

X. Platia Magoula Zarkou in Context: Summary and Conclusions

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X.1. The Area around the Tell

X.1.1. The Geographical Setting and the Environment of the Tell

Platia Magoula Zarkou constitutes an impressive tell rising about 6.7m above the surrounding plain. As the name says, the shape of the tell is characterised by its flat surface of approximately 18,000m² at its base. Its steep sides show a step probably indicating the start of the Early Bronze Age settlement sequence after a hiatus which followed the early Late Neolithic period.

Platia Magoula Zarkou is located on the western fringes of western Thessaly in the Peneiada Valley which is situated between the two reaches that cross the wide Karditsa and Larissa plains. In this area, the Peneios River flows along a narrow alluvial plain, ranging from 0.5 to 3km in width and bordered by the rocky mountain slopes of the Zarkou Mountains, a prolongation of the Antichasia Mountains to the south and Mount Titanos, which during Neolithic times was covered by dense vegetation.¹¹³⁹ The average slope of the alluvial plain is extremely low, and the Peneiada Valley is characterised by numerous, either active or abandoned meanders.¹¹⁴⁰

Due to river incision, during the Neolithic period the Peneiada Valley transformed from lacustrine-marshy conditions to the permanently established eastward water drainage, so that for a part of the year the Peneiada Valley was dry, while at least during the winter and early spring months, it was a marshy lake. Thus, PMZ was established on an active floodplain with frequent flooding of the surroundings, i.e. in a coastal setting of a temporary lake. In an area sloping from northwest to southeast, PMZ itself is located at the toe of the widest ejection cone formed along the northern flank of the Peneiada Valley, thus quite safe from flooding.¹¹⁴¹

Furthermore, geophysical analyses proved that two flows of water in two gullies led from the northern mountain range into the plain, circumnavigating the magoula.¹¹⁴² In the initial phase of settlement of PMZ, the occupation was confined to the west bank of the gully and continued in spite of flooding episodes.¹¹⁴³ However, in the course of the occupation and growing of the tell, these gullies were filled in.¹¹⁴⁴ Although PMZ was generally quite safe, in the case of exceptional events like flash floods emanating from the northern mountain range, the destructive power of these natural phenomena could have been locally catastrophic and could have potentially forced the Neolithic community to move away from the site.¹¹⁴⁵ However, such a scenario is not proven

¹¹³⁹ Halstead 1984, 2, 7.

¹¹⁴⁰ Caputo et al., this volume, 47–48.

¹¹⁴¹ Caputo et al., this volume, 75, 77–78; Sarris et al., this volume, Fig. II.2.13.

¹¹⁴² Sarris et al., this volume, 75; one of the gullies has already been recognised by van Andel et al. 1995, fig. 10.

¹¹⁴³ Toufexis – Batzelas, this volume, 137.

¹¹⁴⁴ Sarris et al., this volume, 78.

¹¹⁴⁵ Caputo et al., this volume, 48.

by archaeological evidence, at least not to a sufficient extent to be registered in the archaeological findings of the site.¹¹⁴⁶

X.1.2. The Constructed Area around the Tell

The Cemetery

PMZ is one of the few Neolithic settlements with a cemetery in its neighbourhood. It is a cremation cemetery, located about 300m north of the magoula. Excavations in 1974 and 1976 produced 67 cremation urns of individuals placed singly and dating to the beginning of the Late Neolithic period,¹¹⁴⁷ according to the pottery, at that time synchronous with the tell settlement. Furthermore, the tell and the cemetery are connected by two figurines of the same type. Although the pottery points to synchronisms with Building Phase (BPh) VIII, i.e. LN I, one of the figurines from the cemetery is similar to the figurines in the house model,¹¹⁴⁸ which was found in an earlier level, Building Subphase (BSP) VIIa, and is dated to the transition from MN III to LN I.¹¹⁴⁹ Therefore, if the figurine is not a heirloom, it could point to a longer use of the cemetery than previously estimated.

Like the tell, this burial ground was most likely located on an elevated geological formation at the border of the flooding zone.¹¹⁵⁰ Furthermore, geophysical investigations showed round anomalies of 1–1.5m diameter or even larger about 60m southeast of the excavated cemetery.¹¹⁵¹ Unfortunately, it cannot be proven that these remains belong to the cemetery and point to an extension of the cemetery to the south. However, if these remains are attached to the burial ground this would mean that the number of graves was considerably larger than previously thought.

The Enclosures of the Tell Settlement

According to the geophysical prospection, a number of curvilinear structures on the west, south and east sides of the tell followed the contour of the magoula and may represent concentric ditches surrounding the tell and dating to the Neolithic period.¹¹⁵² According to the survey in the fields around the magoula, we do not expect any Neolithic habitation outside these ditches, and building activity in the zones below the magoula, mainly located north, northwest and south, probably dates to the Bronze Age period.

Another ditch was excavated in Trench A during the last year of the excavations.¹¹⁵³ The structure is situated in the northern centre and in the lowermost layer of the tell, so that it must belong to the earliest settlement phase of the site, BPh I, with a calibrated absolute date of 5969–5754 calBC (2 σ)/5889–5805 calBC (1 σ). It is probably related to one of the geophysically detected ditches, and in that case encircled the eastern part of the site. In that case, the first settlement may have been slightly dislocated to the east, and perhaps more dispersed in comparison to the more compact habitation of the later settlement phases.¹¹⁵⁴

¹¹⁴⁶ Toufexis – Batzelas, this volume, 137.

¹¹⁴⁷ Gallis 1982; for a comparative analysis see Fowler 2004, 54–58.

¹¹⁴⁸ Gallis 2001. Otherwise, this figurine could also represent an older object in the case of an heirloom. Alram-Stern, this volume, 538, Fig. VI.31.

¹¹⁴⁹ Cf. Alram-Stern, this volume, 468–470.

¹¹⁵⁰ Sarris et al., this volume, 72–75 in accordance with conclusions drawn by Caputo et al., this volume, 48; see also van Andel et al. 1995, 138–140.

¹¹⁵¹ Sarris et al., this volume, 72–75, Figs. II.2.10–11.

¹¹⁵² Sarris et al., this volume, 79–80, Fig. II.2.12, Fig. II.2.13. Souvatzi, this volume, 593–594.

¹¹⁵³ For the stratigraphy of Trench A see below, 611.

¹¹⁵⁴ Souvatzi, this volume, 593–594.

The ditches may have fulfilled several functions, among other things acting as counter measures against flooding episodes, including drainage and irrigation,¹¹⁵⁵ but also as demarcation boundaries of the site. These large-scale constructions also had a social and a symbolic character as markers of collective identity.¹¹⁵⁶

X.2. Stratigraphy and Architecture

X.2.1. The Excavations of Platia Magoula Zarkou: Premises and Procedure

When the Late Neolithic cremation cemetery of PMZ was excavated, it produced pottery types which belonged to the start of the Late Neolithic period (Tsangli phase) as well as pottery, which had originally been considered to belong to the end of the Late Neolithic sequence, i.e. to a phase which Milošević had called the ‘Larissa phase’.¹¹⁵⁷ Therefore, in 1976 a stratigraphic excavation on the nearby tell of PMZ was planned to clarify the correct chronological position of the ‘Larissa Culture’.¹¹⁵⁸

In consequence, a trench (A) of a comparatively small size of 5 × 8m was laid out on the highest point of the tell and was excavated to the virgin soil, step by step becoming as narrow as 2 × 2m at its deepest point. The trench showed that the tell consists of c. 10.00m human deposits, 5.8m of which are assigned to the Middle and early Late Neolithic (Tsangli) periods, the remainder to the Early and Middle Bronze Age. For the so-called Larissa pottery, it was proven that the pottery actually belonged to the Tsangli phase; in consequence, this first phase of the Late Neolithic in Thessaly was called the ‘Tsangli-Larissa’ phase.

X.2.2. The Stratigraphic and Architectural Sequence

While the preliminary publications concentrated on the pottery,¹¹⁵⁹ this final publication presents the stratigraphic sequence as the backbone for a better understanding of the site, as well as the change seen in the archaeological finds over time. Therefore, the development of pottery wares and shapes in particular, but also of all other find categories is fixed in this new framework. The excavation units and structural remains were restudied and attributed to 185 stratigraphic units (SU). Based on floors and/or activity surfaces referred to as ‘surfaces’ and destruction layers, as well as changes in the use of space and in the architectural features, nine building phases (BPh I–IX) are discerned, some of which, with two to five subphases (BSPH), correspond to Ceramic Horizons 1–6. The stratigraphic sequence shows no signs of interruptions throughout the thick Neolithic deposits, i.e., no gap in the settlement’s occupation was observed.

To the earliest BPh I was attributed a part of a shallow ditch dug into the alluvial ground, whilst ditches were not encountered in other phases. According to the geophysical studies this ditch was possibly the eastern limit of the earliest settlement. According to pottery and radiocarbon data, this building phase did not start as early as the Early Neolithic¹¹⁶⁰ but in an early phase of the Middle Neolithic period, i.e. MN I.¹¹⁶¹

¹¹⁵⁵ For a discussion of the role of the ditches especially in Thessaly but also elsewhere in Greece and Balkans see Chondrogianni-Metoki 2009, 526–537; Toufexis 2017, 323–327; Pappa 2020, 267–269; for the role of such enclosures see also Souvatzi, this volume, 594–596.

¹¹⁵⁶ Souvatzi, this volume, 596.

¹¹⁵⁷ Milošević 1960, 19; Hauptmann 1981, 99–110.

¹¹⁵⁸ Gallis 1985a; Gallis 1987.

¹¹⁵⁹ Demoule et al. 1988; Schneider et al. 1991.

¹¹⁶⁰ In his first reports, Gallis has dated the earliest phase of PMZ to the end of the Early Neolithic period or at least into the transition from Early to Middle Neolithic: Gallis 1996, 523.

¹¹⁶¹ For radiocarbon chronology see below as well as Weninger, this volume, 183–195; for pottery see Pentedeka in press.

