Theme: Quantification

Selected bibliography:

Baxter, M., & Cool, H.E. (1995). Notes on some statistical aspects of pottery quantification. Medieval Ceramic 19, 89 – 98.

Orton, C. and Huges, M. (2013). "Quantification" In *Pottery in Archaeology*, Cambridge: Cambridge University Press, 203 – 218.

Orton, C. (2000). "If this is the sample, what was the population?" in *Sampling in Archaeology*, Cambridge: Cambridge University Press, 40 – 44.

Waagen, J. (2021). "Breakage, bias and the archaeological surface record: Assessing the quantification problem in archaeological field survey" *Archaeometry* 2021, 1 – 16.

In the beginning of the meeting Andrea introduced the topic and the chosen texts, which was then followed by a group discussion. Following is a summary of the full debate:

Why discuss quantification?

- It's the basis for what we are doing
- We can never how much we actually have
- It's necessary to distinguish between archaeological context and systemic context
- Knowing numbers of vessels is essential for studying behaviour

Problems with quantification

- Site formation processes can cause differences in breakage patterns, making sherd count not reliable
- How to overcome this?
  - Weight -> can standardise the data, compensate for fragmentation and is suitable for comparison between assemblages
    - Note, heavier types may be overrepresented
  - What to do when weight is not available?
    - Estimated Vessel Equivalent
      - Only not biased measure of quantification
      - Calculates proportion of types within assemblages
      - Based on the idea that one sherd is a specific preserved portion of the vessel and basically measures the percentile preservation via, for example, rim charts
      - Gives value to the part of the vessel you want to focus on
        - Best to compare these, ie. Handles with rims and bases
      - Does not provide real count, but proportion – can overcome overrepresentation of breakage bias – puts all types on same level
  - When EVE and Pie (Pottery information equivalent) is not possible?
    - Use presence/absence

- Comment: And measuring level of brokenness (sherd count/eve) can also be used the other way around to study site formation processes!

<u>Comment: It is not possible to perform significance test (i.e., chi-square test) or statistical analysis by using eve only</u>

- We are not dealing with discrete data (i.e., actual counts), but just estimates
- Converting estimates into pseudo-counts (Pies)
- Software developed by Orton and Tyres for this (available by Orton)
    o Sophie and Andrea will look into how to implement this in R
    o Might be able to later share coding within our group

Comment:

- <u>Important to separate between archaeological decision and statistical decision</u>
    o Sometime we as archaeologist must assume that certain sherds belong to one vessel

What about decorated pottery?

- Normal sherd count
- If possible to reconstruct diameter use this -> but should be taken at the same point for each sherd
- Excavated pottery from primary/closed contexts more reliable

How about quantifying handles?

- Makes most sense to only deal with complete ones, and where the full profile is known (ie. Roman amphorae)

Michael explained us about his research and how he is identifying different pottery workshops through quantification:

- Statement: Eve and pie calculations should be foundational for any works on quantification in pottery!
- conducts 3D modelling of all sherds, instead of drawing them
    o Claims this is faster than drawing!
    o Variability factor comparably lower than sherds, which have been drawn
- This data is then incorporated into a software that measure all sherds and reconstruct them
    o Precise measurement, and estimate probability of sherds fitting together
    o <u>Luca Di Angelo, Hebrew University</u> – responsible for this software
    o with this software the full vessel can be reconstructed

Comment:

- You still need to make decisions on how many sherds go into a vessel, even when programming
- Mention of the recently developed automatic pottery classification tool – <u>ArchAIDE (http://www.archaide.eu/)</u>

- It only makes sense to use this if you are doing quantification that needs to be as precise as possible
- 3D models Convenient for having data at hand, also when you can't study the sherds in person

Questions for Michael:

- Any plans of publishing the data?
  - Models are intended to be published and the work flow behind the process
  - There's a general problems that people are not making software available publicly
- What about Handmade pottery?
  - Has not been tested yet!

Remarks

You need more sherds to get to a statistically significant pie test

- Without reference material it is also difficult, because one does not have full vessels to compare with
- More emphasis should then be placed on archaeological observations, rather than statistics

Comment:

- Whether and how to use statistics also depends on what kinds of questions we want to answer
- For example, when looking at behavioural patterns and discussing the character of a settlement a catalogue can also be a fine starting point for getting an overview of which kind of pottery was used in which contexts

Upcoming events:

Courses organised by FU-stat: https://www.stat.fu-berlin.de/schulungen_neu/interne-start/index.html

13/14 July and 20/21st English seminar on R organised by Dr. Strupler (for further information nehemie.strupler@fu-berlin.de)

Next pottery group meeting will be July 28th at 17!