Chronology from Glass Beads: The English Period in the Southeast, ca. A.D. 1607 - 1783

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The seventeenth and eighteenth centuries represent an incredibly dynamic and pivotal time for Indian groups living in the Southeast. Repeated documentation by historians and archaeologists has highlighted pervasive demographic, economic, and social changes that wracked communities across the region (e.g., Bowne 2005, 2006; Ethridge 2006; Gallay 2002; Ramsey 2001, 2003; Smith 1987; Usner 1992; Worth 2006). While historians and archaeologists have made many advances, gaining nuanced understandings of this period has proven difficult when research has been extended beyond historically documented Indian towns (e.g., Knight 1985, 1994; Smith 1987, 1989, 1994). Indeed, for most of this period, historical documents pertaining to the interior Southeast contain at best brief sketches of a few Indian communities. Archaeology has great potential to address how this tumultuous period played out among an untold number of historically undocumented southeastern Indian communities, but in order to do this we must first create reliable ways of identifying these occupations in the archaeological record. Fortunately, this challenge requires that archaeologists tackle a very familiar and foundational problem – that of chronology. In this paper, I will discuss my attempt to establish a chronology for assemblages of glass trade beads spanning the English Period in the Southeast (ca. A.D. 1607-1783). With this chronology, I hope to contribute to a long-term cooperative effort that will ultimately offer researchers a reasonably accurate method to identify undocumented seventeenth- and eighteenth-century southeastern Indian communities.

For decades, research involving glass trade beads has been pursued by archaeologists who see value in the ability of beads to aid in assigning precise occupation dates. The promise held by beads is understandable, for the combination of abundance in

the archaeological record and celerity in stylistic change is the very stuff of robust artifact chronology. Research conducted over the last 50 years has gone a long way toward realizing the chronology-building potential of glass beads; however, there are some areas that require additional research (e.g., Bennett 1983; Brain 1979; Deagan 1987; Fenstermaker 1974; Good 1972; Huey 1983; Kent 1983; Kenyon and Kenyon 1983; Rumrill 1991; Smith 1983; 1987; Stone 1974; Wray 1983). The temporal resolution of existing glass bead chronologies for seventeenth- and eighteenth-century southeastern contexts suffers from two limitations associated with small sample sizes. First, in most cases bead assemblages from individual burials or features have had to be lumped together at the site level. This has resulted in reduced temporal resolution in some cases, especially towns that were occupied for several decades. Second, because small samples preclude the possibility of seriating assemblages based on relative frequencies of bead types, researchers have been forced to rely on the presence or absence of particular diagnostic bead types in assigning occupation dates. The combination of using lumped site-level assemblages and presence/absence has resulted in chronologies with very large date ranges for many bead types. I follow Marvin Smith (2002) in arguing that we should strive to overcome these limitations and construct bead chronologies that take into account the total bead assemblage from a context or site rather than the presence a single bead type. I further argue that this can be accomplished by performing a quantitative seriation of relatively large glass bead assemblages from individual contexts whose chronological associations are certain – specifically, bead assemblages found in mortuary contexts.

My study focuses on what can be called the English period in the Southeast. This period, which extends from A.D. 1607 to A.D. 1783, marks the English colonial presence in the Southeast book-ended by the founding of the Jamestown colony and by the end of the American Revolutionary War. The study sample is comprised entirely of mortuary assemblages because they represent virtually instantaneous deposition events. Currently, the database I have compiled contains information related to 242 individual mortuary assemblages from 23 sites across the Southeast (Slide 2). These assemblages contain a total of 537,543 beads. I obtained these data from published sources, collections records, and analyses I conducted myself. In this study, I employ the glass bead classification system pioneered by Kidd and Kidd (1970) as it is the most widely used and easily understood.

I restrict the dataset used in this study in order to provide the clearest seriation solution possible. Simple monochromatic seed beads are left out because they comprise such a significant portion of virtually every assemblage. Consequently, they tend to mask the chronologically significant variability in the other bead types. Seed beads of compound construction, however, are left in the sample because their distribution across the assemblages is much more restricted, and they are more likely to be temporally diagnostic. Based on the results of numerous preliminary seriation trials, I further limit the sample to assemblages containing more than 20 beads. This threshold quantity is used because it alleviates most problems related to sample size while maximizing the number of assemblages that can be included in the analysis. Finally, a few large assemblages are excluded as outliers because their size and composition are so radically different from the rest of the sample that they drastically skew the results of the seriation.

Ultimately, this culling reduces the sample to 98 mortuary assemblages from 13 sites. The reduced sample contains 35,564 beads representing 46 distinct bead types (Slide 3).

The method I use to construct a glass bead chronology differs significantly from methods used in previous studies. First, the large study sample affords me the opportunity to forgo lumping assemblages at the site level and allows individual mortuary assemblages to become the unit of analysis. Second, the chronology developed in this study uses a quantitative multi-dimensional seriation technique based on the relative frequencies of different bead types. Third, this seriation does not proceed from known occupation dates for sites. Instead, I use an exploratory and nonparametric seriation technique that identifies patterns in a dataset without any prior assumptions.

The seriation method I use in this study is called correspondence analysis (known as CA). This technique works with untransformed frequency data and is based on straightforward and fundamental statistical logic – essentially the same logic that underlies the Chi-Square test (Slide 4). Indeed, CA can be viewed as a multidimensional Chi-Square test that seeks to represent as accurately as possible the relationships between cases (i.e., individual mortuary assemblages) and between variables (i.e., glass bead types) using a small number of dimensions (Baxter 1994; Shennan 1997). In the visual output produced by CA, if the artifact types are temporally sensitive, the first dimension of variability (represented by the x-axis in the bi-plot) should represent relative time. In interpreting CA bi-plots, one can infer that mortuary assemblages and bead types located near one another in the bi-plot are, in relative terms, temporally associated.

The results of the correspondence analysis seriation are presented in the following series of bi-plots (Slides 5-8). The first bi-plot depicts the relationships among the

individual mortuary assemblages of glass beads (Slide 5). This bi-plot reveals two important distributional patterns. First, the distribution of the glass bead assemblages has the classic parabolic or "twisted one dimensional" shape that is widely recognized as a hallmark of chronological seriation using a multivariate technique. Second, the distribution of glass bead assemblages appears to form at least three and as many as six distinct clusters along the x-axis – the axis that likely represents time. The second bi-plot, which depicts the distribution of bead types, evinces the same clustered pattern (Slide 6). When the distributions of individual assemblages and bead types are plotted together the redundancy of the patterns suggests: first, that there are "meta-assemblages" of glass beads marked by the consistent associations of particular bead types, and second, that these "meta-assemblages" are discretely distributed and are thus good chronological markers (Slide 7). A k-means cluster analysis of the CA component scores provides an objective means to identify and test the feasibility of these glass bead "meta-assemblages" (Slide 8). After numerous trials, a six-cluster solution results in the best logical fit.

Turning to the composition of the clusters or "meta-assemblages," it is clear that the CA seriation identified some substantive associations among bead types. Furthermore, beyond the parabolic distribution of these "meta-assemblages," there is corroborating evidence indicating that the clusters are chronologically ordered. From this evidence, estimates of temporal ranges for these clusters can be suggested (Slide 9). These ranges are based on the results of the current study, on published estimates of date ranges for the sites in the study sample, on previous research regarding the chronology of various bead types, and on associations with other well-dated European artifact types.

The date ranges that follow are estimates and should not be interpreted as absolute. Indeed, this seriation will only benefit from additional data, especially the rather loose ranges associated with early seventeenth and late eighteenth centuries.

