

Towards an artefact's-eye view: Non-site analysis of discard patterns and lithic technology in Neotropical settings with a case from Misiones province, Argentina

Philip Riris

Institute of Archaeology, University College London, 31-34 Gordon Square, London WC1H 0PY, United Kingdom



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ABSTRACT

Surface scatters are an important source of archaeological data in the Neotropics, yet despite their role in exploring regional land use, existing frameworks have serious methodological and theoretical drawbacks. This study proposes a robust alternative to site-centric approaches, by examining spatial and technological variability in time-averaged deposits of artefacts collected from the modern surface of Misiones province, north-eastern Argentina. A family of spatial statistical techniques supported by Monte Carlo simulation identify statistically significant inhomogeneity and clustering in lithic point pattern data. This highlights interaction between technologically meaningful sub-samples of four assemblages, which is interpreted as reflecting long-term discard and association of distinctive reduction sequences. These are irreducible to individual episodes, demonstrating that partitioning palimpsests into sites poorly reflects record formation on a landscape level. This illustrates how explicit models of depositional trends can provide information on indigenous land use, and underlines the rich informative potential of surface archaeology in tropical settings.

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1. Introduction

Over the past two decades, the ubiquitous adoption of spatial technologies in the discipline has precipitated a geospatial revolution, as large spatial databases can be collected and manipulated with relative ease (Conolly and Lake, 2006; Bevan et al., 2013). This new reality for archaeological fieldwork introduces both possibilities and challenges, as the increasing volume and accuracy of spatial data precludes the interpretative value of density-based visualizations (Bevan et al., 2013). This paper proposes a new approach to spatial point pattern data in Neotropical environments, with the aim of characterizing discard patterns over the long term in Misiones province. Formal tests are increasingly deployed to test hypotheses on the formation and configuration of archaeological deposits, drawing in large part on methods developed in landscape ecology and spatial epidemiology (see Pélissier and Goreaud, 2001; Diggle, 2003; Wiegand and Moloney, 2004; Baddeley and Turner, 2005; Jacquemyn et al., 2007; Shekhar et al., 2011). In parallel, research on pre-Columbian cultural landscapes has proven to be extremely fertile ground in recent years (Zeidler, 1995; Walker, 2012). It is argued here that the potential contribution of intensive survey to this strand of investigation has yet to be fully realized, in part due to a lack of rigorous spatial analytical frameworks (see Bevan et al., 2013;

Crema and Bianchi, 2013). As a tentative first step, this article reports on the implementation of a “non-site” archaeological survey in Misiones province, Argentina (Fig. 1), whose landscape dimension has hereto been defined largely by unknowns (Iriarte et al., 2008; Iriarte et al., 2010; Loponte, 2012; Riris, 2014).

Against this backdrop, this study will adapt a set of methods for exploring spatial point patterns, in order to explore indigenous discard practices and, ultimately, land use in a Neotropical setting. This will seek to (a) identify the existence and nature of spatial relationships between three technologically-defined subsets of surface collected lithic data, and (b) characterize the significance and variability in these relationships across space in Misiones province.

Despite the pretensions of nomenclature such as “workshop”, “encampment” or “village” commonly applied to surface scatters, these data rarely translate directly to processes which unfolded on a phenomenological scale (Holdaway and Wandsnider, 2006; Lucas, 2008). Similarly, the assignation of cultural provenance to palimpsest datasets simply on the basis of presence or absence of diagnostic artefacts, often with temporal implications, is equally problematic (Bailey, 2007, cf. De Souza and Merencio, 2013). Together, these sources of bias risk framing archaeological evidence in terms that embody behavioural or social significance, by over-emphasizing high-density clusters of material (Nance, 1983; Ebert, 1992) to the detriment of the majority of the material record that occurs in vast, weakly-patterned distributions (Sullivan, 1995). One potential solution is to treat archaeological data

E-mail address: P.Riris@ucl.ac.uk.

