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THE RESILIENCE OF ANCIENT LANDSCAPES THROUGH THE ANALYSIS OF CERAMIC ASSEMBLAGES: THE CAMPANIAN PLAIN AS A CASE STUDY

1. Introduction

When applied to ancient landscapes, the concept of resilience refers to their capacity to adapt and respond to environmental, climatic, socio-political, and cultural challenges. Historical ecology provides a valuable perspective through which to understand resilience in ancient societies by employing approaches such as Resilience Theory or Theories of Chaos, Complexity, and Complex Adaptive Systems (Holling 1973, 2001; Redman, Kinzig 2003; Redman 2005; Grimm *et al.* 2017). This paper explores the resilience of ancient landscapes by analyzing ceramic assemblages. These contexts are a key archaeological source that can provide crucial insights into the relationship between past societies and their environments. As a fundamental component of daily life, pottery is a marker of economic practices, exchange networks, social transformations, and technological adaptation. Studying ceramic artifacts can help us understand how ancient societies adapted to climate change, resource availability, and the impact of human activities. This can reveal how they responded to periods of crisis or drastic change. Thus, ceramic data offer a distinct perspective on landscape resilience, which is understood not only as a reaction to external events but also as an intrinsic component of the long-term processes that shaped ancient societal development (Mentesana *et al.* 2024).

The Campanian Plain is a particularly rich case study, given its complex and layered landscape history. This paper focuses specifically on ceramic materials from the central sector of the plain, which corresponds to the *Atella* territory and its hinterland. Proximity to both the *Clanius* River and Mount Vesuvius significantly influenced the landscape and human activities in this area (Brancato *et al.* 2024). Analyzing material culture, particularly ceramic finds, can provide valuable insights into human-environment interactions in this region, which is characterized by the successive landscape transformation at multiple scales over a long period. The presence or absence of specific ceramic classes can help detect historical, cultural or economic transformations over time. Furthermore, the ceramic record may reveal so-called 'ghost activities', that are not visible in the archaeological evidence (Tescione in preparation). In this sense, the ceramic analysis is integrated with archaeological, paleoenvironmental, geomorphological, climatic, and historical data, following a multi- and interdisciplinary approach.

