Petras, Siteia
The Pre- and Proto-palatial cemetery in context

Acts of a two-day conference held at the Danish Institute at Athens, 14-15 February 2015

Edited by
Metaxia Tsipopoulou

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This volume is dedicated to all those individuals who participated over the years in the excavation, conservation, study, site development and publication of the results.

This lofty vision for Petras and its region was made possible by their hard work, dedication and support.
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Abbreviations

**Archaeological periods**

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<thead>
<tr>
<th>Code</th>
<th>Period</th>
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</thead>
<tbody>
<tr>
<td>EBA</td>
<td>Early Bronze Age</td>
</tr>
<tr>
<td>EH</td>
<td>Early Helladic</td>
</tr>
<tr>
<td>EM</td>
<td>Early Minoan</td>
</tr>
<tr>
<td>FN</td>
<td>Final Neolithic</td>
</tr>
<tr>
<td>LH</td>
<td>Late Helladic</td>
</tr>
<tr>
<td>LM</td>
<td>Late Minoan</td>
</tr>
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<td>LN</td>
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<tr>
<td>LBA</td>
<td>Late Bronze Age</td>
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<td>MBA</td>
<td>Middle Bronze Age</td>
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<tr>
<td>MH</td>
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<td>MM</td>
<td>Middle Minoan</td>
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<td>Middle Neolithic</td>
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**Other**

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<tbody>
<tr>
<td>PTSO</td>
<td>Petras Rock Shelter</td>
</tr>
<tr>
<td>Σ-palace</td>
<td>Stratigraphical trenches of the palace</td>
</tr>
<tr>
<td>W</td>
<td>Wall</td>
</tr>
<tr>
<td>A.S.L.</td>
<td>Above Sea Level</td>
</tr>
<tr>
<td>diam.</td>
<td>diameter</td>
</tr>
<tr>
<td>gr</td>
<td>gram</td>
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<tr>
<td>h</td>
<td>height</td>
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<tr>
<td>kg</td>
<td>kilogram</td>
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<td>width</td>
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<td>wt</td>
<td>weight</td>
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<tr>
<td>th</td>
<td>thickness</td>
</tr>
<tr>
<td>lt</td>
<td>liter</td>
</tr>
<tr>
<td>MMD</td>
<td>Mean Measure of Divergence</td>
</tr>
<tr>
<td>MNI</td>
<td>Minimum Number of Individuals</td>
</tr>
<tr>
<td>NISP</td>
<td>Number of Identifiable Specimens</td>
</tr>
<tr>
<td>SM</td>
<td>Archaeological Museum, Siteia</td>
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<tr>
<td>vol.</td>
<td>volume</td>
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**Petras Area**

<table>
<thead>
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<th>Area</th>
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<tbody>
<tr>
<td>HT</td>
<td>House Tomb</td>
</tr>
<tr>
<td>R</td>
<td>Room</td>
</tr>
<tr>
<td>L</td>
<td>Lakkos</td>
</tr>
<tr>
<td>P</td>
<td>Petras</td>
</tr>
<tr>
<td>PTSK</td>
<td>Petras Cemetery</td>
</tr>
</tbody>
</table>

The form of the English language for the native speakers (British or American) was the author’s choice. For the non-native speakers the American form was used.
Bibliographic Abbreviations

AAA – Archaiologika Analekta Athinon
ActaPalaeobot – Acta Palaiobotanica
AUA – American Journal of Archaeology
AJPA – American Journal of Physical Anthropology
AJS – American Journal of Sociology
AmHumBiol – American Journal of Human Biology
Arachne – (on-line access to the CMS, with corrected information and enhanced illustrations) http://arachne.uni-koeln.de/drupal/?q=de/node/access date March 2016.
ArchDelt – Archaeologikon Deltion
ArchEph – Archaeologike Ephemeris
ASAtene – Annuario della Scuola Archeologica Italiana di Atene
BAR-IS – British Archaeological Reports, International Series
BCH – Bulletin se correspondence hellénique
BICS – Bulletin of the Institute of Classical Studies of the University of London
BSA – Annual of the British School at Athens

