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Prehistoric land use at an archaeological hot-spot (the rock art park of Campo Lameiro, NW Spain) inferred from charcoal, synanthropic pollen and non-pollen palynomorph proxies

Joeri Kaal [a,*], Felipe Criado-Boado [a], Manuela Costa-Casais [a], José Antonio López-Sáez [b], Lourdes López-Merino [c], Tim Mighall [d], Yolanda Carrión [e], Noemí Silva Sánchez [f], Antonio Martínez Cortizas [f]

[a] Instituto de Ciencias del Patrimonio (Incipit), Consejo Superior de Investigaciones Científicas (CSIC), San Roque 2, 15704 Santiago de Compostela, Spain
[b] G.I. Arqueobiología, Centro de Ciencias Humanas y Sociales (CCHS), Consejo Superior de Investigaciones Científicas (CSIC), Albasanz 26-28, 28037 Madrid, Spain
[c] Institute for the Environment, Brunel University, Uxbridge, London, Middlesex UB8 3PH, United Kingdom
[d] Department of Geography and Environment, School of Geosciences, University of Aberdeen, Elphinstone Road, Aberdeen AB24 3UF, United Kingdom
[e] Departamento de Prehistoria y Arqueología, Universitat de València, Avda. Blasco Ibáñez 28, 46010 Valencia, Spain
[f] Departamento de Edafoloxía e Química Agrícola, Fac. Bioloxía, Universidade de Santiago de Compostela, Campus Sur, 15782 Santiago de Compostela, Spain

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ABSTRACT

Pollen, non-pollen palynomorphs and charcoal from a colluvial soil surrounded by prehistoric petroglyphs (Campo Lameiro, NW Spain) were studied in order to assess the nature of human activities and their impact on Holocene vegetation patterns. Several phases of anthropogenic impact were observed. (i) Between 7.6 and 6.5 ka cal BP, synanthropic taxa (*Urtica dioica* type, *Plantago lanceolata* type) and coprophilous fungi (e.g. *Sporormiella*-type) are indicative of early (pre-agricultural) creation of small patches of pasture using fire, possibly for incipient animal husbandry or as part of a deliberate strategy to improve game availability. Such activities only had a minor effect on the deciduous *Quercus*-dominated forest established earlier during the Holocene Thermal Maximum. (ii) Between 5.9 and 4.8 ka cal BP a more intense signal indicative of pastoral activity was detected, corresponding to the Neolithic period. (iii) Between 4.8 and 3.4 ka cal BP, which fits within the hypothetical timeframe of petroglyph creation, the synanthropic and humidity (e.g. Cyperaceae, *Mougeotia*) indicators diminished while charcoal concentration increased, which can be explained by Mid-Holocene cooling/drying (Neoglaciation) in combination with reduced human impact, or by non-pastoral activities in the area possibly in association with the development of the rock art culture, converting pasture to protected open ground through anthropogenic fires. (iv) During the Late Bronze Age and Early Iron Age (3.4–2.5 ka cal BP), grazing pressure and fire regime intensity are high, coinciding with evidence of regional forest regression, despite an amelioration in climate. (v) Later phases, not corresponding to prehistoric rock art contexts, include a phase of heavy grazing and reduced fire frequency (from ca. 2.5 to 1.2 ka cal BP) as well as the near complete elimination of the deciduous woodland, the expansion of ericaceous shrubland and the evidence of local agriculture and afforestation. These results are consistent with earlier studies in the area and highlight the spatial heterogeneity in the vegetation especially during periods of prehistoric anthropogenic interference.

1. Introduction

Archaeological sites in the NW of the Iberian Peninsula (NW Iberia) often lack close proximity to lacustrine and peat deposits that can be used as natural archives for palaeoecological research. This is especially the case for prehistoric rock art (petroglyphs) contexts, which are concentrated in the undulating coastal areas in SW Galicia (see maps in Costas Goberna and Novoa Álvarez, 1993; Bradley and Fábregas Valcarce, 1998; Santos Estévez, 2007), whereas peat, pond and lake deposits are concentrated in remote high-altitude areas (Ramil-Rego et al., 1998; Martínez Cortizas et al., 2002; Muñoz Sobrino et al., 2004; Pontevedra-Pombal et al., 2006),

* Corresponding author. Tel.: +34 881813315; fax: +34 981547104.
E-mail addresses: joeri.kaal@incipit.csic.es, joeri@samage.net (J. Kaal).

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and therefore may not reflect the human footprint in the palaeoecological history surrounding rock art. In order to overcome this problem other types of archives commonly found at lower elevation, such as colluvial soils (Kalis et al., 2003; Leopold and Völkell, 2007), which can provide detailed high resolution records of Holocene vegetation change surrounding archaeological sites, are investigated (Martínez Cortizas and Moares Domínguez, 1995; Martínez Cortizas et al., 2009). Palaeoenvironmental reconstructions from colluvial soils have a more local character than lacustrine and peat archives (Jacobsen and Bradshaw, 1981). For example, the relevant source area for pollen (Sugita, 1994) in forest hollows and buried soils is significantly smaller (Calcote, 1995; Gaillard et al., 2008; Hannon et al., 2008) and, in a fire-prone environment, use of colluvial soil offers the possibility for anthracological analyses from macroscopic charcoal, which has a very local character (e.g. Clark et al., 1989; Gardner and Whitlock, 2001), while other types of deposit often rely on microscopic charcoal from atmospheric deposition. Hence, colluvial soil archives offer a high spatial resolution and the potential to use the palaeoenvironmental record to identify localized land-use patterns (Dumayne-Peaty and Barber, 1998).

