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Deciphering public spaces in urban contexts: geophysical survey, multi-element soil analysis, and artifact distributions at the 15th–16th-century AD Swahili settlement of Songo Mnara, Tanzania

Jeffrey Fleisher [a, *], Federica Sulas [b, c]

[a] Department of Anthropology, Rice University, PO Box 1892, Houston, TX 77251, USA
[b] Istituto di Storia dell'Europa Mediterranea, CNR, Cagliari, Italy
[c] Department of Anthropology and Archaeology, University of Pretoria, Pretoria, South Africa

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ABSTRACT

Open spaces are an integral part of past urban settlement worldwide. Often large and devoid of visible traces of past activities, these spaces challenge mainstream archaeological approaches to develop methodologies suitable to investigate their history. This study uses geophysical survey, geochemical sampling and artifact distributions to examine open spaces at the Swahili stonetown of Songo Mnara, Tanzania. Initial, magnetic susceptibility survey revealed a set of anomalies associated with activities across the open spaces at the site; a systematic soil/sediment sampling program was applied to map artifact and geochemical distributions across these areas. These data provided a means to distinguish a 'public space' at the site: correlations were found between anomalies, daub, certain chemical elements (Fe, P, K, Mn) while areas without anomalies—the 'public space'—correlated with more fragmented ceramics and other chemical elements (Ca, Na, Mg, Sr). The integrated methodological framework developed at Songo Mnara offers a new way to define areas that may have functioned as 'public spaces' as well as possible activities that were carried out in them. The results suggest that open spaces at this Swahili site contained defined and protected public areas where small-scale production may have occurred.

1. Introduction

The archeology of open space has challenged researchers to devise methodologies for understanding their functional, socio-political, and ritual uses within a settlement (Canuto et al., 2010; Cap, 2012; Cavanagh, 2001; Fleisher, 2014; Hutson et al., 2007; Moore, 1996; Parnell et al., 2002; Robin, 2002; Robin and Rothschild, 2002; Shillito and Ryan, 2013; Smith, 2008; Swenson, 2012; Wells, 2004). Following Stanley et al. (2012: 1089), we define urban open space as "any urban ground space, regardless of public accessibility, that is not roofed by an architectural structure." Open spaces can include a variety of areas such as house yards, gardens and orchards, plazas, alleys/streets, and cemeteries. These spaces are important for the everyday life of an urban settlement as well as for the settings of important social and political events. While the former may include the daily preparation of food, household production or conversations among neighbors, the latter host performances of feasts, installation ceremonies, and ritual dances, to name just a few. We call these latter settings 'public space': open spaces that are accessible by most, if not all, residents (Fleisher, 2014). Yet, open spaces continue to challenge archaeologists as they are difficult to investigate through traditional archaeological methods: often large, with low artifact densities, and the site of recursive activities, they are not well suited to large-scale excavation. Furthermore, we cannot assume that open spaces had single functions, through time or across space. For example, at the Neolithic site of Çatalhöyük in Turkey recent research illustrates how some open spaces first used as dumping areas gradually acquaried different functional meanings (Shillito and Ryan, 2013).

Using geophysical, geoarchaeological and artifact distribution data, this paper examines the nature and use of open spaces in urban contexts at the Swahili stonetown of Songo Mnara, located on a small island off the Tanzania coast (Fig. 1). By addressing the advantages and problems of combining geophysical and geo-archaeological approaches to spatial analysis in urban contexts, the

* Corresponding author. Tel.: +1 713 348 3482.
E-mail addresses: jfleisher@rice.edu (J. Fleisher), sulas@cantab.net (F. Sulas).

