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Using functional aspects for the classification of Meroitic pottery from Hamadab, Sudan[1]

I. Introduction

Pottery is one of the main type of artefacts that field archaeology has to deal with. The scientific aspects to look at pottery are manifold. The study of shapes and decorations forms the key to chronological studies since - literally as a historical constant - taste and techniques changed over irregular but rather short intervalls. In creating highly representative products the designers of Meroitic pottery (ca. 300 BC-350 AD) allowed themselves to be influenced by Hellenistic styles during the early period and by Roman styles during later times. Symbolic and pictographic expressions that are so typical for Meroitic pottery could serve to draw conclusions about the content, the owner, and perhaps the status of the owner. Pottery is an essential element of Meroitic grave furniture. The iconographic display records pottery being used in various religious ceremonies and even the pottery-making process itself implies to bear a spiritual relation. The high degree of organisation of Meroitic handicraft can be studied by the techniques of pottery manufacture and the firing process. The composition of clays proves the procurement of different raw materials and mixtures according to the intended quality of the final product.

The excavation of domestic areas like the Meroitic town-site of Hamadab adds much to knowledge about the actual use and secondary use of pottery vessels. The great amount of fragmented pottery that comes upon us during excavation constitutes a challenge to classical recording systems. Since the data need to be filtered to study all the mentioned facettes a database provides the required procedures to combine functional elements of pottery.

II. Pottery classification and context

Pottery classification systems generally deal with two main aspects:

- systematizing and cataloguing potsherds (often in great quantities) as a finds' inventory[2]
- forming a more or less objective data base to pose specific questions on the material.

Although it might be argued that both aims can be pursued individually especially the second aspect is often underestimated. Despite the demand for objectivity and binding criteria the process of pottery classification bears many 'subjective' or unconsciously combined criteria that are needed to formulate meaningful questions. It might have to be accepted that the ceramic researcher introduces 'subjective' elements to fix an individual impression at the very moment of inventarization. Otherwise the range of questions will be restricted due to the very general character of data to be recorded.

Mostly, context-based questions are addressed to a whole pottery vessel not to a single pottery sherd. Museal inventory systems treat potsherds as single small finds e.g. in assigning an individual registration number to each sherd. However, concerning the archaeological context-based interpretation it is necessary to combine all possible fragments from the same pot to a so-called vessel unit.[3] A single pot can break (even during or after excavation) into a non-foreseeable number of sherds, but the context – one single pot – still remains the same. Quantifying by the

1 The text is a synthesis of a presentation during the course „Pottery analysis" taught by guest lecturer Dr. Rebecca Bradley during summer term 2003 at the Faculty of Sudan Archaeology (Humboldt University of Berlin). It comments on the pottery documentation system established for the Meroitic town site of Hamadab (Sudan) partly within the scope of the database section of the joined project "Virtual Nile Valley – Egypt and Sudan" (2001-2003) and partly during the processing of ceramic finds on the site (Dittrich 2003). Primarily, I would like to thank Prof. Dr. Claudia Näser (Institute of Archaeology, Faculty of Egyptology and Northeast African Archaeology, Humboldt University of Berlin) for kindly revising and commenting on the article.

2 Increasingly documentary systems emphasize the visual reproduction of the original object itself (by the aid of photography, scanning, virtual reconstruction).

3 Following this method of inventarization also the work with a relational database strictly requires a very consistent hierarchical registration system. Equally, other traditionally vaguely defined aspects of ceramic research are subjected to this process.

one or the other method will generate very different results. Although it has been suggested before to consider only rim portions in a counting procedure the concept of a vessel unit is open to any imaginable vessel type. Nevertheless, secondary contexts exist that have been created by the later employment of individual fragments e.g. by reusing a suitable sherd as a lid or as a shovel for digging etc. In the latter case a reconstruction of the whole vessel by refitting would be not appropriate since the reused sherd has been transformed into an object with its own "history of life".

