The Fabrics of the Ceramics at Dhaskalio

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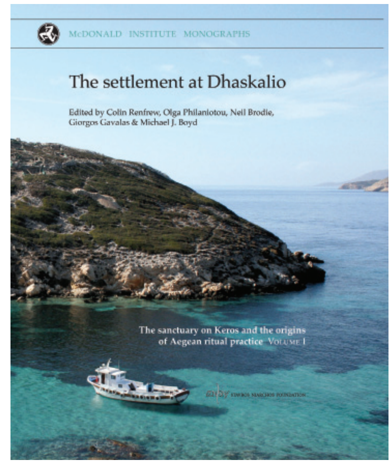

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Chapter 23

The Fabrics of the Ceramics at Dhaskalio

Jill Hilditch

This chapter outlines the results of an extensive macroscopic study of the ceramics excavated on the islet of Dhaskalio, together with a brief discussion of the relevant petrographic analyses, and a note on the neutron activation analysis. The Special Deposit South assemblage will be published in a separate chapter within Volume II of this series. The macroscopic comparison of the Dhaskalio and Special Deposit South assemblages with that from Special Deposit North (from the 1987–88 investigations) will be published in Volume III, along with the petrographic and chemical analyses.

The ceramic material from Dhaskalio (fully discussed by Sotirakopoulou in Volume IV) can be split into the following categories: i) whole and restored vessels; ii) diagnostic sherd material (partially catalogued); iii) non-diagnostic sherd material; and iv) special ceramic finds, such as vessels with mat/cloth impressions (fully discussed in Chapter 31A), rounded sherds (Chapter 31C) and metallurgical ceramics (Chapter 32).

Macroscopic analysis

The macroscopic study draws upon the earlier work on the 1987–88 Kavos Special Deposit North material by Broodbank (2007, 115–237), as many of his groupings and subsequent discussions of provenance remain relevant for the 2006–8 material. In general, for the recent investigations, the quality of the sherd material at Dhaskalio far exceeds that excavated within the Special Deposit South on Kavos. The latter material is extremely fragmented and eroded, with no complete or restorable vessels recovered. The good preservation and chronological resolution of the Dhaskalio material provides enormous potential to highlight changing frequencies of different fabrics over time, as well as provide typological parallels for considering issues of technology and provenance within the assemblage. An approximate figure for the medium *vs* coarse wares is given at the start of each macroscopic group description, though these will be refined in the petrographic study that follows. A more detailed quantification of the Dhaskalio ceramic assemblage, with respect to individual trenches, layers, shapes and surface treatments, will be provided by Sotirakopoulou (Volume IV). This chapter provides a snapshot of the correlations between shape, macroscopic fabric and phase, so as to allow integration with the 1987–88 study of the Special Deposit North material and to provide a broad view of patterns of production, distribution and consumption within the Dhaskalio assemblage.

As a brief introduction to the macroscopic descriptions it is worth commenting upon the considerable range of different groups that were classified within the Dhaskalio and Kavos material. In total there are 32 macroscopic groups (or fabrics): 22 for the coarse and medium wares, which includes sub-groups based upon composition, and 10 groups for the fine wares (see Table 23.20 for a full comparison of the correlations with Broodbank's groups for the Special Deposit North). These groupings and sub-groupings are based upon clay colour, degree of firing (high, medium or low), as well as suggested inclusion composition (colour and habit) and textural (shape, size and frequency) variation, which can offer significant insights into provenance and technological processes, even at this preliminary analytical stage. Most of the macroscopic groups identified within the Dhaskalio assemblage correlate to groups identified by Broodbank in the analysis of the 1987–88 assemblage from the Special Deposit North, which were largely confirmed in their suggested provenance by petrographic analysis (Hilditch 2007).

The Dhaskalio trench material

Three chronological phases have been identified at Dhaskalio on the basis of the typological and stylistic analysis of the assemblage by Sotirakopoulou (Chapter 6 and Volume IV). The earliest, Dhaskalio Phase A (2750–2550 BC), corresponds to the early Keros-Syros culture of the EC II period, with the succeeding

Table 23.1. *Comparison of macroscopic groupings between the 1987–88 material from the Special Deposit North and the Dhaskalio assemblage. Note that Broodbank's Crystalline, Fine Mottled and Fine White groups are only found within the Kavos assemblage.*

Macroscopic groups at Dhaskalio	SDN 1987–88 assemblage (Broodbank)
Coarse/Medium wares	
Quartz	Quartz
Sandy	Sandy
Dark Phyllite	Blue Schist
Red Phyllite	Red Schist
Micaceous Quartz	Micaceous Quartz
Micaceous Schist	Micaceous Other
Calcite	Marble
Talc	Talc
[not noted]	Crystalline
Dark Volcanic	Biotite
Non-micaceous Phyllite-Schist	[not noted]
Pale Volcanic	[not noted]
Granite	[not noted]
Fine Buff with Dark Temper	[not noted]
Fine wares	
Fine Buff	Fine Buff
Fine Dark Buff-Grey Micaceous	Fine Dark Buff Micaceous
[not noted]	Fine Mottled
Fine Grey	VARIANT of Fine Grey
Fine Dark Grey	[not noted]
Fine Orange	Fine Orange
Fine Red-Brown/Brown	[not noted]
Fine Dark Green-Brown Micaceous	[not noted]
Fine Pink	Fine Residual – Pink Variant
[not noted]	Fine White

Dhaskalio Phase B (2550–2400 BC) corresponding to the later Keros-Syros culture or earlier 'Kastri' phase of the late EC II period. The final Dhaskalio Phase C (2400–2300 BC) is contemporary with the later Early Cycladic period (EC III) and the main Kastri Group. To ensure coverage of all chronological phases, a number of trenches excavated to bedrock was studied in their entirety, or by phase (see Table 23.2), i.e. both diagnostic and undiagnostic data sets included in the study. The total below gives an estimate for frequency of vessels, based upon macroscopic categories and surface treatments, though this is likely to be an over-estimate since fragments of the same vessel appear in more than one trench layer. Some layers have been statistically conflated, in particular those where multiple vessels for reconstruction have been found, and are highlighted in the individual trench tables (full details of joining layers are given by Sotirakopoulou, Volume IV). A detailed assessment of macroscopic fabric by specific shape within each phase is given with each macroscopic fabric description in the following section.

Table 23.2. *The chronological phases present in the studied trenches and the number of vessels studied.*

Trench	Phase A	Phase B	Phase C
I	All	All	-
IV	-	All	-
V	-	All	-
VI	All	-	All
VII	-	-	Layer 32
XXI	-	-	All
XXIV	-	-	All
Total no. of vessels	71	373	956

Phase A material was studied from Trench I (layers 40–42) and Trench VI (layers 37, 38, 48, 51 & 52). The estimated vessel counts from the layers studied for each trench, by layer and by macroscopic fabric, can be seen in Table 23.3. The earliest phase within occupation levels at Dhaskalio is statistically the smallest sample of the overall fabric study with, perhaps unsurprisingly, the narrowest range of macroscopic fabric compositions. The most frequent macroscopic fabrics in Phase A are the Micaceous Quartz (V5) and Calcite with Mica (V7C) types, both with a relative frequency of 16.9%. The Calcite suite of macroscopic fabrics contains just over a quarter of the material studied from Phase A (V7A + V7B + V7C = 28.1%), whilst the Micaceous Schist macroscopic fabric class in total forms 16.8% of the studied sample. The non-micaceous Quartz and Sandy macroscopic fabrics are relatively low (4.2% and 5.6% respectively), compared to the level of Granite and Pale Volcanic macroscopic fabrics (both 7%). The combined relative frequency of the Dark Phyllite and Red Phyllite suite is also 7%. The Dark Volcanic macroscopic fabric is extremely low at 2.8%, as is the Fine Buff with Dark Temper macroscopic fabric (1.4%), but significantly there are no Talc Ware sherds found within the Phase A deposits studied. Only two fine ware vessels have been recorded within the Phase A fabric sample, one Fine Grey and one Fine Orange.

Trenches IV and V were identified as solely Phase B deposits so providing a robust data set from which to assess the range and frequencies of macroscopic fabrics within this intermediate phase. The Phase B layers of Trench I were also included to provide a contrast with the Phase A deposits within the same trench. The estimated vessel counts for each trench, by layer and by macroscopic fabric, can be seen in Table 23.4. In contrast to the earlier Phase A, Phase B contains a wide range of macroscopic fabrics reflecting multiple raw material compositions. Dark Phyllite Mixed (V3B) is the single most frequent macroscopic fabric with 13.4%, followed by Micaceous Quartz (V5) with 10.7% and the Coarse Calcite (V7A) with 10.5%. Talc Ware also forms a significant volume of the Phase B sample with 7.3%.

Table 23.3. *Phase A macroscopic fabrics: number of vessels per fabric per trench.*

Macroscopic fabrics	Subgroup	Trench		Total	%
		I	VI		
Quartz	V1A	-	3	**3**	**4.2**
	V1B	-	-	**-**	**-**
Sandy	V2A	-	-	**-**	**-**
	V2B	-	2	**2**	**2.8**
	V2C	-	2	**2**	**2.8**
Dark Phyllite	V3A	2	-	**2**	**2.8**
	V3B	-	1	**1**	**1.4**
Red Phyllite	V4	-	2	**2**	**2.8**
Micaceous Quartz	V5	10	2	**12**	**16.9**
Micaceous Schist	V6A	-	2	**2**	**2.8**
	V6B	-	5	**5**	**7.0**
	V6C	2	2	**4**	**5.6**
	V6D	-	1	**1**	**1.4**
Calcite	V7A	3	2	**5**	**7.0**
	V7B	-	3	**3**	**4.2**
	V7C	4	8	**12**	**16.9**
Talc	V8	-	-	**-**	**-**
Dark Volcanic	V10	1	1	**2**	**2.8**
Non-micaceous Phyllite-Schist	V11	-	-	**-**	**-**
Pale Volcanic	V12	2	3	**5**	**7.0**
Granite	V13	2	3	**5**	**7.0**
Fine Buff with Dark Temper	V14	-	1	**1**	**1.4**
Fine wares	VFW	-	2	**2**	**2.8**
Total		**26**	**45**	**71**	**100**

Table 23.4. *Phase B macroscopic fabrics: number of vessels per fabric per trench.*

Macroscopic fabrics	Subgroup	Trench			Total	%
		I	IV	V		
Quartz	V1A	-	13	9	22	**5.9**
	V1B	2	1	-	3	**0.8**
Sandy	V2A	-	1	-	1	**0.3**
	V2B	-	3	-	3	**0.8**
	V2C	4	4	1	9	**2.4**
Dark Phyllite	V3A	15	5	2	22	**5.9**
	V3B	8	28	14	50	**13.4**
Red Phyllite	V4	2	12	4	18	**4.8**
Micaceous Quartz	V5	12	21	7	40	**10.7**
Micaceous Schist	V6A	-	11	1	12	**3.2**
	V6B	1	11	3	15	**4.0**
	V6C	8	17	1	26	**7.0**
	V6D	4	1	-	5	**1.3**
Calcite	V7A	16	11	12	39	**10.5**
	V7B	5	4	-	9	**2.4**
	V7C	5	15	1	21	**5.7**
Talc	V8	9	14	4	27	**7.3**
Dark Volcanic	V10	2	2	1	5	**1.4**
Non-micaceous Phyllite-Schist	V11	4	10	1	15	**4.0**
Pale Volcanic	V12	7	1	-	8	**2.1**
Granite	V13	2	1	2	5	**1.4**
Fine Buff with Dark Temper	V14	1	-	1	2	**0.5**
Fine wares	VFW	6	7	3	16	**4.2**
Total		**113**	**193**	**67**	**373**	**100**