CMS – Corpus der minoischen und mykenischen Siegel, Berlin 1964-2000, Mainz 2002-
CretChron – Kretika Chronika
EtCret – Études Crétoises
JAS – Journal of Archaeological Science
JMA – Journal of Mediterranean Archaeology
Kentro – Kentro: The Newsletter of the INSTAP Study Center for East Crete
MA – Monumenti Antichi
OJA – Oxford Journal of Archaeology
Prakt – Praktika tes en Athenai Archaeologikes Etaireias
SIMA – Studies in Mediterranean Archaeology
SMEA – Studi Micenei ed Egeo-Anatolici
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Pottery fabrics and recipes in the later Pre- and Proto-palatial period at Petras: The petrographic evidence from House Tomb 2 and Ceremonial Area 1

Eleni Nodarou

Abstract

This paper builds on the analytical work presented in the volume dedicated to 25 years of excavations and studies at Petras. Moving from the Final Neolithic and earlier Prepalatial to the Later Prepalatial and Protopalatial periods, we examine the array of fabrics identified in the assemblage from House Tomb 2 and Ceremonial Area 1. The petrographic analysis of the pottery showed that major changes in the selection of raw materials and the recipes used for pottery manufacture occurred between the Later Prepalatial and Protopalatial periods and earlier phases. There is a clear shift from the calcite- and grog-tempering traditions to naturally tempered fabrics, most of which are connected with the Phyllite-Quartzite series. With regard to the imports, it seems that the off-island contacts are very restricted, especially compared with the Final Neolithic and the Early Minoan I phases, but there exist intra-regional networks connecting Petras and its broader area that reach as far as Gournia/Kalo Chorio in the west and Palaikastro in the east.

Introduction

Petrographic analysis at Petras is not a project concerning a single assemblage, tomb or building; rather it is an extended analytical research involving the study of various assemblages, deriving from different parts of Petras. Ranging from the Final Neolithic and the earlier Prepalatial assemblage of the Kephala hill (in collaboration with Y. Papadatos and P. Tomkins) to the later Prepalatial Rock Shelter and thence the Neopalatial and Postpalatial domestic assemblages from House I, the research attempts to understand pottery production and distribution at Petras and across the broader area of the Siteia bay during the whole Bronze Age.

At the Symposium focusing on 25 years of excavations at Petras the analytical results from the study of three ceramic assemblages were presented: the FN IV and the EM IA pottery from the settlement at Kephala-Petras, and that dated to the EM IB excavated in the burial Rock Shelter. The main

* I would like to express my deepest thanks to Dr. Metaxia Tsipopoulou for long-lasting collaboration and for entrusting me with the analysis of the pottery from Petras. All sampling permits were provided by the Ephorate of Antiquities of Lasithi and the Hellenic Ministry of Culture.

1 Tsipopoulou 2012.

2 Nodarou 2012.
technological trend identified was the predominance of the red non-calcareous clays deriving from alluvial deposits. The most common recipes were the deliberately tempered fabrics, one with grog used for all kinds of vessels and wares, the other with calcite, associated with Minoan- and Cycladic-style vessels. It is only in the EM IB period that we see the emergence of a new manufacturing tradition with the use of fine calcareous clays for the production of fine vessels in the Dark Grey Burnished wares. Finally, the imported pottery in these earlier assemblages consists mainly of off-Cretan shapes, such as the cheesepots, which occur in an array of micaceous fabrics coming from off-island areas, most probably from the Cyclades.³