Cluster 1 (ca. A.D. 1600-1650) contains mortuary assemblages recovered from sites whose occupations are limited to the first half of the seventeenth century (Slide 10). These assemblages are dominated by seed beads composed of two and three layers with clear or light blue translucent cores and opaque outer surfaces. Unfortunately, I have to resort to showing drawings of *Cluster 1* beads as I have yet to take a photograph that does these very small specimens justice. *Cluster 2* (ca. A.D. 1625-1675) contains glass bead assemblages with so-called "eye beads" and translucent navy blue beads with 8-10 white stripes (Smith 1982, 1983) (Slide 11). *Cluster 3* (ca. A.D. 1650-1730) is by far the largest and most diverse "meta-assemblage" (Slide 12). It is comprised primarily of monochrome and striped necklace beads of simple and complex construction. This cluster also contains mandrel-wound "raspberry" beads. The European-made artifacts found in a number of *Cluster 3* burials, such as cast bronze rumbler bells, flushloop bells, doglock muskets, and lateen spoons, are also present in well-dated late seventeenth-century Narragansett burial assemblages from New England (Gibson 1980; Rubertone 2001; Simmons 1970; Turnbaugh 1984).

Cluster 4 (ca. 1670-1730) is primarily comprised of so-called *Cornaline d' Allepo* seed, tubular, and spherical beads (Slide 13). These compound beads with transparent black-to-green cores and opaque red outer layers are usually given a large date range spanning from the late sixteenth century to the mid-eighteenth century. In this study sample, however, the various varieties of the bead are consistently associated with each

other and are limited to mortuary contexts at sites with occupations spanning from last quarter of the seventeenth century to the first quarter of the eighteenth century.

Cluster 5 (ca. A.D. 1690-1740) is a cluster made up of nearly all mandrel-wound beads (Slide 14). The earliest mortuary assemblages in this cluster, which are from Columbus Landing, McKee Landing, the Law's site in the Guntersville Basin (Fleming 1976), and the Ocoee site in eastern Tennessee (Lewis and Kneberg 1995) may be a distinct phenomenon, in that all of the mandrel-wound beads in these assemblages are relatively small (6-10 mm), round, and either black, transparent blue, or colorless. The other assemblages in this cluster contain mandrel-wound beads that are larger (10-16 mm), more oval-shaped, and are from mortuary contexts at the Chota-Tanasee site, an historically documented eighteenth-century Cherokee site (Newman 1986). These larger beads probably date to the second and third decades of the eighteenth century. Marvin Smith (2002) gives a similar date range for large mandrel-wound beads in French colonial contexts. The inclusion of so-called "barleycorn" beads in *Cluster 5* is probably spurious. These more appropriately belong later in the chronology as part of *Cluster 6*. Waselkov (1998) has found mention of this particular bead type in English trade records dating from A.D. 1758 until A.D. 1784.

Cluster 6 (ca. A.D. 1725-1783) represents the most recent meta-assemblage in the seriation (Slide 15). The cluster includes the mortuary assemblage associated with the burial of Chief Oconostota, whose funeral was recorded at the Cherokee town of Chota in 1783 (Schroedl and Breitburg 1986). While the dominance of small diameter monochromatic tubular beads in this cluster certainly appears to be a good chronological marker for the mid to late eighteenth century, the same cannot be said of the so-called

"gooseberry" beads. This bead type is known to have been in circulation much earlier in the period, as early as the sixteenth century (Deagan 1987; Smith 1983). It appears that the small sample size of this cluster combined with large frequencies of gooseberry beads in two late eighteenth-century burials resulted in the misplacement of this type in *Cluster 6.*

As a way to demonstrate how this chronology can be applied, I have taken results of the seriation and constructed a method for estimating the occupation dates of sites with relatively small glass bead assemblages. I employ this method using ten additional site-level bead assemblages from various southeastern sites (Slide 16). These assemblages, which number between approximately 200 and 2,500 beads, represent the sizes of samples that are typically recovered from medium-to large-sized excavations. In order to make the CA seriation technique easier for others to replicate and the results easier to interpret, I modify the mortuary dataset by lumping together the bead assemblages at the level of the cluster. Combining the assemblages at this level has no effect on the overall seriation results, and the resulting bi-plot is cleaner and much easier to interpret. The resulting seriation solution depicts how the ten site-level glass trade bead assemblages fall within the chronology I have constructed.

The biplot resulting from the CA seriation depicts where these site-level assemblages fall among the combined bead clusters (Slide 17). The chronological distribution of the assemblages along the x-axis includes a single site and three groups of sites as one moves from left to right or from earliest to latest. First we first have the bead assemblage from the Nacoochee mound site in northern Georgia (Heye et al. 1918). Its position between *Cluster 2* and *Cluster 3* is based on the significant presence of both

"eye" beads and translucent blue beads with 8-10 white stripes. This position suggests an occupation during the third quarter of the seventeenth century (ca. A.D. 1650-1675). This occupation estimate is corroborated by Waselkov's (1989) estimated range of occupation at Nacoochee based on the presence of diagnostic brass armbands.

The assemblages from the Notla mound, Altamaha Town, and the Townsend sites are very similar to *Cluster 3.* The Notla mound is a relatively unknown Cherokee mound site located in western North Carolina. Altamaha Town is an historically documented Yamasee town that was recently excavated by Brockington and Associates, Inc. as part of a cultural resource management project (Eric Poplin personal communication 2005). Historic documents indicate that this town was settled at the turn of the eighteenth century and was destroyed during the Yamasee War in 1715. The Townsend site contains the remains of a small late seventeenth-century Overhill Cherokee community. All of these sites contain a diverse array of simple and complex striped beads that are the hallmarks of *Cluster 3*. Furthermore mandrel-wound beads are absent in the case of Townsend and present in very minor numbers in the Notla and Altamaha Town assemblages. These results indicate that the assemblages date as early as the mid-seventeenth century, and probably do not postdate the second decade of the eighteenth century (ca. A.D. 1650-1720).

Moving along the temporal dimension of the seriation (the *x-axis*) the next group of assemblages lies just before *Cluster 5* and includes assemblages from the historic Cherokee sites of Chattooga, Hiwassee Old Town, and Coweeta Creek. Chattooga is a Cherokee Lower town located in the foothills of the Appalachian Mountains in northwestern South Carolina (Schroedl 1994). Coweeta Creek is a Cherokee Middle

Town located in the upper Little Tennessee River valley of western North Carolina (Rodning 2002, 2004). Hiwassee Old Town is an Overhill Cherokee settlement located in the lower Hiwassee River valley of eastern Tennessee (Fenstermaker 1978). These assemblages are closely associated in the seriation because they all include significant numbers of large mandrel-wound beads, small tubular beads, and lesser amounts of tumbled monochromatic beads. This position equates to an estimated occupation sometime between ca. A.D. 1720 and 1760.

The latest group of trade bead assemblages were recovered from the Peachtree mound and village site located near Murphy, North Carolina (Setzler and Jennings 1941), and the Overhill Cherokee towns of Tomotley and Mialoquo in eastern Tennessee (Baden 1983; Russ and Chapman 1983). These three assemblages consist of large numbers of simple monochrome tubular beads and mandrel-wound necklace and "barleycorn" beads. Based on archaeological data and historic accounts, researchers place the occupation of Tomotley between A.D. 1750 and A.D. 1776 and that of Mialoquo between A.D. 1760 and A.D. 1780.

