



## Subsistence and social change in central Eurasia: stable isotope analysis of populations spanning the Bronze Age transition



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### ABSTRACT

At the transition from the Middle (2100–1700 BC) to Late Bronze Age (1700–1400 BC) in the central Eurasian steppe, significant changes occurred in patterns of settlement and mortuary practice. Traditional interpretations link these changes to shifts from semi-settled agro-pastoral communities to more mobile forms of pastoralism. However, correlations between subsistence strategies and shifts in social and ritual practices have been infrequently tested. This paper explores the nature of subsistence economies in two populations from the sites of Bestamak (MBA) and Lisakovsk (LBA) in northern Kazakhstan. Carbon and nitrogen stable isotope analysis of bone collagen was undertaken to understand dietary intake. The close clustering of isotope values indicates homogeneity in subsistence practices for these two communities spanning the transition. Therefore, while changes occurred in social and ritual practice, subsistence regimes stayed relatively uniform at the transition. Results of this research add to previous literature, revealing that dietary intake of pastoral populations in the Eurasian steppe are much more intricate than previously believed.

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### 1. Introduction

While pastoral societies have varied economies, social systems, and mobilities, only recently have scholars begun to integrate the variable lifeways of pastoral communities (e.g. Frachetti, 2008a, 2008b; Frachetti et al., 2010; Murphy et al., 2013; Spengler et al., 2013a). In the case of central Eurasia (e.g. northern Kazakhstan,

southern Urals) a great deal of attention has focused on sweeping changes that occurred from the Middle (2100–1700 BC) to Late Bronze Age (1700–1400 BC). During the Middle Bronze Age (Sintashta, Petrovka) a combination of nucleated settlements and large populations, of approximately 200–700 individuals, highlight the more sedentary nature of these communities (Gening et al., 1992; Grigor'yev 2000a; Anthony, 2007; Kohl, 2007; Koryakova and Epimakhov, 2007; Hanks, 2009). In contrast, subsequent Late Bronze Age (Andronovo) settlements more commonly consist of smaller communities with similar cultural materials dispersed over a vast area. Numerous authors have interpreted this pattern as evidence of increased interaction and mobility (Evdokimov, 1983;

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Potemkina, 1983; Habdulina and Zdanovich, 1984; Kuz'mina, 2007; Koryakova and Epimakhov, 2007). Explaining the shift from aggregated to dispersed communities is challenging because the subsistence economies of local communities remain undetermined. This has resulted in models that equate aggregated communities with agro-pastoralism, and the dispersal of these groups as a move towards nomadic pastoralism.

Comparative research on pastoral societies has demonstrated that communities are highly variable in terms of subsistence economies and herding strategies (Khazanov 1978; Cribb, 1991; Chang and Koster, 1994; Leonard and Crawford, 2002; Frachetti, 2008a; Frachetti et al., 2010; Murphy et al., 2013; Spengler et al., 2013a). Furthermore, assumptions that pastoral societies are highly mobile and therefore possess low levels of social complexity have been challenged through the identification of institutionalized social stratification and ranking (Palumbo, 1987; McIntosh, 1999; Di Cosmo, 2002; Kradin, 2002; Chang, 2008). Rather than assume subsistence regimes are predictably related to shifts in mobility and social practice, the nature of subsistence should be treated as one variable among many in reconstructing pastoral societies. Therefore, this paper examines dietary intake at intra- and inter-cemetery scales to investigate if changes in settlement and mortuary practices corresponded with a transition in practices of consumption.

While pastoral societies are now considered in discussions of social complexity, comparative anthropological studies have previously assigned complex social developments only to sedentary agricultural societies with a range of hierarchical forms of social organization. The emergence of social complexity in pastoral groups has subsequently been tied to a reliance on agricultural products or interactions with settled societies (Khazanov 1978, 1984; Dyson-Hudson, 1980; Barfield, 1981). While pastoralists are often defined as those who undertake animal herding as their primary form of subsistence procurement, a number of other strategies linked to variability of within group mobility and agro-pastoralist orientations have been identified (Khazanov 1978; Barfield, 1981, 1993; Cribb, 1991; Chang and Koster, 1994; Frachetti, 2008a). Middle Bronze Age (MBA) sites in the central Eurasian steppe, by virtue of their aggregated nature and seemingly more complex mortuary remains, are posited to have been agro-pastoral (Zdanovich, 1997: 15; Zdanovich and Zdanovich, 2002).

The seemingly stable and settled nature of these communities in conjunction with the recovery of sickles has led some researchers to suggest that MBA sites were undertaking horticultural or agricultural subsistence practices as part of a mixed agro-pastoral lifeway (Zdanovich, 1997: 15; Zdanovich and Zdanovich, 2002). In contrast, as communities became more dispersed during the Late Bronze Age (LBA), others have hypothesized that there was a switch to increased mobile pastoralism (Tkacheva, 1999). Yet the relationship between dispersed communities and possible changes in mobility, herd size, and composition is yet another branch of the prehistoric economy that is not well understood (Morales-Muniz and Antipina, 2003; Bendrey, 2011). Improved comprehension of individual and community dietary intake is therefore critical to a better understanding of the broader social and economic processes within central Eurasia.

This paper examines the diet and subsistence practices of two Bronze Age cemetery populations from northern Kazakhstan through stable carbon and nitrogen isotope analyses. The Bestamak (MBA) and Lisakovsk (LBA) sites have sufficient sample sizes and offer an opportunity to compare these contiguous periods and archaeological culture groups within the central Eurasian steppe (Fig. 1). As variability has been suggested for pastoral subsistence regimes, the current study provides direct evidence for prehistoric diet in two communities that span a ritual and social transformation. This approach offers both a micro-regional context (encapsulating several communities), as well as a broader regional context for understanding possible relationships between subsistence strategies and social change in the central Eurasian steppe. Furthermore, differences in the carbon and nitrogen isotopic composition ( $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ ) of bone collagen provide a useful technique for determining the dietary practices of humans and animals. This is especially true concerning the roles that terrestrial and freshwater resources, as well as wild and cultivated plants, may have played in consumption practices.

## 2. Archaeological context

### 2.1. The cemeteries

The site of Bestamak is located in northern Kazakhstan within Kostanai oblast' (administrative region), and is situated on the right



Fig. 1. Location of Eurasian steppe sites and macro-regions discussed in this paper with rectangle indicating the Central Eurasian Steppe.

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