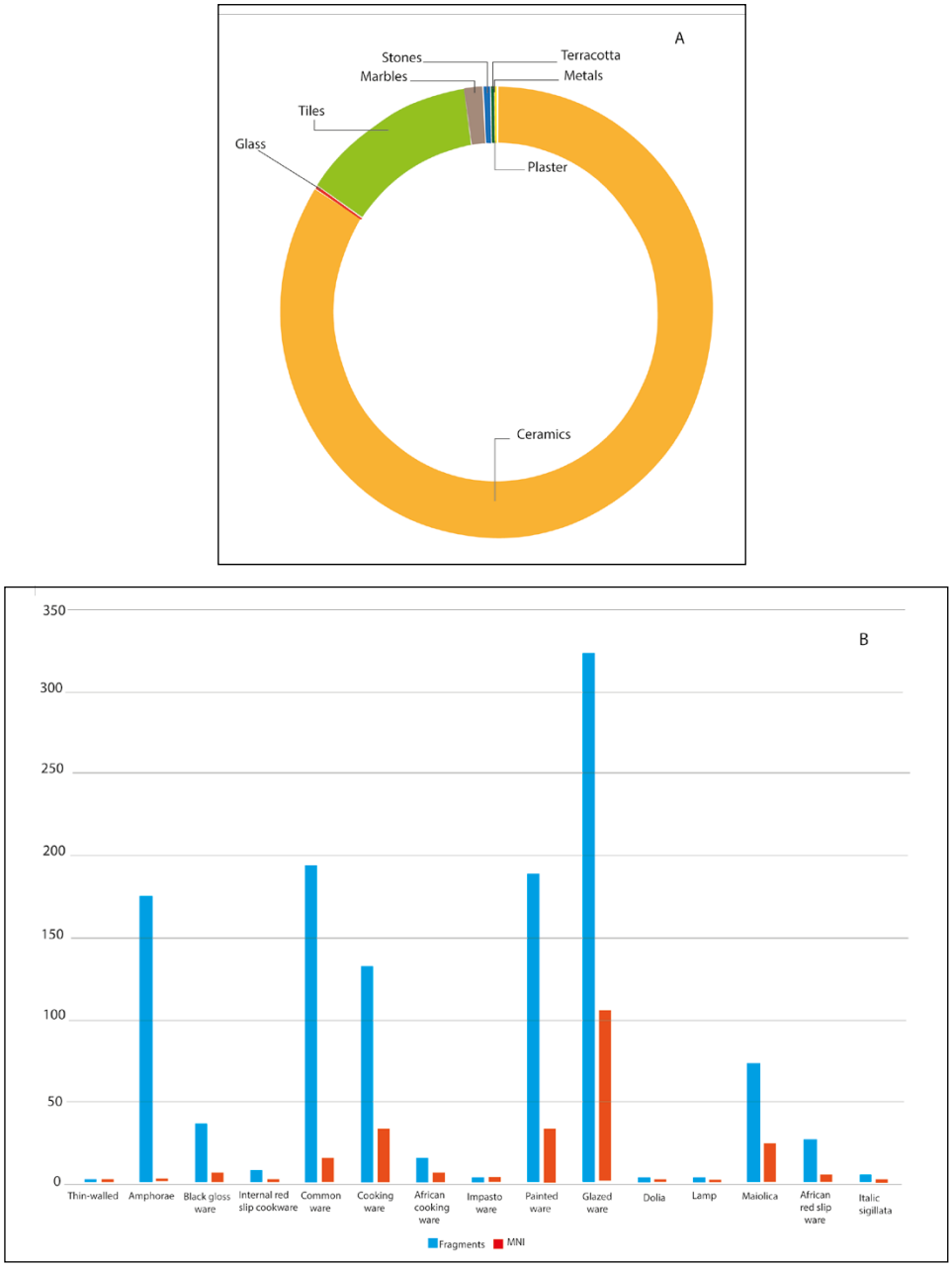

Fig. 1 – A) Quantitative analysis of the archaeological records from the Survey Topographic Units; B) quantitative analysis of the ceramic classes from the Survey Topographic Units.

The analysis has been carried out on ceramic records recovered during the non-invasive survey campaign conducted in 2024 and 2025 within the territory of ancient *Atella* (Brancato *et al.* in this volume). These archaeological records were catalogued according to the standards established for the MINP[1] and MINV[2] modules developed by the ICCD, within the framework of the SiGECWeb system framework. A spreadsheet was developed and integrated in the Digital Groma repository (see Buono *et al.* in this volume). Quantitative analyses have identified approximately 1185 records, belonging to various material categories, of which around 84% consist of ceramic artefacts (Fig. 1A). Within these materials, the morpho-typological and functional repertoire appears highly heterogeneous, spanning a long chronological range from the Samnite age to the contemporary era. The most represented class is that of glazed ceramics, followed by common ware (in terms of fragments), painted and cooking ware (as individuals) (Fig. 1B).

2. The pre-Roman age

Although there is documented prehistoric evidence (Early Bronze Age) in the Atellan hinterland (Gricignano, Succivo, Aversa) (see Brancato *et al.* in this volume), data from the recent field surveys do not allow us to confirm this presence with certainty[3]. Currently, this phase appears as a 'ghost landscape' in the surface archaeological record. Available documentation allows us to reconstruct the settlement dynamics beginning from the second half of the fourth century BC. This is evident from the discovery of black gloss ware that can be clearly linked to morpho-typologies (Fig. 3, 1) known in the Campania region (Ferrara 2016, 85-100). This change in material culture can be understood in the context of new historical developments: *Atella* received *civitas sine suffragio* after 338 BCE (Fest., 50, 126). The introduction of Roman-Latial ceramic types in *Atella* after the end of the fourth century BC reflects change in material culture and the activity of urban craftsmen and traders adapting to new political and economic conditions (Flohr, Wilson 2016). From the mid of the third century BC onward, a marked increase in available data indicates a widespread distribution of coarse wares (Fig. 3, 6-9), associated to Graeco-Italic amphorae (Fig. 3, 5), and black gloss ware (Fig. 3, 2-4), across multiple sites (Fig. 2). This evidence supports the hypothesis of rural farmsteads, or small-scale rural settlements related to the intensive agricultural exploitation of the

[1] http://www.iccd.beniculturali.it/it/ricercanormative%20/156/minp-modulo-per-l-inventariazionepatrimoniale-4_00.

