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Pernil Alto: an agricultural village of the Middle Archaic Period in Southern Peru

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3 The Archaic Period

The Archaic Period (sometimes called the Preceramic Period) in Peru is the period of cultural developments between the end of the Pleistocene or the beginning of the Holocene and the occurrence of ceramics. The definition of the term "Archaic" and its implications were introduced to American archaeology by Gordon R. Willey and Philip Phillips (1958). It was originally introduced for restricted archaeological cultures in Northeastern North America, and then expanded to other archaeological remains as well. Willey and Philips define the Archaic as a conceptual stage of developments which follows the Lithic stage and precedes the Formative stage. The Lithic stage includes generalized hunter-gatherers of the Pleistocene, whereas the Formative stage refers to sedentary societies which used pottery. These stages are not overall clearly defined by means of a specific chronology or chorology. They refer to stages and not to specific periods, and avoid the usage of the terms applied to archaeological developments in the Old World like "Paleolithic" and "Neolithic". The closest similarity with terms of the Old World would be with those of "Mesolithic" and "Epi-Paleolithic". However, the application of these terms to the archaeological remains of the New World would be inadequate for the cultural developments in the New World, as those differ fundamentally from those in the Old World. For example, the use of pottery is—even though important for chronological investigations—not very important for overall cultural or economic developments. Early complex societies on the Central Peruvian coast in the Caral area did not use pottery for centuries, even though monumental structures were built, a complex social system with possible state-like organization was established, and an agricultural-marine economy prevailed. All this—with the exception of the lack of pottery and the lack of polished axes—would be rather typical for the Neolithic in Old World terminology. Because of these inadequacies of archaeological terminology of the Old World for New World developments, this stage is termed "Archaic" in the Americas. Therefore, within this study, the term "Archaic" refers to developments after the Pleistocene and before the introduction of pottery. Sometimes the term "Preceramic" is used in a similar way as "Archaic" by some authors, denoting rather typological changes in the archaeological record than economic or social changes.

During the Archaic Period the economic basis of food production, based principally in domesticated plants and to a lesser degree in animals, developed autochthonous in the Central Andes. These developments occurred in part parallel to an emerging sedentary way of life. Both autochthonous developments formed the socio-economic foundations of the Central Andean cultural development and of the emergence of early civilizations and complex societies. The Central Andes are therefore one of five to seven so-called "centers of neolithization" (Bellwood 2005; Diamond/Bellwood 2003; Flannery 1973; Harlan 1971; MacNeish 1992; Vavilov 1926). Harlan (1971) recognized that the development in the Central Andes was, in contrast to other centers of neolithization (for example the Fertile Crescent), not a clear-cut step-by-step development within a defined area in the sense of a nucleus. He described it therefore in a somewhat misleading way as a "non-center." In contrast to the centers, the process of "neolithization"—that is the emergence of agriculture and settled life—in the non-centers was more multifaceted and characterized by various and partly independently occurring processes which were distributed geographically and chronologically within a greater region. These processes then eventually intertwined in these areas. This was especially the case in the Central Andes. This multifacetedness was probably constituted by the high geographical dissection of the area, which produced and favored diverse adoption strategies.

3.1 History of research

Preceramic remains have been known from the Central Andes for at least 100 years, starting with early reports of shell mounds and other sites by Max Uhle (1913). A first intensive scientific investigation of remains of the Archaic Period in the Central Andes took place in the excavations of the Huaca Prieta by Junius Bird (1948) in Northern Peru. This excavation on the Northern Peruvian coast marks the beginnings of the scientific investigation of this period. It revealed a settlement of maritime foragers, with domestic structures and burials, located directly on the littoral and was originally dated to the time after 5000 BP (Bird 1948, 1990; Bird/Hyslop 1985). The investigations in the Central Andes intensi-

fied shortly after Bird's discoveries and were continued in the following decades more or less continuously, with the exception of an interruption due to conflict in the 1980s. The history of research will not be discussed in detail here. It has already been portrayed in various overviews and meta-studies (for example Burger 1992; Haberland 1991; Kaulicke 1994; Lanning 1967; Lavallée 2000; Moseley 1992 and chapters in Keatinge 1988 and Silverman/Isbell 2008).[1] Therefore, only a brief overview is given here.

The various investigations can be allocated to different geographical areas of the Central Andes. The Central Andes form a part of the Andes which expand from the north to the south of South America. The Central Andes are the section of the Andes reaching from Southern Ecuador to Northern Chile including the mountain area of Peru and Bolivia with the altiplano areas, there. The narrow Pacific coast west of these mountains is usually included into the cultural area of the Central Andes. Thus, in this study it could be sometimes referred to as the Central Andean coastal area.

There is a general distinction between the coastal area and the highlands. The coast includes all altitudes below 1000 m. Altitudes above are part of the highlands. Sometimes, the western flanks or the Andean foothills are mentioned in the study. This area is not very clearly defined, but here the altitudes of about 400 to 2500 m are understood as the Andean foothills. The area east of the Andes in altitudes below 1000 m is not included in the Central Andes.

The Peruvian coast is usually divided in greater areas based on geographical and cultural characteristics. The zonal division is oriented along the river valleys crossing the coastal plain from east to west. In general, it is divided between an Extreme Northern, a Northern (from the Lambayeque to the Virú valley), a Central Northern (from the Santa to the Huaura valley), a Central (from the Chancay to the Cañete valley), a Southern (from the Chincha to the Acarí valley) and an Extreme Southern part of Peru.

Archaeological investigations examining Archaic remains have been mostly concerned with the areas in close proximity to, or directly on, the Pacific littoral or in altitudes above 1000 m beginning at about 2500 m. The area between—situated on the western Andean flanks and foothills—came into the focus of investigations relatively late. Peter Kaulicke (1994: 162) pointed out already more than 20 years ago that archaeological information regarding the Preceramic Period from these areas would be pivotal for the understanding of the cultural processes of the Period. Nevertheless, the processes which took place there during the Archaic Period are still lesser known than on the littoral or the highlands.

History of research in the coastal area

Important research was conducted by Frederick Engel, especially on the Central and Southern Peruvian coast beginning in the 1950s until the 1980s. He detected numerous sites and mapped them with brief descriptions. More detailed reports are available for the villages of La Paloma on the Central Peruvian coast (7800–4700 BP) (Engel 1980, 1982), Chilca 1 in the same area (6800–5000 BP) (Donnan 1964; Engel 1987a, 1988a), Asia 1 on the Rio Omas estuary (Engel 1963a), and Paracas 514 on the Paracas peninsula in Southern Peru (about 6000–5000 BP) (Engel 1981). The enormous research of Frederick Engel was continued by Robert Benfer in La Paloma (Benfer 1982, 1990, 1999, 2008) and for some sites on the estuary of the Rio Ica (Beresford-Jones et al. 2015). These settlements of early sedentary villages with marine-based economies are crucial for the understanding of the developments during the Archaic Period. But Engel did important research as well in the highlands, especially in the Tres Ventanas cave in the upper Chilca valley, where he found an occupation dating to about 11,500–7300 BP (Engel 1970a, 1970b, 1988b) in which he interpreted some botanical remains as indicative of early agriculture. However, his results were later criticized. The discussion will take place in more detail in Chapter 10.

Intensive research on the Archaic Period was conducted by Edward Lanning (for example Lanning 1963, 1967; Lanning/Hammel 1961; Patterson/Lanning 1964), Thomas Patterson (for example Patterson/Lanning 1964; Patterson/Moseley 1968), Mark Nathan Cohen (for example Cohen 1971, 1977, 1978), and Michael Moseley (for example Moseley 1968, 1973, 1975; Patterson/Moseley 1968; Moseley/Barrett 1969; Moseley/Mackey 1972) during the 1960s and 1970s in the area of Ancón on the Central Peruvian coast. The settlement history was based on the investigation of various sites (for example El Tanque/Tank site, PV 45–104, Encanto, Yacht Club, Pampa, Banco Verde, Punta Grande, Camino) and covered six typological Preceramic phases (I–VI) with sub-phases spanning from about 14,000 to 3700 BP. An important aspect of this was the investigation of the emergence of agriculture and settled life in the area of Ancón. Due to the results of this research, this emergence took place during the last Preceramic phase VI (4450–3700 BP),

1 Sites and areas mentioned in this text are mapped in Figures 3, 4, and 5.

when settlements were concentrated in the littoral and their number increased. The site of Pampa was the first permanent village known at that time of the Ancón area. The marine resources, however, still dominated subsistence, but the number of remains of domesticated plants increased in this phase. One important site with monumental architecture of this area and phase was Aspero, located directly in the littoral of the Pacific (Moseley 1973; Feldman 1980).

The research of the Ancón area has led to the formulation of two important hypotheses to explain the developments from foragers to sedentary agriculturalists or fishers. One hypothesis, formulated by Moseley (1975), sees the abundant marine resources of the littoral as pivotal for the emergence of permanent settled societies. This hypothesis is called the "Maritime Foundations of Andean Civilization" hypothesis. The (simplified) basis of this hypothesis is that abundant resources made a permanent settlement on the littoral possible. In contrast, Cohen (1971) interpreted the increase of settlements as the result of an increased population and postulated that population pressure was the key element for the emergence of permanent settlements. Thus, this hypothesis emphasizes a need of the population as pivotal for the development of early civilizations.