Above BPh II, in which there was no architectural evidence, a sequence of three building sub-phases was identified (BSPh IIIa–c) showing wall remains. BSPh IIIa produced a wall built with posts and abundant clay, probably in a combined *pisé* and timber technique; BSPh IIIb is defined by a sequence of layers originating mainly from fire and refuse dumping; and BSPh IIIc showed a posthole and a probable clay wall. BPh IV comprises remains of two superimposed houses. For BSPh IVa the northern wall of a house, built of mud/mudbrick on a single layer of field stones, and its interior with an oven, a pebbled working surface and a quern found in situ were revealed. Exactly above this wall, another wall of similar construction was erected (BSPh IVb), so that the two houses shared their orientation and alignment.

In contrast, BPh V consisted of five BSPh (Va–e) in which the excavated area has been considered as corresponding to open or semi-open spaces between houses. During all these subphases, the domestic spaces were equipped with thermal structures, i.e. fire pits, hearths and ovens, one of which was accompanied by a clay platform.

During BPh VI (BSPh VIa–b), the excavated area again corresponded to a roofed space, enclosed by thin walls defining areas in a kind of an auxiliary annex to a house used for cooking and storage.

From BPh VII onwards, a large part of the excavated area was destroyed by an Early Bronze Age pit. For BPh VII three building subphases were discerned (BSPh VIIa–c) on the basis of three corresponding ‘surfaces’. The eastern part of the trench seemingly corresponded throughout the subphases to a roofed space, while the western part represented an open space. During BSPh VIIa, a thermal structure, a pit and two postholes were found. When the thermal structure ceased to be used and the pit was filled, another thermal structure was built above the pit and a storage vessel was placed very close to it. A potential thermal structure also existed in the opposite southern corner of the trench. The well-known house model was found in the uppermost part of the destruction layer of a house in BSPh VIIa and was associated with this subphase. Furthermore, its proximity to these thermal structures may highlight their symbolic significance in daily life. BSPh VIIb also produced a hearth, found a little bit higher than the house model but still close to it, and two postholes. To BSPh VIIc were assigned two shallow pits and a part of a post-built wall. All in all, this building phase was the richest with regard to small finds, and their relation to the built space will be discussed below.

BPh VIII was connected to very flimsy building remains, and only one thermal structure and two adjacent pits also cutting the ‘surface’ of the previous BSPh VIIc were encountered. The presence of these pits as well as the lack of architecture is evidence that this area was unroofed. The last BPh IX consisted of only one ‘surface’, but the overlying deposits contained mixed LN I and Early Bronze Age material and the Early Bronze Age deposits followed without the intervention of any sterile layer.

X.2.3. Built and Open Space, Construction Techniques and Levelling Activities

For the ditch found in BPh I, it is not certain whether it constituted the external boundary of the initial settlement or divided its domestic space, nor could its contemporaneity to the other Neolithic ditches detected by the geophysical inspection be ascertained. Ditches and enclosures in general have had a significant role in the organisation of the domestic space in tells and flat sites in Thessaly and also elsewhere. Among their several functions, drainage and protecting the settlement from flooding were of primary importance, particularly in settlements located in floodplains, like PMZ.

Regarding the domestic space and the building methods used in PMZ, we were able to observe tendencies of variability and differentiation as well as stability and continuity, bearing in mind, though, that the excavated area was very small and the picture that thus emerged should not be extrapolated for the wider settlement. According to the existing evidence, the domestic space

was characterised throughout the building phases by an alternation of built and open/semi-open areas which were best exemplified in BPh III, IV and VI. In BSPh IIIb a seemingly open-air area in which open fires were repeatedly set, succeeded an area occupied by a house in the previous BSPh IIIa. Similarly, the house in BSPh IVa was erected in an area which showed little evidence of building in BSPh IIIc, while in BPh V open yards or semi-open-air areas were found above the houses of BPh IV. In BPh VI the use of space changed again and the excavated area was covered by buildings, as also happened in BPh VII. In BPh VIII the largely homogeneous deposits where no architecture was found except one thermal structure, succeeded the burnt buildings of BPh VII and probably marked broader changes in the organisation of the domestic space. On the other hand, the vertical building of houses in BPh IV (MN II) and VI (MN III), an otherwise common characteristic in tells, and the longevity of similar activities in the same area, whether open yards, roofed spaces or thermal structures, signified decisions for continuation and stability in the organisation of the domestic space.

The rectilinear lines of the walls indicate that houses were rectangular in plan but no house plans could be retrieved. However, in BPh VI (MN III) small auxiliary buildings associated with and/or annexed to houses were suggested. BPh VI and VII (MN III–LN I) were distinctive in that their buildings were burnt, while the houses of the previous phases were not. The known clay house model was found in BSPh VIIa and had been meticulously deposited in the burnt rubble of a house. Apart from other connotations, it might be related to abandonment rites referring to the end of the life cycle of the house as its specific analysis in this volume showed.

In a wider perspective, PMZ, like other Thessalian tells, is not characterised by the austere organisation of the domestic space and uniformity of the house plans encountered in the tells of Anatolia and the Balkans.

Thermal structures (hearths, ovens and fire pits) were found inside houses, potential auxiliary buildings and in open/semi-open areas or yards. If the latter did not constitute the private yards of individual houses, these thermal structures might have been used by several households, strengthening the esteem of social cohesion and communality among them. BPh V, where yards have been identified throughout all its subphases, yielded the majority of thermal structures sometimes grouped in small clusters of two, indicating functional complementarity to one another. The vertical building of several structures, their allocation in adjacent areas and the successive renewals of their floors imply an effort towards continuity in the use of the domestic space, as mentioned above.

When it comes to the building methods, variability and continuity was also attested, as for other MN tells in Thessaly. The most obvious changes were encountered in MN I, in which the houses in BSPh IIIa were probably built with a combined *pisé* and timber technique, whereas in BPh IV they were built with the ‘stone and mud/mudbrick’ technique. In MN II (BPh V) the few postholes found were probably associated with light wooden structures that existed in yards or semi-open areas, whereas in MN III (BPh VI) the wattle and daub technique was probably implemented for the construction of thin walls of potential small auxiliary buildings associated with and/or annexed to houses. The existing evidence shows that post-built houses also existed in the transitional phase between MN III and LN I as well as in LN I, namely in BSPh VIIa and VIIc, respectively.

With the exception of the MN I building phase, presenting a gentle inclination, the noticeably horizontal lay of the deposits throughout the building phases of MN II–LN I phases and the generally thin layers intervening between the successive indoor or outdoor floors indicate that levelling activities took place widely and systematically in the settlement due to the restricted habitation area of the tell. This might also account for the restricted concentrations of burnt pieces of clay found in buildings destroyed by fire as these were removed or spread around houses through levelling activities in order to provide space for new buildings or yards.

X.3. Relative and Absolute Chronology

X.3.1. Radiocarbon Dating and Relative Chronology

In the course of the PMZ project, twenty-one samples were taken and analysed at the REM laboratory in Mannheim.¹¹⁶² The aim of this sampling was to cover the sequence of all building phases, for their synchronisation with other parts of Thessaly in terms of absolute chronology. As a result, only eighteen samples were obtained, three samples, however, had too little collagen to be used. Of the remaining eighteen samples, five were taken from Early Bronze Age layers. Of the other thirteen samples, three from upper Neolithic strata are outliers, belonging to the Early Bronze Age and pointing to Early Bronze Age intrusions from the Neolithic levels of BSPH VIb onwards. In consequence, ten short-lived samples taken from animal bones are relevant for the Neolithic sequence, and the radiocarbon sequence for the last Neolithic layers is not complete, although the samples constitute a well-established sequence of data. For a sequencing of the ten new, short-lived data, Weninger used Gaussian Monte Carlo Wiggle Matching, which puts the data into a linear sequence through probability calculation and by following the stratigraphy.¹¹⁶³ Previously, four samples of charcoal were analysed during the geological investigations by van Andel and re-evaluated by Reingruber et al.;¹¹⁶⁴ these samples will be considered below.

Since the absolute chronology is always connected to a relative chronology, which is traditionally defined by the ceramic sequence, we have to consider our data in context with the pottery of PMZ. As Demoule has already pointed out,¹¹⁶⁵ the sequence of PMZ also makes us rethink the relative chronology mainly based on the excavations in eastern Thessaly by Miložčić.¹¹⁶⁶ In general, in Thessaly the Middle Neolithic period is defined by the occurrence of red pattern painted ware and ‘scraped ware’¹¹⁶⁷ as well as impressed wares,¹¹⁶⁸ which already start during the Early Neolithic period and continue during the Middle Neolithic period.¹¹⁶⁹ However, in contrast to eastern Thessaly, in western Thessaly a gradual development of monochrome and patterned grey on grey ware, starting as ‘protogrey ware’ already plays a decisive role during the Middle Neolithic period.¹¹⁷⁰ With the start of the LN I phases, black and brown burnished wares¹¹⁷¹ as well as matt-painted, black on red and polychrome wares appear.¹¹⁷²

Within the framework of the PMZ publication project, Pentedeka has sequenced the stratigraphic ‘building phases’ into six Ceramic Horizons, based on these characteristic wares in their percentages within the contexts.¹¹⁷³ Ceramic Horizon 1, which includes BPh I–IV, is characterised by red painted wares, including the so-called scraped ware.¹¹⁷⁴ During Ceramic Horizon 2, including

¹¹⁶² REM – Klaus-Tschira-Archäometrie-Zentrum der Universität Heidelberg.

¹¹⁶³ See Weninger, this volume, Fig. IV.6.

¹¹⁶⁴ Van Andel et al. 1995, 137; Reingruber et al. 2017, 44.

¹¹⁶⁵ Demoule et al. 1988.

¹¹⁶⁶ Otzaki: Hauptmann 1981; Mottier 1981, 57–59; Arapi: Hauptmann – Miložčić 1969; Sesklo: Kotsakis 2006, 207–220.

¹¹⁶⁷ Demoule et al. 1988, 9–16; Otzaki: Mottier 1981, 28–36.

¹¹⁶⁸ Demoule et al. 1988, 41; Otzaki: Mottier 1981, 20–27.

¹¹⁶⁹ Miložčić – Miložčić-von Zumbusch 1971, 73–80.

¹¹⁷⁰ Demoule et al. 1988, 17–23.

¹¹⁷¹ With the help of the stratigraphy of PMZ, Gallis was able to attribute the black burnished ‘Larissa’ ware to the start of the Late Neolithic period: Gallis 1985b; Gallis 1987.