The aim of the petrographic analysis of the pottery from House Tomb 2 and Ceremonial Area 1 is to present an overview of the most common fabrics encountered in the assemblage and of potential patterns of continuities and discontinuities in relation to the fabrics of earlier periods; finally, the intention is to examine trends in the production and consumption of pottery by the community of Petras that used the cemetery. Certain restrictions are imposed on this endeavour by the material. a) The previous analysis stopped at the EM IB period as represented in the assemblage of the Rock Shelter, whereas the material from House Tomb 2 belongs to the MM IA-MM II periods. A very important phase of the Prepalatial, EM II, is missing at present. It is known from other assemblages on the island that during EM II there emerged new wares and new technological traditions.⁴ This gap will be filled at a later stage since there do exist such contexts at Petras, both in their settlement and the cemetery. b) The material analyzed is highly selective for three reasons: i) because it derives from a tomb, and cemeteries are the places par excellence where selected items, imports, and exotica are deposited; ii) because House Tomb 2 is of special significance, since it has produced unique seals and imported artifacts,⁵ and iii) because the material analyzed derives from a single building out of an entire cemetery. Therefore, the results are still in a preliminary stage: the broader contemporary contexts at Petras are as yet unexplored.

The analytical results

The petrographic analysis involved 100 samples of coarse and fine wares dating from the MM IA to the MM IIB period and was carried out on a LEICA DMLP polarizing microscope at the INSTAP Study Center for East Crete. The analysis showed a drastic change in the selection of raw materials and the clay recipes for pottery manufacture compared to the earlier Prepalatial period: the deliberately tempered fabrics have almost disappeared and have been replaced by an array of naturally tempered fabrics connected with the Phyllite-Quartzite series.

Coarse fabrics

Fabric 1: metamorphic with green altered igneous rocks (Fig. 1).

The most common coarse fabric in the assemblage is characterized by a non-calcareous dark reddish brown-firing matrix which is optically inactive. The non-plastic inclusions consist of metamorphic rock fragments (mainly phyllite and quartzite). The most characteristic components, though, are the altered greenstones, most likely of igneous nature. Although not numerous in every sample, their constant presence indicates both a common origin for the raw material and a rather standardized recipe. This fabric appears in the EM III-MM IA and continues in the Neopalatial period; it is encountered in many of

³ Papadatos & Tomkins 2013.
⁵ Tsipopoulou 2012b; 2012d.
the Neopalatial villas located in the Achladia area, namely Zou, Achladia-Riza, Achladia-Platyskinos, and Klimataria. It is connected with the Phyllite-Quartzite series and the greenstones form part of the Achladia Formation; a clay sample with such

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7 Gradstein 1973.
greenstones has been collected at Hagios Spyridon. This fabric is used mainly for medium-sized storage, serving and drinking vessels, such as jars, jugs, plates and cups. There are also a few vessels of special use, such as a tripod incense burner and a larnax. In his study of Neopalatial pottery from east Crete P. Day mentions a small percentage of cooking pots manufactured in this fabric, but this is not corroborated by the present study. However, the presence of cooking pots in the cemetery is rather limited and, therefore, there is a negative bias in their representation in the analysis.

**Fabric 2**: coarse with metamorphic rocks (Fig. 2). This is also a coarse fabric connected with the Phyllite-Quartzite series; it is characterized by a non-calcareous, dark brown-firing matrix ranging from optically active to inactive. The non-plastic inclusions are of metamorphic nature (mainly phyllite and quartzite), but without the altered igneous rock fragments seen in Fabric 1. The vessels represented are in their majority tripod cooking pots of MM I date. This could be a cooking ware recipe.

**Fabric 3**: coarse/semi-coarse calcareous with metamorphic rocks (Fig. 3). This is a coarse/semi-coarse fabric that is very common in the assemblage. It is characterized by a brown-firing matrix which is optically inactive. The technological novelty of this fabric is that the raw material is a buff calcareous clay, as indicated by the presence of micritic limestone and microfossils. This is the first time, at the present state of knowledge, that a calcareous clay is used on such a large scale for the production of medium- and small-sized vessels. The other non-plastic inclusions consist of metamorphic rock fragments, namely a grey or red-brown phyllite, little quartz, quartzite and sandstones. The vessels represented are mainly serving and drinking shapes, such as cups, plates, jugs and jars. This must be a rather local fabric connected with the Miocene marls of the broader area; it continues into the Neopalatial period.