A critique of the research in the Ancón area was given by Richardson (1981) who himself did research on the Northern Peruvian coast. He argued that the known sea level rise was not sufficiently taken into account in the interpretations of the cultural sequence because original sites of the early periods could in fact be located below the actual sea level and are thus unknown.

Duccio Bonavia concentrated his research in the 1980s on the emergence of agriculture on the Northern central Peruvian coast. The most important site investigated by him was the three-phase settlement of Los Gavilanes dating to about 5000–3800 BP (Bonavia 1982).

Bonavia saw the use of maize as pivotal for the emergence of early complex societies on the Peruvian coast and put great effort into this topic. He published a final overview of the results of his decades-long research in 2008 (in Spanish: Bonavia 2008; in English: Bonavia 2013).

Parallel to the investigations of Bonavia, intensive research was conducted on the Santa Ana peninsula in Southwestern Ecuador (see for example: Damp et al. 1981; Stothert 1985, 1992; Raymond 1999; Siemens 1999; Tykot/Staller 2002; Marcos 2003; Pearsall 2003). This research investigated the Las Vegas culture (10,000–6600 BP)—during which permanent villages emerged and first domesticated plants were incorporated into the subsistence—and the Valdivia culture (6000–3700 BP)—during which pottery was introduced for the first time in the Central Andes and the shift to agriculture took place (Pearsall 2003). These results are of particular interest for the evaluation of Pernil Alto and will be discussed in Chapter 17.

The most important results of studies on the Late Archaic Period were obtained beginning in the 1990s in the lower Supe valley on the Northern Central Peruvian coast. There, Ruth Shady Solís excavated the monumental site of Caral, and investigated some 20 more sites, some of them including monumental architecture (among other literature: Shady Solís 1997, 1999, 2000a, 2000b, 2000c, 2002a, 2002, 2006a, 2006b, 2006c, 2010; Shady Solís et al. 2000, 2001, 2009). The area of Caral is interpreted as being the first complex society—possibly already with a state-like organization—in the Central Andes from which the later developments of Andean civilizations started. The site of Aspero on the estuary of the Supe river had been known earlier and had been excavated since the 1970s (see Moseley 1973; Feldman 1980) but was seen as isolated. The newer research of Shady Solis showed that Aspero was incorporated into the settlement system of the lower Supe valley.

Numerous preceramic sites in the littoral—mostly shell mounds and others—were intensively investigated by Daniel Sandweiss, and provided important insights into the development of littoral adaptations as well as into sea level and shore line developments (Andrus et al. 2002; Richardson et al. 1990; Rollins et al. 1986; Sandweiss 2005a, 2005b; Sandweiss et al. 1983, 1989, 1996, 2009, 2010).

After the discoveries of Shady and Sandweiss, research focused on the exploration of the monumental remains of the Late Archaic Period on the Northern central Peruvian coast. This newer research includes the investigations in the river valleys north of the Supe valley, and revealed that monumental structures were distributed in sites during the Late Archaic Period beyond the lower Supe valley (Chu 2006a, 2006b, 2008, 2011; Haas et al. 2004a; Haas/Creamer 2004).

Newer research in the Sechín river valley in Northern Peru revealed an early monumental structure beginning by about 5600 BP, which is the oldest hitherto known monumental structure in the Central Andes (Fuchs 2009; Fuchs et al. 2006), and is located outside the hitherto assumed "nucleus" of monumental structures in the Northern central Peruvian littoral.

Archaic remains in the extreme South of the Peruvian coast have been investigated since the early 1990s as well. Of note were, among others, the investigations of the sites of Kilometro-4, the Quebrada de los Burros, the Quebrada Tacahuay, and the Ring site. Kilometro-4 is located about 9 km north of the estuary of the Ilo river and was a residential site spanning from 7290–1010 BP which was in the beginning a seasonal residential base camp with a cemetery where a more permanent occupa-

tion began by about 5000 BP (Guillén/Carpio 1999; Wise 1999; Wise et al. 1994). The site of the Quebrada de los Burros in the extreme South of Peru was a shell mound dating from 9900–6800 BP with a subsistence based in marine resources but included some plant cultivation as well (Carré et al. 2005, 2009; Lavallée et al. 1999a, 1999b; Lavallée/Julien 2012b). The Quebrada Tacahuay, about 30 km South of Ilo, dating to about 11,120–6640 BP, included a shell mound but was probably not a settlement (deFrance/Umire Àlvarez 2004; deFrance et al. 2009; Keefer et al. 1998). The Ring site, which was a shell mound, was located in the same area and dated to 11,110–3660 BP (deFrance et al. 2009; Richardson et al. 1990; Sandweiss et al. 1989).

Recent research on the Pacific littoral includes an intensive interdisciplinary project on the Huaca Prieta on the littoral of Northern Peru (Dillehay et al. 2012a, 2012b; Grobman et al. 2012) which continues the research of Junius Bird and has revealed a much older occupation covering five phases which span from 9000 BP to 3455 BP with mound building activities in the later phases. A further interdisciplinary research investigates the preceramic developments in the area of the estuary of the Rio Ica in Southern Peru (Beresford-Jones et al. 2015) which continues research of Frederik Engel.

History of research in the highlands

The investigations in the highlands started already during the 1950s, when several caves were investigated by Augusto Cardich in the area of the Lauricocha lake (Cardich 1958, 1964) which revealed a typological sequence of five phases spanning from 9500 to 3000 BP.

A famous research project was conducted in the highlands of Northern Central Peru in the Guitarrero Cave in the Callejón de Huaylas, a site that dated from 10,000 to 8000 BP (Adovasio/Lynch 1973; Kaplan et al. 1973, 1985; Lynch 1980a). The most important result was the recovery of old beans, which later turned out to be intrusive (Kaplan/Lynch 1999).

As a result of this misleading dating of the domesticated plants from the Guitarrero cave, research concentrated more intensively on the highland area, because the emergence of agriculture was assumed to have taken place there. Richard MacNeish conducted an intensive research project in the Ayacucho basin in the highland area of Southern Peru which investigated the shift from mobile hunter-gatherers to sedentary agriculturalist spanning from about 12,000 to 3750 BP during the 1970s (MacNeish 1992, MacNeish et al. 1980, 1981, 1983). Several sites—mostly caves but also some open-air sites—were investigated during this project, the most famous of which is the Pikimachay cave in which a very early occupation reaching as far back as 20,000 BP was detected. However, this old dating is widely rejected, and accepted datings reach back to about 12,000 BP (see Bonavia 1991).

In the 1970s and 1980s the area around the Junín Lake in the central highlands of Peru was intensively investigated. Those investigations included, for example, the Pachamachay cave (12,000/10,000–1800 BP) (Rick 1980, 1988, 2002), the Panaulauca cave (about 9000 BP to 3600 BP) (Rick/Moore 1999), and the Uchkumachay cave (9000–2500 BP in the Preceramic sequence) (Kaulicke 1980, 1999; Wheeler Pires-Ferreira et al. 1976). This research was important for understanding of the developments of early hunter-gatherers in the highlands. Important results were obtained as well from the excavations in the 1980s in the Telarmachay cave (9000–2000 BP) in the same area, where the shift from hunting to herding of camelids was reconstructed (Julien et al. 1981; Lavallée 1990; Lavallée et al. 1985).

Since the 1970s the developments in the highlands of Northern Chile have been the objective of numerous research projects (see for example: Núñez/Hall 1982; Muñoz Ovalle 1993; Guillén 1997; Rothhammer/Santoro 2001; Standen/Santoro 2004) which investigated hunter-gatherers and the famous Chinchorro culture.

An important research of the 1990s discovered developments of the Archaic Period in the Southern Peruvian highlands in the investigation of the open-air site of Asana, dating from 10,000 to 3500 BP in the department of Moquegua (Aldenderfer 1988, 1990, 1993a, 1993b, 1998, 1999).

More recent research in the Titicaca basin revealed the open-air sites of Jiskairumoko and Kaillachuro (Aldenderfer et al. 2008; Craig 2005, 2011; Craig et al. 2006, 2007).

History of research on the western flanks of the Central Andes

As mentioned earlier, the Archaic Period on the western flanks of the Central Andes was less intensively investigated than the littoral and the highlands. However, an extensive project in the Zaña and Jequetepeque valleys in Northern Peru covered the Andean flanks and foothills and revealed important information about the Archaic Period there (see for example Dillehay 2011c; Dillehay et al. 1989, 1992, 2003, 2005, 2007; Dillehay/Rossen 2000; Piperno/Dillehay 2008; Rossen 1991, 1998; Rossen et al. 1996; Rossen/Dillehay 1999). This research was conducted in a transect spanning the littoral to higher zones. Numerous sites were investigated, mostly in smaller areas and trenches. An important site was the Cementerio de Nanchoc, an early ceremonial mound in the upper Nanchoc valley (Dillehay et al. 1989). The sequence of this area was subdivided into three major phases (El Palto: 11,500–9800 BP; Las Pircas: 9800–7800

BP; Tierra Blanca: 7800–5000 BP). Domesticated plants increased in the upper Nanchoc valley during the Las Pircas Phase and during the Tierra Blanca Phase the record is interpreted as representing a shift to agriculture with the emergence of permanent sites. However, some of the interpretations are based on limited data. These important results are discussed later in more detail.

