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Petrographic Analysis of Prehistoric Pottery found in the Shkodër Region of Northern Albania by the Shkodra Archaeological Project (PASH)

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Petrographic analysis of prehistoric pottery found in the Shkodër region of northern Albania by the Shkodra Archaeological Project (PASH)

By

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Pottery, as an artifact, is often used as evidence of exchange patterns among groups during prehistory. This research incorporates paradigmatic classification and petrography to answer questions related to provenience, production mode, and exchange patterns of handmade prehistoric pottery from Gajtan, Zagorë, Kodër Boks, Tumuli 088 and 099 in Shkodër, in Northern Albania. Pottery samples analyzed in this study were collected from test excavations by the Shkodra Archaeological Project (PASH). The results yielded evidence that the area has sufficient local clay sources and other easily accessible natural resources to produce pottery in a domestic mode. Gajtan and Zagorë appeared as two distinct entities, but the former settlement seems to have played a dominant role as a production and distribution center within the region. Results from this study indicate that pots appear to have played an important socio-economic role in northern Albania, across time and space.

DEDICATION

This thesis is dedicated to my mother. With the present paper, I have fulfilled her life-long dream. She could not continue school herself because, during the era of communism in Albania, only the first-born child could go to university. “ii”

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CHAPTER I

INTRODUCTION

Historically, many archaeological excavations have produced huge numbers of potsherds. This kind of artifact has been a longstanding attraction to researchers all over the world who use it, along with the origin of raw materials, to explain events and human interactions through time; including exploration of relative chronologies, trade patterns, and exchange (Dickinson 2006; Dyson 1976; Menelaou et al. 2016; Renfrew and Bahn 2005; Lizee et al. 1995). There are infinite resources such as books, articles, and manuals dedicated to pottery analysis (e.g., Belfiore et al. 2007; Day 2005; Ellis 2000; Eckret et al. 2013; Galaty 1999; Gasćona et al. 2014; Neff 2012; Peacock 1970; Quinn 2013; Reedy 2008; Rice 1978; Rice 2015; Spataro 2006; Spataro 2010; Stoltman 2015; Stoltman 2002; Stoltman 1989; Shepard 1956; Peacock 1970; Peacock 1981; Whitbread 1995, to name a few).

Prehistory lacks written records; therefore, studying the life cycle of potsherds can provide valuable information about ceramic production centers and its circulation by identifying suitable and preferred raw materials to produce them such as clay sediments and tempers. Oftentimes, various chemical and mineralogical examinations are used to characterize the composition of archaeological ceramics. But, only through petrography can researchers distinguish and separate natural inclusions from tempers, intentional additions to the clay (Stoltman and Mainfort 2002: 17).

Microscopic analysis helps researchers to understand the complex interactions between humans and the environment. As Rice (2015: 209) states, "pottery manufacture, like any other productive enterprises, is a part of the broad engagement of humans with their environment through technologies for extracting and manipulating resources to meet individual and group needs." Therefore, petrography is a successful method employed in an attempt to respond to research questions related to the origin of raw materials, location of finished products, and distribution patterns of fine and coarse wares. Study in each of these areas provides valuable information regarding different, but related aspects of human behavior (Stoltman and Mainfort 2002: 1).

Previously, archaeologists in Albania have shown interest in the study of pottery to comprehend the chronology of sites and possible exchange patterns based on stylistic ceramic analogies, a culture-historical orientation (Andrea 1987; Andrea 1996; Fistani 1983; Hoxha 1987; Jubani 1966; Jubani 1972; Jubani 1984; Jubani 1985; Jubani 1995; Koka 1985; Koka 1990; Koka 2010; Lahi 1987; Lahi 1988; Lera et al. 1983; Prendi 1987; Prendi 1998). Despite the interest shown, Albania lacks contemporary research based on new methods of study, such as textural or compositional analysis with the aid of microscopes or chemical tests. Unfortunately, the information provided from previous studies regarding prehistoric pottery from the Shkodër Region is mostly confined to field excavation reports published in periodicals by the Institute of Archaeology and Institute of Monuments in Tirana, Albania. The research performed in this thesis will be the first of its kind conducted on prehistoric pottery in northern Albania.

The aim of this study is to try to determine the provenance of raw materials, the production centers, and circulation of prehistoric pottery found in various settlements in the Shkodra Region such as Gajtan, Zagorë, Kodër Boks, and Tumuli 088 and 099. The methods employed for this purpose are petrography and paradigmatic classification. The results reached upon examining the issues mentioned above will add information and a better understanding of the prehistory of the Shkodër Region and provide new data for future researchers.

CHAPTER II

PROBLEM STATEMENT

Archaeological research undertaken on prehistoric sites in the Shkodra Region is limited and seldom updated, so that the area is poorly understood. As mentioned previously, the main issues to be investigated in this thesis are provenance, production modes, centers of production, and distribution patterns of prehistoric pottery sherds unearthed during the excavations conducted by the PASH project. Although chronology varies in different parts of Europe, in Albania the time from the Neolithic (NEO) to the Bronze Age (BA) spans the 7th to 2nd millennia BC (see radiocarbon dates [^{14}C] in Damiata et al., 2009; Galaty et al., 2013; Gjipali and Allen 2013; PASH Project, unpublished data).

Table 1 Relative chronologies for Albania expressed in absolute dates.

Relative Chronology	**Abbreviations**	**Absolute Dates**
Late Neolithic	LNEO	5th millennium BC
Copper Age/Eneolithic	ENEO	4th millennium BC
Early Bronze Age	EBA	3100-2000 BC
Middle Bronze Age	MBA	2000-1600 BC
Late Bronze Age	LBA	1600-1000 BC

The time period of the materials from this study stretches from the Late Neolithic to the Late Bronze Age. Table 1 presents information about the chronology used in this thesis. Archaeological evidence shows that over these millennia a series of prehistoric groups occupied the Shkodra Region (Mazzini et al. 2016: 2). The nucleation of settlements, the construction of hill forts, and burial mounds characterize the study area during Prehistory (Galaty et al. 2014 and Mazzini et al. 2016: 2). Also, during this time period, people moved from one place to another for different reasons (Kristiansen: 2016). As Kiriatzi and Knappett (2016: 3) argue, "spatial displacement are key events in humans' deep history," and researchers have attempted to trace these movements using vessel style as an indicator. For example, stylistic patterns identified from earlier excavations in the Shkodra Region include those on bowls, amphorae, jars, and other vessels (Jubani 1966: 43- 62; Korkuti 1979: 122- 123) analyzed via analogy with those discovered within and outside the area. The primary focus of studying prehistoric pottery was to provide relative chronologies, which then were used to date sites in the area of study (Andrea 1996; Andrea 1987; Fistani 1983; Hoxha 1987; Prendi 1977; Prendi 1987; Prendi 1988; Jubani 1972; Lahi 1988). For these reasons, pottery was one of the most-studied artifacts in archaeological research in the area.

Handmade prehistoric pottery sherds have been extensively studied. But, since arguments based on style always are hypothetical, there is still a need to investigate the archaeological problems of the region by using new techniques such as petrography or other methods. Hence, a combination of macroscopic and microscopic analyses of prehistoric potsherds of the Shkodra Region will bring to light not only a better recognition of this area but also add new data to the Mediterranean archaeological map which are not present at the moment (Kristiansen 2016). Rice (2015: 33) explains the importance of understanding ceramic properties as follows:

> The pottery fragments recovered in archaeological excavations contain vast amounts of coded or encrypted information about their makers and users. How to break the codes and read the clues? Understanding the human behavior behind the manufacture and use of ancient pottery begins with an understanding of the resources used and their properties, the primary resource being clay.

Textural analysis is a useful tool that helps to understand human behavior by increasing the accuracy of determining ceramic provenance, production centers, exchange, and trade. Jubani (1972) postulates that, in the Shkodra Region, particularly at Gajtan, many of the Bronze Age potsherds represent local production because there exist few analogies in the stylistic patterns with surrounding areas such as Glasinac or Central Europe (1972: 402). However, this assumption needs testing, and petrography is a useful technique for doing that.

The primary goal of this thesis was to test whether handmade prehistoric pottery found in the Shkodra Region was locally produced. To test this hypothesis macroscopic and microscopic (petrographic) analyses were performed on samples of assumed local clays, i.e. non-pottery fired fragments (daub) from three settlements in the area – Gajtan, Zagorë, and Kodër Boks – and pottery specimens from these settlements, and from two burial mounds, Tumuli 088 and 099. If coarse wares were locally produced, the distribution of pottery types and petrographic analysis regarding fabric manufacture should detect substantial variations in across time and space, i.e., standardization is not expected, and pottery specimens would reflect the composition of the geology of the area.

Further, equally important was to test whether the pottery found in the Shkodra Region represented a domestic mode of production. If pottery was produced in a household condition, the distribution of pottery types and petrographic analysis regarding fabric manufacture should reveal significant variations across time and space, again due to a lack of standardization.

The final goal of this research was to test whether Gajtan, where a kiln complex was found (Islami and Ceka 1965: 450), was a center of pottery production in the Shkodra Region. Macroscopic, quantitative, and qualitative examination of the pottery specimens would provide evidence regarding production centers. If Gajtan was a production center in the area, it should have produced and distributed pottery to Zagorë and Kodër Boks settlements. Also, pottery from Gajtan should occur in Tumulus 088 and Tumulus 099.

This thesis analyzes handmade prehistoric coarse wares using paradigmatic classification and petrography to determine provenance, production modes, and trade patterns in the Shkodra Region. Exploring the composition of pottery sherds and clay samples (daub) collected from these settlements under the petrographic microscope helps not only to clarify the research questions raised in this thesis but also will help to contextualize chemical-compositional studies undertaken by PASH, being conducted by Danielle Riebe (Field Museum) and Sylvia Deskaj (University of Michigan). Considering the lack of previous studies regarding provenance, trade, and production centers for prehistoric pottery in northern Albania, this study will provide greater understanding about pottery production and distribution in the region of Shkodër and will be a base reference for further research in the future.

CHAPTER III

THEORETICAL APPROACH

Unless ceramic studies lead to a better understanding of the cultural context in which the objects were made and used, they form a sterile record of limited worth (Matson 1965: 202).

The task of archaeologists is to decipher what is left behind by humankind. Explaining what is left is not easy, especially, when it comes to prehistory where no written records were available. Luckily, the advancement of science has made it possible to explain patterns of human activity such as the production of goods, their distribution, and exchange by developing theories and methods to test hypotheses. The interaction among people is the most difficult part to understand. Accordingly, Costin (1991: 1) states, “exchange events are invisible in the archaeological record.” Nonetheless, what humans have left behind has helped researchers to track their paths in time and space.

“Productive processes create dependencies insofar as individuals must depend on others for access to the technology, energy, or natural resources necessary for production” (McGuire 2005: 44). Individual occupations, therefore, may be more or less connected to other ones in terms of self - sufficiency, reflecting spatial organization of prehistoric groups. In understanding exchange patterns of humans in the past, the main thing to be considered is to study the production process, then exchange.

Compared to exchange, production events leave a clearer and more easily interpretable record in the form of debris, tools, and features (Costin 1991: 1). The discovery of the Haghia Triada kiln in Crete used for firing pottery, or pottery finds such as those unearthed in northern Israel (Belfiore et al. 2007: 662; Zuckerman et al. 2010), are two examples. Pottery is one of the most commonly found artifacts in archaeological excavations, and was widely used in the past for numerous purposes (Brothwell and Pollard 2001). For instance, studies show that vessels were used to store food, cook, to bury people, as signals, for transportation of goods, etc. (Brothwell and Pollard 2001; Islami and Ceka 1965; Neff 2014; Stoltman 2015; Whitbread 1995). Over time, pottery has been, and still is, an attractive artifact to archaeologists all around the world, including Albania. Through ceramics studies, researchers have been able to construct relative chronologies, which started with Thomsen's approach (2005), and identify cultural evolutionary lineages (Gosden 2005: 46, 72). Frankel (2008: 22) describes traditional pottery studies as follows:

> Pottery has always had a central place in archaeology, its role evolving and reflecting the development of the discipline through the application of varied techniques, approaches and styles of research. Its more traditional use in constructing primary referential frameworks of time, place and association has been supplemented by studies of symbolism, function, manufacture, distribution and discard at scales of analysis ranging from the individual to large areas seen in long-term perspective.

Ceramists could identify the distribution and function of vessels based on their styles and types (Andrea 1996; Andrea 1987; Fistani 1983; Hoxha 1987; Prendi 1977; Prendi 1987; Prendi 1988; Jubani 1972; Lahi 1988). Rice (1987) defines style as visual representation, specific to a time and space, which transmits information about the identity of the makers and the context of use. On the other hand, Dunnell (1971: 202) defines type as "… an intuitive cultural class of discrete objects." In this research, I use the term 'type' based on Dunnell's definition (Chapter VII). Later, pottery studies changed focus from analyzing traditional styles and types to the application of new approaches and research techniques. These new methods helped to answer questions related to the origin of raw materials, production mode, long-term use of raw materials, function, technology of production, chronologies, trade, exchange, etc. (Gomez et al. 2002; Heina 2008; Michelakia et al. 2011; Müller 2010; Neff 1995; Rafferty 1996; Rafferty 2001; Rafferty and Peacock 2009; Santacreu 2016; Ten 2010). Researchers have answered these questions by applying various techniques such as settlement pattern analysis, occupation analysis, seriation, thermal conductivity, ceramic firing temperature, compositional analyses, and paradigmatic classification (Dunnell 1971; Gomez et al. 2002; Michelakia et al. 2011; Müller 2010; Neff 1995; Rafferty 1996; Rafferty 2001; Rafferty and Peacock 2009; Santacreu 2016), to name a few. For this thesis, research aims at answering questions related to the origin of raw materials, production centers, and distribution of handmade prehistoric pottery using macroscopic examination and compositional analysis. Although Neff states (1995) that compositional analyses relate to both chemical and mineralogical characterization of the materials, I will use the term to refer to mineralogical properties and quantitative data obtained from potsherds through petrography only.

Prehistoric pottery, including that produced in the Shkodra Region, has gone through natural and cultural processes. Natural processes include the chemical and physical transformation of sedimentary rocks into clay sources, followed by the transformation of raw materials by potters into pots (Glowacki and Neff 2002). "The aim of materials studies in archaeology is to contribute to the investigation of the overall life cycle or chaîne opératoire of surviving artifacts" (Brothwell and Pollard 2001: 443). Gamble (2001: 114) defines chaîne opératoire or operational sequence as "... the acts themselves and the linkages they provide across time and space that matter". Pottery, like any artifact, has a life cycle that includes production, distribution, and use. Urem-Kotsou (2016: 34) states that requirements by the user and the purpose of the manufacture of the vessel are two factors that might affect the potter's choice. But, it is crucial to mention that availability of raw materials and their distances from the production center affect potters' choices as well. Similarly, Jeske (1989: 34) argues "...that settlement systems, social organization, and raw material distribution should lead to the differential treatment of raw materials". Further, Jeske (1989: 35) explains that "…environmental factors determine how efficient a group needs to be in order to survive". In this case, if the area has enough clay sources and natural resources to produce pottery, there is no need to import all the pottery from somewhere else. Neff (2014: 1), in his study of pots as signals, explains that:

> ...costs of transport rise dramatically with distance, especially in the absence of water-borne, animal, or motorised transport, so if a pot is recognisably foreign, it

> is guaranteed to be a high-cost vessel and thus a reliable signal of an individual's control of or access to resources.

This statement shows that pottery finds with no signal seemingly might falsify the hypothesis of their long-distance transportation. Based on this assessment, it can be argued that prehistoric groups were organized depending on raw material procurement in the local area. Thus, knowing about the potsherds' life cycle helps us to understand human behavior in the past. An essential component that provides evidence about pottery's life cycle is pinpointing the origin of the raw materials used to make pots. Rice (1987: 180) explains how to do that in the following statement:

> …studies [that] seek the origin (the geographical source or provenience) of particular artifacts whether pottery or stone or some other material. In these analyses, the composition of a set of artifacts is determined by sensitive mineralogical and chemical techniques to obtain a "fingerprint" unique to that composition and hence to the geological source.

Accordingly, there needs to be strong evidence to determine the provenance of an artifact, which should be unique to meet the provenance postulate. Glowacki and Neff give the definition of the provenance postulate as follows: "[The] postulate states simply that sourcing is possible as long as between-source variation exceeds within-source variation" (Glowacki and Neff 2002: 5). Further, the authors claim that "sourcing is possible as long as there exists some qualitative or quantitative, chemical or mineralogical difference between natural sources that exceeds the qualitative or quantitative variation within each one" (Glowacki and Neff 2002: 5).

Unfortunately, in this study it was not possible to directly meet the provenance postulate because the samples analyzed only come from within the Shkodra Region. There were no samples to compare between and within source variations. Still, pottery production modes and trade patterns can be analyzed by investigating the raw materials used to make pots. In his study of sourcing in evolutionary archaeology, Neff (1995: 72-73) points out that:

> ...compositional diversity in archaeological ceramics reflects variation in raw material source usage.... But if additional opportunities for pottery making are available because of regional economic integration, then some assemblages will contain pottery derived from nonlocal ceramic resource bases and compositional diversity among assemblages will exist.

Information from regional geology can strengthen the arguments about source location, since all ceramics start out as a natural geological material (Glowacki and Neff 2002: 7). The life history of ceramics complicates determination of provenance because they undergo physical and chemical alteration related to a variety of natural and cultural processes (Glowacki and Neff 2002: 8). Therefore, it is necessary to consider factors that might affect the alteration of minerals present in the fabric of pottery. Fortunately, petrography (Chapter VI) is a useful method for identifying raw materials under the microscope. As Renfrew (2005: 230) states, "the identification of the specific source of the material used for an artefact found on an archaeological site is an obvious indication of the transport either of raw materials or of finished objects." Moreover, Glowacki and Neff (2002: 5) explain that using petrography to identify source zones where ceramic raw materials were procured is a primary goal of characterizing pottery. Fabrics of potsherds provide a basis for making inferences about raw material acquisition and processes employed in production (Brothwell and Pollard 2001: 443). Hence, particle sizes, their shapes, and the kinds of minerals found in pottery sherds will "tell" us about the raw material used to produce these artifacts.

Organization of production is another topic discussed in this thesis. There are different opinions about the organization of pottery production as related to mode of production (Costin 1991). Specifically, McGuire (2005: 44) states that the mode of production is vague as a concept, and he defines what researchers historically have meant by it as follows: "... the means of production (i.e. the materials, energy, human labour, and knowledge necessary for production) and the relations of production (i.e. the reciprocal relations between people producing goods) within a mode of production." Rice (1987: 182) characterizes modes of production as particularly related to pottery, stating that the "study of the mode of pottery production is based on interrelated determinations of how the pottery is made, who makes it, and for whom it is made." Further, McGuire (2005: 44) argues, "there exists no universal list of modes; the scale of an analysis or the problems being addressed will determine what distinctions are usefully drawn and how many modes are constituted." Accordingly, modes of production as discussed here are focused specifically on understanding the process of pottery production.

Costin (1991: 4) states that “a product that has a high number of producers in relation to consumers will have a low degree of specialization.” This statement helps us to understand whether pottery was produced in a specialized or a domestic mode of production. Pottery researchers draw their interpretations based on the standardization of pottery production and discrimination between what is standardized and what is not. Costin (1991: 4) argues that “…[as] definition of specialization involves variability in productive activities, it is fairly straightforward to operationalize archaeologically.” Jeske comes to the same conclusion by relating standardization to cost. He asserts that, “when raw material becomes more expensive, because of an increase in energy expenditure...artifact form will become more standardized” (1989: 36). Costin (1991: 3) defines specialization as a form of organization of production needing time, the existence of a recognized title, name, or office, and payment; it is thus different from the domestic mode or generalized form of production. Put differently, a large degree of variability in manufacture and mineral composition of pottery at an archaeological site indicates that numerous individuals were engaged in pottery production. Macroscopic (paradigmatic classification) and petrographic (quantitative and qualitative) analyses make it possible to identify details about recipe and manufacturing of ceramics, potentially answering questions related to the origin of raw materials and exchange patterns as reflected in production modes.

There are many types (Costin 1991), or ways of organizing, pottery production. Galaty (1999: 21) states that the various parameters involved in the organization of production make production types differ, and that these parameters include social, economic, political, and environmental settings. One of the parameters is context, which can be attached, managed by a group, or independent when producers work independently (Costin 1991; Galaty 1995). Put another way, there can be one group or multiple individuals who produce pottery within an area. Another parameter is concentration, which can be nucleated through the organization of production in a single location within the region, or dispersed when production is realized evenly in a geographic area (Costin 1991: 13; Galaty 1999). Costin (1991: 13) suggests that pottery produced via nucleated production parameters was subject to exchange with other groups in a region. An important influence on organization of production is access to natural resources sufficient to produce pottery.

Two general types of pottery production are individual and community-based. When production is performed individually, autonomous individuals or households produce for unrestricted local consumption (Costin 1991: 9; Galaty 1999: 21). On the other hand, when production is community-based, autonomous individuals or household-based production units produce for unrestricted regional consumption in a single community within that region (Costin 1991: 9; Galaty 1999: 21). To clarify, pottery production organized individually is independent in context and dispersed in concentration (Costin 1991: 10; Galaty 1999: 22). That means that various individuals or households produce independently in different parts of a region. On the other hand, community-based pottery production is independent in context but nucleated in concentration (Costin 1991: 10; Galaty 1999: 22). Considering these implications, handmade vessels in the region of Shkodër might have been produced in different centers or one center, individually or community-based. Costin's theoretical approach concerning the specialization of production seems applicable to the identification of modes of pottery production in the Shkodër Region.

Duistermaat (2017) discusses traditional approaches to understanding the organization of pottery production. She points out that "these approaches struggle to bridge the analytical divide between the material remains and the social structure (organization) they are trying to identify" (2017: 114-115). Notably, she criticizes Costin's approach regarding pottery production types for limiting perspectives on pottery studies (Duistermaat 2017: 114-115). But approaches become explanatory depending on case studies. For example, Costin's approach proved successful in Galaty's (1999) dissertation. Therefore, this research uses Costin's framework, focusing on only two of his eight pottery production types due to sample size and limited archaeological context.

Macroscopic and microscopic analysis (petrography) of the composition of the pottery fabrics will provide information about modes of production. For instance, if variation occurs in the means of production, it means that there was no standardization of pottery recipes. This result would show that pottery might have been produced in one or different centers in the region in household conditions. Archaeological findings, information on the mineralogy of the area, and consideration of environmental settings should shed light on pottery production and distribution throughout the region. Petrographic studies may point to multiple production centers and/or ceramic exchange.

The purpose of sourcing studies is mainly to understand material circulation and exchange patterns. Renfrew (2005) points out that the movement of raw materials or finished objects "... will often imply trade and hence exchange, and obviously offers indications of early travel and perhaps the development of exchange systems" (Renfrew

2005: 23). Similarly, Tykot (2004) defines trade as follows: “trade is defined in modern economics as the mutual movement of goods between hands, but in the archaeological record it is the movement of the materials themselves, not their ownership or possession, which is easily determined” (Tykot 2004: 418). In this study, the term trade implies exchange, since, during prehistory, there is no evidence of commerce at an institutional level in the study area. Furthermore, Gamble (2001) states, “by quantifying the spatial distributions they have always plotted out archaeologists have revolutionised their study of trade and exchange” (Gamble 2001: 147). Hence, knowing about the pottery production in the Shkodra Region helps in understanding trade patterns.

According to Gosselain (2016: 200), “when distinct technical traditions co-occur on certain sites and can be separated into ‘local’ and ‘foreign’, the obvious explanation is that both networks of producers worked independently from each other.” Although this statement shows the ideal scenario, it is not always easy to determine the origins of raw materials. Clays are ubiquitous and ceramic technology needs time to master; yet, people anywhere could make pots to fulfill all their needs (Neff 2014: 2). However, the application of archaeometric methods helps archaeologists reach explanations regarding artifact origin. Ceramic composition analysis conducted via petrography provides reliable information not only for the origin of the raw materials but also about exchange or trade (e.g., one center produced pottery, then exchanged it with other centers, or different centers produced it, accessing different raw materials) (Cohena et al. 2018; Stoltman 2015; Whitbread 1995). This helps with “the enormously difficult task of the archaeologist attempting to unravel the details of a complex system of past economic distribution and trade...” (Ucko 1989: xiii).

As Renfrew argues "the early study of trade and exchange in archaeology was based mainly upon the recognition of specific features inherent in the constituent material of artefacts which allowed their assignment to a particular area or place of manufacture" (Renfrew 2005: 23). Such work has evolved to include multiple network aspects, as Kristiansen (2016: 154) explains:

> In order to reach an understanding of the scale and the organization of ancient trading and traveling networks we must be able to combine at least three separate and demanding fields of research: the nature of ancient knowledge of the world (their cognitive maps, sometimes preserved in texts, more often not), the nature of mobility technologies and their capacities (from ships to wagons and caravans, but also infrastructures/logistics to support them), and finally archaeological knowledge of the goods being traded/moved, their origin and distribution.

Although prehistory has no written records and often lacks maps or mobility technologies, archaeological findings provide vital evidence about ancient trading in time and space. As Gamble (2001: 147) argues, "pottery provides a quantified measure of the difference between local and distant." This kind of artifact often was used as a commodity ("an object created for exchange or trade" [Kipfer 2007: 77]) to trade goods or was itself traded; therefore, its spatial distribution approximates patterns of exchange. In other words, knowledge about the origin and spatial distribution of pottery production centers provides evidence about exchange patterns in time and space. To summarize, developing an understanding of pottery trade or exchange, or its "spatial scattering," yields knowledge about its use, the pre-final stage of its life cycle.

The past is a puzzle where most of the pieces are missing. Gamble (2001: 181) states that, "explanation is never easy. It depends upon the paradigm you follow." Hence, archaeologists embrace the approaches that arguably help in putting together available pieces of the puzzle. Thus, this thesis presents a modest work that incorporates, to some degree, a processualist explanatory framework to discuss proposed research questions concerning the origin of raw materials, production modes, and distribution patterns of prehistoric pottery. The final aim is to identify essential components that explain human activities in prehistory. The examination of handmade pottery samples and the application of compositional analysis provides reference groups that can be interpreted based on the chosen theoretical approach. As in many other archaeological studies, the study of prehistoric pottery is prone to limitations such as sample size, human error, or physical and chemical alteration of the artifacts. However, the theoretical approach presented in this chapter, and results obtained through petrography and paradigmatic classification, should yield interpretable data about prehistoric groups in the Shkodra Region.

CHAPTER IV

ENVIRONMENTAL SETTING

In its broadest sense, and as a spatial concept, landscape is the total appearance of the land in a place, district or region: the rocks, soils and minerals, the shape of the land and the scale of its features, its vegetation and land-use, the pattern and kinds of settlement, its industrial elements, and even the general appearance of the sky (Allen 2017: 45).

"Pottery and ceramics can be conceptualized as artificial stone, the first synthetic material created by humans thousands of years ago" (Rice 2015: 3). The preparation of these artifacts requires four elements of nature: earth, water, fire, and air (Rice 2015: 3). Therefore, information about the geographical position, climate, water resources, clay sources, and mineralogical composition of the Shkodra Region, provides data about ceramic ecology. Similarly, Matson (1965: 203) considers pottery studies as an attempt "to relate the raw materials and technologies that the local potter has available to the functions in his culture of the products he fashions." The environment preserves what humans left behind - traces that need decoding. "Humans and nature interact through time at different scales, often generating various dynamic, reciprocal relationships, the effects of which may be recorded in Holocene sediment records as "impacts"" (Mazzini et al. 2016: 2). Similarly, handmade prehistoric sherds provide evidence about human activities in the past.

Water resources, rock types, mineralogical composition, vegetation, and climate are all crucial components that affect human behavior over time. “The deposits where artifacts are found provide information on the age, landscape, and environmental setting of human occupations and on the processes that formed the archaeological record” (Rapp and Hill 1998: 18). Hence, integrating archaeological information with information on environmental setting helps in understanding patterns of pottery production and circulation.

The Shkodra Region (Figure 1) lies in the northwestern part of Albania. It has an overall surface area of 2528 km^2 of which 86% is mountainous and 14% is plain. It shares state borders with Montenegro and administrative ones with Tropojë, Pukë, Lezhë, and the Adriatic Sea (Gjoni and Dibra 1999: 291). In this area, dominant landforms and geomorphologic processes date from the Quaternary up to the current stage. The region is formed mainly by alluvial-proluvial and fluvio-glacial deposits of Quaternary date that overlap with the carbonate foundation of the Mesozoic (Krutaj 1999: 235). The territory of the Shkodër Region consists of Paleozoic, Mesozoic, and Cenozoic rocks (Xhomo et al. 2004).

Geological and archaeological evidence show that during the Holocene a series of prehistoric groups occupied the Shkodra Region (Mazzini et al. 2016: 2). Late-Final Neolithic (3500 BC) and Early Bronze Age (3100-2000 BC) is characterized by the nucleation of settlements in the area (Mazzini et al. 2016: 2). During the Bronze Age, the construction of hill forts and burial mounds, a practice possibly introduced by the Cetina culture of Croatia, became a common phenomenon (Galaty et al. 2014 and Mazzini et al. 2016: 2).

Shkodra and its surrounding areas constitute a particular morphological and morphogenetic entity with a variety of ecosystems and landscapes linked mutually between them (Krutaj 1999: 235). This land-formation complex (Krutaj 1999: 235) includes Shkodra Lake, the Shkodra Plain, the Alps to the northeast, and the hydrographic interactions between the Drin and Buna rivers and Shkodra Lake. Geographers divide the Shkodër Region into two main components based on their geomorphological characteristics, Mbishkodër and Nënshkodër.

In the Mbishkodër area, the Shkodra Plain occupies the northern part of the lowlands along the eastern coast of the lake, from Shkodra city in the southeast to Brigjë village in the northwest, and has a length of 36 km, is 4-15 km wide, and has a surface area of 390 km^2 (Akademia Shqiptare e Shkencave 1990: 457). Prehistoric sites located in this part of the region are Zagorë (Andrea 1986; Andrea 1987), Marshej (Karaiskaj 1977), Mokset (Jubani 1984; Hoxha 2004), Vorfë (Jubani 1984), Kodër Boks, Kratul (Fistani 1983), Drisht (Jubani 1984; Jubani 1986) settlements and the Shtoj (Tumulus 088), Shkrel (Tumulus 099), and Grizhë areas, where tumuli have been identified, (Jubani 1984; Lera et al. 1983). Also, the PASH survey has identified archaeological evidence in the villages of Postribë, Gruemirë, and Dobraç (PASH Project, unpublished data).