To close with another example of how the results of this seriation can be used, I employed this chronology in my dissertation research by combining it with the current Cherokee ceramic chronology (Slide 18) (Marcoux 2008). Interestingly, I found that major changes in the composition of both pottery and glass bead assemblages accompanied the shift from the Pre- to Post- Yamasee War period. Pre-Yamasee War-period Cherokee pottery assemblages dating to A.D. 1670-1715 include a mixture of diagnostic attributes associated with the Middle and Late Qualla ceramic phases. These traits include high frequencies of curvilinear complicated stamping, an even mix of jars

with highly everted folded rims and jars with thick notched appliqué rimstrips, and a small number of incised cazuelas. Glass trade bead assemblages from this period consistently fall within *Cluster 3* of my seriation. These bead assemblages consist of a wide variety of monochromatic and striped drawn and tumbled beads. Post-Yamasee War period Cherokee pottery assemblages (ca. A.D. 1715-1740), on the other hand, evince primarily Late Qualla phase ceramic attributes. These include check stamping and rectilinear complicated stamping as majority surface treatments, an abundance thick notched appliqué rimstrips, and the absence of both jars with highly everted folded rims and incised cazuelas. Glass trade bead assemblages from this Post-Yamasee War period include significant numbers of large mandrel-wound beads and small monochromatic tubular beads.

In the Cherokee case, these clear distinctions in material culture assemblages make possible the temporal assignment of occupational components within 50-year periods even with relatively small artifact samples. My hope is that this method of correlating glass bead assemblages with ceramic assemblages can be applied more broadly to other Indian groups across the Southeast.

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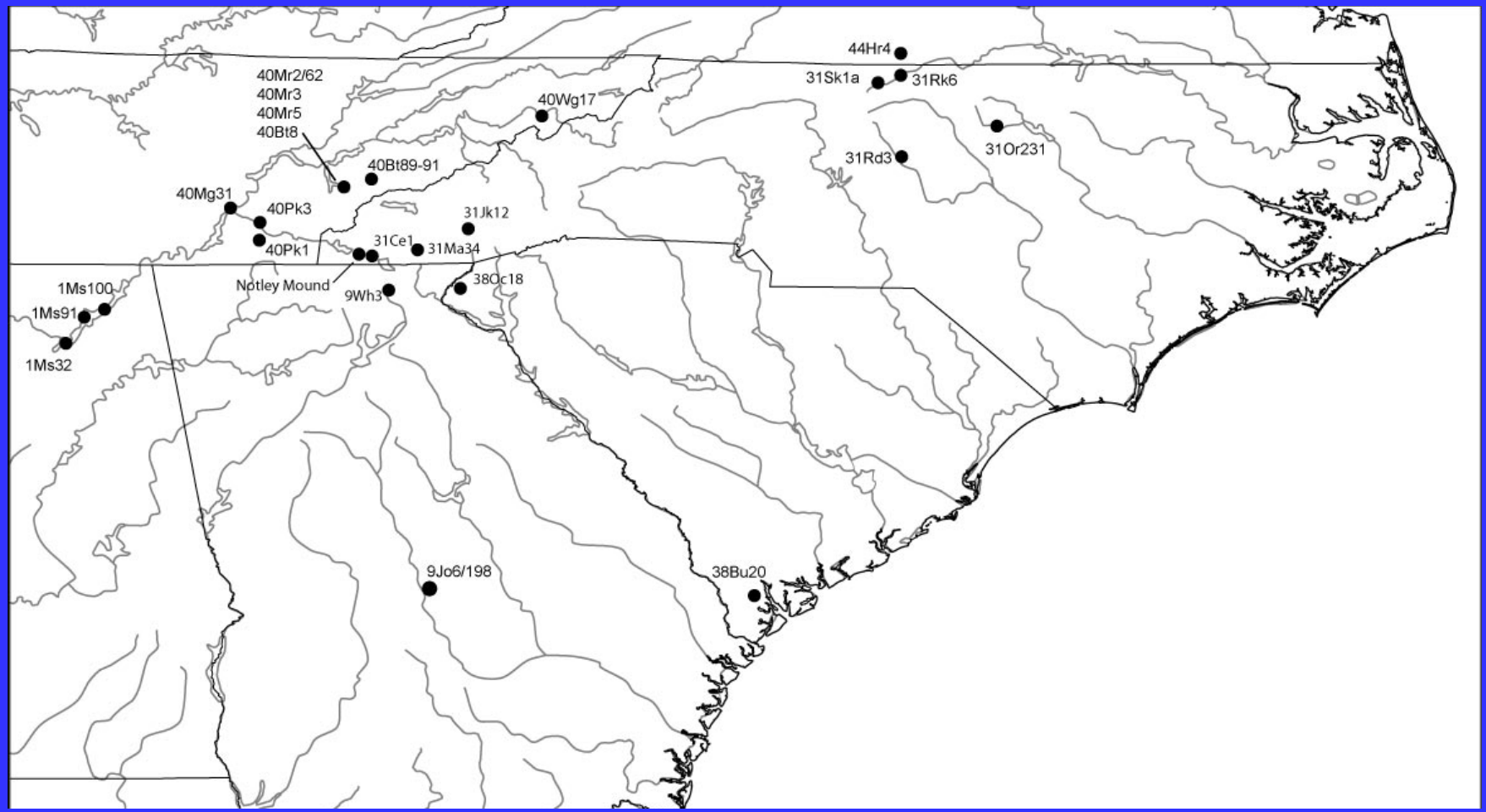
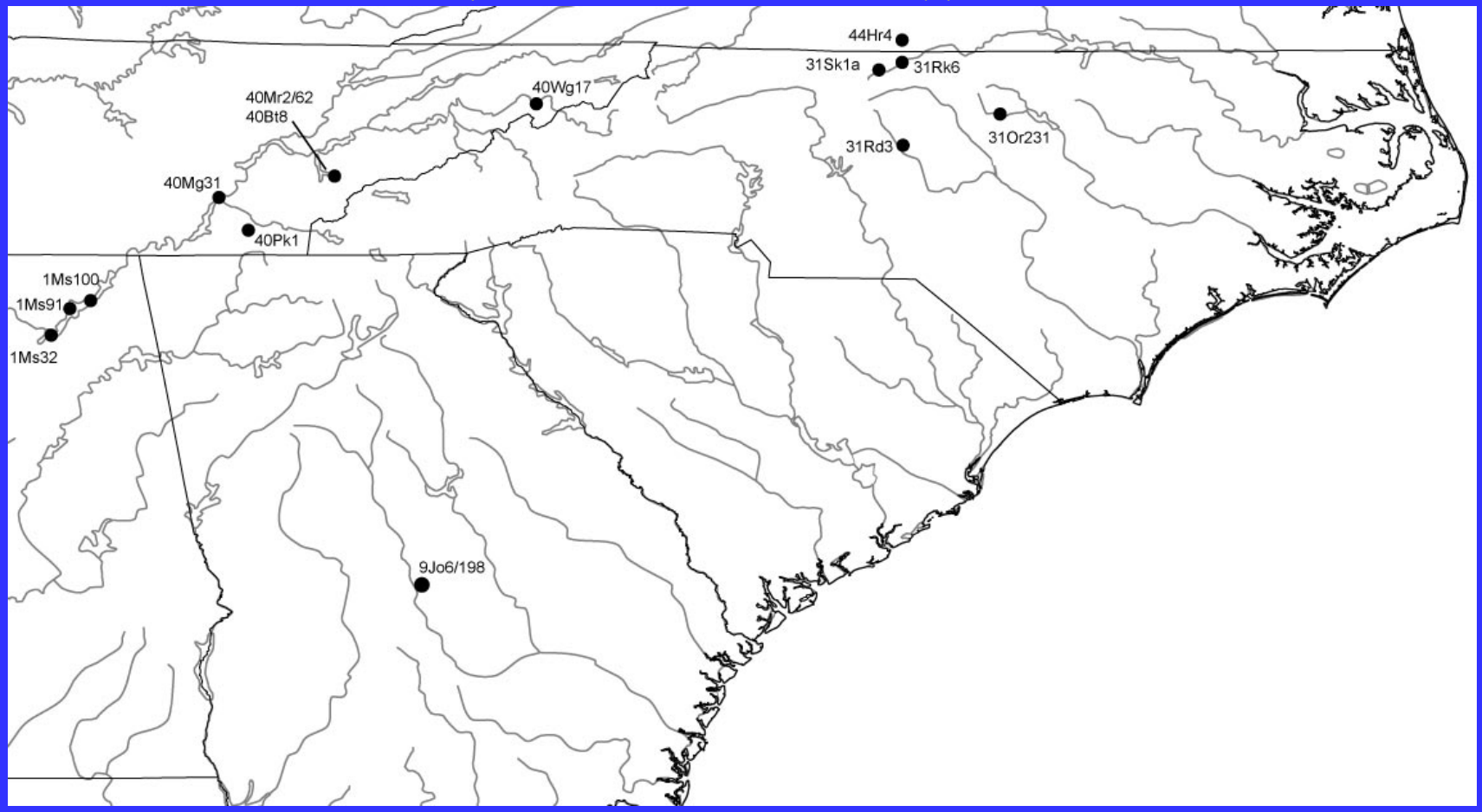
Current Bead Database