[2] http://www.iccd.beniculturali.it/it/ricercanormative/234/minv-modulo-per-l-inventariazione-4_01.

[3] Three fragments from UO 225 (Gricignano d'Aversa) and UO 179 (Sant'Arpino) could be referred to Archaic age impasto pottery.

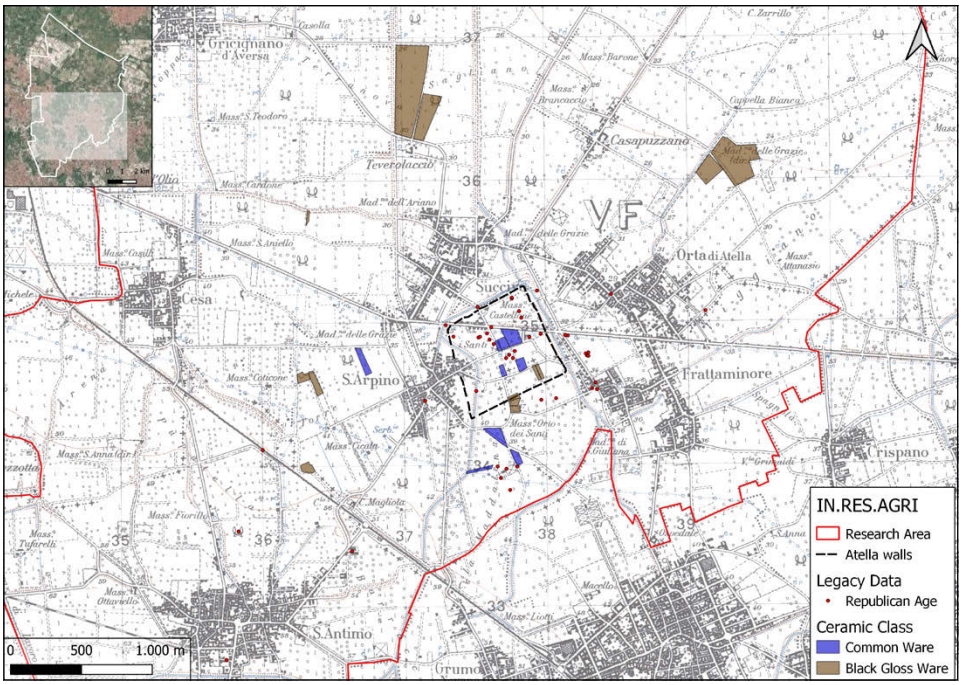

Fig. 2 – Spatial distribution of Republican age sites from legacy data, spatial distribution of black gloss ware and mid-Republican common ware in the Survey Topographic Units.

landscape during this period (Quilici Gigli 2025). Imported materials, such as *unguentaria* and black gloss ware, from northern Campania (*Cales*, Capua, Teano) and the Bay of Naples attest to the city's prosperity. This wealth was likely supported by road networks documented as early as the fifth century BC, as evidenced by the legacy data (see Brancato *et al.* in this volume). Of particular interest are the fine and coarse wares dating to the mid-Republican period found in the eastern (Orta di Atella, UO 229 and 232) and northern (Succivo, UO 225 and 233) sectors of the Atellan territory. Currently, no legacy data is available for these areas (Fig. 2).

3. The Roman period

Following the Hannibalic defeat in the second century BC, the city entered a phase of growth and prosperity, fostered by its strategic position within the regional road network (Laforgia 2014). The presence of imported black gloss ware types, documented in the Vesuvian area (Morsiani 2017, 575) and the Phlegraean region (Esposito 2017, 77), attest to this (Fig. 5,1).