The subarea of Mbishkodër has a Mediterranean climate (Hoti 2004: 5) conditioned by its geographical position at the northern edge of the country, its low relief, encirclement to the east by relatively high mountain chains, and influence of the lake (Akademia Shqiptare e Shkencave 1990: 457). The prevalence of karst in the region has conditioned the hydrographic network, including the development of considerable underground flows. Kiri is the only river that flows through the southeastern edge of the

Mbishkodër plain; therefore, the vegetation coverage is sparse in general (Akademia Shqiptare e Shkencave 1990: 457). Strong karst formations characterize the Mbishkodër Plain, which almost all arise to the northwest and along the shore of the lake.

The main soil type in the Mbishkodër Plain is brown meadow, which occupies 53% of the total area of the plain (Akademia Shqiptare e Shkencave 1990). This type of soil constitutes the main agricultural land, stretching from Koplik to Bajzë (Akademia Shqiptare e Shkencave 1990: 462). It is suitable for planting tobacco, grain, and fodder (Akademia Shqiptare e Shkencave 1990: 462). Brown pasture soil, formed at the foot of the hills, comprises an essential soil component in this area (about 16% of the area) and bounds the plain on the northeast. These soils are medium sub-argil (sub-clay) and are poor in humus and phosphorus. Hence, they are unsuitable for agriculture and suited for summer pasture (Akademia Shqiptare e Shkencave 1990: 457). It is worth mentioning that a special type of soil has been identified in the Shtoj plain. These soils, brown forest meadow, are formed from the erosion of forest lands and the deposition of organic material (Akademia Shqiptare e Shkencave 1990: 462). In the past, Shtoj plain was not suitable for agriculture nor for living purposes (Akademia Shqiptare e Shkencave 1990). But as this soil type has developed in the area, it is now (Akademia Shqiptare e Shkencave 1990).

Excavations and surveys conducted by the PASH project were mostly concentrated in the Mbishkodër area, particularly at the Zagorë settlement and in the vicinity of tumuli in the Shtoj and Shkrel plains. Based on geomorphological data, it is likely that the prehistoric populations living in the Mbishkodër area focused on animal breeding rather than farming. PASH archaeobotanical and archaeofaunal data should help resolve this question.

Different geomorphological characteristics represent the other part of the Shkodër lowland, the Nënshkodër subarea. It extends from the right bank of the Drin river (Vau i Dejës-Bunë), to the north, and includes the area positioned between the Kir river and Guri i Zi village up to the Adriatic seashore in the southwestern part. The Nënshkodër subarea extends south to the city of Lezhë (a distance of about 30 km), west to the foot of Hajmeli Mountain, and east to the Buna River (a distance of 25 km). Its overall surface area is about 630 km^2 (Akademia Shqiptare e Shkencave 1990: 466). In this part of the region are located the main archaeological sites with designated prehistoric phases. Some examples of these sites are Beltojë (Lahi 1988), Belaj (Prendi 1987), Gajtan (Islami and Ceka 1965; Jubani 1966; Jubani 1972; Korkuti 1979), Ganjollë (Lahi 1993), and Shkodra Castle (Hoxha 1987), to name a few.

Non-uniform shapes characterize the relief of the Nënshkodër subarea, with fields and hills traversing its landscape. They constitute the main components of the morphology of the Nënshkodër area. Bregu i Bunës, Guri i Zi, Anamali, Trushit, and Velipojë are the foremost plains located in this area (Akademia Shqiptare e Shkencave 1990). The hydrographic network of the Nënshkodër subarea has numerous flows and enormous water reserves, which nowadays, are utilized in the economy of the country. The Drini i Bardhë and Buna Rivers, which transverse the area of Nënshkodër, have the heaviest water flows in the country. The main soil types of the Nënshkodër plain are gray-brown ones, which cover all its hilly areas (Akademia Shqiptare e Shkencave 1990). Similarly, as with the Mbishkodër subarea, the natural vegetation in both the lowlands and hills of Nënshkodër is sparse (Akademia Shqiptare e Shkencave 1990: 467). However, as Albania has a Mediterranean climate, deciduous oak forest is present all over the country, including the Shkodra Region (Aufgebauer et al., 2012:124; Uncu 2011: 47). In the Nënshkodër area, the PASH project conducted intensive survey, site collection, and test excavations in Gajtan and its surrounding areas.

As the main components of pottery are clays and tempers, detailed background information regarding the sources of clay and mineralogy of the area is needed. Pottery production is primarily dependent on the existence of clay sources (Allen 2017: 109). In other words, it is worth mentioning the geological composition of the Shkodra Region. Unfortunately, until now, no evidence has been obtained about the areas of raw material exploited for pottery production in the Shkodra Region. Hence, geological information is valuable evidence for sourcing pottery under the study. Based on the geological evidence, the area near the Gajtan settlement (Table 2) is surrounded by Paleogenic deposits belonging to the Pleistocene and Lower and Middle Eocene.

Table 2 Clay sources in the Shkodra and surrounding regions and their distances from Gajtan.

Area	**Drisht**	**Karma**	**Melgusha**	**Jushi mountain**	**Lezhë**	**Gajtan**
Distance from Gajtan/km	8.77	16.21-16.29	8.01-9.58	13.14	37.65-40.00	Near Gajtan (?)

Distances were measured using ArcGIS 10.4.1 and data about clay sources were obtained from Gjeoportali i Shqipërisë: Autoriteti Shtetëror për Informacionin Gjeohapësinor “ASIG”. http://geoportal.asig.gov.al

These deposits have mainly a red-colored "clay marl" or clay formation layer that averages 10-12 m thick, near Gajtan, but can extend up to 20-30 m in thickness (Xhomo et al. 2004). Above the "clay marl" layer continues a sandy-clay flysch stratum composed of thin layers of calcium carbonate from the Paleocene-Eocene. Its thickness is about 10 to 30 m (Xhomo et al. 2004).

Gajtan is not the only area rich in clay sources. There are other parts of the Shkodra Region nearby that have raw materials, such as clay, suitable for pottery production. The closest clay source to Gajtan is located in Melgusha about 8.01-9.58 km, and Lezhë is the furthest, around 37.65-40.00 km from Gajtan (Table 2). Also, the geological map (Figure 1) shows that kaolinite or clay minerals are available in the Shkodra Region, in Qelza, Dedaj, and on the border with Lezhë. Reedy (2008) claims that, "kaolinites are one of the most widely occurring and extensively used clays. They can be found as primary clays, formed by an advanced stage of weathering of granitic rocks high in feldspar and quartz, or of micaceous schist" (2008: 109-110).

Regarding mineralogy, geologists previously have mentioned only the presence of metallic minerals in the Shkodra Region, such as tin sources in Koplik and copper in Vau i Dejës (Akademia Shqiptare e Shkencave 1990: 467).

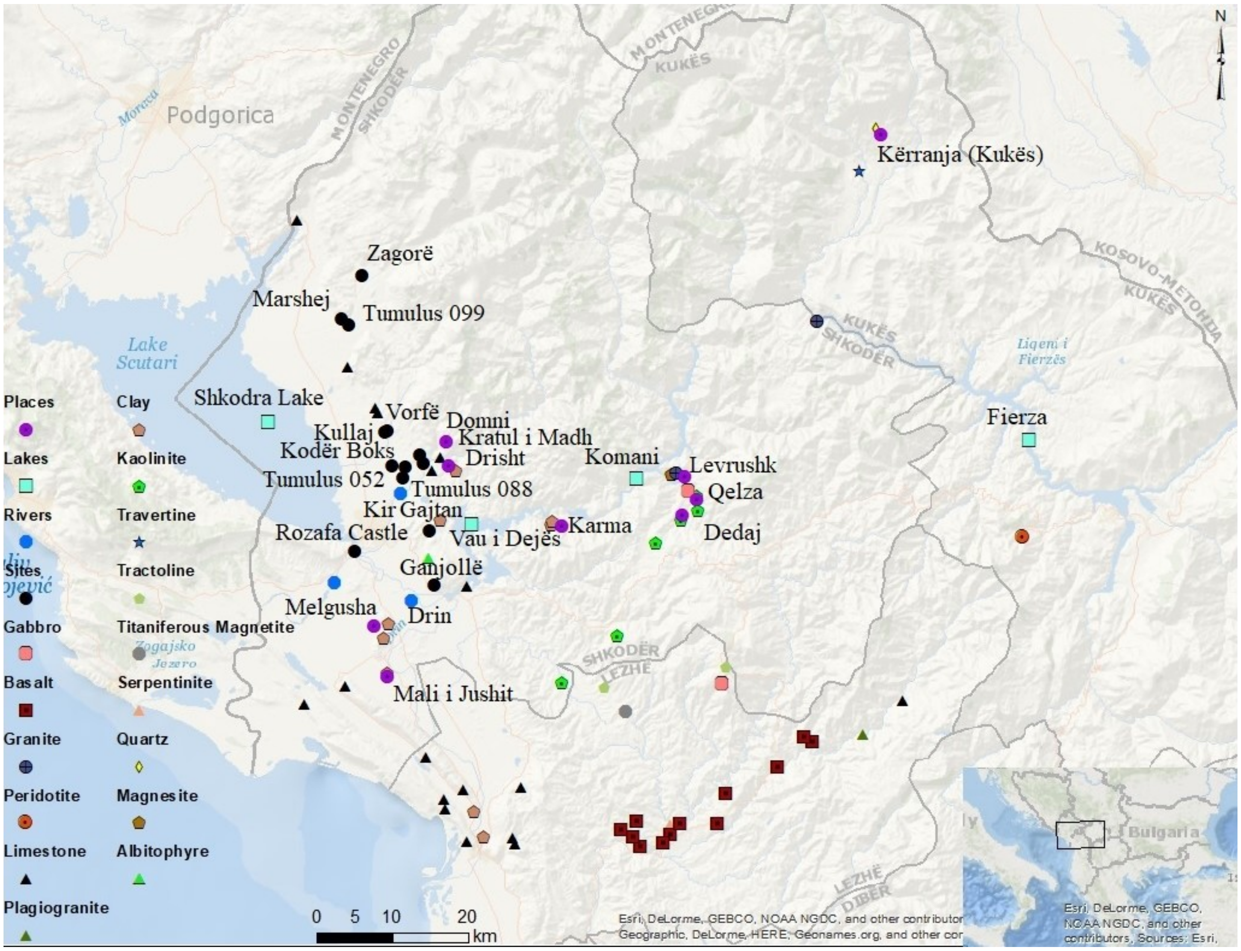


Figure 1 The map represents the main prehistoric archaeological sites, clay sources, and mineralogical composition of the Shkodra Region and its surrounding area. Data about geological sources were obtained from Gjeoportali i Shqipërisë: Autoriteti Shtetëror për Informacionin Gjeohapësinor "ASIG". http://geoportal.asig.gov.al

However, recent geological evidence reveals that the Shkodra Region has a diverse mineralogical composition (Figure 1). Common minerals found in Albania, including the Shkodra Region, are quartz, quartzite, and quartz sandstone (Leka et al. 2012: 97, 99). However, other kinds of minerals such as albitophyre (close to Ganjollë), magnesite (Levrushk), and quartz (Kërranja, Kukës) are present in the region and nearby areas (http://geoportal.asig.gov.al). Also, Çina (2012: 13) mentions the presence of additional ones identified in the area such as quartz (Dedaj, Shkodër), serpentinite (Lezhë), titaniferous magnetite (Lezhë), tractoline (Lezhë), and travertine (Kërranja, Kukës). Moreover, Team F, which surveyed the area around Kodër Boks, Vorfë, and Kratul, has found mineral ores such as hematite or magnetite during the PASH survey (PASH project, unpublished data).

Apart from minerals, rock types provide an extensive amount of information for determining the provenance and exchange patterns of pottery finds. Similar to minerals, rocks can occur naturally in clay, and, therefore, pottery. But, they also can be intentionally added by the potter to the clay. The identification of rock types provide valuable archaeological information when it comes to the origin of raw materials. The main rock types found in the Shkodra Region and its surrounding are gabbro (Levrushk and Lezhë), basalt (Lezhë), granite (Levrushk and on the border with Kukës and Fierzë), and peridotite (Kukës) (Haklaj and Tashko 2012; Hoxha and Boullier 1995: 224). In the PASH study region, limestone resources mainly dominate the area, especially in the Mbishkodër part.

Over a five-year period, from 2010-2014, PASH surveyed and conducted excavations at sites in both the Mbishkodër and Nënshkodër areas. The prehistoric (Late Neolithic to Late Bronze Age) pottery finds from test excavations at Gajtan (Site 011), Zagorë (Site 015), Kodër Boks (Site 007), and excavations at Tumulus 099 (Site 016) and Tumulus 088 (Site 014) are the primary focus of this thesis.

CHAPTER V

SITE INFORMATION AND THE STUDY SAMPLE

Geological evidence, geographical position, and archaeological data indicate that the Shkodra Region is a suitable area for living purposes. In this area, human activities date back to the Paleolithic (Korkuti 1995: 5). In their study on the paleoenvironment of the area, Mazzini et al. (2014: 5) point out the following:

> A multidisciplinary micro-paleontological study of a sediment core (SK19) drilled in the coastal area of Lake Shkodra, northern Albania, integrated with archaeological data from the Projekti Arkeologjikë i Shkodrës (PASH), provides compelling evidence for a long-term relationship between Shkodra's natural environment and its inhabitants.

As pottery comprise the largest percentage of archaeological finds in the area, the interaction between prehistoric groups and their environment seems to have been crucial, because the primary resources needed to produce it are clay, water, and wood.

This chapter will focus on work that 1) the PASH project conducted in the area, 2) background about sites, 3) pottery finds from previous work at Gajtan (Nënshkodër), Zagorë, Kodër Boks and tumuli in Shtoj and Shkrel (Mbishkodër), and 4) the sample selected for this study.

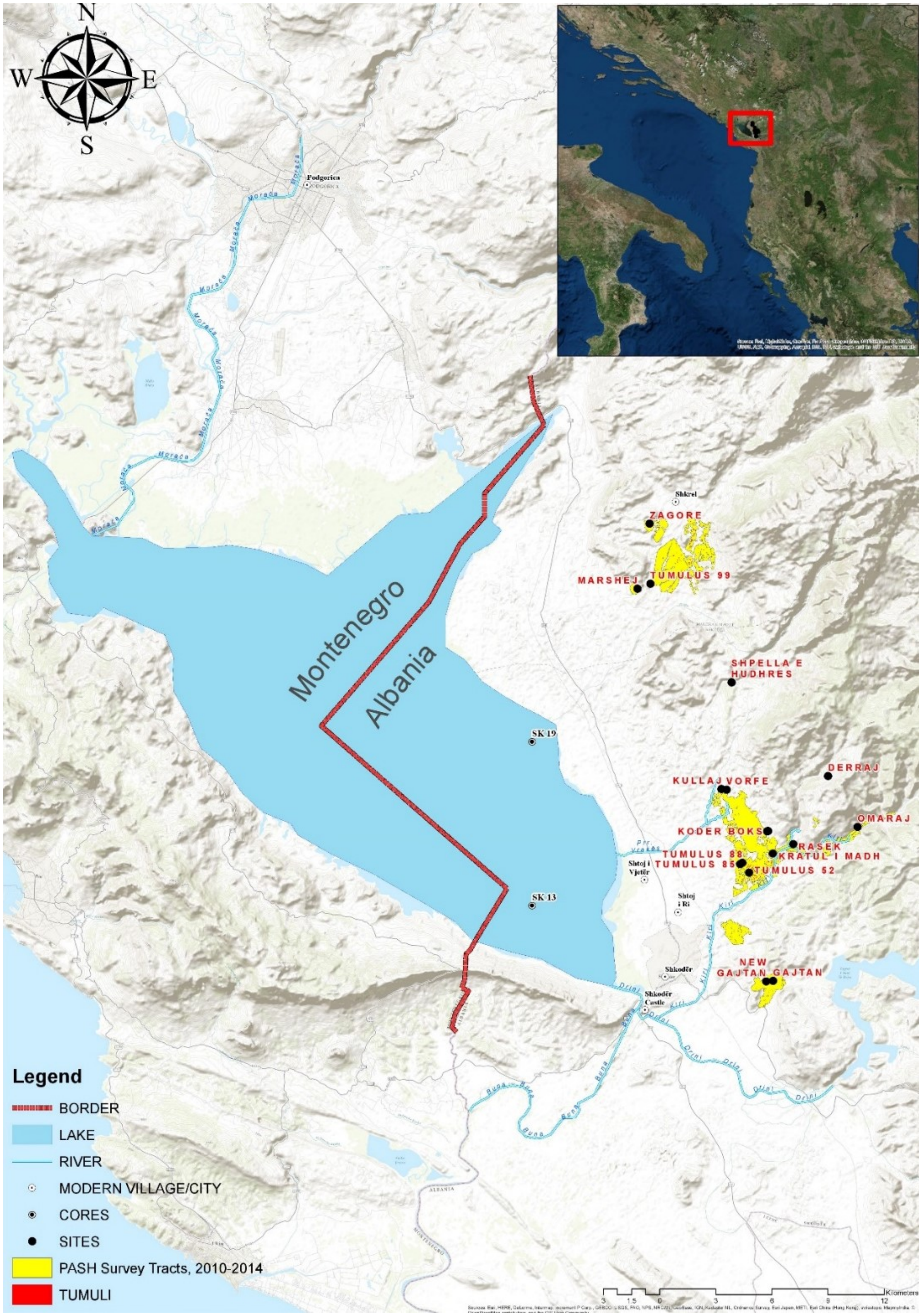


Figure 2 The Shkodra Region, the area covered by PASH project, prepared in ArcGIS by Shefqet Lulja

The PASH project (Figure 2) was carried out by Dr. Michael L. Galaty, now at the University of Michigan's Museum of Anthropological Archaeology, in collaboration with Dr. Lorenc Bejko of the Department of Archaeology and Cultural Heritage (DACH) at the University of Tirana (UT) in Albania. The aim of this project was to explain the origins of Mediterranean social inequality, from the Copper Age to Roman conquest or 3000 BC-1st century AD (https:/shkodraarchaeologicalproject.weebly.com/results.html). Over a period of five years, from 2010-2014, PASH intensively surveyed 2,518 tracts covering approximately 16 sq km in the Shkodra region using standard Mediterranean survey methods (Mazzini et al. 2016: 5; PASH project, unpublished data)[1].

During the survey seasons, PASH targeted several tumuli and sites with high artifact density for excavations: Gajtan (Site 011), Zagorë (Site 015), Kodër Boks (Site 007), Tumulus 088 (T 088 Site 014) in Shtoj, and Tumulus 099 (T 099 Site 016) in Shkrel. During the course of the project, PASH test-excavated three settlements: Gajtan (Site 011), Zagorë (Site 015), and Kodër Boks (Site 007). The method of artifact collection from these sites was via test excavation in 1x1 and 2x1 m units, each of which was divided into arbitrary levels of 10 cm thickness. To show provenance, pottery finds collected in Gajtan were given an ID# such as S011/U001/L 001/1. This example refers to Site 011 (Gajtan), Unit 001, Level 001, and pottery piece 1. Pottery from site excavations Kodër Boks were labeled in a similar manner: e.g., S007/U001/L 001/1. This example refers to Site 007 (Kodër Boks), Unit 001, Level 001, pottery piece 1.

[1] Pottery sherds collected during the surveys are not included in this thesis; for more details, see Mazzini et al. (2016).

Additionally, four tumuli were excavated for the project, two of which are included in this study: T 088 (Site 014) and T 099 (Site 016). The former tumulus, which is circular-shaped, was evenly divided into four quadrants. Quadrants were subdivided into units and excavated in arbitrary levels of 10 cm thickness. To link artifacts with context, pottery finds collected in T 088 were given an ID# such as S014/T088/Q1B/L004/1; or, Site 014 (T 088), Q1B (i.e. quadrant 1, sub-quadrant B which indicates unit), L004 (level four), and pottery piece 1. Likewise, T 099 was evenly divided into four quadrants, each of which was divided into units. Units were excavated in arbitrary levels of 10 cm thickness. The following provides an example of the ID#s given for this tumulus (T 099): S016/T099/Q1/U002/L001/1; or, Site 016 (T 099), Quadrat 1, Unit 002, Level 001, and pottery piece 1 (PASH project, unpublished data).

"The sites produced pottery from the Final Neolithic through the Classical period, with the bulk of the material dating to the Early and Late Bronze Age" (Mazzini et al. 2016: 5). Of the pottery collected during survey and excavations (Figure 3), 127 sherds were broken with pliers and taken as samples for analysis with Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS), at the Elemental Analysis Facility at the Field Museum of Natural History in Chicago. Similarly, 19 clay fragments (prehistoric daub) were analyzed chemically. Samples studied under the petrographic microscope were selected from those subjected to chemical analysis. Nevertheless, in this study, their results will not be compared.

The pottery sherds sampled for this research were all handmade; none of them were made with a wheel. Paradigmatic classification, explained in Chapter VII, will be used as a complementary technique to draw conclusions, since my sample size for petrographic examination is limited. Sherds selected were thin-sectioned then analyzed qualitatively and quantitatively (Chapter VII). They all came from test excavations at Gajtan (Nënshkodër), Zagorë, Kodër Boks, Tumulus 088 in Shtoj, and Tumulus 099 in Shkrel (Mbishkodër). This section summarizes the archaeological research previously done at these sites and the sample selection.

Gajtan-Site 011

Gajtan (PASH Site 011) is located about 5 km from the city of Shkodër on a rocky hill at 193 m altitude in the southeastern part of the region, between Gur i Zi and Rrenc villages (Jubani 1966: 41; Korkuti 1979: 121-122). The settlement of Gajtan is built on a flat platform, creating two ridges that join in a narrow steep ditch (Islami and Ceka 1965: 448). An immense area in Shkodër, including the lake, comprises the view from the site. It is among seven previously identified fortified hilltop sites in the Shkodra region, including Marshej, Shkodër, Samobor, Ganjollë, Beltojë, and Danjë. In addition to these, PASH has identified several others, including Kullaj, possibly Kodër Boks, Vorfë, and Kratul i Madh.

In the archaeological literature, Gajtan is considered the main site of northern Albania (Prendi 1977: 5). Compared to Belaj, Beltojë, Ganjollë, and Shkodra Castle, previously excavated sites in the study area, consisting mainly of pottery finds and fortification walls, the settlement of Gajtan has a more extensive archaeological evidence (Hoxha 1987; Korkuti 1979; Lahi 1987; Lahi 1993; Jubani 1966; Prendi 1987). This site represents a complex prehistoric settlement. Previously, archaeological excavations have identified a fortification wall (which is still present today), evidence of kiln remains (thought to be used for pottery production) (Figure 3), and vessels used as urns (usually used to bury children) (Islami and Ceka 1965; Korkuti 1979). In terms of mobile artifacts, the main finds have been pottery sherds, two stone axes, a few grinding stones, a whetstone, and some tools for pottery production (Islami and Ceka 1965: 450).

Figure 3 The remains of the kiln in Gajtan, photo courtesy of Zamir Tafilica.

This is an old photo and does not have an orientation or measurement units to create an idea about the size of the kiln.

Gajtan's impressive fortification wall is still visible, with measurements of 90 m long, 3.50 m wide, and 2.40 m high at maximum (Islami and Ceka 1965; Korkuti 1979: 122). The area inside the fortification wall is about 5 ha (Korkuti 1979: 122). In addition to fortification walls, in the first excavation project in 1961, a complex of kilns, of which three are partly preserved, was found (Islami and Ceka 1965: 449-450; Korkuti 1979: 123). The three furnaces are horseshoe-shaped, paved, and covered with clay (Figure 3)

(Islami and Ceka 1965: 450)[2]. This information indicates that at least some residents of Gajtan used to produce pottery during prehistory. Unfortunately, during the PASH project, the archaeologists could not identify the exact location of these kilns since the information about them is vague and they have most likely been destroyed. Additionally, during previous excavations, infants' bones have been found inside some of the vessels (Islami and Ceka 1965: 450 and Korkuti 1979: 123). These findings tell us that prehistoric groups living in Gajtan used their space not only for living purposes but also for producing pottery and as a burying place for people (children).

In addition to furnaces, diverse pottery forms such as bowls, amphorae, jars, and vessels have been found at Gajtan (Jubani 1966: 43 - 62; Korkuti 1979: 122 - 123). Archaeologists have described previously found vessels with little variability in terms of fabric composition, although sherds with fine fabric and other poorly fired ones mixed with white limestone or sand inclusions are found (Jubani 1972: 378, 382, 393; Korkuti 1979: 123). The surface treatment is another component of the pottery. Regarding surfaces, a characteristic of pottery found at Gajtan is the porosity of the sherds, which, according to Jubani (1972), is a consequence of weathering (Jubani 1972: 378), but pottery also appears to be slipped (Korkuti 1979: 123). The colors of the vessels vary from gray to black to blackish or reddish (Jubani 1972: 378, 382, 393; Korkuti 1979: 123)[3].

Previously, researchers associate potsherds found at this site with those found in other areas, inside and outside the country, using vessels or potsherds' styles. Based on

[2] Details about the sizes of the kilns are available in Islami and Ceka (1965: 450).
[3] Decorative patterns, shapes, and forms are excluded from the pottery description since they are not the focus of this research.

shapes and decorative patterns, some of the vessels obtained in Gajtan are analogous to those discovered in other parts of the Shkodra Region such as Zagorë, Belaj, Shtoj, Beltojë, Kratul and Ganjollë and in other parts of Albania such as Mat, Kukës, Pazhok, Korçë, Maliq and Vajzë (Andrea 1996; Fistani 1983; Jubani 1972; Koka 1985: 242; Koka 1990: 33-46; Korkuti 1979: 123; Lahi 1988: 69-76; Lahi 1993: 204; Prendi 1987: 242). However, Korkuti (1979: 124) and Islami and Ceka (1965: 450) consider these vessels as representing local production.

Other archaeologists state that some of the pottery sherds found in Gajtan show links with the Ljubljana and Glasinac cultures (Central Europe) (Lafe and Galaty 2009: 108; Jubani 1972; Prendi 1998: 78). During the Early Bronze Age, northern Albania had connections with other parts of the country (Lafe and Galaty 2009: 108). Prendi (1998: 78) dates pottery from Gajtan by comparing its types with those found in northeastern Adriatic cultures. The earliest period, Early Bronze Age, has similar shapes and decorative patterns with Ljubljana and later ones, Middle and Late Bronze Age, with the central area of the eastern Adriatic. Although these analogies are very helpful for understanding cultural patterns, when it comes to production centers, distribution, and exchange patterns, the situation is unclear. Luckily, the PASH project has recovered many pottery sherds from test excavations that will help clarify problems raised in this thesis.

Previously, the chronology of this settlement was believed to belong from the Early Bronze Age (3100-2000 BC) to the IV-I century BC (Hoxha 1987: 74; Jubani 1983: 249; Jubani 1966:41; Korkuti 1979: 122). Fortunately, test excavations conducted in the framework of the PASH project, analysis of pottery finds (done by PASH pottery specialists), and radiocarbon dating helped in the reevaluation of the chronology of the site, including elucidating evidence for Late Neolithic (5th millennium BC) and Copper Age/Eneolithic (4th millennium BC) occupations. Therefore, Gajtan prehistoric pottery sherds analyzed in this thesis, discovered by PASH project, dates into several periods such as the Eneolithic, Bronze Age (3100-1000 BC), and Early Bronze Age (3100-2000 BC) to Late Bronze Age (1600-1000 BC). Stratigraphy, traditional pottery types (dated by Dr. Lorenc Bejko), and ^{14}C dates were used to date potsherds from this settlement.

Zagorë-Site 015

Zagorë (PASH Site 015), an unfortified open hill site, is located on a terrace on the southeastern part of a hill in the village of Zagorë in Shkrel, Mbishkodër (Andrea 1987: 240). Compared to Gajtan, Zagorë represents lighter artifact density, and both the settlement and the artifacts discovered there are less studied. The first excavation at the site was conducted in 1987. During the excavation, various kinds of artifacts were unearthed such as pottery, daub, a bone necklace, grinding stones, and spindle whorls (six biconical and spherical ceramic ones), which, according to Andrea (1987: 240; 1996: 21), belong to the Bronze Age. Among Andrea's findings at this site were traces of a floor made of daub over a wattle platform and fragments of fireplace with a thin layer of clay placed over a pebble-stone layer (Andrea 1987: 240; Andrea 1996: 21).

At this site, pottery sherds make up the largest number of unearthed artifacts; they come in various shapes and decorative patterns (Andrea 1987; Andrea 1996). Similar to Gajtan, excavations done previously at Zagorë have unearthed different vessel forms such as bowls, amphorae, jars, and other vessels (Andrea 1987; Andrea 1996). The composition of fabrics of the potsherds previously found on this site shows little variability, being composed of sand, crushed rocks, and crystal minerals (Andrea 1996: 23). Their surfaces are porous, a consequence of weathering, with reddish brown and a few dark gray and ochre colored sherds (Andrea 1996: 23, 31). Vessels with smaller sizes appear to be slipped (Andrea 1996: 23, 31). Potsherds with slipped surfaces are dark gray or black (Andrea 1996: 31). As will be done for Gajtan, for the goals of this research I present descriptions only of the composition of the potsherds.

Based on shapes and decorative patterns, the pottery sherds found in Zagorë have analogies with other ceramics found at Gajtan, Belaj, the tumuli in Shkrel and Shtoj, Beltojë, Mat (northern Albania), etc. (Andrea 1987: 240-241; Andrea 1996; Koka 1990: 33-46; Koka 2010; Lahi 1988: 69-76; Prendi 1987: 242). In addition, Andrea (1996; 1987) states that there are analogies with potsherds discovered outside the country. For instance, in the Central Adriatic or Cetina culture areas, archaeologists have found cooking pots ("vorba" with biconical bodies) that often occur in Zagorë (Andrea 1996: 25, 26). Despite analogies between pottery stylistic types within and outside the country, it is unclear if vessels found in Zagorë are locally produced or imported.

Prior work provides priceless information about the site of Zagorë. But there is still a need to clarify certain issues about pottery production and its distribution in the Shkodra Region. What was the role of the Zagorë settlement in the region? Is pottery found at this site local, or imported from Gajtan or somewhere else? What about exchange patterns? Answering these questions will provide not only a better understanding of prehistoric groups in the Shkodra Region, but also new data for Albanian archaeological studies in general.

Previous studies show that the occupation of Zagorë spans from Early Bronze Age to Late Bronze Age (Andrea 1996: 26, 27). In order to clarify the chronology, the PASH project conducted test excavations at Zagorë. Based on PASH data, the occupation of Zagorë settlement started during the Eneolithic and not the Early Bronze Age as had been previously thought, and Prehistoric pottery analyzed in this thesis dates from Eneolithic to Late Bronze Age (PASH project, unpublished data).

