28). At Naples-Piazza Montecalvario Final Neolithic/Early Copper Age negative cross-cutting plough-marks were recorded on top of the Paleosol B (Fig. 14.1 and Table 14.2, number 25). Occupation dated between the Final Neolithic/Early Copper Age and the Gaudio cultural aspect phase, the latter sealed by the AMS debris, is attested by pottery sherds at Naples-Stazione San Pasquale (Table 14.1, i; Table 14.2, number 29).

Final Neolithic/Early Copper Age negative cross-cutting plough-marks on top of the Paleosol B were also found at Naples-via Toledo/via Diaz (Fig. 14.1 and Table 14.2, number 24; Fig. 14.4b). Agrarian exploitation at Naples-Via Toledo/Via Diaz and at Naples-Vico Pallonetto seems to have lasted until the paleosol formed on top of the PaleoAstroni 2 eruption debris (Table 14.2, numbers 24 and 22). At Naples-Via Donnaregina agrarian exploitation was recorded between under Agnano 3 (Table 14.1, m) and the AMS tephra (Table 14.1, i; Table 14.2, number 18). Negative cross-cutting plough-marks were found between under Agnano 3 and PaleoAstroni 2 volcanic debris (Table 14.1, m, j) at Naples-Sant'Andrea delle Dame (Table 14.2, number 20); at Naples-via Verdi agrarian exploitation seems recorded under the Agnano 3 debris, and then between the PaleoAstroni 2 and AMS events (Table 14.1, m, j, i; Fig. 14.1 and Table 14.2, number 26).

Fieldwork in advance of the construction of the underground railway line at Via Settembrini (Fig. 14.1 and Table 14.2, number 19) uncovered an agrarian layer located overlain by debris from the AMS eruption (2860–2480 cal BC; Table 14.1, i). Two graves with Gaudio cultural aspect material found at Naples-Vico della Neve may be dated to a similar, or slightly older, chronological phase (c. 2900-2600 cal BC; Talamo et al. 2011: fig. 1; Fig. 14.1 and Table 14.2, number 23).

At Fuorigrotta (Fig. 14.1 and Table 14.2, number 30), c. 8 km south-west of the evidence just discussed, two trenches for the construction of the new CNR (National Research Centre) building reached a depth of c. 6 m bringing to light AMS eruption debris (2860–2480 cal BC; Table 14.1, i). Above the eruptive layer, two different agrarian traces were found: in one trench orthogonal-cross cutting plough-marks, in the other hoe-marks (Sampaolo 2012: 1328). Orthogonal cross-cutting plough-marks were also found stratigraphically located between the PaleoAstroni 3 (dated after 2840–2230 cal BC; Table 14.1, g) and the Solfatara (after 2470–2060 cal BC; Table 14.1, d) eruption debris (Sampaolo 2012: 1328). Two pottery sherds, stratigraphically located on top of a paleosol between the AMS and PdA debris, were found in a core at Naples-Castel Nuovo (Table 14.2, number 27). Moreover, at Naples-Stazione Duomo EBA pottery was found in the layer sealed by the PdA debris (Table 14.2, number 21); at Naples-Stazione San Pasquale EBA pottery vessels seem to be recorded only after the PdA event (Giampaola et al. 2019: 236–237).

14.4 Discussion

In the previous section, an overview of the published prehistoric evidence recorded along the course of the rivers Clanis/Regi Lagni and Sebeto and from the area of Naples was presented with the aim of reconstructing the settlement pattern over time (see Table 14.2). In this section, this evidence will be discussed in terms of land exploitation, showing how selected areas were possibly inhabited and exploited over centuries, even millennia, and suggesting the presence of a series of agrarian management patterns over time, although the considered area was repeatedly affected by eruptive events. To date, the oldest known material documenting human presence in the study area is Late

Neolithic Serra d'Alto and Final Neolithic Diana cultural aspects pottery (Table 14.2; Fig. 14.5, phase 1).

Figure 14.5 provides a diachronic summary of the evidence discussed using eruption debris as key chronological brackets. Different symbols indicate the nature of the evidence found at each site and a site exploitation territory is proposed. This territory, indicated by a 2.1 km radius circle, was calculated by Saccoccio et al. (2013: 89–90) on the basis of the distances between those settlements active at the moment of the PdA eruption debris (1950–1820 cal BC; Table 14.1, c) and destroyed by it, the so-called “destruction horizon” (Saccoccio et al. 2013: 89). All the sites considered were contemporary as they were destroyed at the same time. This territory size suggests the presence of a dense settlement pattern in place in the Campanian Plain in the EBA and finds a good parallel in the 2.5 km radius ‘catchment area’ calculated by Flannery (1976: 109) as needed to satisfy the basic agricultural requirements of the Mesoamerican site of San José, dated 1150–850 BC.