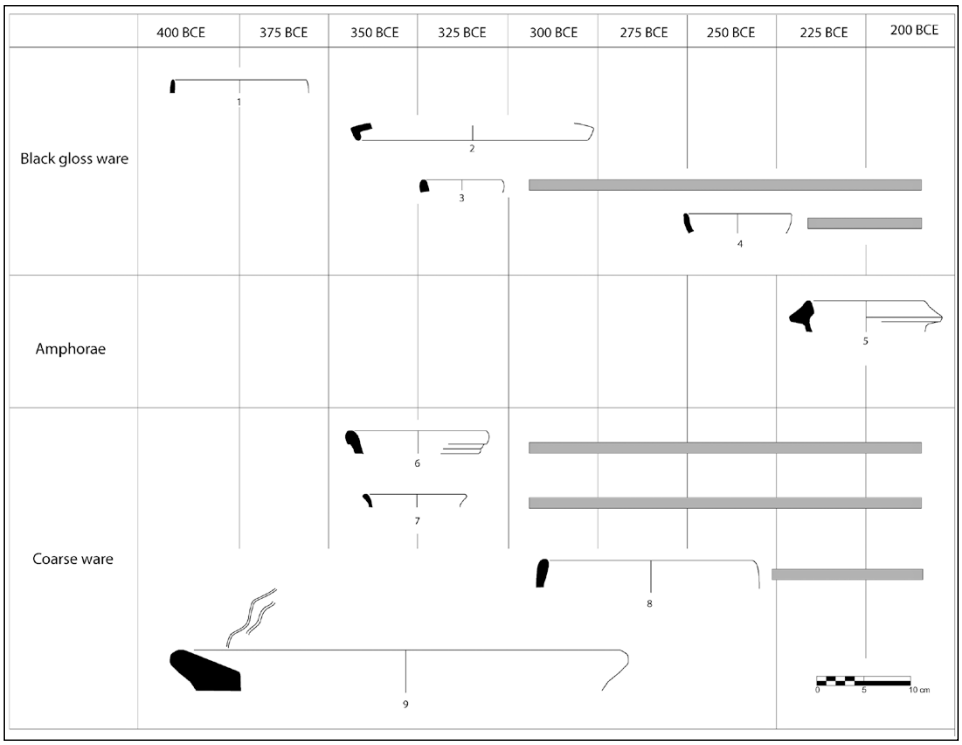

Fig. 3 – Chronotypological graph of mid-Republican ceramic. Black gloss ware: 1) *skyphos* Morel 4380 (Sant'Arpino UO 91); 2) lid (Frattaminore UO 16); 3) cup Morel 2420 (Frattaminore UO 16); 4) cup Morel 2970 (Sant'Arpino UO 65); amphorae: 5) Gr.-Ita Vc (Sant'Arpino UO 91); coarse ware: 6-7) pots (Frattaminore UO 32); 8) situla (Sant'Arpino UO 90); 9) basin (Frattaminore UO 16) (drawings by E. Canciello; re-elab. by Author).

This economic vitality persisted until the end of the first century BC, as evidenced by the short- and medium-range imports of terra sigillata originating from the Bay of Naples (Soricelli 2004) and central Italy. The coarse ware assemblages follow Italic traditions and feature cooking pans with bifid rims, Internal Red Slip cookware, and pots with almond and everted rims (Fig. 5, 5-7), some of which may have been brought to *Atella* from the Vesuvian and/or Phlegraean areas alongside wine transport containers.

Imperial expansion promoted market-oriented practices, amplifying pre-existing local dynamics. By the first century BC, these local responses had contributed to the formation of new food distribution system. Rising expectations and growing demand led to the development of a supply network that was resilient to moderate environmental fluctuations, yet vulnerable to extreme events. For example, the major volcanic eruption of the 79 AD that

