

Identifying Obsidian Procurement Habits during the Pre-Pottery Neolithic in the Levant using Network Analysis

Zack Batist, University of Toronto

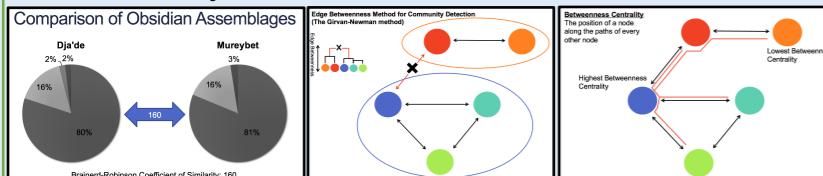
This study...

- ... contributes a heterarchical approach to regional analysis by leveraging obsidian sourcing data as medium for comparison
- ... takes a diachronic view that highlights continuity and change
- ... accounts for multiple facets of obsidian artefacts
- ... re-casts network analysis as a representational method
- ... demonstrates a reflective approach to the interpretation of archaeological networks

Obsidian Sourcing Data

- The raw material sources from which obsidian artefacts derive may be determined through geochemical analysis
- Isolated samples might therefore be considered as markers of long-distance interaction, though further insight might be gained by rendering these data comparable
- Network analysis is used to compare obsidian assemblages irrespective of their geospatial patterning, and has been promoted as a methodology for highlighting mosaics of localized practice¹

Network Analysis



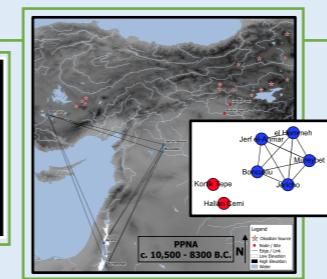
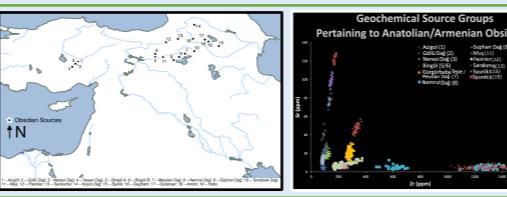
- Weaker edges are filtered out according to arbitrary threshold values, which define what constitutes a meaningful link
 - Construction of networks is therefore an interpretive and representational process, akin to modelling past realities
- Comparing these network models while reflecting upon how particular assumptions affect what is observed enables more coherent and unified conclusions to be drawn²

Overall Observations

- The shifting boundaries between clusters at adjusted threshold values should be taken seriously as patterns that prompt reconsideration of archaeological narratives
- For instance, the splintering of eastern clusters may reflect variable use of obsidian sources of NE Anatolia and Armenia, which might be underscored by distinctive cultural processes
- Alternatively, the persistent detection of tightly-knit clusters along the Mediterranean coast may reflect cohesive cultural relationships that supported regular exchange of obsidian

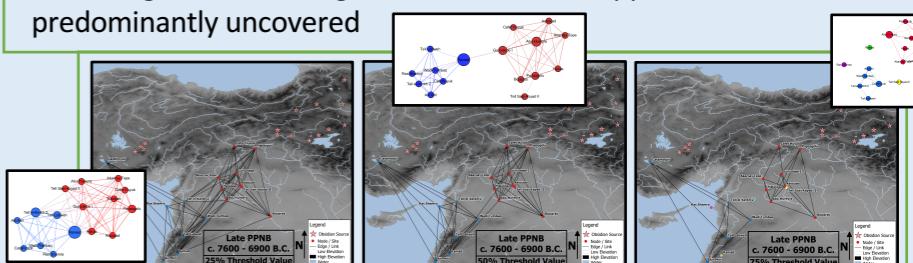
PPNA

- There are two spatially patterned groups pertaining to respective exclusive use of Eastern Anatolian and Cappadocian raw materials
- This network structure persists over all threshold values
- Each cluster is maximally connected – all nodes are equally central
- The persistence of internal connectivity and lack of external connectivity pertaining to the western group may be representative of insularity