- 242 Mortuary Assemblages
- 23 sites
- 537,543 beads



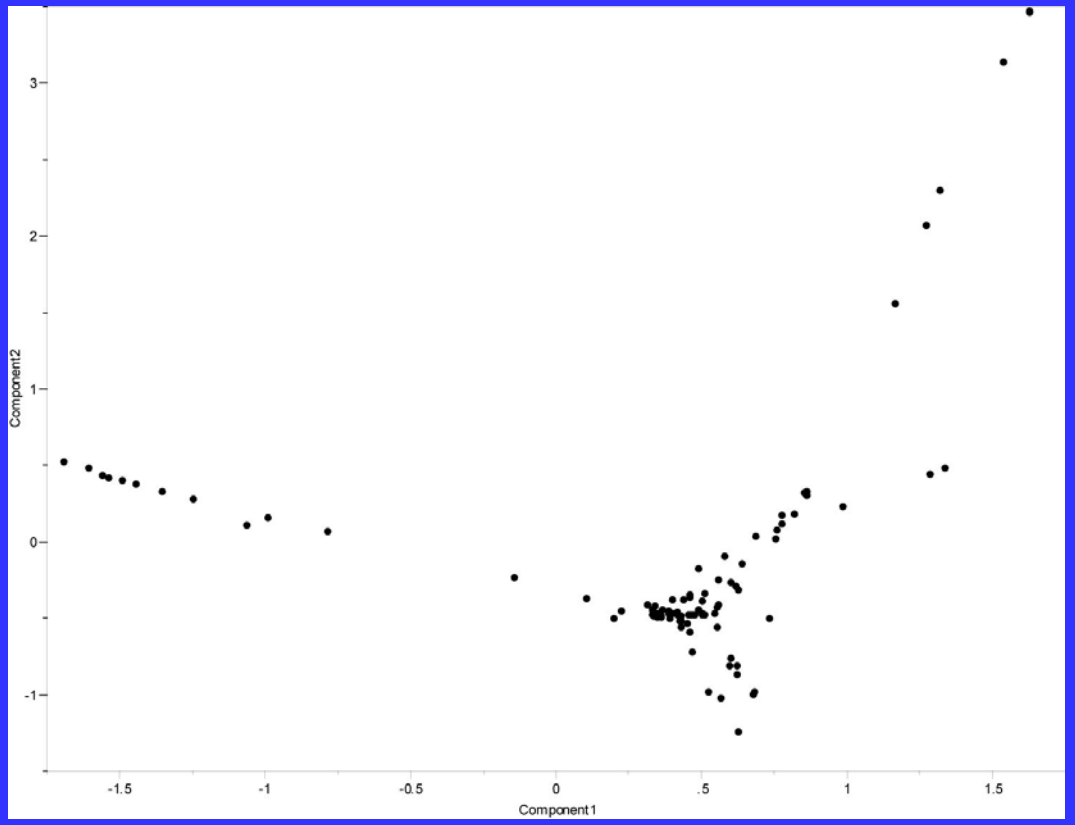
Study Sample

- 98 Mortuary Assemblages
- 13 sites
- 35,564 beads representing 46 bead types



Correspondence Analysis:

A Multidimensional Chi-Square



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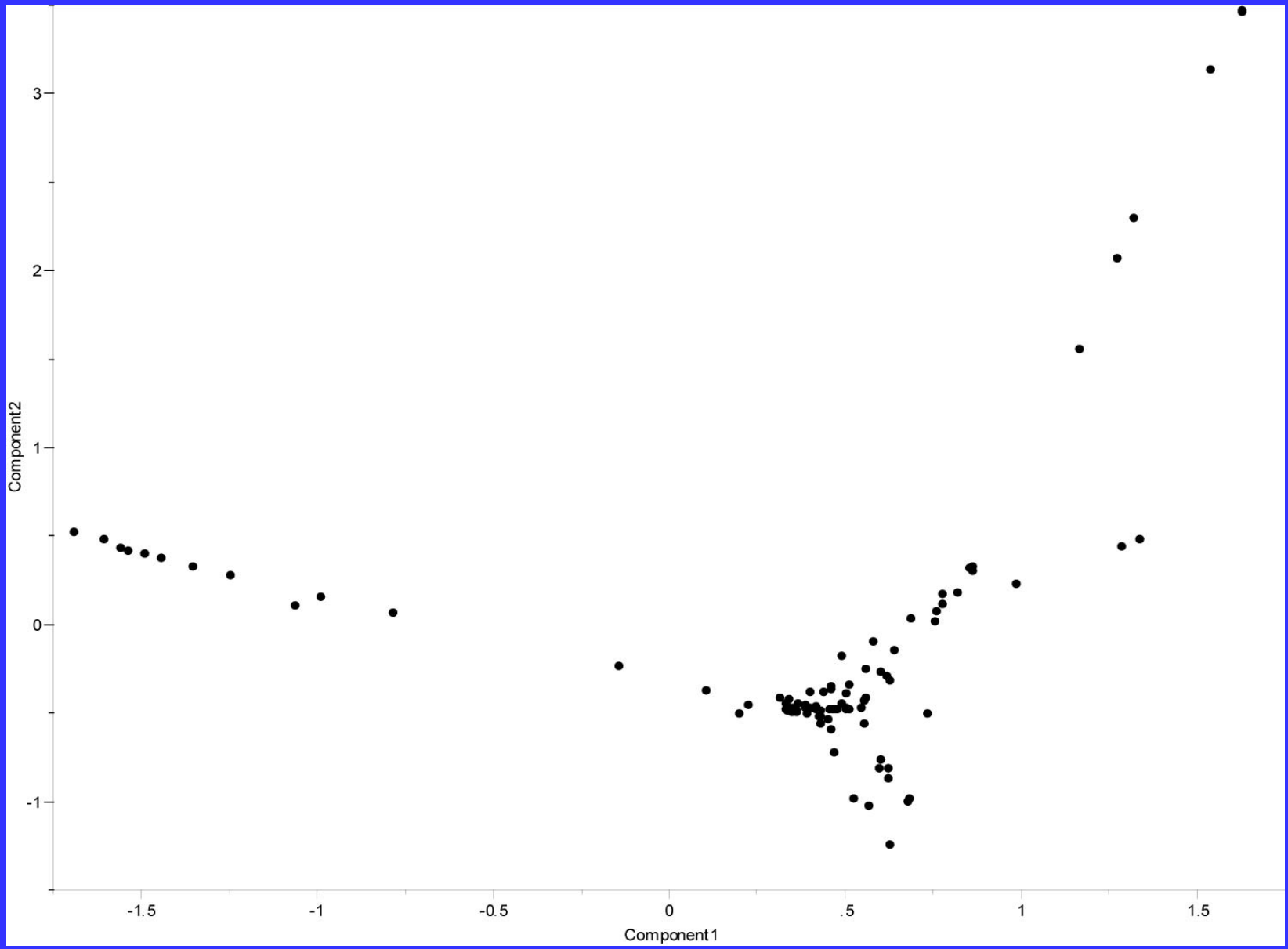