In Fig. 14.5 each circle, defining a site exploitation territory of 2.1 km radius, was associated to a site, or groups of sites, according to the sites’ spatial distribution and to topography, in that river valleys and highlands were considered as natural boundaries. In the territory of Gricignano the circle fits well north with the Holocene valley of the river Clanis and east with the Holocene valley related to a tributary of the river Clanis (Fig. 14.5, numbers 1–6).

In total 30 sites were considered, with the limitation that published information is mostly preliminary in character. The occupation and exploitation of at least 10 different areas across part, or the whole period, between the late 5th/early 4th millennia BC and the early 2nd millennium BC is documented. Occupation is generally marked by one site per phase which I believe is, at least in part, linked to the limited fieldwork to date (see Fig. 14.5). This is shown by the evidence from Naples, a better explored area that documents different sites distributed across the hypothesised exploitation territory, and so suggests that a large area was possibly devoted to agriculture (Fig. 14.5, sites 17–30). Eruptive events possibly led settlement areas to shift a short distance in location over time, as at Gricignano US Navy base, attesting the return of people to previously occupied areas (see Fig. 14.2). Interestingly, evidence also suggests that the same site could change in use over time: settlement areas becoming field-systems and *vice versa* (see, for example, Fig. 14.5, numbers 12 and 14).

Pollen analysis suggests an open landscape dominated by NAP pollen (70 to 90%), of which cereals account for 10–15% (Albore Livadie 1999b; Vivent and Albore Livadie 2001; Saccoccio et al. 2013: 90 and fig. 11). Stock-rearing was also practised, documented both by ox imprints left on the ash of the PdA debris at Palma Campania and by skeletons of sheep buried by the same eruption at Nola-Croce del Papa (Albore Livadie et al. 1998: 65; 2019: 206).

On the basis of the evidence at Gricignano US Navy base and Cambrannone (Fig. 14.5, numbers 4–5), Vanzetti et al. (2019) hypothesised a long-lasting agrarian management pattern between the Late Copper Age (AMS eruption, 2860–2480 cal BC; Table 14.1, i) and the EBA (PdA eruption, 1950–1820 cal BC; Table 14.1, c). This was possibly detected thanks to the huge area investigated, 90 ha over a decade (Saccoccio et al. 2013: 83; Saccoccio 2021). Remarkably, despite small scale shifts in the location of the settled area over time, the agrarian area exploited remains more or less the same throughout the period considered.

Looking at the evidence at a regional scale, it is possible to back-date the presence of an agrarian management pattern at Gricignano at least to the 4th millennium BC. This hypothesis relies on three main arguments. First, all the Final Neolithic/Early Copper Age evidence found in the considered area falls into the hypothetical 2.1 km radius site exploitation territory (Fig. 14.5, phases 1–2); second, because ploughing is attested elsewhere in the study area from the 4th millennium BC (Fig. 14.5; phases 1–2), the absence of such evidence at Gricignano itself might simply be explained by the limited area explored to date; and third, the relocation of settlement and agrarian evidence within the defined site exploitation territory at Gricignano suggests continuous occupation throughout the time span considered, linked to successive agrarian management patterns in which the fertility of the soil was periodically enhanced by eruptive debris.

On the basis of Fig. 14.5, I believe it is possible to extend the presence of a similar agrarian management pattern to the whole study area in prehistoric times, with agrarian exploitation of the same territory for centuries, even millennia (see, for example, Fig. 14.5, number 16). Interestingly, funerary evidence seems to locate at the edge of the suggested exploitation territories, possibly marking their possession by the local communities (see Fig. 14.5, numbers 6 and 23). The limited fieldwork to date and preservation might explain the absence of continuous evidence for the exploitation of some territories displayed in Fig. 14.5. Moreover, especially for the Late/Final Neolithic period (Fig. 14.5, phase 1), the lack of evidence might be related to the depth reached during the excavations, which is very often not stated in published reports. This, together with the previous assumptions, might explain the absence of evidence in the areas of sites 7–15 and 17 in some phases.