A further project started to investigate Archaic remains on the Andean west flank in Central Peru in the area of Polvadera (Goldhausen et al. 2006, 2011). This was a smaller project in which a survey was conducted and the settlement of Huaynacoto (7950–4590 BP) and some sites in Polvadera (5270–4850 BP) were investigated in more detail. These sites represent settlements with internal burials. However, insights into the economy are difficult to discern due to the preservation. In general, relatively good information on the Archaic Period from the direct littoral area of Peru as well as the highlands is available, but the western Andean flanks are so far—with the exception of the mentioned area in the Zaña and Jequetepeque valleys—poorly understood. To date, the eastern Andean flanks are—regarding Archaic developments—practically unknown.

Conclusion of the history of research

The information about the Archaic Period in the Central Andes varies strongly. In general, the Northern, Central Northern, and the Central areas of the coast are relatively well studied. Even from the Extreme South some distinct knowledge about the cultural developments is available. The Archaic Period of Southern Peru where Pernil Alto is located is, in contrast to the mentioned areas, less known. Furthermore, the highlands are relatively well studied. In contrast, the developments on the western flanks of the Central Andes are still less known.

This brief overview of the history of research is surely very coarse and lacks detail. For better and more detailed information the overview literature cited in the text should be consulted. This overview illustrates two things: first, less is known about the Archaic Period on the Andean west flank in general than the developments in the littoral area and the highlands. Second, the information about the Archaic Period of Southern Peru is very sparse. The investigations at Pernil Alto thus bring further important information regarding these two areas.

3.2 Chronology

The Archaic Period, which ends with the temporarily and geographically varying occurrence of pottery by about 3800 to 3500 BP, was subject to various periodizations (see Figure 2). A first systematic organization was done by Edward Lanning (1967) who separated the Archaic Period mainly based on typological changes of lithic artifacts in his own research area on the Central Peruvian coast into six preceramic phases (I–VI). This organization is still applied sometimes (for example Dillehay et al. 2004). However, a more accepted organization of the Archaic Period is based on socioeconomic and cultural changes, subdividing it into an Early, Middle, and Late Archaic Period with sometimes an added Terminal or Final Archaic Period (for example Quilter 1991; Shady Solís 1995; Kaulicke/Dillehay 1999; Chu 2008), even though Quilter (1991) still names it Preceramic. The Early Archaic Period (until about 8000 BP) thereby refers to the Period of versatile and specialized hunter-gatherers. During the Middle Archaic Period (8000–5000 BP) the domestication of plants and animals, the emergence of food-production and agriculture as well as the development of sedentary communities in permanent settlement takes place.

Eventually, during the Late Archaic Period (5000–3800/3500 BP), first complex societies emerged which are sometimes already interpreted as pristine state societies. They are associated with monumental architecture and settlement hierarchies, but pottery was unknown or not used. The beginning of the Late Archaic Period is especially linked to the lower Supe and Patavilca valleys in North Central Peru, and these societies are seen as the nucleus of the later cultural developments in the Central Andes.

Especially the investigations in the Caral area (Shady Solís 1997, 2000b, 2006a, 2010; Shady Solís et al. 2001; Shady Solís/Leyva 2003) have influenced the chronological schemes. The end of the Middle Archaic Period or the beginning of the Late Archaic Period is often associated with the beginning of the monumental architecture in this area by about 5000 BP (Shady Solís et al. 2001). Recent research has shown, however, that monumental structures were already apparent before those of Caral (Fuchs 2009; Fuchs et al. 2006). Therefore, some recent studies put the beginning of the Late Archaic Period in an earlier time. Thus, Chu (2008) sets its beginning at about 5500 BP, whereas Kaulicke (2007, 2010) sees the beginning of a Late Archaic Period at about 7000 BP under the influence of the newer results from the Zaña and Jequetepeque valleys (final summary in Dillehay 2011c).

Lumbreras (2006) was able to show that the occurrence of pottery is in South America was not necessarily associated with profound cultural, social, political or economic changes, and suggested avoiding the term "archaic" of the Late Archaic Period. Thus, there were societies using pottery without an agricultural economic basis and agricultural, complex societies which were not yet using pottery. Therefore, pottery—usually used to

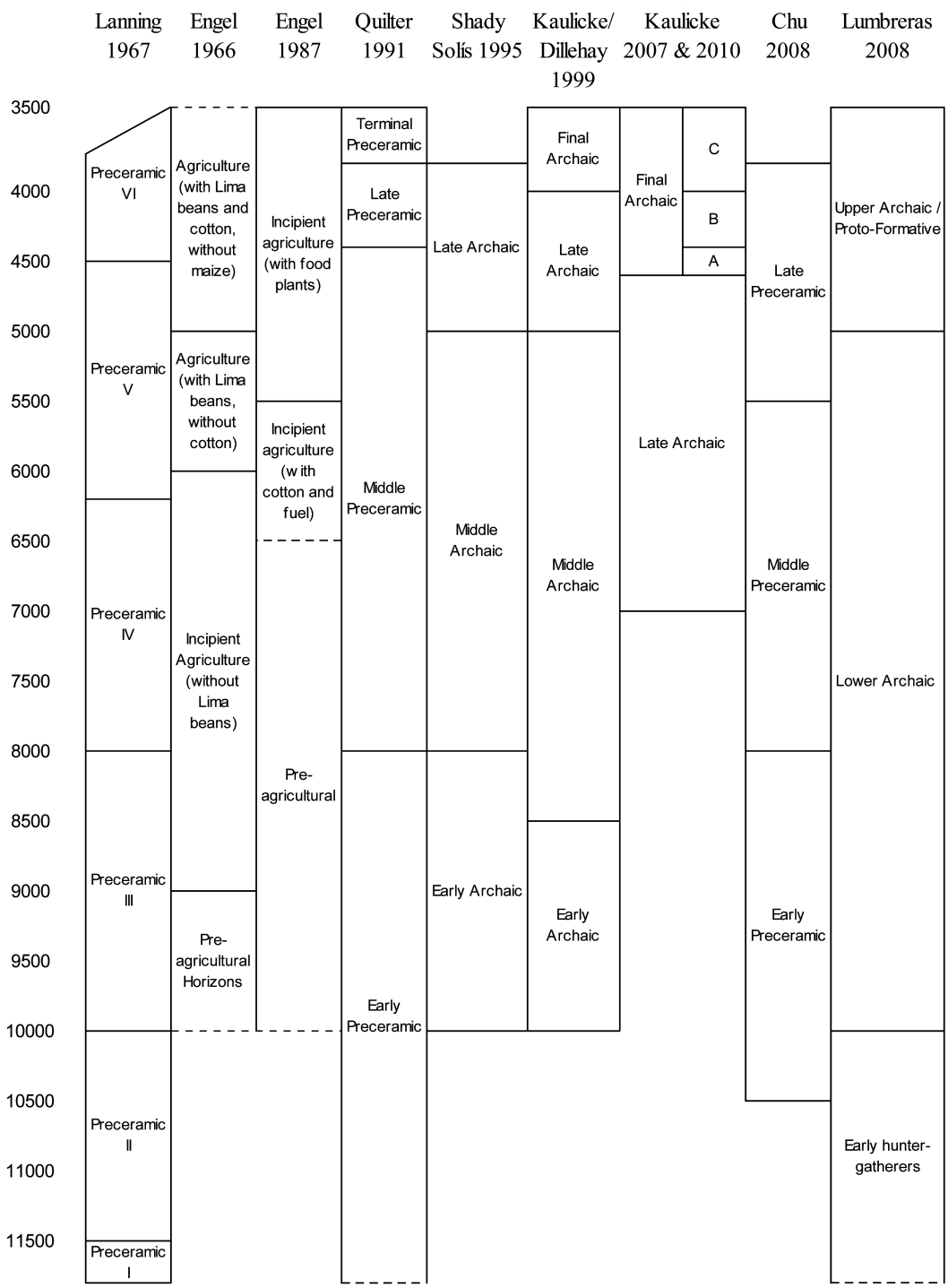

Figure 2: Periodizations of the Archaic Period of Peru.

separate the Archaic from the Formative Period—would be a solely typological marker, but would be inappropriate for the determination of a Formative Period which would be the time during which complex societies based on agriculture emerged. Therefore, he suggests the term "Proto-Formative" for a Period which is—because of the lack of pottery—still labelled as "Late Archaic", because complex societies with agricultural bases already existed before they introduced pottery.

