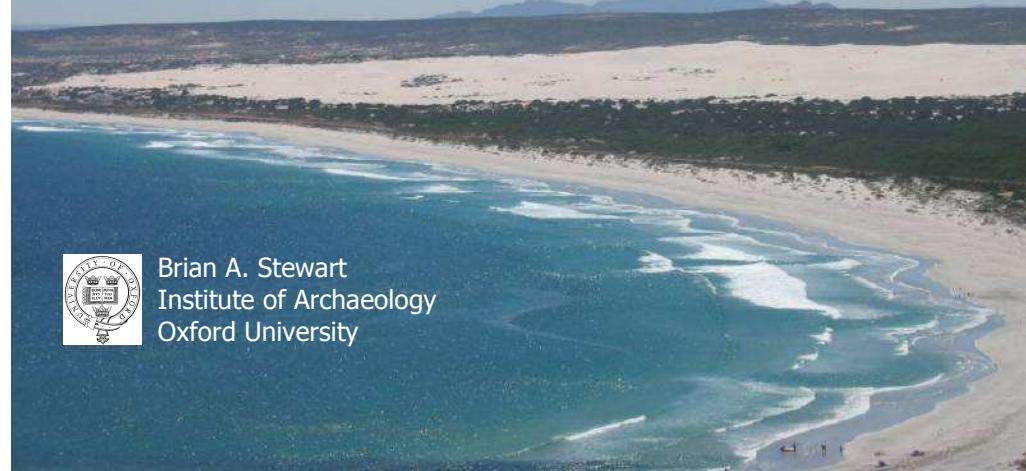


Refitting repasts: a spatial exploration of food processing, sharing, cooking and disposal at the Dunefield Midden campsite, South Africa



Brian A. Stewart
Institute of Archaeology
Oxford University



•This paper presents some results of a large-scale spatial analysis of Dunefield Midden, a pre-colonial Later Stone Age coastal campsite in the Western Cape Province, South Africa. The site was excavated between 1988-2001 by Dr. John Parkington and his colleagues and students from the University of Cape Town's Spatial Archaeology Research Unit (SARU)

- The site is highly significant on account of it representing what seems to have been largely one occupational episode, consisting a single living floor with limited overprinting. The lack of vertical stratigraphy enabled excavations to extend horizontally, with 860 m² currently excavated
- As DFM is one of the most spatially extensive prehistoric hunter-gatherer/herder sites in the world, it presents an excellent opportunity for exploring spatial patterning of domestic remains
- A suite of 14C dates on charcoal and shell range between 400-1000 BP, with a tight cluster between 600-700 BP.
- This presentation contains some animations that do not appear in Normal View.

For a site overview see: Parkington, J., Nilssen, P., Reeler, R., and C. Henshilwood. 1992. Making sense of space at Dunefield Midden campsite, Western Cape, South Africa. *Southern African Field Archaeology* 1:63-71.

For DFM ceramic data see: Stewart, B.A. 2006. The Dunefield Midden ceramics: technical analysis and placement in the Western Cape sequence. *South African Archaeological Bulletin* 60: 103-111.

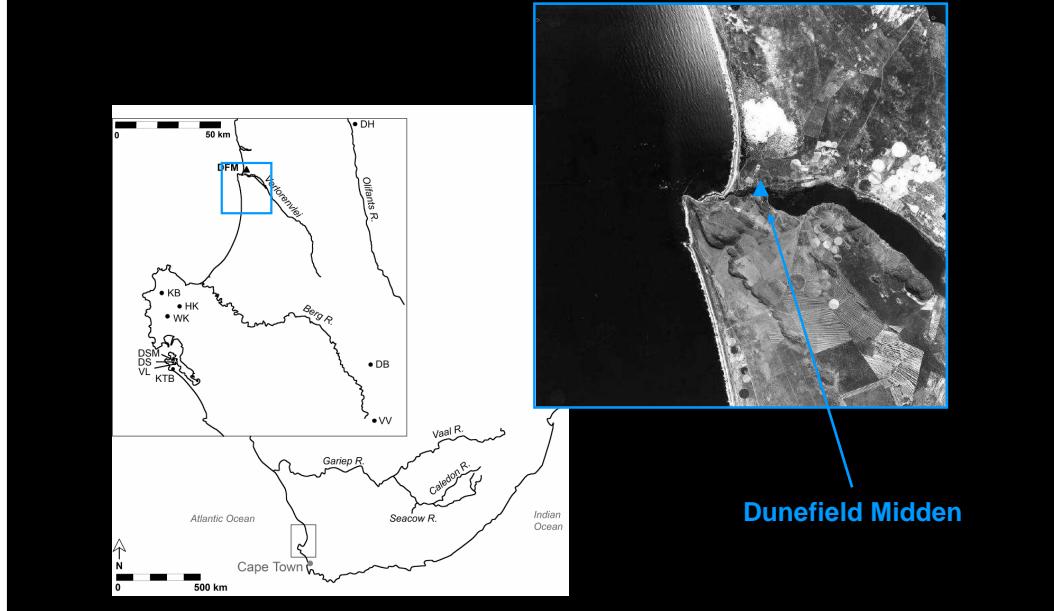
Also: Stewart, B.A. 2005. Charring patterns on reconstructed ceramics from Dunefield Midden: implications for Khoekhoe vessel form and function. *Before Farming* [online version] 2005/1 article 1.

For DFM stone tool data see: Orton, J. 2002. Patterns in stone: the lithic assemblage from Dunefield Midden, Western Cape, South Africa. *South African Archaeological Bulletin* 57: 31-37.

For DFM shellfish data see: Tonner, T.WW. 2005. Later Stone Age shellfishing behaviour at Dunefield Midden (Western Cape, South Africa). *Journal of Archaeological Science* 32(9): 1390-1407.

For DFM small carnivore burial data see: Parkington, J. & Fisher, J. 2006. Small mammal bones on Later Stone Age sites from the Cape (South Africa): consumption and ritual events. In: Ashmore, W., Dobres, M.A., Nelson, S., & Rosen, A. (eds.) *Integrating the diversity of Twenty-First Century anthropology: essays in memory of Susan Kent*, pp. 71-79. Arington: American Anthropological Association.