Kodër Boks-Site 007

Kodër Boks (PASH Site 007) is an archaeological site located in the neighborhood Kodër Boks in the Mbishkodër area of the Shkodër region. There is no previously published archaeological research from the site. The only archaeological find mentioned is one Albanian-Dalmatian type ax (Jubani 1984: 129). However, survey (conducted by Team B) and test excavations conducted on this site by the PASH project brought to light numerous artifacts such as pottery, tiles, and other remains as well as architectural remains such as daub. Preliminary macroscopic examination of prehistoric pottery recovered through test excavations at this site indicates that the assemblage mostly belongs to the Bronze Age.

Tumuli

In addition to settlements, pottery analyzed in this study was also recovered from Tumulus 099 (PASH Site 016) in Shkrel and Tumulus 088 (PASH Site 014) in Shtoj. Unfortunately, I could not include Tumulus 052 (PASH Site 008) in the study due to small sample size.

Tumuli, or burial mounds, constitute a special component of the landscape in Albania. They are built of soil and stones, forming a circular mound 10-30 m diameter (Lera et al. 1983: 249). These mounds have similar architectural characteristics with the exception of size, artifact density, and the number of burials (Jubani 1995: 53). According to Mazzini et al. (2016: 10), "the appearance of tumuli on the Shkodra plain during the Early Bronze Age seems to be related to the establishment of a marshland environment." In the Shkodra Region, these sites are located in the Mbishkodër subarea, particularly the Shtoj and Shkrel plains.

In the northwestern part of the city of Shkodër, near Montenegro, is located the Shkrel plain; a massive field surrounded by a karstic mountainous area (Jubani 1995: 53). Burial mounds are mostly concentrated in the villages of Dedaj, Lohe, and, to a lesser extent, in Zagorë. In the framework of the PASH project, this area was surveyed by Team E and the tumulus excavated in this area is Tumulus 099. The tumuli of Shtoj plain are located in the northeastern part of the city of Shkodër, 5 km from the city center, to the west of the Kir River between Boks and Dragoç villages and the Mes bridge, in the area of Postribë (Koka 1985: 241; Koka 1990: 27; Koka 2010: 8).

Previous archaeological excavations have produced numerous archaeological finds from the Shkodra Region. Among these finds are: fibulae, glass and bronze beads, iron knives, iron pins, hand axes, and potsherds, which constitute the typical artifacts in this area (Koka 2010). However, vessels are the most common artifact. According to archaeologists, tumuli in Shkrel and Shtoj have produced different prehistoric vessel forms such as bowls, amphorae, jars, and other vessel types (Koka 1990; Koka 2010).

Pottery sherds found from tumuli in the Mbishkodër area appear with fine fabrics mixed with frequent sand and quartz inclusions of various colors (Koka 1990: 33-46; Koka 2010; Lera et al. 1983: 250). Concerning surface treatment, Bronze Age pottery sherds recovered in Shtoj and Shkrel have porous and slipped surfaces (Koka 1990: 33-46; Jubani 1995: 56; Koka 2010). Regarding colors, they are brown to light gray or black, and reddish (Koka 1990: 33-46; Koka 2010; Lera et al. 1983: 250). Fragments with slipped surfaces are usually black. Based on fabric composition, Lera et al. (1983) mention that some of the prehistoric pottery sherds found in Shtoj are of local production. Many of them have analogies with sherds found in Gajtan and Zagorë (Koka 1990: 33-46; Koka 2010). Despite all this, archaeologists more often link vessels found in Shtoj and Shkrel with the Cetina culture because they bear its style decorations (Jubani 1995: 54, 71; Koka 1985: 242; Lafe and Galaty 2009: 10). The use of tumuli in the Shkodra Region spans from the Early Bronze Age to the 1st century A.D. (Koka 2010).

Similar to sites described above, pottery collected previously from tumuli in Shtoj and Shkrel is analyzed to construct chronologies and identify cultural patterns based on analogies. These sites hold essential information in understanding human interaction in the past, including the relationships between settlements. Hence, petrography is an advantageous method for helping decode the past. In 2014, PASH excavated Tumulus 088 and Tumulus 099. Unlike T 099, T 088, located in the village of Dragoç, Mbishkodër area, represents some kind of long-term ritual installation, used (probably discontinuously) from the Final Neolithic through the Late Roman period (Mazzini et al. 2016: 5). During the excavation process, there were no graves found in the tumulus.

Sample Selection

The opportunity to analyze pottery sherds from major sites in the Shkodra Region can provide valuable evidence about research questions stated earlier in this thesis. Therefore, in creating pottery types using paradigmatic classification and applying petrography to obtain quantitative and qualitative data, I have several objectives concerning understanding pottery production in this region: 1) identifying raw materials exploited by potters to produce pottery; 2) gathering data about the pottery production mode and whether one center or various centers throughout the region produced pottery simultaneously; and 3) examining distribution patterns of the pottery types. To achieve these objectives, reference groups produced through quantitative and qualitative data (petrography) will be compared with the distribution of pottery types (produced through paradigmatic classification, Chapter VII).

Pottery finds in test excavations were numerous, but, due to the level of preservation, it was hard to determine what shapes the vessels had. After examining some of the diagnostic fragments, PASH project specialists found that test excavations brought to light bowls, amphoras, jars, etc. However, forms and shapes are not the focus of this thesis. Pottery sherds recovered during the test excavations in the Shkodra Region were examined to produce pottery types (Chapter VII). A total of 1056 out of 3333 (32%) pottery sherds from Gajtan, Zagorë, Kodër Boks, T 099, and T 088 were analyzed macroscopically (Table 3). As noted above, not all the pottery was analyzed macroscopically, for several reasons. First, paradigmatic classification is focused only on three, presumably functional properties: thickness, surface treatment, and hardness of body sherds (Chapter VII).

Table 3 Study sites with totals and percentages of potsherds analyzed macroscopically to produce pottery types.

Sites	Number Analyzed	Total Number	Percentages
Gajtan	614	1985	31%
Zagorë	295	898	33%
Kodër Boks	57	295	19%
Tumulus 088	48	58	83%
Tumulus 099	42	97	43%
Total	1056	3333	32%

Therefore, if one or both surfaces of the pottery sherds were damaged, the fragment was excluded from the analysis. Likewise, diagnostic sherds such as bases, handles, decorated parts, and rims were not included in the analysis unless they were part of the body of the vessel. Second, in cases where the sherds belong to the same vessel, only one sherd was analyzed macroscopically. Finally, the number of collected ceramics examined macroscopically in this thesis corresponds to the number of entries in the ceramic finds database (PASH project, unpublished data). While entries are typically associated with one artifact, some others are associated with two or more. For instance, ceramic pieces that belong to the same period, come from the same level, and have similar physical properties are entered in the pottery database under one entry. Below are descriptions of samples selected for macroscopic examination.

Gajtan Site-011 Three hundred and ninety-nine potsherds were analyzed macroscopically from Unit 001, from Level 000 to 016[4]. Nineteen potsherds were

[4] There is no Level 011 for Unit 001.

analyzed macroscopically from Unit 002, from Level 000 to 006. One hundred and ninety-six pieces were analyzed macroscopically from Unit 003, from Level 000 to 018 (including wall cleaning).

Zagorë Site-015 Eighty-seven potsherds were analyzed macroscopically from Unit 001, from Levels 000 to 010; seven potsherds from Unit 002, from Levels 000 to 001; 22 pieces from Unit 003, from Levels 001 to 006; 67 pieces from Unit 004, from Levels 001 to 004; 20 pieces from Unit 005, from Levels 002 and 003; 77 pieces from Unit 006, Levels 001, 003 to 007, and 15 pieces from Unit 007, Levels 001 to 003, 004 and 006.

Kodër Boks Site-007 Three potsherds were analyzed macroscopically from Unit 001, from Level 004; 38 potsherds from Unit 002, from Levels 001 to 006 and 007, Feature 1; 15 pieces from Unit 004, from Levels 002 to 003; and one piece from Unit 005, Level 001.

Tumulus 88 Site-014 Three potsherds were analyzed macroscopically from Unit 000, from Level 003; seven potsherds from Quadrant 1 B/C, from Levels 004 to 006; 10 potsherds from Quadrant 1 C, from Levels 005-007; 19 pieces from Quadrant 4 B, from Level 007; four pieces from Quadrant 4 C, from Levels 003 and 005; one piece from Quadrant 4 D, from Level 004; and four pieces from the baulk between Q1 and Q4.

Tumulus 99 Site-016 Three potsherds were analyzed macroscopically from Unit 001, from Levels 004-005; one piece from Unit 002, from Level 001; 13 potsherds from Quadrant 1, Unit 002, from Levels 001, 002; four potsherds from Quadrant 1, Unit 003, from Levels 001, 002; one piece from Quadrant 1, Unit 004, from Level 001; three pieces from Quadrant 1, Unit 005, from Level 001; one piece from Quadrant 2, Unit 000; eight pieces from Quadrant 2, Unit 006, from Level 001; one piece from Quadrant 2, Unit 007, from Level 001; four pieces from Quadrant 3, Unit 010, from Level 001; one piece from Quadrant 4, Unit 012, from Level 001; and two pieces from Quadrant 4, Unit 013, from Level 001.

For the purpose of this study, and given the level of preservation of the pottery sherds, the following description is only focused on fabric characterization, thickness, surface treatment, color, and hardness (Chapter VII). The macroscopic characteristics of sherds presented below is based on Orton and Hughes's (2013) book *Pottery in Archaeology, Second Edition*.

Inclusions: Reddish and dark brown rocks and limestone inclusions with round and angular shapes are distinguishable from the fractions of the pottery sherds. Some of the fragments have no visible inclusions.

Thickness: Artifacts have thin, medium, and thick walls (Chapter VII).

Surface: Porous surfaces are common, but fragments with slipped ones are present as well (Figure 4). Pottery fragments with treated surfaces differ from one another in their colors and hardness. Eneolithic sherds have black slips whereas Bronze Age ones have red ones. Those with black slips are smooth.

Color: Surface color divides the fragments of this level into two groups, reddish and black. Fragments with reddish surfaces have thicker walls compared to black ones. Generally, vessels appear poorly fired in a reduced atmosphere.

Hardness: Pottery fragments were hard and soft; sherds with soft surfaces are commonly porous, the others slipped. For more information, a detailed description of the specimens analyzed macroscopically is presented in Appendix A.

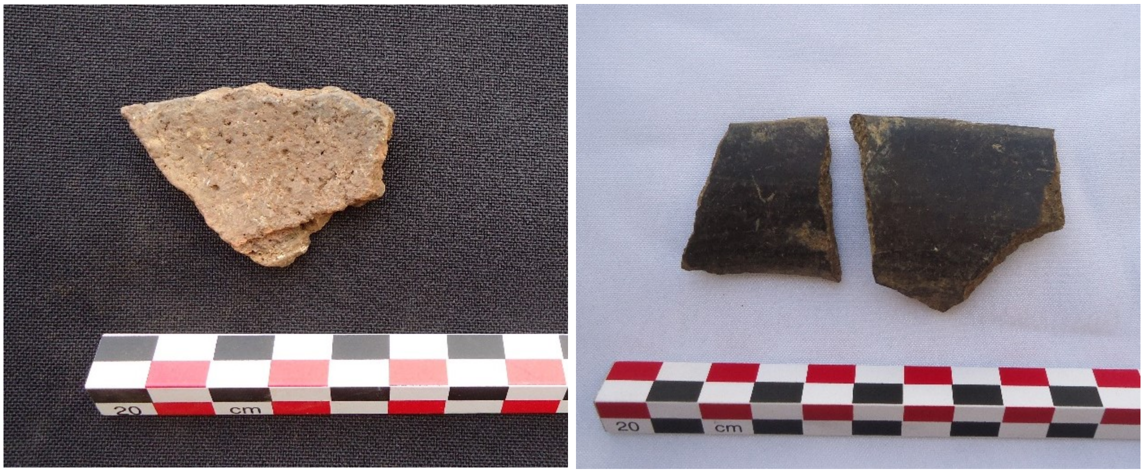


Figure 4 The picture on the left shows a pottery fragment with porous surfaces (PASH 2014 S007-U002-L007-32) and the one on the right shows a potsherd with black slipped surfaces (PASH 2014 S011-U003-L004-2). Scale units are in centimeters. Pictures taken by Michael L. Galaty.

Besides macroscopic examination, some of the sherds from Gajtan, Zagorë, Kodër Boks, and Tumulus 099 were subjected to petrographic analysis. Samples were chosen to represent all prehistoric periods from Eneolithic to Late Bronze Age. For this analysis, twenty-eight specimens were selected in total. Due to the method's destructive character and lab requirements about thin sections (standard: 27x46), sample choice was limited. Therefore, fragments with decorative patterns, diagnostic pieces, and those with smaller dimensions were not considered for petrographic analysis. Unfortunately, no potsherds from T 088 were included as they were too small to be thin sectioned. Besides pottery, pieces of daub, assumed to be a local production, were purposely included to provide proxy measures of local clay types. As mentioned in the beginning of this chapter, samples subjected to petrography were selected from those subjected to chemical analysis. Therefore, ID#s used for petrographic data plots (Chapter VII) will be those derived from the chemistry work. Below, I provide information about their archaeological contexts and chemical ID#s.

From Gajtan, thirteen samples were selected for petrographic analysis, ten pottery sherds out of 614, and three daub (clay). These are:

SD075-S011/U003/L004/21

SD076-S011/U003/L004/16

SD077-S011/U003/L004/18

SD080-S011/U003/L003/12

SD089-S011/U003/L005/15

SD090-S011/U003/L004/17

SD091-S011/U003/L003/11

SD093-S011/U003/L004/22

SD094-Daub S011/U003/L003/14/a

SD096- Daub S011/U003/L012/10

SD097-S011/U003/L004/14

SD098-S011/U003/L004/13

SD099- Daub S011/U003/L005/17

Samples selected for petrographic analysis were labeled as follows: SD075 S011/U003/L004/21 refers to SD075 (code derived from chemical analysis) and S011/U003/L004/21 (archaeological context).

The results of radiocarbon dates from Gajtan conducted by the PASH project show that: 1) Unit 001 Level 013 dates back to LENEO (4690-4520 BC); 2) Unit 003 Level 004 dates back to LBA (1405-1220 BC); 3) Unit 003 Level 010 is MBA (1880-1690 BC); and Unit 003 Level 012 is ENEO (3765-3645 BC) (PASH project, unpublished data).

From Zagorë, seven samples were selected for petrographic analysis, including five out of 295 pottery sherds and two daub samples:

SD053-S015/U004/L002/32 a

SD054-S015/U004/L002/32 b

SD057-S015/U004/L001/16 a

SD058-S015/U004/L002/33

SD059- Daub S015/U004/L001/18

SD060- Daub S015/U003/L003/9

SD103-S015/U06/L004/29 a

The results of radiocarbon dates from Zagorë conducted by PASH project show that Unit 004 Level 003 dates to LBA (1425-1265 BC BC) (PASH project, unpublished data).

From Kodër Boks, five samples were selected for petrographic analysis, four out of 57 pottery sherds and one daub:

SD063-S007/U004/L003/80 a

SD070- Daub S007/U004/L003/80 b

SD066-S007/U002/L007/58 b

SD073-S007/U002/L007/58 a

SD069-S007/U004/L002/2 b

From T 099 three out of 42 pottery samples were selected for petrographic analysis:

SD004-S016/T099/Q1/U002/L001/9

SD012-S016/T099/Q1/U002/L001/10 c

SD008-S016/T099/Q2/U006/L001/4 b

Surface

My research includes handmade prehistoric pottery recovered from four sites. Based on the preliminary examination of potsherds, Bronze Age pots are not well manufactured, are partially oxidized, and have untreated surfaces, unlike the Eneolithic ones. In the following chapters macroscopic and microscopic examination of this pottery will clarify aspects of its manufacture.

CHAPTER VI

LITERATURE REVIEW

Earlier studies on the source, production centers, and exchange patterns of pottery in the Shkodra Region do not apply scientific methods, including petrographic and chemical analysis. The use of petrography in this research will be the first of its kind conducted on prehistoric pottery in Albania.

As mentioned in previous chapters, pottery studies in Albania and the Shkodra Region, in particular, have been developed under the influence of the culture history approach. Researchers have macroscopically studied pottery based on two properties, stylistic patterns and morphological composition of the pots. Hence, depending on these qualitative descriptions, analogies among potsherds found inside and outside the country were observed. For instance, as mentioned in Chapter V, based on vessels' shapes and their decorative patterns, many of the vessels discovered in Gajtan are thought to have analogies with those within the Shkodra Region such as Zagorë, Belaj, Shtoj, Beltojë, Kratul, and Ganjollë and in other parts of Albania such as Mat, Kukës, Pazhok, Korçë, Maliq and Vajzë (Andrea 1996; Fistani 1983; Jubani 1972; Koka 1985: 242; Koka 1990: 33-46; Korkuti 1979: 123; Lahi 1988: 69-76; Lahi 1993: 204; Prendi 1987: 242). Similarly, other archaeologists link pottery sherds found in Gajtan with the Ljubljana and the Glasinac cultures (Central Europe) (Lafe and Galaty 2009: 108; Jubani 1972; Prendi 1998: 78). Consequently, these considerations allowed archaeologists to draw inferences about the provenance of potsherds. For example, many potsherds found in Gajtan were considered local products because they did not share similar decorative patterns with those found outside the area, and their fabric apparently was local (Islami and Ceka 1965: 450; Korkuti 1979: 124). Similar was the case for Zagorë and tumuli (Andrea 1987; Andrea 1996; Jubani 1995; Koka 1985; Koka 1990; Koka 2010; Lahi 1988: 69-76; Prendi 1987). Certainly, the culture history orientation influenced research in pottery studies in the Shkodra Region.

Despite the enormous amount of work done on pottery styles, the culture-historical descriptive method has been highly criticized (Rafferty 1986). Evolutionary archaeologists point out that pottery types and varieties are not defined using the same set of dimensions and attributes, and many definitions are purely descriptive in character (Chapter VII) (Dunnel 1971; Rafferty 1986). In contrast, they suggest using paradigmatic classification, which produces pottery classes by intersecting modes of different dimensions (Chapter VII) (Dunnell 1971). This method has three advantageous characteristics: first, all of the definitive criteria are equivalent; second, paradigmatic classes are unambiguous; and third, classes are comparable with other classes in the same classification (Dunnell 1971: 73, 74). There is no evidence suggesting the use of this technique to study artifacts in the Shkodra Region, nor in Albania in general. Hence, paradigmatic classification of pottery analyzed macroscopically, as used in this research, introduces a new way to study archaeological finds in Albania.

Given the lack of scientific methods in past pottery studies performed in Albania and the success of petrography in such investigations elsewhere, it is important to discuss cases where petrography was used in the problem-oriented study of archaeological ceramics. Even though mineralogical analysis is limited when it comes to fine wares, as minerals are undetectable under the microscope (D. Peacock 1970), archaeologists widely use transmitted light microscopy, especially for the analysis of coarse wares. Through petrography, archaeologists gain potential information about provenance, trade patterns, and production centers (Belfiore et al. 2007; Cohena et al. 2018; Day 2005; Ellis 2000; Eckret et al. 2013; Galaty 1999; Gasćona et al. 2014; Neff 2012; Peacock 1970; Quinn 2013; Reedy 2008; Rice 1978; Stoltman 2015; Stoltman 2002; Spataro 2010; Stoltman 1989; Peacock 1970; Peacock 1981; Whitbread 1995).

As a method, geologists first used petrography to describe and classify rocks, soils, and sand (Reedy 2008; Quinn 2013). The application of petrography in the field of archaeology started in the 19th century, beginning with the contributions of Henry Clifton Sorby, who is considered the founder of petrography (Quinn 2013: 10; Quinn 2009: 2). Later, during the 20th century, ceramic petrography was used by numerous archaeologists such as Anna Shepherd, David Peacock, Henry Hodges, Ian Whitbread, Frederic Matson, Ian Freestone, James Stoltman, etc. (Quinn 2013: 10-16). Many archaeologists use petrography today in the study of ceramic materials.

"Understanding the process whereby the raw materials of ceramics are transformed into finished ceramic products is a necessary precursor to the examination of both the products themselves and the remains of the manufacturing sites" (Orton and Hughes 2013: 121). Usually, petrography is used conjointly with chemical methods such as x-ray fluorescence, neutron activation analysis, or optical emission spectrometry (Belfiore et al. 2007; Eckret et al. 2013; Galaty 1999; Gasćona et al. 2014; Neff 2012; Peacock 1970; Stoltman 2002; Stoltman 2015; Spataro 2010; Whitbread 1995). However, this is not always the case, and there are many successful research studies that have used only petrography in the study of ceramics (e.g., Day et al. 2005; Fitzpatrick 2003; Hays et al. 2016; Stoltman 2015; Stoltman 2011; Shepard 1985).

Petrographic analysis of archaeological ceramics has been used to answer different research questions, especially in pinpointing the provenance of ceramics by looking at their physical properties in thin section. For instance, Whitbread (1995) identified the provenance of Greek transport amphorae based on analysis of their compositions and chemistry. Most archaeologists aim to determine the type of clay used and to identify rocks and minerals to provide information about provenance (Eckert et al. 2015; Cohena et al. 2018; Galaty 1999; Gascón et al. 2015; Neff 2012; Stoltman 2002; Whitbread 1995). Moreover, using petrography archaeologists have been able to understand trade patterns (Stoltman 1991; Whitbread 1995). Additionally, the use of petrography in the study of ceramics has provided evidence for cultural interaction between different societies based on the production centers (Fitzpatrick 2003). For example, Stoltman postulated patterns of cultural interaction between and among Hopewell societies in the Ohio Valley using quantitative petrography (Stoltman 1991; Stoltman 2015).

The PASH project made possible the scientific study of pottery sherds from the Shkodra Region through the application of petrography (in this thesis) and ICP-MS analysis conducted by Sylvia Deskaj. Based on the research studies mentioned here, I believe that analyzing petrographic specimens from the Shkodër Region will provide additional evidence regarding provenance, production centers, and possible exchange patterns.

CHAPTER VII

ANALYTICAL METHODOLOGY

In previous chapters, information was provided about theoretical considerations related to the research questions posed in this study. But as Dunnell (1971) points out "...theory is not an explanation, but principles by which explanation is achieved" (1971: 32). Hence, this chapter presents in detail the methods used to address the research problems raised in this thesis. Paradigmatic classification (macroscopic examination) and petrography (microscopic analysis) are the methods used for this study.

Pottery classification

Commonly, almost all research that focuses on pottery has a classification section based on macroscopic examination. Rice states that, "classification is a basic activity in all scientific disciplines - often called systematics - to express the structural relations underlying its subjects of study" (2015: 220). Similarly, Dunnell (1971) sees classification as "…arrangement which leads to systematics in science" (1971: 43). Hence, pottery sherds analyzed for this thesis are classified through an arrangement called paradigmatic classification, following Dunnell (1971). The purpose of pottery classification here was to produce pottery types and use them as complementary data for petrographic results (Chapter IX). The distribution of pottery types is shown in Chapter VIII using a Multiple Correspondence Analysis (MCA).

Dunnell (1971: 200) defines paradigmatic classification as a "dimensional classification in which classes are formed by intersection." These classes are mutually exclusive and exhaustive. A dimension is "a set of attributes or features which cannot, either logically or actually, co-occur" (Dunnell 1971: 71), whereas an attribute is "the smallest quantitatively distinct unit discriminated for a field of phenomena in a given investigation" (Dunnell 1971: 200). For instance, if thickness of potsherds is a dimension, variations in thickness would be subsumed under attributes.

To employ the certainty and unambiguity of the method, I built a paradigmatic table with three presumably functional properties: surface, hardness, and thickness (Table 4). The dimensions were determined based on Orton and Hughes's (2013) book, *Pottery in Archaeology, Second Edition*. The first dimension, surface, consists of three arbitrary attributes: porous, slipped, and other. "Porous" is defined as sherds with inner and outer porous (voids) surfaces, "slipped" is defined as sherds with a thin clay layer on both surfaces, and "other" consists of all other sherds that do not express the above attributes. The surfaces of the specimens were analyzed by examining them macroscopically. The second dimension, hardness, consists of two attributes: soft and hard. The attributes were defined based on resistance to abrasion from fingernail scratching. Sherds were defined as "hard" when their surfaces resisted finger scratching. Sherds were determined as "soft" when a fingernail could scratch their surfaces. The last dimension, thickness, consists of three attributes: "thin" (0-5 mm), "medium" (>5-8 mm), and "thick" (>8 mm). Measurements were taken using calipers. These dimensions and attributes described above were defined arbitrarily and pottery types produced by incorporating these attributes are designed to test the hypotheses in the current study.

The purpose of this classificatory scheme was to test whether the pottery manufacturing process was realized in household contexts by non-specialized individuals or at nucleated centers by specialists. Compared to specialized production, a household production would create a broad range of variability in ceramics. The distribution of pottery types was expected to provide evidence about whether potsherds from the Shkodra Region were locally produced or imported. Various ranges of pottery types at a site suggest local production, whereas, a limited number of them could indicate a possible import.

Dimensions such as surface, hardness, and thickness are useful in capturing variability in ceramics since they were assumed to be functional. The first dimension, surface, provides strong evidence about pottery manufacture. Specialized potters tend to produce in standardized ways, resulting in limited variations on pots' surfaces, whereas non-specialized potters do not, displaying greater variability. Similarly, the second dimension, hardness, provides evidence about the production mode. During the manufacturing process, specialized potters commonly use standard recipes which is not the case for household production. In measuring hardness, the results will show limited ranges for specialized production and broad ranges for unspecialized ones. Lastly, thickness is a straightforward dimension strongly related to production. Broad ranges in thickness of potsherds would indicate unspecialized production.

These presumed functional properties would help also in determining whether pots were manufactured locally or brought from elsewhere. Limited ranges in pottery type variability might suggest a possible import, and broad ranges of them would imply local production. The use of three dimensions to capture variability in ceramics that pertains to mode of production is powerful, as the resulting types derive from them.

A complete macroscopic characterization of attributes of pottery sherds is available in Appendix A. The intersections of the attributes described above in a paradigmatic classification produced eighteen classes (Table 4). Dunnell (1971) explains a class as a unit of meaning which is intentionally defined (1971: 71). None of them can co-occur in a paradigm since attribute intersections are mutually exclusive and exhaustive.

Table 4 Paradigmatic classification table with eighteen classes.

		Surface					
		Porous		Slipped		Other	
	Hardness	Soft	Hard	Soft	Hard	Soft	Hard
Thickness (in mm)	Thin: 0-5	1	2	3	4	5	6
	Medium: >5-8	7	8	9	10	11	12
	Thick: >8	13	14	15	16	17	18

As noted above, the purpose of constructing this classificatory scheme was to produce pottery types, the distribution of which can be examined over time and/or across space. Accordingly, each intersection of attributes produces a pottery type. For instance, Class 1 represents the pottery type Porous Soft Thin (pst): porous for the surface, soft for hardness, and thin for thickness (Table 5).

Table 5 Pottery types produced using paradigmatic classification and their abbreviations.

Classes	**Pottery types**	**Abbreviations**
Class 1	Porous Soft Thin	pst
Class 2	Porous Hard Thin	pht
Class 3	Slipped Soft Thin	sst
Class 4	Slipped Hard Thin	sht
Class 5	Other Soft Thin	ost
Class 6	Other Hard Thin	oht
Class 7	Porous Soft Medium	psm
Class 8	Porous Hard Medium	phm
Class 9	Slipped Soft Medium	ssm
Class 10	Slipped Hard Medium	shm
Class 11	Other Soft Medium	osm
Class 12	Other Hard Medium	ohm
Class 13	Porous Soft Thick	psth
Class 14	Porous Hard Thick	phth
Class 15	Slipped Soft Thick	ssth
Class 16	Slipped Hard Thick	shth
Class 17	Other Soft Thick	osth
Class 18	Other Hard Thick	ohth

One thousand and fifty-six potsherds coming from the Nënshkodër subarea (Gajtan), and from Mbishkodër one (Zagorë, Kodër Boks, Tumulus 088, and Tumulus

099), were analyzed macroscopically to see the distribution of their types across time and space and to reveal their relationship to these sites, as discussed in Chapter VIII.

Pottery types produced through paradigmatic classification were plotted into MCA to see their distribution across the Shkodra Region. As noted above, ordination performed via MCA analysis shows the relationships between sites and pottery types (Chapter VIII). Data collected from the macroscopic analysis were compared with the microscopic results to examine how pottery types were related to their mineralogical composition. Hence, the use of paradigmatic classification techniques helps to explore problems related to production mode and distribution of pottery types in the Shkodra Region.

Petrography

Before explaining how petrography is applied, Table 6 provides information about characteristics of the selected potsherd specimens as observed macroscopically. As Tykot (2004: 407) states, "for many materials, characterization begins with macroscopic observation and measurement of physical properties such as color." Hence, twenty-two potsherds and six daub thin-section specimens underwent macroscopic examination (Table 6). Recording aspects such as pottery type, period, surface and core color, and kinds and colors of visible inclusions was the focus of the macroscopic examination. A pottery type was determined using paradigmatic classification technique and surface and core color using Munsell Soil Color Charts, while daub fragments were characterized by colors only.

Table 6 Physical properties of pottery sherds selected for petrography.

ID #	Site	Pottery Type	Period	Surface Color	Core color	Fabric description
SD091	Gajtan	Slipped/Hard /Thick	Eneolithic	7.5YR 2.5/1 Black	5YR 3/3 Dark reddish brown	Many different types of inclusions; red, black, and grayish color. Well fired.
SD080	Gajtan	Other/Hard/ Thick	Early Bronze Age	7.5YR 3/2 Dark brown	2.5YR 4/4 Reddish brown	Frequent fine to coarse white and reddish-brown inclusions.
SD098	Gajtan	Slipped/Hard /Thick	Prehistoric (Bronze Age (?))	2.5YR 5/4 Reddish brown	2.5YR 3/3 Dark reddish brown	The fabric is mixed with coarse rock inclusions of dark reddish color.
SD097	Gajtan	Slipped/Hard /Thick	Prehistoric (Bronze Age (?))	7.5YR 5/3 Brown	7.5YR 3/1 Very dark gray	The fabric has many coarse inclusions. The profile has two layers; one has black and one brown color.
SD076	Gajtan	Slipped/Hard /Thick	Bronze Age	5YR 4/1 Dark gray and 5YR 5/6 Yellowish red	7.5YR 4/1 Dark gray	The fabric has medium and coarse inclusions of reddish, white, and grey color. Seems to have sandwich type profile; central layer has dark gray color. Well fired.
SD090	Gajtan	Slipped/Hard /Thin	Eneolithic	5YR 2.5/1 Black	5YR 2.5/1 Black	The fabric has fine inclusions of white and black colors; homogenous profile. Well fired.