Yoshio Onuki (2015) outlines the developments of early monumental ceremonial structures on the Northern and North-central Peruvian coast starting by about 5450 BP. Even though he notices differences in the designs of the structures he terms the pre-pottery period

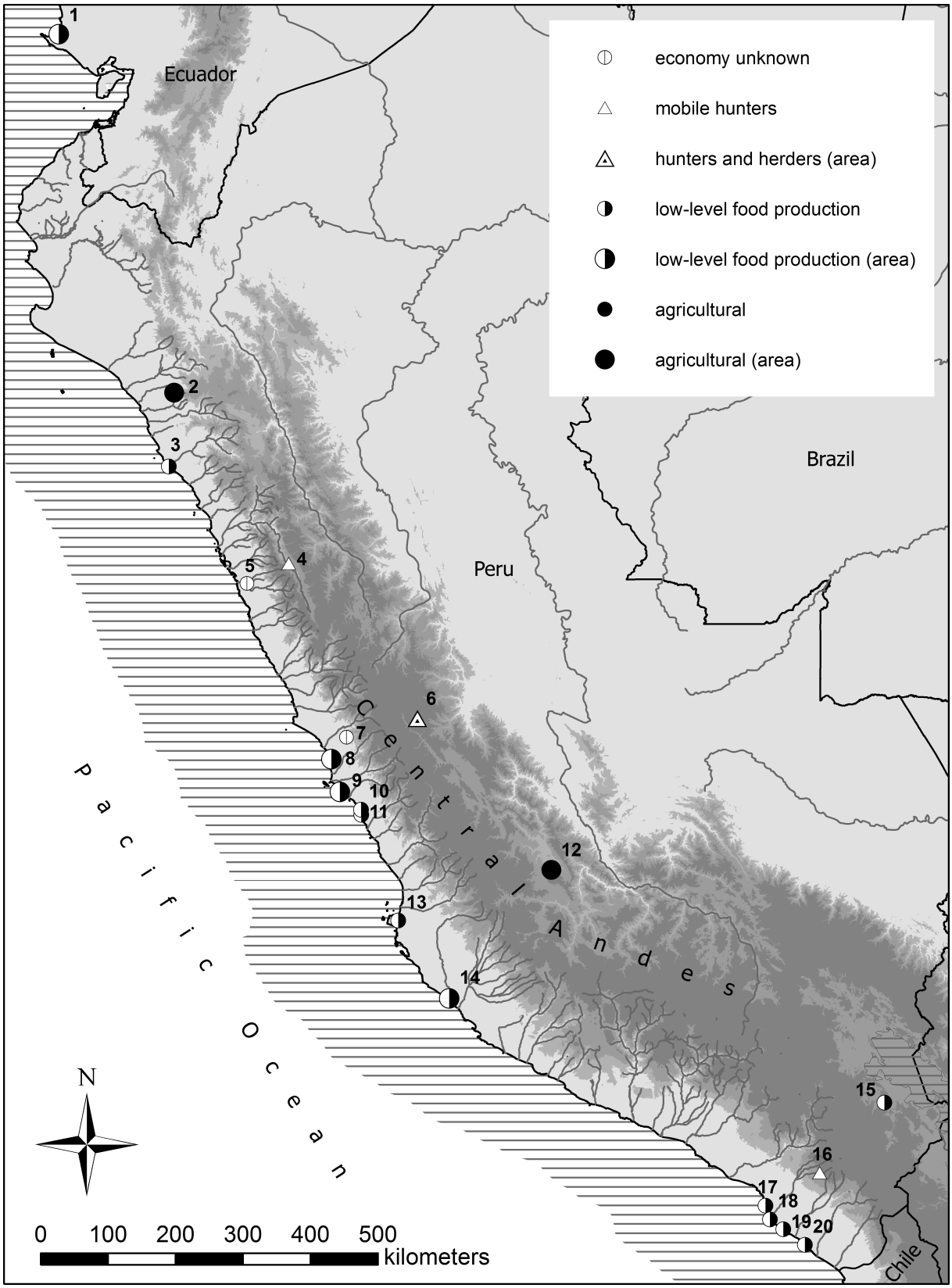

Figure 3: Sites and areas of the Middle Archaic Period (8000–5000 BP) mentioned in the text. Economy and state of mobility are marked. (1: Las Vegas; 2: Upper Zaña/Jequetepeque/Nanchoc; 3: Huaca Prieta; Guitarrero Cave; 5: Sechin Bajo; 6: Junín area; 7: Polvadera; 8: Ancón area; 9: Marcavilca complex; 10: La Paloma; 11: Chilca; 12: Ayacucho basin; 13: Paracas sites; 14: Mouth of Rio Ica; 15: Jiskairumoko; 16: Asana; 17: Kilometro 4; 18: Ring site; 19: Quebrada Tacahuay; 20: Quebrada de los Burros).

between 5450 and 2650 BP as the Initial Formative and the following Period during which pottery was introduced as Early Formative Period, which spanned from 2650 to 2150 BP.

In general, there seems to have been a beginning of constructions of monumental structures around 5500 BP (Fuchs 2009; Fuchs et al. 2006). Furthermore, there is evidence for a possible food-producing agriculture[2] by about 5600 BP in Northern Peru (compare Stackelbeck/Dillehay 2011; Dillehay 2011a). However, in the first case it is not clear if the monumental structure of Sechin Bajo was part of an early regional and complex system—like that of Caral—or an isolated precursor to that. In the latter case some aspects are somewhat problematic and will be discussed with more detail later. The beginning of monumentality and regionally distributed complex societies is connected with the developments on the North Central Coast in the lower Supe valley and this area is furthermore the closest geographical reference area to Pernil Alto. Thus, the Middle Archaic Period in this investigation is understood as the time of 8000 to 5000 BP, because an assignment of Pernil Alto to the Late Archaic Period would produce confusion as Pernil Alto predates Caral.

The preceramic occupation of Pernil Alto—dating from 5800 to 5000 BP—would be set to the end of the Middle Archaic Period in the conventional periodization. In a more recent periodization it would partly be set to the end of the Middle Archaic Period and partly to the Late Archaic or—in the terminology of Onuki and Lumbreras—into the Initial Formative Period, thus covering a site in the transition between both periods. However, the more recent approaches in periodization have not gained overall acceptance yet. Further, they are based on the results of only a few archaeological investigations—Sechín Bajo is, for example, the only ceremonial center pre-dating 5000 BP—and other important cultural aspects for establishing periods, like for example economic, social, or technological developments are not very well known. Therefore, Pernil Alto is still attributed to the Middle Archaic Period, even though an application to one or two of the other periods could be possible in the future because the limits of the periods could shift.

The periodization of the preceramic era of the Central Andean cultural developments is difficult because of multilinear developments—possibly caused by adaptions to numerous environmental zones—in a wide area with a fragmentary archaeological record, despite important findings during the last decades.

However, the aim of the study of Pernil Alto is not to produce a new periodization, but to reconstruct and investigate developments regarding the material culture, economy, mobility pattern, and social structure of one single site. The results of this investigation can help future meta-studies to produce more precise periodization.

An additional chronological order which should be mentioned here was established by Engel (1966, 1987a). He investigated the emergence of agriculture and separated phases of the Archaic Period by species and importance of cultivated plants. This order never gained wider application in archaeology and will not be applied here as it focuses too much on one single aspect of cultural development. This was probably not the aim of Engel. It is just mentioned here to illustrate that the investigation of emergence of agriculture was of high importance in his research, even though some of Engels suggestions are outdated today.

3.3 The Archaic Period

A brief overview of the Archaic Period will be given in this section. As this investigation is concerned with the economic aspects of one site and the question of the subsistence economy and the mode of mobility is central to it, cultural developments in Peru will be outlined under this perspective. The Early Archaic Period is therefore not described. The focus of the depiction will be put on the emergence of productive agriculture (in contrast to a low-level food production in the sense of Smith 2001) and settled life during the Middle Archaic Period. Furthermore, the economic structure of the Late Archaic Period resulting from these previous developments will be briefly demonstrated. This overview will be short and coarse and is only meant to put the results of Pernil Alto into perspective. Questions and discussion regarding plant domestication are only touched upon (see for detailed overviews see Pearsall 1992; Piperno 1998; Piperno/Pearsall 1998). It is, however, important to mention that agriculture is understood in the course of this depiction (and the investigation in general) not as the sim-

2 The term "food-producing agriculture" refers to a subsistence economy based in produced plants and a dependent population. The term contrasts the low-level food production described by Smith (2001), which describes a subsistence economy of foragers which already includes the cultiviaton of domesticated plants (or herding of domesticated animals). These were, however, of a minor economic importance for subsistence in comparison to wild gathered plants, hunting, or fishing. It is thus an economic term and not a technological one. In general, agriculture should not simply be understood as the use of domesticates, but as the dependence on them. In Chapter 18—which is concerned with the economy of Pernil Alto—the definitions are explained in more detail.

ple use of cultivated or domesticated plants. Agriculture is instead understood as a form of subsistence in which domesticated plants form the main food source on which a population depends. A more detailed definition can be found in Chapter 17.

3.3.1 Economic developments in the Middle Archaic Period

The domestication of the plants which later built the foundation of the diet and economy in the Central Andes took place in a wide area of South America (compare Piperno/Pearsall 1998; Piperno 2011b). Of some importance seems to have been the area of Southern Ecuador. There, early evidence of domesticated plants—mostly in the form of phytoliths—has been dated to about 10,000 BP and sometimes earlier. In particular, the bottle gourd seems to have been cultivated in very early times. The plants were used within low-level food production systems, that is, they were of subsidiary or secondary importance within a subsistence mainly characterized by hunting and gathering. Next to this archaeologically and archaebotanically important area, which is linked to the coastal zone, there was another important area in the highlands of the Central Andes. There, the origin areas of later important crops like for example potatoes and quinoa are located. However, as mentioned before, domesticated plants were used by societies whose subsistence was based predominantly on hunting and gathering and which conducted planting as a secondary activity.

