Journal of Archaeological Science: Reports 6 (2016) 200–210

Contents lists available at ScienceDirect

Journal of Archaeological Science: Reports

journal homepage: www.elsevier.com/locate/jasrep

Geochemical investigation of late pre-contact ceramic production patterns in Northwest Alaska

Shelby L. Anderson [a,*], Matthew T. Boulanger [b,1], Michael D. Glascock [b], R. Benjamin Perkins [a]

[a] Portland State University, P.O. Box 751, Portland, OR 97207, United States
[b] University of Missouri Research Reactor, 1513 Research Park Drive, Columbia, MO 65211, United States

ARTICLE INFO

Article history:
Received 16 November 2015
Received in revised form 2 February 2016
Accepted 4 February 2016
Available online 18 February 2016

Keywords:
Hunter-gatherers
Mobility
Exchange
Ceramics
Neutron activation analysis
Arctic

ABSTRACT

Study of northwest Alaskan ceramic production and distribution patterns has the potential to provide new evidence of coastal hunter-gatherer mobility and social interaction in the late pre-contact period. This research is directed at characterizing potential clay sources and linking ceramic groups to raw-material source areas through instrumental neutron activation analysis (INAA) and modeling of possible clay and temper combinations. Results of INAA of 458 ceramic, 31 clay, and 28 possible temper specimens reinforces prior identification (Anderson et al., 2011) of three broad compositional groups. Though raw materials were collected over a large area, the clay specimens demonstrate remarkable geochemical homogeneity and fall within one of the established ceramic geochemical groups, Macrogroup 2. This suggests that potters may have added little to no mineral temper to the clays and also that what we have termed Macrogroup 2 ceramics were produced in the north and central areas of northwest Alaska. Group 1 and 3 ceramics may be evidence of pottery being brought into the region from elsewhere. Results indicate that ceramics circulated widely around the region and suggest the possibility of areas of greater production perhaps due to an abundance of clay or wood fuels needed for firing. This work lays the foundation for further exploring the cultural processes that underlie these distributions and provides insight into the complexities of hunter-gatherer ceramic production and distribution.

1. Introduction

Hunter-gatherer ceramic artifacts are relatively rare (see Jordan and Zvelebil, 2009 for summary), but study of their distributions provides new insights into mobility, social interaction, and technological organization (e.g., Eerkens, 2001, 2002, 2003; Eerkens et al., 2002; Simms et al., 1997). Compositional analysis of North American Arctic ceramic technology presents an opportunity to study coastal hunter-gatherer mobility and social interaction during the late Holocene, a period of significant environmental and social change in the northwestern Arctic (Fig. 1). Over at least the previous 3000 years, coastal occupation increased and people developed specialized maritime tools and subsistence strategies. There is evidence of increasing social difference as well as complex socioeconomic structures that connected people across the region and beyond through extensive travel and trade. Compositional analysis can help archaeologists study the changing geography of these networks over time, illuminating how and why people maintained such extensive interaction networks during the Late Holocene. The goal of this paper is to characterize potential clay sources and to link ceramic groups to raw-material source areas through instrumental neutron activation analysis (INAA). The results of this work establish a foundation for studying the cultural processes involved in Arctic ceramic distribution and the social networks they represent. This work has broader implications for understanding hunter-gatherer ceramic technology, mobility, and the role of social interaction in complex hunter-gatherer groups.

2. Prior work

Prior to our 2011 pilot study (Anderson et al., 2011), it was not clear if the exchange of ceramic artifacts was part of prehistoric distribution networks in northwest Alaska. While there is historic evidence of ceramic trade, the antiquity of this practice was unknown. Ceramic technology was adopted from western Beringia about 2800 years ago (see Ackerman, 1982; Frink and Harry, 2008 for additional summary). Early ceramic vessels are thin, relatively hard, have a globular shape, and are decorated in characteristic linear, check-stamp, or cord-marked styles. This early ceramic tradition is quite different from later, post-1500 BP Arctic ceramics. Post-1500 BP ceramic vessels are thick, softer, cylindrical or flower-pot shaped and often undecorated. Ceramics are much more abundant after 1500 BP. The rough appearance

* Corresponding author.
E-mail addresses: ashelby@pdx.edu (S.L. Anderson), mboulanger@smu.edu (M.T. Boulanger), glascockm@missouri.edu (M.D. Glascock), rperkins@pdx.edu (R.B. Perkins).
[1] Present address: Department of Anthropology, Southern Methodist University, PO Box 750336, Dallas, TX 75275, United States.