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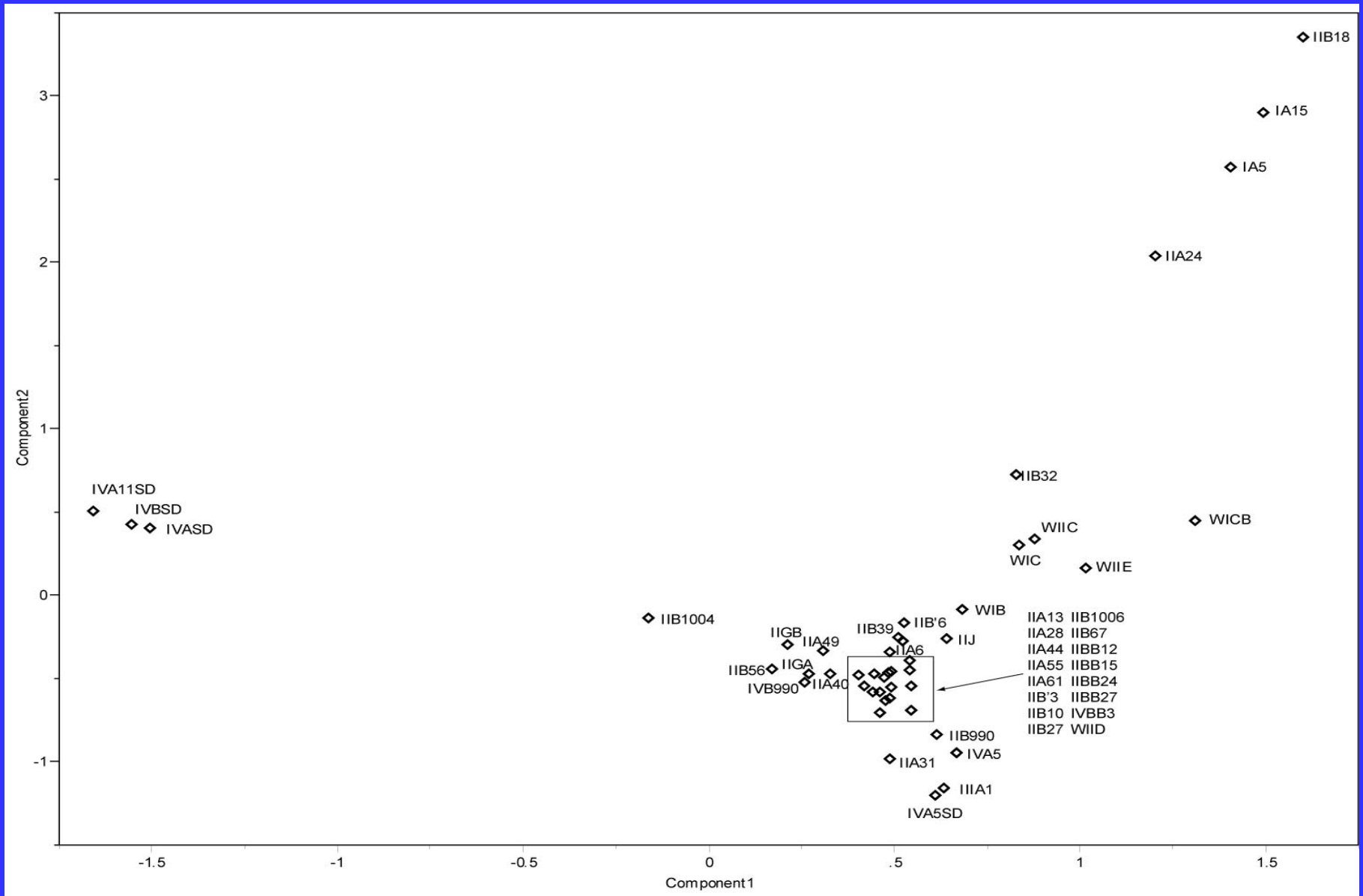
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IIA49
IIA6
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IIA40
IVB990
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IIA28 IIB67
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IIA55 IIBB15