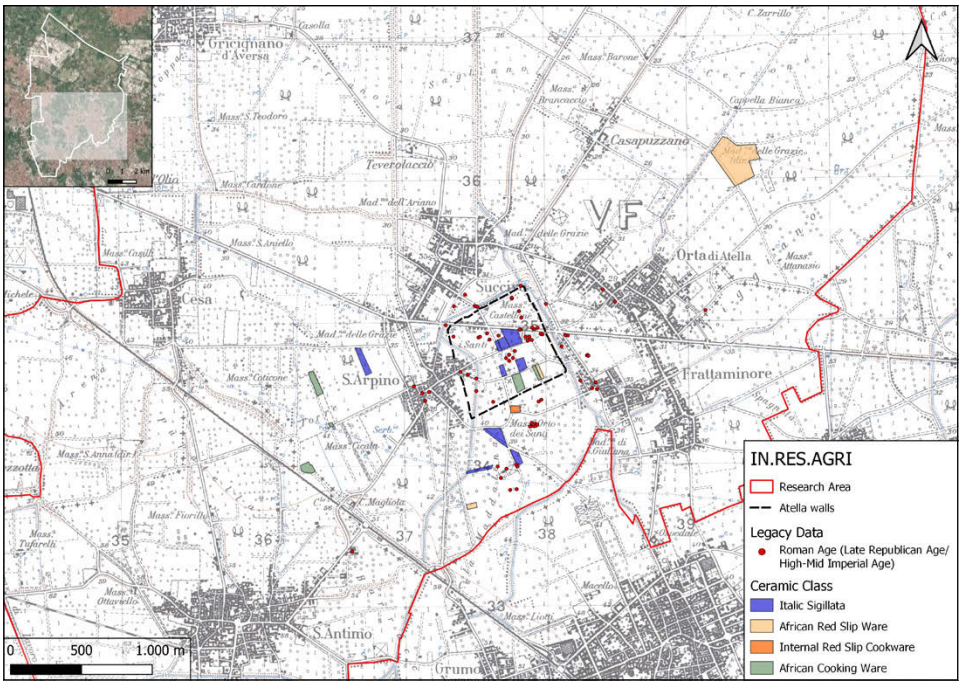

Fig. 4 – Spatial distribution of Roman age (late Republican age/high-mid Imperial age) sites from legacy data, spatial distribution of Italic Sigillata, Internal Red Slip ware, African Red Slip ware, African Cooking ware in the Survey Topographic Units.

may have triggered a sudden period of global cooling at the end of the Republic (Bernard *et al.* 2023). This environmental pressure may also help explain the emergence of new food storage strategies, such as the use of large containers (*dolia*), as evidenced by two sites in the NE (Orta di Atella UO 229) and SE (Frattaminore UO 32) of *Atella* territory (Fig. 4). From the second century AD onwards, there is an increase in ceramics and products from the North African coast, as evidenced by transport containers, fine ceramics, such as African Red Slip Ware, prod. A (Fig. 5, 2-3), and cooking wares (Fig. 5, 4).

4. The late Roman-high medieval age

A chrono-distributive analysis of late Roman to high medieval age ceramic classes reveals interesting perspectives. According to legacy data, sites from this period are scarcely reported in the urban area, except for traces of spoliation or road infrastructure (see Brancato *et al.* in this volume). However, whereas data from field surveys highlight a concentration of Late Roman African Red