http://dx.doi.org/10.1016/j.jasrep.2016.02.001
2352-409X/

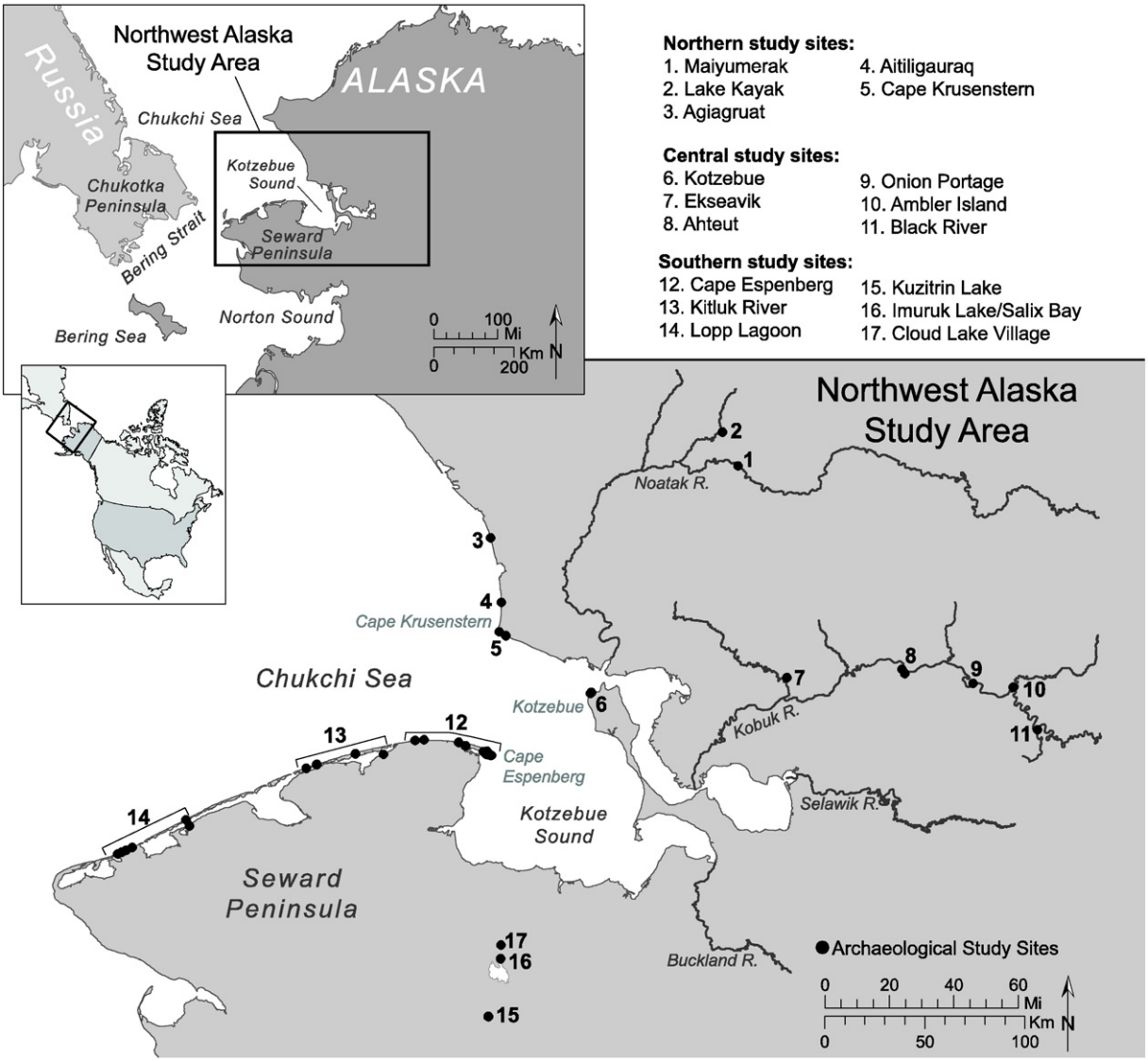

Fig. 1. Map of study area with archaeological study site locations indicated.

of later ceramic cooking vessels suggests expedient production and local use, but a pilot study that included INAA of 99 ceramic specimens from northwest Alaska established that hunter-gatherer ceramics were part of distribution networks over at least the last 1000 years (Anderson et al., 2011). This work also demonstrated the potential of ceramic research for addressing questions about Arctic hunter-gatherer lifeways. Questions remained, however, about the location of production areas and the nature of interaction networks. Analysis of a larger sample of ceramics was needed. The study presented here builds on the earlier pilot project by including a larger sample which also incorporates raw clay and temper materials collected from across the region.

3. Samples

3.1. Ceramics

This study relies on existing ceramic collections from northwest Alaska. The advantage of this approach is that it allows significant temporal and geographic expansion of the project. The disadvantages of using museum collections include variation in sample sizes from sites available for study, limited provenience and contextual information, and limited information on collection methods in some cases. Information was most limited for collections made by Giddings in the 1940s and 50s at Kotzebue and along the Kobuk River (Giddings, 1952), but the value of including these relatively large collections from otherwise unstudied areas of northwest Alaska outweighed the disadvantages. A total of 8395 ceramic specimens from 17 sites spanning the study period (Table 1) were classified according to various technological and decorative attributes using standard ceramic analysis methods (e.g., Rice, 1987). A subsample of specimens for INAA was selected from each site based on the nature and size of primary temper, exterior color, and exterior surface treatment (Anderson, 2011). Rim sherds were preferentially selected for analysis to limit the potential of sampling the same vessel twice. An additional 360 ceramic specimens were submitted for analysis by neutron activation as part of this study, bringing the total sample to 458 specimens.[2]

3.2. Clay and temper samples

Although study of ceramic production and distribution patterns is possible without direct comparison to geological samples of clay from

[2] Specimen SLA 244, though submitted for analysis, was of insufficient mass for reliable analysis by neutron activation using standard University of Missouri Research Reactor procedures.