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8 Day 1995, 155.
9 Day 1995, 155.
Fabric 4: coarse/semi-coarse with mica schist (Fig. 4).
This is a rather coarse/semi-coarse fabric characterized by a reddish brown-firing matrix ranging from optically active to inactive. The base clay is in most cases calcareous, as is indicated by the presence of micritic limestone and microfossils, and highly micaceous due to the presence of abundant biotite and white mica laths. The non-plastic inclusions consist primarily of biotite mica schist and muscovite mica schist. The mica inclusions are responsible for the vessels’ shiny appearance. The shapes represented are rather coarse, i.e., a burial pithos, domestic pithoi and basins, and a few cups. With regard to provenance, the presence of micaceous fabrics usually leads to the suggestion of off-island imports. In this case though the shapes are domestic and their typology does not indicate exotic imports. Moreover, the mineralogy and texture of the fabric is not compatible with that of the white-mica schist fabric encountered in the assemblage of the earlier Prepalatial, which is considered of Cycladic origin.\(^\text{10}\)

An east Cretan origin is, therefore, very plausible: especially given also that near Paraspori and Chamaizi exist deposits of silver mica schist,\(^\text{11}\) and that a similar fabric has been encountered in a Neopalatial jar from Petras.\(^\text{12}\)

Imports

Fabric 5: granitic-dioritic.
There are two small fabric groups that are definitely imported at Petras. Their composition leaves no doubt as to their origin, since the presence of granitic and dioritic rock fragments links them with the bay of the Mirabello and the area of Gournia/Kalo Chorio.\(^\text{13}\) The two groups represent two variants of the same fabric: one with a finer matrix containing mainly granitic rocks (Fig. 5), the other semi-coarse, with the inclusions being more densely

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\(^{10}\) Nodarou 2012, 83-84.

\(^{11}\) Day 1995, 155.


packed in the base clay and the dioritic component being more prominent (Fig. 6). At present only a jar of EM III–MM IA and two jugs of MM I date are represented in the Mirabello fabric(s), but no quantitative information can be provided because the study and analysis of the pottery from the cemetery is still in progress. There are two observations to be made about this fabric and its occurrence at Petras: the first relates to the center(s) of production and the fact that there exist two variants for the same fabric in vessels used for a similar function. This indicates either that the recipes were not yet

Fig. 5. Semi-coarse fabric with granitic inclusions. Photo E. Nodarou.

Fig. 6. Fabric with granitic-dioritic inclusions (variant a). Photo E. Nodarou.
standardized, or that there were different units in
the Gournia area producing similar vessels with
a similar but not identical recipe. The second ob-
servation is that this is the first occurrence of the
granodiorite fabric at Petras: it does not exist in
the earlier Prepalatial assemblages examined. We
do not know when exactly the people of Petras
had access to Mirabello pottery: did this happen in
EM II, the period we are missing? Other contexts
(such as House I) demonstrate that from the MM
I period onwards (until the Postpalatial) it is com-
monly found as an import at Petras.

Fine Fabrics

Due to the restricted character of the sampling it
is not clear yet which is the prominent local fabric
for fine wares. There is an array of closely related
calcareous fabrics, deriving exclusively from the
ceremonial area. Because of the fine nature of these
fabrics, containing few non-plastic inclusions but
small fragments of quartz that are not diagnostic
of origin (Fig. 7), it is not possible to make infer-
ences about provenance. Moreover, the possibility

that the vessels deposited in tombs might be of spe-
cial significance either for the deceased or for their
families (i.e., not necessarily representative of what
was available), make it difficult to establish the local
component of the ordinary fine repertoire. Con-
sidering the predominance of the Neogene marly
deposits in the area there must be one (or more)
calcareous local fine fabric(s), but this point has yet
to be substantiated quantitatively. At present the fine
vessels analyzed are mainly small jugs and plates of
MM I–II date.

