# Mortuary Archaeology and Culture Change among Cis-Baikal Neolithic Hunter-gatherers: Theoretical and Methodological Considerations

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**Abstract**

*This paper describes the goals and approach of our investigation of hunter-gatherer cultures in the Lake Baikal region, Siberia. It is argued that traditional prime-mover explanations for hunter-gatherer culture change, which cite climatic disruption or forager-farmer competition, are not applicable to the boreal forest of the Middle and Late Holocene. Instead, an approach is described in which individual life histories are reconstructed from the mortuary record using new techniques of laboratory analysis. Knowledge of individual life histories promises to provide a much more detailed and insightful picture of the range of behavioural variation within a community. Finally, it is argued that the theoretical framework of evolutionary ecology, with its emphasis on individuals rather than groups/cultures, provides the best approach for understanding this variation.*

**Résumé**

*Cet article présente les objectifs et la démarche d'une étude portant sur les groupes de chasseurs-cueilleurs de la région du lac Baïkal, en Sibérie. Il démontre que les explications traditionnelles concernant les principales raisons de changement dans les sociétés de chasseurs-cueilleurs, dont les perturbations climatiques et la compétition entre fourrageurs et agriculteurs, sont inadéquates dans le cas des chasseurs-cueilleurs de la forêt boréale ayant vécu au cours de l'Holocène moyen et tardif. Une autre démarche est proposée, dans laquelle l'histoire de chaque individu est reconstituée à partir de données mortuaires qui sont analysées avec de nouvelles techniques de laboratoire. La connaissance de l'histoire de ces individus contribuera à dresser un portrait beaucoup plus détaillé des variations de comportement que l'on retrouve à l'intérieur d'une même communauté. Enfin, il est soutenu que le cadre théorique de l'écologie évolutionniste, qui se concentre sur les individus plutôt que sur les groupes ou cultures, propose la meilleure méthode pour comprendre les variations de comportement.*

## Introduction

Reflection about mortuary sites and their meaning has been an important part of archaeological method and theory from the beginning of our discipline and at each of its junctures. This symposium is good example of this continuing contribution. In the following paper we will demonstrate how studies of past cultures through the mortuary record benefit from the synergy between theory building and laboratory technology. In this exercise we consider a case study of Lake Baikal stone age hunter-gatherers, however, the proposed model has the potential to be widely applicable.

The hunter-gatherer lifestyle in various modes has sustained humankind during most of its c. 2.5 million year history and remains viable in a few places even today (Kelly 1995). In contrast, farming and pastoralism are much more recent, appearing no more than 10,000 years ago with the onset of Holocene climatic quiescence and carbon dioxide enrichment. In some places there was an almost instantaneous shift to either food production (e.g., Near East) or intensive hunting and gathering (e.g., Japan). In other regions that were evidently no less favourable, however, food production failed to develop

altogether and the transition to intensive hunting and gathering occurred much later (e.g., North American West Coast). Such differences in local trajectories of hunter-gatherer adaptive change clearly indicate that more than just environment was involved. Recognising this, ethnographers and archaeologists have devoted much research to understanding aspects of this ancient lifestyle that might account for regional differences.

Ethnographers, enjoying the benefits of working with living groups, have developed a remarkably thorough understanding of biological, demographic, social, economic and political hunter-gatherer dynamics in a wide array of cultural traditions and ecological zones. This work vividly demonstrates a wide range of variability in practically every aspect of hunter-gatherer behaviour (e.g., Kelly 1995). At the same time, it reveals distinct trends and relationships that link different behavioural components (e.g., technology, population density, mobility and subsistence), suggesting that hunter-gatherer adaptations in some sense form a coherent whole.