This was, for example, the case during the Las Vegas and early parts of the Valdivia sequences in Southwestern Ecuador.[3] The Las Vegas culture (10,800–6600 BP) (Piperno et al. 2000a; Piperno/Stothert 2003; Stothert 1985, 1992; Stothert et al. 2003) on the Santa Elena Peninsula can be characterized as a society of sedentary, broad-spectrum village foragers with additional horticulture. The subsistence included hunting, collecting wild plants, using marine resources, and the additional use of domesticated plants. Those were *Lagenaria siceraria*, the root crop *Calathea allouia*, as well as maize. Furthermore, beans, cotton, peanuts, manioc, arrowroot, and achira may have been cultivated, but "no direct evidence for these crops was recovered from Vegas sites" (Stothert et al. 2003: 36). Even in the following Valdivia culture (6400–3400 BP) (Damp 1984, 1988; Damp et al. 1981; Estrada 1956; Lathrap et al. 1977; Marcos 1986; Raymond 1999, 2008; Raymond/Burger 2003; Zeidler 2008)—in which pottery was already in use—the subsistence can be characterized for the Early Valdivia culture (Valdivia 1–2, 6400–4800 BP) as a low-level food production economy which was predominantly based on hunting, collecting, and marine resources with additional horticulture of cultivated plants. Pearsall (2003) evaluated the subsistence data available from the Valdivia culture and came to the overall conclusion that the subsistence of the overall Valdivia culture was a multi-faceted, but overall root-crop based agriculture. On the basis of her data, however, this overall interpretation is extremely questionable for the phases Valdivia 1 and 2, since the data are not quantifiable overall (Pearsall 2003) and from these two earliest Valdivia phases only very few remains of cultivated plants are available and wild plants and tree fruits seem to predominate. In addition, isotope analyses (van der Merwe et al. 1993) of individuals from these two early Valdivia phases suggest a diet based on "C3-vegetation and/or terrestrial animals" as well as fish and invertebrates (Pearsall 2003, 235f.). Maize, which is already sparsely detectable, was not the basis of subsistence (Pearsall 2003, 236). In addition to plant nutrition, hunting for wild animals was also very important for subsistence in Valdivia 1 and 2 (Byrd 1996; Damp et al. 1990). All this also fits in with the archaeological evidence, which shows a "more complex intrasite settlement pattern" (Marcos 2003, 14) only after approx. 5000 calBP, indicating a change in settlement patterns shortly before Valdivia 3 that might be connected with changes in subsistence patterns. Also, Zeidler (2008, 462) notes that "newer subsistence data indicate a mixed economy of floodplain horticultural production […], hunting, fishing, and the gathering of wild plants and shellfish". Overall, the subsistence of Valdivia 1 and 2 still seems to have been a low-level food-production (Smith 2001), in which crops were cultivated, but in which subsistence depended probably predominantly on wild resources. However, in the Later Valdivia culture (Valdivia 3–8, 4800–3400 BP), subsistence was based on plant production, the start of which can then be dated to around 4800 BP, even though domesticated plants had been in use for a long time before in the area.

In Northern Peru, in the area of the Zaña and Jequetepeque valleys, a regional sequence spanning from early hunter-gatherers to sedentary agriculturalists was discovered and investigated by a team led by Tom Dillehay (for example Dillehay 2011c; Dillehay et al. 1989, 1992, 2003, 2005, 2007; Dillehay/Rossen 2000; Piperno/Dillehay 2008; Rossen 1991, 1998;

3 The location of the mentioned sites and areas of the Middle Archaic Period are mapped in Figure 3.

Rossen et al. 1996; Rossen/Dillehay 1999). A local chronology was established for the area spanning from 11,500 to 5000 BP. Early cultivation of domesticated plants (squash, peanut, a quinoa-like chenopod, manioc, and bean—*Phaseolus* sp.) in the Nanchoc Quebrada, which is a part of this area at an altitude of around 400 m, took place during the Las Pircas phase (9800–7800 BP), but hunting and gathering were still of major importance for subsistence. During the Tierra Blanca phase (7500–5000 BP) an increasing intensification of plant cultivation and sedentariness eventually led to productive agriculture. This agriculture is, however, only detectable in the Nanchoc area, whereas in the surroundings a foraging subsistence economy prevailed (Rossen 2011b: 190). Based on the poor preservation conditions, only relatively few macro-remains were recovered (compare Rossen 1991; Rossen et al. 1996; Piperno 2011a). Furthermore, the macro-remains are problematic because direct datings returned modern dates (Rossen et al. 1996). However, the explanations for these late datings (Rossen et al. 1996) are convincing. Nevertheless, a quantifying comparison between acquired wild and produced cultivated resources was never done. Only in the case of starch remains detected on the teeth of individuals was a comparison of the ratios of the starches done (Piperno/Dillehay 2008). It was assumed that some starches, which were in fact botanically not determinable as representing remains of wild or domesticated beans, could be—based on theoretical assumptions—determined as domesticated and would represent the major part of the starches. The author does not agree with the explanation by Piperno and Dillehay. A detailed discussion is given in Chapter 17. Further arguments for an early productive agriculture during the Tierra Blanca phase were the construction of irrigation canals associated with this phase (Dillehay 2011b). Irrigation canals are—due to their characteristics—not closed contexts because they can cut through older remains during their construction, and can transport older material during their time of use. They are therefore extremely difficult to securely date by associated material. According to Dillehay (2011b: 262) a certain dating of the irrigation canals lies at about 5600 BP, even though some older dating is possible. Thus, the time of about 5600 BP seems to be an acceptable beginning of productive agriculture in the Nanchoc area. However, an increasing sedentariness began before that and is marked by the construction of early stone architecture. The importance of early agriculture in the Nanchoc area is its geographical location as well as its early dating with a start by about 5600 BP. Thus, it is neither located on the littoral area nor in the highlands, but on the Andean west flank at around 400 m of altitude. At the moment, this is the earliest evidence for productive agriculture in the Central Andes.

Further to the south, in the Huaca Prieta site in the Peruvian littoral, recent excavations took place (Dillehay et al. 2012a, 2012b). These excavations resulted in a very long occupation sequence which distinctly predated the original occupation excavated by Junius Bird (Bird 1948; Bird/Hyslop 1985). The newer results indicated an occupation beginning as early as 9000 BP with a mound construction starting by about 7500 BP. The remains of domesticated, cultivated plants were recovered in the course of the excavations. They included remains of avocado (*Persea* sp.), beans (*Phaseolus lunatus* and *P. vulgaris*), sweet potatoes (*Ipomoea batatas*), white potatoes (*Solanum* sp.), peanut (*Arachis hypogaea*), and other domesticated plants. Some of these remains represent the oldest macro-remains of the mentioned plants. The evidence of early maize (*Zea mays*) (Grobman et al. 2012) and cotton is important to mention from the early remains of the Huaca Prieta. Most of the plants were cultivated already before 6500 BP, some other (including peanut, sweet potato, white potato) were introduced after 6500 BP. Cotton production started by about 6800 BP, and maize is evident as early as 6700 BP. However, cultivated plants were only of supplementary importance within subsistence, because "[a]lthough increases in plant species show a continuous greater reliance on cultigens, marine species dominated the diet throughout all phases" (Dillehay et al. 2012b: Suppl. 8). This was even the case for maize, which—even though it was evident by about 6700 BP—became "a primary food staple in the local diet" not before about 4500/4200 BP (Grobman et al. 2012: 1759).

During the Middle Archaic Period a mixed economy prevailed as well on the Central Peruvian coast, where the Loma vegetation played an important role in plant use, but squash was cultivated as well (Cohen 1971; Lanning 1965, 1967, 1963; Muelle/Ravines 1973; Moseley 1968, 1975; Patterson/Lanning 1964). During later times, an increased use of the marine resources and increasing settlement activity towards the littoral took place. Cotton became important as well. The Marcavilca-Complex (Díaz Arriola 2006) showed a prevailing mobility between the littoral, the lomas and higher areas as well until about 5000 BP when permanent settlements emerged, even though *Lagenaria siceraria*, *Cucurbita* sp., and *Phaseolus vulgaris* were already cultivated before. Thus, the subsistence economy was a low-level food production economy, predominantly based on collecting, marine resources and hunting on the Central Peruvian coast.

Similar occurrences were detectable on the southern Central Peruvian coast in the area of the lower Chilca valley. Early sedentary villages—La Paloma (Benfer 1982,

1990 1999, 2008; Engel 1980, 1982; Pechenkina et al. 2007; Quilter 1989; Reitz 1988; Weir et al. 1988) and Chilca 1 (Donnan 1964; Engel 1988a; Jones 1988; Kaplan/Lynch 1999)—were detected in this area. La Paloma (7800–4700 BP) was located at a distance of about 3.5 km from the littoral. The village consisted of about 50 circular-oval pit houses. Cultivated plants including squash, gourd (*Lagenaria* sp.), begonia, possibly amancay (*Hymenocallis amancaes*), guava, unknown tubers or roots, and—by about 5100 BP—beans (*Phaseolus* sp.) were recovered in La Paloma. However, cultivated plants played a minor role and were in general not important in the diet, which was dominated by marine resources, especially fish, and hunting. Yet, the importance of cultivated plants increased through time (Benfer 1999). The close settlement of Chilca 1 (about 6800–5000 BP), was located closer to the littoral and consisted as well of oval huts (Donnan 1964; Engel 1988a; Jones 1988). There, plant cultivation was conducted as well. The cultivated plants included the same species as in La Paloma, with additional Lima beans and sweet potatoes in the upper levels. However, plant use was, in general, of lower importance and the diet was dominated by marine resources.

On the Paracas Peninsula, a small village named Paracas 514 (about 6000–5000 BP) consisting of eight huts and numerous burials was recovered (Engel 1981). Plant remains of bottle gourds, *Pachyrrhizus* sp., and cotton were found, but subsistence was predominantly dependent on marine resources and hunting.