Dunefield Midden (DFM): Eland's Bay



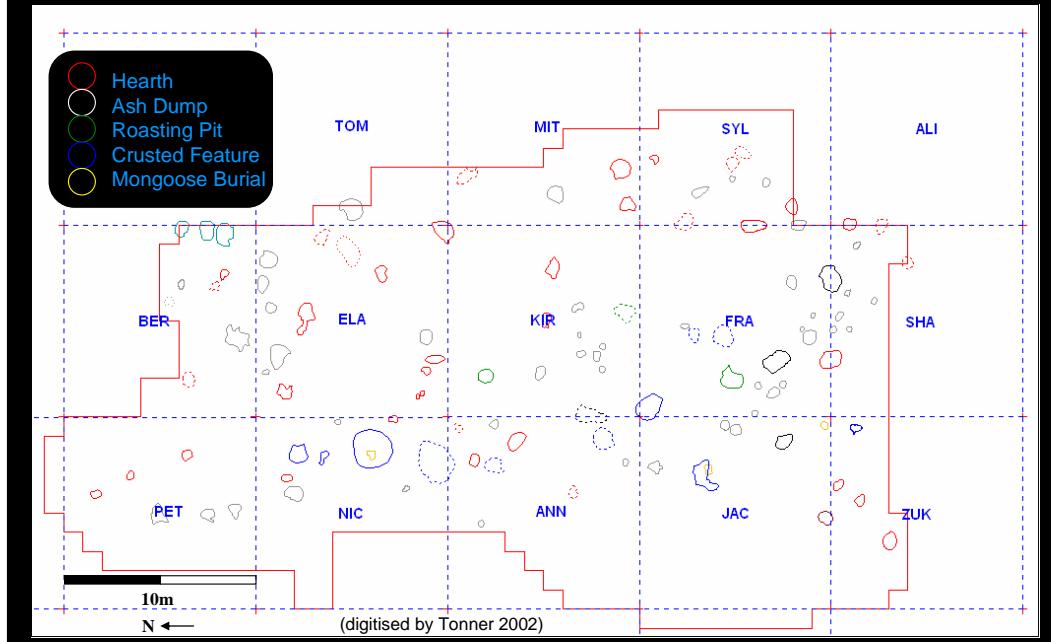
- Dunefield Midden is situated in a large, active dunefield on the Atlantic coast of South Africa at Eland's Bay, roughly 200 km north of Cape Town. About 500 m to the west is the sandy shore of Eland's Bay, while rocky inter-tidal platforms with abundant shellfish can be found just 2 km southwest of the site where the coast protrudes out to form a point (known as Baboon Point).
- Also nearby is the Verlorenvlei River (seen in aerial photo as black southeast-northwest oriented feature), a wide estuarine waterway rich in fish and water fowl.

Introduction

Project Goal: Reconstructing elements of the Dunefield Midden (DFM) inhabitants' social structure by analyzing their domestic spatial organization. The techniques employed are:

- Quantitative analysis of distributions of artefacts and food waste
- Refitting diverse classes of material
- Using GIS to detect and display spatially meaningful patterns

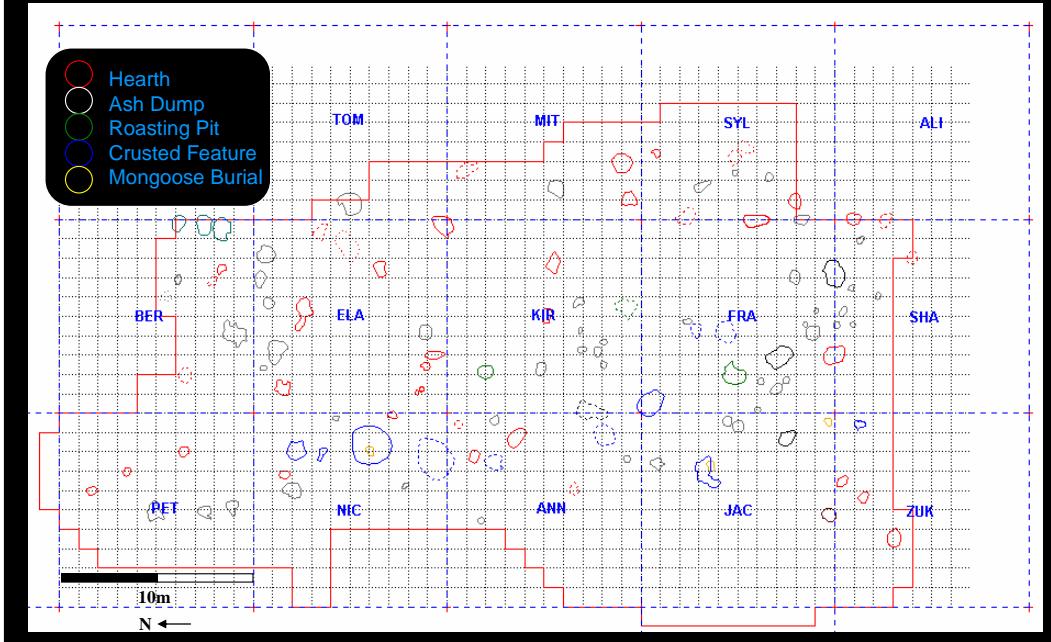
DFM: site structure



- The site is composed of a series of features and associated artefact and food waste distributions. Features include hearths, ash dumps, roasting pits, crusted ashy features and ritualised mongoose burials.
- Material culture includes stone tools (dominated by highly standardised quartz bladelets), ceramics, ostrich eggshell (oes) fragments and beads and rare bone points and pendants.
- Due to the enormous and highly complex shell dump which dominates the disposal area, DFM is characterised a shell midden site. But shellfish are by no means the only fauna present; seal, several classes of antelope, other small mammals, tortoise, fish, birds (including penguin), and reptiles are also abundant and well-preserved.
- In this plan view diagram, the dashed blue squares are 10 m² in size.

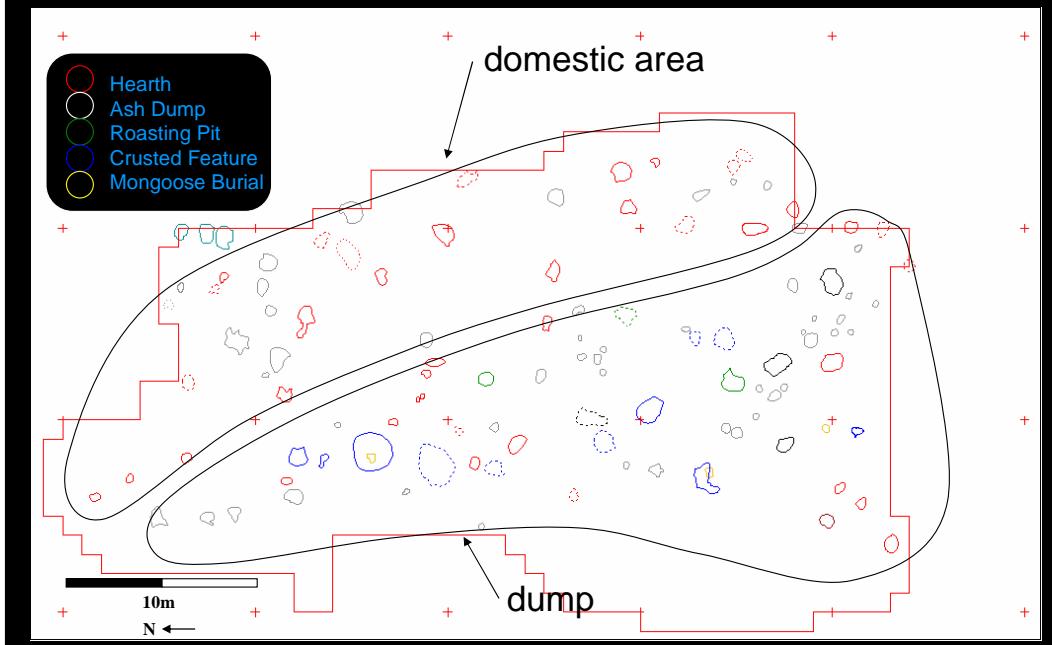
Tonner, T.W.W. 2002. *A spatial database for the Later Stone Age site "Dunefield Midden" (Western Cape, South Africa)*. Unpublished M.S. thesis, Department of Archaeology, University of Cape Town.