Archaeologists have also dedicated much research to improving our understanding of behavioural variability and culture change among past hunter-gatherers. Two characteristics of hunter-gatherer lifeways make this task challenging: technology and mobility. Hunter-gatherer technology draws extensively upon perishable organic materials (e.g., fibre, wood, bone and hides) but the archaeological record consists mainly of stone, a typically small, and frequently unrepresentative component of the original range of behaviors that produced it. In a similar way, hunter-gatherer mobility tends to leave an incomplete (and again often unrepresentative) sample, comprising only unusually large sites or ones where discard rates happened to be very high. Many mobile hunter-gatherers spent the largest fraction of their time in short-term camps, producing a welter of small sites that are difficult to locate, and when located, difficult to interpret. Where conditions of preservation are reasonably good, however, charred plant macrofossils and faunal remains help to correct these deficiencies. Human remains, too, can provide remarkably detailed insights into behaviour and life history, especially when accompanied by grave goods. They are generally rare, however, especially in the numbers required to make reliable inferences.

Despite these challenges, improved techniques of excavation and refinements and innovations in the analysis of lithic assemblages and faunal remains, together with developments in archaeological theory, have all contributed to steady progress in our effort to document behavioural variability and understand culture change among past hunter-gatherers. Traditionally, however, two explanatory approaches have dominated this research, especially in the Old World. One is the environmental approach, in which culture change is viewed as an adaptation to a changing climate. Such explanations are often invoked to account for adaptive change in Late Pleistocene hunter-gatherers and culture change at the Pleistocene-Holocene transition, an interval during which substantial climatic change is well documented. The other approach involves various models of economic competition. For the Holocene, this approach usually revolves around interactions between hunter-gatherers and food-producing groups, in which hunter-gatherers are either assimilated by food producers, becoming food producers themselves, or pushed into "marginal" environments where they remain as clients of food producers. Transition and absorption were sometimes delayed for several centuries before the hunting-gathering lifestyle disappeared (e.g., northern Europe).

Neither of the above approaches, however, seems cleanly applicable to prehistoric hunter-gatherers of the boreal forest. By far the largest biogeographical zone in the northern hemisphere, the boreal forest has been continuously occupied over long periods only during the last 10,000 years, i.e. after the retreat of the glaciers. The usual form of environmental explanation, which relies on large-amplitude climatic change, is less applicable here because the Holocene has simply not seen climatic fluctuations of the magnitude that were quite common in the Pleistocene, during which conditions changed from full glacial to full interglacial in a matter of decades and sometimes years. The environment is clearly critical to explaining Holocene adaptive change in boreal hunter-gatherers, but the models and the environmental data necessary for understanding the connection are different from those commonly used for the Pleistocene. The model of forager-farmer economic competition, too, is only marginally applicable to the boreal forest, which has never been friendly to farming or pastoralism. Most of its native inhabitants did not have to cope with the expansion of food-producers and retained their huntinggathering lifestyle until very recent times.

Our project in the Cis-Baikal represents an effort to develop models for hunter-gatherer adaptive change that are specifically relevant for the Holocene and speak to places where food production never attained dominance. Concentrating on an area where the potential for comprehensive examination of hunter-gatherers is very high, it constitutes part of a broader attempt by prehistoric archaeologists to work at a level of detail similar to that enjoyed in ethnographic research.

**Lake Baikal Hunter-Gatherer Archaeology**

We were attracted to the Lake Baikal region for two reasons. First, we were drawn in by the unusually rich Neolithic and Bronze Age archaeological records (note: in Siberian archaeology, the Neolithic is defined technologically by the presence of pottery or stone grinding not by mode of subsistence). In particular, although living sites are known in many boreal forest areas, the presence of many relatively large cemeteries with well preserved skeletal remains makes this region an especially good research laboratory for prehistoric hunter-gatherers. Second, for several decades the Cis-Baikal region has been the subject of a very interesting culture historical debate regarding the relationship between relatively well-defined Neolithic culture complexes (Weber 1995). In this debate, the chief bone of contention has been the place of

the Kitoi culture in the Neolithic sequence. Although some unusual Kitoi characteristics (e.g., mortuary ritual, inequitable gender relations and differing cranial features) were recognized by most scholars, the Kitoi were nevertheless traditionally seen as occupying the middle portion of the cultural sequence (Weber 1995).