¹¹⁷² Demoule et al. 1988, 23–40; Arapi Magoula: Hauptmann – Miložčić 1969, 19–35.

¹¹⁷³ Pentedeka et al. 2019; Pentedeka in press. The results will be presented to the public in a separate volume of the PMZ publication series: Pentedeka in preparation.

¹¹⁷⁴ Renamed by Pentedeka as ‘painted ware with blurred outline’: Pentedeka et al. 2019; Pentedeka in press; Pentedeka in preparation.

BSPH Va–c, white-on-red painted wares appear. ‘Protogrey wares’ in various versions,¹¹⁷⁵ already appear at the start of the Middle Neolithic sequence of PMZ, but they become more abundant from Ceramic Horizon 3 onwards, i.e. BSPH Vd–e. During Ceramic Horizon 4, i.e. BPH VI, of the red painted wares, the so-called scraped ware and flame patterned wares are still present, but this phase also shows for the first time very low numbers of those wares which are characteristic for the Late Neolithic period, i.e. black burnished ware and early versions of black on red and polychrome wares. During Ceramic Horizon 5, i.e. BSPH VIIa, interpreted as transitional MN III/LN I horizon, grey ware becomes of higher importance, and the Late Neolithic Ceramic Horizon 6, i.e. BSPH VIIb–c, BPH VIII and IX, includes all wares which we traditionally identify as early Late Neolithic (‘Tsangli’) phase pottery, including grey ware as well as matt-painted and bichrome wares.

In the course of the first study of the pottery, Gallis defined a separate chronological phase based on the appearance of the ‘protogrey ware’ from a depth of 8–5.60/5.15m, and called this period the ‘Zarko Phase’, to be characteristic for western Thessaly.¹¹⁷⁶ However, the quantitative analysis of this project has shown the gradual appearance of the ‘protogrey ware’, and its abundance already during Ceramic Horizon 3 and subsequently during Ceramic Horizon 4. Therefore, the term ‘Zarko Phase’ would be appropriate for the layers of Ceramic Horizons 3 and 4, which are still of true Middle Neolithic character.¹¹⁷⁷

For absolute chronology, Reingruber has defined the start of the Middle Neolithic period with the appearance of red pattern painted pottery as well as a number of new pottery shapes in Greece in about 6000 BC.¹¹⁷⁸ At PMZ the very first Ceramic Horizon 1 already includes all red pattern painted wares characteristic for the Middle Neolithic period as well as some impressed ware. The first date from the ditch, 5969–5754 calBC (2 σ)/5889–5805 calBC (1 σ) or, if we accept wiggle matching, even as early as 5896 \pm 14 calBC, speaks in favour of this chronological classification, too. For Ceramic Horizon 1, this first date from the ditch is followed by a date of 5895–5742 calBC (2 σ)/5876–5781 calBC (1 σ) from the layer above the ditch, i.e. a little younger than the ditch. BSPH IIIb (5895–5742 calBC [2 σ]; 5876–5782 calBC [1 σ]) and (5867–5714 calBC [2 σ]; 5799–5729 calBC [1 σ]), wiggle matched 5825 \pm 8 calBC and 5815 \pm 8 calBC, respectively, also belong to the same ceramic horizon. When not wiggle-matched, the latter date is astonishingly young, also if we compare it to the following two dates, and we should not ignore the possibility that it comes from a higher level.

These dates synchronize nicely with the charcoal samples from the same layers of PMZ, dating between 5840 BC and 5790 BC (oxcal median) used by Reingruber et al. for their definition of the Middle Neolithic sequence in Thessaly and provided to us for this chapter:¹¹⁷⁹

“Four dates were obtained on charcoal, all samples deriving from contexts assigned to phase III.¹¹⁸⁰ Calibrated, they cover in the 1-sigma range a time span between 5900 and 5740 calBC – according to the median values, their best estimates are between 5840 and 5790 calBC. The upper limit is to be regarded as a terminus post quem, as there are no determinations of the wood species available. However, since the data on charcoal are in good agreement with the new data on bone, the old-wood effect may be negligible.”

¹¹⁷⁵ The so-called ‘protogrey ware’ combines forms and designs which are mainly known from the pottery with red decoration and blurred outline, with the newly developed technologies resulting in a grey clay body and a grey surface, see Demoule et al. 1988, 17–19.

¹¹⁷⁶ Demoule et al. 1988, 50; Gallis 1996, 525.

¹¹⁷⁷ Pentedeka et al. 2019; Pentedeka in press; Pentedeka in preparation.

¹¹⁷⁸ Reingruber 2008, 214–216.

¹¹⁷⁹ We are grateful to Agathe Reingruber to provide us with this personal communication (19/10/2019, after Reingruber et al. 2017, 44, fig. 13).

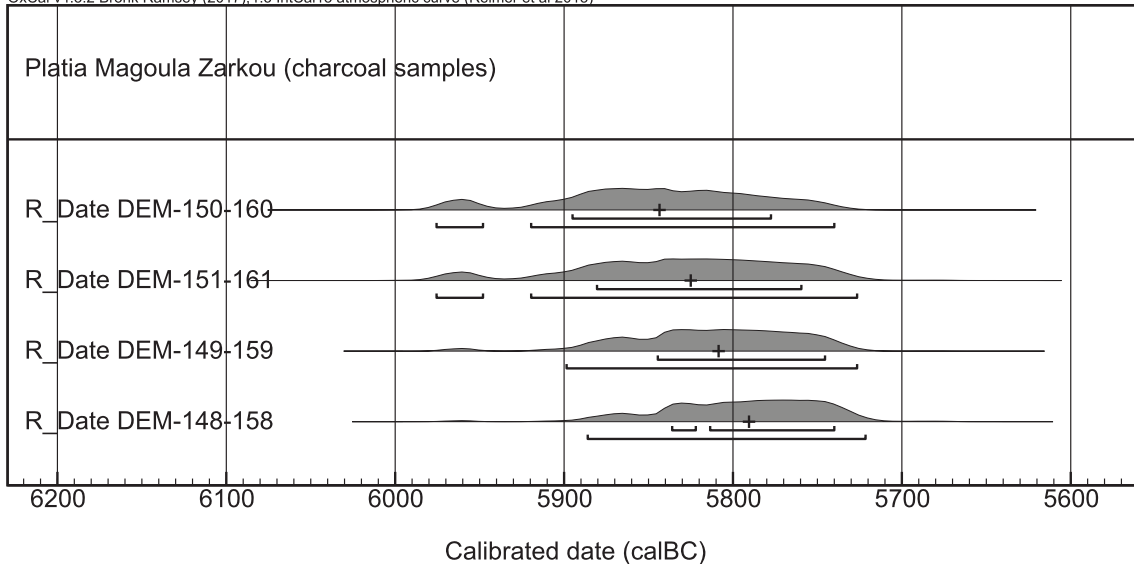
¹¹⁸⁰ Gallis 1995, 214; Gallis 1996, 540, fig. 3.

Tab. X.1 Radiocarbon data on charcoal obtained from drilling by T. van Andel in the year 1990 in the oldest settlement phases of PMZ (after Gallis 1995)

Lab. No.	BP	+/-	calBC 1 σ	calBC 1 σ	calBC 2 σ	calBC 2 σ	Oxcal median	Depth [cm]	Prov. Trench A	BPh	Material
DEM-150-160	6963	43	5900	5770	5980	5740	5840	866	BF27	III	Charcoal
DEM-151-161	6945	51	5890	5760	5980	5720	5830	897	BF28	III	Charcoal
DEM-149-159	6932	39	5850	5740	5900	5720	5810	850	BF27	III	Charcoal
DEM-148-158	6912	40	5840	5740	5890	5720	5790	852	BF27	III	Charcoal

Tab. X.2 Radiocarbon data on charcoal from the oldest settlement phases of PMZ, calibrated IntCal13 (after Reingruber et al. 2017, 44, fig. 13)

OxCal v4.3.2 Bronk Ramsey (2017); r5 IntCal13 atmospheric curve (Reimer et al 2013)



The youngest phase of this ceramic horizon is BSPH IVb (2σ : 5887–5740 calBC; 1σ : 5844–5759 calBC), wiggle matched 5759 ± 4 calBC. Therefore, Ceramic Horizon 1, and in consequence BPh I–IV, belong to the time from 5900 (5969–5754 calBC [2σ]/5889–5805 calBC [1σ]) at the earliest until 5760 (5887–5740 calBC [2σ]/5844–5759 calBC [1σ]) at the latest. By comparing these data with the newly interpreted data from Achilleion IVa, these two phases should be synchronised and fit into the phase which has been called MN I. Furthermore, data from the Theopetra Cave, the Cyclops Cave, Koutroulou Magoula, Sykeon, Imvrou Pigadi and Lake Plastiras fit to the same horizon.¹¹⁸¹ However, for Achilleion a re-study of stratigraphy may produce a totally different picture of pottery types, and for the other sites, pottery is still unpublished.

For the following MN II, PMZ offers a more subtle chronology, since Pentedeka was able to distinguish two ceramic horizons (2 and 3). BSPH Va (Ceramic Horizon 2) has produced a single date of 5895–5732 calBC (2σ)/5845–5751 calBC (1σ), wiggle matched 5742 ± 4 calBC. This date for BSPH Va suspiciously coincides with the date of BSPH IVb, whilst there is a big difference

¹¹⁸¹ Reingruber et al. 2017, 42–45, fig. 10.

from the date of BSPH Vd (2σ : 5804–5667 calBC; 1σ : 5767–5709 calBC). However, when dealing with bone, we should consider the possibility that it might have been dislocated. For Ceramic Horizon 3 (including BSPH Vd and Ve) the date of BSPH Vd, 5804–5667 calBC (2σ)/5767–5709 calBC (1σ) is significantly younger than the previous one. However, if the date of BSPH Va is dislocated, the subsequent date of BSPH Vd 5733 ± 34 calBC would fit well with the sequence. Comparing the data of PMZ with data from Sesklo, Theopetra, Ag. Petros and Achilleion IVb, they start during the same period of time, as Reingruber et al. have suggested.¹¹⁸² In consequence, according to the PalCal calibration and Monte Carlo wiggle matching, MN II (Ceramic Horizon 2 and 3) dates between 5742 (± 4 calBC wiggle matched) and 5690 the latest (5733 ± 34 calBC). Processed by oxcal, BSPH Va–d dates (Ceramic Horizon 2 and 3) fall into 5730–5660 (2σ)/5770–5700 (1σ) calBC. Allowing for another 20–40 years for BSPH Ve, for which no date is available, the time span of the MN II phase in PMZ fits well with the estimation by Reingruber et al. (5750–5600 calBC),¹¹⁸³ but according to our date it could also end earlier.