In terms of generally high macroscopic fabric classes, the Dark Phyllite class represents 19.3% of the Phase B sample, the Calcite class forms 18.5% and the Micaceous Schist suite is slightly lower with 15.5%. On the lower end of the scale, Talc represents 7.3%, the paler Quartz macroscopic fabric (V1A) shows 5.9% (much higher than the denser, grey Quartz variant V1B at 0.8%), Red Phyllite and non-micaceous Phyllite-Schist represent 4.8% and 4.0% respectively. The volcanic-derived macroscopic fabrics are lower still, at 2.1% for the pale buff variant (V12) and 1.4% for the darker brown/red-brown variant (V10). The fine wares form 4.2% of the Phase B sample, displaying a broad range of characteristics: the most frequent samples form a continuum of very micaceous macroscopic fabrics represented by the Fine Dark Buff to Grey Micaceous (FDBGM) group, with non-micaceous examples in Fine Buff, Fine Grey and Fine Dark Grey also appearing. There is also a lone sample of the Fine Dark Green Micaceous macroscopic fabric.

In Phase C the general fabric picture remains relatively unchanged, a wide spread of macroscopic fabrics with no single category dominating the assemblage (see Table 23.5). Phase C is represented by a larger sample than either Phases A or B, consisting of Trenches XXI and XXIV in their entirety, as well as one of the largest layers from Trench VII and the layers overlying Phase A deposits in Trench VI (Phase B is absent in this trench). The most frequent macroscopic fabrics are the Pale Volcanic (14.9%) and the Buff Sandy (V2C - 14.5%), with two variants of the Calcite class the next most frequent, Coarse Calcite and Micaceous Calcite (7.8% and 8.4% respectively). Dark Phyllite Mixed (V3B) and Granite macroscopic fabrics are slightly lower, at 5.6% and 5.4% respectively, closely followed by the paler Quartz variant (V1A) with 4.5% and the muscovite-dominated Micaceous Schist variant (V6C) with 4.2%. The Dark Volcanic macroscopic fabric is significantly lower than the paler variant (3.2% *vs* 14.9%) and Talc Ware is barely present with only 0.7% of the sample.

The varied fine wares, representing 4.8% of the Phase C sample, are dominated by the Fine Dark Buff to Grey Micaceous macroscopic fabric (just over

Table 23.5. *Phase C macroscopic fabrics: number of vessels per fabric per trench (for Trench VII, layer 32 only).*

Macroscopic fabrics	Subgroup	TRENCH				Total	%
		VI	VII	XXI	XXIV		
Quartz	V1A	19	2	11	11	43	**4.5**
	V1B	11	15	3	1	30	**3.1**
Sandy	V2A	20	0	1	-	21	**2.2**
	V2B	30	0	4	4	38	**4.0**
	V2C	112	0	10	16	138	**14.5**
Dark Phyllite	V3A	15	6	7	5	33	**3.5**
	V3B	37	7	7	3	54	**5.6**
Red Phyllite	V4	11	4	1	-	16	**1.7**
Micaceous Quartz	V5	16	2	-	1	19	**2.0**
Micaceous Schist	V6A	7	0	-	11	18	**1.9**
	V6B	18	0	9	5	32	**3.3**
	V6C	25	5	5	5	40	**4.2**
	V6D	12	0	3	-	15	**1.6**
Calcite	V7A	23	39	7	6	75	**7.8**
	V7B	5	6	5	2	18	**1.9**
	V7C	64	2	11	3	80	**8.4**
Talc	V8	5	1	1	-	7	**0.7**
Dark Volcanic	V10	18	9	3	1	31	**3.2**
Non-micaceous Phyllite-Schist	V11	4	1	-	1	6	**0.6**
Pale Volcanic	V12	72	9	26	35	142	**14.9**
Granite	V13	23	3	13	13	52	**5.4**
Fine Buff with Temper	V14	2	0	-		2	**0.2**
Fine wares	VFW	9	10	23	4	46	**4.8**
Total		**558**	**121**	**150**	**127**	**956**	**100**

Table 23.6. *Comparison of macroscopic fabric counts and relative frequencies by phase.*

Macroscopic fabrics	Subgroup	A	%	B	%	C	%
Quartz	V1A	3	**4.2**	22	**5.9**	43	**4.5**
	V1B	-	**-**	3	**0.8**	30	**3.1**
Sandy	V2A	-	**-**	1	**0.3**	21	**2.2**
	V2B	2	**2.8**	3	**0.8**	38	**4.0**
	V2C	2	**2.8**	9	**2.4**	138	**14.5**
Dark Phyllite	V3A	2	**2.8**	22	**5.9**	33	**3.5**
	V3B	1	**1.4**	50	**13.4**	54	**5.6**
Red Phyllite	V4	2	**2.8**	18	**4.8**	16	**1.7**
Micaceous Quartz	V5	12	**16.9**	40	**10.7**	19	**2.0**
Micaceous Schist	V6A	2	**2.8**	12	**3.2**	18	**1.9**
	V6B	5	**7.0**	15	**4.0**	32	**3.3**
	V6C	4	**5.6**	26	**7.0**	40	**4.2**
	V6D	1	**1.4**	5	**1.3**	15	**1.6**
Calcite	V7A	5	**7.0**	39	**10.5**	75	**7.8**
	V7B	3	**4.2**	9	**2.4**	18	**1.9**
	V7C	12	**16.9**	21	**5.7**	80	**8.4**
Talc	V8	-	**-**	27	**7.3**	7	**0.7**
Dark Volcanic	V10	2	**2.8**	5	**1.4**	31	**3.2**
Non-micaceous Phyllite-Schist	V11	-	**-**	15	**4.0**	6	**0.6**
Pale Volcanic	V12	5	**7.0**	8	**2.1**	142	**14.9**
Granite	V13	5	**7.0**	5	**1.4**	52	**5.4**
Fine Buff with Temper	V14	1	**1.4**	2	**0.5**	2	**0.2**
Fine wares	VFW	2	**2.8**	16	**4.2**	46	**4.8**
Total no. of vessels		**71**	**100**	**373**	**100**	**956**	**100**

a third of recorded samples in this phase fall within this broad category), with only Fine Mottled, Fine Hard Blue-Grey and Fine White not present within the layers studied.

As mentioned earlier, the degree of preservation and the extent of excavation on Dhaskalio has provided a unique opportunity to assess changes in the ceramic record throughout the mid to later early bronze age. This section will highlight the chronological patterns observed in specific macroscopic fabrics and general trends within the Dhaskalio sample assemblage. A phase-by-phase comparison of actual and relative frequencies within the sample assemblages is given in Table 23.6.

Discussion of the Dhaskalio macroscopic fabrics: medium to coarse wares

The macroscopic fabrics were initially classified in the field on the basis of inspection using a hand lens. Where quantitative counts are given, these are therefore the categories which have been utilized. Petrographic and chemical analysis, the latter using neutron activation analysis (NAA), was subsequently undertaken to assess the coherence of the macroscopic fabric groups and provide greater resolution on the composition and technology of each fabric. Brief comment on these follows later in this chapter, with a more detailed study of the integrated petro-chemical analyses from Dhaskalio, along with comparable samples from the Special Deposit South, given in Volume III. The classification followed here was informed by the earlier petrological classification used for the Special Deposit North (Hilditch 2007) and by the macroscopic classification defined there by Broodbank (2007). For the sake of clarity, the macroscopic fabric classes here are prefixed by the letter V, and the petrographic fabric classes, based on microscopic examination, will be prefixed by the letter P. It should be noted that while there is some correlation between the macroscopic fabric and petrographic classes, they are certainly not identical, as is clearly shown below in Table 23.22.