The current model of culture history suggests that from about 7000 to 1000 years BC, the Baikal area was successively inhabited by three groups: Kitoi (Late Mesolithic and Early Neolithic), Serovo (Middle to Late Neolithic) and Glazkovo (Late Neolithic to Bronze Age). Notable in this model is a gap in the archaeological record during most of the fifth millennium BC that separates Kitoi from Serovo-Glazkovo (Weber 1995; Weber *et al.,* n.d.):

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|---|---|---|
| Early Kitoi | ca. 6800-5800 cal BC | Late Mesolithic |
| Late Kitoi | ca. 5800-4900 cal BC | Early Neolithic |
| hiatus | ca. 4900-4200 cal BC | Middle Neolithic |
| Early Serovo-Glazkovo | ca. 4200-3400/3000 cal BC | Late Neolithic |
| Late Serovo-Glazkovo | ca. 3400/3000-1000 cal BC | Bronze Age |

In an attempt to elaborate on the nature of Kitoi and Serovo-Glazkovo adaptations and their relationship to the hiatus, techniques of skeletal biology and bone chemistry (stable isotopes of carbon and nitrogen) and animal tooth analysis were employed to study existing collections of human remains and, to a lesser extent, faunal materials, respectively. Human demography, health, diet, mobility, and seal procurement strategies were at the centre of this examination (Katzenberg and Weber 1999; Lam 1994; Link 1996; 1998; 1999; Weber and Katzenberg 1998; Weber *et al.,* 1993; 1998; n.d.). Our working hypotheses about Kitoi and Serovo-Glazkovo lifeways follow.

The Kitoi people were characterized by low population density and considerable group isolation. Annual ranges were small, but residential mobility was likely high within these areas. At least during the later part of the period, the Kitoi experienced demographic stagnation, perhaps even decline. Society was characterized by gender and age imbalances (fewer than expected children, adult women and senescents), with adult males dominating many spheres of life. Food distribution, for example, may have favoured males. Kitoi diet, which emphasized fish, was relatively narrow in species diversity. Groups suffered from occasional serious, but not life-threatening, food deficiencies. Community health appears to have been good overall, but the Kitoi were probably quite sensitive to even minor perturbations in the resource base. Adaptive difficulties of various intensities probably did occur, as illustrated, for example, by the high prevalence of hypoplastic defects in tooth enamel. Despite these challenges, the pre-hiatus pattern persisted for quite some time before finally succumbing to an as yet undefined form of stress, which may have involved more than resource scarcity.

In contrast, the Serovo-Glazkovo pattern appears to have featured logistical mobility, encompassing the entire Cis-Baikal, with less frequent residential moves. Overall, there were substantially more people in the region. Groups were in frequent contact, and individuals moved freely between them. Social relations were more equitable across age and gender boundaries, though not necessarily devoid of tension or conflict. The proportion of children was high, and there was numerical balance between the sexes in both adulthood and old age. Diverse subsistence activities undertaken within a framework of logistical mobility ensured a broader diet and generated enough food for all. Compared to the Kitoi, the Serovo-Glazkovo people were probably more removed from the threshold below which physiological resiliency is insufficient for population sustainment. This configuration supported a demographically expanding population. Despite their inferred higher level of fitness, the Serovo-Glazkovo people, like the Kitoi, eventually disappeared from the Cis-Baikal, after 1000 BC.

Additional differences in the area of Kitoi and Serovo-Glazkovo world-views complement the picture painted above. These archaeologically visible differences, which probably permeated most aspects of life, included perception and use of resources, the roles of various segments of society and attitudes to the dead.