According to the pottery, Ceramic Horizon 4, including BPh VI, belongs to the MN III phase, and a sample from BSPH VIb is dated to 5837–5681 calBC (2σ)/5773–5720 calBC (1σ), wiggle matched 5657 ± 1 calBC. In relation to BSPH Vd this date is too high, and at least 50 years higher than proposed by Reingruber et al. For Ceramic Horizon 5 (BSPH VIIa), which, according to the pottery, should be the transitional Middle Neolithic/LN I phase of PMZ, no radiocarbon date is available. The date of the following BSPH VIIb, to be discussed below, is unexpectedly high, and we cannot exclude that is erroneous and that the MN III phase lasted longer than our sequence of radiocarbon data would suggest. So, the transitional BSPH VIIa may be closer to the start of LN I, as proposed by Reingruber et al. at about 5500 BC.¹¹⁸⁴ This effect is also accentuated by the wiggle-matching as proposed by Weninger et al.¹¹⁸⁵

Ceramic Horizon 6 (BSPH VIIb–c, BPh VIII, IX) shows all characteristics of LN I ('Tsangli-Larissa phase') pottery. However, the earliest Late Neolithic BSPH VIIb of 5629–5531 calBC (2σ)/5620–5560 calBC (1σ), wiggle matched 5619 ± 2 , has a comparatively high date and fits more into the time span of MN III in Reingruber et al. (5600–5500 calBC). When we look at the length of the curve, it could, however, be closer to the end date of our sequence from BSPH VIIc. In any case, with the date of BSPH VIIc of 5545–5472 calBC (2σ)/5513–5478 calBC (1σ) (probably the wiggle matching result of 5601 ± 4 is too high), we have a date which already fits to the start of LN I as defined by Reingruber et al. 2017. In consequence, we would suggest that LN I actually starts in 5520/5550 calBC, i.e. before 5500 BC, in contrast to what is suggested by the data from Makrychori, Theopetra and Prodromos-Ag. Ioannis.¹¹⁸⁶

Unfortunately, no significant data were taken for BPh VIII, which represents the last well-established early Late Neolithic building phase of PMZ, as this phase is already highly eroded, and Building Phase IX has no architectural remains at all.

The radiocarbon sampling of the site produced three outliers dating to the EH II, one from BSPH VIb (MAMS-32122: 2546–2351 calBC [1σ] on a seed), one from BSPH VIIa (MAMS-32121: 2487–2350 calBC [1σ]), and one from BPh VIII (MAMS-32118: 2448–2234 calBC [1σ]). Therefore, we have to argue that from BSPH VIb onwards Early Bronze Age disturbances occurred at the site. This picture is confirmed by the occurrence of a spindle whorl of Bronze Age type in BPh VIII (PM0348).

Since no Neolithic pottery dating later than LN I was uncovered in the entire site of PMZ, and the earliest pottery of the following phase comes from EH II, we argue that the interruption of strata between LN I and EH II, as documented in trench A, derives from a settlement hiatus.

¹¹⁸² Reingruber et al. 2017, 42–46, fig. 15.

¹¹⁸³ Reingruber et al. 2017, 50.

¹¹⁸⁴ Reingruber et al. 2017, 45.

¹¹⁸⁵ Weninger et al., this volume, 194–195.

¹¹⁸⁶ Reingruber et al. 2017, 45–46, fig. 15.

Tab. X.3 Chronological sequence of PMZ according to the radiocarbon data, stratigraphy and periodization of pottery, tools, figurines and ornaments (E. Alram-Stern, G. Tourfexis)

Thessaly, Neolithic periods (Reingruber et al. 2017)	Thessaly, absolute chronology calBC 1 σ (Reingruber et al. 2017)	PMZ data, calBC 1 σ (Reingruber et al. 2017)	PMZ MAMS data [calBC 2 σ]	PMZ MAMS data [calBC 1 σ]	PMZ Best Fit [calBC] 95% GaussWM	PMZ BPh/ BSpH	PMZ Ceramic Horizon	PMZ Lithic Phase	PMZ Figurine Horizon	Textile tools, tools of clay/sherd tools, chipped stone, ornaments
MN I	5980		MAMS-32133 5969–5754	MAMS-32133 5889–5805	5896 \pm 14	BPh I	1	1	1	Perforated sherd discs ornament of stone
			MAMS-32131 5895–5742	MAMS-32131 5889–5805	5865 \pm 12	BPh II				
						BSPH IIIa				
		DEM-150-160: 5900–5770 DEM-151-161: 5890–5760	MAMS-32130 5895–5742 MAMS-32129 5867–5714	MAMS-32130 5876–5782 MAMS-32129 5799–5729	5825 \pm 8 5815 \pm 8	BSPH IIIb				
		DEM-149-159: 5850–5740 DEM-148-158: 5840–5740				BSPH IIIc				
			–	–	–	BSPH IIIId				
			–	–	–	BSPH IVa				
			MAMS-32126 5887–5740	MAMS-32126 5844–5759	5759 \pm 4	BSPH IVb				
MN II	5750		MAMS-32125 5895–5732	MAMS-32125 5845–5751	5742 \pm 4	BSPH Va	2			
			–	–	–	BSPH Vb				
			–	–	–	BSPH Vc				
			MAMS-32124 5804–5667	MAMS-32124 5767–5709	5693 \pm 2	BSPH Vd	3			
					–	BSPH Ve				

Tab. X.3 (continued)

Thessaly, Neolithic periods (Reingruber et al. 2017)	Thessaly, absolute chronology calBC 1 σ (Reingruber et al. 2017)	PMZ data, calBC 1 σ (Reingruber et al. 2017)	PMZ MAMS data [calBC 2 σ]	PMZ MAMS data [calBC 1 σ]	PMZ Best Fit [calBC] 95% GaussWM	PMZ BPh/ BSPH	PMZ Ceramic Horizon	PMZ Lithic Phase	PMZ Figurine Horizon	Textile tools, tools of clay/sherd tools, chipped stone, ornaments
MN III	5600					BSPH VIa	4	2		
			MAMS-32123 5837–5681	MAMS-32123 5773–5720	5657 \pm 1	BSPH VIb				Perforated sherd discs Shell ornaments
End of MN III / start of LN I			–		–	BSPH VIIa	5	3	2	Loom weight Last perforated sherd disc Spondylus shell ornaments incl. barrel-shaped bead Chipped stone: arrow-heads and tools for hide working
Earliest LN I	5500		MAMS-32120 5629–5531	MAMS-32120 5620–5560	5619 \pm 2	BSPH VIIb	6	4		High number of unperforated sherd discs Chipped stone: change of sickle type
LN I			MAMS-32119 5545–5472	MAMS-32119 5513–5478	5601 \pm 4	BSPH VIIc				
			–			BPh VIII	5	3		
		5300 (?)		–						BPh IX

Furthermore, we even cannot exclude the possibility that the settlement at PMZ in LN I (Tsangli-Larissa phase) did not survive until its end in about 5300 BC but may have ended considerably earlier.

X.3.2. Chronology and Phasing Based on Various Artefact Groups

Of special interest is the fact that changes in the use of space and construction techniques were developed equally during the same or different chronological phases as defined above. MN I included the ditch and a sequence of open and built space also showing differentiation in the building techniques (BPh I–IV). MN II coincides with a change in the use of space, the excavated area being turned into an open space (BPh V) and equipped with thermal structures, which acquired a major importance in this phase. On the other hand, MN III yielded buildings probably accompanied by auxiliary annexes (BPh VI). Unfortunately, the transitional Middle Neolithic and earliest Late Neolithic strata (BPh VII–IX) were highly disturbed. During the MN III/LN I transition (BSPH VIIa) and LN I (BSPH VIIb–c and BPh VIII), the excavated area showed buildings next to open spaces or yards (BSPH VIIa–c), whereas in BPh VIII (LN I) a seemingly unroofed and largely homogeneous area was developed (Tab. X.3).

For the chipped stone tools, Perlès has differentiated five lithic phases: From BPh I–V no change in the toolkit is seen, and based on the abundance of flake inserts on sickles these phases are summed up as Lithic Phase 1. Lithic Phase 2 (BPh VI) is discerned by continuity with Lithic Phase I but also by gradual changes in the proportion of flakes, which still predominate over blades. The Lithic Phases 3 (BSPH VIIa) and 4 (BSPH VIIb–c) differ markedly from the previous phases through the emergence of new tool types, used for hide and woodworking as well as for hunting, although flakes continue to constitute the majority of the retouched tools. However, as pointed out by Perlès, in contrast to the pottery, the character of the material is still Middle Neolithic. In contrast to what has been observed in the preceding lithic phases, Lithic Phase 5 (BPh VIII) shows mostly qualitative differences. The raw material of the chipped stone tool kit is characterised by a systematic choice of high quality radiolarite/chocolate chert, the appearance of some new tool types and a drop off, if not disappearance, of obsidian, and the character of the toolkit is to be compared with other Late Neolithic materials in Thessaly. The differentiation in five lithic phases is largely based on quantitative differences. Therefore, alternatively to this scheme, Perlès proposes a tripartite scheme based on qualitative differences. This scheme unites phases 1 and 2 (BPh I–VI) and phases 3 and 4 (BSPH VIIa–c), and only leaves phase 5 (BPh VIII) as a single phase. In this way it coincides with the Middle Neolithic phases as defined by pottery, a transitional Middle Neolithic to LN I phase which, judging by the chipped stone toolkit is still of Middle Neolithic character, and a LN I phase.