III. Functional aspects

The following notes are the attempt to work out so called functional data out of a specific pottery collection to offer a certain directive for further studies of Meroitic ceramics from settlement sites.[4] The term 'functional' has to be interpreted as a measurable material dimension here in the first place and as a determination of a specific usage only in the second. Accordingly, the classification of strictly functional vessel types requires a very precise definition of their functional features, including general shape, exact proportions, mouth shape and inclination, number and position of handles, spouts etc. A vague determination like e.g. 'beer jar' is far from being an unmistakable clear indication of shape nor does the suggestion of former usage e.g. of small black bottles as libation containers (cf. Lenoble 1995) help in classifying the respective vessels.[5] Since function in the meaning of usage comprises many aspects like primary usage, secondary use, reuse, material value, symbolic expression etc. that in the best case can be deduced from the context or pictorial sources functional ceramic classification should follow descriptional rules. Some of them are outlined in more detail.

IV. Documentation system

The pottery classification system discussed here has been designed exclusively for the inventory of surface ceramic finds from the Meroitic town site of Hamadab near Meroe. Since most of the ceramic finds are already heavily fragmented, it had to be anticipated that the basic determination of a vessel type would often be impossible.

On the other hand, some of the pre-existing studies and notes on Meroitic pottery from that area[6] were focussed less on functional vessel types then on elaborate decorations like stamping and painting as artistical expressions. With respect to this, even the smallest stamped or painted fragment was expected to bear useful information.

For the documentation system under discussion an MS Access database as well as corresponding field recording sheets (fig. 1) were outlined during the years 2002 and 2003. The database should serve both of the above mentioned aims of a pottery classification system, namely providing a detailed record and archive of the Hamadab ceramic finds as well as constituting a proper data basis for statistical and analytical queries.

IV. 1 Vessel context

The consecutively numbered vessel unit (fig. 1) stands for the reconstructed vessel context which forms a basis for further study independent from any archaeological context related to the excavation of the settlement. Therefore it can comprise several fragments with individual find numbers (fig. 1) that were assigned during the excavation process due to different locations of the pot fragments, e.g. in different layers, pits etc.

IV. 2 Form

The vessel form is defined in a hierarchical way: Basic distinctions are vessel form families (fig. 5) including

- bowls
- jars
- beakers
- necked jars/bottles
- stands
- lids.

All forms are further subdivided into vessel types that are indicated by a numeral, e.g. bowl 1 (figs. 1, 5). The hierarchical extension is one of the basic elements of the database and can be employed for grouping of datasets in different levels.

In approaching a determination of forms out of heavily fragmented ceramic material it seems advisable to begin with a description of the preserved vessel parts starting from rim via neck, shoulder and body to the bottom, furthermore indicating

4 Function has already played a role in the classificatory studies of Seiler (1999) and Edwards (1999).

5 Apart from the fact that a systematic analysis of organic residues is still outstanding.

6 Garstang/ Sayce/ Griffith 1911; Wenig 1979; Török 1987, 1997; Zach 1988.

the presence of a lid, handle, spout, or other special features (fig. 1).

Concerning the vessel shape three main encodings (rim code, inclination code, bottom code) seemed to be most useful. In the case of Hamadab the rim type comprises plain rims and modelled rims (fig. 2). Especially the modelled rims are of chronological significance.

The rim inclination types (fig. 3) are to be seen as very general indicators, ranging from closed to slightly closed rims, open forms with straight walls or very flat outflaring walls. The inclination types are closely related to the vessel family and type (figs. 3, 5). Bowls are principally defined as open types (Ri3-Ri4), while jars can show open as well as closed specimens (Ri1-Ri4). Necked vessels and bottles as liquid containers mostly have straight to closed mouths (Ri1-Ri3). In fact, beside wall thickness and mouth diameter it is often the inclination of vessel walls that gives a first basic idea of the vessel type. However, in many cases the vessel type is not reconstructable from such a description or a drawing.

The bottom types (fig. 4) are represented by several subtypes of plain or pedestalled bottoms.

III. 3 Preservation and measurements

For the reliability of the determination of a vessel type it is important to indicate whether the vessel shape was preserved or had to be reconstructed. The respective abbreviations are

- DR – reconstructed by drawing
- NR – not reconstructable
- CF – complete but in fragments
- CI – completely preserved).

The preserved height (in cm) and the vessel unit's weight (in gr) are further statistical indicators of how much is preserved of the complete vessel (fig. 1).