Most interestingly, the results of our research suggest that, between 7000 and 1000 BC, the Lake Baikal region featured a biocultural hiatus during the 5$^{th}$ millennium BC, separating the Kitoi from Serovo-Glazkovo groups. There were some critical differences between these two cultures in such important areas as subsistence, diet, mobility, age and sex structure, and demographic trends (Weber *et al.,* n.d.). It is the development of structurally very different hunting gathering adaptations to essentially the same environment on either side of the gap that makes this phenomenon intriguing, stimulating, and relevant from a general anthropological perspective. Consequently, further examination of these groups has the potential to shed more light on the mechanisms of hunter-gatherer viability throughout the Subarctic and globally.

## Current goals

Our work has identified several issues that require further examination:

1. It is essential to develop more detailed views of Kitoi and Serovo-Glazkovo adaptations, both spatially and chronologically, to understand their respective properties, and capture the finer trends and patterns of their development.

2. To test our working hypotheses, we need finer-grained pictures of demography, subsistence and mobility patterns,

and social relations for both cultures.

3. The role and significance of formal corpse disposal areas also require further scrutiny in relation to the above.

4. In the case of the Kitoi, another closely related issue in need of investigation is the nature of life preceding the postulated population decline.

5. Similarly in need of investigation are circumstances leading up to the disappearance of Serovo-Glazkovo peoples at about 1000 BC, especially in view of their alleged higher level of fitness. A comparison of the developmental trajectories of both cultures' adaptive strategies for the duration of their existence, especially in the terminal stages, would be very informative.

6. The roles of possible cultural or ecological determinants in these trajectories and, specifically in regard to the Serovo-Glazkovo, the cultural and ecological effects of demographic expansion all require attention.

7. Gross morphological data strongly suggest no genetic continuity between the pre-hiatus (Kitoi) and post-hiatus (Serovo-Glazkovo) peoples. In view of significant contrasts in social organization, gender relations and mobility patterns, the nature of genetic relatedness within and between groups may have differed substantially between the two. An examination of ancient DNA from Kitoi and Serovo-Glazkovo remains would provide more conclusive answers to questions of biological continuity, post-hiatus population recovery, and familial relatedness.

8. Further examination of subsistence-settlement patterns, resource abundance, and genetic relationships will undoubtedly lead to an improved understanding of the Kitoi and Serovo-Glazkovo systems, but social relations and ideologies must not be overlooked. These can be as critical a force in maintaining and changing culture as biological, demographic, economic or environmental factors. It is world-views that serve to integrate all other aspects of culture. New skeletal and dietary evidence and patterns of animal procurement indicate that Kitoi and Serovo-Glazkovo gender relations, intra and inter community social dynamics and perceptions of natural resources may have all differed substantially. Even more meaningful results may be expected if the databases known for providing the best insights into this realm, namely the multiple forms of mortuary evidence, are examined.

## Theoretical Approach

While all of the cultural, biological and environmental variables mentioned are known to be important in ethnographic hunter-gatherer societies, opportunities to investigate them in prehistory are quite restricted owing to the nature of the archaeological record. The Cis-Baikal region, however, is clearly an exception. Our work demonstrates great potential for increasing the range and resolution of the information obtainable for these prehistoric hunter-gatherers.

The question is how to proceed. More fieldwork, laboratory tests and data analysis are always desirable. In the short term, however, our understanding of culture change may benefit more from a shift in theoretical approach. As mentioned earlier, archaeological studies of past hunter-gatherers have of necessity dwelled on the examination of lithics, archaeofauna and other forms of evidence such as dwellings, refuse pits and organic artifacts. Cemeteries and human skeletal remains, however, have been rare in research protocols on past hunter-gatherers because sites with appropriately large samples are rare. Collectively these circumstances account for the discrepancy in the level of detail of behavioural variability that can be seen in the archaeological record relative to the ethnographic record. Archaeology of boreal forest hunter-gatherers is no exception to these general rules.