A comparable technological change may also be seen in textile tools. While the BPh II–VI (MN I–III) produced perforated sherd discs, possibly used as spindle whorls, the first loom weight comes from BSPH VIIa, and the first spindle whorl is located in BSPH VIIc. Furthermore, unperforated sherd discs, which are tools of unknown use, appear in high numbers during BSPH VIIb, VIIc and BPh VIII. In consequence, we see a dynamic development of textile tools and related implements from BSPH VIIa onward, textile production acquiring major importance in LN I. However, while for the chipped stone tools there is a clear change from a Middle Neolithic to a Late Neolithic toolkit only from BSPH VIIc to BPh VIII, the textile instruments as well as the unperforated sherd discs show a major change with BSPH VIIa and again with VIIb. Therefore, these tools support a phasing which stresses a major change with BSPH VIIa and furthermore, with BSPH VIIb/c.

For the ornaments, during the same period there was a major change in the raw materials. From BSPH VIIa onwards *Spondylus* shell ornaments appear for the first time. Interestingly, from this phase also comes the rare find of a barrel-shaped bead made of *Spondylus* (PM0581) which has its parallels in Late Neolithic contexts. Further *Spondylus* bracelets come from BSPH VIIc

(PM0467) and BPh VIII (PM1001). In consequence, in terms of ornaments, the major change appears from BSpH VIIa onwards.

For figurines, a chronological scheme based on the appearance/disappearance of certain figurine types has been developed: the few fragments of figurines squatting on the floor (Figs. VI.2–3, VI.11) come from MN I and II, and also two fragments of figurines sitting on stools (Figs. VI.4, VI.8) were found in the MN I and II horizons, just one fragment of this type coming from MN III (Fig. VI.16). Therefore, according to our evidence, it seems likely that such figurines, which are abundant all over Thessaly, were typical for the previous Early Neolithic¹¹⁸⁷ and the earlier Middle Neolithic phases, and may be summarized as Horizon 1. Subsequently, with MN III and the transitional MN III/LN I, figurines with incised decoration as well as schematic figurines appear: Three schematic figurines come from MN III (Figs. VI.18–19) as well as from transitional MN III/LN I (Fig. VI.25). To MN III belong the head of a figurine with incised decoration (Fig. VI.15), with parallels outside of Thessaly in the Starčevo-Körös-Cris complex, and the leg of a standing figurine (Fig. VI.21). The house model and its contents (Figs. VI.27–37) and a plaque with incised decoration (Fig. VI.26) were found in the transitional MN III/LN I phase. Therefore, from the point of view of sequencing figurines, MN III and the transitional phase MN III/LN I should be understood as Horizon 2, representing a period of new influences which were perhaps responsible for the dynamic cultural development of this period.¹¹⁸⁸ The last development of figurines of the site, most probably dating to LN I (Tsangli-Larissa Phase), is only present in the upper, mixed context. It includes two figurines (Figs. VI.38, VI.40) and is summed up as Horizon 3.

X.4. The Evidence for Subsistence

In general, as has been shown from archaeobotanical studies at other sites, agriculture at PMZ must have been based on domesticated plants,¹¹⁸⁹ i.e. the cultivation of grains and pulses, and a rare use of collected plants.¹¹⁹⁰ In the Neolithic layers of PMZ, charred plant remains are limited to small amounts of *Vicia ervilia* (bitter vetch) which may have been detoxified for human consumption. For PMZ the importance of grains has been proven by the abundance of sickle inserts in the chipped stone material.¹¹⁹¹

During the 1990s van Andel et al. argued that seasonal flooding due to winter/early spring rains enforced a seasonal abandonment of the site and agriculture only took place outside the flood season. Instead of rain-fed agriculture, the seasonal flooding may have given the opportunity for post-flood cultivation or floodwater farming.¹¹⁹² However, new geological research points out that the magoula was situated in a safe location at the toe of the widest sloping ejection cone formed along the northern flank of the Peneiada Valley and was most probably not exposed to flood water,¹¹⁹³ so that it was perennially inhabited. Farming land was probably established north of the settlement, in an area which was not affected by flooding.¹¹⁹⁴ In addition, Halstead points out that pulses in particular point to a small-scale, horticultural economy.¹¹⁹⁵ A year-round occupation of the site is further confirmed by the slaughter of young domesticated animals in late winter/early spring as well as by the stratigraphy of the tell, which does not point to any interruption in the use of the tell settlement.

¹¹⁸⁷ Chourmouziadis 1994, 82.

¹¹⁸⁸ Alram-Stern, this volume, 460–462.

¹¹⁸⁹ Halstead, this volume, 583–587.

¹¹⁹⁰ Valamoti 2015.

¹¹⁹¹ Perlès – Papagiannaki, this volume, 266–272; see also below.

¹¹⁹² Van Andel et al. 1995, 138–140.

¹¹⁹³ Caputo, this volume, 48.

¹¹⁹⁴ Caputo, this volume, 48; Toufexis – Batzelas, this volume, 137.

¹¹⁹⁵ Halstead, this volume, 585.

For animal husbandry, the slaughter age of domesticated animals points to the consumption of meat and, to a limited extent, of milk. Furthermore, the presence of some young animals in late winter does not support the idea of mobile herding. This assumption is confirmed by the fact that humans from lowland villages seem to have consumed similar amounts of animal proteins as cave sites.¹¹⁹⁶ Another argument against mobile herding in the context of PMZ is the marshy environment near PMZ which might also allow grazing in summer. Becker's studies on cut marks on domesticated and wild animals prove that there must have been rules in sharing carcasses.¹¹⁹⁷

X.5. The Finds

X.5.1. The Activities at the Site Based on the Evidence of the Toolkit

For subsistence activities, the toolkit of PMZ gives information on harvesting. The chipped stone tool assemblage is characterised by sickle elements made either of flakes (mostly in the Middle Neolithic BPh I–III) or of blades. According to use-wear analysis, they were used on low-cut, dry or semi-dry cereals,¹¹⁹⁸ proving that they were used on domesticated cereals which were more profitably harvested in a ripe state. Such harvesting tools clearly dominate during the first four lithic phases, i.e. the Middle and transitional Middle to Late Neolithic phases, but are also present during the last Lithic Phase 5 (LN I). Therefore, we may argue that agriculture was of highest importance for the site. Two types of sickles are differentiated, which points to a change of sickle types during the late Middle Neolithic period: during Lithic Phases 1–3 the characteristic curved denticulated sickles were made of small flake inserts inserted obliquely into the haft. This type, quite similar to the so-called 'Karanovo sickle',¹¹⁹⁹ is hardly comparable to other Thessalian sites. From Lithic Phases 4 and 5 onwards, sickle inserts made on larger, but still curved blades and belonging to larger sickles with a straight working edge became common. Since the larger sickles on blades need fewer inserts, this change of sickle type also explains the smaller number of (blade) inserts in the later phases in comparison to the larger number of (flake) inserts in the Middle Neolithic assemblage. The evidence on sickles coincides with the plant remains known from Neolithic settlements¹²⁰⁰ in Thessaly as well as with the environmental conditions, which were ideal for agriculture.¹²⁰¹ According to the use-wear analysis, two inserts from Lithic Phases 1 and 5 may have been used as inserts of a threshing board. The presence of such innovation may be associated with the increased amount of grain to be processed, possibly in relation to the need for massive quantities of chopped stems.¹²⁰²

Evidence for food preparation comes from grinding tools, i.e. grinding slabs and grinders. We observe certain differences between the Middle Neolithic toolkit and the one used during the Late Neolithic period: during the Middle Neolithic period both smaller and larger grinding stones are present, while the toolkit of the Late Neolithic period is limited to larger items. According to ethnographic parallels the larger tools were used for grinding grain, while the smaller toolkit was used for grinding condiments, spices, medical plants, salt, pigments and sometimes small grain types (e.g. millet). However, none of the grinding tools shows signs of colour. Furthermore, none of the pieces comes from a primary context, but they seem to have been moved around before their final deposition.

¹¹⁹⁶ Papathanasiou 2015.

¹¹⁹⁷ Becker 1991, 35, tab. 18.

¹¹⁹⁸ Perlès – Papagiannaki, this volume, 267, 271–272; for the toolkit and changes during the chronological sequence see below.

¹¹⁹⁹ Gurova 2005; see Perlès – Papagiannaki, this volume, 269.

¹²⁰⁰ Halstead 1994; Valamoti et al. 2011.

¹²⁰¹ Halstead, this volume, 584; see above, 621.

¹²⁰² N. Mazzucco, this volume: PM0845 from Lithic Phase 1, PM0441 from Lithic Phase 5.

Trapezes and transverse arrowheads first appear during Lithic Phases 3 and 4, i.e. in pottery terms during the transition from the Middle Neolithic to the Late Neolithic as well as the earliest Late Neolithic, and they point to hunting or warfare. Besides these, sling bullets of clay, mainly coming from Middle Neolithic and occasionally from Late Neolithic layers, may point to hunting or warlike activities; however, they have also been related to other uses, including their potential use in herding activities,¹²⁰³ or as loom weights.¹²⁰⁴

Chipped stone tools used for perforation appeared in Lithic Phase 5, but a beak from Lithic Phase 1 may already have been used for boring mending holes on pottery. A bone scraper formed on a cattle rib may also point to activities related to clay and probably pottery making.