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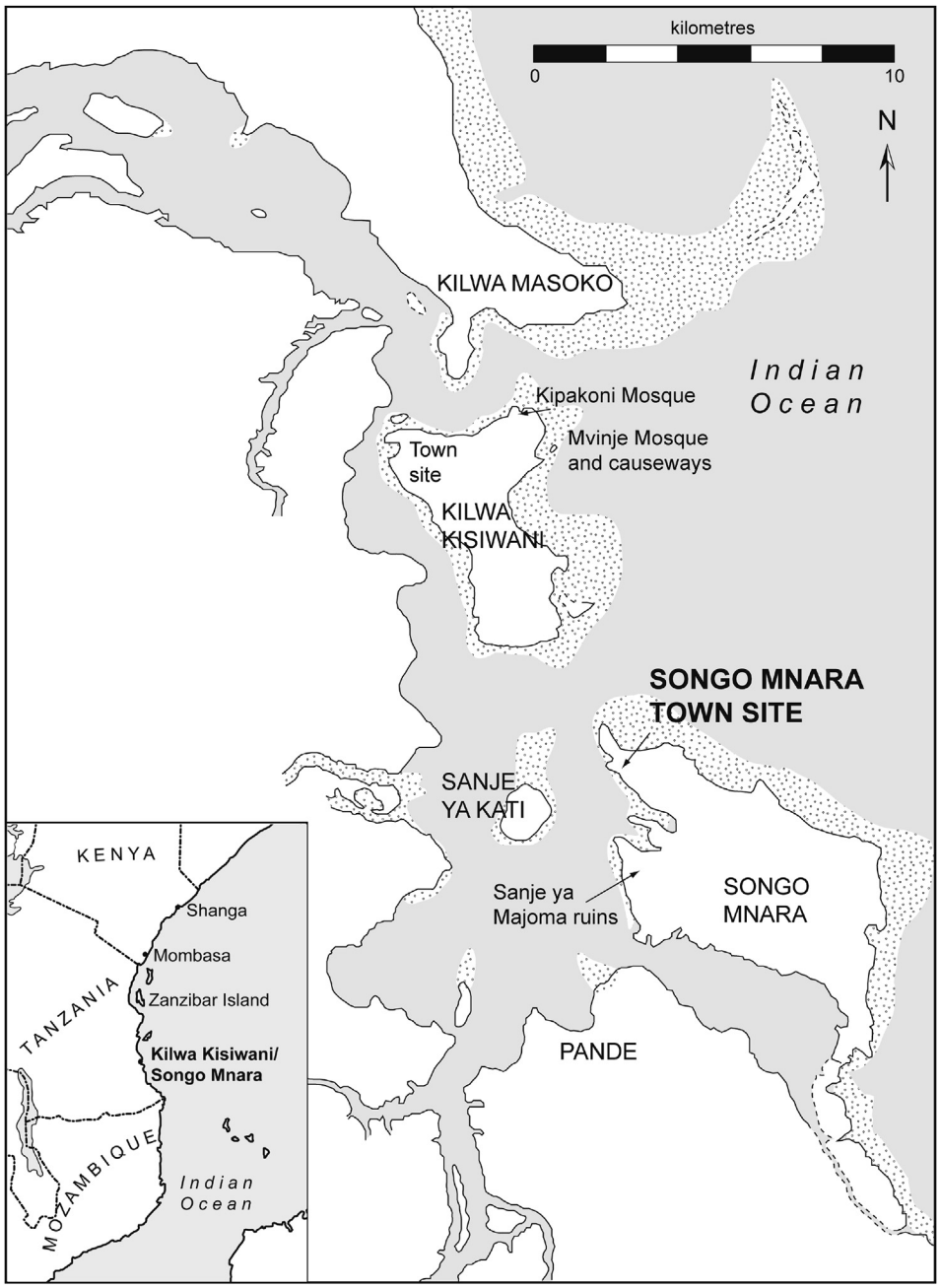

Fig. 1. Map showing the location of Songo Mnara, regional map with inset coast.

paper illustrates one way different datasets can be integrated in order to overcome the limitations of each technique and to refine the interpretation of the data they produce individually (Kvamme, 2007). This study contributes to the growing literature concerned with enhancing archaeological prospection (e.g. Dirix et al., 2013; Luzzadder-Beach et al., 2011; Oonk et al., 2009) and deciphering activities of a settlement (e.g. Hutson and Terry, 2006; Hutson et al., 2007; Milek and Roberts, 2013; Shillito and Ryan, 2013; Wells, 2004, 2010).

1.1. Geophysical surveys and geochemical testing

Archaeological prospection, from geophysical and borehole surveys to coring technologies and geochemical testing, now regularly provides sound stratigraphic records and helps to distinguish between disturbed and archaeological deposits, and between the latter and the sterile bedrock (e.g. Aspinal et al., 2008a, 2008b; Campana and Piro, 2008; Dirix et al., 2013; Gaffney, 2008; Howard et al., 2015; Pearl and Sauck, 2014; Scollar, 1990; Vermeulen et al., 2012). The few applications of these approaches to African contexts have also produced significant results (e.g. McIntosh et al., 1996; Radimilahy, 1998; Sinclair and Petrén, 2002). Studies combining archaeological coring, artifact distribution analysis and soil chemical analyses in urban contexts have shown how the integration of such techniques can provide a cost- and time-effective approach to tackle issues concerning settlement pattern, social organization and complexity, and cultural sequences within their horizontal and vertical stratigraphic context (Hoffman et al., 1987; Juma, 2004; McIntosh et al., 1996; Radimilahy, 1998; Sinclair and Petrén, 2002).