Table 6 (continued).

SD077	Gajtan	Slipped/Hard /Thick	Early Bronze Age	5YR 5/4 Reddish brown and 5YR 2.5/1 black	7.5YR 3/2 Dark brown	Fabric is composed of different types of inclusions such as probably quartz, limestone, and some black and reddish ones. Well fired.
SD075	Gajtan	Slipped/Hard /Thick	Prehistoric (Bronze Age (?))	5YR 4/4 Reddish brown	5YR 4/4 Reddish brown	The fabric has frequent fine to coarse inclusions of reddish, white, and black color. The profile has homogenous color.
SD093	Gajtan	Slipped/Hard /Medium	Eneolithic	5YR 3/2 Dark reddish brown	2.5YR 4/4 Reddish brown	The fabric has many black and reddish inclusions.
SD089	Gajtan	Slipped/Hard /Medium	Eneolithic	7.5YR 3/1 Very dark gray	7.5YR 4/1 Dark gray	The fabric has medium and coarse inclusions of a reddish color. Well fired.
SD094	Gajtan		Prehistoric		2.5YR 5/6 Red	Daub
SD096	Gajtan		Prehistoric		5YR 5/4 Reddish brown	Daub
SD099	Gajtan		Prehistoric		10R 5/6 Red	Daub

Table 6 (continued).

SD057	Zagorë	Porous/Soft/ Thick	Prehistoric (Bronze Age (?))	5YR 4/2 Dark reddish gray	5YR 4/2 Dark reddish gray	Few fine brownish rock inclusions; porous.
SD053	Zagorë	Porous/Soft/ Thick	Prehistoric (Bronze Age (?))	7.5YR 4/2 brown	7.5YR 2.5/1 Black	The fabric has many fine white, probably limestone, and dark brown inclusions, several small pores are visible. Well fired.
SD054	Zagorë	Porous/Hard /Thick	Prehistoric (Bronze Age (?))	10R 4/4 Weak red	2.5YR 3/6 Dark red	The fabric has medium to coarse inclusions of reddish and dark greyish color, porous. Well fired.
SD058	Zagorë	Slipped/Soft/ Medium	Prehistoric (Bronze Age (?))	10YR 4/2 Dark grayish brown	5YR 3/1 Very dark gray and 5YR 4/6 Yellowish red	The fabric has rare dark gray and red inclusions in it. The profile has few pores. Poorly fired; its colors vary from dark gray to reddish.
SD103	Zagorë	Porous/Soft/ Thick	Prehistoric (?) (Bronze Age (?))	5YR 4/4 Reddish brown	10YR 3/3 Dark brown	The fabric has many fine brownish inclusions and many small size pores.
SD060	Zagorë		Prehistoric		5YR 5/4 Reddish brown	Daub; waddle in daub.
SD059	Zagorë		Prehistoric		5YR 5/6 Yellowish red	Daub

Table 6 (continued).

SD073	Kodër Boks	Other/Hard/ Thick	Bronze Age	7.5YR5/3 Brown	7.5YR5/3 Brown	Frequent inclusions of white and red color fired in a reduced atmosphere.
SD066	Kodër Boks	Porous/Soft/ Medium	Bronze Age	2.5YR 4/4 Reddish brown	5YR 3/2 Dark reddish brown	Frequent inclusions of white color; porous. Sandwich type profile.
SD069	Kodër Boks	Other/Soft/ Medium	Bronze Age	2.5YR 2.5/1 Reddish black	5YR 3/1 Very dark gray	The fabric is with frequent white angular inclusions, well fired.
SD063	Kodër Boks	Porous/Hard /Thick	Bronze Age	5YR 4/4 Reddish brown	5YR 3/1 Very dark gray	Frequent small white inclusions; porous. Poorly fired.
SD070	Kodër Boks		Prehistoric		5YR 5/4 Reddish brown	Daub
SD012	Tumulus 099	Other/Hard/ Thick	Prehistoric (Bronze Age (?))	10YR 5/3 Brown	5YR 4/4Reddish brown	The fabric has frequent angular white and reddish inclusions; probably limestone and other rock. Well fired.
SD008	Tumulus 099	Other/Hard/ Thin	Prehistoric (Bronze Age (?))	2.5YR 4/3 Reddish brown	5YR 2.5/1 Black	The fabric has rare inclusions in it. Poorly fired.
SD004	Tumulus 099	Other/Hard/ Medium	Prehistoric (Bronze Age (?))	5YR 4/4 Reddish brown	7.5YR 3/1 Very dark gray	The fabric has angular white and gray inclusions and probably quartz or mica.

Macroscopic examination of handmade pottery samples provides additional information when it comes to sourcing studies (Belfiore et al. 2007; Tykot 2004). Here, pottery's physical properties add information not only about sourcing but also about production centers and distribution in time and space. As shown in Table 6, pottery specimens came from Gajtan, Zagorë, Kodër Boks, and Tumulus 099. Pottery types coming from these sites are as follows: shth, ohth, shth, shm, and sht from Gajtan; psth, phth, and ssm from Zagorë; ohth, psm, osm, and phth from Kodër Boks, and ohth, oht, and ohm from Tumulus 099. Full names of pottery types are available in Table 5. The specimens belong to the Eneolithic, Early Bronze Age, and Bronze Age. They appear in various colors such as black to dark brown and reddish brown. Daub fragments are mostly reddish. Their fabric includes different types of inclusions such as quartz, limestone, and some other rock types. Their colors vary, such as white, black, and reddish, to mention a few. Table 6 provides more details about specimens subjected to petrography.

The next step of the study of pottery from the Shkodra Region was analyzing thin-sectioned specimens under a standard petrographic microscope. Petrography, or transmitted light microscopy conducted with the assistance of a polarizing microscope, is a field of study in geology that allows the description and systematic classification of rocks and minerals (Bates and Jackson 1976: 380; Ellis 2000: 458; Glowacki and Neff 2002: 190; Klein and Philpotts 2013; Reedy 2008: 1; Rice 2015: 459; Stoltman 2015: 8). Although petrography was previously used to study the mineralogical composition of rocks, nowadays it is widely applied also to cultural materials such as pottery. Quinn

(2013) defines the application of petrography in pottery studies as follows: “ceramic petrography is a form of ceramic compositional analysis that is concerned with the characterization and interpretation of ancient ceramic artefacts in ‘thin section’ under microscope” (2013: 4). Thin-section petrography requires knowledge of microscopy, thin section preparation, and mineral and particle size identification, providing valuable evidence for archaeological interpretations (Stoltman 2015: 8).

Petrography is well suited for pottery analysis because this kind of artifact is a mixture of minerals and rock fragments (Stoltman 2015: 8). Mineralogical composition of pottery samples can be viewed under the petrographic microscope in the same way geologists do with rocks. In contrast to rock material, ceramic materials are impregnated and held together to avoid possible damage by filling pores with epoxy resin (Ellis 2000; Quinn 2013; Reedy 2008; Rice 1978; Stoltman 2015; Stoltman 1989). This method makes archaeological interpretations of cultural material possible by analyzing their texture. “Texture of sediments refers to the size, shape, sorting, and orientation of the particles” (Rapp and Hill 1998: 38). Hence, the examination of texture in pottery sherds allows for new archaeological interpretations.

Petrography is considered to be a destructive technique (Reedy 2008; Stoltman 2015: 8). Therefore, decorated and diagnostic sherds were excluded. However, this drawback did not affect the results overly much, since during the PASH project few decorated potsherds were collected. The most common pottery sherds collected during the test excavations were undecorated. Similarly, regarding diagnostic features, although not subjected to petrography, there are no affects expected in results since analyzed potsherds originally were part of the entire vessel.

Even though petrography is a destructive technique, thin-sectioned specimens might be reused at different times to answer various research questions. Despite the fact that petrography makes possible the identification of physical properties of rocks and minerals, it cannot identify individual clay minerals (< .002 mm) since they are too small, nor can it be used to collect chemical compositional data (Stoltman 2015: 9-11). However, as Rice (1987) notes, chemical methods are less suitable for coarse ware compositional analysis (Rice 1987:415). Therefore, considering that the potsherds analyzed for this study are coarse wares, petrography seemed to be an appropriate technique for conducting textural analysis for these ceramics.

Twenty-two pottery sherds and six daub fragments subjected to petrography were sent to Spectrum Petrographics Laboratory (www.petrography.com). The laboratory produced slides with standard measurements of 27 mm x 46 mm. Sherd slices were embedded in clear resin, mounted with acrylic to Na-silicate glass, with standard lapping with 18 µm abrasive, and ground to 30 µm final thickness. The data collection process from thin section specimens unearthed from the Shkodra Region was done using a standard polarizing microscope equipped with different objective lenses, such as cross-polarized (XPL) and plain-polarized (PPL) light, which show various optical properties of minerals (Ellis 2000; Quinn 2013; Reedy 2008; Rice 1978; Stoltman 2015). The specimens collected from the Shkodra Region were analyzed using both eyepieces. For details about parts of a microscope, see Rice's (1978) *Pottery Analysis: A Sourcebook,* *Second Edition*. During the examination process, each specimen was held in place on a horizontal rotating stage to reveal the behavior of the minerals. Under the petrographic microscope, the pottery specimens were analyzed by combining quantitative and qualitative methods. The quantitative analysis gives details about the difference between various fabrics (Galaty 2008: 248). Qualitative analysis can provide information about types of minerals such as quartz and mica, differences in clays, and colors of pottery sherds (Galaty 2008: 248).

The quantitative method was based on Stoltman's (2015) book, *Ceramic Petrography and Hopewell Interaction*. Quinn (2013:39-61) lists three components that characterize the composition of archaeological ceramics: the clay matrix, particle inclusions, and voids. Since, as mentioned above, clay minerals cannot be identified under the petrographic microscope, the quantitative method is a useful way to account for it. The quantitative method in petrography involves measuring grain sizes to generate precise numerical data that can be statistically classified (Stoltman 1989; Shepard 1985). Considering that the sample size is limited conducting statistical analysis of pottery sherds from the Shkodra Region, the data obtained using quantitative technique were simply plotted into ternary graphs to examine their distribution.

Quantitative data on pottery specimens were collected using point counting techniques as described in Stoltman (2015). The completion of point counting analysis was done using an Omano OM349P Series Polarization Microscope at 10X magnification. This work was performed in the Robert C. Dunnell Laboratory for Archaeometry and Artifact Conservation, Cobb Institute, Department of Anthropology and Middle Eastern Cultures, Mississippi State University. This procedure involved point counting each specimen at a 1 mm interval, "creating" a 1x1 mm grid (Appendix B). Quinn (2013: 109) points out that "the 'point' is represented by the intersection of the crosshairs down the microscope eyepiece." Stoltman (2015: 12) explains point counting as "analogous to superimposing a rectangular grid over a thin section and recording the minerals that appear at every point of intersection on the grid." This procedure was realized using the 'multiple intercept' approach. This method involves "recording every point during counting, even if an inclusion is encountered more than once" (Quinn 2013: 109). Point counting was conducted to show bulk composition of each sample. Stoltman explains bulk composition as "a volumetric measure comprised of the relative percentages of three variables, matrix/clay, silt, and sand" (2015: 14). Particle sizes <.002 mm are considered matrix; .002 - .624 mm is considered silt. Sand sizes include particles >.625 mm, whereas .625 - .249 mm is considered fine; .25 - .499 mm is considered medium, .50 -.99 mm is considered coarse, and 1.00 - 1.99 mm is considered very coarse sand. This process involved analyzing the percentage and size of particle inclusions that appear beneath the crosshair when the stage was moved each mm (Appendix B). During point counting process, the discrimination between naturally occurring inclusions and intentionally human additives such as grog and sand tempers was crucial. As used by Stoltman (1991), "at each of the points counted during the quantitative analysis the observations made were assigned to one of the following mutually exclusive categories: clay matrix, silt, sand, temper, or void" (1991: 108). Whereas, paste itself is clay with naturally occurring inclusions, often referred to as plastic (Quinn 2013; Rice 1978; Orton and Hughes 2013; Orton et al. 1993; Stoltman 2015; Stoltman 2002; Whitbread 1995). On the other hand, temper, sometimes referred to as aplastic inclusion, includes everything that was added intentionally to the paste (Quinn 2013; Rice 1978; Orton and Hughes 2013; Orton et al. 1993; Stoltman 2015; Stoltman 2002; Whitbread 1995). Grog is crushed pottery added as a temper to the paste, and voids are pores occurring in the body of the sherd (Quinn 2013; Rice 1978; Orton and Hughes 2013; Orton et al. 1993; Stoltman 2015; Stoltman 2002; Whitbread 1995). However, the distinction between natural and non-natural inclusions is a difficult task. The angularity of inclusions is one characteristic that might help to separate them from one another (Stoltman 1991; Stoltman 2015). Rounded inclusions in the clay are more likely to be a natural occurrence. In contrast, angular ones are more like to have been intentionally added by humans. Bimodal and unimodal grain size distribution is another way to distinguish between tempers and natural inclusions. Unimodal grain size distribution suggests that inclusions present in pottery sherds are natural. Contrarily, when inclusions appear to be bimodally distributed in pottery sherds, some are likely human additives (Quinn 2013).

Quantitative data are displayed by separating body and paste from one another (Stoltman 1991). The results from point counts are represented quantitatively in percentages (Appendix B). As mentioned above, body, often referred to as fabric, applies to matrix, temper, and sand and paste relates to plastic inclusions of the potsherds (matrix, silt, and sand) (Chapter VII). The distinction between body and paste is crucial for sourcing studies, since there is the possibility to conduct a direct comparison between paste and clay samples from the study area (Stoltman 1991; Stoltman 2015). Particularly, Stoltman (1991) explains the importance of point counting as an explanatory method for a "wide range of archaeological problems, including production, distribution, exchange, and classification of pottery" (1991: 109). Hence, petrographic analysis can make possible the distinction between local and non-local pottery sherds discovered in the Shkodra Region.

During point counting, diagenesis, which is related to physical and chemical changes that sediments undergo (Rapp and Hill 1998: 238), might have been a source of error. But, since all fragments have gone through the same diagenetic processes, this factor presumably did not change the results overly much.

The qualitative method was mainly based on Quinn's (2013) book, *Ceramic Petrography: The interpretation of archaeological pottery and related artefacts in thin section*. Other sources, such as *Atlas of Rock-Forming Minerals in Thin Section,* by MacKenzie and Guilford (1980), and *Thin-Section Petrography of Stone and Ceramic Cultural Material* by Reedy (2008) were also used. This method involved the identification of minerals and fabric groups through PPL and XPL (Chapter VIII). Mineralogical compositions of specimens subjected to this study were compared with the geological makeup of the area to provide sourcing evidence. During this process, misidentification of minerals might have caused errors. Nevertheless, mineral properties were compared with those described in published books and they were very similar to each other. Hence, the qualitative analysis did not affect the results overly much. The mineral identification (or qualitative analysis) was conducted at the Geoscience

Department Laboratory at MSU using a Nikon Eclipse E 400 Pol Microscope with x4 and x10 magnification objective lenses.

In this research, arrangements formed using pottery types from sample ordination (MCA), textural analysis through ternary graphs, and qualitative examination of each thin-sectioned specimen displayed interpretable reference groups that helped me to explore research questions related to raw materials, production centers, and exchange patterns among prehistoric sites in the Shkodra Region. Similarly, Stoltman (2015: 11) asserts that the quantitative and qualitative characterization of thin sections along with stylistic consideration provides a robust data set for addressing issues of ceramic production and exchange. Hence, the reference groups made it possible to gather evidence about the social and economic behaviors of the prehistoric groups in the study area. Results from these data are compared and interpreted in the following chapters.

CHAPTER VIII

RESULTS

Data obtained from the pottery analyses are represented visually by performing MCA for pottery types produced through macroscopic examination, by ternary graphs for point-counted specimens analyzed microscopically, and by the identification of minerals present in fabrics of thin-sectioned sherds. The diagrams provided here will enable readers to understand the relationship between archaeological sites in the Shkodra Region and the results of prehistoric pottery analyzed, while qualitative examination permits the identification of similarities and differences between compositional groups of pottery discerned through ternary graphs.

Multiple Correspondence Analysis

As stated in Chapter V, 1056, or 32 percent, of the total pottery sherds recovered from test excavations underwent a macroscopic examination to identify them with the paradigmatic pottery classes discussed in Chapter VII. Each of the examined sherds grouped to one of the eighteen pottery types. Table 7 gives the totals and the percentages of occurrence of each pottery type from Gajtan, Zagorë, Kodër Boks, Tumulus 088, and Tumulus 099 from the Shkodra Region. Based on results, the most frequent pottery type is Porous Soft Medium with 16.19 percent (Table 7), with Gajtan and Zagorë showing the highest concentrations.

Table 7 The occurrence of pottery types per site and their totals expressed in numbers and percentages.

No	Pottery types	Gajtan	Zagorë	Kodër Boks	T 088	T 099	Totals	%
1	Porous Soft Thin	19	2	0	0	2	23	2.18%
2	Porous Hard Thin	4	0	0	0	0	4	0.38%
3	Slipped Soft Thin	1	0	0	0	0	1	0.09%
4	Slipped Hard Thin	25	3	0	2	9	39	3.69%
5	Other Soft Thin	13	1	0	0	1	15	1.42%
6	Other Hard Thin	5	0	1	1	2	9	0.85%
7	Porous Soft Medium	91	54	17	3	6	171	16.19%
8	Porous Hard Medium	12	21	6	5	6	50	4.73%
9	Slipped Soft Medium	2	1	0	0	0	3	0.28%
10	Slipped Hard Medium	86	7	0	13	3	109	10.32%
11	Other Soft Medium	31	8	1	2	1	43	4.07%
12	Other Hard Medium	48	10	3	5	8	74	7.01%
13	Porous Soft Thick	46	84	13	4	0	147	13.92%
14	Porous Hard Thick	31	54	10	2	0	97	9.19%
15	Slipped Soft Thick	4	3	0	1	0	8	0.76%
16	Slipped Hard Thick	87	13	0	6	2	108	10.23%
17	Other Soft Thick	20	10	2	1	1	34	3.22%
18	Other Hard Thick	89	24	4	3	1	121	11.46%
	Totals	614	295	57	48	42	1056	100.00%

On the other hand, pottery type Slipped Soft Thin has the lowest frequency number in all the assemblage, only 0.09 percent represented by a single occurrence at Gajtan. Table 7 shows the occurrences of pottery types but not the correlations between them and sites. Hence, the entire pottery assemblage examined macroscopically was analyzed using Multiple Correspondence Analysis (Figure 5).

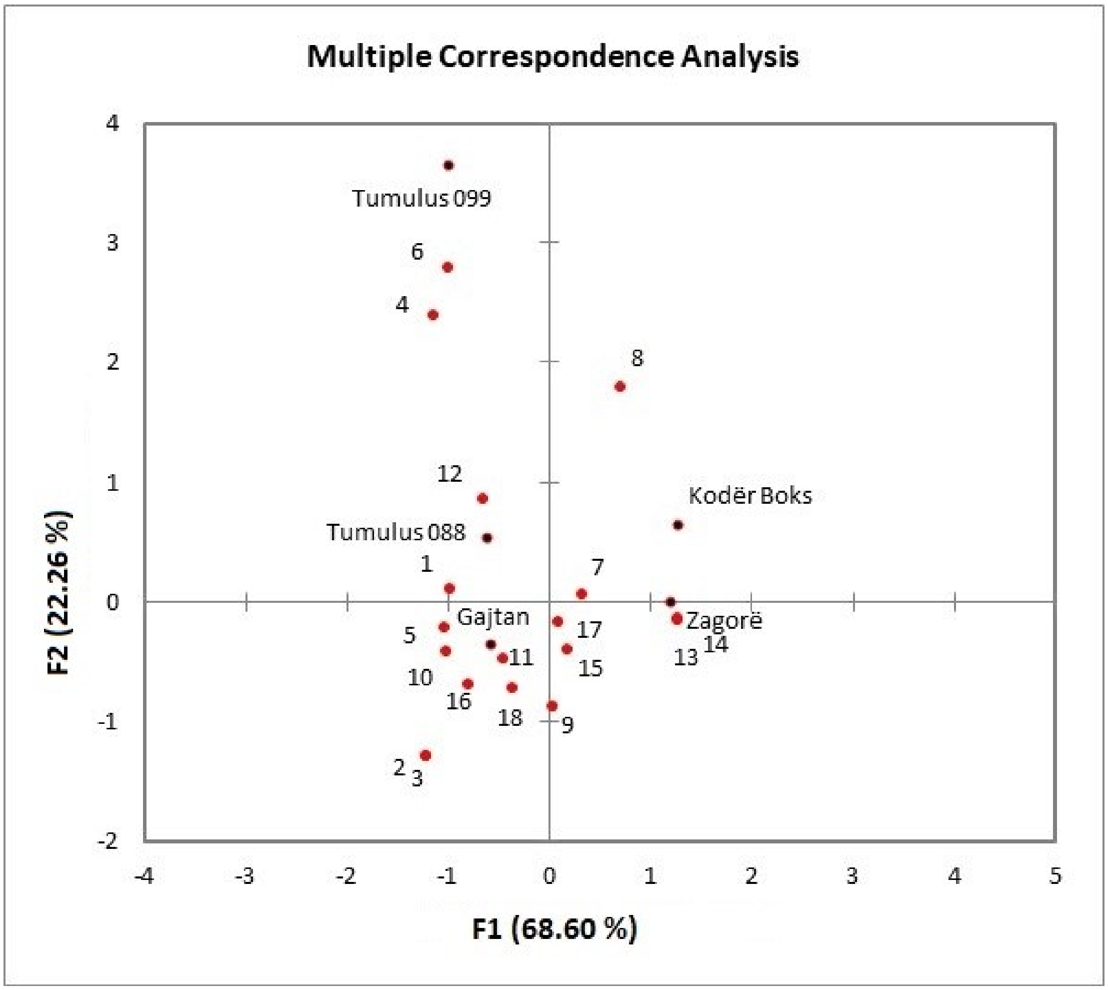


Figure 5 Relationship between eighteen pottery types determined using paradigmatic classification (Chapter VII) and archaeological sites (Gajtan, Zagorë, Kodër Boks, Tumulus 088, Tumulus 099) in the Shkodra Region.

MCA was conducted using XLSTAT 2017, Version 19.5.47365 software. Each number showed in Figure 5 is associated with a pottery type presented in Table 7 (e.g., number 1 in the ordination graph is pottery type Porous Soft Thin).

The analysis shows that the pottery types clustered into three main groups: Group 1 includes the settlement of Gajtan and Tumulus 088, in the lower left quadrant of the ordination graph; Group 2 includes Zagorë and Kodër Boks, in the lower right quadrant, and Group 3 includes only Tumulus 099. The MCA ordination (Figure 5) displays pottery types relatively concentrated in the lower left (Group 1) and right quadrants (Group 2) of the diagram. Group 1 has the highest concentration of pottery types, with Porous Soft Thin (Type 1), Porous Hard Thin (Type 2), Slipped Soft Thin (Type 3), Other Soft Thin (Type 5), Slipped Soft Medium (Type 9), Slipped Hard Medium (Type 10), Other Soft Medium (Type 11), Slipped Hard Thick (Type 16), and Other Hard Thick (Type 18) having relatively high occurrences at Gajtan and to a lesser extent in Tumulus 088 (Figures 2 and 5). It is crucial to reemphasize that Tumulus 088 might not have been a tumulus. It is likely that the site has been part of a settlement. These findings indicate that Gajtan and Tumulus 088 share several pottery types, but the former site has a more extensive pottery assemblage. The presence of numerous pottery types in Gajtan suggests local production of prehistoric pottery at this settlement otherwise a limited number of these types would occur at this site. Presumably, Gajtan produced and distributed pottery to Tumulus 088 and other settlements in the study region. For instance, Gajtan shares several pottery types with Zagorë, too, i.e., Slipped Soft Medium (Type 9) and Other Soft Thick (Type 17) (Table 7). The influence of Gajtan in the Shkodra Region therefore is observable in the ordination graph.

Similarly, the graph in Figure 5 displays that Group 2, which includes the settlements of Zagorë and Kodër Boks, has a relatively high concentration of pottery types such as Porous Soft Medium (Type 7), Slipped Soft Medium (Type 9), Porous Soft Thick (Type 13), Porous Hard Thick (Type 14), Slipped Soft Thick (Type 15), and Other Soft Thick (Type 17). Many pottery types occur in Zagorë settlement as well and to a lesser extent in Kodër Boks (Figures 5). The data provided in Figure 5 reveal that pottery types from both Zagorë and Kodër Boks convey substantial evidence about pottery production in the Shkodra Region. The MCA reveals that Zagorë and Kodër Boks have several pottery types found in both sites, but the former site possesses a higher quantity of them. Consequently, pots from Zagorë either were exchanged from Gajtan or were produced at the site itself, whereas Kodër Boks seemingly occupied a secondary role related to Zagorë.

In contrast, the MCA graph displays one exception regarding Group 3, which includes only Tumulus 099. This group is located near to the top of the upper left quadrant of the ordination diagram (Figure 5). Seemingly, there are only two pottery types more often occurring on this site, Porous Hard Thin (Type 4) and Other Hard Thin (Type 6) (Figure 5). The results show that there is a limited number of pottery types found in this tumulus. The limited number of pottery types from one site is an indication of limited vessel (and site) function since the site is a mortuary context or sherds, possibly, came from only a few vessels, or import. The dates from human remains discovered during the excavations indicate that the tumulus was used during MBA which suggests that the tumulus, unlike settlements, was used for a short time period (PASH project, unpublished data).

The ordination graph shows that while both Gajtan and Zagorë have a high number of pottery types, Gajtan has all of them, which suggests that these sherds were produced using local raw materials. It also implies that Gajtan may have played a central role in pottery production and distribution in the Shkodra Region. However, Zagorë appears to have performed significant socioeconomic roles, but to a lesser extent, mainly interacting with Kodër Boks. In contrast, pottery types coming from Tumulus 099 are low in number. There is a high chance that these sherds came from somewhere other than the Shkodra Region, and/or that the vessels had limited function; e.g., that they were produced specifically for burial with the dead.

In addition to the distribution of pottery types, another issue to be considered is ceramic chronology. As discussed previously (Chapter II), pottery sherds included in this thesis come from various prehistoric periods such as Eneolithic (ENEO) 4th millennium; Early Bronze Age (EBA) 3100-2000 BC; Middle Bronze Age (MBA) 2000-1600 BC; and Late Bronze Age (LBA) 1600-1000 BC. The results presented in Figure 5 show that pottery types do not group by time period. Apparently, the chronology does not influence the results displayed in the ordination graph. This is a strong indication that the dimensions chosen for the paradigm are functional rather than stylistic, as functional traits tend to map on to the environment whereas stylistic traits wax and wane in popularity through time (Dunnell 1978). The large number of functional types represented at individual settlements suggests that a range of vessels were being produced for everyday use.

All eighteen pottery types created through paradigmatic classification occur at Gajtan. While many of the types discovered there also were found at sites such as Zagorë, Kodër Boks, Tumulus 088, and Tumulus 099, those sites had a lower number of types. For instance, unlike at Gajtan, Types 2 (Porous Hard Thin), 3 (Slipped Soft Thin), and 6 (Other Hard Thin) do not occur at Zagorë (Table 7). Likewise, a higher number of pottery types, nine of them, do not occur in Kodër Boks (Table 7). Presumably, compared to Zagorë and Kodër Boks, during prehistory, Gajtan might have had a stronger influence as a production and distribution center in the Shkodra Region, with pottery being produced both for local consumption and extra-local distribution. Additionally, while Zagorë and Kodër Boks occupy similar positions on the ordination diagram, the former site has a higher number of pottery types. Therefore, prehistoric groups living in Zagorë might have produced and distributed pottery throughout the area as well. There remains the possibility that the results are conditioned by sample size effects, however.

Pottery types found in Gajtan and Zagorë occur in T 088 and T 099 as well. The presence of various pottery types in tumuli suggests that prehistoric groups interacted and exchanged goods. Additionally, the occurrence of all pottery types at one settlement (Gajtan) shows that no standardization and no specialization existed in ceramic production. Hence, the results suggest that, during prehistory, pottery was produced in households rather than by specialists. Table 7 and Figure 5 allow us to infer that, throughout prehistory, settlements such as Gajtan and Zagorë had significant roles in the region.

The results obtained from the distribution of pottery types throughout the Shkodra Region might be affected by the disproportional sample size analyzed for each site. The scatter gram (Figure 6) implies a strong correlation between pottery types and the number of pottery sherds analyzed macroscopically. The relationship between the two variables appears to be linear but with one exception, the assemblage from Kodër Boks. Unlike assemblages from Gajtan, Zagorë, T 088, and T 099 where with the increase of the number of pottery sherds the number of their types rises as well, the assemblage from Kodër Boks does not follow the same pattern. For instance, the scatter graph shows that compared to T 099 where 42 pottery sherds produced 12 types, for Kodër Boks a higher number of pottery sherds produced a lower number of pottery types, respectively, 57 pottery sherds produced nine pottery types. Although most of the values shown in Figure 6 appear to have a linear relationship suggesting sample size effect on pottery types, the example of Kodër Boks shows that this is not always the case.

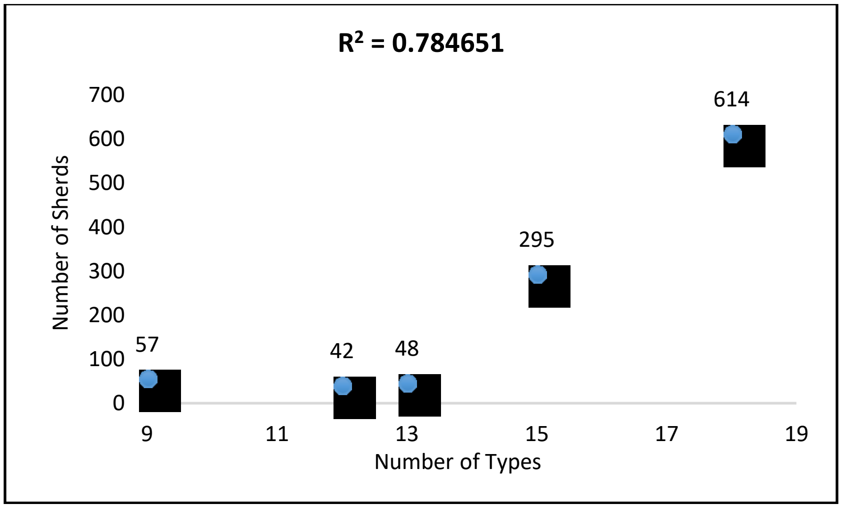


Figure 6 The scattergram shows the correlation between pottery types and sample size for each site.