On the other hand, the pattern shown by the aforementioned areas might also be easily explained as abandonment for a certain amount of time or by the lack of preservation of the archaeological record affected by subsequent occupation. The settlement pattern also allows us to estimate the effect of the AMS debris on the local landscape which was described as devastating by de Vita et al. (1999: 300). Marzocchella (1998: 108, 113) suggested that AMS debris caused a rise in the water table and of the water flow rate of the river Clanis which may have led to floods. As it is possible to see in Fig. 14.5, in phases 3 and 4, the settled and exploited area at Gricignano shifts in location from the northern outskirts of the site exploitation territory to the southern one, and is no longer characterised by a close proximity to the Clanis riverbed. However, Fig. 14.5 (phases 3–4) shows that the AMS debris did not affect other areas in a similar, destructive, way; the only exception could be the area of Naples where documented human presence after this event is very scarce (see Fig. 14.5, phase 4, number 27). At the same time, it is not possible to be sure if people moved to Fuorigrotta, 8 km away (Fig. 14.5; number 30), which has evidence of occupation only after the AMS event. The excavation at this site, in fact, does not provide evidence for the phases underlying the AMS debris which were not reached during the excavation.

In 2019, Albore Livadie et al. (2019: 217) suggested that this agrarian management pattern lasted at least until the AP2 eruption, dated to 1620–1430 cal BC (Table 14.1, a), according to the evidence found in the Campanian Plain following the PdA event (for example Boscoreale and Boscotrecase in Stefani et al. 2001). After this phase, in fact, settlements seem to relocate to hilltop areas, possibly in search of greater security, abandoning the Campanian Plain. New material culture evidence appears: the so-called Proto-Apennine cultural aspect (Albore Livadie et al. 2019: 217–218).

14.5 Conclusions

Comprehensive publication of the archaeological research in advance of construction of the Rome-Naples TAV line is still lacking but is a priority. Site descriptions in this paper, in fact, are mainly based on preliminary reports which are, to date, the only literature available. It is, therefore, difficult to reconstruct the tenure pattern and function of the fields as they are mainly recorded as negative plough-marks explored over limited areas. The only positive agrarian evidence which is well-enough explored and published to date that can contribute to understanding this issue is the 90 ha EBA field system sealed by the PdA debris at Gricignano US Navy base. On the basis of this evidence, Saccoccio et al. (2013: 91; see also Saccoccio 2021) suggested the presence of a tribal economy (*sensu* Polanyi 1944) with single agrarian plots “temporarily attributed to members of the community... correspond[ing] to lineage groups, acting in a corporate way”.

Marzocchella (2002) proposed using foreign case-studies as comparisons for the EBA Gricignano US Navy base evidence. Caulfield (1978: 138) suggested “a sizeable organized community working towards a single objective” to explain the Neolithic agrarian evidence at Behy/Glenura, County Mayo (Ireland). This interpretation was based mainly on two lines of evidence: the regular plan of the agrarian features and a single documented instance of forest clearance by fire; Caulfield (1978: 141) interpreted the long strip divisions of the fields as individual farms.

Fleming (1988: 64; 122) examined a range of interpretative options from “distribution and perhaps periodic reallocation among various families or other social groups” to perpetuity of land possession or a mixed system combining private and community ownership linked to the presence of stratified

societies in order to explain the Bronze Age coaxial field system on Dartmoor, England. However, on the basis of the dispersed settlement pattern with huts aggregated in smaller groups, Fleming (1988: 66) proposed cogent parallels with twentieth century Welsh rural social environments, known as *trefgordd*. These were characterised by considerable local political strength, and a deep sense of community was sparked by the absence of a central social centre enabling direct relationships between the social groups involved. On the basis of the same evidence, Johnston (2005) gave importance to the connection between burial mounds, huts and field systems in the form of dominant alignments maintained through time. This pattern enabled a direct link to be established between human groups' ancestry and their claims on land and resources, with the formation and maintenance of social groupings through identity and continuity of ownership.

From a geographical point of view, this paper defines 10 different areas mostly occupied at least from the 4th millennium BC linked to the 30 analysed sites by associating to a site, or groups of sites, a 2.1 km radius site exploitation territory. Even if occupation is mainly marked by one site per phase (Fig. 14.5), an observation which may be due to limited fieldwork to date, the evidence suggests that prehistoric farmers returned to occupy previous areas even after devastating volcanic events. At Gricignano US Navy base, reoccupation is marked by graves characterised mostly by poor grave goods made on the site of previously settled areas (Albore Livadie and Marzocchella 1999; Fugazzola Delpino et al. 2003; 2007). This pattern may lead to two considerations. On the one hand, continuous occupation might suggest that farmers wanted to establish/stress a relationship with the past, with the people that previously lived in and exploited the same landscape. It is not possible to speculate whether newcomers were direct descendants of former farmers, but the need to establish a tie with the past enhances the hypothesis of continuity (Albore Livadie et al. 2019). On the other hand, a series of agrarian management patterns, most probably linked to the fertility of the soil enhanced by eruptive debris over time, allowed continuous settlement of the plain over centuries, even millennia. In most cases, this agrarian management pattern should be seen as developing at least from the 4th millennium BC, but possibly even from the late 5th millennium BC albeit only one radiocarbon date seems to support this statement so far (Table 14.1, p).

