Results Framework
POPULONIA
by Laura Banducci

A note to reader:

These are the results from statistics tests run on data on ceramics from Populonia, Italy.

The data used can be located at github.com/laurabanducci/foodways_republican_italy and all of the following calculations were completed in SPSS Version 21.

An explanation of the statistical tests and the decisions behind them can be found in the book Foodways in Republican Italy (2021) Appendix I. Interpretation of these results can be found in this publication.

When data was collected, the terms used for the orientation of linear wear was slightly different than at the time of the publication of the project. Thus, in the following notes:
parallel = concentric scratches
perpendicular = radial scratches
diagonal = chordal scratches

Battuto floors > unclear definition in the records.
Several destruction layers
General condition of material: a lot re-used for building material (which SU?) and therefore heavily mortared. I attempted to break down this mortar with vinegar in several instances and a few times it did aid in diminishing some of the coverage of these materials. Also, apart from building material, the soil was very limey and so the majority of the material has heavily incrusted minerals (overall mean and median of everything?). Fragment size of diagnostics (of all mean=24.30, median=16; of only >4%, mean=28.16, median 16) > generally smaller than Musarna (of all mean=32.77, median=16; of only >4%, mean=41.38, median=16)?

Basic break down of ceramics present: total fragments (proportion with alteration); total diagnostic (proportion with alteration)
In a table: total n=777 real diags, preserved over 4% n=576, MNV=763
-fragment # of each ware -weight of each ware -fragment:weight ratio -EVE

	Sherd count	weight	Weight/sherd ratio	With alteration
Diagnostic	777	27,850 g	35.84 g	614
Semi-diagnostic	55	1,435 g	26.09 g	37
Body sherd	897	20,076 g	22.38 g	250
total	1,729	48,361 g	28.55 g	901

ANALYSIS

1. ceramica da fuoco
   -general discussion of the definition of the ware and the forms in which it appears
   A. pentole *n=36*
      a. Morphology
      i. general distribution of rim diameter 11-33cm

		Frequency	Percent
Valid	8	24	66.7
	9	12	33.3
	Total	36	100.0

ii. diameter comparison over time > is there a change?
Sample size small, but no variability over time. Same distribution in Period 4 as Period 5. KW
iii. wall thickness comparison over time > is there a change?'
No.
iv. angle of opening comparison over time > is there a change?

No. Relatively similar distributions

b. Alteration

i. fire damage:

1. proportion interior black, proportion exterior black, proportion which have both

67%, 83%, 64%

2. is there a correlation between interior and exterior black?

Yes. Chis8.1, p<0.01

3. location of blackening – in a table

type	Location of blackening	Count (interior)	Count (exterior)
1	Around belly of vessel	-	1
2	1 patch on belly	3	2
3	2 patches on belly	-	-
4	Around top of rim	10	17
5	Around top of vessel below rim	1	5
6	Around bottom of vessel and on base	-	-
7	Forming a ring on base	-	-
8	Completely covering base	-	-
9	Entirety of vessel not including lower wall and base	-	-
10	Entirety of vessel	10	8
11	Patch in center of base (inverse of 7)	-	-
22	Everything blackened except a strip just below the rim (inverse of 5)	-	-

4. is there a correlation in different locations of blackening on the interior and exterior?

2int and 2ext, 5int and 5ext (there's only 1 eg, but it has both), 10int and 10ext

5. is there a difference in blackening location in different periods?

No sample size too small to do this well

6. is there any correlation between diameter and the appearance of blackening?

Yes. Negatively correlated with int black (isolated for int10, not significant, isolated for Period 3 almost sign. p=0.065). Almost negatively correlated with ext black (p=0.083)

7. is there any correlation between angle and the appearance of blackening?

No.

8. opacity of blackening – in a graph with period and opacity scores

9. is there any significant difference in the opacity of blackening in different periods?

No.

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both

11int (31%), 1 frag ext, none both

2. is there a correlation between interior and exterior abrasions?

No.

3. location of abrasion – in a table

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	-	-
Abrasion on wall	1	-
Abrasion on rim	10	1

A possible reason for the low amount of wall abrasion relative to rim is that 53% of these frags are preserved to a height of 3cm or less

4. is there a correlation between different locations of abrasion?

No.

5. direction of abrasion – proportion of different types and correlation with different locations

Yes. Rim int with parallel (chis 7, p<0.01)

A. optional: proportion of post-depositional masking which may affect the appearance of everything above

6. is there a correlation between presence of any type of abrasion and diameter?

Yes. Int abrasion positively correlated (expB 1.182, sign. 0.026). When I isolate Period 3 this is slightly less sign, but higher prob (expB 1.252, sign. 0.032). Int rim abrasion also positively correlated (expB 1.17, [=0.038)

7. is there a correlation between presence of any type of abrasion and angle of opening?

Yes. Int abrasion negatively correlated with angle. (Exp .970, sign. 0.038). Rim int highly negatively correlated (expB .959, p=0.013)

8. is there a correlation between period and any type of abrasion?