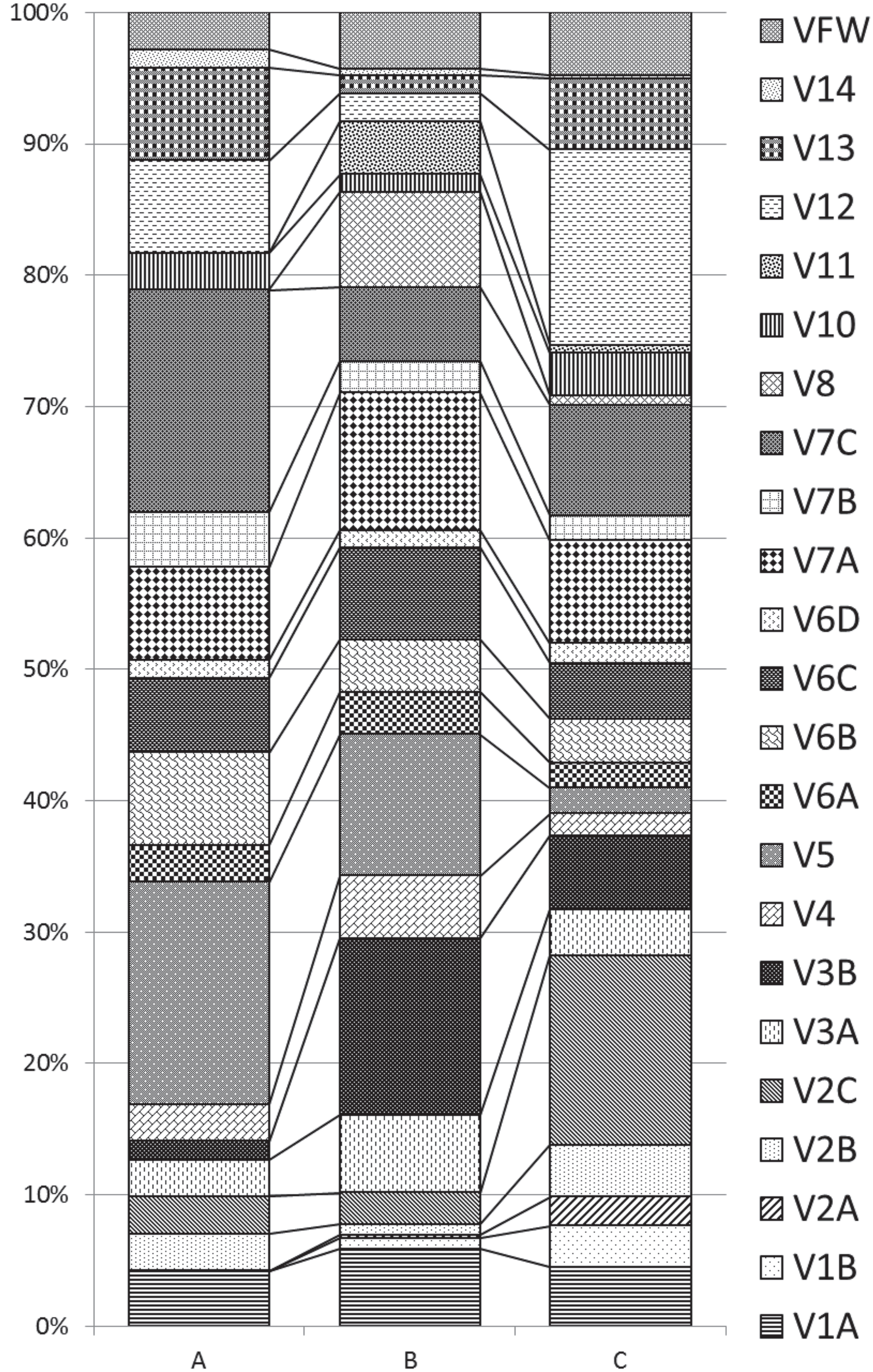

Figure 23.1. *Macroscopic fabric group frequencies by phase.*

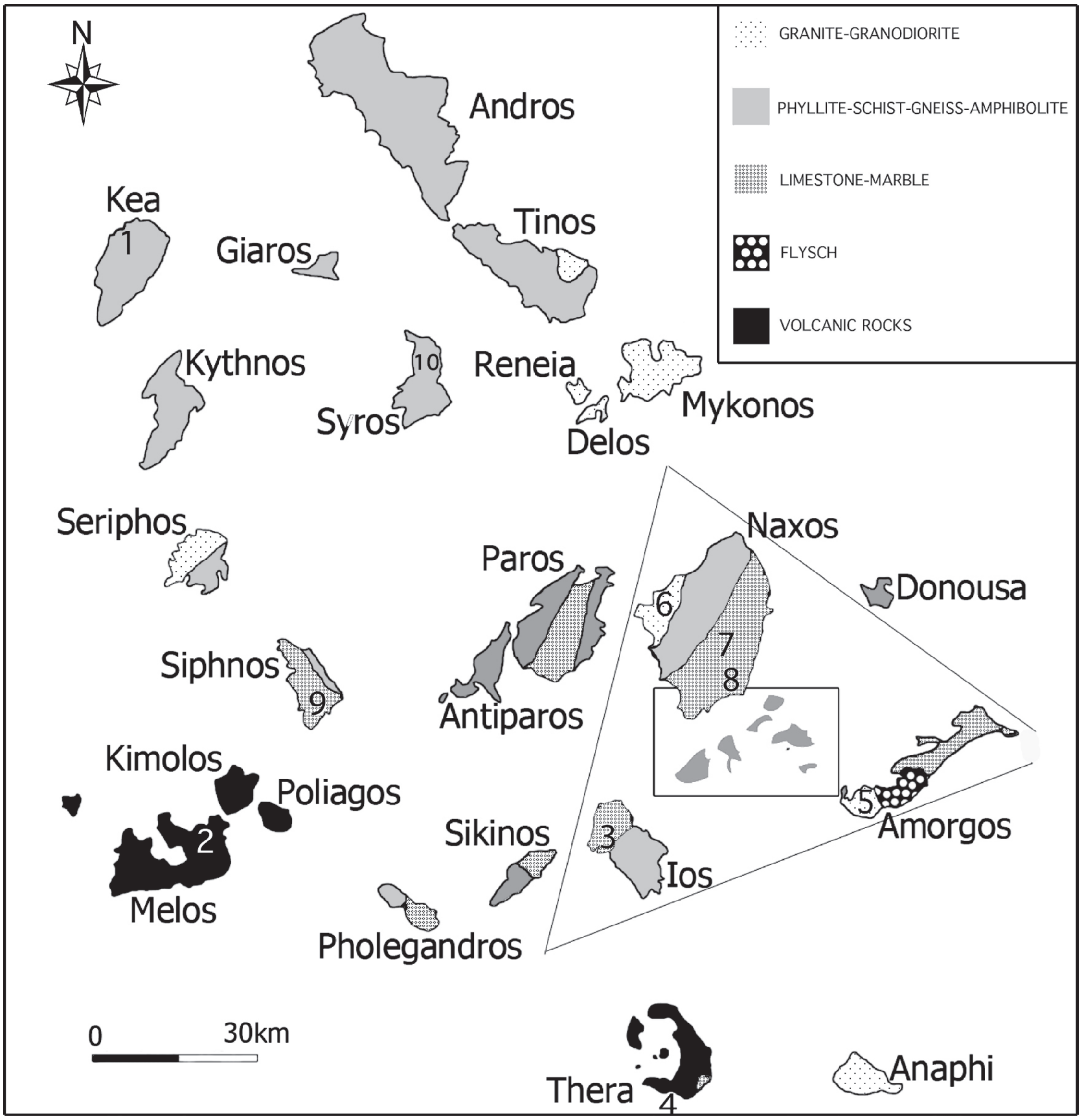

Figure 23.2. *Geological sketch map of the Cyclades indicating the 'Keros Triangle' and (in rectangle) the Mikres Kyklades (Small Cyclades). Sites indicated: 1. Ayia Irini (Kea); 2. Phylakopi (Melos); 3.Skarkos (Ios); 4. Akrotiri (Thera); 5. Markiani (Amorgos); 6. Grotta (Naxos); 7. Zas Cave (Naxos); 8. Panormos (Naxos); 9. Akrotiraki (Siphnos); 10. Chalandriani (Syros).*

A map of the production locations discussed for the following macroscopic fabrics is shown in Figure 23.2, with colour photographs of each macroscopic group presented in Plate 15.

In the macroscopic tables, the percentage values given are relative for each phase, and in total if there are subgroups identified. The following abbreviations are used: misc. jars = miscellaneous jars; NCV = no catalogued vessels, only non-diagnostic sherd data available.

Quartz - V1A, V1B

V1A - Non-grey firing, dense inclusions

V1B - Grey firing, dense clay

Coarse *c.*90%, medium *c.*10%. The Quartz macroscopic fabric class has two variants, based upon the colour and density of the fired ceramic: V1A is medium to well-fired, light brown to red-brown in colour with dense, large grey-white angular crystalline inclusions and rare mica; V1B is well-fired, grey-brown to grey in colour with large grey-white angular crystalline inclusions and rare mica, with a noticeably denser clay, less frequent coarse inclusions, and is consistently fired in a low oxygen environment. The medium examples display close similarities to the Sandy group (especially between V1A and V2A/V2C, and also V1B and V2B), suggesting a possible shared origin.

Table 23.7. *The range of vessel shapes and relative percentage of the Quartz group by phase.*

V1A	V1B
Phase A	
NCV	NCV
4.2%	**0.0%**
Phase B	
Baking pan Basin Jug Misc. jars	Brazier Misc. jars
5.9%	**0.8%**
Phase C	
Brazier Pithoid jar Deep-spouted bowl Misc. jars	Basin Cooking pot Cylindrical-necked jar Deep bowl Neckless jar Pithos
4.5%	**3.1%**

The V1A macroscopic fabric appears relatively constant throughout the different phases of occupation at Dhaskalio, with a brief peak in Phase B, while V1B first appears in Phase B and then increases in relative frequency during the later Phase C. From a macroscopic perspective there is little compositionally to separate these two variants, though the different frequency patterns may suggest the possibility of separate provenances, or at least distinct production units. The combined relative frequencies for this class across all three periods are 4.2%, 6.7% and 7.6%, showing a slight increase over time.

The surface treatment of the majority of vessels characterized as V1A or V1B is plain, though there are rare instances of decoration: fugitive slip on a Phase B jug and buff slip with a black painted vertical band on a closed vessel in Phase C. In addition, a number of Phase C pithoid jars displays relief rope pattern decoration, with a lone V1B pithoid jar also displaying a matt black streaky slip.

This macroscopic group is the same as Broodbank's Quartz group for the Special Deposit North (2007, 120–22), which displayed variation with respect to firing regime and the range of visible inclusion types. The subgroups presented here provide a clearer separation of the firing variations and the possible overlap with examples from the Sandy group. The distinct clay and firing differences may indicate a separate tradition or production unit for these two subgroups. However, the range of possible sources for this group remains firmly within the Keros Triangle, including the island of Keros itself, the Kouphonisia and Naxos.

Sandy - V2A, V2B, V2C

V2A - Red sandy
V2B - Grey sandy
V2C - Buff sandy

Medium 100%. The Sandy macroscopic fabric class is a broad group characterized by the presence of consistent sand-sized inclusions. Medium- to well-fired, containing moderately dense to very dense sand-sized inclusions of different colours and compositions, including friable white calcareous grains, buff to orange crystalline grains, dark red-brown to black rounded grains, occasional microfossils and rare gold and silver mica. Subgroup V2A exhibits predominantly red to brown clay with a slightly higher percentage of white inclusions. Subgroups V2B and V2C are characterized by the same mixed range of inclusion types but 2B displays grey-fired colours while V2C has buff to light brown-fired colours. This group has close parallels with medium examples from the Quartz group (V2A and V2C with V1A, and V2B with V1B). In some cases there were considerable visual similarities between the Sandy V2C and Pale Volcanic (V12) macroscopic fabrics. This is discussed in more detail below with the latter macroscopic fabric.

Table 23.8. *The range of vessel shapes and relative percentage of the Sandy group by phase.*

V2A	V2B	V2C
Phase A		
NCV	NCV	Conical-necked jar Conical-necked jar (ST)
-	**2.8%**	**2.8%**
Phase B		
NCV	Cylindrical-necked jar Sauceboat	Basin Neckless jar Pithoid jar Pithos
0.3%	**0.8%**	**2.4%**
Phase C		
Concave-necked jar Conical-necked jar Pithoid jar Pithos	Beak-spouted jug Pithos Misc. jars	Baking pan Barrel jar Bowl Cylindrical-necked jar Deep bowl Depas cup Pithos Misc. jars
2.2%	**4.0%**	**14.5%**

The variants of the Sandy macroscopic fabric class display quite different trajectories with respect to relative frequencies: 2A is absent from Phase A, barely appears in Phase B (0.3%) and increases to 2.2% in the later Phase C, whilst V2B declines between Phases A and B (2.8% down to 0.8%) but recovers in excess of original levels in Phase C (4%). However, variant V2C displays the most significant change, rising from relatively low frequencies in Phases A and B (2.8% and 2.4% respectively) to 14.5% in the final phase, the second most frequent macroscopic fabric in Phase C. The combined relative frequencies for this class across all three periods are 5.6%, 3.5% and 20.7%, revealing a marked increase in the final phase.

The Sandy subgroups are a refinement of the Sandy group (2007, 122–4), as outlined by Broodbank for the Special Deposit North. Subgroup V2C seems to be the strongest candidate for the pale Neogene deposits of the Kouphonisia, as much of the pottery observed from the ongoing Tzavaris plot excavations on Ano Kouphonisi corresponds to this macroscopic fabric (as do the pedestal-based collared jars from Kato Kouphonisi: Zapheiropoulou 1970). Subgroups V2A and V2B may represent a continuum between the sandier versions of the Quartz group and therefore a provenance within the Keros Triangle, and even on Keros itself, is most likely.