Likewise, the calculation of r-square between the two variables gives a similar result. As shown in Figure 6, r-square is 0.784651268 which means that the result is close to value one. This result indicates that there is a relationship between pottery types and number of sherds; therefore, a sample size effect on pottery types.

Correlations

		Types	Sherds
Types	Pearson Correlation	1	.886*
	Sig. (2-tailed)		.046
	N	5	5
Sherds	Pearson Correlation	.886*	1
	Sig. (2-tailed)	.046	
	N	5	5

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 7 Pearson Correlation test: the number of pottery sherds versus the number of pottery types.

Additionally, Pearson correlation (Figure 7) between the number of pottery sherds is .886, which indicates that there is a positive relationship between variables. In this test, the p-value for correlation between two variables is less than the significance level, .046, which indicates that the coefficient is significant. Therefore, the correlation between pottery types and the sample size is not random, and significance test suggests sample size influences MCA results. Despite the results of the tests, I have taken into consideration the effect of the sample size into the MCA analysis and the sites selected for the purpose of this thesis are random. Therefore, I believe that results obtained from MCA are not much-affected by sample size more than the possibility of no standardization of pottery manufacturing existed during Prehistory. If standardization on pottery manufacturing process existed in the study area, fewer pottery types would have been produced, despite sample size.

Quantitative Analysis

As presented in Chapter VII, the distinction between body and paste is crucial for sourcing studies, identifying production centers, and documenting exchange patterns of archaeological ceramics. “The distinction between body and paste is important because it gives explicit recognition to the fact that temper, the primary discriminator of body, and paste normally have independent origins” (Stoltman 1991: 110). Following Stoltman’s method (Stoltman 2015), the determination of pastes involved the identification of tempers. Tempers/aplastic additives were identified based on angularity of inclusions present in thin sectioned fabrics, whereas grog is always included in this category.

Prehistoric pottery sherds from the Shkodra Region are sand, rock, and grog tempered. Inclusions added as tempers include: limestone (SD053 Zagorë; SD080, SD077 Gajtan; SD004, SD012 T 099; sand (SD057 Zagorë and SD093 Gajtan), polycrystalline quartz (SD073 Kodër Boks and SD076 Gajtan), sandstone (SD080 Gajtan), peridotite (SD080 Gajtan), siltstone (SD075, SD097, and SD091 from Gajtan), and other sedimentary rock (SD089 Gajtan). Although most of hematite inclusions appear to be natural, sample SD054 from Zagorë appears to have one intentionally added into the clay. Lastly, grog is present in SD098, SD091, SD080, SD075, SD076, and SD097 from Gajtan.

The presence of various kinds of inclusions used as tempers suggests that there was no standardization in the recipe of pottery produced during Prehistory in the Shkodra Region. Additionally, the identification of tempers provided bases of the origin of pottery sherds from the Shkodra Region independent to paste. Stoltman (2015) indicates that tracing tempers to known geological sources provides valuable evidence about the local or non-local origin of pottery sherds. Knowing that the Shkodra Region and the surrounding areas have available similar raw sources such as limestone and peridotite, and is mainly of sedimentary origin suggests that prehistoric pottery sherds from the Shkodra Region are of local origin. Similar to clays, the geology of the area is rich in these sources; therefore, it has high cost to import these tempers elsewhere rather than exploiting raw sources.

Ternary diagrams were used to plot data collected via point counting of thin sections of prehistoric potsherds from the Shkodra Region (Figures 7 and 8). The point count data heavily suggest that 28 prehistoric specimens from Gajtan, Zagorë, Kodër Boks, and Tumulus 099 are mainly of local origin since clay specimens (i.e. daub) and pottery assemblages group. But, on the basis of body and paste properties of potsherds, two main groups can be distinguished which seem to be independent of period, with grouping coming from bulk composition and aplastic inclusions. For instance, pottery sherds from the ENEO are part of the same group with those from BA period (Table 9). Presumably, long-term use of raw materials throughout prehistory existed in the Shkodra Region. However, further studies need to be done to investigate the long-term use of raw materials in the region.

The purpose of ternary diagram for body labeled as follows: matrix (includes silt), sand, and temper, is to "provide a visual representation of relative volumetric properties of all mineral inclusions" in each thin section specimen (Stoltman 1991: 111). Figure 8 displays the distribution of 22 pottery sherds from the sites noted above. The daub fragments, assumed to be a local material, were excluded from the body graph for comparison purposes.

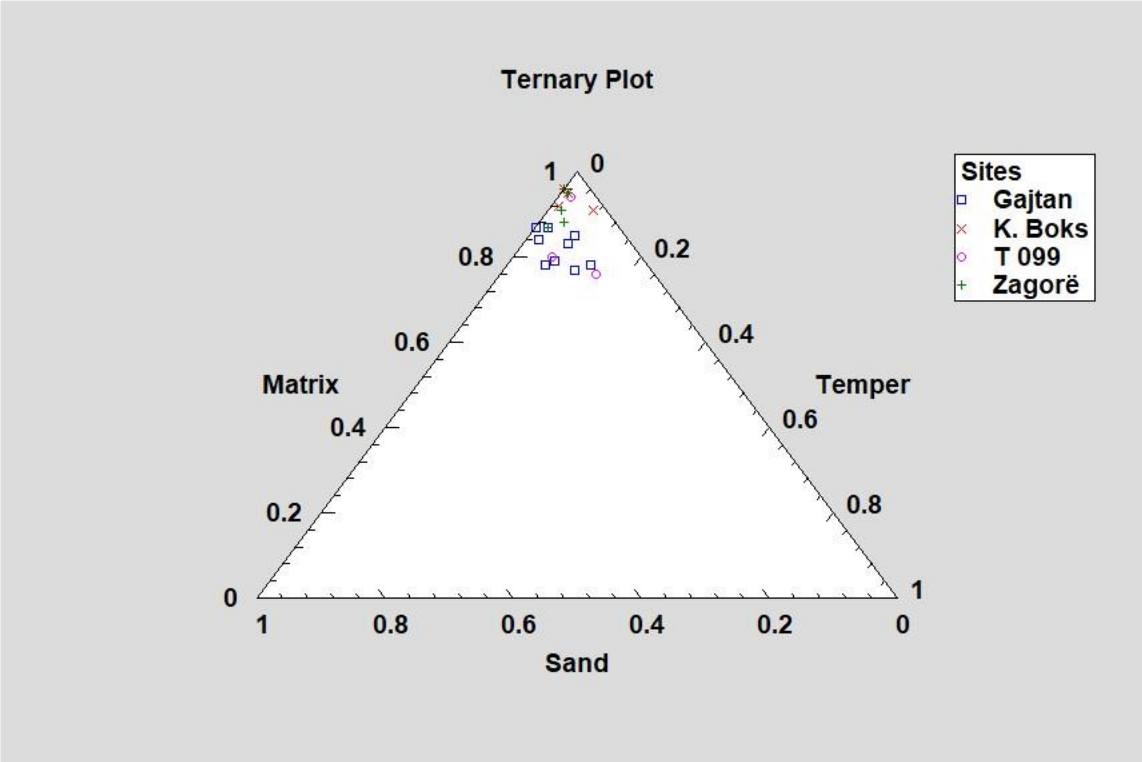


Figure 8 Ternary diagram for body: Prehistoric pottery from Gajtan, Zagorë, Kodër Boks and Tumulus 099 (pottery only).

Ternary plot analysis is conducted using STATGRAPHICS Centurion, Version 18.1.01 (64-bit) software.

In the ternary diagram (Figure 8), values for the body, matrix (in this case includes silt), sand, and temper separate pottery sherds into two major fabric groups. Fabric Group 1 (Table 8), situated on the top of the ternary diagram (Figure 8), shows a correlation between Kodër Boks and Zagorë. On the other hand, Fabric Group 2 (Table 9), set in the lower part of former fabric group (Figure 8), shows a relationship between Gajtan and Tumulus 099. The data showed in the diagram reflect the percentages for matrix, sand, and temper of the specimens given in Tables 8 and 9.

Table 8 Body values for Fabric Group 1 from Gajtan, Zagorë, and Kodër Boks excluding daub specimens.

Fabric Group 1 (Body)					
Thin Section ID#	**Sites**	**Matrix %**	**Sand %**	**Temper %**	**Period**
SD008	T 099	0.94	0.04	0.02	PH (BA?)
SD073	K. Boks	0.91	0.02	0.07	BA
SD066	K. Boks	0.96	0.04	0.00	BA
SD069	K. Boks	0.95	0.04	0.00	BA
SD063	K. Boks	0.92	0.07	0.01	BA
SD057	Zagorë	0.88	0.08	0.05	PH (BA?)
SD053	Zagorë	0.95	0.04	0.01	PH (BA?)
SD058	Zagorë	0.91	0.07	0.02	PH (BA?)
SD103	Zagorë	0.96	0.04	0.00	PH (?) (BA?)

There are four pottery fragments from Kodër Boks, five from Zagorë, and one from T 099 that have similar range percentages of their composition. The range percentages in Table 8 show that the matrices of pottery sherds from Kodër Boks vary from 0.92 to 0.96 percent and those from Zagorë from 0.83 to 0.96 percent. Sand percentages of potsherds from Kodër Boks range from 0.02 to 0.07 percent and Zagorë from 0.04 to 0.10 percent. Lastly, temper percentages of specimens from Kodër Boks range from 0.02 to 0.07 percent and Zagorë from 0.00 to 0.07 percent. There is only one pottery fragment from T 099 included in Fabric Group 1. Its values are 0.94 percent for matrix, 0.04 percent for sand, and 0.02 percent for temper (Table 8).

Table 9 Body values for Fabric Group 2 from Gajtan and Tumulus 099, excluding daub specimens.

Fabric Group 2 (Body)					
Thin Section ID#	**Sites**	**Matrix %**	**Sand %**	**Temper %**	**Period**
SD012	T 099	0.80	0.14	0.05	PH (?)
SD004	T 099	0.76	0.09	0.15	BA
SD054	Zagorë	0.87	0.11	0.01	PH (BA?)
SD091	Gajtan	0.79	0.14	0.07	ENEO
SD080	Gajtan	0.83	0.10	0.07	EBA
SD075	Gajtan	0.83	0.10	0.07	PH (BA?)
SD098	Gajtan	0.87	0.11	0.02	PH (BA?)
SD097	Gajtan	0.77	0.12	0.12	PH (BA?)
SD076	Gajtan	0.78	0.09	0.13	BA
SD090	Gajtan	0.87	0.13	0.00	ENEO
SD077	Gajtan	0.85	0.08	0.07	EBA
SD093	Gajtan	0.78	0.16	0.06	ENEO
SD089	Gajtan	0.84	0.14	0.02	ENEO

On the other hand, unlike the previous group, the data for Fabric Group 2 (Table 9) show that there exist slight differences between the two fabric groups. There are two pottery fragments from Tumulus 099, ten from Gajtan and one fragment from Zagorë, that have a similar range of percentages in their composition. The range of percentages in Table 9 shows that the matrices of pottery sherds from Tumulus 099 vary from 0.76 to 0.80 percent and those of Gajtan from 0.77 to 0.87 percent. Sand percentages of potsherds from Tumulus 099 range from 0.09 to 0.14 percent and from Gajtan from 0.08 to 0.16 percent. Lastly, temper percentages of specimens from Tumulus 099 range from 0.05 to 0.15 percent and from Gajtan from 0.00 to 0.13 percent. Results show a close correlation between Gajtan and T 099, having similar fabric composition. There is only one pottery fragment from Zagorë included in Fabric Group 2. Its values are 0.87 percent for matrix, 0.11 percent for sand, and 0.01 percent for temper (Table 9). These results imply that similar raw materials were used to produce these pots. Possibly, pottery produced in Gajtan was then distributed in other areas throughout the region.

Within this group (Group 2 for body), in the ternary diagram is visible a sub-group, located in the upper left part of Group 2, consisting of SD089 and SD090 coming from Gajtan, SD012 of T099, and SD054 of Zagorë that appear slightly distant from the entire group (Figure 8); they are higher in sand than temper inclusions compared to the entire group. These sherds belong to various periods such PH, ENEO, and BA and macroscopically are determined to have slipped, porous, and other surfaces. Higher percentages of sand into clay matrix suggest that there was no standardization in pottery manufacture during Prehistory.

In contrast to body, "ternary diagram for paste is labeled as follows: matrix, silt (now separated from matrix), and sand" (Stoltman 1991: 111). Tempers are purposely separated from ceramic pastes to compare volumetric properties of raw materials and paste of pottery specimens.

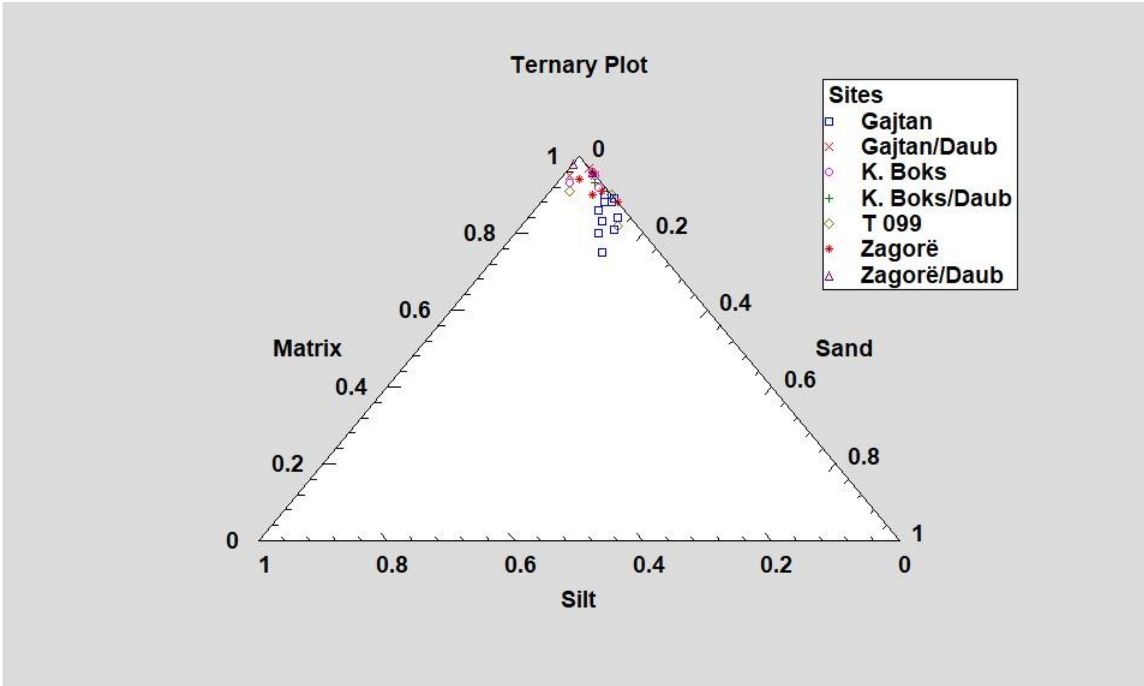


Figure 9 Ternary diagram for paste: Prehistoric pottery and daub fragments from Gajtan, Zagorë, Kodër Boks and Tumulus 099.

Figure 9 displays the distribution of the volumetric data of the paste, natural ingredients, of 22 pottery sherds and six daub fragments from Gajtan, Zagorë, Kodër Boks, and Tumulus 099. Aforementioned, temper inclusions were temporarily set aside from matrix, silt, and sand which characterize the composition of raw sediments to assess the origin of the materials by comparing the percentages of pottery sherds from the Shkodra Region and local sediments/daub fragments (Figure 9). Daub fragments were included to act as proxy measures of local clay types. The separation of paste from the body made it possible to compare pottery sherds with raw materials (daub) collected in Gajtan, Zagorë, and Kodër Boks.

The volumetric proportions of the matrix, silt, and sand for each specimen shown in ternary graph (Figure 9) represent two groups of untempered raw materials. Group 1

(Table 10), located on the upper left of the ternary diagram (Figure 9), shows that four specimens, one from each of the sites, Gajtan, Zagorë, Kodër Boks and Tumulus 099, are grouped. On the other hand, Group 2 (Table 11), located on the upper right part of the ternary diagram (Figure 9), shows that the rest of the samples, coming from all sites, are grouped separately from the former assemblage. The data displayed in the ternary diagram are associated with the percentages for the matrix, silt, and sand of the specimens in Tables 9 and 10. Below is a detailed description of the percentage ranges of natural inclusions in the pottery sherds.

Table 10 Paste values for Group 1. Pottery sherds and daub fragments from Gajtan, Zagorë, Kodër Boks and Tumulus 099.

Group 1 (Paste)					
Thin Section ID#	**Sites**	**Matrix %**	**Silt %**	**Sand %**	**Period**
SD060	Zagorë/ Daub	0.98	0.02	0.00	PH
SD099	Gajtan/ Daub	0.95	0.04	0.01	PH
SD073	K. Boks/Pottery	0.93	0.05	0.02	BA
SD008	T 099/Pottery	0.91	0.06	0.04	PH (BA?)

There are four fragments in Group 1 (Table 10) coming from all sites in this study. One daub fragment from Gajtan, one from Zagorë, and two pottery sherds from Kodër Boks and Tumulus 099 have similar range percentages of their paste composition. The range percentages in Table 10 shows that the matrix of pottery sherds from Gajtan is 0.95 percent, from Zagorë 0.98 percent, from Kodër Boks 0.93 percent, and Tumulus 099 is 0.91 percent. Silt percentage of pottery sherds from Gajtan is 0.04 percent, from

Zagorë 0.02 percent, from Kodër Boks 0.05 percent, and Tumulus 099 is 0.06 percent. Lastly, the sand percentage of pottery sherds from Gajtan is 0.01 percent, from Zagorë 0.00 percent, from Kodër Boks 0.02 percent, and Tumulus 099 is 0.04 percent. The results from paste composition show that the values of the matrix have the highest percentages and the lowest ones are those of sand.

Table 11 Paste values for Group 2. Pottery sherds and daub fragments from Gajtan, Zagorë, Kodër Boks and Tumulus 099.

Group 2 (Paste)					
Thin Section ID#	**Sites**	**Matrix %**	**Silt %**	**Sand %**	**Period**
SD066	K. Boks/Pottery	0.96	0.00	0.04	BA
SD069	K. Boks/Pottery	0.95	0.00	0.04	BA
SD063	K. Boks/Pottery	0.92	0.01	0.07	BA
SD070	K. Boks/ Daub	0.93	0.01	0.06	PH
SD012	T 099/Pottery	0.82	0.03	0.15	PH (BA?)
SD004	T 099/Pottery	0.90	0.00	0.10	BA
SD057	Zagorë/Pottery	0.91	0.01	0.08	PH (BA?)
SD054	Zagorë/Pottery	0.88	0.00	0.12	PH (BA?)
SD058	Zagorë/Pottery	0.90	0.03	0.07	PH (BA?)
SD103	Zagorë/Pottery	0.96	0.00	0.04	PH (?) (BA?)
SD053	Zagorë/Pottery	0.94	0.03	0.04	PH (BA?)
SD059	Zagorë/Daub	0.96	0.00	0.04	PH
SD091	Gajtan/Pottery	0.81	0.04	0.15	ENEO
SD080	Gajtan/Pottery	0.88	0.02	0.10	EBA

Table 11 (continued).

SD098	Gajtan/Pottery	0.89	0.00	0.11	PH (BA?)
SD097	Gajtan/Pottery	0.83	0.05	0.13	PH (BA?)
SD076	Gajtan/Pottery	0.86	0.04	0.10	BA
SD090	Gajtan/Pottery	0.80	0.07	0.12	ENEO
SD077	Gajtan/Pottery	0.90	0.01	0.09	EBA
SD075	Gajtan/Pottery	0.88	0.01	0.11	PH (BA?)
SD089	Gajtan/Pottery	0.84	0.02	0.14	ENEO
SD094	Gajtan/ Daub	0.97	0.00	0.03	PH
SD096	Gajtan/ Daub	0.95	0.00	0.05	PH

On the other hand, unlike the former group, the data for Group 2 show that there exist slight differences between two paste groups. There are eleven specimens from Gajtan, nine potsherds and two daub fragments, six from Zagorë, five potsherds and one daub fragment, three potsherds and one daub from Kodër Boks, and only two potsherds from Tumulus 099 that have similar range percentages of their paste composition. The range percentages in Table 11 shows that the matrices of pottery sherds in Gajtan vary from 0.80 to 0.97 percent, in Zagorë from 0.99 to 0.96 percent, Kodër Boks from 0.92 to 0.96 percent, and Tumulus 099 from 0.82 to 0.90 percent. Silt percentages of potsherds from Gajtan vary from 0.00 to 0.07 percent, in Zagorë from 0.00 to 0.03 percent, Kodër Boks from 0.00 to 0.01 percent, and Tumulus 099 from 0.00-0.03 percent. Lastly, the sand percentages of specimens from Gajtan vary from 0.03 to 0.15 percent, in Zagorë from 0.04 to 0.12 percent, Kodër Boks from 0.04 to 0.07 percent, and Tumulus 099 from

0.10 to 0.15 percent. The results in Table 11 show that there exists a close correlation between Gajtan, Zagorë, Kodër Boks and Tumulus 099 in terms of paste composition, which indicates that the same raw materials were used to produce pottery. Also, the ternary diagram (Figure 9) shows that natural inclusions occurring in pottery sherds match with three daub fragments, two from Gajtan and one from Zagorë. This evidence indicates that these pots were produced using local raw materials.

Within this group (Group 2 for paste), in the ternary diagram is visible a sub-group consisting of SD090, SD091, SD089, and SD097 coming from Gajtan and one of T 099 (SD012) that do not match with daub; they are higher in sand inclusions. These sherds belong to various periods such PH or ENEO, and macroscopically are determined to have slipped surfaces. Higher percentages of sand into clay matrix suggest that likely sand was added as temper to clay for probably functional purposes.

An exception resulted when comparing ceramic pastes with local raw materials (daub). The specimen with ID# SD093, which belong to Eneolithic period, stands alone in the ternary graph (Figure 9).

Table 12 Paste values for one outlier, fragment from Gajtan.

Exception (Paste)					
Thin Section ID#	**Sites**	**Matrix %**	**Silt %**	**Sand %**	**Period**
SD093	Gajtan/Pottery	0.75	0.09	0.16	ENEO

The reason for this exception might be related to chronology, errors during data collection process, or trade. It is possible that the specimen could have been imported from elsewhere within or outside the Shkodra Region.

To summarize, the quantitative results obtained through point counting provided valuable evidence not only about the source but also about the distribution of pottery sherds found in the Shkodra Region. As displayed in pottery type groups, results from point counts show that there appears to be no standardization of paste recipes in the pottery sherds analyzed under the microscope. However, ternary graphs (Figure 8 and 9) show that there are two main fabric groups and two paste groups.

Fabric Group 1 was created after analyzing volumetric proportions of the fabric (body) of specimens. Results showed a correlation between Zagorë and Kodër Boks, with one specimen from Tumulus 099 being part of this group. Fabric Group 2 included Gajtan and Tumulus 099. Again, here the settlements of Gajtan and Zagorë present as two different production centers. Regarding paste, the volumetric percentages of the matrix, silt, and sand show that clays match together. Since paste groups match with daub fragments, which were selected to act as a proxy for raw materials, the pottery was locally produced. The data from point counts resulted in two substantive paste groups (Figure 9, Tables 10 and 11). Group 1 included one daub specimen from Gajtan, one from Zagorë and two pottery sherds coming from both Kodër Boks and Tumulus 099. Specimens of raw materials from Gajtan and Zagorë grouping together could be a result of either exploitation of the same raw sources, exchange, or recording error. Pottery sherds found in Kodër Boks and Tumulus 099 have properties similar to daub fragments from Zagorë and Gajtan, which indicates that pottery might have been distributed from these sites.

Paste Group 2 includes the rest of the samples, excluding the specimen with ID# SD093 (Table 12). There are two daub fragments from Gajtan, one from Zagorë, and one from Kodër Boks included in this group. Also, in Group 2 are concentrated most of the pottery sherds from Gajtan, Zagorë, Kodër Boks and Tumulus 099. This fact indicates that pottery produced in the Shkodra Region is locally produced and the main center of the pottery production during prehistory was Gajtan. The existence of two paste groups suggests that two subareas, Nënshkodër and Mbishkodër, could be chemically different from one another. Accordingly, local clays from both subareas might have been used to produce pots. Results show Gajtan and Zagorë often separating from each other, with the former settlement having higher dominance in the region.

Qualitative Examination

Apart from quantitative data collected from pottery types and point counting, thin-sectioned specimens were also characterized qualitatively (Chapter VII). The qualitative examination of pottery specimens was focused on grouping thin sections visually under the microscope based on their fabric composition (inclusions). Barclay (2001: 9) discusses the importance of pottery composition analysis as follows:

> The identity of minerals, their associations, their relative quantities, and characteristics of size, color, and shape, all reflect the original materials from which the clay was prepared. Combinations of these features, or more rarely,

> some distinctive feature, may point to possible sources that can perhaps be identified from reference material or from fieldwork. By comparison with other collections of samples in museums and research institutions or by reference to geological samples and maps or texts, it may be possible to decide whether the raw materials were likely to have been available locally or must have come from outside the area, though many inclusions are too common for even this to be possible.

Quinn (2013) claims that, “the human eye, attached to the brain, is a powerful tool for the visual classification and identification of complex phenomena” (2013: 73). Hence, fabric groups, described below, were identified under the microscope by switching from low and high magnification (x4 and x10) and from PPL to XPL.

The qualitative examination of pottery suggests that, based on the variety of minerals in fabric composition, two different prehistoric fabric groups are present in the Shkodra Region. Fabric groups were contextualized based on a simple visual examination of the kinds of inclusions and the matrix under the microscope.

Group 1: coarse fabrics with various kinds of inclusions (SD075 Gajtan; SD076 Gajtan; SD077 Gajtan; SD080 Gajtan; SD091 Gajtan; SD098 Gajtan; SD097 Gajtan) similar to those shown in Figure 10, 11 and 14.

This group of specimens appears with various mineral and rock inclusions. For instance, specimen SD080 (Figure 12 (c, d)) has several particles such as calcite, basalt, peridotite, pieces of sedimentary rocks, opaque, and other unidentifiable ones. Voids occupy only four percent of its fabric.

Other pottery samples have quartz, K-spar, biotite, muscovite, sanidine, shale, chert, sandstone, mudrock, siltstone, and claystone in their fabric composition. Most of these inclusions are natural in the clay, while a few of them, such as calcite, appear to be human additives. Their orientation is irregular. Voids occupy a low percentage of the area of specimens with an average of 5.28 percent (Appendix B). Kinds of voids are mostly vesicles, planar, and vughs (Quinn 2013: 98 Figure 4.25 for descriptions about voids). The matrix of Group 1 does not show many variations in color when changing from PPL to XPL. Under the microscope, the matrix is yellowish and reddish-brown in PPL to dark brown and golden brown in XPL.

Group 2: coarse fabrics with few inclusions (SD093 Gajtan; SD053 Zagorë; SD054 Zagorë; SD057 Zagorë; SD058 Zagorë; SD103 Zagorë; SD063 Kodër Boks; SD066 Kodër Boks; SD069 Kodër Boks; SD073 Kodër Boks; SD008 Tumulus 099) similar to those shown in Figure 12 and 13.

Unlike the previous group, specimens in this group appear with less variety in the kinds of inclusions. Also, they do not appear to been wedged fully. For instance, specimen SD054 (Figure 12 (f)) is composed predominantly of opaques (hematite or magnetite) in its fabric composition with a few fine quartz particles. Voids, which vary in shape (vesicles, channels, vughs, and planar), occupy fourteen percent of its fabric.

Likewise, other pottery samples from this group have similar kinds of inclusions as specimens described above. In additional to opaques, pottery specimens from this group have a low concentration of calcite, quartz, and claystone in their fabric composition. Most of these inclusions are natural in clay; a few of them, such as calcite, seem to be human additives. Their orientation is irregular. Voids occupy a higher percentage of the area of specimens compared to Group 1 with an average of 10.16 percent (Appendix B). Shapes of voids are vesicles, channels, vughs, and planar (Quinn 2013: 98 Figure 4.25 for descriptions about voids). Many of the voids have regular squared shapes and parallel planar voids as shown in Figure 12, SD053 (e). Quinn claims that, "soil solutions can dissolve calcareous inclusions such as calcite, limestone, and shell fragments" (2013: 207). The regularly shaped voids are likely left from inclusions such as calcite because of post-depositional alteration. Hence, the presence of these regularly shaped voids in potsherds from this group could be explained by diagenesis.

Regarding matrix, Group 2 does not show many variations. Under the microscope, the matrix is dark brown to brown in PPL to reddish and golden brown in XPL. Dark colors might have been affected by the presence of iron oxide in clay, since iron oxide is a chief colorant of fired clay (Shepard 1956: 18).

There are three specimens that appear with slightly different fabric properties compared to groups mentioned above. Those samples are SD004 Tumulus 099, SD012 Tumulus 099 (Figure 14 (i, j)), and SD089 Gajtan. Compared to other ones, these three specimens appear to be an exception. Samples from Tumulus 099 have a large concentration of calcite. In contrast, the specimen from Gajtan has sparse inclusions compared to all other ones. Particles of SD089 seem to be natural in the clay during its manufacturing.

Qualitative examination indicates that samples from Gajtan are present in both fabric groups, whereas the presence of Zagorë and Kodër Boks in only one suggests that Gajtan potters produced various vessels and distributed them throughout the Shkodra Region. But this does not exclude the possibility that Zagorë also produced pottery during prehistory. The fact that Zagorë has a considerable concentration of pottery sherds with porous surfaces shows that prehistoric groups living in this settlement might have produced pottery, but to a lesser extent compared to Gajtan. Unlike pottery from settlements mentioned above, the composition of prehistoric pottery from T 099 seems to be mixed. For instance, compared to other specimens, the concentration of calcite in pottery sample SD012 (i) (Figure 14) seems to be higher, which explains the distribution of pottery types shown in Figure 5. Hence, prehistoric groups from other settlements in the Shkodra Region or elsewhere might have brought pottery to this tumulus or because of limited vessel (and site) function. To contextualize the qualitative examination, representative microphotographs of the samples from each site are shown below.

Figure 10 (a) shows specimen SD076 from Gajtan. The inclusion situated in the upper left side of the picture is a very coarse polycrystalline quartz about 1.08 mm long, whereas in the upper right is a vugh less than 1 mm in size. In the lower part, mica, both biotite and muscovite, surround the pore (Appendix B).