IIA61 IIBB24
IIB'3 IIBB27
IIB10 IVBB3
IIB27 WIID
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IIA31
IIIA1
IVA5SD
IVA11SD
IVBSD
IVASD
Component2
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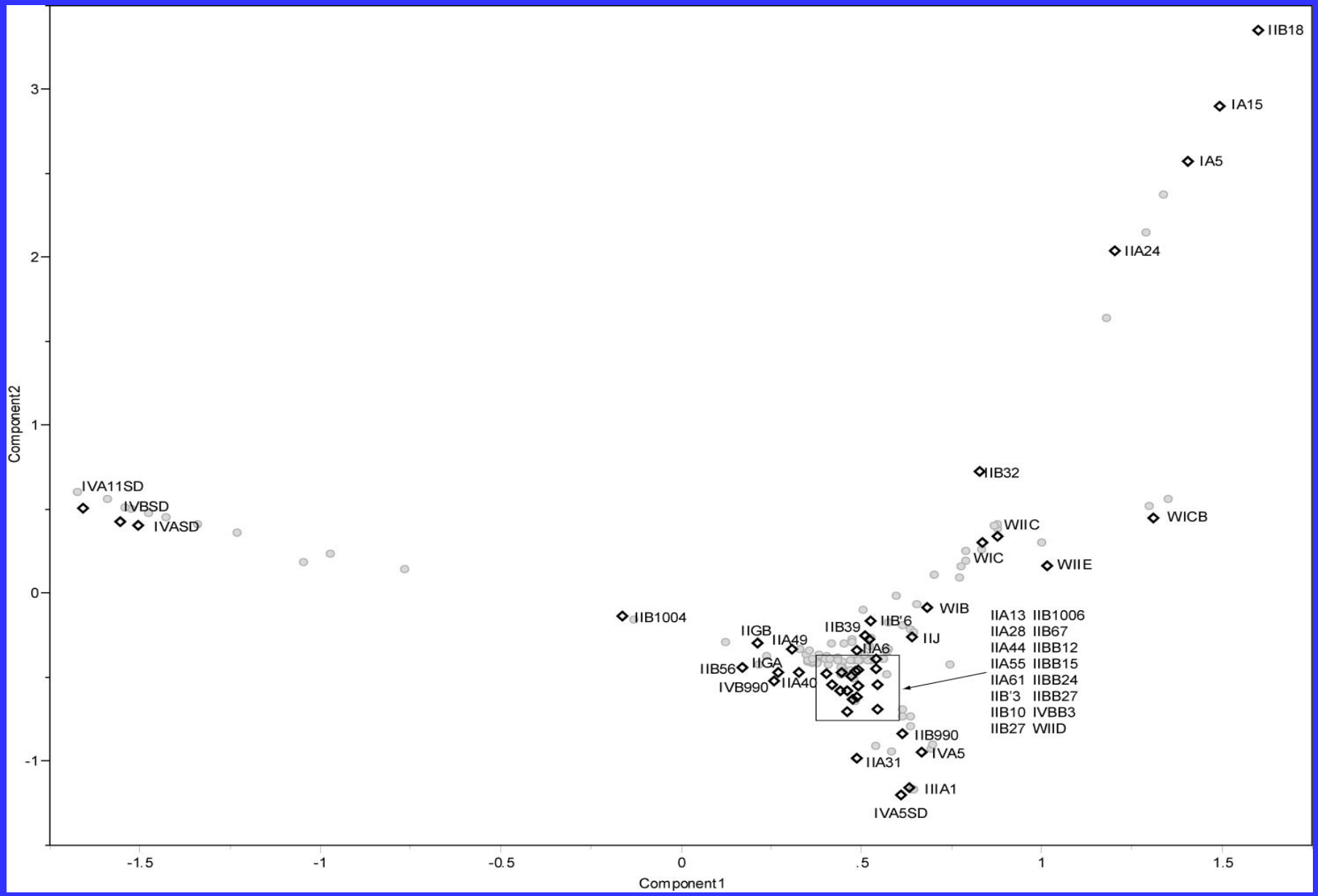
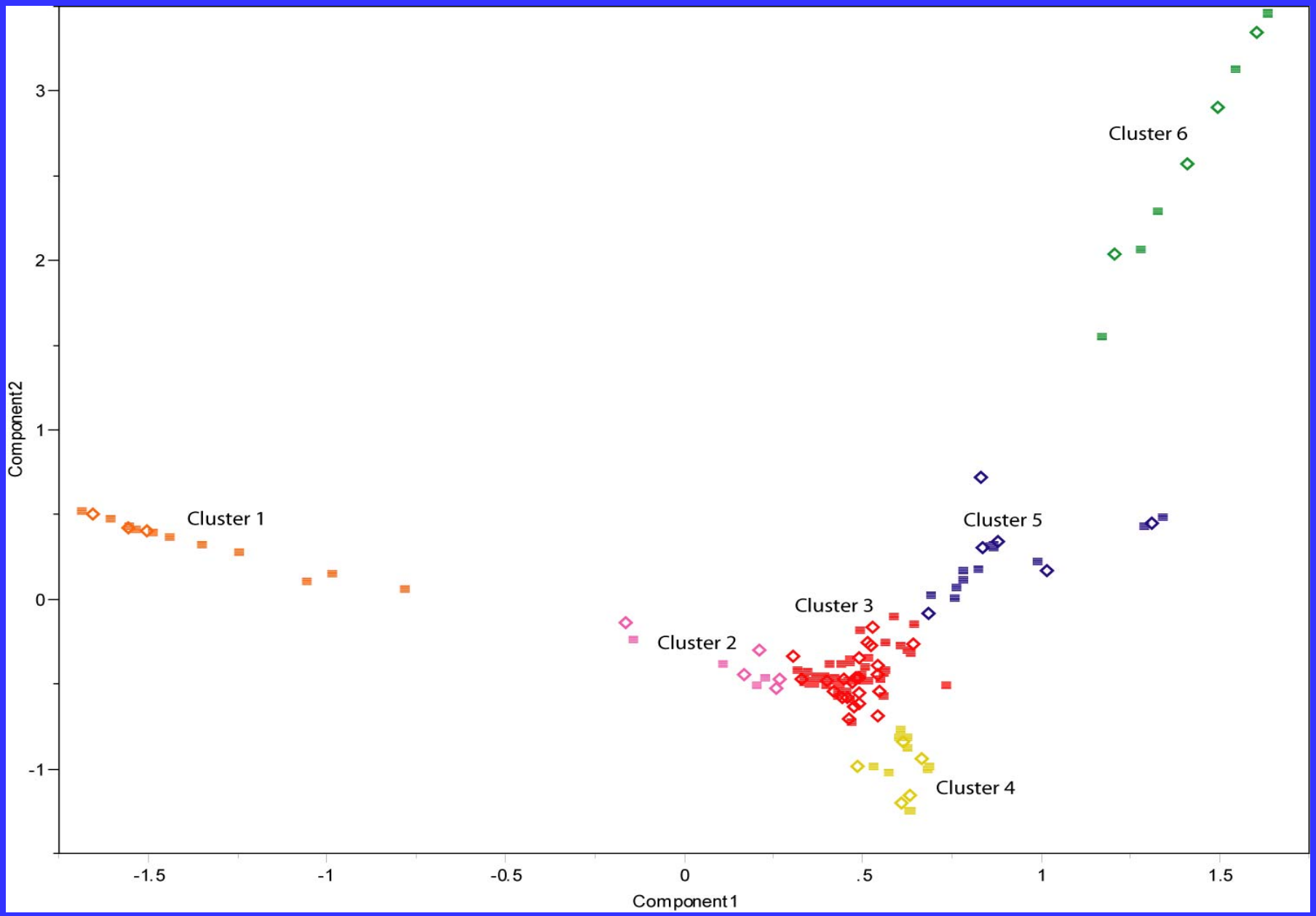
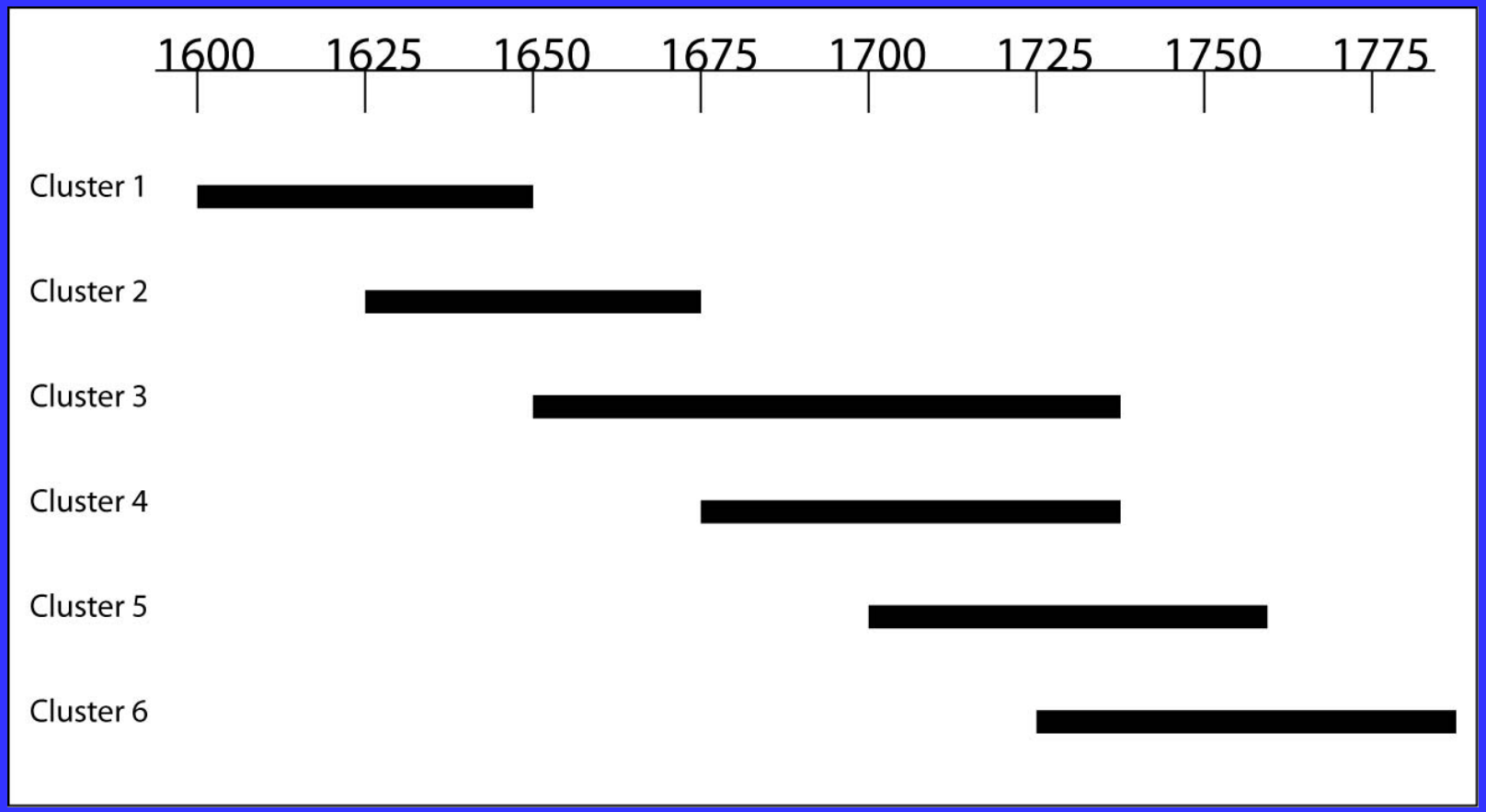
Mortuary Assemblages and Bead Types



