Journal of Anthropological Archaeology 32 (2013) 54–62

Contents lists available at SciVerse ScienceDirect

Journal of Anthropological Archaeology

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

An ethnoarchaeological inductive model for predicting archaeological site location: A case-study of pastoral settlement patterns in the Val di Fiemme and Val di Sole (Trentino, Italian Alps)

Francesco Carrer

Laboratorio di Archeologia preistorica, medievale e Geografia storica "B. Bagolini", Dipartimento di Lettere e Filosofia, Università di Trento, Via Tommaso Gar 14 – 38122 Trento, Italy

ARTICLE INFO

Article history:
Received 31 August 2012
Revision received 18 October 2012
Available online 15 November 2012

Keywords:
Inductive predictive modelling
Ethnoarchaeology
Pastoralism
Italian Alps
Settlement patterns
Dairying

ABSTRACT

In this paper I propose a novel integration of inductive predictive modelling and ethnoarchaeology. The case study concerns seasonal upland pastoral settlement patterns in the eastern Italian Alps. A sample of modern pastoral sites has been selected, and their relationships with environmental variables have been analyzed in order to create a model to predict the location of archaeological upland pastoral sites. The model has been tested with modern and archaeological control samples. It has proved to be useful for predicting the location of specific site categories. Ethnoarchaeological fieldwork has been carried out in the same alpine sample area, which has enhanced the interpretative potential of the proposed model, suggesting that the spatial of the analyzed sites could well be related to their dairying function. The creation of ethnoarchaeological locational models with a predictive potential may be very important not only in helping to tackle some theoretical and methodological problems in predictive modelling, but also in enhancing the importance of ethnoarchaeology in landscape archaeology projects.

Introduction

Inductive (or "correlative") predictive modelling is one of the most common methodologies in quantitative archaeology, and it is also one of the most controversial (Wheatley and Gillings, 2002, p. 179). It is based on the selection of a sample of archaeological sites, whose locations have specific characteristics that are then generalized in order to predict the locations of unknown sites (Warren, 1990; Kvamme, 1988; Kohler and Parker, 1986). Therefore, an inductive model is conditioned by all the biases that affect the selection of the archaeological sample. As a matter of fact the distribution of known sites is rarely representative of past settlement strategies, but more often depends on archaeological visibility (Cavulli et al., 2011), on geomorphological evolution (Hancock et al., 2011) and on archaeological research strategies in the sample area (Wheatley, 2004, p. 10). Another typical bias is the chronological and functional uncertainty of the archaeological sites, as many of them have been inferred only from but a few scattered findings (Kvamme, 1988, pp. 329–331). For these reasons, even though inductive predictive models are quite successful in predicting the locations of some sites, they are often also unsuccessful in reconstructing past settlement patterns (Verhagen and Whitley, 2012, p. 50; Van Dalen, 1999). In fact, as Ebert and Kohler (1988, p. 120) wrote, "It is the mechanism behind the placement of activities in space and their resulting archaeological record that must be understood in order to successfully predict the occurrence of activity loci". Hence, these models often fail to predict settlement patterns because they lack an anthropological theory of "causality" that correlates human behaviour to locational strategies (Verhagen and Whitley, 2012, pp. 55–59; Wheatley, 2004; Ebert, 2000; Aldenderfer, 1996; Brandt et al., 1992, pp. 271, 278; Ebert and Kohler, 1988).

Ethnoarchaeology, rather than ethnology, seems the proper approach to fill this theoretical gap. Ethnoarchaeology deals with the relationships between human behaviour and material culture (artefacts but also settlements and landscapes) in ethnographic contexts, in order to acquire suitable information for archaeological interpretation (David and Kramer, 2001; Kramer, 1979; Gould, 1978). Therefore, quantitative and ethnoarchaeological analyses of modern settlement patterns may highlight the social behaviours behind specific locational systems and provide a useful reference for archaeology (Gamble and Boismier, 1991).

In this paper I have experimented with an interaction between an ethnoarchaeological approach and inductive predictive modelling methods. The selected case-study concerns one of the most common topics in European ethnoarchaeology: pastoralism (Chang, 1992, 1999; Chang and Tourtellotte, 1993; Barker and Grant, 1991; Chang and Koster, 1986; Nandris, 1985). This subject has been chosen for two different reasons: (1) in many areas of the

E-mail address: francesco.carrer@unitn.it

0278-4165/$ - see front matter © 2012 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jaa.2012.10.001

European mountains (Alps, Apennines, Pyrenees, Balkans, etc.) traditional mobile pastoralism is still carried out by local communities; (2) archaeological pastoral sites in the mountain areas are difficult to detect and to recognize (Cribb, 1991, pp. 67–80), and archaeologists need a model to know where it would be more likely to find them.

This paper deals with the creation of a predictive model, based on the pattern of current pastoral sites in the eastern Italian Alps. Two sample areas have been selected in the Trentino province, and have been used to create and to test the model. A further step has been the archaeological evaluation of the model. Ethnoarchaeological analysis of current alpine pastoral activities has thereby enabled improved comprehension of ancient pastoral settlement patterns.

Alpine pastoralism and transhumance in eastern Italian Alps

Traditional pastoralism, in the eastern Italian Alps, consists of movements of flocks from upland pastures in summer to valley bottoms or the Po plain in winter (Frödin, 1940/1941; Scheuermeier, 1943/1956). This mobility is related to seasonal contingency and the constancy (see Cashdan, 1992, pp. 238–239) of environmental resources that force the shepherds to shift from high to low altitudes according to the availability of grazing areas.