On the Southern Peruvian coast, in the area of the estuary of the Río Ica and in the river valley system north of Pernil Alto, recent research identified the cultivation of plants in broad-spectrum economies in the areas of close proximity between the littoral, the lomas and river valley areas (Beresford-Jones et al. 2015). The overall dating of these sites was about 8000–4500 BP. Bottle gourds (*Lagenaria siceraria*) were present by about 7000 BP and beans (*Phaseolus lunatus*) by about 6200 BP in camp sites and settlements. However, they seem to have been integrated into a broad-spectrum subsistence in which plants were of minor importance in comparison to wild resources (like game, wild plants and marine resources), but quantified analyses have not yet been made. In general, an increasing sedentariness took place in the area.

Further to the south, on the Extreme Southern Coast of Peru, several coastal sites are known with a direct economic relation towards the sea. Those include Kilometro 4 (deFrance et al. 2009; Guillén/Carpio 1999; Wise 1999; Wise et al. 1994), the Quebrada de los Burros (Carré et al. 2005, 2009; Lavallée et al. 1999a, 1999b; Lavallée/Julien 2012b), the Quebrada Tacahuay (deFrance/Umire Àlvarez 2004; Keefer et al. 1998), the Ring Site (Richardson et al. 1990; Sandweiss et al. 1989), and others. Most of these sites are in close relation to the littoral and are characterized by the intensive use of marine resources, especially mollusks, as well as game. Chronologically they cover the periods from the Early to the Middle Archaic Period. However, even from this southern area, evidence in the form of phytoliths for the use of domesticated plants was found in the Quebrada de los Burros (Lavallée/Julien 2012a). The spectrum of cultivated plants therefore widened through time. In the beginning (9900–9200 BP), only squashes and bottle gourds are evident, from 9100 BP onwards beans are as well, and later *Canna indica* and *Manihot esculenta*. Of importance is the early use of maize by the time between 7500 and 6800 BP. However, marine resources were always of higher importance in the diet, and cultivated plants were only of additional importance (Lavallée/Julien 2012a: 431).

In general, marine resources formed the basis of subsistence on the Pacific littoral during the Middle Archaic Period. A continuously increasing specialization in these resources was also identifiable in general for the Middle Archaic (Sandweiss 1996). Thus, the use of fish increased in importance in comparison with other marine and terrestrial mammals. However, mollusks were always consumed and important.

In total, sedentariness developed early on the littoral of the Central Andean region with the emergence of early permanent settlements or villages. The cultivation of domesticated plants was conducted very early in these sites, but plant production did not become prevalent in subsistence strategies which were dominated by the exploitation of the close and rich marine resources. Plant cultivation was only complementary and the produced plants only supplemented the marine resources. Agriculture with the produced plants forming the major part of the diet of societies seems to have emerged towards the end of the Middle Archaic Period in Northern Peru by about 5600 BP and at a distance from the littoral marine resources. The development in the Nanchoc valley is thereby solitary in the archaeological record of the Middle Archaic Period of Peru. Even in Southern Ecuador, a dependence on produced plants seems to have emerged later.

In contrast to the coastal areas, the highlands witnessed other subsistence strategies during the Middle Archaic Period. After the detection of remains of domesticated plants (Lima and common beans) in the Guitarrero Cave in layers dating to about 8000 BP (Smith 1980), it was long thought that agriculture had originally emerged in the highlands, until direct datings conducted on the plant remains (Kaplan/Lynch 1999) later revealed that the plants were in fact intrusive and of a much more recent dating. Therefore, in general, the cultivation of plants and agriculture at such early times is not assumed anymore in the highland area around the Guitarrero

cave. In the Central Peruvian highlands, in the area of the Junín lake (for example Bocek/Rick 1984; Julien et al. 1981; Kaulicke 1980, 1999; Lavallée 1990; Lavallée et al. 1985; Matos M. 1975; Rick 1980, 1988, 2002; Rick/Moore 1999) a subsistence based on hunting of camelids and, in decreasing quantity, cervids prevailed during the Middle Archaic Period. Hunting of camelids was the major part of the subsistence up to Southern Peru, as shown by the results of the excavations of Asana (Aldenderfer 1993a, 1988, 1990, 1993b, 1998, 1999). However, not all of the groups in the area were mobile hunters. Thus, the occupants of the later phases of the Panaulaca cave (about 5800–3600 BP) had an increasing sedentariness or were nearly sedentary but did not conduct herding (Rick/Moore 1999). In contrast, in the Telarmachay cave, in the same area, the occupants specialized more and more in camelids, began herding of camelids between 6000 and 5500 BP, and are interpreted as mobile full-time pastoralists by 5000 BP (Julien et al. 1981; Lavallée 1990; Lavallée et al. 1985). The emergence of an early, productive agriculture in the highlands is more difficult to detect than in the arid coastal area due to the condition of preservation. Yet even in the highlands some early indications of an early use of domesticated plants are known. Thus, Richard MacNeish (MacNeish et al. 1980, 1981, 1983) led an intensive archaeological-botanical project in the area of the Ayacucho basin with the aim of reconstructing early agriculture in the highlands. Even though the project was heavily criticized for methodological weaknesses and problems with the dating from the beginning (Lynch 1984; Gero 1986), MacNeish and his team were able to demonstrate early uses of domesticated plants there. However, the groups using domesticated plants were still mobile and a sedentary way of life with a subsistence basis in agriculture did not begin until the Cachi Phase by about 5100 BP (MacNeish 1992), even though mobility had decreased and the use of cultivated plants had intensified before this. Next to gourd and quinoa "there seems to be some evidence" (MacNeish 1992: 57) for common beans, achiote, tree gourds, lúcuma, maybe coca and potato already during the Chihua phase (about 6400–5100 BP). In the Cachi phase, maize, squash and lúcuma were added, even though maize could have been used already towards the end of the Cachi phase.

Middle and Late Archaic remains were also detected in recent excavations in the highland area of the Lake Titicaca (Aldenderfer et al. 2008; Craig 2005, 2011; Craig et al. 2006, 2007). Domesticated plants were in use there as well, especially of Chenopodium and Poacea. However, a "shift away from 'foraging' towards what one typically thinks of as 'low-food production'" (Craig 2011: 385) took place to the end of the Middle Archaic Period by about 5000 BP. Therefore, agriculture emerged even later there.

In total, a multifaceted coexistence of diverse subsistence strategies prevailed during the Middle Archaic Period. Various proportions of the exploitation of marine resources, plant collecting, hunting, herding, and plant cultivation were conducted in different combinations and combined with various forms of mobility. It is noticeable that the domesticated plants and therefore the techniques of plant cultivation were widely known and distributed on the coast and the highlands already at the beginning of the Middle Archaic Period. However, for millennia available wild resources were more important for subsistence. A producing agriculture, in which the subsistence was dependent on domesticated and cultivated plants developed astonishingly late, even though the "technological" prerequisites had been existing long before. Producing agriculture formed the basis of the following millennia in the Central Andes and the use of wild resources decreased distinctly, even though marine resources have remained important on the Peruvian coast until today.

3.3.2 The Late Archaic Period

In the Late Archaic Period (5000–3800/3500 BP) a seemingly abrupt cultural development took place.[4] It is not only characterized by the emergence of early monumentality on the Central Peruvian coast in the lower Supe and Patavilca valleys, but as well as by a socioeconomic system in which the exploitation of marine resources in the littoral was combined with a likely producing agriculture in the hinterland in the river valleys (compare Shady Solís 2006a, 2006c). According to Ruth Shady Solís—the main investigator of the early monumentality in the Caral area—the socioeconomic system was an "agricultural-fishing economy" which was based on an exchange between inland agriculturalists and coastal fishing settlements (Shady Solís 2006a, 2006c). The found food plants at Caral included a long list of domesticated species including beans, squashes, sweet potatoes, fruits, and others (Shady Solís 2006a: 49 f.). However, the cultivation of cotton was especially important and enabled increased productivity through fishing with cotton nets (Shady Solís 2006a: 49; Sandweiss 1996). According to recent investigations, maize "was grown widely in the area and constituted a significant

4 The mentioned sites and areas of the Late Archaic Period are mapped in Figure 4.

portion of the local diet" (Haas et al. 2013: 4948) at least in the Fortaleza valley.

Some investigators assume that societies were already based on an extensive inland occupation relying on irrigation agriculture, whereas the settlements in the littoral represent a much smaller-scale maritime occupation (Haas/Creamer 2004).

The importance of this development is, in part, the concentration of sites with monumental structures in a relatively small area. This concentration, the settlement hierarchy, and the forms and characteristics of the monumental structures have led to the interpretation of the lower Supe valley as an early civilization, a "pristine state" of a complex society (Shady Solís 2006a). Caral, as the largest site with the highest concentration of monumental structures, is therefore interpreted as the capital or central site of this civilization (Shady Solís 2006c). The smaller but still large site of Aspero (Feldman 1980, 1985) is interpreted as a secondary center of this state-like entity representing a fishery site specialized in the exploitation of rich marine resources. Caral is located on the junction between the littoral fishery sites and the agricultural sites in the inland river valley. This is basically an organizational structure in which the economic (and possibly political) basis is formed by the coordination of a marine system on the coast and an agricultural system in the hinterland.