The only area definitely occupied for the whole period considered is that of Gricignano which, however, only documents evidence for the agrarian exploitation of the local landscape from the 3rd millennium BC (Table 14.2, numbers 1-6; Fig. 14.5). The lack of earlier agrarian evidence was explained as being due to limited fieldwork to date. Limited fieldwork to date is also a possible explanation for the lack of continuous occupation through time, either settled or agrarian exploitation, for eight out of the other nine defined areas. Only in one case is abandonment suggested. This is in the area of Naples where very limited archaeological evidence seems to be recorded after the AMS event, possibly linked to its devastating effects on the local landscape so as suggested by de Vita et al. (1999: 300). However, it is not possible to propose with certainty if at least part of the population moved to Fuorigrotta on the basis of the data in our possession.

To conclude. This paper discusses prehistoric management patterns in the Campanian Plain, southern Italy, focusing on the area between the course of the rivers Clanis/Regi Lagni and Sebeto and the territory of Naples. Although the available data are still scanty, it is possible to highlight the presence of at least 10 territories exploited for centuries, even millennia, where communities returned even after devastating eruptive events, re-organising and relocating their settlement and field systems. This pattern allows us to suggest the presence of a series of management patterns, dated at least between the 4th and the early 2nd millennia BC, probably to be linked to soil fertility enhanced by eruptive debris over time. Agriculture, in fact, played a major part in the economy of the prehistoric Campanian Plain as suggested by the widespread presence of agrarian evidence and supported by palaeoenvironmental reconstructions.

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Captions

Table 14.1 OxCal 4.3 (Bronk Ramsey 2017; Reimer et al. 2013) calibrated radiocarbon dates for the eruptions and the agrarian exploitation evidence quoted in the paper; *Italic* indicates dates obtained using the OxCal 4.3 ‘Combine’ command and TPQ indicates *terminus post quem*.

Fig. 14.1 Campanian Plain, Campania region (southern Italy), showing the main eruptive centres, the Clanis and Sebeto Holocene valleys and the sites discussed. DTM data from Farr et al. 2007.

Fig. 14.2 Gricignano d’Aversa US Navy base and Cambrannone: settlement and agrarian pattern over time. Grey dots mark the settled area, grey lines mark the field system while the dotted line marks the cart-track; PS stands for Paleosol (after Vanzetti et al. 2019: figs 2 and 9).

Fig. 14.3 (a) Gricignano-Fusarello TAV site 5: Final Neolithic apsidal hut; **(b)** Gricignano-Fusarello TAV site 6: cross-cutting plough-marks bracketed between PaleoAstroni 2 and AMS debris (Marzocchella 1998: figs 8 and 14).

Table 14.2 List of the published prehistoric evidence discussed in this paper.

Fig. 14.4 Negative cross-cutting plough-marks discovered on top of the Paleosol B at Naples: **(a)** Piazza Santa Maria degli Angeli; **(b)** Via Diaz (Giampaola and Boenzi 2013: figs 4 and 5).

Fig. 14.5 Settlement and exploitation patterns between the late 5th/early 4th millennium BC and the early 2nd millennium BC along the rivers Clanis/Regi Lagni and Sebeto and the territory of Naples, Campanian Plain. DTM data from Farr et al. 2007.