Dark Phyllite - V3A, V3B

V3A - Dark platey inclusions
V3B - Mixed (dark platey and angular white inclusions)

Coarse *c.* 75%, medium *c.* 25%. The clay is orange to red to dark-brown, sometimes grey with orange or brown margins, and often extremely friable from low firing conditions. Two subgroups have been identified: V3A is characterized by large, platey, blue-purple-black phyllite inclusions; V3B has the same dark phyllite inclusions, alongside significant quantities of bright white, angular crystalline inclusions and occasionally redder shale/phyllite inclusions, similar to the Red Phyllite macroscopic group described below.

Table 23.9. *The range of vessel shapes and relative percentage of the Dark Phyllite group by phase.*

V3A	V3B
Phase A	
Baking pan Misc. jars	Misc. jars
2.8%	**1.4%**
Phase B	
Baking pan Brazier Two-stage neck profile jar Wide-mouthed jug Misc. jars	Concave-necked jar Funnel-necked jar Miniature conical cup Neckless jar Pithoid jar Pithos Misc. jars
5.9%	**13.4%**
Phase C	
Pithos Lid	Barrel jar Basin Concave-necked jar Cylindrical-necked jar Depas cup Pithoid jar Pithos Shallow bowl Misc. jars
3.5%	**5.6%**

The V3A variant fluctuates moderately, doubling in relative frequency from Phases A to B (2.8% to 5.9%) but falling almost back to original amounts by the final phase (3.5%). V3B shows a remarkable increase in Phase B (13.4%, up from 1.4% in Phase A) but also a substantial decrease in Phase C, back to 5.6%. Both variants in this class display a rise in relative frequency from Phase A to Phase B, and a subsequent falling off in frequency over the course of Phase B to Phase C, indicating that these macroscopic fabrics probably share a similar geographical origin and, therefore, represent a consistent picture of waxing and waning interactions between Dhaskalio and another specific location or production unit. The combined relative frequencies for this class across all three periods are 4.2%, 19.3% and 7.3%, revealing a considerable increase in the intermediate Phase B assemblage and, despite a dip from this peak, an overall increase over time at Dhaskalio.

Known widely within early bronze age Cycladic assemblages as 'Blue Schist ware', this group corresponds to the Blue Schist macroscopic group described by Broodbank for the Special Deposit North (2007, 124–5). Subgroup V3A is a direct parallel to Broodbank's Platey sub-variant of his Blue Schist Group for the Special Deposit North, while V3B corresponds to his Mixed sub-variant. The Dark sub-variant is not used as the darker, greyer and higher-fired members occur within both subgroups V3A and V3B. This group reflects exploitation of the distinctive manganese and iron-rich 'patelia' deposits on Amorgos (not glaucophane as previously thought: see Vaughan 2006 for a full discussion), although the subgroups may indicate two contemporary potting traditions within this island. The significant increase in frequency of V3B vessels from Phase A to B indicates a brief intensification of imported vessels from Amorgos (though possibly at the expense of V3A), mirroring the increase of 'blue schist' fabrics at Markiani on Amorgos, from approximately 1% to 33% between Phases II and III (Karantzali 2006; Birtacha 2006b).

Red Phyllite - V4

Coarse *c.* 65%, medium c. 35%. The clay is orange-red to dark brown, mostly medium-fired but lower-fired samples can be friable, and is dominated by the presence of flat, pink to red-brown phyllite inclusions, with very few darker blue phyllite and angular white inclusions. The Red Phyllite macroscopic fabric shows a temporary gain in Phase B (from 2.8% to 4.8%), before dropping down to its lowest levels in Phase C (1.7%). This group equates to Broodbank's Red Schist group for the Special Deposit North (2007, 125) and, as he observed, exhibits similarities to subgroup V3B (Dark Phyllite Mixed).

Table 23.10. *The range of vessel shapes and relative percentage of the Red Phyllite group by phase.*

Phase A	Phase B	Phase C
NCV	Baking pan Brazier Cooking pot Two-stage neck profile jar	Pithos Misc. jars
2.8%	**4.8%**	**1.7%**

Table 23.11. *The range of vessel shapes and relative percentage of the Micaceous Quartz group by phase.*

Phase A	Phase B	Phase C
Baking pan Concave-necked jar	Baking pan Bowl Brazier Deep bowl Funnel-necked jar Misc. jars	Concave-necked jar Deep bowl Misc. jars
16.9%	**10.7%**	**2.0%**

As with the Dark Phyllite macroscopic group there are strong parallels to assemblages on Amorgos, where it has been described as the 'Red Shale' macroscopic fabric (Vaughan 2006). An increase during Phase B followed by a decrease in Phase C, as seen in both subgroups 3A and 3B, is also observed for this ware at Markiani over Periods III and IV (Birtacha 2006b; Eskitzioglou 2006). This is also reflected in the higher percentages identified within the sherd material collected from Ta Nera/Kastri (Broodbank 2007, 125). The likelihood of this group originating on Amorgos seems almost certain, although petrographic analysis may help shed light on whether this group is a product of a production unit distinct from that of the other Dark Phyllite wares.

Micaceous Quartz - V5

Coarse *c.* 50%, medium *c.* 50%. This group is characterized by white and grey crystalline inclusions alongside significant levels of silver mica and lesser amounts (or absent) gold mica, with rare orange to dark-brown, sand-sized inclusions. The clay is light brown to dark brown, often with a grey core and rarely entirely grey, well- to medium-fired. As with Broodbank's Micaceous Quartz group there are strong similarities with other groups — higher levels of silver and gold mica distinguish the paler-fired, medium samples from the Sandy subgroup V2C and the all-grey samples from subgroup V2B, while the coarser samples tend to draw parallels with the grey firing Quartz subgroup V1B. There may also be overlap between this group and the Micaceous Schist subgroup V6C (Muscovite-rich schist) if no schist inclusions were visible on the sherd surfaces or section break. This group is distinguished from the Granite group, which has coarse fraction quartz-mica-amphibole(?) inclusions, as it contains mica only in the fine fraction. This macroscopic fabric, along with the Calcite with Mica variant (V7C), has the highest relative frequency within Phase A (16.9%), though it then decreases in Phase B to 10.7% and falls off sharply to 2% in Phase C.

Broodbank's discussion of provenance for finds from the Special Deposit North for this macroscopic group remains pertinent, as the variation seen in both composition and firing regime does suggest a range of possible production units exploiting variable raw materials,

Table 23.12. *The range of vessel shapes and relative percentage of the Micaceous Schist group by phase.*

V6A	V6B	V6C	V6D
Phase A			
NCV	Baking pan Pithos	Baking pan	NCV
2.8%	**7.0%**	**5.6%**	**1.4%**
Phase B			
NCV	Baking pan Neckless jar	Baking pan Bowl Deep bowl	NCV
3.2%	**4.0%**	**7.0%**	**1.3%**
Phase C			
NCV	Baking pan Pithos Misc. jars	Baking pan Bowl Hearth	Cylindrical-necked jar Depas cup
1.9%	**3.3%**	**4.2%**	**1.6%**

Table 23.13. *The range of vessel shapes and relative percentage of the Calcite group by phase.*

V7A	V7B	V7C
Phase A		
Baking pan Brazier Misc. jars	NCV	NCV
7.0%	**4.2%**	**16.9%**
Phase B		
Baking pan Conical bowl Deep bowl Cylindrical-collared jar Neckless jar Pithos	Neckless jar Pithos	Jug Neckless jar Pithos Misc. jars
10.5%	**2.4%**	**5.7%**
Phase C		
Barrel jar Basin Cooking pot Jug Neckless jar Pithoid jar Pithos Misc. jars	Conical-necked jar Neckless jar Misc. jars	Baking pan Barrel jar Basin Beak-spouted jug Bowl Brazier Concave-necked jar Pithoid jar Pithos Misc. jars
7.8%	**1.9%**	**8.4%**

most probably within the Keros Triangle on islands such as Naxos, Ios, Schinousa or Irakleia, though Paros and Amorgos must not be ruled out completely. One certainty is that the micaceous component of this group is incompatible with the raw materials available within the vicinity of Dhaskalio or Kavos or more widely on Keros. The decrease in relative frequency of this group must be considered cautiously, if such a wide range of possible sources is indeed likely, though the lowest frequency in Phase C may correspond to the abandonment or decline of regional settlements towards the end of the early bronze age, such as Panormos on Naxos (Angelopoulou 2008) and Skarkos on Ios (Marthari 2008).

Micaceous Schist - V6A, V6B, V6C, V6D

V6A - mixed schist and calcite

V6B - muscovite+biotite schist

V6C - muscovite schist

V6D - biotite schist

Coarse *c.* 85%, medium *c.* 15%. This class of macroscopic fabrics is distinguished by micaceous schist rock fragments as the dominant coarse fraction inclusion type, with ample fine fraction mica present too. The low to medium-fired clay ranges in colour from yellow- to orange-brown as well as red to dark-brown, with rare grey cores, across all four subgroups. The main compositional differences can be summarized as follows: V6A is a mixture of micaceous schist — biotite (gold) and muscovite (silver) bearing — with calcareous inclusions, and V6B contains both muscovite- and biotite-bearing schist particles but no calcareous inclusions. The variants V6C and V6D have a more limited range of inclusions: muscovite-rich schist in V6C and biotite-rich schist in V6D. Given the compositional variability of the schist fragments, it is unlikely that this class represents the output of a single production unit.

Both V6A and V6C show minor increases in relative frequency from Phase A to Phase B (3.2% and 7% at their highest, respectively), but decrease in the final phase to lower frequencies than their Phase A totals. V6B starts on a moderately high relative frequency (7%) but shows reduced numbers in both later Phases B and C, whereas V6D is scarce throughout all three periods (1.4%, 1.3% and 1.6% respectively). The combined relative frequencies for this class across all three periods are 16.8%, 15.5% and 11%, revealing a downward trend in overall frequency across the three phases of occupation.

This Micaceous Schist group is similar to Broodbank's Micaceous Other category for the Special Deposit North, in that it contains a range of micaceous fabrics characterized by low levels of individual quartz grains. The compositional range of schist outcrops within the Keros Triangle alone is extensive, often varying within a single island too, such as those seen on Naxos, Ios and Amorgos. The high mica content of all of these samples is incompatible with the raw materials around Dhaskalio and Kavos and on Keros generally, making all the Micaceous Schist subgroups imports to the site. As with the Micaceous Quartz group, a range of raw materials and production units are likely responsible for these imports, so the relative frequency must be considered cautiously.