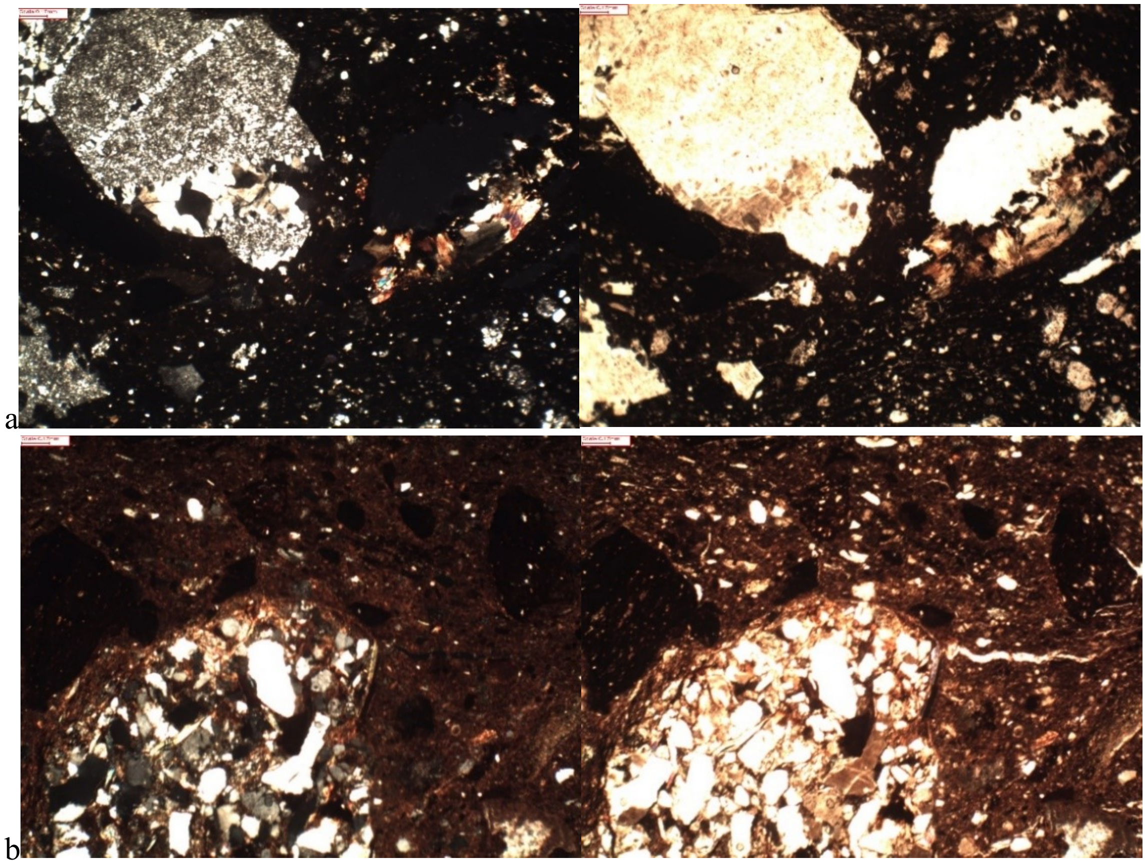


Figure 10 Microphotographs of the sample SD076 (a) and SD075 (b) from Gajtan: in the left is XPL and the right PPL.

Figure 10 (b) shows a different specimen from Gajtan. In the lower part of the picture is located a very coarse inclusion, approximately 1 mm in size. This particle, naturally occurring in the clay, seems to come from a sedimentary rock such as sandstone. During the PASH project, sandstone grinding stones were found from the Site Collection Unit 021 at Gajtan and from Unit 002 Level 005 from excavations conducted at Kodër Boks.

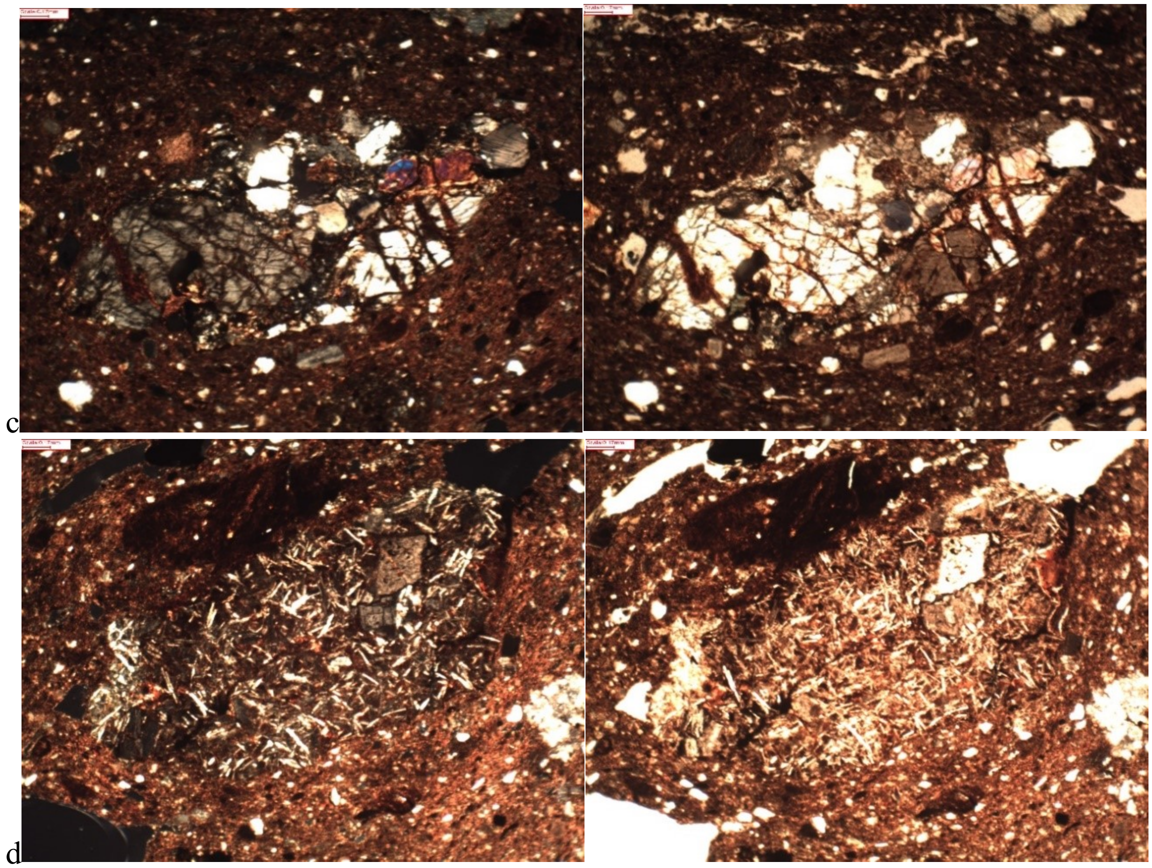


Figure 11 Microphotographs of the sample SD080 (c, d) from Gajtan: in the left is XPL and the right PPL.

Figure 11 (c, d) shows two pictures from the same specimen, SD080 from Gajtan. Figure 11 (c) shows a very coarse inclusion, likely peridotite, about 2.6 mm in size. It seems to be human additive. Figure 11 (c) shows the other inclusion present in the same specimen. This particle inclusion appears to be a naturally occurring basalt, approximately 0.87 mm across.

Grinding stones made of peridotite and basalt (Zhaneta Gjyshja’s master’s thesis) were found during the PASH project in Gajtan. Peridotites were found in Site Collection Unit 019 and from test excavation Unit 002 Level 005, and basalt from Unit 002 Level 002 in Gajtan.

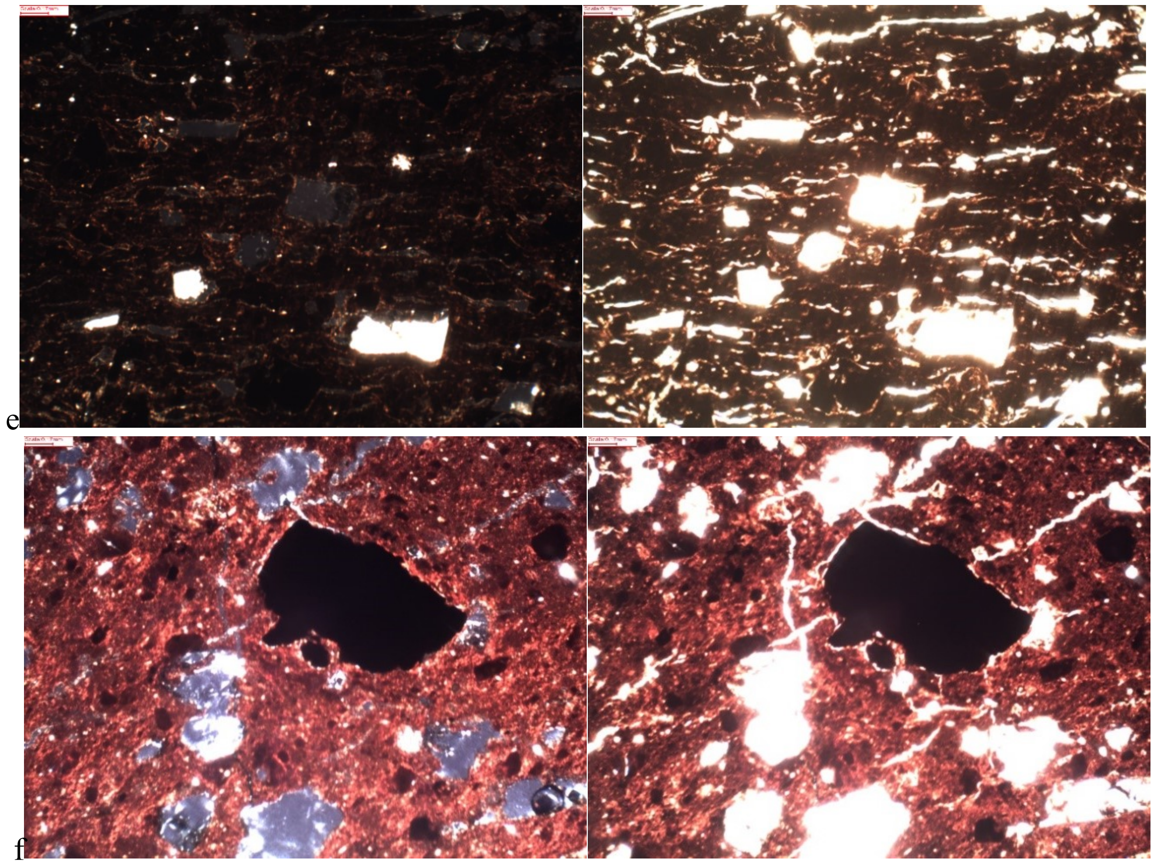
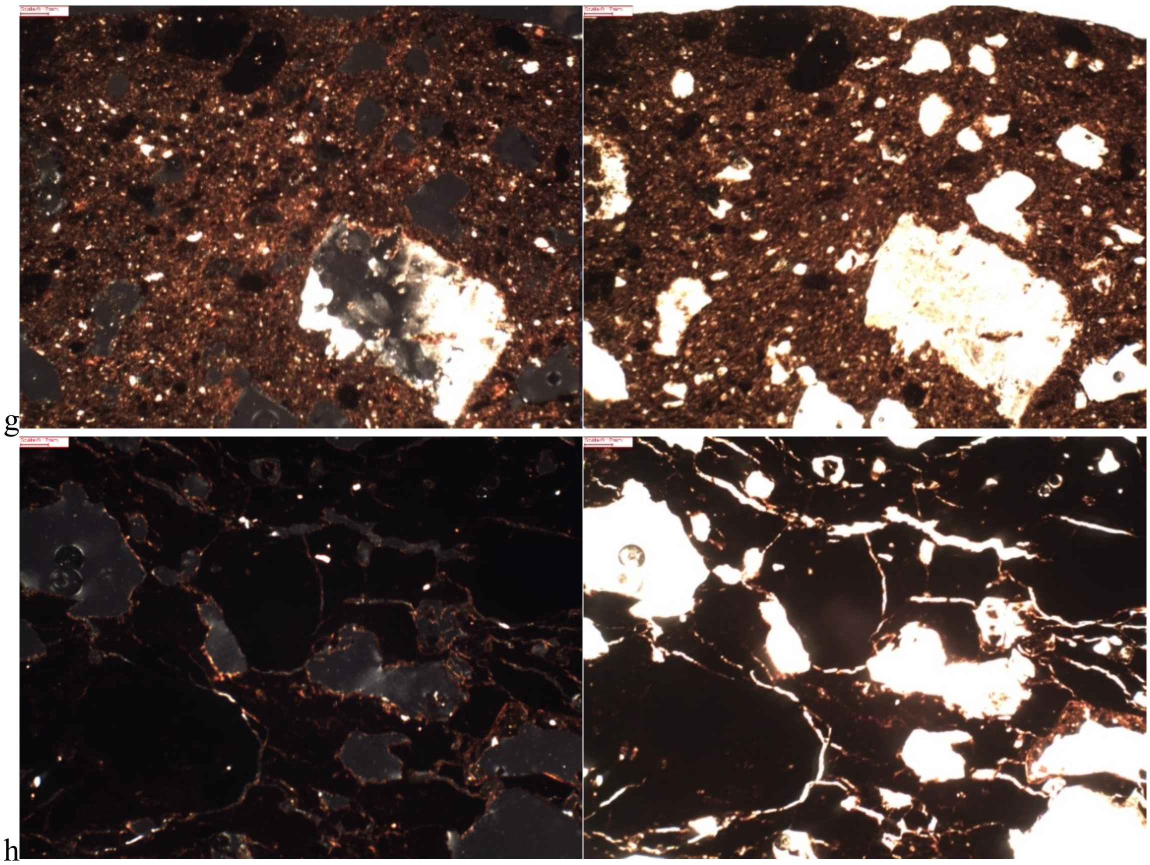


Figure 12 Microphotographs of the sample SD053 (e) and SD054 (f) from Zagorë: in the left is XPL and the right PPL.

Figure 12 (e) shows specimen SD053 from Zagorë. The fabric of this sherd has sparse fine inclusions and many voids. In this specimen, on the lower right side of the picture, is a fine quartz particle. Based on point counting, voids constitute 9 percent of the total area of the slide. Under PPL voids (vughs and planar) are visible, a few of which are rectangular in shape.

Figure 12 (f) displays a different specimen, SD054, which comes from the same settlement. In the center of the picture is situated a very coarse opaque (hematite/magnetite) inclusion, approximately 1.28 mm across. Similar to the previous specimen, voids are frequent in this slide, occupying 14 percent of the area. In 2013, during the PASH project, Team F found mineral ores such as hematite or magnetite around Kodër Boks, Vorfë, and Kratul (PASH project, unpublished data).



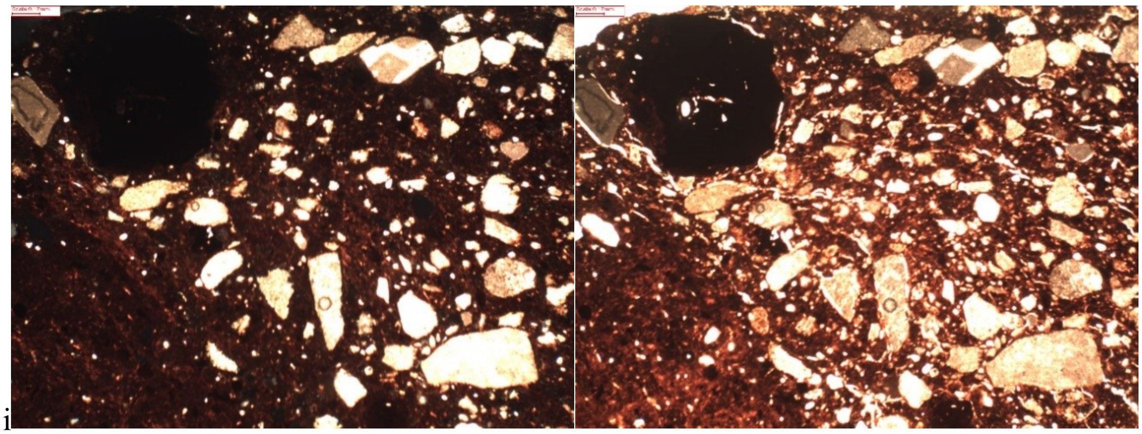
g

h

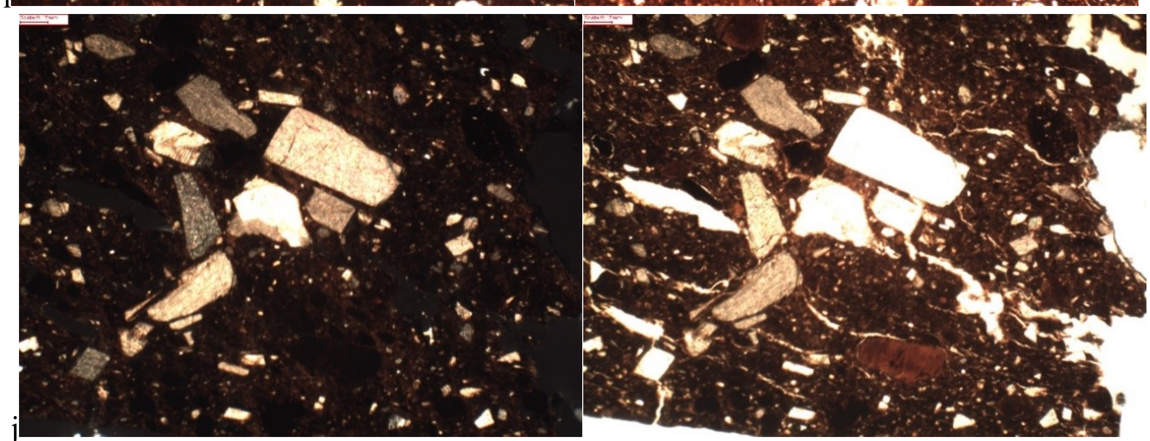
Figure 13 Microphotographs of the sample SD073 (g) and SD063 (h) from Kodër Boks: in the left is XPL and the right PPL.

In Figure 13 (g) is shown specimen SD073 from Kodër Boks. The fabric of this sherd has sparse fine to coarse inclusions and many voids. In this specimen, on the lower right side of the picture, is situated a very coarse polycrystalline quartz particle. Based on point counting, voids constitute 9 percent of the total area of the slide, while vughs are visible under PPL.

Figure 13 (h) displays a different specimen, SD063, which comes from the same settlement. On the left side of the picture is situated a coarse opaque (hematite/magnetite) inclusion, approximately 0.55 mm in size. Voids are frequent in this slide, occupying 14 percent of the area, which under PPL are seen to be vughs and planar.



i



j

Figure 14 Microphotographs of the sample SD012 (i) and SD004 (j) from Tumulus 099: in the left is XPL and the right PPL.

Photos were taken at x4 objective lenses using OPTIX CAM camera with x0.5 magnification: scale 0.17mm.

Figure 14 (i) shows specimen SD012 from Tumulus 099. The fabric of this sherd has abundant fine to very coarse inclusions and few voids. In this specimen, on the upper left side of the picture, is an opaque particle inclusion, naturally occurring, about 1 mm in size. Also, almost the whole area is composed of angular and rounded calcite inclusions. Calcite inclusions seem to be both human additions and naturally occurring in the paste. Based on point counting, voids constitute 5 percent of the total area of the slide, including a few vughs and planar voids visible in PPL.

In Figure 14 (j) is displayed a different specimen, SD004, that comes from the same tumulus. As shown in the picture, the pottery specimen contains frequent calcite inclusions of various sizes, ranging from fine to very coarse (Appendix B). The angularity of particles suggests that they seem to be mostly human additives. Voids occupy 7 percent the area of the specimen; they are mainly planar.

The comparison between macroscopic and microscopic examination shows a possible correlation between pottery types and their fabric composition. For instance, sample SD053 from Zagorë, shown in Tables 6 and 7, belongs to the pottery type Porous Soft Thick, which correlates with its composition as shown in Figure 12 in XPL and PPL. The fabric of this specimen is composed of frequent voids and rare mineral inclusions. Moreover, specimen SD076, in Tables 6 and 8, belongs to the pottery type Slipped Hard Thick, which correlates with its composition as shown in Figure 10 in XPL and PPL. The fabric of this specimen is composed of few voids and a high number of minerals. Additionally, the two specimens mentioned above are quantitatively separated by point counting technique in two different fabric groups: Fabric Group 1 for SD053 and Fabric Group 2 for SD076 (Table 8 and 9). Specimens described above belong to the Bronze Age.

The plastic and aplastic inclusions identified in sherds during their examination under the microscope are compatible with a range of geological deposits in the Shkodra Region and surrounding areas (Figure 1). Chapter IV provides information about the geology of the area, showing where the necessary components to produce pottery are located, such as water, clay, and temper materials (Quinn 2013; Rice 2015).

There are several factors that show that prehistoric pottery from the Shkodra Region is locally produced. First, based on geological evidence, the area has nearby clay sources (Chapter IV). Second, the compositional analysis shown above indicates that the main minerals found in pottery sherds are quartz, calcite, and opaques (hematite/magnetite) which, as explained above, are also available in the Shkodra Region. Third, rock inclusions such as basalt, peridotite, and sandstone identified under the microscope are available in the Shkodra Region and nearby areas. Rock inclusions such as basalt and sandstone seem to be naturally occurring in the pottery sherds, whereas peridotite appears to be human additive. The Shkodra Region is mainly composed of sedimentary rocks, which suggests that sandstone is a natural inclusion in pottery. As explained above, shapes of these embodiments such as roundness and angularity are used to differentiate among the naturally or intentionally added particulate inclusions into the clay. Therefore, peridotite's shape, which is angular (Figure 11 c), suggests that this inclusion might be a human additive.

The PASH project recovered grinding stones of different rock types (most of which are prehistoric), such as basalt, peridotite, and sandstone (PASH Project, unpublished data). Rocks found during this project were likely used also as tools to crush human additives during pottery manufacturing. Shepard (1956) claims that mortars were used to grind tempers and clays to produce pottery (1956: 51). This argument explains the presence of peridotite in pottery sherd SD080. The peridotite inclusion might not have occurred in clay but was incorporated during the crushing process of the tempers. Similarly, the presence of grinding stones made of basalt in Gajtan (found during the excavations) explains the presence of the inclusions in pottery sherd SD080.

Also, qualitative investigation of thin sections showed that calcite is the most frequently occurring mineral in pottery sherds from the Shkodra Region. "Calcite is the main constituent of limestone, the most abundant chemically precipitated sedimentary rock" (Klein and Philpotts 2013: 295). Geological evidence presented in Figure 1 shows that the region has many limestone sources, and calcite seems to derive from those sources.

It is worth mentioning that prehistoric pottery collected during the PASH project it is not fired at high temperatures. Firing conditions are indicated with the naked eye via the colors of the pots, which are reddish and variable, but the presence of calcite adds to the information about firing temperature. Rice (2015) claims that "if a ware is tempered with calcite or uncalcined shell and is fired to approximately 700-750^0 or above, the CaCO3 will dissociate, which can cause spalling (lime popping) of the surfaces after cooling, as the remaining particles of CaO rehydrate from normal atmospheric humidity" (Rice 2015: 377). Under the microscope, calcite seems to have all its mineral properties. "Calcite, the commonest form of a calcium carbonate, is a hexagonal mineral of colorless or white, transparent or opaque, vitreous appearance, with three, very strong cleavages that define a rhombohedron" (Allen 2017: 8). This suggests that prehistoric groups living in the Shkodra Region fired pottery using simple kilns. Hence, the data collected through petrography strengthens the hypothesis about local production of pottery found in the Shkodra Region during PASH project.

Additionally, similar to the MCA results, qualitative examination of pottery specimens suggests that there was no standardization in pottery production. The results show that fabric composition of pottery sherds is compatible with the geology of the area, but there is no standard set of kinds, shapes, sizes, or abundance of mineral and rock inclusions on specimens. Variety in pottery manufacture implies that many non-specialized individuals within a group were engaged in its production.

In closing, the results obtained from incorporating three different techniques discussed above provide similar results. Results show a correlation between the distribution of pottery types, fabric and paste groups, and their mineralogical composition with raw materials and geology of the Shkodra Region. Although samples included in the study cover a range from ENEO to LBA, results do not seem to be much affected by time period.

CHAPTER IX

DISCUSSIONS AND CONCLUSION

The primary goal of this research was to test hypotheses, using macroscopic and microscopic examination, about whether prehistoric pottery sherds found in the Shkodra Region were produced locally. The distribution of pottery types produced through paradigmatic classification and petrography were used to investigate the mode of production and origin of potsherds unearthed in the area mentioned above. As shown in Chapter V, 1056 pottery sherds, collected from PASH project at Gajtan, Zagorë, Kodër Boks, T 088, and T 099 were examined macroscopically to produce pottery types through paradigmatic classification. Twenty-eight (excluding T 088) representative specimens consisting of twenty-two potsherds and six non-pottery fired clay, i.e. daub, were subjected to petrographic analysis applying quantitative and qualitative techniques. The resulting data were analyzed using two techniques: 1) multiple correspondence analysis (MCA) was used to plot the eighteen pottery types produced through paradigmatic classification; and 2) ternary graphs were used to plot data collected during fabric compositional analysis of pottery samples employing the point counting technique. In addition, rock and mineral inclusions of pottery specimens were identified under the microscope.

As discussed in Chapter IV, previous research on pottery unearthed from the Shkodra Region was done based on pots' stylistic patterns and via analogy with specimens from other regions (Andrea 1996; Fistani 1983; Jubani 1972; Koka 1985; Koka 1990; Korkuti 1979; Lahi 1988; Lahi 1993; Prendi 1987). The absence of the use of scientific methods for studying pottery did not allow for direct investigation of the provenance of potsherds.

Due to limited knowledge about the area, PASH conducted a regional archaeological project covering a broad spectrum of research interests such as settlement patterns, land use, and social behaviors, from prehistory to the present, in northern Albania (PASH project, unpublished data). Prehistoric pottery finds collected from test excavations during this project were investigated to respond to research questions posed in this thesis. Non-pottery fired clay fragments were taken as samples from three of the settlements, Gajtan, Zagorë, and Kodër Boks, in the Shkodra Region, to compare with pastes of the pottery assemblages from Gajtan, Zagorë, Kodër Boks, and T 099 extracted through point counts, based on the assumption that daub can act as a proxy for local clays. Rocks and minerals found in pottery assemblages were analyzed to see their compatibility with the geology of the area. Available sources and resources in the study region were documented as well, to understand the capacity of the area to provide necessary raw materials for pottery production. Thus, specimens could be identified as of possible nonlocal origin if exhibiting different characteristics from those available in the Shkodra Region.

As presented in Chapter VIII, the results of the macroscopic and microscopic analyses are positive: the assemblage of pottery specimens groups with non-pottery fired clays. Similarly, qualitative examination suggests that there exist correlations between the fabric composition of pottery specimens, in terms of rock and minerals, and available raw material in the area (Chapter VIII).

In addition to petrographic analysis, the distribution of pottery types produced using paradigmatic classification suggests a similar result. The concentration of eighteen pottery types, shown in Figure 5, from one site (i.e. Gajtan), indicates that these pots had a general function, and/or were being produced by many individuals, and therefore were likely a local product. Macroscopic, quantitative, and qualitative evidence supports the conclusion that prehistoric pottery sherds discovered in the Shkodra Region were made locally, within the area. During prehistory, groups living in the Shkodra Region were primarily dependent on local resources, reflecting the fact that the Shkodra Region is rich in clay sources and other natural materials.

Settlement patterns, social organization, and pottery distribution affect raw material cost (Jeske 1989). In this regard, raw materials nearby to settlements were more likely preferred for pottery production. As Allen (2017) claims, “clays being heavy, bulky, and costly to transport, early potters and brick-makers mainly relied on local resources” (Allen 2017: 109). Elsewhere, (Neff 2014) has suggested that “weight, bulk, and fragility dramatically increase the transport cost of ceramics” (2014: 2). Further, Neff (2014: 5) argues that “most ceramics start out as low-cost items, since, […] raw materials are widely available and the basic technology is simple.” Additionally, there is no evidence of long-distance transportation technologies for prehistory in the Shkodra Region. Therefore, the reliability of local raw materials during the pottery manufacturing process reduced cost and energy.

As discussed in Chapter III, provenance refers to the findspot of an object or implies the source of manufacture of an artifact (Pollard and Wilson 2001). According to Heidke et al., (2002), in provenance studies, the distribution and variability of geologic sources, ceramic production and distribution systems, technological alteration of the materials used in making a ceramic paste, and pottery and its post-depositional alteration all need to be considered (2002: 154). Pottery sourcing studies are often conducted by combining chemical and petrographic analyses (Boccuti et al. 2015; Knappett et al. 2011; Spataro 2011). But, considering that prehistoric potsherds from the Shkodra Region are handmade coarse wares, petrography was a more suitable method to conduct a compositional analysis (Chapters III, VII). Also, the sample size of pottery sherds from the study area was limited for meeting the provenance postulate. Additionally, chemical affects during and after manufacturing (i.e., from use) might have problematized matching ceramic to raw materials. Another consideration is post-depositional alterations of these sherds, which might have altered their chemical or physical properties. Nevertheless, since all pottery sherds have gone through the same process, no negative impacts from this factor were expected in the petrographic analysis. The combined macroscopic and microscopic examination results strongly support the hypothesis that coarse ware finds from the Shkodra Region were produced using local resources.

In addition to the comparison between pottery sherds and non-pottery fired clay specimens being positive, production mode was another issue to investigate. In Chapter II, it was suggested that handmade coarse wares from the Shkodra Region were produced in domestic settings by non-specialists. If that was the case, substantial variation should occur in fabric manufacture and mineralogical composition across time and space.

As discussed in Chapter VIII, pottery type distribution and qualitative examination show that substantial variation existed in ceramic manufacture, especially at settlement sites. Some variation between settlements in these regards seems to be due to differing samples sizes, but the expectation for local production at the household level, that of a wide variety of types, is met. Tumulus 099 is an exception, with only two pottery types occurring more often on this site, indicating import, limited function (special wares produced especially for burial), or chronology (limited time span over which types could occur). The last possibility may be unlikely, given that the paradigmatic types employed were time-transgressive. Sample size also could be playing a role in this result. The fact that all eighteen pottery types created through paradigmatic classification occur at Gajtan may be an indication of multiple production loci, sample size, or longer occupational duration.