DFM: 1m grid



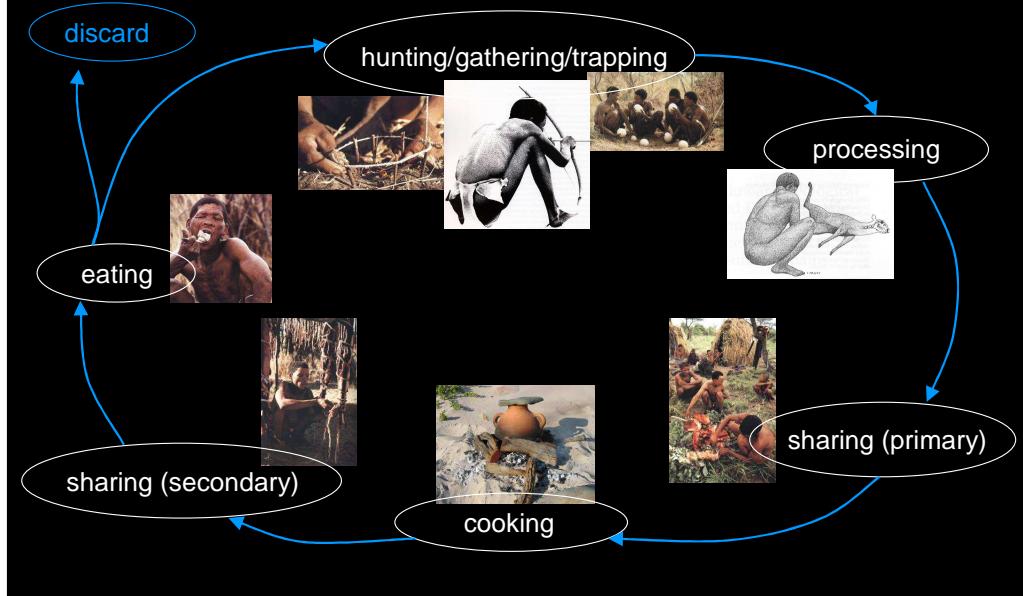
- This slide shows the site with the 1 m grid imposed, to simply give the viewer a good impression of the scale of the excavated area (red border).

DFM: bilateral symmetry



- Some very clear and interesting patterning exists in the arrangement of the features. Along the northern and eastern margins of the site is an 'arc' of hearths with high densities of stone tools and ceramic sherds. This has been interpreted as DFM's domestic area. This is opposed to the south and west by a much larger and more densely packed series of dumping features (ash dumps, crusted features, roasting pits etc.) and associated artefacts and food waste, interpreted as the site's disposal area (or dump). As such the site's structure exhibits a certain bilateral symmetry.
- Also of interest is that the space between the two opposed elements of the site's architecture is relatively clear of debris.

DFM: subsistence cycle



- The ultimate goal of the project is to disentangle the archaeological traces of the individual events that make up the subsistence cycle (hunting and gathering, and perhaps herding) in hopes of understanding the social setting within which they occurred. Each part of the cycle has a unique set of archaeological traces – spatial distributions of material culture and evidence of use on the material itself (organic residues on ceramics, modifications on bones etc.).
- Tracing the movement of food into and throughout the site from the point of acquisition to final disposal can potentially illuminate the social relationships which structured this movement. I therefore want to examine the diverse material residues that these different yet articulated activities produced, such as ceramics from cooking, ostrich eggshell fragments from food preparation and drinking, animal bones from eating etc.
- I do this by analysing 1) the spatial distributions of these discarded materials on the site, primarily through the technique of refitting, combined with 2) evidence of use on the materials themselves.

Hunters



or



Herders?

- Highly formal stone tool assemblage (quartz bladelet dominated)
- ‘Small’ (< 4mm) oes beads present
- Few domesticated animal remains (sheep MNI = 4)
- Faunal assemblage dominated by wild species (seal; steenbok; grysbok; eland; tortoise etc.)

- Formalized toolkit may simply imply DFM = a special purpose campsite

- ‘Large’ (> 4mm) oes beads also present

- Need not expect large domesticated fauna component if animals used primarily for milk

- Enormous seal component (MNI = 87); similar to post-AD 1000 levels at KBB

- Seal assemblage heavily chewed (indicate presence of dogs?)

- Ritualised mongoose burials

- Whole pots

• What kind of social structure do I suspect I am attempting to reconstruct? Around 2000 BP the first archaeological traces of a pastoralist life-way emerge in South Africa, particularly in coastal areas. It is unclear whether or not these earliest herding groups were ‘true’ pastoralists, like the historically known Khoekhoen encountered by colonial Europeans, or indeed were hunter-gatherers who acquired sheep and ceramic technology through contact/trade with more northerly groups. What seems definite, however, is that by the time DFM was occupied the western Cape was inhabited both by groups practicing hunting and gathering and those more dedicated to full-fledged pastoralism. What form(s) the relationships between the hunter-gatherers and herders sharing the landscape took is a matter of ongoing debate, one on which DFM can hopefully shed some light.

• This slide presents the relevant evidence at DFM that supports the hypotheses that the occupants of the site were either hunter-gatherers or herders. The two hypotheses are not necessarily competing – it seems entirely possible that the occupants practiced an ‘intermediate’ subsistence routine between the two ‘extremes’ of hunting and herding.

• This is an important issue for this project because, as the ethnographic record shows, a group’s subsistence base will largely determine its social structure, which will in turn influence the organisation and use of domestic space. We may, therefore, be able to infer the inhabitants’ social structure (be it a largely egalitarian one characteristic of Kalahari hunter-gatherers, one similar to the historic Khoekhoen who had more internal social divisions or something altogether different), by analysing the archaeological evidence.