Calcite - V7A + V7B + V7C

7A - coarse crystalline

7B - sandy crystalline

7C - coarse crystalline and micaceous

Coarse *c.* 70%, medium *c.* 30%. This macroscopic fabric class has three variants, coarse calcite-bearing (V7A), subrounded to angular sand-sized calcite-bearing (V7B) and calcite in a biotite-bearing clay (possibly also muscovite), both in the coarse and fine fractions (V7C). All variants are medium-fired and reveal a broad range of firing colours, from pale to dark brown, red, orange and even grey to black. These subgroups represent the variation observed within Broodbank's Marble group for the Special Deposit North (2007, 126). Each variant displays a different pattern of relative frequencies: V7A increases slightly in Phase B but returns to Phase A levels within the final Phase C; V7B, the lowest of the variants, decreases consistently across all three phases; and V7C drops from the most frequent macroscopic fabric in Phase A (16.9%) to half that level in Phase C (8.4%). The combined relative frequencies for this class across all three periods are 28.1%, 18.6% and 18.1%, showing a decrease in later periods by almost a third from Phase A levels.

The micaceous and non-micaceous subgroups strongly suggest the use of different clay pastes and deliberate tempering activities in the production of this fabric. Subgroup V7C is incompatible with a Kerian provenance due to the high mica content, but the possibility of V7A and V7B originating on Keros must be considered, as marble is the dominant rock type across the island and forms entirely

Table 23.14. *The range of vessel shapes and relative percentage of the Talc group by phase.*

Phase A	Phase B	Phase C
Baking pan Brazier Deep bowl	Deep bowl Two-stage neck profile jar Pithos Misc. jars	Pithos Misc. jars
0.0%	**7.3%**	**0.7%**

the islet of Dhaskalio. However, the calcite-tempering tradition is attested across the early bronze age Cyclades, from sites such as Zas Cave and Grotta on Naxos (Hilditch 2005a,b), Markiani on Amorgos (Vaughan 2006) and at the cemetery of Aghia Photia on the north coast of Crete, which displays strong links to the Early Cycladic culture (Day *et al.* 1998, 138). The likelihood of locally produced calcite-tempered fabrics at numerous locations, as opposed to a single production source with wide distribution, is strengthened by the analysis of calcite-tempered pottery at Poros-Katsambas on Crete (Wilson *et al.* 2008, 262). The relative frequency of this group declines steadily over time, falling from almost a third of the Phase A material to 18.1% during Phase C, suggesting a general decline in the calcite-tempering tradition across the various island sources.

Talc - V8

Coarse 100%. The Talc group equates to Broodbank's macroscopic group of the same name for the Special Deposit North, characterized as 'a soapy texture and reddish-purple to (less commonly) orange-brown fabric, with large pale blue-grey inclusions and lack of mica … it is well-fired but quite friable' (2007, 126). This distinctive 'soapy feel' macroscopic fabric is absent from the Phase A sample at Dhaskalio, appearing first in significant quantities in Phase B (7.3%) and then almost disappearing again in Phase C as the relative frequency drops to 0.7%. Surface treatments are also the same as the Special Deposit North, mainly plain but with occasional incised decoration.

As Broodbank states, 'this fabric is one of the most recognizable in the Cyclades' (2007, 126), though little has been published on this fabric since the study by Vaughan and Wilson (1993). The island of Siphnos has been proposed as the source of this fabric (Vaughan & Wilson 1993), although Palamari on Skyros does offer a potential alternative source, as talc-rich rocks have been identified within the vicinity of the site and a large proportion of the EB II and III assemblage is composed of this fabric (Parlama 1984).

Dark Volcanic - V10

Coarse *c.* 70%, medium *c.* 30%. The Dark Volcanic macroscopic fabric contains small, angular, dark shiny mafic minerals (biotite/amphibole?), probably from a volcanic origin. Other inclusions can vary, with mixtures of grey to orange friable grains, white and grey crystalline grains, fine fraction gold and/or silver mica and red, brown and black porous grains (lava fragments?). The clay is orange to red through to dark brown, often with a dark grey core that can appear slightly blueish. The group is medium to well-fired and rarely friable. Dark Volcanic has strong similarities to Broodbank's Biotite macroscopic group for the Special Deposit North (2007, 127), although the paler samples he describes have here been separated into the Pale Volcanic group. This macroscopic fabric forms a relatively small proportion of the Dhaskalio sample assemblage, composing 2.8% in Phase A, dropping to 1.4% in Phase B and rising finally to 3.2% in Phase C.

The proposed volcanic origin for this group, and Broodbank's Biotite group for the Special Deposit North, is supported by analyses at Markiani of a similar macroscopic fabric found to contain lava grains (tentatively identified as basalts), plagioclase phenocrysts and cherts (Vaughan 2006). Possible sources for volcanic rock fragments are focused on the Cycladic islands of Melos, Thera and Anaphi, as well as Aegina in the Saronic Gulf, though they are more acidic in nature than mafic-rich basalt-derived deposits. Red-brown volcanic-derived fabrics form a major part of the early bronze age assemblage at Phylakopi on Melos (Vaughan & Williams 2007, 114), supporting a Melian provenance over Thera, which consistently produces paler brown and pink fabrics with no blueish core during this period (Vaughan 1990, 472–4). Aegina still remains a possibility, however, as the widespread andesite rocks are more mafic than the rhyolite-dacite rocks that dominate Melos, and a non-calcareous volcanic fabric is one of the dominant local fabric groups (FG 1: Kiriatzi *et al.* 2011, 93–9).

Table 23.15. *The range of vessel shapes and relative percentage of the Dark Volcanic group by phase.*

Phase A	Phase B	Phase C
NCV	Baking pan Basin Misc. jars	Baking pan Basin Concave-necked jar Cooking pot Neckless jar
2.8%	**1.4%**	**3.2%**

Table 23.16. *The range of vessel shapes and relative percentage of the Non-Micaceous Phyllite-Schist group by phase.*

Phase A	Phase B	Phase C
-	Baking pan	Concave-necked jar Misc. jars
0.0%	**4.0%**	**0.6%**

Non-micaceous Phyllite-Schist - V11

Coarse *c.* 85%, medium *c.* 15%. Medium-fired fabric; the clay ranges from a pale brown to a dark red-brown with large elongate, non-micaceous, quartz-bearing phyllite to schist inclusions, alongside quartz crystalline inclusions and rare to absent mica in the fine fraction. This macroscopic group has no parallels from the material recovered during the 1987–88 investigations in the Special Deposit North. As with Talc, this macroscopic fabric appears first in Phase B (4%) and then almost disappears again in Phase C (0.6%).

This group differs from the Micaceous Quartz and Micaceous Schist groups due to the very low levels (or absence) of mica, both in the coarse and fine fractions of the fabric. Possible raw material sources within the Keros Triangle are numerous, including the flysch deposits from Amorgos, the pelitic schists from south-central Naxos, and possibly also on Keros itself, as muddy quartz-schist noted from the foothills behind Gerani during this study (courtesy of Maniatis and Dixon) might offer a viable source. A low-micaceous schist fabric has been identified within material from Grotta and Zas Cave on Naxos by the author, though these findings have yet to be published fully (Hilditch 2005a,b).

Pale Volcanic - V12

Coarse *c.* 25%, medium *c.* 75%. Well-fired fabric; the clay is predominantly buff to dark buff, tending towards pink or pink-brown in the coarser examples. A greenish tinge is present in the very well-fired examples. The inclusions are a mixture of friable white calcareous material and volcanics, such as porous black, brown and red inclusions and occasional white crystalline grains, with minimal amounts of silver mica and rare gold mica. The Pale Volcanic macroscopic fabric differs from the darker variant (V10) by both firing colour and type of volcanic inclusions. Whereas the Dark Volcanic macroscopic fabric contains angular dark biotite/amphibole crystals alongside quartz/feldspar type inclusions, the Pale Volcanic variant has low biotite/amphibole content, with

Table 23.17. *The range of vessel shapes and relative percentage of the Pale Volcanic group by phase.*

Phase A	Phase B	Phase C
Conical-necked jar Pedestalled jar	NCV	Baking pan Barrel jar Basin Bowl Brazier Conical cup/bowl Cooking pot Cylindrical-necked jar Deep bowl Hearth Vertically ribbed jar Pithoid jar Pithos Pyxis Spouted basin Misc. jars
7.0%	**2.1%**	**14.9%**

higher levels of porous lava fragments and friable buff calcareous inclusions. Also, the consistently pale (buff) firing colour gives this macroscopic fabric a similar appearance to the Sandy variant V2C, a particularly interesting feature when considering the Phase C sample assemblage, where Pale Volcanic and Sandy V2C have the greatest relative frequencies. This macroscopic group has no parallels from the material recovered during the 1987–88 investigations in the Special Deposit North.

In Phase A the Pale Volcanic macroscopic fabric forms 7% of the sample assemblage, falling in Phase B to 2.1% before rising to its highest frequency in Phase C, as mentioned above. The frequency pattern for Pale Volcanic is similar to Dark Volcanic (both drop in Phase B) but the significant increase of the former in Phase C is not repeated by the Dark Volcanic macroscopic fabric. Separate provenances for the two volcanic macroscopic fabrics is most plausible, given the range of inclusion compositions.

Suggested provenance for the Pale Volcanic group lies between Melos and Thera, the two Cycladic islands known for producing the pale volcanic fabrics, including Cycladic White ware (Vaughan *et al.* 1995) during the succeeding Middle Cycladic period. At Phylakopi on Melos, pale volcanic fabrics only appear within the very late deposits of the early bronze age, the Phylakopi I phase (Renfrew & Evans 2007; Barber 1987), whereas paler volcanic fabrics are present from the earliest levels at Akrotiri on Thera (Sotirakopoulou 1986; 1990; Vaughan 1990). However, an Aeginetan provenance is also possible, as one of the main local Bronze Age fabric groups is a paler, calcareous version derived from the local andesitic deposits (FG 2: Kiriatzi *et al.* 2011, 99–104). Petrographic analysis will enable more detailed characterization in considering coherence and provenance for this group.

Granite - V13

Coarse *c.* 100%. Medium-fired fabric; the clay is pale orange to brown with less frequent reddish-brown samples. The core tends towards grey or dark brown, and is rarely black. Inclusions are predominantly large, crystalline inclusions composed of translucent and white opaque minerals with visible black minerals and gold mica/amphibole. The fine fraction contains extremely variable levels of gold and silver mica. This macroscopic group has no parallels from the material recovered during the 1987–88 investigations in the Special Deposit North. This macroscopic fabric has a relative frequency of 7% in Phase A, drops right down to 1.4% in Phase B and then recovers in Phase C with 5.4%.

Compatible raw materials for this group are the granite-granodiorite units of Naxos and Paros. Little petrographic work has been undertaken on early bronze age fabrics from Paros, but there are strong parallels with Late Neolithic and Early Cycladic material from Grotta and Zas Cave on Naxos (Hilditch 2005a,b), as well as later Middle Cycladic material from Mikre Vigla on Naxos (Vaughan 1989).

Table 23.18. *The range of vessel shapes and relative percentage of the Granitic group by phase.*

Phase A	Phase B	Phase C
Brazier	NCV	Neckless jar Pithos Strainer
7.0%	**1.4%**	**5.4%**

Table 23.19. *The range of vessel shapes and relative percentage of the Fine Buff with Temper group by phase.*

Phase A	Phase B	Phase C
NCV	Lid	Conical-necked jar
1.4%	**0.5%**	**0.2%**

Fine Buff with Dark Temper - V14

Medium 100%. Well-fired with a very fine, buff groundmass and sand-sized inclusions of red to dark-brown grains, occasionally angular in shape, probably intentionally added. There is no mica in the fine fraction. The sherds have a smooth, non-dusty feel, which distinguishes them from some of the finer, low-mica Sandy 2C subgroup samples and the Pale Volcanic group samples. This macroscopic fabric is relatively small through the occupation at Dhaskalio, most frequent in Phase A (1.4%) and decreasing across subsequent phases to 0.2%.