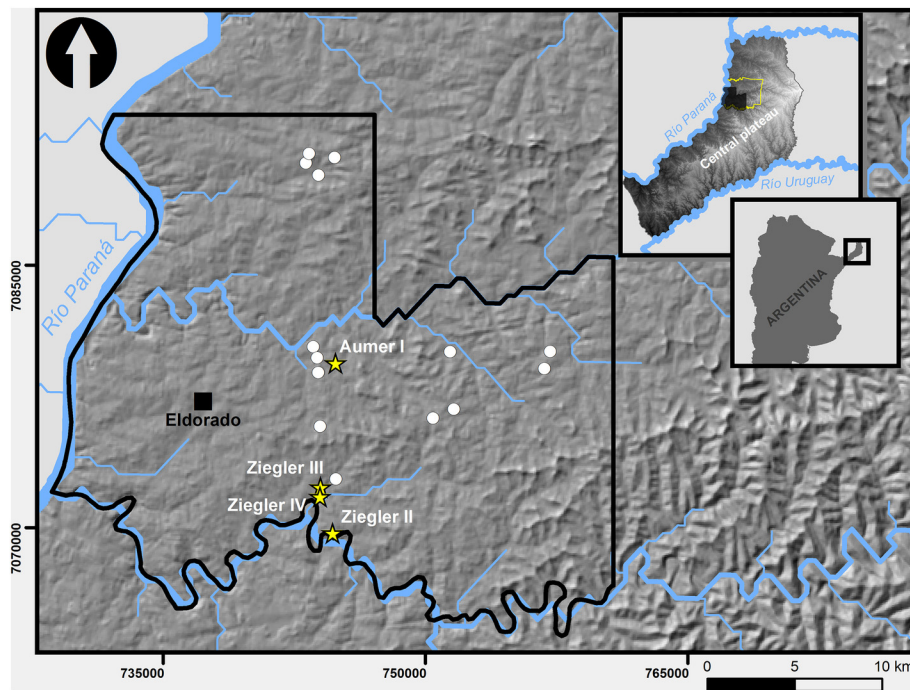


Fig. 1. Location of study area in the hinterland of Eldorado city, with sites surveyed. Sites discussed in text shown as stars. Insets: Study area within Misiones province and Argentina.

as stemming from a continuum of context types rather than a strict dichotomy of open-air (weakly patterned or unstructured) and excavated (controlled, structured) sites (Ebert, 1992; Lucas, 2002). The body of theory called non-site archaeology eschews the use of sites as analytical or interpretative units (see Foley, 1981; Dunnell, 1992; Ebert, 1992), arguing that its inherent bias inadequately describes the full range of human activity that occurred on a landscape scale.

In a bid to surmount the above challenges, this study treats the individual artefact as the unit of discovery, focusing on lithic technological variability in surface archaeology from Misiones province. The following case study will develop this strategy by (1) defining how surface data can be used to characterize spatial trends in deposition and discard across a range of settings, (2) exploring how the distribution of lithic technology varies within and between a sample of locations and (3) suggesting how indigenous land-use patterns might manifest at multiple spatial scales on millennial timescales. Ultimately, this is precipitated on a group of spatial statistical techniques supported by Monte Carlo simulation, which are leveraged towards building an “artefact’s-eye view” (Purves and Law, 2002) of indigenous cultural landscapes in the study area.

1.1. Background to study area

Misiones province is located in the far north-east of Argentina, bordered on three sides by the Paraná, Uruguay and Iguazú rivers. Their courses circumscribe its boundaries with Paraguay and Brazil (Fig. 1). The study area encompasses Eldorado Department in the north-central sector of the province, whose topography is strongly influenced by a perennially wet climate, with fast-flowing rivers cutting steep valleys into the otherwise gently undulating plateaux and floodplains between the major rivers. The native vegetation is composed principally of semi-deciduous subtropical Paraná Interior Atlantic forests, with a dense evergreen canopy. In the south-west these forests transition to open grasslands, while in the uplands near the Brazilian border the westernmost extent of Mixed Highland Paraná Pine (*Araucaria angustifolia*, Bertol. Kuntze) forest is found. In the modern day, the native biomes are heavily fragmented by industrial and agricultural activity around

modern settlements and highways. The highly weathered red soils are acidic, which prevents the archaeological preservation of bone.

Sustained archaeological fieldwork began in earnest only recently in Misiones province (Iriarte et al., 2008, 2010). From the middle of the twentieth century the majority of investigations have taken the form of sporadic surveys, rescue projects, and trial excavations (Schimmel, 1967; Madrazo and Laguzzi Rueda, 1967; Rizzo, 1968; Giesso and Rizzo, 1985; Giesso and Poujade, 1986). The results of these surveys indicate that, in terms of information yield, intensive systematic is ideal for generating large quantities of archaeological data when deployed in open areas. This is valuable especially where virtually no preceding fieldwork has taken place, as in Misiones; every zone targeted in the highlands by a previous survey yielded evidence of discard (see Iriarte et al., 2010). This underlines how targeting the surface record can expand the body of available data significantly and cost-effectively (Riris, 2010). Furthermore, it hints at the presence and potential of extensive, multi-period datasets for investigating cultural variability in land use patterns on a broader spatial scale, in ways which bounded interpretative units cannot. Preceding research has of course been limited by the difficulty of detecting a record dominated by the unobtrusive remains of hunter-gatherers and horticulturalists in dense subtropical forests. Further to this, surveys in southern Brazil suggest major variability in the content and distribution of materials in surface sites (Araujo, 2001; Saldanha, 2005; De Souza and Merencio, 2013).

Unlike neighbouring southern Brazil, a Late Pleistocene occupation is unknown to date in Misiones. Current consensus identifies a long pre-earliest period began with the initial appearance of the Altoparanaense (Humaitá in Brazil) and Umbu industries around approximately 8000 BP (Hoeltz, 2007; Dias and Hoeltz, 2010; Dias, 2012; Loponte, 2012). These are differentiated on the basis of lithic tool morphology. The toolkit of the former consists of large bifacial tools while the latter is mainly small cruciform and lanceolate projectile points (see Schmitz, 1987; Dias, 2007; Dias, 2012). Both are documented in Misiones through informal collections, rescue projects, and excavations in rockshelters. Recent work has highlighted the long term persistence and conservatism in these industries, which overlap to a certain extent with a comparatively short ceramic period that started after c. 2000 BP

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