Period 3 has enough samples to make diameter so. The rest do not. Angle is not correlated with any one Period.

iii. is there a correlation between presence of abrasion and presence of blackening (at all or in any particular location?)

No. Likely not enough abrasion overall.

B. Olla *n=68 I've re-coded the periods so that Period 3 and Period 4 are both Period 4*

a. Morphology

i. general distribution of rim diameter

ii. diameter comparison over time > is there a change?

No. All are focused b/w 15 and 20 cm KW

iii. wall thickness comparison over time > is there a change?'

No. KW

iv. angle of opening comparison over time > is there a change?

Yes. Though very low sample sizes. Much more vertical in Period 2, than Period 4 (chi2=8.78, p=0.003) or Period 9 (chi2=6.38, p=0.012), which has a range more centered on lower angles (this seems surprising given that I associate a floppier curved rim with more archaic pots –see my orientalizing book – however checking the 2 pots in Period 2 which are 80˚ (MU 3596 and 3597) we see that they are ollae with very large almond rims potentially with Etruscan precedents (so says Olcese 2003)

Note generally in Period 5 graphs of all these measurements, there is a distinct gap of 1 or 2 units between groups of measures suggesting that the range in sizes is really reflective vast variability, as opposed to if the measures were all close together and therefore potentially being reflective of measurer error/bias

b. Alteration

i. fire damage:

1. proportion interior black, proportion exterior black, proportion which have both

81%, 84%, 76% both

2. is there a correlation between interior and exterior black?

Yes. Chi2=24.39, p=.000

3. location of blackening – in a table

type	Location of blackening	Count (interior)	Count (exterior)
1	Around belly of vessel	3	2
2	1 patch on belly	5	6
3	2 patches on belly	-	-
4	Around top of rim	18	12
5	Around top of vessel below rim	18	11
6	Around bottom of vessel and on base	-	-
7	Forming a ring on base	-	-
8	Completely covering base	-	-
9	Entirety of vessel not including lower wall and base	-	-
10	Entirety of vessel	20	28
11	Patch in center of base (inverse of 7)	-	-
22	Everything blackened except a strip just below the rim (inverse of 5)	-	-

4. is there a correlation in different locations of blackening on the interior and exterior?

2int and 2ext, 4int and 4ext, 4int and 10ext, 5int and 10ext, 10int and 10ext

5. is there a difference in blackening location in different periods?

Sample size too small. No difference bw total blackening (with black_tot_ext or _int) in any period

6. is there any correlation between diameter and the appearance of blackening?

Yes. Negatively correlated with diameter (expB= .805, p=0.022). When I removed 10ext, it is slightly less sign and more probable, but still there (expB=0.830, p=0.058). 10ext by itself is not sign or probable.

7. is there any correlation between angle and the appearance of blackening?

No.

8. opacity of blackening – in a graph with period and opacity scores

9. is there any significant difference in the opacity of blackening in different periods?

Yes. Int Period 4 darker than Period 5 (KW chi2 9.624 p=0.002). Int Period 2 is also darker than Period 9 (chi2=4.661, p=0.031). Ext does not have any sign diff. in opacity.

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both

4%, 18%, 1% (only 2 have both)

2. is there a correlation between interior and exterior abrasions?

Yes. You're likely to have neither int not ext abrasion.

3. location of abrasion – in a table

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	-	-

Abrasion on wall	3	1
Abrasion on rim	-	11

4. is there a correlation between different locations of abrasion?

Yes. Correlation between ext rim and int wall, but those are also the most popular. Sample size too small.

5. direction of abrasion – proportion of different types and correlation with different locations

All ext rim is parallel. So, strongly correlated.

A. optional: proportion of post-depositional masking which may affect the appearance of everything above *43/68 (63%) have some crust: ext, n=36: 28 have 20% or less, 8 have 30-90%; int, n=33: 19 have 20% or less, 14 have 30-70% > so generally a high amount of coverage by crust. 54/68 have "sharp" edges. 14/68 (21%) have "slightly rounded" edges*

6. is there a correlation between presence of any type of abrasion and diameter?

No.

7. is there a correlation between presence of any type of abrasion and angle of opening?

No.

8. is there a correlation between period and any type of abrasion?

No.

iii. is there a correlation between presence of abrasion and presence of blackening (at all or in any particular location?)

No.

C. Jug *NONE*

D. Bases *n=65*

a. Morphology

i. general distribution of rim diameter *normal*

ii. diameter comparison over time > is there a change?

No. Perhaps too few samples, but even between Period 4 and 5 there's very little difference

iii. wall thickness comparison over time > is there a change?'

No.

iv. angle of opening comparison over time > is there a change?

No. But can be divided into 2 groups. In Period 4, there are 31 above 100˚ and 9 below. In Period 5 there are 19 above 100˚ and 3 below. In Period 2, they are 120 and 170˚. There are proportionally slightly more of Period 4 in the larger group than Period 5. >> wait. This is wrong since there shouldn't be bases under about 100˚. I need to remeasure these drawings.

b. Alteration

i. fire damage:

1. proportion interior black, proportion exterior black, proportion which have both

68%, 83%, 61%

2. is there a correlation between interior and exterior black?