Imports

In the fine ware assemblage there are two samples,
a jar and a cup, in a fine red and optically inactive
fabric, containing small quartz fragments (Fig. 8).
Although the mineralogical composition is not di-
agnostic of origin, a similar fabric from the Neopa-
latial assemblage of House I indicates imports from
Palaikastro.
Geology
The geology of this part of east Crete has often been described. Petras is situated on the conjunction of a multitude of sources of clays and tempering materials suitable for pottery manufacture: the alluvial deposits of the river Stomion with red non-calcareous clays, the Miocene marls with calcareous buff clays, and the Phyllite-Quartzite series in places comprising eruptive bodies. The imports identified so far are connected with a) the granodiorite deposits in the bay of the Mirabello bay to the west, and b) the red alluvial deposits of Palaikastro to the east.

Preliminary observations on fabrics and recipes of the later Prepalatial/Protopalatial period at Petras
A primary aim of this project was to investigate continuity and change in pottery technology and compare it with the previous period. Despite the constraints in the sampling procedure, the analysis of the MM IA – MM II pottery from House Tomb 2 and Ceremonial Area 1 from the cemetery of Petras demonstrated a major shift in the clay recipes, as well as in the patterns of pottery consumption at Petras during the later Prepalatial period.

The calcite- and grog-tempered fabrics that appeared in the Final Neolithic and were widely used until the EM IB period were replaced by naturally tempered fabrics connected with the Phyllite-Quartzite series. This change was occasioned by a total change in the raw materials selected, i.e., away from the use of non-calcareous red clays during the earlier Prepalatial to calcareous buff-firing clays in the later Prepalatial and Protopalatial period. This preference for calcareous clays is the corollary of the increase in the fine painted wares, i.e., the vessels *par excellence* deposited in tombs as offerings. Future analysis of EM II material will clarify whether this shift took place in EM III or earlier.

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17 The first use of calcareous clays in pottery manufacture at Petras occurs in the EM IB period, see Nodarou 2012, 85.
With regard to vessel shape in relation to fabric and function, the array of recipes with metamorphic rocks indicates a degree of standardization: a rather consistent metamorphic fabric with greenstones, a similar one for cooking wares (non-calcareous metamorphic without the greenstones), and a range of calcareous fabrics for medium- and small-sized serving and drinking vessels. A period of standardization in the clay recipes seems underway, one which will become a trend in the subsequent periods.

Finally, the imported material, even in the small quantities revealed by the present data, indicates another shift of interest compared to the FN and the earlier Prepalatial period. Losing its off-island contacts with the Cyclades and the Aegean, the community of Petras seems to be developing intra-regional contacts reaching as far as Gournia/Kalo Chorio to the west and Palaikastro to the east. From this period onwards Petras apparently becomes an important consumer of the pottery both from the Mirabello and from Palaikastro, as is indicated by the imports identified in subsequent periods.

Having stressed the changes in raw material selection and clay paste preparation from the Final Neolithic to the later Prepalatial period, there is one more observation to be made: a pattern emerging in this study concerns continuity in fabrics and recipes from the later Prepalatial to the early Protopalatial period. The pottery analyzed dates from MM IA to MM II, the period during which the palatial society was formed and rose to power causing the construction of the palace on the plateau of the Hill I. The study of the material from the Lakkos (“the pit”), which is contemporary and relates to the social processes that predate the foundation of the palace, showed that the shape repertoire becomes more varied and the decoration more elaborate within the framework of conspicuous consumption. Our analysis of the cemetery material however shows that the choices of the potters are not affected by the establishment of the new elite: the new shapes and decorative motifs are manufactured with the pre-existing recipes.

It is believed that further analysis of the cemetery pottery, in conjunction with the analysis of assemblages from domestic contexts as well as the “Lakkos”, will shed new light on pottery consumption, not only within the confines of the specialized environment of the cemetery, but also on pottery production in the broader area of Siteia. Moreover it will also enable discussion on the relation between the cemetery and the palace, and how innovations in pottery technology were affected by the social changes underlying the emergence of the palatial society at Petras.