The approach proposed here is based on the examination of human osteological remains and their archaeological context. Such remains are rare throughout the boreal forest generally, the Cis-Baikal in Eastern Siberia being a welcome exception. In this region cemeteries with human remains and associated artifacts form a significant part of the archaeological record. The approach proposed here takes a full advantage of the techniques recently made available to modern archaeology and the potential inherent in the Lake Baikal materials.

The developments of the last five to ten years in the area of archaeological science now offer a suite of methods that can provide considerable insight into the variability of past hunter-gatherer behaviour. Comprehensive examination of human osteological remains now provides us with whole new lines of information pertaining genetic characteristics and relationships (e.g., Stone and Stoneking 1996), residential mobility (e.g., Ezzo *et al.,* 1997), climate (e.g., Fricke and O'Niel 1996), season of death, and dietary records from early childhood (Wright and Schwarcz 1998) to the last decade of life (Katzenberg and Harrison 1997). When combined with data on sex, biological and archaeological age, health, place of burial and artifactual associations, these sources of information offer an unprecedented opportunity to assess variability in prehistoric human behaviour with detail and insight never before available.

To make sense of Cis-Baikal hunter-gatherer adaptation and change requires that we first abandon the traditional prime mover explanations of climate change and farmer encroachment. Forager-farmer competition can certainly be eliminated as a force for adaptive change in the Middle and Late Holocene boreal forest. Climate change, on the other hand, is clearly important not as a prime mover but as one of a series of interacting forces (e.g, technology, population, etc.) that affect hunter-gatherer systems. In our view, the broader theoretical framework of behavioural or evolutionary ecology provides the best approach to understanding these systems. This school of thought differs from the usual anthropological interpretation mainly in its concentration on indivi-

duals rather than groups/cultures, and its emphasis on the strategies pursued by individuals to satisfy such basic human requirements as subsistence and reproduction. The guiding idea is that individuals attempt to satisfy these needs economically. The approach does not stipulate that all human behaviour is economizing. Rather it defines a standard for recognizing economizing behaviour when present, and thus for recognizing situations where behaviour is non-economizing and other forms of explanation are necessary. In its emphasis on the need to document the range of behavioural variation within a community and to understand the nature of interactions with the environment, this rather recent orientation combines elements of the ecological with the evolutionary perspective (Bettinger 1991; Kelly 1995; Mithen 1990; Smith and Winterhalder 1992).

By detecting differences between individuals in diet and health, the work completed by us thus far follows just such an approach on small scale. It demonstrates that a more extensive application of such an approach would facilitate a much more insightful examination of culture dynamics and change among prehistoric Cis-Baikal hunter-gatherers. In our view, the study of human remains in mortuary context holds considerable promise to move beyond the limits of the climate change and forager-farmer competition models, for it will allow examination of prehistoric culture dynamics at the level of the individual in addition to the community.

At the empirical level the approach is based on long strings of data that constitute individual life histories. Construction of such life histories is important for at least two reasons. First, it remedies the deficiency of other approaches that study how human systems are organized at given moments in time, i.e., synchronically, which requires relatively large samples from relatively short slices of time. Since sizeable time-slice samples are very rare, in particularly in the hunter-gatherer archaeological record, one is generally forced to treat samples from extended intervals as though they represented a single time slice. The necessary assumption here — that variability from time slice to time slice within such an interval is less than the variability between successive intervals — immediately shifts the locus of processual change from the time slice to intervals and interval boundaries. This assumption facilitates diachronic analysis, but is counterproductive when it comes to explaining culture change, the adaptive context for which often lies in variability within an interval, particularly toward its end. For obvious reasons, such time-slice lumping is counterproductive to the assessment of synchronic patterns, since the analyst is forced to assume that variability observed for an interval pertains to all its constituent time-slices, when in fact, the variability may represent a trajectory in process from time slice to time slice over its span. To circumvent this difficult issue we intend to capitalize on the study of human remains and associated archaeological material and thus expand our understanding of variability to the entire span, rather than lump the data into convenient but perhaps spurious units. Such individual records can be considered capsules containing a variety of information pertaining to environment and culture at specific points in past. They can be examined in their own context and original time depth for both diachronic and synchronic patterns.