Almost. Chi2=3.143, p=0.076. There are only 6 which have neither.

3. location of blackening – in a table

type	Location of blackening	Count (interior)	Count (exterior)
1	Around belly of vessel	2	1
2	1 patch on belly	4	8
3	2 patches on belly	-	-
4	Around top of rim	-	-
5	Around top of vessel below rim	-	-
6	Around bottom of vessel and on base	-	7
7	Forming a ring on base	6	6
8	Completely covering base	9	9
9	Entirety of vessel not including lower wall and base	2	2
10	Entirety of vessel	25	17
11	Patch in center of base (inverse of 7)	1	4
22	Everything blackened except a strip just below the rim (inverse of 5)	-	-

Great photo of ext2 in POP 3610, POP 3775 > oxidization?

4. is there a correlation in different locations of blackening on the interior and exterior?

1int and 1ext (31.992, p=0.000), 1int and 9ext (chi2=15.235, p=0.000), 7int and 7ext (chi2=13.113, p=0.000), 8int and 6ext (chi2=5.535, p=0.019), almost 8int and 8ext (chi2=3.326, p=0.068), 9int and 1 ext (31.992, p=0.000), almost 9int and 6ext (chi2=3.305, p=0.069), 9int and 9 ext (15.235, p=.000), 10int and 7 ext, 10int and 10ext (chi2 4.131, p=0.042); 11int and 2ext (chi2 7.236, p=0.007)

5. is there a difference in blackening location in different periods?

More Int10 in Period 4 than Period 5 (chi2=4.060, p=0.044), more int8 in Period 5 than Period 4 (chi2= 4.656, p=0.031), *Int: ½ black in Period 5, 79% in Period 4, 60% in Period 5*, *Ext: 2/2 black in Period 2, 76% black in Period 4, 73% black in Period 5 >> the rest relatively evenly distributed*

6. is there any correlation between diameter and the appearance of blackening?

No.

7. is there any correlation between angle and the appearance of blackening?

No.

8. opacity of blackening – in a graph with period and opacity scores

9. is there any significant difference in the opacity of blackening in different periods?

Int: No. Ext: proportionally more heavy blackening in Period 4 (with a concentration of score 3, especially, and including score 5) whereas Period 5 has a lot of score 1 (chi2=11.875, p=0.018). Good eg. of score 5 on ext in photo of POP 499.

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both

5%, 43%, 3%

2. is there a correlation between interior and exterior abrasions?

No.

3. location of abrasion – in a table

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	2	27
Abrasion on wall	-	-
Abrasion on rim	-	-

4. is there a correlation between different locations of abrasion?

No. Samples sizes too small, but also only 1 of the int have ext abrasion.

5. direction of abrasion – proportion of different types and correlation with different locations

at this point I decided to remove POP 3560 from this dataset because it is clearly commonware. I have gone back up and recalculated everything above (all saved in Output_pop_base_redofixjan29_1130am); (from this point on everything is saved as output_pop_cookware_base_jan29_1230pm) 13/27 of ext are parallel (a few on those which have feet –like POP 3701 -- and mostly on edges of flat-bottomed vessels), 1/27 is perp it is 2 cm long and cuts across the edge, 13/27 are patches (often the whole base is roughed up because it is flat) between 1 and 100 cm2 (median 4, mean 15.3846 cm2); int: both egs. are 4cm2 patches on int -- POP 161 good pedestalling

A. optional: proportion of post-depositional masking which may affect the appearance of everything above: 58% are sharp, 38% are 2, 3% are 3; *44/65 (68%) have mineral crust; int: 40% of these are at least 80% visible, the median is 20%, the mean is 29.16% ; ext: 51% of these are at least 80% visible, the median is 20%, the mean is 28% > so they are not terribly masked or banged up*

6. is there a correlation between presence of any type of abrasion and diameter?

No.

7. is there a correlation between presence of any type of abrasion and angle of opening?

No.

8. is there a correlation between period and any type of abrasion?

No. They have similar proportions of ext and int base abrasion.

iii. is there a correlation between presence of abrasion and presence of blackening (at all or in any particular location?)

No.

E. Bowl n=2

a. Morphology

b. Alteration *both ext10 and int10*

F. Tegame *n=4 But there are 5 bi-fid pans which are great, but preserved less than 5% because they're quite large (c. 26cm) one of which is whole, which are worth mentioning (MU 480, 481, 482, 483, and 486/7)*

a. Morphology i. general distribution of rim diameter

ii. diameter comparison over time > is there a change?

No. All between 25 and 30cm in diameter except 1 weird 13cm eg. from Period 4 (MU 157) which is not preserved well anyway to make it definitively a tegame

iii. wall thickness comparison over time > is there a change?'

Maybe. These egs. clearly get narrower over time (See graph), but sample size too small.

iv. angle of opening comparison over time > is there a change?