Brief migrations, between alpine villages and nearby high pastures, correspond to a pastoral strategy called *alpeggio* (alpine pastoralism). It is usually carried out between June and September by professional shepherds and dairymen, paid by local corporative groups of peasants to herd the livestock, to milk them and to produce butter and cheese (including *ricotta*). These dairy products, in fact, are the main goals of the *alpeggio* strategy, as they are fundamental food resources and sources of profit for local communities (Kezich and Viazzo, 2004; Viazzo and Wolf, 2001; Šebesta, 1991). In each grazing area there is an independent seasonal dairying site, called *malga*, which consists of permanent stone or wood facilities that are usually close to one another (Perco, 1997; Šebesta, 1991; Scheuermeier, 1943/1956). Some local shepherds also used to bring to the uplands their young or male livestock, in order to get these animals used to the alpine environment; some other shepherds graze in the uplands female livestock that are not exploited for their milk but for their wool, skin and meat.

Long migrations, connecting the plain with the inner alpine uplands, correspond to the *transumanza* (transhumance) strategy. It is carried out by professional shepherds that are often the owners of the livestock (usually sheep and goats). They use to leave the upland pastures in September and bring their flocks to the Po plain for wintering. In the past they had various productive goals, but they mainly sold wool, lambs and sheep in big livestock fairs that took place on the plain. Nowadays they only sell lambs during the Easter period (Perco, 1982).

An important thing to point out concerns the ownership of the upland pastures exploited by local and transhumant shepherds. They are usually owned by closed corporate peasant communities (Wolf, 1957) that manage and safeguard grazing areas, woodlands and meadows in order to allow free and balanced access to all members of the community and to avoid over- or under-exploitation (Netting, 1976). These corporate communities (*comunità montane* in Italian) are not uniformly distributed all over the alpine areas, but they are particularly present in the eastern Italian Alps, where peculiar historical trajectories allowed the survival of these ancient collective organizations (Nequirito, 2002).

Nowadays, *transumanza* and *alpeggio* are becoming rare in the alpine area. The decline of the wool trade during the 19th century, the industrialization of the dairying economy, and economic growth during the second half of the 20th century have destabilized the fragile balance between human communities and the mountain environment (Netting, 1981), and hence traditional pastoral strategies have experienced a crisis. Therefore, analyses of pastoralism in the Alps are particularly important in order to record the last examples of these traditional herding strategies.

In this paper, in particular, an in-depth ethnoarchaeological analysis of seasonal pastoral settlement patterns is presented. It has been divided into two parts: "desk" ethnoarchaeology, focused on spatial analysis of locational patterns of current shepherds in an upland sample area, and "field" ethnoarchaeology, aimed at identifying the behavioural reasons underlying pastoral settlement strategies. In the last part these two approaches have been integrated into a final ethnoarchaeological predictive model.

"Desk" ethnoarchaeology: creation and evaluation of the ethnoarchaeological predictive model

The first phase of this research was the spatial analysis of upland pastoral sites related to the dairying economy (*malghe*) in a sample area of Trentino province, in order to infer the rules behind their settlement pattern and to create a predictive locational model.

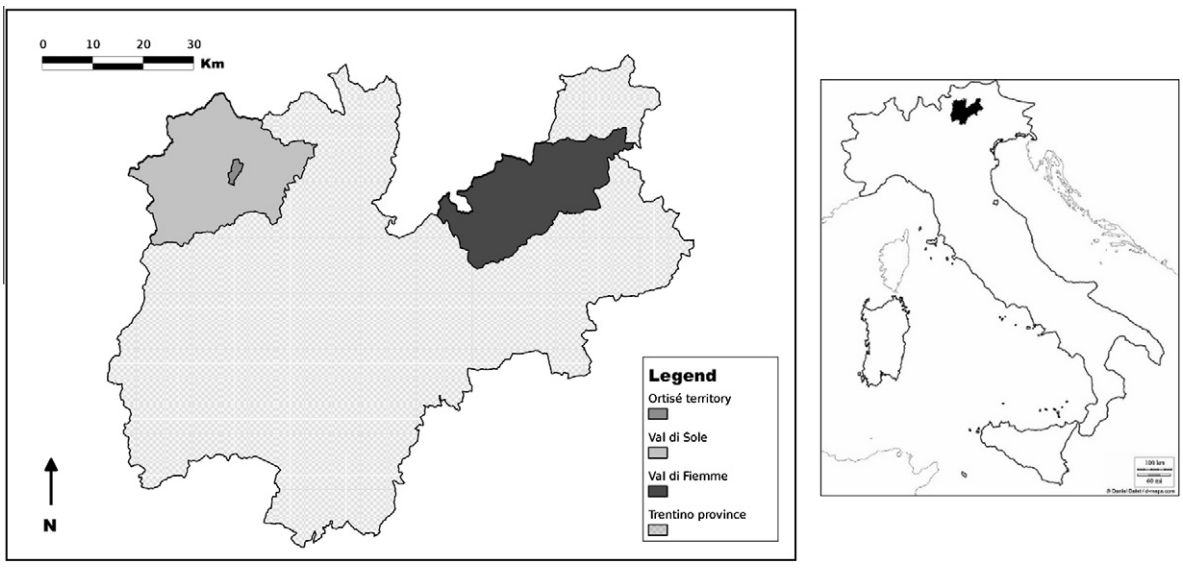

Fig. 1. Val di Fiemme, Val di Sole and Ortisé territory (Val Molinaccio and Val Poré) in the Trentino province (eastern Italian Alps).