DFM: the refitted materials

Artefactual (containers)

Ceramics



Ostrich eggshell



Tortoise



Food waste

Steenbok (sm. bov.)



Sheep (sm.-med. bov.)



Eland (lg. bov)



- This slide illustrates the materials that were chosen to be refitted. They fall into two categories: artefactual and food waste.
- Both the tortoise and the ostrich eggshell ‘sit on the fence’, as it were, because the site’s inhabitants both collected them to be eaten and, afterwards, often used the tortoise carapaces as bowls and the ostrich eggshells as water flasks (and perhaps also as bowls). Indeed, the edges of at least 50 tortoise carapaces have been ground down for this purpose. Likewise, oes flasks commonly have holes drilled in one end where the egg was extracted; this is then used for subsequent refilling and drinking. As such, both tortoise carapaces and oes represent both artefacts with a functional significance and food waste (although the other remaining elements of the tortoise anatomy, such as the plastron and limb bones, represent only the latter).
- This paper focuses only on the artefactual materials exhibited in the top half of this slide – the ceramics, tortoise carapace bowls and ostrich eggshell flasks – each a different type of ‘container’ associated with food preparation and consumption. The bovid bone data are still undergoing analysis and are thus excluded.

DFM: types of evidence, types of activities

Artefactual (containers)

- **Ceramics**: transport, storage?, cooking, eating, caching?
- **Oes**: transport, storage?, food preparation?, eating/drinking, caching?
- **Tortoise (carapace)**: transport?, food preparation?, eating/drinking, caching?

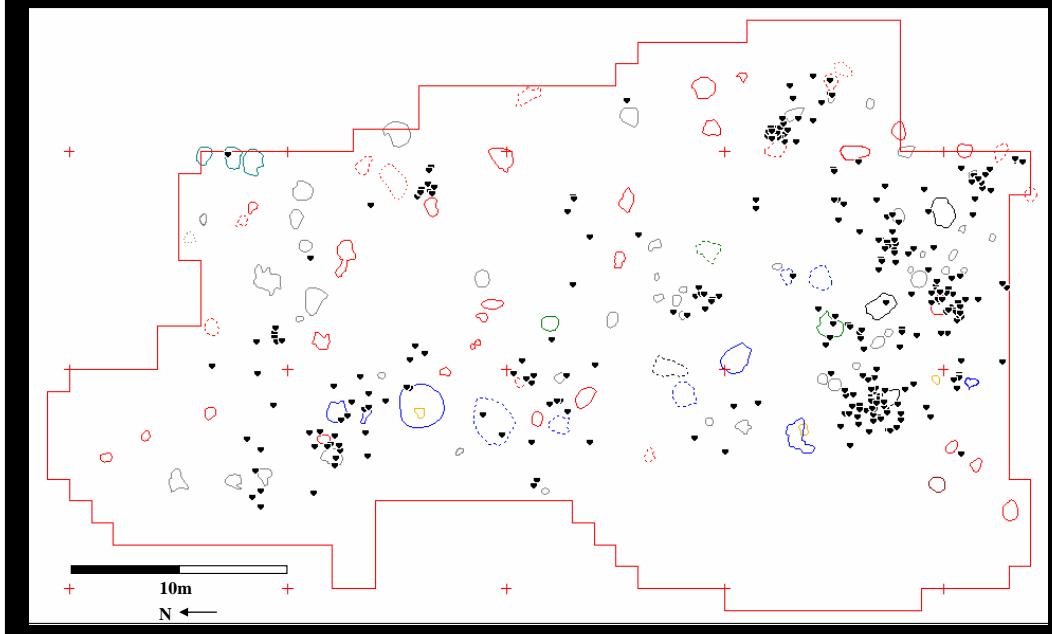
Food Waste

- **Eland**: hunting, processing, sharing, cooking, eating, cleaning
- **Steenbok**: hunting/trapping, processing, sharing?, cooking, eating, cleaning
- **Sheep**: rearing/stealing?, processing, sharing?, cooking, eating, cleaning
- **Tortoise (carapace, plastron, other bones)**: collecting, processing, cooking, eating, cleaning

ALL ACTIVITIES INVOLVE DIFFERENT CONTEXTS FOR SOCIALIZING

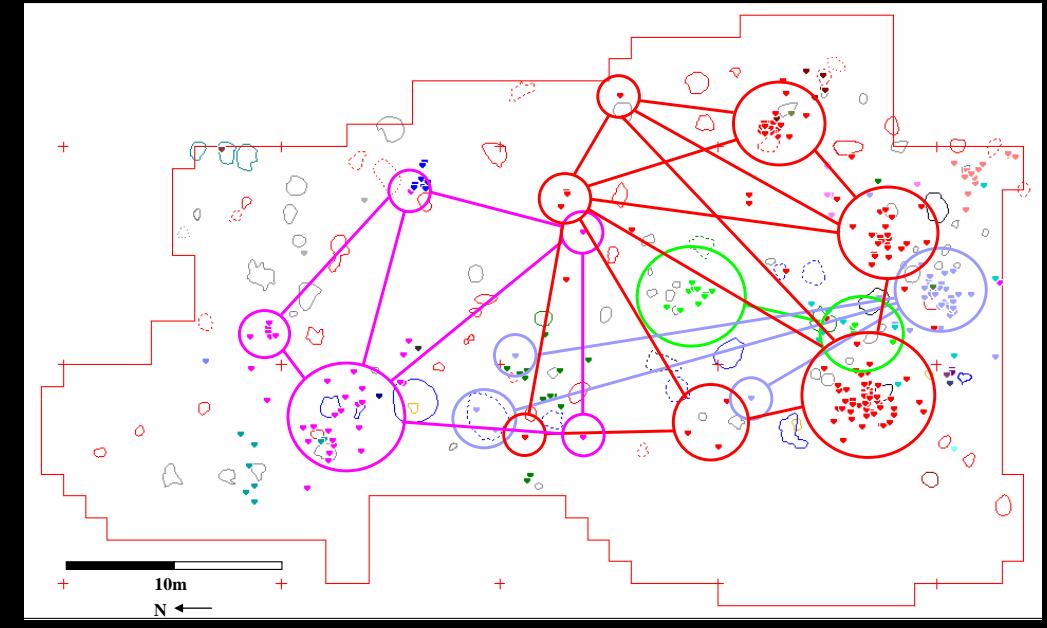
- Each material has a set of (often overlapping) activities that it can potentially reflect. These are listed here.
- The aim is to isolate as much as possible the individual activities responsible for the material distributions that exist. This is important because each activity almost certainly provided a different context for socialising, and the materials discarded thus hint at different social dynamics.
- I also want to explore the concept of use-life variability for both containers and food waste. I contend that similar use-life-related variables underlie the distributions of each. Size and robusticity are two such variables. For example, just as a large and durable ceramic vessel will last for a longer amount of time than a small and fragile one, a large antelope like an eland will be distributed to more people than the much smaller steenbok. Because both have relatively 'long' use-lives their remains will be spatially more widespread than those of their smaller or more delicate counterparts. Besides size and robusticity, other variables that may influence container and food waste distributions are perceived value and particularistic social variables ('appropriateness' of different forms of discard).