No. All 40-45˚ except weird Period 4 eg. which is 75˚

b. Alteration

i. fire damage:

1. proportion exterior black, proportion exterior interior, proportion which have both

50%, 100%, 50% (2, 4, 2)

2. is there a correlation between interior and exterior black?

Yes

3. location of blackening – in a table

type	Location of blackening	Count (interior)	Count (exterior)
1	Around belly of vessel	-	-
2	1 patch on belly	-	-
3	2 patches on belly	-	-
4	Around top of rim	1	1
5	Around top of vessel below rim	-	1
6	Around bottom of vessel and on base	-	-
7	Forming a ring on base	-	1
8	Completely covering base	-	1
9	Entirety of vessel not including lower wall and base	-	-
10	Entirety of vessel	1	1
11	Patch in center of base (inverse of 7)	-	-
22	Everything blackened except a strip just below the rim (inverse of 5)	-	-

4. is there a correlation in different locations of blackening on the interior and exterior?

No. Sample size too small. But the whole vessel has both 5 and 7 ext.

5. is there a difference in blackening location in different periods?

No. Sample too small.

6. is there any correlation between diameter and the appearance of blackening?

No. Sample too small and measures too similar.

7. is there any correlation between angle and the appearance of blackening?

No. Sample too small and measures too similar

8. opacity of blackening – in a graph with period and opacity scores

9. is there any significant difference in the opacity of blackening in different periods?

No. Sample size too small.

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both

0, ¼, 0

2. is there a correlation between interior and exterior abrasions?

No.

3. location of abrasion – in a table *1 parallel scratch on ext rim*

G. Lids and Rims/Lids *n=2 at Populonia*

a. Morphology MUS 517, MUS 3521 (weird whole inceniere?)

i. general distribution of rim diameter

ii. diameter comparison over time > is there a change?

Both in Period 4; 15 and 16 cm

iii. wall thickness comparison over time > is there a change?'

No. 5mm upper, 7mm for central and lower

iv. angle of opening comparison over time > is there a change?

b. Alteration

i. fire damage:

MUS 517 is the only one with blackening, it is blackened in location 10 int and ext

ii. abrasion:

MUS 517 has some ext rim abrasion

A. optional: proportion of post-depositional masking which may affect the appearance of everything above > "sharp"; MUS 3521 has some calcium crust int (80% covered on its int; 60% covered on its exterior > but pretty lightly in both cases)

H. Clibanus *n=1*

a. Morphology *Only flange preserved. Flange is 30cm, so within range of Musarna clibani*

i. general distribution of rim diameter

ii. diameter comparison over time > is there a change?

N/A

iii. wall thickness comparison over time > is there a change?

N/A

iv. angle of opening comparison over time > is there a change? *N/A*

b. Alteration

i. fire damage:

1. proportion exterior black, proportion exterior interior, proportion which have both

Exterior blackening 10 > but with an opacity of 1 > so, not really (photo 110823)

ii. abrasion: *None.*

2. Internal redslip ware *n=18*

-general discussion of the definition of the ware and the forms in which it appears

A. Tegame

a. Morphology

i. general distribution of rim diameter *2 groups of rim size representing 2 different forms of rim:*

Period 2 and Period 4 under 24 cm also all thin-wall and bifid or slightly flanged (3656, 458, 459, 460, 492, 3577, and 430 in Period 5), whereas over 23 is almond rim (3568, 3707, 3740, 3741, 3742) plus 1 weird large flange which could be a pentola, but maybe not: MU 335

ii. diameter comparison over time > is there a change?

Yes. 2 groups of sizes available in Period 4 and Period 5, but Period 5 skewed more towards larger (chi2=5.906, p=0.015)

iii. wall thickness comparison over time > is there a change?

Yes. 2 groups of sizes available in Period 4 and Period 5, but Period 5 skewed more towards larger (chi2=10.49, p=0.001)

iv. angle of opening comparison over time > is there a change?

No. Very regular across time

b. Alteration

i. fire damage:

1. proportion interior black, proportion exterior black, proportion which have both

22%, 33%, 33% (all int has ext)

2. is there a correlation between interior and exterior black?

Yes. 10.286, p=0.001

3. location of blackening – in a table

type	Location of blackening	Count (interior)	Count (exterior)
1	Around belly of vessel	-	-
2	1 patch on belly	2	1
3	2 patches on belly	-	-
4	Around top of rim	2	2
5	Around top of vessel below rim	-	-
6	Around bottom of vessel and on base	-	-
7	Forming a ring on base	-	-
8	Completely covering base	1	-
9	Entirety of vessel not including lower wall and base	-	-
10	Entirety of vessel	-	4
11	Patch in center of base (inverse of 7)	-	-
22	Everything blackened except a strip just below the rim (inverse of 5)	-	-

4. is there a correlation in different locations of blackening on the interior and exterior?

Int2 and ext2, int4 and ext2, int4 and ext4, int8 and ext10 (almost > chi2 3.706, p=0.054)

5. is there a difference in blackening location in different periods? *Sample size too small*

6. is there any correlation between diameter and the appearance of blackening?