This group bears a striking resemblance to the finer Neogene-derived fabrics of Crete, as the clay groundmass is extremely fine and the inclusions are well-sorted, sand-sized deliberate additions to the paste, a Minoan tradition of paste processing attested from sites in north and south central Crete, including the Mesara Plain (Wilson & Day 1994; Whitelaw *et al.* 1997; Day & Wilson 1998). Petrographic analysis may help consider the relationship of this group to the pale fine fabrics of this study too.

Discussion of the Dhaskalio macroscopic fabrics: fine wares

The relative frequencies for all fine ware samples increase across the phases, starting at 2.8% in Phase A, increasing to 4.2% in Phase B and slightly more again in Phase C to 4.8%. A summary of the fine ware appearances in the sample assemblage of Dhaskalio is given in Table 23.20. In comparison to the 1987–88 material from the Special Deposit North, the level of Phase A fine wares are half that recorded for the original survey by Broodbank. However, given the chronological timeframe for activity at Kavos, it may not be possible to draw direct comparisons between the Kavos and Dhaskalio relative frequencies.

Fine Buff

This group equates to Broodbank's Fine Buff group for the Special Deposit North (2007, 127–8), being mid-buff to a pale orange or darker buff in colour, with rare inclusions and fine fraction mica.

Table 23.20. *Fine ware vessels recorded in the Dhaskalio sample assemblage.*

Fine ware macroscopic fabrics	A	B	C
Fine Buff	-	2	9
Fine Dark Buff-Grey Micaceous	-	9	17
Fine Grey	1	3	9
Fine Dark Grey	-	1	2
Fine Orange	1	-	2
Fine Red-Brown/Brown	-	-	3
Fine Dark Green-Brown Micaceous	-	1	3
Fine Pink	-	-	1
Total no. of vessels	**2**	**16**	**46**

The firing states are varied, from medium to well-fired, as with Broodbank's group.

From the limited sherd and catalogued data, the following shapes were noted: a pyxis lid and a conical-necked jar in Phase A and a pedestalled base in Phase B, as well as several non-diagnostic body sherds. There is also a depas cup in Fine Buff from Phase C levels. The range of surface treatments expands from the Dark-on-Light and Pale Slipped of Phases A and B to include Urfirnis, Black Slipped and Burnished, Urfirnis and White Slipped in Phase C. The conical-necked jar of Phase A has Syros-type stamped and incised decoration.

Fine Dark Buff-Grey Micaceous

This group is related to Broodbank's Fine Dark Buff Micaceous for the Special Deposit North (2007, 129), though samples with darker firing colours have also been included here. The clay colour ranges from dark buff to pale grey through to dark grey. In addition to rare fine sand-sized quartz inclusions, all the samples within this group contain significant levels of fine fraction mica, predominantly silver, rarely mixed with gold mica, which distinguishes them from the non-micaceous Fine Buff and Fine Grey groups, and the gold mica-rich Fine Dark Green-Brown Micaceous group. Fine Dark Green-Brown Micaceous also differs in that the fired colours show no sign of reduced-firing conditions and the group is consistently fine with no fine sand inclusions.

No diagnostic sherds of this group were found within Phase A. In Phase B, there are a number of plates, sauceboats, bowls, medium-sized jars, a 'teapot' and several one-handled tankards. In Phase C, the repertoire of shapes increases to include a pyxis, a jug, a possible spool joint from a double vessel and an askos, as well as Kastri shapes such as Anatolian style jugs and depas cups to accompany the one-handled tankards. Surface treatment ranges from Plain to Red- and Red-Brown Slipped and Burnished in Phase B, with a change to Black Slipped and Black Slipped and Burnished in Phase C. A Phase C jug also displays grooved/incised decoration.

Fine Grey

The samples of this group are characterized by a grey fabric, sometimes with a paler grey core and often with very thin orange or pink margins. There are no visible inclusions within the fabric, not even fine fraction mica, which distinguishes this group from Broodbank's Fine Grey for the Special Deposit North (2007, 129) and the grey samples within the Fine Dark Buff-Grey Micaceous group. The pink and orange margins do tend in colour towards the samples within Fine Pink and Fine Orange, but these samples rarely exhibit core-margin firing differences and contain variable levels of fine fraction mica.

This group is extremely sparse across Phases A and B at Dhaskalio, with only an unidentified closed vessel and two one-handled tankards noted. In Phase C, however, there are sauceboats, a bowl and a number of Kastri Phase shapes, including the one-handled bell-shaped cup, the depas cup, an unidentified jug/tankard and a jug with cutaway spout. The unidentified vessel in Phase A has Dark-on-Light painted decoration, while the Phase B tankards have Plain and Black Urfirnis decoration. A range of surface treatments are seen in Phase C, including Urfirnis, Black Burnished, Black Slipped and Burnished, Plain and grooved decoration.

Fine Dark Grey

There are no parallels for this group within Broodbank's macroscopic analysis for the Special Deposit North. The group is characterized by a very dark, charcoal grey colour, with occasionally orange external margins. There is no mica in the fine fraction, though there are rare instances of fine sand-sized quartz inclusions. This group seems less well-fired than most of the other fine groups and can occasionally be friable in broken sections.

There are no recorded sherds in this group within Phases A or B, but a depas cup, a flaring bowl and a one-handled tankard are noted in Phase C. These vessels display Dark Brown Burnished and Black Slipped and Burnished decoration. This group may well be a lower-fired and more reduced version of the Fine Grey samples, but no further comment can be made here on so few sherds — only the petrographic and chemical analyses will be able to characterize any possible connection in more detail.

Fine Orange

This group equates to Broodbank's Fine Orange group for the Special Deposit North (2007, 128), which displays an unusually soft fabric, due to low to medium firing conditions. The clay ranges in colour from pale orange to red-orange and frequently displays a thin, pale grey core. Fine fraction micas, both gold and silver, are visible but not abundant and fine sand-sized quartz inclusions occur infrequently.

This group appears in Phases B and C at Dhaskalio, in a variety of shapes, including a possibly wheelmade plate, sauceboats and a one-handled tankard. The diagnostic shapes are Plain but a number of non-diagnostic body sherds display White Slipped decoration, possibly with traces of dark paint, as Broodbank observed within the 1987–88 assemblage.

Fine Red-Brown

This group has no parallels within the 1987–88 material from the Special Deposit North. The clay is consistently red-brown to brown, relatively micaceous with sparse fine quartz and black inclusions and medium-fired. This group appears in Phase B in the one-handled tankard shape, with Phase C shapes including the depas cup, a pyxis-like vessel and an unidentified spouted vessel. The Phase B material is Plain, whereas Phase C contains Black Burnished, Red Slipped and Burnished and impressed decoration.

Fine Dark Green-Brown Micaceous

This group also has no parallels within the 1987–88 material from the Special Deposit North. The clay is a dark green-brown to very dark brown colour with abundant fine fraction mica, predominantly gold though rare sherds do appear to contain low levels of silver mica also. This group is associated entirely with stamped and incised conical-necked pedestalled jars, known as Syros-type jars, with non-diagnostic body sherds displaying partial Kerbschnitt and various stamped decorations, including spirals, concentric circles and patterned seals (see **C0131** in Sotirakopoulou's preliminary catalogue).

Fine Pink

The Fine Pink group is loosely related to the Fine Residual — Pink variant identified by Broodbank for the Special Deposit North (2007, 129–30). The samples are more consistently medium-fired than the low-fired, 'talc-like texture' observed by Broodbank, though the thin, pale grey core appears less frequently. There is some visible mica in the fine fraction but no other inclusions are present. One Plain jug has been identified within Phase A and only non-diagnostic sherds with a possible Dark Wash surface treatment have been observed within Phase B.

The petrographic study of the Dhaskalio ceramic assemblage

The earlier petrographic study of the 1987–88 assemblage from the Special Deposit North at Kavos (Hilditch 2007, 238–63) offered a valuable means of testing the coherence of the extensive macroscopic study by Broodbank, and provided a more detailed discussion of possible provenance for the large range of fabrics found at Kavos. Despite the relatively small sample, and the large number of fabrics attested by only one sample, many of the wares defined by Broodbank were confirmed as coherent fabrics with respect to provenance and technological behaviours under the microscope. The petrographic study of the 2006–8 ceramic assemblage from Dhaskalio and from the Special Deposit South is significantly larger, with 291 samples taken in total. Of these, 178 samples were taken from the site of Dhaskalio, across all three chronological phases: Phase A - 21 samples; Phase B - 62 samples; and Phase C - 95 samples. A range of catalogued and non-diagnostic sherds were sampled at both Dhaskalio and the Special Deposit South at Kavos, as well as limited numbers of ceramic special finds, from a wide selection of trenches across the site (see Table 23.21).

A number of the fabric groups identified and described within the 1987–88 publication for the Special Deposit North was present within this study. However, where descriptions for the same group differ between volumes, the more robust sample size and detailed macro-micro identification should mean that all descriptions published here supersede those of the previous 2007 volume.

The results of the petrographic study (which as noted above, includes samples both from Dhaskalio and from the Special Deposit South) are fully discussed in Volume III. Here the discussion will focus upon the material from Dhaskalio. First however it will be useful to summarize briefly the results of the petrographic analysis and their relationship to those based on the visual classification into fabrics which has been discussed above. The main petrographic classes identified on the nature of the dominant inclusion types are below, with all subgroups identified:

Table 23.21. *List of trenches and phases (where relevant) sampled for petrographic analysis.*

Dhaskalio		
Trench	**Phase**	**Layer**
I	A	40
I	B	1, 3, 4, 6, 7, 8, 9, 11, 12, 14, 16, 26
II	A	4, 6, 35, 36, 38
II	B	3, 9, 15, 17, 19, 34
IV	B	5, 6, 8, 9
V	B	3
VI	A	37, 38, 48, 51, 52
VI	C	4, 8, 9, 15, 16, 18, 22, 23, 25, 26, 30, 33, 34, 35, 36, 47, 50
VII	C	3, 4, 5, 24, 32
XXI	C	3, 7, 9, 11
XXIV	C	3, 5, 6, 7, 8
Kavos		
Trenches B1, B3, B4, C1, D1, D2, D3 (SDS) + P01 (Promontary) + BA (Middle)		

P1: Meta-quartz and granite (15 subgroups: A–O)
P2: Schist and mica-schist (7 subgroups: A–G)
P3: Volcanic (11 subgroups: A–K)
P4: Phyllite and marble (3 subgroups: A–C)
P5: Talc
P6: Calcite (6 subgroups A–F)
P7: 'Loners'
P8: Fine wares (6 subgroups: A–F)

It should be noted that some fine wares also gave informative results on microscopic examination of petrographic sections. The relationship between the new petrographic classification based on microscopic analysis of thin sections, and that of the preliminary macroscopic analysis, is given in Table 23.22.