References

- Albore Livadie, C. & D’Amore, L. (1981). Palma Campania (Napoli) – Resti di abitato dell’età del bronzo antico. *Notizie Scavi di Antichità*, 34, 59–101.
- Albore Livadie, C. (Ed.). (1986). *Tremblements de terre, eruptions volcaniques et vie des hommes dans la Campanie antique*. Naples: Centre Jean Bérard – Institut Français de Naples.
- Albore Livadie, C. (Ed.). (1999a). *L’eruzione delle Pomici di Avellino e la facies di Palma Campania (Bronzo Antico)* (Atti del Seminario Internazionale). Bari: Edipuglia.
- Albore Livadie, C. (1999b). Territorio e insediamenti nell’agro Nolano durante il Bronzo antico (facies di Palma Campania): Nota preliminare. In C. A. Livadie (Ed.), *L’Eruzione Vesuviana delle “Pomici di Avellino” e la facies di Palma Campania (Bronzo antico)* (pp. 203–246). Bari: Edipuglia.
- Albore Livadie, C., & Marzocchella, A. (1999). Riflessioni sulla tipologia funeraria in Campania tra Bronzo antico e Bronzo medio. In A. Gravina (Ed.), *Ipogei della Daunia: Culti e riti funerari nella media età del Bronzo* (19° Convegno Nazionale sulla Preistoria – Protostoria – Storia della Daunia) (pp. 117–134). San Severo: Archeoclub d’Italia.
- Albore Livadie, C., & Widemann, F. (Eds.) (1990). *Volcanologie et Archéologie* (Pact 25). Ravello: Centre Universitaire pour le Biens Culturels.
- Albore Livadie, C., Mastrolorenzo, G., & Vecchio, G. (1998). *Eruzioni pliniane del Somma-Vesuvio e siti archeologici dell’area nolana*. In P. G. Guzzo & R. Peroni (Eds.), *Archeologia e Vulcanologia in Campania. Atti del Convegno* (pp. 39–86). Naples: Arte Tipografica.
- Albore Livadie, C., Pearce, M., Delle Donne, M., & Pizzano, N. (2019). The effects of the Avellino Pumice eruption on the population of the Early Bronze Age Campanian plain (Southern Italy). *Quaternary International*, 499, 205–220.

- Bronk Ramsey, C. (2017). Methods for summarizing radiocarbon datasets. *Radiocarbon*, 59(2), 1809–1833.
- Caulfield, S. (1978). Neolithic fields: The Irish evidence. In H. C. Bowen & P. J. Fowler (Eds.), *Early land allotment in the British Isles* (British archaeological reports, 48) (pp. 137–144). Oxford: BAR.
- De Caro, S. (2001). L'attività archeologica della Soprintendenza di Napoli e Caserta nel 2000. In *Problemi della Chora colonial dall'occidente al Mar Nero. Atti del 40° convegno di studi sulla Magna Grecia* (pp. 865–905). Taranto: Istituto per la Storia e l'Archeologia della Magna Grecia.
- De Caro, S. (2002). L'attività archeologica della Soprintendenza di Napoli e Caserta nel 2001. In A. Stazio & S. Ceccoli (Eds.), *Taranto e il Mediterraneo. Atti del 41° convegno di studi sulla Magna Grecia* (pp. 636–675). Taranto: Istituto per la Storia e l'Archeologia della Magna Grecia.
- De Caro, S. (2003). L'attività archeologica della Soprintendenza di Napoli e Caserta nel 2002. In A. Stazio & S. Ceccoli (Eds.), *Ambiente e Paesaggio nella Magna Grecia. Atti del 42° convegno di studi sulla Magna Grecia* (pp. 569–621). Taranto: Istituto per la Storia e l'Archeologia della Magna Grecia.
- de Vita, S., Orsi, G., Civetta, L., Carandente, A., D'Antonio, M., Deino, A., di Cesare, T., Di Vito, M. A., Fischer, R. V., Isaia, R., Marotta, E., Necco, A., Ort, M., Pappalardo, L., Piochi, M., & Southon, J. (1999). The Agnano-Monte Spina eruption (4100 years BP) in the restless Campi Flegrei caldera (Italy). *Journal of Volcanology and Geothermal Research*, 91, 269–301.
- De Vivo, B., Rolandi, G., Gans, P. B., Clavert, A., Bohrsen, W. A., Spera, F. J., & Belkin, H. E. (2001). New constraints on the pyroclastic eruptive history of the Campanian volcanic Plain (Italy). *Mineralogy and Petrology*, 73, 47–65.
- Delibrias, G., Di Paola, G. M., Rosi, M., & Santacroce, R. (1979). La storia eruttiva del complesso vulcanico Somma Vesuvio ricostruita dalle successioni piroclastiche del Monte Somma. *Rendiconti della Società Italiana di Mineralogia e Petrologia*, 35(1), 411–438.
- Di Renzo, V., Di Vito, M. A., Arienzo, I., Caradente, A., Civetta, L., D'Antonio, M., Giordano, F., Orsi, G., & Tonarini, S. (2007). Magmatic history of Somma-Vesuvius on the basis of new geochemical and isotopic data from a deep borehole (Camaldoli della Torre). *Journal of Petrology*, 48(4), 753–784.
- Di Vito, M. A., Isaia, R., Orsi, G., Southon, J., De Vita, S., D'Antonio, M., Pappalardo, L., & Piochi, M. (1999). Volcanism and deformation since 12,000 years at the Campi Flegrei caldera (Italy). *Journal of Volcanology and Geothermal Research*, 91, 269–301.
- Di Vito, M., Zarella, E., Gurioli, L., Lanza, R., Sulpizio, R., Bishop, J., Tema, E., Boenzi, G., & Laforgia, E. (2009). The Afragola settlement near Vesuvius, Italy: The destruction and abandonment of a Bronze Age village revealed by archaeology, volcanology and rockmagnetism. *Earth and Planetary Science Letters*, 277, 408–421.
- Di Vito, M., Talamo, P., de Vita, S., Rucco, L., Zanchetta, G., & Cesarano, M. (2019). Dynamics and effects of the Vesuvius Pomice di Avellino Plinian eruption and related phenomena on the Bronze Age landscape of Campania region (Southern Italy). *Quaternary International*, 499, 231–244.
- Farr, T. G., Rosen, P. A., Caro, E., Crippen, R., Duren, R., Hensley, S., Kobrick, M., Paller, M., Rodriguez, E., Roth, L., Seal, D., Shaffer, S., Shimada, J., Umland, J., Werner, M., Oskin, M., Burbank, D., & Alsdorf, D. (2007). The Shuttle Radar Topography Mission. *Review of Geophysics*, 45, RG2004. Accessed 29 June 2019. Available at <https://doi.org/10.1029/2005RG000183>.
- Flannery, K. V. (1976). Empirical determination of site catchment in Oaxaca and Tehuacán. In K. V. Flannery (Ed.), *The early Mesoamerican Village* (pp. 103–117). Orlando/San Diego/New York/London/Toronto/Montreal/Sydney/Tokyo: Academic.
- Fleming, A. (1988). *The Dartmoor reaves: Investigating prehistoric land divisions*. London: B.T. Batsford Ltd.
- Fugazzola Delpino, M. A., Salerno, A., Tagliacozzo, A., & Tiné, V. (2003). Una comunità della facies di Laterza nella Pianura Campana: l'area Forum di Gricignano US Navy (CE). In *Atti della 35 Riunione*