K-Means Cluster Analysis Results



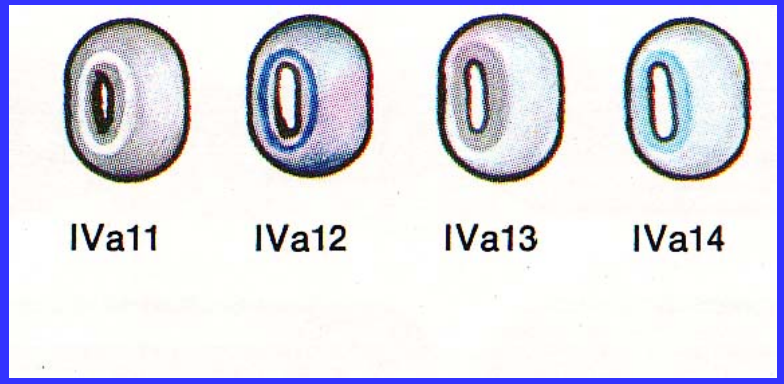
Suggested Bead Chronology



Suggested Bead Chronology

Cluster 1

ca. A.D. 1600-1650



Suggested Bead Chronology

Cluster 2

ca. A.D. 1625-1675

"eye" beads

Suggested Bead Chronology

Cluster 3

ca. A.D. 1650-1730










Suggested Bead Chronology

Cluster 4

ca. A.D. 1670-1730

Cornaline d' Aleppo