Ceramics: all plotted sherds



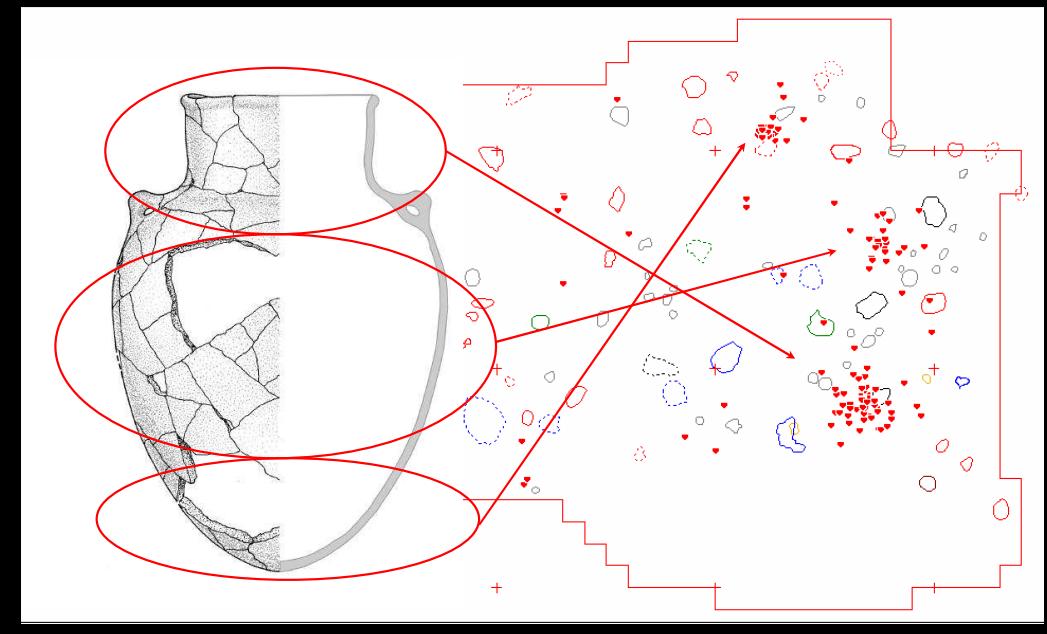
- Displayed here are all the plotted ceramics on the site. It is clear that:
 - the majority are found in the dump area,
 - those in the dump are more spatially diffuse than those in domestic area and heavily associated with 'dump features' (particularly ash dumps and roasting pits), and
 - ceramic distributions in the domestic area comprise spatially discrete clusters (or 'puddles') which are clearly associated with hearths.

Ceramics: refitted sets



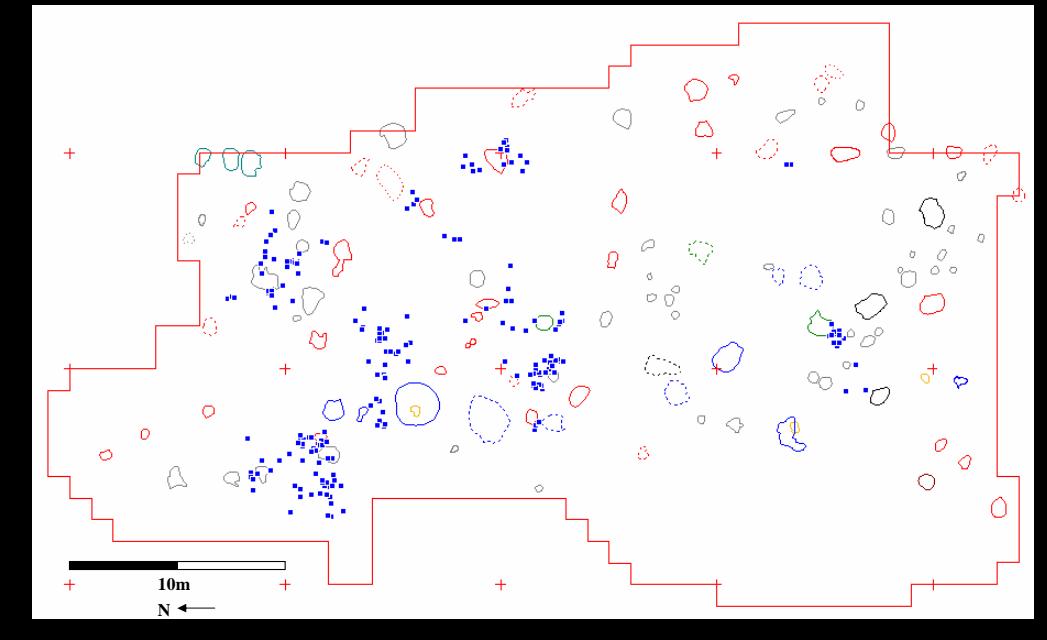
- Displayed here are all the plotted, refitted ceramic sets. Sherds of the same colour indicate they originated from the same vessel. It is clear that:
 - the vast majority of refitted ceramic vessels connect one part of the dump to another part of the dump,
 - fewer refits were found between the domestic area to the dump, and
 - the fewest refits were found within the domestic area, for instance between one hearth and another.
- The ceramics therefore seem to be a heavily dump-related material. This is likely because broken sherds are bulky and uncomfortable when occupying domestic space. The many refits found within the dump area suggests that many vessels had extended use-lives, being discarded to different parts of the dump in sequential stages after individual episodes of breakage. An excellent example of this is the distribution of the Vessel 17 sherds, shown on the following slide.

DFM: Vessel 17



- The distribution of sherds from the largely reconstructed Vessel 17 is an excellent example of a very lengthy use-life. That different parts of the vessel are distributed in spatially isolated 'puddles' hints at episodes of fragmentation and discard as the vessel was reused until it no longer served a practical purpose.
- As can be seen, the vessel seems to have broken from the top down. The neck of the vessel likely fragmented first and is therefore situated farthest away from the domestic area (where it was used for cooking). The vessel body seems to have broken off sometime later and thus lay closer to the domestic area than the neck (the dump margins would have expanded during site occupation with the gradual accumulation of waste). The base, by contrast, is situated in a tight 'puddle' directly adjacent to a hearth in the domestic area. It was thus very likely the part of the vessel which lasted the longest, perhaps being used as a bowl until it fragmented and then 1) was never discarded to the dump (i.e. because it broke shortly before the site was abandoned) or 2) was cached near the hearth for later use then broke post-depositionally.
- Crucially, this is the largest and most robust vessel at DFM. It is therefore little surprise that it also exhibits the widest spatial distribution of sherds.