No.

7. is there any correlation between angle and the appearance of blackening?

No.

8. opacity of blackening – in a graph with period and opacity scores

9. is there any significant difference in the opacity of blackening in different periods?

No. Sample size too small.

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both

17%, 11%, 5% (only 1 frag)

2. is there a correlation between interior and exterior abrasions?

No.

3. location of abrasion – in a table

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	-	-
Abrasion on wall	5	-
Abrasion on rim	10	2

4. is there a correlation between different locations of abrasion?

No. There's only one fragment which has abrasion on the intwall and rim

5. direction of abrasion – proportion of different types and correlation with different locations

Rim int correlated with parallel (chi2=8.775, p=0.003), Wall int correlated with parallel (chi2=6.24, p=0.012) and diagonal (chi2=3.78, p=0.052) (good microscopic photo of MU 3568), Wall int has 1 perp (MU 3707 good microscopic photos with different raking light which demonstrate slip scratching)

A. optional: proportion of post-depositional masking which may affect the appearance of everything above *12/18 (67%), int 7 are 40% or above covered (median 50%, mean 46.67%), ext 9 are 60% or over (median 70%, mean 63.50%); 12/18 (67%) edges are "sharp", 6/18 (33%) "slightly rounded" >> re mineral incrustation > no wonder there's such little blackening!!*

6. is there a correlation between presence of any type of abrasion and diameter?

No.

7. is there a correlation between presence of any type of abrasion and angle of opening?

No.

8. is there a correlation between period and any type of abrasion?

No. Though there's isn't much abrasion visible, it is even across all periods.

iii. is there a correlation between presence of abrasion and presence of blackening (at all or in any particular location?) *No.*

B. Tegame bases *n=4 Only in Period 2 and 4*

a. Morphology

i. general distribution of rim diameter

12 cm, 23, 24, 45

ii. diameter comparison over time > is there a change?

Not statistically significantly (KW), though it is notable that the 3 larger ones are in Period 4 and the smaller one in Period 5

iii. wall thickness comparison over time > is there a change?'

Not statistically sign (KW), though interesting that the narrower one of upper thickness is in Period 2; no pattern in lower thickness

iv. angle of opening comparison over time > is there a change?

Not statistically sign, but Period 2's angle is larger (150˚) compared to Period 4 (120˚-135˚)

b. Alteration

i. fire damage:

1. proportion exterior black, proportion exterior interior, proportion which have both

4/4 have exterior black, none have interior > relatively consistent with Musarna

2. is there a correlation between interior and exterior black?

Sort of.

3. location of blackening – in a table

type	Location of blackening	Count (interior)	Count (exterior)
1	Around belly of vessel	-	-
2	1 patch on belly	-	-
3	2 patches on belly	-	-
4	Around top of rim	-	-
5	Around top of vessel below rim	-	-
6	Around bottom of vessel and on base	1	-
7	Forming a ring on base	-	-
8	Completely covering base	1	-
9	Entirety of vessel not including lower wall and base	-	-
10	Entirety of vessel	1 > *but this is an opacity of 1!!*	-
11	Patch in center of base (inverse of 7)	1	-
22	Everything blackened except a strip just below the rim (inverse of 5)	-	-

4. is there a correlation in different locations of blackening on the interior and exterior?

No, since there's only exterior blackening.

5. is there a difference in blackening location in different periods?

No.

6. is there any correlation between diameter and the appearance of blackening?

No, since all are blackened.

7. is there any correlation between angle and the appearance of blackening?

No, since all are blackened.

8. opacity of blackening – in a graph with period and opacity scores

Ok.

9. is there any significant difference in the opacity of blackening in different periods?

No.

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both

2/4 interior, ¼ exterior, 1 both

2. is there a correlation between interior and exterior abrasions?

No.

3. location of abrasion – in a table

4. is there a correlation between different locations of abrasion?

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	2	-
Abrasion on wall	-	1
Abrasion on rim	-	-

5. direction of abrasion – proportion of different types and correlation with different locations

base int is diag (ok microscopic photo f cutting through slip in MU 3477, but the cut is extremely short), and 1 patch of 4 cm > whole base slip is gone (photo's ok MU 3657); ext wall is 2 perp scratches

A. optional: proportion of post-depositional masking which may affect the appearance of everything above: *2/2 are "sharp" and 2/2 are "slightly rounded"; all 4 have minerals: int all 4 30% or under (mean 11.75%, median 7.5%), ext one is 20% covered >> they're slightly beat up, but not very masked*

6. is there a correlation between presence of any type of abrasion and diameter?

No. Sample size too small.

7. is there a correlation between presence of any type of abrasion and angle of opening?

No. SSTS

8. is there a correlation between period and any type of abrasion?