Other common measurable details are diameters and wall thickness of different vessel parts (fig. 1). The body diameter is reserved to the largest diameter of the vessel: regarding all simple open types it will be identical to the mouth diameter. Size and thickness can be further used to define functional subtypes of vessels; moreover wall thickness is related to the fabric and produces the data for a statistical distinction between coarse domestic wares or thin-walled finewares.

IV. 4 Surface treatment and decoration

Both, surface treatment and decoration can be limited to certain vessel parts that have been divided into the rim portion, the outer walls and the inner walls of the vessel (fig. 1). The determination of surface treatment techniques is always a matter of preservation. Varieties that are common in Hamadab consist of slipping (red[7], brown, creamish), washing (light red, pink, orange), polishing or burnishing (associated with black and red colours), glazing (faience-greenish), coarse to completely eroded surfaces.

Concerning the descriptional elements of the decoration a basic distinction between pattern, technique and exact location seemed to be rather useful. Main techniques are

- incising (IC)
- impressing (IP)
- incrustated impressions (IR)
- painting (P)
- stamping (S)
- plastic applications (A).

Only a few patterns were defined until 2003 due to the high degree of fragmentation of most of the material. Since the introduction of an elaborated abbreviation system for a very detailed account of the decoration types was not possible at the beginning of the excavation, this section on the recording sheet was meant to give a general idea of the decoration type (fig. 1). Every decoration was additionally documented by an occasionally coloured drawing of the fragment which still gives much more information than an encoded description. To convert Meroitic pottery decorations into functional datasets still constitutes a challenge to the objectivity of the ceramic researcher. In the case of Hamadab many recorded vessel units showed multi-coloured lines crossing even stamped motifs, bearing moreover several incised lines at the outer and inner rim, some of them additionally coloured etc. Encoding every line with respect to technique, colour and location would form an extensive bulk of data where the focus on the main symbolic expression gets more and more lost. Obviously, this restriction on 'important' or 'meaningful' decorations contradicts the principles of forming an objective database. On the contrary, in the case of Hamadab it became necessary to record all different types of stamped decoration in greater detail (Dittrich 2003, fig. 7) because it seemed probable that corresponding stamps or potter's workshops at the town site itself or nearby could be identified. Moreover, in view of the proximity to the hieroglyphic system the study of the symbolic content of the stamping motives seemed promising. Consequently, it could be implied that also decora-

7 The red slip becomes more frequent during the late Meroitic period, obviously under the influence of Roman terra sigillata.

tions have different functional backgrounds ranging widely from sketchy marking to the elaborate adding of value. The position and effort of the execution of single decoration elements within the entire production chain might play a determining role.

IV. 5 Fabric

The macroscopically identified fabrics were encoded by distinctive combinations of technological elements (Tab. 1, Colour-Plate 1). The colour was included since it can be assumed that final colouring followed functional terms that needed a specific selection of raw materials for the clay, final slip (e.g. ferrous minerals for red colour), or firing material (e.g. plant material for blackening) prior to the firing process.

The encoding process comprises three hierarchical levels (Tab. 1):

1. wheelmade (W) or handmade (H),
2. main paste components like mud (M)[8], clay (C), kaolin (K), or a non-local paste (A)
3. surface colour like red (R), pink (P), creamish (C), brown (BR), and black (B).

The abbreviation HM stands for the group of handmade mud wares, WC for the great varieties of wheelmade wares without using kaolin with the clay, WK for all wheelmade kaolin wares. Consequently, the fabric code (like WKC for wheelmade kaolin creamish ware in the example of fig. 1) contains already a combination of several technological aspects that in sum is representative for the Hamadab ceramic spectrum (Tab. 1). Over the time it has been further accomplished by appending numerals to distinguish subtypes like WCR1.

The fabric system does not claim to replace a petro-chemical analysis that is needed to verify the paste and temper ingredients in order to approach a systematic investigation of raw material preferences, procurement and treatment. Pottery classification in the field has to deal thereby with the paradoxon that a chemical analysis may result in defining raw material groupings that are different from those identified previously by macroscopical visual and haptical features.[9] Attaching more weight to the one or the other procedure remains in fact not related to the scientific potential of a classification scheme but exclusively to the questions that are posed on the material. Regarding the analysis of possible symbolic and prestigious functions it seems more appropriate to consider only features that have been recognizable in the common sight and sphere of the Meroitic potter as well as the user. On the other hand, in exactly determining the sources of raw materials petro-chemical analysis can shed some light on the general value system.[10]

V. Results

Most of the collected and registered pottery fragments from Hamadab belong to the Meroitic, Late and Post-Meroitic period although it is possible that a few pieces of Late Neolithic, Christian to Islamic periods are present.