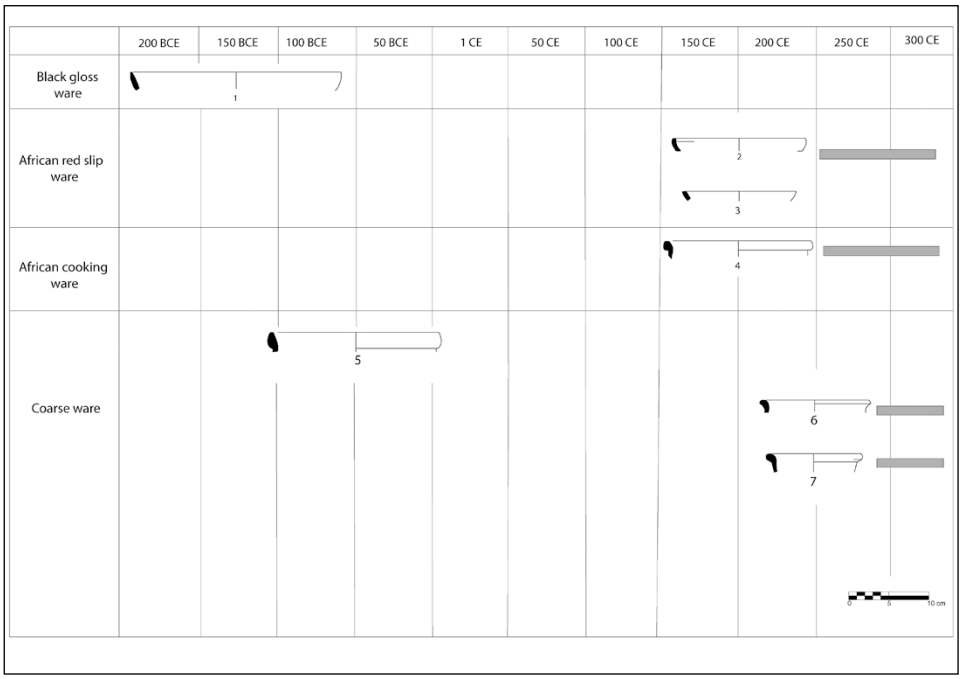

Fig. 5 – Chronotypological graph of late Republican and Imperial age ceramic. Black gloss ware: 1) dish Morel 2280 (Frattaminore UO 16); African Red Slip ware: 2) cup Hayes 26 (Frattaminore UO 32); 3) cup Hayes 14a (Frattaminore UO 32); African cooking ware: 4) Pan Hayes 197 (Frattaminore UO 32); Coarse ware: 5) pot with almod rim (Frattaminore UO 32); 6-7) pot with everted rim (Sant'Arpino UO 94; Frattaminore UO 32) (drawings by E. Canciello; re-elab. by the Author).

Slip ware in this sector (Fig. 6). This finding corroborates the hypothesis of a collapse in the influx of North African imports, which impacted rural areas more than the urban sector because they were increasingly excluded from established commercial networks (Tortorella 1998). Although still in its early stages for certain categories, particularly those related to the late Roman to early medieval phases, spanning the fifth to seventh centuries AD, the qualitative analysis reveals strong correlations with the material culture documented in the 2010 excavation of the forensic baths (Arenella *et al.* 2015).

Between the fifth to seventh centuries AD, imports of ceramics (African Red Slip ware, prod. D, Fig. 7, 1-2) and foodstuffs from *Africa Proconsularis* continued, alongside goods from the Eastern Aegean (common ware, Fig. 7, 3) and the Calabrian-Sicilian regions (e.g. Pantellerian ware). Imported ceramics were gradually imitated in local ceramic repertoires, as seen with Pantellerian (Fig. 7, 11-12) and African cooking ware (Fig. 7, 10). This phenomenon is already well known in Campania (Toniolo 2020) and in the rest of the

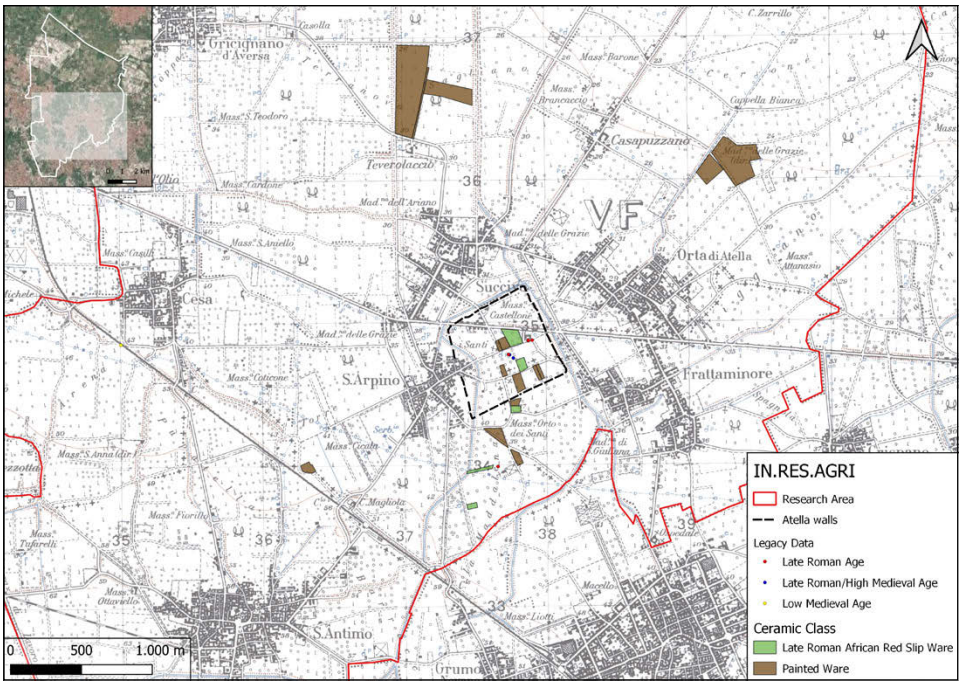

Fig. 6 – Spatial distribution of late Roman and medieval age sites from legacy data, spatial distribution of late Roman African Red Slip ware and painted ware in the Survey Topographic Units.