18 Haggis 2007.
Discussion

Muhly: If you compare the different coarse ware fabrics, from MM I, in the bay of Mirabello and the bay of Siteia, which fabric made the best pot? Do you think of it in these terms?

Nodarou: It is not about the best pot, because it depends on the function of the pot. For example, for cooking wares definitely non calcareous clays naturally tempered with metamorphic materials (phyllite-quartzite) in east Crete or granitic-dioritic materials in the Mirabello. Then for the painted wares in those buff fabrics, they use calcareous, miocenic clays, that are more plastic and that is why there is this shift. Also they are more capable of making larger pots with plastic clays. They never quit using the phyllitic materials, but there is greater use of the buff clays.

Sarri: I would like to ask you if your petrographic groups correspond to the normal archaeological classification. When you archaeologically classify the groups, do you find the petrographic correspondence and vice versa?

Nodarou: This is not our end and has never been. At a certain stage of the work we will definitely compare the macroscopic fabric groups with the petrographic ones to see how they relate and not in order to do a one-to-one correlation. Our aim is to test petrographically a number of samples that is representative of the ceramic assemblage. A one-to-one comparison of petrographic and macroscopic groups is not valid, because it is like comparing apples with oranges, i.e., different classes of information.

Sarri: But it is an aim of the archaeologist to reach a stage where we can recognize more. So, it would help if you can recognize and select features which are useful also for the classification.

Nodarou: Our next stage is to take petrographic groups and see how they relate to the rest of the material that we have not sampled, because we cannot sample everything, and one helps the other in that respect.

Macdonald: Sorry, just a small question. Surely when you take your samples, you do not just do it blind; you take into account the macroscopic aspects of these samples to start with.

Nodarou: Yes, the macroscopic fabric, the ware and the shape.
Κεραμικές ύλες και συνταγές στην Ύστερη Προανακτορική και Παλαιοανακτορική περίοδο στον Πετρά: πετρογραφική ανάλυση της κεραμικής από το Ταφικό Κτίριο 2 και τον Χώρο Τελετουργιών 1
Η συμβολή αυτή αποτελεί συνέχεια της αναλυτικής έρευνας που παρουσιάστηκε στον τόμο για τα 25 χρόνια ανασκαφών και μελετών στον Πετρά (Tsipopoulou ed. 2012). Από την Τελική Νεολιθική και την πρώιμη Προανακτορική προχωρούμε στην Ύστερη Προανακτορική και την πρώιμη Παλαιοανακτορική περίοδο και διερευνούμε τις κεραμικές ύλες από το σύνολο που έχει προέλθει από το Ταφικό Κτίριο 2 και τον Χώρο Τελετουργιών 1. Η πετρογραφική ανάλυση έδειξε σημαντικές αλλαγές προς την επιλογή των πρώτων υλών και τις συνταγές για την παραγωγή κεραμικής κατά την Ύστερη Προανακτορική και πρώιμη Παλαιοανακτορική σε σχέση με τις πρωιμότερες περιόδους. Διαπιστώνεται σαφής μεταστροφή από τις κεραμικές ύλες με προσθήκη ασβεστίτη και θρυμματισμένης κεραμικής προς ύλες με φυσικές προσμίξεις που προέρχονται κυρίως από τη σειρά Φυλλιτών-Χαλαζιτών. Ως προς τις εισαγωγές, σε σχέση με την ΤΝ-ΠΜ Ι περιορίζονται κατά πολύ οι επαφές με περιοχές εκτός Κρήτης αλλά η πετρογραφική ανάλυση υποδηλώνει εκτεταμένο εσωτερικό δίκτυο σχέσεων του Πετρά τόσο με την ευρύτερη περιοχή, όσο και με περιοχές όπως τα Γουρνιά/Καλό Χωρίδι και το Παλαικαστρό ανατολικά.