An Extended Morphometric and Technological Analysis of Bromme and Federmesser Assemblages

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About the data

This is an initial exploratory exercise into the technological and morphological differences of Federmesser and Bromme contexts, using blade, core and point (tanged and backed) data from sites in Denmark, Germany and Sweden. It aims to examine how 'different' these categories are, and aims to shed light on the ambiguous classification of typologically awkward contexts.

All data and supporting material used throughout this exercise is stored on a GitHub open-access repository: https://github.com/CSHoggard/-tech-data.

Only complete examples are examined here, and total 599 artefacts. See Table 1 and Table 2 for more information.

Table 1. Artefact Breakdown

Context	Backed Point	Blade	Core	Tanged Point
Bienenbüttel (FStNr. 15)	5	15	1	NA
Brümmerhof (FStNr. 16)	13	6	NA	3
Häcklingen (FStNr. 19)	9	43	8	7
Rietberg (1)	4	61	5	NA
Rietberg (2)	2	11	NA	NA
Rothenkirchen	4	11	2	NA
Sassenholz (FStNr. 78)	37	102	22	21
Højgård	NA	2	1	NA
Rietberg (5)	NA	21	2	NA
Rietberg (Other)	NA	3	NA	NA
Sassenholz (FStNr. 82)	NA	31	5	1
Segebro	NA	24	11	4
Søvind	NA	88	5	NA
Rietberg (Spoil)	NA	NA	2	NA
Skovmosen	NA	NA	6	1

Sassenholz makes up the greatest proportion of the database featuring 219 artefacts, followed by the Rietberg complex (111), Søvind (93) and Häcklingen (67).

Table 2. Artefact Breakdown

Classification	Technology			
	Backed Point	Blade	Core	Tanged Point
Bromme	50	253	50	30
Federmesser	24	165	20	7

In total 383 originate from a presupposed Bromme context, representing 63.83% of all material. The Federmesser is here represented by 217 artefacts, representing 36.17% of all material.

Technological attributes

The following attributes are recorded in the database:

Attribute	Variable(s)
ID	Catalogue Number / Identification Number
CODE	Site Code
CONTEXT	Archaeological Context
COUTNRY	Country
LONGITUDE	Longitude
LATITUDE	Latitude
RECOVERY METHOD	Recovery Method - 1: **Excavation**; 2: **Surface Collection**
CLASSIFICATION	Taxonomic Unit e.g. Bromme
BP_ASSOCIATION	Association of backed points - 1: **Yes**; 2: **No**
TP_ASSOCIATION	Association of tanged points - 1: **Yes**; 2: **No**
POINT_TYPE	Point type - 1: **Backed Point**; 2: **Tanged Point**
NAMED_ARTEFACT_TYPE	Classification e.g. Federmesser Point

Methodology

A variety of technological and morphological analyses are performed here:

1) Technological and morphological characteristics are first examined through **visual summaries of data**. The significance of differences in the distribution of continuous variables across assemblages were assessed using **pairwise Mann–Whitney** testing (with Bonferroni-corrected p values).

2) **Gini–Simpson** and **Morisita–Horn diversity indices** are employed to examine intra-site variability; past applications in Crema (2014), Maiorano et al. (2020) and Leplongeon et al. (2020).

3) **Multiple Correspondence Analysis (MCA)** is then employed for all categorical technological data, and for each data type (core, blade, backed point, tanged point); this will examine the degree of association between individual contexts and their technological make-up.

4) **Principal Component Analysis (PCA)** is performed for all quantitative (morphometric) data, again for each data type; this will also examine individual contexts and their classification. PCA is analogous to MCA but for quantitative variables.

5) **Multiple Factor Analysis (MFA)** will then be employed to test all variables in one analytical protocol. MFA is a global analysis, where multiple quantitative and qualitative variables are simul-

taneously examined - as such normalisation and weighting are required. MFA produces dimensions (equivalent to PCs) and calculates MFA coordinates (scores), allowing further analyses of the MFA data. A **MANOVA** will be employed in this instance. MFA is used in a variety of fields including survey analysis, sensory analysis, ecology and in time series applications of data analysis (Pagés 2002). For more information on MFA see Abdi and Valentin (2007), Abdi et al. (2013), Escofier and Pagés, (1998) and Pagés (2002). See Marcelo et al. (2015) for an archaeological application of MFA.