Scientifica IIPP, *Le comunità della Protostoria italiana: studi e ricerche sul Neolitico e le età dei metalli* (pp. 199–214). Florence: Istituto Italiano di Preistoria e Protostoria.

Fugazzola Delpino, M. A., Salerno, A., Tagliacozzo, A., Tiné, V., & Vanzetti, A. (2007). Villaggi e necropoli dell'area "Centro Commerciale" di Gricignano d'Aversa/US Navy (Caserta). In *Atti della 40 Riunione Scientifica IIPP, Strategie di insediamento fra Lazio e Campania in età preistorica e protostorica* (pp. 521–537). Florence: Istituto Italiano di Preistoria e Protostoria.

Giampaola, D., & Boenzi, G. (2013). Interazione tra attività vulcanica e vita dell'uomo: evidenze archeologiche nell'area urbana di Napoli. *Miscellanea INGV*, 18, 38–44.

Giampaola, D., & Stanislao, I. (2007). Loc. Bottegghelle (Napoli). Un insediamento del Neolitico avanzato. In *Atti della 40 Riunione Scientifica IIPP, Strategie di insediamento fra Lazio e Campania in età preistorica e protostorica* (pp. 606–610). Florence: Istituto Italiano di Preistoria e Protostoria.

Giampaola, D., Bartoli, C., & Boenzi, G. (2019). Napoli. Territorio e occupazione in età pre e protostorica. *AION*, 25(2018), 207–254.

Giordano, A. (1834). *Memorie istoriche di Fratta Maggiore*. Naples: Stamperia Reale.

Guzzo, P. G. (2010). Attività della Soprintendenza per i Beni Archeologici di Napoli e Pompei. In *Cuma. Atti del 48° convegno di studi sulla Magna Grecia* (pp. 1007–1035). Taranto: Istituto per la Storia e l'Archeologia della Magna Grecia.

Guzzo, P. G., & Peroni, R. (Eds.) (1998). *Archeologia e vulcanologia in Campania*. Atti del Convegno. Naples: Arte Tipografica.