For all settlement periods, tree-felling, the cutting of wood and woodworking is proven by the existence of celts, which appear in larger and smaller versions, probably related to lighter and heavier woodworking, also attested by macroscopic analysis on similar tools from other Neolithic sites in Thessaly.¹²⁰⁵ Furthermore, percussive tools also exist, as well as ground stone tools with narrow grooves, which were probably used for shaft straightening or polishing. In addition, microscopic analysis of the chipped stone toolkit also provides evidence for woodworking, especially during Lithic Phase 4 (BSPH VIIb–c). However, specialisation and small-scale activities seem to be absent.¹²⁰⁶

For hide working a number of tools were used: use-wear analysis of chipped stone flakes and blades points to hide working during Lithic Phase 4 (BSPH VIIb–c).¹²⁰⁷ Scrapers of clay with rough surfaces may have been used for cleaning hair from hides.¹²⁰⁸ According to use-wear analyses of bone tools, several of the pointed tools were used for punching holes into soft animal material like leather in a wet stage, and four tools were used as rotating instruments to perforate skin.¹²⁰⁹

Textile production is documented by a number of tools. Spindle whorls for spinning threads are only present in small numbers in Late Neolithic layers,¹²¹⁰ while pierced sherds may have been used as spindle whorls during the Middle Neolithic period. However, it has to be noted that many of the pierced sherds had their hole situated off-centre, so that their interpretation as spindle whorls is insecure. Furthermore, the pierced sherds are considerably lighter than the spindle whorls. So, if these items were spindle whorls, their lighter weight would point to their use for the production of a thinner thread or of a thread in a different material. Single loom weights were found in the Late Neolithic layers of PMZ. They speak in favour of a more intense or even specialised textile production during this period. This evidence shows that a large part of the textile tool assemblage is missing, so that it is impossible to reconstruct the textile production of the site.¹²¹¹ Pointed tools of bone, mostly from Middle Neolithic layers, were also used for textile production. Based on use-wear analysis, many of them were associated with plant materials. To these belongs a point which was probably used for weaving with vegetal material. A needle with a hole for holding a thread was used for sewing.

Rounded sherds with chipped or smoothed sides have been interpreted as a primary production stage of perforated sherds. However, in contrast to perforated sherds, their sizes show variation. Furthermore, since they are abundant in Late Neolithic layers, at a time when perforated rounded sherds disappear, such an interpretation is unlikely, and their purpose must have been different

¹²⁰³ Perlès 2001, 229–231.

¹²⁰⁴ Demoule – Perlès 1993, 375.

¹²⁰⁵ Stroulia, this volume, 328.

¹²⁰⁶ Stroulia, this volume, 337.

¹²⁰⁷ Perlès – Papagiannaki, this volume, 268.

¹²⁰⁸ Alram-Stern, this volume, 426–427.

¹²⁰⁹ Christidou, this volume, 379.

¹²¹⁰ PM0348 from BPh VIII is probably an intrusion from the Bronze Age settlement strata of the site, see above, Britsch, this volume, 413–414.

¹²¹¹ Britsch, this volume, 413–414.

from the perforated sherds. However, as can be seen from x-rays of Egyptian balls of thread,¹²¹² they may have been used for winding thread around them. In this sense, they could have been connected with textile production. A connection with textiles is also supported by their linear arrangement on the ‘surfaces’ of BSPh VIIb and VIIc. Furthermore, the sherd material contained sherds with smoothed sides which were probably used as burnishing tools or as borers.¹²¹³

X.5.2. Acquisition of Raw Material and Tool Production

Concerning the chipped and ground stone tools, the acquisition of raw materials differs considerably. For the chipped stone assemblage,¹²¹⁴ four main raw materials were used, with only quartz – used in small amounts – being locally available. The most abundant materials are radiolarites/chocolate cherts (72%) coming from the Pindos Range (Koziakas Mountains). Radiolarites/chocolate chert sampling of raw material and its comparison with flakes from the site of PMZ point to their acquisition as cores from the Portaikos and Peneios rivers, with a preference for the Peneios River. Since both the Peneios and the Portaikos River flow too slowly to transport nodules close to the site of PMZ, we argue that the nearest exploitable sources were located 40km to the west of PMZ, i.e. their availability was on a regional scale. Based on fresh cortex, the primary sources in the Pindos were exploited to a lesser extent.¹²¹⁵ According to the debitage on site, these tools were most probably produced on the site from the traded cores and blanks, which fits in with the pattern observed for eastern Thessaly. So, there existed domestic production of flakes with a hard hammer, to be attributed to unspecialised people living at the site. Aside from this, blades and bladelets were produced by indirect percussion or pressure flaking, possibly executed by itinerant specialists. This suggests different levels of expertise among the knappers and a complex, but stable, organisation of production. Regarding the flakes, they were produced through two distinct technological *chaînes opératoires* i.e. the shaping of blades or bladelets cores, and the deliberate production of flakes on discoid cores.

Obsidian in small quantities (11.4%) was imported to the site as already prepared cores from the Cycladic island of Melos. Both blades and flakes come from pressure flaking or indirect percussion, techniques, pointing to specialists who possibly travelled with the material.

Honey chert, which makes up just a small percentage of the entire chipped stone material (7%), was most probably imported as finished chert blanks from western Greece (Epirus) or Albania.

By contrast, ground stone tools were produced of material obtained either on a local or on a microregional scale. Grinding stones were made of cobbles and boulders of gneiss (54% of the assemblage) or schist (20%), which are locally available, as well as sandstone (20%) from sources situated 12 or 18km from the site. There is no evidence of production within the excavated area, but unfinished specimens point to fashioning in other parts of the settlement or just outside the site.

For large celts, gabbro cobbles, which are found in the fields around the site, point to the collecting of local material. Furthermore, marble cobbles were used. The smaller celts were made of serpentine, which probably comes from a local outcrop just 8km southeast of the site. The manufacture process of the larger and smaller celts does not seem to have been a specialised craft at this site. Two different manufacturing processes, i.e. pecking and grinding for the mostly larger gabbro tools and only grinding for the mostly small serpentinite specimens, are associated with them.

For percussive tools quartz and gabbro were used, while schist, chlorite schist and serpentine were taken for specimens with narrow grooves. In consequence, for ground stone tools a certain

¹²¹² Cartland 1918, 139, pl. 22.

¹²¹³ Alram-Stern, this volume, 448–450.

¹²¹⁴ Perlès – Papagiannaki, this volume, 201–202.

¹²¹⁵ Brandl et al., this volume, 309. According to Catherine Perlès, PMZ 5 (Brandl et al., this volume, 299, 306, 309) would be such a candidate.

selection of raw material, depending on tool categories as well as on their sizes, is visible. For their production, five techniques – pecking, grinding, flaking, sawing, and splitting – were used.¹²¹⁶

For bone tools, mainly long bones from small ruminants, particularly caprines, and occasionally from domestic cattle and pig were used. Just one metatarsal comes from a red deer. The total absence of red deer antlers is astonishing. Overall, the production was local and two main techniques, scraping and grinding, were observed.¹²¹⁷

X.5.3. Figurines and Objects of Ritual Connotation and their Relation to the Site

PMZ offers various insights into Neolithic society and ritual: the most important find of the excavations is the unique open house model and its contents found in situ, giving insight into the Neolithic society of PMZ, and probably of the southern Balkans in general. First of all, the house model indicates the importance of the house as the social entity of the Neolithic village society. In contrast to the roofed house models which constitute the majority of the house models in the Middle Neolithic, it represents the relevant persons of such a house. They comprise three generations of an extended family living together as well as females connected to the house by their function, their relation to each other indicated by similar dress and body decoration.

Except two figurines, which represent males, the relevant figurines are females. These females are functionally connected to the objects shown in the rear of the room, a platform, an oven and what may be a grinding stone. Two of the female figurines are taller than the males, demonstrating their importance inside the house. In contrast, the males are smaller, but their important role is indicated by their position on stools as well as by their decoration with necklaces and pendants. Furthermore, their position close to the door points to their connection to the area outside the house.

The house model was deposited in the destruction layer of BSPH VIIa before the ground was levelled for the surface of BSPH VIIb. In this sense, it represents a buried household, illustrated by the arrangement of the figurines in a lying position. The deposition of the house model was performed in the course of a ritual, probably by the residents of either the house connected to the burial or the newly built house.

Aside from this most important assemblage, the stratigraphic context of the figurines of PMZ enabled us to reconstruct their chronological sequence.¹²¹⁸ MN I and II are characterised by fragments of figurines squatting on the ground or sitting on stools well-known all over Thessaly and beyond. From them, we may argue that a similar symbolic language was used during this period all over Thessaly. Besides the house model, MN III and the transitional phase MN III/LN I produced three schematic figurines¹²¹⁹ not paralleled in other areas so that they may point to a local figurative component characteristic for PMZ. Other figurines, such as the figurines from the house model and a figurine with quite schematically indicated breasts,¹²²⁰ have analogies in the neighbouring site of Sykeon. Therefore, we argue that these sites that share similar figurines had similar cultural and ritual perceptions and point not only to regional networks, but, more specifically, to common beliefs.

¹²¹⁶ Stroulia, this volume, 343.

¹²¹⁷ Christidou, this volume, 358.

¹²¹⁸ For the relative chronology see above, 620.

¹²¹⁹ Alram-Stern, this volume, PM0591 (Fig. VI.25), PM0621 (Fig. VI.18), PM0645 (Fig. VI.19).

¹²²⁰ Alram-Stern, this volume, PM0327 (Fig. VI.38).

X.5.4. Prestigious Objects

The eleven ornaments¹²²¹ found at PMZ are assigned to objects emphasising the importance of their owner. The fact that such ornaments underline the social position of their owner is also seen by their representation on figurines, such as the male figurines of the house model.¹²²² The Middle Neolithic objects consist of beads of stone, bone and clay as well as three pendants of shell. The latter items, coming from an MN III layer (BSPH VIb), are of *Pteria hirundo*, which is present on the Sporades as well as in the northern Euboean Gulf, and therefore of exogenous material. From the Middle/Late Neolithic transition onwards, *Spondylus gaederopus* is used for two items representing bracelets, as well as a pendant and a barrel-shaped bead. *Spondylus* production is well-known from Late Neolithic Thessaly and especially from Dimini, and rarely from Middle Neolithic sites. In western Thessaly *Spondylus* bracelets are rare. Of special interest is the barrel-shaped *Spondylus* bead,¹²²³ coming from the transitional BSPH VIIa, which has parallels in the Theopetra Cave and Late Neolithic Damasi 4, and therefore belongs to the earlier items circulating in Thessaly. In any case, *Spondylus* ornaments seem to be prestigious, imported products of exchange, not made at the site.¹²²⁴

Among the stone objects there is a so-called macehead of marble.¹²²⁵ It was found on the surface of Floor F22 that probably represents an indoor space with a thermal structure and two postholes.¹²²⁶ It belongs to the BSPH VIIb, i.e. the very first phase which has been dated to the Late Neolithic period, and most maceheads known from literature date to the Late Neolithic period, too. At the same time, it was found above the area where the house model was deposited. However, due to its fragmentation we cannot be sure if it was used in this area or has been dislocated. There are a number of interpretations of maceheads, such as their use as weights, weapons, gaming pieces, or symbols of authority ('sceptres').¹²²⁷ In any case, as its manufacture of marble tells us, all these interpretations point to its social value.