\The rock art park of Campo Lameiro (Parque Arqueolóxico da Arte Rupestre, PAAR; Fig. 1) in NW Iberia has one of the major concentrations of prehistoric rock art in Europe. There is general agreement that the chronology of the carvings in the PAAR revolves around the Bronze Age (Bradley and Fábregas Valcarce, 1998; Santos Estévez, 2005), but there is some disagreement over the precise time span with suggestions varying between ca. 4.5–3.7 ka cal BP (e.g. de la Peña Santos and Rey García, 1993; de la Peña Santos, 2005) and 5–2.5 ka cal BP (e.g. Santos Estévez, 2007). The former school assumes that rock art creation ceased as a result of a collapse in the Middle Bronze Age, while the latter considers that the rock art culture was nearly continuous during the Bronze Age and with an additional intense period of creation during the Early (pre-Roman) Iron Age, ca. 2.7 ka cal BP (Santos Estévez, 2007). Excavations in the PAAR since 2005 revealed remains of huts, pits and post holes, which may correspond to the period of rock art production but this has yet to be demonstrated, and a lack of other cultural remains (Bonilla Rodríguez and César Vila, in press; Méndez Fernández and López Alonso, in press). The paucity of archaeological remains, notably ceramics and lithic elements, is a common feature of sites surrounding rock carvings (e.g. de la Peña Santos, 1982, 1985; Prieto Martínez, in press). More than 2 km of mechanical trenches dug in the PAAR between 2003 and 2004 produced remarkably little archaeological material (Prieto Martínez, in press). Thus, a discrepancy between the indications of significant domestic settlement and the lack of associated cultural remains exists, which may be explained by intense erosion episodes after abandonment of the site (Méndez Fernández and López Alonso, in press), even though the hut floors were found in a geomorphologically low-energy area. Alternatively, the area was not permanently settled but used for other means such as occasional ritual activities and only for short periods of time (Santos Estévez, 2007; Bonilla Rodríguez and César Vila, in press). Due to the scarcity of archaeological evidence other than rock art, and the difficulties in obtaining precise chronologies of the carvings, the function of the area (ritual site, hunting ground, pastureland, small-scale agricultural practices, nutrient/fuel source, etc.) and its changes through time remain enigmatic. The vast majority of the petroglyphs in Campo Lameiro are located between 200 and 400 m a.s.l. (Parcero Oubiña et al., 1998; Santos Estévez and Seoane Veiga, in press), possibly concentrated at prehistoric territorial boundaries. These sites are easily accessible and offer good visibility over the landscape (if sufficiently deforested), and such locations are considered to reflect the intimate relationship between the territorial organization of the landscape and petroglyph patterns in space (Bradley et al., 1995; Santos Estévez and Criado Boado, 1998, 2000).

Palaeoecological studies can also provide useful insights into the function and environmental setting of archaeological monuments, especially when more traditional forms of archaeology are absent. For example Brown et al. (2011) undertook a palaeoecological study associated with rock carving sites and showed that the rock carving was located in an isolated semi-wooded landscape and provided further evidence that the decorated outcrop had been burnt. Fyfe (2012) used a similar approach to understand the environmental context of a late Neolithic and Early Bronze Age ceremonial complex and the results suggested that there is no single blueprint for vegetation structure associated with these monuments.

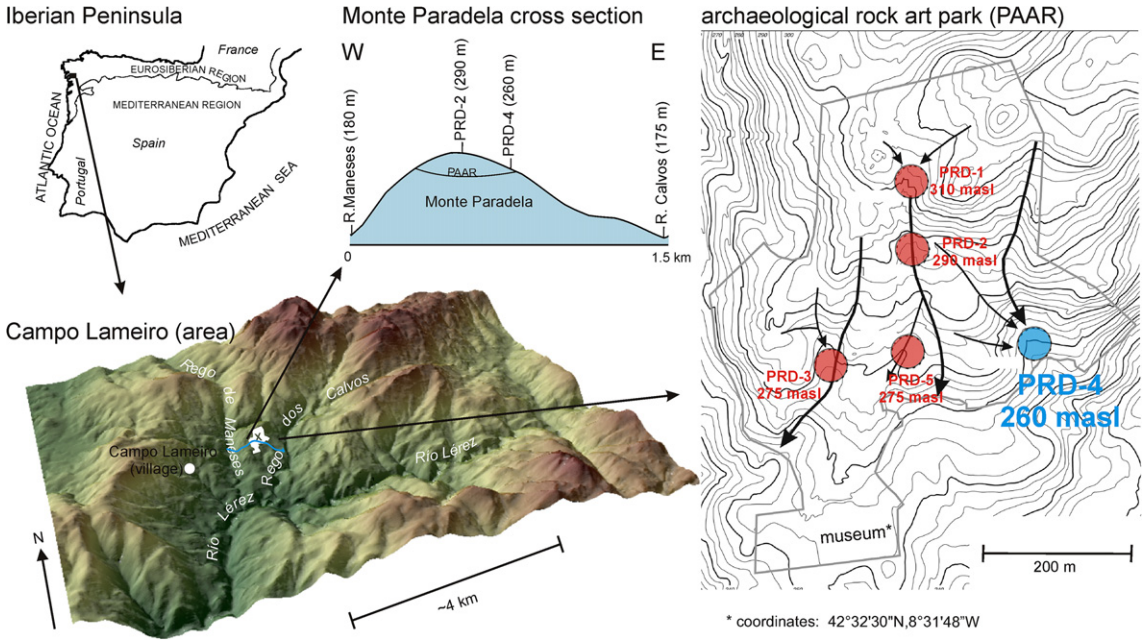

Fig. 1. Location of the study area.