Iovine, R. S., Fedele, L., Mazzeo, F. C., Arienzo, I., Cavallo, A., Wörner, G., Orsi, G., Civetta, L., & D'Antonio, M. (2017). Timescales of magmatic processes prior to the ~4.7 ka Agnano-Monte Spina eruption (Campi Flegrei caldera, Southern Italy) based on diffusion chronometry from sanidine phenocrysts. *Bulletin of Volcanology*, 79. Accessed 29 June 2019. Available at <https://doi.org/10.1007/s00445-017-1101-4>.

Isaia, R., Marianelli, P., & Sbrana, A. (2009). Caldera unrest prior to intense volcanism in Campi Flegrei (Italy) at 4.0 ka B.P.: Implications for caldera dynamics and future eruptive scenarios. *Geophysical Research Letters*, 36, L21303. Accessed 29 June 2019. Available at <https://doi.org/10.1029/2009GL040513>.

Johnston, R. (2005). Pattern without a plan: Rethinking the Bronze Age coaxial field systems on Dartmoor, South-West England. *Oxford Journal of Archaeology*, 24(1), 1–21.

Laforgia, E., & Boenzi, G. (2011). Nuovi dati sull'Eneolitico della piana campana dagli scavi A.V. in provincia di Napoli. In *Atti della 43 Riunione Scientifica IIPP, L'età del Rame in Italia* (pp. 249–255). Florence: Istituto Italiano di Preistoria e Protostoria.

Laforgia, E., Boenzi, G., Amato, L., Di Vito, M. A., Fattore, L., Stanzione, M., & Viglio, F. (2009). The Vesuvian "Pomici di Avellino" eruption and Early Bronze Age settlement in the middle Clanis valley. *Méditerranée*, 112, 101–107.

Marzocchella, A. (1985). L'eneolitico a Napoli. In G. Macchiaroli (Ed.), *Napoli antica* (pp. 27–29). Naples: Gaetano Macchiaroli. Marzocchella, A. (1998). Tutela archeologica e Preistoria nella Pianura Campana. In P. G. Guzzo & R. Peroni (Eds.), *Archeologia e Vulcanologia in Campania* (pp. 97–133). Naples: Arte Tipografica.

Marzocchella, A. (2002). Le più antiche testimonianze di utilizzazione del territorio: "sistemi agrari" pre- e protostorici. In *Il Mondo dell'Archeologia* (Vol. I, pp. 905–907). Rome: Treccani.

Matarazzo, T., Berna, F., & Goldberg, P. (2010). Occupation surfaces sealed by the Avellino eruption of Vesuvius at the Early Bronze Age village of Afragola in southern Italy: A micromorphological analysis. *Geoarchaeology*, 25(4), 437–466.

Nava, M. L., Giampaola, D., Laforgia, E., & Boenzi, G. (2007). Tra il Clanis e il Sebeto: nuovi dati sull'occupazione della piana campana tra il Neolitico e l'età del Bronzo. In *Atti della 40 Riunione*

Scientifica IIPP, Strategie di insediamento fra Lazio e Campania in età preistorica e protostorica (pp. 101–126). Florence: Istituto Italiano di Preistoria e Protostoria.

Orsi, G., Piochi, M., Campajola, L., D’Onofrio, A., Gialanella, L., & Terrasi, F. (1996). 14C geochronological constraints for the volcanic history of the island of Ischia (Italy) over the last 5000 years. *Journal of Volcanology and Geothermal Research*, 71, 249–257.

Passariello, I., Albore Livadie, C., Talamo, P., Lubritto, C., D’Onofrio, A., & Terrasi, F. (2009). 14C chronology of Avellino pumice eruption and timing of human reoccupation of the devastated region. *Radiocarbon*, 51(2), 803–816.

Polanyi, K. (1944). *The great transformation*. New York: Rinehart.

Reimer, P. J., Bard, E., Bayliss, A., Beck, J. W., Blackwell, P. G., Bronk Ramsey, C., Buck, C. E., Cheng, H., Edwards, R. L., Friedrich, M., Grootes, P. M., Guilderson, T. P., Haflidason, H., Hajdas, I., Hatté, C., Heaton, T. J., Hoffmann, D. L., Hogg, A. G., Hughen, K. A., Kaiser, K. F., Kromer, B., Manning, S. W., Niu, M., Reimer, R. W., Richards, D. A., Scott, E. M., Southon, J. R., Staff, R. A., Turney, C. S. M., & van der Plicht, J. (2013). IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP. *Radiocarbon*, 55(4), 1869–1887.