Suggested Bead Chronology

Cluster 5

ca. A.D. 1690-1740

barleycorn beads

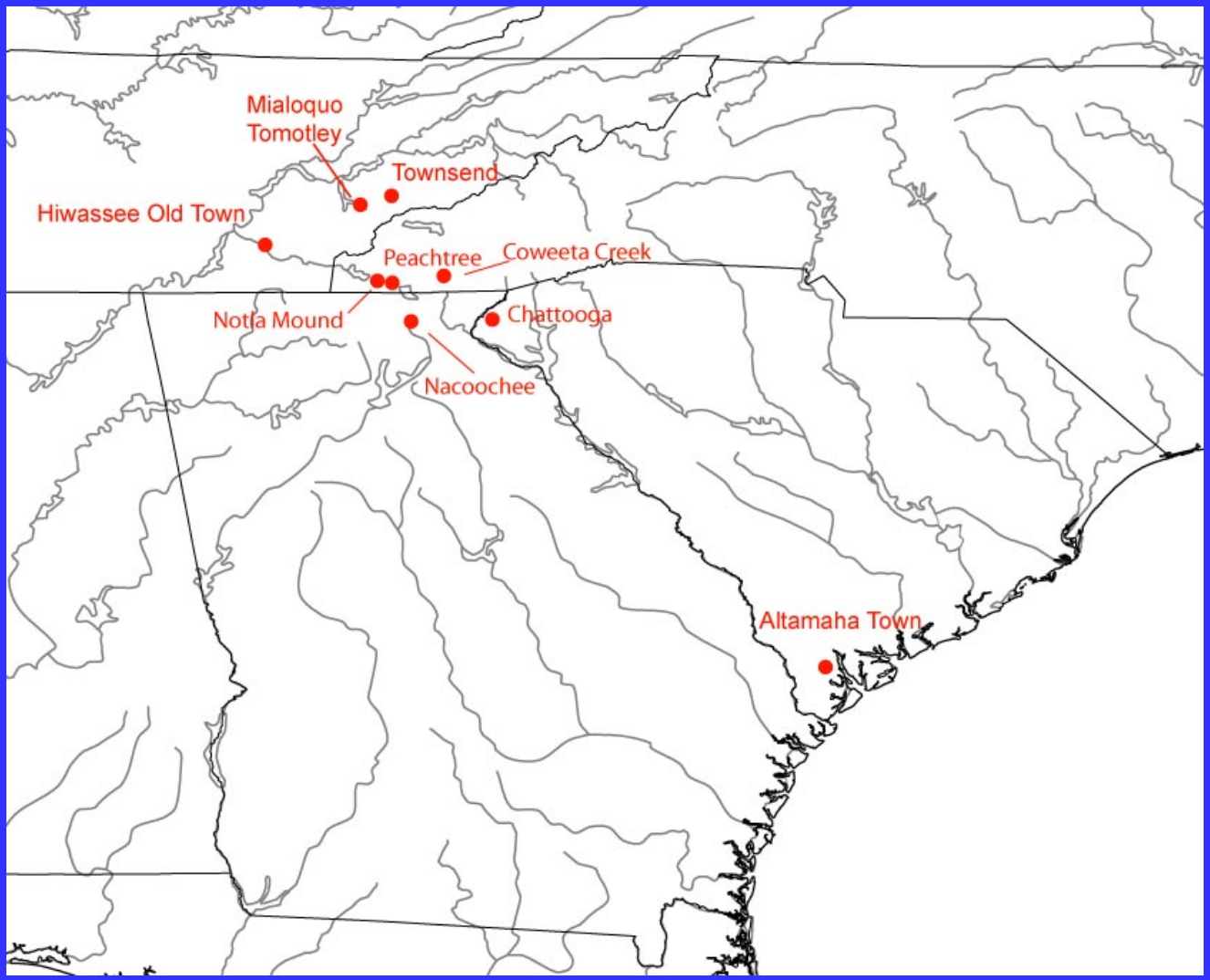
Suggested Bead Chronology

Cluster 6

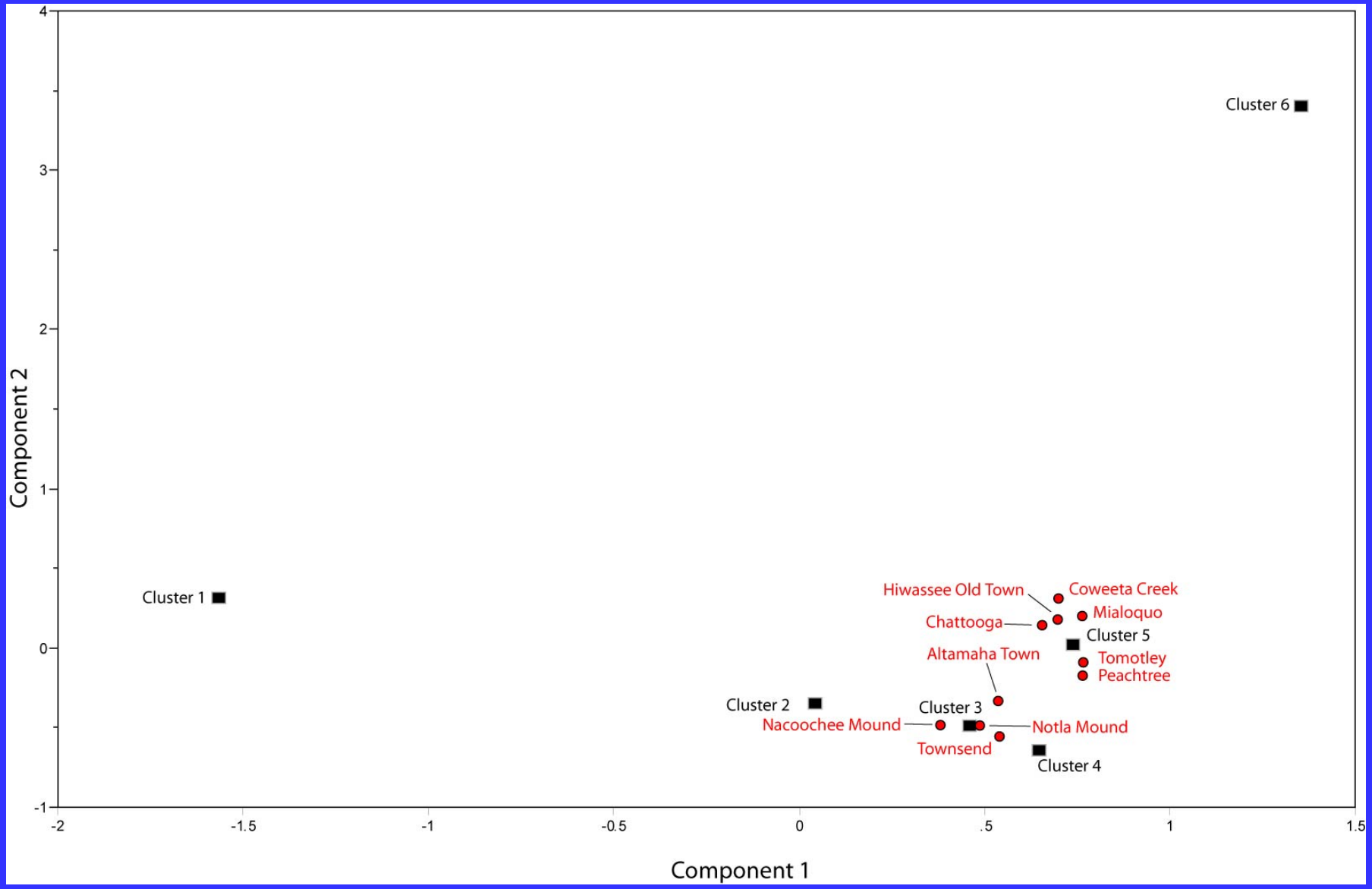
ca. A.D. 1725-1783

gooseberry beads

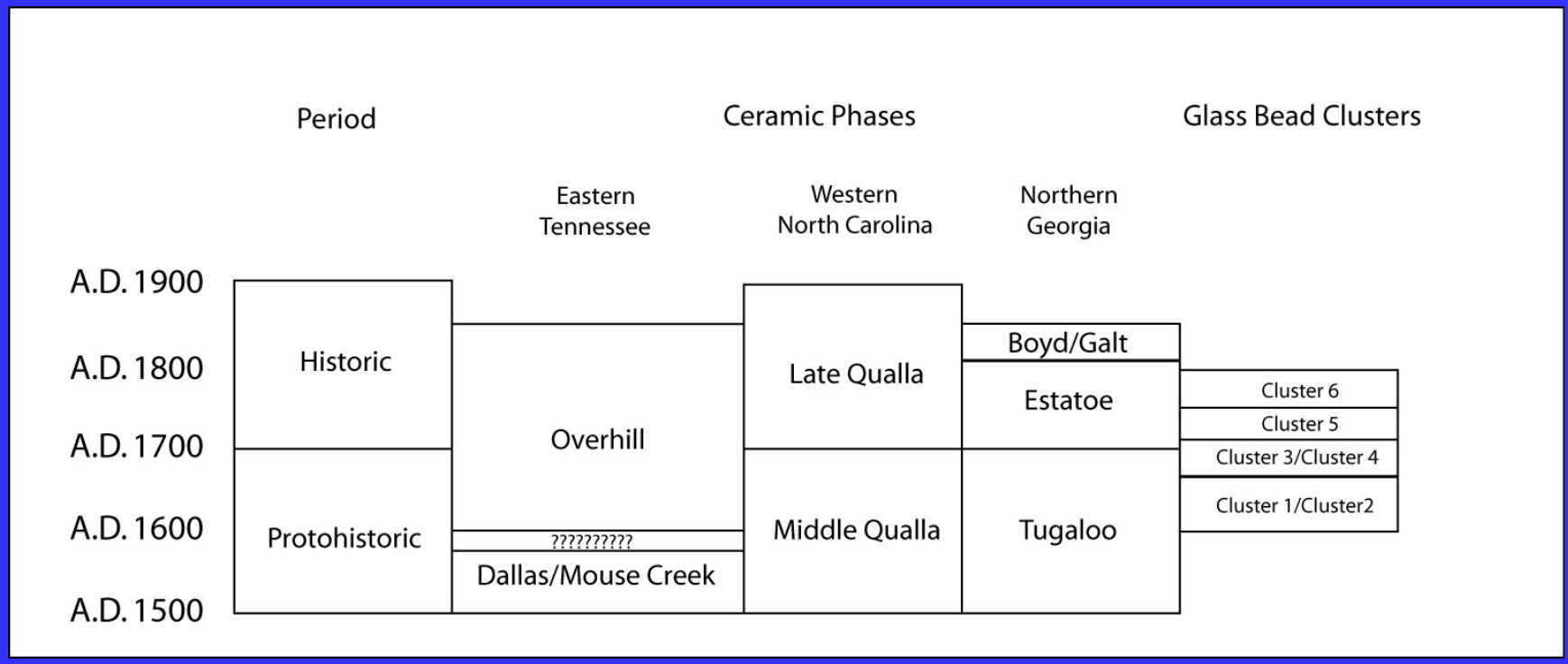
Applying the Chronology



Applying the Chronology



Applying the Chronology



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