No. sample size too small

iii. is there a correlation between presence of abrasion and presence of blackening (at all or in any particular location?) *No. Sample size too small*

C. Semi-diagnostic: b_bases *n=0*

3. Black gloss

A. General discussion of the definition of the ware and the forms in which it appears

-Variability within the assemblage between bowls and plates over time

There are always more bowls than plates. There is no change in their distribution over time. There is always between 70-77% bowls in each period. And a random smattering of ollae and ink wells.

B. Bowls *n=119; rim=114, whole=5*

a. Morphology

i. general distribution of rim diameter

ii. diameter comparison over time > is there a change?

No. There is a broad range of sizes from 7cm to 29cm in every period.

iii. wall thickness comparison over time > is there a change?'

No. Not in upper, central (n=55, which I took from everything >=3cm), or lower. Though lower is clustered in every period around 6mm and upper and central are clustered around 5mm

iv. angle of opening comparison over time > is there a change?

Yes. The mean rank between Periods 5 and 8 is significantly different (as in, a KW test). The mean rank of Period 2 is 75.79˚ whereas the mean rank of Period 4 is 51.92˚. This suggests that bowls are getting broader-rimmed (and less likely to be vertical or incurved) (chis=3.978, p=0.046). There is no significant difference, however, between Period 2 and Period 5, where the mean rank of Period 2 is greater, it's not statistically significant. There is also little change between Period 4 and 5.

v. change in ratio of height to width? *NM*

b. Alteration

i. Discussion about factors affecting abrasion in black gloss:

1. Results of accretion *69% have no crust; 32% have some (n=36); int: 54% have 80% or more visible (median 3.5% and mean 12.12%), ext have 71% have 80% or more visible (median 5% and mean 14.35%)*

2. Results of attrition (fracture rounding) *79% is 1, 19% is 2, 2% is 3, fragment size > mean15.61, median 9 (max 136, min 2)*

3. Qualitative assessment of state of post-depositional processes affecting this assemblage > *Not bad! Surprisingly*. is there a difference between the different SUs or Periods? *While the mean and median of int minerals are higher in Period 2 than the other two, and of ext lower in Period 2 than the other two, there is no significant difference (KW) in these values across time. There are proportionally more frags with calcium in Period 2 (71%) compared to Period 4 (27%) (chi2=6.296, p=0.043). No difference in the distribution of edge rounding.*

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both

67%, 69%, 47% ….if I remove all frags which have edges of 2 or 3….64%, 65%, 43% > interesting that the proportion is the same. Does that mean anything?

2. is there a correlation between interior and exterior abrasions?

No. There's a relatively even number of frags which only have int and which only have ext

3. location of abrasion – in a table *n=94 of only those with "sharp" edges*

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	3	2
Abrasion on wall	5	18
Abrasion on rim	56	54

4. is there a correlation between different locations of abrasion?

Base int and base ext (14.491, p=0.000), base int and wall ext (13.084, p=0.000), wall int and wall ext (12.63, p=0.000), base int and rim int (4.567, 0.033)

5. direction of abrasion – proportion of different types and correlation with different locations *Int 1/3 int base are parallel (chi2=13.799, p=0.000), 1/3 int base are perp (chi2=8.653, p=0.003), 1/3 base int has a 2cm2 patch, 2/5 int wall were 2cm2 patches, 52/55 int rim were parallel (chi2=9.539, p=0.002), 3/55 int rim had 1 and 2 2cm2 patches; wall ext 13/18 (chi2=9.268, p=0.002)*

6. is there a correlation between presence of any type of abrasion and diameter?

No.

7. is there a correlation between presence of any type of abrasion and angle of opening?

No.

8. is there a correlation between period and any type of abrasion?

No. While this could be due to low sample sizes, the proportion of types of abrasion in different periods is quite similar: eg. Period 2 rim int 57%, Period 4 62%, Period 5 64% whereas rim ext Period 2 29%, Period 4 63%, Period 5 55%. Ext generally, Period 2 71%, Period 4 70%, Period 5 54%; Int generally, Period 2 71%, Period 4 66%, Period 5 73%

C. Plates *n=36, 33 rims, 3 whole*

a. Morphology

i. general distribution of rim diameter

Between 5 and 35cm.

ii. diameter comparison over time > is there a change? *No. Though there are FAR more egs. in Period 4, the distribution is similar. Also, there are far too few samples in Period 2 and Period 5.*

iii. wall thickness comparison over time > is there a change?'

Sample size too low. (but everything >=3cm has a central thickness)

b. Alteration

i. Discussion about factors affecting abrasion in black gloss:

1. Results of accretion *57% have crust; int: 40% have 80% or more visible (2 frags only have 90% visible) (20% median, 26.68% mean); ext: 32% have 80% or more visible (20% median, 28% mean)*

2. Results of attrition (fracture rounding) 81% are "sharp", 19% are "slightly rounded"

3. Qualitative assessment of state of post-depositional processes affecting this assemblage > is there a difference between the different SUs or Periods? *No. No difference in edges or calcium distribution. Also, SSS*

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both

83%, 78%, 72% both and when I remove those that have "slightly rounded" edges it's 86%, 76%, 76%

2. is there a correlation between interior and exterior abrasions?