Rolandi, G., Petrosino, P., & Mc Gehin, J. (1998). The interplinian activity at Somma-Vesuvius in the last 3550 years. *Journal of Volcanology and Geothermal Research*, 82, 19–52.

Saccoccio, F. (2021). Crop field management and social structure at Gricignano d’Aversa (Campanian Plain, Southern Italy) in the Early Bronze Age. *Environmental Archaeology: The Journal of Human Palaeoecology*, 26(3), 267–280.

Saccoccio, F., Marzocchella, A., & Vanzetti, A. (2013). The field system of Gricignano d’Aversa (Southern Italy) and the agrarian impact in the Piana Campana, ca. 3900 cal BP. *Quaternary International*, 303, 82–92.

Sampaolo, V. (2005). L’attività archeologica della Soprintendenza di Napoli e Caserta nel 2004. In *Tramonto della Magna Grecia. Atti del 44° convegno di studi sulla Magna Grecia* (pp. 663–705). Taranto: Istituto per la Storia e l’Archeologia della Magna Grecia.

Sampaolo, V. (2012). L’attività archeologica della Soprintendenza di Napoli e Pompei. In *Alle origini della Magna Grecia. Mobilità, migrazioni, fondazioni. Atti del 50° convegno di studi sulla Magna Grecia* (pp. 1309–1353). Taranto: Istituto per la Storia e l’Archeologia della Magna Grecia.

Sasaki, R., Yoshida, M., Ohtsu, Y., Miyahira, M., Ohta, H., Watanabe, M., & Suzuki, S. (2003). Soil formation of new lahar materials derived from Mt. Pinatubo. *Soil Science and Plant Nutrition*, 49(4), 575–582.

Stefani, G., Fergola, L., Albore Livadie, C., & Di Maio, G. (2001). Le Somma – Vésuve et al région pompéienne durant la Préhistoire: premiers résultats géorachéologiques à Boscoreale et à Boscotrecase. In E. Juvigné & J. P. Raynal (Eds.), *Tephros – Cronologie et archéologie. Actes du Symposium international Téphrochronologie et co-existence hommes-volcans, Brives-Charensac 24-29 août 1998, Les dossiers de l’Archéo-logis* (Vol. 1, pp. 211–228). Lausanne: Clermond Ferrand.

Talamo, P., Passariello, I., Lubritto, C., & Terrasi, F. (2011). Evoluzione culturale in Campania: indagine cronologica sistematica tramite datazioni radiocarboniche. In *Atti della 43 Riunione Scientifica IIPP, L’età del Rame in Italia* (pp. 39–48). Florence: Istituto Italiano di Preistoria e Protostoria.

Vanzetti, A., Marzocchella, A., & Saccoccio, F. (2019). The Campanian agrarian systems of the late Copper-Early Bronze Age (ca. 4.550–3.850 BP): A long-lasting agrarian management tradition before the Pomici di Avellino eruption. *Quaternary International*, 499, 148–160.

Vingiani, S., Minieri, L., Albore Livadie, C., Di Vito, M. A., & Terribile, F. (2017). Pedological investigation of an early Bronze Age site in southern Italy. *Geoarchaeology*. Accessed 29 June 2019. Available at <https://doi.org/10.1002/gea.21625>.

Vivent, D., & Albore Livadie, C. (2001). Contribution de la palynologie à l’étude des comportements humains en contexte volcanique actif: l’exemple de l’Âge du Bronze en Campanie (Italie). In E. Juvigné

& J. P. Raynal (Eds.), *Tephtras – Cronologie et archéologie. Actes du Symposium international Téphrochronologie et co-existence hommes-volcans, Brives-Charensac 24–29 août 1998, Les dossiers de l'Archéo-logis* (Vol. 1, pp. 245–254). Clermont Ferrand: Laussonne.

Vogel, S., Märker, M., Rellini, I., Hoelzmann, P., Wulf, S., Robinson, M., Steinhübel, L., Di Maio, G., Imperatore, C., Kastenmeier, P., Liebmann, L., Esposito, D., & Seiler, F. (2016). From a stratigraphic sequence to a landscape evolution model: Late Pleistocene and Holocene volcanism, soil formation and land use in the shade of Mount Vesuvius (Italy). *Quaternary International*, 394, 155–179.

Zanchetta, G., Sulpizio, R., Roberts, N., Cioni, R., Eastwood, W. J., Siani, G., Caron, B., Paterne, M., & Santacrose, R. (2011). Tephrostratigraphy, chronology and climatic events of the Mediterranean basin during the Holocene: An overview. *The Holocene*, 21(1), 33–52.