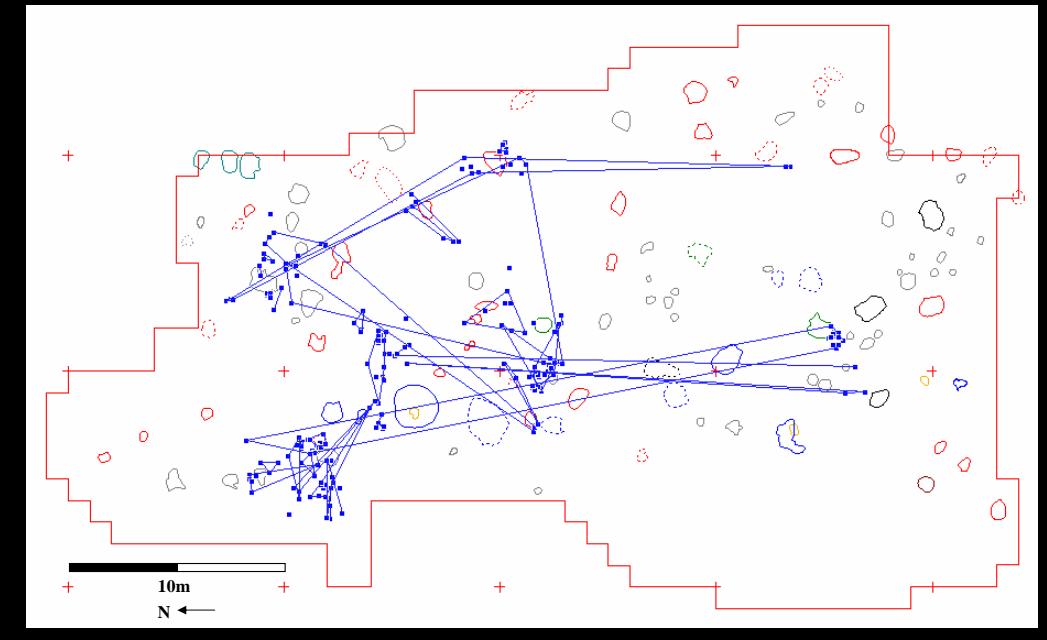
Ostrich eggshell (oes): plotted sets



Exhibited here are all the plotted ostrich eggshell fragment refitted sets. I do not currently have a complete list of *all* the oes fragments at DFM (i.e. those which have not been refitted), and this likely explains the clear dearth of fragments from the southern part of the site. This will be corrected in the near future. However, it is clear from this slide that:

- the oes sets are clustered heavily around ashy patches, both in the dump and domestic areas,
- smaller distributions of oes are situated around domestic hearths, and
- two conspicuous clusters exist near two ash dumps, and another two near the site's two roasting pits. This is an intriguing association that may have several explanations (i.e. the eggs were cooked 'in the shell' by burying them in the hot sand near a fire pit and the shells were then smashed to extract the egg as documented in the Kalahari, or shell fragments were buried near a fire pit to intentionally discolour them for bead production etc.).

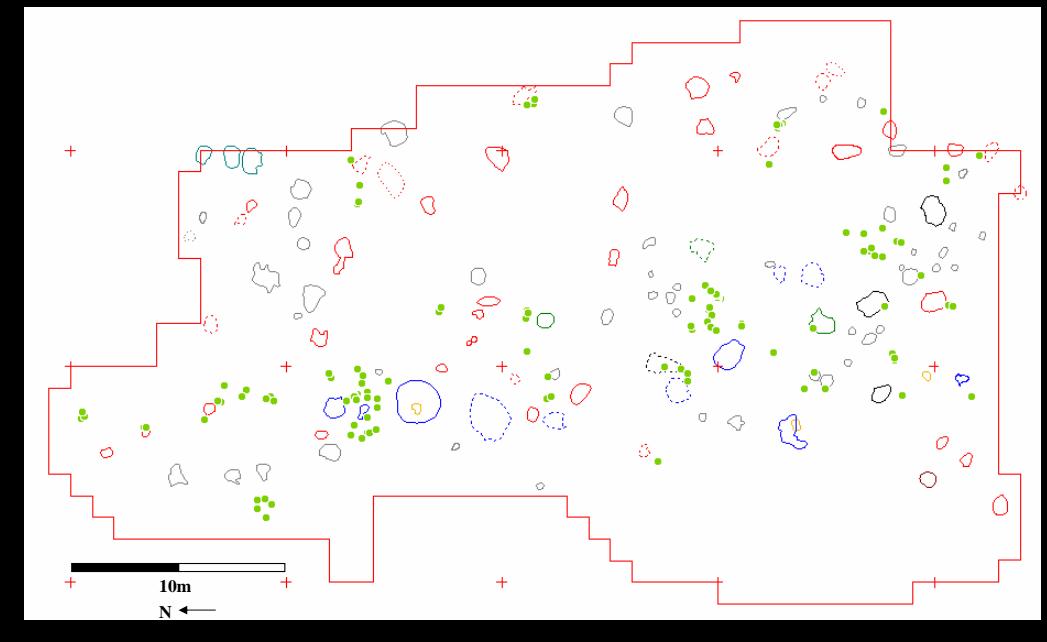
Ostrich eggshell (oes): refits



This slide shows the plotted oes fragments with lines connecting the outlying-most fragments in a set. In other words, geometric shapes are drawn around individual sets. This gives a good general impression of refitted connections without cluttering the image with too many lines showing every individual refit. It is clear that:

- like the ceramics, most refits are found within the dump (the clusters near the two roasting pits do not refit to each other, but do refit to other clusters elsewhere),
- like the ceramics, less refits occur between the domestic area and the dump, but
- unlike the ceramics, many refits occur within the domestic area. This may point to a fundamental difference in the way these two materials – ceramics and ostrich eggshell flasks – were perceived, either in terms of value or as personal property. This issue will be taken up below.
- Crucially, again, oes sets refit over generally shorter distances than ceramics. This is probably because oes flasks are less robust and thus have shorter use-lives than ceramic vessels.