Yes. Chi2=8.229, p=0.004 (with "slightly rounded" removed) chi2=14.583, p=0.000

3. location of abrasion – in a table *n=29*

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	2	1
Abrasion on wall	7	8
Abrasion on rim	23	16

4. is there a correlation between different locations of abrasion?

Base int and base ext highly correlated (chi2=13.982, p=0.000), rim int and base ext (chi2=3.970, p=0.046), rim int and rim ext (chi2=4.535, p=0.033)

5. direction of abrasion – proportion of different types and correlation with different locations

***Frags*: *Rim int is positively correlated with parallel 19/22 (chi2=4.966, p=0.026) since most have some wear on their rim edge likely related to post-dep movement, rim int with perp 2/22 (chi2=6.970, p=0.008) great 20xmag photos of POP 3485 perp and parallel scratches; int wall 3/7 parallel (chi2=6.008, p=0.014), 2/6 perp (p=0.086), 1 both, 1 4cm2 patch, no other correlations likely due to small sample size; wall ext 5/7 parallel (chi2=4.127, p=0.042) also has 1 perp, rim ext 16/16 parallel (8.889, p=0.003); ***Whole**: base int 1/1 diag, wall int 1/1 parallel, rim int 1/1 parallel; base ext 1/1 parallel, wall ext 1/1 parallel*

6. is there a correlation between presence of any type of abrasion and diameter?

No.

7. is there a correlation between presence of any type of abrasion and angle of opening?

No.

8. is there a correlation between period and any type of abrasion?

No. Similar distribution.

C. Bases *n=64*

-very small range in diameter (granted, only of the ring foot) and no change over time

		Frequency	Percent
Valid	jug	1	1.6
	bowl	17	26.6
	plate	16	25.0
	ink well	1	1.6
	unknown_BG	17	26.6
	Total	52	81.3
Missing	System	12	18.8
Total		64	100.0

-abrasion: 39/64, 53/64, 32/64; sherd condition: only 33/64 are "sharp", 29/64 are "slightly rounded", 2/64 are "rounded"; 32/64 have crust; so with only "sharp" selected, 18/33 have int, 28/33 have ext, 15/33 have both; base ext 26/29 parallel (chi2=29, p=0), base int 6/18 parallel, 2/18 diag, 4/18 perp, 6 have patches removed (whereas, when I included all vessels no matter how rounded, there were 14 with patches removed)

with only the "bowls" selected (n=17): *65% (n=11) have int abrasion*, 88% (n=*15) have ext abrasion, 53% (n=9) have both*
-base ext: 15/17 (all parallel), base int 11/17(3/11 parallel, 4/11 perp (with also a parallel scratch), 3 patches (1,2,3, cmsq)

with only the "plates" selected (n=16): *base int 14: 2/14 parallel, 4/14 diag (2 of which have another diag scratch crisscrossing), 3/14 perp, 5 patches (1,2,3,16 cmsq), base ext 13 (parallel), no walls abraded.*

4. Ceramica da mensa, dispensa, per la preparazione

-general description and definition of ware and the forms in which it appears
-cite Fontana 2005, Bertoldi, and Olcese at least in this section

		Frequency	Percent
Valid	pentola	3	7.5
	olla	18	45.0
	tegame	1	2.5
	jug	5	12.5
	bowl	10	22.5
	Total	36	90.0
Missing	System	4	10.0
Total		40	100.0

A. Bowls/Mortaria

		Frequency	Percent
Valid	8	9	88.9
	9	1	11.1
	Total	10	100.0

a. Morphology

i. general distribution of rim diameter

ii. diameter comparison over time > is there a change?

Maybe. The one example from Period 5 is smaller than all of the examples from Period 4, but the sample size is too small to understand this as representative of anything (and the KW test suggests there's no sign. Diff., nor does a t-test)

iii. wall thickness comparison over time > is there a change?'

No. The thickness of Period 5 is within the range of period 4 samples

iv. angle of opening comparison over time > is there a change?

No. The angle of Period 5 example is within the range of Period 4 samples

v. change in ratio of height to width?

b. Alteration

i. Discussion about factors affecting abrasion in black gloss:

1. Results of accretion: *40% (n=4) have incrustation, of which on the int 1 is 90% covered, 1 is 70% covered and the other 2 are 20% covered; on the ext, 1 is 60% covered while the other 2 are 20% covered, and 1 10% covered*

2. Results of attrition (fracture rounding) 5 of these are "sharp" and 5 are "slightly rounded"

3. Qualitative assessment of state of post-depositional processes affecting this assemblage > is there a difference between the different SUs or Periods? *Ssts*

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both *22%, 22%, and 11% (2, 2, 1)*

2. is there a correlation between interior and exterior abrasions? *No.*

3. location of abrasion – in a table *Note: there is no abrasion recorded for POP3286, even though it is likely a mortarium, but its interior was 90% covered in mineral crust.*

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	-	-
Abrasion on wall	2	2
Abrasion on rim	1	1