The combination of some of the recorded functional data produced interesting results (fig. 6). A main relation lies between fabric and vessel type: Handmade mud wares comprise bowls, jars and special types like stands. In general, respective vessels show simple shapes without elaborate rim or neck modelling. There are almost no equivalents to types like cups suggesting that the handmade ware groups stands for a different range of usage. The greatest vessel type variety, however, is to be found among the wheel-made clay wares including smaller semi-fine ware vessels and bigger slow-wheel jars (fig. 6). The wheel-made jars are often modelled with necks as large liquid containers or show outflaring rims which facilitated the attachment of a string on top of broad storage or cooking vessels. Also outflaring parts of stands and lids are made from the wheel-made clay wares. The usage function of large jars lies certainly in the containing of great and probably fixed quantities of certain products (food, potables, liquids) requiring a locking or cover.[11] Altogether the red wheel-made ware served as a multi-functional domestic ware providing also containers for transport and trade.[12]

On the opposite, the cream-coloured wheel-made kaolin wares show a restriction to small bowls, cups and beakers i.e. vessel types that are designed for immediate consumption (table ware). Generally, fine ware bowls have smaller and more standardized mouth diameters (15-16 cm) than bowls of any other ware group (fig. 7). Since between the different ware

8 'Mud' was defined by a visible and presumably initial proportion of organic material.

9 Although the very fine texture of the kaolin wares is very distinctive, the exact composition of all other wares remains uncertain when based on macroscopical examination alone.

10 E.g. through the indication of effort that was spent on the extraction and transportation of kaolin or of the availability of fuel for the maintenance of high-temperature kilns.

11 A few pieces of imported amphorae serving a similar purpose were found (Tab. 1: fabric WAR).

12 Cf. also Robertson/ Hill 2004.

groups there are rather few intersections of vessel subtypes and dimensions it became evident that the potters' choice of a ware group meant at the same time the preliminary decision of the range of vessel types to be produced (fig. 6).

Another relation can be seen in the occurrence of decoration techniques, fabrics and vessel types. Comb impressions and coloured incrustations are restricted to handmade mud wares while incisions (lines etc.) are common among all wares. Painting occurs on wheel-made bowls, necked jars, on stands as well as on kaolin ware bowls and cups (fig. 6). Surely, painting fulfilled several purposes from ornamentation (e.g. on bowls, cups, stands) to the marking of large liquid containers (e.g. symbols for ingredients, owner, destination).

Stamping with a finely cut stamp is exclusively related to kaolin ware cups and bowls (fig. 6). Stamped decoration does never occur as single (marking) element but is always assembled in rows or nets circulating around the vessel surface. Moreover, on the same vessel it is always combined with coloring (painting or slipping). It is the group of small fine ware consumption vessels which is most elaborately decorated with painted and stamped motifs that represent the Meroitic royal and religious symbolic sphere (e.g. uraei, crowns, Isis knots). Simultaneously but not surprisingly, the same group shows indications of rather schematic and automatized (wheel-based) application of decoration due to the demand for greater quantities. There is no doubt that these dishes were in use on occasions that stimulated or even required a prestigious representation of one of the finest Meroitic handicraft.