The second reason for emphasizing individual life histories is because it is the events of an entire lifespan that best reflect interactions between individuals within a community. Both present and past events are actively employed by people as they continually define and redefine their community. What happens to a person after death, i.e., how the particular mortuary protocol is structured and implemented, very much depends on the person's entire life history, not just on the events directly preceding death. The approach proposed here prescribes analysis of evidence from mortuary sites in the context of life histories preserved in the osteological material. This tack, we believe, will provide for a much better understanding of the archaeological data representing behaviour associated with death and corpse disposal.

A necessary pre-condition for the application of such this approach to any past culture is the availability of human remains. In our project, we will take full advantage of the potential inherent in the Lake Baikal materials, the analytical techniques recently made available to modern archaeology, and the theoretical perspective just described. We will use the information provided by each of the investigated humans to assess spatial and chronological patterns in community subsistence, social dynamics and world-views among the pre- and post-hiatus groups. These records will then be interpreted in the context of their original time depth and the region's environmental history. The individual will also provide information on inter- and intra-cultural biological relatedness. This focus will constitute the link necessary for us to integrate and contextualize all the main datasets: genetic, osteological, chemical, artifactual and environmental.

## Materials

Using this general theoretical framework described above, we will develop a novel approach to the examination of mortuary sites and associated human remains. Since such materials are rather rare, it is extremely important for modern archaeology to maximize their potential, both through comprehensive laboratory examination and theoretical reflection. While many of the techniques proposed here have been used in the past, they have never been applied together on the same material and their results assessed in their mutual contexts. Consequently, the approach is applicable beyond the limits of our own work in the Cis-Baikal, including cases where sample sizes are even smaller, for human remains have tremendous potential to provide extremely rich and powerful data. Sample size does not need to be viewed as an impediment of the same magnitude as a short time ago.

A database developed with prehistoric human remains forms the empirical core of our approach. It consists of several interlinked modules in which the basic unit of analysis is defined as an individual. Each module con-

centrates on different types of information relating to a particular person:

1. The Archaeological Context Module provides such data as the topographic location of the remains, grave architecture and associated objects, body position and treatment, and archaeological age.
2. The Human Osteology Module compiles osteobiographical records such as biological age, sex, pathologies and activity patterns.
3. The Bone Chemistry Module deals with various aspects of chemical composition of bone for inferences about diet, subsistence and mobility patterns of the deceased, as well as some aspects of social organization.
4. The Human Genetics Module characterizes genetic variability recovered from human bone samples for insights into inter and intrapopulational relationships.
5. The Environmental Context Module describes climatic and landscape parameters for the entire database spanning ca. 6000 years.

We estimate that in our case we will be able to assemble a database for about 400 boreal hunter-gatherers.

## Conclusion

The approach described here would provide for a much better understanding of archaeological data representing behaviour associated not only with death and disposal, but also other important aspects of hunter-gatherer adaptations such as subsistence, diet, social organization, regional variability and patterns of culture change. It should be viewed as a practical and systematic effort to maximize the potential inherent in human remains. In a nutshell, our approach calls for an analysis and interpretation of personal records comprising archaeological information, osteological data, and chemical and biochemical signatures derived from human remains in their mutual context and in the context of other personal records. The approach thus considers all classes of data as equally important and useful.

It is our opinion that the answers to the most persistent questions in regard to the history of the Kitoi and Serovo-Glazkovo people and many other groups and cultures will be found by employing the methods of the approach as outlined above. Because of the human remains requirement, the approach would not be equally useful everywhere, but it should be part of any research design whenever such collections are part of the entire archaeological context. Research based on this or similar approach will also result in narrowing the perception gap between the variability visible in the ethnographic data versus the archaeological data and will thus have an impact reaching far beyond the spatiotemporal boundaries of our Lake Baikal study.

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