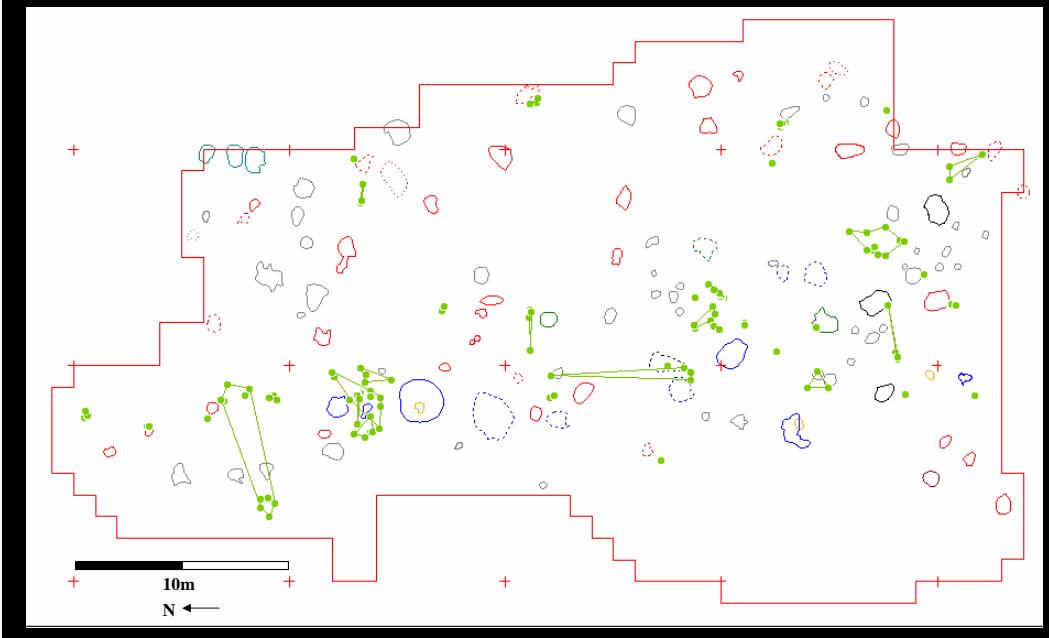
Tortoise bowls: all



This slide shows all the tortoise carapace bowls at DFM (i.e. those refitted carapaces with plates that exhibit evidence of having been ground to form a smooth bowl lip). Most of the dots represent a whole or partially whole bowl, although some denote individual plates. It is clear that:

- again, tortoise carapace bowls are more heavily associated with the dump area; mostly ashy patches and crusted features, but also hearths and a roasting pit,
- the largest concentration of bowls occurs near three crusted features in the dump. What is the significance of the relationship between this material and this type of feature?
- In the domestic area, bowls are primarily associated with hearths with a probability level of medium or low (dashed red circles). Again, what is the significance of this relationship?

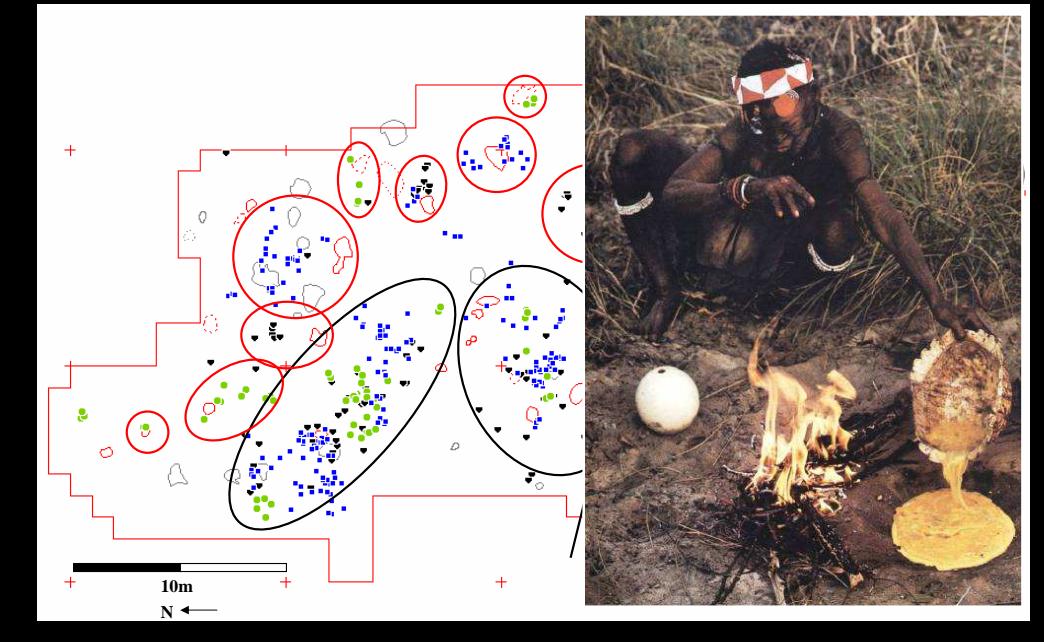
Tortoise bowls: refits



Shown here are the refitted tortoise carapace bowls with, like the ostrich eggshell fragment sets, lines connecting the outlying-most fragments in a set to form a series of geometric shapes. It is clear that:

- the longest distance refits concentrate in the dump and tend not to connect associated features,
- refits in the domestic area are highly concentrated, like the ceramic 'puddles' discussed above, and
- tortoise bowls refit over far less distance than either the ceramics or oes. This is almost certainly because they are much less robust than the other two materials and liable to easily rupture at the sutures. In other words, they have the shortest use-lives. This is exacerbated by the fact that, unlike a ceramic vessel or oes flask, a plate detaching from a bowl renders it largely useless as a container.

Ceramics, tortoise bowls & oes: all plotted



This slide shows all the plotted DFM ceramics, oes fragments and tortoise carapace bowls on the same diagram. Black pots = ceramics / blue squares = OES frags / green dots = tortoise bowls. Several questions can be asked and observations made:

- again, is the obvious lack of oes in southern part of site a tangible spatial difference or due to incomplete data entry?
- There are at least six very obvious, discrete clusters in the dump which include all three (or two of the three) container types, although these clusters are comprised of different proportions of each type. In contrast, the clusters of materials associated with domestic hearths seem to contain only one (or sometimes two) container types. The isolation of certain materials around domestic hearths may signify either 1) that these were special activity hearths rather than typical domestic hearths like those around which hunter-gatherer groups in the Kalahari perform a variety of activities and consequently leave a variety of waste materials or 2) that these *are indeed* domestic hearths but that the society itself is structured in a way whereby domestic activities are spatially separated from one another. Does this spatial separation hint at a more segregated or internally stratified society than that we commonly attribute to 'classic', highly egalitarian hunter-gatherer groups? Were DFM's inhabitants practicing limited herding and therefore ownership/hoarding of resources? Were they full-fledged pastoralists?
- The photo which appears of a Bushman woman serves to remind the archaeologist of the complexities involved when attempting to answer these questions and reconstruct a site history. She pours an ostrich egg omelette onto a heated surface using a tortoise carapace bowl. The previous owner of the tortoise shell she also no doubt ate; its plastron, limb bones etc. lay in a dump likely some distance away from where the carapace will eventually be disposed of. And like the tortoise carapace, the ostrich eggshell can and no doubt will also be re-used and deposited away from where its contents were cooked and consumed. Indeed, all that is left of this cooking event may be the ash and charcoal horizon left by her small fire, the materials which provided and facilitated the meal long since carried off to be used and discarded elsewhere.