Interestingly, the barrel-shaped *Spondylus* bead PM0581 was found in the same building horizon as the house model (i.e. BSPH VIIa) and near it. At the same time, the macehead was found on a floor set above the house model right after its deposition, and therefore could be related to the same people who followed those who had deposited the house model. Therefore, the potential association of the barrel-shaped bead and the macehead with the house model, or more broadly with the destruction of the house, might be taken as another indication of the significance the owners of this house might have had in the community of PMZ.

X.6. The Distribution Networks

X.6.1. Distribution and Consumption of Goods

Besides various other aspects, the study of the finds from PMZ gives insight into the provenance of the goods, their distribution and consumption, so that we learn more about the exchange networks, in which PMZ was involved. For this, we have to be aware that distribution and exchange has, in addition to an economic framework, rather a social one, and that we have to expect a variety of exchange practices. Otherwise circulation of objects is always connected with the mobility

¹²²¹ Kyparissi-Apostolika, this volume, 571.

¹²²² Alram-Stern, this volume, 472.

¹²²³ Kyparissi-Apostolika, this volume, 574 (PM0581).

¹²²⁴ Kyparissi-Apostolika, this volume, 579.

¹²²⁵ Stroulia, this volume, 340–341.

¹²²⁶ Toufexis – Batzelas, this volume, 115.

¹²²⁷ Stroulia, this volume, 340–341.

of people, and especially of craftsmen.¹²²⁸ In consequence, a relative distance between producers and consumers, based on kinship and social ties, such as marriage networks, existed.¹²²⁹ Furthermore, the analyses of sites under study does not show the exact routes, but we can only see the sites as nodes interlinked to each other, and persons and things as the agents of this interaction.¹²³⁰

For the distribution networks in which PMZ was involved, we shall consider the chipped stone tools, the ornaments and the figurines, published in this volume, comparing them with pottery which will be published in a separate volume.¹²³¹ For the chipped stone material, there existed three main materials, radiolarite/chocolate chert deriving from the Pindos Mountains, obsidian from the island of Melos and honey flint with a possible northwestern source.¹²³² While figurines can only be included in this survey based on a stylistic analysis, the provenance of radiolarite has been studied by chemical analyses.¹²³³ Otherwise, the sources of the ornaments are known from various publications.¹²³⁴ However, bone tools are not included, since they are made of bones available from domesticated animals or from the fauna of the environment of the tell and therefore were most probably produced locally.¹²³⁵ The raw material for the ground stone tools was also available locally,¹²³⁶ and only the sources of the sandstone used for grinding tools was situated 12–18km away from the site. Therefore, a local production is also argued for them.¹²³⁷ The provenance studies of pottery are based on petrographic and chemical analyses and offer a detailed picture of its distribution. However, since its final publication will be presented in a separate volume, still in preparation, and only preliminary publications are available, this topic can only be considered here in a very preliminary way.¹²³⁸

X.6.2. Platia Magoula Zarkou and the Distribution Network of Western Thessaly

At PMZ, by far the largest percentage of chipped stone tools was made of radiolarite/chocolate chert. According to core preparation, there was little direct procurement from the primary sources in the Pindos mountains, but already prepared cores and blanks coming from the Peneios and the Portaikos rivers, i.e. from regional sources, were distributed. The production of blades of radiolarite/chocolate chert by hard hammer points to non-specialised local production by the inhabitants of the site. Otherwise, there are also blades produced by indirect percussion or by pressure flaking, pointing to the existence of specialists, who were most probably not inhabitants of the site, but may have come to the site as itinerant knappers. Therefore, exchange of radiolarite/chocolate chert was not limited to the exchange of raw material, but most probably connected to the movement of people who brought new knowledge to the village of PMZ.¹²³⁹ Furthermore, it seems that the raw material coming from the Peneios River was preferred to that from Portaikos River, although the Portaikos River produced better raw material. So, the connection to northwestern Thessaly was probably stronger than to the area of Portaikos.¹²⁴⁰ Also, at other western Thessalian sites, radiolarite/chocolate chert represents a higher percentage so that it has been argued that its

¹²²⁸ Perlès – Vitelli 1999; Perlès 2007; Perlès 2012; Perlès – Papagiannaki, this volume, 265.

¹²²⁹ Karimali 2005, 53.

¹²³⁰ Knappett 2006, 242. For the theoretical background see Pentedeka 2017b.

¹²³¹ Pentedeka in preparation.

¹²³² See above, 624.

¹²³³ Brandl et al., this volume, 297, 302, 308; Tab.V.1.21; Perlès – Papagiannaki, this volume, 201.

¹²³⁴ Kyparissi-Apostolika, this volume, 578–581.

¹²³⁵ Christidou, this volume, 355.

¹²³⁶ In addition to the field survey undertaken by Vasilios Melfos and Anna Stroulia, Giorgos Toufexis, Christos Batzelas and Michael Brandl have checked potential sources in the surroundings of the site.

¹²³⁷ Stroulia, this volume, 315.

¹²³⁸ Pentedeka 2008; Pentedeka 2011; Pentedeka 2012; Pentedeka 2017a; Pentedeka 2017b; Pentedeka in press.

¹²³⁹ Perlès – Papagiannaki, this volume, 266.

¹²⁴⁰ Perlès – Papagiannaki, this volume, 263–264.

sites were incorporated into a dense regional distribution network.¹²⁴¹ If the other sites were also at least partly supplied by knappers coming to the sites, we have to argue a constant movement of people between the sites, not only bringing technical input but also connecting them by social ties. As Karimali has pointed out, the geographical distance between these sites was less important than their social distance, which may have been based on kinship.¹²⁴²

For the figurines, a few transitional Middle Neolithic and early Late Neolithic types, such as the figurines known from the house model and figurines with an accented belly on the flat upper part produced in grey ware, are shared by western Thessalian sites at a closer distance to PMZ, such as Magoula Sykeon, Mavrachades (Sophadon) and Mavrachades Tataria.¹²⁴³ Therefore, a more regional distribution pattern is visible for these figurines, and they indicate an interconnectivity of these communities on the Western Thessalian Plain.¹²⁴⁴ If we consider figurines as points of reference for the conceptualisation of communal identities, they are a defining trait for a group of people.¹²⁴⁵ So, we may argue that these sites, which shared similar figurines, had similar cultural and ritual perceptions and shared some sort of identity, most probably as social groups related to each other by kinship and by other social ties.

For pottery, petrographic analyses show a complex pattern of Thessalian sites producing, distributing and consuming pottery. Furthermore, it has been demonstrated that only a small number of pots circulated, and that the distribution of pottery intensified during the Late Neolithic period.¹²⁴⁶ For the reconstruction of a distribution pattern of pottery in western Thessaly, it is an important fact, that at or near the site of PMZ during the Middle Neolithic ‘scraped ware’, and during early Late Neolithic grey on grey ware, were produced.¹²⁴⁷ During the Middle Neolithic period they were distributed in the Western Thessalian Plain as far north as far as the Theopetra Cave.¹²⁴⁸ During the Late Neolithic period a large number of sites in the Western Thessalian Plain were consumers, from the Theopetra Cave in the north and to Magoula Tsapocha in the south. Otherwise, according to our current knowledge there also exist western Thessalian sites which did not receive this pottery.¹²⁴⁹ In this sense, the pottery produced at PMZ was distributed in the same area as the radiolarite/chocolate chert cores originating from the Peneios area.

X.6.3. Platia Magoula Zarkou and its Connection to the Eastern Thessalian Plain

Furthermore, we have to pay attention to the fact that the distribution of radiolarite as well as pottery produced at PMZ was, of course, not limited to western Thessaly, but also extended to northeastern Thessaly. However, compared to western Thessaly, radiolarite/chocolate cherts are found in a much lower percentage, obsidian being the main material for chipped stone tool production.¹²⁵⁰

For figurines, eastern and western Thessaly share a number of types, especially those current during the earlier phases of the Middle Neolithic period. These similarities most probably point to common beliefs and practices shared by the social groups of both areas, and are probably also related to social ties.

¹²⁴¹ Karimali 2009.

¹²⁴² Karimali 2005, 53.

¹²⁴³ Alam-Stern, this volume, 565, Fig. VI.40.

¹²⁴⁴ Alexiou 2020, 140, fig. 1e; 154, fig. 10 (Magoula Sykeon and Mavrachades Sophadon); Nancy Krahtopoulou, personal communication (Mavrachades Tataria in the Kambos region).

¹²⁴⁵ Nanoglou 2009, 292.

¹²⁴⁶ Pentedeka 2017a, 347.

¹²⁴⁷ The ‘scraped ware’ has been renamed by Pentedeka as ‘ware with blurred outlines’. For the definition of these wares see Demoule et al. 1988, 12–23.

¹²⁴⁸ Pentedeka 2017a, 345, fig. 2.

¹²⁴⁹ Pentedeka 2008; Pentedeka 2011; Pentedeka 2012; Pentedeka 2017a; Pentedeka 2017b; Pentedeka in press.

¹²⁵⁰ Karimali 2009.

Concerning pottery, pottery produced at PMZ is known for the Late Neolithic period from various sites in northeastern Thessaly like Otzaki, Chalki and Souffi Magoula. However, it seems that southeastern Thessaly, with the exception of Tsangli, is widely excluded from this network.¹²⁵¹ In this sense, PMZ was a source of pottery circulating in a wider area. At the same time, during the early Late Neolithic, PMZ was a recipient site of black burnished pottery produced at northeastern Thessalian sites, such as Otzaki or Makrychori 2 to a much a lesser extent.

Therefore, the networks for the distribution of radiolarite/chocolate cherts and pottery reached as far as eastern Thessaly. However, in eastern Thessaly radiolarite played a less important role than in western Thessaly, probably due to the availability of obsidian, which was preferred for its high quality for blade and tool production.¹²⁵² For pottery we need to know the percentage of imported pottery at the various sites of western Thessaly compared to eastern Thessaly to get a better understanding of the differences or similarities of these distribution networks.