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Zusammenfassung

Im Zusammenhang mit der Erfassung der zahlreichen, teils stark zerscherbten Keramikfunde aus dem Stadtgebiet von Hamadab in einer zentralen Datenbank wurde der Frage nachgegangen, inwieweit keramisches Fundmaterial in datenbankrelevante funktionale Merkmale aufzuschlüsseln ist. Die quantitative Ansprache als Gefäßeinheit gewährleistet die Annäherung an den zu rekonstruierenden Gefäßkontext. Die funktionale Charakterisierung von Keramik beinhaltet nicht nur einen einzelnen konkreten (zumeist unbekannten) Bestimmungszweck, sondern kann eine Reihe von funktionalen Merkmalen wie Größe, Beschaffenheit der Gefäßöffnung, Art und Anzahl der Handhaben, haptische und dekorative Erscheinung etc. einschließen. Die regelhafte Kombination mit verschiedenen Warengruppen lässt dabei ein hierarchisches System der meroitischen Keramikproduktion erkennen, die auf diverse Anforderungen, vom robusten amphorenähnlichen Transportbehälter bis zum dünnwandigen gestempelten Kaolinbecher, qualitativ deutlich differenzierte Antworten gefunden hat. Grenzen in der Merkmalsverschlüsselung wurden bei der Gewichtung einzelner Verzierungstypen erreicht, die zumeist anhand subjektiver Kriterien erfolgt. Es ist davon auszugehen, dass feinem Geschirr, charakterisiert durch Dünnwandigkeit, farbige Überzüge und eine aufwertende Verzierung wie Stempeldekor und teils polychrome Bemalung, ein hoher Repräsentationscharakter zukam. Dennoch deutet gerade der schematische Anbringungsprozess dieser Verzierungen auf eine mengenorientierte Produktion hin.

DHE 2003 - VESSEL UNIT LIST															Date:							Ceramic assistent:									
No.	documentation		form			preserved vessel parts							size and weight		measurement of diameters			thickness			fabric code	shape codes			treat-ment		decoration		
Unit	Find no.	drawing	vessel family	subtype	reconstr.	rim	neck	shoul	body	bott	lid	hand	pres. height	weigth in gr	mouth	body	bottom	rim	body	bottom	fabric	rim code	incl. code	bottom code	zone	surface	pattern	techniq.	deco. location
1	03-CC-1.1	03-C-5	bowl	2	dr	x			x				7	43	20			0,3	0,5		WKC	rp01	ri4		rim	red slip	line	IC	rim out
	03-CC-3.4	remarks:																							out	red slip			
	03-C	bowl with red painted ankh inside																							in		ankh	P	inside