However, some researchers (Haas et al. 2004b) question the state structure of the early monumentality on the Central Peruvian coast, interpreting the monumental sites as independent entities. The economic double system based on a combination of marine and agricultural subsystems is, however, still accepted.

The early monumentality on the Peruvian coast can virtually be seen as the nucleus of the later Central Andean cultural development. Comparable developed societies in the highland or the eastern Andean flanks did not develop until 4000 BP in Kotosh (Izumi/Sono 1963; Izumi/Terada 1972). Maize was consumed in these highland societies in quantities already comparable to those of later, clearly agricultural periods (Tykot et al. 2006). A producing subsistence had thus become prevalent and formed the economic basis of the Central Andes.

Recent investigation in Sechín Bajo (Fuchs 2009; Fuchs et al. 2006) have demonstrated, however, that monumental structures had been erected before the emergence of the Caral society in the Casma valley, some 180 km north of Caral. The erection of the single monumental structure of Sechín Bajo—which is located about 14 km inland from the littoral—had begun as early as about 5600 BP. It is until now the oldest known ceremonial structure of the Andean area. It is comparable in size and structure with its Central Peruvian counterparts. However, the economic basis of the society erecting Sechín Bajo is unknown. The location and dating indicate an architectural precursor function of Sechín Bajo for the later structures farther south, but it is unclear if it is connected with a precursor function of the economic system.

However, in other areas in Peru, especially in the highlands and the southern Peruvian coast, the occupation of sites already occupied during the Middle Archaic Period continued without notable changes in the subsistence economy at the beginning of the Late Archaic Period (see Figure 4). Thus, the development of complex societies primarily took place on the Central Peruvian coast.

3.3.3 Conclusion of the economic developments in the Archaic Period

The integration of domesticated plants into foraging subsistence systems happened during the Middle Archaic Period in various forms. Furthermore, an increasing sedentism is detectable in wide areas, especially on the coast. On the coast the integration of domesticated plants and the first permanent settlements developed together with an increasing specialization with marine resources. Even though knowledge about domesticated plants and plant cultivation and the possibility of food production was widespread, subsistence economies dependent on food production did not develop for millennia while the use of marine resources, hunting, and collecting dominated the diets of societies.

In a restricted small area on the western flank of the Andes in Northern Peru a food producing agriculture—which did however not integrate maize which had already in use for millennia on the littoral (see Grobman et al. 2012)—developed towards the end of the Middle Archaic Period. This development is marked by increasing complexity (Dillehay et al. 2004: 27–32) and the construction of a first monumental structure in Northern Peru at Sechin Bajo (Fuchs 2009; Fuchs et al. 2006). These important developments took place in the last half of the sixth millennium, between 5500 and 5000 BP. This combination then happened on the Central Peruvian coast and led to a first blossoming of civilization in the Central Andes.

Pernil Alto (5800–5000 BP) thus is located in the timeframe of these developments. However, it is located in Southern Peru and therefore outside the main geographical areas in which the studies concerning these developments took place. The evaluation of the subsistence economy of Pernil Alto is important in the determination of whether a producing agriculture had already developed on the western Andean flanks of Southern Peru, or if foraging still prevailed. The first

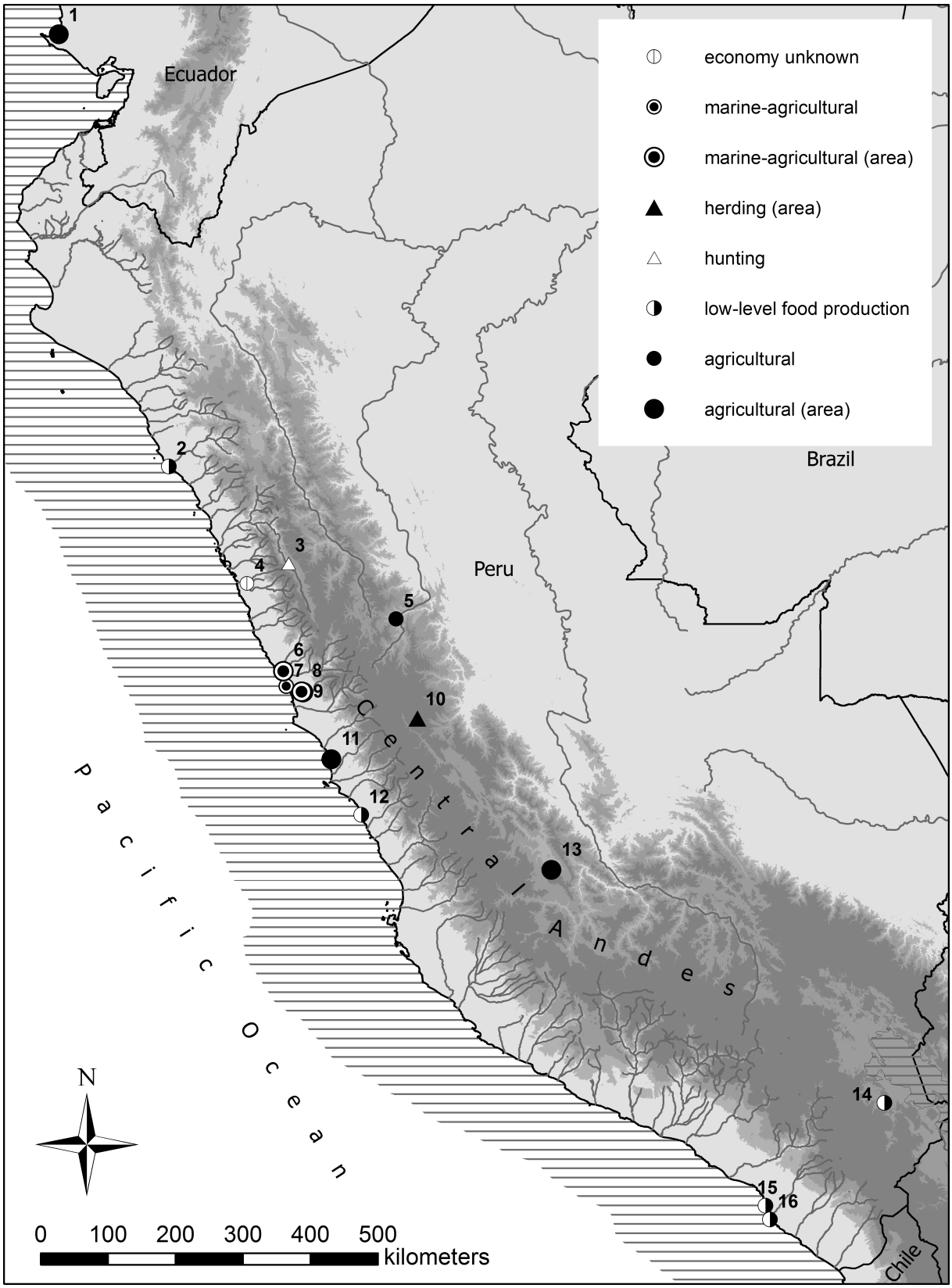

Figure 4: Sites and areas of the Late Archaic Period (5000–3500/3800 BP) mentioned in text. Economy and state of mobility are marked. Some were already occupied during the Middle Archaic Period and were mentioned earlier. (1: Real Alto sequence; 2: Huaca Prieta; 3: Guitarrero Cave; 4: Sechin Bajo; 5: Kotosh; 6: Patavilca/Fortaleza area; 7: Aspero; 8: Supe area; 9: Caral; 10: Junín area; 11: Ancón area; 12: Chilca; 13: Ayacucho area; 14: Jiskairumoko; 15: Kilometro 4; 16: Ring site).

case would imply that the developments in the Zaña valley or the Nanchoc area were not isolated, but rather that agriculture was spaciously distributed in the Central Andes even before the emergence of early civilizations on the Central Peruvian coast.

3.3.4 The Archaic Period in the working area in the Río Grande basin

Pernil Alto is located in the area of the Río Grande basin. The Archaic Period in this area is poorly known. Next to Pernil Alto (5800–5000 BP) only the sites of La Esmeralda (Isla 1990), Las Brujas (Vogt 2007, 2008, 2011), San Nicolas (Strong 1957; Vescelius 1963), Upanca (Vaughn/Linares Grados 2006), Santa Ana and a further unnamed site in the Río Grande (Engel 1963b, 1964, 1981, 1987a) valley have been investigated (see Figure 5). La Esmeralda (Isla 1990) dates to roughly 7450–6750 BP and is located in the Middle section of the margin of the Río Nasca in the area of the Nasca site Cahuachi (Orefici 2012). It was detected in the course of excavations of the Nasca period and a smaller area was excavated. Two occupations of a camp could be distinguished. The first is associated with a smaller wind shelter, the second with the erection of a rectangular structure. A domestic use is not evident, but was assumed by the excavator. One burial was placed within the settlement. The subsistence was dominated by hunting and collecting as indicated by associated plants and obsidian points. Faunal remains of game were, however, not recovered. The use of early domesticated plants (Lima beans and bottle gourds) is evident, but was of a minor importance in the mixed economy. Distinct relations into the highlands are indicated by the obsidian remains, including three larger points. Relations with the littoral were indicated by the remains of sea shells and the remains of a sea lion fur associated with the burial.

