



Contents lists available at ScienceDirect

Journal of Archaeological Science

journal homepage: <http://www.elsevier.com/locate/jas>

Soil forensics as a tool to test reported artefact find sites

Duncan Pirrie^{a,*}, Gavyn K. Rollinson^b, Jens C. Andersen^b, Danielle Wootton^c, Sam Moorhead^d^a Helford Geoscience LLP, Menallack Farm, Treverva, Penryn, Cornwall TR10 9BP, UK^b Camborne School of Mines, University of Exeter, Penryn Campus, Penryn, Cornwall TR10 9EZ, UK^c Department of Archaeology, College of Humanities, University of Exeter, Laver Building, North Park Road, Exeter EX4 4QE, UK^d Department of Portable Antiquities and Treasure, British Museum, London WC1B 3DG, UK

ARTICLE INFO

Article history:

Received 12 May 2013

Received in revised form

6 September 2013

Accepted 11 September 2013

Keywords:

Provenancing

Coins

Soil analysis

SEM-EDS

Automated mineralogy

ABSTRACT

The reported find sites for archaeological artefacts such as coin hoards, can in some cases be either accidentally mistaken or potentially deliberately fabricated. However, testing the veracity of such reported find sites can be difficult. Advances in the analysis of soil samples for both criminal and environmental forensic investigations, is allowing the characterisation of very small soil samples to be achieved. In this study forty three soil samples were analysed from six groups of coins, each of which had been reported as an individual coin hoard collected at different locations in Devon and Somerset, UK. *In-situ* soils were removed from the surface of the coins and mineralogically analysed using automated scanning electron microscopy and energy dispersive analysis. The mineralogical data show that five of these six coin groups could not have been derived from individual find sites. The mineralogical data for one of the groups was indicative that the coins making up that group could potentially have been derived from a single location. Subsequent and independent to the mineralogical assessment of the coins, a numismatic inspection of the coins led to the same conclusions. Automated mineral analysis, which can be carried out on very small soil samples, may prove to be a useful technique for the assessment of the reported provenance of archaeological artefacts.

© 2013 Elsevier Ltd. All rights reserved.

1. Introduction

The discovery of archaeological artefacts such as coin hoards through metal detection can, when carefully documented and recorded, provide important additional data on the distribution of sites of past human activity which might not otherwise have been identified or recorded. However, the veracity of claimed find sites may, on occasion, be challenged, as it is not unknown for the claimed find sites to be either accidentally incorrectly recorded or deliberately fabricated. For some regional and indeed, national museums, un-verified finds make up a significant component of new acquisitions. Field visits to reported find sites are costly and may not provide additional evidence to support, or contradict, the veracity of the claimed find location. Consequently, there is a need for an independent means to scientifically test the reported find sites.

Given that artefacts are commonly buried within, or found on, the soil surface, unless extensively cleaned, there will be soil present on the surface of the artefacts, and this offers an opportunity to

assess the nature of the find location. Peacock and Williams (1997) discussed how traditional petrographic analysis of soil recovered from an Etruscan pottery vessel was used to demonstrate that it had been imported into the UK from Italy, possibly during the last century, rather than having been excavated from the claimed find site in Cheshire, UK. More recently, Hu et al. (2007) examined pollen recovered from terracotta fragments of a warrior and a horse from the Qin Shihuang Mausoleum. The profile of the pollen recovered from the soil from the horse was similar to that from a soil sample from the Qin Dynasty layer in Pit 2 at the Mausoleum. However, the pollen profile from the warrior suggested that this had come from a site which was further afield. In an equivalent study, Chester (2009) examined a pollen sample collected from a Classical Greek cult statue of a Goddess "Aphrodite" from the J. Paul Getty Museum. This statue was thought to have been made between 425 and 400 B.C. in either Sicily or southern Italy. Although the pollen profile enabled the general environment of the soil to be described, the taxa present did not allow a specific geographic location to be inferred (Chester, 2009). The use of pollen from adhering soil is however, potentially problematic, as pollen preservation within soil profiles is commonly very poor and relatively large samples are required to gain a

* Corresponding author. Tel.: +44 (0)1326 341142.

E-mail address: dpirrie@helfordgeoscience.co.uk (D. Pirrie).