Qualitative examination of twenty-two pottery specimens shows that, unlike Zagorë and Kodër Boks specimens that consist mainly of calcite and opaque (magnetite/hematite), potsherds unearthed in Gajtan have the most variation in mineral and rock composition such as quartz, opaque, feldspars, sandstone, basalt, peridotite etc. Their fabric composition varies from one sherd to another. The finding suggests that there was no standardization of pottery production.

Jeske (1989) claims that to manufacture high quality products it is necessary to use expensive materials and invest high energies. But, as shown in the photomicrographs

(Chapter VIII), thin-sectioned specimens lack kneading or wedging consistency, lack inclusion unidirectionality, and are poorly fired. These findings suggest that pottery was made by non-specialists investing low energy and time in production. Potsherds collected from the Shkodra Region seemingly were utilitarian wares since, in terms of fabric composition, firing, and decorative patterns, they do not appear to be a high-quality product. These results strongly imply that these pots were manufactured in a domestic mode of production, as implied by the large number of paradigmatic types found at most sites.

As stated in Chapter II, the final purpose of this research was to test the assumption that Gajtan was the center of pottery production in the Shkodra Region. In other words, it was assumed that, apart from being self-sufficient, the settlement of Gajtan functioned as a center for pottery distribution in the region as well, as archaeological data (Chapter V) from published sources (Islami and Ceka 1965: 450; Korkuti 1979: 122- 123) mention the remains of a prehistoric kiln complex found at Gajtan and some tools for decorating and polishing pottery. Also, Albanian archaeological literature (Prendi 1977) considers Gajtan the main settlement of northern Albania. Additionally, as described in Chapter IV, compared to Zagorë and Kodër Boks, the site of Gajtan has closer proximity to raw materials to produce pots (Galaty 2008: 257) such as clay, water, fuel, and tempers.

If, among sites in Shkodër, Gajtan was a center for pottery production, pottery types from Gajtan should have been distributed from there to the Zagorë and Kodër Boks settlements and occur in T 088 and T 099, and pots exhibiting similar fabric composition should be identified at the other sites included in this research study. The results presented in Chapter VIII do not fully support Gajtan being the center of pottery production in the Shkodra Region. Ordination displays pottery types as falling into major groups, one with few types; Group 1, consisting of Gajtan and T 088; Group 2, Zagorë and Kodër Boks; and Group 3, T 099. Although, Gajtan has all eighteen pottery types used in this study, it does not seem to have been the only pottery producing center in the area during prehistory.

Similarly, data collected from point counts (Chapter VIII), although with some overlap, represent two distinct fabric groups where Gajtan and Zagorë appear separately. The results of the compositional analysis suggest that pottery assemblages do not consist of similar fabric compositions. It is likely that two of the settlements used different raw materials to produce pots.

In addition to the results mentioned above, qualitative examination shows that there exists a difference between Gajtan, where pottery sherds include various minerals and rocks, and Zagorë and Kodër Boks, where pottery includes mainly quartz, calcite, and opaque minerals. It is likely that the Mbishkodër and Nëshkodër subareas have different clay chemical composition. Apparently, Gajtan produced and distributed ceramics in the region but was not the only center for pottery production. However, further investigations need to be done in the future to clarify the assumption regarding multiple production centers. As discussed in Chapter III, based on Costin's (1991) theoretical approach, the results suggest that the organization of production was realized by independent individuals in more than one location throughout the Shkodra Region;

therefore, i.e., it was dispersed. The findings of pottery distribution and exchange in the study area provide limited evidence for pottery imports from elsewhere.

Additionally, results showed that chronology did not affect much the analysis since, oftentimes, Bronze Age pottery specimens grouped with Eneolithic ones (Chapter VIII). Apparently, for millennia, the production of pottery was realized exploiting local raw materials. Nevertheless, further research needs to be done to test the assumption about long-term use of raw materials.

In conclusion, this research shows that prehistoric groups living in the Shkodra Region organized their lives in small spaces not exceeding 5 ha in size, Gajtan being the largest. Findings in this thesis also support previous research focused on settlements during prehistory. Based on archaeological records, especially collected in southeast Albania, Prendi claims that prehistoric communities "...lived in groups of people with an internal organization based on communal production certainly familial groups, usually obtained from the natural resources of their own areas all that they needed for their daily work or existence" (Prendi 1982: 207). Settlement patterns elsewhere during prehistory (Harding 2000) are described as follows: "the Bronze Age village was in general terms neither very large nor very elaborate in physical space and organization" (2000: 90).

Although the Shkodra Region appears to be self-sufficient in terms of pottery production and other tools used to sustain daily life such as grinding stones collected by PASH project happened to have been made of local materials (Zhaneta Gjyshja's master's thesis), the area does not appear to be entirely isolated. As mentioned in earlier chapters, previous research shows links between pottery styles collected in the Shkodra

Region with those found in other areas within and outside the country (Andrea 1996; Jubani 1972; Koka 1990; Korkuti 1979; Prendi 1987) which indicates that prehistoric groups might have had interactions with them and share their knowledge regarding pottery production using local raw materials. Accordingly, Gosselain (2016: 194-195) states that "the concept of connectivity is liable to encompass multiple situations of encounters between things, ideas and people, irrespective of the direction, scale and intensity of fluxes." Since petrographic results show that vessels collected in the Shkodra Region were locally made, it is likely that similarities in pottery style distribution could be as a result of shared knowledge among prehistoric groups.

Overall, the integration of macroscopic examination and petrography provided strong evidence about prehistoric groups living in the Shkodra Region. The area has nearby raw materials to produce pots, and vessels seem to have been made exploiting local sources and resources. Results support the conclusion that during prehistory the Shkodra Region was self-sufficient and the organization of production seems to have been conducted by non-specialist individuals in household conditions. Based on macroscopic and microscopic analyses, these utilitarian wares seemingly had a general function and some may have been produced and exchanged within the region, although the direction of movements of the artifacts is difficult to determine. Among Gajtan, Zagorë, and Kodër Boks, the former settlement appears to have had the most influence in the region.

Ultimately, this research has demonstrated the efficiency of macroscopic analysis and petrography in examining pottery production and movement in the Shkodra Region.

These techniques have great potential for investigating community interactions during prehistory when spatial organization reflects the level of social complexity.

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APPENDIX A

MACROSCOPIC DESCRIPTION OF POTTERY

Table 13 Description of pottery found from test excavation in Gajtan: Site 011.

PASH 2014/2016 Gajtan: Site 011					
Site/Unit/Level	**Period**	**Diagnostic**	**Daub**	**Macroscopically Analyzed**	**Description**
Unit 001 Level 000	Bronze Age	None	-	3	**Inclusions:** Rounded limestone inclusions. **Thickness:** Thick walls. **Surface:** Two of the fragments have porous surfaces (S011/U001/L000/1, S011/U001/L000/3) and one has black slip on the surface(S011/U001/L000/2). **Color:** Black. **Hardness:** Hard.
Unit 001 Level 001	Prehistoric/ Bronze Age	Two handles (S011/U001/L001/3, S011/U001/L001/4) and one rim (S011/U001/L001/2).	-	20	**Inclusions:** Inclusions visible from the factions of the pottery sherds are rocks with reddish and dark brown colors (S011/U001/L001/7) and limestone (S011/U001/L001/15) with different shapes and sizes. **Thickness:** Medium and thick walls. **Surface:** Most of the fragments have untreated surfaces with pores and rock inclusions of different colors. Some of the fragments have a thin clay layer, slipped, on their surfaces of black and brown colors, and other. **Color:** Surface color divides the fragments of this level into three groups, reddish, brownish, and black ones. Fragments with reddish and brownish surface colors have thicker walls compared to ones with black color. Red, brown (S011/U001/L001/7), and black are colors that compose the fabric of these sherds, well fired. **Hardness:** Hard.

Table 13 (continued).

Unit 001 Level 002	Early to Late Bronze Age/ Bronze Age	21 rims, five handles, and one base fragment.	-	73	**Inclusions:** Limestone (S011/U001/L002/30) and rock inclusions (S011/U001/L002/58) of different sizes with angular and rounded shapes. Reddish, black, and gray (S011/U001/L002/73, S011/U001/L002/46, S011/U001/L002/65) are colors that characterize rock inclusions. **Thickness:** Thin, medium, and thick walls. **Surface:** Slipped (S011/U001/L002/44), porous (S011/U001/L002/63), and a mixture of both or neither of them are surfaces that characterize this group. Most of the fragments from this level are hard, probably because of presence of slip or function of the vessel. **Color:** Slipped surfaces have black (S011/U001/L002/21) and brownish to gray color (S011/U001/L002/64). Fragments with untreated or porous surfaces appear with brown to reddish colors. **Hardness:** Hard, only two fragments are soft.

Table 13 (continued).

Unit 001 Level 003	Eneolithic/ Early Bronze Age/ Bronze Age	Four handles, four rims, and four decorated fragments.	17	51	**Inclusions:** White, reddish, and dark brown rocks (S011/U001/L003/24, S011/U001/L003/40, S011/U001/L003/28) and limestone (S011/U001/L003/25) round and angular are visible inclusions from the factions of the pottery sherds. They have different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have thin (S011/U001/L003/52), medium (S011/U001/L003/19), and thick walls (S011/U001/L003/36). **Surface:** Their surfaces are slipped (S011/U001/L003/52), porous (S011/U001/L003/55), a mixture of both or neither of them. Slipped surfaces have black (S011/U001/L003/2) and reddish brown to gray colors (S011/U001/L003/29, S011/U001/L003/31). **Color:** Fabric color divides the fragments of this level into two groups, reddish and black ones. Fragments with reddish surfaces have thicker walls compared to ones with black. Both groups display well-firing conditions. **Hardness:** Regarding hardness, most of the fragments are hard. Fragments with black surface have a thin clay layer on the surface which makes them smooth but hard. A few of them are soft (S011/U001/L003/30).

Table 13 (continued).

Unit 001 Level 004	Early to Late Bronze Age	Six handles, two rims, and two decorated fragments (S011 U001 L004/7 and S011 U001 L004/17).	9	19	**Inclusions**: From this level, mica (S011/U001/L004/9), angular rock, and round sand inclusions (S011/U001/L004/10) of different sizes are visible in the fabrics of some of the pottery sherds. Rock inclusions have different colors such as reddish, black, and gray. **Thickness:** Prehistoric pottery fragments from this level have only one sherd with thin walls (S011/U001/L004/16). Other fragments have medium (S011/U001/L004/15) and thick (S011/U001/L004/12) walls. **Surface:** Slipped (S011/U001/L004/14), porous, and a mixture of both or neither of them (S011/U001/L004/19) characterizes the surfaces of the fragments from this group. **Color:** Slipped surfaces have reddish (S011/U001/L004/14) and brownish to black color (S011/U001/L004/2). Brown (S011/U001/L004/14), reddish (S011/U001/L004/11), and black (S011/U001/L004/6) are the colors that characterize the fabrics of the pottery sherds. **Hardness**: Fragments found in this level have only one soft sherd, the others are hard. A thin clay layer (slip), on the surface, of reddish brown, gray, or black color characterizes hard fragments.

Table 13 (continued).

Unit 001 Level 005	Neolithic/ Eneolithic/ Early to Late Bronze Age	Three handles, four rims, and one decorated fragment.	-	20	**Inclusions:** Few rock inclusions of a reddish color are visible in some of the fragments. The rest is unidentifiable macroscopically. **Thickness:** Thin and medium walls. Surface: Most of the sherds of this group have slipped surfaces, regardless, there are ones with porous and other surfaces. **Color:** Pottery body sherds with slipped surfaces have brownish and grayish black colors. Those with porous surfaces have reddish brown one. Hardness and color of the fragments of this group show that firing temperature of these sherds was high, well-fired. **Hardness:** Fragments found at this level have a few soft sherds, the others are hard. A thin clay layer (slip), on the surface of pottery sherds, of brown, gray, or black color characterizes fragments with hard surfaces.
Unit 001 Level 006	Eneolithic/ Early to Late Bronze Age	One handle and one decorated fragment.	-	19	**Inclusions:** Some of the fragments have visible rock inclusions of brownish color and angular shapes (S011/U001/L006/13). Other ones have limestone inclusions of different shapes and sizes (S011/U001/L006/10). There are fragments inclusions of which are not visible macroscopically. **Thickness:** Thin, medium, and thick walls. **Surface:** Slipped, porous, and other surfaces. **Color:** Pottery body sherds with slipped surfaces have reddish brown and grayish colors. Fragments of this group show well-firing temperatures. **Hardness:** Hard and soft.

Table 13 (continued).

Unit 001 Level 007	Neolithic/ Eneolithic/ Early to Late Bronze Age	None	-	17	**Inclusions:** Different inclusions such as grog (S011/U001/L007/6), rocks with black color (S011/U001/L007/4), mica, and limestone (S011/U001/L007/5) are macroscopically visible in some of the fragments. In other pottery sherds, the identification of their inclusions is difficult. **Thickness:** Thin, medium, and thick walls. **Surface:** Slipped, porous, other. **Color:** Pottery fragments from this group have reddish brown to grayish fabric and surface colors, well fired. **Hardness:** Hard and soft.
Unit 001 Level 008	Prehistoric/ Bronze Age	Six rim fragments.	54	25	**Inclusions:** Visible inclusions from this level are rocks with reddish color (S011/U001/L008/19), dark brown (S011/U001/L008/15), and white (limestone) ones (S011/U001/L008/18). **Thickness:** Thin, medium, and thick walls. **Surface:** Slipped, porous, and other surfaces. **Color:** This group displays reddish brown and grayish black colors, well fired. **Hardness:** Hard and soft.

Table 13 (continued).

Unit 001 Level 009	Prehistoric/ Eneolithic/ Bronze Age	Nine rim fragments.	55	32	**Inclusions:** Macroscopically, it is difficult to identify inclusions that compose the fabric of these pottery body sherds. However, some of the visible ones seem to be limestone ones with different shapes and sizes, grog (S011/U001/L009/18), and other rock ones with dark brown color (S011/U001/L009/21). **Thickness:** Thin, medium, and thick walls. **Surface:** Slipped, porous, and other surfaces. **Color:** Pottery body sherds have reddish brown and grayish colors. Hardness and color of the fragments of this group indicate that the pottery is well-fired. **Hardness:** Hard and soft.
Unit 001 Level 010	Prehistoric/ Bronze Age	One decorated and one rim fragment.	-	12	**Inclusions:** Inclusions visible in this group are rock ones with dark brown to black colors. **Thickness:** Thin, medium, and thick walls. **Surface:** Slipped, porous, and other surfaces. **Color:** Pottery body sherds from this group have reddish, reddish brown, and dark brown fabric and surface colors. **Hardness:** Hard and soft.
Unit 001 Level 012	Prehistoric/ Bronze Age	Three rim fragments.	55	16	**Inclusions:** Visible inclusions from this group are rock, quartz, and limestone (S011/U001/L012/6). **Thickness:** Thin, medium, and thick walls. **Surface:** Porous and other surfaces. **Color:** This group has reddish, brown, and dark brown fabric and surface colors, poorly fired. **Hardness:** Hard and soft.

Table 13 (continued).

Unit 001 Level 013	Prehistoric/ Eneolithic-Early Bronze Age/ and Bronze Age	One rim fragment.	36	23	**Inclusions:** Few of the fragments have visible limestone and rock inclusions (S011/U001/L013/9, S011/U001/L013/21), they have different shapes and sizes. **Thickness:** Prehistoric pottery sherds from this stratum have thin, medium, and thick walls. **Surface:** Porous, slip, and other. **Color:** Pottery body sherds with slipped surfaces have reddish, brownish, and brownish-black colors. Those with porous surfaces have reddish-brown one. Poorly fired. **Hardness:** Hard and soft.
Unit 001 Level 014	Prehistoric/ Bronze Age	Seven rim fragments.	53	24	**Inclusions:** Visible inclusions from this stratum are limestone (S011/U001/L014/9, S011/U001/L014/12) and rock ones (S011/U001/L014/10). Inclusions have different shapes and sizes. **Thickness:** Fragments have thin, medium, and thick walls. **Surface:** Porous, slip, and other. **Color:** Pottery body sherds have reddish brown and grayish black colors, poorly fired. **Hardness:** Hard and soft.
Unit 001 Level 015	Prehistoric/ Bronze Age	Five rim fragments.	8	29	**Inclusions:** No visible inclusions. **Thickness:** Thin, medium, and thick walls. **Surface:** Porous and other surfaces. **Color:** Pottery body sherds from this level have brownish and grayish black colors. poorly fired. **Hardness:** Hard and soft.

Table 13 (continued).

Unit 001 Level 016	Prehistoric/ Bronze Age	One rim fragment.	-	11	**Inclusions:** Quartz, limestone, and rock with different shapes and sizes (S011/U001/L016/2, S011/U001/L016/4) are visible inclusions from this group. Rock ones have brown to dark brown colors. **Thickness:** Thin and medium walls. **Surface:** Porous and other surfaces. **Color:** Pottery fragments from this group have reddish and dark brown to black colors. Well fired. **Hardness:** Except for one fragment (S011/U001/L016/4), all prehistoric pottery sherds from this level have soft surfaces.
Unit 002 Level 005	Early Bronze Age/ Bronze Age	None	-	11	**Inclusions:** Limestone and rock inclusions. **Thickness:** Medium and thick walls. **Surface:** Slip and other surfaces. **Color:** Reddish brown. **Hardness:** Hard and soft.
Unit 002 Level 006	Eneolithic/ Early Bronze Age/ Bronze Age	None	-	8	**Inclusions:** Limestone. **Thickness:** Medium and thick walls. Surface: Slip and other surfaces. **Color:** Reddish brown. **Hardness:** Hard.
Unit 003 Level 000	Bronze Age	Three handles and one rim fragment.	-	12	**Inclusions:** Visually, from the factions of the pottery sherds are distinguishable limestone and rock inclusions. **Thickness:** Medium and thick walls. Surface: Porous, slipped, and other surfaces. **Color:** Pottery body sherds from this level have reddish brown to brown colors, well fired. **Hardness:** Hard.

Table 13 (continued).

Unit 003 Level 002	Prehistoric/ Eneolithic/ Early Bronze Age/ and Bronze Age	Five handles and four rim fragments.	17	27	**Inclusions:** Visible inclusions from the pottery body sherds of this group are rock and limestone with different shapes, sizes, and colors. For example, fragment with the code (S011/U003/L002/17) has rock inclusions with red color. **Thickness:** Thin, medium, and thick walls. Surface: Porous, slipped, and other surfaces. **Color:** Reddish and dark brown to black are the colors that characterize pottery fragments from this group, well fired. **Hardness:** Hard and soft.
Unit 003 Level 003	Prehistoric/ Eneolithic/ Early Bronze Age/ and Bronze Age	Two handles, two rims, and one base.	-	13	**Inclusions:** Unidentifiable macroscopically. **Thickness:** Prehistoric pottery fragments from this stratum have medium and thick walls. **Surface:** Fragments of this group have porous, slipped, and other surfaces. **Color:** Fragments have reddish and dark brown colors, well fired. **Hardness:** Hard and soft.

Table 13 (continued).

Unit 003 Level 004	Prehistoric/ Eneolithic/ Early Bronze Age/ and Bronze Age	Two handles and six rims.	7	22	**Inclusions:** Visually, from the factions of the pottery sherds are distinguishable reddish and dark brown rocks (S011/U003/L004/14, S011/U003/L004/12) and limestone inclusions(S011/U003/L004/11) with round and angular shapes. Some of the fragments have no visible inclusions (S011/U003/L004/7). **Thickness:** One thin (S011/U003/L004/5), four medium (S011/U0 03/L004/10), and the rest of the prehistoric pottery fragments from this stratum have thick walls (S011/U003/L004/21). **Surface:** From this group, only one pottery fragment has porous surfaces (S011/U003/L004/20). The rest of fragments from this stratum have treated surfaces with a thin clay layer on top. Pottery fragments with treated surfaces differ from one another in their colors and hardness. Eneolithic sherds have black whereas Bronze Age ones have reddish slip color. Those with black slip are smooth. **Color:** Surface color divides the fragments of this level into two groups, reddish and black ones. Fragments with reddish surfaces have thicker walls (S011/U003/L004/14) compared to black ones (S011/U003/L004/10). Fragments display well-firing conditions. **Hardness:** Hard.

Table 13 (continued).

Unit 003 Level 005	Prehistoric/ Eneolithic/ Early Bronze Age/ and Bronze Age	Eight rims and two handles.	5	13	**Inclusions:** Inclusions visible from the factions of the pottery sherds are white or limestone, reddish, and dark brown (S011/U003/L005/8) with round and angular shapes. **Thickness:** Prehistoric pottery fragments from this group have thin, medium, and thick walls. **Surface:** Fragments with a thin clay layer on their surfaces (S011/U003/L005/4) and with untreated ones (S011/U003/L005/11). **Color:** Surface color divides the fragments into two groups reddish, and grayish-black ones. Sherds with slip surfaces display better firing conditions compared to those with untreated surfaces. **Hardness:** Hard.
Unit 003 Level 006	Prehistoric	None	4	7	**Inclusions:** Inclusions visible from the factions of the pottery sherds are reddish and dark brown rocks with round and angular shapes and different sizes. **Thickness:** Prehistoric pottery fragments from this stratum have medium and thick walls. **Surface:** All fragments have slipped surfaces of reddish and black color. **Color:** Surface color divides the fragments of this level into two groups reddish, and grayish-black ones. Fragments with reddish surfaces have thicker walls compared to grayish and black ones. This group displays well-firing conditions. **Hardness:** Hard.

Table 13 (continued).

Unit 003 Level 007	Prehistoric	Two rims, one of the rims is decorated (S011/U003/L007/1).	-	8	**Inclusions:** No visible inclusions. **Thickness:** Thin, medium, and thick walls. **Surface:** Slip, porous, and other. **Color:** Reddish brown. **Hardness:** Hard and soft.
Unit 003 Level 008	Prehistoric	-	4	-	-
Unit 003 Level 009	Bronze Age	None	-	1	**Inclusions:** No visible inclusions. **Thickness:** Medium. **Surface:** Porous. **Color:** -. **Hardness:** Soft.
Unit 003 Level 010	Prehistoric/ Bronze Age	One rim.	-	3	**Inclusions:** No visible inclusions. **Thickness:** Medium. **Surface:** Slipped and porous. **Color:** Reddish. **Hardness:** Hard and soft.

Table 13 (continued).

Unit 003 Level 012	Prehistoric/ Bronze Age	Three rims.	12	9	**Inclusions:** Inclusions are of reddish colors, and round and angulated shapes. **Thickness:** Prehistoric pottery fragments from this level have thin (S011/U003/L012/1), medium (S011/U003/L012/6) and thick walls (S011/U003/L012/5). **Surface:** All fragments from this stratum have untreated, porous, surfaces. **Color:** Reddish is the color that characterizes pottery fragments from this group, poorly fired. **Hardness:** Most of the pottery sherds are soft, probably because of the firing temperature or the mixture of the fabric. Two of them are hard.
Unit 003 Level 014	Prehistoric	None	5	1	**Inclusions:** No visible inclusions. **Thickness:** Medium. **Surface:** Porous. **Color:** Reddish. **Hardness:** Soft.

Table 13 (continued).

Unit 003 Level 015	Prehistoric/ Eneolithic/ Bronze Age	Six rims.	53		**Inclusions:** Inclusions visible from the factions of the pottery sherds are reddish and dark brown rocks (S011/U003/L015/8, S011/U003/L015/10) and limestone (S011/U003/L015/5, S011/U003/L015/15) with round and angular shapes. Inclusions appear to have different sizes. Also, the fragments with the code (S011/U003/L015/8, S011/U003/L015/14) have different kinds of inclusions with dark brown color and quartz. **Thickness:** Prehistoric pottery fragments from this level have thin (S011/U003/L015/4), medium, and thick walls. **Surface:** Most of the fragments have untreated surfaces with pores and rock inclusions of different colors (S011/U003/L015/7). Some of the fragments have a thin clay layer, slipped, on their surfaces of black and brown colors (S011/U003/L015/5), and others a mixture of both or neither of them (S011/U003/L015/5). **Color:** Surface color divides the fragments of this level into three groups, reddish, brownish, and black ones. Fragments with reddish and brownish surface colors have thicker walls compared to ones with black. The fabric of these sherds has red (S011/U003/L015/5), brown, and dark gray to black colors, poorly fired. **Hardness:** Hard and soft.

Table 13 (continued).

Unit 003 Level 016	Bronze Age	One rim.	14	10	**Inclusions:** Inclusions visible from the factions and surfaces of the pottery sherds are quartz (S011/U003/L016/2) and limestone (S011/U003/L016/4, S011/U003/L016/6) with round and angular shapes and different sizes. Inclusions have reddish brown to dark brown colors. **Thickness:** Prehistoric pottery fragments from this level have thin, medium, and thick walls. **Surface:** All fragments have untreated surfaces with pores and rock inclusions of different colors (S011/U003/L016/2, S011/U003/L016/3). **Color:** Both surfaces and profiles of prehistoric pottery fragments from this layer display colors that vary from reddish brown to dark brown color. Black color occurs rarely. **Hardness:** All prehistoric pottery fragments from this level have soft surfaces, probably from low firing temperature.

Table 13 (continued).

Unit 003 Level 017	Prehistoric/ Neolithic/ Eneolithic/ Bronze Age	Two rims.	15	13	**Inclusions:** Inclusions visible from the factions and surfaces of the pottery sherds are quartz and black ones (S011/U003/L017/3) with round and angular shapes and different sizes. Inclusions have reddish brown to dark brown colors. **Thickness:** Thin, medium, and thick are the dimensions that walls of these pottery fragments have. **Surface:** Most of the fragments have untreated surfaces with pores and rock inclusions of different colors (S011/U003/L017/4). Other ones have a black shiny slip on their surface (S011/U003/L017/2). **Color:** Both surfaces and profiles of prehistoric pottery fragments from this layer display colors that vary from brown to dark brown color. Black color occurs rarely. **Hardness:** Except two, all other prehistoric pottery fragments from this stratum have soft surfaces, probably from low firing temperature.

Table 13 (continued).

Unit 003 Level 018	Bronze Age	Two rims.	38	16	**Inclusions:** Inclusions visible from the factions and surfaces of the pottery sherds are rock and limestone (S011/U003/L018/10). These inclusions have round and angular shapes and different sizes. Their colors are reddish brown to dark brown. **Thickness:** Prehistoric pottery fragments from this stratum have thin, medium, and thick walls. **Surface:** All the prehistoric pottery fragments from this level have untreated surfaces with pores, visible rock inclusions of different colors, and no inclusions (S011/U003/L018/2). **Color:** Both surfaces and profiles of prehistoric pottery fragments from this layer display colors that vary from reddish brown (S011/U003/L018/5) to dark brown color. Black color occurs rarely. **Hardness:** This group has soft surfaces, probably from low firing temperature.

Table 13 (continued).

Unit 003 Wall Cleaning	Prehistoric/ Eneolithic/ Bronze Age	Two rims, one base, and one undetermined one.	10	20	Inclusions: Inclusions visible from the factions of the pottery sherds are reddish, dark brown, black (S011/U003/Wall Cleaning/2, S011/U003/Wall Cleaning/4, S011/U003/Wall Cleaning/9, S011/U003/Wall Cleaning/18) and white (limestone) (S011/U003/Wall Cleaning/10) of round and angular shapes with different sizes. **Thickness:** Thin, medium, and thick walls. **Surface:** In this group, some of the fragments have untreated surfaces with pores (S011/U003/Wall Cleaning/3). Some of the fragments have a thin clay layer, slipped, on their surfaces of black and brown colors (S011/U003/Wall Cleaning/5, S011/U003/Wall Cleaning/6), a mixture of both or neither of them (S011/U003/Wall Cleaning/9). **Color:** Surface color divides the fragments of this stratum into three groups, reddish, brownish, and black ones (S011/U003/Wall Cleaning/5, S011/U003/Wall Cleaning/6). The fabric of the sherds from this category has dark brown (S011/U003/Wall Cleaning/9), reddish brown (S011/U003/Wall Cleaning/12, S011/U003/Wall Cleaning/15), and dark gray to black colors. These fragments display both well and poor firing conditions. **Hardness:** Regarding hardness, there are fragments with soft and hard surfaces.

Table 14 Description of pottery found from test excavation in Zagorë: Site 015.

PASH 2014 Zagorë: Site 015					
Site/Unit /Level	**Period**	**Diagnostic**	**Daub**	**Macroscopically Analyzed**	**Description**
Unit 000 L000	Eneolithic /Late Bronze Age	Two rims, one handle, two bases, and two decorated fragments.	-	8	**Inclusions:** Macroscopically, visible inclusions are limestone ones (S015/U000/L000/4, S015/U000/L000/5, S015/U000/L000/7). Inclusions have different shapes and sizes. There are no other kinds of inclusions visible, probably because they have the same color with the pottery sherds. **Thickness:** Prehistoric pottery fragments from this group have medium and thick walls. **Surface:** The surfaces of the sherds analyzed are porous and slipped. Unlike sherds with porous surfaces, reddish brown colors and poorly fired, fragments with slipped ones have dark colors and are well fired. **Color:** All fragments from this group have reddish brown to brownish black profile and surface colors. **Hardness:** Soft and hard.
Unit 001 Feature 1	Bronze Age	None	-	1	**Inclusions:** No visible inclusions. **Thickness:** Medium walls. **Surface:** Porous. **Color:** Brownish color, poorly fired. **Hardness:** Soft.
Unit 001 Level 001	Bronze Age	None	-	2	**Inclusions:** No visible inclusions. **Thickness:** Thick walls. **Surface:** Porous. **Color:** Brownish, poorly fired. **Hardness:** Soft.

Table 14 (continued).

Unit 001 Level 002	Prehistoric/ Bronze Age	None	6	6	**Inclusions**: No visible inclusions. Thickness: All prehistoric pottery fragments from this level have thick walls. **Surface**: All the prehistoric pottery fragments from this group have untreated, porous, surfaces. **Color:** All fragments from this group have reddish brown to dark brown profile and surface colors. **Hardness:** Regarding hardness, only two out of six have soft surfaces.
Unit 001 Level 003	Bronze Age	Two rim fragments and two handle fragments.	1	3	**Inclusions:** Macroscopically, limestone inclusions are present (S015/U001/L003/2) with different shapes and sizes. **Thickness:** Fragments from this level have thick walls. **Surface:** All the prehistoric pottery fragments from this group have untreated, porous, surfaces. **Color:** Dark brown fabric color. **Hardness:** All sherds have soft surfaces.
Unit 001 Level 004	Bronze Age	One handle fragment.	6	13	**Inclusions:** Macroscopically, limestone inclusions are present (S015/U001/L004/B, S015/U001/L004/8) with different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have medium and thick walls. **Surface:** Fragments have untreated, porous, surfaces. **Color:** Reddish brown to dark brown fabric colors. **Hardness:** This group has only one fragment with soft surfaces (S015/U001/L004/20 b), the rest has hard ones.