Las Brujas (Vogt 2007, 2008, 2011) is a rock shelter in the lower section of the Río Grande valley. The fertile river valley narrows distinctly downstream from the location. Following the Río Grande, the site is located at a distance of about 45 km from Pernil Alto. The evaluation of the conducted excavations is ongoing. Until now some preliminary reports are available. The remains cover a long chronological sequence, but a use of the rock shelter during the Middle Archaic Period (5800–5400 BP) (Vogt 2011: 308) is indicated. Therefore, the occupation of Las Brujas partly overlaps with that of Pernil Alto. Statements about the economy cannot be made at the moment. Plant and mammal remains are not mentioned, but the findings of marine resources remains (fish, mollusks) and river resources are pointed out but the excavator. Being a rock shelter, Las Brujas probably did not represent part of a hamlet or village.

Santa Ana (Engel 1963b, 1964, 1981, 1987a) is an Archaic site further downstream, on the estuary of the Río Grande. Very little is known about the site and it was only briefly mentioned in the literature. The dating is—besides its Archaic association—not very clear. A semi-circular structure, possibly of domestic function, was associated with the site. A larger pit, lined with slab stones was excavated, but its function is unknown. No information about the subsistence is available, despite rich, close marine resources and the hypothetical possibility of small scale plant cultivation on the river banks. A further site close by, which is mapped in the same position as Santa Ana, was mentioned by Engel (1964).

The site of San Nicolas (Rowe 1956; Strong 1957; Vescelius 1963) is located about 35 km south of the estuary of the Rio Grande. It is composed of five shell mounds which are between 15 and 25 m long and 3–4 m high. No radiocarbon dates are available, but some projectile points were reported. The economy was dependent on marine resources such as mussels, clams, sea urchins, limpets and scallop shells. However, a fragment of a gourd is reported (Strong 1957: 8) indicating some use of domesticated plants. No excavations took place other than some smaller test trenches. A precise dating of the site is not possible but in general it seems to be preceramic, and thus of the Archaic Period.

A dating to the Middle Archaic Period can be assumed for the before mentioned sites. Such a dating is ensured by radiocarbon dates in the cases of La Esmeralda and Las Brujas. But only in the case of La Esmeralda is the basis of the subsistence economy clear. It can be described as a mixed economy which was mainly dependent on foraging. No clear definitions of the forms of mobility or sedentariness can be made for any of the sites. La Esmeralda seems to represent a camp of mobile or semi-mobile foragers. Santa Ana and San Nicolas were related to the exploitation of the marine resources, but the duration of the occupations are unknown and were not discussed.

A further site of the Archaic Period in the Rio Grande basin is Upanca (Vaughn/Linares Grados 2006). It is located in the upper middle valley of the Rio Nasca at an altitude of 1600 m and was dated by one radiocarbon date to 4425–4085 BP. Upanca is the only Archaic site of the Rio Grande basin dating to the Late Archaic Period known so far. It was detected in the course of excavations of the Nasca Period. The remains were only examined in smaller test trenches. Due to the limited excavated space, no distinct statements concerning the subsistence economy and mobility can be made for Upanca (Vaughn/Linares Grados 2006: 608). However, the relatively high amount of obsidian from the Quispissia source "suggests

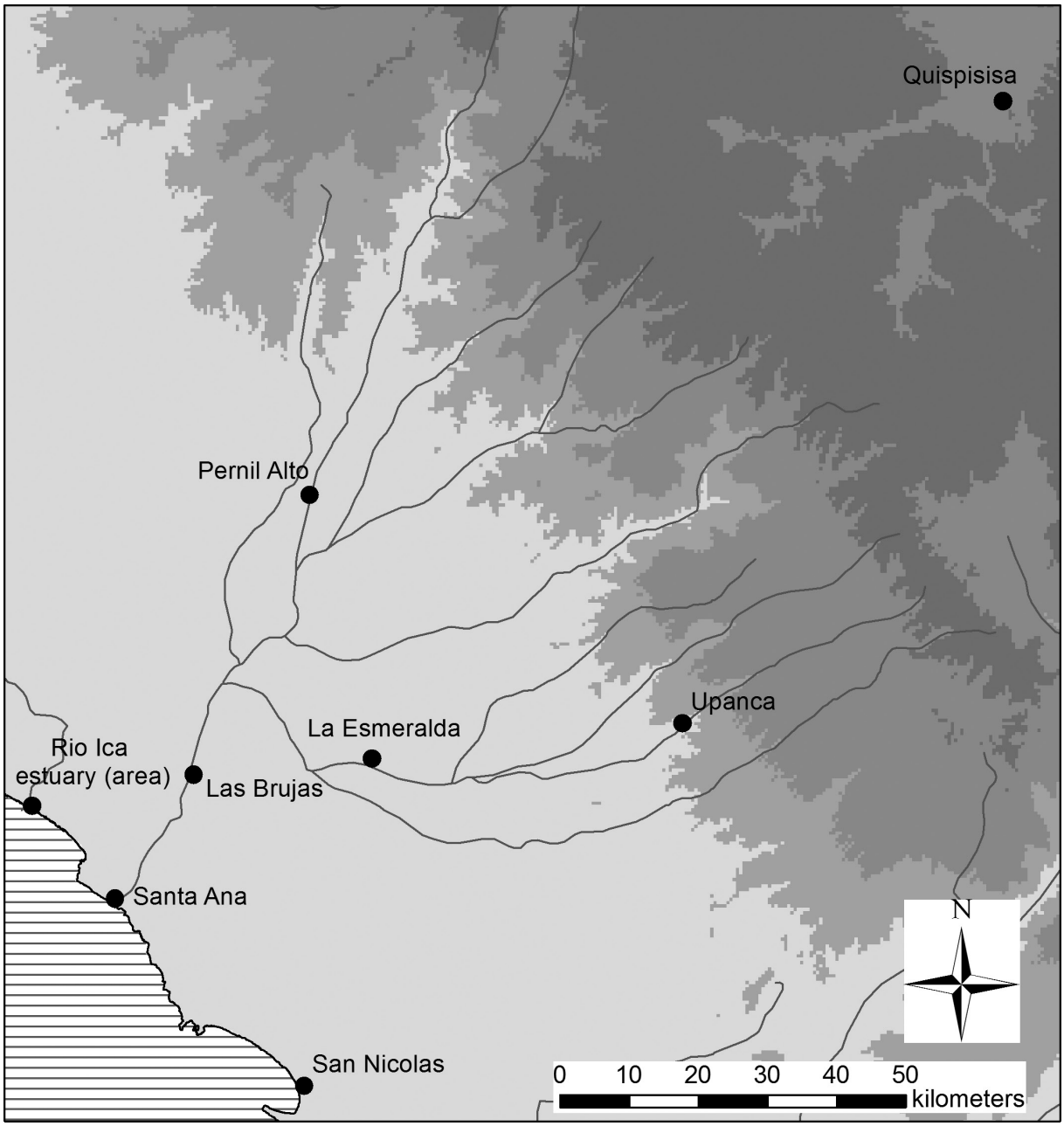

Figure 5: Sites of the Archaic Period in the Río Grande basin.

that even in the Late Archaic, there was already contact between the highlands and this region [the Andean west flank of Southern Peru] indicating some type of exchange" (Vaughn/Linares Grados 2006: 608). The site of Upanca indicates that the area of the Rio Grande basin was also settled during the Late Archaic Period, even though other sites of this time are not known so far.

The stage of research of the Archaic Period of the Rio Grande basin makes clear that remains and developments of this Period are very poorly known. On the other hand, the distribution of the sites covering the littoral, the lower, and middle sections of the rivers and the higher Andean west flank indicate a relatively continuous settlement activity from the early Middle to the Late Archaic Period in the area. Pernil Alto represents one additional site of the Middle Archaic Period in this until now poorly known area.

It is noticeable that the mentioned sites which are not located directly in the littoral (La Esmeralda, Upanca, and Pernil Alto) have one thing in common in their research history: they were all detected in the course of excavations which were aiming to investigate remains of

later Periods. The sparse number of known sites can therefore not be interpreted as an indication of a sparse settlement during the Archaic Period. Rather, the detection of Archaic remains is difficult because of complicating factors, with the result that they were detected accidentally. The result is an incomplete and biased picture of the settlement density of the Archaic Period in the area. Complicating factors include the fact that Archaic sites are not indicated on the surface by ceramic concentrations, raising architectonical remains, or—because of the lack of ceramic vessels valuable for selling on the illegal market—looter pits, which unfortunately are a good indicator in the area for sites of later periods. Furthermore, a high accumulation of alluvial sediments can be assumed in the fertile river valleys, possibly covering sites there. In addition, the same fertile river valley zones are subject to intensive agriculture which probably led to destruction of sites in the river flood plains.

The lack of information about the Archaic Period in the area and especially in the middle Rio Grande basin thus can be understood partly as a result of the history of research. This sparse information makes a detailed analyses of the remains of Pernil Alto important, as no or nearly no information concerning architecture, burials, material culture, and other aspects of the Archaic Period are known in the Rio Grande basin.

One further site which is of importance for the understanding of Pernil Alto is Quispisisa (Burger/Glascock 2000; Contreras et al. 2012; Reindel et al. 2013; Tripcevich/Contreras 2011, 2013). This site was a quarry for the extraction of obsidian which was exploited since Archaic times, and provided a large portion of Southern Peru with this resource. It is located in the central part of the Ayacucho region in altitudes of about 3750 to 4000 m. This quarry was probably also the origin of the obsidian during the Archaic Period in the Rio Grande basin.