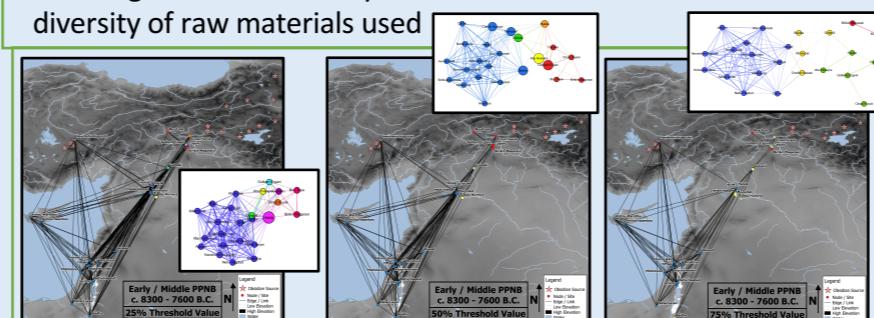
Late PPNB

- At 25% threshold value two spatially patterned clusters are again distinguishable, and the centrality of inland Levantine sites, particularly bordering the southern deserts, increases drastically
- At 50% threshold value the clusters become further disjoined, with only two meaningful links established between them
- At 75% threshold value the eastern cluster appears to split, with some sites exhibiting greater use of Cappadocian raw materials
- When higher standards for recognizing meaningful links are established, assemblages are also distinguished due to variation among Eastern Anatolian and Cappadocian raw materials used
- The sharp distinction of Tell Sabi Abyad and Ras Shamra are good examples of this; Çatalhöyük also bridges between sites where either Gollü Dağ or Nenezi Dağ obsidians – both Cappadocian sources – were predominantly uncovered



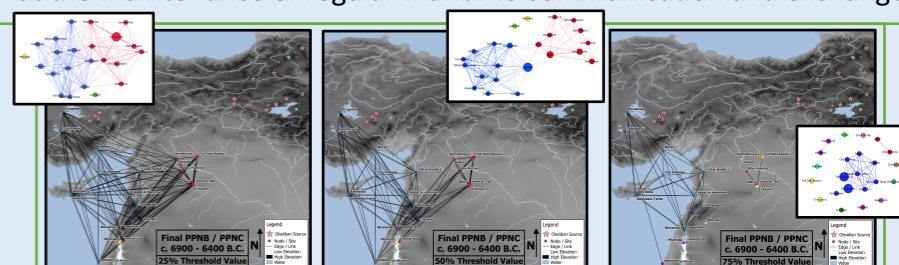
Early / Middle PPNB

- One stable cluster that corresponds with the consistent use of Cappadocian raw materials is diachronically persistent relative to the prior period
- At 25% threshold value many unique assemblages in the east appear to constitute their own modules
- At 50% threshold value two geospatially patterned clusters become apparent, representing assemblages that predominantly have either Eastern Anatolian or Cappadocian obsidians; they are joined by highly central sites situated along the Middle Euphrates, whose assemblages exhibit higher mixing
- At 75% threshold value the eastern clusters consolidate and rearrange to more broadly reflect the boundaries exhibited in the diversity of raw materials used



Final PPNB / PPNC

- At 25% threshold value one large cluster encompasses assemblages comprised mainly of Cappadocian obsidians, while another represents more mixing with eastern raw materials
- As with the prior period, increasing the threshold value reveals the greater connectivity of the Southern Levant
- The large number of small independent modules largely reflects the circulation of new raw materials from NE Anatolia and Armenia
- The persistence of a uniform coastal Levantine and Cypriot cluster hints at the maintenance of regular maritime communication and exchange



References

1. Carter, T., Grant, S., Kartal, M., Coşkun, A. & Özka, V. 2013 Networks and Neolithisation: sourcing obsidian from Körtük Tepe (SE Anatolia). *Journal of Archaeological Method and Theory* 40(1):556-569.
2. Stordeur, D. Change and cultural inertia: From the analysis of data to the creation of a model. Representations in archaeology, J.-C. Gardin & C.S. Peebles (eds.), pp. 205-222. University of Indiana Press.