Table 14 (continued).

Unit 001 Level 005	Prehistoric/ Bronze Age	None	3	10	**Inclusions:** Macroscopically, limestone inclusions are present in eight of the fragments, the ones with porous surfaces (S015/U001/L005/13, S015/U001/L005/16, S015/U001/L005/23), with different shapes and sizes. **Thickness:** Medium and thick walls. **Surface:** Prehistoric pottery fragments from this group have untreated, porous, surfaces and those with mixed characteristics (treated surface with pores). **Color:** All fragments from this group have brown to dark brown profile and surface colors. This group display low firing temperature. **Hardness:** There are only two fragments with hard surfaces, the rest has soft surfaces.
Unit 001 Level 006	Prehistoric/ Eneolithic-Early Bronze Age/ Bronze Age	Three rims and one handle.	-	22	**Inclusions:** Macroscopically, limestone inclusions are present in some of the fragments, the ones with porous and other kinds of surfaces (S015/U001/L006/27, S015/U001/L006/12), with different shapes and sizes. **Thickness:** Thin, medium, and thick walls. **Surface:** Some of the prehistoric pottery fragments from this group have untreated, porous, surfaces. The others have treated surfaces but not slip. **Color:** Reddish brown to dark brown fabric colors. **Hardness:** This group have both soft (S015/U001/L006/9) and hard surfaces.

Table 14 (continued).

Unit 001 Level 007	Prehistoric/ Bronze Age	One rim fragment.	4	6	**Inclusions:** Macroscopically, limestone inclusions are present in some of the fragments (S015/U001/L007/16). The inclusions have different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this group have medium and thick walls. **Surface:** Some of the prehistoric pottery fragments from this group have untreated, porous, surfaces. One of the fragments has a black slip on its surface (S015/U001/L007/14). **Color:** Reddish brown and dark brown to black, profile and surface colors. Well fired. **Hardness:** Hard and soft.
Unit 001 Level 008	Prehistoric/ Bronze Age	One damaged handle fragment.	6	4	**Inclusions:** Macroscopically, limestone inclusions are present in some of the fragments (S015/U001/L008/6, S015/U001/L008/8). The inclusions have different shapes and sizes. **Thickness:** Medium and thick walls. **Surface:** All fragments have untreated, porous, surfaces. **Color:** Reddish brown and dark brown profile and surface colors, poorly fired **Hardness:** Soft.

Table 14 (continued).

Unit 001 Level 009	Prehistoric/ Bronze Age	One handle fragment and one rim fragment.	-	11	**Inclusions:** Macroscopically, limestone inclusions are present in some of the fragments (S015/U001/L009/10, S015/U001/L009/10). The inclusions have different shapes and sizes. One of the fragments has mica (S015/U001/L009/8). **Thickness:** Medium and thick walls. **Surface:** Some of the prehistoric pottery fragments from this group have untreated, porous, surfaces. The others have treated surfaces but not slip. **Color:** Fragments from this group have reddish (S015/U001/L009/2), brown, and dark brown to black profile and surface colors (S015/U001/L009/8). Well fired. **Hardness:** Soft and hard.
Unit 001 Level 010	Prehistoric	None	-	1	**Inclusions:** Limestone. **Thickness:** Thick walls. **Surface:** Porous. **Color:** Reddish, poorly fired. **Hardness:** Soft.
Unit 002 Level 000	Bronze Age	One rim fragment.	6	4	**Inclusions:** Macroscopically, limestone inclusions are present (S015/U002/L000/1 and S015/U002/L000/2), they have different shapes and sizes. **Thickness:** Medium and thick walls. **Surface:** Untreated, porous, surfaces. **Color:** Reddish brown to dark brown profile and surface colors. **Hardness:** Only one of the fragments is soft (S015/U002/L000/4), the rest are hard.

Table 14 (continued).

Unit 002 Level 001	Bronze Age	None	8	3	**Inclusions:** No visible inclusions. **Thickness:** Medium and thick walls. **Surface:** Untreated, porous, surfaces. **Color:** Reddish brown to dark brown profile and surface colors. **Hardness:** None of the fragments can be scratched by the fingernail, all of them are hard.
Unit 002 Level 003	Prehistoric	-	11	-	-
Unit 003 Level 001	Bronze Age	One rim and two handle fragments.	100	9	**Inclusions:** Dark brown inclusions. **Thickness:** Medium and thick walls. **Surface:** Untreated, porous, and slipped surfaces. **Color**: Brown to dark brown profile and surface colors, poorly fired. **Hardness:** Hard and soft.
Unit 003 Level 002	Bronze Age	Rim fragment.	125	2	**Inclusions:** Dark brown inclusions. **Thickness:** Medium and thick walls. **Surface:** Untreated, porous, and other surfaces. **Color:** Brownish color, poorly fired. **Hardness:** Hard and soft.
Unit 003 Level 003	Bronze Age	One base	134	3	**Inclusions:** Dark brown inclusions. **Thickness:** Medium and thick walls. **Surface:** Untreated, porous, and other surfaces. **Color:** Brownish color, poorly fired. **Hardness:** Hard and soft.

Table 14 (continued).

Unit 003 Level 004	Bronze Age	None	302	3	**Inclusions:** Dark brown inclusions. **Thickness:** Medium and thick walls. **Surface:** Untreated, porous, surfaces. **Color:** Brownish color, poorly fired. **Hardness:** Soft.
Unit 003 Level 005	Bronze Age	None	101	2	**Inclusions:** Dark brown inclusions. **Thickness:** Medium and thick walls. **Surface:** Untreated, porous, surfaces. **Color:** Brownish color, poorly fired. **Hardness:** Hard and soft.
Unit 003 Level 006	Bronze Age	None	44	3	**Inclusions:** Dark brown inclusions. **Thickness:** Medium and thick walls. **Surface:** Untreated, porous, surfaces. **Color:** Brownish to black color, poorly fired. **Hardness:** Soft.
Unit 004 Feature 1	Prehistori c/ Bronze Age	None	3	3	**Inclusions:** Macroscopically, fragments have limestone and rock inclusions of different sizes and shapes. **Thickness:** Medium and thick walls. **Surface:** Porous surfaces, well firing temperature. **Color:** This group has reddish brown to black profile and surface colors. **Hardness:** Hard.

Table 14 (continued).

Unit 004 Level 001	Prehistoric/ Eneolithic / Bronze Age	One handle fragment.	3	10	**Inclusions:** No visible inclusions. **Thickness:** Fragments have thin, medium, and thick walls. **Surface:** Their surfaces are slipped (S015/U004/L001/10) and porous (S015/U004/L001/6, S015/U004/L001/17). Based on their color, reddish brown to brown and black, indicates that their firing temperature has been low. **Color:** Slipped surfaces have black color (S015/U004/L001/7). Fragments with untreated or porous surfaces appear with brown and reddish color (S015/U004/L001/16 a). **Hardness:** Hard and soft.
Unit 004 Level 002	Prehistoric/ Eneolithic / Bronze Age	Four handle fragments, one of them is horizontal one, and five rims.	60	30	**Inclusions:** Macroscopically, in some of the fragments are visible limestone (S015/U004/L002/9, S015/U004/L002/21), rock inclusions (S015/U004/L002/28), and mica (S015/U004/L002/25) of varied sizes with angular and rounded shapes. Rock inclusions have different colors such as reddish and white (S015/U004/L002/29). Macroscopically, it is difficult to identify the mixture of the fabric of these pottery fragments. **Thickness:** Thin, medium, and thick walls. **Surface:** Their surfaces are slipped (S015/U004/L002/6), porous (S015/U004/L002/28), and other (S015/U004/L002/7). **Color:** Slipped surfaces have black color (S015/U004/L002/15). Fragments with untreated or porous surfaces appear with brown and reddish color (S015/U004/L002/ 20). **Hardness:** Hard and soft.

Table 14 (continued).

Unit 004 Level 003	Prehistoric/ Bronze Age	One rim fragment.	2	6	**Inclusions:** It difficult to identify the inclusions of these sherds. Fragment with the code (S015/U004/L003/7) has various rock inclusions of different shapes and sizes. **Thickness:** Medium and thick walls. **Surface:** Porous, poorly fired. **Color:** All pottery fragments from this level have reddish brown to deep brown colors. **Hardness:** Hard and soft.
Unit 004 Level 003 Feature 1	Prehistoric/ Bronze Age	One rim fragment.	21	7	**Inclusions:** Macroscopically, in some of the fragments are visible limestone rock inclusions (S015/U004/L003/4 Feature 1, S015/U004/L003/5 Feature 1) of varied sizes with angular and rounded shapes, they have brownish colors. Other inclusions are difficult to be identified. **Thickness:** Fragments have thin, medium, and thick walls. **Surface:** Pottery sherds from this group have porous surfaces and a mixture of porous and treated surface. Sherds with porous surfaces have reddish brown colors, the others have black colors. **Color:** This group has reddish brown to black profile and surface colors, poorly fired. **Hardness:** Hard and soft.

Table 14 (continued).

Unit 004 Level 004	Prehistoric/ Bronze Age	None	23	10	**Inclusions:** Inclusions visible from the factions of the pottery sherds are very difficult to distinguish visually. However, one of the fragments has limestone inclusions visible on its surface (S015/U004/L004/17). Inclusions have different shapes and sizes. **Thickness:** Thin, medium, and thick walls. **Surface:** Most of the fragments from this group have porous surfaces with medium or thick walls. None of them have slip surfaces. **Color:** Surface color divides the fragments of this level into two groups reddish (S015/U004/L004/11) and dark brownish ones (S015/U004/L004/14). Fragments with reddish surfaces have thicker walls compared to grayish and black ones, well fired. **Hardness:** Hard and soft.
Unit 005 Level 002	Prehistoric/ Bronze Age	None	9	10	**Inclusions**: Inclusions visible from the factions of the pottery sherds are limestone ones (S015/U005/L002/7, S015/U005/L002/9) with round and angular inclusions, they have different shapes and sizes. **Thickness:** Fragments have medium (S015/U005/L002/2) and thick walls (S015/U005/L002/13). **Surface:** Most of the prehistoric pottery fragments have porous surfaces with reddish and dark brown colors. **Color:** Surface color divides the fragments of this level into two groups reddish (S011/U003/L006/5) and grayish-black ones (S011/U003/L006/1). Fragments with reddish surfaces have thicker walls compared to grayish and black ones. Groups display well-firing conditions. **Hardness:** Hard and soft.

Table 14 (continued).

Unit 005 Level 003	Prehistoric/ Bronze Age	One base fragment.	13	10	**Inclusions:** No visible inclusions. **Thickness:** Medium and thick walls. **Surface:** Porous and other surfaces. **Color:** The fabric of these sherds has reddish to reddish brown colors, well fired. **Hardness:** Hard and soft.
Unit 006 Level 001	Prehistoric/ Bronze Age	Six handles and five rims.	14	17	**Inclusions:** Macroscopically, in some of the fragments are visible limestone (S015/U006/L001/4) and rock inclusions (S015/U006/L001/13) of different sizes with angular and round shapes. Rock inclusions have different colors such as reddish and white (S015/U006/L001/15). **Thickness:** Medium, and thick walls. **Surface:** Their surfaces are slipped (S015/U006/L001/1) and porous (S015/U006/L001/2). **Color:** Slipped surfaces have black (S015/U006/L001/1). Fragments with untreated or porous surfaces appear with brown and reddish color (S015/U006/L001/17). **Hardness:** Most of the fragments from this level are hard, few of them are soft.

Table 14 (continued).

Unit 006 Level 003	Prehistoric/ Bronze Age	One base.	6	7	**Inclusions:** Visible inclusions from the factions of the pottery sherds are limestone ones (S015/U006/L003/16) of different shapes and sizes. **Thickness:** Except for the fragment with code (S015/U006/L003/21 b), that is medium, all the other prehistoric pottery sherds have thick walls. **Surface:** Fragments have untreated, porous, surfaces with brown and dark brown colors. **Color:** The surfaces of the pottery sherds have brown and dark brown colors. Their fabric has black and brown colors (S015/U006/L003/17). Fragments from this group display poor firing conditions. **Hardness:** Regarding hardness, most of the fragments are hard, only one of them is soft (S015/U006/L003/20).
Unit 006 Level 004	Prehistoric/ Bronze Age	Two rims, one base, one horizontal handle, and one decorated fragment.	-	19	**Inclusions:** Macroscopically, in some of the fragments are visible limestone (S015/U006/L004/12) and rock inclusions (S015/U006/L004/30) of different sizes with angular and rounded shapes. Inclusions have colors such as black and white. **Thickness:** Fragments have thin, medium, and thick walls. **Surface:** Pottery fragments from this level have porous, untreated, surfaces with reddish brown to black color, well fired. Regarding profiles, there are two fragments with overlapping colors (sandwich type) (S015/U006/L004/17, S015/U006/L004/18). Those with black and reddish colored profile are also present in this group. **Color:** Fragments have surfaces with reddish, brownish, and black color. **Hardness:** Hard and soft.

Table 14 (continued).

Unit 006 Level 005	Prehistoric/ Bronze Age	One handle (S015/U006/L005/16) and one base.	1	9	**Inclusions:** Visible inclusions from the factions of the pottery sherds are limestone ones (S015/U006/L005/15). They have different shapes and sizes. **Thickness:** Fragments have medium (S015/U006/L005/19) and thick walls (S015/U006/L005/13). **Surface:** There is only one sherd with slipped surfaces (S015/U006/L005/17). Other pottery fragments from this level have untreated, porous, surfaces with brown and dark brown colors. **Color:** The surfaces of the pottery sherds have brown and dark brown colors. Their fabric has black and brown color, poorly fired. **Hardness:** Most of the fragments are hard, only one of them is soft (S015/U006/L005/19).
Unit 006 Level 006 and 006 1/1	Prehistoric/ Bronze Age	Four rim fragments.	1	19	**Inclusions:** Visible inclusions from the factions of the pottery sherds are limestone ones (S015/U006/L006/2, S015/U006/L006/4). They have different shapes and sizes. In many of the sherds is difficult to identify their fabric mixture (S015/U006/L006/8). One fragment has grog (crushed pottery) in its fabric (S015/U006/L006/10). **Thickness:** Fragments have thin, medium, and thick walls. Surface: These sherds have untreated, porous, surfaces with reddish brown and dark brown colors. **Color:** The surfaces of the pottery sherds have brown and dark brown colors. Their fabric has black and brown color, poorly fired. **Hardness:** Hard and soft.

Table 14 (continued).

Unit 006 Level 007	Prehistoric/ Eneolithic /Bronze Age	Two rim fragments.	-	6	**Inclusions:** Most of the prehistoric pottery fragments from this group have limestone inclusions in their fabric mixture. **Thickness:** Fragments have medium and thick walls. **Surface:** Prehistoric pottery fragments from this level have untreated, porous, and slipped surfaces with reddish brown and black colors. **Color:** The surfaces of the pottery sherds have brown and dark brown colors. Their fabric has black and brown color. Fragments from this group display both well and poor firing conditions. **Hardness:** Regarding hardness, fragments are both soft and hard.
Unit 007 Level 001	Bronze Age	None	17	1	**Inclusions:** No visible inclusions. **Thickness:** Medium walls. **Surface:** Porous. **Color:** Brownish, poorly fired. **Hardness:** Hard.
Unit 007 Level 002	Bronze Age	One handle fragment.	91	6	**Inclusions:** No visible inclusions. **Thickness:** Medium and thick walls. **Surface:** Porous. **Color:** Brownish, poorly fired. **Hardness:** Soft.
Unit 007 Level 003	Bronze Age	One handle fragment.	13	3	**Inclusions:** No visible inclusions. **Thickness:** Medium and thick walls. **Surface:** Porous. **Color:** Brownish to black, poorly fired. **Hardness:** Hard and soft.

Table 14 (continued).

Unit 007 Level 004	Bronze Age	None	-	3	**Inclusions**: -. **Thickness:** Thick walls. **Surface:** Porous. **Color:** Brownish to black, poorly fired. **Hardness:** Hard and soft.
Unit 007 Level 006	Bronze Age	None	-	1	**Inclusions**: -. **Thickness:** Thick walls. **Surface:** Porous. **Color:** Reddish-brown, poorly fired. **Hardness:** Soft.

Table 15 Description of pottery found from test excavation in Kodër Boks: Site 007.

PASH 2014 Kodër Boks: Site 007				
Site/Unit/Level	**Period**	**Diagnostic**	**Macroscopically Analyzed**	**Description**
Site 007 Unit 001 Level 004	Bronze Age	None	3	**Inclusions:** This group of fragments has dark colors inclusions (brownish-greyish) with different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have medium and thick walls. **Surface:** Fragments have untreated, porous, surfaces with brownish color. **Color:** All prehistoric pottery fragments from this level have brownish to black surface and profile colors, poorly fired. **Hardness:** Regarding hardness, fragments have both properties, soft and hard.
Unit 002 Feature 001	Bronze Age	Two joining base fragments	3	**Inclusions:** Their inclusions are not visible macroscopically. **Thickness:** Medium wall thicknesses. **Surface:** All fragments have porous surfaces. **Hardness:** Soft, poorly fired. Two of the base fragments with code (S007/U002/F1/32-33) join and two of the other body sherd fragments with code (S007/U002/F1/35-37) join.
Unit 002 Level 001	Bronze Age	None	1	**Inclusions:** There are no visible inclusions from this fragment. **Thickness:** Thick walls. **Surface:** Fragment is porous. **Color:** Reddish brown colors and, poorly fired. **Hardness:** Soft.

Table 15 (continued).

Unit 002 Level 002	Bronze Age	None	2	**Inclusions:** Both pottery body sherds have visible rock and limestone inclusions. **Thickness:** Thick walls. **Surface:** Their surfaces are porous and other. **Color:** The fabrics have reddish brown color, poorly fired. **Hardness:** One of the fragments is hard and the other soft.
Unit 002 Level 003	Bronze Age	None	1	**Inclusions:** Fragment from this group is composed of various rock inclusions of different shapes and sizes. **Thickness:** The sherd has thick walls. **Surface:** Fragment has other surface. **Color:** Reddish to reddish brown colors. Poorly fired. **Hardness:** Regarding hardness, fragment is hard.
Unit 002 Level 004	Bronze Age	None	3	**Inclusions:** Macroscopically, limestone inclusions are visible in only one of the fragments (S007/U002/L004/9). **Thickness:** Prehistoric pottery fragments from this level have thick walls. **Surface:** Fragments have untreated, porous, and other surfaces with reddish and brownish colors. **Color:** All prehistoric pottery fragments from this level have reddish brown surface and profile colors, poorly-fired. **Hardness:** Regarding hardness, fragments have both properties, soft and hard.

Table 15 (continued).

Unit 002 Level 007	Bronze Age	One base and one handle fragment	26	**Inclusions:** This group of fragments has similar characteristics with other Bronze Age porous pottery sherds found in Shkodër. Their inclusions have dark colors with different shapes and sizes, barely visible. **Thickness:** Prehistoric pottery fragments from this level have medium and thick walls. **Surface:** Fragments have untreated, porous, surfaces with reddish brown colors. **Color:** All prehistoric pottery fragments from this level have brownish and reddish surfaces and profile colors. They display poor-firing conditions. **Hardness:** Regarding hardness, pottery fragments from this group display both properties, soft and hard.
Unit 004 Level 002	Bronze Age	None	2	**Inclusions:** Prehistoric body sherds from this level have some visible limestone inclusions with different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have medium and thick walls. **Surface:** Untreated, porous, and other surfaces characterize sherds in this group. **Hardness:** Fragments have soft surfaces with reddish to reddish brown colors. Poorly fired.

Table 15 (continued).

Unit 004 Level 003	Bronze Age	Two lid fragments (?) and one base fragment.	13	**Inclusions:** This group of fragments have different kinds of inclusions with different colors, shapes, and sizes (S007/U004/L003/18, S007/U004/L003/19, S007/U004/L003/21). **Thickness:** Prehistoric pottery fragments from this level have medium and thick walls. **Surface:** Fragments have untreated, porous, surfaces with reddish brown colors. **Color:** Prehistoric pottery fragments from this level have reddish brown surface and profile colors, poorly fired. **Hardness:** Regarding hardness, pottery fragments from this group display both properties, soft and hard.
Unit 005 Level 002	Bronze Age	None	1	**Inclusions:** Fragment has some visible rock inclusions. **Thickness:** Fragment has thick walls. **Surface:** Porous. **Color:** Yellowish brown fabric color, poorly fired. **Hardness:** Hard.

Table 16 Description of pottery found from test excavation in Tumulus 088: Site 014.

PASH 2014 Tumulus 088: Site 014				
Tumulus/ Quadrant/Unit/ Level	**Period**	**Diagnostic**	**Macroscopically Analyzed**	**Description**
T 088 Unit 000 Level 003	Bronze Age	Two handle fragments.	2	**Inclusions:** Limestone. **Thickness:** Prehistoric pottery fragments from this level have medium wall thickness. **Surface:** All fragments from this level have porous surfaces. **Color:** They have reddish brown fabric and are poorly fired. **Hardness:** Regarding hardness, pottery fragments from this group display both properties, soft and hard.
T 088 Q1B Level 004	Bronze Age	One rim fragment.	2	**Inclusions:** Limestone and rock inclusions of different colors, sizes, and shapes. **Thickness:** Both fragments have thick walls. **Surface:** Porous and slipped surfaces. **Color:** Brown to black fabric, poorly fired. **Hardness:** One of the fragments is soft and the other hard.
T 088 Q1B Level 005	Prehistoric/ Bronze Age	One rim fragment.	6	**Inclusions:** Rock and limestone inclusions of different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have medium and thick walls. **Surface:** Slipped and other surfaces. **Color:** Reddish brown, well fired. **Hardness:** All fragments are hard. **Note:** Two of the fragments have sandwich profile, dark grayish color in between two reddish layers (S014/T008/Q1B/L005/3, S014/T008/Q1B/L005/4).

Table 16 (continued).

T 088 Q1B Level 006	Prehistoric/ Bronze Age	No	1	**Inclusions:** It is composed of white, limestone, and other rock inclusions of different shapes and sizes. **Thickness:** Fragment has medium walls. **Surface:** Porous surfaces. **Color:** Brownish to the black fabric color. **Hardness:** Hard.
T 088 Q1C Level 005	Prehistoric/ Bronze Age	Two handle fragments.	3	**Inclusions:** Limestone. **Thickness:** Fragment has medium walls. **Surface:** Porous and slipped surfaces. **Color:** Reddish color, poorly fired. **Hardness:** Soft and hard.
T 088 Q1C Level 006	Prehistoric/ Bronze Age	Two handle fragments.	8	**Inclusions:** This group of fragments has similar characteristics with other Bronze Age porous pottery sherds found in the Shkodër Region. Therefore, inclusions have dark and white (S014/T088/Q1C/L006/17) colors with different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have medium and thick walls. **Surface:** Fragments have untreated, porous, surfaces with brownish color, except two of them with slipped surfaces. **Color:** All prehistoric pottery fragments from this level have reddish brown to black surface and profile colors. Poorly fired. **Hardness:** Fragments have hard and soft surfaces.

Table 16 (continued).

T 088 Q1C Level 007	Prehistoric/ Bronze Age	None	1	**Inclusions:** No visible inclusion. **Thickness:** Thick. **Surface:** Slipped. **Color:** Reddish brown color. **Hardness:** Hard.
T 088 Q4B Level 007	Prehistoric/ Eneolithic-Early Bronze Age/ Bronze Age	None	18	**Inclusions:** Inclusions visible from the factions of the pottery sherds are limestone (S014/T088/Q4B/L007/1, S014/T088/Q4B/L007/2, S014/T088/Q4B/L007/3) with different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have thin, medium, and thick walls. **Surface:** Most of the fragments have a thin clay layer, slipped, on their surfaces of black and brown colors. A few fragments have porous surfaces (S014/T088/Q4B/L007/1). **Color:** Fabric and surface colors from this group vary from reddish to black. These fragments display well-firing conditions. **Hardness:** All fragments are hard.
T 088 Q4C Level 003	Bronze Age	None	2	**Inclusions:** Limestone. **Thickness:** Thick. **Surface:** Slipped and porous. **Color:** Brown to black colors, poorly fired. **Hardness:** Soft.
T 088 Q4C Level 005	Prehistoric/ Bronze Age	None	2	**Inclusions:** Limestone. **Thickness:** Medium and thick. **Surface:** Other. **Color:** Reddish and black colors, poorly fired. **Hardness:** Soft.

Table 16 (continued).

T 088 Q4D Level 004	Prehistoric	Rim	1	**Inclusions:** Limestone? **Thickness:** Medium. **Surface:** Other. **Color:** Grayish colors, well fired. **Hardness:** Hard.
T 088 Baulk between Q1 and Q4	Prehistoric/ Early Bronze Age/Bronze Age	Three handle fragments.	4	**Inclusions:** Limestone and rock? **Thickness:** Medium and thick. **Surface:** Porous, slipped, other. **Color:** Reddish to reddish brown colors, poorly fired. **Hardness:** Hard.

Table 17 Description of pottery found from test excavation in Tumulus 099: Site 016.

PASH 2014 Tumulus 099: Site 016				
Tumulus/ Quadrant/Unit/ Level	**Period**	**Diagnostic**	**Macroscopically Analyzed**	**Description**
T 099 Unit 001 Level 004	Eneolithic/ Bronze Age	None	2	**Inclusions:** No visible inclusions. **Thickness:** Thin. **Surface:** Slipped. **Color:** -. **Hardness:** Hard, well fired.
T 099 Unit 001 Level 005	Prehistoric	None	1	**Inclusions:** No visible inclusions. **Thickness:** Thin. **Surface: Slipped.** **Color:** Reddish brown, well fired **Hardness:** Hard.
T 099 Unit 002 Level 001	Prehistoric/ Bronze Age	None	1	**Inclusions:** Limestone inclusions and rock inclusions of different shapes and sizes. **Thickness:** Medium. **Surface**: Porous. **Color**: -. **Hardness:** Soft, poorly fired.

Table 17 (continued).

T 099 Q1 Unit 002 Level 001 (Surface Finds)	Prehistoric/ Bronze Age	One incised rim fragment (S016/T099/Q1/U002/L001/1).	9	**Inclusions:** Inclusions visible from the factions of the pottery sherds are limestone with different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have thin, medium, and thick walls. **Surface:** Pottery sherds have slip, porous, and other kinds of surfaces. **Color**: The fabric color of these body sherds is brownish and display poor-firing conditions. **Hardness:** Regarding hardness, fragments display both properties, soft and hard.
T 099 Q1 Unit 002 Level 002	Prehistoric	One base and one rim fragment.	4	**Inclusions:** Inclusions visible from the factions of the pottery sherds are limestone with different shapes and sizes. **Thickness:** All fragments have medium wall thickness. **Surface:** Pottery sherds have porous surfaces. **Color:** Reddish brown and gray, well fired. **Hardness:** All fragments are hard.
T 099 Q1 Unit 003 Level 001	Bronze Age	Two rim fragments.	3	**Inclusions:** Limestone inclusions are visible in the fabric of these fragments (S016/T099/Q1/U003/L001/1). **Thickness:** All fragments have medium wall thickness. **Surface:** Pottery sherds have porous and other surfaces. **Color:** Reddish, well fired. **Hardness:** Hard and soft.

Table 17 (continued).

T 099 Q1 Unit 003 Level 002	Bronze Age	Lid (S016/T099/Q1/U003/L002/1).	1	**Inclusions:** No visible inclusions. **Thickness:** Thick. **Surface:** Other. **Color:** Black, poorly fired. **Hardness:** Soft.
T 099 Q1 Unit 004 Level 001	Prehistoric	None	1	**Inclusions:** No visible inclusions. **Thickness:** Medium. **Surface:** Other. **Color:** Black, well fired. **Hardness:** Hard.
T 099 Q1 Unit 005 Level 001	Prehistoric	None	3	**Inclusions:** Inclusions visible from the factions of the pottery sherds are limestone with different shapes and sizes. **Thickness:** Prehistoric pottery fragments from this level have thin and medium walls. **Surface:** Pottery sherds have porous surfaces. **Color:** The fabric of these fragments has reddish brown to dark brown colors, well-firing conditions. **Hardness:** Regarding hardness, all fragments are hard.
T 099 Q2 Unit 000	Bronze Age	Rim	1	**Inclusions:** Inclusions visible are limestone with different shapes and sizes. **Thickness:** Thin walls. **Surface:** Porous surfaces. **Color:** Brownish color, poorly fired. **Hardness:** Soft.

Table 17 (continued).

T 099 Q2 Unit 006 Level 001	Prehistoric/ Bronze Age	One rim sherd and one unidentified fragment.	10	**Inclusions:** Inclusions in most of these fragments are not visible macroscopically. Nevertheless, from a few of them are visible limestone and rock ones. **Thickness:** Thin and medium walls. **Surface:** Pottery sherds have slipped surfaces with reddish and brownish to black colors, porous ones with reddish colors, and other with brownish ones. **Color:** The fabric of these fragments is reddish brown to dark brown color, they display well-firing conditions. **Hardness:** Regarding hardness, fragments display both properties, hard and soft.
T 099 Q2 Unit 007 Level 001	Prehistoric	None	13	**Inclusions:** Inclusions visible are limestone with different shapes and sizes. **Thickness:** Thin walls. **Surface:** Porous surfaces. **Color:** Grayish and brown color, well fired. **Hardness:** Soft.
T 099 Q3 Unit 010 Level 001	Prehistoric/ Bronze Age	One rim fragment (S016/T099/Q3/U010/L001/4).	4	**Inclusions:** No visible inclusions. **Thickness:** Thin and medium walls. **Surface:** Porous, slipped, other. **Color:** Reddish color, well fired. **Hardness:** Hard and soft.

Table 17 (continued).

T 099 Q4 Unit 012 Level 001	Prehistoric/ Bronze Age	None		**Inclusions:** No visible inclusions. **Thickness:** Thick walls. **Surface:** Slipped surfaces; one black and the other reddish-brown color. **Color:** Reddish brown color, well fired. **Hardness:** Hard.
T 099 Q4 Unit 013 Level 001	Prehistoric/ Bronze Age	None	2	Inclusions: No visible inclusions. **Thickness:** Medium and thin walls. **Surface:** Slipped and porous. **Color:** Reddish brown color, well fired. **Hardness:** Hard and soft.

APPENDIX B

EXCEL SPREADSHEET WITH QUANTITATIVE DATA OBTAINED THROUGH POINT COUNTING

Please see attached file microscipicexamination.xls. Microsoft Excel 97 or a newer version is required for viewing.