peninsula. Interestingly, ceramic materials were produced not only in the Bay of Naples but also in inland and central-northern Campania (colour coated ware, Arthur, Soricelli 2015; Fig. 7, 4, 6-8) and in the Vesuvian area (as demonstrated by the so-called burnished ware, Benková 2017; Fig. 7, 5) appears to be interesting. Painted ware is well attested, particularly in the form of open vessels, such as basins with thickened and variably profiled internal rims (Fig. 7, 6-8). These types are present in contexts from the Bay of Naples dating from the late fourth century AD. They remain fairly frequent through the sixth century AD, and continue to be commonly found into the seventh century AD (about the circulation see Toniolo 2020). During this period, the road network connecting *Atella* to Naples and to Capua was subject to numerous interventions, highlighting the vitality and continued efficiency of the *ager Campanus*'s road network even in the fourth century AD (Quilici Gigli 2005). The ceramic evidence from this period indicates the circulation of products and formal repertoires, which was likely supported by a system of highly frequented periodic markets (*nundinae*), characterized the Roman period (Storchi 2000; Toniolo 2020).

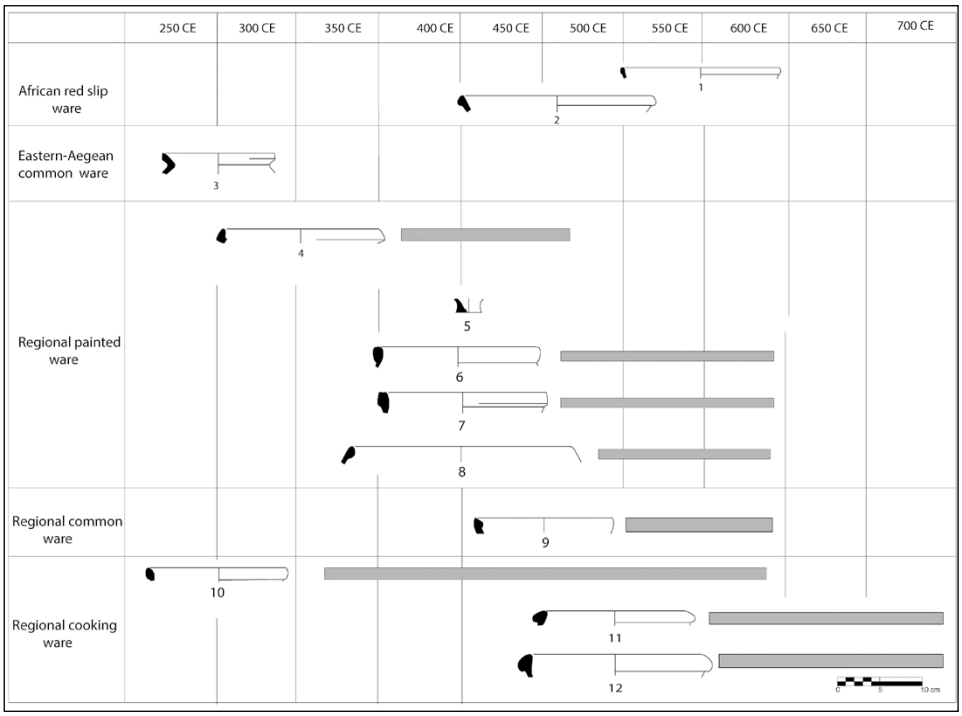

Fig. 7 – Chronotypological graph of late Roman and high Medieval age ceramic. African Red Slip ware: 1) bowl Hayes 88b/90 (Frattaminore UO 32); 2) bowl Hayes 61C (Sant'Arpino UO 94); Aegean-Eastern common ware: 3) pot (Frattaminore UO 32); Regional painted ware: 4) bowl (Sant'Arpino UO 65); 5) jug (Sant'Arpino UO 65); 6-8) basin (Sant'Arpino UO 90; Frattaminore UO 32-UO 43); Regional common ware: 9) cup (Sant'Arpino UO 65); Regional cooking ware: 10-12) pot (Frattaminore UO 32; Frattaminore-S. Arpino UO 52; Sant'Arpino UO 94) (drawings by E. Canciello; re-elab. by the Author).