The subgroups represent distinctive variations within the general classes. For example, within the Volcanic class there are 11 subgroups: subgroup P3A is characterized by a calcareous clay containing microfossils with inclusions composed of rhyolitic-type volcanic rocks and devitrified glass; subgroup P3D contains samples with non-calcareous clay tempered with well-sorted volcanic rock sand composed of large zoned feldspar crystals and lava particles; subgroup P3H is characterized by volcanic rock inclusions of andesitic-type composition within a non-calcareous clay; subgroup P3I has a very fine clay matrix rich in tiny muscovite mica laths, again tempered with volcanic rock particles. It is likely that these subgroups reflect multiple production units, with some possibly utilizing similar raw material sources, across the early bronze age Cyclades and beyond. The full extent of compositional and technological variation within the subgroups is discussed in Volume III.

Table 23.22. *The macroscopically identified fabrics from Dhaskalio with the petrographic fabrics, as identified through microscopic thin-section analysis.*

Macroscopic fabrics	Petrographic fabrics
V1A	P1a, b, c, f, g, j, k; P2a; P3a, b, c
V1B	P1f; P3 a
V2A	P3c, d
V2B	P1a; P3a, b, c
V2C	P1a, c, d, f, g, h, j; P3a, b, c, d, e, i
V3A	P1i; P4a, b
V3B	P4 a, b; P6
V4	P4 b, c
V5	P1h, k; P2a, d, e
V6A	-
V6B	P1h; P2b
V6C	P2a; P6e
V6D	P2a,d
V7A	-
V7B	P1h
V7C	P1c, e, f, h, l
V8	P5
V10	P1f, h; P3g
V11	P2a
V12	P3a, e, f, j
V13	P1b, c, f, g; P2a, c
V14	P1e
Fine Ware	P1b, l, m; P3a, k; FW

The increased resolution at petrographic level, perhaps inevitably, provides a greater range of classifications than those defined at macroscopic levels. However, this does not render macroscopic analysis futile, rather it provides a clearer range of potential interpretations for each macroscopically defined group, which is a valuable tool for archaeologists working in the field. Assemblages cannot be assessed petrographically on a sherd-by-sherd basis, so thin section analysis provides greater resolution for a representative sample of sherds with respect to composition and technology, which can then be integrated into typo-stylistic and macroscopic fabric classifications. Within this study, the coherence of the macroscopic groups will be discussed to assess how accurate our observations in the field can be. The degree of paste standardization within early bronze age pottery production in the Cyclades will also be considered, and the potential for multiple production units exploiting similar raw materials to produce technologically distinct fabric pastes.

It is possible therefore to summarize the information which has been obtained by this petrographic analysis with respect to the material from Dhaskalio. It will be convenient to do so in terms of the major categories, or fabric *classes*, into which the samples chosen for petrographic analysis can be divided.

P1. Quartz (Meta-quartz and granite)

These coarse-medium groups were expected to come predominantly from Naxos, given the petrographic parallels from late neolithic/early bronze age material at Zas Cave and Grotta (Hilditch 2005a,b), and the later middle bronze age site of Mikre Vigla. However, the large number of petrographic fabrics in which samples characterized as V1A or V1B appear (see Table 23.22) shows that at greater resolution there are significant compositional and technological features that can indicate specific production units. Given the range of variation beyond current comparative specimens on Naxos, we may also consider similar raw material sources on Paros, Amorgos and other Cycladic islands with coarse-grained quartz-rich igneous intrusions.

The coarse to medium wares within this petrographic class are mostly large vessels, such as pithoi, miscellaneous storage jars with different neck types (concave, conical, neckless), barrel jars, basins, cooking pots/deep bowls, baking pans and braziers. There are less common instances of side-spouted pyxides, jugs and ceramics used in the metal-working process, a single tuyere and a mould. The semi-fine fabrics (subgroups P1K–P1O) are less common within the Dhaskalio assemblage and are difficult to identify typologically (closed or open vessels), with the exception of one pithos.

P2. Schist & Mica-schist

This class is predominantly thought to represent a range of fabrics from Ios and Naxos, and even Siphnos. Petrographic comparatives from Skarkos on Ios (Hilditch & Kiriatzi 2005) contain garnet-mica schists with distinct marl/micrite inclusions within the coarse and fine fraction, and correlate to subgroup P2A within this study. Naxos may be the source of the more biotite-rich fabrics (P2D and P2F), as the southeast of the island consists of intercalated bedded marbles and pelitic schists rich in biotite. Currently, there are Cycladic islands with contemporary early bronze age sites, such as Chalandriani and Kastri on Syros, that remain almost entirely unknown with respect to available potting raw materials. No Cycladic parallels have been identified for the lone chlorite schist fabric (subgroup P2G), though the coarse temper texture is somewhat reminiscent of the Cretan/Minoan tempering tradition. The subgroups of this fabric appear to be easier to spot in hand specimen (smaller range of macroscopic groups) but there is considerable overlap between the variants of the Micaceous Quartz and Micaceous Schist macroscopic groups, reinforcing the difficulties in considering provenance at the macroscopic level only.

The shapes are mostly jars (deep open, funnel-necked, neckless), cooking pots, baking pans and deep bowls, bowls with incurving rims and a lone tuyère. These shapes form a narrower typological range than the Quartz group, suggesting perhaps a smaller number of potential sources, or a more specialized use of micaceous fabrics in cooking wares during the early bronze age Cyclades.

P3. Volcanic

The majority of vessels in this fabric were found within the Dhaskalio assemblage, with only one subgroup from eleven corresponding to the Kavos assemblage. There are important divisions within this category, the most prominent of which is the distinction between the calcareous-fossiliferous, calcareous-non-fossiliferous and non-calcareous. It is likely, given the EB II date of the site and calcareous-fossiliferous fabric in the earliest Phase A deposits, that subgroup P3A is related to ceramic production on Thera, where early production of pale volcanic wares has been confirmed (Vaughan 1990). There may still be a pale fossiliferous component coming from Melos, or Aegina, in the later Phase C, but this requires further consideration at the chemical level too. The calcareous-non-fossiliferous and non-calcareous fabrics may possibly come from Melos, as they lie on the wide spectrum of acidic volcanic fabrics found on that island, which can be rich in obsidian, ignimbrite and pumice. The

EB petrographic fabrics from Phylakopi have already been shown to be far from homogeneous (Vaughan & Williams 2007).

Shapes are diverse and include cooking pots and baking pans, miscellaneous jars (neckless, concave-necked, deep open, small), pithoi and pithoid jars, as well as rarer examples of jugs, pyxides, conical and depas cups. The latter may suggest local Cycladic imitation of such exotic shapes.

P4. Phyllite and marble (dark/red Phyllite)

The subgroups within this petrographic class are dominated by phyllite inclusions of various types. P4A contains the characteristic iron-manganese phyllite inclusions, known on Amorgos as 'patelia' and matching the fabric identified at early bronze age Markiani (Vaughan 2006). Although this fabric is easily recognized in hand specimen, variation does exist with respect to inclusion density and the relative percentage of angular to subangular calcite inclusions and optically active reddish shale inclusions. It is uncertain whether this reflects chronological variation throughout the early bronze age or perhaps the existence of more than one production unit within the vicinity of Markiani on Amorgos. One of the Calcite fabrics (P6A) also displays the distinctive 'patelia' inclusions, possibly representing the opposite end of a heterogeneous continuum composed of patelia and calcite inclusions.

The shapes are relatively diverse, including deep bowls, cooking pots, baking pans, pyxides and jars. The vessels of this fabric group might form a discrete ceramic set that travelling groups may have brought with them whole. No imitation of 'exotic' shapes has been noted, though it is questionable whether this reflects upon the limitation of the local raw materials or the unwillingness of local communities on Amorgos to engage in such behaviours.

P5. Talc

There is an absolute correlation between the observed macroscopic and petrographic fabrics. Canonical Talc ware is easily recognizable, with hardly any internal microscopic variation. A single source is once again suggested, though no further evidence is offered to support Siphnos over any other talc source within the region (see discussion in Vaughan & Wilson 1993; Vaughan & Williams 2007, 118–19). Geological reconnaissance on Naxos by Dixon (see Chapter 30) has also revealed isolated talc deposits in southern Naxos, though whether these deposits could have served as potential raw materials for potting has yet to be investigated experimentally. Given the large range of other materials sourced from Naxos present at Dhaskalio, these talc deposits deserve further attention. Vessel shapes are relatively large in size, such as baking pans, funnel-mouthed pithoid jars, deep bowls and a tray, which seems comparable to the wider repertoire of Talc shapes found in the earlier early bronze age Period II at Ayia Irini (Wilson 1999).

P6. Marble and Calcite

There is considerable variation within this category, as it appears that compositionally different raw materials were deliberately tempered with crushed calcite, reinforcing the regional tradition of calcite tempering throughout the Cyclades, and beyond, during the early bronze age. There are strong links to Amorgos for one of the variants (P6A, see Phylllite and marble discussion above), which represents the end spectrum of one of the Dark Phyllite subgroups. Otherwise, it is difficult to give any further detailed information on provenance from specific islands as the different clays used create lone samples rather than coherent compositional groups. Only a deep bowl and an unidentified coarse closed vessel appear within the Dhaskalio petrographic samples.

P7. 'Loners'

Serpentinite (sample 07/55): the Cretan/Minoan tradition seems the obvious candidate for this sample and may reflect the 'oatmeal fabric' identified amongst Cycladic assemblages by Vaughan. The South Coast fabric is highly compatible (Myrtos – Fournou Korifi: Whitelaw *et al.* 1997), both compositionally and technologically, as discussed for a lone sample within the 1987 material, and supported by the fact there are no other Cycladic parallels.

Micrite (sample 07/30): this fabric seems to be most compatible with fine calcareous Neogene sediments, found on the Kouphonisia and Crete. There is a parallel with one of the geological samples taken during the field season from Ano Kouphonisi (from the small bay north of the main harbour). A Cycladic provenance may be more likely given the vessel type in question, a cylindrical necked jar.

The study of the Dhaskalio ceramics by neutron activation analysis

The petro-chemical study is presented in full within Volume III, but a short summary of the Dhaskalio samples is given here. In total, 19 samples from the Dhaskalio petrographic samples (13 fine wares and 6 medium wares) were studied for their chemical trace element composition with neutron activation analysis (NAA). The resulting chemical trace element compositions were statistically evaluated using hierarchical cluster analysis and principal component analysis (PCA) to investigate the chemical variation of the assemblage and the identification of possible chemical reference patterns. Furthermore, the data were included in the ceramic data base of the IMS (Hein & Kilikoglou 2011) in order to be compared with ceramics from other sites in the vicinity and the wider Aegean region.