fig. 1: Hamadab, example of pottery recording sheet

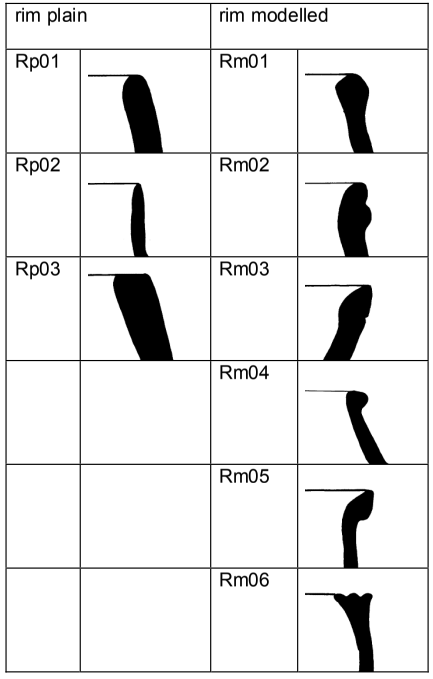


fig. 2: encoding of rim types

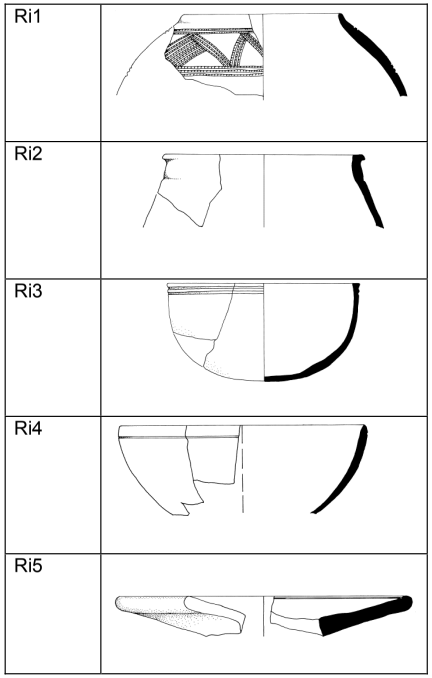


fig. 3: encoding of rim inclination types

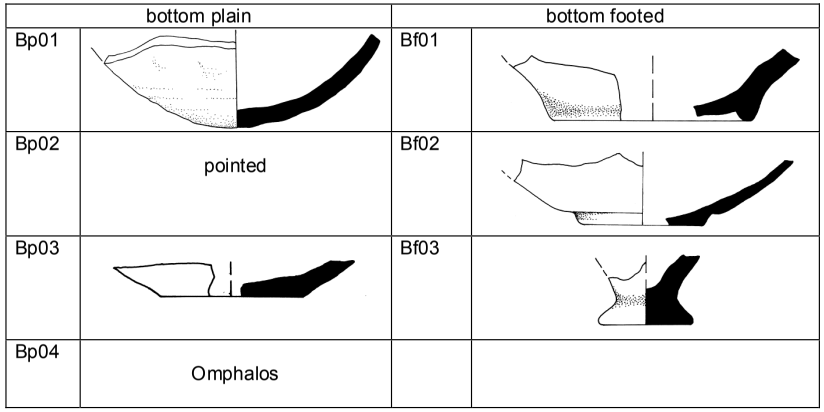


fig. 4: encoding of bottom types

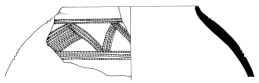
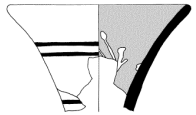
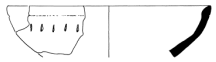
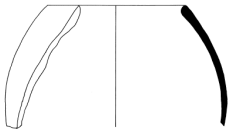
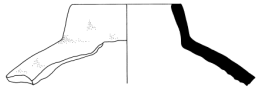
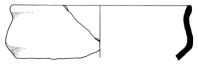
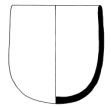
bottle	bowl	flat bowl	jar	necked jar	cup/beaker	stand
						
BT1 short closing neck	B1 closed form	FB1 open flat form	CJ1 closed form	NJ1 short outflaring neck	C1 straight to open form dm <12 cm (cup)	S1 simple outflaring form
		Plate/upper part of stand 				
BT2 straight modelled neck	B2 open form	P1 open very flat form	CJ2 slightly closed form	NJ2 short straight to closed neck	C2 straight carinated form	S2 modelled handle
		lid 				
	B3 carinated form	L1 flat form	J1 open straight form		C3 globular form	
						
	B4 open straight form		J2 open outflaring form		BE1 straight form dm >12 cm (beaker)	

fig. 5: Hamadab, vessel subtypes

fig. 6: Hamadab, overview of functional vessel groups (dark grey background: occurrence of painted decoration; light grey: occurrence of painted and/or stamped decoration)