Ceramics, oes and tortoise bowls: some conclusions

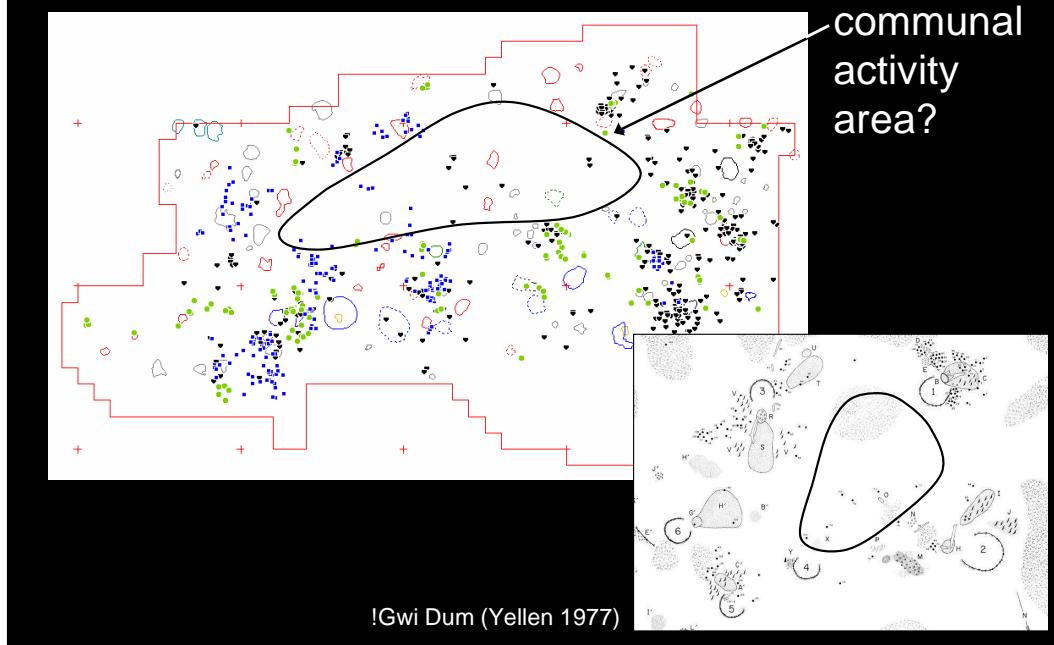
- All three refit mostly within dump area
- Ceramics refit over longest distance, then oes, then tortoise bowls – suggests variable use-life lengths of materials
- Refits of all cluster tightly in domestic area, more diffuse in dump – suggests pattern of primary use in domestic area, secondary disposal in dump
- More oes than ceramic refits between hearths – suggests pots conceptualized more as personal/ family property?
- Homogenous clusters near individual domestic hearths – suggests:
 - Hearths host special purpose activities in a highly egalitarian society? (hunter-gatherers?)
OR
 - Hearths represent domestic units in a more socially stratified society with higher degree of gender/age/kinship division of space? (herders / 'hunters-with-sheep'?)

DFM: the near future

- Integrate ceramic refit data with lipid residue analyses
- Compare distributions of tortoise plastron, carapace and non-shell bones
- Explore distributions of different skeletal elements from the three bovid size classes
- Integrate animal bone refits with bone modification data to delineate processing, consumption and disposal areas
- Perform metrical refitting to explore patterns of food sharing



DFM: the near future

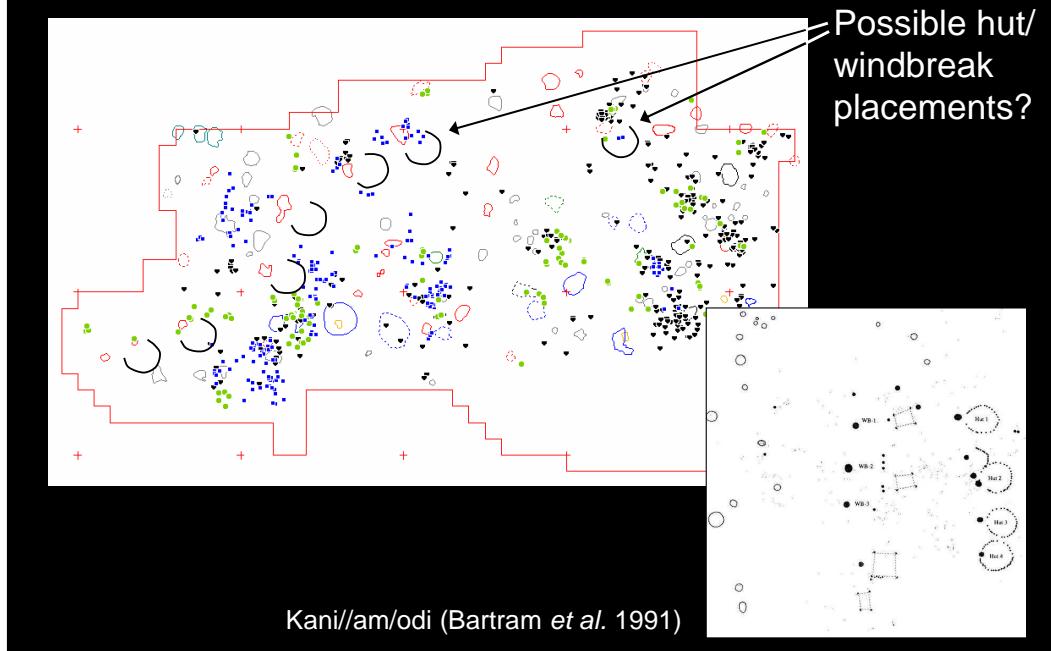


I also want to explore the larger issues of site structure and the organisation of domestic space taking into account ethnoarchaeologically significant variables i.e.

- duration of occupation,
- number of inhabitants,
- shade as a controlling factor for activity area placement,
- wind as a controlling factor for household placement, and
- household spacing as a reflection of kinship distance / degree of sharing.

Yellen, J.E. 1977. *Archaeological approaches to the present*. New York: Academic Press.

DFM: the near future



Bartram, L.E., Kroll, E.M. & Bunn, H.T. 1991. Variability in camp structure and bone food refuse patterning at Kua San hunter-gatherer camps. In: E.M. Kroll & T.D. Price (eds) *The interpretation of archaeological spatial patterning*. New York: Plenum Press

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