4. is there a correlation between different locations of abrasion? *Yes. Only between rim int and wall ext which had 1 overlap (chis=3.938, p=0.047);*

5. direction of abrasion – proportion of different types and correlation with different locations

wall int: ½ parallel, 1 patch 81cmsq; rim int: 1 patch 9cmsq; wall ext: ½ perp, 1 patch 9cmsq

6. is there a correlation between presence of any type of abrasion and diameter? *Maybe. There is no correlation except between diameter and int wall abrasion, but I cannot do logistic regression analysis on this because it is a "perfect fit" error. This is because the highest 2 measured diameters (24cm and 30cm) are the ONLY two fragments with int wall abrasion.*

7. is there a correlation between presence of any type of abrasion and angle of opening? *No.*

8. is there a correlation between period and any type of abrasion? *Ssts*

B. Ollae

		Frequency	Percent
Valid	5	1	5.6
	8	16	88.9
	9	1	5.6
	Total	18	100.0

a. Morphology

i. general distribution of rim diameter

ii. diameter comparison over time > is there a change?

No. Really too few to say anything concrete, but it is notable that all except 1 frag in Period 4 are between 6 and 20 cm and this is the range of the 2 examples from Period 2 and Period 5.

iii. wall thickness comparison over time > is there a change?'

Same pattern as above. There is 1 frag from Period 4 which is an outlier (at 19mm wide). This is the same outlying diam fragment (44cm opening). Given the size of this fragment, it should probably be considered a dolium, not an olla.

iv. angle of opening comparison over time > is there a change?

Similar pattern to above, but the range of Period 4 angles is more widely spread between 20˚ and 100˚

v. change in ratio of height to width?

b. Alteration

i. Discussion about factors affecting abrasion in black gloss:

1. Results of accretion: *39% (n=7) have some incrustation, of these 4 are over 70% covered; and 3 are covered 60% or less >> so, not great visibility; rather calcium-rich soil and these minerals stick well to this ceramic surface*

2. Results of attrition (fracture rounding): *56% (n=10) are "sharp", 33% (n=6) are "slightly rounded" and 6% (n=1) are "rounded"*

3. Qualitative assessment of state of post-depositional processes affecting this assemblage > is there a difference between the different SUs or Periods? *No significant trend (esp. since there's only1 eg from Period 2 and Period 5)*

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both *33% (n=6), 22% (n=6), 0 both*

2. is there a correlation between interior and exterior abrasions? *No.*

3. location of abrasion – in a table

Location of abrasion	Count (interior)	Count (exterior)
Abrasion on base	-	-
Abrasion on wall	3	1
Abrasion on rim	4	4

4. is there a correlation between different locations of abrasion? *No.*

5. direction of abrasion – proportion of different types and correlation with different locations

rim int 2/3 parallel, 1/3 perp; wall int: 2/3 perp, 1 patch 16cmsq (POP 3284 –even though this has a lid seating, it does not have rim abrasion); rim ext ¾ parallel, 1 patch 25cmsq; wall ext patch 25cmsq (POP 3294)

6. is there a correlation between presence of any type of abrasion and diameter? *No.*

7. is there a correlation between presence of any type of abrasion and angle of opening? *No.*

8. is there a correlation between period and any type of abrasion? *No.*

C. Jugs

		Frequency	Percent
Valid	8	3	80.0
	9	1	20.0
	Total	4	100.0

a. Morphology

i. general distribution of rim diameter

ii. diameter comparison over time > is there a change?

No. ssts and only in 2 periods. The one example from Period 5 is within the range of Period 4 (4-11cm

iii. wall thickness comparison over time > is there a change?

Period 5 within range of Period 4 (from 4-10mm)

iv. angle of opening comparison over time > is there a change?

No. The angle of Period 5 fragment is within the range of Period 4 frags (70-90˚)

v. change in ratio of height to width?

b. Alteration

i. Discussion about factors affecting abrasion in black gloss:

1. Results of accretion: *¾ have incrustation; of these 1 is 90%, the other 3 are covered less than 20%*

2. Results of attrition (fracture rounding) *all are "sharp"*

3. Qualitative assessment of state of post-depositional processes affecting this assemblage > is there a difference between the different SUs or Periods? *No. ssts*

ii. abrasion:

1. proportion with interior abrasion, proportion with exterior abrasion, proportion with have both *1 fragment has exterior abrasion*

2. is there a correlation between interior and exterior abrasions? *No.*

3. location of abrasion – in a table *fragment has abrasion on its rim, wall, and base exterior. This is a whole jug which is slipped with red/brown on the exterior and is 10.5cm high in total. Abrasion is, therefore, very easy to see in the slip.*

4. is there a correlation between different locations of abrasion? *No.*

5. direction of abrasion – proportion of different types and correlation with different locations *All three locations have parallel abrasion > seem more associated with post-dep than use.*

6. is there a correlation between presence of any type of abrasion and diameter? *N/A*

7. is there a correlation between presence of any type of abrasion and angle of opening? *N/A*

8. is there a correlation between period and any type of abrasion? *No.*