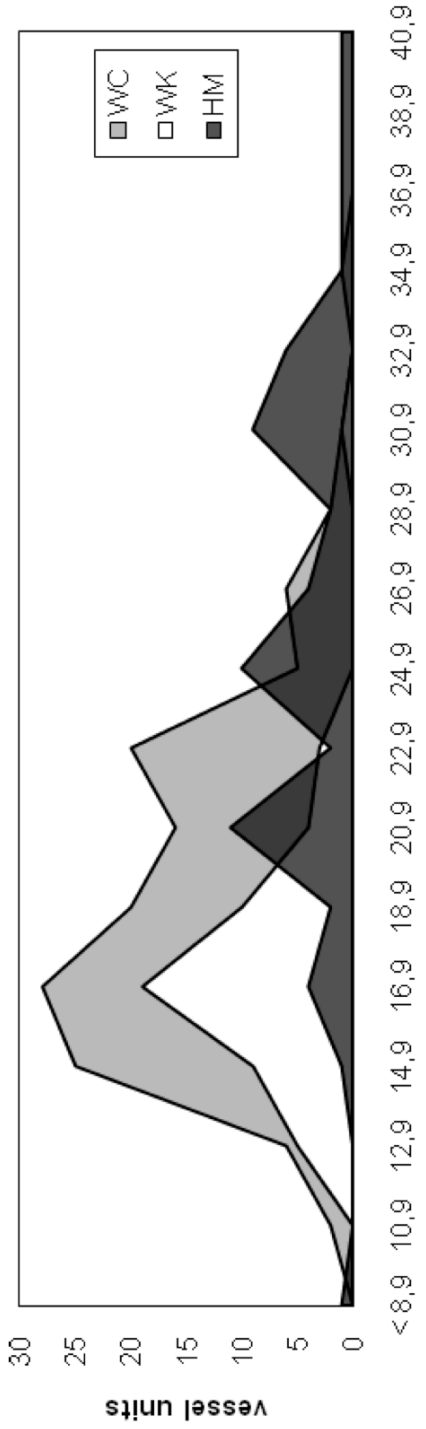


fig. 7: quantity of bowls (vessel units) according to main fabric groups (WC, WK, HM)

Fabric Family	Fabric - Subgroup Abbreviation	Colour outside-core-inside	Firing atmosphere	Paste	Temper/ Inclusions	Densitiy	Surface	Thickness of body sherds	Fragm. total (2003)
handmade HM	HMB	black-black-black	reduced evenly	mud/Nile silt	organic <10 mm	dense to very dense	burnished to polished	average 8 mm (min. 4/max. 16 mm)	32
	HMBR1	brown-black-brown	thin surface layer oxidised rapidly	mud/Nile silt	organic <10 mm	porous to dense	burnished to polished	average 8 mm (min. 4/max. 15 mm)	57
	HMR1	red-black-red	thin surface layer oxidised rapidly	mud/Nile silt	organic <10 mm	dense to very dense	smoothed to burnished	average 8 mm (13 mm for stands)	16
	HMR2	red-grey-red	oxidised partly	mud/Nile silt, clay?	organic <10 mm	porous to dense	coarse to smoothed		7
	HMR3	red-black	outside oxidised	mud/Nile silt	organic <10 mm				2
handmade HC	HCB1	black-black-black	reduced evenly	clay	rounded to angular quartz < 1 mm	dense	smoothed to polished		4
	HCB2	black-grey-black	reduced partly	fine clay	black inclusions?	dense	polished		1
wheelmade WC	WCR1 fast wheel	red-red-red	oxidised evenly	mud/Nile silt – kaolin mixture	kaolin spots, organic < 5 mm	porous to dense	smoothed		3
	WCR2 fast wheel	red-light grey/grey-red	oxidised partly	mud/Nile silt – kaolin mixture	frequent kaolin spots; organic < 5 mm	dense	smoothed to slipped	average 5 mm (min. 3/max. 10 mm)	47
	WCR3 slow wheel	red-light grey/grey-red	oxidised partly	mud/Nile silt – kaolin mixture	organic < 5 mm	porous to dense	smoothed to slipped	average 8 mm (min. 3/max. 18 mm)	141
	WCR4 slow wheel	red-black-red	oxidised partly	mud/Nile silt – less kaolin mixture	organic < 15 mm	porous	coarse to slipped	average 11 mm (min. 4/max. 25 mm)	42
	WCBR1 fast wheel	brown-black	outside oxidised	mud/Nile silt – kaolin mixture	kaolin spots, organic < 5 mm	dense			2
	WCBR2 slow wheel?	brown-black-brown	oxidised partly	mud/Nile silt – less kaolin mixture	organic < 5 mm	porous to dense			11
	WCP fast wheel	pink-grey-pink	oxidised partly	mud/Nile silt – high kaolin mixture	no visible	porous to dense	smoothed to slipped	average 4 mm	14
	WCB fast wheel	black-light grey-black	reduced partly	very fine clay	no visible	dense to very dense	burnished to polished	average 5 mm	14
wheelmade WK	WKC fast wheel	cream-cream-cream		kaolin	no visible	very dense	smoothed to slipped	group 1: 2-4 mm (“eggshell”) group 2: 5-7 mm	220
	WKCx fast wheel	cream-black-cream	core reduced	kaolin	no visible	dense		14 mm	1
	WKP fast wheel	pink-pink-pink	oxidised evenly	kaolin	no visible	very dense	smoothed to slipped	average 5 mm (max. 15 mm)	4
non local wheelmade WA	WAR	light red-light red-light red	oxidised evenly	clay	rounded quartz < 1 mm	very dense	slipped		2

Tab. 1: Hamadab, fabric types and frequency