Considering radiolarite and pottery as part of a cross-craft interaction system,¹²⁵³ we have to keep in mind that the production and distribution of the chipped stone tools made of radiolarite/chocolate cherts mainly had an economic motivation, although most probably with a strong social component. For pottery, we have to consider that the distributed wares were mostly vessels for food/drink consumption made of fine wares, i.e. used at consumption ceremonies on social, or even ritual occasions,¹²⁵⁴ so that their distribution was probably connected to individuals involved in such rituals and events strengthening social ties. The same is argued for figurines used in ritual actions in which a larger number of people or even the community may have been involved. For such distribution the ‘social distance’, i.e. the connection of people via kinship, social affinity or common belief from various sites was of higher importance than the geographical situation of a site.¹²⁵⁵ Therefore we should keep in mind that the networks for the distribution of chipped stone tools and pottery may either have overlapped or coexisted side by side, and we still have to learn more about their social organisation.¹²⁵⁶

By its geographical position, PMZ, situated at the eastern edge of the Western Thessalian Plain, at a crossing point between the Eastern and Western Thessalian Plains, probably played an important role in the distribution of goods. This nodal situation probably produced social contacts and shared beliefs as is demonstrated by the distribution of pottery and the occurrence of comparable types of figurines. So, it seems that PMZ was connected to northeastern Thessaly by social networks, although the procurement with radiolarite as a raw material playing a less important role, probably due to the higher importance of obsidian.

X.6.4. Platia Magoula Zarkou and its Connection to the World outside Thessaly

At PMZ, obsidian, coming from the Cycladic island of Melos, is scarce in comparison to radiolarite (11.4%). Blades and cores were probably produced by itinerant specialists by pressure flaking and indirect percussion. The scarcity of obsidian is strange, since sites like Otzaki or Ag. Sophia in northeastern Thessaly, at a comparable distance from the coast, have a considerably higher proportion of obsidian. On the other hand, sites at a comparable distance from the Gulf of Lamia, like Magoula Koutroulou, are also characterised by a higher proportion of obsidian. Therefore, instead of a single east-west diffusion of obsidian from the sea to inland sites,¹²⁵⁷ Perlès suggests two distinct obsidian networks, one from the Gulf of Lamia to western Thessaly and one from the Gulf of Volos to eastern Thessaly. In such distribution networks, PMZ, situated west of the

¹²⁵¹ Pentedeka 2017a, 346–348.

¹²⁵² Karimali 2009.

¹²⁵³ See already Pentedeka 2011, 106–107, 114–120.

¹²⁵⁴ Perlès – Vitelli 1999, 102–103; Pentedeka 2011, 117.

¹²⁵⁵ Karimali 2000, 18–20.

¹²⁵⁶ Pentedeka 2011, 120.

¹²⁵⁷ Karimali 2009.

Eastern Thessalian Plain and at the entrance of the Western Thessalian Plain, would have been in a marginal position, with little contact to sites closer to the sea.¹²⁵⁸

The connection of PMZ to the sea is also illustrated by the occurrence of a few ornaments of sea-shell, which had the Gulf of Euboea and the Pagasetic Gulf as their source. In contrast to procurement with obsidian, which may have included the movement of people specialised in their production, the ornaments came to the site as finished, prestigious objects. Maybe they entered the site with the obsidian chippers or other people connected to the sea. Otherwise, we have to be aware that such objects need not have entered the site in a direct way, but that they could have been brought to PMZ via various intermediate sites.

Honey chert was produced at the sources and traded as already finished blanks, probably coming from a source in northwestern Greece or further north. Their percentage does not differ from other Thessalian sites so that we argue that they were dispersed as prestigious objects along long-distance networks.¹²⁵⁹ For figurines, we have argued that a few single pieces exist, which stylistically coincide with items from northwestern Macedonia. Possibly these figurines point to the same social connectivity as is reflected in the honey chert blades.

X.7. The Society of Platia Magoula Zarkou

When people founded the village of PMZ they decided to live within a well-defined and spatially restricted area, which was encircled by enclosures, most probably ditches. Besides their functional character, these large-scale collective constructions have important social and symbolic dimensions, constructing sociocultural space, space divisions and landscape marking. While the first settlement might have had a slightly extended character, the subsequent settlements were densely occupied, and the decision for this settlement type was possibly due to regular flooding episodes. In the settlement, the division of space changed over time, and different construction techniques coexisted. By rearranging house or settlement space, people recraft material conditions, social roles and social relationships.¹²⁶⁰

PMZ belongs to the few sites with extramural graves organised in a cemetery. Such an arrangement may be understood as a statement of ancestry, locality and spatial importance, maybe a means of keeping people together during the last phase of the Neolithic settlement, when the pull towards fission, break-ups and abandonment was strong. At the same time, the very act of cremation, as well as the high fragmentation of the bones, may further emphasise the primacy of the communal over the individual.¹²⁶¹

A view on space and landscape characterises the people of PMZ living in proximity to a variety of environments and resources, both upland and lowland, as well as close to a river. The most probably modest animal husbandry shows few hints of distant grazing. Living on a tell means having to use the land outside the settlement for cultivation and most probably land ownership at a communal level.¹²⁶² The plain was temporarily flooded, and perennial, rain-fed fields were probably situated in the north of the site. At the same time, the local hydrology may suggest a cyclical pattern of the extent of land availability.¹²⁶³ From the raw materials, such as radiolarite/chocolate chert from the riverbanks of the Peneios and the Portaikos rivers, we may conclude multiple networks of communication and of circulation of materials, information and ideas. These networks suggest the mobility of people, perhaps including seasonal relocation of traders and specialists as well as, according to obsidian, their participation in long-distance networks.

¹²⁵⁸ Perlès – Papagiannaki, this volume, 264.

¹²⁵⁹ Perlès – Papagiannaki, this volume, 264–265, 269.

¹²⁶⁰ Souvatzi, this volume, 597.

¹²⁶¹ Cf. Triantaphyllou 1999, 131–132; see also Triantaphyllou 2008.

¹²⁶² Chapman 1989.

¹²⁶³ Cf. Bailey et al. 1998, 392.

The site was left at the start of the Late Neolithic period when the site had risen in such a way that the seasonal flooding did not affect the settlement itself. Therefore, this act was a social choice, implying regular migration and even conscious relocation of whole villages.

X.8. Platia Magoula Zarkou and Cultural Change: Questions for Future Research

Based on its toolkit and figurines, we have characterised PMZ as a typical site of the Western Thessalian Plain, with a strong interconnectivity within the Western Thessalian Plain and connections with the northeastern Thessalian Plain. Differences from the northeastern Thessalian sites are mainly seen in the chipped stone toolkit which, according to its main raw material, radiolarite/chocolate chert from the Pindos Mountains, is highly connected with exchange networks of the Western Thessalian Plain throughout the lifetime of the settlement. Otherwise, the social component of the settlement, seen in figurines and pottery,¹²⁶⁴ also has a high connectivity with the northeastern Thessalian Plain, and even higher with the Western Thessalian Plain.¹²⁶⁵

From its size and its active production of pottery, we argue that PMZ was a nodal point in the distribution of goods and knowledge, and hence of higher importance than various other sites of the Western Thessalian Plain. However, a number of Neolithic western Thessalian sites are under study, and analysis and evaluation of these various sites is to be expected in near future. Therefore, we are not able to determine the exact social and economic position of PMZ within this network of sites, and we have to wait for publications bringing to the public sites comparable to PMZ, i.e. sites of higher connectivity than other sites of this area.

PMZ shows a continued occupation for a limited period of time, from the early Middle Neolithic throughout this period till the early Late Neolithic, i.e., not longer than 400 to 500 years. According to our knowledge of Early Neolithic Thessaly, the founding of the settlement in the early Middle Neolithic is not exceptional, since many Thessalian sites are not founded before the late Early Neolithic, and there seems to be an augmentation of sites during the Middle Neolithic period.¹²⁶⁶ Furthermore, it seems that settlement distribution within an area did not change much during the Early and Middle Neolithic period, but a shift of settlement took place on a local scale.¹²⁶⁷ For PMZ we may argue that the predecessor was Koutsaki Magoula.¹²⁶⁸ According to new research, several sites in western Thessaly seem to have been abandoned during or at the end of the Tsangli phase, and before the start of the Arapi phase. However, since these sites are still unpublished, future research will teach us whether this impression reflects reality. If this is the case, research is needed to find out if these important changes in settlement are caused by environmental changes or by human impact.

The study of the stratigraphy as well as the ¹⁴C dating showed that the settlement was uninterruptedly settled by the same community, so that variation in pottery and stone tools are not to be expected. However, as one of the first sites studied, through its continuous settlement, PMZ offers a new view on the transition from Middle Neolithic to the early Late Neolithic period. For this time, i.e. at least from BSPH VIIa onwards, a change and diversification in the toolkit and figurines is perceptible.¹²⁶⁹ The chipped stone tools include new types not known before. In addition, new types of figurines, ornaments and objects of prestige, which have social connotations, appear. Via these objects PMZ is linked to western Thessalian settlements and beyond, so that we argue an intensification of contacts. For the textile tools, this development continues throughout the early Late Neolithic phases of the site, and with BPH VIII, the character of the chipped stone

¹²⁶⁴ Pentedeka 2008; Pentedeka 2011; Pentedeka 2012; Pentedeka 2017a; Pentedeka 2017b; Pentedeka in press.

¹²⁶⁵ Pentedeka 2017b.

¹²⁶⁶ Reingruber 2008, 316–317.

¹²⁶⁷ Johnson – Perlès 2004, 69–70.

¹²⁶⁸ For its location see Caputo et al., this volume, 49, Fig. II.1.8.

¹²⁶⁹ For a summary see above, 622–626.

toolkit finally has a pure Late Neolithic character. PMZ is the first site in which these in some cases gradual, in other cases quite sudden, transformations are visible. However, PMZ is also the first site with a continuous Middle Neolithic to Late Neolithic settlement which has been extensively studied and presented to the public. Therefore, we have to ask if this image is specific to PMZ as a pottery-producing site and a nodal point in the network of settlement, or if we should expect similar developments in other Thessalian sites, which are uninterruptedly settled from the Middle Neolithic to the Late Neolithic, and are going to be studied and published in future.