Additionally, changes in the cooking ware repertoire can be traces, such as the prevalence of lug-handled casseroles. This shift has been linked to changes in dietary habits, which may be due to a decline in global temperatures and subsequent climate deterioration. This climate change may have led to an increased demand for semi-liquid foods, for which casseroles are particularly well-suitable. Dietary variation at other sites in Campania (Naples) is also associated with an increased consumption of goats and sheep, as suggested by archaeozoological evidence (Arthur 2007, 2010)[4].

[4] The results of archaeozoological and paleoenvironmental analyses could provide further confirmation of this hypothesis.

Late Roman evidence represents a substantial revision of previous interpretations that attributed the scarcity of ceramic records from the middle and late Imperial periods primarily to a significant demographic decline in the urban area (Bencivenga Trillmich 1994). However, documentary sources confirm that the city persisted into the sixth century AD, despite being devastated by the Vandals and continued to function as an episcopal seat throughout the early Middle ages (Greg. M., *Epistulae*, IX, 142).

5. The modern and contemporary age

Medieval and modern phases up to the eighteenth century do not appear to be documented, which likely confirms the abandonment of the city. Notably, the episcopal seat was transferred to Aversa in the eleventh century (Bencivenga Trillmich 1994). During the modern period, glazed tableware and cooking pottery is attested, referring to typologies typical of the eighteenth century-twentieth century CE. The documented maiolica ceramics appear to belong to a relatively recent period, dating between the eighteenth century and twentieth century.

6. Final remarks

Archaeological evidence from the Atellan hinterland provides a detailed picture of human settlement and landscape use from the Samnite to the present. While pre and proto-historic presence remains elusive and appears as a 'ghost landscape' within the surface record, the documented material culture from the beginning of the fourth century BCE onwards clearly indicates increasing settlement complexity and economic vitality. The significant raise in ceramic finds between the fourth and third centuries BCE supports the hypothesis of a rural landscape characterized by small farmsteads reflecting intensive agricultural exploitation. The city's prosperity during the Roman period, sustained by its strategic location along major roadways and evidenced by imported fine wares and productive villa estates, underscore its integration into broader regional and Mediterranean trade networks.

Continuities and transformations in material culture from the late Roman to early medieval periods reveal sustained trade connections extending from North Africa to the eastern Mediterranean, as well as within Campania itself. The circulation of goods through periodic, highly frequented markets (*nundinae*) likely facilitated social and economic resilience in this changing historical context. The apparent abandonment of the area during the medieval period, culminating in the transfer of the episcopal seat to nearby Aversa, marked a significant shift in the local settlement pattern. However, the subsequent re-emergence of glazed ceramics and maiolica in the modern era testifies to renewed activity and changing cultural dynamics in the area.

Overall, the ceramic record not only provides crucial insights into settlement dynamics, economic practices, and trade relations, and serves as a valuable proxy for understanding the broader processes of adaptation, resilience, and transformation within the Atellan landscape over millennia. The recurrence or disappearance of particular morpho-typological forms or fabrics may be interpreted as responses to historical, cultural, environmental and climatic changes. Further investigation is required in order to better understand these underlying dynamics and their broader implications.

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ABSTRACT

This paper examines the resilience of ancient landscapes by analyzing ceramic assemblages from the Atellan hinterland in the central Campanian Plain. Using a multidisciplinary approach based on historical ecology and resilience theory, the study examines how pottery reflects adaptive responses to environmental, climatic, and socioeconomic changes over a long period of time, from the Samnite age to the contemporary era. The ceramic record, collected during recent non-invasive surveys (2024-2025), includes over 1100 artifacts cataloged using the Digital Groma standards. The results suggest a substantial increase in rural settlement and agricultural activity between the fourth and third centuries BC, accompanied by evident integration into regional trade networks. Late Roman assemblages demonstrate continued vitality, challenging earlier hypothesis of urban decline. The presence of North African and eastern Mediterranean imports alongside local imitations highlights sustained economic activity and adaptability. Changes in cooking ware types, notably the increase in casseroles, may indicate dietary shifts related to climatic deterioration. The apparent absence of medieval phases, followed by the reappearance of modern ceramics, suggests discontinuities in settlement. Ultimately, ceramic evidence provides a valuable perspective for understanding long-term human-environment interactions, resilience strategies, and cultural transformations within the Atellan landscape in the *longue durée*.