In order to assess the chemical variability of the data set the total variation was determined and found to be quite high (4.11), indicating a comparably inhomogeneous pottery assemblage in terms of chemical composition. Seven distinct chemical groupings were identified, of which four matched known reference groups, as well as five non-clustering chemical loners. Using the *ceraDAT* data base (Hein & Kilikoglou 2011), a number of parallels with known reference groups was identified within the Dhaskalio material, including Melos, Akrotiri on Thera, Naxos and the Argolid. Among the highlights worth noting here is the compatibility of the Pale Volcanic macroscopic samples (V12 – all Phase C) with the known chemical reference groups determined from Akrotiri on Thera. Significantly, this is the first confirmed instance of early bronze age vessels from Thera appearing within other Cycladic assemblages. Also notable is the compatibility of two medium Quartz (V1) samples with a known Naxian reference group. The latter strengthens the proposed level of imported pottery from the Keros Triangle and reduces the likelihood that the Quartz group reflects a local tradition within the vicinity of Dhaskalio or Kavos.

Implications for production *versus* consumption at Dhaskalio

Macroscopic fabric analysis

The central question remains whether pottery production took place on Keros, either within the vicinity of Dhaskalio or Kavos or at another location on the island. At the macroscopic level, inconsistencies in inclusion and clay groundmass composition render establishing a local potting tradition more difficult still, allowing only broad consideration of compatibility with geological units documented within the region. Despite these limitations, some interesting observations can be drawn from the ceramic assemblage, particularly the coarse and medium wares, which can relate these to the local geological setting and allow discussion of ceramic production *vs* consumption practices. Four zones of provenance are discussed for the macroscopic fabric categories: i) Keros, to highlight possible local fabrics; ii) Keros Triangle, as defined by Broodbank in 2007 to include Naxos, Ios and Amorgos and the smaller islands between; iii) the wider Cyclades, with the addition of Aegina; and iv) Other, as a general designation for Greek Mainland, Crete, other Aegean islands and western Anatolia. The range of compatible or likely source areas is shown for each macroscopic group in Table 23.23, with an overview of suspected provenance for each occupation phase shown in Table 23.24.

I) Keros

The site of Dhaskalio occurs on a small islet with relatively steep sides and composed almost entirely of faulted marble. This context suggests very little, if any, 'local' production with 'local' materials occurred on the islet, as the topography does not encourage the build up of sediments suitable for potting. As Broodbank rightly points out (2007, 120), the limited geological profile of Keros (predominantly thinly bedded, crystalline limestone and low-quality marble, with small intrusions of syenite and metatuffites: IGME 1994) means it is much easier to make positive statements on which macroscopic fabrics are NOT compatible with a prospective production tradition using locally available raw materials. However, based upon the macroscopic descriptions, the groups most likely to have been made on Keros are Quartz, Calcite (V7A and V7B) and Sandy (V2A and V2B). This does not positively identify a local production tradition. Rather it would be prudent at this macroscopic stage also to highlight the compatibility of the Quartz, Calcite and Sandy macroscopic fabrics with other locations within the Keros Triangle.

II) Keros Triangle

A number of groups can be attributed to possible origins within the 'Keros Triangle', as defined by Broodbank to include Amorgos, Ios, Naxos and the smaller islands between (Fig. 23.2). The adjacent islands of the Kouphonisia remain the suspected origin of raw materials compatible with the pale Sandy group (V2C), as this group has previously revealed significant compositional heterogeneity at the microscopic level (Hilditch 2007, 245) indicating possibly more than one production unit. The 1987 fabric study for the Special Deposit North also demonstrated an Amorgian provenance for the distinctive Dark and Red Phyllite categories, with a strong coherence between macroscopic and microscopic identifications, while a strong macroscopic correlation between the local wares of Naxos and the Quartz group was also highlighted. Naxos is also the prime candidate for the Granite group, although the lack of known petrographic study on bronze age Parian ceramics means that Paros cannot be ruled out entirely. Ios is a prime candidate for several of the micaceous groups, as mica-bearing metamorphic rocks dominate the island, though we cannot readily dismiss central Naxos and the flysch deposits of southern and central Amorgos for some of the micaceous subgroups. In short, a provenance within the Keros Triangle is suspected for some of the Quartz and Calcite groups (especially the micaceous subgroup V7C), Micaceous Quartz, Micaceous Schist, Non-micaceous Phyllite-Schist and Granite groups, as well as the positively identified Amorgian Phyllite fabrics.

III) Wider Cyclades

Other macroscopic groups can be fairly confidently attributed to other islands within the greater Cyclades: Talc ware is thought to originate on the island of Siphnos (Vaughan & Wilson 1993; Renfrew 2005), while Melos is the prime candidate for the Dark Volcanic group, though Aegina cannot be ruled out for this group at the macroscopic level. Melos and Aegina remain possible candidates for the origin of the Pale Volcanic group, though the island of Thera may be a more plausible source for this group, especially within the earlier Phases A and B, as pale volcanic wares are only attested in number within later early bronze age/early middle bronze age levels at Phylakopi (Barber 1987; Vaughan & Williams 2007) and Kolonna (Kiriatzi *et al.* 2011), but already form the majority of the ceramic assemblage throughout the early bronze age at Akrotiri (Sotirakopoulou 1986; Vaughan 1990). There also remains a possibility for other islands dominated by metamorphic lithologies to be the origin for some of the micaceous schist macroscopic fabrics (Kea, Kythnos, Seriphos, Syros, etc.) but petrographic

Table 23.23. *Suggested origins for the macroscopic fabrics identified within the 2006–8 Keros excavations.*

Macroscopic fabrics	Subgroup	Keros	Keros Triangle	Cyclades & Aegina	Other
Quartz	V1A	■	■		
	V1B	■	■		
Sandy	V2A	■	■		
	V2B	■	■		
	V2C		■		
Dark Phyllite	V3A		■		
	V3B		■		
Red Phyllite	V4		■		
Micaceous Quartz	V5		■	■	
Micaceous Schist	V6A		■	■	
	V6B		■	■	
	V6C		■	■	
	V6D		■	■	
Calcite	V7A	■	■		
	V7B	■	■		
	V7C		■		
Talc	V8			■	
Dark Volcanic	V10			■	
Non-micaceous Phyllite-Schist	V11		■		
Pale Volcanic	V12			■	
Granite	V13		■	■	
Fine Buff with Temper	V14				■
Fine wares	FW			■	■

analysis will help to clarify this diverse suite of micaceous compositions.

IV) Other
The only coarse/medium macroscopic group remaining is the Fine Buff with Dark Temper, which perhaps represents imported ceramics in the distinctive sand-tempered, pale Neogene clay of Minoan pottery produced in central Crete (Wilson & Day 1994; Day & Wilson 1998).

Petrographic fabric analysis
The petrographic analysis discussed above has now clarified the compositional profiles of the macroscopic fabrics for Dhaskalio and allowed a more detailed consideration of whether vessels were manufactured with locally compatible raw materials.

The Quartz macroscopic fabric (V1), the main contender for local production, has a significant range of variation at the microscopic level with many of the variants exhibiting clear parallels to fabric groups observed on Naxos. This then reduces the possibility of provenance on Keros for the whole macroscopic group, as the small granodiorite unit north of Kavos seems insufficient to support such a level of pottery production. Also, the granitic fabrics dominate the assemblages at Naxian sites, such as Grotta and Zas Cave, strengthening a local Naxian provenance and undermining a possible Kerian source.

Table 23.24. *Minimum and maximum possible percentages for provenance, based on broad geological compatibility.*

Suspected origin	Phase A		Phase B		Phase C	
	% Min.	% Max.	% Min.	% Max.	% Min.	% Max.
Keros	0	18.2	0	20.7	0	23.5
Keros Triangle	26.7	85.6	36.2	84.5	34.3	76.2
Cyclades	9.8	53.3	10.8	42.6	18.8	42.0
Other	1.4	4.2	0.5	4.7	0.2	5.0

The Calcite macroscopic fabrics (V7A, V7B and V7C) display even greater variability with respect to their fine fraction components, reinforcing the picture of a Cycladic-wide tradition of calcite tempering using a multitude of local clays across many islands. Only one or two samples maintain potential compatibility with local raw materials on Keros itself, which further reduces the overall projected levels of local production.

The Sandy macroscopic fabric (V2) was also suggested as potentially local during the macroscopic study, but petrographically these samples fall into the *Meta-Quartz & Granite* (P1) and the *Volcanic* (P3) fabrics. The latter is incompatible with a provenance on Keros and corresponds to a range of sources already seen within the early bronze age Phylakopi assemblage (Vaughan & Williams 2007) and the early-middle bronze age Akrotiri assemblages (Vaughan 1990; Hilditch 2009).

So, the maximum estimates for potential Kerian ceramic production given above (Table 23.24) now seem inflated in the face of the petrographic clarification. The locally compatible macroscopic groups display significant compositional differences at the petrographic level, in most cases ruling out Keros as a potential raw material source.

The significant overlap within the Quartz and Micaceous Quartz macroscopic groups, with respect to the range of vessel shapes, may suggest that people from multiple settlements on different islands were bringing their own kitchen and storage kits to the island, rather than specifically importing cooking wares from Ios, storage jars from Melos and transport jars (and their contents) from Naxos, for example. This fabric picture for the 'domestic' pottery (baking pans, cooking pots, storage jars) reinforces a diverse range of origins for these vessels, which again undermines the likelihood of a local production centre on or near Kavos.

Summary

So, if we consider the relative frequencies of all macroscopic groups within the Dhaskalio assemblage, one major feature stands out. No single group, or even cluster of groups, truly dominates the assemblage across all three chronological phases of the site, undermining the possibility of a pottery production tradition using locally available raw materials at Dhaskalio or Kavos (see Table 23.5 for phase comparisons of all macroscopic groups). Subsequent petrographic analysis has also identified strong candidates within the Keros Triangle for the range of macroscopic groups most likely to represent 'local' Kerian production, reducing the possibility of ceramic production on Keros itself during the life of the Dhaskalio settlement further still. The resulting possibilities are summarized in Table 23.25.

Table 23.25. *Minimum and maximum possible percentages for provenance, based on broad geological compatibility, having excluded the possibility of production on Keros itself.*

Suspected origin	Phase A		Phase B		Phase C	
	Min	Max	Min	Max	Min	Max
Keros Triangle	44.9	85.6	56.9	84.5	57.8	76.2
Cyclades	9.8	53.3	10.8	42.6	18.8	42.0
Other	1.4	4.2	0.5	4.7	0.2	5.0

There does not appear to be a major shift in the degree or direction of interactions across any of the phases. The Keros Triangle consistently affords the greatest level of potential provenance for the macroscopic fabrics characterised within the Dhaskalio assemblage across all three phases of occupation, as observed by Broodbank in the 1987–88 assemblage for the Special Deposit North, where he estimated 80–90% (2007, 131).

Perhaps the most striking appearance in the 2006–8 material from Dhaskalio that was not present within the earlier study of the Special Deposit North is the Pale Volcanic macroscopic fabric, a suspected import from Thera with clear petrographic and chemical parallels to the early bronze age ceramic assemblage of Akrotiri. A more detailed comparison between the Special Deposit (North and South) and Dhaskalio assemblages will be discussed in Volume III, with the petrographic study and chemical analysis programme.